3.1 Ecosystems

Ecosystems are generally understood to be defined by the combined physical and biological components of the environment and can be organized in many ways to help understand the interactions between them. For discussion purposes, it is helpful to organize ecosystems in hierarchical manner, discussing the largest physical attribute at a landscape scale, followed by a discussion of habitats and species that interact in the landscape.

For this Draft EIS, the *Ecosystems* section is organized first by a brief discussion of Grays Harbor, the estuarine habitat within which other habitats exist and within which wildlife species breed, forage, and disperse. Resources within the Ecosystems analysis are further divided into three topics: wetlands, fish and aquatic resources (including shoreline and mudflat areas), and wildlife. In the context of ecosystems, watersheds, as defined by state Water Resource Inventory Areas (WRIAs), are discussed primarily within the *Fish and Aquatic Resources* section and include portions of Grays Harbor. (See Section 3.4, Water Resources, for more discussion of watersheds.)

Grays Harbor is the fourth-largest estuarine environment in the western United States (Seiler 1989; USACE 1998), and it comprises both estuarine (semienclosed coastal body of water with a river or stream flowing into it) and open-water (ocean) habitats (Levinton 1982). The mouth of Grays Harbor is constricted by two sand spits, Point Brown to the north and Point Chehalis to the south, which were formed by coastal processes in recent geologic time. Grays Harbor contains many intertidal (area of the shore exposed between the highest and lowest tides) mudflats, which are dissected by several navigation channels.

Grays Harbor is one of two estuaries on the Pacific coast of Washington and is the only coastal estuary in the state with an authorized deep-water navigation channel and major port. The north bay of Grays Harbor is relatively undeveloped, while the inner harbor is heavily industrialized. The habitats of Grays Harbor and the lower Chehalis River (which flows into the harbor) have been altered by dredging, diking, filling, jetty construction, industrial discharges, and other human activities over the past century. These activities caused the loss of wetland and other intertidal habitats, as well as converted shallow-water habitats to deeper water. The inner harbor, which supports Aberdeen and Hoquiam, is heavily populated and industrialized with pulp mills, landfills, sewage treatment plants, and log storage facilities.

The tides at Grays Harbor are semidiurnal (twice a day). Extreme tides in the spring cause expansive mudflats to be exposed in Grays Harbor,

What is the Ecosystems Discipline Report?

This section was derived from the Ecosystems Discipline Report, which includes detailed information about the following:

- How WSDOT identified and classified wetlands in the study area.
- Study area wetlands
- The effects analysis
- Fish, aquatic, and wildlife species—and their habitats—in the study area
- The biology and life histories of the salmon stocks in the study area and the conditions of the shoreline habitats in the study area
- Shoreline conditions in the study area
- Suitable habitat for federally and state-listed wildlife species in the study area
- Specific sources and methods used to evaluate the wildlife and habitat in the study area and project vicinity
- Habitat cover types, how they were designated, and their ecological functions

Please see Appendix C for more information.

with an extensive labyrinth of channels forming during low tide. These expansive mudflats are the predominant physical feature of Grays Harbor, covering 63 percent of the harbor's surface area at low tide (USACE 1998).

Wetlands

Wetlands improve water quality by filtering and removing pollutants. They also provide hydrologic functions, such as retaining floodwater to protect humans, natural resources, and infrastructure. Wetlands also provide important habitat for native plants, fish, and wildlife. Wetlands vary considerably in appearance, and their boundaries fluctuate over time, making them difficult to recognize.

The following Federal Register definition of wetlands is used for regulatory and permitting purposes:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar* areas*.* 45 FR 85344, Dec. 24, 1980, as amended at 58 FR 45037, Aug. 25, 1993.

What regulatory programs govern activities in and around wetlands?

Wetlands are regulated at the federal level under Section 404 of the Clean Water Act, which is implemented by the U.S. Army Corps of Engineers, with oversight by the EPA. Applicants receiving a Section 404 permit from the U.S. Army Corp of Engineers are required to obtain a Section 401 Water Quality Certification from Ecology. Issuing a Section 401 Certification means that Ecology anticipates that the applicant's project will comply with state water quality standards and other aquatic resource protection requirements under Ecology's authority. The Section 401 Certification covers construction of the proposed project. Conditions of the certification become conditions of the federal permit or license. Ecology, along with the Washington State Department of Commerce, provides guidance to local governments regulating wetlands in compliance with the state's Growth Management Act (36.70A RCW). Local governments adopt critical areas ordinances (36.70A.170), which regulate activities in and around wetlands and other critical areas, as designated by Washington's Growth Management Act.

How did WSDOT identify and classify wetlands?

WSDOT defined the project wetlands study area as falling within the build alternative site boundaries (see Exhibit 3.1-1 for the Grays Harbor build alternative sites). WSDOT confirmed via analysis of aerial photographs that there are no wetlands on the CTC site or near the site; therefore, WSDOT did not further evaluate wetlands at that site.

WSDOT wetlands analysts visited both Grays Harbor build alternative sites to identify and map the wetlands. Before the site visits, the analysts reviewed numerous digital and paper maps to determine the location of known and potential wetlands at both sites. During the onsite field work, the analysts looked for indications of wetlands based on guidelines in the 1987 U.S. Army Corps of Engineers *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the Interim Regional Supplement to the Corps of Engineers *Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2008). Wetlands were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al 1979)—also known as the Cowardin system—and the hydrogeomorphic (HGM) classification system, which is based on the methods defined in *A Hydrogeomorphic Classification for Wetlands* (Brinson 1993).

The U. S. Army Corps of Engineers completed a jurisdictional determination at the Aberdeen Log Yard site in December 2009 to verify the wetland delineation. Other agencies with jurisdiction over the site (Ecology and the City of Aberdeen) were consulted throughout the jurisdictional determination process and present onsite during the U. S. Army Corps of Engineers field review of the wetland delineation work. The wetlands were also delineated for the Anderson & Middleton site. If the Anderson & Middleton site is selected as the casting basin facility site, then WSDOT would submit a formal wetland delineation report to the agencies with regulatory jurisdiction over wetlands.

For wetlands on the Anderson & Middleton site, WSDOT analysts estimated wetland categories based on best professional judgment from their extensive use of the Washington State Wetland Rating System for Western Washington (Hruby 2004) developed by Ecology. The cities of Hoquiam and Aberdeen also both follow the Ecology wetland rating system (Aberdeen Critical Areas Ordinance [CAO] 14.100.200[C], 2009; Hoquiam CAO Chapter 11.06.130[2][b], 2008a).

What are the Cowardin and hydrogeomorphic classification systems?

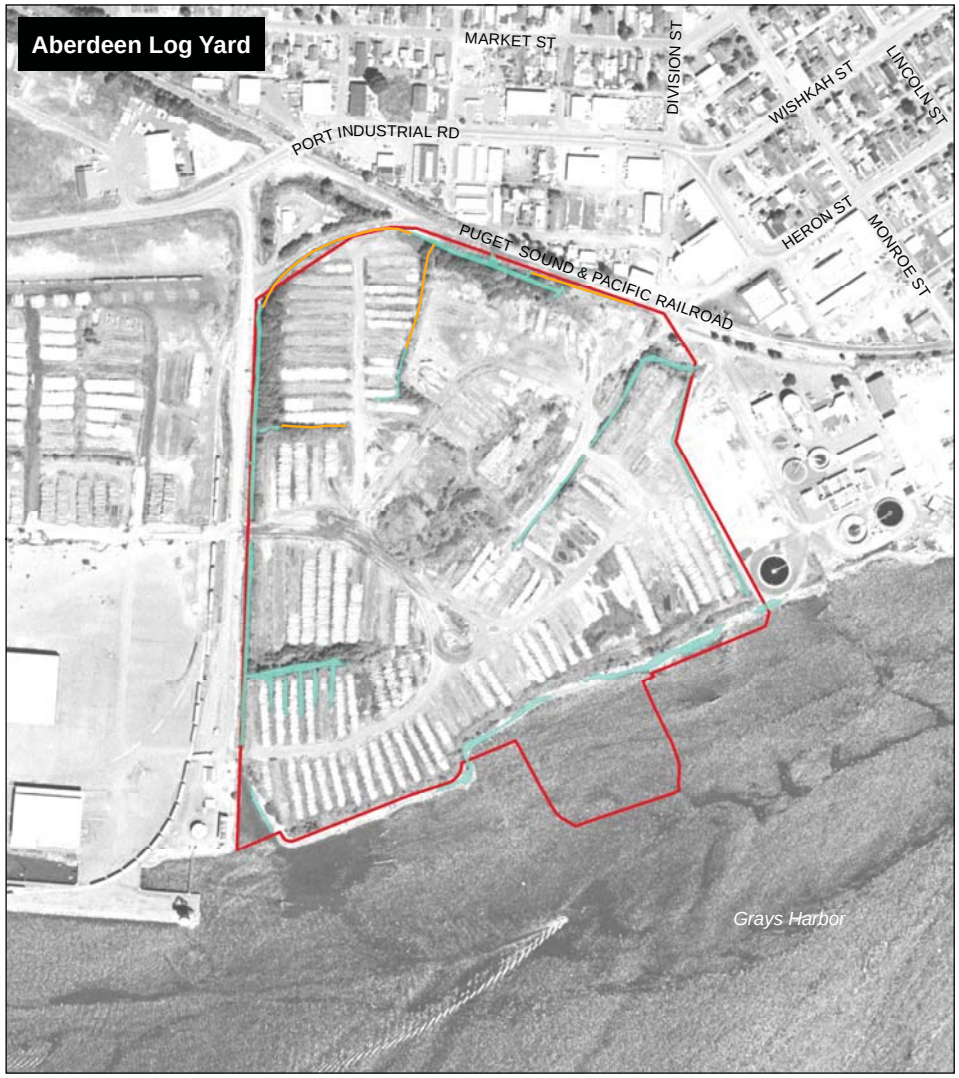
The Cowardin system, which divides wetlands into several subcategories of five ecological systems, is used to describe the type of habitat found in each wetland. The hydrogeomorphic—commonly called HGM—HGM classification system is used to describe the landscape position and the hydrologic characteristics of each wetland.

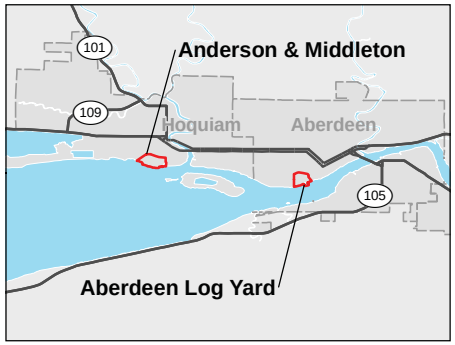
What is the Washington wetland rating system?

The State Wetland Rating System for Western Washington characterizes the water quality, hydrologic, and habitat functions provided by each wetland; this system also assigns a category rating. According to this wetland rating system, wetlands decrease in quality from Category I (highest quality) to Category IV (lowest quality). Category I wetlands include, but are not limited to, rare, unique wetlands that are more sensitive to disturbance than most wetlands and that contain ecological attributes that are impossible to replace in a human lifetime.

What is a jurisdictional determination?

A jurisdictional determination is the process of identifying and locating jurisdictional waters of the United States (including wetlands) regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. This process uses a multiparameter approach that requires positive evidence of hydrophytic vegetation, hydric soils, and wetlands hydrology for a determination that an area is a wetland. The process establishes a line that separates and identifies USACE-regulated wetland areas from areas not regulated by the USACE.





Ditch

Potential wetland area (unconfirmed by US Army Corps of Engineers)

Jurisdictional wetland (confirmed by US Army Corps of Engineers)

Build Alternative Site

Source: WSDOT (2005, 2006) Aerial Photograph, 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.

N

0 250 500 1,000 Feet

Exhibit 3.1-1. **Grays Harbor Build Alternative Sites and Wetland Areas**

SR 520 Pontoon Construction Project

Washington State Department of Transportation

\\JAFAR\PROJ\PARAMETRIX_400707\MAPFILES\PONTOON\DEIS\PON_DEIS_WETLANDS.MXD 4/28/2010

During the permit review process, wetland categories are used to establish buffer requirements, define allowable effects, and determine the replacement ratios for compensatory mitigation when wetlands have been fully delineated. WSDOT has assigned wetland categories and buffers at the Aberdeen Log Yard site to comply with City of Aberdeen critical area regulations.

What are the existing wetlands in the study area?

CTC Facility

Historically, the area in and around the CTC facility was intertidal mudflat, which was filled and converted to an active industrial area during the late nineteenth and early twentieth centuries; no freshwater wetlands likely existed in this portion of Commencement Bay. Currently, the CTC facility is within a fully built-out industrial area. No freshwater wetlands exist on the site or in the immediate vicinity. Because the CTC casting basin facility is completely developed, it contains no vegetative cover and no potential to support wetlands; therefore, the CTC facility is not addressed in the wetlands analysis.

Grays Harbor Build Alternatives

Hydrological, biological, and geological conditions favorable to wetlands occur at both the Anderson & Middleton and Aberdeen Log Yard sites.

Wetlands classified as palustrine (freshwater) exist in the central portion of each build alternative site, and estuarine (fresh-brackish-marine water with daily tidal cycle) wetlands are in the intertidal zone on the shorelines. These wetlands are described generally here for both sites and more specifically below for each alternative.

View of wetland at Anderson & Middleton site, facing northeast.

The palustrine wetlands at both Grays Harbor build alternative sites were formed on fill within active or formerly active industrial areas. As such, they are young wetland systems and, therefore, have a simple vegetative structure, typically limited to one Cowardin habitat classification. Most consist primarily of emergent (nonwoody) vegetation.

Where trees and shrubs exist within the wetland areas, these species are probably less than 10 to 20 years old, and they include species that grow in disturbed areas fairly quickly, such as alder (*Alnus rubra*) and salmonberry (*Rubus spectabilis*). Many of the emergent wetland areas—in particular on the Aberdeen Log Yard site—likely reestablish season

What is an emergent wetland?

Emergent wetlands—commonly called marshes and meadows—are dominated by herbaceous (nonwoody) plants, such as grasses, sedges, and forbs (broad-leaved plants) that "emerge" from the saturated soil.

to season and year to year as the logs on the sites are moved and new tire ruts and former log storage areas pond during the rainy season (November through May). Generally speaking, the wetlands on both sites are relatively small and of low value in terms of water quantity and habitat functions. They do have, however, some water quality and habitat-related function.

The wetlands on the higher and interior upland areas of both sites are all palustrine wetland systems and rated Category III or IV wetlands, ranging in size from less than 0.001 acre to over 4.5 acres.

Anderson & Middleton Alternative

WSDOT identified many palustrine wetlands and one Category I estuarine emergent wetland on the Anderson & Middleton site during November 2008 and January 2009 site investigations (Exhibit 3.1-1). Approximately 8.9 acres of freshwater wetland are located on fill at the Anderson & Middleton site. These wetlands have developed over the approximately 20 to 30 years since the previous industrial activity on the site ceased. Most of these wetland features have developed in depressional areas that were created to facilitate drainage of the site. An approximately 2.4-acre estuarine emergent wetland (Category I) is located along the southwestern portion of the site.

View of estuarine wetlands on the west side of Anderson & Middleton site, facing west.

Most of the freshwater wetland area, or roughly 4.8 acres, is on the central portion of the site that was actively used for log storage; the remainder (4.1 acres) is on the western portion of the site. The wetlands within the former log storage area predominantly occur within existing drainage swales (low areas where water accumulates). Several small wetlands lie along the southern portion of the main log yard area. Estuarine wetlands are also along the shoreline intertidal areas.

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

Aberdeen Log Yard Alternative

Similar to the wetlands located at the Anderson & Middleton site, the wetland areas on the Aberdeen Log Yard site formed on fill that covers the original salt marsh that used to be on the site. WSDOT identified these wetland areas during October and November 2008 site investigations (Exhibit 3.1-1).

The Aberdeen Log Yard site has approximately 1.04 acres of palustrine wetland and approximately 0.95 acre of estuarine wetland.

How did WSDOT evaluate direct effects on wetlands?

To evaluate project effects on wetlands, WSDOT wetlands analysts overlaid the conceptual casting basin facility designs on wetland area maps of each Grays Harbor build alternative site. This enabled the analysts to identify the project's effect on wetland areas at each site.

How would construction of the casting basin directly affect wetlands?

Anderson & Middleton Alternative

Project construction would eliminate approximately 4.8 acres of palustrine wetland area; this represents 54 percent of the total palustrine wetland area on the site. Approximately 1.2 acres of the existing ditch area containing some wetlands would also be eliminated. Construction activities would not directly affect the approximately 2.4-acre estuarine wetland nor the approximately 4.1 acres of palustrine wetland area on the western portion of the property.

Aberdeen Log Yard Alternative

WSDOT expects that the entire 1.04 acres of palustrine wetlands on the Aberdeen Log Yard site would be eliminated by casting basin facility construction; additionally, up to 0.41 acre of estuarine wetland would be eliminated by construction. The estuarine wetlands located along either side of the site likely would not be directly affected by construction of either the casting basin facility or the berm to be built on the upland shoreline portion of the site. This berm would protect water quality treatment facilities on the site from high water and waves.

View of estuarine emergent wetland at the Aberdeen Log Yard site, facing east.

Launch channel construction would affect an approximately 5-acre area within the nearshore and shoreline area, including portions of the subtidal area (this is further quantified in the *Fish and Aquatic Resources* section of this chapter).

How would pontoon-building operations directly affect wetlands?

CTC Facility

With no wetlands in the CTC facility study area, pontoon construction would not directly affect wetlands.

Anderson & Middleton Alternative

No further direct effects on wetlands beyond those described above for casting basin facility construction would occur during pontoon-building operations at the Anderson & Middleton site. No direct effects on the estuarine wetlands located along the Anderson & Middleton site would be anticipated. These wetlands would be much farther from the casting basin and launch channel than the estuarine wetlands at the Aberdeen Log Yard site. The estuarine wetlands are at a higher elevation relative to the shoreline, and they are protected from wind and wave energy by extensive pilings in the nearshore.

Aberdeen Log Yard Alternative

As mentioned previously, estuarine wetlands located along the shoreline on either side of the launch channel would not likely be directly affected by construction of either the casting basin facility or the berm to be built on the upland shoreline portion of the site. However, these estuarine wetlands could be affected by propeller wash from the tugboats required to move pontoons out of the casting basin. The tugboats could increase wave action and erosion to the estuarine emergent wetlands along the site's shoreline. Furthermore, pontoon towing or other project-related nearshore boat activity could deposit sediment on the vegetation of these wetlands. Because pontoon-towing cycles would only occur about two to three times each year, such effects would likely be negligible.

How would pontoon moorage directly affect wetlands?

Pontoon moorage would not directly affect wetlands. Completed pontoons built at the CTC facility and at either Grays Harbor build alternative site would be moored in Puget Sound (at existing marine berths) and at a marine site in Grays Harbor (see proposed pontoon moorage location in Exhibit 2-8 in Chapter 2 of this Draft EIS), respectively. The Grays Harbor site is an open-water environment that does not contain wetlands. Pontoon moorage effects on the aquatic environment are discussed in the *Fish and Aquatic Resources* section of this Draft EIS.

How would the build alternatives compare in their effects on wetlands?

Exhibit 3.1-2 summarizes and compares the project effects on wetlands by each Grays Harbor build alternative site.

EXHIBIT 3.1-2
Wetlands Summary of Direct Effects

	Anderson & Middleton Alternative [a]		Aberdeen Log Yard Alternative [b]	
Effects Category	**Total Wetland Area Onsite (acres)**	**Wetlands Filled (acres)**	**Total Wetland Area Onsite (acres)**	**Wetlands Filled (acres)**
Palustrine emergent wetlands	8.9	4.8	1.04	1.04
Estuarine wetlands (emergent and rocky shore wetlands)	2.4	0.0	0.50	0.41
Total wetland area onsite	**11.3**		**1.54**	
Total direct effects on wetlands		**4.8**		**1.45**

[a] These acreage figures are conservative estimates based on reconnaissance-level information.
[b] These acreage figures are based on a jurisdictional determination made after a wetland delineation of the property.

What indirect effects would the project have on wetlands?

CTC Facility

With no wetlands in the CTC study area, pontoon construction and towing would have no indirect effects on wetlands.

Anderson & Middleton Alternative

Indirect effects on wetlands from the Anderson & Middleton Alternative include the potential risk that onsite and adjacent wetlands not directly affected during casting basin construction could—over time—be affected by dewatering required during construction, operation, and long-term maintenance of the proposed facility. The area comprising the dewatering zone of influence at the Anderson & Middleton site was not fully determined when this document was prepared. If the dewatering zone of influence extended beyond the casting basin and created a drawdown effect on the perched hydrology of the 4.1-acre palustrine wetland on the western portion of the Anderson & Middleton property or the 27 acres of freshwater wetland offsite to the east, then wetlands surface hydrology could, subsequently, be adversely affected. Quantifying the likelihood of this effect is difficult, given that the site substrate (soil layers beneath the site) is uneven and how the soil

characteristics would influence the dewatering zone of influence is not fully understood at this time. The risk appears minimal because investigations to date indicate that the main hydrological source of these wetlands is isolated from and perched above the groundwater that would be affected by drawdown from dewatering activities. Even so, WSDOT acknowledges that a risk of unanticipated effects on wetland hydrology could occur over time as dewatering continues.

Aberdeen Log Yard Alternative

WSDOT's initial reconnaissance indicates a low likelihood that there would be any indirect project effects on wetlands. The surrounding area is heavily developed with industrial and residential uses, and based on visual observations by the wetland analysts, the adjacent properties do not likely support wetlands except for a small wetland area just north of the site. The site is surrounded by a ditch that could constrain offsite dewatering effects. If, however, there are offsite wetlands within the dewatering zone of influence, then there would be a risk that, over time as dewatering continues, the hydrology of such wetlands could be adversely affected. The estuarine wetlands remaining along the shoreline would not be further affected by operation dewatering during pontoon construction because estuarine wetlands along the shoreline receive their primary hydrologic influence from Grays Harbor.

How would wetlands be affected if the project were not built?

Under the No Build Alternative, there would be no construction or long-term effects on wetlands beyond those already occurring on the sites. Wetlands on the Aberdeen Log Yard site would continue to be disturbed by existing log-sorting activities, and wetlands on the Anderson & Middleton site would remain mostly undisturbed.

What mitigation measures does WSDOT propose to reduce direct effects on wetlands?

Federal and state laws require that mitigation efforts follow the following prescribed sequence:

1. Avoid the effect altogether by not taking a certain action or parts of an action.
2. Minimize the 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.

Avoidance and Minimization

Avoiding effects, to the greatest extent practical, is an essential part of WSDOT's early project planning. WSDOT initially selected a site adjacent to and directly east of the Anderson & Middleton site for pontoon construction (IDD #1). Following wetland delineation at the IDD #1 site, WSDOT estimated that approximately 27 acres of wetland existed onsite. As a result, WSDOT removed IDD #1 from the alternatives considered in this Draft EIS because building a casting basin facility there would require eliminating all 27 acres of onsite wetlands. Constructing the pontoon casting basin at either the Anderson & Middleton or Aberdeen Log Yard site would entail much less loss of wetland acreage than would have occurred had the IDD #1 site been pursued. However, due to the size of the proposed casting basin facility, avoiding all effects on wetlands at either build alternative site would not be possible.

At the Anderson & Middleton site, only the central area with ditched and drainage swale wetlands would be directly affected. WSDOT would avoid effects on wetlands on the west side of the site by not extending the facility boundaries that far west. Thus, WSDOT would avoid direct effects on 4.1 acres of palustrine wetlands on the Anderson & Middleton site; these wetlands are densely vegetated and provide some wildlife habitat. WSDOT also would avoid and minimize potential effects on onsite wetlands by designing and placing outfalls required to treat surface water runoff from the site. By placing the casting basin facility on the central portion of the Anderson & Middleton site, WSDOT would also avoid the Category I estuarine wetland located along the southwestern shoreline of the site.

The Aberdeen Log Yard site is only 51 acres compared to the 105-acre Anderson & Middleton site, 55 acres of which would be used for the new casting basin facility. The smaller size of the Aberdeen Log Yard site severely constrains the casting basin design and layout, and the entire area above the shoreline would be needed to accommodate the facility. Therefore, the palustrine wetlands on the Aberdeen Log Yard site must be removed to build the project there. Effects on the estuarine

wetlands along the shoreline would be limited to those within the launch channel.

WSDOT would use best management practices to avoid and minimize unintentional effects on remaining wetland areas including, but not limited to, the following:

- Implementing temporary erosion and sediment control measures
- Developing and following a stormwater management and pollution prevention plan
- Prohibiting servicing and refueling of vehicles within 100 feet of aquatic habitats to reduce potential petroleum and hydraulic fluid spills in sensitive areas

In addition, as the project design progresses WSDOT will evaluate other measures to reduce effects. WSDOT could also design additional best management practices to minimize effects on wetlands during pontoon launching and towing. To ensure that tugboat propeller wash is not directed toward the nearshore emergent wetlands, WSDOT could work with boat operators to develop plans for boats at each site. These plans could, for example, ensure that tugboat wash be directed either toward the casting basin or the navigation channel rather than nearshore areas.

Mitigation

Unavoidable direct effects on wetlands occurring as a result of the proposed project would require compensatory mitigation to replace the areas of wetland filled and offset the permanent loss of wetland functions. The goal of compensatory mitigation is to achieve no net loss of wetland functions and values. WSDOT would follow federal, state, and local requirements for wetland mitigation to determine appropriate compensatory mitigation for project effects. WSDOT would mitigate for effects on wetland areas and functions either by restoring or enhancing former or degraded wetlands or by using a combination of these mitigation measures. WSDOT would consult with federal, state, and local governments, as well as interested tribes, to determine the mitigation required and to obtain approval of the final mitigation site.

What is compensatory mitigation?

Compensatory mitigation involves restoring, creating, enhancing, or (in exceptional cases) preserving wetlands and/or other aquatic resources to compensate for unavoidable effects. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetland functions and acreage.

In collaboration with regulatory agencies and local tribes, WSDOT is in the process of selecting a compensatory wetland mitigation site in the Grays Harbor area that would accommodate the required wetland mitigation. The selected mitigation site would avoid exposure to toxic materials or effects on culturally significant resources. WSDOT anticipates that the selected site will be confirmed and identified in the Final EIS, which will disclose more specific information about the site and planned mitigation activities.

How could WSDOT mitigate for indirect effects on wetlands?

CTC Facility

With no direct or indirect wetland effects on wetlands as a result of the project at the CTC facility, WSDOT does not anticipate any mitigation would be required.

Grays Harbor Build Alternatives

Indirect effects on wetlands not affected by casting basin facility construction at the Anderson & Middleton property could occur as a result of dewatering, although based on existing data, it appears this would be unlikely. Should this site be selected for casting basin construction, then the unaffected wetlands on the western portion of the Anderson & Middleton property could be more carefully analyzed for potential dewatering effects. WSDOT would use adaptive management (for example, monitor potential effects) to address unanticipated consequences of dewatering. If offsite wetlands are identified within the dewatering zone of influence at the Aberdeen Log Yard site, a similar approach could be implemented to determine whether wetlands were being adversely affected by dewatering.

What would the cumulative effect on wetlands likely be?

CTC Facility

WSDOT did not identify any potential direct or indirect effects on wetlands from operating the CTC facility. Therefore, there would be no contribution to cumulative effects on wetlands associated with pontoon-building or towing activities at this site.

Grays Harbor Build Alternatives

The project's contribution to cumulative effects on wetland resources in Grays Harbor would likely be minor. In fact, after compensatory mitigation, the project would likely help to counter the effects of cumulative wetland losses in the Grays Harbor area.

Past activities discussed previously in this section have resulted in a cumulative loss of wetlands and other intertidal habitats in Grays Harbor, as well as the conversion of shallow-water habitats to deeper water. Many of these past effects were not mitigated because they occurred prior to the 1970s, when regulations protecting wetlands were established. Actions since the early 1970s and future actions in the Grays Harbor area have been and will be subject to federal, state, and

local wetland regulations that require avoidance, minimization, and compensatory mitigation for unavoidable wetland impacts based on lost acreage and functions. Such regulations have slowed wetland impacts in the Grays Harbor area, but they have not reversed or corrected the long-term cumulative effects of industrial and residential development. Today the project vicinity is subject to local ordinances as well as state and federal permit programs that have been implemented to protect critical resources and habitat, including wetlands.

Exhibit 3-3 (in the Introduction to this chapter) shows the location of several reasonably foreseeable actions that could also occur in the project vicinity: Actions 5, 6, 8, 10, and 11 (Grays Harbor Deeper Draft, Terminal 1, 2, 3 and 4 Developments). WSDOT analyzed the potential effects of these reasonably foreseeable projects to help assess the future for wetlands in the area – with and without the proposed project. WSDOT found that the likely future projects could eliminate some of the wetlands that might have developed on fill; however, the mitigation associated with the projects would likely adequately compensate for those losses.

Compensatory mitigation for project effects on wetlands should result in better wetland functions over what is currently occurring on either build alternative site. Mitigation for effects on estuarine wetlands, although offsite, would likely be in-kind (provide similar values and functions as the area disturbed), which would be appropriate given the loss of estuarine wetlands within Grays Harbor over the last century. The final details of the wetland mitigation, including site selection, remain to be negotiated with regulatory agencies and tribes. Therefore, after compensatory mitigation is implemented, the project would not contribute to the cumulative wetland loss in the area that has occurred over the last century. In fact, this project would, after mitigation, be beneficial and help to counter the effects of cumulative wetland loss that have occurred over the last century in the Grays Harbor area.

How could cumulative effects on wetlands be mitigated?

The federal wetland regulatory goal of no net loss and recently updated state and local regulations for protecting and managing critical areas under the Growth Management Act are intended to slow the cumulative decline of wetlands. Beyond these measures, the cumulative effect of converting and losing wetlands could be mitigated by more stringent regulations, greater regulatory consistency and coordination among jurisdictions, improved planning at both regional and local levels, and increased participation of nongovernmental organizations and other stakeholders in restoration efforts. Long-term programs, such as

watershed-based mitigation and mitigation banking, could also aid in protecting wetland resources.

Ecology has prepared two guidance documents to facilitate more effective compensatory wetland mitigation: *Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance* (Ecology et al. 2006a), and *Wetland Mitigation in Washington State, Part 2: Developing Mitigation Plans* (Ecology et al. 2006b). Both of these documents were prepared as part of a collaborative effort among Ecology, the U.S. Army Corps of Engineers, and the EPA. More effective compensatory wetland mitigation can help counter the cumulative effects that have occurred over the last century by providing mitigation that considers historical conditions and prioritizing the restoration of ecologic processes within the watershed.

Both of the Grays Harbor build alternative sites are within an area that is subject to the Grays Harbor Estuary Management Plan, which provides management goals, guidelines, policies, and conditions on proposed actions within the plan area. This plan helps to avoid piecemeal decision-making and serves as a tool for estuarywide management. Some areas of the estuary plan are devoted to managing fish, wildlife, and plant resources, while others allow for certain types of economic development. Estuarywide management can also help to counter the cumulative effects that have occurred in Grays Harbor by supporting more meaningful larger-scale preservation efforts and context-sensitive development.

Fish and Aquatic Resources

For this Draft EIS, fish and aquatic resources include fish, aquatic species, and their habitats. Marine mammals are discussed in the Wildlife section of this chapter. The aquatic habitats of Grays Harbor and Puget Sound, including marine, estuarine, and freshwater habitat within the surrounding rivers and streams, support a variety of fish and aquatic species. Many of these species, which include several types of native salmon, trout, shellfish, and crab, are an integral part of the economy and culture of the Pacific Northwest.

Over the last few centuries, both fish and aquatic species have been adversely affected by large-scale alteration of their habitat and the watersheds, as well as by direct harvesting. Fish and their habitat are protected under federal, state, and local regulations. In addition, WSDOT coordinates with tribal representatives regarding fish, aquatic resources, and habitat issues.

What regulatory programs protect fish and aquatic resources?

Fish and their habitat are protected under federal, state, and local regulations. National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), and Washington Department of Fish and Wildlife (WDFW) all have regulatory jurisdiction over fisheries resources within the study area. NOAA Fisheries and USFWS regulate commercial and noncommercial fish stocks, as well as administer the federal Endangered Species Act (16 USC 1531-1544, as amended). WDFW, whose mission includes protecting, restoring, and enhancing fish and wildlife and their habitats, regulate in-water and over-water work activities under the authority of the Hydraulic Code (77.55 RCW) through the Hydraulic Project Approval (HPA) process (220-110 WAC).

What is the Endangered Species Act?

The federal Endangered Species Act is an act of Congress passed in 1973 that governs how animal and plant species whose populations are dangerously in decline or close to extinction will be protected and recovered.

Once listed as threatened or endangered, a species is afforded the full range of protections available under the Act.

Fish habitat requirements are additionally considered under the regulatory authority of the Water Resource Act (90.54 RCW). Additionally, fish and fish habitat needs are often addressed in WRIA Plans in accordance with 173-500 WAC. WRIA plans involve many local stakeholders, including federal, tribal, state, and local agency representatives. Local jurisdictions regulate fish and wildlife habitat by implementing critical areas regulations, as part of the Washington State Growth Management Act (36.70A.060 RCW). Local jurisdictions might also use their SEPA ordinances as regulatory protection mechanisms (197-11 WAC). Fish habitat is also addressed under both the State Shoreline Management Act (90.58 RCW) and local shoreline master programs (173-26 WAC). In addition to

federal, state, and local regulations, WSDOT coordinates with tribal representatives regarding fish, aquatic resources, and habitat issues.

Six species of salmonids spawn in state-designated WRIA 22 (which includes Grays Harbor, the lower main stem Chehalis River, streams that drain into the Chehalis River, other streams that drain into Grays Harbor, and other subbasins) and WRIA 23 (the upper Chehalis River Basin). Recovery actions have been identified for multiple salmonid species within WRIAs 22 and 23 through the *Chehalis Basin Salmon Habitat Restoration and Preservation Work Plan for WRIA 22 and 23* (CBPHWG 2008), the Limiting Factors Analysis, and other planning efforts. These recovery actions generally focus on improving water quality, improving freshwater, estuarine, and marine habitats, and controlling invasive plant species.

What is a salmonid?

A salmonid is a fish of the family Salmonidae, which includes salmon, trout, and char.

What fish and aquatic resources exist in the study area?

The fish and aquatic resources study area includes all aquatic habitat that could be potentially affected by construction and operation of the casting basin facilities at the CTC facility and the two Grays Harbor build alternative sites. As such, the study area encompasses Commencement Bay, Grays Harbor, freshwater aquatic habitat located on both Grays Harbor build alternative sites, and the potential pontoon moorage site in outer Grays Harbor.

The fish-accessible habitat within the Grays Harbor study area is limited to the shorelines of the two build alternative sites and the pontoon moorage sites. Fish habitat along the shorelines of the two built alternative sites has degraded, which resulted from the accumulation of fill and debris over the years and dredging of the navigation channel that passes the sites just below the point of the lowest low tide (the lower edge of the intertidal zone). However, there are fish and aquatic resources in the project vicinity of both the CTC and Grays Harbor sites that could be affected by the proposed project. In addition, there are fish and aquatic resources within and near the proposed pontoon moorage location in Grays Harbor. The fish species living within or using the study area aquatic habitat are described in the following subsections.

CTC Facility

More than 50 fish species use nearshore areas and waterways of Commencement Bay for migration, rearing, and feeding. Commencement Bay serves as a migratory pathway for anadromous salmonids from the Puyallup River and Hylebos and Wapato creeks, which are located in state-designated WRIA 10. Anadromous species (fish that are born in freshwater, mature at sea, and return to their

natal streams to spawn) documented in the Commencement Bay basin include Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), sockeye (*O. nerka*), pink (*O. gorbuscha*), and chum (*O. keta*) salmon, as well as steelhead trout (*O. mykiss*). Bull trout (*Salvelinus confluentus*) also are documented in the Commencement Bay basin. Although bull trout spawn upstream of the bay in the Puyallup River, anadromous bull trout use the bay for migration and feeding. Coastal cutthroat trout (*O. clarki clarki*) and Dolly Varden (*S. malma*) also might exist in the area. Three hatcheries stock the Puyallup River system annually with a combined total of several million Chinook, coho, and chum salmon, and steelhead trout juveniles.

Many marine species also exist in the nearshore areas and waterways of Commencement Bay, including coastal pelagic species (Pacific sardine [*Sardinops sagax*], Pacific mackerel [*Scomber japonicas*], northern anchovy [*Engraulis mordax*], and the invertebrate market squid [*Loligo opalescens*]) and numerous other species collectively referred to as West Coast groundfish; however, many of these species are likely to be only rare visitors to the area.

Federal- or State-Listed or Protected Aquatic Species or Habitat

Three of the fish species in the Commencement Bay portion of the study area—Chinook salmon, bull trout, and steelhead—are listed as threatened under the federal Endangered Species Act. The USFWS has identified the marine nearshore areas of Commencement Bay as critical foraging, migration, and overwintering habitat for the Coastal-Puget Sound Distinct Population Segment of bull trout. In addition, the NOAA Fisheries has identified the marine nearshore areas of the bay as critical habitat for the Puget Sound Evolutionarily Significant Unit of Chinook salmon.

Grays Harbor Build Alternatives

More than 50 fish species inhabit Grays Harbor, including resident and anadromous species. (These species are discussed in more detail in the Ecosystems Discipline Report, Appendix C.) Most of these species are likely to be in the study area at least occasionally. These salmonids migrate through Grays Harbor on a seasonal basis and include Chinook, chum, and coho salmon; steelhead; coastal cutthroat trout; and native char (*Salvelinus* spp.). Within the project vicinity, there are nine stocks of Chinook salmon, seven stocks of coho salmon, two stocks of chum salmon, and ten stocks of steelhead. These include both native and introduced stocks in varying states of health (WDFW 2003). Both the Chehalis and Hoquiam rivers, which are near the build alternative sites, contain spawning

populations of Chinook and coho salmon, as well as steelhead (WDFW 2003).

White sturgeon (*Acipenser transmontanus*), the largest North American sturgeon, is found along the West Coast from Alaska to north-central California, including in Grays Harbor (Scott and Crossman 1973). White sturgeon—a species of interest for the local tribes—is a slow-growing anadromous fish with reported estimated ages of up to 100 years (CDFG 1992 *in* EPIC 2001). White sturgeon are known to occur in Willapa Bay (located on the Pacific coast of Washington south of Grays Harbor), although they are less abundant than green sturgeon (*Acipenser medirostris*) (Emmett et al 1991). In 2008 the Quinault commercial fishery harvested 44 white sturgeon in Grays Harbor, the non-Indian commercial fishery harvested 455, and the noncommercial fishery harvested 2. These catch numbers demonstrate that the stock exists, although not in large numbers.

Federal- or State-Listed or Protected Aquatic Species or Habitat

Two of the fish species in the study area—bull trout and green sturgeon—are listed as threatened under the federal Endangered Species Act; Grays Harbor supports several life stages of bull trout and green sturgeon. The USFWS has identified the marine nearshore environment of Grays Harbor as critical foraging, migration, and overwintering habitat for bull trout. NOAA Fisheries (2009) identified critical habitat for the southern Distinct Population Segment of green sturgeon. The critical habitat in Grays Harbor includes all tidally influenced areas of Grays Harbor up to the MHHW elevation, including tributaries upstream to the head of tide (the farthest point upstream where a river is affected by tidal fluctuations). Both build alternative sites and the pontoon moorage site are within the green sturgeon-designated critical habitat.

In 2002, the USFWS published a withdrawal of the proposed rule to list the Southwestern Washington/Columbia River Distinct Population Segment of the coastal cutthroat trout, which includes these fish in Grays Harbor and its tributaries, as threatened under the Endangered Species Act (67 CFR 44934-44961). As a result of litigation, the USFWS is now reconsidering the withdrawal of the proposed rule with regard to the specific question of whether the marine and estuarine areas might constitute a substantial portion of the range of the Southwestern Washington/Columbia River Distinct Population Segment of coastal cutthroat trout, and if so, whether that portion is threatened or endangered (74 CFR 12297-12300).

In March 2009, NOAA Fisheries proposed to list eulachon (*Thaleichthys pacificus*) under the Endangered Species Act. Eulachon (also known as Columbia River smelt, candlefish, or hooligan) range

from northern California to southwest Alaska and into the southeastern Bering Sea; their range includes Grays Harbor. Smelt typically spend 3 to 5 years in saltwater before returning to freshwater to spawn in late winter through mid-spring. The young eulachon initially rear in shoreline estuarine habitats and then migrate into shallow- to moderate-depth marine waters as they grow (Barraclough 1964). In Grays Harbor, this could include the two build alternative sites' shoreline estuarine habitat.

No state-listed sensitive, threatened, or endangered fish species occur within the study area. State priority fish species (WDFW 2008a) that might be in the study area include chum and sockeye salmon, steelhead and rainbow trout, and coastal cutthroat trout. In addition, shellfish, such as crab, clams, mussels, and oysters, also use Grays Harbor. Portions of Grays Harbor support large commercial shellfish operations, particularly oyster production.

What are priority species and priority habitat?

The Washington Department of Fish and Wildlife defines priority species as those species that are priorities for conservation and management. Priority species include state endangered, threatened, sensitive, and candidate species; animal aggregations considered vulnerable; and those species of recreational, commercial, or Tribal importance that are vulnerable. Priority habitats are those habitat types or elements with unique or significant value to a diverse group of species.

What is the condition of freshwater habitat in the study area?

CTC Facility

There are no freshwater aquatic resources or habitat in the CTC facility study area. The site is located on fill in an old tideflat area next to the Blair Waterway, which is a dredged marine water channel. As noted previously, however, Commencement Bay is a migratory pathway for anadromous salmonids from the Puyallup River and Hylebos and Wapato creeks.

Anderson & Middleton Alternative

The freshwater habitat at the Anderson & Middleton site was created to drain water from the site and comprises approximately 92 small drainage swales throughout the site. These swales drain surface water into four larger channels (drainage ditches) that convey onsite and offsite drainage to Grays Harbor. Depressed drainage swales between roads—many containing potential wetlands—convey surface water into four larger channels that drain into Grays Harbor. Exhibit 3.1-3 identifies the primary surface water drainage features as Channels A through D. These channels drain into Grays Harbor through tide gates that appeared to be mostly blocked in a closed position by sand and debris at the outlet when WSDOT analysts visited the site in 2008.

SOURCE: Parametrix, 554-1631-036/AR(06060P) 2/09

Exhibit 3.1-3. **Grays Harbor Build Alternative Sites Shoreline and Surface Water Features**

Pontoon Construction Project

Washington State Department of Transportation

N

Aberdeen Log Yard Alternative

A single, tidally influenced channel (Channel A) runs along the east side of East Terminal Road and drains water to the south into Grays Harbor (Exhibit 3.1-3). The channel receives flow from several sources. Channels A-1 and A-2, also shown in Exhibit 3.1-3, are tributary drainages to Channel A; they are not accessible to fish and do not contain fish habitat. Channel A is part of the City of Aberdeen's stormwater system and, therefore, receives upstream discharges from additional roadway runoff. In addition, Channel A is regulated as a jurisdictional wetland by the U.S. Army Corps of Engineers, Ecology, and the City of Aberdeen. WSDOT scientists observed small, unidentified fish within Channel A in October 2008. The swimming patterns of these juvenile fish indicated that they were not salmonids. Because the entire reach of Channel A is accessible to fish, especially at high tides, salmonid use of Channel A cannot be discounted, although it is unlikely because of the lack of suitable habitat within the channel.

The second primary surface water feature at the Aberdeen Log Yard site is a manmade ditch (Channel B) located along the eastern boundary of the site (Exhibit 3.1-3). This ditch, which was constructed within the last 10 years, exhibits wetland characteristics and is regulated as a jurisdictional wetland by the U.S. Army Corps of Engineers, Ecology, and City of Aberdeen. Channel B does not provide fish habitat because of the lack of perennial flows and access for fish.

What is the condition of shoreline and intertidal habitat in the study area?

The shorelines of both the CTC site and the Grays Harbor build alternative sites are composed of fill located on former intertidal areas that have been altered, beginning in the late 1800s. Shorelines support habitat for invertebrates (organisms without a backbone) that are an essential food source for fish and other marine life.

CTC Facility

The shoreline in and around the CTC facility is typical of a fully built out industrial zone. Shorelines within the Port of Tacoma are modified and armored, and little to no native vegetation or shoreline habitat exists at the site.

Grays Harbor Build Alternatives

The intertidal zone habitat along both Grays Harbor build alternative sites includes mudflats, which are typically highly productive habitats supporting a high biomass (the amount of living matter in a

What is the intertidal zone?

Intertidal zone habitat lies between the high and low tide marks and is regularly covered and uncovered by the advance and retreat of the tides. It is also referred to as the nearshore or nearshore environment/.

What are mudflats?

Mudflats are sedimentary intertidal habitats in coast environments, particularly estuaries and other sheltered areas such as Grays Harbor. Their formation and function depend on ecological processes such as substrate (underlying layers) composition, sediment deposition, scour, salinity, and exposure to wind and wave energy. The sediments generally consist of silts and clays with a high organic content. Like most other intertidal habitats, they dissipate wave energy and, thus, have an important role in reducing the risk of erosion and flooding in the coastal zone. The mud (including the microbial and macroinvertebrate organisms associated with it) plays an important role in nutrient cycling.

given habitat), but relatively low species diversity. Based on photographic evidence, the amount of intertidal area, including mudflat, at both build alternative sites has substantially decreased since they were initially filled in the mid-twentieth century. The intertidal habitat at both sites is influenced by the high turbidity (suspended sediment concentrations in water) in the water from the Chehalis River that flows over these sites. The mudflats at each site are characterized by fine silt and few visible animals on the surface or living in the mud.

What is turbidity, and how does it affect fish?

Turbidity is a measure of the cloudiness or haziness of water caused by individual particles (suspended solids). Turbidity can directly affect fish vision and gill function.

Both build alternative sites have shorelines that juvenile salmon likely use during their rearing migration through Grays Harbor. The western portion of the shoreline of the Anderson & Middleton site and the tidal inlet to the east likely provide some feeding and rearing opportunities for juvenile salmonids because these areas contain intertidal zone mudflats that support small crustaceans that are eaten by young salmon. The Grays Harbor estuary is an important Dungeness crab (*Cancer magister*) nursery for regional population production and fisheries, but the mudflats at these two sites show no evidence of Dungeness crab production.

Intertidal zone mudflats at the Aberdeen Log Yard site also likely provide feeding and rearing opportunities for juvenile salmonids. Forage fish, which are a critical food source for young salmon, exist within Grays Harbor, but forage-fish spawning is not known to occur at either build alternative site. The high levels of fine silt, together with fill, debris, and piles, make the substrate (mud) unsuitable for forage fish spawning.

View of cobbled tidal inlet shoreline, looking north toward the outlet of Channel A at Anderson & Middleton site.

WSDOT biologists sampled mudflats at both sites during the summer low tides in June, July, and August 2009 to provide a semiquantitative, general characterization of the species at these sites. The results of this sampling are described below under each build alternative.

Anderson & Middleton Alternative

The marine shoreline at the Anderson & Middleton Alternative site is approximately 2,700 linear feet and varies in slope and sediment nature. Portions of the shoreline are almost vertical slopes of large boulders and riprap contained behind a series of piles and derelict pier structures; the remainder of the site is more gradually sloped, with substrate consisting of silt, sand, gravel, angular cobbles, and concrete rubble. Concrete rubble, metal waste, and riprap are scattered along the entire shoreline.

Along most of the shoreline, vegetation is extremely limited. Sparse reed canarygrass (*Phalaris arundinacea*) and other grasses and herbaceous species grow on the central portion of the site. The land along the western portion of the shoreline supports a deciduous forest. Rockweed (*Fucus gardneri*, a brown algae) grows at upper intertidal elevations along most of the shoreline with a few patches of pickleweed (*Salicornia* sp.) and a small amount of the green algae (*Ulva* sp.). Small patches of both native and nonnative eelgrass (*Zostera* spp.) grow along the easternmost portion of the shoreline south of the outlet of Channel A. Scattered mussel (*Mytilis* spp.) and a few oysters (*Crassostrea gigas*) are evident in the upper intertidal zone. A few softshell clams (*Mya arenaria*) are evident in the mudflats that characterize the lower intertidal zone west of the launch channel area. The intertidal substrate contains small numbers of *Macoma balthica*, a small clam that is less than one-half-inch long.

Within the tidal inlet, waves have deposited stumps and logs onto the shoreline. Because much of the debris is above the high tide line, it does not offer important habitat benefits for fish or other aquatic organisms, although it likely provides food benefits to invertebrates such as crab. There are hundreds of old piles along the far western portion of the shoreline. These piles are colonized by rockweed and likely provide habitat to invertebrates upon which juvenile salmonids might prey.

Because the Anderson & Middleton site is located along a scour zone close to the navigation channel, mudflats are neither extensive nor highly productive at this site; this was supported during the June 2009 surveys by the absence of species that characterize mudflat habitat. WSDOT biologists took samples along transects at the 0 and +2 feet MLLW tidal elevations, and essentially no epibenthic fauna or flora (invertebrate animal and plant organisms living in the mudflat) were found along these sampling transects. In addition, clams and worms found within the samples were much less abundant than commonly found in intertidal estuarine areas. Generally, the beach substrate can be characterized as having little visible fauna either on the substrate surface or within the substrate.

Exposed mudflat, piles, and woody debris on the eastern portion of the Aberdeen Log Yard site shoreline.

Aberdeen Log Yard Alternative

The marine shoreline at the Aberdeen Log Yard Alternative site is approximately 1,700 linear feet, with relatively natural, gradual slopes and limited hard bank armoring. The shoreline consists of silt, sand, and angular cobbles and an area of wood waste (sawdust and

bark). The intertidal zone transitions to the upland log storage area along a moderately steep vegetated bank that runs mostly east-west (see Exhibit 3.1-3). West of this area just offshore is a sunken barge within the derelict piles, and there are other areas of abandoned concrete pylons and concrete rubble.

During low tides, hundreds of old wooden piles that likely supported a large pier in the past now extend about 5 or 6 feet above the mudline into the cobbled portion of the shoreline (see Exhibit 3.1-3). During the summer 2009 surveys, the lower portions of the piles were densely covered with rockweed. Two additional rows of piles run parallel to the shoreline, from about the middle of the site to its eastern boundary. Also, there are a 40-foot-long bulkhead and dozens of piles arranged in a T-shape near the eastern boundary area.

The upper limit of the intertidal zone contains scattered patches of emergent intertidal wetlands, formed on turflike mats. Nonnative Himalayan blackberry (*Rubus armeniacus*) and some scattered native shrub species, such as willow (*Salix* spp.), are on the bank above the intertidal zone. Large and small woody debris are all along the entire site shoreline. The woody debris and overhanging woody vegetation on the bank is too far from the water to provide any over-water cover for fish. Patches of rockweed dominate vegetation within the rocky intertidal zone. Overall, the shoreline at the site is unarmored, and the woody debris scattered on the intertidal portion of the site likely provides habitat for aquatic species. The proposed launch channel area at this site is generally spall-covered in the upper intertidal zone and mudflat in the lower intertidal zone.

Based on the summer 2009 surveys, WSDOT found that mudflats at the Aberdeen Log Yard site had more numerous small clams and worms than the Anderson & Middleton site, but otherwise both sites had similar benthic species composition and substrate. It should be noted, however, that the sampling represents a single event, conducted at a single point in time and that overall species composition and distributions can vary seasonally, although the species observed do not tend to change abundance markedly with different seasons.

Are the project sites within any federally adjudicated tribal fishing areas?

CTC Facility

Commencement Bay, designated as Salmon Management Area 11A, is within the federally adjudicated “usual and accustomed” fishing grounds of the Puyallup Tribe of Indians. WSDOT has been in

contact with the Puyallup Tribe and will continue to coordinate with them as the project progresses.

Grays Harbor Build Alternatives

Both Grays Harbor build alternative sites are within the federally adjudicated "usual and accustomed" fishing area of the Quinault Indian Nation. Their "usual and accustomed" fishing grounds include Salmon Management Area 28, which is within Grays Harbor and its tributaries. The Quinault Indian Nation has a staff of fisheries biologists and takes an active role in managing salmonids, shellfish, and other finfish within the study area.

The Quinault currently fish for salmon (coho, chum, and Chinook), steelhead, and sturgeon, and harvest Dungeness crab. Two major fishing areas for the Quinault are the Humptulips and Chehalis rivers. Species of concern in the harbor also include numerous forage species. The Quinault conduct drift-net fishing in the waters off of the Aberdeen Log Yard site and harvest Dungeness crab off of the shores of the Anderson & Middleton site. Tribal fishers are active much of the year because the different fishery resources have different harvest seasons spread throughout the year.

WSDOT is coordinating with the Quinault Indian Nation regarding project activities in their federally adjudicated "usual and accustomed" fishing area and soliciting their feedback on potential effects and mitigation. Coordination efforts have included meeting with the tribal technical staff, leadership, and tribal fishing community; conducting site visits; and reviewing technical documents.

What has led to the condition of fish and aquatic resources in the study area?

Fisheries and aquatic resources and their habitat within the study area have been substantially degraded by past actions, and they probably will continue to be affected by future actions and ongoing trends. These actions and trends include filling, diking, and dredging projects; alteration of ecosystem processes; deforestation; loss of riparian habitat; instream habitat loss and fragmentation; competition and predation by invasive species; overharvesting of fisheries; increased impervious surface and water pollution; and changes in groundwater, stormwater, and surface water flow (Smith and Wenger 2001; Williams et al. 1975). Current stresses on the aquatic environment of Grays Harbor that could specifically affect salmonid populations include degraded water quality, dredging, loss of estuarine habitat, invasive species, predation, and degraded nearshore conditions (Smith and Wenger 2001).

Approximately 30 percent of the historic Grays Harbor estuary has been lost (NRC 1996), and this loss has negatively affected salmonid growth and feeding. Conversely, the lower Chehalis River (about 10 miles upriver from Grays Harbor) contains large amounts of relatively undeveloped estuarine floodplain off-channel habitat that supports juvenile salmonid migrating out of the river (Smith and Wenger 2001).

How did WSDOT evaluate direct effects on fish and aquatic resources?

WSDOT collected information on fish species and their distribution and habitat within the study area by reviewing available literature, including peer-reviewed articles in scientific journals, technical reports, and data from various state, county, tribes, and city agencies. WSDOT biologists also visually inspected freshwater and marine and estuarine aquatic habitat conditions within and adjacent to the Grays Harbor build alternative sites study area, including riparian vegetation, algae and aquatic plants, bank stability, bottom sediments composition, culverts, in-stream habitat morphology (form and structure), and habitat complexity.

As mentioned previously, WSDOT biologists sampled mudflats at both sites during the 2009 summer low tides to generally characterize the species found at these sites. WSDOT then evaluated project design and agency construction methods to identify changes to fish and aquatic habitat that would likely result from each build alternative.

In addition, video surveys were conducted at the pontoon moorage area to determine locate and assess aquatic vegetation. The surveys showed no aquatic vegetation at the proposed pontoon moorage site. The pontoons would likely be moored in water depths varying between -25 to -65 feet MLLW, and there is insufficient light at these depths to support aquatic vegetation.

How would construction of the casting basin directly affect fish and aquatic resources?

Grays Harbor Build Alternatives

Habitat alteration effects on fish resources could occur through the following activities:

- Constructing the launch channel
- Conducting in-water and upland pile-driving
- Constructing the casting basin and support facilities, such as access roads, laydown areas, a concrete batch plant, office and parking

spaces, a rail spur, the gate trestle, and water-handling and treatment systems

Both Grays Harbor build alternatives would place new structures within shoreline, intertidal, open water, and watercourse (any natural or artificial channel through which water flows) habitats that support fish species in the Grays Harbor watershed. Constructing the launch channel at either build alternative site would require dredging within the nearshore, including intertidal mudflats. The launch channel gate might be accessed by a trestle (built into what is now land), which when fully operational, would become a new over-water structure within the site's modified shoreline.

In addition to shoreline and intertidal habitat replacement, hydroacoustic (that is, noise) effects associated with installing the upland and in-water piles at either site could adversely affect aquatic species. Initial dredging to construct the launch channel at either build alternative site would convert existing intertidal habitat into subtidal habitat. This intertidal habitat alternation and displacement would negatively affect benthic organisms that currently occupy the intertidal zone. In addition, construction dredging would result in short-term, localized increases in turbidity in the dredging area during site construction; however, both build alternative sites are located within an area characterized by high sedimentation rates from the Chehalis River and other tributaries to Grays Harbor. Regulatory work windows (see sidebar)—implemented as part of permitting requirements—would minimize exposure of many fish species that exist within Grays Harbor (for example, salmon, bull trout, and forage fish) to water quality effects, including increased turbidity during construction and maintenance dredging.

What are regulatory work windows and how do they apply to fish?

Regulatory work windows are periods during the year when construction or other potentially fish-disturbing activities are allowed to occur as condition of a permit. These windows correspond to times when work would have the least effect on fish, such as when fish are not migrating or spawning.

Although the facility designs at each build alternative site have several similarities, the magnitude of habitat alteration that would occur differs. Construction would disturb nearshore and intertidal habitat at both alternative sites; however, the launch channel footprint at the Aberdeen Log Yard site would be larger and extend farther into the harbor than at the Anderson & Middleton site. This is because the nearshore area is shallower at the Aberdeen Log Yard site and a longer launch channel would need to be constructed to accommodate pontoon transport from the casting basin to the navigation channel. The dredging required to create the proposed launch channel would be much greater at the Aberdeen Log Yard and result in substantially more disturbance to nearshore and intertidal fish habitat. Specifically, constructing the launch channel would encompass a 5-acre area at the Aberdeen Log Yard site compared to a 1-acre area at the Anderson & Middleton site.

At either build alternative, piles for up to 12 mooring dolphins would be installed within the launch channel, and up to another 12 mooring dolphins would be installed outside the launch channel. Sound energy from in-water pile-driving could affect general fish behavior and could directly injure or kill fish. Several variables could determine the specific effects of this project's pile-driving activities on fish, including the nature of the sediment (soft versus hard); the type of pile (concrete or steel); the type of hammer used (impact versus vibratory); whether or not fish are present; fish size; and fish distance from the activity. None of these are determined at this time. WSDOT would implement appropriate best management practices, however, such as using a vibratory hammer when feasible and/or using a bubble curtain or other noise attenuation system to minimize the sound energy effects of pile-driving on fish and aquatic species. Regulatory work windows would minimize exposure of many fish species within Grays Harbor to increased underwater sound levels.

During casting basin facility construction, there could be sources of pollutants in the runoff from the site, such as fuel, oil, grease, heavy metals, and small-particle sediment that could increase the water's turbidity. Potential water quality effects on fish resources, including salmonids, forage fish, flat fish, and sturgeon, would be similar at either build alternative site. WSDOT would implement best management practices and treat discharge water as needed to comply with local, state, and federal water quality regulations.

Other potential construction effects on water quality that could affect fish and aquatic resources include spills of hazardous materials, chemical contaminants, nutrients, or other materials. Because WSDOT would not likely encounter large amounts of contaminated sediments in the launch channels at either Grays Harbor build alternative site during launch channel dredging (based on investigations to date), and because best management practices would be implemented as appropriate to contain contaminated sediments, effects from sediment resuspension in Grays Harbor likely would be limited to temporary increases in turbidity levels and would not be toxic to aquatic organisms. (See Section 3.3, Hazardous Materials, for more detailed information on potential project effects related to hazardous materials.) Stormwater and construction-related runoff would be treated as needed for metals, pH, and other contaminants before being discharged into surface water. As a result, site development would not likely degrade water quality beyond the existing baseline conditions.

How do nutrients affect water quality?

Nutrients of concern for water quality typically include phosphorus and, to a lesser extent, nitrogen, which can stimulate excessive algae and aquatic plant growth and later decay. This excess of decomposing algae and aquatic plants, along with potentially causing undesirable odor and aesthetic nuisances, depletes dissolved oxygen needed by fish.

Aquatic species could be adversely affected during the construction of the wetland mitigation site; however, WSDOT anticipates that,

once completed, the proposed mitigation would increase fish and aquatic habitat function and acreage over time.

Anderson & Middleton Alternative

At the Anderson & Middleton Alternative site, constructing the launch channel from the casting basin would not substantially alter aquatic habitat in Grays Harbor. The launch channel would extend approximately 110 feet into shallow subtidal habitat in Grays Harbor. Between the casting basin and the shoreline, the channel footprint would require excavating approximately 100,000 cubic yards of existing fill material. WSDOT would construct the launch channel within the existing asphalt staging area of the log yard and into the shoreline. This shoreline area is now dominated by a bulkhead with riprap and concrete rubble. The offshore extension of the channel would require excavating approximately 23,000 cubic yards of substrate habitat comprising tidal mudflats and bottom material composed of fine silt and muck.

The shoreline that would be converted to the launch channel at this site is now composed of riprap and concrete rubble, which includes some large (greater than 100-square-foot) pieces; thus, the project would not likely diminish existing shoreline habitat functions. Any pieces of large wood within the launch channel footprint would be repositioned along the site shoreline.

Although project-related dredging would not likely have an effect on the overall aquatic community in Grays Harbor, localized habitat displacement would occur, and habitat functions supporting fish would be affected in this area. For example, activities and habitat alterations within the launch channel area could alter salmonid migratory patterns. Likewise, habitat functions provided by the existing piles and mudflat would be replaced with nearshore mooring dolphins, although WSDOT expects that rockweed would quickly recolonize on the dolphins within the disturbed areas.

Constructing support facilities (such as the concrete batch plant) on the upland portion of the Anderson & Middleton site would mainly affect dozens of small symmetrical rows of earthen depressions that drain stormwater into Channels A, B, C, and D (Exhibit 3.1-3), which in turn convey onsite and offsite drainage to Grays Harbor. These small rows of manmade depressions do not contain quality stream habitat nor are they known or presumed to support fish. Upland habitat, including these drainage swales, would be disturbed during construction of support facilities.

Aberdeen Log Yard Alternative

Constructing the casting basin at the Aberdeen Log Yard Alternative site would not alter any aquatic habitat on the upland portion of the

site used by Grays Harbor fish. As described above, the only potential for fish within this site is through the stormwater channel (Channel A), although the habitat is of poor quality. The casting basin would be constructed within an area that contains numerous log piles, remnant built structures, and approximately 2.4 acres of highly disturbed emergent wetlands that have formed under log piles and roadside depressions. These features are completely inaccessible to fish and do not provide riparian habitat to fish-bearing waterways. Because the casting basin would be constructed approximately 100 feet from the shoreline and on dry land, the pile-driving for the casting basin foundation would have a limited effect on fish.

The launch channel at this site would extend approximately 420 feet into shallow subtidal habitat in Grays Harbor. The launch channel footprint between the casting basin and the shoreline would require excavating approximately 101,000 cubic yards of existing material on a moderately steep bank vegetated with nonnative Himalayan blackberry, reed canarygrass, and sparse areas of native shrub species that provide minimal fish habitat. Habitat in this zone would be displaced during construction. The large woody debris along the shoreline would be repositioned to continue to provide habitat functions.

The launch channel offshore extension would require excavating approximately 111,000 cubic yards of substrate habitat and permanently placing approximately 40,000 square feet of riprap to protect the edges of the launch channel. Nearly half of this riprap would be placed within the intertidal zone, between MLLW 0 to -4. Approximately 17,000 square feet of riprap (not accounted for in the total quantity of riprap above) would be placed along the edge of the launch channel in an area that is currently upland; this upland area would become subtidal (always submerged) after launch channel construction.

Individual fish could be harmed where the launch channel is excavated in submerged areas. Some fish could become trapped or even directly affected during dredging or excavation. The behavior of some fish could be temporarily affected by the increased and localized turbidity. These effects would occur within the mudflats, which consist of anoxic (oxygen-deficient) fine silt and muck bottom material, in an area that serves as an outmigration corridor for juvenile salmon. Preliminary investigations indicate that existing mudflat appears to be of limited biological productivity, with eelgrass and other aquatic macrophytes (marine plants) generally lacking and a limited amount and diversity of epibenthic fauna (organisms living on the mudflat) present.

The effects of launch channel dredging at the Aberdeen Log Yard site would be similar to those discussed above for the Anderson & Middleton site. However, because the launch channel at the Aberdeen Log Yard site would extend over a greater distance of mudflat (420 linear feet versus 110 linear feet), slightly more aquatic flora and fauna would be disturbed by the Aberdeen Log Yard Alternative, and some habitat functions that support fish in this area would be disturbed. Nonetheless, for the reasons discussed above and with the use of best management practices and mitigation measures to offset effects, WSDOT does not anticipate that the effects from the launch channel, dolphins in the launch channel, and pontoon anchoring (in outer Grays Harbor) would adversely affect the overall aquatic community in Grays Harbor.

How would pontoon-building operations directly affect fish and aquatic resources?

CTC Facility

Gate-opening associated with pontoon-building operations at the CTC facility could result in some fish becoming trapped in the casting basin during casting basin flooding. However, WSDOT would employ fish exclusion measures, such as screening incoming water, to minimize fish being trapped during casting basin flooding and pumping activities. WSDOT would also implement protocols for retrieving stranded fish as the water is drained from the casting basin. These measures would minimize mortality from fish entrapment and stranding at the CTC facility. This facility is currently operational and permitted for existing uses.

Grays Harbor Build Alternatives

Project operations would be similar at both Grays Harbor build alternatives sites, as would the types of fish and aquatic species potentially affected by the project. While pontoons are being constructed, all pumps or outlets, if used to convey water between the site and fish-bearing waters of Grays Harbor, would be screened according to NOAA Fisheries (NOAA 1997) and WDFW standards (per RCW 77.57.070; RCW 77.57.010; and RCW 77.57.040). The access gate from the harbor to the casting basin would be closed during pontoon construction. Since the casting basin would connect to Grays Harbor via the launch channel, fish could potentially enter the basin with each gate opening. These fish could become trapped when the casting basin is flooded and then stranded after the gate is closed and the basin is emptied for the next pontoon-building cycle.

When a set of pontoons is complete, the casting basin would be flooded in a controlled manner, with water entering the basin through

a hydraulic control structure. This control structure would include properly sized fish screens on intake structures (small enough to keep juvenile or small fish out) to prevent fish from entering the facility during basin filling and draining. Water intake velocities of the pumps would be low enough so that fish would not be trapped on the screen surface. WSDOT would design these structures in accordance with NOAA Fisheries standards to avoid potential effects on fish.

WSDOT would also design the casting basin with trenches and sumps to allow any fish that do become stranded as the gates are closed to be safely removed (see Chapter 2 section *Why is WSDOT analyzing the casting basin method for building pontoons?*). WSDOT would monitor the casting basin during draining operations. Any fish collected in these trenches, which would drain to a fish collection box, would be collected and released into Grays Harbor using protocols consistent with NOAA Fisheries, USFWS, and WDFW requirements (WSDOT 2009a).

High pH (alkaline) waters resulting from contact with curing concrete in the casting basin pontoon forms and from basin cleaning could be generated and discharged. These process waters would be treated to meet applicable water quality standards before being discharged to Grays Harbor.

Each cycle of completed pontoons (except the last cycle) would be towed out of the casting basin through the Grays Harbor navigation channel to reach the pontoon moorage location. A short-term disturbance to soft sediment and an increase in turbidity, caused by propeller wash from tugboats, could occur when moving the pontoons out of the casting basin. However, both build alternative sites are located in areas with a high existing baseline for sedimentation; thus, tugboat traffic would not substantially increase turbidity levels above existing conditions. Both alternative sites are adjacent to the Grays Harbor navigation channel; therefore, moving and transporting the pontoons (which could only occur two to three times per year at most) would have only minimal and immeasurable effects on fish and aquatic habitat compared to existing vessel traffic in the navigable waterway.

Stormwater from approximately 30 acres of impervious surfaces at either site could potentially increase the amount of pollutants entering surface waters, including Grays Harbor, which could affect fish and aquatic resources. However, all discharged water would be treated to meet state water quality standards prior to discharge. Other potential effects on water quality during pontoon-building operations could include hazardous material (for example, oil and gasoline) and chemical contaminant spills into surface waters. See Section 3.4,

Water Resources, for potential effects on water resources and measures to reduce these effects.

Both build alternative sites are in areas of Grays Harbor where sediments are continuously being deposited from the Chehalis River. While the casting basin facility is used for pontoon-building operations, WSDOT would dredge the launch channel as needed to keep it free of sediment deposition and deep enough for pontoon launching. Between dredging episodes, some amount of aquatic flora and fauna would recolonize the bottom of the launch channel.

How would pontoon moorage directly affect fish and aquatic resources?

WSDOT ecosystem analysts reviewed the proposed pontoon moorage location and configurations (Morgan et al. 2009). WSDOT could moor up to 23 longitudinal and 10 supplemental stability pontoons in outer Grays Harbor (See Exhibit 2-8 in Chapter 2). The moorage configuration analyzed assumes that all pontoons built at the casting basin facility would be accommodated at the moorage location. The pontoon moorage location is 200 feet south of the navigation channel, in waters varying in depth from -65 to -25 feet MLLW. The pontoons would be moored in rafts of four placed about 300 feet apart and aligned roughly parallel to (and south of) the navigation channel. A taut line mooring system with pile-driven plate anchors is proposed to hold the rafts in place to minimize effects on the benthic (bottom-dwelling) habitat.

In total, the pontoon moorage area would encompass roughly 24 acres of water surface, while the surface of the pontoons would encompass approximately 15 acres. For this analysis, WSDOT assumed that the pontoons could be moored between 5 and 10 years (Morgan et al. 2009). However, if the SR 520 Program's I-5 to Medina: Bridge Replacement and HOV Project remains on schedule, pontoons would be moored only up to 1.5 years.

The pontoons would be equipped with lighting in compliance with U.S. Coast Guard lighting requirements. (Lights must be yellow and be visible from between 2 to 3 nautical miles.) The timing of lights flashing would follow U.S. Coast Guard requirements, which are based on the site's location. Lights would be placed on all four corners of the pontoon rafts and would not exceed 200 feet between lights.

The harbor's substrate at the proposed pontoon moorage site is dynamic, with high rates of sand movement, as evidenced by the sand waves on the sea bottom and video records of the substrate (ICF Jones & Stokes 2009a; Golder & Associates 2009). This dynamic

condition likely limits the abundance and diversity of benthic fauna (bottom-dwelling organisms) occurring at the site. WSDOT has selected the least environmentally damaging plate-anchoring system. WSDOT proposes a direct, embedded plate-anchor system for holding the moored pontoons in place. The plate anchors would be vibrated 30 to 60 feet below the sediment surface using a pile-follower (a removable shaft around the plate and anchor chain). The pile-follower would then be removed, leaving the plate anchor connected to an anchor chain. A crane barge would then apply tension to the anchor chain to toggle the plate anchors into place. This system would use four plate anchors for each pontoon raft, for a total of 36 anchors. Each raft of pontoons would be further secured by a taut-line mooring system, which in turn is held in place with two mooring buoys, for a total of 18 mooring buoys.

Installing any anchoring system would disturb the footprint of the benthic habitat. The proposed plate-anchoring system would have the smallest possible footprint of available anchoring alternatives. Each anchor would likely temporarily disturb less than a square yard of benthic habitat when the anchor is embedded in the harbor's floor. However, some benthic organisms (such as clams and worms) within the anchor insertion footprint would be destroyed. The embedded anchor would rest well below the bottom surface layer that can support benthic organisms (the biologically active surface layer is estimated to be less than 1 foot deep), with only the anchor chain penetrating the surface layer.

Shading

WSDOT anticipates that any potential effects on benthic invertebrates and aquatic vegetation from shading caused by pontoon rafts would be minimal. The zone within which pontoons would be moored varies in depth from -25 MLLW at its shallowest point (closer to shore) to -65 MLLW at its deepest point (200 feet away of the navigation channel). Recent video surveys revealed no aquatic plants and algae (ICF Jones & Stokes 2009a) in these zones. The absence of aquatic plants and algae is likely due to a combination of low light on the bottom of Grays Harbor (sediment from the rivers entering the harbor produce turbid conditions) and the relatively high velocities of tidal currents, which likely prevent benthic fauna from attaching or settling on the sea bottom.

The size of the surface area of the pontoon moorage site represents approximately 0.02 percent of the more than 58,000 acres of Grays Harbor at high tide. Altering this small portion of the Grays Harbor surface water would be unlikely to produce a detectable effect on Grays Harbor primary productivity or temperature.

Biofouling

The hard underwater surface of the moored pontoons could—depending on how long they are moored—support a variety of aquatic species, such as barnacles, macroalgae, and a variety of other marine fauna that reside on hard substrate. Species that cause biofouling would also likely become established on both the anchor chains and the wet surfaces of the mooring buoys at either end of a pontoon raft. Together with the increased in-water habitat complexity provided by the pontoons, these species could attract fish that are commonly attracted to structures placed in aquatic habitats.

What is biofouling?

Biofouling refers to the impairment or degradation of something, such as a ship's hull or the underwater side of a floating pontoon, as a result of the growth or activity of living organisms.

WSDOT is continuing to consider biofouling as a potential effect associated with pontoon moorage. See the section *What mitigation measures does WSDOT propose to reduce direct effects on fish and aquatic resources?* for proposed measures to prevent the transport of invasive species. Potential use of the pontoons by birds (and proactive measures to discourage any wildlife use of the pontoons) is discussed further in the Wildlife section of this chapter.

Sediment Scour and Deposition

WSDOT analyzed currents in and around the proposed outer Grays Harbor pontoon moorage location. The modeling for this analysis demonstrates that local hydrodynamics (the dynamics of fluids in motion) could be slightly altered by pontoon moorage configurations (Darnell 2009). However, the alteration would be minimal and would likely result in just a small and transient increase in sediment transport in the pontoon vicinity, which could result in a localized depression (2 to 3 feet) of the sea bottom under the pontoon rafts. This depression would likely fill and recover after the pontoons are removed. WSDOT would anticipate no adverse effects on ecosystems as a result of this localized alteration in sediment transport.

How would the project affect tribal fishing?

CTC Facility

WSDOT does not expect that operating the CTC facility would affect "usual and accustomed" tribal fishing and will consult with the Puyallup Tribe to ensure that pontoon launching and towing are coordinated to avoid tribal fishing activities. Once pontoons are constructed, they would be transported through existing navigation channels in Puget Sound and moored at an existing berth(s).

Grays Harbor Build Alternatives

Project construction and operation could affect treaty fishing; these activities include launch channel construction, mooring dolphin

installation, pontoon moorage, materials transport via barge, and activities associated with pontoon launching from the casting basin. These activities could temporarily displace Quinault Indian Nation fishers from some Grays Harbor fishing locations or affect habitats contributing to the health and population of fisheries resources.

Overall, the types of effects on treaty fishing would likely be comparable for both build alternative sites; however, there would be some differences in how the construction and operation activities would interact with treaty fishing opportunities at each site. For example, dolphins installed within and adjacent to the launch channels at either site might interfere with treaty fishing. The Aberdeen Log Yard site is in a portion of the Chehalis River system that includes numerous built obstructions that already currently affect treaty fishing, whereas relatively few obstructions are present adjacent to the Anderson & Middleton site. Similarly, constructing the respective launch channels might affect treaty fishing opportunities and fishery resources.

The Aberdeen Log Yard site launch channel would have a larger overall footprint because it would span a farther to reach the navigation channel. Developing this launch channel would take slightly more time, but it would be coordinated with the Quinault Indian Nation to avoid periods of treaty fishing. Mitigation for lost habitat function would occur at a mitigation site. WSDOT would minimize potential effects by coordinating directly with the Quinault Indian Nation and tribal managers to limit these activities during periods of active treaty fishing.

How would the build alternatives compare in their effects on fish and aquatic resources?

Exhibit 3.1-4 summarizes and compares the direct effects of the Anderson & Middleton and Aberdeen Log Yard alternatives on fish and shoreline habitats.

What indirect effects would the project have on fish and aquatic resources?

CTC Facility

WSDOT does not anticipate that using the CTC facility would affect fish and aquatic resources at a distance from the site or later in time because all potential effects from pontoon construction at the site (for example, fish becoming stranded or trapped and water quality effects) would be direct effects. Similarly, pontoon towing and moorage in Puget Sound also would not likely indirectly affect fish and aquatic resources either after the pontoons leave the moorage or at a distance from the moorage locations.

EXHIBIT 3.1-4
Fish and Aquatic Resources Summary of Direct Effects

Dredging Footprint by Area	Anderson & Middleton Alternative (cubic yards)	Aberdeen Log Yard Alternative (cubic yards)
Above MHHW more than 10 feet MLLW	104,900	115,500
Intertidal and/or mudflat (10 feet by more than -2 feet MLLW)	13,800	99,800
Subtidal (less than -2 feet MLLW)	4,900	8,000
Total dredge volume (cubic yards) (below MHHW = +10 feet MLLW)	123,600	223,300
Approximate total direct effects (acres)	1.0	5.0

MHHW mean higher high water
MLLW mean lower low water

Grays Harbor Build Alternatives

Except for launch channel construction, developing a casting basin at either Grays Harbor build alternative site would not result in indirect effects on fish and aquatic resources. As mentioned earlier, the launch channel could cause slight changes to the migratory pattern of salmonids, and such changes could make them more vulnerable to predatory fish, birds, or marine mammals. Although potential changes to fish migratory patterns would be a direct project effect, the subsequent changes in fish behavior and predator/prey relationships would be considered an indirect effect. The indirect effects on fish and aquatic resources resulting from altered migration patterns would likely be minor and would not likely adversely affect the overall aquatic community in Grays Harbor.

WSDOT does not anticipate that pontoon-building operations at either build alternative site would indirectly affect fish and aquatic resources because any effects from building pontoons would all be direct effects (see *How would pontoon-building operations directly affect fish and aquatic resources?* previously).

Pontoons moored in outer Grays Harbor would create shading under the pontoons. The pontoons would become colonized by aquatic organisms (in this case likely barnacles and mussels) that typically colonize hard structures in the marine environment. This, in turn, would likely draw larger predator fish to feed under the pontoons, thus creating a local ecosystem—a localized, indirect effect. This indirect effect could alter some predatory/prey relationships, although these changes could benefit some fish (such as salmonids, bull trout, sturgeon, and other larger species), while causing increased predation on other species (such as aquatic invertebrates, forage fish, and other smaller fish).

How would fish and aquatic resources be affected if the project were not built?

Under the No Build Alternative, there would be no construction, operational, or long-term effects on fish and aquatic resources because no action would be taken.

What mitigation measures does WSDOT propose to reduce direct effects on fish and aquatic resources?

Avoidance and Minimization

CTC Facility

By using the existing CTC facility, WSDOT could accelerate the pontoon construction schedule. Because the facility is already in place and WSDOT anticipates no effects on fish and aquatic resources outside of the normal, already-permitted operation of the existing facility, WSDOT does not anticipate that any mitigation would be required, other than fish handling protocols.

Grays Harbor Build Alternatives

Avoiding effects, to the greatest extent practical, is an essential part of WSDOT's early project planning. WSDOT would apply best management practices to help minimize direct effects on fish from casting basin facility construction and operation. WSDOT would handle and treat all stormwater runoff in accordance with state water quality requirements using WSDOT's *Highway Runoff Manual* (WSDOT 2008a), and use features such as sediment ponds and wet ponds (constructed basins that have a permanent pool of water throughout the year) for stormwater retention to prevent water quality degradation.

Depending on final design, WSDOT would likely implement some or all of the following best management practices at either build alternative site:

- Perform in-water work only during published work windows, as directed by the appropriate agencies, to minimize the likelihood that fish exist during the in-water construction activities.
- Implement measures to minimize the loss or transport of contaminated sediment or debris from the dredging footprint and minimize leachate from generating and/or running off of dredged material to Grays Harbor during transport or handling of dredged sediments.

- Design and implement a fish-handling system at the casting basin to minimize or eliminate fish stranding or entrapment within the facility.
- Implement management practices, such as using bubble curtains, for sound attenuation during in-water pile-driving, thus minimizing noise levels that could injure fish.
- Develop a spill prevention, control, and countermeasures plan and maintain the necessary materials for containing accidental spills onsite before and during construction.
- Prepare and implement a temporary erosion and sediment control plan to minimize and control pollution and erosion from stormwater.

WSDOT proposes locating the pontoon moorage where the pontoons would have minimal effects on tidal exchange, currents, or substrate distribution in Grays Harbor, all of which affect fish. (Exhibit 2-8 in Chapter 2, Project Alternatives, shows the proposed moorage locations). To ensure that no invasive aquatic species, such as green crab, would be transported out of Grays Harbor on the pontoons, WSDOT would monitor the pontoons for aquatic species growth and clean the pontoons, as needed, before they leave the harbor. WSDOT has also selected the least environmentally damaging anchor system available for pontoon moorage.

Mitigation

In cooperation with regulatory agencies and tribes, and as part of the required permit applications, WSDOT would develop specific plans for habitat improvements, restoration, or creation to compensate for project effects on fish and fish habitat.

Compensatory habitat restoration might include enhancing shoreline areas onsite or at an appropriate site elsewhere in the Grays Harbor basin with appropriate substrate and vegetation or installing complex habitat components, such as large wood. Mitigation could include removing existing derelict creosote-treated piles. WSDOT would address shoreline effects to satisfy the requirements of local critical areas regulations and to enhance marine fish habitat to the maximum extent possible. All of these options would be considered, as appropriate, at the mitigation sites being considered. In addition, as the design progresses WSDOT would evaluate other measures to reduce effects.

How could WSDOT mitigate for indirect effects on fish and aquatic resources?

CTC Facility

The CTC facility is currently in operation, and indirect effects on fish and aquatic resources are not currently occurring. WSDOT does not anticipate any indirect effects to occur with ongoing use of the site to construct pontoons for their projects, so no mitigation would be required.

Grays Harbor Build Alternatives

As noted above, WSDOT would adopt best management practices during casting basin development and pontoon-building operations to avoid or minimize direct effects on fish and aquatic resources; these measures would also reduce indirect effects. WSDOT would also design mitigation to offset the anticipated direct and indirect effects. While it is still early in design, WSDOT anticipates mitigation would include creating nearshore or estuarine intertidal habitat that provides high-functioning resting, holding, and migration habitat for the affected aquatic resources.

What would the cumulative effect on fish and aquatic resources likely be?

CTC Facility

WSDOT did not identify any potential direct or indirect effects on fish and aquatic resources from operating the CTC facility. Therefore, there would be no contribution to cumulative effects on fish and aquatic resources associated with pontoon-building or towing activities at this site.

Grays Harbor Build Alternatives

The project's contribution to cumulative effects on fish and aquatic resources in Grays Harbor would likely be minor. Five other possible future development actions in the study area would involve in-water work, including dredging and increasing vessel access and traffic in the nearshore environment. Although developing and using those sites are consistent with the current industrial uses within this part of Grays Harbor and are consistent with the area's historical development over the last 100 or so years, dredging associated with these actions would likely increase turbidity within the harbor and could affect fish and aquatic resources in several ways. Sensitive aquatic organisms (such as macroinvertebrates and forage fish) could be directly injured during dredging, which could also remove a source of forage food for fish. Also, fish behavior could change as a

result of the turbid water. Today the project vicinity is subject to local ordinances and state and federal water quality regulations that have been implemented to protect water resources and aquatic habitat, including Grays Harbor.

Without the SR 520 Pontoon Construction Project, current development trends in Grays Harbor are likely to continue, although at a somewhat reduced pace than historical trends. Even at a reduced pace, development trends in this area could continue to place stress on aquatic species and degrade habitats. The habitat management goals of the resource agencies with jurisdiction in the project vicinity generally do not prioritize habitat restoration within existing industrial zones, given the lack of habitat connectivity and the potential for exposure to contaminants.

Furthermore, the Port of Grays Harbor and the cities of Aberdeen and Hoquiam have economic development goals that support ongoing industrial use of areas currently zoned as industrial, such as the Grays Harbor sites. From that perspective, using either Grays Harbor build alternative site for industrial development would be likely, even if this project were not constructed.

The SR 520 Pontoon Construction Project's contribution to resource degradation would likely be relatively minor. When assessed in the context of a WRIA or fish stock, the small amount of habitat affected would not substantially alter current trends.

How could cumulative effects on fish and aquatic resources be mitigated?

WSDOT anticipates that agencies and tribes would continue to work together to develop a regulatory framework that prioritizes fish habitat restoration actions for maximum benefit to the fish and aquatic resources within Grays Harbor.

Cumulative effects on fish and aquatic resources could be minimized by several measures. To aid in recovering fish stocks, a regionwide cooperative interagency approach or public-private partnership could focus on substantially improving fish habitat conditions and water quality within WRIAs 22 and 23, including Grays Harbor and its tributaries. Efforts to remove derelict fishing gear could be coordinated and enhanced.

What is the Endangered Species Act consultation process?

WSDOT began consultation with the NOAA Fisheries and USFWS in 2007 to coordinate on potential project effects on endangered species. Endangered Species Act consultation is required for projects

with federal funding or other federal nexus (that is, when a federal agency funds, authorizes, or carries out a proposed project). Potential effects on listed species are required to be evaluated in the form of a formal report called a Biological Assessment, which is expected to be complete mid-2010 for the SR 520 Pontoon Construction Project. The Biological Assessment evaluates effects of the preferred alternative on listed species and critical habitat in detail. The Biological Assessment also incorporates more specific project design information and describes the potential effects of proposed construction techniques. After reviewing the Biological Assessment, NOAA Fisheries and the USFWS will each issue a Biological Opinion with terms and conditions designed to minimize adverse effects on the listed species and habitats in the study area. The results of the Endangered Species Act consultation process will be documented in the SR 520 Pontoon Construction Project Final EIS.

Why is consultation under the Endangered Species Act required?

Section 7 of the Endangered Species Act requires that projects with federal funding or federal permits consult with the appropriate federal resource agencies to determine whether the project could jeopardize the continued existence of Endangered Species Act-listed species or adversely modify any designated critical habitat. The interagency consultation process occurs during the NEPA process, but it is on a separate, but parallel, track.

Wildlife

In this Draft EIS analysis, wildlife includes terrestrial (land) species, avian (bird) species, and marine mammals. Wildlife is part of an ecosystem, and the movements of wildlife (foraging, breeding, refuge, dispersal, and migration) affect and are affected by both the built and natural environment. Wildlife can affect habitat by consuming vegetation, insects, fish, or other animals; providing a source of prey and nutrients to other animals; and serving as a mechanism to disperse seeds. In the Grays Harbor area, wildlife diversity also helps support various aspects of the local culture and economy, including tourism. Wildlife is protected under federal, state, and local regulations.

What regulatory programs protect wildlife?

Regulatory programs to protect wildlife exist at the federal, state, and local level. Federal agencies with jurisdiction over wildlife include the USFWS and the NOAA Fisheries. USFWS is responsible for enforcing the Migratory Bird Treaty Act (16 USC 703 through 713) and the Bald and Golden Eagle Protection Act (16 USC 668-668c); NMFS implements the Marine Mammal Protection Act (50 CFR 216). Both agencies have responsibilities under the Endangered Species Act (16 USC 1536 (a)-(d)).

At the state level, the WDFW is charged with managing the wildlife resource, including designating and protecting state-listed endangered, threatened, and candidate species (WAC 232-12-014 and WAC 232-12-011) as well as Priority Habitats and Species. WDFW also oversees Hydraulic Project Approvals and establishes permit conditions for in-water work consistent with RCW 77.55 and WAC 220-110. Local governments might choose to designate fish and wildlife conservation areas, including species of local concern, in compliance with the Growth Management Act (RCW 36.70A).

What wildlife species live in and/or use the study area?

WSDOT biologists evaluated wildlife and habitat within one-half mile of the Grays Harbor build alternative sites because using either site could affect wildlife and habitats in this area. No site-specific wildlife analysis was conducted at the CTC facility because the site provides little to no natural vegetation or resources that support wildlife.

During the spring of 2008, WSDOT conducted a series of field surveys to document wildlife on the IDD #1 site, which is adjacent to the Anderson & Middleton site and approximately 2 miles from the Aberdeen Log Yard site. At that time, the IDD #1 site was a project

alternative, but it was later dismissed from further analysis. Data from these surveys are included in this Draft EIS because survey information from the IDD #1 site likely represents species use of the surrounding area, including both Grays Harbor build alternative sites.

CTC Facility

As stated above, no site-specific wildlife analysis was conducted at the CTC facility because the site provides little to no natural vegetation or resources that support wildlife.

Grays Harbor Build Alternatives

Both Grays Harbor build alternative sites are degraded habitat used by a wide variety of animal species, including birds, amphibians, reptiles, and mammals. (The actual species present vary with the season.) During April and May 2008, surveys at the IDD #1 site documented 53 bird species and garter snakes (*Thammophis* spp.), Pacific chorus frog (*Pseudacris regilla*), blacktail deer (*Odocoileus hemionus columbianus*), and harbor seal (*Phoca vitulina*). A full list of the observed species is provided in Appendix C, the Ecosystems Discipline Report. The most commonly occurring bird species within Grays Harbor are listed below, in descending order of occurrence, as observed during Christmas bird counts between 1974 and 2008 (Audubon Society 2008):

- European starling (*Sturnus vulgaris*)
- Mallard (*Anas platyrhynchos*)
- Gulls (*Larus* spp.) and terns (*Hydroprogne caspia*, others)
- Canada goose (*Branta canadensis*)
- Northern pintail (*Anas acuta*)
- Western sandpiper (*Calidris mauri*)
- Song sparrow (*Melospiza melodia*)
- Killdeer (*Charadrius vociferus*)
- Red-tailed hawk (*Buteo jamaicensis*)

Many birds in the study area and general vicinity use the dense riparian forest and shrub habitat, emergent wetland, and grassland habitat on the sites and nearby for migration and, possibly, nesting. There is more such habitat on the Anderson & Middleton site than the Aberdeen Log Yard site. The emergent wetland and grassland in the study area could provide habitat for Canada geese, ducks, and migrating shorebirds that forage in the wetland, but nesting within the emergent wetland and grassland at the Anderson & Middleton site is unlikely, given the lack of plant diversity and the proximity of higher quality habitat in the vicinity. The steep shoreline and general lack of emergent wetland connected to the estuary also limit nesting and foraging opportunities for shorebirds in the study area. The smaller Aberdeen Log Yard site provides even

less nesting and foraging opportunities than the Anderson & Middleton site. The narrow zone of shoreline habitat at the Anderson & Middleton site—between the north navigation channel of Grays Harbor and the steep rock berm surrounding much of the site—provides some foraging habitat for shorebirds. Comparable foraging habitat at the Aberdeen Log Yard site is more limited in quantity and quality.

Waterfowl live in Grays Harbor year round, but their numbers are largest during spring and fall migrations. Waterfowl live in Grays Harbor year-round, with the greatest numbers present during the spring and fall migration periods. American wigeons are the most common species during fall and winter, making up nearly 60 percent of the waterfowl population. Mallards, green-winged teals, and northern pintails are also common during the fall (USFWS 1990). More detail on bird use in the project vicinity, including at the Grays Harbor National Wildlife Refuge, is documented in Appendix C, Ecosystems Discipline Report.

Federal- or State-Listed or Protected Wildlife Species or Habitat

USFWS initially identified six federally listed wildlife species and two federal candidate species as potentially existing in Grays Harbor County (USFWS 2008a). Since that list was developed, one species (brown pelican) was removed from the federal list of endangered species (74 FR 59443), although it is still included in this discussion. In addition, there are harbor seals and bald eagles in the county, which are federally protected under the Marine Mammal Protection Act of 1972 and the Bald and Golden Eagle Protection Act, respectively. The study area contains potentially suitable foraging habitat for brown pelicans, marbled murrelets, bald eagles, harbor seals, and gray whales. Rennie Island (shown on Exhibit 3-3) provides potentially suitable nesting habitat for yellow-billed cuckoos, but this species no longer breeds in Washington (see Exhibit 3.1-5).

Two state-listed sensitive species (peregrine falcon and bald eagle) are known to exist near the study area (WDFW 2008b). In addition, four other state priority species—the western grebe, common loon, great blue heron, and purple martin—have been observed close to the build alternative sites and might occasionally be on or near either build alternative site (see Exhibit 3.1-6).

EXHIBIT 3.1-5
Federally Protected Species in Grays Harbor County

Species	Federal Status	Suitable Habitat Existence
Brown pelican *(Pelecanus occidentalis)*	Endangered (was delisted on November 17, 2009)	Suitable foraging habitat for nonbreeding pelicans exists in Grays Harbor, primarily in the mid- and outer estuary during summer and fall.
Marbled murrelet *(Brachyramphus marmoratus)*	Threatened	Suitable foraging habitat exists in Grays Harbor, primarily in mid- and outer estuary. No suitable nesting habitat exists within 5 miles of study area.
Northern spotted owl *(Strix occidentalis caurina)*	Threatened	No suitable mature or old-growth forests exist within 5 miles of study area.
Oregon silverspot butterfly *(Speyeria zerene hippolyta)*	Threatened	No suitable coastal salt-spray meadows or open-field habitats with larval host plant, western blue violet (*Viola adunca*), exist in study area.
Short-tailed albatross *(Phoebastria albatrus)* [outer coast]	Endangered	Pelagic species nest on isolated islands; no suitable habitat exists for this species in Grays Harbor.
Western snowy plover *(Charadrius alexandrinus nivosus)*	Threatened	Suitable nesting beaches and known nesting activity exists at Damon Point (8 to 10 miles from study area). No suitable nesting habitat exists within 5 miles of study area.
Streaked-horned lark *(Eremophila alpestris strigata)*	Candidate	Suitable nesting beaches and known nesting activity exist at Damon Point (8 to 10 miles from study area). No suitable nesting habitat exists within 5 miles of study area.
Yellow-billed cuckoo *(Coccyzus americanus)*	Candidate	Potentially suitable nesting habitat exists in forested and scrub-shrub wetland on Rennie Island. This species no longer breeds in Washington (Smith et al 1997).
Bald eagle *(Haliaeetus leucocephalus)*	Federal Species of Concern and protected by Bald and Golden Eagle Protection Act	Nesting territory exists on Rennie Island. The species forage on fish and waterfowl throughout Grays Harbor and perches on natural and manmade structures. The species perch on the piles at both build alternative sites.
Harbor seal *(Phoca vitulina)*	Protected under federal Marine Mammal Protection Act	The species use waters of Grays Harbor and lower Hoquiam and Chehalis rivers for foraging. Important haulout and pupping sandbars exist throughout mid- and outer estuary. The species are regularly seen just offshore from both alternative sites.
Gray whale *(Eschrichtius robustus)*	Protected under federal Marine Mammal Protection Act	The species use the waters of Grays Harbor during migration.

EXHIBIT 3.1-6
Existence of State-Listed and State Priority Wildlife Species in the Study Area

Species	State Status	Pontoon Construction Sites
Peregrine falcon (*Falco peregrinus*)	Sensitive	The Anderson & Middleton site, approximately the southern half of the Aberdeen Log Yard site, the mouth of the Hoquiam River, and intertidal habitats associated with Rennie Island are all mapped as a regular concentration area for peregrine falcons. They are known to forage in intertidal habitats along the Hoquiam waterfront and perch on trees, piles, and tall structures, including Hoquiam River bridge.
Western grebe (*Aechmophorus occidentalis*)	Candidate	Western grebes occasionally forage for small fish in waters adjacent to both sites. No known breeding sites exist in the study area.
Common loon (*Gavia immer*)	Sensitive	Common loons are regularly observed foraging for fish immediately offshore of the Anderson & Middleton site. They are likely also present offshore of the Aberdeen Log Yard site.
Great blue heron (*Ardea herodias*)	Monitor	An active rookery is on Rennie Island. Birds regularly forage in wetlands on the Anderson & Middleton site and in the study area.
Purple martin (*Progne subis*)	Candidate	Martins nest in piles within the study area. They forage for insects over the emergent wetlands in the study area.

WDFW identifies nonbreeding concentrations of shorebirds and waterfowl as priority species (see the sidebar description of state priority species in the *Fish and Aquatic Resources* section). Large concentrations of these species groups exist throughout Grays Harbor, particularly along shorelines and in intertidal zones. Neither build alternative site includes areas mapped by WDFW as large shorebird and waterfowl concentrations, although there are such areas in the general vicinity—most prominently near the Grays Harbor National Wildlife Refuge. The refuge, which is less than 2 miles west of the Anderson & Middleton Alternative site, and other locations nearby provide additional resting and foraging habitat for waterfowl in and around the study area. State priority habitats in the project vicinity include estuarine wetlands and freshwater wetlands, estuarine shorelines, and the vegetated estuarine habitats (for example, eelgrass) (WDFW 2008a).

Federal- or State-Listed or Protected Wildlife Species and Habitat near Proposed Pontoon Moorage Location

Grays Harbor provides suitable nesting habitat for snowy plovers and streaked horned larks and suitable foraging habitat for marbled murrelets, all of which are listed or candidates for listing under the federal Endangered Species Act. Federally protected marine mammals also are likely to travel through the pontoon moorage location vicinity.

Snowy Plover

The Damon Point and Oyhut Wildlife Area, approximately 4 miles west of the proposed pontoon moorage location, supports one of three known active breeding grounds for snowy plovers in Washington (Richardson 1995; WDFW 2008a). Snowy plovers of the Pacific Coast population typically nest on flat, sandy areas with little or no vegetative cover, such as on barrier beaches, dry lake beds, and salt flats (Wilson-Jacobs and Meslow 1984; Palacios et al. 1994). The birds generally nest above the high tide line on coastal beaches, sand spits, dune-backed beaches, and sparsely vegetated dunes; along beaches at creek and river mouths; and on salt pans at lagoons and estuaries. Snowy plovers nest from late April to late June (Wahl et al. 2005), with females laying two to three clutches of three eggs annually (Page et al. 1995). A major limiting factor for some populations is nest predation by gulls, ravens, and mammals (Page et al. 1983).

Streaked Horned Lark

Along with snowy plovers, streaked horned larks have been documented breeding at the Damon Point and Oyhut Wildlife Area (WDFW 2008a). The breeding range of this bird in Washington appears to be restricted to isolated locations at the south end of Puget Sound, on the outer coast, and in the Columbia River estuary (Stinson 2005). Nesting and foraging habitat in coastal areas includes open dune sites with unstable substrate and little or no vegetation, such as sand spits and dune-backed beaches (Richardson 1995; Rogers 2000; Stinson 2005). Stinson (2005) identified crows as the major predators of streaked horned lark nests in Washington.

Marbled Murrelet

Marbled murrelets forage in marine waters and nest in old-growth coniferous forest. The nearest known nesting site is more than 5 miles from the study area. Speich and Wahl (1995) reported that, over a 23-year period, marbled murrelets were recorded in Grays Harbor Channel in every month of the year. The general pattern of marbled murrelet occurrence was one of high average densities during the spring, fall, and winter, with higher densities in habitats closer to shore.

Marine Mammals

Approximately 29 species of marine mammals breed, rest within, or migrate through the waters off the Washington coast (NMFS 1992; NOAA 1993). Most of these are found only in offshore waters and are unlikely to venture into shallow, enclosed habitats such as Grays Harbor. A search of the Orca Network sightings archives from 2001 through 2009 yielded sightings of killer whales in Grays Harbor on several occasions, as well as isolated observations of gray whales, humpback whales, and pilot whales (Orca Network 2009). There are

harbor seal haulout sites throughout Grays Harbor, including sites where pupping occurs (WDFW 2008a). Harbor porpoise, California sea lion, and Steller sea lion are the other marine mammal species that might occur in Grays Harbor. Appendix C, the Ecosystems Discipline Report, includes additional detail on marine mammal use of Grays Harbor.

What are the habitat characteristics of the CTC site?

The CTC site is nearly fully built out and offers little to no wildlife habitat. The CTC facility is an actively used casting basin facility located within the industrial zone of the Port of Tacoma, an active deep-water port. The Port was established more than 100 years ago, and its construction led to the dredge and fill of intertidal mudflats and wetlands to develop usable land to support the burgeoning timber industry.

Aquatic habitat in the Commencement Bay area has been substantially degraded from predevelopment conditions by extensive fill and shoreline armoring projects, as well as the ongoing noise and pollutants that typify an industrial area.

What are the habitat characteristics of the Grays Harbor area and build alternative sites?

From a habitat perspective, the native vegetation and wildlife habitat at both Grays Harbor build alternative sites is characterized by a history of natural resource extraction and industrial land use development patterns in the area. Much of the forests in and around Grays Harbor were logged during the late nineteenth century and early twentieth century, which resulted in adverse effects on both terrestrial habitat (by removing forests) and aquatic habitat (by greatly increasing sedimentation and erosion entering streams and rivers after logging). Many streams and rivers were straightened and widened to function as log transporting systems, which also negatively affected wildlife habitat.

As noted in the *Wetlands* section, many of the harbor's natural features were modified by dredging and filling intertidal estuaries to create lands suitable for development, again changing habitat. The navigation channel continues to be dredged annually to maintain shipping access into the harbor.

Although both build alternative sites are located within industrially zoned portions of Aberdeen and Hoquiam, these jurisdictions are fairly small and surrounded by relatively rural and undeveloped lands that provide terrestrial and aquatic habitat. Bowerman Basin, an important

shorebird foraging site at the Grays Harbor National Wildlife Refuge, lies within 2 miles of the Anderson & Middleton site. Grays Harbor is the one of the largest estuaries along the West Coast and an important resource to migrating shorebirds and waterfowl (USACE 1998). Marine mammals, including harbor seals, and migratory gray whales also use Grays Harbor.

The pontoons would be moored approximately 2 miles from the nearest shoreline, in the vicinity of Whitcomb Flats (see Exhibit 2-8 in Chapter 2). The town of Ocosta and Bottle Beach State Park are located along the shoreline of Grays Harbor in this vicinity. Marine mammals such as harbor seals use the waters of Grays Harbor, including the pontoon moorage area. Gray whales also migrate along the West Coast and have been observed within Grays Harbor. Shorebirds feed on the rich supply of invertebrates in the mudflats within Grays Harbor. (Shorebird use is seasonal during migration.) Waterfowl and raptors use the intertidal areas as well. Shorebird use of Grays Harbor is documented in detail in Appendix C, Ecosystems Discipline Report.

Anderson & Middleton Alternative

The Anderson & Middleton site was formally used for log storage, and former site operators interspersed log storage areas with drainage swales in a regular pattern to drain the site. These swales now contain sedges, rushes, and grasses and tend to pond water, especially during the winter. These swales might provide breeding and rearing habitat for chorus frogs, as well as shelter, protection, and forage areas for passerine bird species (birds with feet adapted for perching). The log storage areas are intermittently covered with grasses and compacted gravel and fill material and provide little habitat for birds, mammals, or reptiles using the area.

The western portion of the site is more heavily dominated by grasses with interspersed patches of blackberry. An established alder-dominated forest runs along the southwestern edge of the site. The alder forest together with the grassy area in the western portion of the site encompasses approximately 19 acres and provides the best wildlife habitat on the site. This portion of the site is likely used by passerine birds, small mammals, reptiles, and amphibians within the study area.

Aberdeen Log Yard Alternative

The Aberdeen Log Yard site is more heavily developed than the Anderson & Middleton site and is an active log storage facility with limited habitat structural diversity and few vegetative features that support many wildlife species. The estuarine, rocky shore, emergent wetlands along the shoreline do provide some foraging for shorebirds

and waterfowl in the area; these areas encompass less than 0.5 acre of the total site.

More than half of the 51-acre site is used now as an access road or log storage area. The remainder of the site is characterized by the fill material used to develop the site and occasional swales intended to drain the site. Combined, these areas encompass approximately 16 acres of the current site. The swales pond water seasonally and might be used for breeding and rearing by common species, such as chorus frogs.

How did WSDOT evaluate direct effects on wildlife?

WSDOT mapped wildlife habitat within the study area, identifying basic landscape cover types within one-half mile of each site and the specific wildlife habitats within each cover type. The classification included estuarine habitats; wetlands; riparian areas; residential, urban, and industrial areas; and upland forests. Next, WSDOT reviewed proposed structures and project actions relative to mapped wildlife habitat and determined potential effects. WSDOT based the effects analysis on an assessment of potential changes in the availability and distribution of identified habitats, as well as the potential for disturbance from construction and related activities.

In addition to gathering information on wildlife and habitat within the boundaries of the study area, WSDOT ecosystem analysts collected information for the Grays Harbor estuary, offsite pontoon moorage locations, and areas near the proposed facilities. WSDOT also obtained information on wildlife from several other sources, including WDFW Priority Habitats and Species data (WDFW 2008a) and the USFWS list of federally listed species that are known or expected to occur in Grays Harbor County (USFWS 2008a). To supplement the existing data, WSDOT investigated field conditions and reviewed aerial photographs to identify habitat types and elements in the study area.

How would construction of the casting basin directly affect wildlife and their habitat?

Developing the casting basin at either Grays Harbor build alternative site would likely eliminate use by many wildlife species (including federally protected and state priority species) because existing vegetation would be removed and replaced with built structures and the laydown area.

Anderson & Middleton Alternative

Developing the casting basin facility and pontoon launch channel would eliminate the 32 acres of existing vegetative cover and a 300-foot-wide by 100-foot-long area of the shoreline. This area includes approximately 4.8 acres of emergent wetland and intertidal habitat. Wildlife using this area, such as small mammals, passerine birds, amphibians and reptiles, would be displaced during construction.

Construction would not directly affect a 40-acre area of vegetated land on the western portion of the Anderson & Middleton property, and existing habitat and vegetative cover would remain on this portion of the property. This area comprises primarily herbaceous and shrub wildlife habitat, but also provides grassland habitat, emergent wetland habitat, and high-quality estuarine wetland habitat. This area would remain available for use by wildlife in the vicinity, although use of the area might be adversely affected by construction noise, lighting, and disturbance.

WSDOT measured ambient noise levels at seven different locations near the Anderson & Middleton site, including the proposed haul route, which passes by the Grays Harbor National Wildlife Refuge along Paulson Road (see Section 3.10, Noise, later in this chapter). Using the haul route along Paulson Road would increase noise levels and result in an elevated risk of disturbance to shorebirds and other wildlife using the refuge. As discussed later in Section 3.10, noise levels at the Grays Harbor National Wildlife Refuge would likely increase by 5 to 12 decibels, ranging from 54 to 71 decibels, during peak hauling along Paulson Road. (Although the dBA scale reflects the hearing sensitivity of humans rather than wildlife, these values provide a sense of the relative magnitude of the anticipated increase; a 10-dbA increase is typically perceived as a doubling of loudness.) Based on the small proportion of the refuge area that would be affected by noise level increases and the availability of suitable habitat away from the proposed haul route, WSDOT does not anticipate that this increase would substantially alter shorebirds or other wildlife use of the refuge.

Noise and human activity associated with constructing the new casting basin facility could disturb wildlife. The degree of disturbance would depend on the noise level, the timing and duration of construction activities, and the sensitivity of individual animals. Most animals that use habitats at or near the Anderson & Middleton site are likely accustomed to urban conditions, including loud noises, vehicle traffic, and the presence of humans. Individual animals that are sensitive to such disturbance would likely avoid the area. Potential noise levels associated with construction activity would depend on many factors,

including the specific machinery and equipment being used and the conditions of the site undergoing excavation. Some activities, such as pile-driving, would be substantially louder than existing activities and could temporarily displace some animals or prevent them from using suitable habitat in areas adjacent to the site. In extreme cases, birds could abandon their nests in response to noise disturbance.

Federally protected bird species that could exist in the study area include brown pelican, marbled murrelet, and bald eagle, all of which might forage in the study area. State priority species that might forage in the study area include peregrine falcon, western grebe, common loon, great blue heron, and purple martin. If any individuals of these species are present while construction activities are underway, their feeding activities could be disrupted by increased levels of noise and human activity. Such effects would be temporary and localized and would not likely influence the viability of any local populations. Similarly, construction activities could disrupt the breeding behavior of purple martins and great blue herons in the short term during a single nesting season.

Lighting associated with nighttime construction could also disturb wildlife. Based on the proximity of the Anderson & Middleton site to nearby active industrial areas, areas where existing light levels are relatively low are likely scarce. Species that rely on low nighttime light levels probably avoid this area now, and constructing a new casting basin facility would not likely cause new disturbance.

In the marine environment, pile-driving for permanent and temporary pontoon mooring dolphins could result in underwater noise levels high enough to disturb marine mammals (which are protected under the Marine Mammal Protection Act and Endangered Species Act) and diving seabirds (including marbled murrelets, which are protected under the Endangered Species Act). WSDOT would use the best available information to determine the most efficient installation method to minimize the pile-driving process and associated biological effects on fish and wildlife.

In addition to using installation practices and sound attenuation methods that minimize adverse biological effects, WSDOT would employ appropriate and available best management practices during construction to minimize sound pressure being generated and transmitted as a result of pile-driving. Examples of such practices would include driving piles during low tide and approved work windows (as specified by WDFW, NOAA Fisheries, and/or USFWS). WSDOT is coordinating with NOAA Fisheries and the USFWS on this and other issues as part of the Endangered Species Act consultation process for the

project, as discussed under *What is the Endangered Species Act consultation process?* in the Fish and Aquatic Resources section earlier in this chapter.

Aberdeen Log Yard Alternative

All existing vegetative cover (approximately 16.5 acres) would be eliminated at the Aberdeen Log Yard Alternative site as a result of casting basin construction. This includes approximately 5 acres of upland forest habitat and approximately 2.6 acres of wetland (both palustrine and estuarine). In addition, approximately 300 of the 1,700 linear feet of the existing shoreline habitat at the Aberdeen Log Yard site would be converted to build the launch channel. Launch channel construction would alter approximately 5 acres of intertidal mudflat and subtidal areas, thereby affecting the intertidal habitat in this area.

Wildlife that might use this habitat type include raptors, waterfowl, passerine bird species, amphibians, and reptiles; harbor seals have been seen offsite in the waters of Grays Harbor as well. These animals would be displaced and would likely no longer use this site as roosting, resting, or foraging areas as a result of construction activities.

Because the Aberdeen Log Yard site is located in an urban area near other industrial sites, the effects of noise and human activity would be identical to those described above for the Anderson & Middleton site. In the marine environment, the location, duration, and intensity of pile-driving would be the same at the Aberdeen Log Yard site as at the Anderson & Middleton site; therefore, the effects of pile-driving would not differ under the two build alternatives.

How would pontoon-building operations directly affect wildlife and their habitat?

CTC Facility

The CTC facility is already constructed and operating. The project's use of this facility would not, therefore, result in any new effects on wildlife or wildlife habitat.

Grays Harbor Build Alternatives

During the 2 years of pontoon construction at either Grays Harbor site, noise and activities associated with operating the casting basin facility, including maintenance dredging, would likely disturb wildlife. The effects of disturbance—including displacing and disrupting feeding or breeding activities—would be similar to those associated with constructing the casting basin. The area in which wildlife would be affected would likely be smaller, however, because pontoon

construction would not entail pile-driving. Similar to construction-related effects, the degree of disturbance would depend on noise level, the timing and duration of activities, and the sensitivity of the individual animals.

Anderson & Middleton Alternative

Based on the small proportion of the Grays Harbor National Wildlife Refuge area that could be affected by noise level increases and the availability of suitable habitat away from the proposed truck haul route, WSDOT does not expect increases in noise levels during pontoon-building operations at the Anderson & Middleton site to substantially alter the use of the refuge by shorebirds or other wildlife.

Aberdeen Log Yard Alternative

Pontoon-building operations at the Aberdeen Log Yard site would not affect the Grays Harbor National Wildlife Refuge because the site is over 5 miles away from the refuge.

How would pontoon moorage directly affect wildlife?

WSDOT does not anticipate adverse impacts on wildlife would occur due to pontoon moorage; however, resource agencies have raised concerns about potential effects on seals, sea lions, and bird species. WSDOT does not expect that seals or sea lions would haul out of the water and rest on the pontoons because the pontoons would rise approximately 15 feet out of the water, and these animals would probably be unable to scale the vertical side walls to reach the top surface. Eighteen mooring buoys would likely hold the pontoon rafts in place. Seals and sea lions might use these buoys as haulout locations, although these species already have established haulout locations within Grays Harbor (see Appendix C). Anchor cables and mooring dolphins would not likely impede moving these or other marine mammals, which are adapted to navigating around obstacles in low-visibility situations.

The moored pontoons would not likely provide attractive habitat for birds because the pontoons would be exposed to wind and waves and would not provide refuge from these elements. WSDOT is investigating best management practices to further discourage pontoon use by birds, and will consider use of such practices as appropriate.

WSDOT would not transport pontoons out of Grays Harbor as part of this project. Instead, pontoons would be moved as either part of an emergency action or as part of the I-5 to Medina: Bridge Replacement and HOV Project. For those actions, WSDOT would inspect the pontoons for colonization by invasive species before towing pontoons

out of Grays Harbor. If warranted, the pontoons could be cleaned before being transported out of Grays Harbor to prevent invasive species, such as green crab, from being transported into Puget Sound.

Effects on Federal- and State-Listed or Protected Species

Snowy Plover

WSDOT does not expect that temporarily mooring concrete pontoons in Grays Harbor would adversely affect snowy plovers nesting at Damon Point. In light of the distance between the proposed moorage location and Damon Point (4 miles), noise and human activity associated with pontoon installation and maintenance would be unlikely to disturb nesting plovers. Pontoon moorage also would not likely result in increased nest predation from gulls or other birds nesting, roosting, or perching on the pontoons. Existing vegetation and other structures adjacent to Damon Point provide ample nest, roost, and perch sites for crows and other avian predators, and the presence of moored pontoons 4 miles away would not change this. In addition, WSDOT and USFWS would implement measures (such as wrapping exposed portions of the pontoons with chicken wire) to deter birds from landing on the pontoons. Furthermore, if any predatory birds were to use the pontoons, numerous seabird nesting colonies on islands within Grays Harbor would provide foraging opportunities closer to pontoon moorage site than Damon Point. In addition, those islands and other natural features within and adjacent to Grays Harbor would provide higher-quality habitat that would likely be more attractive to birds than the pontoon rafts.

Streaked Horned Larks

The potential for temporarily mooring pontoons in Grays Harbor to adversely affect streaked horned larks would be the same as described above for snowy plovers.

Marbled Murrelet

Installing the plate anchors to secure the moored pontoons might disturb marbled murrelets foraging nearby. Because impact pile-driving is not proposed as an installation method, the risk of bird injury from high underwater sound exposure levels would be very low. The potential for murrelets to be actively foraging near anchor installation activities would depend on numerous factors—including time of year and location of prey species—and cannot be predicted. Once the pontoons are in place, fish attracted to the pontoon moorage area might serve as prey for foraging murrelets. WSDOT does not anticipate that murrelets foraging near the moored pontoons would be at an elevated risk of predation. Raptors and other potential murrelet predators would not likely use the

pontoons as nesting, roosting, or perching sites because measures would be in place to deter this; further, existing vegetation and other structures elsewhere in and around Grays Harbor would continue to provide more attractive sites.

Marine Mammals

Installing the plate anchors to secure the moored pontoons might disturb any marine mammals in nearby waters. As mentioned above, since WSDOT does not propose impact pile-driving (vibratory pile-driving would be used instead) to install the anchors, the risk of injury to marine mammals from high underwater sound exposure levels would be very low. Once the pontoons are in place, fish attracted to the moorage site might become prey for harbor seals and other marine mammals. Mooring buoys used to anchor the pontoons might also provide haulout sites for seals and sea lions, unless measures are taken to discourage such use. Based on the widespread availability of suitable haulout sites in Grays Harbor, WSDOT does not expect that the mooring buoys would result in any changes in the abundance or distribution of seals or sea lions near the moored pontoons.

How would the build alternatives compare in their effects on wildlife?

Exhibit 3.1-7 summarizes and compares the direct effects of the Anderson & Middleton and Aberdeen Log Yard build alternatives on wildlife. Developing a casting basin and associated structures would require using an approximately 55-acre area at both sites; much of this area is classified as existing industrial land. The Anderson & Middleton property is much larger than the Aberdeen Log Yard property, and WSDOT would position the casting basin facility to minimize habitat effects on that property. Most of the existing habitat on the Anderson & Middleton property exists beyond the casting basin facility boundary and would not be eliminated by construction of the facility.

In contrast, the Aberdeen Log Yard site—at 51 acres—just meets the size requirements of a casting basin facility. As a result, avoiding effects on habitat would not be possible, and all existing habitat at the Aberdeen Log Yard site would be eliminated with the project construction. Additionally, it is important to note that Exhibit 3.1-7 describes wildlife habitat by vegetative cover type; this is not based on parcel size or acreage and does differ from parcel size and acreage. This analysis is intended to fully disclose adverse effects on habitat that could result from construction activities at either build alternative.

EXHIBIT 3.1-7
Wildlife Habitat Summary of Direct Effects

	Anderson & Middleton Alternative			Aberdeen Log Yard Alternative		
Affected Resource	**Existing Land Cover (acres)**	**Area Affected by Construction (acres)**	**Habitat Area Avoided by Construction (acres)**	**Existing Land Cover (acres)**	**Area Affected by Construction (acres)**	**Habitat Area Avoided by Construction (acres)**
Industrial	32	32	0	35.4	35.4	0
Upland forest	5.4	Avoided	5.4	0	0	0
Grassland	11	5	6	3.4	3.4	0
Herb and/or shrub	19	Avoided	19	5.3	5.3	0
Riparian forest	1.4	Avoided	1.4	4.7	4.7	0
Estimated freshwater wetland area	8.0	4.8	3.2	3.1	3.1	0
Estimated estuarine habitat types	5.7	1.0	4.7	1.8	0.6	1.2
Total (acres)	**82.5**	**42.8**	**39.7**	**53.7**	**52.5**	**1.2**

Note: The acreage estimates presented in this table are based on vegetative cover inferred from aerial photographs; therefore, these numbers differ from those in the *Wetlands* discussion earlier in this section, which are based on the field wetland delineations. In addition, the estimates also differ from parcel acreage. For a full discussion and detailed mapping of how habitat types were analyzed see the Ecosystems Discipline Report, Appendix C. Launch channel impacts are discussed within the *Fish and Aquatic Resources* discussion of this section.

What indirect effects would the project have on wildlife?

CTC Facility

With no terrestrial habitat to be altered and no onsite or nearby species affected by ongoing site operations, the project would not likely result in either direct or indirect effects on wildlife at the CTC site.

WSDOT does not anticipate that towing or mooring the pontoons in Puget Sound would have indirect effects on wildlife. The pontoons would be moored at existing moorage berths, which are characterized by their industrial nature and not typically used by a wide variety of wildlife species.

Grays Harbor Build Alternatives

Casting basin construction at either Grays Harbor build alternative site would displace wildlife to nearby areas of suitable habitat, which could lead to increased competition for food, cover, and other resources within those areas. This potential indirect effect would likely be negligible because there is available habitat in the project vicinity that is of equal

or greater quality than the build alternative sites. All other project effects on wildlife are considered by WSDOT to be direct effects.

How would wildlife be affected if the project were not built?

Under the No Build Alternative, there would be no construction, operational, or long-term effects on wildlife, because no action would be taken. Wildlife would continue to use the Grays Harbor build alternative sites, which have been developed in the past and, thus, provide limited wildlife habitat function now.

What mitigation measures does WSDOT propose to reduce direct effects on wildlife?

Avoiding effects, to the greatest extent practical, is an essential part of WSDOT's early project planning. By proposing that the Grays Harbor casting basin facility be built at an existing industrial-zoned site, the project would avoid high-quality wildlife habitats and minimize effects on wildlife and wildlife habitat. In addition, site design at the Anderson & Middleton site would allow WSDOT to avoid the most highly functioning wildlife habitats at that site. To reduce the potential for in-water pile-driving to injure or disturb marine mammals and foraging seabirds, WSDOT would use pile-installation practices and sound attenuation methods designed to minimize biological effects. Wildlife habitat functions related to wetland effects could be enhanced through the wetland regulatory process. In addition, as the design progresses WSDOT would evaluate other measures to reduce effects on wildlife.

How could WSDOT mitigate for indirect effects on wildlife?

WSDOT does not anticipate that activities during casting basin construction, pontoon construction, pontoon towing, or pontoon moorage would have substantial indirect adverse affects on wildlife. Therefore, WSDOT does not propose to mitigate for indirect effects on wildlife.

What would the cumulative effect on wildlife likely be?

CTC Facility

There would be no direct or indirect project effects on wildlife at the CTC site, so there would be no contribution to cumulative effects on wildlife associated with pontoon-building or towing activities at this site.

Grays Harbor Build Alternatives

To evaluate possible cumulative effects on wildlife of the SR 520 Pontoon Construction Project in combination with other projects, WSDOT considered past actions that have led to the existing conditions and reasonably foreseeable actions in the project vicinity. Two anticipated actions, the Westport shipyard expansion and the Paneltech International expansion, would involve industrial redevelopment within the existing industrial area; these projects would be similar to the SR 520 Pontoon Construction Project with respect to wildlife effects. WSDOT also considered the development of new retail and commercial uses, as well as marine industrial redevelopment at three locations within Grays Harbor in proximity to the Aberdeen Log Yard Alternative; these actions would redevelop land within existing industrial or commercial zones that are already developed and where wildlife likely occurs only sporadically. Redevelopment within established industrial or commercial areas has a lesser effect on wildlife habitat than other possible future projects would.

WSDOT analyzed the potential effects of these reasonably foreseeable projects to help assess the future for wildlife in the area—with and without the proposed project. WSDOT found that the likely future projects would affect wildlife and their habitat. However, the incremental contribution of the SR 520 Pontoon Construction Project to wildlife would be too small to measure and would not adversely affect the Grays Harbor area's carrying capacity for wildlife habitat.

WSDOT does not anticipate that project effects at either build alternative site would contribute to cumulative effects on wildlife in such a way that would have substantial adverse effects on the Grays Harbor area's carrying capacity for wildlife habitat. There is comparable and higher-quality habitat in the vicinity of either site that could accommodate shifts in wildlife use.

How could cumulative effects on wildlife be mitigated?

Addressing cumulative effects of population growth and land development on wildlife and their habitat requires long-range planning that balances critical habitat preservation and economical development. As previously noted, the cities of Hoquiam and Aberdeen both have comprehensive plans and critical areas ordinances that guide future community development so that cumulative effects on natural resources, including wildlife, can be considered (City of Hoquiam 2008a, 2009a; City of Aberdeen 2001, 2008).

WSDOT would provide compensatory mitigation for project-related effects on wetlands and special aquatic sites, and this mitigation would occur within Grays Harbor or its tributaries. This mitigation, although not proposed to address cumulative effects, would likely provide a net benefit to wildlife habitat within Grays Harbor. WSDOT is currently looking at three potential mitigation sites, all of which would meet regulatory mitigation requirements. Proposed compensatory mitigation would also protect the mitigation site from future development that could contribute to cumulative trends in wildlife habitat degradation.