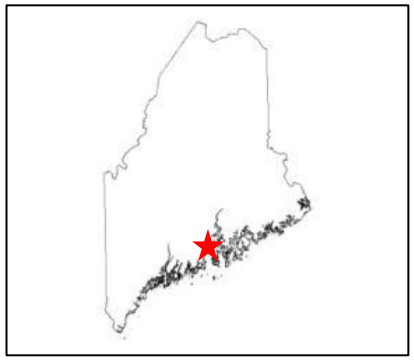
Geologic Site of the Month

May, 2013

Glacial Geology of Moose Point State Park, Maine



44° 25‘ 59.18"N, 68° 56‘ 37.11"W

Text and photos by
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Introduction

Moose Point State Park is located on U. S. Route 1 in Searsport, on the west side of Penobscot Bay in mid-coastal Maine. It was selected as the Site of the Month because recent mapping by the Maine Geological Survey revealed features formed during the Ice Age that may interest park visitors (Thompson, 2013).

Figure 1. Map of Moose Point State Park, with approximate park boundaries.

Park Map

Most of the park sites discussed here are located along the shoreline adjacent to Big Spruce Trail, shown in yellow on the map. The trail follows a flat surface above the shoreline, but you can descend to the shore from the trail or parking lot in several places. This is best done at low tide!

Figure 2. Map of Moose Point State Park, from brochure on Maine Department of Agriculture, Conservation and Forestry – Division of Parks and Lands brochure.

Bedrock

The bedrock seen along the park shoreline is metamorphic rock of the Penobscot Formation. It is approximately 490 million years old (Ordovician-Cambrian) and thus much older than the sediments that overlie it (Loiselle, 2007). The latter were formed between about 30,000 and 15,000 years ago, during the latest part of the Pleistocene "Ice Age".

Figure 3a. A bedrock outcrop on the shoreline in front of the fence marked on park map.

Photos by: Woodrow B. Thompson

Figure 3b. Close-up view of a nearby shoreline outcrop showing folds.

Glacial Striations on Moose Point

Photos by: Woodrow B. Thompson

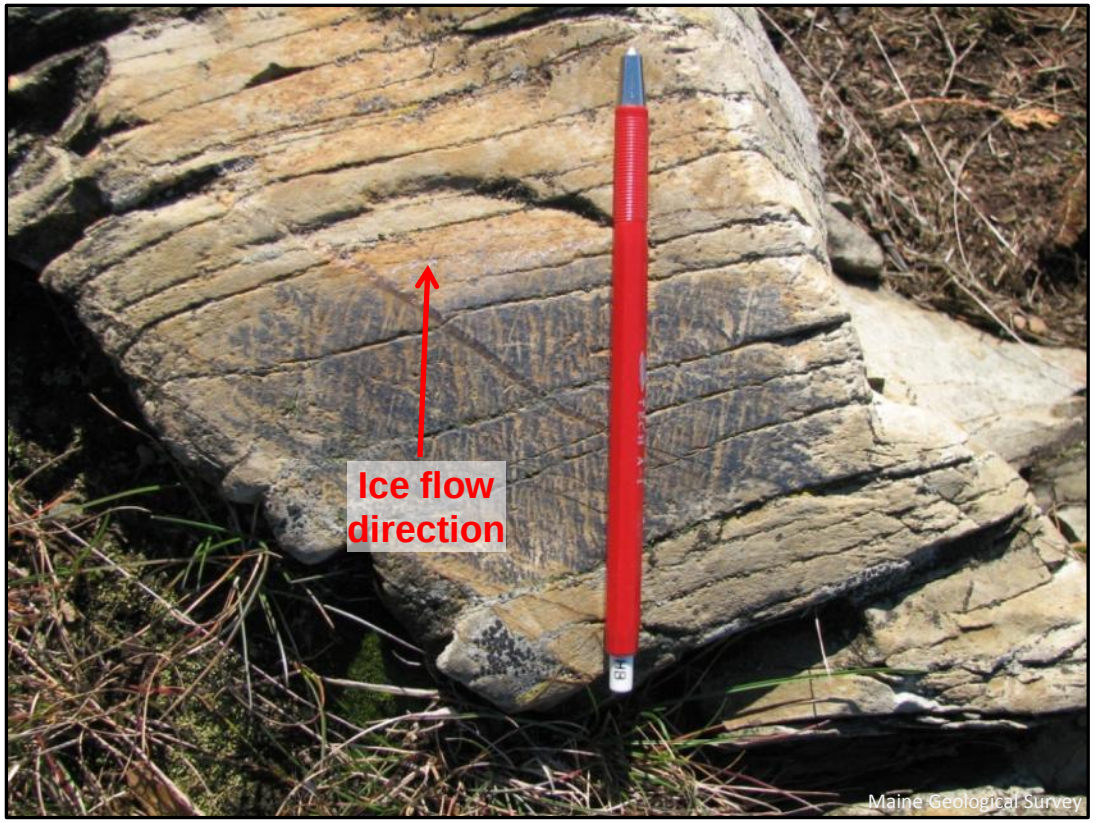

Figure 4. Glacial striations are scratch marks produced by the ice dragging broken rock debris across rock surfaces. Most of the ledges in the park are too weathered to preserve striations, but a good set was revealed by rubbing a pencil across the small patch of rock at this site on Moose Point. These striations, and the crescent-shaped rock fracture to left of red pencil, indicate glacial flow toward the south-southeast (parallel to pencil).

Glacial Erratic Boulders

Many boulders that eroded out from glacial till are scattered along the shoreline. The ribbed surface of the metamorphic bedrock protrudes from beach gravel in front of the prominent white granite boulder shown here. This boulder is a true "glacial erratic" because it differs from the local bedrock.

Photo by: Woodrow B. Thompson

Figure 5. Bouldery shoreline at Moose Point State Park.

Erratic Boulders from Many Places

The glacial erratics seen along the park shoreline include a wide variety of igneous and metamorphic rocks carried by the ice sheet from points north of here. How many different rock types can you find? A good place to look is this part of the beach near the picket fence seen in the background.

Figure 6. Erratic boulders. This photo was taken in 2012, so they may have been moved by later storm action.

Glacial Till

Till is a heterogeneous mixture of pulverized rock debris that was carried by glacial ice and released directly from the glacier by various processes. This material probably underlies the ground surface over much of the park, but it is exposed to view only along parts of the ocean shore.

Photos by: Woodrow B. Thompson

Figure 7. Overview and close-up of silty glacial till containing pebble-size stones. This site is located on the shoreline, midway between the flagpole and "fence" labels on the park map.

Till Stone

The stone in the photo below was taken from a shovel hole dug in glacial till on the hillside near the park entrance gate. The wetted surface of the stone shows striations formed as it was abraded by other rocks during transport in flowing glacial ice.

Figure 8. Striations on 6-inch till stone.

Under the Sea

The last glacial ice sheet was so heavy that it pushed the land hundreds of feet downward. This depression caused lowland areas of southern Maine to be flooded by the sea as the glacier retreated. In Searsport the submergence reached present-day elevations nearly 300 feet above current sea level.

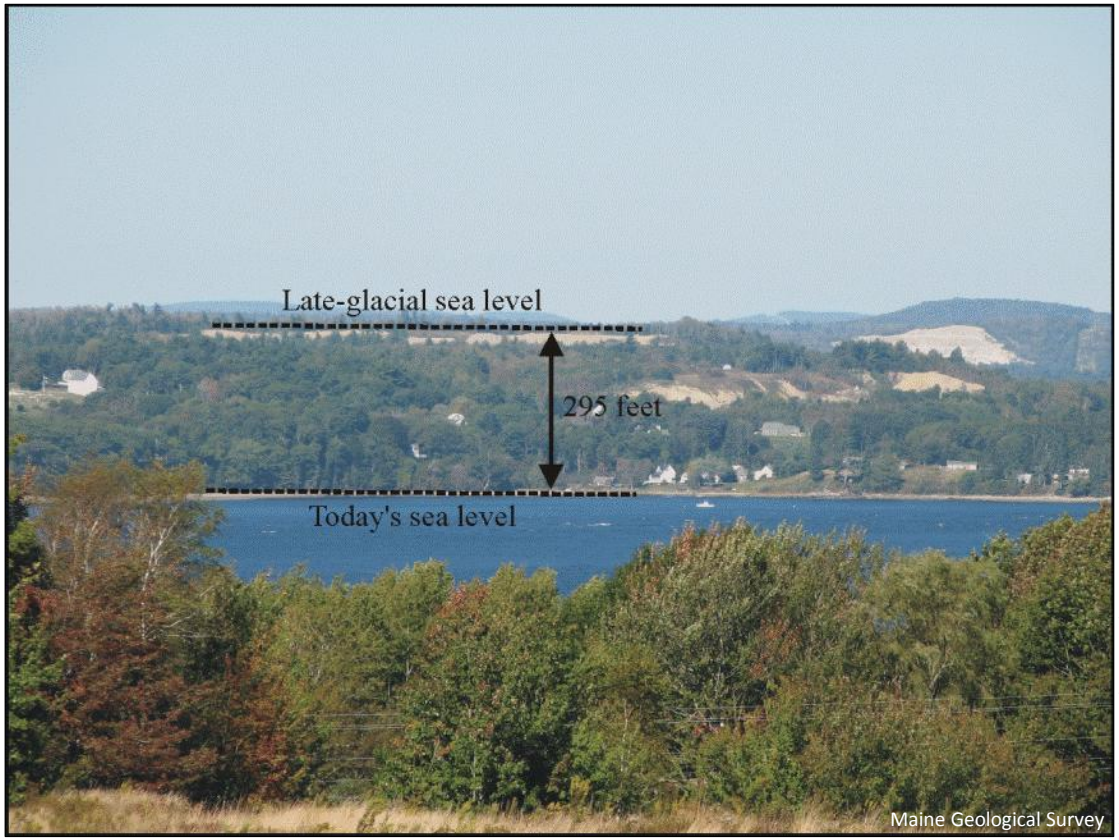

Figure 9. Penobscot Bay in nearby Stockton Springs. The flat hilltop in the distance is the upper surface of a delta built into the sea at the margin of the retreating ice sheet. It marks where sea level stood at that time.

Glacial-marine Clay

Marine mud (mostly silt and clay) settled to the ocean floor during the marine submergence, forming layered deposits such as the one shown here.

Figure 10. Exposure of glacial-marine sediments (above knife) on shoreline at southwest corner of the park. The stratified clay overlies till deposited directly from glacial ice.

References and Additional Information

Loiselle, Marc, 2007, The U.S. Route 1/State Route 3 Roadcut at the Approach to the Penobscot Narrows Bridge: Maine Geological Survey website.

Stewart, D. B., 1998, Geology of Northern Penobscot Bay, Maine: U. S. Geological Survey, Misc. Investigations Series Map I-2551, 1:62,500 bedrock geologic map and text.

Thompson, Woodrow B., 2013, Surficial Geology of the Searsport Quadrangle, Maine: Maine Geological Survey, Open-File Map 13-5 (PDF, 1.3 Mb), scale 1:24,000.