
EXHIBIT K-8
CONSISTENCY WITH CRITICAL AREAS
ORDINANCES INCLUDING
WETLAND MITIGATION
(REVISED)

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Consistency With Critical Areas Ordinances Including
Wetland Mitigation Plan (Revised)
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Report for the Final Supplemental Environmental Impact Statement

Consistency With Critical Areas Ordinances Including Wetland Mitigation Plan (Revised)

1. Introduction

The Columbia River Channel Improvement Project (Project) takes place within five different local jurisdictions within the state of Washington. This report reviews the Project's consistency with the Critical Areas Ordinance (CAO) of these jurisdictions. This report is prepared for purposes of complying with the Washington State Environmental Policy Act (SEPA), Chapter 43.21C RCW. The level of detail results from the extensive discussions that have occurred between the Washington Ports and state and local agencies and exceeds the amount of information typically found in a SEPA EIS.

Project activities consist of dredging in the Columbia River Federal Navigation Channel, disposal of dredged sand, wetland and wildlife mitigation activities, and ecosystem restoration features. These activities are summarized in Table 1. The CAOs typically do not cover in-water activities, such as dredging and flow-lane disposal. This analysis, therefore focuses on the "upland" disposal sites.

1.1 Wetland and Wildlife Mitigation Plan

The U.S. Army Corps of Engineers (Corps), Portland District has considered the project action area as a whole for assessing impacts to wetland and wildlife resources and their habitats and developing associated wetland and wildlife mitigation efforts. This approach is consistent with the Corps requirements to address impacts to wildlife resources arising from implementation of the Federal project. Further, the Corps' wildlife mitigation effort addresses impacts to wildlife resources in upland (including agricultural lands), riparian forest and wetland habitats rather than focusing only on wetland habitats as would occur for private development actions. An interagency team was established to assess impacts to wildlife resources and develop a mitigation plan (with representatives from the Corps, Ecology, Washington Department of Fish and Wildlife [WDFW], Oregon Dept. of Fish and Wildlife [ODFW], and U.S. Fish and Wildlife Service [USFWS]). The team used the USFWS's Habitat Evaluation Procedure (HEP) to assess wildlife impacts.

Table 1. Upland sand disposal and mitigation sites.

Disposal Site ¹	Location Name	Jurisdiction	SMA Designation	Disposal History ²	Type of Disposal ³	Use for Construction/Maintenance
W-101.0	Gateway 3	City of Vancouver	Urban	New	Upland	Construction and Maintenance
W-97.1	Fazio Sand and Gravel	Clark Co.	Rural	Used 2,3, DMMS	Upland, Resale	Construction and Maintenance
W-96.9	Adjacent to Fazio	Clark Co.	Rural	New, Used 3	Upland, Resale	Maintenance
W-86.5	Austin Point	Cowlitz Co.	Urban	Used 3	Upland, Resale	Construction and Maintenance
W-82.0	Martin Bar	Cowlitz Co.	Urban	Used 3	Upland, Resale	Construction and Maintenance
W-80.0	Martin Island Disposal (Mitigation)	Cowlitz Co.	Conservancy	New	In-water	Mitigation; Construction (2yr)
W-71.9	Northport	Cowlitz Co.	Urban	Used 2, 3	Upland, Resale	Construction and Maintenance
W-70.1	Cottonwood Island	Cowlitz Co.	Urban	Used 2,3	Upland	Construction and Maintenance
W-68.7	Howard Island	Cowlitz Co.	Urban	Used 2,3, DMMS	Upland	Construction and Maintenance
W-67.5	Pt. of Longview/ International Paper	Cowlitz Co.	Urban	Used 1,2	Upland, Resale	Construction and Maintenance
W-63.5	Reynolds Aluminum	Cowlitz Co.	Urban	Used 1,2,3	Upland	Construction
W-62.0	Mt. Solo	City of Longview	Urban	New	Upland	Construction and Maintenance
W-59.7	Hump Island	Cowlitz Co.	Rural	Used 1,2,3, DMMS	Upland	Construction and Maintenance (6 yr)
W-46.3/ W-46.0	Brown Island	Wahkiakum Co.	Conservancy	Used 1,2,3, DMMS	Upland	Construction and Maintenance
W-44.0	Puget Island (Vik Prop.)	Wahkiakum Co.	Rural	New	Upland	Construction and Maintenance
W-33.4	Skamokawa	Wahkiakum Co.	Conservancy /Urban	Used 3	Shoreline, Resale	Maintenance
W-21.0	Rice Island	Wahkiakum Co.	Conservancy	Used 1,2,3, DMMS	Upland	Maintenance
Mitigation Sites						
W-81.0	Woodland Bottoms	Cowlitz Co.	Conservancy	Not Applicable (N/A)	N/A	N/A
W-80.0	Martin Island	Cowlitz Co.	Conservancy	N/A	Mitigation; see W-80.0 above	N/A
Ecosystem Restoration Features						
W-97.0	Shillapoo Lake Restoration	Clark Co.	Rural	N/A	N/A	N/A
W-91.5-87.0	Bachelor Slough Restoration	Clark Co.	Rural	N/A	Upland	Rest. Feature Construction
W-81.0	Burris Creek Tidegate Retrofit	Cowlitz Co.	Rural	N/A	N/A	N/A
W-71.5-68	Cottonwood-Howard Island Deer Reintroduction	Cowlitz Co.	Rural	N/A	N/A	N/A
W-60	Improved Embayment Circulation	Cowlitz Co.	Rural	N/A	Upland	Rest. Feature Construction
W-52-18	Purple Loosestrife Control Program	Wahkiakum Co.	Conservancy/ Natural	N/A	N/A	N/A
W-22.0	Deep River Tidegate Retrofit	Wahkiakum Co.	Conservancy/ Rural	N/A	N/A	N/A

(1) "W-xx.x" means Washington shoreline and the approximate river mile.

(2) "New" means new disposal site; "Used" means site has been previously been used by the Corps for disposal: 1 - Site used within the last 2 years, 2 - Site used within the last 10 years, 3 - Site used more than 10 years ago. DMMS—is listed in the FEIS as being included in the No Action alternative.

(Table 1 continued)

Disposal Site	Disposal Site (Acres)/ Habitat ⁴	Site Capacity (cy)	Disposal Volume (cy)	Source Material (RM)	Existing Approx. Avg Elevation (Ft CRD)	Estimated Post-Fill Elevation if filled to capacity (Ft CRD)	Final Height (Ft) ⁵
W-101.0	40 AG	2,300,000	2,300,000	95-104	21	65	44
W-97.1	27 EUD	650,000	1,200,000	94-95	10	Varies	10
W-96.9	EUD 8.8, AG 8.2; Total 17	475,000	0	--	20	Varies	0
W-86.5	EUD 22.6, RP 3.4; Total 26	1,645,000	1,700,000	88-89	15	Varies	49
W-82.0	EUD 29.1, RP 2.9; Total 32	1,500,000	760,000	81-82	25	51	26
W-80.0	WL 16 ⁵	550,000	460,000	78-81	-20	-8	12
W-71.9	EUD 27; Total 27	900,000	1,900,000	73-75	15	Varies	26
W-70.1	EUD-55.8, RP 6.2, Total 62	3,200,000	1,500,000	70-73	30	49	19
W-68.7	EUD 180, RP 20, Total 200	6,400,000	600,000	68-70	26	51	25
W-67.5	EUD 29; Total 29	1,000,000	2,900,000	67-68	20	Varies	27
W-63.5	EUD 13	500,000	200,000	63-64	20	Varies	30
W-62.0	AG 35.8, WL 10.8; Total 47.0	2,500,000	2,400,000	62-63	8	49	41
W-59.7	EUD 62, RP 7; Total 69	1,500,000	1,500,000	58-59	25	42	17
W-46.3/ W-46.0	EUD 72	4,700,000	4,700,000	45-50	15	66	51
W-44.0	AG 88.2, WL 5.4, RP 2.6, Other 3.8; Total 100	3,500,000	3,300,000	43-45	15	41	27
W-33.4	EUD 11	250,000	0	--	0	Varies	Varies
W-21.0	EUD 21 (WA) EUD 207 (OR)	5,500,000	5,500,000	--	13	53	40
Mitigation Sites							
Woodland Bottoms	WL 284 (mit., not disp.)	N/A	N/A	N/A	N/A	N/A	N/A
Martin Island	WL 298-378 (mit., not disp.)	N/A	N/A	N/A	N/A	N/A	N/A
Ecosystem Restoration Features							
Shillapoo Lake Restoration	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bachelor Slough Restoration	EUD 17, NWR 29	N/A	132,000	Bachelor Slough	15	17	2
Burris Creek Tidegate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cottonwood-Howard Island CWTD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hump-Fisher Island	EUD 2	24,000	5,800	Old Disposal Site	25	27	2
Purple Loosestrife Control	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deep River Tidegates	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(3) Existing Conditions - AG = Agricultural Land; EUD = Existing Upland Disposal; RP = Riparian (i.e., shoreline with trees or shrubs); WL = Wetlands; NWR = National Wildlife Refuge lands

(4) In-water disposal is a component of the mitigation proposal.

(5) Difference between final elevation and existing average elevation

"Upland" means landward of the ordinary high water mark of the river; "Beach Nourishment" means below the OHWM of the river.

The HEP evaluation is a modeling tool to quantify impacts to habitat value for specific species. HEP is usually used with a limited range of habitat variables relative to a single species selected as an indicator of ecosystem health (Manlow 2002). In this case, nine target species were used to evaluate project-related impacts to wildlife resources. In order to simplify the analysis, all project impacts were considered to take place within the first year of the project (Corps 1998).

HEP is also used to measure the performance of wildlife mitigation actions, including wetland and riparian habitat restoration and development. The Corp's Wildlife Mitigation Plan was presented in Appendix G of the Final Integrated Feasibility Report and Environmental Impact Statement.

Please refer to the Final SEIS Exhibit K-5, *Wildlife and Wetland Mitigation for the Columbia Channel Improvement Project*, for a more detailed discussion.

In addition, for the purposes of SEPA and compliance with local jurisdiction CAOs and Ecology requirements for wetland mitigation, Appendix B to this report is a Wetland Mitigation Plan consistent with Ecology's *Guidelines for Preparing Freshwater Mitigation Plans and Proposals* (Ecology 1994).

2. Method

The project permitting team (PI Engineering, Anchor Environmental, Preston Gates and Ellis LLP, Ports, and Corps) met with appropriate regulatory personnel from each of the local jurisdictions to discuss permitting requirements, including the application of the local CAO and Shoreline Management Plan (SMP)¹ to project activities under their jurisdiction. The meetings, called Focus Groups, were held with individual jurisdictions (listed in Table 2) in order to ensure that every local entity had the opportunity to ask questions and provide information on their requirements regarding elements of the project occurring within their jurisdiction. The project team also had the opportunity to verify their understanding of the local CAOs and SMPs. For elements of the project that occur within a city and county, meetings with city jurisdictions took place with those of their respective counties in order to identify and clarify similarities and differences in requirements. At least one representative from Ecology attended each meeting. Focus Group meetings are listed in Table 2 below.

¹ An analysis of the application of local SMPs to the project actions within the state of Washington is contained in a separate Exhibit.

Table 2. Focus Group meetings with local jurisdictions.

Date	Jurisdiction	Representatives Present
October 24, 2001	Pacific County ^a	Mike Desimone
October 25, 2001	Wahkiakum County	Chuck Beyer Jack Tobin George Trott Steve McClain (Port of Wahkiakum 2)
November 20, 2001	Cowlitz County/City of Longview	Kathy Harnden (Cowlitz County) Robb Millspaw (City of Longview)
January 23, 2002	Clark County/City of Vancouver	Terri Brooks Brent Davis (Clark County) Marian Lahav Annette Griffy Rich Hines Brian Snodgrass Vicky Ridge-Cooney (City of Vancouver)

^a The Focus Group meeting with Pacific County covered Shoreline Management Plan (SMP) and Coastal Zone Management Act (CZM) compliance. No upland sand disposal is proposed in Pacific County.

At the Focus Group meetings, it was determined which sections of the appropriate CAO applied to each of the sand disposal and mitigation sites. The project team checked each provision of the applicable CAO to make sure that all project activities were consistent with the requirements. In cases where activities did not meet requirements, the project was modified to bring it into compliance. The project team communicated with local jurisdiction personnel throughout the consistency analysis. This process is documented in Section 3, Results.

Focus Group meetings were also held to examine project-wide issues, some of which affect the upland sand disposal sites. These meetings were attended by the Ports, consultants, and state agency representatives. Issue-specific meetings are shown in Table 3.

During the HEP meeting on February 15, 2002, WDFW provided preliminary information about designated Priority Habitat and Species (PHS), along with management recommendations to the Corps. These recommendations are addressed for each upland disposal site in Section 3, Results.

Table 3. Focus Group meetings for project-wide issues.

Date(s)	Subject
October 25, 2001, Jan. 23, 2002, Feb. 8, 2002 June 10, 2002 Sept. 5, 2002	Crab
November 13, 2001	SEPA Compliance
November 20, 2001	Wetlands
December 2, 2001, January 30, 2002, February 25, 2002 November 6, 2002	Sediment Supply
February 6, 2002	Fish Stranding
February 7, 2002	Sturgeon/Smelt
February 15, 2002 August 30, 2002 December 2, 2002	Habitat Evaluation Procedure (HEP)

A comparative summary of local CAO requirements is in Table 4.

3. Results

3.1 City of Vancouver

One upland disposal site, Gateway 3, is located within the City of Vancouver. The City of Vancouver does not have a unified CAO. Critical areas are handled within a number of sections of the City of Vancouver Municipal Code (VMC). During a Focus Group meeting with City of Vancouver personnel, it was determined that this project should be reviewed for compliance with the applicable section of the VMC, Chapter 20.50, Wetlands Protection. As discussed below, the Project has been designed to avoid any wetland fill. A review of the FEMA 100-year floodplain map (Exhibit K-7, Figure 1) showed that the project will also need to be reviewed under Chapter 20.51, Flood Plain Combining Districts.

3.1.1 Gateway 3, RM W-101.0

Gateway 3 refers to a 40-acre portion of Parcel 3 of the Port of Vancouver's Gateway property (Appendix A, Figure 1). The land is currently used for agricultural purposes and is designated Urban in the City of Vancouver SMP. The Corps proposes to dispose of dredged sand on these 40 acres over a 20-yr period, during both the construction and maintenance phases of the project.

The 40-acre parcel currently lies at 21 ft CRD. The 2,300,000 cy of sand to be placed at the site will raise it to the level of 65 ft CRD. Sand disposal will be set back 300 ft from the river.

Applicable Requirements of the City of Vancouver Municipal Code

Flood Plain Combining Districts: The Sponsor Ports have complied with the City of Vancouver's rules in Chapter 20.51 governing Floodplain Combining Districts.

Wetlands: Wetlands on the site were delineated by JD White for the Port of Vancouver as part of their work on the SEPA EIS for the Port's Columbia Gateway development project (JD White 2001) (Appendix A, Figure 1). Following JD White's wetland delineation, the Corps revised its site plan to avoid all wetlands on the site and their designated buffers (Appendix A, Figure 1).

Wildlife: The City of Vancouver is in the process of drafting a Habitat Ordinance.

Two bald eagle nests, both within the Buckmire Slough/South Flushing bald eagle territory have been constructed in the riparian stand portion of Parcel adjacent to the Columbia River (Appendix A, Figure 2). The downstream-most nest (0453-3; Isaacs and Anthony 2001) was first reported in 1998 and was apparently blown down, along with the supporting branch in a Fall 2001 windstorm. The second nest in Parcel 3 was constructed upstream of the first nest in Fall 2001 and was occupied by the bald eagle pair in 2002. This latter nest is approximately 1,000 feet upstream of the southwest corner (nearest point) of the 40 acre disposal site.

The disposal area does not contain any riparian forest habitat. The bald eagle nest locations have been avoided in the disposal site plan and the Corps has undergone formal consultation with the USFWS. The BO issued by USFWS on December 6, 1999 permits the incidental take (harassment due to project related disturbance) of one pair (Buckmire/South Flushing territory) of bald eagles at Gateway 3. Harassment of these bald eagles would be associated with construction and O&M dredged material placement. No incursions of equipment or personnel are anticipated within 1,000 ft of the established riparian forest that supports the bald eagle nest site. The Buckmire/South Flushing pair has at least three alternate nest locations to date (Isaacs and Anthony 2001). The Corps currently funds and will continue to fund bald eagle occupancy and productivity surveys for the lower Columbia River per conditions of the DMMP and Channel Improvement BOs. These data will be used to monitor nest site placement of this pair in order to minimize disturbance at the nest site.

Table 4. Comparative summary of Critical Areas Ordinance requirements.

	Clark County	City of Vancouver
Relevant CAO	Clark County	City of Vancouver
Areas Regulated under the CAO	<p>Critical areas are handled within the Clark County Code:</p> <p>Title 20 Environmental Policy Ordinance 18.327 Floodplain Combining Districts 13.29 Stormwater and Erosion Control 13.36 Wetlands Protection 13.51 Habitat Protection</p>	<p>Critical areas are handled within the City of Vancouver Municipal Code. Sections determined relevant to this project:</p> <p>Wetlands Wildlife</p>
Riparian Requirements	<p>Review under Habitat Ordinance required for activities within riparian priority habitat, defined as "areas extending outward from high water mark to the edge of the 100-year floodplain, or the following distances, if greater:</p> <p>DNR Type 1 and 2 waters 250 ft DNR Type 3 waters 200 ft DNR Type 4 and 5 waters 150 ft</p> <p>Approval criteria are listed in Section 3.4 of this Technical Memorandum.</p>	<p>Riparian areas are currently regulated under the state SMP. The City of Vancouver evaluates projects with a focus on critical values and functions. Specific questions should be directed to Vicky Ridge-Cooney.</p>
Wetland Mitigation Requirements	<p>Unenhanced concurrent (within 1 yr)</p> <p>Category 1 6:1 Category 2 3:1 Category 3 (forested) 3:1 Category 3 (scrub-shrub) 2:1 Category 3 (emergent) 1.5:1 Category 4 1.25:1</p> <p>Unenhanced Pre-Development</p> <p>Category 1 1.5:1 Category 2 1.25:1 Category 3 1:1 Category 4 1:1</p> <p>Enhanced replacement results in a 20% reduction in area for each category higher (ex., replacing 10 ac of Category 3 wetland with 8 ac of Category 2 wetland, or 6 ac of Category 1 wetland).</p>	<p><u>Post-Impact</u></p> <p>Category 1 6:1 Category 2 3:1 Category 3 3:1 Category 4 2:1 Category 5 1.5:1</p> <p><u>Pre-Impact</u></p> <p>Category 1 1.5:1 Category 2 1.25:1 Category 3 1:1 Category 4 1:1 Category 5 1:1</p>
Wetland Buffer Requirements	<p>Category 1 300 ft Category 2 200 ft Category 3 100 ft Category 4 50 ft</p> <p>Adjusted base buffer width based on quality</p> <p>Type A 40% Type B 30% Type C 15% Type D 0%</p>	<p>Category 1 300 ft Category 2 200 ft Category 3 100 ft Category 4 50 ft Category 5 None</p> <p>Reduced width based on buffer quality (see Municipal Code 20.50.399)</p> <p>Quality A 40% Quality B 30% Quality C 15% Quality D None</p>
PHS/State Listed Species	<p>Habitat Ordinance covers areas identified by and consistent with the WDFW PHS criteria, including areas within 1,000 ft of individual species point sites.</p>	<p>Certain sites designated as PHS in the late 1980s were folded into the CAO.</p>

Cowlitz County	City of Longview	Wahkiakum County																		
Cowlitz County	City of Longview	Wahkiakum County																		
Wetlands Geologic Hazards Aquifer Recharge Areas Fish and Wildlife Habitat Conservation Areas (including riparian zones) Frequently Flooded Areas.	Wetlands Geologic Hazards Aquifer Recharge Areas Fish and Wildlife Habitat Conservation Areas (including riparian zones)	Frequently Flooded Areas Geologically Hazardous Areas Aquifer Recharge Areas Wetlands Fish and Wildlife Habitat Conservation Areas (including riparian zones).																		
Depends on water type and stream width. Buffer zone as described in Section 13C of the CAO. In some cases, Habitat Management Plans with BAs are required (see Section 13C of CAO).	Regulated under Fish and Wildlife Habitat Conservation Areas, Sec. 17.10.120. Required setbacks: <table style="margin-left: 20px;"> <tr><td>Type 1 and 2</td><td style="text-align: right;">250 ft</td></tr> <tr><td>Type 3, 5-20 ft wide</td><td style="text-align: right;">200 ft</td></tr> <tr><td>Type 3, less than 5 ft wide</td><td style="text-align: right;">150 ft</td></tr> <tr><td>Type 4 and 5, low mass wasting potential</td><td style="text-align: right;">150 ft</td></tr> <tr><td>Type 4 and 5, high mass wasting potential</td><td style="text-align: right;">225 ft</td></tr> </table> Setbacks subject to revision at the discretion of City personnel	Type 1 and 2	250 ft	Type 3, 5-20 ft wide	200 ft	Type 3, less than 5 ft wide	150 ft	Type 4 and 5, low mass wasting potential	150 ft	Type 4 and 5, high mass wasting potential	225 ft	<u>High Intensity Land Use:</u> Type I & II Stream = 100 feet Type III Stream = 75 feet Type IV & V Stream = 50 feet <u>Low Intensity Land Use:</u> Type I, II & III Stream = 50 feet Type IV & V Stream = 25 feet <u>Areas Adjacent to the Columbia River:</u> 25 feet, provided the following three circumstances exist: (a) the land consists primarily of dredge spoils or similar degraded habitat; (b) the land lacks any significant woody vegetation (c) there are no associated wetlands present. (Sec. 21.E.4.)								
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Cowlitz County's classification system is explained in Section 12 of the CAO. Classification 1 Alteration prohibited unless it would maintain or improve existing functions. Classification 2 and 3 At least 1:1 replacement Classification 4 No replacement required	<table style="margin-left: 20px;"> <tr><td>Category I</td><td style="text-align: right;">6:1</td></tr> <tr><td>Category II/III Forested</td><td style="text-align: right;">3:1</td></tr> <tr><td>Category II/III Shrub/scrub</td><td style="text-align: right;">2:1</td></tr> <tr><td>Category II/III Emergent</td><td style="text-align: right;">1.5:1</td></tr> <tr><td>Category IV</td><td style="text-align: right;">1.25:1</td></tr> </table>	Category I	6:1	Category II/III Forested	3:1	Category II/III Shrub/scrub	2:1	Category II/III Emergent	1.5:1	Category IV	1.25:1	<table style="margin-left: 20px;"> <tr><td>Category I = 6:1</td></tr> <tr><td>Category II or III (forested) = 3:1</td></tr> <tr><td>Category II or III (scrub-shrub) = 2:1</td></tr> <tr><td>Category II or III (emergent) = 2:1</td></tr> <tr><td>Category IV = 1.25:1</td></tr> </table>	Category I = 6:1	Category II or III (forested) = 3:1	Category II or III (scrub-shrub) = 2:1	Category II or III (emergent) = 2:1	Category IV = 1.25:1			
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Category IV = 1.25:1																				
Dependent on soil type (Table 1 in CAO), and specific buffers for wetlands that provide functions and values for wildlife and fisheries (Table 2 in CAO).	Actual buffer width determined by site visit. <table style="margin-left: 20px;"> <thead> <tr><th></th><th style="text-align: center;">Min</th><th style="text-align: center;">Max</th></tr> </thead> <tbody> <tr><td>Category I</td><td style="text-align: center;">200</td><td style="text-align: center;">300</td></tr> <tr><td>Category II</td><td style="text-align: center;">100</td><td style="text-align: center;">200</td></tr> <tr><td>Category III</td><td style="text-align: center;">50</td><td style="text-align: center;">100</td></tr> <tr><td>Category IVa</td><td style="text-align: center;">25</td><td style="text-align: center;">50</td></tr> <tr><td>Category IVb</td><td style="text-align: center;">25</td><td style="text-align: center;">50</td></tr> </tbody> </table> There is additional information about averaging and enhancement in the CAO.		Min	Max	Category I	200	300	Category II	100	200	Category III	50	100	Category IVa	25	50	Category IVb	25	50	<u>High Intensity Land Use:</u> Category I = 200 feet Category II = 150 feet Category III = 75 feet Category IV = 50 feet <u>Low Intensity Land Use:</u> Category I = 150 feet Category II = 100 feet Category III = 50 feet Category IV = 25 feet
	Min	Max																		
Category I	200	300																		
Category II	100	200																		
Category III	50	100																		
Category IVa	25	50																		
Category IVb	25	50																		
Covered in Sec. 13 of the CAO. Critical Area Fish and Wildlife Permit required for eight categories of Fish and Wildlife Habitat Conservation Areas pursuant to WAC 365-190-020(5)(b), plus unintentionally created ponds between 1 and 20 ac in size.	Covered in Sec. 17.10.120 of the CAO. Critical Area Fish and Wildlife Permit required for eight categories of Fish and Wildlife Habitat Conservation Areas pursuant to WAC 365-190-020(5)(b), plus unintentionally created ponds between 1 and 20 ac in size.	Sec. 21 of the CAO addresses WDFW Habitat Conservation areas (areas with state listed species or on PHS list). Critical Areas Permit required.																		

The Pacific Bald Eagle Recovery Plan (1986) established Habitat Management Goals (HMG) and Recovery Population Goals (RPG) by recovery zone for bald eagles. The Gateway 3 site lies in the Columbia Recovery Zone (RZ-10), which includes portions of both Oregon and Washington. Table 5 (repeated below) summarizes these bald eagle management goals for RZ-10 and observed results for 2001.

Table 5. Habitat Management and Recovery Population Goals

State	Habitat Management Goal ^a	Recovery Population Goal ^b	2001 Breeding Territories Surveyed	2001 Occupied Breeding Territories ^{c,d}
Washington	18	12	39	38
Oregon	29	19	50	48
Total	47	31	89	86

- a This is the target number of breeding territories in order to ensure at least 12 occupied territories per year.
- b This is the minimum number of occupied breeding territories to indicate recovering eagle population.
- c Data compiled by Isaacs and Anthony (2001).
- d Not all existing breeding territories are occupied in any given year.

Data compiled by Isaacs and Anthony (2001) demonstrate that the population of bald eagles in Oregon and Washington, including the RZ-10 population, are exhibiting a continued population growth. Since 1990, the RZ-10 population has expanded from 25 to 89 breeding territories surveyed and 23 to 86 territories occupied and exceeds both the established HMG and RPG. Thus, the incidental take due to harassment of the Buckmire/South Flushing pair would not significantly impact the RZ-10 population.

Sandhill cranes, a state-listed species, have been observed at the site (Manlow 2002). The distribution of sandhill cranes in this region of the Columbia River occurs throughout Sauvie Island and Scappoose Bottoms in Oregon, and the Vancouver Lowlands, Ridgefield National Wildlife Refuge and Woodland Bottoms in Washington.

A strip of riparian vegetation exists between the site and the Columbia River. The temporary pipeline to convey sand from the dredge vessel to the site will be laid over the ground where vegetation is sparse (determined by aerial photo). The pipeline is stationary during sand disposal. Any disturbance to the riparian vegetation will be temporary and minimal.

The Gateway 3 site is set back a minimum of 300 ft from OHW. The strip of riparian vegetation along the river is not included in the disposal site. The weir drainage system will have to cross the riparian zone for dredged material to reach the site and return water to reach the river. The Corps

site plan shows the crossings at the most sparsely vegetated point (as identified by aerial photo), near the northernmost corner of the site (Appendix A, Figure 3).

The USFWS has provided an Incidental Take Statement for the Buckmire/South Flushing bald eagle pair (USFWS BO, December 6, 1999); therefore, no BEMP will be prepared for this location. Timing limitations will be complied with to the extent practicable and work outside the disposal site boundary near the active bald eagle nest will not be allowed during the nesting season, provided the nest site is active.

Wintering waterfowl habitat is included in the Wildlife Mitigation Plan for the Federal project at the Woodland Bottoms location (1999 Final IFR/EIS, Appendix G). Approximately 284 acres would be secured in fee title at this location for wildlife mitigation actions. The majority of this acreage would be targeted toward wetland (97 acres) or agricultural (132 acres - long-term pasture) development comparable to management actions at Ridgefield National Wildlife Refuge. These habitat management measures for long-term pasture and wetland habitat should also be suitable for supporting migrant sandhill cranes during their spring and fall stopovers in this area of the lower Columbia River. Littlefield and Ivey (2002) report the species as an opportunistic omnivore. Wetland and pasture management practices at Woodland Bottoms are expected to produce roots, bulbs, berries, earthworms, insects, amphibians, snakes, mice and greens that numerous authors (see Littlefield and Ivey 2002) have reported as constituents of the sandhill crane diet.

The proposed wildlife mitigation is consistent with the Final Washington State Sandhill Crane Recovery Plan (Littlefield and Ivey 2002). As noted above, mitigation at Woodland Bottoms will include 132 acres in long-term pasture and 97 acres in wetland habitat that will benefit sandhill cranes. The wildlife mitigation plan for the project assessed the habitat value of the W-101.0 disposal site and more than compensates for any impact to it. The wildlife mitigation plan provides for securing lands and habitat development in Woodland Bottoms which is documented by WDFW in their final sandhill crane recovery plan as lands used by this crane population.

The Corps will observe timing restrictions for specific activities as listed in the NOAA Fisheries and USFWS Biological Opinions dated May 20, 2002.

3.2 Clark County

There are two sand disposal sites in Clark County, known as Fazio and Adjacent to Fazio. There are also two Ecosystem Restoration Features, Shillapoo Lake and Bachelor Slough, within Clark County.

Clark County does not have a unified CAO. Critical areas are in the Clark County Code in Title 20, Clark County Environmental Policy Ordinance; Title 18, Zoning, Chapter 18.327, Floodplain Combining Districts; Title 13, Public Works, Chapter 13.29, Stormwater and Erosion Control Ordinance, 13.36, Wetland Protection Ordinance, and 13.51, Habitat Protection Ordinance. In the Focus Group meeting with Clark County personnel on January 23, 2002, it was determined that the following areas should be examined:

Floodplain (FP) Combining District

18.327.055:

A. Floodway area. The floodway includes the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot. For areas of special flood hazard studied in detail, the floodway boundary is delineated upon the Flood Insurance Study Maps. In all other areas of special flood hazard, the floodway boundary shall be determined by the use of other base flood data, as described in Section 18.327.070(C-2).

B. Floodway Fringe Area. The floodway fringe is the land area between the boundary of the floodway and the limits of the one hundred (100)-year floodplain. In those special flood hazard areas where the floodway boundary is not delineated upon Flood Insurance Study Maps, the floodway fringe area shall be determined by the use of other base flood data, as described in Section 18.327.070(C-2).

18.327.070(A): *A permit is required before construction of development begins with any area of special flood hazard established in Section 18.327.045.*

18.104.240 (From "Definitions"): *Development. The permit shall be for all structures and development as set forth in the "Definitions."*
"Development" includes any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations. Development also includes the commencement of a new use, or the change in existing use of real estate or a structure thereon. (Sec. 3 of Ord. 1982-03-80; amended by Sec. 4 of Ord. 1990-09-04; amended by Sec. 1 of Ord. 1999-03-04)

18.327.065 Regulation of uses in the Floodplain Combining District. *A. Relationship to Other Requirements. Land uses in the Floodplain Combining District shall be subject to all relevant local, state, or federal regulations including those of the underlying zoning district. Where applicable, permit requirements under the Shoreline Management Act*

(RCW 90.58), or the State Flood Control Zone Act (RCW 86.16) may be substituted for permits required under this chapter, provided that the standards of this chapter are applied.

Wetlands

Wetland mitigation and buffer requirements are shown in Table 4. There are no wetlands on either disposal site.

Habitat Ordinance

The following areas are subject to review under the Habitat Ordinance:

Riparian priority habitat: *Areas extending outward from high water mark to the edge of the 100-year floodplain or the following distances, if greater:*

- *DNR Type 1 and 2 waters, 250 ft*
- *DNR Type 3 waters, 200 ft*
- *DNR Type 4 and 5 waters, 150 ft.*

Clark County Code (“CCC”) § 13.51.050, Table 13.51.050.

Other priority habitats and species (PHS): *Areas identified by and consistent with the WDFW priority habitats and species criteria, including areas within 1,000 ft of individual species point sites. Id.*

Locally important habitats and species: *Areas legislatively designated by Clark County because of unusual or unique habitat warranting protection because of qualitative species diversity or habitat system health indicators, as specified in Section 13.51.055. Id.*

Projects are reviewed with respect to the approval criteria listed in Section 13.51.080 of the Clark County Code:

1. *Intent. Designated habitats are to be protected through an avoidance or reduction of most activities. This section provides standards for the review of proposed nonexempt activities within these designated areas.*
2. *Basic Criteria. Proposed activities subject to this chapter shall demonstrate that the proposal:*
 - a. *Substantially maintains the level of habitat functions and values; and*
 - b. *Minimizes habitat disruption or alteration beyond the extent required to undertake the proposal.*
3. *Mitigation Measures. Mitigation measures may be established pursuant to the above basic criteria. Subject to individual*

circumstances, potential mitigation measures may include, but are not limited to the following:

- a. Avoiding the impact altogether by not taking a certain action or parts of an action;*
 - b. Exploring alternative on-site locations to avoid or reduce impacts of activities;*
 - c. Preservation of important vegetation and natural habitat features through establishment of buffers or other limitations on clearing or alteration;*
 - d. Enhancement, restoration or replacement of vegetation or other habitat features and functions. In riparian areas, this may include buffer averaging as specified in Section 13.51.090(2)(c);*
 - e. Managing the access to habitat areas;*
 - f. Seasonal restriction on construction activities;*
 - g. Implementation of best management practices;*
 - h. Monitoring or review of impacts;*
 - i. Establishment of performance measures or bonding;*
 - j. Establishment of conservation covenants.*
- 4. Clark County shall approve, approve with conditions or if necessary deny proposals based on compliance with the basic criteria and the adequacy of mitigation measures to ensure compliance, and applicable reasonable use assurances of Section 13.51.090. Clark County shall retain final authority for such determination, which shall be issued consistent with the review timelines of Chapter 18.600, and shall be based on best scientific information and analysis available within those timelines. Clark County shall consult with the Department of Fish and Wildlife and shall substantially follow resulting recommendations of WDFW, unless alternative determinations are supported by scientific analysis (Sec. 1 of Ord. 1997-05-30).*

3.2.1 Shillapoo Lake, RM W-97.0

This Ecosystem Restoration Feature consists of restoring wetland and riparian habitat on lands purchased by WDFW for inclusion in their Shillapoo Lake Wildlife Management Area. Shillapoo Lake lies behind flood control dikes and currently is drained annually for agricultural use on private lands and for planting of forage crops (mainly corn) to benefit wintering waterfowl.

The proposed ecosystem restoration feature would entail construction of water supply and control structures to ultimately create a total of four

diked cells for wetland habitat management purposes. Construction of two cells would not occur unless private lands are acquired. These wetland cells would be hydrologically connected to the Lake River via pipelines, a tidegate and a pumping station in order to manage water levels in the four wetland management units. This will enable WDFW to maintain desired water levels in the wetland management units for optimal habitat management.

Floodplain Combining District

The Shillapoo Lake Wildlife Area lies within the FEMA 100-year floodplain (Exhibit K-7, Figure 1). The proposed water control structures will not alter flood proneness of the floodplain, which is controlled by the existing exterior flood control dikes. Floodwater storage, during major flood events, comparable to February 1996 when the main flood control dikes were overtopped, would incur a negligible impact as borrow areas for levees should offset the fill associated with levee construction. This is consistent with the public safety objective as stated in the Clark County Code, Section 18.327.055.

Wetlands

The Shillapoo Lake site is designated wetland by WDFW. Construction of the water control structures will result in a temporary, minor disturbance to wildlife as construction would occur during summer when most wildlife resources are absent from the area and agricultural tillage and crops are ongoing actions. Operation of the completed project will enhance the wetland characteristics and enhance vegetative productivity, and therefore wildlife use, of the area.

Habitat Ordinance

Shillapoo Lake is used by wintering waterfowl, bald eagles and other raptors, wading birds, shorebirds and sandhill cranes, amongst other species. While construction of the water control structures will result in a temporary disturbance to the area when least populated by wildlife resources, the net benefit of the ecosystem restoration is expected to be significant, based on results of the HEP analysis performed in cooperation with WDFW (Corps 1998). The ecosystem restoration feature will be maintained by WDFW after construction.

Waterfowl concentrations are noted on the WDFW PHS maps for this ecosystem restoration feature (Appendix A, Figure 4). Bald eagle nest locations occur over a mile distant from the area and there are no suitable riparian or coniferous trees in the project vicinity for eagles to use for nesting purposes.

Zoning

Shillapoo Lake is zoned Rural. Restoration activities at the site are consistent with the zoning requirements.

3.2.2 Fazio Sand and Gravel, RM W-97.1

The Fazio site (Appendix A, Figure 4) is owned by Fazio Bros. Sand and Gravel and is used for their sand resale operations. The existing sand pit is surrounded by a berm and drained by a weir system that allows water to clear before it is returned to the river. Current local permits exist for the site's ongoing dredged material receipt from maintenance dredging for the 40-ft channel. Original plans for use of the site for the Channel Improvement Project included expansion of the existing sand pit. The Corps has determined that expansion of the site is not required during the first five years of the project (the two-year construction phase and the first three years of maintenance dredging).

The Fazio sand pit site covers 13.5 acres and current approximate average elevation is 10 ft CRD. The Corps plans to place 112,000 cy of sand at the site during the 2-yr construction dredging phase of the project. The mean elevation of the sand pile will vary depending upon sand resale by Fazio Bros. Sand and Gravel, with the highest elevation likely to be about 19 ft CRD.

Floodplain Combining District

The Fazio site lies within the FEMA 100-year floodplain (Exhibit K-7, Figure 2). Fazio Bros. Sand and Gravel operates their sand pit under an existing Shoreline permit and no expansion to the site is currently proposed.

Wetlands

There are no wetlands on the site.

Habitat Ordinance

Riparian vegetation was planted at the downstream end of the site as part of required mitigation for the current Shoreline permit obtained for Fazio Bros. Sand & Gravel's regular operations. This vegetation will be avoided.

The Corps disposal plan avoids the riparian vegetation as required by the current Shoreline permit for the site.

The WDFW PHS map shows the site falling within a Waterfowl Concentration overlay (Appendix A, Figure 4). The Fazio site itself is bare of vegetation, with the exception of the riparian vegetation mentioned above. The site is developed for sand and gravel mining operations and does not provide any forage or other habitat value to waterfowl.

Zoning

Clark County requires a Surface Mining Overlay to permit sand resale activities. The Fazio site is appropriately zoned.

3.2.3 Adjacent to Fazio, RM W-96.9

The Adjacent to Fazio site (Appendix A, Figure 4) has been used for disposal of dredged sand and a cattle stockyard on 8.8 acres in the past. The balance of the acreage (8.2 acres) continues to be used as a pasture for cattle. The soil of the former disposal portion of the site is unsuitable for intensive use as cropland. The Corps proposes to place sand at the site over a 20-yr period, from the maintenance phase of the project. Fazio Bros. Sand and Gravel will then resell the sand.

The Adjacent to Fazio site covers approximately 17 acres, with an average elevation of 20 ft CRD. A volume of 475,000 cy of sand placed by the Corps would raise the site to 22 ft above the surrounding area, although the crest elevation may be less depending upon resale volumes. No material is presently planned for disposal at this site.

Floodplain Combining District

The site lies within the FEMA 100-yr floodplain (Floodway Fringe Area) (Exhibit K-7, Figure 2) and a floodplain review will be required. Construction standards for flood hazard reduction apply to conventional structures such as buildings. The sand disposal site plan will be reviewed by the Planning Director for assurance that flood hazards have been minimized.

Wetlands

There are no wetlands on the site.

Habitat Ordinance

Sand disposal activities on the previously used disposal portion of the site will avoid riparian habitat that occurs along the shoreline. The riverward portion of the site has been used for sand disposal in the past, and it is of poor value for vegetation and wildlife habitat. The site is currently used as a stockyard for cattle.

The WDFW PHS map shows the site falling within a Waterfowl Concentration overlay (Appendix A, Figure 4). Canada geese occasionally use the 8.2-acre pasture portion of the site.

The project Wildlife Mitigation Plan (1999 Final IFR/EIS, Appendix G) provides for construction of 132 acres of permanent pastureland habitat at Woodland Bottoms, consistent with WDFW recommendations. This habitat will benefit Canada geese, ground-dwelling songbirds, sandhill cranes, reptiles, amphibians and other species.

Zoning

During a meeting between the Corps and Clark County, a question arose if the northernmost portion of the site extended beyond the limit of the surface mining overlay. Subsequent review has determined that there was a difference in scale between the map furnished by the Corps and the

zoning illustration furnished by Clark County. When the illustration is enlarged to match the scale of the Corps map, the Clark County overlay covers the entire Adjacent to Fazio site (Appendix A, Figure 5). When precise site mapping is available, this will be verified with Clark County. If a zone change is in fact required for a portion of the Adjacent to Fazio site, an amendment to the Comprehensive Plan will not be necessary in order to make the zoning change; however, the zoning must be complete before the County can process the Shoreline and Critical Areas Permit applications.

3.2.4 Bachelor Slough, RM W-87-91.5

Implementation of this ecosystem restoration feature is contingent on the Corps' sediment quality evaluation to determine whether material to be dredged from Bachelor Slough is suitable for dredging and/or upland disposal. The action also requires approval from WDNR and the USFWS to dispose of dredged material on their property for riparian habitat development purposes.

The restoration consists of two actions. The first action was proposed by the USFWS, Ridgefield National Wildlife Refuge. Approximately 132,000 cy of material would be dredged from Bachelor Slough to increase water depth and flow, with the result of decreasing water temperatures, which currently exceed the temperature tolerance of salmonids from mid-summer until fall. Improvements in water quality parameters are intended to benefit juvenile salmonids.

The second action involves restoring six acres of riparian habitat on the Bachelor Island shoreline of Bachelor Slough, downstream of the bridge crossing the slough, and restoration of riparian forest on the upland disposal site(s).

Floodplain Combining District

Bachelor Slough lies within the FEMA 100-year floodplain (Exhibit K-7, Figure 3). The proposed upland disposal will result in a negligible reduction in flood storage capacity on 46 acres. Restoration of riparian forest may reduce the risk of erosion from flood flows.

Wetlands

There are no wetlands present on the proposed disposal site(s). The disposal site on WDNR property adjacent to the Columbia River is an old dredged material disposal site for channel maintenance material. The two potential disposal sites on Ridgefield NWR are upland locations. One upland site is managed as a grassland (goose pasture) and the other is an old field habitat. The 6 acres of riparian forest development along the Bachelor Island shoreline of Bachelor Slough would be classified as wetland. The shoreline community is dominated by reed canarygrass and false indigo. The management prescription calls for excavation to a depth

of approximately one foot to remove roots, rhizomes and above-ground vegetation and thus prepare a seed bed for riparian vegetation establishment. Excavated material will be buried in a trench adjacent to the toe of the levee if acceptable, or at an upland location interior to the levee and on the refuge.

Habitat Ordinance

Nests in the Bachelor Island bald eagle territory occur over ½ mile to the west of the Bachelor Slough dredging activity (Isaacs and Anthony 2002). Nests in the Mallard Slough bald eagle territory are a comparable distance south of the Bachelor Slough dredging activity (Isaacs and Anthony 2002). The WDFW PHS maps do not identify any important wildlife resources in the general area (Appendix 1, Figure 6).

Functions of existing riparian habitat will be maintained in accordance with Clark County Code 13.51.050, Table 13.51.050.

Zoning

Bachelor Island is zoned Rural. Restoration activities at the site are consistent with the zoning requirements.

3.3 Cowlitz County

Cowlitz County's CAO covers Wetlands, Geologic Hazards, Aquifer Recharge Areas, Fish and Wildlife Habitat Conservation Areas, and Frequently Flooded Areas (Cowlitz County Draft Critical Areas Ordinance, Section 3 [2000]). The applicant may request that the County conduct a preliminary review of the project site to determine whether any critical areas exist within the site that would trigger the requirement for a CAO permit. *Id.* at Section (9)A.

Request for Determination of Critical Areas: *Staff will conduct an environmental review, based on existing in-house data, to determine if critical areas exist on a parcel, provided that the applicant supplies the following: A completed master application and vicinity map; an assessor's map of the property; the appropriate fee...; and other information as needed. Cowlitz County Draft Critical Areas Ordinance, Section 9(B)(4), (2000).*

Frequently Flooded Areas

All lands identified in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, as amended, and approved by the county, as within the 100-year floodplain are designated as frequently flooded areas. Id. at Section 14(A).

All development within designated frequently flooded areas shall comply with the Cowlitz County Floodplain Management Ordinance, Cowlitz County Code 16.25, as now or hereafter amended. Id. at Section 14(B).

Section 16.25 of the Cowlitz County Code requires that a floodplain permit be obtained from the Cowlitz County Department of Building and Planning. Maintenance activities are exempt from this requirement, but placement of dredged material is specifically excluded from the exemption.

The General Development Standards in the Cowlitz County Code Section 16.25.B, states that *no development shall be allowed that, as determined by the Administrator, threatens to: (1) adversely restrict, alter, or increase the flow of floodwaters in the floodway; (2) adversely affect the efficiency or capacity of the floodway or the integrity or stability of flood protection facilities; or (3) increase water surface elevation or the location of the floodway during the regulatory flood.*

Geologic Hazards

For all regulated activities proposed within designated landslide, erosion, and mine hazard areas, a geotechnical assessment or an erosion hazard assessment prepared by a qualified expert shall be submitted and coordinated with the uniform building code requirements. Cowlitz County Critical Areas Ordinance, Section 15(A), (2000).

If the geotechnical assessment indicates an inability of the site to accommodate the proposed activity without special measures or precautions as determined by a qualified expert, the department may require a geotechnical report. Id.

Cowlitz County Wetlands

Wetland mitigation and buffer requirements are shown in Table 4. Project-related actions in wetlands involve the proposed wetland mitigation as part of the mitigation actions at Woodland Bottoms and Martin Island and the two ecosystem restoration features. No disposal activity occurs in sites with wetlands or their buffers, with the exception of the embayment fill at Martin Island for the purpose of developing intertidal marsh habitat, described in detail in the Wetland Mitigation Plan (attached).

Fish and Wildlife Habitat Conservation Areas

Cowlitz County imposes Development Performance Standards, Habitat Protection requirements, and in some cases, Habitat Management Plan requirements for activities within areas identified by WDFW on their PHS maps to support state listed species or designated PHS (Cowlitz County Critical Areas Ordinance, Section 13[B-D]). There are eight different classifications of Fish and Wildlife Habitat Conservation Areas as defined by WAC 365-190-080 (5), plus Cowlitz County's addition of unintentionally created ponds between 1 and 20 acres in size. *Id.* at Section 13(A). This addition at the County's discretion is authorized under WAC 365-190-080(5)(b). Designated Fish and Wildlife Habitat

Conservation Areas are subject to General Development Performance Standards. *Id.* at Section 13(B-D).

Aquifer Recharge Areas

For the purposes of this classification, critical aquifer recharge areas are determined by the combined effects of soil types and hydrogeology (Critical Aquifer Recharge Map, Cowlitz-Wahkiakum Council of Governments, 1993). Id. at Section 16(A).

Classification 1: High susceptibility-areas, identified on the Aquifer Recharge Map, with a very high susceptibility to contamination of the underlying aquifer due to high soil permeability and high water table. Id. None of the Project activities occur in Class 1 Aquifer Recharge Areas.

Id. at Section 16(13)(1-4).

None of the regulated activities are planned as part of the project activities within Cowlitz County.

3.3.1 Austin Point, RM W-86.5

This site, located north of the confluence of the Lewis and Columbia rivers (Appendix A, Figure 7), was used by the Corps for dredged material disposal over ten years ago. Most of the surface is covered with sand. The Port of Woodland owns the site and has been removing the sand for its own use or resale since the Corps discontinued using the site. The Port of Woodland has a current Shoreline permit for sand removal at the site.

The 26-acre site will hold up 1,645,000 cy of sand. The Corps plans to place 1,700,000 cy over a twenty-year period including the construction and maintenance phases of the project. The Port of Woodland will continue to remove sand from the site between disposal events, making room for additional sand. The current average site elevation is 15 ft CRD. When full, the top of the sand pile could potentially reach 64 ft CRD. Sand resale efforts are anticipated to maintain the crest elevation of the disposal site at a lower elevation. A weir system and outfall to handle return water are already in place.

A training school on the site for heavy equipment use will remain in operation, avoiding work areas during disposal events.

Frequently Flooded Areas

The Austin Point site has a FEMA Floodplain Designation A 100-year floodplain (no baseflood elevation determined) (Exhibit K-7, Figure 5). Cowlitz County's floodplain review requirements will be complied with when the site is permitted for use.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Austin Point site is not located in a Classification 1 regulated area.

Wetlands

A site visit was conducted by Ecological Land Services, Inc. on November 30, 2000. No wetlands were found on or immediately adjacent to the berm that defines the limits of the site (ELS 2000).

Fish and Wildlife Habitat Conservation Areas

Riparian vegetation is present in the form of a 3.4-acre grove of cottonwood trees in the northeast corner of the site. The Austin Point site lies within a WDFW PHS area for bald eagles. A bald eagle nest is in the vicinity, about $\frac{3}{4}$ mi (more than 1,000 ft from the site) downstream of the site (observed by WDFW June 5, 2001) (Appendix A, Figure 7).

The Austin Point site is disturbed over virtually its entire area. Before the heavy-equipment training school operated on the site, it was used as a stockyard for cattle. Some cottonwood trees have colonized the sandy soils at the northeast corner and, based upon the revised site map from the NMFS BA, these pioneering riparian trees will be avoided. A small grove of cottonwoods adjacent to the heavy equipment training school buildings remains within the disposal site. These trees will be removed before sand is deposited on that portion of the site. This 3.4-acre stand of riparian habitat (revised from 2.7 acres after site realignment for the 2001 BA to NMFS) from Austin Point is included as an impact to be mitigated in the Wildlife and Wetland Mitigation Plan (Final SEIS, Exhibit K-5). The plan proposes to develop 202 acres of riparian forest habitat in Washington in the Wildlife and Wetland Mitigation Plan to mitigate a projected impact of approximately 50 acres of riparian forest in both Oregon and Washington.

Because the disposal site is more than 1,000 ft from the nearest bald eagle nest site, a BEMP is not required.

The Biological Assessments and Biological Opinions prepared to date along with the conceptual mitigation plan in Appendix B are intended to satisfy 13D of the CAO.

3.3.2 Martin Bar, RM W-82.0

The Martin Bar site has been covered with dredged sand in the past. The site consists of two parcels with a day-use park and riparian forest inclusion separating the parcels (Appendix A, Figure 8). The two parcels total 32 acres, with an average elevation of 25 ft CRD. The strip between

the disposal site parcels will not be impacted by sand disposal activities in order to preserve the park access road and eliminate impacts to the riparian forest stand. The Corps plans to place an additional 760,000 cy of sand on the two parcels, raising the elevation to 51 ft CRD. Disposal will take place as needed during construction and maintenance dredging over a 20-yr period. A weir system will be constructed to allow drainage water to clear before it returns to the river. The Port of Woodland may, at its discretion, use or sell sand from this site.

Frequently Flooded Areas

The Martin Bar site's average elevation is 25 ft CRD. The base flood elevation at the site is 22.1 ft CRD. The site has been raised out of the 100-yr floodplain by previous sand disposal activities, but this is not reflected on the FEMA map (Exhibit K-7, Figure 6). A Letter of Map Revision due to Fill (LOMR-F) will be prepared by the Corps upon attainment of more detailed topographic information for the site.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this Project. The Martin Bar site is not located in a Classification 1 regulated area.

Wetlands

One small, forested wetland lies immediately adjacent to the proposed disposal area and the access road to the WDFW property (Appendix A, Figure 8). It is not included within the disposal site boundary. The site has been used for sand disposal in the past and is elevated 10 to 15 ft above the surrounding area.

Fish and Wildlife Habitat Conservation Areas

The site is divided into two parts to avoid a forested wetland and the WDFW access road that runs through the middle of the site. The Martin Bar site is not within any designated PHS habitat (Appendix A, Figure 8). The site supports a few wintering waterfowl and adjacent forested wetlands probably support cavity-nesting ducks.

The Cowlitz County General Development Performance Standards as stated above apply to this site as a Category 1 Habitat Conservation Area. The Cowlitz County Planning Department may, at their discretion, require Development Performance Standards for Salmonids Only or Habitat Management Plans to protect designated Habitat Conservation Areas (Cowlitz County CAO, Section 13B). The Corps in cooperation with Ecology, WDFW, and other state and federal agencies has already met the

requirements therein for a BA, Mitigation Plan and Monitoring Plan. Cowlitz County will be furnished with copies of these documents.

3.3.3 Woodland Bottoms Mitigation Site, RM W-81.0

The Woodland Bottoms Mitigation Site (Appendix A, Figure 8) is currently used for agricultural purposes, including row crops, hybrid poplar plantations, and pasture lands. Farmed wetlands (grazed, row crop) exist on the 284-acre wildlife mitigation site (Appendix A, Figure 9). Through mitigation construction activities, 97 acres of wetland habitat and 43 acres of riparian habitat will be developed (Appendix A, Figure 10). A 132-acre portion of the site will be converted to permanent Canada goose forage habitat (Appendix A, Figure 10), similar to that at Ridgefield National Wildlife Refuge.

Construction activities at Woodland Bottoms would include some agricultural tillage. The only grading required would be done in construction of the perimeter levees for the wetland management unit in order to maintain the current level of protection to surrounding lands afforded by the Burris Creek levees (Appendix A, Figure 11). Borrow material for use in constructing the perimeter levees will be obtained by removal of the necessary volume of material from the levees presently encompassing Burris Creek (Appendix A, Figure 11).

Frequently Flooded Areas

The mitigation site lies outside the 100-year floodplain (Exhibit K-7, Figure 6), behind main flood control dikes. An interior drainage system, (e.g., ditches and pump stations) is in place to drain waters from the diking district, including the mitigation site.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Woodland Bottoms site is not located in a Classification 1 regulated area.

Wetlands

Degraded wetlands and hydric soils currently exist in patches at the Woodland Bottoms site. These wetlands will be enhanced by removal of grazing cattle, restoration of native vegetation, and water management.² Alteration of all wetland types is permitted under the CAO as long as *“the alteration would improve or maintain the existing wetland function and value, or the alteration would create a higher value or less common wetland type which would improve the function or value of the wetland as*

² The Wetland Mitigation Plan for this site is described in more detail in Appendix B.

indicated within the wetland assessment and the mitigation plan.” The Wetland Mitigation Plan (Appendix B) clearly demonstrates that the proposed alteration is beneficial and consistent with the intent of the CAO.

The 1999 IFR/EIS, Appendix G states that these mitigation wetlands must be protected in perpetuity. These lands would be obtained in fee title by the sponsoring Washington ports for the Corps. Ownership of the mitigation sites will be turned over to the State of Washington upon their completion. The Wetland Mitigation Plan (Appendix B) outlines how the mitigation wetlands will be maintained.

Fish and Wildlife Habitat Conservation Areas

The area is currently used by wintering waterfowl, principally wintering Canada geese and surface feeding ducks (Appendix A, Figure 8). Wetland, riparian, and permanent pastureland habitat will be developed from existing agricultural land through tillage, construction of water control structures, natural seeding and plantings. This habitat will benefit Canada geese, ground-dwelling songbirds, sandhill cranes, reptiles, amphibians and other species.

3.3.4 Tidegate retrofits at Burris Creek, RM W-81.0

This restoration action entails installation of a new tide gate with a fish slide gate to improve fish passage. The tide gate would be fitted with a panel that has a rectangular opening of approximately 12 by 15 inches (fish slide). The opening can be closed if needed for flood control.

This action will enable salmonids to access spawning and rearing habitat upstream in Burris Creek.

Frequently Flooded Areas

The restoration feature site lies outside the 100-year floodplain (Exhibit K-7, Figure 6). Because the fish slides can be closed, their installation will not affect flood management capabilities within the Diking District.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Burris Creek site is not located in a Classification 1 regulated area.

Wetlands

The tidegate for Burris Creek would be located on the northern edge of the Woodland Bottoms Mitigation Site. The tidegate retrofits are consistent with the goals of the Woodland Bottoms Mitigation Site. Because the fish

slide can be closed if needed, they will not reduce WDFW's ability to regulate flows to the wetlands at Woodland Bottoms.

Fish and Wildlife Habitat Conservation Areas

The adjacent area (Woodland Bottoms) is currently used by wintering waterfowl, principally wintering Canada geese and surface feeding ducks (Appendix A, Figure 8). Installation of the tidegate retrofits will require minimal disturbance because it involves replacement of a portion of an existing structure rather than new construction and is limited in area to the flood control levee. Construction would occur in late summer when wildlife use of the area is minimal. The retrofit will enable salmonids to use spawning habitat upstream that is currently inaccessible.

3.3.5 Martin Island Mitigation Site, RM W-80.0

Martin Island contains a number of habitats, including agricultural pasturelands, riparian forest, and an embayment (Appendix A, Figure 12). Mitigation activities at the Martin Island site consist of two parts; partial filling (16 of 34 acres) of the embayment to create intertidal marsh habitat, and establishment of riparian forest and wetland habitat on a substantial portion of the rest of the island, primarily through conversion of agricultural pasturelands and blackberry thickets (Appendix A, Figure 13).³

Lagoon Intertidal Marsh Habitat: The 34-acre lagoon was artificially developed in 1966 when sand was excavated for use in the construction of nearby Interstate Highway 5. The Corps proposes to refill a 16-acre portion of the lagoon (W-80.0; Appendix A, Figure 8) to a level matching the elevation of adjacent, intertidal marsh, in order to create intertidal marsh habitat. The lagoon will be filled during the two-year construction phase. **Riparian Forest Establishment:** Parts of Martin Island have been used for cattle grazing and pastureland. Approximately 159 acres of agricultural habitat (pasture) will be restored to natural riparian forest (riparian early successional; Appendix A, Figure 13). The total may increase to 239 acres if 80 acres of pastureland, located at the south end of the site and no longer considered for an upland disposal site, are used for riparian forest restoration. Establishment of good-quality riparian forest can be accomplished by removing cattle from the island, spot removal of blackberry thickets, and tillage of pasturelands to provide a proper soil condition for seed germination of riparian trees. Riparian forest stands on Martin Island provide an excellent source of seeds for riparian forest development. Tillage operations will be timed to take advantage of natural seed dispersal by riparian tree species. The elevated area where topsoil overburden was dumped during excavation of the embayment, currently overgrown by invasive blackberries, will be removed and a

³ The wetland mitigation plan for this site is described in more detail in Appendix B.

portion of the topsoil used to cover the sand fill in the embayment to provide a better substrate for emergent wetland plants to develop.

Frequently Flooded Areas

Martin Island is frequently flooded, consistent with its FEMA Floodplain Designation A – 100 year floodplain; no baseflood elevations determined (Exhibit K-7, Figure 6). The 100-year base flood elevation at Martin Island is approximately 22 ft. (CRD). The goal of the mitigation activities on Martin Island is to return the island to a natural condition (e.g., principally riparian forest). Flooding is a natural occurrence in riparian and intertidal marsh habitats and these features often improve flood control. Flooding does not pose a risk to this land use; nor does construction of these habitats increase flood risk to any surrounding areas.

Geologic Hazards

Two small areas of severely erosive soils (old dredged material disposal locations composed of sand) are located on the western edge of the island. These are beaches that will not be disturbed by mitigation activities. The native soil comprising the island proper is less prone to erosion than the sand placed along the shoreline in the past.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Martin Island Mitigation Site is not located in a Classification 1 regulated area.

Wetlands

The lagoon site is a fully submerged embayment and entrance channel that was initially excavated to provide fill material for Interstate Highway 5. A portion of the embayment will be filled with sand and capped with two feet of topsoil to create 16 acres of intertidal marsh habitat (Appendix A, Figures 13 and 14). As a wetland developed by a mitigation action, the site will be regulated as outlined and approved in the Wetland Mitigation Plan (Appendix B).

The island itself is classified as wetland on the NWI wetland maps. The majority of the land surface is in fact existing riparian forest, cattle pasture and blackberry thickets. Wetland pockets exist on the island where depressions or frequent flooding by the river occur. Establishment of riparian forest on the island, and wetland habitat where elevation is appropriate, is consistent with this NWI characterization.

Alteration of all wetland types is permitted under the CAO as long as *“the alteration would improve or maintain the existing wetland function and value, or the alteration would create a higher value or less common wetland type which would improve the function or value of the wetland as indicated within the wetland assessment and the mitigation plan.”* The

Wetland Mitigation Plan (Appendix B) clearly demonstrates that the proposed alteration is beneficial and consistent with the intent of the CAO.

Appendix G of the project EIS states that these mitigation wetlands must be protected in perpetuity. These lands would be obtained in fee title by the sponsoring Washington ports for the Corps. Ownership of the mitigation sites will be turned over to the State of Washington upon their completion. The Wetland Mitigation Plan (Appendix B) outlines how the mitigation wetlands will be maintained.

Fish and Wildlife Habitat Conservation Areas

Although the WDFW PHS maps does not show a bald eagle nest site, a bald eagle nest is located on the west edge of the lagoon (Manlow 2002) (Appendix A, Figure 8). According to WDFW PHS mapping, dusky Canada geese and other waterfowl use the southern tip of the island, ½ mi south of the embayment and forage in the pasturelands present on the island (Appendix A, Figure 8).

Although the WDFW PHS maps do not show great blue heron nesting, a great blue heron rookery occurs north of the lagoon (Manlow 2002).

The Corps evaluated a number of potential measures to address potential impacts. These are discussed below. It is not possible to observe the timing restriction for protection of bald eagle nesting (January 1 to July 15) and great blue herons (February 15 to July 31) at Martin Island. Wildlife mitigation efforts slated for Martin Island are directed toward development of riparian forest and wetland habitats. For successful mitigation, establishment of riparian vegetation requires that work be done on the site in spring (e.g., April 15 – June 15). Dredged material disposal actions in the Martin Island embayment may occur throughout the year. The Corps has undergone formal consultation with USFWS and the BO issued by USFWS on December 6, 1999 permits the incidental take (harassment due to project-related disturbance) of one pair of bald eagles at Martin Island. Harassment of bald eagles, and great blue herons (if nesting birds are present) would be associated with mitigation operations (herbicide application, tillage, removal of invasive blackberry thickets, dredged material and soil placement in the embayment) to develop riparian and wetland habitat at Martin Island. These mitigation operations represent repetitive actions to which bald eagles and great blue herons are anticipated to habituate quickly. No incursions of equipment or personnel are anticipated into the established riparian forest that supports the bald eagle and great blue heron nest sites.

The Pacific Bald Eagle Recovery Plan (1986) established Habitat Management Goals (HMG) and Recovery Population Goals (RPG) by recovery zone for bald eagles. Martin Island lies in the Columbia Recovery Zone (RZ-10), which includes portions of both Oregon and

Washington. Table 5 summarizes these bald eagle management goals for RZ-10 and observed results for 2001.

Table 5. Habitat Management and Recovery Population Goals

State	Habitat Management Goal ^a	Recovery Population Goal ^b	2001 Breeding Territories Surveyed	2001 Occupied Breeding Territories ^{c,d}
Washington	18	12	39	38
Oregon	29	19	50	48
Total	47	31	89	86

- a This is the target number of breeding territories in order to ensure at least 12 occupied territories per year.
- b This is the minimum number of occupied breeding territories to indicate recovering eagle population.
- c Data compiled by Isaacs and Anthony (2001).
- d Not all existing breeding territories are occupied in any given year.

Data compiled by Isaacs and Anthony (2001) demonstrates that the population of bald eagles in Oregon and Washington, including the RZ-10 population, are exhibiting a continued population growth. The RZ-10 population, since 1990, has expanded from 25 to 89 breeding territories surveyed and 23 to 86 territories occupied and exceeds both the established HMG and RPG. Thus, the incidental take due to harassment of the Martin Island pair does not significantly impact the RZ-10 population.

Mitigation actions may result in an expanded, more diversified wildlife use of the site. Waterfowl, principally ducks, will benefit from the intertidal habitat developed at Martin Island. Riparian forest restoration will benefit Neotropical and resident songbirds, and improve Critical Habitat for listed Columbia River salmonids through provision of insects, fauna, and detrital (leaves) debris, and eventually large woody debris export to the Columbia River.

3.3.6 Northport, RM W-71.9

The Northport site has been used for dredged sand disposal in the past. The Port of Kalama is currently removing sand for resale. Sand placed by the Corps during the construction and maintenance phases of the Channel Improvement Project will also be resold.

The Northport site covers 27 acres (Appendix A, Figure 13) and the average elevation is 15 ft CRD. The existing berm will need to be raised over time in order to increase the site's capacity to hold another 900,000 cy of sand. The Corps plans to place 1,900,000 cy of sand at the site. The Port of Kalama will continue to mine sand from the site between disposal events, making room for additional sand. When full, the site elevation will be 41 ft CRD. A weir drainage system is already in place.

Frequently Flooded Areas

The Northport site remains within the 100-yr floodplain, no baseflood elevation determined (Exhibit K-7, Figure 8). The site will undergo FEMA review as required by Cowlitz County to ensure that flood hazards have been minimized.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Northport site is not located in a Classification 1 regulated area.

Wetlands

The PHS map inaccurately identifies wetlands on the site (Appendix A, Figure 15). There are no wetlands on the site. Wetland habitat does immediately abut the site. This is an existing sand disposal and resale site.

Fish and Wildlife Habitat Conservation Areas

An osprey nest was observed ¼ mi south of the site on a steel dock platform, August 14, 2001 and is shown on the PHS map (Appendix A, Figure 15). The Northport site is in a heavily industrialized area and the PHS maps from WDFW show no wildlife use of the site.

3.3.7 Cottonwood-Howard Island Deer Reintroduction, RM W-68-71.5

Approximately 650 acres of Cottonwood and Howard Islands will be acquired for the reintroduction of Columbian white-tailed deer (Appendix A, Figure 15). Approximately 60 acres of tidelands will also be acquired. Columbian white-tailed deer will be translocated to the islands from populations located on the Julia Butler Hansen Columbian White-tailed Deer National Wildlife Refuge, Puget Island or another suitable population determined by the USFWS. The USFWS will monitor Cottonwood-Howard Island to determine the success of establishing a secure, viable population of Columbian white-tailed deer.

Frequently Flooded Areas

The portions of Howard and Cottonwood islands designated for deer introduction lie within the FEMA 100-year floodplain (Exhibit K-7, Figure 8). The reintroduction of the deer to the riparian forest habitat will not reduce flood storage capacity or increase the risk of erosion during high flows.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas. Unstable slopes exist on the southwestern edge of Cottonwood Island, as shown on the Cowlitz County Critical Areas Maps.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Howard-Cottonwood Island Ecosystem Restoration Feature is not located in a Classification 1 regulated area.

Wetlands

The reintroduction of Columbian white-tailed deer poses not threat to wetlands on the Howard-Cottonwood Island site.

Fish and Wildlife Habitat Conservation Areas

WDFW PHS maps show little wildlife use of the Howard and Cottonwood islands. Concentrations of wintering waterfowl are shown to the east of Cottonwood Island. Implementation of the proposed restoration action would result in use of the site by Columbian white-tailed deer.

3.3.8 Cottonwood Island, RM 70.1

Cottonwood Island was substantially altered in the 1980's by placement of dredged material from the Mt. St. Helens emergency action. Natural riparian forest abutting Carrolls Channel does remain. The land surface is at about 30 ft CRD and steep banks drop off to the Columbia River and Carrolls Channel. The island is undeveloped except for navigational beacons, shoreline protection structures, and a few primitive campsites.

The 62-acre disposal site is located immediately south of the Howard Island disposal site (Appendix A, Figure 15) and can hold up to 3,200,000 cy of sand. The Corps plans to place 1,500,000 cy of sand over a 20-yr period including the construction and maintenance phases of the project. The final site elevation will be 49 ft CRD. A weir drainage system will be constructed to allow return water to clear before it outfalls back to the Columbia River.

Frequently Flooded Areas

The Cottonwood Island site's average elevation is 30 ft CRD. The base flood elevation at the site is 17.7 ft CRD. The site has been raised out of the 100-yr floodplain by previous sand disposal activities, but this is not reflected on the FEMA map (Exhibit K-7, Figure 8). A Letter of Map Revision due to Fill (LOMR-F) will be prepared by the Corps upon attainment of more detailed topographic information for the site.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas. Severely erosive soils to the south of the disposal site, as shown on the Cowlitz County Critical Areas Maps, have been avoided.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Cottonwood Island site is not located in a Classification 1 regulated area.

Wetlands

No wetlands exist on the disposal site. Disposal is limited to the previously designated and used disposal area, thus adjacent wetlands will not be impacted.

Fish and Wildlife Habitat Conservation Areas

There are an estimated 6.2 acres of riparian habitat on the site, consisting of clumps of cottonwoods that have grown since the last deposition of dredged sand (circa 1980s). Impacts to these 6.2 acres have been addressed in the project mitigation plan under the project-wide mitigation approach (Appendix G to the EIS). Riparian impacts for all Washington and Oregon disposal sites are estimated at 50 acres. Approximately 159 acres of riparian habitat will be developed at the Martin Island mitigation site and 43 acres at Woodland Bottoms, for a total of 202 acres (Appendix A, Figures 10 and 13). This yields an average replacement ratio of 4:1. The riparian acreage proposed in the mitigation plan is more than sufficient to replace the anticipated loss of riparian habitat at all Washington and Oregon disposal sites. WDFW's PHS maps show waterfowl nesting adjacent to but not on the site (Appendix A, Figure 15). The site lies outside the PHS area of waterfowl concentration. A great blue heron rookery is present approximately ½ mile north of the disposal site (Appendix A, Figure 13). Waterfowl, primarily Canada geese and mallards, nest on and adjacent to the disposal site. Osprey nest on pile dikes scattered along the shoreline (Appendix A, Figure 15).

The Corps has evaluated a number of potential measures to address potential impacts. These are discussed below.

The disposal site covers only a portion of Cottonwood Island (Appendix A, Figure 15). Corps disposal actions are limited to previously impacted areas and do not intrude into the wetland and riparian forest habitat abutting the disposal site. On the current site map, the heronry is located 970 feet from the nearest portion of the disposal site. The site border will be adjusted to assure that the distance between the site and the rookery is at least 1,000 feet. The rookery is visually screened by intervening riparian forest from the disposal site.

Several osprey nests occur on platforms and structures adjacent to the site (Appendix A, Figure 15). Since osprey nesting and disposal activities have coexisted for years, disposal activities from the Project are not expected to impact the ospreys.

The WDFW PHS maps do not show use of the island by Canada geese; however, a small number of Canada geese utilize Cottonwood Island for nesting activities (WDFW 1996). Loss of a portion of their nesting habitat to disposal activities at Cottonwood Island poses no threat to this population. Nesting activities for Canada geese are virtually fully completed by early May. Some nesting by mallards may occur at this location. However, once the initial construction volumes are placed on the site, no nesting habitat is expected to be available in subsequent years for waterfowl. Thus, the timing restriction is a moot point after the first construction year. Tall, dense vegetative cover suitable for waterfowl nesting would be difficult to establish between annual disposal actions. Planting of vegetation at this location could occur after disposal use of this site has been completed. The 300-foot setback of the disposal site from the Columbia River does provide adequate nesting habitat for the small number of Canada geese and mallards that currently nest at Cottonwood Island.

Columbian white-tailed deer have yet to be translocated to Cottonwood Island. Translocation of deer to the island is proposed as an ecosystem restoration feature to be implemented concurrently with project construction. Provisions for vegetative cover on the disposal site would be relatively futile until site use is discontinued. A deer population translocated to this site would be expected to primarily use the riparian forest habitat that occurs on the undisturbed portions of the island rather than occupy the disposal location on Cottonwood Island.

3.3.9 Howard Island, RM 68.7

The Howard Island site is an existing disposal site used for maintenance of the 40-ft channel. Nearly all of the Howard Island property has been covered with dredged sand over the last 40 years. A 200-acre area is planned for use over the construction and 20-year maintenance phases of the project. This area can hold up to 6,400,000 cy of additional sand, which would raise the average site elevation from 26 ft CRD to 51 ft CRD. The Corps initially plans to utilize only a small amount of this capacity, placing 600,000 cy of sand. A weir drainage system will be constructed to allow return water to clear before it outfalls to the Columbia River.

Frequently Flooded Areas

The Howard Island site's average elevation is 26 ft CRD. The base flood elevation at the site is 17.1 ft CRD. The site has been raised out of the 100-yr floodplain by previous sand disposal activities, but this is not reflected on the FEMA map (Exhibit K-7, Figure 9). A Letter of Map Revision due to Fill (LOMR-F) will be prepared by the Corps upon attainment of more detailed topographic information for the site.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Howard Island site is not located in a Classification 1 regulated area.

Wetlands

There are no wetlands within the 200-acre Howard Island disposal site.

Fish and Wildlife Habitat Conservation Areas

The Howard Island site is not designated as a Fish and Wildlife Habitat Conservation Area for any state-listed species. The PHS designation, as shown on Appendix A, Figure 15, is for “Island” habitat. No regulatory requirements are associated with this designation. The proposed 200-acre disposal site will lie within the footprint of an existing disposal site, resulting primarily from disposal actions associated with Mt. St. Helens dredging activities in the 1980’s. The disposal site selected for the Channel Improvement Project has been inactive since the 1980s and some riparian vegetation has established on the site. Placement of dredged material from the Channel Improvement Project will impact an estimated 20 acres of riparian habitat on the site. The Cowlitz County CAO requires that a BA be conducted to determine appropriate mitigation. This has been addressed in the Corps 1999 EIS and associated BA and Mitigation Plan, which will be provided to the County.

Mitigation for riparian impacts is planned under the project-wide mitigation approach as described in the 1999 Final IFR/EIS, Appendix G. Riparian impacts for all Washington and Oregon disposal sites are estimated at 50 acres. Approximately 159 acres of riparian habitat will be developed at the Martin Island mitigation site and 43 acres at Woodland Bottoms, for a total of 202 acres (Appendix A, Figures 10 and 13). This yields an average replacement ratio of 4:1. The riparian acreage proposed in the mitigation plan is more than sufficient to replace the anticipated loss of riparian habitat at all Washington disposal sites.

A great blue heron rookery occurs more than 1,000 ft southeast of the disposal site (Appendix A, Figure 15). Waterfowl nest on and adjacent to the site. Wetlands and a large block of riparian forest are adjacent north and east of the site.

Corps disposal actions are limited to previously impacted areas and do not intrude into the wetland and riparian forest habitat abutting the disposal site. WDFW typically recommends timing restrictions for activities within 1,000 feet of a great blue heron rookery. Disposal will occur beyond 1,000 feet to avoid impacts to the rookery. In addition, the

disposal site is screened by intervening riparian forest from the heron rookery.

Several osprey nests occur on platforms and structures adjacent to the site (Appendix A, Figure 15). Since osprey nesting and disposal activities have coexisted for years, disposal activities from the Project are not expected to impact the ospreys.

The WDFW PHS maps do not show use of the island by Canada geese and the area is not a Fish and Wildlife Conservation area for geese; however, a small number of Canada geese utilize Howard Island for nesting activities (WDFW 1996). Loss of a portion of their nesting habitat to disposal activities at Howard Island poses no threat to this population. Nesting activities for Canada geese are almost completed by early May. Some nesting by mallards may occur at this location. However, once the initial construction volumes are placed on the site, no nesting habitat is expected to be available in subsequent years for waterfowl. Tall, dense vegetative cover suitable for waterfowl nesting would be difficult to establish between annual disposal actions. Planting of vegetation at this location could occur after disposal use of this site is completed. The 300-foot setback of the disposal site from the Columbia River provides adequate nesting habitat for the small number of Canada geese and mallards that currently nest at Howard Island.

Columbian white-tailed deer have yet to be translocated to Howard Island. Translocation of deer to the island is proposed as an ecosystem restoration feature to be implemented concurrently with project construction. Provisions for vegetative cover on the disposal site would be relatively futile until site use is discontinued. A deer population translocated to this site would be expected to primarily use the riparian forest habitat that occurs on the undisturbed portions of the island rather than occupy the disposal location on Howard Island. Forage on the undisturbed portions of the island is denser and more palatable because of favorable soil conditions.

3.3.10 Port of Longview, International Paper, RM W-67.5

This site is zoned for heavy manufacturing. It is used as a receiving site for dredged material from maintenance of the 40-ft channel. Sand is currently being sold from the site, and sand placed by the Corps will also be resold. Containment dikes presently surround the 29-acre site (Appendix A, Figure 16). The current average site elevation is 20 ft CRD. When full, the elevation at the top of the sand pile will be 47 ft CRD. The site can accept up to 1,000,000 cy of sand. The Corps plans to place up to 2,900,000 cy of sand over the entire life of the project at this location, using storage capacity created when sand is sold from the site. Because the site has already been used for sand disposal, a weir drainage system is already in place.

Frequently Flooded Areas

The entire International Paper site lies outside the FEMA 100-year floodplain (Exhibit K-7, Figure 14). Flood control levees protect the site.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. This site is not located in a Classification 1 regulated area.

Wetlands

There are no wetlands on the site. This is an existing, active sand disposal site.

Fish and Wildlife Habitat Conservation Areas

The site is in a heavily industrialized area and the PHS maps from WDFW show no wildlife use of the site (Appendix A, Figure 16). Several osprey nests occur on platforms and other structures in the vicinity of the site. The closest osprey nest is approximately 650 ft from the southern edge of the site. Since osprey nesting and industrial activities have coexisted for years, disposal activities from the Project are not expected to impact the ospreys. A great blue heron rookery occurs approximately 2½ miles from the site, on land across Carrolls Channel, and disposal activities are not expected to adversely affect the heron rookery.

3.3.11 Reynolds Aluminum, RM W-63.5

Reynolds Aluminum has used this 13-acre site in the past for sand disposal from maintenance dredging of the access channel from the river to their aluminum plant, which is now closed (Appendix A, Figure 17). Sand is currently being sold from the site, and sand placed there by the Corps will also be resold. The site lies behind a dike and a weir drainage system for water from pipeline placement of dredged sand is already in place.

The site elevation is currently 20 ft CRD. At full capacity, the top of the sand pile will reach 50 ft CRD. The site can hold up to 500,000 cy of sand. The Corps plans to place 200,000 cy during the first year of the construction phase that would result in a disposal site crest elevation of 32 ft CRD. This sand will probably be resold from the site. The landowner may request additional material to be placed at this location in subsequent years should they sell the sand placed there.

Frequently Flooded Areas

The entire Reynolds Aluminum site lies outside the 100-year floodplain (Exhibit K-7, Figure 10).

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Wetlands

There are no wetlands on the site. This is an existing, bermed, active sand disposal site.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities within the scope of this project. The Reynolds Aluminum site is not located in a Classification 1 regulated area.

Fish and Wildlife Habitat Conservation Areas

The site is in a heavily industrialized area and the PHS maps from WDFW show no wildlife use of the site (Appendix A, Figure 17).

3.3.12 Improved Embayment Circulation, RM W-60

The strip of land connecting Hump and Fisher Islands impedes the flow of water through the embayment. This Ecosystem Restoration Feature proposes to construct a channel between the islands (Appendix A, Figure 17) to allow water to flow through the embayment, reducing water temperature and increasing water quality. Improvements to water quality are expected to benefit juvenile salmonids that use the embayment.

Frequently Flooded Areas

The area designated for channel construction is outside the FEMA 100-year floodplain (Exhibit K-7, Figure 10). The material to be excavated, sand from a historic disposal action, would be placed atop like material immediately adjacent to the channel location that is also outside the FEMA 100-year floodplain.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Wetlands

The channel will cut through fringing wetlands on both the river and embayment sides of the feature. The impacted area is minor in nature and fringing wetland habitat is expected to develop along the channel margins post-construction.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities at this site. The Hump-Fisher Island site is not located in a Classification 1 regulated area.

Fish and Wildlife Habitat Conservation Areas

Habitat changes as a result of opening the channel between Hump and Fisher Islands are not expected to be detrimental to the heron rookery on Fisher Island. The site is over 2,000 ft from the construction activity and if the forage base is changed at all, the changes are likely to be beneficial.

3.3.13 Hump Island, RM W-59.7

The Hump Island site is an active, existing Corps sand disposal site for maintenance dredging of the 40-ft channel (Appendix A, Figure 17). The site can hold up to 1,500,000 cy of additional sand. The Corps plans to fill the site to capacity during the first six years of the maintenance phase of the Improvement project. The site's current elevation averages 25 ft CRD, with the highest areas adjacent to the navigation channel. When the site is full, the final elevation at the top of the sand pile will be 42 ft CRD. A weir drainage system with outfall to the Columbia River is already in place.

Frequently Flooded Areas

The Hump Island site's average elevation is 25 ft CRD. The base flood elevation at the site is 13.4 ft CRD. The site has been raised out of the 100-yr floodplain by previous sand disposal activities, which is reflected on the FEMA map (Exhibit K-7, Figure 10).

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements do not apply to activities at this site. The Hump Island site is not located in a Classification 1 regulated area.

Wetlands

There are no wetlands on the site. This is an active sand disposal site.

Fish and Wildlife Habitat Conservation Areas

The Hump Island site is in a Waterfowl Concentration Area. The PHS maps do not identify eagle, heron, or osprey nests or rookery on the site.

A bald eagle nest is located on Fisher Island, adjacent to the site, and about 1,700 ft north of the northern edge of the site (Appendix A, Figure 17). A great blue heron rookery is present 2,600 ft north of the northern edge of the site on Fisher Island (Appendix A, Figure 17). Three osprey nests occur immediately off the site—one site occurs on a dolphin and the other two are navigation markers (Appendix A, Figure 17). Waterfowl (Canada goose, cavity-nesting ducks) nest on and adjacent to the site. Concentrations of wintering waterfowl feed in the lagoon. Regular small

concentrations of cavity nesting ducks utilize the embayment and nest primarily on Fisher Island (Appendix A, Figure 17).

The Corps has evaluated a number of potential measures to address potential impacts. These are discussed below.

A review of WDFW's PHS map of the area shows that the bald eagle nest is more than 1,700 ft from planned disposal and ecosystem restoration activities; therefore, a Bald Eagle Management Plan (BEMP) is not required. The bald eagle nest location is approximately 1,700 feet distant from the nearest portion of the disposal site with riparian forest along both the Hump Island and Fisher Island shoreline providing a visual barrier. Thus, disposal activities are not considered to pose a concern for this nesting pair and timing restrictions are unnecessary.

Sand disposal will take place at least 3,000 ft away from the great blue heron rookery. Riparian forest along both the Hump Island and Fisher Island shoreline will provide a visual barrier between the heronry and the disposal site. Thus, disposal activities are not expected to impact this heronry.

The osprey nests exist on structures adjacent to the site. Past sand disposal has not adversely affected osprey nesting, and disposal activities from the Project are not expected to impact these sites.

An introduced population of Canada geese has nested throughout western Oregon and western Washington since at least the 1970s. This population and the area it uses have increased dramatically since its introduction. A small number of these geese utilize Hump Island for nesting and would be expected to rear their broods in the embayment between Hump and Fisher islands. Loss of a portion of their nesting habitat to disposal activities at Hump Island poses no threat to this population. Nesting activities for Canada geese are almost completed by early May. Some nesting by mallards may occur at this location. However, once the initial construction volumes are placed on the site, no nesting habitat is expected to be available in subsequent years for waterfowl. Thus, the timing restriction would not provide any benefit after the first construction year. Tall, dense vegetative cover suitable for waterfowl nesting would be difficult to establish between annual disposal actions. Planting of vegetation at this location could occur once disposal use of this site has been completed. Mitigation for Canada goose forage habitat is planned in the Wildlife Mitigation Plan (1999 Final IFR/EIS, Appendix G). The 132 acres of permanent pastureland habitat planned for Woodland Bottoms will be of higher quality and more stable than any vegetation that could be established on Hump Island. This pastureland habitat will benefit Canada geese, ground-dwelling songbirds, sandhill cranes, reptiles, amphibians and other species.

Columbian white-tailed deer have yet to be translocated to the Fisher-Hump Island complex by USFWS (David 2002). Translocation of deer to the island complex may occur in approximately February 2003. Provisions for vegetative cover on the disposal site would be relatively futile until site use is discontinued. A deer population translocated to this site would be expected to use the riparian forest habitat that occurs on Fisher Island rather than occupy the disposal location on Hump Island.

Populations of Columbian white-tailed deer naturally occupy Karlson, Price, Hunting, Jackson, Tenasillahe, Wallace, Little Wallace, Puget, Little, Ryan, Jackson, Brown, Whites, Anundes, Kinnunen Cut, and Skull islands in the lower Columbia River (USFWS 1983). Alan Clark, USFWS (Clark 2002) stated that USFWS does not provide crossings for deer to access or egress these islands and that Columbian white-tailed deer are quite capable of swimming between islands and crossing the entire Columbia River. Thus, provision of a crossing at Fisher-Hump Island is unnecessary from a biological standpoint.

The County may require a Habitat Management Plan pursuant to Section 13D of the CAO. The Biological Assessments and Biological Opinions prepared to date along with the conceptual mitigation plan in Appendix B are intended to satisfy 13D of the CAO.

3.4 City of Longview

One disposal site (Mt. Solo) is located within the City of Longview's jurisdiction.

The City of Longview's CAO requirements are the same as Cowlitz County's, except where noted below.

Request for Determination of Critical Areas: *The Director will conduct a preliminary environmental review, based on existing in-house resources and data, to determine if critical areas are known to exist on the applicant's parcel; however, the ultimate burden of proof is on the applicant to provide sufficient data to the Director should the Director suspect critical areas are present. Longview Municipal Code ("LMC") §17.10.080(4).*

A Critical Area permit is required if it is determined that the proposed alteration or development is located within 100 feet of a critical area or associated buffer. LMC §17.10.060.

Wetlands

Wetland categories I through III are nearly identical to Classifications 1 through 3 in the Cowlitz County CAO. Cowlitz County Critical Areas

Ordinance, Section 12(A). Category IV is defined differently from Classification 4. *Id.*; LMC § 17.10.110(A).

Category IV:

- a. *Those wetlands which are not category I, II, or III.*
- b. Wetlands 2 acres or larger and hydrologically isolated with one vegetation class, and more than 90% ground cover (as assessed by aerial photo) being any combination of non-native, invasive species, are rated Category IV or higher. LMC § 17.10.110(A).

Minimum size for Category IVa and IVb is 2 acres. *Id.* at (B).

Wetland replacement and buffer requirements are shown in Table 4.

Geologic Hazards

The definition for a Landslide Hazard Area is the same as that for Cowlitz County, except that the City of Longview's Engineer has the discretion to include "other areas as the City Engineer may conclude present potential slide hazards." LMC § 17.10.140(B).

Critical Aquifer Recharge Areas

Regulated Aquifer Recharge Areas. All areas with a critical recharging effect on aquifers used for potable water are areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water supply. LMC § 17.10.150(A).

Fish and Wildlife Habitat Conservation Areas

The City of Longview imposes Development Performance Standards, Habitat Protection requirements, and in some cases, Habitat Management Plan requirements for activities within areas identified by WDFW to support state listed species or designated PHS. LMC § 17.10.120(B, D-I). There are eight different classifications of Fish and Wildlife Habitat Conservation Areas as defined by WAC 365-190-080 (5), plus the City of Longview's addition of unintentionally created ponds between 1 and 20 acres in size (the same as the ninth category adopted by Cowlitz County). LMC § 17.10.120(B). This addition at the City's discretion is authorized under WAC 365-190-080(5)(b). *Id.*

Frequently Flooded Areas

- A. Classification. *All flood hazard areas shall be as identified on the Flood Insurance Rate Maps prepared by FEMA, dated December 20, 2001. These maps are hereby adopted by reference and declared to be part of this ordinance.* LMC § 17.10.130(A).
- B. Designation. *Areas of the City of Longview meeting the classification criteria for frequently flooded areas are hereby designated as such under RCW 36.70A.170. Id. at (B).*

- C. *Development Limitations.* All development shall comply with the Longview Municipal Code 17.24, Flood Damage Prevention Ordinance, as now or hereafter amended. *Id.* at C.

3.4.1 Mt. Solo, RM W-62.0

The 46.6-acre Mt. Solo site (Appendix A, Figure 17) is nearly level at 8 ft CRD. The site can hold up to 2,500,000 cy of dredged sand. The Corps plans to place 2,400,000 cy of sand over a 20-yr period including the construction and maintenance dredging phases of the project, raising the site's elevation to 49 ft CRD. This is a new disposal site with a 2-acre settling/discharge cell. from which a pump station will pump discharge waters over the flood control dike and into the Columbia River (Appendix A, Figure 18). An outfall structure (generally a weir with a pipe riser set at appropriate elevations) will be installed between cells to allow water to flow to the settling/discharge cell adjacent to the flood control dike (Appendix A, Figure 18).

Request for Determination of Critical Areas

The formal Request for Determination, required by the City of Longview, will accompany the Joint Aquatic Resources Permitting Application (JARPA), submitted for Shoreline, Conditional Use, and CAO permits. A preliminary meeting was held with Cowlitz County and City of Longview staff on November 20, 2001. At that time it was determined that the only likely critical area was an approximately 10.8-acre wetland located on the site.

Frequently Flooded Areas

The Mt. Solo site lies outside the FEMA 100-year floodplain, behind a flood control dike maintained by the Cowlitz County Consolidated Diking District (Exhibit K-7, Figure 10). Permission will be secured from the Diking District to lay the temporary pipeline over the dike during sand disposal activities.

Geologic Hazards

The site is not within any designated landslide, erosion, or mine hazard areas.

Aquifer Recharge Areas

The Critical Aquifer Recharge Areas requirements for Cowlitz County do not apply to activities within the scope of this project. The Mt. Solo site is not located in a Classification 1 regulated area.

The Mt. Solo site does not meet the City of Longview's definition of a Regulated Aquifer Recharge Area, as it is hydrologically connected to the Columbia River rather than the Cowlitz River, which is the source of the majority of Longview's potable water resources (LMC Section 17.10.150).

Fish and Wildlife Habitat Conservation Areas

None of the Mt. Solo site matches the descriptions in the City of Longview CAO of Fish and Wildlife Habitat Conservation Areas. The WDFW PHS map does not show any PHS or state-listed species using the site (Appendix A, Figure 17).

Riparian Zones: Development setbacks are required by the City of Longview in areas adjacent to streams. The Columbia River is a Type 1 stream (WAC 222-16-030) and a setback of 250 ft from Ordinary High Water (OHW) is required. The Mt. Solo site lies behind a flood-control dike that effectively limits the boundary of the riparian zone. Distance from OHW to the inland toe of the dike is 191 ft. The riparian zone at the Mt. Solo location consists of the flood control dike, which is annually mowed and maintained as grassland to facilitate dike inspection for damage or leaks. Consequently, no riparian vegetation (trees or shrubs) is allowed to grow on the dike. Nonetheless, the waterward boundary of the disposal site will be set back 300 ft, as agreed to in the 2002 NMFS BO. This setback exceeds that required by the CAO.

Wetlands

The Mt. Solo disposal site is located behind a flood control dike maintained by the Cowlitz County Consolidated Diking District (Corps 2001). Wetland habitat present in the disposal site is detailed in Appendix A, Figure 19.

Using Ecology's information, the wetland on the Mt. Solo site will be classified by the City of Longview personnel according to their classification scheme. It is expected that the wetland will meet the criteria for the fourth level classification under the City CAO, or at best, the third level, and because of its size, it will be considered a Class Three wetland (Ecology 1993). The City of Longview requires mitigation at a 2:1 replacement level. The project-wide mitigation at Martin Island and Woodland Bottoms (Appendix A, Figures 10 and 13) was predicated upon replacement of 20.4 acres of impacted wetlands (revised in 2002 to 16 acres of wetland impacts) with 120 acres, yielding an approximately 8:1 replacement ratio, well above what is required. Further, the wetlands developed by mitigation activities will be of higher quality and greater ecological value than those at the Mt. Solo site due to their larger size, protection, and juxtaposition to riparian forest habitat. Wetlands at Mt. Solo are subject to drainage associated with operation of the diking district and are grazed by cattle. Waste rock was graded over a substantial portion of the site sometime in the past.

Conceptual Mitigation Plan: The Wetland Mitigation Plan (Appendix B) describes the mitigation action using Ecology's *Guidelines for Preparing Freshwater Mitigation Plans and Proposals* (Ecology 1994).

3.5 Wahkiakum County

Wahkiakum County is preparing Critical Areas Maps for adoption. Until the maps are complete, applicants and County staff rely on National Wetlands Inventory (NWI) maps and WDFW PHS maps for use in their environmental review (Beyer 2002).

Critical areas regulated under the Wahkiakum County CAO include:

Frequently Flooded Areas

Flood hazard areas shall be as identified in the scientific and engineering report entitled “the Flood Insurance Study for Wahkiakum County,” dated September 28, 1990, with accompanying Flood Insurance Rate Maps prepared by FEMA, and all areas identified within Wahkiakum County’s Flood Control Ordinance, Title 86 RCWC, as areas of special flood hazard. Wahkiakum County Ordinance 131-00, Section 17(A), (2000).

Geologically Hazardous Areas

Geologically hazardous areas are defined as designated erosion, seismic, volcanic, and landslide hazard areas. *Id.* at Section 18(A)(1-4).

Aquifer Recharge Areas

Municipal water for Wahkiakum County is pumped directly from the Elochoman River and from ground water adjacent to the Grays River. There are no known critical aquifer recharge areas within the County. Id. at Section 19.

Wetlands

Wetland classifications and mitigation and buffer requirements are shown in Table 4. See *Id.* at Sections 20(B, F and G).

Fish and Wildlife Habitat Conservation Areas

Wahkiakum County imposes Development Standards, Habitat Protection requirements, and in some cases, Habitat Management Plan requirements for activities within areas identified by WDFW to support state listed species or designated PHS. See *Id.* at Section (D). There are eight different classifications of Fish and Wildlife Habitat Conservation Areas (as defined by WAC 365-190-080[5], and standard requirements apply to these areas, as listed in the section following Table 4. *Id.* at Section 21(B).

D. Standards.

1. *The Administrator shall ensure that any development within fish and wildlife habitat conservation areas, as classified in subsection B of this Section, shall be reviewed according to the following performance standards:*
 - a. *When impacts to fish and wildlife habitat cannot be avoided, the performance standards contained in this subsection shall*

be used to develop plans for regulated activities. Critical area permits may be conditioned to reflect the following performance standards contained in this Subsection D.

- b. Consider habitat in site planning and design.*
- c. Locate buildings and structures in a manner that preserves the habitat or minimizes adverse impacts.*
- d. Consolidate habitat and vegetated open space in contiguous blocks, and where possible, locate habitat contiguous to other habitat, open space or landscaped areas to contribute to a continuous system or corridor that provides connections to adjacent habitat areas.*
- e. Use native species in any landscaping of disturbed or undeveloped areas and in any enhancement of habitat or buffers.*
- f. Emphasize heterogeneity and structural diversity of vegetation in landscaping.*
- g. Remove and/or control any noxious or undesirable species of plants as identified by the Wahkiakum County Noxious Weed Control Board, but with due attention to possible negative impacts of herbicide sprays to wetlands.*
- h. Preserve trees to the extent possible, preferably in consolidated areas.*
- i. Preserve and introduce native plant species which serve as food, shelter from climatic extremes and predators, and structure and cover for reproduction and rearing of young for critical wildlife.*
- j. Preserve the natural hydraulic and ecological functions of drainage systems.*
- k. Preserve fish and wildlife habitat conservation areas through maintenance of stable channels, adequate low flows, management of stormwater runoff, erosion and sedimentation.*
- l. Manage access to fish and wildlife habitat conservation areas to protect species which are sensitive to human disturbance.*
- m. Maintain or enhance water quality through control of runoff and use of best management practices.*

Wahkiakum Ordinance 131-00, Section 21(D)(1), (2000).

Riparian zones are regulated under Section 21, Fish and Wildlife Habitat Conservation Areas. *Id.* at Section 21(E). Designated riparian zones and mitigation requirements are shown in Table 4.

3.5.1 Purple Loosestrife Control Program, RM W-52-18

Approximately 10,000 acres of tidal marsh in the Columbia River estuary are infested with purple loosestrife, an invasive, non-native plant that displaces native vegetation. If left unchecked, purple loosestrife (sp.) dominates the tidal marsh habitat, resulting in reduced biological diversity and negative impacts to estuarine wildlife.

The Purple Loosestrife Control Program will use an integrated pest management approach to include biological agents (insects), herbicides and mechanical (hand pulling) treatments. The USEPA-approved herbicide Rodeo will be applied from June to October during low tides when the plants are exposed. Fabric treated with the herbicide will be used to wipe herbicide onto purple loosestrife and spot spraying and hand-pulling will be used where appropriate. Release of biological agents would be based upon results from an ongoing action in the estuary (USFWS, Clatsop County and others). These approaches are intended to minimize exposure of non-target plant species.

The success of the program will be monitored and documented over a five-year period, and the results will assist the U.S. Fish and Wildlife Service, the States of Oregon and Washington, and local governments with planning regional control efforts.

Frequently Flooded Areas

The intertidal areas in the estuary targeted for purple loosestrife control all lie within the FEMA 100-year floodplain. No dredging, fill, or construction actions are associated with this restoration activity. Purple loosestrife will only be treated with herbicide at low tides during the summer season (June-October), when the plants are actively growing and leaves, stems and/or flowers are exposed.

Geologically Hazardous Areas

There are no geologically hazardous areas as defined in the CAO on this site.

Wetlands

Activities associated with this restoration action will take place within wetlands. The restoration action is expected to enhance the function of existing wetlands.

Fish and Wildlife Habitat Conservation Areas

The most likely areas for purple loosestrife to occur in Washington include intertidal marsh habitat at Whites, Jackson and Ryan Islands adjacent to Puget Island, the mouth of the Elochoman River, the embayment near Three Tree Point and Grays Bay. These areas all support waterfowl, wading birds such as great blue herons, bald eagles, including nesting pairs at some locations, and shorebirds. Columbian white-tailed

deer occur at Whites, Jackson and Ryan Islands and the mouth of the Elochoman River. Figures 20, 23, 24, and 25 provide PHS information for these locations.

3.5.2 Brown Island, RM W-46.3/46.0

Brown Island (Appendix A, Figure 20) is an existing, active sand disposal site, used routinely by the Corps for maintenance dredging of the 40-ft channel. The site is listed in the Wahkiakum County Dredged Material Management Plan (DMMP). The 72-acre site will be used as needed over a 20-yr period including the construction and maintenance phases of the project. Up to 4,700,000 cy of sand will be placed on Brown Island, raising the elevation from an estimated elevation of 15 ft CRD to 66 ft CRD. A weir drainage system with outfall to the Columbia River is already in place.

Frequently Flooded Areas

The entire Brown Island site lies within the FEMA 100-year floodplain (Exhibit K-7, Figure 12). Brown Island is an established sand disposal site for the 40-foot channel O&M material and a containment berm surrounds the site.

The base flood elevation at the site is 10.3 ft CRD. Portions of the site have been raised out of the 100-yr floodplain by previous sand disposal activities, but this is not reflected on the FEMA map (Exhibit K-7, Figure 12). The containment berm that is in place blocks river flows from entering the remaining area within the disposal area that is lower than the base flood elevation. A Letter of Map Revision due to Fill (LOMR-F) will be prepared by the Corps upon attainment of additional topographic information.

Geologically Hazardous Areas

There are no geologically hazardous areas as defined in the CAO on this site.

Wetlands

There are no wetlands on this site. The site has been routinely used for sand disposal and is raised approximately 10 ft above the natural ground surface level.

Fish and Wildlife Habitat Conservation Areas

Brown Island is almost completely covered by sand. Vegetative cover is sparse due to the virtually sterile, xeric nature of the sand substrate derived from dredged material placement. Wildlife use of the site is limited due to lack of available vegetative forage and cover.

WDFW has expressed concern for waterfowl concentrations, harbor seal haulout areas, and Columbian white-tailed deer at or near the site (Appendix A, Figure 20). Waterfowl concentrations have been observed

in the intertidal zone on the north side of the island facing the Cathlamet Channel, north and outside of the sand disposal area. Harbor seals have been observed by WDFW personnel to haulout on sandbars in the intertidal zone north of the island, but are not expected to occur on the disposal site. The disposal activities on Brown Island will not impact the intertidal area frequented by waterfowl or harbor seals. The proposed disposal activity is relatively low intensity, distant from the intertidal area and visually buffered by the containment dike. Some nesting by Canada geese does occur at the location, but disposal operations associated with 40-ft channel O&M have restricted their nesting to the outer toe of the containment dike where debris and/or dense vegetation above the high tide line occurs.

In April 2002, to comply with USFWS requirements in their BO for the Corps' DMMP (O&M dredging of the 40-foot navigation channel), the Corps seeded 57.1 acres of the site with a spring oats/pasture mix and applied approximately 300 lbs of fertilizer/acre (50 percent slow-release formulation) to provide higher-quality forage for Columbian white-tailed deer and to stabilize soil (Dorsey 2002b). The BO requires that the site must be reseeded after each sand disposal event. Once established, the improved vegetation would also provide forage and cover for waterfowl on the disposal site area. The ESA terms and conditions established through the BO for the DMMP will also be implemented during the Channel Improvement Project. The actions the Corps is presently taking, and will continue to implement, as required by USFWS ESA terms and conditions, are sufficient to address Columbian white-tailed deer at Brown Island.

The nearest eagle nest to the site is 1 mile northwest of the western edge, and the nearest great blue heron rookery is $\frac{3}{4}$ mile northwest of the western edge of the site. Both the nest and the rookery are in the Cut-Off Slough, just off the shore of Whites Island. These nest locations are sufficiently distant from the disposal site that neither will be affected by Project activities.

3.5.3 Puget Island, RM W-44.0

The Puget Island site (Appendix A, Figure 20) is privately owned and currently used as agricultural land. The property is divided into three parcels totaling 100 acres. The landowners have requested that topsoil stripped during the grading process be replaced after sand disposal so they can resume using the land for agricultural purposes. The Corps, in their Biological Assessment (BA) for the USFWS, stated that the site was to be used in three increments, with topsoil to be removed and saved and placed atop the dredged material as each cell was filled. USFWS, in their BO (December 6, 1999) included the Corps incremental disposal plan with topsoil replacement as a non-discretionary reasonable and prudent

measure for implementation in order to minimize take of Columbian white-tailed deer.

The current average elevation of the Puget Island site is 15 ft CRD. The Corps disposal plan will raise the elevation to 41 ft CRD by placing 3,300,000 cy of sand. This is a new disposal site and while use of the site is scheduled throughout the construction and 20-yr maintenance phases of the Project, the three parcels will be filled at three different times (Appendix A, Figure 21). Each cell may require multiple years to fill to design height, with the time period dependent upon construction and the O&M volumes available in the nearby navigation channel. A weir, pump station and outfall system for return water will be constructed, to remain in place until all three cells are filled (Appendix A, Figure 20).

The upstream cell would be filled first and the downstream last. The downstream cell contains the 5.4-acre wetland that will ultimately be filled. The Corps estimates that Cell 1 would be filled upon receipt of two years of construction and two years of O&M material. Cells 2 and 3 would each receive approximately 8-10 years of O&M material apiece before they reach design height.

For the purposes of this Critical Areas Ordinance analysis, it is noted that the wetlands at the Puget Island site that are subject to critical areas ordinance are in the part of the site that is scheduled to be used last. Given the projected volumes of sand, the Corps estimates that this would occur more than 12 years after construction. For purposes of mitigation, the Corps assumes that the impact will occur in the first year of the Project. This assumption results in greater mitigation being provided for the project and greater certainty that the mitigation is performing as planned before any fill would occur.

Frequently Flooded Areas

The Puget Island site lies behind flood control dikes, outside the FEMA 100-year floodplain (Exhibit K-7, Figure 12).

Geologically Hazardous Areas

There are no geologically hazardous areas as defined in the CAO on this site.

Wetlands

Wahkiakum County classifies wetlands according to the Washington State Wetland Rating System for Western Washington (2nd Edition) Wahkiakum County Ordinance 131-00, Section 20(B)(2000). The property contains a 5.4-acre wetland (Appendix A, Figures 21 and 22) that meets the functional standards for a Class IV wetland. Under the State Rating System, Class IV wetlands over two acres in size are considered at least a Class III (Ecology 1993). Based on preliminary discussions with Ecology, the wetland will be treated as a Category III shrub wetland.

Section 20(G) requires creation, restoration, or enhancement of wetlands if wetlands are altered. The wetland on the Puget Island site will be filled. Under Section 20(G)3, the County may increase replacement ratios for off-site compensation. Under the project's mitigation approach, 120 acres of wetland habitat, including 16 acres of intertidal marsh, will be restored or enhanced at the Woodland Bottoms and Martin Island mitigation sites (Appendix A, Figures 10 and 13), for an average replacement ratio of 8:1 for the 16.2-acre total impact. This replacement ratio is well beyond what is required, even if the County were to increase the replacement ratio (see Section 9).

Fish and Wildlife Habitat Conservation Areas

A 5.4-acre wetland exists on the site as described above. The site is part of a large agricultural cropland (primarily pasture) area used by Columbian white-tailed deer (Appendix A, Figure 20). The closest bald eagle nest is over a mile east of the site and a great blue heron rookery occurs 1 mile east of the site (Appendix A, Figure 20).

The WDFW PHS map does not show waterfowl use of the Puget Island disposal site properties, though waterfowl do concentrate in the slough areas east of the island. Wintering Canada geese would be expected to forage in these pasturelands. The wildlife mitigation plan includes creation of 132 acres of permanent pastureland habitat at Woodland Bottoms (Appendix A, Figure 10). This habitat will benefit Canada geese, ground-dwelling songbirds, sandhill cranes, reptiles, amphibians and other species. Further, incremental use of the site plus topsoil replacement post-construction also addresses provision of waterfowl (Canada goose) forage comparable to present condition.

The Puget Island subpopulation area used by Columbian white-tailed deer encompasses Puget, Jackson, Brown, and Whites islands. The area to be disturbed during disposal activities is small in relation to the full range of the Puget Island subpopulation of deer. Topsoil will be replaced and the land restored to its existing use after disposal per the Corps disposal plan and non-discretionary requirement of USFWS. The Corps will also provide lands and habitat management on approximately 100 acres for Columbian white-tailed deer at the Webb mitigation site on the Oregon shore opposite and slightly upstream of W-44.0. Potentially, the Woodland Bottoms mitigation site plan that includes the creation of 43 acres of riparian habitat (Appendix A, Figure 10), and the Martin Island mitigation site plan that includes 159 acres of riparian forest could be used to establish populations of Columbian white-tailed deer (Appendix A, Figure 13).

3.5.4 Skamokawa, RM W-33.4

Skamokawa Beach (Appendix A, Figure 23) has had serious erosion problems and sand is routinely placed on the shoreline there to replenish

sand lost by erosion. The site is located on the outside of a river bend, and thus is subject to relatively strong river currents. When a sand surplus exists, excess sand is sold from the site to offset operating costs for neighboring Skamokawa Vista Park (a day-use park managed by Port of Wahkiakum 2).

The 11-acre site has a current average elevation of 0 ft CRD. Sand placed at the site will raise the elevation by up to 18 ft. The site capacity is 250,000 cy of sand. No dredged material is currently scheduled for placement at this site during construction. As a beneficial use site, the Port of Wahkiakum 2 may request placement of dredged material (O&M) at the location as it becomes depleted and site capacity becomes available.

Frequently Flooded Areas

The entire Skamokawa Beach site lies within the FEMA 100-year floodplain (Exhibit K-7, Figure 13). This is an existing beach nourishment site and it is expected that the sand may be inundated or carried downstream by erosion. Placement of sand at the site may actually help protect the portion of the park located in the interior of the disposal site from damage due to erosion during flood flows.

Geologically Hazardous Areas

Skamokawa Beach is a highly erosive area. Sand is regularly placed there as shoreline disposal to provide for recreational use and resale by the Port of Wahkiakum 2.

The CAO states that an erosion control plan shall be submitted to the administrator for approval prior to any clearing, construction or other development in an erosion hazard area. The erosion control plan shall be designed so that the hazard is mitigated such that the site is rendered safe as an area without erosion hazards.

This site is included in the Corps disposal plan at Wahkiakum County's request as part of the County's erosion control plan.

Wetlands

There are no wetlands on or immediately adjacent to the site.

Fish and Wildlife Habitat Conservation Areas

Bald eagle nesting territories occur approximately 11/4 miles upstream and 1 mile downstream of the Skamokawa Beach disposal site (Appendix A, Figure 23).

3.5.5 Tidegate Retrofits at Deep River, RM W-22

This Ecosystem Restoration Feature entails installation of fish slides in existing tide gates located in levees along Deep River (Appendix A, Figure 24). Where the tide gates now impede fish passage, they will be fitted with panels that have a rectangular opening of approximately 12 by

15 inches. The opening can be closed if needed for flood control purposes. This action will enable salmonids to access spawning and rearing habitat upstream in the Deep River tributaries.

Frequently Flooded Areas

Because the fish slides can be closed if needed, the diking districts ability to regulate flows is not affected.

Geologically Hazardous Areas

The Deep River tidegates are not located in a geologically hazardous area.

Wetlands

The tidegate structures are located within the flood control dikes, thus there is little likelihood of physical damage to adjacent wetland habitat during construction. The combination of lighter tidegate doors and fish slides may result in a more pronounced tidal fluctuation for waters upstream of the tidegate. Fish slides will allow water to flow upstream of the tidegate structure during time periods when the tidegate door is normally closed. Lighter tidegate doors are intended to open sooner and longer to allow for a greater period of time for salmonids to access the stream. This may allow for a more pronounced drawdown of water in the stream above the flood control levee.

Fish and Wildlife Habitat Conservation Areas

The installation of the fish slides does not typically involve new construction; rather, a portion of an existing structure will be replaced. Disturbance to the area is minimal, and the resulting fish passage will benefit salmonids by allowing use of spawning and rearing habitat that is currently inaccessible. Only when the entire tide box structure is in disrepair will a full replacement be considered. Even then, disturbance to adjacent habitat and fish and wildlife resources would be minimal. One bald eagle nesting territory is located in the Deep River project area for this ecosystem restoration feature (Appendix A, Figure 24).

3.5.6 Rice Island, RM W-21.0

Rice Island was created by the Corps as a sand disposal site for the navigation channel beginning around 1962. The 228-acre site lies on the state boundary line and only 21 acres are within the state of Washington (Appendix A, Figure 25). WDNR and the Oregon Division of State Lands (ODSL) own the island. Elevations on the island range from 0 to 40 ft Columbia River Datum (CRD), with an average elevation of 13 ft CRD on the Washington portion of the site. Most of the island is level, with steep 20- to 35-ft banks dropping off from the crest of the dredge pile. Because the island is an existing sand disposal site with containment dikes around the active disposal area, a drainage system is already in place. An additional containment dike and weir would be required when the low

elevation portion in the state of Washington is filled. The weir system would be located on the Washington side of the state borderline.

The entire site (encompassing both states) can hold up to 5,500,000 cy of additional sand. The Corps plans to place up to that amount during the maintenance phase of the project, raising the site elevation to 53 ft CRD. The site will be used throughout the entire 20-yr maintenance phase of the project as needed.

Frequently Flooded Areas

The Rice Island site's average elevation is 30 ft CRD. The base flood elevation at the site is 96.9 ft CRD. The site has been raised out of the 100-yr floodplain by previous sand disposal activities, but this is not reflected on the FEMA map (Exhibit K-7, Figure 15). A Letter of Map Revision due to Fill (LOMR-F) will be prepared by the Corps upon attainment of additional topographic information.

Geologically Hazardous Areas

The majority of the island is stabilized by the berm around the sand placement area and does not present an erosion, landslide, or seismic hazard. The balance of the island lies slightly above the high tide line and poses no geologic hazard either.

Wetlands

There are no wetlands on Rice Island.

Fish and Wildlife Habitat Conservation Areas

The WDFW PHS maps show Canada goose, Caspian tern, and double-crested cormorant habitat on the entire island (Appendix A, Figure 25). Glaucous-winged/western gull hybrids, double-crested cormorants, and Caspian terns nest or formerly nested on the western (Oregon) end of the island. Bald eagles and other raptors forage on the site. Two bald eagle nests were observed in 30-ft cottonwoods on the northern edge of the island in 1991 (Appendix A, Figure 25). These nests no longer exist and the eagle pair has relocated to Miller Sands Island, Oregon, more than a mile from the original nest site (Isaacs and Anthony 2001). Concentrations of wintering shorebirds utilize the downstream tip (Oregon) of the island as a winter/high tide roost location.

The Corps has evaluated a number of potential measures (e.g., timing restrictions and revegetation) to address potential impacts. These are discussed below.

Canada geese, the principal waterfowl species that nest on Rice Island, primarily use the debris line or densely vegetated areas for nesting purposes. Disposal actions would remove vegetative cover at the upstream tip where some nesting currently occurs. The Corps has avoided the debris line in the past to the extent practicable to preserve nesting

habitat for Canada geese, and this practice would continue with implementation of the Channel Improvement Project. Canada geese have essentially completed their nesting activities (hatched) by May 10. Brood rearing occurs elsewhere (Grays Bay, Miller Sands embayment) as Rice Island does not provide fringing intertidal marsh habitat and protected shorelines that geese with broods seek, nor do the uplands provide an adequate forage base. Construction volumes in this reach of the Columbia River would be placed in either an ecosystem restoration area or the ocean. Typically, Corps maintenance disposal actions at Rice Island would occur after June 1. The Corps would avoid the debris line to the extent practicable during Operations and Maintenance (O&M) actions to maintain Canada goose nesting habitat. These provisions should sufficiently protect nesting Canada geese. In addition, 132 acres of permanent pastureland habitat will be developed at the Woodland Bottoms mitigation site, furnishing the habitat features that Rice Island lacks. This habitat will benefit Canada geese, ground-dwelling songbirds, sandhill cranes, reptiles, amphibians and other species.

Gulls, terns and cormorants nest, or formerly nested, on the downstream tip of the island (Oregon). The Corps, coordinating with USFWS, has used a 1,500-foot separation distance from the nesting colonies when implementing disposal actions concurrent with the nesting seasons for these species. That avoidance measure has been sufficient to protect the colonies from disturbance and would be implemented in the future, if warranted. However, the National Marine Fisheries Service (NMFS) Biological Opinion (BO) for the Columbia River Dredged Material Maintenance Plan (O&M dredging of the 40-foot navigation channel) requires the Corps to prevent Caspian terns from nesting on estuarine islands (Rice Island, Pillar Rock Island and Miller Sands Spit). Further, the settlement agreement between the litigants and plaintiffs for Case No. C00-615R, United States District Court for the Western District of Washington, allows the Corps to place dredged material on Rice Island and other estuarine islands that have not been colonized by Caspian terns in the past. The Corps actions regarding distance setback from bird nesting colonies and compliance with ESA requirements and the Settlement Agreement and Migratory Bird Treaty Act, in addition to continuing coordination with the USFWS, will sufficiently protect colonial nesting birds.

The Corps will implement efforts to establish vegetation on Rice Island when fill activities are completed. Establishment of vegetation is difficult, based upon previous attempts, due to adverse environmental conditions (wind erosion) and the sterile, xeric nature of the sand substrate.

Implementation of these measures to avoid and minimize impacts would meet the Wahkiakum County requirements for habitat protection as stated in Section 21, subsection D, of the CAO.

4. Potential Impacts

4.1 Direct Impacts

Direct impacts as a result of sand disposal activities are the loss of wetland, riparian, and agricultural habitat as shown in Table 6. A summary of upland site floodplain designations is given in Table 7, and PHS habitat designations are summarized in Table 8.

5. Assessment of Impact

Impacts to wetlands and riparian habitat have been discussed in the previous sections. The proposed Wildlife Mitigation Plan for the Project (1999 Final IFR/EIS, Appendix G) exceeds requirements and is expected to yield greater ecosystem benefits than creating more, but smaller mitigation features. In addition, the Wetland Mitigation Plan (Appendix B), prepared to comply with local jurisdiction CAOs and Ecology's *Guidelines for Preparing Freshwater Mitigation Plans and Proposals* (Ecology 1994), demonstrates CAO compliance and functional gains.

6. Action Plan

Wetlands have been avoided wherever possible. At the Mt. Solo and Puget Island sites, total avoidance of wetlands was not feasible and the proposed mitigation exceeds CAO requirements.

The project-wide BAs, Wildlife Mitigation Plan (1999 Final IFR/EIS, Appendix G) and Monitoring Plans will be furnished to the local planning departments. Personnel in these departments should note minor changes in habitat acreage impacts that have arisen due to the 2001 BA and NMFS 2002 BO. All required Critical Areas permits will be applied for. This Consistency Analysis is meant to aid planners in reviewing the permit applications.

Table 9 shows total project mitigation requirements and Table 10 shows proposed project-wide mitigation.

Table 6 Project impacts by habitat type.

River Mile	Location Name	Wetland	Riparian	Agricultural	EUD ^a	Other	Total
101.0	Gateway 3			40.0			40.0
97.1	Fazio Sand and Gravel				27.0		27.0
96.9	Adjacent to Fazio			8.2	8.8		17.0
86.5	Austin Point		3.4		22.6		26.0

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Final Supplemental Integrated Feasibility Report and Environmental Impact Statement*

River Mile	Location Name	Wetland	Riparian	Agricultural	EUD ^a	Other	Total
82.0	Martin Bar		2.9		29.1		32.0
80.0	Martin Island Mitigation					16.0 ^b	16.0
71.9	Northport				27.0		27.0
70.1	Cottonwood Island		6.2		55.8		62.0
68.7	Howard Island		20.0		180.0		200.0
67.5	Pt. of Longview/Int'l. Paper				29.0		29.0
63.5	Reynolds Aluminum				13.0		13.0
62.0	Mt. Solo	10.8		35.8			46.6
59.7	Hump Island		7.0		62.0		69.0
46.3/46.0	Brown Island				72.0		72.0
44.0	Puget Island (Vik Prop.)	5.4	2.6	88.2		3.8 ^c	100.0
33.4	Skamokawa				11.0		11.0
21.0	Rice Island				21.0		21.0
	Total	16.2	42.1	172.2	558.3	19.8	808.6

a EUD = Existing Upland Disposal.

b Other habitat type refers to the Martin Island lagoon that will be converted to intertidal marsh habitat.

c Other habitat type refers to houses, driveways, yards, outbuildings, flood control levees and other man-made structures.

Table 7 Floodplain designations for upland sand disposal sites.

Disposal Site *	Disposal History**	Site Name	Site Acres	FEMA Floodplain Designation				Notes
				A	AE	Outside	Protected by Flood Control Dike	
W-101.0	New	Gateway 3	40	X			X	New site.
W-97.1	DMMS	Fazio Sand & Gravel	27	X				Site elevation historically raised by dredged material deposition.
W-96.9	New	Adjacent Fazio	17	X				Site elevation historically raised by dredged material deposition (1/2 site nearest river). Balance new site.
W-86.5	Used	Austin Point	26	X				Site elevation historically raised by dredged material deposition.
W-82.0	Used	Martin Bar	32	X				Site elevation historically raised by dredged material deposition.
W-80.0	New	Martin Island Embayment	16	X				Mitigation site - emergent marsh development.
W-71.9	Used	Northport	27	X				Site elevation historically raised by dredged material deposition.
W-70.1	Used	Cottonwood Island	62	X				Site elevation historically raised by dredged material deposition.
W-68.7	DMMS	Howard Island	200	X				Site elevation historically raised by dredged material deposition.
W-67.5	Used	IP Rehandle	29			X	X	Site elevation historically raised by dredged material deposition.
W-63.5	Used	Reynolds Aluminum	13			X		Disposal site already has containment dike constructed around perimeter.
W-62.0	New	Mt. Solo	47			X	X	New site.
W-59.7	DMMS	Hump Island	69			X		Site elevation historically raised by dredged material deposition.
W-46.0/ 46.3	DMMS	Brown Island	72		X			Disposal site already has containment dike constructed around perimeter.
W-44.0	New	Puget Island	100			X	X	New site.
W-33.4	Used	Skamokawa	11		X			Shoreline disposal.
W-21.0	DMMS	Rice Island	WA-21; OR-207		X			Site elevation exceeds 100-yr floodplain elevation over most of island due to historic dredged material disposal.

* "W" refers to the Washington shoreline, respectively. The number refers to the approximate river mile on the navigation channel.

** DMMS = site is in the no action alternative (existing 40-foot channel maintenance)

New = site is new for this study

Used = site previously used by Corps for disposal

Table 8 WDFW Priority Habitat and Species

Site	Waterfowl Concentration	Dusky Canada Goose	Canada Goose	Bald Eagle	Harbor Seal	Great Blue Heron	Gull Spp.	Caspian Tern	Double-Crested Cormorant	Columbian White-tailed Deer	Osprey	Wetlands	Islands	Notes
W-21.0 Rice Island			◆	◆			◆	◆	◆					
W-33.4 Skamokawa Beach														No PHS polygons assigned.
W-44.0 Puget Island										◆			◆	
W-46.3 Brown Island	◆		◆		◆					◆			◆	
W-59.7 Hump Island	◆		◆	◆							◆		◆	
W-62.0 Mt. Solo														No PHS polygons assigned.
W-63.5 Reynolds Aluminum														No PHS polygons assigned.
W-67.5 International Paper											*			Osprey nests near site. No PHS polygons assigned.
W-68.7 Howard Island						*					*		◆	*Waterfowl concentration and Great Blue Heron PHS polygons adjacent to site.
W-70.1 Cottonwood Island						*					*			*Waterfowl concentration and Great Blue Heron PHS polygons adjacent to site.
W-71.9 Northport											*	*		*Wetland polygon extending onto Northport site is incorrect.
W-80.0 Martin Island Lagoon				*										*Bald eagle nest near site. Waterfowl concentration and Canada goose PHS polygons 0.5 mi upstream.
W-82.0 Martin Bar											*			*Osprey nests near site. Waterfowl concentration and Canada goose PHS polygons adjacent to site.
W-86.5 Austin Point				◆							*			*Osprey nests near site. Waterfowl concentration PHS polygon adjacent to site.
W-96.9 Adjacent to Fazio	◆													Dusky Canada goose PHS polygon adjacent to site.
W-97.1 Fazio	◆													Dusky Canada goose PHS polygon adjacent to site.
W-101 Gateway 3	◆	◆	*											*Eagle nest off disposal site; personal observation, Geoff Dorsey, Corps.

Table 9 Total required mitigation.

Site Requiring Mitigation	Wetland Acres Impacted	Replacement Ratio	Replacement Acreage Required	Riparian Acres Impacted
Austin Point				3.4
Martin Bar				2.9
Cottonwood Island				6.2
Howard Island				20.0
Mt. Solo	10.8	2:1	21.6	
Hump Island				7.0
Puget Island	5.4	2:1	10.8	2.6
Total	16.2		32.4	42.1

Table 10 Habitat creation on mitigation sites.

Site	Wetland (acres)	Riparian (acres)	Agricultural (acres)	
Woodland Bottoms	97	43	132	In addition to Wetland and Riparian habitat, 132 acres of permanent pastureland habitat is provided
Martin Island	23	159		Wetland includes 16 acres of emergent marsh habitat development at Martin Island
Total	120	202	132	

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Wetland Mitigation Plan

Columbia River Channel Improvement Project

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1. Introduction

1.1 Background

The Columbia River Channel Improvement Project takes place within five different local jurisdictions within the state of Washington, including the City of Longview, Cowlitz County, City of Vancouver, Clark County, and Wahkiakum County. The Project activity that results in unavoidable impacts to isolated wetlands is the disposal of dredged material (sand) at the Mt. Solo disposal site (W-62.0) in the City of Longview and on Puget Island (W-44.0) in Wahkiakum County. Both of these sites have not previously been used as dredged material disposal sites. The mitigation actions that will replace lost wetland area and function will occur at Martin Island and Woodland Bottoms, both located in Cowlitz County.

This wetland mitigation plan was developed to address local and Washington Department of Ecology's concerns regarding wetland impacts and mitigation in Washington State, address the impacts to wetlands at Mt. Solo and Puget Island, and present the actions that will occur at Martin Island and Woodland Bottoms to compensate for wetland impacts consistent with the City of Longview, Wahkiakum County, and Cowlitz County Critical Areas Ordinances (CAOs). In addition the wetland mitigation plan follows Washington Department of Ecology's *Guidelines for Developing Freshwater Wetland Mitigation Plans* (Ecology 1994).

1.2 Project Purpose and Description

The overall Project purpose is to provide three additional feet of channel depth to improve safety and efficiency of deep-draft vessel transport of goods on the lower Columbia River. A detailed description of the Project is contained in the Final Integrated Feasibility Report/Environmental Impact Statement (FIFR/EIS, August 1999), and additional project elements are discussed in the Columbia River Channel improvement Project Final SEIS.

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2. Impact Area

2.1 Impact Area Location

The proposed disposal site at Mt. Solo is located at RM W-62.0 within the City of Longview (Appendix A, Figure 17). The proposed Puget Island disposal site is located at the southern tip of the island at River Mile (RM) W-44.0 within Wahkiakum County (Appendix A, Figure 20).

2.2 Project Impact Area Description and Wetland Delineation

2.2.1 Project Impact Area Description

Mt. Solo, RM W-62.0

The 46.6-acre Mt. Solo site (Appendix A, Figure 17) is nearly level at 8 feet CRD. The site can hold up to 2,500,000 cy of dredged sand. The Corps plans to place 2,400,000 cy of sand over a 20-yr period including the construction and maintenance dredging phases of the project, raising the site's elevation to 49 ft CRD. This is a new disposal site with a 2-acre settling/discharge cell from which a pump station will pump discharge waters over the flood control dike and into the Columbia River (Appendix A, Figure 18). An outfall structure (generally a weir with a pipe riser set at appropriate elevations) will be installed between cells to allow water to flow to the settling/discharge cell adjacent to the flood control dike. The Mt. Solo wetland is located behind a flood control dike maintained by the Cowlitz County Consolidated Diking District (Corps 2001).

The initial containment berm will be constructed from topsoil obtained from the disposal site. Dredged material will be placed in each cell using a hydraulic pipeline that transports sand from the dredge to the site. Deposited sand will subsequently be used to build up the height of the perimeter berm and the berm between the cells prior to the next cycle of dredging and disposal at the disposal site.

Using information from Ecology's site visit in January 2002, the wetland on the Mt. Solo site will be classified by the City of Longview personnel according to their classification scheme. It is expected that the wetland will meet the criteria for the fourth level classification under the City CAO, or at best, the third level, and because of its size, it will be considered a Class 3 wetland (Ecology 1993). The disposal of sand on this site will result in the loss of approximately 10.8 acres of a Category 3 shrub wetland. The City of Longview requires mitigation at a 2:1 replacement level.

Puget Island, RM W-44.0

The Puget Island site is privately owned and currently used as agricultural land (see Appendix A, Figures 20, 21 and 22). The property totals 100 acres. The landowners have requested that topsoil stripped during the construction of the initial containment dikes be replaced after sand disposal so they can resume using the land for agricultural purposes. The Corps, in their Biological Assessment (BA) for the USFWS, stated that the site was to be used in three increments, with topsoil to be removed and saved and placed atop the dredged material as each cell was filled. USFWS, in their Biological Opinion (December 6, 1999) included the Corps incremental disposal plan with topsoil replacement as a non-discretionary reasonable and prudent measure for implementation in order to minimize take of Columbian white-tailed deer. To accomplish topsoil replacement, the soil in the initial containment berms will be removed and redistributed atop the disposal site upon completion of fill placement for each cell.

The current elevation of the Puget Island site is 15 ft CRD. The Corps disposal plan will raise the elevation to 41 ft CRD by placing 3,300,000 cy of sand from construction and maintenance dredging activities. This is a new disposal site divided into three cells, and while use of the site is scheduled throughout the construction and 20-yr maintenance phases of the Project, the three parcels will be filled at three different times (Appendix A, Figure 21). Each cell may require multiple years to fill to design height, with the time period dependent upon construction and maintenance volumes available in the nearby navigation channel.

Heavy equipment will be used to strip topsoil from each cell where dredged sand will be placed. The stripped topsoil will be used for the initial containment berms and then mined from these sites for redistribution as topsoil after sand has filled each cell. Dredged material will be placed in each cell using a hydraulic pipeline that transports sand from the dredge to the site. Deposited sand will subsequently be used to build up the height of the perimeter berm and the berm between the cells prior to the next cycle of dredging and disposal at the disposal site.

An outfall structure (generally a weir with pipe riser set at appropriate elevations) will be constructed to convey water between the main portion of the cell and the 2-acre settling/discharge cell and from that cell to the toe drain for outfall water. The toe drain will convey the discharge waters to a pump station from which they will be pumped to the Columbia River.

Wahkiakum County classifies wetlands according to the Washington State Wetland Rating System for Western Washington (2nd Edition) Wahkiakum County Ordinance 131-00, Section 20(B)(2000). The property contains a 5.4-acre wetland (Appendix A, Figures 21 and 22) that meets the functional standards for a Class IV wetland. Under the State Rating System, Class IV wetlands over two acres in size are considered at least a Class III (Ecology 1993). Based on preliminary discussions with Ecology, the wetland will be treated as a Category III shrub wetland.

Section 20(G) requires creation, restoration, or enhancement of wetlands if wetlands are altered. The wetland on the Puget Island site will be filled. Under Section 20(G)3, the County may increase replacement ratios for off-site compensation. Under the project's mitigation approach, 120 acres of wetland habitat, including 16 acres of intertidal marsh, will be restored or enhanced at the Woodland Bottoms and Martin Island mitigation sites (Appendix A, Figures 10 and 13), for an average replacement ratio of 8:1 for the 16.2-acre total impact. This replacement ratio is well beyond what is required, even if the County were to increase the replacement ratio. The wetland occurs in the downstream disposal cell (Cell 3) that will be filled last, thus the wetland impact is not likely to occur for several years (e.g., 15 years) after construction dredging occurs.

2.2.2 Wetland Descriptions

The U.S. Army Corps of Engineers (Corps), Portland District has considered the project action area as a whole for assessing impacts to wetlands and wildlife resources and their habitats and in developing associated wildlife mitigation actions, including a wetland mitigation component. This approach is consistent with the Corps requirements to address impacts to wildlife resources arising from implementation of the Federal project. Further, the Corps' wildlife mitigation effort addresses impacts to wildlife resources in upland (including agricultural lands), riparian forest and wetland habitats rather than focusing only on wetland habitats as would occur for private development actions.

An interagency team was established to assess impacts to wildlife resources and develop a mitigation plan (with representatives from the Corps, Ecology, Washington Department of Fish and Wildlife [WDFW], Oregon Dept. of Fish and Wildlife [ODFW], and U.S. Fish and Wildlife Service [USFWS]). The team used the USFWS's Habitat Evaluation Procedure (HEP) to assess wildlife and wetland impacts.

The HEP evaluation is a modeling tool to quantify impacts to habitat value for specific species. HEP is usually used with a limited range of habitat variables relative to a single species selected as an indicator of ecosystem health (Manlow 2002). In this case, nine target species were used to evaluate project-related impacts to wildlife and wetland resources. In order to simplify the analysis, all project impacts were considered to take place within the first year of the project (Corps 1998).

Impacts to the Puget Island wetland will occur after the wetland mitigation has been implemented. In addition, the amount of wetland impact has been decreased since the HEP analysis was performed from approximately 20 acres to 16 acres as a result of more accurate map analysis (a reduction of approximately 25 percent). HEP is also used to measure the performance of wildlife and wetland mitigation actions, including wetland and riparian habitat restoration and development. The Corp's Wildlife Mitigation Plan was presented in the 1999 Final IFR/EIS, Appendix G. Please refer to Exhibit K-5, *Wildlife and Wetland Mitigation for the Columbia Channel Improvement Project*, for a more detailed discussion.

Because it was determined that HEP was the appropriate tool to use to determine wetland and wildlife impacts, and that rights of entry have not yet been obtained from the property owners of Puget Island and Mt. Solo, wetlands were identified using aerial photographs and by reconnaissance site visits. No formal wetland delineation has been completed on either site, and some detailed information (*i.e.*, soil characteristics from taking soil samples and comparing to the Munsell Soil book) on the wetlands is not available. A formal wetland delineation will be conducted by the Ports for permitting purposes prior to any dredged material being discharged to the wetlands to confirm the wetland acreage, type, and to collect additional baseline information.

Descriptions of the impacted wetlands at the Mt. Solo and Puget Island locations are provided below. Wetland habitat losses occur at two locations and include wetland habitat associated with drainage ditches, swales, land subject to row crop agriculture, and land grazed by livestock.

Mt. Solo Wetland

Classification: A palustrine emergent wetland (PEM).

Size: Approximately 10.8 acres.

Topography: The wetlands are several small, shallow topographic swales (Appendix A, Figures 18 and 19).

Hydrology: The source of water is internal drainage within the flood control dike.

Soils: Soils in this wetland are mapped as Caples, a silty clay loam and Snohomish, also a silty clay loam. These are classified as hydric soils. Their function as hydric soils is compromised by water management implemented by the drainage district (e.g., drainage ditches, pumps).

Vegetation: The wetland swales consist primarily of herbaceous wetland vegetation (e.g., rushes and invasive herbaceous and pasture-type grasses).

Functional Analysis: Based on aerial photography and the reconnaissance site visit, the primary functions of the wetland include habitat for small mammals, waterfowl, passerine birds, and possibly for amphibians. The site provides some internal flood storage during heavy rainfall events for the diking district until water is drained and discharged via a pump to Columbia River. The buffer consists of pasturelands. A formal wetland delineation will be conducted by the Ports for permitting purposes prior to any dredged material being discharged to the wetlands to confirm the wetland acreage, type, and to collect additional baseline information.

The functions of the wetlands will be assessed using Ecology's *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology 1999) prior to material being placed in the wetlands.

Puget Island Wetland

Classification: Predominately a palustrine shrub (PSS) wetland community, seasonally flooded/inundated, located within and on the sides of a constructed ditch and adjacent area (Appendix A, Figures 21 and 22).

Size: Approximately 5.4 acres.

Topography: The disposal site is generally flat pastureland and the small wetland is lower in elevation because it is a drainage ditch and immediately associated lands.

Hydrology: Internal drainage (i.e., surface water) of agricultural pasturelands behind the flood control dike of Wahkiakum County Consolidated Diking District No. 1.

Soils: Soils in this wetland are mapped as the Cathlamet series, generally a silt loam.

Vegetation: The majority of the wetland is a PSS wetland consisting of willows and invasive reed canarygrass in and adjacent to the drainage ditch.

Functional Analysis: Based on aerial photography and the reconnaissance site visit, the primary function of the wetland is water conveyance from the adjacent pasturelands. It also appears to provide habitat for some small mammals, passerine birds, and amphibians. It provides some water quality function by trapping sediments as evidenced by landowner's periodic excavation of soil and sediments from these drainage ditches. A formal wetland delineation will be conducted by the Ports for permitting purposes prior to any dredged material being discharged to the wetlands to confirm the wetland acreage, type, and to collect additional baseline information.

The functions of the wetlands will be assessed using Ecology's *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology 1999) prior to placement of material into the wetlands.

The buffer consists of pasture grasses that are used for agricultural production (e.g., silage, hay, grazing).

2.2.3 Fauna

The lack of complex habitat structure and lack of vegetative diversity on the sites, and the heavy disturbance from past and current land uses restrict the types of wildlife species that could be present on these sites. The WDFW priority habitat and species (PHS) database indicates that Columbian white-tailed deer are present on the Puget Island disposal location (Appendix A, Figure 20). Small mammals such as voles, wintering Canada and resident geese, small numbers of other waterfowl, passerine birds such as savannah sparrows inhabit the location, often only seasonally. Waterfowl, some small mammals, savannah sparrows and some amphibians use the site but are limited by the lack of vegetative structure and diversity.

2.3 Procedural Variation for Wetland Delineations

2.3.1 City of Longview

The City of Longview's CAO indicates that the burden of proof is on the applicant to provide sufficient data to determine whether a wetland exists on a subject property. The City requires that certain information

(e.g., master application, assessor's map, critical areas checklist) be provided to the City in an application. The City classifies wetlands in accordance with the *Washington State Wetland Rating System Manual, Western Washington* (Ecology 1996).

A formal wetland delineation will be conducted by the Ports on the site prior to any material being discharged into wetlands.

2.3.2 Wahkiakum County

Wahkiakum County's CAO indicates that wetlands shall be identified and delineated according to the most current edition of Ecology's manual adopted pursuant to RCW 90.58.380, and that they will accept a written determination by the Corps, Ecology, or other qualified critical areas professional as to whether a specific parcel contains a wetland. In lieu of a written determination, the County may also consider other reliable evidence in determining whether a wetland exists. A formal wetland delineation will be conducted by the Ports on the site prior to any material being discharged into wetlands.

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3. Mitigation Approach

3.1 Mitigation Summary

Mitigation will be implemented according to Cowlitz County's CAO because the mitigation sites occur in Cowlitz County. Adverse impacts to existing wetlands on the mitigation sites are not proposed; however, once the sites are acquired, existing wetlands on the mitigation sites will be delineated using Ecology's and the Corps delineation manual and classified based on Cowlitz County's CAO and Ecology's Guidelines for rating wetlands. Additional site data (*i.e.*, baseline topography and hydrology) will also be collected. This mitigation plan is consistent with Cowlitz County's CAO, and the plan will be finalized in coordination with the County when permit applications are prepared to implement the mitigation actions.

Mitigation actions to provide compensatory mitigation for unavoidable impacts to 5.4 acres of wetland on Puget Island and 10.8 acres of wetland at Mt. Solo are proposed at the Woodland Bottoms and Martin Island sites located in Cowlitz County (Appendix A, Figures 10 and 13). Compensation for wetland impacts will be accomplished through the restoration and enhancement of 120 acres of wetland habitat at Woodland Bottoms and Martin Island, including 16 acres of freshwater intertidal emergent marsh restored within the Martin Island embayment, for an average replacement ratio of approximately 8:1 for the 5.4-acre wetland impact and buffer impact at Puget Island and for the 10.8 acres of wetland impact and buffer impact at Mt. Solo.

These replacement ratios are well beyond the required 2:1 replacement ratio for a Category 2 PSS wetland in Wahkiakum County and the required 2:1 replacement ratio for a Category 2 PEM wetland in the City of Longview.

The mitigation plan currently calls for development or substantial improvement to 120 acres of wetland habitat in Washington and 194 wetland acres for the entire project. The Washington wetland mitigation acreages represent an approximately eight-fold increase over projected losses and would result in a net gain of secured wetland habitat along the lower Columbia River.

Wetland development will be the emphasis of mitigation actions as recommended by the interagency HEP team. The Corps' and Sponsor Ports' goal is to develop wetland habitat acreage to the extent identified at the individual mitigation sites. The Corps' and Sponsor Ports' objective will be to replace the wetland acreage and function

identified as lost due to placement of dredged sands on Puget Island and Mt. Solo. The mitigation actions will target wetland-oriented species.

The major wetland mitigation actions at Woodland Bottoms include eliminating the existing drainage features and agricultural practices, construction of small perimeter levees that provide internal protection comparable to the present Burriss Creek levees, removal of the Burriss Creek internal levees to allow water from Burriss Creek to naturally flow into the wetland area, and associated water control structures (24-inch-diameter culverts with risers and stop logs), an overflow structure to provide a more natural and appropriate hydrology to the restored wetland areas. Minimal grading associated with levee construction and removal is proposed because the reestablishment of a more natural hydrologic regime is expected to result in emergent wetland establishment within the wetland mitigation unit. Wetland plants that are currently suppressed or lie in the soil seed bank are expected to populate the emergent wetland areas.

Specific features of the mitigation action at Woodland Bottoms include:

- Soil saturation sufficient to support emergent wetland plant communities.
- A hydrologic regime predicated upon the natural flows of Burriss Creek dispersing across the wetland management unit
- The establishment of emergent and associated riparian habitat.
- Increased habitat interspersed and diversity.
- Functional replacement.
- A monitoring program that incorporates interim performance standards.
- Maintaining and improving connectivity to adjacent riparian and wetland habitat for amphibians, reptiles, birds, and mammals.

Wetland mitigation activities at Martin Island consist of two parts (Appendix A, Figures 10 and 11). The first action entails fill of 16 acres of the embayment, a former borrow pit for I-5 fill, with dredged material and cap with a 2-foot of topsoil taken from the adjacent upland. The final elevation of the embayment will mimic elevations of adjacent fringe emergent marsh vegetation (Appendix A, Figures 10 and 11). The other wetland development (restoration of 7 acres of emergent marsh) would entail minor grading and removal of invasive reed canarygrass in an existing swale. Removal of reed canarygrass,

including soil, in a one-foot increment will remove the roots, rhizomes and seeds of reed canarygrass and increase depth and allow for a longer duration of inundation. Seeds in the soil bank are expected to populate this wetland area. Specific features of the mitigation action at Martin Island include:

- Soil saturation sufficient to support emergent wetland plant communities.
- Placement of dredged material and topsoil in the Martin Island embayment to an elevation level determined by survey of adjacent intertidal marsh habitat to ensure a proper target elevation for emergent marsh establishment and tidal coverage daily
- The establishment of a riparian buffer community.
- Increased habitat interspersion and diversity through development of 159 acres of riparian forest and 23 acres of wetland habitat on Martin Island in addition to natural occurring stands.
- Functional replacement.
- A monitoring program that incorporates interim performance standards.
- Maintaining and improving habitat connectivity to adjacent water bodies that directly support fisheries and wildlife resources such as salmonids, amphibians, reptiles, birds, and mammals.

The mitigation actions will be implemented as a condition of the Wahkiakum County CAO permit, the City of Longview's CAO permit, Cowlitz County's local shoreline permit and CAO permit, and Ecology's 401 water quality certification.

A 10-year performance monitoring period is proposed to evaluate whether mitigation objectives are being achieved. An adaptive management and contingency plan is provided to ensure that interim performance standards are being assessed and that desired results of the mitigation actions are achieved.

3.2 Mitigation Goals, Objectives, and Performance Standards

3.2.1 Goals

The goals for the mitigation actions are to:

1. Achieve no net loss of wetland acreage by establishing 7 acres of emergent marsh and 16 acres of freshwater intertidal emergent

marsh at Martin Island and 97 acres of emergent wetland at Woodland Bottoms;

2. Provide buffer protection/riparian habitat at the mitigation sites;
3. Provide habitat structures (e.g., downed large [> 12 inches in diameter] woody debris and snags) to support wildlife including amphibians; and
4. Provide for an increase in overall habitat functions in the lower Columbia River.

3.2.2 Design Objectives

To achieve these goals, the following objectives have been developed for the mitigation actions:

1. Martin Island Freshwater Intertidal Marsh - Establish suitable site elevations (using the known (surveyed) elevation of immediately adjacent intertidal emergent marsh vegetation) that results in tidal inundation to support freshwater intertidal emergent marsh communities.
2. Martin Island Emergent Wetland and Woodland Bottoms Emergent Wetland – Provide seasonal wetland hydrology to support emergent vegetation. For Woodland Bottoms, the levees encasing Burris Creek will be removed in part to allow flood waters from the stream to spread over the 97-acre wetland mitigation unit. This will allow for a more natural hydrologic regime to influence the wetland mitigation unit. Material borrowed from the Burris Creek levees will be used to construct perimeter levees around the mitigation wetland to ensure that a comparable level of flood protection is maintained for neighboring properties.
3. Provide area and functional replacement for impacts to 5.4 acres of wetland at Puget Island and 10.8 acres of wetland at Mt. Solo.
4. Provide buffer and riparian habitat.
5. Provide freshwater intertidal marsh and emergent wetland habitat and deciduous riparian forest habitat for a diverse array of wildlife species.
6. Provide deciduous riparian forested habitat, including shrub understory buffer, and feeding, rearing and breeding habitat for emergent wetland associated birds, mammals and amphibians.
7. Provide habitat for amphibians.
8. Provide a more diverse aggregate of habitat types.

9. Assure long-term protection of the mitigation sites through acquisition in fee title and transfer to the appropriate State of Washington agency for management.

3.2.3 Performance Standards

The performance standards correspond to the design objectives and define measurable criteria that are evaluated to predict when a mitigation element has been successfully implemented or accomplished and whether overall mitigation goals have been met at the end of the monitoring program (Table 1). Interim performance standards, identified in Chapter 6 – Monitoring Plan, are measurable criteria that are evaluated at periodic intervals during compliance monitoring and serve as indicators of the need for adaptive management or contingency actions.

Table 1. Mitigation goals and associated design objectives, design criteria, and final performance standards.

Design Objective	Design Criteria	Final Performance Standard
Wetland Mitigation Goal 1:	Achieve no net loss of wetland acreage and improve wetland function by establishing 7 acres of emergent marsh and 16 acres of freshwater intertidal emergent marsh at Martin Island and 97 acres of emergent wetland at Woodland Bottoms.	
Provide seasonal wetland hydrology to support emergent vegetation.	At Martin Island, excavate to establish an elevation that would increase the duration of inundation to support emergent wetland communities on 7 acres. At Woodland Bottoms, eliminate site drainage ditches, remove agricultural impacts (grazing and tillage), construct water control structures (low levees and pipes with risers) and remove the Burris Creek levees to provide for and maintain site inundation for approximately 8 months of the year for the 97-acre emergent wetland.	Emergent Wetland – Surface water (internal drainage and collection) will be present from 1.0 inches to 1.5 foot depths approximately 8 months of the year with soil saturation typically for the balance of the year. The levees encasing Burris Creek will be removed in part or in total, depending on borrow material requirements to construct perimeter levees for wetland mitigation unit, to within a foot (Appendix A, Figure 11) of typical Burris Creek surface level to ensure freshets overtop bank and flood over 97 acre wetland mitigation unit.
Martin Island Freshwater Intertidal Marsh - Establish suitable site elevations (using the known elevation of immediately adjacent intertidal emergent marsh vegetation) that results in tidal inundation to support freshwater intertidal emergent marsh communities.	Freshwater Intertidal Marsh (Martin Island) – fill embayment with approximately 460,000 of sand and cap with approximately 56,000 cy of topsoil (2-foot cap). Site elevation will mimic immediately adjacent intertidal marsh plant community, and will be at an elevation below that which could support reed canarygrass.	Freshwater Intertidal Marsh: Site will be inundated twice daily by normal tidal fluctuations. Inundation will be assured by matching surface elevation of mitigation site substrate to survey surface elevation of adjacent intertidal marsh habitat.
	Emergent Marsh (Martin Island) – Excavate an existing swale of approximately one foot of topsoil (11,000 cy) to rid area of invasive reed canarygrass roots, rhizomes, and seeds and expose native wetland plant seeds in the soil seed bank.	Emergent Wetland – Surface water (internal drainage and collection) will be present from 1.0 inches to 1.5 foot depths approximately 8 months of the year with soil saturation typically for the balance of the year.

Design Objective	Design Criteria	Final Performance Standard
Provide area and functional replacement for impacts to 5.4 acres of wetland at Puget Island and 10.8 acres of wetland at Mt. Solo.	Martin Island and Woodland Bottoms – Rely on seeds in the soil bank of native emergent wetland plant species that historically occurred on or near these sites prior to human perturbation and that are suited to seasonally flooded and saturated conditions, to repopulate the wetland mitigation sites.	Native emergent wetland species will contribute at least 80% of plant cover in areas restored within 5 years of construction.
Wetland Mitigation Goal 2: Provide buffer protection/riparian habitat at the mitigation sites.		
Provide buffer and riparian habitat.	Restore 159 acres of deciduous riparian forest at Martin Island, in addition to existing riparian forest stands. Restore 43 acres of riparian forest habitat at Woodland Bottoms. A 132 acre pasture will be developed at Woodland Bottoms too that will provide buffer protection from adjacent land uses.	Establish planting density of approximately 400 cuttings and/or natural seedlings per acre of deciduous riparian forest species that naturally occur on or adjacent to the sites. Species composition will be predominantly willow <i>spp.</i> , black cottonwood and Oregon ash. Native species will contribute at least 80% of plant cover in buffer areas and not more than 20% of invasive species.
Wetland Mitigation Goal 3: Provide habitat structures (e.g., downed large (> 12 inches in diameter) woody debris) to support wildlife including amphibians.		
Provide freshwater intertidal marsh and emergent wetland habitat and deciduous riparian forest habitat for a diverse array of wildlife species.	Provide deciduous riparian forest habitat with a minimum of two species that develop large diameter and height (cottonwood and Oregon ash) and an understory of shrubby willows to 30 ft at project life (50 years).	Deciduous riparian forested habitat will have a shrub understory over 25 to 50% of the area. Evidence of songbird nesting (nest, breeding territories, or observations of breeding behavior) will be present. Amphibians will be locatable in the forest floor litter. Evidence of small mammal use will be present.

Design Objective	Design Criteria	Final Performance Standard
Provide deciduous riparian forested habitat, including shrub understory buffer, and emergent wetland feeding, rearing and breeding habitat for mammals and amphibians.	Large woody debris (stumps and logs of native species) placed throughout the deciduous riparian forested habitat buffer and the emergent wetland to provide year round habitat for smaller mammals and amphibians as an interim measure until the deciduous riparian forest develops and matures to the point where it contributes these materials.	Evidence of small mammal use (nests, feeding) will be present. Presence of habitat structure capable of supporting amphibians (individuals, egg clusters).
Provide habitat for amphibians.	Provide for emergent marsh plant communities that provide attachment substrate for breeding amphibian species consisting of emergent erect vegetation with stem diameter <0.25 inches in emergent zones.	Leaf litter and vegetation debris will be present to provide habitat for invertebrates. Invertebrates will be observed in the ground litter. Presence of habitat structure capable of supporting amphibian egg masses and juveniles (larval form) rearing in the emergent wetlands.
Wetland Mitigation Goal 4: Provide for an increase in overall habitat functions in the lower Columbia River.		
Provide a more diverse aggregate of habitat types (e.g., hummocks and micro excavations).	Restore emergent wetland habitat with associated riparian habitat buffers to provide wildlife habitat features that improve connectivity to adjacent developed or naturally wetland and forested habitats.	See performance standards above.
Assure long-term protection of the mitigation sites.	Legal proof that the land has been acquired in fee title for wetland mitigation purposes.	Title to the land, and permanent deed restrictions for the mitigation sites.

4. Mitigation Sites

4.1 Site Descriptions

There are two mitigation sites – Woodland Bottoms and Martin Island, located in Cowlitz County (Appendix A, Figure 8). Woodland Bottoms is located south of the Martin Island mitigation site, and Burke Slough, Burke Island, and Martin Slough separate the two sites.

4.1.1 Woodland Bottoms, RM W-81.0

The Woodland Bottoms mitigation site is 284 acres in size (see Appendix A, Figure 8). The site is bound by the railroad and I-5 to the east, a tributary slough to Burke Slough on the north, agricultural land and Burke Slough to the west, and agricultural land to the south (Appendix A, Figure 9). The site is currently used for agricultural purposes, including row crops, hybrid poplar plantations, and cattle grazing lands. Existing habitat types including degraded wetlands (grazed, row cropped) exist on the site (Appendix A, Figure 9). Wintering waterfowl, principally wintering Canada geese and surface feeding ducks use the site.

4.1.2 Martin Island, RM W-80.0

Martin Island is 378 acres in size (Appendix A, Figure 8). At least 298 acres of the island would be used for mitigation purposes with the 80-acre balance potentially available for habitat development purposes based on the manner in which the property is acquired. The site is bound by Martin Slough and the railroad and I-5 to the east, north and west by the Columbia River, and Martin Slough to the south (Appendix A, Figure 8). Martin Island has been used for cattle grazing and pastureland. There is a 35-acre lagoon on the east side of the island. The lagoon was artificially created in 1966 when sand was excavated for use in the construction of Interstate 5.

The island itself is classified as wetland on the NWI wetland maps. The majority of the land surface is in fact existing riparian forest, cattle pasture and blackberry thickets. Wetland pockets exist on the island where depressions or frequent flooding by the river occur. A bald eagle nest is located on the west edge of the lagoon and a great blue heron rookery occurs north of the lagoon (Manlow 2002). According to WDFW PHS mapping, dusky Canada geese and other waterfowl use the southern tip of the island, ½ mi south of the embayment (Appendix A, Figure 8). Canada geese forage in the pasturelands present on the island.

4.2 Ownership

The Sponsor Ports will acquire the mitigation sites. These properties will subsequently be conveyed to the WDFW.

4.3 Zoning

The zoning of the Woodland Bottoms and Martin Island mitigation sites is primarily agriculture. The zoning designations should not affect establishing wetlands in the mitigation sites.

4.4 Rationale for Choice of Mitigation Sites

The Corps conducted an extensive evaluation to determine potential mitigation sites during the development of the IFR/EIS. The proposed mitigation sites were selected for the following reasons:

1. The mitigation sites are adjacent to the Columbia River or its side channels and thus provide an opportunity to expand on available fisheries and wildlife habitat.
2. The sites can increase riparian and wetland habitat and provide buffering capacity to protect the integrity of the mitigation wetlands.
3. The mitigation sites will provide habitat connectivity to adjacent habitats and the Columbia River.
4. Acquisition in fee title guarantees preservation of the mitigation sites.
5. Historic photographs of the sites indicate these areas formerly consisted of forested and shrub wetland and riparian habitat prior to human uses.
6. A reliable source of water (internal drainage, Burris Creek at Woodland Bottoms, ground water and/or the Columbia River) will provide water sources necessary to support wetland vegetation.

4.5 Existing Conditions of Mitigation Sites

4.5.1 Vegetation

Woodland Bottoms

Vegetation on the mitigation site consists predominately of pasture grasses, row crops (i.e., corn), and hybrid poplar plantations (Appendix A, Figure 9).

Martin Island

Vegetation on this site consists of pasture grasses, blackberry thickets, and an established willow and cottonwood dominated riparian forest habitat (Appendix A, Figure 12).

4.5.2 Hydrology

Woodland Bottoms

The mitigation site lies behind main flood control dikes and an interior drainage system, (e.g., ditches, pump station and tide gate) is in place to drain waters from the diking district, including the mitigation site. Existing hydrology is from internal drainage and groundwater. The levees along Burris Creek will be removed in part or whole, depending upon borrow requirements to construct the perimeter levees for the wetland mitigation unit, in order to allow freshets to flood over the wetland mitigation unit and thereby affect a natural hydrologic regime.

Martin Island

Martin Island is occasionally flooded by the Columbia River during freshets.

4.5.3 Soils

Woodland Bottoms

The soils at Woodland Bottoms are characterized as Caples and Newberg series.

Martin Island

The soils at Martin Island are characterized as Caples and Newberg series. There is a pocket of riverwash adjacent to the Columbia River.

4.5.4 Fauna

Woodland Bottoms

The site is currently used by wintering waterfowl, principally wintering Canada geese and surface feeding ducks. Small mammals, amphibians, and passerine birds also use the site but the extent of use is limited by the lack of vegetative cover and complexity due to agricultural practices.

Martin Island

A bald eagle nest is located in the riparian forest stand near the west edge of the lagoon and a great blue heron rookery occurs north of the lagoon (Manlow 2002). According to WDFW PHS mapping, dusky Canada geese and other waterfowl use the southern tip of the island, ½ mi south of the embayment (Appendix A, Figure 8). Wintering and resident Canada geese forage in the pasturelands present on the island. Small mammals, amphibians, and passerine birds use the site.

4.5.5 Functions

Woodland Bottoms

This site currently provides some limited wetland functions including foraging habitat for waterfowl and great blue herons. Wetland functions have been compromised by the use of the site for grazing, row-crop agriculture and farming of hybrid poplars.

Martin Island

This site provides wetland functions including some flood storage, forage and rearing habitat for birds, small mammals, and amphibians, nesting habitat for a bald eagle pair, nesting and rearing habitat for great blue herons, and primary production, insect faunal and detrital inputs to the lagoon and surrounding water bodies.

4.5.6 Buffers

Woodland Bottoms

Buffers include a flood control dike on the northern boundary, I-5, including the toe drain and right-of-way to the east, and agricultural lands to the west and south.

Martin Island

Buffers include the Columbia River to the west and Martin Slough to the east and south. Riparian forest stands on the island also buffer much of the area targeted for mitigation development. The island tapers to a point at the northern tip where Martin Slough and the Columbia River join.

4.5.7 Estimate of Wetland Functions After Performance Standards are Met

A functional assessment, using Ecology's *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology 1999) will be conducted prior to implementing the mitigation actions to collect baseline information for which subsequent monitoring data can be compared with.

The functional performance level for newly established wetlands on the mitigation sites is estimated using the conceptual site plan and best professional judgment.

Wetland functions anticipated at the mitigation sites after performance standards have been met include:

- Song bird habitat
- Waterfowl foraging, nesting and rearing habitat

- Amphibian habitat
- Mammal habitat
- Fisheries foraging and rearing habitat in Martin Island lagoon
- Plant diversity (although plant diversity is not a function, *per se*, it is a good indicator of overall wetland quality)
- Primary production and nutrient retention and transformation
- Detrital export from wetlands
- Export of leaf litter and woody debris from the deciduous riparian buffer habitat and large woody from the riparian buffer habitat after establishment

4.6 Opportunities and Constraints

The Woodland Bottom and Martin Island sites provide an opportunity to:

1. Provide habitat adjacent to Burke Slough;
2. Remove grazing and agricultural tillage, herbicides and pesticides;
3. Provide deciduous riparian forest buffer habitat;
4. Restore wetland habitats to areas that historically supported this habitat type; and
5. Remove 35+ acres of Himalayan and evergreen blackberry from Martin Island and subsequent restoration of this acreage to riparian forest.
6. Provide for a continuous, large block of secure wetland and riparian forest habitat in the lower Columbia River.

There are no significant constraints on either site to providing wetland mitigation. At Woodland Bottoms, water control structures (low levees, overflow structures) are required to protect immediately adjacent properties from flooding when Burris Creek floods, while maintaining proper hydrologic conditions on the wetland mitigation site to support emergent wetland habitat.

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5. Preliminary Site Grading, Planting Plan, and Hydraulics/Hydrology

The habitat features for the Woodland Bottoms mitigation site are shown in Appendix A, Figures 10 and 11, and for the Martin Island mitigation site are shown in Appendix A, Figures 13 and 14.

5.1 Site Grading

The mitigation objectives for the 7-acre emergent wetland at Martin Island would be achieved by:

1. Grading the 7-acre site to approximately one-foot lower in depth to remove reed canarygrass roots, rhizomes, seeds in the soil and vegetative matter plus allow for native wetland plant seeds in the soil seedbank to germinate and become established; and
2. Establishing hydrology to support the targeted wetland community.

This section discusses the technical considerations, constructability issues, and limitations associated with grading the mitigation site.

The proposed grading potentially involves one earthwork construction step. Surface soil would be excavated one foot below existing grade and removed from the site.

No grading is proposed for restoration of wetland habitat at Woodland Bottoms, with the exception of grading required to remove the Burris Creek levee and construct the perimeter levee for the wetland mitigation unit.

5.2 Excavation

At the 7-acre emergent wetland site on Martin Island, soils would be excavated to a depth of approximately one foot in order to remove invasive reed canarygrass roots, rhizomes, seeds and vegetative matter in order to expose native wetland plant seeds in the soil seed bank, and establish grades appropriate to support proposed wetland communities.

No excavation is proposed for restoration of wetland habitat at Woodland Bottoms other than that required to remove borrow material for levees and associated infrastructure such as an overflow weir.

5.3 Filling

At the Martin Island site, the embayment will be filled with dredged material sand and capped with two feet of topsoil from the adjacent uplands to create 16 acres of intertidal marsh habitat (Appendix A, Figure 10). The entrance channel will not be filled. Fill will be to an elevation based upon surveyed surface elevation of adjacent intertidal marsh habitat.

Portions or all of the Burriss Creek levees, based upon borrow requirements for the perimeter levees for the wetland mitigation unit, will be removed to establish a more natural hydrologic regime. Removal of the Burriss Creek levees will allow waters from the stream to flood over the wetland management unit during freshets, affecting a more natural hydrologic regime for the area. The wetland mitigation unit perimeter levees are required to protect adjacent properties from flooding and will be constructed to a height comparable to that of the existing Burriss Creek levees.

5.4 Planting Plan

At Woodland Bottoms, no formal planting plan is proposed. Rather, natural reestablishment of emergent wetland vegetation is expected once agricultural practices are discontinued and site hydrology is restored via flooding of Burriss Creek waters onto the wetland mitigation unit. The existing wetland vegetation is expected to be released upon removal of agricultural practices and provision of a more natural hydrologic regime. At Martin Island, the 7 acre wetland site and emergent marsh in the embayment will rely initially upon natural recruitment to establish the wetland plant community. Emergent wetland plant seeds in the soil seed bank are expected to provide the source material for the 7-acre wetland. Columbia River flows and tidal fluctuation are expected to provide the seed and propagules source for establishment of tidal marsh vegetation in Martin Island embayment.

Deciduous riparian forest buffer habitat will be established through site tillage, planting of cottonwood, willow, and Oregon white ash, plus natural establishment via seeds dispersed from the adjacent riparian forest stands. These riparian forest species are native to the area and currently occur on or adjacent to the mitigation sites. At Woodland Bottoms, approximately 43 acres of riparian forest buffer and habitat would be restored (Appendix A, Figure 10). Species composition per acre would consist of 11,000 black cottonwood cuttings, 4,400 willow cuttings, and 2,200 Oregon ash cuttings and

seedlings. The cuttings would be installed in late February – early March. Cuttings and seedlings would be obtained from on-site, Martin and Burkes islands, or other local areas.

At Martin Island, approximately 159 acres of agricultural land would be converted to riparian forest habitat (Appendix A, Figure 13). Deciduous riparian forest buffer habitat will be established through site tillage, planting of cottonwood, willow, and Oregon white ash, plus natural establishment via seeds dispersed from the adjacent riparian forest stands. These riparian forest species are native to the area and currently occur on or adjacent to the mitigation sites. Species composition per acre would be targeted for 250 black cottonwoods, 100 willows, and 50 Oregon ash. The cuttings would be installed in late February – early March. Cuttings and seedlings would be obtained from on-site, Martin and Burkes islands, or other local areas.

5.5 Hydrology

Water for the Woodland Bottoms mitigation site will come from water that floods over the wetland mitigation unit from Burris Creek during freshets and internal drainage of surface water. The sources of water for the wetlands on Martin Island are surface drainage, ground water and surface water from Martin Slough or the Columbia River.

5.6 Habitat Structures

Habitat structures (i.e., logs and woody debris) would be placed in the tidal wetland habitat developed in the embayment at Martin Island and in wetlands at Woodland Bottoms. Logs could be deciduous trees of various species (black cottonwood, red alder, Oregon white ash), western red cedar and/or Douglas fir trees. These species are readily available in the immediate area.. They will be a minimum of 16 inches in diameter and would be in the form of whole logs with several limbs left intact.

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6. Monitoring Plan

Three types of monitoring are proposed.

Construction Monitoring

Oversight of work at the mitigation sites will be needed to ensure that contractors are following requirements identified in the final plans and specifications developed for the site.

As-Built Monitoring

An as-built report would be prepared to define the baseline conditions for measuring progress towards the mitigation goals and final performance standards. The as-built also establishes any permanent sampling locations for future compliance monitoring activity. Any significant deviations between the final site plan and the as-built would be noted, and the significance of these deviations evaluated. Baseline data on hydrology, vegetation, wildlife, topography will be used to evaluate wetland function and compliance with the performance standards summarized in Table 1 and outlined in detail in Table 2. Monitoring would also include photographic documentation of site features and the development of habitat on the site.

Compliance Monitoring

Compliance monitoring would be conducted to determine the degree to which the mitigation action meets performance standards, identifies potential problems and recommends corrective actions, provides a record of site development progress, and reports monitoring protocol effectiveness. The monitoring plan will be developed in consultation with permitting agencies and will be based on the most current and scientifically accepted methods. At least one protocol that could be used includes Ecology's *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology 1999).

Monitoring will occur according to the schedule indicated in Table 2. Most monitoring activities would be completed along permanent transects and fixed points established and marked during the as-built survey; however, as determined in the field, additional monitoring may be needed to document unique conditions not present at pre-established sampling locations. All monitoring would use standard ecological techniques to sample, measure, or describe vegetation, hydrologic, and wildlife habitat conditions. These techniques include walk-through surveys, line-intercept sampling along transects (Canfield 1941), plot sampling (Daubenmire 1959), and wetland delineation (FICWD 1989; Environmental Laboratory 1987).

Table 2. Wetland monitoring methods, reporting schedule, and contingencies.

Design Objective	Performance Standard	Method	Month	Frequency	Interim Performance Standards ^a	Contingency Action
Forested Buffer / Riparian Vegetation	Species composition	Walk-through surveys and plot or belt transect sampling to document all plant species present	June-July	As-built and Years 1, 3, 5, 7, and 10	>80% survival of planted stock; density at least 400 stems per acre to include naturally established seedlings	None
	Tree and shrub density	Measure by line-intercept method along transects	June-July	Years 1, 3, 5, 7, and 10	60 – 80% survival; density less than 400 stems per acre; total stems to include naturally established seedlings	Evaluate reason(s) for mortality, and replant to achieve performance standard.
	Plant growth	Walk-through surveys to estimate annual shoot growth and survival rates	June-July	Years 1, 3, 5, 7, and 10	<60% survival; total stems to include naturally established seedlings	Evaluate reason(s) for mortality; consider species suitability for site conditions; replant with the same or alternate species.
	Vegetation structure	Describe from walk-through surveys, incorporating data from above analysis as available	June-July	Years 1, 3, 5, 7, and 10	Presence of seed and/or fruit production on shrub species Lack of seed and/or fruit production on shrub species	None Evaluate potential reasons for lack of seed and/or fruit production; evaluate health and vigor; consider fertilization.
Emergent and Marsh Wetland Vegetation	Species composition	Walk-through surveys to document all plant species present	June-July	As-built and Years 1, 3, 5, 7, and 10	Species composition includes at least 40% of plant species present in adjacent reference wetland	None
	Herbaceous plant coverage/density	Measure by plot sampling method along transects	June-July	Years 1, 3, 5, 7, and 10	Total cover by emergent wetland species at least 70%	None

Design Objective	Performance Standard	Method	Month	Frequency	Interim Performance Standards ^a	Contingency Action
					Total cover by emergent wetland species less than 70%	Consider supplemental plantings. When invasive species (reed canarygrass) represent greater than 20% cover, control of this species by herbicide or other recommended methods would be evaluated.
					Total cover by emergent wetland species less than 20%	Re-evaluate the grades and hydrology of the site and re-establish if necessary. Consider supplemental plantings.
	Plant growth	Walk-through surveys to estimate annual shoot growth and survival rates	June-July	Years 1, 3, 5, 7, and 10	Primary productivity of native emergent wetland species at least 40% of adjacent reference marshes.	None
	Vegetation structure	Describe from walk-through surveys, incorporating data from above analysis, as available	June-July	Years 1, 3, 5, 7, and 10	Height and vegetative density measure on cover boards 40% of adjacent reference marsh	Re-evaluate the grades and hydrology of the site and re-establish if necessary. Consider supplemental plantings.
Wetland Hydrology	Soil saturation	Depth from the soil surface to groundwater measured at permanent sampling stations in forested, shrub, and emergent wetland zones	February, June, September	Years 1, 3, 5, 7, and 10	Comparable to adjacent reference marsh. At Woodland Bottoms, surface water present from 1.0 inch to 1.5 foot depths approximately 8 months of the year. At Martin Island - saturation within 6 inches of surface from December through April (normal rainfall years). At Martin Island intertidal freshwater marsh –tidal inundation twice daily.	Evaluate hydrology and need for supplemental water supply with consideration for seasonal/year weather expression. Possible solutions include modification of water control structures, changing grades.

Design Objective	Performance Standard	Method	Month	Frequency	Interim Performance Standards ^a	Contingency Action
	Surface water depth	Water depths measured at permanent sampling stations in shrub and emergent wetland zones	February, June, September	Years 1, 3, 5, 7, and 10	Comparable to adjacent reference marsh.	Evaluate hydrology and need for supplemental water supply with consideration for seasonal/year weather expression
	Habitat structure	Description of habitat structure from walk-through surveys	February, June	Years 1, 3, 5, 7, and 10	Evaluate based upon results from plant growth and vegetative structure surveys	See vegetative structure proposals.
Wildlife usage		Conduct surveys to record wildlife species and activities on-site.	January, April, June, November	Years 1, 3, 5, 7, and 10	Observations of a variety of wildlife use of the sites	None; or if use limited, evaluate reasons for non-attainment. Possible solutions include modifying water control structures, changing grades, and adding more structure.
Long-term Protection				Years 1	There is no interim performance standard because the Sponsor Port's must provide proof of a deed restriction prior to the site being used for mitigation.	None

General monitoring methods are described below.

6.1 Hydrologic Regime

At Woodland Bottoms and for the 7-acre emergent wetland at Martin Island, surface water elevations would be measured within the wetland itself, and soil saturation would be measured by digging test pits to determine the level of ground water. At the Martin Island freshwater intertidal marsh, surface water elevations would be measured with a measuring rod and calibrated for the tidal elevation.

6.2 Vegetation Structure

Naturally colonizing vegetation will be monitored to measure the species composition and density.

Permanent vegetation sampling and photographic points will be established using lath and rebar within wetland mitigation areas at locations representative of the emergent marsh plant community being sampled. At each sampling point, either a 1.0-m² quadrat for emergent, or the line intercept method for shrub and forested vegetation, will be used to measure the following:

- all plant species, in the order of dominance, based on relative percent cover of each species within the vegetative strata;
- the species composition (i.e., percent of each species, exotic or native, planted or colonized); and
- average height and general health of each planted species.

The vegetation data will be correlated with the surface and groundwater water regimes to evaluate the relative success of planted vegetation communities.

6.3 Fauna

A species list of fauna expected and known to occur in wetlands in the project vicinity will be filled out in conjunction with conducting monitoring. The kinds and locations of habitat used by each species will be recorded when observed. Any breeding or nesting activity in the mitigation areas will be documented.

6.4 Assessing Wetland Functions

Functions of the wetland mitigation sites will be assessed prior to construction to establish baseline conditions and after construction as part of the overall monitoring plan using *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (Ecology 1999).

7. Site Protection

As discussed in Section 4.2, the Sponsor Ports will acquire the mitigation sites in fee title. Legal proof that the land will continue to be adequately protected will be documented through property deed restrictions. The sites will be conveyed to the WDFW.

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8. Adaptive Management and Contingency Plan

Monitoring results will be reported annually, by December 30, to Ecology, Wahkiakum County, City of Longview, and Cowlitz County so that contingency actions, if any, can be implemented before the next winter.

In addition to the annual report, an as-built report will be completed following construction of the mitigation sites (i.e., Year 0) and submitted to Ecology and the local jurisdictions for review and approval. The as-built report will define existing conditions (e.g., topography, water levels, plant communities, infrastructure) in the mitigation areas following construction. It will serve as the baseline from which achievement of mitigation objectives can be measured. Each monitoring report will document project success relative to the mitigation performance standards.

All contingencies cannot be anticipated. The contingency plan needs to be flexible so that modifications can be made if portions of the final design do not produce the desired results. Problems or potential problems will be evaluated by a qualified wetland ecologist, the Corps, Ecology, and Cowlitz County. Specific contingency actions will be developed, agreed to by consensus, and implemented based on all scientifically and economically feasible recommendations.

Contingencies may include the following:

- Modifying grades to correct too low or too high elevations.
- Plantings to correct excessive mortality.
- Monitoring beyond Year 10, or unscheduled monitoring during Years 1 through 10.

Table 2 incorporates contingency measures for the mitigation sites.

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9. Responsible Parties

The mitigation actions will be implemented by the Corps and Sponsor Ports, which include the Port of Longview, the Port of Kalama, the Port of Vancouver, and the Port of Woodland. Tracey McKenzie, Anchor Environmental, and Geoff Dorsey, Corps, Portland District, prepared this mitigation plan.

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10. References

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Appendix A

Figures

