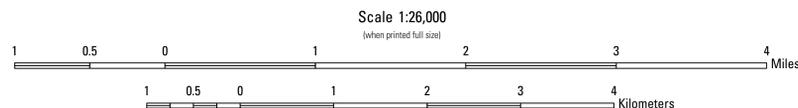


Universal Transverse Mercator, 1983 North American Datum-Zone 16 North  
This map is not intended for use in navigation.



**Project Description**

The U.S. Geological Survey (USGS) is studying coastal hazards and coastal change to improve our understanding of coastal ecosystems and to develop better capabilities of predicting future coastal change. One approach to understanding the dynamics of coastal systems is to monitor changes in barrier-island subenvironments through time. This involves examining morphological and topographic change at temporal scales ranging from millennia to years and spatial scales ranging from tens of kilometers to meters. Of particular interest are the processes that produce those changes and the determination of whether or not those processes are likely to persist into the future. In these analyses of hazards and change, both natural and anthropogenic influences are considered. Quantifying past magnitudes and rates of coastal change and knowing the principal factors that govern those changes are critical to predicting what changes are likely to occur under different scenarios, such as short-term impacts of extreme storms or long-term impacts of sea-level rise. Horn Island, MS was selected for detailed mapping of barrier-island morphology and topography because the islands offer a diversity of depositional subenvironments and the islands' areas and positions have changed substantially in historical time. The geomorphologic and subenvironmental maps emphasize the processes that formed the surficial features and also serve as a basis for documenting which subenvironments are relatively stable, such as the beach ridge complex, and those which are highly dynamic, such as the beach and active overwash zones.

**Data Description**

The barrier-island classification was referenced and mapped using September 2007 high-resolution orthorectified aerial photography from the National Agriculture Imagery Program (NAIP), October 2007 low-altitude color videos of the Mississippi barrier islands acquired from Great Divide Pictures under contract to the National Park Service, and June 2007 1-meter-pixel-resolution Experimental Advanced Airborne Research Lidar (EAARL) collected by National Aeronautics and Space Administration (NASA) and the USGS. Each geomorphic layer is stored in standard shapefile format viewable in any GIS software.

**Further Reading**

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Morton, R.A., 2007. Historical changes in the Mississippi-Alabama barrier islands and the roles of extreme storms, sea level, and human activities. U.S. Geological Survey Open-File Report 2007-1161, 38 p. (Available online at: <http://pubs.usgs.gov/of/2007/1161/>.)

Morton, R.A., Guy, K., and Whitko, A., 2007. Morphological impacts of Hurricane Camille (1969) on barrier islands of Mississippi and western Alabama. U.S. Geological Survey website at: <http://coastal.er.usgs.gov/hurricanes/historical-storms/camille/>.

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Pessin, L.J., and Burleigh, T.D., 1941. Notes on the forest biology of Horn Island. *Ecology*, v. 22, p. 70-78.

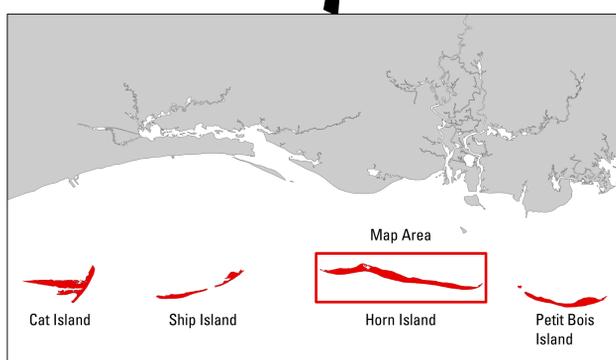
Waller, T.H., and Malbrough, L.P., 1976. Temporal changes in the offshore islands of Mississippi. Mississippi State University Water Resources Research Institute, 109 p.

**Geomorphology and Depositional Subenvironments  
of Gulf Islands National Seashore:  
Tile 3, Horn Island, Mississippi**

By Robert A. Morton<sup>1</sup> and Bryan Rogers<sup>2</sup>

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2009



**Natural Features**

**Active Dune Complex**

Barren to sparsely vegetated mounds or ridges of wind-blown sand that form hummocky topography landward of the beach.

**Stable Dune Complex**

Mounds or ridges of wind-blown sand that are typically densely vegetated with salt-tolerant grasses. The vegetated dunes form hummocky topography landward of the beach. The sand in these dunes is protected by the vegetation and is not moving.

**Active Overwash Zone**

An area that is frequently flooded by high water and ocean waves generated by storms. Typically low-lying with sparse vegetation and composed of sand with patches of shell at the surface.

**Inactive Overwash Zone**

An area that was historically overwashed by storm surge, such as during Hurricane Katrina in 2005. These areas are not flooded frequently by high water and ocean waves, but are still vulnerable to flooding from extreme storms. The former overwash sand is commonly reworked into low hummocky dunes that can be densely vegetated with salt-tolerant grasses.

**Beach**

A mostly unvegetated strip of sand parallel to the shore that extends from the water to the seaward edge of the dunes or crest of a washover terrace. The seaward part of the beach is regularly inundated by wave run-up during high-water phases of the tidal cycle.

**Beach Ridge Complex**

Sets of long, continuous ridges formed parallel to the ocean shore by sand that is deposited by a combination of wave run-up and wind. Typically vegetated by salt-tolerant grasses.

**Beach Ridge Swale**

Topographic depressions within a beach ridge complex. May be dry or may intermittently pond freshwater after heavy rain.

**Marsh**

Low vegetated wetlands that support plant assemblages tolerant of saltwater. Typically found along the sides of barrier islands protected from ocean waves or along the margins of tidal creeks.

**Spit**

A narrow, mostly unvegetated strip of sand at the end of a barrier island that extends the island alongshore. Spits form because of recent deposition by waves and currents.

**Vegetated Barrier Flat**

A low, relatively flat interior part of the barrier island that is densely vegetated in some places and at the same time is sparsely vegetated in other places, both by salt-tolerant grasses.

**Water**

Unclassified water data surrounding a barrier island or small bodies of permanent water within the boundaries of an island. Island exterior boundary referenced to June 2007 Experimental Advanced Airborne Research Lidar (EAARL) elevation data.

**Man Made Features**

**Structure**

Miscellaneous man-made features, including buildings, docking piers, roads, and walkways, and shoreline-protection structures.

**Classification Extent**

----- Gulf Islands National Seashore park boundary.