

SHORELINE EROSION AND WETLAND LOSS IN MISSISSIPPI

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Abstract

Set within a geologic framework that includes Pleistocene and Holocene barrier complexes, estuarine bays, and fluvio-deltaic tidal wetlands, coastal Mississippi shares environmental problems of shoreline erosion and wetland loss with her neighboring Gulf Coast states. The mainland coast consists of several Pleistocene headlands and barrier complexes interspersed with the St. Louis Bay and Back Bay of Biloxi estuaries. Tidal wetlands are found in the protected bays and tributary streams, as well as in the Pleistocene/Holocene deltaic environments associated with the Escatawpa, Pascagoula, Pearl, and Mississippi fluvial systems. Four barrier islands, formed by erosion and modification of a late Pleistocene/Holocene beach ridge, lie 6 to 12 miles (10 to 20 km) offshore. Historically, these islands—with a combined length of 30 miles (48 km)—have both migrated westward in response to prevailing longshore currents and also transgressed across the shallow platform of Mississippi Sound.

Wave erosion, both “normal” and storm-induced, has historically caused shoreline retreat on both the barrier islands and on the mainland. Erosion rates in excess of 30 ft/yr (9 m/yr) have been measured at the updrift ends of the barrier islands while accretion has characterized the downdrift ends. Net shoreline retreat rates of 6 ft/yr (2 m/yr) have been measured on the Gulf side of the islands, although the Sound side rates are nearly as high. Since the earliest accurate maps were made in 1848, Mississippi’s barrier islands have experienced a 20 percent reduction in area, amounting to about 2000 acres (800 ha). Mainland shoreline retreat rates are similarly high, except for along the more stable and now artificially nourished beaches of Harrison County (“the longest man-made beach in the world”). Erosion rates exceeding 10 ft/yr (3 m/yr) since 1940 have been noted at the Point aux Chênes headland and the Grand Batture Islands. These islands, which formerly sheltered valuable oyster grounds and protected fragile marshes, have been reduced to shoals over the last several decades. In western Mississippi, erosion rates of 7 to 9 ft/yr (2 to 3 m/yr) characterize southeast-facing marshes of Hancock County. Recently initiated studies indicate that rates of mainland shoreline erosion have increased significantly since the 1970s.

In terms of wetland loss, tidal marshes (both mainland and barrier island) have been reduced from 72,700 acres (29,600 ha) in 1956 to 67,200 acres (27,300 ha) in 1978. This loss of 8.6 square miles (22.1 sq km) of wetlands represents a reduction of over 7.5 percent. Urbanized land within the Mississippi Coastal Zone (officially defined on the mainland by the 15-ft contour line) has increased from 25.3 to 67.3 square miles during the same period. Prior to passage of the 1973 Wetlands Protection Law, much of this urbanization consisted of dredge-and-fill activity in wetlands. Although natural processes of land loss have historically been less significant than human-induced processes in Mississippi, recent indications are that coastal marshes are beginning to break up at accelerated rates, perhaps due to localized subsidence and/or sea level rise. A comprehensive study of wetland loss and shoreline erosion, initiated this year, will document in detail the historic patterns of coastal changes and shed light upon the relative roles of the many dynamic processes which have shaped—and are still shaping—the coastal environments of Mississippi.

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