Section 227 Program: A Dynamic Berm Revetment at Cape Lookout, OR

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Cape Lookout State Park is a popular campground and day-use area located on the northern Oregon Coast approximately 10 km (12 mi) SW from Tillamook or 1-1/2 hrs west of Portland. The park is located on a barrier sand spit between Netarts Bay and the Pacific Ocean at the south end of a "pocket beach" littoral cell, immediately north of Cape Lookout. The beach fronting the park has experienced extensive erosion in recent years, much of it associated with the strong El Niños of 1982-83 and 1997-98, culminating with the series of unusually severe storms during the La Niña winter of 1998-99. The erosion removed the line of high dunes that had existed between the ocean beach and park facilities, so winter storms were able to flood the park grounds damaging the park's infrastructure.

While a shore protection structure was clearly needed, it was determined that a conventional quarry-stone revetment or seawall would not be used. Instead, it was decided to construct a dynamic revetment or cobble berm, one that would be similar to a natural cobble beach, backed by an artificial dune having a core of sand-filled geotextile bags, covered by loose sand and dune vegetation. The dynamic revetment was completed in the winter of 2001.

Dynamic revetments appear to offer an alternative method of shoreline erosion control that provides a natural-looking solution without any hardened structures. Unfortunately, very little design guidance is available for design of dynamic revetments. A study was initiated to monitor the effectiveness of the cobble revetment at Cape Lookout State Park, including a program of periodic surveys, analyses of tides and wave runup compared with structure elevations, sediment tracing, and the progressive changes in the structures wherein they evolve to become more like their natural counterparts on the coast. To date the structures have survived five winters, including several major storms that produced some overtopping. The ultimate goal of the study is to provide improved design criteria for the use of such "natural" structures where conventional approaches to shore protection cannot be used.

In addition to regular surveys along pre-set transects, movement of individual stones was monitored by attaching a small tagging device similar to those used to tag wildlife. Each tag emitted a unique signal that identified the individual stone when the signal was picked up an antenna. the antenna was capable of locating the individual stones under as much as 30 cm of sand.

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Biographies

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