

# Scientific Measurement Devices

## 1.0 Summary of Activity

### **For all Fresh Waters excluding the Columbia River mainstem**

Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that:

1. Work is done within the approved work window.
2. No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or habitat for listed or proposed species.
3. No uncured concrete shall come into contact with the waterbody.
4. No more than one new pile or dolphin is placed.
5. No land leveling or grading is conducted.
6. No dewatering or re-routing is done and no fill is placed in wetlands or waterward of OHW.
7. Work does not include weirs and flumes.
8. Placement does not require the de-watering or hydraulic modification of a stream or waterbody.
9. Work will be done during low flow and when possible in the dry. [from NWP 5 or 3]

### **For the Columbia River Mainstem including the Snake River and Baker Bay**

Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that:

1. Work is done within the approved work window.
2. No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State designated noxious weeds) or habitat for listed or proposed species or prey/forage species (i.e., forage fish for pacific salmon).
3. No uncured concrete shall come into contact with the waterbody.
4. No new piling is placed.

5. No land leveling or grading is conducted.
6. . No dewatering or re-routing is done and no fill is placed in wetlands or waterward of OHW or MHHW.
7. Work does not include weirs and flumes.
8. Placement does not require the de-watering or hydraulic modification of a stream or waterbody.
9. Work will be done during low flow and when possible in the dry. [from NWP 5 or 3]

### **For all Marine/Estuarine Waters excluding Baker Bay**

Placement of new devices or replacement of old devices (with no greater dimensions than those already in place) whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures, provided that:

1. Work is done within the approved work window.
2. No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State designated noxious weeds) or habitat for listed or proposed species or prey/forage species (i.e., forage fish for pacific salmon).
3. No uncured concrete shall come into contact with tidal waters.
4. No more than one new pile or dolphin is placed and piling is not treated with creosote or pentachlorophenol.
5. No land leveling or grading is conducted.
6. No dewatering or re-routing is done and no fill is placed in wetlands or waterward of OHW or MHHW.
7. Work does not include weirs and flumes.
8. Placement does not require the de-watering or hydraulic modification of a stream or waterbody.
9. Work will be done during low tide and when possible in the dry. [from NWP 5 or 3]

## **2.0 Programmatic Description**

Individual permits (IPs), Letters of Permission (LOPs), and/or Nationwide Permits 5 or 3 (NWP5 or NWP3) may authorize the placement of scientific measurement devices including placement of up to 25 cubic yards (cy) of fill for weirs and flumes, into waters of the U.S. This programmatic biological evaluation only covers placement (via NWP5) or replacement (via NWP3) of scientific measuring devices into waters of the U.S. that do not require placement of associated weirs or flumes. Additionally, this programmatic biological evaluation does not cover placement that requires dewatering of streams,

placement of fill waterward of OHW or MHHW along with the other conditions listed above (under Summary of Activity). Work that cannot be designed or constructed to fit under this programmatic biological evaluation must go through individual informal or formal ESA consultation.

### **3.0 Project Location**

In all fresh waters and all marine/estuarine waters, only in the counties of Washington State where the National Marine Fisheries Service and U.S. Fish and Wildlife Service have concurred that the project is not likely to adversely affect listed species and designated critical habitat and will not jeopardize proposed species or destroy or adversely modify proposed critical habitat.

### **4.0 Project Description**

Placement of devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar structures. Activities covered within this programmatic biological evaluation must be accomplished solely for the collection of scientific information. This programmatic biological evaluation does not cover any interrelated and/or interdependent work activities in any of the designated critical habitat areas, except those activities distinctly specified.

### **5.0 Project Construction Description<sup>1</sup>**

Structures and appurtenant features associated with construction of devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices and similar structures. Generally, construction takes place along the banks of the waterbody, on an existing structure, within the waterway, or over and across the waterbody.

#### **Construction of New Facilities within a Waterbody**

In some cases, construction within a waterbody requires constructing a small facility (5-feet x 5-feet) to house the measuring devices near the line of OHW or MHHW, and extending one or two PVC pipe(s) into the waterbody. An anchoring system may be necessary for the placement of the measuring device if the device is placed on a buoy. No fill associated with the facility may be placed in wetlands or waterward of OHW or MHHW. Work must take place during approved work windows (Appendix D). Dewatering, of any kind, is not covered under this programmatic biological evaluation. Work will only be accomplished during low flows and when possible outside the wetted perimeter, in the dry. Only situations where no land leveling will be required is covered by this informal programmatic consultation. Scour chains may also be placed at or below OHW or MHHW. A scour chain is a chain that is inserted into the bank or stream bottom. The scour of the bank or stream channel is measured by the number of chain links exposed over time. The chain link averages 1½-inches in length. In marine/estuarine waters, a single pile or dolphin (not treated with creosote or pentachlorophenol) may be driven into the bed of the waterbody and a protected wooden platform (up to 10 square feet) built on the top to house the scientific measuring devices. Gages may also be connected to a buoy and anchored with a concrete or steel anchor. Some placement of the measuring devices may necessitate placement of concrete blocks just landward of MHHW. The concrete blocks are typically used for the footing of the housing structure. The blocks may consist of a maximum of 5 concrete anchors or 2 concrete “ecology blocks”, both averaging 5 cubic yards total. Under this informal programmatic consultation, no uncured concrete shall come into contact with

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<sup>1</sup> Information about project construction methods provided by personal communication with John Pell, Navigation Expert, Corps of Engineers, Regulatory Branch, and Eric Winters, Chief of Floating Plan, Corps of Engineers, Navigation Branch on February 16, 2000.

tidal waters. The new structure with the cured concrete foundation may be placed close to the waters' edge, but not within the waterbody, and PVC pipe is extended from the structure into the waterbody.

Under the terms of this informal programmatic consultation, no uncured concrete shall come into contact with the waterbody in fresh waters. Similar to marine/estuarine waters, concrete blocks may be placed above OHW for the foundation of the housing with a PVC pipe extending from the structure into the waterbody. Only the bottom of the measuring device and the PVC pipes are located at or below OHW, and must be able to record the lowest low flows of the waterbody. Staff gages may be placed within a waterbody to record water stages. This requires pounding a measuring gage several feet into the substrate of the waterbody and almost always takes place below the line of OHW. In some instances, gages may be placed on buoys with pre-cast concrete anchors dropped into the water body. No other construction is necessary for installation of a staff gage.

### **Construction of New Facilities Next to a Waterbody**

Gauging, water quality or water quality testing structures placed next to the waterbody are generally placed on the banks of the waterbody at or near OHW or MHHW. The structure must be close enough to the waterbody so that the PVC piping or measuring device extends into the waterbody and can record the lowest low flows from that waterbody. No de-watering of any kind is covered under this informal consultation. With the structure constructed next to the waterbody, no dewatering or rerouting of the water during construction is necessary. Work in these waterbodies are minor (may be only two PVC pipes). Under the terms of this programmatic biological evaluation, no fill will be placed waterward of OHW or MHHW. Fill may be placed in the adjacent upland areas close to but not at OHW or MHHW. If the structure is placed near OHW, but not at or within OHW, then the only structure in Corps of Engineers jurisdiction is the PVC piping.

### **Placement of Scientific Measuring Devices on Existing Structures**

Generally, scientific measurement devices are placed within and/or on existing structures (i.e., gauging station, buoy, dock). If new equipment is installed, it generally consists of electronic measuring devices housed within the existing structure. In some cases, new equipment may require extending one or more PVC pipe(s) from the existing structure into the waterbody. In this case, new equipment is placed in the existing housing and new piping extended into the water from the existing structure.

### **Placement of Scientific Measuring Devices over Waterways**

Sometimes measuring devices are located above waterbodies and extend out over the water during data collection periods. These structures are generally constructed in the uplands and linked with cable. A device hangs from the cable and is used to measure water depth and velocity using a weighted line that extends into the water. This type of activity only requires Federal permitting if it is constructed over a navigable waterway.

### **Placement of Scientific Measuring Devices on Buoys**

Buoy placement whether in freshwaters, the Columbia River, or marine waters is relatively the same. The scientific measuring device will be attached to the buoy either on it or below it, depending on what the device is measuring.

## **A. Construction Equipment**

The equipment used is the vessel to place the buoy (discussed under methods).

## **B. Construction Methods**

Access to the buoy location is from a “Buoy Tender” or barge. A “Buoy Tender” is an open decked vessel with a mounted crane used for buoy placement. The buoy tender is at a minimum 65 feet in length. Barges may be as long as 500 feet. The length of barge used depends on the depth of buoy placement and size of buoy. For smaller buoys, a smaller vessel averaging 22 feet in length may be used.

The buoy is placed at a minimum depth of 10 feet at low water (fresh or marine). The maximum depth could be as much as 2,000 feet or more, such as in the Straits or Puget Sound. For typical placement of larger buoys from a buoy tender, the anchor is connected to a “trip wire” or “chalk” (a tripping device) on the side of the boat, the chain/nylon rope is “faked” or folded back and forth along the deck of the vessel, and the buoy is tied off along the same side of the boat as the anchor. The vessel is brought to a stop or an extremely slow speed. The anchor is lowered to be partially suspended in the water before release, minimizing splash disturbance. The “trip wire” is released, dropping the anchor allowing the chain/nylon rope to thread into the water and finally untying and releasing the buoy. If released with a crane versus a “trip wire”, the anchor is also partially suspended in the water before completely released.

## **C. Materials Used**

The buoy is made of either steel encased in close cell Styrofoam (plastic coating to ensure no water leakage), steel with a Styrofoam or other floatation material inside, or close cell Styrofoam only. The buoy is a maximum of 4-foot radius (some as small as 1 ft radius). The length of line for small or large buoys varies based on the scope needed. The scope refers to the ratio of length to depth based on currents in the waterbody. The average scope is a ratio of 5:1 line length to depth.

The anchor is made of fully cured concrete or steel, with a maximum weight of 1 ½ tons and a maximum size of 4 cubic yards. The line from anchor to buoy is either a combination of chain and nylon rope or chain and cable. For large buoys, the buoy is an average of 6-foot radius; the anchor is made of a fully cured concrete or steel (for steel sometime a regular boat anchor is used) up to 6 tons in weight and 10 cubic yards in size. The line from anchor to buoy is a large anchor chain or a combination of chain and cable.

The Coast Guard and Washington State Department of Transportation regulate the size, material, and the scope used for the buoy, line and anchor. Each U.S. Coast Guard District regulates specific standards for design and placement. The U.S. Coast Guard 13th District regulates all navigable waters in Washington State. Channel buoy design requirements are described in the Boat Handling Guide from Boat/U.S. Foundation in Alexandria, Virginia.

## **D. Cleanup**

Any left over materials will be collected and properly disposed.

## **E. Construction Timing**

The placement of the buoy occurs in a matter of minutes. The anchor drops at a rate of 10 feet per second, no matter the size.

## **Placement of Scientific Measuring Devices on a Pile or Dolphin**

Pile and dolphin placement is proposed as part of this programmatic biological evaluation only in marine/estuarine waters, excluding the mouth of the Columbia River (Baker Bay).

### **A. Construction Equipment**

The equipment used includes a barge-mounted pneumatic pile driver, standard drop-hammer, or vibratory pile driver, barge averaging 50- by 100-feet (5,000 square feet), and a tug boat.

### **B. Materials Used**

One pile or one dolphin (three piles with  $\frac{3}{4}$ " cable tie), either steel or wood treated (no creosote or pentachlorophenol) would be used for the pile and/or dolphin, signage (usually metal), shorelight, and a solar powered battery to be placed on the dolphin. The battery is used to power the shorelight and/or the recording devices or equipment.

Design standards for the signage and lighting requirements are regulated by the U.S. Coast Guard. Description of the U.S. Coast Guard Lighting Standards may be found in the Inland Navigation Lighting Provisions [33 CFR Parts 84, 87, 88, and 90]. Each U.S. Coast Guard District regulates specific standards for design and placement. The U.S. Coast Guard 13th District regulates all navigable waters in Washington State.

### **C. Construction Methods**

The pile placement is accessed by a barge positioned by a tug boat. Barges may be as long as 500 feet. The length of barge used depends on the depth of pile or dolphin placement. The barge anchors into position by dropping "spuds" – large steel piles that act as anchors at each corner of the barge. The tug boat is a maximum of 60 feet in length with engine power equivalent to an 100-foot long pleasure vessel.

The pile driving would be performed with a barge mounted, pile driver. A crane on the pile driver lowers a pile into the water until it rests in place on the bottom of the waterbody. The pile is attached to a special rail system that allows precise placement of the pile. A heavy weight runs along a similar track system. The weight is then repeatedly dropped onto the upper end of the pile, driving the pile into the bottom of the waterbody. For dolphins, three piles are driven in at an angle and tied together on top with a  $\frac{3}{4}$ " cable. The pile or dolphin is placed at a minimum depth of 8 feet high water and a maximum depth of 45 feet at high water (fresh or marine). After the pile or dolphin is driven, then the signage, shore light and battery are attached by hand using a welder, an hydraulic hammer or a drill (depending on material).

### **D. Cleanup**

Any left over materials will be collected and properly disposed.

### **E. Construction Timing**

Total construction time is less than one day.

## **6.0 Action Area Description**

The action area includes all fresh and marine/estuarine waters and adjacent terrestrial areas within 1 mile of the proposed project within Washington State.

**For all Fresh Waters in Washington State excluding the Columbia River mainstem:**

The action area for the individual project includes: the measuring device; the existing in-water structure the device is connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the upland facility it is connected to; the upland access point; a 25-foot radius<sup>2</sup> around the measuring device, the inwater structure; and, a distance of 2 miles downstream of the project area, and a 1-mile above water radius for noise and visual impacts associated with construction activities. The majority of the work takes place in uplands.

**For the Columbia River mainstem in Washington State, including Snake River and Baker Bay:**

The action area for the individual project includes: the measuring device; the existing in-water structure the device to connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the upland facility it is connected to; the upland access point; a 25-foot radius<sup>3</sup> around the measuring device, and the in-water structure for potential temporary water quality impacts; for a distance of 2 miles downstream of the project area, and a 1-mile above water radius for noise and visual impacts associated with construction activities.

**For all Marine/Estuarine Waters in Washington State excluding Baker Bay:**

The action area for the individual project includes: the measuring device; the existing in-water structure the device to connected to (i.e. pier, pile, or buoy); the new in-water buoy the device is connected to plus the anchor, anchor line, and a 5-foot radius for the buoy swing; the new pile or dolphin and platform; the upland facility it is connected to; the upland access point; a 25-foot radius<sup>4</sup> around the measuring device, and the in-water structure for potential temporary water quality impacts; 1,000 feet radius<sup>5</sup> around the pile or dolphin for noise impacts associated with the pile driving, and a 1-mile above water radius for visual impacts associated with construction activities.

## **7.0 Species and Habitat Information**

### **Species Present**

The plants, animals, insects, and fish present in the project area are provided in Table 1 through Table 4. Details on each species can be found in Appendix B.

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<sup>2</sup> The determination of impact area for potential water quality impacts is based on personal communication with John Malek, Sediment Management, Environmental Protection Agency, on May 10, 2000. Mr. Malek stated that typically turbidity impacts of a pile driving, anchor placement or the like would not exceed a 15-foot radius, a 25-foot radius is the maximum extent of impact, regardless of substrate type and currents at a project site.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

<sup>5</sup> The determination of impact area for noise impacts associated with pile driving of 1000-foot radius around the pile is based on information provided in Feist, 1991.

Table 1. Sensitive Terrestrial and Insect Species Potentially Occurring in Designated Project Areas.

Species Name <i>Scientific Name</i>	Status	Fresh Water Areas (excluding the Columbia River mainstem)	Mainstem Columbia River Area (including Snake River and Baker Bay)	Marine/Estuarine Water Area (excluding Baker Bay)
Brown Pelican <i>Pelecanus occidentalis</i>	E	X	X	X
Marbled Murrelet <i>Brachyramphus marmoratus</i>	T	X	X	X
Northern Spotted Owl <i>Strix occidentalis</i>	T	X		X
Short-Tailed Albatross <i>Phoebastria albatrus</i>	E	X	X	X
Western Snowy Plover <i>Charadrius alexandrinus</i>	T	X	X	X
Canada Lynx <i>Lynx canadensis</i>	T	X		
Columbia White-Tailed Deer <i>Odocoileus virginianus leucurus</i>	E	X	X	
Gray Wolf <i>Canis lupis</i>	E	X		
Grizzly Bear <i>Ursus arctos horribilis</i>	T	X		
Pygmy Rabbit <i>Barchylagus idahoensis</i>	E	X	X	
Woodland Caribou <i>Rangifer tarandus caribou</i>	E	X		
Oregon Silverspot Butterfly <i>Speyeria zerene hippolyta</i>	T	X	X	X

Table 2. Sensitive Marine Species Potentially Occurring in Designated Project Areas.

Species Name <i>Scientific Name</i>	Status	Fresh Water Areas (excluding the Columbia River mainstem)	Mainstem Columbia River Area (including Snake River and Baker Bay)	Marine/Estuarine Water Area (excluding Baker Bay)
Blue Whale <i>Balaenoptera musculus</i>	E			X
Fin Whale <i>Balaenoptera physalus</i>	E			X
Humpback Whale <i>Megaptera novaeangliae</i>	E			X
Sei Whale <i>Balaenoptera borealis</i>	E			X
Sperm Whale <i>Physeter macrocephalus</i>	E			X
Killer Whale <i>Orcinus orca</i>	E			X
Steller Sea Lion <i>Eumetopias jubatus</i>	T		X	X
Green Sea Turtle <i>Chelonia mydas</i>	T			X
Leatherback Sea Turtle <i>Dermochelys coriacea</i>	E			X
Loggerhead Sea Turtle <i>Caretta caretta</i>	T			X

Table 3. Sensitive Plant Species Potentially Occurring in Designated Project Areas

Species Name <i>Scientific Name</i>	Status	Fresh Water Areas (excluding the Columbia River mainstem)	Mainstem Columbia River Area (including Snake River and Baker Bay)	Marine/Estuarine Water Area (excluding Baker Bay)
Bradshaw's Desert Parsley <i>Lomatium bradshawii</i>	E	X	X	
Golden Paintbrush <i>Castilleja levisecta</i>	T	X	X	
Kincaid's Sulphur Lupine <i>Lupinus sulphureus ssp. Kincaidii</i>	T	X		
Marsh Sandwort <i>Arenaria paludicola</i>	E	X		
Nelson's Checker-Mallow <i>Sidalcea nelsoniana</i>	T	X	X	
Showy Stickseed <i>Hackelia venusta</i>	PE	X		
Spalding's Silene <i>Silene spaldingii</i>	PT			
Water Howellia <i>Howellia aquatilis</i>	T	X	X	
Wenatchee Mountain Checker-Mallow <i>Sidalcea oregana var. calva</i>	E	X		
Ute Ladies'-Tresses <i>Spiranthes diluvialis</i>	T	X	X	

Table 4. Sensitive Fish Species Potentially Occurring in Designated Project Areas.

Species Name <i>Scientific Name</i> Evolutionary Significant Unit (ESU)/Distinct Population Segment (DPS)	Status	Fresh Water Areas (excluding the Columbia River mainstem)	Mainstem Columbia River Area (including Snake River and Baker Bay)	Marine/Estuarine Water Area (excluding Baker Bay)
Bull Trout <i>Salvelinus confluentus</i>				
Coastal/Puget Sound DPS	T	X		X
Columbia River DPS	T	X	X	X
Chinook Salmon <i>Oncorhynchus tshawytscha</i>				
Puget Sound ESU	T	X		X
Snake River Fall Run ESU	T	X	X	X
Snake River Spring/Summer-run ESU	T	X	X	X
Lower Columbia River ESU	T	X	X	X
Upper Columbia River Spring-run ESU	E	X	X	X
Upper Willamette River ESU	T		X	X
Sockeye Salmon <i>Oncorhynchus nerka</i>				
Ozette Lake ESU	T	X		X
Snake River ESU	E		X	X
Coho Salmon <i>Oncorhynchus kisutch</i>				
Puget Sound/Strait of Georgia ESU	C	X		X
Lower Columbia River/SW WA ESU	C	X	X	X
Chum Salmon <i>Oncorhynchus keta</i>				
Hood Canal Summer-run ESU	T	X		X
Columbia River ESU	T	X	X	X
Steelhead Trout <i>Oncorhynchus mykiss</i>				
Upper Columbia River ESU	E	X	X	X
Middle Columbia River ESU	T	X	X	X
Lower Columbia River ESU	T	X	X	X
Snake River Basin ESU	T	X	X	X
Upper Willamette River ESU	T		X	X
Puget Sound ESU	T	X		X

## 8.0 Activity History and Status

Table 5 is a breakdown of the number of scientific measurement device verifications authorized by the Corps of Engineers. The breakdown is organized by year and waterbody. The waterbody includes all creeks, streams, and unnamed tributaries that flow into it unless otherwise noted. Each of the waterbodies is categorized as below:

### Marine

All marine waters within Washington State (i.e., Pacific Ocean, Willapa Bay, Grays Harbor, Strait of Juan de Fuca, Strait of Georgia, Puget Sound, Hood Canal, Sammish Bay, Skagit Bay, Totten Inlet, Dabob Bay, Commencement Bay, etc.). Because of the design of the Corps database, it was not possible to

separate out tidal areas from minor freshwater creeks, streams, and unnamed tributaries that flow into these waterbodies.

## Fresh

All fresh waters within Washington State including all rivers, tributaries, lakes, and reservoirs (regardless of size) and excluding the Columbia River mainstem (i.e., Snoqualmie River, Skagit River, Puyallup River, Nisqually River, Cowlitz River, Yakima River, Wenatchee River, Snake River, Pend Oreille River, Lake Washington, Lake Sammamish, Lake Chelan, Moses Lake, Baker Lake, Spanaway Lake, etc).

## Columbia River

Mainstem Columbia River within Washington State, including the Snake River, Baker Bay, reservoirs/lakes (i.e. Lake Entiat, Lake Wallula, Franklin D. Roosevelt Lake, Priest Rapids Lake, etc.). Data for all tributaries are included under “fresh waters”.

To determine the number of authorized device installation verifications, all finalized permit actions were queried against the key word “NWP 5” and cross- referenced with the work type “scientific measurement device.” The cross-referencing ensures that the activity is properly categorized and each authorization is only counted once. The following data includes before- and, when applicable, after-the-fact authorizations.

The 1999 data from WDFW recorded 51 research projects. Research projects as defined by WDFW include dataloggers, dissolved gas monitoring devices, downstream and upstream migrant traps, egg/alevin sampling, videotaping or photography inside culverts, piezometers, scour chains and monitoring, soil borings, stilling wells, and weir gages. These activities would be considered “scientific measuring devices” by Corps definition. Of the “research projects” identified by WDFW, all but the following actions are covered under this informal programmatic consultation: downstream and upstream migrant traps, egg/alevin sampling, and soil borings. The majority of these actions are done in non-navigable waters of the U.S. and are not regulated under Section 404 of the Clean Water Act. In comparing the Corps database with one year of data from WDFW (1999) for research projects, the Corps database represents less than 1 % of the actual number of scientific measuring devices.

Table 5. Historical Record of Corps Authorization of Scientific Measurement Devices

<b>WATERBODY</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
Marine	3	0	0	1	0
Fresh	1	2	1	1	1
Columbia River	0	0	1	3	0
<b>Total</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>5</b>	<b>1</b>

As of March 25, 2004, this programmatic has been used twice since authorization.

## 9.0 Environmental Baseline

The environmental baseline is provided in Appendix C.

## 10.0 Effects of the Action

### 10.1 Direct effects

#### Measuring Device Placement or Replacement

1. Water quality (Turbidity): Temporary water quality impacts may occur with the placement of the structure or measuring device (including scour chains or gages). Placing a measuring device within the wetted perimeter would suspend sediment within the water column for some period of time, not to exceed 1 hour. These sediments would drop out relatively rapidly at or directly downstream of where a measuring device was placed. Since no material is removed to pound the measuring device in, water quality impacts are expected to be discountable and/or insignificant. When a larger structure is placed near OHW or MHHW, a concrete structure may be placed on top of the ground. Under this informal programmatic consultation, no uncured concrete shall come into contact with the waterbody. This informal programmatic consultation does not cover activities where the land will be leveled or grading or where the fill is placed at or waterward of OHW or MHHW. Construction would take place during low flows (or low tides) and sediments will be re-suspended within the water column once flows return or the tide comes back in. This turbidity would dissipate relatively rapidly, not to exceed 2 hours after inundation is achieved. Since the area that will be disturbed is in the uplands and is covered with the small structure, water quality impacts should be minor and dissipate altogether after the area has stabilizes. As outlined in Appendix G - Implementation Conditions, erosion control measures must be taken to insure that no sediments enter the water column from the construction activities. The PVC pipes that may be placed in the water are not expected to affect the water quality in the project area as they are suspended above the substrate and are used exclusively to measure water quality and quantity parameters. They house devices that extend into the water to measure temperature, turbidity, dissolved oxygen, etc. and the level of the water. They do not collect or extract water (or anything else) into the PVC pipe.
2. Water Quality (concrete): Under the terms of this informal programmatic consultation, no uncured concrete shall come into contact with either fresh or marine/estuarine waters. Wet concrete causes a change in the pH of the water due to the lime in the concrete, resulting in the water that comes into contact with the concrete becoming “basic” in fresh water systems. Basic water can adversely impact fish. These effects may be lessened in marine/estuarine waters, as the lime has more options to bind to aside from the water in marine/estuarine systems. If semi-wet concrete has a partially cured “skin” then the lime will leach at a slower rate.<sup>6</sup> Cured concrete in fresh water systems releases carbonate ( $\text{CO}_3^{2-}$ ) through natural weathering processes. Carbonate reacts with hydrogen ( $\text{H}^+$ ) to form bicarbonate ( $\text{HCO}_3^-$ ) and/or carbonic acid ( $\text{H}_2\text{CO}_3$ ). A product of these reactions is an increase in pH, thereby causing the water that comes into contact with the weathering concrete to become basic.<sup>7</sup> Under this informal programmatic consultation, no fill is allowed waterward of OHW or MHHW. In fresh waters, the only concrete that would come into contact with the water would be cured concrete used for an anchoring system (up to 10 cubic yards) or if the water raises above OHW during flood and storm events. With only cured concrete coming into contact with the water and the limited amount or exposure of the concrete to the water, the impacts of the weathering concrete to pH levels in the water are insignificant and/or discountable. In marine waters, the only cured concrete would

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<sup>6</sup> Impacts associated with concrete were obtained through personal communication with Hal Michael, Fisheries Biologist, Washington Department of Fish and Wildlife on February 3, 2000.

<sup>7</sup> Information on the impacts of the natural weathering of concrete was obtained through personal communication with MaryAnn Baird, Soil Scientist, U.S. Army Corps of Engineers, Regulatory Branch.

come into contact with the water used for an anchoring system or structure (up to 10 cubic yards) or if the water raises above MHHW during extreme high tides and storm events. With the limited amount and/or exposure to the water of the cured concrete, the impacts of the weathering concrete to pH levels in the water are insignificant and/or discountable.

3. **Water Quantity:** No changes to flow and hydrology and overall watershed conditions are anticipated with these types of activities.
4. **Habitat Health:** The gages, devices, and/or structures used to measure data will not be constructed in or adjacent to (within 300-feet) vegetated shallows (except where such vegetation is limited to State designated noxious weeds) or habitat for listed or proposed species, or prey/forage species - including eelgrass beds, kelp beds, or other macroalgae. No dewatering of the stream or waterway is covered under the terms of this programmatic biological evaluation. As outlined in Appendix F – Implementation Conditions, no woody riparian vegetation will be degraded or removed and any disturbed herbaceous areas must be revegetated as outlined in the “Revegetation Guidelines” of Appendix G. Therefore, impacts to the substrate of the stream, large woody debris (LWD) found on the banks or beaches, pool frequency and quality, off-channel habitat and refuge areas will be insignificant and/or discountable.

### **Scientific Measuring Devices on Buoys:**

1. **Water quality (anchor placement):** Temporary water quality impacts may occur with the placement of buoys as scientific measuring devices when the anchor drops and a small amount of sediment is temporarily suspended in the water column. Buoys are usually placed during “slack tide” when the water is relatively still. Because the anchor drops in a matter of seconds and settles sediment suspension is unlikely to exceed a radius of 25 feet from the anchor and would settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. If the anchor is not installed properly or the weight is not sufficient, the anchor could drag along the substrate, causing additional sediment suspension. The Corps’ experience is that this is rare. Buoys will be anchored securely so that the anchor line does not drag. All temporary water quality impacts associated with the anchor placement are insignificant and/or discountable.
2. **Water quality (propwash):** The boat placing the buoy is likely to cause some sediment suspension associated with propwash. The boat is stopped or moving extremely slowly during anchor placement so the disturbance with the propwash is extremely small. If a tug and barge are used, the placement is done very quickly (matter of minutes) and the work is done in the approved work window (Appendix D and E) when listed or proposed species are least likely to be present. Any turbidity associated with propwash from the boat or tug and barge would settle out of the water column to background levels in no more than an hour, depending on depth, sediment type and currents. All temporary water quality impacts are insignificant and/or discountable.
3. **Habitat Health (vegetated shallows):** If a buoy is placed over or adjacent to vegetated shallows, the placement of the buoy and propwash from the vessel placing the buoy could destroy areas of the vegetated shallows. Vegetated shallows provide refuge for juvenile salmonids and support forage species that the listed or proposed species are dependent upon, such as invertebrates for juvenile salmonids and forage fish for adult salmonids. For example, herring spawn in eelgrass beds in marine areas. Boat activity near or adjacent to vegetated areas has been documented to damage and/or destroy the vegetated areas. (NOAA, 1998) To be covered by this informal consultation, the buoys will be placed so that the vessel and buoy are not over or adjacent to vegetated shallows. The substrate may support benthic invertebrates that juvenile listed or proposed fish species are dependent upon for forage. Buoy anchors will be weighted and installed so that the anchor line does not drag,

disturbing the substrate and associated habitat. Using this method of installation, impacts to habitat health are insignificant and/or discountable.

### **Scientific Measuring Devices on Piles or Dolphins:**

The placement of one pile or one dolphin applies only to marine/estuarine waters excluding for the mouth of the Columbia River (Baker Bay). A pile or dolphin placed in or adjacent to marine/estuarine waters will only have potential to affect marine animals (e.g., fish, marine mammals) and birds. Effects of the placement of one pile or dolphin when used as scientific measuring devices are outlined below:

1. **Water Quality (pile driving, spud placement, and propwash):** Pile driving and spud placement to anchor the barge will have a temporary impact on water quality. As each pile is driven or each spud is placed into the substrate, a turbidity plume is created. The plumes will be small, localized and will dissipate quickly. Based on discussions between the Corps, USFWS, and NMFS in Informal Consultation Batch Meeting for structures in Lake Washington, the “plume” is unlikely to exceed a radius of 25 feet from the pile or dolphin and would settle out of the water column to background levels in no more than an hour, depending on sediment type and currents. Propwash impacts would only occur when the tug is either situating the barge in place or removing the barge. The work is done in the approved work window when listed or proposed species, and prey/forage species are least likely to be present. Any turbidity associated with propwash from the tug and barge is relatively short-term and would settle out of the water column to background levels in no more than an hour, depending on depth, sediment type and currents. To ensure that sediment suspension impacts are discountable, the pile driving for the pile or dolphin and the anchoring of the barge will only occur during approved work windows when listed or proposed species, or prey/forage species are least likely to be present. The impacts to water quality due to pile driving and spud placement are insignificant and/or discountable.
2. **Water Quality (pile treatment and slag):** No piles treated with creosote or pentachlorophenol will be used in marine/estuarine waters, in order to be covered under this informal consultation. Studies by NMFS have shown that the primary metal of concern in pile treatment is copper as it is the “most acutely toxic”. (NMFS, 1998.) Copper has been shown to be the most actively leaching metal with arsenic and chromium rating second. (Warner and Solomon, 1990.) About 300 compounds including polycyclic aromatic hydrocarbons (PAHs) – which are also known to be very toxic and bioconcentrate - are found in creosote. (NMFS, 1998) Exposure to these chemicals could result in the death or reduced survival of salmonids, forage fish, prey organisms, and marine animals (e.g., marine mammals, birds, turtles (NMFS, 1998.) Dioxins are found in pentachlorophenol. When wood is treated with pentachlorophenol, the dioxins are likely to leach into the water column. Exposure of female fish species, including salmon and trout, to dioxins and dioxin-like contaminants cause increased larval mortality. (Hornung, et al, 1998). There is the potential that slag will enter the water column when signs are welded to the pile or dolphin. The amount of slag from welding one sign would be no more than 1 square inch. This amount is so small that any impact to water quality is insignificant and/or discountable. Using these methods of installation, adverse effects associated with pile treatment and/or slag are insignificant and/or discountable.
3. **Habitat Health (underwater noise from pile driving):** Pile driving can cause a considerable amount of noise. The impact of the weight causes sound waves to radiate outward. Studies conducted in estuarine areas in Puget Sound indicate, though inconclusively, that the sound waves generated by pile driving frighten juvenile pink and chum salmonids in estuaries away from the pile driver (Feist, 1991). The effects of the pile driving were observed up to 1000 feet away. The juvenile salmonids fled, and remained away from the area during active pile driving, and for a short time after the pile driving stops (Feist, 1991). No conclusive evidence was found to show any long term effects on

juvenile growth rates or feeding patterns from the sound waves created from pile driving (Feist, 1991). Tests showed the fish had been actively feeding during the pile driving (Feist, 1991). Juveniles apparently moved to other feeding areas and returned shortly after the pile driving ceased (Feist, 1991). Underwater noise impacts on whales can include confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding (IWC 2002). Noise impacts on sea turtles include interference with travel and foraging. In order to minimize impacts from pile driving noise, the pile driving for the pile or dolphin will only occur during approved work windows when listed or proposed species, or forage fish species, are least likely to be present and pile driving methods would implement noise reducing BMPs (Appendix D and E). Sound disturbance impacts related to construction activities would likely be short-term and result in temporary displacement of animals rather than injury. The duration of pile driving sound and the probability of impact to listed species would be minimized by implementing timing restrictions and noise reducing BMPs (Appendix D and E) designed to avoid or minimize impacts.

4. Habitat Health (Airborne Noise): Noise from the operation of heavy equipment, especially pile drivers, may have an effect on listed species. The noise associated with construction equipment and activities could disrupt murrelet nesting and foraging activities and cause murrelets to temporarily avoid the project area. However, sound disturbance impacts related to construction activities would likely be short-term and result in temporary displacement of species rather than injury. Noise generated by pile driving and the operation of installation vessels is expected to have a minor impact on listed fish, marine species, and terrestrial species. The duration of pile driving sound and the probability of impact to listed species would be minimized by implementing timing restrictions and sound attenuating BMPs (Appendix D and E) designed to avoid or minimize impacts.
5. Habitat Health (pile driving impacts to vegetated shallows): The pile driving and any propwash associated with the tug boat or pile driving barge could destroy vegetated shallows. The vegetated shallows support forage species that listed or proposed species are dependent upon, such as herring spawning in eelgrass beds in marine areas. Boat activity in or adjacent to vegetated shallows has been documented to damage and/or destroy vegetated shallows. (NOAA, 1998) To be covered by this informal consultation, the pile or dolphin will be placed so that the tug boat, barge, and pile/dolphin are not over or adjacent to vegetated shallows and the barge will not ground out. Using this method of installation, impacts to habitat health are insignificant and/or discountable.
6. Disturbance: The presence and operation of equipment (i.e., vessel) may have an effect on listed species. Construction activities could disrupt marine mammals, sea turtles, and murrelet nesting and foraging, causing animals to temporarily avoid the project area. However, construction activities would be short-term and potential impacts to listed species would be minimized by implementing timing restrictions (Appendix D and E) designed to avoid or minimize impacts.

## 10.2 Indirect effects

There are no effects that would result from the placement or operation of the measuring devices later in time. With no water being removed or added to the waterbody (stream, river, lake, or marine/estuarine waters), there is no change in the water quantity over time due to the placement or operation of the gages or other devices. Devices do not add any chemicals to the stream. Impacts to pH levels from cured

concrete are insignificant and/or discountable because of the limited amount and/or exposure. Any change in water quality over time due to their placement or operation of the measuring devices will be insignificant and/or discountable.

### 10.3 Others

For all other pathways and indicators not specifically mentioned above, the activity will not alter the present environmental baseline.

### 10.4 Determination of Effect

Activities covered by this document may affect certain threatened and endangered species, species proposed for listing as threatened or endangered, and designated or proposed critical habitat for those species (summarized in Table 6 through Table 9). The determinations for each species assumes the following:

For all Fresh Waters excluding the Columbia River mainstem:

- Work is done within the approved work windows for listed species and or forage fish.
- No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or habitat for listed or proposed species, or habitat for prey/forage species.
- No uncured concrete shall come into contact with the waterbody.
- No new piling is placed.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of OHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a stream or waterbody.
- Work will be done during low flow and when possible in the dry.

For the Columbia River Mainstem including the Snake River and Baker Bay:

- Work is done within the approved work windows for listed species and/or forage fish.
- No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or habitat for listed or proposed species, or habitat for prey/forage species.
- No uncured concrete shall come into contact with the waterbody.
- No new piling is placed.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of OHW or MHHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a stream or waterbody.
- Work will be done during low flow and when possible in the dry.

For all Marine/Estuarine Waters excluding Baker Bay

- Work is done within approved work windows for listed species and/or forage fish.

- No work is done in or adjacent to vegetated shallows (except where such vegetation is limited to State-designated noxious weeds) or habitat for listed or proposed species, or habitat for prey/forage species.
- No uncured concrete shall come into contact with the waterbody.
- Only one new pile is placed.
- The pile is not treated with creosote or pentachlorophenol.
- No land leveling or grading is conducted.
- No fill is placed in wetlands or waterward of MHHW.
- Work does not include weirs and flumes.
- Placement does not require the de-watering of a waterbody.
- Work will be done during low tide and when possible in the dry.

### **Brown Pelican (*Pelecanus occidentalis*)**

The proposed activity “may affect, but is not likely to adversely affect” brown pelicans. In Washington, brown pelicans inhabit only coastal marine waters. The proposed activity could occur in or near coastal marine waters and could result in temporary displacement of brown pelicans during construction due to the associated noise and visual disturbance. Direct mortality or sub-lethal effects are unlikely. It could affect current brown pelican habitat because scientific devices could be placed in or near coastal marine waters. To minimize impacts, noise attenuation BMPs would be implemented and work would be limited in Pacific and Grays Harbor Counties by the work window specified in Appendix E.

### **Marbled Murrelet (*Brachyramphus marmoratus*)**

The proposed activity “may affect, but is not likely to adversely affect” marbled murrelets and their critical habitat. The proposed activity may result in temporary displacement of marbled murrelets during construction due to the associated noise and visual disturbance. Direct mortality or sub-lethal effects are unlikely. The proposed activity will not alter or impact critical habitat because activity would occur offshore or at the shoreline, away from old growth habitat. In addition, noise attenuation BMPs would be implemented and work would be prohibited in or near critical habitat areas and during sensitive nesting or foraging periods as described in Appendix E.

### **Northern Spotted Owl (*Strix occidentalis*)**

The proposed activity “may affect, but is not likely to adversely affect” the northern spotted owl and its critical habitat. The proposed activity may result in temporary displacement of spotted owls during construction due to the associated noise and visual disturbance. Direct mortality or sub-lethal effects are unlikely. The proposed activity will not alter or impact current spotted owl prey and habitat because activity would occur offshore or at the shoreline, away from old growth habitat. In addition, noise attenuation BMPs would be implemented and work would be prohibited in or near critical habitat areas and during sensitive nesting periods as described in Appendix E.

### **Short-Tailed Albatross (*Phoebastria albatrus*)**

The proposed activity “may affect, but is not likely to adversely affect” short-tailed albatross. In Washington, short-tailed albatross inhabit only coastal and offshore marine waters. The proposed activity

could occur in coastal and offshore marine waters and could result in temporary displacement of short-tailed albatross during construction due to the associated noise and visual disturbance. Noise attenuation BMPs (Appendix E) would be implemented to minimize disturbance. Direct mortality or sub-lethal effects are unlikely.

### **Western Snowy Plover (*Charadrius alexandrinus*)**

The proposed activity “may affect, but is not likely to adversely affect” western snowy plover and its proposed critical habitat. Plovers inhabit only ocean beach areas in Pacific and Grays Harbor counties; southwest Washington is furthest known northern area for snowy plovers. Western snowy plover utilize open shoreline areas where little vegetation exists. The proposed activity could occur near the shoreline or along ocean beaches and could result in temporary displacement of western snowy plover during construction due to the associated noise and visual disturbance. Direct mortality or sub-lethal effects are unlikely. To minimize impacts, noise attenuation BMPs would be implemented and work would be limited by the work window and distance to nesting areas specified in Appendix E.

### **Canada Lynx (*Lynx canadensis*)**

The proposed activity would have “no effect” on Canada lynx. The proposed activity would occur in marine/estuarine waters and/or beaches and would not occur near remote areas of the Selkirk Mountains or the Cascade Range where lynx occur. Because there would be no overlap of the proposed activity action area and Canada lynx or their habitat, the proposed activity would have no potential to affect Canada lynx.

### **Columbia White-Tailed Deer (*Odocoileus virginianus leucurus*)**

The proposed activity “may affect, but is not likely to adversely affect” Columbia white-tailed deer. Any construction noise or activities along the lower Columbia River from River Mile (RM) 50 to RM 52 may result in temporary displacement of Columbia white-tailed deer due to the associated noise and visual disturbance. Direct mortality or sub-lethal effects are unlikely. To minimize impacts, noise attenuation BMPs would be implemented and work will be prohibited in or near sensitive habitat areas as specified in Appendix E.

### **Gray Wolf (*Canis lupis*)**

The proposed activity would have “no effect” on gray wolves. The proposed activity would occur in marine/estuarine waters and/or beaches and would not occur near remote areas of the Selkirk Mountains or the Cascade Range where gray wolves occur. Because there would be no overlap of the proposed activity action area and gray wolves or their habitat, the proposed activity would have no potential to affect gray wolves.

### **Grizzly Bear (*Ursus arctos horribilis*)**

The proposed activity would have “no effect” on grizzly bears. The proposed activity would occur in marine/estuarine waters and/or beaches and would not occur near remote areas of the Selkirk Mountains or the Cascade Range where grizzly bears occur. Because there would be no overlap of the proposed activity action area and grizzly bear or their habitat, the proposed activity would have no potential to affect grizzly bears.

### **Pygmy Rabbit (*Barchylagus idahoensis*)**

The proposed activity “may affect, but is not likely to adversely affect” pygmy rabbits. Pygmy rabbits occur in the shrub steppe habitat of Douglas County, Washington. Activities could occur adjacent to habitats (e.g., along the Columbia River mainstem) that support the pygmy rabbit. Construction has the potential to adversely affect pygmy rabbits via activities occurring along the shoreline in suitable habitat. To minimize impacts, construction will avoid areas near suitable habitat and known populations of pygmy rabbit.

### **Woodland Caribou (*Rangifer tarandus caribou*)**

The proposed activity would have “no effect” on woodland caribou. The proposed activity would occur in navigable waters and would not occur in or near the Selkirk Mountains where woodland caribou occur. Because there would be no overlap of the proposed activity action area and woodland caribou or their habitat, the proposed activity would have no potential to affect woodland caribou.

### **Oregon Silverspot Butterfly (*Speyeria zerene hippolyta*)**

The proposed activity “may affect, but is not likely to adversely affect” Oregon silverspot butterflies and their critical habitat. Oregon silverspot butterflies inhabit coastal salt spray marshes and open meadows. In Washington, Oregon silverspot butterflies may be extirpated. However, areas suitable for recolonization or reintroduction occur in southwest Washington. Activities near sand dune, salt-spray meadows or open field habitat in the Pacific coastal and Willapa Bay areas of Pacific County could impact the butterfly or their habitat. The early blue violet is a host species for the butterfly larvae, and no activity would be allowed where blue violet is detected by a plant survey conducted at the appropriate time of year. To minimize potential impacts work will be prohibited in or near sensitive habitat areas as specified in Appendix E.

### **Blue Whale (*Balaenoptera musculus*)**

The proposed activity “may affect, but is not likely to adversely affect” whales. The blue whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of blue whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Fin Whale (*Balaenoptera physalus*)**

The proposed activity “may affect, but is not likely to adversely affect” fin whales. The fin whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of fin whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Humpback Whale (*Megaptera novaeangliae*)**

The proposed activity “may affect, but is not likely to adversely affect” humpback whales. The humpback whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of humpback whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Sei Whale (*Balaenoptera borealis*)**

The proposed activity “may affect, but is not likely to adversely affect” sei whales. The sei whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of sei whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Sperm Whale (*Physeter macrocephalus*)**

The proposed activity “may affect, but is not likely to adversely affect” sperm whales. The sperm whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of sperm whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Killer Whale (*Orcinus orca*) and Critical Habitat**

The proposed activity “may affect, but is not likely to adversely affect” killer whales or their critical habitat. The killer whale occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of killer whales during construction due to the associated noise and visual disturbance. Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding. To minimize impacts, noise attenuation BMPs would be implemented.

### **Steller Sea Lion (*Eumetopias jubatus*)**

The proposed activity “may affect, but is not likely to adversely affect” steller sea lions and their critical habitat. In Washington, Steller sea lions inhabit pelagic areas of marine waters and occasionally move up the lower Columbia River to feed during the fall. Any work in marine waters or the lower Columbia River may result in temporary disturbance of Steller sea lions during construction due to the associated noise and visual disturbance. Activities could result in confusion, disruption of social cohesion, separation, alteration of travel, and interference with feeding or breeding. To minimize impacts, noise attenuation BMPs would be implemented and work will be prohibited near or in critical habitat.

### **Green Sea Turtle (*Chelonia mydas*)**

The proposed activity “may affect, but is not likely to adversely affect” green sea turtles. The green sea turtle occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of green sea turtles during construction due to the associated noise and visual

disturbance. Construction noise and activity could interfere with travel and foraging. To minimize impacts, noise attenuation BMPs would be implemented.

### **Leatherback Sea Turtle (*Dermochelys coriacea*)**

The proposed activity “may affect, but is not likely to adversely affect” leatherback sea turtles. The leatherback sea turtle occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of leatherback sea turtles during construction due to the associated noise and visual disturbance. Construction noise and activity could interfere with travel and foraging. To minimize impacts, noise attenuation BMPs would be implemented.

### **Loggerhead Sea Turtle (*Caretta caretta*)**

The proposed activity “may affect, but is not likely to adversely affect” loggerhead sea turtles. The loggerhead sea occurs in marine areas where activities could occur. Any work in marine waters may result in temporary disturbance of loggerhead sea turtles during construction due to the associated noise and visual disturbance. Construction noise and activity could interfere with travel and foraging. To minimize impacts, noise attenuation BMPs would be implemented.

### **Bradshaw’s Desert Parsley (*Lomatium bradshawii*)**

The proposed activity “may affect, but is not likely to adversely affect” Bradshaw’s desert parsley. Bradshaw's desert parsley occurs in wet meadows. Populations of desert parsley have been identified near streams in Clark County, Washington, areas that could potentially be affected by the proposed activity. If proposed activity occurs in an area where the species occurs it could result in species or habitat disturbance. In or near potentially suitable habitat areas, surveys to determine the presence of Bradshaw’s desert parsley can help avoid and minimize potential impacts.

### **Golden Paintbrush (*Castilleja levisecta*)**

The proposed activity would have “no effect” on golden paintbrush. Golden paintbrush occurs in small populations in uplands in the Puget Trough, San Juan County, and Clark County. The species or habitat would not be affected by the proposed activity because the activity is unlikely to occur in or near suitable upland areas and work would be prohibited in or near sensitive areas as specified in Appendix E.

### **Kincaid’s Sulphur Lupine (*Lupinus sulphureus ssp. Kincaidii*)**

The proposed activity would have “no effect” on Kincaid’s sulphur lupine. Kincaid's sulphur lupine occurs in upland prairie habitat in southwest Washington. The species would not be affected by the proposed activity because the activity is unlikely to occur in or near suitable upland prairie habitat and work would be prohibited in or near sensitive areas as specified in Appendix E.

### **Marsh Sandwort (*Arenaria paludicola*)**

The proposed activity would have “no effect” on the marsh sandwort. Marsh sandwort may be extirpated in Washington, but marsh sandwort historically occurred in freshwater wetlands. Because it may be extirpated, there is an insignificant and discountable chance that activities would affect marsh sandwort habitat. In addition, surveys to determine the presence of marsh sandwort can help avoid and minimize potential impacts.

### **Nelson's Checker-Mallow (*Sidalcea nelsoniana*)**

The proposed activity “may affect, but is not likely to adversely affect” Nelson's checker mallow. Nelson's checker-mallow occurs in meadows and along streams in southwest Washington and the Olympic peninsula, areas that could potentially be affected by the proposed activity. If proposed activity occurs in an area where the species occurs it could result in species or habitat disturbance. In or near potentially suitable habitat areas, surveys to determine the presence of Nelson's checker-mallow can help avoid and minimize potential impacts. Work will be prohibited in or near sensitive areas as specified in Appendix E.

### **Showy Stickseed (*Hackelia venusta*)**

The proposed activity would have “no effect” on showy stickseed. Showy stickseed occurs in open mountain sites composed of loose sand or talus slopes, away from areas where activities would typically occur (e.g. drainages and waterbodies). Therefore, the species would not be affected by the proposed activity because the activity is unlikely to occur in or near suitable habitat.

### **Spalding's Silene (*Silene spaldingii*)**

The proposed activity would have “no effect” on Spalding's silene. Spalding's silene occurs in upland grasslands in eastern Washington, away from areas where activities would typically occur (e.g. drainages and waterbodies). Therefore, the species would not be affected by the proposed activity because the activity is unlikely to occur in or near upland grassland habitat. In addition, surveys to determine the presence of Spalding's silene can help avoid and minimize potential impacts.

### **Water Howellia (*Howellia aquatilis*)**

The proposed activity “may affect, but is not likely to adversely affect” water howellia. Water howellia occurs in seasonal wetlands in the Puget lowlands and the Columbia basin, primarily in small, vernal ponds, although some ponds may retain water throughout the year. Although unlikely, the proposed activity could affect or occur in these ponds and wetlands, thereby potentially affecting the species and their habitat. If proposed activity occurs in an area where the species occurs it could result in species or habitat disturbance. In or near potentially suitable habitat areas surveys to determine the presence of water howellia can help avoid and minimize potential impacts. Work will be prohibited in or near sensitive areas as specified in Appendix E.

### **Wenatchee Mountain Checker-Mallow (*Sidalcea oregana* var. *calva*)**

The proposed activity would have “no effect” on the Wenatchee mountain checker-mallow and its critical habitat. Wenatchee mountain checker-mallow occurs in wet meadows within a small region southeast of Leavenworth, Washington. Surveys to determine the presence of Wenatchee mountain checker-mallow can help avoid and minimize potential impacts. Because it is unlikely that a project would occur near known plant populations and construction would be prohibited in or near sensitive areas (as specified in Appendix E), the species and habitat would not be affected by the proposed activity.

### **Ute Ladies'-Tresses (*Spiranthes diluvialis*)**

The proposed activity “may affect, but is not likely to adversely affect” Ute ladies'-tresses. Ute ladies'-tresses can occur in wet meadows associated with meandering wetland complexes, areas that could

potentially be affected by the proposed activity. If proposed activity occurs in an area where the species occurs it could result in species or habitat disturbance. In or near potentially suitable habitat areas surveys to determine the presence of Ute ladies'-tresses can help avoid and minimize potential impacts. Work will be prohibited in sensitive areas as specified in Appendix E.

## **Pacific Salmon and Bull Trout**

Adult and juvenile salmonids utilize habitats within the action area as migratory corridors and rearing habitat and may be affected by construction activities. The proposed activity may result in temporary increases in suspended sediment during construction; however, turbidity is expected to be short-term. Proposed activity will not occur in or near vegetated shallows where listed salmonids or forage fish may occur and buoys will be anchored securely so that the anchor line does not drag. No creosote or pentachlorophenol treated piling may be installed under this PBE. In marine or estuarine waters only one new pile or one new dolphin (3 piles) is allowed under this activity, no piles are authorized in freshwater. Any piles to be replaced must be fully extracted, if possible, and the holes capped with appropriate material to ensure that the chemicals from the existing pile do not leach into adjacent sediments or waters (see Appendix E). Pile installation and removal BMPs will be implemented to minimize potential impacts associated with turbidity, contaminants, construction noise, and high decibel noise associated with pile driving through adherence of work windows and the monitoring of noise levels to avoid exceeding 180 dB (re: 1  $\mu$ Pa) (see Appendix D and E). The in-water work windows (see Appendix D) will minimize the chance that adult and juvenile salmonids are present during project construction, and forage fish spawning will be protected.

The proposed activity “may affect, but is not likely to adversely affect”:

- Snake River sockeye and their critical habitat
- Snake River spring/summer chinook and their critical habitat
- Snake River fall chinook and their critical habitat
- Snake River steelhead and their critical habitat
- Columbia River chum
- Columbia River bull trout
- Lower Columbia River steelhead
- Lower Columbia River chinook
- Middle Columbia River steelhead
- Upper Columbia River steelhead
- Upper Columbia River spring chinook
- Upper Willamette River chinook
- Upper Willamette River steelhead
- Ozette Lake sockeye
- Hood Canal summer chum
- Puget Sound chinook
- Coastal/Puget Sound bull trout/dolly varden

- Puget Sound steelhead
- Lower Columbia River/SW Washington coho salmon

Table 6. Effect Determinations for Listed Terrestrial Animals and Insects

<b>Species Name</b> <i>Scientific Name</i>	<b>Status</b>	<b>Determination</b>	<b>Rational for Determination</b>
Brown Pelican <i>Pelecanus occidentalis</i>	E	May affect, but not likely to adversely affect	Any work near coastal marine waters and associated with the proposed activity may result in temporary displacement during construction due to noise, which has the potential to affect brown pelicans. To minimize impacts work would be limited in Pacific and Grays Harbor Counties by a work window and noise attenuation BMPs would be implemented (Appendix E).
Marbled Murrelet <i>Brachyramphus marmoratus</i>	T	May affect, but not likely to adversely affect	The proposed activity may result in temporary displacement during construction due to noise, which has the potential to affect marbled murrelets. Noise attenuation BMPs would be implemented and work will be prohibited in or near critical habitat areas and during sensitive nesting or foraging periods (Appendix E).
Northern Spotted Owl <i>Strix occidentalis</i>	T	May affect, but not likely to adversely affect	The proposed activity may result in temporary displacement during construction due to noise, which has the potential to affect northern spotted owls. Noise attenuation BMPs would be implemented and work will be prohibited in or near critical habitat areas and during sensitive nesting or foraging periods (Appendix E).
Short-Tailed Albatross <i>Phoebastria albatrus</i>	E	May affect, but not likely to adversely affect	In Washington, short-tailed albatross inhabit only coastal and offshore marine waters where temporary displacement during construction has the potential to affect short-tailed albatross.
Western Snowy Plover <i>Charadrius alexandrinus</i>	T	May affect, but not likely to adversely affect	Plovers inhabit only ocean beach areas in Pacific and Grays Harbor counties where temporary displacement during construction has the potential to affect western snowy plover. Noise attenuation BMPs would be implemented and work will be prohibited in or near critical habitat and sensitive nesting areas (Appendix E).
Canada Lynx <i>Lynx Canadensis</i>	T	No effect	The proposed activity would not occur near remote areas of the Selkirk Mountains or the Cascade Range where Canada lynx occur.
Columbia White-Tailed Deer <i>Odocoileus virginianus leucurus</i>	E	May affect, but not likely to adversely affect	Construction noise and activities along the lower Columbia River from River Mile (RM) 50 to RM 52 may temporarily displace Columbia white-tailed deer. Work will be prohibited in or near sensitive habitat areas as specified in Appendix E.
Gray Wolf <i>Canis lupis</i>	E	No effect	The proposed activity would not occur near remote areas of the Selkirk Mountains or the Cascade Range where grey wolves occur
Grizzly Bear <i>Ursus arctos horribilis</i>	T	No effect	The proposed activity would not occur near remote areas of the Selkirk Mountains or the Cascade Range where grizzly bear occur.
Pygmy Rabbit <i>Barchylagus idahoensis</i>	E	May affect, but not likely to adversely affect	The proposed activity may result in temporary displacement or habitat disturbance during construction. Construction will avoid areas of suitable habitat and known populations of pygmy rabbit.
Woodland Caribou <i>Rangifer tarandus caribou</i>	E	No effect	The proposed activity would not occur in or near the Selkirk Mountains where woodland caribou occur.

<b>Species Name</b> <i>Scientific Name</i>	<b>Status</b>	<b>Determination</b>	<b>Rational for Determination</b>
Oregon Silverspot Butterfly <i>Speyeria zerene hippolyta</i>	T	May affect, but not likely to adversely affect	Activities near sand dune, salt-spray meadows or open field habitat in the Pacific coastal and Willapa Bay areas of Pacific County could impact the butterfly or their habitat. Work will be prohibited in or near sensitive habitat areas as specified in Appendix E.

Table 7. Effect Determinations for Listed Marine Animals

<b>Species Name</b> <i>Scientific Name</i>	<b>Status</b>	<b>Determination</b>	<b>Rational for Determination</b>
Blue Whale <i>Balaenoptera musculus</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Fin Whale <i>Balaenoptera physalus</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Humpback Whale <i>Megaptera novaeangliae</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Sei Whale <i>Balaenoptera borealis</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Sperm Whale <i>Physeter macrocephalus</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Killer Whale <i>Orcinus orca</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and/or stranding.
Steller Sea Lion <i>Eumetopias jubatus</i>	T	May affect, but not likely to adversely affect	Construction noise and activity could result in confusion, disruption of social cohesion, separation, alteration of travel, and interference with feeding or breeding.
Green Sea Turtle <i>Chelonia mydas</i>	T	May affect, but not likely to adversely affect	Construction noise and activity could interfere with travel and foraging.
Leatherback Sea Turtle <i>Dermochelys coriacea</i>	E	May affect, but not likely to adversely affect	Construction noise and activity could interfere with travel and foraging.
Loggerhead Sea Turtle <i>Caretta caretta</i>	T	May affect, but not likely to adversely affect	Construction noise and activity could interfere with travel and foraging.

Table 8. Effect Determinations for Listed and Proposed Plant Species

<b>Species Name</b> <i>Scientific Name</i>	<b>Status</b>	<b>Determination</b>	<b>Rational for Determination</b>
Bradshaw's Desert Parsley <i>Lomatium bradshawii</i>	E	May affect, but not likely to adversely affect	Populations of desert parsley have been identified near streams, areas that could potentially be affected by construction activities. In or near potentially suitable habitat areas surveys to determine the presence of Bradshaw's desert parsley can help avoid and minimize potential impacts.
Golden Paintbrush <i>Castilleja levisecta</i>	T	No effect	Species or habitat would not be affected by the proposed activity because the activity would not occur in upland habitat and work would be prohibited in or near sensitive areas as specified in Appendix E.
Kincaid's Sulphur Lupine <i>Lupinus sulphureus ssp. Kincaidii</i>	T	No effect	Species or habitat would not be affected by the proposed activity because the activity would not occur in upland prairie habitat and work would be prohibited in or near sensitive areas as specified in Appendix E.
Marsh Sandwort <i>Arenaria paludicola</i>	E	No effect	There is an insignificant and discountable chance that activities would affect marsh sandwort habitat since it may be extirpated and the activity would be limited to offshore areas or at the shoreline where plants are not expected to occur.
Nelson's Checker-Mallow <i>Sidalcea nelsoniana</i>	T	May affect, but not likely to adversely affect	Nelson's checker-mallow occurs in meadows and along streams, areas that could potentially be affected by the proposed activity. In or near potentially suitable habitat areas, surveys to determine the presence of Nelson's checker-mallow can help avoid and minimize potential impacts. Work will be prohibited in or near sensitive areas as specified in Appendix E.
Showy Stickseed <i>Hackelia venusta</i>	PE	No effect	Proposed activity would not occur in open mountain sites composed of loose sand or talus slopes. Activities would be limited to offshore areas or at the shoreline.
Spalding's Silene <i>Silene spaldingii</i>	PT	No effect	Species or habitat would not be affected by the proposed activity because the activity would not occur in upland grasslands.
Water Howellia <i>Howellia aquatilis</i>	T	May affect, but not likely to adversely affect	Proposed activity could affect or occur in ponds and wetlands that are habitat for water howellia, thereby potentially affecting the species and their habitat. In or near potentially suitable habitat areas surveys to determine the presence of water howellia can help avoid and minimize potential impacts. Work will be prohibited in or near sensitive areas as specified in Appendix E.
Wenatchee Mountain Checker-Mallow <i>Sidalcea oregana var. calva</i>	E	No effect	Species or habitat would not be affected by the proposed activity because construction would be limited to offshore areas or at the shoreline where plants are not expected to occur and work would be prohibited in or near sensitive areas as specified in Appendix E.
Ute Ladies'-Tresses <i>Spiranthes diluvialis</i>	T	May affect, but not likely to adversely affect	Ute ladies'-tresses can occur in wet meadows associated with meandering wetland complexes, areas that could potentially be affected by proposed activity. In or near potentially suitable habitat areas surveys to determine the presence of Ute ladies'-tresses can help avoid and minimize potential impacts. Work will be prohibited in or near sensitive areas as specified in Appendix E.

Table 9. Effect Determinations for Listed, Proposed, and Candidate Fish Species

Species Name <i>Scientific Name</i> Evolutionary Significant Unit (ESU)/Distinct Population Segment (DPS)	Status	Determination	Rational for Determination
Bull Trout <i>Salvelinus confluentus</i> Coastal/Puget Sound DPS Columbia River DPS	T T	May affect, but not likely to adversely affect	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.
Chinook Salmon <i>Oncorhynchus tshawytscha</i> Puget Sound ESU Snake River Fall Run ESU Snake River Spring/Summer-run ESU Lower Columbia River ESU Upper Columbia River Spring-run ESU Upper Willamette River ESU	T T T T E T	May affect, but not likely to adversely affect	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.
Sockeye Salmon <i>Oncorhynchus nerka</i> Ozette Lake ESU Snake River ESU	T E	May affect, but not likely to adversely affect	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.
Coho Salmon <i>Oncorhynchus kisutch</i> Puget Sound/Strait of Georgia ESU Lower Columbia River/SW WA ESU	C C	Will not jeopardize (“may affect, but not likely to adversely affect” if listed)	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.
Chum Salmon <i>Oncorhynchus keta</i> Hood Canal Summer-run ESU Columbia River ESU	T T	May affect, but not likely to adversely affect	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.
Steelhead Trout <i>Oncorhynchus mykiss</i> Upper Columbia River ESU Middle Columbia River ESU Lower Columbia River ESU Snake River Basin ESU Upper Willamette River ESU Puget Sound ESU	E T T T T T	May affect, but not likely to adversely affect	Proposed activity occurs in areas where fish may occur and potential impacts from turbidity, contaminants, and noise associated with construction could affect fish.

## **11.0 Essential Fish Habitat**

### **Overview**

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act to establish new requirements for Essential Fish Habitat (EFH) descriptions in Federal fishery management plans and to require federal agencies to consult with NMFS on activities that may adversely affect EFH.

The Magnuson-Stevens Act requires all fishery management councils to amend their fishery management plans to describe and identify EFH for each managed fishery. The Pacific Fishery Management Council (1999) has issued such an amendment in the form of Amendment 14 to the Pacific Coast Salmon Plan, and this amendment covers EFH for all fisheries under NMFS jurisdiction that would potentially be affected by the proposed action. Specifically, these are the chinook, coho and pink salmon fisheries. EFH includes all streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon. Activities occurring above impassable barriers that are likely to adversely affect EFH below impassable barriers are subject to the consultation provisions of the Magnuson-Stevens Act.

The Magnuson-Stevens Act requires consultation for all federal agency actions that may adversely affect EFH. EFH consultation with NMFS is required by federal agencies undertaking, permitting, or funding activities that may adversely affect EFH, regardless of its location. Under Section 305(b)(4) of the Magnuson-Stevens Act, NMFS is required to provide EFH conservation and enhancement recommendations to federal and state agencies for actions that adversely affect EFH. Wherever possible, NMFS utilizes existing interagency coordination processes to fulfill EFH consultations with federal agencies. For the proposed action, this goal is being met by incorporating EFH consultation to the Endangered Species Act Section 7 consultation, as represented by this biological evaluation.

### **Location**

The location of the activity covered by this assessment has been described in detail earlier in this document (see Section 3).

### **Description of Proposed Activity**

The activity covered by this assessment have been described earlier in this document (see Section 4).

### **Potential Adverse Effects of the Proposed Activity**

Projects would occur in or along the edges of marine, estuarine, and freshwater waters. EFH for ground fish (Table 10), coastal pelagics (Table 11) and salmonids (Table 12) could be affected by proposed activity.

### **Ground Fish EFH**

Effects to the environmental baseline that would impact groundfish species are discussed in detail in Section 10.

## **Coastal Pelagic EFH**

Effects to the environmental baseline that would impact coastal pelagic species are discussed in detail in Section 10.

## **Salmon EFH**

Effects to the environmental baseline that would impact salmon species are discussed in Section 10.

### **EFH Conservation Measures**

Conservation measures designed to protect listed species and those proposed as threatened or endangered will also help avoid and minimize impacts of the proposed activities on salmonid and groundfish EFH (see Appendix D, E, F, and G).

### **Conclusion**

In accordance with EFH requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the Corps has determined that the proposed activity would not adversely impact EFH utilized by Pacific salmon and groundfish. It has been determined that the proposed action will not adversely affect EFH for federally managed fisheries in Washington waters.

Table 10. Ground Fish Species with Designated EFH and the Life History Stages that May Occur in the Action Area (PFMC, 1998a).

<b>GROUND FISH SPECIES</b>	<b>Adults</b>	<b>Spawning/ Mating</b>	<b>Large Juvenile</b>	<b>Small Juvenile</b>	<b>Larvae</b>	<b>Eggs/ Parturition</b>
Leopard Shark	X	X	N/A	X	N/A	X
Southern Shark	X	X	N/A	X	N/A	X
Spiny Dogfish	X		X	X	N/A	X
California Skate	X	X	N/A	X	N/A	X
Ratfish	X	X	N/A	X	N/A	
Lingcod	X	X	X	X	X	X
Cabezon	X	X	X	X	X	X
Kelp Greenling	X	X	X	X	X	X
Pacific Cod	X	X	N/A	X	X	X
Pacific Whiting (Hake)	X	X	N/A	X	X	X
Sablefish				X		
Jack Mackerel	X		N/A		X	
Black Rockfish	X			X		
Bocaccio				X	X	
Brown Rockfish	X	X	N/A	X		X
Calico Rockfish	X		N/A	X		
California Scorpionfish						X
Copper Rockfish	X		X	X		X
Kelp Rockfish				X		
Quillback Rockfish	X		X	X	X	X
English Sole	X	X	N/A	X	X	X
Pacific Sanddab			N/A	X	X	X
Rex Sole	X		N/A			
Starry Flounder	X	X	N/A	X	X	X

N/A - Not Applicable. Either the species does not have a particular life stage in its life history, or when EFH of juveniles is not identified separately for small juvenile and large juvenile stages. For many species, habitats occupied by juveniles differ substantially, depending on the size (or age) of the fish. Frequently, small juveniles are pelagic and large juveniles live on or near the bottom; these life stages are identified separately in the table when sufficient information is available to do so. When juvenile habitats do not differ so substantially or when information is insufficient to identify differences, EFH is identified only for the juvenile stage (small and large juveniles combined), and N/A is listed in the column for the large juvenile stage in the table (PFMC, 1998a).

Table 11. Coastal Pelagic Species with Designated EFH and the Life History Stages that May Occur in the Action Area (PFMC, 1998a).

<b>COASTAL PELAGIC SPECIES</b>	<b>Adults</b>	<b>Spawning/ Mating</b>	<b>Large Juvenile</b>	<b>Small Juvenile</b>	<b>Larvae</b>	<b>Eggs/ Parturition</b>
Northern Anchovy	X		X		X	X
Pacific Sardine	X		X		X	X
Pacific Mackerel	X		X		X	X
Jack Mackerel	X					
Market Squid	X	N/A		N/A	N/A	N/A

N/A - Not Applicable. Either the species does not have a particular life stage in its life history, or when EFH of juveniles is not identified separately for small juvenile and large juvenile stages. For many species, habitats occupied by juveniles differ substantially, depending on the size (or age) of the fish. Frequently, small juveniles are pelagic and large juveniles live on or near the bottom; these life stages are identified separately in the table when sufficient information is available to do so. When juvenile habitats do not differ so substantially or when information is insufficient to identify differences, EFH is identified only for the juvenile stage (small and large juveniles combined), and N/A is listed in the column for the large juvenile stage in the table (PFMC, 1998a).

Table 12. Salmonid Species with Designated EFH and the Life History Stages that May Occur in the Action Area (PFMC, 1998a).

<b>PACIFIC SALMON</b>	<b>Egg</b>	<b>Larvae</b>	<b>Young Juvenile</b>	<b>Juvenile</b>	<b>Adult</b>	<b>Spawning</b>
Chinook salmon	X	X	X	X	X	X
Coho salmon	X	X	X	X	X	X
Pink salmon	X	X	X	X	X	X