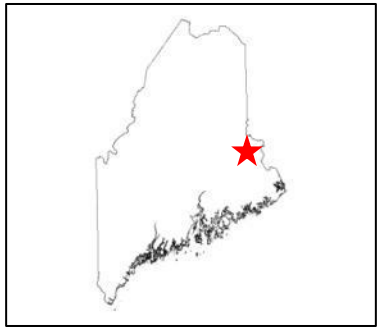
Geologic Site of the Month

September, 2013

Fluted Till Surfaces, Brookton, Maine



45° 32’ 13.33” N, 67° 49’ 07.77” W

Text by
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Introduction

Dung Fork Points? Where in Maine is that? How did the U. S. Geological Survey come up with that name for a geographic feature? Extending out into Baskahegan Lake in Brookton, in northern Washington County, are a few uniquely shaped peninsulas. Their size ranges to almost a mile in length, up to one hundred feet in width and up to twenty feet in height. From the air and on a map they look like the tines on a pitch fork so I guess that is where the name came from. What are they and how were they formed ?

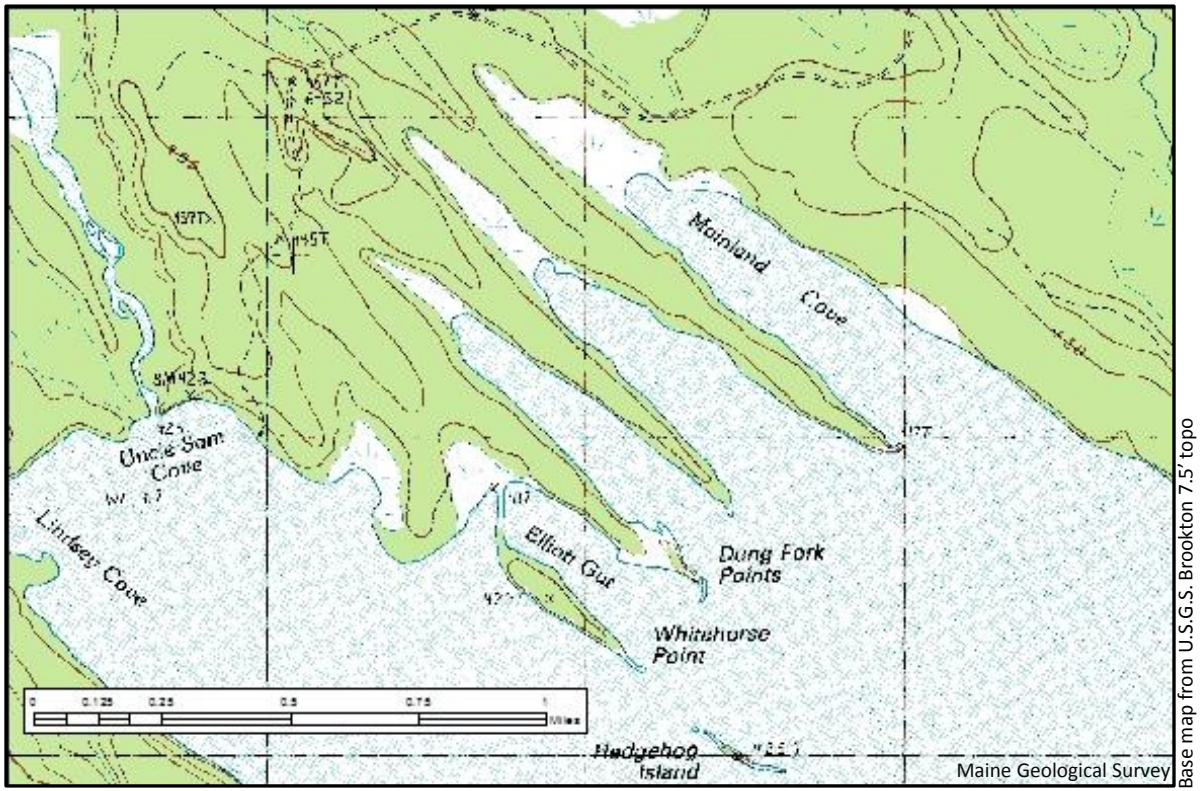

Figure 1. U. S. G. S. Brookton 7.5' topographic map showing grooved till surfaces.

Introduction

Figure 2. Aerial photograph (1969) of grooved till ridges in Baskahegan Lake, Brookton, Maine.

General Geology

The features in Baskahegan Lake are glacial till ridges that are oriented in a northwest – southeast direction, the direction of ice flow during the most recent continental glaciation. The underlying bedrock is the Upper Member of the Baskahegan Lake Formation (Ludman, 1990). It is made up of conglomerates, sandstones, siltstones and pelites. The area was also mapped by Larrabee and Spencer (1963). There are few outcrops of the Baskahegan Formation in close proximity to the till ridges.

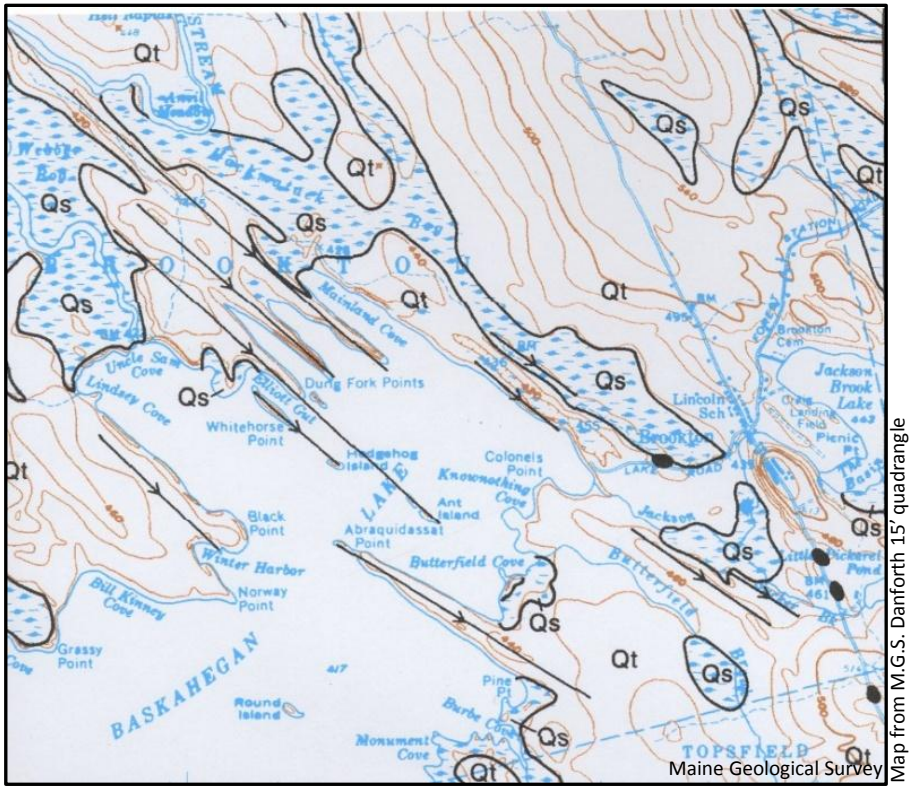

Figure 3. Surficial Geology of a portion of the Danforth 15' Quadrangle, Maine.
"Qt" = till, "Qs" = wetlands; straight lines indicate crests of the till ridges (from Brewer, (1980).

General Geology

Till, a heterogeneous mixture of sand, silt, clay and rock, makes up the ridges and overlies the bedrock in this area (see Brewer, 1980). The U.S.D.A. Natural Resource Conservation Service (USDA) mapped the area as Dixfield-Colonial-Brayton soil type (DNB) and Telos-Monarda-Brayton (TMB). These soil types have a stony, loamy matrix which developed on a basal till (Ferwerda and others, 1977) (Figure 4).

Figure 4. NRCS soils map of the northeastern cove of Baskahegan Lake.

Formation

Straight, parallel grooves with intervening ridges are locally common on till surfaces in glaciated areas (Flint, 1971). These features range in length up to 12 miles, can be upwards of 300 feet in width, and up to 75 feet in height. The ridges are composed of till which was deposited at the base of an ice sheet. This basal till consists of an unstratified, unsorted mixture of pebbles, cobbles and boulders with a matrix of sand, silt and clay. Having formed under the weight of thousands of feet of ice it is very compact. Geologists sometimes call this distinctive streamlined terrain a "fluted till surface". This landscape can easily be seen in a section of the bathymetry map of Baskahegan Lake (Figure 5).

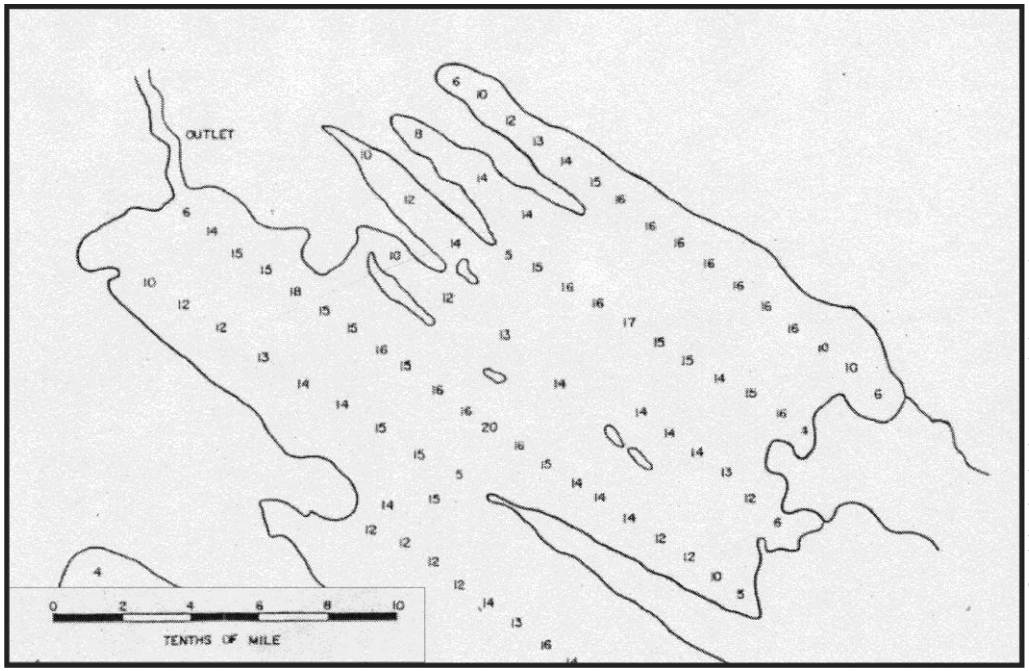

Figure 5. A portion of the Baskahegan Lake Maine Department of Inland Fisheries & Wildlife lake depth chart. Note the consistent depths along the tracks that parallel the grooved till ridges.

Formation

Fluted till ridges, megaflutes and drumlins are all geologic features formed at the base of ice sheets. There is much debate among geologists over their formation and what to call them.

- Some fluted till ridges are small, often less than 10 feet high, and in certain cases they developed in the lee of boulder obstacles at the bottom of the glacier.
- The larger flutes – such as those described here - are called “megaflutes” by some authors. Megaflutes can be over ten feet high and hundreds of feet long. They may grade into drumlins.
- Drumlins are shorter and stubbier, and can be composed of many materials and formed by a number of processes.

The features found in Brookton warrant more investigation to determine their method of origin.

References and Additional Information

Brewer, T., 1980, Reconnaissance Surficial Geology of the Danforth Quadrangle, Maine. Maine Geological Survey Open-File Map 80-3. 1 map.

Ferwerda, J. A., LaFlamme, K. J., Kalloch, Jr., N. R., and Rourke, R. V., 1997, The Soils of Maine. Maine Agricultural and Forest Experiment Station Miscellaneous Report 402, University of Maine

Flint, R. F., 1971, Glacial and Quaternary Geology. John Wiley & Sons, Inc., New York. 892 p.

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Ludman, A., 1990, Revised Bedrock Geology of the Danforth, Scraggly Lake, Forest, Waite, Vanceboro, and Kellyland 15' Quadrangles, Maine: Report of Mapping Progress, June-August, 1989. 20 p. report and map.