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

Acadia National Park

GRI Ancillary Map Information Document

Produced to accompany the Geologic Resources Inventory (GRI) Digital Geologic Data for Acadia National Park

acad_surficial_geology.pdf

Version: 9/3/2019

Geologic Resources Inventory Map Document for Acadia National Park

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Geologic Resources Inventory Map Document

Acadia National Park, Maine

Document to Accompany Digital Geologic-GIS Data

acad_surficial_geology.pdf

Version: 9/3/2019

This document has been developed to accompany the 1:24,000 scale and 1:62,500 scale surficial digital geologic-GIS datasets developed by the Geologic Resources Inventory (GRI) program for Acadia National Park, Maine (ACAD).

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 Map Citations** – A listing of the GRI surficial digital geologic-GIS map (1:24,000 scale) produced for this project along with sources used in its completion. In addition, a brief explanation of how each source map was used is provided.

    a) **Index Map** – An index map displaying the extent of GRI digital geologic-GIS maps for Acadia National Park, the source maps used, the park boundary and relevant 7.5 quadrangles and population centers.

3) **Digital Surficial Geologic-GIS Map of Mount Desert Island and Vicinity (1:24,000 scale data)** – Contains a unit listing, unit descriptions and additional ancillary source map information relevant to the 1:24,000 scale GRI digital geologic-GIS dataset.

    a) **Map Unit List** – A listing of all surficial geologic map units present on the map, listed from youngest to oldest.

    b) **Map Unit Descriptions** – Descriptions for all surficial geologic map units present on the map.

    c) **Photograph Localities** – Photograph figures with caption text present on each source map. Some source maps, Baker Island, Bartlett Island, Bar Harbor, Bass Harbor and Swans Island, had corresponding localities present on the source map. These localities

are present in the GRI digital geologic-GIS data.

d) **Ancillary Source Map Information** – Additional source map information presented for the source map. This includes a map legend, index map and references pertaining to a map. In addition, some information, present on every or nearly every source map such as "Uses of Surficial Geology Maps", a disclaimer on responsible use pertaining to natural resources, and text on the "Surficial Geology of Maine", is also presented here.

4) **Digital Surficial Geologic-GIS Maps of Isle Au Haut and Schoodic Head (1:62,500 scale data)** – Contains a unit listing, unit descriptions and additional ancillary source map information relevant to the 1:62,500 scale GRI digital geologic-GIS datasets.

a) **Map Unit List** – A listing of all surficial geologic map units present on the maps, listed from youngest to oldest.

b) **Map Unit Descriptions** – Descriptions for all surficial geologic map units present on the maps.

c) **Ancillary Source Map Information** – Additional source map information presented for the source maps.

5) **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

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: https://www.nps.gov/articles/gri-geodatabase-model.htm

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://go.nps.gov/gri_products

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: https://www.nps.gov/subjects/geology/gri.htm, 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 Maps and Source Map Citations

This document, acad_surficial_geology.pdf, is only relevant to 1:24,000 scale surficial and 1:62,500 scale surficial and geologic GRI digital geologic-GIS data for Acadia National Park. Ancillary map information relevant to the 1:50,000 scale geologic data for Acadia National Park is present in a separate document (acad_geology.pdf).

The 1:24,000 scale GRI digital surficial geologic-GIS map for Acadia National Park, Maine (ACAD) and its source maps:

GRI Digital Surficial Geologic-GIS Map of Mount Desert Island and Vicinity, Acadia National Park, Maine (*GRI MapCode ACAD_surficial*)

Braun, Duane D., 2016, Surficial Geology of the eastern portion of the Bartlett Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-16, scale 1:24,000 (Bartlett Island Quadrangle (eastern portion)). (*GRI Source Map ID 76290*).

Braun, Duane D., 2016, Surficial Geology of the northern portion of the Baker Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-13, scale 1:24,000 (Baker Island Quadrangle (northern portion)). (*GRI Source Map ID 76292*).

Braun, Duane D., 2016, Surficial Geology of the southwestern portion of the Bar Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-19, scale 1:24,000 (Bar Harbor Quadrangle (southwestern portion)). (*GRI Source Map ID 76295*).

Braun, Duane D., 2016, Surficial Geology of the northern portion of the Bass Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-14, scale 1:24,000 (Bass Harbor Quadrangle (northern portion)). (*GRI Source Map ID 76293*).

Braun, Duane D. and Weddle, Thomas K., 2016, Surficial Geology of the Newbury Neck Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-17, scale 1:24,000 (Newbury Neck Quadrangle). (*GRI Source Map ID 76297*).

Braun, Duane D. and Weddle, Thomas K., 2016, Surficial Geology of the Salsbury Cove Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-18, scale 1:24,000 (Salsbury Cove Quadrangle). (*GRI Source Map ID 76298*).

Braun, Duane D., 2016, Surficial Geology of the Seal Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-20, scale 1:24,000 (Seal Harbor Quadrangle). (*GRI Source Map ID 76294*).

Braun, Duane D., Lowell, Thomas V. and Foley, Michael E., 2016, Surficial Geology of the Southwest Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-21, scale 1:24,000 (Southwest Harbor Quadrangle). (*GRI Source Map ID 76296*).

Braun, Duane D., 2016, Surficial Geology of the northeastern portion of the Swans Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-15, scale 1:24,000 (Swans Island Quadrangle (northeastern portion)). (*GRI Source Map ID 76291*).

The GRI used the full extent of each source map, and incorporated prominent components of each source map (e.g., unit colors, unit descriptions and other ancillary map information) into the 1:24,000 scale GRI digital geologic-GIS dataset and product.

The 1:62,500 scale GRI digital surficial geologic-GIS maps for Acadia National Park, Maine (ACAD) and their source maps:

GRI Digital Surficial Geologic-GIS Map of Isle Au Haut and Immediate Vicinity, Acadia National Park, Maine (*GRI MapCode ISHA*)

Borns, Harold W., Jr., Smith, Geoffrey W. and Thompson, Woodrow B., 1974, Reconnaissance Surficial Geology of the Deer Isle [15-minute] Quadrangle, Maine: Maine Geological Survey, Open-File Map 74-12, scale 1:62,500 (Deer Isle 15' Quadrangle (surficial)). (*GRI Source Map ID 64425*).

GRI Digital Geologic-GIS Map of the Schoodic Head Area, Acadia National Park, Maine (*GRI MapCode SCHE)*

Borns, Harold W. Jr., 1974, Reconnaissance Surficial Geology of the Bar Harbor [15-minute] Quadrangle, Maine: Maine Geological Survey, Open-File Map 74-1, scale 1:62,500 (Bar Harbor 15' Quadrangle (surficial)). *GRI Source Map ID 64423*).

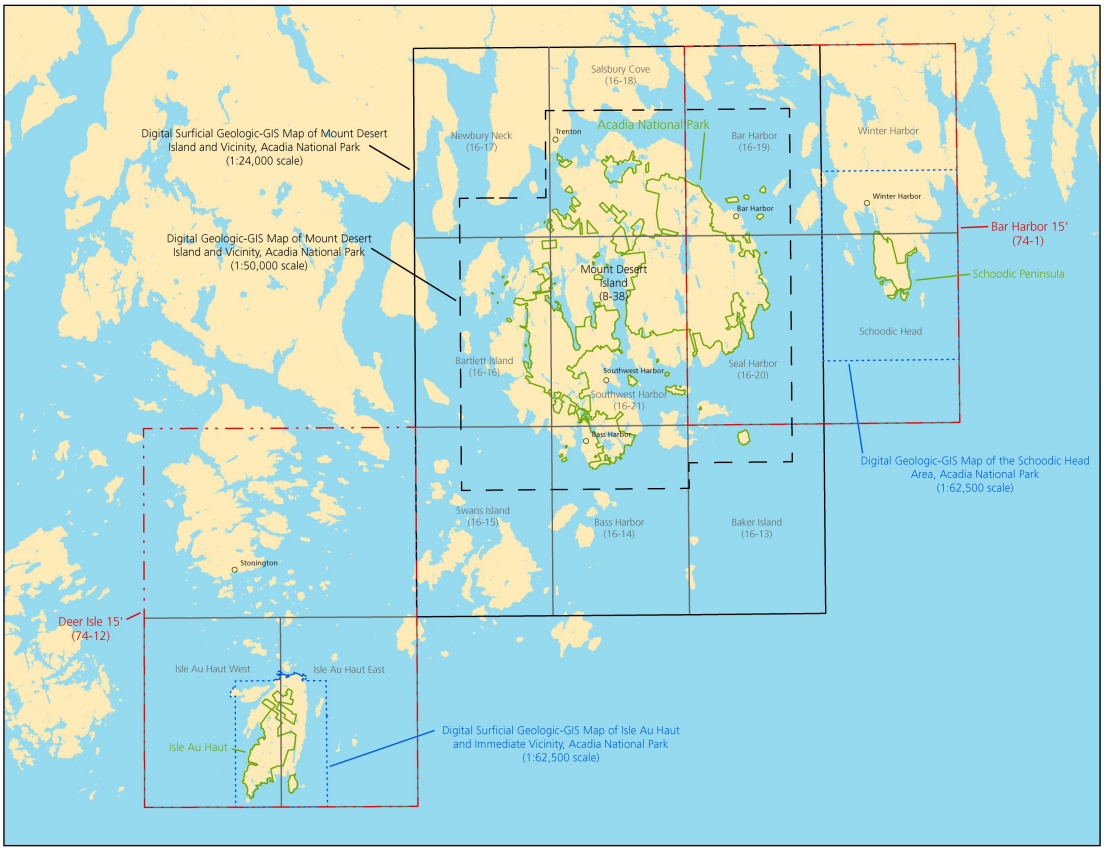
Gilman, Richard A., 1985, Bedrock Geologic Map of the Bar Harbor 15' Quadrangle, Maine: Maine Geological Survey, Progress Map PROG-71, scale 1:62,500 (*GRI Source Map ID 76031*).

The GRI used only a partial extent of each source map, however, all geologic features within this extent were captured. The Gilman, 1985 (bedrock geologic map) was used to capture bedding and foliation attitude observations, as well as denote the likely bedrock unit (e.g., Bar Harbor Formation) of a bedrock outcrop area where possible. In addition, prominent components of each surficial source map were added to the GRI digital geologic-GIS dataset and product.

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

Index Map

The following index map displays the extent of GRI digital geologic-GIS maps for Acadia National Park. These maps include the 1:50:000 scale Digital Geologic-GIS Map of Mount Desert Island and Vicinity, Acadia National Park (map extent displayed with a black dashed line), the 1:24,000 scale Digital Surficial Geologic-GIS Map of Mount Desert Island and Vicinity, Acadia National Park (map extent displayed with a black line), and the 1:62,500 scale Digital Surficial Geologic-GIS Map of Isle Au Haut and Immediate Vicinity, Acadia National Park, and the Digital Geologic-GIS Map of the Schoodic Head Area, Acadia National Park (both map extents displayed with blue dashed lines). The extent of source maps and their map series number (e.g., B-38) are also displayed. In addition, 7.5 quadrangles relevant to these maps and their source maps are also displayed in gray. The boundaries of Acadia National Park (as of August, 2019) are displayed in dark green. This includes Mount Desert Island, Isle Au Haut and Schoodic Peninsula. As previously mentioned, ancillary map information relevant to the 1:50,000 scale geologic data for Acadia National Park is present in a separate document (acad_geology.pdf).



Index map produced by Jake Suri (Colorado State University) with extent data produced by Stephanie O'Meara (Colorado State University).

Digital Surficial Geologic-GIS Map of Mount Desert Island and Vicinity (1:24,000 scale)

Map Unit List

The surficial geologic units present in the 1:24,000 scale digital geologic-GIS data produced for Acadia National Park, Maine (ACAD) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., af - Artificial fill). Units are listed from youngest to oldest. No description for water is provided. Information about each geologic unit is also presented in the GRI Geologic Unit Information (ACADUNIT) table included with the GRI geologic-GIS data. Of note, as the GRI uses the symbol "PE" to denote units of "Pleistocene" age (and not "P" as denoted on the source maps), unit symbols for all Pleistocene-age units have been changed to adopt "PE" in its unit symbol. Also, to better differentiate younger (Holocene) and older (Pleistocene) "marine shoreline deposits", units Hms and PEms, respectively, the age text, "Holocene" and "Pleistocene" was added to the beginning of their unit names.

Cenozoic Era

Quaternary Period

Holocene Epoch
af - Artificial fill
Ha - Stream aullvium
Haf - Alluvial fan
Hat - Alluvial terrace
Hms - Holocene marine shoreline deposit
Hw - Freshwater wetland
Hwsm - Salt marsh

Holocene and Pleistocene Epochs
Qta - Talus

Pleistocene Epoch
PEge - Esker
PEgi - Ice-contact gravel
PEmd - Marine delta
PEmdf - Marine delta, Forest Hill delta
PEmdb - Marine delta, Blunts Pond delta
PEmf - Submarine outwash fans
PEmn - Marine nearshore deposits
PEms - Pleistocene marine shoreline deposit
PEms/PEgi - Pleistocene marine shoreline deposit over ice-contact gravel
PEms/PEt - Pleistocene marine shoreline deposit over till
PEp - Presumpscot Formation
PEt - Till
PEtd - Thin drift, undifferentiated

Cenozoic Era and older

Pleistocene Epoch and older
rk - Bedrock

Map Unit Descriptions

Descriptions of all (1:24,000 scale) surficial geologic map units, generally listed from youngest to oldest, are presented below.

af - Artificial fill (Recent)

af - Artificial fill (Recent)
This unit occurs along roadways and at building sites. Considerable areas of fill occur around the Town of Bar Harbor. Description from source map: Bar Harbor Quadrangle (southwestern portion)

af - Artificial fill (Recent)
This unit occurs along roadways and at building sites. Description from source maps: Bartlett Island Quadrangle (eastern portion), Salsbury Cove Quadrangle, and Seal Harbor Quadrangle

af - Artificial fill (Recent)
This unit occurs along roadways, at building sites, and abandoned gravel pits. Description from source map: Bass Harbor Quadrangle (northern portion)

af - Artificial fill (Recent)
This unit occurs along roadways and at building sites. Considerable areas of fill occur at each of the villages. Description from source map: Southwest Harbor Quadrangle

Ha - Stream alluvium (Holocene)

Ha - Stream alluvium (Holocene)
Stratified sand and gravel with minor amounts of silt deposited on flood plains of present day streams; typically 1-2 m (3-6 ft) thick. Description from source maps: Bar Harbor Quadrangle (southwestern portion), Seal Harbor Quadrangle, and Southwest Harbor Quadrangle

Haf - Alluvial fan (Holocene)

Haf - Alluvial fan (Holocene)
Stratified gravel and sand deposited in a fan-shaped landform where a steep stream channel enters a more gently sloped and wider area; typically 2 m (6 ft) or more thick. Description from source map: Bar Harbor Quadrangle (southwestern portion)

Haf - Alluvial fan (Holocene)
Stratified gravel and sand deposited in a fan-shaped landform where steep stream channels enter more gently sloped and wider areas; typically 2 m (6 ft) or more thick. Description from source maps: Bartlett Island Quadrangle (eastern portion), Salsbury Cove Quadrangle, and Seal Harbor Quadrangle

Haf - Alluvial fan (Holocene)
Stratified gravel and sand deposited in a fan-shaped landform where steep stream channels enter more gently sloped and wider areas. Occur mostly around the periphery of Sargent Mountain; typically 2 m (6 ft) or more thick. Description from source map: Southwest Harbor Quadrangle

Hat - Alluvial terrace (Holocene)

Stratified sand and gravel forming benches running parallel to and 1-3 m (310 ft) above the present floodplain; usually 1-2 m (3-6 ft) thick. Description from source map: Seal Harbor Quadrangle

Hms - Holocene marine shoreline deposit (Holocene)

Hms - Marine shoreline deposit (Holocene)
Beach ridges composed of cobble to boulder-size material 2-3 m (6-10 ft) thick. Description from source maps: Baker Island Quadrangle (northern portion), and Swans Island Quadrangle (northeastern portion)

Hms - Marine shoreline (Holocene)
Beach deposit composed of sand to boulder-size material 1-5 m (3-15 ft) thick. Description from source map: Bar Harbor Quadrangle (southwestern portion)

Hms - Marine shoreline deposit (Holocene)
Beach ridges composed of cobble to boulder-size material 2-5 m (6-15 ft) thick. Description from source map: Bartlett Island Quadrangle (eastern portion)

Hms - Marine shoreline deposit (Holocene)
Beach ridges composed of cobble to boulder-size material 2-5 m (6-15 ft) thick. Such deposits form the natural "seawall" along the coast from Seawall Pond to west of the Seawall Picnic area. Description from source map: Bass Harbor Quadrangle (northern portion)

Hms - Marine shoreline deposit (Holocene)
Sand and gravel on present day ocean beaches. Description from source map: Newbury Neck Quadrangle

Hms - Marine shoreline deposit (Holocene)
Sand and gravel on modern ocean beaches. Includes beach ridges composed of cobble to boulder-size material 1-3 m (3-10 ft) thick. Description from source map: Salsbury Cove Quadrangle

Hms - Marine shoreline deposit (Holocene)
Beach ridges composed of cobble to boulder-size material 2-5 m (6-15 ft) thick. The most extensive beaches occur on Little Cranberry Island. Description from source map: Seal Harbor Quadrangle

Hms - Marine shoreline deposit (Holocene)
Beach ridges composed of cobble to boulder-size material 2-5 m (6-15 ft) thick. They form as an almost continuous ridge along the shore southeast of Manset and the north side of Great Cranberry Island, as triangular points on Sutton Island, and between rock headlands elsewhere. Buried tree stumps exposed on Greening Island and on the south side of Great Cranberry Island indicate that these deposits are transgressing landward. Description from source map: Southwest Harbor Quadrangle

Hw - Freshwater wetland (Holocene)

Hw - Freshwater wetland (Holocene)
Muck, peat, silt, and sand, typically 0.3-2 m (1-6 ft) thick. Poorly drained areas, often with standing water. Description from source maps: Bar Harbor Quadrangle (southwestern portion), Bartlett Island, Quadrangle (eastern portion), Newbury Neck Quadrangle, and Southwest Harbor Quadrangle

Hw - Freshwater wetland (Holocene)

Muck, peat, silt, and sand, typically 0.3-2 m (1-6 ft) thick. Poorly drained areas, often with standing water. Extensive wetlands occupy the lowlands between Seawall Campground and the harbor of Bass Harbor. Description from source map: Bass Harbor Quadrangle (northern portion)

Hw - Freshwater wetland (Holocene)
Muck, peat, silt, and sand. Poorly drained areas, often with standing water. The most extensive wetlands are Fresh Meadow and The Heath. Description from source map: Salsbury Cove Quadrangle

Hw - Freshwater wetland (Holocene)
Muck, peat, silt, and sand, typically 0.3-2 m (1-6 ft) thick. Poorly drained areas, often with standing water. The most extensive wetland is Great Meadow. Description from source map: Seal Harbor Quadrangle

Hwsm - Salt marsh (Holocene)

Hwsm - Salt marsh (Holocene)
Grass, reed, and sedge wetland, inundated at high tide, that is underlain by fine grained sediment having a variable thickness of 0.3 - 2 m (1-6 ft). Description from source map: Baker Island Quadrangle (northern portion)

Hwsm - Salt marsh (Holocene)
Grass, reed, and sedge wetland, inundated at high tide, that is underlain by fine grained sediment having a variable thickness of 0.3 – 2 m (1-6 ft). Salt marsh is present to the west and southwest of the village of Bernard. Description from source map: Bass Harbor Quadrangle (northern portion)

Hwsm - Salt marsh (Holocene)
Peat, muck, silt, and clay, typically 0.3-2 m (1-6 ft) thick. Coastal marsh, subject to tidal flooding. Description from source map: Newbury Neck Quadrangle

Hwsm - Salt marsh (Holocene)
Peat, muck, silt, and clay. Coastal marsh, subject to tidal flooding. Grass, reed, and sedge wetland with thin, non-commercial peat layers overlying a mineral substrate consisting of estuarine sands and muds. Description from source map: Salsbury Cove Quadrangle

Hwsm - Salt marsh (Holocene)
Grass, reed, and sedge wetland, inundated at high tide, that is underlain by fine grained sediment having a variable thickness of 0.3-2 m (1-6 ft). Salt marsh is only present on Little Cranberry Island. Description from source map: Seal Harbor Quadrangle

Hwsm - Salt marsh (Holocene)
Grass, reed, and sedge wetland, inundated at high tide, that is underlain by fine grained sediment having a variable thickness of 0.3-2 m (1-6 ft). Salt marsh is only present at the heads of Bass Harbor and Somes Sound. Description from source map: Southwest Harbor Quadrangle

Qta - Talus (Quarternary)

Qta - Talus (Quarternary)
Angular to subangular rock blocks deposited at the base of bedrock cliffs. Individual blocks are typically around 0.6-1 m (2-3 ft) and range in size from 0.3-10 m (1-33 ft). Deposit thickness is typically 1-5 m (3-15 ft), with some deposits more than 10 m (33 ft) thick. Much of material was deposited during late Pleistocene periglacial climate conditions with lesser amounts of material deposited during the Holocene. The most extensive talus deposits are around The Tarn. Description

from source map: Seal Harbor Quadrangle

Qta - Talus (Quarternary)
Angular to subangular rock blocks deposited at the base of bedrock cliffs. Individual blocks are typically around 0.6-1 m (2-3 ft) and range in size from 0.3-10 m (1-33 ft). Deposit thickness is typically 1-5 m (3-15 ft), with some deposits more than 10 m (33 ft) thick. The deposit at Valley Cove extends below present sea level. Much of this material was deposited during late Pleistocene periglacial climate conditions with lesser amounts of material deposited during the Holocene. Description from source map: Southwest Harbor Quadrangle

PEge - Esker (Pleistocene)

Pge - Esker (Pleistocene)
Ridges of massive to stratified, commonly interbedded, sand and gravel. Deposited by meltwater streams in subglacial and englacial conduits during retreat of the last ice sheet. Description from source map: Salsbury Cove Quadrangle

Pge - Esker (Pleistocene)
A ridge of stratified boulder to pebble gravel and sand deposited in a subglacial tunnel. The bedding is often chaotic with abrupt bedding and grain size changes. The only esker is in the headwaters of Hunters Brook. Description from source map: Seal Harbor Quadrangle

PEgi - Ice-contact gravel (Pleistocene)

Pgi - Ice-contact gravel (Pleistocene)
Stratified boulder to pebble gravel and sand deposited in contact with the melting glacial ice. Stratification in places may be horizontal or dipping consistently while in other places stratification may be chaotic with abrupt bedding and grain size changes. A 10-15 m (30-50 ft) thick deposit of such material marks an ice margin position separating The Tarn from Great Meadow. Description from source map: Seal Harbor Quadrangle

Pgi - Ice-contact gravel (Pleistocene)
Stratified boulder to pebble gravel and sand deposited in contact with the melting glacial ice. Stratification in places may be horizontal or dipping consistently while in other places stratification may be chaotic with abrupt bedding and grain size changes. Description from source map: Southwest Harbor Quadrangle

PEmd - Marine delta (Pleistocene)

Pmd - Marine delta (Pleistocene)
Pleistocene marine delta formed during flooding by the sea due to glacial depression of the land. Very low-angle sand and silt foreset bedding is mantled by trough cross-bedded sand deposited by braided glacial meltwater streams which flowed over the delta top as it expanded seaward. In places, may be mantled with unmapped thin eolian deposits. Two deltas have been assigned unique geographic names: Pmdf - Forest Hill delta; Pmdb - Blunts Pond delta. Description from source map: Salsbury Cove Quadrangle

Pmd - Marine delta (Pleistocene)
Stratified sand and gravel with nearly horizontal top strata (topsets) underlain by seaward dipping strata (foresets). Top surface graded to sea level at time of deposition. Deposit thickness is generally 5-15 m (15-50 ft). A large delta is present in the headwaters of Stanley Brook on the north side of the village of Seal Harbor. Description from source map: Seal Harbor Quadrangle

Pmd - Marine delta (Pleistocene)
Stratified sand and gravel with near horizontal top strata (topsets) underlain by seaward-dipping strata (foresets). Top surface graded to sea level at time of deposition. Deposit thickness is generally 5-10 m (15-33 ft). Two such deltas occur, one southeast of Jordan Pond and a second east of lower Hadlock Pond. At the north end of both deltas are moraine ridges that rose above sea level. Description from source map: Southwest Harbor Quadrangle

PEmdf - Marine delta, Forest Hill delta (Pleistocene)

Pmdf - Forest Hill Delta (Pleistocene)
See PEmd for unit description. Unit from source map: Salsbury Cove Quadrangle

PEmdb - Marine delta, Blunts Pond delta (Pleistocene)

Pmdb - Blunts Pond delta (Pleistocene)
See PEmd for unit description. Unit from source map: Salsbury Cove Quadrangle

PEmf - Submarine outwash fans (Pleistocene)

Pmf - Submarine outwash fans (Pleistocene)
Thick sand and gravel accumulations formed at the mouth of subglacial tunnels along the receding late Pleistocene ice margin. The sand and gravel is interbedded with and overlain by Presumpscot Formation clays at the distal edges of the fans, and interlayered with and overlain by tills at their ice-contact faces. Description from source maps: Newbury Neck Quadrangle, and Salsbury Cove Quadrangle

PEmn - Marine nearshore deposits (Pleistocene)

Pmn - Marine nearshore deposits (Pleistocene)
Pleistocene gravel, sand, and mud deposited as a result of wave activity in nearshore or shallow-marine environments; not associated with beach morphology. Description from source maps: Newbury Neck Quadrangle, and Salsbury Cove Quadrangle

PEms - Pleistocene marine shoreline deposit (Pleistocene)

Pms - Marine shoreline deposit (Holocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where there is a rounded gravel mantle with distinct strandline features. Deposited during the postglacial marine submergence of the coast. Description from source map: Baker Island Quadrangle (northern portion)

Pms - Marine shoreline deposit above present sea level (Pleistocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where abandoned gravel and sand pits show the material to be 2-5 m (6-15 ft) thick or where there are distinct strandline (beach ridge) features. Deposited during the postglacial marine submergence of the coast. Description from source map: Bar Harbor Quadrangle (southwestern portion)

Pms - Marine shoreline deposit (Pleistocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where abandoned gravel and sand pits show the material to be 2-5 m (6-15 ft) thick or where there are distinct strandline features. Deposited during the postglacial marine submergence of the coast. Description from source maps: Bartlett Island Quadrangle (eastern portion), and Salsbury Cove Quadrangle

Pms - Marine shoreline deposit (Pleistocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where abandoned gravel and sand pits show the material to be 2-5 m (6-15 ft) thick or where there are distinct strandline features. Deposited during the postglacial marine submergence of the coast. The most extensive areas of such deposits are around the Seawall Campground and north of the Bass Harbor lighthouse. Description from source map: Bass Harbor Quadrangle (northern portion)

Pms - Marine shoreline deposit (Pleistocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where abandoned gravel and sand pits show the material to be 2-5 m (6-15 ft) thick or where there are distinct strandline features. Deposited during the postglacial marine submergence of the coast. The most extensive areas of such deposits are north of Sand Beach, between Otter Cove village and Hunters Brook valley, and on Little Cranberry Island. Description from source map: Seal Harbor Quadrangle

Pms - Marine shoreline deposit (Pleistocene)
Stratified pebble to boulder gravel and sand that has layering dipping downslope. This deposit was mapped where abandoned gravel and sand pits show the material to be 2-5 m (6-15 ft) thick or where there are distinct strandline features. In some strandline areas, particularly the broad area on Hio Hill, the deposit is less than 2 m (6 ft) thick. Well-defined shoreline deposits and strandlines often occur at elevations up to 67 m (220 ft). In the southwest facing valley between Mansell and Barnard Mountains distinct shoreline strandlines and deposits occur up to an elevation of 79 m (260 ft). That higher elevation may be due to exceptional storm surge into that southwest-oriented valley. Description from source map: Southwest Harbor Quadrangle

PEms/PEgi - Pleistocene marine shoreline deposit over ice-contact gravel (Pleistocene)

Pms/ Pgi - Marine shoreline deposit over ice-contact gravel (Pleistocene)
Stratified pebble to boulder gravel and sand, with layering dipping downslope, overlies and truncates ice-contact gravel and sand. The unit was mapped at one site between the southwest end of Beech Mountain and the south end of “Great” Long Pond. The highest northeastern part of the deposit may have been an ice-contact marine delta that was significantly eroded by wave action. Description from source map: Southwest Harbor Quadrangle

PEms/PEt - Pleistocene marine shoreline deposit over till (Pleistocene)

Pms/ Pt - Marine shoreline deposit over till (Pleistocene)
Stratified pebble to boulder gravel and sand, with layering dipping downslope, overlies and truncates till. The unit was mapped at one site southwest of St. Sauveur Mountain. Description from source map: Southwest Harbor Quadrangle

PEp - Presumpscot Formation (Pleistocene)

Pp - Presumpscot Formation (Pleistocene)
Fine-grained marine mud (silt and clay with sandy lenses) commonly containing gravel dropstones and, more rarely, marine shell fossils. The mud was deposited in deeper, quieter water during the postglacial marine submergence of the coast. Description from source maps: Baker Island Quadrangle (northern portion), Bar Harbor Quadrangle (southwestern portion), Bartlett Island Quadrangle (eastern portion), and Swans Island Quadrangle (northeastern portion)

Pp - Presumpscot Formation (Pleistocene)
Fine-grained glaciomarine mud (silt and clay with sandy lenses) commonly containing gravel dropstones and, more rarely, marine shell fossils. Typically 1-3 m (3-10 ft) thick. The mud was deposited in deeper, quieter water during the postglacial marine submergence of the coast. Description from source map: Bass Harbor Quadrangle (northern portion)

Pp - Presumpscot Formation (Pleistocene)
Massive to laminated silty clays with rare dropstones and occasional shelly horizons, which overlie rock and till, and are interbedded with and overlie end moraines and marine fan deposits; includes sand deposited as a distal unit of submarine fans. The mud was deposited in deeper, quieter water during the post glacial marine submergence of the coast. Description from source maps: Newbury Neck Quadrangle, and Salsbury Cove Quadrangle

Pp - Presumpscot Formation (Pleistocene)
Fine-grained marine mud (silt and clay with sandy lenses) commonly containing gravel dropstones and, more rarely, marine shell fossils. The mud was deposited in deeper, quieter water during the postglacial marine submergence of the coast. The most extensive such deposits are around Great Meadow, in the lower part of Otter Creek north of Otter Cove, and in the lower part of Hunters Brook. Description from source map: Seal Harbor Quadrangle

Pp - Presumpscot Formation (Pleistocene)
Fine-grained marine mud (silt and clay with sandy lenses) commonly containing gravel dropstones and, more rarely, marine shell fossils. The mud was deposited in deeper, quieter water during the marine submergence of the coast. Description from source map: Southwest Harbor Quadrangle

PEt - Till (Pleistocene)

Pt - Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice; typically 1-5 m (3-15 ft) thick. Land surface is often more bouldery than the underlying till due to removal of smaller size surface material by running water or waves. Description from source maps: Bar Harbor Quadrangle (southwestern portion), Bartlett Island Quadrangle (eastern portion), and Bass Harbor Quadrangle (northern portion) See Pt - Thick Till below.

Pt - Thick Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice having a thickness of 3-10 m (10-33 ft). Land surface is often more bouldery than the underlying till due to removal of smaller surface material by running water or waves. Description from source map: Bar Harbor Quadrangle (southwestern portion) See Pt - Till above.

Pt - Till (Pleistocene)
Light- to dark-gray nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy to silty diamicton containing some gravel. Generally found under most other deposits. Description from source map: Newbury Neck Quadrangle

Pt - Thin Till (Pleistocene)

Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by the glacial ice. Typically less than 3 m (10 ft) thick; may have bedrock outcrops projecting through the till. Land surface is often more bouldery than the underlying till due to removal of smaller surface material by running water or waves. Description from source map: Salsbury Cove Quadrangle

Pt - Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice; typically 1-5 m (3-15 ft) thick. Land surface is often more bouldery than the underlying till due to removal of smaller-size surface material by running water or waves. The most extensive deposits of till, often forming a series of moraine ridges, are in the headwaters of Kebo Brook, Otter Creek, and Hunters Brook. Description from source map: Seal Harbor Quadrangle See Pt - Thick Till below.

Pt - Thick Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice and having a thickness of 3-10 m (10-33 ft). Land surface is often more bouldery than the underlying till due to removal of smaller surface material by running water or waves. Description from source map: Seal Harbor Quadrangle See Pt - Till above.

Pt - Thin Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice, with a thickness of less than 3 m (10 ft) and with bedrock outcrops often projecting through the till. Land surface is often more bouldery than the underlying till due to removal of smaller surface material by running water or waves. Description from source map: Southwest Harbor Quadrangle See Pt - Thick Till below.

Pt - Thick Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by glacial ice, with a thickness of 3-10 m (10-33 ft). Land surface is often more bouldery than the underlying till due to removal of smaller surface material by running water or waves. From well data, the thickest till (18-21 m [60-70 ft]) is along the crest of Beech Hill (ridge projecting north of Carter Nubble). Other thick till areas probably exist in the buried valleys southeast of Jordan Pond, southeast of the Hadlock Ponds and south of Echo Lake. Description from source map: Southwest Harbor Quadrangle See PT - Thin Till above.

Pt - Thin Till (Pleistocene)
Poorly sorted mixture of gravel, sand, silt and clay (diamict) deposited directly by the glacial ice; typically 1-5 m (3-15 ft) thick. Land surface is often more bouldery than the underlying till due to removal of smaller size surface material by running water or waves. There is often a thin layer of marine mud on top of the till in topographically low areas. Description from source map: Swans Island Quadrangle (northeastern portion)

PEtd - Thin drift, undifferentiated (Pleistocene)

Ptd - Thin drift, undifferentiated (Pleistocene)
Areas of thin patchy sediment cover on bedrock, which are unmapped or have few exposures of surficial materials. The sediments may include till, Presumpscot Formation, and/or marine nearshore deposits. Description from source map: Newbury Neck Quadrangle

rk - Bedrock (Pleistocene and pre-Pleistocene)

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial till or marine mud materials overlie the bedrock

between knobs. Description from source maps: Baker Island Quadrangle (northern portion), and Swans Island Quadrangle (northeastern portion)

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas on the map shown as light gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits. Description from source map: Bar Harbor Quadrangle (southwestern portion)

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, glaciomarine, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits. Description from source map: Bartlett Island Quadrangle (eastern portion)

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, glaciomarine, and/or colluvial materials overlie the bedrock between knobs. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits. Description from source map: Bass Harbor Quadrangle (northern portion)

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Thin (.3-1 m [1-3 ft]) glacial, glaciomarine, and/or colluvial materials overlie the bedrock between knobs. Description from source map: Newbury Neck Quadrangle

rk - Bedrock (Pleistocene and pre-Pleistocene)
Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting though the glacial deposits. Description from source maps: Salsbury Cove Quadrangle, Seal Harbor Quadrangle, and Southwest Harbor Quadrangle

Of note, unit descriptions for rk (Bedrock) that mention "areas shown in gray ..." denote a varying characteristic of the unit that was not present in the source GIS data, and therefore not present in the GRI digital geologic-GIS data. See the individual source map publications for this additional information.

Photograph Localities

On each source map there are photograph figures with associated figure caption text. On five of the nine source maps, Baker Island, Bartlett Island, Bar Harbor, Bass Harbor and Swans Island, corresponding localities for these photographs exist within their geologic map extent. These localities were captured on each of these source maps by the GRI as they were not present in the source GIS data. These localities are present in the GRI digital geologic-GIS data in the Geologic Observation Localities feature class. Locations are "approximate", and no information on the map or with the photograph figure caption denotes a direction of the photograph.

Baker Island Photographs

Figure 1: (Baker Island Quadrangle)

Figure 1: West shore of Baker Island showing intertidal granite ledges with light gray boulder pile "seawall" beach at the high tide line on the right. In the background on the left is a low green strip, Little Cranberry Island. On the skyline are the glacially sculpted mountains on Mount Desert Island.

Graphic from source map: Baker Island Quadrangle (northern portion)

Bar Harbor Photographs

Figure 1: (Bar Harbor Quadrangle)

Figure 1: Glacially streamlined landscape of rounded mountains and deeply scoured notches. From left to right, Champlain Mountain, Huguenot Head, Dorr Mountain, and Cadillac Mountain. View south across the Town of Bar Harbor from top of a knob on Bar Island, spring 2013.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 2: (Bar Harbor Quadrangle)

Figure 2: Balance Rock, a large glacial erratic of Lucerne granite from the Lucerne Hills, 40 km (30 mi) to the northwest. In the background are the steep south faces of the Porcupine Islands, a line of glacially sculpted hills or roche mountonnées that are gentler on the north side and steeper on the south side. View to northeast from the Shore Path in Bar Harbor, spring 2013.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 3: (Bar Harbor Quadrangle)

Figure 3: Beach of pebbles, cobbles, and boulders with a wave-cut scarp on the left in marine mud - clayey silt of the Presumpscot Formation. On the right is Frenchman Bay with the glacially sculpted Gouldsboro hills on the skyline. View to north from north of Lookout Point.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 4: (Bar Harbor Quadrangle)

Figure 4: View of the north shore of Hulls Cove showing the present beach with a wave-cut scarp in beach gravels above present sea level. Those gravels were deposited as sea level fell from a postglacial high of 70 m (230 ft) above present to 55 m (180 ft) below present as the crust rebounded from removal of the weight of the continental glacier's ice.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 5: (Bar Harbor Quadrangle)

Figure 5: Cromwell Cove (upper left), a pocket sand beach at the head of the cove where Kebo Brook enters the sea.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 6: (Bar Harbor Quadrangle)

Figure 6: Present-day sea cave with rounded cobbles jammed into the back of the cave. Similar features are also observed inland up to elevations of 70 m (230 ft) above present sea level, due to postglacial uplift of the land following retreat of the last glacial ice sheet.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 7: (Bar Harbor Quadrangle)

Figure 7: Rounded beach gravel at elevation of 61 m (200 ft) at the base of Great Hill on the west side of the Town of Bar Harbor. The beach formed in late-glacial time, when relative sea level was higher than today.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Figure 8: (Bar Harbor Quadrangle)

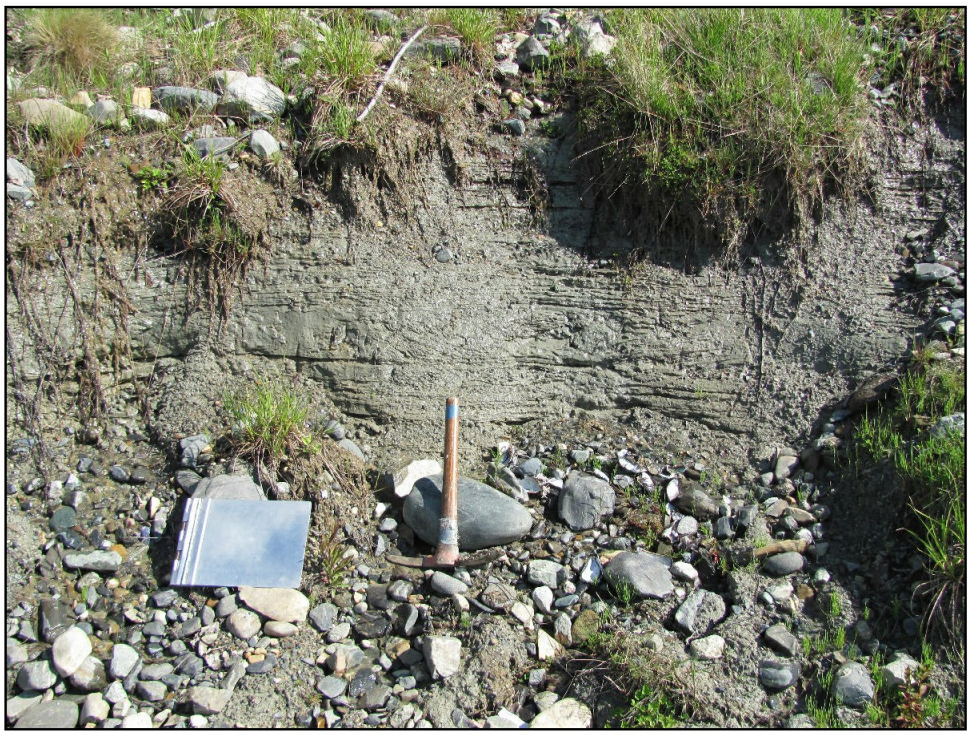


Figure 8: Layers in marine mud, clayey silt of the Presumpscot Formation, on the south shore of Bar Island. Deposited during the postglacial marine submergence of the coast.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Bartlett Island Photographs

Figure 1: (Bartlett Island Quadrangle)

Figure 1: View south across the western part of Long Pond to the glacial sculpted ridges on the western part of Mount Desert Island. From left to right are Beech, Mansell, and Bernard Mountains.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 2: (Bartlett Island Quadrangle)

Figure 2: Large glacial erratic boulder, 5.5 m long and 2.3 m high, of Ellsworth schist projecting from a glacial till and marine mud mantled area (gray clipboard on boulder for scale).

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 3: (Bartlett Island Quadrangle)

Figure 3: Glacially sculpted bedrock knob or "whaleback" at Seal Cove. Ice flow was from left to right, grinding a gentle “up-flow” slope and plucking a steep “down-ice” slope on the whaleback (also called a roche mountonnée).

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 4: (Bartlett Island Quadrangle)

Figure 4: Glacial crescentic fracture "trains" (series of crescentic-shaped fractures one after the other spaced a few millimeters apart). Formed by rock fragments embedded in the base of the glacier being both pressed into and dragged across the bedrock surface. The alternating stick-slip motion of the rocks produced the individual crescent-shaped fractures. Ice flow was left-to-right toward the open end of the crescents.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 5: (Bartlett Island Quadrangle)

Figure 5: Wave-cut scarp 8.2 m (27 ft) high, exposing beach gravel overlying glacial till. Starting from the top, 0.6 m (2 ft) of brown pebbly coarse sand is underlain by 1.5 m (5 ft) of olive-green to brown weakly-stratified stony sandy diamict that is in turn underlain by 4.5 m (15 ft) of compact olive-green to gray fine sandy, sparsely stony diamict. Lowest 1.5 m (5 ft) is covered by vegetation and debris from above.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 6: (Bartlett Island Quadrangle)

Figure 6: Wave-cut scarp 8 m (26 ft) high exposing olive-green to gray fine sandy, sparsely stony diamict (glacial till)(gray metal clipboard for scale). Exposure emphasizes that the till has few cobble to boulder-size clasts per unit volume. There is a concentration of cobbles and boulders at the ground surface due to erosion by wave wash removing the finer material as sea level fell past this elevation.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 7: (Bartlett Island Quadrangle)

Figure 7: Stream bank exposure of beach sand overlying marine mud. Starting from the top, 0.6 m (2 ft) of brown pebbly coarse sand is underlain by 1.5 m (5 ft) of brown medium to coarse sand that in turn is underlain by 2.4 m (8 ft) of interbedded thinly layered clayey silt and silt with common pebble to cobble-size dropstones (Presumpscot Formation) that in turn is underlain by bedrock. Several thin organic rich layers are present within the interbedded clayey silts and silts.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Figure 8: (Bartlett Island Quadrangle)

Figure 8: Deformed layering of interbedded clayey silts and silts (Presumpscot Formation marine mud). Exposed at base of 4.5-6.0 m (15-20 ft) high wave-cut scarp at the head of Sawyers Cove.

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Bass Harbor Photographs

Figure 1: (Bass Harbor Quadrangle)

Figure 1: Polish and striations resulting from glacial scour on Seawall granite along Ship Harbor trail. The polished surface is being eroded by wave attack.

Graphic from source map: Bass Harbor Quadrangle (northern portion)

Figure 2: (Bass Harbor Quadrangle)

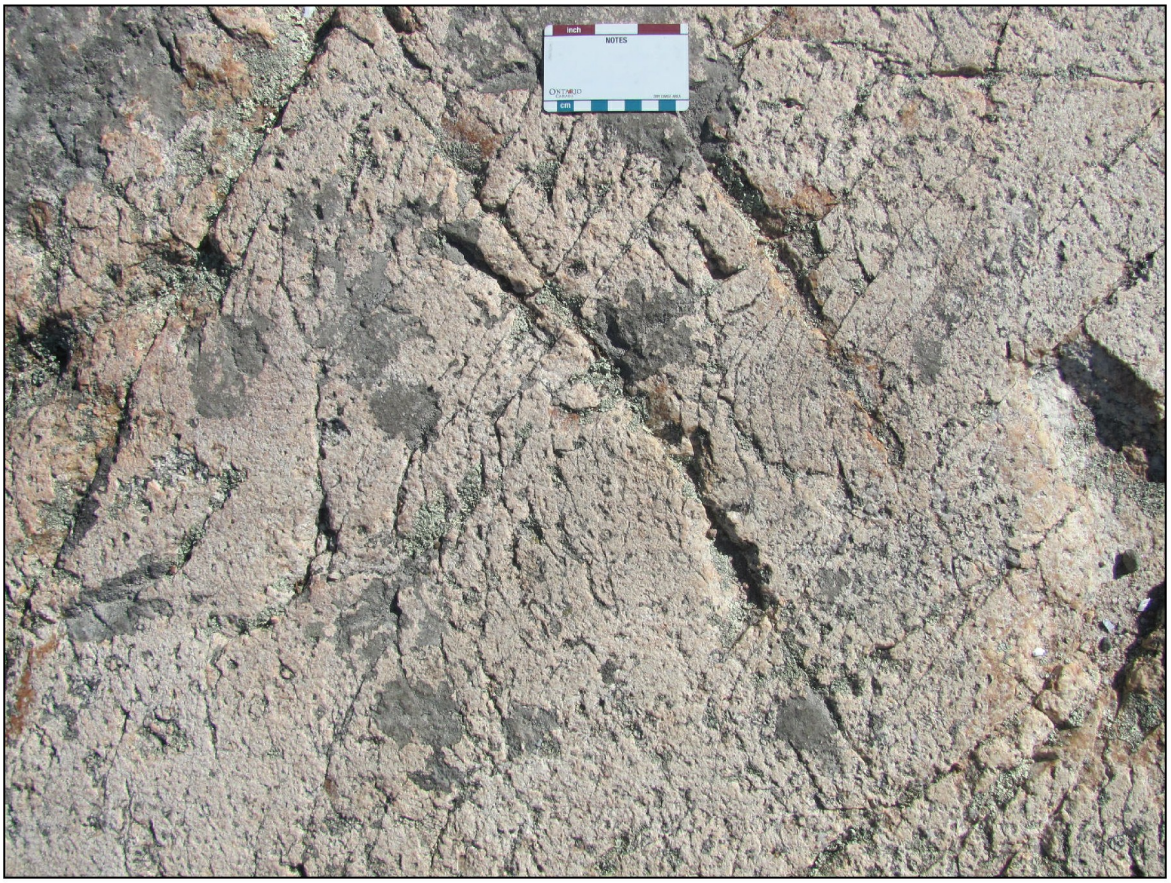


Figure 2: Glacial crescentic fracture "trains". This series of crescent-shaped fractures are aligned one after the other spaced 1-2 cm apart (1 cm is length of each green bar on scale card). Formed by rock embedded in the base of the glacier being both pressed into and dragged along the bedrock surface. The alternating stick-slip motion of the rocks produced the individual crescent-shaped fractures. Ice flow is toward the open end of the crescents.

Graphic from source map: Bass Harbor Quadrangle (northern portion)

Newbury Neck, Salsbury Cove and Swan Island Photographs

Photographs present on Newbury Neck, Salsbury Cove and Swan Island were all the same, and thus are presented just once.

Figure 1: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 1: "The Bubbles" and Jordan Pond in Acadia National Park. These hills and valleys were sculpted by glacial erosion. The pond was dammed behind a moraine ridge during retreat of the ice sheet.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 2: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 2: Daggett's Rock in Phillips. This is the largest known glacially transported boulder in Maine. It is about 100 feet long and estimated to weigh 8,000 tons.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 3: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 3: Granite ledge in Westbrook, showing polished and grooved surface resulting from glacial abrasion. The grooves and shape of the ledge indicate ice flow toward the southeast.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 4: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 4: Glaciomarine delta in Franklin, formed by sand and gravel washing into the ocean from the glacier margin. The flat delta top marks approximate former sea level. Kettle hole in foreground was left by melting of ice.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 5: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 5: Esker cutting across Kezar Five Ponds, Waterford. The ridge consists of sand and gravel deposited by meltwater flowing in a tunnel beneath glacial ice.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 6: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 6: Aerial view of moraine ridges in blueberry field, Sedgwick (note dirt road in upper right for scale). Each bouldery ridge marks a position of the retreating glacier margin. The ice receded from right to left.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 7: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 7: Sand dune in Wayne. This and other "deserts" in Maine formed as windstorms in late-glacial time blew sand out of valleys, often depositing it as dune fields on hillsides downwind. Some dunes were reactivated in historical time when grazing animals stripped the vegetation cover.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Figure 8: (Newbury Neck, Salsbury Cove and Swan Island Quadrangles)

Figure 8: Songo River delta and Songo Beach, Sebago Lake State Park, Naples. These deposits are typical of geological features formed in Maine since the Ice Age.

Graphic from source maps: Newbury Neck Quadrangle, Salsbury Cove Quadrangle and Swans Island Quadrangle (northeastern portion)

Seal Harbor Photographs

Figure 1: (Seal Harbor Quadrangle)

Figure 1: Glacial sculpting of "whale back" knobs on a basalt dike on the Cadillac Mountain south ridge. View to the south along the gentle "up-ice" scoured parts of the knobs with the steep "down-ice" plucked parts hidden from view.

Graphic from source map: Seal Harbor Quadrangle

Figure 2: (Seal Harbor Quadrangle)

Figure 2: Cliff on the east side of Champlain Mountain steepened by glacial plucking. Postglacial frost splitting of joint blocks from the cliff has deposited a pile of blocks (talus) at the base of the cliff. View westward from Cranberry Hill.

Graphic from source map: Seal Harbor Quadrangle

Figure 3: (Seal Harbor Quadrangle)

Figure 3: Glacially polished and striated ledge surface that cuts through and highlights the edges of Shatter Zone fragments in the

* later text omitted from figure on source map

Graphic from source map: Seal Harbor Quadrangle

Figure 4: (Seal Harbor Quadrangle)

Figure 4: Boulder beach berm at an elevation of 67 m (220 ft) at the east base of Eagles Crag on the Cadillac Mountain south ridge. View to north along the crest of the berm marking the highest level of immediate postglacial marine submergence of the area.

Graphic from source map: Seal Harbor Quadrangle

Figure 5: (Seal Harbor Quadrangle)

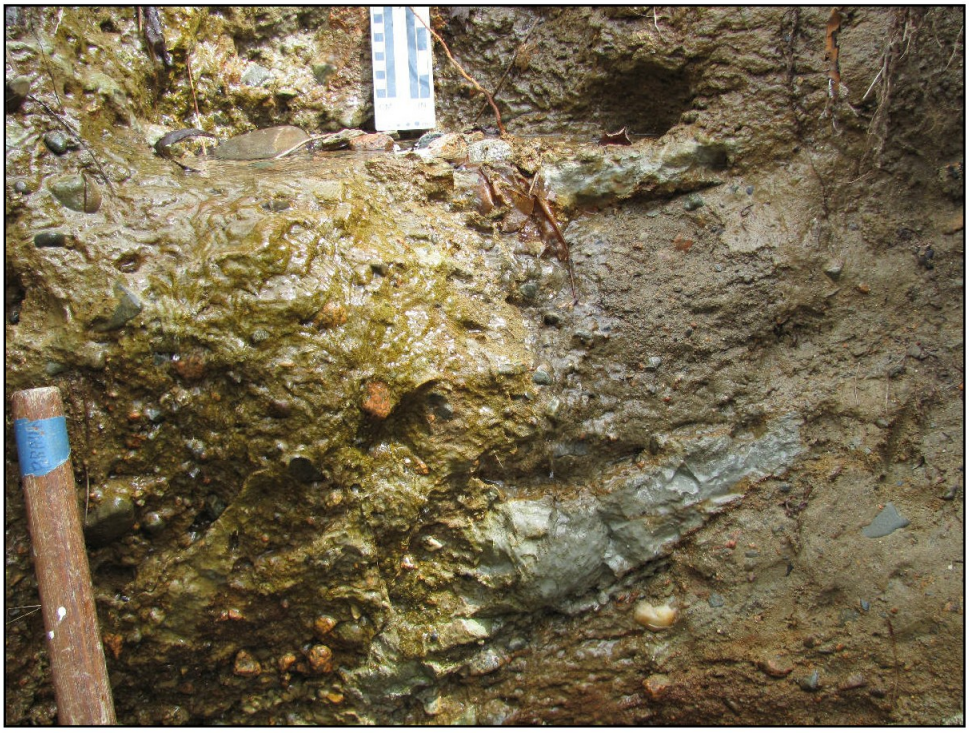


Figure 5: Beach deposit at an elevation of 47 m (155 ft) consisting of pebbly sand containing a flat angular clast of clayey silt marine mud (Presumpscot Formation). The mud had been deposited when sea level was up to a maximum of 20 m (65 ft) above that elevation,. As the land rebounded out of the ocean from the removal of the weight of the glacial ice, the falling sea level formed a beach at this site. The waves ripped up the semi-consolidated mud on the sea floor and the clast was incorporated in the gravelly sand.

Graphic from source map: Seal Harbor Quadrangle

Figure 6: (Seal Harbor Quadrangle)

Figure 6: South to north view of Otter Creek cutting into glacial deposits. Exposure is 45-50 m (150-165 ft) long and 6-10 m (20-30 ft) high. Gray glaciomarine clayey silt with dropstones (Presumpscot Formation), interbedded with thin gravelly sand layers and diamict lenses, overlie (cap) yellowish to reddish-yellow glaciofluvial sandy gravel that in turn overlies greenish-gray glacial till (in lower right part of stream bank).

Graphic from source map: Seal Harbor Quadrangle

Figure 7: (Seal Harbor Quadrangle)

Figure 7: Closer view of a 7 m (23 ft) high by 10 m (30 ft) wide area in the middle the exposure shown in Figure 6. At the upper right an orange notebook marks a cobbly diamict lens in the marine mud. Near the center a rectangular scale bar marks the contact of stratified clayey silt with underlying yellowish oxidized sandy gravel.

Graphic from source map: Seal Harbor Quadrangle

Figure 8: (Seal Harbor Quadrangle)

Figure 8: Close-up of the northern or distal part of the exposure in Figure 6. Interbedded layers of gray clayey silt and yellowish to reddish sand are steeply tilted down to the northeast. The tilting is probably due to postglacial slumping of the area as Otter Creek cut down into the deposits. The landscape behind the exposure shows arcuate slump headwalls.

Graphic from source map: Seal Harbor Quadrangle

Southwest Harbor Photographs

Figure 1: (Southwest Harbor Quadrangle)

Figure 1: "The Bubbles" and Jordan Pond in Acadia National Park. The rounded hills and the valley occupied by the Pond were sculpted by glacial erosion. The view is from the moraine ridge, deposited during glacial retreat, which dams the Pond.

Graphic from source map: Southwest Harbor Quadrangle

Figure 2: (Southwest Harbor Quadrangle)

Figure 2: View from Sutton Island of the glacially sculpted landscape of rounded summits and a U-shaped trough. From left to right, Penobscot Mountain – Jordan Ridge, The Bubbles, and Pemetic Mountain. In the foreground is Bracey Cove with the Jordan Valley trough behind it with The Bubbles in its center. Jordan Pond (Figure 1) is out of sight below The Bubbles.

Graphic from source map: Southwest Harbor Quadrangle

Figure 3: (Southwest Harbor Quadrangle)

Figure 3: View to the north of the glacial trough occupied by Long Pond with the steepened slope of Mansell Mountain on the left and Beech Mountain on the right.

Graphic from source map: Southwest Harbor Quadrangle

Figure 4: (Southwest Harbor Quadrangle)

Figure 4: View from Beech Cliff through the glacial trough valley bounded by Saint Sauveur Mountain on the left and Canada Cliff on the right out to Great Cranberry Island on the left and Manset – Southwest Harbor on the right. At lower left is the man made beach at the south end of Echo Lake in Acadia National Park. In the middle ground as the valley opens out are moraine ridges covered by green spruce trees separated by wetlands covered red maple trees.

Graphic from source map: Southwest Harbor Quadrangle

Figure 5: (Southwest Harbor Quadrangle)

Figure 5: Glacial striations trending southeast at a bearing of 154° obliquely crossing layering in volcanic rock.

Graphic from source map: Southwest Harbor Quadrangle

Figure 6: (Southwest Harbor Quadrangle)

Figure 6: Wave washed moraine ridge trending to the southwest from the east shore of Somes Sound. In background is one of the larger moraine ridges at the entrance to Somes Sound.

Graphic from source map: Southwest Harbor Quadrangle

Figure 7: (Southwest Harbor Quadrangle)

Figure 7: Wave eroded moraine ridge cross-section on the Somes Sound side of the village of Northeast Harbor. The moraine ridge trends perpendicular to shore and is twenty to twenty-five feet high, gray metal clip board and rock hammer for scale. The slope shows how stony the glacial till is that forms the ridge.

Graphic from source map: Southwest Harbor Quadrangle

Figure 8: (Southwest Harbor Quadrangle)

Figure 8: Exposure of tilted layers of sand and gravel in an ice contact stratified drift deposit in the wave washed large scale moraine ridge south of Long Pond. Outcrop is about twenty feet high, on left is gray metal clip board for scale.

Graphic from source map: Southwest Harbor Quadrangle

GRI Ancillary Source Map Information

The following sections present ancillary source map information associated with source maps used to produce the 1:24,000 scale GRI digital surficial geologic-GIS map for Acadia National Park, Maine (ACAD). Photograph figures present on the source maps, many of which have corresponding locations in the GRI digital geologic-GIS data, are presented in the Photograph Localities section of this document.

Of added note, as every source map legend consisted of detailed information pertaining to features present on the source map, and therefore in the GRI digital geologic-GIS data, users are encouraged to review these legends for additional information concerning mapped (non-unit) features. Some of the information concerning a feature is present in the Notes field of within the GIS data, however, often the information was too lengthy to fully include. This is particularly true for feature types present in the Surface Area Features data layer (e.g., bedrock outcrop, boulder field, disturbed earth and areas denoting thin or thick till).

Lastly, repeated on every or nearly every source maps was the following information: text on the Uses of Surficial Geology Maps and related reference, a disclaimer on responsible use pertaining to natural resources, text on the Surficial Geology of Maine and related references and an explanation of symbols denoting unit age. Rather then repeat this information with every or nearly every source map ancillary information section this information is instead presented below just once.

Uses of Surficial Geology Maps

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site.

References for Uses of Surficial Geology Maps

Lowell, T.V, 1980, Late Wisconsin ice extent in Maine: evidence from Mount Desert Island and the Saint John River area: unpublished M.S. thesis, University of Maine, Orono, 180 p.

Norton, S. A. and others, 2010, Early post-glacial and Holocene history of the Sargent Mountain pond watershed, as seen from the bottom of Sargent Mountain pond, Acadia National Park, Maine: in Gerbi, C., Yates, M., Kelley, A., and Lux, D., eds., Guidebook for field trips in coastal and interior Maine: 102nd NEIGC meeting, p. 45-60.

Disclaimer

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Surficial Geology of Maine

Continental glaciers like the ice sheet now covering Antarctica probably extended across Maine several times during the Pleistocene Epoch, between about 2.5 million and 11,700 years ago. The slow-moving ice superficially changed the landscape as it scraped over mountains and valleys, eroding and transporting boulders and other rock debris for miles. The sediments that cover much of Maine are largely the product of glaciation. Glacial ice deposited some of these materials, while others washed into the sea or accumulated in meltwater streams and lakes as the ice receded. Earlier stream patterns were disrupted, creating hundreds of ponds and lakes across the state. The map at left shows the pattern of glacial sediments in this quadrangle.

The most recent "Ice Age" in Maine began about 30,000 years ago, when an ice sheet spread southward over New England (Stone and Borns, 1986). During its peak, the ice was several thousand feet thick and covered the highest mountains in the state. The weight of this huge glacier actually caused the land surface to sink hundreds of feet. Rock debris frozen into the base of the glacier abraded the bedrock surface over which the ice flowed. The grooves and fine scratches (striations) resulting from this scraping process are often seen on freshly exposed bedrock, and they are important indicators of the direction of ice movement. Erosion and sediment deposition by the ice sheet combined to give a streamlined shape to many hills, with their long dimension parallel to the direction of ice flow. Some of these hills (drumlins) are composed of dense glacial sediment (till) plastered under great pressure beneath the ice.

A warming climate forced the ice sheet to start receding as early as 21,000 calendar years ago, soon after it reached its southernmost position on Long Island (Ridge, 2004). The edge of the glacier withdrew from the continental shelf east of Long Island and reached the present position of the Maine coast by about 16,000 years ago (Borns and others, 2004). Even though the weight of the ice was removed from the land surface, the Earth's crust did not immediately spring back to its normal level. As a result, the sea flooded much of southern Maine as the glacier retreated to the northwest. Ocean waters extended far up the Kennebec and Penobscot valleys, reaching present elevations of up to 420 feet in the central part of the state.

Great quantities of sediment washed out of the melting ice and into the sea, which was in contact with the receding glacier margin. Sand and gravel accumulated as deltas and submarine fans where streams discharged along the ice front, while the finer silt and clay dispersed across the ocean floor. The shells of clams, mussels, and other invertebrates are found in the glacial-marine clay that

blankets lowland areas of southern Maine. Ages of these fossils tell us that ocean waters covered parts of Maine until about 13,000 years ago. The land rebounded as the weight of the ice sheet was removed, forcing the sea to retreat.

Meltwater streams deposited sand and gravel in tunnels within the ice. These deposits remained as ridges (eskers) when the surrounding ice disappeared. Maine's esker systems can be traced for up to 100 miles, and are among the longest in the country.

Other sand and gravel deposits formed as mounds (kames) and terraces adjacent to melting ice, or as outwash in valleys in front of the glacier. Many of these water-laid deposits are well layered, in contrast to the chaotic mixture of boulders and sediment of all sizes (till) that was released from dirty ice without subsequent reworking. Ridges consisting of till or washed sediments (moraines) were constructed along the ice margin in places where the glacier was still actively flowing and conveying rock debris to its terminus. Moraine ridges are abundant in the zone of former marine submergence, where they are useful indicators of the pattern of ice retreat.

The last remnants of glacial ice probably were gone from Maine by 12,000 years ago. Large sand dunes accumulated in late-glacial time as winds picked up outwash sand and blew it onto the east sides of river valleys, such as the Androscoggin and Saco valleys. The modern stream network became established soon after deglaciation, and organic deposits began to form in peat bogs, marshes, and swamps. Tundra vegetation bordering the ice sheet was replaced by changing forest communities as the climate warmed (Davis and Jacobson, 1985). Geologic processes are by no means dormant today, however, since rivers and wave action modify the land, and worldwide sea level is gradually rising against Maine's coast.

References for Maine Surficial Geology

Borns, H. W., Jr., Doner, L. A., Dorion, C. C., Jacobson, G. L., Jr., Kaplan, M. R., Kreutz, K. J., Lowell, T. V., Thompson, W. B., and Weddle, T. K., 2004, The deglaciation of Maine, U.S.A., in Ehlers, J., and Gibbard, P. L., eds., Quaternary Glaciations - Extent and Chronology, Part II: North America: Amsterdam, Elsevier, p. 89-109.

Davis, R. B., and Jacobson, G. L., Jr., 1985, Late-glacial and early Holocene landscapes in northern New England and adjacent areas of Canada: Quaternary Research, v. 23, p. 341-368.

Ridge, J. C., 2004, The Quaternary glaciation of western New England with correlations to surrounding areas, in Ehlers, J., and Gibbard, P. L., eds., Quaternary Glaciations – Extent and Chronology, Part II: North America: Amsterdam, Elsevier, p. 169-199.

Stone, B. D., and Borns, H. W., Jr., 1986, Pleistocene glacial and interglacial stratigraphy of New England, Long Island, and adjacent Georges Bank and Gulf of Maine, in Sibrava, V., Bowen, D. Q., and Richmond, G. M. (editors), Quaternary glaciations in the northern hemisphere: Quaternary Science Reviews, v. 5, p. 39-52.

Age Explanation

Note: The first letter of each map unit indicates the general age of the unit: H = Holocene (postglacial deposit; formed during the last 11,700 years). Q = Quaternary (deposit of uncertain age; usually late-glacial and/or postglacial). P = Pleistocene (deposit formed during glacial to late-glacial time, prior to 11,700 yr B.P. [years before present]).

Baker Island Quadrangle (northern portion)

The formal citation for this source.

Braun, Duane D., 2016, Surficial Geology of the northern portion of the Baker Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-13, scale 1:24,000 (*GRI Source Map ID 76292*).

Prominent graphics and text associated with this source.

Map Legend

Bedrock - Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial till or marine mud materials overlie the bedrock between knobs.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landform.

Marine beach ridge or strandline - Subtle ridge or bench feature with an abrupt steepening of slope in the downslope direction in an area of Pleistocene marine shoreline deposits. A strandline marks a temporary pause in sea-level lowering or an especially stormy period as the sea receded.

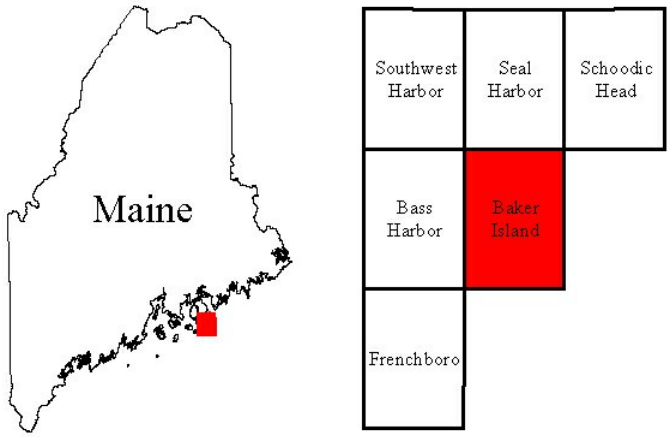
Glacial striation locality - Arrow shows ice-flow direction inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction.

Crescentic mark - Arrow shows direction of ice-flow. Dot indicates point of observation. Number is azimuth (in degrees) of flow direction.

Photo locality

Graphic from source map: Baker Island Quadrangle (northern portion)

Index Map



Graphic from source map: Baker Island Quadrangle (northern portion)

Sources of Map Information

Surficial geologic mapping of the Baker Island quadrangle was conducted by Duane D. Braun during the 2014 field season.

Text from source map: Baker Island Quadrangle (northern portion)

Sources of Related Information

Braun, Duane D., 2015, Surficial materials of the northern portion of the Baker Island quadrangle, Maine: Maine Geological Survey, Open-File Map 15-22, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Baker Island Quadrangle (northern portion)

Figure 2: Baker Island NW Hillshade

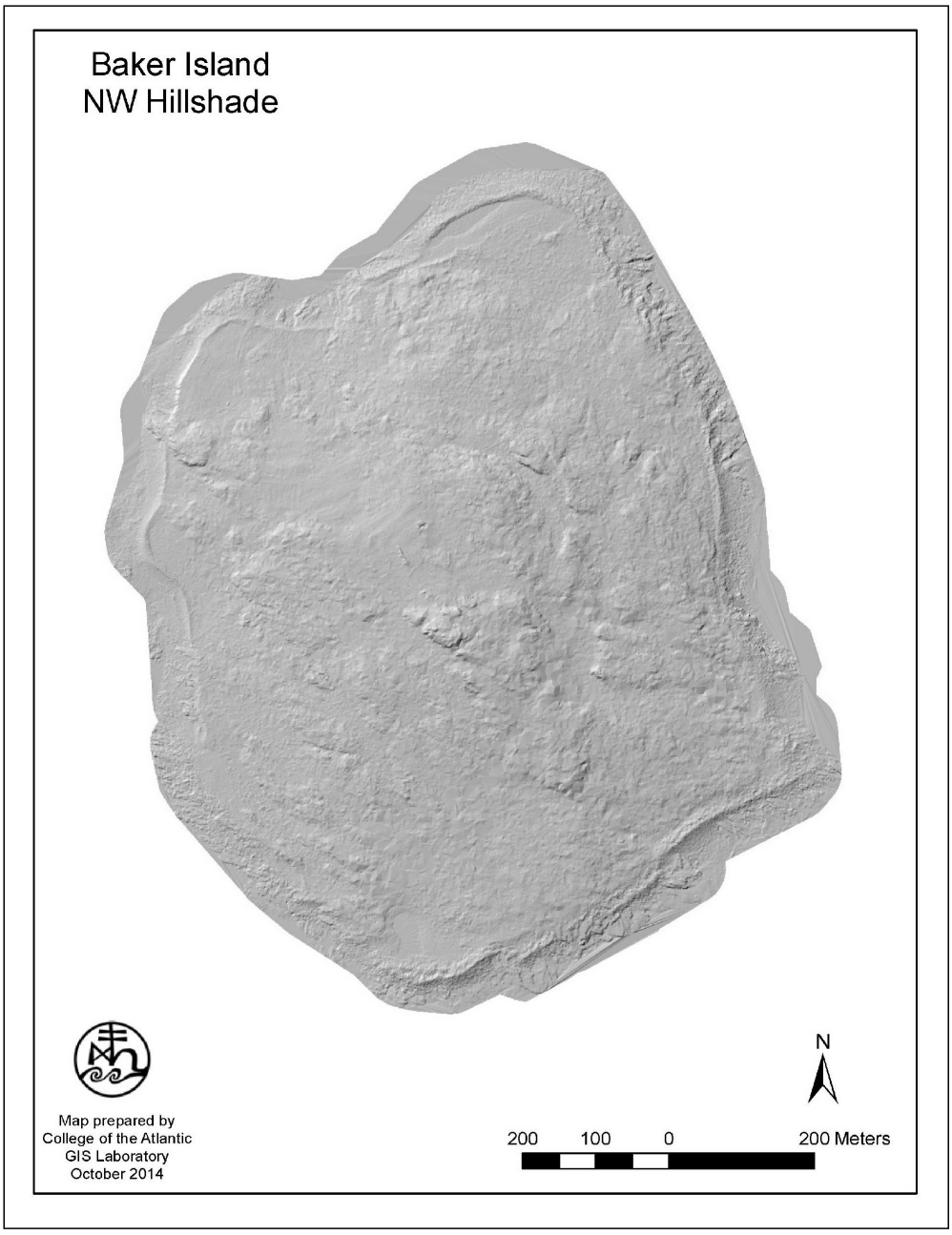


Figure 2: Shaded relief Lidar image of Baker Island with illumination from the northwest. The interior of the island is dominated by bedrock ledges while the periphery of the island is ringed by cobble-boulder ridges built by storm action. On the east and south sides of the island (exposed to the open ocean) the ridge is made of angular blocks of granite. On the west and north sides of the island (more protected from wave attack) the ridge is made of rounded boulders and some angular blocks. On the northwest part of the island there are beach deposits from sea levels higher than present, where the ground surface is smoother with faint lines representing beach strandlines. Image courtesy of the College of Atlantic GIS laboratory.

Graphic from source map: Baker Island Quadrangle (northern portion)

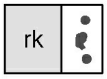
Bar Harbor Quadrangle (southwestern portion)

The formal citation for this source.

Braun, Duane D., 2016, Surficial Geology of the southwestern portion of the Bar Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-19, scale 1:24,000 (*GRI Source Map ID 76295*).

Prominent graphics and text associated with this source.

Map Legend



Bedrock - Areas on the map shown as light gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is a 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Upper limit of marine submergence - Shows highest elevation of sea level immediately following recession of the glacier from the area. This elevation is approximate, based on glacial-marine delta elevations in the region (~67-73 m [~220-240 ft] above sea level; Thompson and others, 1989, figure 2 contours). Everywhere below this elevation wave erosion has cut into the glacial deposits. Where such deposits were thin, only lags of large boulders have been left on bedrock ledges. Where such deposits were thicker, a thin 0.3-1 m (1-3 ft) deposit of gravel and sand, often with a boulder surface, overlies other glacial deposits. This thin "wave wash veneer" is not shown on the map, only the underlying material.

Small moraine ridge - Ridge of till and/or sand and gravel deposited and/or deformed by glacial ice; about 1-5 m (3-15 ft) high and 5-30 m (15-100 ft) wide. Such ridges probably represent annual "push moraines".

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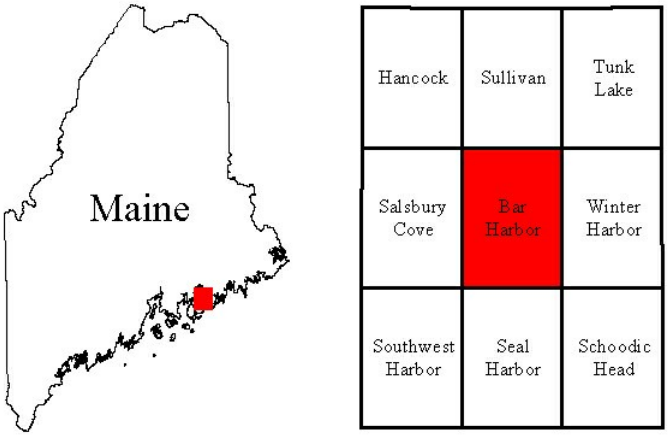
Glacial striation locality - Arrow shows ice-flow direction(s) inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction. Where relative ages are known, flagged arrow shows older flow direction.

Photo locality.

Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Index Map



Graphic from source map: Bar Harbor Quadrangle (southwestern portion)

Sources of Map Information

Surficial geologic mapping of the Bar Harbor quadrangle was conducted by Duane D. Braun during the 2013 field season.

Text from source map: Bar Harbor Quadrangle (southwestern portion)

Sources of Related Information

Braun, Duane D., 2015, Surficial materials of the southwestern portion of the Bar Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 15-16, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Bar Harbor Quadrangle (southwestern portion)

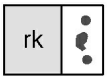
Bartlett Island Quadrangle (eastern portion)

The formal citation for this source.

Braun, Duane D., 2016, Surficial Geology of the eastern portion of the Bartlett Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-16, scale 1:24,000 (*GRI Source Map ID 76290*).

Prominent graphics and text associated with this source.

Map Legend



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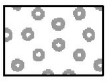

Boulder surface mantle - Area of boulders covering the ground surface on top of other material such as till or bedrock. Boulders typically cover 50 to 100 percent of the ground surface. Average boulder size is 0.6 to 1 m (2-3 ft) and ranges from 0.3 to 5 m (1 to 15 ft).

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is a 3-6 m (10-20 ft) to locally as much as 10-15 m (30- 50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

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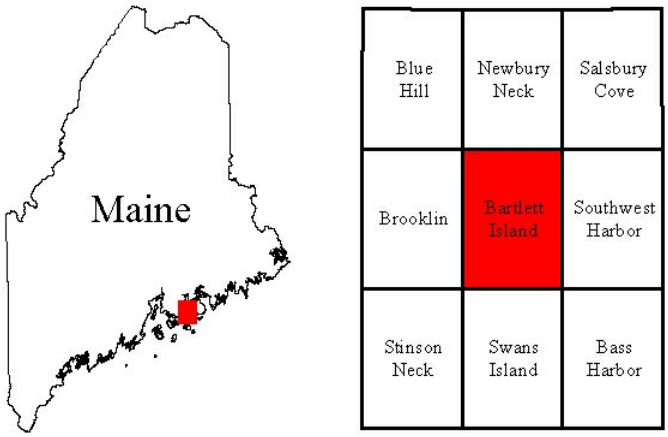
Crescentic mark - Arrow shows direction of ice-flow. Dot indicates point of observation. Number is azimuth (in degrees) of flow direction.

② **Photo locality**

Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Index Map



Graphic from source map: Bartlett Island Quadrangle (eastern portion)

Sources of Map Information

Surficial geologic mapping of the Bartlett Island quadrangle was conducted by Duane D. Braun during the 2014 field season.

Text from source map: Bartlett Island Quadrangle (eastern portion)

Sources of Related Information

Braun, Duane D., 2015, Surficial materials of the eastern portion of the Bartlett Island quadrangle, Maine: Maine Geological Survey, Open-File Map 15-19, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Bartlett Island Quadrangle (eastern portion)

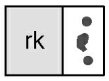
Bass Harbor Quadrangle (northern portion)

The formal citation for this source.

Braun, Duane D., 2016, Surficial Geology of the northern portion of the Bass Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-14, scale 1:24,000 (*GRI Source Map ID 76293*).

Prominent graphics and text associated with this source.

Map Legend



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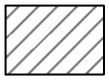


Disturbed earth - Original topography of the area has been disturbed by gravel pit excavation.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30- 50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Small moraine ridge - Ridge of till and/or sand and gravel deposited and/or deformed by glacial ice. Such ridges probably represent annual "push moraines".

Marine beach ridge or strandline - Subtle ridge or bench feature with an abrupt steepening of slope in the downslope direction in an area of Pleistocene marine shoreline deposits. A strandline marks a temporary pause in sea-level lowering or an especially stormy period as the sea receded.

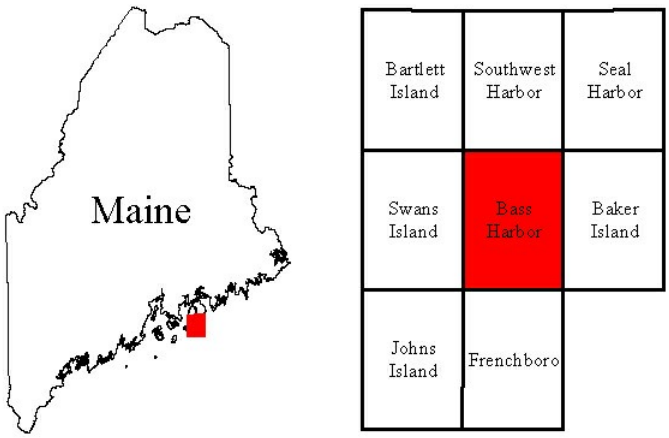
Glacial striation locality - Arrow shows ice-flow direction(s) inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction. Where relative ages are known, flagged arrow shows older flow direction.

Other glacial erosion marks on bedrock - Includes crescentic marks and stoss-and-lee topography. Arrow shows direction of ice-flow. Dot indicates point of observation.

② **Photo locality**

Graphic from source map: Bass Harbor Quadrangle (northern portion)

Index Map



Graphic from source map: Bass Harbor Quadrangle (northern portion)

Sources of Map Information

Surficial geologic mapping of the Bass Harbor quadrangle was conducted by Duane D. Braun during the 2012 and 2014 field seasons.

Text from source map: Bass Harbor Quadrangle (northern portion)

Sources of Related Information

Braun, Duane D., 2015, Surficial materials of the northern portion of the Bass Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 15-21, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Bass Harbor Quadrangle (northern portion)

Newbury Neck Quadrangle

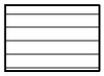
The formal citation for this source.

Braun, Duane D. and Weddle, Thomas K., 2016, Surficial Geology of the Newbury Neck Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-17, scale 1:24,000 (*GRI Source Map ID 76297*).

Prominent graphics and text associated with this source.

Map Legend

Bedrock - Areas where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Thin (.3-1 m [1-3 ft]) glacial, glaciomarine, and/or colluvial materials overlie the bedrock between knobs.



Bedrock outcrops/thin-drift areas - Areas of thin patchy sediment cover where bedrock outcrops are common and/or surficial sediments are generally less than 10 ft thick. Mapped from air photos and ground observations. Actual thin-drift areas probably are more extensive than shown.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is a 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Upper limit of marine submergence - Shows highest elevation of sea level immediately following recession of the last glacial ice sheet from the quadrangle. Deltas found in the adjacent Salsbury Cove quadrangle are at elevations of approximately 263 ft (80 m) to 250 ft (76 m), marking the highest level of the sea. Most of the land shown on the quadrangle was covered by the sea, with only a few areas that would have been islands in the northern and northwestern part of the map, shown by the blue dashed lines.

End moraine crests - Linear ridges consisting of bedded sand and gravel interbedded with Presumpscot Formation silty clays and overlain by till on the ice-proximal faces of the moraines.

Ice-margin positions - Hachured line shows an approximate position of the glacier margin during ice retreat based on meltwater deposits, moraines, or positions of meltwater channels.

Glacially grooved or fluted till - Formed beneath the glacier by erosion of till surfaces by boulders in the base of the ice scouring the till, or by obstructions on the till surface that allow for development of elongate till ridges parallel to ice-flow direction.

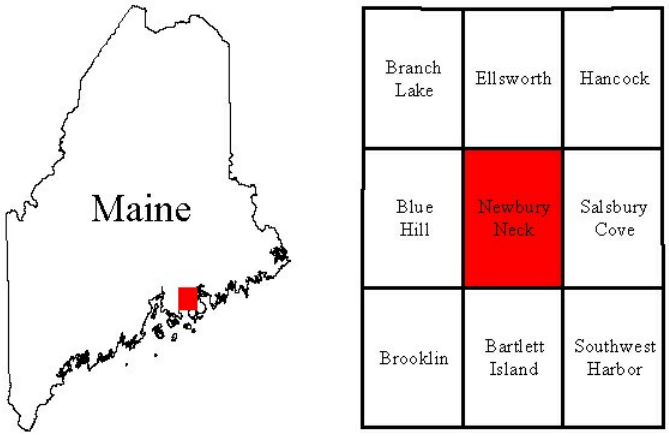
Glacial striation locality - Observations made at dot. Number indicates azimuth (in degrees) of ice-flow direction. Where two directions are observed in the same outcrop, flags indicate older trends where discerned. Where present, arrows on striation lines indicate a unique flow direction.

Crescentic fractures - Observations made at dot. Number indicates azimuth (in degrees) of ice-flow direction. Crescent mark indicates direction of ice flow. These features are the result of friction from boulders in the base of the ice passing over the bedrock and gouging the rock surface, leaving the crescent-shaped fractures, oriented nearly perpendicular to ice-flow direction.

Drumlin - Glacially streamlined hill. Symbol shows long axis of hill or ridge shaped by flow of glacial ice, and which is parallel to former ice-flow direction.

Graphic from source map: Newbury Neck Quadrangle

Index Map



Graphic from source map: Newbury Neck Quadrangle

Sources of Map Information

Surficial geologic mapping of the Newbury Neck quadrangle, Mount Desert Island portion, was conducted by Duane D. Braun during the 2013 field season. Mapping was also conducted by Thomas K. Weddle during the 2011 field season.

Text from source map: Newbury Neck Quadrangle

Sources of Related Information

Weddle, Thomas K., and Braun, Duane D., 2015, Surficial materials of the Newbury Neck quadrangle, Maine: Maine Geological Survey, Open-File Map 15-7, map, scale 1:24,000.

Weddle, Thomas K., 2012, Significant sand and gravel aquifers in the Newbury Neck quadrangle, Maine: Maine Geological Survey, Open-File Map 12-14, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Newbury Neck Quadrangle

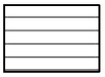
Salsbury Cove Quadrangle

The formal citation for this source.

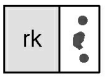
Braun, Duane D. and Weddle, Thomas K., 2016, Surficial Geology of the Salsbury Cove Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-18, scale 1:24,000 (*GRI Source Map ID 76298*).

Prominent graphics and text associated with this source.

Map Legend



Bedrock outcrops/thin-drift areas - Ruled pattern indicates areas where bedrock outcrops are common and/or surficial sediments are generally less than 10 ft thick. Mapped from air photos and ground observations. Actual thin-drift areas probably are more extensive than shown.



Bedrock - Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Upper limit of marine submergence - Shows highest elevation of sea level immediately following recession of the last glacial ice sheet from the quadrangle. The two deltas in Lamoine in the northern half of the map are at elevations of approximately 263 ft (80 m) to 250 ft (76 m), marking the highest level of the sea to which the deltas were deposited. The blue dashed lines show where islands would have been found in the glacial sea, approximately 15,000 years ago. Everywhere below this elevation wave erosion has cut into the glacial deposits. Where such deposits were thin, only lags of large boulders have been left on bedrock ledges. Where such deposits were thicker, a thin 0.3-1 m (1-3 ft) deposit of gravel and sand, often with a boulder surface, overlies other glacial deposits. This thin "wave wash veneer" is not shown on the map, only the underlying material.

End moraine crests - Line shows crest of moraine ridge deposited along the retreating margin of the most recent glacial ice sheet. Consists of till and/or sand and gravel deposited and locally deformed by glacial ice about 1-5 m (3-15 ft) high and 5-30 m (15-100 ft) wide. Such ridges probably represent annual "push moraines".

Wave-cut scarp - Marks the top edge of a marine wave-cut scarp formed during the recession of the glacial sea. Hachures point downslope.

Marine beach ridge or strandline - Subtle ridge or bench feature with an abrupt steepening of slope in the downslope direction in an area of Pleistocene marine shoreline deposits. A strandline marks a temporary pause in sea-level lowering or an especially stormy period during as the sea receded.

Esker ridge - Shows trend of sand and gravel ridge deposited in a meltwater tunnel within or beneath glacial ice. Chevrons indicate direction of meltwater flow.

Glacially grooved or fluted till - Formed beneath the glacier by erosion of till surfaces by boulders in the base of the ice scouring the till, or by obstructions on the till surface that allow for development of elongate till ridges parallel to ice-flow direction.

Ice-margin positions - Shows an approximate position of the glacier margin during ice retreat based on meltwater deposits or moraines.

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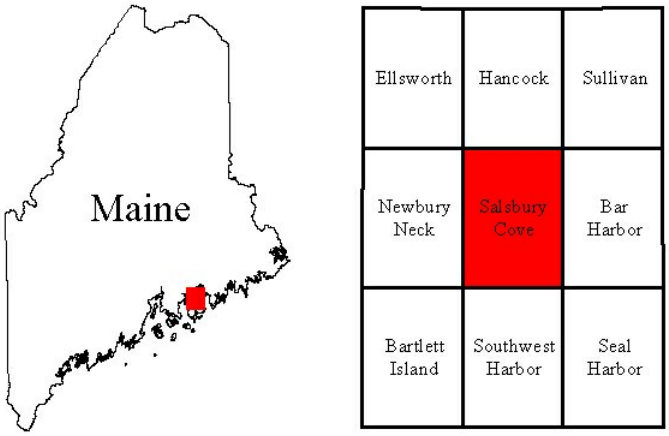
Glacial striation locality - Observations made at dot. Number indicates azimuth (in degrees) of ice-flow direction. Where two or more directions are observed in the same outcrop, flags indicate older trends where discerned. Where present, arrows on striation lines indicate a unique flow direction. (Sh) after azimuth number indicates striations from Shaler, 1889. (L) after azimuth number indicates striations from Lowell and Borns, 1988.

Crescentic fractures - Observations made at dot. Number indicates azimuth (in degrees) of ice-flow direction. Crescent mark indicates direction of ice flow. These features are the result of friction from boulders in the base of the ice passing over the bedrock and gouging the rock surface, leaving the crescent-shaped fractures, oriented near perpendicular to ice-flow

Glacially streamlined hill - Glacially streamlined hill. Symbol shows long axis of hill or ridge shaped by flow of glacial ice, and which is parallel to former ice-flow direction.

Graphic from source map: Salsbury Cove Quadrangle

Index Map



Graphic from source map: Salsbury Cove Quadrangle

Sources of Map Information

Surficial geologic mapping of the Salsbury Cove quadrangle was conducted by Thomas K. Weddle during the 2011 field season. Mapping of the Mount Desert Island portion was updated by Duane D. Braun during the 2014 field season.

Text from source map: Salsbury Cove Quadrangle

Sources of Related Information

Weddle, Thomas K., Braun, Duane D., Prescott, Glenn C., Jr. and Locke, Daniel B., 2015, Surficial materials of the Salsbury Cove quadrangle, Maine: Maine Geological Survey, Open-File Map 15-8,

map, scale 1:24,000.

Locke, Daniel B. and Neil, Craig D., 2007, Significant sand and gravel aquifers in the Salsbury Cove quadrangle, Maine: Maine Geological Survey, Open-File Map 07-4, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Salsbury Cove Quadrangle

Additional References for Uses of Surficial Geology Maps

Gilman, Richard A., Chapman, Carleton A., Lowell, Thomas V., and Borns, Harold W., Jr., 1988, The geology of Mount Desert Island; a visitor's guide to the geology of Acadia National Park: Maine Geological Survey, Bulletin 38, 50 p., 28 figs., 2 color maps, scale 1:50,000.

Shaler, Nathaniel Southgate, 1889, Part 2; The geology of the Island of Mount Desert, Maine: U. S. Geological Survey, 8th Annual Report, Part 2, p. 987-1061.

Text from source map: Salsbury Cove Quadrangle

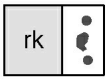
Seal Harbor Quadrangle

The formal citation for this source.

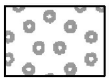
Braun, Duane D., 2016, Surficial Geology of the Seal Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-20, scale 1:24,000 (*GRI Source Map ID 76294*).

Prominent graphics and text associated with this source.

Map Legend



Bedrock - Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits.



Boulder surface mantle - Area of boulders covering the ground surface on top of other material such as till or bedrock. Boulders typically cover 50 to 100 percent of the ground surface. Average boulder size is 0.6 to 1 m (2-3 ft) and ranges from 0.3 to 5 m (1 to 15 ft).

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Upper limit of marine submergence - Shows highest elevation of sea level immediately following recession of the glacier from the area. This elevation is approximate, based on glacial-marine delta elevations in the region (~67-73 m [~220-240 ft] above sea level; Thompson and others, 1989, figure 2 contours). Everywhere below this elevation wave erosion has cut into the glacial deposits. Where such deposits were thin, only lags of large boulders have been left on bedrock ledges. Where such deposits were thicker, a thin 0.3-1 m (1-3 ft) deposit of gravel and sand, often with a boulder surface, overlies other glacial deposits. This thin "wave wash veneer" is not shown on the map, only the underlying material.

Small moraine ridge - Ridge of till and/or sand and gravel deposited and/or deformed by glacial ice; about 1-5 m (3-15 ft) high and 5-30 m (15-100 ft) wide. Such ridges probably represent annual "push moraines".

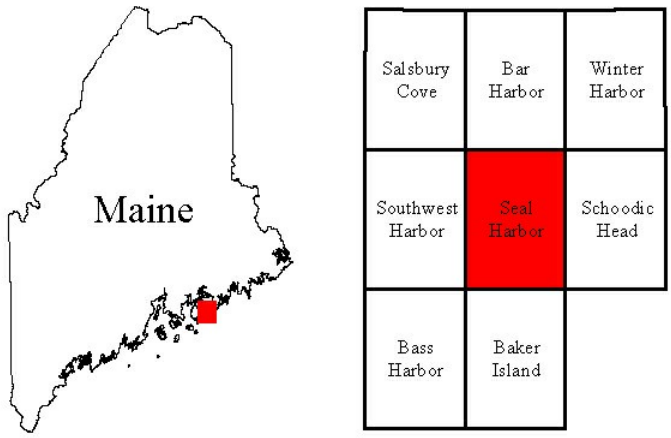
Marine beach ridge or strandline - Subtle ridge or bench feature with an abrupt steepening of slope in the downslope direction in an area of Pleistocene marine shoreline deposits. A strandline marks a temporary pause in sea-level lowering or an especially stormy period as the sea receded.

Marine scarp - Marks the top edge of a marine wave-cut scarp; hachures point downslope.

Rock slide scarp - Marks top edge of down dropped rock slide mass. Hachure marks point down the slip direction.

Graphic from source map: Seal Harbor Quadrangle

Index Map



Graphic from source map: Seal Harbor Quadrangle

Sources of Map Information

Surficial geologic mapping of the Seal Harbor quadrangle was conducted by Duane D. Braun during the 2013 field season.

Text from source map: Seal Harbor Quadrangle

Sources of Related Information

Braun, Duane D., Foley, Michael E. and Prescott, Glenn C., Jr., 2015, Surficial materials of the Seal Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 15-15, map, scale 1:24,000.

Neil, Craig D. and Foley, Michael E., 2006, Significant sand and gravel aquifers in the Seal Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 06-8, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Seal Harbor Quadrangle

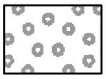
Southwest Harbor Quadrangle

The formal citation for this source.

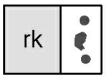
Braun, Duane D., Lowell, Thomas V. and Foley, Michael E., 2016, Surficial Geology of the Southwest Harbor Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-21, scale 1:24,000 (*GRI Source Map ID 76296*).

Prominent graphics and text associated with this source.

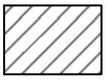
Map Legend



Boulder surface mantle - Area of boulders covering the ground surface on top of other material such as till or bedrock. Boulders typically cover 50 to 100 percent of the ground surface. Average boulder size is 0.6 to 1 m (2-3 ft) and ranges from 0.3 to 5 m (1 to 15 ft).



Bedrock - Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial, colluvial, and/or residual materials overlie the bedrock between knobs. On higher, more steeply sloped areas 75-100% of the surface is bare or vegetation-covered ledge. Where gray spots lie within other colored areas of glacial deposits, the gray spots are bedrock ledges projecting through the glacial deposits.



Disturbed earth - Original topography of the area has been disturbed by gravel pit excavation.

Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Upper limit of marine submergence - Shows highest elevation of sea level immediately following recession of the glacier from the area. This elevation is approximate, based on glacial-marine delta elevations in the region (~67-73 m [~220-240 ft] above sea level; Thompson and others, 1989, figure 2 contours). Everywhere below this elevation wave erosion has cut into the glacial deposits. Where such deposits were thin, only lags of large boulders have been left on bedrock ledges. Where such deposits were thicker, a thin 0.3-1 m (1-3 ft) deposit of gravel and sand, often with a boulder surface, overlies other glacial deposits. This thin "wave wash veneer" is not shown on the map, only the underlying material.

Small moraine ridge - Ridge of till and/or sand and gravel deposited and/or deformed by glacial ice. About 200 small moraine ridges, 1-5 m (3-15 ft) high and 5-30 m (15-100 ft) wide have been identified, mostly in the southwestern and northwestern parts of the map. Such ridges probably represent annual "push moraines".

Large moraine ridge - A pair of much larger moraines lies at the southern ends of Long Pond and Echo Lake and to either side of the Somes Sound Narrows. Large till knobs south of Upper Hadlock Pond and Jordan Pond are probably equivalent to those moraines. The large moraines probably represent stabilization of the receding ice front for a few decades or more.

Marine beach ridge or strandline - Subtle ridge or bench feature with an abrupt steepening of slope in the downslope direction in an area of Pleistocene marine shoreline deposits. A strandline marks a temporary pause in sea-level lowering or an especially stormy period as the sea receded.

Marine scarp - Marks the top edge of a marine wave-cut scarp; hachures point downslope. It was only mapped around Beech Hill. Along the west side of the hill the scarp top edge elevation rises southward as the scarp becomes larger and more deeply cut into the hillside.

Rock slide scarp - Marks top edge of down dropped rock slide mass. Hachure marks point down the slip direction.

Meltwater channel - Arrow shows trace of former meltwater channel; arrowhead shows direction of water flow.

Buried valley - Arrow shows trend of preglacial stream valley floor now partly to completely filled in by glacial deposits.

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Glacial striation locality - Arrow shows ice-flow direction(s) inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction. Where relative ages are known, flagged arrow shows older ice-flow direction.

Other glacial erosion marks on bedrock - Includes crescentic marks and stoss-and-lee topography. Arrow shows direction of ice-flow. Dot indicates point of observation.

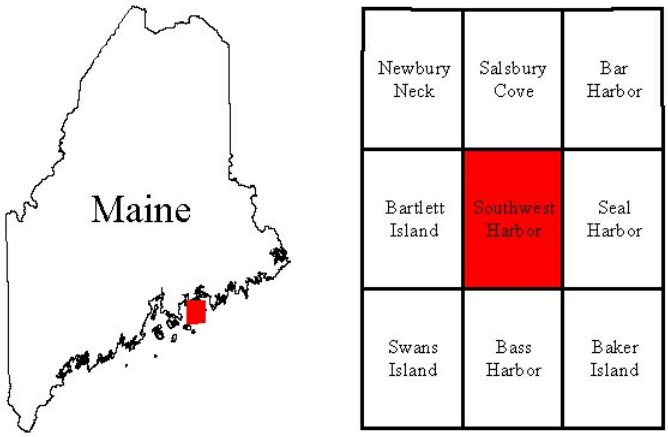
▲ 231

Glaciomarine delta - Site is south of Jordan Pond. Number is elevation in feet of the contact between topset and foreset beds or of a meltwater channel on the delta surface.

© **Core sample locality** - Location of core sample from Sargent Mountain Pond; radiocarbon-age analysis yielded a date of 16,600 calendar years B.P. (Norton and others, 2010). Lowell (1980) obtained a date of 13,230 ± 360 radiocarbon years B.P. from the same site.

Graphic from source map: Southwest Harbor Quadrangle

Index Map



Graphic from source map: Southwest Harbor Quadrangle

Sources of Map Information

Surficial geologic mapping of the Southwest Harbor quadrangle was conducted by Duane D. Braun during the 2013 field season. Mapping was also conducted by Thomas V. Lowell during the 1988 field season and modified using 2011 field data by Thomas K. Weddle.

Text from source map: Southwest Harbor Quadrangle

Sources of Related Information

Braun, Duane D., Lowell, Thomas V. and Foley, Michael E., 2015, Surficial materials of the Southwest Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 15-17, map, scale 1:24,000.

Foley, Michael E. and Neil, Craig D., 2006, Significant sand and gravel aquifers in the Southwest Harbor quadrangle, Maine: Maine Geological Survey, Open-File Map 06-12, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Southwest Harbor Quadrangle

Swans Island Quadrangle (northeastern portion)

The formal citation for this source.

Braun, Duane D., 2016, Surficial Geology of the northeastern portion of the Swans Island Quadrangle, Maine: Maine Geological Survey, Open-File Map 16-15, scale 1:24,000 (*GRI Source Map ID 76291*).

Prominent graphics and text associated with this source.

Map Legend

Bedrock - Areas shown as solid gray are where 25% or more of the land surface is knobs of bare or vegetation-covered bedrock ledge. Thin (.3-1 m [1-3 ft]) glacial till or marine mud materials overlie the bedrock between knobs.

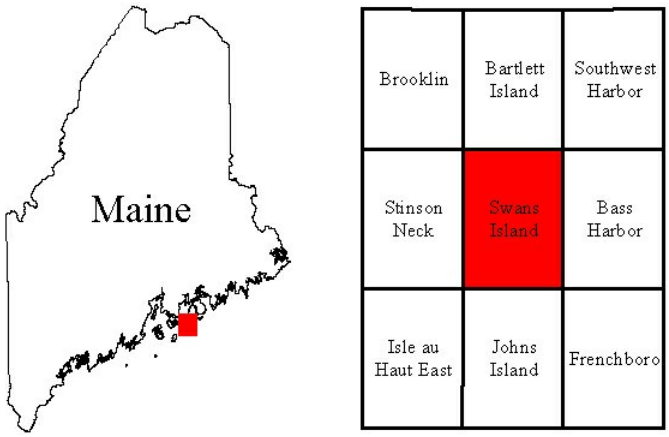
Contact - Indicates approximate boundary between adjacent map units. Expectable line location error is 3-6 m (10-20 ft) to locally as much as 10-15 m (30-50 ft) where the materials are obscured by dense surface vegetation and lack diagnostic landforms.

Small moraine ridge - Ridge of till and/or sand and gravel deposited and/or deformed by glacial ice; about 1-5 m (3-15 ft) high and 5-30 m (15-100 ft) wide. Such ridges probably represent annual "push moraines".

Glacial striation locality - Arrow shows ice-flow direction(s) inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction.

Graphic from source map: Swans Island Quadrangle (northeastern portion)

Index Map



Graphic from source map: Swans Island Quadrangle (northeastern portion)

Sources of Map Information

Surficial geologic mapping of the Swans Island quadrangle was conducted by Duane D. Braun during the 2014 field season.

Text from source map: Swans Island Quadrangle (northeastern portion)

Sources of Related Information

Braun, Duane D., 2015, Surficial materials of the northeastern portion of the Swans Island quadrangle, Maine: Maine Geological Survey, Open-File Map 15-20, map, scale 1:24,000.

Thompson, Woodrow B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p.

Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Text from source map: Swans Island Quadrangle (northeastern portion)

Digital Surficial Geologic and Geologic-GIS Maps of Isle Au Haut and Schoodic Head (1:62,500 scale)

Map Unit List

The surficial geologic units present in the 1:62,500 scale digital geologic-GIS data produced for Acadia National Park, Maine (ACAD) are listed below. Units are listed with their assigned unit symbol and unit name (e.g., Qs - Swamp and tidal-marsh deposits). Units are listed from youngest to oldest. No description for water is provided. Information about each geologic unit is also presented in the GRI Geologic Unit Information (ACADUNIT) table included with the GRI geologic-GIS data. In addition to surficial units, bedrock units denoted with bedrock outcrop areas are also listed.

Cenozoic Era

Quaternary Period

Holocene Epoch
Qs - Swamp and tidal-marsh deposits

Pleistocene Epoch
Qp - Presumpscot Formation, mostly silt and clay
Qt - Till

Cenozoic Era and older

Quaternary Period and pre-Quaternary
rk - Bedrock outcrops

Bedrock Unit Listing
In the GRI digital geologic-GIS data for the Schoodic Head map a bedrock unit maybe denoted in the Notes field of a bedrock outcrop area This bedrock unit was inferred using the source bedrock geologic map (Gilman, 1985). These bedrock units are listed below, however, no additional information concerning these units was present on the source map.

Paleozoic Era

Devonian Period
DSgr - Schoodic and Southwest Harbor granite

Devonian and Silurian Periods
DScig - Cranberry Island greenstone
DSbh - Bar Harbor Formation

Map Unit Descriptions

Descriptions of all (1:62,500 scale) surficial geologic map units, generally listed from youngest to oldest, are presented below. All unit descriptions were derived from the two 1:62,500 scale surficial source maps (Bar Harbor 15' Quadrangle (surficial) and Deer Isle 15' Quadrangle (surficial)).

Qs - Swamp and tidal-marsh deposits (Holocene)

Peat, silt, clay and sand. Poor drainage. Flat topography. Formed by accumulation of sediments and organic material in depressions and other poorly drained area.

Qp - Presumpscot Formation, mostly silt and clay (Pleistocene)

Qp - Glacial-marine deposits (Presumpscot Formation), mostly silt and clay (Quaternary) Silt, clay, and sand. Commonly a clayey silt, but sand is very abundant at the surface in some places. Locally fossiliferous. Map unit includes small areas of till, sand, and gravel that are not completely covered by marine sediment. Mostly silt and clay. Low permeability. Poor drainage. Flat to gently sloping except where dissected by modern streams. Commonly has a branching network of steep-walled stream gullies. Composed of sediments that washed out of the Late Wisconsinan glacier and accumulated on the ocean floor. Formed during late-glacial time, when relative sea level was higher than at present.

Qt - Till (Pleistocene)

Heterogeneous mixture of sand, silt, clay, and stones. Stratification is rare. Includes two varieties: basal till and ablation till. Basal till is fine grained and very compact, with low permeability and poor drainage. Ablation till is loose, sandy, and stony, with moderate permeability and fair to good drainage. Unit generally overlies bedrock, but may overlie or include sand and gravel. Commonly a blanket deposit that conforms to bedrock surface. Also forms glacially streamlined hills (including drumlins), where till thickness locally exceeds 100 feet. Deposited directly by giacial ice.

rk - Bedrock outcrop (Quaternary and pre-Quaternary)

Area of many outcrops and/or thin surficial deposits (generally less than 10' think). Outcrops mapped largely by interpretation of aerial photography in off-road areas.

In the GRI digital geologic-GIS data for the Schoodic Head map a bedrock unit maybe denoted in the Notes field of a bedrock outcrop area This bedrock unit was inferred using the source bedrock geologic map (Gilman, 1985). No additional information about these bedrock units was available on the source map, however, additional information concerning these units is present in the bulletin associated with the 1:50,000 scale source map used for the GRI Digital Geologic-GIS Map of Mount Desert Island. The aforementioned bulletin is present in that map's GRI Ancillary Map Information Document (acad_geology.pdf).

GRI Ancillary Source Map Information

The following sections present ancillary source map information associated with source maps used to produce the 1:62,500 scale GRI digital surficial geologic-GIS maps for Acadia National Park, Maine (ACAD). As the source bedrock geologic map (Gilman,1985) for the Schoodic Head map was an unpublished mylar map with no additional ancillary information other than a basic legend of units no ancillary source map information section is presented for this source map.

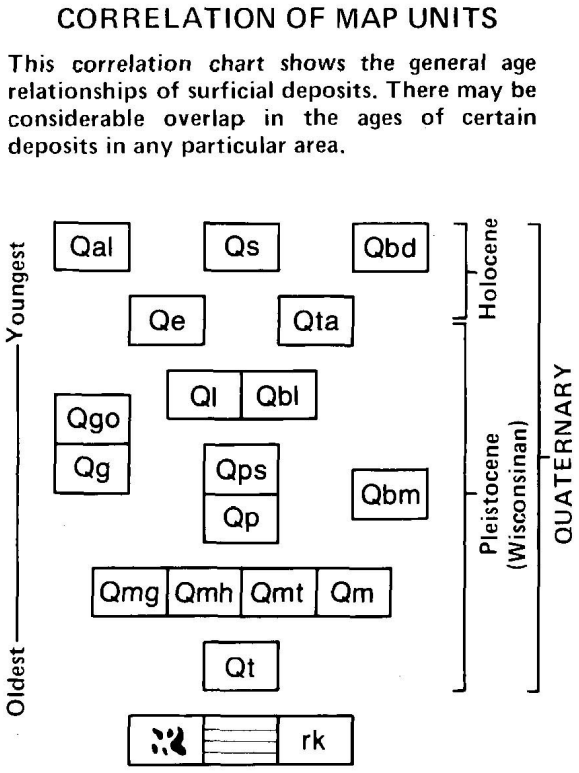
Bar Harbor 15' Quadrangle (surficial)

The formal citation for this source.

Borns, Harold W. Jr., 1974, Reconnaissance Surficial Geology of the Bar Harbor [15-minute] Quadrangle, Maine: Maine Geological Survey, Open-File Map 74-1, scale 1:62,500 (Bar Harbor 15' Quadrangle (surficial)). *GRI Source Map ID 64423*).

Prominent graphics and text associated with this source.

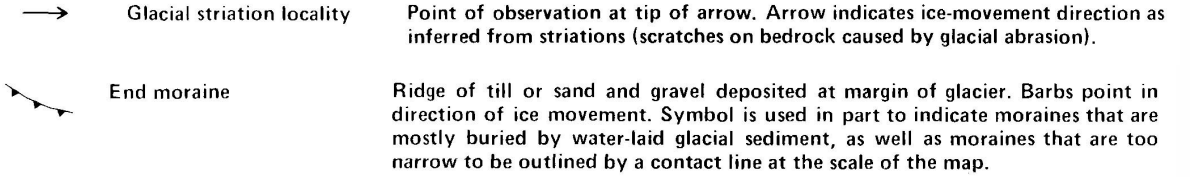
Correlation of Map Units



Graphic from source map: Bar Harbor 15' Quadrangle (surficial)

Of note, only units Qs, Qp, Qt and rk are present in the extent of the source map used by the GRI.

Map Legend



Graphic from source map: Bar Harbor 15' Quadrangle (surficial)

Of note, other than contacts no additional geologic feature other than a glacial striation locality and end moraine were present in the extent of the source map used by the GRI. Therefore, only a limited potion of the source map legend is presented in the above graphic.

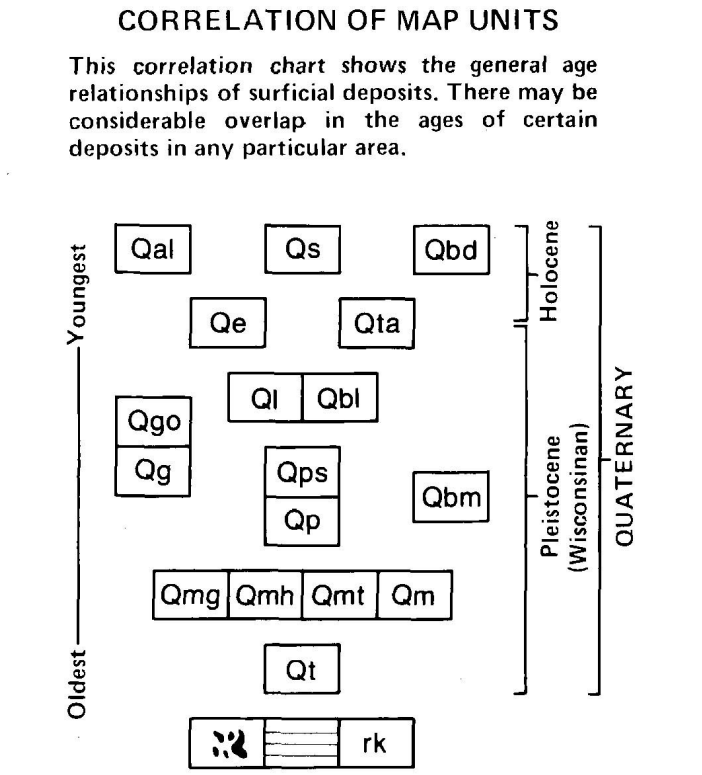
Deer Isle 15' Quadrangle (surficial)

The formal citation for this source.

Borns, Harold W., Jr., Smith, Geoffrey W. and Thompson, Woodrow B., 1974, Reconnaissance Surficial Geology of the Deer Isle [15-minute] Quadrangle, Maine: Maine Geological Survey, Open-File Map 74-12, scale 1:62,500 (*GRI Source Map ID 64425*).

Prominent graphics and text associated with this source.

Correlation of Map Units



Graphic from source map: Deer Isle 15' Quadrangle (surficial)

Of note, only units Qs, Qp, Qt and rk are present in the extent of the source map used by the GRI.

Map Legend

⟶	Glacial striation locality	Point of observation at tip of arrow. Arrow indicates ice-movement direction as inferred from striations (scratches on bedrock caused by glacial abrasion).

Graphic from source map: Deer Isle 15' Quadrangle (surficial)

Of note, other than contacts no additional geologic feature other than a glacial striation locality was present in the extent of the source map used by the GRI. Therefore, only a limited potion of the source map legend is presented in the above graphic.

GRI Digital Data Credits

This document was developed and completed by Jake Suri and 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 and James Winter.

The information in this document was compiled from GRI source maps, and is intended to accompany the digital surficial geologic-GIS maps and related digital data for Acadia National Park (ACAD) developed by Stephanie O'Meara, James Winter, Sarah Lowe, and Jake Suri (Colorado State University) (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 map).

GRI finalization by Stephanie O'Meara.

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