

DRAFT MITIGATION PLAN

TERMINAL 4 EARLY ACTION

PORT OF PORTLAND, PORTLAND, OREGON

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

Prepared for
Port of Portland

Prepared by
Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 110
Portland, Oregon 97224-7192

In Association with
NewFields
4720 Walnut Street, Suite 200
Boulder, Colorado 80301

December 2006



DRAFT MITIGATION PLAN

**TERMINAL 4 EARLY ACTION
PORT OF PORTLAND, PORTLAND, OREGON**

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

Prepared for

Port of Portland

Prepared by

Anchor Environmental, L.L.C.
6650 SW Redwood Lane, Suite 110
Portland, Oregon 97224-7192

In Association with

NewFields
4720 Walnut Street, Suite 200
Boulder, Colorado 80301

December 2006

Table of Contents

1	INTRODUCTION.....	1
2	BACKGROUND INFORMATION.....	5
2.1	Purpose and Need of Removal Action.....	5
2.2	Removal Action Activities Requiring Compensatory Mitigation.....	6
2.3	Process for Identifying Compensatory Mitigation Project.....	7
2.3.1	Habitat Assessment Results—Lost Habitat Features and Functions in Slip 1—Step 1.....	8
2.3.2	Mitigation Project Options—Steps 2 and 3.....	10
3	OFF-SITE MITIGATION PROJECT SELECTION PROCESS.....	13
3.1	Off-site Mitigation Project Comparison Criteria.....	13
3.2	Off-site Mitigation Project Comparison.....	14
3.3	Off-site Mitigation Project Selection.....	14
4	MITIGATION GOALS AND ACTIONS.....	17
4.1	Habitat Bench.....	17
4.1.1	Benefits to Salmon.....	18
4.1.2	Benefits to Other Aquatic Species.....	18
4.1.3	Connectivity.....	18
4.1.4	Project Timing.....	18
4.1.5	Administrative Logistics.....	19
4.2	Removal of Piling.....	19
4.2.1	Benefits to Salmon.....	19
4.2.2	Benefits to Other Aquatic Species.....	19
4.2.3	Connectivity.....	19
4.2.4	Project Timing.....	20
4.2.5	Administrative Logistics.....	20
4.3	Capping.....	20
4.3.1	Benefits to Salmon.....	20
4.3.2	Benefits to Other Aquatic Species.....	21
4.3.3	Connectivity.....	21
4.3.4	Project Timing.....	21
4.3.5	Administrative Logistics.....	21
4.4	Ramsey Refugia, Phase II.....	21
4.4.1	Benefit to Salmon.....	22
4.4.2	Benefit to Other Aquatic Species.....	23
4.4.3	Connectivity.....	23
4.4.4	Project Timing.....	23
4.4.5	Administrative Logistics.....	23

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



Table of Contents

4.5	Equivalency of Lost Habitat in Slip 1 to Habitat Gained Through Mitigation Actions	25
5	PERFORMANCE AND MONITORING MEASURES	27
5.1	Habitat Bench	27
5.1.1	Performance and Contingency Measures.....	28
5.1.2	Monitoring Measures	28
5.2	Piling Removal	29
5.2.1	Performance and Contingency Measures.....	29
5.2.2	Monitoring Measures	29
5.3	Capping Activities	29
5.3.1	Performance and Contingency Measures.....	30
5.3.2	Monitoring Measures	31
5.4	Ramsey Refugia, Phase II.....	31
5.4.1	Performance and Contingency Measures.....	31
5.4.2	Monitoring Measures	34
6	PERFORMANCE AND MONITORING METHODS.....	37
6.1	Ramsey Refugia, Phase II.....	37
6.1.1	Habitat Measurements	37
6.1.2	Vegetation Cover	37
6.1.3	Fish Surveys.....	37
6.1.4	Wildlife Surveys.....	37
6.2	Habitat Bench	37
6.3	Piling Removal	37
6.4	Schedule	37
6.5	Reporting and Documentation Requirements	37
7	REFERENCES	39

List of Tables

Table 1	Project Selection Criteria Comparison
Table 2	Mitigation Project/Action Consistency with General Mitigation Criteria

List of Figures

Figure 1	Vicinity Map
Figure 2	Summary of Removal Action
Figure 3	Ramsey Refugia, Phase II Conceptual Design

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



Table of Contents

List of Appendices

- Appendix A September 20, 2006 Habitat Mitigation Meeting Agenda and Summary
Appendix B Terminal 4 Mitigation Package Memo to Sean Sheldrake at USEPA
Appendix C Response to Agency Comments on the Conceptual Mitigation Plan Proposal

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

List of Acronyms and Abbreviations

AOC	Administrative Order on Consent
CDF	Confined Disposal Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CMPP	Conceptual Mitigation Plan Proposal
CWA	Clean Water Act
cy	cubic yards
DEQ	Oregon Department of Environmental Quality
EE/CA	Engineering Evaluation/Cost Analysis
LTMRP	Long Term Monitoring and Reporting Plan
LWD	large woody debris
MNR	Monitored Natural Recovery
MOU	Memorandum of Understanding
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NPL	National Priorities List
NTCRA	Non-Time Critical Removal Action
PAHs	polycyclic aromatic hydrocarbons
Port	Port of Portland
RAOs	Removal Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
SOW	Statement of Work
SQGs	sediment quality guidelines
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

1 INTRODUCTION

This document presents a Draft Mitigation Plan to address requirements of the Clean Water Act (CWA) Section 404(b)(1) (40 CFR 230 [2001]) that arise because of activities associated with the Non-Time Critical Removal Action (Removal Action) ordered by the United States Environmental Protection Agency (USEPA) at the Port of Portland's (Port) Terminal 4 facility in Portland, Oregon.

In 2000, USEPA added the Portland Harbor Superfund Site (Superfund Site or Site) to the National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. § 9601, et seq. The Superfund Site Initial Study Area (ISA) encompasses about 6 miles of the Willamette River in Portland, Oregon and includes the Terminal 4 facility. A vicinity map and aerial photograph of the Terminal 4 facility are shown on Figure 1. The Port owns Terminal 4 and leases land to several marine tenants.

In fall 2001, the USEPA and 10 of the Superfund Site's potentially responsible parties entered into an Administrative Order on Consent (AOC) for a Remedial Investigation/Feasibility Study (RI/FS) of the Superfund Site, CERLCA-10-2001-240 (USEPA 2001). The AOC allows Early Removal Actions to be conducted to address known contamination at specific locations within the Superfund Site. Contaminants found in Terminal 4 sediment samples during an RI directed by the Oregon Department of Environmental Quality (DEQ) led to a determination that a Removal Action at Terminal 4 is warranted. Accordingly, the Port is conducting a Non-Time-Critical Removal Action (NTCRA) under an AOC for Removal Action, CERCLA 10-2004-0009, executed by the Port and USEPA in October 2003 (USEPA 2003).

As required by the AOC and attached Statement of Work (SOW), the Port conducted a site characterization and evaluated potential Removal Action alternatives necessary to protect human health and the environment. Four Removal Action alternatives were identified, described, and evaluated in the engineering evaluation/cost analysis (EE/CA) (BBL 2005) in accordance with USEPA NTCRA evaluation criteria. USEPA issued the Action Memorandum on May 11, 2006 (USEPA 2006), and documented their cleanup decision for the Removal Action (Figure 2).

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

The Removal Action includes a combination of remedial technologies, including capping contaminated sediments, dredging, and monitored natural recovery (MNR). The Removal Action also includes construction of a confined disposal facility (CDF) in Slip 1. Construction of the CDF will require discharge of fill materials into Slip 1 to construct containment components, and discharge of contaminated dredged sediments into the CDF for final isolation. Discharge of the fill materials for capping and for the CDF results in a requirement for USEPA to evaluate the action based on guidelines in the CWA Section 404(b)(1) and triggers the need for compensatory mitigation due to the permanent loss of aquatic habitat. This document presents the mitigation package, including on-site actions and the off-site project selected from the options presented in the Conceptual Mitigation Plan Proposal (CMPP; Anchor 2006), which will be implemented as part of the Removal Action.

The remainder of this document provides the following information related to the on-site mitigation actions and the selection of an off-site mitigation project to replace habitat lost due to the Removal Action:

- **Section 2 – Background Information** describes the purpose and need for the Removal Action, Removal Action activities requiring mitigation, lost habitat features and functions resulting from the Removal Action, and a process for selecting a mitigation project. All information provided in this section was also presented in the CMPP.
- **Section 3 – Off-Site Mitigation Project Selection Process** summarizes the process that was used to select a specific mitigation project from the options presented in the CMPP.
- **Section 4 – Mitigation Goals and Actions** presents the overall goals of the compensatory mitigation and specific details of the on-site and off-site mitigation actions, including construction of a habitat bench along the face of the berm, piling removal, capping activities, and construction of the Ramsey Refugia, Phase II project.
- **Section 5 – Performance and Monitoring Measures** identifies initial post-construction verification and long-term performance and monitoring measures that will be implemented and related criteria for evaluating whether specific mitigation objectives are being met sufficiently to attain overall mitigation goals. This section also details contingency measures that will be implemented if performance criteria are not met.
- **Section 6 – Performance and Monitoring Methods** will summarize the methods that will be used for initial post-construction verification and long-term performance and

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



monitoring measures, along with a monitoring schedule and reporting and documentation requirements. This section is reserved for the Final Mitigation Plan as additional coordination with the City of Portland is necessary to complete this section.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



2 BACKGROUND INFORMATION

The background information presented below was also provided in the CMPP and is presented in this document for consistency.

2.1 Purpose and Need of Removal Action

The need for the proposed action is based on the presence of contaminated sediments in the Portland Harbor Superfund Site and, specifically, the Terminal 4 Removal Action Area. In some areas of the Terminal 4 Removal Action Area, concentrations of the contaminants exceed sediment quality guidelines (SQGs) that represent concentrations at which sediments may be toxic to benthic organisms that live in the sediments and experience direct exposure to contaminated sediments. Other forms of aquatic life, avian and mammalian wildlife, and humans may be indirectly exposed to sediment contaminants if they eat biota that have become contaminated from Removal Action Area sediments. As a result of the contaminated sediments, the need for a NTCRA was identified and the EE/CA was performed.

Removal Action Objectives (RAOs) identified for the Removal Action Area are to:

- Reduce ecological and human health risks associated with sediment contamination within the Removal Action Area to acceptable levels
- Reduce the likelihood of recontamination of sediments within the Removal Action Area

The proposed action must also be considered in the context of the overall Superfund Site. USEPA guidance requires removal actions “to avoid wasteful, repetitive, short-term actions that do not contribute to the efficient, cost-effective performance of a long-term remedial action” (USEPA 1993). Thus, the purpose of the proposed action includes maximizing the proposed action’s contribution to the efficient, cost-effective performance of the long-term remedial action of the overall Portland Harbor Superfund Site.

Terminal 4 is an active marine terminal. The Port’s maritime strategic objective is to serve the regional and national importers, exporters, and consumers by enhancing the Portland area’s role as a cost-competitive gateway for bulk cargo and automobiles and improve

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

Portland's niche as a regional container and general cargo port. The Port's long-range goal is to promote regional economic vitality in an environmentally sustainable fashion. Terminal 4 is integral to achieving these objectives. Thus, the Removal Action must achieve the RAOs in a manner that is consistent with the maritime uses at Terminal 4 and minimize the disruption to tenant operations during implementation of the Removal Action.

In summary, the purpose of the proposed action is to remediate contaminated sediments in the Removal Action Area consistent with the RAOs in a manner supportive of the overall cleanup of the Portland Harbor Superfund Site and consistent with the current and future maritime uses at Terminal 4.

2.2 Removal Action Activities Requiring Compensatory Mitigation

USEPA must evaluate the Removal Action based on guidelines in the CWA Section 404(b)(1) (40 CFR 230 [2001]) because the Removal Action includes filling of Slip 1 to create the CDF and placement of capping materials. A preliminary evaluation of 404(b)(1) requirements was completed by USEPA and the Port as a supplement to the EE/CA in May 2005 (see Appendix Q of the EE/CA).

As a result of the preliminary evaluation, USEPA determined that the sediment discharges associated with the CDF and capping were necessary to mitigate long-term effects of sediment contaminants, and that compensatory mitigation was necessary to replace the habitat function lost in filling of Slip 1. Capping and dredging activities will temporarily impact the existing benthic invertebrate communities. However, based on studies completed in the Columbia River estuary, the capping and dredging areas will quickly (within months) recolonize with benthic invertebrates (Morton 1977 and McCabe et al. 1996; both *as cited in* NMFS 2005a) after the Removal Action. Further the Removal Action will improve the quality of habitat for benthic invertebrate communities that currently exist by removing contaminants. Therefore, no compensatory mitigation is required to replace habitat in dredging and capping areas.

The Action Memo required the Port to refine habitat characterization in the affected area to characterize the habitat functions to be replaced by compensatory mitigation, and prepare a

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



mitigation plan. USEPA required that the mitigation plan be consistent with regional restoration efforts and contribute to the conservation and recovery of Endangered Species Act (ESA) -listed species. Therefore, the habitat assessment focused on features that are important for juveniles of ESA-listed salmonid species that are the focus of major regional conservation and recovery plans. Habitat for other important fish species, such as sturgeon, pan fish, and other resident species, was not targeted as those species prefer deeper aquatic habitats that are plentiful in the Willamette River.

The habitat assessment was conducted in May 2006. Based on USEPA's requirements and results of the habitat assessment, specific habitat features and functions that will be lost in Slip 1 and targeted for replacement are off-channel shallow water nearshore habitats that juvenile salmon may use for rearing and migration. Results of the assessment are presented in Section 2.3.1.

2.3 Process for Identifying Compensatory Mitigation Project

A process for identifying appropriate mitigation project(s) was described in Appendix Q (Section Q-7.2.1) of the EE/CA (BBL 2005) to help ensure that the Slip 1 lost habitat functions are adequately replaced. Since the EE/CA was completed, more advanced design of the Removal Action has occurred and the Port is following the general steps originally listed in Appendix Q (Draft 404(b)(1) Analysis Memoranda) of the EE/CA. The steps listed in the EE/CA are as follows:

1. Conduct a habitat assessment of the Removal Action Area to refine the characterization of affected habitat provided in Appendix Q of the EE/CA based on the design of the Removal Action by describing the biological and physical characteristics of the habitat in the Removal Action Area.
2. Identify options for proposed mitigation project(s) and determine feasibility of each option.
3. Prepare a CMPP, which will describe the identified mitigation options and evaluate the feasibility of each option.
4. Identify the mitigation project based on the evaluation of mitigation options. The selected mitigation project will be matched to the anticipated habitat losses. As part of this step, the Port will meet with USEPA and, as appropriate, personnel from state

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

- or federal natural resource agencies, tribes, or other stakeholders. During these meetings, the Port will present conceptual details of the potential mitigation projects, including drawings and limited engineering characterization needed to support approval of a preferred project(s). The result of this process will be identification of mitigation actions that are adequate to offset habitat losses due to the Removal Action and approval of a conceptual mitigation project.
5. Prepare Draft Mitigation Plan (60 percent design) once the mitigation project has been identified. The plan will identify the site, mitigation requirements, engineering requirements, and approximate costs. This Draft Mitigation Plan will be submitted to USEPA for review and comment along with the 60 percent design documents for the Removal Action. If the selected project is a financial contribution to another habitat restoration project in the region, the 60 percent design would not be required because that component of the project would be completed by that project's primary sponsor (unless a portion of the Port's contribution was conducting the mitigation design). Should that be the case, the 60 percent design "submittal" would instead focus on the funding approach and mechanisms that could be established to ensure the performance and monitoring measures are met.
 6. Prepare a Final Mitigation Plan (100 percent design) once the Draft Mitigation Plan has been approved. It is anticipated the Final Mitigation Plan will be submitted along with the 100 percent design documents for the Removal Action. Again, the nature of this 100 percent mitigation design submittal may vary depending on whether the mitigation action is a stand alone Port project, or if the Port is contributing to another project in the region.

The CMPP document addressed steps 1 through 3 and this document addresses steps 4 and 5 in the above outlined process. The remainder of this section summarizes the key components of the CMPP and the first three steps in the process.

2.3.1 Habitat Assessment Results—Lost Habitat Features and Functions in Slip 1—Step 1

Consistent with the first step in the process of identifying compensatory mitigation actions, a habitat assessment of the Removal Action Area was conducted to refine the

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

characterization of affected habitat provided in Appendix Q of the EE/CA based on the design of the Removal Action by describing the biological and physical characteristics of the habitat in the Removal Action Area.

The CMPP (Anchor 2006) detailed the methods and results of the habitat assessment conducted in Slip 1 to determine which habitat features and functions would be lost from the construction of the CDF. Recent scientific literature indicates that shallow, nearshore areas are likely to be the most important for juvenile salmonids in rearing and migration (Tiffan et al. 2006; NMFS 2005b). Off-channel shallow water habitat is important for juvenile salmon rearing because it typically consists of vegetated shallow water areas with slower velocities than the main river channel, which is important for rearing and minimizing the amount of energy spent swimming.

Results of this habitat assessment indicate that shallow water nearshore habitats will be lost as a result of constructing the CDF in Slip 1. However, the quality of these habitats in Slip 1 is degraded due to steep slopes, shoreline armoring, lack of extensive riparian vegetation, and lack of in-water cover. The degraded condition limits the rearing and migration functions provided by the existing habitat within Slip 1. From a physical perspective, Slip 1 provides off-channel habitat important for rearing; however, the function is limited due to the marine commerce activity within the slip at Berths 405 and 408.

The results of the habitat assessment identified that approximately 14 acres of aquatic habitat will be lost in Slip 1 from construction of the CDF. Of the approximately 14 total acres of aquatic habitat, only 1.1 acres, or approximately 8 percent of the total aquatic habitat, is in the less than 6 foot depth range, which is the most important depth stratum for juvenile salmonids. Within this 1.1 acres of less than 6 feet deep shallow water habitat, over 85 percent is steep sloped, armored with large riprap, and/or covered with overwater structures such as a pier apron.

A total of 2.3 acres is within the 6 to 20 foot depth stratum, which represents about 16 percent of the total aquatic habitat impacted in Slip 1. Within this 2.3-acre area, there is

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

a similar trend whereby approximately 85 percent of the 2.3 acres is either steep sloped, armored with large riprap, and/or covered with overwater structures. A total of approximately 10.9 acres, or about 75 percent of the total aquatic habitat impacted at Terminal 4 is in the greater than 20 foot depth range, which is deeper than the preferred habitat of juvenile salmonids.

Besides potentially providing habitat for juvenile salmon species, Slip 1 potentially provides habitat for other aquatic species, including smallmouth bass, Pacific lamprey, common carp, large-scale sucker, crayfish, and sculpins (Windward 2004). Vegetated shallows are found at the head of Slip 1, but are not likely to be habitat for aquatic-feeding mammals such as mink and otter because of its degraded nature and isolation from other habitat areas.

2.3.2 Mitigation Project Options—Steps 2 and 3

2.3.2.1 On-site Mitigation Actions

Consistent with step 2 of the mitigation project identification process, the following on-site actions were identified for mitigation:

- **Habitat Bench**—creation of a habitat bench along the outer edge of the CDF berm face that creates 0.38 acres of shallow habitat (i.e., 0 to 6 feet of water depth), 0.42 acres of moderately shallow habitat (i.e., 6 to 20 feet of water depth) and 0.17 acres of deep habitat (i.e., greater than 20 feet of water depth). The habitat bench will be 30 feet wide and 540 feet long and will be covered with a surface layer of sand and gravel (2-inch minus) to fill in the spaces between the large rock.
- **Piling Removal**—removal of over 1,800 treated wood pilings in areas of Wheeler Bay and Slip 3 covering over 3 acres of habitat.
- **Capping**—creation of 0.08 acres of shallow water habitat and 0.15 acres of moderately shallow water habitat during the capping activities.

Additionally, habitat enhancements and improvements will be made in Wheeler Bay as part of the capping activities, including placing a layer of sand and gravel (2-inch minus) over the cap armor layer (large rock) between + 3.0 feet and -3.5 feet National Geodetic Vertical Datum (NGVD) to improve

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

substrate conditions within the prime shallow water habitat area of the Bay. The Wheeler Bay bank slope will be vegetated with cottonwood poles and willow livestakes for slope stability.

Based on the habitat assessment results, the Port recognized that the on-site mitigation actions described above would not be enough to offset the habitat loss in Slip 1 and that an off-site project would be necessary to fulfill mitigation requirements.

2.3.2.2 Off-site Mitigation Project(s)

Also consistent with step 2 of the mitigation project identification process, the Port set up a meeting with USEPA, personnel from state and federal natural resource agencies, tribes, and other stakeholders to identify a list of potential projects that could be used for mitigation. The Port researched the list of potential projects and narrowed the list to the three most feasible: Swan Island, Ramsey Refugia, Phase II, and Miller Creek.

Consistent with step 3 of the process, the three candidate mitigation projects were described in the CMPP. The next step of the process was to select an off-site mitigation project, as described in the following section.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



3 OFF-SITE MITIGATION PROJECT SELECTION PROCESS

The mitigation project selection process consisted of the Port meeting with USEPA, personnel from state and federal natural resource agencies, tribes, and other stakeholders. The meeting was held on September 20, 2006. During this meeting, the Port presented conceptual details of the three candidate mitigation projects described in the CMPP:

- Swan Island (layback the shoreline along 700 to 800 feet of shoreline owned by the Port to create a more gently sloping beach and increase the amount of shallow water habitat),
- Ramsey Refugia, Phase II, (Port would fund about half of this project that the City plans to conduct in the Columbia Slough; approximately 2.5 acres of off-channel shallow water and floodplain wetland habitat. The Port would also fund post-construction monitoring to assess whether mitigation goals are met.),
- Miller Creek (move Miller Creek to different location; creation of approximately 1.8 acres of off-channel shallow water habitat).

The group attending the meeting discussed comparison criteria and determined the specific habitat and programmatic considerations that would be used to compare each potential project. The group then compared the three projects based on the agreed-upon criteria and selected a project that was adequate to offset habitat losses resulting from the Removal Action. These steps are described in more detail below and a summary of the meeting is provided in Appendix A.

3.1 Off-site Mitigation Project Comparison Criteria

The comparison criteria agreed upon by the group included both habitat and programmatic considerations. The habitat considerations consisted of the following:

- Provides salmonid habitat function
- Provides lamprey habitat function
- Creates shallow water habitat
- Creates off-channel habitat
- Creates wetland/floodplain marsh habitat
- Provides habitat complexity
- Improves water quality
- Provides habitat connectivity

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

- Located on the mainstem Willamette/within the Portland Harbor Superfund Site

The programmatic considerations included the following:

- Success/precedence
- Habitat development timing
- 404(b)(1) consistency
- Implementability
- Consistent with regional efforts
- Stakeholder interest
- Meets ESA requirements

3.2 Off-site Mitigation Project Comparison

For the project comparison exercise, the group by consensus ranked each project for each criterion. The objective was to rank the projects 1, 2, or 3, but ties were allowed for some criteria. A ranking of 1 indicated the project best met the criterion in question; therefore, at the end of the exercise, the project with the lowest score would be selected as the mitigation project. The results of the comparison exercise are shown on Table 1. The Swan Island project had the highest total score, while the Ramsey Refugia, Phase II, received the lowest total score. The Miller Creek project had the mid-range score although it was very close to the Ramsey Refugia, Phase II score.

3.3 Off-site Mitigation Project Selection

Based on the results of the project comparison exercise, the stakeholder group discussed the scores and selected the Ramsey Refugia, Phase II project. The Ramsey Refugia, Phase II project was selected based on the habitat and scale of the project relative to the habitat lost from Slip 1, the implementability of the project, the demonstrated success of the Ramsey, Phase I project in attracting juvenile salmonids, other factors that are consistent with CWA Section 404 requirements, and the desired characteristics previously communicated by resource agency personnel, particularly National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). In addition, the group of stakeholders asked the Port to further evaluate the feasibility of second project, Miller Creek, since some members of the group favored Miller Creek over the Ramsey Refugia, Phase II project. In response, the Port

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

initiated discussions with the landowner and determined that the landowner was too strong an impediment to make the project feasible as mitigation for the Terminal 4 Early Action project.

The mitigation package, consisting of on-site and off-site actions, is described in more detail in the following section.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



4 MITIGATION GOALS AND ACTIONS

The mitigation goals are to mitigate for lost habitat features and functions in Slip 1 by implementing actions that are consistent with the general criteria for selecting a mitigation project listed in the Action Memo and CMPP. Table 2 details how each component of the mitigation package meets the general mitigation criteria listed in the Action Memo and CMPP. As noted previously, the mitigation emphasizes replacement of off-channel, shallow water nearshore habitats that juvenile salmon may use for rearing and migration functions.

The proposed mitigation package has four main components: (1) on-site construction of a bench on the CDF containment berm covered with sand and gravel (2-inch minus) to fill in the spaces between the large rock, that will provide shallow water habitat; (2) on-site removal of approximately 1,800 treated wood piles in Slip 3 and 26 piles in Wheeler Bay ; (3) increasing the area of shallow water habitat as cap material is placed and habitat enhancements in Wheeler Bay and (4) construction of the Ramsey Refugia, Phase II project. The following sections provide details on each mitigation component.

4.1 Habitat Bench

The design of the CDF berm, which will be placed across the mouth of Slip 1, includes a habitat bench with a 20 percent slope that will provide habitat with less than the 6-foot water depth range during the peak juvenile salmon outmigration period between February and May (i.e., from +2.8 feet NGVD to -3.2 feet NGVD). The final surface layer of the habitat bench will be a layer of sand and gravel (2-inch minus) to fill in the spaces between the large rock. The creation of the habitat bench will provide approximately 540 lineal feet and approximately 0.38 acres of gently sloping shallow water habitat within the less than 6 foot water depth range important to juvenile salmon and will provide a migration corridor through the berth replacement area towards Wheeler Bay. Additionally the berm face will create 0.42 acres of habitat in the 6 to 20 foot depth and 0.17 acres in greater than 20 feet deep during the peak juvenile outmigration period between February and May.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



4.1.1 Benefits to Salmon

Shallow water habitat is important for juvenile salmonid rearing and migration. Shallow water is important for the growth and survival of juvenile salmon because these areas tend to have low velocities and have a shallow slope (Tiffan et al. 2006). This depth stratum is the most important for juvenile salmonid rearing, especially subyearling Chinook salmon. A number of studies have shown that salmon fry and fingerlings often remain in water depths between approximately 10 centimeters and 2 meters (6.6 feet) (NMFS 2005b). In a study conducted in the Hanford Reach of the Columbia River, investigators found a majority of the subyearling Chinook salmon in water no deeper than 1 meter (3.3 feet) (Tiffan et al. 2006).

4.1.2 Benefits to Other Aquatic Species

Shallow water areas are also among the most productive in large river systems and therefore, important sources of food to the local ecosystem in general. The habitat bench and deeper habitats associated with the berm face may also provide habitat for a number of fish species other than salmon, including smallmouth bass, common carp, large-scale sucker, crayfish, sculpin, sunfish, and potentially for Pacific lamprey larvae. The bench will also be colonized by benthic invertebrates that provide a food base for many fish species.

4.1.3 Connectivity

The habitat bench will provide a migration corridor through the berth replacement area and connect to Wheeler Bay, which is more quiescent water and contains substantial beach areas and water depth of less than 20 feet.

4.1.4 Project Timing

The CDF berm and habitat bench will be constructed during the in-water work period between July 1 and October 31, 2007, prior to the filling of Slip 1.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

4.1.5 Administrative Logistics

Construction of the habitat berm will be coordinated through the Removal Action construction process and will not require additional administrative considerations.

4.2 Removal of Piling

Approximately 1,800 treated-wood piles from the Pier 5 area in Slip 3 and approximately 26 treated wood piles associated with the old fire boat in Wheeler Bay will be removed for mitigation purposes. Removal of the piles is not necessary to implement the Removal Action (i.e., capping), and is being conducted as a mitigation measure. The total area that will be improved in these two areas of Terminal 4 is approximately 3 acres. Pile removal will be coordinated with the dredging and capping activities.

4.2.1 Benefits to Salmon

Piling removal will improve substrate conditions and reduce exposure to polycyclic aromatic hydrocarbons (PAHs) in approximately 3 acres of aquatic habitat in the Removal Action Area. Additionally, piling removal will remove habitat for potential salmonid predators within Slip 3 and Wheeler Bay.

4.2.2 Benefits to Other Aquatic Species

Similar to the benefits to salmon, piling removal will improve substrate conditions for benthic invertebrate communities and reduce exposure to PAHs in approximately 3 acres of aquatic habitat in these areas of Terminal 4.

4.2.3 Connectivity

Piling removal will improve habitat conditions in Wheeler Bay and the south side of Slip 3. The piling removal in Wheeler Bay is in the vicinity of the habitat bench that will be constructed along the berm face. These two actions will slightly improve connectivity of a migration corridor for juvenile salmonids through the Terminal 4 site.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

4.2.4 Project Timing

The piling will be removed during the in-water work period between July 1 and October 31, 2007, prior to the filling of Slip 1.

4.2.5 Administrative Logistics

Removal of the piling will be coordinated through the Removal Action construction process and will not require additional administrative considerations.

4.3 Capping

In situ capping in Wheeler Bay, Slip 3, and at Berth 414, will create 0.08 acres of new prime shallow water habitat and 0.15 acres of moderately shallow habitat. Additionally, habitat enhancements and improvements will be made in Wheeler Bay as part of the capping activities, including placing a layer of sand and gravel over the cap armor layer (large rock) between + 3.0 feet and -3.5 feet NGVD to improve substrate conditions within the prime shallow water habitat area of the Bay. Additionally, the Wheeler Bay bank slope will be vegetated with cottonwood poles and willow livestakes for slope stability.

4.3.1 Benefits to Salmon

Shallow water habitat is important for juvenile salmonid rearing and migration. Shallow water is important for the growth and survival of juvenile salmon because these areas tend to have low velocities and have a shallow slope (Tiffan et al. 2006). This depth stratum is the most important for juvenile salmonid rearing, especially subyearling Chinook salmon. A number of studies have shown that salmon fry and fingerlings often remain in water depths between approximately 10 centimeters and 2 meters (6.6 feet) (NMFS 2005b). In a study conducted in the Hanford Reach of the Columbia River, investigators found a majority of the subyearling Chinook salmon in water no deeper than 1 meter (3.3 feet) (Tiffan et al. 2006).

In addition, the willow and cottonwood trees will stabilize the slope and prevent bank erosion. As the willow and cottonwood trees grow, overhanging vegetation will

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

increase the amount of shade and cover important for juvenile salmonids in the upper elevations of this section of river bank.

4.3.2 Benefits to Other Aquatic Species

Shallow water areas are also among the most productive components of large river systems and therefore, important sources of food to the local ecosystem in general. The capped shallow water areas with a surface layer of sand and gravel will be colonized by benthic invertebrates that provide a food base for many fish species.

4.3.3 Connectivity

The Wheeler Bay habitat enhancements will connect to the habitat bench that will be created along the CDF berm face.

4.3.4 Project Timing

The capping will occur during the in-water work period between July 1 and October 31, 2007, prior to the filling of Slip 1.

4.3.5 Administrative Logistics

Capping activities will be coordinated through the Removal Action construction process and will not require additional administrative considerations.

4.4 Ramsey Refugia, Phase II

This project is part of a larger plan to restore the Ramsey Wetland Complex (located in the Columbia Slough) by re-establishing hydrologic connectivity to the Lower Columbia Slough to improve floodplain wetland functions and to increase the amount and quality of off-channel rearing and refuge habitat for ESA-listed juvenile Chinook, coho, and steelhead (Thompson 2006). Off-channel tidal wetlands are frequently cited as the habitat that has been most affected as a result of converting floodplain habitat within the lower Willamette River to marine, commercial, and industrial uses (Altman 1997; Uhrich and Wentz 1999). This habitat was not only important to salmonids, but also to the overall ecological

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

productivity of the lower river and adjacent floodplain. Therefore, replacement of this habitat function is a major goal of many regional and local restoration programs.

The City of Portland owns the property where the project will be implemented. Until 2005, the Port owned the property, but transferred it to the City of Portland as part of a larger parcel for construction of the Ramsey Lake Stormwater Treatment Facility.

Conceptual designs for three alternatives were developed by the City in early June 2006. Since June, the City selected the preferred alternative, which consists of creating a backwater wetland and connected high-flow channel (Figure 3). This concept includes excavating two alcoves and connecting them through positively draining high-flow channels. Overall, this concept includes restoring and revegetating 5 acres of land and the placement of anchored large woody debris (LWD) for habitat complexity and cover in submerged sections.

4.4.1 Benefit to Salmon

The proposed project will re-establish hydrologic connectivity to the Lower Columbia Slough to reclaim and improve floodplain wetland functions (forested wetland and soft bottom, mud backwater sloughs) and to increase the amount and quality of off-channel rearing and refuge habitat for juvenile Chinook, coho, and steelhead. Loss of tidally influenced, floodplain wetland habitats have been identified as a limiting factor for Columbia and Willamette River basin salmon. The overall project will restore 5 acres of this lost habitat, thus helping to achieve restoration goals identified by regional resource managers (Thompson 2006).

Slip 1 does not contain the riparian habitat or the type of vegetated shallows to be constructed in the Ramsey Refugia, Phase II project. These are important habitat types that have been lost from the Lower Willamette River floodplain due to development. Therefore, the Ramsey project will not only replace shallow water habitat functions lost at Slip 1, but will also contribute additional important habitat functions that are not being lost. Monitoring at the Ramsey Refugia, Phase I, project indicates that juvenile salmon from Willamette River populations are utilizing the habitat for rearing. The

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



Ramsey Refugia, Phase II, is near the Phase I site, and the Phase II design is modeled after the successful Phase I configuration (Figure 3).

4.4.2 Benefit to Other Aquatic Species

The creation of shallow water habitat will provide habitat for other aquatic species, including smallmouth bass, Pacific lamprey ammocoetes, common carp, large-scale sucker, and crayfish. Off-channel, shallow water areas are also among the most productive in large river systems and therefore, are important sources of food to the local ecosystem. In addition, creation of floodplain wetland habitat will provide habitat features important for mink and amphibian use. As noted above, the quality of habitat for most aquatic species that will be lost due to filling of Slip 1 during the Removal Action is relatively low compared to the potential quality of habitat created in the Ramsey Refugia, Phase II.

4.4.3 Connectivity

The Ramsey Refugia, Phase II, project is in close proximity to the Ramsey Refugia, Phase I, project and will build on the restoration efforts started by the first phase of the project. In addition, there have been a number of restoration/enhancement activities completed throughout the Columbia Slough and this project will complement those projects.

4.4.4 Project Timing

Conceptual design drawings for this project were developed for the City of Portland in early June 2006 and more extensive design is expected to begin this winter. Construction is expected to occur in summer 2008.

4.4.5 Administrative Logistics

For this project, the Port will make a financial contribution to the City of Portland to partially fund the project (i.e., 2.5 acres). Funds would be provided to the City to be used for design, construction, and monitoring of 2.5 acres of the 5-acre project for the Terminal 4 Early Action project mitigation.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



4.4.5.1 Memorandum of Understanding

A Memorandum of Understanding (MOU) is in the process of being established between the Port, City of Portland, and USEPA. The MOU will stipulate the logistics of transferring the money from the Port to the City to be used to fund the Ramsey Refugia, Phase II project. The payment would be similar to an in-lieu-fee payment consistent with the CWA 404 regulations and guidance for compensatory mitigation¹. The MOU will include conditions that the City will be required to implement specific to the Port's mitigation obligations, including performance and monitoring measures, contingency actions, monitoring schedule, and documentation and reporting requirements. Consistent with the in-lieu-fee payment guidance document (USEPA 2000b), the MOU will contain the following:

- A description of the conceptual mitigation plan and detail of the habitat features and functions that will be restored
- A schedule for implementing the mitigation project or a requirement that the project be started within a specified time after impacts occur
- Description of post-construction and long-term performance and monitoring measures that will be implemented and related performance criteria
- Description of potential contingency actions tied to specific performance measures
- Documentation and reporting procedures
- Provision that clearly states that the legal responsibility for ensuring mitigation terms are fully satisfied rests with the organization accepting the fee

4.4.5.2 Roles and Responsibilities

As stated previously, the Port will provide funding for 2.5 acres of the project as part of the mitigation package for filling Slip 1 during the Removal Action.

¹ See "Federal Guidance for the Establishment, Use and Operation of Mitigation Banks," 60 FR 58605 (Nov. 1995) <http://www.epa.gov/owow/wetlands/guidance/mitbankn.html>; "Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act," (October 2000), <http://www.epa.gov/owow/wetlands/pdf/inlieufee.pdf>.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

The City of Portland will be the project sponsor and will be responsible for all components of the project, including design, permitting, construction, post-construction monitoring, long-term monitoring and maintenance, and implementing contingency actions as necessary.

4.5 Equivalency of Lost Habitat in Slip 1 to Habitat Gained Through Mitigation Actions

Early in the process, USEPA and the Agency Team agreed that the mitigation options will be identified based on qualitative characterization of habitat functions associated with candidate projects, rather than strict quantification and replacement of existing habitat characteristics in Slip 1. Subsequently, USEPA requested that the Port provide semi-quantitative documentation of how the proposed mitigation options offset losses of habitat in Slip 1. A separate memorandum was prepared to address USEPA's request and is provided in Appendix B.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

5 PERFORMANCE AND MONITORING MEASURES

Performance and monitoring measures will be implemented immediately after construction activities to verify that construction occurred as specified, and over the long term to confirm that performance and monitoring measure criteria and mitigation objectives are being met. The distinction between performance and monitoring measures is that performance measures have quantitative criteria for success or compliance with project specifications, which are directly linked to a contingency measure or action. Performance measures are related to aspects of the project over which managers have a relatively high level of control and can readily make adjustments to improve function. Monitoring measures refer to aspects that are not under control of site managers, such as presence of juvenile salmonids or wildlife and water levels in the Columbia Slough. Management actions taken in response to monitoring measures may help improve function or use, but cannot guarantee it.

Specific performance and monitoring measures for initial post-construction activities and long-term monitoring are described below for each mitigation action. Contingency measures associated with not attaining specified performance measure criteria are also provided below.

5.1 Habitat Bench

A habitat bench will be constructed between elevations +2.8 feet NGVD and -3.2 feet NGVD along the face of the CDF berm. These target elevations correspond to the 0 to 6-foot water depth stratum during February through May, the time of year when peak numbers of juvenile salmon are expected in the Lower Willamette River. The mitigation objective of the habitat bench is to increase the amount of shallow water habitat between the target elevations of +2.8 feet NGVD and -3.2 feet NGVD, which will provide 0 to 6 feet of water depth during the time of year when peak juvenile salmon are expected to be in the area. The 0 to 6-foot water depths have been shown to be the most important for juvenile salmonids for rearing and migration. Additionally, sand and gravel material (2-inch minus) will be placed as the final layer of the habitat bench to fill in the spaces between the large rock.

No long-term performance measures will be monitored for the habitat bench.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

5.1.1 Performance and Contingency Measures

5.1.1.1 Performance Measures

To determine if the habitat bench meets the mitigation objective of increasing the amount of shallow water habitat, bathymetric/topographic progress surveys will be completed during construction on 25-foot spacing to confirm that the habitat bench elevations are being constructed as specified. The habitat bench is designed at a 5:1 slope between the elevations of +2.8 feet NGVD and -3.2 feet NGVD. Progress surveys will be completed once per week or every 10,000 cubic yards (cy) placed during construction activities, whichever occurs more frequently. After construction is completed, a final survey will be completed and will serve as the baseline condition for long-term monitoring activities.

Long-term monitoring activities associated with the habitat bench along the face of the CDF berm will be determined as part of the Long-term Monitoring and Reporting Plan (LTMRP), which will be developed during the Final (100 percent) Design.

5.1.1.2 Contingency Measures

If construction bathymetric/topographic progress surveys show that the habitat bench is outside of the design elevations (+2.8 feet NGVD and -3.2 feet NGVD) by more than 1 foot, the contractor will be required to add a sufficient amount of additional material or grade as necessary to achieve the specified elevations and meet the mitigation objective.

Contingency measures for long-term monitoring activities will be described in the LTMRP, which will be developed during the Final (100 percent) Design.

5.1.2 Monitoring Measures

No monitoring measures are proposed for the habitat bench.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

5.2 Piling Removal

Approximately 1,800 treated wood piles along Pier 5 in Slip 3 and 26 treated wood piles in Wheeler Bay associated with the old fire boat pier will be removed. Some piles will be broken off at the mudline and others will be completely removed. The mitigation objective of the piling removal is to remove the piles, which will restore aquatic habitat and remove a potential source of contaminant exposure in Slip 3 and Wheeler Bay.

5.2.1 Performance and Contingency Measures

5.2.1.1 Performance Measures

To determine if the mitigation objective of removing the piles was achieved, the contractor will be required to confirm that piles were removed and/or note which piles were unable to be removed. To accomplish this, the contractor will be required to survey and locate all piles and structures prior to the removal/demolition, and to present this information on an as-built drawing. After pile removal, the contractor will note which piles were unable to be removed as specified in the drawings, and the elevation of the top of any remaining piles.

No long-term performance measures will be monitored for the areas where piling have been removed.

5.2.1.2 Contingency Measures

No contingency measures are proposed for piling removal. Piles that are unable to be removed as specified will be noted on the as-built drawings.

5.2.2 Monitoring Measures

No monitoring measures are proposed for piling removal.

5.3 Capping Activities

In-situ capping will occur in different locations around Terminal 4 as part of the Removal Action. In Wheeler Bay, Slip 3, and Berth 414, the capping actions will create new shallow water habitat between elevations +2.8 feet NGVD and -3.2 feet NGVD. These target elevations correspond to the 0 to 6-foot water depth stratum during February through May,

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

the time of year when peak numbers of juvenile salmon are expected in the Lower Willamette River. The mitigation objective of the capped areas is to increase the amount of shallow water habitat between the target elevations of +2.8 feet NGVD and -3.2 feet NGVD, which will provide 0 to 6 feet of water depth during the time of year when peak juvenile salmon are expected to be in the area. The 0 to 6 foot water depths have been shown to be the most important for juvenile salmonids for rearing and migration.

Additionally, habitat enhancements and improvements will be made in Wheeler Bay as part of the capping activities, including placing a layer of sand and gravel (2-inch minus) over the cap armor layer (large rock) between + 3.0 feet and -3.5 feet NGVD) to improve substrate conditions within the prime shallow water habitat area of the Bay. The Wheeler Bay bank slope will be vegetated with cottonwood poles and willow livestakes for slope stability.

5.3.1 Performance and Contingency Measures

5.3.1.1 Performance Measures

To determine if the capping activities in Wheeler Bay, Slip 3, and Berth 414 meet the mitigation objective of increasing the amount of shallow water habitat, bathymetric/topographic surveys will be completed during construction to confirm specified thicknesses for the placement of base cap material and the armor layer. Additionally, the placement of LWD and plant installations will be verified based on the specifications.

No long-term performance measures will be monitored for the capping areas.

5.3.1.2 Contingency Measures

If the result of the bathymetry surveys and/or cores shows base cap material thickness is less than the specified amount in any location, a sufficient amount of material will be added to achieve the specified thickness. There will be no tolerance for material thicknesses less than those specified.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

If verification inspections determine that the LWD and plantings were not installed according to the specifications, additional placement activities will occur as necessary to comply with the specifications.

5.3.2 Monitoring Measures

No monitoring measures are proposed for the capped areas.

5.4 Ramsey Refugia, Phase II

The City of Portland will be responsible for monitoring the Ramsey Refugia, Phase II project. The measures listed below in this section are compiled and adapted from the Phase I project and will also be applicable to the Phase II project. The specific performance and monitoring measures may be updated based on discussions with the City of Portland during development of the MOU. Any updates will be reflected in the Final Mitigation Plan.

The mitigation objectives (Thompson 2006) for the Ramsey Refugia, Phase II, project that the performance and monitoring measures will address include:

- Increase the amount of high quality rearing and refuge habitat for juvenile Chinook, coho, and steelhead
- Restore hydrologic connectivity between Ramsey Wetland Complex and the Lower Columbia Slough to enhance historic floodplain wetland habitat
- Monitor fish and wildlife communities and distribution before and after project implementation

5.4.1 Performance and Contingency Measures

5.4.1.1 Habitat Elevation

Performance Measures

To meet the mitigation objective of increasing the amount of high quality rearing and refuge habitat for juvenile Chinook, coho, and steelhead (i.e., increase additional off-channel shallow water habitat), initial post-construction topographic and/or bathymetric surveys will be conducted to verify that target elevations were achieved as specified in the design documents. The criterion for success is that that 95 percent

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

of the targeted habitat acreage has been provided. The results of these surveys will be used as the baseline to compare results of subsequent monitoring events.

Subsequent topographic and/or bathymetric surveys will be conducted in years 1, 3, and 5 after construction to confirm that the target elevations are being reasonably maintained. The criterion for success is that less than 1 foot of erosion or accretion occurred since the previous monitoring event or that less than 2 feet of change has occurred cumulatively since the baseline survey.

Contingency Measures

If less than 95 percent of the targeted habitat acreage has been provided, the contractor will be required to adjust elevations in the project area to meet the 95 percent performance criteria.

If greater than 1 foot of erosion or accretion has occurred since the previous monitoring event or if greater than 2 feet of change has occurred cumulatively since the baseline event, the City of Portland will evaluate the need to implement contingency actions that may include the following actions:

- Additional surveys to determine the extent of changes detected in the transect surveys
- Regrading to restore original or revised contours
- Addition of a new (coarser) material to restore contours and minimize future erosion (or removal of excess accumulations)
- Additional plantings to stabilize upper elevations and/or addition of large woody debris to stabilize the beach area

5.4.1.2 Vegetation Cover and Large Woody Debris

Performance Measures

To meet the mitigation objective of increasing the amount of high quality rearing and refuge habitat for juvenile Chinook, coho, and steelhead, riparian vegetation and in-water vegetation will be planted and LWD will be placed and anchored. Post-construction vegetation surveys will be conducted to verify that 95 percent of the

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

targeted acreage of vegetation has been created and that plants and LWD have been installed as specified. The results of this survey will be used to compare the results of subsequent monitoring events.

Subsequently, the project site will be evaluated in years 1, 3, and 5 as described below to confirm that the planted vegetation is growing and surviving:

- Evaluate percent of native tree and shrub stocking and survival to confirm that a minimum of 50 percent tree and shrub survival of initial plant stocking has been achieved by year 5
- Evaluate weed biomass, defined as those listed as invasive or undesirable on the Portland Plant List, to confirm that a maximum of 20 percent weed cover occupies the site at the end of year 5
- Photo documentation will be conducted at photo points within vegetation zones to help evaluate percent cover of native tree, shrub, and herbaceous plants

Contingency Measures

If initial post-construction vegetation surveys show that less than 95 percent of the targeted acreage of vegetation has been created, the contractor will be required to increase the vegetation acreage in the project area to meet the 95 percent performance criteria.

If monitoring identifies less than 50 percent survival of trees or shrubs, by year 5, the City of Portland will evaluate the need to implement contingency actions that may include the following:

- Control herbivory
- Install additional plantings, emphasizing species with higher survival rates
- Increase frequency of maintenance (e.g., weeding, watering), if necessary

If monitoring determines greater than 20 percent cover of weed species, defined as those listed as invasive or undesirable on the Portland Plant List, on planted plots, plant encroachment would be identified and quantified and a maintenance

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

treatment would be identified. Maintenance treatment may include cutting, spraying, planting, mulching, or watering.

5.4.2 Monitoring Measures

5.4.2.1 Water Surface Elevation and Inundation Levels

To assess the mitigation objective of restoring hydrologic connectivity between Ramsey Wetland Complex and the Lower Columbia Slough to enhance historic floodplain wetland habitat, the City of Portland will evaluate stream gauge and velocity data to determine the levels, timing, and areas of inundation of the site throughout the year for the first 5 years post-construction. Additionally, a staff gauge may be placed at the site to determine specific water level elevations during photo-monitoring events.

If water surface elevation and inundation levels are consistently not providing the target habitat for the first 5 years post-construction, the City of Portland and a group of key stakeholders will convene to discuss the reasons for unexpected water surface elevation and inundation levels.

5.4.2.2 Fish Surveys

To address the mitigation objective of monitoring fish communities and distribution before and after the project, the City of Portland will coordinate monitoring of fish presence and distribution in and around the project site. As done for the Phase I project, fish will be monitored pre- and post-construction in partnership with Ducks Unlimited and Oregon Department of Fish and Wildlife (or similar entities) to evaluate fish presence/absence and to determine if juvenile salmonids are using the project site during the targeted periods—fall, winter, and spring. Evaluation of fish response will include analysis of temporal use, spatial use, and species richness. Data collection will include size (fork length), age composition, and genetic analysis. The data will be used to determine when and how juvenile salmonids are using the project site, evaluate age composition of fish use, and determine the origin of different fish stocks.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

Monitoring will occur three times per year for the first 5 years post-construction. If 3 consecutive years of monitoring indicate continual absence of juvenile salmonids in the restored area, the City of Portland and a group of key stakeholders will convene to discuss reasons for lack of fish.

5.4.2.3 Wildlife Surveys

To address the mitigation objective of monitoring wildlife communities before and after the project, the City of Portland will conduct wildlife surveys focused on documenting target aquatic and terrestrial wildlife species use pre- and post-construction. Surveys will occur seasonally and document use of the site by target wildlife species, including native freshwater mussels (visual surveys), nesting neotropical migratory song birds (point count surveys during nesting season), migratory shorebirds (visual surveys), native amphibians and reptiles (egg mass and visual surveys), and native mammals (visual surveys and motion detecting cameras). Wildlife surveys will occur for informational purposes only seasonally for the first 5 years post-construction.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

6 PERFORMANCE AND MONITORING METHODS

Performance and monitoring methods will be determined in conjunction with the City of Portland once the MOU is in place. Therefore, this section is reserved for the Final Mitigation Plan submittal.

6.1 Ramsey Refugia, Phase II

6.1.1 Habitat Measurements

6.1.2 Vegetation Cover

6.1.3 Fish Surveys

6.1.4 Wildlife Surveys

6.2 Habitat Bench

6.3 Piling Removal

6.4 Schedule

6.5 Reporting and Documentation Requirements

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



7 REFERENCES

- Altman. 1997. Summary Information on Aquatic Biota and Their Habitats in the Willamette Basin, OR through 1995. USGS Water Resources Investigations Report 97-4023. Prepared in cooperation with USFWS and as part of the National Water-Quality Assessment Program.
- Anchor Environmental, LLC (Anchor). 2006. Conceptual Mitigation Plan Proposal, Terminal 4 Early Action Project, Port of Portland, Portland, Oregon. August 9 2006.
- BBL. 2005. Terminal 4 Early Action Engineering Evaluation/Cost Analysis, Public Review Draft, Port of Portland, Portland Oregon.
- Iadanza, N.E. 2001. Determining Habitat Value and Time to Sustained Function. Appendix C to NOAA Hylebos NRD Settlement Proposal.
- National Marine Fisheries Service (NMFS). 2005a. Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Northwest Aggregate Sand and Instream Gravel Mining, Lower Columbia River, Multnomah County, Oregon. NMFS Number 2005/03522, December 27, 2005.
- NMFS. 2005b. Salmon at River's End: The Role of the Estuary in the Decline and Recovery of Columbia River Salmon. NOAA Technical Memorandum NMFS-NWFSC-68. August 2005.
- Thompson, Ry. 2006. Personal communication from Ry Thompson, Project Manager, City of Portland Environmental Services, with Tom Schadt of Anchor Environmental, L.L.C.
- Tiffan, K.F., L.O. Clark, R.D. Garland, and D.W. Rondorf. 2006. Variables Influencing the Presence of Subyearling Fall Chinook Salmon in Shoreline Habitats of the Hanford Reach, Columbia River. North American Journal of Fisheries Management 26:351-360, 2006.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

- Uhrich and Wentz. 1999. Environmental Setting of the Willamette Basin, OR. US Department of the Interior USGS Water Resources Investigation Report 97-4082-A. Portland, OR.
- U.S. Environmental Protection Agency (USEPA). 1993. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA. EPA540-R-93-057. August.
- USEPA. 2000a. NPL Site Narrative for the Portland Harbor.
<http://www.epa.gov/superfund/sites/npl/nar1606.htm>
- USEPA. 2000b. Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, October 2000, <http://www.epa.gov/owow/wetlands/pdf/inlieufee.pdf>.
- USEPA. 2001. Administrative Order on Consent for Remedial Investigation/Feasibility Study, U.S. EPA Docket Number CERCLA-10-2001-0240.
- USEPA. 2003. Administrative Order on Consent for Removal Action in the Matter of Portland Harbor Superfund Site, Terminal 4, Removal Action Area, Portland, Oregon.
- USEPA. 2006. Action Memorandum for a Removal Action at the Port of Portland Terminal 4 site within the Portland Harbor Superfund Site, Portland, Multnomah County, Oregon, May 11, 2006.
- Willamette Restoration Initiative (WRI). 2004. Draft Willamette Subbasin Plan. Prepared for The Northwest Power and Conservation Council by the Willamette Restoration Initiative. May 28, 2004.
- Windward Environmental, LLC. 2004. Portland Harbor RI/FS Programmatic Work Plan Appendix B: Ecological Risk Assessment Approach. Prepared for the Lower Willamette Group, April 23, 2004.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.



TABLES

Table 1
Scoring Results of Terminal 4 Removal Action Off-Site Mitigation Project
(composed in agency habitat meeting on 9/20/06)

Mitigation Option	Habitat Considerations									Programmatic Considerations						
	Salmonid habitat function	Lamprey habitat function	Create shallow water habitat	Create off-channel habitat	Creates wetland/floodplain marsh	Provides habitat complexity	Improves water quality	Habitat connectivity	Mainstem Willamette/within ISA	Success/precedents	Habitat development timing	404(b)1 Consistency	Implementability	Consistent with regional efforts	Stakeholder Interest	Meets ESA
Swan Island	3	2	3	3	3	3	3	2	1	3	2	2 (+)	1	+	+	-
Miller Creek	1	1	2	2	2	1	1	2	2	1	1	1 (+)	3	+	+	+
Ramsey Refugia	1	2	1	1	1	1	1	2	3	1	1	2 (+)	1	+	+	+

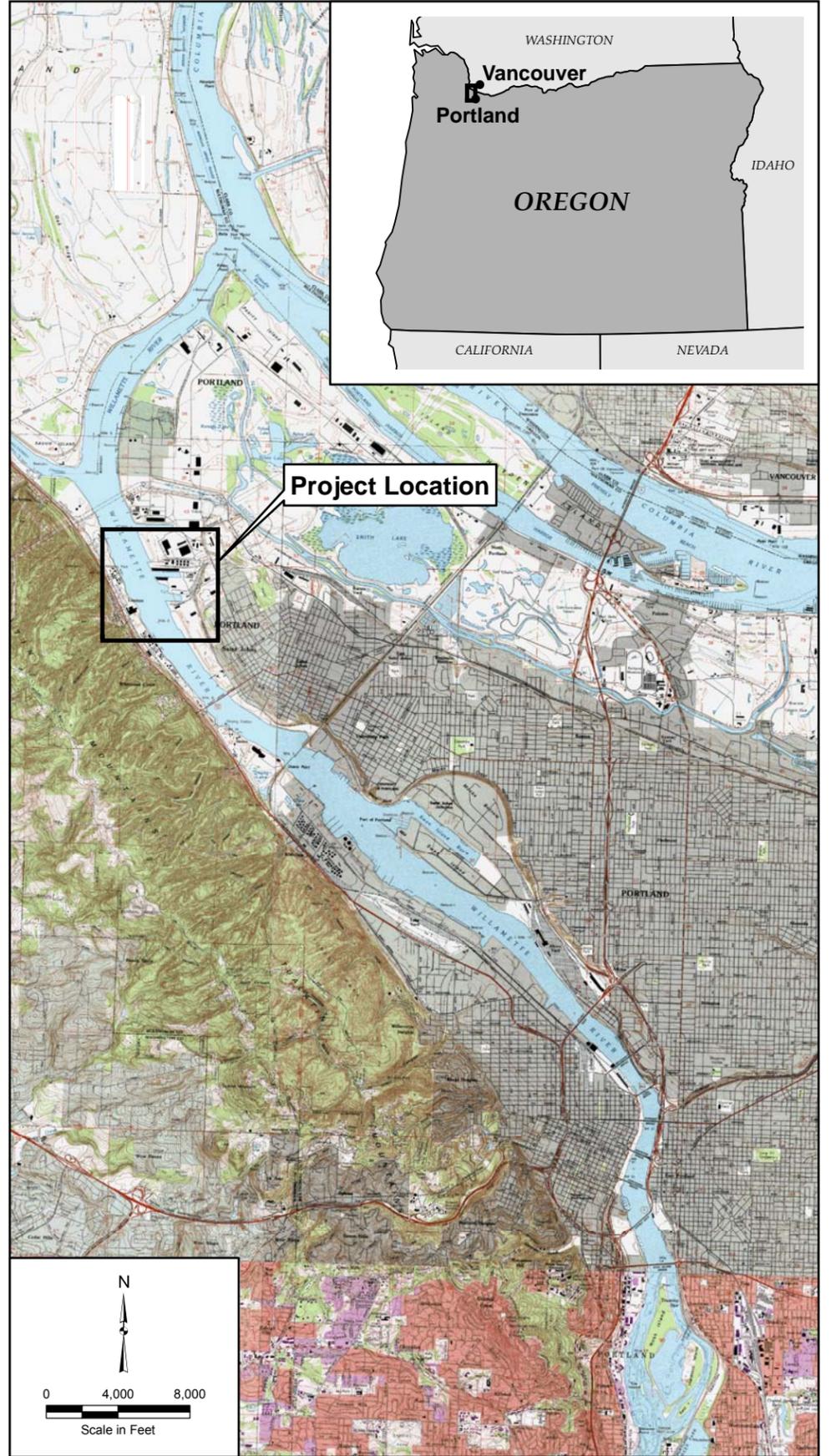
Notes:

- "1" = Alternative ranks highest based on criterion
- "2" = Alternative ranks second of three based on criterion
- "3" = Alternative ranks lowest based on criterion
- "+" = Meets criterion/Yes
- "-" = Does not meet criterion/No

Table 2
Mitigation Project/Action Consistency with General Mitigation Criteria

General Habitat Mitigation Criteria	Additional Criteria Information	Ramsey Refugia, Phase II	Habitat Bench	Piling Removal	Capping	Ramsey Refugia, Phase II
All compensatory mitigation must be consistent with the established mitigation strategies, conservation initiatives, or precedence from mitigation projects supported by state and federal resource agencies in the Lower Willamette Basin.	Based on the results of a literature search provided in the CMPP, regional mitigation/restoration efforts are focused on developing gradually sloped sand and gravel beach areas with shallow water habitat; providing features to increase habitat complexity, including overhanging riparian vegetation, large woody debris, and in-water vegetation; improving water quality characteristics; and developing off-channel or backwater habitat with low current velocity.	Project will restore 2.5 acres of shallow water and wetland floodplain habitat in the Columbia Slough. Off channel shallow water and wetland floodplain habitats are limited in the Lower Columbia Basin.	Creation of a habitat bench along the face of the CDF berm will provide an additional 0.38 acres of prime shallow water habitat at the Terminal 4 facility. This action will add shallow water habitat, which is limited in the Lower Willamette River.	Removal of approximately 1,800 piling in Slip 3 and 26 piling in Wheeler Bay will improve substrate conditions and potentially contaminant exposure conditions in these areas covering approximately 3.0 acres.	Capping activities in Wheeler Bay, Slip 3, and Berth 414 will create new shallow water habitat covering 0.08 acres. Additionally, in Wheeler Bay a surface layer of sand and gravel (2-inch minus) will be placed over large rock armor layers at elevations between + 3 feet NGVD and -3.5 feet NGVD to fill the spaces between the large rock and improve substrate conditions. Riparian plantings will improve slope stability and riparian conditions adjacent to shallow water areas in the Bay.	Project will restore 2.5 acres of shallow water and wetland floodplain habitat in the Columbia Slough. Off channel shallow water and wetland floodplain habitats are limited in the Lower Columbia Basin.
Preference will be given to compensatory mitigation plans that are consistent with habitat function.		Project will create 2.5 acres of a substantially superior habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. The Ramsey Refugia, Phase II project will improve floodplain wetland functions and increase the amount and quality of off-channel habitat, which will be higher quality than the habitat being lost at Slip 1.	Action will create shallow water habitat, which is better habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. Creation of the habitat bench will provide a more gently sloping shallow water area than currently exists in Slip 1.	Piling removal will improve the function of aquatic habitat in Slip 3 and Wheeler Bay by improving substrate conditions and by removing a potential source of contamination.	Action will create shallow water habitat and will enhance riparian habitat, which is better habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. Capping activities will isolate chemical contaminants and will provide an improved substrate for benthic organisms. Placement of a surface layer of sand and gravel material (2-inch minus) to fill in the spaces between the large rock in the armor layer will improve substrate conditions.	Project will create 2.5 acres of a substantially superior habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. The Ramsey Refugia, Phase II project will improve floodplain wetland functions and increase the amount and quality of off-channel habitat, which will be higher quality than the habitat being lost at Slip 1.
All compensatory mitigation plans will include an assessment of how they contribute toward the conservation and recovery of ESA-listed species.	Limiting factors identified in the Lower Willamette River for steelhead, chinook, and coho salmon are habitat diversity and key habitat quantity. Factors that have reduced habitat diversity include loss of shallow water habitat, lack of wood, bank hardening and reconfiguration, and loss of off-channel habitats (WRI 2004).	Project will create shallow water, off-channel habitat and will include placement of LWD and riparian vegetation planting. These actions will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.	Action will create shallow water habitat, which will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.	Piling removal will improve substrate conditions and potentially contaminant exposure conditions over approximately 3 acres of aquatic habitat in these areas of Terminal 4. Additionally, piling removal will remove habitat for potential salmonid predators within Slip 3 and Wheeler Bay.	Action will create shallow water habitat, which will contribute to the recovery of ESA-listed salmonid species.	Project will create shallow water, off-channel habitat and will include placement of LWD and riparian vegetation planting. These actions will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.
Mitigation plans must include consideration for connectivity to existing habitat		Project will complement the habitat restoration already completed as part of Ramsey Refugia, Phase I as well as a number of restoration/enhancement activities completed throughout the Columbia Slough.	The habitat bench will provide a migration corridor through the berth replacement area and connect to Wheeler Bay, which is currently a quieter area of Terminal 4.	Piling removal will improve habitat conditions in Wheeler Bay and the south side of Slip 3. The piling removal in Wheeler Bay is in the vicinity of the habitat bench that will be constructed along the berm face. These two actions will slightly improve connectivity of a migration corridor for juvenile salmonids through these areas of Terminal 4.	The capping areas in Wheeler Bay will occur in an area adjacent to the habitat bench that will provide a migration corridor through the berth replacement area.	Project will complement the habitat restoration already completed as part of Ramsey Refugia, Phase I as well as a number of restoration/enhancement activities completed throughout the Columbia Slough.
The potential success of the mitigation projects will be specifically factored into habitat plans.		The success of Ramsey Refugia, Phase I after only one year contributed to the selection of the Phase II project as mitigation. The Phase I monitoring identified use of the restored area by juvenile steelhead, juvenile chinook, juvenile coho, and adult steelhead.				The success of Ramsey Refugia, Phase I after only one year contributed to the selection of the Phase II project as mitigation. The Phase I monitoring identified use of the restored area by juvenile steelhead, juvenile chinook, juvenile coho, and adult steelhead.
All compensatory mitigation plans will include measurable performance objectives, management, monitoring and reporting requirements, responsibilities, and schedules.		This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.	This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.	This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.	This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.	This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.
Native species only will be utilized in any plantings to the maximum extent practicable.		Native species are proposed for plantings to the maximum extent practicable as part of the Ramsey Refugia, Phase II project.				Native species are proposed for plantings to the maximum extent practicable as part of the Ramsey Refugia, Phase II project.
Mitigation plans should include facility design and site plans for any development/redevelopment that occurs as a			Creation of shallow water habitat bench along the riverward face of the CDF berm.	Removal of approximately 1,800 piling in Slip 3 and 26 piling in Wheeler Bay.	Capping to create shallow water habitat, use of habitat friendly materials, and installation of livestock plantings.	
Performance criteria will be developed that quantitatively relate to the above criteria.		Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.	Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.	Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.	Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.	Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.

FIGURES



J:\Jobs\050332_Portland\T4\Maps\2006_11\vicinity_map.mxd 11/15/2006 3:37 PM



Notes:
1. High resolution imagery dated July 2005.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE
This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

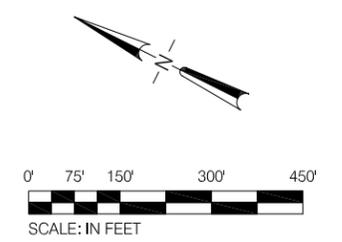
Figure 1
Vicinity Map
Terminal 4 Early Action Draft Mitigation Plan
Portland, Oregon

Nov 16, 2006 4:49pm hlevasseur K:\Jobs\050332-PORT OF PORTLAND\05033201 TERMINAL 4 - 60 PERCENT MIT - FIG 2.dwg MIT FIG 2

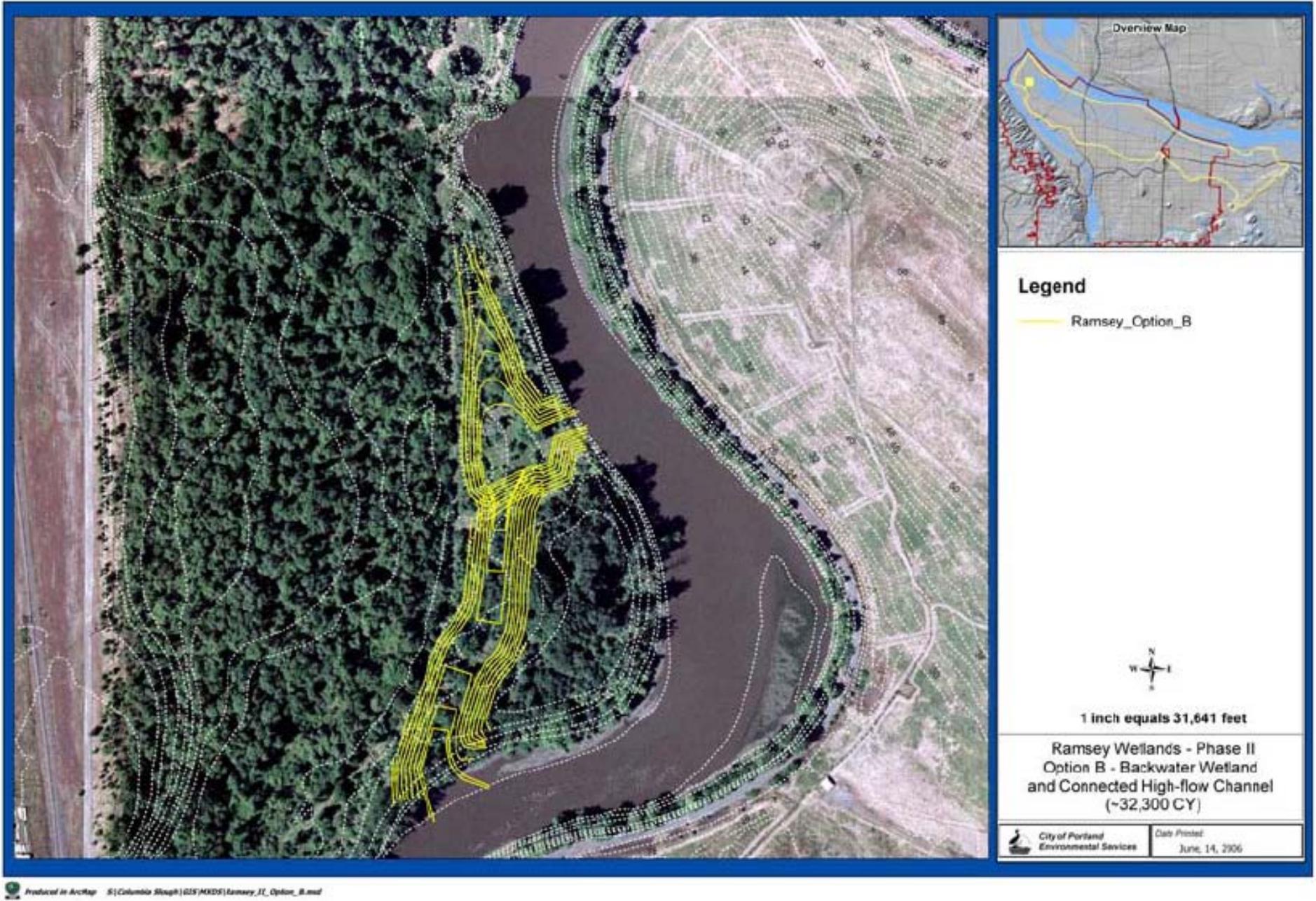


- DEMOLITION
- CAPPING
- DREDGE
- DREDGE AND CAP
- CDF AND BERM
- MONITORED NATURAL RECOVERY
- DSL PROPERTY LINE
- CITY OF PORTLAND BOUNDARY

HORIZONTAL DATUM: PORT OF PORTLAND PORTWIDE GRID
 VERTICAL DATUM: NGVD 29
 CONTOUR INTERVAL = 1FT



DRAFT DOCUMENT: DO NOT QUOTE OR CITE THIS DOCUMENT HAS NOT BEEN REVIEWED OR APPROVED BY USEPA AND ITS FEDERAL, STATE, AND TRIBAL PARTNERS AND IS SUBJECT TO CHANGE IN WHOLE OR IN PART.



DRAFT DOCUMENT. DO NOT QUOTE OR CITE
This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.

APPENDIX A
SEPTEMBER 20, 2006 HABITAT MITIGATION MEETING AGENDA AND
SUMMARY

T-4 Early Action
Habitat Mitigation Meeting at Port of Portland
September 20, 2006

Concluding Decision

- Ramsey Lake (Phase II) is the preferred option, with an informal agreement to further explore the feasibility of the Miller Creek option.

Discussion Points

- Overview provided of the three options. General reaction from attendees:
 - Swan Island – No track record for concept; hydraulics and lack of off-channel habitat are concerns.
 - Ramsey Lake – Phase I was successful in attracting fish, therefore strong likelihood of Phase II being successful.
 - Miller Creek – Ownership identified as difficult to work with; implementation problems on numerous fronts; tribes see potential of site.

Comparison of Listed Criteria

- Each option is ranked (1-3: low, medium, high) for habitat and programmatic considerations (listed criteria was previously distributed in e-mail).
- Swan Island concept clearly last in rankings (NOAA will not support).
- Somewhat of a toss-up between Ramsey Lake and Miller Creek (too close to call one over the other as ranked – NOAA would support either of the two).
- Sub-group (agencies, City, tribes) caucuses to further discuss the options.
- Sub-group selects Ramsey Lake as preferred option. Overall group agrees.
- Tribes (mainly) push to include further pursuit of the feasibility of Miller Creek; propose making additional contact with owner.
- Port agrees with decision, but not exactly sure how to commit to exploring the feasibility of Miller Creek at this point.
- Group feels Miller Creek may be valuable for further mitigation needs so exploring feasibility can prove beneficial for future mitigation if not currently.

Additional Discussion

- Timeline for NOAA review of BA should not be an issue because fall/winter is a “slow” time for reviewing documents.
- Need to identify other tasks for Miller Creek and who the participants will be.
- Need a timetable for Ramsey Lake Phase II construction (estimated 2008).
- A brief discussion on monitoring and performance standards and the difficulties of quantification of species being present (beyond presence/absence).
- A brief discussion of the depth of Slip 3 fill placed into Slip 1 and the depth of water that will be above the fill and how contaminated the new fill surface may be (agree to explore further at tomorrow’s meeting that will address this type of issue).

-----Original Message-----

From: Summers, Anne [mailto:Anne.Summers@portofportland.com]

Sent: Tuesday, October 03, 2006 7:58 PM

Subject: RE: Summary of T4 Mitigation Meeting 9/20/06

Thank you everyone who participated in the meeting on the 20th and thank you Erin for forwarding this information on to the Port team.

The Port would like to add a few clarifications and additional summary items as an addendum to the Parametrix meeting summary for the September 20, 2006 meeting as listed below:

1. In the Parametrix summary, line 2 under "Discussion Points", the Port would like to add that the group discussed that for the Swan Island project, the Port would be responsible for design, construction and monitoring of the entire project.
2. In the Parametrix summary, line 3 under "Discussion Points", the Port would like to add that the group discussed that this option would close the funding gap between the amount of money the City already has secured and the amount they need to complete the Ramsey Lake Refugia II project.
3. In the Parametrix summary, line 4 under "Discussion Points", the Port would like to add that the group discussed that the Port contribution to the Miller Creek project would be to provide the administrative effort to set up a trust and provide seed money to get the project going, not to fund the entire project.
4. In the Parametrix summary, line 5 under the "Comparison of Listed Criteria" heading, the Port would like to clarify that the Port agrees with the decision to select partial funding of Ramsey Refugia II as the preferred option and that the group agreed this will be the project described in the Biological Assessment.
5. In the Parametrix summary, line 6 under the "Comparison of Listed Criteria" heading, the Port would like to clarify that at the meeting the Port agreed to make additional contact with the property owner.
6. In the Parametrix summary, under "Additional Discussion", the Port would like to add the following:
 - a. Group agreed that fish presence/absence would be included as a monitoring component of the chosen mitigation project and that if no fish are found for an undetermined number of years at the mitigation site, a group of stakeholders would convene to discuss possible reasons for the lack of fish. Group agreed that no quantitative metric would be attached to this monitoring activity. General performance measures (that would have quantitative metrics) that were discussed as appropriate included elevation, substrate composition, and vegetation cover.
 - b. For the Miller Creek Option, the Port would not be the project proponent, rather the Port would establish the trust and identify administrative and project proponents who would implement the project. In addition to the administrative efforts, the Port would provide "seed money" to start the project and other funding mechanisms (i.e., grants, other entities requiring mitigation) would complete the project. Nancy Munn added that she sees a need for a large scale mitigation project that various entities could contribute discrete amounts of money to for mitigation purposes.

7. A question was asked about the cost of the Ramsey Refugia II project. The City's current estimate is approximately \$800,000 to \$1.2 million. The City currently lacks approximately \$450,000 in funding that the Port would provide. It was also stated that the Port would provide an additional sum for monitoring (currently estimated at \$150,000). Someone asked if the project would happen without Port funding. The City responded that it would not.

8. A question was asked about the cost estimate for the Miller Creek project. Very rough estimates put the construction and monitoring components in the range of \$700,000 to \$1,000,000 – but that does not include any real estate acquisition costs or project transactions costs. For this project, the Port would be putting resources toward establishing a trust and would provide “seed money” into the trust. The trust would seek additional funding to implement the project.

9. A question was asked about the amount of habitat that Ramsey Refugia II will provide as mitigation for T-4. The total acreage of restored habitat is about 5 total acres, most of which will be aquatic habitat. Since the Port's proposed funding level is about 50 % of the project costs, then by percent contribution the mitigation component would be about 2.5 acres.

Please let me know if you have any questions.

Anne Summers

Environmental Program Manager | Port of Portland

121 NW Everett Street | Portland, OR 97209

(503) 944 7508

(503) 944-7353 (fax)

anne.summers@portofportland.com

Subject: RE: Summary of T4 Mitigation Meeting 09/20/06 - City of Portland Clarifications

Greetings all -

Thanks for inviting the City of Portland (Nancy Hendrickson and Jim Middaugh) to attend the T4 Mitigation Meeting on September 20th to provide additional information about the Ramsey Refugia Project and to discuss the possibility of this project serving as mitigation for the Port's T4 CDF.

I am the project manager for the Ramsey project and unfortunately I was out of town during this meeting, but would like to add a few clarifications about the project and its current status.

I will build off of the clarifications that Anne Summers from the Port provided on October 3rd. The City's clarifications are included as strikeout and new text (in red) and are as follows:

7. A question was asked about the cost of the Ramsey Refugia II project. The City's current estimate is approximately \$800,000 to \$1.2 million. The City currently has secured about one-quarter million in funds for the project, mostly for design. We have been looking for more funders and are in conversations with the Army Corps but do not have a signed agreement with them. The City currently lacks approximately \$450,000 in funding that the Port would provide. It was also stated that the Port would provide an additional sum for monitoring (currently estimated at \$150,000). Someone asked if the project would happen without Port funding. The City responded that it does not have the project fully funded at this time.

9. A question was asked about the amount of habitat that Ramsey Refugia II will provide as mitigation for T-4. The total acreage of restored habitat is about 5 total acres, most of which will be aquatic habitat. Since the Port's proposed funding level is about 50 % of the project costs, then by percent contribution the mitigation component would be about 2.5 acres. The total project acreage of Ramsey Phase II is 5 acres. The aquatic habitat provided is approximately 60% of the total, or approximately 3.0 acres. There was absolutely no discussion that the Port would be funding 50% of the cost.

Thanks for the opportunity to provide additional clarification and we look forward to further discussion with the Port of Portland and others about next steps in this process.

Ry

~~~~~  
Ry Thompson  
City of Portland Environmental Services  
1120 SW 5th Avenue, Room 1000  
Portland, OR 97204  
503-823-5760 voice  
503-823-6995 fax  
ryt@bes.ci.portland.or.us



---

**APPENDIX B**  
**TERMINAL 4 MITIGATION PACKAGE MEMO TO SEAN SHELDRAKE**  
**AT USEPA**

---



## Memorandum

---

**To:** Sean Sheldrake, USEPA and Lori Cora, USEPA

**From:** Anne Summers, Port of Portland

**CC:** Krista Koehl, Port of Portland; Marcel Hermans, Port of Portland; Tom Schadt, Anchor Environmental; and Mark Lewis, NewFields

**Date:** November 21, 2006

**Re:** Terminal 4 Mitigation Package

---

As part of the USEPA-mandated Removal Action at Terminal 4 (USEPA 2006), the Port of Portland (Port) is constructing a confined disposal facility (CDF) in Terminal 4/Slip 1 for placement of contaminated sediments dredged from Terminal 4. Construction of the CDF will result in a permanent loss of aquatic habitat as submerged areas of the slip will be filled. As a result, the Port must conduct compensatory mitigation to offset the aquatic habitat loss as required under the Clean Water Act (CWA) Section 404(b)(1). This memo is provided to present the Terminal 4 mitigation package that will offset the losses of aquatic habitat in Slip 1. The specific components of the mitigation package that will be implemented include both on-site and off-site actions as follows:

- **Habitat Bench**—creation of a habitat bench along the outer edge of the CDF berm face will create 0.38 acres of shallow water habitat (i.e., 0 to 6 feet of water depth), 0.42 acres of moderately shallow habitat (i.e., 6-20 feet of water depth) and 0.17 acres of deep habitat (i.e., greater than 20 feet of water depth). The habitat bench will be 30 feet wide and 544 feet long and will be covered with a surface layer of fine to medium sand as the final layer of material to fill in the spaces between the large rock.
- **Piling Removal**—removal of over 1,800 treated wood pilings in areas of Wheeler Bay and Slip 3 covering over 3 acres of habitat.
- **Capping**—creation of 0.08 acres of shallow water habitat and 0.15 acres of moderately shallow water habitat during the capping activities. Additional habitat enhancements in Wheeler Bay are being considered as part of the Prefinal (60 percent) Design.
- **Ramsey Refugia, Phase II**—2.5 acres of the Ramsey Wetland Complex will be created in the Columbia Slough by re-establishing hydrologic connectivity to the Lower Columbia

Slough to improve floodplain wetland functions and to increase the amount and quality of off-channel aquatic rearing and refuge habitat.

In accordance with the Action Memorandum (USEPA 2006), the Port characterized the habitat that would be lost within Slip 1 for purposes of identifying appropriate mitigation actions. Based on these results, the Port evaluated on-site mitigation actions and recognized these actions would not be enough to offset the habitat loss in Slip 1. Therefore, the Port convened a group of stakeholder agencies and organizations including USEPA, National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), the Tribes, the State of Oregon, the City of Portland (City), and Willamette Riverkeepers to identify a list of potential projects that could be used for mitigation. The stakeholder group agreed that the potential mitigation projects would be identified based on qualitative characterization of habitat functions associated with candidate projects, rather than strict quantification and replacement of existing habitat characteristics in Slip 1.

The Port researched the list of potential projects and narrowed the list to the three most feasible, including Swan Island, Ramsey Refugia Phase II, and Miller Creek. Information detailing each conceptual option was provided in the Conceptual Mitigation Plan Proposal, which was submitted to the USEPA and Agency Team on August 8, 2006. On September 20, 2006, the Port and group of stakeholders met with the expressed purpose of selecting a project. At the meeting, the group compared the three projects based on a list of biological and programmatic criteria and, as a team, selected the Ramsey Refugia, Phase II project. Table 1 summarizes the results of the comparison. The Ramsey Refugia, Phase II project was selected based on the habitat and scale of the project relative to the habitat lost from Slip 1, the implementability of the project, the demonstrated success of the Ramsey Refugia, Phase I project in attracting juvenile salmonids, other factors that are consistent with CWA Section 404 requirements, and the desired characteristics previously communicated by resource agency personnel (NMFS and USFWS). As presented in the meeting, the Port would provide funding for approximately one half of the Ramsey Refugia, Phase II project (i.e., 2.5 acres), including funding for habitat and fish monitoring. Funds would be provided to the City to be used for design, construction, and monitoring. The City of Portland would be responsible for meeting the performance criteria via an agreement between the Port, USEPA, and the City.

In addition, the group of stakeholders asked the Port to further evaluate the feasibility of another potential project, Miller Creek, since some members of the group favored Miller Creek over the Ramsey Refugia, Phase II project. In response, the Port initiated further discussions with the landowner and determined that the landowner was not willing to participate and therefore too strong an impediment to make the project feasible as mitigation for the Terminal 4 Early Action project.

Since the September 20 meeting, USEPA has requested that the Port further document adequacy of the on-site and off-site components of mitigation for habitat loss in Slip 1. The remainder of this memo is intended to provide the requested documentation.

### **Mitigation Package Meets General Mitigation Criteria**

As defined in the Action Memo and the USEPA-approved EE/CA, Table 2 describes the general mitigation criteria and how the mitigation package components meet the criteria.

### **Mitigation Package Benefits Offset Removal Action Impacts**

As described in the Action Memo and Conceptual Mitigation Plan Proposal, mitigation was targeted at replacing shallow water habitat areas important for juvenile salmonids to meet the general criterion that states, "All mitigation will show how it contributes to the recovery and conservation of listed species." Additionally, shallow off-channel habitat represents the natural habitat that has been most affected by anthropogenic development. Habitat for other important fish species, such as sturgeon, pan fish, and other resident species, was not targeted as those species prefer deeper aquatic habitats that are plentiful in the Willamette River. Since deep water habitat is not limited in the system, it was not targeted for mitigation. It is recognized, however, that increasing the amount of shallow water nearshore habitat is important for all aquatic species as these areas are among the most productive in large river systems and, therefore, important sources of food to the local ecosystem.

At Terminal 4, approximately 1.1 acres of shallow aquatic habitat, 2.3 acres of moderately shallow water aquatic habitat, and 10.9 acres of deep aquatic habitat will be lost as a result of filling Slip 1. As described in the Conceptual Mitigation Plan Proposal, the less than 6 foot water depth is considered prime shallow water habitat for juvenile salmon. Approximately 0.94

acres of the 1.1 acres at Slip 1 within this important depth range provides limited habitat function because it is either steep sloped, armored with large riprap, and/or covered with overwater structures such as a pier apron.

The moderately shallow 6 to 20 foot water depth stratum was also evaluated, although it is not the most important water depth to juvenile salmon species. Approximately 2.3 acres moderately shallow habitat will be lost as a result of filling Slip 1. Within this 2.3-acre area, there is a similar trend whereby approximately 2.0 acres is either steep sloped, armored with large riprap, and/or covered with overwater structures. The remaining 10.7 acres of aquatic habitat within Slip 1 that will be lost is greater than 20 feet deep, which is deeper than the preferred habitat of juvenile salmonids.

As discussed previously, on-site project related measures that will help to mitigate for the loss of habitat in Slip 1 include new habitat that will be created along the CDF berm face, pilings that will be removed from areas around Terminal 4, and capping activities that will create new shallow water habitat and improve substrate conditions.

To quantitatively show the equivalency of lost habitat to habitat gained by the components of the mitigation package, existing conditions within Slip 1 were "normalized" to off-channel shallow water habitat by applying equivalency ratios which relate habitat quality/function relative to the importance to rearing and refuge for juvenile salmonids (See Table 3). The ratios were adapted from the framework developed by the National Oceanic and Atmospheric Administration (NOAA) for the Hylebos Waterway in Commencement Bay, Washington (Iadanza 2001), and on recent publications from NOAA (2005), which identify habitat factors that are important to aquatic species, particularly juvenile salmon. Since these types of ratios have not been developed for the Willamette system to the point where they are widely accepted, a range of reasonable ratios was developed that are an attempt to bracket what may be considered to be a reasonable low and high ratio. The technical basis for the ratios is provided in Table 4.

The ratios were then multiplied by the acres of different types of habitat that will be lost in Slip 1 to determine the amount of off-channel shallow water habitat required to offset the losses in Slip 1. The same exercise was done for the new habitat created by the berm face. The net

habitat required was determined by subtracting the habitat "credit" related to the new berm face from the habitat required due to losses in Slip 1. As shown on the table, the range of habitat required for losses in Slip 1 total 1.18 to 1.94 acres of off-channel shallow water habitat. The high quality shallow water habitat provided by Ramsey Refugia, Phase II ranges from 2.0 to 2.5 acres (a range of acreages is provided as the City of Portland is in the conceptual phase of design. The excess off-channel shallow water habitat includes between 0.60 and 0.87 acres. The benefits of Ramsey Refugia, along with the benefits of the on-site actions, including the habitat bench along the berm, piling removal, and capping activities, demonstrates more than adequate compensatory mitigation to offset losses of aquatic habitat from Slip 1.

### **References**

- Iadanza, N.E. 2001. Determining Habitat Value and Time to Sustained Function. Appendix C to NOAA Hylebos NRD Settlement Proposal.
- NMFS. 2005. Salmon at River's End: The Role of the Estuary in the Decline and Recovery of Columbia River Salmon. NOAA Technical Memorandum NMFS-NWFSC-68. August 2005.
- USEPA. 2006. Action Memorandum for a Removal Action at the Port of Portland Terminal 4 site within the Portland Harbor Superfund Site, Portland, Multnomah County, Oregon, May 11, 2006.
- Willamette Restoration Initiative (WRI). 2004. Draft Willamette Subbasin Plan. Prepared for The Northwest Power and Conservation Council by the Willamette Restoration Initiative. May 28, 2004.

**Table 1**  
**Results of Terminal 4 Removal Action Off-Site Mitigation Project Selection Process**

| <b>Mitigation Option</b> | <b>Habitat Considerations</b>    |                                 |                                     |                                   |                                         |                                    |                               |                             |                                       |
|--------------------------|----------------------------------|---------------------------------|-------------------------------------|-----------------------------------|-----------------------------------------|------------------------------------|-------------------------------|-----------------------------|---------------------------------------|
|                          | <b>Salmonid habitat function</b> | <b>Lamprey habitat function</b> | <b>Create shallow water habitat</b> | <b>Create off-channel habitat</b> | <b>Creates wetland/floodplain marsh</b> | <b>Provides habitat complexity</b> | <b>Improves water quality</b> | <b>Habitat connectivity</b> | <b>Mainstem Willamette/within ISA</b> |
| Swan Island              | 3                                | 2                               | 3                                   | 3                                 | 3                                       | 3                                  | 3                             | 2                           | 1                                     |
| Miller Creek             | 1                                | 1                               | 2                                   | 2                                 | 2                                       | 1                                  | 1                             | 2                           | 2                                     |
| Ramsey Refugia           | 1                                | 2                               | 1                                   | 1                                 | 1                                       | 1                                  | 1                             | 2                           | 3                                     |

**Table 1**  
**Results of Terminal 4 Removal Action Off-Site Mitigation Project Selection Process**

| <b>Programmatic Considerations</b> |                                |                                           |                                |                         |                                                 |                                 |                  |
|------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|-------------------------|-------------------------------------------------|---------------------------------|------------------|
| <b>Mitigation Option</b>           | <b>Success/<br/>precedents</b> | <b>Habitat<br/>development<br/>timing</b> | <b>404(b)1<br/>Consistency</b> | <b>Implementability</b> | <b>Consistent<br/>with regional<br/>efforts</b> | <b>Stakeholder<br/>Interest</b> | <b>Meets ESA</b> |
| Swan Island                        | 3                              | 2                                         | 2 (+)                          | 1                       | +                                               | +                               | -                |
| Miller Creek                       | 1                              | 1                                         | 1 (+)                          | 3                       | +                                               | +                               | +                |
| Ramsey Refugia                     | 1                              | 1                                         | 2 (+)                          | 1                       | +                                               | +                               | +                |



**Table 2**  
**Mitigation Project/Action Consistency with General Mitigation Criteria**

| General Habitat Mitigation Criteria                                                                                                                                                                                                         | Additional Criteria Information                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ramsey Refugia, Phase II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Habitat Bench                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Piling Removal                                                                                                                                                                                                                                                                                                                                             | Capping                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ramsey Refugia, Phase II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All compensatory mitigation must be consistent with the established mitigation strategies, conservation initiatives, or precedence from mitigation projects supported by state and federal resource agencies in the Lower Willamette Basin. | Based on the results of a literature search provided in the CMPP, regional mitigation/restoration efforts are focused on developing gradually sloped sand and gravel beach areas with shallow water habitat; providing features to increase habitat complexity, including overhanging riparian vegetation, large woody debris, and in-water vegetation; improving water quality characteristics; and developing off-channel or backwater habitat with low current velocity. | Project will restore 2.5 acres of shallow water and wetland floodplain habitat in the Columbia Slough. Off channel shallow water and wetland floodplain habitats are limited in the Lower Columbia Basin.                                                                                                                                                                                                                                                                                                                                                   | Creation of a habitat bench along the face of the CDF berm will provide an additional 0.38 acres of prime shallow water habitat at the Terminal 4 facility. This action will add shallow water habitat, which is limited in the Lower Willamette River.                                                                                                                                                                                                           | Removal of approximately 1,800 piling in Slip 3 and 26 piling in Wheeler Bay will improve substrate conditions and potentially contaminant exposure conditions in these areas covering approximately 3.0 acres.                                                                                                                                            | Capping activities in Wheeler Bay, Slip 3, and Berth 414 will create new shallow water habitat covering 0.08 acres. Additional habitat enhancement activities are currently being evaluated for Wheeler Bay as part of the Prefinal (60 percent) Design.                                                                                                                                                                                                         | Project will restore 2.5 acres of shallow water and wetland floodplain habitat in the Columbia Slough. Off channel shallow water and wetland floodplain habitats are limited in the Lower Columbia Basin.                                                                                                                                                                                                                                                                                                                                                   |
| Preference will be given to compensatory mitigation plans that are consistent with habitat function.                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Project will create 2.5 acres of a substantially superior habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. The Ramsey Refugia, Phase II project will improve floodplain wetland functions and increase the amount and quality of off-channel habitat, which will be higher quality than the habitat being lost at Slip 1. | Action will create shallow water habitat, which is better habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. Creation of the habitat bench will provide a more gently sloping shallow water area than currently exists in Slip 1. | Piling removal will improve the function of aquatic habitat in Slip 3 and Wheeler Bay by improving substrate conditions and by removing a potential source of contamination.                                                                                                                                                                               | Action will create shallow water habitat, which is better habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. Capping activities will isolate chemical contaminants and will provide an improved substrate for benthic organisms. | Project will create 2.5 acres of a substantially superior habitat compared to what is being lost at Slip 1. Slip 1 habitat has limited function due to the lack of floodplain connectivity, lack of shallow water habitat, altered hydrology, lack of complex habitat to provide forage and cover, and the presence of overwater structures. The Ramsey Refugia, Phase II project will improve floodplain wetland functions and increase the amount and quality of off-channel habitat, which will be higher quality than the habitat being lost at Slip 1. |
| All compensatory mitigation plans will include an assessment of how they contribute toward the conservation and recovery of ESA-listed species.                                                                                             | Limiting factors identified in the Lower Willamette River for steelhead, chinook, and coho salmon are habitat diversity and key habitat quantity. Factors that have reduced habitat diversity include loss of shallow water habitat, lack of wood, bank hardening and reconfiguration, and loss of off-channel habitats (WRI 2004).                                                                                                                                         | Project will create shallow water, off-channel habitat and will include placement of LWD and riparian vegetation planting. These actions will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.                                                                                                                                                                                                                                                                                              | Action will create shallow water habitat, which will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.                                                                                                                                                                                                                                                                                             | Piling removal will improve substrate conditions and potentially contaminant exposure conditions over approximately 3 acres of aquatic habitat in these areas of Terminal 4. Additionally, piling removal will remove habitat for potential salmonid predators within Slip 3 and Wheeler Bay.                                                              | Action will create shallow water habitat, which will contribute to the recovery of ESA-listed salmonid species.                                                                                                                                                                                                                                                                                                                                                  | Project will create shallow water, off-channel habitat and will include placement of LWD and riparian vegetation planting. These actions will create habitat that is limited in the system and will contribute to the recovery of ESA-listed salmonid species.                                                                                                                                                                                                                                                                                              |
| Mitigation plans must include consideration for connectivity to existing habitat                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Project will complement the habitat restoration already completed as part of Ramsey Refugia, Phase I as well as a number of restoration/enhancement activities completed throughout the Columbia Slough.                                                                                                                                                                                                                                                                                                                                                    | The habitat bench will provide a migration corridor through the berth replacement area and connect to Wheeler Bay, which is currently a quieter area of Terminal 4.                                                                                                                                                                                                                                                                                               | Piling removal will improve habitat conditions in Wheeler Bay and the south side of Slip 3. The piling removal in Wheeler Bay is in the vicinity of the habitat bench that will be constructed along the berm face. These two actions will slightly improve connectivity of a migration corridor for juvenile salmonids through these areas of Terminal 4. | The capping areas in Wheeler Bay will occur in an area adjacent of the habitat bench that will provide a migration corridor through the berth replacement area.                                                                                                                                                                                                                                                                                                  | Project will complement the habitat restoration already completed as part of Ramsey Refugia, Phase I as well as a number of restoration/enhancement activities completed throughout the Columbia Slough.                                                                                                                                                                                                                                                                                                                                                    |
| The potential success of the mitigation projects will be specifically factored into habitat plans.                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The success of Ramsey Refugia, Phase I after only one year contributed to the selection of the Phase II project as mitigation. The Phase I monitoring identified use of the restored area by juvenile steelhead, juvenile chinook, juvenile coho, and adult steelhead.                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The success of Ramsey Refugia, Phase I after only one year contributed to the selection of the Phase II project as mitigation. The Phase I monitoring identified use of the restored area by juvenile steelhead, juvenile chinook, juvenile coho, and adult steelhead.                                                                                                                                                                                                                                                                                      |
| All compensatory mitigation plans will include measurable performance objectives, management, monitoring and reporting requirements, responsibilities, and schedules.                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.                                                                                                                                                                                                                                                                                                                                                                | This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.                                                                                                                                                                                                                                                                      | This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.                                                                                                                                                               | This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.                                                                                                                                                                                                                                                                     | This document outlines monitoring and performance measures and objectives and the Final Mitigation Plan will provide information on responsibilities, reporting requirements, and schedules.                                                                                                                                                                                                                                                                                                                                                                |
| Native species only will be utilized in any plantings to the maximum extent practicable.                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Native species are proposed for plantings to the maximum extent practicable as part of the Ramsey Refugia, Phase II project.                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Native species are proposed for plantings to the maximum extent practicable as part of the Ramsey Refugia, Phase II project.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Mitigation plans should include facility design and site plans for any development/redevelopment that occurs as a                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Creation of shallow water habitat bench along the riverward face of the CDF berm.                                                                                                                                                                                                                                                                                                                                                                                 | Removal of approximately 1,800 piling in Slip 3 and 26 piling in Wheeler Bay.                                                                                                                                                                                                                                                                              | Capping to create shallow water habitat and potential addition of habitat enhancements within Wheeler Bay.                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Performance criteria will be developed that quantitatively relate to the above criteria.                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.                                                                                                                                                                                                                                                                                                                                                                                                                 | Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.                                                                                                                                                                                                                                                                                                                       | Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.                                                                                                                                                                                                                | Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.                                                                                                                                                                                                                                                                                                                      | Specific monitoring and performance measures are included in Section 5 of this document and will be finalized in the Final Mitigation Plan.                                                                                                                                                                                                                                                                                                                                                                                                                 |



Table 3

Quantification of Net Habitat Required to Mitigate for Habitat Lost in Slip 1 Expressed as Acres of Off-Channel Shallow Water Habitat

T-4 Slip 1-Existing Habitat

| Water Depth <sup>1</sup> | EXISTING CONDITIONS                   |              |              | NORMALIZATION TO OFF-CHANNEL BACKWATER HABITAT                                                                      |      |              |      | APPROXIMATE HABITAT REQUIREMENTS NORMALIZED TO OFF-CHANNEL SHALLOW WATER HABITAT |       |              |      |              |              |              |
|--------------------------|---------------------------------------|--------------|--------------|---------------------------------------------------------------------------------------------------------------------|------|--------------|------|----------------------------------------------------------------------------------|-------|--------------|------|--------------|--------------|--------------|
|                          | Existing Habitat Eliminated in Slip 1 |              |              | Habitat Equivalency (Fraction of 1.0) for T-4 Slip 1 Existing Habitat Relative to Off-Channel Shallow Water Habitat |      |              |      | Habitat Required Expressed As Acres of Off-Channel Shallow Water Habitat         |       |              |      |              |              |              |
|                          | Degraded <sup>2</sup>                 | Non-Degraded | Total        | Degraded                                                                                                            |      | Non-Degraded |      | Degraded                                                                         |       | Non-Degraded |      | Total        |              |              |
|                          |                                       |              |              | Low                                                                                                                 | High | Low          | High | Low                                                                              | High  | Low          | High |              |              |              |
| 0 to 6 ft                | -0.94                                 | -0.16        | -1.1         | 0.3                                                                                                                 | 0.4  | 0.8          | 1    | 0.282                                                                            | 0.376 | 0.128        | 0.16 | 0.41         | 0.536        |              |
| 6 to 20 ft               | -2                                    | -0.3         | -2.3         | 0.2                                                                                                                 | 0.3  | 0.3          | 0.5  | 0.4                                                                              | 0.6   | 0.09         | 0.15 | 0.49         | 0.75         |              |
| > 20 ft                  | 0                                     | -10.9        | -10.9        | NA                                                                                                                  | NA   | 0.05         | 0.1  | 0                                                                                | 0     | 0.545        | 1.09 | 0.545        | 1.09         |              |
|                          |                                       | <b>TOTAL</b> | <b>-14.3</b> |                                                                                                                     |      |              |      |                                                                                  |       |              |      | <b>TOTAL</b> | <b>1.445</b> | <b>2.376</b> |

T-4 CDF Berm-Future Habitat

| Water Depth <sup>1</sup> | FUTURE CONDITIONS               |              |             | NORMALIZATION TO OFF-CHANNEL BACKWATER HABITAT                         |  |              |      | APPROXIMATE HABITAT REQUIREMENTS NORMALIZED TO OFF-CHANNEL SHALLOW WATER HABITAT            |  |              |      |              |             |             |
|--------------------------|---------------------------------|--------------|-------------|------------------------------------------------------------------------|--|--------------|------|---------------------------------------------------------------------------------------------|--|--------------|------|--------------|-------------|-------------|
|                          | New Habitat Created By CDF Berm |              |             | New Habitat Relative to Off-Channel Shallow Water Habitat <sup>3</sup> |  |              |      | Habitat "Credit" From New Berm Face Expressed As Acres of Off-Channel Shallow Water Habitat |  |              |      |              |             |             |
|                          |                                 | Non-Degraded | Total       |                                                                        |  | Non-Degraded |      |                                                                                             |  | Non-Degraded |      | Total        |             |             |
|                          |                                 |              |             |                                                                        |  | Low          | High |                                                                                             |  | Low          | High | Low          | High        |             |
| 0 to 6 ft                |                                 | 0.38         | 0.38        |                                                                        |  | 0.6          | 0.8  |                                                                                             |  | 0.23         | 0.30 | 0.23         | 0.30        |             |
| 6 to 20 ft               |                                 | 0.42         | 0.42        |                                                                        |  | 0.2          | 0.4  |                                                                                             |  | 0.08         | 0.17 | 0.08         | 0.17        |             |
| > 20 ft                  |                                 | 0.17         | 0.17        |                                                                        |  | 0.025        | 0.05 |                                                                                             |  | 0.00         | 0.01 | 0.00         | 0.01        |             |
|                          |                                 | <b>TOTAL</b> | <b>0.97</b> |                                                                        |  |              |      |                                                                                             |  |              |      | <b>TOTAL</b> | <b>0.32</b> | <b>0.48</b> |

Net Habitat Required

| (Delta Between Habitat Eliminated and Credit From Berm Face)<br>Expressed As Acres of Off-Channel Shallow Water Habitat |      |              |              |             |             |
|-------------------------------------------------------------------------------------------------------------------------|------|--------------|--------------|-------------|-------------|
| Degraded                                                                                                                |      | Non-Degraded |              | Total       |             |
| Low                                                                                                                     | High | Low          | High         | Low         | High        |
| 0.28                                                                                                                    | 0.38 | -0.10        | -0.14        | 0.18        | 0.23        |
| 0.40                                                                                                                    | 0.60 | 0.01         | -0.02        | 0.41        | 0.58        |
| 0.00                                                                                                                    | 0.00 | 0.54         | 1.08         | 0.54        | 1.08        |
|                                                                                                                         |      |              | <b>TOTAL</b> | <b>1.13</b> | <b>1.90</b> |
| Off-channel Shallow Water Habitat Provided by RAMSEY REFUGIA, PHASE II <sup>5</sup>                                     |      |              |              | 2.0         | 2.5         |
| EXCESS PROVIDED                                                                                                         |      |              |              | 0.87        | 0.60        |
| Net New 0 to -6 ft Shallow Habitat in Slip 3 Due to Cap (acres):                                                        |      |              |              | 0.08        |             |
| Net New -6 to -20 ft Moderately Shallow Habitat in Slip 3 Due to Cap (acres):                                           |      |              |              | 0.15        |             |
| Improved Aquatic Habitat from Piling Removal in Slip 3 and Wheeler Bay (acres)                                          |      |              |              | 3.00        |             |

**Table 3**

**Quantification of Net Habitat Required to Mitigate for Habitat Lost in Slip 1 Expressed as Acres of Off-Channel Shallow Water Habitat**

Notes:

- 1 = Water Depths are relative to +2.8 ft NGVD which is the mean water level during the 4-month period from February to May when juvenile salmonids are most likely to be present
- 2 = Degraded habitat refers to rip rap, steep slopes, and/or pier / piling cover
- 3 = New berm face habitat is not off-channel, it is on the mainstem, so therefore it is discounted further than off-channel equivalencies
- 4 = Acreages estimated; actual acreages will be used once calculated by CAD
- 5 = A range of acreages is provided as the City of Portland is in the conceptual phase of design

**Table 4  
Technical Basis for Habitat Equivalency Numbers**

| Water Depth | Habitat Equivalency (Fraction of 1.0) for T-4 Slip 1<br>Existing Habitat Relative to Off-Channel Shallow Water Habitat |      |              |      | Technical Basis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------|------------------------------------------------------------------------------------------------------------------------|------|--------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Degraded                                                                                                               |      | Non-Degraded |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|             | Low                                                                                                                    | High | Low          | High |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 0 to 6 ft   | 0.2                                                                                                                    | 0.4  | 0.8          | 1    | Commencement Bay HEA precedent utilized 0.10 as the value of degraded intertidal habitat and a range of values between 0.5 to 1.0 for intertidal and marsh habitat relative to critical shallow water habitat that is lacking in the system (dendritic marsh in the Commencement Bay example). Transposing this same approach to the Willamette System, riverine habitat between 0 and 6 ft is analogous to intertidal and marsh habitat, and off-channel shallow water habitat is the critical type of shallow water habitat lacking in the system. |
| 6 to 20 ft  | 0.2                                                                                                                    | 0.3  | 0.3          | 0.5  | Commencement Bay HEA precedent utilized 0.10 as the value of degraded shallow subtidal habitat and a value of 0.4 for non-degraded shallow subtidal relative to critical shallow water habitat that is lacking in the system (dendritic marsh in the Commencement Bay example). Transposing this same approach to the Willamette System, riverine habitat between 6 and 20 ft is analogous to shallow subtidal habitat, and off-channel shallow water habitat is the critical type of shallow water habitat lacking in the system.                   |
| > 20 ft     | NA                                                                                                                     | NA   | 0.05         | 0.1  | Commencement Bay HEA precedent utilized 0.05 as the value of deep subtidal habitat (not used by juvenile salmonids) relative to critical shallow water habitat that is lacking in the system (dendritic marsh in the Commencement Bay example). Transposing this same approach to the Willamette System, riverine habitat deeper than 20 ft is typically not used by juvenile salmonids, and off-channel shallow water habitat is the critical type of shallow water habitat lacking in the system.                                                  |



---

**APPENDIX C**  
**RESPONSE TO AGENCY COMMENTS ON THE CONCEPTUAL**  
**MITIGATION PLAN PROPOSAL**

---



## Response to Agency Comments on the Conceptual Mitigation Plan Proposal

| Comment |  |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------|--|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.      |  | General | Although it currently may not have favor with NOAA, Option 1 has some advantages to either Option 2 or 3 for the following reasons: 1) it is more directly related to functional replacement of the proposed impacts (shallow water habitat), 2) restoring shallow water habitat (not necessarily off-channel) in the Lower Willamette has been identified in numerous literature sources as a desirable enhancement for juvenile salmon, 3) it is located on Port property, 4) it would be readily implementable, 5) it is a concept that could be transferable to other Lower Willamette riverbank locations, and 6) it would be a visible enhancement to the public and especially those directly using the river. An aspect of Option 1 is the potential to be able to readily transfer this bank enhancement concept/methodology to other locations within the Lower Willamette (to my knowledge a project of this concept has yet to be implemented within the Lower Willamette). It may help jump-start other projects of this nature. |
|         |  |         | <b>Team Response:</b> These factors were considered in choosing a final mitigation project at the September 20, 2006 meeting with USEPA and other stakeholders.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2.      |  | General | If Option 1 is not acceptable to the resource agencies, and if a “payment in lieu” vehicle is being endorsed, it may be in the Port’s best interest to negotiate payment into a fund that would eventually support a larger off-channel habitat creation/restoration (dollar dependent, of course). This concept was also endorsed by both NOAA and Willamette Riverkeepers (see Appendix D, June 12, 2006, Meeting Notes).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|         |  |         | <b>Team Response:</b> Comment noted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3.      |  | General | Would habitat function(s) be measured for Options 2 and 3, and be compared to the function(s) of the impact site? If so, how will that be done?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|         |  |         | <b>Team Response:</b> Per discussions with agency personnel at the initial meetings on mitigation, the mitigation project selection will not include attempts to quantitatively match habitat functions in the Removal Action Area with those in the mitigation project. Rather, the mitigation project will attempt to replace habitats and functions that resource agencies perceive are needed in the lower Willamette River corridor (see Appendix D, June 12, 2006, Meeting Notes). This approach was a major part of the rationale for selecting the candidate restoration projects. Section 4 in the Draft Mitigation Plan details the habitat features and functions that will be restored and enhanced as part of each mitigation option.                                                                                                                                                                                                                                                                                            |
| 4.      |  | General | A cost estimate for implementing each mitigation option would be insightful and may influence a choice of preference.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|         |  |         | <b>Team Response:</b> Comment noted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*

**Response to Agency Comments on the Conceptual Mitigation Plan Proposal**

| Comment No. | Directed Comment | Item                                                                                                                   | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.          |                  | Section 2.2.1, Activities Requiring Compensatory Mitigation                                                            | Offshore deep water habitat should be considered differently than channel deep habitat. Even off-channel shallow habitat that is covered with riprap and/or covered with over water structures (e.g. pier apron) will still provide habitat for many species including fish (native and non-native) and wildlife. Many wildlife species have been seen foraging in the areas under the piers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|             |                  |                                                                                                                        | <b>Team Response:</b> The selection of habitat mitigation options was based on criteria defined in the Action Memorandum, including “All compensatory mitigation plans will include an assessment of how they contribute toward the conservation and recovery of ESA listed species.” Based on this USEPA requirement, the Port has focused the habitat assessment and selection of mitigation options to target habitat important to listed species (i.e., salmonids). Shallow water habitat is the most biologically productive area in large river systems, therefore, increasing this type of habitat will be beneficial to all aquatic species as an important source of food. In this way, improving shallow water habitat is also important to species other than salmon. Deep water habitat was not targeted for mitigation as that type of habitat is plentiful in the Willamette River.                                      |
| 6.          |                  | Section 2.3, Item 5                                                                                                    | The 60% design should also identify how the proposed mitigation plan will meet requirements outlined in the Action Memo, and draft specific performance targets as described there.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|             |                  |                                                                                                                        | <b>Team Response:</b> Section 4, Table 2 in the Draft Mitigation Plan details how each mitigation option meets the requirements outlined in the Action Memo and Section 5 details the performance and monitoring measures for each mitigation option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7.          | X                | Section 2.3 Item 5, Section 2.3 Item 6, Section 5.2 (Ramsey Lake City Project), and Section 5.3 (Miller Creek Project) | For any project, the 100% design needs to outline how the project will meet Action Memo required goals and quantitative performance targets. If the Port makes a contribution to another project, targets outlined in the Action Memo will also be further described and attached to this project's list of minimum requirements, in some type of binding legal vehicle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|             |                  |                                                                                                                        | <b>Team Response:</b> As described previously, Section 4, Table 2 in the Draft Mitigation Plan details how each mitigation option meets the requirements outlined in the Action Memo and Section 5 details the performance and monitoring measures for each mitigation option. See Section 4.4.5 for a description of the agreement that will be established to implement the Ramsey Refugia, Phase II project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 8.          |                  | Section 3.1-3.4                                                                                                        | The evaluation of salmonid habitat should not prohibit the mitigation of habitat lost by other species (e.g. wildlife and other fish). The terminal area is an important spawning and rearing area for other species of fish, such as northern pikeminnow, peamouth, stickleback, bass, and crappie. Spawning and rearing of some of these fish are likely concentrated in water under the piers, which is largely dismissed by this evaluation. This habitat is very important to wildlife species in the area, as they are frequently see foraging on fish in the slip areas (e.g. great blue heron). This foraging area will be eliminated by this action. Habitat analysis for other species should be considered in any habitat valuation assessment and looked at as a loss of habitat. It is understood that habitat mitigation should not be designed in such a way that it does “not adversely affect habitat for native fish |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*

**Response to Agency Comments on the Conceptual Mitigation Plan Proposal**

| Comment No. | Directed Comment | Item                                   | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                  |                                        | and wildlife” (Oregon Rules); however, it doesn’t seem like one is precluded by the other. If an evaluation is not done that includes other species, then this analysis makes a strong case that this action is actually beneficial because it is “getting rid” of habitat that is preferred by non-native species, which ultimately does not restore the beneficial use of the area. The result is that by focusing the evaluation only on salmonid habitat, the acreage affected and requiring mitigation is very low (Table 1 and Appendix A). It seems like the evaluation should focus on the loss of off-channel habitat and how it would affect all species. Off-channel habitat is very rare in the lower Willamette, with the exception of the slips and Willamette Cove. This type of evaluation would result in more habitat mitigation than what is currently proposed in Section 5.1.                                                                                                                                                                                                        |
|             |                  |                                        | <b>Team Response:</b> See response to Comment No. 5. The habitat assessment and selection of mitigation options were focused on salmon as the target species based on the Action Memo requirements. Specifically, the Action Memo states that “All compensatory mitigation plans will include an assessment of how they contribute toward the conservation and recovery of ESA listed species.” Additionally, increasing the amount of shallow water habitat is a benefit to all aquatic species, not just salmon, as shallow water habitat is the most productive area in large river systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9.          |                  | Section 3.5, Last Paragraph            | This section does not mention aquatic birds at all – species should include osprey, Bald Eagle, and great blue heron. Potential detriment to these species may occur while the CDF exists in the “open pond” stage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|             |                  |                                        | <b>Team Response:</b> Fish will be removed as much as possible from the slip after the berm is constructed and before any dredged sediment is placed into the CDF. This step is intended to minimize impact to listed fish species, but will include other fish species that are collected with the juvenile salmon. The absence (or near absence) of fish from the CDF area will minimize or eliminate the potential contact of piscivorous birds with affected water, sediments, or prey from Slip 1. Additionally, a thin layer of clean material will be placed over the contaminated sediment when the average expected water depth after a filling event is shallow enough that exposures potentially causing wildlife, including aquatic birds, risk may exist. During the majority of the filling operations, wildlife protection will not be necessary due to the significant water depths over the sediment and the initial removal of fish from the CDF following berm closure. These factors minimize the potential contact of piscivorous birds with affected sediments or prey from Slip 1. |
| 10.         |                  | Section 4, Overall Mitigation Approach | The section should note that most of the habitat lost at Slip 1 may be deep water habitat, but that it is off-channel habitat. This distinction is important for many aquatic species that would use this area differently than deep water in the main stem of the river.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|             |                  |                                        | <b>Team Response:</b> See response to Comments 5 and 8. In addition, creating off-channel habitat is proposed in the mitigation options described in Section 4 of the Draft Mitigation Plan in recognition of the importance of off-channel habitat in the region.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 11.         | X                | Section 4.1                            | a. This Action Memo required goal was left off the list: "Mitigation plans should include facility design and site plans for any development/redevelopment that occurs as a result of a fill. The facility and site plans must ensure that the facility and site characteristics and functions do not create adverse impacts to water, sediment,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*

**Response to Agency Comments on the Conceptual Mitigation Plan Proposal**

| Comment No. | Directed Comment | Item     | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                  |          | <p>and habitat quality during construction and operation." This goal shall be included in the memo and the design (i.e., the bench on the berm that allows shallow water habitat is consistent with this requirement). Other aspects of the design should include this requirement such as caps and slope stability armoring.</p> <p>b. The Action Memo performance criteria No. 9 shall be included in the next design iteration for clarity in what quantitative goals must be developed in the mitigation design. "Performance criteria will be developed that quantitatively relate to the above criteria. Potential performance criteria that will be used or considered include, but are not limited to: specific depth and acre size at specific depths (to be monitored over time), utilization surveys to verify the project objective is being met (e.g. diver surveys for juvenile salmonid use of the area), photopoint monitoring over time to ensure that percent coverage standards for flora, and maximum coverage ceilings for invasive species."</p>                                                                                                                                                                                                                                                                                                                                                                     |
|             |                  |          | <p><b>Team Response:</b> a. See Section 4 of the Draft Mitigation Plan, Table 2 for a description of how each mitigation component is consistent with the goals listed in the Action Memo. b. See Section 5 of the Draft Mitigation Plan for performance and monitoring measures and criteria.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12.         |                  | Option 1 | <p>ODFW research indicates that juveniles utilize the lower river for a longer period of time than just the peak out-migration window (ODFW 2005). Option 1 would appear to provide the most benefit to juveniles during lower water periods than either Option 2 or 3. Please discuss in more detail.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|             |                  |          | <p><b>Team Response:</b> This was noted in the revised CMPP and considered when choosing a mitigation option at the meeting on September 20, 2006.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 13.         |                  | Option 2 | <p>a. Concepts A and B of Option 2 (Ramsey Lakes) seem more of a wetland restoration project, even though one of the factors it attempts to address is off-channel aquatic habitat.</p> <p>b. How would Option 2 (and Option 3) address potential fish entrapment in the channel connection?</p> <p>c. Does the 5 acres of restored/revegetated land include upland side slopes? The depth of dredge fill in this area is extensive, with excavation down to native soil resulting in typically large bank slope areas of sand.</p> <p>d. Toxicity is known to be an issue for Columbia Slough sediments, and the potential for sediment/contaminant mobilization would need to be fully addressed in establishing connectivity to the alcove.</p> <p>e. How would sediment accumulation affect the long-term function of the alcove? What type of sediment modeling is proposed for design?</p> <p>f. Option 2 should maximize the off-channel habitat (alcove) in its design to satisfy concerns of the agencies.</p> <p>g. How does depth to native soil correspond to the target elevation(s) for desired hydrologic connectivity between the river and the slough?</p> <p>h. Being outside the Portland Harbor Superfund Site Study Area is a drawback.</p> <p>i. It appears Option 2 will be implemented with or without any contribution from the Port (Section 5.2.3.4 Status and Timing of Proposed Project). Please clarify.</p> |
|             |                  |          | <p><b>Team Response:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*

**Response to Agency Comments on the Conceptual Mitigation Plan Proposal**

| Comment No. | Directed Comment | Item     | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------|------------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                  |          | <p>a. Phase I of Ramsey Refugia project attracted juvenile salmonids. Phase II is an extension of Phase I and will provide the same habitat. Therefore, this type of project has demonstrable potential benefit as off-channel habitat.</p> <p>b.- e. and g. The City of Portland is responsible for the design effort and project details. Performance and monitoring measures will be required to ensure the habitat functions as anticipated. Section 5 of the Draft Mitigation Plan details the performance and monitoring measures.</p> <p>f. Comment noted.</p> <p>h. Comment noted. Location was considered during the mitigation project selection process.</p> <p>i. The City of Portland has no other committed funds for this project besides the Port's funding.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 14.         |                  | Option 3 | <p>a. The marina at the mouth of Miller Creek (Option 3) is likely utilized as a slack water alcove for juvenile salmon. Moving the location of the creek mouth may cause a reduction of existing function. Please evaluate this concern.</p> <p>b. Option 3 mentions establishment of a mitigation bank as part of the project. If ESA species (salmon) are involved in banking, then there must be an approved accounting system (calculating credits/debits) for salmon which has yet to be developed within Region 10. This could likely be a significant barrier to establishment of the bank in the near future.</p> <p>c. Total habitat area (shallow water?) of Option 3 is given as 1.8 acres (Figure 13). This is less than the loss of shallow water (&lt;20 feet deep) of 3.1 acres stated in the EPA Action Memo (p. 23). Is there the possibility of expansion of the habitat area? Does habitat function overrule area, and if so, how will that function(s) be measured at both the impact and mitigation sites?</p> <p>d. Disposal of excavated soil onto the adjacent site area would limit the potential for future expansion of the proposed habitat area (see Figure 13), and therefore, is not recommended. Please identify an off-site disposal location.</p> <p>e. Option 3 contains significant barriers to actually implementing the project (property owner involvement, establishing a mitigation/conservation bank, etc.). Please identify and discuss approaches for resolving these issues.</p> <p>f. Please identify a utilization goal in order for the project to be successful (mentioned as a performance criterion in the EPA Action Memo on page 24). The utilization goal should be specific (e.g., presence/absence, number of juveniles, by species, etc.). (Refer to previous directed comment.)</p> <p>g. New dock structures should be located at least 100 feet from the shoreline, with no part of the platform in less than 20 feet of water depth. Placement of the structure in shallower water or closer to the shoreline will necessitate mitigation.</p> |
|             |                  |          | <p><b>Team Response:</b> a-e. This project was not selected as the off-site component of the Terminal 4 mitigation package. f. Performance and monitoring goals are provided in Section 5.0 of the Draft Mitigation Plan. g. The distance from the shoreline to the replacement berth structure will be maximized to the extent possible while balancing the structure's required footprint size with the Outer Harbor Line (OHL). The platform's location is bounded on the outer edge by the OHL, in other words it can not extend out beyond that point. The distance</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*

**Response to Agency Comments on the Conceptual Mitigation Plan Proposal**

| Comment No. | Directed Comment | Item | Comment                                                                                                                                                                                                                                          |
|-------------|------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                  |      | from the inside edge of the platform to the shoreline will be approximately 65 feet from the Ordinary High Water (OHW) elevation of the shoreline. The width of the structure cannot be reduced as it will be used to tender ocean-going barges. |

**DRAFT DOCUMENT: DO NOT QUOTE OR CITE**

*This document has not been reviewed or approved by USEPA and its federal, state and tribal partners and is subject to change in whole or in part.*