United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
United States Department of the Interior
Fish and Wildlife Service

National Marine Fisheries Service
510 Desmond Drive SE., Suite 103
Lacey, Washington 98503

U.S. Fish and Wildlife Service
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In Reply Refer To:
NMFS Tracking No.: 2008/07581
FWS Reference No.: 13410-2009-I-0093

October 15, 2009

Daniel M. Mathis
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
711 South Capitol Way, Suite 501 Evergreen Plaza
Olympia, WA 98501-1284

Re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Proposed Magnolia Bridge Replacement Project, City of Seattle, King County, Washington. HUC 171100190401, Shell Creek.

Dear Mr. Mathis:

This correspondence is in response to your request for consultation under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et. seq.*). Additionally, this letter meets the requirement for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

Endangered Species Act

The Federal Highway Administration (FHWA) will provide funding to the Seattle Department of Transportation (SDOT) in order to replace the existing Magnolia Bridge with a new structure that meets current design standards. On November 18, 2008, FHWA requested consultation with NOAA's National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS, jointly the Services) with the following effects determinations[1] on the listed species and designated critical habitat.

[1] LAA = May Affect, Likely to Adversely Affect
NLAA = May affect, Not Likely to Adversely Affect

NMFS species:

Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*)	LAA
Puget Sound Chinook salmon critical habitat	NLAA
Puget Sound steelhead (*Orcorhynchus mykiss*)	LAA
Southern Resident killer whale (*Orcinus orca*)	NLAA
Southern Resident killer whale critical habitat	NLAA
Steller sea lion (*Eumetopias jubatus*)	NLAA

USFWS species:

Coastal-Puget Sound bull trout (*Salvelinus confluentus*)	LAA
Coastal-Puget Sound bull trout critical habitat	NLAA
Marbled murrelet (*Brachyramphus marmoratus*)	NLAA

After review of the consultation package, the Services requested additional information on estimated number of strikes required during pile driving and additional analysis on stormwater dilution (phone conversation between Brian Hasselbach (FHWA) and Jim Muck (Services) on December 23, 2008). In addition, Alison Agness (NMFS) requested additional information on marine mammal monitoring on January 6, 2009. The information requested on the number of strikes per pile was received in an email from Mr. Hasselbach on January 6, 2009. Ms. Agness received the additional information on marine mammal monitoring on January 29, 2009. The stormwater dilution analysis was received in an amendment to the Biological Assessment (BA) in an email from Mr. Hasselbach on May 12, 2009. Upon providing this information, FHWA modified the request for formal consultation to a request for informal consultation for all the above species and designated critical habitat. The request was provided in a letter to the Services dated May 14, 2009.

This consultation is based on the BA, dated October 2008, the amendment to the BA, dated May 8, 2009, and information received in emails. A complete record of this consultation is on file at both NMFS's Washington State Habitat Office and USFWS's Washington Fish and Wildlife Office in Lacey, Washington. Your letter requested the Services' concurrence with a determination of "may affect, not likely to adversely affect" for the species and designated critical habitat listed above. This consultation with the FHWA is conducted under section 7(a)(2) of the ESA, and its implementing regulations (50 CFR 402).

The SDOT proposes to replace the existing Magnolia Bridge between West Galer Street and 15th Avenue West. The bridge was closed in 1997 due to damage from the Magnolia Bluff landslide, and in 2001 due to earthquake damage. The bridge is aging and requires ongoing maintenance. The bridge spans the Port of Seattle Terminal 91 and Burlington Northern Santa Fe railroad track facilities. In-water construction is expected to take approximately 36 weeks with the entire bridge being replaced in approximately three years.

Specific project features include:

- Remove and replace the 23rd Avenue West on- and off-ramps.

- Remove existing wood wharf and timber wall under the bridge.
- Remove and replace mainline bridge columns and superstructure.
- Install stormwater improvements.

In-water work will occur from October through February, beginning with the removal of the 23rd Ave West on-ramp. Pile driving activities including the installation of the temporary bridge support piles and sheet piles for the cofferdam will occur in November and December of the first year of construction. Removal of the temporary work bridge and falsework will occur in December and January of the third year of construction.

Numerous avoidance, minimization, and conservation measures and best management practices have been included in the project design. The measures are identified on Pages 21-25 of the BA, and include:

A. Containment booms will be deployed around the work area to contain any floatable debris or spills that may enter the water.

B. Timing windows will be followed for in-water work. The in-water work window for Elliott Bay is July 16 through February 14.

C. A bubble curtain will be used to reduce underwater sound pressure levels when an impact hammer is used to drive or proof steel piles. The bubble curtain will completely surround the pile and be adequately weighted to keep the bubble ring resting on the sea floor. The pile shall be completely engulfed in bubbles over the full length of the water column at all times when the impact pile driver is in use. A 9 decibel reduction in sound pressure levels is anticipated from use of the bubble curtain.

D. Underwater noise during pile driving will be monitored according to accepted methods as described in WSDOT's Underwater Noise Monitoring Plan template.

E. Monitoring within of 1.2 miles of the project site will occur for marine mammals during all vibratory and impact pile driving activities. If an orca or Steller sea lion is located, all pile driving activities will stop until the orcas or Steller sea lions have left the area (Appendix D of Biological Assessment).

F. The last sheet pile to close the cofferdam will be driven at low tide to reduce the potential for fish entrapment. Any fish trapped will be removed following Washington State Department of Transportation Fish Removal Protocol and Standards.

G. Heavy equipment will be checked daily for petroleum leaks and repairs made as necessary.

Located on the north side of Elliott Bay within Smith Cove, the project is surrounded by land on three sides (see Figure 1). The east side of Smith Cove has commercial and industrial land use,

with 16th Ave West running along the shoreline. Smith Cove Park and Elliott Bay Marina are located on the west side. Piers 90 and 91 are also located within Smith Cove and extend out approximately 2,500 feet from the project site. Piers 90 and 91 are constructed on numerous wooden piles.

Puget Sound Chinook salmon use the nearshore marine waters for migration, nursery areas, residence, and refugia. Chinook salmon may begin migrating into estuaries and the nearshore in late January and early February, but peak migration occurs in June and July. Juvenile Chinook salmon are found along the nearshore through October. Little information is available on Chinook salmon use within Elliott Bay itself. Chinook salmon have been captured around Piers 90 and 91 from February through October, with most caught in April through July. Increasing abundance of juvenile Chinook salmon has been observed in Elliott Bay in the summer months which coincide with the timing of juvenile Chinook salmon emigration from the Duwamish River. Adults migrate through Elliott Bay from late June to early November as they make their way to the Duwamish River. Fish habitat within Elliott Bay has been extensively modified with approximately 97 percent of the original wetlands and shallow sub-tidal habitats filled.

Most juvenile Puget Sound steelhead migrate to Puget Sound during their second year. Migration primarily occurs from April to mid-May. The inshore migration pattern of steelhead in Puget Sound is not well understood; it is generally thought that steelhead smolts move quickly offshore. Summer-run Puget Sound steelhead adults migrate through Elliott Bay to the Duwamish River from April through October and winter-run steelhead migrate through from November through May. Few Puget Sound steelhead have been observed in Elliott Bay. Those that have been caught were captured at the mouth of the Duwamish River.

Elliot Bay is considered foraging, migration, and overwintering habitat for bull trout, and bull trout will use this area as they migrate to and from core areas. Fifteen bull trout have been captured in the lower Duwamish River in April, May, August, and September of various years. Although bull trout captures in the Duwamish River indicate that bull trout migrate through Elliott Bay, both the Duwamish River and Elliott Bay are highly urbanized and lack complex habitat bull trout prefer. Therefore, it is extremely unlikely that individuals would occur within the project action area during the work timing window.

Marbled murrelets forage in the marine environment and occur throughout Puget Sound. However, marbled murrelet use of the action area is considered extremely unlikely due to the high levels of boat and ferry traffic and lack of forage fish in the highly urbanized area.

The Southern Resident killer whale (SR killer whales) Distinct Population Segment composed of J, K, and L pods was listed as endangered under the ESA on November 18, 2005 (70 FR 69903). The final rule listing SR killer whales as endangered identified several potential factors that may have resulted in the decline or may be limiting recovery of these whales, including: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel traffic. The rule further identified oil spills as a potential risk factor for this species. The final recovery plan (73 FR 4176) also includes information on these potential threats to SR killer whales. SR killer whales have been documented in the vicinity of Elliot Bay with varying frequency across the year.

Steller sea lions occur year-round in Washington coastal waters, but no breeding rookeries have been identified in Washington waters. Most Steller sea lions are commonly observed in the Strait of Juan de Fuca and are occasionally found on navigation buoys in Puget Sound. No Steller sea lion haul-out sites exist along the City of Seattle shoreline. The closest haul-out is located on Toliva Shoals Buoy near Tacoma, Washington.

The proposed project will result in temporary effects to Puget Sound Chinook salmon, bull trout, and steelhead. In-water construction activities will result in short-term and localized increased turbidity, sedimentation, and degradation of water quality during removal of the steel and timber piles as part of the wharf demolition and removal of the temporary work bridge and falsework supports and during filling of holes left by pile extraction. These impacts may result in behavior changes to Puget Sound Chinook salmon, bull trout, and steelhead through decreased visibility and foraging opportunities and abandonment or avoidance of habitat.

Degradation of water quality could result from the suspension of creosote during removal of timber piles and from petroleum spills during construction. Approximately 200 creosote treated timber piles will be removed during demolition of the wharf. Removal of the piles will result in buried creosote contaminated sediments being brought to the surface. Piles that are broken during extraction will be cut two feet below the surface. This results in fresh creosote being exposed to the water until the holes and piles can be capped with clean sediment. The operation of heavy equipment from the temporary work bridge or on the substrate during low tides could result in petroleum spills into Puget Sound. This degradation in water quality could displace aquatic prey species and reduce foraging opportunities for Chinook salmon, bull trout, and steelhead.

The installation of approximately 115 temporary steel piles, removal of approximately 200 creosote treated piles, and installation of the sheet piles for the cofferdam will result in increased sound pressure levels during vibratory and impact pile driving. The steel piles will be installed to construct the temporary work bridge, finger trestles, and falsework supports. Piles will be installed with a vibratory pile driver and proofed to a load bearing weight of 200 tons per pile. Existing timber piles will be pulled out, removed with a vibratory hammer, or cut two feet below the substrate with a pneumatic chainsaw. Sheet piles will be installed with a vibratory pile driver. Elevated underwater sound pressure levels can result in mortality, injury, or behavioral effects to Chinook salmon, bull trout, steelhead and marine mammals. The expected extent of elevated underwater sound pressure levels is shown in Figure 1. The project area is located on the north side of Smith Cove. Sound will carry in a straight line out of Smith Cover into Elliott Bay with sound levels being limited by land on the east and west sides of Smith Cove. This results in a cone shaped action area that extends across Elliott Bay to West Seattle and Harbor Island in the Duwamish River (Figure 1).

For this project, the extent of potential harm to listed fishes is 52 meters for fish greater than or equal to two grams and 96 meters for fish less than two grams. Sound pressure levels that could result in behavioral effects extend 1,369 meters from the project site. The maximum length of the behavioral threshold at the furthest distance from the project area is approximately 1,100 meters. Pile driving activities will occur in November and December during times when no

Chinook salmon, bull trout or steelhead have been captured within Smith Cove. Because the project is located on the north end of Smith Cove, elevated underwater sound pressure levels will travel in a straight line south of the project area creating a cone-shaped action area. The cone-shaped action area limits listed salmonid exposure to elevated sound pressure levels that can result in behavioral changes. Listed salmonids can swim outside the action area, unlike a project that is along a shoreline that has a 360 degree arc action area, where a fish will have long-term exposure to elevated sound pressure levels.

SR killer whales could be injured or disturbed by sound pressure generated by in-water construction activities. NMFS is currently developing comprehensive guidance on sound exposure levels likely to cause injury and behavioral disruption in the context of the Marine Mammal Protection Act. Until formal guidance is available, NMFS uses conservative thresholds of sound exposure levels from broad band impulse sounds that cause behavioral disturbance (160dBrms re: 1μPa) and injury (180dBrms re: 1μPa for whales and 190dBrms re: 1μPa for pinnipeds) (70 FR 1871). Sound pressure levels that could result in behavioral effects extend 1.2 miles from the project site (Figure 1). Monitoring within 1.2 miles of the project site will occur for marine mammals during all vibratory and impact pile driving activities. If an orca or Steller sea lion is located, all pile driving activities will stop until the orcas or Steller sea lions have left the area.

Stormwater runoff from the completed project will discharge to Elliott Bay. The project will increase pollution-generating impervious surface from 6.08 acres to 7.72 acres. Approximately one acre of stormwater discharges to the sanitary sewer and treated at the King County West Point Treatment Plant. The remaining stormwater will be treated prior to discharge into Elliott Bay. Basic water quality treatment will be provided by canister filter media.

Stormwater runoff is a major source of pollution in Puget Sound (PSAT 2007). Pollutants in stormwater include nutrients, sediment, metals, hydrocarbons from gasoline, oil and vehicle exhaust, pathogens, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and pesticides. In addition, stormwater affects water temperatures, turbidity, dissolved oxygen (DO), and pH. These factors naturally fluctuate daily or seasonally in magnitude or concentration. However, when exacerbated by stormwater runoff, the acceptable range of these factors can be exceeded, altering or impairing biological processes and negatively impacting salmonids.

Either individually or in a mixture, exposure to these pollutants may result in reduced growth, migratory success, and reproduction in Chinook salmon, steelhead and bull trout. Effects are influenced by background water quality conditions, life stage of the fish, duration of exposure, concentration and relative toxicity of the pollutants, and concurrent discharges and background levels of other contaminants. Salmonids exposed to zinc and copper experience a significantly decreased ability to recognize and avoid predators and navigate back to natal streams. These effects would lead to lower spawning success in adults and increased predation on juveniles. The threshold at which dissolved copper and zinc are expected to have harmful effects are 2 μg/L and 5.6 μg/L above background, respectively (Hecht 2007; Sandahl 2007; Sprague 1968).

Killer whales are candidates for bioaccumulating high concentrations of contaminants because of their high position in the food web and long life expectancy. High levels of persistent organic pollutants, such as PCBs, have been documented in SR killer whales. These and other chemical compounds have the ability to induce immune suppression, impair reproduction, and produce other adverse physiological effects, as observed in studies of other marine mammals and described in the recovery plan for SR killer whales.

Pollutants in stormwater not only result in water quality degradation, but many adsorb to particulates and are sequestered in sediments where they enter the food chain via the benthic community (benthic invertebrates are a prey species for listed salmonids). Pollutants may directly affect the abundance and productivity of benthic invertebrates, thus affecting the numbers and diversity of food for listed salmonids. In addition, when benthic invertebrates are exposed to and assimilate many of these pollutants, they can become sources of contamination for listed salmonids that prey on them or marine mammals that prey on salmonids.

The project will include treatment of all stormwater and is expected to result in a net reduction in pollutant concentrations for pollutants of concern to salmonids (Table 1) and in the discharge of total suspended solids (which carry persistent organic pollutants). For dissolved copper and zinc that will continue to be discharged, the distance from the outfall at which the pollutants would be diluted to safe levels was analyzed. Because SDOT did not provide a dilution model for the project, the dilution model from another project, the Alaska Way Viaduct (AWV) Project; South Holgate Street to South King Street, was used for comparison. Specifically, the Lander Outfall from the AWV Project because the post-construction pollutant concentrations were similar. The comparison is imperfect because the Lander Outfall discharges to the East Waterway of the Duwamish River and dilution is influenced by the flows in the Duwamish River, whereas the Magnolia Bridge Outfall discharges directly into Smith Cove and is only influenced by tidal waters. Nevertheless, the Services consider the use of this comparison valid because both transportation projects sites are highly tidally influenced with similar size outfalls, and the overall project stormwater treatment greatly reduces the overall pollutant concentrations from the project. Table 1 also shows the pollutant concentrations for the AWV Lander Outfall.

Table 1. Summary of stormwater pollutant concentrations for the 90th percentile effluent concentrations at each outfall.

Pollutant of Concern	**Magnolia Bridge Outfall**		**Lander Outfall**	
	Pre-	**Post-**	**Pre-**	**Post-**
TSS (mg/L)	79.18	6.4	192	14
Total Zinc (µg.L)	152.62	40	350	67
Dissolved Zinc (µg/L)	56.42	27	110	44.8
Total Copper (µg/L)	27.17	7	59	12
Dissolved Copper (µg/L)	7.19	5	14	7.8

For the AWV Project, the CORMIX model was used to calculate distances along the shoreline (length) and offshore (width) needed for diluting project stormwater pollutant concentrations to the Service's biological effects threshold for listed salmonids of 2 µg/L above background for dissolved copper and 5.6 µg/L for dissolved zinc (Table 2). The Services used the percent difference in pollutant concentrations between the Magnolia Bridge Outfall and the Lander

Outfall in Table 1 to calculate the likely area required for dilution to safe thresholds. The Magnolia Bridge Outfall has 60.3% as much dissolved zinc and 64.1% as much dissolved copper as the Lander Outfall. In Table 2, these values are applied to calculate the area required for dilution.

Table 2. Calculated dilution plume in square meters for each outfall.

Percentile		Pre-Project Conditions Length (UA=0.3 m/s)	Width (UA=0.05 m/s)	Area (m^2)	Post-Project Conditions Length (UA=0.3 m/s)	Width (UA=0.05 m/s)	Area (m^2)	% Decrease in Dilution Zone
Lander Outfall								
50th	Cu	0.1	0.6	0.06	0	0.3	0	100%
	Zn	0.2	0.9	0.18	0.1	0.6	0.06	67%
95th	Cu	1.1	6.7	7.37	0.5	4.1	2.05	72%
	Zn	68	11	748	1.4	7.3	10.22	99%
99th	Cu	4.2	4.3	18.06	2.7	2.9	7.83	57%
	Zn	132	7.1	937.2	4.9	4.6	22.54	98%
Magnolia Bridge Outfall								
50th	Cu				0	0.2	0	
	Zn				0.1	0.4	0.04	
95th	Cu				0.3	2.6	0.78	
	Zn				0.8	4.4	3.52	
99th	Cu				1.7	1.9	3.23	
	Zn				3.0	2.8	8.4	

Other benefits of the project will result from the removal of 30,000 square feet of wharf, of which, 17,000 square feet is over water, and 400 square feet of timber wall below the wharf. Removal of the wharf and timber wall will open up areas of Smith Cove to light that will benefit terrestrial and aquatic plants, thereby increasing productivity in the project area. Construction of the temporary work bridge and finger trestles will have short-term (12 to 14 months) effects due to increased shade under the bridge. Due to increased construction activity and noise, listed salmonids will avoid the area.

Species Determination

Puget Sound Chinook Salmon, Puget Sound Steelhead, and Coastal-Puget Sound Bull Trout:

The Services expect the effects of the project to Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout to be insignificant because 1) the project will follow the marine in-water work window of July 16 through February 14; 2) in-water construction will be further limited to October through February when few listed salmonids have been found in Smith Cove [most Chinook salmon caught from April through July]; 3) steel piles will be initially installed with a vibratory hammer, and proofed to 200 tons per pile with an impact hammer; 4) sheet piles for the cofferdam will be installed with a vibratory hammer; 5) a bubble curtain will be used during impact pile driving to attenuate sound pressure levels; 6) stormwater will be treated prior to discharge into Elliott Bay; 7) treatment will result in a net reduction in the concentration of

copper and zinc in the action area; and 8) the project increases light penetration to shallow water regions of Smith Cove increasing productivity in the area.

Marbled Murrelets:

The Services expect the effects of the project to marbled murrelets to be discountable because 1) marbled murrelets are not expected to use the action or project area of Elliott Bay; and 2) discharge of treated stormwater into Elliott Bay will not have measureable effects on murrelet prey species since the project area does not contain forage fish spawning areas.

Southern Resident Killer Whales and Steller Sea Lions:

NMFS expects effects of the project on killer whales and Steller seal lions will be insignificant, because: 1) the project is not likely to adversely affect salmonids (prey of SR killer whales), as described above; 2) although the project will result in a slight increase in project water routed to the Magnolia Bridge Outfall in Elliot Bay, basic treatment of project water will reduce the level of total suspended solids and therefore the levels and concentrations of persistent organic pollutants from baseline conditions; and 3) monitoring during all pile driving activities will occur within 1.2 miles of the project site for marine mammals and all pile driving activities will stop if an orca or Steller sea lion is located.

The Services believe that sufficient information was provided to determine the effects of the proposed project to federally listed species and to conclude whether this project is likely to adversely affect those species. We, therefore, concur with your "may affect, not likely to adverse affect" determinations for Puget Sound Chinook salmon, Puget Sound steelhead, bull trout, marbled murrelets, SR killer whales, and Steller sea lions.

Critical Habitat Determination

Puget Sound Chinook Salmon and Coastal-Puget Sound Bull Trout:

NMFS designated critical habitat for the Puget Sound Chinook salmon on September 2, 2005 (70 FR 52630). The FWS designated critical habitat for the Coastal-Puget Sound bull trout on September 26, 2005 (70 FR 56212). One of the six primary constituent elements (PCEs) of Puget Sound Chinook salmon critical habitat is in the action area:

- Puget Sound Chinook Salmon PCE #5: Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fish, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

Four of the eight PCEs of bull trout critical habitat are in the action area:

- Bull trout critical habitat PCE #1 - Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32° F to 72° F (0° C to 22° C) but are found more frequently in temperatures ranging from 36° F to 59° F (2° C to 15°

C) with adequate thermal refugia available for temperatures at the upper end of this range. These temperature ranges may vary depending on bull trout life-history stage and form, geography, elevation, diurnal and seasonal variation, shade (such as that provided by riparian habitat), and local groundwater influence.

- Bull trout critical habitat #6 - Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

- Bull trout critical habitat #7 - An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

- Bull trout critical habitat # 8 - Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.

The effects of the proposed project on designated Puget Sound Chinook salmon and bull trout critical habitat are considered insignificant for the following reasons:

- Puget Sound Chinook salmon PCE #5 - The proposed project will not result in a migration barrier or impede migration of Chinook salmon or affect the water quantity, quality, or natural cover in Elliott Bay. Water quality will be improved through treatment of project stormwater entering Elliott Bay. Elliott Bay is highly urbanized which has eliminated or reduced the natural cover and removed overhanging vegetation and large wood and replaced it with piers, docks and bulkheads.

- Bull trout critical habitat PCE #1 - The water temperature within the action area will not increase due to the proposed project. Water temperature within the action area is tidally influenced.

- Bull trout critical habitat PCE #6 - Although project implementation will result in short-term elevated levels of turbidity and sound pressure levels, the proposed project will not preclude bull trout movement through the area during or after construction.

- Bull trout critical habitat PCE #7 – Bull trout prey resources are not expected to be appreciably impacted by the proposed project. No forage fish spawning areas exist within the action area. Removal of 17,000 square feet of overhead cover, 200 creosote treated piles, and placement of clean fill in holes left after pile removal will increase macroinvertebrate production.

- Bull trout critical habitat PCE #8 - In-water work will result in short-term increases in turbidity, sedimentation, and suspension of sediment contaminants. However, due to the implementation of conservation measures and best management practices, project-related water quality impacts are not expected to result in measurable effects to this PCE.

Therefore the Services concur with your findings of "may affect, not likely to adversely affect" critical habitat of Puget Sound Chinook salmon and bull trout.

Southern Resident Killer Whales:

Critical habitat for SR killer whales was designated in three specific areas: 1) Summer Core Area in Haro Strait and waters around the San Juan Islands; 2) Puget Sound; and 3) the Strait of Juan de Fuca on November 29, 2006 (71 FR 69054). Critical habitat includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. The PCEs for SR killer whale CH are:

> (1) Water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

The potential effects of the project relate to PCEs 1 and 2: water quality and prey. The project will treat all pollutant generating impervious surfaces and will reduce pollutant levels/concentrations from baseline conditions with basic treatment of storm water. Additionally, the project is not likely to adversely affect salmonid prey resources of SR killer whales or their critical habitat, as described above.

Therefore the Services concur with your findings of "may affect, not likely to adversely affect" critical habitat of SR killer whales.

This concludes informal consultation in accordance with 50 CFR 402.13. The FHWA should re-analyze this ESA consultation if (1) new information reveals effects of the action that may affect listed species in a way not previously considered; (2) the action is modified in a manner that causes an effect to the listed species or critical habitat that was not previously considered; or (3) a new species is listed, or critical habitat designated, that may be affected by the identified action.

Magnuson-Stevens Fishery Conservation and Management Act

Federal agencies are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NMFS is required to provide the Federal action agency with EFH conservation recommendations (section 305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal agency and descriptions of EFH for Pacific coast groundfish, coastal pelagic species, and Pacific salmon contained in the Fishery Management Plans developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

The proposed action is described on pages 5 through 26 of the BA. The project area includes habitat which has been designated as EFH for various life stages of 46 species of groundfish, four species of coastal pelagics, and three species of Pacific salmon (see Table 3 enclosure).

EFH Conservation Recommendations: Because the conservation measures that the WSDOT included as part of the proposed action to address ESA concerns are also adequate to avoid, minimize, or otherwise offset potential adverse effects to the EFH of the species in Table 3, conservation recommendations pursuant to MSA ('305(b)(4)(A)) are not necessary. Since NMFS is not providing conservation recommendations at this time, no 30-day response from WSDOT is required (MSA '305(b)(4)(B)).

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, WSDOT will need to reinitiate consultation in accordance with the implementing regulations for EFH at 50 CFR 600.920(l).

We appreciate your efforts to comply with requirements under the ESA and the MSA. If you have questions, please contact Jim Muck of the NMFS's Washington State Habitat Office and the FWS's Washington Fish and Wildlife Office at (206) 526-4740, or by electronic mail at jim.muck@noaa.gov. If questions pertain to the marine mammal analysis, please contact Lynne Barre of the NMFS Northwest Region, Protected Resources Division at (206) 526-4745, or by electronic mail at lynne.barre@noaa.gov.

Sincerely,

Barry A. Thom
Acting Regional Administrator
NOAA Fisheries

Martha C. Jenger
for

Ken S. Berg, Manager
Washington Fish and Wildlife Office
U.S. Fish and Wildlife Services

cc: USFWS - Teachout

References:

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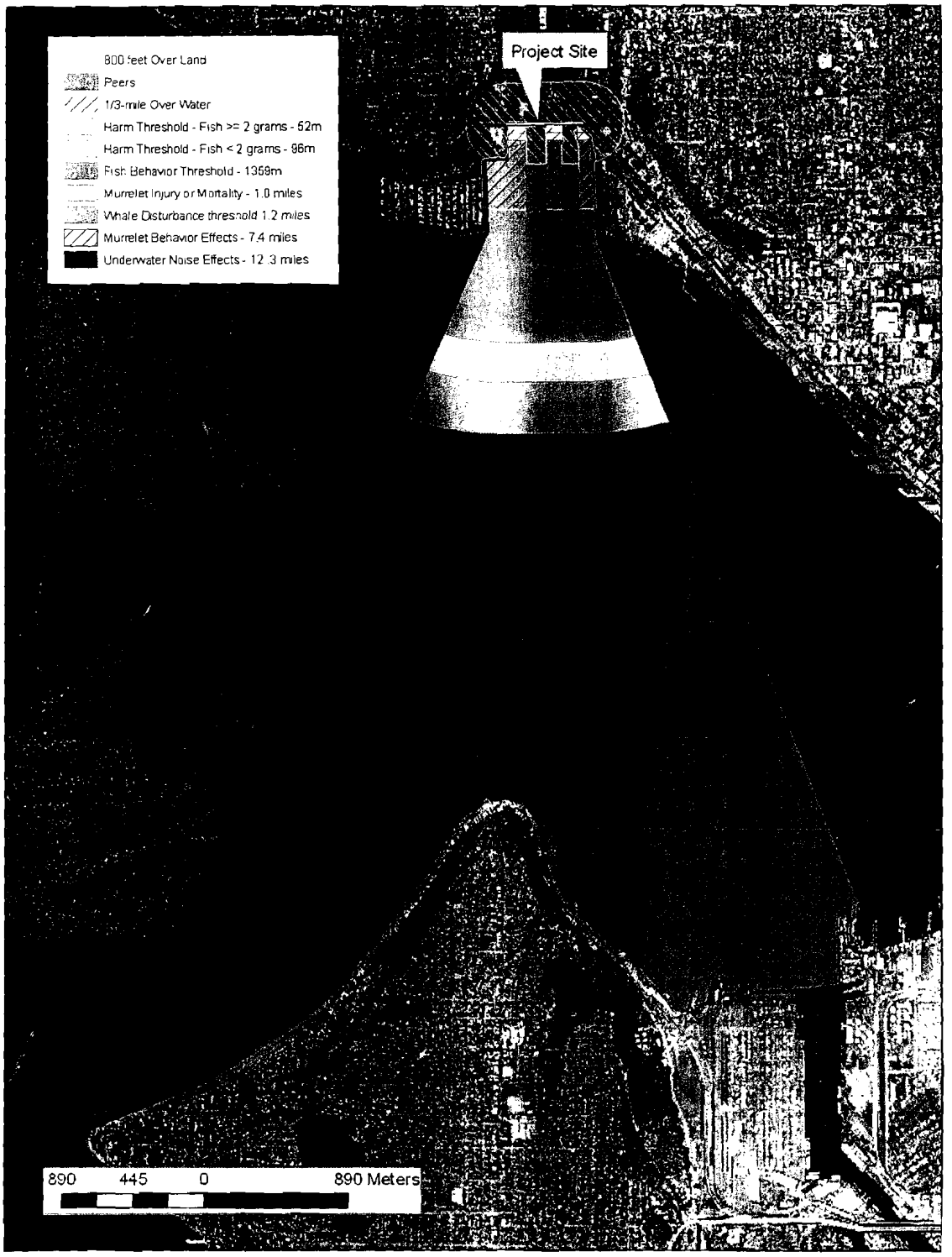

Figure 1 – Project site, action area, and expected extent of elevated underwater sound pressure levels for listed species.

Table 3. Species of fishes with designated EFH occurring in Puget Sound.

Groundfish Species	redstripe rockfish *S. proriger*	Dover sole *Microstomus pacificus*
spiny dogfish *Squalus acanthias*	rosethorn rockfish *S. helvomaculatus*	English sole *Parophrys vetulus*
big skate *Raja binoculata*	rosy rockfish *S. rosaceus*	flathead sole *Hippoglossoides elassodon*
California skate *Raja inornata*	rougheye rockfish *S. aleutianus*	petrale sole *Eopsetta jordani*
longnose skate *Raja rhina*	sharpchin rockfish *S. zacentrus*	rex sole *Glyptocephalus zachirus*
ratfish *Hydrolagus colliei*	splitnose rockfish *S. diploproa*	rock sole *Lepidopsetta bilineata*
Pacific cod *Gadus macrocephalus*	striptail rockfish *S. saxicola*	sand sole *Psettichthys melanostictus*
Pacific whiting (hake) *Merluccius productus*	tiger rockfish *S. nigrocinctus*	starry flounder *Platichthys stellatus*
black rockfish *Sebastes melanops*	vermilion rockfish *S. miniatus*	arrowtooth flounder *Atheresthes stomias*
bocaccio *S. paucispinis*	yelloweye rockfish *S. ruberrimus*	
brown rockfish *S. auriculatus*	yellowtail rockfish *S. flavidus*	**Coastal Pelagic Species**
canary rockfish *S. pinniger*	shortspine thornyhead *Sebastolobus alascanus*	anchovy *Engraulis mordax*
China rockfish *S. nebulosus*	cabezon *Scorpaenichthys marmoratus*	Pacific sardine *Sardinops sagax*
copper rockfish *S. caurinus*	lingcod *Ophiodon elongatus*	Pacific mackerel *Scomber japonicus*
darkblotch rockfish *S. crameri*	kelp greenling *Hexagrammos decagrammus*	market squid Loligo opalescens
greenstriped rockfish *S. elongatus*	sablefish *Anoplopoma fimbria*	**Pacific Salmon Species**
Pacific ocean perch *S. alutus*	Pacific sanddab *Citharichthys sordidus*	Chinook salmon *Oncorhychus tshawytscha*
quillback rockfish *S. maliger*	butter sole *Isopsetta isolepis*	coho salmon *O. kisutch*
redbanded rockfish *S. babcocki*	curlfin sole *Pleuronichthys decurrens*	Puget Sound pink salmon *O. gorbuscha*

bc: F/NWR - Collier
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WSHO - Muck
WSHO - Sibley (NPS)
WSHO - Grady
FWS - File Copy
PRD - Barre

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Biological Assessment Addendum

October 2014

Magnolia Bridge Replacement
City of Seattle

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BIOLOGICAL ASSESSMENT ADDENDUM

MAGNOLIA BRIDGE REPLACEMENT PROJECT

Prepared for

Seattle Department of Transportation
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Prepared by

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October 2014

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1 INTRODUCTION

The Seattle Department of Transportation (SDOT) proposes to replace the existing Magnolia Bridge with a new structure that meets current design standards. The project has received funding from the Federal Highway Administration (FHWA) and is therefore required to consult with the Services [the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS)] under Section 7(a)(2) of the Endangered Species Act and its implementing regulations (50 Code of Federal Regulations [CFR] Part 402.16.

Informal consultation with the Services was initiated in 2008. The effects of the project on listed species and critical habitat was documented in a Biological Assessment or BA (Anchor, 2008). Consultation concluded on October 15, 2009, via a letter from NMFS and USFWS (Appendix B). The effects determinations on listed species decided by the Services are shown in Table 1.

Table 1
2009 Effects Determination for USFWS and NMFS Listed Species and Critical Habitats

Species/Critical Habitat	Effects Determination
NMFS Species and Critical Habitats	
Puget Sound Chinook salmon *(Oncorhynchus tshawytscha)*	NLAA
Puget Sound Chinook salmon critical habitat	NLAA
Puget Sound steelhead *(Oncorhynchus mykiss)*	NLAA
Southern Resident killer whale *(Orcinus orca)*	NLAA
Southern Resident killer whale critical habitat	NLAA
Steller sea lion *(Eumetopias jubatus)*	NLAA
USFWS Species and Critical Habitats	
Coastal-Puget Sound bull trout *(Salvelinus conjluentus)*	NLAA
Coastal-Puget Sound bull trout critical habitat	NLAA
Marbled murrelet *(Brachyramphus marmoratus)*	NLAA

Notes: LAA = Likely to adversely affect; NLAA = Not likely to adversely affect

Since that time, three new rockfish species (bocaccio [*Sebastes paucispinus*], yelloweye rockfish [*S. ruberrimus*], and canary rockfish [*S. pinniger*]) have been listed, bull trout (*Salvelinus confluentus*) critical habitat has been revised, and critical habitat for Puget Sound steelhead (*Oncorhynchus mykiss*) has been proposed. In March 2014, the Washington Department of Transportation (WSDOT) for FHWA reinitiated informal consultation with the Services.

2 PROJECT DESCRIPTION

The Magnolia Bridge is located in northwest Seattle, in King County, Sections 23 and 26 of Township 25N, Range 3E (see Figures 1 and 2). The bridge's latitude is 47 degrees, 38 minutes, 1.3 seconds north; its longitude is 122 degrees, 22 minutes, 46.2 seconds west. Site elevation is 15 feet above sea level at Port of Seattle's Terminal 91, rising to 140 feet at Magnolia Bluff.

The Magnolia Bridge, with a total project length of about 4,400 feet, spans about 550 feet of Smith Cove, an inlet on the Elliott Bay shoreline. According to mapping by the Washington State Department of Ecology (Ecology), the bridge lies within Water Resource Inventory Area (WRIA) 8, the Cedar/Sammamish watershed (Ecology 2007). The majority of the Elliott Bay shoreline lies within WRIA 9, the Green/Duwamish watershed. Because of Smith Cove's location on the Elliott Bay shoreline, it interacts with water and fish from both watersheds. Smith Cove lies within the Duwamish Hydrologic Unit Code 1711001904.

SDOT proposes to replace the existing Magnolia Bridge south of its current alignment with a new mainline structure and approach ramps similar to the existing bridge. In-water construction is expected to take approximately 36 weeks with the entire bridge being replaced in three years. Construction activities involving in-water work or impact includes:

- Removing the existing and constructing a new 23rd Avenue West on-ramp
- Removing the existing wood wharf
- Installing a temporary work bridge
- Installing and removing finger trestles, and falsework supports
- Constructing foundations for a new 23rd Avenue West on-ramp and mainline bridge
- Constructing new mainline bridge columns and superstructure
- Demolishing existing mainline bridge and 23rd Avenue West off-ramp
- Removing the existing and constructing a new 23rd Avenue West off-ramp
- Constructing stormwater improvements

A detailed project description and construction schedule can be found on BA pages 5 through 25.

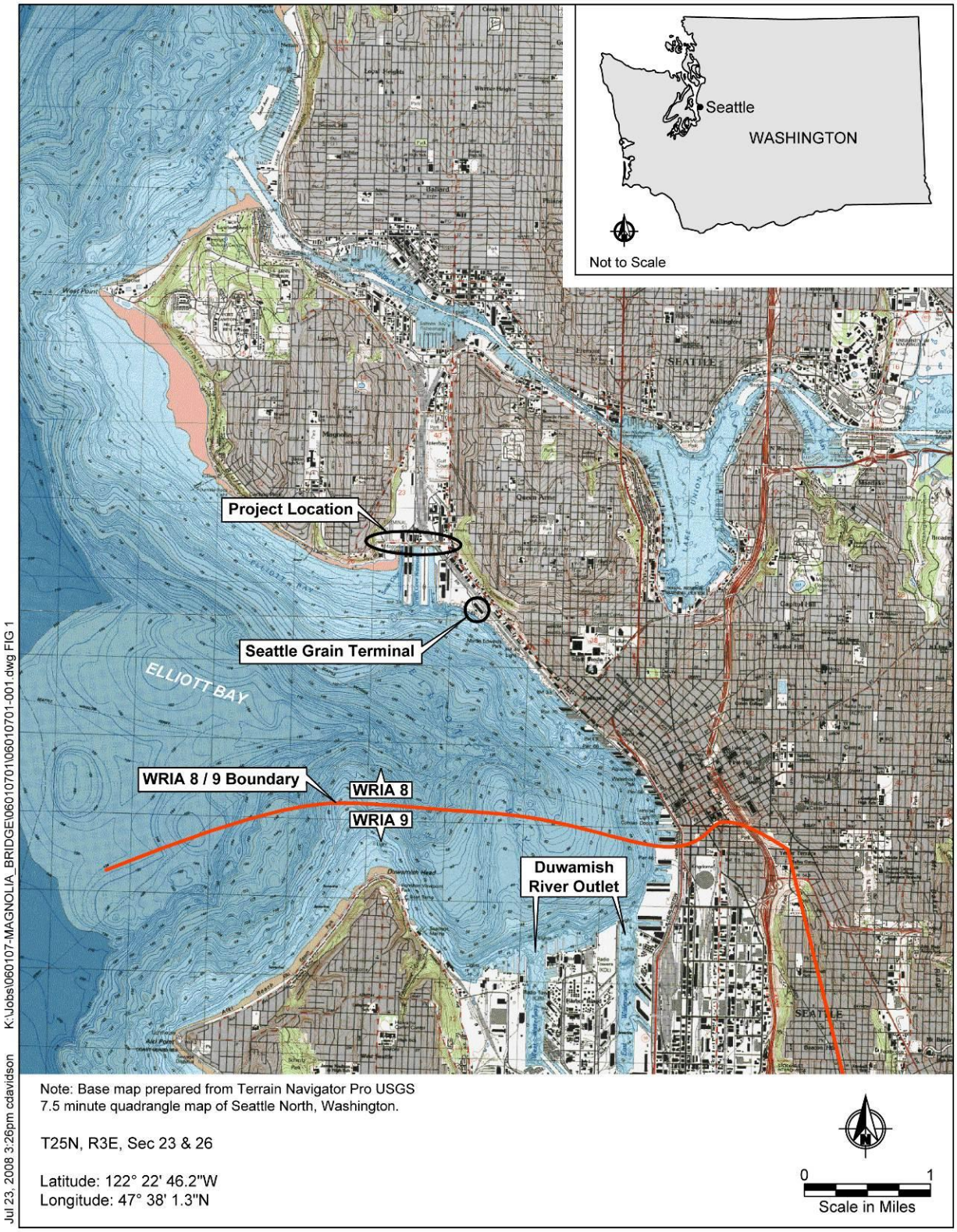

Figure 1
Vicinity Map (Anchor 2008)

Figure 2
Aerial Photo (Anchor 2008)

3 EFFECTS OF THE PROPOSED ACTION

The following section evaluates the effects of the project on three rockfish species (bocaccio, yelloweye rockfish, and rockfish), revised bull trout critical habitat, and the new proposal for listing of critical habitat for Puget Sound steelhead. Effects determinations for these listed species and critical habitat are listed in Table 2.

Table 2
FHWA Effects Determinations to Listed Species and Critical Habitat

Species	Status	Effects Determination	Critical Habitat	Critical Habitat Effects Determination
Puget Sound steelhead (*Oncorhynchus mykiss)*	Threatened (Puget Sound DPS)	NLAA*	Proposed January 14, 2013	Will not adversely modify
Bull trout (*Salvelinus confluentus*)	Threatened (Coastal-Puget Sound DPS)	NLAA *	Revised October 18, 2010	NLAA
Bocaccio (*Sebastes paucispinus)*	Endangered (Georgia Basin DPS)	LAA	Proposed August 6, 2013	Will not adversely modify
Yelloweye rockfish *(Sebastes ruberrimus)*	Threatened (Georgia Basin DPS)	LAA	Proposed August 6, 2013	Will not adversely modify
rockfish (*Sebastes pinniger)*	Threatened (Georgia Basin DPS)	LAA	Proposed August 6, 2013	Will not adversely modify

Notes: LAA = Likely to adversely affect; NLAA = Not likely to adversely affect
*Effect determinations made in 2009.

3.1 Potential Direct Project Effects

The potential direct effects of the project on bocaccio, yelloweye rockfish, and rockfish would be from in-water noise, turbidity, stormwater treatment and opening of the nearshore habitat to light penetration as described for salmonids on BA pages 27-32.

3.2 Potential Indirect Project Effects

The potential indirect effects f the project on bocaccio, yelloweye rockfish, and rockfish are the same as described for salmonids on BA page 31.

3.3 Effects of Interrelated/Interdependent Actions/Activities

Potential effects from interrelated and interdependent actions/activities will be the same for the new listed species as for listed salmonids as discussed in BA Section 6. The project will not result in additional actions that have no independent utility apart from the bridge replacement project. The project will not result in increased maintenance, additional related projects, or increased access to the area.

The proposed project is not part of a larger action, and does not depend on a larger action for its justification. There are no other anticipated related actions that could impact threatened or endangered species in the project area.

3.4 Cumulative Effects

The project lies in the highly developed Interbay industrial area which is the focus of urban renewal under its neighborhood master plan. While no changes in land use zoning have occurred, there are several potential future projects that may occur in vicinity of the Magnolia Bridge (See Figure 3):

- **City of Seattle Fire Station Number Five (1)** – will be relocated to Port of Seattle Terminal 91, Pier 90 in late 2014. It will remain here until the Elliott Bay Seawall is completed in 2017. At that time the station will be moved back into its permanent home on Alaskan Way. The proposed temporary Fire Station includes aquatic area and pier/upland actions at and 2000 square feet of concrete cell moorage float area. The project has obtained a conditional Shoreline Substantial Development permit from the City of Seattle that includes mitigation measures to maintain the existing conditions.

- **Washington Army National Guard Armory Site (2) –** The site was reviewed in the Ballard to Interbay Land Use Corridor Study conducted in 2013 (Seattle DPD 2013) for potential future zoning change to allow mixed uses including manufacturing, but no change was recommended for the 2014 comprehensive plan amendments. The National Guard may pursue development options in the future.

- **West Yard Property (3) -** The Seattle Parks and Recreation Department (Parks) recently acquired a 4.60 acre Terminal 91 West Yard property from the Port of Seattle in late 2013. The majority of the property is currently being used for staging and construction by King County for the construction of the Magnolia Combined Sewer Overflow (CSO) project. The southern portion of the site consists of the existing 1.12-acre Smith Cove Waterfront Park. While Parks has no immediate plans to develop the West Yard site, the property is being banked for development of a future park.

- **King County South Magnolia Combined Sewer Overflow Control Project (4) –** King County is constructing a new CSO facility on the West Yard Property - adjacent

to the Magnolia Bridge. The CSO will consist of stormwater and sewage when heavy rains fill pipes, reducing untreated overflows to Puget Sound. The underground Tank will be located on the northern end of the West Yard Property. After storms have passed, stored flows will be transferred to the Interbay Pump Station for conveyance to the West Point Treatment Plant – which lies west of Smith Cover. This will eliminate CSOs that have occasionally been discharged into Smith Cove. Construction began in May 2013 and will continue through October 2015. Startup and project commissioning will take place through May 31, 2017.

If construction of the new Magnolia Bridge coincides with the construction of any of the projects listed above the future combined construction impacts could be of higher intensity. However, the combined operational impacts of these projects are expected to improve stormwater and sediment quality. The 2009 Concurrence Letter describes expected improvements to water quality.

These projects, if implemented, are expected to be completed in coordination with Ecology and the Unites State Army Corps of Engineers (USACE) and will be subject to conditions to protect sediment and water quality in the surrounding area; sediment quality effects are expected to be insignificant. If sediment remediation is required, sediment quality will be improved.

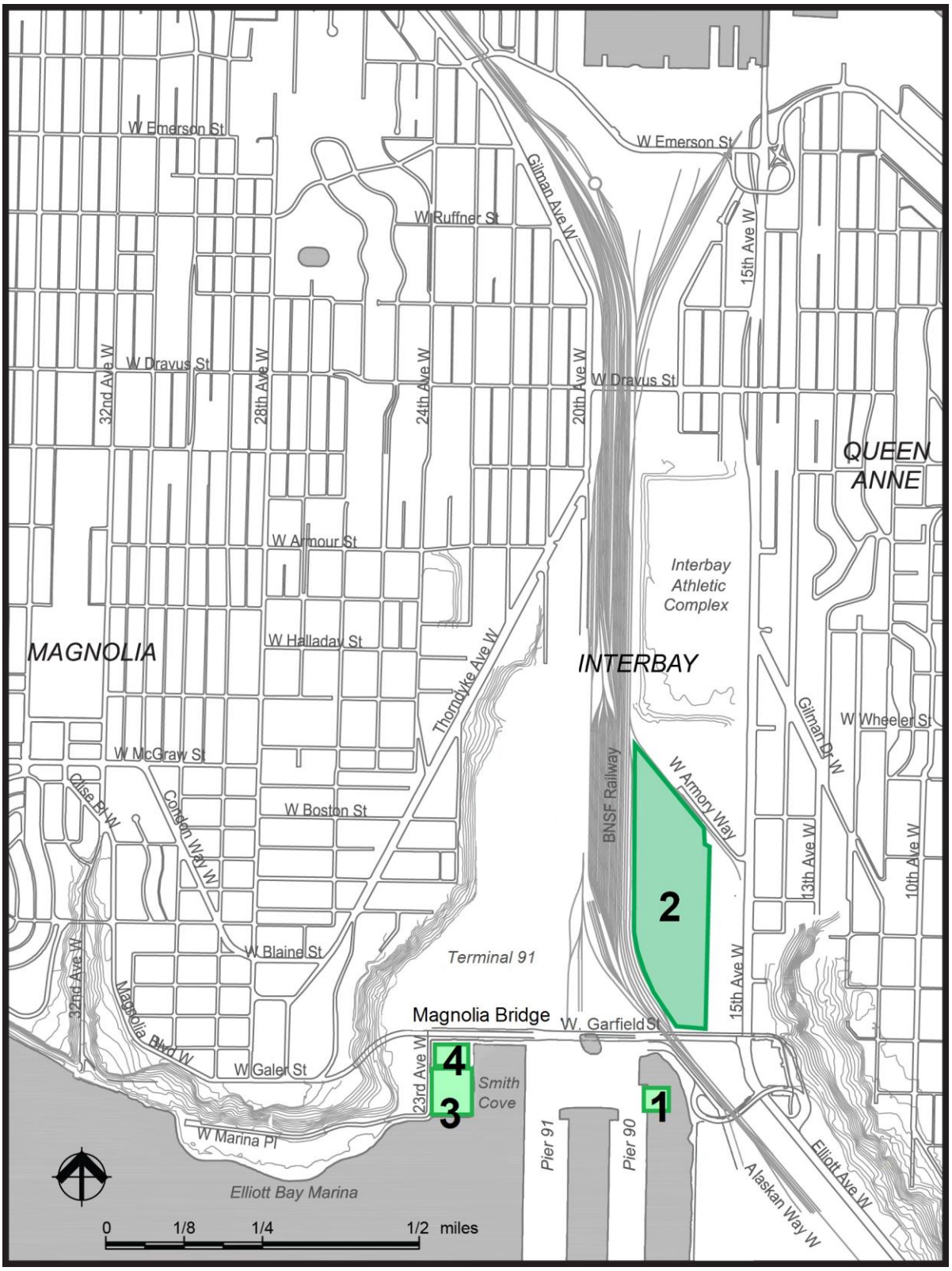

Figure 3
Areas Where Proposed Cumulative Effects Could Occur

4 ACTION AREA

The Action Area is the area to be affected directly or indirectly by the federal action, and not merely the immediate area involved in the action (50 CFR §402.02). The Action Area also considers the effects of interrelated and interdependent activities. The Action Area for the project is described in BA Chapter 4, and the boundary is defined as the distance required for noise to attenuate to background levels. Because Smith Cove is surrounded by land, the boundaries of Smith Cove limit underwater sound transmission. In-water sound will carry in a straight line out of Smith Cove into Elliott Bay. While worst-case in-water noise will attenuate to below the harm threshold within a third of a mile, the Action Area has been determined to extend to the nearest land mass. For in-air noise, the Action Area is expected to attenuate to typical high-density urban noise levels within 800 feet over land and 1,600 feet (0.3 mile) over water. These boundaries are shown on Figure 4.

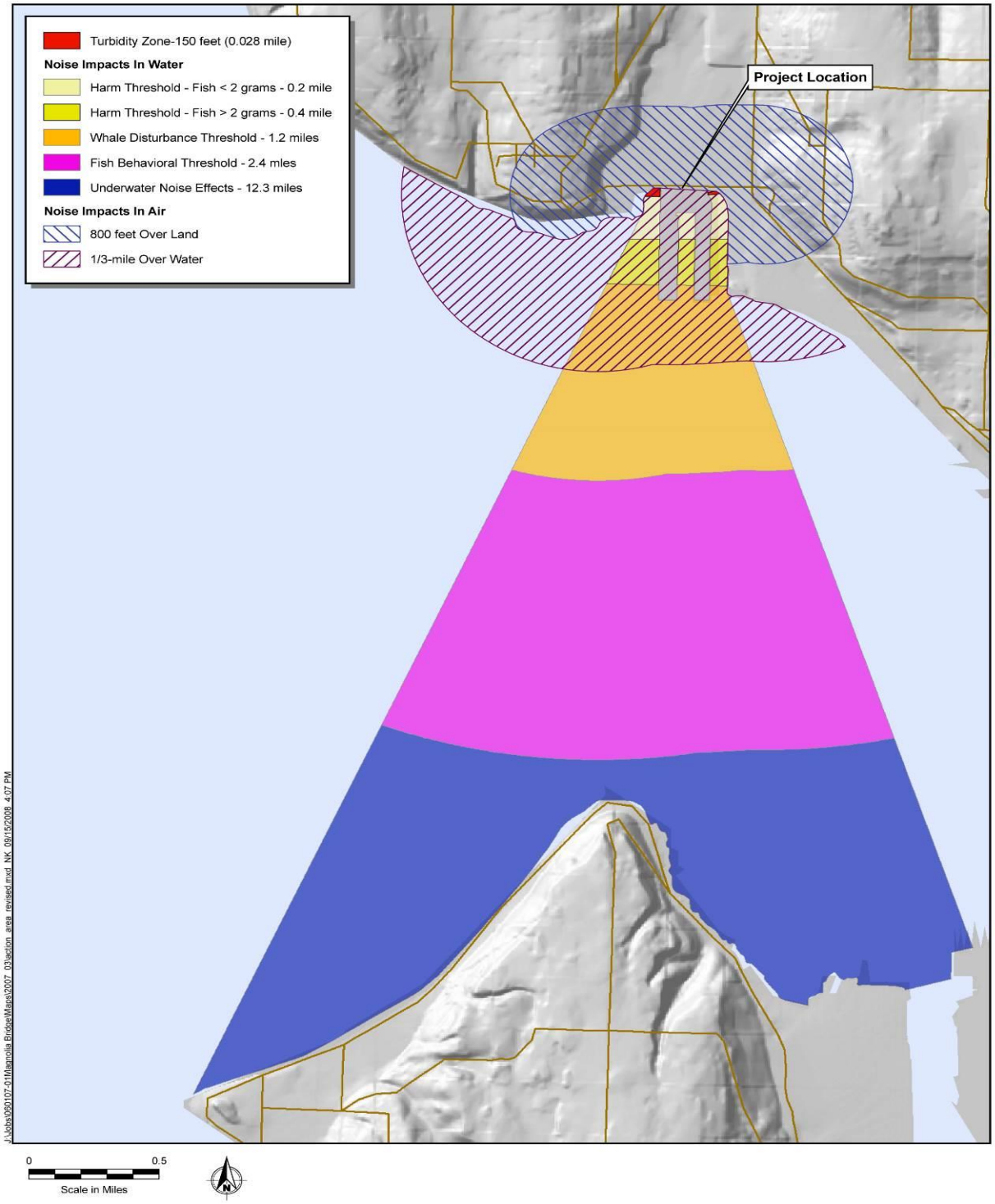

Figure 4
Action Area (Anchor 2008)

5 ENVIRONMENTAL BASELINE IN ACTION AREA

The environmental baseline has not changed since 2008 and is described in detail on BA pages 41-43. Potential effects to the baseline are the same as those identified in the BA and are summarized in Table 3.

5.1 Physical Indicators

Smith Cove, in which the project site resides, contains gravel and sand in shallow water with sand, silt, and cobble in deeper water. Riprap is found under the wharf adjacent to the concrete seawall. Shoreline vegetation consists of grasses and Himalayan blackberry (*Rubus discolor*), and limited shoreline trees near steep riprap slopes.

Smith Cove once functioned as an estuary, but historic fill and development activities blocked off the drainages that formed the cove (SDOT et al. 2007), and there are no freshwater streams draining into Smith Cove. Groundwater flows into Smith Cove from a shallow unconfined aquifer. Flushing of Smith Cove occurs from tidal flows. Four stormwater outfalls are located near the mouth of the cove, and runoff from the area west of Smith Cove flows directly into Elliott Bay. The project will treat stormwater runoff collected on project vehicle roadways. Runoff from the existing structure is not treated.

A 17,800-square-foot portion of the nearshore/intertidal habitat in Smith Cove is blocked off to light penetration by the existing wharf and facing timbers. While fish may be able to get under the wharf when the area is inundated, the habitat below the wharf is degraded by long-term shading and is of low productivity.

5.2 Chemical Indicators

Elliott Bay receives input of fecal coliform from two municipal sewer outfalls located along the Elliott Bay shoreline. There are frequent shellfish pollution warnings from the Washington Department of Health. Despite the intense industrial activity near the site, no sediment contamination is known to exist in Smith Cove where in-water bridge foundations are proposed. Preliminary site investigations will be performed prior to excavation to determine the location and extent of any contamination (SDOT et al. 2007).

5.3 Biological Indicators

Chinook salmon (*Oncorhynchus tshawytscha*), steelhead, and bull trout use the nearshore of the project site, and Pacific herring (*Clupea pallasii*), sand lance (*Ammodytes hexapterus*),

surf smelt (*Hypomesus pretiosus*), crab, mollusks, perch, spiny dogfish (*Squalus acanthias*), rockfish, skate, flounder, sole, and sculpin also occur there. No forage fish spawning beaches are known at or near the site. The dominant invertebrate species in the intertidal zone are acorn barnacles (*Balanus glandula*) and mussels (*Mytilus edilus*).

The high intertidal zone is dominated by rockweed (*Fucus distichus*), especially in riprap areas, and *Ulva* sp. in the intertidal zone. Cobbles in the intertidal and subtidal zones provide many attachment sites for red, green, and brown macroalgae. *Laminaria* sp. are found on the western side of the shallow subtidal zone.

5.4 Baseline Effects Table

Project effects to the environmental baseline are summarized in Table 3. The project is expected to maintain baseline conditions at the watershed scale, with some improvement to aquatic vegetation as a result of the wharf removal.

Table 3
Baseline Effects

	Environmental Baseline			Project Effects at Watershed Scale			Project Effects at Project Scale		
	Properly Functioning	At Risk	Not Properly Functioning	Improve	Maintain	Degrade	Improve	Maintain	Degrade
Water Quality									
Temperature	X				X			X	
Sediment/turbidity		X			X				X (short-term)
Chemical contamination and nutrients		X	X		X		X		
Flows and currents		X			X			X	
Salt/freshwater mixing	X				X			X	
Habitat Access									
Physical barriers			X		X		X		
Habitat Elements									
Substrate		X			X			X	
Aquatic vegetation		X		X			X		
Shoreline vegetation			X		X			X	
Refugia		X			X			X	
Prey availability		X			X			X	

At the project scale, there will be short-term degradation to water quality in the form of turbidity and long-term restoration as a result of reduced contaminant loading due to stormwater improvements. The wharf currently blocks access to nearshore habitat with the timber wall on the waterward side of the wharf. This wall will be removed and access to the area behind it will be restored. This habitat has become unproductive as a result of long-term shading; however, shading will be removed at the same time that physical access is restored. Aquatic vegetation will also be restored to this area as a result of light penetration.

6 SPECIES EFFECTS ANALYSIS AND DETERMINATIONS

The following sections describe effects on individual species.

6.1 Direct and Indirect Effects to Fish

Potential direct effects to rockfish are the same as those described for salmonids in BA pages 46 to 53 and in the 2009 Concurrence Letter. These include short-term negative effects from noise, water quality effects, long-term effects of removal of approximately 200 square feet of intertidal habitat where the bridge foundations will be replaced, and positive effects to water quality from stormwater treatment, removal of creosote-treated wood piles, and increased nearshore light penetration.

The total duration of in-water construction, including pile driving, pile removal, and drilled shaft construction, will be about 7 months. All impact driving of steel piles is expected to take place within a 1-month period, in November and/or December. This is within the approved in-water work window (July 16 through February 14). Rockfish juveniles could be present during this timeframe. Table 4 summarizes the effects and minimization efforts intended to offset the effects.

6.1.1 Noise

Impact driving of steel piles can produce intense sound pressure waves that can injure and kill fish. However, pile driving and other construction will occur outside the peak outmigration periods for juveniles (April through June), reducing the potential for impacts to juvenile salmon. Direct impacts would be limited to sub-adults or adults that could occur in the Action Area. Effects on sub-adults and adults are expected to be limited because fish in this life history stage are highly mobile, can avoid the immediate project area, and are less sensitive than juveniles to barotrauma and modifications to their migration routes. However, the potential for incidental take exists because pile driving could result in harm, injury, or harassment to fish.

6.1.2 Turbidity and Water Quality Degradation

Demolition and pile removal could produce turbidity and degrade water quality. These activities will take place over a 2-month period in the fall, within the approved work window and several months removed from the peak outmigration periods for Chinook salmon, steelhead, and bull trout. It is anticipated that the 401 Water Quality Certificate will specify a mixing zone of 150 feet beyond which project-related turbidity cannot

extend. Water quality monitoring during pile removal activities will ensure that this condition is met. Turbidity effects will be localized and timed to minimize harm to fish.

6.1.3 Removal of Intertidal Beach Habitat

The footprint of the new bridge foundations will cover approximately 200 square feet of intertidal beach habitat. This loss will be offset by the removal of old wharf piles, discussed below.

6.1.4 Water Quality Improvements Stormwater Treatment

Stormwater from the existing bridge is collected in drain inlets. The bridge downspouts drain the water to the surface pavement, where surface storm drains carry the water to two outfalls to Elliott Bay.

The new bridge will have approximately 7.72 acres of pollution-generating impervious surface (PGIS) compared to 6.08 acres of PGIS on the existing bridge. Stormwater runoff from the new bridge will be treated to remove pollution before discharging into Elliott Bay. Treatment will include separation of oil from surface runoff at 15th Avenue West at West Garfield Street, and removal of at least 80% of the suspended solids. This will result in a net reduction of pollutant loads and concentrations over current conditions as described in Section 3.1.3 of the BA and in the 2008 BA Addendum.

Table 4
Potential Effects and Minimization Measures

Action	Where	Exposure					Response to Stressor	Minimization Measures	Performance Standards	Resulting Effects of the Action
		Stressor	When	Duration	Frequency	Life History Form				
Impact installation of up to 115 temporary piles	In water	Noise up to and possibly exceeding disturbance and harm thresholds	November and December	A total of 58 hours of impact driving and 58 hours of vibratory pile driving over a 2-month period	Intermittent; half an hour at a time, with incidents half an hour to an hour apart, during daylight hours only.	Adults and juveniles	Behavioral (startle response, disrupted foraging and/or migration), possible barotrauma	– In-water work complies with approved timing window – Vibratory pile driving will be done to the extent possible and impact driving and proof loading will be kept to the minimum necessary to achieve the required load-bearing capacity – A bubble curtain designed to achieve at least a 9 dB noise reduction will be used to reduce peak sound pressures transmitted to the water column		Minimization of injurious noise levels, especially to juvenile salmonids
Removal of approximately 200 existing wood piles and a timber wall	In water	Temporary turbidity and water quality effects	Late October to early December	Several weeks during a 2-month period	Constant throughout daylight hours	Adults and juveniles	Behavioral (disrupted foraging and/or migration), avoidance—turbidity is not expected to reach levels that cause physical harm	– In-water work complies with approved timing window – Pier demolition will be conducted in a manner to minimize debris and accidental spill material entering the waterway – Adherence to state water quality restrictions		Minimized turbidity impacts; long-term increase in water quality resulting from removal of creosote
Placement of 11 falsework support bents below MHHW	In water	Noise up to and possibly exceeding disturbance thresholds	November and December	Several days during a 2-month period	Intermittent	Adults and juveniles	Behavioral (startle response, disrupted foraging and/or migration)	– In-water work complies with approved timing window – Vibratory pile driving will be done to the extent possible		Minimization of disturbing noise levels, especially to juvenile salmonids
Overwater cover from temporary work bridge	In water	Blocked light penetration results in lower habitat productivity and possible increased predation	Year-round beginning in December	Approximately 12 to 14 months Any holes left by pile removal will be backfilled with clean sand or suitable native substrate	Constant	Adults and juveniles	Avoidance of the area	Impact is unavoidable		Temporarily reduced habitat productivity; effect will be eliminated when work bridge is removed
Removal of overwater cover from wharf demolition	In water	Increased light penetration results in increased habitat productivity (effect is not a stressor)	Permanent effect beginning in October	Permanent effect	Constant	Adults and juveniles	Increased use of the area			Use of habitat that was previously blocked off
Installation of temporary cofferdams to isolate the multiple-shaft foundation work area and the area where work will be done immediately behind the seawall	In water	Noise up to and possibly exceeding disturbance thresholds	December and January	Several days during a 2-month period	Constant throughout daylight hours, with interruptions as each panel is set in position	Adults and juveniles	Behavioral (startle response, disrupted foraging and/or migration)	– In-water work complies with approved timing window – Vibratory pile driving will be done to the extent possible – Cofferdams will be closed at low tide to avoid trapping fish		Minimization of noise impacts to disturbance rather than injury thresholds; prevention of entrainment

Action	Where	Exposure					Response to Stressor	Minimization Measures	Performance Standards	Resulting Effects of the Action
		Stressor	When	Duration	Frequency	Life History Form				
Removal of the cofferdam after the multiple-shaft foundation block is poured	In water	Temporary turbidity, noise probably not exceeding disturbance thresholds	February	Several days	Constant throughout daylight hours, with interruptions as the vibratory hammer is positioned on each panel.	Adults and juveniles	Behavioral (disrupted foraging and/or migration), avoidance—turbidity is not expected to reach levels that cause physical harm	– In-water work complies with approved timing window – Adherence to state water quality restrictions – Excavated material will be removed from the site and not returned to the water – Water collected from the drilled shaft construction will be tested and treated if necessary before returning it to Smith Cove		Minimization of turbidity impacts, especially to juvenile salmonids
Removal of temporary piles and falsework bents when construction is complete	In water	Temporary turbidity, noise probably not exceeding disturbance thresholds	December and January	Up to 2 months	Constant with brief interruptions throughout daylight hours	Adults and juveniles	Behavioral (disrupted foraging and/or migration), avoidance—turbidity is not expected to reach levels that cause physical harm	– In-water work complies with approved timing window – Adherence to state water quality restrictions		Minimization of turbidity and noise impacts, especially to juvenile salmonids
Stormwater improvements	In water	None (effect is improved water quality, which is not a stressor)	Year-round	Permanent effect	Constant	Adults and juveniles	Increased use of the area		The project will result in a decrease in pollutant loading	Increased water quality leads to improved habitat and greater fish survival

Removal of Creosote from the Marine Environment

Approximately 200 creosote-treated wood piles, along with a 60-foot-long timber wall, will be removed from the marine environment during the wharf demolition. This will result in improved water quality by reducing creosote leachates into the water. This will also result in the restoration of 400 square feet of intertidal habitat.

Increased Light Penetration

The removal of the wharf will open up approximately 17,800 square feet of nearshore/intertidal habitat to light penetration. New bridge structures will include a similar area of overwater structure compared to the existing bridge, but the majority of it will be much higher over the water, allowing at least 60% light penetration required by Washington Department of Fish and Wildlife for new overwater structure. Light penetration allows photosynthetic macroalgae to colonize the area. Macroalgae provide some nutrient absorption, which improves water quality.

7 UPDATED LISTED SPECIES PRESENCE IN THE ACTION AREA

7.1 Puget Sound DPS Steelhead (Oncorhynchus mykiss)

7.1.1 Species Presence in the Action Area

In 2009, the Services determined that Puget Sound steelhead could occur in the Action Area between April and mid-May (juveniles) and adults between April and October (summer run) and November through May (winter-run).

7.1.2 Effects Determination

In 2009, the Services determined that the project was not likely to adversely affect Puget Sound DPS Steelhead and concurred with the FHWA's **may affect, not likely to adversely affect** determination (See Appendix A).

7.1.3 Critical Habitat

Critical habitat was proposed for Puget Sound steelhead on January 14, 2013 (78 Fed. Reg. 2726). Primary constituent elements (PCEs) listed in the proposal are the same as the PCEs for Chinook salmon and are described in pages 55-57 of the BA.

For proposed critical habitat, the Project is not likely to jeopardize the continued existence of the species and the effects of the Project will improve the conservation value of the Action Area over the long term. It is determined that the Project **will not destroy or adversely modify proposed critical habitat**, and in the event that critical habitat for Puget Sound steelhead is designated in the future, the provisional critical habitat effect determination is that the Project **may affect, but is not likely to adversely affect designated steelhead critical habitat**.

The **may affect** determination is appropriate because:

- Short-term effects to Puget Sound steelhead critical habitat, extending no more than 150 feet from the project area shoreline, will result from temporary turbidity during in-water work.
- Short-term effects to critical habitat will result from partial shading of an approximately 16,000-square-foot area due to the temporary work bridge being in place for 1 year or more.
- Long-term effects to critical habitat will result from the removal of 140 square feet of intertidal habitat to accommodate the bridge foundations, and

restoration of 17,800 square feet (0.4 acre) of nearshore habitat from removal of the wharf pilings and increased light penetration.

- In addition, long-term improvement to water quality will result from the removal of creosote and the treatment of stormwater runoff that is currently untreated.

A **not likely to adversely affect** determination is appropriate because:

- Long-term beneficial effects are far greater than short-term detrimental effects.

7.2 Bull Trout (Salvelinus confluentus)

7.2.1 Species Presence in the Action Area

In 2009, the Services discussed that there is no clear known or recorded pattern of bull trout distribution or timing in Elliott Bay and that habitat presence lacked the complexities that bull trout prefer. The letter stated that it was "extremely unlikely that individuals would occur within the project action area during the work timing window" (Appendix A).

7.2.2 Effects Determination

In 2009, the Services determined that the project was not likely to adversely affect bull trout and concurred with the FHWA's effect determination of **may affect, not likely to adversely affect** determination (See Appendix A).

7.2.3 Critical Habitat

On September 26, 2005, the USFWS published final rules designating critical habitat for the Coastal-Puget Sound DPS of bull trout (70 Fed. Reg. 56211). On October 18, 2010, a revised designation was published for critical habitat for bull trout in the coterminous United States, including the Coastal-Puget Sound DPS of bull trout (75 FR 63898). The rule became effective on November 17, 2010. Critical habitat designates areas that contain the physical and biological habitat features (called PCEs) essential for the conservation of a threatened or endangered species and that may require special management considerations. The revised designation for critical habitat revisited the PCEs for bull trout.

For an area to be included as critical habitat, it has to provide one or more of the following functions for bull trout:

1. Spawning, rearing, foraging, or overwintering habitat to support essential existing local populations.
2. Movement corridors necessary for maintaining essential migratory life history forms.
3. Suitable habitat that is considered essential for recovering existing local populations that have declined or that need to be re-established to achieve recovery.

Areas providing one or more of these functions and at least one of the revised nine PCEs are designated as critical habitat. Nine PCEs are identified as essential for the conservation of bull trout and may require special management considerations or protection (those in italics below are relevant to this Project):

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.
2. *Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.*
3. *An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.*
4. *Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.*
5. *Water temperatures ranging from 2 to 15 degrees Celsius (°C) (36 to 59 degrees Fahrenheit [°F]), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.*
6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry

emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
8. *Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.*
9. Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

In marine nearshore areas, the inshore extent of critical habitat is the mean higher high water line (average of all the higher high-water heights of the two daily tidal levels), including tidally influenced freshwater heads of estuaries. Adjacent shoreline riparian areas, bluffs, and uplands are not proposed as critical habitat. The offshore extent of critical habitat for marine nearshore areas is to the depth of 30 meters (98 feet) relative to mean lower low water (average of all the lower low water heights of the two daily tidal levels), which is the average depth of the photic zone.

7.2.3.1 Presence and PCEs in the Action Area

This project now falls within the geographical boundaries of critical habitat unit 2 – Puget Sound Marine. It provides rearing and foraging habitat to support existing local populations by PCEs 2, 3, 4, 5, and 8, discussed below.

PCE #2: Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

Elliott Bay serves as a migratory corridor for bull trout. There may be some short-term interference with use of Smith Cove during in-water construction, but Smith Cove can by bypassed by fish across its mouth. There will be no long-term interference with use of Smith Cove as part of the Elliott Bay migratory corridor.

PCE #3: An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

There may be short-term effects to food abundance during in-water work, both from bottom coverage of the temporary work bridge piles and from pile driving noise resulting in avoidance of the area by forage fish. There will be a long-term increase in the food base resulting from opening the area under the wharf to sunlight.

PCE #4: Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

The existing shorelines at Smith Cove are human-influenced, simplified habitats typical of an urban environment, with limited variations in depth and structure. The bank and nearshore areas exhibit sparse non-native vegetation and no large wood. While sand is present in some areas, substrates are generally larger, with riprap and cobble predominant. Much of the nearshore/intertidal habitat in Smith Cove is blocked off to light penetration by the existing wharf and facing timbers and is of low productivity. Due to these existing urban and degraded shoreline conditions, features, and processes, the Project is not expected to reduce the function of this PCE. Conversely, the Project will improve current shoreline conditions due to the restoration of 17,800 square feet (0.4 acre) of nearshore/intertidal habitat from removal of the wharf pilings and increased light penetration.

PCE #5: Water temperatures ranging from 2 to 15 degrees Celsius (°C) (36 to 59 degrees Fahrenheit [°F]), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

Smith Cove provides water temperatures in the specified range for bull trout for most of the year. Spawning is the life stage most sensitive to water temperature, requiring temperatures lower than 48°F (9°C). Spawning occurs in fresh water, in the Duwamish River system tributaries.

Ambient temperature monitoring is done in Elliott Bay, but not in Smith Cove (Anchor 2008). Because Smith Cove is shallow and somewhat confined, temperature could be a concern in late summer, but daily tidal flushing would keep it from becoming a serious problem. The area under the wharf will be warmed by sunlight when the wharf is removed, to the same temperature as the surrounding nearshore.

Jacobs Lake is only hydrologically connected to the cove via groundwater. The interrelated Jacobs Lake filling could cause a temporary rise in temperature as the water is pumped from the basin into Smith Cove. This effect would only last one tidal cycle, as tidal flushing would disperse the warmer water.

PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
Smith Cove provides a constantly inundated area, influenced by tidal fluctuation. Tidal flushing helps to protect water quality. Project activities will not affect water levels in Smith Cove (except where cofferdams are used during in-water work).

7.2.3.2 Effects Analysis and Determination

A **may affect** determination is warranted for bull trout critical habitat because:

- Short-term effects to bull trout critical habitat will result from temporary turbidity during in-water work.
- Long-term beneficial effects to critical habitat will result from the removal of 200 square feet of intertidal habitat to accommodate the bridge foundations, and restoration of 17,800 square feet (0.4 acre) of nearshore/intertidal habitat from removal of the wharf pilings and increased light penetration.
- In addition, long-term improvement to water quality will result from the removal of creosote and the treatment of stormwater runoff that is currently untreated.

A **not likely to adversely affect** determination is warranted for bull trout critical habitat because:

- Most of the effects described above will improve critical habitat. The removal of 200 square feet of intertidal habitat is more than offset by the restoration of 17,800 square feet of nearshore/intertidal habitat from the wharf removal.

7.3 Bocaccio (Sebastes paucispinus)

7.3.1 Species Presence in the Action Area

The Georgia Basin bocaccio (rockfish) was listed as endangered on April 28, 2010 (75 FR 22276). In Puget Sound, bocaccio have always been rare in the north Puget Sound surveys of the recreational fishery (Drake et al. 2008). Adult bocaccio have been documented along areas of high relief and non-rocky substrates such as sand, mud, and other unconsolidated sediments (Washington 1977; Miller and Borton 1980), but it is very likely that densities are highest near rocky habitats (Drake et al. 2010). As for depth, adult bocaccio are most commonly found between 160 and 820 feet in depth, but may be found as deep as 1,560 feet (Feder et al. 1974; Love et al. 2002). This deep, rocky habitat does not exist in the Project footprint but may occur in patches offshore in the Action Area of Elliott Bay, and bocaccio could be present there.

NMFS presumes that larval rockfish could be present if any one of these three habitat features is present: 1) kelp beds; 2) eelgrass; or 3) large rock. Smith Cove is not ideal habitat for bocaccio due to its lack of natural rocky reefs or substrate, but large rock occurs as riprap near the shore of the Action Area, and therefore, juvenile bocaccio could be presumed to occur there.

Based on the depth, substrate preferences, and geographical range information presented above, juvenile bocaccio could occur in the nearshore, and adults could be present in the deeper waters of Puget Sound outside the immediate area of the bridge.

7.3.2 Direct and Indirect Effects to Species

Potential effects to larval and adult bocaccio are the same as those described for salmonids and bull trout in the BA and 2009 Concurrence Letter. They include:

- Short-term localized turbidity and sedimentation effects from pile driving placement of bridge footings and temporary structures
- Short-term localized noise effects from pile driving
- Long-term effects from removal of approximately 200 square feet of intertidal habitat where bridge foundations will be replaced

- Long-term positive effects to water quality from stormwater treatment and removal of creosote-treated wood piles
- Long-term positive habitat effects from increased nearshore light penetration

7.3.3 Effects Determination

The project **may affect** bocaccio because:

- Rocky (riprap) habitat is present within the Action Area.
- Short-term noise impacts will occur.
- Temporary turbidity will result from pile removal and other in-water work.
- Short-term effects to habitat will result from partial shading of an approximately 16,000-square-foot area due to the temporary work bridge being in place for 1 year or more.
- Nearshore habitat productivity is likely to improve with the opening of 17,800 square feet of nearshore habitat to light penetration.
- Water quality will improve as a result of removing approximately 200 creosote-treated piles and facing timbers from the aquatic environment.
- The project will include numerous conservation measures to mitigate project impacts on aquatic species.
- The project will include treatment of all stormwater and is expected to result in a net reduction in pollutant concentrations for pollutants of concern to salmonids and similarly to rockfish.

This project **is likely to adversely affect** bocaccio because:

- Sound pressure peaks during impact proofing of steel piles may cause injury to juveniles that may occur within a 1,600-foot radius of the pile being driven. There is no clearly defined pattern of distribution or timing, therefore presence in the Action Area is assumed.

7.3.4 Critical Habitat

On August 6, 2013, NMFS published proposed rules for designating critical habitat for Puget Sound/Georgia Basin bocaccio, as well as yelloweye and rockfish of the Puget Sound/Georgia Basin (78 FR 47635). Proposed critical habitat for bocaccio includes approximately 1,185 square miles of marine habitat in Puget Sound.

Once designated, critical habitat includes areas containing the physical and biological habitat features, or PCEs, essential for the conservation of the species or that require special management considerations. PCEs include sites that are essential to supporting one or more life stages of the DPS and that contain physical or biological features essential to the conservation of the DPS. Specific sites and features proposed for the Puget Sound/Georgia Basin bocaccio DPS include the following:

1. Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities (applies to adults and juveniles)
2. Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities (applies to adults and juveniles)
3. The type and amount of structure and rugosity that supports feeding opportunities and predator avoidance (applies to adults only)

7.3.4.1 Presence and PCEs in the Action Area

The United States portion of Puget Sound/Georgia Basin that is occupied by bocaccio can be divided into five biogeographic basins or areas based on the presence and distribution of adult and juvenile rockfish, geographic conditions, and habitat features; the Project occurs in the "Main Basin" of Puget Sound. As stated above, based on the depth, substrate preferences, and geographical range information, it would be highly unlikely that adult bocaccio would occur in the Action Area, but juveniles could occur there.

Proposed PCE 1: Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities (applies to adults and juveniles).

Prey plankton and invertebrate species are likely not available in quantities and qualities for optimal conditions due to the urban nature of the shoreline and lack of habitat complexity, and no kelp or eelgrass is present to support prey species and provide juvenile refugia.

Proposed PCE 2: Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities (applies to adults and juveniles).

Proposed PCE 2 is functioning in the Action Area (see Section 5.2.1 of the BA) and dissolved oxygen is not generally limiting.

Proposed PCE 3: The type and amount of structure and rugosity that supports feeding opportunities and predator avoidance (applies to adults only).

Proposed PCE 3 is functioning in the Action Area; however, substrates are not available of the type and depth that adult bocaccio prefer.

7.3.4.2 Effects Analysis and Determination

For proposed critical habitat, the Project is not likely to jeopardize the continued existence of the species and the effects of the Project will improve the conservation value of the Action Area over the long term.

The Project **will not adversely modify proposed bocaccio critical habitat**. In the event that critical habitat becomes designated in the future, the provisional determination is that the Project **may affect, but is not likely to adversely affect designated bocaccio critical habitat**.

These determinations are appropriate because:

- Temporary turbidity during in-water work will cause temporary effects to bocaccio critical habitat, but they will be short term and localized to the area near bridge construction.
- Long-term beneficial effects to critical habitat will result from the removal of 200 square feet of intertidal habitat to accommodate the bridge foundations, and restoration of 17,800 square feet (0.4 acre) of nearshore/intertidal habitat from removal of the wharf pilings and increased light penetration.
- Long-term improvement to water quality will result from the removal of creosote and the treatment of stormwater runoff that is currently untreated.
- Most of the effects described above will improve critical habitat. The removal of 200 square feet of intertidal habitat is more than offset by the restoration of 17,800 square feet of nearshore/intertidal habitat from the wharf removal.

7.4 Yelloweye Rockfish (Sebastes ruberrimus)

7.4.1 Species Presence in the Action Area

The Georgia Basin yelloweye rockfish was listed as threatened on April 28, 2010 (75 FR 22276). Adult yelloweye rockfish are associated with steep, complex, rocky habitats with crevices (Yoklavich et al. 2000; Love et al. 2002; Wang 2005; Anderson and Yoklavich 2007). Yelloweye rockfish occur in waters 80 to 1,560 feet deep (Orr et al. 2000), but are most commonly found between 300 to 590 feet in depth (Love et al. 2002). This deep, rocky habitat does not exist in the Project footprint but may occur in patches offshore in the Action Area of Elliott Bay, and yelloweye rockfish could be present there.

Unlike bocaccio and rockfish, juvenile yelloweye rockfish are not typically found in intertidal waters (Love et al. 1991; Studebaker et al. 2009), but are most frequently observed in waters deeper than 98 feet (30 meters) near the upper depth range of adults (Yamanaka et al. 2006). Typically, NMFS presumes that larval rockfish could be present if any one of these three habitat features is present: 1) kelp beds; 2) eelgrass; or 3) large rock. Large rock (riprap) is present along the shoreline, but because juvenile yelloweye rockfish do not typically occupy shallow waters (Love et al. 1991; Studebaker et al. 2009), they are unlikely to be present in the nearshore zone of the Action Area.

Based on the depth, substrate preferences, and geographical range information presented above, juvenile yelloweye rockfish would not occur in the nearshore of the Action Area, but adults and juveniles could be present in the deeper waters of Puget Sound outside the immediate area of the bridge.

7.4.2 Direct and Indirect Effects to Species

Effects of the project on fish are the same as those described for boccacio and rockfish.

7.4.3 Effects Determination

A **may affect, likely to adversely affect** determination is warranted for yelloweye rockfish for the same reasons described for bocaccacio and rockfish.

7.4.4 Critical Habitat

On August 6, 2013, NMFS published proposed rules for designating critical habitat for Puget Sound/Georgia Basin yelloweye rockfish, as well as bocaccio and rockfish of the Puget Sound/Georgia Basin (78 FR 47635). Proposed critical habitat for yelloweye rockfish includes approximately 575 square miles of marine habitat in Puget Sound.

7.4.4.1 Presence and PCEs in the Action Area

Proposed PCEs are the same for all three species, except that nearshore critical habitat does not apply to juvenile yelloweye rockfish; PCEs for rockfish are described in Section 4.3.4.1.

7.4.4.2 Effects Analysis and Determination

The determination for proposed yelloweye rockfish critical habitat is the same as for bocaccio, for the same reasons listed above in Section 5.3.4.2. The Project will not jeopardize the continued existence of the species and the effects of the Project will improve the conservation value of the Action Area over the long term. The Project **will not adversely modify proposed yelloweye rockfish critical habitat**.

In the event that yelloweye rockfish critical habitat is designated in the future, a provisional determination is that the Project **may affect, but is not likely to adversely affect yelloweye rockfish critical habitat.**

7.5 Canary Rockfish (Sebastes pinniger)

7.5.1 Species Presence in the Action Area

The Georgia Basin canary rockfish was listed as threatened on April 28, 2010 (75 FR 22276). Canary rockfish most commonly occur in waters 160 to 820 feet deep (Orr et al. 2000), but may be found up to 1,400 feet in depth (Boehlert 1980). Canary rockfish adults are generally associated with hard bottom areas and along rocky shelves and pinnacles (74 FR 18516). This deep, rocky habitat does not exist in the Project footprint but may occur in patches offshore in the Action Area of Elliott Bay, and canary rockfish could be present there.

Juvenile canary rockfish settle into tide pools, rocky reefs, kelp beds, low rock, and cobble areas (Miller and Geibel 1973; Love et al. 1991; Love et al. 2002). NMFS presumes that larval rockfish could be present if any one of these three habitat

features is present: 1) kelp beds; 2) eelgrass; or 3) large rock. Smith Cove is not ideal habitat for canary rockfish due to its lack of natural rocky reefs or substrate, but large rock occurs as riprap near the shore of the Action Area, and therefore, juvenile rockfish could be presumed to occur there.

Based on the depth, substrate preferences, and geographical range information presented above, juvenile canary rockfish could occur in the nearshore, and adults could be present in the deeper waters of Puget Sound outside the immediate area of the bridge.

7.5.2 Direct and Indirect Effects to Species

Effects of the project on fish are the same as described for boccacio and yelloweye rockfish.

7.5.3 Effects Determination

A **may affect, likely to adversely affect** determination is warranted for the canary rockfish for the same reasons described for bocaccio and yelloweye rockfish.

7.5.4 Critical Habitat

On August 6, 2013, NMFS published proposed rules for designating critical habitat for Puget Sound/Georgia Basin canary rockfish, as well as bocaccio and yelloweye rockfish of the Puget Sound/Georgia Basin (78 FR 47635). Proposed critical habitat for canary rockfish includes approximately 1,185 square miles of marine habitat in Puget Sound.

7.5.5 Presence and PCEs in the Action Area

Proposed PCEs are the same for all three species; PCEs are the same as those described for bocaccio and yelloweye rockfish.

7.5.6 Effects Analysis and Determination

The determination for proposed canary rockfish critical habitat is the same as for bocaccio, for the same reasons listed above in Section 5.3.2. The Project will not jeopardize the continued existence of the species and the effects of the Project will improve the conservation value of the Action Area over the long term. The Project **will not adversely modify proposed rockfish critical habitat**.

In the event that rockfish critical habitat is designated in the future, a provisional determination is that the Project **may affect, but is not likely to adversely affect rockfish critical habitat.**

8 INCIDENTAL TAKE ANALYSIS

The potential for harm to bocaccio, yelloweye rockfish and rockfish exists because pile driving (even with the use of a sound attenuation device) could result in harm, injury, or harassment to these species. Noise from vibratory pile driving could reach potentially injurious levels for up to 58 hours during a 2-month period during November and December.

No incidental take analysis has been conducted for the Magnolia Bridge Replacement Project. However, incidental take calculated for the Elliott Bay Seawall BO for noise due to pile driving. The study predicted that one bocaccio and one rockfish would be harmed or killed per year of the project. No incidental take was predicted for yelloweye rockfish. While it is possible that the Magnolia Bridge Replacement Project could result in vibratory noise effects to listed species, if they do occur, they would be far less than those predicted for the Elliott Bay Seawall. This is because the Magnolia Bridge will install fewer piles than the Seawall project over a much shorter duration (See Table 5). It is assumed that while it is possible, there will be no incidental take associated with the Magnolia Bridge Replacement Project.

Table 4– Comparison of Pile Driving Effects of
The Magnolia Bridge Replacement Project and the Elliott Bay Seawall Project

Project	Number of Piles Installed	Duration of Pile Driving
Magnolia Bridge Replacement	1740	20 days*
Elliott Bay Seawall	85-115	48-53 hours (4-5) days**

* Source: Elliott Bay Seawall 2012 Biological Opinion

**Source: Magnolia Bridge Replacement Project BA

9 SUMMARY OF UPDATED EFFECT DETERMINATIONS

Table 5 summarizes the updates to effect determinations for the Magnolia Bridge Replacement Project since receipt of the 2009 Concurrence Letter.

Table 5
Summary of Effect Determinations

Species	Status	Effects Determination	Critical Habitat	Critical Habitat Effects Determination
Puget Sound steelhead (*Oncorhynchus mykiss*)	Threatened (Puget Sound DPS)	NLAA	Proposed on January 14, 2013	Will not adversely modify
Bull trout (*Salvelinus confluentus*)	Threatened (Coastal-Puget Sound DPS)	NLAA	Revised October 18, 2010	NLAA
Bocaccio (*Sebastes paucispinus*)	Endangered (Georgia Basin DPS)	NLAA	Proposed on August 6, 2013	Will not adversely modify
Yelloweye rockfish (*Sebastes ruberrimus*)	Threatened (Georgia Basin DPS)	NLAA	Proposed on August 6, 2013	Will not adversely modify
Canary rockfish (*Sebastes pinniger*)	Threatened (Georgia Basin DPS)	NLAA	Proposed on August 6, 2013	Will not adversely modify

DPS = Distinct Population Segment
NLAA = Not likely to adversely affect
LAA = Likely to adversely affect

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APPENDIX A

SPECIES BIOLOGY

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Species in this appendix are those that were not covered in the original BA.

BOCACCIO (*SEBASTES PAUCISPINUS*)

Biology and Distribution

Bocaccio are large Pacific coast rockfish that are found from Baja California to Alaska, most commonly between Oregon and northern Baja California. Bocaccio are live-bearers, and larvae are found in surface waters distributed over a wide area extending far offshore (Moser 1996). Larval and juvenile bocaccio feed on zooplankton, while adults eat epibenthic invertebrates and small fishes, including other species of rockfish (Eschmeyer et al. 1983).

Bocaccio are most commonly found between 160 and 820 feet in depth, but may be found as deep as 1,560 feet (Feder et al. 1974; Love et al. 2002). Juveniles and subadults are more common than adults in shallower water, and bocaccio are known to school in nearshore waters as juveniles (MacCall and He 2002). Adults are generally associated with rocky areas and outcrops (Drake et al. 2010), but some are also frequently found in areas lacking hard substrate (Washington 1977; Miller and Borton 1980).

YELLOWEYE ROCKFISH (*SEBASTES RUBERRIMUS*)

Biology and Distribution

Yelloweye rockfish are very large Pacific coast fish that are found from northern Baja California to the Aleutian Islands, Alaska, but are most common from central California northward to the Gulf of Alaska (Eschmeyer et al. 1983). In Puget Sound, Yelloweye rockfish are more frequently observed in North Puget Sound than in South Puget Sound (Miller and Borton 1980), likely due to the larger amount of rocky habitat in North Puget Sound in the San Juan Archipelago and in the Strait of Juan de Fuca.

Similar to other rockfish, Yelloweye rockfish are live-bearers, and larvae are found in surface waters (Moser 1996). Also similar to bocaccio, juvenile Yelloweye rockfish feed on zooplankton and adults eat epibenthic invertebrates and small fishes (Eschmeyer et al. 1983; Love et al. 2002).

Adult Yelloweye rockfish occur in waters 80 to 1,560 feet deep (Orr et al. 2000), but are most commonly found between 300 to 590 feet in depth (Love et al. 2002). They are highly associated with benthic habitats with moderate to extreme steepness; complex bathymetry;

and/or substrates consisting of fractured bedrock, rock, and boulder-cobble complexes (Yoklavich et al. 2000; Love et al. 2002; Wang 2005; Anderson and Yoklavich 2007).

Unlike bocaccio and rockfish, juvenile Yelloweye rockfish are not typically found in intertidal waters (Love et al. 1991; Studebaker et al. 2009), but are most frequently observed in waters deeper than 98 feet (30 meters) near the upper depth range of adults (Yamanaka et al. 2006).

ROCKFISH (*SEBASTES PINNIGER*)

Biology and Distribution

rockfish are large Pacific coast fish that are distributed from Baja California to the Gulf of Alaska (Boehlert 1980; Mecklenburg et al. 2002). These fish are most common off the coast of central Oregon (Richardson and Laroche 1979). They were once common in the greater Puget Sound area (Holmberg et al. 1967), but are now rare.

Similar to other rockfish, rockfish are live-bearers, and larvae are found in surface waters over a wide area (Moser 1996). Also, similar to bocaccio, juvenile rockfish feed on zooplankton and adults eat epibenthic invertebrates and small fishes (Eschmeyer et al. 1983; Love et al. 2002).

rockfish most commonly inhabit waters 160 to 820 feet deep (Orr et al. 2000), but may be found up to 1,400 feet in depth (Boehlert 1980). rockfish adults are generally associated with hard bottom areas and along rocky shelves and pinnacles (Drake et al. 2010). Juveniles settle into tide pools, rocky reefs, kelp beds, low rock, and cobble areas (Miller and Geibel 1973; Love et al. 1991; Love et al. 2002).

APPENDIX B

2008 MAGNOLIA BRIDGE BIOLOGICAL ASSESSMENT (CD)

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APPENDIX C

2008 BA ADDENDUM

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U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284
(360) 753-9480
(360) 753-9889 (FAX)
http://www.fhwa.dot.gov/wadiv

May 14, 2009

HFO-WA.3/ WA636

Mr. Ken Berg
US Fish and Wildlife Service
510 Desmond Drive SE, Suite 102
Lacey, WA 98503

Attention: Mr. Jim Muck

City of Seattle's Magnolia Bridge Replacement Project - Retraction of Formal Consultation Request; EHR-1533 (005)

Dear Mr. Berg:

On November 18, 2008, the Federal Highway Administration initiated formal consultation with your agency on proposed impacts from the proposed Magnolia Bridge Replacement project, as required under Section 7(a)(2) of the Endangered Species Act (as amended). The project is located within the city of Seattle.

At the time, we determined that the proposed project will result in an adverse effect to the Coastal-Puget Sound bull trout DPS. During the course of the consultation, we have prepared additional information in response to comments received from Jim Muck, with NOAA Fisheries. Based on the findings from that additional information, as well as conversations with your staff, we have arrived at a different conclusion regarding the potential effects of this project.

As such, FHWA respectfully retracts our previous request to initiate formal consultation. Based on our continued analysis of this project, we have determined that the proposed project may affect, but is not likely to adversely effect the Coastal-Puget Sound bull trout DPS.

This conclusion is based on the results of additional stormwater analysis and an improved understanding of the potential impacts from proposed pile-driving activities. At the request of your staff, we prepared supplemental information on the potential stormwater impacts. We drew a comparison between this proposed project and the analysis conducted for the Alaskan Way Viaduct and Seawall Replacement Program: SR 99 S. Holgate Street to S. King Street

Viaduct Replacement project, which received a letter of concurrence from the Services on June 13, 2008. The projects are located in close proximity and it is reasonable to assume that both projects will have comparable impacts to listed species within Elliott Bay. As a result of our analysis, we determined that the dilution plume for zinc and copper is less than what we previously determined (and is approximately a quarter of what was determined for the referenced AWV project). The potential impacts will be lessened even further when coupled with the fact that listed salmonids will spend little time in the project area, as the highly urbanized Elliott Bay provides little fish habitat for rearing or migrating salmonids.

With respect to pile driving, we have reconsidered the analysis in the BA and determined that the proposed activity will not result in an adverse effect to listed salmonids. Smith Cove (where the bulk of the pile driving will occur) is surrounded by land, which will limit sound transmission. Sound will likely carry in a straight line out of Smith Cove into Elliott Bay. However, impacts from the pile-driving activity will likely be diminished by the fact that the project is located in a busy port terminal, with high ambient noise levels and an active shipping lane, and the low occurrence of use of the area by listed salmonids. Existing piers and piles within the Cove are also likely to break up the sound waves and allow for a quicker attenuation to sub-harm thresholds.

Based on this additional information, we are requesting informal consultation with NOAA on our determination of may affect, not likely to adversely effect for the Puget Sound Chinook ESU and Puget Sound steelhead. Our previous determination of a NLTAA for Steller sea lions, Southern resident killer whales, and the critical habitats for chinook and killer whales remain in effect.

If you have any questions regarding this request or the information provided in the BA, please contact Brian Hasselbach at (360) 753-9411 or Trevin Taylor, WSDOT H&LP, at (360) 705-6975.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator

Brian Hasselbach

By: Brian Hasselbach
Area Engineer

CC: Ed Conyers, WSDOT NWR H&LP, NB82-121
Trevin Taylor, WSDOT H&LP, 47390

U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

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May 14, 2009

HFO-WA.3/ WA636

Hwys & Local Programs

MAY 18 2009

Olympia, WA

Mr. Steve Landino
National Marine Fisheries Service
510 Desmond Drive SE, Suite 103
Lacey, WA 98503

Attention: Mr. Jim Muck

City of Seattle's Magnolia Bridge Replacement Project - Retraction of Formal Consultation Request; EHR-1533 (005)

Dear Mr. Landino:

On November 18, 2008, the Federal Highway Administration initiated formal consultation with your agency on proposed impacts from the proposed Magnolia Bridge Replacement project, as required under Section 7(a)(2) of the Endangered Species Act (as amended). The project is located within the city of Seattle.

At the time, we determined that the proposed project will result in an adverse effect to the Puget Sound Chinook ESU and Puget Sound steelhead. During the course of the consultation, we have prepared additional information in response to comments received from Jim Muck, of your staff. Based on the findings from that additional information, as well as conversations with your staff, we have arrived at a different conclusion regarding the potential effects of this project.

As such, FHWA respectfully retracts our previous request to initiate formal consultation. Based on our continued analysis of this project, we have determined that the proposed project may affect, but is not likely to adversely effect the Puget Sound Chinook ESU and Puget Sound steelhead.

This conclusion is based on the results of additional stormwater analysis and an improved understanding of the potential impacts from proposed pile-driving activities. At the request of your staff, we prepared supplemental information on the potential stormwater impacts. We drew a comparison between this proposed project and the analysis conducted for the Alaskan Way Viaduct and Seawall Replacement Program: SR 99 S. Holgate Street to S. King Street

Viaduct Replacement project, which received a letter of concurrence from the Services on June 13, 2008. The projects are located in close proximity and it is reasonable to assume that both projects will have comparable impacts to listed species within Elliott Bay. As a result of our analysis, we determined that the dilution plume for zinc and copper is less than what we previously determined (and is approximately a quarter of what was determined for the referenced AWV project). The potential impacts will be lessened even further when coupled with the fact that listed salmonids will spend little time in the project area, as the highly urbanized Elliott Bay provides little fish habitat for rearing or migrating salmonids.

With respect to pile driving, we have reconsidered the analysis in the BA and determined that the proposed activity will not result in an adverse effect to listed salmonids. Smith Cove (where the bulk of the pile driving will occur) is surrounded by land, which will limit sound transmission. Sound will likely carry in a straight line out of Smith Cove into Elliott Bay. However, impacts from the pile-driving activity will likely be diminished by the fact that the project is located in a busy port terminal, with high ambient noise levels and an active shipping lane, and the low occurrence of use of the area by listed salmonids. Existing piers and piles within the Cove are also likely to break up the sound waves and allow for a quicker attenuation to sub-harm thresholds.

Based on this additional information, we are requesting informal consultation with USFWS. Our previous determination of a may affect, not likely to adversely effect for marbled murrelets and designated critical habitat for Coastal-Puget Sound bull trout remain in effect.

If you have any questions regarding this request or the information provided in the BA, please contact Brian Hasselbach at (360) 753-9411 or Trevin Taylor, WSDOT H&LP, at (360) 705-6975.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator

Brian Hasselbach

By: Brian Hasselbach
Area Engineer

CC: Ed Conyers, WSDOT NWR H&LP, NB82-121
Trevin Taylor, WSDOT H&LP, 47390

APPENDIX C

2009 CONCURRENCE LETTER

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United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
United States Department of the Interior
Fish and Wildlife Service

National Marine Fisheries Service
510 Desmond Drive SE., Suite 103
Lacey, Washington 98503

U.S. Fish and Wildlife Service
510 Desmond Drive S.E., Suite
Lacey, Washington 98503

In Reply Refer To:
NMFS Tracking No.: 2008/07581
FWS Reference No.: 13410-2009-I-0093

October 15, 2009

Daniel M. Mathis
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
711 South Capitol Way, Suite 501 Evergreen Plaza
Olympia, WA 98501-1284

Re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Proposed Magnolia Bridge Replacement Project, City of Seattle, King County, Washington. HUC 171100190401, Shell Creek.

Dear Mr. Mathis:

This correspondence is in response to your request for consultation under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et. seq.*). Additionally, this letter meets the requirement for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

Endangered Species Act

The Federal Highway Administration (FHWA) will provide funding to the Seattle Department of Transportation (SDOT) in order to replace the existing Magnolia Bridge with a new structure that meets current design standards. On November 18, 2008, FHWA requested consultation with NOAA's National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS, jointly the Services) with the following effects determinations[1] on the listed species and designated critical habitat.

[1] LAA = May Affect, Likely to Adversely Affect

2

NMFS species:

Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*)	LAA
Puget Sound Chinook salmon critical habitat	NLAA
Puget Sound steelhead (*Orcorhynchus mykiss*)	LAA
Southern Resident killer whale (*Orcinus orca*)	NLAA
Southern Resident killer whale critical habitat	NLAA
Steller sea lion (*Eumetopias jubatus*)	NLAA

USFWS species:

Coastal-Puget Sound bull trout (*Salvelinus confluentus*)	LAA
Coastal-Puget Sound bull trout critical habitat	NLAA
Marbled murrelet (*Brachyramphus marmoratus*)	NLAA

After review of the consultation package, the Services requested additional information on estimated number of strikes required during pile driving and additional analysis on stormwater dilution (phone conversation between Brian Hasselbach (FHWA) and Jim Muck (Services) on December 23, 2008). In addition, Alison Agness (NMFS) requested additional information on marine mammal monitoring on January 6, 2009. The information requested on the number of strikes per pile was received in an email from Mr. Hasselbach on January 6, 2009. Ms. Agness received the additional information on marine mammal monitoring on January 29, 2009. The stormwater dilution analysis was received in an amendment to the Biological Assessment (BA) in an email from Mr. Hasselbach on May 12, 2009. Upon providing this information, FHWA modified the request for formal consultation to a request for informal consultation for all the above species and designated critical habitat. The request was provided in a letter to the Services dated May 14, 2009.

This consultation is based on the BA, dated October 2008, the amendment to the BA, dated May 8, 2009, and information received in emails. A complete record of this consultation is on file at both NMFS's Washington State Habitat Office and USFWS's Washington Fish and Wildlife Office in Lacey, Washington. Your letter requested the Services' concurrence with a determination of "may affect, not likely to adversely affect" for the species and designated critical habitat listed above. This consultation with the FHWA is conducted under section 7(a)(2) of the ESA, and its implementing regulations (50 CFR 402).

The SDOT proposes to replace the existing Magnolia Bridge between West Galer Street and 15th Avenue West. The bridge was closed in 1997 due to damage from the Magnolia Bluff landslide, and in 2001 due to earthquake damage. The bridge is aging and requires ongoing maintenance. The bridge spans the Port of Seattle Terminal 91 and Burlington Northern Santa Fe railroad track facilities. In-water construction is expected to take approximately 36 weeks with the entire bridge being replaced in approximately three years.

Specific project features include:

- Remove and replace the 23rd Avenue West on- and off-ramps.

- Remove existing wood wharf and timber wall under the bridge.
- Remove and replace mainline bridge columns and superstructure.
- Install stormwater improvements.

In-water work will occur from October through February, beginning with the removal of the 23rd Ave West on-ramp. Pile driving activities including the installation of the temporary bridge support piles and sheet piles for the cofferdam will occur in November and December of the first year of construction. Removal of the temporary work bridge and falsework will occur in December and January of the third year of construction.

Numerous avoidance, minimization, and conservation measures and best management practices have been included in the project design. The measures are identified on Pages 21-25 of the BA, and include:

A. Containment booms will be deployed around the work area to contain any floatable debris or spills that may enter the water.

B. Timing windows will be followed for in-water work. The in-water work window for Elliott Bay is July 16 through February 14.

C. A bubble curtain will be used to reduce underwater sound pressure levels when an impact hammer is used to drive or proof steel piles. The bubble curtain will completely surround the pile and be adequately weighted to keep the bubble ring resting on the sea floor. The pile shall be completely engulfed in bubbles over the full length of the water column at all times when the impact pile driver is in use. A 9 decibel reduction in sound pressure levels is anticipated from use of the bubble curtain.

D. Underwater noise during pile driving will be monitored according to accepted methods as described in WSDOT's Underwater Noise Monitoring Plan template.

E. Monitoring within of 1.2 miles of the project site will occur for marine mammals during all vibratory and impact pile driving activities. If an orca or Steller sea lion is located, all pile driving activities will stop until the orcas or Steller sea lions have left the area (Appendix D of Biological Assessment).

F. The last sheet pile to close the cofferdam will be driven at low tide to reduce the potential for fish entrapment. Any fish trapped will be removed following Washington State Department of Transportation Fish Removal Protocol and Standards.

G. Heavy equipment will be checked daily for petroleum leaks and repairs made as necessary.

Located on the north side of Elliott Bay within Smith Cove, the project is surrounded by land on three sides (see Figure 1). The east side of Smith Cove has commercial and industrial land use,

with 16th Ave West running along the shoreline. Smith Cove Park and Elliott Bay Marina are located on the west side. Piers 90 and 91 are also located within Smith Cove and extend out approximately 2,500 feet from the project site. Piers 90 and 91 are constructed on numerous wooden piles.

Puget Sound Chinook salmon use the nearshore marine waters for migration, nursery areas, residence, and refugia. Chinook salmon may begin migrating into estuaries and the nearshore in late January and early February, but peak migration occurs in June and July. Juvenile Chinook salmon are found along the nearshore through October. Little information is available on Chinook salmon use within Elliott Bay itself. Chinook salmon have been captured around Piers 90 and 91 from February through October, with most caught in April through July. Increasing abundance of juvenile Chinook salmon has been observed in Elliott Bay in the summer months which coincide with the timing of juvenile Chinook salmon emigration from the Duwamish River. Adults migrate through Elliott Bay from late June to early November as they make their way to the Duwamish River. Fish habitat within Elliott Bay has been extensively modified with approximately 97 percent of the original wetlands and shallow sub-tidal habitats filled.

Most juvenile Puget Sound steelhead migrate to Puget Sound during their second year. Migration primarily occurs from April to mid-May. The inshore migration pattern of steelhead in Puget Sound is not well understood; it is generally thought that steelhead smolts move quickly offshore. Summer-run Puget Sound steelhead adults migrate through Elliott Bay to the Duwamish River from April through October and winter-run steelhead migrate through from November through May. Few Puget Sound steelhead have been observed in Elliott Bay. Those that have been caught were captured at the mouth of the Duwamish River.

Elliot Bay is considered foraging, migration, and overwintering habitat for bull trout, and bull trout will use this area as they migrate to and from core areas. Fifteen bull trout have been captured in the lower Duwamish River in April, May, August, and September of various years. Although bull trout captures in the Duwamish River indicate that bull trout migrate through Elliott Bay, both the Duwamish River and Elliott Bay are highly urbanized and lack complex habitat bull trout prefer. Therefore, it is extremely unlikely that individuals would occur within the project action area during the work timing window.

Marbled murrelets forage in the marine environment and occur throughout Puget Sound. However, marbled murrelet use of the action area is considered extremely unlikely due to the high levels of boat and ferry traffic and lack of forage fish in the highly urbanized area.

The Southern Resident killer whale (SR killer whales) Distinct Population Segment composed of J, K, and L pods was listed as endangered under the ESA on November 18, 2005 (70 FR 69903). The final rule listing SR killer whales as endangered identified several potential factors that may have resulted in the decline or may be limiting recovery of these whales, including: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel traffic. The rule further identified oil spills as a potential risk factor for this species. The final recovery plan (73 FR 4176) also includes information on these potential threats to SR killer whales. SR killer whales have been documented in the vicinity of Elliot Bay with varying frequency across the year.

5

Steller sea lions occur year-round in Washington coastal waters, but no breeding rookeries have been identified in Washington waters. Most Steller sea lions are commonly observed in the Strait of Juan de Fuca and are occasionally found on navigation buoys in Puget Sound. No Steller sea lion haul-out sites exist along the City of Seattle shoreline. The closest haul-out is located on Toliva Shoals Buoy near Tacoma, Washington.

The proposed project will result in temporary effects to Puget Sound Chinook salmon, bull trout, and steelhead. In-water construction activities will result in short-term and localized increased turbidity, sedimentation, and degradation of water quality during removal of the steel and timber piles as part of the wharf demolition and removal of the temporary work bridge and falsework supports and during filling of holes left by pile extraction. These impacts may result in behavior changes to Puget Sound Chinook salmon, bull trout, and steelhead through decreased visibility and foraging opportunities and abandonment or avoidance of habitat.

Degradation of water quality could result from the suspension of creosote during removal of timber piles and from petroleum spills during construction. Approximately 200 creosote treated timber piles will be removed during demolition of the wharf. Removal of the piles will result in buried creosote contaminated sediments being brought to the surface. Piles that are broken during extraction will be cut two feet below the surface. This results in fresh creosote being exposed to the water until the holes and piles can be capped with clean sediment. The operation of heavy equipment from the temporary work bridge or on the substrate during low tides could result in petroleum spills into Puget Sound. This degradation in water quality could displace aquatic prey species and reduce foraging opportunities for Chinook salmon, bull trout, and steelhead.

The installation of approximately 115 temporary steel piles, removal of approximately 200 creosote treated piles, and installation of the sheet piles for the cofferdam will result in increased sound pressure levels during vibratory and impact pile driving. The steel piles will be installed to construct the temporary work bridge, finger trestles, and falsework supports. Piles will be installed with a vibratory pile driver and proofed to a load bearing weight of 200 tons per pile. Existing timber piles will be pulled out, removed with a vibratory hammer, or cut two feet below the substrate with a pneumatic chainsaw. Sheet piles will be installed with a vibratory pile driver. Elevated underwater sound pressure levels can result in mortality, injury, or behavioral effects to Chinook salmon, bull trout, steelhead and marine mammals. The expected extent of elevated underwater sound pressure levels is shown in Figure 1. The project area is located on the north side of Smith Cove. Sound will carry in a straight line out of Smith Cover into Elliott Bay with sound levels being limited by land on the east and west sides of Smith Cove. This results in a cone shaped action area that extends across Elliott Bay to West Seattle and Harbor Island in the Duwamish River (Figure 1).

For this project, the extent of potential harm to listed fishes is 52 meters for fish greater than or equal to two grams and 96 meters for fish less than two grams. Sound pressure levels that could result in behavioral effects extend 1,369 meters from the project site. The maximum length of the behavioral threshold at the furthest distance from the project area is approximately 1,100 meters. Pile driving activities will occur in November and December during times when no

Chinook salmon, bull trout or steelhead have been captured within Smith Cove. Because the project is located on the north end of Smith Cove, elevated underwater sound pressure levels will travel in a straight line south of the project area creating a cone-shaped action area. The cone-shaped action area limits listed salmonid exposure to elevated sound pressure levels that can result in behavioral changes. Listed salmonids can swim outside the action area, unlike a project that is along a shoreline that has a 360 degree arc action area, where a fish will have long-term exposure to elevated sound pressure levels.

SR killer whales could be injured or disturbed by sound pressure generated by in-water construction activities. NMFS is currently developing comprehensive guidance on sound exposure levels likely to cause injury and behavioral disruption in the context of the Marine Mammal Protection Act. Until formal guidance is available, NMFS uses conservative thresholds of sound exposure levels from broad band impulse sounds that cause behavioral disturbance (160dBrms re: 1μPa) and injury (180dBrms re: 1μPa for whales and 190dBrms re: 1μPa for pinnipeds) (70 FR 1871). Sound pressure levels that could result in behavioral effects extend 1.2 miles from the project site (Figure 1). Monitoring within 1.2 miles of the project site will occur for marine mammals during all vibratory and impact pile driving activities. If an orca or Steller sea lion is located, all pile driving activities will stop until the orcas or Steller sea lions have left the area.

Stormwater runoff from the completed project will discharge to Elliott Bay. The project will increase pollution-generating impervious surface from 6.08 acres to 7.72 acres. Approximately one acre of stormwater discharges to the sanitary sewer and treated at the King County West Point Treatment Plant. The remaining stormwater will be treated prior to discharge into Elliott Bay. Basic water quality treatment will be provided by canister filter media.

Stormwater runoff is a major source of pollution in Puget Sound (PSAT 2007). Pollutants in stormwater include nutrients, sediment, metals, hydrocarbons from gasoline, oil and vehicle exhaust, pathogens, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and pesticides. In addition, stormwater affects water temperatures, turbidity, dissolved oxygen (DO), and pH. These factors naturally fluctuate daily or seasonally in magnitude or concentration. However, when exacerbated by stormwater runoff, the acceptable range of these factors can be exceeded, altering or impairing biological processes and negatively impacting salmonids.

Either individually or in a mixture, exposure to these pollutants may result in reduced growth, migratory success, and reproduction in Chinook salmon, steelhead and bull trout. Effects are influenced by background water quality conditions, life stage of the fish, duration of exposure, concentration and relative toxicity of the pollutants, and concurrent discharges and background levels of other contaminants. Salmonids exposed to zinc and copper experience a significantly decreased ability to recognize and avoid predators and navigate back to natal streams. These effects would lead to lower spawning success in adults and increased predation on juveniles. The threshold at which dissolved copper and zinc are expected to have harmful effects are 2 μg/L and 5.6 μg/L above background, respectively (Hecht 2007; Sandahl 2007; Sprague 1968).

Killer whales are candidates for bioaccumulating high concentrations of contaminants because of their high position in the food web and long life expectancy. High levels of persistent organic pollutants, such as PCBs, have been documented in SR killer whales. These and other chemical compounds have the ability to induce immune suppression, impair reproduction, and produce other adverse physiological effects, as observed in studies of other marine mammals and described in the recovery plan for SR killer whales.

Pollutants in stormwater not only result in water quality degradation, but many adsorb to particulates and are sequestered in sediments where they enter the food chain via the benthic community (benthic invertebrates are a prey species for listed salmonids). Pollutants may directly affect the abundance and productivity of benthic invertebrates, thus affecting the numbers and diversity of food for listed salmonids. In addition, when benthic invertebrates are exposed to and assimilate many of these pollutants, they can become sources of contamination for listed salmonids that prey on them or marine mammals that prey on salmonids.

The project will include treatment of all stormwater and is expected to result in a net reduction in pollutant concentrations for pollutants of concern to salmonids (Table 1) and in the discharge of total suspended solids (which carry persistent organic pollutants). For dissolved copper and zinc that will continue to be discharged, the distance from the outfall at which the pollutants would be diluted to safe levels was analyzed. Because SDOT did not provide a dilution model for the project, the dilution model from another project, the Alaska Way Viaduct (AWV) Project; South Holgate Street to South King Street, was used for comparison. Specifically, the Lander Outfall from the AWV Project because the post-construction pollutant concentrations were similar. The comparison is imperfect because the Lander Outfall discharges to the East Waterway of the Duwamish River and dilution is influenced by the flows in the Duwamish River, whereas the Magnolia Bridge Outfall discharges directly into Smith Cove and is only influenced by tidal waters. Nevertheless, the Services consider the use of this comparison valid because both transportation projects sites are highly tidally influenced with similar size outfalls, and the overall project stormwater treatment greatly reduces the overall pollutant concentrations from the project. Table 1 also shows the pollutant concentrations for the AWV Lander Outfall.

Table 1. Summary of stormwater pollutant concentrations for the 90th percentile effluent concentrations at each outfall.

Pollutant of Concern	**Magnolia Bridge Outfall**		**Lander Outfall**	
	Pre-	**Post-**	**Pre-**	**Post-**
TSS (mg/L)	79.18	6.4	192	14
Total Zinc (µg.L)	152.62	40	350	67
Dissolved Zinc (µg/L)	56.42	27	110	44.8
Total Copper (µg/L)	27.17	7	59	12
Dissolved Copper (µg/L)	7.19	5	14	7.8

For the AWV Project, the CORMIX model was used to calculate distances along the shoreline (length) and offshore (width) needed for diluting project stormwater pollutant concentrations to the Service's biological effects threshold for listed salmonids of 2 µg/L above background for dissolved copper and 5.6 µg/L for dissolved zinc (Table 2). The Services used the percent difference in pollutant concentrations between the Magnolia Bridge Outfall and the Lander

Outfall in Table 1 to calculate the likely area required for dilution to safe thresholds. The Magnolia Bridge Outfall has 60.3% as much dissolved zinc and 64.1% as much dissolved copper as the Lander Outfall. In Table 2, these values are applied to calculate the area required for dilution.

Table 2. Calculated dilution plume in square meters for each outfall.

		Pre-Project Conditions			Post-Project Conditions			%
Percentile		Length (UA=0.3 m/s)	Width (UA=0.05 m/s)	Area (m^2)	Length (UA=0.3 m/s)	Width (UA=0.05 m/s)	Area (m^2)	Decrease in Dilution Zone
Lander Outfall								
50th	Cu	0.1	0.6	0.06	0	0.3	0	100%
	Zn	0.2	0.9	0.18	0.1	0.6	0.06	67%
95th	Cu	1.1	6.7	7.37	0.5	4.1	2.05	72%
	Zn	68	11	748	1.4	7.3	10.22	99%
99th	Cu	4.2	4.3	18.06	2.7	2.9	7.83	57%
	Zn	132	7.1	937.2	4.9	4.6	22.54	98%
Magnolia Bridge Outfall								
50th	Cu				0	0.2	0	
	Zn				0.1	0.4	0.04	
95th	Cu				0.3	2.6	0.78	
	Zn				0.8	4.4	3.52	
99th	Cu				1.7	1.9	3.23	
	Zn				3.0	2.8	8.4	

Other benefits of the project will result from the removal of 30,000 square feet of wharf, of which, 17,000 square feet is over water, and 400 square feet of timber wall below the wharf. Removal of the wharf and timber wall will open up areas of Smith Cove to light that will benefit terrestrial and aquatic plants, thereby increasing productivity in the project area. Construction of the temporary work bridge and finger trestles will have short-term (12 to 14 months) effects due to increased shade under the bridge. Due to increased construction activity and noise, listed salmonids will avoid the area.

Species Determination

Puget Sound Chinook Salmon, Puget Sound Steelhead, and Coastal-Puget Sound Bull Trout:

The Services expect the effects of the project to Puget Sound Chinook salmon, Puget Sound steelhead, and bull trout to be insignificant because 1) the project will follow the marine in-water work window of July 16 through February 14; 2) in-water construction will be further limited to October through February when few listed salmonids have been found in Smith Cove [most Chinook salmon caught from April through July]; 3) steel piles will be initially installed with a vibratory hammer, and proofed to 200 tons per pile with an impact hammer; 4) sheet piles for the cofferdam will be installed with a vibratory hammer; 5) a bubble curtain will be used during impact pile driving to attenuate sound pressure levels; 6) stormwater will be treated prior to discharge into Elliott Bay; 7) treatment will result in a net reduction in the concentration of

copper and zinc in the action area; and 8) the project increases light penetration to shallow water regions of Smith Cove increasing productivity in the area.

Marbled Murrelets:

The Services expect the effects of the project to marbled murrelets to be discountable because 1) marbled murrelets are not expected to use the action or project area of Elliott Bay; and 2) discharge of treated stormwater into Elliott Bay will not have measureable effects on murrelet prey species since the project area does not contain forage fish spawning areas.

Southern Resident Killer Whales and Steller Sea Lions:

NMFS expects effects of the project on killer whales and Steller seal lions will be insignificant, because: 1) the project is not likely to adversely affect salmonids (prey of SR killer whales), as described above; 2) although the project will result in a slight increase in project water routed to the Magnolia Bridge Outfall in Elliot Bay, basic treatment of project water will reduce the level of total suspended solids and therefore the levels and concentrations of persistent organic pollutants from baseline conditions; and 3) monitoring during all pile driving activities will occur within 1.2 miles of the project site for marine mammals and all pile driving activities will stop if an orca or Steller sea lion is located.

The Services believe that sufficient information was provided to determine the effects of the proposed project to federally listed species and to conclude whether this project is likely to adversely affect those species. We, therefore, concur with your "may affect, not likely to adverse affect" determinations for Puget Sound Chinook salmon, Puget Sound steelhead, bull trout, marbled murrelets, SR killer whales, and Steller sea lions.

Critical Habitat Determination

Puget Sound Chinook Salmon and Coastal-Puget Sound Bull Trout:

NMFS designated critical habitat for the Puget Sound Chinook salmon on September 2, 2005 (70 FR 52630). The FWS designated critical habitat for the Coastal-Puget Sound bull trout on September 26, 2005 (70 FR 56212). One of the six primary constituent elements (PCEs) of Puget Sound Chinook salmon critical habitat is in the action area:

- Puget Sound Chinook Salmon PCE #5: Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fish, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

Four of the eight PCEs of bull trout critical habitat are in the action area:

- Bull trout critical habitat PCE #1 - Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32° F to 72° F (0° C to 22° C) but are found more frequently in temperatures ranging from 36° F to 59° F (2° C to 15°

C) with adequate thermal refugia available for temperatures at the upper end of this range. These temperature ranges may vary depending on bull trout life-history stage and form, geography, elevation, diurnal and seasonal variation, shade (such as that provided by riparian habitat), and local groundwater influence.

- Bull trout critical habitat #6 - Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.

- Bull trout critical habitat #7 - An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

- Bull trout critical habitat # 8 - Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.

The effects of the proposed project on designated Puget Sound Chinook salmon and bull trout critical habitat are considered insignificant for the following reasons:

- Puget Sound Chinook salmon PCE #5 - The proposed project will not result in a migration barrier or impede migration of Chinook salmon or affect the water quantity, quality, or natural cover in Elliott Bay. Water quality will be improved through treatment of project stormwater entering Elliott Bay. Elliott Bay is highly urbanized which has eliminated or reduced the natural cover and removed overhanging vegetation and large wood and replaced it with piers, docks and bulkheads.

- Bull trout critical habitat PCE #1 - The water temperature within the action area will not increase due to the proposed project. Water temperature within the action area is tidally influenced.

- Bull trout critical habitat PCE #6 - Although project implementation will result in short-term elevated levels of turbidity and sound pressure levels, the proposed project will not preclude bull trout movement through the area during or after construction.

- Bull trout critical habitat PCE #7 – Bull trout prey resources are not expected to be appreciably impacted by the proposed project. No forage fish spawning areas exist within the action area. Removal of 17,000 square feet of overhead cover, 200 creosote treated piles, and placement of clean fill in holes left after pile removal will increase macroinvertebrate production.

- Bull trout critical habitat PCE #8 - In-water work will result in short-term increases in turbidity, sedimentation, and suspension of sediment contaminants. However, due to the implementation of conservation measures and best management practices, project-related water quality impacts are not expected to result in measurable effects to this PCE.

Therefore the Services concur with your findings of "may affect, not likely to adversely affect" critical habitat of Puget Sound Chinook salmon and bull trout.

Southern Resident Killer Whales:

Critical habitat for SR killer whales was designated in three specific areas: 1) Summer Core Area in Haro Strait and waters around the San Juan Islands; 2) Puget Sound; and 3) the Strait of Juan de Fuca on November 29, 2006 (71 FR 69054). Critical habitat includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. The PCEs for SR killer whale CH are:

> (1) Water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

The potential effects of the project relate to PCEs 1 and 2: water quality and prey. The project will treat all pollutant generating impervious surfaces and will reduce pollutant levels/concentrations from baseline conditions with basic treatment of storm water. Additionally, the project is not likely to adversely affect salmonid prey resources of SR killer whales or their critical habitat, as described above.

Therefore the Services concur with your findings of "may affect, not likely to adversely affect" critical habitat of SR killer whales.

This concludes informal consultation in accordance with 50 CFR 402.13. The FHWA should re-analyze this ESA consultation if (1) new information reveals effects of the action that may affect listed species in a way not previously considered; (2) the action is modified in a manner that causes an effect to the listed species or critical habitat that was not previously considered; or (3) a new species is listed, or critical habitat designated, that may be affected by the identified action.

Magnuson-Stevens Fishery Conservation and Management Act

Federal agencies are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NMFS is required to provide the Federal action agency with EFH conservation recommendations (section 305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal agency and descriptions of EFH for Pacific coast groundfish, coastal pelagic species, and Pacific salmon contained in the Fishery Management Plans developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

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The proposed action is described on pages 5 through 26 of the BA. The project area includes habitat which has been designated as EFH for various life stages of 46 species of groundfish, four species of coastal pelagics, and three species of Pacific salmon (see Table 3 enclosure).

EFH Conservation Recommendations: Because the conservation measures that the WSDOT included as part of the proposed action to address ESA concerns are also adequate to avoid, minimize, or otherwise offset potential adverse effects to the EFH of the species in Table 3, conservation recommendations pursuant to MSA ('305(b)(4)(A)) are not necessary. Since NMFS is not providing conservation recommendations at this time, no 30-day response from WSDOT is required (MSA '305(b)(4)(B)).

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, WSDOT will need to reinitiate consultation in accordance with the implementing regulations for EFH at 50 CFR 600.920(l).

We appreciate your efforts to comply with requirements under the ESA and the MSA. If you have questions, please contact Jim Muck of the NMFS's Washington State Habitat Office and the FWS's Washington Fish and Wildlife Office at (206) 526-4740, or by electronic mail at jim.muck@noaa.gov. If questions pertain to the marine mammal analysis, please contact Lynne Barre of the NMFS Northwest Region, Protected Resources Division at (206) 526-4745, or by electronic mail at lynne.barre@noaa.gov.

Sincerely,

Barry A. Thom
Acting Regional Administrator
NOAA Fisheries

Martha L. Jenson
for
Ken S. Berg, Manager
Washington Fish and Wildlife Office
U.S. Fish and Wildlife Services

cc: USFWS - Teachout

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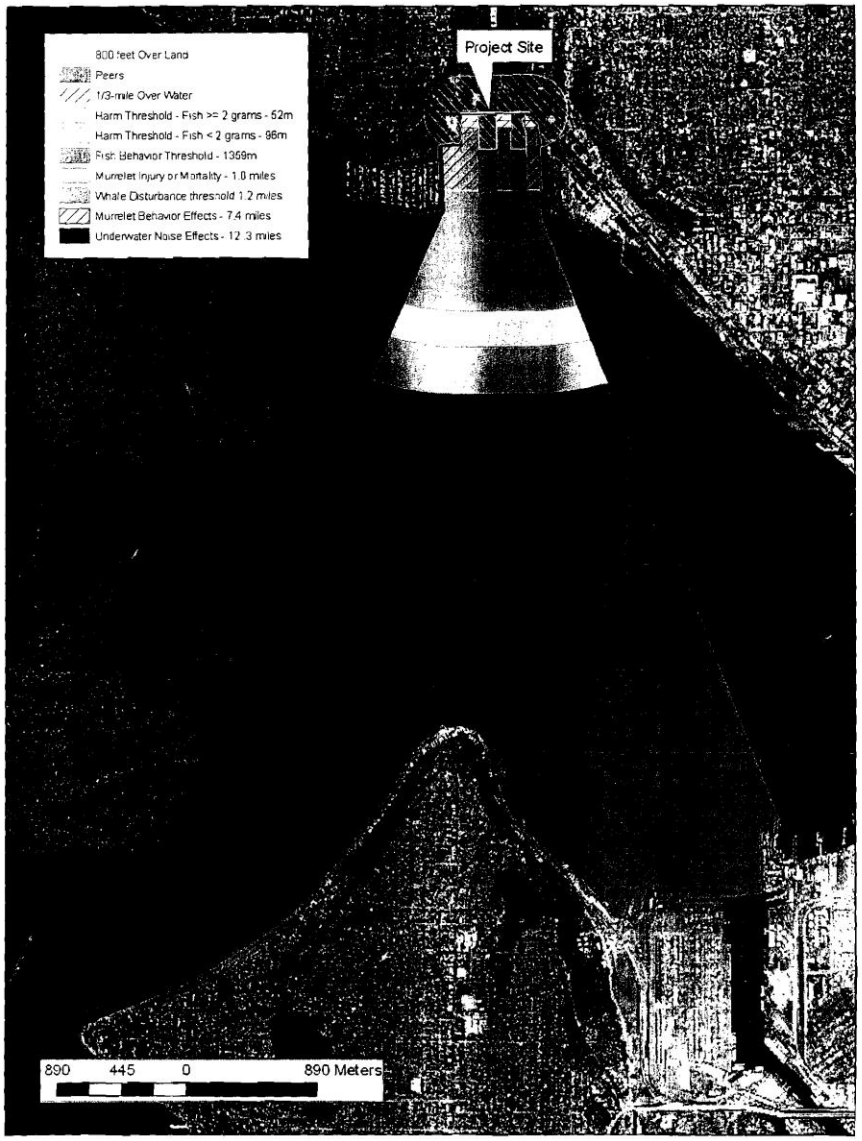

Figure 1 – Project site, action area, and expected extent of elevated underwater sound pressure levels for listed species.

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Table 3. Species of fishes with designated EFH occurring in Puget Sound.

Groundfish Species	redstripe rockfish *S. proriger*	Dover sole *Microstomus pacificus*
spiny dogfish *Squalus acanthias*	rosethorn rockfish *S. helvomaculatus*	English sole *Parophrys vetulus*
big skate *Raja binoculata*	rosy rockfish *S. rosaceus*	flathead sole *Hippoglossoides elassodon*
California skate *Raja inornata*	rougheye rockfish *S. aleutianus*	petrale sole *Eopsetta jordani*
longnose skate *Raja rhina*	sharpchin rockfish *S. zacentrus*	rex sole *Glyptocephalus zachirus*
ratfish *Hydrolagus colliei*	splitnose rockfish *S. diploproa*	rock sole *Lepidopsetta bilineata*
Pacific cod *Gadus macrocephalus*	striptail rockfish *S. saxicola*	sand sole *Psettichthys melanostictus*
Pacific whiting (hake) *Merluccius productus*	tiger rockfish *S. nigrocinctus*	starry flounder *Platichthys stellatus*
black rockfish *Sebastes melanops*	vermilion rockfish *S. miniatus*	arrowtooth flounder *Atheresthes stomias*
bocaccio *S. paucispinis*	yelloweye rockfish *S. ruberrimus*	
brown rockfish *S. auriculatus*	yellowtail rockfish *S. flavidus*	**Coastal Pelagic Species**
canary rockfish *S. pinniger*	shortspine thornyhead *Sebastolobus alascanus*	anchovy *Engraulis mordax*
China rockfish *S. nebulosus*	cabezon *Scorpaenichthys marmoratus*	Pacific sardine *Sardinops sagax*
copper rockfish *S. caurinus*	lingcod *Ophiodon elongatus*	Pacific mackerel *Scomber japonicus*
darkblotch rockfish *S. crameri*	kelp greenling *Hexagrammos decagrammus*	market squid Loligo opalescens
greenstriped rockfish *S. elongatus*	sablefish *Anoplopoma fimbria*	**Pacific Salmon Species**
Pacific ocean perch *S. alutus*	Pacific sanddab *Citharichthys sordidus*	Chinook salmon *Oncorhychus tshawytscha*
quillback rockfish *S. maliger*	butter sole *Isopsetta isolepis*	coho salmon *O. kisutch*
redbanded rockfish *S. babcocki*	curlfin sole *Pleuronichthys decurrens*	Puget Sound pink salmon *O. gorbuscha*

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bc: F/NWR - Collier
WSHO - File Copy
WSHO - Chron File
WSHO - Muck
WSHO - Sibley (NPS)
WSHO - Grady
FWS - File Copy
PRD - Barre

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