WILLOWMOOR EXISTING HABITAT, FISH AND WILDLIFE REPORT

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WILLOWMOOR EXISTING HABITAT, FISH AND WILDLIFE REPORT

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Executive Summary

King County and the King County Flood Control District seek to improve flood control and habitat conditions in the upper Sammamish River in Marymoor Park. The river channel was constructed as part of the overall Sammamish River Improvement Project in 1964 by the U.S. Army Corps of Engineers (Corps) in cooperation with King County. King County conducts maintenance including regular mowing, trimming and removal of vegetation and sediment in the channel. These actions adversely affect water quality and habitat and conflict with Federal, state and local efforts to protect and enhance riverine habitat and recover ESA listed salmon species. Additionally, property owners around Lake Sammamish have expressed concerns about lake water levels and are interested in solutions to reduce high lake levels. Consequently, the County is undertaking the Willowmoor Floodplain Restoration Project to further the following goals:

- Provide necessary lake level control, flow conveyance, and downstream flood control;
- Reduce costs, complexity and ecological impacts of maintenance;
- Enhance habitat conditions in the river channel and adjacent tributaries and wetlands to benefit ESA listed Chinook and other species.

This report includes the results of a literature review of existing fish data, a summary of the fish populations present in the project area, upper Sammamish River and tributary aquatic habitat conditions, upper Sammamish River hydrology and water quality, a wetland delineation and functional assessment, vegetation community mapping, wildlife habitat, and recommendations for enhancing aquatic and terrestrial habitat in the project area. The purpose of this report is to briefly summarize existing habitat conditions and identify opportunities and constraints for aquatic and terrestrial habitat restoration in the project area.

1. Introduction

1.1 Overview

King County and the King County Flood Control District seek to improve flood control and habitat conditions in the Sammamish River Transition Zone in Marymoor Park. The Transition Zone is located in the upper portion of the Sammamish River immediately downstream of the Sammamish Weir structure that controls the minimum elevation of Lake Sammamish (Figures 1 and 2). The Transition Zone was constructed as part of the overall Sammamish River Improvement Project in 1964 by the U.S. Army Corps of Engineers (USACE) in cooperation with King County. The Transition Zone as currently constructed has required increasingly intensive and costly maintenance including regular mowing, trimming and removal of the vegetation and accumulated sediments in the channel. These actions adversely affect water quality and habitat and conflict with Federal, state and local efforts to protect and enhance riverine habitat and recover ESA listed salmon species. Additionally, property owners around Lake Sammamish have expressed concerns about lake water levels and are interested in solutions to reduce high lake levels. Consequently, reconfiguration of the river channel and the adjacent floodplain is desirable to further the following goals:

- Provide necessary lake level control, flow conveyance, and downstream flood control;
- Reduce costs, complexity and ecological impacts of maintenance;
- Enhance habitat conditions in the river channel and adjacent tributaries and wetlands to benefit ESA listed Chinook and other species.

1.2 Project Area

The Sammamish River begins at the outlet of Lake Sammamish and flows north and west approximately 13.5 miles to Lake Washington (Figure 1). Four major tributaries enter the Sammamish River including Bear, Little Bear, North and Swamp Creeks. Several smaller tributaries also enter the river. The Sammamish River is the second largest tributary to Lake Washington and provides a migratory corridor for fish and wildlife between Lakes Washington and Sammamish.

The project area includes the outlet of Lake Sammamish down to the end of the Transition Zone and King County owned property within the floodplain to the south of the river (Figure 2). This includes the channel from Lake Sammamish to the end of the Transition Zone (approximately 4,500 feet of channel) and approximately 90 acres south of the channel. Two small tributaries enter the river in the project area: Tosh and Country Creeks. Of interest, although outside of the project area is the Sammamish River downstream to the confluence with Bear Creek, an additional distance of 2,200 feet of river channel.

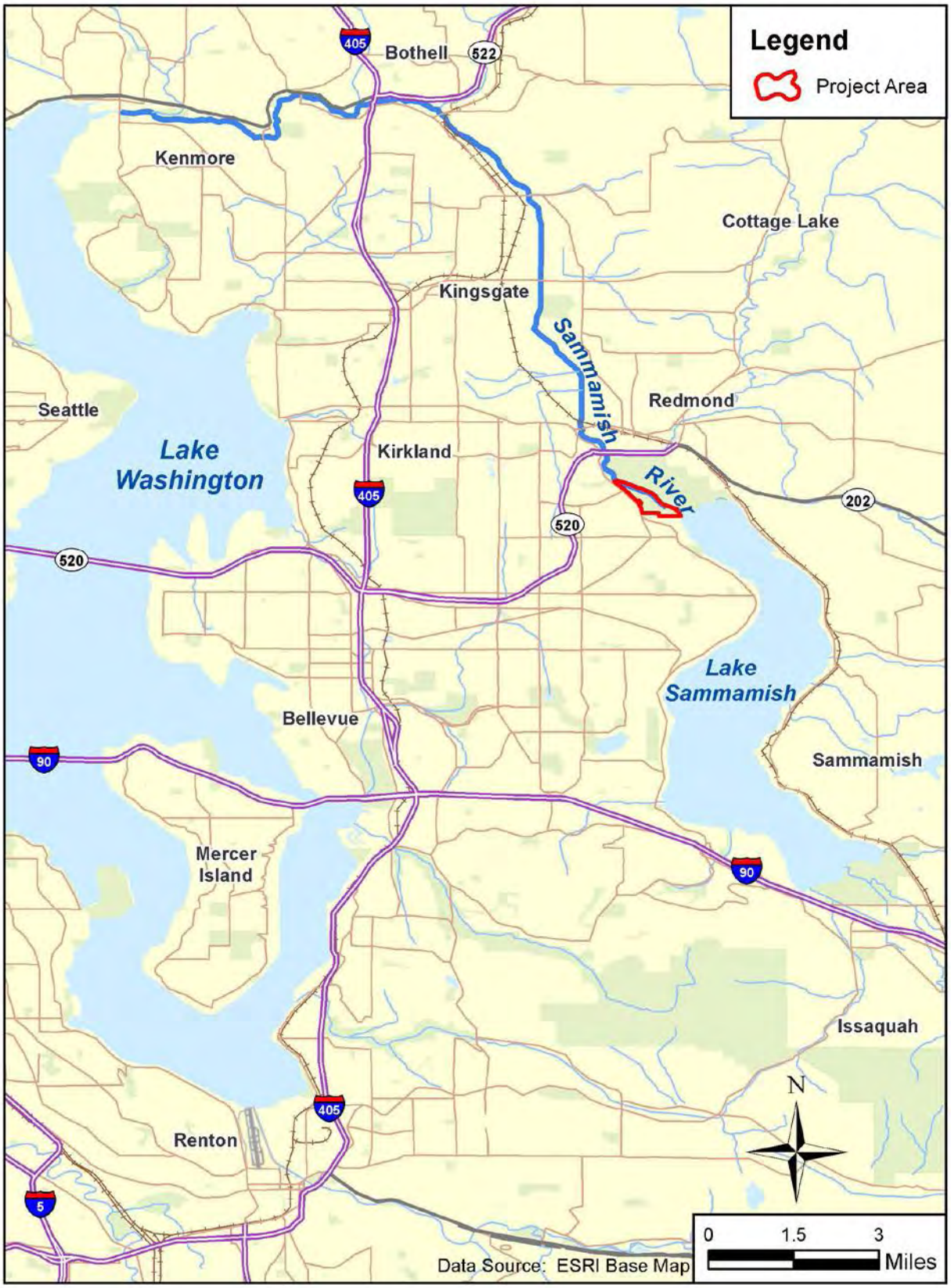

Figure 1. Vicinity Map.

Figure 2. Project Area

2. Aquatic Habitat in the Upper Sammamish River

The Sammamish River is a low gradient (0.01%) and low velocity channel that drops only 13 feet between Lakes Sammamish and Washington over 13.5 miles (King County 2009). Historically, the Sammamish River was characterized as a slow-moving slough with multiple channels and extensive wetlands throughout the floodplain (USACE and King County 2002). The river was navigated by steam powered vessels during the early European settlement period (late 1800s) and it was reportedly difficult to identify the main channel from the numerous blind channels. Large woody debris (LWD) was also abundant, likely from the extensively forested conditions that existed along the river. (Stickney & McDonald 1977) Figure 3 shows the current river alignment in orange overlaid on the 1871 General Land Office survey map of the project area (BLM 2013) and Figure 4 shows the current river alignment on a 1936 aerial photo. The upper reach of the Sammamish River was likely historically seasonally inundated by Lake Sammamish or comprised of lake fringing wetlands.

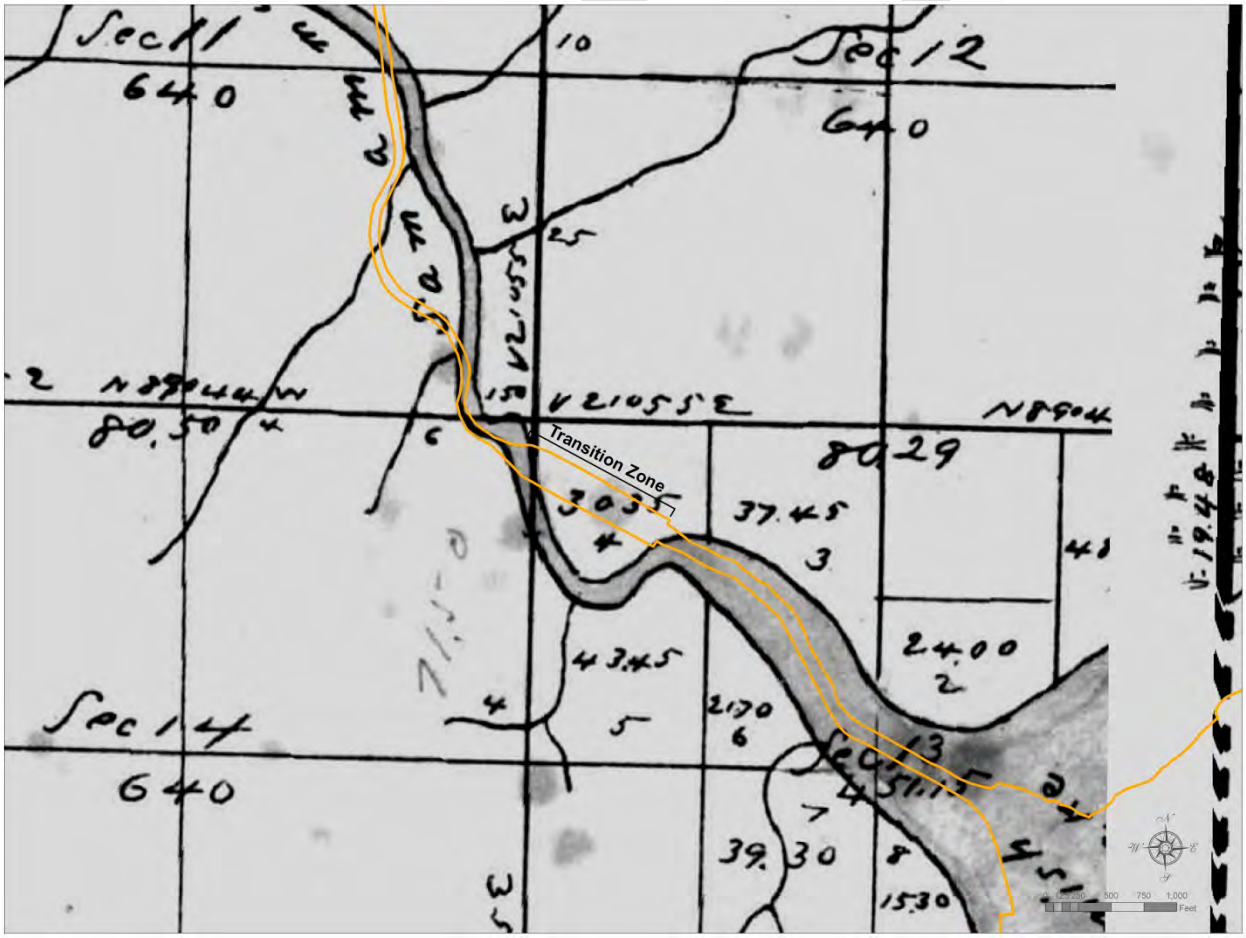

Figure 3. 1871 General Land Office Survey Map with Current River Alignment (in orange).

The Sammamish River is highly modified from historic conditions, primarily as a result of three major projects: 1) the lowering of Lakes Washington and Sammamish resulting from the construction of the Lake Washington Ship Canal/Locks in 1917; 2) straightening of the river in 1938; and, 3) construction of

the Sammamish River Improvement Project in 1964. These three projects plus agricultural, residential, and commercial development over the past nearly 150 years have changed the Sammamish River and floodplain from a forested swamp valley with a multi-threaded channel to a single-thread trapezoidal channel surrounded by development. Figure 5 is reproduced from USACE and King County (2002) and shows the changes to the river alignment and floodplain from pre-1938 conditions to present day.

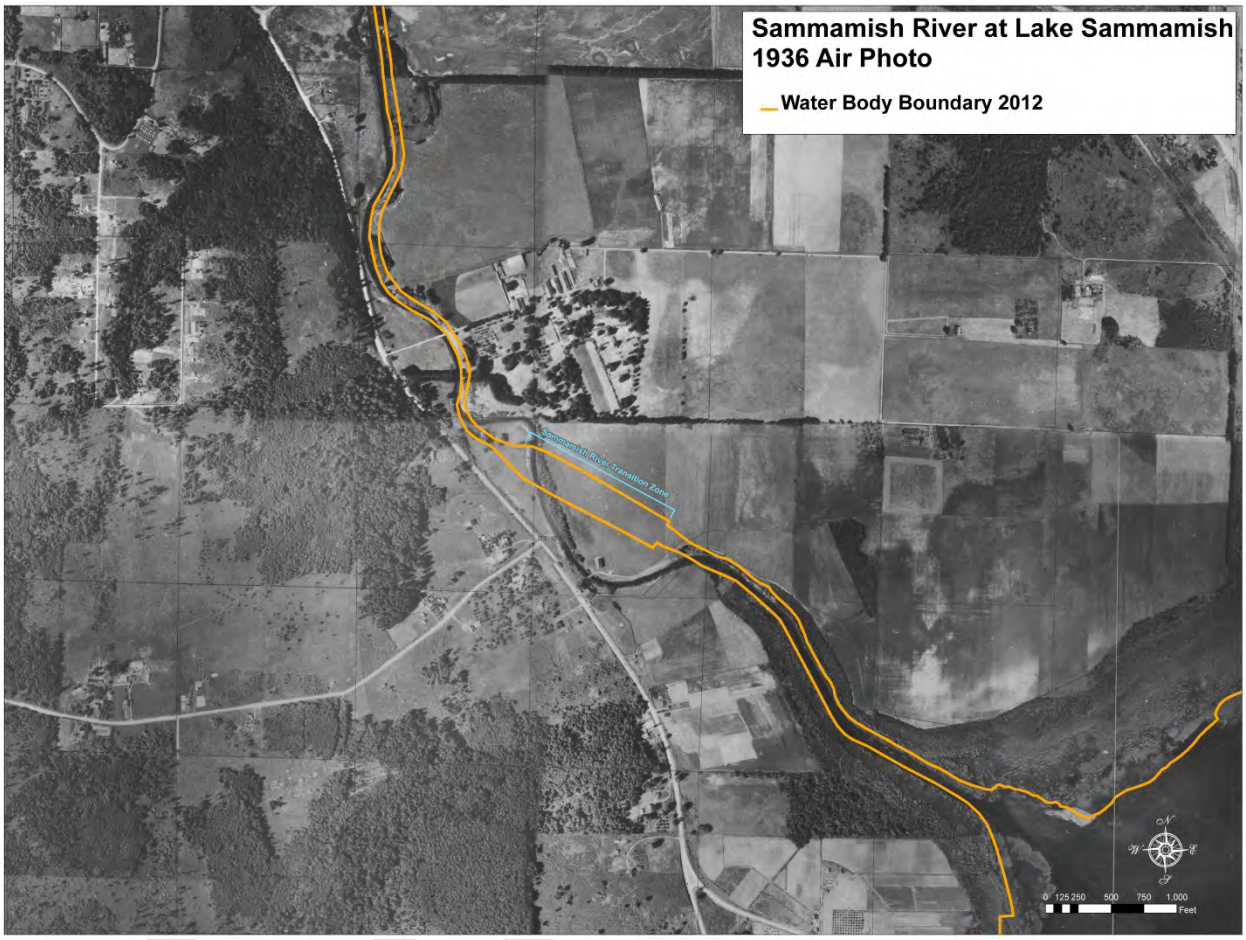

Figure 4. 1936 Aerial Photo with Current River Alignment (shown in orange).

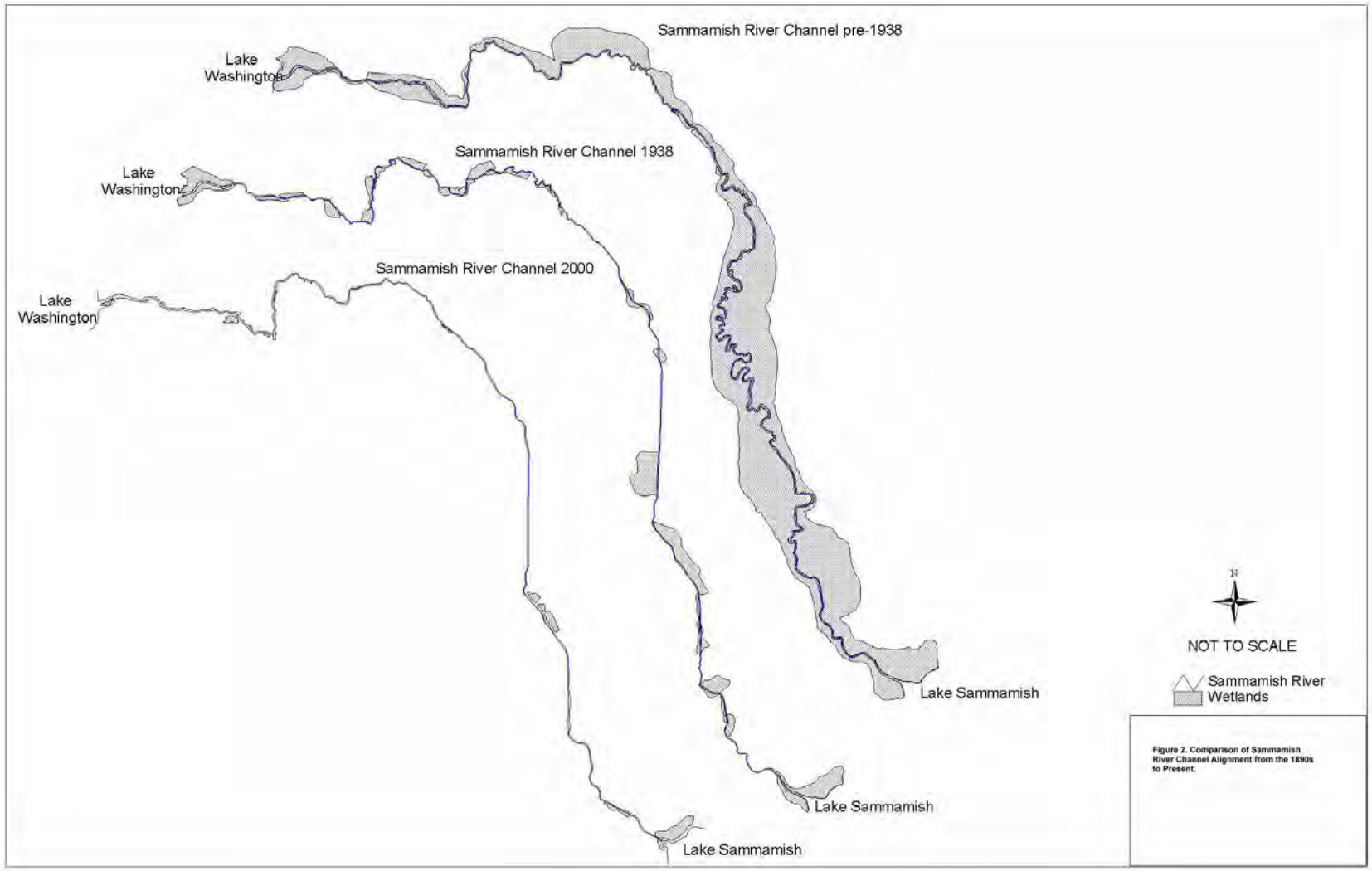

Figure 5. Comparison of Sammamish River alignment and wetlands from pre-1938 to present.

The project area includes two primary constructed features from the 1964 work including the Sammamish Weir and the Transition Zone. The weir was designed to maintain the minimum Lake Sammamish elevation and the transition zone was designed to convey the design flood of 1,500 cfs without exceeding a lake elevation of 29 feet National Geodetic Vertical Datum 1929 (NGVD29; 32.6 feet North American Vertical Datum 1988; NAVD88; NHC 2013). The Transition Zone is a constructed channel with an approximate 12-foot low flow channel in the center and a 200-foot wide high flow channel and then banks sloping up to grade. The Transition Zone was lined with angular rock and intended to be a grass-lined channel in order to maintain effective conveyance.

The weir was reconfigured in 1998 by the USACE to replace the aging grouted riprap weir that had shallow sheet flow with a concrete weir with a defined low-flow notch to provide 12-18 inches of water for fish passage during low flows. The weir is suitable for adult salmon and trout passage. It is not known if juvenile salmon or other species have difficulty passing the weir. For lamprey species it is difficult to pass velocities that may be suitable for adult salmon, and they will often attach to structures and manually climb the structure. Sharp angles and corners on concrete fishways are difficult for lamprey to hang onto and pass over.

A stream habitat survey of the Sammamish River was conducted by R2 Resource Consultants in 1999, and the upper reach from Lake Sammamish to the Bear Creek confluence was classified as consisting of 22 percent riffles[1], 3 percent pools[2], and 75 percent glide[3] habitat (see Figure 6). What was defined as riffle habitat is the Transition Zone, which has shallow turbulent flow, but is not all that similar to natural riffles because of the constructed channel with angular rock. Downstream of the transition zone, the river is predominantly glide habitat with three pools mapped in 1999 (R2 Resource Consultants 1999) between the transition zone and Bear Creek. These pools were noted as providing holding habitat for adult Chinook salmon in 1998 (Fresh, et al. 1999) and having slightly cooler water temperatures at depth, although the residual depth[4] of these pools was only about 2 feet. A more recent survey of pools in the project area was conducted by King County in 2013 and three pools were also mapped, but did not correspond to the same pools mapped in 1999 (see Figure 5). The pools mapped in 1999 no longer exist. Depending on what maintenance has been undertaken by King County in the transition zone, riparian conditions vary. Currently, the low flow channel (riffle) in the Transition Zone is bordered on both sides by a narrow (approximately 30 foot wide canopy) willow (*Salix* sp.) and shrub zone that provides 30 to 40 percent canopy cover over the low flow channel. The river banks and high flow channel area were cleared in 2013, so only re-sprouting herbaceous vegetation occurs here.

[1] Riffles are shallow water habitats with less than a 3.5 percent gradient and may have surface turbulence from increased velocity and shallow depth over coarse substrate (i.e. gravel and cobble; NWIFC 1994)

[2] Pools are deeper water habitats with very low surface water gradient and low velocity (NWIFC 1994).

[3] Glides are deeper water habitats with moderate velocity and no surface turbulence.

[4] Residual pool depth is the additional depth of the pool below the depth of the river channel bed adjacent to the pool.

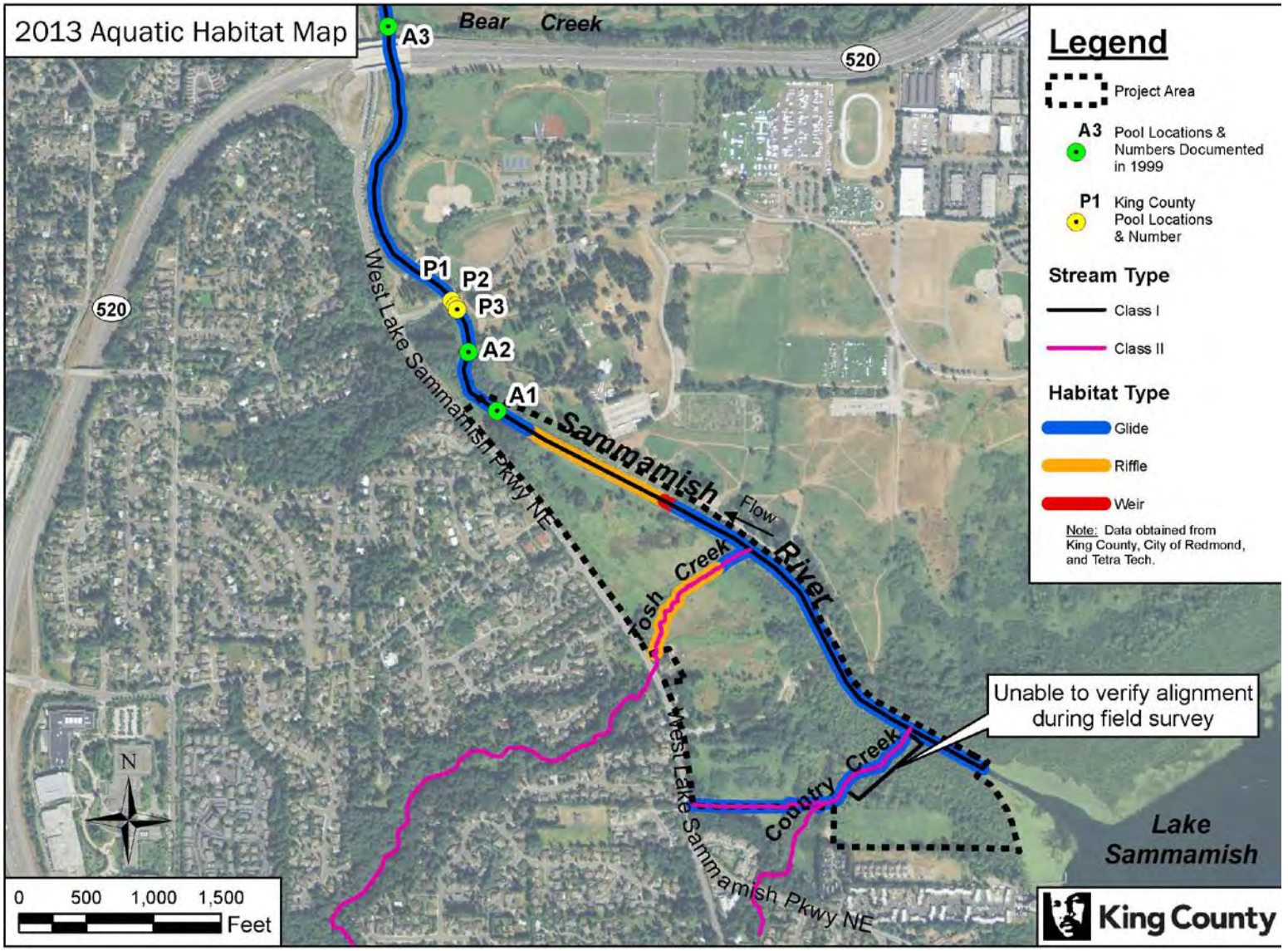

Figure 6. Existing aquatic habitat types in the project area

The upper reach of the river actually provides the most diverse aquatic habitat in the entire Sammamish River; however, the habitat is still far from meeting standards for high quality stream habitat (see Table 1 below; NOAA 1996); although the unique geomorphic setting of the Sammamish River (low gradient lowland river between two large lakes) renders many of the stream habitat ratings in the NOAA (1996) guidelines not entirely applicable.[5] However, as a general guideline to what is considered good salmon habitat, the NOAA guidance provides important information.

Two tributaries enter the Sammamish River in the project area (Tributaries 0141 - Tosh Creek and Tributary 0142 - Country Creek). The City of Redmond recently completed a culvert replacement and stream restoration project on Tosh Creek to improve fish habitat and provide fish passage upstream of West Lake Sammamish Parkway. Approximately 700 feet of the creek was restored into a meandering alignment with large wood placed in the bed and on the banks; the stream habitat through this reach is largely riffle and a wide buffer has been planted with a diverse mix of native trees and shrubs (TT field data 2013). The lower 300 feet of the creek still occupies a ditch along a former property line down to the Sammamish River. The lower 300 feet of creek is glide habitat with dense reed canary grass (*Phalaris arundinaceae*), blackberry (*Rubus armeniacus*), and red alder (*Alnus rubra*) along the banks (TT field data 2013). This lower reach was left unrestored so that restoration could be performed in concert with the goals and objectives of this Willowmoor project.

Country Creek is located in a ditch with glide habitat for about 600 feet downstream from West Lake Sammamish Parkway. The creek then disappears into a large wetland fringing Lake Sammamish and the creek channel becomes indistinguishable from the wetland. Figure 6 shows the existing creek alignments and existing aquatic habitat types in the project area.

Where the lake narrows into the channel upstream of the weir, a significant amount of wetland area is still present on both riverbanks, approximately 250 acres. Emergent, forested, and scrub-shrub wetlands provide a mosaic of habitats within the open space. These habitats are most representative of the historic Sammamish River conditions, although now primarily deciduous forested wetlands and with substantial presence of non-native plant species. However, the interconnected lake, riverine, and wetland habitats provide refuge for fish during high flows and opportunities for enhancement for greater connectivity and restoration of diverse native plant communities such as existed historically.

The following table compares NOAA's identified properly functioning conditions and the existing condition in the project area. As previously stated, not all properly functioning conditions as defined by NOAA are necessarily relevant to the Sammamish River – those indicators of most relevance are highlighted in bold in Table 1.

[5] The NOAA 1996 "Matrix of Pathways and Indicators" and the definitions of "Properly Functioning Conditions" which is used to help determine potential effects of actions on listed species was developed to implement the Aquatic Conservation Strategy and to evaluate effects of the Northwest Forest Plan, the Recovery Plan for Snake River Salmon and management of eight National Forests in Idaho and Oregon. Thus, the research and baseline data used to define Properly Functioning Conditions is necessarily primarily derived from information on streams located in National Forests that have steeper gradients, coarser substrate, and heavily forested canopy as compared to a low gradient lowland river such as the Sammamish River.

Table 1. Comparison of project area existing conditions to properly functioning conditions.

Indicators	Properly Functioning Condition	Existing Condition in Project Reach
Water temperature	50-57° F (10-14° C)	Regularly exceeds 77° F (25° C)
Sediment/Turbidity	<12% fines, turbidity low	>12% fines, turbidity low due to lake outlet
Chemical Contamination Nutrients	No 303(d) listings, low levels of contaminants and nutrients	Four Category 5 303(d) listings in project reach; multiple upstream
Physical Barriers to Habitat	Any man-made structures allow upstream and downstream passage at all flows	Weir allows fish passage at all flows; tbd if could be improved
Substrate Quality	Dominant substrate is gravel or cobble or embeddedness <20%	Dominant substrate sand, gravel, quarry spalls; embeddedness >20%
Large Woody Debris	>80 pieces/mile at>24" diameter and >50 feet long	Less than 10 per mile, do not meet size categories
Pool Frequency	~18 pools/mile	3 pools/mile
Pool Quality	Pools >1 meter deep with cover and cool water, minor reduction of pool volume by fine sediment	All pools less than 1 meter deep, limited cover, slightly cooler water
Off-Channel Habitat	Backwaters with cover and low energy	No off-channel habitats
Refugia	Habitat refugia exist and are adequately buffered; existing refugia are sufficient in size, number and connectivity	Wetland refugia in Lake Sammamish fringing forested/shrub wetlands[6]
Channel Width/Depth Ratio	<10	~100
Streambank Condition	>90% stable	>90% stable, but due to engineering and low velocities
Floodplain Connectivity	Off-channel areas are frequently hydrological linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession	Off-channel areas not frequently connected; wetlands maintained by lake and upslope surface and groundwater
Change in Peak/Base Flows	Peak flow, base flow, and flow timing comparable to undisturbed watershed of similar size, geology and geography	Peak flow and base flow modified due to upstream development; flow timing altered due to locks
Increase in Drainage Network	Zero or minimum increases in drainage network density due to roads	Substantial increases in drainage network density due to roads and development
Road Density and Location	<2 miles/mi^2; no valley bottom roads	Substantial miles of road per mi^2, multiple valley bottom roads
Disturbance History	Less than 15% disturbance in watershed	Close to 100% disturbance in watershed
Riparian Reserves	Riparian system provides adequate shade, large wood recruitment, habitat protection, and connectivity	Riparian system provides only minimal shade, limited large wood recruitment, limited habitat protection and connectivity

Essential Fish Habitat (EFH) is a concept defined by the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600.905-930) as "…those waters and substrate necessary to fish for spawning,

[6] No data available on fish use of these wetlands within Marymoor Park fringing Lake Sammamish, but would be accessible to fish during winter/spring season.

breeding, feeding, or growth to maturity." EFH is another way of identifying if existing conditions provide suitable conditions for fish survival. EFH for Pacific salmon refers to those waters and substrate necessary to support a long-term, sustainable salmon fishery and salmon contributions to a healthy ecosystem. Key elements of EFH that would be appropriate in the project area (as summarized from PFMC 1999) include rearing areas for juvenile Chinook including pools and shallow stream margins, undercut banks, woody debris accumulations, and other areas with cover and low velocity. Adult Chinook require large, deep, low velocity pools with abundant large wood and other cover. Coho smolt production is often limited by freshwater rearing habitat availability. Coho typically rear in smaller streams, but larger lakes, sloughs, and wetlands can all be productive habitats. Complex habitats in streams with a mix of pools, riffles, glides, large woody, undercut banks and overhanging vegetation provide good feeding opportunities for coho.

3. Fish Occurrence and Populations

Six species of salmon are known to be present in the Sammamish River watershed: Chinook, coho, pink (H. Berge, King County, Pers. comm. 2013), and sockeye salmon/kokanee, and steelhead/rainbow and cutthroat trout. The presence of bull trout has not been confirmed. Chum salmon may occasionally stray into the watershed, but are not known to be a sustaining population. All information provided below is summarized from the Washington Department of Fish and Wildlife (WDFW 2013a and 2013b), unless otherwise noted.

In addition to salmon species, other fish species known or likely to occur in the Sammamish River watershed include native species such as Pacific lamprey, river lamprey, Western brook lamprey, mountain whitefish, longfin smelt, northern pike minnow, peamouth chub, three-spine stickleback, large-scale sucker, redside shiner, longnose dace, speckled dace, Olympic mudminnow, and several species of sculpin, and non-native species such as yellow perch, smallmouth bass, largemouth bass, brown bullhead, bluegill, pumpkinseed sunfish, green sunfish, tench, black crappie, grass carp and common carp (Wydoski & Whitney 2003; USACE and King County 2002).

Chinook Salmon. Chinook salmon occur throughout the greater Lake Washington watershed and two stocks have been identified by WDFW: Cedar River and Sammamish. There are also the Issaquah Hatchery produced Chinook salmon and natural spawners in Issaquah Creek. The Lake Washington populations are part of the Puget Sound Chinook salmon Evolutionary Significant Unit (ESU) listed as a threatened species under the federal Endangered Species Act in 2005 (NOAA 2005). All naturally spawned and Issaquah Hatchery-produced Chinook salmon in the watershed are included in the Puget Sound ESU, with hatchery production representing an indistinguishable component of the population.

A genetic study conducted in 2003 and 2004 (Warheit and Bettles 2005) indicates that Chinook salmon in the watershed may be a single genetic population. There was a lack of consistent genetic differentiation between the populations, which may be a function of common ancestry or could also result from hatchery strays into all areas of the watershed (Issaquah Creek Hatchery). There is a large amount of genetic variance within each of the stocks. While naturally spawning fish from both the Cedar

River and the Bear/Cottage Lake Creek system show some genetic differences from Issaquah Creek Hatchery fish (and three other hatcheries evaluated), this was only a weak difference.

Chinook spawn in all four major tributaries to the Sammamish River (Bear, Little Bear, North and Swamp Creeks) and tributaries to Lake Sammamish, although the majority of fish spawn in Bear and Issaquah Creeks (WRIA8 Steering Committee 2005). WDFW collects spawner data for the Sammamish population of Chinook and adult escapement (natural spawners) has ranged from 33 to 544 in the Bear/Cottage Lake system and from 311 to 7,314 in Issaquah Creek[7] since 1980. Figure 7 shows the Chinook escapement estimates since 1976, based on index counts of live spawners and carcasses. The Issaquah Hatchery operates under a Hatchery Genetic Management Plan (WDFW 2002) with the goal of releasing 2,000,000 fingerling fall Chinook per year into Issaquah Creek with 18,000 to 19,000 adults produced. The broodstock return goal is 1,600 adult Chinook, with current goals to reach 10 to 20 percent natural origin fish, ultimately to reach the integrated genetic goal of 50 percent natural origin fish for broodstock. In recent years, natural origin return fish have ranged from 7 to 22 percent of the broodstock (average 12 percent). The overall smolt to adult return rate is less than 1 percent. (WDFW 2013a) Approximately 5 percent of the hatchery returning adults spawn naturally in the watershed, primarily in Issaquah Creek both upstream and downstream of the hatchery. WDFW has been investigating options for providing improved fish passage upstream of the hatchery and water intake.

Chinook in the basin are fall run and adults enter the Lake Washington basin from June through September. Spawning generally occurs from September through October and depending on water temperature during incubation, fry typically emerge from January through March. For most ocean-type Chinook (the majority of Lake Washington basin Chinook exhibit ocean-type behavior), juveniles may rear in tributary streams, larger rivers, lakes, or estuaries for one to six months before migrating into saltwater. Peak smolt outmigration typically occurs at the locks from June through August, but smaller numbers out-migrate from February through September. There may be a small number of stream-type Chinook present in the watershed, which rear for approximately one year in freshwater and out-migrate the year following emergence. (USACE and King County 2002)

WDFW lists the Sammamish River as potential spawning habitat for Chinook salmon (WDFW 2013b). The project area would not be likely to provide suitable spawning habitat due to angular rock and fine sediments and Chinook spawning has not been documented in the project area. The project area is a migratory corridor for both adult and juvenile Chinook salmon. Chinook adults pass through the project area on their way to tributaries of Lake Sammamish. These fish are predominantly hatchery-derived fish, although natural spawning occurs and wild fish could be sustained in the system. Due to the lack of cool water and pools, adult fish transit through the project area quickly, often taking only minutes, or at night when temperatures are lower (Fresh, et al. 1999). A number of dead adult Chinook were observed in the Sammamish River in 1998 and 1999, up to several dozen on each date counted (R. Tabor, USFWS, unpublished data from 1998 and 1999), and while a specific study on mortality has not been conducted, it is speculated that high water temperatures contributed to their death (R. Tabor, USFWS, Pers. comm.

[7] WDFW conducts live index counts in Bear Creek (RM 1.3 to 8.8), Cottage Lake Creek (RM 0 to 2.3), Issaquah Creek (RM 0 to 3.0), and the East Fork Issaquah Creek (RM 0 to 3.1). In addition, other areas are surveyed annually.

2013). Juvenile Chinook similarly pass through and may rear in the project area for short periods of time. It is unlikely that juveniles would spend a substantial amount of time in the project area due to the lack of cover and limited habitat diversity.

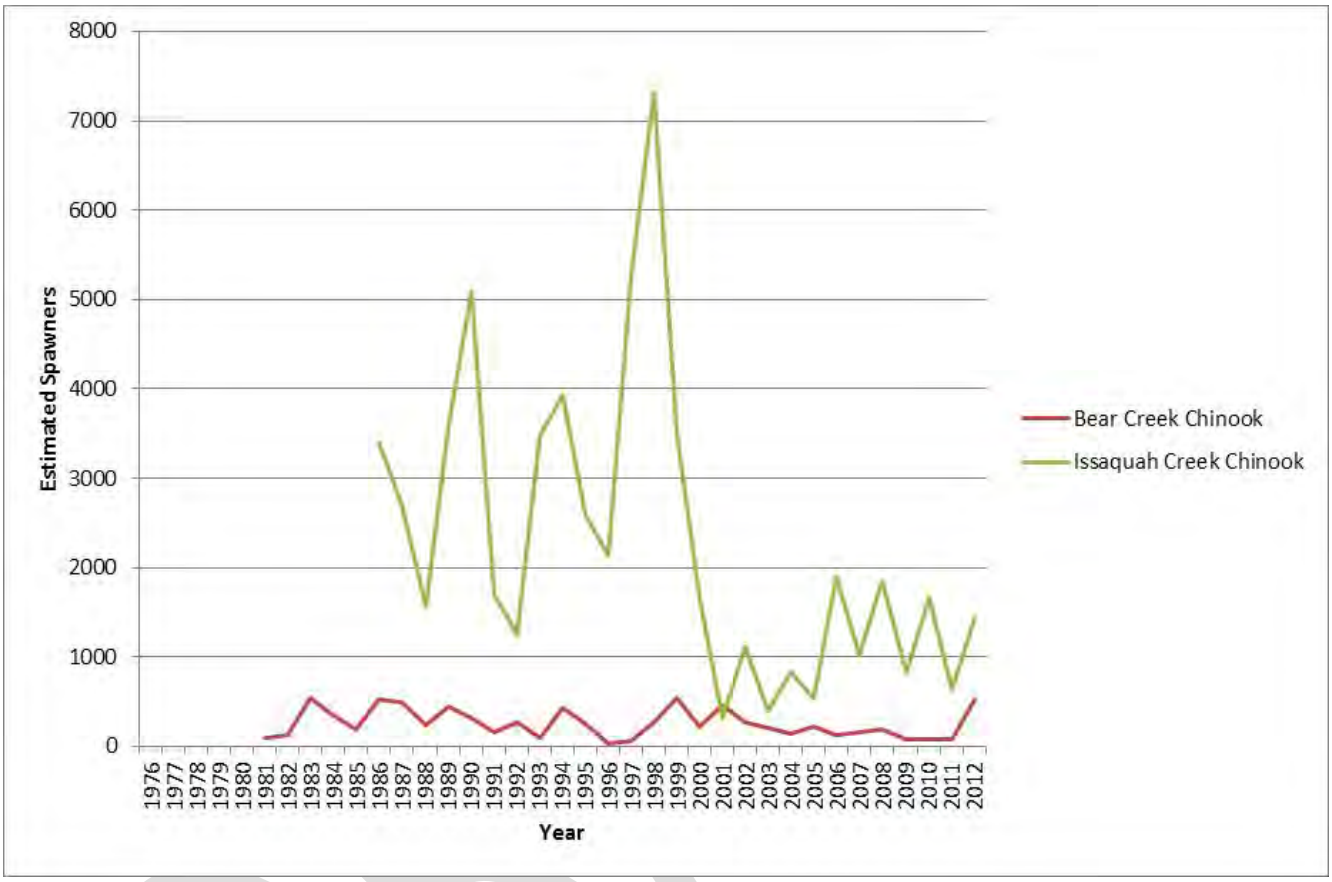

Figure 7. Chinook adult escapement since 1980 in Bear and Issaquah Creek systems.

Coho Salmon. Coho salmon occur throughout the greater Lake Washington watershed and WDFW identifies two stocks: Cedar River and Lake Washington/Sammamish Tributaries. The Puget Sound coho salmon ESU is a candidate species for listing under the Federal Endangered Species Act. No genetic analysis has been conducted on the Lake Washington/Sammamish Tributaries stock, but the stock is considered to be of mixed hatchery and wild origin. Naturally spawning adult returns have ranged from 34 to 20,002 since 1980. Figure 8 shows the coho adult spawner return estimates since 1980 (along with sockeye spawner estimates). There is a distinct declining trend. The lowest count on record (of 34) occurred in 2011. The recovery goal for the Lake Washington/ Sammamish Tributaries stock is 13,526 adults; however, there is no active management to achieve this goal. The Issaquah Hatchery produces 450,000 juvenile coho per year and approximately 29,000 adults are produced. An average of 26 percent of the broodstock is from natural origin returns. Over 14,000 adults are excess to broodstock requirements and it is not known what percentage naturally spawn in the watershed.

WDFW lists the upper Sammamish River as rearing habitat for coho juveniles (WDFW 2013b). Coho adults attempting to spawn were observed during the 1999 habitat survey of the Sammamish River (E.

Jeanes, R2 Resource Consultants, pers. comm. 2001). Lake Washington basin coho are fall run and enter the locks from August to December. Spawning typically occurs in tributaries in November and December, although spawning may occur as early as October. Fry emerge from March through June and juveniles typically rear in freshwater for one year. Juveniles rear in natal tributaries, larger rivers, and lakes in the watershed (USACE and King County 2002). In general, freshwater habitat that is structurally complex with dense wood, pools, and other cover is preferred by coho juveniles (Sandercock 1991). Smolts typically migrate out through the locks in May as yearlings. In the project area, both coho adults and juveniles migrate though, although limited rearing may also occur.

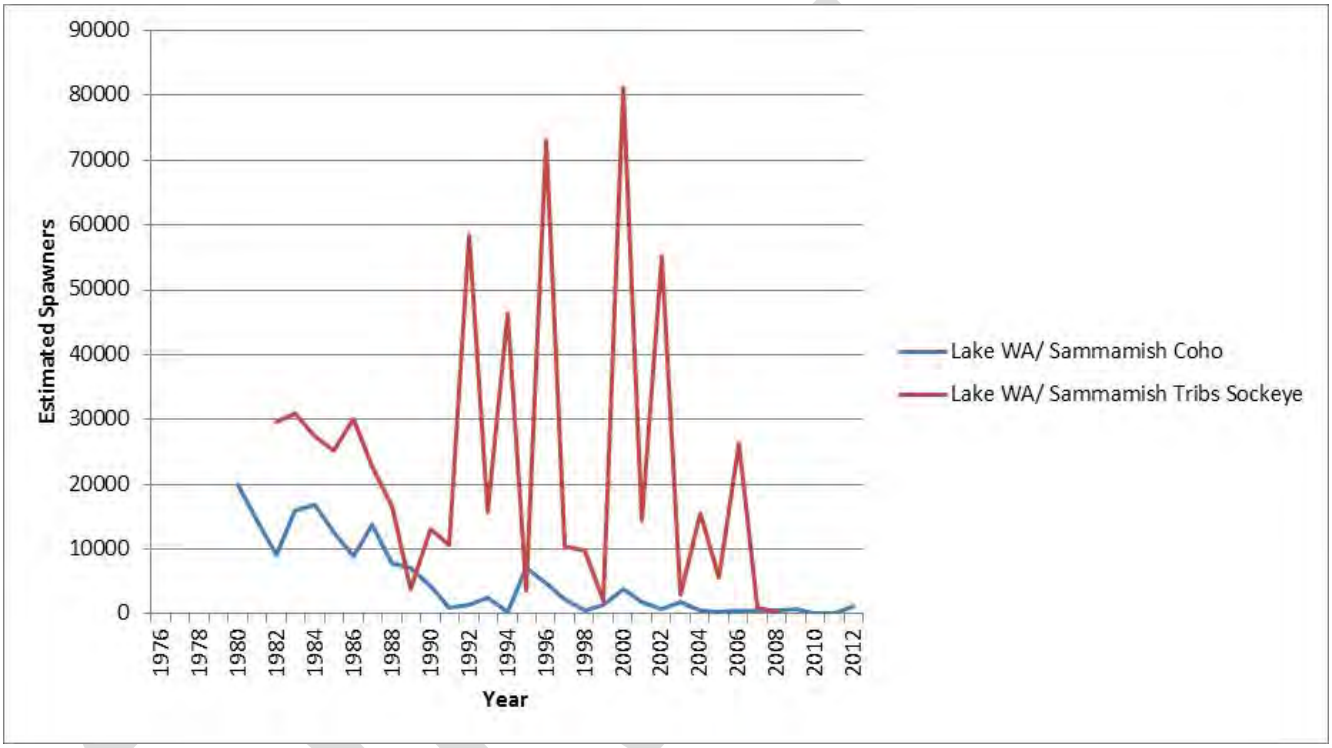

Figure 8. Lake Washington/Sammamish tributaries adult coho and sockeye spawner returns since 1980.

Sockeye Salmon. Sockeye salmon occur throughout the greater Lake Washington watershed and WDFW identifies two stocks: Cedar River and Lake Washington/Sammamish Tributaries. The Lake Washington/Sammamish stock primarily spawns in the Cedar River, Bear Creek and Issaquah Creek systems; some spawning also occurs in Little Bear Creek. Recent genetic analysis (Spies, et al. 2007) indicates that the Bear Creek sockeye population appears to be genetically distinct from sockeye in the remainder of the watershed and is likely native. The sockeye from other parts of the watershed (Cedar River, Lake Washington beach spawning, and Issaquah Creek) are more similar to Baker Lake sockeye, the source of most historic introductions in the watershed. Escapement (natural spawners) has ranged from 246 to 81,090 based on counts of live spawners in Bear Creek. The lowest return on record was 246 in 2008. The numbers are highly variable from year to year, so no obvious trend is observed (Figure 8).

WDFW lists the upper Sammamish River as a migratory corridor for sockeye salmon (WDFW 2013b). Sockeye are fall run and typically enter the Lake Washington basin from June through August. Spawning occurs from September through January, although the peak spawning period is in October, and fry typically emerge from January through May and migrate quickly (or over one to two months) to Lakes Sammamish and Washington to rear for up to one year. Smolts out-migrate through the locks typically in May and June (USACE and King County 2002). In the project area, both adult and juvenile sockeye migrate through.

Kokanee. Kokanee are the same species as, but a resident form of, sockeye salmon; spending their entire life history in fresh water. The U.S. Fish and Wildlife Service received a petition in 2007 to list all naturally spawning kokanee in the Lake Washington watershed (USFWS 2008). A substantial finding was published in 2008 and a 12-month status review was undertaken; it was determined that kokanee were not warranted for listing (USFWS 2011). Three runs had been recognized in the Lake Washington/Sammamish population including summer-run, fall-run, and winter-run. The summer and fall runs appear to have been extirpated (USFWS 2011). Remnant fall runs in the Sammamish River and tributaries were collected and genetic analysis suggests that they are of Baker Lake origin (H. Berge, King County, Pers. comm. 2014). The winter run that still exists in Lake Sammamish and its tributaries is of native origin, with spawners numbering from 64 to 4,702 since 1996. Late run spawning occurs from late October through March in tributaries to Lake Sammamish (H. Berge, King County, Pers. comm. 2014). The Kokanee Work Group comprised of local, state, federal agencies and several citizen groups, has been undertaking emergency supplementation efforts since 2008, and has also identified several restoration projects to benefit kokanee. Kokanee juveniles and adults likely pass through the project area; kokanee spawning has been observed downstream in restored reaches of the Sammamish River (H. Berge, King County, Pers. comm. 2013).

Pink Salmon. There is not a designated pink salmon population in the Lake Washington watershed (WDFW 2013a); however, occasional pink salmon have been observed and are likely to be strays from nearby watersheds (H. Berge, King County, Pers. comm. 2013). Pink salmon typically have only a two-year life span, thus, even and odd-year spawning populations can become differentiated and Puget Sound populations are predominantly odd-year runs (Heard 1991). Adults enter freshwater in August and September and spawning occurs in September and October.

Steelhead. Steelhead in the Lake Washington watershed are identified by WDFW as two stocks: Cedar River and North Lake Washington/Sammamish. The stocks were identified as separate based on the differing habitats used (snowmelt dominated Cedar River vs. rainfall dominated tributaries). Puget Sound steelhead were listed as a threatened species in 2007 (NOAA 2007). The steelhead population has been so low in recent years that it is not known if steelhead still occur in North Lake Washington and Sammamish tributaries or if they transit through the project area.

WDFW lists the upper Sammamish River as a migratory corridor for steelhead (WDFW 2013b). Steelhead in the basin are winter run. Steelhead return to the locks from December through March and spawn in tributaries from March to June. Juveniles rear in natal streams and larger rivers from one to three years and then migrate as smolts from May through July. (USACE and King County 2002)

Cutthroat Trout. Cutthroat trout have a diversity of life history strategies including anadromous, adfluvial (lake resident, tributary spawning) to stream resident. Very little information on cutthroat trout populations exists for the Lake Washington basin and they are not identified as a stock by WDFW. A sizable adfluvial population is known to exist in Lakes Washington and Sammamish with resident fish also observed in most tributaries, including the Sammamish River. Adfluvial and resident adults spawn in tributaries from April to May, and anadromous fish may spawn from December to January. Juveniles may spend several years in freshwater before migrating to saltwater. Escapement values are unknown. (USACE and King County 2002) Cutthroat trout are likely to migrate through the project area as juveniles or adults and may rear in the project area.

Bull Trout. Bull trout can also have a diversity of life history strategies. The presence and status of bull trout is not well understood in the Lake Washington basin. A resident population occurs above Chester Morse dam in the upper Cedar River, but only isolated observations have occurred elsewhere in the basin. Individual observations have occurred in Lake Sammamish and Issaquah Creek (King County 2000a). King County conducted surveys to identify if bull trout are present in Issaquah Creek (King County 2000b), but no conclusive information was collected. Bull trout prefer cold streams with temperatures less than 55° F (13° C). Spawning occurs from August through November. Fry emerge from April to May and rear in areas with extensive cover from wood or boulders. (USACE and King County 2002) It is not likely that bull trout are currently present in the project area.

3.1 Fish Data Gaps

Fish use of the project area (Upper Sammamish River) is not well documented as the Sammamish River is a unique habitat area and is not included in spawning surveys and other regular programs; although the Fresh et al. (1999) study tracked Chinook adults through the project area. Particularly, it is not known to what extent juvenile salmonids and other native fish species use the project area and their seasonal timing. It is recommended that a juvenile fish survey be conducted during the February through August time period to identify species, size, and timing to inform what types of habitats would be most beneficial for rearing.

4. Hydrology

As previously discussed, construction of the Lake Washington Ship Canal and Locks lowered the surface elevation of Lakes Washington and Sammamish by up to 9 and 6 feet, respectively. Base flows have been decreased as a result of increased impervious surfaces in the watershed and reduced floodplain and groundwater connections. The flood control project further disconnected and drained the floodplain, likely causing additional loss of groundwater flow as a result of reduced floodplain storage. Base inflows (summer/fall) into Lake Sammamish have decreased substantially as a result of development and impervious surfaces in tributary watersheds, thus also affecting outflows into the Sammamish River (NHC 2013); Figure 9 shows mean monthly discharge for Issaquah Creek (from NHC 2013, Table 5, USGS gage 12121600 WY 2002-2008), which is the largest inflow to Lake Sammamish and for the Sammamish River at the weir (King County gage 51M, data from 2001-2013). Impervious surface

area has increased in the Sammamish floodplain as well, reducing the opportunity for groundwater recharge. Water withdrawals for domestic and agricultural uses may have reduced water volume in the river resulting in greater heating of the smaller volume of water (Jain, et al. 2000). Peak flows in the Sammamish River appear to have increased as a result of increased capacity from the flood control project (NHC 2013). However, this does not mean increased frequency of connection to the floodplain.

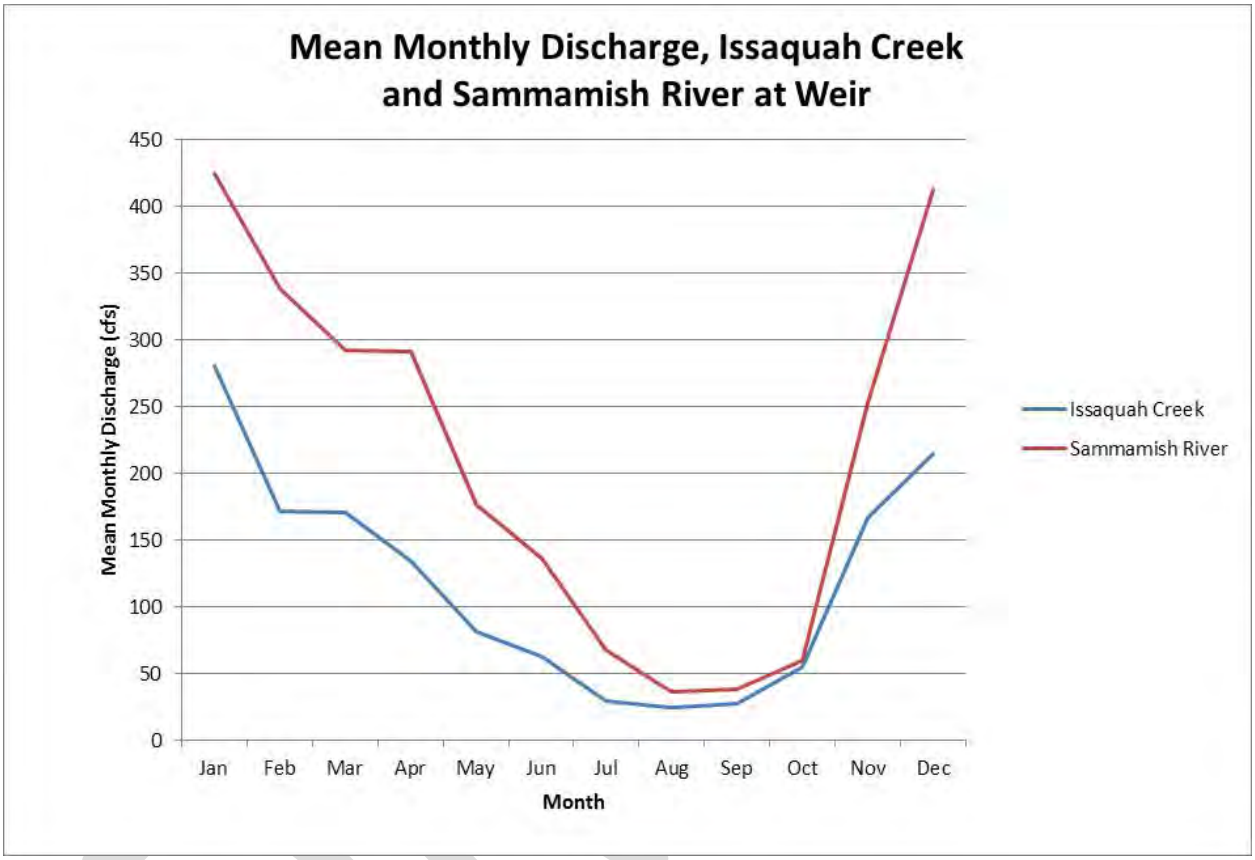

Figure 9. Issaquah Creek and Sammamish River (at the weir) mean monthly discharge.

Lake Sammamish peak water elevations appear to have increased over time, causing concerns to lakeside residents. A hydrologic analysis by Northwest Hydraulic Consultants (2013) indicates that 90% of the highest lake levels have occurred since 1989[8], and post-1998 lake levels are significantly different (statistically) than pre-1998 lake levels. Causes for peak lake levels include high or prolonged inflows to Lake Sammamish, cumulative high lake levels prior to a specific storm event, vegetation condition in the Transition Zone, and high Bear Creek flows. Vegetation condition and capacity in the Transition Zone are both conditions to explore in the project area for potential to reduce high elevations on Lake Sammamish.

[8] Based on data from 1965 to 2010 (NHC 2013).

5. Water Quality

Water quality in the project area is poor. The Washington Department of Ecology's 303(d) list of impaired waterbodies in the State of Washington has listed the Sammamish River downstream of the project area and multiple tributaries upstream and also in Lake Sammamish (WDOE 2013). Table 2 provides the Category 5 (polluted water bodies requiring a Total Maximum Daily Load, TMDL) listings in the project area. Issaquah and Tibbetts Creeks have an approved TMDL for bacteria.

Table 2. 303(d) listed waterbodies in project area and upstream.

Waterbody	Parameters Listed (Category 5)
Sammamish River (below Transition Zone)	Temperature, bacteria, dissolved oxygen
Tosh Creek	Bacteria
Country Creek	Bacteria
Villa Marina Creek	Temperature, bacteria, dissolved oxygen
Idylwood Creek	Temperature, bacteria, dissolved oxygen
Unnamed west-side tributary	Bacteria
Pine Lake Creek	Bacteria, dissolved oxygen
Laughing Jacobs Creek	Bacteria, dissolved oxygen
Lewis Creek	Temperature, bacteria, dissolved oxygen
Eden Creek	Bacteria
Tibbetts Creek	Temperature, dissolved oxygen
Issaquah Creek	Dissolved oxygen
Lake Sammamish	Bacteria, dissolved oxygen

High water temperature and low dissolved oxygen concentrations are the most serious concerns for fish and the aquatic ecosystem in the project area. Water temperatures as high as 80° F (27° C) have been measured in late July (Martz, et al. 1999; R. Tabor, unpublished data). As the discharge from the Lake that enters the Sammamish River is from the surface, the river temperatures are naturally seasonally high. Figure 10 shows the monthly mean, mean maximum, and mean minimum Sammamish River water temperatures (at the weir, Gage 51M, and near the railroad bridge downstream of Bear Creek, Gage 51L). Even with cooler Bear Creek water flows, temperatures downstream of Bear Creek are still high.

Temperature modeling of the Sammamish River has been conducted by King County and others (DeGasperi 2009, 2001; Buchak, et al. 2001; Jain, et al. 2000) to evaluate existing conditions and potential scenarios for reducing temperatures. As summarized in DeGasperi (2001), under existing conditions there is a thermal stress on average of 1.35 degrees above 17° C every day during the August to October timeframe analyzed for the project area (i.e. the water temperature exceeds 17° C by an average of 1.35 degrees over each 24 hour day). Since this is an average exceedance, the maximum water temperatures during this time period are often several degrees higher – the maximum thermal stress is 7.02 degrees (i.e. maximum water temperatures each day average about 7.02 degrees above 17° C). A number of scenarios for reducing temperatures were evaluated and compared to existing conditions (base case) and the only scenarios that can significantly reduce water temperatures in the upper river were the hypolimnetic withdrawal scenarios of 10 or 20 cfs from deep in Lake Sammamish. Other scenarios such as riparian restoration can provide cumulative benefits to the river and reduce

water temperatures in the lower river (by preventing heating throughout the upper river), but do not substantially reduce temperatures in the upper river. The large scale changes to the whole river system have so substantially altered what historically existed that water temperatures in the upper river are now very far from meeting water quality standards and standard restoration measures are not likely to achieve the level of temperature reduction that would make a substantial difference in the upper river.

The Washington Department of Ecology (WDOE) water temperature standard is 63.5° F (17.5° C) for salmonid spawning, rearing and migration (September 16 to June 14) and 60.8° f (16° C) for core salmonid summer habitat (June 15 to September 15; WDOE 2012). This is similar to Environmental Protection Agency (EPA) guidance provided to the states for setting water quality standards that recommends daily maximum temperatures not exceed 64° F (18° C; UWPA 2003) in waters where adult migration and non-core juvenile rearing occurs. A review of temperature requirements and effects on salmonids by Carter (2005) indicates that 50 percent mortality of Chinook occurs around 77° (25° C), but coho are more tolerant and 50 percent mortality occurs at 82° F (28° C). NOAA (1996) considers optimal temperatures for salmonids to be 50-57° F (10-14° C). Beyond acute mortality, high water temperatures cause a variety of physiological effects (sub lethal) that are harmful to salmon survival and reproduction as well as increasing the potential for disease. Disease risk becomes high at temperatures from 64-68° F (18-20° C; USEPA 2003). Figure 11 shows the Sammamish River water temperatures along with the general timing of salmon presence in the river, and the WDOE temperature standards.

Water temperatures exceed WDOE water temperature standards during the months of July and August, even the minimum (nighttime) temperatures. The mean monthly maximum temperatures exceed WDOE standards from April through October. Dissolved oxygen is not measured at these river gage sites.

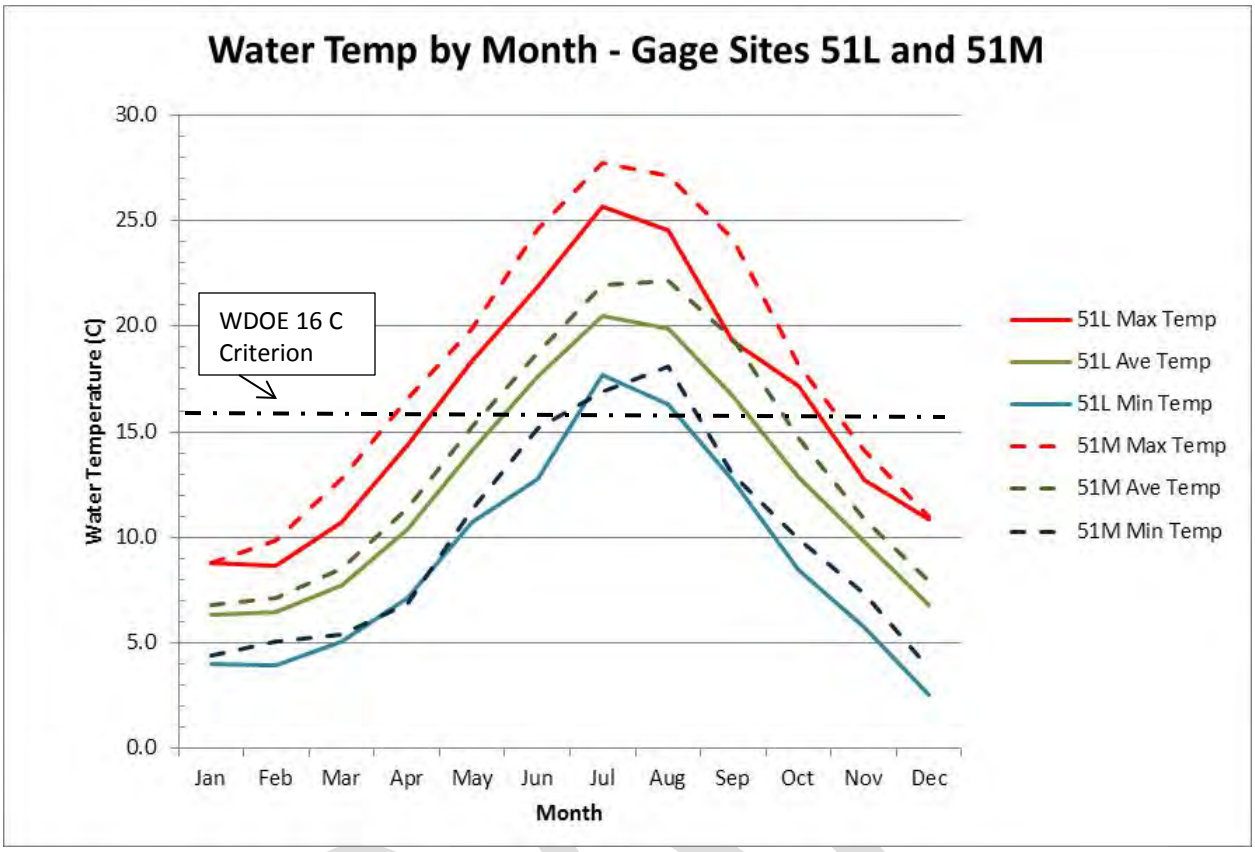

Figure 10. Monthly water temperatures in Sammamish River at Weir (Gage 51M) and railroad bridge (Gage 51L)

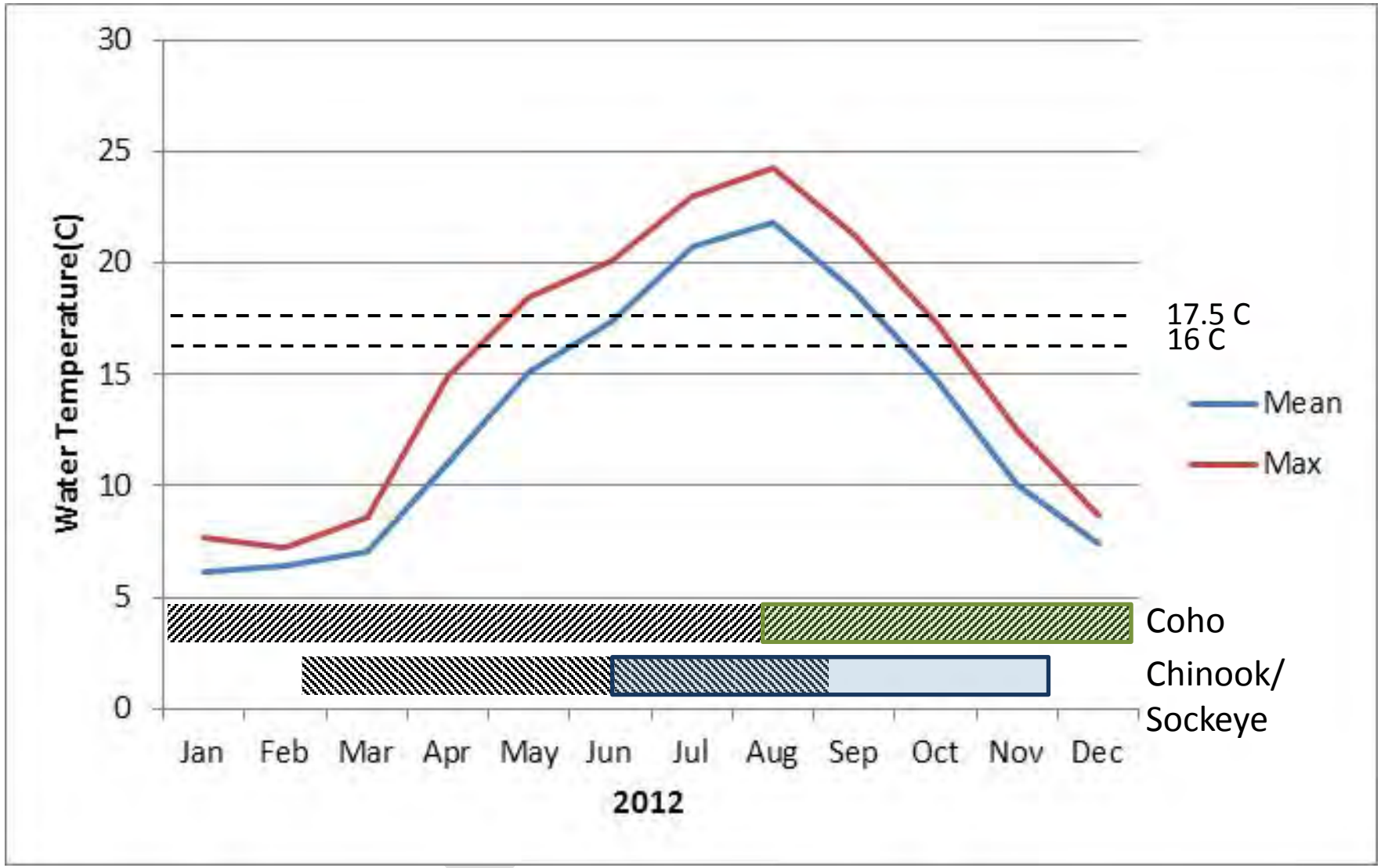

Figure 11. Average monthly water temperature in the Upper Sammamish River and comparison to fish presence. Hatched bars indicate timing of juvenile salmon; solid bars indicate timing of adult salmon.

In Lake Sammamish, Gage 612 (near the middle of the lake) has data loggers at multiple depths including surface (1 meter or 3.3 feet), mid-depth (10 meters or 33 feet) and deep water (20 meters or 66 feet). Figure 12 shows mean water temperatures by month at these three depths for Gage 612. Figure 13 shows mean dissolve oxygen concentrations by month at these three depths for Gage 612. The WDOE criterion for dissolved oxygen is 9.5 milligrams/liter (mg/l) for core summer salmonid habitat and 8 mg/l for salmonid spawning, rearing, and migration (WDOE 2012).

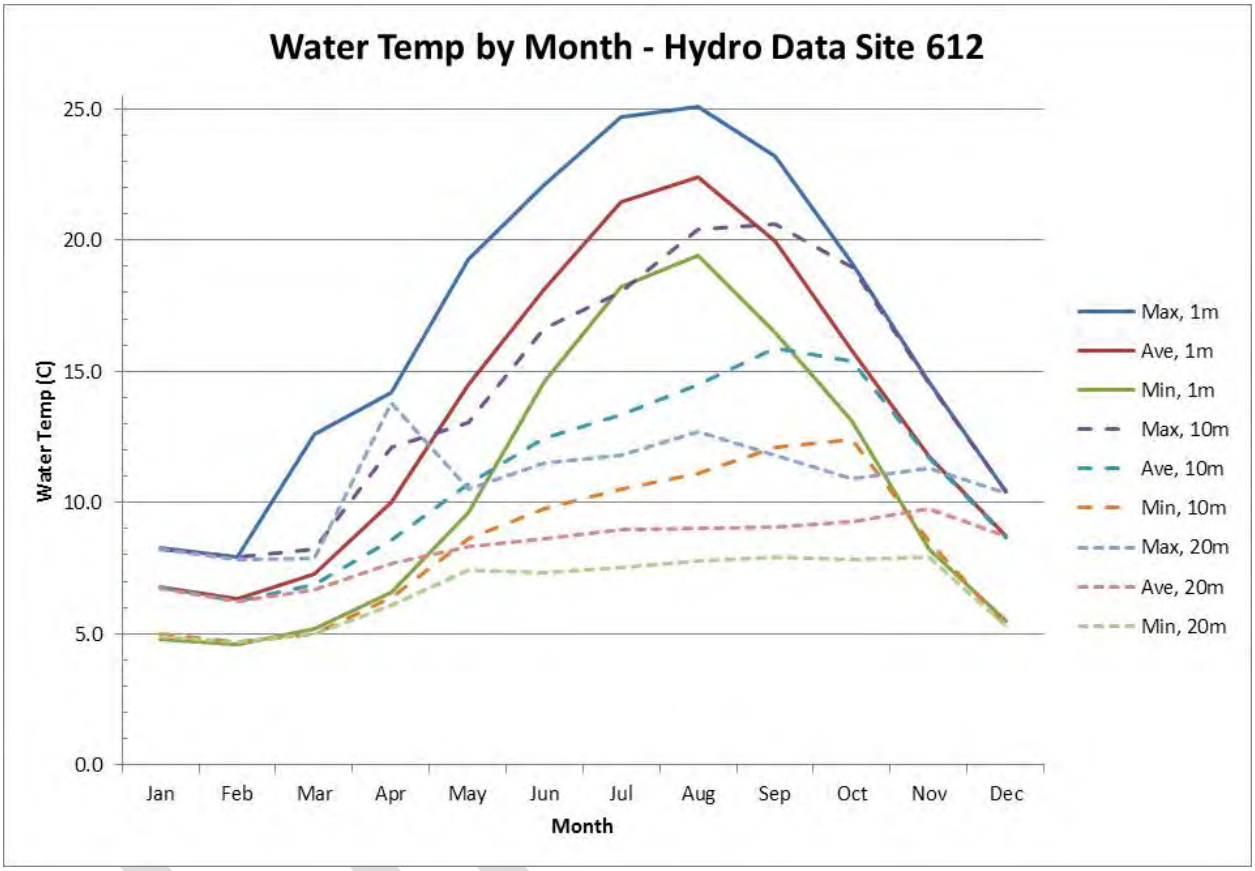

Figure 12. Monthly water temperatures at Lake Sammamish Gage 612 at 1, 10, and 20 meter depths

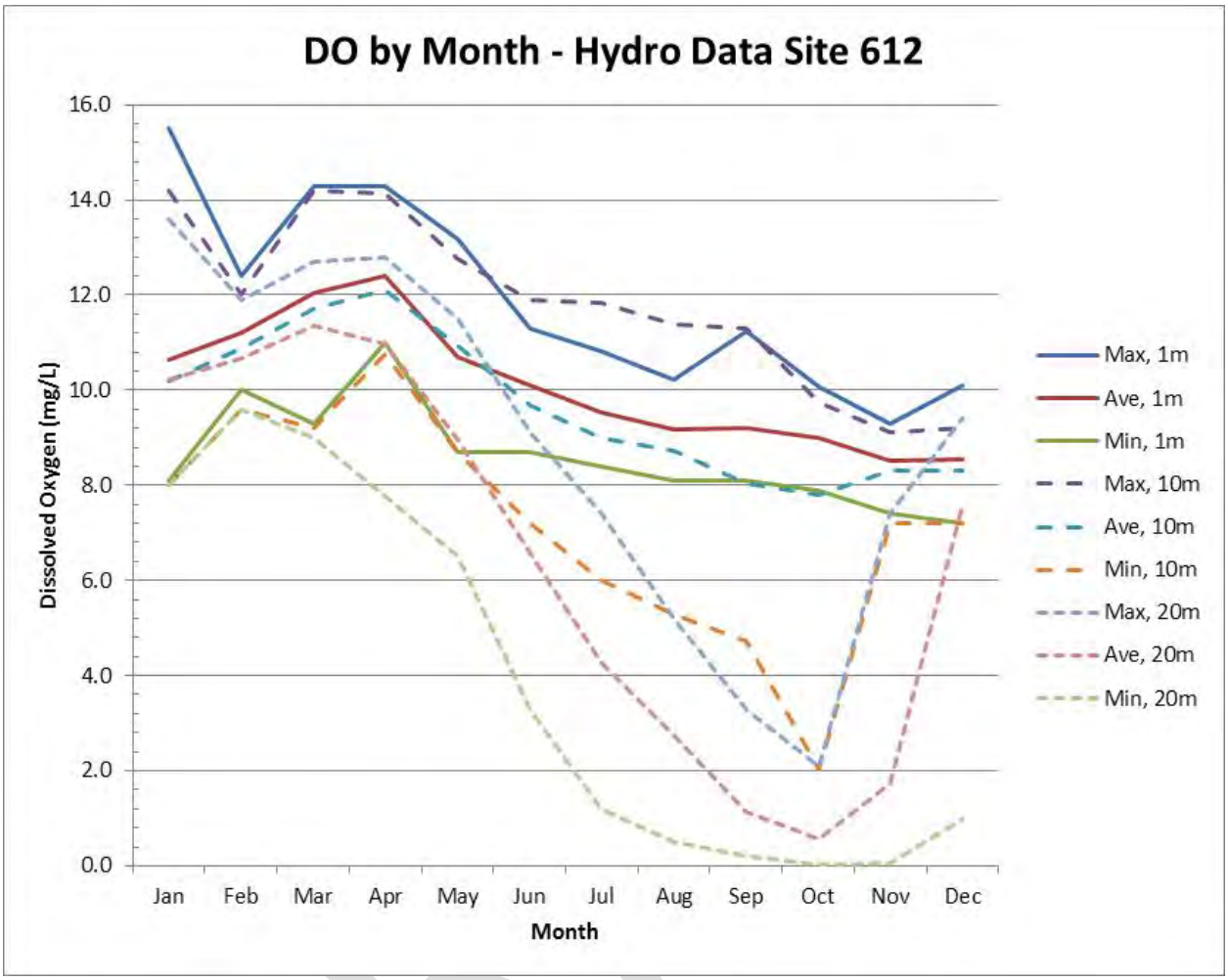

Figure 13. Monthly dissolved oxygen concentrations at Lake Sammamish Gage 612 at 1, 10, and 20 meter depths

Dissolved oxygen (dissolved oxygen) is inversely related to temperature. King County deployed continuous sensors to measure temperature and DO from July 3 through September 27, 2012 (King County unpublished data). In the project area (located just downstream of the Transition Zone), the minimum DO concentration was 5.2 mg/l, maximum was 10.8 mg/l, and mean was 8.9 mg/l over the 2012 data collection period.

6. Wetlands

Previous studies of existing conditions for the project area included wetland delineations completed in 2003 (Bowles *et al.* 2003) and 2005 (Bowles 2005). Updating the wetland delineation and functional assessment is being undertaken because conditions may have changed since the previous reports and wetland delineation protocol details for the region have been revised (USACE 2010). This report is intended to provide updated mapping, functional assessment, and narrative description of the wetlands within the study area; building on previous reports by Bowles *et al.* and supplementing with recent field investigations.

In conjunction with these field investigations, data were collected regarding the vegetation communities present throughout the entire study area, including both wetland and upland communities.

6.1 Historic Land Use and Site Alterations

The project area was formerly agricultural and single-family residential. Thus, the soils have been plowed and disturbed over the past 100 plus years. The site has generally been fallow as open space for nearly 20 years and owned by King County. A portion of the site was used as a wastewater treatment facility including settling ponds. Much of the area that was formerly occupied by the wastewater treatment facility is now operated as a rowing facility (Sammamish Rowing Association) and includes an access road, storage buildings, a launch site, and a mitigation area. A former willow nursery is also present at the south end of the project area, but it has also been fallow for many years.

Construction of the 1964 channel improvements included dredging of the river sediments; most of which were side-cast onto the riverbanks to raise the bank elevation. Thus, locations along the riverbank have river sediments as opposed to natural soils present.

6.2 Precipitation Data and Analysis

Field work for the delineation was conducted during October 2013 at the end of the dry summer season when fall rains typically begin. The months preceding had both normal and well above normal precipitation (Table 3) (NRCS 2013; NOAA-NWFSO 2013). August 2013 had near normal precipitation while September 2013 had substantially more precipitation than normal. During the two weeks prior to the delineation there was virtually no precipitation (NOAA-NWFSO 2013) and no precipitation on the days of the field investigation (October 28 and 29, 2013).

Precipitation data from the Seattle-Tacoma Airport was used for this analysis because it was the closest source for both the NOAA-National Weather Service Data and WETS Station Data.

TABLE 3. Precipitation comparison at closest WETS and NOAA weather station site (Sea-Tac). WETS data includes the average monthly precipitation and 30% chance range (in parenthesis).

PRECIPITATION MONTH OF DELINEATION		PRECIPITATION PRECEDING MONTHS			
October (inches)		August (inches)		September (inches)	
2013	Normal	2013	Normal	2013	Normal
1.54[/1]	3.19 (1.96 – 3.86)[/2]	1.35[/1]	1.02 (0.38 – 1.24)[/2]	6.17[/1]	1.63 (0.62 – 2.03)[/2]

[/1] NOAA-NWFSO 2013
[/2] NRCS 2013

6.3 Methods

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) as:

> *"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

Wetlands are generally characterized by three parameters: vegetation, soil, and hydrology. At least one indicator for each parameter is required to delineate an area as a wetland, except in certain circumstances defined in the wetland delineation manual (USACE 1987) and subsequent guidance and regional manuals (USACE 2010).

The field wetland delineation was completed within the study area on October 28 and 29, 2013 following the 1987 Wetland Delineation Manual (USACE 1987) protocol, along with supplemental detail provided in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0, USACE 2010). The functional assessment was conducted following the protocol in the Washington State Wetland Rating System for Western Washington (Hruby 2004, annotated August 2006).

Prior to field work a base map was prepared showing the wetlands delineated in the 2003 and 2005 reports, as well as wetlands reported by the National Wetland Inventory (NWI) and the City of Redmond. Soil surveys were reviewed to determine the presence of hydric soils (NRCS 2013).

A routine level field sampling method was employed throughout the project site, where accessible, to evaluate wetland conditions. Sample plots were located to represent wetland and upland sites and were typically "paired" or located in close proximity to demonstrate the differences and potential boundary location. In areas not previously determined to be wetland, sample plots were located generally along a transect extending across the project area from West Lake Sammamish Parkway to the river. Individual sample plots consisted of holes dug to 14 inches deep in representative wetland and upland plots. Vegetation, soils, and hydrology were sampled at each plot and data were recorded on wetland rating forms for western Washington (Appendix B).

Field indicators were assessed using the Regional Supplement (USACE 2010) and the latest version of the National Wetland Plant List (USACE 2013). Wetland plot vegetation data were collected using sample plot circular diameters of 30 feet for tree canopy, 12 feet for shrubs, and six feet for herbaceous cover and determining percent cover for each species present. Sample plots were located using a Trimble GeoXT GPS (sub meter accuracy) and wetland boundaries were compared to previous boundaries; location data were then translated into a wetland delineation map using ArcGIS.

Additional sample plots to document vegetation communities were also identified with field plots measuring approximately 30 feet in diameter, within which all vegetation present and percent cover were recorded. These communities were then located using the Trimble GeoXT GPS and translated into ArcGIS map polygons in the office.

6.4 Results

6.4.1 Soils

Soils mapped within the study area included Alderwood gravelly sandy loam (6-15 percent slopes), Earlmont silt loam, Kitsap silt loam (2-8 percent slopes), Pilchuck loamy fine sand, Seattle muck, Sultan silt loam, and Tukwila muck (NRCS 2013). Soils are categorized as hydric (100 percent hydric), predominantly hydric (66-99 percent hydric), predominantly non-hydric (1-32 percent hydric), and non-hydric (NRCS 2013). Tukwila and Seattle mucks are hydric soils and Earlmont is predominantly hydric. Alderwood, Pilchuck, Kitsap, and Sultan soils are predominantly non-hydric, but may have hydric inclusions.

In general, the mapped soils were not confirmed in the field, although diatomaceous material was found in many sample plots and is identified as a layer in the Earlmont soil. Overall, most soil plots were closest in resemblance to the Earlmont soils. Many of the soils had mottling that is indicative of reduction and oxidation occurring from seasonal inundation or saturation, and this is consistent with the description of the Earlmont soils. However, even when soils have been effectively drained, hydric soil indicators such as mottles can remain in the soil, making it difficult to determine if a site is still wetland, or not.

6.4.2 Hydrology

Plots with strong positive hydrology indicators were either saturated within the upper 12 inches of the soil, had a water table within the upper 12 inches of the soil, or had standing surface water. Secondary hydrology indicators were typically not present.

In general, hydrology was a strong indicator of wetlands in many areas of the site. However, in some parts of the site, there were no hydrology indicators present. As the delineation occurred during the end of the dry summer season and some of the wetlands on the site are seasonal, the lack of hydrology does not necessarily mean the site was not wetland. In order to assist wetland determinations on portions of the site that were lacking hydrology, several piezometers were installed along with data loggers that will monitor water levels over the next several months.

6.4.3 Vegetation

Dominant trees on the site included black cottonwood (*Populus balsamifera*), red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), Douglas fir (*Pseudotsuga menziesii*), Pacific willow (*Salix lucida s. lasiandra*), and Sitka willow (*Salix sitchensis*). Isolated ornamental trees were also present including domestic apple (*Pyrus malus*); indicative of the former agricultural and residential land use.

Scrub-shrub layers were overwhelmingly dominated by non-native blackberries (*Rubus armeniacus*) throughout the site, but also had substantial cover of Sitka and Pacific willows, Douglas spirea (*Spiraea douglasii*), red osier dogwood (*Cornus sericea s. occidentalis*), and peafruit rose (*Rosa pisocarpa*). Non-native shrubs including Scotch broom (*Cytisus scoparius*), English hawthorn (*Crataegus monogyna*), butterfly bush (*Buddleia davidii*) and Japanese knotweed (*Reynoutria japonica*) were present in patches. Less common native shrubs included snowberry (*Symphoricarpos albus*), thimbleberry (*Rubus parviflorus*), and salmonberry (*Rubus spectabilis*).

The herbaceous layer was overwhelmingly dominated by reed canary grass (*Phalaris arundinaceae*) throughout the site, which often occurred as a monoculture in large areas. In some areas, reed canary grass was interspersed with patches dominated by sedges (*Carex obnupta*), rushes (*Juncus effusus*), grasses (*Agrostis gigantea*), and Canada thistle (*Cirsium arvense*). Other common herbaceous plants included creeping bent grass (*Agrostis stolonifera*), yellow flag iris (*Iris pseudacorus*), creeping buttercup (*Ranunculus repens*), tall fescue (*Schedonorus arundinaceus*), and bittersweet nightshade (*Solanum dulcamara*). Two Regulated Class B noxious weeds were present along the river in Wetland A, purple loosestrife (*Lythrum salicaria*) and yellow or garden loosestrife (*Lysimachia punctata or L. vulgaris*).

Vegetation was overall highly disturbed and substantially dominated by non-native species throughout the study area. In general, the vegetation was not a reliable indicator of wetlands as there were many facultative (FAC) species and many non-native species that occur equally well in upland and wetland locations.

6.4.4 Wetland Determinations

A total of five wetland areas were found and mapped within the study area (Figure 14). In general, these wetlands confirmed the wetlands as previously delineated (Bowles *et al.* 2003, Bowles 2005), with some slight changes in extent. A description of representative sample plots is provided below for each wetland. Data sheets are attached as Appendix B.

Creeks that were mapped in the project area included Tosh Creek and County Creek. County Creek was located from West Lake Sammamish Parkway through approximately half of its alignment, but an extensive area of standing water in Wetland E did not allow for its entire alignment to be mapped to the Sammamish River. It was confirmed that this creek does not flow through the Willow Nursery area (at the southeast end of the study area within a large reed canary grass monoculture) as previously shown on King County mapping. There were no swales, channels, or depressions of note within the former Willow Nursery area.

Wetland A

Wetland A covers 8.9 acres and is located in the northwest corner of the study area. It extends parallel to West Lake Sammamish Parkway roughly from NE 58th Court at the north end to NE 50th Way at its south end. It is a long narrow depressional wetland that is likely influenced by groundwater and surface runoff from West Lake Sammamish Parkway and the developed hill slope to the south.

Wetland Plot 2

Wetland Plot 2 was located in a flat terrace below West Lake Sammamish Parkway at the north end of the site. The vegetation was dominated by black cottonwood (FAC), big-leaf maple (FACU), creeping bentgrass (FAC), small-fruited bulrush (*Scirpus microcarpus*; OBL), and bittersweet nightshade (FAC). Standing water was present at a depth of two inches. The soil was highly saturated throughout the pit and was organic (histosol). A soil color was not taken as the soil was so wet and loose that an appropriate sample could not be pulled out. Positive indicators for all three parameters were found and this plot was determined to be wetland.

Wetland Plot 3

Wetland Plot 3 was paired with Wetland Plot 2 to contrast the upland characteristics. The vegetation was dominated by black cottonwood (FAC), big-leaf maple (FACU), and reed canary grass (FACW). The soil was fine gravelly sand with a matrix color of 10YR 3/2 and no mottles. The soil color was dark enough to meet hydric soil indicator F3 (depleted matrix). No hydrology indicators were present. As both the vegetation and soil indicators were fairly weak and significantly different from the vegetation and soil at Wetland Plot 2 (located approximately 8 feet away), and no hydrology indicators were present, this plot was determined to be upland.

Wetland Plot 9

Wetland Plot 9 was located further to the south and east, still immediately below West Lake Sammamish Parkway. The vegetation was dominated by black cottonwood (FAC), Sitka willow (FACW), Douglas spirea (FACW), creeping bent grass (FAC), slough sedge (OBL), and tall fescue (*Schedonorus arundinaceae*; FAC). The soil was medium sand with a matrix color of 10YR 4/1 and distinct mottles with a color of 7.5YR 5/8. This met the hydric soil indicator S5 (sandy redox). The soil was saturated at twelve inches. Positive indicators for all three parameters were found and this plot was determined to be wetland.

Wetland Plot 8

Wetland Plot 8 was paired with Wetland Plot 9 to contrast the upland characteristics. The vegetation was dominated by black cottonwood (FAC), Lombardy poplar (N.L), Sitka willow (FACW), Himalayan blackberry (FACU), timothy (*Phleum pratense*; FAC), and creeping bent grass (FAC). The soil was medium sand with a matrix color of 10YR 5/1 and a few indistinct mottles of 10YR 5/8. The mottles were not

distinct enough to meet hydric soil indicator S5 (sandy redox). There were no hydrology indicators present. Due to the lack of hydric soil and hydrology indicators, this plot was determined to be upland.

Boundary Determination

The boundary determination was generally made where a distinct vegetation community change was observed, or where hydrology disappeared.

Wetland B

Wetland B covers 2.3 acres and is a riverine wetland located along the Sammamish River TZ on the south or west bank (left bank). This area is separated from Wetland A by an access roadway for maintenance vehicles that runs along the top of the river bank. The wetland extends the length of the TZ starting near the north boundary of the study area and extending just upstream of the weir and roughly corresponds to the designed high flow channel. The toe of the berm slope is roughly where the wetland boundary lies and is also indicated by the presence of the Ordinary High Water Mark (OHWM) observable where the tree line persists. Angular rock and sandy high chroma soils were present on the slope, indicating well drained conditions. Two sample plots were within this wetland.

Wetland Plot 4

Wetland Plot 4 was located on the slope of the bank just below the transition zone (but below the access road). Vegetation was dominated by Sitka willow (FACW), Himalayan blackberry (FACU), reed canary grass (FACW), and yellow-flag iris (OBL). The soil was gleyed silty sand with a matrix color of Gley1 3/N and distinct mottles of 7.5YR 5/8. This met the hydric soil indicator S4 (sandy gleyed matrix). Groundwater was present at 8 inches and the soil was saturated to the surface. Positive indicators for all three parameters were present and this plot was determined to be wetland.

Wetland Plot 5

Wetland Plot 5 was located in the high flow area of the TZ. The vegetation had been recently mowed, but was dominated by reed canary grass (FACW) and small-fruited bullrush (OBL). The soil was gleyed silty sand with a matrix color of Gley1 4/5GY and distinct mottles of 7.5YR 5/8. This met the hydric soil indicator S4 (sandy gleyed matrix). Groundwater was present at 8 inches and the soil was saturated to the surface. Positive indicators for all three parameters were present and this plot was determined to be wetland.

Boundary Determination

The boundary determination was made at either the ordinary high water mark (OHWM) as evidenced in the field by living woody vegetated stems and by topography and presence of angular rock located on the bank slope up to the access roadway.

Wetland C

Wetland C also covers 2.3 acres and is a riverine wetland located along the Sammamish River TZ on the north or east bank (right bank), just across from Wetland B. Wetland C roughly mirrors Wetland B in length and width.

Wetland Plot 35

Wetland Plot 35 was located in the high flow area of the TZ. The vegetation had been recently mowed, but was dominated by reed canary grass (FACW). The soil was gleyed silty sand with a matrix color of Gley1 3/10Y and no mottles. This met the hydric soil indicator S4 (sandy gleyed material). The soil was saturated to the surface. Positive indicators for all three parameters were present and this plot was determined to be wetland.

Wetland Plot 37

Wetland Plot 37 was located in the high flow channel area of the TZ where sediment had recently been removed. Vegetation was sparse and dominated by blue grass (*Poa pratensis*; FAC). The soil was silt with quarry spalls with a matrix color of 10YR 4/1 with no mottles. This does not meet hydric soil indicator F3 (depleted matrix) without mottles. Water was present at 10 inches below the surface and the soil was saturated. Positive indicators for vegetation and hydrology were present and particularly due to the presence of water, this plot was determined to be wetland. The soil was comprised largely of quarry spalls that would not show redoximorphic features.

Boundary Determination

The boundary determination was made at either the ordinary high water mark (OHWM) as evidenced in the field by living rooted woody vegetated stems or by topography and presence of angular rock located on the bank slope up to the trail.

Wetland D

Wetlands D1 and D2 are two very small depressional wetlands that each comprise approximately 0.2 acres and are not large enough to create visible polygons on the mapping. Both wetlands were immediately visible in the field due to an abrupt change from reed canary grass to nearly 100% cover of slough sedge (*Carex obnupta),* an obligate wetland species. Soils are silty clay with a matrix of Gley1 4/5GY and distinct mottles of 10YR 5/6. The soil was saturated at 10 to 12 inches depth.

These two patches are fairly near to what had been identified as Wetland B in the Bowles, et al. (2003) report, which could not be found during this wetland investigation. It is not likely that a Douglas spirea wetland (previously identified) would have transitioned to a sedge-dominated wetland without evidence of dead shrubs. It is more likely that the formerly Douglas spirea wetland has been overgrown with Himalayan blackberry and was not observed during this wetland delineation.

Wetland E

Wetland E is a lake-fringing wetland that covers 39.4 acres and is located in the southeast portion of the study area. Its eastern border follows the open water boundary of Lake Sammamish and Sammamish River, extending from the lake to just downstream of Tosh Creek. The wetland covers the bulk of the southern portion of the study area, including areas surrounding the Sammamish Rowing Association buildings and the abandoned wastewater treatment ponds.

Wetland Plot 15

Wetland Plot 15 is located at the eastern end of Wetland E. Vegetation is dominated by Douglas spirea (FACW) and reed canary grass (FACW). The soil is silty clay with a matrix color of 10YR 4/2. There were clods of diatomaceous earth at 10 to 12 inches (could have been historically plowed). The soil was not dark enough to meet hydric soil indicator F3 (depleted matrix) without mottles. The soil was saturated, however, at 10 inches. The presence of strong vegetation and hydrology indicators indicates that the plot is likely a wetland even with a lack of a hydric soil indicator. Particularly the presence of saturated soils in late fall is a strong indicator that the site is a wetland.

Wetland Plot 16

Wetland Plot 16 was paired with Wetland Plot 15 to distinguish upland characteristics. Vegetation is dominated by Himalayan blackberry (FACU), pea-fruit rose (FAC) and reed canary grass (FACW). The soil was the same silty clay with a matrix color of 10YR 4/2 without mottles. There were no hydrology indicators. Due to the lack of either hydric soil or hydrology indicators coincident with the transition to blackberry dominated vegetation, this plot was determined to be upland.

Wetland Plot 26

Wetland Plot 26 was located south and east of the Sammamish Rowing Association road and buildings. The vegetation was dominated by reed canary grass (FACW) with much lesser abundance, but still dominant Himalayan blackberry (FACU); the prevalence index was 2.2. The soil was silty clay with a matrix color of 10YR 3/2 and distinct mottles of 10YR 5/6. The met the hydric soil indicator F3 (depleted matrix). Oxidized root channels (rhizospheres) were present along living roots, meeting that hydrology indicator although no water was present. Positive indicators of all three parameters indicate this plot is wetland.

Wetland Plot 27

Wetland Plot 27 was paired with Wetland Plot 26 to distinguish upland characteristics. Vegetation is dominated by reed canary grass (FACW). The soil was silty clay with a matrix color of 10YR 4/2 with indistinct mottles of 10YR 5/3. The mottles were determined to be barely distinguishable and thus did not meet the hydric soil indicator F3 (depleted matrix). There were no hydrology indicators. Due to the lack of either hydric soil or hydrology indicators this plot was determined to be upland.

Wetland Plot 33

Wetland Plot 33 was located in the eastern portion of Wetland E closer to Lake Sammamish. Vegetation is dominated by Oregon ash (*Fraxinus latifolia*; FACW) and reed canary grass (FACW). The soil was clayey silt with a matrix color of 10YR 2/1 without mottles. This is sufficiently dark to meet hydric soil indicator F3 (depleted matrix). Water was present at 12 inches below the surface and the soil was saturated to the surface. Positive indicators of all three parameters indicate this plot is wetland.

Lake Fringing Wetland

Vegetation was documented in this area of standing water (Vegetation Plot 29). Vegetation is dominated by Pacific willow (*Salix lucida* var. lasiandra; FACW), reed canary grass (FACW), red osier dogwood (*Cornus stolonifera*; FACW), thimbleberry (FACU), and Oregon ash (FACW).

Boundary Determination

The boundary determinations were made where the vegetation dominance changed (such as to Himalayan blackberry) or where the soil and hydrology indicators were lost.

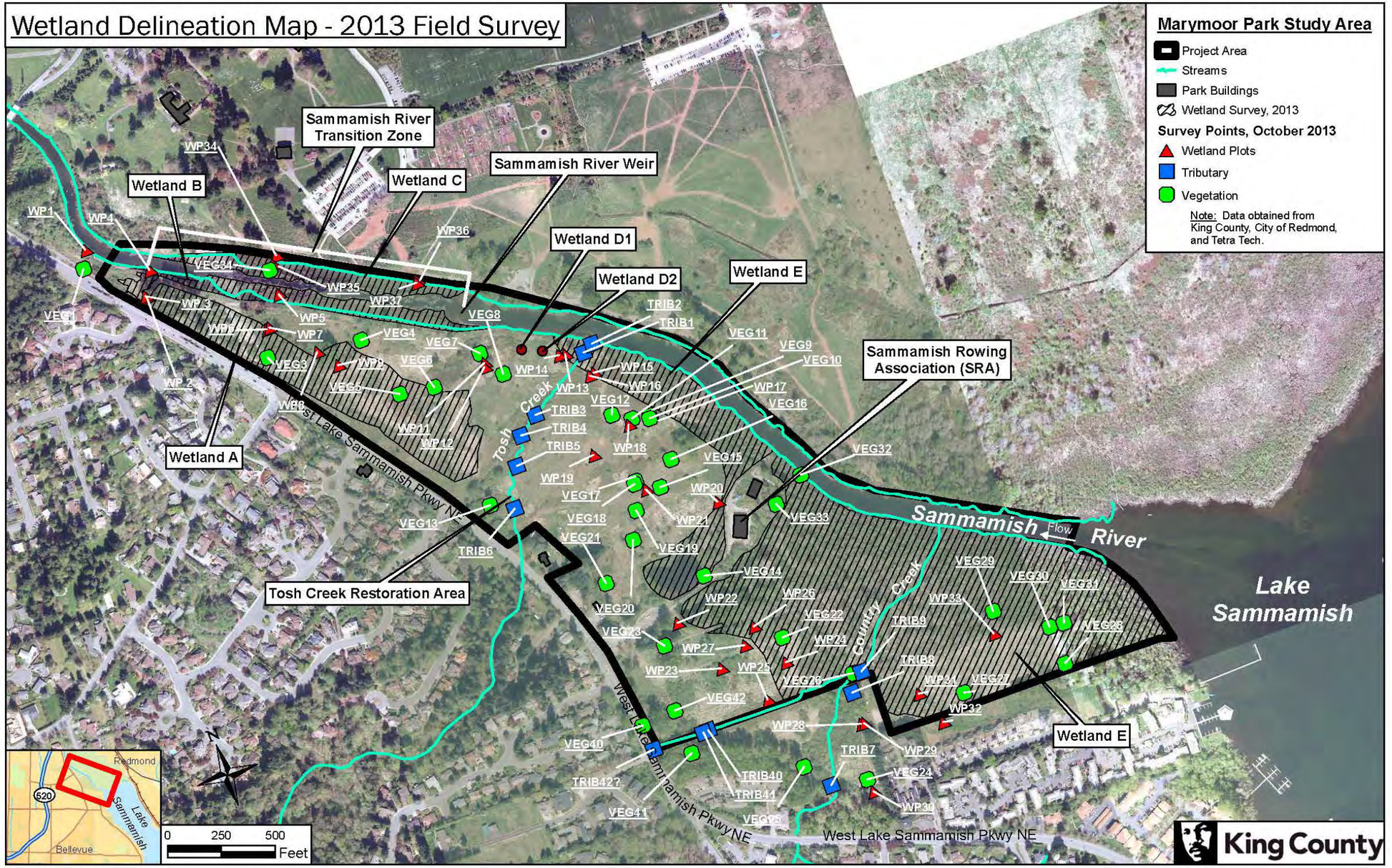

Figure 14. Wetland Sample Plot and Boundary Map.

6.5 Wetland Functional Assessment and Rating

Information used to prepare the functional assessment came from data collected in the field on October 28 and 29, 2013, data available from previous investigations (Bowles *et al*. 2003 and Bowles 2005) and online sources, and information from County staff and park users familiar with the study area. Wetlands delineated in the study area were rated and categorized according to the Washington State Wetlands Rating System (2004). Functional assessment data sheets are provided in Appendix C.

The rating system requires the assessment of several parameters that describe existing wetland conditions, which are translated into a point system to indicate the level of function occurring or that has the potential to occur within the wetland. The parameters are divided into water quality functions, hydrologic functions, and habitat functions. The final outcome of the rating system is placement of the wetland into a Category of I, II, III, or IV. Category I wetlands are those that provide excellent function, are ecologically valuable or sensitive, or are unique or rare. These wetlands must be protected from degradation. Category II wetlands are functionally valuable, and though they are not as essential to protect as Category I wetlands, still require a relatively high level of protection. Category III wetlands provide a moderate level of wetland functions, but can be less diverse or more isolated from other natural resources in the landscape. Category IV wetlands have the lowest functional value, typically due to heavy disturbance. These wetlands often have the potential to improve. In some cases, these wetlands provide at least one important function and should be protected. Understanding the current level of function of the wetland on the project site will help in the identification of restoration or enhancement measures that could improve function.

Water quality functions include ratings for surface flow conditions, soil condition, and characteristics of persistent vegetation. If the wetland has the potential to provide improvements to water quality, the score is doubled. The potential to provide improvements is based on the potential for pollutants to be within the study area, or to be washed into the study area. Because the area is adjacent to residential development and roadways, and because untreated stormwater runs into the wetland via culverts or streams throughout the site, each wetland score in Table 3 has been doubled for water quality functions.

Hydrology is assessed using characteristics of surface flow, depth of water storage during wet periods, and contribution of wetland to storage in larger watershed. Again, if the wetland has the opportunity to provide improvement to hydrologic functions, based on the presence of hydrologic problems within the area, the score is doubled. The potential for improving hydrologic function varies between wetlands and not all scores were doubled.

Habitat conditions are rated by assessing the potential for the wetland for supporting habitat for a variety of species, the wetlands hydroperiod variability, richness of plant species, interspersion of plant communities and habitats, presence of special habitat features, buffer condition, corridors and connectivity to other habitats, presence of priority habitats as defined by WDFW, and the larger wetland landscape. There is no doubling factor possible for this function rating.

If a wetland contains one or more items from a special set of characteristics (i.e. documented to contain a listed species), it can be categorized as a Category I wetland based solely on that condition. There were no wetlands in the study area that could be categorized based on these special characteristics (although Wetlands A, B, and E fringe waterbodies known to contain listed salmon species) and none of the project wetlands were Natural Heritage Wetlands (DNR 2013).

Based on data gathered over the past several years by Friends of Marymoor Park, there are several Washington Department of Fish and Wildlife priority species that are known to be present in the study area. According to the wetland rating system, wetlands with priority species present may require additional protections Additional details on wildlife and wildlife habitat are provided in Appendix D.

Prior to performing the rating assessment, it must be determined which classification best describes the wetland. Within the study area, wetlands were identified as depressional (Wetlands A and D), riverine (Wetlands B and C), and lake-fringe (Wetland E). Though Wetland E had multiple wetland types, the largest area of the wetland was classified as lake fringe. Wetland classifications, ratings, and category are provided in Table 4.

Table 4. Wetland Functional Assessment and Rating Categories.

Wetland	A	B	C	D	E
Classification	Depressional	Riverine	Riverine	Depressional	Lake-fringe
Water Quality	24	20	20	8	24
Hydrology	10	18	18	4	12
Habitat	16	22	22	9	26
Total Score	50	60	60	21	62
Category	**III**	**II**	**II**	**IV**	**II**
Priority Species Present?	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Wetland A

Wetland A is a depressional wetland that received a Category III rating, primarily due to its lack of hydrologic functioning. Though the site retains water and should have the potential to reduce flooding and erosion, the depth of water storage and the size of the wetland are not sufficient. Water quality and habitat functions received higher overall ratings. The wetland has the potential to improve water quality since the unit is a depression with no water leaving, has persistent ungrazed vegetation throughout the majority of the site, and the wetland is seasonally ponded throughout more than half its area. The hydrologic score is doubled since the wetland ponds surface water runoff that might otherwise flow into

a river that has flooding problems. Habitat function is fair with good scores for buffers, corridors, and lake-fringe landscape, and low scores for special habitat features, vegetation structure and hydroperiod. Opportunities for enhancement include control of non-native species and planting a more diverse native plant community, placement of wood, and excavation of microtopographic features to store water longer and provide diversity of habitat.

Wetland B

This riverine wetland has an overall score of 60, giving it a Category II rating. In this case, scores for water quality, hydrologic, and habitat functioning are all similar and are valuable ecologically. The wetland unit has the potential to improve water quality and hydrologic functions, as well as the opportunity to do both. This is due to the ability of the wetland to reduce flood flows and trap sediments and also has the opportunity to do so due to the presence of human structures and natural resources downstream that may be damaged by flooding. However, the area is relatively small with little overbank storage capacity. Habitat function strengths include a variety of hydroperiods within the wetland, high interspersion of existing habitats, buffers, corridors and the overall wetland landscape or proximity to other wetlands. Habitat function weaknesses include low species richness, lack of WDFW priority habitats, and lack of special habitat features. Opportunities for enhancement include control of non-native species, placement of wood, reducing mowing/maintenance by increasing capacity, and planting a more diverse native plant species community.

Wetland C

This riverine wetland has received the same functional assessment as Wetland B, Category II with 60 total points. Wetland C conditions mirror those described for Wetland B, since they are separated only by the narrow river low-flow channel. Opportunities for enhancement include control of non-native species, placement of wood, reducing mowing/maintenance by increasing capacity, and planting a more diverse native plant species community.

Wetlands D1 and D2

These two small depressional wetlands have received scores of 21 and fall into Category IV. Though these wetlands have the potential for improving water quality (and scores have been doubled to reflect that potential) and hydrologic function, their size is so small that the opportunity results in no appreciable benefit. There is no opportunity to improve hydrologic function and those scores have not been doubled. Further, because the unit area is so small, very little habitat diversity is present and habitat function is very low. Opportunities for enhancement include the potential to connect these small wetland patches to the larger Wetland E, control of non-native species, placement of wood, and planting a more diverse native plant species community.

Wetland E

Wetland E received the highest score within the study area and is a Category II lake-fringe wetland. Water quality and habitat functions received higher scores, while hydrologic functions were fair. Water quality functions were strong due to a high average width of vegetation along the lakeshore, extent of

herbaceous cover within the wetland, and having the potential to improve water quality. Hydrologic function is based on vegetation classes along the lakeshore and an extensive boundary of shrubs or forest in this wetland, along with its potential to improve hydrologic function due to presence of human structures and activities. Habitat functions at this wetland were also high. Vegetation structure, hydroperiod, interspersion of habitats, buffers, corridors, and landscape context received highest scores, while special habitat features, WDFW priority habitats, and species richness were low. Opportunities for enhancement include control of non-native species, placement of wood, excavation of microtopographic features in the more disturbed areas of the wetland, and planting a more diverse native plant species community.

7. Vegetation Community Mapping

A number of distinct vegetation types were observed during field wetland delineations. A total of 75 vegetation sample plots were inventoried throughout the study area. In some cases, access was not possible to portions of the study area due to deep standing water or impassable blackberry thickets. Where vegetation could not be physically reached for evaluation, aerial photograph interpretation was used to determine map polygons. A total of 13 vegetation communities were identified, and if possible, classified and described as a habitat type based on Kunze (1994) for wetland areas. However, Kunze (1994) does not include non-native dominated wetland vegetation communities. Upland vegetation communities have been described using data and nomenclature from the Washington Natural Heritage Program (Chappell 2006). All vegetation communities present have been described below and all communities with areas greater than 0.1 acres have been mapped on Figure 15.

Alder dominated. This community occurs at the mouth of Tosh Creek and in other patches. Tree canopy cover is at least 50%. This community is a variant of the natural *Alnus rubra-Rubus spectabilis* community described by Kunze (1994), but on the project site is highly disturbed with understory species including reed canary grass and Himalayan blackberry. A small component of *Rubus spectabilis* is present.

***Agrostis* or *Poa* dominated** (non-native). This community represents the areas throughout the site that were dominated by non-native grasses other than *Phalaris*. Creeping bent grass (*Agrostis stolonifera*) occurred throughout the site as part of the larger herbaceous layer mosaic where it grew in patches, or as individual plants under scrub-shrub or tree canopy. Poa was present in distinct large patches where maintenance activities take place, such as along the berms to the east and west of the river, along the terraces alongside the river, and in staging areas on the west side of the river. Non-native grasses colonize rapidly after disturbance to native habitats and generally require continued disturbance to remain.

Bigleaf maple – red alder (Chappell 2006). This community type occurs mostly around shorelines and most remaining examples are small, fragmented, and degraded to varying degrees by non-native species. The community is dominated by bigleaf maple and/or red alder and may be associated with several other species. Within the study area, other associated species included Douglas fir, thimbleberry,

snowberry, vine maple, rose, sword fern, and horsetail. Chappell notes that non-native blackberry is a prolific invader of this association, and this was found to be true at the study site. Reed canary grass, English hawthorn, and holly (*Ilex aquifolium*) were also present. Other trees of lesser dominance in this community included native black cottonwood and Oregon ash. These communities primarily occurred at the margins of the study area along West Lake Sammamish Parkway and the access road leading to the Rowing Association buildings.

***Carex obnupta* community type** (Kunze 1994) Slough sedge is a robust perennial herb that grows 20 to 60 inches in height. Pockets of slough sedge wetlands were present, but were too small to create polygons on the mapping. These areas are a monoculture of slough sedge and are less than 10 square meters in size. Kunze notes that this community type is often monospecific and field observations confirmed this. This community type occurred as patches in a mosaic that also included *Phalaris* dominated, *Agrostis* dominated, and *Rubus* dominated communities.

Cottonwood dominated. Cottonwood is present in patches or as a minor component in many other vegetation communities. Cottonwood is a natural riparian species that often dominates in patches along lakes and streams. At the project site, it is only dominant in small areas.

***Cytisus* dominated** (non-native) Scotch broom is a perennial shrub of the Pea family that may reach heights of 10 feet. Scotch broom, once established, spreads rapidly and may become an impenetrable thicket to wildlife species. It displaces native and beneficial plants and prevents reforestation by shading out saplings. Its seeds are toxic to humans, horses, and other livestock and the plant is considered a fire hazard. Though control of this species is not required in the study area according to King County's noxious weeds categorization, it is recommended. Within the study area, Scotch broom grows in several distinct locations and typically indicates the presence of upland soils.

Douglas fir /snowberry-serviceberry (Chappell 2006) Within the study area there were some distinct Douglas fir dominated forest canopy, such as along West Lake Sammamish Parkway near the parking lot for the Sammamish Rowing Association access road. These areas were associated with some of the species listed by Chappell, including snowberry, ocean spray, bigleaf maple, sword fern, bracken fern, and Scotch broom. They were also often found with holly, blackberry, reed canary grass and ornamental trees, such as Lombardy poplar.

Mixed Forest. Mixed forest is dominated by tree canopy cover of at least 50%, but on the project site there are often multiple tree species present including cottonwood, big-leaf maple, red alder, and Oregon ash. The two primary forested areas on the project site are in the northwest portion of the site near West lake Sammamish Parkway and along Country Creek. Understory includes reed canary grass, small-fruited bulrush, Himalayan blackberry, and red osier dogwood.

***Phalaris* dominated** (non-native). Reed canary grass is a perennial sod-forming grass that may grow to 8 feet (NRCS 2002). Benefits of this grass include its ability to control erosion and provide filtering of wastewater; it is also used by some wildlife for nesting, escape cover, and seed foraging. However, this plant rapidly becomes invasive where native species are unable to compete with its robust adaptations to inundation and frost. Initially seeded as hay or pasture on sites too wet for good performance of

other forage plants, it has spread throughout the U.S. and become invasive in many sites. The study area has extensive cover of reed canary grass and it occurs in nearly every plant community on the site. It grows as a dense monoculture in many areas, as a mosaic with other patches, and as an herbaceous layer under forest canopy and scrub-shrub. Only thick blackberry seem to outcompete this grass.

Phalaris* dominated with sparse *Alnus (non-native) Red alder is a native deciduous tree of the Birch family. This community represents a small area north of the ponds where reed canary grass is the dominant vegetation, but the red alder tree cover, and other trees, are substantial enough to distinguish from the solely *Phalaris* dominated areas.

***Potamogeton natans* community type** (Kunze 1994) Pondweed is an aquatic perennial herb that grows in permanently flooded areas including shallow lake margins or throughout shallow ponds. It was found in all four abandoned wastewater treatment ponds along the gravel road leading to the Sammamish Rowing Association buildings.

***Rubus* dominated** (non-native) The Himalayan blackberry is a non-native and invasive species that can rapidly claim native habitats once established. It is technically a perennial subshrub of the rose family. Himalayan and evergreen blackberries (*Rubus laciniatus*) are both classified as Class C noxious weeds on the Washington State Noxious Weed List and are non-regulated noxious weeds in King County. Though the non-native blackberry species may occur occasionally in wetlands as FACU species, they are most often present in uplands. Throughout the study area, blackberries tended to be an indicator of upland and were often good wetland boundary indicators. These subshrubs quickly out-compete other native understory vegetation and prevent the establishment of trees that require sun for germination. Dense thickets prevent large mammals from moving freely through habitat and may restrict access to water or forage. Brambles also reduce habitat diversity and availability and may mask erosion issues along streambanks. Root structure is not adequate for bank stabilization.

***Salix* spp. community type** (Kunze 1994). This community can be found in seasonally or permanently flooded wetlands. Vegetation can include any of the *Salix* species that occur in the region, and is often associated with Douglas spirea. These species tend to consist of several shrubby species forming a dense stand where one or more species of *Salix* is dominant. Within Marymoor Park, willow species include Pacific, Sitka, Piper's and Scouler's willow. Dominant species in the project area were usually Sitka willow and Pacific willow. In many *Salix* dominated communities, black cottonwood was also present. Not all willow community types in the study area were associated with wetlands.

***Spirea douglasii* community type** (Kunze 1994) Spirea is a perennial deciduous shrub in the rose family that grows 2 to 7 feet tall. It grows in dense thickets and can withstand competition from wetland grasses better than other woody species (Darris and Gonzalves 2009). This community provides good cover for birds and small mammals and contributes to stabilization of stream banks. This community occurred in one discrete location north of the Rowing Association buildings and near the river, where it grew as a thick cover. Reed canary grass was also present in this area. Small patches of spirea were also present in areas mapped as *Phalaris* dominated.

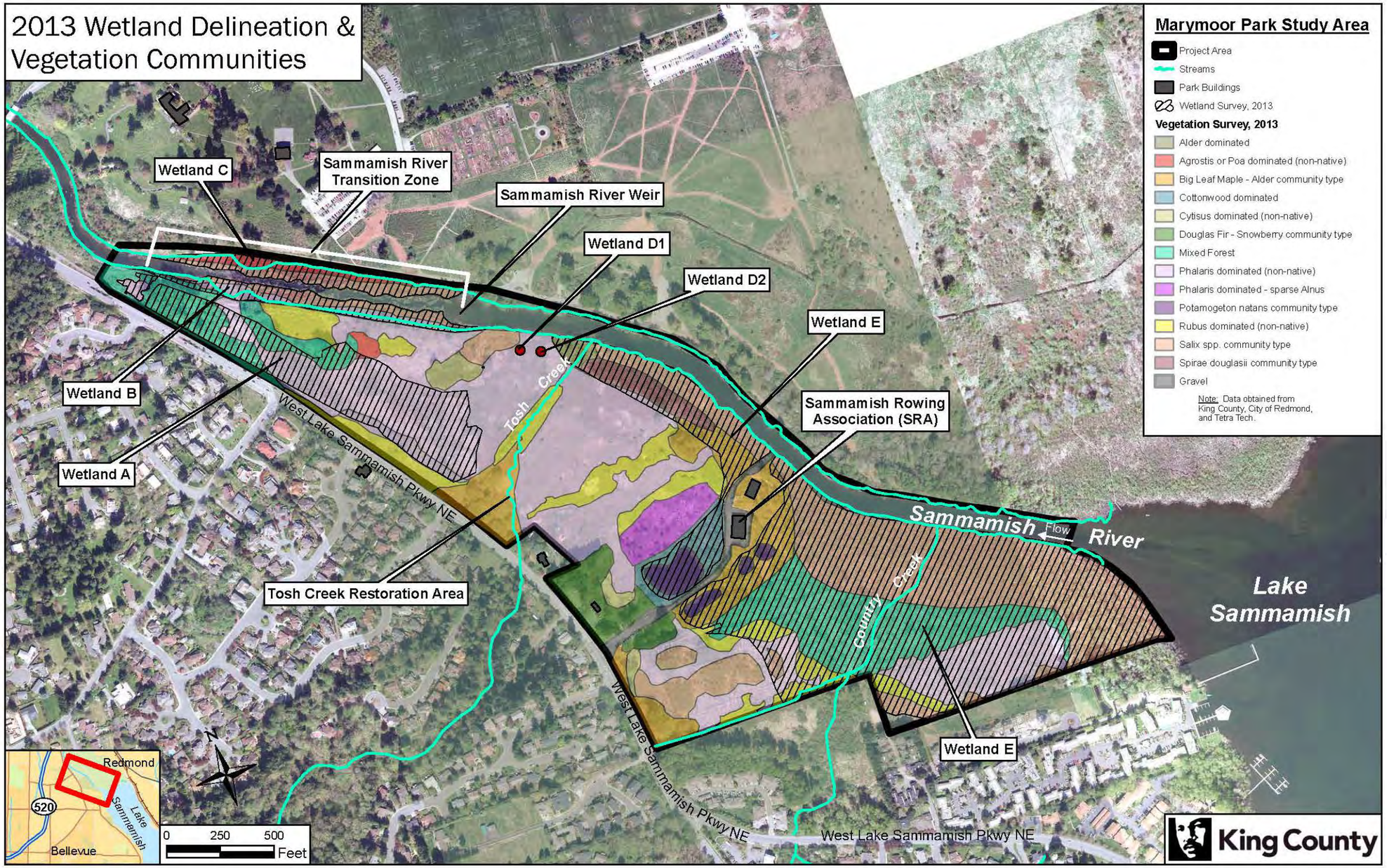

Figure 15. Vegetation Communities Present In the Project Area.

8. Wildlife

Marymoor Park, between the Sammamish River and Lake Sammamish Parkway, is an open space park with a variety of wetland and upland vegetation communities and habitats (Figure 4 in main report). A diverse assemblage of native and non-native wildlife species uses the project area and greater Marymoor Park throughout the year, including resident and migratory birds, large and small mammals, amphibians, and reptiles. The purpose of this report is to describe the current wildlife habitat and condition within the project area, describe the native and non-native wildlife assemblages that occur, and provide recommendations for enhancing or restoring those habitats to improve wildlife use.

Each wildlife guild of interest for this study, including birds, mammals, and amphibians/reptiles, has been presented below along with representative native species or any known species of special concern that occur in the area. Each species description presents life history and habitat preference data. Wildlife presence in the study area comes from reported sightings by the Friends of Marymoor Park and incidental sightings recorded during field investigations in October 2013.

8.1 Mammals

Since 1998, the Friends of Marymoor Park have collected observation data for mammals in the study area and seen over 1,187 individuals of various species. The most common sightings are of introduced species such as Eastern gray squirrel and Eastern cottontail, which are seen repeatedly during each month of the year. Other more common species are coyote, river otter, raccoon, weasel, mule deer, and muskrat. Animals that have been rarely sighted include opossum, mink, bobcat, mountain beaver, northern flying squirrel, and Townsend's chipmunk. Though none of these species is included on Federal or State lists of threatened, endangered, or sensitive species, the northern flying squirrel and Townsend's chipmunk are both protected from hunting under Washington state law. There have been no mammals categorized as WDFW priority species observed at the study site. Detailed accounts of mammal presence in the park and habitats used were provided by M. Hobbs (Pers. comm. 2013).

Beaver (Castor canadensis) (WDFW 2013, Burke 2013)

Beavers are medium sized mammals weighing between 28-77 pounds at full size. Beavers are adapted to living year-round in water having a thick waterproof coat, paddle shaped tail, webbed feet and valvular ears and nostrils which can be sealed when submerged. Once beavers reach 1.5 to 3 years of age, mating begins, typically in the month of February. Gestation is 4 months and commonly produces between 2 and 5 furry kits. Both parents care for young and life expectancy is 10-15 years.

Habitat preferences are based on where beavers can create lodges or dens and find sufficient food sources. The best locations include forested wetlands where beavers can collect tree branches and logs to create dams and lodges. Dams are constructed to pond water, creating a safe place for chewing trees down, foraging, storing food underwater, and creating underwater access to lodges. Lodges are then built with collected tree branches and downed logs, and other materials available, and can be as large as 30 feet in diameter. The leaves, buds, and bark of their home territory trees also comprise their diet.

Preferred habitats include trees of aspen, poplar, birch, maple, willow and alder. Beavers will also consume lilies and other aquatic vegetation in the early spring.

Beaver have been observed several times within the project area, generally during the months of February and June, including within the former wastewater treatment ponds adjacent to the Sammamish Rowing Association buildings. At least one beaver den is present in the project area, built into the river bank about 100 yards downstream of the weir in the TZ, and beavers have been denning at the site for many years. Prior to construction activities at the Sammamish Rowing Association buildings, beaver were denning at the ponds. Additional evidence of beaver activity includes a partial dam built in the TZ earlier this year, as well as numerous beaver spikes and girdled or cut down trees. Beavers use all wetted habitats and probably cross upland patches between the river and ponds to reach additional foraging ground.

River Otter (Lutra canadensis) (WDFW 2013)

River otters are a medium to small furbearer of the family Mustelidae, subfamily Lutrinae. Including their tail, otters reach an average of 4 feet in length and can weigh 20-28 pounds. Streamlined bodies, short legs, webbed toes, and long tapered tails are aquatic life adaptations. River otters reach reproductive age at 2 years and generally give birth to 2-4 pups per year born March through May. Young otters learn to swim at about 7 weeks and explore beyond the den at 10 weeks. In late fall, young of the year will leave to establish their own territories.

River otters select aquatic habitats throughout Washington including ponds, lakes, river, sloughs, estuaries, bays and open waters and can survive in fresh, brackish, or salt water. River otters will avoid polluted waterways, though they are not averse to urban areas. Otters are not the builders that beavers and muskrats are, choosing instead to occupy hollow logs, log jams, piles of driftwood or boulders, and lodges abandoned by other aquatic mammals. Dens are typically well hidden and birthing dens are lined with small sticks, shredded vegetation and other available insulating materials. River otters are opportunistic feeders, consuming anything from fish to insects to crustaceans to other smaller mammals or birds.

A total of 45 confirmed sightings of river otter have been recorded in the project area, including sightings within every month of the year, at least once since 1998. Otters are most commonly seen where the lake and the river meet, commonly called the slough due to slow water velocities. Otter have also been seen swimming and fishing in the TZ near the weir. Young otter have been observed onsite and slides, or smooth otter-sized swales used to slide from dens into water, have been seen on the west bank of the river. This is evidence that river otters are reproducing in the study area.

Coyote (Canis latrans) (WDFW 2013)

Coyotes are part of the Canidae family, which also includes dogs, foxes, and wolves. Litters are born in April to late May with an average of 4 pups. Pups emerge from the den after two to three weeks and will disperse to establish their own territory when they reach six to eight months of age. Availability of food determines how distant the juvenile coyotes will travel to establish territories. Mated coyote pairs have

been known to live, hunt, and raise pups for many years or for life. Male coyotes can reach about 2 feet tall at the shoulder and weight 20-35 pounds.

Coyotes have adapted to occupy almost every habitat type in Washington, from open ranch to forest to city streets. Despite encroachment on coyote habitat, these animals continue to maintain their population numbers or even increase in some areas. Coyotes may maintain a network of dens, which can be opportunistically used, such as abandoned burrows or hollow logs, or may be dug out under an uprooted tree, log, or thicket. Coyotes both hunt and scavenge and will eat any small mammal captured or carrion discovered, including rodents, rabbits, squirrels, snakes, lizards, birds, and fish. They will also consume grass, fruits, and berries during summer and fall as those foods become more available. Coyotes that have consumed human food, such as outdoor pet food or garbage, can become aggressive toward humans when foraging in neighborhoods.

Coyote have been observed at the study area 29 times, including a sighting in every month except November, since 1998. Coyotes were more consistently observed throughout the year in the past, but recently have declined. It is unknown why, though possibly related to increasing development and disturbance. Coyotes have been observed passing through most habitat types in the project area and have even been seen catching rabbits. No young coyotes have been observed onsite and dens are probably not present. The site is primarily valuable as a hunting ground for coyotes in the area.

Long-tailed weasel (Mustela frenata) (Newell 2002)

The long-tailed weasel, like the river otter, is a member of the Mustelidae family. It is a furbearer that reaches a little over one foot in body length, with a tail that is half as long, and weighs less than one pound. They have short legs and shiny brown fur that is shed twice a year. Mating occurs in the summer, but delayed implantation of the egg can result in a gestation time of about 280 days, and young are born generally from April to May. Average litter size is 6 pups. At 36 days, young weasels are weaned and eat solid food. After about two months, weasels are able to hunt on their own. Females reach reproductive age in their first summer, while males typically reach reproductive age in their second year.

Like coyotes, weasels are opportunistic in selecting habitat and taking over abandoned burrows. They do well in a wide range of habitats from crop fields to small woodlots to suburban neighborhoods or urban areas. However, they do not generally occur in deserts or thick forests. Weasels are good climbers and swimmers and use habitats that provide food, cover, water, and refuge. Home ranges of adult male weasels do not overlap and territory is aggressively defended. Primary prey items include small rodents, but weasels will also eat a variety of other small animals, fruits, and berries.

Long-tailed weasels have been observed within the project area a total of 57 times, including sightings in all months except October since 1998. Given the territoriality of these species, it is possible that all 57 sightings are of a very few individuals. They are most often seen along the slough and are using the project area for both hunting and denning. Young of the year have been observed, as have weasels hunting and carrying voles and other rodents through the site.

Mule Deer (Odocoileus hemionus) (WDFW 2013, Misuraca 1999)

Mule deer are a part of the Cervidae family and the largest deer in Washington state. Males can reach 330 pounds and heights of 3.5 feet at the shoulder. Males also develop antlers that are shed each year and regrown in time for the breeding season. Though older bucks tend to have more antler points than young ones, the number of antler points is not an accurate measure of age. Dropped antlers are chewed by a variety of small mammals in order to sharpen their teeth, but in the process also receive calcium, phosphorous and other minerals. Mule deer and black-tailed deer have a close resemblance, but mule deer can be distinguished by their tail having only a black tip, not a black patch across the entire tail length.

Breeding begins in late season, in November and December, and young of the year are born the following summer in June or July. Two young are the average litter size. Weaning begins at about 5 weeks and after 4 months is usually complete. Females reach reproductive age usually in their second year, though first year reproduction does occur.

Mule deer occur in a wide variety of habitats, but are sometimes referred to as an "edge" species, selecting habitats that include open areas adjacent to forest or other cover types. Many wooded suburban environments fulfill this requirement and Marymoor Park is a good example. Deer are herbivorous ruminants that prefer to eat the growing tips of trees and shrubs, known as browse. Secondary diet items include grass, clover, fruit, nuts, and farm and garden crops if available. Some of the preferred browse of mule deer that occur at the study area include rose, thimbleberry, willow, snowberry, dogwood, Douglas fir, and bluegrass.

Mule deer have been positively identified at the study area a total of 45 times according to the Friends of Marymoor Park, with observations occurring in the months from March to November, since 1998. During the 2013 wetland field investigation for this project, a single mule deer was observed moving from north to south through the project area, along the edge of the Douglas spirea habitat near Tosh Creek. Mule deer have a territory from one-half to 3 square miles range, so it is possible that sightings are of one or only a few individuals. Evidence of mule deer bedding in the project area was observed during the wetland investigation, and notably occurred in large areas of reed canary grass. Very young deer have also been observed by the Friends of Marymoor Park and breeding may be taking place in the park.

Bobcat (Lynx rufus) (Ciszek 2002)

The bobcat is a member of the cat or Felidae family. It is a medium sized mammal, ranging in length from two to 3.5 feet and weighing up to 33 pounds. The bobcat is distinguished by its tufted ears and short tail, which is typically less than 7 inches long. Bobcat usually mate in spring and after a gestation of 60-70 days an average litter of 3 pups is born. Young open their eyes at 10 days old, nurse through their second month, and disperse during the winter at about 8 months of age. Lifespan is an average of 15 years in the wild.

These solitary cats are territorial; male home ranges may overlap, but female home ranges do not. Selected habitats include forests, mountains, and brushland. They sleep in dens that are often located in hollow trees, thickets, or rocky crevices. Bobcats are carnivorous and hunt rodents, rabbits, large ground birds, and small ungulates. Occasionally they will hunt reptiles, small domesticated animals and poultry.

Bobcat activity in the study area has been increasing in the past year. Before then, bobcat were only sighted once in 2010. However, in the past year, and just in fall 2013, a bobcat has been observed 4 separate times by the Friends of Marymoor Park. Photos confirm the sighting. The continuous sightings and territoriality of bobcat indicate that this individual may be establishing residency in the project area.

8.2 Birds

Over 200 bird species have been recorded within Marymoor Park by the Friends of Marymoor Park. This substantial number precludes a life history and habitat preference evaluation of each species. Instead, representative species of each bird group has been described below. Bird guilds have been grouped into herons, waterfowl, raptors, upland game birds, shorebirds, owls, swifts, and songbirds. For each group, species that are WDFW priority species have also been described below. A total of 7 birds with a sensitive status have been sighted in the project area. No sightings have been made of birds on the Federal list of threatened or endangered species. Observation details for all bird species have been provided by M. Hobbs (Pers. comm. 2013).

Herons (Naumann 2002, Ehrlich et al. 1988, SAS 2013, Butzbaugh 2001)

Herons, and similar birds most commonly observed in the study area include great blue heron (*Ardea herodias*) and green heron (*Butorides virescens*). Less often seen, but still commonly present is American bittern (*Botaurus lentiginosus*), while the great egret (*Ardea alba*) is only rarely observed. A sandhill crane (*Grus canadensis*) was observed on two occasions in 2010 but has not been seen in the area since. The sandhill crane is a state listed endangered species.

Most wading birds begin nesting in February and birds are hatched by May, though some species may breed as late as July. Clutches can include 2 to 5 eggs on the average, which hatch after about 30 days of incubation. Chicks live in nests for about 2 months until they are ready to fledge or leave the nest. Herons can live up to 15 years in the wild, though shorter lifespans are known for some species. Green herons have only been known to live approximately 8 years.

Herons, bitterns, and egrets are wading birds associated with aquatic habitats, including freshwater or estuarine wetlands, ponds, and streams with thick emergent vegetation and riparian cover. These species prefer habitats that are free of human disturbance and have plenty of vegetative cover. The diet of wading birds is primarily fish and insects, though they will also consume amphibians, reptiles, small mammals and other birds. Great blue herons and egrets in Washington will also hunt on land and a large portion of their diet consists of rodents and grasshoppers. Green heron are known to use tools to attract bait, placing flies on the surface of the water and waiting for prey.

Great blue heron are resident within the project area and are commonly found feeding along the edges of the river or wading through puddles and channels in the TZ. In addition, great blue herons are

conspicuously nesting at Marymoor Park; a heronry has been established in a cottonwood stand located within the off-leash dog area. The heronry was established two years ago and the number of nests has risen to 18 since then. Selecting this busy location may be the result of human disturbance that restricts other competitive species from entering the area (raccoons and eagles). Green herons had previously been known to nest at the former wastewater treatment ponds, but did not establish nests this year. American bittern were once more common in the park, but have declined and have not been seen since 2009. It is possible that mowing vegetation along the river has reduced their use of the area, but the cause is not certain. Herons are tree nesters and are not typically observed in other areas of Marymoor Park away from the river or lake.

Waterfowl (SAS 2013, Ehrlich et al. 1988)

Over 40 waterfowl species have been observed in the project area including geese, swans, wigeon, teal, pintail, scaup, merganser, wood duck, and gadwall. The most commonly sighted ducks are gadwalls, wood ducks, mallard, bufflehead, and both hooded and common merganser. Canada geese, grebes, coots, and cormorants are also very common. The common loon, which has been observed several times in the project area, is a state listed sensitive species (WDFW 2012). Western and Clark's grebes, also known to be present within the project area, are candidates for state listing. A general description of waterfowl diet, reproduction, and habitat has been provided to represent this group.

The uniting factor of each of the species included in this group is their requirement for nesting near aquatic habitats and their food preferences. Some species, such as common goldeneye, prefer to nest in trees adjacent to open water sources, while others, such as green-winged teal and mallard, usually nest in grasses or brush within two hundred feet of a waterbody. Waterfowl diet preferences vary by species, though in general ducks prefer insects, but will also eat seeds, roots, aquatic plants, and aquatic invertebrates. Most species graze opportunistically, both on land or under water, as food is available. Breeding begins in late December and eggs are laid in spring. Clutches vary widely and depend on conditions and availability of food. The average clutch for a common goldeneye is about 7 eggs, mallards average 9 eggs, and many species lay even more.

In winter, Canada geese, mallard, gadwall, American coot, and green-winged teal are present in the study area and seem to prefer areas that are mowed. Common goldeneye, common merganser, and pied-billed grebes tend to feed in the main river channel. Many of the ducks, coots, and grebes remain in the area until mid-spring. There are no confirmed duck nest sitings; however, presence of very young fledgling mallards indicates that nesting for some species is occurring onsite.

Raptors

A total of eleven raptors have been positively identified within the project area. The most commonly observed raptors include osprey, bald eagle, Northern harrier, sharp-shinned hawk, Cooper's hawk, merlin, red-tailed hawk, peregrine falcon and American kestrel. Lesser seen raptors include turkey vulture, Swainson's hawk and rough-legged hawk. Life history data for the bald eagle and red-tailed hawk have been included below and are representative of the raptor group.

Bald Eagle (Haliaeetus leucocephalus) (Siciliano 2013, SAS 2013)

The bald eagle is a state listed sensitive species and a federally listed species of concern. It is the national symbol and adults are easily distinguished by its white head feathers and large wing span. Females tend to be larger than males, weighing as much as seven pounds with a wingspan of 7.5 feet. Nesting dates vary regionally, and in Washington bald eagles are early nesters, laying eggs in late February and incubating through May. Average clutch size is two and eggs hatch from April to May. Females reach sexual maturity at five years and typical lifespan is 15-20 years in the wild.

The bald eagle typically prefers areas near large water bodies with large trees. They most often select areas that have available prey, tall trees, and a low level of human disturbance. Bald eagles build the largest nests of any other bird species in North America, which have been measured at nine feet in diameter. Nest trees are usually large coniferous trees surrounded by smaller trees. Nests may also occur on cliffs, cell towers or electrical poles. Their diet includes many aquatic species, including fish and waterfowl. Recently spawned fish are a favorite, as eagles do not dive to obtain prey, but retrieve fish from the water surface with powerful talons. Adult water birds, their nestlings and eggs are also common food items. In Washington, American coots are an important part of a bald eagles' winter diet. Eagles will also hunt small mammals, steal food from other raptors, and consume carrion.

Bald eagles were observed repeatedly in every month of 2012 by the Friends of Marymoor Park. Eagles are generally observed perched on trees along the slough in the southeast corner of the project area. Although nests are not located within the project area, they are known to have been established in and near the park for most years since data have been collected. Over 30 bald eagles were seen in the north quarter mile of the lake in a single day.

Red-tailed Hawk (Buteo jamaicensis) (Arnold 2002)

Red-tailed hawks are smaller than bald eagles, with an average wingspan of four feet and maximum weight of less than three pounds. Female hawks lay eggs around the first week of April and incubate for 28-35 days. Average clutch size is three and fledging age is between 42 and 46 days. Chicks become completely independent at about ten weeks after fledging. Average lifespan of red-tailed hawks is about 29 years. Reproductive age is reached after an average of two years.

Red-tailed hawks are found in almost every type of habitat, but select locations that have open areas interspersed with a mosaic of trees or other elevated perches. Unlike bald eagles, red-tailed hawk do not prefer habitat near open water for foraging or nesting. Hawks prefer to build nests where forest edge meets open meadow in the tallest tree available. Diet consists of small mammals, birds, reptiles and sometimes fish or large insects, if available. Raptors will also eat fresh carrion.

Red-tailed hawks were observed in every week of 2012 within the project area and one individual was observed during the 2013 wetland investigation. Two nests are located on the west side of West Lake Sammamish Parkway and the project area is likely the main foraging area for the two pairs.

Other nesting raptors include Cooper's hawks, which are one of most common, active, and visibly present raptors in the area, and osprey. Osprey have established an ongoing nest in a man-made tower along Highway 520 near the velodrome. These birds are often seeing foraging along the slough.

Upland Game Birds

California quail and ring-necked pheasant are the most commonly observed game birds in the project area, while ruffed grouse are present but rarely seen. Upland game birds have very similar habitat preferences and diet. According to Hobbs (Pers. comm. 2013), natural populations of upland game birds are extremely rare these days. Though the California quail has been seen at the project area in the past, it has been very rare in the past several years. These birds used to nest on the slopes west of West Lake Sammamish Parkway and come into the park to forage. The disappearance of quail from the site generally coincides with the development of residences on the west slope. Ring-necked pheasants are released for hunting in the area, but are rarely seen.

California quail (Callipepla californica) (SAS 2013, Price 2000)

This small upland game bird ranges in weight from only five to seven ounces and may reach nearly ten inches in length. It is the state symbol and easily recognized by the distinct coloration and teardrop-shaped plume. Quail nest between May and June, laying an average of 13-17 eggs, and females incubate eggs for 22-23 days. Breeding typically occurs once yearly, though a second attempt may result from unsuccessful initial breeding. Average lifespan in the wild is almost seven years. Outside of breeding months, quails form coveys or groups that may include 25-40 birds. Preferred habitats of quail include open woodlands, brushy foothills, valleys with streams, agricultural lands and suburbs. They often use edge habitat with fruit producing plants and shrubs for cover. They are typically ground dwellers. Primary diet of the California quail includes seeds, gains, and nuts. In Washington, quail rely heavily on seeds from broad-leafed legumes, but will also eat fruits, berries, nuts, and insects, if available.

Shorebirds

At least 30 shorebirds have been observed in the project area including sandpipers, killdeer, snipes, gulls, rails, sora, and terns. The most common of these are killdeer, Wilson's snipe, and five species of gull. These species are seen in habitats associated with water. Shorebirds generally use shorelines for foraging that are flat or have little vegetation. Rails and sora will often perch on low hanging vegetation within wetlands. The most commonly used habitats in the project area are the sparse grassy areas along the river, or where willows provide perches. According to Hobbs (Pers. comm. 2013), there are only two shorebirds that occur regularly in the project area; spotted sandpiper and Wilson's snipe. However, other parts of the park do host a variety and abundance of shorebirds when ephemeral puddles form in parking lots. These attract migrating shorebirds and provide excellent foraging habitat.

Wilson's Snipe (Gallinago delicata) (SAS 2013)

This snipe is a part of the family Scolopacidae, which includes sandpipers, yellowlegs, curlews, godwits, dowitchers and phalaropes. This long billed brownish shorebird is about 10-11 inches in length. Breeding

activity peaks April through August, and most females produce four eggs that hatch after 18-20 days. Fledging occurs after 20 days. They are generally found in lowland, freshwater marshes, wet meadows, sedge meadows, ditches, and occasionally mudflats. Diet items include insects, earthworms, and other invertebrates that burrow in wet soils in marshes. Nests are built in grasses or on sedge hummocks and lined with moss, leaves, and grass. Annual surveys suggest that this species in decline in Washington State, potentially as a result of loss of wetlands and hunting. The project area is a significant wintering site for Wilson's snipe. They are present from October to the end of April and use habitats along the TZ, in ponds, and take cover in the reed canary grass to the west of the TZ.

Owls

Owls observed in the project area include barn, Western screech, great horned and short-eared owls. Less commonly observed are Northern saw-whet, snowy, barred, and long-eared owls. The most common owls in the area are barn owls, which have been nesting in the park annually in several locations. They have nests established in cottonwood trees and in a man-made nest box. The great horned owl is widely distributed in a variety of habitat types, but has become less common in the project area. Its life history, habitat preferences, and diet are described below.

Great Horned Owl (Bubo virginianus) (SAS 2013, Dietrich 2013)

Great horned owls are a solitary member of the Strigidae family, which includes all owls. The great horned owl can reach lengths of over two feet and have wingspans that extend to four feet. Owls reproduce once a year, with breeding months between November and April. Average number of eggs laid is three, incubation takes between 30-37 days, and fledging occurs six to nine weeks after hatching. Great horned owls become sexually mature after one to three years and live an average of 13 years in the wild. Home ranges may be occupied by an individual or pair and generally cover two square miles.

These large birds are suited for many habitats, but are most commonly found in interspersed areas of woodland and open fields, much like red-tailed hawks. They prefer habitats with forest edge adjacent to grasslands, swamps, and marshes, including areas in both rural and urban areas. Open meadow areas provide their preferred food items; small mammals. They consume rodents, rabbits, skunks, grouse, coots, and other birds. Other foods that may be consumed include reptiles, amphibians, fish and large insects.

A total of five sightings of great horned owl were recorded in the project area in 2012. In prior years, more sightings were recorded including reports of this owl nesting in the project area. Though great horned owls have not nested in the project area in the past few years, they are nesting in adjacent areas and using the project area for hunting.

Passerines and other Smaller Birds (Ehrlich et al. 1988, Hobbs pers. comm. 2013)

Over 100 passerines, or perching birds, have been observed in the project area. These are species that include sparrows, meadow larks, orioles, warblers, swallows, flycatchers, and similar. Because of the vast number of birds in this category, habitat preferences are described in general.

Songbirds occupy a wide variety of habitats and are likely present in most areas of the project site. Particularly good habitat is available where willow dominated shrub cover is adjacent to the river or ponds. Willows provide excellent perches, especially when over water or surrounded by other vegetative cover. Feeding opportunities draw both resident and migratory birds to the area. Resident songbirds include chickadee, bushtit, Bewick's wren, golden-crowned kinglet, ruby-crowned kinglet, American robin, song sparrow, dark-eyed junco, and red-winged blackbird. Marsh wrens are resident and also breed in the cattails along the river margins. Migrating birds that pass through the site include towhees and a variety of sparrows and warblers. Common yellowthroat are migrants that return to the area in spring where they nest in the willows along the river. Summer breeding songbirds at the site include cedar waxwing, yellow warbler, song sparrow, red-winged blackbird, American goldfinch and willow flycatchers.

Many birds in the area are becoming adapted to the presence of non-native plant species, particularly blackberry and reed canary grass. In particular, a significant number of smaller birds have been observed using blackberry during winter as cover. Fox sparrows, towhees, golden-crowned sparrows are all seen perched in blackberry thickets. Robins, thrushes, grosbeaks, house finches, and other bird species consume the berries during summer and into the fall. Marsh wrens and common yellowthroat are known to nest in reed canary grass, though will select more suitable shrub species when present.

8.3 Amphibians and Reptiles

Very few amphibians are known to be present in the study area, and fewer still that are native. The single native amphibian regularly observed is the Pacific tree frog. During 2013 field investigations, these frogs were heard throughout the project area. While no sampling was done on-site in 2013, other native species that occur in the vicinity include long-toed salamanders and Northwestern salamanders (Richter & Ostergaard 1999). Other native species known to be present in the watershed include rough-skinned newt, Pacific giant salamander, Western toad, and Northern red-legged frog (Richter & Ostergaard 1999). Non-native amphibians and reptiles present include the bullfrog, painted turtle, and red-eared slider. Despite their non-native status, these species are likely contributing substantially to the diet of other native birds and mammals in the area.

There is little information on reptiles present in the study area, although the Washington Herp Atlas (WDNR 2014) indicates that the common, Northwestern and Western terrestrial garter snakes and rubber boas are present in King County.

Pacific Treefrog (Pseudacris regilla) (Hallock and McAllister 2005)

Pacific treefrogs are small members of the family Hylidae that usually grow to less than two inches. These frogs have a variety of body colors, ranging from bright green to brownish and a conspicuous dark mask typically extends from the tip of the nose through the eye to the shoulder. Eggs are laid in loose groups of nine to 70 eggs each mass approximately one inch in diameter. Egg laying begins in mid-February and eggs hatch after two to five weeks. Tadpoles develop over 1.5-2.5 months.

Treefrogs are the most common frog species in Washington and occur in a wide variety of habitats, even adapting well to urban areas. Breeding habitats must have still or slow-moving water, which can include

ponds, slow-moving stretches of streams, or even roadside ditches. Treefrogs use breeding sites for only a few weeks or months of the year and then move into upland areas the rest of the year where they can be found in almost any slightly moist habitat including under rocks and logs or inside animal burrows in riparian corridors, forests, or grasslands. Adult treefrog diet consists of beetles, flies, spiders, ants and other invertebrates.

Bullfrog (Rana catesbiana) (Hallock and McAllister 2009)

Bullfrogs are not native to the Western U.S., but are described here due to their ubiquity in Marymoor Park and potential effects on native wildlife species. Bullfrogs are large heavy-bodied frogs of the family Ranidae (true frogs) and can attain sizes up to 6 inches in length. Their dorsal body color can range from tan to brown to olive-brown with black mottles or speckles and typically are greenish in the upper jaw and eye area. The underside is typically white to cream colored and may have dark mottling. Eggs are laid in a thin film at the water's surface that may extend for greater than one foot in diameter. There are usually many thousands of eggs in this mass and they often sink to the bottom before hatching. Eggs are typically laid in June or July, or even as late as August and hatching occurs rapidly within a few days to a week (depending on water temperature). Tadpoles grow rapidly but do not metamorphose until their second or third summer. Frogs are typically dormant in the Pacific Northwest the colder months from November to April.

Bullfrogs require permanent year-round waterbodies for their life history, although they are occasionally found in terrestrial sites at night and will disperse over uplands and temporary puddles/ponds on warm rainy nights. They overwinter in permanent waterbodies with well-oxygenated water. They are able to exist and proliferate in waterbodies with exotic warm-water fish and may benefit from the presence of these fish. While bullfrogs have been considered detrimental to native amphibians and populations of native frogs have declined in many waterbodies with bullfrogs present, it is unclear at this time if non-native fish are more of a cause of native amphibian decline than bullfrogs.

Turtles

Turtles in the study area are all introduced species. Yet, their presence has become somewhat naturalized over time. Washington State affords protection to the painted turtle; it is unlawful to collect or hunt this species. Throughout the study area, sliders and painted turtles are extremely common, particularly during summer time, but also during spring and fall on sunny afternoons. Turtles can be found in all the waterways of the site, including the river and former wastewater treatment ponds.

8.4 Local and Regional Habitat Value

The diversity and abundance of mammals and birds present in the study area, coupled with its proximity to urban centers, makes Marymoor Park an extremely valuable regional resource for birding and other wildlife observation. However, additional opportunity exists to improve the natural habitat condition and provide greater access of the site to potential visitors.

The desire for outdoor opportunities to observe and photograph nature has grown as cities have expanded and natural areas have declined. According to the 2006 Outdoor Recreation Survey

(Willmorth 2007), the second-most common recreational activity in Washington State for the same year was observing or photographing wildlife or nature, which was reported by survey participants to occur 3.1 million times. Only more popular was recreational walking (without a pet, which occurred 3.5 million times). Of those surveyed for the report, nearly 26% reported wanting to engage in more observation or photography of wildlife or nature in the subsequent year than they had pursued in the current year. This indicates increasing demand for access to natural areas to experience nature and wildlife.

Marymoor Park is exceptionally located where an existing natural area and Lake Sammamish, comes in contact with the expanding suburban and urban growth of surrounding cities. The park is central to the communities of Bellevue, Redmond, Kirkland, Sammamish, and Issaquah and serves more than 3 million visitors annually. Most activities in Marymoor Park are centered on physical activity, events, or sporting. However, there is a large community of nature enthusiasts in this region, headed by the dedicated members of the Friends of Marymoor Park. Ongoing wildlife observation by members of the group have provided evidence of the need for protection and enhancement of the undeveloped areas of Marymoor Park, both through collecting data about the wildlife in the park and by demonstrating their enthusiasm for natural observation.

The project area is largely undeveloped. The Sammamish Rowing Association uses a small portion of this area and there are periodic maintenance efforts to remove vegetation along the Sammamish River Transition Zone. Despite these human activities, and a long history of land use, this section of the park remains in a relatively natural state. Because of this, a large number of small and large mammals, resident and migratory birds, and amphibians and reptiles are present. However, there are opportunities to provide passive public access for wildlife viewing.

The main constraint facing human use of the area for recreational nature observation currently is the lack of easy access. Trails are only present on the perimeter and standing water, blackberries, and thick vegetation make it extremely difficult to access the site further. There is one way to reach the interior of the site and view the river; this can be achieved using the maintenance access trail that enters from areas downstream of the Transition Zone. This trail is not developed, but is easy to walk. It reaches roughly to the weir and terminates, offering views of only a small portion of the overall site. Improving access to the site by building trails or boardwalks into wetlands would offer nature enthusiasts the safest and easiest access to the site. However, it is always necessary to consider the impacts of inviting additional human activity into areas that are currently relatively undisturbed. Strategic view points and/or limited trails could enhance access while minimizing disturbance.

9. Opportunities for Habitat and Water Quality Improvements

9.1 Restoration Opportunities and Constraints for Fish

The primary limiting factor for salmon and other native fish species in this reach is elevated water temperature, to the point of being lethal. Other than water temperature, aquatic habitat is of low to moderate quality in this reach.

Many indicators of quality salmonid habitat are clearly degraded in the project area. Key restoration opportunities identified for the project reach include (from USACE and King County 2002; WRIA 8 Steering Committee 2005): 1) temperature reduction through modification of the Lake Sammamish outflow; 2) riparian revegetation; 3) restore remnant meander adjacent to the transition zone; 4) creation of cool water refuge via possible groundwater sources in the reach; 5) restore hyporheic flows; 6) restore/enhance wetland habitats; 7) create and enhance river pool habitat; 8) provide wood and other cover; and 8) enhance mouths of tributaries to create cool water pools and cover.

Suggested ways to improve lamprey passage through the weir are to provide smooth ramps and rounded corners or more natural substrate as well as reducing velocities (USACE 2009).

An evaluation of the potential to reduce water temperatures in the Sammamish River was explored in Jain, et al. (2000) and DeGasperi (2001). Fourteen possible scenarios including using cold water from deep in Lake Sammamish, riparian shading at various widths and distances, eliminate existing surface water withdrawals, augmenting flows with groundwater inputs, increased Bear Creek flows and various combinations of scenarios. The scenario with the greatest potential to reduce water temperatures in the upper reach of the river was the blending of 20 cfs of cold lake water with the outflow at the weir – this could reduce average thermal stress in the upper river by 96 percent and nearly 53 percent for the maximum thermal stress. The addition of 10 cfs of cold water at the weir could reduce average thermal stress in the upper reach of the river by 66 percent and 35 percent for the maximum thermal stress. It is still unlikely that the river will ever meet water quality standards of 16° C for summer core rearing habitat, or even 17.5° C for migratory habitat, but cooling the river to something well below lethal temperatures may be achievable.

9.2 Restoration Opportunities and Constraints for Mammals

There are a number of opportunities to improve habitat conditions for mammals in the area. These include a variety of options for modifying the existing ponds and vegetation.

Wetland Expansion and Connections

Moderately shallow wetland habitats are preferred by beaver and river otter. Increasing the area of seasonal water flow and creating connections between them will improve habitat for these species. Specific modifications could include:

- Creating connections between existing ponds,
- Connecting the ponds to the river, or
- Creation of backwater wetlands that extend from the river.

Constraints to these actions include the potential for poor water quality within the ponds, turbidity or erosion issues related to backwaters, or difficulty of access for large equipment.

Non-Native Vegetation Removal and Native Plantings

Vegetation on the site has been substantially disturbed from past agricultural activities and surrounding development. Plant communities are overwhelmingly comprised of non-native and invasive species.

Reed canary grass, blackberries and Scotch broom are dense and difficult for many mammals to pass through or use and are not generally conducive to ecological function for the mammals described above. Opportunities to improve vegetation conditions include:

- Removal of blackberry where dense thickets prevent larger wildlife from accessing wetland resources,
- Removal of Scotch broom to prevent potential growth of dense thickets,
- Removal of purple and yellow loosestrife, which must be controlled in King County and are currently only growing in very limited areas within the project site,
- Control of reed canary grass through excavation to create deeper wetland ponding, and
- Plantings of native tree and shrub species, especially those preferred by beavers and mule deer.

Constraints to improving vegetation typically include difficulty/ineffectiveness of invasive species control methods. It is extremely difficult to fully eradicate invasive plants and any attempt to control these species requires ongoing maintenance, which in turn requires a labor force, adequate funds, and a plan to maintain the newly planted native species. Plantings of rapid growing native trees such as cottonwood, alder, and willow species will tend to quickly establish shading that can reduce the density and vigor of reed canary grass and blackberries. The density of species preferred by beaver and mule deer should likely be increased to compensate for expected browsing. Maintenance actions focused on the first 3-5 years following a project including mowing, spot herbicide application and removal of individual weedy species that are not widespread can help lead to rapid establishment of native tree/shrub species.

9.3 Restoration Opportunities and Constraints for Birds

Non-Native Vegetation Removal and Native Plantings

In contrast to mammal species, there appears to be some value in the blackberries that occur on-site for bird species. However, uncontrolled growth of blackberry would likely result in the loss of the diversity of the site that maintains its attractiveness as a feeding and nesting ground for many species. Because blackberry is difficult to control and nearly impossible to eradicate, it may be worthwhile to employ a more targeted control approach in specific locations. In addition to providing cover and forage, blackberries have the benefit of also reducing human disturbance.

Additional opportunities to improve vegetation include:

- Removal of Scotch broom to prevent potential growth of dense thickets,
- Removal of purple and yellow loosestrife, which must be controlled in King County and are currently only growing in very limited areas within the site,
- Excavation of reed canary grass with dense replanting of native meadow plants (such as using sod mats); dense mats of reed canary grass create cover that is too thick for effective hunting by raptors and owls,
- Plantings with rapid-growing native tree and shrub species, especially those preferred by nesting raptors, owls and passerines.

As noted previously for mammals, controlling invasive species is difficult and ongoing maintenance is required to keep invasives from growing back, and to ensure survival of newly planted species.

Increased Habitat Interspersion

Currently, habitat diversity and interspersion is moderate and there are opportunities to increase the variety and mosaic pattern of habitats. Many bird species prefer edge habitats, where emergent plants meet water, where forest meets meadow, or where forests have complex and diverse understory. Opportunities to improve habitat interspersion include:

- Excavate depressions in reed canary grass fields to allow seasonal ponding and densely revegetate areas around ponds with emergent vegetation or willows and spirea; this will reduce reed canary grass, and create additional edge habitat for passerines, wading birds, and shorebirds, while creating additional open water habitat for waterfowl,
- Create backwater habitats connected to the river to provide additional wetland edge and open water habitat,
- Replace ornamental trees and Scotch broom with native conifers that provide nesting and perching habitat for raptors, owls, woodpeckers, and other perching birds,
- Replace blackberry understory with native thimbleberry, snowberry, ocean spray, and Indian plum to provide cover, structure, and food for passerines.

Increased Availability of Nesting Habitat

Some passerine species appear to select nest sites in reed canary grass. However, this is most likely the result of a lack of other grass habitats. The removal of reed canary grass and replacement with dense plantings or mats of native grass or meadow species could potentially improve the availability of nesting sites for ground-nesting species. Replacement of other invasive species, such as Scotch broom and blackberry, with native shrubs such as spirea, thimbleberry, snowberry, and willow, will improve nesting availability.

Increased Shorebird Habitat

Currently, a large number of shorebirds are passing through the project area, but the vast majority do not stop or stop only very briefly. Little foraging habitat is available to shorebirds that prefer mudflat shorelines along shallow water bodies. Where it does exist, a surprisingly large number of shorebirds will stop to take advantage of foraging. Solitary sandpiper, yellowlegs, dowitchers and other shorebirds pass through in April/May and again in later summer and if there is standing water over gravel or dirt, they stop to feed. It is especially beneficial if the puddle is ephemeral; as the puddle shrinks, a band of wet mud is formed, releasing additional food items. The creation of ephemeral pools would attract a substantial number of shorebirds throughout the migration seasons. As many of the non-native species such as reed canary grass and yellow-flag iris readily invade bare ground, ephemeral/seasonal ponds may be most effective connected to the river where there will be long periods of inundation.

9.4 Restoration Opportunities and Constraints for Herptiles

There are few native species expected to use the project area, since the region is naturally low in diversity of turtles and frogs. However, the species that are present would benefit from a variety of actions that would increase habitat function. These include:

- Create habitat variability along streams and in wetlands through meandering streams, creating backwaters, and placing woody debris along shorelines,
- Create a variety of new wetlands of varying depths to ensure that shallow water habitats, which are preferred by amphibians, are present during the native species' breeding season,
- Create microhabitat along shorelines and wetlands by adding log jams, brush piles or rocks piles,
- Establish seasonal marshes where thin stemmed emergent vegetation provides amphibian egg laying structures.
- Maintaining or creating suitable dispersal corridors (without roads or parking areas) along the river and from uplands to the wetlands.

Constraints include the difficulty of controlling invasive plant species and the need to maintain channel capacity.

Following from these recommendations, specific targets are suggested for physical habitat features to be included for habitat restoration measures. Table 5 outlines suggested targets and identifies the problems that each restoration measure addresses.

Table 5. Recommended habitat restoration measures, suggested targets, and problems that each measure could address

Potential Restoration Measure	Possible Habitat Target	Problems Addressed
Cool water input near weir	1. Meet WDOE standard of 16° C (7-day maximum) 2. Not exceed 21° C maximum daily temperature	Eliminate fish mortality and reduce stress Prevent seasonal fish barrier due to temperature
Reconnect transition zone to excavated floodplain	1. Connect at typical winter high flows (November to May, 70% exceedance)	Increase capacity of upper river channel Restore off-channel habitat that currently is rare Lack of connections between wetlands and river
Protect and enhance riparian zone and wetlands from Lake to Bear Creek	1. Minimum 150 width per City of Redmond code 2. Focus on rapid plant growth and shading to outcompete non-native species	Increase shading Increase habitat complexity and suitability for wildlife Increase aquatic food resources Recruit large wood over time Reduce non-native species Increase cover and nesting habitat
Create and enhance pools	1. Increase number of pools/mile 2. Pools >1 meter residual depth with complex cover	Increase adult holding habitat and juvenile rearing habitat Increase cool water refugia Provide amphibian habitat Provide shorebird habitat (mudflats)
Enhance mouths of Tosh and Country Creeks	1. Provide cover and complexity via wood placement	Increase cool water refugia Increase channel complexity and

	2. Consider routing Tosh Creek into a side channel around weir	cover
Reconfigure weir as riffle	1. Provide unhindered fish passage upstream and downstream at all flows (all life stages) 2. 2 fps max velocity at annual peak flow or complex hydraulics	Create more natural structure that is more conducive to lamprey and juvenile fish migration
Create side-channel using one or more alternate water sources	1. Provide cool water passage during summer/fall 2. Provide natural substrate channel for unhindered fish passage upstream/downstream with complex hydraulics	Reduce seasonal barrier Reduce fish mortality and stress Improve fish passage for multiple species Provide habitat interspersion and connections
Place large wood and brush in floodplain	1. Provide cover and complexity for wildlife species	Increase overwinter and dispersal habitat

In conclusion, there are multiple opportunities for habitat enhancement in the project area directed at water temperature, aquatic and riparian habitat complexity and quality. If the critical high water temperatures were reduced and more complex aquatic habitats and cover were created, juvenile salmon could potentially more effectively use the area for rearing and the thermal barrier and effects to adult salmon could be reduced. To facilitate the recovery of salmon species, NOAA has developed Viable Salmonid Population (VSP) goals for the Lake Washington watershed. The improvement of the Sammamish River to support smolt rearing and allow unhindered migration of adults is important objectives for improving the diversity of the population and the distribution of spawning populations (Salmon Recovery Council 2009).

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Appendix A: Photos

Photo 1. Wetland Plot 2 (wetland). Mixed forest community.

Photo 2. Wetland Plot 3 (upland). Edge of mixed forest (Rubus understory dominated).

Photo 3. Wetland Plot 9 (wetland). *Phalaris* dominated community with sparse trees.

Photo 4. Wetland Plot 8 (upland). *Rubus* dominated.

Photo 5. Wetland Plot 4 (wetland). *Phalaris* dominated.

Photo 6. Wetland Plot 5 (wetland). Transition Zone, *Phalaris* dominated.

Photo 7. Wetland Plot 35 (wetland). Transition Zone.

Photo 8. Wetland D Patch. *Carex obnupta* dominated.

Photo 9. Wetland D patch. *Carex obnupta* dominated.

Photo 10. Wetland plot 15 (wetland). *Spiraea* dominated.

Photo 11. Wetland plot 16 (upland). *Phalaris* dominated.

Photo 12. Wetland Plot 26 (wetland). *Phalaris* dominated.

Photo 13. Wetland plot 27 (upland). *Phalaris* dominated.

Photo 14. *Salix* dominated area of Wetland E.

Appendix B: Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP2
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.659559081 | Long: -122.123103902 | Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	x	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	x	No	

Remarks: Plot located in relatively high flat ground near West Lake Sammamish Parkway

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	50	Y	FAC
2. Alnus rubra	10		FAC
3. Acer macrophyllum	20	Y	FACU
4.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	30	Y	FAC
2. Scirpus microcarpus	50	Y	OBL
3. Solanum dulcamara	30	Y	FAC
4. Reynoutria japonica	10		FACU
5. Phalaris arundinaceae	20		FACW
6. Equisetum telmateia	10		FACW
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No ___**

Remarks:

SOIL

Sampling Point: WP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14							Muck, too wet to get color sample	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks: Soil was so wet and loose fell off the shovel as liquid, did not sample color.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- x Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- x Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes x No ___ Depth (inches): 2

Water Table Present? Yes x No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing water even in fall

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP3
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.659580958 Long: -122.123123399 Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	___	No	X
Hydric Soil Present?	Yes	x	No	___
Wetland Hydrology Present?	Yes	___	No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: Plot located in relatively high flat ground near West Lake Sammamish Parkway

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	75	Y	FAC
2. Acer macrophyllum	20	Y	FACU
3.			
4.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	70	Y	FACU
2.			
3.			
4.			
5.			
	70	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	20	Y	FACW
2. Equisetum telmateia	5		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	25	x 2 =	50
FAC species	75	x 3 =	225
FACU species	90	x 4 =	360
UPL species		x 5 =	
Column Totals:	190 (A)		635 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** x

Remarks:

SOIL

Sampling Point: WP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR3/2						Fine gravelly sand; rock at depth	No mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Weak indicator for F3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Upland paired plot to WP2

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP4
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.659876960 | Long: -122.122886758 | Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Wetland Hydrology Present?	Yes	X	No	

Remarks: Plot located in relatively high flat ground near West Lake Sammamish Parkway. Quarry spalls present as area used for staging/access

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix sitchensis	10	Y	FACW
2.			
3.			
4.			
	10	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2. Iris pseudacorus	30	Y	OBL
3. Typha latifolia	20		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No ___**

Remarks:

SOIL

Sampling Point: WP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6							Peat	
6-14	Gley1 3/N	80%	7.5YR 5/8	20%	C	M	Silty sand	Quarry rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- x Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	8”
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	Surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP5
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.659876960 Long: -122.120738600 Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: Palustrine scrub/shrub
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Wetland Hydrology Present?	Yes	X	No	

Remarks: Plot located in transition zone that was recently mowed

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae (mowed)	100	Y	FACW
2. Scirpus microcarpus (mowed)	20	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	120	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4							Peat	
4-8							Coarse sand	
8-10	Gley1 4/5GY	75%	7.5YR 5/8	25%			Silty sand	Excavated?
10+							Rock	Quarry rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- x Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	8”
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	Surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP6
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.658679569 | Long: -122.121163701 | Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes		No	x

Remarks: Strong vegetation and soil indicators and no hydrology. As sampling occurred at end of long dry season, presume hydrology present in late winter/spring to strongly affect veg and soil.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lucida	50	Y	FACW
2. Fraxinus latifolia	30	Y	FACW
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4							Root mat	
4-14	10YR 6/2	50%	2.5YR 4/8	50%	C	M	Silty loam	
~12							Diatomaceous layer	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches):	
Water Table Present?	Yes	___	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP7
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.658691305 Long: -122.121110987 Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Wetland Hydrology Present?	Yes		No	X

Remarks: Weak vegetation indicator, in blackberry patch. Appears to be upland plot and is paired with WP6 (wetland)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lucida	25	Y	FACW
2. Fraxinus latifolia	50	Y	FACW
3.			
4.			
	75	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	90	Y	FACU
2.			
3.			
4.			
5.			
	90	= Total Cover	

Herb Stratum (Plot size: 2m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6							Organic enriched loam	
6-14	10YR 4/2	60%	10YR 5/8	40	C	M	Fine sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP8
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.658198838 Long: -122.120403697 Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** **X**

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	50	Y	FAC
2. Populus nigra	20	Y	N.L.
3. Salix sitchensis	15	Y	FACW
4.			
	85	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	20	Y	FACU
2. Frangula purshiana	10		
3. Crataegus monogyna	10		
4. Cytisus scoparius	10		
5.			
	50	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phleum pratense	20	Y	FAC
2. Agrostis stolonifera	60	Y	FAC
3. Schedonorus arundinaceae	10		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **x** **No** ___

Remarks:

SOIL

Sampling Point: WP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4							Organic enriched sand	
4-14	10YR 5/1	98%	10YR 5/8	2%	C	M	Medium sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Redox mottles are not distinct or prominent to meet S5 indicator

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP9
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.657951085 Long: -122.120114300 Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Wetland Hydrology Present?	Yes	X	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	20	Y	FAC
2. Salix sitchensis	20	Y	FACW
3.			
4.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Spirea douglasii	15	Y	FACW
2.			
3.			
4.			
5.			
	15	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	60	Y	FAC
2. Phalaris arundinaceae	20		FACW
3. Carex obnupta	30	Y	OBL
4. Schedonorus arundinaceae	25	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	135	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No**

Remarks:

SOIL

Sampling Point: WP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics/duff	
2-14	10YR 4/1	90%	7.5YR 5/8	10%	C	M	Medium sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 12

Wetland Hydrology Present? **Yes** x **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP10
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: Long: Datum: NAVD88
Soil Map Unit Name: Alderwood gravelly sandy loam, 6 to 15% NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?**	**Yes ___ No x**
Hydric Soil Present?	Yes ___	No x		
Wetland Hydrology Present?	Yes ___	No X		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Cytisus scoparius	80	Y	N.L.
2.			
3.			
4.			
5.			
	80	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	20	Y	FAC
2. Atriplex sp.	20	Y	N.L.
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No x

Remarks:

SOIL

Sampling Point: WP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1							Organics/duff	
1-14	10YR 4/2	100					Medium sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Redox mottles are not distinct or prominent to meet S5 indicator

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP11
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.657369537 | Long: -122.117496098 | Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam | NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: Weak hydrophytic vegetation indicator and no hydrology (previous data indicated not wetland).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula pendula	50	Y	FACU
2.			
3.			
4.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Cytisus scoparius	25	Y	N.L.
2. Rubus procerus	10		FACU
3.			
4.			
5.			
	35	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Carex obnupta	75	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	60	x 4 =	240
UPL species		x 5 =	
Column Totals:	135 (A)		315 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics/duff	
2-14	10YR 5/2	70	10YR 5/8	30	C	M	Silty loam	
~12							Diatomaceous	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Previous install of piezometers (King County 2003) indicated not wet.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP12
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.657321306 Long: -122.117519407 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes		No	X
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: Only hydric soil indicator present; previous piezometer monitoring indicated not wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula pendula	50	Y	FACU
2. Unidentified ornamental	30	Y	N.L.
3.			
4.			
	80	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Cytisus scoparius	20	Y	N.L.
2. Ilex aquifolium	5		
3.			
4.			
5.			
	25	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	90	Y	FAC
2. Phalaris arundinaceae	10		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	10	x 2 =	20
FAC species	90	x 3 =	270
FACU species	50	x 4 =	200
UPL species	35	x 5 =	175
Column Totals:	185 (A)		665 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** x

Remarks:

SOIL

Sampling Point: WP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics/duff	
2-14	10YR 6/1	90	10YR 8/6	30	C	M	Silty loam	Diatomaceous mixed in

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Previous piezometer monitoring indicated not wetland

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP13
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.657139733 Long: -122.116003493 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Wetland Hydrology Present?	Yes	X	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lucida	35	Y	FACW
2.			
3.			
4.			
	35	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Spirea douglasii	10	Y	FACW
2.			
3.			
4.			
5.			
	10	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Carex obnupta	90	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No**

Remarks:

SOIL

Sampling Point: WP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	Gley1 4/5GY	40	10YR 5/6	60	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- x Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 10”

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP14
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.657155493 | Long: -122.116122349 | Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam | NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Wetland Hydrology Present?	Yes		No	x

Remarks: Weak hydrophytic vegetation indicator – weedy species. Previous piezometer monitoring indicated not wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	10	Y	FACU
2.			
3.			
4.			
5.			
	10	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	30	Y	FACW
2. Agrostis stolonifera	50	Y	FAC
3. Schedonorus arundinaceae	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 5/2	90	10YR 6/6	10	C	M	Silt w/ diatomaceous	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP15
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.656801082 Long: -122.115609596 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes	x	No	

Is the Sampled Area within a Wetland? **Yes x No ___**

Remarks: Strong vegetation and hydrology indicators, if hydrology is present, preponderance of evidence is that it is a wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Spirea douglasii	75	Y	FACW
2.			
3.			
4.			
5.			
	75	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	50	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
x 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No ___**

Remarks:

SOIL

Sampling Point: WP15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 4/2						Silty clay w/ diatomaceous	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No mottles to meet hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 10”

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP16
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.656779926 Long: -122.115697686 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: Neither hydric soil nor hydrology present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	40	Y	FACU
2. Rosa pisocarpa	30	Y	FAC
3.			
4.			
5.			
	70	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	60	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 4/2						Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: No mottles to meet hydric soil indicator F3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP17
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.656023455 Long: -122.114853263 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	20	Y	FAC
2.			
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	80	Y	FAC
2. Cirsium arvense	10		FAC
3. Equisetum telmateia	2		FACW
4. Schedonorus arundinaceae	30	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	122	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 4/2						Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** **x**

Remarks: No mottles to meet hydric soil indicator F3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** **x**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP18
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.656029017 Long: -122.115307042 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Agrostis stolonifera	90	Y	FAC
2. Juncus effusus	10		FACW
3. Schedonorus arundinaceae	10		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	110	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-12	10YR 2/2	100					Loam	
12-14	10YR 8/2	95	10YR 5/8	5	C	M	Loam w/ diatomaceous	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP19
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.655811177 Long: -122.116117062 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Wetland Hydrology Present?	Yes		No	X

Remarks: Very strong vegetation and soils indicators, may be a small patch of wetland, did not find hydrology. Currently did not call wetland, but piezometers to be installed to monitor hydrology.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Iris pseudacorus	40	Y	OBL
2. Juncus effusus	50	Y	FACW
3. Agrostis gigantea	20		FAC
4. Phalaris arundinaceae	10		FACW
5. Carex obnupta	30	Y	OBL
6.			
7.			
8.			
9.			
10.			
11.			
	150	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 4/2	90	10YR 6/8	10	C	M	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/28/13
Applicant/Owner: King County | State: WA | Sampling Point: WP20
Investigator(s): Townsend, Martz | Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.654732522 | Long: -122.114196309 | Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes X No**
Wetland Hydrology Present?	Yes	x	No	

Remarks: Within planted mitigation area for SRA, seasonal wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Alnus rubra	10	Y	FAC
2. Salix sitchensis	20	Y	FACW
3. Spirea douglasii	10	Y	FACW
4. Picea sitchensis	10	Y	FAC
5. Populus balsamifera	10	Y	FAC
	60	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	60	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 3/2	75	10YR 5/6	25	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- x FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP21
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.655180825 Long: -122.115396706 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? Yes ___ No x

Remarks: Neither vegetation or soils indicators all that strong; weedy vegetation and no mottles, determined to not be wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Crataegus monogyna	5		FAC
2. Rubus procerus	5		FACU
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Cirsium arvense	30	Y	FAC
2. Agrostis gigantea	70	Y	FAC
3. Equisetum telmateia	10		FACW
4. Schedonorus arundinaceae	20	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	130	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-14	10YR 3/2	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Meets F3 indicator without mottles (sufficiently dark).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP22
Investigator(s): Townsend, Martz Section, Township, Range: T25N, R5E, Section13
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.653440810 Long: -122.115654008 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Wetland Hydrology Present?	Yes		No	X

Remarks: Vegetation indicator not all that strong, weedy species, and no hydrology, determined to not be wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	10	Y	FAC
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus procerus	15	Y	FACU
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	50	Y	FACW
2. Cirsium arvense	5		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	55	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2							Organics	
2-12	10YR 3/2	85	10YR 5/8	15	C	M	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/28/13
Applicant/Owner: King County State: WA Sampling Point: WP23
Investigator(s): Townsend, Martz Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.652712659 Long: -122.115154402 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes		No	X

Remarks: Strong vegetation and hydric soil indicators, very sparse understory, appears to be inundated, but no hydrology present at time of survey.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lucida	100	Y	FACW
2.			
3.			
4.			
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Ranunculus repens	10	Y	FAC
2. Unknown grass	20	Y	N.L.
3. Phalaris arundinaceae	5		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 70

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-1							Organics	
1-10							Silty clay	
10-14	10YR 5/1	75	10YR 6/6	25	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- x Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/29/13
Applicant/Owner: King County | State: WA | Sampling Point: WP24
Investigator(s): Townsend, Baines | Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.652519116 | Long: -122.113972437 | Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam | NWI classification: Palustrine forested
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	X	No	

Remarks:.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lucida	100	Y	FACW
2.			
3.			
4.			
	100	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	60	Y	FACW
2. Iris pseudacorus	40	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No

Remarks:

SOIL

Sampling Point: WP24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-1							Organics	
1-14	10YR 2/1	60	10YR 4/6	40			Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- x Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor | City/County: King County | Sampling Date: 10/29/13
Applicant/Owner: King County | State: WA | Sampling Point: WP25
Investigator(s): Townsend, Baines | Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain | Local relief (concave, convex, none): None | Slope (%): <1
Subregion (LRR): Northwest Forests and Coast | Lat: 47.652143063 | Long: -122.114522263 | Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam | NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___ , Soil ___ , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	25	Y	FACU
2.			
3.			
4.			
5.			
	25	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis gigantea	30	Y	FAC
2. Ranunculus repens	20	Y	FAC
3. Phalaris arundinacea	40	Y	FACW
4. Cirsium arvense	15		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1							Organics	
1-14	10YR 4/2	90	10YR 4/3	10	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Mottling not distinct to meet F3 indicator

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- x Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP26
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.653081081 Long: -122.114318595 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine forested
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	X	No	

Remarks:.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	10	Y	FACU
2. Urtica dioica	5		FAC
3.			
4.			
5.			
	15	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	100	x 2 =	200
FAC species	5	x 3 =	15
FACU species	10	x 4 =	40
UPL species		x 5 =	
Column Totals:	115 (A)		255 (B)

Prevalence Index = B/A = 2.2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- x 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organics	
2-10							Silty clay	
10-14	10YR 3/2	65	10YR 5/6	35	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Mottling not distinct to meet F3 indicator

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- x Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP27
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.652894448 Long: -122.114593098 Datum: NAVD88
Soil Map Unit Name: Earlmont silt loam NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	x
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-1							Organics	
1-6							Silty clay	
6-12							Clayey silt	
12-14	10YR 4/2	80	10YR 5/3	20	C	M	Clayey silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Mottling not distinct to meet indicator F3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP28
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.651463793 Long: -122.113003258 Datum: NAVD88
Soil Map Unit Name: Kitsap silt loam, 2-8% slopes NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	x	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix sitchensis	25	Y	FACW
2. Salix lucida	10		FACW
3.			
4.			
	35	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	10	Y	FACU
2.			
3.			
4.			
5.			
	10	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

SOIL

Sampling Point: WP28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Could not get soil sample as it was so wet to be liquid, generally organic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): Surface

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP29
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.651461552 Long: -122.112951191 Datum: NAVD88
Soil Map Unit Name: Kitsap silt loam, 2-8% slopes NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	30	Y	FACW
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	20	Y	FACU
2. Cornus stolonifera	20	Y	FAC
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	90	Y	FACW
2. Equisetum telmateia	5		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4							Organic/duff	
4-12	10YR 3/2						Clayey silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks: Rock present from road/parking lot fill; no mottling but depleted matrix, kind of suspect whether really hydric or not.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP30
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.650600506 Long: -122.113199443 Datum: NAVD88
Soil Map Unit Name: Kitsap silt loam, 2-8% slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** x
Wetland Hydrology Present?	Yes		No	x

Remarks: No hydrology present, weak soil and hydrophytic vegetation indicators

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophyllum	10	Y	FACU
2. Salix sitchensis	10	Y	FACW
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	110	x 2 =	220
FAC species		x 3 =	
FACU species	30	x 4 =	120
UPL species		x 5 =	
Column Totals:	140 (A)		340 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1							Organic/duff	
1-12	10YR 3/2	90	10YR 4/4	10	C	M	Clayey silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- x Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP31
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.651587418 Long: -122.111794395 Datum: NAVD88
Soil Map Unit Name: Tukwila muck NWI classification: Palustrine emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	x	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No

Remarks:

SOIL

Sampling Point: WP31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4							Organic/roots	
4-12	10YR 2/2	100					Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	x	No		Depth (inches):	6

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP32
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.651143435 Long: -122.111535357 Datum: NAVD88
Soil Map Unit Name: Tukwila muck NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks: No hydrology and weak soil indicators – site dominated by Phalaris

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix sitchensis	20	Y	FACW
2.			
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1. Rubus armeniacus	10	Y	FACU
2.			
3.			
4.			
5.			
	10	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2. Agrostis stolonifera	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	120	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2							Organic/roots	
2-12	10YR 3/2	80	10YR 4/4	20			Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks: Mottling is faint but meets F3 indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): 6

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP33
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.651999443 Long: -122.110085643 Datum: NAVD88
Soil Map Unit Name: Tukwila muck NWI classification: Palustrine forested
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	X	No	

Remarks

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia	20	Y	FACW
2.			
3.			
4.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No**

Remarks:

SOIL

Sampling Point: WP33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3							Organic/roots	
3-12	10YR 2/1	100					Clayey silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- x Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	12
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	Surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP34
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.659528904 Long: -122.120542002 Datum: NAVD88
Soil Map Unit Name: Pilchuck loamy fine sand NWI classification: Palustrine scrub/shrub
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae (mowed)	50	Y	FACW
2. Agrostis stolonifera (mowed)	100	Y	FAC
3. Unidentified grass (mowed)	50	Y	N.L.
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	200	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1							Organic/roots	
1-12	10YR 5/3	100					Medium sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** **x**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** **x**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP35
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.659431984 Long: -122.120651359 Datum: NAVD88
Soil Map Unit Name: Pilchuck loamy fine sand NWI classification: Palustrine scrub/shrub
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?** **Yes x No**
Wetland Hydrology Present?	Yes	X	No	

Remarks

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae (mowed)	50	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes x No**

Remarks:

SOIL

Sampling Point: WP35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4							Organic/roots	
4-6							Silt	
6-14	Gley1 3/10Y						Silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- x Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): surface

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP36
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.658646997 Long: -122.118186375 Datum: NAVD88
Soil Map Unit Name: Pilchuck loamy fine sand NWI classification: Palustrine scrub/shrub
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes		No	X

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Agrostis gigantea	100	Y	FAC
2. Poa pratensis	50	Y	FAC
3. Phalaris arundinaceae	10		FACW
4. Traxacum officinale	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 4m)		
1.		
2.		
	0	= Total Cover

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2							Organic enriched sand	
2-14	10YR 4/2						Medium sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Doesn't quite meet indicator S6

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Willowmoor/Marymoor City/County: King County Sampling Date: 10/29/13
Applicant/Owner: King County State: WA Sampling Point: WP37
Investigator(s): Townsend, Baines Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1
Subregion (LRR): Northwest Forests and Coast Lat: 47.658617815 Long: -122.122886758 Datum: NAVD88
Soil Map Unit Name: Pilchuck loamy fine sand NWI classification: Palustrine scrub/shrub
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? Y (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No	
Hydric Soil Present?	Yes		No	X
Wetland Hydrology Present?	Yes	X	No	

Is the Sampled Area within a Wetland? **Yes** x **No** ___

Remarks: Strong vegetation and hydrology indicators provides preponderance of evidence that site is a wetland. Soils have been modified – includes quarry spalls and soil indicators would likely be difficult to find.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 4m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 2m)			
1. Phalaris arundinaceae	5		FACW
2. Poa pratensis	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25	= Total Cover	

Woody Vine Stratum (Plot size: 4m)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 75

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ___

Remarks:

SOIL

Sampling Point: WP37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2							Organic enriched sand	
2-14	10YR 4/1						Quarry spalls w/silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks: Does not meet indicator F3 without mottles. However, observation of standing water is a strong indication of wetland presence.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- x High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches):	___
Water Table Present?	Yes	x	No	___	Depth (inches):	~10
Saturation Present? (includes capillary fringe)	Yes	x	No	___	Depth (inches):	~10

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Couldn't dig through quarry spalls, standing water adjacent

Appendix C: Wetland Functional Assessment Forms

Wetland name or number A

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): MARYMOOR A Date of site visit: 10/28/13

Rated by _____ Trained by Ecology? Yes__ No__ Date of training____

SEC: 24 TWNSHP: 5E RNGE: 11 Is S/T/R in Appendix D? Yes__ No X

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I__ II__ III X IV__

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	24
Score for Hydrologic Functions	10
Score for Habitat Functions	16
TOTAL score for Functions	50

50

Category based on SPECIAL CHARACTERISTICS of wetland

I__ II__ **Does not Apply** X

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	X
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	X

Wetland name or number A

Does the wetland unit being rated meet any of the criteria below?
If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.(see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X	
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number A

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 YES – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 YES – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 YES – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
___The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO – go to 5 **YES – The wetland class is Slope**

5. Does the entire wetland unit **meet all** of the following criteria?
___✓ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
___ The overbank flooding occurs at least once every two years.
NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.
NO – go to 6 YES – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*
NO – go to 7 YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
NO – go to 8 YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	~~Riverine~~
Slope + Depressional	Depressional
Slope + Lake-fringe	~~Lake-fringe~~
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number A

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ___Aquatic bed ___Emergent plants ___Scrub/shrub (areas where shrubs have >30% cover) ✓ Forested (areas where trees have >30% cover) barely 30% ? *If the unit has a forested class check if:* ✓ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 1
H 1.2. Hydroperiods *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ___Permanently flooded or inundated ✓ Seasonally flooded or inundated ___Occasionally flooded or inundated ✓ Saturated only 4 or more types present — points = 3 3 types present — points = 2 2 types present — point = 1 1 type present — points = 0 ___Permanently flowing stream or river in, or adjacent to, the wetland ___Seasonally flowing stream in, or adjacent to, the wetland ***Lake-fringe wetland* = 2 points** ***Freshwater tidal wetland* = 2 points** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft². (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* *List species below if you want to:* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page _____

Wetland name or number A

H 1.4. Interspersion of habitats *(see p. 76)* — Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

None = 0 points Low = 1 point Moderate = 2 points

[riparian braided channels]

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

2

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

___Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

___Standing snags (diameter at the bottom > 4 inches) in the wetland

___Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

___Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

___At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)*

___Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

0

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5 — 5

Comments

Wetland name or number A

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** ✓ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). (YES) = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) (NO) = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	4

Total for page_____

Wetland name or number A

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)***

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).

X **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).

____**Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

____**Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.

____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).

____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

____**Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).

____**Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

____**Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*

____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

____**Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

1

Wetland name or number A

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	11
TOTAL for H 1 from page 14	5
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO ___	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES – Category I NO go to SC 1.2	Cat. I
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

T25N R5E S11,13,14 NOT ON LIST

Wetland name or number A

SC 2.0 Natural Heritage Wetlands *(see p. 87)* — **Cat. I**

Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*

S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site X

YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?

YES = Category I NO ____not a Heritage Wetland

SC 3.0 Bogs *(see p. 87)*

Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?

   Yes - go to Q. 3 No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?

   Yes – Is a bog for purpose of rating No - go to Q. 4

   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.
4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*

   YES = Category I No___ Is not a bog for purpose of rating

Cat. I

Wetland name or number A

SC 4.0 Forested Wetlands *(see p. 90)*

Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.*

— **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.

— **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

YES = Category I NO ___not a forested wetland with special characteristics

Cat. I

SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)*

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

— The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

— The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon

SC 5.1 Does the wetland meets all of the following three conditions?

— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).

— At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. **Cat. I**

— The wetland is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II **Cat. II**

Wetland name or number _____

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO __ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	

Wetland name or number B

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): MARYMOOR B Date of site visit: 10/28/13

Rated by _____ Trained by Ecology? Yes__ No___ Date of training_____

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: **Figure** ____ **Estimated size** _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II X III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	18
Score for Habitat Functions	22
TOTAL score for Functions	60

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ **Does not Apply** X

Final Category (choose the "highest" category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	X
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X	
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number B

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO - go to 2 **YES – the wetland class is Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO - go to 4 **YES – The wetland class is Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
___**The water leaves the wetland without being impounded?**
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number B

5. Does the entire wetland unit **meet all** of the following criteria?
✓ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
✓ The overbank flooding occurs at least once every two years.
NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.
NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*
NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number A

D	Depressional and Flats Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	Points (only 1 score per box)
D	**D 1. Does the wetland unit have the potential to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Provide photo or drawing	Figure ___ 3
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	Figure ___ 4
D	**Total for D 1** *Add the points in the boxes above*	12
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft X Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland X A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging X Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen Other ___ (YES) multiplier is **2** NO multiplier is **1**	*(see p. 44)* multiplier 2
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	24

Wetland name or number A

D	Depressional and Flats Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	Points (only 1 score per box)
D	**D 3. Does the wetland unit have the potential to reduce flooding and erosion?**	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	1
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	5
D	**D 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems X Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other ___ (YES) multiplier is **2** (NO) multiplier is **1**	*(see p. 49)* multiplier 2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	10

Wetland name or number B

R	Riverine and Freshwater Tidal Fringe Wetlands WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	Points (only 1 score per box)
R	**R 1. Does the wetland unit have the potential to improve water quality?**	*(see p.52)*
R	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: Depressions cover >3/4 area of wetland points = 8 Depressions cover > 1/2 area of wetland points = 4 If depressions > ⅓ of area of unit draw polygons on aerial photo or map Depressions present but cover < 1/2 area of wetland points = 2 No depressions present points = 0	Figure ___ 4
R	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): Trees or shrubs > 2/3 the area of the unit points = 8 Trees or shrubs > 1/3 area of the unit points = 6 Ungrazed, herbaceous plants > 2/3 area of unit points = 6 Ungrazed herbaceous plants > 1/3 area of unit points = 3 Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0 Aerial photo or map showing polygons of different vegetation types	Figure ___ 6
R	*Add the points in the boxes above*	10
R	**R 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft X Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 feet of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging X Residential, urban areas, golf courses are within 150 ft of wetland X The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality X Other Wetland periodically mowed (YES) multiplier is 2 NO multiplier is 1	*(see p.53)* multiplier 2
R	**TOTAL - Water Quality Functions** Multiply the score from R 1 by R 2 ***Add score to table on p. 1***	20

Comments

Wetland name or number B

R	Riverine and Freshwater Tidal Fringe Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	Points (only 1 score per box)
	R 3. Does the wetland unit have the potential to reduce flooding and erosion?	*(see p.54)*
R	R 3.1 Characteristics of the overbank storage the unit provides: *Estimate the average width of the wetland unit perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit)/(average width of stream between banks).* If the ratio is more than 20 points = 9 If the ratio is between 10 – 20 points = 6 If the ratio is 5 - <10 points = 4 If the ratio is 1 - <5 points = 2 If the ratio is < 1 points = 1 Aerial photo or map showing average widths	Figure ___ 2
R	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description.* (polygons need to have >90% cover at person height NOT Cowardin classes): Forest or shrub for >1/3 area OR herbaceous plants > 2/3 area points = 7 Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 Vegetation does not meet above criteria points = 0 Aerial photo or map showing polygons of different vegetation types	Figure ___ 7
R	*Add the points in the boxes above*	9
R	**R 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* X There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. X There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding — Other ___ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* (YES) multiplier is 2 NO multiplier is 1	*(see p.57)* multiplier 2
R	**TOTAL - Hydrologic Functions** Multiply the score from R 3 by R 4 ***Add score to table on p. 1***	18

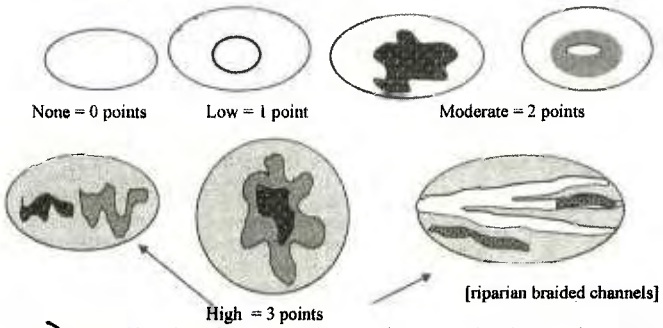
Comments

Wetland name or number B

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	Points (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* X Aquatic bed X Emergent plants X Scrub/shrub (areas where shrubs have >30% cover) ___Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ___The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0 Map of Cowardin vegetation classes	Figure ___ 2
H 1.2. Hydroperiods *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* X Permanently flooded or inundated X Seasonally flooded or inundated X Occasionally flooded or inundated X Saturated only X Permanently flowing stream or river in, or adjacent to, the wetland X Seasonally flowing stream in, or adjacent to, the wetland ***Lake-fringe wetland* = 2 points** ***Freshwater tidal wetland* = 2 points** 4 or more types present points = 3 3 types present points = 2 2 types present point = 1 1 type present points = 0 Map of hydroperiods	Figure ___ 3
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* *List species below if you want to:* If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0	1

Total for page 6

Wetland name or number B

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points [riparian braided channels] High = 3 points → NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	3
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ___Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ___Standing snags (diameter at the bottom > 4 inches) in the wetland ___Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) X Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ___At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ___Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	10

Comments

Wetland name or number B

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** X 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 4
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are consdered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	4

Total for page 8

Wetland name or number B

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)***

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

___**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).

X **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).

___**Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

___**Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.

___**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).

___**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

___**Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).

___**Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

___**Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*

___**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

___**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

___**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

___**Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

1

Wetland name or number B

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	12
TOTAL for H 1 from page 14	10
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	22

Wetland name or number B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES – Go to SC 1.1 NO ___	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number B

SC 2.0 Natural Heritage Wetlands *(see p. 87)* — **Cat. I**

Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*

S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site X

YES ___ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?

YES = Category I NO ___not a Heritage Wetland

SC 3.0 Bogs *(see p. 87)*

Does the wetland unit **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?

   Yes - go to Q. 3 No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?

   Yes – Is a bog for purpose of rating No - go to Q. 4

   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.

1. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*

2 YES = Category I No___ Is not a bog for purpose of rating — **Cat. I**

Wetland name or number B

SC 4.0 Forested Wetlands *(see p. 90)*

Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.*

— **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.

— **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

YES = Category I NO ___not a forested wetland with special characteristics — **Cat. I**

SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)*

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

— The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

— The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon

SC 5.1 Does the wetland meets all of the following three conditions?

— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasiye species on p. 74).

— At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — **Cat. I**

— The wetland is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II — **Cat. II**

Wetland name or number B

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO __ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	

Wetland name or number C

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 10/28/13

Rated by _____ Trained by Ecology? Yes__No___ Date of training____

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II X III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	20
Score for Hydrologic Functions	18
Score for Habitat Functions	22
TOTAL score for Functions	60

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	X
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number C

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X	
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number C

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
___The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number C

5. Does the entire wetland unit **meet all** of the following criteria?
___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
___The overbank flooding occurs at least once every two years.
NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding
NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*
NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number C

R	Riverine and Freshwater Tidal Fringe Wetlands WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	Points (only 1 score per box)
R	**R 1. Does the wetland unit have the potential to improve water quality?**	*(see p.52)*
R	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: Depressions cover >3/4 area of wetland points = 8 Depressions cover > 1/2 area of wetland points = 4 If depressions > ½ of area of unit draw polygons on aerial photo or map Depressions present but cover < 1/2 area of wetland points = 2 No depressions present points = 0	Figure ___ 4
R	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): Trees or shrubs > 2/3 the area of the unit points = 8 Trees or shrubs > 1/3 area of the unit points = 6 Ungrazed, herbaceous plants > 2/3 area of unit points = 6 Ungrazed herbaceous plants > 1/3 area of unit points = 3 Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0 Aerial photo or map showing polygons of different vegetation types	Figure ___ 6
R	*Add the points in the boxes above*	10
R	**R 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft X Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 feet of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging X Residential, urban areas, golf courses are within 150 ft of wetland X The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality X Other Wetland previously mowed (YES) multiplier is 2 NO multiplier is 1	*(see p.53)* multiplier 2
R	**TOTAL - Water Quality Functions** Multiply the score from R 1 by R 2 ***Add score to table on p. 1***	20

Comments

Wetland name or number C

R	Riverine and Freshwater Tidal Fringe Wetlands HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	Points (only 1 score per box)
	R 3. Does the wetland unit have the potential to reduce flooding and erosion?	*(see p.54)*
R	R 3.1 Characteristics of the overbank storage the unit provides: *Estimate the average width of the wetland unit perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit)/(average width of stream between banks).* If the ratio is more than 20 points = 9 If the ratio is between 10 – 20 points = 6 If the ratio is 5 - <10 points = 4 If the ratio is 1 - <5 points = 2 If the ratio is < 1 points = 1 Aerial photo or map showing average widths	Figure ___ 2
R	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description.* (polygons need to have >90% cover at person height NOT Cowardin classes): Forest or shrub for >1/3 area OR herbaceous plants > 2/3 area points = 7 Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 Vegetation does not meet above criteria points = 0 Aerial photo or map showing polygons of different vegetation types	Figure ___ 7
R	*Add the points in the boxes above*	9
R	**R 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* X There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. X There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding — Other_____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* (YES) multiplier is 2 NO multiplier is 1	*(see p.57)* multiplier 2
R	**TOTAL - Hydrologic Functions** Multiply the score from R 3 by R 4 ***Add score to table on p. 1***	18

Comments

Wetland name or number C

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	Points (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* X Aquatic bed X Emergent plants X Scrub/shrub (areas where shrubs have >30% cover) ___Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ___The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0 Map of Cowardin vegetation classes	Figure ___ 2
H 1.2. Hydroperiods *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* X Permanently flooded or inundated — 4 or more types present — points = 3 X Seasonally flooded or inundated — 3 types present — points = 2 X Occasionally flooded or inundated — 2 types present — point = 1 X Saturated only — 1 type present — points = 0 X Permanently flowing stream or river in, or adjacent to, the wetland X Seasonally flowing stream in, or adjacent to, the wetland ***Lake-fringe wetland* = 2 points** ***Freshwater tidal wetland* = 2 points** Map of hydroperiods	Figure ___ 3
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft². (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species:* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0 *List species below if you want to:*	1

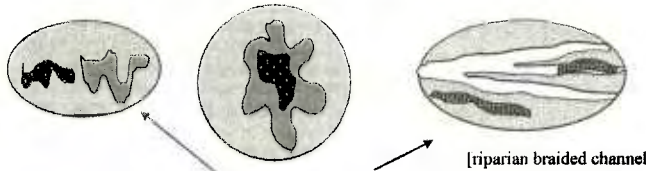
Total for page 6

Wetland name or number C

H 1.4. Interspersion of habitats *(see p. 76)* — Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

None = 0 points Low = 1 point Moderate = 2 points



[riparian braided channels]

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

3

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

___Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

___Standing snags (diameter at the bottom > 4 inches) in the wetland

___Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

___Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

___At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)*

___Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

1

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5 — 10

Comments

Wetland name or number C

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** X 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 4
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). **YES = 4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	4

Total for page 8

Wetland name or number C

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)***

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

___**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).

X **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).

___**Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

___**Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.

___**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).

___**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

___**Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).

___**Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

___**Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*

___**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

___**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

___**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

___**Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1 priority habitat = 1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

1

Wetland name or number C

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	12
TOTAL for H 1 from page 14	10
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	22

Wetland name or number C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands *(see p. 86)* Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¼ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number C

SC 2.0 Natural Heritage Wetlands *(see p. 87)* — **Cat. I**

Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*

S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site X

YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?

YES = Category I NO ____not a Heritage Wetland

SC 3.0 Bogs *(see p. 87)*

Does the wetland unit **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?

   Yes - go to Q. 3 No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?

   Yes – Is a bog for purpose of rating No - go to Q. 4

   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.

1. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*

2. YES = Category I No___ Is not a bog for purpose of rating — **Cat. I**

Wetland name or number C

SC 4.0 Forested Wetlands *(see p. 90)*

Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.*

— **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.

— **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

YES = Category I NO ___not a forested wetland with special characteristics — **Cat. I**

SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)*

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

— The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks

— The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon

SC 5.1 Does the wetland meets all of the following three conditions?

— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).

— At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — **Cat. I**

— The wetland is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II — **Cat. II**

Wetland name or number C

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO __ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	

Wetland name or number D

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): MARYMOOR D Date of site visit: 10/28/13

Rated by _____ Trained by Ecology? Yes__No___ Date of training_____

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure ____ **Estimated size** _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	16
Score for Hydrologic Functions	4
Score for Habitat Functions	9
TOTAL score for Functions	29

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ **Does not Apply**___

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	X
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number D

Does the wetland unit being rated meet any of the criteria below?
If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X	
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number D

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES – the wetland class is Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO – go to 5 **YES** – The wetland class is **Slope**

Wetland name or number D

5. Does the entire wetland unit **meet all** of the following criteria?
____The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
____The overbank flooding occurs at least once every two years.
NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.
NO – go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*
NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number D

D Depressional and Flats Wetlands — WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality

Points (only 1 score per box)

D 1. Does the wetland unit have the potential to improve water quality? *(see p.38)*

D 1.1 Characteristics of surface water flows out of the wetland: — Figure ___
- Unit is a depression with no surface water leaving it (no outlet) points = 3
- Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2
- Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1
- Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1
- (*If ditch is not permanently flowing treat unit as "intermittently flowing"*)

Provide photo or drawing — **3**

S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)*
- YES points = 4
- NO points = 0

0

D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) — **Figure ___**
- Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5
- Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3
- Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1
- Wetland has persistent, ungrazed vegetation <1/10 of area points = 0

Map of Cowardin vegetation classes — **5**

D1.4 Characteristics of seasonal ponding or inundation. — **Figure ___**

This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.
- Area seasonally ponded is > ½ total area of wetland points = 4
- Area seasonally ponded is > ¼ total area of wetland points = 2
- Area seasonally ponded is < ¼ total area of wetland points = 0

Map of Hydroperiods — **0**

Total for D 1 *Add the points in the boxes above* — **8**

D 2. Does the wetland unit have the opportunity to improve water quality? *(see p. 44)*

Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.*
- — Grazing in the wetland or within 150 ft
- X Untreated stormwater discharges to wetland
- — Tilled fields or orchards within 150 ft of wetland
- X A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging
- X Residential, urban areas, golf courses are within 150 ft of wetland
- — Wetland is fed by groundwater high in phosphorus or nitrogen
- — Other ___

YES multiplier is 2 — NO multiplier is 1

multiplier — **2**

TOTAL - Water Quality Functions Multiply the score from D1 by D2 *Add score to table on p. 1* — **16**

Wetland name or number D

D Depressional and Flats Wetlands — HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation

Points (only 1 score per box)

D 3. Does the wetland unit have the potential to reduce flooding and erosion? *(see p.46)*

D 3.1 Characteristics of surface water flows out of the wetland unit
- Unit is a depression with no surface water leaving it (no outlet) points = 4
- Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2
- Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1
- (*If ditch is not permanently flowing treat unit as "intermittently flowing"*)
- Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0

4

D 3.2 Depth of storage during wet periods

Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).
- Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7
- The wetland is a "headwater" wetland points = 5
- Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5
- Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3
- Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1
- Marks of ponding less than 0.5 ft points = 0

0

D 3.3 Contribution of wetland unit to storage in the watershed

Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.
- The area of the basin is less than 10 times the area of unit points = 5
- The area of the basin is 10 to 100 times the area of the unit points = 3
- The area of the basin is more than 100 times the area of the unit points = 0
- Entire unit is in the FLATS class points = 5

0 ?

Total for D 3 *Add the points in the boxes above* — **4**

D 4. Does the wetland unit have the opportunity to reduce flooding and erosion? *(see p. 49)*

Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur.

Note which of the following indicators of opportunity apply.
- — Wetland is in a headwater of a river or stream that has flooding problems
- — Wetland drains to a river or stream that has flooding problems
- — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems
- — Other ___

YES multiplier is 2 — **NO** multiplier is 1

multiplier — **1**

TOTAL - Hydrologic Functions Multiply the score from D 3 by D 4 *Add score to table on p. 1* — **4**

Wetland name or number D

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed ____Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. Hydroperiods *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ____Permanently flooded or inundated ____Seasonally flooded or inundated ____Occasionally flooded or inundated __X__Saturated only ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____***Lake-fringe wetland*** **= 2 points** ____***Freshwater tidal wetland*** **= 2 points** 4 or more types present — points = 3 3 types present — points = 2 2 types present — point = 1 1 type present — points = 0 Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft². (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* *List species below if you want to:* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	0

Total for page 1

Wetland name or number D

H 1.4. Interspersion of habitats *(see p. 76)* — Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

None = 0 points Low = 1 point Moderate = 2 points

[riparian braided channels]

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

0

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

____Standing snags (diameter at the bottom > 4 inches) in the wetland

____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)*

____Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

0

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5 — 1

Comments

Wetland name or number D

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 4
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*) YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page_____

Wetland name or number D

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ___ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). _X_ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ___ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ___ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ___ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ___ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ___ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ___ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ___ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ___ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ___ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ___ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ___ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has 1 priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	1

Wetland name or number D

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are **relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.** points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	8
TOTAL for H 1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

Wetland name or number D

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands *(see p. 86)* Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands *(see p. 87)* — **Cat. I**

Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*
S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site X

YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?
YES = Category I NO ____not a Heritage Wetland

SC 3.0 Bogs *(see p. 87)*

Does the wetland unit **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?
   Yes - go to Q. 3 No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?
   Yes – Is a bog for purpose of rating No - go to Q. 4
   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.
4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*

2 YES = Category I No___ Is not a bog for purpose of rating — **Cat. I**

SC 4.0 Forested Wetlands *(see p. 90)*

Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.*

— **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.

— **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

YES = Category I NO ___not a forested wetland with special characteristics — **Cat. I**

SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)*

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

— The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks
— The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon

SC 5.1 Does the wetland meets all of the following three conditions?

— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).
— At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — **Cat. I**
— The wetland is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II — **Cat. II**

Wetland name or number D

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	

Wetland name or number E

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): MARYMOOR E Date of site visit: 10/29/13

Rated by _____ Trained by Ecology? Yes__No___ Date of training_____

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II X III___ IV___

Category I – Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	24
Score for Hydrologic Functions	12
Score for Habitat Functions	26
TOTAL score for Functions	62

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the **"highest"** category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		**Lake-fringe**	X
Mature Forest		Slope	
Old Growth Forest		**Flats**	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number E

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	X	
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number E

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES – the wetland class is Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES – The wetland class is Slope**

Wetland name or number E

5. Does the entire wetland unit **meet all** of the following criteria?
____The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river
____The overbank flooding occurs at least once every two years.
NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.
NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*
NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number E

	Lake-fringe Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	Points (only 1 score per box)
L	**L 1. Does the wetland unit have the potential to improve water quality?**	*(see p.59)*
L	L 1.1 Average width of vegetation along the lakeshore *(use polygons of Cowardin classes)*: Vegetation is more than 33ft (10m) wide — points = 6 Vegetation is more than 16 (5m) wide and <33ft — points = 3 Vegetation is more than 6ft (2m) wide and <16 ft — points = 1 Vegetation is less than 6 ft wide — points = 0 Map of Cowardin classes with widths marked	Figure ___ 6
L	L 1.2 Characteristics of the vegetation in the wetland: *choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* Cover of herbaceous plants is >90% of the vegetated area — points = 6 Cover of herbaceous plants is >2/3 of the vegetated area — points = 4 Cover of herbaceous plants is >1/3 of the vegetated area — points = 3 Other vegetation that is not aquatic bed or herbaceous covers > 2/3 unit — points = 3 Other vegetation that is not aquatic bed in > 1/3 vegetated area — points = 1 Aquatic bed vegetation and open water cover > 2/3 of the unit — points = 0 Map with polygons of different vegetation types	Figure ___ 6
L	*Add the points in the boxes above*	12
L	**L 2. Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Wetland is along the shores of a lake or reservoir that does not meet water quality standards — Grazing in the wetland or within 150ft X Polluted water discharges to wetland along upland edge — Tilled fields or orchards within 150 feet of wetland X Residential or urban areas are within 150 ft of wetland — Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) — Power boats with gasoline or diesel engines use the lake Other ___ (YES) multiplier is 2 NO multiplier is 1	*(see p.61)* multiplier 2
L	**TOTAL - Water Quality Functions** Multiply the score from L1 by L2 ***Add score to table on p. 1***	24

Comments

Wetland name or number E

	Lake-fringe Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce shoreline erosion	Points (only 1 score per box)
L	**L 3. Does the wetland unit have the potential to reduce shoreline erosion?**	*(see p.62)*
L	L 3 Distance along shore and average width of Cowardin classes along the lakeshore (**do not** include aquatic bed): *(choose the highest scoring description that matches conditions in the wetland)* > ¾ of distance is shrubs or forest at least 33 ft (10m) wide — points = 6 > ¾ of distance is shrubs or forest at least 6 ft. (2 m) wide — points = 4 > ¼ distance is shrubs or forest at least 33 ft (10m) wide — points = 4 Vegetation is at least 6 ft (2m) wide (any type except aquatic bed) — points = 2 Vegetation is less than 6 ft (2m) wide (any type except aquatic bed) — points = 0 Aerial photo or map with Cowardin vegetation classes	Figure ___ 6
L	*Record the points from the box above*	6
L	**L 4. Does the wetland unit have the opportunity to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* X There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. X There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests other wetlands) than can be damaged by shoreline erosion — Other ___ (YES) multiplier is 2 NO multiplier is 1	*(see p.63)* multiplier 2
L	**TOTAL - Hydrologic Functions** Multiply the score from L 3 by L 4 ***Add score to table on p. 1***	12

Comments

Wetland name or number E

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* X Aquatic bed X Emergent plants X Scrub/shrub (areas where shrubs have >30% cover) X Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ___The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0 Map of Cowardin vegetation classes	Figure ___ 4
H 1.2. Hydroperiods *(see p. 73)* *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* X Permanently flooded or inundated — 4 or more types present points = 3 X Seasonally flooded or inundated — 3 types present points = 2 X Occasionally flooded or inundated — 2 types present point = 1 X Saturated only — 1 type present points = 0 X Permanently flowing stream or river in, or adjacent to, the wetland X Seasonally flowing stream in, or adjacent to, the wetland ___***Lake-fringe wetland*** **= 2 points** ___***Freshwater tidal wetland*** **= 2 points** Map of hydroperiods	Figure ___ 3
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft². (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0 *List species below if you want to:*	1

Total for page ___

Wetland name or number E

H 1.4. Interspersion of habitats *(see p. 76)* — Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

None = 0 points Low = 1 point Moderate = 2 points

[riparian braided channels]

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". **Use map of Cowardin vegetation classes**

3

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

___Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

___Standing snags (diameter at the bottom > 4 inches) in the wetland

___Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

___Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

X At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)*

___Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

1

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5 — 12

Comments

Wetland name or number E

H 2. Does the wetland unit have the opportunity to provide habitat for many species?

H 2.1 Buffers *(see p. 80)* — Figure ___

Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."

- — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5**
- — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4**
- — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4**
- — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, **Points = 3**
- — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3**

If buffer does not meet any of the criteria above

- — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2**
- — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2**
- — Heavy grazing in buffer. **Points = 1**
- — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.**
- — Buffer does not meet any of the criteria above. **Points = 1**

Aerial photo showing buffers

4

H 2.2 Corridors and Connections *(see p. 81)*

H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*).

YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2

H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above?

YES = **2 points** (*go to H 2.3*) NO = H 2.2.3

H 2.2.3 Is the wetland:

within 5 mi (8km) of a brackish or salt water estuary OR
within 3 mi of a large field or pasture (>40 acres) OR
within 1 mi of a lake greater than 20 acres?

YES = **1 point** NO = **0 points**

4

Total for page_____

Wetland name or number E

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*

Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.*

- ___ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- X **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- ___ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ___ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ___ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- ___ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ___ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).
- ___ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ___ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*
- ___ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ___ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ___ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ___ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point** No habitats = 0 points

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

1

Wetland name or number E

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits) **(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	14
TOTAL for H 1 from page 14	12
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	26

Wetland name or number E

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO ___	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands *(see p. 87)*
Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.

SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)*
S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site X

YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X

SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species?
YES = Category I NO ___not a Heritage Wetland

Cat. I

SC 3.0 Bogs *(see p. 87)*
Does the wetland unit **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.***

1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2
2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond?
   Yes - go to Q. 3 No - Is not a bog for purpose of rating
3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)?
   Yes – Is a bog for purpose of rating No - go to Q. 4
   NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.
4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?*
   YES = Category I No___ Is not a bog for purpose of rating

Cat. I

SC 4.0 Forested Wetlands *(see p. 90)*
Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.*

— **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.

NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.

— **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.

YES = Category I NO ___not a forested wetland with special characteristics

Cat. I

SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)*
Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

— The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks
— The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon

SC 5.1 Does the wetland meets all of the following three conditions?

— The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).
— At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
— The wetland is larger than 1/10 acre (4350 square feet)

YES = Category I NO = Category II

Cat. I
Cat. II

Wetland name or number _____

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO __ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES – Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	