FINDING OF NO SIGNIFICANT IMPACT
2012 Union Slough Levee Rehabilitation
Snohomish County, Washington

1. Background. Flooding occurred on the Snohomish River in January 2009 with a peak stage of 24.12 feet at the Monroe gage (flood stage of 15 feet) resulting in damage to the Union Slough levee system at two sites. River flows damaged the right bank levee (site 1) of the Snohomish River at the south end of Smith Island and the left bank levee on Union Slough at the north end of the island. Loss of embankment material occurred at both sites. Site 1, along the Snohomish River, is 650 feet long, within this length 460 feet of in-water work is anticipated. Site 2, along Union Slough, consists of two areas of damage, 830 and 480 feet long. In the current condition, the levee offers a 5-year level of flood protection. While the level of protection can be difficult to determine in tidally influenced areas and previous reports have used various protection levels, the levee did not overtop during the 15-year flood event in 2009, therefore the levee is estimated to offer a 20-year level of protection in its undamaged pre-2009 flood condition.

Before repairs could be completed, another high water event occurred with a peak of 13.32 feet at the Monroe gage on 22 February 2012. During the high water event the Corps, along with Diking District #5, determined that immediate repairs were required to protect the integrity of the levee. This emergency construction occurred 21 February through 23 February on the left bank of Union Slough. Eighty-eight feet of Class II/III riprap was placed on the riverward face of the levee at site 2. Emergency repairs were hampered by accessibility and roughly 1,875 feet of temporary access road was improved, resulting in 0.73 acres of wetland impacts. In addition, 735 feet of the levee crown was reinforced with crushed gravel to allow truck access. While the flood fight repair increased stability of a small portion of the levee through the ongoing event, more repairs are needed to fully restore the flood protection capability of this system.

The Union Slough levee project is located near the City of Everett in Snohomish County, Washington, Diking District 5. The levee system is approximately 45,000 feet in length and protects much of Smith Island. Approximately 13 public facilities and businesses exist on Smith Island, including the City of Everett Water Pollution Control Facility, Dagmar's Marina, Buse Timber Sales Hima Farm and the City of Everett's Humane Society. Interstate 5 also traverses the island, but the highway is higher than the levee system throughout this area.

The purpose of the proposed construction is to repair and restore the damaged levee system to the 20-year level of flood protection as found prior to the January 2009 flood event in order to protect lives and property from subsequent flooding. In the current condition, the levee offers only a five year level of protection and any flows greater could result in levee failure and resulting overbank flooding.

2. Proposed Action. The project includes proposed repairs to two non-contiguous sites and one emergency repair constructed during the 2012 flood season. Site 1 has discontinuous damage along 650 feet of levee. The removal of vegetation along the 650 feet of riverward slope will more clearly show which sections require repair within that area, estimated to be 460 feet. Class II riprap armor will be used, as consistent with the surrounding area. As described above, emergency repairs along a portion of Site 2 were completed during flood fight activities in

February 2012. To fully restore the flood protection, further work is required at site 2. The proposed construction includes work at two separate locations in Site 2; the west site is 830 feet and the east site is 480 feet. The Site 2 repair will repair and armor an existing earthen berm. All proposed in-water work would be completed during the approved in-water work window (1 August – 31 October) for this area and is expected to take approximately 4 weeks to construct.

3. Impacts Summary. Pursuant to the National Environmental Policy Act (NEPA), the attached Environmental Assessment (EA) has been prepared. The EA evaluates the environmental impacts associated with the emergency actions and the proposed action and whether those actions would cause significant effects to the quality of the human environment as briefly summarized below.

Through a combination of Corps project priority determinations and funding timelines, it was not feasible for the Corps to complete all NEPA procedures prior to accomplishing the Federal emergency response activities during the flood event of February 2012. The action taken in 2012 was an emergency response designed to avert more widespread damage that may have resulted from progressive levee failure originating at the vulnerability point generated by 2009 damage. In February 2012, the District Engineer made real time decisions, communicated verbally, to proceed with any action having the potential to affect the quality of the human environment, in the absence of full NEPA evaluation and documentation, in light of the urgent circumstances then presented. The agency complied with NEPA "to the fullest extent possible" under the circumstances, with respect to emergency response activities during and after the ongoing flood event.

Site 1 was an armored bank previous to the damage and will be replaced with an armored bank, however a small amount of sedge wetland (0.02 acres) has become established in the footprint and will be impacted by the repair. Repairs to Site 2 will convert approximately 0.7 acres of intertidal wetland and muddy bottom habitat to an armored bank. Compensatory mitigation is proposed at a 2-to-1 ratio to offset the loss of habitat and water quality function. The proposal includes purchase of 1.45 acres of offsite mitigation at the City of Everett advanced mitigation site upstream on Union Slough. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. USACE finds that this project is within the public's interest and complies with the substantive elements of Section 404 of the Clean Water Act. Clean Water Act compliance review was conducted by the Washington State Department of Ecology and a Water Quality Certification was received on 23 July 2012.

The Corps has determined that the project is consistent with the Washington Shoreline Management Act, based on review of applicable sections of the State of Washington Shoreline Management Program and policies and standards of the Snohomish County Shoreline Management Plan, as well as the City of Everett's Shoreline Master Program. As per each of these shoreline management documents, the repair of a diking system that was established prior to 1975 is exempt. Records show that improvements to the levee were made by the Board of County Commissioners in 1931, therefore the Corps has determined that the project is exempt, as per RCW 90.58.030. The project is also consistent with the five other enforceable policies of the

Coastal Zone Management Act (CZMA). The Corps received a CZMA consistency concurrence from Ecology on 30 July 2012.

The Corps has determined that the Union Slough Preferred Alternative is an undertaking of the type that has No Potential to cause effects to Historic Properties under the National Historic Preservation Act, as the levee system has been recommended as ineligible for the National Register of Historic Places and all activities will be conducted within demonstrated limits of previous construction activities. The project has complied with the National Historic Preservation Act and the Corps has coordinated with all recognized Native American Tribes in the project vicinity.

A Biological Assessment (BA) of the impacts of the completed emergency response and the proposed repairs of the Union Slough Levee Rehabilitation project was sent to the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) on 21 May 2012. The BA analyses concluded that the change in substrate and loss of emergent wetlands required to repair the damaged levee *is likely to adversely affect Puget Sound steelhead, Puget Sound Chinook, and bull trout and is likely to adversely affect Chinook and bull trout critical habitat.* While an impact may be seen to Chinook, a main killer whale prey species, that impact was not expected to be sufficient to impact this species. The BA found that the project *may affect but is not likely to adversely affect Southern Resident killer whale or their critical habitat.* NMFS provided their findings in a Biological Opinion dated 30 July 2012. Reasonable and prudent measures to limit impact to Chinook and steelhead were provided. These include the purchase of credits to offset impacts, use of best management practices, and turbidity monitoring. These measures will be implemented as a part of the construction. Consultation with the USFWS is ongoing. Draft Reasonable and Prudent Measures and Terms and Conditions were received on 5 September 2012. These include working in the dry at low tide to the extent possible and placing rock individually in a slow controlled manner if in-water work is required.

The Corps will commit to fully funding and performing all Reasonable and Prudent Alternatives necessary to avoid the likelihood of jeopardy to listed species or destruction or adverse modification of designated critical habitat, as well as Reasonable and Prudent Measures (RPMs) necessary and appropriate to minimize the impact of Incidental Take, that are described if a Biological Opinion is received. The Environmental Assessment will be reevaluated at the time that consultation with USFWS is complete. If necessary, this EA will be supplemented with necessary and applicable corresponding modifications to the scope and/or nature of the project, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project.

Unavoidable adverse effects associated with this project include: (1) a temporary and localized increase in noise and emissions, which may disrupt fish and wildlife in the area, (2) a temporary and localized disruption of local traffic by construction vehicles, (3) a temporary and localized increase in turbidity levels during in-water construction which may affect aquatic organisms in the area, (4) temporary relocation and disturbance of recreation trails and facilities at the project sites, (5) removal of vegetation from within the proposed construction areas, (6) temporary impacts to wetlands from the road improvements completed as a part of the emergency response, and (7) a permanent change from the earthen bank at Site 2 to an armored bank. The proposed

mitigation offsets the permanent impact to wetlands and intertidal mudflat habitat at the City of Everett advanced mitigation site. The inclusion of the mitigation along with the availability of similar nearby habitats and the minimization of vegetation removal decreases the impact to less than significant levels. The Diking District plans to remove the temporary wetland fill to return the access road to pre-project condition after the proposed levee repair is completed. The other unavoidable impacts would be short in duration and considered insignificant.

4. Conclusion. I find that the proposed action will not result in significant adverse environmental impacts and complies with all applicable laws, regulations, and agency consultations, including the Clean Water Act, Endangered Species Act, Coastal Zone Management Act, and National Environmental Policy Act, as well as Executive Orders. Based on the analysis described above and provided in more detail in the accompanying Environmental Assessment, the 2012 Union Slough Levee Rehabilitation is not a major Federal action significantly affecting the quality of human environment, and therefore, does not require preparation of an environmental impact statement.

14 Sep 12
DATE

Bruce A. Estok
Colonel, Corps of Engineers
Commanding

ENVIRONMENTAL ASSESSMENT

UNION SLOUGH LEVEE
REHABILITATION OF FLOOD CONTROL WORKS
SNOHOMISH COUNTY, WASHINGTON

September 2012

US Army Corps of Engineers®
Seattle District

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1 INTRODUCTION

The purpose of an Environmental Assessment, as reflected in 15 CFR sections 1500.1(c) and 1508.9(a)(1) of the Council on Environmental Quality regulations implementing the National Environmental Policy Act of 1969 (as amended) is to "provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" on actions authorized, funded, or carried out by the federal government, and to assist agency officials in taking actions that are based on understanding of "environmental consequences, and take actions that protect, restore, and enhance the environment." This assessment evaluates environmental consequences for the implementation of management actions carried out by the U.S. Army Corps of Engineers (Corps) in cooperation with Snohomish County Diking District 5 (DD5) in response to the flood event described in Section 2.0.

2 BACKGROUND

Flooding occurred on the Snohomish River in January 2009 with a peak stage of 24.12 ft (approximately a 15-year flood event) occurring at the Monroe gage (flood stage 15 feet). Before repairs could be completed, another high water event occurred with a peak of 13.32 feet at the Monroe gage on 22 February 2012. In both events, intense rainfall and rapid snowmelt resulted in the river exceeding flood stage. River flows damaged the right bank levee (site 1) of the Snohomish River at the south end of Smith Island and the left bank levee on Union Slough at the north end of the island (Figures 1 and 2). Loss of embankment material occurred at both sites. Site 1, along the Snohomish River, is 650 feet long, within this length 460 feet of in-water work is anticipated. Site 2, along Union Slough, consists of two areas of damage, 830 and 480 feet long.

3 PURPOSE and NEED

The DD5 levee system is approximately 45,000 feet in length and protects much of Smith Island. Approximately 13 public facilities and businesses exist on Smith Island, including the City of Everett Water Pollution Control Facility, Dagmar's Marina, Buse Timber Sales Hima Farm and the City of Everett's Humane Society. Interstate 5 also traverses the island, but the highway is raised higher than the levee system throughout this area.

In the current condition, the levee offers a 5-year level of flood protection. The level of protection can be difficult to determine in tidally influenced areas and previous reports have used various protection levels for this levee system. The levee did not overtop during the 15-year flood event in 2009, therefore the levee is estimated to offer a 20-year level of protection in its undamaged pre-2009 flood condition. The purpose of the proposed construction is to repair and restore the damaged levee system to the 20-year level of protection as found prior to the January 2009 flood event in order to protect lives and property.

4 AUTHORITY

Both the emergency and proposed actions are authorized under Public Law 84-99 (33 U.S. Code Section 701n). Corps rehabilitation and restoration work under this authority is limited to flood

control works damaged or destroyed by floods. The statute authorizes rehabilitation to the level of protection exhibited by the flood control work prior to the damaging event, with modifications to those facilities authorized under limited circumstances in order to preserve the structural integrity of non-Federal projects. The Union Slough levee is a non-Federal levee that was active in the Corps' Public Law 84-99 Rehabilitation and Inspection Program at the time of the damaging flood, making the local sponsor eligible for rehabilitation assistance. Snohomish County Diking District 5 (DD5) is the local sponsor.

5 PROJECT LOCATION AND DESCRIPTION

The Union Slough levee project is located near the City of Everett in Sections 04 and 21, Township 29 North, Range 5 East of the Willamette Meridian in Snohomish County, Washington (Figure 1). The project is on Smith Island, located near the City of Everett Water Pollution Control Facility and within the Snohomish River Estuary.

The Snohomish River in the project area separates into numerous sloughs and channels within the lower river section. The project is located on Smith Island which lies between the river and Union Slough. This area receives twice daily tide cycles, making salinity conditions brackish, but generally retains its fluvial characteristics. Union Slough is confined by unarmored earthen levees while the levees on the Snohomish River side are largely riprapped. The river provides habitat for all salmon species utilizing the lower mainstem of the Snohomish River. These species include coho (*Oncorhynchus kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), Chinook (*O. tshawytscha*), coastal cutthroat (*O. clarki*), steelhead (*O mykiss*), and bull trout (*Salvelinus confluentus*)

Fish habitat, riparian function, and floodplain conditions in the Snohomish Basin have been dramatically altered due to past human activities. Pentec and NW GIS (1999) reported in the Snohomish River Basin Conditions and Issues report that the four major conditions limiting salmonid survival include: (1) Reduction of refuge and rearing habitat in sides channels and sloughs from channel alteration, diking, and fish passage barriers, (2) Shortage of woody debris, (3) Fresh and saltwater marsh habitat loss, and (4) Cumulative effect of urbanization including riparian disturbance and water quality degradation. Smith Island was historically dominated by tidal marsh, but has been highly modified to allow for industry and farming.

Vegetation on the Smith Island levees is managed to maintain a high standard of levee safety and inspectability. To remain eligible for rehabilitation under the Corps' Public Law 84-99 program, the Diking District maintains the vegetation to the Seattle District's 1995 Vegetation Variance standard by regularly mowing the levee and precluding large woody vegetation growth. Site 1 (Figure 2) is colonized on the riverward face by occasional woody species but is heavily infested with blackberry and Japanese knotweed. These species transition into sedge wetlands (*Carex lyngbyei*) below mean higher high water. The levee crown includes a recreational trail which is lined with grass on both sides. Site 2 is dominated by sedges or bare soils on the riverward face, with a mown grassy crown. The landward side of the levee includes a drainage ditch and wetland along the levee toe. A tide gate exists at the downstream end of the eastern repair site. The tide gate will not be impacted by the proposed project. At both sites, soils waterward of the levee consist of muds and sands with compressed peat layers observable in places.

The project includes proposed repairs at two locations and one completed emergency action. In total, 88 feet of inwater work was completed during the 2012 flood fight effort and a further

1,760 feet of work is proposed to restore flood protection (see Section 6.6). All proposed in-water work would be completed during the approved in-water work window (1 August – 31 October) for this area and is expected to take approximately 4 weeks to construct.

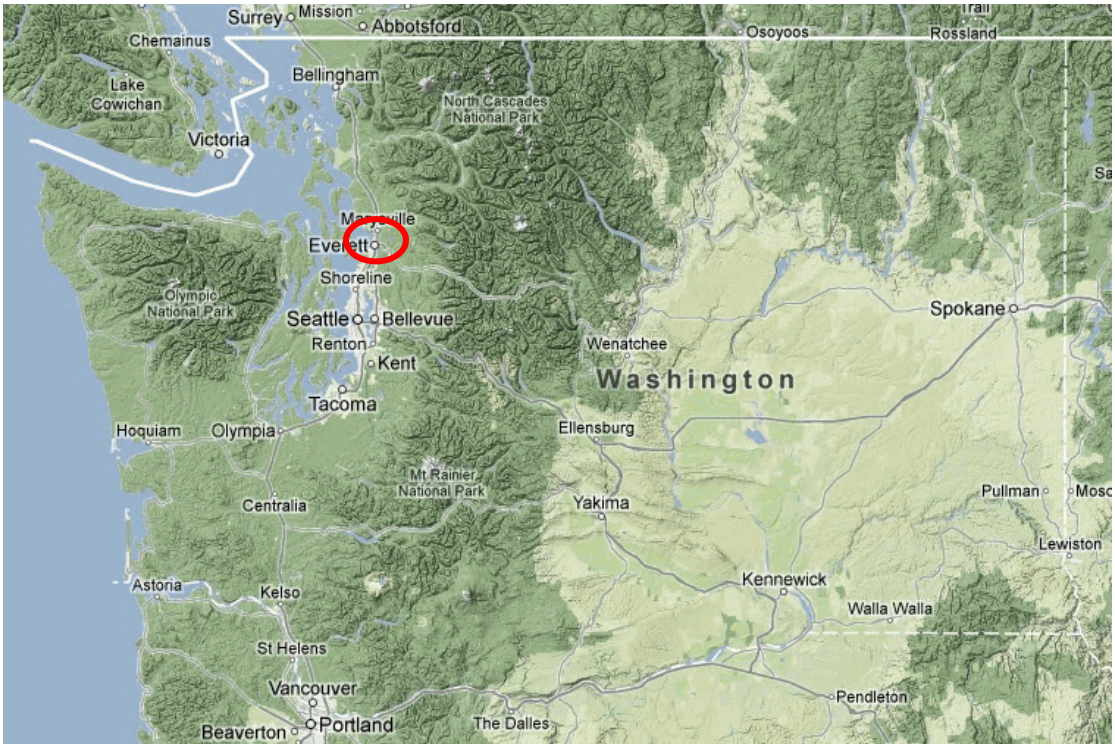


Figure 1. Overview Project Location Map.

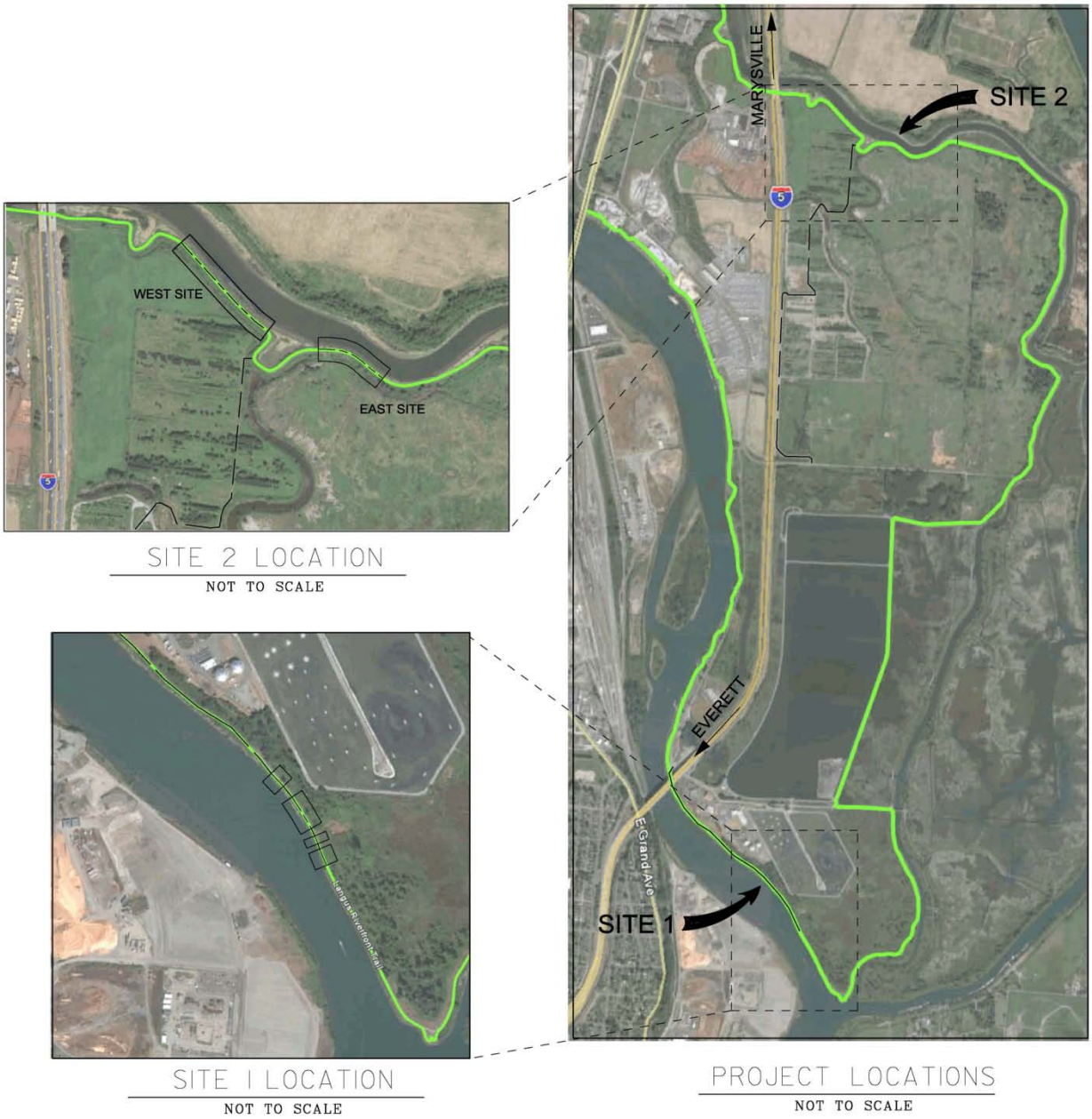


Figure 2. General project location map.

6 ALTERNATIVES CONSIDERED

Alternatives considered under the NEPA must include the proposed actions (Preferred Alternatives), the No-Action alternative, and reasonable alternatives that meet the purpose of the project. Multiple alternatives were considered including the No-Action Alternative, the Repair in Place Alternative, the Repair in Kind Alternative, the Setback Alternative, and the Non-Structural Alternative. In order for any alternative to be acceptable for consideration it must meet the purpose of the proposed project. The project purpose is to restore flood protection to

the level provided prior to the damaging flood event. The project must be economically justified, environmentally acceptable, and should minimize costs for the non-Federal Sponsor and the Federal government to the extent possible. The non-Federal sponsor is responsible for providing a 20 percent cost-share on the construction of the repairs.

6.1 No Action Alternative

Under this alternative, the Corps would not provide assistance to DD5; no project features will be implemented. The levee system would continue to only provide protection against a 5-year flood event. The decreased level of protection increases the risk of flood damage to businesses and public infrastructure on Smith Island. The levees would remain damaged and could potentially sustain further damage.

6. 2 Repair in Kind Alternative

This alternative repairs the levee by returning it to the pre-flood condition with minimal or no change to the character, scope, or size of the levee. This alternative maintains the status quo of the river and levee at the repair location as existed prior to the flood damage and includes no footprint change for the levee.

6. 3 Repair in Place Alternative

This alternative repairs the levee by returning it to the pre-flood level of protection. Changes to the levee character may be needed to meet current design standards or river conditions.

6.4 Setback Alternative

A typical setback alternative removes all or part of the existing levee and builds a new levee landward of the existing location. In this case, the setback alternative considered included the repair of the damaged area by placing material on the backside of the levee to rebuild the required width behind the levee and maintaining the existing eroded face. While this is not a "typical" setback because there is no increase in floodplain beyond that already seen through erosion, it was considered a "setback" in relation to the pre-damaged condition where the levee centerline and footprint moved landward. This alternative maintains the level of flood protection but does not include any riverward repair of the existing erosion.

6.5 Non-Structural Alternative

This alternative would include no repairs to the damaged levee and would instead relocate all protected existing structures, utilities and infrastructure beyond the flood inundation zone. The Corps has no authority to pursue this alternative absent a request from the local sponsor. As the local sponsor did not request the pursuit of this alternative and the implementation of this alternative would be extremely expensive, this alternative has not been carried through the analysis.

6.6 Preferred Alternative

6.6.1 Completed Emergency Actions

Emergency repairs at Site 2 were completed during flood fight activities on 21-23 February 2012 (See Figure 3). During the flood event the Corps determined that immediate repairs were

required to protect the integrity of the levee, however these repairs were hampered by accessibility. Eighty-eight feet of Class II/III riprap (218 tons) was placed on the riverward face of the levee at site 2. While the flood fight repair increased stability of a small portion of the levee during the ongoing event, more repairs are needed to fully restore the flood protection capability of this system.

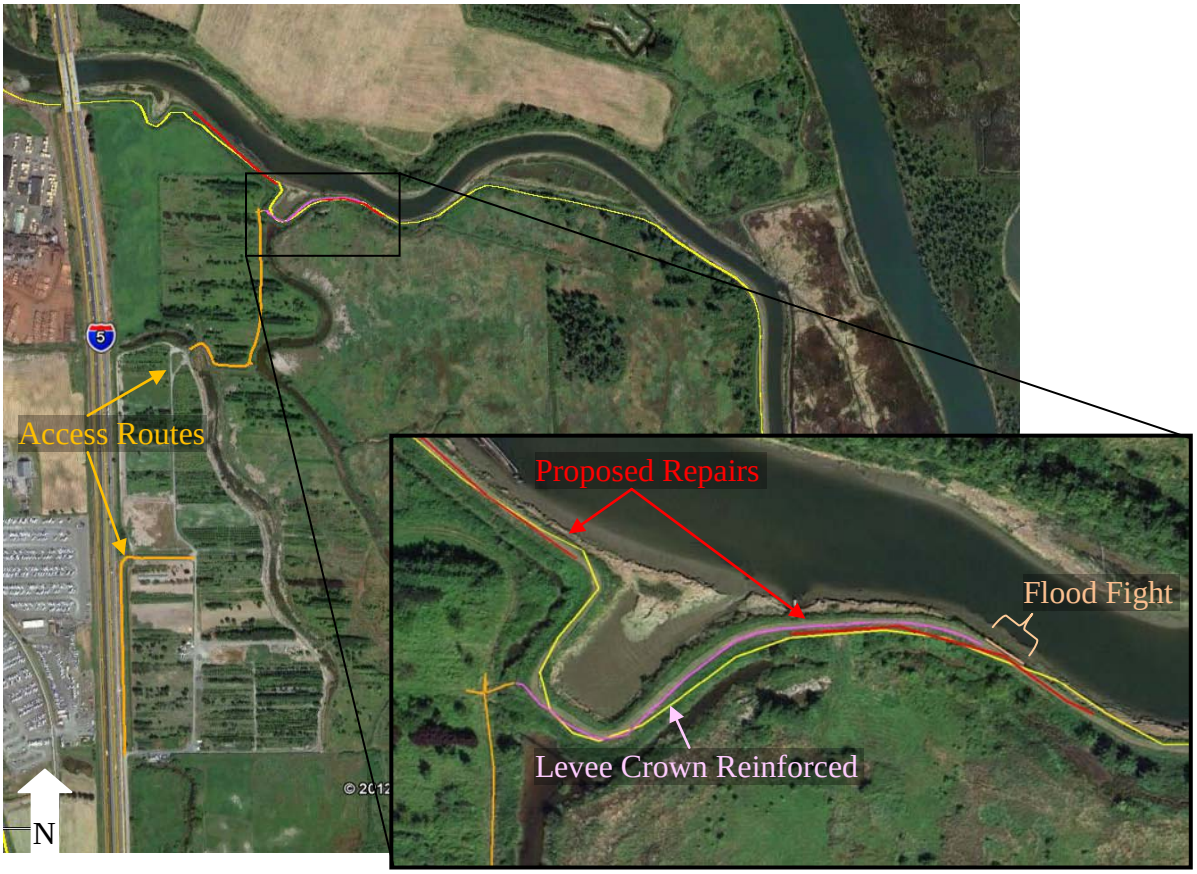


Figure 3. Completed emergency repairs at Site 2.

Additionally, during the flood fight roughly 1875 feet of temporary access road was improved behind the levee, resulting in 0.73 acres of wetland impacts and 735 feet of the levee crown was reinforced with crushed gravel to allow truck access (1,688 tons of 2-4" spalls and 750 tons of 1 1/4" minus crushed rock). The improved access road is on the landward side of the levee, but a portion of the road is within floodplain wetlands. Two sections of road were improved, the south portion was in an upland area, the northern portion was in wetland. Using the Washington State Wetland Rating System for Western Washington, the wetland was determined to be a Category 2 wetland (Snohomish County 2012).

As per the Cooperation Agreement signed by the local sponsor to request flood fight assistance, the local sponsor is required to hold and save the Government free from damages due to authorized work and to remove all temporary work associated with the flood fight. The temporary road work during the flood fight included improving an existing dirt road. Prior to the flood fight, the dirt road met the requirements to be a jurisdictional wetland. The placement of a large amount of spalls and gravel to raise and harden the road surface for construction vehicles,

constituted wetland and floodplain fill. Any short term impact due to construction and emergency use of the road during the flood would be the responsibility of the Corps. Any longer term impacts caused by the improvements to the access road are the responsibility of the local sponsor and are therefore not covered in this document. The Diking District plans to remove this added material after the proposed levee repair is completed so that the improved roadway can be used to access the repair site. The in-water levee repair completed during the flood fight is within our proposed repair footprint, any impact of the flood fight work is expected to be masked by the proposed repair. As such the Corps is addressing the impacts of the riverward work during the 2012 flood fight, and consideration is included in this document.

Table 1: Description of Completed and Proposed Repairs

Site	Status	Length	Description	
Site 1 (South site along Snohomish River, see Figures 4 and 5)	Proposed work	Total 460 feet	repair of riverward face/toe with in-water work in four locations at this site	
		reach 1	0+00 to 0+80	80 feet
		reach 2	1+55 to 3+75	220 feet
		reach 3	4+50 to 4+90	40 feet
		reach 4	5+30 to 6+50	120 feet
Site 2 (North site along Union Slough, see Figures 6 and 7)	Emergency repair	88 feet (riverward) and 735 feet (crown only)	Emergency repair of riverward face/toe with in-water work and placement of crushed rock on the crown to create a driving surface.	
	Proposed work	1310 feet (riverward)	repair of riverward face/toe with in-water work in two locations at this site, this repair includes the location of the completed emergency repair	

6.6.2 Proposed Actions

Site 1: The proposed repair for Site 1 is the Repair in Kind Alternative (Figures 4 and 5). Site 1 has discontinuous damage along 650 feet of levee. The removal of vegetation along the 650 feet of riverward slope will more clearly show which sections require repair within that area, estimated to be 460 feet. The repaired reaches will tie-in to the existing stable bank. Some toe armoring or riprap blanket thickening may be done to the reaches between the identified damage reaches once the vegetation is brushed. The actual damage reaches requiring repair will be staked prior to the start of construction following consultation with the design engineer and lead construction engineer. The levee rehabilitation design will stabilize and armor the riverward slope to prevent further erosion damage. Generally, the repair will involve filling the scour voids with an approximately 50-50 mixture of 1 ¼-inch minus gravel and 2-inch to 4-inch quarry spalls. The fill will be capped with a 1 foot thick layer of 2-inch to 4-inch quarry spall material that will also serve as a filter blanket. Following the quarry spall placement, a blanket of riprap will be added. To account for water velocities along the Snohomish River, Class II riprap was selected for Site 1. The armoring will be added to the slope above the large silt benches that have formed on the lower slope. The riprap will be laid on a 1.75H:1V minimum slope. The blanket thickness is 2 feet as required for the riprap size. The levee crown will be covered with

up to a 6-inch lift of 1 1/4”-inch gravel to prevent rutting. A willow lift will be placed at ordinary high water with a minimum of 6 inches of soil. Live branches of Scouler’s willow (*Salix scouleriana*) will be placed at 6 inches on center. Finally, a layer of soil will cover the upper portion of the riprap above the willows, approximately elevation 9 feet, to the levee crown. The soil will be hydroseeded with native grasses. Access to the site will be via existing roads and the asphalt path on the levee crown. All work will be completed from the top of the levee. Site 1 was an armored bank previous to the damage and will be replaced with an armored bank, however there is a small amount of sedge wetland that has become established in the footprint which will be impacted. This includes approximately 0.02 acres of wetland.

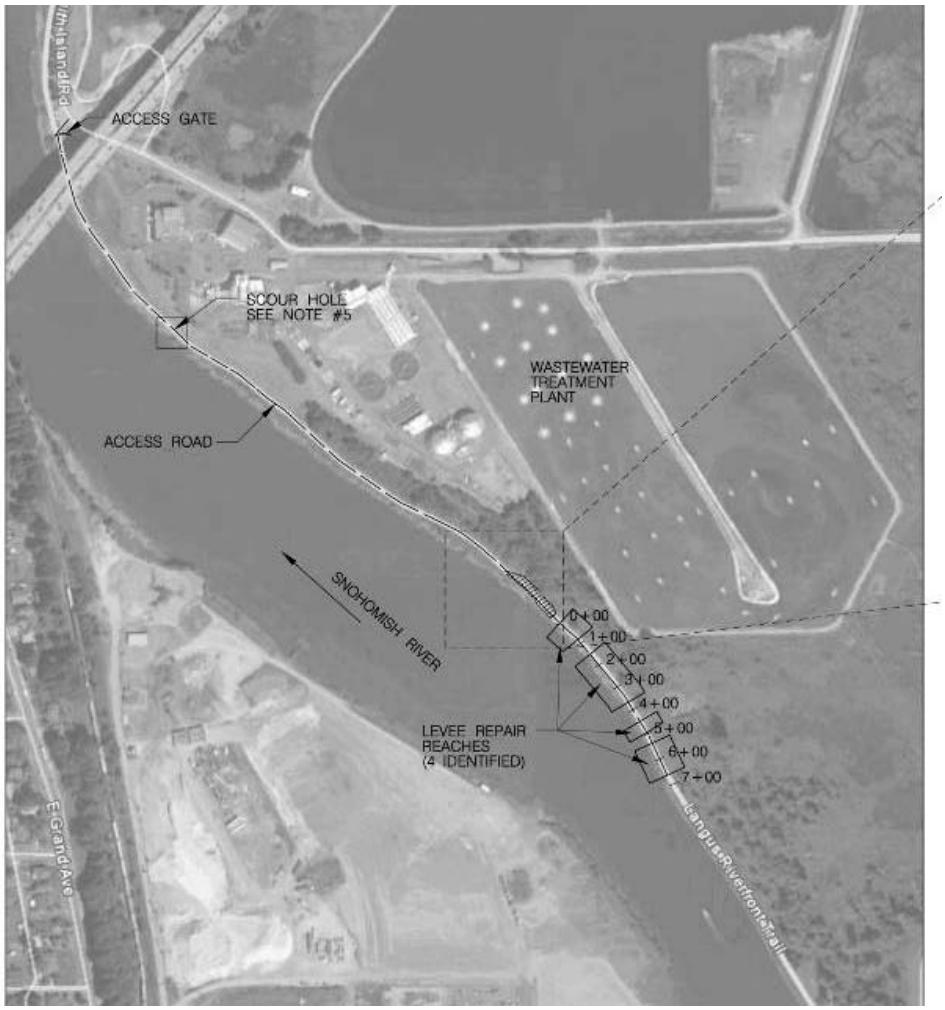


Figure 4. Proposed Site 1 repair location.

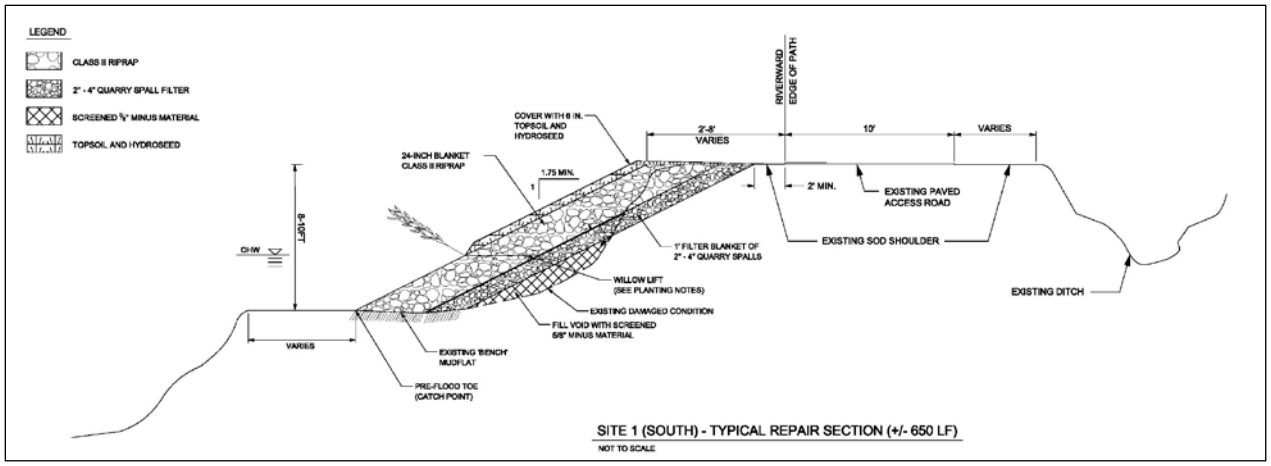
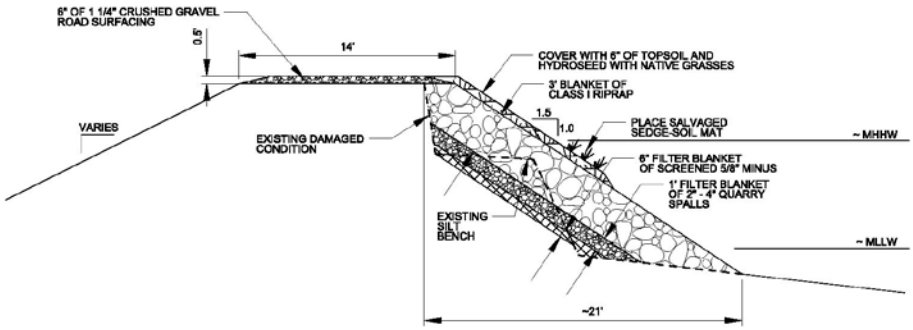


Figure 5. Proposed Site 1 cross section design.

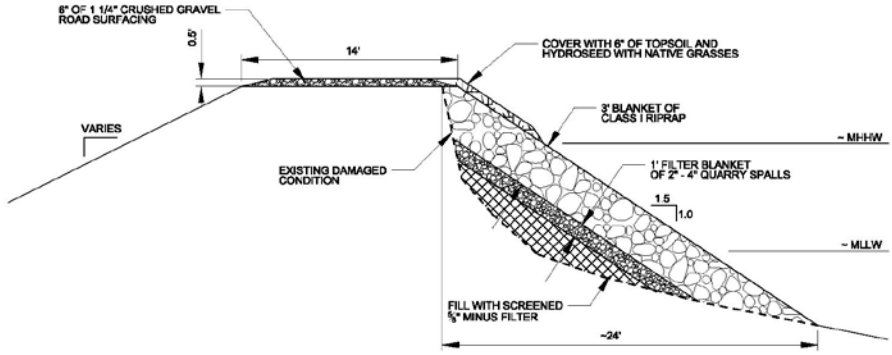
Site 2: The proposed repair for Site 2 is the Repair in Place Alternative (Figures 6 and 7). Site 2 has two separate sites requiring repair; the west site and the east site. The west site is 830 feet and the east site is 480 feet. The east site has stable silt benches riverward of the damage, allowing for reduced height of repairs from station 0+00 to 2+00 and from station 4+40 to 4+80. The location of the damage is shown in Figure 6. The repair reaches will be staked prior to the start of construction. The levee rehabilitation design will stabilize and armor the riverward slope to prevent further erosion damage. Generally, the repair will involve filling the scour voids with an approximately 50-50 mixture of 1 ¼-inch minus gravel and 2-inch to 4-inch quarry spalls. The fill will be capped with a 1 foot thick layer of 2-inch to 4-inch quarry spall material that will also serve as a filter blanket. Following the quarry spall placement, a blanket of riprap will be added. Stream velocities encountered at Site 2 along Union Slough range from 4.8 to 6 feet per second. While the site is currently only an earthen berm and velocities are generally slow, turbidity concerns with the placement of fine material into the water and the inability to compact fine material placed in the water requires construction with clean angular rock. Class I riprap will be placed at the site with steepened riverward slopes (1.5H:1V) to minimize the riverward extent of the repair. The thickness of the Class I riprap blanket was doubled to maximize the stability of the steeper slope. The levee crown will be covered with up to a 6-inch lift of 1 1/4”-inch gravel to prevent rutting.

Where possible, sedge mats at Site 2 will be salvaged from the impacted area and placed on the riverward face of the rebuilt levee. These sedge mats will be anchored to the extent possible to keep them in place at a similar elevation to the pre-construction sedge benches. By salvaging the plants with their root systems and soils intact, the plants are expected to stabilize the soils and minimize turbidity increases. Finally, a layer of soil will cover the upper portion of the riprap, approximately elevation 9 feet (mean higher high water), to the levee crown. The soil shall be hydroseeded with native grasses in a wood fiber mulch with a tackifier to protect the seed until it germinates. Access to the site will be via existing roads, the temporary road reinforced during the flood fight, and the levee crown. All work will be completed from the top of the levee. Repairs to Site 2 will require approximately 0.7 acres of intertidal wetland and muddy bottom habitat to be converted to an armored bank.

Figure 6. Proposed Site 2 repair location. The red line shows the location of the February 2012 emergency repair.

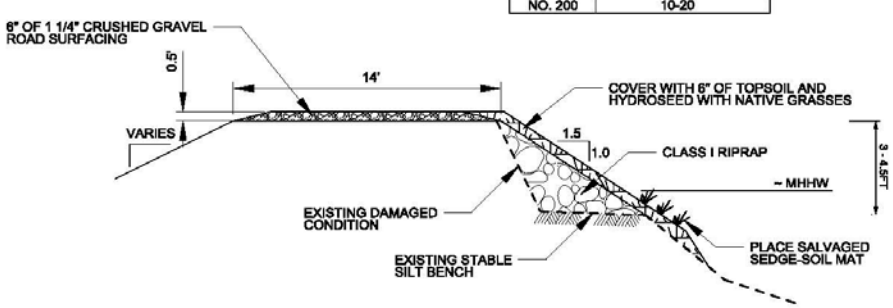


SITE 2 (NORTH) – TYPICAL REPAIR SECTION – WEST SITE (+/– 830 LF)
NOT TO SCALE



SITE 2 (NORTH) – TYPICAL REPAIR SECTION – EAST SITE
(STA 2+00 TO STA 4+40)
NOT TO SCALE

NO. 40	25-50
NO. 200	10-20



SITE 2 (NORTH) – TRANSITION SECTION – EAST SITE
(STA 0+00 TO STA 2+00 & STA 4+40 TO STA 4+80)
NOT TO SCALE

Figure 7. Proposed Site 2 cross section design.

6.7 Conservation Measures

Several measures would be employed during construction of the proposed repair work to minimize adverse project effects on protected species and their habitat.

- Proposed in-water work would be accomplished only during the approved in-water work window (1 August to 31 October).
- Only clean rock will be placed on the riverward side of the levee. There will be no end dumping of material into the river. Riprap will be individually placed; quarry spalls will be placed in small quantities from the bucket of an excavator.
- No new access roads will be constructed.
- Vegetation removal will be limited to the minimum extent needed to complete the repairs.
- No net loss of wetlands or sensitive aquatic sites will occur due to the inclusion of the mitigation site.
- One willow lift will be planted on riverward face of Site 1.
- Sedge salvage will occur at Site 2.
- Hydroseeding with native grasses will be completed for all disturbed soils. wood fiber mulch with a tackifier to protect the seed until it germinates.

Construction Best Management Practices (BMPs), as suggested by the Washington State Department of Ecology, during previous similar repairs will be included during the construction, and to the extent practicable were included during flood fight operations. See Table 2.

Table 2. BMPs Implemented During Construction

1. Equipment used near the water will be cleaned prior to construction.
2. Work will be conducted during a period of low flow.
3. Biodegradable hydraulic fluids will be used in machinery where appropriate.
4. Refueling will occur on the backside of the levee.
5. Construction equipment shall be regularly checked for drips or leaks.
6. At least one fuel spill kit with absorbent pads will be onsite at all times.
7. Drive trains of equipment will not operate in the water.
8. At least one biologist will be onsite or available during construction.
9. Continuous visual water quality monitoring will be conducted during construction; with measurements taken when a plume is noted.
10. Individual placement of clean riprap (no end dumping) into the water.

11. All noxious species will be removed and disposed of offsite at an approved location where work is being accomplished.

In addition a Fueling and Spill Recovery Plan will be developed prior to construction that will include specific BMPs to prevent any spills and to prepare to react quickly should an incident occur. Similar repairs have been conducted with strict water quality monitoring efforts. No significant turbidity was noted during the emergency flood response. Turbidity monitoring will be conducted as required by the water quality certification. Should construction cause an exceedance of the state maximum turbidity standards, work will be halted and construction methods adjusted to ensure that further exceedances will not occur.

BMPs were in place to minimize impacts of the completed emergency response. These included individual placement of rocks, regular checking of equipment for drips and leaks, use of biodegradable hydraulic fluids, fuel spill kit availability, refueling on the back side of the levee, and no drive trains operated in the water. Rocks were placed individually to limit disturbance and no turbidity increases were noted. See Appendix A for photographs taken during the 2012 emergency response.

6.7.1 Mitigation

To counter the unavoidable impacts to sedge wetlands and substrate change within the slough, mitigation alternatives have been included. This includes a single willow lift throughout the entire repair area of Site 1 above MHHW. Where possible, sedge mats at Site 2 will be salvaged from the impacted area and placed on the riverward face of the levee at a similar elevation to the current sedge benches. These sedge mats will be anchored to the extent possible to keep them in place. By salvaging the plants with their root systems and soils intact, the plants are expected to stabilize the soils and minimize turbidity increases. Soil placement with sedge plantings was also considered, however due to the daily tides the stabilization of the soil was a concern for both turbidity and planting success. Transplanted marshes have been shown to provide habitat to rearing Chinook. Studies found that the species composition of fish communities using transplanted marshes was similar to that of reference areas and there was no evidence that transplanted marshes were avoided by juvenile salmon or dominated by non-salmonids (Levings and Nishimura 1997, Scott and Susanto 1993.

This transplantation method is experimental for *Carex lyngbei* and success rate is unknown. A total of 0.72 acres of impact to sedge wetlands and intertidal mud flat is proposed to be offset at a 2-to-1 ratio. To prevent the loss of habitat and water quality function to the area, 1.45 acres of offsite mitigation is proposed at the City of Everett advanced mitigation site upstream on Union Slough. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success. The mitigation site will also provide off channel refuge and rearing habitat.

7 AFFECTED ENVIRONMENT

7.1 Topography, Hydrology, and Soils

The Snohomish River estuary is the second largest river discharge into the Puget Sound and accounts for about 30% of the freshwater discharge to Whidbey Basin. It drains about 1776 square miles, mostly via the Snohomish River, which has an approximate annual river inflow of 9,535 cfs. The Snohomish River is a highly braided system from river mile (RM) 8.1 – where it first splits into the mainstem and secondary sloughs – down to the mouth. Steamboat Slough diverges from the mainstem at RM 3.9. Union Slough diverges from Steamboat at RM 2.5 and rejoins at RM 0.9.

The project area is influenced by diurnal tidal fluctuations of up to 13 feet. The slough is up to 100 feet wide and the river channel is up to 400 feet wide. The tidal influence can reach as far as 20 miles upstream of the river mouth. The lower Snohomish River and its tributaries, side channels, and sloughs have been modified by an extensive network of levee systems. The braided, leveed, tidally-influenced channels, such as Union Slough, can account for significant velocity and sediment bedload fluctuations that cause localized scour or deposition. The average depth in the river delta sloughs is about 10 feet relative to mean sea level.

Historical channel migration of Union Slough has slowed since the introduction of the levee systems – decreasing from approximately 40 feet/year in the 1950's and 1960's to less than 10 feet/year in the 1990's and presumably even less today. The slough's migrating nature is exemplified in moderate to large flood events, when higher channel velocities erode levee banks and cause localized channel scour.

Soils in the area are classified as predominately Puget silty clay loam with isolated areas of Mukilteo muck, Snohomish silt loam, and Terric Medisaprists by the Natural Resources Conservation Service (http://soils.usda.gov/). Upper subsurface materials on the site consist of very soft to soft silty clay, silt, and organic silt with peat layers to depth of 15 to 25 feet below the surface and a pH of 5.0. The silty soils are underlain by fine sand with silty sand, silty layers, and scattered peat lenses. Dense sand and gravel occurs at depths of approximately 125 feet. According to the Natural Resource Conservation Services soil survey classifications, Puget silty clay loam is a very deep artificially drained soil formed in alluvium. While the soils under the original levee footprint are previously compacted, these soil types can be problematic as foundation material due to expected settling under additional weight outside of the footprint. Permeability is slow and susceptibility to erosion is low to moderate for all four soil units (types) occurring on the site. The bottom of the slough consists of very soft silt and fine sand.

7.2 Vegetation

Union Slough is almost entirely leveed in the project vicinity. Vegetation on the Smith Island levees is managed to maintain a high standard of levee safety and inspectability. To remain eligible for rehabilitation under the Corps' Public Law 84-99 program, the Diking District maintains the vegetation to the Seattle District's 1995 Vegetation Variance standard. Site 1 is colonized on the riverward face by occasional woody species but is heavily infested with blackberry and Japanese knotweed. These species transition into sedges (*Carex lyngbyei*) below mean higher high water. Soils waterward of the levee consist of muds and sands with compressed peat layers observable in places. The levee crown includes a recreational trail which is lined with grass on both sides and is regularly mowed. Site 2 is dominated by sedges or bare

soils on the riverward face, with a mown grassy crown. The landward side of the levee includes a drainage ditch and wetland along the levee toe, with agricultural fields in the floodplain. A tide gate exists within site 2, at the downstream end of the eastern repair site. The tide gate will not be impacted by the proposed repair.

7.3 Fish and Wildlife

Union Slough and the lower Snohomish River supports anadromous stocks of seven salmonids: coho (*Oncorhynchus kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), Chinook (*O. tshawytscha*), coastal cutthroat (*O. clarki*), steelhead (*O mykiss*), and bull trout (*Salvelinus confluentus*). All of these species are important in recreational fisheries, and five are important for commercial and Native American fisheries. All species spawn in freshwater upstream of the estuary. Spawning varies from August and September for pink and Chinook salmon to May through June for steelhead and cutthroat trout. Dolly Varden (*S. malma*) are also found in the project area. Dolly Varden and bull trout are closely related and have considerable biological similarities. Bull trout are mainly an inland species while Dolly Varden are more coastal, however in Washington both are present in the Puget Sound area and both could be expected in the project vicinity.

Upstream migration of adult salmonids occurs every month of the year, mostly in August through March. Migrating salmon can pass through Union Slough, though most fish use Steamboat Slough to the east and the Snohomish River to the west to reach upstream holding and spawning areas. By the time adult salmon and steelhead enter the Snohomish River, most have stopped active feeding. The smaller adult sea-run cutthroat trout and Dolly Varden, however, actively feed in the lower river channels and shorelines where favorable habitats are found. Downstream smolt migration occurs mainly in the spring and early summer. Estuarine habitats provide a transition zone where juvenile salmonids physiologically adapt from fresh to salt water environments.

Migratory birds use four major migratory routes (Pacific, Central, Mississippi, and Atlantic flyways) in North America. Washington is within the Pacific flyway. The City of Everett Water Pollution Control Facility oxidation ponds and the adjacent Spencer Island support a wide variety of wintering waterfowl. Although not considered a natural waterfowl habitat, the oxidation ponds are of value to waterfowl and other wildlife species. The oxidation ponds are considered one of the best waterfowl birding areas in Snohomish County. Eighteen waterfowl species use the ponds for resting, feeding, and/or breeding. Other shorebirds, such as great blue herons and other wading birds, use the Spencer Island habitats.

While population recovery has removed eagles from the listing under the Endangered Species Act, they remain protected under the Bald and Golden Eagle Protection Act as well as the Migratory Bird Treaty Act. Witmer and O'Neil (1990) reported that a deficiency of roosting habitat and riparian perch trees may be limiting the number of wintering eagles in the lower Snohomish and Skykomish River basins which are primarily in private ownership. A query of the WDFW (2010) Priority Habitats and Species Database indicates that no bald eagle nests are currently located near the project vicinity (nearest nest is 1.5 miles away) and surveys of the sites by Corps staff have not noted any nests.

7.4 Threatened and Endangered Species

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA), federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally

listed and proposed threatened or endangered species. Chinook, bull trout, and steelhead, protected under the ESA (Table 3), may occur in the vicinity of the project and a fourth protected species, killer whale, could be indirectly affected through impacts to prey species. The following sections briefly summarize relevant information for the protected species and evaluate how the proposed project may affect the species, concluding with a determination of effect. Further detail on project effects are found in the sections below.

Table 3. ESA Protected Species Potentially Occurring in the Project Vicinity

Species	Listing Status	Critical Habitat
Puget Sound Chinook ESU *Oncorhynchus tshawytscha*	Threatened	Designated, includes the project area
Coastal/Puget Sound Bull Trout DPS *Salvelinus confluentus*	Threatened	Designated, includes the project area
Puget Sound Steelhead DPS *Oncorhynchus mykiss*	Threatened	N/A
Southern resident killer whale *Orcinus orca*	Endangered	Designated, does not include project area

It is also anticipated that marbled murrelet (*Brachyramphus marmoratus*), listed as threatened, could transit the area while traveling between nesting areas in the upper watershed, and feeding areas in Puget Sound. The project area does not include designated critical habitat for marbled murrelet.

Other listed species in Snohomish County are Canada Lynx (*Lynx canadensis*: threatened; reclusive and very unlikely in the urbanized project vicinity), grizzly bear (*Ursus arctos horribilis*: threatened; presence in Washington not well documented and likely scarce; very unlikely to be found in the urban project environment), gray wolf (*Canis lupis*: endangered; reclusive and very unlikely in the urbanized project vicinity), and northern spotted owl (*Strix occidentalis caurina*: threatened; requires old-growth forest for nesting and feeding and this habitat does not exist in the project area).

7.4.1. Puget Sound Chinook ESU

The Puget Sound Evolutionarily Significant Unit of Chinook salmon was listed as a threatened species under the ESA, as amended, in March 1999 (NMFS 1999). The four Snohomish basin Chinook stocks originally described in Salmon and Steelhead Stock Inventory (SASSI)(WDFW and WWTIT 1993) have been reorganized into two stocks, Skykomish and Snoqualmie, following the Chinook population delineation used by the Puget Sound Technical Recovery Team (Puget Sound TRT 2001). The Skykomish Chinook stock combines the Snohomish summer, Wallace summer, and Bridal Veil Creek fall Chinook stocks and a portion of the Snohomish fall Chinook stock. The Snoqualmie Chinook stock is composed of fish from the 1992 SASSI Snohomish fall Chinook stock that spawn in the Snoqualmie River and its tributaries. Stock status for both is rated Depressed in 2002 due primarily to low stock productivity (WDFW 2002).

All populations of Snohomish River Chinook transit the action area during migration. Adult migrants may be in the project area from June through September and juvenile outmigration occurs from April through July. Juvenile Chinook pass through the action area on their way to Possession Sound with the average residence in the estuary of up to several weeks occurring

from April through July. Chinook depend on extended estuarine residence time to grow and prepare for offshore migration. Emergent marsh, often dominated by *Carex lyngbyei* as seen at the project sites, provides critical rearing habitat for juvenile Chinook.

7.4.2 Coastal/Puget Sound Bull trout

The Coastal/Puget Sound bull trout distinct population segment was listed as a threatened species under the Endangered Species Act in October 1999 (USFWS 1999). Bull trout populations have declined throughout much of the species' range; some local populations are extinct, and many other stocks are isolated and may be at risk (Rieman and McIntyre 1993). Combinations of factors including habitat degradation, expansion of exotic species, and exploitation have contributed to the decline and fragmentation of indigenous bull trout populations.

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams. Temperatures in rearing habitats typically range less than 59.0˚F and temperatures in spawning habitats are generally less than 48.2˚F (Pratt 1992, Rieman and McIntyre 1993, USFWS 2004). Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems (Rieman and McIntyre 1993). Factors that can influence bull trout ability to survive in warmer rivers include availability of cold water patches and food productivity (Myrick et al. 2002). All life history stages of bull trout are associated with complex forms of cover, including LWD, undercut banks, boulders, and pools (Pratt 1992). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Pratt 1992, USFWS 2004). Preferred spawning habitat consists of low gradient stream reaches with loose, clean gravel. Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Rieman and McIntyre 1996). Critical habitat was designated for bull trout in 2005 and includes all of the project area.

Similar to Chinook, juvenile bull trout likely use the emergent marshes throughout the slough as important forage habitat. The existing undercut banks may provide protective cover habitat at certain tidal ranges.

7.4.3 Puget Sound Steelhead DPS

Puget Sound steelhead were listed as threatened under the ESA on May 11, 2007 (NMFS 2007). Critical habitat has not been designated or proposed for Puget Sound steelhead. The Snohomish River supports populations of summer and winter-run steelhead (WDFW 2002). In contrast with other species of Pacific salmon, *O. mykiss* is capable of repeat spawning.

There are two major life history types expressed by anadromous *O. mykiss* (NMFS 2005): summer-run and winter-run steelhead. Summer-run steelhead enter fresh water at an early stage of maturation, usually from May to October. These steelhead migrate to headwater areas and hold for several months prior to spawning in the spring. Winter-run steelhead enter fresh water from November to April at an advanced stage of maturation. Spawning for both occurs from January to mid-June, with peak spawning occurring from mid-April through May. Steelhead reside in fresh water for their first one to three years before migrating to the ocean for one to three years. Smoltification and seaward migration occur principally from April to mid-May.

Steelhead enter the Snohomish River as adults throughout the year (NMFS 2005a) they may be present year-round. Juveniles may have been present during the flood fight and could be present during construction, but both construction cycles miss the peak period when they would be most prevalent (March to May). Migrating adults were and would likely be present in the river at the time of construction.

7.4.3 Southern Resident Killer Whale

The southern resident population of killer whale was listed as endangered effective February 16, 2006 (USFWS 2010b). While Southern Resident killer whales will not use the Snohomish River, they range throughout Puget Sound.

Prey availability has been noted as a potential limiting factor to species recovery. The type of prey available changes seasonally (NMFS 2006b). Chinook salmon are the dominant component (83-99%) of the southern resident killer whale diet during the summer months (Hanson et al. 2010). Hanson et al. (2010) note that steelhead were shown to be more predominant in the orca diet during the spring and that in the fall other salmonids become more predominant in the diet, though many of the southern resident pods spend considerable time outside of the inland waters in these months and may be consuming other species. This same study (Hanson et al. 2010) showed that 80-90% of the Chinook eaten by the southern resident killer whales originated in the Fraser River, and only 6-14% originated in Puget Sound rivers. Of the Puget Sound Chinook prey samples, Southern Puget Sound Chinook made up the higher portion of overall estimates (3.7-13.0%, vs Northern Puget Sound's 1.1-2.4%); however the Northern Puget Sound stocks did make up a higher portion of the September samples (17.8%; Hanson et al. 2010).

7.5 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires all Federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). Section 3(10) of the Magnuson-Stevens Act defines EFH as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Though primarily focused on marine species, anadromous fishes like the Pacific salmon have EFH that can occupy freshwater habitats critical to their life cycle. According to NMFS (2008b), the Snohomish River is identified as Essential Fish Habitat for coho, pink, and Chinook salmon.

Important features of essential habitat for spawning, rearing, and migration include adequate: substrate composition, water quality (e.g. dissolved oxygen, nutrients, temperature, etc.), water quantity, depth and velocity, channel gradient and stability, food, cover and habitat (e.g. large woody debris, pools, channel complexity, aquatic vegetation), space, access and passage, and floodplain and habitat connectivity.

7.6 Cultural Resources

The project area is within the ceded territory of the Tulalip Tribes. The Tulalip Tribes comprise six bands of fishing, hunting and gathering peoples who were signatories to the Treaty of Point Elliott on January 22, 1855. The name "Tulalip" is an Anglicized version of the Coast Salishan language Lushootseed word *Duh-hlay-lup* and signifies "almost landlocked" after the shape of the bay of the same name. The Tulalip Reservation encompasses 22,000 acres of land that was

set aside for members of the Snohomish, Snoqualmie, Skagit, Suiattle, Samish, and Stillaguamish tribes.

Historically, the project area was used agriculturally as part of the Smith Island dike and ditch system. While the earliest planning for the dike began in approximately 1931, construction occurred between 1941 and 1960. Previous surveys of the project area recorded the levee system as an archaeological site 45SN482 and recommended it as ineligible for the National Register of Historic Places (NRHP). No pre-contact archaeological sites have been identified within the project footprint (please add references for the surveys).

7.7 Water Quality

In general, the water quality is good in the Snohomish River basin , except in specific locations like Marshlands, French, Quilceda, Allen and lower Patterson creeks (SBSRTC 1999). The Washington Department of Ecology (Ecology) monitors water quality in the Snohomish River at Snohomish (gage 07A090). In 2011, Ecology calculated the overall water quality index (WQI) score for this station at 77 (WDOE 2012a). To calculate WQI scores, Ecology converts monitoring results from monthly grab samples into scores ranging from 1 to 100. In general, scores less than 40 indicate poor water quality, scores of 40 through 79 indicate moderate quality, and scores of 80 and greater indicate water quality met expectations and was good. The lowest monthly scores in 2011 at this station occurred in September and October and the lowest scores by constituent were for suspended solids (64), total phosphorous (60), and turbidity (66; WDOE 2012b). In 2010, this gage also showed lower scores for temperature (77) in addition to suspended solids (68), total phosphorous (74), and turbidity (72; WDOE 2012b). Downstream of the project site, near the mouth of Union Slough, the area, known as Possession Sound North, tissue samples from flounder have revealed presence of dioxin. Also in the project vicinity, water quality samples have shown low pH levels and elevated temperature and fecal coliform levels outside of state criteria (WDOE 2012b).

Salinity in Union Slough at the Spencer Island Bridge ranges from 3.0 parts per thousand (ppt) at the surface to 8.0 ppt at a depth of two meters (during high tide event in September 1992). By comparison, salinity at Steamboat Slough was measured to be 8.2 ppt at a depth of five meters during a high tide in late summer.

Groundwater was encountered at or only slightly below the floodplain ground surface elevation at the Smith Island restoration site (USACE 2011). Boring logs indicate that groundwater was observed at the time of drilling to be about 25 feet below the floodplain elevation. However, groundwater levels likely vary with tidal fluctuations and should be expected to be within a few feet below the floodplain elevation throughout the year.

7.8 Air Quality and Noise

The EPA's Clean Air Act sets National Ambient Air Quality Standards (NAAQS) for several criteria pollutants including ozone (O3), lead (Pb), carbon monoxide (CO), nitrogen oxides (NO, NO2 etc), sulfur dioxide (dioxide), and particle pollutants with diameters less than 10 microns (PM2.5 and PM10). Areas that persistently exceed the standards are designated as nonattainment areas. In Washington, EPA has designated 1 nonattainment area in Tacoma.

Once a nonattainment area has attained and maintained NAAQS, they may be redesignated as "maintenance areas". According to the Washington Department of Ecology, the project site is

located in an area listed as maintenance areas for ozone and carbon monoxide (WDOE 2010). Monitoring sites in Snohomish County are close to the daily fine particle federal standard. Sites in Snohomish County continue to exceed the agency's local PM2.5 health goal set at 25 g/m^3 to adequately protect health. Air quality index for Snohomish County in 2008 (latest data) was rated at Good for 80 percent and Moderate for 20 percent of the year (Puget Sound Clean Air Agency 2008 Air Quality Data Summary October 2009). PM2.5 is one of the major air pollution concerns affecting the project area. PM2.5 primarily comes from wood burning and vehicle exhaust including cars, diesel trucks, and buses. Fine particulate can be formed in the atmosphere through chemical reactions of pollutant gases. Snohomish County continues to occasionally exceed the federal standard for PM2.5.

The project site is rural in character but bordered by urban activities. Background noise at the site is dominated by traffic noise coming from nearby I-5. In addition, Site 1 is adjacent to the physical plant of the water pollution control facility and Site 2 is near the Buse Timber and Hima Farm, these facilities contribute to the background noise in the area.

7.9 Utilities and Public Services

Utilities and public services in the vicinity of the project site include local and city roads, Interstate 5, the City of Everett Water Pollution Control Facility, as well as power lines and public greenways.

7.10 Land Use

Smith Island, in north Everett, was annexed into the City in 1983 and is zoned for heavy industry. Existing land use of the project is an existing levee at both sites. Site 1 includes a paved walking and biking path accessible by the public and Site 2 is private with a gravel/dirt levee crown for emergency access only. Land behind the levee consists of leveed freshwater wetlands and approximately 13 public facilities and businesses exist on Smith Island, including the City of Everett Water Pollution Control Facility, Dagmar's Marina, Buse Timber Sales, Hima Farm and the City of Everett's Humane Society. Interstate 5 traverses the island, as well as State Route 529 and local roads.

7.11 Recreation

The crown of the levee at Site 1 is a popular walking and biking path known as Langus Riverfront Trail. The Union Slough levee on the southern side of Smith Island has a regional trail located on top of the levee. This trail was mandated by the Shoreline Management Act and allows for access by the public to Union Slough. The oxidation ponds for the water treatment facility and nearby Spencer Island Wildlife Area are a major destination for area bird watchers. While hunting is restricted in the project area, it is allowed on the north half of Spencer Island. Site 2 is on private land and is not accessible by the public.

8 ENVIRONMENTAL EFFECTS

Throughout this section, the environmental effects of the Emergency Action, No Action Alternative, the Setback Alternative and Repair in Place/Repair in Kind Alternatives for the project at the Union Slough Levee are presented and compared.

Environmental effects at any quarry, or gravel mine used for fill material will not be considered. Any site would be a commercial facility fully permitted by the state and as such will have undergone an individual environmental evaluation (Norman 2000).

8.1 Topography, Hydrology, and Soils

8.1.1 Emergency Action

The emergency actions completed at Site 2 had temporary impacts to the topography, hydrology, and soils of the project site and surrounding area. The emergency action placed materials to build a temporary road in order to access the damaged levee. The road measured approximately 1,875 feet long, averaged 17 feet wide and 14 inches deep. This equates to roughly 0.73 acres and 1,377 cubic yards of fill in the floodplain. This fill changed the local topography and will change how water flows through the area. This material was placed as part of an emergency operation requested by the Diking District, therefore the impact and final disposition of the road is the responsibility of the Diking District. The Diking District has stated that they plan to leave the road in place for use during the proposed repairs for Site 2 and then they expect to remove the fill. The Diking District will work with the Corps' Regulatory Branch to complete any permits or mitigation needed.

The emergency action at Site 2 also placed rock on the riverward side of Site 2 (88 feet) in a location that had been only an earthen bank. This changes the soil at this location permanently.

The changes to topography and hydrology within the floodplain are small and temporary. Flood storage was not significantly impacted due to the fact that the floodplain is 491 acres and the temporary fill impact was to 0.73 acres; however, how water moves through the site and recedes after flooding may change until the fill is removed. The use of rock to stop the bank erosion creates a small permanent change. The effects of this change have been added into the proposed full repair for mitigation calculations. Overall the impacts to topography, hydrology, and soils from the emergency repair is not significant.

8.1.2 No-Action Alternative

The No-Action Alternative would allow continued erosion on the levees of the Union Slough and Snohomish River and a higher risk of damage from flooding would persist. The soil conditions and topography would not be affected. The levees would not be repaired and the possibility of failure would increase. In the event of a levee breach during a flood event, the river channel could migrate into developed industrial areas, changing the hydrology in the immediate area of the breach and throughout the affected reach of the river. If ongoing erosion is noted during high water events, emergency flood fight measures would likely be initiated by the local sponsor to protect lives and property and prevent such a breach from occurring to the extent possible. Effects of flood fight activities would be similar to those discussed above for emergency actions and below for the Repair in Place Alternative, though rock placement during flood events could require more rock placement and require the use of larger rocks, depending on the specific events at the time of the emergency.

8.1.3 Setback Alternative

Local topography and hydrology would be changed slightly from the pre-damaged condition with the setback alternative. The centerline of the levee would move landward, maintaining the widened river channel and changing the location of the wetland.

Soil testing at the proposed repair sites was not completed; however the nearby Qwuloot levee, approximately 1 mile to the north, has been extensively studied for a large levee setback and restoration project. NRCS maps the soils as that same Puget silty clay loam and it is believed the two sites are similar in make-up due to their proximity to each other. At the Qwuloolt site the density of the foundation soils is very soft. Strength tests on the soils gave low undrained strengths for samples between 0 - 15 feet below ground surface. Loose moderately plastic silts are very problematic foundation soils for construction. Settlement analysis based on laboratory tested compressibility index resulted in 18 inches of soil for a 10-15 foot new embankment. This settlement would be acceptable if it were uniform. However, loading the slope of an existing levee where the foundation below the levee is consolidated but the foundation beneath the new setback portion would be unconsolidated has a high likelihood of differential settlement. Longitudinal cracks would develop as the landward section settled and the foundation soils compacted. The soils are not unsuitable for construction, but the construction of a slight setback with work only on the landward side would likely require two or three construction phases over several years in order to allow the foundation to consolidate and gain strength. During this period the levee would remain vulnerable. The length of time that the levee would remain vulnerable was considered an unacceptable level of risk for the protected infrastructure and businesses.

The change to topography and hydrology would be minimal, however the soils and the expected differential settlement of the foundation soils make this alternative unacceptable as it does not meet the purpose of the project, restoring flood protection, in a timely fashion.

8.1.4 Repair In Place /Repair in Kind Alternative

The Repair in Kind Alternative would result in no change from the pre-2009 condition. No changes to the channel configuration or river flows would be expected. As the preferred alternative for Site 1, the face and toe of the levee would be repaired with armor rock to re-establish the 20-year level of protection with material and slopes similar to pre-flood condition. The Repair in Place alternative at Site 2 similarly would result in no changes to the channel configuration or river flows; however this repair changes the material type of the bank. Repairing the bank in kind to the pre-flood condition would mean placing bare soil onto the bank, with expected daily tidal fluctuations. Concern about turbidity impacts and ability to properly compact the levee face preclude this alternative at this site. The use of rock will change the bank material from soil to armor. Sedge salvage and placement onto the slope will restore some soil and pre-flood condition. Although this repair changes the bank at the project location, no change outside of the repair areas is anticipated from this work. Union Slough is roughly 5.3 miles long, (55,968 feet of shoreline) such that this repair will change approximately 2% of the bank. These repairs will not significantly impact topography, hydrology, or soils within the reach.

8.2 Vegetation

8.2.1 Emergency Action

No riverward vegetation was removed during emergency actions at Site 2, though some tree removal was required to widen the existing road for the construction access. Tree removal was minimized to the extent possible. Some riverward vegetation was covered during rock placement; however there was ongoing erosion at the sites and limited vegetation prior to the repair. Overall, impacts to vegetation were less than significant.

8.2.2 No-Action Alternative

Under the No Action Alternative, no repair actions would be constructed so no impacts to vegetation would occur. Vegetation at the project sites would continue to be managed under the County's levee maintenance program for continued eligibility under the Corps' rehabilitation program. Under this program, the levee is regularly mowed and brushed to preclude colonization by woody vegetation and maintain a high degree of inspectibility.

8.2.3 Setback Alternative

The Setback Alternative generally requires vegetation removal within the new levee footprint. The setback levee would impact the existing wetland vegetation that exists on the backside of teh levee and at the landward toe. The wetland and associated vegetation would be relocated behind the setback. No significant impact to vegetation would be expected as replanting would occur, however there would be a greater loss of vegetation than other alternatives and there would be a time lag before the planted vegetation would provide similar habitat and water quality values as the existing condition.

8.2.4 Repair in Place/ Repair in Kind Alternative

The Repair in Kind Alternative at Site 1 would require the removal of existing vegetation on the riverward bank. This is mostly non-native blackberries with few willows and dogwoods. The repair at this site includes replanting a dense line of willows along the bank and seeding the upper slope with native grasses.

At site 2, the Repair in Place Alternative requires impacting the sedge wetlands that have formed on the sloughed levee embankment material. The sedge mats will be salvaged to the extent possible and placed on the levee face following the repair. As this is experimental, and survival of the sedge is unknown, offsite mitigation through the purchase of credits at the City of Everett Advanced Mitigation Bank is also proposed to offset the loss of vegetation. Vegetation removal at both sites will be limited to the footprint of the repairs. Due to the limited vegetation removal for these repairs and the proposed mitigation, loss vegetation is not expected to cause a significant impact.

8.3 Fish and Wildlife

8.3.1 Emergency Action

The emergency actions involved short-term disturbance to fish and wildlife. Use of heavy machinery and rock placement likely created noise and vibrations that disturbed fish and wildlife from the project area during construction. In water work to repair the levee face was completed

at Site 2. Minor turbidity increases may have occurred, however no visible plumes were noted and background turbidity levels were high due to ongoing flooding. Tree removal and bank armoring changed habitat conditions within the emergency repair area.

Wildlife in the area is habituated to human presence and both fish and wildlife are expected to be habituated to car and boat traffic noise in this urban environment. While fish and wildlife may have been disturbed by emergency actions, the impact is expected to have been minimal and to be similar to typical urban disturbance levels. The emergency actions' effects on fish and wildlife were short-term and less than significant.

8.3.2 No-Action Alternative

The No-Action alternative may result in continued release of sediment from erosion of the bank, especially in a flood event. Increased sediment into the river could affect the quality of habitat in the area for fish and wildlife; however, this is a natural process that occurs during flood events within a river system. The No Action Alternative leaves the levee vulnerable to continued damage, which could result in a breach or more likely a flood fight effort. A breach would result in inundation of industrial and farming areas with associated severe turbidity and potential pollution impacts to the river. A flood fight would likely be undertaken to prevent such a breach. Flood fights generally occur outside the fish window which can create a greater impact on salmonids than a planned repair. Also, depending on the severity of flooding, flood fights can require larger rock in greater quantities with less precise placement. The no-action alternative would leave the levee vulnerable to continued damage leading to events that could have greater impacts on fish and wildlife.

8.3.3 Setback Alternative

Effects to fish and wildlife would be temporary and occur primarily during construction. Any fish and wildlife in the project area could be temporarily displaced due to construction activities. Construction could be completed outside the fish window if there is no in-water work included, but would also need to consider nesting seasons. The additional channel capacity and maintenance of the existing undercut banks and sedge wetlands by this alternative would be beneficial to the local habitat functionality. Construction would require some vegetation loss, and the relocation of the wetland currently at the landward toe of the levee. Reconstruction and relocation of this freshwater wetland would provide reduced habitat quality until the plants grew and wetland functions were restored. Overall effects to the reach would be short-term and not significant.

8.3.4 Repair in Place/ Repair in Kind Alternative

Effects to fish and wildlife would be temporary and occur primarily during construction. Any fish and wildlife in the project area could be temporarily displaced due to construction activities. Any eagles in the project area are highly acclimated to human presence and would not be expected to be disturbed by construction. As there are no nests in the area and no large trees would be removed, no impact to eagles is expected.

Inwater work could involve short-term water quality impacts such as minor and localized increase in turbidity during rock placement. High levels of turbidity or suspended sediment can cause gill trauma, feeding disruption, and reduce dissolved oxygen levels in the water. While fish may be naturally exposed to some elevation in suspended sediment levels in estuaries and in

streams, ideal conditions tend more toward lower turbidity levels. To limit turbidity increases, equipment would not enter the water and would remain on dry ground at all times and best management practices for construction activities would be employed.

Vegetation loss will be minimized to the extent possible at both sites, however vegetation loss and wetland loss will impact the habitat function of the repair sites for fish wildlife. The repair at Site 2 will replace an earthen bank with an armored bank, covering sedge wetlands and intertidal mud flats that are used by fish, shorebirds, ducks, and other wildlife for foraging and refuge habitat. This will be a permanent impact. Union Slough is unarmored with similar sedge wetlands and habitat existing throughout. The mitigation site is 1.75 miles upstream and will restore similar habitats to the slough. Fish and wildlife would be able to find similar habitat nearby and would return to the construction area once construction is complete.

The Repair in Kind Alternative for Site 1 and the Repair in Place Alternative for Site 2, with the mitigation, would have minor temporary impact to fish and wildlife, however this impact is not significant.

8.4 Threatened and Endangered Species

8.4.1 Emergency Action

As the project area is adjacent to a busy interstate highway and industrial areas, any added level of activity and noise is not anticipated to have an effect on marbled murrelet. Canada lynx, gray wolf, and northern spotted owl are not expected to be present in the project area due to specialized habitat requirements, lack of tolerance for human activity. No effect to these species is expected.

The emergency action effects due to noise and vibration were short term and related to the placement of riprap on the levee face at Site 2. Temporary increase of turbidity may have occurred; however turbidity levels in the river were already high due to the flood event and no plume was visible. In-water construction during the flood fight occurred during the time when outmigrating juveniles may have been in the river. Juvenile fish numbers can increase in the lower reaches of rivers during high water events as young fish are swept downstream. The side channels and sloughs in the lower river are important refuges from the velocities of the mainstem river. Due to placement of gravel on the top of the levee and an unexpected difficulty with a dumptruck that was stuck on the crown of the levee, increased noise and vibration occurred at the flood fight site prior to rock placement. This may have caused avoidance of the area immediately adjacent to the repair, further limiting fish presence during rock placement. The following BMPs were implemented during the emergency action: 1) construction equipment was checked regularly for drips or leaks; 2) at least one fuel spill kit with absorbent pads was onsite; 3) at least one biologist was onsite or available during construction; 4) drive trains of equipment did not operate in the water; and 5) no end dumping of rock into the water.

Due to the urgent nature of completing the repair during ongoing flood events, the Corps may proceed with construction prior to completion of the consultation with the Services pursuant to the “emergency circumstances” provisions of the ESA consultation regulation, and may complete ESA consultation after the fact rather than delaying the urgent work in order to complete ESA consultation before construction begins. The applicable regulation is set out at 50 CFR Section 402.05 (a) and (b) and provides as follows:

(a) Where emergency circumstances mandate the need to consult in an expedited manner, consultation may be conducted informally through alternative procedures that the Director determines to be consistent with the requirements of section 7(a)-(d) of the Act. This provision applies to situations involving acts of God, disasters, casualties, national defense or security emergencies, etc.

(b) Informal consultation shall be initiated as soon as practicable after the emergency is under control. The Federal agency shall submit information on the nature of the emergency actions(s), the justification for expedited consultation, and the impacts to endangered or threatened species and their habitats. The Service will evaluate such information and issue a biological opinion including the information and recommendations given during emergency consultation.

A Biological Assessment (BA) of the impacts of the completed emergency response and the proposed repairs of the Union Slough Levee Rehabilitation project was sent to NMFS and USFWS on 21 May 2012. The BA analyses concluded that the change in substrate and loss of emergent wetlands required to repair the damaged levee *is likely to adversely affect Puget Sound steelhead, Puget Sound Chinook, and bull trout and is likely to adversely affect Chinook and bull trout critical habitat.* While an impact may be seen to Chinook, a main killer whale prey species, that indirect impact is expected to be insignificant and discountable. The BA found that the project *may affect but is not likely to adversely affect Southern Resident killer whale or their critical habitat.*

NMFS provided their findings in a Biological Opinion dated 30 July 2012. Reasonable and prudent measures to limit impact to Chinook and steelhead were provided. These include the purchase of credits to offset impacts, use of best management practices, and turbidity monitoring. These measures will be implemented as a part of the construction to minimize impacts to listed species.

Consultation with the USFWS is ongoing. Draft Reasonable and Prudent Measures and Terms and Conditions were received on 5 September 2012. These include working in the dry at low tide to the extent possible and placing rock individually in a slow controlled manner if in-water work is required.

The impact of the completed emergency repairs on threatened and endangered species included placement of rock over 88 feet of riverward bank, and noise and vibration that likely displaced fish from the repair area. Because of the short length of the repair and the presence of nearby similar habitat, this impact was not significant.

8.4.2 No-Action Alternative

The no-action alternative may result in an increase in sediment from continued erosion of the banks. Increased sediment into the river could affect the quality of habitat for listed salmonids; however, bank erosion is a natural process that occurs during flood events within a river system. As discussed above, failure to repair the existing damage could lead to a breach or further flood fight activities in order to protect infrastructure within the floodplain. A breach would result in inundation of industrial and farming areas with potentially severe turbidity and pollution impacts to the river. A flood fight would likely be undertaken by the local sponsor to prevent such a breach; however flood fights generally occur outside the fish window which can create a greater impact on salmonids than a planned repair. Also, depending on the severity of flooding, flood

fights can require larger rock in greater quantities with less precise placement. The no-action alternative would leave the levee vulnerable to continued damage potentially leading to large scale flood fight activities or flooding of industrial areas that could have greater impacts on threatened and endangered species.

8.4.3 Setback Alternative

Effects to listed species would be temporary and occur primarily during construction. Any fish in the project area could be temporarily displaced due to construction activities that occur adjacent to the river. Long-term benefits of setback levees include more natural shorelines, natural bank formation, and avoidance of impact to the sedge wetlands that provide important rearing habitat for listed salmonids. Overall effects of the proposed setback on listed species would be short in duration and not significant.

8.4.4 Repair in Place/ Repair in Kind Alternative

The completed emergency actions, as well as proposed repairs was included in the ESA analysis and consultation described in Section 8.4.1 above. See Section 8.4.1 for ESA consultation summary and status.

As mentioned above in Section 8.4.1, the project area is adjacent to a busy interstate highway and industrial areas therefore no effect to marbled murrelet, Canada lynx, gray wolf, or northern spotted owl is expected from proposed repairs. .

The Repair in Kind Alternative for Site 1 will maintain the status quo of the sites as existed prior to the flood damage. Construction activities would have temporary and localized impacts on fish habitat. Turbidity may increase during the in-water portion of the work. Best management practices would be employed during the construction process to minimize the impact on fish and their habitat. Some vegetation will be removed for the repair, and while willows will be planted to offset this loss there will be a time lag between planting and regrowth of the vegetation to provide the same habitat functions.

The Repair in Place alternative for Site 2 will change 1310 feet of bank from the existing earthen bank with undercut banks, tidal mudflats, and sedge wetlands into an armored bank. These lost features provide refuge and feeding habitats important to migrating salmonids. This impact represents 2% of the bank habitat in the slough. Experimental sedge salvage will be completed to potentially offset some of the loss onsite and purchase of credits in a nearby mitigation site at a 2:1 ratio will offset the loss of function to the slough habitat.

Overall impacts to endangered and threatened species for the Repair in Kind and Repair in Place alternative to be implemented at Sites 1 and 2, with the addition of the mitigation, are not expected to be significant.

8.5 Essential Fish Habitat

8.5.1 Emergency Action

The emergency action effects due to noise and vibration were short term and related to the placement of riprap on the levee face at Site 2. Temporary increase of turbidity may have occurred; however turbidity levels in the river were already high due to the flood event and no plume was visible. In-stream construction during the flood fight occurred during the time when

outmigrating juveniles may have been in the river. Juvenile fish numbers can increase in the lower reaches of rivers during high water events as young fish are swept downstream. The side channels and sloughs in the lower river are important refuges from the velocities of the mainstem river. Due to placement of gravel on the top of the levee and an unexpected difficulty with a dumptruck that was stuck on the crown of the levee, increased noise and vibration occurred at the flood fight site prior to rock placement. This may have caused avoidance of the area immediately adjacent to the repair, further limiting fish presence during rock placement. The following BMPs were implemented during the emergency action: 1) construction equipment was checked regularly for drips or leaks; 2) at least one fuel spill kit with absorbent pads was onsite; 3) at least one biologist was onsite or available during construction; 4) drive trains of equipment did not operate in the water; and 5) no end dumping of rock into the water.

The BA discussed above in Section 8.4.1 included analyses of impacts to EFH and began consultation with NMFS. The analyses concluded that the 2012 completed flood fight and proposed repairs *are likely to adversely affect EFH* for federally managed fisheries in Washington waters. This determination is based on the permanent transition of intertidal habitat to riprap bank at Site 2. In the Biological Opinion issued by NMFS on 30 July 2012, NMFS recommends that implementation of two actions would limit impacts to EFH: 1) incorporation of large woody debris into riprapped banks and 2)working with all appropriate agencies to expedite and streamline permitting for the Smith Island Restoration Project. The Corps agrees that incorporation of wood into or adjacent to hardened banks can provide habitat benefits for EFH species, however this inclusion requires careful consideration. Large woody debris (LWD) anchored within the levee presents levee safety concerns if dislodged and LWD anchored outside the prism presents risks to navigation at both sites. In addition, loose LWD can cause damage to the critical downstream bridges. For these reasons, LWD was determined to be inappropriate for these sites. In lieu of large woody debris, design features such as willow plantings and sedge salvage have been incorporated to increase structural variation and habitat function at the repaired levee sites without increasing the risk to the levee stability and offsite mitigation is expected to fully offset impacts. The Corps' Regulatory Branch has had a pre-application meeting with the County for the Smith Island Restoration Project but has not received a permit application. The Corps has worked to streamline the permitting process for restoration projects and will work with the County to process the future permit application in a timely manner.

The impact of the completed emergency repairs on EFH included placement of rock over 88 feet of riverward bank, and noise and vibration that likely displaced fish from the repair area. Because of the short length of the repair and the presence of nearby similar habitat, this impact was not significant.

8.5.2 No-Action Alternative

The no-action alternative may result in an increase in sediment from continued erosion of the banks. Increased sediment into the river could affect the quality of habitat for listed salmonids; however, bank erosion is a natural process that occurs during flood events within a river system. As discussed above, failure to repair the existing damage could lead to a breach or further flood fight activities in order to protect infrastructure within the floodplain. A breach would result in inundation of industrial and farming areas with potentially severe turbidity and pollution impacts to the river. A flood fight would likely be undertaken to prevent such a breach; however flood fights generally occur outside the fish window which can create a much greater impact on

salmonids than a planned repair. Also, depending on the severity of flooding, flood fights can require larger rock in greater quantities with less precise placement. The no-action alternative would leave the levee vulnerable to continued damage potentially leading to events that could have significant impacts on EFH.

8.5.3 Setback Alternative

Effects to EFH would be temporary and occur primarily during construction. Any fish in the project area could be temporarily displaced due to construction activities that occur adjacent to the river. Longterm benefits of setback levees include softened shorelines, natural bank formation, and avoidance of impact to the sedge wetlands that provide important rearing habitat for listed salmonids. Overall effects of the proposed setback on EFH would be short in duration and not significant.

8.5.4 Repair in Place/ Repair in Kind Alternative

As mentioned above in Section 8.4.1, the full Union Slough project was submitted to NMFS and USFWS on 21 May 2012. The BA analyses concluded that the change in substrate and loss of emergent wetlands required to repair the damaged levee *is likely to adversely affect EFH.* In the Biological Opinion issued by NMFS on 30 July 2012, NMFS recommends that implementation of two actions would limit impacts to EFH, as summarized in Section 8.5.1.

The Repair in Kind Alternative for Site 1 will maintain the status quo of the sites as existed prior to the flood damage. Construction activities would have temporary and localized impacts on fish habitat. Turbidity may increase during the in-water portion of the work. Best management practices would be employed to minimize the impacts. Some vegetation will be removed for the repair, and while willows will be planted to offset this loss there will be a time lag between planting and regrowth of the vegetation to provide the same habitat functions.

The Repair in Place alternative for Site 2 will change 1310 feet of bank from the existing earthen bank with undercut banks, tidal mudflats, and sedge wetlands into an armored bank. This represents 2% of the bank habitat in the slough. Experimental sedge salvage will be completed to potentially offset some of the loss onsite and purchase of credits in a nearby mitigation site at a 2:1 ratio will offset the loss of function to the slough habitat.

Overall impacts to EFH for the Repair in Kind and Repair in Place alternative to be implemented at Sites 1 and 2, with the addition of the mitigation, are not expected to be significant.

8.6 Cultural Resources

8.6.1 Emergency Action

It is presumed that there were no effects on cultural resources during the emergency actions based on the lack of evidence of cultural resources in the immediate project vicinity.

8.6.2 No-Action Alternative

No effects on cultural resources would result from the no-action alternative.

8.6.3 Setback Alternative (see my comments on the appendix MFR

A cultural resources assessment was performed by a professional archaeologist in order to determine if a potential exists to cause effects on Historic Properties if they should exist within the project area. A search of the archaeological and historic site records at the Washington State Department of Archaeology and Historic Preservation (DAHP) indicated that no properties listed in the National Register of Historic Places (NRHP) or the Washington State Historic Site Register are recorded in the project area. While the levee system has been recorded as archaeological site 45SN482, it was recommended as not eligible for the NRHP.

The Corps has determined that the Union Slough Preferred Alternative is an undertaking of the type that has No Potential to cause effects to Historic Properties under the National Historic Preservation Act (NHPA), as the levee system has been recommended as ineligible for the NRHP and all activities will be conducted within demonstrated limits of previous construction activities. This determination completes the NHPA process for Union Slough Levee.

8.6.4 Repair in Place/ Repair in Kind Alternative (see my comments on the appendix MFR

To comply with Section 106 of the NHPA, a Corps archaeologist conducted a cultural resources reconnaissance survey of the proposed project Area of Potential Effect (APE). The cultural resources report included a search of the Washington Department of Archaeology and Historic Preservation (DAHP) Electronic Historic Sites Inventory Database, and other background and archival research. While the levee system has been recorded as archaeological site 45SN482, it was recommended as not eligible for the NRHP.

Based on the background research and preliminary site visit the Corps has determined that the project has No Potential to cause effects to Historic Properties under the NHPA, as the levee system is recommended not eligible for the National Register. As no further work is recommended, the NHPA process is completed.

8.7 Water Quality

8.7.1 Emergency Action

During flood events, the turbidity level in a river increases. The emergency action at Site 2 included in-water work during a flood event. No visual turbidity increase was noted. This repair changed the bank from the pre-flood condition by replacing an earthen bank with armor rock for 88 feet. A small area of mudflat and sedge wetland was impacted. Best management practices for construction activities were employed to minimize impacts to water quality such as 1) construction equipment checked regularly for drips or leaks; 2) at least one fuel spill kit with absorbent pads was onsite; 3) at least one biologist was onsite or available during construction; 4) drive trains of equipment did not operate in the water; and 5) no end dumping of rock into the water.

The loss of wetland and muddy bottom habitat have been wrapped into the proposed mitigation for the overall project as the 88 feet of rock work completed during the flood is within the footprint of the proposed repair.

On 31 May 2012 the Corps provided a Clean Water Act Section 404 Analysis to Ecology for the completed emergency actions and the proposed repairs. A 401 Water Quality Certification was received from the Department of Ecology on 23 July 2012 for the project.

Overall the impacts of the completed emergency actions, with the inclusion of the proposed mitigation, did not have a significant impact on water quality.

8.7.2 No-Action Alternative

Under this alternative, the unrepaired levees would continue to erode and could fail during the upcoming flood season. This could result in flood waters potentially entering industrial areas and accumulating debris, turbidity, and potential hazardous materials that could wash back into the river. However, it is likely that before a breach occurred, flood fight efforts would be undertaken to prevent loss of the levee. Flood fight effects are similar to those noted above for in Section 8.7.3. If flood fights are effective, impacts to water quality would be minimal from the no-action alternative. If flood fights are not implemented in time or are not sufficient, a breach in the levee could cause significant impacts to water quality.

8.7.3 Setback Alternative

The Setback Alternative would impact freshwater wetlands landward of the levee. These wetlands would be recreated behind the setback levee, but the water quality function of the wetlands would be diminished until vegetation becomes fully established. The repeated repair cycle required due to differential settlement would potentially create repeated disturbance to the landward wetland and associated vegetation in order to compact the prism material. All work could be completed out of the river such that no riverine turbidity or vegetation loss would occur. The widened channel would be maintained. Overall effects to the water quality throughout the reach would be minimal.

8.7.4 Repair in Place/ Repair in Kind Alternative

The Repair in Place and Repair in Kind Alternatives would involve short-term water quality impacts from construction of the repairs. During construction there may be water quality impacts such as an increase in turbidity during rock placement or sedge salvage and placement. To limit water quality impacts, equipment would not enter the water and would remain on dry ground at all times. Best management practices for construction activities would be employed. Using best management practices, similar repairs in similar conditions have been completed and closely monitored on levees throughout the Puget Sound area with little turbidity impacts. The Repair in Kind Alternative for Site 2, rebuilding the earthen bank, was dismissed because of concerns about significantly elevating turbidity during placement and compaction of material. The placement of well sorted armor rock with minimal fines as a part of the Repair in Place Alternative will have minimal turbidity impacts. A 401 Water Quality Certification was received from the Department of Ecology on 23 July 2012 for the project. The Water Quality Certificate requires monitoring during construction, which will be completed. Overall the Repair in Kind Alternative at Site 1 and the Repair in Place Alternative at Site 2 would have an insignificant impact on water quality for this reach of the Snohomish River and Union Slough.

8.8 Air Quality and Noise

8.8.1 Emergency Action

Effects to air quality were temporary, lasting only until the actions were completed. Because the activity constitutes repair of an existing facility generating an increase in emissions that is clearly

de minimis, air quality effects of the emergency action are not expected to require a conformity determination under 40 CFR 93.153(c)(2)(iv).

There was a temporary increase in noise during the emergency actions. Some of these actions included work 24 hours per day in order to construct the emergency repairs quickly, adding to the impacts of the construction noise. There are businesses near the construction site, but no residences. Overall effects of construction noise were minimal and only lasted for the duration of the emergency actions.

8.8.2 No-Action Alternative

No effects would result from the no-action alternative because no repairs would take place.

8.8.3 Setback Alternative

Because the setback alternative requires construction over several construction seasons, this would include a larger and longer impact on emissions and noise. When not an emergency, construction activities would occur during daylight hours. Emissions from construction activities such as material placement, compaction, and hauling are anticipated to be *de minimis*. In addition, equipment such as dump trucks, excavator, and dozers would have mufflers and exhaust systems in accordance with State and Federal standards. Any effects to air quality would occur only during construction events. Because the activity constitutes repair of an existing facility generating an increase in emissions that is clearly *de minimis*, construction-phase air quality effects are not expected to require a conformity determination under 40 CFR 93.153(c)(2)(iv). There would be a temporary increase in noise during construction; however the effects would be temporary and consistent with background noises in this urban industrial environment. Following construction, there would be no change in air quality or noise at these sites.

8.8.4 Repair in Place/ Repair in Kind Alternative

Construction activities would occur during daylight hours. The proposed repairs project are expected to take four weeks to complete. As summarized in Section 8.8.3, emissions from construction activities such as material placement, compaction, and hauling are anticipated to be *de minimis*. There would be a temporary increase in noise during construction; however the effects of construction noise would be consistent with typical background noises in this urban environment and would be minimal given the temporary nature of the construction. Following construction, there would be no change in air quality or noise at these sites.

8.9 Utilities and Public Services

8.9.1 Emergency Action

During the emergency action, vehicles and equipment associated with the action could have disrupted and increased local traffic. Increases in traffic were localized and of short duration, with no long term impacts. The emergency actions preserved the integrity of the Union Slough levee system which provides flood risk reduction to the City of Everett Water Pollution Control Facility and other local utilities. Effects to utilities and public services of the completed emergency actions were less than significant.

8.9.2 No-Action Alternative

The current damaged state of the levee system only offers a 5-year level of protection, and this decreased protection would be maintained with this alternative. Continued erosion of the levee would be expected to occur, resulting in damages or continued increased risk of flood damage to surrounding infrastructure including the City's water treatment facility as well as local roads and infrastructure on the island. Increased risk of flood damage to utilities and public services would continue and could be significant.

8.9.3 Setback Alternative

Setback alternatives can be designed to provide the same level of protection to utilities and public services, however with the expected differential settlement the full restoration of flood protection could take several years. During this period, the risk of flooding would remain higher than the designed levee system for the protected structures, including important utility systems. During setback construction activities, vehicles and equipment associated with the project may disrupt local traffic. This increase in traffic would be localized and of short duration, with no long term impacts. Implementation of this alternative would provide flood risk reduction to businesses and associated public infrastructure after a few years. Implementation of the setback alternative would not have significant impacts, however the longer term vulnerability is a risk that is not associated with the other alternatives.

8.9.4 Repair in Place/ Repair in Kind Alternative

Existence of important public utilities, namely the water treatment facility, was a determining factor in choosing the Repair in Place/ Repair in Kind alternative. The increased and prolonged vulnerability to flooding for these structures with the other alternatives was not acceptable and did not sufficiently meet the purpose and need of the project. During construction activities, vehicles and equipment associated with the Repair in Place/ Repair in Kind alternative may disrupt local traffic due to merging, turning and traveling together. This increase in traffic would be localized and of short duration, with no long term impacts. Implementation of this alternative would provide immediate flood risk reduction to public infrastructure. No significant short- or long-term effects to utilities and public services would occur.

8.10 Land Use

8.10.1 Emergency Action

During emergency actions, land owners surrounding the project area may have been disrupted while equipment and personnel accessed the project area. The repair improved an access road into the project area, however the improvement is temporary and the land is expected to remain in its current use. No significant short- or long-term effects to land use occurred.

8.10.2 No-Action Alternative

As designed, this levee provides protection from a 20-year event. In its current damaged state, the levee provides only a 5-year level of protection. Under this alternative, the current damaged state of the levee would continue, with a diminished level of flood protection and a higher risk of flood damage for developed land behind the levee.

8.10.3 Setback Alternative

The setback alternative would shift the centerline of the levee landward, slightly decreasing the protected area. Property acquisition for the lands within both the new footprint, plus the reconstructed wetland behind the levee would be required, potentially removing this small area from further development however this land is already open space that is not expected to be developed. During construction activities, land owners surrounding the project areas would be disrupted while equipment and personnel access the construction areas via current land easements. After completion of the setback, the protected area would be provided flood risk reduction to the designed level of protection. Overall effects to landuse within the reach would be insignificant.

8.10.4 Repair in Place/ Repair in Kind Alternative

During construction activities, land owners surrounding the project areas would be disrupted while equipment and personnel access the construction areas via current land easements. After completion of the project, the protected area behind the levees would remain unchanged and would be provided the same level of protection as prior to the flood damage. This alternative would not change current land uses. No significant short- or long-term effects to land use would occur.

8.11 Recreation

8.11.1 Emergency Action

Site 2 is not accessible to the public. Recreational activities at the project area were not changed after completion of the emergency action.

8.11.2 No-Action Alternative

No effects would result from the no-action alternative.

8.11.3 Setback Alternative

Site 1 is available for recreation and is a part of an existing trail system. The trail would be closed during construction, but could be reopened with little change. Impacts to recreation would be short term in nature and less than significant.

8.11.3 Repair in Place/ Repair in Kind Alternative

Site 1 is a part the Langus Riverfront Trail system. Temporary closing of the trail through the repair are at Site 1 during construction would likely be needed for safety purposes. Signs, cones, and other markings will be used to redirect pedestrians and bikers. Trails would be reopened after construction. Impacts to recreation would be short term in nature and less than significant.

9 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects associated with this project include: (1) a temporary and localized increase in noise and emissions, which may disrupt fish and wildlife in the area, (2) a temporary

and localized disruption of local traffic by construction vehicles, (3) a temporary and localized increase in turbidity levels during in-water construction which may affect aquatic organisms in the area, (4) temporary relocation and disturbance of recreation trails and facilities at the project sites, (5) removal of vegetation from within the proposed construction areas, (6) temporary impacts to wetland from the road improvements completed as a part of the emergency response, and (7) a permanent change from the earthen bank at Site 2 to an armored bank. The proposed mitigation offsets the permanent impact to wetlands and intertidal mudflat habitat at the City of Everett advanced mitigation site. The inclusion of the mitigation along with the availability of similar nearby habitats and the minimization of vegetation removal decreases the impact to less than significant levels. The Diking District plans to remove the temporary wetland fill to return the access road to pre-project condition after the proposed levee repair is completed. The other unavoidable impacts would be short in duration and considered insignificant.

10 CUMULATIVE EFFECTS

Cumulative effects include effects resulting from future Federal, State, tribal, local or private actions that are reasonably foreseeable to occur in the project area.

Future damage from flooding is likely to occur to Federal and non-federal levees along the Snohomish River and its sloughs and tributaries. Non-federal entities would likely undertake at least some repair actions under those circumstances and potentially Federal assistance with repairs or possible emergency actions would be sought.

A large restoration project is being designed at the project site on Smith Island. Snohomish County is planning to build a setback levee and restore estuarine habitat to approximately 400 acres to the northeast portion of Smith Island (Snohomish Couth 2012). The County issued the Draft Environmental Impact Statement on June 6, 2011 with a public comment period from June 6 to July 6, 2011. The purpose of the Smith Island Restoration Project is to restore estuarine tidal marshlands that provide critical habitat for ESA-listed Chinook, as well as other salmon species in the Snohomish River basin. The County proposes to restore historic tidal marsh conditions by constructing a new setback levee further west on the site and breaching the existing levee along Union Slough. This would include breaching and removing a portion of the existing, damaged levee that is being repaired by the Corps project. The west portion of the Corps' proposed repair at Site 2 will be permanent, however if the County's proposed restoration occurs, the eastern portion of the site 2 repair would be removed. The restoration project will contribute significantly toward achieving salmon recovery benchmarks identified in the Puget Sound Salmon Recovery Plan, the Puget Sound Action Agenda, the Snohomish River Basin Salmon Conservation Plan, and actions noted on the Snohomish River Basin Three Year Work Plan. The date of construction for the setback is uncertain and likely based on funding availability and logistical concerns.

Across the slough from Site 2, a large mitigation bank is expected to begin construction in the near future under the guidance of Wildlands, Inc. Known as Blue Heron Slough Mitigation Bank, this site is expected to restore 354 acres of estuarine habitat, breaching the existing levee across the slough from the project area. This is the first Conservation Bank in the Pacific

Northwest, meaning it is certified to offset impacts to listed salmonids as it is designed to increase the carrying capacity of the Snohomish River Estuary for juvenile Chinook salmon by 20 percent (Wildlands 2012). The Bank is still under review for wetland mitigation credits (WDOE 2012c). Historically, this site supported tidally-influenced marsh and non-tidal scrub-shrub and forested habitat typical of the lower Snohomish Estuary. Prior to certification as a Conservation Bank, the site was converted to agricultural uses by diking and draining. Once construction is complete, the Bank will restore estuarine habitat throughout the site by re-establishing former wetland habitat and rehabilitating currently degraded wetlands (WDOE 2012c). The Bank will also restore intertidal mudflat and marsh, as well as riparian scrub-shrub/forested habitat.

The Union Slough 1135 Restoration Project is a joint City of Everett and Corps of Engineers project to restore riverine and tidal influence to 93 acres of intertidal riverine habitat on Smith Island. A Finding of No Significant Impact was signed for the restoration effort in February 2003 The project is divided into 35 acres as part of the cost-shared Federal Section 1135 project, and 58 acres as a mitigation project of the City of Everett (USACE 2011). This is the mitigation site proposed to be used for the Union Slough Levee Rehabilitation discussed in this EA. The project is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. The City of Everett mitigation site was restored in advance of impacts to fresh water wetlands expected from levee improvements and treatment plant expansion. A new levee was constructed along the north, west and south perimeter of the restoration site in 2003 and 2004. The existing levee at the restoration site was breached along Union Slough in three locations, borrow and agricultural ditches were filled, and several drainage channels were excavated between the breach locations and the newly created habitat areas to facilitate tidal flows in 2007. Pedestrian bridges were constructed at each of the three 180-foot breaches to maintain public access. Since 2007 the project has not achieved the expected ecosystem restoration benefits, largely due to a lower than expected hydraulic capacity through the bridge openings affecting the tidally-influenced drainage of site. Changes to the original bridge foundation design, the elevations of the breaches, and limited low-flow channels appear to be the primary cause of the inadequate drainage. Additionally, significant portions of the remnant levee remain between each breach and Union Slough, reducing the effectiveness of each breach opening. Several of the spread footings for the three 180 foot bridges have experienced undercutting caused by scour from the tidal flows. Efforts were made in 2008 to repair damaged footings and reduce the effects of scouring, however, the repairs were ineffective and the City of Everett's consultant ICF Jones & Stokes (in a report dated 2009) concluded that bridge removal would cost less than replacement of the bridges (USACE 2011). The pedestrian trail has been rerouted around the perimeter of the restoration site. The northern bridge was removed in 2011. In 2012, the remaining bridges will be removed along with final grading at all three openings and some internal channeling to improve overall drainage to the site.

An ongoing project to expand and upgrade the City of Everett Water Pollution Control Facility is also occurring on Smith Island. The City applied for and received permits (Reference No.: NWS-2010-01316) for this action. The project includes placement of fill in 0.6 acres of palustrine emergent, scrub/shrub and forested riparian wetlands and impacts to 1.63 acres of wetland buffer for the expansion. Expansion of the water treatment facility would entail the placement of fill over an area of 2 acres for the development pad to a height of 25 feet for pre-loading with the final development pad at a height of 13 feet. Currently, the pre-loading material has been placed (behind the levee at Site 1). Proposed development within the project site boundary includes two new anaerobic digesters and a digester control building. To compensate

for impacts to wetlands, the applicant has proposed to use the Smith Island/Union Slough Restoration Project, the same advanced mitigation site proposed to offset the levee repairs discussed in this report.

The Qwuloolt Estuary Restoration Project is a partnership of NMFS, Tulalip Tribes of Washington, USFWS, Washington Department of Ecology, the Corps, NRCS, and the City of Marysville. Other partners include the Snohomish Basin Salmon Recovery Forum, the Washington Department of Fish and Wildlife, and the non-profit Stilly-Snohomish Fisheries Enhancement Task Force (Tulalip Tribes 2010). The Qwuloolt Estuary is located within the Snohomish River floodplain approximately three miles upstream from its outlet to Puget Sound and within the Marysville City limits and approximately 1 mile north of the proposed levee repairs at Site 2. Historically, the area was tidal marsh and forest scrub-shrub habitat, interlaced by tidal channels, mudflats, and streams. Today, the project area is disconnected from the river and tides by levees, and is modified by drainage ditches with limited native vegetation. The proposed restoration would setback the levees to reconnect floodplain to the river while restoring a portion of the historic tidal wetlands and their associated functions. Construction is expected to start in late 2012.

The City of Everett applied to the Corps in 2012 (Reference No.: NWS-2012-00333) to use Nationwide Permit 3 for ditch maintenance and culvert replacements in five areas on Smith Island and Spencer Island. This use was verified with special conditions. Everett Parks and Recreation Department (Langus Park Boat Launch) applied to the Corps in 2010 (Reference No.: NWS-2010-00884) to use Nationwide Permit 3 to excavate riverine sediments. This use was verified with special conditions. Snohomish County Diking District No. 4 applied to the Corps in 2010 (Reference No.: NWS-2010-00088) to use Nationwide Permit 3 to repair a breached levee. Diking District 4 includes the right bank of nearby Ebey Slough from river mile 6 to 8. This use was verified with special conditions.

The overall impacts of the known projects planned in the project vicinity are expected to be beneficial due to the large restoration projects underway or proposed. As mentioned above, the impacts from the completed and proposed levee repairs include local, short-term disturbances (noise, emissions, traffic disruptions, etc.) as well as a long-term change in the bank material at Site 2. The levee repairs do not or would not impede proposed restorations. Therefore, the emergency action and preferred alternatives are not anticipated to generate incremental adverse effect on the quality of the human environment, when considered in conjunction with other past and present actions, and future proposals.

11 COORDINATION

The following agencies and entities have been involved with the environmental coordination of this project:

- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Washington Department of Fish and Wildlife (WDFW)
- Washington Department of Ecology (WDOE)
- Washington State Historic Preservation Officer (SHPO)

- Washington State Department of Archaeology and Historic Preservation (DAHP)
- City of Everett
- Tulalip Tribes

Coordination with the above listed agencies and tribes consisted of phone conversations and e-mail exchanges. Topics discussed during this coordination include project design, project construction timing, effects to listed species, and other environmental concerns. A Notice of Preparation for the Union Slough Levee Rehabilitation Project was issued on 16 April 2012. Comments were received from the Tulalip Tribes; the Corps' responses to those comments are in Appendix C.

12 ENVIRONMENTAL COMPLIANCE

12.1 Federal Statutes

12.1.1 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) establishes protection and preservation of Native Americans' rights of freedom, belief, expression, and exercise of traditional religions. Courts have interpreted the American Indian Religious Freedom Act to mean that pubic officials must consider Naïve Americans' interests before undertaking actions that might impact their religious practices, including impact on sacred sites.

No alternative is expected to have any effect upon Native Americans' rights of freedom of belief, expression, and exercise of traditional religions.

12.1.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) prohibits the taking, possession or commerce of bald and golden eagles, except under certain circumstances. Amendments in 1972 added to penalties for violations of the Act or related regulations.

No take of either bald or golden eagles is likely through any of the actions discussed in this EA.

12.1.3 Clean Air Act

The Clean Air Act requires states to develop plans, called State Implementation Plans (SIP), for eliminating or reducing the severity and number of violations of National Ambient Air Quality Standards (NAAQS) while achieving expeditious attainment of the NAAQS. The Act also required Federal actions to conform to the appropriate SIP. An action that conforms with a SIP is defined as an action that will not: (1) cause or contribute to any new violation of any standard in any area; (2) increase the frequency or severity of any existing violation of any standard in any area; or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The Corps has determined that emissions associated with the project would not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone) or affect the implementation of Washington's Clean Air Act implementation plan and as the project constitutes routine facility repair generating an increase in emissions that is clearly *de minimis* a conformity determination is not required, pursuant to 40 CFR 93.153 (c)(2)(iv).

12.1.4 Federal Water Pollution Control Act

The Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) is more commonly referred to as the Clean Water Act (CWA). This act is the primary legislative vehicle for Federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States. The CWA was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA sets goals to eliminate discharges of pollutants into navigable waters, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment.

The project will impact 0.72 acres of tidal wetland and intertidal mudflats. Compensatory mitigation is proposed at a 2:1 ratio at a nearby advanced mitigation site with additional onsite plantings and salvage efforts. No discharge of pollutants would occur, rock placement into the river did and would include only clean rock from commercial quarries. USACE finds that this project is within the public's interest and complies with the substantive elements of Section 404 of the Clean Water Act. A 404(b)(1) analysis has been completed and is included in Appendix E. The Corps has requested Clean Water Act compliance review by the Washington State Department of Ecology. A Water Quality Certification was received from Ecology on 23 July 2012 (Appendix E) and the Corps will comply with all conditions in the certification.

12.1.5 Coastal Zone Management Act

Under the Coastal Zone Management Act of 1972 (16 USCA 1451-1465), Sec. 307(c)(1)(A), "[e]ach Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs."

The Corps has determined that the project is consistent with the Washington Shoreline Management Act, based on review of applicable sections of the State of Washington Shoreline Management Program and policies and standards of the Snohomish County Shoreline Management Plan, as well as the City of Everett's Shoreline Master Program. As per each of these shoreline management documents, the repair of a diking system that was established prior to 1975 is exempt. While the actual construction dates for the levees on Smith Island are not known, receipts for engineering services and improvements to the levee were paid by the Board of County Commissioners in 1931, therefore the Corps has determined that the project is exempt, as per RCW 90.58.030. The project is also consistent with the five other enforceable policies of the CZMA. The Corps received a determination of consistency from Ecology on 30 July 2012 (Appendix E).

12.1.6 Endangered Species Act

The Endangered Species Act (16 U.S.C. 1531-1544), amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat upon which they depend. Section 7(a) of the ESA requires that Federal agencies consult with USFWS and NMFS, as appropriate, to ensure that proposed actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy designated critical habitats.

As discussed above in Section 8.4, due to the urgent nature of completing the emergency actions prior to the oncoming flood season, the Corps may proceed with construction prior to completion of the consultation with the Services pursuant to the "emergency circumstances" provisions of the ESA consultation regulation, and may complete ESA consultation after the fact rather than delaying the urgent work in order to complete ESA consultation before construction begins.

A Biological Assessment (BA) of the impacts of the completed emergency response and the proposed repairs of the Union Slough Levee Rehabilitation project was sent to NMFS and USFWS on 21 May 2012. The BA analyses concluded that the change in substrate and loss of emergent wetlands required to repair the damaged levee *is likely to adversely affect Puget Sound steelhead, Puget Sound Chinook, and bull trout and is likely to adversely affect Chinook and bull trout critical habitat.* While an impact may be seen to Chinook, a main killer whale prey species, that impact was not expected to be sufficient to impact this species. The BA found that the project may *affect but is not likely to adversely affect Southern Resident killer whale or their critical habitat.* NMFS provided their findings in a Biological Opinion dated 30 July 2012. Reasonable and prudent measures to limit impact to Chinook and steelhead were provided. These include the purchase of credits to offset impacts, use of best management practices, and turbidity monitoring. These measures will be implemented as a part of the construction to minimize impacts to listed species.

Consultation with the USFWS is ongoing. Draft Reasonable and Prudent Measures and Terms and Conditions were received on 5 September 2012. These include working in the dry at low tide to the extent possible and placing rock individually in a slow controlled manner if in-water work is required. Though consultation is not complete, the Corps has reached an agency determination of species/habitat effect, based on the best factual and technical information available at the time of decision, and following preliminary coordination with the Services. In light of the conservation measures and best management practices that were or would be employed, the project is not reasonably believed to generate take to a level that would jeopardize listed species by: (1) creating the likelihood of injury to listed species by significantly disrupting normal behavior patterns including breeding, feeding, or sheltering, or (2) significantly modifying or degrading habitat to the extent that individual members of species would be actually killed or injured by significantly impairing essential behavior patterns including breeding, feeding, or sheltering.

The Corps will also commit to fully funding and performing all Reasonable and Prudent Alternatives necessary to avoid the likelihood of jeopardy to listed species or destruction or adverse modification of designated critical habitat, as well as Reasonable and Prudent Measures (RPMs) necessary and appropriate to minimize the impact of Incidental Take, that are described if a Biological Opinion is received. The Environmental Assessment will be reevaluated at the time that the USFWS consultation is complete. If necessary, this EA will be supplemented with necessary and applicable corresponding modifications to the scope and/or nature of the project, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project.

12.1.7 Federal Water Project Recreation Act

In the planning of any Federal navigation, flood control, reclamation, or water resources project, the Federal Water Project Recreation Act, as amended (16 U.S.C. 460(l)(12) et seq.) requires that full consideration be given to opportunities that the project affords for outdoor recreation and

fish and wildlife enhancement. The Act requires planning with respect to development of recreation potential. Projects must be constructed, maintained, and operated in such a manner if recreational opportunities are consistent with the purpose of the project.

This EA assesses impacts of alternative actions on recreation. Site 1 is a part the Langus Riverfront Trail system. Temporary detours or closing during construction would likely be needed for safety purposes. Signs, cones, and other markings will be used to redirect pedestrians and bikers. Trails would be reopened after construction. Impacts to recreation would be short term in nature and less than significant.

12.1.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, (16 U.S.C. 1801 et seq.) requires Federal Agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). EFH is defined in as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The Snohomish River is identified as Essential Fish Habitat for coho, pink, and Chinook salmon.

See section 8.5 for a discussion of project impacts to EFH. The BA included analyses of impacts to EFH and began consultation with NMFS. The analyses concluded that the 2012 completed flood fight and proposed repairs *are likely to adversely affect EFH* for federally managed fisheries in Washington waters. This determination is based on the permanent transition of intertidal habitat to riprap bank.

In the Biological Opinion issued by NMFS on 30 July 2012, NMFS recommends that implementation of two actions would limit impacts to EFH: 1) incorporation of large woody debris into riprapped banks and 2)working with all appropriate agencies to expedite and streamline permitting for the Smith Island Restoration Project. The Corps agrees that incorporation of wood into or adjacent to hardened banks can provide habitat benefits for EFH species, however this inclusion requires careful consideration. Large woody debris (LWD) anchored within the levee presents levee safety concerns if dislodged and LWD anchored outside the prism presents risks to navigation at both sites. In addition, loose LWD can cause damage to the critical downstream bridges. Because of these reasons, LWD was determined to be inappropriate for these sites. In lieu of large woody debris, design features such as willow plantings and sedge salvage have been incorporated to increase structural variation and habitat function at the repaired levee sites without increasing the risk to the levee stability and offsite mitigation is expected to fully offset impacts. The Corps' Regulatory Branch has had a pre-application meeting with the County forteh Smith Island Restoration Project but has not received a permit application. The Corps has worked to streamline the permitting process for restoration projects and will work with the County to permit the action in a timely manner.

Overall impacts to EFH for the Repair in Kind and Repair in Place alternative to be implemented at Sites 1 and 2, with the addition of the mitigation, are not expected to be significant.

12.1.9 National Environmental Policy Act

In accordance with the National Environmental Policy Act, federal projects are required to declare potential environmental impacts and solicit public comment. A Notice of Preparation for the Union Slough Levee Rehabilitation Project was issued on 16 April 2012. Comments were received from the Tulalip Tribes; the Corps' responses to those comments are in Appendix C.

The purpose of this Environmental Assessment document is to fulfill the Corps of Engineers documentation requirements under the National Environmental Policy Act.

This EA evaluates the environmental effects of the emergency response activities completed during the flood event of February 2012 and the execution of final repairs to the levee system scheduled for Fall 2012. Of these Federal actions, the first has already taken place as of the finalization of this EA document, and is thus evaluated here retrospectively; the execution of 2012 repairs is prospectively reviewed in this document. The following discussion assesses how the Corps has nevertheless complied with NEPA's requirements.

It was not feasible for the Corps to complete all NEPA procedures prior to accomplishing the Federal actions of emergency response activities during the flood event of February 2012. The emergency actions taken were emergency responses designed to avert more widespread – and possibly catastrophic – damage that may have resulted from progressive levee failure originating at the vulnerability point generated by flooding damage. In February 2012, the District Engineer made real time decisions, communicated verbally, to proceed with any action having the potential to affect the quality of the human environment, in the absence of full NEPA evaluation and documentation, in light of the extremely urgent circumstances then presented.

The agency's obligations under NEPA must be satisfied prior to implementation of an agency's Federal action. This obligation is not inviolable, and an exception is available under limited circumstances. The Corps' NEPA regulation regarding "Emergency Actions" does allow for completion of NEPA documentation after the fact in emergency situations. Emergency actions are discussed in 33 CFR 230.8 as follows:

"Section 230.8 - Emergency actions. In responding to emergency situations to prevent or reduce imminent risk of life, health, property, or severe economic losses, district commanders may proceed without the specific documentation and procedural requirements of other sections of this regulation. District commanders shall consider the probable environmental consequences in determining appropriate emergency actions and when requesting approval to proceed on emergency actions, will describe proposed NEPA documentation or reasons for exclusion from documentation. NEPA documentation should be accomplished prior to initiation of emergency work if time constraints render this practicable. Such documentation may be accomplished after the completion of emergency work, if appropriate. Emergency actions include Flood Control and Coastal Emergencies Activities pursuant to Pub. L. 84-99, as amended, and projects constructed under sections 3 of the [Rivers and Harbors] Act of 1945 or 14 of the Flood Control Act of 1946 of the Continuing Authorities Program. When possible, emergency actions considered major in scope with potentially significant environmental impacts shall be referred through the division commanders to HQUSACE (CECW-RE) for consultation with CEQ about NEPA arrangements."

Completion of the NEPA documentation prior to implementation of the 2012 emergency repair actions – while still fulfilling the agency's emergency levee rehabilitation authorities and responsibilities under PL 84-99 – was impossible. Since approval of funding levels and the subsequent verification of the non-Federal sponsor's real estate capabilities, insufficient time was available to assess and document the environmental impacts of the proposal in light of the other urgent projects also requiring evaluation under NEPA and other environmental regimes. It was impossible for the Corps to complete all the following NEPA procedures prior to the date on which each of the Federal actions was necessary: promulgate and evaluate public comments

received in response to a Notice of Preparation; complete and finalize the EA; determine whether a FoNSI is appropriate or an EIS must be prepared; and execute and promulgate a FoNSI, if deemed warranted.

Therefore, the agency complied with NEPA "to the fullest extent possible" under the circumstances, with respect to emergency response activities during and immediately after the flood events. The determination to proceed with the emergency repairs was preceded by consideration and a decision to proceed by the District Engineer, reflected through verbal communication of possible impacts.

As of the date of finalization of this EA, consultation with USFWS under Section 7 remains incomplete. The remaining proposed work would nevertheless proceed in light of the urgent need for the repair work, pursuant to the “emergency circumstances” provisions of the ESA consultation regulation. This Environmental Assessment would be reevaluated at the time the USFWS consultation is complete. If necessary, this EA would be supplemented with necessary and applicable corresponding modifications to the scope and/or nature of the project, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project.

12.1.10 National Historic Preservation Act

Section 106 of the NHPA (16 U.S.C. 470) requires that Federal agencies evaluate the effects of Federal undertakings on historical, archaeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking. The lead agency must examine whether feasible alternatives exist that would avoid eligible cultural resources. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects.

To comply with Section 106 of the NHPA, a Corps archaeologist conducted a cultural resources reconnaissance survey of the proposed project APE. The cultural resources report included a search of the Washington DAHP Electronic Historic Sites Inventory Database, and other background and archival research. While the levee system has been recorded as archaeological site 45SN482, it was recommended as not eligible for the NRHP.

A cultural resources assessment was performed by a professional archaeologist in order to determine if a potential exists to cause effects to Historic Properties if they should exist within the project area. A search of the archaeological and historic site records at the Washington State DAHP indicated that no properties listed in the NRHP or the Washington State Historic Site Register are recorded in the project area. While the levee system has been recorded as archaeological site 45SN482, it was recommended as not eligible for the NRHP.

The Corps has determined that the Union Slough Preferred Alternative is an undertaking of the type that has No Potential to cause effects to Historic Properties under the NHPA, as the levee system has been recommended as ineligible for the NRHP and all activities will be conducted within demonstrated limits of previous construction activities. This determination completes the NHPA process for Union Slough Levee.

Based on the background research and preliminary site visit the Corps has determined that the project has No Potential to cause effects to Historic Properties under the NHPA, as the levee system is recommended not eligible for the National Register. As no further work is recommended, the NHPA process is completed.

12.1.11 Safe Drinking Water Act

The Safe Drinking Water Act protects drinking water and its sources, including- rivers, lakes, reservoirs, springs, and ground water wells. This Act does not regulate private wells that serve fewer than 25 individuals. The project is consistent with this Act as no change in the quality or quantity of water will occur as a result of the completed or proposed levee repair projects.

12.1.12 Treaty Rights

In the mid-1850s, the United States entered into treaties with nearly all of the Native American tribes in the territory that would become Washington State. These treaties guaranteed the signatory tribes the right to "take fish at usual and accustomed grounds and stations . . . in common with all citizens of the territory" [U.S. v. Washington, 384 F. Supp. 312 at 332 (WDWA 1974)]. In U.S. v. Washington, 384 F. Supp. 312 at 343 - 344, the court resolved that the Treaty tribes had the right to take up to 50 percent of the harvestable anadromous fish runs passing through those grounds, as needed to provide them with a moderate standard of living (Fair Share). Over the years, the courts have held that this right comprehends certain subsidiary rights, such as access to their "usual and accustomed" fishing grounds. More than *de minimis* impacts to access to usual and accustomed fishing area violates this treaty right [Northwest Sea Farms v. Wynn, F.Supp. 931 F.Supp. 1515 at 1522 (WDWA1996)]. In U.S. v. Washington, 759 F.2d 1353 (9th Cir 1985) the court indicated that the obligation to prevent degradation of the fish habitat would be determined on a case-by-case basis. The Ninth Circuit has held that this right also encompasses the right to take shellfish [U.S. v. Washington, 135 F.3d 618 (9th Cir 1998)].

The proposed project has been analyzed with respect to its effects on the treaty rights described above. The Corps has concluded the following:

(1) The work will not interfere with access to usual and accustomed fishing and gathering areas;

(2) The work, with the proposed mitigation, will not cause the degradation of fish runs in usual and accustomed fishing grounds or with fishing activities or shellfish harvesting and habitat; and

(3) The work will not impair the Treaty tribes' ability to meet moderate living needs.

The Tulalip Indian Tribe, Samish Indian Nation, Upper Skagit Indian Tribe, Suquamish Tribe, Skagit River System Cooperative (Sauk-Suiattle Indian tribe and Swinomish Indian Tribal Community), and Stillaguamish Tribe of Indians were notified about the proposed project. The Tulalip Indian Tribe did provide comments (see Appendix C).

12.2 Executive Orders

12.2.1 Executive Order 11990, Protection of Wetlands

Executive Order 11990 encourages Federal agencies to take actions to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking Federal activities and programs. The project will have an unavoidable impact to 0.72 acres of sedge wetlands and intertidal mudflat. Where possible, impacted sedge mats will be salvaged and replaced on the riverward face of the levee post-repair

at a similar elevation to the current sedge benches. These sedge mats will be anchored to the extent possible to keep them in place. This transplantation method is experimental for *Carex lyngbei* and success rate is unknown. As such, 1.45 acres of offsite mitigation is also proposed at the City of Everett advanced mitigation site upstream on Union Slough. The mitigation site is designed to restore intertidal wetlands as salmon rearing habitat that historically existed along Union Slough. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success. This is intended to offset the loss of sedge wetland as well as the loss of intertidal muddy bottom habitat. The mitigation site will also provide off channel refuge and rearing habitat. Actions proposed by the Corps are consistent with Executive Order 11990.

12.2.2 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

Executive Order 12898, dated February 11, 1994, requires Federal agencies to consider and address environmental justice by identifying and assessing whether agency actions may have disproportionately high and adverse human health or environmental effects on minority or low income populations. Disproportionately high and adverse effects are those effects that are predominately borne by minority and/or low income populations and are appreciably more severe or greater in magnitude than the effects on non-minority or non-low income populations.

The project does not involve siting a facility that would discharge pollutants or contaminants, so no human health effects would occur. The preferred alternatives would not have a disproportionate adverse impact on low-income or minority populations since the preferred alternatives would restore pre-existing levees of flood protection to the floodplain. Therefore the project is in compliance with this order.

12.2.3 Executive Order 11988, Floodplain Management

Executive Order 11988 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, “each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains.”

By Corps policy, the provisions of EO 11988 are not applicable to the repair of flood control works to the pre-existing level of flood protection, as the repair actions do not directly affect either the modification or occupancy of floodplains, and do not directly or indirectly impact floodplain development.

13 CONCLUSION

Based on the above analysis, the levee rehabilitation projects are not major Federal actions significantly affecting the quality of the human environment, and therefore do not require preparation of an environmental impact statement.

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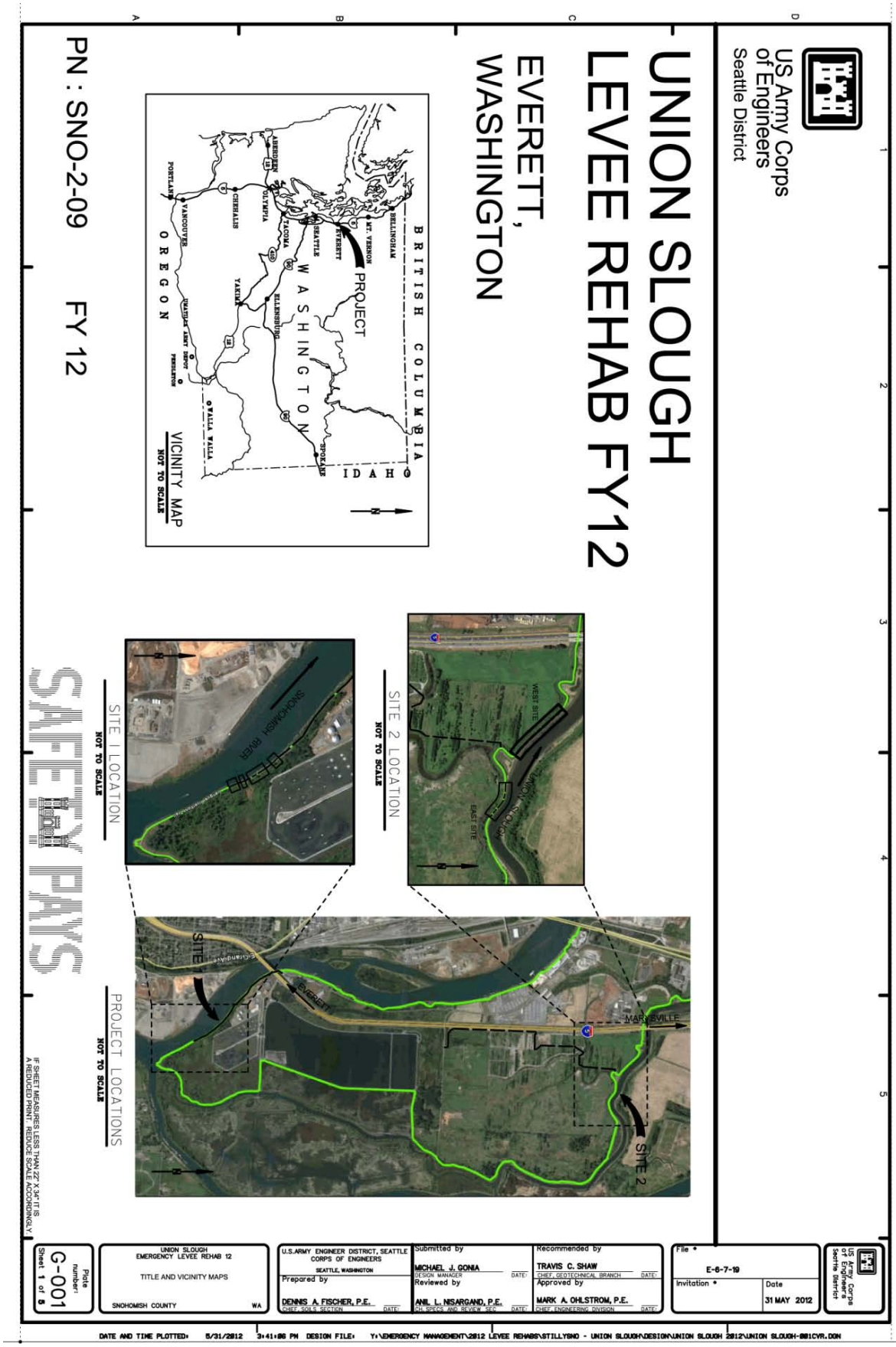
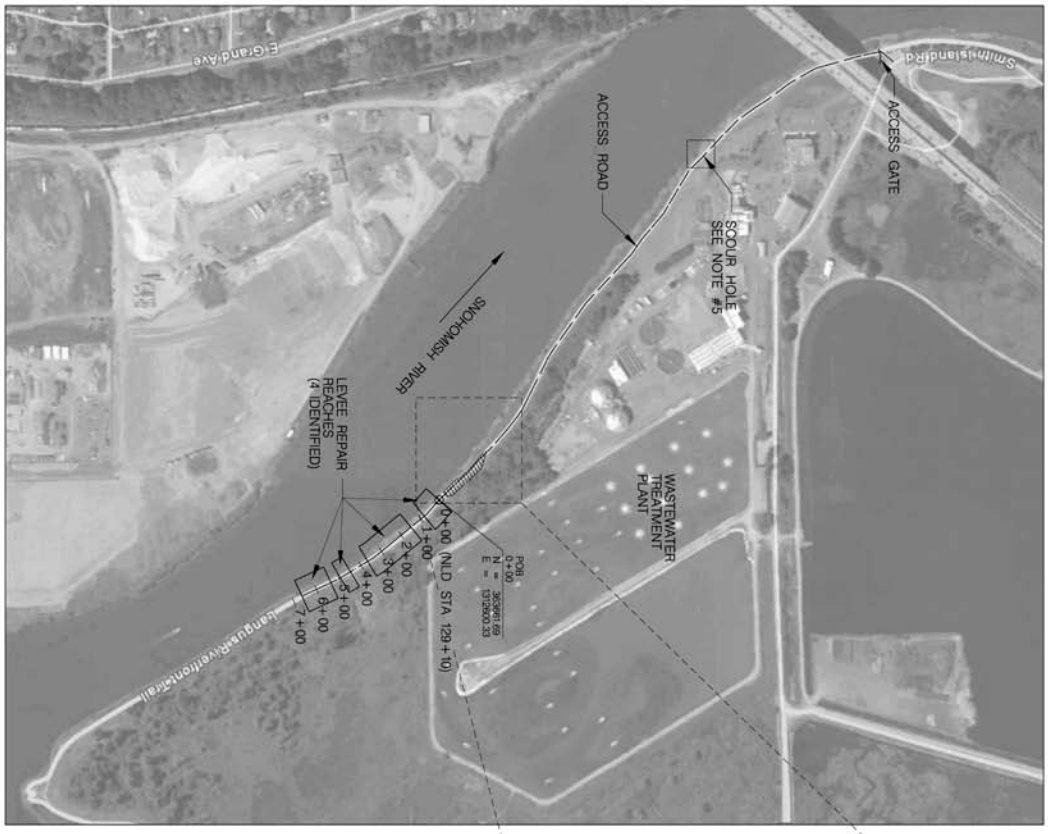
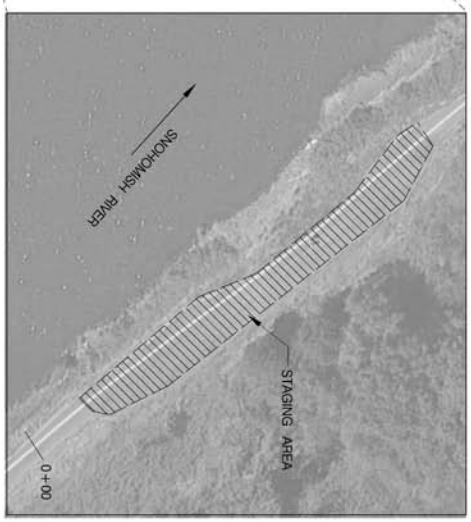
Appendix A: Construction Designs and Site Photographs


US Army Corps of Engineers
Seattle District
UNION SLOUGH
LEVEE REHAB FY12
EVERETT, WASHINGTON
BRITISH COLUMBIA
IDAHO
WASHINGTON
OREGON
PROJECT
VICINITY MAP
NOT TO SCALE
PN : SNO-2-09
FY 12
SAFETY PAYS
SITE 1 LOCATION
NOT TO SCALE
SITE 2 LOCATION
NOT TO SCALE
PROJECT LOCATIONS
NOT TO SCALE
SITE 1
SITE 2
EVERETT
MARYSVILLE
SNOHOMISH RIVER
WEST SITE
EAST SITE
IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY
UNION SLOUGH
EMERGENCY LEVEE REHAB 12
TITLE AND VICINITY MAPS
SNOHOMISH COUNTY
WA
Plate number: G-001
Sheet 1 of 5
U.S.ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON
Prepared by
DENNIS A. FISCHER, P.E.
CHIEF, SOILS SECTION
Submitted by
MICHAEL J. GONIA
DESIGN MANAGER
Reviewed by
ANIL L. NISARGAND, P.E.
CH. SPECS. AND REVIEW SEC.
Recommended by
TRAVIS C. SHAW
CHIEF, GEOTECHNICAL BRANCH
Approved by
MARK A. OHLSTROM, P.E.
CHIEF, ENGINEERING DIVISION
File #
E-6-7-19
Invitation #
Date
31 MAY 2012
US Army Corps of Engineers
Seattle District
DATE AND TIME PLOTTED: 5/31/2012 3:41:06 PM DESIGN FILE: Y:\EMERGENCY MANAGEMENT\2012 LEVEE REHABS\STILLYSNO - UNION SLOUGH\DESIGN\UNION SLOUGH 2012\UNION SLOUGH-001CVR.DGN



GENERAL SITE PLAN – SITE 1 (SOUTH) – (+/- 650 LF)
NOT TO SCALE



GENERAL SITE PLAN – STAGING AREA
NOT TO SCALE

LEGEND

STAGING AREA

CONSTRUCTION NOTES

1. THE PROJECT FOOTPRINT SHALL BE STAKED AND FLAGGED AT THE UPSTREAM AND DOWNSTREAM LIMITS PRIOR TO THE START OF CONSTRUCTION.
2. THE DISCONTINUOUS REPAIR LENGTH IS APPROXIMATLEY 650 LF. 460 LF IS CONFIRMED DAMAGE FOR REPAIR. AN ESTIMATED DAMAGE REACH SUMMARY IS TABULATED BELOW. ONCE VEGETATION REMOVAL IS COMPLETE, A USACE ENGINEER SHALL IDENTIFY REACHES TO BE REPAIRED IN THE FIELD.
3. THE DOWNSTREAM BEGINNING OF DAMAGE BEGINS 36 FEET BEYOND THE UPSTREAM END OF THE WIDENED STAGING AREA. (SEE INSET).
4. A PAVED WIDENED SETBACK SHALL BE USED AS A STAGING AREA. (SEE INSET).
5. A 45-FOOT LENGTH OF SCOUR ON THE RIVERSIDE SLOPE OF THE ACCESS ROAD DOWNSTREAM OF THE PROJECT WILL NEED TO BE BUTTRESSED TO ALLOW SAFE PASSAGE OF LOADED DUMP TRUCKS. SCOUR HOLE IS APPROXIMATLEY 825 FEET FROM THE ACCESS GATE. SEE SHEET C-102 FOR REPAIR. REPAIR TO BE DONE BY OTHERS.
6. ANY DAMAGES TO THE EXISTING PAVED PATH SHALL BE REPLACED TO PRE-EXISTING CONDITION.
7. POINT OF BEGINNING (POB) FOR LEVEE REPAIR HORIZONTAL CONTROL BASED ON WASHINGTON COORDINATE SYSTEM, NAD 83/91, NORTH ZONE.

DAMAGE	STATION BEGIN	STATION END
REACH 1	0+00	0+80
REACH 2	1+55	3+75
REACH 3	4+50	4+90
REACH 4	5+30	6+50

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers Seattle District

Symbol	Description	Date	Appr.	Symbol	Description

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

Prepared by: CENWS-EN-GB-SS/GONIA

Designed by: M. GONIA
Drawn by: M. GONIA
Checked by: D. FISCHER
Date: 23 MAY 2012
File #: E-6-7-19
Rev.:

PL84-99 REHABILITATION & INSPECTION PROGRAM
2012 LEVEE REPAIR

UNION SLOUGH - SITE 1
PLAN VIEW

SNOHOMISH COUNTY WA

Plate number: C-101
Sheet 2 of 5

CONSTRUCTION NOTES

1. CLEAR AND GRUB EMBANKMENT SLOPES.
2. REGRADE SLOPE TO 1.75H:1V MINIMUM.
3. STAGE SOIL FOR REUSE AND DISPOSE OF VEGETATION APPROPRIATELY OFF-SITE.
4. FILL SCOUR HOLE WITH SCREENED 5/8" MINUS MATERIAL.
5. PLACE SPALL FILTER BLANKET (2"-4") OVERLAIN WITH CLASS II RIPRAP.
6. COVER EXPOSED ROCK ABOVE OHW WITH 6" INCHES OF MIXTURE OF TOPSOIL AND EXCAVATED SOIL. SOIL SHALL COMPLETELY FILL ALLL LARGE VOIDS IN THE ROCK RIPRAP. DEPTH OF SOIL ABOVE RIPRAP WILL BE AT LEAST 6 INCHES. HYDROSEED.
7. TOTAL REPAIR LENGTH APPROXIMATELY 650 LF.
8. ANY DAMAGES TO THE EXISTING PAVED PATH SHALL BE REPLACED BY THE LOCAL SPONSOR FOR WORK-IN-KIND CREDIT.

PLANTING NOTES

1. SALIX SCOULERIANA WILLOWS WILL BE PLACED HORIZONTALLY IN ONE ROW. SPACING SHALL BE 1 FOOT ON CENTER (O.C.) FOR THE LENGTH OF THE REPAIR SITES.
2. DORMANT CUTTINGS SHALL BE 1 INCH TO 2 INCHES IN DIAMETER WITH A POLE LENGTH OF 3 TO 4 FEET.

LEGEND

- CLASS II RIPRAP
- 2" - 4" QUARRY SPALL FILTER
- SCREENED ⅝" MINUS MATERIAL
- TOPSOIL AND HYDROSEED

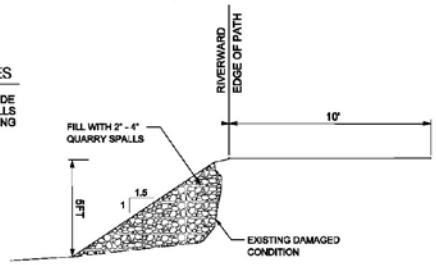
TOPSOIL MATERIAL	
SIEVE	PERCENT PASSING
1/2"	100
NO. 4	75-95
NO. 10	40-75
NO. 16	25-55
NO. 40	25-50
NO. 200	10-20

CLASS II RIPRAP	
100% SMALLER THAN	500#
50% SIZE	200#
90% LARGER THAN	100#
10%	25-100#

⅝" MINUS MATERIAL	
SIEVE	PERCENT PASSING
5/8"	100
1/2"	90-100
NO. 4	45-65
NO. 40	10-25
NO. 200	0

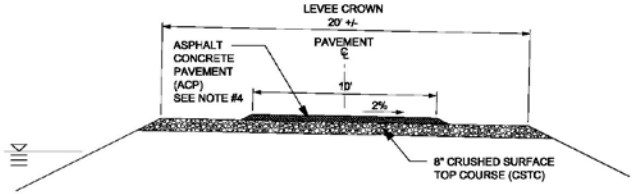
ACCESS ROAD SLOPE REPAIR NOTES

1. FILL 45 FOOT LENGTH OF SCOUR ALONG RIVERSIDE SLOPE OF ACCESS ROAD WITH 2" - 4" QUARRY SPALLS TO BUTTRESS THE ROAD FOR HEAVY TRUCK LOADING ON PATH.
2. WORK TO BE DONE BY OTHERS.



ACCESS ROAD SLOPE REPAIR (45 LF)

NOT TO SCALE



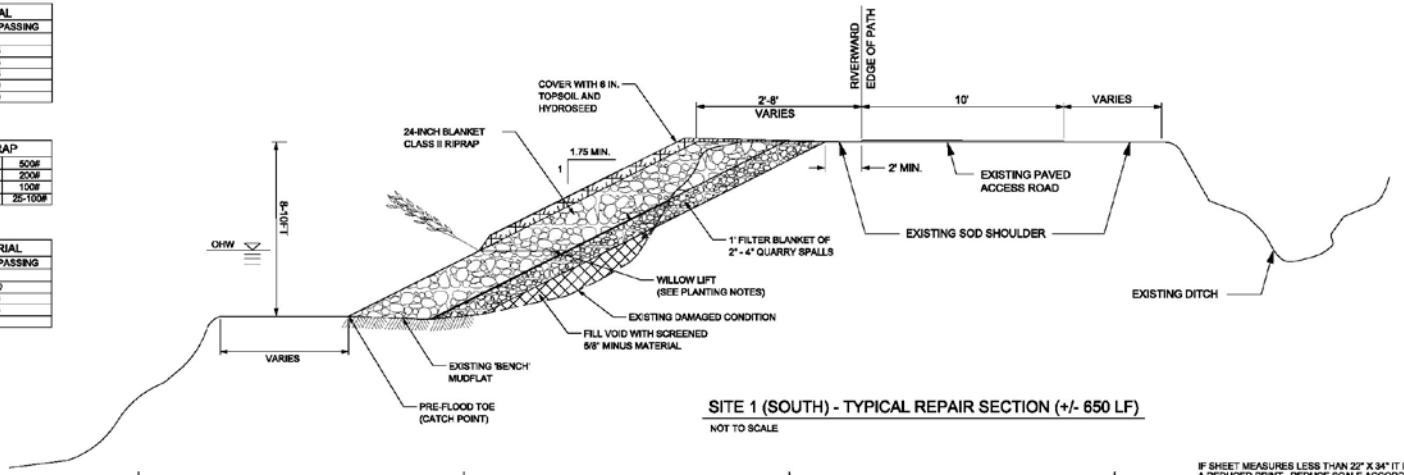
ACCESS ROAD PAVEMENT SECTION

NOT TO SCALE

ACCESS ROAD PAVEMENT REPAIR NOTES

1. REPAIR ASPHALT PAVEMENT SECTIONS DAMAGED DURING CONSTRUCTION.
2. SAWCUT EXISTING PAVEMENT EDGES OF THE DAMAGED SECTIONS TO PREPARE FOR SECTION REPLACEMENT.
3. COMPACT CSTC BASE TO 95% OF COMPACTION.
4. PLACE HOT MIX ASPHALT PER SPECIFICATIONS IN ONE 2.5-INCH THICK MINIMUM LAYER OR MATCH EXISTING THICKNESS.

TOP COURSE (CSTC)	
SIEVE	PERCENT PASSING
3/4"	100
1/2"	80-100
NO. 4	46-68
NO. 40	8-24
NO. 200	10 MAX



SITE 1 (SOUTH) - TYPICAL REPAIR SECTION (+/- 650 LF)

NOT TO SCALE

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers Seattle District

Symbol	Description	Date	Appr.	Symbol	Description

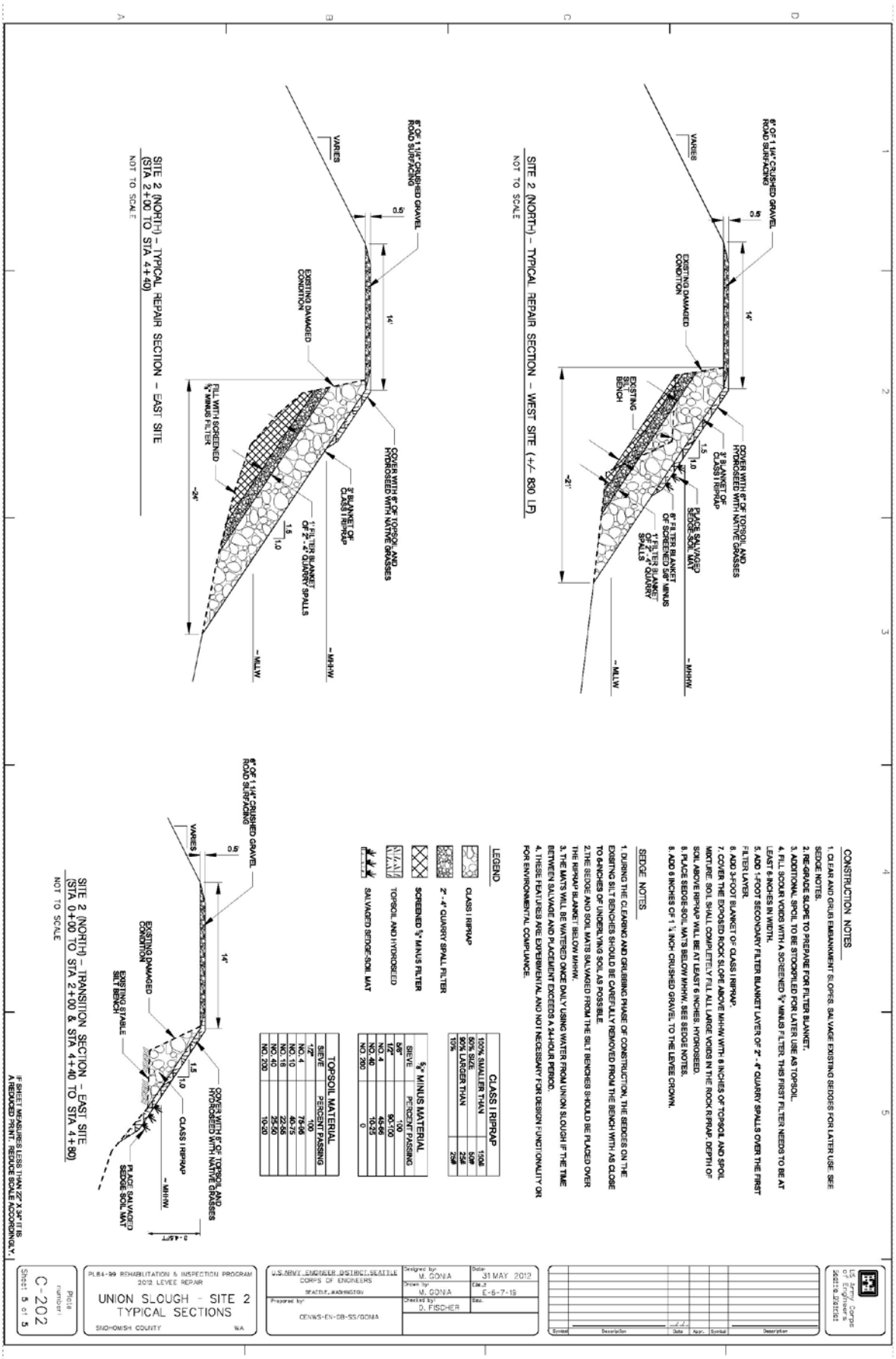
Designed by: M. GONIA
Drawn by: M. GONIA
Checked by: D. FISCHER
Date: 31 MAY 2012
Fm: 1 - 67 - 7 - 19
Rev:

U.S.ARMY ENGINEER DISTRICT SEATTLE CORPS OF ENGINEERS
SEATTLE, WASHINGTON
Prepared by:
DENWS-EN-DS-SS/GONIA

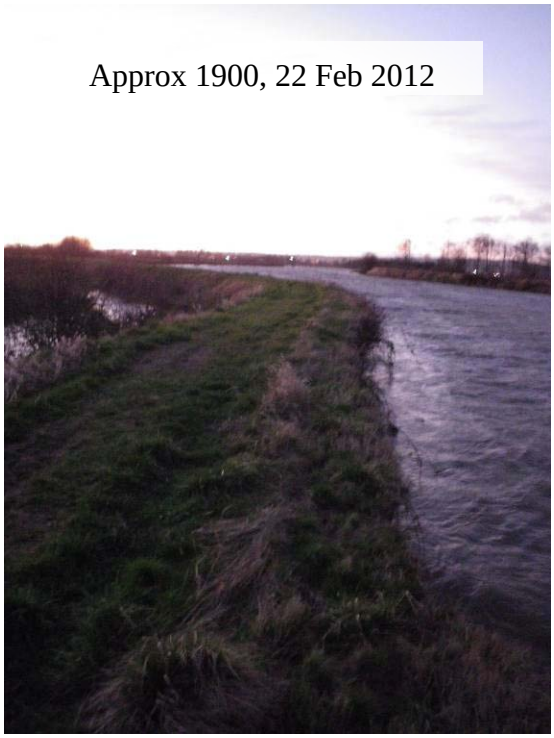
FLS-1-99 REHABILITATION & INSPECTION PROGRAM 2012 LEVEE REPAIR
UNION SLOUGH - SITE 1
TYPICAL SECTION
SNOHOMISH COUNTY WA

Plate number:
C-102
Sheet 3 of 5

POB
0+00
N = 376078.86
E = 1317719.46
0+00 (NLD STA 365+85)
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
8+30
WEST REPAIR
(830 LF)
STAGING AREA
UNION SLOUGH
EXISTING TIDEGATE
ACCESS ROAD
STAGING AREA
POB
0+00
N = 375466.03
E = 1313662.90
0+00 (NLD STA 351+30)
1+00
2+00
3+00
4+00
4+80
EAST REPAIR
(480 LF)
CONSTRUCTION NOTES
1. THE PROJECT FOOTPRINT SHALL BE STAKED AND FLAGGED AT THE UPSTREAM AND DOWNSTREAM LIMITS PRIOR TO THE START OF CONSTRUCTION.
2. THE DOWNSTREAM BEGINNING OF THE EAST SITE SHALL TIE INTO THE RIPRAP ARMORING THE TIDEGATE OUTFALL. THE TIDEGATE SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION.
3. APPROXIMATELY 65 FEET OF THE EAST SITE WAS REPAIRED DURING THE FEBRUARY 2012 FLOOD FIGHT. (STA 2+60 TO STA 3+40).
4. THE ACCESS ROAD AND NORTH STAGING AREA WAS BUILT DURING THE 2012 FLOOD FIGHT. THE ACCESS ROAD WILL NEED TO BE PERMITTED OR REMOVED BY THE LOCAL SPONSOR.
5. POINT OF BEGINNING (POB) FOR LEVEE REPAIR HORIZONTAL CONTROL BASED ON WASHINGTON COORDINATE SYSTEM, NAD 83/91, NORTH ZONE.
GENERAL SITE PLAN – SITE 2 (NORTH)
NOT TO SCALE
N
LEGEND
STAGING AREA
IF SHEET MEASURES LESS THAN 22"X34" IT IS A REDUCED PRINT - REDUCE SCALE ACCORDINGLY.
FL84-99 REHABILITATION & INSPECTION PROGRAM
2012 LEVEE REPAIR
UNION SLOUGH - SITE 2
PLAN VIEW
SNOHOMISH COUNTY
WA
Plate number:
C-201
Sheet 4 of 5
U.S.ARMY ENGINEER DISTRICT,SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON
Prepared by:
CENWS-EN-CG-SS/GONIA
Designed by: M. GONIA
Drawn by: M. GONIA
Checked by: D. FISCHER
Date: 31 MAY 2012
File #: E-6-7-19
Rev.
Symbol
Description
Date
Appr.
Symbol
Description
U.S. Army Corps of Engineers Seattle District


CONSTRUCTION NOTES
1. CLEAR AND GRUB EMBANKMENT SLOPES. SALVAGE EXISTING SEDGES FOR LATER USE. SEE SEDGE NOTES.
2. RE-GRADE SLOPE TO PREPARE FOR FILTER BLANKET.
3. ADDITIONAL SPOIL TO BE STOCKPILED FOR LATER USE AS TOPSOIL.
4. FILL SCOUR VOIDS WITH A SCREENED ¾" MINUS FILTER. THIS FIRST FILTER NEEDS TO BE AT LEAST 6 INCHES IN WIDTH.
5. ADD 1-FOOT SECONDARY FILTER BLANKET LAYER OF 2"-4" QUARRY SPALLS OVER THE FIRST FILTER LAYER.
6. ADD 3-FOOT BLANKET OF CLASS I RIPRAP.
7. COVER THE EXPOSED ROCK SLOPE ABOVE MHHW WITH 6 INCHES OF TOPSOIL AND SPOIL MIXTURE. SOIL SHALL COMPLETELY FILL ALL LARGE VOIDS IN THE ROCK RIPRAP. DEPTH OF SOIL ABOVE RIPRAP WILL BE AT LEAST 6 INCHES. HYDROSEED.
8. PLACE SEDGE-SOIL MATS BELOW MHHW. SEE SEDGE NOTES.
9. ADD 6 INCHES OF 1 ¼" INCH CRUSHED GRAVEL TO THE LEVEE CROWN.
SEDGE NOTES
1. DURING THE CLEARING AND GRUBBING PHASE OF CONSTRUCTION, THE SEDGES ON THE EXISTING SILT BENCHES SHOULD BE CAREFULLY REMOVED FROM THE BENCH WITH AS CLOSE TO 6-INCHES OF UNDERLYING SOIL AS POSSIBLE.
2. THE SEDGE AND SOIL MATS SALVAGED FROM THE SILT BENCHES SHOULD BE PLACED OVER THE RIPRAP BLANKET BELOW MHHW.
3. THE MATS WILL BE WATERED ONCE DAILY USING WATER FROM UNION SLOUGH IF THE TIME BETWEEN SALVAGE AND PLACEMENT EXCEEDS A 24-HOUR PERIOD.
4. THESE FEATURES ARE EXPERIMENTAL AND NOT NECESSARY FOR DESIGN FUNCTIONALITY OR FOR ENVIRONMENTAL COMPLIANCE.
LEGEND
CLASS I RIPRAP
2"-4" QUARRY SPALL FILTER
SCREENED ¾" MINUS FILTER
TOPSOIL AND HYDROSEED
SALVAGED SEDGE-SOIL MAT
CLASS I RIPRAP
100% SMALLER THAN 100#
50% SIZE 50#
50% LARGER THAN 25#
10% 25#
¾" MINUS MATERIAL
SIEVE PERCENT PASSING
3/8" 100
1/2" 90-100
NO. 4 45-66
NO. 40 10-25
NO. 200 0
TOPSOIL MATERIAL
SIEVE PERCENT PASSING
1/2" 100
NO. 4 75-95
NO. 10 40-75
NO. 18 22-55
NO. 40 25-50
NO. 200 10-20
SITE 2 (NORTH) – TYPICAL REPAIR SECTION – WEST SITE (+/- 800 LF)
NOT TO SCALE
SITE 2 (NORTH) – TYPICAL REPAIR SECTION – EAST SITE (STA 2+00 TO STA 4+40)
NOT TO SCALE
SITE 2 (NORTH) – TRANSITION SECTION – EAST SITE (STA 0+00 TO STA 2+00 & STA 4+40 TO STA 4+90)
NOT TO SCALE
6" OF 1 ¼" CRUSHED GRAVEL ROAD SURFACING
VARIES
EXISTING DAMAGED CONDITION
EXISTING STABLE SILT BENCH
COVER WITH 6" OF TOPSOIL AND HYDROSEED WITH NATIVE GRASSES
CLASS I RIPRAP
PLACE SALVAGED SEDGE-SOIL MAT
6" FILTER BLANKET OF SCREENED ¾" MINUS
1' FILTER BLANKET OF 2"-4" QUARRY SPALLS
~MHHW
~MLLW
~21'
14'
0.5
1.5
1.0
FILL WITH SCREENED ¾" MINUS FILTER
~24'
~3.45FT
IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.
U.S. Army Corps of Engineers Seattle District
Symbol Description Date Appr. Symbol Description
U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON
Prepared by:
CENWS-EN-GB-SS/GONIA
Designed by: M. GONIA
Drawn by: M. GONIA
Checked by: D. FISCHER
Date: 31 MAY 2012
File #: E-6-7-19
Rev.
PL84-99 REHABILITATION & INSPECTION PROGRAM
2012 LEVEE REPAIR
UNION SLOUGH - SITE 2
TYPICAL SECTIONS
SNOHOMISH COUNTY WA
Plate number: C-202
Sheet 5 of 5

Photos taken during the flood fight work:



Photos taken on 29 February 2012, following flood fight work:

Photos of Site 1 damage and current condition:

Appendix B: Non-Federal Sponsor Rehabilitation Request

APPENDIX E: REHABILITATION REQUEST FORM

U.S. Army Corps of Engineers, Seattle District Date of 2-10-09
Request:
ATTN: Emergency Management Branch
Street Address
City, State ZIP+4

Dear Sir:

The purpose of this letter is to request Rehabilitation Assistance from the Corps of Engineers under Public Law 84-99 for the repair of the Diking District 5 levee (or other type of flood control project) that was damaged by (flood)(high waters) during January 2009. The project is Active in the Rehabilitation and Inspection Program, and was last inspected by the Corps of Engineers on 18 Sept 2007. The location of the levee and a brief description of the damage are as follows:

Project Identification Number Union Slough Diking District 5 River or Stream Snohomish River/Union Slough
Bank (circle): Left, Right, Both
Description of Damage 80LF of toe Rock and sideslope damage along Riverside Face of Levee. Toe scour along the Riverside Face of Levee and several Locations along Union Slough.
City Everett County Snohomish State WA

Section 16 Township 29N Range 05E

Public Sponsor Point of Contact:

Name STEVE FOGG, Commissioner Dike District #5
Address 3812 28th Pl NE City Everett State WA
Telephone (W) (425) 258 5850 ~~(H)~~ Cell (425) 271-4995

If this project is eligible for PL 84-99 Rehabilitation Assistance, I further request that the Corps of Engineers take all necessary steps to accomplish the appropriate repairs. It is agreed that the required items of local cooperation will be provided should the levee be eligible for Rehabilitation Assistance under PL 84-99 and the repair work is accomplished by the Corps of Engineers.

I hereby certify that the right-of-way which is required for any authorized repair work is presently available, and this letter constitutes permission for the Government and its agents to enter and use said right-of-way in undertaking authorized repair work.

Sincerely,

Appendix E- Rehabilitation Request Form

1

APPENDIX E: REHABILITATION REQUEST FORM

U.S. Army Corps of Engineers, Seattle District
Date of Request: April 10, 2012
ATTN: Emergency Management Branch
4735 E. Marginal Way S.
Seattle, WA 98134

Dear Sir:

The purpose of this letter is to request Rehabilitation Assistance from the Corps of Engineers under Public Law 84-99 for the repair of the DD-5 Union Slough levee (or other type of flood control project) that was damaged by (flood)(high waters) during 23 - 20 12. The project is Active in the Rehabilitation and Inspection Program, and was last inspected by the Corps of Engineers on 23 Feb, 2011. The location of the levee and a brief description of the damage are as follows:

Project Identification Number CENWS-UNIO-2011a0001 River or Stream Union Slough
Bank (circle): Left, (Right), Both
Description of Damage Toe along 240 feet of existing Dike was cut away during Flood flows, DDS-A-295+400 and at 325+100

City Everett County Snohomish State Washington

Section 16 Township 29N Range 05E

Public Sponsor Point of Contact:

Name DD-5
Address 11225 SE 6TH STREET, 220 City BELLEVUE State WA 98004
Telephone (W) 425-454-4494 (H)

If this project is eligible for PL 84-99 Rehabilitation Assistance, I further request that the Corps of Engineers take all necessary steps to accomplish the appropriate repairs. It is agreed that the required items of local cooperation will be provided should the levee be eligible for Rehabilitation Assistance under PL 84-99 and the repair work is accomplished by the Corps of Engineers.

I hereby certify that the right-of-way which is required for any authorized repair work is presently available, and this letter constitutes permission for the Government and its agents to enter and use said right-of-way in undertaking authorized repair work.

Sincerely,

X Victor M. Loehrer

Appendix C: Public Comments and Responses

USACE
Planning and Project Management Division
Environmental and Cultural Resource Branch
P.O. Box 3755
Seattle, WA 98124-3755
Attn: Bobbi Jo McClain (PM-ER)

Union Slough Levee Rehabilitation Project
PM-ER-12-7

The Tulalip Tribes Natural and Cultural Resources Department (TNCRD) staff have reviewed the USACE Notice of Preparation / Clean Water Act Public Notice and have several concerns and comments on the completed and proposed Union Slough Levee Rehabilitation work.

Completed Emergency Levee Repairs at Site 2

The emergency repairs took place during the beginning of juvenile Chinook salmon out migration in the Snohomish River and likely impacted fish directly and

The stretch of levee repaired during the flood event was identified as a known area where emergency repairs may be required during a flood event in 2009. There is no reason why prior to this event an emergency levee repair response plan could have been developed with all of the stake holders to allow for more efficient and effect of response that would have minimized impacts to the environment and the Tribes' treaty resources. In the future pre-flood season emergency repair response plans should be developed for known levee weak points.

The TNCRD has concerns about the use of emergency repairs as a means to circumvent non-emergency regulatory requirements especially in cases where a known potential emergency response repair maybe needed. We do not presume that this was the case in this instance, but we have encountered this tactic elsewhere. This concern was specifically expressed to us by another agency we encountered at the site during the emergency repairs efforts. Pre-developed response plans would help in dispelling this concern.

Proposed Site 1 Repairs

The proposed levee repairs for site 1 should not further reduce riparian habitat for juvenile salmon, specifically juvenile chinook rearing and migrating through the mainstream of the Snohomish River. The mainstem of the Snohomish River has the greatest amount of flow of all the river slough channels in the estuary and the least amount of riparian and off channel habitat for juvenile chinook salmon. The concern is

that if not properly mitigated for this levee repair effort will further reduce the limited amount of riparian habitat to juvenile chinook in the mainstem.

Proposed Site 2 Repairs

The TNCRD is concerned despite the Notice's reassurance that any levee repair on the river side of the existing levee will potentially complicate or add additional costs to the future restoration efforts planned at the site. TNCRD would recommend the setback levee option for this site to reduce impacts to Union slough and to coordinate these efforts with Snohomish county so that a portion of the setback levee or materials used to build it might be incorporated into the restoration site setback levee.

Levee repairs that potentially may occur on the river side of the levee are of a concern given that placing of riprap below the OHWM will eliminate suitable habitat for juvenile chinook and provide concealing habitat for fish that prey on juvenile salmon. Given the unknown timeline for the restoration of the site the impacts may persist for a decade.

Please contact me if you have any questions or need clarification on any of our concerns or comments.

- Todd Zackey

Todd Zackey
Marine and Nearshore Program Manager
Tulalip Tribes Natural & Cultural Resources Dept.
6406 Marine Drive
Tulalip, WA 98271

P- 360.716.4637
Tzackey@tulaliptribes-nsn.gov

Response to Tulalip Tribe's letter dated 26 May 2012

The Corps appreciates the Tulalip's comments. While coordination efforts have been ongoing, the Corps recognizes that improvements can always be made and is working to establish pre-flood season coordination with stakeholders on any known damaged sites.

The Corps' Civil Works and Regulatory Branches have worked closely to ensure that the impacts of both the completed emergency actions and proposed repairs are adequately mitigated. While the perception may exist that emergency repairs are not held to the same standard as typical repairs, at Union Slough the Corps believes that to not be the case. The Corps also agrees with the Tribe that additional pre-flood season coordination would help to alleviate that perception.

At Site 1, limited riparian habitat exists at the damage sites due to ongoing scour and continued maintenance by the local sponsor to maintain levee inspectability and safety. This bank was an armored bank prior to the damage and will be returned to an armored bank by the repair. The proposed project includes planting a willow lift throughout the repair sites and placement of topsoil with seeding of native herbaceous plants above the willows. While there will be a time lag before vegetation regrows, it is expected that within a short time (1-2 years) the bank will provide similar habitat above the water line as is there now. There is a small area (0.02 acres) of wetland that has developed within the footprint of the levee since the damage. This impact is to be offset at 2:1 ratio through the purchase of credits at the City of Everett's advanced mitigation site on Union Slough.

At Site 2, the setback alternative was rejected due to the length of time that would be required for construction due to the expected differential settlement while the foundation consolidates under the added weight. Up to three years of construction would be needed to complete this repair alternative and until the repair was complete, the levee would remain vulnerable to flood damage with continued flood risk to protected structures.

Snohomish County's proposed Smith Island Restoration would be expected to remove a portion of the Site 2 repair. The Corps does not expect that the proposed or completed work would hinder the removal of the levee at these locations as the rock could be excavated out in the same method as the earthen levee. As the date for construction of this restoration has not been set the Corps cannot wait for this setback to occur without repairing the existing damage.

As the setback was rejected for Site 2 (see Section 8.1.3 for further details), the impacts of the Repair in Place alternative to mudflat and wetland habitat (0.7 acres) is to be offset at 2:1 ratio through the purchase of credits at the City of Everett's advanced mitigation site on Union Slough. A total of 1.45 acres of mitigation is proposed offsite.

Appendix D: ESA Coordination

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

NMFS Tracking No:
2012/02014

July 30, 2012

Evan Lewis, Chief
Corps of Engineers, Seattle District
Environmental and Cultural Resources Branch
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Army Corp of Engineers Union Slough Levee Rehabilitation Project in Union slough and the Snohomish River, Snohomish County, Washington, (Lower Snohomish River 6th Field HUC 171100110203)

Dear Mr. Lewis:

The enclosed document contains a biological opinion prepared by the National Marine Fisheries Service pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the levee rehabilitation project in Union Slough and the Snohomish River. In this Opinion, the National Marine Fisheries Service concludes that the action, as proposed, is not likely to jeopardize the continued existence of Puget Sound Chinook salmon and Puget Sound steelhead or result in the destruction or adverse modification of designated critical habitat for Puget Sound Chinook salmon.

As required by section 7 of the Endangered Species Act, the National Marine Fisheries Service provided an incidental take statement with the biological opinion. The incidental take statement describes reasonable and prudent measures the National Marine Fisheries Service considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions. Incidental take from actions that meet the term and condition will be exempt from the Endangered Species Act take prohibition.

This document also includes the results of our analysis of the action's likely effects on Essential Fish Habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on Essential Fish Habitat. The Conservation Recommendations is a subset of the ESA Terms and Conditions. Section 305(b) (4) (B) of the

MSA requires Federal agencies to provide a detailed written response to the National Marine Fisheries Service within 30 days after receiving these recommendations.

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

If you have questions regarding this consultation, please contact Sean Callahan at (206) 526-4744 or Sean.Callahan@noaa.gov.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

Enclosure

cc: Bobbi Jo McClain, COE

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation

Army Corp of Engineers
Union Slough and Snohomish River Dike Repair Project, Snohomish County

NMFS Consultation Number: 2012/02014

Action Agency: Army Corp of Engineers

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Puget Sound steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	*N/A*
Puget Sound Chinook (*O. tshawytscha*)	Threatened	Yes	No	No

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon (Chinook, coho, and PS Pink)	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued By: _____
William W. Stelle, Jr.
Regional Administrator

Date: July 30, 2012

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1.0 INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

The biological opinion (opinion) and incidental take statement portions of this document were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402.

The NMFS also completed an Essential Fish Habitat (EFH) consultation. It was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, et seq.) and implementing regulations at 50 CFR 600.

The opinion and EFH conservation recommendations are both in compliance with the Data Quality Act (44 U.S.C. 3504(d)(1) et seq.) and they underwent pre-dissemination review.

1.2 ConsultationHistory

On February 29, 2012, NMFS met on site to look at the emergency dike repair that was installed by the United States Army Corps of Engineers (COE) following the flooding that occurred during the week of February 20, 2012.

On April 16, 2012, NMFS received a *Notice of Preparation* for an environmental assessment from the COE describing the emergency actions as well as the permanent repair to two locations on Union Slough and the Snohomish River.

On May 3, 2012, NMFS participated in a conference call with the COE, Department of Ecology (Ecology), Washington Department of Fish & Wildlife (WDFW), and United States Fish & Wildlife Service (USFWS) regarding the appropriate level and location of compensatory mitigation in order to offset the impacts from this proposed action. The conversation included purchasing credits in the Union Slough Restoration Project (Note: the site has 36.38 acres of advanced wetland mitigation credits remaining as of May 4, 2012) or having the COE provide funds for the Smith Island Restoration Project.

On May 23, 2012, NMFS received a letter from the COE requesting formal consultation pursuant to section 7(a)(2) of the ESA, and EFH consultation pursuant to section 305(b)(2) of the MSA for the permanent dike repair at two locations on Union Slough and the Snohomish River in Snohomish County, Washington. The proposed levee repair is authorized by Public Law 84-99 (33 U.S. Code Section 701n). Corps rehabilitation and restoration work under this authority is limited to flood control works damaged or destroyed by floods. The statute authorizes rehabilitation to the level of protection exhibited by the flood control work prior to the damaging event. The local sponsor for this project is Snohomish Diking District No. 5. The Diking District is responsible for annual operation and maintenance of the Union Slough Levees.

On June 4, 2012, NMFS attended a field visit with USFWS, City of Everett and the COE to view the two sites and the mitigation project as well.

Additional information was received June 12, 2012. Formal consultation was initiated on June 12, 2012. The consultation also included numerous telephone conversations and electronic mail between NMFS and COE staff. The COE determined the proposed action was likely to adversely affect Puget Sound (PS) Chinook salmon (*Oncorhynchus tshawytscha*), and PS steelhead (*O. mykiss*). The COE also determined the proposed action was likely to adversely affect PS Chinook critical habitat, and will have an adverse affect on Essential Fish Habitat (EFH) for Chinook salmon, coho salmon (*O. kisutch*), and pink salmon (*O.gorbuscha*). A complete record of this consultation is on file at Washington State Branch office in Lacey, Washington.

Flooding (i.e. 15-year event) occurred on the Snohomish River in January 2009. Before repairs were completed, flooding occurred again in February 2012. River flows damaged the right bank levee (site 1) of the Snohomish River and the left bank levee on Union Slough. Site 1, along the Snohomish River, is approximately 650 linear feet long (approximately 0.075 acres of impact) and is adjacent to the City of Everett Wastewater Treatment Plant. Site 2, along Union Slough, consists of two areas of damage, 830 and 480 LF long. In the current condition, the levee offers a 5-year level of flood protection. While the level of protection can be difficult to determine in tidally influenced areas and previous reports have used various protection levels, the levee did not overtop during the 15 year flood event in 2009, therefore the levee is estimated to offer a 20-year level of protection in its undamaged condition.

Emergency repairs at site 2 were completed between the 21st and 23rd of February 2012. During this time, the construction crew completed the access road and began stabilizing approximately 88 feet of levee which included placing Class II/III riprap on the riverward side of the levee. No emergency work was conducted at site 1. The emergency action did not fully restore flood protection of the levee.

The Snohomish County Diking District #5 previously submitted a Joint Aquatic Resources Permit Action (JARPA) and Biological Evaluation to the COE Seattle District Regulatory Branch for the long-term "fix" of the levee at Site 2. The projects was never completed because the Diking District and various regulatory agencies did not reach agreement on acceptable mitigation for unavoidable habitat impacts. The COE Operations agreed to complete the repairs as a PL 84-99 project, the Diking District withdrew their application from COE regulatory branch.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The COE proposes to repair and restore the damaged levees at both sites to the pre-flood 20-year level of flood protection. At Site 1, the COE is proposing to re-slope up to 650 feet of levee to achieve a 1.75H - 1V slope. A 12 inch thick filter blanket of spalls would be placed and overlain with a 24 inch thick layer of Class II riprap armor. At this location, the COE will not be extending the toe of the slope waterward into the Snohomish River. All of the work will be contained in the existing footprint and extend only down to the vegetative bench. The repair would tie into the existing slope protection upstream and downstream of the repair site. The area of impact is approximately 0.075 acres. The COE proposes to plant one long linear willow lift in the riprapped area.

At Site 2, the COE is proposing to re-slope the riverward bank to achieve a 1.5H:1V slope with a 14 ft. top width for safe driving access along the top of the levee at two areas that are 830ft. and 480 ft., for a total of 1310 ft. A 12 inch thick filter blanket of spalls would be placed and overlain with a 36 inch thick layer of Class I riprap armor. The eastern repair area at site 2 is within the portion of the levee expected

to be removed within 5 years as part of a proposed Smith Island restoration project. The proposed repair of this section is expected to provide flood protection until such time that the restoration project is completed. The western repair will be maintained as part of the permanent levee. Both repairs will extend below the Ordinary High Water Mark (OHWM). The total area of impact at both locations is approximately 0.7 acres.

The COE is incorporating minimization measures and compensatory mitigation into the project as well as experimentally transplanting sedge vegetation back into the riprapped area to promote future colonization of sedge vegetation and off-set the reflective heating to the nearshore water column from the "heated" riprap. The COE is not requesting any mitigation credit for this experimental transplantation. The COE also proposes to buy 1.45 acres of compensatory mitigation credits (i.e. estuarine wetlands) at a mitigation site that was completed in 2006.

Minimization Measures

The Best Management Practices (BMPs) and minimization measures that will incidentally benefit ESA-listed fish or their habitats are included in the project description and described below:

- All in-water work will be completed within the August 1 to October 31 window.
- Riprap will be placed during low tidal periods to eliminate or reduce placing rock in-water.
- A one-foot thick layer of topsoil will be placed on the levee face and planted with willows or other acceptable native riparian vegetation.
- All noxious weed species will be removed from the construction site.
- Disturbed areas would be hydro seeded upon completion.
- The COE will start upland construction, staging, and access work prior to August 1 to shorten the overall time within the work window.

The NMFS' relied on the inclusion of these measures to conduct this consultation, including all stated performance standards and minimization measures. The realities of completing such actions often involve changes in on-the-ground practices, construction methods, and construction design and such changes can bear on the environmental effects of the action and the conclusions reached during the consultation. Therefore, the action agency or other cooperating party should inform NMFS' of any changes to ensure the conclusions drawn during consultation remain valid.

1.4 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this project includes the project footprint, and the reach affected by the riprap placement. Bank hardening potentially affects the reach by transferring energy downriver and/or constricting flow upriver. Absent a reach analysis, NMFS determined the action area to extend about 1/3 mile upriver and downriver from the riprap placement on the levee in Union Slough and about 1/2 mile downriver past the I-5 bridge where flow is constricted. The action area supports PS Chinook salmon and PS steelhead, and is designated critical habitat of PS Chinook salmon. The area is used primarily as a migration corridor for juvenile and adult life stages of both species and also provides habitat for juvenile rearing. The action area has been designated as EFH for Chinook, coho and PS pink salmon (PFMC 1999).

2.0 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the United States Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the Service provide an opinion stating how the agencies' actions will affect listed species or their critical habitat. If incidental take is expected, Section 7(b)(4) requires the provision of an incidental take statement (ITS) specifying the impact of any incidental taking, and including reasonable and prudent measures to minimize such impacts.

2.1 Analytical Approach of the Biological Opinion

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

This biological opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.[1]

We use the following approach to determine whether the proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- *Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.*
- *Describe the effects of the environmental baseline in the action area.*
- *Analyze the effects of the proposed actions on both species and habitat.*
- *Describe any anticipate cumulative effects in the action area.*
- *Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.*
- *Reach jeopardy and adverse modification conclusions.*

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

2.2 Rangewide Status of the Species and Critical Habitat

This section presents information about the status and trend of the listed species, using attributes associated with a "viable salmonid population" (VSP) (McElhany et al. 2000), including information about their geographic distribution, population structure, risks of extinction, and the factors limiting their recovery. Those attributes are influenced by the survival, behavior, and experiences of individual fish throughout the entire life cycle, characteristics that are influenced, in turn, by habitat and other environmental conditions. This section also presents the status of the habitat designated as critical for the conservation of the listed species, presenting the condition of PCEs throughout the designated area, and the conservation values within the designated area.

Climate change is one factor affecting the status of salmon and their habitat. Climate change affects water quality and quantity by altering water yield, peak flows, and stream temperature. Other effects, such as increased vulnerability to catastrophic wildfires, may occur as climate change alters the structure and distribution of forest and aquatic systems. Based on the best available science, there is increasing certainty that climate change is occurring and is accelerating (IPCC 2007; Battin et al. 2007).

In Washington State, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. According to model predictions, average temperatures in Washington State are likely to increase between 1.7 degrees and 2.9 degrees C (3.1 degrees and 5.3 degrees F) by 2040 (Casola et al. 2005). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. There is concern, as the snow pack diminishes, and seasonal hydrology shifts to more frequent early large storms, stream flow timing will change and peak river flows will likely increase.

In a study to project impacts of climate change on salmon habitat restoration in the Snohomish Basin, model results indicate a large negative impact of climate change on freshwater salmon habitat. The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows which scour the streambed and destroy salmon eggs (Battin et al. 2007). Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality in the Snohomish Basin and in hydrologically similar watersheds throughout the region. This is expected to make recovery targets for these salmon populations more difficult to achieve. Recommendations to mitigate the adverse impacts of climate change include restoring connections to historical floodplains and freshwater and estuarine habitats (ISAB 2007, Battin et al. 2007).

The apparent dependence of stream-type Chinook salmon on snowmelt-dominated patterns of instream flow makes it hard to predict whether efforts to conserve and expand the stream-type life history in Puget Sound Chinook salmon will be hindered by climate change and the potential loss of snowmelt-dominated habitats. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote et al. 2003) – changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories, as the stream-type life history appears to be dependent on a diminishing habitat (Beechie et al 2006).

Higher ambient air temperatures will likely cause water temperatures to rise (ISAB 2007). Salmon and steelhead require cold water for spawning and incubation. Suitable spawning habitat is often found in accessible higher elevation tributaries and headwaters of rivers. In addition, as climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon and steelhead with patches of suitable

habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold water refugia.

2.2.1 Status of the Species

Puget Sound Chinook Salmon

This ESU was listed as threatened on March 24, 1999; its threatened status was reaffirmed on June 28, 2005, and again in 2011. The NMFS adopted the Shared Strategy for Puget Sound (SSPS)-- a locally-developed listed species recovery plan for PS Chinook salmon-- in 2007 (SSPS 2007). NOAA Fisheries issued results of a five-year review on Aug. 15, 2011, and concluded that this species should remain listed as threatened because the new information on abundance, productivity, spatial structure and diversity since the 2005 status review does not indicate a change in the biological risk category (Ford et al. 2010).

Factors for the decline of PS Chinook salmon include a variety of human activities that have degraded extensive areas of PS Chinook salmon spawning and rearing habitat. Development has limited fish access to historical spawning grounds and altered downstream flow and thermal conditions. Urbanization affects many parts of the aquatic environment. It has caused direct loss of riparian vegetation and soils, significantly altered hydrologic and erosion rates and processes by creating impermeable surfaces (roads, buildings, parking lots, sidewalks etc.), and polluting waterways. Urbanization throughout the Puget Sound region has increased sedimentation, raised water temperatures, and decreased large woody debris recruitment. In addition, this urbanization has also decreased gravel recruitment, reduced river pools and spawning areas, and dredged and filled estuarine rearing areas (Bishop and Morgan 1996). Large areas of lower river meanders (formerly mixing zones between fresh and salt water) have been channelized and diked for flood control and to protect agricultural, industrial and residential development. In spite of this, habitat degradation in upstream areas has exacerbated flood events in these areas with adverse effects on Chinook salmon populations (Myers 1998).

Diversity and Spatial Structure. The PS Chinook salmon ESU includes all naturally-spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington (64 FR 14208, March 24, 1999). The PS Chinook salmon ESU is composed of 31 historically quasi-independent populations, 22 of which are believed to be extant (PSTRT 2001). The nine populations presumed extinct are mostly early-run fish; most of these are in mid- to southern Puget Sound or Hood Canal and the Strait of Juan de Fuca. Up to twenty-six artificial propagation programs are part of the ESU. Eight of the programs are directed at conservation, and are specifically implemented to preserve and increase the abundance of native populations in their natal watersheds where habitat needed to sustain the populations naturally at viable levels has been lost or degraded. The remaining programs are operated primarily for fisheries harvest augmentation purposes (some of which also function as research programs) using transplanted within-ESU-origin Chinook salmon as broodstock. These artificially-propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the ESU (NMFS 2005a). Assessing extinction risk for the PS Chinook salmon ESU is complicated by high levels of hatchery production and a limited availability of information on the fraction of natural spawners that are of hatchery-origin.

Abundance and Productivity. All PS Chinook populations are well below escapement abundance levels identified as required for recovery to low extinction risk. Most populations are consistently below the productivity goals identified in the recovery plan. Although trends vary for individual populations across the ESU, most populations have declined in total natural origin recruit abundance since the last status

review. Natural origin recruit escapements levels since 1995 are relatively stable (Ford et al 20101). No trend was notable for the total ESU escapements; while trends vary from decreasing to increasing among populations. Natural-origin pre-harvest recruit escapements remained fairly constant from 1985-2009. Returns (pre-harvest run size) from the natural spawners were highest in 1985, declined through 1994, remained low through 1999, increased in 2000 and again in 2001, and have declined through 2009, with 2009 having the lowest returns since 1997. Median recruits per spawner for the last 5-year period (brood years 2002-2006) is the lowest over any of the 5-year intervals.
Many of the habitat and hatchery actions identified in the Puget Sound Chinook salmon recovery plan are likely to take years or decades to be implemented and to produce significant improvements in natural population attributes, and these trends are consistent with these expectations (Ford et al. 2010).

Puget Sound Steelhead

Puget Sound steelhead was listed as threatened on May 11, 2007 (72 FR 26722). No new estimates of productivity, spatial structure and diversity of PS steelhead have been made available since the 2007 review, when the BRT concluded that low and declining abundance and low and declining productivity were substantial risk factors for the species (USDC 2007). Loss of diversity and spatial structure were judged to be "moderate" risk factors. The 2010 status review has retained the risk category for the DPS based upon the extinction risk of the component populations (see table 7). NOAA Fisheries issued results of the five-year review on Aug. 15, 2011, and concluded that this species should remain listed as threatened (Ford et al. 2010).

The principal factor for decline for PS steelhead is the present or threatened destruction, modification, or curtailment of its habitat or range. Barriers to fish passage and adverse effects on water quality and quantity resulting from dams, the loss of wetland and riparian habitats, and agricultural and urban development activities have contributed and continue to contribute to the loss and degradation of steelhead habitats in Puget Sound. Existing regulatory mechanisms inadequately protect habitats as evidenced by the historical and continued threat posed by the loss and degradation of nearshore, estuarine, and lowland habitats due to agricultural activities and urbanization. Ocean and climate conditions can have profound impacts on the continued existence of steelhead populations. (72 FR 26722, May 11, 2007)

Life History. Steelhead are the anadromous form of *O. mykiss*. Puget Sound steelhead typically spend two to three years in freshwater before migrating downstream into marine waters. Once the juveniles emigrate, they move rapidly through Puget Sound into the North Pacific Ocean where they reside for several years before returning to spawn in their natal streams. Unlike other species of *Oncorhynchus*, *O. mykiss* are capable of repeat spawning. Averaged across all West Coast steelhead populations, eight percent of spawning adults have spawned previously. Coastal populations have a higher incidence of repeat spawning than inland populations (Busby et al. 1996). There are two types of steelhead, winter steelhead and summer steelhead. Winter steelhead become sexually mature during their ocean phase and spawn soon after arriving at their spawning grounds. Adult summer steelhead enter their natal streams and spend several months holding and maturing in freshwater before spawning.

Spatial Structure and Diversity. The PS DPS includes all naturally spawned anadromous winter-run and summer-run steelhead populations in streams in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington, bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive), as well as the Green River natural and Hamma Hamma winter-run steelhead hatchery stocks. Non-anadromous ''resident'' *O. mykiss* occur within the range of PS steelhead but are not part of the DPS due to marked differences in physical, physiological, ecological, and behavioral characteristics (Hard et al. 2007, USDC 2007). Steelhead populations can be divided into two basic reproductive ecotypes, based on the state of sexual maturity at the time of river entry (summer or winter) and duration of spawning migration (Burgner et al. 1992).

Abundance and Productivity. The 2007 BRT considered the major risk factors facing Puget Sound steelhead to be: widespread declines in abundance and productivity for most natural steelhead populations in the ESU, including those in Skagit and Snohomish rivers (previously considered to be strongholds); the low abundance of several summer run populations; and the sharply diminishing abundance of some steelhead populations, especially in south Puget Sound, Hood Canal, and the Strait of Juan de Fuca (Hard et al. 2007).

For all but a few putative PS steelhead populations, estimates of mean population growth rates obtained from observed spawner or redd counts are declining—typically 3 to 10 percent annually—and extinction risk within 100 years for most populations in the DPS is estimated to be moderate to high, especially for draft populations in the putative South Sound and Olympic MPGs. Most populations within the DPS continue downward trends in estimated abundance, a few sharply so. Extinction risk within 100 years for most populations in the DPS is estimated to be moderate to high, especially for populations in the South Sound and Olympic MPGs. (Ford et al 2010)

2.2.2 Status of Critical Habitat

The NMFS has not yet designated critical habitat for Puget Sound steelhead. NMFS designated critical habitat for the PS Chinook ESU on September 2, 2005. The Primary Constituent Elements (PCEs) for PS Chinook salmon critical habitat are the sites and the physical characteristics' of such sites, which are essential to support one or more life stages of the ESU. The PCEs of PS Chinook salmon critical habitat are:

PCE 1 - Freshwater spawning sites with water quantity and quality conditions and substrate that support spawning, incubation, and larval development;

PCE 2 - Freshwater rearing sites with (1) water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility, (2) water quality and forage that support juvenile development, and (3) natural cover such as shade, submerged and overhanging large wood, logjams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;

PCE 3 - Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks that support juvenile and adult mobility and survival;

PCE 4 - Estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation;

PCE 5 - Nearshore marine areas free of obstruction and excessive predation with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and

PCE 6 - Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

As part of the process to designate critical habitat within the PS Chinook salmon ESU, NMFS assessed the conservation value of habitat within freshwater, estuarine and nearshore areas at the fifth field hydrologic unit code (HUC) scale. That scale corresponds generally to the watershed scale. The ratings were generally devised as "low", "medium", or "high" conservation value. The PS Chinook salmon ESU has 61 freshwater and 19 marine areas within its range. Of the freshwater watersheds, 41 are rated high conservation value, 12 with low conservation value, and 8 received a medium rating. Of the marine areas, all 19 are ranked with high conservation value.

The Snohomish subbasin is located in north-central Puget Sound and contained entirely in Snohomish County, Washington. The subbasin contains two watersheds occupied by this ESU that encompass approximately 278 square miles and 823 miles of streams. The streams in the Snohomish River watershed contain 20.5 miles of spawning and rearing PCEs, 0.1 miles of rearing and migration PCEs, and 44.3 miles of migration and presence PCEs (NMFS 2005b).

Management activities in the Snohomish River HUC5 watersheds that may affect these PCEs include: agriculture; hydroelectric dams; forestry; and sand and gravel mining. The Snohomish River HUC was rated as having high conservation value because the PCEs support two of ten populations in the Central Sound region which is the primary production region for this ESU. A high conservation ranking does not mean that all PCEs are in good condition. The relative importance of high ranked HUCs is based also on factors such as life history expressed there, or relative importance of the population that uses that watershed.

2.3 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The action area of this project is within the Snohomish River estuary, which has been drained, filled, diked, and altered for development and human consumption. Eighty-five percent of the historic area of tidal marsh is no longer accessible to salmonids (Shapiro and Associates 1979). Conditions within the action area are influenced by upstream and upland uses throughout the watershed. The Snohomish River Basin in east central Puget Sound lies in two counties-Snohomish and King-and covers an area of 1,856 square miles with over 1,700 identified rivers and tributaries. It is the second largest watershed in the Puget Sound.

While habitat quantity and quality affect capacity and survival throughout the salmonid life cycle, the loss of rearing habitat quantity and quality along the mainstems and within the estuary and nearshore environment is thought to be the primary factor affecting population performance for PS Chinook salmon in the Snohomish River basin (Snohomish Basin Salmon Recovery Forum 2005). Shared Strategy (2007) lists loss of estuarine and marine habitats, poor quality riparian forests, lack of habitat complexity that provides pools and back eddies, loss of hydrologic function, loss of floodplain function, disruption of sediment processes, and access to habitat as high restoration priorities for salmonids within the Snohomish Basin. The Snohomish River Chinook recovery plan (SSDC 2007) lists floodplain and estuarine habitat loss and impacts to water quality as the three main factors limiting recovery of PS Chinook salmon. The loss of floodplain habitat and simplification of bank edges reduce quality and quantity of rearing habitat that supports PS Chinook salmon and PS steelhead. These losses contribute to decreased survival of juvenile PS Chinook salmon as they leave the estuary and reduce their chances of returning as adults to their natal rivers.

Most of the basin still provides high quality habitat for salmonids. About 75 percent of the watershed is in forestry with approximately half of that within National Forest boundaries. However, Snohomish County is one of the most rapidly growing regions in Puget Sound. Agriculture in the basin is decreasing due to increasing urbanization. The City of Everett, at the mouth of the Snohomish River is heavily urbanized with extensive impervious surfaces and development.

The reach in which the action area is located has been armored by levees for several decades and thus has degraded baseline for riverbank and river process conditions. This project will replace riprap in a small section of this levee system on Union Slough and the main channel of the Snohomish River to maintain this part of the levee system. The existence of the levee system adversely affects salmonid habitat and prevents natural fluvial processes. Riprap prevents channel migration and reduces the amount and quality of habitat within the reach. Negative effects to the channel morphology and natural sediment regime (e.g., filling potential holding pools) are likely to occur and affect normal salmonid rearing, and migration habitats. Riprap also reduces the ability of the existing habitat to support prey, thereby reducing and disrupting foraging opportunities for PS Chinook salmon and steelhead. Riprap and its habitat impacts are considered permanent.

The effects of streambank alteration are not limited to the wetted stream channel and extend beyond the construction site. Connectivity longitudinally (up and downstream), laterally (floodplain and uplands) and vertically (groundwater, hyporheic, and phreatic) is a major feature of stream corridors (Stanford and Ward 1992). The temporal nature of the system adds a fourth dimension. Impacts include changes in hydrology, biology, morphology and water quality (Bolton and Shellberg 2001).

Typically, changes due to human activities in the channel migration zone result in a reduction in habitat diversity, which affects the numbers and kinds of animals that can be sustained. As the physical habitat changes, stresses are placed on individual plants and animals. These stresses, depending on the tolerance of the species and individual, may limit growth, abundance, reproduction, and survival. Biologically important parameters that change following channel activities include water temperature, turbidity, flow velocity, variable water depths, hydrologic regime, a decrease or change in vegetation, changes in storage of organic matter and sediment, and changes in the size and stability of channel substrate (Bolton and Shellberg 2001). These changes can decrease habitat connectivity and the exchange of energy and matter between habitats. The direction of change varies by site and circumstance.

Habitat complexity is the key factor related to success of species during and after floods (Pearsons et al., 1992; Letcher and Terrick 1998; Bischoff and Wolter, 2001; Schwartz and Herricks 2005). These complex habitat features are formed and maintained by the same flood events, which may form new pools, floodplains, and gravel bars (Bischoff and Wolter 2001). Following floods, complex reaches lost proportionately fewer fish, had higher fish diversities, and had higher fish assemblage than simple reaches (Pearsons et al., 1992). Juvenile fish are particularly vulnerable to strong flows associated with floods because of their limited swimming ability and small size (Pearsons et al., 1992). Valuable habitat used by juveniles during floods includes inundated floodplain which serves as a nursery (Bischoff and Wolter 2001). The loss of floodplain directly reduces the complexity of watercourse reaches and permanently removes valuable rearing and holding areas during floods. The loss results in an increase in fish washed downstream and a reduced ability to recolonize following the flood. Channeling and diking isolates floodplains, thereby reducing the amount of channel habitat available for juvenile salmonids. Hayman et al. (1996) demonstrated that natural and unaltered floodplains have twice the amount of channel habitat than isolated floodplains. Assuming a direct correlation to the amount of habitat available, unaltered floodplains may support up to twice the amount of salmonids as riprapped or altered floodplains. Maintaining the levee system ensures that those features which contribute to salmonid survival and recovery will not be restored in the action area.

Two distinct populations of Chinook salmon occur in the Snohomish River system (Ruckelshaus et al. 2006), both of which use the lower Snohomish River and estuary, including Ebey Slough, as a migratory corridor and as rearing habitat. These populations have distinct differences in migratory timing and rearing life history. One consequence of this life history diversity is the potential for adult and/or juvenile Chinook salmon from either or both of these populations being present in the action area throughout much of the year.

Chinook salmon from the Skykomish population are characterized by an extended summer/fall spawning migration, commencing as early as the first week June and extending as late as mid-October (WDFW 2009). This population demonstrates a distinctly bi-modal return, with an early peak in abundance between mid-June and mid-July, and a larger peak in late-September and early-October. Snoqualmie Chinook are a classic fall-run population. Upstream migration commences in early-September and extends through as late as the first week of December, with the majority of fish reaching the spawning grounds by the end of October (WDFW 2009).

Researchers at NMFS have studied the timing and duration of juvenile fish residence in the Snohomish River over a four-year period between 2002 and 2007. They observed outmigrant and rearing juvenile Chinook in the emergent forested transition zone of the estuary (which includes the action area) as early as mid-January and as late as November. The timing of peak abundance appears to vary by year depending on environmental factors. For example, in 2002 abundance spiked in June and remained high through August, remaining present at lower densities into October. In contrast, 2003 abundance increased steadily between February and May, peaking in June and then declining rapidly in July and August. In 2005 and 2007, very few if any juveniles were observed in July and none were observed in August.

Collectively, this information indicates that Chinook salmon are likely to be present in the action area between the months of February and November.

The PSTRT is currently in the process of identifying historical and extant populations in the PS steelhead DPS and defining recovery criteria for this species. In the absence of this information, distinct spawning stocks defined by WDFW are useful for identifying probable future populations, life history, migratory timing, and habitat use. The WDFW (2002) has identified six distinct stocks of steelhead in the Snohomish River system. Three of these, the Snohomish/Skykomish, Snoqualmie, and Pilchuck stocks, are winter-run steelhead. The remainder, the North Fork Skykomish, South Fork Skykomish, and Tolt stocks, are summer-run steelhead. Both the winter-run and summer-run races are supported by hatchery production.

Upstream migrant summer-run steelhead either native or hatchery origin enter the Snohomish River estuary as early as April. The spawning migration continues sporadically throughout the summer and into the fall, commonly as late as mid-October. Peak periods of abundance are typically in June and early July. Winter-run steelhead have a distinctly bi-modal peak in abundance. Hatchery origin steelhead typically appear in late-November or early-December, peaking in abundance in December. Native origin steelhead typically appear in abundance between early-January and early-May, although a small number may be present as early as November (WDF and WWTIT 1992). In effect, adult migrant steelhead are likely to be present during every month of the year, with the smallest numbers likely to occur in the estuary during the month of November.

Outmigrant steelhead smolts have been observed or have a high probability of occurrence in Ebey Slough (e.g. north of Union Slough) as early as February and as late as October, with peak abundance occurring in April and May. Steelhead smolts typically migrate rapidly to offshore marine habitats, spending little time in estuarine habitats (Berger and Ladley 2006; Melnychuk et al. 2007; Pearcy 1992; Welch et al.

2004). This indicates that while migratory juveniles may transit the action area over the course of several months, the actual residence time of individual fish is likely limited.

Summer-run and winter-run steelhead stocks are present in the Snohomish basin; both runs are composed of wild and hatchery-raised steelhead. The winter run is the larger of the two stocks. Three wild winter steelhead stocks have been identified from the Snohomish/Skykomish, Snoqualmie, and Pilchuck rivers (NMFS 2005). The wild steelhead winter run occurs primarily between February and April, while the hatchery fish generally run from mid-November through mid-February. Spawning occurs through most of this entire winter/spring period. The escapement goal for the Snohomish basin wild winter steelhead is 6,500 fish. The average escapement from 1981 to 2006 was 5,649 fish with escapement goals being met only 8 of the 23 years that the data were collected (NMFS 2005).

Designated CH within the action area consists of freshwater migration (PCE 2), rearing (PCE 3), and estuarine (PCE 4) habitat and their essential physical and biological features in Union Slough. The effects of the proposed action on these features are summarized as a subset of the habitat-related effects of the action discussed below, except permanent in-water effects which are discussed in the applicable CH sections, below.

The action area is the Snohomish River, fifth-field watershed (HUC 1711001102). The CHART determined that this watershed has a high conservation value for PS Chinook. The PCEs within the Snohomish watershed support two historically independent populations – Skykomish River and Snoqualmie River populations. The Snohomish River HUC provides rearing and migration corridors and estuarine areas for fish in the Snoqualmie River population.

2.4 Effects of the Action on the Species and its Designated Critical Habitat

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. "Interrelated actions are those that are part of the larger action and depend on the larger action for their justification. Interdependent actions are those that have no significant independent utility apart from the action that is under consideration" (50 CFR 402.02). The following describes interrelated actions already completed or planned to offset impacts from floodplain/wetlands filling and other activities.

In 2006 the COE and the City of Everett constructed a restoration project on Smith Island near the sewage treatment plant to create 93 acres of tidal habitat and provide a mitigation bank for future Everett projects. Modifications to this project occurred in 2012 to improve water movement on the restoration site. The sponsors identified that bridges originally constructed for maintenance access and foot traffic prevented full tidal inundation of the site, which is one of the performance measures associated with the mitigation bank. One bridge was removed in 2011 and two others are proposed for removal in 2012 in order to meet specific performance standards. All the potential effects from the construction of this mitigation site and current improvements have been previously consulted on (NMFS tracking No.: 2001/01060). These projects are interrelated because the current project proposes to purchase credits from the mitigation bank.

The proposed 480 foot levee repair on Union Slough will eventually be removed as part of another restoration action to allow tidal inundation of a northern portion of Smith Island. Although this is not part of the proposed action, the close physical proximity will positively influence the environmental baseline in the action area and the Snohomish River watershed.

2.4.1 Effects on Listed Salmonids

The project has beneficial effects in terms of providing flood protection to the wastewater treatment plant reducing the likelihood that it will be inundated and release untreated sewage downstream. Nevertheless the project also has adverse effects to listed species and their habitats.

The proposed action will maintain the existing degraded baseline in the action area and prevent, or delay, the restoration of estuarine habitat that contribute to recovery of listed salmonids in the Snohomish River basin. Stasis in habitat conditions, especially habitat conditions that are degraded, limits the carrying capacity of the habitat. By preventing increases over time in the amount of habitat available, preventing the re-establishment of riparian vegetation, by preventing functional access to floodplain habitats, rearing habitat for juvenile salmonids cannot increase the number of fish that can be supported in growth, development, maturation, and general rates of survival.

Bank stabilization such as the riprap proposed in this project reduces the quality of edge habitat and the density of juvenile salmonids that rear near banks. Beamer and Henderson (1998) reported a reduction in juvenile rearing density of 5 to 10 times between natural forested banks and riprapped banks. Beechie et al. (2006) suggested that modified banks lacked backwater areas, and pools created by eddies. Fish species have much lower densities and diversity in riprap areas than in natural areas (Bolton and Shellberg 2001). More fish species were found in areas with natural banks due to the greater diversity of habitat in these areas.

The effects of the proposed habitat alteration on salmonids are presently occurring as the Snohomish River adjusts to the physical structures that are placed on the floodplain. At the site level, it is likely that thousands of Chinook are affected by this habitat alteration, annually, and in perpetuity. Beamer and Henderson (1998) showed that subyearling juvenile Chinook salmon use natural banks (i.e., banks with riparian cover, large woody debris, and backwaters) at a density five times greater than riprap banks. While this study only represents one of the pathways, the site level effects, it demonstrates the importance of natural banks to Chinook salmon habitat.

Peters et al. (1998) compared seasonal fish densities in Washington at sites with various bank stabilization structures. They surveyed typical bank stabilization methods and found that 496 of 667 projects used riprap or riprap with deflectors. Only 29 projects used bioengineering or large woody debris. Of all project types (riprap, riprap with large woody debris, rock deflectors, rock deflectors with large woody debris), only sites stabilized with large woody debris consistently had higher fish densities in spring, summer, and winter than the control sites without any stabilization structures (Peters et al., 1998). Riprap sites consistently had lower densities than control sites. At all sites, fish densities were generally positively correlated with increasing surface of large woody debris and increasing amounts of overhead riparian cover within 30 cm of the water surface.

Replacement of bank armor to maintain the existing system of flood control will perpetuate a lowered ability of the action area to support rearing fish, and hold both abundance and productivity of the affected populations stable at suboptimum levels.

2.4.2 Effects on Primary Constituent Elements of Critical Habitat

Water Quality. Water quality is an essential element of the rearing and migration, and estuarine PCEs in the action area, and will be temporarily diminished by the proposed action. The project may affect water quality conditions by slightly increasing turbidity and sedimentation during riprap placement. There is a potential during placement that a turbid plume extending up to 200 feet down from the site can be expected. The NMFS expects that turbidity levels will be episodic and short-lived because the riprap will be placed in designated locations rather than being dumped and work will be conducted during low tide cycles. The turbidity levels will return to background levels in a few hours after the completion of the in-water work. The temporary water quality degradation will not impair the ability of the action area to support juvenile rearing or migration of PS Chinook salmon.

Floodplain Connectivity. The proposed action will maintain the existing disconnected floodplain. The long term effects of the actions include permanent loss of floodplain habitat and reduced quality of rearing habitat along the bank edges. The PCE's in the action area include freshwater rearing and migration corridors. Placing riprap on the banks of Union Slough prevents channel migration and natural habitat creating processes that provide rearing and holding habitat during floods. The reduction of channel and habitat diversity reduces the amount of habitat available for rearing salmon. The placement of riprap and subsequent simplification of the banks also reduces the quality of rearing habitat at the site. Part of this impact is temporary, until the larger Smith Island restoration project is completed.

Forage. Forage habitat is a component of the freshwater rearing PCE. The proposed action will have short-term and negative effects on benthic macro-invertebrate prey availability by crushing or displacing them during construction. The project will permanently cover high quality benthic habitat and result in a loss of macro-invertebrates production. This long-term reduction in prey availability as a PCE may affect some juvenile PS steelhead and PS Chinook salmon by reducing prey availability and foraging habitat. The overall square footage of reduced prey is not expected to decrease foraging to a level that alters juvenile growth, development, or survival; thus it is not anticipated to change the forage PCE of the action area in a manner that diminishes conservation potential of the of critical habitat at the any scale.

Natural Cover. Natural cover is very limited in the existing pre-project work area. The project includes willow plantings which will slightly improve riparian functions from the baseline condition in the corridor.

Relevance of Effects on Primary Constituent Elements to Critical Habitat Conservation Value. As described above, the proposed action will have short-term negative effects on water quality (which dissipates quickly) but a longer-term negative impact on forage habitat. The major functional change in the PCEs is the area that will be covered with riprap, where benthic forage opportunities will be eliminated. The COE has incorporated compensatory mitigation into this project to off-set the loss of benthic habitat. Although this loss is long-term it will not be permanent if the proposed Smith Island restoration project is complete in the future. When these changes are added to the baseline condition, the function of the PCEs are modified at a level that is not appreciable within the watershed. Since these effects are not noticeable beyond the site scale, they will not appreciably diminish the conservation role of the watershed in which the site is located.

2.5 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Between 2000 and 2010, the population of Snohomish County increased by 17.7 percent (U.S. Census Bureau 2010). The Snohomish River estuary has the highest concentration of urban development in the basin. Thus, NMFS assumes that future private and state actions will continue within the action area, increasing with population. As the human population in the action area continues to grow, residential development is likely to increase. The effects of new development are likely to further reduce the conservation value of the habitat within the action area.

Over the past several years, actions intended to improve habitat conditions along the lower Snohomish River have been undertaken. Log raft storage areas along the southeast shoreline of Jetty Island in the Snohomish River have been restricted. Dredged material was used beneficially to enhance nearshore habitat on Jetty Island. The Port of Everett constructed the Union Slough Restoration Site adjacent to the proposed Blue Heron Slough Conservation Bank, creating 26 acres of brackish marsh and tidal mudflat. The City of Everett also constructed a restoration site on Union Slough approximately 2 miles upstream from the proposed bank site, creating 50 acres of tidal marsh and mudflat habitat. Other restoration projects are being planned for the lower Snohomish River in the next few years. Together with the Blue Heron Slough Conservation Bank, over 1,000 acres of estuarine habitat will be made accessible to salmonids. These actions are expected to improve habitat capacity and productivity for anadromous fish and other species, and contribute significantly to salmon recovery in the Snohomish River.

While the existing environmental regulations could decrease adverse effects to watershed function that arise through upland and waterfront development, they still allow incremental degradation to occur, which accumulates over time. NMFS anticipates that anticipated negative cumulative effects will prevent restoration activities from fully maximizing improvements for rearing juvenile salmonids.

2.6 Integration and Synthesis

The Integration and Synthesis section is the final step of NMFS' assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action to the environmental baseline and the cumulative effects to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat.

Both species considered in this opinion are at risk in part because of weakness of abundance, productivity, and spatial structure of the component populations. Chinook salmon from the Skykomish population are characterized by an extended summer/fall spawning migration, with an early peak in abundance between mid-June and mid-July, and a larger peak in late-September and early-October, while the Snoqualmie Chinook are a classic fall-run population. These populations contribute to the spatial structure and diversity of the PS Chinook ESU. The Skykomish population abundance is at roughly 3.4 percent, and the Snoqualmie population abundance at about 5.7 percent, of historic abundance (Snohomish River Basin Conservation Plan), and both are at 10 percent or less of the target abundance for recovery.

The number of fish from either population likely to be injured or killed during construction would be a very small. While this number would reduce the abundance of the specific cohorts of the populations affected, it is too few to produce an observable effect on the, distribution, diversity, or productivity of the specific populations of PS Chinook and PS steelhead.

The proposed project's small long-term reduction of forage habitat within Union Slough is not expected to result in a decrease in abundance or productivity of the populations because the proposed mitigation and eventual construction of the Smith Island Restoration Project are expected to allow greater juvenile to adult survival, therefore greater overall productivity, in the action area. Based on the above factors, the proposed action will not influence existing population viability for either of the affected salmonid species.

The project's adverse effect on forage as a PCE of CH in the action area is unlikely to diminish the conservation role of PCEs in the watershed as the action area is primarily a migration corridor through which PS Chinook salmon and PS steelhead transit quickly. Furthermore, temporary effects such as those from increased turbidity, occurring episodically from riprap placement within Union Slough will not persist long enough (up to three weeks during low tidal conditions) to impair the migratory capacity of the area. The purchase of compensatory mitigation credits in an estuary restoration project upriver from the site will off-set the small permanent impacts from this project and address salmonid limiting factors in this watershed. Therefore, the effects of the action are not likely to appreciably diminish the conservation role or value of PCEs in the watershed in which the action area lies.

The applicant has reduced the original footprint of impact in Union Slough from the project submitted in a Joint Aquatic Resources Permit Application from the Diking District #5. In addition, the COE is purchasing mitigation credits (i.e. 1.45 acres) in a site that is increasing one of the limiting factors listed in the recovery plan. Because the effects to VSP parameters of the affected populations are small, it is unlikely that any measureable effects will occur to the ESU of PS Chinook salmon or DPS of PS steelhead.

2.7 Conclusion

After reviewing the best available scientific and commercial information regarding the status of the affected ESA-listed species, the environmental baseline, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed project will have a small negative long-term impact to the environmental baseline due to the reduction of forage habitat. However, these small impacts are not expected to result in a measurable decrease in abundance and productivity parameters of the ESA-listed fish at the population level because the impacts are off-set by the purchase of mitigation credits (i.e. 1.45 acres) which is twice the acreage of impact occurring in Union Slough. Consequently, the action will not appreciably reduce the likelihood of the survival or recovery of PS Chinook salmon ESU and PS steelhead DPS in the wild and will therefore not jeopardize the continued existence of PS Chinook salmon or PS steelhead.

Similarly, after reviewing the status of PS Chinook salmon critical habitat, the environmental baseline, the effects of the action, and the cumulative effects, NMFS concludes that periods of decreased function (i.e. three weeks of increased turbidity) are unlikely to diminish the conservation role the action area plays in the watershed as the action area is primarily a migration corridor through which PS Chinook salmon and PS steelhead transit quickly. Furthermore, small permanent effects such as those from substrate reduction within Union Slough will not impair the migratory capacity of the area and will be off-set by the purchase of advanced mitigation credits at the Union Slough estuary mitigation site downstream of this project.

The effects of the action when aggregated with the status of critical habitat, the effects in the baseline, and cumulative effects will not appreciably reduce the conservation value of PCEs in the watershed because the action area is only a small fraction of the critical habitat available to PS Chinook salmon. Therefore, the conservation value of designated critical habitat will not be appreciably reduced.

2.8 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered.[2] Section 7(b)(4) and Section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this incidental take statement.

2.8.1 Amount or Extent of Take

The proposed action will modify habitat to an extent that causes harm of some exposed fish, as defined above. Therefore, the proposed action is reasonably certain to cause take of listed fish. The habitat modification causing take will do so by impairing normal rearing and holding behavior. The sources of harm assessed in this consultation are 1) temporary turbid conditions, and 2) decreased availability of food and refugia, which together will decrease growth and fitness among the juveniles that rear in the action area.

The NMFS cannot predict the number of fish that will be injured by exposure to pulses of increased sediment, or the number that will respond by moving out of the action area to avoid the turbid conditions, which would alter natural migration patterns and expose them to greater risk of predation by moving into deeper water at a smaller size. During floods, reduction in flood storage and off access to channel habitat leads to an increase in fish injury or mortality, when they are flushed out to sea prematurely, another source of harm. Since the proposed action in this consultation is hardening the banks which prevents off channel habitat creation without compensation, harm will occur among both populations, though at numbers impossible to predict.

[2] NMFS has not adopted a regulatory definition of harassment under the ESA. The World English Dictionary defines harass as "to trouble, torment, or confuse by continual persistent attacks, questions, etc." The U.S. Fish and Wildlife Service defines "harass" in its regulations as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The interpretation we adopt in this consultation is consistent with our understanding of the dictionary definition of harass and is consistent with the U.S. Fish and Wildlife interpretation of the term.

The NMFS' ability to quantify the amount of take in numbers of fish can be difficult if not impossible to accomplish when harm occurs because of the range of individual fish responses to habitat change. Some will encounter changed habitat and merely react by seeking out a different place in which to express their present life history. Others might change their behavior, causing them to express more energy, suffer stress, or otherwise respond in ways that impair their present or subsequent life histories. Yet others will experience changed habitat in a way that kills them.

In these circumstances, NMFS uses the extent of habitat change to which present and future generations of fish will be exposed to quantify the extent of take. These measures are readily discernible and present a reliable measure of the extent of take that can be monitored and tracked. In this case, juvenile Chinook salmon and steelhead will be harmed by increased turbidity, only at intervals, and only within the 200-foot zone where turbidity is expected to be above background levels in short duration pulses. Individuals from all cohorts in the future will be injured in their rearing and holding behavior patterns by the reduced amount of forage and floodplain habitat, which amounts to 0.7 acres in Union Slough and 0.075 acres of the Snohomish River.

2.8.2 Effect of the Take

Having added the effects of the action to the baseline, and considering the status of the species and cumulative effects, NMFS concludes that the take from the proposed action is not likely to jeopardize the continued existence of Puget Sound Chinook salmon, or of Puget Sound Steelhead. Having added the effects of the action on PCEs to the baseline condition of the PCEs, and considering the status of critical habitat and its conservation values, the NMFS concludes that the proposed action will not destroy or adversely modify designated critical habitat.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

"Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). "Terms and conditions" implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

The COE has the continuing duty to regulate the activities covered in this incidental take statement where discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of section 7(o)(2) may lapse if the COE fails to exercise its discretion to require adherence to terms and conditions of the incidental take statement, or to exercise that discretion as necessary to retain the oversight to ensure compliance with these terms and conditions. The following reasonable and prudent measures are necessary and appropriate to minimize the take of listed species.

The COE shall:

1. Minimize incidental take from the loss of forage habitat reduction;
2. Minimize incidental take from riprap placement activities; and
3. Minimize take of PS Chinook salmon and PS steelhead from elevated turbidity and other contaminants

To be exempt from the prohibitions of section 9 of the ESA, the COE and its cooperators must comply with the following terms and conditions that implement the reasonable and prudent measures described

above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to a different conclusion regarding whether the proposed action will result in jeopardy.

1. To implement RPM No. 1, the COE shall require that credits are purchased from the Union Slough mitigation site as compensatory mitigation for the lost foraging habitat. When the acquisition of credits is completed with the Regulatory section of the COE (Seattle District), *a copy of the ledger recording this transaction* will be forwarded to National Marine Fisheries Service, Washington State Habitat Office, Attention: Sean Callahan, 510 Desmond Drive SE, Suite 103, Lacey, Washington 98503.

2. To implement RPM No. 2, the COE shall ensure that:

   a. Equipment or other machinery is operated slowly to allow fish to escape from being crushed during the installation and removal of these structures and minimize the time that equipment is in the river.
   b. Conduct all in-water work during the briefest possible period between August 1 and October 31.

   c. Schedule in-water work during low tidal conditions, if feasible, between August 1 and October 31

3. To implement RPM No. 3, the COE shall:

   a. Monitor turbidity levels and erosion control activities, including minimization measures and BMPs, to ensure that the project complies with Washington State water quality standards. If the project exceeds the water quality standards, the project will have exceeded the amount of take authorized, and COE must reinitiate consultation with NMFS. The COE shall report the results of the turbidity monitoring and the effectiveness of the erosion control BMPs, minimization measures, to NMFS within 60 days of project completion.

   b. Document all PS Chinook salmon and PS steelhead encountered during work area isolation by submitting an in-water Construction Monitoring Report or equivalent to NMFS within 30 days of work area isolation.

   NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the action area, the finder must notify NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this Opinion, or through the NMFS Washington State Habitat Office. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder should carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not disturbed unnecessarily.

   All reports shall be sent to National Marine Fisheries Service, Washington State Habitat Office, attention: Sean Callahan, 510 Desmond Drive SE, Suite 103, Lacey, Washington 98503.

2.9. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). The following recommendation is a discretionary measure that NMFS believes is consistent with this obligation and therefore should be carried out by the COE:

- Safely incorporate large woody debris into riprapped banks to "soften" the banks and provide roughness. The addition of wood would add structure to an otherwise featureless bank as proposed and would improve salmonid habitat at the bank.

- Plant trees on the levee. Willows will provide some riparian benefits; large conifers and deciduous trees provide foliage, shade, overhanging roots, and provide input as large woody debris. These features improve salmonid habitat that the project as designed currently limits.

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

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION

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

This analysis is based, in part, on the EFH assessment provided by the COE and descriptions of EFH for Pacific coast salmon (PFMC 1999) contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life history stages of Chinook and coho (*O. kisutch*), and PS pink salmon (PFMC 1999).

3.2 Adverse Effects on Essential Fish Habitat

Based on information provided in the BE and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have the following adverse effects on EFH designated for Chinook, coho, and PS pink salmon:

- Short-term degradation of water quality in the action area from construction activity within Union Slough and the Snohomish River extends approximately 200 lineal feet upstream and downstream from the construction sites.

- Loss of 0.7 acres of forage habitat in Union Slough from the placement of riprap.

3.3 Essential Fish Habitat Conservation Recommendations

Project affects to EFH from loss of benthic habitat impacting the forage base from the placement of riprap will persist until the Smith Island restoration project is completed. NMFS believes that implementation of the following two conservation recommendations are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH which is described in section 3.2 above:

- The COE should incorporate large woody debris into riprapped banks to "soften" the banks as designed in this project, and provide roughness. The addition of wood would add structure to an otherwise featureless bank and would improve salmonid habitat at the bank.

- The COE should work with all the appropriate agencies to expedite and streamline permit processes in order for the construction phase of the Smith Island Restoration Project to occur. This would improve habitat conditions to offset impacts in a more timely manner.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the COE must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation from NMFS. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations, unless NMFS and the COE have agreed to use alternative time frames for the COE response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS Conservation Recommendations, the COE must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action

agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The DQA specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of document addresses these components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

4.1 Utility:

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this consultation are COE, Snohomish County, City of Everett, and the General Public. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

4.2 Integrity:

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

4.3 Objectivity:

Information Product Category: Natural Resource Plan.

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

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

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

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

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From: Nancy_BrennanDubbs@fws.gov
Sent: Wednesday, September 05, 2012 2:07 PM
To: Mcclain, Bobbi J NWS; Hadley, Hannah F NWS
Cc: Laufle, Jeffrey C NWS; evan.lewis@usace.army.mil; Karen_Myers@fws.gov
Subject: Draft RPMs and T&Cs for Union Slough

Bobbi Jo/Hannah - please find below the draft RPMs and Terms and Conditions for the Union Slough consultation. Let Karen Myers know if you have any questions/comments. Thanks, Nancy

DRAFT REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of bull trout:

1. Reduce impacts to bull trout from the placement of riprap.

2. Monitor the implementation and effectiveness of all conservation measures and mitigation measures described in the project description of the Opinion, as well as the aforementioned RPM and its accompanying Terms and Condition.

DRAFT TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following Terms and Conditions are required for the implementation of RPM 1:

1. Every attempt shall be made to place riprap rock on the face of the levee at low tide and in the dry. Where this is not feasible, based on flows and timing, the Corps shall place individual riprap rock along the levee face in a slow and controlled fashion to allow bull trout to escape injury from crushing or other contact.

2. The Corps will monitor the placement of riprap and report to the Service if the rock was placed at low tide (provide tidal elevation) and in the dry. If placement in the dry is not possible, the Corps will report how the rock was place to allow bull trout to escape injury.

The Service is to be notified within 3 working days upon locating a dead, injured, or sick endangered or threatened species specimen. Initial notification must be made to the nearest U.S. Fish and Wildlife Service Law Enforcement Office. Notification must include the date, time,

precise location of the injured animal or carcass, and any other pertinent information. Care should be taken in handling sick or injured specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Contact the U.S. Fish and Wildlife Service Law Enforcement Office at (425) 883-8122, or the Washington Fish and Wildlife Office at (360) 753-9440.

Nancy Brennan-Dubbs
Fish and Wildlife Biologist
Federal Activities Branch
US Fish and Wildlife Service
510 Desmond Dr. SE Suite 102
Lacey, WA 98503
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Appendix E: Clean Water Act and Coastal Zone Management Act documents

Clean Water Act Section 404 Analysis

Snohomish River – Union Slough Levee Repair
Rehabilitation of Flood Control Works

Snohomish County, Washington

Prepared by:

U.S. Army Corps of Engineers
Seattle District
Environmental and Cultural Resources Branch

May 2012

US Army Corps of Engineers ®
Seattle District

Introduction

The purpose of this document is to record the U.S. Army Corps of Engineers (Corps) compliance evaluation of the repair of the Union Slough Levee on the Snohomish River, Snohomish County, Washington, pursuant to the Clean Water Act (CWA), and the General Regulatory Policies of USACE. Specifically, Section 404 of the CWA requires an evaluation of impacts for work involving discharge of fill material into the waters of the U.S., and evaluation guidance can be found in the CWA 404(b)(1) Guidelines [40 CFR §230.12(a)]. The General Regulatory Policies of the Corps of Engineers [33 CFR §320.4(a)] provide measures for evaluating permit applications for activities undertaken in navigable waters.

Attachment A provides the specific USACE analysis of compliance with the CWA Section 404(b)(1) and the General Regulatory Policy requirements.

Project Background

Flooding occurred on the Snohomish River in January 2009 with a 15-year flood event occurring at the Monroe gage. Before repairs could be completed, flooding again occurred in February 2012. The Snohomish River Gage at Snohomish shows that the Snohomish River rose above flood stage with a peak of 25.09 ft on 23 February 2012. In both events, intense rainfall and rapid snowmelt from a high velocity jet stream, a common weather pattern experienced in this region, resulted in the river exceeding flood stage. River flows damaged the right bank levee (site 1) of the Snohomish River at the south end of Smith Island and the left bank levee on Union Slough at the north end of the island. Loss of embankment material occurred at both sites. Site 1, along the Snohomish River, is 650 linear feet (LF) long, within this length 460 ft of in-water work is anticipated. Site 2, along Union Slough, consists of two areas of damage, 830 and 480 LF long.

Project Need

The Diking District 5 levee system is approximately 45,000 linear feet in length and protects much of Smith Island. Approximately 13 businesses exist on Smith Island, including the City of Everett Water Pollution Control Facility, Dagmar's Marina, Buse Timber Sales Hima Farm and the City of Everett's Humane Society. Interstate 5 also traverses the island, but the highway is raised above flood stage throughout this area.

In the current condition, the levee offers a 5-year level of flood protection. While the level of protection can be difficult to determine in tidally influenced areas and previous reports have used various protection levels, the levee did not overtop during the 15 year flood event in 2009, therefore the levee is estimated to offer a 20-year level of protection in its undamaged pre 2009 flood condition. The purpose of the proposed construction is to repair and restore the damaged levee system to the 20-year level of flood protection as found prior to the January 2009 flood event in order to protect lives and property from subsequent flooding.

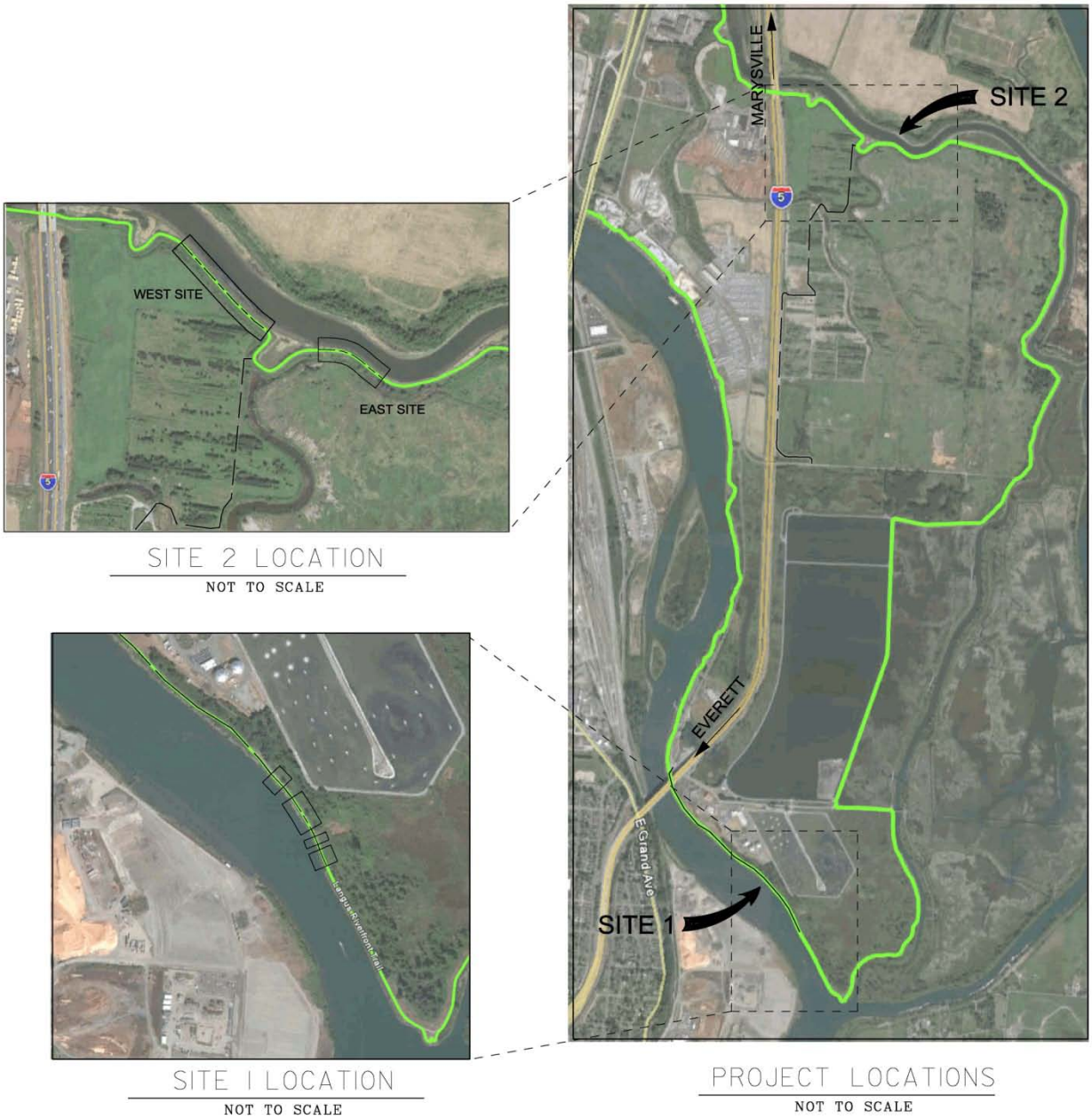

Figure 1. Overview map showing the location of proposed repairs.

Project Purpose

The project would repair the damaged portions of the Union Slough Levee to restore and maintain adequate and reliable flood protection for the businesses and public infrastructure to the same level of protection that was provided by the levees prior to the 2009 flood event. The Corps has determined that failure to repair these sites greatly increases the chances of economic damage and disruption of commercial, agricultural, and government services.

Proposed Action and Alternatives

Under the No-Action Alternative, the Corps would not provide assistance to Snohomish County Diking District 5 under the PL 84-99 Program and no project features would be implemented. All levees would be left in damaged condition until such time as the Diking District was able to procure the funds on their own to complete the repairs. The No-Action Alternative does not fulfill project goals and objectives as it leaves the levees in a vulnerable condition for an indeterminate amount of time and thereby increases the risk of economic damage and disruption of services.

The construction includes repairs to two locations, including a completed emergency action constructed during the 2012 flood season. In total 88 ft of inwater work was completed in the flood fight effort and 1760 ft of work is proposed adjacent to the river and slough (Table 1). All proposed in-water work would be completed during the approved in-water work window (1 August – 31 October) for this area and is expected to take approximately 3 weeks to construct.

The On 21 February 2012, 1700 hours, Colonel Bruce A. Estok, Seattle District Commander, declared an emergency in response to a western Washington flood event. Construction occurred 21 February through 23 February on the left bank of Union Slough in the Snohomish River delta, just east of Interstate 5, in Snohomish County, Washington, Diking District 5. Eighty-eight linear feet of Class II/III riprap (218 tons) was placed on the riverward face of the levee at site 2. Additionally, roughly 3,500 feet of temporary access road was improved and 735 feet of the levee crown was reinforced with crushed gravel to allow truck access (1,688 tons of 2-4" spalls and 750 tons of 1 1/4" minus crushed rock). See Figure 3 for a map of the site showing the location of the access road and the completed riverward work. The work was done to prevent flooding of built resources on Smith Island and did impact some wetlands. While the flood fight repair increased stability of a small portion of the levee through the ongoing event, more repairs are needed to fully restore the flood protection capability of this system.

Table 1: Description of Completed and Proposed Repairs

Site	Status	Length	Description
Site 1 (South site along Snohomish River)	Proposed work	Total 460 ft	repair of riverward face/toe with in-water work in four locations at this site
		reach 1	0+00 to 0+80
		reach 2	1+55 to 3+75
		reach 3	4+50 to 4+90
		reach 4	5+30 to 6+50
Site 2 (North site along Union Slough)	Emergency repair	88 ft (riverward) and 735 ft (crown only)	Emergency repair of riverward face/toe with in-water work and placement of crushed rock on the crown to create a driving surface.

Site	Status	Length	Description
	Proposed work	1310 ft (riverward)	repair of riverward face/toe with in-water work in two locations at this site, this repair includes the location of the completed emergency repair

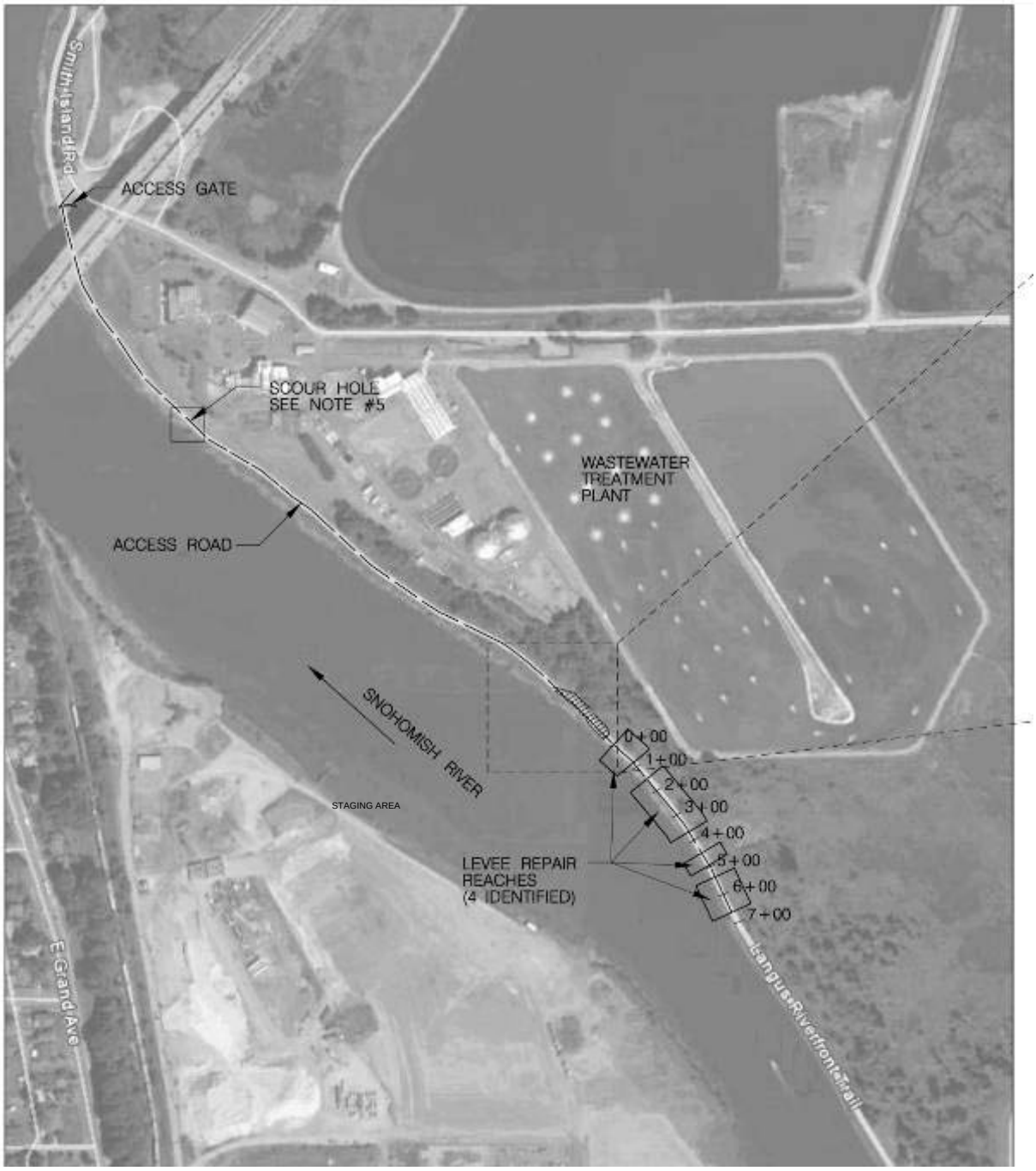

Figure 2. Plan view of Site 1.

Figure 3. Plan view of Site 2.

The red line indicates the location of the in-water flood fight work

The improved access road is on the landward side of the levee, but is within floodplain wetlands. The road had been a dirt access road, however in order to allow access for large construction vehicles improvements were required. The improvements included placement of a large amount of spalls and gravel, constituting wetland fill. Any short term impact due to construction and emergency use of the road during the flood would be the responsibility of the Corps. No short term impacts to listed species occurred due to the road construction portion of the flood fight. Because this work was completed during the flood fight, any longer term impacts caused by the improvements to the access road are the responsibility of the local sponsor, Diking District 5, that requested Corps' assistance in the emergency. The Diking District anticipates removal of

this added material, though they expect to wait until the proposed levee repair is completed so that the improved roadway can be used to access the repair site. Long term impacts of the road are not covered in this document. The local sponsor is responsible for environmental impacts caused by the flood fighting, permitting to retain the structure, or removal of the structure. However since the in-water repair completed during the flood fight is within our proposed repair footprint, any impact is expected to be masked by the proposed repair and restoration of the damaged levee system to the 20-year level of flood protection and as such the Corps is addressing the impacts of the riverward work during the 2012 flood fight, and consideration is included in this consultation document.

The proposed levee rehabilitation/repair design will seek to stabilize and armor the riverward slope to prevent further erosion damage. Generally, the repair will involve filling the scour voids with an approximately 50-50 mixture of 1 ¼-inch minus gravel and 2-inch to 4-inch quarry spalls. The fill will be capped with a 1 foot thick layer of 2-inch to 4-inch quarry spall material that will also serve as a filter blanket. The upper slope will be re-graded to a 1.5H:1V slope on which to place the quarry spalls. No in-water excavation will occur. Excess material will be stockpiled for re-use as cover along the upper portion of the riprap. Following the quarry spall placement, a blanket of riprap sized for the expected velocities at each site will be added (Class II riprap at site 1, Class I riprap at site 2). The levee crown will be covered with up to a 6-inch lift of 1 1/4”-inch gravel to prevent rutting and create a drivable surface. Finally, a lift of soil will cover the upper portion of the riprap from MHHW, approximately elevation 9 feet, to the levee crown. The soil will be hydroseeded with native grasses. One willow lift will be planted in this upper region at Site 1.

Site 1 has discontinuous damage along 650 ft of levee. The removal of vegetation along the riverward slope will more clearly show which sections require repair, and 460 ft of in-water work is expected. The location of the damage is depicted in the design drawings. The currently identified damage reaches are shown in table 1. The repaired reaches will tie-in to the existing stable bank. Some toe armoring or riprap blanket thickening may be done to the reaches between the identified damage reaches once the vegetation is brushed. The actual damage reaches requiring repair will be staked prior to the start of construction following consultation with the design engineer and lead construction engineer.

Site 2 has two separate sites requiring repair; the west site and the east site which together total 1310 ft. The west site is 830 ft and the east site is 480 ft. The east site has extended tie-in sections or reduced height that will be founded on stable silt benches. The transitions range from station 0+00 to 2+00 and station 4+40 to 4+80. The damage reaches requiring repair will be staked prior to the start of construction. See Attachment A for detailed designs.

While the Site 1 included armoring prior to the flood damage, the rock placement completed and proposed at site 2 will armor a previously earthen berm. In kind construction with a typical silty sand levee fill material was considered but was determined to not be constructible due to the semi-diurnal tidal inundation of the site. The tides would wash out the freshly laid levee fill and likely exceed Washington State turbidity regulation maxima. Therefore, a relatively clean rock fill will be placed to allow for proper compaction and minimized turbidity.

Furthermore, the possibility of repairing the levee on the landward side was also explored. The concern with this option regarded the expected differential settlement between the previously compacted levee material and the new material added to the uncompacted soils on the backside

of the levee. The data for the settlement issues at the Union Slough site comes from the extensive testing that has been done for the Qwuloolt Levee approximately 1 mile to the North. NRCS maps the soils as that same Puget silty clay loam. It is believed the two sites are similar in make-up due to their proximity to each other. At the Qwuloolt site, the density of the foundation soils is very soft. Strength tests on the soils gave low undrained strengths for samples between 0 - 15 feet below ground surface. Loose moderately plastic silts are very problematic foundation soils for construction.. Settlement analysis based on laboratory tested compressibility index resulted in 18 inches of soil for a 10-15 foot new embankment. This settlement would be acceptable if it were uniform, but loading the slope of an existing levee where the foundation is partially consolidated has a high likelihood of differential settlement and could cause damage to the levee. The soils are not unsuitable for construction, but the construction of a slight setback with work only on the landward side would likely have to have two or three construction phases over several years in order to allow the foundation to consolidate and gain strength. During this period the levee would remain vulnerable and flood protection would not be fully restored for several years. The length of time that the levee would remain vulnerable was considered an unacceptable level of risk for the protected infrastructure and businesses.

Potentially Adverse Effects (Individually or Cumulatively) on the Aquatic Environment

a. Effects on Physical, Chemical, or Biological Characteristics of the Aquatic Ecosystem

Unavoidable impacts will occur, included loss of sedge wetlands and substrate change within the slough. Site 1 was an armored bank and will be replaced with an armored bank, however there is a small amount of sedge wetland that has become established in the footprint which will be impacted. This includes approximately 0.02 acres of wetland. On site 2, approximately 0.7 acres of intertidal wetland and muddy bottom habitat would be converted to an armored bank. Emergent marsh, often dominated by Carex lyngbyei (sedge), provides critical rearing habitat for juvenile Chinook. Sedges host aquatic insects that are the prey preference for juvenile Chinook salmon. Chinook use sedge habitat for its ability to provide refuge from predators and as resting area in lower water velocities. Given the high value of tidal marsh habitat, this is considered a top priority for type of restoration project for juvenile Chinook.

The February 2012 flood fight effort was not completed during the approved inwater construction period. The construction period lasted from 21 to 23 February, however most of this period was spent constructing a temporary access road. Work on the levee crown began on 23 February, including placing crushed gravel to create a safe driving surface and begin deliveries of riprap. In one of the first deliveries the dump truck slid on the crown and became stuck. Rescue of the truck plus crown work took nearly 8 hours. Inwater work occurred after this effort and lasted approximately 1.5 hours in which 88 ft of riverward work was completed to stabilize the bank. The work on the levee crown and the riverward rock placement likely displaced fish to the opposite side of the river due to increased noise and vibration. No turbidity increases were seen during rock placement. Proposed construction would be limited to the approved inwater construction period which is 1 August to 31 October.

To counter the unavoidable impacts to sedge wetlands and substrate change within the slough, mitigation alternatives have been included. This includes a single willow lift throughout the entire repair area of Site 1 above MHHW. Where possible, sedge mats at Site 2 will be salvaged

from the impacted area and placed on the riverward face of the levee at a similar elevation to the current sedge benches. These sedge mats will be anchored to keep them in place. By salvaging the plants with their root systems and soils intact, the plants are expected to stabilize the soils and minimize turbidity increases. Soil placement with sedge plantings was also considered, however due to the daily tides the stabilization of the soil was a concern for both turbidity and planting success. Transplanted marshes have been shown to provide habitat to rearing Chinook.

This transplantation method is experimental for *Carex lyngbei* and success rate is unknown. As such 1.45 acres of offsite mitigation is also proposed at the City of Everett advanced mitigation site upstream on Union Slough. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success. This is a 2:1 ratio for the impacted 0.72 acres of sedge wetland and intertidal muddy bottom habitat. The mitigation site will also provide off channel refuge and rearing habitat.

b. Effects on Recreational, Aesthetic, Historical, and Economic Values

Site 1 includes a public walking trail, site 2 is on private land but is visible from the slough, river, and potentially from I-5. There will be some loss of recreational and aesthetic value to the public during and after construction. These impacts will be of temporary duration at Site 1, but will be longer duration at Site 2. Site 1 included riprap prior to the flood damage and the area will return to existing uses after construction, and vegetation similar to pre-repair condition is expected to be re-established. Site 2 includes placement of riprap on an earthen bank. Efforts will be made to decrease the timelag for establishment of native vegetation with sedge salvage efforts and placement of soil and hydroseeding above MHHW, but the rock placed at the toe is expected to remain visible for quite some time, or potentially permanently, before silt accumulation would blend it into surrounding areas. Levee repair is not expected to change the current trends of economic values of properties or commerce on Smith Island.

In accordance with the National Historic Preservation Act (16 USC 470), historic properties have been investigated. The project has been determined to have no potential cause effect, as the area has been previously surveyed and contains no historic properties.

c. Findings

The repair at Site 2 is not exempt from Section 404 of the CWA due to a change in material. Based on the complete analysis of this site with the proposed work at Site 1, the completed flood fight, and the associated compensatory mitigation, the levee repair work will not have a significant environmental impact.

All Appropriate and Practicable Measures To Minimize Potential Harm to the Aquatic Ecosystem

a. Impact Avoidance Measures

Five project alternatives were initially proposed, with three being further evaluated in order to select the best alternative for minimizing cost and impact to the environment while fully restoring flood protection. The proposed project action was selected because it minimizes the footprint as well the as negative impact on the environment, will restore flood protection prior to the next flood season and will provide compensatory mitigation for unavoidable impacts. The original topwidth of the levee was 20 ft wide, according to the local sponsor, but all designs decreased the topwidth to minimize the work in eth slough.

Early designs, submitted by the Diking District to obtain permits for the repairs at Site 2 called for 2:1 slopes, a 16 ft topwidth, and a weighted launchable toe. These designs, if applied to the proposed repair lengths, would have resulted in 1.1 acres of impact to wetlands and intertidal mudflats at Site 2. Our proposed 1.5:1 slope with 14 ft top width and no weighted toe reduced the cross-sectional footprint by up to 18.8 ft. This design reduced the impact at Site 2 to 0.7 acres without compromising the level of protection or the ability to safely inspect and flood fight the levee. See Figure 4 for design comparison between the Diking Districts Architect/Engineereing firm (labeled A-E Repair) and the Corps' proposed design.

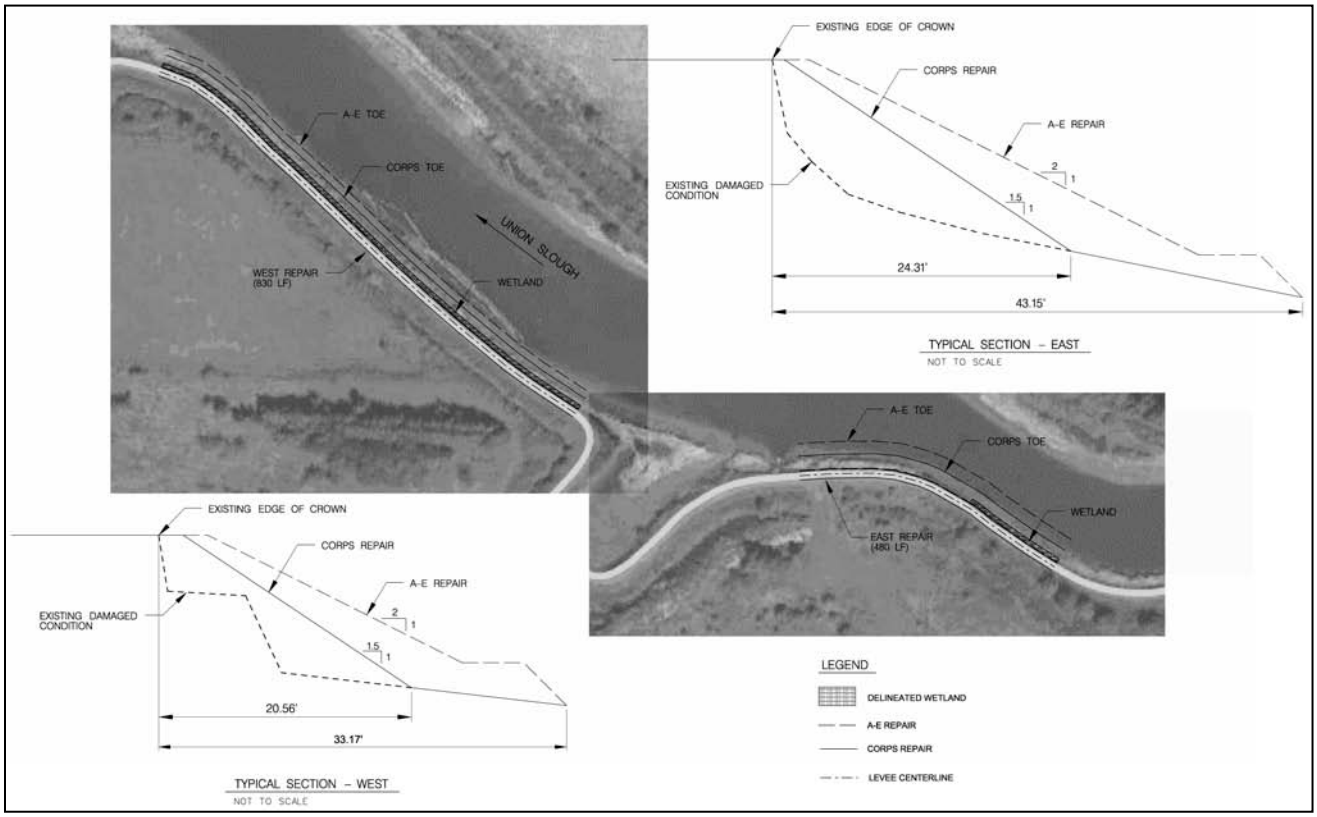

Figure 4: Original designs for Site 2 showing increased footprint and associated impact.

b. Impact Minimization Measures

USACE will take all practicable steps during construction of the project to minimize impacts to aquatic and terrestrial resources. Contingencies will be in place if any of the water quality protection measures fail to achieve their intended function. USACE will observe all in-water construction windows for proposed repairs to ensure that impacts to migratory fish will be avoided or minimized. The minimization measures will be as follows:

- Project design will incorporate planting of willows, experimental salvaging of sedge mats, and placement of soil and hydroseeding with native grasses at the top of the levee to provide habitat for fish and initiate re-establishment of native species;
- Best management practices (BMPs), such as stormwater runoff prevention, will be used to ensure that no unnecessary damage to the environment occurs;

- Proposed in-water work would be accomplished only during the approved in-water work window (1August to 31 October);
- Only clean rock will be placed on the riverward side of the levee. There will be no end dumping of material into the river. Riprap will be individually placed; quarry spalls will be placed in small quantities from the bucket of an excavator;
- Vegetation removal will be limited to the minimum extent needed to complete the repairs; and
- A USACE biologist will periodically check on construction progress to ensure BMPs are in place and environmental impacts are properly avoided and minimized.

c. Compensatory Mitigation Measures

As discussed above, to counter the unavoidable impacts to sedge wetlands and substrate change within the slough, mitigation alternatives have been included. On site mitigation includes a single willow lift throughout the entire repair area of Site 1 above MHHW, sedge mat salvage at Site 2, and topsoil placement above MHHW with hydroseeding of native grasses throughout both repair sites.

Because of the impact to sedge wetlands and the unknown success of the salvage effort, 1.45 acres of offsite mitigation is also proposed at the City of Everett advanced mitigation site upstream on Union Slough. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. The mitigation site will also provide off channel refuge and rearing habitat. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success. This is a 2:1 ratio for the impacted 0.72 acres of sedge wetland and intertidal muddy bottom habitat.

d. Findings

USACE has determined that all appropriate and practicable measures have been taken to minimize potential harm to the environment.

Other Factors in the Public Interest

a. Fish and Wildlife. USACE is in a consultation process to coordinate construction and impact compensation activities with local Native American Tribes and state and federal resource agencies to minimize impacts to fish and wildlife resources. USACE has submitted a Biological Assessment to the NMFS and USFWS for their review of this project.

b. Water Quality. USACE concluded that this project will not violate the state water quality standards found at WAC 173-201A. Similar levee repairs throughout Puget Sound have been closely monitored with no exceedances noted. During extensive repairson the Skagit River in 2007, the average increase over background levels was 0.9 NTU, ranging from 0.3 to 6.7 NTU. These repairs occurred in the mainstem as well as in the slow velocity sloughs. No increase in turbidity was noted during the flood fight efforts at Union Slough in February 2012 and, likewise, turbidity levels are not expected to increase significantly during the proposed summer/fall 2012 construction and no impact to pH or temperature are expected. If a visible plume is noted, sampling will be conducted downstream of the repairs at a distance appropriate to allow for acceptable mixing and dilution of any released sediment, as allowed under the state regulations (Washington Administrative Code 173-201A-400). If samples indicate that state

water quality maximum standards for turbidity are exceeded, project work will be halted and modified so that standards can be met. Any turbidity effects were and would be temporary and limited to areas along the shore within a short distance downstream of each project site.

c. Historical and Cultural Resources

See 5b above.

e. Environmental Benefits.

This project has no net benefits to the environment. Compensatory environmental features are proposed through multiple design additions and purchase of offsite mitigation credits and are designed to balance the impacts of the complete repair project.

Conclusion

USACE finds that this project is within the public's interest and complies with the substantive elements of Section 404 of the Clean Water Act.

Attachment A

Clean Water Act 404(b)(1) Evaluation [40 CFR §230]
Permit Application Evaluation [33 CFR §320.4]

404(b)(1) Evaluation [40 CFR §230]

Potential Impacts on Physical and Chemical Characteristics [Subpart C]:

1. **Substrate [230.20]**

   The placement of riprap along the shoreline at Site 2 will bury the natural silt and sand substrate. The Site 1 will not substantially change the nature of the aquatic substrate in the Snohomish River as the work will restore a previously armored bank.

2. **Suspended particulates/turbidity [230.21]**

   Little or no turbidity is expected during construction since the work will occur during summer low flow conditions. Any in-water work did/ would involve individually placed rocks with no uncontrolled dumping. Best management practices (BMPs) for sediment control will be used throughout construction to minimize any potential turbidity issues.

3. **Water [230.22]**

   The work is not expected to add any nutrients to the water that could affect the clarity, color, odor, or aesthetic value of the water, or that could reduce the suitability of the Snohomish River for aquatic organisms or recreation. Rock placement will impact wetlands that have water quality and habitat functions. These impacts will be offset onsite to the extent possible, but will be mitigated trhough purchase of credits at the City of Everett advanced mitigation site on Union Slough.

4. **Current patterns and water circulation [230.23]**

   USACE expects no disruption of current patterns and water circulation during or after construction. A Hydraulic Engineer assisted with the design of the projects to determine rock size and design details to restore flood protection and minimize disturbance.

5. **Normal water fluctuations [230.24].**

   The levee repair work is not expected to have any effect on normal water fluctuations.

6. **Salinity gradients [230.25]**

   The levees may have affected local salinity gradients when they were first constructed; however, the proposed repair work will not change the current established salinity gradients.

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem [Subpart D]:

1. **Threatened and endangered species [230.30]**

   USACE has prepared a Biological Assessment for this project that has been submitted to the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to ensure compliance with the Endangered Species Act. The BA included a mitigation plan that was developed in concert with USFWS, NMFS, and Ecology to offset project impacts on wetlands and salmonid habitat. The Corps anticipates receiving Biological Opinions from NMFS and USFWS covering the listed salmonid species.

2. **Fish, crustaceans, mollusks, and other aquatic organisms in the food web [230.31]**
   Fish may have been impacted during flood fight as the work was outside of the approved inwater work window. The removal of riparian vegetation has a negative impact on habitat for all salmonid species as it decreases detritus inputs and insect fall into the river and simplifies the shoreline. The conversion of the soft mud bottom to the rough surface of riprap may cause descaling of juvenile salmonids during high river flows and changes the types of crustaceans, mollusks, and other aquatic organisms that will use the site. Mitigation efforts focused on offsetting these impacts by including bank plantings of willows and experimental salvage of the sedge mats to create refuge and add nutrients to the system. The advanced mitigation site has been designed to create refuge habitat for salmonids and its close proximity within the same slough will also help to offset impacts to the same populations.
3. **Other wildlife [230.32]**
   Birds and other wildlife may be temporarily displaced during construction due to noise, construction vehicles, and riprap placement. Because these impacts will only occur during the weeks of construction, they are expected to be inconsequential and temporary. The loss of the sedge wetlands has a potential longer term impact if the salvage efforts are not successful. The offsite mitigation will provide similar nearby habitat features and functions.

Potential Impacts on Special Aquatic Sites [Subpart E]:

1. **Sanctuaries and refuges [230.40]**
   Not applicable, since the Skagit River is not designated by local, state, or federal regulations to be managed principally for the preservation and use of fish and wildlife resources.
2. **Wetlands [230.41]**
   A loss of sedge (*Carex lyngbyei*) wetlands and substrate change will occur as a result of this project. On site 2, approximately 0.7 acres of intertidal wetland and muddy bottom habitat would be converted to an armored bank within Union Slough. Site 1 was an armored bank and will be replaced with an armored bank, however there is a small amount of sedge wetland that has become established in the footprint which will be also impacted. This includes approximately 0.02 acres of wetland. Because of the impact, 1.45 acres of offsite mitigation is proposed at the City of Everett advanced mitigation site on Union Slough. This is a 2:1 ratio for the impacted 0.72 acres of sedge wetland and intertidal muddy bottom habitat. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. Including sedge wetlands and intertidal mud flats. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success.

3. Mud flats [230.42]

A loss of sedge (*Carex lyngbyei*) wetlands and substrate change will occur as a result of this project. On site 2, approximately 0.7 acres of intertidal wetland and muddy bottom habitat would be

converted to an armored bank within Union Slough. Site 1 was an armored bank and will be replaced with an armored bank, however there is a small amount of sedge wetland that has become established in the footprint which will be also impacted. This includes approximately 0.02 acres of wetland. Because of the impact, 1.45 acres of offsite mitigation is proposed at the City of Everett advanced mitigation site on Union Slough. This is a 2:1 ratio for the impacted 0.72 acres of sedge wetland and intertidal muddy bottom habitat. The mitigation site is designed to restore intertidal salmon rearing habitat that historically existed along Union Slough. Including sedge wetlands and intertidal mud flats. Because the site is on Smith Island and will provide similar habitat characteristics, it is being considered as in-kind mitigation in close proximity to the impacted area. The City will maintain and operate the mitigation site to ensure success.

4. **Vegetated shallows [230.43]**
   Not applicable.
5. **Corral reefs [230.44**]
   Not applicable.
6. **Riffle and pool complexes [230.45]**
   Not applicable, since riffle and pool complexes are characteristics of streams.

Potential Effects on Human Use Characteristics [Subpart F]:

1. **Municipal and private water supplies [230.50]**
   Not applicable.
2. **Recreational and commercial fisheries [230.51]**
   Impacts to fisheries resources are not anticipated as the mitigation is expected to offset the impacts to rearing habitat. The levee repair work will not prevent access to recreational or commercial fishing.
3. **Water-related recreation [230.53]**
   Because the work was and will be conducted during the summer when water sport and outdoor activities are usually at their peak, the project may temporarily affect water-related recreation. Recreational use of the top of levee would be restricted while construction machinery is present.
4. **Aesthetics [230.53]**
   During construction there will be some minor disturbance from heavy equipment noise and exhaust. After construction the shoreline will look different because the riprap bank stabilization structure will have replaced green vegetation, mud sediments, and trees. The repair sites will look less natural initially, but plantings will be done to offset these impacts. It is expected that foliage will begin to develop relatively quickly and the repairs will blend in more with the surroundings.
5. **Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves [230.54]**
   Site 1 is near Langus Riverfront Park and the levee crown includes a recreational walkway. The walkway would be closed during construction, for safety, but would be expected to reopen at the completion of the construction activities. No longterm impact or change to recreational activities at the site are expected.

Evaluation and Testing [Subpart G]:

1. **General evaluation of dredged or fill material [230.60]**
   Bank stabilization material will consist of class I and class II riprap and quarry spalls. All imported material will be free from contamination and obtained from a permitted local quarry.

2. **Chemical, biological, and physical evaluation and testing [230.61]**

   NA

Actions to Minimize Adverse Effects [Subpart H]:

1. **Actions concerning the location of the discharge [230.70]**
   Since USACE is not selecting a disposal site, but rather is repairing a flood control structure, the actions that will be taken are necessary for the location.
2. **Actions concerning the material to be discharged [230.71]**
   Bank stabilization material will be required to meet USACE standards for placement of riprap. Material will be imported from an approved, clean source.
3. **Actions controlling the material after discharge [230.72]**
   No actions should be required, as the structure is not expected to move after construction; however, should any structural deterioration occur, the responsible Diking Districts will be expected to address it as the owner or bring it to the attention of the USACE.
4. **Actions affecting the method of dispersion [230.73]**
   As described above, the structure is expected to be stable after construction and not disperse. Project drawings that show the design of the structure are included.
5. **Actions related to technology [230.74]**
   No specific advanced technologies will be used to repair the structure.
6. **Actions affecting plant and animal populations [230.75]**

   The USACE has coordinated construction activities and compensatory mitigation features with state and federal resource agencies to minimize impacts to fishery and wildlife resources. There will be temporary disturbance to wildlife in the project vicinity due to noise from operation of machinery. Planting of the levee face will minimize lost riparian functions such as cover, shade, and input of nutrients. Compensatory mitigation is included through the purchase of credits at a nearby established advanced mitigation site. This is expected to offset impacts to fish and wildlife from the construction activities, the removal of vegetation at the project sites, and the placement of riprap on the riverward banks.
7. **Actions affecting human use [230.76]**
   Repair of the flood control structure did not and is not expected to diminish water quality, but may temporarily impact the aesthetics of the aquatic site.
8. **Other actions [230.77]**
   Best management practices were used during eth completed flood fight activities and will be used in the proposed construction to ensure that no unnecessary damage to the environment occurs during construction.

General Policies for Evaluating Permit Applications [33 CFR §320.4]

1. **Public Interest Review [320.4(a)]**
   USACE finds this repair to flood control structures to be in compliance with the 404(b)(1) guidelines and not contrary to public interest.
2. **Effects on wetlands [320.4(b)]**
   See 404(b)(1) evaluation above. No net loss of wetlands is expected.

3. **Fish and wildlife [320.4(c)]**
   USACE has consulted and continues to consult with state and federal resource agencies, tribes and other interested members of the public on this action. Mitigation is proposed to offset the change in substrate and loss of sedge wetlands.
4. **Water quality [320.4(d)]**
   USACE certifies that this project will not violate Water Quality Standards as set forth by the Clean Water Act. USACE is seeking a 401 Water Quality Certification from the State of Washington.
5. **Historic, cultural, scenic, and recreational values [320.4(e)]**

   The project has been determined to have no potential cause effect, as the area has been previously surveyed and contains no historic properties.

6. **Effects on limits of the Territorial Sea [320.4(f)]**

   Not applicable, since the project will not occur in coastal waters.

7. **Consideration of property ownership [320.4(g)]**
   Access for construction equipment and materials will be via public rights-of-way and real estate rights of entry provided by the diking district, the non-federal sponsors for the repairs.
8. **Activities affecting coastal zones [320.4(h)]**

   The Corps has determined that the proposed rehabilitation activities comply with the policies, general conditions, and activities as specified in the Snohomish County Unified Development Code. The proposed action is considered to be consistent to the maximum extent practicable with the State of Washington Shoreline Management Program and policies and standards of the Snohomish County Shoreline Management Program. A CZMA consistency determination has been submitted to Ecology for review.

9. **Activities in marine sanctuaries [320.4(i)]**
   Not applicable, since the area is not a marine sanctuary.
10. **Other federal, state, or local requirements [320.4(j)]**

    USACE has initiated formal consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on the findings of the Biological Assessment for the proposed repair at the two sites as well as the completed flood fight activities. A mitigation plan has been proposed to offset project impacts on endangered salmonids and their critical habitat.

11. **Safety of impoundment structures [320.(k)]**
    Not applicable, since an impoundment structure is not being built.
12. **Water supply and conservation [320.4(m)]**
    No permit is needed concerning water supply.
13. **Energy conservation and development [320.4(n)]**
    Not applicable.
14. **Navigation [320.4(o)]**
    Not applicable.
15. **Environmental benefits [320.4(p)]**
    No net benefits are anticipated as a result of the repair of the flood control structures.
16. **Economics [320.4(q)]**
    Completion of the project will protect public infrastructure such as the wastewater treatment facility, roads, and powerlines and prevent disruption of commerce and services should flood stage water levels occur in the lower Snohomish River.
17. **Mitigation [320.4(r)].**
    To address the loss of wetlands and the change of substrate, the Corps has developed a mitigation strategy that includes the purchase of credits at a nearby established advanced mitigation site.

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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June 18, 2012

Bobbi Jo McClain
U.S. Army Corps of Engineers
PO Box 3755
Seattle, WA 98124

Dear Ms. McClain:

RE: U.S. Army Corps of Engineers (Corps) Reference #PM-ER_12-7
Union Slough Levee Rehabilitation, Union Slough and Snohomish River, Snohomish County, Washington

The Department of Ecology (Ecology) received the Corps' request for a Water Quality Certification for this project on May 31, 2012. An individual 401 Water Quality Certification (WQC) and Coastal Zone Management (CZM) consistency determination are required.

Information Received and Needed

Ecology has received the following documents:

- Notice of Preparation/Clean Water Act Public Notice, dated 4/16/12
- CZM Consistency Determination, received 5/31/12
- Clean Water Act Section 404 Analysis

In order to complete the WQC process and make our CZM determination, we need the following additional information per RCW 90.48.120(1):

- Ecology issued a public notice for this project on June 5, 2012, and we need to await the completion of the public comment period before taking any action.

We will be working with you over the course of the permitting process to identify what other information is needed. Ecology may request additional information during our detailed project review in order to provide reasonable assurance that water quality standards will be met.

Please contact me if you have any questions regarding your application or the WQC/CZM process at (425) 649-7129 or e-mail Rebekah.Padgett@ecy.wa.gov.

Sincerely,

Rebekah R. Padgett, Federal Permit Manager
Shorelands and Environmental Assistance Program

RRP:cja

By Certified Mail: 7011 0470 0003 3720 9695

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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July 23, 2012

Bobbi Jo McClain
U.S. Army Corps of Engineers
East Marginal Way South
PO Box 3755
Seattle, WA 98124

RE: Water Quality Certification Order #9321 for U.S. Army Corps of Engineers Reference #PM-ER-12-7, Union Slough Levee Rehabilitation Project, Union Slough and Snohomish River, Snohomish County, Washington

Dear Ms. McClain:

On May 31, 2012, U.S. Army Corps of Engineers submitted a request to the Department of Ecology (Ecology) for a Section 401 Water Quality Certification (401 Certification) under the federal Clean Water Act for the proposed Union Slough Levee Rehabilitation project.

On behalf of the State of Washington, Ecology certifies that the work described in the request and the public notice complies with applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act, as amended, and applicable state laws. This certification is subject to the conditions contained in the enclosed Order.

If you have any questions, please contact Rebekah Padgett at (425) 649-7129. The enclosed Order may be appealed by following the procedures described in the Order.

Sincerely,

Erik Stockdale

Erik Stockdale, Unit Supervisor
Northwest Regional Office
Shorelands and Environmental Assistance Program

ES:rrp:cja

Enclosure

By certified mail: 7011 0470 0003 3720 9794

cc: Jamie Bails, Washington Department of Fish and Wildlife
Laura Arber, Washington Department of Fish and Wildlife
Tammy Olson, Washington Department of Natural Resources
Tom Sibley, NOAA Fisheries
Nancy Brennan-Dubbs, U.S. Fish and Wildlife Service

e-cc: Patricia Lambert – NWRO
Paul Anderson – NWRO
Loree' Randall – HQ
Raman Iyer – NWRO
Randy Middaugh, Snohomish County Randy.Middaugh@co.snohomish.wa.us
ecyrefedpermits@ecy.wa.gov

IN THE MATTER OF GRANTING A WATER QUALITY CERTIFICATION TO U.S. ARMY CORPS OF ENGINEERS in accordance with 33 U.S.C. 1341 (FWPCA § 401), RCW 90.48.120, RCW 90.48.260 and Chapter 173-201A WAC	))))))))	**ORDER #9321** **Corps Reference #PM-ER-12-7** Union Slough Levee Rehabilitation Project; Union Slough and Snohomish River, Snohomish County, Washington.

TO: U.S. Army Corps of Engineers
Attn: Bobbi Jo McClain
East Marginal Way South
PO Box 3755
Seattle, WA 98124

On May 31, 2012, U.S. Army Corps of Engineers (Corps) submitted a request to the Department of Ecology (Ecology) for a Section 401 Water Quality Certification. A public notice regarding the request was distributed by Ecology for the above-referenced project pursuant to the provisions of Chapter 173-225 WAC on June 5, 2012.

The levee rehabilitation proposal includes:

- Emergency repairs: Emergency repairs completed in February 2012 included placement of Class II/III riprap on the riverward face along 88 feet, placement of spall rock on the upper portion of the backslope, and reinforcement of approximately 735 feet of the levee top with crushed rock.

- Site 1: Re-slope and work a maximum of 450 feet of levee to achieve a 1.75H:1V slope, place a 12-inch-thick filter blanket of spalls overlain with a 24-inch-thick layer of Class II riprap armor, place topsoil on top of the levee face to achieve a 6-inch-thick layer to be seed with native grass seed mix, plant a willow lift at Mean Higher High Water throughout the repair, remove noxious weeds, and hydroseed disturbed areas with a native seed mix.

- Site 2: The west site is 830 feet long, and the east site is 480 feet, for a total of 1,310 feet. Re-slope the riverward bank to achieve a 1.5H:1V slope with a 14-foot top width for vehicle access, place a 12-inch-thick layer of spall rock as a filter blanket and a 3-foot-thick layer of Class 1 riprap on the face of the levee, place topsoil on top of the levee face to achieve a 6-inch-thick layer to be seeded with native grasses, salvage sedge mats from the riverward bench within the disturbed area during low tide for placement on the levee face at a similar elevation, hydroseed disturbed areas on the levee crown and in staging areas.

Mitigation for 0.72 acre of wetland and intertidal habitat impacts will include using 1.45 acres of mitigation at the City of Everett advanced mitigation site (Smith Island/Union Slough Habitat Restoration Site), as well as on-site willow plantings at Site 1, sedge salvage at Site 2, native grass seeding at both sites above Mean Higher High Water.

The project is located at two sites on Smith Island, near Everett, Snohomish County, Washington, Union Slough and Snohomish River, Sections 4, 9, and 21, T. 29 N., R. 5W., WRIA 7.

AUTHORITIES:

In exercising authority under 33 U.S.C. § 1341, RCW 90.48.120, and RCW 90.48.260, Ecology has examined this application pursuant to the following:

1. Conformance with applicable water quality-based, technology-based, and toxic or pretreatment effluent limitations as provided under 33 U.S.C. §§ 1311, 1312, 1313, 1316, and 1317 (FWPCA §§ 301, 302, 303, 306 and 307);

2. Conformance with the state water quality standards contained in Chapter 173-201A WAC and authorized by 33 U.S.C. § 1313 and by Chapter 90.48 RCW, and with other applicable state laws; and

3. Conformance with the provision of using all known, available and reasonable methods to prevent and control pollution of state waters as required by RCW 90.48.010.

WATER QUALITY CERTIFICATION CONDITIONS:

Through issuance of this Order, Ecology certifies that it has reasonable assurance that the activity as proposed and conditioned will be conducted in a manner that will meet the applicable water quality standards and other appropriate requirements of state law. In view of the foregoing and in accordance with 33 U.S.C. § 1341, RCW 90.48.120, RCW 90.48.260 Chapter 173-200 WAC and Chapter 173-201A WAC, water quality certification is granted to the Applicant subject to the conditions within this Order.

Certification of this proposal does not authorize the Applicant to exceed applicable state water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC) or sediment quality standards (Chapter 173-204 WAC). Furthermore, nothing in this certification shall absolve the Applicant from liability for contamination and any subsequent cleanup of surface waters, ground waters or sediments occurring as a result of project construction or operations.

A. General Conditions:

A1. For purposes of this Order, the term "Applicant" shall mean U.S. Army Corps of Engineers and its agents, assignees and contractors.

A2. For purposes of this Order, all submittals required by its conditions shall be sent to Ecology's Northwest Regional Office, Attn: 401/CZM Federal Project Manager, 3190 160th Avenue SE, Bellevue, WA 98008-5452. Any submittals shall reference Order #9321 and Corps Reference #PM-ER-12-7.

A3. Work authorized by this Order is limited to the work described in the JARPA received by Ecology on May 31, 2012. The Applicant will be out of compliance with this Order and must reapply with an updated application if the information contained in the JARPA is voided by subsequent changes to the project not authorized by this Order.

A4. Within 30 days of receipt of an updated JARPA, Ecology will determine if the revised project requires a new water quality certification and public notice or if a modification to this Order is required.

A5. Copies of this Order shall be kept on the job site and readily available for reference by Ecology personnel, the construction superintendent, construction managers and lead workers, and state and local government inspectors.

A6. The Applicant shall provide access to the project site and all mitigation sites upon request by Ecology personnel for site inspections, monitoring, necessary data collection, and/or to ensure that conditions of this Order are being met.

A7. Nothing in this Order waives Ecology's authority to issue additional orders if Ecology determines that further actions are necessary to implement the water quality laws of the state. Further, Ecology retains continuing jurisdiction to make modifications hereto through supplemental order, if additional impacts due to project construction or operation are identified (*e.g.*, violations of water quality standards, downstream erosion, etc.), or if additional conditions are necessary to further protect water quality.

A8. The Applicant shall ensure that all appropriate project engineers and contractors at the project site have read and understand relevant conditions of this Order and all permits, approvals, and documents referenced in this Order. The Applicant shall provide Ecology a signed statement (see Attachment A for an example) from each project engineer and contractor that they have read and understand the conditions of this Order and the above-referenced permits, plans, documents and approvals. These statements shall be provided to Ecology before construction begins at the project or mitigation sites.

A9. This Order does not authorize direct, indirect, permanent, or temporary impacts to waters of the state or related aquatic resources, except as specifically provided for in conditions of this Order.

A10. Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.

B. Mitigation Conditions:

B1. The Applicant shall mitigate wetland impacts as described in § 6d (pages 6-7) and § 7g (page 9) of the May 31, 2012 JARPA submitted by the Applicant, or as modified by this Order, or revised and approved by Ecology. The City of Everett (City) shall withdraw 1.45 acres of intertidal wetland within the City's Smith Island/Union Slough Habitat Restoration Site to compensate for the loss of 0.72 acre of estuarine Category II wetland and intertidal habitat. Willow lifts will be installed at Site 1 and sedge mats will be salvaged and placed at the toe of the levee at Site 2 to hasten the re-establishment of native plant communities.

B2. The Applicant shall submit any changes to the proposed mitigation in writing to Ecology (see A2) for review and approval before work begins.

B3. Within 30 days of completion of levee repairs at Site 2, all fill associated with the levee repair, including access roads and staging areas, shall be removed from wetlands and the wetlands restored, unless otherwise approved by Ecology. To ensure proper restoration, the Applicant's wetland professional must supervise wetland fill removal and restoration.

B4. An As-Built Report documenting the levee rehabilitation at Site 1 and 2 must be prepared when site construction is completed. The Report shall include the following:

a. Drawings that clearly identify in plan view and cross-section levee rehabilitation as constructed.

b. Drawings and a description of any changes to the levee rehabilitation that occurred during construction.

A copy of the As-Built Report for the Union Slough Levee Rehabilitation Sites 1 and 2 shall be sent to Ecology per Condition A2 within 60 days of completing site construction, and in no case later than December 31, 2012.

<u>Implementation</u>

B5. Unless otherwise approved by Ecology in writing, the Applicant shall complete the withdrawal of mitigation credits before the impacts to wetlands occur.

B6. Proof of Mitigation Credit Withdrawal: Prior to impacting wetlands, including buffers, associated with the construction of the project, the Applicant shall submit the following to Ecology:

a. A copy of the credit transaction report listing Ecology Order #9321, the Order issuance date, and the debited credits verifying credit withdrawal from the Smith Island Habitat Restoration Project.

b. Documentation that credits applied to the project have been registered, with Ecology Order #9321 and the Order issuance date, at the Snohomish County Auditor's office.

B7. Until the Applicant has received written notice from Ecology that the mitigation has been fully implemented, the Applicant's obligation under Condition B1 to mitigation for wetland impacts is not met.

B8. Mitigation Contingency Measures: If the Applicant is unable to implement the mitigation measures as proposed and approved by this Order, including Conditions B9 – B11 below, the Applicant shall submit to Ecology for its review and written approval a plan for alternative mitigation. The alternative mitigation plan shall be submitted to Ecology per Condition A2.

Willow Lift Conditions

B9. Willow lifts shall be installed at Site 1 as shown in Plate number C-102 of plan sheets for Union Slough Levee Rehabilitation: Snohomish County Diking District 5 (DD5), Union Slough and Snohomish River, by US Army Corps of Engineers, Seattle District, dated May 23, 2012.

Sedge Mat Conditions:

B10. Sedge mats shall be salvaged at Site 2 from within the levee repair footprint prior to construction and placed along the waterward toe of the repaired slope.

a. During levee construction, sedge mats will be placed on the backslope of the levee for temporary storage. While being stored, sedge mats shall be kept moist.

B11. Sedge mats shall be anchored in place at Site 2 at a similar elevation to the pre-construction location.

C. Water Quality Condition:

C1. This Order does not authorize temporary exceedances of water quality standards beyond the limits established in WAC 173-201A-210(1)(e)(i).

C2. In-Water Construction Water Quality Sampling and Monitoring: A Water Quality Protection and Monitoring Plan (Plan) shall be developed and implemented. A copy of the Plan shall be submitted to Ecology at least 15 days prior to start of construction for Ecology review and approval per Condition A2.

The Plan shall include the following minimum requirements:

a. Locations of samples: Locations of water quality sampling sites shall be identified and described in the Plan and on a map of the project area. At a minimum, sampling shall take place at the point of compliance as specified in WAC 173-201A-210(1)(e)(i), which allows a 150-foot temporary area of mixing for turbidity resulting from disturbance of in-place sediments in Union Slough and Snohomish River. Background samples shall be collected outside the area of influence of the in-water work. Background samples shall be collected at the same frequency as the point of compliance samples.

b. Number of samples: Number and frequency of water quality samples to be taken.

c. Parameter to be sampled: Turbidity shall be sampled for this project.

d. Equipment: Sampling for turbidity is to be accomplished using a turbidometer properly calibrated according to the operator's manual.

e. Best Management Practices (BMPs): A description of the BMPs that will be used during construction to protect water quality.

f. Detection of exceedances: Water quality standards for turbidity in "Excellent Quality" waters are as follows: turbidity shall not exceed 5 NTU over background conditions when the background is 50 NTU or less, or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU. If exceedances of this standard at the point of compliance specified in WAC 173-201A-210(1)(e)(i) is detected through water quality sampling and monitoring, the Applicant shall immediately take action to stop, contain, and prevent unauthorized discharges or otherwise stop the violation and correct the problem. After such an event, the Applicant shall assess the efficacy of the site BMPs and update or improve the BMPs used at the work site in an effort to reduce or prevent recurrence of the turbidity exceedance.

g. Reporting: If no exceedances are detected, results of water quality sampling, as determined by the Plan, shall be forwarded to Ecology on a monthly basis in accordance to Condition A2.

h. Notification of exceedances: Notification of exceedances that are detected through water quality sampling shall be made to Ecology within 24 hours of occurrence. Notification shall be made with reference to Order #9321, Attn: 401/CZM Federal Project Manager, by telephone at (425) 649-7129 or (425) 649-7000, or by fax to (425) 649-7098. The Applicant shall, at a minimum, provide Ecology with the following information:

i. A description of the nature and cause of exceedance.

ii. The period of non-compliance, including exact dates, duration, and times and/or the anticipated time when the Applicant will return to compliance.

iii. The steps taken, or to be taken, to reduce, eliminate, and prevent recurrence of the non-compliance.

iv. In addition, within five (5) days after notification of an exceedance, the Applicant shall submit a written report to Ecology that describes the nature of the exceedance, turbidity results and location, photographs, and any other pertinent information.

D. Conditions for Construction Activities:

D1. Construction stormwater, sediment, and erosion control best management practices (BMPs; *e.g.*, filter fences, etc.) suitable to prevent exceedances of state water quality standards shall be in place before starting construction at the site.

D2. Sediment and erosion control measures shall be inspected and maintained prior to and during project implementation.

D3. All waste material such as construction debris, silt, excess dirt or overburden resulting from this project shall be properly disposed of on land so that it cannot enter a waterway or cause water quality degradation to state waters.

D4. Machinery and equipment used during construction shall be serviced, fueled, and maintained upland, unless otherwise approved by Ecology, in order to prevent contamination to any surface water.

D5. Wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal, and shall not be discharged into state waters or storm drains.

D6. Clean Fill Criteria: Applicant shall ensure that fill (topsoil) placed for the proposed project does not contain toxic materials in toxic amounts.

In-Water Conditions:

D7. Work below the Ordinary High Water Mark (OHWM) shall be minimized in both time and area and shall take place in the lowest possible tides in accordance with the approved construction schedule in order to minimize turbidity. Project activities shall not occur when the project area, including the work corridor, is inundated by tidal waters.

D8. Sedge mat removal shall only occur at low tides in order to avoid in-water excavation.

D9. Riprap shall be placed individually into the water and quarry spalls shall be placed in small quantities in order to minimize turbidity.

D10. Work in or near the water that may affect fish migration, spawning, or rearing shall cease immediately upon a determination by Ecology that fisheries resources may be adversely affected.

D11. All debris or deleterious material resulting from construction shall be removed from the beach area and bed and prevented from entering waters of the state.

D12. All trash and unauthorized fill, including concrete blocks or pieces, bricks, asphalt, metal, treated wood, glass and paper, below the OHWL in and around the applicant project area, shall be removed and deposited above the limits of flood water in an approved upland disposal site.

D13. The waterward face of the rock bulkhead shall follow the contour of the existing natural bankline.

D14. Bank slope of the repaired segment shall be the same as, or no steeper than, the adjacent uneroded and unslumped banks.

D15. Bank sloping shall be accomplished in a manner that avoids release of overburden material into the water. Overburden material resulting from the project shall be deposited upland so it will not re-enter the water.

D16. Bank protection material shall not constrict the flow and cause any appreciable increase (not to exceed 0.2 feet) in backwater elevation (calculated at the 100-year flood) or channel-wide scour, and shall be aligned to cause the least effect on the hydraulics of the stream.

D17. Bank protection material shall be clean, angular rock, and shall be installed to withstand 100- year peak flows. River gravels or other round cobbles shall not be used as exterior armor. Bank protection work shall be restricted to work necessary to protect the eroding and slumping bank.

D18. Bank protection and filter blanket material shall be placed from the bank.

D19. Beach area depressions created during project activities shall be reshaped to pre-project beach level upon project completion.

D20. All trenches, depressions, or holes created in the beach area shall be backfilled prior to inundation by tidal waters. Trenches excavated for base rocks may remain open during construction. However, fish shall be prevented from entering such trenches.

D21. All natural habitat features on the beach larger than 12 inches in diameter, including trees, stumps, and logs, shall be retained on the beach following construction. These habitat features may be moved during construction if necessary.

D22. If sand, gravel, and other coarse excavated material are to be temporarily placed where it will come into contact with tidal waters, this material shall be covered with filter fabric and adequately secured to prevent erosion and/or potential entrainment of fish.

D23. Equipment shall be operated to minimize turbidity. During excavation, each pass with the bucket shall be complete.

E. Emergency/Contingency Measures:

E1. The Applicant shall develop and implement a Spill Prevention and Containment Plan for all aspects of this project.

E2. The Applicant shall have adequate and appropriate spill response materials on hand to respond to emergency release of petroleum products or any other material into waters of the state.

E3. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters.

E4. Any work that is out of compliance with the provisions of this Order, or conditions causing distressed or dying fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, is prohibited. If these occur, the Applicant shall immediately take the following actions:

a. Cease operations at the location of the violation or spill.

b. Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

c. Notify Ecology of the failure to comply. All oil spills shall be reported immediately to Ecology's 24-Hour Spill Response Team at 1-800-258-5990, **and** within 24 hours of spills or other events to Ecology's 401/CZM Federal Project Manager at (425) 649-7129 or (425) 649-7000.

d. Submit a detailed written report to Ecology within five (5) days that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

Compliance with this condition does not relieve the Applicant from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

F. Timing Requirements

F1. In-water work may begin immediately and shall be completed by October 31, 2012.

F2. This Order expires five (5) years from the date of issuance of this Order.

G. Reporting and Notification Requirement Conditions

G1. Applicant shall provide notice to Ecology's 401/CZM Federal Project Manager:

a. At least three (3) days prior to the start of construction.
b. Within 14 days after completion of construction at the project site.

Notification, referencing Corps Reference #PM-ER-12-7, Order #9321 can take place by telephone to (425) 649-7129 or (425) 649-7000, fax to (425) 649-7098, or in writing.

G2. If the project construction is not completed within 13 months of issuance of this Order, the Applicant shall submit per Condition A2 a written construction status report and submit status reports every 12 months until construction is complete.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Erik Stockdale

Erik Stockdale, Unit Supervisor
Wetlands/401 Unit
Shorelands and Environmental Assistance Program
Northwest Regional Office

7·23·2012
July 23, 2012

ATTACHMENT A

U.S. ARMY CORPS OF ENGINEERS
UNION SLOUGH LEVEE REHABILITATION PROJECT
Water Quality Certification Order #9321

Statement of Understanding of
Water Quality Certification Conditions

I have read and understand the conditions of Order #9321 Section 401 Water Quality Certification for the U.S. Army Corps of Engineers Union Slough Levee Rehabilitation Project. I have also read and understand all permits, plans, documents, and approvals associated with the project referenced in this Order.

_____ _____
Signature Date

_____
Title

_____
Company

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 30, 2012

Bobbi Jo McClain
U.S. Army Corps of Engineers
East Marginal Way South
PO Box 3755
Seattle, WA 98124

Dear Ms. McClain:

RE: **Coastal Zone Consistency for Corps Reference #PM-ER-12-7**
Union Slough Levee Rehabilitation Project, Union Slough and Snohomish River, Snohomish County, Washington

On May 31, 2012, U.S. Army Corps of Engineers (Corps) submitted a Certification of Consistency with the Washington State Coastal Zone Management Program (CZMP). Pursuant to Section 307(c)(3) of the Coastal Zone Management Act of 1972 as amended, Ecology concurs with the Corps' determination that the proposed work is consistent with Washington's CZMP.

If you have any questions regarding Ecology's consistency determination please contact Rebekah Padgett at (425) 649-7129.

YOUR RIGHT TO APPEAL

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

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Sincerely,

Erik Stockdale, Unit Supervisor
Northwest Regional Office
Shorelands and Environmental Assistance Program

ES:rrp:cja

By certified mail: 7011 0470 0003 3720 9817

cc: Jamie Bails, Washington Department of Fish and Wildlife
Laura Arber, Washington Department of Fish and Wildlife
Tammy Olson, Washington Department of Natural Resources
Tom Sibley, NOAA Fisheries
Nancy Brennan-Dubbs, U.S. Fish and Wildlife Service

e-cc: Patricia Lambert – NWRO
Paul Anderson – NWRO
Loree' Randall – HQ
Raman Iyer – NWRO
Randy Middaugh, Snohomish County Randy.Middaugh@co.snohomish.wa.us
ecyrefedpermits@ecy.wa.gov

Appendix F: National Historic Preservation Act documents

9/21/2012

MEMORANDUM FOR RECORD

SUBJECT: Union Slough Levee Rehabilitation Project NHPA Review

BY: Ashley Dailide, Archaeologist, Seattle District US Army Corps of Engineers

1. **Purpose:** Review Proposed Levee Rehabilitation for Compliance with NHPA.

2. **Location:** The Union Slough Levee project is located near the City of Everett in Sections 04 and 21, Township 29 North, Range 5 East of the Willamette Meridian in Snohomish County, Washington. The project is on Smith Island, located near the City of Everett Water Pollution Control Facility (CEWPCF) and within the Snohomish River Estuary.

3. **Proposed Work:** The project purpose is to repair-in-kind an existing levee system

4. **Background Research and Site Visit:** Corps archaeologist Ashley Dailide visited the site with the project development team in the winter of 2012 (so? What sort of ground search happened? Where? What was soil exposure? What kind of confidence level can be assigned to the "no resources present" assertion?) . A search of the archaeological and historic site records at the Washington State Department of Archaeology and Historic Preservation (DAHP) indicated that no properties listed in the National Register of Historic Places (NRHP) or the Washington State Historic Site Register are recorded in the project area (references? Where did previous inventory take place, and did it actually cover the affected area – did Fuller *et al* hit it in the early 70s? What about potential for undiscovered sites – what makes it safe to conclude that this won't happen?). While the levee system has been recorded as archaeological site 45SN482, it was recommended (by whom?) as not eligible for the NRHP (on what basis? Has any authority concurred with the finding?).

5. **Results and Recommendations:** Based on the background research and preliminary site visit the Corps has determined that the project has No Potential to cause effects on Historic Properties under the NHPA, as the levee system is recommended "not eligible" for the National Register. As no further work is recommended, the NHPA process is completed.