

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



Cumberland Island National Seashore

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital Geologic Data for Cumberland Island National Seashore

cuis_geology.pdf

Version: 2/27/2013

Geologic Resources Inventory Map Document for Cumberland Island National Seashore

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Geologic Resources Inventory Map Document



Cumberland Island National Seashore, Georgia

Document to Accompany Digital Geologic-GIS Data

[cuis_geology.pdf](#)

Version: 2/27/2013

This document has been developed to accompany the digital geologic-GIS data developed by the Geologic Resources Inventory (GRI) program for Cumberland Island National Seashore, Georgia (CUIS).

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.

National Park Service (NPS) Geologic Resources Inventory (GRI) Program staff have assembled the digital geologic-GIS data that accompanies this document.

For information about the status of GRI digital geologic-GIS data for a park contact:

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About the NPS Geologic Resources Inventory Program

Background

Recognizing the interrelationships between the physical (geology, air, and water) and biological (plants and animals) components of the Earth is vital to understanding, managing, and protecting natural resources. The Geologic Resources Inventory (GRI) helps make this connection by providing information on the role of geology and geologic resource management in parks.

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 Geologic Resources Inventory aims to raise awareness of geology and the role it plays in the environment, and to provide natural resource managers and staff, park planners, interpreters, researchers, and other NPS personnel with information that can help them make informed management decisions.

The GRI team, working closely with the Colorado State University (CSU) Department of Geosciences and a variety of other partners, provides more than 270 parks with a geologic scoping meeting, digital geologic-GIS map data, and a park-specific geologic report.

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: <http://science.nature.nps.gov/im/inventory/geology/GeologyGISDataModel.cfm>

Geologic Reports: Park-specific geologic reports identify geologic resource management issues as well as features and processes that are important to park ecosystems. In addition, these reports present a brief geologic history of the park and address specific properties of geologic units present in the park.

For a complete listing of Geologic Resource Inventory products and direct links to the download site visit the GRI publications webpage http://www.nature.nps.gov/geology/inventory/gre_publications.cfm

GRI geologic-GIS data is also available online at the NPS Data Store Search Application: <http://irma.nps.gov/App/Reference/Search>. 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: <http://www.nature.nps.gov/geology/inventory>, or contact:

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The Geologic Resources Inventory (GRI) program is funded by the National Park Service (NPS) Inventory and Monitoring (I&M) Division.

GRI Digital Map and Source Map Citation

The GRI digital geologic-GIS map for Cumberland Island National Seashore, Georgia (CUIS):

Digital Morphogenetic Map of Cumberland Island National Seashore and Vicinity, Georgia (GRI MapCode CUIS)

Parkinson, R.W. and Latiolas, M., 2010, Geologic Inventory of Cumberland Island National Seashore, RWParkinson Inc. and MDA Information Systems, Inc., digital data, map and report, 1:60,000 scale. (*GRI Source Map ID 75585*).

Additional information pertaining to each source map is also presented in the GRI Source Map Information (CUISMAP) table included with the GRI geology-GIS data.

Map Unit List

The morphogenetic map units present in the GRI digital geologic-GIS data produced for Cumberland Island National Seashore, Georgia (CUIS) are listed below. Units are listed with their assigned map unit symbol and unit name (e.g., Mw - Mainland, Wetland).

Morphogenetic units identify geologic features by categories related to form (structure) and development (origin). A three level hierarchy describes the morphogenetic units used in this mapping project. Each unit is mapped using distinct colors and a 3 - 4 digit letter code as described in NPS publication NPS-D-2269, Coastal Geology Mapping Protocols for the Atlantic and Gulf National Park Units (from [Parkinson and Latiolais, 2011](#)) (*GRI Source Map ID 75585*).

Morphogenic Unit List

Mainland Units

- [Mw](#) - Mainland, Wetland
- [Mpa](#) - Mainland, Princess Anne
- [Mow](#) - Mainland, Open Water

Estuary Units

- [Eow](#) - Estuary, Open Water
- [Ei](#) - Estuary, Intertidal
- [Esp](#) - Estuary, Spoil
- [ERsb](#) - Estuary, Relict, Sand Bar

Barrier Complex Units

Barrier Complex, Coastal

- [BCb](#) - Barrier Complex, Coastal, Beach
- [BCd](#) - Barrier Complex, Coastal, Dune

BCss - Barrier Complex, Sand Spit

Barrier Complex, Relict

- [BRd](#) - Barrier Complex, Relict, Dunes
- [BRb](#) - Barrier Complex, Relict, Beach
- [BRbr](#) - Barrier Complex, Relict, Beach Ridges
- [BRsr](#) - Barrier Complex, Relict, Sand Ridges
- [BRss](#) - Barrier Complex, Relict, Sand Spit

Barrier Complex, Island Core

- [Blsb](#) - Barrier Complex, Island Core, Silver Bluff
- [Blw](#) - Barrier Complex, Island Core, Wetland
- [Bow](#) - Barrier Complex, Island Core, Open Water

Atlantic Ocean Unit

- [AOc](#) - Atlantic Ocean, Coastal

Additional information about unit is also presented in the Geologic Unit Information (CUISUNIT) table included with the GRI geology-GIS data.

Map Unit Descriptions

Descriptions of all map units is presented below. All unit descriptions are from [Parkinson and Latiolais, 2011](#). (*GRI Source Map ID 75585*).

Mainland Units

The emergent margin of the North American tectonic plate regionally referenced as the Atlantic Coastal Plain. Composed primarily of unconsolidated fluvial and marine sediments which have accumulated over the last 100 million years.

Mw - Mainland, Wetland

Non-cultivated vegetated zone wherein the substrate is inundated or saturated for a significant part of the year.

Mpa - Mainland, Princess Anne

The second in a series of late Pleistocene paleo-shoreline features identified along the coast of Georgia. The complex is located along the mainland shoreline; landward of the Silver Bluff shoreline.

Mow - Mainland, Open Water

Standing water features like lakes, ponds and reservoirs.

Estuary Units

A coastal embayment wherein the salinity of seawater is measurably diluted by the influx of freshwater and where tidal effects are evident.

Eow - Estuary, Open Water

Typically channel features with depths greater than – 4 ft MLLW (Mean Lower Low Water).

Ei - Estuary, Intertidal

Zones within or along the margin of the estuary wherein the substrate is permanently wet and/or intermittently water-covered; may be vegetated or barren. When barren, substrate typically sandy mud with local oyster bioherms and/or wetland peat outcrops.

Esp - Estuary, Spoil

Anthropogenic feature created by mechanical deposition of dredged material (generally sand, shell and mud).

ERsb - Estuary, Relict, Sand Bar

Emergent depositional feature consisting predominantly of coarse-grained shell and quartz sand created by waves and tides. Environment of deposition no longer present at site.

Barrier Complex Units

Part of barrier island system consisting of composite island or complex seaward of mainland and estuary. Associated with stable or slowly rising sea level, moderate to high wave energy, micro-tides, and abundant sediment supply.

Barrier Complex, Coastal

Features formed or modified by the effects of physical, biological, or chemical processes associated with the Atlantic Ocean shoreline.

BCb - Barrier Complex, Coastal, Beach

Gently sloping surface of unconsolidated sediments (e.g., sand and gravel) accumulating in high-energy zone of breaking waves at the land-sea interface and extending from low tide to toe of coastal dunes, sea cliffs, or other distinct change in slope or physiography.

BCd - Barrier Complex, Coastal, Dune

Low mound, ridge, bank, or hill of loose, windblown, granular material (generally fine sand), either bare or covered by vegetation, that is capable of movement from place to place but always maintaining a characteristic shape determined by the relative importance of sediment supply, vegetation, and wind.

BCss - Barrier Complex, Sand Spit

Continuous linear accumulation of sand or gravel deposited from longshore drift and having one end attached to the mainland or beach and the other termination adjacent to open water. Linear morphology deviates to "curving" or at high angle to the general trend of the coastline when currents of tidal inlet or creek encountered.

Barrier Complex, Relict

Landform made by environmental processes no longer operating at location.

BRd - Barrier Complex, Relict, Dunes

Mound of fine-grained sediment exhibiting features similar to modern or active dunes, but in region where processes necessary to generate landform do not presently operate.

BRb - Barrier Complex, Relict, Beach

Deposit of sand and gravel with features similar to modern beach (i.e., orientation generally parallel to Atlantic Ocean shoreline) but in a region where coastal processes necessary to generate this landform do not presently operate.

BRbr - Barrier Complex, Relict, Beach Ridges

Essentially continuous linear mound(s) of sand and gravel material trending parallel to the modern coast, but located landward of the present limit of storm surge and wave action. Morphological and sedimentological similarity to active beach ridges evident. However, located in region where processes necessary to generate beach ridges do not presently operate.

BRsr - Barrier Complex, Relict, Sand Ridges

Essentially continuous linear mound(s) of coarse-grained material located landward of and generally parallel to the Atlantic Ocean. Morphological and sedimentological characteristics not sufficient to determine whether landform constructed by storm surge, wave action, or aeolian processes; none of which are presently operating at landform location.

BRss - Barrier Complex, Relict, Sand Spit

Essentially continuous linear mound(s) of coarse-grained material generally parallel to the Atlantic Ocean with terminus curved towards mainland (west). Geomorphology indicates landform constructed by interaction of wave action, longshore currents, and tides, but landform in region where these processes are no longer operating.

Barrier Complex, Island Core

Portion of island complex formed during preceding late Pleistocene sea level highstand and subsequently modified by subaerial processes of weathering and erosion.

Blsb - Barrier Complex, Island Core, Silver Bluff

The youngest late Pleistocene relict shoreline complex. Frequently found along landward margin of "composite" barrier islands.

Blw - Barrier Complex, Island Core, Wetland

Non-cultivated vegetated zone wherein the substrate is inundated or saturated for a significant part of the year.

Bow - Barrier Complex, Island Core, Open Water

Includes lakes, ponds, and reservoirs.

Atlantic Ocean Unit

Second largest and geologically youngest major ocean basin that initiated about 180 million year ago.

AOc - Atlantic Ocean, Coastal

Margin of ocean basin extending from mean low water to fair weather wave base.

GRI Source Map

The GRI digital geologic-GIS map for Cumberland Island National Seashore, Georgia (CUIS) was compiled from the following source:

Parkinson, R.W. and Latiolas, M., 2010, Geologic Inventory of Cumberland Island National Seashore, RWParkinson Inc. and MDA Information Systems, Inc., digital data, map and report, 1:60,000 scale. (*GRI Source Map ID 75585*).

Prepared for and funded by the National Park Service (NPS) Geological Resource Inventory (GRI) Program .

Morphogenetic feature schema and sub-surface interpretation by R.W. Parkinson, Ph.D., P.G..

Spatial data and cartographic development by M. Latiolais.

** Additional information pertaining to the source map is also presented in the Source Map Information (MAP) table included with the GRI geology-GIS data.

Quadrangle Location Map



Extracted from: [Parkinson and Latiolais, 2011](#) (*GRI Source Map ID 75585*).

Administrative Agency Map

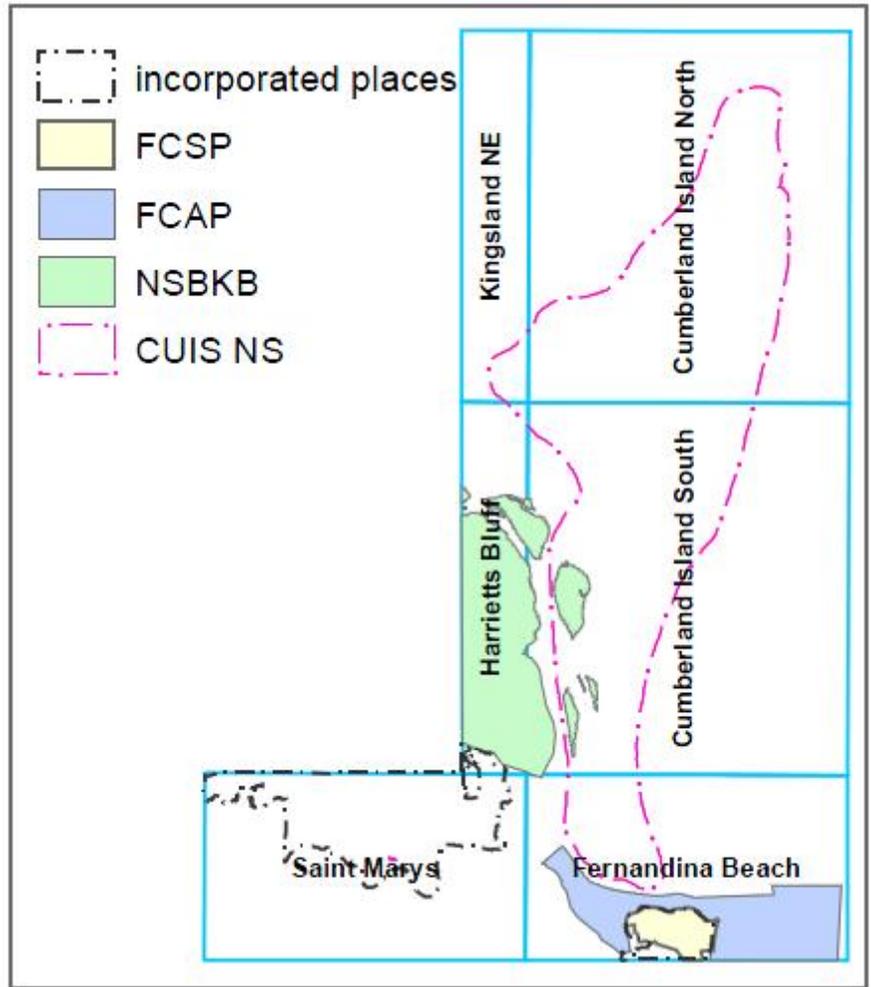
Much of the lands on Cumberland Island and the surrounding area are under multiple administrations.

FCSP = Fort Clinch State Park

FCAP = Fort Clinch Aquatic Preserve

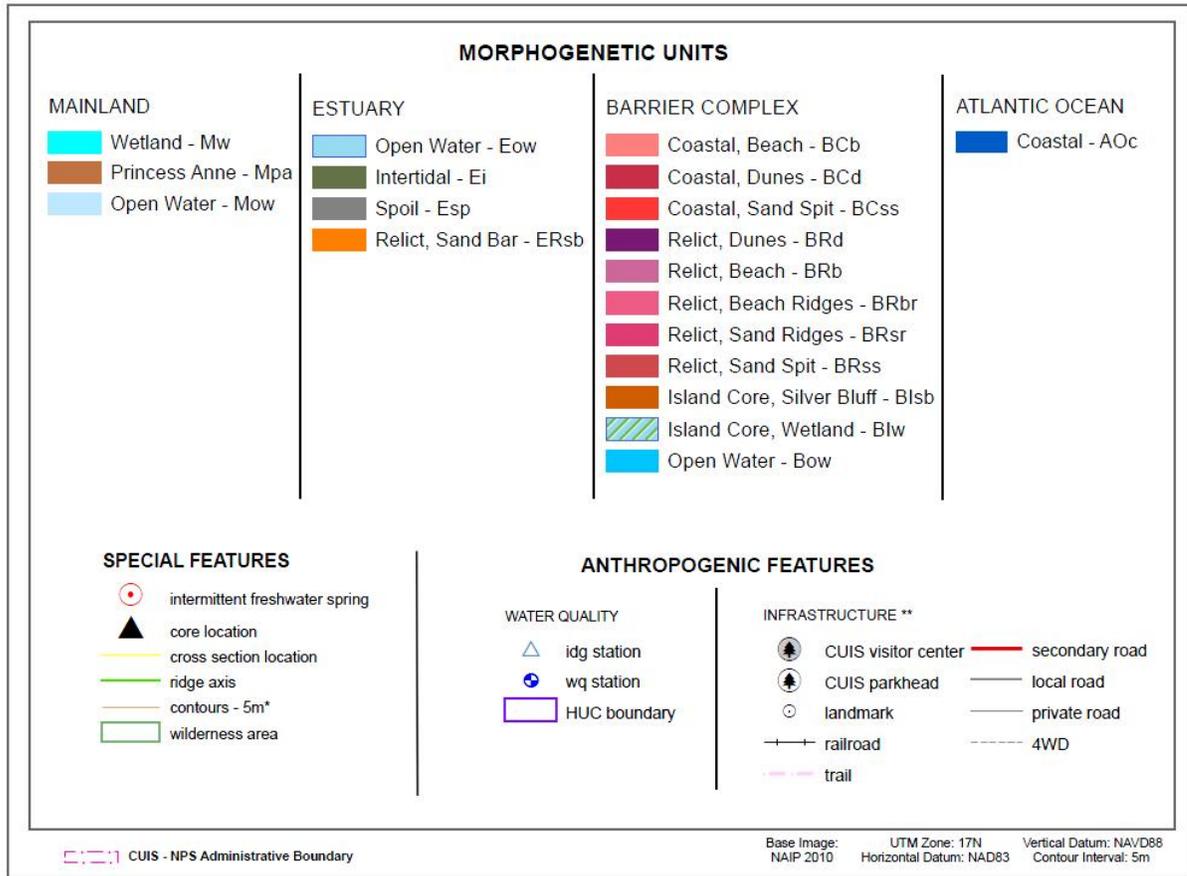
NSBKB = Naval Submarine Base - US Navy

CUIS NS = Cumberland Island National Seashore - National Park Service



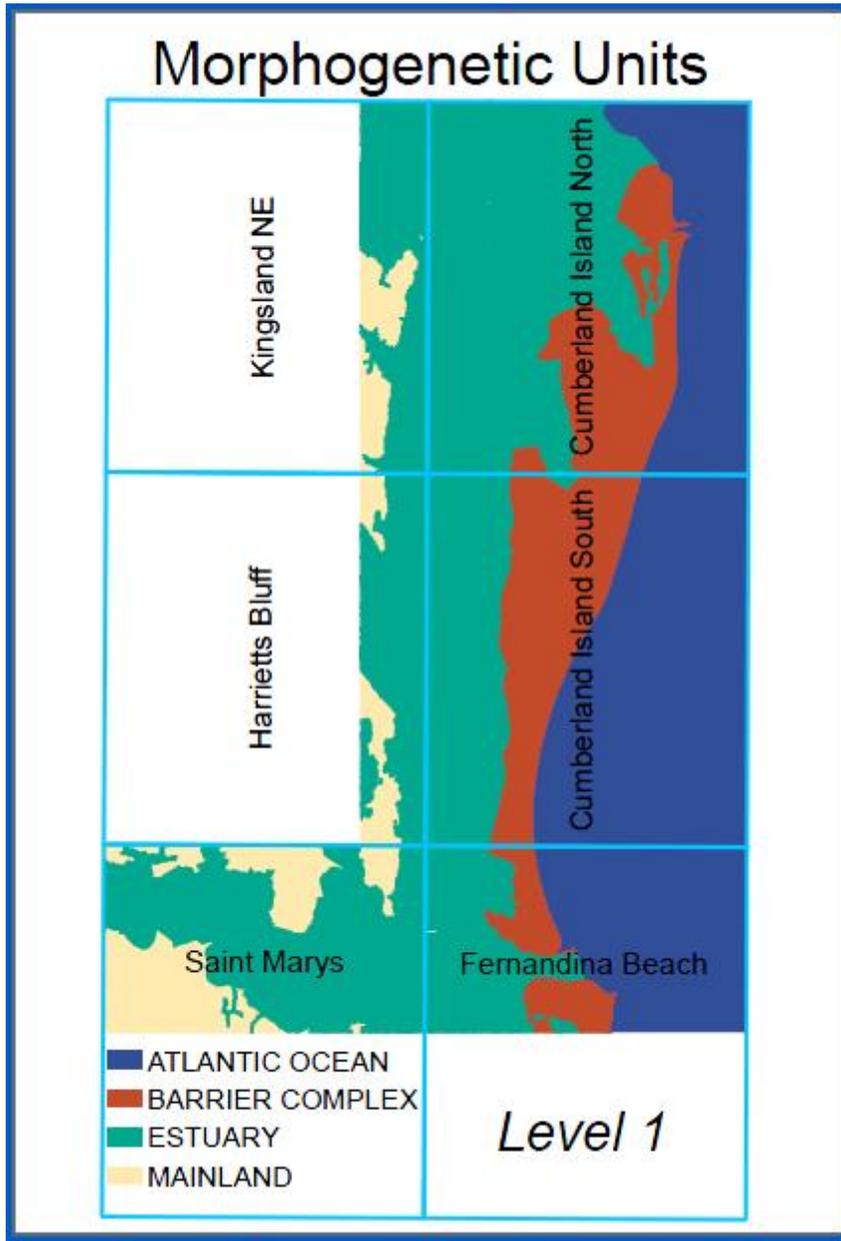
Extracted from: [Parkinson and Latiolais, 2011](#) (GRI Source Map ID 75585).

Map Legend



Extracted from: [Parkinson and Latiolais, 2011](#) (GRI Source Map ID 75585).

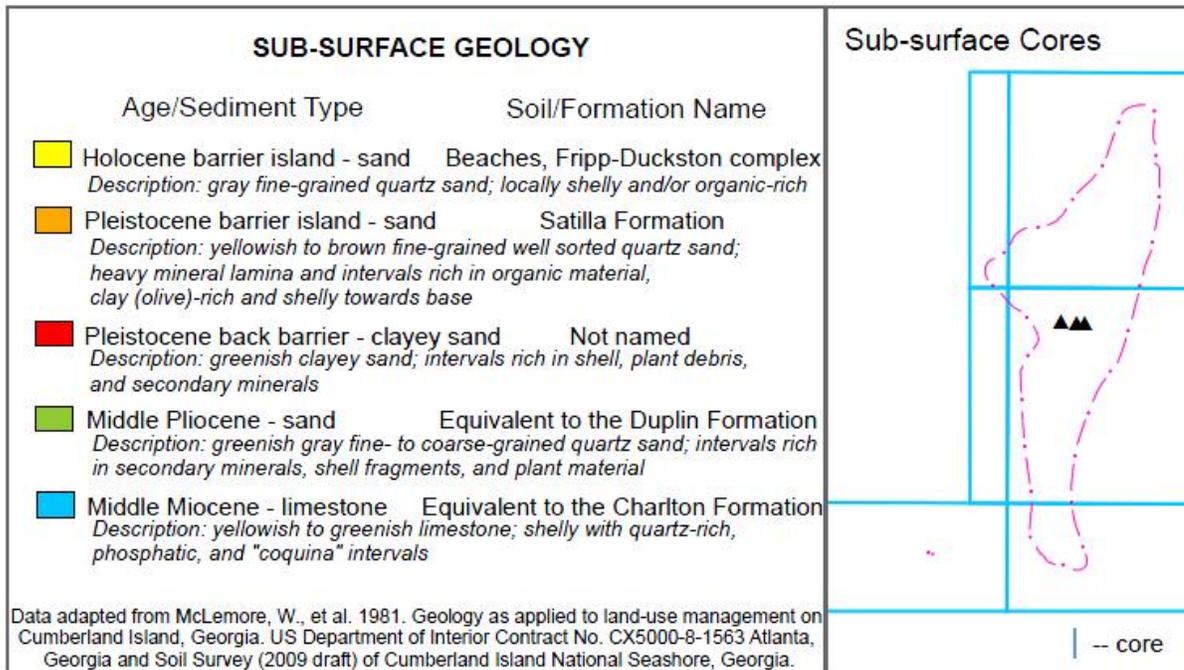
Level 1 Morphogenetic Units



Extracted from: [Parkinson and Latiolais, 2011](#) (GRI Source Map ID 75585).

** Refer to the [source report](#) for an explanation of morphogenetic level classifications.

Sub-surface Geology Legend

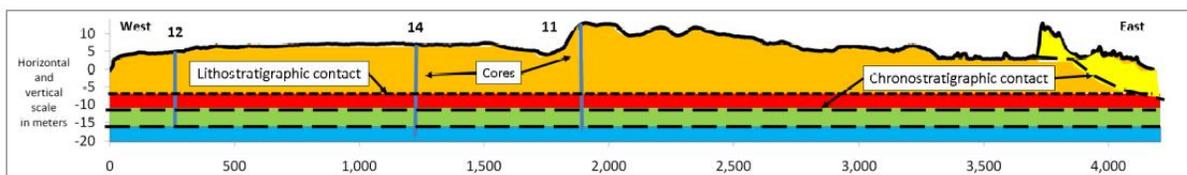


Extracted from: [Parkinson and Latiolais, 2011](#) (GRI Source Map ID 75585).

Geologic Cross Section

A cross-section illustrating the subsurface geology of Cumberland Island was constructed based primarily upon transect B-B' (Figure 5) of McLemore et al. (1981). Chronostratigraphic contact between Holocene shoreline and Pleistocene island complex mapped as a ravinement surface during this study. All other contacts are based upon McLemore et al (1981). Paucity of subsurface data recognized during this study and as such all stratigraphic contacts are illustrated using a dashed line. ([Parkinson and Latiolais, 2011](#)) (GRI Source Map ID 75585).

Refer to the [subsurface geology legend](#) for an explanation of units, as well as the general locations of coreholes present on the cross section that are also present in the map area.



Extracted from: [Parkinson and Latiolais, 2011](#) (GRI Source Map ID 75585).

Geology Report

GEOLOGIC MAPPING OF CUMBERLAND ISLAND NATIONAL SEASHORE GEORGIA, U.S.A.

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This report, [cuissourcegeologyreport.pdf](#), is provided with the GRI digital geologic-GIS data.

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 Stephanie O'Meara.

The information contained here was compiled to accompany the digital geologic-GIS map(s) and other digital data for Cumberland Island National Seashore, Georgia (CUIS) formatted to GRI specifications by Stephanie O'Meara using source digital GIS data, map and report produced by [R.W. Parkinson and M. Latiolais \(2011\)](#).

GRI finalization by Stephanie O'Meara. Format migration and Google Earth product by Stephanie O'Meara.

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