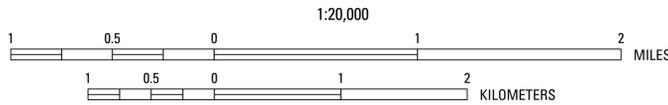


Universal Transverse Mercator, 1983 North American Datum--Zone 16 North
This map is not intended for use in navigation.



Suggested Citation:
Morton, R.A. and Montgomery, M.C., 2010,
Geomorphology and depositional subenvironments of Gulf Islands
National Seashore, Perdido Key and Santa Rosa Island, Florida:
U.S. Geological Survey Open-File Report 2010-1330.

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 morphologic 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. Gulf Islands National Seashore was selected for detailed mapping of barrier-island morphology and topography because the islands offer a diversity of depositional subenvironments and island 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 vegetated barrier core, and those which are highly dynamic, such as the beach and inactive overwash zones.

The primary mapping procedures were supervised functions within a Geographic Information System (GIS) that were applied to delineate and classify depositional subenvironments and features, collectively referred to as map units. The delineated boundaries of the map units were exported to create one shapefile, and are differentiated by the field "Type" in the associated attribute table. Map units were delineated and classified based on differences in tonal patterns of features in contrast to adjacent features observed on orthophotography. Land elevations from recent lidar surveys served as supplementary data to assist in delineating the map unit boundaries.

Data Description
The barrier-island classification was referenced and mapped using 2006-2007 1-foot resolution true-color orthophotography downloaded from the USGS National Map Seamless Server. Supplementary land elevation data were composed of 2006-2008 lidar-derived digital elevation models and hillshades from the Northwest Florida Water Management District, and 2004 and 2005 bare-earth surface lidar-derived digital elevation models and hillshades from the Experimental Advanced Airborne Research Lidar (EAARL) collected by the USGS and the National Aeronautics and Space Administration (NASA). Low-altitude videography collected by the USGS in 2004, 2005, and 2008 served as additional supplementary data. The geomorphic classes, or map units, are depicted with a single shapefile that is viewable in ESRI ArcGIS software, version 9.3.1.

Selected References
Claudino-Sales, Vanda, Wang, Ping, and Horowitz, M.H., 2010, Effect of Hurricane Ivan on coastal dunes of Santa Rosa barrier island, Florida: Characterized on the basis of pre- and poststorm LIDAR surveys: Journal of Coastal Research, v. 26, no. 3, p. 470-484.

Houser, Chris, Hapke, Cheryl, and Hamilton, Stuart, 2008, Controls on coastal dune morphology, shoreline erosion and barrier island response to extreme storms: Geomorphology, v. 100, p. 223-240.

Morton, R.A., and Sallenger, A.H., Jr., 2003, Morphological impacts of extreme storms on sandy beaches and barriers: Journal of Coastal Research, v. 19, p. 560-574.

Otvos, E.G., 1982, Santa Rosa Island, Florida Panhandle, Origins of a composite barrier island: Southern Geology, v. 23, p. 15-28.

Stone, G.W., Liu, Baozhu, Pepper, D.A., and Wang, Ping, 2004, The importance of extratropical and tropical cyclones on the short-term evolution of barrier islands along the northern Gulf of Mexico, USA: Marine Geology, v. 210, p. 63-78.

Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore, Perdido Key and Santa Rosa Island, Florida:

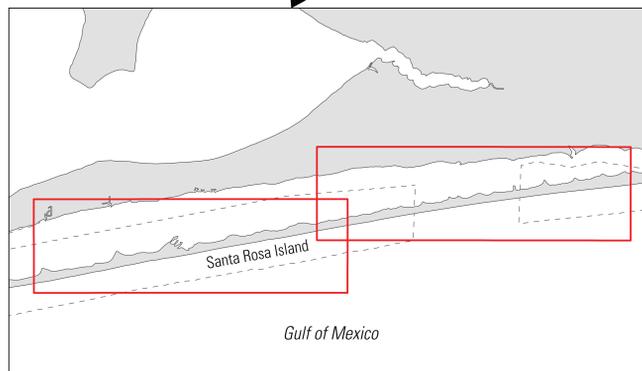
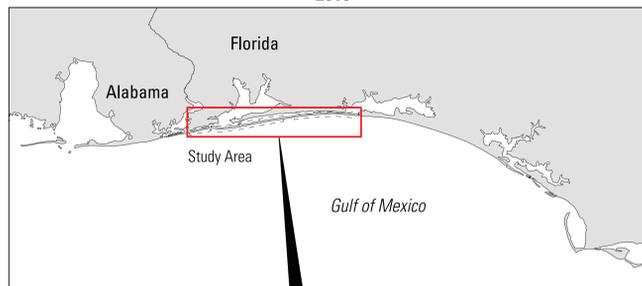
Title 2: Central Santa Rosa Island

By Robert A. Morton¹ and Marilyn C. Montgomery²

¹ U.S. Geological Survey, St. Petersburg, FL

² Jacobs Technology, Contracted to USGS, St. Petersburg, FL

2010



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 vegetated with salt-tolerant grasses or shrubs. The vegetated dunes form hummocky topography landward of the beach. The sand in these dunes is protected by the vegetation and is not moving.

Inactive Overwash Zone

An area that was historically overwashed and flooded by storm surge, such as during Hurricane Ivan in 2004. This area is not frequently flooded by high water or ocean waves but is still vulnerable to flooding from extreme storms. The former overwash sand is commonly reworked into low, hummocky dunes that can be 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.

Vegetated Barrier Core

A low, stable interior part of the barrier island that is sparsely to densely vegetated by salt-tolerant grasses or trees.

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.

Interior Wetland

Nontidal inundated barrier-island swales that support plant assemblages tolerant of brackish water and freshwater.

Water

Unclassified water bodies surrounding a barrier island or small bodies of permanent water within the boundaries of an island. This includes both natural water bodies and constructed retention ponds.

Manmade Features

Modified Land

Significant alterations of the land surface for residential and commercial development. Includes paved roads, parking lots, and infrastructure.

Structures

Miscellaneous manmade features along the shore, including piers, walkways, boat docks, and shoreline-protection structures, such as groins and bulkheads.

Structure Zone

Closely spaced manmade features along the shore, including piers, walkways, boat docks, and shoreline-protection structures, such as riprap, groins, and bulkheads.

Artificial Dune

A low linear ridge of sand constructed in the backbeach parallel to the shore to reduce overwash of the barrier island. Includes planted vegetation and other devices designed to trap wind-blown sand. Commonly associated with residential and commercial development.

Classification Extent

Gulf Islands National Seashore park boundary