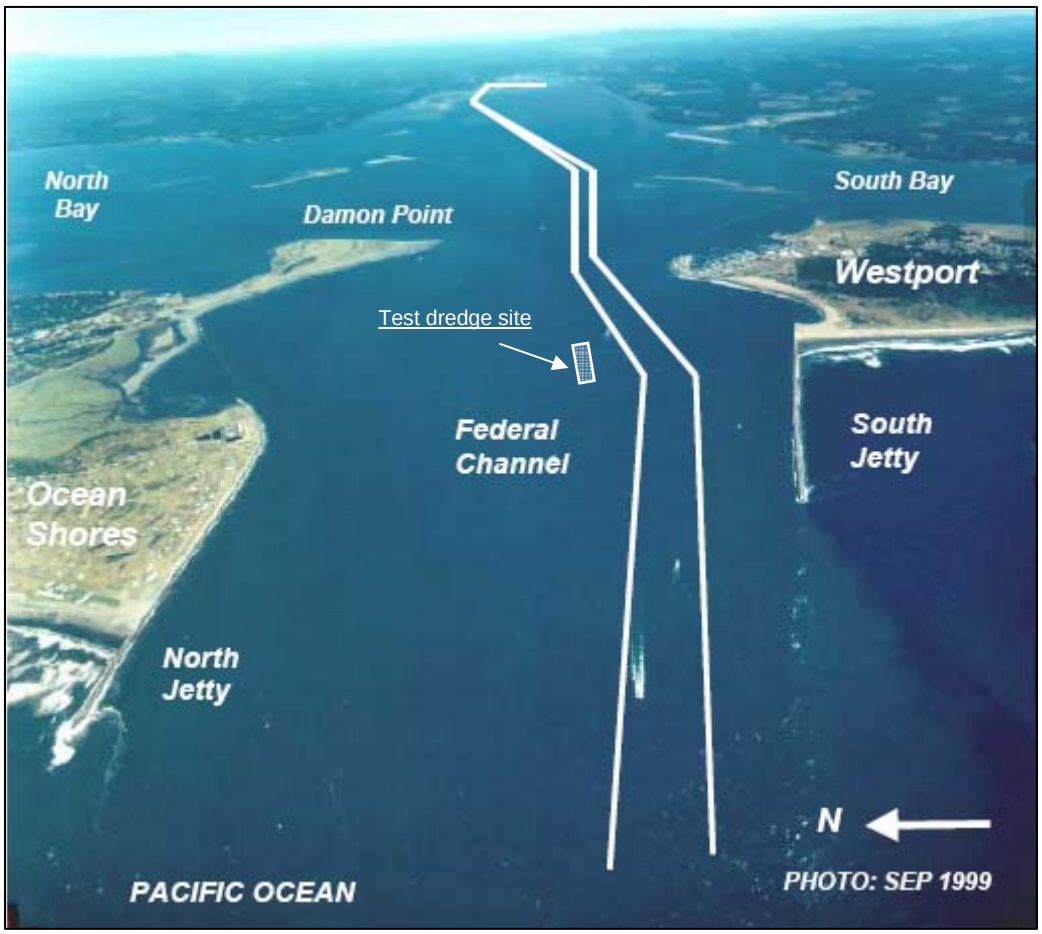
DRAFT ENVIRONMENTAL ASSESSMENT

Grays Harbor Test Dredge for Potential Entrance Channel Realignment
Grays Harbor Navigation Project

Grays Harbor County, Washington



US ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

December 2006

US Army Corps of Engineers
Seattle District

GRAYS HARBOR TEST DREDGE FOR POTENTIAL ENTRANCE CHANNEL REALIGNMENT

Grays Harbor Navigation Project
Grays Harbor County, Washington
December 2006
Draft Environmental Assessment

Responsible Agency: The responsible agency for this work is the U.S. Army Corps of Engineers, Seattle District.

Abstract:
In accordance with the National Environmental Policy Act (NEPA), this Environmental Analysis discusses the potential impacts of a test dredge project that would remove approximately 110,000 cubic yards of material from the sea floor at the Grays Harbor coastal inlet, with disposal at the Point Chehalis site. The Federal Navigation Channel in Grays Harbor provides sea-going vessels with commercial shipping access between the Pacific Ocean and the cities of Aberdeen, Hoquiam, and Cosmopolis on the Chehalis River, Grays Harbor County, Washington. The navigation channel, which is 23.5 miles long, is dredged annually by the U.S. Army Corps of Engineers (Corps) in order to maintain authorized project depths. Without annual maintenance dredging, shoaling would reduce the ability of larger ships to enter and leave the inner harbor safely under full load or low tide conditions, thereby impacting the economy of Grays Harbor County. Coastal Engineers have proposed realignment of the Grays Harbor Entrance Channel because bathymetric surveys show the area of the proposed test dredge is scouring sediment into the ocean, and the channel may be attempting to move to the new (test dredge) location. While the requirement for continued maintenance dredging of the navigation channel in its present location appears to be certain, the persistent loss of sediment from the central portion of the entrance raises the possibility that authorized channel depths will develop naturally in this area. If the channel were realigned, either naturally or by dredging, maintenance dredging requirements for the Entrance channel may decrease significantly. Dredging a portion of the proposed realigned channel to authorized depth of -40 feet at Mean Lower Low Water (MLLW), and monitoring the shoaling rate over the following year could verify this possibility.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Grays Harbor is at the mouth of the Chehalis River on the southwestern coastline of Washington, approximately 110 miles south of the entrance to the Strait of Juan de Fuca and 45 miles north of the Columbia River's outfall (Figure 1). Fresh water inflow to the estuary predominantly comes from the Chehalis, Hoquiam, and Humptulips Rivers.

The Federal Navigation Channel in Grays Harbor provides sea-going vessels with commercial shipping access between the Pacific Ocean and the cities of Aberdeen, Hoquiam, and Cosmopolis on the Chehalis River, Grays Harbor County, Washington. The local economy in the area is historically tied to forest products that are shipped to domestic and international markets. More recently, the Port of Grays Harbor has begun to diversify their cargo market. The navigation channel, which is 23.5 miles long, is dredged annually by the U.S. Army Corps of Engineers (Corps) in order to maintain authorized project depths of -32 to -46 feet below mean lower low water (MLLW) (Figure 2). Without annual maintenance dredging, shoaling would reduce the ability of larger ships to enter and leave the inner harbor safely under full load or low tide conditions, thereby impacting the economy of Grays Harbor County.

This Environmental Assessment has been written for a proposed test dredge as part of a Potential Entrance Channel Realignment and discusses dredging and disposal of sediment from the deep draft Grays Harbor and Chehalis River Navigation Project. If the test dredge proved to be successful in that no future dredging is required in the test dredge location, then additional studies would be required to determine the impact to the estuary. This EA evaluates the potential environmental impacts of the Grays Harbor Test Dredge.

1.1. Project Area

The Chehalis River Basin originates in the hills of southwest Washington and flows to the Pacific Ocean via Grays Harbor, draining approximately 2,170 square miles. Basin topography varies from rolling uplands and fertile river valleys of the hills to the south and east, to foothills of the Olympic Mountains to the north. Higher elevations in the basin are rugged and densely forested, but near the city of Chehalis the river emerges onto a broad, flat valley and meanders until emptying into eastern Grays Harbor. Land in the Chehalis valley is extensively farmed, and a large portion of the basin is in timber production. The lower main stem Chehalis has a low gradient and a number of sloughs and side channels. Depending on flow in the Chehalis and tide height, tidal influence may extend as far upstream as the Wynoochee River at river mile 13. The streambed ranges from 50 to 300 yards wide and consists primarily of gravel, sand, and silt (Phinney and Bucknell 1975).

The action area for this project consists of the test dredge location at LAT 46 55.056 N, LONG 124 08.485 W, with a dredge area of 800 feet wide and 2,000 feet long. The test dredge location is 2,000 feet north of the west end of the existing Point Chehalis reach of the Federal Navigation Channel. Dredging will remove an estimated volume of 110,000 cubic yards (cy), which will be disposed of at the Point Chehalis disposal site (Figures 2 and 3).

1.2. Project Purpose and Need

Corps Coastal Engineers have suggested realignment of the Grays Harbor Entrance Channel because bathymetric surveys show the area of the proposed test dredge is scouring sediment into the ocean, and the channel may be attempting to move to the new location. While the requirement for continued maintenance dredging of the navigation channel in its present location appears to be certain, the persistent loss of sediment from the central portion of the entrance raises the possibility that authorized channel depths will develop naturally in this area. Based on the present (2005) annual condition survey data, constructing a channel with authorized widths and depths (+2' advanced maintenance) would require

dredging approximately 840,000 cy. Erosion processes are reducing this volume by about 70,000 cy/yr, and, at this rate, the required volume would be removed naturally in the central portion of the entrance within 10 years. If the channel were realigned, either naturally or by dredging, maintenance dredging requirements for the Entrance channel may decrease significantly. Dredging a portion of the proposed realigned channel to the authorized depth of -46 feet below MLLW, and monitoring the shoaling rate over the following year could verify this possibility.

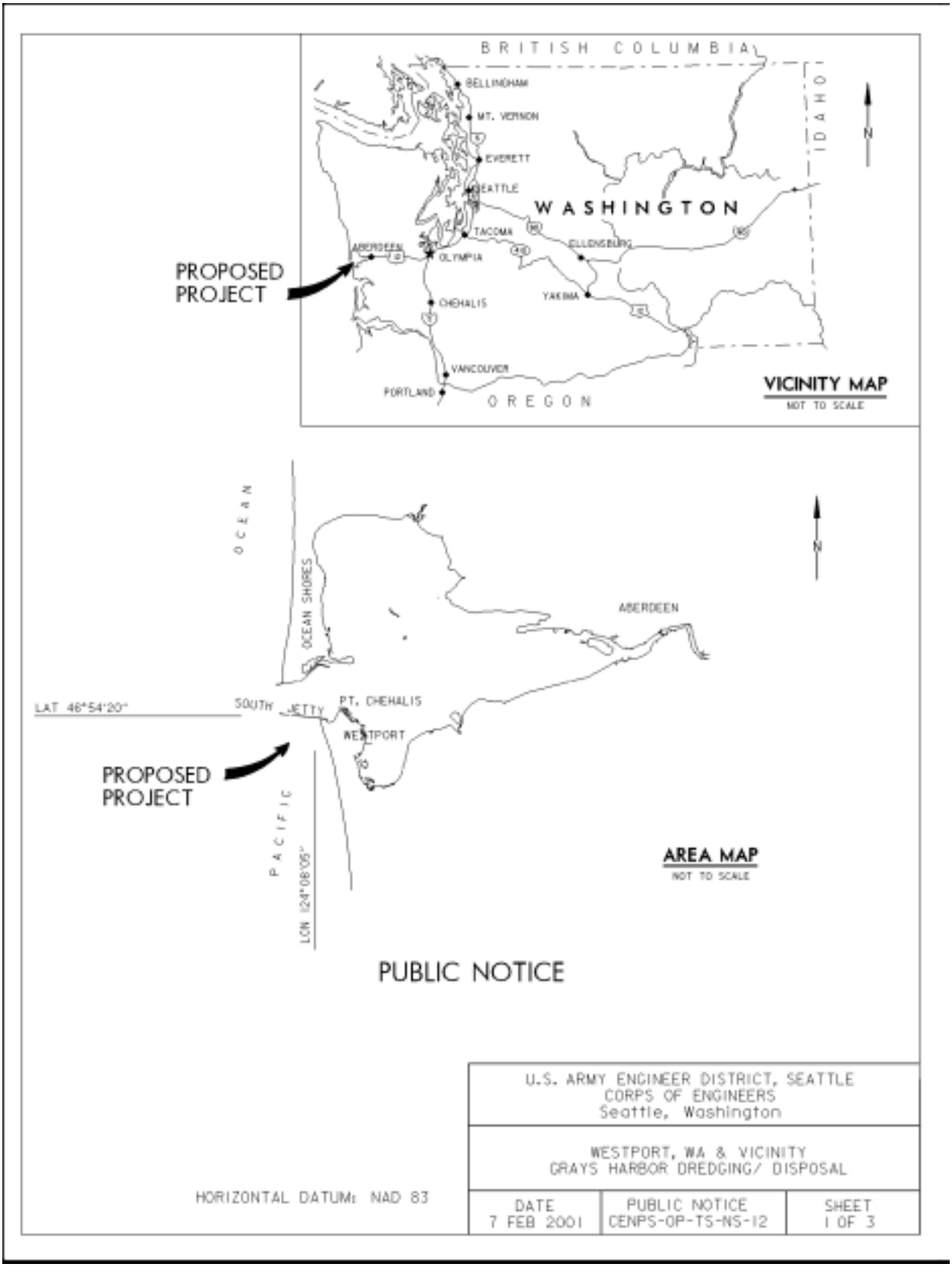

Figure 1. Grays Harbor, Washington

1.3. Description of the Proposed Action

A Test Dredge Project would require removing approximately 110,000 cy of material that is located in a relatively small inner sand wave (Figures 3 and 4). The test dredge will be 800' wide and 2,000' long. The authorized project depth is -46 feet below MLLW. The plan is to use a government hopper dredge to accomplish the proposed test, with placement of the dredged material at the existing Point Chehalis open-water disposal site. The plan is to dredge the 110,000 cy during April or May 2007 when the government dredge is scheduled to be in Grays Harbor doing routine maintenance dredging.

The dredged material will be disposed of at the Point Chehalis disposal site, which is at the eastern end of the Point Chehalis reach (Figure 2). The depth of the disposal site varies between -50' to -70' MLLW. It is a high-energy area with a predominantly westward current. The irregular bottom consists of fine to medium sized sand grains of marine origin. Historically, this site has been extremely deep. Charts that predate jetty construction show depths of –100' MLLW in this area. Over 30 million cy of dredged material have been placed in this area since 1977 at an average rate of 1.7 million cy/yr (USACE 1997). Annual survey records indicate that approximately 75% of material disposed at this site erodes during the dredging period, and that another 15% erodes during the following winter. Bathymetric surveys indicate that most of this eroded material moves seaward along the South Jetty. Disposal at this location reduces erosion of the Point Chehalis revetment and groins. The Point Chehalis site is the most heavily used disposal site in Grays Harbor.

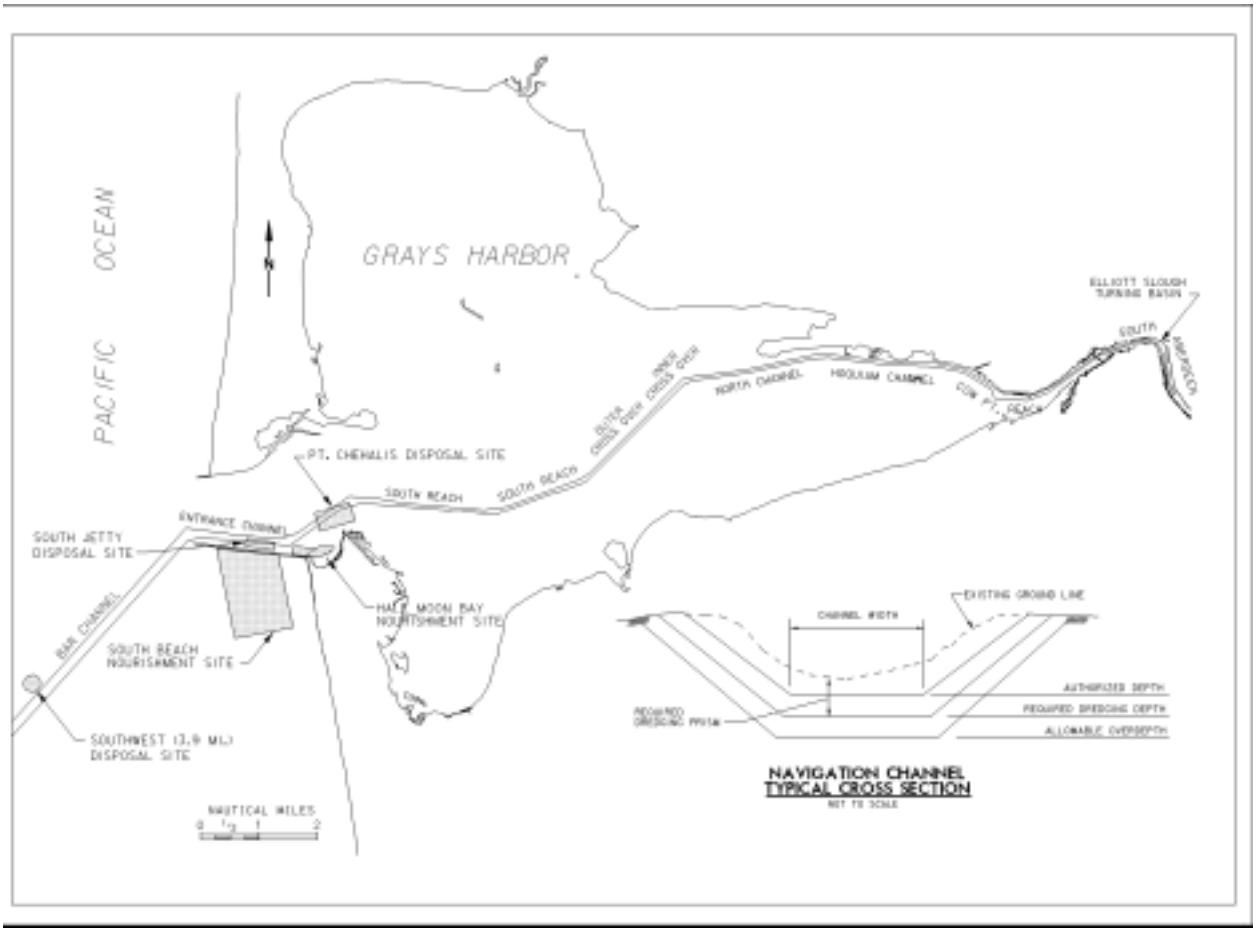

Figure 2. Grays Harbor Navigation Channel Reaches and Disposal Sites

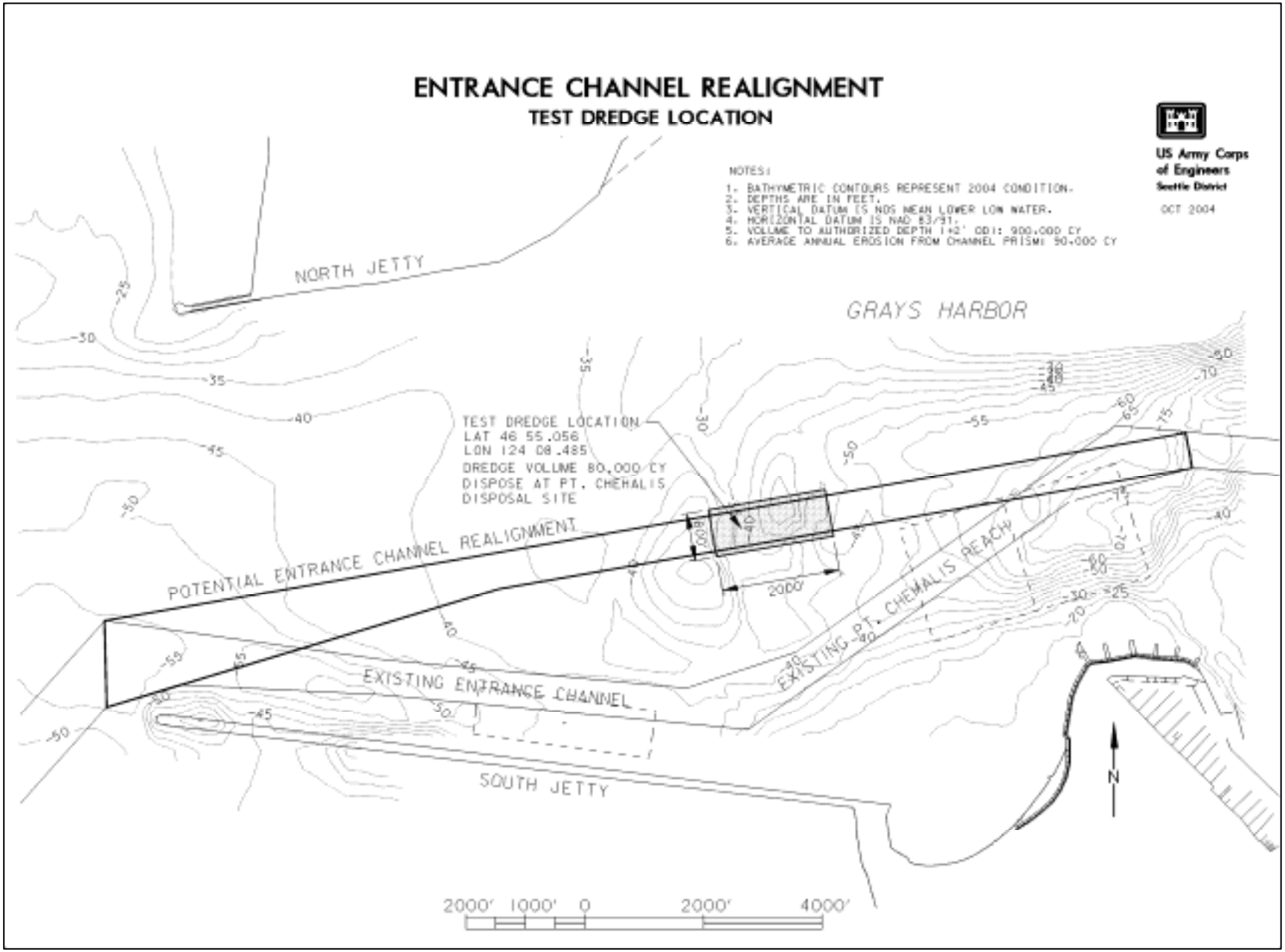

Figure 3. Entrance channel potential realignment - test dredge location

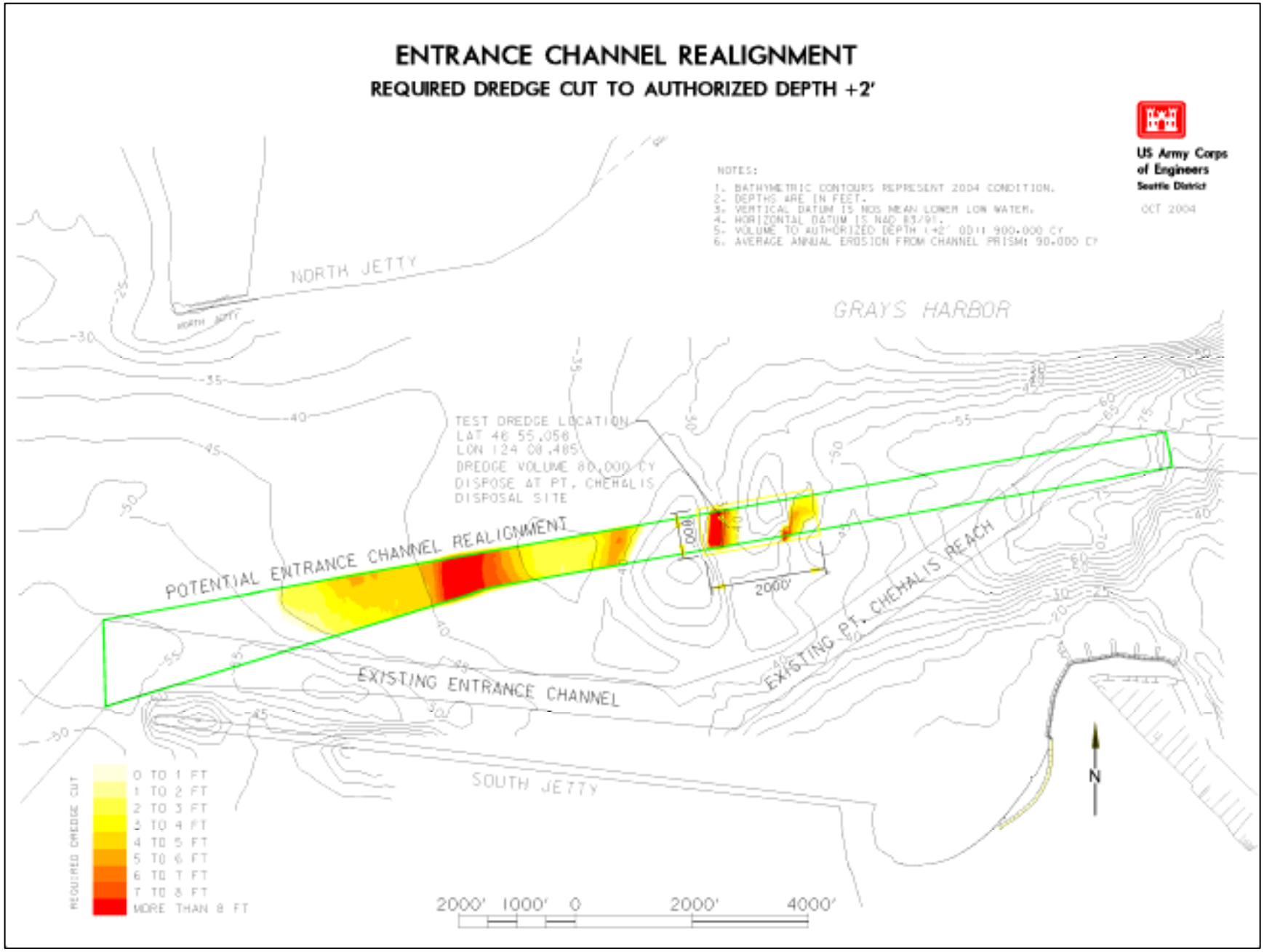

Figure 4. Entrance channel potential realignment - required dredge cut to authorized depth of -46' below MLLW

1.4. Authority

The original Grays Harbor deep draft navigation channel was authorized by Congress in the Rivers and Harbors Act of 1896. The Grays Harbor and Chehalis River project and maintenance dredging by the Department of the Army were authorized by the Rivers and Harbors Act of 1935 and modified by the Act of 1945, the Act of 1954, and the Water Resources Development Act of 1986 (Public Law 99-662). Copies of authorizing documents are on file at the Seattle District Office.

1.5. Associated Studies and Reports

The 23.5-mile long Grays Harbor navigation channel is dredged annually by the Corps in order to maintain authorized project depths. The following documents provide historical information on work performed on the Federal Navigation Channel and other structures in Grays Harbor, as well as descriptions of recent modifications and maintenance work:

- Grays Harbor and Chehalis River Navigation Project, Operation and Maintenance Environmental Impact Statement (EIS), dated June 1975
- Long Range Maintenance Dredging Program for the Grays Harbor and Chehalis River Navigation Project, Operation and Maintenance Environmental Impact Statement Supplement (EISS) No. 2, dated October 1980
- Grays Harbor, Chehalis and Hoquiam Rivers, Washington Channel Improvements for Navigation Interim Feasibility Report and Final EIS, dated September 1982
- Grays Harbor, Washington, Navigation Improvement Project Final EISS, dated February 1989
- Grays Harbor, Washington, Navigation Improvement Project Operations and Maintenance Final Environmental Assessment, 1989 Sediment Collection and Testing Program, dated February 1990
- Dredged Material Evaluation Procedures and Disposal Site Manual, dated June 1995
- Fiscal Years 2001-2006 Maintenance Dredging and Disposal, Grays Harbor and Chehalis River Navigation Project Final Environmental Assessment, dated April 2001
- Fiscal Year 2006 Maintenance Dredging and Disposal, Grays Harbor and Chehalis River Navigation Project Final Supplemental Environmental Assessment, dated December 2005
- Grays Harbor Crab Mitigation Program Oyster Spat Placement Environmental Assessment and Biological Evaluation, dated March 2006
- US Army Corps of Engineers, Seattle District. 2005. Analysis of Future Dredging Requirements: Entrance Channel, Point Chehalis Reach, South Reach and Crossover Channel; Stations 280+89 to 862+49. Grays Harbor, Washington, Navigation Project.
- FY07-11 Public Notice #CENWS-OD-TS-NS-25

2. ALTERNATIVES ANALYSIS

2.1. Project Objectives and Evaluation Criteria

The objective of this project is to dredge a portion of the proposed realigned channel to authorized depth, and monitor the shoaling rate over the following year to verify the possibility of permanent channel realignment under the Corps Operations and Maintenance authorities. Alternatives will be analyzed on the basis of how well each would achieve the proposed data collection regarding shoaling rate and pattern along the proposed channel realignment.

2.2. The No Action Alternative

Under the no action alternative, the test dredge would not occur, and no dredged material would be released at the Point Chehalis disposal area. No information would be gathered as to whether the Grays Harbor estuarine bathymetry might maintain a channel sufficiently deep to be used as a shipping channel without periodic dredging. Routine authorized operations and maintenance dredging of an average of 400,000 cy from the existing Entrance and Point Chehalis channel reaches would continue to occur every year with disposal at the Point Chehalis site.

2.3. The Realignment Dredge Alternative

Bathymetric surveys show the area to the north of the Federal Navigation Channel is starting to scour sediment to the ocean, and the channel may be attempting to move to the new location. The persistent loss of sediment from the central portion of the entrance raises the possibility that authorized channel depths of -40 to -46 feet below MLLW will develop naturally in this area. Based on the most recent (2005) annual condition survey data, constructing a channel with authorized widths and depths (+2' advanced maintenance) would require dredging approximately 840,000 cy over a distance of approximately 3.5 miles. Erosion processes are reducing this volume by about 70,000 cy/yr, and, at this rate, the required volume would be removed naturally in the central portion of the entrance within 10 years.

2.4. The Preferred Alternative – Test Dredge

The test dredge would occur as described in section 1.3 of this document. A hopper dredge would remove 110,000 cy of material along a 2,000-foot-long section near the current Federal Navigation Channel. Disposal of the dredged material would occur at the Point Chehalis disposal site. Dredging a portion of the potential channel realignment to authorized depth, and monitoring the shoaling rate over the following year could verify the possibility of realigning the Entrance channel and potentially reducing annual dredging volumes.

3. EXISTING ENVIRONMENT

3.1. Physical Characteristics

The predominant physical feature of the Harbor is the expansive mudflats that cover 63% of the harbor's surface area at low tide (MLLW); the water surface ranges from about 94 square miles at mean higher high water (MHHW) to 38 square miles at MLLW. Numerous shallow channels have been cut into the mudflat areas of the North, South, and East Bays by ebb tide flows and discharge from the Humptulips, Elk, and Chehalis Rivers, respectively. The mouth of Grays Harbor is constricted by two sand spits, Point Brown to the north and Point Chehalis to the south, which were formed by coastal processes in recent geologic time. Before the jetties were constructed, sediment was carried into the harbor by the flood tide, and out of the harbor with the ebb tide. These sediments formed a large shoal west of the harbor's inlet. This shoal was broad and shallow, and restricted safe navigation into the harbor. The construction of jetties at the harbor mouth confined tidal currents, and created scouring velocities that deepened the entrance channel.

The 23.5 miles of the Grays Harbor Navigation Channel have been divided into 10 different reaches. The downstream reaches are Outer Crossover, South Reach, Entrance, and Bar Channel, while Elliott Slough Turning Basin, South Aberdeen, Cow Point, Hoquiam, North Channel, and Inner Crossover, constitute the upstream portion of the navigation project (Figure 2). Typically, only one reach is dredged at a time, and the different reaches have different dredging requirements (i.e., volume dredged, annual vs. biennial scheduling) as a result of different shoaling rates. The material dredged from the Bar, Entrance, and South Reach channels consists mainly of ocean sands deposited by tidal action and silt redistributed within the estuary by wind and wave action. Material dredged from the inner reaches is primarily suspended bedload material from tributary streams and rivers. Sediments have been tested under Corps, Environmental

Protection Agency (EPA), and Washington Department of Ecology (DOE) Dredged Material Management Program (DMMP) guidelines, and approved for open water disposal.

3.2. Topography, Geology, and Soils

The Chehalis River has a high sediment load, which is a factor in the frequency of dredging. Kehoe (1982) found that three Chehalis sub-basins, the Wynoochee, Middle Fork Satsop, and West Fork Satsop, discharged suspended sediments at an extremely high annual rate compared to other watersheds in western Washington and Oregon. It is thought that a combination of steep topography, high rainfall, and deeply weathered surface soils make the problem sub-basins inherently susceptible to erosion and subsequent high sediment discharge levels, and that these natural conditions have been aggravated by forestry practices (Kehoe 1982).

Grays Harbor acts as a trap for both river and ocean transported sediments. Sediments in the Grays Harbor Channel consist of coarse to medium sand, sandy silt, silt, and gravel. Ocean-borne sand occurs in the outer estuary, while river-borne silts are found in the areas of river outfalls in the northern, southern, and eastern lobes of the harbor. A mixed transition zone lies in a broad band between the harbor and outer estuary.

The side slopes of the navigation channel vary throughout the harbor. Slopes become progressively steeper towards the mouth of the Chehalis, since finer substrates are more cohesive and can therefore maintain a steeper slope. Representative slopes range from 1V:3H in the South Aberdeen, Cow Point, and Hoquiam reaches, to 1V:5H in the North, Crossover, and inner portion of the South Reach channels, to 1V:10H in the outer portion of South Reach, Entrance, and Bar reaches.

3.3. Hydrologic Regime

The continental shelf along the Grays Harbor coast varies from 30 to 36 miles in width. The continental slope then extends from about the 600-foot depth contour to abyssal ocean depths. The coast is subjected to the full impact of severe winter storm-produced waves. This winter wave environment produces turbulent mixing of surface and bottom waters over the continental shelf, which affects biological productivity, water column characteristics, and sediment transport processes. The shelf area is influenced heavily by the discharge of the Columbia River, which flows northward during the winter months. During the summer months, climatic conditions shift this flow southward and move coastal surface waters offshore, causing upwelling that supports high biological productivity.

The mouth of Grays Harbor is constricted by two sand spits, Point Brown to the north and Point Chehalis to the south, which were formed by coastal processes in recent geologic time. Before the Corps constructed jetties at these points, sediment was carried into the harbor by the flood tide, and out of the harbor with the ebb tide. These sediments formed a large shoal west of the harbor's inlet. This shoal was broad and shallow, and restricted safe navigation into the harbor. The construction of jetties at the harbor mouth confined tidal currents, and created scouring velocities that deepened the entrance channel. Tide, wind, waves, and freshwater inflows affect water circulation and salinity in Grays Harbor.

3.4. Water and Sediment Quality

Both the inner and outer harbors have been moved off of Washington's 303(d) list of polluted waters. Recent sampling in various areas of the harbor indicate that water temperature, dissolved oxygen, and pH standards are sometimes exceeded, but that these problems may be the result of natural conditions (e.g., solar heating of shallow water), or from nutrient enrichment attributed to wastewater treatment plant effluent. Potential point and non-point sources of contaminants in Grays Harbor are associated with past and existing land uses adjacent to the estuary. One of two pulp mills that operated in the vicinity of Cow Point closed in the early 1990s; another pulp mill located in Aberdeen and a paper company in Hoquiam

are still in operation. Since 1990, the principal sources of dioxin as a result of pulp mill processing have been reduced or eliminated through DOE actions.

Other potential sources of contaminants may originate from city outfalls located near the navigation channel in Aberdeen and Hoquiam. Paints, petroleum products, and anti-foulants [e.g., tri-n-butyl tin (TBT)] may exist in sediments near marinas and boat docks located at Westport, the Hoquiam River in Hoquiam, the Wishkah River in Aberdeen, and smaller creeks surrounding the harbor. Boatyards located in Westport, Aberdeen, and Hoquiam may generate contaminants and sandblast grit (e.g., metals, paint chips, TBT). Seafood processors, oyster mariculture, and cranberry processors are located in South Bay near Westport. The pesticide sevin (carbaryl) is used by the oyster culture industry to exterminate the burrowing shrimp that cause oysters to sink and perish. Coarse-grained sands found at the Bar, Entrance, and South Reaches meet no-test guidelines for high-energy areas under the Marine Protection, Research, and Sanctuaries Act.

3.5. Biological Resources

A variety of habitats occur in the harbor; these habitats and the organisms occupying them were described extensively by USFWS (1982). Deeper subtidal habitat is primarily man-made. Channel habitat largely consists of the dredged navigation channel running the length of the harbor west from Cosmopolis. Characteristic channel fauna include several species, including starry flounder (*Platichthys stellatus*), staghorn sculpin (*Leptocottus armatus*), lingcod (*Ophiodon elongatus*), salmon (*Onchorhynchus* spp.), and a variety of sharks. Other fish species that occur in Grays Harbor include forage fish such as herring (*Clupea palasi*), surf and longfin smelt (*Hypomesus pretiosus, Sprinichus thaleichthys*), and anchovy (*Engraulis mordax*). These fish are an important source of food for the larger fish found in the harbor.

Sub- and intertidal mudflat habitat radiates from the mouths of major rivers emptying into the estuary. Epibenthic green and blue-green algae and diatoms are the predominant flora, while zooplankton is dominated by copepods and mysids. Softshell clams (*Mya arenaria*), bent-nose clams (*Macoma nasuta*), and polychaete worms dominate the benthos. Mudflats support a wide variety of avian species, such as the western sandpiper, sanderling, yellowleg, dunlin, dowitcher, curlew, western grebe, scoter, cormorant, and great blue heron. Starry flounders, staghorn sculpins, and sticklebacks (*Gasterosterus aculeatus*) are the most common resident fish species; mudflats are of special value to juvenile salmonids during their outmigration.

Subtidal sandflat habitat is found in the western harbor and is generally bounded toward the nearshore by eelgrass (*Zostera* spp.) beds at the point where coarse ocean sands begin to mix with finer riverborne silts. Epibenthic algal production is low in sandflat areas, so detrital and deposit feeders are less abundant than in mudflat habitat. Ephemeral sand spits and islands are important nesting and foraging areas for the threatened snowy plover.

Studies conducted by Kinney et al. (1981) found that Grays Harbor's prominent taxa, based on numerical frequency of occurrence in their bongo net frame collections, included barnacle larvae (nauplii and cyprides), the calanoid copepods (*Eurytemora americana*, *Acartia clausi*, and *Calanus* spp.), and the crangonid shrimp larvae (*Centropages abdominalis*). Juvenile and adult sand shrimp (*Crangon francisscorum*), the mysid shrimp (*Neomysis mercedis*), and *Eurytemora americana* composed the majority of the total standing crop (biomass).

3.5.1. Vegetation

Eelgrass habitat occurs in areas with moderate current velocities and substrates composed of a mix of sand and silt. In Grays Harbor, eelgrass is generally limited to –3' MLLW because of high turbidity. Areal extent and density may change from year to year as old beds are uprooted and new ones established. Eelgrass habitat provides food, shelter, and substrate for an abundance of marine organisms,

thus increasing the biological productivity and diversity of the estuary. Benthic fauna include nereid worms, clams, nematodes, and burrowing anemones. Eelgrass blades support isopods, amphipods, hydroids, bryzoa, harpacticoids, snails, limpets, protozoa, ciliates, and nudibranchs. Juvenile salmonids, stripey sea perch (*lutjanus carponotatus*), pipefish (*Syngnathus leptorhynchus*), and blennies (Blenniidae) find food and cover in eelgrass beds. Flatfish, crabs, and moon snails (*Isocheles pilosus*) can be found in the epibenthos. Eelgrass is also an important food item for waterfowl, particularly the black brant and wigeon.

Emergent vegetation fringes the estuary in areas of tidal influence and low-energy wave conditions. Characteristic marsh flora include threesquare bulrush (*Schoenoplectus pungens*), arrowgrass (*Triglochin moritimum*), spike rush (*Eleocharis macrostachya*), sand spurry (*Spergularia marina*), salt grass (*Distichlis spicata*), bulrush (*Scirpus validus*), and Lyngby's sedge (*Carex lyngbyei*). Grays Harbor marsh habitats have been extensively modified during the past century, and Bowerman Basin is one of the last traditional gathering sites for threesquare bulrush, which is used in Native American basket weaving (NRCS 2000).

3.5.2. Fish

Grays Harbor is an important salmon migration corridor and provides essential rearing habitat. Populations that return to basins draining to Grays Harbor include fall, winter, and spring Chinook (*Oncorhynchus tshawytscha*); fall chum (*O. keta*), coho (*O. kisutch*), and cutthroat (*O. clarki*); and summer and winter steelhead (*O. mykiss*) (NMFS 1997). Important demersal species are: lingcod, English sole (*Parophyrs vetulus*), starry flounder, rockfish (*Sebastus* spp.), and Pacific cod (*Gadus microgadus).*

Forage fish are an important and abundant fish species in Washington; they are noteworthy due to the critical part they play as the prey base for a large variety of other marine organisms. Simenstad (1981) found seven species of forage fish to occur in Grays Harbor: Pacific herring, Pacific sand lance (*Ammodytes hexapterus*), northern anchovy, surf smelt, longfin smelt, whitebait smelt (*Allosmerus elongatus*), and American shad (*Alosa sapidissima*). Northern anchovy were the most ubiquitously distributed species and were represented in all life history stages. Surf smelt were the most common species in the lower estuary, while longfin smelt appeared to be restricted to the upper reaches of the estuary. Juvenile Pacific herring were also abundant.

Simenstad (1981) found the occurrence of forage fish in Grays Harbor to be highly transitory and typically related to influxes of fish into the estuary from offshore. The residence time of forage fish appeared to be somewhat dependent on physical processes (e.g. passive transport via intrusion of oceanic water masses into the harbor due to coastal upwelling). Only adult and juvenile northern anchovy, juvenile Pacific herring, and juvenile longfin smelt were consistently abundant over Simenstad's sampling period.

3.5.3. Wildlife

Grays Harbor is an important migratory stop for numerous species of shorebirds. The western sandpiper and overwintering dunlins are particularly numerous species. Other shorebirds, seabirds, and waterfowl common to the Grays Harbor area include: the red knot, dowitcher, great blue heron, Caspian tern, wigeons, black brant geese, pelagic and double-crested cormorants, western grebes, and various species of gulls. The eelgrass beds of the harbor are an important food source for many of these species. Grays Harbor supports the peregrine falcon, which prey upon shorebirds during their spring migrations. Marsh habitats support the black brant, Canada goose, scaup, mallard, widgeon, canvasback, bald eagle, kestrel, muskrat, vagrant shrew, and Townsend's vole. Bald eagles and several species of hawks and owls also use the harbor.

Harbor seals (*Phoca vitulina*) use intertidal flats and islands in Grays Harbor as haul-out areas and pupping grounds. Gray whales (*Eschrichtius robustus*) migrate along the Washington coast in spring and fall; some individuals remain at Neah Bay during the summer, and occasionally enter Grays Harbor estuary. Other marine mammals that occur in the area include the Pacific striped dolphin (*Stenella coeruleoalba*), harbor porpoise (*Phocoena phocoena*), sea otter (*Enhydra lutris*), and several species of seals and sea lions.

3.5.4. Threatened and Endangered Species

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 and proposed threatened or endangered species. Several species listed as either threatened or endangered are potentially found in Grays Harbor. These species are listed in Table 1.

Table 1. Threatened and endangered species potentially occurring in the vicinity of the proposed project.

Species	Listing Status	Critical Habitat	Agency with Jurisdiction
Bald Eagle *Haliaeetus leucocephalus*	Threatened	-----	USFWS
Brown Pelican *Pelecanus occidentalis californicus*	Endangered	-----	USFWS
Western Snowy Plover *Charadrius alexandrius nivosus*	Threatened	Designated	USFWS
Marbled Murrelet *Brachyramphus marmoratus*	Threatened	Designated	USFWS
Bull Trout *Salvelinus confluentus*	Threatened	Designated	USFWS
Green Sturgeon *Acipenser medirostris*	Threatened	-----	NMFS
Steller Sea Lion *Eumetopias jubatus*	Endangered	-----	NMFS
Southern Resident Killer Whale *Orcinus orca*	Endangered	Proposed	NMFS
Humpback Whale *Megaptera novaeangliae*	Threatened	Designated	NMFS
Blue Whale *Balaenoptera musculus*	Endangered	-----	NMFS
Fin Whale *Balaenoptera physalus*	Endangered	-----	NMFS
Sei Whale *Balaenoptera borealis*	Endangered	-----	NMFS
Sperm Whale *Physeter macrocephalus*	Endangered	-----	NMFS
Leatherback Sea Turtle *Dermochelys coriacea*	Endangered	Designated	USFWS/NMFS*
Loggerhead Sea Turtle *Caretta caretta*	Threatened	-----	USFWS/NMFS*
Green Sea Turtle *Chelonia mydas*	Threatened	Designated	USFWS/NMFS*
Olive Ridley Sea Turtle *Lepidochelys olivacea*	Threatened	-----	USFWS/NMFS*

*NMFS has jurisdiction over sea turtles in the water, while USFWS has jurisdiction over sea turtles on land.

3.6. Cultural Resources

Estuarine areas are known to have been heavily utilized by Native American tribes and early European settlers; Grays Harbor is generally considered a culturally rich area. However, lands in the vicinity of the project area have accreted since 1870 so it is unlikely that buried archaeological resources or materials exist near the dredging project area. A June 5, 2006 query of the Washington State Office of Archaeology and Historical Preservation database revealed one site listed on the National Register of Historic Places. This site is the Grays Harbor Light Station located west of the City of Westport.

3.7. Native American Concerns

The Quinault Nation has treaty-reserved rights to Usual and Accustomed fishing grounds in Grays Harbor. A small tribal steelhead fishery occurs during the winter, generally through February; fishing takes place for 3 days during the early part of the week (e.g. Sunday through Tuesday). Spring/summer stocks are harvested from early May through the end of July for three days per week. No tribal fisheries occur in August or September. Fall fishing begins around October 1, and may take place 24 hours a day.

3.8. Land Use

Land uses in Grays Harbor are residential, commercial, municipal (city outfalls and drains), industrial (paper mill, timber and wood products industries, marine vessel moorage and repair, fish processors), maricultural (oyster beds), agricultural (cranberry bogs), and recreational (parks and waterways).

3.9. Recreation and Aesthetics

Recreational harvesters target several species present in adjacent coastal waters, including surf smelt, salmon, razor clams, and crab. Bird watching, walking, horseback riding, and kite flying are also common recreational activities along the shorelines of Grays Harbor. The Oyhut Wildlife Area and Damon Point State Park are located in Ocean Shores. Boating activities in the vicinity include deep-sea fishing, pleasure boating, kayaking, and whale watching. Boaters can also navigate upriver to restaurants and activities in Aberdeen and Hoquiam.

3.10. Air Quality and Noise

Grays Harbor County's Air Quality Index, as established by EPA, is in the "good air quality" category 96% of the time (ORCAA 2006). No "attainment area" has been established in the County. Typical noise in the Grays Harbor estuary largely comes from wind and waves. Commercial and recreational boat traffic also contributes to noise on the water in the vicinity of the project.

3.11. Socioeconomics

General socioeconomic and demographic information for Grays Harbor County and municipalities in the vicinity of the proposed project are presented in Table 2. At the time of the 2000 U.S. Census, local, state, or federal governments employed 15% of the civilian population 16 years of age and over. The largest employment sectors are "sales and office occupations" (25%) followed by "management, professional and related occupations" (22%). The economy of Grays Harbor also relies on wood processing, tourism, shipbuilding, fishing, shellfish harvesting, and seafood processing. Natural resource jobs including agriculture, forestry, fishing, hunting and mining employed 7% of the employed civilian population 16 years of age and over in 2000. The Weyerhaeuser Company, located in Aberdeen, is Grays Harbor County's largest employer, employing and contracting over 2,000 workers; Westport Shipyard is also a major employer with over 800 employees (GHEDC 2005).

Table 2. Selected socioeconomic and demographic information for Grays Habor County and local governments compared to Washington State.

	Population Estimate[1]	% Minority Population	Per Capita Income	Median Household Income	% individuals below poverty level
Washington State	6,287,759	14.7	$22,973	$48,185	11.0
Grays Harbor County	70,900	9.0	$16,799	$35,413	15.0
Aberdeen	16,461	15.1	$16,092	$30,683	22.2
Hoquiam	9,097	10.7	$15,089	$29,658	19.0
Ocean Shores	3,836	7.6	$19,192	$34,643	12.4
Westport	2,137	7.3	$17,362	$32,037	14.3

[1] Most recent population estimates for state and county are from 2005; cities are from 2000. Source: US Census Bureau.

4. ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

4.1. Physical Characteristics

Under the no action alternative, no material would be dredged from the test location, and no test dredge area sediments would be released at the Point Chehalis disposal area. Maintenance of the Entrance and Point Chehalis reaches of the Federal Navigation Channel will continue to require dredging approximately 400,000 cy per year.

With the preferred alternative, no changes to the key characteristics of Grays Harbor are expected to occur. The total area of mudflats and average depth throughout the harbor would remain the same.

4.2. Topography, Geology, and Soils

For the no action alternative, no changes to topography, geology, or soils are expected to occur. Ocean-borne sands will continue to accumulate in the Entrance Channel, which will continue to require maintenance dredging each year.

Under the preferred alternative, an inner sand wave will be removed from an area that appears to be scouring to a depth adequate for commercial ship navigation. This action will deepen an area to the north of the existing Point Chehalis Reach. Removing this material from the sea floor may slightly alter the way in which sediment accumulates in this location.

4.3. Hydrologic Regime

The no action alternative would have no effect on the hydrologic regime of the Grays Harbor Estuary.

The preferred alternative is not expected to have any effect on the hydrologic regime in Grays Harbor, mainly because the scale of the test dredge area, 800 feet wide by 2,000 feet long, is very small in relation to the size of the entrance to Grays Harbor, which is well over one mile wide, and more than two miles from the tip of the north jetty to Damon Point. The removal of the small inner sand wave, a total of 110,000 cubic yards, is not substantial enough to affect the coastal processes, such as tide, wind, and waves, and effects of the continental shelf that influence water circulation in the estuary.

4.4. Water and Sediment Quality

The no action alternative will have no effect on water and sediment quality.

The preferred alternative would require a Clean Water Act Section 401 Water Quality Certification from DOE. This dredging operation would likely cause temporary, localized turbidity, but would not contribute

any pollutants into the environment. The Corps would strictly follow the directives of the 401 certification. Disposal of dredged material is not expected to cause degradation to sediment quality at the Point Chehalis disposal site. All of the sediments have been tested under Corps, EPA, and DOE Dredged Material Management Program (DMMP) guidelines, and approved for open water disposal.

4.5. Biological Resources

While Dungeness crab (*Cancer magister*) mortality rates are affected by dredging (primarily entrainment of adult crabs), mitigation measures have prevented an overall population decline. Therefore, with respect to this prey item, there has been a negligible reduction in prey availability attributable to yearly dredging operations. Navigation dredging in Grays Harbor entrains and kills a small percentage of the estuarine population of Dungeness crabs. Studies on dredging impacts to crab have shown that impacts to crab vary with season, age and size of crab, location and dredging method. A crab mitigation plan, presented in the 1989 EISS, used timing and dredge type to minimize impacts to crab, and described a process for mitigating for lost crabs by using intertidal oyster shell to serve as habitat for newly settled crab. That mitigation agreement was updated in 1998 by consensus of an interagency group.

This indicator may be temporarily degraded by turbidity associated with dredging and disposal operations, and may suffer entrainment due to the hopper dredge. However, with specific timing of the dredge operation, and the use of oyster shells as mitigation for loss of Dungeness crab, this indicator would likely return to baseline conditions shortly after completion of the proposed work. The Corps will perform crab trawl surveys before the test dredge occurs and estimate the potential loss due to the proposed action. This number can then be added to the crab mitigation work that is performed in conjunction with the annual channel maintenance dredging.

4.5.1. Vegetation

The preferred alternative and the no action alternative are each expected to have no effect on the eelgrass populations, the emergent grasses, or the available habitat for these vegetation types in the Grays Harbor Estuary.

4.5.2. Fish

Under the no action alternative, no changes are expected to occur to the fish species or communities in Grays Harbor.

With the preferred alternative, certain risks are known to exist with dredging operations. Most forage fish species are thought to actively avoid the dredging and disposal areas, or occur in nearshore areas out of the immediate vicinity of the dredges. Dredging activities are not expected to affect spawning of the forage fish community. Conditions for most forage fish species may be temporarily degraded by turbidity associated with dredging and disposal operations, but would likely return to baseline conditions upon completion of the proposed work. The exception is sand lance, which are entrained by hopper dredges. The effects of reduced numbers of this prey species on salmonids are unknown. Since outer harbor dredging occurs in the spring when entrainment rates are relatively low, dredging activities are not expected to have a substantial impact on sandlance populations.

Mobile epibenthic organisms and demersal fish are sometimes entrained or suctioned along with the sediment slurry by hopper dredges. In a review of ten years (1979-1989) of entrainment data from Grays Harbor, McGraw and Armstrong (1990) found twenty-eight species of fish to be identified in entrainment samples. Pacific sand lance were entrained at the highest rate (594 per 1000 cy, please see the discussion in the Forage Fish section above), followed by Pacific staghorn sculpin (92 per 1000 cy) and Pacific sanddab (*Citarichthys sordidus*, 76 per 1000 cy). The greatest entrainment rates and number of species occurred in the South Reach; for much of the study period, hopper and pipeline dredges were used in the

inner harbor. A comparison of trawl data with this entrainment data indicates that larger crabs and some fish actively avoided the dredges. The only salmonid in this data set was one chum salmon fry entrained by a pipeline dredge in February of 1981. Larson and Moehl (1990) concluded that anadromous fish are unlikely to suffer entrainment by hopper dredging in large estuaries such as Grays Harbor.

4.5.3. Wildlife

The no action alternative would have no effect on any wildlife in Grays Harbor. The preferred alternative may be a temporary and minor disruption in the immediate vicinity of the Entrance Channel, but is expected to have no lasting effect to any wildlife.

4.5.4. Threatened and Endangered Species

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 and proposed threatened or endangered species. The Corps conducted informal consultation with NMFS and USFWS regarding the threatened and endangered species listed in Table 1. The Corps received concurrence from both services for the effect determinations as presented in Table 3. An addendum to the Biological Evaluation is currently pending with NMFS regarding Green Sturgeon and Southern Resident Killer Whale critical habitat, which were listed after the initial BE was submitted.

Table 3. Effect determinations for threatened and endangered species in the project vicinity.

Species	Listing	Effect Determination	Critical Habitat
Bald Eagle	Threatened	Not likely to adversely affect	None designated
Brown Pelican	Endangered	Not likely to adversely affect	None designated
Western Snowy Plover	Threatened	Not likely to adversely affect	Not likely to adversely affect
Marbled Murrelet	Threatened	Not likely to adversely affect	None in project area
Bull Trout	Threatened	Not likely to adversely affect	Not likely to adversely affect
Humpback Whale	Endangered	Not likely to adversely affect	None designated
Steller Sea Lion	Threatened	Not likely to adversely affect	None in project area
Blue Whale	Endangered	No Effect	None designated
Fin Whale	Endangered	No Effect	None designated
Sei Whale	Endangered	No Effect	None designated
Sperm Whale	Endangered	No Effect	None designated
Leatherback Sea Turtle	Endangered	No Effect	None in project area
Loggerhead Sea Turtle	Threatened	No Effect	None designated
Green Sea Turtle	Threatened	No Effect	None in project area
Olive Ridley Sea Turtle	Threatened	No Effect	None designated

4.6. Cultural Resources

Because the area of the proposed project in located in a high energy estuary with a dynamic and shifting sea floor, and a regularly used disposal site for dredged material, neither the no action alternative nor the preferred alternative are expected to have any effect on cultural resources. A copy of this Draft EA will be provided to the State Historic Preservation Officer (SHPO), and coordination will occur before the EA is finalized.

4.7. Native American Concerns

Under the no action alternative, there would be no effect to the Usual and Accustomed fishing and gathering area in Grays Harbor.

For the preferred alternative, timing of the test dredge would be coordinated with the Quinault Nation so as not to interfere with harvest of spring/summer salmon stocks. A copy of this Draft EA will be provided to the Quinault Nation, and coordination will occur between a Corps archaeologist and the tribe before this EA is finalized.

It has been speculated that the century of maintenance dredging along the Federal Navigation Channel has potentially caused loss of habitat suitable for *Schoenoplectus pungens*, an estuarine grass with cultural and material importance for Native Americans who harvest the grass for basket weaving and other uses (Ryan 2002). At this time, no direct link has been established between Navigation Channel maintenance and loss of *S. pungens* populations, therefore no effects of the test dredge are anticipated to occur.

4.8. Land Use

There are currently no restrictions to public access of the area, and no such restrictions are anticipated in the foreseeable future. The proposed test dredging and disposal project would not alter land use in either Ocean Shores or Westport, the two population centers nearest to the Navigation Channel. All work for this project involves water-based activities and will not affect land use in the Grays Harbor area. Disposal will only occur at an approved, designated disposal site. The Point Chehalis site is a Washington Department of Natural Resources (DNR) public, multi-user unconfined open water dredged material disposal site, and is located directly adjacent to the navigation channel. This site is located on state-owned aquatic lands, and managed by DNR.

4.9. Recreation and Aesthetics

Under the no action alternative, the visual characteristics and aesthetic environment in the vicinity of Westport and Ocean Shores would remain unchanged.

For the preferred alternative, the activity of the hopper dredge in the Federal Navigation Channel will be apparent while the work is performed. However, such activities would not alter the general visual characteristics of the outer estuary as this area experiences frequent passage of large commercial vessels coming and going from the sea ports at Aberdeen, Hoquiam, and Cosmopolis. Therefore, no adverse impacts to visual characteristics or the aesthetic environment are expected to occur.

4.10. Air Quality and Noise

The no action alternative would have no effect on air quality or noise in the Grays Harbor estuary.

Under the preferred alternative, the proposed activity (4-7 days of dredging and disposal) would not involve discharge of air pollutants that exceed *de minimis* levels of direct emissions of a criteria pollutant or its precursors. Air quality would meet the standards as set forth by the DOE and would not be permanently affected by the project.

Noise both above and below the water would be temporary and localized at the site and would vary depending on the frequency of dredging and disposal activities. Noise levels would increase slightly above ambient levels while construction equipment was operating. Above the water, noise from the dredging operation would likely be somewhat masked by wind and waves and other vessel traffic in the area. Below the water, hopper dredge sounds are generally continuous from the pumps and dredge power plant. The sound has been measured in the range of 70 to 1,000 Hz and peaked around 140 dB (Clarke et al. 2002). Potential effects to the listed marine mammals range from no disturbance to temporary

avoidance of the immediate area. Clarke et al. (2002) found that the sound attenuation of hopper dredge noise made it nearly inaudible at 500m (1700 feet). The low frequency noise made by operating a hopper dredge would not mask orca calling and echolocation, which occur at much higher frequencies (Talus 2000, Clarke et al. 2002).

4.11. Socioeconomics

For both the preferred alternative and the no action alternative, no impacts to the socioeconomic status of the Grays Harbor population are expected to occur. Annual maintenance dredging will continue in order to allow shipping capabilities of the port.

5. UNAVOIDABLE ADVERSE EFFECTS

Habitat in and adjacent to the Entrance Reach of the Federal Navigation Channel will be disturbed by dredging and disposal operations. The Corps has determined that the effects will be localized in nature, short in duration, and minor in scope. Impacts to fish and wildlife have been considered and will be reduced and/or avoided through implementation of timing restrictions. No adverse impacts to threatened or endangered species are anticipated.

6. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No federal resources would be irreversibly and irretrievably committed to the proposed action until this Environmental Assessment is finalized and a "Finding of No Significant Impact" has been signed.

7. CUMULATIVE IMPACTS

The NEPA defines cumulative effects as the impact on the environment which results from the incremental impact 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 (40 CFR §1508.7).

The physical features with the greatest influence on bathymetry of the outer harbor are the north and south jetties, constructed between 1898 and 1913 for the purpose of preventing shoaling of the navigation channel. The historical shoreline accretion that led to development of coastal towns appears to be reversing due to reduction of sediment sources. Erosion control and development will continue to be active within the project area in the foreseeable future. New developments are proposed along the coastal strand and protection of existing infrastructure will be an on-going concern for the City of Westport, the State of Washington, and private landowners. These will likely include a multitude of shoreline stabilization projects, channel diversion projects, and other proposals to either dissipate energy or provide additional sand sources to the littoral processes.

Up to 1,725 acres are disturbed by the Corps' annual maintenance dredging, with an additional 697 acres disturbed by disposal of this material. Because the proposed test dredge is only 1200 feet away from the Entrance Reach, this dredging would not result in any new impacts to ecological function given the existing degraded condition of the navigation project area. The Point Chehalis disposal area is used during annual maintenance dredging, so the proposed action would not disturb any new area for disposal of dredged material.

The Corps will perform a trawling survey for crabs in the location of the test dredge immediately prior to the dredging action. This will provide an estimate of the number of crabs likely to be entrained by the hopper dredge. The Corps can then add this number to the crab mitigation work that is performed in conjunction with the Federal Navigation Channel Maintenance Dredging.

A future action that could occur after the test dredge, if the test proves successful, is realignment of the Entrance Reach of the Federal Navigation Channel under the Corps Operation and Maintenance program. The purpose of the proposed test dredge is to determine whether removing a small sand wedge will allow the outer harbor to maintain a channel deep enough for the deepest-draft shipping traffic. A self-maintaining channel would allow realignment of the Entrance reach and potentially reduce the need for dredging in this area. Another portion of the proposed new channel would be dredged. A new Environmental Analysis would be produced in order to evaluate environmental effects of that dredging action and permanent realignment of the Entrance Channel. If no test dredge is performed, then the Entrance Channel will not be realigned, and annual maintenance dredging will continue in this reach of the Navigation Channel. For environmental effects of the annual maintenance dredging at this location, please refer to the Final Environmental Assessment: Fiscal Years 2007-2011 Maintenance Dredging and Disposal – Grays Harbor and Chehalis River Navigation Project (USACE 2006).

The proposed project will not change the characteristics of the function or extent of the regional regime of sediment transport from the Columbia River along the Washington coast, so therefore will not affect other shoreline processes. The project will also not result in any changes to the human occupancy of the project area. The Corps concludes that there will not be a significant cumulative effect associated with this action.

8. ENVIRONMENTAL COMPLIANCE AND COORDINATION

Several federal statutes, executive orders, and executive memoranda apply to the development of federal projects. These laws and regulations, and their applicability to the proposed project are described in the sections below.

8.1. National Environmental Policy Act (42 USC 4321 et seq.)

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

8.2. Endangered Species Act (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 has been prepared and was submitted to NMFS and USFWS for concurrence prior to initiation of construction.

8.3. Clean Water Act (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 has prepared a 404(b)(1) Consistency Evaluation and has contacted the DOE requesting a 401 water quality certification to be obtained prior to proceeding with the project.

8.4. Clean Air Act (42 USC 7401)

The Federal Clean Air Act (CAA) was enacted in 1969, and established the National Ambient Air Quality Standards (NAAQS). Air quality regulation in Washington is divided between the Environmental Protection Agency (EPA) Region 10 and DOE. EPA and DOE establish regulations designed to limit emissions from air pollution sources and to minimize concentrations of pollutants in the outdoor air. Although their regulations are similar in stringency, each agency has established its own standards. Washington has established additional state ambient standards for total suspended particulates and sulfur dioxide standards more stringent than the federal requirements.

The proposed activity (4-7 days of dredging and disposal) would not involve discharge of air pollutants that exceed *de minimis* levels of direct emissions of a criteria pollutant or its precursors. Accordingly, the activities are exempted by 40 CFR Part 93.153.

8.5. Coastal Zone Management Act (16 USC 1451-1465)

The Coastal Zone Management Act of 1972, as amended, requires federal agencies to carry out their activities in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The Corps has prepared a Coastal Zone Management Act Consistency Determination for the navigation channel maintenance program. This evaluation established that the proposed work complies with the policies, general conditions, and general activities specified in the Grays Harbor County Shoreline Management Master Plan, the City of Westport Shoreline Management Master Plan, and the Grays Harbor Estuary Management Plan. The proposed action is thus considered consistent to the maximum extent practicable with the State of Washington Shoreline Management Program.

8.6. Rivers and Harbors Act (33 USC 401, 403, 407)

The Rivers and Harbors Act of 1899 regulates structures or work in or affecting navigable waters of the United States including discharges of dredged or fill material into waters of the United States. Structures include without limitation, any pier, boat dock, weir, revetment, artificial islands, piling, aid to navigation or any other obstacle or obstruction. This act is not applicable to the proposed project because the dredging does not restrict navigation or access to navigable waters.

8.7. Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.)

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) regarding actions that may adversely affect Essential Fish Habitat (EFH) for Pacific coast groundfish, coastal pelagic species, and Pacific salmon. The Act defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Descriptions of EFH are provided in Fishery Management Plans produced by the Pacific Fisheries Management Council. The Corps provided an analysis of effects to EFH as part of the ESA Section 7 consultation with NMFS. The project area is part of the Washington State Estuarine EFH composite, and has been designated as EFH for various life stages of 24 species of groundfish, 5 coastal pelagic species, and 2 species of Pacific salmon. The Corps has determined that the proposed action would not adversely affect the EFH at the entrance of Grays Harbor based on the highly dynamic nature of the sea floor in this area, the small number of organisms likely to be entrained, and the ability of the benthic organisms to repopulate the area quickly. Moreover, if the resulting bathymetry after the test dredge proves to stabilize and maintain a channel of adequate depth, this would decrease and possibly eliminate the need for repeated dredging in this area.

8.8. National Historic Preservation Act

The National Historic Preservation Act (16 USC 470) 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. Since the proposed dredging is confined to the removal of recently deposited sediments in close proximity to the previously dredged channel width and depth boundaries, no submerged cultural resources will be affected by the project.

8.9. Environmental Justice (Executive Order 12898)

Executive Order 12898 directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-

income populations. No tribal resources would be harmed. No adverse effects to minority or low-income populations would result from the implementation of the proposed project.

9. CONCLUSION

Based on the above analysis, this project is not a major federal action significantly affecting the quality of the human or natural environment, and therefore does not require preparation of an environmental impact statement.

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