CENWS-OD-TS-DMMO

MEMORANDUM FOR RECORD July 12, 2007

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM 1) SAND BORROW SITES ADJACENT TO THE WILLAPA BAY NORTH CHANNEL FOR BENEFICIAL USE IN THE RESTORATION OF THE GRAVEYARD SPIT BARRIER DUNE AT THE SHOALWATER BAY INDIAN RESERVATION AND 2) THE PROPOSED NORTH COVE CHANNEL ALIGNMENT.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability of the borrow material needed to restore the Graveyard Spit barrier dune. The Corps of Engineers proposes to dredge approximately 600,000 cubic yards (cy) of sand from the entrance of Willapa Bay and place it on the spit to restore the eroded dune. An ancillary feature of the barrier dune restoration is the realignment of the North Cove channel, which will require excavating 100,000 cy of sand, with the excavated sand relocated to the area presently occupied by the existing tidal channel. (See Attachment 1 for vicinity and location maps).

2. Background. The Shoalwater Bay Shoreline Erosion Project was authorized by Section 545 of the Water Resources Development Act of 2000. A study to determine the most appropriate long-term solution to reduce shoreline erosion and flood damage due to coastal storms affecting the Shoalwater Bay Indian Reservation was conducted by the Corps of Engineers (USACE, 2007). The preferred alternative is to restore the severely eroded barrier sand dune located on Graveyard Spit, extend an existing riprap flood berm along the shoreline, and restore the entrance channel to North Cove to the location it occupied in 1994 (see Attachment 2). Material for dune restoration is proposed to be taken from two borrow sites located adjacent to the Willapa Bay North Channel (see Attachment 3).

3. Exclusionary Criteria. The entire project area, including the borrow sites, is located within three miles of the baseline for territorial seas. Therefore, Section 404 of the Clean Water Act (CWA) applies, but not the Marine Protection, Research and Sanctuaries Act. The CWA Section 404(b)1 Guidelines for Specification of Disposal Sites for Dredged or Fill Material (CFR 40 Section 230.60, subparagraphs a and b) include exclusionary criteria with regard to testing. The Guidelines state that (1) dredged or fill material is most likely to be free from chemical, biological, or other pollutants where it is composed primarily of sand, gravel, or other naturally occurring inert material. Dredged material so composed is generally found in areas of high current or wave energy such as streams with large bed loads or coastal areas with shifting bars and channels; and (2) the extraction site shall be examined in order to assess whether it is sufficiently removed from sources of pollution to provide reasonable assurance that the proposed discharge material is not a carrier of contaminants (EPA, 1980). Dredged material that meets these two guidelines may be excluded from further testing.

   The proposed project is in a highly dynamic coastal area with high-energy waves and currents. The USGS verified the physical characteristics of the sediment in a 2004 erosion study for the U.S. Army

Corps of Engineers (USGS, 2004). Seven sediment samples were taken from five locations near the entrance to Willapa Bay. Three of the sampling locations were in the general vicinity of the borrow sites and proposed North Cove channel alignment. Surface samples were collected with a Van Veen grab sampler and analyzed for grain size. All samples were predominantly fine sand, with very low fines content (< 2%). See Attachment 4 for grain size sampling locations and data.

The proposed dredged material is also far from any known sources of contamination. The DMMP Users Manual indicates that the Willapa Bar is ranked "low", meaning that there are few or no sources of chemicals of concern (DMMP, 2007).

Based on the above information, the agencies with regulatory jurisdiction agree that the material does not require further testing under Section 404 of the CWA.

4. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from 1) sand borrow sites adjacent to North Channel in Willapa Bay for beneficial use in the restoration of the Graveyard Spit barrier dune and 2) the proposed North Cove channel alignment. Based on the results of the grain-size characterization conducted by the U.S. Geological Survey and the CWA exclusionary criteria, the DMMP agencies conclude that **all 700,000 cubic yards are suitable** for beneficial use or as fill material.

5. References.

DMMP, 2007. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*, prepared by the U.S. Army Corps of Engineers – Seattle District for the Dredged Material Management Program agencies, May 2007.

EPA, 1980. *Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 40 CFR Part 230*, Environmental Protection Agency (published in the Federal Register), December 24, 1980.

USACE, 2007. *Shoalwater Bay Shoreline Erosion, Washington – Flood and Coastal Storm Damage Reduction, Shoalwater Bay Indian Reservation. Appendix 1 – Engineering Analysis and Design*, U.S. Army Corps of Engineers – Seattle District, July 2007.

USGS, 2004. *Shoalwater Bay Tribe Erosion Study Report*, U.S. Geological Survey, December 6, 2004 Draft Report.

6. Agency Signatures.

Concur:

7/12/07 — David F. Fox
Date — David Fox, P.E. - Seattle District Corps of Engineers

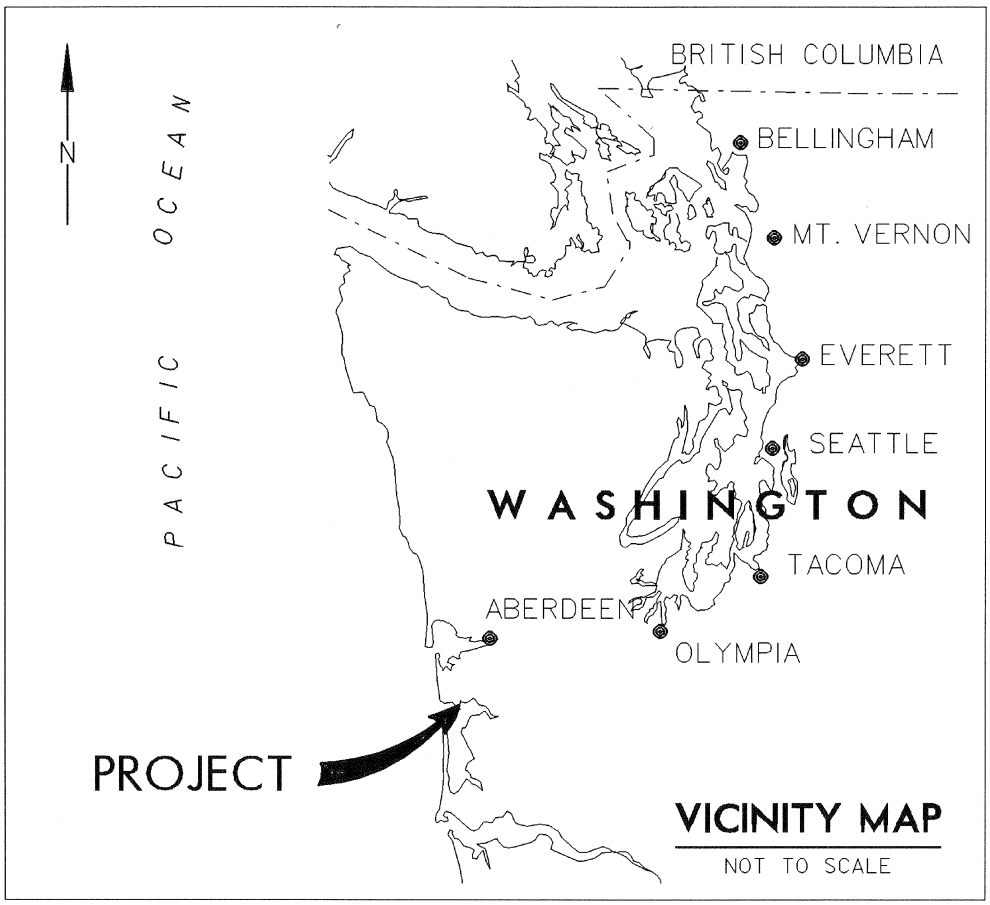
7/12/07 — Jonathan R Freedman
Date — Jonathan Freedman - Environmental Protection Agency

7/18/07 — Laura Inouye
Date — Laura Inouye, Ph.D. - Washington Department of Ecology

7/18/07 — Courtney Wasson
Date — Courtney Wasson - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Steve Babcock, Seattle District Planning
Rustin Director, Seattle District Environmental Resources Section
DMMO file



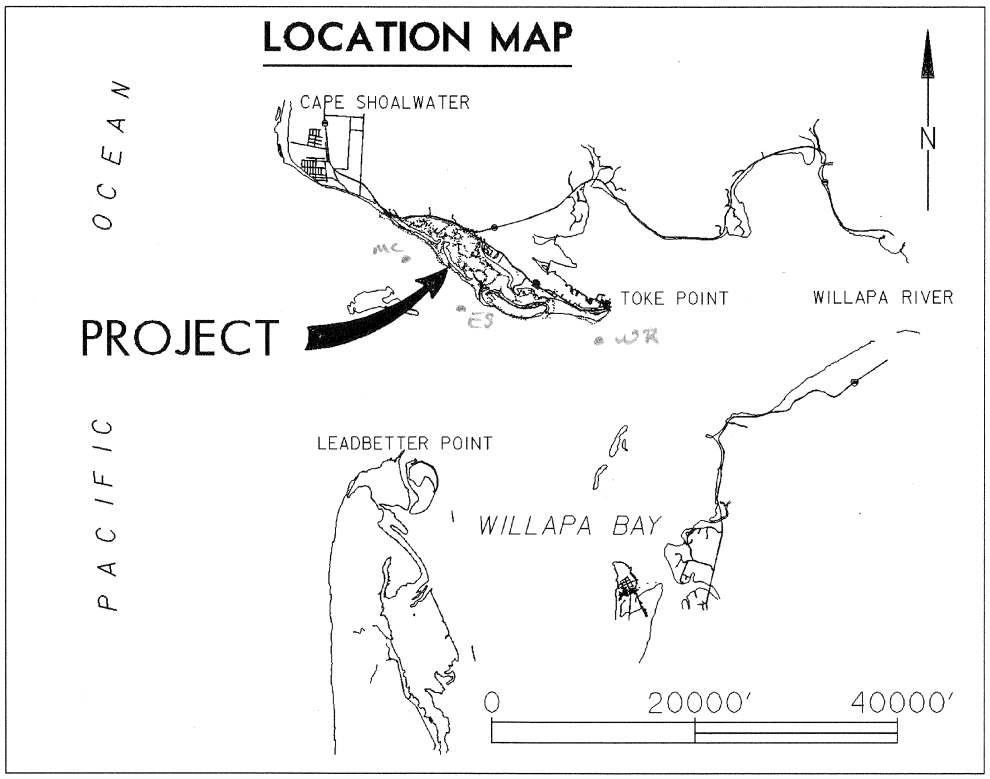
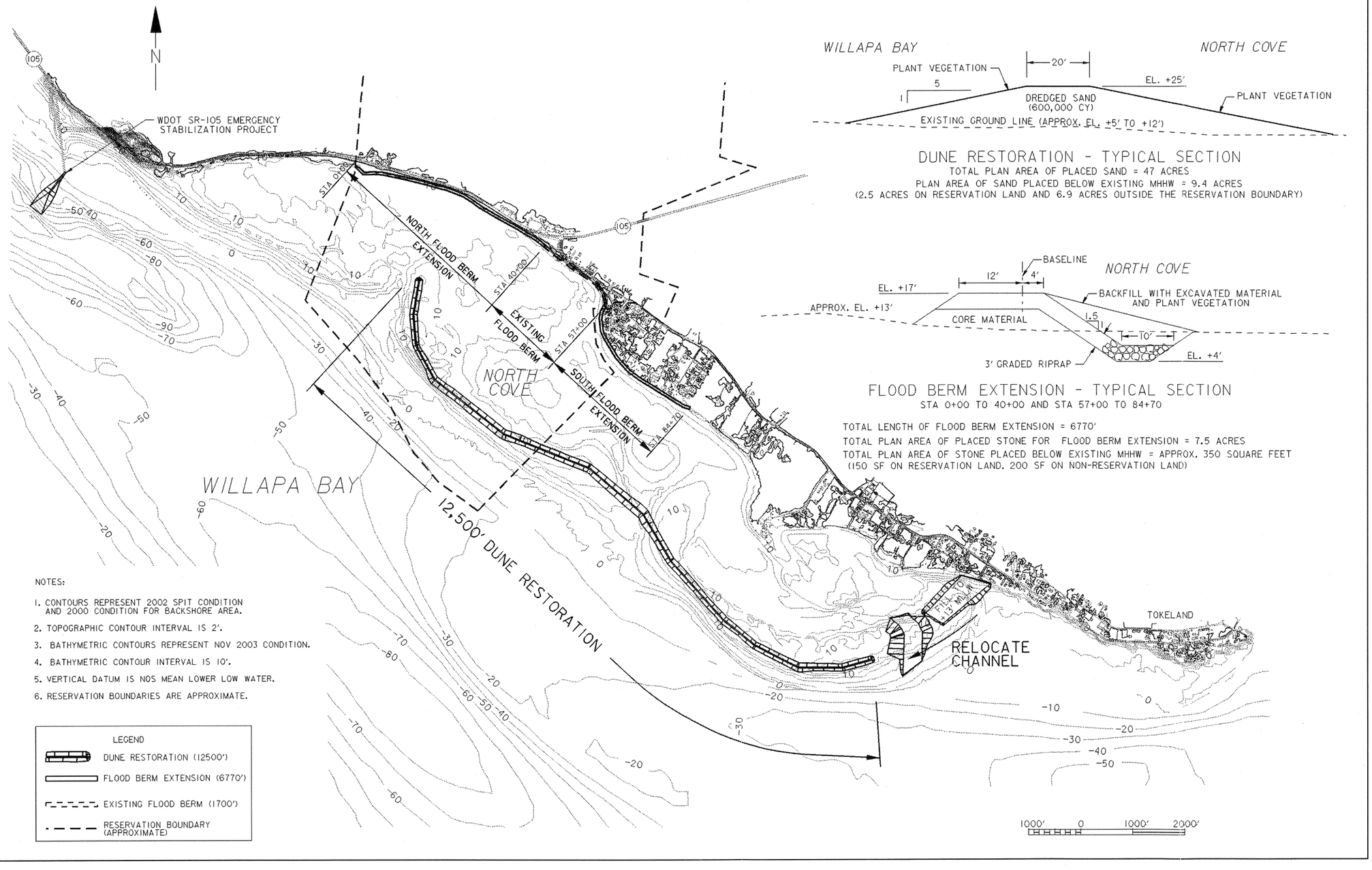


Figure 1.1 - Project vicinity and location maps.

DUNE RESTORATION WITH FLOOD BERM EXTENSION



DUNE RESTORATION - TYPICAL SECTION

TOTAL PLAN AREA OF PLACED SAND = 47 ACRES
PLAN AREA OF SAND PLACED BELOW EXISTING MHHW = 9.4 ACRES
(2.5 ACRES ON RESERVATION LAND AND 6.9 ACRES OUTSIDE THE RESERVATION BOUNDARY)

FLOOD BERM EXTENSION - TYPICAL SECTION

STA 0+00 TO 40+00 AND STA 57+00 TO 84+70

TOTAL LENGTH OF FLOOD BERM EXTENSION = 6770'
TOTAL PLAN AREA OF PLACED STONE FOR FLOOD BERM EXTENSION = 7.5 ACRES
TOTAL PLAN AREA OF STONE PLACED BELOW EXISTING MHHW = APPROX. 350 SQUARE FEET
(150 SF ON RESERVATION LAND, 200 SF ON NON-RESERVATION LAND)

Figure 3.8 Barrier Dune Restoration with Flood Berm Extension, Plan and Sections

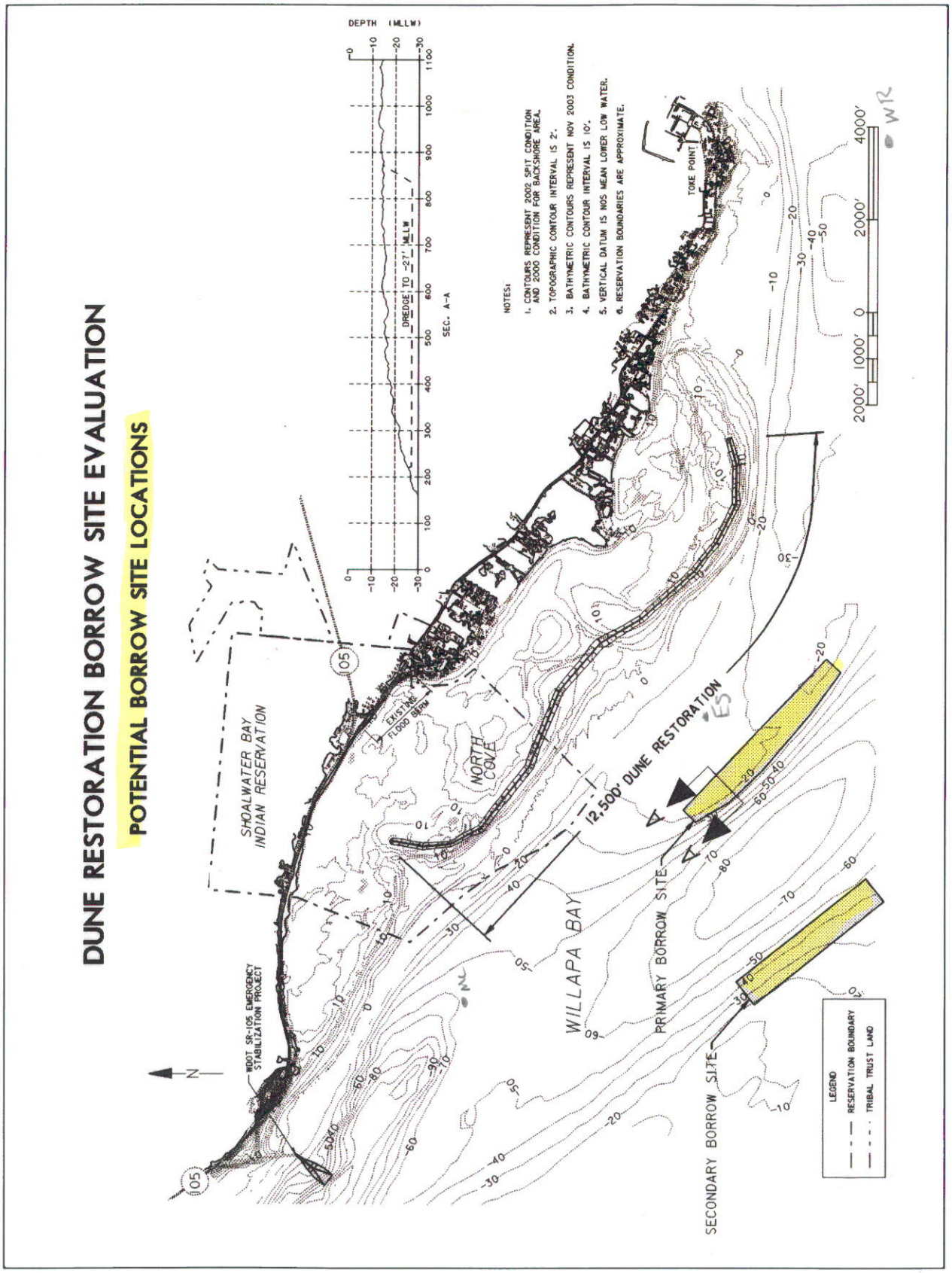


Figure 5.2 Dune restoration borrow site evaluation, potential borrow site locations.

Attachment 3

USGS
science for a changing world

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Shoalwater Bay Tribe Erosion Study Report

Guy Gelfenbaum, George Kaminsky, Giles Lesser, Laura A. Landerman, Peter Ruggiero, and Diana McCandless

Scientific Investigations Report XX
December 6, 2004 DRAFT

Prepared in Cooperation with
Washington State Department of Ecology

U.S. Department of the Interior
U.S. Geological Survey

3.3 Oceanographic Data Collection

3.3.1 Experiment Overview

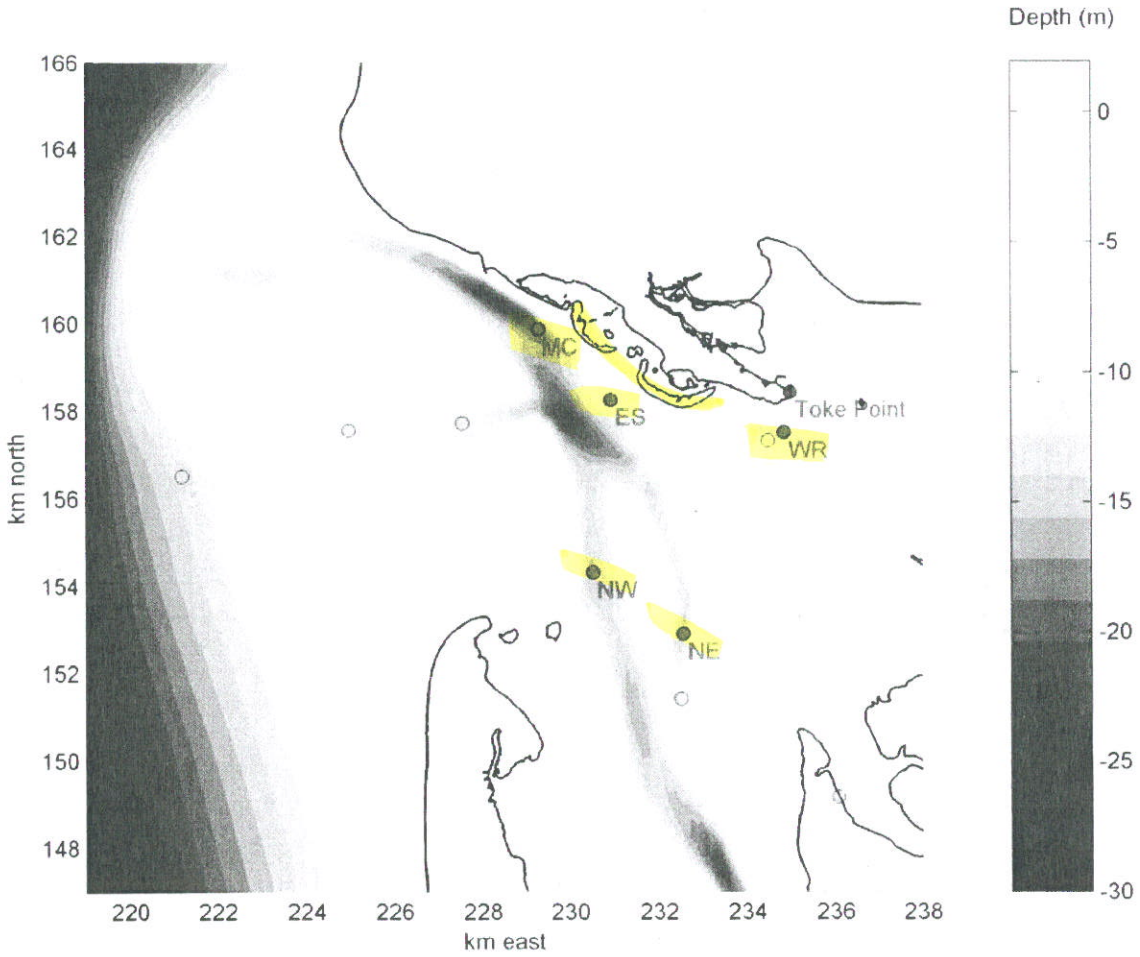


Figure 33: Map of the study area showing the USGS sites, USACE sites, Toke Point tide gauge and meteorologic station, and bathymetry.

Table 3: Summary of Deployment 2. Times reported in GMT.

Site	North Latitude	West Longitude	Approx. Depth (m)	Washington State Plane, South Zone		Deployment		Recovery	
				Easting (m)	Northing (m)	Date	Time	Date	Time
MC	46° 42.997'	124° 02.537'	18.5	229280.57	159832.65	12/04/02	20:54	01/19/03	03:04
ES tripod*	46° 42.206'	124° 01.204'	7.5	230911.84	158292.49	12/06/02	03:45	01/19/03	03:43
WR	46° 41.857'	123° 58.107'	6.5	234827.15	157472.23	12/03/02	00:25	01/19/03	04:04
NE tripod	46° 39.293'	124° 59.739'	17.5	232538.05	152818.16	12/03/02	23:44	01/19/03	15:34
NE mooring	46° 39.315'	123° 59.777'	17.5	232491.49	152860.57	12/03/02	23:50	01/19/03	15:38
NW	46° 40.050'	124° 01.339'	13.5	230562.08	154308.92	12/04/02	00:23	01/19/03	15:11
*This tripod was originally deployed at the following location without the ADCP, but was retrieved and redeployed with the ADCP.									
ES	46° 42.206'	124° 01.189'		230930.98	158291.49	12/04/02	20:40	12/05/02	15:45

3.3.2 Bottom Sediment Samples

Grab samples of bottom sediments were obtained using a Van Veen sampler off the side of the Tricia Rae (TR) (Table 4). Samples were obtained from each of the tripod deployment sites.

Table 4: Visual and location descriptions of the surface sediment samples collected aboard the F/V Tricia Rae.

Site	Latitude	Longitude	Easting (m)	Northing (m)	Date	Approx. Depth (m)	Visual Description and Comments
MC1	46° 42.997'	124° 02.524'	229297.03	159831.10	11/04/02		fine sand, no shells or worms
MC2	46° 43.011'	124° 02.544'	229272.29	159858.43	11/04/02	19	fine sand, no shells or worms
ES	46° 42.198'	124° 01.220'	230890.50	158279.10	11/04/02	6.5	fine sand, no shells or worms
Near ES	46° 42.232'	124° 01.269'	230831.20	158343.94	11/04/02		fine sand, no shells or worms
WR	46° 41.856'	123° 58.087'	234851.65	157469.44	11/03/02		fine sand, shell fragment, little worms, medium size dead sand dollar
NE	46° 39.290'	123° 59.742'	232534.55	152813.16	11/03/02		fine sand, no shells or worms
NW	46° 40.093'	124° 01.382'	230510.40	154391.99	11/03/02		fine sand, small bi-valve shell, small shell fragments, no fines

The grain size distribution of each sample was determined using standard USGS Coastal and Marine Geology procedures, modified from Folk (1968) and Carver (1971; chapter 4). Settling tubes (modified after Thiede *et al.*, 1976, and similar to that described by Syvitski, 1991; chapters 1 and 4) were used to analyze the sand fraction (4 phi to -1phi, 0.063 mm to 2 mm) The weight percentage of the fine (> 4 phi, < 0.063 mm) and coarse (< -1 phi, > 2 mm) fractions were determined but were not further analyzed because individually they contained less than 2% of the sample.

Statistical analyses of the results were obtained using a USGS-developed computer program. The program calculates graphical statistics, median, mean, skewness, and kurtosis, using methods presented by Folk and Ward, Inman (Carver,1971; chapter 6), and Trask (1930), and the moment measures (Carver, 1971; chapter 6). Results are presented in Section 4.3.1 Bottom Sediments.

4.3 Oceanographic Data Collection Results

4.3.1 Bottom Sediments

The results of grain-size analyses (weight percent in 1/4-phi intervals) are listed Table 54 and graphed in Figure 117.

All the samples are very well sorted fine sands (Folk, 1974), with means ranging of 2.07 - 2.49 phi (0.24 - 0.19 mm) and sortngs of 0.24 - 0.31 phi (Folk and Ward classifications; CArver, 1971; Chapter 6). Each sample contained little to no coarse fraction (< 1.25%) and little fine fraction (< 0.25%). Statistical descriptions of each sediment sample are reported in Table 55. Settling velocity has been calculated using Gibbs (1971) equation for settling velocity at 10°C, 30 psu, and 18 dbar.

Table 54: Results of grain size analysis reported as weight percent at 1/4 phi intervals (with associated settling velocity).

phi class	Settling Velocity (cm/s)	MC1	MC2	ES	Near ES	WR	NE	NW
-1.00	2.653E+01	0	0	0	0	0.17	0	1.15
-0.75	2.307E+01	0	0	0	0	0	0	0
-0.50	1.992E+01	0	0	0	0	0	0	0
-0.25	1.708E+01	0	0	0	0	0	0	0
0.00	1.453E+01	0	0	0	0	0	0	0
0.25	1.225E+01	0	0	0	0	0	0	0
0.50	1.024E+01	0	0	0	0	0	0	0
0.75	8.474E+00	0	0	0	0	0	0	0
1.00	6.937E+00	0	0	0	0	0	0	0
1.25	5.612E+00	0	0	0	0	0	0	0.99
1.50	4.485E+00	0.5	0	0	0	0	0	2.47
1.75	3.537E+00	7.99	6.49	1.5	3.5	1.99	0	6.41
2.00	2.751E+00	32.47	27.48	7.99	12.99	6.97	9.48	14.8
2.25	2.111E+00	36.96	39.46	23.47	27.48	12.44	25.44	42.43
2.50	1.598E+00	14.98	18.48	39.96	37.97	25.88	32.93	23.19
2.75	1.194E+00	5.49	6.49	22.98	16.49	33.84	22.95	6.41
3.00	8.821E-01	1	0.5	2.5	0.5	14.93	6.98	1.97
3.25	6.452E-01	0.5	1	1	0.5	1.49	2	0
3.50	4.681E-01	0	0	0.5	0.5	0.5	0	0
3.75	3.373E-01	0	0	0	0	0	0	0
4.00	2.419E-01	0	0	0	0	1.49	0	0
4.25	1.728E-01	0	0	0	0	0	0	0
14.00	2.390E-07	0.11	0.09	0.11	0.09	0.3	0.23	0.18