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

Refer to NMFS No.:
2007/07790

February 25, 2008

Mr. Lawrence Evans
U.S. Army Corps of Engineers, Portland District
P.O. Box 2946
Portland, Oregon 97208-2946

Mr. Robert Willis
U.S. Army Corps of Engineers, Portland District
ATTN: Mr. Kim Larson
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7 Formal and Informal Programmatic Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Revisions to Standard Local Operating Procedures for Endangered Species to Administer Stream Restoration and Fish Passage Improvement Actions Authorized or Carried Out by the U.S. Army Corps of Engineers in Oregon (SLOPES IV Restoration).

Dear Mr. Evans and Mr. Willis:

The enclosed document contains a formal and informal programmatic opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of implementing a proposed revision to the standard local operating procedures used by the U.S. Army Corps of Engineers, Portland District (Corps), to authorize or carry out stream restoration activities and fish passage improvement actions in Oregon (SLOPES IV Restoration).[1] This action is in accordance with the Corps' regulatory and civil works authorities under section 10 of the Rivers and Harbors Act of 1899, section 404 of the Clean Water Act of 1972, and sections 1135, 206, and 536 of the Water Resources Development Acts of 1986, 1996, and 2000, respectively. Actions covered in this Opinion are modified from those analyzed in the biological opinion issued on November, 2004, as summarized in the consultation history section of the Opinion.

In this Opinion, NMFS concludes that the proposed action is not likely to adversely affect southern green sturgeon (*Acipenser medirostris*); critical habitat has not yet been proposed for this species. Moreover, the proposed action is not likely to jeopardize the continued existence of the Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) spring-run Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Snake River (SR) spring/summer run Chinook salmon, SR fall-run Chinook salmon, Columbia

[1] This document replaces the Opinion dated February 22, 2007, which was found to contain pagination errors.

River chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), Oregon Coast coho salmon, Southern Oregon/Northern California coho salmon, SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), UWR steelhead, Middle Columbia River steelhead, UCR steelhead, or Snake River Basin steelhead, and is not likely to result in the destruction or adverse modification of critical habitat designated for each of the above listed species, with the exception of LCR coho salmon, for which critical habitat has not yet been proposed.

As required by section 7 of the ESA, this Opinion includes reasonable and prudent measures with terms and conditions that are necessary to minimize the impact of incidental take associated with this action. The action agency and applicant, if any, must comply with these terms and conditions for exemption from the prohibition against taking in section 7(o) to apply.

This document also presents the results of our consultation on the proposal's effect on essential fish habitats (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes four conservation recommendations to avoid, minimize, or otherwise offset likely adverse effects to EFH. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the recommendations, the action agency must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

If you have any questions regarding this consultation, please contact Marc Liverman at 503-231-2336 or Ben Meyer at 503-230-5425, of my staff in the Oregon State Habitat Office.

Sincerely,

Michael Tehan

for D. Robert Lohn
Regional Administrator

cc: Federal Highways Administration
Natural Resources Conservation Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Department of Parks and Recreation
Oregon Department of State Lands
Oregon Department of Transportation
Oregon Watershed Enhancement Board

Endangered Species Act - Section 7
Formal and Informal
Programmatic Opinion

&

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

Revisions to Standard Local Operating Procedures for Endangered Species to Administer Stream Restoration and Fish Passage Improvement Activities Authorized or Carried Out by the U.S. Army Corps of Engineers in the Oregon (SLOPES IV Restoration)

Agency: U.S. Army Corps of Engineers,
Portland District, Operations and Regulatory Branches

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: February 25, 2008

Issued by: for Michael Tehan
D. Robert Lohn
Regional Administrator

Refer to: **2007/07790**

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INTRODUCTION

This document contains a formal and informal programmatic opinion (Opinion) and incidental take statement prepared in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, *et seq*.), and implementing regulations at 50 CFR 402. The National Marine Fisheries Service (NMFS) also completed an essential fish habitat (EFH) consultation, prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq*.) and implementing regulations at 50 CFR 600. The docket file for this consultation is available at the Oregon State Habitat Office in Portland, Oregon.

Background and Consultation History

The U.S. Army Corps of Engineers, Portland District (Corps), propose to revise the "Standard Local Operating Procedures for Endangered Species" (SLOPES). "SLOPES" refers to the process and criteria that the Corps uses to guide the administration of activities regulated under section 10 of the Rivers and Harbors Act of 1899 (RHA) and section 404 of the Clean Water Act of 1972 (CWA), or carried out by the Corps as part of civil works programs authorized by sections 1135, 206, and 536 of the Water Resources Development Acts of 1986, 1996, and 2000, respectively (WRDA), in areas occupied by ESA-listed salmon and steelhead or their designated critical habitats.

Section 10 of the RHA requires authorization from the Secretary of the Army for the creation of any structure, excavation, or fill within the limits defined for navigable waters of the United States, if the structure or work will affect the course, location, or condition of the waterbody. The law applies to any dredging or disposal of dredged material, excavation, filling, channelization, or any other modification of a navigable water of the United States, and applies to all structures, from the smallest floating dock to the largest commercial undertaking. It further includes, without limitation, any wharf, dolphin, weir, boom, breakwater, jetty, groin, bank stabilization, mooring structures (such as pilings), aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent or semi-permanent obstacle or obstruction.

Section 404 of the CWA requires authorization from the Secretary of the Army, acting through the Corps, for the discharge of dredged or fill material into all waters of the United States, including adjacent wetlands. Discharges of fill material generally include, without limitation, any placement of fill that is necessary for construction of any type of structure, development, property protection, reclamation, or other work involving the discharge of fill or dredged material. A Corps permit is required whether the work is permanent or temporary. Examples of temporary discharges included dewatering of dredged material before final disposal, and temporary fills for access roadways, cofferdams, storage, and work areas.

Section 1135 of WRDA authorizes the Corps to modify the structure or operation of a Corps project to restore or improve environmental quality and ecosystem functions impaired by that project, provided that the modification does not conflict with the authorized project purposes.

Section 206 of WRDA expands this authority to cover construction of projects for the restoration and protection of aquatic ecosystems unrelated to an existing Corps facility. Section 536 of WRDA authorizes studies and ecosystem restoration actions in the Lower Columbia River and Tillamook Bay. The Corps has environmental restoration programs in place, in Oregon, that are authorized by these authorities and are intended to restore habitat for ESA-listed salmon and steelhead.

Nearly all anadromous fish-bearing streams within the Corps' jurisdiction are occupied by ESA-listed salmon and steelhead and designated as EFH for Chinook salmon and coho salmon. Individual ESA and EFH consultation for permits within these streams results in a substantial workload for both the Corps and NMFS, often with little additional benefit to the species. Many of these activities are minor and repetitive in nature, and consultation on them has resulted in the imposition of similar conditions for regulatory approval.

Since March 21, 2001, the Portland District has used SLOPES, as described in a series of programmatic biological opinions,[1] to guide its review of individual permit requests under section 10 of the RHA and section 404 of the CWA, including requests for authorization of activities under the Corp's nationwide permit 27 (NWP-27 "Aquatic Habitat Restoration, Establishment, and Enhancement"). "Habitat restoration activity" is defined by NMFS to mean an activity that has the sole objective of restoring natural aquatic or riparian conditions or processes (50 CFR 222.102). In 2003, the use of SLOPES was expanded to include the Portland District's restoration actions under WRDA. The Corps uses SLOPES to evaluate applications for stream and wetland restoration actions that are within the range of ESA-listed salmon and steelhead. Applications for actions that the Corps finds to be within the range of effects considered in the most recent SLOPES biological opinion are issued a permit with corresponding conditions; applications that are not found to be within this range of effects are submitted to NMFS for additional, site-specific ESA and EFH consultation.

Under SLOPES, the Corps is required to provide an annual monitoring report. The report is intended to be a summary of action data and a description of program participation, the quality of supporting analyses, monitoring information, compensatory mitigation provided by applicants, and recommendations to improve the effectiveness of the program. Between 2001 and 2006, the

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[1] Programmatic Biological Opinion – 15 Categories of Activities Requiring Department of the Army Permits. (refer to:OSB2001-0016) (March 21, 2001); Programmatic Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation for Standard Local Operating Procedures for Endangered Species (SLOPES) for Certain Activities Requiring Department of Army Permits in Oregon and the North Shore of the Columbia River (refer to OHB2001-0016-PEC) (June 14, 2002); Letter from D. Robert Lohn, NOAA Fisheries, to Lawrence Evans and Thomas Mueller, U.S. Army Corps of Engineers (August 14, 2002) (Amending Terms and Conditions for SLOPES, issued June 14, 2002); Programmatic Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation for Standard Local Operating Procedures for Endangered Species (SLOPES II) for Certain Regulatory and Operations Activities Carried Out by the Department of Army Permits in Oregon and the North Shore of the Columbia River (refer to: 2003/00850) (July 8, 2003); Programmatic Biological Opinion and Conference Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Revised Standard Local Operating Procedures for Endangered Species (SLOPES III) to Administer Certain Activities Authorized or Carried Out by the Department of the Army in the State of Oregon and on the North Shore of the Columbia River (refer to: 2004/01043) (November 30, 2004).

Corps used SLOPES to issue 106 permits for stream and wetland restoration, mostly in the Willamette/Lower Columbia and coastal areas (Table 1).

Table 1. Number of stream and wetland restoration permits issued by the Corps using SLOPES, by geographic area and year (n=118).[2]

Geographic Area	2001 N=0	2002 n=8	2003 n=23	2004 n=41	2005 n=18	2006 n=28
Willamette/Lower Columbia n=53	0	6	12	17	11	13
Interior Columbia n=7	0	1	0	6	1	2
Oregon Coast n=21	0	1	6	6	2	7
Southern Oregon/Northern California Coasts n=25	0	0	5	12	4	6

By design, SLOPES provides a focus for discussion between NMFS, the Corps, and applicants regarding ways to reduce or remove the adverse effects of regulated actions on ESA-listed salmon and steelhead, designated critical habitat, and EFH. The delivery of technical assistance for administration of individual actions under SLOPES, interagency training in the use of SLOPES, the SLOPES annual review process, and many individual consultations which are beyond the range of actions authorized by SLOPES, have all been informed by previous SLOPES opinions, and thus helped to ensure that SLOPES will continue to be adaptive, accountable, and credible as a conservation and regulatory tool. Over the years, the Federal Highway Administration, Natural Resources Conservation Service, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, Oregon Division of State Lands, Oregon Marine Board, Oregon Watershed Enhancement Board, Oregon Public Ports Association, the City of Portland, various port authorities, and others with a substantial and recurrent stake in the Corps' regulatory program have each made major contributions to the development of SLOPES.[3]

In some cases, requests by those action agencies for a separate programmatic consultation have been collected into SLOPES. This was possible because the Corps consented to act as the lead agency for consultation, and the SLOPES Opinion already encompassed analyses of effects of those actions and corresponding measures to minimize take, or could be easily expanded to do so

[2] In January, 2006, NMFS announced that the Oregon Coast coho salmon did not warrant listing under the ESA (71 FR 3033; Jan. 19, 2006). Nonetheless, much of this area is still designated as EFH for coho and Chinook salmon. Thus, pursuant to EFH conservation recommendations from NMFS, the Corps continues to apply SLOPES-type conditions to permits for actions within this area that otherwise meet requirements of the SLOPES opinion. On October 9, 2007, the Oregon District Court issued an order in the case of Trout Unlimited, *et al*. v. Lohn, No. CV-06-1493-ST (D. Or. July 13, 2007) that reversed NMFS' decision and restored the status of OC coho salmon as proposed for listing as threatened.

[3] See *e.g.*, Letter from Lawrence C. Evans, U.S. Army Corps of Engineers, to Michael Crouse, NMFS, (December 26, 2002) (requesting programmatic consultation for maintenance and restoration activities conducted by port authorities and commercial/industrial organizations); NMFS (2003).

(*e.g.*, activities related to geological drilling and surveying; maintenance of boat docks, commercial marinas, ports, and roads; regulatory streamlining; stream and wetland restoration). This helped to ensure that SLOPES is based on the highest quality scientific information and strong, collaborative partnerships, and will continue to yield the highest degree of conservation effectiveness and regulatory efficiency.

In this way, NMFS and the Corps have examined the shared characteristics of many regulatory actions with similar effects and identified those types of actions for which short-term environmental effects are likely to be low intensity, repetitive, and predictable, and for which long-term effects are likely to contribute to the recovery of listed species. These individual actions also have similar requirements for regulatory approval and, beyond confirmation that each action meets applicable constraints on design and the use of conservation practices, would not reward additional analysis or deliberation with further conservation benefits. NMFS and the Corps have used this information in SLOPES to set clear expectations and achieve consistent outcomes that, with other important regulatory initiatives, have significantly reduced conflict over listed species and regulatory actions, thus improving public relations and creating new opportunities for further advances in listed species conservation.

The broad scope of the Corps' regulatory program, the rapid pace at which interested parties have gained and shared practical experience using SLOPES, and the need to assure adequate oversight in light of evolving ESA policies often require the Corps to adjust the actions authorized by SLOPES. Moreover, many requests by the Corps and various applicants for assistance regarding the use of SLOPES for actions related to stream and wetland restoration, streambank stabilization, transportation, and over and in-water structures, led NMFS to conclude that SLOPES can be better managed if these categories are addressed in separate opinions. This will allow these consultation documents to be more focused on specific consultation needs, rather than dependent on reissuance of the entire opinion in its present form.

Accordingly, on December 5, 2007, the Corps requested reinitiation of SLOPES for actions related to stream and wetland restoration to reflect the ongoing process of SLOPES management, and new information regarding the status of listed species and critical habitats. Future SLOPES opinions will address actions related to roads and bridges, over and in-water structures, bank stabilization, and miscellaneous waterway alterations that, until now, have been combined in a single opinion.

Proposed Action

For this consultation, the proposed action is a revision of SLOPES that the Corps uses to guide the permitting of stream restoration and fish passage activities regulated under section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act, including NWP27, or that are carried out by the Corps as part of civil works programs authorized by sections 206, 536, and 1135 of the Water Resources Development Act. Use of the revised SLOPES will ensure that the Corp's regulatory oversight of these habitat restoration actions will continue to meet requirements of the ESA and MSA with procedures that are simpler to use, more efficient, and more accountable for all parties.

The Corps is proposing to use SLOPES IV Restoration to authorize nine categories of action related to stream restoration and fish passage, specifically:

1. **Boulder Placement** to increase habitat diversity and complexity, improve flow heterogeneity, provide substrate for aquatic vertebrates, moderate flow disturbances, and provide refuge for fish during high flows by placing large boulders in stream beds where similar natural rock has been removed.

2. **Fish Passage Restoration** to improve fish passage by installing or improving step weirs, fish ladders, or lamprey ramps at an existing facility, or replacing or improving culverts.

3. **Spawning Gravel Restoration** to improve spawning substrate by compensating for an identified loss of a natural gravel supply.

4. **Large Wood Restoration** to increase coarse sediment storage, habitat diversity and complexity, retain gravel for spawning habitat, improve flow heterogeneity, provide long-term nutrient storage and substrate for aquatic macroinvertebrates, moderate flow disturbances, increase retention of leaf litter, and provide refuge for fish during high flows by placing large wood in areas where natural wood accumulations have been removed.

5. **Off- and Side-Channel Habitat Restoration** to reconnect stream channels with floodplains, increase habitat diversity and complexity, improve flow heterogeneity, provide long-term nutrient storage and substrate for aquatic macroinvertebrates, moderate flow disturbances, increase retention of leaf litter, and provide refuge for fish during high flows by restoring or modifying hydrologic and other essential habitat features of historical river floodplain swales, abandoned side channels, and floodplain channels.

6. **Piling Removal** to improve water quality by eliminating chronic sources of toxic contamination.

7. **Set-back Existing Berms, Dikes, and Levees** to reconnect stream channels with floodplains, increase habitat diversity and complexity, moderate flow disturbances, and provide refuge for fish during high flows by increasing the distance that existing berms, dikes or levees are set back from active streams or wetlands.

8. **Streambank Restoration** to restore eroding streambanks by (a) bank shaping and installation of coir logs or other soil reinforcements as necessary to support riparian vegetation; (b) planting or installing large wood, trees, shrubs, and herbaceous cover as necessary to restore ecological function in riparian and floodplain habitats; or (c) a combination of the above methods.

9. **Water Control Structure Removal** to reconnect stream corridors, reestablish wetlands, improve fish passage, and restore more natural channel and flow conditions, by removing earthen embankments, subsurface drainage features, spillway systems, tide gates,

outfalls, pipes, instream flow redirection structures (*e.g.*, drop structure, gabion, groin), or similar devices used to control, discharge, or maintain water levels.

Proposed Design Criteria

The Corps proposed to apply the following design criteria, in relevant part, to every action authorized under this opinion. Measures described under "Administration" apply to the Corps as it manages the SLOPES IV Restoration program. Measures described under "General Construction" apply, in relevant part, to each action that involves a construction component. Measures described under "Types of Action" apply, in relevant part, to each of the actions as described. The Corps will ensure that all other measures apply to each party that is given authorization for, or carries out, an action under SLOPES IV Restoration.

<u>Administration</u>

1. Species presence. The Corps will confirm that each action authorized or carried out under this Opinion is within the present or historic range of an ESA-listed salmon or steelhead (fish), or designated critical habitat.

2. Corps review. The Corps will individually review and approve each action to ensure that all adverse effects to fish and their designated critical habitats are within the range of effects considered in this Opinion.

3. NMFS review. The Corps will ensure that each action that involves (a) diversion of surface water using gravity or by pumping at a rate that exceeds 3 cubic feet per second (cfs); (b) a step weir, fish ladder, or culvert replacement for fish passage restoration; (c) off- and side-channel habitat restoration; (d) set-back of an existing berm, dike or levee; or (e) removal of a water control structure, will also be individually reviewed and approved by NMFS as consistent with this Opinion before that action is authorized. Actions to place boulders, large wood, spawning gravel, or restore streambanks, or to remove pilings, do not require NMFS prior review and approval.

4. Electronic notification. The Corps will initiate NMFS' review by submitting the SLOPES IV programmatic implementation form (Appendix A) to NMFS with sufficient detail about the action design and construction to ensure the proposed action is consistent with all provisions of this Opinion. For off- and side-channel habitat restoration actions, set-back of an existing berm, dike or levee; or removal of a water control structure; the notification must include the results of a site assessment for contaminants to identify the type, quantity, and extent of any potential contamination. NMFS will notify the Corps within 30 calendar days if the action is approved or disqualified. The Corps will use the NMFS Public Consultation Tracking System-Consultation Initiation and Reporting System (CIRS) to submit this form when the online system becomes available. Until CIRS is available, submit forms to NMFS by email at this address: SLOPES.NWR@noaa.gov.

5. <u>Site assessment for contaminants</u>. Any action involving off- and side-channel habitat restoration or set-back of an existing berm, dike or levee must include the results of a site assessment with the following elements to identify the type, quantity, and extent of any potential contamination: (a) A review of readily available records, such as former site use, building plans, records of any prior contamination events; (b) a site visit to observe the areas used for various industrial processes and the condition of the property; (c) interviews with knowledgeable people, such as site owners, operators, and occupants; neighbors; local government officials; and (d) a report that includes an assessment of the likelihood that contaminants are present at the site.

6. <u>Action completion: regulatory actions</u>. The Corps will require each applicant to submit an action completion report (Appendix B) to NMFS within 60-days of completing all work below ordinary high water (OHW) with the following information: (a) The Corps contact person and the Corps permit number; (b) the action name; (c) the type of activity; (d) the location of the action site by latitude and longitude (including degrees, minutes, and seconds), and 6th field hydrologic unit code (HUC); (e) start and end dates for the completion of in-water work; (f) photos of habitat conditions before, during, and after action completion; (g) any dates work ceased due to high flows; (h) evidence of compliance with fish screen criteria, as defined below, for any pump used; (i) a summary of the results of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort; (j) the number, type, and diameter of any pilings removed or broken during removal; (k) a description of any riparian area cleared within 150 feet of OWH; (l) the linear feet of bank alteration; (m) a description of site restoration; and (n) a completed fish salvage reporting form from Appendix C for any action that requires fish salvage. The Corps will use CIRS to submit this report when the online system becomes available. Until CIRS is available, the Corps will submit reports to NMFS by email at this address: SLOPES.NWR@noaa.gov.

7. <u>Action completion: civil works actions</u>. The Corps will submit an action completion report (Appendix B) to NMFS within 60-days of completing all work below ordinary high water (OHW) with the following information: (a) The Corps contact person; (b) the action name; (c) the type of activity; (d) the location of the action site by latitude and longitude (including degrees, minutes, and seconds), and 6th field HUC; (e) start and end dates for the completion of in-water work; (f) photos of habitat conditions before, during, and after action completion; (g) any dates work ceased due to high flows; (h) evidence of compliance with fish screen criteria, as defined below, for any pump used; (i) a summary of the results of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort; (j) the number, type, and diameter of any pilings removed or broken during removal; (k) a description of any riparian area cleared within 150 feet of OWH; (l) the linear feet of bank alteration; (m) a description of site restoration; and (n) a completed fish salvage reporting form from Appendix C for any action that requires fish salvage. The Corps will use CIRS to submit this report when the online system becomes available. Until CIRS is available, the Corps will submit reports to NMFS by email at this address: SLOPES.NWR@noaa.gov.

8. Permit conditions. The Corps will include each applicable design criterion as an enforceable condition of every permit issued under this Opinion.

9. WRDA action specifications. The Corps will include each applicable design criterion as a final action specification of every WRDA civil works action carried out under this Opinion.

10. Site access. The Corps will retain the right of reasonable access to the site of actions authorized using this Opinion to monitor the use and effectiveness permit conditions.

11. Salvage notice. The Corps will include the following notice as part of each permit issued using this Opinion and, for actions completed by the Corps, provide the notice in writing to the action supervisor.

> If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify NMFS' Office of Law Enforcement at 503-231-6240 or 206-526-6133. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by the Office of Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

12. Annual program report. The Corps' Regulatory and Civil Works Branches will each submit a monitoring report to NMFS by February 15 each year that describes the Corps' efforts to carry out this Opinion. The report will include an assessment of overall program activity, a map showing the location and type of each action authorized and carried out under this Opinion, and any other data or analyses the Corps deems necessary or helpful to assess habitat trends as a result of actions authorized under this Opinion. The Corps will use CIRS to submit this report when the online system becomes available. Until CIRS is available, the Corps will submit reports to NMFS by email at this address: SLOPES.NWR@noaa.gov.

13. Annual coordination meeting. The Corps' Regulatory and Civil Works Branches will each attend an annual coordination meeting with NMFS by March 31 each year to discuss the annual monitoring report and any actions that will improve conservation under this Opinion, or make the program more efficient or more accountable.

14. Reinitiation. If the Corps chooses to continue programmatic coverage under this Opinion, it will reinitiate consultation within 5 years of the date of issuance.

General Construction

15. Flagging sensitive areas. The action area will be flagged to identify sensitive resource areas, such as areas below ordinary high water and wetlands.

16. Temporary erosion controls. Temporary erosion controls will be in place before any significant alteration of the action site is allowed.

17. Temporary access roads. Temporary access roads will not be built on steep slopes, where grade, soil, or other features suggest a likelihood of excessive erosion or failure; will use existing ways whenever possible; and will minimize soil disturbance and compaction within 150 feet of a stream, waterbody, or wetland. All temporary access roads will be obliterated when the action is completed, the soil will be stabilized and the site will be revegetated. Temporary roads in wet or flooded areas will be restored by the end of the applicable in-water work period.

18. Fish passage. Fish passage must be provided for any adult or juvenile fish present in the action area during construction, unless passage did not exist before construction. After construction, adult and juvenile passage that meets NMFS fish passage criteria must be provided for the life of the action (NMFS 2008, or most recent version).

19. In-water work period. All work within the wetted channel will be completed during periods of time listed in the Oregon Guidelines for Timing of In-water Work to Protect Fish and Wildlife Resources (ODFW 2000, or the most recent version), except that the winter work window is not approved for actions in the Willamette River below Willamette Falls. The timing guidelines are available from the Oregon Department of Fish and Wildlife, Wildlife Division, Salem, Oregon. Hydraulic and topographic measurements as part of a restoration action, and large wood restoration, may be completed at any time, provided that the affected area is not occupied by adult fish congregating for spawning or an area where redds are occupied by eggs or pre-emergent alevins.

20. Work area isolation. A work area within the wetted channel will be completely isolated from the active stream whenever a fish is reasonably certain to be present, or if the work area is 300 feet or less upstream from spawning habitats, except for boulder and large wood restoration actions. When work area isolation is required, a work area isolation plan will be prepared and carried out, commensurate with the scope of the action, that includes the following information: (a) The name, phone number, an address of the person responsible for accomplishing each component of the plan; (b) an estimate of stream flows likely to occur during isolation; (c) a plan view of all isolation elements and fish release areas; (d) a list of equipment and materials necessary to complete the plan, including a fish screen that meets NMFS fish screen criteria (NMFS 1996) for any pump used to dewater the isolation area; (e) and the sequence and schedule of dewatering and rewatering activities.

21. Capture and release. Any fish that may be trapped within the isolated work area will be captured and released using a trap, seine, electrofishing, or other methods as prudent to minimize the risk of injury, then released at a safe release site. Capture and release will be supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all fish.

22. Electrofishing. If electrofishing will be used to capture fish for salvage, NMFS' electrofishing guidelines will be followed (NMFS 2000). Those guidelines are available from the NMFS Northwest Region, Protected Resources Division, Portland, Oregon.

23. Construction water. Surface water may be diverted to meet construction needs only if developed sources are unavailable or inadequate, and diversions will not exceed 10% of the available flow rate.

24. Fish screens. NMFS must review and approve fish screens for surface water that is diverted by gravity or by pumping at a rate that exceeds 3 cfs. All other diversions must have a fish screen that meets the following specifications: (a) An automated cleaning device with a minimum effective surface area of 2.5 square feet per cfs, and a nominal maximum approach velocity of 0.4 feet per second (fps), or no automated cleaning device, a minimum effective surface area of 1 square foot per cfs, and a nominal maximum approach rate of 0.2 fps; and (b) a round or square screen mesh that is no larger than 2.38 mm (0.094") in the narrow dimension, or any other shape that is no larger than 1.75 mm (0.069") in the narrow dimension. Each fish screen must be installed, operated, and maintained according to NMFS' fish screen criteria (NMFS 2008, or most recent version).

25. Erosion and pollution control plan. A erosion and pollution control plan will be prepared and carried out, commensurate with the scope of the action, that includes the following information: (a) The name, phone number, an address of the person responsible for accomplishing the plan; (b) best management practices to confine vegetation and soil disturbance to the minimum area, and minimum length of time, as necessary to complete the action, and otherwise prevent or minimize erosion associated with the action; (c) best management practices to confine, remove, and dispose of construction waste, including every type of debris, discharge water, concrete, cement, grout, washout facility, welding slag, petroleum product, or other hazardous materials generated, used, or stored on-site; (d) procedures to contain and control a spill of any hazardous material generated, used or stored on-site, including notification of proper authorities; and (e) steps to cease work under high flows, except for efforts to avoid or minimize resource damage.

26. Choice of equipment. Heavy equipment will be limited to that with the least adverse effects on the environment (*e.g.*, minimally-sized, rubber-tired).

27. Vehicle staging and use. All vehicles and other heavy equipment will (a) be stored, fueled, and maintained in a vehicle staging area placed 150 feet or more from any stream, waterbody or wetland; (b) inspected daily for fluid leaks before leaving the vehicle

staging area for operation within 50 feet of any stream, waterbody or wetland; (c) steam cleaned before operation below ordinary high water, and often as necessary during operation to remain grease free.

28. Stationary power equipment. Generators, cranes, and any other stationary equipment operated within 150 feet of any stream, waterbody or wetland, will be maintained as necessary to prevent leaks and spills from entering the water.

29. Work from top of bank. To the extent feasible, heavy equipment will work from the top of the bank, unless work from another location would result in less habitat disturbance.

30. Site restoration. Any large wood, native vegetation, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration. When construction is finished, all streambanks, soils, and vegetation will be cleaned up and restored as necessary to renew ecosystem processes that form and maintain productive fish habitats. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

Types of Actions

Boulder Placement[4]

31. Site selection. Boulder placement will be limited to stream reaches with the following features: (a) an intact, well-vegetated riparian area, including trees and shrubs where those species would naturally occur, or that are part of riparian area restoration action; and (b) a stream bed that consists predominantly of coarse gravel or larger sediments.

32. Installation. Boulders will be installed as follows: (a) The cross-sectional area of boulders may not exceed 25% of the cross-sectional area of the low flow channel, or be installed to shift the stream flow to a single flow pattern in the middle or to the side of the stream; (b) boulders will be machine-placed (no end dumping allowed); and (c) permanent anchoring, including rebar or cabling, may not be used.

Fish Passage Restoration

33. Step weir, fish ladder, and culvert replacement approval. The Corps will not issue a permit to install or improve a step weir or fish ladder, or to replace or improve a culvert, until the action has been reviewed and approved by NMFS for consistency with NMFS fish passage criteria (NMFS 2008, or most recent version). Fish passage actions that would not require prior approval must still complete a post-action report.

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[4] For additional information on design and methods for boulder placement, see "boulder clusters" in WDFW *et al*. (2004).

Large Wood Restoration[5]

34. Large wood condition. Stabilizing or key pieces of large wood that will be relied on to provide streambank stability or redirect flows must be intact, hard, and undecayed to partly decaying, and should have untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable.

Off- and Side-Channel Habitat Restoration[6]

35. Off- and side-channel habitat approval. The Corps will not issue a permit for off- or side-channel habitat restoration until the action has been reviewed and approved by NMFS.

Piling Removal

36. Pile removal. The following steps will be used to minimize creosote release, sediment disturbance, and total suspended solids: (a) Install a floating surface boom to capture floating surface debris; (b) keep all equipment (*e.g.*, bucket, steel cable, vibratory hammer) out of the water, grip piles above the waterline, and complete all work during low water and low current conditions; (c) dislodge the piling with a vibratory hammer, whenever feasible--never intentionally break a pile by twisting or bending; (d) slowly lift the pile from the sediment and through the water column; (e) place the pile in a containment basin on a barge deck, pier, or shoreline without attempting to clean or remove any adhering sediment (a containment basin for the removed piles and any adhering sediment may be constructed of durable plastic sheeting with sidewalls supported by hay bales or another support structure to contain all sediment, and return flow may be directed back to the waterway); (f) fill the holes left by each piling with clean, native sediments; and (g) dispose of all removed piles, floating surface debris, any sediment spilled on work surfaces, and all containment supplies at a permitted upland disposal site.

37. Broken piles. (a) If a pile breaks above the surface of uncontaminated sediment, or less than 2 feet below the surface, make every attempt short of excavation to remove it entirely. If the pile cannot be removed without excavation, saw the stump off at least 3 feet below the surface of the sediment. (b) If a pile breaks above contaminated sediment, saw the stump off at the sediment line; if a pile breaks within contaminated sediment, make no further effort to remove it and cover the hole with a cap of clean substrate appropriate for the site. (c) If dredging is likely in the area of piling removal, use a global positioning device (GPS) to note the location of all broken piles for future use in site debris characterization.

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[5] For additional information on selection of large wood for restoration actions, see stream slope and width dimensions and minimum large wood piece diameters described in Figure 1 in ODF and ODFW (1995, or the most recent version), and for anchoring and placement, see WDFW and Inter-Fluve (2006).

[6] For additional information on methods and design considerations for off- and side-channel habitat restoration, see "side channel/off-channel habitat restoration" in WDFW *et al*. (2004).

Set-back Existing Berm, Dike, and Levee[7]

38. Set-back existing berm, dike, and levee approval. The Corps will not issue a permit for set-back of existing berms, dikes or levees until the action has been reviewed and approved by NMFS.

Spawning Gravel Restoration[8]

39. Gravel placement. Gravel augmentation is limited to areas where the natural supply has been eliminated or significantly reduced through anthropogenic means.

40. Gravel source. Gravel to be placed in streams must be obtained from an upland source outside of the channel and riparian area (gravel from any instream source is prohibited), sized such that 50% of the gradation becomes mobile at the dominant discharge event, rounded and uncrushed (less than 25% fractured face), and washed before instream placement.

Streambank Restoration[9]

41. Streambank shaping. Without changing the location of the bank toe, restore damaged streambanks to a natural slope, pattern, and profile suitable for establishment of permanent woody vegetation.

42. Soil reinforcement. Complete all soil reinforcement earthwork and excavation in the dry. Use soil layers or lifts that are strengthened with biodegradable fabrics and penetrable by plant roots.

43. Large Wood. Include large wood in each streambank restoration action to the maximum extent feasible. Large wood must be intact, hard, and undecayed to partly decaying, and should have untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable. Wood that is already within the stream or suspended over the stream may be repositioned to allow for greater interaction with the stream.

44. Use of Rock in Streambank Restoration. Rock may not be used for streambank restoration, except as ballast to stabilize large wood.

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[7] For additional information on methods and design considerations for levee removal and modification, see "levee removal and modification" in WDFW *et al*. (2004).

[8] For additional information on gravel restoration methods and design, see "salmonid spawning gravel cleaning and placement" in WDFW *et al*. (2004).

[9] For additional information on methods and design for bank shaping; installation of coir logs and soil reinforcements; anchoring and placement of large wood; woody plantings; and herbaceous cover, see WDFW and Inter-Fluve (2006), and "riparian restoration and management" in WDFW *et al*. (2004).

45. Planting or installing vegetation. Use a diverse assemblage of species native to the action area or region, including trees, shrubs, and herbaceous species. Do not use noxious or invasive species.

46. Fertilizer. Do not apply surface fertilizer within 50 feet of any stream channel.

47. Fencing. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

Water Control Structure Removal

48. The Corps will not issue a permit for removal of any water control structure (including an earthen embankment, subsurface drainage feature, spillway system, tide gate, and an instream flow redirection structure, such as a drop structure, gabion, groin) that is used to control, discharge, or maintain water levels, until the action has been reviewed and approved by NMFS.

The NMFS relied on the foregoing description of the proposed action, including all proposed design criteria, to complete this consultation. However, unforeseen occurrences or changed circumstances encountered while carrying out the proposed action may require a significant change in the proposed design, construction methods, or other on-the-ground practices. These changes may, in turn, result in effects of the action which exceed the amount or extent of taking specified in the incidental take statement or otherwise affect listed species or designated critical habitat in ways not previously considered. Therefore, the action agency or other cooperating party must keep NMFS informed of any such changes to ensure that conclusions drawn during consultation remain valid.

Action Area

"Action area" means 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). For this consultation, the overall action area consists of the combined action areas for each action to be authorized or carried out under this Opinion within the range of ESA-listed salmon or steelhead, designated critical habitat, or designated EFH in Oregon. This includes all upland, riparian and aquatic areas affected by site preparation, construction, and site restoration design criteria at each action site. Individual action areas also include riparian areas, banks, and the stream channel in area extending no more than 300 feet upstream and 300 feet downstream from the action footprint, where aquatic habitat conditions will be temporarily degraded until site restoration is complete. All actions authorized by this Opinion will occur within the jurisdiction of the Portland District in Oregon.

The Corps concluded that the proposed action was "likely to adversely affect" Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River spring-run (UWR) Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Snake River (SR) spring/summer run Chinook salmon, SR fall-run Chinook salmon, Columbia River

(CR) chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), Oregon Coast (OC) coho salmon, Southern Oregon/Northern California (SONCC) coho salmon, SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), UWR steelhead, Middle Columbia River (MCR) steelhead, UCR steelhead, Snake River Basin (SRB) steelhead, and southern green sturgeon (Table 2).

Table 2. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered; "P" means proposed for listing or designation.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River spring-run	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River spring/summer run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Chum salmon (*O. keta*)			
Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Coho salmon (*O. kisutch*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	Not applicable	6/28/05; 70 FR 37160
Oregon Coast	T 2/11/08; 73 FR 7816	2/11/08; 73 FR 7816	2/11/08; 73 FR 7816
Southern Oregon / Northern California Coasts	T 6/28/05; 70 FR 37160	5/5/99; 64 FR 24049	6/28/05; 70 FR 37160
Sockeye salmon (*O. nerka*)			
Snake River	E 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (*O. mykiss*)			
Lower Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Middle Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	E 1/05/06; 71 FR 834*	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Green sturgeon (*Acipenser medirostris*)			
Southern	T 4/07/06; 71 FR 17757	Not applicable	Not applicable

* UCR steelhead was initially listed as an endangered species (6/18/97; 62 FR 43937), status upgraded to threatened (1/5/06; 71 FR 834), then reinstated as endangered status per a decision in U.S. District Court on June 13, 2007 (Trout Unlimited *et al*. v. Lohn, No. CV06-0483-JCC).

The Opinion also addresses effects to critical habitat designated for LCR Chinook salmon, UWR spring-run Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, OC coho salmon, SONCC coho salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead and SRB steelhead. Critical habitat has not been proposed or designated for LCR coho salmon, or for southern green sturgeon.

The overall action area is also designated as EFH for Pacific Coast groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Pacific Coast salmon (PFMC 1999), or is in an area where environmental effects of the proposed action may adversely affect designated EFH for those species.

ENDANGERED SPECIES ACT

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The biological opinion (Opinion) that follows records the results of the interagency consultation for this proposed action. An incidental take statement (ITS) is provided after the Opinion that specifies the impact of any taking of threatened or endangered species that will be incidental to the proposed action, reasonable and prudent measures that NMFS considers necessary and appropriate to minimize such impact, and nondiscretionary terms and conditions (including, but not limited to, reporting requirements) that must be complied with by the Federal agency and applicant (if any) to carry out the reasonable and prudent measures.

Biological Opinion

To complete the jeopardy analysis presented in this Opinion, NMFS reviews the status of each listed species of Pacific salmon and steelhead[10] considered in this consultation, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this analysis, NMFS determines whether effects of the action were likely, in view of existing risks, to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

For the critical habitat adverse modification analysis, NMFS considers the status of the entire designated area of the critical habitat considered in this consultation, the environmental baseline in the action area, the likely effects of the action on the function and conservation role of the affected critical habitat, and cumulative effects. NMFS uses this assessment to determine whether, with implementation of the proposed action, critical habitat would remain functional, or retain the current ability for the primary constituent elements (PCEs) to become functionally established, to serve the intended conservation role for the species.[11]

Status of the Species and Critical Habitats

The summaries that follow describe the status of ESA-listed salmon and steelhead, and their designated critical habitats, that occur within the geographic area of the Corps' regulatory jurisdiction, and that are likely to be adversely affected by a permit the Corps may issue under this Opinion within the next 5 years for a stream restoration or fish passage improvement action. A summary that describes the status of ESA-listed southern green sturgeon is also included.

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[10] An "evolutionarily significant unit" (ESU) of Pacific salmon (Waples 1991), a "distinct population segment" (DPS) of steelhead (71 FR 834; January 5, 2006), and a DPS of sturgeon are all "species" as defined in Section 3 of the ESA.

[11] Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (November 7, 2005) (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act).

Information presented in these summaries is based on information presented in a large body of scientific publications and reports, and is the basis for the analyses we present in the Effects of the Action section of this Opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 2) and in many publications available from the NMFS Northwest Region, Protected Resources Division, Portland, Oregon.

The status of species and critical habitat sections below are organized by recovery domains to better integrate recovery planning information that NMFS is developing on the conservation status of the species and critical habitats considered in this consultation. Recovery domains are the geographically-based areas that NMFS is using to prepare multi-species recovery plans. Southern green sturgeon are under the jurisdiction of NMFS' Southwest Region which has not yet convened a recovery team for this species.

The four recovery domains relevant to this consultation and the ESA-listed salmon and steelhead species that reproduce in each domain are shown in Table 3. For this consultation, populations that reproduce in Oregon are also identified as one indication of the importance of the action area to the recovery of these species. However, all populations spawning within the Columbia Basin use the Columbia River mainstem and estuary to complete part of their life history.

Table 3. Recovery planning domains identified by NMFS and their ESA-listed salmon and steelhead species.

Recovery Domain	Species
Willamette-Lower Columbia	LCR Chinook salmon
	UWR Chinook salmon
	CR chum salmon
	LCR coho salmon
	LCR steelhead
	UWR steelhead
Interior Columbia	UCR spring-run Chinook salmon
	SR spring/summer Chinook salmon
	SR fall-run Chinook salmon
	SR sockeye salmon
	UCR steelhead
	MCR steelhead
	SRB steelhead
Oregon Coast	OC coho salmon
Southern Oregon Northern California Coasts	SONCC coho salmon

For each recovery domain, a technical review team (TRT) appointed by NMFS has developed, or is developing, criteria necessary to identify independent salmon populations within each species, recommend viability criteria for that species, and analyze factors that limit species survival. The definition of a population used by each TRT is set forth in the "viable salmonid population" (VSP) document prepared by NMFS for use in conservation assessments of Pacific salmon and steelhead (McElhany *et al*. 2000). The boundaries of each population are defined using a combination of genetic information, geography, life-history traits, morphological traits, and population dynamics that indicate the extent of reproductive isolation among spawning groups.

Understanding population size and spatial extent is critical for the viability analyses, and a necessary step in recovery planning and conservation assessments for any species. If a species consists of multiple populations, the overall viability of that species is a function of the VSP attributes of its constituent populations. Until a viability analysis of a species is completed, the VSP guidelines recommend that all populations should be managed to retain the potential to achieve viable status to ensure a rapid start along the road to recovery, and that no significant parts of the species are lost before the full recovery plan is implemented (McElhany *et al*. 2000).

The status of critical habitat was based primarily on a watershed-level analysis of conservation value that focused on the presence of listed ESA-listed salmon and steelhead and the biological and physical features (*i.e.*, the PCEs) that are essential to their conservation. This analysis for the 2005 designations was completed by Critical Habitat Analytical Review Teams (CHARTs) that focused on large geographical areas corresponding approximately to recovery domains (NOAA Fisheries 2005). Each watershed was ranked using a conservation value attributed to the quantity of stream habitat with PCEs, the present condition of those PCEs, the likelihood of achieving PCE potential (either naturally or through active restoration), support for rare or important genetic or life history characteristics, support for abundant populations, and support for spawning and rearing populations. In some cases, our understanding of these interim conservation values has been further refined by the work of TRTs and other recovery planning efforts that have better explained the habitat attributes, ecological interactions, and population characteristics important to each species.

Status of the Species. Natural variations in freshwater and marine environments have substantial effects on the abundance of salmon and steelhead populations. Of the various natural phenomena that affect most populations of salmon and steelhead, changes in ocean productivity are generally considered the most important. Salmon and steelhead are exposed to high rates of natural predation, particularly during freshwater rearing and migration stages. Ocean predation probably contributes to significant natural mortality, although the levels of predation are largely unknown. In general, salmon and steelhead are eaten by pelagic fishes, birds, and marine mammals.

Over the past few decades, the size and distribution of the salmon and steelhead populations considered in this Opinion, like the other salmon and steelhead that NMFS has listed, generally have declined because of natural phenomena and human activity, including the operation of hydropower systems, over-harvest, hatcheries, and habitat degradation. Enlarged populations of terns, seals, and sea lions in the Pacific Northwest have reduced the survival of some Pacific salmon and steelhead populations. It is likely that climate change will play an increasingly important role in determining the abundance of salmon and steelhead by exacerbating long-term problems related to temperature, stream flow, habitat access, predation, and marine productivity (CIG 2004, Scheuerell and Williams 2005, Zabel *et al.* 2006, ISAB 2007).

Willamette and Lower Columbia (WLC) Recovery Domain. Species in the WLC Recovery Domain include LCR Chinook, UWR Chinook, CR chum, LCR coho, LCR steelhead, and UWR steelhead. The WLC-TRT identified 107 demographically independent populations of those species (Table 4), including 47 populations that spawn within Oregon. These populations were further aggregated into strata, groupings above the population level that are connected by some degree of migration, based on ecological subregions. All 107 populations use parts of the mainstem of the Columbia River and the Columbia River estuary that flow through Oregon for migration, rearing, and smoltification.

The WLC-TRT recommended viability criteria that follow the VSP framework and described biological or physical performance conditions that, when met, indicate a population or species has a 5% or less risk of extinction over a 100 year period (McElhany *et al*. 2006, see also, NRC 1995). McElhany *et al.* (2007) applied those criteria to populations in Oregon and found that the combined extinction risk is very high for LCR Chinook, UWR Chinook salmon, CR chum salmon, LCR coho salmon, and moderate for LCR steelhead and UWR steelhead, although the status of those species with populations in Washington is still under assessment.

Table 4. Demographically-independent populations in the WLC Recovery Domain and spawning populations in Oregon.

Species	Populations In WLC	Spawning Populations In Oregon
LCR Chinook salmon	32	12
UWR Chinook salmon	7	7
CR chum salmon	17	8
LCR coho salmon	24	9
LCR steelhead	23	6
UWR steelhead	4	5

LCR Chinook salmon. This species includes all naturally-spawned populations of Chinook salmon in the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River; the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River; and progeny of seventeen artificial propagation programs. The WLC-TRT identified 32 historical populations of LCR Chinook salmon – seven in the coastal subregion, six in the Columbia Gorge, and nine in the western Cascades. Twelve of those populations occur within the action area (Table 5) and only Sandy River late fall Chinook is considered "viable" (McElhany *et al*. 2007). The major factors limiting recovery of LCR Chinook salmon include altered channel morphology, loss of habitat diversity, excessive sediment, high water temperature, reduced access to spawning/rearing habitat, and harvest impacts (NMFS 2006).

UWR Chinook salmon. The species includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, and progeny of seven artificial propagation programs. All seven historical populations of UWR Chinook salmon identified by the WLC-TRT occur within the action area and are contained within a single ecological subregion, the western Cascade Range (Table 6); only the Clackamas population is characterized as "viable" (McElhany *et al*. 2007). The major factors limiting recovery of UWR Chinook salmon identified by NMFS include lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Table 5. LCR Chinook salmon populations spawning in Oregon. Overall viability risk: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years, "very low" means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered "viable."

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Coast Range	Fall	Young Bay	Very High
		Big Creek	Very High
		Clatskanie	Relatively High
		Scappoose	Very High
Columbia Gorge	Spring	Hood	Very High
	Early fall ("tule")	Upper Gorge	Very High
	Fall	Hood	Very High
		Lower Gorge	Very High
West Cascade Range	Spring	Sandy	Moderate
	Early fall ("tule")	Clackamas	Very High
		Sandy	Very High
	Late fall ("bright")	Sandy	Low

Table 6. UWR Chinook salmon populations. Overall viability risk: “extinct or very high” means greater than 60% chance of extinction within 100 years; “relatively high” means 60 to 25% risk of extinction in 100 years; “moderate” means 25 to 5% risk of extinction in 100 years, “low or negligible” means 5 to 1% risk of extinction in 100 years; “very low” means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered “viable.”

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
West Cascade Range	Spring	Clackamas	Low
		Mollala	Relatively High
		North Santiam	Very high
		South Santiam	Very high
		Calapooia	Very high
		McKenzie	Moderate
		Middle Fork Willamette	Very high

CR chum salmon. This species includes all naturally-spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, and progeny of three artificial propagation programs. The WLC-TRT identified 17 historical populations of CR chum salmon and aggregated these into four strata (Myers *et al*. 2006). Unlike other species in the WLC Recovery Domain, CR chum salmon spawning aggregations were identified in the mainstem Columbia River. These aggregations generally were included in the population associated with the nearest river basin. Three strata and eight historical populations of CR chum salmon occur within the action area (Table 7); of these, none are “viable” (McElhany *et al*. 2007). The major factors limiting recovery of CR chum salmon include altered channel morphology, loss of habitat diversity, excessive sediment, reduced streamflow, harassment of spawners, and harvest impacts (NMFS 2006).

Table 7. CR chum salmon populations spawning in Oregon. Overall viability risk: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years; "very low" means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered "viable."

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Coast Range	Fall	Young's Bay	Very high
		Big Creek	Very high
		Clatskanie	Very high
		Scappoose	Very high
Columbia Gorge	Fall	Lower Gorge	Very high
		Upper Gorge	Very high
West Cascade Range	Fall	Clackamas	Very high
		Sandy	Very high

LCR coho salmon. This species includes all naturally-spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers; in the Willamette River to Willamette Falls, Oregon; and progeny of 25 artificial propagation programs. The WLC-TRT identified 24 historical populations of LCR coho salmon and divided these into two strata based on major run timing: early and late (Myers *et al*. 2006). Three strata and nine historical populations of LCR coho salmon occur within the action area (Table 8). Of these nine populations, Clackamas River is the only population characterized as "viable" (McElhany *et al*. 2007). The major factors limiting recovery of LCR coho salmon include degraded floodplain connectivity and channel structure and complexity, loss of riparian areas and large wood recruitment, degraded stream substrate, loss of stream flow, reduced water quality, and impaired passage (NMFS 2007).

In general, late coho salmon spawn in smaller rivers or the lower reaches of larger rivers from mid-November to January, coincident with the onset of rain-induced freshets in the fall or early winter. Spawning typically takes place within a few days to a few weeks of freshwater entry. Late-run fish also tend to undertake oceanic migrations to the north of the Columbia River, extending as far as northern British Columbia and southeast Alaska. As a result, late coho salmon are known as "Type N" coho. Alternatively, early coho salmon spawn in the upper reaches of larger rivers in the lower Columbia River and in most rivers inland of the Cascade Crest. During their oceanic migration, early coho salmon tend to migrate to the south of the Columbia River and are known as "Type S" coho salmon. They may migrate as far south as the waters off northern California. While the ecological significance of run timing in coho salmon is fairly well understood, it is not clear how important ocean migratory pattern is to overall diversity and the relative historical abundance of Type N and Type S life histories largely is unknown.

Table 8. LCR coho salmon populations spawning in Oregon. Overall viability risk: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years; "very low" means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered "viable."

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Type		
Coast Range	N	Young's Bay	Very High
		Big Creek	Very High
		Clatskanie River	Relatively High
		Scappoose River	Relatively High
Columbia Gorge	N and S	Lower Gorge	Very High
		Upper Gorge	NA
		Hood River	Very high
West Cascade Range	S	Clackamas River	Low
		Sandy River	Relatively High

LCR steelhead. The species includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between and including the Cowlitz and Wind Rivers, Washington; in the Willamette and Hood Rivers, Oregon; and progeny of ten artificial propagation programs; but excluding all steelhead from the upper Willamette River Basin above Willamette Falls, Oregon, and from the Little and Big White Salmon Rivers, Washington. The WLC-TRT identified 23 historical populations of LCR steelhead (Myers *et al*. 2006). Within these populations, the winter-run timing is more common in the west Cascade subregion, while farther east summer steelhead are found almost exclusively.

Summer steelhead return to freshwater long before spawning. Winter steelhead, in contrast, return from the ocean much closer to maturity and spawn within a few weeks. Summer steelhead spawning areas in the lower Columbia River are found above waterfalls and other features that create seasonal barriers to migration. Where no temporal barriers exist, the winter-run life history dominates. Three strata and six historical populations of LCR steelhead occur within the action area (Table 9). Of the populations in Oregon, only Clackamas is "viable" (McElhany *et al*. 2007). The major factors limiting recovery of LCR steelhead include altered channel morphology, lost/degraded floodplain connectivity and lowland stream habitat, excessive sediment, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Table 9. LCR steelhead populations spawning in Oregon. Overall viability risk: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years; "very low" means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered "viable."

Stratum		Population Spawning In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Columbia Gorge	Summer	Hood River	Very High
	Winter	Lower Gorge	Relatively High
		Upper Gorge	Moderate
		Hood River	Moderate
West Cascade Range	Winter	Clackamas	Low
		Sandy	Relatively High

UWR steelhead. This species includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River. The WLC-TRT identified four historical populations of UWR steelhead, all with winter run timing and all within Oregon (Myers *et al*. 2006). Only winter steelhead historically existed in this area, because flow conditions over Willamette Falls allowed only late winter steelhead to ascend the falls, until a fish ladder was constructed in the early 1900s and summer steelhead were introduced. Summer steelhead have become established in the McKenzie River where historically no steelhead existed, although these fish were not considered in the identification of historical populations. UWR steelhead currently are found in many tributaries that drain the west side of the upper Willamette River basin. Analysis of historical observations, hatchery records, and genetic analysis strongly suggested that many of these spawning aggregations are the result of recent introductions and do not represent a historical population. Nevertheless, the WLC-TRT recognized that these tributaries may provide juvenile rearing habitat or may be temporarily (for one or more generations) colonized during periods of high abundance.

One stratum and five historical populations of UWR steelhead occur within the action area (Table 10), although the west-side tributaries population was included only because it is important to the species as a whole, and not because it is independent. Of these five populations, none are "viable" (McElhany *et al*. 2007). The major factors limiting recovery of UWR steelhead include lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Table 10. UWR steelhead populations. Overall viability risk: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years; "very low" means less than 1% chance of extinction in 100 years, and NA means not available. A low or negligible risk of extinction is considered "viable."

Stratum		Population Spawning In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Type		
West Cascade Range	Winter	Molalla	Moderate
		North Santiam	Moderate
		South Santiam	Moderate
		Calapooia	Moderate
		West-side Tributaries	Moderate

Interior Columbia (IC) Recovery Domain. Species in the IC Recovery Domain include UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, MCR steelhead, and SRB steelhead. The IC-TRT identified 82 demographically-independent populations of those species based on genetic, geographic (hydrographic), and habitat characteristics (Table 11). In some cases, the IC-TRT further aggregated populations into "major groupings" based on dispersal distance and rate, and drainage structure, primarily the location and distribution of large tributaries (IC-TRT 2003). Of the 82 populations identified, 24 have all or part of their spawning range in Oregon, and all 82 use the lower mainstem of the Snake River, the mainstem of the Columbia River, and the Columbia River estuary, or part thereof, in Oregon for migration, rearing, and smoltification.

Table 11. Demographically-independent populations in the IC Recovery Domain and spawning populations in Oregon.

Species	**Populations In IC**	**Spawning Populations In Oregon**
UCR spring-run Chinook salmon	3	0
SR spring/summer Chinook salmon	31	7
SR fall-run Chinook salmon	1	1
SR sockeye salmon	1	0
UCR steelhead	4	0
MCR steelhead	17	10
SRB steelhead	25	6

The IC-TRT also recommended viability criteria that follow the VSP framework (McElhany *et al*. 2006) and described biological or physical performance conditions that, when met, indicate a population or species has a 5% or less risk of extinction over a 100-year period (IC-TRT 2007, see also, NRC 1995). As of this writing, the IC-TRT has applied the viability criteria to 68 populations, although it has only completed a draft assessment for 55 populations (see IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon). Of those assessments, the only population that the TRT found to be viable was the North Fork John Day population of MCR steelhead. The strength of this population is due to a combination of high abundance and productivity, and good spatial structure and diversity, although the genetic effects of the large number of out-of-species strays and of natural spawners that are hatchery strays are still significant long-term concerns.

UCR spring-run Chinook salmon. This species includes all naturally-spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River), 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) upstream to Chief Joseph Dam in Washington, as well as progeny of six artificial propagation programs. The IC-TRT identified four independent populations of UCR spring-run Chinook salmon in the upriver tributaries of Wenatchee, Entiat, Methow, and Okanogan (extirpated), but no major groups due to the relatively small geographic area affected (IC-TRT 2003, McLure *et al*. 2005). Although none of these populations spawn in Oregon, they all use the Columbia River mainstem and estuary so all adult and juvenile individuals of this species must pass through part of the action area. The IC-TRT considered that this species, as a whole, is at high risk of extinction because all extant populations are at high risk (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon). The major factors limiting recovery of UWR spring-run Chinook salmon include altered channel morphology and flood plain, riparian degradation and loss of in-river large wood, reduced streamflow, impaired passage, hydropower system mortality, and harvest impacts (NMFS 2006).

SR spring/summer run Chinook salmon. This species includes all naturally-spawned populations of spring/summer run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins; and progeny of fifteen artificial propagation programs. The IC-TRT identified 31 historical populations of SR spring/summer run Chinook salmon, and aggregated these into major population groups (IC-TRT 2003, McLure *et al*. 2005). This species includes those fish that spawn in the Snake River drainage and its major tributaries, including the Grande Ronde River and the Salmon River, and that complete their adult, upstream migration past Bonneville Dam between March and July. Of the 31 historical populations of SR spring/summer run Chinook salmon identified by the IC-TRT, seven occur entirely or partly within Oregon (Table 12). Each of these populations are part of the Grande Ronde and Imnaha River major group, and all face a high risk of extinction (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon).

The major factors limiting recovery of SR spring/summer run Chinook salmon include altered channel morphology and flood plain, excessive sediment, degraded water quality, reduced streamflow, and hydropower system mortality (NMFS 2006).

Table 12. SR spring/summer run Chinook salmon populations in Oregon. Overall viability risk: "high" means greater than 25% risk of extinction in 100 years; "moderate" means 5 to 25% risk of extinction with 100 years; "low" means 1 to 5% risk of extinction in 100 years; and "very low" means less than 1% risk of extinction in 100 years.

Major Group	Spawning Populations In Oregon (Watershed)	Viability Assessment		
		Abundance Productivity Risk	Spatial Diversity Risk	Overall Viability Risk
Grande Ronde And Imnaha Rivers	Wenaha River	High	Moderate	High
	Wallowa-Lostine River	High	Moderate	High
	Minam River	High	Moderate	High
	Catherine Creek	High	Moderate	High
	Upper Grande Ronde	High	High	High
	Imnaha River mainstem	High	Moderate	High
	Big Sheep Creek	High	Moderate	High

SR fall-run Chinook salmon. This species includes all naturally-spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River, and progeny of four artificial propagation programs. The IC-TRT identified three populations of this species, although only the lower mainstem population exists at present, and it spawns in the lower main stem of the Clearwater, Imnaha, Grande Ronde, Salmon and Tucannon Rivers (IC-TRT 2003, McLure *et al*. 2005). Unlike the other listed Chinook species in this recovery domain, most SR fall-run Chinook have a subyearling, ocean-type life history in which juveniles outmigrate the next summer, rather than rearing in freshwater for 13 to 14 months before outmigration. Adults return to the Snake River basin in September and October and spawn shortly thereafter. The lower mainstem population spawns in the Columbia River mainstem, in part adjacent to Oregon. All adult and juvenile individuals of this species must pass through part of the action area. The IC-TRT has not completed a viability assessment of this species. The major factors limiting recovery of SR fall-run Chinook salmon include reduced spawning/rearing habitat, degraded water quality, hydropower system mortality, and harvest impacts (NMFS 2006).

SR sockeye salmon. This species includes all anadromous and residual sockeye salmon from the Snake River basin, Idaho, and artificially-propagated sockeye salmon from the Redfish Lake captive propagation program. The IC-TRT identified historical sockeye production in at least five Stanley Basin lakes and in lake systems associated with Snake River tributaries currently cut off to anadromous access (*e.g.*, Wallowa and Payette Lakes), although current returns of SR sockeye are extremely low and limited to Redfish Lake (IC-TRT 2007). SR sockeye salmon do not spawn in Oregon, but all adult and juvenile individuals of this species must pass through part of the action area. The major factors limiting recovery of SR sockeye salmon include altered channel morphology and flood plain, reduced streamflow, impaired passage, and hydropower system mortality (NMFS 2006).

MCR steelhead. This species includes all naturally-spawned steelhead populations below natural and artificial impassable barriers in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River basin; and progeny of seven artificial propagation programs. The IC-TRT identified 20 historical populations of MCR steelhead in major groups (IC-TRT 2003, Mc Lure *et al*. 2005). Ten populations of MCR steelhead occur in Oregon, divided among three major groups (Table 13). Of the 20 historical populations of MCR steelhead identified by the IC-TRT, only the North Fork John Day population currently meets viability criteria, and none of the major groups or the species are considered viable (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon). The major factors limiting recovery of MCR steelhead include altered channel morphology and flood plain, excessive sediment, degraded water quality, reduced streamflow, impaired passage, and hydropower system mortality (NMFS 2006).

Table 13. MCR steelhead populations in Oregon. The Walla Walla population also occurs partly in Washington.

Major Group	Population (Watershed)
Cascade East Slope Tributaries	Fifteenmile Creek
	Deschutes Eastside Tributaries
	Deschutes Westside Tributaries
John Day River	Lower Mainstem John Day River
	North Fork John Day River
	Middle Fork John Day River
	South Fork John Day River
	Upper Mainstem John Day River
Walla Walla and Umatilla Rivers	Umatilla River
	Walla Walla River

UCR steelhead. This species includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, and progeny of six artificial propagation programs. Four independent populations of UCR steelhead were identified by the IC-TRT in the same upriver tributaries as for the previous species (*i.e.*, Wenatchee, Entiat, Methow, and Okanogan) and, similarly, no major population groupings were identified due to the relatively small geographic area involved (IC-TRT 2003, McLure *et al*. 2005). None of these populations spawn in Oregon, although all adult and juvenile individuals of this species must pass through part of the action area. The IC-TRT has not completed a viability assessment of this species, although all extant populations are considered to be at high risk of extinction (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon). The major factors limiting recovery of UCR steelhead include altered channel morphology and flood plain, riparian degradation and loss of in-river large wood, excessive sediment, degraded water quality, reduced streamflow, hydropower system mortality, harvest impacts, and hatchery impacts (NMFS 2006).

SRB steelhead. This species includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, and progeny of six artificial propagation programs. These fish are genetically differentiated from other interior Columbia steelhead populations and spawn at higher altitudes (up to 6,500 feet) after longer migrations (more than 900 miles). The IC-TRT identified 24 populations in five major groups (IC-TRT 2003, Mc Lure *et al*. 2005). Of those, six populations divided among three major groups spawn in Oregon (Table 14). The IC-TRT has not completed a viability assessment of this species. The major factors limiting recovery of SRB steelhead include altered channel morphology and flood plain, excessive sediment, degraded water quality, reduced streamflow, hydropower system mortality, harvest impacts, and hatchery impacts (NMFS 2006).

Table 14. SRB steelhead populations in Oregon.

Major Group	Population (Watershed)
Grande Ronde	Lower Grande Ronde
	Joseph Creek
	Wallowa River
	Upper Grande Ronde
Imnaha River	Imnaha River
Hells Canyon Tributaries	Hells Canyon Tributaries

Oregon Coast (OC) Salmon Recovery Domain. The OC recovery domain includes one species, the OC coho salmon, and covers Oregon coastal streams south of the Columbia River and north of Cape Blanco. Streams and rivers in this area drain west into the Pacific Ocean, and vary in length from less than a mile to more than 210 miles in length. All, with the exception of the largest, the Umpqua River, drain from the crest of the Coast Range. The Umpqua transects the Coast Range and drains from the Cascade Mountains. The OC recovery domain covers cities along the coast and inland, including Tillamook, Lincoln City, Newport, Florence, Coos Bay and Roseburg, and has substantial amounts of private forest and agricultural lands. It also includes portions of the Siuslaw and Umpqua National Forests, lands managed by the U.S. Bureau of Land Management, and the Tillamook and Elliott State Forests.

OC coho salmon. This species includes all naturally-spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco, and progeny of five artificial propagation programs. The OC-TRT identified 56 historical populations, grouped into five major “biogeographic strata,” based on consideration of historical distribution, geographic isolation, dispersal rates, genetic data, life history information, population dynamics, and environmental and ecological diversity (Table 15) (Lawson *et al*. 2007). The OC-TRT concluded that, if recent past conditions continue into the future, OC coho salmon are moderately likely to persist over a 100-year period without artificial support, and have a low to moderate likelihood of being able to sustain their genetic legacy and long-term adaptive potential for the foreseeable future (Wainwright *et al*. 2007). The major factors limiting recovery of OC coho salmon include altered stream morphology, reduced habitat complexity, loss of overwintering habitat, excessive sediment, high water temperature, and variation in ocean conditions (NMFS 2006).

Table 15. OC coho salmon populations in Oregon. Population type "D" means dependent; "FI" means functionally independent; and "PI" means potentially independent.

Stratum	Population	Type	Stratum	Population	Type
North Coast	Necanicum	PI	Mid-Coast (cont.)	Alsea	FI
	Ecola	D		Big (Alsea)	D
	Arch Cape	D		Vingie	D
	Short Sands	D		Yachats	D
	Nehalem	FI		Cummins	D
	Spring	D		Bob	D
	Watseco	D		Tenmile	D
	Tillamook	FI		Rock	D
	Netarts	D		Big (Siuslaw)	D
	Rover	D		China	D
	Sand	D		Cape	D
	Nestucca	FI		Berry	D
	Neskowin	D		Sutton	D
Mid-Coast	Salmon	PI	Lakes	Siuslaw	FI
	Devils	D		Siltcoos	PI
	Siletz	FI		Tahkenitch	PI
	Schoolhouse	D		Tenmile	PI
	Fogarty	D	Umpqua	Lower Umpqua	FI
	Depoe	D		Middle Umpqua	FI
	Rocky	D		North Umpqua	FI
	Spencer	D		South Umpqua	FI
	Wade	D	Mid-South Coast	Threemile	D
	Coal	D		Coos	FI
	Moolack	D		Coquille	FI
	Big (Yaquina)	D		Johnson	D
	Yaquina	FI		Twomile	D
	Theil	D		Floras	PI
	Beaver	PI		Sixes	PI

Southern Oregon and Northern California Coasts (SONCC) Recovery Domain. The SONCC recovery domain includes one ESA-listed species: the SONCC coho salmon. The SONCC recovery domain extends from Cape Blanco, Oregon, to Punta Gorda, California. This area includes many small-to-moderate-sized coastal basins, where high quality habitat occurs in the lower reaches of each basin, and three large basins (Rogue, Klamath and Eel) where high quality habitat is in the lower reaches, little habitat is provided by the middle reaches, and the largest amount of habitat is in the upper reaches of the subbasins.

SONCC coho salmon. This species includes all naturally-spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California; and progeny of three artificial propagation programs. The SONCC-TRT identified 50 populations that were historically present based on consideration of historical distribution, geographic isolation, dispersal rates, genetic data, life history information, population dynamics, and environmental and ecological diversity (Williams *et al*. 2006). In some cases, the SONCC-TRT also identified groups of populations referred to as "diversity strata" largely based on the geographical arrangement of the populations and basin-scale environmental and ecological characteristics. Of those populations, 13 strata and 17 populations occur within the action area (Table 16). The SONCC-TRT has not yet developed viability criteria for use in setting recovery goals. The major factors limiting recovery of SONCC coho salmon include loss of channel complexity, loss of estuarine and floodplain habitat, loss of riparian habitat, loss of in-river wood, excessive sediment, degraded water quality, high water temperature, reduced streamflow, unscreened water diversions, and structures blocking fish passage (NMFS 2006).

Table 16. SONCC coho salmon populations in Oregon. Populations that also occur partly in California are marked with an asterisk. Population type "D" means dependent; "E" means ephemeral; "FI" means functionally independent; and "PI" means potentially independent.

Population		Population Type
River Basin	Subbasin	
Elk River		FI
Mill Creek		D
Hubbard Creek		E
Brush Creek		D
Mussel Creek		D
Euchre Creek		E
Rogue River *	Lower Rogue River	PI
	Illinois River*	FI
	Mid Rogue/Applegate*	FI
	Upper Rogue River	FI
Hunter Creek		D
Pistol River		D
Chetco River		FI
Winchuck River		PI
Smith River *		FI
Klamath River *	Middle Klamath River	PI
	Upper Klamath River	FI

Southern green sturgeon. The southern green sturgeon was recently listed as threatened under the ESA (Table 2). This species includes all naturally-spawned populations of green sturgeon that occur south of the Eel River in Humboldt County, California. The principal factor for the decline of southern green sturgeon is the reduction of its spawning area to a single known population limited to a small portion of the Sacramento River. Unless spawning, green sturgeon are broadly distributed in nearshore marine areas from Mexico to the Bering Sea and are commonly observed in bays, estuaries, and sometimes the deep riverine mainstem in lower elevation reaches of non-natal rivers along the west coast of North America. The principal threat to southern green sturgeon is the reduction of available spawning habitats due to the construction of barriers along the Sacramento and Feather Rivers. Other threats are insufficient flow rates, increased water temperatures, water diversion, nonnative species, poaching, pesticide and heavy metal contamination, and local fishing. The viability of this species is still under assessment.

Status of the Critical Habitats. The NMFS designated critical habitat for all species considered in this opinion, except LCR coho salmon and southern green sturgeon, for which critical habitat has not been proposed or designated (Table 2). To assist in the designation of critical habitat in 2005, NMFS convened Critical Habitat Analytical Review Teams, or “CHARTs,” organized by major geographic areas that roughly correspond to salmon recovery planning domain (NOAA Fisheries 2005). Each CHART consisted of Federal biologists and habitat specialists from NMFS, the Fish and Wildlife Service, the Forest Service, and the Bureau of Land Management, with demonstrated expertise regarding salmon and steelhead habitat and related protective efforts within that domain.

Each CHART assessed biological information pertaining to areas under consideration for designation as critical habitat to identify the areas occupied by listed salmon and steelhead, determine whether those areas contained PCEs essential for the conservation of those species, and whether unoccupied areas existed within the historical range of the listed salmon and steelhead that may also be essential for conservation. The CHART then scored each habitat area based on the quantity and quality of the physical and biological features; rated each habitat area as having a ‘‘high,’’ ‘‘medium,’’ or ‘‘low’’ conservation value; and identified management actions that could affect habitat for salmon and steelhead. CHART reports are available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon.

The ESA gives the Secretary of Commerce discretion to exclude areas from designation if he determines that the benefits of exclusion outweigh the benefits of designation. Considering economic factors and information from CHARTs, NMFS partially or completely excluded the following types of areas from the 2005 critical habitat designations:

1. Military areas. All military areas were excluded because of the current national priority on military readiness, and in recognition of conservation activities covered by military integrated natural resource management plans.

2. Tribal lands. Native American lands were excluded because of the unique trust relationship between tribes and the federal government, the federal emphasis on respect for tribal sovereignty and self governance, and the importance of tribal participation in numerous activities aimed at conserving salmon.

3. Areas With Habitat Conservation Plans. Some lands covered by habitat conservation plans were excluded because NMFS had evidence that exclusion would benefit our relationship with the landowner, the protections secured through these plans outweigh the protections that are likely through critical habitat designation, and exclusion of these

lands may provide an incentive for other landowners to seek similar voluntary conservation plans.

4. Areas With Economic Impacts. Areas where the conservation benefit to the species would be relatively low compared to the economic impacts.

In designating these critical habitats, NMFS organized information at scale of the watershed or 5th field HUC because it corresponds to the spatial distribution and site fidelity of salmon and steelhead populations (WDF *et al*. 1992, McElhany *et al*. 2000). For earlier critical habitat designations for Snake River salmon and SONCC coho salmon, similar information was not available at the watershed scale, so NMFS used the scale of the subbasin or 4th field HUC to organize critical habitat information.

The NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of primary constituent elements (PCEs) throughout the designated area. PCEs consist of the physical and biological features identified as essential to the conservation of the listed species in the documents that designate critical habitat (Tables 17 and 18).

Table 17. PCEs of critical habitats designated for ESA-listed salmon and steelhead species considered in the Opinion (except SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, and SR sockeye salmon), and corresponding species life history events.

Primary Constituent Elements		Species Life History Event
Site Type	**Site Attribute**	
Freshwater spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin development
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence Fry/parr growth and development
Freshwater migration	Free of artificial obstructions Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration, holding Kelt (steelhead) seaward migration Fry/parr seaward migration
Estuarine areas	Forage Free of obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation Adult "reverse smoltification" Adult upstream migration, holding Kelt (steelhead) seaward migration Fry/parr seaward migration Fry/parr smoltification Smolt growth and development Smolt seaward migration
Nearshore marine areas	Forage Free of obstruction Natural cover Water quantity Water quality	Adult sexual maturation Smolt/adult transition
Offshore marine areas	Forage Water quality	Adult growth and development

Table 18. PCEs of critical habitats designated for SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, SONCC coho salmon, and corresponding species life history events.

Primary Constituent Elements		**Species Life History Event**
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Access (sockeye) Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook and coho) Spawning gravel Water quality Water temperature (sockeye) Water quantity	Adult spawning Embryo incubation Alevin development Fry emergence Fry/parr growth and development Fry/parr smoltification Smolt growth and development
Juvenile migration corridors	Cover/shelter Food Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Fry/parr seaward migration Smolt growth and development Smolt seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified	Adult growth and development Adult sexual maturation Fry/parr smoltification Smolt/adult transition
Adult migration corridors	Cover/shelter Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult "reverse smoltification" Adult upstream migration Kelt (steelhead) seaward migration

Willamette and Lower Columbia River Recovery Domain. Critical habitat was designated in the WLC Recovery Domain for UWR spring-run Chinook salmon, LCR Chinook salmon, LCR steelhead, UWR steelhead, and CR chum salmon. In addition to the Willamette and Columbia River mainstems, important tributaries on the Oregon side of the WLC include Youngs Bay, Big Creek, Clatskanie River, and Scappose River in the Oregon Coast subbasin; Hood River in the Gorge; and the Sandy, Clackamas, Mollala, North and South Santiam, Calapooia, McKenzie, and Middle Fork Willamette Rivers in the West Cascades subbasin.

The Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitat by as much as 75%. In addition, the construction of 37 dams in the basin blocked access to more than 435 miles of stream and river spawning habitat. The dams alter the temperature regime of the Willamette River and its tributaries, affecting the timing and development of naturally-spawned eggs and fry. Agriculture, urbanization, and gravel mining on the valley floor and timber harvesting in the Cascade and Coast Ranges contribute to increased erosion and sediment loads throughout the basin.

The mainstem Willamette River has been channelized and stripped of large wood. Development began to encroach on the riparian forest beginning in the 1870s (Sedell and Froggatt 1984). Gregory *et al*. (2002a) calculated that the total mainstem Willamette River channel area decreased from 41,000 to 23,000 acres between 1895 and 1995. They noted that the lower reach, from the mouth of the river to Newberg (RM 50), is confined within a basaltic trench, and that due to this geomorphic constraint, less channel area has been lost than in upstream areas. The middle reach from Newberg to Albany (RM 50 to RM 120) incurred losses of 12% primary channel area, 16% side channels, 33% alcoves, and 9% islands. Even greater changes occurred in the upper reach, from Albany to Eugene (RM 187). There, approximately 40% of both channel length and channel area were lost, along with 21% of the primary channel, 41% of side channels, 74% of alcoves, and 80% of island areas.

The banks of the Willamette River have more than 96 miles of revetments; approximately half were constructed by the U.S. Army Corps of Engineers. Generally, the revetments were placed in the vicinity of roads or on the outside bank of river bends, so that while only 26% of the total length is revetted, 65% of the meander bends are revetted (Gregory *et al*. 2002c). The majority of dynamic sections have been armored, reducing adjustments in channel bed and sediment storage by the river, and thereby diminishing both the complexity and productivity of aquatic habitats (Gregory *et al*. 2002b).

Riparian forests have diminished considerably in the lower reaches of the Willamette River (Gregory *et al*. 2002d). Sedell and Frogatt (1984) noted that agriculture and cutting of streamside trees were major agents of change for riparian vegetation, along with snagging of large wood in the channel. The reduced shoreline, fewer and smaller snags, and reduced riparian forest comprise large functional losses to the river, reducing structural features, organic inputs from litter fall, entrained allochthonous materials, and flood flow filtering capacity. Extensive changes began before the major dams were built, with navigational and agricultural demands dominating the early use of the river. The once expansive forests of the Willamette River floodplain provided valuable nutrients and organic matter during flood pulses, food sources for macroinvertebrates, and slow-water refugia for fish during flood events. These forests also cooled river temperatures as the river flowed through its many channels.

Gregory *et al*. (2002d) described the changes in riparian vegetation in river reaches from the mouth to Newberg, from Newberg to Albany, and from Albany to Eugene. They noted that the riparian forests were formerly a mosaic of brush, marsh, and ash tree openings maintained by annual flood inundation. Below the City of Newberg, the most noticeable change was that conifers were almost eliminated. Above Newberg, the formerly hardwood-dominated riparian forests along with mixed forest made up less than half of the riparian vegetation by 1990, while agriculture dominated. This conversion represents a loss of recruitment potential for large wood, which functions as a component of channel complexity, much as the morphology of the streambed does, to reduce velocity and provide habitat for macroinvertebrates that support the prey base for salmon and steelhead. Declining extent and quality of riparian forests have also reduced rearing and refugia habitat provided by large wood, shading by riparian vegetation which can cool water temperatures, and the availability of leaf litter and the macroinvertebrates that feed on it.

Hyporheic flow in the Willamette River has been examined through discharge measurements and was found to be significant in some areas, particularly those with gravel deposits (Fernald *et al*. 2001). The loss of channel complexity and meandering that fosters creations of gravel deposits decreases the potential for hyporheic flows, as does gravel mining. Hyporheic flow processes water and affects its quality on reemerging into the main channel, stabilizing variations in physical and chemical water characteristics. Hyporheic exchange was found to be significant in the National Water-Quality Assessment of the Willamette Basin (Wentz *et al*. 1998). In the transient storage zone, hyporheic flow is important for ecological functions, some aspects of water quality (such as temperature and dissolved oxygen), and some benthic invertebrate life stages. Alcove habitat, limited by channelization, combines low hydraulic stress and high food availability with the potential for hyporheic flows across the steep hydraulic gradients in the gravel separating them from the main channel (Fernald *et al*. 2001).

On the mainstem of the Columbia River, hydropower projects, including the Federal Columbia River Hydropower System (FCRPS), have significantly degraded salmon and steelhead habitats (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005a, NOAA Fisheries 2006). The series of dams and reservoirs that make up the FCRPS block an estimated 12 million cubic yards of debris and sediment that would otherwise naturally flow down the Columbia and replenish shorelines along the Washington and Oregon coasts.

Industrial harbor and port development are also significant influences on the lower Willamette and lower Columbia Rivers (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005a, NOAA Fisheries 2006). Since 1878, 100 miles of river channel within the mainstem Columbia River, its estuary, and Oregon’s Willamette River have been dredged as a navigation channel by the Army Corps of Engineers. Originally dredged to a 20-foot minimum depth, the Federal navigation channel of the Lower Columbia River is now maintained at a depth of 43 feet and a width of 600 feet. The lower Columbia River supports five ports on the Washington State side: Kalama, Longview, Skamania County, Woodland, and Vancouver. These ports primarily focus on the transport of timber and agricultural commodities. In addition to loss of riparian habitat, and disruption of benthic habitat due to dredging, high levels of several sediment chemicals, such as arsenic and polycyclic aromatic hydrocarbons (PAHs), have been identified in Lower Columbia River watersheds in the vicinity of the ports and associated industrial activities.

The most extensive urban development in the lower Columbia River subbasin occurs in the Portland/Vancouver area. Outside of this major urban area, the majority of residences and businesses rely on septic systems. Common water quality issues with urban development and residential septic systems include higher water temperatures, lowered dissolved oxygen, increased fecal coliform bacteria, and increased chemicals associated with pesticides and urban runoff.

The Columbia River estuary has lost a significant amount of tidal marsh and tidal swamp habitat that are critical to juvenile salmon and steelhead, particularly small or ocean-type species (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005a, NOAA Fisheries 2006). Edges of marsh areas provide sheltered habitats for juvenile salmon and steelhead where food, in the form of amphipods or other small invertebrates which feed on marsh detritus, is plentiful, and larger predatory fish can be avoided. Historically, floodwaters of the Columbia River inundated the margins and floodplains along the estuary, allowing juvenile salmon and steelhead access to a wide expanse of low-velocity marshland and tidal channel habitats. In general, the riverbanks were gently sloping, with riparian and wetland vegetation at the higher elevations of the river floodplain becoming habitat for salmon and steelhead during flooding river discharges or flood tides. Sherwood *et al*. (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970. This study further estimated an 80% reduction in emergent vegetation production and a 15% decline in benthic algal production.

Habitat and food-web changes within the estuary, and other factors affecting salmon population structure and life histories, have altered the estuary’s capacity to support juvenile salmon (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005a, NOAA Fisheries 2006). Diking and filling activities that decrease the tidal prism and eliminate emergent and forested wetlands and floodplain habitats have likely reduced the estuary’s salmon-rearing capacity. Moreover, water and sediment in the lower Columbia River and its tributaries have levels of toxic contaminants that are harmful to fish and wildlife (LCREP 2007). Contaminants of concern include dioxins and furans, heavy metals, polychlorinated biphenyls (PCBs) and organochlorine pesticides such as DDT. Simplification of the population structure and life-history diversity of salmon possibly is yet another important factor affecting juvenile salmon viability. Restoration of estuarine habitats, particularly diked emergent and forested wetlands, reduction of avian predation by terns, and flow manipulations to restore historical flow patterns might significantly enhance the estuary’s productive capacity for salmon, although historical changes in population structure and salmon life histories may prevent salmon from making full use of the productive capacity of estuarine habitats, even in their presently altered state.

Interior Columbia Recovery Domain. Critical habitat has been designated in the IC Recovery Domain, which includes the Snake River Basin, for SR spring/summer Chinook salmon, SR fall-run Chinook salmon, UCR spring-run Chinook salmon, SR sockeye salmon, MCR steelhead, UCR steelhead, and SRB steelhead. Major tributaries in the Oregon portion of the IC Recovery Domain include the Deschutes, John Day, Umatilla, Walla Walla, Grande Ronde, and Imnaha Rivers.

Habitat quality in tributary streams in the IC Recovery Domain varies from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (Wissmar *et al.* 1994, Carmichael 2006). Critical habitat throughout the IC recovery domain has been degraded by intense agriculture, alteration of stream morphology (*i.e*., channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, timber harvest, mining, and urbanization. Reduced summer stream flows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been severely affected by the development and operation of the FCRPS dams and reservoirs in the mainstem Columbia River, Bureau of Reclamation tributary projects, and privately owned dams in the Snake and Upper Columbia River basins. For example, construction of Hells Canyon Dam eliminated access to several likely production areas in Oregon and Idaho including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise river basins (Good *et al*. 2005), and Grande Coulee and Chief Joseph Dams completely block anadromous fish passage on the upper mainstem Columbia River. Hydroelectric development modified natural flow regimes, resulting in higher water temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juveniles. Physical features of dams such as turbines also kill migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juveniles.

Similarly, development and operation of extensive irrigation systems and dams for water withdrawal and storage in tributaries have drastically altered hydrological cycles. A series of large regulating dams on the middle and upper Deschutes River affect flow and block access to upstream habitat, and have extirpated one or more populations from the Cascades Eastern Slope major population (IC-TRT 2003). Pelton Round Butte Dam blocked 32 miles of MCR steelhead habitat in the mainstem Deschutes below Big Falls and removed the historically-important tributaries of the Metolius River and Squaw Creek from production. Similarly, Condit Dam on the White Salmon River extirpated another population from the Cascades Eastern Slope major group. In the Umatilla subbasin, the Bureau of Reclamation developed the Umatilla Project beginning in 1906. The project blocked access to more than 108 miles of historically highly productive tributary habitat for MCR steelhead in upper McKay Creek with construction of the McKay Dam and Reservoir in 1927. A flood control and irrigation dam on Willow Creek was built near RM 5, completely blocking MCR steelhead access to productive habitat upstream in this subbasin. Construction of Lewiston Dam, completed in 1927, eliminated access for Snake River basin steelhead and salmon to a major portion of the Clearwater basin. Continued operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima Projects have significantly reduced flows and degraded water quality and physical habitat in these rivers.

Many stream reaches designated as critical habitat in the IC Recovery Domain are over-allocated under state water law, with more allocated water rights than existing streamflow conditions can support. Irrigated agriculture is common throughout this region and withdrawal of water increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence *et al.* 1996). Reduced tributary stream flow has been identified as a major limiting factor for all listed salmon and steelhead species in this area except SR fall-run Chinook salmon (NMFS 2005).

Summer stream temperature is the primary water quality problem, with many stream reaches designated as critical habitat listed on the Clean Water Act's section 303(d) list for water temperature. Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Contaminants such as insecticides and herbicides from agricultural runoff and heavy metals from mine waste are common in some areas of critical habitat.

Oregon Coast (OC) Coho Salmon Recovery Domain. In this recovery domain, critical habitat has been designated for OC coho salmon. Many large and small rivers supporting significant populations of coho salmon flow through this domain, including the Nehalem, Nestucca, Siletz, Yaquina, Alsea, Siuslaw, Umpqua, Coos, and Coquille.

The historical disturbance regime in the central Oregon Coast Range was dominated by a mixture of high and low-severity fires, with a natural rotation of approximately 271 years. Old-growth forest coverage in the Oregon Coast Range varied from 25-75% during the past 3000 years, with a mean of 47%, and never fell below 5% (Wimberly *et al.* 2000). Currently the Coast Range has approximately 5% old-growth, almost all of it on Federal lands. The dominant disturbance now is timber harvesting on a cycle of 30-100 years, with fires suppressed.

The State of Oregon (2005) completed an assessment of habitat conditions in the range of OC coho in 2005. Oregon's assessment mapped how streams with high intrinsic potential (HIP) for coho salmon rearing are distributed by land ownership categories. Agricultural lands and private industrial forests have by far the highest percentage of land ownership in high HIP areas and along all coho stream miles. Federal lands have only about 20% of coho stream miles and 10% of HIP stream reaches. Because of this distribution, activities in lowland agricultural areas are particularly important to the conservation of Oregon coastal coho.

The coho assessment concluded that at the scale of the entire domain, pools are generally abundant, although slow-water and off-channel habitat (which are important refugia for coho during high winter flows) are limited in the majority of streams when compared to reference streams in minimally-disturbed areas. Amounts of large wood in streams are low in all four ODFW monitoring areas and land-use types relative to reference conditions. Amounts of fine sediment are high in three of the four monitoring areas, and were comparable to reference conditions only on public lands. Approximately 62-91% of tidal wetland acres (depending on estimation procedures) have been lost for functionally and potentially independent populations of coho.

As part of the coastal coho assessment, the Oregon Department of Environmental Quality (ODEQ) analyzed the status and trends of water quality in the range of OC coho using the Oregon water quality index, which is based on a combination of temperature, dissolved oxygen, biological oxygen demand, pH, total solids, nitrogen, total phosphates, and bacteria. Using the index at the species scale, 42% of monitored sites had excellent to good water quality, and 29% show poor to very poor water quality. Within the four monitoring areas, the North Coast had the best overall conditions (6 sites in excellent or good condition out of 9 sites), and the Mid-South coast had the poorest conditions (no excellent condition sites, and only 2 out of 8 sites in good condition). For the 10-year period monitored between 1992 and 2002, no sites showed a declining trend in water quality. The area with the most improving trends was the North Coast, where 66% of the sites (six out of nine) had a significant improvement in index scores. The Umpqua River basin, with one out of 9 sites (11%) showing an improving trend, had the lowest number of improving sites.

Southern Oregon and Northern California Coasts (SONCC) Coho Salmon Recovery Domains. Critical habitat in this recovery domain has been designated for SONCC coho salmon. Many large and small rivers supporting significant populations of coho salmon flow through the this area, including the Elk, Rogue, Chetco, Smith and Klamath. The following summary of critical habitat information in the Elk, Rogue, and Chetco Rivers is also applicable to habitat characteristics and limiting factors in other basins in this area.

The Elk River flows through Curry County, drains approximately 92 square miles (or 58,678 acres) (Maguire 2001). Major tributaries of the Elk River include the North Fork, South Fork, Blackberry Creek, Panther Creek, Butler Creek, and Bald Mountain Creek. The upper portion of the Elk River basin is characterized by steeply sloped forested areas with narrow valleys and tributary streams that have steep to very steep gradients. Grazing, rural residential development and other agricultural uses are the dominant land uses in the lower portion of the basin (Maguire 2001). Over half of the Elk River basin is in the Grassy Knob wilderness area. Historical logging, mining, and road building have degraded stream and riparian habitats in the Elk River basin. Limiting factors identified for salmon and steelhead production in this basin include sparse riparian cover, especially in the lower reaches, excessive fine sediment, high water temperatures, and noxious weed invasions (Maguire 2001).

The Rogue River drains approximately 5,160 square miles within Curry, Jackson and Josephine counties in southwest Oregon. The mainstem is about 200 miles long and traverses the coastal mountain range into the Cascades. The Rogue River estuary has been modified from its historical condition. Jetties were built by the U.S. Army Corps of Engineers in 1960, which stabilized and deepened the mouth of the river. A dike that extends from the south shore near Highway 101 to the south jetty was completed in 1973. This dike created a backwater for the large shallow area that existed here, which has been developed into a boat basin and marina, eliminating most of the tidal marsh.

The quantity of estuary habitat is naturally limited in the Rogue River. The Rogue River has a drainage area of 5,160 square miles, but the estuary at 1,880 acres is one of the smallest in Oregon. Between 1960 and 1972, approximately 13 acres of intertidal and 14 acres of subtidal land were filled in to build the boat basin dike, the marina, north shore riprap and the other north shore developments (Hicks 2005). Jetties constructed in 1960 to stabilize the mouth of the river and prevent shoaling have altered the Rogue River, which historically formed a sill during summer months (Hicks 2005).

The Lower Rogue Watershed Council's watershed analysis (Hicks 2005) lists factors limiting fish production in tributaries to Lower Rogue River watershed. The list includes water temperatures, low stream flows, riparian forest conditions, fish passage and over-wintering habitat. Limiting factors identified for the Upper Rogue River Basin include fish passage barriers, high water temperatures, insufficient water quantity, lack of large wood, low habitat complexity, and excessive fine sediment (RBCC 2006).

The Chetco River is in the southwest corner of Oregon, almost entirely within Curry County, with a drainage of approximately 352 square miles. The Chetco River mainstem is about 56 miles long, and the upper 28 miles are within the Kalmiopsis Wilderness Area. Elevations in the watershed range from sea level to approximately 5,098 feet. The upper portion of the basin is characterized by steep, sloping forested areas with narrow valleys and tributary streams that have moderately steep to very steep gradient. The lowest 11 miles of the river are bordered by private land in rural/residential, forestry, and urban land uses.

The Chetco River estuary has been significantly modified from its historical condition. Jetties were erected by the U.S. Army Corps of Engineers in 1957, which stabilized and deepened the mouth of the river. These jetties have greatly altered the mouth of the Chetco River and how the estuary functions as habitat for salmon migrating to the ocean. A boat basin and marina were built in the late 1950s and eliminated most of the functional tidal marsh. The structures eliminated shallow water habitats and vegetation in favor of banks stabilized with riprap. Since then, nearly all remaining streambank in the estuary has been stabilized with riprap. The South Coast Watershed Council's watershed analysis (Maguire 2001) states the factors limiting fish production in the Chetco River appear to be high water temperature caused by lack of shade, especially in tributaries, high rates of sedimentation due to roads, poor over-wintering habitat due to a lack of large wood in tributaries and the mainstem, and poor quality estuary habitat (Maguire 2001).

Environmental Baseline for the Action Area

Because the action area for this programmatic consultation includes the combined action areas of restoration actions for which an exact location within the Corps jurisdiction is not yet known, it was not possible to precisely define the current condition of fish or critical habitats in the action area, the factors responsible for that condition, or the conservation role of those specific areas. Therefore, to complete the jeopardy and destruction or adverse modification of critical habitat analyses in this consultation, NMFS made the following assumptions regarding the environmental baseline in each area that will eventually be chosen to support an action: (1) The purpose of the proposed action is to authorize or carry out stream restoration and fish passage improvements for the benefit of listed species; (2) each individual action area will be occupied by one or more listed species; (3) the biological requirements of individual fish in those areas are not being fully met because aquatic habitat functions, including functions related to habitat factors limiting the recovery of the species in each area, are impaired; and (4) active restoration at each site is likely to improve the factors limiting recovery of salmon and steelhead in that area.

As described above in the Status of the Species and Critical Habitats section, factors that limit the recovery of salmon and steelhead vary with the overall condition of aquatic habitats on private, state, and Federal lands. Many stream habitats and riparian areas have been degraded by the effects of land and water use, including road construction, forestry, agriculture, mining, urbanization, and water development. Each of these economic activities has contributed to a myriad of interrelated factors for the decline of salmon and steelhead. Among the most important of these are changes in channel morphology, loss spawning substrates, loss of instream roughness, loss of estuarine rearing habitats, loss of wetlands, loss and degradation of riparian areas, water quality degradation (e.g., temperature, sediment, dissolved oxygen, contaminants), blocked passage, elimination of habitats, direct take, and loss of core refugia areas.

The environmental baseline also includes the anticipated impacts of all Federal actions in the action area that have already undergone formal consultation. For example, from 2001 through 2006, the Corps authorized 118 restoration actions in Oregon under the SLOPES consultation, and more than 800 other actions related to transportation features, over and in-water structures, and bank stabilization. The Corps, Bonneville Power Administration, and Bureau of Reclamation have also consulted on large water management actions, such as operation of the Federal Columbia River Power System, the Umatilla Basin Project, and the Deschutes Project. The U.S. Forest Service and U.S. Bureau of Land Management consult on Federal land management throughout Oregon, including restoration actions, timber harvest, livestock grazing, and special use permits. Each of these actions was designed to avoid or minimize effects on listed salmon, steelhead, and their habitats.

It is very likely that a few action areas for some of these previously consulted upon actions will overlap with action areas for restoration actions covered under this new iteration of the SLOPES consultation. Impacts to the environmental baseline from these previous actions vary from short-term adverse effects to long-term beneficial effects.

Effects of the Action

Under the administrative portion of this action, the Corps will evaluate each individual action to ensure that the following conditions are true: (a) The requirements of this Opinion are only applied where ESA-listed salmon or steelhead, their designated critical habitats, or both, are present; (b) the anticipated range of effects is within the range considered in this Opinion; (c) the action is carried out consistent with the proposed design criteria; and (d) action and program level monitoring and reporting requirements are met. Although that process will not, by itself, affect a listed species or critical habitat, it determines which factors must be considered to analyze the effects of each individual action that will be authorized or completed under this Opinion.

Construction of each action will begin after the Corps' approval. The discussion of the direct physical and chemical effects of this part of the action on the environment will vary depending on the type of restoration or fish passage action being performed, but will all be based on a common set of effects related to construction. Actions involving fish passage restoration, off- or side channel reconstruction, set-back of an existing berm, dike or levee, or removal of a water control structure are likely to have all of the following effects; actions that only involve placement of boulders, gravel or wood will only have a subset of those effects, or will express those effects to a lesser degree.

Construction will have direct physical and chemical effects on the environment that commonly begin with pre-construction activity, such as surveying, minor vegetation clearing, placement of stakes and flagging guides. This requires movement of personnel and sometimes machines over the action area. The next stage, site preparation, may require development of access roads, construction staging areas, and materials storage areas that affect more of the action area. If additional earthwork is necessary to clear, excavate, fill, or shape the site, more vegetation and topsoil may be removed, deeper soil layers exposed, and operations extended into the active channel. The final stage of construction is site restoration. This stage consists of any action necessary to undo disturbance caused by the action, may include replacement of large wood, native vegetation, topsoil, and native channel material displaced by construction, and otherwise restoring ecosystem processes that form and maintain productive fish habitats.

Vegetation, soil and channel disturbance caused by construction can disrupt the vegetative and fluvial processes at an action site that create and maintain habitat function, such as delivery of large wood, particulate organic matter, and shade to a riparian area and stream; development of root strength for slope and bank stability; and sediment filtering and nutrient absorption from runoff (Darnell 1976, Spence *et al*. 1996). Although the size of areas likely to be adversely affected by actions proposed to be authorized or carried out under this Opinion are small, and those effects are likely to be short-term (weeks or months), even small denuded areas will lose organic matter and dissolved minerals, such as nitrates and phosphates. The microclimate at each action site where vegetation is removed is likely to become drier and warmer, with a corresponding increase in wind speed, and soil and water temperature. Water tables and spring flow in the immediate area may be temporarily reduced. Loose soil will temporarily accumulate in the construction area. In dry weather, this soil can be dispersed as dust and, in wet weather, loose soil is transported to streams by erosion and runoff, particularly in steep areas. Erosion and runoff increase the supply of sediment to lowland drainage areas and eventually to aquatic habitats, where they increase total suspended solids and sedimentation.

During and after wet weather, increased runoff can suspend and transport more sediment to receiving waters. This increases total suspended solids and, in some cases, stream fertility. Increased runoff also increases the frequency and duration of high stream flows and wetland inundation in construction areas. Higher stream flows increase stream energy that can scour stream bottoms and transport greater sediment loads farther downstream that would otherwise occur. Sediments in the water column reduce light penetration, and can increase water temperature and modify water chemistry. Redeposited sediments can fill pools, reduce the width to depth ration of streams, and change the distribution of pools, riffles, and glides. Increased fine sediments in substrate also can reduce survival of eggs and fry, reducing spawning success of salmon and steelhead.

During dry weather, the physical effects of increased runoff appear as reduced ground water storage, lowered stream flows, and lowered wetland water levels. The combination of erosion and mineral loss can reduce soil quality and site fertility in upland and riparian areas. Concurrent in-water work can compact or dislodge channel sediments, thus increasing total suspended solids and allowing currents to transport sediment downstream where it is eventually redeposited. Continued operations when the construction site is inundated can significantly increase the likelihood of severe erosion and contamination.

Use of heavy equipment for vegetation removal and earthwork compacts soils, thus reducing soil permeability and infiltration. Use of heavy equipment also creates a risk that accidental spills of fuel, lubricants, hydraulic fluid, coolants, and other contaminants may occur. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonid fish and other aquatic organisms at high levels of exposure and can cause sublethal adverse effects on aquatic organisms at lower concentrations (Heintz *et al.* 1999, 2000, Incardona *et al*. 2004, 2005, 2006). Discharge of construction water used for vehicle washing, concrete washout, pumping for work area isolation, and other purposes can carry sediments and a variety of contaminants to riparian areas and streams.

Some of these adverse effects will abate almost immediately, such as increased total suspended solids caused by boulder or large wood restoration. Others will be long-term conditions that may decline quickly but persist at some level for weeks, months, or years, until riparian and floodplain vegetation are fully reestablished. Failure to complete site restoration, or to prevent disturbance of newly restored areas by livestock or unauthorized persons will delay or prevent recovery of processes that form and maintain productive fish habitats.

The direct physical and chemical effects of post-construction site restoration to be included as parts of the proposed actions are essentially the reverse of the construction activities that go before it. Bare earth will be protected by various methods, including seeding, planting woody shrubs and trees, and mulching. This will immediately dissipate erosive energy associated with precipitation and increase soil infiltration. It also will accelerate vegetative succession necessary to restore the delivery of large wood to the riparian area and stream, root strength necessary for slope and bank stability, leaf and other particulate organic matter input, sediment filtering and nutrient absorption from runoff, and shade. Microclimate will become cooler and moister, and wind speed will decrease. Whether recovery occurs over weeks or years, the disturbance frequency, considered as the number of restoration actions per unit of time, at any given site is likely to be extremely low, as is the intensity of the disturbance as a function of the quantity and quality of overall habitat conditions present within an action area.

The indirect effects, or effectiveness, of fish restoration actions, in general, have not been well documented, in part because they often concentrate on instream habitat without addressing the processes that led to the loss of the habitat (see Fox 1992, Zedler 1996, Simenstad and Thom 1996, Cederholm *et al.* 1997, and Roper *et al*. 1997). Nonetheless, the careful, interagency process used by the Corps to develop the proposed action ensures that it is reasonably certain to lead to some degree of ecological recovery within each action area, including the establishment or restoration of environmental conditions associated with functional habitat and high conservation value.

As described in the proposed action section, the indirect effects of placing boulders and large wood for restoration purposed in areas where these natural features have been reduced or removed are likely to include increased habitat diversity and complexity, greater flow heterogeneity, increased coarse sediment storage, gravel retention for spawning habitat, more long-term nutrient storage and more substrate for aquatic vertebrates, moderation of flow disturbances, and refugia for fish during high flow events (Negeshi and Richardson 2003, Roni *et al.* 2006a, 2006b, WDFW 2004, WDFW and Inter-Fluve 2006). The indirect effects of gravel placement are likely to compensate for an identified loss of the natural gravel supply, thus increasing the quantity and quality of spawning habitat (WDFW 2004).

Off- and side-channel habitat restoration to reconnect stream channels with historical river floodplain swales, abandoned side channels, and floodplain channels, setting back existing berms, dikes and levees, and water control structure removal are likely to have similar but significantly greater positive indirect effects on habitat diversity and complexity by affecting a larger habitat area (WDFW 2004).

Fish passage restoration using a step weir is likely to result in development of a backwater upstream of the weir, with reduced velocities and greater depths at a variety of flows, accelerated flow through the weir, and deposition of sediment immediately downstream of the weir ("tailouts") (WDFW and Inter-Fluve 2006). Adding a fish ladder to an existing facility, or improving a culvert for fish passage, is likely to decrease stream gradient in at least a portion of the reach, which will reduce stream energy and may cause aggradation due to sedimentation and provide access to previously blocked habitat (WDFW and Inter-Fluve 2006). The indirect effects of piling removal are likely to include reduction of resting and areas for piscivorous birds, and of hiding habitat for aquatic predators such as smallmouth bass.

The time necessary for recovery of functional habitat attributes following disturbance will vary by attribute. Recovery mechanisms such as soil stability, sediment filtering and nutrient absorption, and vegetation succession may recover quickly (months to years) after completion of the proposed action. Recovery of functions related to large wood and microclimate may require decades or longer. Functions related to shading of the riparian area and stream, root strength for bank stabilization, and organic matter input may require intermediate lengths of time.

The rate and extent of functional recovery is also controlled in part by watershed context. Most proposed actions will occur in areas where productive habitat functions and recovery mechanisms were absent or degraded before construction took place. These sites are only likely to be functionally restored if the pre-construction environment retains the ecological potential to function properly, as evidenced by the residual productivity of riparian soils and channel conditions with balanced scour and fill processes. The prospect for ecological recovery will be further limited by ecological and social factors at the watershed and landscape scales, or site capacity. Thus, ecological recovery of an action site surrounded by intensive land use and severe upstream disturbance is likely to be less successful than the recovery of a site surrounded by wildlands where the headwaters are protected. To some extent, the proposed actions will help to compensate for low residual ecological potential and accelerate recovery. However, they are unlikely to fully overcome severe site constraints imposed by low site capacity.

Effects on Listed Species. Just as completion of each action is likely to have a similar set of effects on the environment because they are all based on the same set of underlying construction actions, each salmon and steelhead species is likely to respond to those effects in a similar way because of underlying similarities in their biology. Some species will only show some of these effects, or will express those effects to a lesser or greater degree. Much less is known about the biology of southern green sturgeon than is known about salmon and steelhead. However, because the distribution of southern green sturgeon in Oregon is limited to nearshore marine areas, bays, estuaries, and the deep, low elevation, riverine mainstem of coastal rivers, it is likely that very few southern green sturgeon are likely to occur in close proximity to any of the proposed actions. The direct effects of the construction on these listed species will include interactions between fish and construction personnel and their supplies and equipment, but are primarily the result of physical and chemical changes in the environment caused by that construction. The effects of the proposed actions are also reasonably certain to result in some degree of ecological recovery within each action area.

In general, construction has direct adverse effects on individual fish when interactions occur between fish and construction personnel, when equipment is operated instream where it can injure fish mechanically or block habitat access, when construction waste or other pollutants enter the stream, and when fish are captured and removed from in-water work areas. The physical and chemical changes in the environment associated with construction, especially decreased water quality (*e.g.*, total suspended solids, temperature, dissolved oxygen), are likely to affect a larger area than direct interactions between fish and construction personnel. Design criteria related to in-water work timing, sensitive area protection, fish passage, erosion and pollution control, choice of equipment, in-water use of equipment, and work area isolation have been proposed to avoid or reduce these adverse effects. Those measures will ensure that actions are not completed at sites occupied by adult fish congregating for spawning or where redds are occupied by eggs or pre-emergent alevins, defer construction until the fewest number of fish are present, and otherwise ensure that the adverse environmental consequences of construction are avoided or minimized.

It is unlikely that individual adult or embryo salmon or steelhead will be adversely affected by the proposed action because all in-water construction activities are deferred until after spawning season has passed and fry emerge from gravel. Moreover, the degree of soil disturbance likely to occur under these actions is so small that significant sedimentation of spawning gravel is unlikely, although use of heavy equipment in-stream in spawning areas can disturb or compact gravel and other channel materials, thus making it harder for fish to excavate redds, and decreasing redd aeration (Cederholm *et al.* 1997). If, for some reason, an adult is migrating in an action area during any phase of construction, it is likely to be able to successfully avoid noise or other construction disturbances by moving laterally or stopping briefly during migration, although spawning itself would be delayed until construction was complete (Gregory 1988, Sigler 1988, Servizi and Martens 1991, Feist *et al.* 1996). To the extent that the proposed actions are successful at improving flow conditions and reducing sedimentation and other pollutants that affect intergravel conditions, future spawning and embryo survival in the action area will be enhanced.

In-water construction activities are likely to occur when juvenile salmon and steelhead are present. Most direct, lethal effects of authorizing and carrying out the proposed actions are likely be caused by the isolation of in-water work area, even though lethal and sublethal effects would be greater without isolation. Any individual fish present in the work isolation area will be captured and released. Fish that are transferred to holding tanks can experience trauma if care is not taken in the transfer process, and fish can experience stress and injury from overcrowding in traps, if the traps are not emptied on a regular basis. The primary contributing factors to stress and death from handling are differences in water temperatures between the river and wherever the fish are held, dissolved oxygen conditions, the amount of time that fish are held out of the water, and physical trauma. Stress on salmon and steelhead increases rapidly from handling if the water temperature exceeds 64°F, or if dissolved oxygen is below saturation. Debris buildup at traps can also kill or injure fish if the traps are not monitored and cleared on a regular basis. Design criteria related to the capture and release of fish during work area isolation will avoid most of these consequences, and ensure that most of the resulting stress is short-lived (NMFS 2002).

Rapid changes and extremes in environmental conditions caused by construction are likely to cause a physiological stress response that will change the behavior of salmon and steelhead (Moberg 2000, Shreck 2000). For example, reduced input of particulate organic matter to streams, the addition of fine sediment to channels, and mechanical disturbance of shallow-water habitats are likely to lead to under use of stream habitats, displacement from or avoidance of preferred rearing areas, or abandonment of preferred spawning grounds, which may increase losses to competition, disease, predation, or, for juvenile fish, reduce the ability to obtain food necessary for growth and maintenance (Newcombe and Jenson 1996, Sprague and Drury 1969, Moberg 2000).

The ultimate effect of these changes in behavior, and on the distribution and productivity of salmon and steelhead, will vary with life stage, the duration and severity of the stressor, the frequency of stressful situations, the number and temporal separation between exposures, and the number of contemporaneous stressors experienced (Newcombe and Jenson 1996, Shreck 2000). Restoration actions that affect stream channel widths are also likely to impair local movements of juvenile fish for hours or days, and downstream migration maybe similarly impaired. Moreover, smaller fry are likely to be injured or killed due to in-water interactions with construction activities, including work area isolation, and due to the adverse consequences that displacement and impaired local movement will have on rearing activities, at each restoration site subject to those activities.

Fish may compensate for, and adapt to, some of these perturbing situations so that they continue to perform necessary physiological and behavioral functions, although in a diminished capacity. However, fish that are subject to prolonged, combined, or repeated stress by the effects of the action combined with poor environmental baseline conditions will likely suffer a metabolic cost that will be sufficient to impair their rearing, migrating, feeding, and sheltering behaviors and thereby increase the likelihood of injury or death.

In addition to the general effects of construction on listed species described above, each type of action will also have the following effects on individual fish. Restoration of boulders, gravel, and large wood, as well as restoration of specific off-channel, floodplain and wetland habitats will all provide habitat conditions that are likely to increase the productivity of rearing salmon and steelhead (WDFW 2004, Roni *et al.* 2006a, 2006b). Fish passage restoration will increase the quantity of spawning and rearing habitat accessible to affected species. Removal of pilings is likely to decrease predation on juvenile salmon and steelhead by reducing resting areas for piscivorous birds and cover for aquatic predators, and reducing long-term exposure to toxics.

Population level responses to habitat alterations can be thought of as the integrated response of individual organisms to environmental change. Thus, instantaneous measures of population characteristics, such as population abundance, population spatial structure and population diversity, are the sum of individual characteristics within a particular area, while measures of population change, such as population growth rate, are measured as the productivity of individuals over the entire life cycle (McElhany *et al.* 2000).

As discussed above, very few individual fish are likely to be injured or killed by any individual action authorized or completed under this Opinion. This number of fish adversely affected by the proposed action will be far too small to have a meaningful effect on abundance, distribution, productivity, or genetic diversity of any affected population. This is also true for very small populations of endangered species (*i.e.*, UCR spring-run Chinook salmon, SR sockeye salmon, UCR steelhead) for which a combination of very low abundance, river-type ecology, and distribution within the action area that is limited to mainstem of the Columbia River and estuary make it unlikely that they will be injured or killed by the proposed action.

At the species level, direct biological effects are synonymous with those at the population level or, more likely, are the integrated demographic response of one or more subpopulations (McElhany *et al.* 2000). Because the likely effects of any action authorized or completed under this Opinion will be too minor, localized and brief to affect the VSP characteristics of any salmon or steelhead population, they also will not have any effects at the species level.

The effects of the SLOPES IV restoration action, as a whole, on species will be the combined effects of all of the individual actions completed under this Opinion. Combining the effects of many actions, does not change the nature of the individual effects caused by individual actions, but does require an analysis of the additive effects of multiple occurrences of the same type of effects at the individual fish, population, and species scales. If the adverse effects of one action are added to the effects of one or more additional actions in the same place and time, individual fish may experience a more significant adverse effect than if only one action was present. This would occur when the action area for two or more recovery actions overlap, *i.e.*, are placed within 100 to 300 feet of each other and are constructed at approximately the same time.

Monitoring information shows that up to 37 restoration actions per year have been completed under SLOPES, with no more than 17 being completed in a single recovery domain and sometimes far less. While those numbers are not increasing from year to year, it is reasonable to assume that interest and funding for restoration and fish passage may increase arithmetically, and that the number of actions authorized and completed each year under this Opinion may also. Even if the number of restoration actions statewide increases dramatically, it is very unlikely that two or more would occur within 100 to 300 feet of each other. Further, the strong emphasis on use of design criteria to minimize the short-term adverse effects of these actions, the small size of individual action areas, and the use of action designs that are likely to result in a long-term improvement in the function and conservation value of each action area will ensure that individual fish will not suffer greater adverse effects even if two or more action areas overlap. Moreover, the rapid onset of beneficial effects from these types of actions is likely to result in an environmental improvement for the population that is likely to improve the baseline for subsequent actions so that adverse effects are not likely to be additive at the population or watershed scale.

Effects on Critical Habitat. Completion of each action is likely to have the following effects on the PCEs or habitat qualities essential to the conservation of each species. These effects will vary somewhat in degree between actions because of differences in the scope of construction at each, and in the current condition of PCEs and the factors responsible for those conditions. This assumption is based on the fact that all of the actions are based on the same set of underlying construction actions, and the PCEs and conservation needs identified for each species are also essentially the same. In general, ephemeral effects are likely to last for hours or days, short-term effects are likely to last for weeks, and long-term effects are likely to last for months, years or decades. Actions with more significant construction component are likely to adversely affect larger areas, and to take a longer time to recover, than actions based in restoration of a single habitat element. However, they are also likely to have correspondingly greater conservation benefits.

1. Freshwater spawning sites
    a. Water quantity – Brief reduction in flow due to short-term construction needs, reduced riparian permeability, increased riparian runoff, and reduced late season flows; slight longer-term increase based on improved riparian function and floodplain connectivity.
    b. Water quality – Short-term increase in total suspended solids, dissolved oxygen demand, and temperature due to riparian and channel disturbance; longer-term improvement due to improved riparian function and floodplain connectivity.
    c. Substrate – Short-term reduction in quality due to increased compaction and sedimentation; long-term increase in quality due to gravel placement, and increased sediment storage from boulders and large wood.
2. Freshwater rearing sites
    a. Water quantity – as above.
    b. Floodplain connectivity – Short-term decrease due to increased compaction and riparian disturbance; long-term improvement due to off- and side channel habitat

restoration, set-back of existing berms, dikes, and levees, and removal of water control structures.

   c. Water quality – as above.
   d. Forage – Short-term decrease due to riparian and channel disturbance, and water quality impairments; long-term improvement due to improved habitat diversity and complexity, and improved riparian function and floodplain connectivity, and increased litter retention.
   e. Natural cover – Short-term decrease due to riparian and channel disturbance; long-term increase due to improved habitat diversity and complexity, improved riparian function and floodplain connectivity, off- and side channel habitat restoration, and reduced sites for predator resting and hiding.

3. Freshwater migration corridors
   a. Free passage – Short-term decrease due to decreased water quality and in-water work isolation; long-term increase due to improved water quantity and quality, habitat diversity and complexity, forage to support juvenile migration, and natural cover.
   b. Water quantity – as above.
   c. Water quality – as above.
   d. Natural cover – as above.
4. Estuarine areas
   a. Free passage – as above.
   b. Water quality – as above.
   c. Water quantity – as above.
   d. Salinity – no effect.
   e. Natural cover – as above.
   f. Forage – as above.
5. Nearshore marine areas
   a. Free passage – no effect.
   b. Water quality – no effect.
   c. Water quantity – no effect.
   d. Forage – no effect.
   e. Natural cover – no effect.
6. Offshore marine areas
   a. Water quality – no effect.
   b. Forage – no effect.

The intensity of these effects within the action area, in terms of the total condition and value of PCEs after each action is completed, and the severity of the effects, given the recovery rate for those same PCEs, is such that the function of PCEs and the conservation value of critical habitat are likely to be only impaired for a short time due to restoration actions authorized or completed under this Opinion. Similarly, the frequency of disturbance will be limited to a single event or, at most, a few events within a given watershed. As noted above, no more than 17 restoration actions in a single recovery domain have been completed using this Opinion in a single year. It is unlikely, but not impossible, that two or more actions per year would occur in a single 5^{th} field watershed. However, given the mild intensity and severity of these effects, PCE conditions in each action area are likely to quickly return to, or exceed, pre-action levels. Thus, it is unlikely that several actions within the same watershed, or even within the same action area, would have an important adverse effect on the function of PCEs or the conservation value of critical habitat at the action area, watershed, or designation scales.

As noted above, the indirect effects, or effectiveness, of fish restoration actions, in general, have not been well documented, in part because they often concentrate on instream habitat without addressing the processes that led to the loss of the habitat (see Fox 1992, Zedler 1996, Simenstad and Thom 1996, Cederholm *et al*. 1997, and Roper *et al*. 1997). Nevertheless, the proposed actions are reasonably certain to lead to some degree of ecological recovery within each action area, including the establishment or restoration of environmental conditions associated with functional habitat and high conservation value. Fish passage improvement actions, in particular, may have long-term beneficial effects at the watershed or designation-wide scale.

Cumulative Effects

Between 2000 and 2006, the population of Oregon grew from 3.4 to 3.7 million, an increase of approximately 8%.[12] The state is projected to grow at a similar rate for the next 5 years. Thus, NMFS assumes that future private and state actions will continue within the action areas, increasing as population density rises.

The most common activities reasonably certain to occur in the action areas addressed by this consultation are agricultural activities, operation of non-Federal hydropower facilities, urban and suburban development, recreational activities, timber harvest, road construction and maintenance, and metals and gravel mining. Many of these activities are not subject to ESA consultation and would result in some adverse effects to salmon, steelhead, and their habitat. Some of the activities such as timber harvest and development are subject to regulation under state programs and the effects to fish and stream habitat are reduced to varying degrees under these programs. The adverse effects of these activities will result in negative effect on salmon and steelhead population abundance, productivity, and spatial structure and result in some degradation of the condition of critical habitat PCEs.

Throughout Oregon, watershed councils, Native American Tribes, local municipalities, conservation groups, and others carry out restoration projects in support of salmon and steelhead recovery. Many of these actions will be covered by this consultation, or future individual consultations, in which cases their effects are not cumulative effects. Some of the private or state funded actions for which funding commitments and necessary approvals already exist will not undergo consultation and do result in beneficial cumulative effects. They address protection, restoration, or both, of existing or degraded fish habitat, instream flows, water quality, fish passage and access, and watershed or floodplain conditions that affect stream habitat. These beneficial effects will be similar to those described in the Effects on Listed Species section of this Opinion. These effects will result in small improvements to salmon and steelhead population abundance, productivity, and spatial structure and result in some improvement to the condition of critical habitat PCEs.

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[12] Source: Oregon QuickFacts, available from the Population Estimates Program, U.S. Bureau of the Census, Washington, D.C.

When considered together, these cumulative effects are likely to have a small negative effect on salmon and steelhead population abundance, productivity, and spatial structure. Similarly, the condition of critical habitat PCEs will be slightly degraded by the cumulative effects.

Conclusion

After reviewing the best available scientific and commercial information available regarding the current status of southern green sturgeon, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, NMFS concludes that the proposed action is not likely to adversely affect southern green sturgeon. This conclusion is based on the following considerations. Southern green sturgeon occur in Oregon in nearshore marine areas, bays, estuaries, and the deep, low elevation, riverine mainstem of coastal rivers. NMFS has not completed a detailed viability assessment of southern green sturgeon but has determined that the primary threat facing this species is the reduction in the number and geographic distribution of spawning areas, which do not occur within the action area of this proposed action. Other identified threats related to the destruction, modification, or curtailment of green sturgeon habitats are also limited to the geographic range of green sturgeon outside the action area for this proposed action. Fisheries, including trophy poaching, are another significant threat to this species, but will not be affected by the proposed action. The only adverse effects of the proposed action on southern green sturgeon is likely to occur as a result of the proposed action is short-term degradation of water quality due to increased total suspended solids, dissolved oxygen demand, and temperature due to minor riparian and channel disturbance. Those effects are likely to be insignificant because the intensity will be very low and confined primarily to shallow water habitats not frequented by southern green sturgeon. This level of adverse effect is unlikely to ever rise to the level of take. The proposed action is unlikely to have any effect on nearshore marine areas, bays, or estuaries, where southern green sturgeon are most likely to occur in Oregon.

After reviewing the best available scientific and commercial information available regarding the current status of the 15 species considered in this consultation (LCR Chinook salmon, UWR spring-run Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SONCC coho salmon, OC coho salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead, and SRB steelhead), the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of these species, and is not likely to destroy or adversely modify their designated critical habitat. These conclusions are based on the following considerations.

Of those species and populations for which viability has been assessed by a TRT, virtually all face a moderate to very high risk of extinction. Although NMFS considers changes in ocean productivity to be the most important natural phenomenon affecting the productivity of salmon and steelhead, NMFS identified many other factors associated with the freshwater phase of their life cycle that are also limiting the recovery of these species, such as elevated water temperatures, excessive sediment, reduced access to spawning and rearing areas, loss of habitat diversity, large wood, and channel stability, degraded floodplain structure and function, and reduced flow. NMFS also designated designation of critical habitat for all of these species, except LCR coho salmon. CHART teams determined that most designated critical habitat has a high conservation value, based largely on its restoration potential. Baseline conditions for these PCEs vary widely from poor to excellent.

Although the programmatic nature of the action prevents a precise analysis of each action that eventually will be authorized or completed under this Opinion, each type of action will be carefully designed and constrained by comprehensive design criteria such that construction will cause only brief (days to weeks), localized, and minor exacerbation of factors limiting the viability of the listed species. Also, actions are likely to be widely distributed across all recovery domains in Oregon, so adverse effects will not be concentrated in time or space within the range of any listed species. In the long term, these restoration actions will contribute to a lessening of factors limiting the recovery of these species, particularly those factors related to reduced habitat diversity and large wood, degraded spawning habitat and floodplain connectivity, and fish passage, and improve the currently-degraded environmental baseline, particularly at the site scale. A very small number of individual fish, far too few to affect the abundance, productivity, distribution, or genetic diversity of any salmon or steelhead population, will be affected by the adverse effects of any single action permitted under the proposed action. Because the VSP characteristics at the population scale will not be affected, the likelihood of survival and recovery of the listed species will not be appreciably reduced by the proposed action. Similarly, the adverse effects of each action on PCEs are likely to be brief and mild, while the longer term effects are likely to contribute to lessening of the factors limiting the recovery of these species during the freshwater phase of their life cycle.

Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. The following conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the Corps:

1. The effectiveness of some types of stream restoration actions are not well documented, partly because decisions about which restoration actions deserve support do not always address the underlying processes that led to habitat loss. NMFS recommends that the Corps encourage applicants to use species' recovery plans to help ensure that their actions will address those underlying processes that limit fish recovery.

2. NMFS also recommends that the Corps evaluate whether the availability of regulatory streamlining provided by this Opinion influences the design of restoration actions, or acts as an incentive that increases the likelihood that restoration actions will be completed.

Please notify NMFS if the Corps carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit the listed species or their designated critical habitats.

Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (a) the amount or extent of taking specified in the Incidental Take Statement is exceeded, (b) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (c) the identified action is subsequently modified in a manner that has an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

If the Corps fails to provide specified monitoring information annually by February 15, NMFS will consider that a modification of the action that causes an effect on listed species not previously considered and causes the Incidental Take Statement of the Opinion to expire. This programmatic consultation expires five years from the date of issuance. New actions should not be authorized or carried out under this consultation after this date. To reinitiate consultation, contact the Oregon State Habitat Office of NMFS and refer to the NMFS Number assigned to this consultation.

Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a 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 by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. “Harass” is defined by Fish and Wildlife Service as an intentional or negligent act or omission that creates the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Section 7(o)(2) provides that any incidental take that is in compliance with the reasonable and prudent measures and terms and conditions specified in a written take statement shall not be considered to be a prohibited taking of the species concerned.

Amount or Extent of Take

Work necessary to complete actions authorized or carried out under this Opinion will take place beside and within active stream channels when individuals of the 15 species considered in this consultation are likely to be present. The habitat that will be affected is of variable quality and may be limited at the stream reach or watershed scale.

Incidental take caused by the adverse effects of the proposed action will include (a) capture of juvenile fish, some of which will be injured or killed during work area isolation; and (b) harassment or harm of juvenile fish because increased water temperatures, increased total suspended solids, decreased forage, decreased cover, and decreased passage will reduce growth, increase disease, increase competition, increase predation, and inhibit movements necessary for rearing and migration.

This take will occur within an area that extends not more than 300 feet upstream and 300 feet downstream from each action's footprint for the duration of the construction period (commonly hours to days), although actions involving off- and side-channel habitat restoration; set-back of an existing berm, dike or levee; or removal of a water control structure may continue to release sediment intermittently for weeks, months, or years until riparian vegetation and floodplain vegetation are restored and a new topographic equilibrium is reached. Incidental take within that area that meets the terms and conditions of this incidental take statement will be exempt from the taking prohibition.

The NMFS anticipates that no more than 900 juvenile individuals, per year, of the species considered in the consultation will be captured, injured, or killed as a result of work necessary to isolate in-water construction areas. Because these fish are from different species that are similar to each other in appearance and life history, and to unlisted species that occupy the same area, it is not possible to assign this take to individual species. This estimate is based on the following assumptions: (1) Up to a three-fold increase may occur in the maximum number of actions authorized or completed each year under the proposed action, due to an increased emphasis on completion of recovery actions as various salmon and steelhead recovery planning products are becoming available, for a total 90 actions per year; (2) approximately 10% of all actions will require isolation of the in-water work area, for a total of nine actions; (3) each action requiring in-water work area isolation is likely to capture fewer than 100 listed juvenile salmon and steelhead; for a total of 900 individuals, and (4) of the ESA-listed fish to be captured and handled in this way, less than 2% are likely to be injured or killed, including delayed mortality, a total of less than 18 fish, while the remainder are likely to survive with no long-term adverse effects. Nonetheless, an estimate of 5% lethal take, or 45 fish per year, will be used here to allow for variations in environment and work conditions during the capture and release operations. Capture and release of adult fish is not likely to occur as part of the proposed isolation of in-water work areas.

Take caused by the habitat-related effects of this action cannot be accurately quantified as a number of fish because the distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by the proposed action. Thus, the distribution and abundance of fish within the action area cannot be attributed entirely to habitat conditions, nor can NMFS precisely predict the number of fish that are reasonably certain to be injured or killed if their habitat is modified or degraded by the proposed action. In such circumstances, NMFS uses the causal link established between the activity and the likely changes in habitat conditions affecting the listed species to describe the extent of take as a numerical level of habitat disturbance.

Here, the best available indicator for the extent of take is the total length of stream reach that will be modified during construction of actions authorized or carried out under the proposed action because that variable is directly proportional to harm and harassment attributable to this action. Because each action may modify up to 300 lineal feet of riparian and shallow-water habitat, and up to 90 actions per year are likely to occur, the extent of take for this action is 27,000 linear stream feet per year. In the accompanying biological opinion, NMFS determined that this level of incidental take is not likely to result in jeopardy to the listed species.

The estimated number of fish to be captured and injured or killed during capture and handling operations conducted during work area isolation, i.e., 45 juveniles per year, and the length of stream reach, i.e., 27,000 linear stream feet per year, that that will be modified by the construction of all actions authorized or carried out under the proposed action are thresholds for reinitiating consultation. Exceeding any of these limits will trigger the reinitiation provisions of this Opinion.

Reasonable and Prudent Measures

The following measures are necessary and appropriate to minimize the impact of incidental take of listed species from the proposed action.

The Corps shall:

1. Minimize incidental take from administration of SLOPES IV Restoration by ensuring that the proposed design criteria are used in all actions authorized or completed using this approach.

2. Ensure completion of a comprehensive monitoring and reporting program regarding all actions authorized or completed using SLOPES IV Restoration.

Terms and Conditions

The measures described below are non-discretionary, and must be undertaken by the Corps or, if an applicant is involved, must become binding conditions of any permit issued to the applicant, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps or applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement.

1. To implement reasonable and prudent measure #1 (proposed design criteria), the Corps shall ensure that:

   a. Every action authorized or completed under this Opinion will be administered by the Corps consistent with design criteria 1 through 14.
   b. For each action with a general construction element, the Corps will apply design criteria 15 through 30 as enforceable permit conditions or as final action specifications.
   c. For specific types of actions, the Corps will apply design criteria 31 through 48 as appropriate, as enforceable conditions or as final action specifications.

2. To implement reasonable and prudent measure #2 (monitoring and reporting), the Corps shall ensure that:

   a. The Corps' Regulatory and Civil Works Branches will each submit a monitoring report to NMFS by February 15 each year that describes the Corps efforts to carry out this Opinion. The report will include an assessment of overall program activity, a map showing the location and type of each action authorized and carried out under this Opinion, and any other data or analyses the Corps deems necessary or helpful to assess habitat trends as a result of actions authorized under this Opinion.
   b. The Corps' Regulatory and Civil Works Branches will each attend an annual coordination meeting with NMFS by March 31 each year to discuss the annual monitoring report and any actions that will improve conservation under this Opinion, or make the program more efficient or more accountable.
   c. If the Corps chooses to continue programmatic coverage under this Opinion, it will reinitiate consultation within 5 years of the date of issuance.
   d. Failure to provide timely reporting may constitute a modification of SLOPES that has an effect to listed species or critical habitat that was not considered in the biological opinion and thus may require reinitiation of this consultation.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) designated EFH for groundfish (PFMC 2005), coastal pelagic species (PFMC 1998b), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook and coho salmon, groundfish, and coastal pelagic species. Based on information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following adverse effects on EFH designated for those species:

1. Freshwater EFH quantity will be reduced due to short-term construction needs, reduced riparian permeability, and increased riparian runoff, and a slight longer-term increase based on improved riparian function and floodplain connectivity.

2. Freshwater EFH quality will be reduced due to a short-term increase in turbidity, dissolved oxygen demand, and temperature due to riparian and channel disturbance, and longer-term improvement due to improved riparian function and floodplain connectivity.

3. Tributary substrate will have a short-term reduction in quality due to increased compaction and sedimentation, and a long-term increase due to gravel placement, increased sediment storage from boulders and large wood.

4. Floodplain connectivity will have a short-term decrease due to increased compaction and riparian disturbance during construction, and a long-term improvement due to off- and side channel habitat restoration, set-back of existing berms, dikes, and levees, and removal of water control structures.

5. Forage will have a short-term decrease in availability due to riparian and channel disturbance, and a long-term improvement due to improved habitat diversity and complexity, and improved riparian function and floodplain connectivity.

6. Natural cover will have short-term decrease due to riparian and channel disturbance, and a long-term increase due to improved habitat diversity and complexity, improved riparian function and floodplain connectivity, off- and side channel habitat restoration.

7. Fish passage will be impaired in the short-term due to decreased water quality and in-water work isolation, and improved over the long-term due to improved water quantity and quality, habitat diversity and complexity, forage, and natural cover.

EFH Conservation Recommendations

The following two conservation recommendations are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. These conservation recommendations are a subset of the ESA terms and conditions:

1. The effectiveness of stream restoration actions is not well documented, partly because decisions about which restoration actions deserve support do not always address the underlying processes that led to habitat loss. NMFS recommends that the Corps encourage applicants to use species' recovery plans to help ensure that their actions will address those underlying processes that limit fish recovery.

2. NMFS also recommends that the Corps evaluate whether the availability of regulatory streamlining provided by this Opinion influences the design of restoration actions, or acts as an incentive that increases the likelihood that restoration actions will be completed.

3. As appropriate to each action issued a regulatory permit under this Opinion, include the design criteria for construction and types of actions (i.e., 15 through 48) as enforceable permit conditions, except 21 (fish capture and release) and 21 (electrofishing).

4. Include each applicable design criteria for construction and types of actions (i.e., 15 through 48) as a final action specification of every WRDA civil works action carried out under this Opinion, except 21 (fish capture and release), and 22 (electrofishing).

Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations [50 CFR 600.920(j) (1)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse affects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations. The reasons must include 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.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Supplemental Consultation

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

DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users.

This ESA consultation concludes that the proposed revisions to Standard Local Operating Procedures for Endangered Species to administer stream restoration and fish passage improvement actions authorized or carried out by the Department of the Army in Oregon (SLOPES IV Restoration) will not jeopardize the affected listed species. Therefore, the Corps may authorize those actions in accordance with its authorities under section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act or 1972, or carry out similar actions as part of the Corps' civil works programs authorized by sections 1135, 206, and 536 of the Water Resources Development Acts of 1986, 1996, and 2000, respectively. The intended users are the Corps and applicants seeking permits from the Department of the Army for stream restoration and fish passage improvement.

Individual copies were provided to the above-listed entities. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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Appendix A: E-mail Guidelines & SLOPES IV-Restoration Action Notification Form

E-MAIL GUIDELINES FOR SLOPES IV PROGRAMMATIC

The **SLOPES IV** programmatic e-mail box (slopes.nwr@noaa.gov) is to be used for actions submitted to the National Marine Fisheries Service (NMFS) by the Federal Action Agencies for formal consultation (50 CFR § 402.14) under SLOPES IV.

The Federal Action Agency must ensure the final project is being submitted to avoid multiple submittals and withdrawals. In rare occurrences, a withdrawal may be necessary and unavoidable. In this situation, please specify in the e-mail subject line that the project is being withdrawn. There is no form for a withdrawal, simply state the reason for the withdrawal and submit to the e-mail box, following the email titling conventions. If a previously-withdrawn notification is resubmitted later, this resubmittal will be regarded as a new action notification.

An automatic reply will be sent upon receipt, but no other communication will be sent from the programmatic e-mail box; this box is used for **Incoming Only**. All other pre-decisional communication should be conducted **outside** the use of the slopes.nwr@noaa.gov e-mail.

The Federal Action Agency will send only **one** project per e-mail submittal, and will attach all related documents. These documents **must be in pdf format** and will include the following:

1. Action Notification Form, the Action Completion Form, or the Salvage Report
2. Map(s) and project design drawings (if applicable);
3. Final project plan.

In the subject line of the email (see below for requirements), clearly identify which SLOPES IV programmatic you are submitting under (Restoration, Bank Stabilization, Boat Docks, or Transportation), the specific submittal category (30-day approval, no approval, project completion, withdrawal, or salvage report), the Corps Permit Number, the Applicant Name, County, Waterway, and State

E-mail Titling Conventions
Use caution when entering the necessary information in the subject line. **If these titling conventions are not used, the e-mail will not be accepted.** Ensure that you clearly identify:

1. Which SLOPES IV programmatic you are submitting under (Restoration, Bank Stabilization, Boat Docks, or Transportation.);
2. The specific submittal category (30-day approval, no approval, action completion, withdrawal, or salvage report);
3. Corps Permit number;
4. Applicant Name (you may use last name only, or **commonly used** abbreviations);
5. County;
6. Waterway; and
7. State.

Examples:

SLOPES IV Programmatic_Specific Submittal Category, Corps Permit #, Applicant Name, County, Waterway, State

<u>*Action Notification*</u>

Restoration_No Approval, 200600999, Smith, Multnomah, Willamette, Oregon
Restoration_30-day Approval, 200600999, Smith, Multnomah, Willamette, Oregon

<u>*Project Completion*</u>

Banks_Completion, 200600999, Smith, Multnomah, Willamette, Oregon

<u>*Salvage Report*</u>

Boat Docks_Salvage, 200600999, Smith, Multnomah, Willamette, Oregon

<u>*Withdrawal*</u>

Transportation_Withdrawal, 200600999, Smith, Multnomah, Willamette, Oregon

Project Description

Please provide enough information for NMFS to be able to determine the effects of the action and whether the project fits the SLOPES criteria. Attach additional sheets if necessary. The project description should include information such as (but not limited to):

- Proposed in-water work including timing and duration
- Work area isolation and salvage plan including pumping, screening, electroshocking, fish handling, etc.
- Discussion of alternatives considered
- Description of any proposed mitigation
- Cross section to show depth of over and in-water structures.

SLOPES IV PROGRAMMATIC - RESTORATION ACTION NOTIFICATION FORM

Submit this completed action notification form with the following information to NMFS at slopes.nwr@noaa.gov. The SLOPES IV Programmatic e-mail box is to be used for **Incoming Only**. Use the NMFS Public Consultation Tracking System-Consultation Initiation and Reporting System (CIRS) to submit this report when the online system becomes available.

NMFS Review and Approval. Any action that involves (a) fish passage restoration; (b) off- and side-channel habitat restoration; (c) set-back of a berm, dike or levee; or (d) removal of a water control structure, must be individually reviewed and approved by NMFS as consistent with this Opinion before that action is authorized. NMFS will notify the Corps within 30 calendar days if the action is approved or disqualified. For actions that require NMFS approval, attach engineering designs and the results of a site assessment for contaminants to identify the type, quantity, and extent of any potential contamination.

Actions to (e) place boulders, (f) restore large wood, (g) restore spawning gravel, (h) restore streambanks, or (g) remove pilings, do not require NMFS prior review and approval.

Attach a copy of the erosion and pollution control plan, if required.

DATE OF REQUEST: ____________________ **NMFS Tracking #: 2007/07790**

TYPE OF REQUEST:
☐ ACTION NOTIFICATION (NO APPROVAL)
☐ ACTION NOTIFICATION (APPROVAL REQUIRED)

Statutory Authority: ☐ ESA ONLY ☐ EFH ONLY ☐ ESA & EFH INTEGRATED

Lead Action Agency: **Corps of Engineers**

Action Agency Contact: ____________________ Individual Corps Permit #: ____________________

Applicant: ____________________ Individual DSL Permit #: ____________________

Action Title: ____________________

6th Field HUC & Name: ____________________

Latitude & Longitude (including degrees, minutes, and seconds) ____________________

Proposed Project: ***Start Date:*** ____________________ ***End Date:*** ____________________

Action Description:

Type of Action:
Identify the type of action proposed.

Actions Requiring **No Approval** from NMFS:

- ☐ Boulder Placement
- ☐ Spawning Gravel Restoration
- ☐ Large Wood Restoration
- ☐ Piling Removal
- ☐ Streambank Restoration

Actions Requiring **Approval** from NMFS:

- ☐ Fish Passage Restoration
- ☐ Off- and Side-Channel Habitat Restoration
- ☐ Set-back Berms, Dikes and Levees
- ☐ Water Control Structure Removal

NMFS Species/Critical Habitat Present in Action Area:
Identify the species found in the action area:

- ☐ Lower Columbia River Chinook
- ☐ Upper Willamette River spring-run Chinook
- ☐ Snake River spring/summer run Chinook
- ☐ Snake River fall-run Chinook
- ☐ Upper Columbia spring-run Chinook
- ☐ Columbia River chum
- ☐ Lower Columbia River coho
- ☐ Oregon Coast coho salmon

- ☐ Southern Oregon/Northern California coho
- ☐ Snake River sockeye
- ☐ Lower Columbia River steelhead
- ☐ Upper Willamette River steelhead
- ☐ Middle Columbia River steelhead
- ☐ Snake River Basin steelhead
- ☐ Upper Columbia River steelhead
- ☐ Green sturgeon

EFH Species:

- ☐ Salmon, Chinook
- ☐ Salmon, coho
- ☐ Coastal Pelagics
- ☐ Groundfish

Terms and Conditions:
Check the Terms and Conditions from the biological opinion that will be included as conditions on the permit issued for this proposed action. Please attach the appropriate plan(s) for this proposed action.

Administrative

- ☐ Electronic notification
- ☐ Site assessment for contaminants
- ☐ Action completion report
- ☐ Site access
- ☐ Salvage notice

Construction

- ☐ Flagging sensitive areas
- ☐ Temporary erosion controls
- ☐ Temporary access roads
- ☐ Fish passage criteria
- ☐ In-water work period
- ☐ Work area isolation
- ☐ Capture and release
- ☐ Electrofishing
- ☐ Construction water
- ☐ Fish screen criteria
- ☐ Erosion/pollution control plan
- ☐ Choice of equipment
- ☐ Vehicle staging and use
- ☐ Stationary power equipment
- ☐ Work from top of bank
- ☐ Site restoration

Types of Actions

Boulder Placement

- ☐ Site selection
- ☐ Installation

Fish Passage Restoration

- ☐ Needs NMFS Approval

Large Wood Restoration

- ☐ Large wood condition

Off- and Side-Channel Habitat

- ☐ Needs NMFS Approval

Piling Removal

- ☐ Pile removal
- ☐ Broken piles

Set-back Berm, Dike, and Levee

- ☐ Needs NMFS Approval

Spawning Gravel Restoration

- ☐ Gravel placement
- ☐ Gravel source

Streambank Restoration

- ☐ Streambank shaping
- ☐ Soil reinforcement
- ☐ Large Wood
- ☐ Use of Rock in Streambank
- ☐ Planting or installing vegetation
- ☐ Fertilizer
- ☐ Fencing

Water Control Structure Removal

- ☐ Needs NMFS Approval

Appendix B: SLOPES IV Programmatic-Restoration Action Completion Form

SLOPES IV PROGRAMMATIC - RESTORATION ACTION COMPLETION FORM

Within 60 days of completing all work below ordinary high water (OHW) as part of an action completed under the SLOPES IV Restoration programmatic opinion, submit the completed action completion form with the following information to NMFS at slopes.nwr@noaa.gov. Use the NMFS Public Consultation Tracking System-Consultation Initiation and Reporting System (CIRS) to submit this report when the online system becomes available.

Corps Permit #: ______________________________

Action Agency Contact: ______________________________

Action Title ______________________________

Start and End Dates for the completion of in-water work: ***Start***: ______________ ***End***: ______________

Any Dates work ceased due to high flows: ______________ ______________

______________ ______________

______________ ______________

______________ ______________

Include With This Form:

1. Photos of habitat conditions before, during, and after action completion
2. Evidence of compliance with fish screen criteria for any pump used
3. A summary of the results of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort
4. Number, type, and diameter of any pilings removed or broken during removal
5. A description of any riparian area cleared within 150 feet of OHW
6. Linear feet of bank alteration
7. A description of site restoration
8. A completed Salvage Reporting Form from Appendix C for any action that requires fish salvage

Appendix C: SLOPES IV Programmatic – Restoration Salvage Reporting Form

SLOPES IV PROGRAMMATIC - RESTORATION
SALVAGE REPORTING FORM

Within 10 days of completing a capture and release as part of an action completed under the SLOPES IV Restoration programmatic opinion. The applicant or, for Corps civil works actions, the Corps, must submit a complete a Salvage Reporting Form, or its equivalent, with the following information to NMFS at slopes.nwr@noaa.gov. Use the NMFS Public Consultation Tracking System-Consultation Initiation and Reporting System (CIRS) to submit this report when the online system becomes available.

Corps Permit #: ____

Action Agency Contact: ____

Action Title ____

Date of Fish Salvage Operation: ____________________

Supervisory Fish Biologist (name, address & telephone number): ____________________

Include With This Form:

1. A description of methods used to isolate the work area, remove fish, minimize adverse effects on fish, and evaluate their effectiveness.
2. A description of the stream conditions before and following placement and removal of barriers.
3. A description of the number of fish handled, condition at release, number injured, and number killed by species.