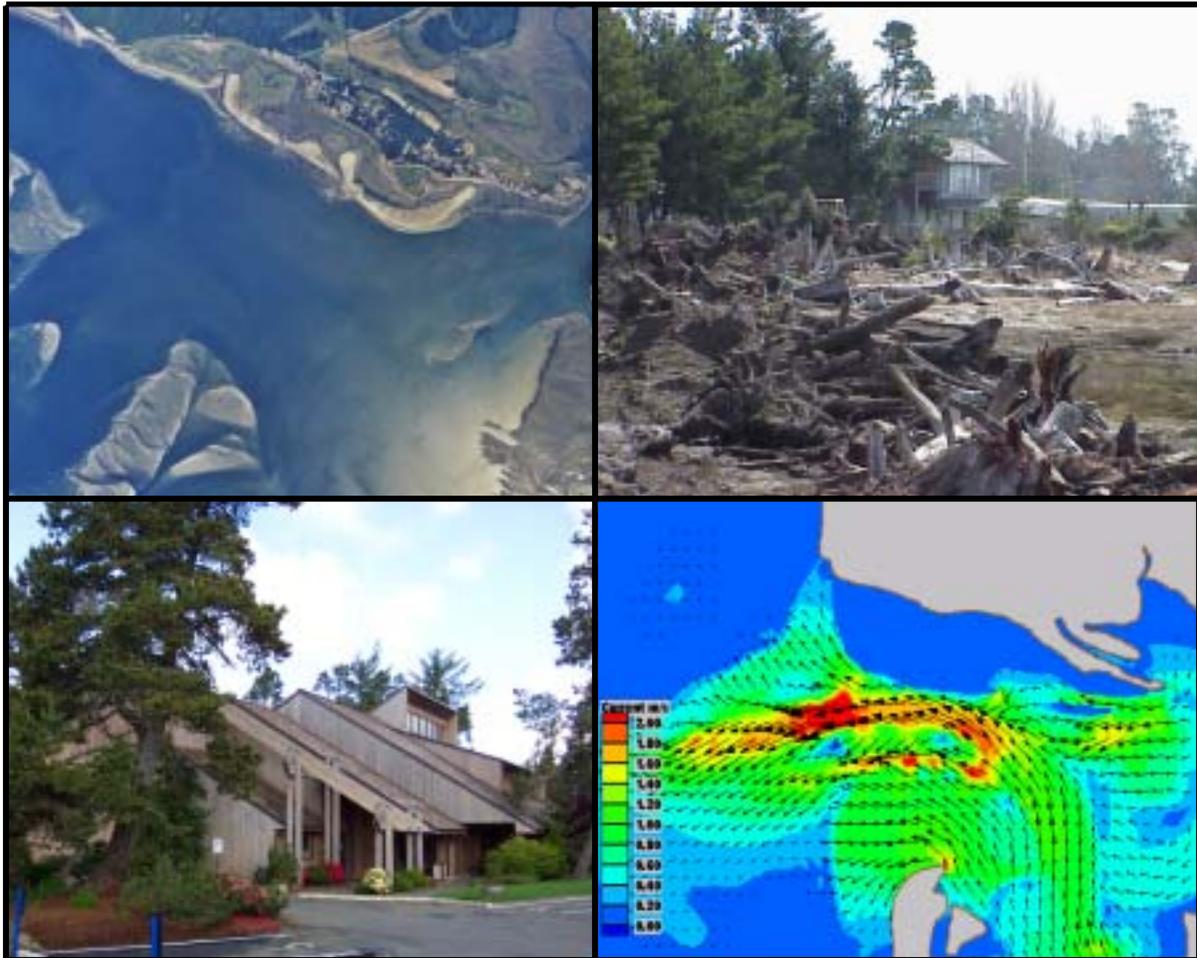


Draft Environmental Assessment

Shoalwater Bay Shoreline Erosion Project
Pacific County, Washington

Shoalwater Bay Indian Reservation
Flood and Coastal Storm Damage Reduction



**US Army Corps
of Engineers®**
Seattle District

January 2007

Shoalwater Bay Shoreline Erosion Project
Draft Environmental Assessment
January 2007

Responsible Agency: The responsible agency for this flood and coastal storm damage reduction project is the U.S. Army Corps of Engineers, Seattle District.

Abstract:

This Environmental Assessment (EA) evaluates the environmental effects of the proposed Shoalwater Bay Shoreline Erosion Project. The project area is located on the north side of the entrance to Willapa Bay, a large estuarine system located on the southwest Pacific Ocean coast of the State of Washington, in Pacific County. The project will be located on and adjacent to the Shoalwater Bay Indian Tribe's Reservation on the northern edge of Willapa Bay, between Cape Shoalwater/Washaway Beach and Toke Point. The Reservation was created by an Executive Order in 1866; is approximately one mile square in size, and has 2/3 of its area specifically set aside as intertidal and subtidal lands to support the Tribe's subsistence shellfish harvesting and other fishery related activities.

The Shoalwater Reservation has a recent history of flooding and storm damage. On March 3, 1999, a combined storm and high tide caused severe flooding of the Shoalwater Reservation shoreline and surrounding community. The Reservation also experienced severe flooding and debris damage from winter storms in February 2006. The flooding is believed to be a direct result of erosion and breaching of the barrier dune on Graveyard Spit that fronts the Tokeland Peninsula. The limited wave protection currently afforded by the eroded barrier dune will continue to decrease, and flooding of the Shoalwater Reservation and adjoining lands will occur at increasingly frequent intervals.

The proposed project consists of a restoration of a deteriorated barrier dune system with an extension of an existing shoreline flood berm to protect the Shoalwater Reservation. The proposed project will not constitute a major federal action significantly affecting the quality of the human environment.

This document is also available online at:

<http://www.nws.usace.army.mil/ers/envirdocs.html>

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1. INTRODUCTION

1.1 BACKGROUND AND LOCATION

The project area is located on the north side of the entrance to Willapa Bay, a large estuarine system located on the southwest Pacific Ocean coast of the State of Washington, in Pacific County (see Figure 1). Willapa Bay's entrance to the Pacific Ocean is approximately 28 miles north of the mouth of the Columbia River and 17 miles south of the Grays Harbor entrance. Willapa Bay has an area of 109 square miles at mean higher high water (MHHW) elevation. Its spring or diurnal range tidal prism is more than 1,010 cubic feet, making it one of the largest of all inlets of the continental United States. The magnitude of the tidal prism is produced by the broad bay area and relatively large tidal range (approximately seven feet). The bay entrance is about six miles wide between Cape Shoalwater on the north and Leadbetter Point on the south.

The Willapa River is its principal tributary and enters from the east, and the Naselle River enters the bay at its southerly end. The bay has a southerly arm 19 miles long and an easterly arm 12 miles long. Both arms have numerous shoals and tide flats, with intervening channels formed by the discharge of tributary streams. The south arm is separated from the Pacific Ocean by a sandy peninsula (Long Beach Peninsula) having an average width of 1 ½ miles and elevations ranging up to 40 feet above MLLW and is terminated at its northern end by Leadbetter Point. Cape Shoalwater, bordering the bay's entrance channel on the north, consists of sand dunes adjacent to an actively eroding shoreline, wooded sand ridges about 40 feet high in the central part, and relatively low ground to the east.

The project would be located on and adjacent to the Shoalwater Bay Indian Tribe's Reservation in Pacific County, Washington. Reservation lands are on the northern edge of Willapa Bay, between Cape Shoalwater/Washaway Beach and Toke Point (see Figure 2). The Reservation was created by an Executive Order in 1866; is approximately one mile square in size, and has 2/3 of its area specifically set aside as intertidal and subtidal lands to support the Tribe's subsistence shellfish harvesting and other fishery related activities.

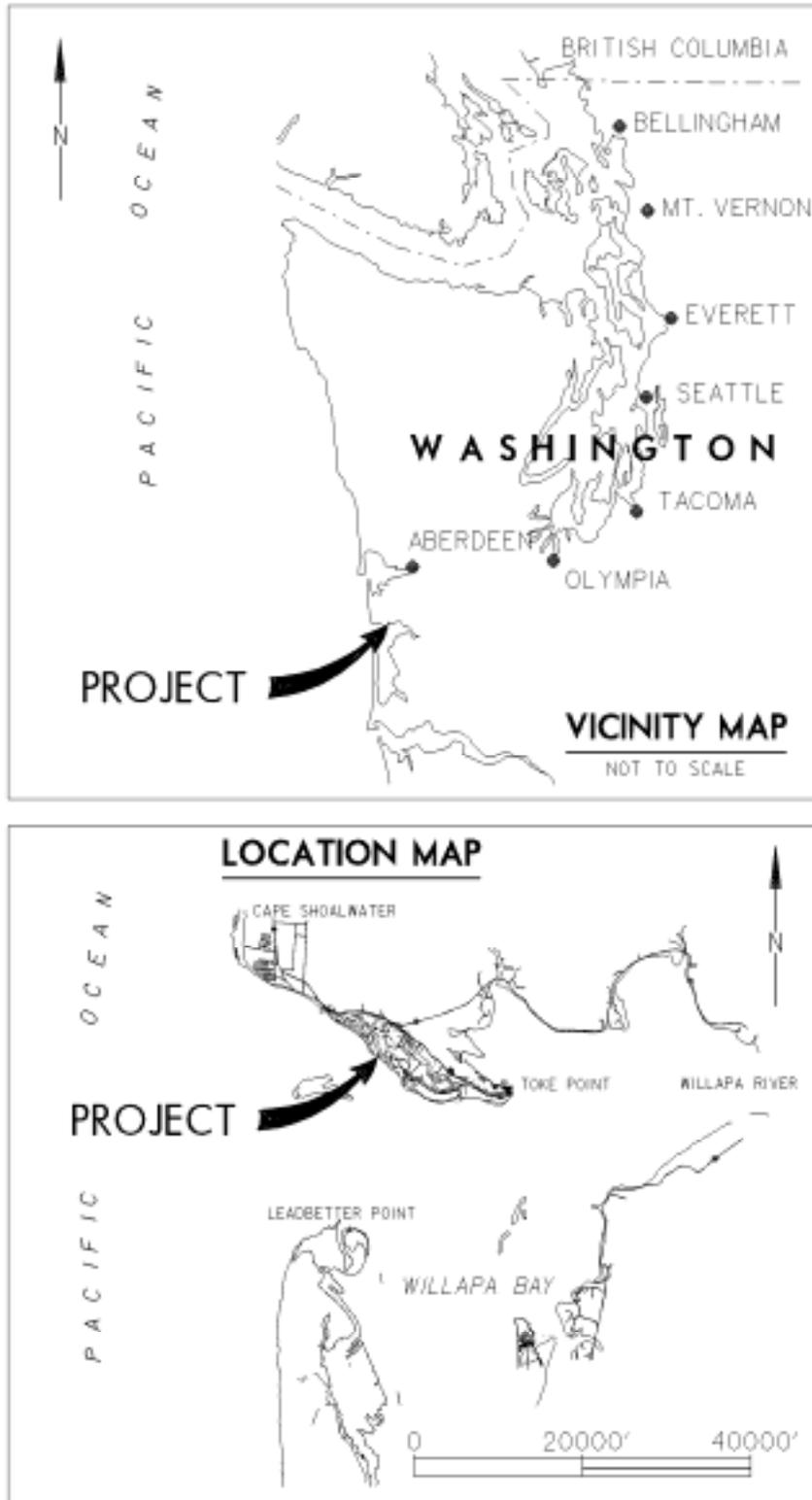


Figure 1. Project vicinity and location maps.

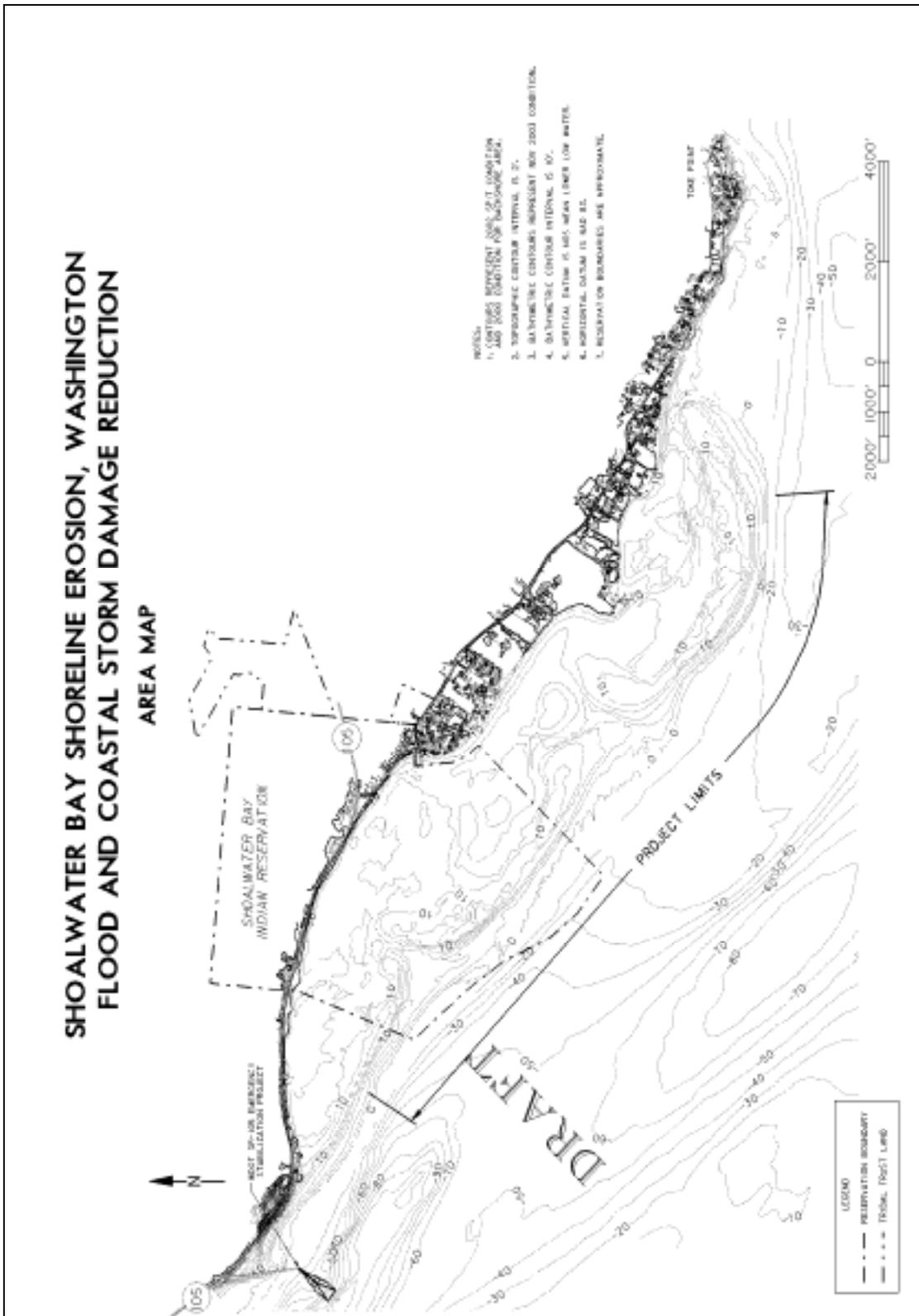


Figure 2. Shoalwater Bay Tribe Reservation

The Shoalwater Reservation has a recent history of flooding and storm damage. On March 3, 1999, a combined storm and high tide caused severe flooding of the Shoalwater Reservation shoreline and surrounding community. The Reservation also experienced severe flooding and debris damage from winter storms in February 2006. The flooding is believed to be a direct result of the erosion and breaching of the barrier dune on Empire Spit that fronts the Tokeland Peninsula. The limited wave protection currently afforded by the eroded barrier dune will continue to decrease, and flooding of the Shoalwater Reservation and adjoining lands will occur at increasingly frequent intervals.

1.2 PURPOSE AND NEED

Purpose

The purpose of this project is to provide coastal erosion protection for the tribal reservation of the Shoalwater Bay Tribe on Willapa Bay, Washington, that is cost-effective; environmentally acceptable and technically feasible; and will improve the economic and social conditions of the Shoalwater Bay Tribe.

Need

The Shoalwater Bay Indian Tribe has requested the assistance of the U.S. Army Corps of Engineers (Corps) in protecting reservation lands and upland facilities from flood damage associated with storm events, as well as further erosion and infilling of intertidal lands that is threatening shellfish habitat located on reservation lands.

The existing barrier dune in North Cove has suffered from erosion and resulted in several breaches. These changes in North Cove geomorphology between 1994 and 2003 are illustrated on Figure 3.

Comprehensive geologic studies found that the erosion processes, driven by the channel migration, are undergoing a profound change. The northward migration of the Willapa channel has stopped in the vicinity of the proposed project. Since the mid-1980s, the slope of the north bank of the main channel has been constant and has remained in a fixed position. This strongly indicates that the channel encountered hard strata that are resistant to erosion, sparing the last of the severely damaged dunes fronting the Shoalwater Reservation shoreline. Assuming this is indeed the case; engineering solutions will not have to attempt to turn aside the advance of the Willapa Channel but will only have to address the barrier dune erosion and resultant flooding caused by locally generated waves or waves that enter from the ocean. Wave studies, including the collection of field data and numerical modeling determined that while these waves were capable of eroding the dunes and causing flooding of Shoalwater Reservation uplands, they are relatively small by coastal engineering standards.

The level of wave protection currently provided by the eroded barrier dune was evaluated at the Corps' Coastal and Hydraulics Laboratory (CHL), the U.S. Geological Survey, and the Washington Department of Ecology. Since the extreme maximum tides are always associated with low atmospheric pressure events, storm extreme tides are almost always accompanied by storm wave conditions¹. A numerical model was used by CHL to evaluate wave heights along the Shoalwater Reservation/ Tokeland Peninsula shoreline for the "with" and "without" dune conditions for a storm and extreme +13.61 feet mean lower low water (MLLW) tide that occurred on March 3, 1999. The model results indicate that the 1999 storm probably generated waves at the shoreline that were approximately 1.5 feet high.

The numerical model was also used to simulate the same storm assuming that the barrier dune was eroded to the elevation of the surrounding land (+8 feet MLLW). Model results indicate that, without the protection of the dune, wave heights at the shoreline would more than double to as much as 3.3 feet. The March 3, 1999 storm caused severe flooding and resulted in the initiation of an "emergency flood protection planning process." As a consequence, in March 2001, the Corps of Engineers constructed a riprap flood berm along 1,720 feet of the Shoalwater Reservation shoreline. While this segment of flood berm provides protection from direct wave attack, the structure fails to address flooding caused by overtopping of the adjacent shoreline areas. Portions of the shoreline that are not protected by the 1,720 foot-long revetment will continue to be overtopped, causing flooding of all the low lying backshore areas of the Shoalwater Reservation with elevations lower than approximately +15 feet MLLW. A topographic survey map illustrates the extent of flooding that can be expected during storm events during which the tide elevation exceeds approximately +13 feet MLLW (see Figure 4). High tides exceeding about +13 feet occurred 10 times in the last 30 years, and tides at or above +13 feet have occurred four times in the last five years. Even if the frequency of high tides remains constant, erosion and lowering of the dunes due to erosion will continue. The limited wave protection currently afforded by the eroded barrier dune will continue to decrease, and flooding of the Shoalwater Reservation and adjoining lands will occur at increasingly frequent intervals.

Equally important, erosion and breaching of the barrier dune has severely degraded the tide flats and marsh habitat in North Cove, located between the barrier dune and Tribal uplands. The intertidal areas in North Cove that once supported shellfish on which the Shoalwater Tribe relied heavily both historically and in recent times are being shifted from tidal flat to high salt marsh due to infilling with sand eroded from the barrier dune during storm events.

¹ Tide records are available from a NOAA tide station located at nearby Toke Point.

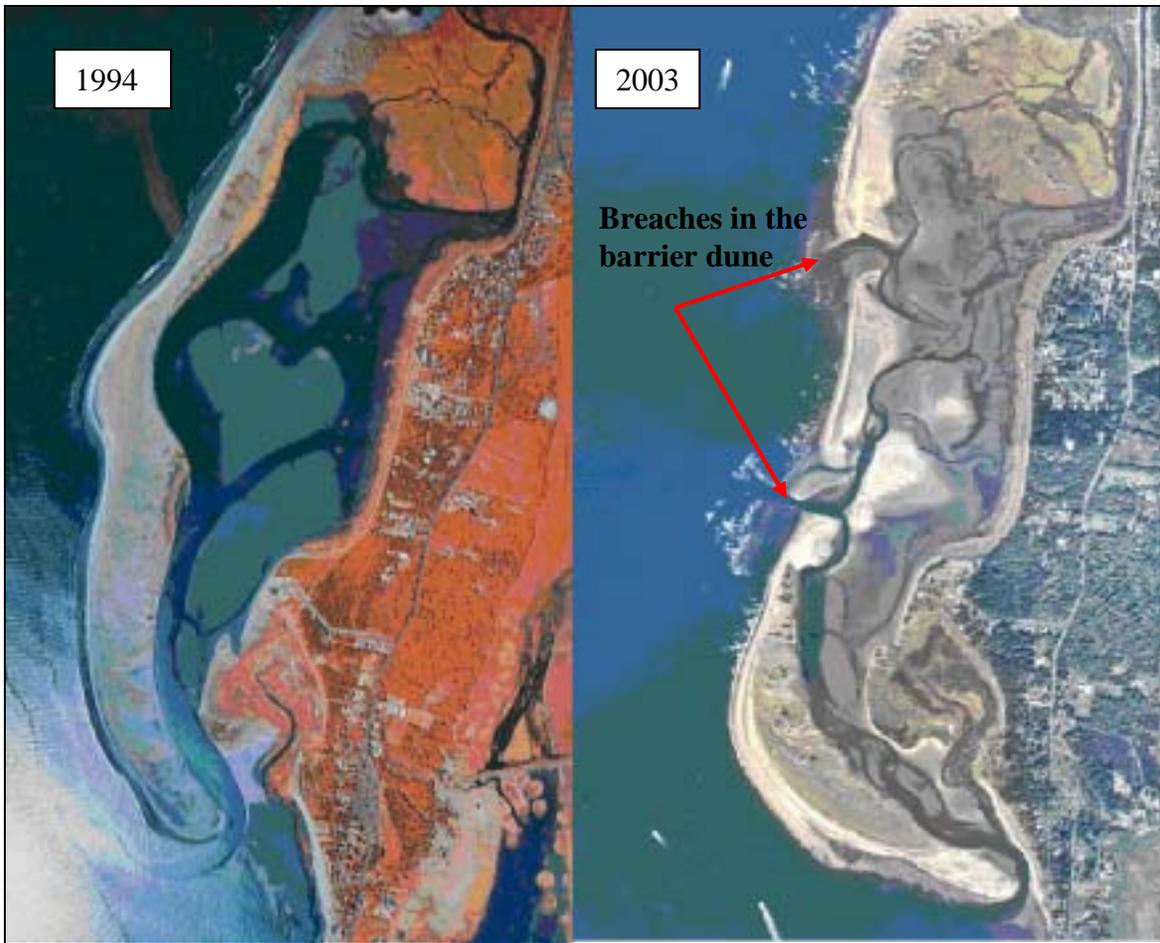


Figure 3. Aerial photography illustrating changes in North Cove geomorphology between 1994 and 2003.

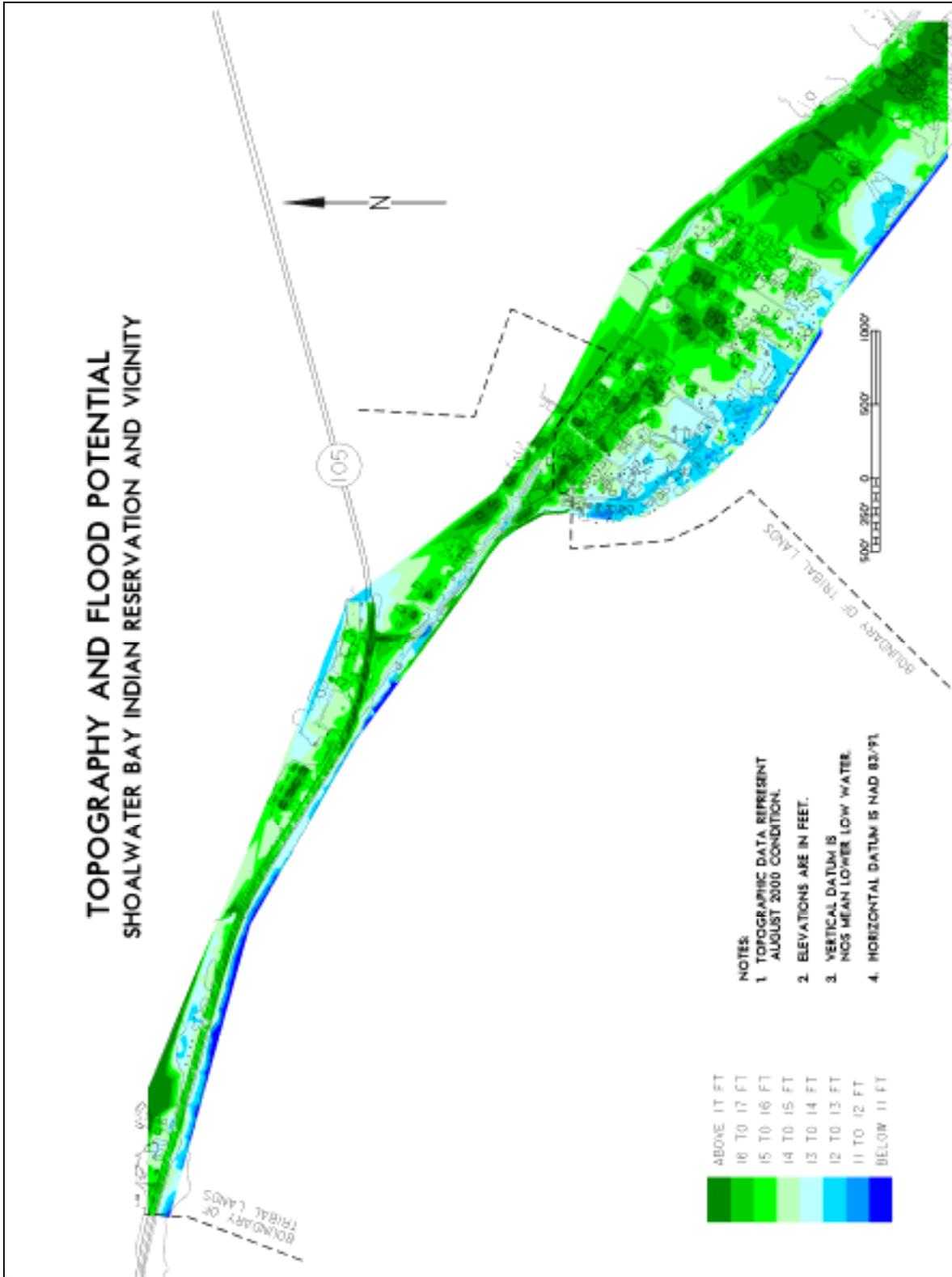


Figure 4. Topography and flood potential.

1.3 AUTHORIZATION

The project was authorized as Section 545, WILLAPA BAY, WASHINGTON, of the Water Resources Development Act of 2000, signed into law by President Clinton on December 11, 2000. The text of this section is as follows:

SEC. 545. WILLAPA BAY, WASHINGTON.

(a) STUDY. – The Secretary shall conduct a study to determine the feasibility of providing coastal erosion protection for the tribal reservation of the Shoalwater Bay Tribe on Willapa Bay, Washington.

(b) PROJECT. –

(1) IN GENERAL. – Notwithstanding any other provision of law (including any requirement for economic justification), the Secretary may construct and maintain a project to provide coastal erosion protection for the tribal reservation of the Shoalwater Bay Tribe on Willapa Bay, Washington, at Federal expense, if the Secretary determines that the project –

(A) is a cost-effective means of providing erosion protection;

(B) is environmentally acceptable and technically feasible; and

(C) will improve the economic and social conditions of the Shoalwater Bay Tribe.

(2) LANDS, EASEMENTS, AND RIGHTS-OF-WAY. – As a condition of the project, described in paragraph (1), the Shoalwater Bay Tribe shall provide lands, easements, rights-of-way, and dredged material disposal areas necessary for implementation of the project.

1.4 NEPA REQUIREMENTS

As the federal Action Agency for this project, the Corps is required by the National Environmental Policy Act (NEPA) (40 CFR § 1500 et. seq.) to assess the effects to the human environment of proposed agency actions, determine the significance of those effects, and coordinate with other agencies, Tribes, and the interested public in that assessment. The Corps has implemented NEPA through its ER 200-2-2 regulation. This EA has been prepared according to that regulation, and the guidance presented in the Planning Guidance Notebook, ER 1105-2-100. This EA has been prepared specifically to determine if this project warrants the preparation of an Environmental Impact Statement (EIS).

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 ALTERNATIVE 1- NO ACTION

The “No Action” alternative assumes that no measures will be undertaken to address the ongoing erosion of the barrier dune located in North Cove fronting the Tokeland Peninsula. This alternative also assumes that, although the northern migration of the North Willapa Channel has halted seaward of the Shoalwater Reservation, tidal currents and – to a greater extent – storm waves will continue to erode the barrier dunes which have afforded protection to the Shoalwater Reservation and Tokeland Peninsula.

2.2 ALTERNATIVE 2- DUNE RESTORATION AND FLOOD BERM EXTENSION (PREFERRED ALTERNATIVE)

The dune restoration and flood berm extension alternative combines restoration of the now deteriorated barrier dune system with an extension of a shoreline flood berm that was constructed in 2001 to protect the Shoalwater Reservation. The restored barrier dune will provide primary protection from storm waves, but the presence of the flood berm allows for an additional level of flood protection and lengthens the intervals between required barrier dune maintenance actions. This alternative also proposes to relocate the channel at the southern end of North Cove to reduce bank erosion in this area.

2.21 Dune Restoration

Erosion and lowering of the barrier dune that extends southward on Graveyard Spit and Empire Spit is exposing the Shoalwater Bay Indian Reservation and the Tokeland Peninsula shoreline to increased flooding from storm waves during periods of extreme high tides. The dune restoration alternative is intended to rebuild, and maintain the now deteriorated dune system with sand dredged from the adjacent Willapa Bay entrance and channel. The restored dune would be 12,500-foot-long, with a top elevation of +25 feet MLLW, a top width of 20 feet, and a side slope of 1V on 5H. The dune restoration would be constructed along the crest of the now deteriorated dune. The initial dune restoration would require the placement of approximately 600,000 cy of sand dredged from the entrance to Willapa Bay. The dredged sand would be graded and planted with native dune grass (see Figures 4 and 5).

Over the last ten years, the erosion of the barrier dune has profoundly affected the channel that flows into North Cove. Figure 2 shows that, in 1994, the dune formed a continuous barrier separating North Cove from Willapa Bay and a single, well-defined channel entered the southern end of the cove. The tidal flow in this channel was strong enough to scour away sand that was being carried southward on the ocean side of the spit. In 1995 erosion of the dune resulted in the formation of a breach. This additional entrance and exit for tidal flows, combined with the reduction in the cove volume due to infilling, resulted in a diminished flow through the channel. The flow through the North Cove channel was no longer strong enough to resist the southward encroachment of the spit,

and the channel began migrating to the southeast. In 2003, a second breach developed in the spit decreasing the channel flow even further. The 2003 aerial photograph (see Figure 2) clearly shows that the migrating channel is now eroding the southern Tokeland Peninsula shoreline. Rehabilitation of the barrier dune will close the breaches, which will result in an increase in the flow through the channel.

Tribal members expressed concerns that the increased flow could exacerbate the channel-caused erosion along the Tokeland Peninsula shoreline. This potential problem will be addressed by relocating the North Cove channel 1,000 feet westward, to the approximate location it occupied in 1994. Relocation of the channel will require excavating approximately 100,000 cy of sand. The excavated material will be relocated to the area presently occupied by the existing channel. The plan areas (below MHHW) for the relocated channel and for the fill were adjusted to balance each other so that there will be no net change in intertidal area.

Although the migration of the Willapa channel appears to have halted, other littoral process will not be altered. Erosion by storm waves and currents will continue, and the restored barrier dune will require maintenance on a regular basis. The cost of mobilizing a large dredge to the project site is a major consideration, and the lowest life-cycle cost is obtained by maximizing the dune maintenance interval. For this reason, the initial dune dimensions maximize the volume of sand that is placed within the available plan area of the existing spit. Maintenance requirements for the dune restoration were estimated by using topographic surveys of the dune to compute the sand loss that occurred between 2000 and 2002. Based on the 2000-2002 erosion rates, the annual loss of sand from the dune (above +6 feet MLLW) is estimated to be 50,000 cy/year. For both construction and maintenance, the sand will be dredged from the borrow areas shown in Figure 5. A potential borrow site is located approximately 4,000 feet from the project, on the north side of the Willapa Bay channel. A similar construction process was carried out by the Washington State Department of Transportation in 1998 for the SR 105 Emergency Stabilization Project.

2.22 Flood Berm Extension

In addition to the dune restoration, this alternative includes the construction of an extension of the existing flood berm northward 4,000 feet and southward 2,770 feet. The flood berm extension would utilize a design that is similar to the existing flood berm. It would be constructed of graded riprap with a top elevation of +17 feet MLLW, a top width of 16 feet, and a side slope of 1V on 1.5H. The total planned area of rock placed below MHHW is approximately 350 square feet (150 square feet on reservation land for the north flood berm extension and 200 square feet on non-reservation land for the south flood berm extension). When the 4,000-foot-long north flood berm extension and 2,770-foot-long south flood berm extension would be combined with the existing 1700-foot-

long berm, the flood berm would form a continuous protective structure that would have a total length of 8,470 feet (see Figure 4). The north extension of the flood berm would require approximately 35,000 tons of graded riprap and 14,000 tons of core material. Approximately 15,000 cy of sand would be excavated to make way for the north extension core material. The south extension of the flood berm would require approximately 25,000 tons of graded riprap and 15,000 tons of core material. Approximately 10,000 cy of sand would be excavated to make way for the south extension core material. All construction materials for the flood berm extension would be brought to the construction site by truck, and access to the site would be along the structure itself. The 10,000 cy of excavated sand would be re-graded over the flood berm and planted with native vegetation.

A portion of the flood berm extension would extend along the shoreline, beyond the Shoalwater Reservation boundary, requiring a perpetual easement be acquired from affected Dexter property owners. If the easement could not be acquired from Dexter property owners, the project would likely proceed with a limited design only on Reservation lands.

2.23 Maintenance Requirements

The maintenance requirements for this alternative are assumed to be 500,000 cy at 10-year-intervals for dune maintenance, replacement of 25 percent of the flood berm riprap at 25-year intervals, and replacement of 5,000 cy of the sand covering the seaward face of the flood berm at 25-year-intervals. However, the “backup” protection provided by the flood berm allows considerable flexibility in the maintenance schedule for the dune restoration, allowing the maintenance interval to increase to at least 10 years verses every five years if the dune restoration-only alternative were implemented. This flexibility alleviates some of the concerns regarding availability and timing of funding for dune maintenance, and scheduling of relatively scarce dredging equipment, and the short four-month-long dredging “window” within which dredging equipment can safely operate in the severe wave climate at Willapa Bay.

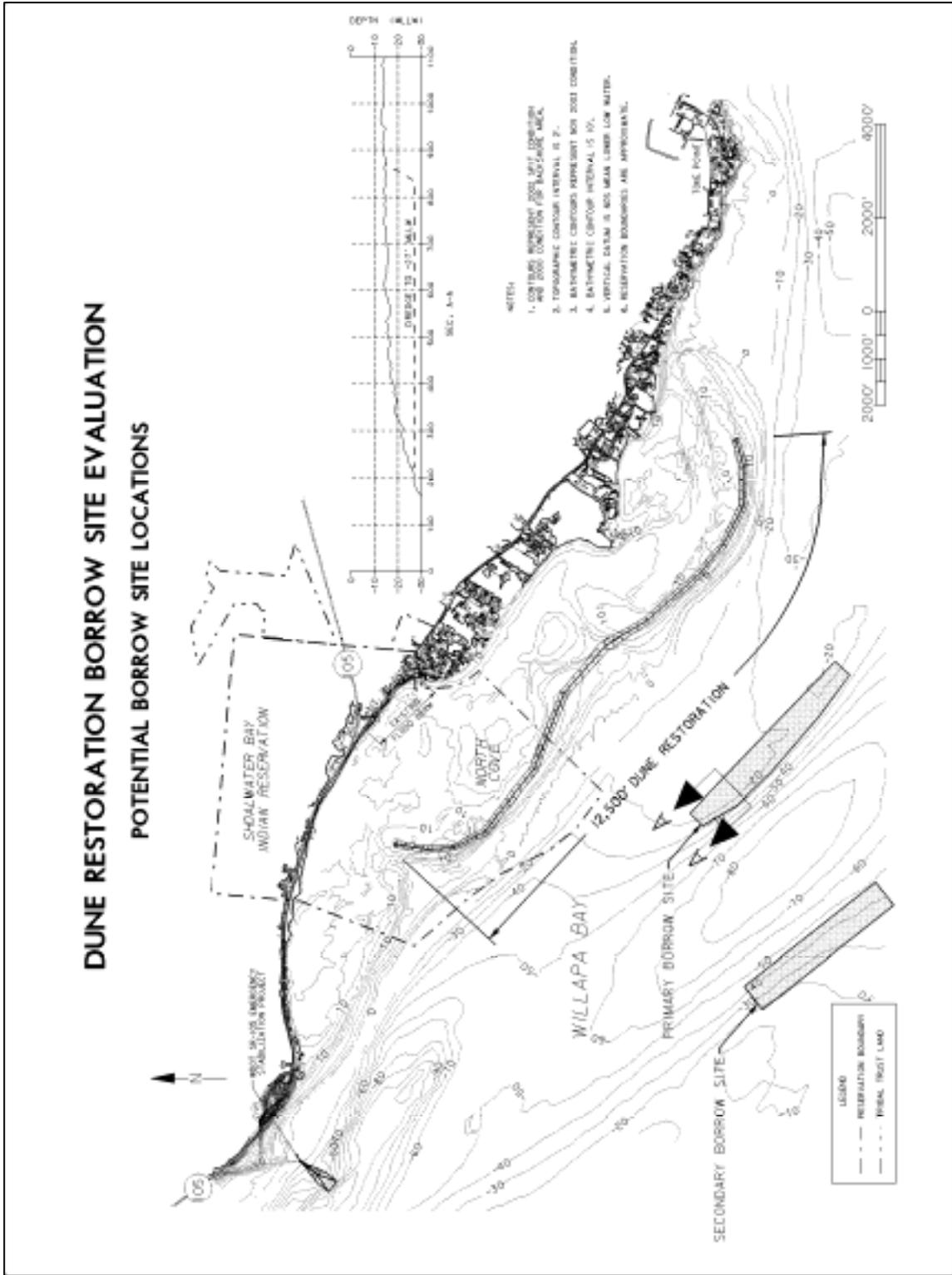


Figure 6. Proposed action- borrow sites for barrier dune restoration

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

2.31 Alternative 3- Sea Dike

This alternative would construct a sea dike, which would be a 12,500-foot-long rock structure that is intended to replace the wave protection that was once afforded by the now deteriorated dune system. The structure would have a top elevation of +20 feet MLLW, a top width of 14 feet, and a side slope of 1V on 2H. The dike would require approximately 213,000 tons of underlayer and quarry stone, and 203,000 tons of armor stone, and would be constructed along the crest of the deteriorated dune. Approximately 200,000 CY of sand would be excavated to make way for the dike stone. The excavated sand would be re-graded over the dike, and planted with native dune grass. While the sea dike itself would be designed to resist erosion by waves and currents, the sand covering the rock on the seaward side of the dike probably would be eroded, and would require maintenance on a regular basis.

The dike stone would be brought to the construction site by truck. Access to the site would require construction of a one mile haul road from SR 105. The haul road would be removed at the completion of construction. The maintenance requirement for the sand covering the seaward face of the dike is assumed to be 100,000 cy at two-year-intervals. Replacement of 50 percent of the dike armor stone would likely be required at 25-year intervals.

Impacts of the Sea Dike Alternative

The sea dike alternative was eliminated from further evaluation because it is not environmentally acceptable to resource and regulatory agencies, based on feedback during the plan formulation phase of the project development. This alternative was also not supported by the Shoalwater Bay Indian Tribe. The sea dike would transform a natural sand dune feature to a rock structure, eliminating shellfish habitat as well as habitat of other organisms' dependant on the sand dune habitat. The sea dike alternative assumes that the northward migration of the Willapa channel has halted seaward of the Shoalwater Reservation. Since the dike would not be intended to address the channel migration, further channel encroachment could undermine and destroy the dike. Another major disadvantage of this alternative is that the dike alignment would be fixed at the time of construction, and could not easily accommodate even a minor change in the channel location without a major reconstruction effort.

2.32 Alternative 4- Flow Diversion Structures

When evaluating this alternative, four representative flow diversion structures, or training dikes, were modeled at the Corps' Coastal and Hydraulics Laboratory, using the ADCIRC hydrodynamic model. The dimensions and orientation of the structures were adjusted until an obvious change in the flow regime of the channel occurred. The results of the

model investigation found that extremely massive structures would be required to make a significant change in the flow regime of the Willapa channel. Estimated initial construction volumes for individual structures varied from 640,000 to 1,800,000 tons. Assuming an “in place” unit cost of \$50/ton, the initial construction costs probably would range from \$32 million to \$90 million. The drawback of the high construction cost was compounded by high maintenance costs and the risk for unanticipated, and potentially adverse, consequences to the hydrodynamics and ecology of Willapa Bay.

Potential Impacts of Alternative 4

The Flow Diversion Structures Alternative was eliminated from further consideration because it did not appear to be either cost effective or environmentally acceptable, or verifiable as to the beneficial effect in reducing the flood and coastal storm damage threat to the Shoalwater Bay Indian Reservation.

2.33 Alternative 5- Shoreline Revetment

The revetment alternative consists of constructing an 8,470-foot-long rock structure that would be intended to provide protection from coastal flooding due to wave overtopping during periods of high tides. The revetment would be designed for wave conditions that would result as the barrier dune continues to erode (i.e., is not restored) and lowers to the elevation of the surrounding inter-tidal area (approximately +8 feet MLLW). The revetment would have a top elevation of +21feet MLLW, a top width of 8 feet, and a side slope of 1V on 1.5H. Construction of the revetment would require placing approximately 55,000 tons of graded riprap and 64,000 tons of armor stone along the existing shoreline. The graded riprap and revetment stone would be brought to the construction site by truck, and access to the site would be along the structure itself. Approximately 24,000 cy of sand would be excavated to make way for the revetment stone. The excavated sand along with approximately 40,000 cy of imported sand would be re-graded to create a shoreline cover over the revetment. The sand cover would then be planted with native vegetation.

While the revetment itself would be designed to resist erosion by storm waves, some of the sand covering the rock on the seaward side of the revetment probably would be eroded during extreme tide events. Maintenance requirements for the revetment are assumed to be a replacement of 25,000 cy of sand covering the seaward face of the revetment every 10 years, and replacement of 25 percent of the revetment armor stone at 25-year intervals. As for all the protective structures, the revetment alternative assumes that the northward migration of the Willapa channel has halted seaward of the Shoalwater Reservation.

Potential Impacts of Alternative 5

The revetment alternative abandons any attempt to preserve the existing barrier dune structure and does not address the filling of North Cove and eventual loss of the remaining Shoalwater Reservation inter-tidal habitat within North Cove. This alternative protects only the small upland portion of the Shoalwater Reservation. It was screened out

because, unlike other available solutions, it fails to fully meet the criteria specified in the project authorization. For these reasons, the shoreline revetment is also not acceptable to the Shoalwater Bay Indian Tribe.

2.34 Alternative 6- Dune Restoration without the Flood Berm Extensions

Under this alternative, the dune would be restored in a similar fashion to Alternative #2 to provide protection from storm waves, however, no work would be done to extend the existing flood berm. The maintenance requirement is assumed to be 250,000 cy at five-year-intervals. The dune alignment could be readjusted to the most effective location each time maintenance is required.

Potential Impacts of Alternative 6

Under this alternative, maintaining the dune to its design dimensions would be critical, and the dune could not be allowed to deteriorate to a point that waves could overtop the structure. Because this design would not include an extended flood berm, the community would be at substantial risk of flood damage if the dune was damaged or eroded. Subsequent maintenance actions to repair the dune would be dependant on funding and equipment availability, and, therefore, may not be possible to schedule in time to prevent future flood damages. For this reason, this alternative was eliminated in favor of Alternative #2, which would provide the additional “backup” protection of the expanded flood berm and decreased maintenance intervals.

3. AFFECTED ENVIRONMENT

3.1 INTRODUCTION/GENERAL SETTING/CLIMATE

The Shoalwater Reservation is located on the north shore of Willapa Bay in Pacific County, Washington. At one-mile square, the reservation is relatively small, with 2/3 lying at or below the intertidal zone. The Shoalwater Reservation is mostly in a flat area along the shore, with lands extending north toward a Pleistocene rock ridge, which generally runs east to west, and comes within 200 feet of the shore at Washaway Beach. Washington SR 105 runs east west through the Shoalwater Reservation, with Toke Point Road running southeast off SR 105. Within the tidal portion of the Shoalwater Reservation (behind Graveyard Spit and including parts of North Cove) there are small bays, and extensive intertidal marsh communities. The marsh is a mix of native plants and invasive smooth cordgrass (*Spartina alterniflora*). None of the marsh adjacent to and within the reservation is listed by the Washington Department of Natural Resources as high quality natural heritage wetland.

Average water temperature of the Pacific Ocean adjacent to Willapa Bay is 48 to 58°F, and water temperature in the Bay is likely similar to and influenced by ocean exchange. Average temperature ranges from 34.9 to 72.4 °F, and there is an annual total average of 86.9 inches of precipitation (NRCS, 2000).

3.2 ELEMENTS OF THE NATURAL ENVIRONMENT

3.21 Geology/Soils

The area along the shore of northern Willapa Bay which contains the Shoalwater Reservation is classified generally as Ocosta Soils (NRCS, 2000). Three soil types dominate: Newskah Loam, Ocosta Silty Clay Loam, and Westport Fine Sand. The adjacent Dexter-By-the-Sea community is underlain with Yaquina loamy fine sand. Graveyard Spit has been described as Dunelands and Fluvaquents, with Ocosta Silty Clay Loam and Westport Fine Sands in the North Cove area.

3.22 Surface Water

Marine surface waters adjacent to the Reservation are regularly sampled by the Washington Department of Ecology (WDOE). There has been a sampling station adjacent to Toke Point since 1990. In 2000, the most recent data available, surface water temperature ranged between 7.91 and 16.75°C; salinity was within the range for brackish water to seawater (19.15 ppt to 31.63 ppt); and dissolved oxygen was between 7.796 mg/L and 10.477 mg/L. The tide range 6.78 feet, with a Spring Tide range of 8.85 feet.

The Naselle, North, and Willapa Rivers flow into Willapa Bay. Flow measurements from the U.S. Geological Survey show an average annual range for the Willapa River from 411 cubic feet per second (CFS) to 1,011 CFS; average annual flow in the Naselle is between 284 and 648 CFS. Modeling by the Corps of Engineers shows an ebb tide flow of up to 500,000 CFS at the mouth of Willapa Bay.

In the immediate vicinity of the Shoalwater Reservation, the WDOE has three sites listed under Section 303 (d) of the Clean Water Act. North Cove has been designated a Class 4 water (Impaired by a Non-Pollutant) for invasive or exotic species (*Spartina alterniflora*), and the creek feeding the northwest portion of the Cove is also a Class 4 water for a fish passage barrier (WDOE, personal communication, 2004). WDOE has also designated several sites around North Cove, Graveyard Spit, and Toke Point as Waters of Concern (Class 2) for Carbaryl, a pesticide used in oyster aquaculture.

3.23 Plant Communities

Marsh plants dominate the intertidal areas of North Cove. Species present include beach grass, sedges, rushes, *Salicornia sp.*, and *Spartina alterniflora*. Upland areas are composed of coastal woodlands and residential ornamental plants and grasses.

3.24 Fish and Aquatic Species

Willapa Bay has historically been a major coastal fishing and shellfishing area for Washington. Commercially and recreationally important species include Pacific tom cod, lingcod, white and green sturgeon, Chinook, coho and chum salmon, steelhead and cutthroat trout. Forage fish, including Pacific herring, sandlance, surf smelt, and anchovy are all common in the Bay. Bull trout are believed to forage in the Bay, but there are no known resident populations in Willapa Bay or its adjacent rivers. Commercial fisheries for Dungeness crab, razor clams, and oyster aquaculture exist throughout the Bay.

3.25 Wildlife

A query of the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species database indicates that the project site is designated as wood duck habitat, and a waterfowl concentration area. Marsh hawks (*Circus cyaneus*), osprey (*Pandion haliaetus*), and great blue herons (*Ardea herodias*) are commonly seen. The Willapa River estuary provides habitat for wintering and migrating shorebirds, which feed on mudflats and roost in marshes and pastures along the river. Dominant species are the Western sandpiper (*Calidris mauri*) and short-billed dowitcher (*Limnodromus griseus*) in the spring, and dunlin (*Calidris alpina*) during the winter (Cullinan 2001). Waterfowl utilize Washington's coastal bays primarily during migration. American wigeon (*Anas americana*) account for 80% of the waterfowl species migrating through Grays Harbor and Willapa Bay with fall counts peaking at approximately 30,000 birds. Northern pintails (*Anas acuta*) are the second most abundant with about 15,000 birds, and mallards (*Anas platyrhynchos*) are common during all times of the year.

Large numbers of green-winged teal (*Anas crecca*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*), red-breasted merganser (*Mergus serrator*), and to a lesser extent, canvasback (*Aythya valisineria*), northern shoveler (*Anas clypeata*), ruddy duck (*Oxyura jamaicensis*), ring-necked duck (*Aythya collaris*) and gadwall (*Anas strepera*) will use the area during migration and wintering periods. Wood ducks (*Aix sponsa*) use the area as breeding habitat and during migration periods. About 90,000 scoters (*Melanitta sp.*) are counted annually during midwinter surveys by the USFWS with over half occurring in western Washington. Canada geese (*Branta canadensis*) are most numerous along Willapa Bay, with a resident population of 900–1,000 birds. Another significant movement of geese through the region is by black brant (*Branta bernicla*). Willapa Bay is one of the most important wintering and spring staging areas for brant on the West Coast. Approximately 12,000 birds use the area as spring staging habitat, while 2,500 birds are present during the winter months.

Of the waterfowl that uses Willapa Bay, green-winged teal prefer to forage on mudflats where they find seeds and small invertebrates. Wigeon feed more on vegetative parts of aquatic plants, compared to other dabbling ducks, and commonly feed on submerged aquatic vegetation such as eelgrass. Gadwall, pintail, and canvasbacks also use estuaries

and feed on submerged aquatic vegetation. Northern shovelers can be found in shallow water along the shores of estuaries, especially where freshwater enters the estuary. Their diet is heavily dominated by animal material. Scaup (*Aythya sp.*) forage primarily on animal material including small fish, mollusks, and snails. Buffleheads commonly feed on fish, amphipods, isopods, shrimp, and mollusks in estuarine environments during the winter.

3.26 Endangered Species

Nineteen species protected by the Endangered Species Act of 1973, as amended, and one candidate species are potentially found in the vicinity of Shoalwater Bay Erosion Project (see Table 1 below). In accordance with Section 7(a)(2) of the Act, Federally funded, constructed, permitted, or licensed projects must take into consideration impacts to Federally listed and proposed threatened or endangered species. In order to satisfy the requirements of the Act, the Corps will consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) regarding the effects of the proposed action on listed species. The Corps has prepared a biological evaluation (BE) to determine the effects of the project and propose conservation measures for species affected by the proposed action. The effect determinations described in the Corps BE can be found in Table 2. No construction would occur by the Corps until the Services concur with the determinations made in the BE.

Table 1. Threatened, endangered, candidate and species and critical habitat potentially found in the project area

Species	Listing Status	Critical Habitat
Bald Eagle <i>Haliaeetus leucocephalus</i>	Threatened	None
Brown Pelican <i>Pelecanus occidentalis</i>	Endangered	None
Marbled Murrelet <i>Brachyramphus marmoratus</i>	Threatened	Designated (none in project area)
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	Threatened	Proposed
Northern spotted owl <i>Strix occidentalis caurina</i>	Threatened	Designated (none in project area)
Short-tailed albatross <i>Phoebastria albatrus</i>	Endangered	None
Streaked horned lark <i>Eremophila alpestris strigata</i>	Candidate	N/A
Coastal-Puget Sound Bull Trout <i>Salvelinus confluentus</i>	Threatened	Designated (none in project area)

Species	Listing Status	Critical Habitat
Leatherback Sea Turtle <i>Dermochelys coriacea</i>	Endangered	Designated (none in project area)
Loggerhead Sea Turtle <i>Caretta caretta</i>	Threatened	None
Green Sea Turtle <i>Chelonia mydas</i>	Threatened	Designated (none in project area)
Olive Ridley Sea Turtle <i>Lepidochelys olivacea</i>	Threatened	None
Oregon silverspot butterfly <i>Speyeria zerene hippolyta</i>	Endangered	Designated (none in project area)
Steller sea lion <i>Eumetopias jubatus</i>	Threatened	Designated (none in project area)
Humpback whale <i>Megoptera novaeangliae</i>	Endangered	None
Sperm whale <i>Physeter catodon</i>	Endangered	None
Sei whale <i>Balaenoptera borealis</i>	Endangered	None
Fin whale <i>Balaenoptera physalus</i>	Endangered	None
Blue whale <i>Balaenoptera musculus</i>	Endangered	None
Southern resident killer whale <i>Orcinus orca</i>	Endangered	Proposed

Threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (FWS) are bald eagle, brown pelican, coastal/Puget Sound bull trout, green sea turtle, olive Ridley sea turtle, marbled murrelet, northern spotted owl, Oregon silverspot butterfly, short tailed albatross, Western snowy plover, streaked horned lark, and Oregon silverspot butterfly.

Federally listed, proposed, and candidate animal species under the jurisdiction of the NOAA Fisheries (formerly the National Marine Fisheries Service), which may occur in the project vicinity, include: leatherback sea turtle, loggerhead sea turtle, Steller sea lion, sperm whale, sei whale, fin whale, humpback whale, blue whale, and killer whale. In addition, the project area is located within designated Essential Fish Habitat for salmon, groundfish, and coastal pelagic species as designated under the Magnuson/Stevens Fishery Conservation and Management Act.

3.3 ELEMENTS OF THE BUILT ENVIRONMENT

3.31 Land and Shoreline Use

Lands within the Project Area are divided between Shoalwater Reservation infrastructure and operations, private residential housing (on and off Reservation), and minor commercial activity (fireworks sales, gasoline and convenience stores sales). Specific Tribal land uses include a multi-building Tribal Center, which includes Tribal meeting spaces, a Tribal Wellness Center and Tribal Police; the Shoalwater Bay Casino; and residential housing built by the Tribe. Tribal members reside in housing of various types both on and off the Reservation. In addition, there is private residential land use, and a hotel within the adjacent Dexter-by-the-Sea community.

Major industries in Pacific County include tourism, logging, lumber manufacturing, oyster harvesting, seafood canning, crabbing, commercial and sport fishing, dairy farming, and cranberry production. In 1990, the County's economy was more dependent on employment in forestry, fisheries, manufacturing, and personal services than Washington State as a whole (Cook and Jordan, 1994). Employment in distributive, social, and producer services was under-represented in Pacific County by comparison.

Many farms along the Willapa Basin's river valleys raise beef and dairy cattle, with related production of hay, silage, and calves. During the 1990's, beef cattle production in Pacific County declined while numbers of dairy cattle slowly increased (Willapa Alliance, n.d.). Changing markets, the cyclical nature of worldwide beef prices, an oversupply of milk, waste management restrictions, and rising property prices have led to a consolidation of the number of cattle farms. In Pacific County, this trend has resulted in fewer farms with more head of cattle per farm, and operations that import more feed and silage than in the past (Willapa Alliance, n.d.).

Many of Willapa Bay's tidal flats are in private ownership and managed for oyster mariculture sites. Pacific and neighboring Grays Harbor counties are home for two-thirds of the oyster industry in Washington (Conway 1991, as cited by USFWS 1997). WDFW reported a five-year average of 462,000 gallons of Pacific oysters harvested in Pacific County (Hoines 1996, as cited by USFWS 1997). In Pacific County, the oyster growing and processing industry employed 480 workers with a total labor income of \$6.3 million, accounting for one out of every twelve jobs in 1990 (Conway 1991, as cited by USFWS 1997).

3.32 Cultural Resources

Leslie Sapir (1936:30) cites Curtis (In North American Indian, IX, 6-7, 173) in stating that the villages on the north side of Willapa Bay were Salish or "Shoalwater Salish," and included: "H1ímŭmi" near North Cove, Mónílŭmsh" at Georgetown, and "Númoïha ' nhl" at Tokeland. Verne Ray (1938:41) lists village Number 30 as: "na·mst'cat's" which

was located between Tokeland and north Cove and was a village occupied principally during the winter and that at that time (in 1938) it was called Georgetown. Hajda (1990:514) places the project area within the traditional territory of the Lower Chehalis, a subdivision of the Southwestern Coast Salish speaking people. Hajda states that in the early 1830's a malaria epidemic (as cited by Boyd 1985) devastated the Lower Columbia River and adjacent area populations and resulted in changes of group compositions. The surviving Chinook and Lower Chehalis in Willapa Bay became a bilingual population (as cited by Swan 1857:211) that were known as Shoalwater Bay Indians. The Lower Chinook were eventually totally replaced by Lower Chehalis (as cited by Ray 1938:30). A small reservation was established in 1866 for the Lower Chehalis, Chinooks, and others living in the area that came to be called the Georgetown Reservation and then later the Shoalwater Bay Indian Reservation.

3.34 Native American Issues

The Shoalwater Bay Indian Tribe is the project sponsor and proponent. The Shoalwater Tribe has worked to secure funding for the project, and has been an active participant on the design and evaluation team. Tribal leadership and their consultants contributed to the initial choice and assessment of alternatives. Tribal biological and cultural resources staff have supported field surveys and provided documentation in support of the analyses of environmental and cultural effects of the proposed action. The Shoalwater Tribe also maintains an active dialogue with the adjacent non-reservation community, hosts public meetings and forums on the project, and has conducted mailings to affected community members with regard to the project. Tribal members are also commercial fishermen within Willapa Bay, and make use of local native plant species for Tribal crafts and ceremonial use.

3.35 Recreation

Fishing, bird watching, walking along the existing flood berm, bicycling, and beach combing are major outdoor recreational activities conducted within the project area. Casino gaming is undertaken within the Tribe's casino, which is adjacent to the project site.

3.36 Noise

There is little noise pollution on the Reservation or within the surrounding community as there is no industrial activity on the Reservation, in Dexter-by-the-Sea, or in Tokeland. Noise levels are thus considered equal to residential noises, and include noise from passing vehicles, lawn mowers, and similar low level noise sources.

3.37 Air Quality

Pacific County has no designated non-attainment areas. Air quality is monitored by the Olympic Region Clean Air Agency, under authority from the U.S. Environmental Protection Agency.

3.38 Environmental Health/Hazardous and Toxic Waste

The Corps performed an environmental evaluation for the presence of hazardous, toxic, and radioactive waste at lands located on and adjacent to the Shoalwater Reservation. This was completed under ER 1165-2-132, “Hazardous, Toxic and Radioactive Waste (HTRW) Guidance for Civil Works Projects”, which provides guidance for considering issues associated with HTRW which may be located within project boundaries or may affect or be affected by Corps Civil Works projects. The specific goals for this evaluation were to identify any existence of, or potential for, HTRW contamination on lands, including structures and submerged lands in the project area, or external HTRW contamination which could impact, or be impacted by, the project.

A site visit was made by the Corps on March 23, 2005 to complete the site reconnaissance for the project. During the visit, personnel searched for evidence of HTRW in the form of soil staining, unusual odors, distressed vegetation, dead animals, landfills, sumps, disposal areas, above-ground and underground storage tanks, vats, containers of unidentified substances, water treatment and sewage treatment plants, ditches, abandoned buildings boat yards, harbors, and fueling stations. No creosoted timbers, petroleum stained soils or odors, dead animals, distressed vegetation, or any other evidence of HTRW was identified during this visit. Several above ground storage tanks were identified but were not considered a potential problem because of their distance from the proposed project site. It is possible that some of the houses that back up to the southern end of the proposed flood berm may have septic systems and/or underground storage tanks (UST) for fuel oil buried in their back yards. Even if any of the septic tanks or UST’s leaked into the intertidal area, it is unlikely that the sediments are contaminated since the tidal flushing is quite high and no visual or olfactory signs were present during the site visit.

A search of Environmental Protection Agency (EPA) and State of Washington databases was conducted to locate sites in the project area that are known or suspected to be contaminated or could have contributed contamination to the project area.

Out of over 200 sites in Pacific County, only one site of potential concern was identified in the project area. This site is the “Tokeland Cattle Dip Tank” that is located at 2406 Tokeland Road. Through discussions with the State of Washington Department of Ecology (WDOE), it was determined this site was a State Cleanup Site that had been contaminated with pesticides in the groundwater and petroleum and pesticides in the soil.

However, the cleanup was completed and a No Further Action Letter (NFA) was issued by WDOE in 1999. No other contaminated sites are known to exist in the project area.

The offshore dune restoration borrow areas, although in close proximity to the Long Beach Peninsula, have never been the sites of any construction, any recent ship wrecks or any other source of contamination. Therefore it is unlikely that they would contribute any contamination to the project site.

4. EFFECTS OF THE ALTERNATIVES

4.1 ELEMENTS OF THE NATURAL ENVIRONMENT

4.11 Geology/ Soils

Dune Restoration and Flood Berm Extension

The preferred alternative is not expected to have any major effects to the geology and soils in the area. This alternative would require an initial quantity of approximately 600,000 cy of sand to be placed on the existing dune. The source for this sand will be material dredged from the entrance to Willapa Bay and therefore, similar in character to the material currently comprising the barrier dune. Future dune nourishment actions will continue to utilize material dredged from the Willapa Bay region. The flood berm extensions to create a continuous protective structure of 8,470 feet will utilize similar materials to the existing flood berm. Placed armor stone may prevent erosion of the soils and bank adjacent to Highway 105.

No Action Alternative

The no-action alternative would likely result in some continued erosion of the barrier dune. It appears that the northward migration of the Willapa channel has stopped in the vicinity of the proposed project. Migration of the channel is believed to have encountered hard strata that are resistant to erosion, sparing the last of the severely damaged dunes fronting the Shoalwater Reservation shoreline.

4.12 Surface water

Dune Restoration and Flood Berm Extension

Changes in the drainage patterns of North Cove are expected from the proposed dune restoration and channel relocation. By relocating the channel at the south-eastern corner of North Cove approximately 2000 ft from the shoreline, future erosion damage along the

shore in this reach should be limited. In addition, the existing channels in the barrier dune will be filled and limit the tidal drainage of North Cove to the newly aligned channel. Because the majority of the flood berm extensions will be above MHHW, the extended berm should have little effect on surface water, other than limiting flooding during extreme high-tide storm events.

No Action Alternative

The no action alternative would likely result in further in-filling of North Cove, with less frequent flushing of the cove. The surface area covered by tidal fluctuation would likely decrease. Less frequent flushing could result in increased water temperature in the cove, especially during water months. Due to the diminished state of the barrier dune, the likelihood of wave-overtopping and flooding on reservation lands and the surrounding areas is expected to increase during future storm activity.

4.13 Plant Communities

Dune Restoration and Flood Berm Extension

Limited vegetation currently exists on the barrier dune. The proposed dune restoration will bury any existing vegetation; however, the finished restored dune would be planted in selected areas with native dune grass, *Elymus mollis*. Similar plantings of native dune grass at the South Jetty Breach Fill near Westport, WA have been tremendously successful and robust and function to limit wind-driven erosion as well as provide increased wildlife habitat. The proposed layout of the flood berm extensions has been designed to limit the removal of the large conifers currently bordering the highway. A few of these trees might need to be removed to allow construction vehicle access; however, the majority of these trees would remain unaffected by construction activities. In addition, the backside of the flood berm extension would be planted with native vegetation.

No-Action Alternative

The no-action alternative would not have any major effects on plant communities. The barrier dune might continue to erode areas limiting areas of vegetation. Non-native species would like continue to flourish in the project area.

4.15 Fish and Aquatic Species

Dune Restoration and Flood Berm Extension

Impacts from the dune restoration would likely include the initial burial of sessile or slow-moving aquatic organisms in the water column and at or beneath the surface of the substrate. Re-colonization of these sites is expected to be relatively rapid as these sites can be easily accessed by nearby individuals. In addition, most of the organisms that

exist on the face of the barrier dune should be acclimated to a high energy, sand-shifting environment.

Construction of the flood berm extension would have limited impacts to fish and aquatic species as only approximately 350ft of the approximate 6800 foot berm extension would be below MHHW. Encroachment into the existing salt marsh would be extremely limited. The berm will also be planted with native vegetation to provide food, shading, and habitat for nearby aquatic species.

No-Action Alternative

In the absence of a project, North Cove is expected to continue its transformation from historic tidal flats to a high salt marsh through erosion of the existing dune materials into the cove during storm events that overtop the spit. Aquatic species that are dependant upon current habitat conditions would likely continue to be impacted by existing and future eroding conditions (USFWS 2006).

4.16 Wildlife

Dune Restoration and Flood Berm Extension

Construction of the dune restoration and flood berm extension could have minor, short-term impacts to wildlife due to increased noise and turbidity in the project area. However, construction will occur in accordance with the Washington Department of Fish and Wildlife approved construction windows to minimize impacts to wildlife species during sensitive life stages. The completion of the project will help to maintain and restore the existing tidal flat habitat in North Cove habitat that is essential to many of the current waterfowl and wildlife inhabitants.

No-Action Alternative

In the absence of a project, North Cove is expected to continue its transformation from historic tidal flats to a high salt marsh through erosion of the existing dune materials into the cove during storm events that overtop the spit. Wildlife species that are dependant upon current habitat conditions would likely continue to be impacted by existing and future eroding conditions (USFWS 2006).

4.17 Endangered Species

Dune Restoration and Flood Berm Extension

The Corps prepared a Biological Evaluation (BE) describing the potential effects of the proposed action and submitted the document to the NMFS and USFWS for review. The BE determined that the dune restoration and flood berm extension would not have any major effects on the listed species currently found in the project area. A summary of the effect determinations can be found in Table 2.

Table 2. Effect determination summary.

Species	Effect Determination	Critical Habitat Determination
Bald Eagle	Not likely to adversely affect	Not applicable
Brown Pelican	Not likely to adversely affect	Not applicable
Marbled Murrelet	Not likely to adversely affect	No effect
Western Snowy Plover	Not likely to adversely affect	No effect on proposed critical habitat
Northern Spotted Owl	No effect	No effect
Short-tailed Albatross	No effect	Not applicable
Streaked Horned Lark	Not likely to adversely affect	Not applicable
Coastal-Puget Sound Bull Trout	Not likely to adversely affect	No effect
Green Sturgeon	Not likely to adversely affect	Not applicable
Leatherback, Loggerhead, Green, and Olive Ridley Sea Turtles	No effect	Not applicable
Oregon Silverspot Butterfly	No effect	No effect
Steller Sea Lion	Not likely to adversely affect	No effect
Humpback Whale	Not likely to adversely affect	Not applicable
Sperm, Sei, Fin, and Blue Whales	No effect	Not applicable
Southern Resident Killer Whale	Not likely to adversely affect	No effect on proposed critical habitat

It is important to note that restoration of the barrier dune may further attract snowy plovers to nest on the dune in subsequent years after completion of the project. Therefore, based on the recommendations of the USFWS, the Corps will work to develop a snowy plover monitoring plan to determine plover use of the restored dune. In addition, future maintenance placements of sand will be timed to avoid the snowy plover nesting season, should the birds begin to utilize the barrier dune.

No-Action Alternative

The no-action alternative is not likely to have any major effects on endangered species; however, it is possible that continued erosion of the dune would result in a loss of potential habitat for the Western snowy plover.

4.2 ELEMENTS OF THE BUILT ENVIRONMENT

4.21 Land and Shoreline Use

Dune Restoration and Flood Berm Extension

Other than increased coastal flooding protection, land and shoreline use is not expected to undergo any major changes in the project area. Pedestrian access to the dune will remain somewhat limited.

No-Action Alternative

Land and shoreline use is not expected to change under the no action alternative.

4.23 Cultural Resources

Dune Restoration and Flood Berm Extension

The Corps has determined that the proposed project is a Federal undertaking of the type that could affect historic properties and must comply with the requirements of Section 106, as amended through 2004, of the National Historic Preservation Act of 1966, as amended through 2000 (NHPA; 16 USC 470). Section 106 requires that Federal agencies identify and assess the effects of Federal undertakings on historic properties and to consult with others to find acceptable ways to resolve adverse effects. Properties protected under Section 106 are those that are listed or are eligible for listing in the National Register of Historic Places (NRHP). Eligible properties must generally be at least 50 years old, possess integrity of physical characteristics, and meet at least one of four criteria for significance. Regulations implementing Section 106 (36 CFR Part 800) encourage maximum coordination with the environmental review process required by the National Environmental Policy Act (NEPA) and with other statutes. The Washington State Archaeological Sites and Resources Act (RCW 27.53) may also apply.

To comply with Section 106 of the NHPA, a cultural resources investigation has been completed. The project Area of Potential Effect (APE) consists of three discontinuous areas where construction is proposed: 1) The northern shoreline flood berm extension; 2) The southern shoreline flood berm extension; and 3) The dune restoration area. The cultural resources investigation included a search of the Washington Department of Archaeology and Historic Preservation (DAHP) electronic Historic Sites Inventory Database, background and archival research, coordination with the Shoalwater Tribe, pedestrian surveys of all three APEs, and excavation of 43 shovel tests in the two flood berm extension APEs. No historic properties listed in the National Register of Historic Places (NRHP) were found to be located in or near the APEs. One cultural resource is listed in the Washington State inventory where it is shown located near one of the APEs. To further identify historic properties, Section 106 of the National Historic Preservation

Act (NHPA; 36 CFR 800.4[a][3]) requires Federal agencies to seek information from tribes likely to have knowledge of, or concerns with, historic properties within the project APEs. Because the project is partially located on Shoalwater Indian Reservation lands the Corps archaeologist has been working closely with the tribe in identifying properties that may be of religious or cultural significance, including Traditional Cultural Properties (TCP), and that may be eligible for the NRHP.

The subject of archaeological cultural resources in the vicinity of the project is confidential and has been reported on in a separate document that was submitted to the Washington State Historic Preservation Officer (SHPO) at the DAHP and the Shoalwater Tribe. The report includes an archaeological monitoring plan and a determination by the Corps of No Historic Properties Affected, with the provision that archaeological construction monitoring will be conducted in certain portions of the APEs. If, during construction activities, the Contractor observes items that might have historical or archeological value and the archaeological monitor is not present, such observations shall be reported immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination can be made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in the destruction of these resources and shall prevent his employees from trespassing on, removing, or otherwise damaging such resources.

No-Action Alternative

No effects to cultural resources are anticipated from the no-action alternative.

4.24 Native American Issues

Dune Restoration and Flood Berm Extension

The preferred alternative is expected to reduce flooding and storm damage to the Reservation lands and surrounding areas, as well as help prevent the further transformation North Cove from a tidal flat to a high salt marsh. This will improve the economic and social conditions of the Shoalwater Bay Tribe, allowing continued existence and continuation of cultural activities on the Reservation.

No-Action Alternative

The no action alternative would allow continued and possibly more frequent flooding of the Shoalwater Bay Tribal reservation. It would also allow continuation of the transformation of North Cove from tidal flat to a high salt marsh, potentially jeopardizing the traditional uses of the area by the Shoalwater Tribe.

4.25 Recreation

Dune Restoration and Flood Berm Extension

The preferred alternative would likely increase recreational opportunities in the project area. Restoration of the dune would maintain recreational access to the dune. In addition, the expanded flood berm would provide a larger pedestrian access to the waterfront for the local community and visitors. Because the project would provide increase flood protection to the neighboring communities, it would allow for continued recreational access to Shoalwater Bay Reservation during storm events where access to the community otherwise might be limited.

No-Action Alternative

The no-action alternative would likely have harmful long-term effects to recreation in the area. The barrier dune would likely continue to erode, preventing recreational access to the dune. Flooding during storm events would likely limit recreational access to the reservation and surrounding area.

4.26 Noise

Dune Restoration and Flood Berm Extension

The preferred alternative would have short term and discountable increases in noise due to the operation of heavy equipment and construction vehicles. No long-term increases in noise are expected.

No-Action Alternative

The no-action alternative is not anticipated to have any effects to noise in the area.

4.27 Air Quality

Dune Restoration and Flood Berm Extension

The proposed action will have short term and discountable effects to air quality due to the operation of gas-burning heavy equipment and construction vehicles.

No-Action Alternative

The no-action alternative is not anticipated to have any effects on air quality.

4.28 Environmental Health/ Hazardous and Toxic Waste

Dune Restoration and Flood Berm Extension

Because no contaminated sites or other contamination has been identified within the project area, construction of the preferred alternative is unlikely to affect or be affected by any hazardous or toxic waste.

No-Action Alternative

The no-action alternative is not anticipated to have any major effects on the environmental health of the area. It is possible, however, that without any increased flood protection to the reservation and nearby communities, future flood events could wash any exposed household contaminants into the bay.

5. UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects associated with this project include:

- (1) a temporary and localized increase in noise and turbidity, which may temporarily disrupt fish and wildlife in the area,
- (2) a temporary and localized disruption of benthic productivity
- (3) a temporary and localized disruption of traffic by construction vehicles
- (4) a temporary disruptions to recreational and Tribal cultural uses at the project site

6. MITIGATION

Mitigation for impacts of a proposed action is something that is evaluated as part of documentation under NEPA, such as this EA. Mitigation takes the following forms (Federal Register 1978):

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

The preferred alternative includes several measures that would be employed to avoid and minimize any adverse effects, including:

- (1) All in-water work would occur during the WDFW approved construction windows.
- (2) The flood berm extensions were designed so that only an extremely small portion of the extensions will fill habitat below MHHW.
- (3) The barrier dune will be surveyed prior to construction for nesting Western snowy plovers. If any nesting Western snowy plovers are observed, the Corps will contact USFWS and coordinate a plan to proceed with work while avoiding the nesting area during the nesting season.

(4) Planting of the barrier dune will occur with native vegetation and only on the backside of the dune (to allow approximately 12 acres of the barren nesting conditions preferred by Western snowy plovers on the front slopes of the dunes).

(5) The Corps will work with the Shoalwater Tribe and USFWS to develop a Western snowy plover monitoring plan for future monitoring on the barrier dune.

7. COORDINATION

The proposed project alternatives have been extensively coordinated with the local communities as well as several resource agencies. A regulatory and resource agency coordination kickoff meeting was conducted by the Corps at the Tribal Center on August 20, 2002. Attendees included representatives from the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Port of Willapa Harbor, Washington Department of Ecology, Washington Department of Fish and Wildlife, and Shoalwater Bay Tribal Council.

A community meeting was held on May 12, 2004 at the Shoalwater Bay Indian Tribal Center. The purpose of the meeting was to provide the public with detailed information, and to have a dialogue with the public, on the technical study findings and alternatives formulation for the proposed project. Approximately 40 member of the tribal and Dexter and Tokeland community attended the meeting. Technical study team members making presentations at the meeting included research scientists from the Corps' Coastal and Hydraulics Laboratory, U.S. Geological Survey's Coastal and Marine Geology Program, Washington Department of Ecology's Coastal Monitoring and Analysis Program, and the Corps' Seattle District. State and Federal regulatory agencies represented at the meeting included U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Department of Ecology, and U. S. Environmental Protection Agency.

An interagency meeting was held on May 16, 2004 at the Shoalwater Bay Indian Tribal Center. Purpose of the meeting was to discuss environmental aspects and avoidance/mitigation measures associated with Shoalwater project alternatives. The meeting agenda included a description of several alternatives (sea dike, dune restoration, and dune restoration with flood berm extension), design considerations (construction techniques, project footprint below MHHW, maintenance intervals, borrow sources, beneficial use of dredged material), and environmental considerations associated with technically feasible alternatives. The meeting was attended by representatives from the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Department of Transportation, Pacific County, and Shoalwater Bay Tribal Council.

A meeting was held on Saturday, July 16, 2005 at the Shoalwater Bay Indian Tribal Center. The meeting was hosted by the Dexter-By-The-Sea (Dexter) property owners

association as part of their annual property owners meeting. The meeting was attended by approximately 35 people and included the Shoalwater Bay Tribal Council Chair, the Shoalwater Bay Tribe's project manager, and the Corps' project manager. Strong support for the project was expressed by Dexter property owners, based on recognition that both tribal and non-tribal residents of area would directly benefit from construction of the project.

A meeting was held on Saturday, July 22, 2006 at the Shoalwater Bay Indian Tribal Center. The meeting was hosted by the Dexter property owners association as part of their annual property owners meeting. The meeting was attended by 34 property owners. The Shoalwater Bay Tribe's project manager briefed attendees on the status of the proposed Corps shoreline erosion project. Continued strong support for the project was expressed by Dexter property owners.

8. ENVIRONMENTAL COMPLIANCE

8.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) (42 USC 4321 ET SEQ.)

In accordance with the National Environmental Policy Act, federal projects are required to declare potential environmental impacts and solicit public comment. The purpose of this document is to solicit public comment and fulfill the Corps of Engineers documentation requirements under the National Environmental Policy Act.

8.2 ENDANGERED SPECIES ACT OF 1973, AS AMENDED (16 USC 1531-1544)

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. A Biological Evaluation is currently being prepared and will be submitted to NMFS and USFWS for concurrence prior to initiation of construction.

8.3 CLEAN WATER ACT, AS AMENDED (33 USC 1251 ET SEQ.)

The Clean Water Act requires federal agencies to protect waters of the United States. The Act disallows the placement of dredged or fill material into waters (and excavation) unless it can be demonstrated there are no reasonable alternatives. The Corps will prepare a 404(b)(1) Consistency Evaluation and will coordinate the project with the Washington Department of Ecology and the Environmental Protection Agency (EPA) requesting a 401 water quality certification and to be obtained prior to proceeding with the project.

8.4 COASTAL ZONE MANAGEMENT ACT (16 U.S.C. 1451-1465)

The Coastal Zone Management Act of 1972 as amended (15 CFR 923) requires Federal agencies to carry out their activities in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The Corps will prepare a Coastal Zone Consistency Determination and coordinate with the Washington Department of Ecology and EPA.

8.5 NATIONAL HISTORIC PRESERVATION ACT) (16 USC 470 ET SEQ., 110)

Section 106 of the National Historic Preservation Act (36 CFR PART 800) requires that the effects of proposed actions on sites, buildings, structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. As required under Section 106 of the NHPA, the Corps is coordinating with the Washington State Department of Archeology and Historic Preservation (DAHP) and the Shoalwater Bay Indian Tribe.

8.6 CLEAN AIR ACT AS AMENDED (42 USC 7401, ET SEQ.)

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 requires 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 U.S. Army Corps of Engineers has determined that emissions associated with this project will not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone).

8.7 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT (16 USC 701-715)

The proposed project would be conducted in such a manner that migratory birds would not be harmed or harassed. The proposed work would be outside the nesting season for most birds.

8.8 EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

Executive Order 12898 directs every federal agency to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-income populations. This project will not exclude, deny benefits to, or discriminate against minority or low-income populations, nor does the project involve siting a facility that will discharge pollutants or

contaminants. The preferred alternative is strongly supported by the Shoalwater Bay Tribe. Therefore the project is in compliance with this order.

8.9 EXECUTIVE ORDER 11990, PROTECTION OF WETLANDS

In order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative

SECTION 1

(a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for...conducting Federal activities and programs affecting land use...

SECTION 5

In carrying out the activities described in Section 1 of this Order, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:

- (a) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;
- (b) maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and
- (c) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

The preferred alternative was designed to limit impacts to wetlands as much as possible, and to help maintain the historic tidal flats.

8.10 TREATY RIGHTS

In the mid-1850's, the United States entered into treaties with a number of Native American tribes in Washington. 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 also found 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. We believe that:

- (1) The work would not interfere with access to usual areas
- (2) The work would not cause the degradation of fish runs accustomed fishing grounds or with fishing activities or shellfish harvesting; and habitat; and
- (3) The work would not impair the Treaty tribes' ability to meet moderate living needs.
- (4) The proposed project is strongly supported by the Shoalwater Bay Indian Tribe.

9. CUMULATIVE EFFECTS

As defined by the White House Council on Environmental Quality implementing regulations for NEPA at 40 CFR 1508.7, "cumulative impact" means "the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

A March 3, 1999 storm caused severe flooding and resulted in the initiation of an emergency flood protection planning process by the Corps Seattle District Emergency Management Branch. Subsequently, in March 2001, a 1,700-foot-long riprap flood berm segment was constructed along the Shoalwater Reservation shoreline under the Corps' flood fight emergency response authority. While this segment of flood berm provides protection to this segment of the Shoalwater Reservation shoreline from direct wave attack, the structure fails to address flooding caused by storm wave overtopping of the adjacent Reservation shoreline areas. Portions of the shoreline that are not protected by the 1,700 foot-long flood berm will continue to be overtopped, causing flooding of all the low lying backshore areas of the Shoalwater Reservation with elevations lower than +15 feet MLLW. Like the proposed flood berm extensions which will tie into it, the majority of this project was located above MHHW. Impacts from this project included the minor loss of some existing vegetation and a minor loss of some benthic production in the project area.

In addition to the previous Corps project, the Washington Department of Transportation has constructed numerous projects immediately north of the proposed project area in attempts to protect State Route (SR) 105 from damage. Over the long term, SR 105 in

the vicinity of milepost 20 has been eroding due to powerful currents, wave action, and storm events. In 1998, WSDOT constructed the SR 105 Emergency Stabilization Project. Most recently, WSDOT crews have been finishing the SR 105 Emergency Embankment project in an area that became unstable last December when high tides eroded the bank along the westbound lane of SR 105. Last winter, maintenance crews were able to temporarily stabilize the roadway, with the intention of later completing a longer-term emergency repair project. More information on WSDOT projects can be found on the world-wide-web at <http://www.wsdot.wa.gov/> Possible impacts from these projects could also include the minor loss of some existing vegetation and a minor loss of some benthic production in the project areas.

The Corps knows of no other actions that are reasonably certain to occur in the action area. The current proposed action will likely only result in a minor amount of additional incremental harm (see Section 5) that will be mitigated by the measures listed in Section 6 of this document.

10. CONCLUSION

Based on the preceding analysis, the proposed dune restoration and flood berm extension project is not a major Federal action significantly affecting the quality of the human environment, and therefore does not require preparation of an environmental impact statement.

11. REFERENCES

US Army Corps of Engineers, November 2006. *Draft Post Authorization Decision Document-Shoalwater Bay Shoreline Erosion Project*. Seattle District, USACE., Seattle WA.

US Fish and Wildlife Service, August 2006. *Assessment of the Shoalwater Reservation Coastal Erosion Project- Fish and Wildlife Coordination Act Report*. Western Washington Fish and Wildlife Office. Lacey, WA.

DRAFT FINDING OF NO SIGNIFICANT IMPACT

SHOALWATER BAY SHORELINE EROSION PROJECT PACIFIC COUNTY, WASHINGTON

1. Background: The project area is located on the north side of the entrance to Willapa Bay, a large estuarine system located on the southwest Pacific Ocean coast of the State of Washington, in Pacific County. The project will be located on and adjacent to the Shoalwater Bay Indian Tribe's Reservation on the northern edge of Willapa Bay, between Cape Shoalwater/Washaway Beach and Toke Point. The Reservation was created by an Executive Order in 1866; is approximately one mile square in size, and has 2/3 of its area specifically set aside as intertidal and subtidal lands to support the Tribe's subsistence shellfish harvesting and other fishery related activities.

The Shoalwater Reservation has a recent history of flooding and storm damage. On March 3, 1999, a combined storm and high tide caused severe flooding of the Shoalwater Reservation shoreline and surrounding community. The Reservation also experienced severe flooding and debris damage from winter storms in February 2006. The flooding is believed to be a direct result of erosion and breaching of the barrier dune on Graveyard Spit that fronts the Tokeland Peninsula. The limited wave protection currently afforded by the eroded barrier dune will continue to decrease, and flooding of the Shoalwater Reservation and adjoining lands will occur at increasingly frequent intervals.

2. Project Description: The proposed project consists of a restoration of a deteriorated barrier dune system with an extension of an existing shoreline flood berm to protect the Shoalwater Reservation. Approximately 600,000 cubic yards of sand will be dredged from a nearby borrow site and placed on along 12,500 foot-long barrier dune. The total length of the flood berm extensions will be approximately 6800 feet.

3. Impacts: Environmental impacts associated with the proposed action include: a temporary and localized increase in noise and turbidity, which may temporarily disrupt fish and wildlife in the area, temporary and localized disruption of benthic productivity, a temporary and localized disruption of traffic by construction vehicles, and temporary disruptions to recreational and Tribal cultural uses at the project site.

The benefits of this project include shoreline erosion protection and the reduced potential for flooding and storm damages to the Shoalwater Bay Tribe Indian Reservation as well as the surrounding communities. This project is also designed to halt the transformation of North Cove from important productive tidal flats to upper salt marsh habitat. The dune restoration component will likely provide an increase in nesting habitat for the threatened

Western snowy plover, as they prefer to nest on secluded sand beaches and dunes.

The dune restoration and preservation of the tidal flats will not only benefit fish and wildlife species native to the project area, but it will allow for the continued existence and traditional uses of North Cove by Shoalwater Bay Tribe. In addition, the preferred project alternative project meets the required project authorization goals as it:

- (A) is a cost-effective means of providing erosion protection;
- (B) is environmentally acceptable and technically feasible; and
- (C) will improve the economic and social conditions of the Shoalwater Bay Tribe.

4. Findings: For the reasons described above, I have determined that this barrier dune restoration and shoreline flood berm extension on and near the Shoalwater Bay Indian Reservation will not result in significant adverse impacts on the human environment. The proposed action is not a major action and therefore does not require an environmental impact statement.

Date

Michael McCormick
Colonel, Corps of Engineers
District Commander