SIUSLAW RIVER

[Local Sponsor: Port of Siuslaw]

Description

The **1977** Siuslaw Interim (A) ocean dredged material disposal site (ODMDS) was used exclusively until **1995**. Material removed from the federally authorized channel by hopper dredge between **1996** and **2009** was placed in the two Siuslaw River Section 103 Sites B and C (Figure 1). In **June 2010** EPA, Region 10 designated two new sites North and South under its Section 102 authority. EPA, Region 10's designation documents are available at:

http://www.regulations.gov/search/Regs/home.html#docketDetail?R=EPA-R10-OW-2010-0086

Coordinates: Siuslaw Ocean Dredged Material Disposal Site (Interim Site A)
Corner Coordinates (NAD 27)

44° 01' 32" N, 124° 09' 37" W
44° 01' 22" N, 124° 09' 02" W
44° 01' 14" N, 124° 09' 07" W
44° 01' 24" N, 124° 09' 42" W

Dimensions: 3,000' x 900', Azimuth (long axis): 297° T, Average Depth: 70

Corner Coordinates Site B:

44° 01' 49.94" N, 124° 09' 58.44" W
44° 01' 39.03" N, 124° 09' 20.26" W
44° 01' 20.67" N, 124° 09' 30.33" W
44° 01' 31.57" N, 124° 10' 08.51" W
(NAD 27, Corps Section 103)

Dimensions: 3,000' x 2,000', Azimuth (long axis): 297° T, Average Depth: 90

Corner Coordinates Site C:

44° 01' 06.95" N, 124° 10' 20.04" W
44° 01' 04.67" N, 124° 09' 39.11" W
44° 00' 54.83" N, 124° 09' 40.16" W
44° 00' 57.11" N, 124° 10' 21.09" W
(NAD 27, Corps Section 103)

Dimensions:3,000' x 1,000', Azimuth (long axis): 264° T, Average Depth: 78

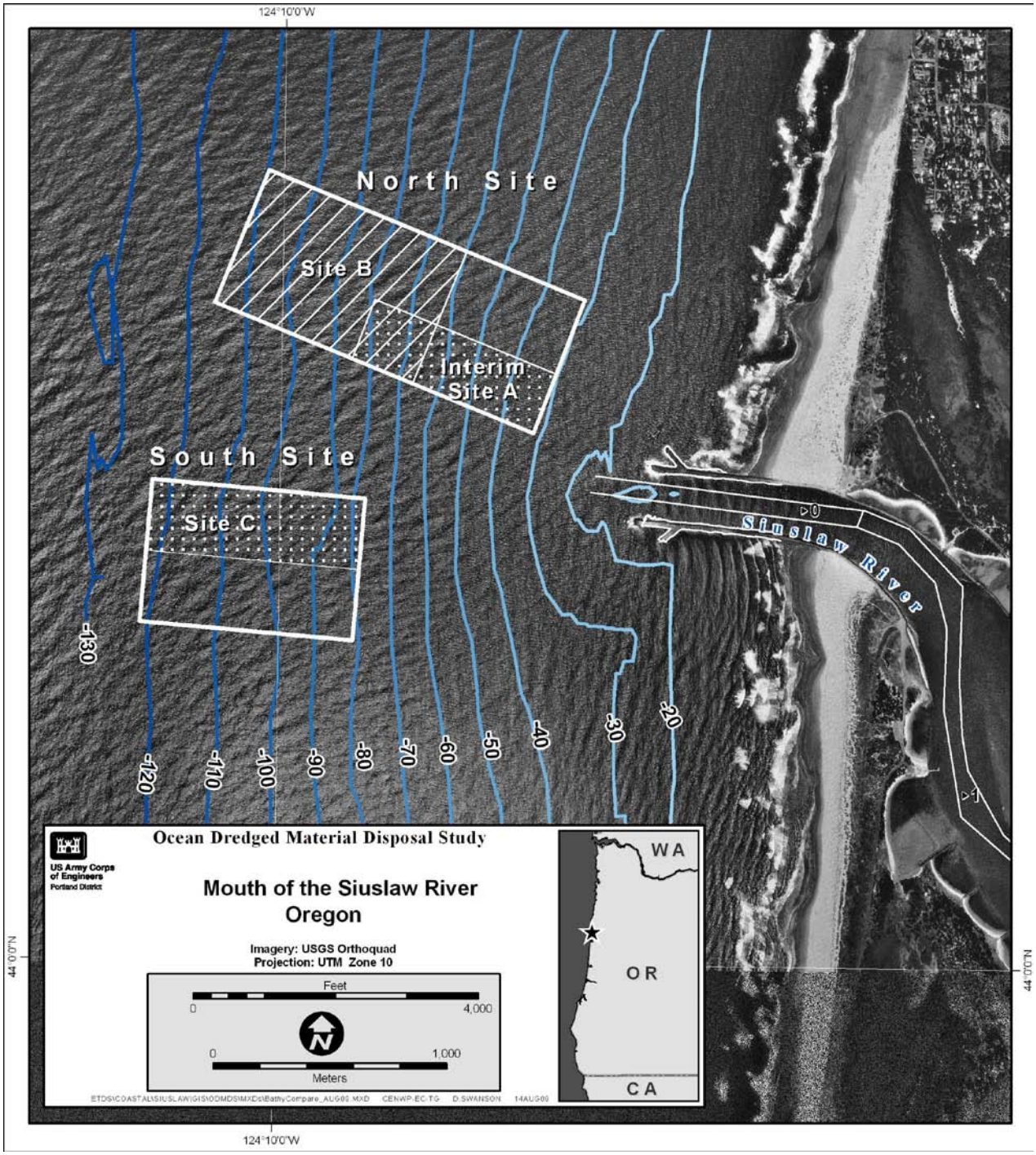


Figure 1: Siuslaw River ODMDSs.

Coordinates: EPA Section 102 North Site

44° 01′ 31.03″ N, 124° 10′ 12.92″ W,
44° 01′ 49.39″ N, 124° 10′ 02.85″ W,
44° 01′ 31.97″ N, 124° 09′ 01.86″ W,
44° 01′ 13.45″ N, 124° 09′ 11.41″ W.

Size: Approximately 1.5 kilometers (0.81 nm) long and 0.6 kilometers (0.32 nm) wide.
Depth: Ranges from approximately 9 to 35 meters (30 to 115 feet).

Coordinates: EPA Section 102 South Site

44° 00′ 46.72″ N, 124° 10′ 26.55″ W,
44° 01′ 06.41″ N, 124° 10′ 24.45″ W,
44° 01′ 04.12″ N, 124° 09′ 43.52″ W,
44° 00′ 44.45″ N, 124° 09′ 45.63″ W.

Size: Approximately 0.9 kilometers (0.49 nm) long and 0.6 kilometers (0.32 nm) wide.
Depth: Ranges from approximately 24 to 38 meters (79 to 125 feet).

Shoaling at the entrance usually requires annual dredging to -20 to -22 feet MLLW to ensure the authorized depth of -18 feet MLLW between dredging operations. The entrance and south jetty shoals build during late winter and spring. The inside range and south turn shoals are affected more by river flood stages than by tidal action. A small hopper dredge removes material from the entrance shoals between April and October. In 2010 the turning basin at RM 5 above the 101 Highway Bridge was dredged using a clamshell and barge operation.

Dredged Material Description

The sediment at the entrance is sand, with an average in-place density of 2,000 grams/liter. Sediment from the Siuslaw River near RM 1.0 is sand, with an average in-place density of 1,850 grams/liter. Sediments collected in 1991 showed the material to be poorly graded sand with an average of 99.9% sand, 0.1% fines, and 1.1% volatile solids. Mean grain size was 0.32 mm. Sediments within the federal navigation project are tested periodically, generally every five years, to ensure they are still suitable for ocean disposal. Generally, testing of material from the estuary is limited to physical analyses since the material meets exclusion criteria found in the MPRSA regulations. Sediments above the Hwy 101 Bridge (RM 5) have been chemically tested and found suitable for unconfined in-water placement.

Sediment Evaluation

1987, sediment samples from the federal navigation project were analyzed by the Portland District. Only physical analyses were conducted.

1991, sediment samples from the federal navigation project were analyzed by the Portland District. As with the 1987 analyses testing was limited to physical analysis except for one sample which was subjected to chemical analyses. Siuslaw River sediments are 99.9% poorly graded sand with a low volatile solids content (1.1%). The mean median grain size (0.32 mm) was that of medium sand. The results of the chemical analysis of one sample, S-1, taken from the turning basin at RM 5.0 near the town of Florence, had metals concentrations below established levels of concern. No pesticides, PCBs, PAHs, or phenols were detected.

1996, Ten samples were collected using a ponar grab sampler which takes a sample approximately 9 cm thick that represents the surface sediments. These samples were subjected to physical tests including density, void ratio, volatile solids, specific gravity, particle size classification (ASTM D2487) and particle roundness. Siuslaw River sediments range from 100% to 92.7% (mean 98.6%) poorly graded sand with volatile solids content ranging from 1.4% to 0.3% (mean 0.8 %). The mean grain size is that of medium sand (0.294 mm). The material meets the exclusionary criteria of the Clean Water Act and therefore does not require any further testing prior to disposal.

2001 April, Eight (8) surface grab sediment samples were collected from the Siuslaw River. All samples were submitted for physical analyses (mean 0.29mm, with an average of 99.15 % sand and 0.81% fines), with 2 samples analyzed for metals (9 inorganic), total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs) and organotin (TBT) pore water analysis. Sediment represented by samples collected during this sampling event meet the Tier II guidelines established in the DMEF for unconfined in-water placement without further characterization.

2006 August, Seven (7) surface grab samples were collected in the Siuslaw River from the entrance to River Mile (RM) 6. All samples were submitted for physical analyses, with grain-size ranging from 98.5% to 95.4% (mean 97.1%) poorly graded sand, with volatile solids content ranging from 0.69% to 2.24% (mean 1.14 %). One (1) sample was selected for chemical analyzes to include: metals, total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs) and two (2) sample were submitted for organotin (TBT) (total) analysis. The first sample analyzed for TBT was collected in the turning basin, adjacent to the marina (sample 6). Sample 7 collected in the federal channel by the fuel dock was submitted for all chemical parameters listed above. Pore-water TBT was not run due to insufficient pore-water in the samples, a result of the high sand content.

Sediment represented by samples collected during this sampling event meet the Tier II guidelines established in the DMEF/SEF for unconfined in-water placement without further characterization.

September 2011: Seven (7) surface grab samples were collected in the Siuslaw River from the entrance to River Mile (RM) 5. Sediments collected for analysis are considered representatives of the material to be dredged including any advanced maintenance or overdepth material. All samples were submitted for physical analyses, with grain-size ranging from 98.5% to 96.6% poorly graded sand (mean 97.4%), with total organic carbon (2 samples only) content ranging from 0.142% to 0.152% (mean 0.147 %). Two (2) samples were selected for chemical analyses to include: metals, total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs), chlorinated hydrocarbons, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs), and organotin (TBT). Sample 6 was collected adjacent to the bridge; sample 7 was collected off the Port of Siuslaw facilities. Pore-water TBT was not analyzed due to insufficient pore-water volume in the samples, a result of the high sand content. Sediment represented by samples collected during this sampling event meet the Tier II guidelines established in the SEF for unconfined in-water placement without further characterization.

ODMDS HISTORY

Designation

1977, the Siuslaw River ODMDS A received interim designation from the EPA.

July 9, 1995, the Portland District under its Section 103 authority selected two alternate sites [Site B and C, north and south of the entrance respectively] for dredged material disposal. These sites were recommended for final site designation in the Portland District's **1992** site evaluation study.

EPA in a **February 14, 1995** letter concurred with the Corps' Section 103 selection of the two new ODMDSs at Siuslaw. Site use began in **1996** for Site C and in **1999** for Site B. Site use expired for Site C in **2001** and Site B in **2004**. A letter dated **April 12, 2004** was sent to EPA requesting the additional 5 year site use allowed by WRDA 92. EPA in their **July 27, 2004** letter concurred with the additional five years use of the two sites under the authority of Section 103. The Section 103 site use for Site B and Site C expired at the end of the **2009** dredging season.

Benthic infauna, fish trawls, sediment chemistry, and sediment physical analyses studies were conducted in **2008** and EPA's the site designation EA was prepared. The Proposed Rule for site designation was published on **February 4, 2010**. EPA published the Final Rule for site designation of the North Site and South Site on **April 29, 2010** which became effective on **June 1, 2010**.

Evaluation Studies for Designation

During August and September 1984, Site specific geologic information and geophysical investigations by sidescan sonar and sub-bottom acoustic reflection profiling was performed. In addition, existing geologic and oceanographic data pertinent to the Siuslaw River ZSF was compiled.

1984, 1985, 1986, and **1988**, field sampling was conducted to evaluate aquatic resources and characterize sediment of the Siuslaw River ZSF.

An **October 1988**, report presents data on seabed drifter and dye field studies conducted in **1986** and **1987** to evaluate sediment transport and currents.

In **March 1992**, the Siuslaw Ocean Dredged Material Disposal Site Evaluation, Final Report was published by the Portland District.

In **2008** benthic infauna, fish trawls, sediment chemistry, and sediment physical analyses were conducted at 10 stations.

MANAGEMENT/MONITORING

A Siuslaw River **site management/monitoring plan (SMMP)** was completed and coordinated for public review in **April 1997**. A new SMMP was prepared as part of EPA's

2010 site designation documents. The SMMP for this site called for conducting bathymetric surveys annually as a routine site monitoring activity.

Bathymetric surveys were conducted at the interim (Site A) and Site B in **September 1981**, **August 1990**, **August 1992**, **April 1994**, **May 1995**, **June 1996**, **September 1996**, **June 1997**, **September 1997**, **May 1998**, **June 1999**, **April 2001**, **June 2002**, **July 2003**, **September 2004**, **August 2005**, **July 2007**, **July 2008**, and **May 2009**. Incomplete surveys in **May 1993** were made of the interim site. The southern adjusted Site C was surveyed in **September 1981**, **August 1990**, **August 1992**, **September 1997**, **May 1998**, **June 1999**, **April 2001**, **June 2002**, **July 2003**, **September 2004**, **August 2005, July 2007**, **July 2008**, and **May 2009**. No dredged material was placed at Site C prior to **1997** so no surveys were conducted from **1993** through **1996**. For material quantities placed see Table 1. Bathymetric surveys were conducted at the EPA Section 102 North and South Sites in **May 2010** and **May 2011**. Copies of the most recent bathymetry and bathymetry difference plots for the Siuslaw River ODMDSs are attached to the end of this section.

Management/Monitoring Actions and Recommendations

Beginning in **1992**, CENPP-OP-NWH was notified of requirements for annual bathymetric surveys of all ODMDSs as a Tier I monitoring requirement.

Interim (Site A): The **September 1981** bathymetric survey indicated mounding along the southern boundary of the interim ODMDS nearest the Siuslaw River entrance. By **August 1992** the mound, which had exceeded the depth of —42 feet MLLW, had decreased by 12 feet. However, the outer third of the disposal site showed 10 feet of accumulation. By **April 1994** accumulation reached 12 feet, by **September 1996** 14 feet. Water depths over this portion of the mound are between —60 and —84 feet MLLW. Action was taken in **1994** to restrict dredged material placement to the deeper outer third of the interim ODMDS. No material has been placed in the area of Site A since **1996**. The **May 1998** survey indicated material in the interim site is being eroded and moved out of the site. The **June 1999** survey shows further erosion of material from Site A. The 11-foot mound height in the outer third of the site in **1998** was reduced to 9-foot by **June 1999** and remained at 8-foot as of **June 2002**. The area of the Interim Site (A) was incorporated into the **2010** EPA Section 102 North Site.

Site B: In **September 1995** the Portland District under its Section 103 authority selected the two alternate sites (Site B and C) recommended for final site designation in its **1992** site evaluation study. This eliminated further mounding of the interim site. No material was placed in the north 103 site (B) prior to **1999** as the south 103 site (C) has received all material dredged in **1997** and **1998**. Material was placed only in the Section 103 Site B in **1999** and **2003** through **2009**. The area overlapping the interim site (Site A) was avoided through **2007** to allow this area to erode further. While it is important to avoid overloading this SE corned placement was not be restricted after **2008**. The area of the Corps' Section 103 Site B was incorporated into the **2010** EPA Section 102 North Site.

Site C: The **September 1997** survey shows dredged material mounded to a maximum of 4-feet. The **May 1998** survey also shows the maximum mound height to be 4-feet but the footprint of the mound increased. The material placed at the site was concentrated in the

shallower half of the site closer to the project. The **June 1999** survey of Site C showed 4-foot and the **2001** and **2002** surveys show a maximum 7-foot and 9-foot of accumulation, respectively, over the shoreward third of the site. Minimum water depth at the site was 80 feet MLLW. Because of the mounding disposal operations after **2001** were primarily shifted to Site B. In **2004** 9,000 CY of material was placed at site C. The area of the Corps' Section 103 Site C was incorporated into the **2010** EPA Section 102 South Site.

During analyses of the **August 1992-September 1981** ODMDS bathymetric difference plots it was noted that there appeared to be significant shoaling of material in-shore and to the south of Site A. Maximum accumulation was 24 feet. The **August 1990-September 1981** bathymetric plot indicated 16 feet of accumulation in the same area. This area is directly off the mouth of the Siuslaw River and indicates significant changes to the ebb delta. It is obvious from the monitoring efforts of the Siuslaw River ODMDSs, specifically the bathymetric difference plots, that this buildup is not related to Portland District's dredge material disposal operations. The accumulation and the significant change between **1981**, **1990**, and **1992** were brought to the attention of Steve Chesser (recently retired **2010**) who has been monitoring the area offshore of the Siuslaw River since the seaward extension of the jetties in **1985**. Movement of depth contours seaward appears to have moderated as is evident when comparing the **September 1996** through **June 2002** surveys.

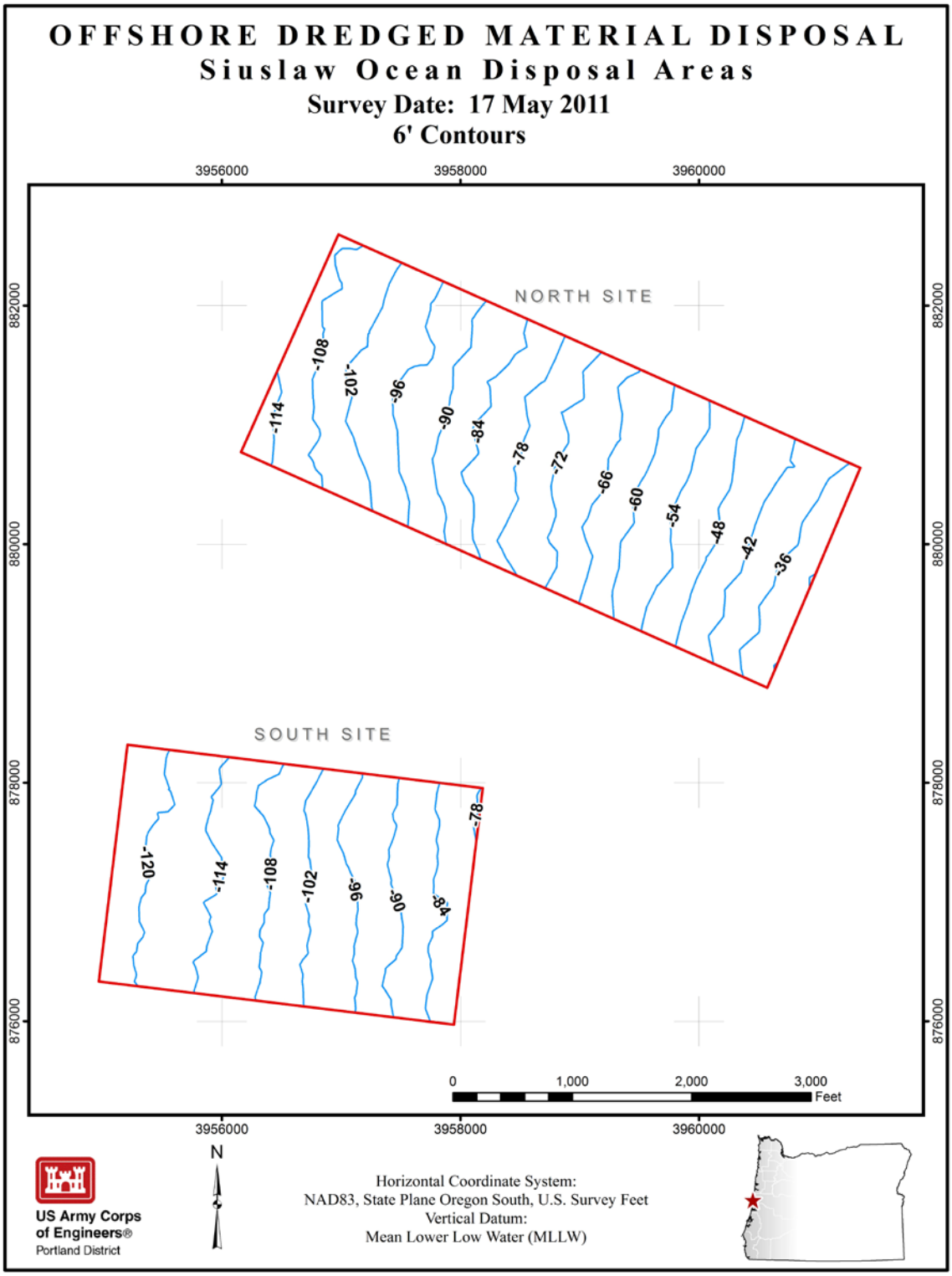
Benthic infauna following EPA, Region 10's site designation was conducted in **June** and **December 2010** along with fish/invertebrate trawls. A total of 14 stations were sampled for benthic infauna and sediment physical parameters. Seven trawls were originally planned however due to weather conditions some were dropped in December and one was dropped totally. Samples were collected in the area of the new North Site and South Site as well as areas as far as 5 miles north and south of the mouth of the Siuslaw River.

Computer modeling of disposal operations to determine the optimum spacing of discharge points and long-term and short-term sediment fate is now possible and recommended. Special studies such as sidescan sonar surveys or benthic infauna and sediment characterization should be conducted as needed.

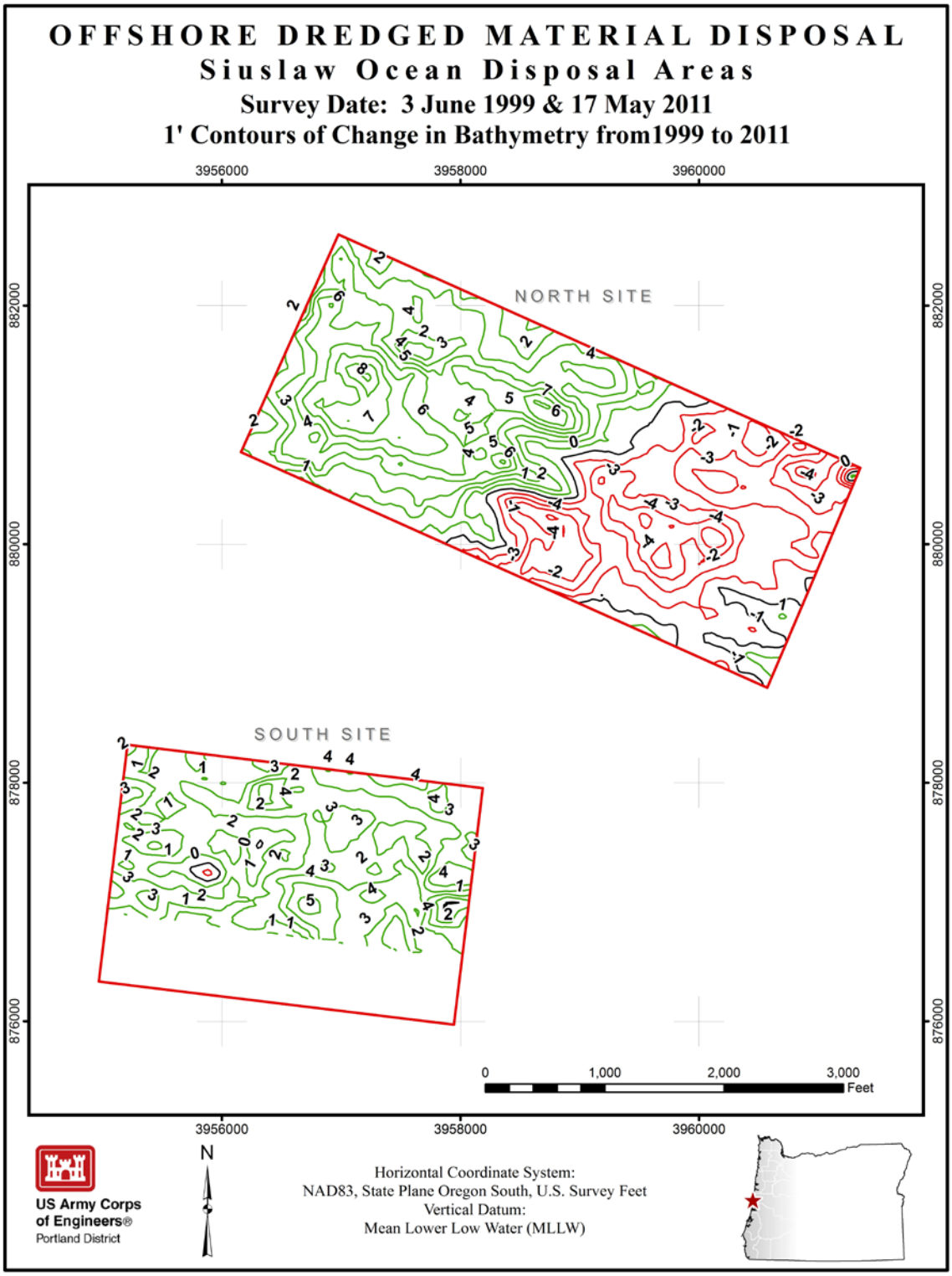
Table 1
Volumes Dredged

Siuslaw River, Total Project
[in thousands of cy]

Fiscal Year	Hopper Dredge
1986	218.8
1987	215.8
1988	114.5
1989	116.8
1990	99.0
1991	65.9
1992	194.2
1993	239.6
1994	223.3
1995	121.6
1996	84.8
1997	40.0 (C)
1998	69.6 (C)
1999	43.5 (B)
2000	55.1 (C)
2001	101.2 (C)
2002	117.3 (B)
2003	55.0 (B)
2004	14.1 (B)
2004	9.0 (C)
2005	33.4 (B)
2006	22.3 (B)
2007	76.0 (B)
2008	69.9 (B)
2009	91.7 (B)
2010	178.8 (N)
2011	84.3 (N)


OFFSHORE DREDGED MATERIAL DISPOSAL
Siuslaw Ocean Disposal Areas
Survey Date: 17 May 2011
6' Contours
3956000
3958000
3960000
882000
880000
878000
876000
NORTH SITE
-114
-108
-102
-96
-90
-84
-78
-72
-66
-60
-54
-48
-42
-36
SOUTH SITE
-120
-114
-108
-102
-96
-90
-84
-78
0
1,000
2,000
3,000
Feet
N
US Army Corps of Engineers®
Portland District
Horizontal Coordinate System:
NAD83, State Plane Oregon South, U.S. Survey Feet
Vertical Datum:
Mean Lower Low Water (MLLW)

OFFSHORE DREDGED MATERIAL DISPOSAL
Siuslaw Ocean Disposal Areas
Survey Date: 13 May 2010 & 17 May 2011
1' Contours of Change in Bathymetry from 2010 to 2011
3956000
3958000
3960000
882000
880000
878000
876000
NORTH SITE
SOUTH SITE
0
1,000
2,000
3,000
Feet
US Army Corps of Engineers®
Portland District
N
Horizontal Coordinate System:
NAD83, State Plane Oregon South, U.S. Survey Feet
Vertical Datum:
Mean Lower Low Water (MLLW)


OFFSHORE DREDGED MATERIAL DISPOSAL
Siuslaw Ocean Disposal Areas
Survey Date: 3 June 1999 & 17 May 2011
1' Contours of Change in Bathymetry from1999 to 2011
NORTH SITE
SOUTH SITE
3956000
3958000
3960000
882000
880000
878000
876000
0
1,000
2,000
3,000
Feet
N
US Army Corps of Engineers®
Portland District
Horizontal Coordinate System:
NAD83, State Plane Oregon South, U.S. Survey Feet
Vertical Datum:
Mean Lower Low Water (MLLW)