Fish and Aquatic Resources

For this Final 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.

Has any new information been developed since the Draft EIS?

Since the Draft EIS was issued, WSDOT has revised the effects analysis for the shoreline, fish, and aquatic resources habitat to reflect the modified launch channel design. Because the launch channel would be smaller than was discussed in the Draft EIS, effects on fish and aquatic resources would be less than originally anticipated. WSDOT has also designed a new method for safely removing any fish that become entrapped in the casting basin when the basin is flooded to float out pontoons. In addition, three species of rockfish (bocaccio, canary, and yellow eye) were listed under the federal ESA for Puget Sound and have been included in this section. This section has been updated to reflect comments from the public, reviewing agencies, and tribes.

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 ESA (16 United States Code [USC] 1531-1544, as amended).

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.

WDFW has the responsibility for preserving, protecting, and perpetuating all fish and shellfish resources of the state. The

Hydraulic Code (Chapter 77.55 RCW) requires that any person, organization, or government agency wishing to conduct any construction activity that will use, divert, obstruct, or change the bed or flow of state waters must do so under the terms of a permit (called the Hydraulic Project Approval [HPA]) issued by the WDFW. State waters include all marine waters and fresh waters of the state, except those watercourses that are entirely artificial, such as irrigation ditches, canals, and stormwater runoff devices.

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 site. Fish habitat along the shorelines of the two built alternative sites is 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. Marine species include forage fish and coastal pelagic species (Pacific sardine [*Sardinops sagax*], Pacific mackerel [*Scomber japonicas*], northern anchovy [*Engraulis mordax*], the invertebrate market squid [*Loligo opalescens*]), and numerous other species collectively referred to as West Coast groundfish. Many of these species are likely to be only rare visitors to the area.

Commencement Bay also 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.

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

Six of the fish species in the Commencement Bay portion of the study area—Chinook salmon, bull trout, steelhead, and three rockfish species (bocaccio, canary, and yellow eye)—are listed as endangered or threatened under the federal ESA. 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. Critical habitat has not been designated for the rockfish species.

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), (Emmett et al. 1991). In 2008 the Quinault Tribal member yearly harvest of white sturgeon in Grays Harbor was 3,111 fish. In 2009 the Quinault Tribal member yearly harvest of white sturgeon in Grays Harbor was 1,107 fish (Jim Jorgensen, Quinault Indian Nation Fisheries Biologist, personal communication to Margaret Kucharski, WSDOT Environmental Lead, email dated August 10, 2010).

Data for green sturgeon (*Acipenser medirostris*) catches by the Quinault Tribal fishery in Grays Harbor are available for 1997 (186 fish), 1998 (59 fish), and 1999 (54 fish). After 2007 retention of (catching) green sturgeon was prohibited along the entire coast (Jim Jorgensen, Quinault Indian Nation Fisheries Biologist, personal communication to Margaret Kucharski, WSDOT Environmental Lead, email August 10, 2010).

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

Three of the fish species in the study area—bull trout, green sturgeon, and eulachon (*Thaleichthys pacificus*)—are listed as threatened under the federal ESA; Grays Harbor supports several life stages of bull trout and green sturgeon (see Exhibit 3.1-5). The USFWS has designated as critical habitat the marine nearshore environment of Grays Harbor for foraging, migration, and overwintering of 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 mean higher high water (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.

EXHIBIT 3.1-5
Federally Protected Fish Species in Grays Harbor County

Species	Federal Status	Suitable Habitat Existence	ESA Effects Determination	Rationale for ESA Effects Determination
Bull trout (*Salvelinus confluentus*)	Threatened	Suitable habitat for foraging and migrating bull trout exists in Grays Harbor. No spawning habitat is present in Grays Harbor or the lower Chehalis River	Likely to Adversely Affect (LAA) [a]	Individual bull trout might be injured or harmed due to pile-driving and fish-handling (if trapped in basin)
Green sturgeon (*Acipenser medirostris*)	Threatened	Green sturgeon use Grays Harbor for rearing, feeding, and holding. No spawning is known to occur in Grays Harbor or the Chehalis River	Likely to Adversely Affect (LAA)[b]	Individual green sturgeon might be injured or harmed due to pile-driving and fish-handling (if trapped in basin)
Eulachon (*Thaleichthys pacificus)*	Threatened	Suitable habitat exists for eulachon migration, however eulachon exhibit limited use of Grays Harbor with core populations using the Columbia River	Likely to Adversely Affect (LAA) [b]	Individual eulachon might be injured or harmed due to pile-driving and fish-handling (if trapped in basin)

[a] This determination is supported and documented in the July 2010 Biological Assessment for the SR 520 Pontoon Construction Project, USFWS Reference Number 13410-2010-F-0497. A formal Biological Opinion from USFWS concurring with this determination is expected in December 2010.

[b] This determination is final. WSDOT received concurrence on this finding from NOAA Fisheries, documented in the Biological Opinion received in October 2010, NOAA Fisheries Tracking Number 2010/03543.

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 ESA (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).

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.

In March 2009, NOAA Fisheries proposed to list eulachon (*Thaleichthys pacificus*) under the ESA. On May 17, 2010, eulachon were listed under the ESA. 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 exist in the study area. State priority fish species (WDFW 2008b) 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 is the condition of freshwater habitat in the study area?

CTC Facility

There are no freshwater aquatic resources or habitat on the CTC facility site, which is located on fill in an old tideflat area next to the Blair Waterway, 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.

Aberdeen Log Yard Alternative (Preferred Alternative)

There is no fish-accessible freshwater habitat at the Aberdeen Log Yard. 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 3.1-6). The channel receives flow from several sources on site. Channels A-1 and A-2 (also shown in Exhibit 3.1-6) are tributary drainages to Channel A; although they are freshwater, these drainages 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, although offsite, Channel A lies directly adjacent to the Aberdeen Log Yard site and 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. The entire reach of Channel A is accessible to fish, especially at high tides. Because of this, salmonid use of Channel A must be considered, although it is unlikely because of the lack of suitable habitat within the channel. WDFW has jurisdiction over the ditch as well, since it provides fish habitat.

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

Exhibit 3.1-6. **Grays Harbor Build Alternative Sites Shoreline and Surface Water Features**

Pontoon Construction Project

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Washington State Department of Transportation

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 3.1-6). 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 has limited fish habitat because of the lack of perennial flows and poor access for fish. However, WDFW has documented fish use in Channel B (see Appendix T, Draft EIS Comments and Responses Report, WDFW letter dated July 13, 2010).

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.

Anderson & Middleton Alternative

The freshwater habitat at the Anderson & Middleton site was created while draining 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 3.1-6 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. Although the tide gates appear to be mostly blocked, fish access cannot be ruled out. Fish habitat within these channels is extremely degraded, with the exception of Channel A, which contains sufficient vegetation to provide shade and cover.

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.

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 native vegetation or natural 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 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 out-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. Herring, for example, are known to spawn on piles and debris throughout Grays Harbor (see Appendix T, Comments and Responses, WDFW letter dated July 13, 2010). However, forage-fish spawning is not known to occur along the shoreline of either build alternative site, nor have spawning herring been documented on any of the pilings on or near the Aberdeen Log Yard site. The high levels of fine silt, together with fill, debris, and piles, make the substrate (mud) unsuitable for forage fish spawning.

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

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

Aberdeen Log Yard Alternative (Preferred 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 that lies along a moderately steep vegetated

bank running mostly east-west (see Exhibit 3.1-6). 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 3.1-6). 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, a 40-foot-long bulkhead and dozens of piles are 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 turf-like 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. Overall, the shoreline at the site is unarmored.

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 occur within the rocky intertidal zone. 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 a greater number of small clams and worms than the Anderson & Middleton site, but 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.

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.

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

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.

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, and their habitat within the study area. In addition to managing these fisheries, the Quinault Indian Nation has expressed an equally strong concern for habitat protection, restoration, and management. The continued existence of the fishery stocks, upon which the Nation's fishers rely, depends both on fishery stock management and on habitat protection and restoration.

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 has coordinated with the Quinault Indian Nation regarding project activities in their federally adjudicated “usual and accustomed” fishing area and solicited 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. FHWA, WSDOT, and the Quinault Indian Nation are developing a Memorandum of Agreement to resolve issues such as mitigation, fish handling, and best management practices.

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

In general, fisheries and aquatic resources and their habitat within the study area have been substantially degraded by past actions beginning in the 1850s through the present. Fisheries and aquatic resources will continue to be affected by future development actions and ongoing trends. These actions and trends include filling, diking, and dredging projects; alteration of ecosystem processes; deforestation; loss of riparian habitat; in-stream habitat loss and fragmentation; competition and predation by invasive species; historic overharvesting of fisheries that has affected the status of many stocks along the Pacific coast; 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

Effects on fish and aquatic resources and their habitats could occur through the following activities:

- Constructing the launch channel, including armoring
- 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 (at the Anderson & Middleton site), the launch channel gate, water-handling and treatment systems, and fish-handling systems within the casting basin

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.

In addition to shoreline and intertidal habitat replacement, hydroacoustic (that is, noise) effects associated with installing the 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 (located between the low- and high-tide lines) into subtidal habitat (located below the low-tide line). Launch channel construction would result in the loss and alteration (due to change in depth profile) of intertidal habitat and would negatively affect benthic organisms that currently occupy the intertidal zone. Fish might also exhibit minor short- and long-term changes in behavior associated with the intertidal and shoreline alterations. In addition, construction dredging would result in short-term, localized water quality degradation 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 or are not present in the area.

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 2.87-acre area within the shoreline environment at the Aberdeen Log Yard site compared to a 0.38 acre area within the shoreline at the Anderson & Middleton site.

Both build alternative sites and the pontoon moorage site are within the green sturgeon and bull trout-designated critical habitat that is federally protected under the ESA. There is no designated critical habitat for eulachon. Both build alternatives would negatively affect shoreline and intertidal habitat by constructing operating the casting basin and launch channel; however, the effects on habitat are insufficient to appreciable diminish the ecological value to green sturgeon and bull trout (see Exhibit 3.1-5).Under both alternatives, the availability of prey species might be slightly altered during in-water activities in Grays Harbor due to the disturbance of the benthic invertebrate community within the footprint of the launch channel (which would be larger at the Aberdeen Log Yard than at the Anderson & Middleton site) from dredging activities, pile installation, and proposed launch channel operations. However, these activities would not affect growth or survival of fish. Any difference in prey availability between the two alternative sites would be insubstantial because productivity at both sites is insubstantial compared to the productivity in Grays Harbor and its associated estuary. At either site, the effects would generally be limited to effects on fish behavior and distribution, with minimal fish injury or mortality.

Benthic macroinvertebrates would also be affected, with more intertidal habitat affected at Aberdeen Log Yard. Based on existing mudflat conditions, these effects would not result in substantial disruption to the aquatic food web, and substantial recolonization of affected areas would occur after dredging activities ceased. Effects at both sites would be similar, and insubstantial, with respect to the total habitat area available within Grays Harbor.

At the Aberdeen Log Yard site, WSDOT would install a total of approximately 70 piles in two rows connected by a timber rail on both sides of the launch channel. The rails would help in maneuvering pontoons out of the casting basin. In addition, two turning dolphins would be placed at the mouth of the launch channel to help maneuver the pontoons into the navigation channel. All piles and dolphins would be arranged and placed as to not impede fish passage. At the Anderson & Middleton site, the launch channel would be shorter; therefore, only 23 piles would be used to stabilize the timber rail and only one turning dolphin would be required.

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 (timber or steel); the type of hammer used (impact versus vibratory); whether or not fish are present; fish size; and fish distance from the activity. Both timber and steel piles would be used for launch channel construction. And both vibratory and impact hammers would be used for pile installation. WSDOT would implement appropriate best management practices, 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 construction of the mitigation site. Construction activities could have some short-term negative affects on aquatic species, such as fish and invertebrates, resulting from physical disturbance, turbidity, and habitat alteration. However, WSDOT anticipates that, once completed, the proposed mitigation would substantially increase fish and aquatic habitat function and acreage over time.

Aberdeen Log Yard Alternative (Preferred 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 has, until recently, been used as a log storage yard. The site encompasses remnant built structures, and approximately 1.04 acres of highly disturbed emergent wetlands that 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 no effect on fish.

The launch channel at the Aberdeen Log Yard site shoreline would be approximately 300 feet wide, and would extend approximately 470 feet into shallow subtidal habitat in Grays Harbor. The launch channel footprint between the casting basin and the shoreline would require excavating approximately 63,000 square feet 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 87,000 cubic yards of substrate habitat, affecting a 125,000-square-foot area. Riprap would not be used to armor the bottom of the launch channel. Approximately 8,000 cubic yards of riprap would be placed along the edge of the launch channel and below the ordinary high water mark (OHWM) after launch channel construction. In addition, approximately 280 cubic yards of riprap would be placed above the OHWM to armor the sides of the launch channel.

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 and physiology of some fish, such as bottom-oriented baitfish and salmonids, could be temporarily affected by the increased and localized turbidity. These effects would be short-lived and relatively minor because fish within the inner harbor have tolerances to naturally high turbidity levels associated with turbidity from freshwater rivers. 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.

Although project-related dredging would not likely affect 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 launch channel piles and turning dolphins because WSDOT expects that rockweed would recolonize on the dolphins within the disturbed areas.

The launch channel at the Aberdeen Log Yard site would extend over a greater distance of mudflat (470 linear feet versus 120 linear feet) than at the Anderson & Middleton site, so 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.

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 be approximately 300 feet wide at the shoreline and would extend approximately 120 feet into shallow subtidal habitat in Grays Harbor. Between the casting basin and the shoreline, the channel footprint would require excavating approximately 58,000 square feet 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 6,900 cubic yards, encompassing 16,000 square feet of substrate habitat comprising tidal mudflats and subtidal 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.

The effects of launch channel dredging at the Anderson & Middleton site would be similar to those discussed above for the Aberdeen Log Yard Alternative.

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 3.1-6), 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.

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 avoid 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 to allow any fish that do become stranded as the gates are closed to be safely removed. WSDOT would monitor the casting basin during draining operations. Any fish collected in the casting basin would be herded gradually, in a controlled manner, to a fish collection box, 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 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 20 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 likely 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 placed about 300 feet apart and aligned roughly parallel to (and south of) the navigation channel. A taut line mooring system with embedded plate anchors is proposed to hold the rafts in place to minimize effects on the benthic (bottom-dwelling) habitat.

While the surface of the pontoons would encompass approximately 15 acres, the pontoon moorage area acreage will depend upon final design. For this analysis, WSDOT assumed that the pontoons could be moored between 5 and 10 years (Morgan et al. 2009). However, if the proposed SR 520, I-5 to Medina: Bridge Replacement and HOV Project remains on schedule and catastrophic failure does not occur, 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 40 square feet 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 growing in these zones (ICF Jones & Stokes 2009a). 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 flora from attaching or settling on the sea bottom.

The size of the surface area of the pontoons represents approximately 0.0003 percent of the more than 58,000 acres of Grays Harbor at high tide. Temporarily occupying 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

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.

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.

WSDOT considers biofouling as a potential effect associated with pontoon moorage. There is a potential for invasive species, such as green crab, to become established in the biofouling community. 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. As described under *What mitigation measures does WSDOT propose to reduce direct effects on fish and aquatic resources?* in Chapter 5, Mitigation, WSDOT will monitor the pontoons for biofouling and clean them, as needed, before they are towed out of Grays Harbor.

Sediment Scour and Deposition

WSDOT analyzed currents in and around the proposed outer Grays Harbor pontoon moorage location. The modeling for this analysis demonstrated 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 extend 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. 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?

The volume of material excavated from the launch channel footprint would be significantly larger at the Aberdeen Log Yard site than at the Anderson & Middleton site. Exhibit 3.1-7 summarizes and compares the volume of material that would be excavated at each site.

EXHIBIT 3.1-7
Fish and Aquatic Resources Summary of Direct Effects

Dredging Footprint by Area	Aberdeen Log Yard Alternative (Preferred Alternative) (square feet)	Anderson & Middleton Alternative (square feet)
Above +12 feet MLLW (upland area)	63,000	58,000
+12 feet MLLW waterward	125,000	16,000
Approximate total direct effects waterward of +12 feet MLLW (acres)	2.87	0.38

MLLW mean lower low water

Both alternatives would negatively affect shoreline and intertidal habitat through the construction and operation of the respective casting basins and launch channels. The Aberdeen Log Yard Alternative would require a greater amount of dredging, and thus have a greater potential disturbance of fish and benthic organisms. However, at either site, the

effects would generally be limited to effects on fish behavior and distribution, with minimal fish injury or mortality.

Benthic macroinvertebrates would also be affected. More intertidal habitat would be affected at the Aberdeen Log Yard site, although based on existing mudflat conditions, these effects would not substantially disrupt the aquatic food web, and substantial recolonization of affected areas would occur when dredging activities ceased. Operational and indirect effects at both sites would be similar, and insubstantial.

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.

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). There are no other actions related to project activities at either build alternative site that would result in indirect effects related to fish and aquatic resources.

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).

Grass Creek

Constructing the Grass Creek mitigation site would result in temporary disturbances to fish habitat on the site; however, these effects would be mitigated by the resulting improvements in ecological function at the site when construction is complete and the site stabilizes.

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 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 proposed 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 proposed 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.

What is the Endangered Species Act consultation process?

WSDOT began early consultation with the NOAA Fisheries and USFWS in 2007 to coordinate on potential project effects on endangered species. ESA 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 was submitted for the proposed SR 520 Pontoon Construction Project to NOAA Fisheries and USFWS in July 2010. The Biological Assessment evaluates effects of the preferred alternative on listed species and critical habitat in detail. The Biological Assessment specifically addresses the following fish species: green sturgeon (*Acipenser medirostris*), Pacific eulachon (*Thaleichthys pacificus*), and bull trout (*Salvelinus confluentus*). The Biological Assessment has determined that the proposed project is likely to adversely affect (LAA) all of the above species, all of which are listed as Threatened under the ESA (see Exhibit 3.1-5). (Other ESA-listed species are discussed in the Wildlife section of this document, as well as in the Biological Assessment). In addition to detailed discussions regarding project effects to these species and their habitats, 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 issued and the USFWS will issue a Biological Opinion with terms and conditions designed to minimize adverse effects on the listed species and habitats in the study area. Terms and conditions are anticipated to be as follows:

- Related to impact pile-driving noise (launch channel)
  a. Provide NOAA Fisheries and USFWS with a detailed underwater noise monitoring plan;
  b. Monitor the number of pile strikes and underwater sound at a representative number of piles; and
  c. Submit a report of the monitoring to NOAA Fisheries and USFWS.
- Related to launch channel dredging:
  a. Provide USFWS with a water quality monitoring plan during dredging operation.
- Related to fish handling (casting basin operations):
  a. Provide NOAA Fisheries and USFWS with a detailed fish removal plan;
  b. Follow the WSDOT Fish Exclusion Protocols and Standards (WSDOT 2009) and the NOAA Fisheries fish screening criteria (NOAA 1997); and
  c. Document all green sturgeon, eulachon, and bull trout encountered during work area isolation by submitting an In-water Construction Monitoring Report or equivalent to NOAA Fisheries and USFWS within 30 days of fish exclusion.
- Related to pontoon moorage:
  a. Inspect pontoon moorage lines annually and remove derelict fishing nets, if any have become entangled on the moorage lines.

USFWS terms and conditions will be formalized in their Biological Opinion. The USFWS Biological Opinion is anticipated to be issued in December 2010.

Why is consultation under the Endangered Species Act required?

Section 7 of the ESA 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 ESA-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.

What are the results of the Endangered Species Act consultation?

FHWA, as the federal lead agency, initiated formal consultation with USFWS and NOAA Fisheries on the project alternatives in July 2010. WSDOT, as the project proponent and co-lead agency and in cooperation with FHWA, has continued to coordinate with the USFWS and NOAA Fisheries throughout the ESA consultation process. NOAA Fisheries issued their formal Biological Opinion for the project on October 25, 2010. USFWS anticipates issuing their formal Biological Opinion by early December 2010.