

COASTAL SAND DUNE STRATIGRAPHY OF THE NORTH SPIT OF HUMBOLDT BAY, NORTHERN CALIFORNIA

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One of the largest coastal sand dune fields in northern California is located on the North Spit of Humboldt Bay. There are at least three distinct periods of sand dune aggradation on the North Spit. The oldest dunes are highly stabilized parabolic dunes occupying the central eastern portion of the spit. At least two other, much younger, sequences of dunes successively bury the oldest set of dunes on its western margin. Stratigraphically deposited between the oldest and two younger dune sequences on the North Spit are extensive exposures of beach gravel. The abandoned beach was cut into the western margin of the oldest dune sequence and was subsequently buried by advancement of the intermediate and youngest dune sequences. Recent studies suggest the timing of dune formation, stabilization, and erosion of coastal dune sequences in the Humboldt Bay region is a function of tectonically controlled relative sea-level changes and possibly Holocene or late Pleistocene eustatic sea-level fluctuations.

Carbon 14 age estimates and tree ring analysis of a tree buried and killed by the initial advance of the youngest dune sequence suggests the tree was first inundated by sand between 1730 and 1750 A.D. Tree ring evidence suggests the tree finally died from burial by sand after 8 years of diminished growth. Based on the location of the tree, and assuming the youngest dune sequence originated from the foredune area, it is likely that the sand dunes advanced for many years prior to initial burial of the tree. This along with other geologic evidence from the Mad River Slough and Clam Beach areas suggest the youngest dune advancement likely initiated shortly after the last Cascadia subduction zone earthquake in 1700 A.D. The age of the intermediate dune sequence is only constrained by its stratigraphic context, although its morphology and soil development suggest it is closer in age to the youngest dune sequence. The size, extent and clearly older age of the oldest dune sequence suggests it may have formed either in the Late Pleistocene or in the Early to Mid-Holocene as the rate of sea level rise slowed.

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