THE PROJECT
The Mound of the Columbia River (MCR) federal navigation channel is the gateway to the Columbia-Snake River navigation system, which extends 2,000 miles inland to Lewiston, ID. The 45-ft. channel between the Pacific Ocean and Portland, OR/Vancouver, WA supports deep-draft navigation. The U.S. Army Corps of Engineers (Corps) annually dredges around 3.5 million cubic yards (Mcy) of sand from the MCR. The MCR dredged material is placed in the Pacific Ocean at three nearshore sites and one offshore site jointly managed by the Corps and U.S. Environmental Protection Agency – Region 10 (EPA).

THE PROBLEM
Chronic coastal sediment deficit in the Columbia River littoral zone at the MCR results in beach erosion (Moritz et al., 2013).

THE SOLUTION
Dredged material is beneficially used at coastal sites where navigation channels are dredged and maintained. THIN LAYER placement of dredged material is prioritized at the nearshore sites to allow sediment to remain in the active littoral zone. THIN LAYER placement of dredged material in the littoral zone provides many benefits:
1. Maintains nearshore sediment budget & coastal morphology
2. Protects infrastructure (e.g., the MCR jetties)
3. Minimal impacts to benthic/epibenthic communities
4. Minimal impacts to navigation by increased wave height
5. Improves efficiency of dredging operations at the MCR

GOAL
To increase the amount of dredged material placed in the Columbia River littoral zone, the Corps proposes nearshore placement of material off the North Head at the North Head Site (NHS). Nearshore placement of 0.5% of MCR dredged material (2.7 Mcy) by 2020.

PAST STUDIES
2001 SEDIMENT TREND ANALYSIS (McIlan & Hill, 2001)

FINDINGS:
Sediment transport across the mouth and Peacock Spit is from south to north. The Davidson Current is likely the driving process for this regime, which is strongest in winter, along with storms from the south.

2007 WAVE MODELING (Corps, 2007) Wave amplification analysis at the Shallow Water Site to evaluate increased wave height, possibly caused by dredged material disposal.

2006-2007 SWF SAND TRACER STUDY (ETS, 2007)
Understanding of littoral sediment transport pathways & fate of dredged sediments by deploying sand tracer in the SWF.

WHAT WE CHANGED
Informed by these studies, MCR nearshore placement strategies evolved to maximize sediment dispersal & abate mounding. Dredging operations were modified to minimize impact (THIN LAYER placement) and maximize beneficial use of dredged material to increase littoral sediment budget & sustain navigation infrastructure & function.

NHS 2017 BASELINE SURVEY
The survey was planned in coordination with the multi-agency/national library (U.S. Navy Corps of Engineers, NOAA, U.S. Geological Survey, U.S. National Marine Fisheries Service) PAMER environmental stewardship of displaced material at the MCR site under MCR scientific collection permit no. 17-234

OBJECTIVES
Survey baseline ecological and substrate characteristics in the NHS study area to support selection of a dredged material disposal site that minimizes environmental impacts and optimizes beneficial use of dredged material.

PHYSICAL & CHEMICAL
It’s mostly sand, and it’s clean.

COMMERICAL CRAB POT SURVEY - LOTS of keepers!

REFERENCES

NHS 2017 BASELINE SURVEY (cont.)

EPIBENTHIC (BOTTOM) TRAWLS
Greatest density and diversity of organisms in the NE part of the NHS study area (trawl TR-02). Does this vary and what can be inferred by metrics and indices below?

FUTURE WORK AT NHS
2018 CURRENT AND WAVE BUOY
Determine how quickly dredged material disperses from the NHS by mounting 555 to 560 cubic yards of sand in THIN LAYER along a set transect in a 2 hr-8 hr beam. One per day, for a 3 post-dredge multibeam hydrographic surveys will be performed to measure the rate of sand dispersion in the study area.

2019 SITE SELECTION AND USE
Similar to SWF, NHS & SWS disposal operations, use NHS to retain sediment in the littoral zone and minimize ecological impacts via THIN LAYER placement.

BENTHIC INFAUNA
Results pending.

FUTURE WORK AT NHS 2018 CURRENT AND WAVE BUOY

NHS 2017 BASELINE SURVEY

Sediment TREND ANALYSIS

Imagery
Komar et al. (2013)
Figure. Mounding (ft.) between 1997 and 2007.

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