

Tidal Vegetation Survey – 2003
Lewis & Clark River
Fort Clatsop National Memorial

by
Kathleen Sayce
ShoreBank Pacific
P O Box 400
Ilwaco, WA 98624
360-642-1166
kas@sbpac.com

for
Fort Clatsop National Memorial
92343 Fort Clatsop Road
Astoria, Oregon 97103
503-561-2471

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Summary

The goals of this study were to survey intertidal and subtidal habitats, to record all species present in these and adjacent wetland habitats along the Lewis & Clark River in the Fort Clatsop National Memorial, and to provide documentation for ESA-listed species and for introduced species that impact habitat.

One hundred and forty seven species were seen on the river. Of these, 2 were ONHP-listed, and twelve were new collections. The ONHP-listed species appear to have healthy populations in more than three to five locations within the Memorial. No other ONHP-listed species were seen. Forty-four species are introduced, nine of those are invasive and should be controlled to protect habitat quality. In addition, eight other species not yet found in the Memorial should be watched for, and removed when and as they appear.

Some sections of the river have very high habitat qualities. These high quality areas are undiked, or were diked many decades ago and have been left alone since. Some sections of the river have lower habitat qualities. These low quality areas were diked or used for log yards; in some units, regular disturbance by grazing continues to this day. These areas are characterized by fewer structural elements, and a replacement of native species with introduced species.

One major omission in fieldwork occurred during this study. Due to the lack of access to the river in the Memorial by boat at all tidal stages, little low tide work was done. One area was surveyed with mudwalkers near low tide, other areas were not surveyed. This can be completed with a low tide survey using access points upriver outside the Memorial during the next growing season, and this action is recommended.

FOCL Tidal Vegetation Survey 2003

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Introduction

Objectives of this Study

This study was designed to provide specific information to the Park to support its planning process as part of a planned expansion on the Lewis & Clark River. Information gaps for this expansion were determined by staff to center on the tidal and subtidal portions of the river. This study was the outcome. Fieldwork was scheduled for the 2003 growing season. Study goals are outlined in the following:

One: Meet the Phase I inventory and monitoring standard as identified in the Inventory and Monitoring Guideline NPS-75 for estuarine habitat zones E2EMN and E1UBL on the Lewis and Clark River within in present and planned future boundaries of Fort Clatsop National Memorial. This goal is met in this report.

Two: Provide documentation and distribution maps for any federal or state threatened, endangered and special status plant species encountered during the survey. This goal is met in this report in part, and in maps and digital information now in the hands of biological staff.

Three: Provide documentation and distribution maps of non-native invasive species encountered during the survey. This goal is met in this report in part, and in maps and digital information now in the hands of biological staff.

Physiography of Lewis & Clark River

The Lewis & Clark River is a small coastal subbasin within Youngs Bay Basin, which is part of the Columbia River system. It is tidal in its lower reaches, with both saltwater and freshwater tidal areas in the main river channel.

Geology is predominantly Tertiary (Eocene to Miocene) and Holocene (Pleistocene to modern) marine to shallow-water sediments, with Miocene basaltic intrusives, and recent to present day (Anthrocene) alluvium sediments. Sediments vary widely in cohesive strength, from unconsolidated to very strong. Interbedded volcanic ash layers are common, either as ash or decomposed clays. Within the park, Quaternary terrace sediments and recent to present day sediments are typical. Sediments in the Lewis & Clark River are generally fine, ranging from fine sands to clays. See Niem and Niem for more information.

Topography ranges from sealevel to 996 m (3,267 ft), and is moderate to steep, particularly at higher elevations with well-consolidated sedimentary and igneous outcrops. Saddle Mountain is the highest elevation in the sub-basin.

Annual precipitation varies with elevation. According to a recent state map using current precipitation models, the lowlands see 180-200 cm (70-80 inches) per year, while the highest peaks are in the 400-460 cm (160-180 inches) per year precipitation range. A more detailed county map from Inforain (www.ecotrust.org) shows the peak of Saddle Mountain to be in the 460-510 cm (180-200 inches) annual range. Most of this precipitation falls as rain; however, elevations above 600 m (2,000 ft) see regular snowfall and snow persistence for some weeks during winters. Most precipitation falls from October to April, with a dry season from May to September. Coastal fog is common during the dry season; the Lewis & Clark River falls within the coastal fog belt.

Soils in the sub-basin range from thin to none to deep and well drained on sandstone terraces to deep and poorly drained in the floodplain. These are predominately silts and silty clays. On low to moderate slopes with deep well-drained soils, tree growth is good to excellent.

Much of Clatsop County and the Lewis & Clark River sub-basin falls within the coastal temperate rainforest biome, in the seasonal rainforest zone, which stretches from Vancouver Island south to northern California and includes the west side of the Cascades as well as the Willapa Hills / Coast Range (www.inforain.org). This area is part of the Coast Range Biome (Franklin & Dyrness 1988). The dominant natural forest type in the uplands of the basin, up to 500 m (1,500 feet), is western hemlock, with western red cedar and Douglas-fir. Immediately adjacent to saltwater tidal habitats along the coast, Sitka spruce is the dominant tree species. Above 500 m, Pacific silver fir and noble fir are more common. Red alder is a common seral stage tree. Shore pine is an early seral stage species along the immediate coast on sand dunes. The upland coniferous habitat that is most reduced today is old growth forest. Sitka spruce and western red cedar would have been common, large conifers along the pre-contact Lewis & Clark River.

Bigleaf maple, black cottonwood, Oregon ash, several willows and red alder are common deciduous hardwood species found in flood plains and riparian areas. Red alder is also an early seral species in uplands. The habitat categories that are most reduced today are scrub-shrub thickets and hardwood floodplain forests, both of which would have been common along the pre-contact Lewis & Clark River.

Natural Disturbances

Since the end of the Pleistocene, major disturbances to local ecosystems have included floods, windstorms, wildfires, volcanic eruptions and subduction zone earthquakes. All of these disturbances impacted the site of the present day memorial.

Floods were common on the wild Columbia River. Seasonal high flow occurred each spring, peaking in May and June with flood waters twenty feet or more above mean river level. These floods were driven by high elevation snowmelt in the Cascade Range. Present-day floods come when snow melts during the winter during warm storms, where prolonged cold weather brings snow to low elevations, followed by very warm rainstorms (AKA Pineapple Expresses), resulting melt up to thousands of feet in elevation. Flooding of lowlands is much reduced from historic levels.

Windstorms are an occasional disturbance. The immediate coast is rated for five storms per year with winds over 100 mph, but these are not the highly destructive storms that flatten forests. An estimated three to five storms per century with winds well in excess of 120 mph arrive on the coast with tornadoes and water spouts, and may flatten entire stands of trees. These events tend to be sporadic in impact even in high wind areas, with micro-topography consistently protecting some areas and not others. The point of highest winds, vector and direction of storm track also vary from storm to storm.

Wildfires were not a regular part of the pre-contact landscape of the Willapa Hills / Coast Range forest north of the Nehalem River (Agee, Ecotrust, unpublished information). South of the Nehalem, coastal tribes regularly set fires in the forest, encouraging game species and maintaining meadows and park-like understory conditions. North of the Nehalem River, the evidence is for intermittent catastrophic wildfires, which may have occurred around once every two hundred years. As with windstorms, micro-topography and climate both may have protected some areas, so that not all forests burned under very dry conditions.

Volcanic eruptions have been common in the Pacific Northwest for millions of years. In the Lewis & Clark sub-basin, lava flows and hot ash flows are not likely, being too far from present day sources. Aerial ashfall reached Pacific and Clatsop Counties following the eruption of Mt. St. Helens in 1980, and unweathered ash deposits in nearby rivers are as much as 18 inches thick, indicating that this event was not unusual (Sayce, personal information for Salmon Creek, Naselle River, Pacific County, Washington).

Nearshore subduction zone earthquakes are a regular event along the Pacific Northwest coast. These earthquakes occur at long intervals from the human perspective. These are severe, estimated to be above 9 on the moment magnitude scale, accompanied by uplift, subsidence, liquefaction and tsunamis. The Lewis & Clark River has been affected by subduction zone earthquakes several times in the recent geologic past (Atwater et al, 2003). Marsh deposits along this river, and throughout the region, have been studied extensively, looking at layers of oceanic versus estuarine sediments, diatoms, liquefaction features, and dating dead in-position trees. Inundation is probably limited to floodplains and adjacent areas. The most recent event was 303 years ago, the next event could occur at any time (Satake et al, 2003).

Land-Use History

The following comments for this section are summarized from a recent report on the Youngs Bay Basin, . Commercial timberlands are the major land-use category within the present-day Lewis & Clark sub-basin, followed by agriculture and suburban residential land-uses. Now widely in third to fourth stage regrowth, timberlands are composed of certain tree species – Douglas-fir and western hemlock. Along with commercial timberlands, roads, stream crossings and water diversions as a result of roads are found throughout the sub-basin. The typical condition is 5.4 miles of forest roads per square mile, with 2.9 river crossings per square mile (E & S et al, 2000).

The removal of old growth coniferous timber and its replacement with younger forests, which are in turn cut at much younger ages, has reduced large woody debris in the river and side streams, increased stream temperatures and resulted in wider swings in stream flow volumes. Mass wasting has increased from road cuts, stream crossings, and other widespread soil disturbances.

Agricultural lands are located in the river valley. The major crops are beef cattle, dairy cattle and grass hay. Floodplain soils are deep and may be slow to drain. Ditches and dikes to control the water table in the flood plains were installed over several decades as the area was settled by Euro-Americans. Recent crops include hybrid cottonwood trees and Christmas trees (usually Douglas-fir or Noble fir). Flood capacity in the mainstem of the Lewis & Clark River has been reduced; water quality impacts, while not monitored extensively, appear to imply worsening conditions.

Hydrologic Changes

The following comments for this section are summarized from a recent report on the Youngs Bay Basin (E & S et al, 2000) . The Lewis & Clark River is now in a functionally reduced condition. Dikes have reduced the floodplain available during high water flow conditions and eliminated fish habitat. Withdrawals of water significantly lower flow during the dry season. Over time this could lead to saltwater intrusion further upriver. It already impacts the ability of the river above tide stage to support fish during the dry season. A series of major dams on the Columbia River suppresses all main basin floods, and divert an estimated 40% of peak flow away from the spring high water period to other times of the year. This seasonal late spring flood historically reached Youngs Bay and its tributaries, turning the entire bay and riverine tidal reaches fresh for some weeks. This no longer occurs, instead a regular pattern of lower salinity to freshwater conditions is maintained. Minor floods during winter, driven by rapid melt of low elevation snow still occur.

Diking and ditching altered lowland soils of the floodplain beginning more than a century ago. This change dries out summer soils and reduces winter standing water, making these areas more manageable year round for grass or forage production. In forestlands, roads and stream crossings altered natural drainage patterns. These changes had significant historic impacts on salmon species, affecting both breeding and rearing habitats. Municipal water withdrawals also impact water quality in the main river reducing stream flow in the river above tide stage during the dry season.

Present Conditions

The Lewis & Clark River is now in a functionally reduced condition, with impacts to water quality from timbering, farming and urbanization, reduced availability of large woody debris, reduced fish habitat and species, and reduction or loss of specific historic habitat types. Major floods and annual spring high water no longer occur. Historic seasonal fluctuations between regular saltwater intrusion and major freshwater floods no longer occur. Water withdrawals impact flow during the dry season; this trend can be expected to continue. The basin remains

vulnerable to periodic natural disasters, which include wildfires, subduction zone earthquakes and related impacts (tsunamis, liquefaction, subsidence), and volcanic ash fall.

Methods

Tidal Habitat Designations

Pacific Northwest Coast tides are mixed, semi-diurnal, with two high and two low tides each day, each tidal point being of a different height for a given twenty-four hour period.

Average tide heights in the Lewis & Clark River are around eight feet. On the same day, the actual elevation of each low and each high may vary by several feet. This results in the following diurnal pattern: high high tide, low low tide, low high tide and high low tide. Therefore it is correct to use mean higher high water, or MHHW, when discussing high tides, which is based on the mean of the daily *highest* high tides. Mean lower low water, or MLLW, is used when discussing low tides, and is based on the mean of the daily *lowest* low tides.

The eccentricity in daily tidal heights means that some areas low in the tidal zone are exposed only once each day, and other areas high in the tidal zone are inundated only once each day. Plants often respond to this extended range of inundation and exposure with wider ranges of growth in the tidal areas when compared to other regions.

Because this survey did not have precise elevations available to establish the heights of salt marshes and specific points on tidal flats at precise tidal stages, a more general method of tidal position estimation was used.

Lower tide designations were used to cover the areas within three feet of low water.

Mid tide designations were used to cover areas from three to six feet above low water.

Upper tide designations were used to cover areas from six feet above low water to salt marshes.

NWI Categories Used

Riverine, Palustrine and Estuarine categories were used to describe functional areas on the river. See Appendix for a list of all terms as applied to the Lewis & Clark River for this survey.

Riverine categories are used for the portion of the river determined to be above saltwater influence, based on plant species found growing in the low marsh and intertidal zone. These areas do not go above reach of normal tide in the Memorial, so intertidal and subtidal designations were used.

Palustrine categories are used for those areas which are forested, shrub-scrub or marsh. These areas are generally described as being above the normal reach of tides, but along the Pacific Northwest Coast these are typically inundated by normal storm and spring high tides from fall

through winter to spring. A compromise designation was used here, wherein Palustrine designations were used for forests, shrub-scrub and marshes, and inundation was considered occasional, except for a few instances where it was known to be more regular.

Estuarine categories are used for those marsh, tideflat and subtidal areas that are normally saltwater tidal. This was the primary focus of this study. Because of the eccentricity of Pacific Northwest tides, marsh designations were included where those portions of marshes are regularly inundated on higher high tides.

Survey Methods

Fort Clatsop National Memorial provided kayaks for fieldwork. These were launched in the Memorial from dikes and a former log yard, depending on the river sections to be surveyed. This was useful for mid tide to high tide surveys, but not for low tide work. No water access was available within the Memorial at low tide stages, so to survey at these stages, mudwalkers were used. However, little survey work could be done at lower low tides over much of the river by mudwalking due to access issues and the extreme softness of the muds encountered. Mudwalkers did make it possible to collect some species, and survey some areas, but could not be used for all areas.

The contractor provided a GPS with 3–10 m positioning accuracy to provide data points for the survey. The unit used was a Magellan Platinum Plus with latitude / longitude and UTM positioning. UTM's were used for this survey.

The Memorial provided recent aerial photographs (2000) at 1" : 300' resolution as a base for survey work. These photographs were used to compile unit information for the composite map of wetland units. In addition, the contractor used a private plane to take uncontrolled oblique aerial color photographs of the river units to provide more information on plant communities. Those photographs went to the Memorial at the completion of the project, as part of the support documentation.

The Memorial provided a current list of documented plant species; this list was used to decide which new species to collect for the herbarium.

The river was divided into ten survey units for survey purposes. Landscape features were used to establish and describe end points, such as tide gates, ditches and sloughs. These units are marked on the compiled map, a map is included in this report, and all habitat data sheets refer to these units. The units begin on the west side of the river, at the lowest point of Memorial ownership or easement, and continue upriver on the west side to the highest point, then begin on the east side of the river at the lowest point of Memorial ownership, and continue on the east side upriver, to the highest point of ownership or easement. End points for each unit were measured with GPS in UTM's.

By kayaking in and along units at mid to high tide, plant species were observed for each unit. Dominant species for a range of tidal elevations were determined by direct observation. Notes

were made on all species seen. Those species known or suspected not to be in herbarium collections were collected. Plants that needed keys or magnification to determine were collected. Individuals of two invasive weed species were mapped, GPS locations taken, and they were targeted for immediate removal by seasonal staff. These species were *Lythrum salicaria* (purple loosestrife) and *Iris pseudacorus* (yellow iris). Notes were made on particular species that needed to be observed in flowering condition to identify; these included *Juncus*, *Rumex* and *Myriophyllum*. By the end of the season, all but the *Myriophyllum* had flowered and was identified.

Unit notes were compiled in a relational database (Filemaker Pro, version 4) and returned to the Memorial as an Adobe Acrobat file in pdf. Those notes are included in this report, see Appendix I. Each unit's notes include a summary of landuse changes, current uses, geology, dominant species, and all species seen. ONHP-listed species, invasive weeds and management notes were also included. Each unit was divided into two areas, the lower area was within the reach of daily tides (DT), and the upper area was above the reach of daily tides (ADT). Approximate tidal positions and NWI designations were included for each species in each unit.

Documentation of New Species

According to National Park Service policy, each new species collected during the survey was documented with a field collection data sheet. GPS location was noted, and the distribution of the species determined during the survey (number of individuals, number and location of populations in river units). Collections were identified the same day, before pressing, by the contractor and park staff. An aquatic moss was sent to a bryologist, Dr. Judy Harpel, USFS, Gifford Pinchot National Forest, for identification. Twelve collections were made during the survey, most of which were new species to the Memorial.

Findings

Vascular Plant Species

During the survey 147 plant taxa were noted in palustrine to estuarine habitats. Of those 147, ten were not in flower and were not identified to species. Among the 147 taxa, 103 are native species, and 44 are introduced species. Figures 1, 3 and 4 contain species lists: all taxa seen – Figure 1, new collections – Figure 3, and introduced taxa – Figure 4. Appendix 1 contains habitat data sheets, which summarize findings by unit and tidal position.

One introduced species on the list was not seen on Memorial property proper, but grows within a few hundred meters of the Memorial, *Pragmites australis* (Poaceae), common reed. It was included because of its proximity to Memorial properties. An aquatic grass, it could easily spread onto Memorial property by floating seeds.

The introduced species in total represent 30% of the flora local to the Memorial, and are predominately found in the most highly disturbed units. A few introduced species are found in all units. This percentage is typical of disturbed habitats in the Pacific Northwest coast.

Several new collections were made for the herbarium during the survey. Twelve taxa were collected, identified and pressed. One was a moss. Eleven were vascular plants, with six native and five introduced species. These new collections represent 8% of the species seen during the survey.

A few species were dominant in nearly all units. These include, from lowest tidal position to highest, *Myriophyllum* sp., *Eleocharis palustris*, *Lilaeopsis occidentale*, *Carex lyngbyei*, *Phalaris arundinacea* and *Salix hookeriana*. In Figure 2 a table summarizes the dominant plant species for all units.

ONHP-listed Species

Two ONHP-listed species are known to live in the Memorial in estuarine/riverine habitats. An important goal of the survey was to develop a better understanding of their distributions and population sizes. Several dozen ESA-listed species are known to occur in this region. For a list of these species, see Figure 5. No other ESA-listed species were seen during the survey.

The ONHP-listed species are:

Lilaea scilloides (Poir.) Hauman, flowering quillwort (Juncaginaceae), and
Samolus valerandi L. ssp. *parviflorus* (Raf.) Hultén, seaside brookweed (Primulaceae).

Prior to this survey, local populations of both species were thought to be composed of relatively few individuals with restricted distributions on the river. During the survey it became apparent that there were several populations of both species in several units.

Lilaea scilloides, flowering quillwort (Juncaginaceae), is a small tufted grass-like annual that grows on tideflats in the mid tide range, below the permanent marsh edge on open flats. *Lilaea* was identified in the field by its distinctive succulent leaves and flowering spikes in early summer on the Lewis & Clark River.

Groups of plants were seen in several units at mid intertidal elevations. *Lilaea* probably grows outside Memorial boundaries further upriver on the freshwater tidal flats, and is known to grow in the freshwater intertidal zone of the Columbia River Estuary. Clusters of five to twenty plants were typically seen on open, soft muds during the survey. Total population size in the Memorial is estimated at 200-220 individuals, in six of ten river units. It appears to tolerate low salinities as well as freshwater habitats.

While dense stands of *Myriophyllum* sp. (milfoil) have colonized tideflats throughout the park, *Lilaea* does not appear to be in competition with milfoil for habitat. It may be that the tidal character of this portion of the river keeps milfoil from forming dense layers that might restrict *Lilaea* seedlings. Instead, milfoil grows as an open, short layer with considerable light reaching the sediment surface in the intertidal zone. *Lilaea* plants were seen both in and outside *Myriophyllum* meadows, usually growing above the meadows and below marshes on open flats. *Lilaea scilloides*' position corresponds to E2USN.

Lilaea scilloides is an aquatic annual of wide distribution, growing from coastal tideflats upriver, and in interior valleys. Its distribution is from British Columbia to Baja California on the West Coast, east to Alberta, Montana, Idaho, Nevada, in Central America, and in South America, where it is documented in Argentina, Chile, Ecuador and Peru.

In Oregon it is on Oregon Natural Heritage Program List 3, and under consideration for List 4. It is not listed for counties in Washington or in other states.

Samolus valerandi* ssp. *parviflorus, seaside brookweed (Primulaceae), is a small perennial forb. In the Memorial, *Samolus* grows around the bases of native *Carex lyngbyei* clumps and on open mud under scrub-shrub thickets, in shaded and protected locations along marsh edges. Its position in the upper intertidal zone is at the lower edge of the permanent marsh or thicket, and corresponds to E2EM/USN. *Samolus* is short, with tiny, round delicate leaves and small white flowers. It was distinctly different at all life stages from other plants in this position in the intertidal zone and marsh.

Prior to this survey, one population was seen in Burnshed Slough, which is on the boundary between units 1 and 2. During the survey, plants were seen in Burnshed Slough, and in units 7, 2, and Alder or Canoe-landing Slough. In each area, individuals were few to over thirty in number, and there were several such populations, for a total estimate of 100-120 individuals. It appears to live on the saltwater – freshwater boundary in estuarine habitats. It may be that repeated disturbances upriver of these units have limited its distribution in the Memorial to down river, less disturbed areas.

Samolus valerandi ssp. *parviflorus* is a freshwater perennial forb growing in the Lower Columbia River Estuary. It is widely distributed in North America, from southern British

Columbia down the West Coast to Mexico, across the Rockies in Nevada and Utah, in the southern Midwest, around the Great Lakes, throughout the Northeast and Southeast, and in the Caribbean to South America.

In Washington, it is listed as Sensitive. It is also listed for the states of New Hampshire and Pennsylvania. In Oregon, it is on Oregon Natural Heritage Program List 3. It is not federally listed.

New Collections

Twelve new collections were made during the survey. Additional notes, on where each species was collected and population assessments, can be found in Figure 3.

Fontanalis antipyretica (Bryidae), is a native aquatic moss that grows in the lower marsh on the bases of *Carex lyngbyei* clumps, and on logs and piling.

Isolepis cernua (Cyperaceae), low clubrush, is a native common small perennial of the open intertidal zone on the river. Former name: *Scirpus cernuus*.

Myriophyllum sp. (Haloragaceae), milfoil, is an introduced aquatic that was found in all units on the river during the survey in the low to mid intertidal zone. It was not seen to flower during the summer of 2003, so species identification was not confirmed.

Juncus arcticus var. *balticus* (Juncaceae), Baltic rush, is a common native rush along the coast. Several clumps were found in the Memorial below the marsh in the intertidal zone.

Triglochin maritima (Juncaginaceae), seaside arrowgrass, was found in the lowest, most saline unit. One clump was seen on the edge of a dike in the mud. This native species is common in salt marshes along the coast, and is found here in the most saline unit.

Lemna minor (Lemnaceae), water lentil, is a common native aquatic in the Memorial and was collected to document its presence.

Mentha x piperita (Lamiaceae), peppermint, is introduced. It was seen growing on log rafts off unit 4. It was a common member of the log raft plant community, but was not seen on the shore.

Glyceria grandis var. *grandis* (Poaceae), reed mannagrass, a native grass, was found in Alder or Canoe-landing Slough and seen in an adjacent unit.

Rumex conglomeratus (Polygonaceae), clustered dock, is a common introduced species of wetlands and riparian communities. It was found in many units.

Potamogeton crispus (Potamogetonaceae), curly pondweed, is a very common introduced aquatic plant on the mainstem of the Columbia River. Several free-floating specimens were seen

during the survey, one was collected to document its presence on the Lewis & Clark River in the Memorial.

Potamogeton gramineus (Potamogetonaceae), variable-leaf pondweed, is a native aquatic plant. Several free-floating specimens were seen during the survey, one was collected to document its presence in the Memorial on the Lewis & Clark River.

Salix alba var. *vitellana* (Salicaceae), golden willow, was noticed and identified during this survey. It is an introduced tree, widely planted in wet sites across North America. Both large trees and young saplings were seen in several units, usually in or adjacent to cattle pastures on the east side of the river.

Introduced Species

About 30% of the flora of the riparian area in the Memorial is composed of introduced plant species, similar to the region around the Lower Columbia River Estuary, Figure 4. Of these species, a handful may pose serious management problems for the Memorial. Most are not problematic.

There are several vectors by which new species come into this area, and in particular to the Memorial. Road building and maintenance, logging, grazing, residences and dike repair and maintenance are common vectors. Shipping, boating, and tourism are also important. Species come in on tires, on heavy equipment (earth moving equipment is particularly well known for seed transmission), on boat hulls, in ballast water, on boat trailers, on or as fish bait, shoes, clothing, plants, as seeds, on livestock and pets.

The river units in the Memorial that are now dominated by introduced species are those that have seen the most disturbance. Some of this is historic, such as in dike building and in the former log yards, and some of it is ongoing, such as where cattle still graze down to the river on and over dikes. The difference in vegetation in the estuarine marsh portions of the Memorial is striking: where regular disturbance continues, plant species are predominantly not native.

Not all non-native or introduced species are noxious weeds. In Europe, the general rule is that for every ten introductions, nine grow where they are planted but fail to naturalize (begin to set seed and grow on their own in the original area of establishment). Of ten plants that naturalize, one spreads beyond the original point of establishment. Of ten plants that naturalize and spread, one species does so well that it crowds out other species and alters the ecosystems into which it spreads. General usage for species in the last category are the terms noxious or invasive.

Problematic aquatic or near aquatic species in the Memorial include, or in one case, may include:

- Cytisus scoparius* (Fabaceae), Scots broom
- Hedera helix* (Araliaceae), English ivy
- Holcus lanatus* (Poaceae), common velvetgrass
- Iris pseudacorus* (Iridaceae), yellow flag
- Myriophyllum aquaticum* (Haloragaceae), parrotfeather

Myriophyllum spicatum (Haloragaceae), Eurasian watermilfoil (the non-flowering milfoil is suspected to be this species)
Phalaris arundinacea (Poaceae), reed canarygrass
Rubus armeniacus (Rosaceae), Himalayan blackberry
Rubus laciniatus (Rosaceae), cut-leaf blackberry
Senecio jacobaea (Asteraceae), tansy ragwort

There are also species with which to be concerned that are not presently found in the Memorial. These species already grow in Clatsop County and or around Youngs Bay, or in nearby estuaries, and would present the Memorial with major alterations to habitats should they become established. Severe and rapid control methods are recommended for these species, to keep them from establishing populations from which to spread within the Memorial. Prompt mechanical removal of all portions of pre-flowering individuals may go a long way towards protecting habitats, as was used during the survey in 2003 on the first two species on the following list:

Lythrum salicaria (Lythraceae), purple loosestrife
Phragmites australis (Poaceae), common reed
Polygonum cuspidatum (Polygonaceae), Japanese knotweed
Polygonum polystachya (Polygonaceae), Himalayan knotweed
Polygonum sachalinense (Polygonaceae), giant knotweed
Spartina alterniflora (Poaceae), smooth cordgrass
Ulex europeus (Fabaceae), gorse

Invasive Weed Management

Weed management goes beyond selecting a herbicide and applying it correctly. Hand brush cutting, mechanical brushing, shading, weed barriers, mulching, grazing and other mechanical control methods should also be part of the management tools. Grazing is best used as a high density, short duration weed control method. Goats take down most non-grass plants including woody and shrubby species. Cattle and sheep graze down grasses and soft herbs, or forbs. After woody species are controlled in pastures, high density, short duration grazing by livestock will keep the pasture in better health than low density grazing does, and it can prevent or slow the return of undesirable species.

The unknown *Myriophyllum* species in the main river was left off the list. Given the wide establishment of milfoils in local and regional Columbia River habitats, and the lack of effective controls, which includes herbicides, no recommendations are given for control for this species. This milfoil was not seen in the Memorial until 1999. It is now widely established in the lower intertidal throughout the units. The impact of this plant on estuarine habitats should be monitored over the next few years. Recommendations are to watch the interaction between *Lilaea scilloides* and milfoil to determine whether milfoil's establishment is impacting the *Lilaea* population. This could be done with an annual inventory of *Lilaea* populations. A second species, *Myriophyllum brasiliense*, has been seen in freshwater sloughs in the Memorial since 1996, when it was first noticed and collected.

Specific non-chemical management comments follow for some species:

Cytisus scoparius (Fabaceae), Scots broom is a nitrogen-fixing woody shrub that can establish quickly on nutrient-poor soil. It is palatable when green. If cut down after flowering, many plants do not resprout; pulling out of the ground is effective. Fire may stimulate it. Seeds are long-lived the soil, so suppression is a long-term management process.

Hedera helix (Araliaceae), English ivy is a woody vine with fleshy berries surrounding the seeds. Birds eat the fruits and disperse the seeds, so control of both pre-flowering, pre-fruiting plants and established, flowering plants is important. Cut stems at ground level where vines go up into shrubs and trees. Pull up vines on the ground, including stem fragments. If herbicides are not used on the roots, be prepared to return for several years to remove sprouting fragments.

Holcus lanatus (Poaceae), common velvetgrass is a perennial grass that may grow into large clones, crowding out species as it spreads and increases in size. Velvetgrass is a common pasture species, and can reduce very diverse marsh habitat to one species over time. Pull out all above ground material, and use flaming to kill crowns. Repeated visits over several years may be needed to reduce this grass in some areas. Pulling plus burning can be very effective if repeated for several years. Seeds are not long-lived.

Phalaris arundinacea (Poaceae), reed canarygrass is a tall perennial grass of wetlands. It can crowd out almost all native marsh species as well as shrubs and trees in adjacent upland locations. It is not shade tolerant. Control methods that help reduce its vigor include shading, fire, regular heavy grazing, and flooding for prolonged periods to reduce oxygen at the roots. Once established, it is too dense for tree seedlings to out-compete. Where trees are desired in canarygrass meadows, plan on mowing around saplings for several years to release them from the grass. However, trees planted to provide permanent shade are one of the best long-term control methods. Seeds are not long-lived, but being aquatic, can float in from other areas.

Rubus armeniacus (Rosaceae), Himalayan blackberry, and *Rubus laciniatus* (Rosaceae), cut-leaf blackberry are woody vines that grow in dense, often impenetrable, thorny thickets. Mechanical brushing can release blackberry thickets, but must be repeated regularly to keep the vines from regrowing. Heavy brushing with goats, grazed in very high densities for short periods of time, is a useful way to reduce blackberries while leaving grass alone. Like reed canarygrass, blackberries can significantly restrict tree establishment. Seeds live for some years in the soil, so while control of above ground portions may be achieved quickly, seedlings continue to appear for years afterwards. A mixed strategy of increasing structural diversity with partial tolerance might be the best approach. In this approach, blackberries would be cut back where needed to establish trees and fruiting shrubs, and otherwise left alone. They do provide food for pollinators, flower-eating and fruit-eating birds over several months.

River Habitats

The habitats along the Lewis & Clark River prior to Euro-American settlement were a combination of marshes, shrub-scrub thickets, and coniferous floodplain forest. There may have also been some hardwood floodplain forest. In the tidal portion of the river, large woody debris was probably common. Benthic algae and a few vascular plants were probably found on the tideflats and subtidal river bottom.

Remnants of the first three habitats are still seen today in the oldest units of the park, river units 2 and 3. River Unit 2 has excellent communities of scrub-shrub thicket (south of Burnshed Slough), transitional coniferous floodplain forest (between Burnshed Slough and Alder or Canoe-landing Slough), and emergent marsh (along and Alder or Canoe-landing Slough).

Historic marshes were a complex of many species, often fringed by *Carex lyngbyei*, Lyngbye's sedge, at the lower edges, along with native grasses and dicots.

Shrub-scrub thickets form dense tangles of woody vegetation. Typical species include *Malus fusca*, western crabapple, *Lonicera involucrata*, black twinberry, *Salix hookeriana*, Hooker's willow, and *Spirea douglasii*, Douglas' spirea.

Floodplain forests are dominated by conifers, but include hardwoods. Typical species include *Alnus rubra*, red alder, *Picea sitchensis*, Sitka spruce, and *Thuja plicata*, western red cedar. *Frangula purshiana*, cascara, and *Salix hookeriana*, Hooker's willow, are common understory tree species in coastal floodplain forests. *Fraxinus latifolia*, Oregon ash, was not found along the Lewis & Clark River in the Memorial. It is a typical species of Columbia River floodplain forests, and should be considered for planting.

The diked areas vary widely in vegetative composition, depending largely on whether grazing continues at this time. The forested dike areas have understories of a mix of native and introduced species, while the open dike areas are vegetated with reed canarygrass and blackberries. Native species are present, but their distribution and abundance in ground and understory layers are significantly reduced compared to less disturbed areas.

Some sections of the river have very high habitat qualities. These high quality areas are undiked, or were diked many decades ago and have been left alone since. These are characterized by several structural layers, and include marsh, shrubs, understory trees and overstory canopy trees. These habitats exist as mosaics, and animals and birds are able to move more freely from one habitat to another within these units. Trees and shrubs overhang the water, and provide shade on the water, and cover for fish, aquatic mammals and herptiles. Birds have a diversity of tree heights, densities, nesting sites, and food sources.

Some sections of the river have lower habitat qualities. These low quality areas were diked or used for log yards; in some units, regular disturbance by grazing continues to this day. These areas are characterized by fewer structural elements, and a replacement of native species with introduced species. In some instances, diverse marsh and scrub-shrub layers have been completely replaced by one or two introduced species, which form such dense populations that

trees and shrubs are excluded. Some management alternatives are proposed in the next section to increase structural diversity.

Habitat Maintenance and Restoration

In those units with established trees and shrubs without grazing, the recommendation is to let these units continue to mature on their own. These include units 2-6. This study recommends establishing floodplain trees, predominately conifers, in dense stands along the Lewis & Clark River in those Memorial units where dikes and cattle grazing will continue. Native trees will offer shade for fish, bird and small mammal habitat, and will over time dominate and overhang the riverbanks, replacing a variety of low, marsh to shrub introduced species that now form dense thickets on the dikes and overhang the water. For specific methods, see comments in the noxious weeds section. These include units 7-10, and a portion of unit 6. Unit 1 was recently taken out of grazing, and should be included in this group.

The transition from the present conditions, with a few large trees, lots of woody weeds and reed canarygrass, to many trees, few weeds and less reed canarygrass will take years to decades. First the woody weed species will need to be suppressed so that trees can be planted and outgrow them. After the young trees have reached eight to ten feet in height, they can be left to grow on their own. By protecting the young trees with shields, and using high density grazing with both cattle and goats, most weed control in this transitional period can be achieved without mechanical tools or herbicides.

A shift to more productive grazing methods would benefit both farmers and the riparian areas in which their cattle graze in the river units. So long as grazing continues with unrestricted access by animals to the dikes and river, those areas will continue to be degraded by regular trampling and uneven consumption. Low density, long duration grazing encourages tough weedy species and reduces forage production. Shifting to high density, short duration grazing could reduce the impacts of some weedy species over time, and could increase productivity by desirable forage species. This could also benefit productivity in the pastures inside the dikes. The local climate is so moderate that grasses grow year round, except in unusually cold winters. Grass-based livestock production is a viable alternative where forage growth can be increased, and can confer a marketing advantage for motivated farmers in local and high quality markets.

Gaps and Omissions

During the first few weeks of fieldwork it became clear that access to one area of the river would be very restricted. This is the subtidal area, below the reach of normal tides, and corresponds to E1UB habitats. The Memorial does not have a dock or boat launch on the river that is accessible at all tide stages. The launching areas that were used are accessible from mid to high tide; mud flats are exposed at mid to low water.

Mudwalkers were used to walk out to one area at a lower tide stage to survey milfoil populations, but walking access is also limited to a few points on one side of the river.

As a consequence, marshes to lower intertidal elevations were well surveyed, but MLLW and subtidal elevations were not. It is proposed that a trip launched from a well-graveled access point upriver should be used to gain access by water during very low tides to this habitat in the Memorial.

One genus, *Sagittaria*, was not examined in fruit, and may represent intermixed populations of two closely related species, *S. cuneata* and *S. latifolia*. Both taxa were put on the species list with notes to resolve this question as to species in the next growing season.

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Frank Wolfe provided flying services so that aerial photographs could be taken along the river.

Thank you, everyone, for helping this project run smoothly, if not always dry or mud-free, from beginning to end.

Figure 1. List of Vascular Plants (and one moss) for Tidal Vegetation Survey

Field Year 2003

K Sayce, N Eid

Fort Clatsop National Memorial

Row Codes					
Introduced species					
Rare, uncommon or endemic species (bold)					
Family	Scientific Name	Common Name	Notes, Old/Alternate Name	Wetland Indicator	
Moss	Fontinalis antipyretica		Riparian moss, in this environment somewhat salt tolerant, found growing at base of Carex lyngbyei clumps; probably OBL. Identification	NL	
Ferns & Fern Allies					
Equisetaceae	Equisetum arvense	common horsetail		FAC	
	Equisetum telmateia var. braunii	giant horsetail		FACW	
Polypodiaceae	Adiantum aleuticum	Alaska maidenhair	Current name in FNA; Adiantum pedatum	FAC	
	Athyrium filix-femina	lady fern		FAC+	
	Polypodium glycyrrhiza	licorice fern	sweet licorice-flavored rhizome		
	Polystichum munitum	Western sword fern		FACU	
Pinaceae	Picea sitchensis	Sitka spruce		FAC	
	Tsuga heterophylla	western hemlock		FACU+	
Monocots					
Alismataceae	Alisma triviale	American waterplantain	Current name in NPD; Alisma plantago-aquatica and others	OBL	
	Sagittaria cuneata	wapato, arumleaf arrowhead	FNA gives S. cuneata a natural PNW distribution. Check local plants in seed, we may have both species here.	OBL	
	Sagittaria latifolia	wapato, broadleaf arrowhead	FNA gives S. latifolia a natural Eastern distribution. Check local plants in seed	OBL	
Araceae	Lysichiton americanus	skunk cabbage		OBL	
	Peltandra virginica	tuckahoe, greenarrow arum	Native to eastern US, established in Columbia R	OBL	
Cyperaceae	Carex aquatilis var. dives	Sitka sedge	Current name, NPD; few plants seen in Canoe Landing Slough; Carex sitchensis	OBL	
	Carex lyngbyei	Lyngbye's sedge		OBL	
	Carex obnupta	slough sedge		OBL	
	Carex stipata	owlfruit sedge		OBL	
	Eleocharis palustris	common spike-rush	E. macrostachya	OBL	
	Isolepis cernua	low clubrush	Intertidal, below main marsh on open flats; Scirpus cernuus	OBL	
	Schoenoplectus acutus var. occidentalis	softstem bulrush	Higher in intertidal zone, tending to fresher water; S. lacustris ssp. acutus, S. acutus var. occidentalis	OBL	
	Schoenoplectus tabernaemontani	hardstem bulrush	Lower in intertidal areas, tending to more saline waters; Scirpus tabernaemontani, S. validus, S. lacustris ssp. validus	OBL	
	Scirpus microcarpus	small-fruited bulrush, panicked bulrush	More common upriver in freshwater areas above reach of tides	OBL	

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes, Old/Alternate Name</i>	<i>Wetland Indicator</i>
Iridaceae	<i>Iris pseudacorus</i>	yellow flag	Plants found on survey were located and later removed	OBL
Juncaceae	<i>Juncus arcticus</i> var. <i>balticus</i>	Baltic rush	J. balticus	OBL
	<i>Juncus articulatus</i>	jointed rush		OBL
	<i>Juncus effusus</i> var. <i>effusus</i>	common rush	Largest and coarsest of soft rushes	FACW
	<i>Juncus effusus</i> var. <i>pacificus</i>	Pacific rush		FACW
	<i>Luzula</i> sp.	woodrush	Not flowering	
Juncaginaceae	<i>Lilaea scilloides</i>	flowering quillwort		OBL
	<i>Triglochin maritimum</i>	seaside arrowgrass	Unit 1 (downriver end), along dike; usually a salt marsh species	OBL
Lemnaceae	<i>Lemna minor</i>	common duckweed, water lentil		OBL
	<i>Spirodela punctata</i>	dotted duckmeat		OBL
Liliaceae	<i>Maianthemum dilatatum</i>	false lily of the valley		FAC
Poaceae	<i>Agrostis exarata</i>	spike bentgrass		FACW*
	<i>Bromus sitchensis</i>	Alaska brome, Sitka brome	Frequently found at upper edge of marshes, along streams	nl
	<i>Calamagrostis nutkaensis</i>	Nootka reedgrass		FACW
	<i>Deschampsia caespitosa</i> var. <i>arctica</i>	tufted hairgrass	Most were purple flowered form. Found one white flowered form along Alder Creek	FACW
	<i>Distichlis spicata</i>	saltgrass		OBL
	<i>Elymus repens</i>	quack, quackgrass	<i>Agropyron repens</i> , <i>Eltrygia repens</i>	FAC-
	<i>Glyceria grandis</i> var. <i>grandis</i>	reed mannagrass		OBL
	<i>Holcus lanatus</i>	common velvet grass		FAC
	<i>Hordeum depressum</i>	dwarf barley		FAC
	<i>Lolium arundinaceum</i>	tall fescue	<i>Festuca arundinacea</i>	FAC-
	<i>Phalaris arundinacea</i>	reed canary grass		FACW
	<i>Phragmites australis</i>	common reed	P. communis; not seen in Memorial, but adjacent to lowest river units	FACW+
Potamogetonaceae	<i>Potamogeton</i> sp.		Not flowering, few leaf sections	OBL
	<i>Potamogeton crispus</i>	curly pondweed		OBL
	<i>Potamogeton gramineus</i>	variable-leaf pondweed		OBL
Ruppiaceae	<i>Ruppia maritima</i>	ditchgrass, widgeongrass		OBL
Typhaceae	<i>Typha angustifolia</i>	narrowleaf cattail		OBL
	<i>Typha latifolia</i>	broadleaf cattail		OBL
Dicots				
Apiaceae	<i>Angelica genuflexa</i>	kneeling angelica		FACW
	<i>Angelica lucida</i>	sea-watch		FAC+
	<i>Cicuta douglasii</i>	Douglas' waterhemlock, Western waterhemlock		OBL

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes, Old/Alternate Name</i>	<i>Wetland Indicator</i>
	Conioselinium gmelinii	Pacific hemlock-parsley	Current name in NPD; C. chinese, C. pacificum	FACW
	Daucus carota	Queen Anne's lace		nl
	Heracleum maximum	cowparsnip	Heracleum lanatum	FAC+
	Hydrocotyle ranunculoides f. ranunculoides	floating marsh pennywort		OBL
	Lilaeopsis occidentalis	lilaeopsis	Quite common in open intertidal below marshes	OBL
	Oenanthë sarmentosa	Pacific waterparsley		OBL
	Sium suave	hemlock waterparsnip		OBL
Aquifoliaceae	Ilex aquifolium	English holly		nl
Araliaceae	Hedera helix	English ivy	Often just above high water line along Columbia River	nl
Asteraceae	Achillea millefolium	common yarrow		FACU
	Bidens cernua	nodding beggarticks		FACW+
	Bidens frondosa	devil's beggarticks		FACW+
	Cirsium arvense	Canada thistle		FAC-
	Cotula coronopifolia	brass buttons		FACW+
	Erechtites minima	coastal burnweed	E. prenanthoides	nl
	Hypochaeris radicata	hairy cats'ear		FACU
	Senecio jacobaea	tansy ragwort, stinking willie		FACU
	Symphyotrichum subspicatum var. subspicatum	Douglas' aster	Aster subspicatus	FACW
	Sonchus arvensis	field sow-thistle		FACU+
	Taraxacum officinale	common dandelion	T. laevigatum	FACU
Balsaminaceae	Impatiens sp.	jewelweed	Not flowering	FACW
	Impatiens capensis x I. ecalcarata	hybrid jewelweed	spurred+spotless	FACW
Betulaceae	Alnus rubra	red alder	A. oregana	FAC
Boraginaceae	Myosotis laxa	smallflower forget-me-not, bay forget-me-not		OBL
Brassicaceae	Brassica sp.		Not flowering	nl
	Cardamine oligospermum var. oligospermum	little western bittercress		FAC
	Rorippa sp.		Not flowering	
	Rorippa palustris	Western bog yellowcress	Current name in NPD; Rorippa islandica ssp. occidentalis	OBL
Callitrichaceae	Callitriche sp.		Few leaves, unable to ID	OBL
	Callitriche heterophylla var. bolanderi	different-leaved water starwort		OBL
	Callitriche stagnalis	pond waterstarwort		OBL
Caprifoliaceae	Lonicera involucrata	black twinberry, twinberry honeysuckle		FAC+
	Lonicera periclymenum	European honeysuckle		nl
	Sambucus racemosa var. racemosa	red elderberry	Sambucus racemosa ssp. pubens var. arborescens	FACU

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes, Old/Alternate Name</i>	<i>Wetland Indicator</i>
Caryophyllaceae	Sagina sp.		No flowers, unit 4; NWI status varies with species	
	Stellaria media	common chickweed	Seen in Unit 9 along edge of marsh	FACU
Clusiaceae	Hypericum scouleri var. scouleri	Scouler's or Western St John's-wort	Current name in NPD; H. formosum var. scouleri	FAC
Convolvulaceae	Calystegia sepium	hedge bindweed, wild morning-glory	Current name in NPD; check in flower and fruit to determine variety; Convolvulus sepium	FAC
Ericaceae	Gaultheria shallon	salal		FACU*
	Vaccinium ovatum	evergreen huckleberry		nl
	Vaccinium parvifolium	red huckleberry		NI
Fabaceae	Cytisus scoparius	Scots broom		nl
	Lathyrus latifolius	perennial pea		nl
	Lathyrus palustris	marsh peavine		OBL
	Lathyrus sp.		No flowers, unit 4, on log	
	Lotus corniculatus	bird's-foot trefoil		FAC
	Trifolium repens	white clover		FAC-
	Trifolium wormskioldii	streambank clover, cow clover	T. wormskioldii	FACW+
	Vicia nigricans ssp. gigantea	giant vetch	Vicia gigantea	nl
Grossulariaceae	Ribes divaricatum var. divaricatum	spreading gooseberry, coast black gooseberry		FAC*
	Ribes lacustre	prickly currant		FACW
	Ribes laxiflorum	trailing black currant		nl
Haloragaceae	Myriophyllum aquaticum	parrotfeather watermilfoil	Myriophyllum brasiliense	OBL
	Myriophyllum sp.		No flowers, dominant species of lower intertidal to subtidal	OBL
Lamiaceae	Lycopus americanus	American water horehound		OBL
	Mentha x piperita (pro sp.)	peppermint	Current name in NPD; [M. aquaticum X M. spicata]	FACW+
Lythraceae	Lythrum salicaria	purple loosestrife	All plants seen in Memorial were located and later removed by staff	OBL
Onagraceae	Epilobium ciliatum ssp. glandulosum	fringed willowherb	E. watsonii, E. ciliatum ssp. watsonii	FACW-
Plantaginaceae	Plantago lanceolata	ribwort, narrowleaf plantain		FACU+
	Plantago major var. major	common plantain		FAC
Polygonaceae	Polygonum amphibium ssp. emersum	longroot smartweed	Current name in NPD; Polygonum coccineum	OBL
	Polygonum hydropiperoides	swamp smartweed		OBL
	Rumex conglomeratus	clustered dock		FACW
	Rumex crispus	curly dock		FAC+
	Rumex obtusifolius	bitter dock		FAC
Portulacaceae	Montia parviflora ssp. flagellaris	small-leaved montia, littleleaf minerslettuce	NPD changed var. to ssp.	FACW-

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes, Old/Alternate Name</i>	<i>Wetland Indicator</i>
Primulaceae	<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	seaside brookweed	Current name in NPD; <i>S. valerandi</i> , <i>S. parviflorus</i>	OBL
Ranunculaceae	<i>Ranunculus repens</i>	creeping buttercup		FACW
	<i>Ranunculus sceleratus</i>	celeryleaf buttercup, cursed buttercup		OBL
Rhamnaceae	<i>Frangula purshiana</i>	cascara	Current name in NPD; <i>Rhamnus purshiana</i>	FAC-
Rosaceae	<i>Argentina egedii</i>	Pacific silverweed	<i>P. egedii</i> , <i>P. pacifica</i> , <i>P. anserina</i> ssp. <i>pacifica</i>	OBL
	<i>Malus fusca</i>	Western crabapple	<i>Pyrus fusca</i>	FACW
	<i>Physocarpus capitatus</i>	Pacific ninebark		FACW
	<i>Prunus</i> sp.	feral cherry		nl
	<i>Prunus laurocerasus</i>	cherry laurel		nl
	<i>Rosa nutkana</i>	Nootka rose		FAC-
	<i>Rubus armeniacus</i>	Himalayan blackberry	<i>R. discolor</i> is current name in NPD, but <i>R. armeniacus</i> was just published and may supersede <i>discolor</i> in FNA; <i>R. procerus</i> is second former name	FACU
	<i>Rubus laciniatus</i>	evergreen blackberry, cutleaf blackberry		FACU+
	<i>Rubus spectabilis</i>	salmonberry		FAC+
	<i>Rubus ursinus</i>	dewberry, trailing blackberry, California blackberry		FACU
Rubiaceae	<i>Spiraea douglasii</i>	Douglas' spiraea, rose spiraea		FACW
	<i>Galium aparine</i>	cleavers, stickywilly		FACU
Salicaceae	<i>Salix alba</i> var. <i>vitellana</i>	golden willow	Found both large trees and young saplings of golden willow along L&C River in 2003	FACW
	<i>Salix hookeriana</i>	coast willow, Hooker's willow	Note: FNA lumps <i>hookeriana</i> , <i>scouleri</i> , <i>piperi</i> and others into <i>S. hookeriana</i> . NPD still separates them, or most of them, into species	FACW
	<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific willow	Current in NPD	FACW+
	<i>Salix</i> sp.		Appears FACW; leaves 2-3 X length of <i>S. lucida</i> ; shrubby rather than tall trees, always near water or in very wet locations	
Saxifragaceae	<i>Tellima grandiflora</i>	fringe cup		NI
Scrophulariaceae	<i>Digitalis purpurea</i>	foxglove		FACU*
	<i>Parentucellia viscosum</i>	yellow glandweed		FAC-
	<i>Scrophularia californica</i> ssp. <i>californica</i>	California figwort	Not listed in NW, FAC in CA	nl
	<i>Veronica americana</i>	American speedwell		OBL
Solanaceae	<i>Solanum dulcamara</i> var. <i>dulcamara</i>	bittersweet, climbing nightshade		FAC+
Urticaceae	<i>Urtica dioica</i> ssp. <i>gracilis</i>	stinging nettle	Current name in NPD; <i>Urtica dioica</i> ssp. <i>lyallii</i> , var. <i>lyallii</i> , var. <i>gracilis</i>	FAC+

Family

Scientific Name

Common Name

Notes, Old/Alternate Name

*Wetland
Indicator*

References

<i>Title</i>	<i>Website (if applicable)</i>	<i>Code</i>	<i>Use</i>
Plants National Database	plants.usda.gov	NPD	Current and past names, confirm wetland status
<u>Flora of North America</u>		FNA	Current names, summary of taxonomic work
<u>The Jepson Manual</u>		TJM	Current names for West Coast species
<u>Flora of the Pacific Northwest</u>		FPNW	Names and distributions for PNW species (1972)
<u>National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary</u>			Current wetland status, USFWS - NWI listings

Figure 2. Table of Dominant Plant Species

Elevation	NWI Designation	Species Name	Units												
			1	BS	2	CS	3	4	LR	5	6	7	8	9	10
Low	E2USN	Myriophyllum sp.	√		√		√	√		√	√	√	√	√	√
Low-Mid	E2USN	Eleocharis palustris	√	√	√	√	√	√		√	√	√	√	√	√
Low-Mid	E2USN	Lilaeopsis occidentale	√	√	√	√	V	√		√		√	√		
Mid	E2USN	Scirpus tabernaemontani	√	√								√			
Mid-Upper	E2USN	Scirpus acutus	√	√			√					√			
Upper	E2EMN	Carex lyngbyei	√	√	√	√	√	√		√	√	√		√	√
Upper	E2EMN	Carex obnupta				√									
Upper	E2EMN	Deschampsia caespitosa	√	√		√	√								
Upper	E2EMN	Argentina egedii						√							
Upper	E2EMN	Typha angustifolia						√							
Above	E2EMP	Festuca arundinacea	√												
Above	E2EMP	Phalaris arundinacea	√	√	√	√				√	√	√	√	√	√
Above	PFOP	Alnus rubra				√		√		√	√		√	√	
Above	PSSP	Cytisus scoparius								√					
Above	PSSP	Lonicera involucrata											√		
Above	PSSP	Rubus armeniacus								√					
Above	PSSP	Rubus laciniatus								√	√				
Above	PFOP	Picea sitchensis			√	√						√			
Above	PFOP	Salix hookeriana	√		√	√		√			√	√	√	√	√
Log Rafts	no designation	Cicuta douglasii							√						
Log Rafts	no designation	Impatiens capensis							√						
Log Rafts	no designation	Myosotis laxa							√						
Log Rafts	no designation	Veronica americana							√						

Codes:

BS – Burnshed Slough, between River Units 1 & 2

CS – Canoe Landing Slough, between River Units 2 & 3

LR – Log Rafts, tied to piles in river by River Units 4 & 5

Numbers refer to River Units 1 through 10

Figure 3. New Plant Collections

Field Year 2003

K Sayce, N Eid

Fort Clatsop National Memorial

Row Code Introduced species				
<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Distribution Notes, Old/Alternate Names</i>	<i>Unit</i>
Bryidae	Fontinalis antipyretica		Common, growing at base of Carex lyngbyei clumps in many units, also on pilings, logs in water	7
Cyperaceae	Isolepis cernua	low clubrush	Common, found in all units; Scirpus cernuus	1
Haloragaceae	Myriophyllum sp.	milfoil	Common, dominant species of lower intertidal to subtidal, in all units	1
Juncaceae	Juncus arcticus var. balticus	Baltic rush	Common, 30+ plants seen in several units; J. balticus	1
Juncaginaceae	Triglochin maritimum	seaside arrowgrass	Uncommon, one plant seen, in River Unit 1 (most saline); more typical of fully saline marshes and intertidal zones	1
Lemnaceae	Lemna minor	common duckweed, water lentil	Common. Seen prior to survey, collection made to document species in collection	4
Lamiaceae	Mentha x piperita (pro sp.)	peppermint	Common, several populations growing on log rafts off River Unit 4; [M. aquaticum X M. spicata]	log rafts off 4
Poaceae	Glyceria grandis var. grandis	reed mannagrass	Several plants seen in units 2/3, 3	3
Polygonaceae	Rumex conglomeratus	clustered dock	Common, seen in many units	10
Potamogetonaceae	Potamogeton crispus	curly pondweed	Probably common, plants seen during survey were free-floating, abundant on mainstem Columbia River	2/3
Potamogetonaceae	Potamogeton gramineus	variable-leaf pondweed	Probably common, collection was free-floating	6
Salicaceae	Salix alba var. vitellana	golden willow	Found both large trees and young saplings of golden willow along L&C River in 2003, est. 20 plants in all.	8

Figure 4. Introduced Plants

Fort Clatsop National Memorial

Field Year 2003

K Sayce, N Eid

This list encompasses non-native plants in three categories:

1. Established – growing well, not or slowly reproducing;
2. Naturalized – setting seed, plants seen in some/all areas, not dominant;
3. Noxious – dominant species that crowd out other plants in this habitat. Shaded.

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes; Old/Alternate Names</i>	<i>Wetland Indicator</i>
Monocots				
Araceae	<i>Peltandra virginica</i>	tuckahoe, greenarrow arum	Native to eastern US, established in Columbia R	OBL
Iridaceae	<i>Iris pseudacorus</i>	yellow flag	Plants found on survey were lcoated and later removed	OBL
Juncaceae	<i>Juncus effusus</i> var. <i>effusus</i>	soft rush	Widespread diked pasture weed	FACW
Poaceae	<i>Elymus repens</i>	quack, quackgrass	<i>Agropyron repens</i> , <i>Eltrygia repens</i>	FAC-
	<i>Holcus lanatus</i>	common velvet grass		FAC
	<i>Lolium arundinaceum</i>	tall fescue	<i>Festuca arundinacea</i>	FAC-
	<i>Phalaris arundinacea</i>	reed canary grass	Widespread wetland weed	FACW
	<i>Phragmites australis</i>	common reed	Not in Memorial, but adjacent to lowest River Units; <i>P. communis</i>	FACW+
Potamogetonaceae	<i>Potamogeton crispus</i>	curly pondweed	Well established in Columbia R	OBL
Dicots				
Apiaceae	<i>Daucus carota</i>	Queen Anne's lace		nl
Aquifoliaceae	<i>Ilex aquifolium</i>	English holly		nl
Araliaceae	<i>Hedera helix</i>	English ivy	Often just above high water line along Columbia River	nl
Asteraceae	<i>Cirsium arvense</i>	Canada thistle		FAC-
	<i>Cotula coronopifolia</i>	brass buttons		FACW+
	<i>Erechtites minima</i>	toothed coast fireweed	<i>E. prenanthoides</i>	nl
	<i>Hypochaeris radicata</i>	hairy cats'ear		FACU
	<i>Senecio jacobaea</i>	tansy ragwort		FACU
	<i>Sonchus arvensis</i>	perennial sow-thistle		FACU+
	<i>Taraxacum officinale</i>	common dandelion	<i>T. laevigatum</i>	FACU
Caprifoliaceae	<i>Lonicera periclymenum</i>	European honeysuckle		nl
Caryophyllaceae	<i>Stellaria media</i>	common chickweed	Unit 9, along marsh edge	FACU
Convolvulaceae	<i>Calystegia sepium</i>	hedge bindweed, wild morning-glory	Current name in NPD; <i>Convolvulus sepium</i>	FAC
Fabaceae	<i>Cytisus scoparius</i>	Scots broom		nl
	<i>Lathyrus latifolius</i>	perennial pea		nl
	<i>Lotus corniculatus</i>	birds'foot trefoil		FAC
	<i>Trifolium repens</i>	white clover		FAC-

<i>Family</i>	<i>Scientific Name</i>	<i>Common Name</i>	<i>Notes; Old/Alternate Names</i>	<i>Wetland Indicator</i>
Haloragaceae	Myriophyllum aquaticum	parrotfeather watermilfoil	Myriophyllum brasiliense	OBL
	Myriophyllum sp.		No flowers, dominant species of lower intertidal to subtidal	OBL
Lamiaceae	Mentha x piperita (pro sp.)	peppermint	Current name in NPD; [M. aquaticum X M. spicata]	FACW+
Lythraceae	Lythrum salicaria	purple loosestrife	All plants seen in Memorial were located and later removed by park staff	OBL
Plantaginaceae	Plantago lanceolata	ribwort, narrowleaf plantain		FACU+
	Plantago major var. major	common plantain		
Polygonaceae	Rumex conglomeratus	clustered dock		FACW
	Rumex crispus	curly dock		FAC+
	Rumex obtusifolius	bitter dock		FAC
Ranunculaceae	Ranunculus repens	creeping buttercup		FACW
Rosaceae	Prunus sp.	feral cherry	Could be sweet or sour pie cherries	nl
	Prunus laurocerasus	cherry laurel		nl
	Rubus armeniacus	Himalayan blackberry	R. discolor is current name in NPD, but R. armeniacus was just published and may supersede discolor in FNA, R. procerus is also an older name	FACU
	Rubus laciniatus	evergreen blackberry, cutleaf blackberry		FACU+
Salicaceae	Salix alba var. vitellana	golden willow		FACW
Scrophulariaceae	Digitalis purpurea	foxglove		FACU*
	Parentucellia viscosum	yellow glandweed		FAC-
Solanaceae	Solanum dulcamara var. dulcamara	bittersweet, climbing nightshade		FAC+

Figure 5. Table of rare plants

[ESA, WNHP, ODA and ONHP-listed Plants in SW Washington & NW Oregon]

9-2003 Update

<i>Scientific Name</i>	<i>Common Name</i>	<i>Heritage Rank</i>	<i>Federal Status</i>	<i>OR D.Ag Status</i>	<i>OR NHP Status</i>	<i>WA Status</i>	<i>Listed Counties</i>	<i>Notes on distribution, habitat</i>	<i>Known to grow in</i>	<i>Look For</i>
<i>Abronia latifolia</i>	Yellow sandverbena	G3 S3			Watch		Clatsop, Tillamook	Coastal beaches, needs open sand, also in SW WA	Grays Harbor, Pacific	
<i>Abronia umbellata</i> ssp. <i>breviflora</i>	Pink sandverbena	G4T2, S1	Concern	Endangered	T/E1		Clatsop	Document (GPS, photo) if seen, and notify appropriate agencies at once.		In all coastal counties
<i>Arenaria paludicola</i>	Swamp sandwort	G1	Endangered			Possibly Extirpated	Grays Harbor	Not likely along coast, found in Chehalis Vv		
<i>Aster curtus</i>	White-top aster	G3, S2		Threatened	T/E1	Sensitive	Grays Harbor	Chehalis Valley, Willamette Valley; dry, open, low-elevation habitats, BC to OR		
<i>Baccharis pilularis</i>	Coyotebush	G5, S1				Threatened	Pacific	Northernmost population in SW WA. Grows from NW OR south into Calif	Coastal OR counties south	
<i>Cardamine pattersonii</i>	Saddle Mtn bittercress	G2, S2	Concern	Candidate	T/E1		Clatsop,	Saddle Mtn, montane rocky slopes		
<i>Carex anthoxanthea</i>	Yellow-flowered sedge					Sensitive	Grays			
<i>Carex brevicaulis</i>	Short-stemmed sedge	G5, S2			Review		Clatsop, Tillamook	Dunes, terraces along ocean, OR & WA		
<i>Carex circinata</i>	Coiled sedge	G4, S1				Sensitive	Grays Harbor	Olympics are s-end of range, grows to AK		
<i>Carex densa</i>	Dense sedge	G5, S1				Threatened	Wahkiakum	Willamette Valley, some sites on lower Columbia River		Clatsop, Pacific, Columbia
<i>Carex interior</i>	inland sedge	G5, S1			Watch, prop. Review		Clatsop	SW WA, NW OR		
<i>Carex leptalea</i>	bristle-stalked sedge	G5, S?			Watch, prop. Review		Clatsop	Columbia River marshes; low to mid elevation, OR to BC		
<i>Carex livida</i>	pale sedge	G5, S2			T/E2		Clatsop	Ak to OR, bogs, marshes, streambanks, low to mid elevations		
<i>Carex macrocephala</i>	Big-headed sedge	G5, S3			Watch		Clatsop, Tillamook	Boreal species, sandy beaches of N Hemisphere	All coastal counties of WA, most of OR	
<i>Carex macrochaeta</i>	Large-awn sedge	G5, S1			T/E2	Threatened	Grays Harbor, Clatsop	Old dune prairies, coastal montane meadows, streambanks, low to subalpine,	S end Olympics, Clatsop	Pacific
<i>Carex pluriflora</i>	Many-flowered sedge	G4, S1			T/E2		Clatsop	Freshwater marshes & bogs; common n to AK		Grays Harbor, Pacific, Tillamook
<i>Carex retrorsa</i>	retrorse sedge	G5, S1			T/E2		Clatsop, Columbia	Rare along Columbia River; S BC to CA; wet, emergent	Pacific, Wahkiakum, Grays Harbor, Tillamook	
<i>Castilleja chambersii</i>	Chamber's paintbrush	G1, S1	Concern	Candidate	T/E1		Clatsop	Saddle Mtn, montane rocky slopes		
<i>Centunculus minimus</i>	Chaffweed					Review	Wahkiakum	Vernal pools, coast to inland valleys	Pacific, Clatsop	

<i>Scientific Name</i>	<i>Common Name</i>	<i>Heritage Rank</i>	<i>Federal Status</i>	<i>OR D.Ag Status</i>	<i>OR NHP Status</i>	<i>WA Status</i>	<i>Listed Counties</i>	<i>Notes on distribution, habitat</i>	<i>Known to grow in</i>	<i>Look For</i>
<i>Cimicifuga elata</i>	Tall bugbane	G3, S3	Concern	Candidate	T/E1	Sensitive	Grays Harbor, Columbia	Riparian forest, wet streamside soils, s BC to nw OR	Pacific, Clatsop, Tillamook	
<i>Claytonia lanceolata</i> var. <i>pacifica</i>	Pacific lance-leaved springbeauty	GRT3, S1S2				Threatened	Grays Harbor	High elevation moist meadows		
<i>Cochlearia officinalis</i>	Scurvygrass	G5, S1S2				Sensitive	Grays	Shorelines, GH n to AK	Pacific	
<i>Coptis aspleniifolia</i>	Spleenwort-leaved goldenthrad	G4G5, S2				Sensitive	Grays Harbor	Moist forest, bogs, Olympics N to AK		
<i>Delphinium oreganum</i>	Menzie's larkspur	G5, S1		Candidate	T/E1		Clatsop	Montane meadows, Coast Range		
<i>Dodecatheon austrofrigidum</i>	Frigid shootingstar	G2, S2	Concern		T/E1	Endangered	Pacific, Grays Harbor, Wahkiakum, Clatsop	Rocky wet slopes, especially above rivers		
<i>Douglasia laevigata</i> var.	Small-leaved douglasia	G3?S?			Review			Saddle Mtn, montane rocky slopes		
<i>Erigeron aliceae</i>	Alice's fleabane	G4, S2				Sensitive	Grays	Montane, Coast Range	Clatsop	
<i>Erigeron oreganus</i>	Gorge daisy	G3, S3	Concern	Candidate	T/E1	Threatened	Wahkiakum	Columbia River Gorge, "lower gorge" basalt cliffs, Wahkiakum		Clatsop, Columbia
<i>Erigeron peregrinus</i> ssp. <i>peregrinus</i> var. <i>peregrinus</i>	Wandering daisy	G5T4, S2			T/E2		Clatsop	Montane, Coast Range	Clatsop	
<i>Erigeron peregrinus</i> ssp. <i>peregrinus</i> var. <i>thompsonii</i>	Thompson's wandering daisy	G5T4, S2				Sensitive	Grays Harbor	Montane, Olympics		
<i>Eriophorum chamissonis</i>	Russet cotton-grass	G5, S1			T/E2		Clatsop, Tillamook	Freshwater marsh & bogs of Coast Range; AK to s OR coast	Coastal Puget Sound Counties, central OR coastal counties	Pacific, Grays Harbor
<i>Erythronium elegans</i>	Coast Range fawn-lily	G1,S1		LT	T/E1		Tillamook	Mt Hebo		Clatsop
<i>Erythronium revolutum</i>	Pink fawn-lily	G4,S4			Watch	Sensitive	Pacific, Wahkiakum, Clatsop	Damp forest soils, open to shaded		
<i>Euonymus occidentalis</i>	Western wahoo	G3,S3			Watch			Coast Range; Pacific Co.	Pacific	Clatsop
<i>Filipendula occidentalis</i>	Queen-of-the-forest	G2,S2	Concern	Candidate	T/E1	Threatened	Pacific, Clatsop	Rare endemic to Coast Range around Columbia River	Tillamook	Wahkiakum, Columbia
<i>Geum triflorum</i> var.	Western red avens	G5T4, S1			T/E2		Clatsop	Montane, Olympics & Saddle Mtn		
<i>Hydrocotyle ranunculoides</i>	Floating water pennywort	G5, S2				Sensitive	Pacific	Common to slow moving waters, permanent lakes of lowlands along coast.		Clatsop, Wahkiakum, Columbia
<i>Hypericum majus</i>	Canada St. John's wort	G5, S2				Sensitive	Grays			
<i>Juncus kelloggii</i>	Kellogg's dwarf rush	G3?, S?			Review		Columbia	VI to CA, in Columbia River, Willamette Vy		Pacific, Wahkiakum, Clatsop
<i>Lewisia columbiana</i> var. <i>rupicola</i>	Rosy lewisia	G4T4, S2			T/E2		Clatsop	Montane, Olympics, Mt. Rainier, Saddle Mtn		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Heritage Rank</i>	<i>Federal Status</i>	<i>OR D.Ag Status</i>	<i>OR NHP Status</i>	<i>WA Status</i>	<i>Listed Counties</i>	<i>Notes on distribution, habitat</i>	<i>Known to grow in</i>	<i>Look For</i>
<i>Lilaea scilloides</i>	Flowering quillwort	G4, S3?			Watch, prop. Review		Clatsop	Tidal freshwater, freshwater emergent; BC to Baja CA		Pacific, Wahkiakum, Grays Harbor, Columbia
<i>Lloydia serotina</i>	Alp lily	G5, S?			Review		Clatsop	Montane, Coast Range, AK to nw OR		Grays Harbor
<i>Lycopodiella inundata</i>	Bog clubmoss	G5, S2			T/E2	Sensitive	Pacific	Freshwater marsh & bogs		
<i>Montia diffusa</i>	Branching montia					Sensitive	Grays Harbor	BC to CA, moist lowland sites		
<i>Montia howellii</i>	Howell's montia	G3, S2		Candidate	Watch		Columbia	BC to nw CA, moist lowland sites		Clatsop, Wahkiakum, Pacific
<i>Myrica gale</i>	Sweet gale	G5, S2			Review		Clatsop	Freshwater marshes & bogs; grows along coast in sw WA and ne OR	Grays Harbor, Pacific	
<i>Myriophyllum ussuriense</i>	Russian water milfoil	G3, S1			Review		Clatsop	Lower Columbia River aquatic		Wahkiakum, Pacific, Columbia
<i>Najas guadalupensis</i>	Common water-nymph	G5, S?			Review		Clatsop	Columbia River aquatic		Wahkiakum, Pacific, Columbia
<i>Parnassia palustris</i> var. <i>neogaea</i>	Northern grass-of-Parnassus	G4T4, S2				Sensitive	Pacific, Grays Harbor	Montane, Coast Range		
<i>Plantago macrocarpa</i>	Alaska plantain	G4, S2			T/E2	Sensitive	Grays Harbor	Ak to nw OR, beaches and meadows at low elevations		Pacific, Clatsop
<i>Poa laxiflora</i>	Loose-flowered bluegrass	G3, S3			Watch	Threatened	Pacific, Grays Harbor, Clatsop, Tillamook	SE AK to n OR		
<i>Poa marcida</i>	Weak bluegrass	G4, S4			Watch		Clatsop, Tillamook	Moist meadows in coastal mountains, VI to nw OR		Pacific, Wahkiakum, Grays Harbor
<i>Poa unilateralis</i>	Ocean-bluff bluegrass	G3, S2			List 2	Threatened	Pacific, Clatsop, Tillamook	Northernmost population in SW WA. Grows from NW OR south into Calif – healthy populations to south along ocean.		
<i>Polemonium carneum</i>	Great polemonium	G4, S1S2				Threatened	Pacific	Cascades & Coast Range, WA & OR	Clatsop	
<i>Puccinellia pumila</i>	Dwarf alkali grass	G4, S?			Review		Tillamook	Along coast in salt marshes, AK to n CA	Pacific	Clatsop
<i>Ranunculus cooleyae</i>	Cooley's buttercup	G4, S2S1				Sensitive	Grays Harbor	High elevation, AK to Olympics		
<i>Rhinanthus crista-galli</i>	Yellow rattle	G4, S4			Watch		Clatsop, Tillamook	Montane, high meadows, AK to nw OR		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Heritage Rank</i>	<i>Federal Status</i>	<i>OR D.Ag Status</i>	<i>OR NHP Status</i>	<i>WA Status</i>	<i>Listed Counties</i>	<i>Notes on distribution, habitat</i>	<i>Known to grow in</i>	<i>Look For</i>
Rorippa columbiae	(Persistent-sepal) Columbia yellow-cress	G3, S1S2		Candidate	T/E1		Clatsop	Columbia River freshwater marshes		
Salix sessilifolia	Soft-leaved willow	G4, S2				Sensitive	Wahkiakum	Freshwater tidal, Columbia River swamps, w Cascades thru Gorge		
Samolus parviflorus	Water pimpernel	G5, S1			Review	Sensitive	Clatsop, Wahkiakum	Freshwater tidal, in marshes		Pacific, Clatsop, Columbia
Sanguisorba menziesii	Menzie's burnet	G3G4, S1				Sensitive	Grays Harbor	Coastal bogs and marshes, AK to Olympics		
Sanicula arctopoides	Bear's-foot sanicle	G5, S1				Endangered	Pacific, Grays Harbor	Grows in old dune prairies, VI to CA		Clatsop, Tillamook
Saxifraga hitchcockiana	Saddle Mtn saxifrage	G1, S1	Concern	Candidate	T/E1		Clatsop	Saddle Mtn, montane rocky slopes		
Sedum lanceolatum var. nesioticum	Lance-leaved stonecrop				Prop. Review		Columbia	BC to WA, n OR, usu coastal		Pacific, Wahkiakum,
Senecio flettii	Flett's groundsel	G4, S4			T/E2		Clatsop	Montane, high meadows, Olympics, Mt Rainier, Clatsop Co		
Sidalcea hendersonii	Henderson's sidalcea	G3/G4, S1			T/E2, prop. T/E1		Clatsop, Tillamook	Brackish edge of salt marshes where freshwater enters, VI to s OR coast	Pacific	Clatsop, Tillamook – refind!
Sidalcea hirtipes	Bristly-stemmed checkermallow	G2, S1S2		Candidate	T/E1		Clatsop, Wahkiakum, Tillamook	Montane, damp meadows, Coast Range of OR to sw WA		Pacific
Sidalcea nelsoniana	Nelson's sidalcea	G2, S1S2	Threatened	Threatened	T/E1		Tillamook	Willamette Vy to e Tillamook Co		
Silene douglasii var. oraria	Cascade Head catchfly	G4T1, S1	Concern	Threatened	T/E1		Tillamook	Cascade Head, OR		
Synthyris schizantha	Fringed synthyris	G4, S4			Watch		Clatsop, Tillamook	Olympics, mid Cascades near Mt Rainier, nw OR		Pacific, Wahkiakum, Columbia
Stellaria humifusa	creeping chickweed	G5?, S?			T/E2		Tillamook	Salt marshes, AK to n OR	Pacific, Grays Harbor, Clatsop	
Sullivantia oregana	Oregon sullivantia	G2, S2	Concern	Candidate	T/E1		Columbia	Columbia River Gorge, lower Willamette Valley		Wahkiakum
Triglochin striata	Three-ribbed arrowgrass	G5?S?			Review		Clatsop, Tillamook	Columbia River, freshwater marshes	Pacific	
Vaccinium oxycoccos	Wild bog cranberry	G5, S4			Watch		Clatsop, Tillamook	Lowland bogs along coast, AK to OR, across continent	Pacific, Grays Harbor	

Oregon – Natural Heritage Program T/E1, List 1 (Threatened or Endangered throughout range)

Oregon – Natural Heritage Program T/E2, List 2 (Threatened, Endangered or Extirpated from Oregon, secure elsewhere)

Oregon Natural Heritage Program – List 3 – Review

Oregon Natural Heritage Program – List 4 – Watch

Figure 7. List of NWI Designations used in FOCL Tidal Vegetation Survey

Estuarine (E) Designations: Used where vegetation reflects saltwater, and regular tidal influence (2).

E2UBL – Estuarine, Tidal, Unconsolidated bottom, Subtidal
With the exception of basalt shelves, expect most of the river bottom to be unconsolidated.
Typical Plants: Were not able to sample in 2003, expect *Myriophyllum* sp. and several salt-tolerant species, along with open, unvegetated areas, benthic algae.

E2USN – Estuarine, Tidal, Unconsolidated sediments, Normal Tides. Tidal flats where new sediments are accumulating.
Typical Plants: *Myriophyllum* sp. (may colonize), normally open mudflats with benthic algae.

E2ABN – Estuarine, Tidal, Aquatic bed, Normal tides.
Sediments may accumulate, usually mid to upper tidal flats where vascular plants can establish.
Typical Plants: *Myriophyllum* sp. forms dense cover.

E2AB/USN – Estuarine, Tidal, Aquatic bed/Unconsolidated sediments, Normal tides. Mixed conditions.
Typical Plants: *Myriophyllum* sp. open flats, *Juncus balticus*, *Bidens cernua*, *Sagittaria cuneata*, *Lilaeopsis occidentale*, *Scirpus cernuus*.

E2EMN – Estuarine, Tidal, Emergent Marsh, Normal tides.
Marshes, where lower portions are regularly inundated.
Typical Plants: *Carex lyngbyei*, *Deschampsia caespitosa*, *Phalaris arundinacea*, *Sium suave*.

Riverine (R) Designations: Used where vegetation is fresh water species, and regularly tidal (1).

R1UBL – Riverine, Tidal, Unconsolidated bottom, Subtidal.

As with estuarine UB, this is the typical river bottom.

Typical Plants: None, to *Myriophyllum* sp., perhaps others, benthic algae

R1ABN – Riverine, Tidal, Aquatic bed, Normal tides.

Freshwater tidal flats with enough exposure to let vascular plants establish. May be sediment accumulation.

Typical Plants: *Myriophyllum* sp. forms dense cover, *Carex lyngbyei*, *Eleocharis palustris*.

R1USN – Riverine, Tidal, Unconsolidated sediments, Normal

Tides. Tidal flats where new sediments are accumulating.

Typical Plants: Usually open sediments, benthic algae.

R1AB/USN – Riverine, Tidal, Aquatic bed/Unconsolidated sediments, Normal tides. Mixed conditions.

Typical Plants: *Myriophyllum* sp. in part, open sediments, seedlings of other species.

R1EMN – Riverine, Tidal, Emergent vegetation, Normal tides.

Lower portion of marshes, regularly inundated.

Typical Plants: *Aster subspicatus*, *Carex lyngbyei*, *Agrostis exarata*, *Carex obnupta*, *Potentilla edgii*, *Sium suave*.

Palustrine (P) Designations: Used where vegetation is clearly wetland yet out of the reach of normal tides and other high water events. These areas may flood during major storms in the wet season.

PEMP – Palustrine, Emergent marsh, Floods under high water conditions. Given local mixed semi-diurnal tides, the boundary between N and P is not clearcut. However, this unit tends to be slightly higher than wettest portions of marsh.
Typical Plants: *Phalaris arundinacea*, *Juncus effusus*, *Lotus corniculatus*, *Heracleum lanatum*,

PFO – Palustrine, Forested (may be behind dike, or water conditions not known). Wetland forest trees predominate.
Typical Plants: *Alnus rubra*, *Picea sitchensis*.

PFOP – Palustrine, Forested, Floods under high water conditions. Wetland trees predominate.
Typical Plants: *Alnus rubra*, *Picea sitchensis*

PSSP – Palustrine, Scrub-shrub, Floods under high water conditions. Wetland shrubs predominate.
Typical Plants: *Salix hookeriana*, *Lonicera involucrata*, *Physocarpus capitatus*, *Alnus rubra*, *Pyrus fusca*.

PSS – Palustrine, Scrub-shrub (may be behind dike, or water conditions not known). Wetland shrubs predominate.
Typical Plants: *Salix hookeriana*, *Lonicera involucrata*, *Alnus rubra*, *Pyrus fusca*.

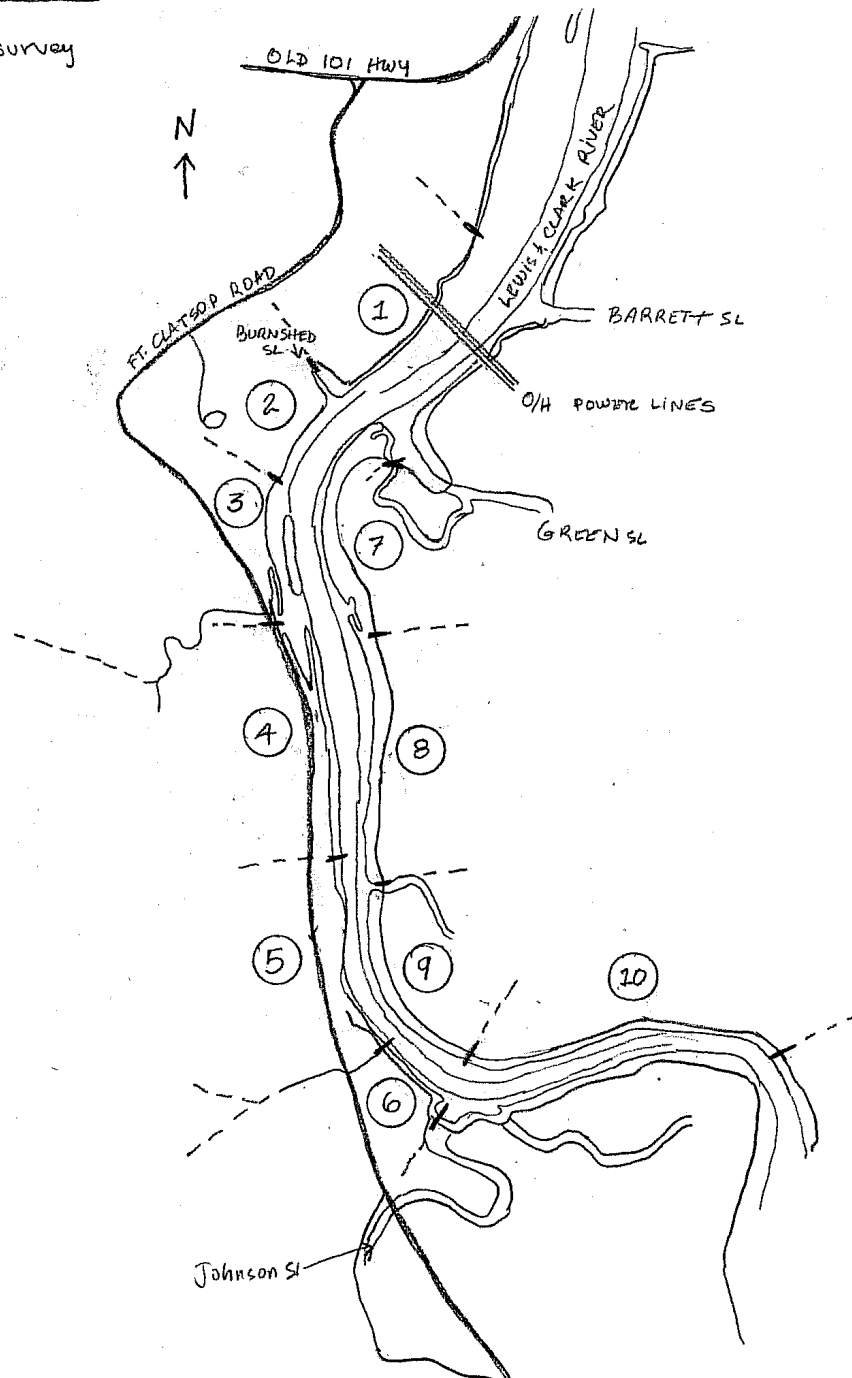
PSS/FON/P – Palustrine, Scrub-shrub/Forested, Floods under normal to high water conditions (N/P). Mixed conditions.
Typical Plants: *Picea sitchensis*, *Alnus rubra*, *Salix hookeriana*, *Pyrus fusca*.

Figure 6. Map of Units used for Tidal Vegetation Survey, 2003

FT CLATSOP NAT'L MEM - TIDAL VEGETATION SURVEY

① unit for survey

--- boundary



Appendix I. Habitat Data Sheets for Tidal Vegetation Survey, 2003

Elevation Codes: ADT – Above reach of Daily Tides
DT – Within range of Daily Tides

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 1 – Historic Association North (HANT) – ADT		
Land Owner	Fort Clatsop National Memorial	Dates	4-14-03, 7-22-03, 8-29-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Warrenton	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Scrub-Shrub Tidal, irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; E2EMP - Estuarine Emergent Irregularly flooded; E2EMN - Estuarine Tidal Emergent Regularly flooded			
Geologic Unit – Base Material		Recent Alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432838 m E/ 5109604 m N
		S boundary	432347 m E/ 5109393 m N

Hydrologic Description	Unit 1 is tidal, brackish to freshwater. Tidal cycle is mixed semi-diurnal, with an average height of 9 feet. Good large woody debris (root wads) along dike. Dike is sheathed with rip rap for most of its length. Sediment deposition in river has recently created larger benches and islands which are now vegetating.
Present & past use	Pre-dike and dredging, this area was part of tidally influenced flood plain and river edge. Vegetation was scrub-shrub, emergent and aquatic. Diking and ditching created higher strip, where conifers now grow. Formerly grazed, now fallow. Interior scrub-shrub wetland is heavily used by elk during winter months.

Dominant Vegetative Features					
Habitat type/Plant Community		Reed canarygrass / tall fescue			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Phalaris arundinacea</i>	FACW	above HT - PEMP			
<i>Festuca arundinacea</i>	FAC-	above HT - PMP			
<i>Salix hookeriana</i>	FACW+	above HT-PSSP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alnus rubra</i>	FAC	above HT - PFOP	<i>Rubus laciniatus</i>	FACU+	above HT -PSSP
<i>Angelica lucida</i>	FAC+	above HT - PEMP	<i>Rubus spectabilis</i>	FAC+	above HT - PSSP
<i>Athyrium filix-femina</i>	FAC+	above HT - PEMP	<i>Rubus ursinus</i>	FACU	above HT - PSSP
<i>Equisetum telmateia</i> var. <i>braunii</i>	FACW	above HT - PSSP	<i>Sambucus racemosa</i>	FACU	above HT - PSSP
<i>Holcus lanatus</i>	FAC	above HT - PEMP	<i>Taraxacum officinale</i>	FACU	above HT - PSSP
<i>Impatiens</i> sp. (no flrs)	FACW	above HT - PEMP	<i>Vicia gigantea</i>	nl	above HT -PSSP
<i>Lonicera involucrata</i>	FAC+	above HT -PSSP			
<i>Picea sitchensis</i>	FAC	above HT - PFOP	on floating log – partially anchored against bank:		
<i>Physocarpus capitatus</i>	FACW	above HT - PSSP	<i>Alnus rubra</i>	FAC	
<i>Polystichum munitum</i>	FACU	above HT - PSSP	<i>Carex obnupta</i>	OBL	
<i>Pyrus fusca</i>	FACW	above HT - PSSP	<i>Gaultheria shallon</i>	nl	
<i>Ribes divaricatum</i>	FAC	above HT -PSSP	<i>Elymus repens</i>	nl	
<i>Rosa nutkana</i>	FAC-	above HT - PSSP	<i>Lotus corniculatus</i>	FAC	
			<i>Hypochaeris radicata</i>	FACU	
			<i>Vaccinium ovatum</i>	nl	

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
<i>Holcus lanatus</i>	FAC			patches on grazed section of dike above HT
<i>Festuca arundinacea</i>	FAC-			patches on grazed section of dike above HT
<i>Phalaris arundinacea</i>	FACW			patches on grazed section of dike above HT
<i>Rubus laciniatus</i>	FACU+			sections of dike dominated by blackberry

Weed Management Concerns – Discuss by species:

Collectively these grasses can move into estuarine areas, especially upper marshes. Continued disturbance by cattle favors their spread. Suggest limiting cattle access to dikes for a few weeks each year, so they can graze intensively for a few days in each section.

Rubus – Blackberries are capable of crowding out a variety of native shrubs and trees. Propose brushing out (goats may help) and digging out crowns to reduce impact of this species on the shrub layer along the dikes.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 1 – Historic Association North (HANT) – DT		
Land Owner	Fort Clatsop National Memorial	Dates	4-14-03, 7-22-03, 8-29-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Warrenton	Published Information & Position	County Clatsop	Summary	State Oregon
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National Wetlands Inventory - Site Designations:

PSSP - Palustrine Scrub-Shrub Tidal, irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; E2EMP - Estuarine Emergent Irregularly flooded; E2EMN - Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Unconsolidated shore Regularly flooded; E1UBL - Estuarine Unconsolidated bottom Subtidal

Geologic Unit – Base Material Recent Alluvium

N boundary 432838 m E/ 5109604 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432347 m E/ 5109393 m N

Hydrologic Description Unit 1 is tidal, brackish to freshwater. Tidal cycle is mixed semi-diurnal, with an average height of 9 feet. Good large woody debris (root wads) along dike. Dike is sheathed with rip rap for most of its length. Sediment deposition in river has recently created larger benches and islands which are now vegetating.

Present & past use Pre-dike and dredging, this area was part of tidally influenced flood plain and river edge. Vegetation was scrub-shrub, emergent and aquatic. Diking and ditching created higher strip, where conifers now grow. Formerly grazed, now fallow. Interior scrub-shrub wetland is heavily used by elk during winter months.

Dominant Vegetative Features

Habitat type/Plant Community Softstem bulrush/ Lyngby's sedge (tidal strip)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - E2USN	<i>Scirpus acutus</i>	OBL	mid - upper tidal - E2EMN
<i>Eleocharis palustris</i>	OBL	lwr tidal - E2USN	<i>Carex lyngbyei</i>	OBL	upper tidal - E2EMN
<i>Lilaeopsis occidentalis</i>	OBL	lwr tidal - E2USN	<i>Deschampsia caespitosa</i>	OBL	upper tidal - E3EMN
<i>Scirpus tabernaemontani</i>	OBL	mid tidal - E2EMN			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	lwr tidal - E2USN	<i>Agrostis exarata</i>	FACW	upr tidal - E2EMN
<i>Sagittaria cuneata</i>	OBL	lwr tidal - E2USN	<i>Aster subspicatus</i>	FACW	upr tidal - E2EMN
<i>Triglochin maritima</i>	OBL	mid tidal - E2EMN	<i>Glyceria grandis</i>	OBL	upr tidal - E2EMN
			<i>Oenanthae sarmentosa</i>	OBL	upr tidal - E2EMN
<i>Bidens cernua</i>	FAW+	mid-upr tidal - E2EMN	<i>Peltandra virginica</i>	NI (OBL elsewhere)	upr tidal - E2EMN
<i>Juncus arcticus</i> var. <i>balticus</i>	OBL	mid-upr tidal - E2EMN	<i>Rumex conglomeratus</i>	FACW	upr tidal - E2EMN
<i>Juncus articulatus</i>	OBL	mid-upr tidal - E2USN	<i>Rumex crispus</i>	FAC+	upr tidal - E2EMN
<i>Potentilla egedii</i>	OBL	mid-upr tidal - E2EMN			
<i>Sium suave</i>	OBL	mid-upr tidal - E2EMN	<i>Achillea millefolium</i>	FACU	at/above HT - PEMP
<i>Scirpus cernuus</i>	OBL	mid-upr tidal - E2EMN	<i>Heracleum lanatum</i>	FAC+	above HT - PEMP
<i>Triglochin maritimum</i>	OBL	mid-upr tidal - E2EMN	<i>Iris pseudacorus</i>	OBL	above HT - PEMP
<i>Typha angustifolia</i>	OBL	mid-upr tidal - E2EMN	<i>Lotus corniculatus</i>	FAC	above HT - PEMP
			<i>Phalaris arundinacea</i>	FACW	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

North portion of unit is still grazed, and the differences in vegetation are clearly seen in plant distribution and abundance along the dike. The ungrazed portion is thick with shrubby species (willow, rose, ninebark, etc.) and provides shade over water in summer. The grazed portion is grasses, open, no shade. Sitka spruce trees are in good condition on the dike top.

Sediment deposition on the west side island is increasing the intertidal area of the wet island, which is rapidly colonizing with mid to upper tide species. *Scirpus* spp. dominate the island and growing shelf.

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
<i>Triglochin maritima</i>	OBL	10-432518E 5109252 N	one clump, mid tide
<i>Juncus arcticus</i> var. <i>balticus</i>	OBL	10-432558E 5109279N	extensive clumps on shelf

Rare Plant Management Concerns – Discuss by species:

Triglochin: this is the first known individual of this species in FOCL. It is in a unit that is not grazed, and will probably survive without any action by staff. Triglochin maritima is not a listed species, and healthy populations exist in the Columbia estuary.

Juncus arcticus var. balticus is not rare; this is the first known population in FCNM. Again, no special management practices are needed to maintain this population, which is extensive outside the park.

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
<i>Iris pseudacorus</i>	OBL		In marsh near dike.
<i>Phalaris arundinacea</i>	FACW		Patches on grazed section of dike, down into marsh

Weed Management Concerns – Discuss by species:

Shade is known to reduce the vigor of Phalaris arundinacea populations. Pesticides, burning and digging out are other options. This should be aggressively managed (reduced, pulled, burned, weeded) in park habitats to reduce spread into native marsh.

Iris – Dig out and remove.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 1 - Burnshed Slough – all tidal stages	
Land Owner	Fort Clatsop National Memorial	Dates 7-8-03, 8-29-03
Field Staff	K Sayce, N Eid	

USGS Quad Warrenton	Published Information & Position	Summary
	County Clatsop	State Oregon

National Wetlands Inventory - Site Designations:

PSSP - Palustrine Scrub-Shrub Tidal, irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; E2EMP - Estuarine Emergent Irregularly flooded; E2EMN - Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore Regularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432347 m E/ 5109393 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432347 m E/ 5109393 m N

Hydrologic Description Unit 1 is tidal, brackish to freshwater. Tidal cycle is mixed semi-diurnal, with an average height of 9 feet. Sediment deposition over past few years has altered elevations, bulrushes have established in former open mud bottom; signs of winter erosion of mud during high rainfall periods. It appears that the slough is rapidly becoming a much shallower drainage, covered with emergent vegetation.

Present & past use Historic diking along north edge, historic logging, fill along west end. To south, scrub shrub wetland has been left more or less intact, is now an excellent feature of park.

Dominant Vegetative Features

Habitat type/Plant Community Softstem bulrush / Lyngby's sedge

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	low tidal - E2ABN	<i>Carex lyngbyei</i>	OBL	upper tidal - E2EMN
<i>Eleocharis palustris</i>	OBL	lwr tidal - E2USN	<i>Deschampsia caespitosa</i>	OBL	upper tidal - E3EMN
<i>Lilaeopsis occidentalis</i>	OBL	lwr tidal - E2USN	<i>Phalaris arundinacea</i>	FACW	above HT - E2/PEMP
<i>Scirpus tabernaemontani</i>	OBL	mid tidal - E2EMN			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	lwr tidal - E2USN	<i>Agrostis exarata</i>	FACW	upr tidal - E2EMN
<i>Callitriche diversifolia</i>	OBL	low-mid tidal - E2USN	<i>Carex obnupta</i>	OBL	upr tidal - E2EMN
<i>Sagittaria cuneata</i>	OBL	low-mid tidal - E2US	<i>Oenanthe sarmentosa</i>	OBL	upr tidal - E2EMN
<i>Bidens cernua</i>	FAW+	mid-up tidal - E2EMN	<i>Plantago major</i>	FAC	upr tidal - E2EMN
<i>Lilaea scilloides</i>	OBL	mid-upr tidal - E2USN	<i>Rumex conglomeratus</i>	FACW	upr rtidal - E2EMN
<i>Potentilla egedii</i>	OBL	mid-up tidal - E2EMN	<i>Scirpus microcarpus</i>	OBL	upr tidal - E2EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - E2USN	dike bank:		
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	OBL	mid-up tidal - E2EMN	<i>Athyrium filix-femina</i>	FAC+	above HT - PEMP
<i>Scirpus cernuus</i>	OBL	mid-up tidal - E2EMN	<i>Lonicera involucrata</i>	FAC+	above HT - PSSP
<i>Sium suave</i>	OBL	mid-up tidal - E2EMN	<i>Lotus corniculatus</i>	FAC	above HT - E2EMP
			<i>Rosa nutkana</i>	FAC-	above HT - PSSP
			<i>Rubus ursinus</i>	FACU	above HT - PSSP
			<i>Salix hookeriana</i>	FACW+	above HT - PSSP
			<i>Spirea douglasii</i>	FACW	at/above HT - PEMP
			<i>Vicia gigantea</i>	nl	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

<u>Species</u>	<u>Status</u>	<u>Lat/Long (Grid used:</u>	<u>) Population Size/Condition</u>
Lilaea scilloides	ONHP L3		20-25 plants on open mud
Samolus valerandi ssp. parviflorus	ONHP L3		30-50 plants on open mud under overhanging shrubs

Rare Plant Management Concerns – Discuss by species:

Both species were considered rare in FOCL until this survey. They seem to be well distributed in many units and coexisting well under conditons of continual sediment accumulation in sloughs, marsh edges and intertidal benches.

Noxious Weed Species

<u>Species</u>	<u>Status</u>	<u>Lat/Long (Grid used:</u>	<u>) Population Size/Condition</u>
<i>Phalaris arundinacea</i>			Continuous meadow along north side of slough

Weed Management Concerns – Discuss by species:

Phalaris is keeping out native species along dike at this location. Suggest some sort of control (mowing, herbicide, shade cloth) to reduce population. In long term, planting trees will provide shade to reduce vigor. In short term, this grass is seriously reducing shoreline diversity.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 2 – Fort Clatsop North (FCN) – ADT		
Land Owner	Fort Clatsop National Memorial	Dates	4-14-03, 7-8-03, 8-27-03
Field Staff	K Sayce, N Eid		

USGS Quad	Warrenton	Published Information & Position	County	Clatsop	Summary	State	Oregon
National Wetlands Inventory - Site Designations:							
PFOP - Palustrine Forested Seasonal Irregularly flooded; PSSP - Palustrine Scrub Shrub Seasonal Irregularly flooded; PSSC - Palustrine Scrub-Shrub Seasonally wet; E2EMN - Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore (mud) Regularly flooded; E1UBL - Estuarine Subtidal Unconsolidated bottom							
Geologic Unit – Base Material				Recent Alluvium			
SCS Soil Type				Coquille silt loam			
					N boundary	432347 m E/ 5109393 m N	
					S boundary	432271 m E/ 5108914 m N	

Hydrologic Description	Unit 2 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Dike north of Canoe Landing may be made of wood. North half of unit is undiked, and floods back from river on regular high tides. Higher portion floods on winter spring and storm tides.
Present & past use	The main park area was clearcut some decades ago, but recent disturbance has been limited. This stretch of river now demonstrates good native habitat with little disturbance and few invasive species. It is a good example of riparian swamp and scrub shrub.

Dominant Vegetative Features					
Habitat type/Plant Community		Sitka spruce / Hooker's willow			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Picea sitchensis	FAC	above HT - PFOP			
Salix hookeriana	FACW+	at/above HT - FSSP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Adiantum pedatum	NI	above HT - PEMP	Lonicera involucrata	FAC+	above HT - PSSP
Agrostis exrata	FACW	above HT - PEMP	Physocarpus capitatus	FACW	above HT - PSSP
Angelica lucida	FAC+	above HT - PEMP	Prunus sp. (dom cherry)	nl	above HT - PSSP
Athyrium filix-femina	FAC+	above HT - PEMP	Pyrus fusca	FACW	above HT - PSSP
Daucus carota	nl	above HT - PEMP	Rhamnus purshiana	nl	above HT - PSSP
Festuca arundinacea	FAC-	above HT - PEMP	Ribes divaricatum	FAC	above HT - PSSP
Leontodon nudicaulis	nl	above HT - PEMP	Rosa nutkana	FAC-	above HT - PSSP
Lotus corniculatus	FAC	above HT - PEMP	Spirea douglasii	FACW	above HT - PEMP
Phalaris arundinacea	FACW	above HT - PEMP	Taraxacum officinale	FACU	above HT - PSSP
Rumex conglomeratus	FACW	above HT - PEMP	Vaccinium ovatum	nl	above HT - PSSP
			Vaccinium parvifolium	NI	above HT - PSSP
Alnus rubra	FAC	above HT - PFOP	On log:		
Dactylis glomerata	FACU	above HT - PSSP	Maianthemum dilatatum	FAC	above HT - PEMP
Gaultheria shallon	nl	above HT - PSSP	On tree:		
Hedera helix	nl	above HT - PSSP	Polypodium glycyrrhiza	nl	epiphyte
Hypochaeris radicata	FACU	above HT - PSSP			
Ilex aquifolium	nl	above HT - PSSP			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

For some decades this unit has revegetated naturally along the water, and the lack of alteration is obvious. This unit exhibits a very nice native riparian swamp to scrub shrub community. In addition, the overhanging trees provide year round shade on the water.

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Ilex aquifolium		One small tree seen	
Hedera helix		Growing on a snag, has been cut down in past	
Phalaris arundinacea		Scattered along water	
Prunus sp. (domestic cherry)		One tree seen	

Weed Management Concerns – Discuss by species:

Ilex aquifolium – cut down and dig out roots

Hedera helix – cut out of trees, dig up roots, and look for seedlings. Consider using glyphosate paste on stubs where removal is not possible.

Phalaris arundinacea – Shade offers the best non-herbicide control known. Continue to let conifers shade the bank and reduce light to this grass.

Prunus sp. (domestic cherry) no flowers or fruits seen, could be *P. avium* (sweet cherry), *P. cerasus* (sour cherry) or other domestic species. Recommend cutting down / wrenching out to remove from site. Watch for sprouts and seedlings.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 2 – Fort Clatsop North (FCN) – DT		
Land Owner	Fort Clatsop National Memorial	Dates	4-14-03, 7-8-03, 8-27-03
Field Staff	K Sayce, N Eid		

USGS Quad	Warrenton	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PFOP - Palustrine Forested Seasonal Irregularly flooded; PSSP - Palustrine Scrub Shrub Seasonal Irregularly flooded; PSSC - Palustrine Scrub-Shrub Seasonally wet; E2EMN - Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore (mud) Regularly flooded; E1UBL - Estuarine Subtidal Unconsolidated bottom			
Geologic Unit – Base Material		Recent alluvium	N boundary
			432347 m E/ 5109393 m N
SCS Soil Type		Coquille silt loam, Clatsop muck	S boundary
			432271 m E/ 5108914 m N

Hydrologic Description	Unit 2 is tidal, freshwater to brackish. Tidal cycle is diurnal, mixed, with an average range of 9 feet. South half has an old dike, perhaps made of wood. North half is not diked. Sediment deposition in river has recently created larger intertidal benches along this unit. Tidal portion of unit (west of river channel) floods regularly on high tides.
Present & past use	The main park area was clearcut some decades ago, but recent disturbance has been limited. This stretch of river now demonstrates good native habitat with little disturbance and few invasive species.

Dominant Vegetative Features					
Habitat type/Plant Community		Lyngby's sedge/Common spikerush (tidal strip)			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	low tidal - E2USN			
<i>Eleocharis palustris</i>	OBL	lower tidal - E2USN			
<i>Lilaeopsis occidentalis</i>	OBL	lower tidal - E2USN			
<i>Carex lyngbyei</i>	OBL	upper tidal - E2EMN			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Potamogeton sp.</i>	OBL	aquatic - floating	<i>Scirpus acutus</i>	OBL	upr tidal - E2EMN
<i>Alisma triviale</i>	OBL	lower tidal - E2USN	<i>Sium suave</i>	OBL	upr tidal - E2EMN
<i>Bidens cernua</i>	FAW+	mid tidal - E2USN	<i>Typha angustifolia</i>	OBL	upr tidal - E2EMN
<i>Lilaea scilloides</i>	OBL	mid tidal - E3USN	<i>Achillea millefolium</i>	FACU	at/above HT - E2EMN
<i>Sagittaria cuneata</i>	OBL	lower tidal - E2USN	<i>Agrostis exarata</i>	FACW	at/above HT - E2EMN
<i>Scirpus tabernaemontani</i>	OBL	mid tidal - E2USN	<i>Aster subspicatus</i>	FACW	at/above HT - E2EMN
<i>Potentilla egedii</i>	OBL	mid-up tidal - E2EMN	<i>Calamagrostis nutkaensis</i>	FACW	at/above HT - E2EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - E2EMN	<i>Daucus carota</i>	nl	at/above HT - E2EMN
<i>Rumex crispus</i>	FAC+	mid-up tidal - E2EMN	<i>Deschampsia caespitosa</i>	OBL	at/above HT - E2EMN
<i>Scirpus cernuus</i>	OBL	mid-up tidal - E2EMN	<i>Oenanthe sarmentosa</i>	OBL	at/above HT - E2EMP
<i>Samolus valerandi ssp. parviflorus</i>	OBL	mid-up tidal - E2EMN	<i>Rumex obtusifolius</i>	FAC	at/above HT - E2EMN
			<i>Solanum dulcamara</i>	FAC+	at/above HT - E2EMN
<i>Conioselinum pacificum</i>	FACW	upr tidal - E2EMN			
<i>Iris pseudacorus</i>	OBL	upr tidal - E2EMN			
<i>Lathyrus palustris</i>	OBL	upr tidal - E2EMN			
<i>Rumex conglomeratus</i>	FACW	upr tidal - E2EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
Lilaea scilloides	ONHP L3		Patchy in inlets along river
Sagittaria cuneata	not listed	10 432306E 51 09041N 10 432301E 51 09083N	Three patches along river on tidal flats
Samolus valerandi ssp. parviflorus	ONHP L3	10 432296E 51 09032N 10 432301E 51 09083N	2-3 dozen plants in side sloughs, some near Sagittaria

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
Iris pseudacorus		10 432417E 51 09183N	

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name River Unit 2/3 – Canoe Landing/Alder Slough (FCS-CL) – DT
Land Owner Fort Clatsop National Memorial **Dates** 4-14-03, 7-8-03
Field Staff K Sayce, N Eid

USGS Quad Warrenton **Published Information & Position** **County** Clatsop **State** Oregon

National Wetlands Inventory - Site Designations:

PFOF - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PSSC - Palustrine Scrub-Shrub Seasonally wet; PEMP – Palustrine Emergent Irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; R1SBN– Riverine Tidal Stream Bed (mud) Regularly flooded; E2EMN –Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore Regularly flooded; E1UB - Estuarine Subtidal Unconsolidated bottom

Geologic Unit – Base Material Recent alluvium

N boundary 432271 m E/ 5108914 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432271 m E/ 5108914 m N

Hydrologic Description Freshwater marsh and slough with tidegate at upland end, ringed by scrub-shrub and coniferous forest, slough floods on regular high tides, marsh floods on spring and storm tides, forested areas flood on extreme tides, runs to Lewis & Clark river; backed by dike on Ft Clatsop Road (where tidegate is placed in slough).

Present & past use Marsh was diked, ditched, grazed, planted; dike breeched in 1962 to restore normal tidal flow. Today shows signs of regular disturbance in abundance of reed canary grass. Assessed slough edges and lower portion of marsh, not main area of flats. The marsh was surveyed in 1995

Dominant Vegetative Features

Habitat type/Plant Community Lyngby's sedge/tufted hairgrass (tidal marsh)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	low tidal - R1USN	<i>Carex lyngbyei</i>	OBL	upr tidal - R1EMN
<i>Eleocharis palustris</i>	OBL	mid tidal - R1USN	<i>Carex obnupta</i>	OBL	upr tidal - R1EMN
<i>Lilaeopsis occidentalis</i>	OBL	mid tidal - R1USN	<i>Deschampsia caespitosa</i>	OBL	at/above HT - R1EMN
			<i>Phalaris arundinacea</i>	FACW	at/above HT - R1EMN

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Potamogeton crispus</i>	OBL	aquatic - free floating	<i>Agrostis exarata</i>	FACW	upr tidal - R1EMN
<i>Alisma triviale</i>	OBL	low-mid tidal - R1USN	<i>Epilobium ciliatum</i>	FACW-	upr tidal - R1EMN
<i>Bidens cernua</i>	FAW+	low- mid tidal -R1USN	<i>Glyceria grandis</i>	OBL	upr tidal-R1EMN
<i>Callitriche sp.</i>	OBL	mid tidal - R1USN	<i>Hordeum depressum</i>	FACW	upr tidal-R1EMN
<i>Lilaea scilloides</i>	OBL	mid tidal - R1USN	<i>Iris pseudacorus</i>	OBL	upr tidal - R1EMN
<i>Juncus articulatus</i>	OBL	mid-up tidal - RUSN	<i>Lathyrus palustris</i>	OBL	upr tidal - R1EMN
<i>Carex aquatilis</i> var. <i>dives</i>	OBL	mid-up tidal - R1EMN	<i>Plantago major</i>	FAC	upr tidal - R1EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal -R1EMN	<i>Polygonum amphibium</i> ssp. <i>emersum</i>	OBL	upr tide - R1EMN
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	OBL	mid-up tidal -R1EMN	<i>Potentilla egedii</i>	OBL	upr tidal - R1EMN
<i>Scirpus cernuus</i>	OBL	mid-up tidal - R1EMN	<i>Rorippa sp</i> (not <i>flring</i>)		upr tidal - R1EMN
<i>Scirpus tabernaemontani</i>	OBL	mid-up tidal - R1EMN	<i>Rumex conglomeratus</i>	FACW	upr tidal - R1EMN
<i>Spirodela punctata</i>	NI	mid-up tidal - R1USN	<i>Rumex crispus</i>	FAC+	upr tidal - R1EMN
			<i>Scirpus microcarpus</i>	OBL	upr tidal - R1EMN
			<i>Sium suave</i>	OBL	upr tidal - R1EMN
			<i>Typha angustifolia</i>	OBL	upr tidal - R1EMN
			<i>Typha latifolia</i>	OBL	upr tidal - R1EMN

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Note one *Deschampsia* plant appears to be white or alba instead of the more common purple in spike & flower color.

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	ONHP L3		2 sets rounded leaves
<i>Lilaea scilloides</i>	ONHP L3		Well distributed along banks of slough and near tidegate
<i>Glyceria grandis</i>		10 431043E 51 08819N	One clump, collected one spike; first sighting.
<i>Deschampsia caespitosa</i> f. <i>alba</i>			Note one white-flowered form growing along slough on edge of marsh

Rare Plant Management Concerns – Discuss by species:

This survey has found more populations of these rare species. It appears that current management practices are promoting the maintenance of *Samolus* and *Lilaea* plants. No changes are recommended.

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
<i>Phalaris arundinacea</i>	FACW		at/above HT; extensive meadows, west side and north end
<i>Iris pseudacorus</i>	OBL		one patch

Weed Management Concerns – Discuss by species:

Not certain that lotus can be effectively controlled without pesticides.

Non-native woody blackberries should be brushed out, recommend goats, herbicides, etc.

Phalaris arundinacea - reed canarygrass - without pesticides, controlled by altering water level and shade. This large population should be removed from the marsh, but no non-herbicide methods can be effective without damaging marsh.

Iris pseudacorus - dig out and remove, watch for seedlings.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 2/3 – Canoe Lndng/Alder Slough (FCS-CL) - ADT	
Land Owner	Fort Clatsop National Memorial	Dates 4-14-03, 7-8-03
Field Staff	K Sayce, N Eid	

USGS Quad Warrenton	Published Information & Position	Summary
	County Clatsop	State Oregon

National Wetlands Inventory - Site Designations:

PFOP - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PSSC - Palustrine Scrub-Shrub Seasonally wet; PEMP – Palustrine Emergent Irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; R1SBN– Riverine Tidal Stream Bed (mud) Regularly flooded; E2EMN –Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore Regularly flooded; E1UB - Estuarine Subtidal Unconsolidated bottom

Geologic Unit – Base Material Recent Alluvium

N boundary 432271 m E/ 5108914 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432271 m E/ 5108914 m N

Hydrologic Description Freshwater marsh and slough with tidegate at upland end, ringed by scrub-shrub and coniferous forest, slough floods on regular high tides, marsh floods on spring and storm tides, forested areas flood on extreme tides, runs to Lewis & Clark river; backed by dike on road (where tidegate is placed in slough).

Present & past use Marsh was diked, ditched, grazed, planted; dike breeched in 1962 to restore normal tidal flow. Today shows signs of regular disturbance in abundance of reed canary grass. Assessed slough edges and lower portion of marsh, not main area of flats.

Dominant Vegetative Features

Habitat type/Plant Community Red alder / Sitka spruce (above marsh)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Alnus rubra	FAC	above HT - PFOP			
Picea sitchensis	FAC	above HT - PFOP			
Salix hookeriana	FACW+	above HT - PFOP			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Achillea millefolium	FACU	at/above HT - PEMP	Lonicera involucrata	FAC+	above HT - PSSP
Aster subspicatus	FACW	at/above HT - PEMP	Pyrus fusca	FACW	above HT - PSSP
Oenanthе sarmentosa	OBL	at/above HT - PEMP	Ribes divaricatum	FAC	above HT - PSSP
<i>Solanum dulcamara</i>	FAC+	at/above HT - PEMP	Rosa nutkana	FAC-	above HT - PSSP
Spirea douglasii	FACW	at/above HT - PEMP	<i>Rubus laciniatus</i>	FACU+	above HT - PSSP
Trifolium wormskjoldii	FACW+	at/above HT -PEMP	Rubus spectabilis	FAC+	above HT - PSSP
			Rubus ursinus	FACU	above HT - PSSP
Athyrium filix-femina	FAC+	above HT - PEMP			
Bromus sitchensis	nl	above HT - PEMP			
<i>Erechtites minima</i>	nl	above HT - PEMP			
Galium aparine	FACU	above HT - PEMP			
Heracleum lanatum	FAC+	above HT - PEMP			
<i>Lotus corniculatus</i>	FAC	above HT- PEMP			
<i>Phalaris arundinaceae</i>	FACW	above HT- PEMP			
Scirpus microcarpus	OBL	up tidal - PEMP			
Vicia gigantea	nl	above HT - PEMP			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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<i>Rubus laciniatus</i>	FACU+	above HT; small population near mouth of slough	
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Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 3 – Fort Clatsop South (FCS) – ADT		
Land Owner	Fort Clatsop National Memorial	Dates	4-14-03, 7-8-03
Field Staff	K Sayce, N Eid		

USGS Quad	Warrenton	Published Information & Position	County Clatsop	Summary	State Oregon
National Wetlands Inventory - Site Designations:					
PFOP - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PEMP – Palustrine Emergent Irregularly flooded					
Geologic Unit – Base Material		Recent alluvium		N boundary 432271 m E/ 5108914 m N	
SCS Soil Type		Coquille silt loam, Clatsop muck		S boundary 432248 m E/ 5108525 m N	

Hydrologic Description	Unit 3 is tidal, slightly brackish to freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes may be held with logs. Higher portion floods on winter spring and storm tides. Islands and ridges (old dikes) form series of banded layers of vegetation. Tidegate on slough under road at south park boundary.
Present & past use	Formerly diked, original wetland cut up by road and tidegate. Historic log storage on main river. Has been left alone for several decades, now good example of naturally revegetated riparian buffer.

Dominant Vegetative Features					
Habitat type/Plant Community		Red alder / Hooker's willow			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Alnus rubra	FAC	above HT - PFOP			
Salix hookeriana	FACW+	above HT - PFOP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Athyrium filix-femina	FAC+	above HT - PEMP			
Bromus sitchensis	nl	above HT - PEMP			
Calystegia sepium	FAC	above HT - PSSP			
Erechtites minima	nl	above HT - PEMP			
Heracleum lanatum	FAC+	above HT - PEMP			
Lonicera involucrata	FAC+	above HT - PSSP			
Lotus corniculatus	FAC	above HT - PEMP			
Phalaris arundinaceae	FACW	above HT - PEMP			
Picea sitchensis	FAC	above HT - PFOP			
Pyrus fusca	FACW	above HT - PSSP			
Rubus laciniatus	FACU+	above HT - PSSP			
Rubus spectabilis	FAC+	above HT - PSSP			
Rumex crispus	FAC+	above HT - PEMP			
Spirea douglasii	FACW	above HT - PEMP			
Vicia gigantea	nl	above HT - PEMP			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 3 – Fort Clatsop South (FCS) – DT	
Land Owner	Fort Clatsop National Memorial	Dates 4-14-03, 7-8-03
Field Staff	K Sayce, N Eid	

USGS Quad	Warrenton	Published Information & Position	Summary
		County Clatsop	State Oregon

National Wetlands Inventory - Site Designations:

E2EMN –Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Tidal Unconsolidated shore Regularly flooded; E1UB - Estuarine Subtidal Unconsolidated bottom

Geologic Unit – Base Material Recent alluvium

N boundary 432271 m E/ 5108914 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432248 m E/ 5108525 m N

Hydrologic Description Unit 3 is tidal, slightly brackish to freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes may be held with logs. Higher portion floods on winter spring and storm tides. Islands and ridges (old dikes) form series of banded layers of vegetation. Tidegate on slough under road at south park boundary.

Present & past use Formerly diked, original wetland cut up by road and tidegate. Historic log storage on main river. Has been left alone for several decades, now good example of naturally revegetated riparian buffer.

Dominant Vegetative Features

Habitat type/Plant Community Lyngby's sedge / common spikerush (tidal strip)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - E2USN	<i>Carex lyngbyei</i>	OBL	upr tidal - E2EMN
<i>Eleocharis palustris</i>	OBL	mid tidal - E2EUSN	<i>Scirpus acutus</i>	OBL	upr tidal - E2EMN
<i>Lilaeopsis occidentalis</i>	OBL	mid tidal - E2EUSN	<i>Deschampsia caespitosa</i>	OBL	at/above HT - E2EMN

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	low-mid tidal - E2EUBN	<i>Aster subspicatus</i>	FACW	at/above HT - E2EMN
<i>Bidens cernua</i>	FAW+	low- mid tidal -E2UBN	<i>Iris pseudacorus</i>	OBL	at/above HT - E2EMN
			<i>Lythrum salicaria</i>	NI	at/above HT - E2EMN
<i>Juncus articulatus</i>	OBL	mid-up tidal - E2USN	<i>Oenanthe sarmentosa</i>	OBL	at/above HT - E2EMN
<i>Scirpus cernuus</i>	OBL	mid-up tidal - E2EMN			
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - E2USN			
<i>Agrostis exarata</i>	FACW	upr tidal - E2EMP			
<i>Carex obnupta</i>	OBL	upr tidal - E2EMN			
<i>Polygonum amphibium ssp. emersum</i>	OBL	upr tide - E2EMN			
<i>Potentilla egedii</i>	OBL	upr tidal - E2EMN			
<i>Rumex conglomeratus</i>	FACW	upr tidal - E2EMN			
<i>Scirpus microcarpus</i>	OBL	upr tidal - E2EMN			
<i>Sium suave</i>	OBL	upr tidal - E2EMN			
<i>Typha angustifolia</i>	OBL	upr tidal - E2EMN			
<i>Typha latifolia</i>	OBL	upr tidal - E2EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
Lythrum salicaria	NI	10 432262E 51 08730N	1 plant, dug out and removed 7/8/03
Iris pseudacorus	OBL	10 432272E 5108594N	2 plants
Calystegia sepium	nl		On dike along highway only
Phalaris arundinacea	FACW		Moderate-sized patch at south end

Weed Management Concerns – Discuss by species:

Iris - dig out and remove

Lythrum – monitor area for seedlings and other plants

Calystegia (morning-glory) - annual, remove pre-flowering plants next year and monitor thereafter

Phalaris – Aggressive grass crowds out native marsh species. Consider herbicides, shade, etc.

Field Data Form – Tidal Vegetation Survey

Unit Name River Unit 4 – Netul Landing North – Log Rafts

Land Owner Fort Clatsop Historical Association

Dates 7-8-03, 7-22-08, 8-25-03

Field Staff K Sayce, N Eid, H Brause

Published Information & Position Summary

USGS Quad Warrenton/Gearhart **County** Clatsop **State** Oregon

National Wetlands Inventory - Site Designations:

R1EMN – Riverine Tidal Emergent Regularly flooded (closest designation to floating structures, always in water, never on mud)

Geologic Unit – Base Material NA; plants are on old logs

N boundary 432248 m E/ 5108525 m N

SCS Soil Type NA

S boundary 432366m E/ 5107869 mN

Hydrologic Description Unit 4 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Log rafts are tied off on piles, and are always floating in the river

Present & past use The upland area was used for log storage and handling, the water for log booms (log storage in large rafted units). Numerous pilings (wood, metal) remain from this use. The remaining log rafts were the original central floats used to tie rafts off on either side.

Dominant Vegetative Features

Habitat type/Plant Community Douglas water-hemlock / American speedwell (on logs)

<u>Species</u>	<u>Indicator Status</u>	<u>Stratum</u>	<u>Species</u>	<u>Indicator Status</u>	<u>Stratum</u>
Cicuta douglasii	OBL	upr tide - R1EMN			
Impatiens X (spur, no spots)	FACW	above HT - R1EMN			
Myosotis laxa	OBL	upr tide - R1EMN			
Veronica americana	OBL	upr tide - R1EMN			

Other plant species present

<u>Species</u>	<u>Indicator Status</u>	<u>Stratum</u>	<u>Species</u>	<u>Indicator Status</u>	<u>Stratum</u>
Achillea millefolium	FACU	at/above HT - R1EMN	Juncus articulatus	OBL	mid-up tidal - R1USN
Agrostis exarata	FACW	upr tidal - R1EMP	Lemna minor	OBL	upr tidal-R1USN
Aster subspicatus	FACW	at/above HT - R1EMN	Lotus corniculatus	FAC	above HT- R1EMPV
Bidens frondosa	FACW+	above HT-R1EMN	Luzula sp.	FAC	above HT - R1EMN
Callitriche sp.	OBL	upr tidal - R1USN	Lycopus americana	OBL	upr tide - R1EMN
Carex obnupta	OBL	upr tide - R1EMN	Mentha x piperita	OBL	upr tide - R1EMN
Carex stipata	OBL	above HT - R1EMN	Parentucellia viscosa	FAC-	above HT - R1EMN
Epilobium ciliatum	FACW-	upr tidal - R1EMN	Rumex conglomeratus	FACW	upr tide - R1EMN
Erectites minima	nl	above HT - R1EMN	Solanum dulcamara	FAC+	upr tide - R1EMN
Holcus lanatus	FAC	above HT - R1EMN			
Hydrocotyle ranunculoides	OBL	upr tidal - R1ABN			
Iris pseudacorus	OBL	at/above HT - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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<i>Iris pseudacorus</i>	OBL		Many clumps on floating logs
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Weed Management Concerns – Discuss by species:

While ownership of piling/raft areas is not known, it is to the benefit of FOCL to remove Iris clumps from the logs and keep them from re-establishing.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 4 – Netul Landing North (NLN) - ADT	
Land Owner	Fort Clatsop Historical Association	Dates 7-8-03, 7-22-03
Field Staff	K Sayce, N Eid, H Brause	

USGS Quad	Warrenton/Gearhart	Published Information & Position	Summary
		County Clatsop	State Oregon

National Wetlands Inventory - Site Designations:

PFOP - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PEMP – Palustrine Emergent Irregularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432248 m E/ 5108525 m N

SCS Soil Type Coquille silt loam, various fill materials

S boundary 432366m E/ 5107869 mN

Hydrologic Description Unit 4 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes are held with logs. Higher portion floods on winter spring and storm tides. Old dikes form series of banded layers of vegetation. Tidegate on slough under road at former south park boundary, north end of this unit. This unit contains high quality willow shrub and cattail marsh habitat, with a low element of invasive non-native species.

Present & past use The upland area was used for log storage and handling, the water for log booms (log storage in large rafted units). Numerous pilings (wood, metal) remain from this use. The yard is being relandscaped for shuttle parking and waterside access, woody strip will be left along water, with a riverside trail to main park area.

Dominant Vegetative Features

Habitat type/Plant Community Red alder / Hooker's willow (above tidal strip)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Alnus rubra	FAC	above HT - PFOP			
Salix hookeriana	FACW+	above HT - PFOP			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Achillea millefolium	FACU	at/above HT - PEMP	Picea sitchensis	FAC	above HT - PFOP
Angelica lucida	FAC+	above HT - PEMP	<i>Prunus sp. (dom. cherry)</i>	nl	above HT - PFOP
Aster subspicatus	FACW	at/above HT - PEMP	Rhamnus purshiana	nl	above HT - PSSP
Athyrium filix-femina	FAC+	above HT - PEMP	Ribes divaricatum	FAC	above HT - PSSP
<i>Calystegia sepium</i>	FAC	above HT - PSSP	<i>Rubus laciniatus</i>	FACU+	above HT - PSSP
Heracleum lanatum	FAC+	above HT - PEMP	Rubus spectabilis	FAC+	above HT - PSSP
Lonicera involucrata	FAC+	above HT - PSSP	Rubus ursinus	FACU	above HT - PSSP
Oenanthe sarmentosa	OBL	at/above HT - PEMP	Salix lucida ssp. lasiandra	FACW+	above HT - PFOP
<i>Lotus corniculatus</i>	FAC	above HT - PEMP	Salix sp - lg leaf		above HT - PSSP
<i>Phalaris arundinaceae</i>	FACW	above HT - PEMP	Sambucus racemosa	FACU	above HT - PSSP
<i>Rumex crispus</i>	FAC+	above HT - PEMP	Spirea douglasii	FACW	above HT - PSSP
Vicia gigantea	nl	above HT - PEMP	Tsuga heterophylla	FACU+	above HT - PFOP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Calystegia sepium

nl

Phalaris arundinaceae

Prunus sp. (dom. cherry)

Rubus laciniatus

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 4 – Netul Landing North (NLN) – DT	
Land Owner	Fort Clatsop Historical Association	Dates 7-8-03, 7-22-03
Field Staff	K Sayce, N Eid, H Brause	

USGS Quad	Warrenton/Gearhart	Published Information & Position	Summary
		County Clatsop	State Oregon

National Wetlands Inventory - Site Designations:

PEMP – Palustrine Emergent Irregularly flooded; R1EMN – Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Estuarine (Subtidal) Unconsolidated bottom

Geologic Unit – Base Material Recent alluvium

N boundary 432248 m E/ 5108525 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432366m E/ 5107869 mN

Hydrologic Description Unit 4 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes may be held with logs. Higher portion floods on winter spring and storm tides. Islands and ridges (old dikes) form series of banded layers of vegetation. Tidegate on slough under road at former south park boundary, north end of this unit. This unit contains high quality cattail/willow marsh habitat, with a low element of invasive non-native species.

Present & past use The upland area was used for log storage and handling, the water for log booms (log storage in large rafted units). Numerous pilings (wood, metal) remain from this use. The yard is being relandscaped for shuttle parking and waterside access. A riveride trail is planned between this unit and the main park area.

Dominant Vegetative Features

Habitat type/Plant Community Lyngby's sedge / common spike-rush (tidal strip)

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - R1USN	<i>Carex lyngbyei</i>	OBL	upr tidal - R1EMN
<i>Eleocharis palustris</i>	OBL	mid tidal - R1EUSN	<i>Typha angustifolia</i>	OBL	upr tidal - R1EMN
<i>Lilaeopsis occidentalis</i>	OBL	mid tidal - R1EUSN			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	low-mid tidal - R1USN	<i>Agrostis exarata</i>	FACW	upr tidal - R1EMN
<i>Lemna minor</i>	OBL	low-mid tidal - R1USN	<i>Carex obnupta</i>	OBL	upr tidal - R1EMN
			<i>Deschampsia caespitosa</i>	OBL	upr tidal - R1EMN
<i>Bidens cernua</i>	FAW+	mid tidal - R1USN	<i>Polygonum amphibium ssp. emersum</i>	OBL	upr tide - E2EMN
<i>Callitriche stagnalis</i>	OBL	mid tidal - R1USN	<i>Potentilla egedii</i>	OBL	upr tidal - R1EMN
<i>Juncus articulatus</i>	OBL	mid tidal - R1USN	<i>Rumex conglomeratus</i>	FACW	upr tidal - R1EMN
<i>Lilaea scilloides</i>	OBL	mid tidal - R1USN	<i>Rumex crispus</i>	FAC+	upr tidal - R1EMN
<i>Polygonum hydropiperoides</i>	OBL	mid tidal - R1EMN	<i>Rumex obtusifolius</i>	FAC	upr tidal - R1EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - R1USN	<i>Scirpus microcarpus</i>	OBL	upr tidal - R1EMN
<i>Scirpus cernuus</i>	OBL	mid tidal - R1EMN	<i>Sium suave</i>	OBL	upr tidal - R1EMN
<i>Scirpus tabernaemontanii</i>	OBL	mid-upr tidal - R1EMN	<i>Solanum dulcamara</i>	FAC+	upr tide - R1EMN
			<i>Typha angustifolia</i>	OBL	upr tidal - R1EMN
			<i>Typha latifolia</i>	OBL	upr tidal - R1EMN

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
Typha angustifolia	Not listed		
Lilaea scilloides	ONHP L3		Well distributed along banks of slough and near tidegate

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
Prunus sp. (domestic cherry)			Above HT on bank; several trees seen
Phalaris arundinacea			Patchy in unit, some extensive areas on open dike
Rubus armeniacus			Extensive patches along dikes over water.

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 5 - Netul Landing South (NLS) - ADT 1 (native sp.)		
Land Owner	Fort Clatsop Historical Association	Dates	4-14-03, 6-24-03, 7-8-03, 7-23-03, 8-24-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Gearhart, Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon

National Wetlands Inventory - Site Designations:

PFOP - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PEMP – Palustrine Emergent Irregularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432366m E/ 5107869 mN

SCS Soil Type Coquille silt loam, various fill materials

S boundary 432527 m E/ 5107250 m N

Hydrologic Description Unit 5 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes are held with logs. Higher portion floods on winter spring and storm tides. Old dikes form series of banded layers of vegetation.

Present & past use The upland area was used for log storage and handling, the water for log booms. The yard is being relandscaped for shuttle parking and waterside access, woody to shrubby strip will be left along water. Highly disturbed unit, former use as log yard brought in many non-native species. Marsh & scrub-shrub along water are lush and diverse.

Dominant Vegetative Features

Habitat type/Plant Community red alder / Hooker's willow

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Alnus rubra	FAC	above HT - PFOP			
Salix hookeriana	FACW+	above HT - PFOP			
Salix lucida ssp. lasiandra	FACW+	above HT - PFOP			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Athyrium filix-femina	FAC+	above HT - PEMP	Rhamnus purshiana	nl	above HT - PSSP
Cardamine oligosperma	FAC	above HT - PEMP	Ribes divaricatum	FAC	above HT - PSSP
Equisetum telmateia var. braunii	FACW	above HT - PSSP	Ribes laxiflorum	nl	above HT - PSSP
Juncus effusus var. pacificus	FACW	above HT - PEMP	Rubus parviflorus	FAC-	above HT - PSSP
Lonicera involucrata	FAC+	above HT - PSSP	Rubus spectabilis	FAC+	above HT - PSSP
Lonicera periclymenum	nl	above HT - PSSP	Rubus ursinus	FACU	above HT - PSSP
Physocarpus capitatus	FACW	above HT - PSSP	Sambucus racemosa	FACU	above HT - PSSP
Picea sitchensis	FAC	above HT - PFOP	Tellima grandiflora	NI	above HT - PSSP
Polypodium glycyrrhiza (on willow)	nl	above HT - PFOP	Tsuga heterophylla	FACU+	above HT - PFOP
Polystichum munitum	FACU	above HT - PSSP	Urtica dioica	FAC+	above HT - PSSP
Pteridium aquilinum	FACU	above HT - PSSP	Vaccinium parvifolium	NI	above HT - PFOP
Pyrus fusca	FACW	above HT - PSSP	Vicia gigantea	nl	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

This section is being converted to overflow parking for shuttle service to main park area. The former log storage yard is highly disturbed by various kinds of fill (construction rubble, old paving, dredge materials, etc.) Along the water, logs, rock and concrete rip rap and metal were used to harden the intertidal to above tidal shoreline. This shoreline is lush with plants, many of them not native.

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
Phalaris arundinaceae	FACW		Patches along dike and in upland
Rubus armeniacus	FACU		Patches along dike hanging into water
Rubus laciniatus	FACU+		Patches along dike hanging into water
Prunus lauroceras	nl		(understory plant) 3 trees on shore
Lonicera periclyminum	nl		(vine) Patch (50 ft wide) on shore
Cytisus scoparius	nl		Few plants growing along shore, many above in uplands

Weed Management Concerns – Discuss by species:

Phalaris – Plant trees that will in time shade out this grass

Rubus spp. – Chop out, dig out crowns, consider goats for annual clearing, and work to reduce/eliminate from landscape.

Prunus lauroceras (cherry laurel) – Cut down, dig out stump or treat with appropriate stump herbicide, watch for and remove smaller plants. Birds eat fruit and spread seeds around, so seeds are often spread 100s yards from fruiting plants.

Lonicera periclyminum (honeysuckle) – Cut down, dig out roots, or treat stump with appropriate herbicide.

Cytisus (Scots broom) – Brush out old plants, pull stumps. Consider goats for annual clearing, be prepared to spend years pulling seedlings as plant has very long-lived seeds.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 5 - Netul Landing South (NLS) - ADT 2 (introduced sp.)		
Land Owner	Fort Clatsop Historical Association	Dates	4-14-03, 6-24-03, 7-8-03, 7-23-03, 8-24-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Gearhart, Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon

National Wetlands Inventory - Site Designations:

PFOP - Palustrine Forested Irregularly flooded; PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; PEMP – Palustrine Emergent Irregularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432366m E/ 5107869 mN

SCS Soil Type Coquille silt loam, various fill materials

S boundary 432527 m E/ 5107250 m N

Hydrologic Description Unit 5 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes are held with logs. Higher portion floods on winter spring and storm tides. Old dikes form series of banded layers of vegetation.

Present & past use The upland area was used for log storage and handling, the water for log booms. The yard is being relandscaped for shuttle parking and waterside access, woody to shrubby strip will be left along water. Highly disturbed unit, former use as log yard brought in many non-native species. Marsh & scrub-shrub along water are lush and diverse.

Dominant Vegetative Features

Habitat type/Plant Community Scots broom / Himalayan blackberry

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Cytisus scoparius</i>	nl	above HT - PSSP			
<i>Rubus armeniacus</i>	FACU	above HT - PSSP			
<i>Rubus laciniatus</i>	FACU+	above HT - PSSP			
<i>Phalaris arundinaceae</i>	FACW	above HT- PEMP			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Calystegia sepium</i>	FAC	above HT - PSSP	<i>Plantago lanceolata</i>	FACU+	above HT - PEMP
<i>Digitalis purpurea</i>	FACU	above HT - PEMP	<i>Prunus lauroceras</i>	nl	above HT - PSSP
<i>Erectites minima</i>	nl	above HT - R1EMP	<i>Rumex conglomeratus</i>	FACW	upr tidal - PEMP
<i>Holcus lanatus</i>	FAC	above HT - PEMP	<i>Salix alba var. vitellina</i>	FACW	above HT - PFOP
<i>Hypochaeris radicata</i>	FACU	above HT - PEMP	<i>Senecio jacobaea</i>	FACU	above HT - PEMP
<i>Ilex aquifolium</i>	nl	above HT - PFOP	<i>Sonchus arvensis</i>	FACU+	above HT - PEMP
<i>Lathyrus latifolius</i>	nl	above HT - PSSP	<i>Sorbus aucuparia</i>	nl	above HT - PSSP
<i>Lathyrus sp (on log, no flowers, not identified)</i>					
<i>Leontodon nudicaulis</i>	nl	above HT-PEMP			
<i>Lonicera periclymenum</i>	nl	above HT - PSSP			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 5 - Netul Landing South (NLS) - DT		
Land Owner	Fort Clatsop Historical Association	Dates	4-14-03, 6-23-03, 6-24-03, 7-8-03, 7-23-03, 8-24-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Gearhart	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PEMP – Palustrine Emergent Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Estuarine (Subtidal) Unconsolidated bottom			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, various fill materials	
		N boundary	432366m E/ 5107869 mN
		S boundary	432527 m E/ 5107250 m N

Hydrologic Description	Unit 5 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Some old dikes are held with logs. Higher portion floods on winter spring and storm tides. Old dikes form series of banded layers of vegetation, also extensive rock fill along dike.
Present & past use	The upland area was used for log storage and handling, the water for log booms (log storage in large rafted units). Numerous pilings (wood, metal) remain from this use. The yard is being relandscaped for shuttle parking and waterside access, woody to shrubby strip will be left along water. Most disturbed unit, urbanization.

Dominant Vegetative Features					
Habitat type/Plant Community		Lygnby's sedge / common spikerush			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - R1USN			
<i>Eleocharis palustris</i>	OBL	mid tidal - R1USN			
<i>Lilaeopsis occidentalis</i>	OBL	mid tidal - R1USN			
<i>Carex lyngbyei</i>	OBL	upr tidal - R1EMN			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	low-mid tidal - R1USN	<i>Rumex crispus</i>	FAC+	upr tidal - R1EMN
<i>Callitriche diversifolia</i>	OBL	low-mid tidal - R1 USN	<i>Sium suave</i>	OBL	upr tidal - R1EMN
<i>Ruppia maritima</i>	OBL	low-mid tidal - R1 USN	<i>Achillea millefolium</i>	FACU	at/above HT - PEMP
<i>Sagittaria cuneata</i>	OBL	low-mid tidal - R1USN	<i>Aster subspicatus</i>	FACW	at/above HT - PEMP
<i>Bidens cernua</i>	FAW+	mid tidal -R1USN	<i>Deschampsia caespitosa</i>	OBL	at/above HT - R1EMN
<i>Lilaea scilloides</i>	OBL	mid tidal - R1USN	<i>Hypericum scouleri</i> ssp. <i>scouleri</i>	FAC	at/above HT - R1EMN
<i>Scirpus cernuus</i>	OBL	mid tidal - R1EMN	<i>Iris pseudacorus</i>	OBL	at/above HT - R1EMN
<i>Juncus articulatus</i>	OBL	mid-up tidal - R1EMN	<i>Oenanthe sarmentosa</i>	OBL	at/above HT - PEMP
<i>Polygonum hydropiperoides</i>	OBL	mid-up tidal - R1EMN	<i>Trifolium wormskjoldii</i>	FACW+	at/above HT -PEMP
<i>Scirpus tabernaemontanii</i>	OBL	mid-up tidal - R1EMN			
<i>Carex obnupta</i>	OBL	upr tidal - R1EMN	<i>Angelica lucida</i>	FAC+	above HT- PEMP
<i>Cicuta douglasii</i>	OBL	upr tidal - R1EMN	<i>Heracleum lanatum</i>	FAC+	above HT - PEMP
<i>Conioselinum pacificum</i>	FACW	upr tidal - R1EMN	<i>Lotus corniculatus</i>	FAC	above HT- PEMP
<i>Lathyrus palustris</i>	OBL	upr tidal - R1EMN	<i>Spirea douglasii</i>	FACW	above HT - PSSP
<i>Lysichiton americanus</i>	OBL	upr tidal - R1EM			
<i>Potentilla egedii</i>	OBL	upr tidal - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
Lilaea scilloides	ONHP L3		Unknown, a few plants seen

Rare Plant Management Concerns – Discuss by species:

While Lilaea is considered rare, as the survey progressed, new plants and in general extensive populations were found. It appears that no management actions will be needed to maintain this species at present numbers.

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
<i>Phalaris arundinaceae</i>	FACW		Patches at upper edge of marsh along dike
<i>Iris pseudacorus</i>	OBL		1 plant growing along shore

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 6 – West Shore South Terminus (WSST) – ADT		
Land Owner	Fort Clatsop Historical Association	Dates	6-23-03, 7-8-03, 7-23-03, 8-24-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Forested/Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432527 m E/ 5107250 m N
		S boundary	432710 m E/ 5107044 m N

Hydrologic Description	Unit 6 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.
Present & past use	Historic diking divided floodplain to west and south. Tidegate at south end of unit on dike. Signs of grazing into WSST along river from south end (adjacent cattle farm). Mid to north portions are recovering riparian forest habitat.

Dominant Vegetative Features					
Habitat type/Plant Community		Red alder / Hooker's willow			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Rubus laciniatus</i>	FACU+	above HT - PSSP			
<i>Alnus rubra</i>	FAC	above HT - PFOP			
<i>Phalaris arundinaceae</i>	FACW	above HT - PEMP			
<i>Salix hookeriana</i>	FACW+	above HT - PFOP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Athrium filix-femina</i>	FAC+	above HT - PEMP	<i>Rosa nutkana</i>	FAC-	above HT - PSSP
<i>Cirsium arvense</i>	FAC-	above HT - PEMP	<i>Rubus armeniacus</i>	FACU	above HT - PSSP
<i>Equisetum telmateia</i> var. <i>braunii</i>	FACW	above HT - PSSP	<i>Rubus spectabilis</i>	FAC+	above HT - PSSP
<i>Hedera helix</i>	nl	above HT - PFOP	<i>Rubus ursinus</i>	FACU	above HT - PSSP
<i>Lonicera involucrata</i>	FAC+	above HT - PSSP	<i>Sambucus racemosa</i>	FACU	above HT - PSSP
<i>Polystichum munitum</i>	FACU	above HT - PSSP	<i>Vicia gigantea</i>	nl	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Cirsium arvense	FAC-		
Hedera helix	nl		
Phalaris arundinaceae	FACW		

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 6 – West Shore South Terminus (WSST) – DT		
Land Owner	Fort Clatsop Historical Association	Dates	6-23-03, 7-8-03, 7-23-03, 8-24-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	County Clatsop	Summary	State Oregon
National Wetlands Inventory - Site Designations:					
PEMP – Palustrine Emergent Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Riverine (Subtidal) Unconsolidated bottom					
Geologic Unit – Base Material		Recent Alluvium		N boundary	432527 m E/ 5107250 m N
SCS Soil Type		Coquille silt loam, Clatsop muck		S boundary	432710 m E/ 5107044 m N

Hydrologic Description	Unit 6 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.
Present & past use	Historic diking divided floodplain to west and south. Tidegate at south end of unit on dike. Signs of grazing into WSST along river from south end (adjacent cattle farm). Mid to north portions are recovering riparian forest habitat.

Dominant Vegetative Features					
Habitat type/Plant Community		Lyngby's sedge / common spikerush			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - R1USN			
Eleocharis palustris	OBL	mid tidal - R1USN			
Carex lyngbyei	OBL	up tidal - R1EMN			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Potamogeton gramineus	OBL	aquatic - floating	Aster subspicatus	FACW	at/above HT - R1EMP
Callitriche sp.	OBL	mid tidal - R1USN	Cicuta douglasii	OBL	at/above HT - R1EMP
Lilaeopsis occidentalis	OBL	mid tidal - R1USN	Deschampsia caespitosa	OBL	at/above HT - R1EMP
Juncus articulatus	OBL	mid-up tidal - R1USN	<i>Erectites minima</i>	nl	above HT - PEMP
<i>Myriophyllum aquaticum</i>	OBL	mid-upr tidal - R1USN	Galium aparine	FACU	at/above HT - PEMP
Polygonum hydropiperoides	OBL	mid-up tidal - R1USN	Heracleum lanatum	FAC+	above HT - PEMP
Typha angustifolia	OBL	mid-up tidal - R1EMN	Impatiens sp. (no flrs)	FACW	above HT - PEMP
Carex obnupta	OBL	upr tidal - R1EMN	<i>Juncus effusus var. effusus</i>	FACW	at/above HT - PEMP
Distichlis spicata	FAC+	upr tidal - R1EMN	<i>Juncus effusus var. pacificus</i>	FACW	at/above HT - PEMP
Potentilla egedii	OBL	upr tidal - R1EMN	<i>Lotus corniculatus</i>	FAC	above HT - PEMP
Hordeum depressum	FACW	upr tidal - R1EMN	Oenanthe sarmentosa	OBL	at/above HT - R1EMP
Lathyrus palustris	OBL	upr tidal - R1EMN	<i>Ranunculus repens</i>	FACW	above HT - R1EMP
<i>Peltandra virginica</i>	NI (OBL elsewhere)	upr tidal - R1EMN	Trifolium worms kjoldii	FACW+	at/above HT - R1EMP
<i>Rumex crispus</i>	FAC+	upr tidal - R1EMN			
Scirpus acutus	OBL	upr tidal - R1EMN			
Scirpus microcarpus	OBL	upr tidal - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Myriophyllum aquaticum	OBL	Saw floating fragments while in this unit	
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Weed Management Concerns – Discuss by species:

Myriophyllum sp. needs to be identified. May be native, could be Eurasian or other.

Field Data Form – Tidal Vegetation Survey

Unit Name River Unit 7– Ft Clatsop Green Slough (FCGS) –ADT
Land Owner Fort Clatsop National Memorial (FOCL) **Dates** 6-24-03, 8-25-03
Field Staff K Sayce, N Eid, H Brause

USGS Quad Astoria **Published Information & Position Summary**
County Clatsop **State** Oregon

National Wetlands Inventory - Site Designations:

PSSP - Palustrine Scrub-Shrub Tidal, irregularly flooded; PEMA - Palustrine Emergent Temporarily wet; E2EMP - Estuarine Emergent Irregularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432669 m E/ 5108947 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432390 m E/ 5108882 m N

Hydrologic Description Unit 2 is tidal, brackish to freshwater. Tidal cycle is mixed semi-diurnal, with an average height of 9 feet. Good large woody debris (root wads) along dike. Dike does not appear to be sheathed. Sediment deposition in river has recently created larger benches below marshes, which are now vegetating.

Present & past use Pre-dike and dredging, this area was part of tidally influenced flood plain and river edge. Vegetation was scrub-shrub, emergent and aquatic. Sitka spruce were planted on dike 5-2002. Grazing continues to keep vegetation low in south & east of Unit 2.

Dominant Vegetative Features

Habitat type/Plant Community

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Phalaris arundinacea</i>	FACW	above HT - PEMP			
<i>Picea sitchensis</i>	FAC	above HT - PFOP			
<i>Salix hookeriana</i>	FACW+	at/above HT - FSSP			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Angelica lucida</i>	FAC+	above HT - PEMP	<i>Alnus rubra</i>	FAC	above HT -PFOP
<i>Barbarea</i> sp.			<i>Ilex aquifolium</i>	nl	above HT - PFOP
<i>Heracleum lanatum</i>	FAC+	above HT - PEMP	<i>Lonicera involucrata</i>	FAC+	above HT -PSSP
<i>Lotus corniculatus</i>	FAC	above HT - PEMP	<i>Polypodium glycyrrhiza</i> (on willow)	nl	
<i>Rumex conglomeratus</i>	FACW	above HT - PEMP	<i>Polystichum munitum</i>	FACU	above HT - PSSP
			<i>Pyrus fusca</i>	FACW	above HT - PSSP
			<i>Rhamnus purshiana</i>	nl	above HT - PSSP
			<i>Ribes divaricatum</i>	FAC	above HT -PSSP
			<i>Ribes laxiflorum</i>	nl	above HT - PSSP
			<i>Rosa nutkana</i>	FAC-	above HT - PSSP
			<i>Rubus armeniacus</i>	FACU	above HT - PSSP
			<i>Rubus laciniatus</i>	FACU+	above HT - PSSP
			<i>Rubus spectabilis</i>	FAC+	above HT - PSSP
			<i>Sambucus racemosa</i>	FACU	above HT - PSSP
			<i>Vaccinium ovatum</i>	nl	at/above HT - PSSP
			<i>Vicia gigantea</i>	nl	above HT -PSSP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:	)	Population Size/Condition
<i>Phalaris arundinacea</i>	FACW			Widespread on dike
<i>Rubus armeniacus</i>	FACU			Limited to South end of unit
<i>Rubus laciniatus</i>	FACU+			Limited to South end of unit

Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 7 – Ft Clatsop Green Slough (FCGS) – DT		
Land Owner	Fort Clatsop National Memorial (FOCL)	Dates	6-24-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Astoria	Published Information & Position	Summary
		County	State
		Clatsop	Oregon

National Wetlands Inventory - Site Designations:

E2EMP - Estuarine Emergent Irregularly flooded; E2EMN - Estuarine Tidal Emergent Regularly flooded; E2USN - Estuarine Unconsolidated shore Regularly flooded; E1UBL - Estuarine Unconsolidated bottom Subtidal

Geologic Unit – Base Material Recent alluvium

N boundary 432669 m E/ 5108947 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432390 m E/ 5108882 m N

Hydrologic Description Unit 2 is tidal, brackish to freshwater. Tidal cycle is mixed semi-diurnal, with an average height of 9 feet. Good large woody debris (root wads) along dike. Dike does not appear to be sheathed. Sediment deposition in river has recently created larger benches below marshes, which are now vegetating.

Present & past use Pre-dike and dredging, this area was part of tidally influenced flood plain and river edge. Vegetation was scrub-shrub, emergent and aquatic. Diking and ditching created higher strip, where some conifers now grow. Grazing continues to keep vegetation low in south & east of Unit 2. Sitka spruce planted on dike 5-2002.

Dominant Vegetative Features

Habitat type/Plant Community Lyngby's sedge/ hardstem bulrush

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - E2USN	<i>Scirpus acutus</i>	OBL	mid - upper tidal - E2EMN
<i>Eleocharis palustris</i>	OBL	mid tidal - E2USN	<i>Carex lyngbyei</i>	OBL	upr tidal - E2EMN
<i>Lilaeopsis occidentale</i>	OBL	mid tidal - E2USN	<i>Salix hookeriana</i>	FACW	above HT - PSSP
<i>Scirpus tabernaemontani</i>	OBL	mid tidal - E2EMN			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Potamogeton crispus</i>	OBL	aquatic - floating	<i>Agrostis exarata</i>	FACW	upr tidal - E2EMN
<i>Alisma triviale</i>	OBL	lower tidal - E2USN	<i>Achillea millefolium</i>	FACU	upr tidal - E2EMN
<i>Sagittaria cuneata</i>	OBL	lower tidal - E2USN	<i>Aster subspicatus</i>	FACW	upr tidal - E2EMN
<i>Polygonum hydropiperoides</i>	OBL	mid-tidal - E2USN	<i>Cicuta douglasii</i>	OBL	upr tidal - E2EMN
<i>Triglochin maritima</i>	OBL	mid tidal - E2EMN	<i>Conioselinum pacificum</i>	FACW	upr tidal - E2EMN
			<i>Deschampsia caespitosa</i>	OBL	upr tidal - E2EMN
<i>Bidens cernua</i>	FAW+	mid-up tidal -E2EMN	<i>Equisetum arvense</i>	FAC	upr tidal - E2EMN
<i>Fontanalis antipyretica</i>		mid-up tidal -E2EMN	<i>Hordeum depressum</i>	FACW	upr tidal - E2EMN
<i>Juncus arcticus</i> var. <i>balticus</i>	OBL	mid-up tidal - E2EMN	<i>Lathyrus palustris</i>	OBL	up tidal - E2EMN
<i>Juncus articulatus</i>	OBL	mid-up tidal - E2USN	<i>Leonotodon nudicaulis</i>	nl	upr tidal - E2EMN
<i>Potentilla egedii</i>	OBL	mid-up tidal- E2EMN	<i>Lysichiton americanus</i>	OBL	upr tide - E2EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - E2EMN	<i>Oenanthe sarmentosa</i>	OBL	upr tidal- E2EMN
<i>Rumex crispus</i>	FAC+	mid-up tidal - E2EMN	<i>Trifolium worms kjoldii</i>	FACW+	upr tidal - E2EMP
<i>Samolus valerandi</i> ssp. <i>parviflorus</i>	OBL	mid-up tidal -E2EMN	<i>Typha angustifolia</i>	OBL	upr tidal - E2EMN
<i>Scirpus cernuus</i>	OBL	mid-up tidal - E2EMN	<i>Typha latifolia</i>	OBL	up tidal - E2EMN
<i>Sium suave</i>	OBL	mid-up tidal - E2EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
Samolus valerandi ssp. parviflorus	ONHP L3	10 432579E 5109039N	Est dozen plants, on marsh edge among C. lyngbyei
Fontanalis antipyretica	nl		Aquatic moss collected at base of C. lyngbyei clumps on marsh edge.

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
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Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 8 – East Shoreline One (ES1) – ADT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney, Astoria	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Riverine (Subtidal) Unconsolidated bottom			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432390 m E/ 5108882 m N
		S boundary	432506 m E / 5107720 m N

Hydrologic Description	Unit 8 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.
Present & past use	Historic diking divided floodplain to east. Continued grazing disturbance (cattle) in unit at this time. Dike is in part made of wood, metal (across from log landing). Logs embedded crosswise near south end of unit. Tidegate at south end.

Dominant Vegetative Features					
Habitat type/Plant Community		Red alder / Hooker's willow			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Alnus rubra	FAC	above HT - PFOP			
Lonicera involucrata	FAC+	above HT - PSSP			
Phalaris arundinaceae	FACW	above HT- PEMP			
Salix hookeriana	FACW+	above HT - PFOP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
Achillea millefolium	FACU	at/above HT - PEMP	Picea sitchensis	FAC	above HT - PFOP
Angelica lucida	FAC+	above HT- PEMP	Polystichum munitum	FACU	above HT - PSSP
Aster subspicatus	FACW	at/above HT - PEMP	Prunus lauroceras	nl	above HT - PSSP
Athrium filix-femina	FAC+	above HT - PEMP	Pyrus fusca	FACW	above HT - PSSP
Equisetum telmateia var. braunii	FACW	above HT - PSSP	Ribes divaricatum	FAC	above HT - PSSP
Galium aparine	FACU	above HT - PSSP	Rubus armeniacus	FACU	above HT - PSSP
Hedera helix	nl	above HT - PSSP	Rubus laciniatus	FACU+	above HT - PSSP
Heracleum lanatum	FAC+	above HT - PEMP	Rubus spectabilis	FAC+	above HT - PSSP
Hypochaeris radicata	FACU	above HT - PEMP	Rubus ursinus	FACU	above HT - PSSP
Ilex aquifolium	nl	above HT - PFOP	Salix alba var. vitellina	FACW	above HT - PFOP
Juncus effusus var. effusus	FACW	at/above HT - PEMP	Salix lucida ssp. lasiandra	FACW+	above HT - PFOP
Lotus corniculatus	FAC	above HT- PEMP	Sambucus racemosa	FACU	above HT - PSSP
Montia parviflora var. flagellaris	FACW-	above HT - PFOP	Spiraea douglasii	FACW	above HT - PSSP
Rumex crispus	FAC+	above HT - PEMP	Tellima grandiflora	NI	above HT - PSSP
			Tsuga heterophylla	FACU+	above HT - PFOP
			Urtica dioica	FAC+	above HT - PSSP
			Vicia gigantea	nl	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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<i>Phalaris arundinaceae</i>			Extensive population along dike, regular disturbance is helping spread
<i>Prunus lauroceras</i>			One plant on dike
<i>Rubus armeniacus</i>			Extensive plants, overhanging water
<i>Rubus laciniatus</i>			Extensive plants, overhanging water

Weed Management Concerns – Discuss by species:

Prunus - remove, keep from sprouting and setting seed.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 8 – East Shoreline One (ES1) – DT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause []		

USGS Quad	Olney, Astoria	Published Information & Position	Summary
		County	State
		Clatsop	Oregon

National Wetlands Inventory - Site Designations:

PFOF- Palustrine Forested Irregularly flooded; PSSP - Palustrine Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated sediment Regularly flooded

Geologic Unit – Base Material Recent alluvium

N boundary 432390 m E/ 5108882 m N

SCS Soil Type Coquille silt loam, Clatsop muck

S boundary 432506 m E / 5107720 m N

Hydrologic Description Unit 8 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.

Present & past use Historic diking divided floodplain to east. Continued grazing disturbance (cattle) at this time. Dike is in part made of wood, metal (across from log landing). Logs embedded crosswise near south end of unit. Tidegate at south end.

Dominant Vegetative Features

Habitat type/Plant Community Common spikerush / reed canarygrass

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	lwr tidal - R1USN			
Eleocharis palustris	OBL	mid tidal - R1USN			
Lilaeopsis occidentalis	OBL	mid tidal - R1USN			

Other plant species present

Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alisma triviale</i>	OBL	mid tidal - R1USN	<i>Impatiens</i> (no flowers)	FACW	upr tidal - R1EMN
<i>Callitriche stagnalis</i>	OBL	mid tidal - R1USN	<i>Iris pseudacorus</i>	OBL	upr tidal - R1EMN
<i>Sagittaria cuneata</i>	OBL	mid tidal - R1USN	<i>Oenanthe sarmentosa</i>	OBL	upr tidal - R1EMN
			<i>Potentilla egedii</i>	OBL	upr tidal - R1EMN
<i>Juncus articulatus</i>	OBL	mid-up tidal - R1USN	<i>Rumex occidentalis</i>	nl	upr tidal - R1EMN
<i>Polygonum hydropiperoides</i>	OBL	mid- up tidal - R1USN	<i>Scirpus acutus</i>	OBL	upr tidal - R1EMN
<i>Ranunculus sceleratus</i>	OBL	mid-up tidal - R1USN	<i>Sium suave</i>	OBL	upr tidal - R1EMN
<i>Scirpus cernuus</i>	OBL	mid-up tidal - R1EMN	<i>Typha angustifolia</i>	OBL	upr tidal - R1EMN
<i>Deschampsia caespitosa</i>	OBL	upr tidal - R1EMN	<i>Hypericum scouleri</i> ssp. <i>scouleri</i>	FAC	at/above HT - R1EMN
<i>Carex lyngbyei</i>	OBL	upr tidal - R1EMN	<i>Rumex conglomeratus</i>	FACW	at/above HT - PEMP
<i>Carex obnupta</i>	OBL	upr tidal - R1EMN	<i>Rumex crispus</i>	FAC+	above HT - PEMP
<i>Conioselinum pacificum</i>	FACW	upr tidal - R1EMN			
<i>Equisetum arvense</i>	FAC	upr tidal - R1EMN			
<i>Hordeum depressum</i>	FACW	upr tidal - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Iris pseudacorus	OBL	Plants were individually mapped 8-03 for removal	
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Weed Management Concerns – Discuss by species:

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 9 – East Shoreline Two (ES2) - ADT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded (upper portion)			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432506 m E / 5107720 m N
		S boundary	432709 m E / 5107212 m N

Hydrologic Description	Unit 9 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance. Outer curve in river is building up shelf on SW corner of unit.
Present & past use	Historic diking divided floodplain to east and north. Continued grazing disturbance into ES2 (adjacent cattle farm). No vegetation over 6 m tall. Extensive Himalayan blackberry population on dike. One area of logs piled on dike, perhaps from log yard across river.

Dominant Vegetative Features					
Habitat type/Plant Community		Red alder / Hooker's willow			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Alnus rubra</i>	FAC	above HT - PFOP			
<i>Phalaris arundinaceae</i>	FACW	above HT - PEMP			
<i>Salix hookeriana</i>	FACW+	above HT - PFOP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Achillea millefolium</i>	FACU	at/above HT - PEMP	<i>Lonicera involucrata</i>	FAC+	above HT - PSSP
<i>Lotus corniculatus</i>	FAC	at/above HT - PEMP	<i>Physocarpus capitatus</i>	FACW	above HT - PSSP
<i>Oenanthе sarmentosa</i>	OBL	at/above HT - PEMP	<i>Polystichum munitum</i>	FACU	above HT - PSSP
			<i>Ribes divaricatum</i>	FAC	above HT - PSSP
<i>Hedera helix</i>	nl	above HT - PSSP	<i>Ribes lacustre</i>	FAC+	above HT - PSSP
<i>Juncus effusus</i> var. <i>pacificus</i>	FACW	at/above HT - PEMP	<i>Rubus armeniacus</i>	FACU	above HT - PSSP
			<i>Rubus laciniatus</i>	FACU+	above HT - PSSP
			<i>Rubus ursinus</i>	FACU	above HT - PSSP
			<i>Spirea douglasii</i>	FACW	above HT - PSSP
			<i>Vicia gigantea</i>	nl	above HT - PEMP

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
<i>Phalaris arundinaceae</i>	FACW		Extensive meadows along unit
<i>Rubus armeniacus</i>	FACU		Widespread along dike
<i>Rubus laciniatus</i>	FACU+		Widespread along dike

Weed Management Concerns – Discuss by species:

Rubus spp. – High density of blackberry cover is probably due to continuous disturbance by cattle during growing season. Propose limiting cattle access to dike and river to no more than 2- 3 weeks per year, intensely grazing a portion of dike each day, so that entire area is not continuously trampled and disturbed. Use goats to brush back blackberries, then grub out crowns and let area recover. Limited grazing by cattle, regular brushing by goats should allow native grasses and lower plants to recover. Also consider planting evergreen trees along dike to provide shade, shift to higher quality riparian habitat over time.

Phalaris – Shade will reduce reed canarygrass over time if annual disturbance during growing is limited.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 9 – East Shoreline Two (ES2) - DT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Riverine (Subtidal) Unconsolidated bottom			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432506 m E / 5107720 m N
		S boundary	432709 m E / 5107212 m N

Hydrologic Description	Unit 9 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance. Outer curve in river is building up shelf on SW corner of unit.
Present & past use	Historic diking divided floodplain to east and north. Continued grazing disturbance into ES2 (adjacent cattle farm). No vegetation over 6 m tall.

Dominant Vegetative Features					
Habitat type/Plant Community		Lyngby's sedge / common spikerush			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	aquatic - R1USN			
Eleocharis palustris	OBL	mid tidal - R1USN			
Carex lyngbyei	OBL	up tidal - R1EMN			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum aquaticum</i>	OBL	floating in water -R1USN	<i>Peltandra virginica</i>	NI (OBL elsewhere)	upr tidal - R1EMN
Alisma triviale	OBL	low-mid tidal - R1USN	Polygonum hydropiperoides	OBL	upr tidal - R1EMN
Callitriche diversifolia	OBL	low-mid tidal - R1USN	Potentilla egedii	OBL	upr tidal - R1EMN
Sagittaria cuneata	OBL	low-mid tidal - R1USN	Peltandra virginica	NI (OBL elsewhere)	upr tidal - R1EMN
Lilaea scilloides	OBL	mid tidal - R1USN	Rumex crispus	FAC+	upr tidal - R1EMN
Lilaeopsis occidentalis	OBL	mid tidal - R1USN	Scirpus acutus	OBL	upr tidal - R1EMN
Juncus articulatus	OBL	mid-up tidal - R1EMN	Sium suave	OBL	upr tidal - R1EMN
Ranunculus sceleratus	OBL	mid-up tidal - R1USN	Hypericum scouleri ssp. scouleri	FAC	at/above HT - R1EMN
Scirpus cernuus	OBL	mid-up tidal - R1EMN			
Typha angustifolia	OBL	mid-up tidal - R1EMN			
Agrostis exarata	FACW	upr tidal - R1EMN			
Deschampsia caespitosa	OBL	upr tidal - R1EMN			
Iris pseudacorus	OBL	upr tidal - R1EMN			
Lathyrus palustris	OBL	upr tidal - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:	) Population Size/Condition
Lilaea scilloides	ONHP L3	432476E 5107516N	Several plants on open shelf sediments
Sagittaria cuneata			Several patches on shelf below main marsh

Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:	) Population Size/Condition
Phalaris arundinaceae	FACW		Extensive meadows along unit
Iris pseudacorus	OBL		Several plants – returned later to map each one
Myriophyllum sp.	OBL		Extensive plants on lower bank in river, aquatic bed

Weed Management Concerns – Discuss by species:

Iris – Map and remove.

Phalaris – Reduce cattle access, plant trees to shade dike. Cattle should graze shoreline no more than a few weeks each year (2-3), with intense grazing for a few days at a time, no longer.

Myriophyllum sp. – Collect flowering material and identify definitively.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 10 – East Shoreline South 2 (ESST) – DT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	Summary
		County	State
		Clatsop	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded; R1USN - Riverine Tidal Unconsolidated shore Regularly flooded; RUB - Riverine (Subtidal) Unconsolidated bottom			
Geologic Unit – Base Material		Recent alluvium	
SCS Soil Type		Coquille silt loam, Clatsop muck	
		N boundary	432709 m E/ 5107212 m N
		S boundary	433673 m E/ 5107216 m N

Hydrologic Description	Unit 10 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.
Present & past use	Historic diking divided floodplain to east and north. Continued grazing disturbance into ES2 (adjacent cattle farm). No vegetation over 6 m tall. South end on erosive corner has debris: logs, concrete rubble, garbage (mostly large metal objects, boat, similar). Pilings along abt 500 ft of shoreline, dolphin on channel edge.

Dominant Vegetative Features					
Habitat type/Plant Community		Hooker's willow / Lyngby's sedge			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum sp.</i>	OBL	low tidal - R1USN			
Carex lyngbyei	OBL	up tidal - R1EMN			
Eleocharis palustris	OBL	mid tidal - R1USN			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Myriophyllum aquaticum</i>	OBL	floating in water -R1USN	<i>Rumex conglomeratus</i>	FACW	up tidal - R1EMN
Alisma triviale	OBL	low-mid tidal - R1USN	Potentilla egedii	OBL	up tidal - R1EMN
Callitriche diversifolia	OBL	low-mid tidal R1USN	<i>Peltandra virginica</i>	NI (OBL elsewhere)	up tidal - R1EMN
Juncus articulatus	OBL	mid-up tidal - R1EMN	<i>Rumex crispus</i>	FAC+	up tidal - R1EMN
Lilaeopsis occidentalis	OBL	mid tidal - R1EUSN	Scirpus acutus	OBL	up tidal - R1EMN
Polygonum hydropiperoides	OBL	mid-up tidal - R1EMN	Scirpus microcarpus	OBL	up tidal - R1EMN
Ranunculus scleratus	OBL	mid-up tidal - R1USN	Sium suave	OBL	up tidal - R1EMN
Sagittaria cuneata	OBL	lower tidal - R1USN	Achillea millefolium	FACU	at/above HT - R1EMN
Scirpus cernuus	OBL	mid-up tidal - R1EMN	Angelica lucida	FAC+	at/above HT - R1EMN
<i>Agrostis exarata</i>	FACW	up tidal - R1EMN	Aster subspicatus	FACW	at/above HT - R1EMN
Angelica genueflexa	FACW	up tidal - R1EMN	Deschampsia caespitosa	OBL	at/above HT - R1EMN
Carex obnupta	OBL	up tidal - R1EMN	Trifolium wormskjoldii	FACW+	at/above HT -R1EMN
<i>Cotula coronopifolia</i>	FACW+	up tidal - R1EMN			
Hordeum depressum	FACW	up tidal - R1EMN			
Lathyrus palustris	OBL	up tidal - R1EMN			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
Lilaea scilloides	ONHP L3	4333344E 5107318N	Est 10 plants in this area
Sagittaria cuneata	not listed	433011E 5107241N	Several extensive patches within 50 ft

Rare Plant Management Concerns – Discuss by species:

Sagittaria is not listed, but has been considered uncommon in FOCL up to the year of this survey.

Lilaea is listed, and is more common than originally thought in FOCL, with several populations of 5-10+ plants.

Noxious Weed Species

Species	Status	Lat/Long (Grid used: UTM)	Population Size/Condition
<i>Phalaris arundinaceae</i>	FACW		Extensive meadows along unit
<i>Iris pseudacorus</i>	OBL		Several plants – returned later to map each one

Weed Management Concerns – Discuss by species:

Iris – Remove all clumps

Phalaris – Plant trees to eventually provide shade to crowd grass out. Meanwhile, exclude cattle from edge full time. A few weeks of access each year might allow vegetation to recover.

Field Data Form – Tidal Vegetation Survey

Unit Name	River Unit 10 – East Shoreline South Terminus (ESST) – ADT		
Land Owner	Weyerhaeuser Corp./FOCL easement	Dates	6-23-03, 8-25-03
Field Staff	K Sayce, N Eid, H Brause		

USGS Quad	Olney	Published Information & Position	Summary
		County	Clatsop
		State	Oregon
National Wetlands Inventory - Site Designations:			
PSSP - Palustrine Scrub Shrub Irregularly flooded; R1EMN –Riverine Tidal Emergent Regularly flooded			
Geologic Unit – Base Material	Recent alluvium		
SCS Soil Type	Coquille silt loam, Clatsop muck	N boundary	432709 m E/ 5107212 m N
		S boundary	433673 m E/ 5107216 m N

Hydrologic Description	Unit 10 is tidal, freshwater. Tidal cycle is diurnal, mixed, with an average range of 9 feet. Higher portion floods on winter spring and storm tides. Old dikes produce banded layers of vegetation corresponding to tidal level, material dike is formed of and amount of disturbance.
Present & past use	Historic diking divided floodplain to east and north. Continued grazing disturbance into ES2 (adjacent cattle farm). No vegetation over 6 m tall. South end on erosive corner has debris: logs, concrete rubble, garbage (mostly large metal objects, boat, similar). Pilings along abt 500 ft of shoreline, dolphin on channel edge.

Dominant Vegetative Features					
Habitat type/Plant Community		Hooker's willow / reed canary grass			
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Phalaris arundinaceae</i>	FACW	above HT - PEMP			
<i>Salix hookeriana</i>	FACW+	above HT - PFOP			

Other plant species present					
Species	Indicator Status	Stratum	Species	Indicator Status	Stratum
<i>Athyrium filix-femina</i>	FAC+	above HT - PEMP	<i>Lonicera involucrata</i>	FAC+	above HT - PSSP
<i>Epilobium ciliatum</i>	FACW-	above HT - PEMP	<i>Rosa nutkana</i>	FAC-	above HT - PSSP
<i>Juncus effusus var. effusus</i>	FACW	at/above HT - PEMP	<i>Rubus armeniacus</i>	FACU	above HT - PSSP
<i>Lotus corniculatus</i>	FAC	at/above HT - PEMP	<i>Rubus laciniatus</i>	FACU+	above HT - PSSP
<i>Oenanthе sarmentosa</i>	OBL	at/above HT - PEMP	<i>Rubus spectabilis</i>	FAC+	above HT - PSSP
			<i>Salix alba var. vitellina</i>	FACW	above HT - PFOP
<i>Holcus lanatus (on log)</i>	FAC	above HT - PEMP	<i>Salix lucida ssp. lasiandra</i>	FACW+	above HT - PFOP
<i>Heracleum lanatum</i>	FAC+	above HT - PEMP	<i>Scrophularia californica</i>	nl (FAC in CA)	above HT - PSSP
<i>Iris pseudacorus</i>	OBL	above HT - PEMP	<i>Spirea douglasii</i>	FACW	at/above HT-PSSP
<i>Juncus effusus var. pacificus</i>	FACW	at/above HT - PEMP			
<i>Lythrum salicaria</i>	FACW+	above HT - PEMP			
<i>Senecio jacobea</i>	FACU	above HT - PEMP			
<i>Trifolium repens</i>	FAC-	above HT - PEMP			
<i>Vicia gigantea</i>	nl	above HT - PEMP			

Field Data Form – Tidal Vegetation Survey

Summary of Current Site Management Practices

Rare, ESA-listed (state, federal) Plant Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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Rare Plant Management Concerns – Discuss by species:

Noxious Weed Species

Species	Status	Lat/Long (Grid used:)	Population Size/Condition
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<i>Lythrum salicaria</i>			One flowering plant, seed heads were removed, later plant was dug out and removed
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Weed Management Concerns – Discuss by species: