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

June 2, 2003

Daniel M. Mathis, P.E.
Division Administrator
Federal Highway Administration
Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for SR 522 Paradise Lake Road to Cathcart Road Vicinity Project (WRIAs 7 and 8) (NMFS Tracking No. WHB-02-143).

Dear Mr. Mathis:

In accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended, 16 U.S.C. 1531, *et seq*. and Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, the attached document transmits NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and MSA Essential Fish Habitat (EFH) Consultation. These consultations are based on NOAA Fisheries' review of a proposal to fund a project to widen SR 522 from Paradise Lake Road to Cathcart Road vicinity. The Federal Highway Administration (FHWA) determined that the proposed action was not likely to adversely affect (NLAA) the Puget Sound chinook salmon (*Onchorynchus tshawytscha)* Evolutionarily Significant Unit, yet requested formal consultation assuming formal consultation was initiated by FHWA through the request letter. However, the description of the proposed action was still under discussion between FHWA and NOAA Fisheries as identified in the consultation history section of the attached Opinion. For future reference, please be advised that the official consultation clock starts when NOAA Fisheries has adequate information to do so, and in this instance both agencies were engaged in technical and policy level meetings in an attempt to revise the project in a manner enabling NOAA Fisheries concurrence with FHWA's NLAA determination. Finally, after all discussions and through extensive review of the information, NOAA Fisheries determined that the proposed action was likely to adversely affect the Puget Sound chinook salmon ESU, and initiated formal consultation on February 25, 2003.

This Opinion reflects the results of a formal ESA consultation and contains an analysis of effects covering the above listed species in the Snohomish and Sammamish River Basins. The Opinion is based on information provided in the Biological Assessment and additional information provided by FHWA and Washington State Department of Transportation. A complete administrative record of this consultation is on file at the Washington Habitat

Branch Office.

NOAA Fisheries concludes that implementation of the proposed project is not likely to jeopardize the continued existence of Puget Sound chinook salmon. In your review, please note that the incidental take statement, which includes Reasonable and Prudent Measures and Terms and Conditions, was designed to minimize take.

The MSA consultation concluded that the proposed project may adversely impact designated Essential Fish Habitat (EFH) for chinook, coho and Puget Sound pink salmon (*O. gorbuscha*). Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries has made conservation recommendations intended to minimize the adverse effects of this action to designated EFH.

If you have any questions, please contact Michelle Steinmetz of the Washington Habitat Branch Office at (206) 526-4740 or via email at Michelle.Steinmetz@noaa.gov.

Sincerely,

Russell M Strach for

D. Robert Lohn
Regional Administrator

Enclosure

cc: Gary Davis, WSDOT
Ken Berg, USFWS

Endangered Species Act - Section 7 Consultation
Biological Opinion
And
Magnuson-Stevens Fisheries Conservation and Management Act
Essential Fish Habitat Consultation

WHB-02-143

SR 522 Paradise Lake Road to Cathcart Road
Snohomish County, Washington

Agency: Federal Highway Administration

Consultation
Conducted By: National Marine Fisheries Service,
Northwest Region Washington State Habitat Branch

Issued by: Russell M Strach for Date: June 2 , 2003

D. Robert Lohn
Regional Administrator

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1.0 INTRODUCTION

This document transmits the NOAA's National Marine Fisheries' (NOAA Fisheries) Biological Opinion (Opinion) and Magnuson-Stevens Fisheries Management Act (MSA) consultation based on our review of the proposed State Route (SR) 522 Paradise Lake Road to Cathcart Road project, located in Snohomish County, Washington. The project consists of widening 3.6 miles of SR 522 from two lanes to four lanes and constructing two interchanges. The new lanes for this project cross six streams in two Water Resource Inventory Areas (WRIA). Evans Creek, Anderson Creek, and Elliott Creek drain to the Snohomish River (WRIA 7) and three unnamed streams, one of which is a tributary to Bear Creek flow to the Sammamish River and into Lake Washington (WRIA 8). The project area is within the Puget Sound chinook salmon (Puget Sound chinook) (*Oncorhynchus tshawytscha)* evolutionary significant unit (ESU). WRIA 7 contains Essential Fish Habitat (EFH) for Puget Sound chinook, coho (*O. kisutch*), and pink (*O. gorbuscha*) salmon. WRIA 8 contains EFH for Puget Sound chinook and coho salmon.

1.1 Consultation Background

The Federal Highway Administration (FHWA) proposes to fund, in whole or in part, the above referenced project, to be constructed by the funding recipient, the Washington State Department of Transportation (WSDOT). The WSDOT has been designated as the non-Federal representative on state highway projects requiring section 7 informal consultation under the Endangered Species Act (ESA) (50 CFR 402.13). The FHWA requested section 7 formal consultation, and WSDOT submitted the Biological Assessment (BA) and other related information on the FHWA's behalf. Included in the BA was a determination of no adverse affect to EFH, however, NOAA Fisheries disagreed with this, and conducted the EFH consultation.

This document is based on information provided in the BA and through a history of continuing dialogue to refine and determine the project description. The following is a summary of the consultation history, including a thumbnail description of the issues discussed with the action agency:

- On April 3, 2002, NOAA Fisheries received a BA from WSDOT;

- In April and May, 2002, NOAA Fisheries telephoned WSDOT on several occasions to clarify information contained in the BA;

- On May 30, 2002, a phone conference between NOAA Fisheries, FHWA, and WSDOT followed prior attempts to clarify information contained in the BA. Issues needing clarification were:

  a. The extent of the project/action area; 1994 Environmental Impact Statement (EIS) (FHWA 1994) encompassed the entire project (phases 1-5), but the BA addressed only phases 2, 3, and 4. The action area had to be clarified. Indirect effects were not sufficiently addressed to initiate consultation.

b. EFH was not adequately addressed.

- On July 12, 2002, NOAA Fisheries issued a non-concurrence letter, outlining concerns with the BA, validity of phasing, and need for more information. Specifically, the project should have encompassed all phases as defined in 1994 EIS (FHWA 1994). The indirect effects needed elaboration, more information was needed on stormwater outfall locations and design, and a copy of the EIS was requested;

- On August 5, 2002, NOAA Fisheries received responses to a portion of the issues raised in the July 12, 2002 letter. Items requested but not received/issues not addressed were: EIS; indirect effects; and validity of phasing;

- On August 20, 2002, FHWA issued a draft letter to address the validity of phasing the project;

- On September 3, 2002, NOAA Fisheries commented on the draft letter and responded to FHWA, in writing, during a meeting with WSDOT, FHWA, United States Fish and Wildlife Service (FWS), and NOAA Fisheries. Issues of logical termini, independent utility and supporting documentation for FHWA's Documented Categorical Exclusion (DCE) were not adequately addressed in FHWA's draft letter. FWS had similar concerns;

- On October 8, 2002, FHWA issued a letter to NOAA Fisheries and FWS redefining the proposed project;

- On October 15, 2002, during a meeting with WSDOT, FHWA, FWS, and NOAA Fisheries, WSDOT submitted supporting documents that had ben requested in the July 12, 2002 letter. These items included: Hydraulic analysis, and Traffic Reports but did not include the 1994 EIS, indirect effects analysis, or EFH assessment as requested;

- On November 1, 2002, FWS issued a letter of non-concurrence to WSDOT and submitted additional information needs;

- On November 4, 2002, NOAA Fisheries presented written questions to FHWA/WSDOT in a meeting with FHWA, FWS, WSDOT, and NOAA Fisheries. Identified items still needing to be addressed were stormwater, maintenance, Snohomish River outfall, tree removal, wetland impacts, indirect effects, and EFH;

- On November 14, 2002, WSDOT responded to FWS' and NOAA Fisheries' questions as posed at the November 4, 2002 meeting;

- On November 18, 2002, NOAA Fisheries received a letter from FHWA requesting formal consultation on the project as a "may affect, not likely to adversely affect" (NLAA) and stated that all information had been submitted;

- On November 26, 2002, NOAA Fisheries convened a meeting with managers from WSDOT

and FHWA to discuss two key issues: 1) confirmation that FHWA's1994 EIS linking the road widening project with the new bridge construction over the Snohomish River was no longer relevant to this consultation; and 2) to inform FHWA and WSDOT of NOAA Fisheries suggestion that a modification to the proposed stormwater outfall might minimize effects of the project to enable concurrence with a "not likely to adversely affect" determination. FHWA agreed to pursue staff to staff discussions on such a modification;

- In December 2002, Electronic mail (email) correspondence between FHWA and NOAA Fisheries suggested that FHWA was willing to make modifications to minimize effects to enable a NLAA concurrence;

- On December 13, 2002, FHWA faxed NOAA Fisheries requesting comment on a draft letter dated December 6, 2002 clarifying the project was no longer linked with a new bridge over the Snohomish River, and proposed language regarding the stormwater outfall redesign;

- On December 18, 2002, NOAA Fisheries faxed (and emailed) FHWA suggested language for FHWA's draft letter (dated December 6, 2002), including some detail language on proposed modifications to the stormwater outfall design;

- December 19, 2002, FHWA emailed NOAA Fisheries with thanks on the prompt response, but registered an unwillingness to include the suggested language regarding the stormwater outfall. NOAA Fisheries emailed back indicating availability and a willingness to work out the stormwater outfall details.

- On January 3, 2003, NOAA Fisheries received a letter from FHWA (identified above as a draft dated December 6, 2002) describing the scope of the ESA consultation in relation to the EIS and phasing. FHWA determined that this project was a Documented Categorical Exclusion (DCE) and stated that a new environmental document was being prepared for this current project (as covered by this Opinion);

- January 8, 2003, FHWA agreed to form a workgroup to resolve the stormwater outfall issue identified at the November 26 meeting;

- On January 24 and 28, 2003 the Agencies (NOAA Fisheries, WSDOT, FHWA) had two lines of communication to resolve the remaining stormwater outfall issue, technical staff and management.

- On January 24, 2003, technical staff scheduled a meeting to discuss ways of minimizing the effects of the stormwater outfall elements of the project.

- On January 28, 2003, management met to discuss progress of the consultation. FHWA expressed displeasure that the consultation had not concluded in light of the FHWA's November 18, 2002 letter. The agencies were unable to reach consensus regarding the initiation date for formal consultation in light of the unresolved stormwater outfall issue.

- On February 10, 2003, NOAA Fisheries met with FHWA and WSDOT to discuss options to avoid or minimize effects of the outfall.

- On February 19, 2003, NOAA Fisheries initiated a follow-up discussion with WSDOT manager to confirm the understanding of discussions among the three agencies during November and January, 2003. WSDOT confirmed NOAA Fisheries understanding.

- On February 25, 2003, FHWA informed NOAA Fisheries that there would be no further adjustments to the outfall design;

- On March 13, 2003, NOAA Fisheries informed FHWA that formal consultation on SR 522 was initiated on February 25, 2003, and triggered the start of the formal consultation clock.

- On March 13, 2003, WSDOT sent an email stating that the DCE will not be done until the Opinion is approved;

Finally, numerous additional telephone conversations, meetings, email correspondence, and site visits between staff of NOAA Fisheries, FHWA, WSDOT, Washington State Department of Fish and Wildlife (WDFW), Snohomish County, and FWS are documented in the administrative record, which is available at NOAA Fisheries, Washington Habitat Branch, Lacey Washington.

1.2 Description of the Proposed Action

The proposed action is the FHWA funding, in whole or in part, of a project to be constructed by the WSDOT. The WSDOT, proposes to widen 3.6 miles of State Route (SR) 522 from two lanes to four from Paradise Lake Road to Cathcart Road (Mile Post 16.8 to 20.8) and construct interchanges at Paradise Lake Road and Fales Road, Snohomish County, Washington. Transportation improvements in the SR 522 corridor are needed to improve safety, ease congestion, and accommodate anticipated growth, which is reflected in the land use and comprehensive plans of the adjacent communities. The existing roadways are routinely congested during weekday commute periods. The WSDOT's objective is to construct SR 522 improvements to address these needs.

The project is located within Sections 24 and 25 of Township 27 North, Range 5 East, and Sections 16, 17, 19 and 20 of Township 27 North, Range 6 East, within unincorporated Snohomish County and the Town of Maltby. The proposed project crosses four drainages (subbasins). One of the subbasins, Bear Creek, drains to the Sammamish River/ Issaquah Creek Basin (WRIA 8) and the other three subbasins, Elliot, Evans and Anderson, drain to the Snohomish River (WRIA 7).

Additionally, FHWA/WSDOT proposes to replace two at-grade intersections with a diamond interchange at Paradise Lake Road, and a single point urban interchange at Fales/Echo Lake Road. The interchanges will replace the existing at grade intersections with bridge crossings.

Other safety improvements include illumination, striping, guardrail, signing and fencing. It will also include filling anchor bolt pockets with grout and applying pigmented sealer to the existing concrete barrier on the Snohomish River bridge. Design will take into consideration signalized intersections at the five major intersections to be constructed at the Paradise Lake interchange, and the Fales/Echo Lake Road interchange ramps.

This project will create 24.7 acres of new impervious surface, and will retrofit 71.0 acres of existing impervious surface for stormwater treatment. New and existing impervious surface associated with road widening and interchanges within the Lake Washington basin will be treated for water quality and quantity by wet pond, filters, settling basins, and detention pond Best Management Practices (BMPs). New and existing impervious surface associated with road widening and interchanges within the Snohomish River basin will be treated for water quality with a pre-settling basin and a turf-amended sand filter. The treatment will meet the design criteria of the August 2001 Washington State Department of Ecology (WDOE) Stormwater Management Manual for Western Washington.

1.2.1 Stormwater

There is a high point near the proposed Paradise Lake Road interchange that separates the Bear Creek basin from the Snohomish River basin. Stormwater runoff west of this boundary will flow to the unnamed Bear Creek tributary in the Sammamish River Basin (WRIA 8). Stormwater runoff east of this point will flow to the Snohomish River (WRIA 7).

1.2.1.1 Sammamish River Stormwater (WRIA 8)

Three unnamed streams flow through the project site that lies within the Bear Creek subbasin (one central type four stream and two tributary type five streams). The unnamed type four stream is a tributary to Bear Creek which is part of the Sammamish River Basin. The unnamed Bear

Figure 1 - Schematic map of project vicinity (not to scale). North at top of figure

Creek tributary flows to Crystal Lake, Daniels Creek, Cottage Lake, Cottage Lake Creek, and into Bear Creek. The Bear Creek Basin Plan indicates that and coho salmon have been found in Daniels Creek, Cottage Lake Creek, and Bear Creek. However, a manmade barrier is reported downstream of Cottage Lake (King County 2000). In addition, a weir at the outlet of Crystal Lake, blocks access of anadromous fish to this lake and areas upstream of this lake. The outlet of Crystal Lake is the boundary of the action area for this subbasin.

Within the Sammamish River basin, the project would create approximately 20.3 acres of new impervious surface and would remove approximately 7.6 acres of existing impervious surface, for a net increase of 12.7 acres of impervious surface. The WSDOT will provide stormwater treatment and detention for all of the new and reconstructed roadways (approximately 28.6 acres of impervious surface). The WSDOT will construct four new stormwater detention/quality treatment ponds that will discharge to the unnamed Bear Creek tributary. Currently, the majority of stormwater runoff from the roadway in the project is not treated or detained.

1.2.1.2 Snohomish River Basin Stormwater (WRIA 7)

After treatment, stormwater from events up to the six-month, 24-hour event will directly discharge to the Snohomish River. A pre-settling pond and sand filter will treat runoff from existing and new impervious surfaces up to the six-month 24-hour storm event. Prior to discharge to the river, a flow splitter will route the six-month storm treatment volume to a single water quality treatment facility. Stormwater runoff from storm events larger than the six-month, 24-hour event will discharge directly to the Snohomish River without complete detention or treatment for water quality.

The water quality treatment facility will consist of a pre-settling basin followed by a turf-covered sand filter. This sand filter facility will serve as a pilot project for WSDOT to learn more about the treatment effectiveness and maintenance requirements of sand filters that receive highway runoff (WSDOT 2002b). The direct discharge pipe outlet elevation will be set at the river ordinary high water (OHW) elevation. The location of the outlet will be approximately 10 feet to 15 feet upstream of the WSDOT fence, downstream of the Snohomish River Bridge. The conveyance pipe will be constructed in a trench and backfilled. The WSDOT will replant with native vegetation following construction. The WSDOT will install a stormwater outfall on the left bank of the Snohomish River. The outfall will include a riprap scour pad below the OHW elevation designed to withstand the 100-year flood and prevent bank erosion during high stream flows. The scour pad and pipe will require approximately 526 cubic yards of excavation and approximately 409 cubic yards of riprap fill. The stormwater pipe will be a 42-inch diameter pipe. A 55-foot by 46-foot clearing is required for the outfall. The WSDOT will build a cofferdam around the outfall work area prior to outfall construction and remove it following outfall completion. To facilitate revegetation, WSDOT will place topsoil on the riprap above the OHW elevation, and plant willow stakes in the interstices following scour pad construction. The WSDOT will place sheet piling in the river channel approximately 15 feet waterward of the stream bank to minimize turbidity.

1.2.1.2.1 New Stormwater Outfall/Facility

A sand filter will treat stormwater from the Snohomish River Basin for water quality standards. This sand filter will require an outfall to discharge treated water to the Snohomish River. The river system in the proposed action area provides migratory, foraging, spawning, and rearing habitat for Puget Sound chinook. The outfall construction will require in-water work, scheduled to take place between July 1 and September 1 of 2003, and last for two to three weeks. The outfall will terminate in a riprap pad in the riparian zone of the Snohomish River.

The proposed new stormwater outfall will be located on the left (SW) bank of the Snohomish River, within the existing WSDOT right-of-way immediately north of the Snohomish River Bridge. The WSDOT will place approximately 409 cubic yards of riprap on the bank and below the OHW elevation to form the outfall pad. The size of the riprap outfall pad is approximately 40-feet long by 46-feet wide by 6 feet deep.

Work activities associated with the outfall installation include: installing erosion control BMPs, installing a cofferdam, clearing, grading, excavating, placing riprap, and installing the pipe. Temporary erosion control BMPs such as silt fences will be installed before all other outfall construction activities commence. Following installation of erosion control BMPs, WSDOT will install a temporary cofferdam along approximately 50 feet of the riverbank at the outfall location. The cofferdam will incorporate sheet piles or other means to isolate the worksite in the Snohomish River. The WSDOT will remove fish trapped within the cofferdam with hand nets. The WSDOT will use precautions during dewatering the cofferdam to ensure fish are not entrained. Any water intake structure will have a fish screen installed, operated, and maintained in accordance to NOAA Fisheries fish screen criteria (isolation of the water bypass suction pipe two to four feet from the pump hose end by approximately 3/32-inch mesh). Water removed from the work site will be pumped to river. The WSDOT will excavate approximately 526 cubic yards of material. The outfall pipe and riprap lined pad will be installed and the cofferdam and silt fence will be removed. To reduce erosion WSDOT will place live stake plantings into the riprap locations, and place erosion control grass seeding on all disturbed earth.

1.2.1.2.2 Operation of Stormwater Facilities

The turf filter facility will treat the first flush from all storm events (regardless of the total storm rainfall depth), and will treat the full runoff volume from all small and medium-sized storm events. For the six-month, 24-hour storm event (statistically, the storm that occurs on average twice per year) the runoff will initially be routed to the turf filter. During events larger than these six-month, 24-hour storm events, the capacity of the facility will be exceeded, at which point, flows will bypass the facility and discharge directly to the Snohomish River. A flow splitter in the turf filter facility will be designed to route 91% of the total mean annual runoff volume to the turf filter for enhanced treatment. The bypass flow (the remaining nine percent of the total mean annual runoff volume) will only occur during the peak flows of the largest storm events when highway pollutant concentrations are typically very low (WSDOT 2002b).

1.2.2 Culvert Replacements

The WSDOT will replace seven culverts that are currently fish barriers, with new fish passable, culverts. Three of these are on Evans Creek West Tributary, two on Evans Creek Middle Tributary, one on Evans Creek East Tributary, and one on Elliott Creek. Culvert replacement will involve work below the OHW elevation of Evans and Elliott Creeks. The WSDOT will remove culverts with a large crane rather than demolishing the structures. In addition, WSDOT will lengthen five existing culverts to accommodate the widened roadway. Portions of several streams, including Elliott Creek and the West, Middle, and East tributaries of Evans Creek will be affected by culvert replacement and/or extension. As proposed, WSDOT will channel approximately 246 additional feet of stream habitat from Evans Creek and its tributaries through culverts. The replacement of one of the Evans Creek West Tributary culverts (at station 567+85) will include minor realignment of the stream channel at the downstream end. Approximately 25 feet of new stream channel will be constructed at the outlet to connect the culvert end with the existing stream.

The WSDOT's extension and replacement of culverts will likely disturb the substrate of Evans, Anderson and Elliott creeks and will reduce the amount of open channel in these creeks by approximately 246 linear feet. Additionally, approximately 820 linear feet of the unnamed Bear Creek tributary will be relocated.

1.2.3 Wetland Impacts and Mitigation

Wetland impacts during construction are primarily from filling and clearing approximately 2.95 acres of wetland and buffer. By filling wetlands and converting buffer areas to transportation use, WSDOT will cause the loss of all wetland and buffer functions for these areas. Changes in wetland hydrology and water quality from construction and operation of the roadway could alter functions of remaining wetlands. To compensate for unavoidable impacts, WSDOT will mitigate impacts to Class 1 and 2 wetlands at a minimum ration of 1.5 to 1, and Class 3 wetlands at a ratio of 1 to1.

The WSDOT proposes in-kind mitigation on the project site and off-site within the Lake Washington basin. In-kind mitigation will involve creating wetlands, enhancing wetlands, enhancing buffers, and relocating stream channel segments that not only replace lost functions, but also improve functions within the Lake Washington basin. An estimated 4.36 acres of on-site wetland and stream mitigation will occur with the enhancement and creation of wetlands in the Paradise Lake Road vicinity. The WSDOT proposes a minimum of 1.04 acres of off-site stream and wetland mitigation within the upstream basin of the project site. The site is within the headwaters of the unnamed type four stream that flows through the SR 522/Paradise Lake Road site. Additionally, 0.33 acres of off-site mitigation is accounted for at a wetland mitigation site constructed during Stage 1 which involved restoring a stream channel and creating adjacent wetlands between SR 9 and the confluence of Little Bear Creek.

1.2.4 Best Management Practices

The WSDOT proposes the following permanent BMPs for this project:

1. Install rock protection around culvert ends (inlets or outlets);

2. Seed all soil disturbed by the construction work that is not covered by some other method (e.g., paving);

3. Line ditches with rock if design velocities are greater than 5 feet per second; seeding with grasses if design velocities are less than or equal to 5 feet per second;

4. Use clean, angular rock riprap for structure protection, which shall be installed to withstand the 100-year peak flow;

5. Clean all equipment to be used for instream work prior to operations below the bankfull elevation. External oil and grease will be removed, along with dirt and mud. Discharge no untreated wash and rinse water into streams and rivers;

6. Obtain boulders, rock, woody materials and other natural construction materials for the project from outside of the riparian area;

7. Replant all disturbed areas with native vegetation specific to the project vicinity and comprised of a diverse assemblage of woody and herbaceous species.

1.3 Description of the Action Area

The project area includes portions of WRIA 8, the Lake Washington watershed and to WRIA 7, the Snohomish River watershed. The demarcation between these two watersheds occurs immediately west of Yew Way, and crosses the project at approximately WSDOT Station 15+600. The principal waterways relevant to the SR 522 Improvement Project consist of the West, Middle, and East Tributaries of Evans Creek (referred to throughout this document as Evans Creek), Anderson Creek, Elliott Creek, the Snohomish River and the unnamed Bear Creek tributary.

The action area is all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area includes the adjacent riparian zone of Evans Creek, Anderson Creek, Elliott Creek, the unnamed tributary to Bear Creek, and the Snohomish River (River Mile [RM] 16-20.5) as well as the staging area,

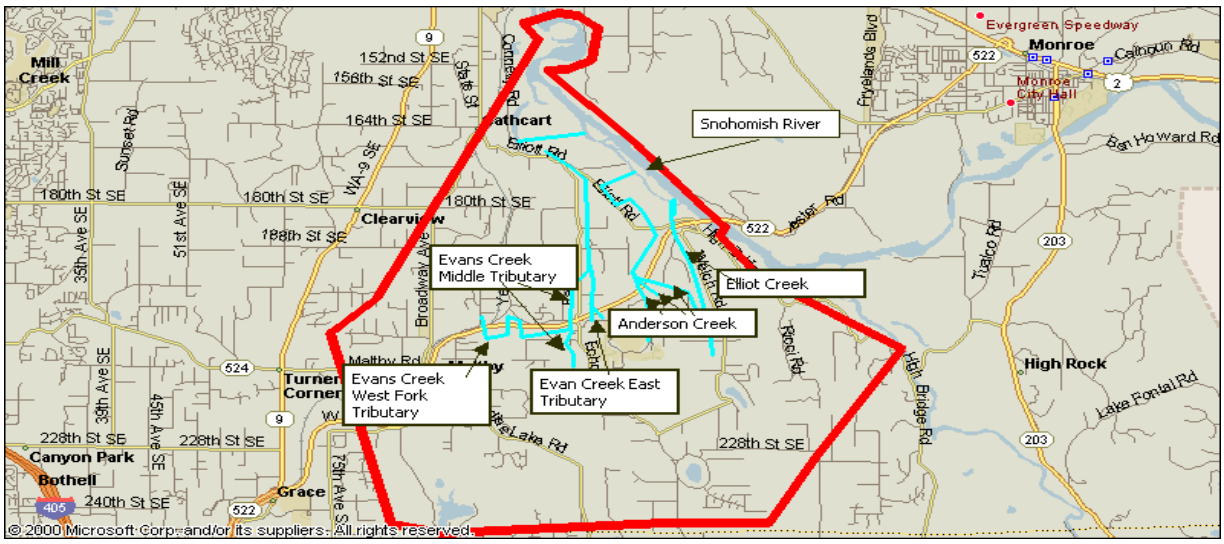

Figure 6 - Schematic depicting Action Area (not to scale). North at top of schematic.

catch basins, detention ponds, mitigation sites, and roadways. NOAA Fisheries has determined that the action area should include the tributaries of Evans, Anderson and Elliot creek to their confluence with the Snohomish River, as well as the unnamed Bear Creek tributary to the outfall of Crystal Lake. This covers four and a half miles of the Snohomish River (RM 16 to RM 20.5). The downstream extent of the action area is based on the potential for sediment from in-water construction to stay suspended, as well as the potential for treated and untreated stormwater generated by the proposed project to travel downstream. Sediment generated from instream activities in Evans, Anderson, and Elliott Creeks could reach the mouth of these creeks; turbidity from excavation in the Snohomish River could travel as far downstream as four and one-half miles. Effects from decreased water quality would not occur downstream of Crystal Lake in WRIA 8 because the headwater wetlands and Crystal Lake are expected to attenuate incremental decreases in water quality from the project.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The purpose of consultation under the ESA is to ensure that any action authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of threatened or endangered species, or result in the adverse modification of designated critical habitat. Formal consultation concludes with the issuance of a Opinion under section 7(b)(3) of the Act.

2.1.1 Evaluating the Proposed Action

The standards for determining jeopardy as set forth in section 7(a)(2) of the ESA are defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of injury and mortality attributable to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed species' life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct and indirect injury and mortality of the Puget Sound chinook ESU. For the purposes of conservation under the Act, an ESU is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991). ESUs are deemed suitable for protection under the ESA in order to preserve genetic diversity within a species. NOAA Fisheries' jeopardy analysis also considers the extent to which the proposed action affects the quantity and quality of Puget Sound chinook habitat by assessing the functions of elements essential for migration, spawning, and rearing of the listed salmon under the existing environmental baseline.

2.1.1.1 Biological Requirements

The Puget Sound chinook ESU is listed as threatened under the ESA. The biological requirements of Puget Sound chinook are those conditions necessary the ESU to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stocks, enhance the species' capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment. Specific information related to biological requirements for Puget Sound chinook can be found in Myers *et al.* (1998). The biological requirements are generally defined as properly functioning habitat relevant to each life history stage of Puget Sound chinook. In addition, there must be enough of the properly functioning habitat to ensure the continued existence and recovery of the ESU. The relevant biological requirements for this consultation include good water quality, extant riparian vegetation, and natural rates of channel disturbance, sediment transport, and channel morphology.

2.1.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions to which the effects of the proposed action are added. Environmental baseline is defined as "the past and present impacts of all Federal, State, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 CFR 402.02).

2.1.1.2.1 Snohomish River

Similar to chinook habitat throughout the range of the Puget Sound ESU, the Snohomish River watershed has been significantly altered by human activities for over a century. The Snohomish, formed by the Skykomish and Snoqualmie Rivers, flows through agricultural land for the majority of its length. Large portions of the upper watersheds of the Skykomish and Snoqualmie Rivers deliver altered flow regimes due to historical logging activities, highway and road development. As a result of these activities, the Snohomish system typically has higher and more frequent winter and spring flow events than it did historically (Williams, *et al.* 1975). Significant portions of the mainstem Snohomish River have been diked and riprap has been placed along the banks. Riparian areas below the town of Snohomish consist of minimal amounts of mature trees and vegetation. Seventy percent of the Snohomish River has no riparian forest greater than or equal to one site-potential tree height (56m) in width (Haas and Collins, 2001). Most of the estuary and floodplain has been altered by construction of levees, dikes, tide gates and pumphouses to exclude intertidal influence, resulting in off-channel habitat loss, which limits the carrying capacity of the basin. It has been estimated that 95% of the Puget Sound chinook rearing production capacity in the floodplain has been lost (Haas and Collins, 2001).

The lack of off-channel rearing habitat and higher velocity flows is a result of the river's inability to access its floodplain in most flow events. This likely results in the premature introduction of juvenile Puget Sound chinook to the salt and estuary environments. This dynamic is a major limiting factor for chinook populations in the Snohomish, as the juveniles are subjected to environments to which they are not physiologically prepared, likely resulting in decreased growth and survival (NMFS 2001).

2.1.1.2.1.1 Cathcart Subbasin

The Cathcart subbasin is composed of Evans, Anderson, and Elliott Creeks, which drain into the main-stem Snohomish between RM 18 and 20. In addition, Ricci Creek drains into the lower Snoqualmie River at RM 0.4. All of these systems currently and/or historically supported anadromous salmonids, including coho and limited numbers of chum, although there is no current or historical knowledge of Puget Sound chinook use in these streams for spawning. These streams have been degraded to various degrees by culvert placement, riparian habitat elimination/alteration, altered flows due to land clearing, and impervious surface resulting from development. The subbasin is currently in unincorporated Snohomish County, and is largely

zoned as Rural Residential (one dwelling unit per five acres). Existing impervious surface has been estimated to be five percent (Memo, Shockey/Brent, inc. 2000). The Cathcart basin abuts the main-stem Snohomish River from approximately RM 14 to the confluence of the Skykomish and Snoqualmie Rivers (RM 21), and extends up to RM 0.4 of the Snoqualmie. This section of the Snohomish serves as spawning habitat for Puget Sound chinook, and as rearing habitat for juvenile Puget Sound chinook from throughout the basin (NMFS 2001). Prime rearing locations are on the southern side of the river, in an existing backwater channel that runs approximately from RM 18.3 to RM 19.7. Further down river, Lake Beecher, which is a backwater, beaver controlled pond, fed by Evans Creek and several other smaller tributaries, may also serve as rearing habitat for juvenile Puget Sound chinook during high water events. The Bob Heirman dike, located on the lower portion of this subbasin and installed several decades ago, limits the natural meander zone of the Snohomish, and excludes historical off-channel rearing habitat totaling up to 360 acres (NMFS 2001).

2.1.1.2.2 Sammamish River Basin

Similar to chinook habitat throughout the Puget Sound ESU, the Sammamish River Basin has been significantly altered by human activities for over a century. The river flows from Lake Sammamish to Lake Washington, and has numerous tributaries entering the main-stem throughout its 13.5 mile length. Riparian habitat has been encroached upon by development, decreasing Large Woody Debris (LWD) in the mainstem. In 1964 the COE channelized the river for flood control purposes, achieving channel volume capacity ranging from 1,700 to 1,900 cfs and resulting in highly degraded and simplified habitat. As early as 1975, stormwater runoff from urban and industrial development was identified as a factor limiting salmon production (Williams *et al.* 1975). Due to significantly reduced low flows relative to historic conditions, the WDOE has closed all water withdrawal rights (over 5,000 gallons per day (gpd) for the Sammamish River tributaries (NMFS 2001). According to the Cross Valley Water District's (CVWD) Draft September 1999 Water Comprehensive Plan, the CVWD currently has the capacity to withdraw 2.4 million gpd through groundwater in hydrologic continuity with the Bear Creek, and Little Bear Creek and subbasins. A portion of these wells are in hydrologic continuity with the Cathcart subbasin as well, thus not all water withdrawn is from the Lake Washington basin. Stormwater runoff is delivered directly to the river in a number of locations, causing increased levels of nutrients and other pollutants (King County 2002).

Due to the lack of LWD and natural off-channel habitat, poor water quality and typically high water temperatures, the Sammamish River mainly provides a migratory path for Puget Sound chinook. However, its tributaries provide fair to good quality spawning and rearing habitat for Puget Sound chinook (King County 2002).

2.1.1.2.2.1 Bear Creek Subbasin

The headwaters of the Bear Creek subbasin headwaters are located on the southern border of Snohomish County, adjacent to the Cathcart subbasin. This subbasin is approximately 50 square miles, and has more than 100 miles of streams, nine lakes and over 2,000 acres of wetlands. Past

and continuing suburban and urban development has altered the basin hydrology through the conversion of forest and pasture to impervious surface and lawns. As early as 1975, stormwater runoff from urban and industrial development was identified as a factor limiting salmon production (Williams *et al.* 1975). Data indicates that Bear Creek has had a 20% reduction in flow during traditional low water periods since 1985 (NMFS 2001). Bear Creek provides fair to good quality swawning and rearing habitat for salmonid species and is considered a Regionally Significant Resource Area (King County 1990) because of its support of several salmonid populations, including natural spawning Puget Sound chinook (King County 2002).

For the Puget Sound ESU of chinook salmon, the biological requirements are not met under the existing environmental baseline, placing them at the Threatened status listing (March 1999, 64 FR 14308). Their status requires improvement in environmental conditions throughout the ESU. Any further degradation of existing conditions would probably increase the risks to listed salmon under the existing environmental baseline.

2.1.2 Status of the Species

Chinook are the largest of the Pacific salmon (Netboy 1958), and arguably exhibit the most diverse and complex life history strategies of all salmonids. Healey (1986) described 16 age categories for chinook, seven total ages with three possible freshwater ages. Two generalized freshwater life-history types were initially described by Gilbert (1912): "stream-type" chinook that reside in freshwater for a year or more following emergence, and "ocean-type" chinook salmon that migrate to the ocean within their first year. Healey (1983, 1991) has promoted the use of broader definitions for "ocean-type" and "stream-type" to describe two distinct races of chinook. This racial approach incorporates life history traits, geographic distribution, and genetic differentiation and provides a valuable frame of reference for comparisons of chinook populations. The generalized life history of chinook involves incubation, hatching, and emergence in freshwater, migration to the ocean, and subsequent initiation of maturation and return to freshwater for completion of maturation and spawning. Some male chinook mature in freshwater, thereby foregoing emigration to the ocean.

The Puget Sound ESU is comprised of 31 historically quasi-independent populations of chinook salmon, of which 22 are believed to be extant (PSTRT 2001 and 2002). The populations that are presumed to be extirpated were mostly of early-returning fish, and most of these were in the mid- to southern parts of Puget Sound, Hood Canal and the Strait of Juan de Fuca. This ESU encompasses all runs of chinook in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula. Puget Sound chinook are found in most of the rivers in this region. The boundaries of the Puget Sound ESU correspond generally with the boundaries of the Puget Lowland Ecoregion. Despite being in the rainshadow of the Olympic Mountains, the river systems in this area maintain high flow rates due to the melting snowpack in the surrounding mountains. Temperatures tend to be moderated by the marine environment. The Elwha River, which is in the Coastal Ecoregion, is the only system in this ESU which lies outside the Puget Sound Ecoregion.

Puget Sound chinook in this area all exhibit an ocean-type life history. Although some spring-run chinook populations in the Puget Sound ESU have a high proportion of yearling smolt emigrants, the proportion varies from year to year and appears to be environmentally mediated rather than genetically determined. Puget Sound stocks all tend to mature at ages 3 and 4 and exhibit similar, coastally-oriented, ocean migration patterns.

The most recent 5-year geometric mean natural spawner numbers in populations of Puget Sound chinook ranges from 42 to just over 7,000 fish. Most populations contain natural spawners numbering in the hundreds (median recent natural escapement equals 481); and of the six populations with greater than 1,000 natural spawners, only two are thought to have a low fraction of hatchery fish. Estimates of historical equilibrium abundance from predicted pre-European settlement habitat conditions range from 1,700 to 51,000 potential chinook spawners per population. The historical estimates of spawner capacity are several orders of magnitude higher than realized spawner abundances currently observed throughout the ESU.

Previous assessments of stocks within this ESU have identified several stocks as being at risk or of concern. Long-term trends in abundance and median population growth rates for naturally spawning populations of chinook in Puget Sound both indicate that approximately half of the populations are declining and half are increasing in abundance over the length of available time series. The number of populations with declining abundance over the short-term is similar to long-term trends 8 of 22 and 11-12 of 22 populations.

Anthropogenic activities have blocked or reduced access to historical spawning grounds and altered downstream flow and thermal conditions. In general, upper tributaries have been impacted by forest practices while lower tributaries and mainstem rivers have been impacted by agriculture and/or urbanization. Diking for flood control, draining and filling of freshwater and estuarine wetlands, and sedimentation due to forest practices and urban development are cited as problems throughout the ESU (WDF *et al.* 1993). Blockages by dams, water diversions, and shifts in flow regime due to hydroelectric development and flood control projects are major habitat problems in several basins. Bishop and Morgan (1996) identified a variety of critical habitat issues for streams in the range of this ESU including: (1) changes in flow regime (all basins); (2) sedimentation (all basins); (3) high temperatures in some stream; (4) streambed instability; (5) estuarine loss; (6) loss of large woody debris in some streams; (7) loss of pool habitat in some streams; (8) blockage or passage problems associated with dams or other structures; and (9) decreased gravel recruitment and loss of estuary areas. These impacts on the spawning and rearing environment may also have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks. The Puget Sound Salmon Stock Review Group (PFMC 1997) concluded that reductions in habitat capacity and quality have contributed to escapement problems for Puget Sound. It cited evidence of direct losses of tributary and mainstem habitat due to: (1) dams; (2) loss of slough and side-channel habitat caused by diking, dredging, and hydromodification; and (3) reductions in habitat quality due to land management activities.

The artificial propagation of fall-run stocks is widespread throughout this region. Summer/fall

chinook transfers between watersheds within and outside the region have been commonplace throughout this century; thus, the purity of naturally spawning stocks varies from river to river. Nearly two billion chinook have been released into Puget Sound tributaries since the 1950s. The vast majority of these have been derived from local returning fall-run adults. Returns to hatcheries have accounted for 57% of the total spawning escapement, although the hatchery contribution to spawner escapement is probably much higher than that due to hatchery-derived strays on the spawning grounds. The electrophoretic similarity between Green River fall-run chinook and several other fall-run stocks in Puget Sound (Marshall *et al.* 1995) suggests that there may have been a significant and lasting effect from some hatchery transplants. Overall, the pervasive use of Green River stock throughout much of the extensive hatchery network, in this ESU, may reduce the genetic diversity and fitness of naturally spawning populations.

Nehlsen *et al.* (1991) identified four stocks as extinct, four stocks as possibly extinct, six stocks at high risk of extinction, one stock at moderate risk, and one stock of special concern. The WDFW (WDF *et al.* 1993) considered 28 stocks within the ESU, of which 13 were thought to be of native origin and predominantly natural production. The status of these 13 stocks was: two healthy, five depressed, two critical, and four unknown. The status of the remaining (composite production) stocks was eight healthy, two depressed, two critical, and three unknown.

Harvest impacts on Puget Sound chinook populations averaged 75% (median equals 85%; range 31-92%) in the earliest five years of data availability and have dropped to an average of 44% (median equals 45%; range 26-63%) in the most recent 5-year period.

Other concerns noted by the Biological Review Team (BRT) (NOAA 2003) are the concentration of the majority of natural production in just two basins, high levels of hatchery production in many areas of the ESU, and widespread loss of estuary and lower floodplain habitat diversity and, likely, associated life history types. Populations in this ESU have not experienced the sharp increases in the late 1990's seen in many other ESUs, more populations have increased than decreased since the last BRT assessment. After adjusting for changes in harvest rates, however, trends in productivity are less favorable. Most populations are relatively small, and recent abundance within the ESU is only a small fraction of estimated historic run size.

The above information indicates that the overall abundance of chinook salmon in this ESU has declined substantially from historical levels, and many populations are small enough that genetic and demographic risks are likely to be relatively high. Both long- and short-term trends in abundance are predominantly downward, and several populations are exhibiting severe short-term declines. Spring-run chinook salmon populations throughout this ESU are all depressed.

2.1.3 Status of the Species within the Action Area

The action area provides migration, spawning, and juvenile rearing for Puget Sound chinook in the Snohomish River. Additionally, the Bear Creek subbasin (unnamed Bear Creek Tributary) as well as the Evans, Anderson and Elliott creek subbasins, are within the action area. Some Puget Sound chinook spawn in the vicinity SR 522, upstream and downstream of the SR 522 bridge

(RM 20). Puget Sound chinook use of the smaller creeks (Evans, Elliott, and Anderson) would be limited to juvenile rearing of fry that enter from the Snohomish River (pers. comm. Kraemer 2003). Although Puget Sound chinook are not known to utilize the identified creeks within the action area (with the possible exception of the mouths of Elliott, Anderson, and Evans Creek where they drain to the Snohomish River) (Murray and Rosenau 1989), they do drain into chinook salmon bearing streams, therefore they are addressed.

While data is limited regarding historic population levels in the Snohomish basin, a 1970 study by the Pacific Northwest River Basins Commission stated that from 1956-1965 chinook returns (catch plus escapement) ranged from 5,520 to 72,480 with an average of 30,720 per year. From that period, total returns declined steadily, and the introduction of hatchery-produced chinook failed to reverse the downward trend in wild stocks. The effects of human activities on salmon habitat throughout the Snohomish basin have had an adverse impact on freshwater survival (NMFS 2001). Furthermore, the decline in both freshwater and marine survival (PSSSRG 1997) has occurred despite constrained commercial fishing and reduced exploitation rates. From 1971 to 1980, the annual average escapement of wild chinook fell to 10,565, from 1981 to 1990 to 8,619, and from 1991 to 2000 to 4,661. During the most recent decade wild stock returns appear to have reached a plateau of from 4,500 to 8,161 fish per year (WDFW, 2001). However, because of three continuous decades of decline to current low levels, a Salmon and Steelhead Stock Inventory (SaSSI) review in 1993 (WDF, 1993), followed by a NOAA Status Review (Myers *et al.* 1998), concluded that Snohomish summer and fall stocks of chinook were depressed.

2.1.3.1 Snohomish River

Both genetic data and distinct geographic locations of spawning grounds for chinook in the Snoqualmie and Skykomish River Basins support their delineation as separate populations within the Snohomish system (PSTRT 2001).

All Snohomish Basin chinook are either summer or fall stocks. Most Snohomish summer/fall chinook smolts emigrate as sub-yearlings ocean-type, but a relatively large proportion of smolts (33% in 1993 and 1994 samples) are stream-type (Myers *et al.* 1998). Of returning fall chinook, 25% to 30% showed a stream-type life history (Snohomish Basin Salmonid Recovery Technical Committee 1999 taken from NMFS 2001). No other summer or fall chinook stocks in Puget Sound produces this high a proportion of yearling smolts (Puget Sound chinook Harvest Management Plan).

Summer chinook enter freshwater from May through July and into August, spawning primarily in September. Fall chinook spawn from late September through October. However, fall chinook spawning in the Snoqualmie River continues through November (WDF *et al*. 1993). Juvenile out-migration occurs from mid-April into July. Stream-type juveniles rear in fresh water throughout the year. A few chinook spawn above and below the SR 522 Bridge.

Snohomish chinook stocks include two genetically distinct stocks including the Skykomish River and Snoqualmie River stocks (PSTRT 2001). Chinook salmon are known to spawn throughout

the main-stem of the river from above the town of Snohomish (RM 13) to the confluence of the Skykomish and Snoqualmie Rivers (RM 21), in the mainstems of the Skykomish and Snoqualmie Rivers and the larger tributaries including the Pilchuck, Woods, Wallace, Raging and Sultan Rivers (WDFW 2002).

2.1.3.1.1 Skykomish Chinook Salmon Stock

The Skykomish chinook stock combined the 1992 SaSSI Snohomish summer, Wallace summer, and Bridal Veil Creek fall chinook stocks and a portion of the Snohomish fall chinook stock (WDFW 2002). Spawning takes place in the main-stem Snohomish and Skykomish Rivers and associated tributaries, including the Pilchuck River, Wallace River, Bridal Veil Creek, Sultan River, Elwell Creek and in the North and South forks of the Skykomish. Spawning generally occurs from September through October. The stock is classified as depressed in the WDFW 2002 Draft Salmonid Stock Inventory (SaSI) report. Because of their partial location downstream of the action area, (particularly the Snohomish River redds) some chinook redds might be impacted by future development and additional impervious surfaces. Additionally, the portion of the Snohomish River within the action area for the project provides migratory, foraging, and rearing habitat. Juveniles near/down-river of the action area will also be affected by altered flow regime resulting from future development.

2.1.3.1.2 Snoqualmie Chinook Salmon Stock

The Snoqualmie chinook stock is comprised of fish from the 1992 SaSSI Snohomish fall chinook stock that spawn in the Snoqualmie River and its tributaries. Snoqualmie chinook spawn from mid-September through October but can be later in some years. Primary spawning areas include the main-stem Snoqualmie River and major tributaries including Raging and Tolt rivers and Tokul Creek. Escapement levels averaged 1,287 fish/year from 1986 - 2001. The age composition of returning Snoqualmie River fall chinook showed a relatively strong age five component (28%), relative to other Puget Sound fall stocks. Age three and four fish comprised 20% and 46%, respectively, of returns in 1993 to 1994 (Myers *et al*. 1998). Stock status is rated as depressed by the WDFW Draft SaSSI report, primarily because of low stock productivity. Because of their location upstream of the action area, chinook redds from this stock will not be impacted from an altered flow regime resulting from development, although juveniles near/down-river of the action area may be affected as this portion provides rearing habitat. Adults that migrate and may forage in the action area may likewise be affected.

2.1.3.2 North Lake Washington Tributaries

The North Lake Washington Tributaries chinook spawn mostly in North, Swamp, Bear, Little Bear, Thornton McAleer and Cottage Lake creeks as well as in the Sammamish River. Spawning typically occurs from mid-September through October. Adult returns have ranged from 528 fish in 1986, to 33 fish in 1996, and 459 fish in 2001, with an average escapement of 306 fish/year from 1986-2001 (WDFW 2002).

The only North Lake Washington tributary within the action area is the unnamed Bear Creek tributary. This tributary flows to Crystal Lake, Daniels Creek, Cottage Lake, Cottage Lake Creek and into Bear Creek. The Bear Creek Basin Plan indicates that chinook and coho have been found in Daniels Creek, Cottage Lake Creek, and Bear Creek (King County 2000). The Bear Creek Basin Plan indicates that chinook and coho have been found in Daniels Creek, Cottage Lake Creek, and Bear Creek. However, a manmade barrier is reported downstream of Cottage Lake (King County 2000). In addition, a weir constructed at the outlet of Crystal Lake, blocks access of anadromous fish to this lake and areas upstream of this lake. The outlet of Crystal Lake is the boundary of the action area for this subbasin.

2.1.4 Analysis of Effects

In this analysis, which relies on the Habitat Approach (NMFS 1999), NOAA Fisheries evaluates the changes to chinook habitat caused by the proposed action. By examining the effects of the proposed action on the components of a species' habitat, NOAA Fisheries can gauge how the action will affect the population, allowing a determination of whether or not the effect of the action on the ESU constitutes jeopardy.

This effects analysis includes the probable direct and indirect effects of the action on chinook salmon "together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." (50 CFR 402.02.)

2.1.4.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated. Direct effects include the effects of other activities that are interrelated or interdependent with the action, that will be added to the baseline. (50 CFR 404.02.)

Listed chinook will experience direct effects from the proposed project as they will be present in the action area during project construction. Characteristics of their life history for the Snohomish River indicate that up to one third of juvenile chinook stay in the Snohomish River system for one year before migrating to the ocean (Myers 1998).

Generally, the direct effects of the project include water quality degradation from construction activities and stormwater discharges, permanent and temporary loss of riparian vegetation, temporary loss of wetlands, and injury or mortality to fish from worksite isolation practices. The construction activities include excavation of approximately 526 cubic yards (approximately 46 linear feet) of river bank, and placement of approximately 409 cubic yards of riprap in the riparian zone. The riprap will form the channel for the outfall pipe to the river and form the outfall pad. The WSDOT will install a cofferdam in the work area prior to outfall construction to isolate the work area from the river. Additional stormwater generated by the project will bypass natural routes and be piped directly to the Snohomish River without detention. Moreover,

stormwater runoff from storm events larger than the six-month, 24-hour event will be discharged without detention or complete treatment, which will periodically degrade water quality. The construction activities similarly result in vegetation removal. The worksite isolation activities require handling of fish. The effects on fish are described in greater detail below.

2.1.4.1.1 Water Quality

The project involves construction elements that will affect water quality. Specifically chinook will experience temporary increases in turbidity and sediment levels during construction associated with grading and excavation to extend the existing culverts, replacement of the seven culverts in Evans, Anderson, and Elliott Creeks, outfall construction in the Snohomish River basin, and construction of wetland mitigation sites. Within the Bear Creek subbasin, turbidity and sediment levels may increase during construction of stormwater treatment facilities and wetland mitigation. By using erosion control measures described in the BA, and by complying with WDOE's water quality standards and open work windows recommended by WDFW, WSDOT will reduce the likelihood and extent that chinook will be exposed to these effects.

The WSDOT does expect turbid conditions to extend downstream for short periods of time during construction (WSDOT 2002a). While turbid conditions are expected to persist at a detectable level as far downstream as RM 16 (4.5 miles from the project site), adverse effects to listed fish are expected only within a subset of this area. Exceedences of water quality standards for turbidity might extend up to 600 feet from the construction site. Potential short-term negative effects to fish include deposition of fine sediment that can temporarily degrade instream spawning habitat, and loss of intergravel cover (Spence *et al*. 1996). Elevated turbidity levels can reduce the ability of salmonids to detect prey, and can cause gill damage (Sigler 1980; Lloyd *et al*. 1987). Additionally, short-term pulses of suspended sediment have been shown to influence territorial, gill-flaring, and feeding behavior of salmon under laboratory conditions (Berg and Northcote 1985). Overall, the increased turbidity and potential fine sediment deposition are expected to be short-term, transitory, and minor effects associated with construction.

The use of heavy machinery and trucks poses the potential for accidental spills of hazardous materials. Oil or gas could have an adverse impact on chinook if it were to enter the adjacent streams. A Spill Prevention, Control and Countermeasures (SPCC) Plan will be fully implemented to minimize the likelihood of discharge of hazardous materials into any waterbody or other sensitive area.

In the future water quality will be degraded at intervals, as the stormwater facility will only treat runoff up to the six-month 24-hour storm event. Any storm event exceeding this level will discharge with only partial treatment, releasing road contaminants into the river. Stormwater collected from the roadway has the potential to carry a number of toxicants both in solution and in the sediments. Contaminants deposited on roads from automobiles include lubrication system losses, oil, grease, hydraulic fluids, antifreeze, particles from tires and brakes (particles of rubber and metals) (Ruediger and Ruediger 1999). Such runoff can convey pollutants (e.g., polynuclear aromatic hydrocarbons (PAHs) and metals) at concentrations that are toxic to fish (Spence *et al.*

1996). Such contaminant loading will usually not be so concentrated, because of the high the volume of water entering the system during larger storm events, so effects to fish exposed to these contaminants are generally expected to be sublethal.

The proposed project will further degrade water quality by conveying untreated roadway runoff to the ditches and eventually the Snohomish River. While a portion of the stormwater from the proposed project will be conveyed to the stormwater facility (six-month 24-hour event), runoff that exceeds the capacity of the facility (i.e. from storms larger than the six-month storm event) will not benefit from water quality treatment.

2.1.4.1.2 Riparian Vegetation

The project will require the removal of riparian vegetation. Riparian vegetation links terrestrial and aquatic ecosystems, influences channel processes, contributes organic debris to streams, stabilizes streambanks, and modifies water temperatures (Gregory *et al*. 1991). On small streams, the removal of vegetation can result in increased water temperatures. Loss of vegetation might also reduce allochthonous inputs to the stream. Woody debris provides essential functions in streams including the formation of habitats. Additionally, the removal of streambank vegetation can decrease streambank stability and resistance to erosion.

The WSDOT will remove up to 6,300 square feet of riparian vegetation from Evans, Anderson and Elliott creeks. Approximately 1,047 deciduous and coniferous trees will be removed from the project corridor, including 403 trees within the riparian zones of Evans and Elliott creeks. During outfall construction WSDOT will remove approximately 1,840 square feet of riparian vegetation in order to placed pipe and riprap. The riprap pad will permanently reduce the function of, and fragment, the riparian zone, reducing its value as chinook habitat. Additionally, WSDOT will relocate approximately 820 linear feet of the unnamed Bear Creek tributary, which also necessitates riparian vegetation removal. Chinook will experience both habitat degradation and loss of available habitat from the removal of riparian vegetation in these locations. However, WSDOT will minimize the temporal extent of these effects by planting native vegetation and coniferous trees in the disturbed riparian areas, as well as 1,047 at the two proposed wetland mitigation sites.

2.1.4.1.3 Wetlands

The WSDOT's project requires the fill of 2.96 acres of wetland. Filling the wetlands can decrease water quality and habitat value in streams within the subbasin. Because salmon benefit from wetlands as a source of water recharge, flood attenuation, and water pollutant reduction, Puget Sound chinook will experience habitat degradation from the fill of wetlands. However, WSDOT will reduce the duration that Puget Sound chinook will experience this type of habitat degradation by building two wetland mitigation sites. Site 1 is in unincorporated Snohomish County adjacent to the north side of Maltby Community Park. Soils near the unnamed stream are classified as Norma loam, which is listed as hydric and is not expected to produce silt or sediments. Surrounding upland soils are Alderwood Gravelly Sandy Loam. The site is within the

headwaters of the unnamed Bear Creek tributary that flows through the Paradise Lake Road intersection site, but active overland flow is limited to several braided channels. The unnamed Bear Creek tributary is intermittent for most of its length within and downslope from the mitigation site, and there are no protected aquatic species.

Wetland mitigation Site 2 is located at the intersection of Downes Road and Fales Road, northwest of the intersection. This approximately three-acre site is a vacant residential parcel surrounded by wetlands. Much of the mitigation site currently consists of fill, and mitigation would consist of removing the fill, and excavating down to an elevation that matches the adjacent wetlands to create a mosaic of shallow depressions fed by seasonal high groundwater. Native emergent plants, trees, and shrubs would be planted in patches to create a diversity of habitat types within the wetland. The WSDOT will provide buffers of at least 50 feet between the wetland restoration site and the adjacent roads. Following construction of the new interchange, this area will be bounded by realigned Downes Road to the north and west, the re-aligned Fales Road to the east, and the SR 522 ramps to the south. The WSDOT will isolate mitigation site construction or planting operations will be isolated and have no impacts to sensitive habitat or species.

The mitigation sites will perform a variety of ecological functions including storing stormwater, improving water quality, and providing habitat for small mammals, birds, and possibly amphibians. This would offset loss of wetland functions due to filling other wetlands in the project vicinity. Per WSDOT policy, these mitigation sites will not be converted to other development uses without appropriate regulatory compliance.

Fill material to be placed in wetlands will conform to WSDOT standards and must originate in WSDOT approved sites. Generally, the selection of a site for fill material is left to the contractor. Only under extraordinary circumstances would WSDOT dictate a specific fill source. Fill for the SR 522 project will originate from one or more of the sites within a ten-mile radius of the project. No WSDOT-approved fill sources in the WSDOT Northwest Region (King, Snohomish, Skagit, Whatcom, Island Counties) mine fill from sensitive habitat such as stream floodplains (WSDOT 2002a).

2.1.4.1.4 Worksite Isolation

Worksite isolation is used to minimize effects to chinook by decreasing the likelihood that they will directly encounter construction activities while in progress. It also serves to prevent sediments from migrating into the river column, reducing fish exposure to turbid conditions, and sedimentation of spawning areas.

The construction of culvert extensions, new culverts, and the new outfall will require worksite isolation and possible fish handling. Chinook present during construction will experience temporary exclusion from usable near shore habitat when water is detoured through bypass pipes or excluded with cofferdams. Fish that are isolated in the work area must be removed, and returned to the river, therefore handling is expected to occur. Exclusion nets and electroshocking

may be used. Chinook capture, handling and relocation, if required, will take place at approximately RM 20 of the Snohomish River and occur on no more than two days, between July 1, 2004 and September 1, 2004. Outfall construction activities will also require the installation of a cofferdam along approximately 50 feet of the Snohomish River in order to isolate and dewater instream habitat. These activities may require capture, handling, and relocation of chinook, if they are trapped behind the cofferdam. Nets and electroshocking may be used to capture fish and return them to the river.

While the length of exposure to these activities is likely to be short, this type of handling is known to result in injury and/or mortality of individual fish. Handling stress, trauma from seines and dip nets, and electroshocking can result in some injury and death. Mortality from capture and handling of fish, including chinook salmon, may be immediate or delayed.

2.1.4.1.5 Interrelated and Interdependent Actions

An interrelated action is one that is part of the proposed action, or depends on the proposed action for its justification. An interdependent action is one that has no independent utility apart from the proposed action (50 CFR 402.02).

The WSDOT's proposed improvements to SR 522 will include establishment of temporary equipment storage and staging areas. Equipment staging and storage will be established in areas that are not wetlands or other known sensitive areas. Two locations are currently under consideration for staging. Site 1 is south of the Paradise Lake Road intersection; this location is currently a fallow agricultural area. Site 2 is south of SR 522 and west of Echo Lake Road. There are no streams or wetlands within 300 feet of either of these sites, however, the second site appears from aerial photographs to be mature forest (WSDOT 2002a). Because the locations of these sites are well away from water, no effects to fish are expected from the temporary staging or storage areas.

2.1.4.2 Indirect Effects

Indirect effects are those that are caused by, or will result from, the proposed action and are later in time but are still reasonably certain to occur (50 CFR. 402.02). Indirect effects include actions that do not require section 7 consultation but are reasonably certain to occur, or are a logical extension of the proposed action.

The project is a road widening project that will increase transportation capacity. Land use patterns are influenced by availability and capacity infrastructure necessary to support growth, such as roads. Subsequent alteration of land use patterns in the action area should be expected as an indirect effect of the SR 522 improvements. The widening is likely to affect the rate and scope of land use changes; the environmental alterations associated with these land use changes will affect chinook in the action area.

The proposed project is likely induce growth in rural Snohomish County, particularly in the

vicinity of the improved interchanges. "New capacity is defined as an increased ability for the transportation system to handle traffic volumes. New roadways or significant changes to capacity or land access have the potential for indirect effects to listed species and their habitat, because they can potentially cause changes in land development by altering access to land." Examples of "significant changes" includes the addition of lanes to a roadway (WSDOT 2001). The area surrounding the Paradise Road interchange, near Maltby, and the Fales Road interchange is "expected to change from a rural character to a more urban character" as consequential to the proposed improvements (FHWA and WSDOT 1994). Snohomish County (2003) considers this area a rural/urban transition area and expects that a mix of growth will include commercial/retail, residential development of varying densities, and manufacturing and industrial land uses (FHWA and WSDOT 1994; Snohomish County 2003). The FHWA and WSDOT (1994) expect that the proposed project will provide the necessary infrastructure to support this growth, and would also increase the "pressure to develop underdeveloped property and vacant land."

The Washington State Growth Management Act directs agencies such as Snohomish County, WSDOT, and others, to develop regional strategies for transportation systems that complement land-use goals. The regional transportation organizations provide a forum for coordinating the diverse ambitions of the regions, counties, towns, cities, and other agencies (RCW 47.80.010). Inherent in this approach is an understanding that transportation projects can indirectly influence intraregional land development decisions. In 2002, the National Cooperative Highway Research Program (NCHRP) identified this as one of three primary ways that transportation projects induce growth. In California, Cervero confirmed that road improvements induce land-use shifts along the affected corridor over time, and that the improvements in travel operating speeds influenced development shifts twice as much as lane additions (Cervero 2001). He also found that this development shift resulted in a feedback loop increasing demand for additional road investment decisions.

General conditions that influence the likelihood that induced development shifts would occur include: land availability and price; the state of the regional economy; area vacancy rates; location attractiveness; local political/regulatory conditions; land-use controls; and the extent and maturity of existing transportation infrastructure (NCHRP 2002). A number of these conditions are favorable for development changes in the vicinity of the proposed project. This, plus the expectation that rate of growth and scope of the development would be slowed and restricted were the project not constructed, is sufficient to warrant an analysis of the potential effect of growth on listed species and their habitats (NCHRP 2002; FHWA and WSDOT 1994).

Further, the facilitation of the ongoing and anticipated growth resulting from these proposed road and interchange improvements has been illustrated through the lifting of building moratoria and amendments to Snohomish County Code (Snohomish County 2002). Since August 1999 Snohomish County had imposed building moratoria on certain types of land-uses that threatened to worsen the already poor level of service standards on Paradise Lake Road from Maltby to SR 522 (Unit 354), and a similar moratoria had been place on Echo Lake Road from North Echo Lake Road to SR 522 (Unit 266) since August 2000 (Snohomish County 2002). At the time the BA was submitted to NOAA Fisheries, Snohomish County was extending a building moratorium

to medium and large developments that would add three new trips during peak hours on these arterials. Changes to the ordinance (in early 2001) allowed Snohomish County to consider the effect of the interchange improvements proposed by FHWA and WSDOT on the level of service of these arterials (Snohomish County 2002). This remedied the deficient level of service rating for the arterials and the building moratoria was lifted.

For these reasons, NOAA Fisheries has determined that the proposed project would contribute to growth within the area, and has evaluated such growth as an indirect effect of the proposed project. Quantitative data to distinguish between future development as a result of the proposed action and development unrelated to the proposed action are not readily available. Nevertheless, it is reasonably certain that development will convert existing vegetated landscape to new uses and create new impervious surface within the action area. Increased stormwater flows associated with impervious area will have potential effects on water quality and quantity, erosion and sediment transport, and channel morphology. Increased development will affect the functional processes that maintain and create salmonid habitat in the same manner that historical development throughout the region created unfavorable habitat conditions that have contributed to the listing of the ESU.

2.1.5 Cumulative Effects

Cumulative effects are defined 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" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

NOAA Fisheries focused the analysis on the changes in land use that could be expected under a future full build-out scenario based upon current zoning. This build-out scenario is established by information gathered from Snohomish County's Comprehensive Plans, the Transportation Permit Efficiency and Accountability Committee (TPEAC) study using this project as an example, and studies done by Hill, Botsford, and Booth (Hill 2000). The studies and analyses concluded that medium to high density growth is anticipated in the action area. The possible range of potential effects related to this expected development scenario include changes in subbasin hydrology related to loss of forest cover and increase in impervious surface coverage, which yield changes in water quantity and quality, including pollutants, temperature change, and increased sedimentation.

NOAA Fisheries assumes that future private and State actions will continue within the action area, but at increasingly higher levels, as population density increases. NOAA Fisheries believes the majority of environmental effects related to future growth will be linked to land clearing, associated use shift (e.g., from forest to lawn/pasture and impervious surface) and related changes. Land use changes and development of the built environment are likely to continue under existing zoning. Further, NOAA Fisheries believes that the existing local and State regulatory mechanisms to minimize and avoid impacts to watershed function and listed species

from future commercial, industrial, and residential development are generally not adequate, and/or are not implemented sufficiently. Thus, while these existing regulations could significantly lower the expected rate of increase in adverse effects to watershed function, they still allow incremental degradation to occur, which accumulates over time. These cumulative effects, when added to the degraded environmental baseline, might result in degraded conditions that reduce both habitat quantity and quality for listed species.

2.1.6 Conclusion

NOAA Fisheries has determined that the effects of the proposed action are not likely to jeopardize the continued existence of Puget Sound chinook, based on the following: (1) timing restrictions for construction and a fish removal protocol together will minimize potential take of fish by significantly reducing their exposure to transient construction impacts; (2) installing and maintaining stormwater facilities will minimize the effects of increased impervious surface; (3) planting 1,047 coniferous trees to replace the 1,047 trees removed during project construction will reduce the duration of loss of habitat values provided by mature tree cover; (4) creation and rehabilitation of 4.36 acres of adjacent wetland and wetland buffer will reduce the duration of loss of habitat values provided by functioning wetlands.

NOAA Fisheries used best available scientific and commercial data in this analysis. The analysis was conducted by evaluating the expected effects of the proposed action on habitat elements of the species' biological requirements, and on the species itself, then adding these together with cumulative effects and effects from the baseline conditions.

2.1.7 Reinitiation of Consultation

The FHWA must reinitiate consultation if: the amount or extent of taking specified in the Incidental Take Statement is exceeded or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed, or habitat is designated, that may be affected by the action (50 CFR 402.16). Specifically, if WSDOT does not employ BMPs, construct the wetland mitigation, or replant the vegetation as described in the biological assessment, the project may affect species in a way not previously considered, requiring reinitiation of consultation.

2.1.8 Conservation Recommendations

Section 7(a)(1) of the ESA directs the Federal agencies to utilize their authorities to further the purposes of ESA by carrying out programs for the conservation of endangered and threatened species. The conservation recommendations provided here are discretionary activities FHWA could employ to minimize or avoid adverse affects to a proposed action in listed species or critical habitat, to help implement recovery plans, or to develop information. NOAA Fisheries recommends the following conservation measures to the FHWA when designing future SR 522 projects.

These are as follows:

1. Relocate the outfall to the Snohomish River downstream, placing it in the wetland on the adjacent property owner's land in order to utilize natural flow through the wetland into the side channel of river. This would create habitat as well as minimize the effects of the stormwater without the placement of riprap in the Snohomish River and associated riparian area.

2. For transportation infrastructure projects that facilitate or accommodate planned development, develop partnerships with the local jurisdictions to facilitate the exchange of local knowledge and information. Commit resources and engage the local jurisdiction(s) in joint efforts to enhance, restoration and preserve upland, riparian and stream habitat that support forage, migratory and overwintering chinook salmon. Additional land, preserved by easements, covenants, or deed restrictions not to be developed in the future, should be provided to offset potential effects to stream base flows.

3. For in-water structures that require the use of riprap, incorporate "fish friendly" structures (e.g. rootwad, LWD).

4. Encourage the development and use of "non-engineered" stormwater solutions. Suggestions for this include:

    a. A combination of traditional stormwater treatment and habitat restoration and enhancement that meet "quality" and "quantity" treatment requirements. Habitat restoration and/or enhancement could provide detention or "quantity" treatments beyond just minimizing peak flows.
    b. Permanent removal of impervious surface, and restoration of soils and vegetation to increase water storage capacity and infiltration, thus recharging aquifers, groundwater and base flows while reducing the amount of water reaching the ground and becoming "stormwater."
    c. Provide low impact development (LID) incentives (e.g., fee reductions). Implementation of LID measures such as rooftop treatments (i.e., rooftop gardens), can reduce and slow runoff, increase quality treatment and minimize the amount of land that might be needed for more traditional treatments (i.e. stormwater ponds).

5. Follow the COE Programmatic (WSB-01-197) standards for culvert replacement.

2.2 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that actually kills or injures listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 CFR 222.102). Incidental

take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking, provided that such taking is in compliance with the terms and conditions of the incidental take statement.

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also specifies Reasonable and Prudent Measures (RPMs) that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the RPMs. The RPMs herein include elements that were described as part of the proposed action. They are restated in the incidental take statement to ensure the action agency understands they are mandatory.

2.2.1 Amount or Extent of Take Anticipated

Puget Sound chinook are likely to use the action area during some periods of the project construction. Construction involves some activities that are likely to modify habitat to an extent that causes harm. Isolation techniques designed to reduce the numbers of fish exposed to habitat modifying activities (e.g., turbid conditions, etc.) can result in injury and death of listed fish. Therefore, the proposed action is reasonably certain to result in incidental take of Puget Sound chinook.

NOAA Fisheries cannot estimate a specific amount of incidental take of individual Puget Sound chinook that would result from habitat modifying activities, despite the use of the best scientific and commercial data available, because there is not a strict relationship between habitat conditions and the numbers of fish that may be present in a given location. As a surrogate for estimating the number of fish harmed by habitat modifying elements of the proposed action, NOAA Fisheries has estimated the extent of habitat affected by those activities. The estimated extent of habitat affected by construction activities (e.g., amount of riverbank and streambed covered by riprap, and spatial extent of riparian vegetation removed as a result of outfall construction) are the surrogate measure of the extent of take, and are the thresholds for reinitiating consultation. The downstream extent of harm from temporary habitat degradation caused by turbidity is 600 feet from the outfall construction site. The extent of effects on habitat have been ascertained for the widening project. Take resulting habitat degradation from the fill of class two and three wetlands will not exceed 2.95 acres. Take resulting from riparian conversion and loss of habitat within the OHW of the Snohomish River will not exceed the combined total of 1,742 square feet.

Similarly, difficulties in projecting how many fish might be present in the area at the time construction is scheduled to commence, renders it difficult to estimate the numerical amount of take caused by site isolation,electrofishing, and direct handling of fish to replace them instream below the worksite (techniques intended to reduce the exposure of fish to other habitat modifying acitivities in the action area). Because of the timing restrictions and short duration of in-water construction, NOAA Fisheries assumes no more than five fish will be injured, harmed or harassed

by fish handling and electrofishing.

This incidental take statement provides RPMs and related Terms and Conditions to ensure that the likelihood of take from this activity should be adequately minimized, if not avoided.

2.2.2 Reasonable and Prudent Measures

The NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of Puget Sound chinook salmon:

1. The FHWA shall minimize take caused by removal of riparian trees, vegetation, and wetlands.

2. The FHWA shall minimize take caused by water quality and water quantity impacts.

3. The FHWA shall minimize take caused by capturing, handling, and releasing fish.

4. The FHWA shall minimize take caused by the construction of the stormwater treatment facility outfall to the Snohomish River.

2.2.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the take prohibitions of ESA section 9, the FHWA must comply with the terms and conditions that implement the reasonable and prudent measures. The terms and conditions are non-discretionary.

To implement RPM No.1, FHWA shall ensure that:

1. Monitoring measures for riparian revegetation and wetland mitigation described in this document and the BA will be implemented. The FHWA shall be responsible for mechanical maintenance and monitoring of the rehabilitated area after the plants have been maintained for 10 years.

   a. If monitoring of the wetland mitigation site determines that by the tenth year the survival of plant materials is less than 80% (by stem count or aerial cover), contingency measures shall be taken. Contingency measures shall consist of: replanting dead or dying plant material with the same species; replacing dead or dying plant material with a more suitable species; and/or irrigation as necessary.
   b. Plant materials used in the wetland mitigation should be collected in or grown from stock originating in the same geographic area as the project. Such materials will more readily adapt to recipient site conditions, have survival rates superior to nursery-grown stock imported from other areas, and help protect the genetic integrity of the regions flora. Should plant materials be collected from natural donor sites, harvest should not occur from plants that overhang streams, wetlands, or other water bodies.
   c. A wetland mitigation monitoring report will be submitted for 10 years, in years 1, 3, 5, 6, 7

and 10 by the end of the February. Monitoring reports should address at a minimum:

i. Date of site visit(s).
ii. Maintenance and monitoring activities to date.
iii. Status of the achievement of success standards.

2. The location of secondary project features (e.g., staging areas, waste sites, and stockpile sites) that are not currently known will be identified by the project contractor who is responsible for obtaining and/or compliance with all permits and regulations. FHWA or WSDOT shall ensure through site inspection that staging, waste sites, and/or stockpile areas:

a. Will not be located in delineated wetlands.
b. Will not be located within 300 feet of any waterbody if closer proximity creates the potential for material to enter the aquatic systems, but in no case less than 150 feet.
c. Will not require clearing and grading of functioning forested habitat (e.g., the removal of mature native forest).

If WSDOT cannot meet the above criteria for locating secondary project features, then a biologist from FHWA or WSDOT shall contact NOAA Fisheries to determine if additional mitigation will be necessary.

To implement RPM No. 2, FHWA shall ensure that:

1. Stormwater facilities undergo regular and extensive maintenance to ensure their effectiveness in preserving water quality and quantity.

2. A compliance report on BMP implementation will be submitted annually by December 31, 2003, 2004, and 2005, and should address at a minimum:

a. Date of site visit(s).
b. Extent and status of BMP implementation as per the TESC and SPCC plans.

3. An annual report on the sand filter stormwater facility effectiveness will be submitted for the first five years following construction of the facility. The report should at a minimum include:

a. Date of site visit(s) (no fewer than once per year).
b. Maintenance and monitoring activities to date.
c. A comparison of turbidity, pH, temperature and dissolved oxygen measurements over time.
d. Percent of flow that bypassed detention facility for the storm events.

4. In the absence of WDOE's's issuance of a Short-Term Modification of water quality standards, the downstream limit of harm to listed fish caused by turbidity is 300 feet from the outfall construction site.

To implement RPM No. 3, FHWA shall ensure that:

1. Chinook will be handled with extreme care and kept in the water to the maximum extent possible during handling and processing procedures. Circulation and replenishment of water in holding units is required, and shaded containers and supplemental oxygen should be available on site.

2. All juvenile chinook captured during water diversion shall be returned to the stream (outside the block-net area) as close to the area of capture as possible. Young-of-the-year salmonids shall be held in buckets separate from other fish to avoid predation by other fish during transfer.

3 The WSDOT provides NOAA Fisheries Habitat Branch office in Lacey, Washington, written notification 10 working days prior to the initiation of electrofishing. A fish biologist shall observe the condition of handled fish. Seining will be the method used first to remove fish, followed by electroshocking if necessary.

   a. If fish appear stressed or injured (dark bands, gulping air, excessive mucus, irregular swimming, or bucket predation), immediately halt handling and decrease the frequency and voltage.
   b. Electrofishing, if necessary, will be conducted following the National Marine Fisheries Service's June 2000 Backpack Electrofishing Guidelines.
   c. If more than five listed fish are encountered in the worksite isolation area, WSDOT shall contact NOAA Fisheries prior to handling these fish, or conducting any further construction related activities.

4. A report on dewatering and fish handling activities will be submitted within 30 days of handling fish. The report on fish handling activities should at a minimum include:

   a. Number and types of fish captured and moved.
   b. Habitat conditions at the time of dewatering and fish handling activities (i.e., water temperature, ambient air temperature and weather conditions, stream turbidity).
   c. Number of known or suspected fish mortalities.

To implement RPM No. 4, FHWA shall ensure that:

1. In-water construction will be limited to three weeks, to occur between July 1 - September 1, 2004.

2. No more than 553 cubic yards of streambank material will be excavated (526+5percent) and no more than 430 cubic yards (409+5percent) of riprap shall be placed for the riprap pad at the outfall to the Snohomish River.

3. The placement of the riprap not extend beyond 50 linear feet parallel to the Snohomish River.

4. For each of the first five years following outfall construction, WSDOT submits by the end of July to NOAA Fisheries a monitoring report documenting the condition of the riprap. Reports should include information on riprap condition following major storm events, described below:
   a. The United States Geological Survey (USGS) River Gauge "12150800 Snohomish River Near Monroe" reaches 55,000 cubic feet per second (cfs), which is a channel-forming event (pers. comm. Aldrich).
   b. When stormwater bypasses the sand filter (e.g., in storm events exceeding the six month/24 hour flow).

   The report will describe the stability of the two to one (vertical to horizontal) slope of the outfall, and if the riprap has been displaced or shifted to areas outside the originally constructed footprint.

The following terms and conditions are required for implementation of all RPMs:

1. All requested reports should reference NOAA Fisheries number: WHB 02-143 and be sent to NOAA Fisheries, 510 Desmond Drive SE, Suite 103, Lacey, WA 98503. This provision is incorporated here by reference as a Term and Condition of this Incidental Take Statement.

2. A qualified biologist will conduct a site inspection prior to construction and will be present on site as often as needed to assure compliance with the regulatory requirements of this project.

3. NOAA Fisheries is to be notified within three working days upon locating a dead, injured, or sick Puget Sound chinook. Initial notification must be made to the nearest NOAA Fisheries Law Enforcement Office at 360-753-4409. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

4. Monitoring reports can be consolidated into a single document.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- 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 (§305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or State activity that may adversely affect EFH (§305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must 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 must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook, coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.2 and 1.3 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook, coho, and Puget Sound pink salmon.

3.4 Effects of Proposed Actions

As described in detail in Section 2.1.4 of this document, the proposed action may result in detrimental short- and long-term impacts to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of habitat due to removal of riparian trees and vegetation.

2. Short-term degradation of salmonid habitat due to wetland loss.

3. Long-term loss of stream channel due to the installation and extension of culverts.

4. Long-term loss of near shore habitat due to outfall construction and rip rap placement below OHW.

5. Long-term water quality impacts to the Snohomish River when stormwater facility bypassed during greater than six month/24 hour storm events.

6. Short-term degradation of water quality from sediment delivery and accidental releases of chemical contaminants (i.e., petroleum products).

7. Short-term degradation of salmonid habitat during dewatering of the streams and work area of the Snohomish River.

Additional potential short- and long-term adverse effects to EFH, not addressed in the Biological Opinion, include:

8. Long-term loss of baseflow attenuation in Evans, Elliott and Anderson Creeks by stormwater being bypassed to the new stormwater facility.

3.5 Conclusion

NMFS concludes that the proposed action would adversely affect designated EFH for Puget Sound chinook, coho, and pink salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation

recommendations to Federal agencies regarding actions which may adversely affect EFH. NOAA Fisheries understands that the conservation measures described in the Biological Assessment will be implemented by the FHWA, and believes that these measures are sufficient to minimize the short-term degradation of water quality (EFH Effect No. 6). However, NOAA Fisheries does not believe that these conservation measures are sufficient to address the remainin adverse impacts to EFH described above. Consequently, NOAA Fisheries recommends that the FHWA implement the following conservation measures to minimize the potential adverse effects to designated EFH for Pacific salmon (most of these recommendations also appear as Terms and Conditions in Section 2.2.3 of this document):

1. To minimize adverse effect to EFH No. 1 (removal of riparian trees and vegetation) and No. 2 (degradation due to wetland loss), the FHWA should implement the following:

   a. The FHWA should be responsible for mechanical maintenance and monitoring of the rehabilitated area after the plants have been maintained for 10 years.

   b. If monitoring of the riparian vegetation mitigation site determines that by the tenth year the survival of plant materials is less than 80% (by stem count or aerial cover), contingency measures should be taken. Contingency measures may consist of: replanting dead or dying plant material with the same species; replacing dead or dying plant material with a more suitable species; and/or irrigation as necessary.

   c. Plant materials used in the riparian vegetation sites should be collected in or grown from stock originating in the same geographic area as the project. Such materials will more readily adapt to recipient site conditions, have survival rates superior to nursery-grown stock imported from other areas, and help protect the genetic integrity of the regions flora.

   d. The FHWA should locate secondary project features (e.g., staging areas, waste sites, and stockpile sites) such that:

      i. They are not located within 300 ft of any waterbody where there is the potential for riparian vegetation to be removed; and
      ii. They do not require clearing and grading of functioning forested habitat (e.g., the removal of mature native forest).

   e. For transportation infrastructure projects that facilitate/ accommodate planned development, FHWA should develop partnerships with the local jurisdictions to facilitate the exchange of local knowledge and information. Commit resources and engage the local jurisdiction(s) in joint efforts to enhance, restorate and preserve upland, riparian and stream habitat that support forage, migratory and overwintering chinook, coho, and Puget Sound pink salmon.

2. To minimize adverse effect to EFH No. 3 (long-term loss of stream channel from installation and extension of culverts), the FHWA should:

a. Incorporate "fish friendly" structures (e.g. rootwad, LWD) for in-water structures that require the use of riprap; and

b. Follow standards for culvert replacement outlined in the Biological Opinion for the Corps of Engineers' Programmatic Consultation for Permit Issuance for 4 Categories of Fish Passage Restoration Activities in Washington (WSB-01-197). The Opinion can be found at http://www.nwr.noaa.gov/1publcat/bo/2001/wsb01-197.pdf.

3. To minimize adverse effect to EFH No. 4 (loss of near shore habitat), the FHWA should:

a. Excavate no more than 553 cubic yards (526 + 5 percent) of streambank material, or place no more than 430 cubic yards (409+5 percent) of riprap for the outfall to the Snohomish River.

b. Place riprap so that is does not extend beyond 50 linear feet parallel to the Snohomish River.

c. Submit a monitoring report for the first five years following construction of the outfall which documents the stability of the riprap. It should be provided to NOAA Fisheries by the end of January for that year, when:

i. The United States Geological Survey (USGS) River Gauge "12150800 Snohomish River Near Monroe" reaches 55,000 cubic feet per second (cfs) which is a channel-forming event (pers. comm. Aldrich).
ii. Stormwater bypasses the sand filter when the storm event exceeds the six month/24 hour flow.

The report should include the stability of the two to one (vertical to horizontal) slope of the outfall and if the surface now covered by the riprap has expanded from the original, constructed footprint.

d. Relocate the outfall to the Snohomish River downstream to the wetland on the adjacent property owner's land to utilize natural flow through the wetland to the side channel to river. This would create habitat as well as minimize the effects of the stormwater without the placement of riprap in the Snohomish River and associated riparian area.

4. To minimize adverse effect to EFH No. 5 (water quality impacts in the Snohomish River), the FHWA should:

a. Submit a report to the Washington Habitat Branch, Lacey, WA, on the effectiveness of the sand filterr stormwater facility, at the end of the 3 year monitoring period. The report should, at a minimum, include:

i. Date of site visit(s).
ii. Maintenance and monitoring activities to date.
iii. A comparison of turbidity, pH, temperature and dissolved oxygen measurements

over time.

iv. Percent of flow that bypassed detention facility for the storm events.

b. Encourage the development and use of "non-engineered" stormwater solutions. Suggestions for this include:

i. A combination of traditional stormwater treatment and habitat restoration/enhancement that meet "quality" and "quantity" treatment requirements. Habitat restoration and/or enhancement could provide detention or "quantity" treatments beyond just minimizing peak flows.

ii. Permanent removal of impervious surface and/or other impacted areas, and restoration of soils and vegetation to increase water storage capacity and infiltration, thus recharging aquifers, groundwater and base flows while reducing the amount of water reaching the ground and becoming "stormwater."

iii. Provide low impact development (LID) incentives (e.g., fee reductions). Implementation of LID measures such as rooftop treatments (i.e., rooftop gardens), can reduce and slow runoff, increase quality treatment and minimize the amount of land that might be needed for more traditional treatments (i.e. stormwater ponds).

5. To minimize adverse effect to EFH No. 7 (salmonid habitat degradation during dewatering), FHWA should:

a. Limit in-water construction to three weeks, to occur between July 1 - September 1, 2004.

6. To minimize the adverse effect to EFH No. 8, (base flow attenuation), FHWA should implement the following:

a. As discussed in the First Draft SR 522 Stage 2 & 4 Hydraulic Report, additional land not to be developed in the future, should be provided to offset potential affects the project development may have on stream base flows.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed

to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(k)).

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