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

Refer to:
2003/01140

March 15, 2004

Mr. Alan Goodman
U.S. Environmental Protection Agency, Region 10
Oregon Operations Office
811 SW 6th Avenue
Portland OR 97204

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the McCormick and Baxter Creosoting Company Site, Willamette River Remediation Sediment Cap, Multnomah County, Oregon

Dear Mr. Goodman:

Enclosed is a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) that addresses the proposed funding of a project to place a sand, rock and concrete cap over sediments in the Willamette River beside the McCormick and Baxter Creosoting Company site in Multnomah County, Oregon. The site is a Federal Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The proposal is the second of three remedial actions proposed for the site to reduce the potential exposure to contaminants present in the sediment, groundwater and soils site.

NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize the continued existence of ESA-listed 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. As required by section 7 of the ESA, this Opinion includes reasonable and prudent measures with terms and conditions that are necessary to minimize the potential for incidental take associated with this action.

This document also serves as consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR Part 600. This reach of the Columbia River has been designated as EFH for chinook salmon, coho salmon (*O. kisutch*), and starry flounder (*Platyichthys stellatus*).

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

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Kevin Parrett, Oregon Department of Environmental Quality
John Montgomery, ecology and environment, inc.
Helen Hillman, NOAA Coastal Resource Coordinator
John Malek, U.S. Environmental Protection Agency

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

McCormick and Baxter Creosoting Company Site,
Willamette River Remediation Sediment Cap
Multnomah County, Oregon

Agency:	U.S. Environmental Protection Agency
Consultation Conducted By:	NOAA's National Marine Fisheries Service, Northwest Region
Date Issued:	March 15, 2004
Issued by:	F.r Michael R Course D. Robert Lohn Regional Administrator
Refer to:	**2003/01440**

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1. INTRODUCTION

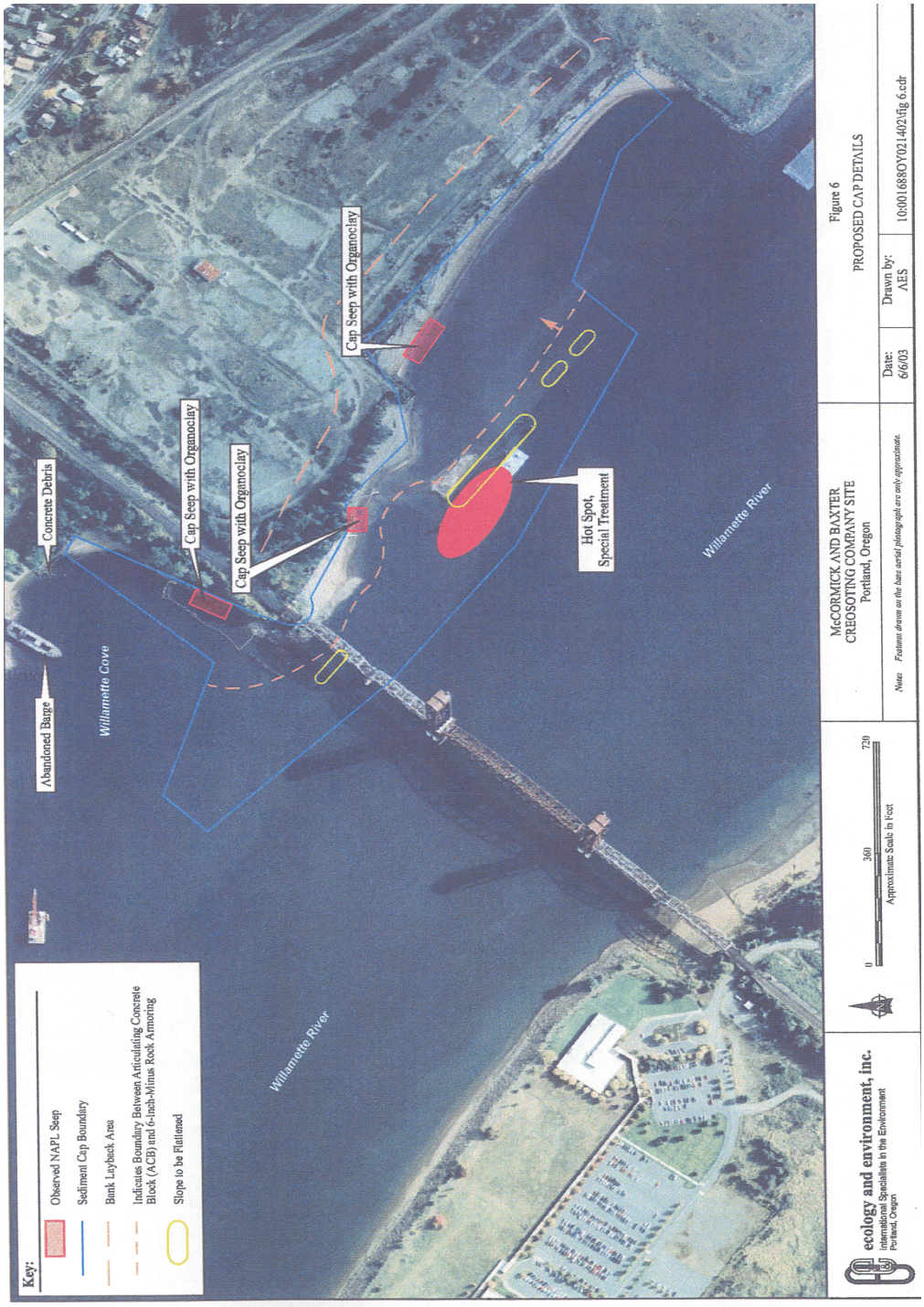
1.1 Consultation History

On November 25, 2003, National Ocean and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NOAA Fisheries) received a letter dated November 10, 2003 and a biological assessment (BA) dated October, 2003, from the U.S. Environmental Protection Agency (EPA) requesting formal consultation under the Endangered Species Act (ESA) on the funding of a project to place a cap over contaminated sediments in the Willamette River beside the site of the former McCormick and Baxter Creosoting Company (Figure 1). McCormick and Baxter Creosoting Company operated between 1944 and 1991, treating wood products with creosote, pentachlorophenol, and inorganic preservative solutions with arsenic, copper, chromium, and zinc. Historically, process wastewaters were discharged directly to the Willamette River, and other process wastes were dumped in several areas of the site. Significant concentrations of wood-treating chemicals have been found in soil and groundwater at the site, and in river sediments beside the site. The EPA listed the site on the National Priorities List (NPL) in June 1994, which is a Federal Superfund designation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The purpose of the cap is to significantly reduce the potential risk to human health and/or ecological receptors resulting from potential exposure to contaminants present in sediment, groundwater, and soils at the project site. The EPA has designated Oregon Department of Environmental Quality (DEQ) as the lead in implementing the actions contained within the CERCLA Record of Decision (ROD) for the site, although these remain Federal actions with Federal funding.

The proposed cap is the second of three remedial actions proposed by EPA and DEQ. The first phase included the construction of a subsurface barrier wall around 16 acres of the upland portion of the site. The subsurface barrier wall contains the primary source areas of groundwater contamination and should eliminate ongoing seepage of creosote into the Willamette River. The EPA completed ESA consultation on the barrier wall on August 20, 2002, and construction of the barrier wall was completed in September 2003. The third phase of the cleanup is a proposed soil cap on the upland portion of the site. The October 2003, BA tiers off the BA for Phase 1 to avoid repeating background information. Project activities for this second phase will include the placement of a 25-acre sand and organoclay cap over sediments in the Willamette River, placement of an organophyllic clay cap over known creosote beach seeps, placement of rock and concrete armor over the cap, removal of pilings and dolphins, demolition of a wooden dock remnant, removal of an abandoned barge, removal of concrete debris, and regrading and revegetation of the riverbank.

In the October 2003, BA, EPA determined that Lower Columbia River (LCR) chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) chinook salmon, LCR steelhead (*O. mykiss*), UWR steelhead, and Columbia River chum salmon (*O. keta*) may occur within the project area and that the proposed project is "likely to adversely affect" (LAA) the listed species.

Figure 1. Map of action area.



References for listing status and dates, and ESA section 4(d) take prohibitions are provided in Table 1. This biological opinion (Opinion) is based on the information presented in the 2003 BA, the 2002 BA, and information provided during discussions with EPA, DEQ, and ecology and environment, inc. The objective of this Opinion is to determine whether funding the placement of a cap on the river bed of the Willamette River is likely to jeopardize the continued existence of the ESA-listed species described in Table 1. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for coho salmon (*O. kisutch*), chinook salmon, and starry flounder *(Platichthys stellatus)*, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

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

Species Evolutionarily Significant Unit	Status	Protective Regulations	Biological Information, Historical Population Trends
Chinook salmon (*O. tshawytscha*)			
Lower Columbia River	Threatened 3/24/99; 64 FR 14308	7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 1991
Upper Willamette River	Threatened 3/24/99; 64 FR 14308	7/10/00; 65 FR 42422	Myers *et al.*1998; Healey 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
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

1.2 Proposed Action

1.2.1 Project Location

The McCormick and Baxter Site is along the west bank of the Willamette River at river mile (RM) 7. The site includes approximately 43 acres of uplands, and 17 acres of contaminated sediments in the Willamette River. An additional 7 acres of steeply-sloping riverbank between the river and the uplands has contaminated soils and sediment. The upland portion of the site lies between a 120-foot high bluff near the northeast border and a 20-foot high bank along the Willamette River to the southwest. The site is zoned for heavy industrial use, but has been vacant since the early 1990s. Nearly all the infrastructure has been removed from the site and adjacent industrial properties. The upland portion of the site is bordered by railroad tracks to the northeast and northwest, although contaminants from the site extend below the railroad tracks to the north and into Willamette Cove. A barge maintenance and dredging facility borders the site to the southeast. To the northwest beyond the railroad tracks, the site is vacant but once housed a shipyard and cooperage.

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 with arsenic, copper, chromium, and zinc. Historically, process wastes were discharged directly to the Willamette River, and were also disposed of in several areas of the site, including the Former 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, and spills of varying size were common. As a consequence, 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 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 actions that address the human and environmental health threats at the site by treating the most highly contaminated soil,[1] capping less contaminated soil, extracting nonaqueous phase liquid (NAPL), installing a subsurface barrier wall as a

[1]The term 'soil' is used for surface materials above the ordinary high water level, and the term 'sediment' is for surface materials below the ordinary high water level.

contingency if on-site treatment is 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.

To minimize contaminant migration off-site, a combined subsurface sheet pile and soil-bentonite barrier wall was constructed during 2003. This activity also included the removal of large pieces of wood along the shoreline to facilitate sheet pile construction. The sheet pile wall was driven into the ground beside the river with a vibratory hammer. Approximately 1,466 linear feet of sheet piles were installed along the bank of the Willamette River, to a depth of approximately 50 feet in all but two locations where the sheet pile driving was unable to drive to the prescribed depths. The other three sides of the containment wall were constructed with a soil-bentonite mix, installed by a slurry trench method using specialized excavation equipment. Additional activities associated with the barrier wall construction included the excavation of approximately 1,500 cubic yards of highly contaminated soils from an inoperable interceptor trench, located shoreward and outside the sheet pile wall near the tank farm area. The excavated soils were buried on site in a disposal cell within the barrier wall and covered with at least four feet of soil.

1.2.3 Proposed Action

Removal of In-water Structures in the Willamette River

To facilitate construction of the sediment cap, approximately 775 pilings will be removed from within the cap footprint. This includes pilings associated with dolphins. The treated wood pilings will be removed at the sediment surface by cutting them at the mudline to minimize disturbance and suspension of contaminated sediments. The removed pilings will be transported to an off-site disposal facility. The removal of additional pilings outside of the sediment cap footprint is discussed below in section 1.2.4.

Removal of Existing Bulkhead and Dock Remnant

The shoreline supports a small remnant of a former creosote dock. About 180 feet of a wooden bulkhead is associated with the dock remnant and runs roughly perpendicular to the shoreline. Before the placement of the sediment cap, the dock and bulkhead structures will be removed. This will facilitate grading the bank to a more stable and natural slope. The removed wood will be disposed of at a suitable facility.

Excavation and Grading of the Existing Bank

The uplands portion of the McCormick and Baxter site was largely created through the placement of dredged materials in wetlands and shallow water areas along the banks of the Willamette River. The created shoreline has eroded over time to a steep embankment. To ensure stability of the cap, EPA proposes to grade the bank upslope from the sediment cap. The finished grade will have a maximum slope of 4:1, with a range from 4:1 to 7:1. A terrace would be created by the grading, and would provide storage for river flows above the approximate five-year flood event. The purpose of the terrace is to provide additional flood storage to

compensate for the material placed in the river for the cap. The terrace and the bank slope will be planted with riparian vegetation.

After the bank is graded, 1.5 feet of clean soil and six inches of topsoil will be placed over the ground surface. The soil layers will be covered with a turf reinforcement mat (TRM) to augment the strength of the roots of the proposed plantings. TRM is a new product that does not photodegrade, and is designed to assist in erosion control.

Sand/Organoclay Cap in the Willamette River

The ROD identified the sediment cap as the selected remedy for sediment contamination at the site, with the object of preventing humans and benthic organisms from directly contacting the contaminated sediment. A second objective was to minimize the release of chemicals from sediments that might contaminate the Willamette River in excess of Federal and state ambient water quality criteria. In the ROD, EPA determined that the cap would be composed of a two-foot layer of sand, or other readily available clean fill, in addition to some form of armoring to protect the cap.

According to the final design, the cap will cover approximately 25 acres below ordinary high water (OHW). It will extend along the shoreline within most of the length of the embayment, including the area of the former creosote dock, under the railroad bridge, and into Willamette Cove (Figure 1). The final design calls for a two-foot thick layer of 50% organoclay and 50% sand, thus giving an effective thickness of one foot of pure organoclay. The proposed cap boundary also includes areas of known NAPL migration or seeps. The seeps will be covered with organophyllic clay, a special material that has an affinity to absorb these types of contaminants. The sand materials will be placed at a controlled rate to minimize resuspension of contaminated bottom sediments. This may be done by conveyor, clamshell bucket, hose-wash from a barge, or other method to achieve even cap distribution as well as a controlled rate of disposal.

To increase the stability of the cap, EPA proposes to place rock or concrete on top of the sand and organophyllic clay. A maximum of 13.5 acres within the sediment cap will be armored with articulated concrete block (ACB) from a depth of -7 Columbia River Datum (CRD) to approximately OHW. This may be reduced by 6.7 acres if the ACB can be substituted with ten-inch minus rock. An additional 11.5 acres of the cap will be armored with six-inch minus rock. The six-inch minus rock will extend from the -7 CRD to as deep as -50 CRD. All rock will be placed by equipment such as a clamshell bucket to control placement and minimize disturbance to the cap.

The sand and clay cap will transition to an upland soil cap (Phase III) at the bank near the shoreline. The sand and clay cap will extend into the river to the base of the steeply sloped area at approximately the 40-foot depth line, and will terminate at least 100 feet from the eastern edge of the Federal navigation channel.

Riparian Planting on the Shoreline

EPA proposes to plant trees and shrubs along the graded shoreline. The planting area would extend 2,300 feet along the shoreline, and average 132 feet in width, for an area of approximately 5.5 acres. This effort includes soil preparation and enhancement to support a diverse riparian community.

The existing riparian fringe community is dominated by invasive non-native plant species such as Scot's broom, invasive grasses, clematis, and Himalayan blackberry. Following grading and prep work, the area will be planted with a diverse mix of native trees, shrubs, and grasses to mimic an early successional gallery forest. Plantings would occur in two phases. The first phase would occur immediately following the grading and placement of a turf reinforcement mat, and would include planting herbaceous vegetation. Phase 2 plantings would occur during February 2005, or February 2006, depending on bank stability, and would include trees and shrubs.

DEQ will issue a separate contract for the vegetation management strategy described in Appendix A of the BA. This includes specified erosion control measures and short-term (five year) and long-term monitoring and maintenance of shrubs and trees. The BA describes performance standards for the plants. In addition to manual, mechanical, and biological control of invasive weeds on site, EPA and DEQ propose to use herbicides as a transitional tool to suppress weeds. The contractor will spot apply glyphosate to the target weeds using backpack sprayers following the Portland Parks Waterway Management Policy. The herbicide will not be applied under any wind conditions greater than six miles per hour, and the applicators will use a spray shield, coarse spray nozzle, or drift retardant to eliminate drift. Native plantings will be protected with portable metal plant shields during all herbicide applications.

Timing

The timing of the proposed action is contingent upon obtaining the necessary approvals and permits. The tentative schedule proposes beginning the construction of the cap in July 2004, with the plantings beginning in November 2004. With this scenario, all in-water construction work would be completed by November 1, 2004. Table 2 below outlines the schedule of construction activities.

Table 2. Schedule of construction activities.

Activity	Schedule
Demolition of in-water and shoreline structures	4 weeks
Cap placement, beginning in shallow water areas. For the nearshore areas, the sand and organoclay components would be placed first, followed by placement of the ACB.	8 weeks (deep-water cap placement may require an additional 6 weeks)
Bank grading and filling (would start when cap near completion)	2 weeks
Phase I plantings	1 week
Phase II plantings	2 weeks

1.2.4 Proposed Conservation Measures

According to the BA, the intent of the proposed conservation measures is to protect, expand, and enhance the existing shallow water environment.

Removal of Existing Structures
Approximately 350 old pilings from a creosote-treated dock upstream of the McCormick and Baxter site will be removed. The pilings are beside the Triangle Property and are outside the boundary of the proposed cap. EPA plans to remove the pilings by pulling the pilings out, which should completely remove the treated wood from the aquatic environment.

Protection of the Nearshore Environment
EPA proposes to place rock mounds in the shallow embayment beside the Triangle Property. The rock mounds will help dissipate wave energy and help trap sand.

Additional Cap Design Measures
Fine-grained substrate and ten clusters of boulders will be placed on top of the constructed cap within the shallow embayment area. The purpose of the clusters would be to slow the flow down so the sand from the Willamette River is deposited on the cap. These emergent features would increase the roughness and complexity of the site. The purpose of the placement of the fine-grained material is to provide a sand reserve that the currents and waves could work into the spaces of the cap.

Measures within Willamette Cove
EPA proposes to improve habitat function within the adjacent Willamette Cove. EPA proposes to remove old concrete rubble, an abandoned barge and other debris along the shoreline, and restore the fine-grained substrate of the beach. EPA also proposes to remove approximately 50 creosote-treated pilings in Willamette Cove that are outside of the cap boundary. To assure the

protection of the beach and nearshore areas of Willamette Cove, EPA and DEQ will work with Metro (owner of Willamette Cove) to establish permanent restrictions on future development along the shoreline and riverbank where the habitat improvement will occur.

1.2.5 Avoidance and Minimization Measures

EPA has committed to implementing the following measures to reduce or eliminate potential effects to listed fish species.

- To the extent feasible, all in-water work will be done during the summer/fall low water months of July 1, 2004, through October 31, 2004. If in-water work is not complete, the remaining in-water work will be done during the winter in-water work period of December 1, 2004, through January 31, 2005, or during the summer in-water work window in 2005.

- A comprehensive monitoring and reporting program will be developed before construction to ensure the effectiveness of minimization measures in reducing the potential for take. An environmental professional will monitor and document on a daily basis the conditions of the shoreline and nearshore area during construction. A qualified biologist will be on-site during construction, and a fish biologist will be on-site during the first two days of each construction sequence to assure that fish protection measures are in place and functioning.

- EPA and DEQ will require the contractor to adhere to the 401 Water Quality Certification.

- If a sizable sheen or seepage are observed, the existing protective measures will be reevaluated for efficacy. If deemed necessary by the environmental professional, work may be stopped until the cause of the event is determined and work can be resumed without additional impacts.

- EPA and DEQ will require the contractor to submit a Storm Water Pollution Prevention Plan and Spill Prevention and Control Plan required by the general NPDES permit for construction.

- The contractor will be required to provide sorbant booms, pads, and other sorbant materials and vacuum pumps to remove and isolate any sheen or product seep resulting from construction activities. The construction oversight contractor (ecology and environment, inc.) will be responsible for any sheen that does not result from construction activities. All sheens, regardless of origin or cause, will be addressed by DEQ during construction.
- The contractor will take extraordinary care to prevent soils and debris from being deposited on the beach during piling removal. DEQ anticipates that the contractor will remove the beach and near-shore pilings from the beach, and will remove the deeper,

off-shore pilings from a barge. The pilings will be loaded onto a barge or transferred upland to a truck for transportation to an off-site landfill.

- An oil-containment boom will be employed during all pile removal activities. The boom shall encircle the areas where the pilings are being removed. This boom shall also serve to collect any floating debris.

- Oil-absorbent materials will be employed if visible product is observed. The booms will remain in place until all oil material and floating debris has been collected and sheens have dissipated. The contractor will maintain a boom around their specific area of work to include demolition activities such and piling removal and dock removal. ecology and environment, inc., will maintain another boom around a broader area (typically in deeper water areas) so that, for much of the time, there will be two rows of booms.

- Oil-absorbent pads will be employed if visible contamination occurs, beyond routine sheens, as directed by the DEQ construction oversight manager.

- Debris netting will be available to collect and remove floating material or debris during all demolition and removal activities.

- Pilings, broken stubs, and associated sediments (if any) will be contained on a barge (if a barge is used during piling removal). If a barge is not used, removed pilings and broken stubs and sediment shall be contained in a designated upland storage area. The perimeter of the barge or the upland storage area shall be encircled by a row of hay or straw bales or filter fabric to allow for dewatering of the sediments.

- It is EPA's expectation that sediment cap material will not contain detectable levels of organic contaminants and will have background level concentrations of metals. The final design provides detailed specifications on the acceptability of capping material (sand, rock armoring, ACB, and bank cap soil). The specifications require the sand to be obtained from mainstem Columbia River dredge spoils taken from the navigational channel, pursuant to the U.S. Army Corps of Engineers (COE) Federal Navigation Project permit. DEQ reviewed the COE's analytical and geotechnical data on this material. It is a coarse sand containing no detectable organics and background levels of metals. For the bank soil, the specifications requires that it meet DEQ's regulatory definition of clean fill.

- All cap materials will be placed in a controlled and accurate manner. EPA and DEQ will direct the contractor to avoid using equipment and placement rates that result in the displacement of and/or excessive mixing with the river sediments to be capped. The contractor will be required to meet turbidity standards specified in the 401 Certification. Also, the contractor will be required to place the sand material in lifts (*i.e.*, at least two lifts with the first lift not exceeding 16 inches thick) as verified by surveying and/or bottom gauging. The contractor will not be paid for material that exceeds the thickness

tolerances (*i.e.*, not exceeding 125% of the required thickness) or areas of placement as specified in the contract drawings.

- Armor stones will be placed in a manner that does not disrupt or penetrate the other cap components.

- Bank grading will be done in dry weather when possible. Bank grading and sand cap placement will be scheduled during dry days. However, if an extended stretch of rain occurs, DEQ would allow the contractor to proceed but require extra care to minimize surface water erosion. Monitoring would be increased, and additional control measures may be required.

- All large wood greater than 12 inches is to be retrieved for future use on the site. However, some of this wood may be decayed, and it may not be possible to successfully move it intact.

- Construction equipment will be serviced, stored and fueled at least 100 feet away from the shoreline. Any equipment used on the beach shall be checked for oil leaks and other potential environmental hazards on a daily basis. No equipment posing environmental hazards shall be operated on the beach.

- EPA and DEQ will conduct periodic reviews (every five years) of the sand cap's protectiveness. In conducting these reviews, DEQ will monitor site media (*i.e.*, groundwater, surface water and sediment) as well as the integrity of the cap using bathymetry and visual inspections. In addition to physical monitoring activities, the five-year reviews will include continued evaluation of evolving standards for the protection of human and environmental health. Additional protective measures may be implemented as a result of site monitoring and/or the development of new standards.

- EPA and DEQ is working with Metro, the owner of the property in Willamette Cove, to establish permanent restrictions on future development along the shoreline and riverbank in Willamette Cove where the habitat improvements are to occur. DEQ will implement institutional controls, such as deed restrictions, to restrict development that would result in degradation of the bank layback areas. These measures will be developed during the design of the upland soil cap.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Biological Information

The Willamette River serves as a migration corridor for the listed chinook and steelhead evolutionarily significant units (ESU) under consideration in this Opinion. The action area may also serve as a feeding and rearing area for juvenile chum, sub-yearling chinook salmon and steelhead. Essential features of the area for the species are: (1) Substrate; (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food (juvenile only); (8) riparian vegetation; (9) space; and (10) safe passage conditions (see 65 FR 7764). The proposed action within the action area serves as a rearing and migration area for listed species considered in this Opinion. The essential habitat features that the proposed project may affect are substrate, water quality, cover/shelter and food (juvenile), riparian vegetation, and safe passage conditions.

References for further background on listing status and biological information and critical habitat can be found in Table 1. According to a recent draft of "Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead," drafted by the West Coast Salmon Biological Review Team (BRT), a number of ESUs were determined by the majority of the BRT as "likely to become endangered in the foreseeable future" including LCR and UWR chinook and LCR and UWR steelhead (NOAA Fisheries 2003). Biological information for each listed ESU considered in this Opinion are discussed below.

Lower Columbia River Chinook
LCR chinook salmon includes both fall-fun 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.

Threats to chinook spawning and rearing habitat in the Lower Columbia River ESU continue to be habitat degradation and loss due to extensive hydropower development projects, urbanization, logging and agriculture.

Upper Willamette River Chinook
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.

Lower Columbia River Steelhead

Based on the updated information provided in the BRT report (NOAA Fisheries 2003), the information contained in previous LCR status reviews, and preliminary analyses, the number of historical and currently viable populations have been tentatively identified. Like the previous BRT, the current BRT could not conclusively identify a single population that is naturally self-sustaining. Over the period of the available time series, most of the populations are in decline and are at relatively low abundance. No population has a recent mean greater than 750 spawners. In addition, many of the populations continue to have a substantial fraction of hatchery origin spawners.

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

Upper Willamette River Steelhead

Populations of UWR steelhead are at relatively low abundance, and overall abundance of the ESU has been steeply declining since 1988, with adult returns improving in 2001 and 2002 (NOAA Fisheries 2003). It is uncertain whether the recent increases can be sustained. The previous BRT was concerned about the potential negative interaction between non-native summer steelhead and wild winter steelhead (cited in NOAA Fisheries 2003). The loss of access to historical spawning grounds because of dams was considered a major risk factor.

UWR 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.

Columbia River Chum Salmon

Chum salmon are semelparous, spawning primarily in freshwater but spend more of their life in marine waters that any other Pacific salmonid. The species has the widest natural geographic and spawning distribution of any Pacific salmonid, primarily because its range extends further along the shores of the Arctic Ocean than other salmonids. Chum salmon may historically have been the most abundant of all salmonids: Neave (1961) estimated that before the 1940s, chum salmon contributed almost 50% of the total biomass of all salmonids in the Pacific Ocean.

In December 1997, the first status review of west coast chum salmon (Johnson *et al.* 1997) noted dramatic declines in the abundance of this ESU as well as significant restrictions in the distribution. The BRT was also concerned about the low productivity of the extant population. The updated status review states that close to 90% of the historic populations in the ESU are extinct or nearly so, resulting in loss of much diversity and connectivity between populations (NOAA Fisheries 2003). The populations that remain are small and overall abundance for the ESU is low. Unofficial reports for 2002 suggest a large increase in abundance in some

locations (NOAA Fisheries 2003). The cause of this increase is not known, and the sustainability of the increase is not known.

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.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy and destruction or adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with the Habitat Approach (NMFS 1999): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species and whether the action is consistent with the available recovery strategy; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors is likely to appreciably reduce the likelihood of species survival in the wild or destroy or adversely modify critical habitat. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species. 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.

2.1.3 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. 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 time 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 adult and juvenile migration and rearing. Listed Pacific salmonid survival in the wild depends upon the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while removing adverse impacts of current practices. In conducting analyses of habitat-altering actions, NOAA Fisheries defines the biological requirements in terms of a concept called Properly Functioning Condition (PFC) and applies a "habitat approach" to its analysis (NMFS 1999). The current status of the listed species covered by this Opinion, based upon their risk of extinction, has not significantly improved since they were considered for listing.

2.1.4 Environmental Baseline

In step 2 of NOAA Fisheries' analysis, we evaluate the relevance of the environmental baseline in the action area to the species' current status. The environmental baseline is an analysis of the effects of past and ongoing human-caused and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The action area is defined by NOAA Fisheries regulations (50 CFR 402.02) 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 this project, therefore, includes the water column, streambed, and banks of the Willamette River, from the upstream extent of piling removal activities, downstream to the extent of visible turbidity resulting from construction activities (approximately 100 feet downstream of the cap boundary).

The McCormick and Baxter Dite is within the lower Willamette River watershed at river mile (RM) 7. 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 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 before the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about 5% 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% of the values at RM 7, and 61% 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 4-149 nephelometric turbidity units (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 polynuclear aromatic hydrocarbons (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.

As part of the Remedial Investigation (RI) for the Portland Harbor Superfund, a group of potentially liable parties (the Lower Willamette Group) along with DEQ and EPA, have been investigating the physical, chemical and biological characteristics of the Portland Harbor. 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 beside major industrial facilities and stormwater outfalls. Contaminant plumes downstream from these sources are minimal. The Willamette River beside the project site is within an area that is in dynamic equilibrium (balanced sediment inputs and outputs), with a tendency toward coarser-grained sediments. A summary of the extent of groundwater, soil and sediment contamination at the McCormick and Baxter Site is described in section 1.2, above.

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 exists 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, 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.

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.

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.

The City of Portland and the Oregon Department of Fish and Wildlife (ODFW) are mid-way through a four-year study to evaluate relationships between fish communities and waterway developments. Two years of the collected data have been analyzed and are discussed here (ODFW 2003). Juvenile salmonids are present in the lower Willamette River during every month sampled. In both sampling years, the abundance of all juvenile salmonids increased beginning in November, peaked in April, and declined to near zero by July. Some of the larger juveniles may spend extended periods of time in off-channel habitat. Mean migration rates of juvenile salmonids ranged from 2.7 km/day for steelhead to 8.6 km/day for sub-yearling chinook salmon. Residence time in the lower Willamette River ranged from 4.9 days for chinook to 15.8 days for steelhead. Catch rates of juvenile salmonids were significantly higher at sites composed of natural habitat (*e.g.*, beach, rock) and alcoves. Juvenile salmonids tended to move along the east bank of the river.

Based on this information as well as information in the BA, the environmental baseline within the action area is not properly functioning and is not currently adequate to meet the needs of migrating or rearing salmonids.

2.1.5 Effects of Proposed Action

In step 3 of the jeopardy analysis, NOAA Fisheries evaluates the effects of the proposed action on listed fish and their habitat. Potential effects of the proposed action on listed salmonids includes the potential for direct take, harm or disturbance during in-water work, an increase in turbidity during in-water work, modification of the shallow and deep water habitat, a change in prey availability and foraging, and a reduction in toxic sediments and release of toxic compounds into the water column.

Short-term Effects of Construction

Salmonids use the Willamette River in the project vicinity differently, depending upon the age at which they migrate downstream. Sub-yearlings tend to rear in near-shore habitats as they move downstream. Recent studies in the lower Willamette River show that juveniles tend to

prefer beach and alcove habitats typical of the project area (ODFW 2003). Yearlings and adults tend to preferentially use mid-channel habitat as a migratory corridor. Both shallow and deeper water areas will be affected by the placement of the cap, because the cap will extend from the shoreline to the 40-foot depth line. This work will involve dropping a two-foot thick blanket of sand and clay over 25 acres of river sediment, and then adding either rock or concrete blocks. Consequently, both adult and juvenile salmonids may be injured or killed by this activity, sub-yearlings could be buried, and the behavior of adults and yearlings could be modified. The degree to which they are affected depends on the number of fish present and timing of the in-water work. As currently scheduled, the in-water work would occur during the summer in-water work window (July through October) when there is a low probability of adults salmonids being present in the project area, and fewer juveniles would be present. Furthermore, adults and yearlings will likely flee when the area is disturbed, although sub-yearlings are more limited in their ability to avoid the construction area. If in-water work extends beyond October, the potential for injury or death would increase significantly. In summary, both adult and juvenile salmonids may be injured or killed by in-water work although the likelihood of fish being injured or killed is low because fish abundance is low during the in-water work window. The potential for take is greater for sub-yearling salmonids than for adults or yearlings because their ability to flee from the construction is limited.

Effects of Increased Turbidity. Increased turbidity is expected during the placement of the cap materials as the added sand and clay drops to the river bottom, and through the resuspension of contaminated bottom sediments. Turbidity increases are also expected during the excavation of a trench in Willamette Cove, removal of the barge and concrete rubble from Willamette Cove, removal of the existing bulkhead and dock remnant, and during the removal of pilings. Increased turbidity is also possible during bank grading activities, particularly if conducted during rainy weather. Increased turbidity can disrupt or disturb listed salmonids. EPA and DEQ have not proposed the use of sediment curtains to minimize the turbidity or to isolate fish from the area of increased turbidity. The BA states that the contractor must comply with the 401 Certification, and a draft of the certification requirements has been developed by DEQ (http://www.deq.state.or.us/nwr/mccormic_and_baxter/mccormick.htm). The draft requirements limit turbidity increases to 10% above background, or 5 NTU above background when the background concentration is below 50 NTU. Turbidity must be monitored every four hours during in-water work and must occur 100 feet downstream of the turbidity-causing activity. If turbidity exceeds these standards, the relevant activities must cease. Specific measures to limit turbidity increases are not defined in the draft 401 Certification. Given the amount of sand, clay and rock being added to the river, NOAA Fisheries believes there will be significant increases in turbidity.

Juvenile and adult salmonids are affected by increased turbidity. 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 (McLeay *et al.* 1984, 1987, 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 *et al.* 1987). 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 (Bjornn 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). In addition to increased physiological stress, the increased turbidity and in-water activity will impede normal movement patterns for any juveniles using the vicinity during the eight or more weeks of cap placement activities. According to the recent ODFW study, juveniles fish prefer moving along the eastern shoreline of the Willamette River. Thus, normal movement patterns will be disrupted.

NOAA Fisheries anticipates that turbidity generated from pile removal, and barge and concrete removal will be limited in both space and time, and confined to the area close to the specific activity. NOAA Fisheries does not expect turbidity increases associated with these activities to kill salmon or steelhead although there is potential for injury. In contrast, there is potential to kill or injure fish during the placement of sand, gravel and rock on the river bed of the Willamette River because this activity will extend over a larger area and require more time to complete. In addition, EPA and DEQ have provided few details on how in-water turbidity will be minimized. The reason for this is that they do not want to restrict the flexibility of the contractor to develop innovative and cost-effective solutions. Thus, NOAA Fisheries cannot be certain that EPA/DEQ will meet the turbidity performance standards. If a Corrective Action is needed because the contractor cannot meet the turbidity performance standard, one option is to place a sediment curtain around the work area. If this is required, then removal of fish from within the curtain will be required.

Effects of an Increase in Release of Contaminants. An increase in release rates of contaminants may occur during piling removal, particularly if the piling is cut or broken and a new surface is exposed, or if contaminated wood fragments are introduced or left on the river bed (Poston 2001), or if contaminated sediment is suspended. Although leaching rates from treated pilings declines with time, the migration of PAHs and other contaminants from pilings over 50 years old is still sufficient to kill herring embryos (Vines *et al.* 2000). Any increase in contaminant exposure is expected to be short-term and limited to the immediate vicinity of removal activity. No long-term adverse effects to salmon are expected.

Contaminant leaching rates from the sediments may increase during cap placement, either from the weight of the materials added or as a consequence of disturbing the sediments. If the NAPL is light weight (LNAPL), then it will rise to the surface, and sorbant booms should be effective at removing it from the system. However, if the NAPL is heavy (DNAPL), it will remain at the surface/water interface, and would likely collect in depressions along the river bottom. Sorbant booms that sit on the water surface cannot effectively remove this DNAPL, and benthic

organisms or fish in the vicinity can be exposed to the toxic material, with potential indirect effects to listed salmonids.

Effects of Pesticide Use. EPA proposes to selectively use herbicides to control invasive plant species along the riparian area of the property until the proposed riparian community is established. Herbicide spraying may occur as often as once a year over a 10-year period. The City of Portland's Watershed Revegetation Program proposes the use of targeted applications of glyphosate (with adjuvants) on the site where invasive species are hindering or could hinder the establishment of a native plant community. The likelihood of effects to salmon from herbicide applications are based on four factors: (1) The expected environmental concentrations and persistence; (2) the likelihood of the herbicide entering salmon habitat; (3) the likelihood of impacts to the aquatic food chain (indirect effects); and (4) the likelihood of impacts to salmon health (direct effects).

Glyphosate is moderately persistent in soil, with an estimated average half-life of 47 days. Field half-lives range from one to 174 days. It is strongly adsorbed to most soil types, including types with low organic and clay content. Therefore, even though it is highly soluble in water, glyphosate has a low potential for runoff (except as adsorbed to colloidal matter) and leaching. One study suggested that 2% of the applied chemical was lost to runoff. However, glyphosate can enter waterbodies by other means, such as overspray, drift, or erosion of contaminated soil. Once in water, glyphosate is strongly adsorbed to any suspended organic or mineral matter and is then broken down primarily by microbes. Sediment adsorption and/or biodegradation represents the major dissipation process in aquatic systems. Half-lives in ponds range from 12 days to 10 weeks (Extoxnet website). Furthermore, evidence from studies suggest that glyphosate levels first rise and then fall to a very low, or even undetectable level, in aquatic systems.

Given the results reported in the literature (Rashin and Graber 1993), and limitations of models and existing BMPs, it appears likely that the herbicide will enter salmon habitat as a result of the proposed action. Standard BMPs have been shown to be insufficient to completely eliminate drift and runoff, and models, despite their complexities, have not been sufficiently developed to be able to predict the risk of spray drift. EPA proposes to use the herbicide within the riparian area, thus increasing the risk of spray drift or direct application to salmon habitat. However, when used according to the EPA label restrictions, it is unlikely that the herbicides or surfactant will be present in the Willamette River at sufficient concentrations to kill salmon or steelhead. The greatest risk of toxicological effects is during the summer low flow period. The risk of effect should decline over time as the herbicide degrades.

The indirect effects of herbicides on ecosystem structure and function are a key factor in determining a toxicant's cumulative risk to aquatic organisms (Preston 2002). Moreover, aquatic plants and macroinvertebrates are generally more sensitive than fish to the acutely toxic effects of herbicides. Therefore, chemicals can potentially impact the structure of aquatic communities at concentrations that fall below the threshold for direct biological impairment in salmon. The integrity of the aquatic food chain is an essential biological requirement for

salmon, and the possibility that herbicide applications will limit the productivity of the river should be considered in an adverse affect analysis. Herbicide applications have the potential to impair autochthonous production and, by extension, undermine the trophic support for stream ecosystems. However, existing data gaps make it difficult to estimate the degree of ecological risk. The proposed herbicide use is unlikely to cause fish kills when used according to the EPA label. Therefore, for listed salmonids, the vast majority of harmful direct effects are expected to be from sublethal exposure, although glyphosate appears to carry low risk for sublethal effects. The potential for additive effects with the adjuvants or other chemicals found at the site has not be investigated. The possibility of sublethal effects leading to loss of ecological function (Kruzynski *et al.* 1994) or other deleterious biological outcomes is a possibility for the listed species at the site.

Non-toxicological effects are also possible when using a herbicide like glyphosate. Since glyphosate is a broad spectrum chemical, it tends to kill native grasses as well as the non-native target species. This leaves the soil vulnerable to erosion with the potential for increased turbidity in the Willamette River. Furthermore, the effectiveness of glyphosate to control blackberries at some sites has been low (*e.g.*, Gresham Woods Site, NOAA Fisheries No.: 2003/01440).

Long-term Effects of the Proposed Action

Beneficial long-term effects of the proposed action include a reduction in the release of NAPL and other contaminants into the Willamette River from the sediments beside the McCormick and Baxter Site, improved riparian condition south of the railroad crossing, and improved shallow water habitat in Willamette Cove. Negative long-term effects include a change in the character of the substrate in the project area.

Reduction in Contaminant Exposure from Piling Removal. The long-term effect of the removal of pilings is expected to be positive. Most, if not all, the pilings to be removed have been treated with a wood preservative. Treated wood used for pilings releases contaminants into freshwater environments. The most common preservative on old pilings is creosote which releases polycyclic aromatic hydrocarbons (PAHs) into the water column and sediment. PAHs may cause a variety of deleterious effects, such as cancer, reproductive anomalies, immune dysfunction, and growth and development impairment, to exposed fish (Johnson 2000, Johnson *et al.* 1999, Stehr *et al.* 2000). Direct exposure to the contaminants occurs as salmon migrate past installations with treated wood or when the area is used for rearing, and indirect exposure occurs through ingestion of other organisms that have been exposed (Poston 2001). Leaching rates of contaminants from treated wood is highly variable and dependent on many factors, however, pilings over 50 years old still contain sufficient amounts of creosote to kill herring embryos (Poston 2001).

The most probable route of exposure to leached or diffused contaminants from treated wood for salmon is through the consumption of contaminated prey (Poston 2001). Hence, exposure is greatest for salmon when they are feeding in areas of sediment deposition immediately beside treated wood structures. Areas where there a large number of number of creosote-treated

structures pose the greatest risk to salmon. It is uncertain if that risk is significant (the actual intake of PAH from treated wood has not been quantified) and that the resulting exposure in those situations results in appreciable harm to migrating salmon (Poston 2001).

EPA proposes to remove approximately 350 pilings from an old dock structure upstream of the McCormick and Baxter Site as well as 775 old pilings from within the cap footprint and a wooden bulkhead. Removing these pilings will eliminate a long-term source of PAH contamination from the Willamette River, and will likely contribute to the recovery of the water quality baseline in this reach of the Willamette River.

Effect of Cap Placement. The cap will be placed over highly contaminated Willamette River sediments. The resulting substrate will no longer be a source of potential contamination to sediment and the water column, and would serve to isolate contaminated sediment from biological uptake. A model was used to predict when contaminants will break through the cap and into the water column based on a variety of assumptions (COE 2003). The model predicts that the cap as designed would have a breakthrough of 100 years.[2] During that time, the cap will contribute to improved water quality conditions in the lower Willamette River over the long term, which reduce exposure of migrating and rearing salmonids to highly toxic compounds.

However, the nature of the cap will prevent the reach of the river from achieving properly functioning conditions for substrate and feeding. Anywhere from 6.8 to 13.5 acres of the cap will be covered with articulated concrete block (ACB) to stabilize the sand and decrease the risk of breakthrough of contamination. While the ACB will have space between the blocks, the benthic community will be substantially altered, and the potential for healthy hyporheic processes (exchange of flow, nutrients, microbial and meiofaunal community) will be dramatically reduced. The rest of the 25 acre cap will be topped with six-inch minus or ten-inch minus rock. The natural substrate for the site is a sandy substrate. Recent evidence from ODFW shows that juvenile fish prefer sandy beach habitat and alcove habitat. The cap will cover near-shore sandy beach habitat, deeper water habitat, and alcove habitat in Willamette Cove. Salmonid prey species that use near-shore sandy habitat will not thrive at the site post-construction. This will lead to a net decrease in prey availability unless new prey species can colonize the project area.

Sub-yearling salmonids are commonly found within feet of the shoreline at water depths of less than three feet. Although they migrate between areas over deeper water, they generally remain close to the water surface and near the shoreline during rearing, favoring water no more than six feet deep and areas where the current does not exceed one foot per second. Benthic invertebrates in shallow water habitats are key food sources for juvenile salmonids during their outmigration (McCabe *et al.* 1996). The proposed changes to the substrate may force sub-yearling salmonids into deeper water habitats in search of food where they may be subject to

[2] Email from Kevin Parrett, Oregon Department of Environmental Quality, to Nancy Munn, NOAA Fisheries (January 20, 2004) (clarifying the results of the Isolation Layer Modeling Report).

increased predation and less desirable foraging conditions than normal beach habitat. The availability of prey species at the site currently is limited, presumably because of contamination. While the nature of the substrate will change, there is potential for an increase in benthic productivity in areas without concrete blocks because the isolation of the chemical contamination will provide a net benefit to benthic species using the project area. The overall expected effect, however, is a loss in benthic production because of the loss of substrate.

The habitat loss will be mitigated by the addition of rock clusters (to provide habitat complexity), removal of debris from Willamette Cove, removal of pilings, the riparian plantings, and the reduction in contaminant exposure pathways. Despite a permanent alteration of about 25 acres of river bed habitat, this project is expected to provide a benefit to listed species because of the improvements to water quality, and removal of the chemical exposure pathway for the benthic community.

2.1.6 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." This is step 4 in NOAA Fisheries' analysis process. Future Federal actions, including the cleanup of the Willamette River through the Superfund program, ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. 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. Metro is considering riparian restoration work in Willamette Cove and the construction of a park on the upland bench beside the cove. Industrial activities in the project vicinity will continue, and this will likely involve redevelopment of existing facilities, expansion of existing facilities, and new industrial development. The future use of the McCormick and Baxter Site has not yet been determined but may involve a public park or public recreation area. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years**.**

2.1.7 Conclusion

The final step in NOAA Fisheries' approach to determine jeopardy is to determine whether the proposed action is likely to appreciably reduce the likelihood of species survival or recovery in the wild. NOAA Fisheries has determined that when the effects of the proposed action addressed in this Opinion are added to the environmental baseline and cumulative effects occurring in the action area, it is not likely to jeopardize the continued existence of listed salmonids. NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis, when analyzing the effects of the proposed action on the biological

requirements of the species relative to the environmental baseline, together with cumulative effects.

These conclusions are based on the following considerations: (1) Placement of the cap will be completed between July 1 and October 31, which is within the in-water work window for the lower Willamette River and is when the lowest density of listed salmonids is found in the lower Willamette River; (2) performance standards are proposed to limit turbidity increases, and turbidity increases are expected to be of short duration (no more than 14 weeks); (3) over 1,000 existing treated pilings, both within and outside the cap footprint, will be removed; (4) the riverbank will be regraded and planted to create a more natural riparian habitat; (6) the contaminated materials will be isolated from the water column and benthic prey species; and (7) the proposed action is not likely to impair properly functioning habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

2.1.8 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2.2 Incidental Take Statement

Section 9 of the ESA [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 USC 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and

sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of the Take

The proposed action is reasonably certain to result in incidental take of the listed species because surveys show the listed species occur in the action area, the proposed action will adversely affect essential features of habitats, and that will reduce the survival of the listed species for feeding, breeding, or sheltering. However, take associated with the habitat-related effects of actions such as these are largely unquantifiable and are not expected to be measurable as long-term effects on populations. Therefore, NOAA Fisheries is unable to estimate a specific amount of incidental take attributable to those effects. In instances such as these, NOAA Fisheries designates the expected level of take as 'unquantifiable.' The extent of take will be limited to the action area, including the water column, the 25 acres of streambed subject to capping, and the banks of the Willamette River beside the cap, an additional area limited by the extent of piling removal activities and downstream to the extent of visible turbidity resulting from construction activities, not to exceed 100 feet downstream of the cap boundary. If work area isolation and handling of fish is required as a result of a Corrective Action, NOAA Fisheries expects the possibility for incidental take of up to 50 juvenile steelhead and chinook salmon. Incidental take occurring due to modifications to the proposed action or beyond the area described is not authorized by this consultation.

2.2.2 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 ensure that the grantee will:

1. Avoid or minimize incidental take from in-water work associated with placement of the sand and organophyllic clay cap, placement of rock and concrete armor over the cap, removal of pilings and dolphins, demolition of a wooden dock remnant, removal of an abandoned barge, and removal of concrete debris by applying permit conditions or project specifications that avoid or minimize adverse effects to riparian and aquatic systems.

2. Avoid or minimize incidental take from streambank and upland activities including grading, plantings, and staging, by applying permit conditions or project specifications that provide the greatest degree of ecological function in the near-shore and riparian areas.

3. Complete a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities.

2.2.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the EPA must require that DEQ and/or their contractors 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 (in-water activities), the EPA shall ensure that:

    a. Project Design. The design of this project must be reviewed to ensure that impacts to natural resources have been avoided, minimized and mitigated, and that the following overall project design conditions are met.
        i. Minimum area. Construction impacts will be confined to the minimum area necessary to complete the project.
        ii. In-water work. All work within the Willamette River or Willamette Cove will be completed within the in-water work period (July 1 through October 31, and December 1 through January 31);
        iii. Work period extensions. Extensions of the in-water work period, including those for work outside the wetted perimeter of the river but below the ordinary high water mark must be approved in writing by biologists from NOAA Fisheries.
    b. Water Quality Plan, Pollution and Erosion Control Plan. Increased turbidity as placement of cap materials and other in-water work is a concern. Prepare and carry out a pollution and erosion control plan to prevent increased turbidity caused by such activities.[3] The plan must be available for inspection on request by EPA or NOAA Fisheries. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.
        i. The names and address of the party(s) responsible for accomplishment of the water quality and pollution and erosion control plan.
        ii. Describe methods or best management practices (BMPs) that will be used to minimize turbidity increases as a result of piling removal, placement of cap materials, or resuspension of river sediment. Silt curtains and floating booms will be deployed, as necessary, during placement of the

[3]Note that the Contractor will prepare the Pollution and Erosion Control Plan, and ecology and environment will prepare the Water Quality Monitoring Plan. Ecology and environment will perform the water quality monitoring. The Contractor will be required to meet the water quality criteria. The Water Quality Monitoring Plan will include action levels that, if exceeded, will trigger implementation of Corrective Actions by the Contractor. The DEQ assumes these Corrective Actions will include such things as limiting fall distance of cap materials, slower placement, modifying placement methods or equipment, and silt curtains/fish exclusion. The Contractor is required to identify and implement the appropriate Corrective Action to meet the water quality criteria. The Corrective Actions will be identified by the Contractor before construction in their Construction Operations Plan (COP).

cap (including sand, clay, rock and ACB) to maintain the water quality standards described below. All materials must be placed by equipment such as a clamshell bucket to control placement and minimize disturbance to the existing sediment or new cap materials.

iii. The cap placement activities shall not cause turbidity of the Willamette River to exceed the turbidity criteria at a distance of 100 feet downstream from the turbidity-causing activity. The turbidity criteria are as follows:
   (1) Turbidity shall be no greater than 5 NTU over background turbidity when background is 50 NTU or less; or
   (2) No more than 10% increase in turbidity when background turbidity is more than 50 NTU.
   (3) Background turbidity shall be established by collecting seven independent turbidity measures, at a minimum, during a two-day period before construction. Mean turbidity values will be used to represent background.

iv. Turbidity shall be monitored during active in-water work period with a turbidity meter that is calibrated daily (calibration measures must be documented and available for review upon request). Monitoring points shall be an undisturbed site 100 feet upstream of the activity and 100 feet downstream from the fill point. In addition, monitoring points at the point of discharge shall be collected at the bottom, midlevel and tip of the water column.

v. Turbidity shall be measured and recorded at least once every four hours during in-water work. The first sample of the day will be taken four hours after the initiation of the in-water activity, and once at each four-hour interval thereafter. If the turbidity criteria is exceeded, work will not proceed until the turbidity level has dropped to an acceptable level.

vi. Visual monitoring must occur at least once every four hours during in-water work. If, at any time, the visual turbidity levels are estimated to be approaching the turbidity exceedance level, field-testing will be performed. If field testing confirms turbidity criteria exceedances, then the contractor will cease operations responsible for causing the elevated turbidty.

vii. Daily turbidity measurements will be emailed (nancy.munn@noaa.gov) or faxed to NOAA Fisheries (503-231-6893), including information identifying all sampling locations.

viii. The BMPs will be evaluated and modified (when applicable) throughout the construction period to assure that the water quality standards are met. BMP modifications may include deployment of addition sediment control devices. If sediment curtains are used, ESA consultation must be reinitiated to ensure appropriate fish exclusion practices are followed.

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

x. 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.

c. Isolation of in-water work area. If the in-water work area requires isolation as part of a Corrective Action, the work area will be isolated from the work area using inflatable bags, sandbags, sheet pilings, sediment curtains, or similar materials. All listed salmonids trapped within the isolation area will be removed and placed in the actively-flowing river using methods described in 1d.

d. Capture and release. If the in-water work should require isolation as part of a Corrective Action, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

ii. Do not use electrofishing if water temperatures exceed 18°C.

iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[4]

iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

v. Transport fish in aerated buckets or tanks.

vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

e. Removal of Timber Pilings. The following conditions apply to the piling removal.

i. Remove old timber pilings within the cap footprint using a barge-mounted hydraulic cutting device or with a diver using barge-mounted hoists to extract the cut portions. Once loose, place the piling onto the barge or other appropriate dry storage site.

[4] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

ii. Old timber pilings within the cap footprint may be removed using equipment operating from the shoreline and outside of the actively flowing water, as long as the equipment meets the following conditions:

(1) Inspect all vehicles operated within 150 feet[5] of any river or waterbody daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by EPA or NOAA Fisheries.

(2) Before operations begin and as often as necessary during operation, stream clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminants are removed.

(3) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any river or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering the river. Containment systems functioning as impervious basins potentially include metal or plastic tubs and earthen berms lined with plastic sheets or other impervious materials for stationary generators and similar equipment. Fueling of stationary vehicles such as excavators would not be allowed during the second half of the work shift to minimize the amount of fuel remaining in the vehicles during non-working times, and such fueling would occur with the use of oil-absorbent pads around fuel nozzles to avoid and minimize the risk of contamination of the aquatic environment.

(4) Use vegetable oil or other environmentally-sensitive lubricant for any vehicle that enters the water.

iii. Remove old timber pilings outside the cap footprint using a vibratory hammer. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting three feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. No pilings may be placed, temporarily or permanently, on the river bed (below ordinary high water level). In addition, no pilings may be stored overnight within 100 feet of the ordinary high water level.

v. Sediment fences and booms must be deployed during the removal operations for all pilings and the shoreline dock and bulkhead structures.

vi. All large woody material will be trapped and removed from the water.

[5] Distances from the river are measured horizontally from, and perpendicular to, the bankfull elevation.

vii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

viii. Fill the holes left by each piling with clean, native sediments, whenever feasible.

f. Institutional Controls. Implement institutional controls for the site to prevent damage to the cap and potential harm to listed species over the long term. The institutional controls shall focus on long-term protection of the sediment cap in the Willamette River and the riparian plantings on the McCormick and Baxter property. Institutional controls must include deed or property restrictions, consent decrees, or easements that will ensure responsibility for monitoring and maintenance of the cap, physical barriers and signage, and long-term protection of the plantings. Future use of the site will need to be restricted to protect the integrity of the cap and mitigation plantings. Restrictions shall be placed such that the 132-foot average riparian area will remain in an undisturbed state. A copy of the property and deed restrictions will be supplied to NOAA Fisheries. Institutional controls shall be used as necessary to prevent damage to the cap and formalize monitoring requirements.

2. To implement reasonable and prudent measure #2 (streambank and upland activities), the EPA shall ensure that:

a. Pollution and Erosion Control Plan. Increased turbidity as a result of bank grading and upland activities is a concern. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by earth-moving activities. The plan must be available for inspection on request by EPA or NOAA Fisheries.

i. Plan Contents. The plan contents identified here are in addition to the contents identified under term and condition #1.

(1) Practices to prevent erosion and sedimentation associated with access roads, streambank grading, equipment and material storage sites, fueling operations, and staging areas. A sediment or silt fence must be installed and maintained on the downslope site of the bank grading activities. Seeding outside of the growing season (mid-November through February) will not be considered adequate nor permanent stabilization.

(2) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(3) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be

available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Practices to prevent construction debris from dropping into the cove or river, and to remove any material that does drop with a minimum disturbance to the riverbed and water quality.

ii. Inspection of erosion controls. During construction in upland and riparian areas, monitor shoreline turbidity and inspect all erosion controls daily, or more often as necessary, to ensure that erosion controls are working adequately.[6]

(1) Erosion control devices will be inspected daily during the rainy season and weekly during the dry season until the site is permanently stabilized.

(2) If monitoring and inspection shows that the erosion controls are ineffective, mobilize work crews immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.

(3) Erosion control measures will be judged ineffective when turbidity plumes are evident in waters occupied by listed salmonids during any part of the year. If soil erosion and sediment resulting from construction activities is not effectively controlled, the engineer will limit the amount of disturbed area to that which can be adequately controlled.

(4) Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 5 inches (12 cm). Catch basins will be maintained so that no more than 6 inches (15 cm) of sediment depth accumulates within traps or sumps.

(5) Sediment-laden water created by construction activity will be filtered before it leaves the right-of-way or enters the Willamette River.

b. Pre-construction Activities. Before significant alteration of the action area, the following actions will be accomplished.

i. Boundaries of the clearing limits associated with site access and construction are flagged to prevent ground disturbance of critical riparian vegetation and other sensitive sites beyond the flagged boundary.

ii. The following erosion control materials are onsite.

(1) A supply of erosion control materials (*e.g.*, silt fence and straw bales) is on hand to respond to sediment emergencies. Sterile

[6] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 50 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

straw or hay bales will be used when available to prevent introduction of weeds.

(2) An oil-absorbing, floating boom is available on-site during all phases of construction whenever surface water is present.

iii. All temporary erosion controls (*e.g.*, straw bales, silt fences) are in-place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures will be in-place at all times during the contract, and will remain and be maintained until such time that permanent erosion control measures are effective.

c. Heavy Equipment. Heavy equipment use will be restricted as follows.

i. When heavy equipment is required, the applicant will use equipment having the least impact (*e.g.*, minimally-sized, rubber-tired).

ii. Heavy equipment will be fueled, maintained and stored as follows.

(1) Place vehicle staging, maintenance, refueling, and fuel storage areas a minimum of 150 feet horizontal distance from the Willamette River. Exceptions may be made for cranes and other very slow-moving equipment; these vehicles may be refueled in place but shall have containment measures in place that meet or exceeds 100% containment.

(2) All vehicles operated within 150 feet of the Willamette River will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation.

(3) When not in use, vehicles will be stored in the vehicle staging area with the exception of cranes and other very slow-moving vehicles.

d. Plantings. Prepare and carry out a site restoration plan as necessary to ensure that the streambank is stable and appropriately planted. Make the written plan available for inspection on request by the EPA or NOAA Fisheries.

i. Goal. The goal of the bank layback and plantings is the production of habitat elements such as large wood, riparian vegetation for food, cover and shelter, and shading.

ii. Streambank shaping. The grading shall occur consistently with the proposed grading plan to restore a natural slope and profile suitable for the establishment of vegetation.

iii. Plants. Complete the plantings by the end of 2005. Use a diverse assemblage of species native to the project site, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used. However, a certified sterile, non-native seed mix may be used for erosion control the first year, if necessary.

iv. Pesticides. Take of ESA-listed species caused by pesticide use is included in the incidental take statement. Pesticide use is limited in type and extent, as described in the proposed action.

v. Fertilizer. Do not apply fertilizer (including fertilizers within the hydroseed mix) within 50 feet of the Willamette River or Willamette Cove.

vi. Fencing. Install fencing as necessary to prevent access to revegetated sites by unauthorized persons or by equipment during future construction.

vii. Plan Contents. Include each of the following elements.

(1) Responsible party. The name and address of the party(s) responsible for meeting each component of the planting requirements, including providing and managing any financial assurances and monitoring necessary to ensure planting success.

(2) Performance standards. Use these standards to help design the plan and to assess whether the planting goals are met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well dispersed.

(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basin, is absent or slight and local.

(c) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.

(d) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.

(e) Vegetation structure is resulting in rooting throughout the available soil profile.

(f) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.

(g) Streambanks have less than 5% exposed soils with margins anchored by deeply-rooted vegetation or coarse-grained alluvial debris.

(h) A continuous corridor of shrubs and trees provide shade for the entire streambank.

viii. Long-term maintenance of the plants. The plan shall address roles and responsibilities associated with the long-term maintenance of the trees and shrubs. Because the trees and shrubs are being planted to mitigate the long-term effects of the cap, the plan must address maintaining the forest community in perpetuity in an undeveloped state (*i.e.*, no trails, walkways, building intrusions).

ix. While the average width of the riparian area can be 132 feet, no location shall be less than 50 feet in width.

3. To implement reasonable and prudent measure #3 (monitoring and reporting), the EPA shall ensure that:

a. Construction Monitoring. Provide NOAA Fisheries with a monitoring report within 30 days of completing cap construction describing EPA's success meeting these terms and conditions. Information on the riparian planting is required 30 days after planting, and all other monitoring information is required 30 days after project demobilization. This report will consist of the following information.

i. Project identification.

ii. 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.

iii. Isolation of in-water work area, capture and release.

(a) Supervisory fish biologist – name and address.

(b) Methods of work area isolation and take minimization.

(c) Stream conditions before, during and within one week after completion of work area isolation.

(d) Means of fish capture.

(e) Number of fish captured by species.

(f) Location and condition of all fish released.

(g) Any incidence of observed injury or mortality of listed species.

iv. Provide a narrative that briefly discusses project implementation and consistency with the terms and conditions, with special attention to turbidity, plantings, and implementation of mitigation. Submit a copy of this report to the Oregon State Habitat Office of NOAA Fisheries.

Director, Oregon State Habitat Office
Habitat Conservation Division
National Marine Fisheries Service
Attn: 2003/01440
525 NE Oregon Street
Portland, OR 97232

b. Long-term Monitoring.

i. Cap Longevity. Following cap construction, a long-term monitoring program will be implemented. Initially, yearly cap inspections will be required, and then inspection intervals will be lengthened to five years. Maintenance of any damaged areas would occur immediately following the inspection. Regular reports will be sent to NOAA Fisheries, Oregon State Habitat Office.

ii. Plantings. A five-year monitoring report that addresses planting success of the trees and shrubs planted along the Willamette River will be sent to NOAA Fisheries, Oregon State Habitat Office.

c. If a dead, injured, or sick endangered or threatened species specimen is found, initial notification must be made to the National Marine Fishery Service Law Enforcement Office, 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.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 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 substrates 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; "substrates" include 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.

3.2 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 waterbodies 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 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). The assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

3.3 Proposed Action

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.

3.4 Effects of Proposed Action

As described in detail in section 2.1.5, the proposed activities may result in detrimental short-term direct impacts to EFH species. In addition, the proposed activities may have short-term and long-term adverse effects to a variety of habitat parameters, as well as long-term beneficial

effects. Placement of cap material will result in a temporary increase in turbidity, and may result in a temporary increase in the release of contaminants. The proposed activities will cause a permanent change to the substrate of the Willamette River within the cap footprint; the 25-acre cap will be comprised of a two-foot layer of sand and organoclay, topped by either rock or concrete blocks to hold the sand in place. The riparian area along the McCormick and Baxter will be replanted with trees and shrubs and will, through time, regain riparian functions. The primary beneficial effect of the project is the isolation of the NAPL and other contaminants from benthic and lotic organisms which will reduce their exposure to wood-treating compounds.

3.5 Conclusion

NOAA Fisheries believes that the proposed action will adversely affect the EFH for Pacific salmon species and starry flounder.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, 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 the EPA and all of the reasonable and prudent measures and the terms and conditions contained in section 2.2.3 are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

3.8 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) require 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

The 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

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this Opinion in addition to the BA and additional information requested by NOAA Fisheries and provided by EPA and DEQ.

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