

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science Directorate
Geologic Resources Division



Gulf Islands National Seashore

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital Geologic Data for Gulf Islands National Seashore

guis_geomorphology.pdf

Version: 2/18/2021

Geologic Resources Inventory Map Document for Gulf Islands National Seashore

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Geologic Resources Inventory Map Document



Gulf Islands National Seashore, Mississippi and Florida

Document to Accompany Digital Geologic-GIS Data

[guis_geomorphology.pdf](#)

Version: 2/18/2021

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Gulf Islands National Seashore, Mississippi and Florida (GUIS).

Attempts have been made to reproduce all aspects of the original source products, including the geologic units and their descriptions, geologic cross sections, the geologic report, references and all other pertinent images and information contained in the original publication.

This document contains the following information:

- 1) **About the NPS Geologic Resources Inventory Program** – A brief summary of the Geologic Resources Inventory (GRI) Program and its products. Included are web links to the GRI GIS data model, and to the GRI products page where digital geologic-GIS datasets, scoping reports and geology reports are available for download. In addition, web links to the NPS Data Store and GRI program home page, as well as contact information for the GRI coordinator, are also present.
- 2) **GRI Digital Maps and Source Citations** – A listing of all GRI digital geologic-GIS maps produced for this project along with sources used in their completion. In addition, a brief explanation of how each source map was used is provided.
- 3) **Map Unit List** – A listing of all geomorphic map units present on maps for this project.
- 4) **Map Unit Descriptions** – Descriptions for all geomorphic map units.
- 5) **Ancillary Source Map Information** – Links to U.S. Geological Survey source map publications web pages which contain source map project information, metadata, map tiles and project data.
- 6) **GRI Digital Data Credits** – GRI digital geologic-GIS data and ancillary map information document production credits.

For information about using GRI digital geologic-GIS data contact:

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About the NPS Geologic Resources Inventory Program

Background

The Geologic Resources Inventory (GRI) provides geologic map data and pertinent geologic information to support resource management and science-informed decision making in more than 270 natural resource parks throughout the National Park System. Geologic resources for management consideration include both the processes that act upon the Earth and the features formed as a result of these processes. Geologic processes include: erosion and sedimentation; seismic, volcanic, and geothermal activity; glaciation, rockfalls, landslides, and shoreline change. Geologic features include mountains, canyons, natural arches and bridges, minerals, rocks, fossils, cave and karst systems, beaches, dunes, glaciers, volcanoes, and faults.

The GRI is one of 12 inventories funded by the National Park Service (NPS) Inventory and Monitoring Program. The Geologic Resources Division of the NPS Natural Resource Stewardship and Science Directorate administers the GRI. The NPS Geologic Resources Division partners with the Colorado State University Department of Geosciences to produce GRI products. Many additional partners participate in the GRI process by contributing source maps or reviewing products.

The GRI team undertakes three tasks for each park in the Inventory and Monitoring program: (1) conduct a scoping meeting and provide a summary document, (2) provide digital geologic map data in a geographic information system (GIS) format, and (3) provide a GRI report. These products are designed and written for nongeoscientists.

Products

Scoping Meetings: These park-specific meetings bring together local geologic experts and park staff to inventory and review available geologic data and discuss geologic resource management issues. A summary document is prepared for each meeting that identifies a plan to provide digital map data for the park.

Digital Geologic Maps: Digital geologic maps reproduce all aspects of traditional paper maps, including notes, legend, and cross sections. Bedrock, surficial, and special purpose maps such as coastal or geologic hazard maps may be used by the GRI to create digital Geographic Information Systems (GIS) data and meet park needs. These digital GIS data allow geologic information to be easily viewed and analyzed in conjunction with a wide range of other resource management information data.

For detailed information regarding GIS parameters such as data attribute field definitions, attribute field codes, value definitions, and rules that govern relationships found in the data, refer to the NPS Geology-GIS Data Model document available at: <https://www.nps.gov/articles/gri-geodatabase-model.htm>

Geologic Reports: GRI reports synthesize discussions from the original scoping meeting, follow up conference call(s), and subsequent research. Chapters of each report discuss the geologic setting of the park, distinctive geologic features and processes within the park, highlight geologic issues facing resource managers, and describe the geologic history leading to the present-day landscape. Each report also includes a poster illustrating these GRI digital geologic-GIS data.

For a complete listing of GRI products visit the GRI publications webpage: <https://go.nps.gov/gripubs>. GRI digital geologic-GIS data is also available online at the NPS Data Store: <https://irma.nps.gov/DataStore/Search/Quick>. To find GRI data for a specific park or parks select the appropriate park(s), enter "GRI" as a Search Text term, and then select the Search button.

For more information about the Geologic Resources Inventory Program visit the GRI webpage: <https://>

www.nps.gov/subjects/geology/gri.htm. At the bottom of that webpage is a “Contact Us” link if you need additional information. You may also directly contact the program coordinator:

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The Geologic Resources Inventory (GRI) program is funded by the National Park Service (NPS) Inventory and Monitoring (I&M) Division. Learn more about I&M and the 12 baseline inventories at the I&M webpage: <https://www.nps.gov/im/inventories.htm>.

GRI Digital Maps and Source Map Citations

The GRI digital geologic-GIS maps for Gulf Islands National Seashore, Mississippi and Florida (GUIS):

The GRI compiled park extent map (sources are listed with the individual island component maps below),

Digital Geomorphic-GIS Map of Gulf Islands National Seashore (5-meter accuracy and 1-foot resolution 2006-2007 mapping), Mississippi and Florida (*GRI MapCode GUIS_geomorphology*)

Individual (component) GRI digital geologic-GIS maps with source publication.

Digital Geomorphic-GIS Map of Cat Island (5-meter accuracy 2007 mapping), Mississippi (*GRI MapCode CATI_geomorphology*)

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 1, Cat Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:11,500 ([Cat Island](#)). (*GRI Source Map ID 75236*).

Digital Geomorphic-GIS Map of Horn Island (5-meter accuracy 2007 mapping), Mississippi (*GRI MapCode HRNI_geomorphology*)

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 3, Horn Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:26,000 ([Horn Island](#)). (*GRI Source Map ID 75258*).

Digital Geomorphic-GIS Map of Perdido Key and Santa Rosa Island (1-foot resolution 2006-2007 mapping), Florida (*GRI MapCode PKSR_geomorphology*)

Morton, Robert A., and Montgomery, Marilyn C., 2010, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile, Perdido Key and Santa Rosa Island, Florida: U.S. Geological Survey, Open File Report OF-2010-1330, scale 1:20,000 ([Perdido Key and Santa Rosa Island](#)). (*GRI Source Map ID 75490*).

Digital Geomorphic-GIS Map of Petit Bois Island (5-meter accuracy 2007 mapping), Mississippi (*GRI MapCode PEBO_geomorphology*)

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 4, Petit Bois Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:12,000 ([Petit Bois Island](#)). (*GRI Source Map ID 75259*).

Digital Geomorphic-GIS Map of Ship Island (5-meter accuracy 2007 mapping), Mississippi (*GRI MapCode SHIP_geomorphology*)

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 2, Ship Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:14,000 ([Ship Island](#)). (*GRI Source Map ID 75257*).

The full extent of each source map was used, and all geologic/geomorphic features and units within these extents were captured in the GRI digital geologic-GIS data. Additional information pertaining to

each source map is also presented in the GRI Source Map Information (GUISMAP) table included with the GRI geologic-GIS data.

Index Map

The following index map displays the extents of the GRI digital geologic-GIS maps produced for Gulf Islands National Seashore (GUIS). The boundaries for Gulf Islands National Seashore (as of February, 2021) are outlined in green. The GRI digital geologic-GIS map extents (in black, from west to east) for Cat Island, Ship Island, Horn Island, Petit Bois Island, and Perdido Key and Santa Rosa Island are also shown.



Index Map by Stephanie O'Meara (Colorado State University).

Map Unit List

The geomorphic units present in the GRI digital geologic-GIS data produced for Gulf Islands National Seashore, Mississippi and Florida (GUIS) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., dn_cplx_a - Active Dune Complex). No description for water is provided. Information about each geomorphic unit is also presented in the GRI Geomorphic Unit Information (GUISUNIT) table included with the GRI digital geologic-GIS data.

Cenozoic Era

Quaternary Period

[dn_cplx_a](#) - Active dune complex
[dn_cplx_s](#) - Stable dune complex
[ovrwh_zn_a](#) - Active overwash zone
[ovrwh_zn_i](#) - Inactive overwash zone
[beach](#) - Beach
[bch_rdg_cplx](#) - Beach ridge complex
[bch_rdg_swl](#) - Beach ridge swale
[marsh](#) - Marsh
[shoal](#) - Shoal
[spit](#) - Spit
[veg_brrflt](#) - Vegetated barrier flats
[veg_brrcr](#) - Vegetated barrier core
[intr_wtlnd](#) - Interior wetland
[mdfd_lnd](#) - Modified land
[structure](#) - Structures
[strctr_zn](#) - Structure zone
[rclmd_lnd](#) - Reclaimed land
[drdg_mtrl](#) - Dredge material
[artfcl_dn](#) - Artificial dune

Map Unit Descriptions

Descriptions of all geomorphic map units are presented below. All geomorphic unit descriptions were derived from the source map or maps the unit is present on. For some units a descriptions is present for Cat Island, Horn Island, Petit Bois Island and/or Ship Island, as we as for Perdido Key and Santa Rosa Island.

dn_cplx_a - Active dune complex (Recent)

Barren to sparsely vegetated mounds or ridges of wind-blown sand that form hummocky topography landward of the beach. Unit present on maps: Cat Island, Horn Island, Petit Bois Island, Perdido Key and Santa Rosa Island, and Ship Island.

dn_cplx_s - Stable dune complex (Recent)

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. Unit present on maps: Cat Island, Horn Island, Perdido Key and Santa Rosa Island, and Ship Island.

ovrwh_zn_a - Active overwash zone (Recent)

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. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

ovrwh_zn_i - Inactive overwash zone (Recent)

An area that was historically overwashed and flooded by storm surge, such as during Hurricane Katrina in 2005. These areas are not frequently flooded by high water or 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. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

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. Unit present on map: Perdido Key and Santa Rosa Island.

beach - Beach (Recent)

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. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

bch_rdg_cplx - Beach ridge complex (Recent)

Sets of long, continuous ridges formed parallel to the ocean shore by sand that is deposited by a combination of wave run-up and the wind. Typically vegetated with salt-tolerant grasses. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

bch_rdg_swl - Beach ridge swale (Recent)

Topographic depressions within beach-ridge complex. May be dry or intermittently pond fresh water after heavy rain. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

marsh - Marsh (Recent)

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. Unit present on maps: Cat Island, Horn Island, Petit Bois Island, and Perdido Key and Santa Rosa Island.

shoal - Shoal (Recent)

Prominent subtidal platforms surrounding the upland core of a barrier island. Composed of mobile sand and typically covered with large bedforms constructed by ocean waves and currents. These features are important components of the littoral sediment-transport system. Delineated from 2007 USGS bathymetric data. Unit present on maps: Petit Bois Island and Ship Island.

spit - Spit (Recent)

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. Unit present on maps: Cat Island, Horn Island, Petit Bois Island and Ship Island.

veg_brrflt - Vegetated barrier flats (Recent)

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. Unit present on maps: Horn Island and Petit Bois Island.

veg_brrcr - Vegetated barrier core (Recent)

A low, stable interior part of the barrier island that is sparsely to densely vegetated by salt-tolerant grasses or trees. Unit present on map: Perdido Key and Santa Rosa Island.

intr_wtlnd - Interior wetland (Recent)

Nontidal inundated barrier-island swales that support plant assemblages tolerant of brackish water and freshwater. Unit present on map: Perdido Key and Santa Rosa Island.

mdfd_Ind - Modified land (Recent)

Significant alterations of the land surface for residential and commercial development. Includes paved roads, parking lots, and infrastructure. Unit present on map: Perdido Key and Santa Rosa Island.

structure - Structures (Recent)

Miscellaneous manmade features, including buildings, docking piers, roads, and walkways, and shoreline-protection structures. Unit present on maps: Cat Island, Horn Island and Ship Island.

Miscellaneous manmade features along the shore, including piers, walkways, boat docks and shoreline protection structures, such as groins and bulkheads. Unit present on map: Perdido Key and Santa Rosa Island.

strctr_zn - Structure zone (Recent)

Closely spaced manmade features along the shore, including piers, walkways, boat docks and shoreline-protection structures, such as riprap, groins, and bulkheads. Unit present on map: Perdido Key and Santa Rosa Island.

rclmd_Ind - Reclaimed land (Recent)

Former land areas that were eroded and rebuilt by emplacement of dredged material. Unit present on map: Ship Island.

drdg_mtrl - Dredge material (Recent)

Material dredged to construct artificial channels and placed along the margins of the channels. Unit present on map: Cat Island.

Land formed by the disposal of sediments dredged from adjacent navigation channels. Unit present on map: Perdido Key and Santa Rosa Island.

artfcl_dn - Artificial dune (Recent)

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. Unit present on map: Perdido Key and Santa Rosa Island.

Ancillary Source Map Information

The following sections present source map information associated with sources used for this project.

Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore (2009)

The formal citations (by tile) for this source.

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 1, Cat Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:11,500 (*GRI Source Map ID 75236*).

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 2, Ship Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:14,000 (*GRI Source Map ID 75257*).

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 3, Horn Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:26,000 (*GRI Source Map ID 75258*).

Morton, Robert A., and Rogers, Bryan E., 2009, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile 4, Petit Bois Island, Mississippi: U.S. Geological Survey, Open File Report OF-2009-1250, scale 1:12,000 (*GRI Source Map ID 75259*).

All source map information including project information, metadata, map tiles, project data and other information is available at the source map's U.S. Geological Survey publications page: <https://pubs.usgs.gov/of/2009/1250/>

Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore (2010)

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Morton, Robert A., and Montgomery, Marilyn C., 2010, Geomorphology and Depositional Subenvironments of Gulf Islands National Seashore: Tile, Perdido Key and Santa Rosa Island, Florida: U.S. Geological Survey, Open File Report OF-2010-1330, scale 1:20,000 (*GRI Source Map ID 75490*).

All source map information including project information, metadata, map tiles, project data and other information is available at the source map's U.S. Geological Survey publications page: <https://pubs.usgs.gov/of/2010/1330/index.html>

GRI Digital Data Credits

This document was developed and completed by Stephanie O'Meara (Colorado State University) for the NPS Geologic Resources Division (GRD) Geologic Resources Inventory (GRI) Program. Quality control of this document by Ron Karpilo (Colorado State University). An earlier version of this document was produced by Georgia Hybels (NPS GRD) and Stephanie O'Meara.

The information in this document was compiled from GRI source maps and is intended to accompany the GRI digital geologic-GIS maps and other digital data for Gulf Islands National Seashore, Mississippi and Florida (GUIIS) developed by Georgia Hybels and Stephanie O'Meara (see the [GRI Digital Maps and Source Map Citations](#) section of this document for all sources used by the GRI in the completion of this document and related GRI digital geologic-GIS maps).

GRI finalization by Stephanie O'Meara (Colorado State University).

GRI program coordination and scoping provided by Bruce Heise, Jason Kenworthy and Tim Connors (NPS GRD, Lakewood, Colorado).