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Engineer Research and Development Center

National Regional Sediment Management Program Portland District (NWP):

West Sand Island Shore Stabilization

Description

Pile dikes in the Baker Bay West (Ilwaco) Federal Navigation Channel (FNC) are severely degraded. The lost shore connection between the pile dikes and West Sand Island is allowing increased flow to pass between the pile dikes and the island. The result is a rapidly eroding West Sand Island, and an increasing loss in pile dike functionality. This has caused dramatic changes to the shoaling patterns in the FNC, which has required emergency dredging multiple times due to life safety concerns. Data collection and analysis is needed to move forward with a repair to these features, NWP would like to explore the option of beneficially using dredged material from the FNC to start restoring the shore connections.

West Sand Island – Historical Photogrammetry of Shoreline Movement

Issue/Challenge To Address

NWP and the local stakeholders have had growing concerns about the status of West Sand Island and the adjacent Baker Bay FNC. Qualitative analysis and stakeholder feedback shows that the pile dikes have become severely detached from their shore connections to West Sand Island. The result has been an increase in flow passing between the pile dikes and West Sand Island, bypassing the training structures. This has causes a significant increase in erosion of the island, and sets up a positive feedback loop with further pile dike deterioration, channel shoaling, and shoreline erosion.

NWP has seen irregular shoaling as a result of this. Previously, annual O&M dredging was completed on a 2-3 year cycle to maintain the FNC. In recent years annual dredging has been required to maintain the channel. In 2012 and 2017 emergency dredging was needed outside of the in-water work period to remove shoals that presented a threat to life safety. This emergency work was in addition to annual maintenance dredging during both years. The Baker Bay channel is vital for safe navigation in the area since it is the only passage for USCG Search and Rescue operations at the Mouth of the Columbia River. The USCG respond to 300-400 SAR calls annually and depend on a reliable channel for transit.

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Due to the increase in sedimentation in the FNC, disposal sites for dredged material are becoming increasingly hard to find. The sediment in the FNC is appropriate for beach nourishment, and could be used to supplement the placement of rock for repair of the pile dikes. The major benefit of this study would be to optimize the use of such material for re-establishing the shoreline of West Sand Island.

West Sand Island hosts unique habitat types (coastal prairie) that are becoming increasingly rare on the west coast. Local groups are attempting restoration projects to ensure that these habitats are not lost, as well as restoring areas for other species such as salmonids. If West Sand Island continues to erode and levees breach, the area will be inundated and the habitat will be lost.

Successes Lessons Learned

Lessons learned will be compiled during the duration of this study.

Expected Products

- GIS maps showing historic/present conditions
- IPR Presentation
- Tech Note
- Conference Paper/Presentation

Stakeholders/Users

NWP, ERDC, USGS, ODFW, WDFW, EPA, NOAA, DLCD, DOE, ODEQ, others

Projected Benefits Value Added

Benefits would include the reduction of erosion on West Sand Island, protecting critical habitat and stabilizing the estuary. Placement on the island would result in the beneficial use of 80kcy-100kcy of dredged material, and result in a reduced cost of dredging due to the proximity of the island to the FNC.

Leveraging Opportunities

NWP is currently funding an Engineering Design Document (EDR) to evaluate the Baker Bay Pile Dikes. The development of this document will contribute to the RSM initiative, and includes data collected as part of the Sand Island Pile Dike Project. The inclusion of the RSM initiative at this time leverages $375k from the Baker Bay Pile Dikes and $1.1M in data collected from the Sand Island Pile Dike MMR.

Points of Contact

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Participating Partners

Columbia River Estuary Study Taskforce, Port of Ilwaco, Port of Chinook.