CHAPTER ONE
INTRODUCTION

*1. revised INTRODUCTION

The Columbia River Channel Improvements Project was originally presented in the Final *Integrated Feasibility Report for Channel Improvements and Environmental Impact Statement* (Final IFR/EIS, August 1999). The U.S. Army Corps of Engineers, Portland District (Corps), with the cooperation of the lower Columbia River Ports (Portland, and St. Helens in Oregon; Kalama, Longview, Vancouver, and Woodland in Washington) completed the 5-year IFR/EIS process in August 1999. The U.S. Environmental Protection Agency (USEPA), Region 10, is a cooperating agency for the project.

This Final Supplemental EIS (SEIS) supplements the 1999 Final IFR/EIS. The scope of the 1999 Final IFR/EIS included the following actions: 1) improvements to the navigation channel for the Columbia and Willamette Rivers; 2) ecosystem restoration features; and 3) the long-term disposal needs for continued maintenance of the Mouth of Columbia River (MCR) project, maintenance of the existing 40-foot channel, and the disposal requirements for construction and maintenance of the proposed channel improvements alternatives. The Corps is the federal agency with primary responsibility for navigation improvements and ecosystem restoration actions. The USEPA is the federal agency responsible for designating ocean disposal sites necessary to address long-term disposal needs. The USEPA expects to initiate formal rulemaking on the Shallow Water and Deep Water Sites in February 2003, with the designations becoming effective by summer 2003.

A SEIS typically focuses on project changes and/or new information. To understand the scope of the Final SEIS it may be helpful to explain how the Final SEIS is intended to address changes in the proposed action and new information for each of the three types of actions that were the subject of the 1999 Final IFR/EIS.

Navigation channel improvements. The Final SEIS reflects the decision to defer action on deepening the Willamette River until after USEPA decisions have been made regarding the clean up of the parts of the river listed as a Superfund site. The Final SEIS, therefore, focuses on the Columbia River; impacts regarding the Willamette River are discussed to a lesser extent in Section 6.12. With regards to new information, much of the new information presented in the Final SEIS pertains to impacts of deepening the Columbia River, hereafter referred to as the channel improvements project.

Restoration projects. The Final SEIS reflects the incorporation of five new restoration features and analyzes the environmental impacts associated with implementing these features. The new restoration features result in a minor change to long-term disposal needs.

Long-term disposal needs for MCR and channel improvements projects. The Final SEIS discusses revisions to upland disposal sites for the channel improvements project that resulted from the consultation process with NOAA Fisheries. In addition, implementation of the proposed restoration features at the Lois Mott embayment and Millar Pillar are anticipated to significantly reduce the need for ocean disposal of river channel material. The

Final SEIS addresses this change in the disposal plan. Because the channel improvement project amounted to only a small fraction of sediments proposed for ocean disposal as analyzed in the 1999 Final IFR/EIS, the use of this material for ecosystem restoration, while significant in the context of the Corps' decision regarding the channel improvement project, does not fundamentally change the need for or sizing of the ocean disposal sites selected in the 1999 Final IFR/EIS. The Final SEIS also presents new baseline information collected for the ocean disposal sites selected in the 1999 Final IFR/EIS; however, the Final SEIS has less new information regarding this action then the other two actions discussed above.

The purposes of this Final SEIS are to document additional information, environmental analyses, and project modifications resulting from consultation of the project under Section 7 of the Endangered Species Act (ESA); to update the disposal plan; to update the project economics; to comply with National Environmental Policy Act (NEPA) requirements; and to comply with the Washington State Environmental Policy Act (SEPA).

Several additional ecosystem restoration features and evaluation actions are proposed for implementation to benefit the recovery of listed salmonids and other fish and wildlife resources. Material proposed for ocean disposal in the 1999 Final IFR/EIS will be used to construct two of the ecosystem restoration features. Therefore, it is the intention of the Corps not to use the Deep Water Site in disposing of materials dredged for the channel improvement project. Construction volumes also were updated using December 2001 and January 2002 hydrographic survey data. Other items updated include a reduction in rock excavation; utility relocations; additional information for crab, smelt, sturgeon, and stranding gained from data collection conducted with federal and state resource agencies; additional information on sediment transport and consistency with coastal programs; and modification to some of the upland disposal sites to avoid impacts to resources and habitat. Project economics are reexamined to evaluate the sensitivity of the fleet and commodity forecasts, and changes to shipping operations in the Portland area.

Authorized Project

In December 1999, Congress authorized the deepening of the Columbia and Lower Willamette Rivers Federal Navigation Channel to 43 feet [Section 101(b)(13) of the Water Resource Development Act of 1999]. However, additional funds must still be appropriated before the channel improvement project can begin. The authorized plan would deepen the existing federal navigation project for the Columbia and Willamette Rivers and provide for construction of ecosystem restoration features. The recommended plan presented in the 1999 Final IFR/EIS consisted of the following:

- The existing 600-foot-wide, 40-foot-deep navigation channel would be deepened from -40 feet to -43 feet Columbia River datum (CRD), from Columbia River mile (CRM) 3 to CRM 106.5, including advanced maintenance dredging for overwidth and overdepth (authorized and approved actions) in the reaches where this practice is currently performed in the maintenance program.

- The existing 600-foot-wide, 40-foot-deep navigation project channel would be deepened from -40 feet to -43 feet CRD, from Willamette River mile (WRM) 0 to WRM 11.6 (see next section on *Willamette River Construction*).
- Three of the existing five turning basins on the Columbia River (located at CRM 13, 73.5, and 101.5, respectively) would be deepened to -43 feet CRD.
- The three turning basins located at WRM 4, 10, and 11.7 on the Willamette River would be deepened to -43 feet CRD (see next section on *Willamette River Construction*).
- A total of 29 upland sites (with a total land area of 1,681 acres), 3 shoreline sites, 2 ocean sites, and 1 gravel pit would be required for the disposal of construction materials and subsequent channel maintenance dredged material.
- Ecosystem restoration features include the use of a combined pump/gravity water supply for restoring wetland and riparian habitat at Shillapoo Lake. Tidegate retrofits with fish slides for salmonid passage would be installed at selected locations along the lower Columbia River. Connecting channels would be constructed at the upstream end of Walker-Lord and Hump-Fisher Islands to improve juvenile salmonid access to their embayment-rearing habitats.
- Environmental mitigation features would be constructed on a total of 740 acres of land purchased for mitigation efforts located at the Woodland Bottoms, Martin Island, and Webb mitigation sites.

The location of the dredging will be limited to selected areas from CRM 3, near the mouth of the Columbia River, to CRM 106.5, near the I-5 Bridge in Portland. Because significant reaches of the Columbia River navigation channel are naturally deeper than what the new channel requires, only specific areas will require dredging. The shallower reaches subject to deepening activities represent approximately 3.5% of the total river area between CRM 3-106.5, or 56% of the navigation channel. Three of the five turning basins on the Columbia River (located at CRM 13, 73.5, and 101.5) also would be deepened to 43 feet.

Willamette River Construction (Deferred)

Although 11.6 miles of the lower Willamette River were addressed in the 1999 Final IFR/EIS, and included in the Congressional authorization, the Willamette River portion is not addressed in detail in this Final SEIS. The project features for the lower Willamette River will be reevaluated in a subsequent NEPA document after resolution of sediment cleanup issues associated with its inclusion on the federal National Priorities List by USEPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Background and Update

In December 1999, after issuance of the 1999 Final IFR/EIS, the NOAA Fisheries (National Marine Fisheries Service) issued a 'No Jeopardy' Biological Opinion on the expected impacts to ESA-listed salmonids, and the U.S. Fish and Wildlife Service (USFWS) completed its 'No Jeopardy' Biological Opinion on the potential impacts to listed wildlife and plant species. In August 2000, NOAA Fisheries withdrew their Biological Opinion citing the availability of new information regarding impacts to bathymetry (water depths) and flow

on estuarine habitat, and resuspension of toxics. The Biological Opinion by the USFWS remains valid, however. Because a Biological Opinion meeting ESA requirements for listed salmonids must be in place before the project can proceed, the Corps and NOAA Fisheries began a consultation process to resolve issues connected with the project. The USFWS also reentered the process for two aquatic species, bull trout and coastal cutthroat trout.

Shortly after NOAA Fisheries withdrew its Biological Opinion in 2000, the States of Washington and Oregon denied certification of the project under Section 401 of the Clean Water Act and consistency under the Coastal Zone Management Act (CZMA). Three of their major concerns were sediment transport, Dungeness crab, and consistency with coastal programs. Since then, the Corps and sponsor ports have met with officials from Washington and Oregon to understand and work to address the issues identified by the agencies.

As a result of meetings with Washington agencies, the Washington Ports agreed to prepare a Supplemental EIS (a supplement to the IFR/EIS prepared by the Corps and USEPA) under SEPA to address issues identified in Washington's letters, including those regarding Section 401 and the CZMA. When the Corps and USEPA determined that it would prepare a SEIS under NEPA, the Federal Government and the Washington Ports agreed to issue a joint document. As discussed below, both NEPA and SEPA strongly encourage this approach.

Oregon does not have a state law comparable to NEPA or SEPA. However, many of the issues identified by Oregon, such as impacts to sturgeon and smelt and royalties for sand extraction, have received additional analysis. Oregon agency staff have participated in a number of these efforts. Information that results from these studies is included in the Final SEIS. Issues such as coastal zone consistency and 401 certification for water quality have been the subject of a number of meetings and will be addressed in documents related to those applications as well as in information included in this Final SEIS.

The NEPA encourages federal agencies to cooperate with state and local agencies to reduce duplication between NEPA and state and local requirements. This cooperation includes joint planning, environmental evaluation, public hearings and environmental assessments. In addition, NEPA encourages federal agencies to join with state or local agencies to prepare joint EIS's. Where state laws or local ordinances have EIS requirements in addition to, but not in conflict with, those in NEPA, the NEPA encourages federal agencies to cooperate in fulfilling these requirements as well as those of federal laws so that one document will comply with all applicable laws.

The SEPA similarly encourages state agencies to avoid duplication of paperwork and allows agencies to use environmental analyses prepared under NEPA. When a state agency uses a federal EIS for the same proposal, the state agency is not required to adopt the federal NEPA document. Consistent with these provisions of NEPA and SEPA, the Federal Government and the Washington Ports are issuing the Final SEIS as a joint document for purposes of complying with NEPA and SEPA for the scope of activities specified above. Subsequent references in this document to NEPA are intended to include SEPA, where applicable.

The ESA consultation procedure for a federal action may be reinitiated if new information reveals potential effects to listed species not previously considered during an earlier consultation [50 Code of Federal Regulations (CFR) Section 402.16]. The Corps worked closely with NOAA Fisheries and USFWS to address new information, as well as resolve concerns in the NOAA Fisheries withdrawal letter (August 2000). Coordination included discussion on specific areas of concern, proposed actions, and modifications to those actions to ensure protection of listed species and habitats. Work was aimed at reaching agreement among agencies on a foundation of best available science (how to obtain and apply it) to be used in developing the new Biological Assessment (BA) and Biological Opinions.

In February 2001, the Sustainable Ecosystems Institute (SEI) was hired to facilitate a series of workshops to provide an independent, scientific peer-review process to evaluate the potential environmental issues using best available scientific knowledge. The Corps, NOAA Fisheries, and USFWS jointly agreed to use SEI. The SEI process included formal and informal review of scientific materials by SEI staff and an independent panel of seven scientific experts. The process included five workshops held from March to August 2001, which were open to the public, to review the science underlying the project and meetings between panelists and project managers and agency scientists, as well as a questionnaire completed by all panelists. Based on comprehensive discussion of all relevant issues (numeric and conceptual modeling, fisheries, sediment and water quality, monitoring and adaptive management), the panel determined that the knowledge base represented "best available science" and no other sources were identified. Also, a Biological Review Team (BRT) made up of federal representatives (NOAA Fisheries, USFWS and Corps) was formed for the consultation process. The BRT met weekly for about 8 months to address biological concerns and identify ecosystem restoration features and evaluation actions to further resource recovery and enhance baseline information on ESA salmonids and their habitats.

Outcomes of the SEI workshops and discussions among the agencies provided input for the new BA prepared by the Corps in response to NOAA Fisheries request to reinitiate consultation on listed species potentially affected by the project. This BA addresses Distinct Population Segments (DPS) for two fish species (one listed DPS, one DPS proposed for listing) under the purview of the USFWS plus reviewed the potential for impacts arising from added features and actions to species originally listed by the USFWS for the project. The 2001 BA also addresses 13 evolutionary significant units (ESU; a distinctive group of Pacific salmon or steelhead) including 12 listed ESUs, and one candidate ESU, as well as Steller sea lions. Thirteen ESUs were evaluated during the previous consultation process. The following were considered during preparation of the 2001 BA: SEI workshop materials and summaries; additional numerical and conceptual modeling; salmonid biological requirements; NOAA Fisheries December 1999 Biological Opinion and administrative record; NOAA Fisheries and USFWS new information; and other existing and new information.

In January 2002, the Corps submitted the BA (December 2001) to NOAA Fisheries and USFWS. This BA included actions to address concerns associated with dredging and deepening, including compliance measures to minimize incidental take of listed species; monitoring actions to ensure project actions have minimal effects on listed fish and their

habitats; and adaptive management to respond to impacts discovered through the monitoring program. The BA also included ecosystem restoration features involving numerous proposals to improve existing habitat conditions in the lower Columbia River and estuary, and evaluation actions to increase knowledge of the river and estuary ecosystem.

On May 20, 2002, NOAA Fisheries and USFWS transmitted their final Biological Opinions to the Corps. These opinions determined that the project, including dredging, disposal, monitoring, adaptive management, evaluation, and ecosystem restoration is not likely to jeopardize the continued existence of, or adversely modify or destroy, designated critical habitat of 12 federally listed salmonid ESUs, one listed DPS, one DPS proposed for listing, and one candidate ESU, bald eagles, or Columbian white-tailed deer. In addition, NOAA Fisheries concurred that the project is not likely to adversely affect Steller sea lions.

In order to address the concerns of the States of Washington and Oregon as expressed in their 401 certification and CZMA consistency denial letters (August 2000), a rationale of producing evaluation reports was developed. These reports (Exhibits K-1 to K-9) cover the following subjects: white and green sturgeon, smelt, fish stranding, Dungeness crab, wildlife and wetland mitigation, state royalties, floodplains, and consistency with the Washington State Critical Area Ordinances and Shoreline Master Programs. Also, the Corps developed a comprehensive evaluation report on sediment transport, titled *Columbia River Sediment Impacts Analysis* (Exhibit J).

Between January and June 2002, the Corps conducted a reassessment of the economic and environmental information reported in the 1999 Final IFR/EIS for the channel improvement project. The economic reanalysis focused on confirming what are the benefits and costs of the 43-foot channel. Each of the inputs to the benefit and cost calculations were reviewed and updated using the most current data available.

In August 2002, the Corps convened two technical review teams to evaluate the reasonableness of the economic analysis: one review team to evaluate the benefit analysis and the other to evaluate the cost analysis. The technical review process was facilitated by a neutral, non-profit organization. The panel's meetings were open and transparent and the public was invited to attend. All information provided to the panel was posted on the Corps' website prior to the meeting. All presentations made by the Corps' facilitator, Corps, Port of Portland, and consultants were posted to the Corps' website after the event. The panel's findings also were posted to the Corps' website prior to the close of the public comment period. The technical review process resulted in a published assessment of the Corps' economic analysis, responses to which are incorporated in this Final SEIS.

Revised Project

Table S1-1 provides a comparison of the Columbia River 43-foot channel improvement project as presented in the 1999 Final IFR/EIS and as modified in the Final SEIS. As noted above, the Willamette River portion of the authorized project has been deferred and is not being addressed in detail in the Final SEIS. For the purposes of this Final SEIS, the

authorized Columbia River project, as modified and shown in Table S1-1, will be referred to as 'the project' including all enforceable conditions of NOAA Fisheries and USFWS Biological Opinions. As noted in the 1999 Final IFR/EIS, the without project condition (the No Action Alternative) is maintenance dredging and disposal as described in the *Dredged Material Management Plan and Supplemental Environmental Impact Statement* (Corps 1998) for the 40-foot channel.

The Final SEIS discusses revisions to upland disposal sites for the channel improvement project that resulted from the consultation process with NOAA Fisheries and USFWS. With implementation of the proposed restoration features at Lois Island embayment and Miller-Pillar, and subsequent use of existing disposal sites (e.g., flowlane, Miller Sands Spit, Rice Island, Pillar Rock Island) for maintenance dredged materials, the project should not require ocean disposal for construction and the first 20 years of maintenance. The Final SEIS discloses this change in the disposal plan. The Final SEIS also presents new information regarding ocean disposal. Because the channel improvement project accounted for a small fraction of the sand proposed for ocean disposal as analyzed in the 1999 Final IFR/EIS, the reduced use of the Deep Water Site, while significant in context of the Corps' decision regarding the channel improvement project, does not fundamentally change the need for the ocean disposal site as documented in the 1999 Final IFR/EIS. The Final SEIS only addresses potential use of the ocean disposal site associated with the channel improvement project in the event the Lois Island embayment and Miller-Pillar ecosystem restoration features are not fully implemented. This Final SEIS does not address any use of ocean disposal sites that may occur as a result of maintenance of the MCR project or maintenance of the Columbia River navigation channel in the absence of this project.

Several other steps remain before construction of the project could begin. The Washington Department of Ecology and the Oregon Department of Environmental Quality must issue 401 Water Quality certifications under the Clean Water Act, and the Washington Department of Ecology and Oregon Department of Land Conservation and Development must evaluate the proposed action for consistency under the CZMA. The Corps has applied for 401 Certification and CZMA Consistency Determinations. Coordination between the Corps and these state agencies is ongoing. The sponsor ports are also working with local jurisdictions on applicable local permitting requirements for the upland disposal sites.

The Final SEIS follows the same format as the 1999 Final IFR/EIS. Sections of the final report that have been updated, or new sections added for the Final SEIS, are clearly marked. However, because much of the information and analysis contained in the 1999 Final IFR/EIS has not changed, the entire text of that report is not repeated here. Accordingly, for complete analysis of any aspect of the project, the reader should refer to both the 1999 Final IFR/EIS and to the corresponding section of this Final SEIS. A CD-ROM of the 1999 Final IFR/EIS is provided with the Final SEIS.

The revisions to the channel improvement project by the Corps and the collection of additional, baseline information also triggered reevaluation by USEPA of the ocean disposal element contained in the 1999 Final IFR/EIS, Appendix H.

Table S1-1. Columbia River Channel Improvement Project Comparison

Action	1999 Final IFR/EIS for the Columbia River	Final SEIS for the Columbia River
Navigation Feature		
Dredging Volume (construction)	18.4 million cubic yards	14.5 million cubic yards
Rock Volume	590,000 cubic yards	490,500 cubic yards
Basalt	173,000 cubic yards	50,500 cubic yards
Cemented Cobbles	417,000 cubic yards	440,000 cubic yards
Disposal		
Upland Disposal Sites Areas	1,681 acres	1,630 acres
Agricultural Crop Land	200 acres	172 acres
Wetlands	20 acres	16 acres
Riparian Habitat	67 acres	50 acres
Ocean disposal site use	Construction and maintenance, 37 mcy over 20 years	None during construction if the Lois Island ecosystem restoration feature is fully implemented; none anticipated during the first 20 years of maintenance if Miller-Pillar and existing disposal sites in the estuary are used.
Utility Relocations	5 on the Columbia River	None on the Columbia
ESA Consultation		
Monitoring Actions	Included	Strengthened and clarified
Minimization and BMPs	Included	Strengthened and clarified
In-water Work Windows	None	Specified
Adaptive Management	Included	Strengthened and clarified
Ecosystem Restoration Features		
Shillapoo Lake	1,250 acres	470-839 acres
Miller-Pillar	Not Included	235 acres
Lois Island	Not Included	191 acres
Purple Loosestrife Control	Not Included	CRM 18-52
Tenasillahe Island (Phased Implementation)	Not Included	New
Interim (Phase 1)	Not Included	92 acres
Cottonwood-Howard (Phase 2) Columbian White-tailed Deer Reintroduction	Not included	650 acres Columbian white-tailed deer; 60 acres tidelands
Long-term (Phase 3)	Not Included	1,778 acres
Bachelor Slough	Not Included	85 acres of in-stream restoration, 6 acres shoreline riparian restoration, 46 acres of riparian restoration upland
Ecosystem Evaluation	Not Included	6 actions added
Adaptive Management	Not Included	Included
Costs and Benefits		
Columbia River NED Costs	$154,224,000	$118,924,000
Columbia River NED Average Annual Benefits	$28.0 million	$18.8 million
NED Benefit-to-cost Ratio	1.9	1.7
Columbia River Costs - Proposed Plan	$160,884,000	$133,629,000

1.1. revised Purpose and Need

Subsection 1.1.1 has been added to this section to provide updated information since completion of the 1999 Final IFR/EIS.

1.1.1. new Purpose and Need for the Additional Ecosystem Restoration Features

The purpose of these ecosystem restoration features is to restore habitat conditions, which would contribute to the recovery and long-term viability of the listed species and other natural resources. The need for these ecosystem restoration features arises from historic activities that have resulted in population declines requiring listing, and from the Corps' ESA responsibility to assist with listed species conservation. These additional ecosystem restoration features, as well as evaluation and monitoring actions, resulted from consultation of the project under Section 7 of the ESA. The additional features and actions are based on opportunities identified to enhance juvenile salmonid feeding and rearing habitat for listed salmonid ESUs and wildlife species. These features also would provide benefits to many other species of fish and wildlife.

1.2. revised Study Authority

The following information was added to this section for the Final SEIS. In December 1999, Congress authorized the deepening of the Columbia and Lower Willamette Rivers Federal Navigation Channel to 43 feet [Section 101(b)(13) of the Water Resource Development Act of 1999]. As discussed above, deepening of the Lower Willamette River (and associated turning basins) has been deferred at this time and will be reevaluated in a subsequent NEPA document after resolution of sediment cleanup issues associated with its inclusion on the federal National Priorities List under CERCLA.

1.3. revised Study Area

Subsection 1.3.1 has been added to this section to provide updated information resulting from the ESA consultation process since completion of the 1999 Final IFR/EIS.

1.3.1. new Action Area

The NOAA Fisheries, USFWS, and the Corps defined the action area in the 2001 BA to extend beyond the actual location of proposed activities to include areas that may potentially be directly or indirectly affected by the project (50 CFR Section 402.02). For purposes of this Final SEIS, this area is adopted as the study area, and includes the following:

- A bank-to-bank run of the Columbia River from Bonneville Dam down to the river's mouth, which includes adjacent port terminals and berths and certain ecosystem restoration and wildlife mitigation sites, as well as from the river mouth extending 12 miles out into the Pacific Ocean in a fan shape.
- Upland disposal, ecosystem restoration, and wildlife mitigation sites.

The bank-to-bank run of the river includes formerly designated and recently proposed ESA Critical Habitat for the listed ESUs.[1] For discussion purposes, the action area is divided into three general habitat or reach types. The first is riverine, which begins at Bonneville Dam and runs downstream to the start of the estuary at approximately CRM 40. The second is estuarine and runs from CRM 40 downstream to CRM 3. The third is the river mouth, which starts at a wide area at CRM 3 and encompasses the outer boundary of the Deep Water Site (approximately 12 miles beyond the CRM 3 boundary of the channel improvement project) in a fan shape (Figure S1-1). The reach numbering system used in the 1999 Final IFR/EIS runs from Reach 1 at CRM 106.5 to Reach 7 at CRM 3. To avoid renumbering the original reaches in the action area, the Bonneville reach is designated as Reach A, while the river mouth reach is designated Reach B (Figure S1-1). The seven reach maps for the project, which show areas to be dredged, disposal areas, ecosystem restoration sites, mitigation sites, and other pertinent information, are found at the end of Chapter 4.

1.4. revised Scope of Study

Subsection 1.4.1 has been added to this section to provide updated information on the ecosystem restoration component developed during the ESA consultation process.

1.4.1. new Ecosystem Restoration Features Developed During Consultation

As a result of the ESA consultation process, five additional ecosystem restoration features were added to the channel improvement project. These actions are described in detail in Chapter 4 of this Final SEIS. The Lois Island embayment and Miller-Pillar restoration features will be constructed to beneficially use dredged material to attain establishment of tidal marsh habitat. Target elevations, representing tidal marsh elevations determined from adjacent tidal marsh habitat, will be used to guide tidal marsh development. Miller-Pillar also requires construction of a pile dike field (five pile dikes) to hold material in place.

These two ecosystem restoration features were initially proposed in 1995 when the Corps, USEPA, and sponsor ports initiated Columbia River environmental roundtable meetings with state and federal resource agencies, resource and commercial fishing interest groups and interested members of the public, but were not included in the preferred alternative described in the 1999 Final IFR/EIS.

All ecosystem restoration features were further developed during the ESA consultation with NOAA Fisheries and USFWS. The Corps, with the assistance of NOAA Fisheries and USFWS, has determined these features to be important to aid in the recovery of listed salmonids and in some cases, address habitat concerns that were the subject of much discussion and analysis throughout the consultation process.

[1] NOAA Fisheries has recently withdrawn its designation of critical habitat for listed salmonids. USFWS has recently proposed but not yet formally designated critical habitat for bull trout.

Figure S1-1. Action Area for ESA Consultation

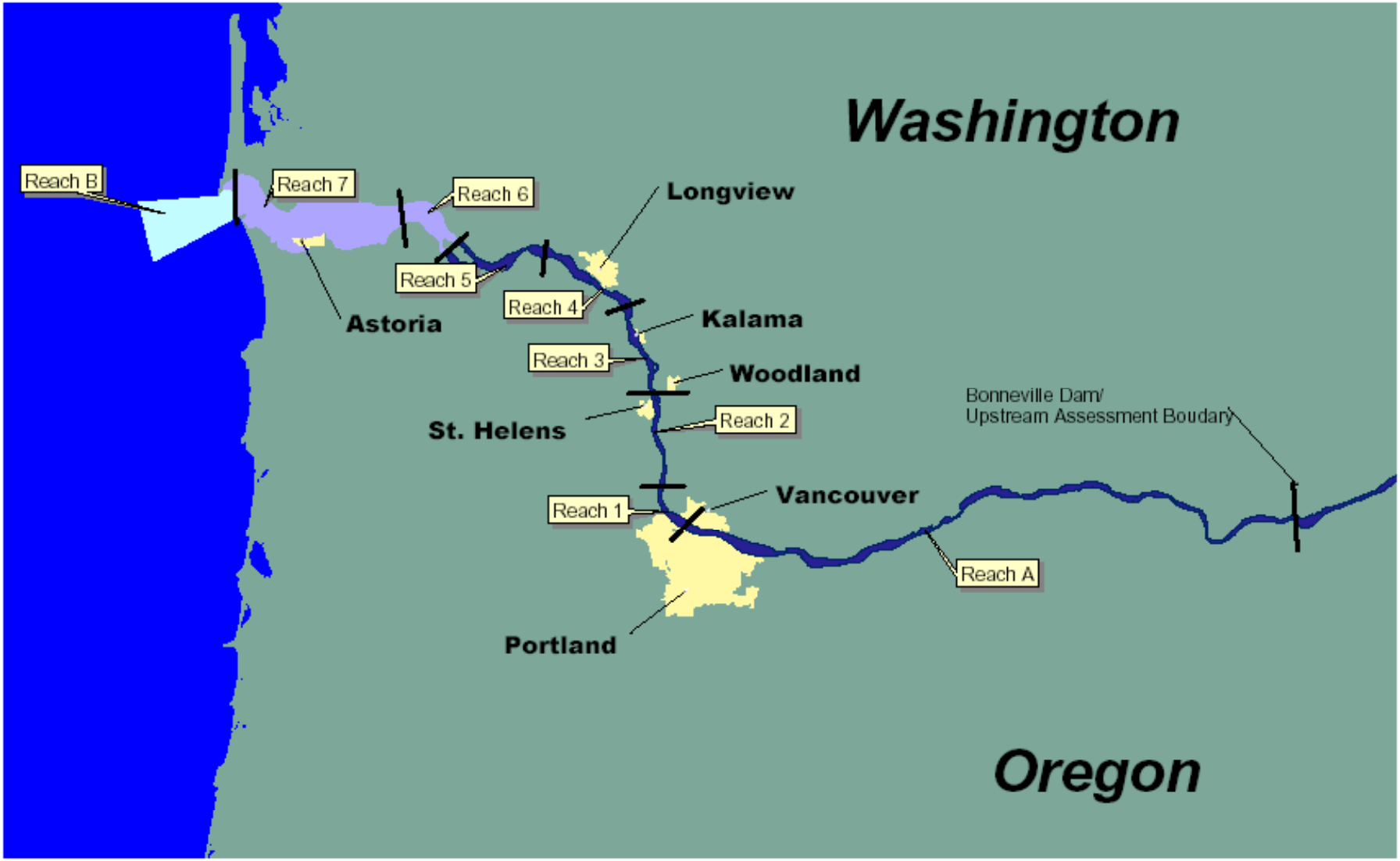

Figure S1-1
Action Area

In addition, the Lois Island embayment and Miller-Pillar habitat restoration features were discussed at the 2001 "Lower Columbia River and Estuary Habitat Conservation and Restoration Workshop" held cooperatively by the Corps, Columbia River Estuary Study Task Force, Lower Columbia River Estuary Program, and American Rivers in Astoria to identify ecosystem restoration projects. For further information on the screening criteria, see Chapter 6, Section 6.2.4, *Ecosystem Restoration Features*. These two ecosystem restoration features were modified after the consultation process had been concluded based upon comments received on the Draft SEIS and recommendations from ODFW, Oregon Division of State Lands, and others. These modifications were coordinated further with NOAA Fisheries and USFWS to obtain their concurrence.

The Bachelor Slough restoration feature includes deepening an existing side channel by dredging and disposal of material at one to three upland location(s) plus restoration of riparian forest along Bachelor Slough (6 acres). Upland disposal of Bachelor Slough sediments allows for the additional development of riparian forest habitat (approximately 46 acres)within the ESA Critical Habitat zone for listed salmonids.

The purple loosestrife control program would use an integrated pest management approach that includes introduction of biological control agents, use of herbicides, and/or mechanical pulling of this plant for restoration of estuarine marshes between CRM 18-52. Purple loosestrife is an introduced exotic plant that is spreading throughout emergent tidal marshes in the Columbia River estuary. Native vegetation such as Lyngby's sedge, tufted hair grass, and softstem bulrush are being displaced. Currently, more than 10,000 acres of estuarine tidal marsh are infested, although the degree of infestation varies widely among locations

The Phase 1 interim restoration at Tenasillahe Island includes improving existing tidegates and construction of inlets, complete with water control structures at the head of these interior sloughs to improve fish accessibility, water quality, and circulation in the sloughs. Under Phase 2 interim restoration, Columbian white-tailed deer will be reintroduced to Cottonwood-Howard Islands near Longview, Washington, where habitat will be secured via purchase and deed restrictions. Over the long term, Phase 3 improvements at Tenasillahe Island would include breaching of exterior dikes to return tidal circulation to 1,778 acres.

Phase 1 interim actions at Tenasillahe Island are contingent on hydraulic engineering analyses demonstrating the feasibility of the proposed actions, and that no adverse impacts would occur to Columbian white-tailed deer. Implementation of Phase 3 at Tenasillahe Island is contingent on delisting of Columbian white-tailed deer and determination that such actions are compatible with the purposes and goals of the refuge. The Bachelor Slough restoration is contingent on securing use agreements from the Washington Department of Natural Resources (WDNR) and favorable sediment testing results. The Phase 2 Tenasillahe Island (Cottonwood-Howard) deer reintroduction also is contingent on acquisition of the site by the sponsor ports.

1.5. revised Study Participants and Coordination

The following information was added to this section for the Final SEIS. Since 1999, discussions have continued with federal and state agencies. In addition, working groups were formed for smelt and sturgeon research. Numerous meetings with state resource agencies have been held to discuss issues of concern including Dungeness crab, fish stranding, sediment budget, and consistency with coastal programs.

1.6. Previous Studies

No updating of the existing information in this section was necessary for the Final SEIS (see the Final IFR/EIS, August 1999).