Lower Columbia Solutions Group
Quarterly Meeting: MCR Update

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USACE Portland District
October 22, 2010
Port of Portland
Overview

- MCR & Baker Bay 2010 Dredging Summary
- Benson Beach Placement Summary
- SW WA Littoral Drift Monitoring Update
- South Jetty Beneficial Use Site Update
General Area

Pacific Ocean

Washington

Oregon

Courtesy Golder Associates
MCR & Baker Bay 2010 Dredging Summary

- Volume of Material Dredged at the MCR
  - Essayons – 1.53 mcy
    - SWS – 948 kcy
    - DWS – 584 kcy
  - Dodge Island – 1.99 mcy
    - SWS – 1,343 kcy
    - NJS – 254 kcy
    - DWS – 2.25 kcy
    - NJ Berm – 20 kcy
    - SW WA Littoral Drift – 367 kcy
  - Ilwaco – 42 kcy
  - Chinook – 61 kcy (to date)
Storm wave & surge from the foreshore passes over the reduced NJ Berm (foreshore) and destabilizes jetty root along lagoon.

NJ Berm DEC 2009, after being overtopped by heavy wave-surge action during NOV; 3-6 ft of elevation loss of the NJ Berm.

With NJ Berm elevation reduced along the north jetty, storm surge action can flow over the NJ Berm and surcharge the "lagoon" area east of the foredune.

Damage to North Jetty Berm (foreshore) after NOV 2009 storms

Scarp along western flank of NJ Berm.
Permit Area extends along shore, from the North Jetty to approximately 4,500 ft north of North Jetty, and cross shore from the foredune scarp (≈+14 ft NAVD) to –10 ft NAVD. Within 500 ft of the north jetty, the permit area extends inland for a finite distance along the +20 ft NAVD contour. Permit Area also includes terrestrial area where the pump-ashore pipeline would pass, as shown.

Active placement of dredged material during 2010 is planned to occur at two (2) locations within the permit area.

The NJ Berm Repair Area lies along the north side of the north jetty. The alongshore extent is approximately 300 ft. The cross-shore extent is approximately 800 ft. Placement of sand within the NJ Berm is intended to repair the foredune which was overtopped & damaged during winter 2009-2010.

The WA Littoral Drift Area lies 1500 ft north of the north jetty. The alongshore extent is 3000 ft. The cross-shore extent encompasses the intertidal zone from backshore dune scarp to the active swash zone (≈+12 ft NAVD). Placement of sand within the WA LD area intended to augment the littoral zone with sand morphology that can be monitored to assess dispersion.

Contour data (ft NAVD) are based on 1999-2003, contour elevations east of north jetty are approximate. 

= Potential pump-ashore pipeline location
= Active placement area for WA Littoral Drift; 0.25-0.5 MCY
= Active placement area for NJ berm repair; 10-30 KCY

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Potential pump-ashore pipeline location
Active placement area for WA Littoral Drift; 0.25-0.5 MCY
Active placement area for NJ berm repair; 10-30 KCY
Permit Area for dredged material placement and related support activities
Permit Area for dredged material placement and related support activities
Active placement area for WA Littoral Drift; 0.25-0.5 MCY
Active placement area for NJ berm repair; 10-30 KCY
Contour data (ft NAVD) are based on 1999-2003, contour elevations east of north jetty are approximate.
Parking area to be used as KTR staging area during NJ Berm and WA LDR construction activities. KTR to clear ~1000 CY of overwash sand from parking lot prior to KTR use; cleared sand to be used to augment NJ Berm repair. Contractor work areas to be barricaded as need to restrict public access within KTR work areas. Special measures may be required to minimize restricting public access to non-work areas during KTR operations.
Objective for NJ Berm repair is to replace material (sand) lost from the foredune due to storm wave-surge action during 2008-2010. The foredune functions as a berm to protect vulnerable areas of the North Jetty from wave-surge action. The North Jetty Berm is viewed as an engineered grade feature. The KTR will be required to place 10-20 Kcy to achieve a specified grade; berm crest at +20 to +22 ft NAVD, with smooth transition to adjacent grade and sloping grade no steeper than 1v:10H.
Cape Disappointment State Park, WA

Expected areal extent for deposition of 250-400 KCY of dredged material immediately after placement within the WA LDR area. KTR to minimize re-handling of placed dredged material within the WA LDR area. Placed dredged material is to take on natural morphology, as waves and tide re-work placed material. The intent is to create a depositional feature or salient which extents into the intertidal zone; along the northern-most 2/3’s of the WA drift area. Red dashed line indicates permit boundary for WA LDR.
WA Littoral Drift Dredged Material Placement Area: Cross-Shore Section A-A

WA LDR Fill template is intended to develop “naturally” as dredged material is hydraulically placed within an intertidal target area spanning 700-900 ft cross shore and 900-1300 ft alongshore. The formation of a tombolo-salient extending seaward from the shore edge is the objective of the WA LDR dredged material placement activity. The KTR may need to move the discharge location seaward as the tombolo forms with continued shoreface placement. The thickness of the deposited feature is expected to be 5-8 ft. Minimal re-working of the place material by KTR is expected. The WA LDR placement is NOT considered and engineered grade feature.
3-dimensional view of the intended morphological feature to be formed along the intertidal zone of Benson Beach, in response to the placement of 250-400 KCY of sand (dredged from the MCR navigation channel) during 15 July – 15 September 2010.

View from the north, facing southward

The “transient morphological feature” will be dispersed by waves and currents through time; the rate of dispersion is unknown. As this feature is dispersed, the dispersed sand will augment the littoral sediment budget of the adjacent areas.

Execution of a pre-planned monitoring program will track the movement of the feature to gain understanding of how sediment is transported along Benson Beach and how to mitigate future erosion at this location.

View from the south, facing northward
SW WA LDR Monitoring

- Topographic and bathymetric surveys: (WDOE, OSU, USGS) - Execution Time Frame: JUN 10 – DEC 11
- Remote observation of foreshore dynamics – ABMS at North Head: (NWRA/NWP) - Execution Time Frame: JUN 10 – DEC 11
- Nearshore wave and current data collection: (WDOE) - Execution Time Frame: JUN 10 – DEC 10
- Hydrodynamic, sediment transport, and morphological modeling: (USGS) - Execution Time Frame: SEP 10 – FEB 12
- Sediment tracer study: (SAIC) - Execution Time Frame: JUN 10 – JUL 12
- Aerial photography: (NWP) - Execution Time Frame: JUN 10 – NOV 10
Delft 3-D modeling area of interest for WA LDR is encompassed within bounds shown in image.

- Green = WA LDR dredged material placement zone, northern 2/3s.
- = shore-based sampling tracer locations
- Yellow = nearshore sampling locations for tracer
- Small-scale aerial photography
- Large-scale aerial photography
- = wave & current meter data collection location

Offshore bathymetry data collection extends offshore from 11 meters MLLW to 45 meter contour. Nearshore bathymetry data collection extends offshore from 0 m MLLW to 11 meter contour. Topography extends inshore from 0 m MLLW to + 6 meter contour.
Topographic and Bathymetric Surveys
Cross-Shore Profiles

Line 212

Line 213

Line 214

Line 215

Line 216

Line 217
Morphological Change
CLARIS
Coastal Lidar and Radar Imaging System
Courtesy Jesse McNinch, ERDC

A mobile system that integrates:
- Terrestrial laser
- X-band radar
- RTK-GPS
- POS-LV motion
CLARIS
Coastal Lidar and Radar Imaging System

X-band radar image of waves

Integrated beach topography and nearshore bathymetry from radar and LiDAR measurements

LiDAR topography of beach
Seamless topography and depths during storms

View of beach and nearshore sand bars from the lighthouse looking south

Courtesy Jesse McNinch, ERDC
Seamless topography and depths during storms

Courtesy Jesse McNinch, ERDC

View of beach and nearshore sand bars from the jetty looking north
LiDAR topography of the Benson Beach fill

View of the beach fill looking north

View of the beach fill looking south

Courtesy Jesse McNinch, ERDC

swash
CLARIS-measured wave direction during wave event (Hs~4m)

Courtesy Jesse McNinch, ERDC
Measuring and predicting overwash

$R_2 = 1.1 \left\{ 0.35 \beta_f \left( H_0 L_0 \right)^{\frac{1}{2}} + \frac{H_0 L_0 \left( 0.563 \beta_f^2 + 0.004 \right)^{\frac{1}{2}}}{2} \right\}$

17AM Survey

modeled

CLARIS-observed

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USGS Modeling
Southward view from North Head lighthouse onto Benson Beach, on 1 Sept 2004 and 28 May 2009. Tide level is approximately the same for both scenes. Note the growth of intertidal zone between 2004 and 2009, although the scarp along the backshore has receded between 2004 and 2009. The northward shift in winter storm wave direction during 2009 is believed to have promoted growth of the sand bars shown in the May 2009 scene. For more information, see [http://www.planetargus.com/north_head/](http://www.planetargus.com/north_head/)
NWRA North Head Analysis
2004 - 2009
Cross-Shore Profile – Section A-A’:

2 Miles **South** of MCR

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**Mean Sea Level**

**40 ft**

**55 ft**

Cross-shore extent of proposed south jetty placement site

Seabed

Miles (West) Offshore from Shores Edge
Similar Sediment Tracer Sampling Scheme
(South Jetty Beneficial Use Site)
Wave height with bathymetry contours and directions

From the North

From the South
Time exposure image compared to calculated percent breaking

Time Exposure image

Percent Breaking Calculated by SWAN
CIVIL WORKS
PROGRAM MANAGEMENT

HQ Provides Budget Guidance (Mar -- Apr BY-2)

Districts Develop Program Requirements (May - Jun BY-2)

OMB Provides Budget Guidance (Jan BY-2)

Budget Presented to Sec. Army (Jul - Aug BY-2)

President Signs Appropriations Bill (Sep BY-1)

Cong. Hearings (Feb - Mar BY-1)

Funding Alloc. To Field Offices (Oct - Dec BY-1)

President’s Budget to Congress (Feb BY-1)

OMB Provides Budget Guidance (Jan BY-2)

Budget Submitted to OMB (Sep BY-2)

Cong. Appropriations Bills (Jul - Sep BY-1)

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CIVIL WORKS PROGRAM MANAGEMENT

The Budget Cycle

Development FY 2011 Defense

Execution FY 2010 FY 2012