DRAFT ENVIRONMENTAL IMPACT STATEMENT
SR 520 BRIDGE REPLACEMENT AND HOV PROGRAM

MAY 2010

SR 520 Pontoon Construction Project

Ecosystems Discipline Report

Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

THE INFORMATION IN THIS REPORT IS ACCURATE; HOWEVER, THE PONTOON CONSTRUCTION PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT IS THE SOURCE OF THE MOST CURRENT PROJECT INFORMATION AND ANALYSIS.

SR 520 Pontoon Construction Project
Draft Environmental Impact Statement

Ecosystems
Discipline Report

Prepared for

Washington State Department of Transportation
Federal Highway Administration

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Abbreviations and Acronyms

°F	degrees Fahrenheit
CFR	Code of Federal Regulations
CTC	Concrete Technology Corporation, Inc.
DPS	distinct population segment
E	estuarine
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FCo	federal species of concern
FT	federally threatened
GIS	geographic information system
GPS	global positioning system
HGM	hydrogeomorphic
HOV	high-occupancy vehicle
IDD #1	Port of Grays Harbor Industrial Development District #1
LWD	large woody debris
MLLW	mean lower low water
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NPDES	National Pollutant Discharge and Elimination System
OHWM	ordinary high water mark
P	palustrine

PHS	priority habitats and species
PSW	potential shoreline wetland
PW	potential wetland
R	riverine
SC	state candidate species
SEPA	State Environmental Policy Act
SM	state monitor species
SR	State Route
SW	shoreline wetland
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	water resource inventory area
WSCC	Washington State Conservation Commission
WSDOT	Washington State Department of Transportation

1. Introduction

1.1 Why are ecosystems considered in an EIS?

An ecosystem is a biological community interacting with its physical and chemical environment as an integrated dynamic unit. Ecosystems are made up of living organisms, including humans, and the environment they inhabit. Understanding this relationship is integral to the environmental review process. Various federal, state, and local regulations, including the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA), require that effects of a proposed project on ecosystem structure, function, and process be evaluated in an environmental impact statement (EIS).

Ecosystems are also regulated by federal, state, and local laws because of their ecological and social functions and values. The primary federal regulations or statutes that apply to wetlands, fish, streams, and wildlife in the study area are the Clean Water Act Sections 401 and 404, the Endangered Species Act, the Migratory Bird Treaty Act, the Rivers and Harbors Act, the Coastal Zone Management Act, and the Fish and Wildlife Coordination Act. State and local regulations that apply to these resources include the State Hydraulic Code, the Shoreline Management Act, and local sensitive and critical area ordinances. A general goal of these regulations is to protect water quality, shorelines, streams, wetlands, riparian areas, and associated terrestrial habitats, as well as the species that depend on these areas.

This discipline report presents three important biotic resources: wetlands, fish and aquatic resources, and wildlife. Water is integral to these resources and is also a key driver for many other physical and chemical processes. Because of its complexity, water resources are discussed separately in the Water Resources Discipline Report (WSDOT 2009a).

This discipline report is organized into sections by ecosystem resources: wetlands; fish and aquatic resources, including drainage features of each build alternative and shoreline habitat; and wildlife habitat, often referred to as terrestrial habitat. Each resource section discusses the existing resources (affected environment) as well as the potential environmental project effects. Mitigation is discussed at the end of each resource section, and references are provided at the end of the report.

1.2 What are the key points of this report?

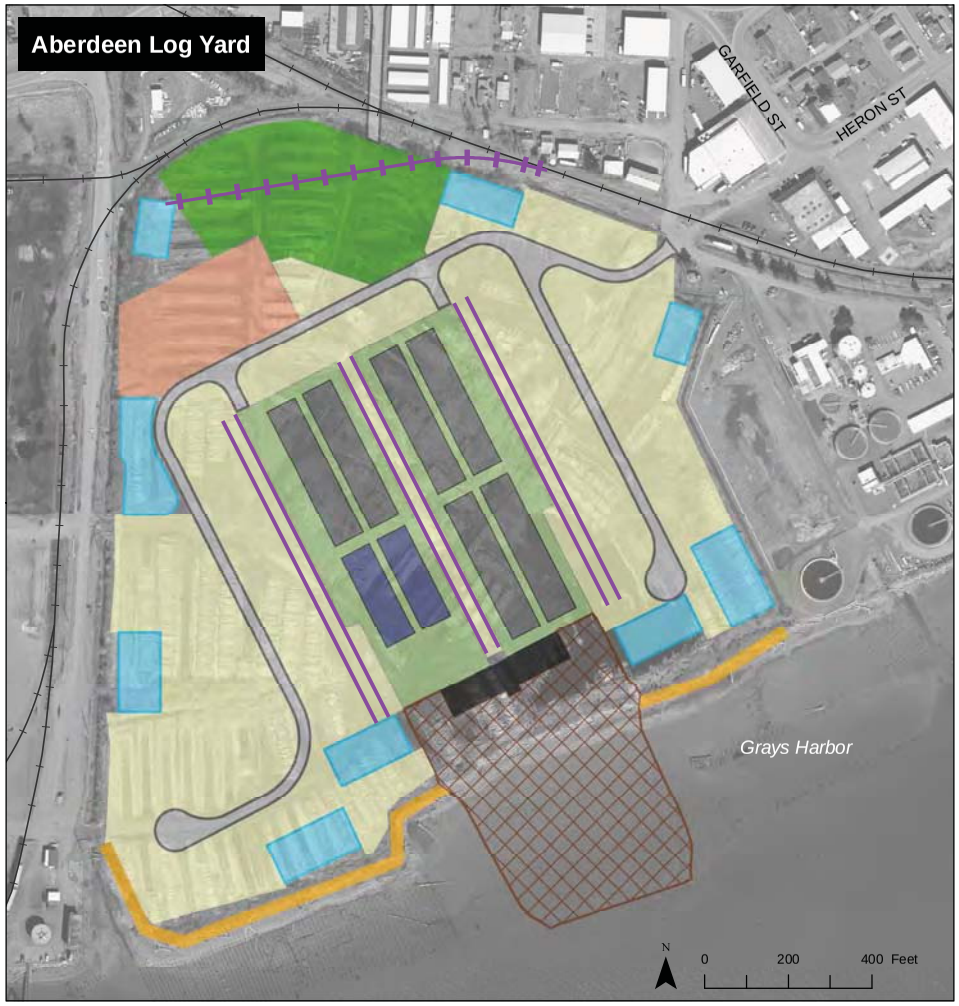
The Washington State Department of Transportation (WSDOT) proposes building a casting basin facility at one of two alternative sites in the Grays Harbor area to manufacture large concrete floating bridge pontoons (Exhibit 1-1). These pontoons would be built to replace the floating portion of the Evergreen Point Bridge in the event of a catastrophic failure or to support the planned replacement of the bridge. The Concrete Technology Corporation, Inc. (CTC) casting basin in Tacoma could be used to build smaller pontoons while the Grays Harbor casting basin is being built (Exhibit 1-2). The completed pontoons would be moored at an approved location in Grays Harbor and in Puget Sound until needed. Potential pontoon moorage effects are documented in the Pontoon Mooring Site Selection Memorandum (WSDOT 2009b) and potential biological effects of pontoon moorage are further discussed Pontoon Construction Project Draft EIS.

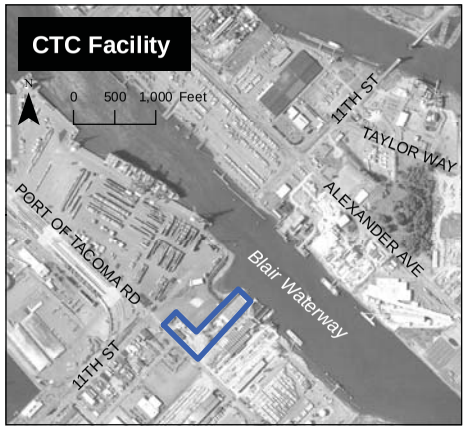
This report documents existing ecosystem conditions at both Grays Harbor build alternative sites. The report also discusses potential effects to existing ecosystems that might result from pontoon construction, including indirect effects from long-term operation of the casting basin facility. In addition to this discussion, Section 3.1, Ecosystems, of the Draft EIS discusses cumulative and indirect project effects on ecosystems.

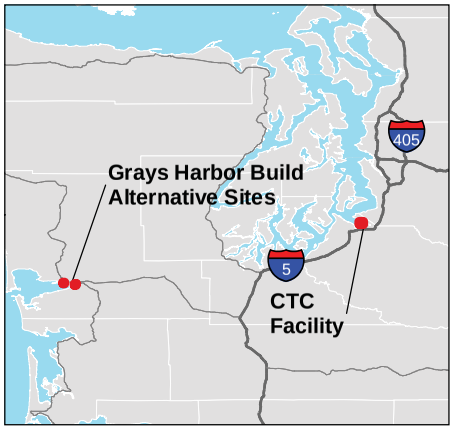
Where existing resources would be negatively affected at potential casting basin construction sites, this report describes mitigation in general terms. Once a site has been selected, detailed studies and mitigation designs will be developed to comply with local, state, and federal regulatory requirements. The remainder of this section summarizes the key points of this report by discipline and by site.

Wetlands

- Constructing the pontoon casting basin and associated structures at the Anderson & Middleton Alternative site would eliminate approximately 4.8 acres of estimated palustrine wetland area from the central portion of the site. While about 2.4 acres of estuarine wetland area exists along the southwestern portion of the shoreline, this area would not be directly affected by construction at this site.







INTERNAL USE ONLY - DRAFT

- Crane rail
- Proposed rail spur
- Existing railroad
- CTC facility limits
- Cross pontoon
- Longitudinal pontoon
- Water treatment area
- Access road
- Batch plant
- Berm
- Casting basin
- Dry storage and laydown area
- Gate
- Launch channel
- Office and parking

Source: WSDOT (2005, 2006) Aerial Photo, USDA-FSA (2006) Aerial Photo, Grays Harbor County (2006) GIS Data (Road), Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 1-1. **Locations and Conceptual Layouts for Build Alternative Sites**

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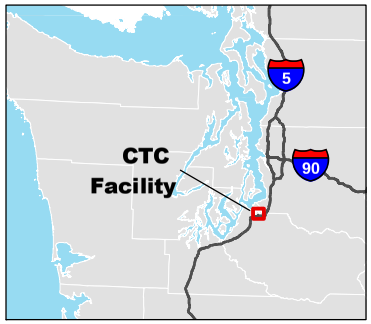

Existing CTC Facility

N

0 500 1,000 Feet

Source: USDA-FSA (2006) Aerial Photograph. Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 1-2. **CTC Facility and Surrounding Area**

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- The Aberdeen Log Yard Alternative site contains approximately 2.4 acres of palustrine wetland and 0.2 acre of estuarine wetland, half of which would be eliminated by construction of the casting basin and associated structures.

Fish and Aquatic Resources

- All existing drainage ditches (approximately 1.2 acres) at the Anderson & Middleton site would be eliminated and likely replaced with upgraded drainage systems that would require water quality treatment. The launch channel at this site would require an excavated area equal to approximately 1 acre of nearshore area, including intertidal mudflats, accessible to fish and aquatic resources.
- Similarly, all of the existing freshwater drainage ditches (approximately 0.6 acres, some of which is accessible to fish) at the Aberdeen Log Yard site would be eliminated. The launch channel at this site would involve excavating an area equal to approximately 5 acres of nearshore area, including intertidal mudflats, accessible to fish and aquatic resources.
- Neither Grays Harbor build alternative contains high-quality freshwater fish habitat.

Wildlife

- Project construction and operation would cause unavoidable effects on wildlife at both Grays Harbor build alternative sites. Both sites would convert large areas of wildlife habitat to active industrial use. The Anderson & Middleton Alternative site, however, because it is larger, would retain approximately 40 acres or more of habitat, while the Aberdeen Log Yard Alternative site would require using the entire site to build the casting basin facility.
- By proposing the casting basin facility at existing industrial sites, high-quality wildlife habitats have been avoided and effects have been reduced.

1.3 What are the project alternatives?

The Pontoon Construction Project Draft EIS evaluates two build alternatives that would involve constructing a new casting basin in Grays Harbor and one No Build Alternative. Two waterfront sites in the Grays Harbor area are being evaluated for the new casting basin facility:

- Anderson & Middleton property in Hoquiam
- Aberdeen Log Yard property in Aberdeen

The new Grays Harbor casting basin facility could produce all 33 pontoons needed for this project: 21 longitudinal pontoons (360 feet long by 75 feet wide), 10 supplemental stability pontoons (98 feet long by 60 feet wide), and 2 cross pontoons (240 feet long by 75 feet wide). To expedite pontoon construction, however, each build alternative could include using the existing CTC casting basin facility in Tacoma to build pontoons while the new casting basin facility at Grays Harbor is being constructed. If used, the CTC facility, which has a limited operations area, could build up to three longitudinal pontoons and up to ten supplemental stability pontoons.

> What is a casting basin facility?
>
> Pontoons for this project would be built at a casting basin facility, which would consist of a casting basin (a large chamber in which pontoons are constructed, see the next text box for a more thorough description) and several supporting facilities, such as a batch plant to produce concrete, access roads, storage and laydown areas, office space for workers, and water treatment facilities.

WSDOT would float most of the completed pontoons built at the new casting basin facility out of the casting basin and tow them to a moorage location in the Grays Harbor area. The last pontoons built would be stored in the casting basin until needed. Any pontoons constructed at the CTC facility would be moored at existing marine berths in Puget Sound.

After the project is completed, the new casting basin would be available to produce additional pontoons needed for the planned Evergreen Point Bridge replacement, a component of the I-5 to Medina: Bridge Replacement and High-Occupancy Vehicle (HOV) Project. Pontoons for other WSDOT bridge replacement projects in the future could also be produced at this facility.

Each alternative is described below. For more details, see the Description of Alternatives and Construction Techniques Discipline Report (WSDOT 2010a), included as Appendix B to the Draft EIS.

Site Descriptions

Anderson & Middleton Alternative

The 105-acre Anderson & Middleton Alternative site is on the north shore of Grays Harbor in Hoquiam, Washington (Exhibit 1-1). This generally flat property is privately owned and is zoned for industrial use. The site is surrounded by industrial maintenance shop buildings to the west, railroad tracks to the north, and vacant industrial property to the east; a rock berm borders the shoreline. The Anderson & Middleton site has no structures on it except for an existing small office building on the northern edge of the property. The site also has some gravel roads and an asphalt pad remaining from its former use as a log-sorting yard. WSDOT would purchase 95 acres of this site for the project, and the casting basin and support facilities would occupy the eastern half of the site, amounting to approximately 55 acres.

Historically this site has been used for lumber industry activities. In the early twentieth century there was a sawmill and other related facilities, such as machine shops and burners, west of what was then an extension of 8th Street. Over the next several decades, fill from harbor dredging and refuse accumulation increased the land area of the site. By the late 1960s, the former mill structures were all gone. Since then, the site has been used for timber storage.

Aberdeen Log Yard Alternative

The 51-acre Aberdeen Log Yard Alternative site lies on the north shore of Grays Harbor in Aberdeen, Washington, near the mouth of the Chehalis River (Exhibit 1-1). This generally flat site is zoned industrial and is currently owned and used for log storage by Weyerhaeuser Corporation. There are no structures on the site now but there is a system of unpaved access roads connecting to East Terminal Road to the west and State Street to the northeast. Immediately west of the site is paved Port of Grays Harbor industrially zoned property, the City of Aberdeen wastewater treatment plant borders the eastern boundary, and the Puget Sound & Pacific Railroad mainline and siding run along the northern boundary of the site. WSDOT would purchase all 51 acres, and the casting basin and support facilities would occupy the entire site.

Two sawmills operated on the site in the last century, but since 1971, the site has been used mostly for log storage. All former sawmill-related structures have been demolished. Between 1971 and 1981, the shoreline was extended to the south through backfilling with sediments dredged from the Chehalis River, accumulated wood waste, and other fill material.

No Build Alternative

For the Pontoon Construction Project, the No Build Alternative is continued existing conditions and uses at all proposed alternative sites. Specifically, this means that WSDOT would not construct or store any pontoons—either at a new Grays Harbor facility or at the existing Tacoma CTC facility—needed to respond to a catastrophic failure of the Evergreen Point Bridge. As a result, any environmental effects resulting from the proposed project activities would not occur.

For this Draft EIS, WSDOT assumes that, if unused by this project, the alternative site properties would continue to be used as they are today: the Aberdeen Log Yard would remain an active log yard, the Anderson & Middleton site would remain largely inactive, and the CTC site would be used as a casting basin for other projects and clients. While either Grays Harbor site could be developed for new uses should this project not occur, the use of these properties has remained unchanged since the 1990s.

Potential future uses for these two properties, other than our proposed project, are speculative and therefore not considered under the No Build Alternative.

Key Components of Both Build Alternatives

Both build alternatives would carry out the proposed action by constructing a casting basin in the Grays Harbor area. Use of the existing CTC facility in Tacoma to produce pontoons while the new casting basin is constructed could also occur.

Potential Use of the Existing CTC Casting Basin Facility

The existing CTC facility is adjacent to the Blair Waterway on the eastern edge of Commencement Bay in Tacoma (Exhibit 1-2). This casting basin is too small to accommodate the timely construction of the pontoons required for the Pontoon Construction Project, but WSDOT could use this facility to supplement pontoon construction at the larger casting basin proposed in the Grays Harbor area. The pontoons manufactured at the CTC facility would most likely be the smaller supplemental stability pontoons.

WSDOT would moor the pontoons built at the CTC facility at existing marine berths in Puget Sound, subject to availability.

> What is a casting basin?
>
> A casting basin is a construction facility built next to a navigable waterway that consists of a concrete slab built deep below ground level and surrounded by high concrete walls. The interior area of the casting basin provides a flat dry space where several pontoons can be constructed side by side at the same time. After the pontoons are completed, the basin is flooded. The basin walls contain the flood water, allowing the pontoons to float. When the pontoons are floating, a gate is opened and the pontoons are towed from the casting basin into navigable waters.

Proposed Grays Harbor Casting Basin

The design of the proposed Grays Harbor casting basin would be basically the same at both build alternative sites, with variations depending on site-specific features. (See the Description of Alternatives and Construction Techniques Discipline Report [WSDOT 2010a] for information on the casting basin conceptual design.) The casting basin would be positioned a few hundred feet from the shoreline and partitioned into two separate work areas—called chambers—connected to the water by a single launch channel. The launch channel would consist of an onshore portion excavated between the casting basin and shoreline, a breach in the shoreline berm, and a dredged channel extending offshore to the federal navigation channel in Grays Harbor.

Up to four concrete pontoons could be cast and cured in each of the two chambers of the partitioned casting basin, allowing pontoon construction to be phased for efficiency. That is, while the second chamber is under construction, pontoon construction could be initiated in the first partitioned chamber as soon it was completed. Two reinforced floating concrete gates

leading to each chamber would allow each to be independently flooded and drained, as well as control access to the launch channel.

Constructing a casting basin facility at either Grays Harbor build alternative site would require heavy construction activities to transform the vacant land into an industrial facility. Such activities include, but would not be limited to, the following:

- Grading (leveling) the site and excavating the casting basin
- Pile-driving to install support piles for the casting basin floor
- Paving onsite access roads
- Making multiple truck trips for hauling materials to and from the site
- Dewatering the soils during casting basin construction

All stormwater, process water, and groundwater collected onsite would be handled and treated in accordance with state water quality requirements and discharged to Grays Harbor. Project engineers are designing a water supply, distribution, and treatment system for each site to meet state standards.

Dewatering

WSDOT would install two different dewatering systems to remove groundwater from the casting basin work area at either build alternative site. Before and during casting basin construction, a temporary construction dewatering system would operate at the site. During pontoon-building operations and after the Pontoon Construction Project is completed (but while the site is still maintained by WSDOT), a permanent operation dewatering system would operate.

Operational Support Facilities

To support the use of the casting basin, each build alternative would include onsite operational support facilities such as an access road, a concrete batch plant, large laydown areas, water handling and treatment areas, office space, a rail spur, and a designated parking area for workers.

Pontoon Towing and Moorage

If WSDOT uses the existing CTC facility in Tacoma, it would moor the pontoons built there at existing marine berths in Puget Sound. Using these berths would be subject to availability, but there are several locations in the Puget Sound region that could accommodate this project's needs. The first two cycles of eight pontoons manufactured at the new Grays Harbor casting basin facility would be towed from the casting basin and moored in the Grays Harbor area outside of navigation channels. The last

construction cycle of pontoons could be stored in the dry casting basin behind the closed gate.

For the pontoons to be moored in the Grays Harbor area, there are several existing berths that WSDOT could lease for pontoon moorage, if available when needed. In addition, WSDOT has identified another potential moorage location—open water moorage in Grays Harbor. Please see the Description of Alternatives and Construction Techniques Discipline Report (WSDOT 2010a) for more information on these potential moorage locations.

The constructed pontoons would be stored together until they are needed to replace the Evergreen Point Bridge in the event of a catastrophic failure, and they would be identified with navigation lighting in compliance with U.S. Coast Guard requirements.

Construction Schedule

If WSDOT uses the existing CTC facility, pontoon construction would take 2 years there to complete. WSDOT would start site development for the new Grays Harbor casting basin facility about the same time pontoon construction begins at the CTC facility. For the Grays Harbor facility, casting basin construction would take 2 years, as would pontoon construction. In total, overall pontoon project construction would span 4 years.

WSDOT anticipates that it would take approximately 6 to 9 months to complete a pontoon construction cycle at either the existing Tacoma facility or at the new Grays Harbor facility. The new Grays Harbor facility could produce eight pontoons during one cycle; as a result, two and a half pontoon construction cycles would be required to produce 20 pontoons. At the existing CTC facility, five supplemental stability pontoons could be constructed during each pontoon construction cycle, and one longitudinal pontoon could be constructed during a cycle. As a result, three construction cycles would be needed to produce ten supplemental stability pontoons and one longitudinal pontoon.

2. Wetlands

Wetlands areas are transitional zones between aquatic environments and dry land, within which soils, vegetation, and hydrology interact to establish characteristics unique to this habitat type. Their physical, chemical, and biological functions provide ecologic and economic benefits to society. For example, the capacity of wetlands to store water and trap sediments can reduce downstream flooding and improve overall water quality. Wetland vegetation slows the movement of water, reducing streambank and shoreline erosion. In addition, wetlands support diverse vegetation types, which provide food and habitat for fish and wildlife. Wetlands also provide educational and recreational opportunities for humans. Wetlands are located on both Grays Harbor build alternative sites that are being considered for the Pontoon Construction Project.

The U.S. Army Corps of Engineers (USACE), Washington State Department of Ecology (Ecology), Washington Department of Fish and Wildlife (WDFW), and Cities of Aberdeen and Hoquiam are the main regulatory agencies with jurisdiction over wetlands and other critical areas (streams and habitat conservation areas) within the study area.

At the federal level, wetlands and streams are protected by Section 404 of the Clean Water Act, which regulates fill placement in waters of the United States. The USACE is responsible for implementing permits under Section 10 of the Rivers and Harbors Act for work within navigable waters and under Section 404 of the Clean Water Act for filling wetlands and streams. Filling neighboring tidal waters or onsite wetlands in excess of 0.5 acre would require a Section 404 Individual Permit and a 404 (b)(1) Alternative Analysis.

State law requires that the proposed project be reviewed to ensure that it complies with SEPA and the Shoreline Management Act because it would involve work within 200 feet of a “Water of the State”; these acts are typically administered at both the state and local government level. Activities that affect project wetlands would also require a water quality certification (Section 401 of the Clean Water Act), which is implemented at the state level by Ecology. Ecology reviews studies for compliance with state water quality standards and then determines permitting and mitigation requirements based on the nature and extent of effects, as well as the type and quality of wetlands and streams being affected. Work

within streams or water bodies also requires a Hydraulic Project Approval issued by WDFW.

At the local government level, the City of Hoquiam (2008) and the City of Aberdeen (2009) regulate wetlands in compliance with their critical areas ordinances. Shorelines are regulated by locally adopted Shoreline Master Programs created in compliance with the State Shoreline Management Act.

2.1 Affected Environment

How did WSDOT collect the information on wetlands?

The ecosystems analysts collected information on potential wetlands for both of the proposed alternative project sites from several sources. The analysts consulted numerous digital and paper maps to determine the location of known and potential wetlands; digital sources included aerial photographs, National Wetlands Inventory data, and current wetland mapping from the cities of Hoquiam and Aberdeen. These digital sources were supplemented with paper maps, such as the Grays Harbor County Soil Survey, and with field-collected data. Additionally, historical aerial photographs were used to analyze historical land use of the proposed sites.

To determine the presence of wetlands or wetland characteristics, the wetland analysts examined both build alternative sites as well as the adjacent shorelines and ditches. The analysts conducted field reconnaissance for both sites was conducted on November 11, 20, and 21, 2008 and January 29, 2009. The analysts identified potential wetlands in the project vicinity using field indicators consistent with the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetland Identification and Delineation Manual* developed by Ecology (Ecology 1997). A formal, detailed wetland delineation will be performed for the alternative that is selected. The wetland delineation will use these manuals, as well as the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2008). These manuals outline an approach for identifying wetlands that involves determining whether wetland soils, plants, and water are present.

Wetland vegetation is adapted to saturated soil conditions. The analysts evaluated each proposed build alternative site for its dominant plants and the wetland indicator status of these plants. The analysts then determined whether the vegetation met the wetland vegetation criterion based on the wetland indicator category assigned by the U.S. Fish and Wildlife Service (USFWS) (Reed 1997). The analysts also examined the build alternative

sites for evidence of wetland hydrology. Indicators of wetland hydrology are surface inundation or ponding, saturated soils, drainage patterns, watermarks on vegetation, and water-stained leaves.

The analysts conducted wetland reconnaissance at both build alternative sites. Areas of ponded water and areas dominated by facultative wetland vegetation, such as soft rush (*Juncus effusus*), slough sedge (*Carex obnupta*), and reed canarygrass (*Phalaris arundinacea*), were assumed to be wetland. Generally, an area must have hydric soils to be a wetland. Hydric soils have an identifiable color pattern, which occurs if the soil is saturated, flooded, or ponded for long periods. Low-chroma colors (i.e., dull and gray) and mottles of bright color (known as redoximorphic features) typically form within the soil matrix. Other important indicators of wetland soils include organic matter accumulated at the surface, a sulfur odor, and organic matter stains. The ecosystems analysts excavated soil pits and used Munsell color charts (GretagMacbeth 1994) to describe soil colors.

Based on the reconnaissance surveys, the ecosystems analysts recorded potential wetland boundaries at each build alternative site using a professional-grade global positioning system (GPS) device. The GPS data were incorporated into the project geographic information system (GIS) database.

On April 24, 2008, the ecosystems analysts also conducted a land-based survey of the shoreline areas along the area known as the abandoned mill pond immediately to the east of the Anderson & Middleton Alternative site (referred to herein as the tidal inlet) and the Hoquiam River, with the tide at +0.06 foot mean lower low water (MLLW). They conducted another survey on May 7, 2008, at -2.43 feet to characterize the overall occurrence of eelgrass and macroalgae vegetation in these broader intertidal zones. The tidal inlet on the eastern shoreline of the Anderson & Middleton property is completely inundated at high tides. Approximately 400 feet of the eastern shoreline of the Anderson & Middleton site were surveyed for eelgrass beds (see Chapter 3.0, Fish and Aquatic Resources, for a complete discussion). No eelgrass was found in the 400-foot eastern portion of the shoreline of the Anderson & Middleton Alternative site.

Six small patches of native eelgrass were identified along intertidal mudflat area, downstream of the outlet of Channel A, which separates the Anderson & Middleton property from the adjacent property to the east. (More information on the location of the eelgrass surveys is in Chapter 3.0, Fish and Aquatic Resources.) Because of seasonal limitations for eelgrass surveys, these studies have not been fully completed for the

Anderson & Middleton Alternative or the Aberdeen Log Yard Alternative sites. Further eelgrass surveys will be conducted, if required, along the shorelines of the selected build alternative site in order to inform compliance with applicable environmental regulations.

The shoreline areas of both build alternative sites were analyzed for the presence of intertidal wetland areas, in addition to shoreline habitat for fish resources. The intertidal wetland areas were mapped using a hand-held GPS device.

How did WSDOT classify and rate the wetlands?

Wetlands are generally classified according to their physical characteristics. For this study, the wetland analysts used the two wetland classification systems: the Cowardin Classification System and the Hydrogeomorphic Classification System; these are described below.

Cowardin Classification System

The first classification system used by the analysts was the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), also known as the Cowardin system. The Cowardin system allows wetlands to be classified based on their vegetation and hydrologic characteristics. USFWS uses the Cowardin system, as do many state and local jurisdictions, including the Cities of Hoquiam and Aberdeen. Exhibit 2-1 summarizes the Cowardin classification system.

> What is the Cowardin system?
>
> The Cowardin classification system is a comprehensive system of classifying wetlands and deepwater habitats that was developed by the USFWS in 1979. Wetland ecologists used the Cowardin system to classify wetland habitat—such as forested, scrub-shrub, and emergent—at both Pontoon Construction Project alternatives. State and local jurisdictions also recognize and use this classification system.

To better explain the wide variety of habitats in the project vicinity, wetlands and deepwater habitats are defined separately. Traditionally, the term “wetland” has not included deep, permanent water, such as Grays Harbor; however, both wetlands and deepwater habitats must be considered in an ecological approach to classification. According to Cowardin et al. (1979), *wetlands* are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

The boundary between wetland and deepwater habitat in the palustrine (i.e., marshlike) and riverine (i.e., within or alongside a river or other flowing water channel) systems lies roughly at a depth of 6.6 feet below low water. Wetlands transition to uplands when soils are no longer saturated for long periods during the growing season and when dominant plants are not adapted to saturated soils.

EXHIBIT 2-1
Summary of Cowardin Wetland Classifications Found in the Study Area

System	Subsystem	Class	Abbreviation
Palustrine: All nontidal wetlands dominated by trees, shrubs, emergents, mosses, or lichens.	Not applicable.	**Aquatic bed:** Wetlands dominated by plants that grow principally on or below the surface of the water	PAB
		Emergent: Characterized by erect, rooted, herbaceous hydrophytes[a] present for most of the growing season in most years; usually dominated by perennial plants	PEM
		Scrub-shrub: Dominated by woody vegetation less than 20 feet tall; includes true shrubs, young trees (saplings), and trees or shrubs that are small or stunted	PSS
		Forested: Characterized by woody vegetation 20 feet tall or taller	PFO
		Open water: Unvegetated, open water	POW
Estuarine: Deepwater tidal habitats and adjacent tidal wetlands that are usually semi enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land.	1. **Subtidal:** The substrate is continuously submerged; includes deepwater habitats. 2. **Intertidal:** The substrate is exposed and flooded by tides; includes the associated splash zone; includes estuarine wetlands onsite, including rockweed-dominated areas.	**Aquatic bed:** Same as above	EAB
		Emergent: Same as above	EEM
		Scrub-shrub: Same as above	ESS
		Forested: Same as above	EFO
		Rocky shore: Habitats with greater than 75 percent or more areal cover of bedrock, stones, or boulders, and vegetative cover less than 30 percent	ERS
		Unconsolidated shore: Habitats with less than 75 percent areal cover of stones, boulders, or bedrock; vegetative cover less than 30 percent; a flooded water regime	EUS
Riverine: Wetlands and deepwater habitats contained within a channel and not vegetated by persistent plants.	**Tidal:** The gradient is low and water velocity fluctuates under tidal influence.	**Emergent:** Wetlands occurring in the channel dominated by nonpersistent emergent plants	R2EM
		Open water: Unvegetated channels or streams	R2OW

Source: Cowardin et al. (1979).

[a] Hydrophytes are plants adapted to living in saturated soils.

The boundary between wetlands and deepwater habitats in the estuarine system coincides with the elevation of the extreme low water of spring tide. Those areas permanently flooded are considered subtidal, deepwater habitats; those habitats that are irregularly flooded, regularly flooded, or irregularly exposed are intertidal and are classified as wetlands according to the Cowardin classification system.

Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live, regardless of whether or not they are attached to the substrate (Cowardin et al. 1979). Deepwater habitats are true aquatic environments. The associated fish and wildlife using these habitats are discussed in Chapter 3.0, Fish and Aquatic Resources, and in Chapter 4.0, Wildlife and Habitat.

At both build alternative sites, three systems as defined by Cowardin et al. (1979)—palustrine, estuarine, and riverine—which comingle to produce the ecosystems in the study area; these systems are described in Exhibit 2-1.

The estuarine (E) system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, such as estuaries and lagoons, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity might be periodically increased above that of the open ocean by evaporation. They are generally low-energy systems. Exhibit 2-2 depicts distinguishing features and examples of habitats in estuarine systems.

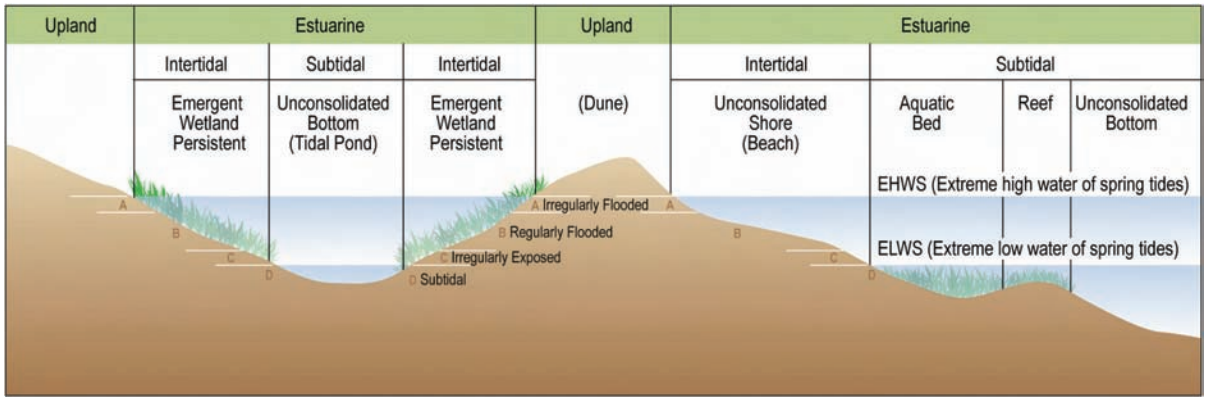


EXHIBIT 2-2
Distinguishing Features and Examples of Habitats in the Estuarine System

The extent of the estuarine system is as follows: (1) upstream and landward to where ocean-derived salts measure less than 0.5 percent during the period of average annual low flow; (2) to an imaginary line closing the mouth of a river, bay, or sound; and (3) to the seaward limit of wetland emergents, shrubs, or trees where they are not enclosed by the mouth of a river, bay, or sound. The estuarine system also includes offshore areas of continuously diluted sea water.

The riverine (R) system includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in excess of 0.5 parts per thousand (Cowardin et al. 1979). Exhibit 2-3 depicts distinguishing features and examples of habitats in riverine and palustrine systems.

The palustrine (P) system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand (Cowardin et al. 1979) (Exhibit 2-3).

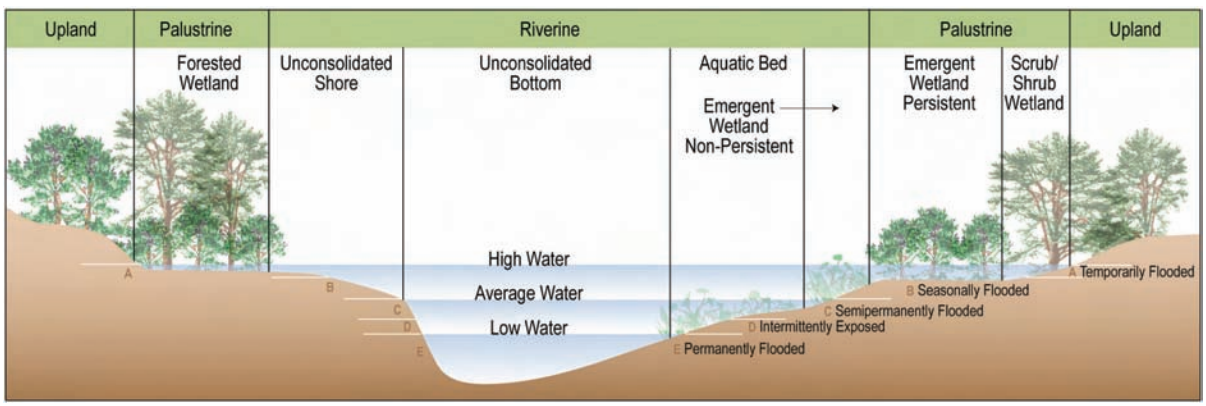


EXHIBIT 2-3
Distinguishing Features and Examples of Habitats in the Riverine and Palustrine Systems

Hydrogeomorphic Classification System

The second system used by the wetland analysts to classify wetlands in the study area considers the landscape position, primary water source, and direction of water flow through the wetland. This classification system is referred to as hydrogeomorphic (HGM) classification, which is based on the methods defined in *A Hydrogeomorphic Classification for Wetlands* (Brinson 1993). Exhibit 2-4 summarizes the HGM classification system.

> What is a wetland hydrogeomorphic classification?
>
> The hydrogeomorphic classification of a wetland is based on the three fundamental factors that influence how wetlands function: general topography, water source, and the movement of water.

EXHIBIT 2-4
Overview of HGM Characteristics for Study Area Wetlands

HGM Class	Primary Water Sources	Water Flow Properties
Depressional wetlands	Precipitation, groundwater	Vertical fluctuations
Riverine wetlands	Precipitation, groundwater discharge	Unidirectional flow
Fringe wetlands	Lateral flow	Bidirectional flow
Slope	Precipitation, lateral flow, and groundwater	Unidirectional flow

Source: Brinson (1993).

Wetland Rating Systems

Resource agencies and regulatory jurisdictions rate or categorize wetlands according to their relative rarity or importance, and they also define wetland buffer requirements and mitigation ratios for mitigation purposes. Numerous systems for rating wetlands exist, but these systems tend to focus on the common elements of the wetlands' functions and values, sensitivity to disturbance, rarity, and irreplaceability. At the state level, wetlands are categorized according to Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby 2004). Exhibit 2-5 summarizes these rating criteria for each wetland category used to rate the wetlands. This Ecology method rates wetlands based on the class level of the HGM system. Unless otherwise specified, Ecology's wetland classification system is used for the remainder of this report.

EXHIBIT 2-5
Ecology Criteria for Wetland Rating Categories

Category	Rating Criteria
Category I	(a) Include unique or rare wetland types (bog, estuary, mature/old-growth forested); or (b) Are especially sensitive to disturbance; or (c) Are relatively undisturbed and provide functions and/or values impossible to replace within a human lifetime; or (d) Are wetlands documented as high quality by Natural Heritage Program; or (e) Are wetlands with documented occurrence of state sensitive plant(s) by the Natural Heritage Program; or (f) Perform the highest level of wetland functions (scoring more than 70 points).
Category II	(a) Perform at a moderately high level of wetland functions (scoring 51 to 69 points); or (b) Are interdunal wetlands more than 1 acre in size.
Category III	(a) Perform with a moderate level of functions (scoring 30 to 50 points); or (b) Are interdunal wetlands between 0.1 and 1 acre in size.
Category IV	(a) Are wetlands with the lowest level of functions (scoring less than 30 points), frequently disturbed.

Source: Hruby (2004).

In 2008, the City of Hoquiam adopted a new critical areas ordinance, and the City's wetland rating system adopted the state's rating system (Hruby 2004). The City of Aberdeen's critical areas ordinance also includes the wetland rating system based on the *Washington State Wetland Rating System for Western Washington*. Exhibit 2-6 summarizes the City of Aberdeen's wetland classification system.

Wetland ratings are used during the permit review process to establish buffer requirements to determine allowable effects, and determine the replacement ratios for compensatory mitigation. The individual wetland ratings provided in this report are preliminary and are based on current data and regulations. Analysts would refine these ratings (as appropriate) if local jurisdictions adopt new standards or if new information becomes available. Final wetland ratings will be applied to the preferred build alternative once a formal wetland delineation has been completed and will follow local and state regulatory requirements.

EXHIBIT 2-6
City of Aberdeen Wetland Rating System [a]

Category	Critical Areas Designation
Category I	Wetlands of exceptional value in terms of protecting water quality, storing flood and stormwater, and/or providing habitat for wildlife as indicated by a rating system score of 70 points or more. These are wetland communities of infrequent occurrence that often provide documented habitat for critical, threatened, or endangered species, and/or have other attributes that are very difficult or impossible to replace if altered.
Category II	Wetlands of significant value based on their function as indicated by a rating system score of between 51 and 69 points. They do not meet the criteria of Category I rating but occur infrequently and have qualities that are difficult to replace if altered.
Category III	Wetlands of important resource value as indicated by a rating system score between 30 and 50 points.
Category IV	Wetlands of limited resource value as indicated by a ratings system score of less than 30 points. They typically have vegetation of similar age and class, lack special habitat features, and/or are isolated or disconnected from other aquatic systems or high-quality upland habitats.

Source: City of Aberdeen draft critical areas ordinance, 14.100.200 Wetlands Critical Areas – Designation.
[a] The City of Aberdeen wetland rating system is based on Hruby (2004).

Wetland Functions

The wetland analysts qualitatively characterized functions using Ecology's wetland rating system. The Ecology method uses a semiquantitative scoring system for characterizing wetland functions. The Ecology rating system considers functions as well as wetland scarcity and sensitivity to alteration.

Wetlands generally perform three types of functions: aid in improving water quality (i.e., biogeochemical functions), maintain the water regime in a watershed (i.e., hydrologic functions), and support food webs and providing habitat (i.e., habitat functions) (Sheldon et al. 2003). The functions that wetlands provide are determined by the wetlands' characteristics, including its location within the landscape, the surrounding land use (such as urban, agricultural, or wilderness area), and the opportunity the wetland has to perform a given function (Hruby 2004).

Wetland water quality and hydrologic functions include removing sediment and contaminants, providing storage for base flow to streams or groundwater, and attenuating flood flows. Performance of these functions is closely correlated to the wetlands' size, shape, and position within the watershed, as well as to the presence of pollutants. Wetland habitat functions involve producing and exporting organic matter and the presence of wildlife habitat. The capacity to perform these functions depends on the size of the wetland, the presence of multiple plant communities, and how much permanent water exists in the wetland.

Animal species that use wetlands have differing, specific habitat needs. Wetland invertebrates, a pivotal part of the wetland food web, feed on vegetation and microorganisms, serve as food for animals higher in the food web, assist in plant decomposition, and filter water (Mitsch and Gosselink 2000; Sheldon et al. 2003). The quality of wetland invertebrate habitat depends on the mixture of open water and emergent vegetation, diverse plant assemblages, the presence of decaying wood, and a marked seasonal variation in water levels (Sheldon et al. 2003).

There are approximately 59 species of reptiles and amphibians in Washington and Oregon. Reptiles such as some garter snakes (*Thamnophis* spp.) might feed or breed in emergent wetlands. Most amphibian species in Washington depend on wetlands for some portion of their life cycle. Amphibians prefer interspersed wetland vegetation and open water in which to lay their eggs. Amphibian egg masses must stay moist, so stable water levels during spawning and hatching are important. Some amphibians are selective about the size and shape of plant stems where egg masses are anchored. Amphibians also require connections to other wetlands, terrestrial habitats, and well-vegetated buffers (Sheldon et al. 2003).

Numerous bird species depend on wetlands for habitat to varying degrees. Wetland-dependent birds require access to wetlands and riparian corridors for some of their needs, such as food, shelter, breeding, or resting (Sheldon et al. 2003). In

What is riparian habitat?

Riparian habitat is the aquatic and terrestrial habitat adjacent to streams, lakes, estuaries, or other waterways.

the western United States, there are 23 species of waterfowl, 14 species of waders (such as cranes, rails, and herons), and numerous shorebirds that depend on wetlands (Sheldon et al. 2003). Factors that produce quality habitat for wetland-dependent birds include water of varying depths, bays and peninsulas to provide cover, nearby open water or large fields for foraging, mudflats, and snags or other nesting habitat. Dense tree canopy is not desirable because it restricts access to the wetland. The size and condition of wetland buffers also influence bird use (Sheldon et al. 2003).

Wetland-dependent mammals include beaver, muskrat, river otter, and mink; these species prefer habitats with stable water levels, food sources (e.g., plants, amphibians, and fish), vegetated corridors, and persistent emergent vegetation interspersed with open water. Relatively undisturbed wetland buffers are also important for these animals. Numerous other mammals occasionally use wetlands but do not depend on them. Researchers in one study found 69 species of mammals in riparian wetlands in western Washington, approximately half of which used wetlands for foraging and breeding (Kauffmann et al. 2001).

In addition to their hydrologic and biological value, wetlands have value as a cultural resource. Documented educational or scientific use, public ownership, and accessibility to humans are the major criteria required for these values.

What areas did WSDOT assess for wetlands?

CTC Facility

The CTC is an existing casting basin facility in an established industrial area. The site is fully built out, contains no vegetative cover, and no wetlands (Exhibit 1-2). As a result, no onsite wetland reconnaissance work or delineations was conducted at the CTC site.

Grays Harbor Build Alternatives

Each build alternative site being considered for the proposed project was evaluated at a reconnaissance level for the presence of wetlands and wetland characteristics. Wetland reconnaissance provides sufficient information to identify wetland classification, location, and an educated estimate of size. A detailed wetland delineation will be required for the preferred alternative, and this wetland delineation will collect detailed information on soils and plants located within each wetland and will more accurately determine wetland size.

No Build Alternative

The No Build Alternative would not affect wetland resources, so no sites were assessed.

Where do wetlands exist in the study area?

The hydrological, biological, and geological conditions favorable to wetlands are found in both build alternatives. Wetlands occur in the central portion of both build alternative sites (the areas used for log storage) and their shorelines. The wetlands in the central portion of the sites are classified as palustrine (freshwater) wetlands, and the wetlands occurring in the intertidal zone on the shoreline are classified as estuarine (saltwater) wetlands. Approximately 8.9 acres of potential palustrine wetland area and approximately 2.4 acres of estuarine wetland exist on the Anderson & Middleton Alternative site. Of this area, 4.8 acres would be eliminated by casting basin construction. Approximately 2.4 acres of palustrine wetland and approximately 0.2 acre of estuarine wetland exist on the Aberdeen Log Yard Alternative site; all of the palustrine wetland and approximately half (or 0.1 acre) of the estuarine wetland area would be eliminated by casting basin construction. The palustrine wetlands at both sites are likely to be Category III and IV wetlands due to size and vegetative characteristics.

Anderson & Middleton Alternative

Wetlands onsite were identified by areas that were inundated by surface water and supported plants adapted to growing in these conditions or areas that were dominated by facultative wetland vegetation. Identifying wetlands at this site is complicated by several factors, including historical land use and land use patterns, lack of a natural soil profile, and the established vegetation within features that were intended to drain the site.

Historically, the site was an intertidal estuary, which was filled during the late 1940s to create land on which logs could be stacked and stored prior to commercial shipping or use. The fill material used to create the dry land was primarily rocks, cobbles, and gravel. This material was deposited in a systematic way to facilitate log storage and movement within the site; elevated gravel roads or pads created easily accessible roadways as well as raised surface areas on which the logs could be stored. These roads also created areas that were easily accessible by the heavy machinery necessary to move logs around the site. The roads alternated with drainage swales onsite, establishing a regular pattern of land use that was created to facilitate moving and storing logs. In turn, this land use established where and how many of the wetlands located in the central portion of the site exist.

Over time, organic debris from moving and storing logs across the site has become mixed at the surface layer with the rocks and gravels used to fill the site. The surface layer of organic debris can be several inches thick in

places, but it is underlain by a layer of densely compacted cobbles and gravels. The swale areas, which are located between the log storage roads, have retained more organic material and, because they are at a lower elevation than the roadways, sometimes also pond water. In addition, unlike the roadways, which were constantly disturbed by heavy equipment and logs, vegetation has become established in some of the swale areas and other areas onsite.

Site soils varied throughout the site and consisted of rocks, wood debris, and sandy or loamy soils. In some areas, the soil pits were generally shallow due to a dense rock layer at or near the surface. As a result, soils were not always a reliable indicator on the site.

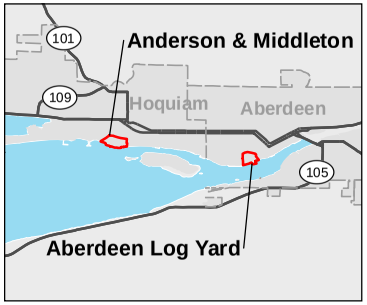
The wetlands are grouped by their location on the site and by wetland classification. Generally, this section first discusses palustrine wetlands in the central portion of the former log yard. The wetlands within the central portion are discussed separately: first the wetlands within the drainage swales and second the potentially isolated wetlands. These wetlands are discussed separately because they might be viewed differently by different regulatory agencies.

Following this discussion, the wetlands on the west side of the site are evaluated. These wetlands would not be directly affected by construction, and the area in which they are located—although still characterized by fill material—is different than the central portion of the site. Unlike the central portion, these westside wetlands are covered with vegetation, primarily reed canarygrass, but also shrub and forested areas (Exhibit 2-7). This portion of the site was not regularly used for log storage or movement, although access roads do run through this part of the site.

Finally, the Category I estuarine wetland is discussed separately because it is a different wetland classification, and it would not be directly affected by construction of the casting basin.

The identified potential wetlands discussed in this report are not to be construed as jurisdictional wetlands regulated by the U.S. Environmental Protection Agency (EPA), USACE, Ecology, or local jurisdictions. These agencies have regulatory authority over wetlands at the site, and will verify final wetland delineations with jurisdictional determinations as appropriate.

Wetland analysts identified many potential palustrine wetlands and one Category I estuarine emergent wetland on the Anderson & Middleton site during November 2008 and January 2009 site investigations (Exhibit 2-7). The potential wetlands range in size from less than 0.01 acre to 2.9 acres.



Ditch

Drainage swale wetlands

Isolated wetlands

Shoreline wetlands

Westside wetlands

Build Alternative Site

Ditch	Area
1	0.18 acre
2	0.16 acre
3	0.18 acre
4	0.19 acre
5	0.04 acre
6	0.07 acre
7	0.20 acre
8	0.16 acre
TOTAL	1.2 acres

N

0 250 500 Feet

Source: Grays Harbor County (2006) GIS Data (Waterbody and Street). Horizontal datum for all layers is State Plane Washington South NAD 83; vertical datum for layers is NAVD88.

Exhibit 2-7. **Anderson & Middleton Alternative Wetlands and Ditches**

Pontoon Construction Project

Washington State Department of Transportation

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In total, there are approximately 8.9 acres of potential palustrine wetland area on the Anderson & Middleton site. Most of this area, or roughly 4.8 acres, is located on the main portion of the site in the area that was actively used to store logs; the remainder (4.1 acres) is located on the western portion of the site. The wetlands located within the former log storage area are predominantly found within existing drainage swales. In addition, several small wetlands, which might be isolated wetlands, are located along the southern portion of the main log yard area.

It is important to emphasize that this acreage represents potential wetland area, rather than delineated wetland areas, on the site. The wetlands on the site have not been rated, although they are likely Category III or IV wetlands due to size and characteristics. These wetlands will be rated during the formal wetland delineation if the Anderson & Middleton Alternative is selected as the preferred alternative.

Drainage Swale Potential Wetlands

For this report, the wetland analysts preliminarily classified potential wetland areas located in the east-west drainage swales on the central portion of the site as potential wetlands totaling approximately 4.8 acres. The drainage swales had been constructed to drain the site toward larger, north-south oriented drainage features that convey water to the south toward Grays Harbor. These north-south drainage features encompass an additional 1.2 acres; this acreage is reported separately from wetland acreage (Exhibit 2-7), although there is likely some overlap between wetland acreage and ditch area. If the Anderson & Middleton Alternative is selected, then these drainage features will be analyzed more thoroughly to distinguish wetland area from ditch area. Under the HGM classification system, they are slope or depressional features where rain and/or groundwater collect and pond.

The primary source of hydrology to the drainage swales is precipitation and onsite stormwater runoff. Standing water was observed in some of the drainage swales during the site visits. Photo 1 shows a typical view of potential wetlands located in drainage swales on the site.

The most prevalent vegetation in these emergent stormwater drainage swales includes reed canarygrass, slough sedge, and common rush. Other species observed include seacoast bulrush (*Scirpus maritimus*), small-fruited bulrush (*Scirpus microcarpus*), Himalayan blackberry (*Rubus armeniacus*), creeping buttercup (*Ranunculus repens*), tapertip rush (*Juncus acuminatus*), and tall fescue (*Festuca arundinacea*).

Photo 1. View of potential wetland in drainage swale at the Anderson & Middleton site, facing east.

The drainage swales are separated from one another and the potential wetlands by distinct topographic rises; the rises are former roads created to access and store logs. The species composition within the surrounding uplands is sparse and typical of frequently disturbed sites; it is primarily composed of upland forbs and grasses.

Westside Potential Wetlands

Seven potential wetland areas are located in the vegetated western portion of the site (Exhibit 2-7). These potential palustrine wetlands comprise primarily emergent vegetation and total approximately 4.1 acres. Under the HGM classification system, they are depressional wetlands.

The primary hydrology source for these potential wetlands is precipitation and surface runoff from the upland slope. Standing water was observed in the southwestern and eastern portions of the largest potential wetland area during the site visit. In this lower area, however, groundwater likely contributes to wetland hydrology.

The most prevalent vegetation in these potential wetlands is common rush, reed canarygrass, and slough sedge (Photo 2). The southwestern portion of the largest potential wetland area in the western portion of the Anderson & Middleton site is dominated by palustrine forested vegetation, such as red alder (*Alnus rubra*) and salmonberry (*Rubus spectabilis*) (Photo 2).

Photo 2. View of potential wetland at the Anderson & Middleton site, facing northeast.

These potential wetlands are separated from other potential wetlands by irregular topography, which was likely created by uneven fill disposal and settling. The species composition within the surrounding uplands is primarily upland forbs, Scot's broom (*Cytisus scoparius*), red alder, reed canarygrass, and Himalayan blackberry.

Isolated Potential Wetlands

There are distinct areas that contain isolated wetlands along the southern portion of the site (Exhibit 2-7). These potential palustrine wetlands are composed of primarily emergent vegetation and total approximately 0.7 acre. Under the HGM classification system, they are depressional wetlands. The primary hydrology source for these potential wetlands is probably precipitation and surface runoff from the surrounding uplands. Generally, the wetland analysts did not observe any standing water in these potential wetlands during the site visit; however, the soils were saturated.

The dominant vegetation in these potential wetlands is slough sedge. Grasses, such as bentgrass (*Agrostis* spp.) and other forbs, are sporadically mixed in throughout these potential wetlands. These potential wetlands are separated from other potential wetlands by slight topographic rises, which were apparently created by uneven settling of soils or raised gravel roads. The species composition within the surrounding uplands is primarily upland forbs, Scot's broom, reed canarygrass, and Himalayan blackberry.

Estuarine Wetlands

Estuarine wetlands are located in the intertidal zone, which occurs from the extreme low water of spring tides to the extreme high water of spring tides. The spring tides, and thus the intertidal zone, vary from year to year. A 2.4-acre estuarine wetland occurs on the west side of the Anderson & Middleton site (Photo 3).

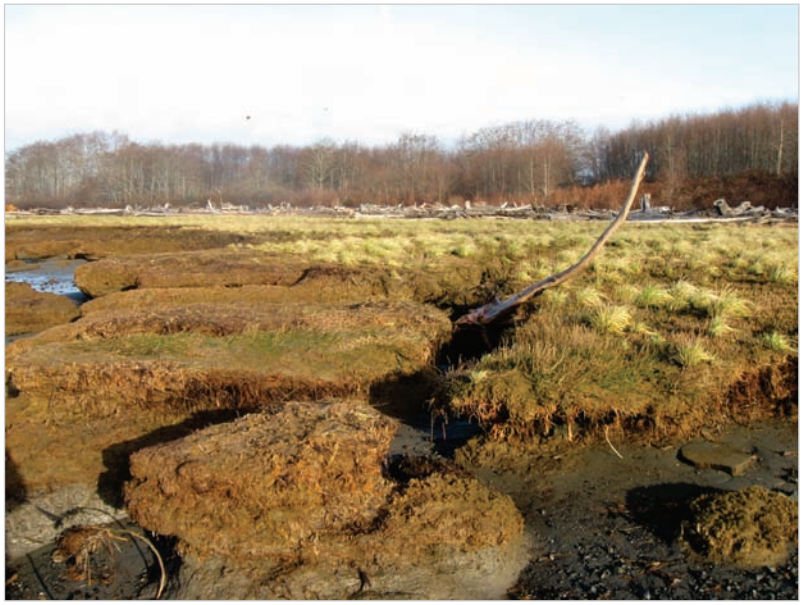


Photo 3. View of estuarine wetland on the west side of the Anderson & Middleton Alternative, facing west.

Estuarine wetlands classified under the Cowardin system include intertidal areas of high marsh that have rooted emergent vegetation and rocky intertidal areas. Rockweed (*Fucus* spp.) is the most abundant plant species within these rocky intertidal areas (Photo 4). The rockweed-dominated areas occur along the intertidal areas of the shoreline at both sites. The Anderson & Middleton site's shoreline has a sporadic band of rockweed that is located primarily along the upper edge of the mudflats and lower edge of the sloping cobble bench. In addition, the rockweed has colonized the derelict pilings along the shoreline.

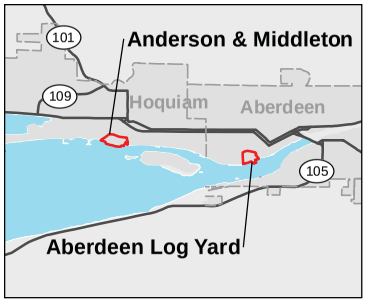
The large emergent wetland along the southwestern portion of the site's shoreline occurs over 2.4 acres of the intertidal zone (see Photo 3 and Shoreline Wetland [SW] 1 in Exhibit 2-7). Under the HGM classification system, it is a tidal fringe wetland. Given its estuarine environment and its size, this wetland is a high-quality Category I estuarine emergent wetland dominated by herbaceous vegetation that has become established in turflike mats.

Photo 4. View of rockweed at the Anderson & Middleton site, facing west.

The vegetation is dominated by pickleweed (*Salicornia virginica*) and includes Lyngby sedge (*Carex lyngbyei*) and tufted hairgrass (*Deschampsia cespitosa*). The mats of grasses and sedges are interspersed with dendritic channels (Photo 3). This wetland provides forage for geese, waterfowl, and shorebirds in the area, and the vegetation mats are heavily grazed by waterfowl. The northern edge of SW is covered by driftwood and debris washed ashore by tidal and wave action from Grays Harbor.

Aberdeen Log Yard Alternative

The wetland analysts evaluated nearly the entire Aberdeen Log Yard site during the site visit (Exhibit 2-8). However, numerous log piles, remnant built structures, and active machinery limited the investigation in some areas. Similar to the wetlands located at the Anderson & Middleton site, the potential wetland areas located on the Aberdeen Log Yard site were formed on fill used to cover the original salt marsh that was historically present in the area; the salt marsh appears in 1948 photographs. As its name implies, the Aberdeen Log Yard has been used as an active log storage facility since at least the 1970s, and it remains active today.



Stormwater Drainage

Potential Wetland Area

Project Alternative Site

Ditch	Area
1	1.15 acres
2	0.39 acre
TOTAL	1.5 acres

INTERNAL USE ONLY-DRAFT

N

0 250 500 Feet

Source: Grays Harbor County (2007) GIS Data (Water Bodies and Streets), Parametrix (2009) GIS Data (Pontential Wetland Areas). Horizontal datum for all layers is State Plane Washington South NAD 83, vertical datum for layers is NAVD88.

Exhibit 2-8. **Aberdeen Log Yard Alternative Wetlands, Ditches, and Stormwater Drainage Features**

Pontoon Construction Project

Washington State Department of Transportation

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Wetlands

The wetland analysts identified potential wetlands in the Aberdeen Log Yard site by locating areas that were inundated by surface water and supported plants adapted to growing in these conditions. Because the industrial site is an active log yard, log-sorting by heavy machinery occurs regularly, and as a result, the site is highly disturbed. Tire ruts, roadside depressions, and low areas under log piles accumulate water. Other inundated areas, including drainage ditches, that are not regularly disturbed by heavy equipment support wetland plants and thus exhibit wetland characteristics. The site's soil profile consisted of rocks, wood debris, and loamy material. Soil pits were generally shallow due to a compacted layer of cobble and gravels at or near the surface; as a result, soils were not a reliable wetland indicator on the site.

The identified potential wetlands discussed in this section are not to be construed as jurisdictional wetlands regulated by the USACE, EPA, Ecology, or local jurisdictions. Only these agencies can exert regulatory authority over wetlands on the site. Potential wetlands occur on the level or main portion of the Aberdeen Log Yard site and its shoreline. The potential wetlands on the main portion of the site are classified as palustrine. The wetlands occurring in the intertidal zone along the shoreline are classified as estuarine. The wetland areas were identified during October and November 2008 site investigations and are shown in Exhibit 2-8. The potential wetlands on the Aberdeen Log Yard site occur as a result of past disturbances. The general characteristics of the potential wetlands and drainage features are discussed below.

Stormwater Retention Features and Wetland Area

Potential Wetlands (PWs) 1, 16, and 17 are associated with the site's stormwater drainage features. Combined, they total approximately 0.3 acre. An active National Pollutant Discharge and Elimination System (NPDES) permit is available for the site. These drainage features were constructed to meet water quality requirements related to site runoff prior to discharge into tidal waters of Grays Harbor. There are two main stormwater drainage features; the larger one (Channel A) corresponds roughly to the site's northern and western perimeter. The other stormwater feature, within which PW 17 is located, begins in the central portion of the site, runs northeast and southwest, and then turns south where it runs along the site parcel perimeter. Stormwater from this feature discharges through a boxed culvert offsite to the east; it does not discharge directly into Grays Harbor. Vegetation functions as a biofiltration mechanism by retaining sediment in stormwater. The smallest of these drainage features is primarily composed of emergent vegetation (Exhibit 2-8).

The two larger wetlands associated with stormwater retention features (PWs 1 and 17) comprise forest, shrub, and emergent vegetation. Under the HGM classification system, they are depressional features, where rain and/or groundwater collect and pond. Only Channel A drains directly to Grays Harbor. The primary source of hydrology to the stormwater retention features is precipitation and stormwater runoff onsite. Standing water was observed in some of the ditches during the site visit. Photo 5 shows a view of one of the stormwater retention features on the site.

Photo 5. View of stormwater retention feature at the Aberdeen Log Yard site (Channel B on Exhibit 3-5), facing east.

The most prevalent vegetation in the emergent portions of the stormwater retention features includes common cattail (*Typha latifolia*), reed canarygrass, and soft rush. Within the shrub portions, the most prevalent vegetation includes salmonberry, red alder, and willows (*Salix* spp.). Within the forested portion, the dominant vegetation is red alder and salmonberry.

Potential Wetlands Associated with Stormwater Retention Features

Three potential wetland areas appear to be associated with the stormwater retention features on site. These wetlands (PWs 2, 4, and 9 on Exhibit 2-8) are separated from the other potential wetlands by slight topographic rises, which were apparently created by uneven settling of fill or raised gravel roads. The species composition within the surrounding uplands is sparse and disturbed but primarily comprises upland forbs, grasses, and Himalayan blackberry.

Two of the potential wetlands (PWs 4 and 9) are located in the northwest portion of the site, and one potential wetland is located in the southwest portion of the site (PW 2); all three consist of emergent vegetation. In total, these three potential wetlands are approximately 0.2 acre (Exhibit 2-8). Under the HGM classification system, they are depressional wetlands. These wetlands are likely Category III wetlands, primarily because of the opportunity these potential wetlands have to provide water quality functions.

The primary source of hydrology to these potential wetlands is probably precipitation and surface runoff from the surrounding areas. Soils were either saturated to the surface or inundated in these potential wetlands. The most prevalent vegetation in these potential wetlands is rushes (*Juncus* spp.), common velvet grass (*Holcus lanatus*), and reed canarygrass. Other species include common cattail, birdsfoot trefoil (*Lotus corniculatus*), and creeping buttercup. These potential wetlands are separated from other potential wetlands by slight topographic rises, which were apparently created by uneven settling of fill. The species composition within the surrounding uplands primarily consists of upland forbs, grasses, and Himalayan blackberry.

Ditched Potential Wetland

PW 15 is located primarily along the northeast perimeter of the Aberdeen Log Yard Alternative site and comprises two areas. The first is a narrow swale that drains to a primarily nonvegetated ditch, which drains to the northeast into the second, larger portion of this potential wetland area (Exhibit 2-8). Under the HGM classification system, it is a depressional wetland. The wetland is likely a Category III wetland (using Ecology's system) because it has multiple Cowardin classes and the opportunity to provide water quality functions. The primary source of hydrology to this potential wetland is probably precipitation and surface runoff from upland slopes and a nearby road (offsite to the northeast). Wetland analysts observed shallow standing water (0 to 2 inches) throughout much of this area during the site visit.

The most prevalent vegetation in this potential wetland is willows, reed canarygrass, and water parsley (*Oenanthe sarmentosa*). This wetland, therefore, is dominated by palustrine scrub-shrub and palustrine emergent vegetation. The swale portion of this wetland area consists primarily of reed canarygrass, Hooker's willow (*Salix hookeriana*), and red alder. This potential wetland is separated from other potential wetlands by excavation spoils from ditch creation. The species composition within the surrounding uplands is primarily composed of upland forbs, western sword fern

(*Polystichum munitum*), Japanese knotweed (*Polygonum cuspidatum*), red alder, red elderberry (*Sambucus racemosa*), and Himalayan blackberry.

Isolated Potential Wetlands

There are four isolated potential wetlands at the base of a slope near the center of the Aberdeen Log Yard site (PWs 10, 11, 13, and 14), located near the remnants of a log mill structure. These four potential palustrine wetlands consist of shrub and emergent vegetation and total approximately 0.04 acre (Exhibit 2-8). Under the HGM classification system, they are depressional wetlands that appear to be hydrologically isolated. The primary source of hydrology to these potential wetlands is probably precipitation and surface runoff from the upland slope. The wetland analysts observed standing water in two of the potential wetlands during the site visit.

The most prevalent vegetation in these potential wetlands is willows, while the understory was dominated by birdsfoot trefoil and common rush. Three of the potential wetlands are dominated by palustrine scrub-shrub and palustrine emergent vegetation. One potential wetland (estimated to be less than 0.005 acre) is dominated by palustrine emergent vegetation. These potential wetlands are separated from other potential wetlands by slight topographic rises, which were apparently created by uneven settling of fill or adjacent gravel roads. The species composition within the surrounding uplands primarily consists of upland forbs, Scot's broom, red alder, and Himalayan blackberry (Photo 6).

Photo 6. View of potential wetland area at the Aberdeen Log Yard site, facing southwest.

Two of the largest potential wetlands are located in the southeastern portion of the Aberdeen Log Yard site (PWs 5 and 6; see Exhibit 2-8). These two wetlands are primarily composed of emergent vegetation and open water, and they total approximately 1.9 acres (see Exhibit 2-8). During the site visit, most of these two potential wetlands were covered by log racks. Under the HGM classification system, they are depressional wetlands. According to the Cowardin classification system they are palustrine emergent and appear to be hydrologically isolated.

The primary source of hydrology to these inundated potential wetlands is precipitation and stormwater runoff. These potential wetlands were inundated up to approximately 8 inches during the site visit (see Photo 7).

Photo 7. View of potential wetland at the Aberdeen Log Yard site, facing north.

Vegetation observed in these potential wetlands includes common velvet grass, rushes, birdsfoot trefoil, narrow-leaf cattail (*Typha angustifolia*), duckweed (*Lemna minor*), willows, and spike rush (*Eleocharis* sp.). The vegetation is generally sparse throughout much of the inundated potential wetlands.

These potential wetlands are located in a large depressional area that is bisected by a main access road. The species composition within the surrounding uplands is sparse and typical of vegetation at sites disturbed by frequent industrial land use, such as log storage; the vegetation primarily consists of upland forbs, grasses, Scot's broom, and Himalayan blackberry.

Estuarine Wetlands

The intertidal zone occurs from the extreme low water of spring tides to the extreme high water of spring tides. The spring tides, and thus the intertidal zone, vary from year to year. In the spring of 2008, the extreme low tide was -2.67 feet, while extreme high water was 11.74 feet on June 4 in Grays Harbor at the Aberdeen recording station (NOAA Fisheries 2008) Wetland analysts conducted land-based field observations at low tide on October 1, 2008, at +0.06 foot MLLW, and on May 7, 2008, at -2.43 feet MLLW.

Estuarine wetlands classified under the Cowardin system include intertidal areas of high marsh that have rooted emergent vegetation and rocky intertidal areas. Rockweed (*Fucus* spp.) is the most abundant plant species within these rocky intertidal areas (Photo 8) at the Aberdeen Log Yard Alternative site. The site's shoreline has an approximately 5- to 15-foot-wide band of rockweed that is located primarily along the upper edge of the mudflats and lower edge of the sloping cobble bench.

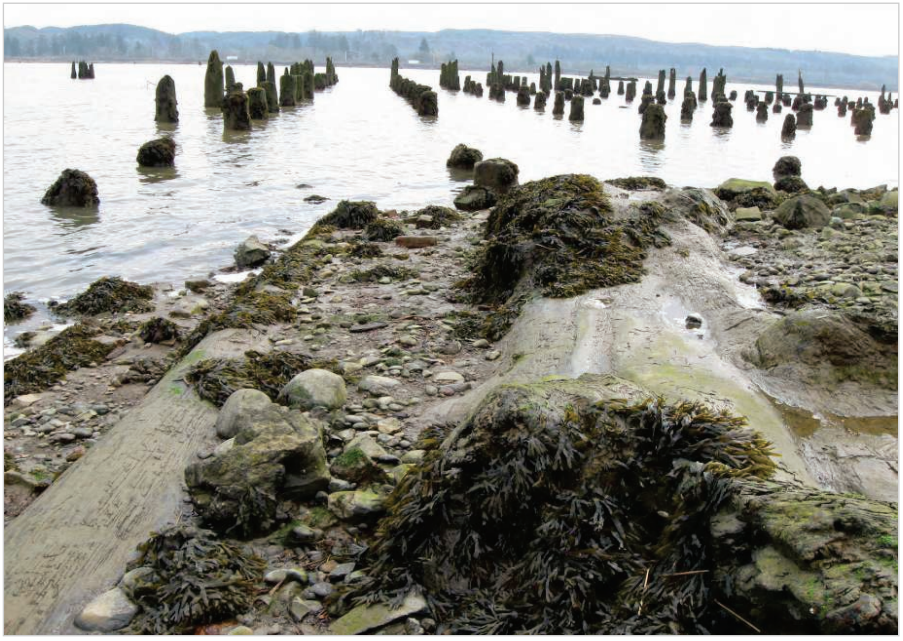

Photo 8. View of rockweed at the Aberdeen Log Yard site, facing south.

The intertidal wetlands along the shoreline of the site are intermittently scattered throughout approximately 0.2 acre of the intertidal zone (Photo 9). These scattered wetlands are shown on Exhibit 2-8 as potential shoreline wetlands (PSWs) 1 through 9.

Photo 9. View of estuarine emergent wetland at the Aberdeen Log Yard.

What functions do wetlands at the Grays Harbor build alternatives provide?

The wetlands have been reviewed at a reconnaissance level of detail. This is preliminary information and will need to be supplemented at the preferred site by a full wetland delineation and a more detailed discussion of wetland functions on the site. Still, some general statements can be made about the palustrine wetland areas on both sites because they formed under similar conditions and provide similar functions.

The palustrine wetlands were formed on fill within active or formerly active industrial areas. As such, they are relatively young wetland systems and, therefore, have a simple vegetative structure, typically limited to one Cowardin habitat classification. Most are composed primarily of emergent vegetation. Where trees and shrubs exist within the wetland areas, these species are estimated to be less than 10 to 20 years old and include species that colonize disturbed areas fairly quickly, such as alder and salmonberry. Many of the emergent wetland areas, in particular on the Aberdeen Log Yard site, likely reform season to season and year to year as the logs on the sites are moved and new tire ruts and former log storage areas pond with seasonal water. Generally speaking, the wetlands on the sites are relatively small and of low value in terms of their functions related to water quality and habitat. However, they do support water quality purification and some habitat-related functions. Although the wetlands have not all been rated, wetland analysts estimate that all palustrine

wetland systems located on both sites are Category III or IV wetlands, ranging in size from less than 0.001 acre to 2.9 acres. Most of the wetland areas on the sites are far less than 1 acre in size.

The 2.4-acre Category I estuarine wetland is located on the western portion of the Anderson & Middleton site. This is a high-quality wetland that would not be directly affected by casting basin construction. This wetland provides functions related to habitat (i.e., the grasses and sedges that grow upon the turf are heavily grazed by waterfowl and shorebirds). Estuarine wetlands of this size and category are rare within industrial areas (such as the project site). The additional wetlands within the shoreline occur along the rocky intertidal area and are those areas colonized by rockweed. Estuarine wetlands classified under the Cowardin system include intertidal areas of high marsh that have rooted emergent vegetation and rocky intertidal areas. Rockweed (*Fucus* spp.) is the most abundant plant species within these rocky intertidal areas, and the rockweed-dominated areas occur along the intertidal areas of the shoreline at both sites. The Anderson & Middleton site's shoreline has a sporadic band of rockweed; this portion of the Anderson & Middleton site has not been quantified. At the Aberdeen Log Yard this type of intertidal wetland encompasses approximately 0.2 acre, of which 0.1 would be eliminated by casting basin construction. This type of intertidal wetland provides habitat and forage for juvenile salmonids that migrate along the nearshore and also provides foraging areas for shorebirds.

Do wetlands exist at the offsite pontoon moorage location?

The constructed pontoons would be up to 34 feet tall, and up to eight of them would be rafted together and anchored in a deepwater site, which has yet to be identified. Mooring the pontoons would require an approximately 10-acre open-water area. Because of their large size and the amount of area required for their storage, the pontoons would be stored at deepwater sites in Grays Harbor. These areas are true aquatic environments and do not contain wetlands. The environmental effects of the pontoon moorage will be analyzed in Chapter 3.0, Fish and Aquatic Resources, once a preferred site has been selected for their deepwater storage.

2.2 Potential Effects of the Project

How did WSDOT evaluate the project's potential effects on wetlands?

WSDOT developed conceptual designs for pontoon construction facilities for both build alternatives (Exhibit 1-1). These designs were overlain onto

aerial photographs of each alternative site. The conceptual design footprint was then analyzed with respect to its potential effect on wetland areas identified at each alternative project site. The discussion below is organized first by site and then by a discussion of construction, operational, and long-term effects. Indirect effects are discussed in greater detail in the Indirect and Cumulative Effects Technical Memorandum (WSDOT 2010b).

> **Project Effects**
>
> What are construction, operational, and long-term project effects and how are they measured?
>
> **Effects** describe how the project would directly affect the built or natural environment.
>
> **Construction effects** are effects that would occur while the new casting basin, ancillary and pontoon moorage facilities, and any mitigation features are built.
>
> **Operational effects** are effects that would occur when the pontoons are being built at the new casting basin facility in Grays Harbor and at the CTC facility in Tacoma.
>
> **Long-term effects** are effects that would remain after pontoon production is complete, effects of mooring pontoons over an indefinite period of time, and effects associated with mitigation features expected to remain after completion of the project.

How would construction of the casting basin affect wetlands?

Anderson & Middleton Alternative

The Anderson & Middleton site, at 105 acres, is the larger site being considered for the proposed project. There is approximately 8.9 acres of potential palustrine wetland area on the site (including the acreage of the potential isolated wetland areas), based on reconnaissance-level information. This acreage does not include the 1.2 acres within the north-south drainage ditches on the site. Constructing the casting basin and associated area would eliminate existing wetlands in the main portion of the site (approximately 4.8 acres of potential palustrine wetland area would be eliminated as a direct result of construction, plus 1.2 acres of existing ditch area that may contain some wetland). The approximately 2.4-acre estuarine wetland would not be directly affected by construction, nor would the approximately 4.1 acres of palustrine wetland area on the western portion of the site.

Aberdeen Log Yard Alternative

All of the potential palustrine wetlands located on the Aberdeen Log Yard site would be eliminated by casting basin construction. Potential palustrine wetlands on the site are estimated to cover approximately 2.4 acres (including the acreage of potential isolated wetland area). In addition, approximately 0.2 acre of estuarine wetland is located along the shoreline of the Aberdeen Log Yard site. The estuarine emergent wetlands are of two types: the first consists of areas dominated by rockweed (Photo 8); the second is emergent areas on turflike soils, as represented in Photo 9. As previously noted, under the Cowardin classification system, estuarine wetland habitat includes both rooted emergent vegetation and rockweed-dominated areas within the intertidal zone. The estuarine emergent wetlands located along the central portion of the shoreline would be eliminated during the construction of the launch channel required to access the casting basin; these estuarine emergent wetlands are estimated to cover

less than 0.1 acre of the shoreline (Exhibit 2-8). However, the potential estuarine wetlands located along either side of the launch channel (approximately 0.1 acre of wetland area) would likely not be directly affected by berm or casting basin construction. The berm is anticipated to be built on the upland shoreline portion of the site to protect water quality treatment facilities on the site from high water and wave action.

How would pontoon-building operations affect wetlands?

Anderson & Middleton Alternative

The wetlands analysts are currently discussing and analyzing the effects of dewatering and the dewatering zone of influence. Dewatering during construction would unlikely adversely affect the perched hydrology of adjacent wetlands; however, wetlands not eliminated by construction could be affected by ongoing dewatering required at the casting basin during operation. If the dewatering zone of influence extends sufficiently beyond the casting basin to create a drawdown effect on wetlands on either the west side or offsite to the east, then it could adversely affect the wetlands surface hydrology in the project vicinity. This potential effect is unlikely, but if found to be present by modeling, this adverse affect could be mitigated by constructing a cofferdam around the casting basin, which would absorb the hydrologic drawdown effect, thereby protecting the surface hydrology of adjacent wetland areas. In addition, the wildlife-related functions of wetlands on the western portion of the site might be adversely affected by the facility's operational noise.

Aberdeen Log Yard Alternative

Palustrine wetlands at the Aberdeen Log Yard site would be eliminated as a result of construction activities. Estuarine wetlands located along the shoreline of the Aberdeen Log Yard site receive their primary hydrologic influence from Grays Harbor and are therefore not likely to be affected by the groundwater drawdown required to construct the casting basin (Exhibit 2-8). However, those estuarine wetlands in the central portion of the site would be eliminated to construct the launch channel on the site.

How would the project affect wetlands in the long term?

Anderson & Middleton Alternative

Constructing the casting basin facility at the Anderson & Middleton site would result in the direct loss of approximately 4.8 acres of potential palustrine wetland area. In addition, indirect effects of dewatering during casting basin construction and operation might affect portions of the

wetland areas on the western portion of the Anderson & Middleton site, as well as palustrine wetland areas offsite to the east. However, the likelihood of drawdown activities adversely affecting perched wetlands is quite low (based on preliminary information and best professional judgment), but the risk does exist. The estuarine wetlands on the site and within the vicinity would not likely be affected by dewatering because their primary hydrologic influence is Grays Harbor. Grays Harbor hydrology would not be affected by dewatering for casting basin construction or operation.

Aberdeen Log Yard Alternative

Constructing the casting basin facility at the Aberdeen Log Yard site would result in the direct loss of approximately 2.4 acres of palustrine wetlands on the site and 0.1 acre of estuarine wetlands along the shoreline. Approximately 0.1 acre of estuarine wetland would not be affected by construction.

How would the alternatives compare in their effects on wetlands?

Exhibit 2-9 compares side-by-side the estimated wetland effects.

EXHIBIT 2-9
Comparison of Wetland Effects [a]

	Anderson & Middleton		Aberdeen Log Yard	
Effects Category	**Direct**	**Indirect**	**Direct**	**Indirect**
Palustrine emergent wetlands	4.1	4.1	2.4	0
Isolated potential wetlands	0.7		0.1	0
Estuarine wetlands (Emergent and rocky shore wetlands)		No effect	0.1	0.1
Total wetlands effected	**4.8**	**4.1** [b]	**2.6**	**0.1**
Ditches [c]	1.2		0.6	
Rocky shore intertidal			0.4	
Intertidal, aquatic and/or mudflat	0.6		3.2	
Subtidal aquatic	0.4		1.2	
Total direct effects	**7.0**		**8.0**	

[a] Acreage figures are estimates only because no formal wetland delineation has taken place at either site.
[b] Not directly affected by construction.
[c] There is some overlap between ditch area and wetland area at both sites.

2.3 Mitigation

What measures would WSDOT propose to reduce negative project effects on wetlands?

Laws that regulate wetlands at the federal, state, and local level require adherence to a sequential process to ensure that wetland impacts are avoided and minimized to the extent practicable. This process is called mitigation sequencing and must document that the following has taken place:

1. Avoid the effect altogether by not taking a certain action or parts of an action.
2. Minimize effect by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce effects.
3. Rectify the effect by repairing, rehabilitating, or restoring the affected environment.
4. Reduce or eliminate the effect over time by preservation and maintenance operations during the life of the action.
5. Compensate for the effect by replacing, enhancing, or providing substitute resources or environments.
6. Monitor the effect and take appropriate corrective measures.

Because both freshwater and estuarine wetlands exist at both sites, avoiding all wetland effects would not be possible. Project activities would unavoidably affect project site wetlands because of the size of the operation. For the Aberdeen Log Yard Alternative site, all potential freshwater wetlands would be removed for site development. Effects to the estuarine shoreline wetlands would be minimized to only those areas in the immediate launch channel.

For the Anderson & Middleton Alternative, the central area containing an estimated 4.8 acres of ditched and drainage swale wetlands would be affected. Effects to 4.1 acres of wetlands on the west side of the site would be avoided by precluding construction in this area. The estuarine wetlands on the southwest shoreline would be avoided. Launch channel construction would affect the armored shoreline but would minimize effects to more developed wetlands along the shoreline of the tidal inlet on the east side of the site, at the outlet of Channel A. Constructing the casting basin at this site would avoid effects to beds of eelgrass. Despite avoidance and

minimization, however, some palustrine and estuarine wetlands would be lost as a result of building a pontoon casting basin.

WSDOT would use best management practices to avoid and minimize unintentional effects to wetlands or aquatic sites. Best management practices could include implementing temporary erosion and sediment control measures and a stormwater management and pollution prevention plan. These measures would also include prohibiting vehicles from being serviced and refueled within 100 feet of aquatic habitats to reduce potential spills of petroleum and hydraulic fluids in sensitive areas. Other best management practices during pontoon launching would be devised during project predesign.

The pontoon storage sites would be clearly marked in Grays Harbor. Best management practices would be designed to minimize effects to aquatic habitats.

How could WSDOT compensate for unavoidable negative effects on wetlands?

Both build alternatives would result direct effects to wetland resources onsite. The wetlands on both build alternative sites are similar in character and function and were formed on fill placed within former salt marsh areas. These wetlands are typical of wetlands located on active or former industrial areas, in that they have extensive nonnative invasive vegetation and do not represent structurally or functionally complex wetland systems.

The difference between the two build alternatives being considered is that more potential wetland areas are located on and adjacent to the Anderson & Middleton Alternative site than at the Aberdeen Log Yard Alternative site (Exhibit 2-9). Approximately 4.8 acres of palustrine (including isolated potential) wetland would be eliminated at the Anderson & Middleton Alternative, versus eliminating 2.4 acres of palustrine and emergent wetland at the Aberdeen Log Yard Alternative.

Constructing the launch channel would have greater effects on the subtidal zone at the Aberdeen Log Yard Alternative site (approximately 5 acres) than at the Anderson & Middleton Alternative (approximately 1 acre). The final effect area would be determined after formal jurisdictional determination by the USACE.

To inform this decision, mudflats and intertidal areas were sampled at both sites during 2009 summer low tides. Impacts to mudflat function and acreage would likely be a part of the permitting process. Specific mitigation requirements would be coordinated in consultation with local, state, federal, and tribal representatives.

In addition to mitigating for impacts to mudflats at the preferred alternative site, compensatory mitigation would be required to replace the area of wetland filled and to offset the permanent loss of wetland functions. The goal of the compensatory mitigation would be to achieve no net loss of wetland functions and values.

WSDOT will follow Ecology's mitigation guidance to determine appropriate compensatory mitigation for project effects. The project site wetlands are predominantly Category III and IV wetlands. WSDOT would mitigate for all wetland effects by either restoring or enhancing former or degraded estuarine wetlands or by using a combination of mitigation types. Mitigation could occur at one or more sites depending on the size, mitigation potential and availability of the site or other factors.

WSDOT will consult with federal, state, local and tribal governments to determine the minimum mitigation required and for approval of the final mitigation sites.

WSDOT and project biologists developed a wetland mitigation site selection process that was adapted and applied through collaboration with regulatory agencies, including tribal coordination. The goal of the mitigation site selection process was to identify the best sites for mitigation using a watershed approach, while quickly eliminating high-risk sites, such as those containing potential hazardous materials or cultural resources. Constructing the mitigation sites could result in exposing toxic materials or affecting culturally significant resources.

Currently, wetland analysts are evaluating a short list of top sites for mitigation opportunities and availability. All sites are on either the shoreline of Grays Harbor or the Chehalis River.