UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

Refer to:
2002/00761

August 20, 2002

Alan Goodman
US EPA, Region 10
Oregon Operations Office
811 SW 6th Avenue
Portland, OR 97204

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation for the Construction of a Barrier Wall at the McCormick and Baxter Creosoting Company Site, Portland, Oregon.

Dear Mr. Goodman:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the construction of a subsurface barrier wall at the McCormick and Baxter Creosoting Company site (the Site) in Portland, Oregon. The Site is adjacent to the Willamette River, and has been designated a Federal Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The proposed action is the first of three remedial actions proposed for the Site to reduce the potential exposure to contaminants present in the sediment, groundwater, and soils at the project site. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Willamette River chinook salmon (*Oncorhynchus tshawytscha*), Lower Columbia River chinook salmon, Columbia River chum salmon (*O. keta*), Upper Willamette River steelhead (*O. mykiss*), and Lower Columbia River steelhead. As required by section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This Opinion also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR Part 600.

If you have any questions regarding this consultation, please contact Dr. Nancy Munn of my staff in the Oregon Habitat Branch at 503.231.6269.

Sincerely,

F.r Michael R Crouse

D. Robert Lohn
Regional Administrator

cc. Kevin Parrett, ODEQ
Kathy Kunz, COE
Kathy Ivy, EPA
Helen Hillman, NOAA Office of Response and Restoration

Endangered Species Act - Section 7 Consultation & Magnuson-Stevens Act Essential Fish Habitat Consultation

BIOLOGICAL OPINION

Construction of the Barrier Wall at the McCormick and Baxter Creosoting Company Superfund Site, Willamette River, Portland, Oregon.

Agency:	U.S. Environmental Protection Agency, Oregon Operations Office
Consultation Conducted By:	NOAA Fisheries, Northwest Region
Date Issued:	August 19, 2002
Issued by:	for Michael R Course D. Robert Lohn Regional Administrator
Refer to:	**2002/00761**

TABLE OF CONTENTS

1. ENDANGERED SPECIES ACT

1.1 Background

On June 17, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a letter and a biological assessment (BA) from the U.S. Environmental Protection Agency (EPA) requesting formal consultation under the Endangered Species Act (ESA) for the construction of a subsurface barrier wall at the McCormick and Baxter Creosoting Company site (the Site) along the Willamette River in Portland, Oregon. The Site has been designated a Federal Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This action is one of several remedial actions being taken under CERCLA to significantly reduce the potential risk to human health and ecological receptors resulting from potential exposure to contaminants present in the sediment, groundwater, and soils at the project site. The project applicant is EPA, and EPA and the Oregon Department of Environmental Quality (DEQ) jointly prepared the BA. EPA has designated DEQ as the lead in implementing the actions contained with the CERCLA Record of Decision (ROD), although this remains a Federal action with Federal funding. DEQ will be solely responsible for the long-term operation and maintenance of the Site.

Activities at the Site include the removal of existing wooden pilings from the shoreline area, removing pieces of large wood that have accumulated along the shoreline to facilitate sheet pile wall construction, the construction of a sheet pile wall along the ordinary high water line of the Willamette River, and construction of a slurry wall on the upland portion of the Site. The barrier wall will fully encircle the upland portion of the Site, and is expected to substantially reduce the off-site migration of contaminants. Additional remedial actions will take place to address the contaminated sediments in the Willamette River, and to address contaminated groundwater and soils on the upland portion of the Site. The additional actions are in design phase and will not begin construction until 2003 or later. The barrier wall can be treated as an action of independent utility because containment of the upland sources of contamination is critical for any future remedial actions, and must take place regardless of the final selection of remedies for contaminated soils, sediment and groundwater at the Site. EPA anticipates that the future construction actions will include the construction of a sediment cap on Willamette River sediments and the construction of a soil cap on the contaminated upland sediments. This consultation does not include construction of the soil or sediment cap. Consultation on these portions of the remedy will occur at a later design phase and when funding is more assured.

In the June, 2002, BA, EPA determined that Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*), Lower Columbia River (LCR) chinook salmon, Columbia River chum salmon (*O. keta*), UWR steelhead (*O. mykiss*), and LCR steelhead, may occur within the project area and that the proposed action is "likely to adversely affect" the listed species. The objective of this biological opinion (Opinion) is to determine whether the activities included in the barrier wall construction plan are likely to jeopardize the continued existence of the above-listed species. This Opinion was prepared based on information received from the EPA and

DEQ, and the best available science. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

1.2 Proposed Action

1.2.1 Location

The Site is along the west bank of the Willamette River at river mile (RM) 7. The Site is located on approximately 43 acres of uplands and 17 acres of contaminated sediments in the Willamette River. An additional 5 acres of steeply-sloping riverbank is located between the river and the uplands. The Site is zoned for heavy industrial use but has been vacant since the early 1900s. The Site is bordered by railroad tracks to the northeast and northwest, a barge maintenance and dredging facility to the southeast, and an empty lot where a shipyard and cooperage were once located on the northwest. Nearly all the infrastructure has been removed from the Site and adjacent industrial properties.

1.2.2 Background

The McCormick and Baxter Creosoting Company operated between 1944 and 1991, treating wood products with creosote, pentachlorophenol, and inorganic preservative solutions (arsenic, copper, chromium, and zinc). Historically, process wastes were disposed of in several areas of the Site, including the Formal Waste Disposal Area (FWDA). In addition, there were periodic spills and leaks of wood-treating chemicals in the Tank Farm Area (TFA) and the Central Process Area (CPA). Creosote was delivered by barge and transported via a 6-inch line to the storage site on shore. As a consequence of these activities, significant concentrations of wood-treating chemicals are now present in groundwater beneath the Site. Sources of sediment contamination include spills at the transfer site, FWDA, TFA, and CPA, and via groundwater contamination.

The McCormick and Baxter Site was proposed for addition to the National Priorities List (NPL) under CERCLA on June 18, 1992, and was added to the NPL on June 1, 1994. After a detailed study of the nature and extent of contamination at the Site and a detailed analysis of cleanup alternatives, EPA, in conjunction with DEQ, signed a Record of Decision (ROD) in 1996. The ROD identifies the selected remedy for the Site, and describes the source areas and the nature and extent of contamination in the soil, sediment and groundwater.

The selected remedy is a series of remedial actions that address the human and environmental health threats at the Site by treating the most highly contaminated soil, capping less contaminated soil, extracting nonaqueous phase liquid (NAPL), installing a subsurface barrier wall as a contingency if on-site treatment was not effective, and capping contaminated sediments. Several of these actions have been completed or are ongoing. A ROD Amendment was issued in 1997 and changed the treatment requirement for highly contaminated soil to off-site disposal at a permitted landfill. This provides the basis and justification for invoking the barrier wall contingency. The proposed action for this consultation is the construction of the

barrier wall. Funding is pending for the construction of the barrier wall. Funding has not been allocated yet for the sediment or soil cap.

1.2.3 Groundwater Contamination

The Site-related groundwater contaminants are polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and metals associated with wood-treating solutions. The main source areas of the groundwater contamination include the TFA, the FWDA, and the CPA. Wood-treating products (*i.e.*, containing PAHs) generally have low-to-moderate solubility in water, and they either float on the water table or continue to sink depending on the density of the product compared to that of the water. The relatively insoluble materials are described as nonaqueous phase liquids (NAPL). NAPL that floats is referred to as lighter-than-water nonaqueous phase liquid (LNAPL), and NAPL that is heavier than water and sinks is referred to as denser-than-water nonaqueous phase liquid (DNAPL). The density of DNAPL at the Site is close to that of water, and tends to be suspended throughout the water column or aquifer thickness. LNAPL is predominantly found at the water surface without much vertical suspension. Groundwater quality at the Site also has been impacted by dissolved-phase contaminants.

Releases of NAPL contaminants from the main source areas at the Site, particularly from the TFA and FWDA, have affected the shallow aquifer. Two distinct NAPL plumes are present at the Site: one in the TFA and one in the FWDA. These contaminant plumes contain LNAPL and DNAPL or both. The plumes also contain dissolved-phase contaminants.

The FWDA NAPL plume is estimated to affect approximately 4 acres of soil and 5 acres of sediment. The contaminants in this plume originated from waste oil, stormwater from system pits, and other liquid wastes that were disposed of in the FWDA. This mixture of contaminants migrated vertically to the water table (approximately 30 feet below ground surface (bgs)), and then laterally toward the river, spreading as LNAPL and DNAPL.

The TFA plume is estimated to affect approximately 8 acres of soil and 6 acres of sediment. The contaminants in this plume originated from the former tank farm, the large creosote tank, the creosote retorts, the butt tanks, and the southeast waste disposal trench, in which either periodic spills or disposal of waste oils (creosote and PCP) and other liquid waste occurred. This mixture of contaminants migrated vertically to the water table and then laterally toward the river, spreading as LNAPL and DNAPL. Near the beach, LNAPL occasionally has been observed in seeps at low tides and at low river stage (*i.e.*, generally during late summer).

Contaminant flux from shallow aquifer groundwater to river sediment still is occurring at the Site downgradient from the FWDA and TFA plumes. The groundwater gradient direction in the shallow, intermediate, and deep zones is generally from the bluff toward the river. However, periodic reversals of the groundwater gradient occur near the shoreline. As previously discussed, contaminated groundwater can be observed in beach seeps during late summer when the river stage is low and hydrostatic pressures decrease, allowing NAPL and contaminated groundwater to enter the river sediment.

1.2.4 Sediment Contamination

Sediment sampling was initiated in the early 1990s during the Remedial Investigation (RI). Results indicated that the contamination could be correlated to the NAPL plumes emanating from the TFA and FWDA. Subsurface sample data indicate that contamination may extend as deep as 35 feet bgs in heavily contaminated areas. RI studies concluded that NAPL, when present, was found in the upper 7 feet of the sediment and that NAPL discharge, as indicated by an oily sheen or beach seeps, appeared to be greatest during river stages of -3 CRD or lower.

Additional sediment sampling and analyses were conducted in 1999 and 2001. The sample locations included sites in the vicinity of the former creosote dock where spillage occurred during off-loading procedures. The results indicated that carcinogenic PAHs and dioxin/furan compounds contaminate sediments at the Site. Bioassay tests resulted in significant mortality to test organisms at a number of sampling locations.

Based on evaluation of the 1999 and 2001 sediment sampling results, the following general conclusions can be reached:

- High concentrations of PAHs were detected in samples collected where LNAPL releases are known or are suspected to be occurring (*i.e.*, near the creosote dock, downstream into Willamette Cove, and along the sediment drop-off along the harbor line);
- PAH concentrations appear to decline rapidly away from known or suspected NAPL release areas, suggesting little lateral spreading of PAH-contaminated sediment; and
- Sediment testing for PAHs is a generally reliable indicator to define the area to be capped due to chemical contamination.
- NAPL blebs (visible globules of NAPL) extend down to 70 feet bgs in some areas.

During an extreme low-water period in August 2001, a NAPL seep emerged at Willamette Cove that had not been observed previously, except as an occasional sheen. Drought conditions and an extremely low river water level may have led to the emergence of the seep. The location of the seep is in the predicted downgradient direction from the FWDA and comparison of ratios of LPAH to high-molecular-weight PAH between seep sediment samples and on-site subsurface soil samples appear to verify that the FWDA is the source of this NAPL contamination.

1.2.5 Soil Contamination

The ROD provided two sets of criteria for soil, based on the cost-effectiveness of treatment alternatives to achieve the Remedial Action Objectives (RAOs). Highly contaminated soil required treatment, which was later amended to removal. Residually-contaminated soil could remain on site but measures were required to prevent direct contact or ingestion with contaminated soil, or surface runoff from contaminated soil.

In 1996 and 1997, extensive surface (0 to 6 inches bgs) and subsurface (4 and 10 feet bgs) soil samples were collected and analyzed in anticipation of excavating and treating the most heavily contaminated soil. Removal of the highly contaminated soil began in March 1999, and was

completed in May 1999. Approximately 33,000 tons of contaminated soil and debris were removed from the Site and disposed of in a permitted, hazardous waste landfill in Idaho. The *Revised Final Remedial Design Data Summary Report* (DEQ 1998) depicted the locations of the residually contaminated surface soil and concluded that the entire upland area of the Site should be capped.

1.2.6 Construction of the Barrier Wall (Proposed Action)

The purpose of the proposed action is to construct a barrier wall to minimize or prevent the movement of contaminants from the upland sources to Willamette River sediments and water column. Activities associated with the proposed action include removal of existing wooden pilings, the displacement of large wood along the shoreline to facilitate sheet pile wall construction, the construction of the sheet pile wall along the ordinary high water line of the Willamette River, and construction of a slurry wall on the upland portion of the Site. Construction will occur in 2003. Construction of the soil slurry wall is anticipated to require approximately 8 to 10 weeks, and construction of the sheet pile wall is anticipated to require approximately 12 weeks.

The wood pilings will be removed at the sediment surface, either by cutting or pulling and will be transported to an upland site (either on-site or off-site). The disposition of the wood pilings will be determined during design of the uplands soil cap.

Since the sheet piles cannot be driven through wood, the wood that has accumulated along the shoreline may need to be relocated a short distance away from its existing location. The wood will be moved by heavy equipment from the shoreline to another part of the Site.

The barrier wall will fully encompass the upland portion of the Site; the portion of the barrier wall along the Willamette River will be constructed out of sheet pile, while the rest of the wall will be constructed out of a slurry material. The sheet pile part of the wall will be 1,270 linear feet of steel. It will be driven with a compression and/or a vibratory hammer, and will be driven flush with the ground surface.

The upland slurry wall will be constructed by excavating a 3-foot wide by 2,380-foot long trench to depths up to approximately 80 feet bgs. As the trench is excavated, it will be immediately backfilled with a bentonite-water slurry and a soil-bentonite mixture, which forms an impermeable barrier wall. The finished slurry wall will be capped with soil to be flush with the ground surface. The slurry will not come within 100 feet of the banks and shoreline of the Willamette River, and will not result in the discharge of any materials to the river. All construction stormwater will be restricted to the construction site with no discharges to surface waters.

1.3 Biological Information

The action area is defined by NOAA Fisheries regulations (50 CFR 402) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved

in the action." The action area for the proposed project is the Willamette River extending from RM 8 downstream one mile, including the water column and substrate. The action area includes the area of disturbance in the upland and riparian parts of the Site. The size of the action area is based on the possible extent of a toxic plume if NAPL is mobilized during the driving of the sheet piles.

The Willamette River within the action area serves as a migration area for all listed species under consideration in this Opinion, with the exception of chum salmon. It may also serve as a feeding and rearing area for juvenile steelhead and chinook salmon. Essential features of the area for the species are: Substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food (juvenile only), riparian vegetation, space, and safe passage conditions (50 CFR 226). The proposed action may affect the essential habitat features of water quality, substrate, food, and riparian vegetation.

References for further background on listing status and biological information can be found in Table 1. Information about Lower Columbia River/Southwest Washington coho salmon is provided in the table, but that ESU is not discussed in this Opinion because it remains on the candidate list. A discussion of the historical status of the ESUs can be found in the biological assessment (2002).

The LCR chinook salmon includes both fall-run and spring-run stocks. Adults migrating to the Clackamas River may be present in the lower Willamette River starting in August and continuing through November, with peak migration occurring in September and October. Juveniles in this ESU would be expected in the lower Willamette River starting in March, continuing through July, with the peak occurring in April, May, and June.

Adults from the UWR chinook salmon ESU migrate through the action area beginning in March, and complete their migration by the end of July, with the peak between late April and early June. It is also possible that some adults hold for periods of time within the Portland harbor. Chinook smolts would typically pass through the action area from January through June, and from August through December. Juveniles would be expected in the lower Willamette River anytime from March through mid-December. Information on the migratory behavior of subyearling chinook is limited. Subyearling chinook have been found in the harbor area over a longer period than other species of salmonids, probably because they actively feed during migration. Some juveniles may over-winter in the lower Willamette River.

Adult chum salmon may occur near the mouth of the Willamette River during their upstream migration from late September through December. They do not spawn in the Willamette River or its tributaries. Chum salmon fry may move into the lower Willamette River during incoming tides and could feed on organisms within the action area for short periods during their downstream migration.

LCR steelhead move through the action area throughout the year. Peak movement is expected from late April through May. Juvenile steelhead migration peaks in April and May. Most steelhead smolts move downriver through the action area in less than one day. UWR steelhead

adults could be expected in the action area from January through mid-May. Smolts would be present from March through mid-July, with peak migration occurring in May.

Table 1. References for Additional Background on Listing Status, Biological Information, and Protective Regulations for the ESA-Listed and Candidate Species Considered in this Consultation.

Species / ESU	Status	Protective Regulations	Biological Information
Chinook salmon (*O. tshawytscha*)			
Lower Columbia River	Threatened 3/24/00; 64 FR 14308	7/10/00; 65 FR 42422	Myers et al. 1998; Healey 1991
Upper Willamette River	Threatened 3/24/00; 64 FR 14308	7/10/00; 65 FR 42422	Myers et al. 1998; Healey 1991
Chum Salmon (*O. keta*)			
Columbia River	Threatened 3/25/99; 64 FR 14508	7/10/00; 65 FR 42422	Johnson et al. 1997; Salo 1991
Steelhead (*O. mykiss*)			
Lower Columbia River	Threatened 3/19/98; 63 FR 13347	7/10/00; 65 FR 42422	Busby et al. 1995; 1996
Upper Willamette River	Threatened 3/25/99; 64 FR 14517	7/10/00; 65 FR 42422	Busby et al. 1995; 1996
Coho salmon (*Oncorhynchus kisutch*)			
Lower Columbia River/ Southwest Washington	Candidate 7/25/95; 60 FR 38011	Not Applicable	Weitkamp et al. 1995, Sandercock 1991

1.4 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements and current status of the listed species, evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Furthermore, NOAA Fisheries evaluates whether the action is likely to result in habitat modifications that appreciably diminish the value of the habitat for both survival and recovery of the listed species. NOAA Fisheries identifies those effects of the action that are likely to impair the function of habitat. If NOAA Fisheries concludes that the action modifies habitat in a way that affects the survival and recovery of listed species, it must identify any reasonable and prudent measures available.

For the proposed action, a jeopardy analysis by NOAA Fisheries considers direct or indirect mortality of fish attributable to the action. NOAA Fisheries also considers the extent to which the proposed action impairs habitat to determine whether the action is likely to result in jeopardy.

1.4.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. The NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess to the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The current status of the listed species, based upon their risk of extinction, has not significantly improved since the species were listed. Chum salmon returns began to decline in the 1950s, and have remained at a depressed level since 1965 (Muldoon *et al.* 2001). The five-year average adult escapement of native, late-run winter steelhead within both ESUs has been declining since 1971 (Foster 2001). LCR chinook salmon in the Willamette River basin are represented by a single, small population of fall-run fish that spawn primarily in the lower mainstem Clackamas River. Long-term trends of this ESU are declining. Trends in the UWR chinook salmon populations are declining as well. The North Santiam population currently does not meet the critical viability threshold for abundance and productivity (King 2001).

1.4.2 Environmental Baseline

The Site is within the lower Willamette River watershed at RM 7 within the Portland Harbor. The Willamette River watershed covers approximately 11,500 square miles in northwest Oregon between the Coast and Cascade mountain ranges. The river travels 187 miles from its

headwaters to its mouth at the Columbia River. Most of the rainfall occurs in the fall, winter, and spring, with little rainfall during June, July, and August. The lowest river flow occurs during late summer. The 13 U.S. Army Corps of Engineer (COE) dams on tributary systems largely regulate flows in the mainstem Willamette River.

Significant changes have occurred in the watershed since the arrival of Europeans in the 1800s. The watershed was mostly forested land prior to the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about five percent is urbanized or is in residential use. The river receives direct inputs from treated municipal wastes and industrial effluents. Nonpoint source input from agricultural, silvicultural, residential, urban and industrial land uses are also significant, especially during rainfall runoff.

The Willamette River, from its mouth to Willamette Falls, is currently on the 1998 Oregon DEQ 303(d) list as water quality limited for the following parameters: Temperature (summer), bacteria, biological criteria (fish skeletal deformities), and toxics (mercury in fish tissue). Results from DEQ ambient monitoring data indicate that 68 percent of the values at RM 7 and 61 percent of the values at RM 13.2 collected during the summer exceed the temperature standard of 68°C. Sediment conditions in the Willamette River watershed range from excellent in some of the upper tributaries to poor in much of the mainstem of the river (Altman et al. 1997). In the lower Willamette River, average turbidity levels tend to be higher in fall and winter. Monthly average turbidity ranges from four NTUs to 149 NTUs.

In 1997, DEQ and the EPA took sediment samples within the Portland Harbor. The results of the study indicated that sediments in the harbor, including within the project area, contain concentrations of metals, PCBs, pesticides, herbicides, dioxins/furans, tributyltin (TBT), and PAHs above EPA contaminant guidelines. Cleanup of the contaminated sediments is presently being addressed under the Federal Superfund process. In addition, the skeletal deformities in fish upstream of Willamette Falls suggests that there may also be chemical contamination upstream of the Portland Harbor area.

Habitat conditions within the lower Willamette River are highly degraded. The streambanks have been channelized, off-channel areas removed, tributaries put into pipes, and the river has been disconnected from its floodplain as the lower valley was urbanized. Silt loading to the lower Willamette River has increased over historic levels due to logging, agriculture, road building, and urban and suburban development within the watershed. The river in the vicinity of McCormick and Baxter site has a soft bottom, with little or no aquatic vegetation. Limited opportunity exits for large wood recruitment to the lower Willamette River due to the paucity of mature trees along the shoreline, and the lack of relief along the shoreline to catch and hold the material. The banks of the river in the action area are heavily industrialized, with much of the bank hardened with riprap, vertical concrete walls, and docking facilities. Much of the historic off-channel habitat has been lost due to diking and filling of connected channels and wetlands. Columbia Slough, located downstream from the project site, is the closest remaining off-channel habitat. Connections between the slough and the river have been cut off, and dikes have been constructed along much of the slough.

In the past two years, the Lower Willamette Group has been investigating the physical, chemical and biological characteristics of the Portland Harbor as part of the Remedial Investigation (RI) for the Portland Harbor Superfund. The McCormick and Baxter site is within the investigation area of the Portland Harbor; however, the McCormick and Baxter Superfund designation predates the Portland Harbor designation, and the RI for the McCormick and Baxter site is complete. At least two more years of data collection will be conducted before completion of the RI for the Portland Harbor. Existing data shows little migration of contaminants downstream. Contaminant concentrations in river sediments are highest adjacent to major industrial facilities and stormwater outfalls. Contaminant plumes downstream from these sources are minimal. The Willamette River adjacent to the Site is within a depositional area, with a tendency toward coarser-grained sediments. A summary of the extent of groundwater, soil and sediment contamination at the Site is described in section 1.2 above.

The Willamette River is tidally influenced at the project site. At RM 7, the river is about 1,500 feet wide, with a maximum depth of 60 to 70 feet. COE maps indicate that there are steep slopes to the dredged navigation channel approximately 150 feet offshore. In addition to chinook salmon and steelhead, coho salmon, sockeye salmon, American shad, and white sturgeon occur in the area. Cutthroat trout are also present, but their abundance is low. Both juveniles and adults use the project area as a migratory corridor and as rearing habitat for juveniles.

The Willamette River, from its mouth to Willamette Falls, is a free-flowing river. Historically, Willamette Falls was impassable to fall chinook salmon, coho salmon, chum salmon, and cutthroat trout. Only steelhead and some spring chinook salmon were known to ascend the falls. Fish passage facilities were constructed at the falls in the early 1900s, and were upgraded in 1971, however, the passage facilities are inefficient, and delay upstream migration.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Action

1.5.1.1 Effects of Removal of Existing Piling

The shoreline of the Site has many remnant treated piles that will impede access by equipment. Some of the piles appear to part of former docks or piers, and others form a retaining wall parallel to the shoreline. Removal of many of the piles will be required to facilitate the installation of the sheet pile wall. The effects of pile removal depends on the elevation of the water surface at the time of pile removal. The proposed method of pile removal is cutting the piles at the sediment/water interface or the mudline, if exposed. This may require digging the surrounding soil/sediment to facilitate a cutting surface. If the water elevation is high, these activities may occur within the water. Under this scenario, any fish in the vicinity would be displaced, and localized turbidity is likely. EPA states that a silt curtain may be installed to limit turbidity. If water levels are low, these activities are not likely to result in increased turbidity or fish displacement. In either case, staging for pile removal will be done from the upland portion of the Site, and no equipment will be placed in the water, other than equipment used to grab or cut the piles.

EPA stated in the BA that they will try to remove the pilings in the dry, when the beach is exposed. However, the need to stop the migration of the contaminant plume into the river sediments and water column is a higher priority than waiting for low water to remove the pilings. The risk of contamination through a sediment plume associated with pile removal is less than the risk of continued exposure. Removal of the piles will occur in an area known to have contaminated sediments. The potential for mobilizing the contaminated sediments will be minimized through the use of sediment curtains or other containment devices. The pilings will be contained during removal and disposed in a suitable disposal site.

NOAA Fisheries generally prefers treated piles to be removed completely, rather that cut, leaving a portion of piling below the sediment/water interface (Jim Meador, personal communication, May 31, 2002). The reason for this is that treated piles, even piles older than 40 years, continue to leach contaminants at concentrations that are toxic to aquatic organisms (Poston 2001). With the situation at the Site where the background concentrations of the sediment are higher than in the pilings, it is doubtful that complete removal of the pilings would provide any benefit for salmonids and their prey base. However, if it is determined that excavation of the sediments at the contaminant hot spots is the preferred remedial action for the sediments, complete removal of the pilings is a better choice.

The effects of increased turbidity associated with pile removal will be addressed in section 1.5.1.3 below.

1.5.1.2 Effects of Displacement of Large Wood

Many pieces of large and small wood have deposited along the shoreline of the project site. Most pieces are submerged during winter flows and exposed during summer flows. Several of the pieces are large with root wads attached, but most pieces appear to be relatively transitory, with no development of complex wood structures. However, because of the paucity of large wood in the lower Willamette River, this material likely provides some complexity and limited refugia during high water events.

The wood will be removed to facilitate the placement of the sheet pile wall. The removal of the large wood will occur at the same time as the removal of the pilings. If any of the pieces are partially buried, some suspension of contaminated sediments may occur. Because most wood does not appear to be buried, the consequence of this would likely be localized and of a short duration.

The wood that is removed from the McCormick and Baxter shoreline will be placed at a similar shoreline location in the lower Willamette River. There will be no change in the amount or availability of large wood in the lower Willamette River. In addition, it is likely that additional wood will accumulate along the Site's shoreline.

1.5.1.3 Effects of Construction of Sheet Pile Wall

Construction of the sheet pile wall along the shoreline of the Site will occur from the upland side of the shoreline, and will not occur during any flooding or high water events. It is likely that the construction will increase turbidity at the Site by disturbing the existing shoreline surface. The disturbance will result in increased suspension of sediments during the first few high water events after or during construction. During the high water events, the sediment inputs from the Site will contribute to already high sediment levels in the river, so the effect is likely to be minimal. Site controls will be used to minimize the movement of soils from the Site, and all construction stormwater will be detained and treated on-site.

The purpose of the sheet pile wall is to contain areas that contain mobile NAPL that frequently discharge to the Willamette River. However, the vibration or pounding associated with driving the sheet pile may mobilize NAPL in the soil, and may result in additional surface discharges. If these releases were to occur, they would likely be directly adjacent to the sheet pile alignment. Controls will be put in place to limit the extent of any release. These controls include daily construction monitoring and documentation of any releases, the placement and maintenance of absorbent booms during construction of the sheet pile wall to contain potential releases, and a containment plan should NAPL be observed outside of the absorbent booms.

Releases of NAPL during project construction are most likely to occur in shallow water areas adjacent to construction. It is unlikely that any juvenile salmonids would be rearing in these shallow water areas because of the background concentrations of contaminants and the consequent lack of a prey base. However, any juvenile salmonids moving through the area would be exposed to NAPL. As stated previously, PAHs are a primary component of the NAPL at the Site. Although PAHs generally do not generally bioaccumulate in fish or other vertebrates, the metabolites present in food are bioavailable to the consumer (James et al. 1991), and PAH-DNA adducts accumulate in the liver of fish chronically exposed to sediment-associated PAHs (Reichert et al. 1998). Moreover, PAHs are capable of causing a variety of deleterious effects in exposed animals. While metabolism serves mainly as a pathway for detoxification for PAH, some of the metabolites that are intermediates in this process possess carcinogenic, mutagenic and cytotoxic activity. Based on recent research with English sole, a variety of effects resulting from PAH exposure include toxicopathic liver lesions, DNA adducts in liver, inhibited gonadal growth, inhibited spawning, reduced egg viability, and reduced growth (Johnson 2000). It would be difficult to predict or estimate the effect of construction-related exposure to NAPL on salmonids moving through the area because background concentrations of NAPL are already above the levels predicted to have an effect. However, any construction-related releases of contaminants would contribute to sublethal effects, and further degrade any potential prey base.

Despite potentially harmful short-term effects, the long-term effect of the construction activities will be to control the current and on-going release of contaminants from the soils and groundwater on the upland portion of the Site. This will ultimately result in significantly decreased levels of contamination of surface water and sediments in the Willamette River, and less exposure to the contaminants through time.

To construct the sheet pile wall, some riparian vegetation along the north section of the shoreline will be removed. It is likely that several large trees and the associated understory will be removed. EPA will minimize tree removal to the greatest extent possible. The vegetation may be restored during additional remedial activities at the Site, depending on the outcome of the remedy selection, and an evaluation of the exposure risk for any species attracted by the habitat provided by the vegetation.

Increased turbidity could occur during sheet pile driving and/or pile removal. The effects of suspended sediment and turbidity on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd 1987).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial tradeoff (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 NTUs have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjorn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

NOAA Fisheries anticipates that turbidity generated from pile removal and sheet pile wall driving will be limited in both time and extent. NOAA Fisheries does not expect direct lethal take to occur because of turbidity. NOAA Fisheries expects that some individual chinook salmon and steelhead (both adult and juvenile) may be harassed by turbidity plumes but could easily avoid the plumes.

1.5.1.4 Effects of Construction of Slurry Wall

All activities associated with the construction of the slurry wall will be limited to the upland portion of the Site. All waste materials generated by construction or rain events will be contained and will not be discharged to the Willamette River prior to discharge.

1.5.2 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Implementation of additional remedies at the Site will also be reviewed through separate section 7 consultation processes. Clean-up of the Portland Harbor will also be reviewed through section 7. Therefore, these actions are not considered cumulative to the proposed action.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years**.**

1.6 Conclusion

NOAA Fisheries believes that the proposed action would cause a minor, short-term degradation of anadromous salmonid habitat due to a potential for short-term increases in turbidity and a potential for mobilization of NAPL during driving of the sheet pile wall. However, NOAA Fisheries has determined, based on the available information, that the proposed action covered in this Opinion is not likely to jeopardize the continued existence of listed salmonids, and will result in reduced exposure of salmonids to contaminants at the McCormick and Baxter Creosoting Company site. NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis. Our determination is based on these findings: (1) The overall effect of the action is positive because it will remove or drastically minimize a continued source of contamination to the river sediments and water; (2) short-term releases of NAPL will be treated with absorbent booms and other tools to contain and remove any observed NAPL; and (3) there will likely be limited exposure of contaminated sediments outside of the action area because of proposed methods to contain sediments on site.

1.7 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are *discretionary* measures suggested to minimize or avoid adverse effects of a proposed action on listed species, or to develop additional information. NOAA Fisheries believes the following conservation recommendation is consistent with these obligations, and therefore should be carried out by EPA:

1. To the greatest extent possible, EPA should design and build a stormwater collection system for the upland portion of the Site within the sheet pile/slurry wall. A stormwater collection system would limit the infiltration of rain water into the Site, and limit the movement of contaminated groundwater under and around the containment wall. The design and construction of a stormwater collection system should occur concurrently with the final remedial action for the upland portion of the Site.

1.8 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). Reinitiation of consultation is required: (1) If the amount or extent of incidental take is exceeded; (2) if the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this biological opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed that may be affected by the action; or (5) new critical habitat rulemaking results in the designation of critical habitat that may be affected by the action (50 CFR 402.16).

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in complicance with the terms and conditions of this incidental take statement.

2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the action covered by this Opinion is reasonably certain to result in incidental take of listed salmonids because of detrimental effects from increased turbidity levels (non-lethal) from removing the treated pilings and/or construction of the sheet pile wall, and detrimental effects associated with the exposure to a potential release of NAPL during sheet pile driving (lethal and/or non-lethal). Effects of actions such as the one covered by this Opinion are largely unquantifiable in the short term, and are not expected to be measurable as long-term effects on habitat or population levels. Therefore, even though NOAA Fisheries expects some low level incidental take to occur due to the action covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to

estimate a specific amount of non-lethal incidental take to the species itself. In instances such as these, the NOAA Fisheries designates the expected level of take as "unquantifiable". The extent of take is limited to the project area.

2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of listed salmonid species resulting from the action covered by this Opinion. The EPA shall:

1. Minimize the potential for incidental take of juvenile steelhead and chinook salmon during the removal of existing treated piles.

2. Minimize the potential for loss of riparian habitat or complexity in the project vicinity.

3. Minimize the potential for the release of hazardous materials into the water column or sediments of the Willamette River during the construction of the sheet pile wall.

4. Complete a comprehensive monitoring and reporting program to ensure measures provided in this Opinion are effective in minimizing the likelihood of take from permitted activities.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, EPA and/or their contractors must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (potential for incidental take), the EPA shall ensure that:
    a. In-water work. All work within the active channel of all anadromous fish-bearing streams, or in systems which could potentially contribute sediment or toxicants to downstream fish-bearing systems, will be completed within the ODFW approved in-water work period of July 1 through October 31 or December 1 through January 31. Extensions of the in-water work period, including those for work outside the wetted perimeter of the stream but below the ordinary high water mark, must be approved by biologists from NOAA Fisheries.
    b. Turbidity. Sediment curtains or some other tool will be used to contain sediments if the pile removal is done in the wet. If done outside of the wetted river, other tools will be used to prevent the discharge of turbid construction water into the Willamette River.
    c. Pollution control plan. A Pollution Control Plan (PCP) will be developed for each authorized project to prevent point-source pollution related to construction operations. The PCP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:

i. Methods that will be used to prevent erosion and sedimentation associated with equipment and the removal action.

ii. A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.

iii. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures will be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

iv. Measures that will be taken to prevent debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

d. Waste management. All contaminated waste generated will be disposed of off-site at an appropriate facility.

e. Exposure to hazardous materials. If excavation of sediment contaminant hot spots is a possibility, then the treated piles will be completely removed rather than cut at the sediment/water interface. Pile removal must occur in the dry or within containment booms.

2. To implement reasonable and prudent measure #2 (loss of riparian habitat and complexity), EPA shall ensure that:

a. Any pieces of large wood removed from the shoreline construction area will be placed at a similar area within the lower Willamette River system.

b. All trees and shrubs removed will be replanted at a 2:1 ratio. They may be planted at a similar lower Willamette River riparian site if it is determined that the trees and shrubs would provide an attractive nuisance at the McCormick and Baxter site.

3. To implement reasonable and prudent measure #3 (release of NAPL blebs during driving of the sheet pile wall), EPA shall ensure that:

a. Absorbent booms will be placed and maintained adjacent to the sheet pile construction area to contain any potential release of NAPL triggered by the driving of the sheet piles.

b. A containment plan will be prepared prior to the beginning of construction to describe required actions should NAPL be observed outside of the absorbent booms.

4. To implement reasonable and prudent measure #4 (monitoring and reporting), EPA shall ensure that:

a. Monitoring. During the driving of the sheet piles, the water within and outside of the absorbent booms will be monitored for the presence of any sheen. This monitoring will occur on a daily basis, at a minimum, during construction. Within 30 days of completing the construction of the barrier wall, EPA will

submit a monitoring report to NOAA Fisheries describing the success meeting these terms and conditions. This report will consist of the following information.

i. Project identification.
ii. Project initiation and completion dates.
iii. Photographic documentation of environmental conditions at the project site before, during and after project completion. Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
iv. Documentation of any reported sighting of a sheen on the water, and response for removing the sheen from the water.

b. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the NOAA Fisheries Law Enforcement Office, located at Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; telephone: 360/418-4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

c. Monitoring reports will be submitted to:

NOAA Fisheries
Oregon Habitat Branch
Attn: 2002/00761
525 NE Oregon Street
Portland, OR 97232

3. MAGNUSON-STEVENS ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH

descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;
- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;
- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural

waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border.

Detailed descriptions and identifications of EFH for the groundfish species are found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to The Pacific Coast Groundfish Management Plan (PFMC 1998a) and the NOAA Fisheries Essential Fish Habitat for West Coast Groundfish Appendix (Casillas *et al.* 1998). Detailed descriptions and identifications of EFH for the coastal pelagic species are found in Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (PFMC 1998b). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed action is detailed above in section 1.2. This area has been designated as EFH for various life stages of chinook and coho salmon, and starry flounder (*Platyichthys stellatus*).

3.5 Effects of Proposed Action

As described in detail in section 1.5, the proposed activities may result in detrimental short-term adverse effects to water and sediment quality. These impacts include:

1. A potential for short-term releases of NAPL to the water column and surface sediments.

2. Short-term increases of turbidity associated with removal of existing piling and sheet pile wall if done during high water events.

3.6 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect the EFH for starry flounder and Pacific salmon species (chinook and coho salmon). Conservation measures proposed by EPA and DEQ such as the deployment of absorbent boom along the shoreline of the Site during the construction of the sheet pile wall and the conservation measures and terms and conditions provided in this Opinion will minimize impacts to EFH. Therefore, NOAA Fisheries incorporates them here as EFH conservation recommendations.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or State agency action that would adversely affect EFH. The conservation measures proposed for the project by EPA and all of the Reasonable and Prudent Measures and the Terms and Conditions contained in sections 2.2

and 2.3 are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

EPA must reinitiate EFH consultation with NOAA Fisheries if the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Altman, B., C. Henson, and I.R. White. 1997. Summary of information on aquatic bioa and their habitats in the Willamette Basin, Oregon, Through 1995. U.S. Geological Survey Water Resources Investigations Report 97-4023.

Birtwell, I. K., G. F. Hartman, B. Anderson, D. J. McLeay and J. G. Malick. 1984. A Brief Investigation of Arctic Grayling (*Thymallus arcticus*) and Aquatic Invertebrates in the Minto Creek Drainage, Mayo, Yukon Territory: An Area Subjected to Placer Mining. Canadian Technical Report of Fisheries and Aquatic Sciences 1287.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. *In* W.R. Meehan (*ed*.) Influences of forest and rangeland management on salmonid fishes and their habitats. Amer. Fish. Soc., Spec. Pub. 19, Bethesda, MD.

Busby, P., S. Grabowski, R. Iwamoto, C. Mahnken, G. Matthews, M. Schiewe, T. Wainwright, R. Waples, J. Williams, C. Wingert and R. Reisenbichler. 1995. Review of the status of steelhead (*Oncorhynchus mykiss*) from Washington, Idaho, Oregon, and California under the U.S. Endangered Species Act. 102 p. plus 3 appendices.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-NWFSC-27, 261p.

Casillas, E., L. Crockett, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson and T. Pepperell,. 1998. Essential Fish Habitat West Coast Groundfish Appendix. National Marine Fisheries Service. Seattle, Washington. 778 p.

DeVore, P. W., L. T. Brooke and W. A. Swenson. 1980. The Effects of Red Clay Turbidity and Sedimentation on Aquatic Life In the Nemadji River System. Impact of Nonpoint Pollution Control on Western Lake Superior. S. C. Andrews, R. G. Christensen, and C. D. Wilson. Washington, D.C., U.S. Environmental Protection Agency. EPA Report 905/9-79-002-B.

Foster, C.A. 2001. 1999 Willamette River spring chinook salmon run, fisheries, and passage at Willamette Falls. Oregon Department of Fish and Wildlife.

Gregory, R.S. 1993. Effect of turbidity on the predator avoidance behavior of juvenile chinook salmon (Oncorhynchus tshawytcha). Can. J. Fish. Aquat. Sci. 50:241-246.

Gregory, R. S. and C. D. Levings. 1998. Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon. Transactions of the American Fisheries Society 127: 275-285.

Healey, M.C. 1991. Life history of chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 *In:* Groot, C. and L. Margolis (eds.). 1991. Pacific salmon life histories. Vancouver, British Columbia: University of British Columbia Press.

James, M.O., J.D. Schell, S.M. Boyle, A.H. Altman, and E.A. Cromer. 1991. Southern flounder hepatic and intestinal metabolism and DNA binding of benzo[a]pyrene (BaP) metabolites following dietary administration of low doses of BaP, BaP-7, 8-dihydroldiol or a BaP metabolite mixture. Chem. Biol. Interact. 79:305-321.

Johnson, L. 2000. An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish. White paper prepared by Lyndal Johnson of the NOAA Fisheries, Northwest Fisheries Science Center.

Johnson, O.W., W.S. Grant, R.G. Cope, K. Neely, F.W. Waknitz and R.S. Waples. 1997. Status review of chum salmon from Washington, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-32, 280 p.

King, S.D. 2001. Fisheries Management and Evaluation Plan. Upper Willamette River spring chinook in freshwater fisheries of the Willamette Basin and lower Columbia River mainstem. Oregon Department of Fish and Wildlife.

Lloyd, D.S. 1987. Turbidity as a water quality standard for habitats in Alaska. North American Journal of Fisheries Management 7:34-35.

Muldoon, A., J. Youngers, and E. Ollerenshaw. 2001. 2000 Oregon lower Columbia River chum spawning ground survey results, Oregon Department of Fish and Wildlife, Columbia River Management.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-35, 443 p.

Newcombe, C. P. and D. D. MacDonald. 1991. Effects of Suspended Sediments on Aquatic Ecosystems. North American Journal of Fisheries Management 11: 72-82.

PFMC (Pacific Fishery Management Council), 1998a. Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan. October 1998.

PFMC (Pacific Fishery Management Council), 1998b. The Coastal Pelagic Species Fishery Management Plan: Amendment 8. Portland, Oregon.

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Poston, T. 2001. White Paper: Treated Wood Issues Associated with Overwater Structures in Marine and Freshwater Environments. Submitted to Washington Department of Fish and Wildlife, Washington Department of Ecology, and Washington Department of Transportation. April, 5, 2001.

Redding, J. M., C. B. Schreck and F. H. Everest. 1987. Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids. Trans. Am. Fish. Soc. 116: 737-744.

Reichert, W.L., M.S. Myers, K. Peck-Miller, B. French, B.F. Anulacion, T.K. Collier, J.E. Stein, and U. Varanasi. 1998. Molecular epizootiology of genotoxic events in marine fish: linking contaminant exposure, DNA damage, and tissue-level alterations. Mutation Research 411:215-225.

Salo, E.O. 1991. Life history of chum salmon (*Oncorhynchus keta*). Pages 231-309 *In:* Groot, C. and L. Margolis (eds.). 1991. Pacific salmon life histories. Vancouver, British Columbia: University of British Columbia Press.

Sandercock, F.K. 1991. *Life history of coho salmon (Oncorhynchus kisutch)*. Pages 395-445 In: Groot, C. and L. Margolis (eds.). 1991. Pacific salmon life histories. Vancouver, British Columbia: University of British Columbia Press.

Scannell, P.O. 1988. Effects of Elevated Sediment Levels from Placer Mining on Survival and Behavior of Immature Arctic Grayling. Alaska Cooperative Fishery Unit, University of Alaska. Unit Contribution 27.

Servizi, J. A. and Martens, D. W. 1991. Effects of Temperature, Season, and Fish Size on Acute Lethality of Suspended Sediments to Coho Salmon. Can. J. Fish. Aquat. Sci. 49:1389-1395.

Sigler , J. W., T.C. Bjorn and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelheads and coho salmon. Trans. Am. Fish. Soc. 111:63-69.

U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ). 1996. Record of Decision. McCormick and Baxter Creosoting Company. Portland Plant. Portland, Oregon. March 1996.

Weitcamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope and R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. U.S. Dep. Commer., NOAA Tech Memo. NMFS-NWFSC-24, Northwest Fisheries Science Center, Seattle, Washington. 258 p.