Geologic Resources Inventory Map Document for Assateague Island National Seashore

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Geologic Resources Inventory Map Document

Assateague Island National Seashore, Maryland and Virginia

Geologic Database to Accompany Digital Geologic-GIS Data

asis_geology.pdf

Version: 10/18/2012

This digital database has been developed to accompany numerous published and/or unpublished geologic maps in the area of Assateague Island National Seashore, Maryland and Virginia (ASIS)

Attempts have been made to reproduce all aspects of the original “paper” published product, including the geologic units and their descriptions, the geologic report, references, geologic cross sections 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 database.

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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Map Unit List

The geologic units present in source maps used for Assateague Island National Seashore, Maryland and Virginia (ASIS) are listed below. Units are listed with their unit name and assigned GRI unit symbol in parentheses (e.g., Barrier Core (brr_cr)). Units are generally listed from youngest to oldest. No description for water is provided. Information about each geologic unit is also presented in the Geologic Unit Information (UNIT) table included with the GRI geology-GIS data.

Geologic Map Units

Natural Features

Accretion Mounds (artn_mnd)
Accretion Mound Swales (artn_mnd_swl)
Barrier Core (brr_cr)
Beach (beach)
Beach Ridge Complex (bch_rdg_cmp)
Beach Ridge Swales (bch_rdg_swl)
Dunes (dunes)
Interdune Swales (intr_dn_swl)
Overwash Zones, Active (ovrwsh_zn_a)
Overwash Zones, Inactive (ovrwsh_zn_i)
Marsh (marsh)
Tidal Flats (tdl_flt)

Man-made Features

Artificial Berm (artfcl_brm)
Impoundments (impndmnts)
Jetty (jetty)
Modified Land (mdfd_lnd)
Parking Lots (prkg_lots)
Reclaimed Land (rclmd_lnd)

Map Unit Descriptions

Descriptions of all geologic map units, generally listed from youngest to oldest, are presented below.

artn_mnd - Accretion Mounds (Recent)

Low, oblong vegetated hills formed on the margins of overwash zones by the concentric accumulation of sand. *GRI Source Map ID 75016* (Open File Report 2007-1388).

art_mnd_swl - Accretion Mound Swales (Recent)

Topographic depressions within an accretion mound. May be dry or intermittently pond freshwater after heavy rain. *GRI Source Map ID 75016* (Open File Report 2007-1388).

brr_cr - Barrier Core (Recent)

The central part of the barrier island that commonly lies between dunes on the seaward side and marshes on the landward side. May be sparsely vegetated or covered by grasses or trees. *GRI Source Map ID 75016* (Open File Report 2007-1388).

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. *GRI Source Map ID 75016* (Open File Report 2007-1388).

bch_rdg_cmp - Beach Ridge Complex (Recent)

Sets of long, continuous ridges parallel to the ocean shore by sand that is deposited by a combination of wave runup and the wind. May be covered by grasses or trees. *GRI Source Map ID 75016* (Open File Report 2007-1388).

bch_rdg_swl - Beach Ridge Swales (Recent)

Topographic depressions within a beach-ridge complex. May be dry or intermittently pond freshwater after heavy rain. *GRI Source Map ID 75016* (Open File Report 2007-1388).

dunes - Dunes (Recent)

Hills or ridges of wind-blown sand that form hummocky topography landward of and parallel to the beach. May be sparsely or densely vegetated with grasses. *GRI Source Map ID 75016* (Open File Report 2007-1388).

intr_dn_swl - Interdune Swales (Recent)

Topographic depressions between dune ridges. May be dry or intermittently pond freshwater after heavy rain. *GRI Source Map ID 75016* (Open File Report 2007-1388).

ovrwsh_zn_a - Overwash Zones, Active (Recent)

Overwash zone divided into active and inactive zones. An *active* overwash zone is frequently flooded by high water and ocean waves generated by storms. It is typically low lying with sparse vegetation and composed of sand with a concentrated layer of shell at the surface. *GRI Source Map ID 75016* (Open File Report 2007-1388).

ovrwsh_zn_i - Overwash Zones, Inactive (Recent)

Overwash zone divided into active and inactive zones. An *inactive* overwash zone is an area that was historically overwashed by storm surge, such as during the 1962 Ash Wednesday Storm, or created by overwash such as the flats that widened the north end of the island during 1998 storms. 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 dunes and can be densely vegetated with low wood plants. Inactive overwash zones typically grade landward into marshes. *GRI Source Map ID 75016* (Open File Report 2007-1388).

marsh - Marsh (Recent)

Low vegetated wetlands that support plant assemblages tolerant of saltwater, brackish water, and freshwater. Typically found along the landward side of the barrier island adjacent to the lagoon along the margins of tidal creeks. *GRI Source Map ID 75016* (Open File Report 2007-1388).

tdl_flt - Tidal Flats (Recent)

Unvegetated transitional areas that are alternately inundated and exposed either by the astronomical tides or intermittently by wind-driven water. *GRI Source Map ID 75016* (Open File Report 2007-1388).

artfcl_brm - Artificial Berm (Recent)

A low linear ridge of sand, gravel, and shell constructed in the backbeach parallel to the shore to reduce overwash of barrier island. *GRI Source Map ID 75016* (Open File Report 2007-1388).

impndmnts - Impoundments (Recent)

Former water bodies or flats that have been altered by dikes to retain water, or interior water bodies created by dredging below the water table. *GRI Source Map ID 75016* (Open File Report 2007-1388).

jetty - Jetty (Recent)

An engineering structure that projects perpendicular tot he shoreline. A jetty is typically composed of large blocks of rock and is designed to reduce the flow of sand into a coastal navigation channel, such as a tidal inlet. *GRI Source Map ID 75016* (Open File Report 2007-1388).

mdfd_lnd - Modified Land (Recent)

Significant alterations of the land surface for residential/commercial development. *GRI Source Map ID 75016* (Open File Report 2007-1388).

prkg_lots - Parking Lots (Recent)

Areas cleared for parking vehicles. *GRI Source Map ID 75016* (Open File Report 2007-1388).

rclmd_lnd - Reclaimed Land (Recent)

Formerly low, commonly flooded land that is built up by material either dredged from adjacent submerged areas or imported from other site. *GRI Source Map ID 75016* (Open File Report 2007-1388).

GRI Source Map Citation

Open File Report 2007-1388

Morton, R.A., Bracone, J.E., and Cooke, Brian, 2008, Geomorphology and depositional sub-environments of Assateague Island, Maryland-Virginia: U.S. Geological Survey, Open-File Report OF-2007-1388, 1:21,552 scale (*GRI Source Map ID 75016*)

OFR 2007-1388 Legend

Extracted from Open-File Report OF-2007-1388

OFR 2007-1388 Map Text

Universal Transverse Mercator Projection. 1983 North American Datum-Zone 17 North
This map is not intended for use in navigation.

Project Description

The U.S. Geological Survey 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 sub-environments through time. This involves examining morphological and topographic change at time scales ranging from millennia to years and space scales ranging from tens of kilometers to meters. Of particular interest are the processes that produce those changes and determining 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. Assateague Island MD/VA was selected for detailed mapping of barrier island morphology and topography because the island offers a diversity of depositional sub-environments that are representative of other barrier islands along the middle Atlantic coast. The geomorphology and sub-environment map emphasizes the origins of the surficial features and it also serves as a basis for documenting which sub-environments are relatively stable, such as the barrier island core, and those that are highly dynamic, such as the beach and active overwash zones.

Data Description

This classification was referenced and mapped using 1999 Digital Orthophoto Quadrangles (DOQ), 0.25 meter pixel resolution orthorectified aerial photography from 2003, historical aerial photographs, 2003 and 2004 Experimental Advanced Airborne Research Lidar (EAARL), and a 1993 Assateague Island data file showing a preliminary survey of island vegetation. Spatial variability of shape boundaries vary between 1 and 7 meters due to the variability between the data sources. Each geomorphic layer is stored in a standard format shapefile viewable in any GIS software.

Further Reading

Biggs, R. B., 1970, The origin and geologic history of Assateague Island, Maryland and Virginia, *in* Assateague Ecological Studies Final Report, part 1: University of Maryland Natural Resources Institute, Contribution no. 446, p. 8-41.

Dolan, R., Hayden, B, and Heywood, J., 1977, Atlas of environmental dynamics, Assateague Island National Seashore: National Park Service, Natural Resource Report No. 11, 40 p.

Halsey, S. D., 1978, Late Quaternary geologic history and morphologic development of the barrier system along the Delmarva Peninsula of the Mid-Atlantic bight: unpublished PhD. Thesis, University of Delaware, 592 p.

Morton, R. A., 2002, Factors controlling storm impacts on coastal barriers and beaches -- A preliminary basis for real-time forecasting: Journal of Coastal Research, v. 18, p. 486-501.

Morton, R. A., Guy, K.K., Hill, H.W., and Pascoe, T., 2003, Regional morphological responses to the March 1962 Ash Wednesday storm: Proceedings Coastal Sediments '03, 11p.

Pendleton, E.A., Williams, S.J. and Thieler, E.R., 2004, Coastal vulnerability assessment of Assateague Island National Seashore (ASIS) to sea-level rise: U.S. Geological Survey Open-File Report 2004-1020, Web Only. URL: pubs.usgs.gov/of/2004/1020/.

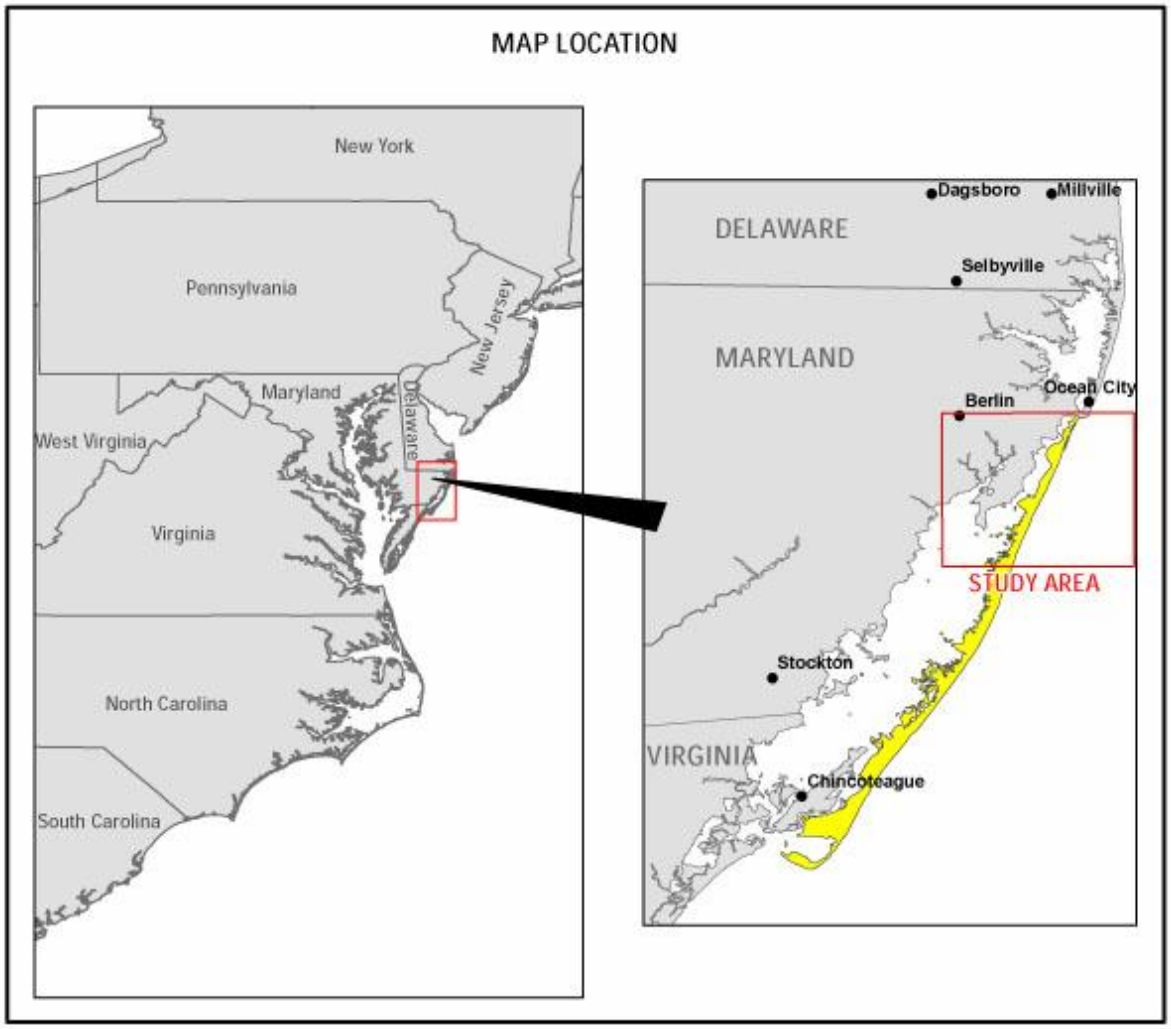
Extracted from Open-File Report OF-2007-1388

*** The UTM zone indicated in the text above (first line), as well as on the U.S. Geological Survey map tiles that follow should be Zone 18 North, and not Zone 17N. This is an error only on the U.S. Geological Survey source map tiles and not in the GRI GIS data (i.e., the GRI GIS data is in the correct UTM zone, Zone 18N).*

Map Tile 1

Open File Report 2007-1388 Map Tile 1 PDF

Map Tile 1: Map Location

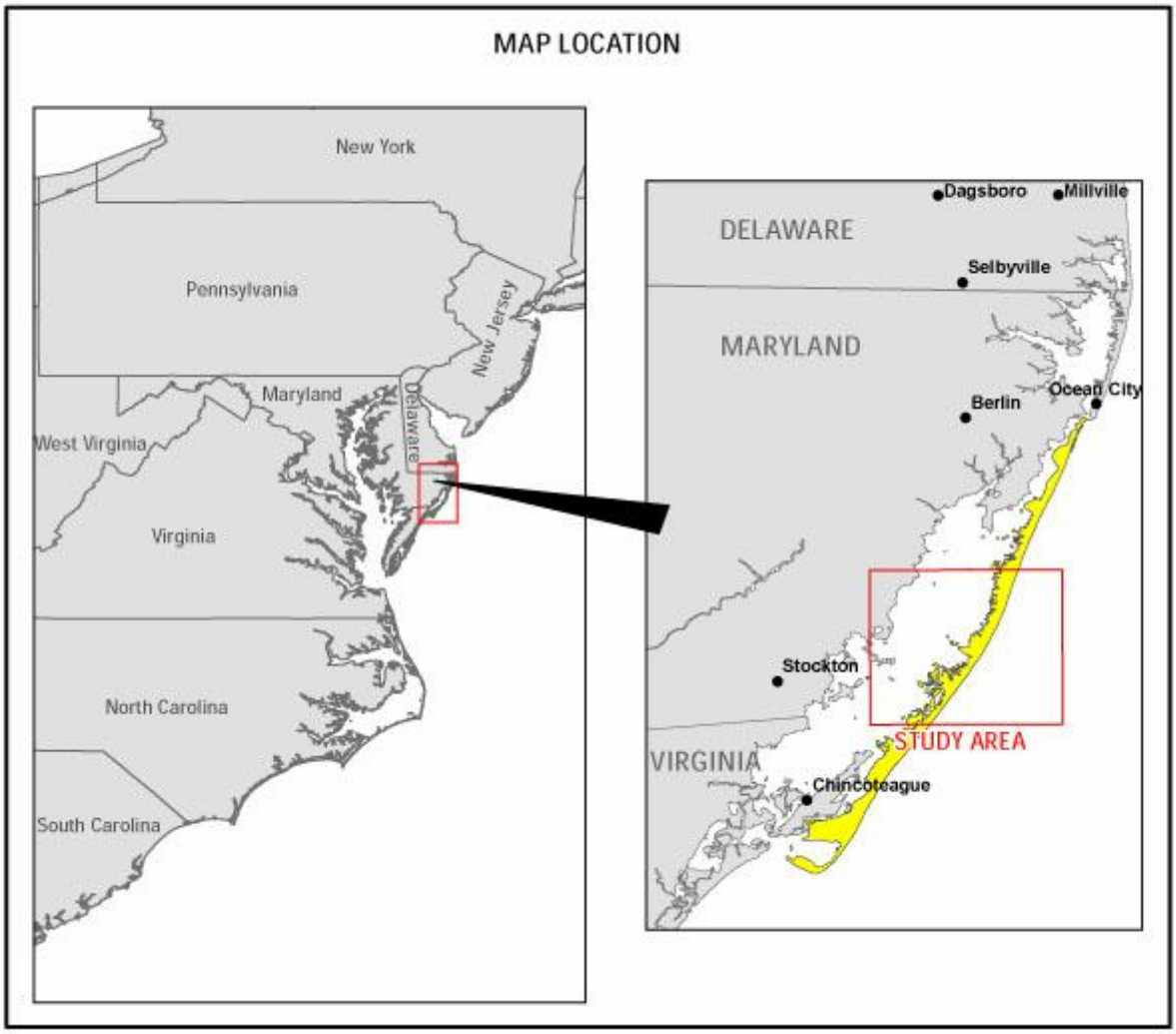


Extracted from Open-File Report OF-2007-1388

Map Tile 2

Open File Report 2007-1388 Map Tile 2 PDF

Map Tile 2: Map Location

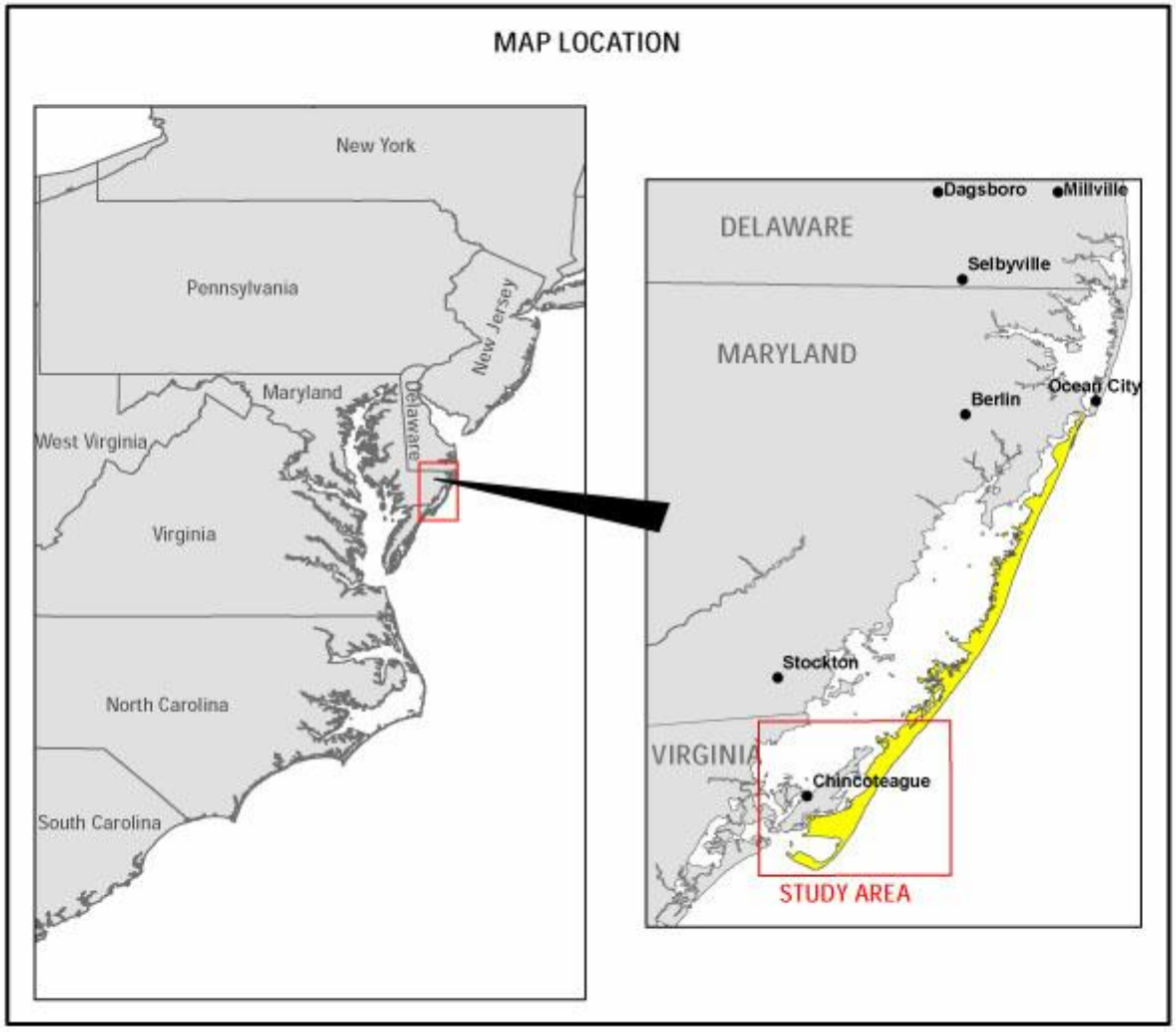


Extracted from Open-File Report OF-2007-1388

Map Tile 3

Open File Report 2007-1388 Map Tile 3 PDF

Map Tile 3: Map Location



Extracted from Open-File Report OF-2007-1388

GRI Digital Data Credits

This PDF document was developed and completed by Georgia Hybels (National Park Service) for the NPS Geologic Resources Division (GRD) Geologic Resources Inventory(GRI) Program. Quality control was provided by Stephanie O'Meara (Colorado State University)

The information contained here was compiled to accompany the digital geologic-GIS map(s) and other digital data for Assateague Island National Seashore, Maryland and Virginia (ASIS) developed by Georgia Hybels (National Park Service) from USGS source digital data. Quality control provided by Stephanie O'Meara.

GRI finalization and project review by Stephanie O'Meara.

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