



OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

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‘Novel’ solution may slow coastal erosion, report shows

A cobble berm built by the U.S. Army Corps of Engineers has so far prevented further erosion that would jeopardize the Columbia River south jetty

CLATSOP COUNTY, Ore. – A new study by the Oregon Department of Geology and Mineral Industries (DOGAMI) reports on a novel approach for managing coastal erosion hazards.

The jetties at the mouth of the Columbia River were constructed from 1885 to 1940 to provide safe, efficient navigation through one of the world’s most treacherous ocean inlets. Extreme waves are a constant, and erosion an ongoing threat. In 2013, the south jetty was in danger. Years of erosion had already robbed sand from the beach south of the jetty, and the remaining dune was at risk of a breach – which would have seriously impacted the stability of the south jetty.

A solution, says Jonathan Allan, DOGAMI coastal geomorphologist, was a dynamic revetment built by the U.S. Army Corps of Engineers-Portland District. Dynamic revetments are cobble berms, built by piling cobbles of various sizes into a mound. Dynamic revetments stand up well to waves, and rather than being removed into the surf like sand, the cobble tends to pile up at the back of the beach where sand meets dune. If they’re built big enough, dynamic revetments can protect dunes from further erosion.

“Dynamic revetments exhibit a remarkable degree of stability in the face of sustained wave attack,” he says. “The U.S. Army Corps of Engineers designed and constructed the berm, and commissioned DOGAMI to establish a system for monitoring the beach and shoreline.” Much of the Corps’ design was based on a 2005 study by Allan that examined cobble beach dynamics along the Oregon coast.

With two years of data collected, the cobble berm is performing well and has prevented further erosion of the dune. The berm has withstood several major wave events, including minor overtopping of the structure. The storms have resulted in erosion of the cobbles at the north end – but that erosion is occurring in a designed “sacrificial” area, and the eroded cobbles are being redistributed to the south end of the beach. Given recent mild winters with few major storm events it remains to be seen how the berm is tested under even more extreme storms. Monitoring will continue through 2018.

Overall, Allan says, knowing how well the cobble berm performs is crucial as coastal communities and residents seek new solutions for the erosion that puts homes and beaches at risk. Such gravel berms are a recent alternative to conventional approaches, such as constructing riprap.

“What we learn in monitoring the Columbia River cobble berm will help to validate proof of concept, and ultimately help guide the design of similar structures,” Allan says. “In the right environment, such structures could become an effective strategy for mitigating coastal erosion along the Oregon coast, and within its estuaries.”

Open-File Report O-16-07, Monitoring the response and efficacy of a dynamic revetment constructed next to the Columbia River south jetty, Clatsop County, Oregon, by Jonathan C. Allan and Laura L. Gabel, is available for download at bit.ly/2dP2YrO

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