PROGRAMMATIC BIOLOGICAL ASSESSMENT (PBA) FOR THE FEDERAL TRANSIT ADMINISTRATION REGION X

NATIONAL MARINE FISHERIES SERVICE

OREGON STATE BRANCH OFFICE
&
IDAHO STATE BRANCH OFFICE

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Appendices

ACRONYMS

BA	Biological Assessment
BE	Biological Evaluation
BMP	Best Management Practice
CE	Categorical Exclusion
CH	Critical Habitat
DO	dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FHWA	Federal Highway Administration
FR	Federal Register
FTA	Federal Transit Administration
HRM	Highway Runoff Manual
ITS	Intelligent Transportation Systems
LAA	May affect, likely to adversely affect
LWD	large woody debris
MPI	Matrix of Pathways and Indicators
MSA	Magnuson-Stevens Act
NE	No Effect
NEPA	National Environmental Policy Act
NLAA	May affect, not likely to adversely affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OHWM	Ordinary High Water Mark
PBA	Programmatic Biological Assessment
SPCCP	Spill Prevention Control and Countermeasure Plan
SSP	Stormwater Site Plan
TESC	Temporary Erosion and Sedimentation Control
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

1.0 EXECUTIVE SUMMARY

The Federal Transit Administration (FTA) provides financial and technical assistance to local public transportation systems. These systems include buses, light and heavy rail systems, ferryboats, commuter rail, monorails, and other types of public mass transit. Implementing legislation and FTA policy require that any environmentally related study, review, or consultation required by Federal law be conducted within the framework of the National Environmental Policy Act (NEPA) process (65 FR 33960). This includes the protections of the Endangered Species Act (ESA) of 1973, as amended (7 U.S.C. 136, 16 U.S.C. 1531 to 1543). This also includes the protections of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976, as amended (16 U.S.C. 1801 et seq.).

Section 7 of the ESA requires federal agencies to conserve endangered and threatened species and their designated critical habitat. It also requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS) if they determine that any action they fund, authorize, or carry out may affect a listed species or designated critical habitat. For FTA, the "action" is the Department of Transportation (DOT) grant authorization. Consultation with NMFS is required for projects affecting marine, estuarine, and anadromous fishery resources and their habitats. This document addresses potential effects on proposed, listed, and candidate species under the jurisdiction of NMFS.

To determine whether a project or action will affect a listed or proposed species, to determine whether informal or formal consultation with NMFS is required, and to achieve compliance with ESA, a biological assessment (BA) is generally required. Section 7(c) of the ESA requires that a BA be prepared for "major construction projects" if any of those species or their critical habitats are present in the proposed action area.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of Essential Fish Habitat (EFH) descriptions in Federal fishery management plans. The Federal Transit Administration (FTA) and all other federal agencies are required to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect EFH. MSA requires the Federal agency to provide a written response to NMFS' EFH conservation recommendations within 30 days of its receipt of this letter. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with NMFS' conservation recommendations, the reasons for not implementing them must be included.

Proposed Department of Transportation regulations (65 FR 33960) describe the practice of using programmatic environmental approvals as one way of addressing recurring situations in a streamlined manner. Programmatic approvals are particularly useful for meeting ESA requirements for uncomplicated and non-controversial projects.

This Programmatic Biological Assessment (PBA) has been developed to: 1) meet section 7 consultation requirements for evaluating impacts of certain types of FTA-funded projects in Oregon and Idaho on threatened and endangered species for which ESA is administered by the NMFS, and 2) meet MSA consultation requirements for evaluating potential adverse impacts to EFH.

This document describes:

?? How the PBA is intended to be used (Section 2.0);

?? The types of FTA-funded activities to be covered by the PBA (Section 3.0);

?? Listed, proposed, and candidate species, their habitat requirements, and species life histories (Section 4.0);

?? Potential adverse impacts to ESA-listed species and habitat resulting from these activities (Section 5.0);

?? Conservation measures that avoid, minimize, or otherwise offset, potential adverse affects (Section 6.0);

?? Effect determinations for each species and project type (Section 7.0); and

?? Potential adverse effects of the proposed class of actions on Essential Fish Habitat, including proposed conservation measures to avoid, minimize, or otherwise offset, potential adverse affects (Section 8.0).

2.0 INTENT OF USE

This section describes how the PBA will be used to determine environmental impacts on certain types of FTA-funded projects. Many of these projects are minor in nature and separate consultations a) create a substantial workload for both FTA and NMFS, and b) result in similar requirements for project approvals. Projects that meet the scope and intensity of the anticipated work described in the PBA, and which implement the appropriate conservation measures to avoid, minimize, or otherwise offset potential adverse impacts, are addressed. Projects that exceed the scope and intensity of anticipated work described in this PBA are not covered and will require a separate BA. FTA may also decide that a site-specific BA is warranted for highly controversial or high profile projects or for some other reason, even though the project meets the requirements of the PBA.

FTA is consulting with NMFS on a statewide level for all construction activities described herein for impacts that may occur to listed or proposed species within the states of Oregon and Idaho. The goal of this programmatic consultation is to further the protection and recovery of threatened and endangered species through consistent guidelines for construction activities and an abbreviated consultation procedure. FTA understands that if an activity does not meet the description or parameters approved within the final PBA, the activity will go through individual consultation as outlined in section 7 of the ESA.

2.1 Dichotomous Key for PBA Use

1. Does the action include in-water work or work below the ordinary high water mark of a waterbody with listed salmonids, including hydrologically connected off-channel areas?

Yes	Individual consultation required
No	Go to 2

2. Does the action include any new impervious surface within 150 feet of a stream waterbody with listed salmonids?

Yes	Individual consultation required
No	Go to 3

3. Is it reasonably likely that the action (including beneficial activities such as tree planting) results in the adverse modification of critical habitat, or degradation of habitat pathways and indicators (shade, hydrology, nutrient regulation, etc)? Is it reasonably likely that the action result in a temporary or permanent impact on the water quality or riparian vegetation of a waterbody with listed salmonids?

Yes	Individual consultation required
No	Action can be considered for inclusion in the programmatic consultation

(**Note:** If individual consultation is required, the action cannot be included within the scope of this programmatic consultation.)

Actions specifically excluded include:

a. Rehabilitation or reconstruction of bridges, or construction of a new bridge,
b. Modification or replacement of existing bridge with essentially the same alignment or location,
c. Rehabilitation, renovation, or improvement of piers and docks,
d. New construction or major extension of fixed rail transit facilities,
e. New construction or major extension of a separate roadway for buses or high occupancy vehicles not located within an existing highway facility,
f. An inter-city railroad not located within an existing railroad right-of-way,
g. Multimodal or intermodal facilities that includes or requires the above actions.

2.2 Application Process for the PBA

The following steps will be performed by the proposing agency:

1. If it is determined by FTA that potential effects to listed species or critical habitat may occur, qualified project staff will complete an ESA Screening Checklist (Appendix A) to assess whether the project requires a BA.

2. If the project does not require a BA, a finding of "No Effect" should be indicated in the ESA documentation.

3. If a BA is required, qualified project staff will use the "Dichotomous Key for PBA Use" (Section 2.1) to determine whether the project activities fall within the scope of the PBA.

4. If the project activities do not fall within the scope of the PBA, a site-specific BA will be prepared.

5. If the project falls within the scope of the PBA, an ESA Screening Checklist (Appendix A) will be submitted to NMFS. This completes both section 7 consultation and MSA compliance with NMFS for the project.

6. If the project activities or potential effects do not fall within the scope of the PBA, a site-specific BA will be prepared and non-programmatic section 7 consultation shall be initiated with NMFS.

(*Note*: A monitoring program for PBA projects is outlined in Section 2.4 below.)

2.3 Action Area

An "action area" is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (51 FR 19938). The action area includes all areas that could potentially be affected by the covered activities, considering implementation of the required conservation measures described in Section 6.0. The action area will vary based on scale of the project and on the species under consideration. The PBA is intended to cover the species activities throughout Oregon and Idaho. The project-specific action area is to be defined in the ESA Checklist. For fish and aquatic wildlife species, the action area for individual projects would be no more than 2 miles downstream and no more than 0.5 miles upstream of the project area boundary. Beyond these limits, project impacts on water quality, noise, flooding characteristics, and habitat would not affect listed fish and aquatic wildlife species. As noted in Section 2.1, projects involving in-water work are excluded from the PBA and will require a site-specific BA.

Spatial scale of a project relates to the size of the action area. For example, installation of a sign or small passenger shelter is likely to have a much smaller action area (and a lower potential for adverse impacts on listed species) than construction of a bus transfer station or a bus/rail maintenance facility. In addition, impacts of a specific type of project, such as a park-and-ride lot, may vary significantly depending on the size of the lot (e.g., 20 vs. 200 parking spaces).

Projects located within designated critical habitat are also more likely to adversely impact listed species. "Critical habitat" is defined in section 3(5)(A) of the ESA as "the specific areas within the geographic area occupied by a listed species or on which are found those physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection".

Critical habitat may include all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers. Additional critical habitat requirements may include:

1) Space for individual and population growth, and for normal behavior;
2) Food, water, air, light, minerals, or other nutritional or physiological requirements;
3) Cover or shelter;
4) Sites for breeding, reproduction, or rearing of offspring; and
5) Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of the species.

Critical habitat encompasses dozens of major river basins and a variety of essential habitat features. Essential habitat areas include: juvenile rearing areas, juvenile migration corridors, areas for growth and development to adulthood, adult migration corridors, and spawning areas. Within these areas, essential features of critical habitat include adequate: substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions.

Adjacent riparian zones are included as critical habitat. Streams may submerge portions of the riparian zone via floods and channel migration, and portions of the riparian zone may contain off-channel rearing habitats used by juvenile salmonids (65 FR 7768). The riparian area is defined by NMFS as the area adjacent to a stream that provides some or all of the following functions:

?? shade
?? sediment transport
?? nutrient or chemical regulation
?? streambank stability
?? input of large woody debris or organic matter.

Designated critical habitats for each species are described in Section 4.0. The size of the riparian zone will vary from project to project, depending on site-specific conditions. It will be the responsibility of qualified project staff to identify the extent of the riparian zone (and therefore the critical habitat) for a project.

2.4 Monitoring Program for the PBA

The monitoring program for this PBA includes the following steps:

a) An ESA Screening Checklist (Appendix A, Section 2.2 above) will be submitted to NMFS prior to construction. This checklist will document project parameters, potentially impacted species, and mitigation measures for each project.

b) FTA will submit an annual report by December 31st of each year that documents the following information: # annual programmatic consultations, species listed in each individual PBA project area, and the net amount of new impervious surface area per watershed (WRIA) for each PBA consultation. The report will be in Excel format and will include a cover letter to NMFS signed by the FTA Regional Administrator.

3.0 CONSTRUCTION ACTIVITIES

Specific categories of projects that are included in the PBA include:

?? **Construction projects,** including: (a) parking facilities or carpool/vanpool projects, (b) bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks, and other related street improvements) and intermodal transfer facilities, (c) new buildings to house transportation management and control centers, (d) new bus or rail storage or maintenance facilities, (e) bicycle and pedestrian lanes, paths, and facilities, (f) installation of fencing, signs, pavement markings, small passenger shelters, traffic signals, lighting, and railroad warning devices, and (g) landscaping, streetscaping, public art and other scenic beautification.

Potential activities associated with these projects typically include: vegetation removal, minor excavation, grubbing, grading, minor filling (including placement of asphalt or concrete on paved or unpaved ROW), and use of toxic or hazardous materials, including fuel, industrial fluids, paint, uncured concrete, hot asphalt, and hot tar.

?? **Improvement projects,** including: (a) renovation, reconstruction, and improvement of existing rail, bus, ferry, and intermodal buildings and facilities, (b) improvement of existing tracks, railbeds, communications systems, signal systems, security systems, and electrical power systems, including the construction of sidings or passing tracks, (c) transportation safety improvements and programs and hazard eliminations, including projects to mitigate hazards caused by wildlife, seismic retrofit of existing transportation facilities and structures, and modifications pursuant to the Americans with Disabilities Act (e.g., curb improvements), (d) installation of noise barriers or other appropriate alterations to existing non-historic facilities to provide for noise reduction, and (e) incorporation of an Intelligent Transportation Systems (ITS) element into an existing transportation facility.

Potential activities associated with these projects typically include: minor vegetation removal, minor amounts of excavation, grubbing, grading, placement of asphalt or concrete on paved or, rarely, unpaved, ROW, and use of toxic or hazardous materials, including fuel, industrial fluids, paint, uncured concrete, hot asphalt, and hot tar.

?? **Other activities,** including: (a) construction or installation of components of linear projects if ESA documentation for the project as a whole was completed within previous 3 years (e.g., installation of fiber optic cable along a rail line), (b) mitigation of water quality and quantity impacts from a transportation facility's storm water runoff, and (c) geotechnical activities, including soil borings and installation of survey stakes.

Staging areas (generally occurring on previously cleared or developed sites) are needed for stockpiling, loading, and hauling materials and construction equipment. Generally, the property on which the facility is being constructed serves as the staging area. Other staging areas may be needed when the facility property is not large enough.

Materials are generally transported to a project site by truck or rail, and most construction activity uses standard construction equipment such as dump trucks, bulldozers, graders, compactors, paving equipment, backhoes, asphalt grinders, traffic control devices, chainsaws, and cranes.

Contractors may install culverts or other permanent drainage structures during the grading phase. Additionally, underground utility services may need to be relocated during the grading phase.

Potential project impacts and applicable conservation measures related to these and other project elements are discussed in Sections 5.0 and 6.0, respectively.

4.0 POTENTIALLY AFFECTED SPECIES

The PBA addresses listed species (or ESUs) under the jurisdiction of the National Marine Fisheries Service (NMFS). An ESU is a population (or group of populations) that is reproductively isolated from other population units and is of substantial ecological/genetic importance to the species as a whole (NMFS 1991). An ESU is considered a "species" for purposed of ESA.

Several species of marine mammals and sea turtles may occur off the coast of Oregon. However, because these species are extremely rare near shore and because in-water work is beyond the scope of the PBA, they would not be affected by the actions described in this document and are not discussed further.

This section describes each of the ESUs and critical habitat identified in the PBA action area (Oregon and Idaho). Critical habitat for each ESU includes spawning and rearing areas as well as migration pathways.

4.1 Chinook Salmon

4.1.1 General Life History

Chinook salmon (*Oncorhynchus tshawytscha*) are the largest of the Pacific salmon, with individuals over 54.5 kg recorded. Like all Pacific salmon, chinook reproduce in fresh water but spend the majority of their life cycle in the marine environment. Chinook migrate from a marine environment into the fresh water rivers of their birth (anadromous) where they spawn and die (semelparous). Average fecundity for chinook females is about 5,000 eggs (range 2,250 to 7,750) (Meyers et al. 1998). After laying eggs in a redd (spawning bed), adult chinook will protect the redd for 4 to 25 days before dying. Chinook eggs will hatch between 90 and 150 days, depending on water temperatures (NMFS 1998). Fry emerge from the gravel in spring and generally exhibit either ocean or stream-type characteristics. Ocean-type chinook are characterized by a short juvenile fresh water residence time and normally migrate to estuarine areas within their first year, usually around three months after emergence from spawning gravel. In contrast, stream-type chinook typically spend one or more years in fresh water before migrating to the sea.

Estuaries are an important rearing habitat for all species of salmon, but chinook are probably the most dependent of the Pacific salmon species on this type of habitat (Healey 1982). Salmon use estuaries for rearing, as refugia from predators, and as a physiological transition area (Simenstad et al. 1982). Rapid growth also occurs in estuaries because of the abundance of preferred prey. Rivers with well-developed estuaries are generally able to sustain larger ocean-type populations than those without (Levy and Northcote 1982). Juvenile chinook rear in estuaries for a period of days to two months. They range in size from 35 to 160 mm in length when entering the estuary (Beauchamp *et al.* 1983). Stream-type smolts are much larger, averaging 73 to134 mm, than ocean-type smolts, and are therefore able to move offshore more rapidly (Healey 1991). Ocean-type chinook are generally smaller, and tend to utilize estuaries and coastal areas more extensively for rearing than stream-type juveniles (Healey 1991).

Chinook remain at sea for an average of 2 to 4 years, with ocean-type chinook tending to migrate along the coast, while stream-type chinook are found far from the coast in the central North Pacific (Healey 1991, Meyers et al. 1998). Ocean-type chinook typically return to their natal stream a few days or weeks before spawning while stream-type chinook often return to their natal streams several months prior to spawning. Ocean- and stream-type chinook are recovered differentially in coastal and mid-ocean fisheries, indicating divergent migratory routes (Healey 1991, NMFS 1998). Differences in the ocean distribution of individual stocks represent an important form of resource partitioning and may be crucial to the success of the species.

4.1.2 Lower Columbia River Chinook ESU

Lower Columbia River chinook salmon were listed as a threatened species under the ESA by NMFS on March 24, 1999 (FR 64 [56]: 14308-14328). The ESU for Lower Columbia

River chinook includes all naturally spawned populations from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to the crest of the Cascade Range and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River (Meyers *et al*. 1998, NMFS 2000).

Major river basins known to support this ESU include the Grays, Elochoman, Kalama, Lewis, Washougal, White Salmon, Cowlitz, Coweeman, Klaskanine, Clackamas, Sandy, and Hood Rivers, as well as Youngs Bay and the Columbia River and estuary (NMFS 2000).

Abundance within this ESU is relatively high, although the majority of the fish appear to be hatchery-produced. Naturally spawning populations may not be able to sustain or replace themselves due to pervasive influences of hatchery fish and the degradation of freshwater habitat. Abundance shows mostly negative trends for both long and short-term analyses, with some severely depressed. It has been concluded that this ESU is likely to become endangered in the near future (Meyers *et al*. 1998). Of the 14 Lower Columbia River fall chinook stocks, 12 are currently classified as healthy while the two Toutle River stocks are considered depressed (WDFW 1994).

4.1.3 Snake River Fall-Run Chinook ESU

Snake River fall-run chinook salmon were listed as a threatened species under the ESA by NMFS on April 22, 1992 (FR 57 [78]: 14653-14662). The ESU for Snake River Fall-Run chinook includes all naturally spawned populations in the mainstem Snake River and any of the following subbasins: Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River (NMFS 2000). On March 9, 1999, NMFS proposed extending the ESU's geographic range to include the Deschutes River, Oregon (Meyers *et al*. 1998).

The Snake River population map of chinook is made up, in part or wholly, of 19 counties in Idaho, Oregon, and Washington. The Snake River has historically been the main source of production for this ESU. The current five-year average for Snake River fall-run chinook salmon is about 500 adults, drastically lower than 72,000 in the 1930s and 1940s. The Deschutes River has averaged about 6,000 naturally spawning fish (1990 to 1996). Because of historical hydrologic system development, this ESU is likely to become in danger of extinction in the near future (Meyers *et al*. 1998).

Designated Critical Habitat

Critical habitat for this ESU is designated to include river reaches presently or historically accessible (except reaches above impassable natural falls, and Dwarshak and Hells Canyon Dams) to Snake River Fall-Run chinook salmon in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) and including all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers; the Snake River, all river reaches from the confluence with the Snake River upstream to Palouse Falls; the Clearwater River from its confluence with the Snake River upstream to its confluence with Lolo Creek; the North Fork Clearwater River from its confluence with the Clearwater River upstream to Dworshak Dam (NMFS 2000).

Major river basins containing spawning and rearing habitat for this ESU comprise approximately 13,679 square miles in Idaho, Oregon and Washington (NOAA 2000). More detailed critical habitat information for this ESU (i.e. specific watersheds, hydrologic units and counties) can be found in the Federal Register or at the following NMFS website: http://www.nwr.noaa.gov/.

4.1.4 Snake River Spring/Summer Run Chinook ESU

Snake River spring- and summer-run chinook salmon were listed as a threatened species under the ESA by NMFS on April 22, 1992 (FR 57 [78]: 14653-14662). The ESU for Snake River spring- and summer-run chinook includes all naturally spawned populations in the mainstem Snake River and any of the following subbasins: Tucannon River, Grande Ronde River, Imnaha River, and Salmon River (NMFS 2000).

The Snake River population map of chinook is made up, in part or wholly, of 19 counties in Idaho, Oregon, and Washington. Current abundance of naturally spawning populations for this ESU has averaged about 2,500 fish, drastically lower than the historical levels of 1.5 million (Meyers *et al*. 1998). Abundance shows mostly negative trends for both long and short term analyses for all populations. As a result of dam construction, a number of populations within this ESU have been eliminated.

Designated Critical Habitat

Critical habitat for this ESU is designated to include river reaches presently or historically accessible (except reaches above impassable natural falls, and Dwarshak and Hells Canyon Dams) to Snake River spring/summer run chinook salmon in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) and including all Columbia River estuarine areas and river reaches proceeding upstream to the confluence of the Columbia and Snake Rivers; all Snake River reaches from the confluence of the Columbia River upstream to Hells Canyon Dam (NOAA 2000). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 22,390 square miles in Idaho, Oregon and Washington (NOAA 2000). More detailed critical habitat information for this ESU (i.e. specific watersheds, hydrologic units and counties) can be found in the Federal Register or at the following NMFS website: http://www.nwr.noaa.gov/.

4.1.5 Upper Willamette River Chinook ESU

Upper Willamette River chinook salmon were listed as a threatened species under the ESA by NMFS on March 24, 1999 (FR 64 [56]: 14308-14328). The ESU for Upper

Willamette spring- and summer-run chinook includes all naturally spawned populations in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon (NOAA 2000). Major river basins known to support this ESU include the Willamette, Molalla, North Santiam, and McKenzie Rivers, as well as the Columbia River and estuary (NMFS 2000).

The Upper Willamette River population map of chinook is made up, in part or wholly, of 18 counties in Oregon and Washington. This ESU has a relatively high and stable abundance (20,000-30,000 adults). However, approximately 10% of escapement spawns naturally, and of the natural spawners more than half are first-generation hatchery strays (Meyers *et al*. 1998). Due to the inaccessibility of the majority of historical spawning habitat, in conjunction with limited and degraded remaining available spawning habitat, this ESU is likely to become endangered in the near future.

4.2 Chum Salmon

4.2.1 General Life History

Chum salmon, *Oncorhynchus keta*, are semelparous and anadromous salmonids with the widest distribution of any Pacific salmon (Bakkala 1970, Emmett *et al*. 1991). Chum salmon are the second largest of the Pacific salmon, second only to chinook salmon in adult size, with individuals reaching up to 20.8 kg in weight (Anonymous 1928). Chum are considered ocean-type fish because of a very short juvenile freshwater residence time (up to three months). Fry normally migrate seaward immediately after emergence and generally enter estuaries (March to mid-May) when they are 30 to 55 mm long (Emmett *et al*. 1991). This is in contrast to stream-type salmonids (i.e. coastal cutthroat trout, steelhead, coho, and sockeye salmon), which will rear in freshwater for months or years before migrating to sea at a larger size. Therefore, survival and growth in juvenile chum salmon depends greatly upon favorable estuarine and marine conditions and less upon freshwater conditions (NMFS 1998).

Juvenile chum slow their migration once they enter estuaries. The period of estuarine residence appears to play an important role in the life history of chum salmon, as smolts use estuarine habitat for rearing, refugia from predators, and as a physiological transition area (Simenstad *et al*. 1982). Chum smolts may remain in an estuary for 4 to 32 days and move offshore when they are 80 to 100 mm in length (Healey 1982). Adults will then return to the mouth of their natal stream after 2 to 7 years of ocean residence and "mill" in the estuaries for a period of days to a week before moving up the streams to spawn.

4.2.2 Columbia River Chum ESU

Columbia River chum salmon were listed as a threatened species by NMFS on March 25, 1999 (FR 64 [57]: 14508). The ESU for Columbia River chum salmon includes all naturally spawned populations in the Columbia River and its tributaries in Washington and Oregon (NMFS 2000). The Columbia River population of chum is made up, in part or wholly, of 9 counties in Oregon and Washington

There have been an estimated 10,000 chum salmon spawning annually in the Columbia River basin (WDFW 1994). Estimation of minimal run size for chum salmon returning to both the Oregon and Washington sides of the Columbia River indicates that the run size has been relatively stable since the run collapsed in the mid-50's (Johnson *et al*. 1997). The minimal run size in 1995 was 1,500 fish. Today, only remnant chum salmon populations exist, concentrated in the Grays River system near the mouth and tributaries near Bonneville Dam (NMFS 2000). Currently, the Grays River and Hamilton Creek stocks are classified as depressed and the Hardy Creek stock is considered healthy.

4.3 Steelhead

4.3.1 General Life History

Steelhead (*Oncorhynchus mykiss*) exhibit complex life history traits and occur in two forms: the anadromous steelhead and the resident rainbow trout. Steelhead can be further divided into two major genetic groups that occur on the west coast of the U.S. These are a coastal group and an inland group, separated in the Fraser and Columbia River Basins by approximately the Cascade crest (NMFS 2000).

Considerable variation occurs in the life history of steelhead. Steelhead females' fecundity is related to size and age of the fish, but usually averages 2,000 to 5,000 eggs (Wydoski and Whitney 1979). Redd size is approximately 50 square feet, and depending on temperature, eggs may incubate for 1.5 to 4 months before hatching (NMFS 1996b). Alevins stay in the gravel for another 3 weeks before emerging and will spend from 1 to 4 years in the fresh water before migrating to the sea as smolts (NMFS 1996b). Out-migration of smolts generally occurs from April to June. They then reside in marine waters for typically 2 or 3 years (up to 4 years) prior to returning to their natal stream to spawn as 4 or 5 year olds. Steelhead spawners are divided into two distinct groups; winter-run and summer-run. Winter-run steelhead enter the rivers between November and April, whereas summer-run steelhead enter the rivers from May to November (Busby *et al*. 1996). Unlike Pacific salmon, steelhead are iteroparous, meaning that they are capable of spawning more than once before they die (NMFS 1996b). However, it is rare for steelhead to spawn more than twice before dying.

4.3.2 Middle Columbia River Steelhead ESU

Middle Columbia River steelhead were listed as a threatened species under the ESA by NMFS on March 25, 1999 (FR 64 [57]: 14517). The ESU for Middle Columbia River steelhead includes all naturally spawned populations in streams above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington (NMFS 2000). Excluded are steelhead from the Snake River Basin. Major Columbia River tributaries known to support this ESU include the Deschutes, John Day, Klickitat, Umatilla, Walla Walla, and Yakima Rivers (NMFS 2000). The Middle Columbia River population map of steelhead is made up, in part or wholly, of 28 counties in Oregon and Washington.

Thirteen stocks within this ESU are classified as depressed by WDFW (1994), based on chronically low escapement; and two stocks are currently considered unknown due to insufficient data.

4.3.3 Lower Columbia River Steelhead ESU

Lower Columbia River steelhead were listed as a threatened species under the ESA by NMFS on March 19, 1998 (FR 63 [53]: 13347). The ESU for Lower Columbia River steelhead includes all naturally spawned populations in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive) and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington (NMFS 2000). Major Columbia River tributaries known to support this ESU include the Clackamas, Cowlitz, Hood, Kalama, Lewis, Sandy, Washougal, and Wind Rivers (NMFS 2000).

The Lower Columbia River population of steelhead is made up, in part or wholly, of 13 counties in Oregon and Washington. This ESU contains 12 distinct stocks of summer and winter steelhead. Seven of these are classified by WDFW (1994) as depressed because of chronically low escapement numbers or severe short-term declines. Three stocks are considered unknown due to insufficient data, while two stocks (South Fork Toutle River and Kalama River winter-run fish) are classified as healthy.

4.3.4 Snake River Steelhead ESU

Snake River steelhead were listed as a threatened species under the ESA by NMFS on August 18, 1997 (FR 62 [159]: 43937). The ESU for Snake River steelhead includes all naturally spawned populations in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (NMFS 2000). Major Snake River tributaries known to support this ESU include the Clearwater, Grande Ronde, Salmon, Selway, and Tucannon Rivers, as well as the Columbia River and estuary (NMFS 2000).
The Upper Willamette River population of steelhead is made up, in part or wholly, of 35 counties in Idaho, Oregon and Washington.

Although there is little escapement information for most stocks within this ESU, there are current run-size estimates for several stocks. An approximate escapement of 71,000 steelhead was counted above Lower Granite Dam (1990 to 1994) with a natural component of 9,400. Run size estimates are available for only a few tributaries within this ESU, all with small populations (NMFS 1997). Based on a high “hatchery-to-wild ratio” within this ESU, NMFS concluded that the Snake River ESU is threatened. The primary indicator of risk to the ESU is declining abundance throughout the region (NMFS 1997).

4.3.5 Upper Willamette River Steelhead ESU

Upper Willamette River steelhead were listed as a threatened species under the ESA by NMFS on March 25, 1999 (FR 64 [57]: 14517). The ESU for Upper Willamette River steelhead includes all naturally spawned populations in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River, inclusive (NOAA 2000). Major river basins known to support this ESU include the Willamette, Mollala, and Santiam Rivers, as well as the Columbia River and estuary (NMFS 2000).

The Upper Willamette River population of steelhead is made up, in part or wholly, of 16 counties in Oregon and Washington.

4.4 Coho

4.4.1 General Life History

Coho salmon (*Oncorhynchus kisutch*) are smaller than chinook and chum, generally weighing between 8 and 10 lbs. as adults (Laufle *et al.* 1986). In contrast to the life histories of other anadromous salmonids, coho salmon generally exhibit a relatively simple, 3-year life cycle.

Fecundity for female coho in the region ranges from 2,000 to 4,000 eggs (Groot and Margolis 1991). Eggs incubate in redds for 1.5 to 4 months before hatching. Fingerlings will rear in freshwater for up to 15 months before migrating to the ocean as smolts. Smolt migration occurs during the spring months. Coho salmon will generally spend two years at sea before returning to their natal stream as three-year-olds to spawn. Adults typically return in late summer and fall, spawn by mid winter then die. Run and spawn timing of adult coho salmon varies between and within coastal and Columbia River Basin populations (NMFS 1995).

4.4.2 Southern Oregon/Northern California Coasts Coho ESU

This ESU was listed as a threatened species on May 6, 1997. The ESU includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California.

Critical habitat for this ESU was designated on May 5, 1999 and includes all river reaches accessible to listed coho salmon between Cape Blanco and Punta Gorda. Excluded are areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 18,090 square miles in California and Oregon. The following counties lie partially or wholly within watersheds inhabited by this ESU:California - Del Norte, Glenn, Humboldt, Lake, Mendocino, Siskiyou, and Trinity; Oregon - Coos, Curry, Douglas, Jackson, Josephine, and Klamath.

More detailed critical habitat information (i.e., specific watersheds, migration barriers, habitat features, and special management considerations) for this ESU can be found in the May 5, 1999 *Federal Register* notice.

(NMFS 2002)

4.4.3 Oregon Coast Coho ESU

This ESU was listed as threatened on August 10, 1998 and includes all naturally spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco.

Critical habitat was designated on February 16, 2000. Critical habitat is designated to include all river reaches accessible to listed coho salmon in Oregon coastal rivers between the Columbia River and Cape Blanco. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 10,606 square miles in Oregon. The following counties lie partially or wholly within these basins (or contain migration habitat for the species): Benton, Clatsop, Columbia, Coos, Curry, Douglas, Josephine, Lane, Lincoln, Polk, Tillamook, Washington, and Yamhill.

More detailed critical habitat information (i.e., specific watersheds, migration barriers, habitat features, and special management considerations) for this ESU can be found in the February 16, 2000 *Federal Register* notice.

(NMFS 2002)

4.5 Sockeye

4.5.1 General Life History

Sockeye salmon (*Oncorhynchus nerka*) possess one of the most unique and complex life histories of any Pacific salmon species because of the unusual requirement of a lake rearing environment for the juveniles. Sockeye salmon are primarily anadromous, yet there are distinct populations called kokanee which spend their entire life cycle in fresh water, without any residence time in the sea. Both forms of sockeye require a lacustrine environment for part or all of their life cycle. Anadromous sockeye typically utilize lake rearing areas for one to three years after emergence from the gravel (Groot and Margolis 1991) before migrating to the ocean to mature. After lake rearing, migrating sockeye smolts range in size from 50 to 100 mm. Sockeye may spend from one to four years in the ocean before returning to fresh water to spawn.

Adults return to their natal system as early as late February and spend the summer and fall months in the lake environment. Spawning generally occurs from November to early February either in streams flowing into a lake, in spring-fed areas along lake shores, or in the upper reaches of lake outlet streams. Spawning sites for sockeye vary greatly, but usually contain small to medium sized gravels with strong upwelling. Sockeye are generally "mass spawners" with redds averaging up to 20 square feet.

Sockeye females' average fecundity ranges from 2,000 to 5,000 eggs, depending on fish size and locality (Groot and Margolis 1991). Egg incubation may last from 8 to 12 weeks depending heavily upon temperature. The alevins remain in the gravel for another two to six weeks before emerging in April or May (Wydoski and Whitney 1979). Fry will not spend any significant amount of time in the river systems and migrate downstream to the lake environment almost immediately upon emergence.

4.5.2 Snake River Sockeye

Snake River sockeye salmon were listed as an endangered species under the ESA by NMFS on November 20, 1991 (FR 56 [224]: 58619). The ESU for Snake River sockeye salmon includes all naturally spawned populations from the Snake River Basin, Idaho (extant populations occur in the Stanley River subbasin) (NMFS 2000).

The Snake River population of sockeye is made up, in part or wholly, of 40 counties in Idaho, Oregon and Washington. The Washington counties that lie within these basins include; Adams, Asotin, Benton, Clark, Columbia, Cowlitz, Franklin, Garfield, Klickitat, Lincoln, Pacific, Skamania, Spokane, Wahkiakum, Walla Walla, and Whitman.

Historically, the largest numbers of Snake River sockeye salmon returned to headwaters of the Payette River, where 75,000 were taken one year by a single fishing operation in Big Payette Lake (Bevan et al. 1994). During the early 1880s, returns of Snake River sockeye salmon to the headwaters of the Grande Ronde River in Oregon (Wallowa Lake) were estimated between 24,000 and 30,000 at a minimum (Cramer 1990, cited in Bevan et al. 1994). During the 1950s and 1960s, adult returns to Redfish Lake numbered more than 4,000 fish (Bevan et al. 1994). Over the past ten years, single digit numbers of fish have returned per year, to the Snake River Basin (NMFS 1995).

Designated Critical Habitat

Critical habitat is designated to include river reaches presently or historically accessible (except reaches above impassable natural falls, and Dworshak and Hells Canyon Dams) to Snake River sockeye salmon in the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) and including all Columbia River estuarine areas and river reaches upstream to the confluence of the Columbia and Snake Rivers; all Snake River reaches from the confluence of the Columbia River upstream to the confluence of the Salmon River; all Salmon River reaches from the confluence of the Snake River upstream to Alturas Lake Creek; Stanley, Redfish, Yellow Belly, Pettit, and Alturas Lakes (including their inlet and outlet creeks); Alturas Lake Creek, and that portion of Valley Creek between Stanley Lake Creek and the Salmon River (NMFS 2000). More detailed information on critical habitat within this ESU can be found at the following NMFS website: http://www.nwr.noaa.gov/.

5.0 POTENTIAL PROJECT IMPACTS

Potential project impacts on listed and candidate ESUs and critical habitat depend on many factors including the project elements identified in Section 3.1 and the location of project activities with respect to critical habitat. The following sections describe potential direct effects during construction, indirect effects, interrelated and interdependent effects, cumulative effects, and the likelihood that incidental take of a listed species will occur. Conservation measures listed in Section 6.0 are included for each impact (C1, L1, etc.). As discussed in Section 2.1, projects involving in-water work are not covered by the PBA.

5.1 Direct Effects

Direct effects are defined as those construction activities or operations that will immediately affect listed species. For example, actions that immediately degrade or destroy habitat or displace animals or plants are considered to be direct effects (USFWS 1999). Potential direct effects will be avoided, minimized, or otherwise offset by the implementation of appropriate Best Management Practices (BMPs) and Conservation Measures as described in Section 6.0.

5.1.1 Addition of New Impervious and Pollution-Generating Surfaces

The creation of new impervious surface has three main impacts: increased runoff, diminished infiltration, and increased pollutant deposition. If existing stormwater management capacity is not adequate, the addition of new impervious surfaces can increase both the volume of surface runoff and the peak rate of flow resulting from a storm event. The higher velocity and larger quantity of flow may cause stream bank erosion and general habitat destruction. Sediment from cleared areas and eroded and unstable stream banks is deposited downstream, filling ponds, streambeds, and stormwater facilities. Changes in the nature of stream bottoms can be particularly harmful to salmon spawning and juvenile salmon survival, as explained in Section 5.1.2.

Lack of infiltration also results in lower stream flows during the summer by reducing the interception, storage, and release of groundwater into streams. This affects habitat availability and salmonid production, particularly for those species that have extended freshwater rearing environments (e.g., coho). Generally, it has been found that instream functions and value begin to seriously deteriorate when the impervious surface exceeds 10 percent of a sub-basin (WDFW 1997).

Runoff often functions as the transport mechanism for nonpoint sources of pollution, which can result in measurable degradation of receiving waters. Runoff from parking lots, bus transfer and multimodal facilities, roadways, administrative and storage/maintenance facilities, tracks and railbeds, and associated facilities may contain oil and grease, heavy metals such as lead and zinc, and in some cases volatile organic compounds.

Conservation Measures to be implemented for this impact: **C1, C5, C9, C10, C11, C24, C28, L1, L2, L3**

5.1.2 Soil-Disturbing Activities

Soil-disturbing activities include clearing, grading, boring, filling, grubbing, and use of heavy equipment. If exposed soils are subject to stormwater runoff during construction, erosion may occur. Sediment-laden runoff may enter creeks or streams if proper conservation measures are not implemented. Sediment-laden stormwater could result in an increase in turbidity. Water pumped from dewatered construction areas would likely contain fine sediment and could affect the turbidity of creeks/streams if untreated dewatering water were discharged directly into a stream or other surface water body. Projects may involve the use of various types of heavy equipment and may involve multiple construction crews. Use of heavy equipment may result in soil compaction, cause mobilization of sediments, and increase soil erosion rates.
Increased sediment loads could potentially degrade habitats downstream of proposed actions by reducing pool quality, increasing scour potential and down-cutting, and decreasing the quantity and quality of habitat for benthic macroinvertebrates, which are an important food item for rearing salmonids. Increases in sediment load downstream of a proposed action area could degrade streambed substrates, and could directly harm eggs or aelvins developing within redds if stormwater or dewatering releases occur during critical spawning or intragravel development periods.

Other increased turbidity/sedimentation effects include smothering of spawning gravels and transport of contaminants. Salmon migration may be affected by precipitation-induced increases in turbidity in rivers and streams (PSMFC 2000). Increased turbidity could also affect juvenile salmon occurring in the immediate construction area through decreased visibility for foraging activities and impaired oxygen exchange due to clogged or lacerated gills.

Implementation of erosion control and use of the BMPs described in Section 6.0 will reduce the potential for significant increases in turbidity. Most of the projects addressed by this Programmatic BA are relatively small and will not generate significant amounts of sediment, so any increase in turbidity may be insignificant. Even with the use of conservation measures, however, occasional increases in sediment load and turbidity could occur, particularly if large storm events were to coincide with periods of active construction.

Conservation Measures to be implemented for this impact: **C2, C3, C4, C6, C7, C8, C12, C13, C14**

5.1.3 Removal of Vegetation

Projects may require modification to upland or wetland/riparian vegetation within new transit corridors or other project areas. These modifications may be short-term (e.g., during construction only), long-term, or permanent. The long-term or permanent removal of riparian vegetation could result in reduced in-stream habitat quality and riparian habitat complexity, lowered trophic input potential, decreased flood and storm water attenuation, and increased potential for erosion and sedimentation in the cleared riparian areas. Reducing land cover, mainly by tree removal, can also significantly increase runoff even if pervious surfaces remain. Grading activities can destabilize soils, which may lead to increased rates of soil erosion and downstream sedimentation. In addition, removal of vegetation, especially shade trees, may result in an increase in water temperature. Furthermore, the removal of vegetation can reduce the amount of large woody debris (LWD) that enters into salmon habitat. Large woody debris provides structure to stream channels thus promoting habitat complexity that allows multiple salmon species to coexist. For example, depending on the size of the woody debris and the stream, the debris may create plunge, lateral, scour and backwater pools, short riffles, undercut banks, side channels and backwaters, and create different water depths (Spence et al. 1996). Large woody debris in the stream also helps retain gravel for spawning habitat, provides long term nutrient storage and substrate for aquatic invertebrates that are salmon prey, and provides refuge for fish and prey during high and low-flow periods (Spence et al. 1996). Additionally, large woody debris provides cover for salmon, influences water flow, allows for the storage and transport of sediment and fine organic debris (as well as salmon carcasses), and influences the physical structure and stability of important habitat features such as pools (Spence et al. 1996).

Conservation Measures to be implemented for this impact: **C15, C16**

5.1.4 Use of Toxic or Hazardous Materials

The projects identified in this document may require the use of toxic and hazardous materials, including fuel, industrial fluids, oil and grease, paint, solvents, uncured concrete, hot asphalt, or hot tar. Though not likely, accidents such as spills of hazardous materials (typically green cement or grout, fuel, and hydraulic fluid) could degrade water quality, be toxic to fish, or impact fisheries habitat.

The introduction of pollutants can create both lethal and sublethal habitat conditions to salmon and their prey. Contaminants can be assimilated into fish tissues by absorption across the gills or through bioaccumulation as a result of consuming contaminated prey. Pollutants either suspended in the water column (e.g., nitrogen, contaminants, fine sediments) or settled on the bottom (through food chain effects) can affect salmon (PSMFC 2000). Many heavy metals and persistent organic compounds such as pesticides and polychlorinated biphenyls (PCBs) tend to adhere to solid particles. As the particles are deposited, these compounds or their degradation products (which may be equally or more toxic than the parent compounds) can bioaccumulate in benthic organisms at much higher concentrations than in the surrounding waters (OTSMS 1987, Stein et al. 1995).

Conservation Measures to be implemented for this impact: **C13, C14, C17 through 21, C25, C26, C27**

5.2 Indirect Effects

Indirect effects are those that are caused by the action and are later in time but still reasonably certain to occur (NMFS 1999b). They include effects on species or critical habitat caused by future activities that are induced by the action and occur after the action is completed. They include effects during operational project phases, and may include long-term loss and alteration of habitat, and long-term stormwater runoff impacts (water quality and quantity) on stream habitat. Potential indirect effects will be avoided, minimized, or otherwise offset by the use of appropriate conservation measures and BMPs described in Section 6.0.

5.2.1 Water Quality

Water quality from new pollutant-generating impervious surfaces will be controlled by the implementation of best management practices during construction and operation. Use of BMPs would reduce or eliminate potential releases of pollutants from project sites.

During the operational phase, these projects will not generate significant amounts of sediment, so turbidity is not expected to be significant. Storm water management facilities will help to reduce sedimentation effects.

Clearing of vegetation may result in some level of long-term habitat degradation by increasing water temperature due to removal of shading. Increases in water temperature coupled with nutrients from some land uses may cause algal blooms and reduction of dissolved oxygen (DO). Low DO can cause fish to die and allow undesirable species to establish residence.

Water quality degradation may result from erosion, sedimentation, and the release of pollutants during construction or the operational phases of a project. These impacts will be avoided, minimized, or otherwise offset by implementing the BMPs described in Section 6.0 and by minimizing construction during peak fish migration and spawning periods.

Conservation Measures to be implemented for this impact: **G2, L1, L2, L3, L4**

5.2.2 Habitat Access

Habitat can be blocked by the installation of man-made physical barriers that may prevent fish passage. No impacts on habitat access are expected to occur as a result of these projects because no in-water work will be covered by the PBA. No barriers will be added or refuge areas removed as a result of construction or operation of these projects. If these activities are expected to occur a site-specific BA will be produced and the project will undergo non-programmatic ESA consultation with NMFS.

Conservation Measures to avoid this impact: **G1, G3, G4, L5**

5.2.3 Habitat Elements

Habitats may be altered when a stream changes its configuration and deposits its sediment load in response to development. Natural structures of the stream channel, riffles, pools, gravel bars, and other areas, can become embedded with silt and unusable by fish. Increased sediment loads could potentially degrade habitats downstream of proposed actions by reducing pool quality. Implementation of conservation measures and BMPs described in Section 6.0 during construction and operational phases, and proper stormwater management, will avoid, minimize, or otherwise offset potential adverse impacts on habitat elements.

Conservation Measures to be implemented for this impact: **G5, G6, G7, L6**

5.2.4 Channel Condition and Dynamics

Increased runoff from impervious surface may cause stream bank erosion. Sediment from cleared areas and eroded and unstable stream banks may be deposited downstream, filling ponds and streambeds. Increased sediment loads could potentially degrade habitats downstream of proposed actions by increasing scour potential and down-cutting.

The alteration in quantity and timing of surface run-off also accelerates bank erosion and the scouring of the streambed, as well as the downstream transport of wood. This results in simplified stream channels and greater instability, all factors harmful to salmon (Spence et al. 1996). These impacts will be avoided, minimized, or offset by implementation of the BMPs described in Section 6.0.

Conservation Measures to be implemented for this impact: **G2, L1**

5.2.5 Flow/Hydrology

Addition of impervious surfaces may result in a decrease in infiltration, thereby reducing groundwater flow and summer base flows in streams and wetlands. Reduction in infiltration can dry up small streams and wetlands in the summer and in turn render aquatic systems barren during these times. The lack of infiltration also results in lower stream flows during the summer by reducing the interception, storage, and release of ground water into streams. This affects habitat availability and salmonid production, particularly for those species that have extended freshwater rearing requirements (e.g., coho). Generally, it has been found that instream functions and value begin to seriously deteriorate when the levels of impervious surfaces exceed 10% of a sub-basin (WDFW 1997).

New impervious surfaces can increase both the volume of surface runoff and the peak rate of flow resulting from a storm event. The magnitude of stream discharge can strongly influence substrate and channel morphology, and impact the amount of available spawning and rearing area for salmon. Increased peak flows can cause redd scouring, channel widening, stream incisement, and increased sedimentation (NMFS 1996a).

Proposed actions may increase the impervious surface within the basin, and may cause some increase in road density, depending on the site. Stormwater treatment and detention facilities can mitigate impacts on the watershed.

Conservation Measure to be implemented for this impact: **L2, L3, L4**

5.2.6 Watershed Conditions

Proposed actions may increase the impervious surface within the basin, and may cause some increase in road density, depending on the site. Stormwater treatment and detention facilities can mitigate impacts on the watershed.

Conservation Measure to be implemented for this impact: **L2, L3**

5.3 Interrelated and Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Impacts could be caused by increased vehicle use within the project action area, for example by increasing the capacity of park-and-ride lots. The increased vehicle traffic could also increase vehicle use in areas around the perimeter of a site that do not meet current surface water treatment standards. This may be mitigated by the intended purpose of a transit center or park-and-ride facility: the reduction of miles travelled in single occupancy vehicles.

5.4 Cumulative Effects

In the scope of the ESA, cumulative effects include the effects of future State, tribal, local, or private activities that are reasonably certain to occur in the covered area; in this case, Oregon and Idaho. Future Federal activities, including those that are unrelated to the project action, are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Cumulative effects, in the context of Section 7 consultation, are generic to the area of consideration and, other than temporally, not related to the Federal action. The cumulative effects analysis is therefore independent of the Federal actions addressed in the PBA. Future Federal actions, including future FTA actions, will be addressed via future individual or programmatic section 7 consultations.

In general, activities covered by the PBA will be widely scattered across the PBA action area. Non-Federal actions occurring concurrently with the covered activities will be similarly distributed across the state. This cumulative effects analysis addresses impacts in the context of general trends in land use across the region.

Land use development patterns in recent decades have contributed to adverse effects on wetlands, water quality, and fish habitat. Land use regulation, extensive roadway development, and increased automobile ownership have resulted in dispersed, low-density growth patterns. These impacts include increased levels of pollutant loading and runoff; change in riparian vegetation to species that provide less woody debris, shading and food supply for salmon; and sediment entering streams, rivers and wetlands, which degrades fish habitat.

The extensive road network and increased automobile ownership have been significant factors in allowing these more dispersed development patterns to occur. In recent years, however, road capacity has not kept pace with increased travel demands. Transit projects, such as the ones described in this report, would provide additional alternatives to the automobile. The proposed projects would likely reduce the direct, indirect, and cumulative impacts on water quality, hydrology, and fish habitat.

In many cases, properties developed prior to the adoption of current stormwater standards will be redeveloped and upgraded to current standards.

5.5 Incidental Take

"Take" is defined in ESA Section 3(18) as actions to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Incidental take is defined as take of a species "if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (ESA Section 10(a)(1)(B)). Take may occur only to individual species, not to a species' habitat or to designated critical habitat.

None of the projects covered by this Programmatic BA is expected to result in incidental take of listed species, as no in-water work is covered by this document.

6.0 Conservation Measures

Conservation measures are actions that, when implemented, reduce or eliminate the adverse impacts of the proposed activity. They include timing restrictions or changes in project features or location.

Conservation measures that will be applied to activities addressed in the PBA have been divided into three categories: general conservation measures (which apply to all phases of a project), conservation measures during construction, and long-term (post-construction) conservation measures.

Not all of these conservation measures will be applicable to each project. A determination of which measures are appropriate to a particular project will be made on a site-specific basis.

Best management practices (BMPs) associated with these conservation measures are summarized in Appendix D.

6.1 General Conservation Measures

G1. All new facilities will be sited as far from fisheries habitat creeks/streams as practical.

G2. Every effort will be made to minimize soil compaction and reduce effective impervious surface within the action area, particularly adjacent to streams and within the prescriptive wetland or stream buffer.

G3. Minimize the footprint of new construction to reduce impact on critical habitat.

G4. Minimize road widths and the number and size of access roads and facilities within wetland/riparian areas and associated stream or wetland buffers, where practicable.

G5. Rectify any impacts by restoring the affected environment. Restore all temporary disturbance areas to pre-construction conditions or better following construction.

G6. Compensate for vegetation and wetland impacts by replacing, enhancing or substituting resources; restore/enhance wetland and riparian habitats at selected sites. Compensatory offsite mitigation will require consultation with NMFS.

G7. Monitor impacts and take corrective action. Monitor construction activities to ensure that temporary impacts are minimized.

6.2 Conservation Measures During Construction

Conservation measures during construction are intended to mitigate impacts identified as direct effects in Section 5.1.

6.2.1 <u>Soil-Disturbing Activities and Addition of Impervious Surfaces</u>

C1. Implement a project construction sequence to minimize the areal extent of exposed soil at any given time. Detention and water quality treatment facilities will be constructed before other project elements where possible. As portions of the proposed actions are constructed, they will be integrated into the stormwater detention and treatment system, and the system will be maintained as necessary to compensate for increased sediment deposition within stormwater vaults/ponds resulting from construction runoff. Sediment leaving the site must not reach occupied habitat.

C2. Do not place temporary material storage piles in the 100-year floodplain during the rainy season unless the following conditions are met: (1) storage does not occur when flooding is imminent; and (2) if storage piles consist of erosive material they are to be covered with plastic tarps (or similar) and surrounded with compost berms. Material used within 12 hours of deposition is not considered a temporary material storage pile.

C3. Conduct extensive soil-disturbing work, including excavation, in the "dry" season (generally from June to October). This is expected to limit the amount of potential erosion and will minimize the need to dewater some construction areas.

C4. To avoid and minimize the potential for erosion/sedimentation during construction, prepare a detailed Temporary Erosion and Sediment Control (TESC) Plan prior to project construction for all grading, ditching, filling, compaction, excavation, and other earth work. The TESC plan will identify procedures for implementing standard erosion and sediment control procedures.

C5. Implement BMPs during construction to avoid or minimize impacts to water quality and habitat. Specific BMPs implemented during construction will be based on generally accepted principles that include: use of silt curtains to contain releases of turbid water; erosion control through use of barrier berms, silt fences, and sediment ponds; mulching or seeding to minimize the extent and duration of exposed areas; installing dikes or swales to keep runoff velocities low; monitoring and maintaining erosion and sediment control measures; scheduling earthwork during the dry season; implementing spill controls at the construction site to keep uncontrolled releases of fuels and other construction materials from entering downstream receiving waters through stormwater runoff.

C6. Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas will be stabilized by native seeding, mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure. All other areas will be stabilized quickly as reasonable, but within 14 days of exposure. Seeding outside of the growing season will not be considered adequate nor permanent stabilization.

C7. All unstable slopes with the potential to impact listed fish-bearing waters will be stabilized as soon as practicable.

C8. Develop and implement a Stormwater Site Plan for all construction located within the area of a listed or candidate ESU that involve one-half acre or more of clearing, grading, or grubbing. The plan will identify appropriate BMPs and a BMP maintenance schedule. Projects shall be in accordance with state or local regulations.

C9. The project will be designed and constructed so that stormwater discharges during construction do not exceed stormwater discharges expected during project operation. This may require the use of additional temporary retention, detention, or treatment facilities to compensate for the potential of increased runoff during construction and the higher sediment load of construction runoff.

C10. No untreated, undetained stormwater or other untreated water (such as from the dewatering of construction areas) will be allowed to leave the limits of the construction site. In areas where treatment using existing, proposed, or temporary stormwater detention or retention facilities is not feasible, stormwater runoff from construction areas will be treated or controlled using other means such as perimeter berms or dikes, siltation fencing, or appropriate source-control measures such as mulching, seeding, and/or covering exposed soils with plastic or other material to prevent erosion.

C11. To prevent impairment of hydrologic function, the project will not be permitted to discharge water exceeding: a) the turbidity or total suspended solids values of the existing condition based on a 2-year storm event, OR b) 10% of the background discharge. These requirements will be based on NMFS latest guidance, and pre-construction water sampling should be conducted to determine these baseline values.

C12. Collateral damage can be avoided or minimized by using BMPs, including restricting vehicle use in the wetland buffer or riparian areas and placing erosion control measures such as silt fence and compost berms at the edge of clearing limits.

C13. At no time should machinery, or materials that may be toxic to fish or other aquatic life, be used or handled outside of an active or passive containment system.

C14. Limit site access during construction. No contractor staging areas will be allowed within 300 feet of any potential wetland, stream, river, or drainage as identified by the project biologist.

6.2.2 Removal of Vegetation

C15. Revegetate construction easements and other areas after the project is completed. All disturbed riparian vegetation will be replanted onsite at a 2:1 ratio. If a 2:1 ratio is not possible in the action area, a detailed explanation should be provided in the ESA Screening Checklist. Riparian vegetation should be replanted with species native to that region of Oregon or Idaho.

C16. The removal of mature trees (greater than 6 inches diameter at breast height) from the stream riparian area, stream buffer, or wetland buffer should be replaced inkind on-site. In the event that trees of similar size or type cannot be practically installed, smaller replacement trees may be substituted but the overall quantity of replacement trees should be of equal or greater basal area. Fallen mature coniferous trees should be retained within the riparian area as large woody debris (LWD).

6.2.3 Use of Toxic or Hazardous Materials

C17. To minimize and prevent spills or leakage of hazardous materials during construction, implement standard spill-prevention measures during construction. These measures shall be described in a detailed Spill Prevention, Containment, and Control Plan (SPCCP) developed prior to construction. The SPCCP shall address potentially toxic materials used on-site during construction, including green cement grout, fuel, and hydraulic fluid.

C18. To mitigate for potential hazardous materials spills, spill clean-up equipment (for example, oil-absorbent pads and booms) shall be available onsite during construction.

C19. A spill control separator should be included in the drainage system, and the developed site should be maintained according to local stormwater pollution control manuals and/or other applicable guidelines.

C20. At no time will materials which may be toxic to fish or other aquatic life be permitted to enter a surface water body, or other stormwater drainage system that discharges directly to a surface water body, without first being detained and treated. No herbicide application will occur within 300 feet of any stream channel.

C21. No paving, chip sealing, or painting will occur in rainy weather.

C22. For projects involving concrete, establish concrete truck chute cleanout areas to properly contain wet concrete.

C23. Protect all inlets and catchments from fresh concrete, tackifier, paving, or paint stripping if inclement weather unexpectedly occurs.

C24. Debris accumulations will be collected or swept up and properly disposed of prior to fresh water flushing. Flushing will involve the use of clean water only, to prevent detergents or other cleaning agents from entering waters of the State.

C25. Painters will work from pails containing a maximum of two gallons of paint to minimize the impact of accidental spillage, except for sealed containers that are part of a spray system.

C26. Cleaning of paint materials and maintenance equipment will not be done in surface waters nor will cleaning runoff be allowed to enter surface waters.

C27. Drip pans or other protective devices are required for all paint mixing and solvent transfer operations. Drip tarps should be suspended below paint platforms to prevent spilled paint, buckets, brushes, etc. from entering surface waters.

C28. All fueling and maintenance of equipment should occur more than 300 feet from the nearest wetland, ditches, flowing or standing water. At no time shall refueling and equipment maintenance areas be closer than 150 feet horizontal distance from any stream.

6.3 Long-Term Conservation Measures

Long-term conservation measures are intended to mitigate impacts due to indirect effects on water quality, habitat access, habitat elements, channel condition and dynamics, flow/hydrology, and watershed conditions.

L1. To mitigate potential water quality impacts associated with runoff from sites, oil-water separators, bioswales, or other appropriate water quality treatment will be provided according to current scientific knowledge and existing regulations, where applicable. The project will be designed to provide water quality treatment to the highest biological standard, and to meet state water quality standards at the end of pipe or before entering the stream, where necessary.

L2. To mitigate potential cumulative impacts from new impervious surface, stormwater infiltration facilities will be designed with appropriate infiltration conditions. Such sites should have well-drained soils, a wet-season water table well below the pond bottom, and adequate protection of groundwater from impacts due to stormwater contaminants. For projects using existing parking, stormwater shall be routed to existing storm sewers if adequate capacity is available. If there is no available capacity, appropriate on-site detention and treatment will be provided. Where needed, existing infrastructure will be upgraded to handle increased flows or provide appropriate treatment of runoff water.

L3. Appropriate stormwater management facilities will be implemented in accordance with current scientific knowledge and best management practices (BMPs). A Stormwater Site Plan will be implemented to the maximum extent practicable given the technology and resources available at project implementation. At no time shall the detention requirements be less than full detention of all new and disturbed impervious surfaces. The most current stormwater treatment and detention standards will be used, unless superceded by other arrangements with NMFS regarding site stormwater detention and treatment.

L4. At no time during construction or the initial operation of a facility (at least 5 years after construction is complete) will the stormwater from the proposed facility exceed the baseline conditions from the existing facility. Pre-construction and post-construction water quality monitoring would be required to determine baseline conditions and to evaluate the effectiveness of this performance standard. Some allowances for future water quality treatment, if necessary, should be designed into the stormwater treatment and detention system.

L5. At no time will a project include modifications to a stream that may result in a migration barrier for adult and juvenile salmonids under all flow conditions up to a 2-year storm event.

L6. At no time will the project include the direct modification of habitat elements within a surface water body within the action area unless specifically directed to do so by NMFS or other permitting agency with jurisdiction over fish or in-stream habitat. In the event that in-stream habitat enhancement may be proposed to compensate for future, as yet unknown, project impacts, non-programmatic ESA consultation will occur.

7.0 Determinations of Effect

NMFS has issued guidelines for making ESA determinations of effect (NMFS 1996a, 1999b); they recommend that the guidelines be applied to individual or grouped actions at the watershed scale. The guidance identifies four steps in the analysis of a proposed activity:

1. Describe the affected species' status and define the biological requirements of the listed species;
2. Evaluate the relevance of the environmental baseline to the species' current status;
3. Determine the effects of the proposed or continuing action on the listed species; and
4. Determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the environmental baseline, any cumulative effects, and considering measures for survival and recovery specific to other life stages.

NMFS (1996a) presents a Matrix of Pathways and Indicators (MPI), which summarizes important environmental parameters and levels of condition for each. The matrix contains six groups, or elements (water quality; habitat access; habitat elements; channel conditions and dynamics; flow/hydrology; watershed conditions). Each of these represents a significant pathway by which actions can have potential effects on anadromous salmonids and their habitats. The pathways are also broken down into 18 "indicators", which may be metrics containing numeric values or qualitative descriptions.

The condition of each indicator may be at one of three levels: properly functioning, at risk, or not properly functioning.

The MPI is then used to determine whether the proposed actions would further damage impaired habitat or retard the progress of impaired habitat toward properly functioning condition. The effects of the proposed action on each indicator are classified by whether it will restore, maintain, or degrade the indicator.

While the MPI was developed for use on a watershed scale, for practical purposes it must sometimes be applied to geographic areas smaller than a watershed or basin due to a proposed project's scope or geographic distribution. This is particularly true for the types of projects that are identified in the PBA, which tend to be small in both temporal and spatial scale. Evaluation of habitat conditions and impacts on smaller geographic areas reduces the analytic accuracy of the MPI, because the processes essential to aquatic habitats extend continuously upslope and downslope, and may operate quite independently between drainages. Such loss of analytic accuracy should be offset by more conservative management practices (NMFS 1999b).

Based on the analysis described above, an "effect determination" for the proposed action is made. The following effect determinations have been defined (NMFS 1996a):

- **No Effect ("NE")**: the proposed action will not affect listed species or critical habitat
- **May affect, not likely to adversely affect ("MANLAA")**: the effects on the species or critical habitat are expected to be beneficial, discountable or insignificant.
- **May affect, likely to adversely affect ("MALAA")**: an adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions. If the overall effect of the proposed action is beneficial to the listed species or critical habitat, but is also likely to cause some adverse effects, then the proposed action is "likely to adversely affect" the listed species or critical habitat.

If the project has "no effect" on listed species/critical habitat and is not a major construction activity, there is no requirement for consultation with NMFS. If it is determined that the project "may affect, but not likely to adversely affect" (MANLAA) listed species/critical habitat, informal consultation is generally required (NMFS 1999b). However, approval by NMFS of the PBA constitutes informal consultation for the activities listed in Section 2.1 and no further concurrence from NMFS is required. Activities excluded from the PBA or activities with extenuating circumstances will require non-programmatic concurrence procedures.

If the project is classified as "may affect, likely to adversely affect" (MALAA), formal consultation must be initiated with NMFS. In this case, a site-specific BA will be required. The BA must be submitted to NMFS for review and receipt of a Biological

Opinion. NMFS will perform a jeopardy analysis that results in one of the following conclusions:

- ?? **Not likely to jeopardize and/or not likely to result in the destruction or adverse modification of critical habitat**: the action does not appreciably reduce the likelihood of species survival and recovery, or result in the destruction or adverse modification of its critical habitat.
- ?? **Likely to jeopardize and/or likely to result in the destruction or adverse modification of critical habitat**: the proposed action appreciably reduces the likelihood of species survival and recovery, or results in the destruction or adverse modification of its critical habitat.

Major elements that influence the effect of a project on listed species are:

1. Location within an ESU. Section 4.0 describes each ESU included in the PBA. ESU location maps may also help determine whether a project is located within the area of a listed or candidate ESU. The NMFS website (http://www.nwr.noaa.gov/) provides salmonid ESU maps.

2. Location with respect to critical habitat. Section 4.0 describes designated critical habitat for each ESU.

3. Whether appropriate conservation measures are in place. Section 6.0 describes conservation measures. All general conservation measures should be implemented. The project biologist or other qualified project staff should identify the construction and long-term conservation measures that apply.

   In addition, a Temporary Erosion and Sediment Control Plan (TESCP), Spill Prevention, Containment, and Control Plan (SPCCP), and Stormwater Site Plan will be required for most projects.

4. Whether the proposed project involves new impervious surface. New impervious surface results in potential impacts associated with stormwater runoff. If existing stormwater management capacity is not in place, these impacts may be mitigated by:

   - ?? Infiltration with pretreatment for all new impervious surface areas. This may result in a determination of NE.
   - ?? Water quantity and quality treatment for between 100 and 140 percent of the runoff generated by the new impervious surface.
   - ?? Treatment of quality and quantity at less than the above percentages of new impervious surface generated by the project are likely to result in a determination of MALAA.

5. Whether the project involves soil-disturbing activities. These activities result in potential construction impacts due to soil erosion and sedimentation. These impacts may be mitigated by use of appropriate conservation measures (see Section 6.0).

6. Whether the project involves the use of potentially toxic or hazardous materials. These materials could be spilled or released to surface water and result in direct effects on fish (if present) or in degradation of critical habitat. The likelihood of spills or releases can be reduced by use of appropriate conservation measures (Section 6.0).

7. Whether the project results in degradation of the environmental baseline. The MPI should be used by the project biologist to assess the likelihood that the proposed project will result in degradation of environmental indicators. These include impacts on spawning areas, large woody debris, riparian habitat, etc.

8. Whether there are any other significant direct or indirect project impacts. A determination should be made by the project biologist as to the likelihood that there may be other direct or indirect project impacts that will influence the effect determination.

8.0 EFH ASSESSMENT

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of Essential Fish Habitat (EFH) descriptions in Federal fishery management plans. The objective of the EFH consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse impacts to EFH resulting from the proposed action. The Federal Transit Administration (FTA) and all other federal agencies are required to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect EFH.

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

?? Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

?? NMFS shall provide conservation recommendations for any Federal or State activity that may adversely affect EFH;

?? Federal agencies shall within 30 days after receiving conservation recommendations from NMFS provide a detailed response in writing to NMFS regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or

> offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NMFS, the Federal agency shall explain its reasons for not following the recommendations.

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

The EFH Assessment for this PBA includes the following parts: 1) Identification of EFH, 2) Project description, 3) Anticipated effects of the proposed activities on EFH, 4) Conservation measures to avoid, minimize, or otherwise offset potential adverse effects, and 5) Effects determination.

8.1 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km)(PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years)(PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border.

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

8.2 Project Description

Refer to Section 3.0 Construction Activities for a description of projects included in the EFH Assessment.

8.3 Anticipated Effects of Proposed Activities on EFH

Refer to Section 5.0 Project Impacts for a description of anticipated effects on EFH.

8.4 Conservation Measures

Refer to Section 6.0 Conservation Measures for a list of measures intended to avoid, minimize, or otherwise offset potential adverse impacts to EFH.

8.5 Effects Determination

While a few activities may result in short-term degradation of selected habitat elements, the extent and nature of actions within the PBA will have "**no effect**" on EFH.

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