

Maine Geologic Facts and Localities  
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***Alpine Glacial Features along the Chimney Pond Trail,  
Baxter State Park, Maine***



45° 54' 57.98" N, 68° 54' 41.48" W

Text by  
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## Introduction

The Mount Katahdin area in Baxter State Park is one of the great places in New England to view alpine glacial features. Few places in the northeast United States offer a chance to see these landforms in such an unspoiled, rugged environment. In this site of the month, we discuss glacial features that can be viewed on the trail from Roaring Brook to Chimney Pond on the east side of the mountain (Figure 1).



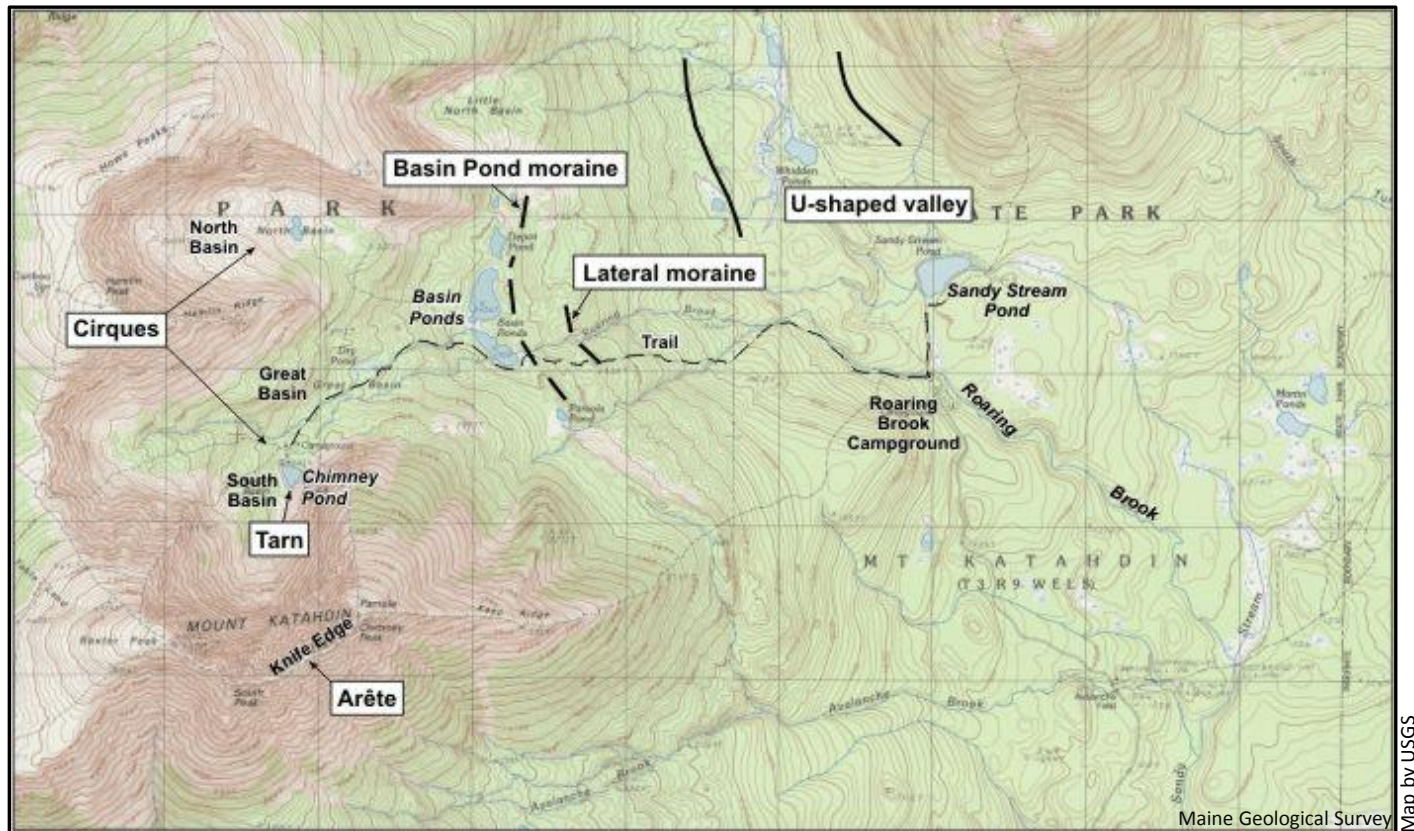
Photo by Robert A. Johnston

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## Mount Katahdin

At 5267 feet, Mount Katahdin is the highest mountain peak in Maine. It lies in north-central Maine and has a local relief of over 4700 feet, making it one of the largest massifs in the Appalachian Mountain chain. A massif is a massive topographic and structural feature formed of basement or plutonic rocks.



**Figure 1.** Roaring Brook to the Chimney Pond area in Baxter State Park. Map shows glacial features found near the Chimney Pond Trail.

### Bedrock Geology

Katahdin initially formed as a granitic pluton, a mass of molten rock which solidified deep within the earth. Erosion over hundreds of millions of years removed nearly two miles of rock (Hon, 1980), exposing the granite. The pluton was emplaced near the end of the time when the Appalachian Mountains were formed just over 400 million years ago, making it Early Devonian in age.

Several times over the last few million years, climate change has allowed glaciers to grow into continental ice sheets that covered broad areas of the northern hemisphere. These ice sheets would have covered even the tops of New England's highest mountains. The farthest extent south in our region had the glacier grounded off Georges Bank. The sheer weight of the ice caused the earth's crust to subside allowing ocean waters to move far inland of their present position as the ice melted. Marine shells have been reported as far north as Millinocket in Maine. As the continental ice melted, mountains and high hills were exposed. Alpine glaciers may have filled high, mountain valleys and likely the area around Mount Katahdin (however, see Davis, 1989). Evidence of both continental ice that covered the entire landscape, and alpine glaciers which affected higher elevation areas can be seen in Baxter State Park.





### Cirques

From the shore of Sandy Stream Pond one can view cirques in the North and South Basins on the east side of Mount Katahdin (Figure 2). A cirque is a semi-circular recess with steep sidewalls, formed by erosion under an alpine glacier. They are always found at the head of a valley and form a sharp indentation in a normally smooth slope. We will discuss the South Basin cirque when we talk about Chimney Pond a bit later.



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**Figure 2.** North Basin cirque as seen from Sandy Stream Pond (a short hike from Roaring Brook Campground).

Roaring Brook Campground to Chimney Pond

A 3.3 mile hike from Roaring Brook Campground to Chimney Pond takes about 2.5 hours. About 1.8 miles up the trail from Roaring Brook on your right, just past Halfway Rock, is a viewpoint. This feature (Figure 3) is a moraine, an accumulation of rock material (drift) that was deposited directly by ice or meltwater associated with an ice sheet. This lateral moraine was deposited on the side of the continental glacier that filled the South Branch of Wassataquoik Stream.



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**Figure 3.** Lateral moraine deposited by the glacial ice that filled the South Branch of Wassataquoik Stream.



Roaring Brook Campground to Chimney Pond

Looking north from the viewpoint one can see a U-shaped valley (Figure 4) that formed between North and South Turner Mountains to the east and Russell Mountain and the Howe Peaks to the west. Ice sculpted the basin, smoothing and rounding the valley floor and walls.



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**Figure 4.** U-shaped valley between North and South Turner Mountains to the east and Russell Mountain and the Howe Peaks to the west. Ice sculpted the basin, smoothing and rounding the valley floor and walls. Traveler Mountain is the tall peak in the background.



### Moraines

Two miles (2.0) from Roaring Brook a short side trail leads to Lower Basin Pond. This, and the other Basin Ponds formed behind the Basin Ponds moraine (Figure 5 and Figure 6). Caldwell (Caldwell and Davis, 1983), who called this feature an end moraine (a ridge of debris deposited by active ice), believed the materials composing this moraine came from alpine glaciers in the three cirques behind the moraine.



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**Figure 5.** Looking north at the Basin Ponds moraine as seen from the shore of Lower Basin Pond.





### Moraines

Davis (Caldwell and Davis, 1983) cites evidence indicating the material was derived from valley glaciers to the east. Whatever the source the moraine serves as a dam for the ponds. The moraine here is approximately three miles in length and is composed of boulders as large as 18 feet in diameter (Davis, 1989).



Photo by Robert A. Johnston

**Figure 6.** The Basin Ponds and Basin Pond moraine as seen from Hamlin Ridge.

### Chimney Pond

Chimney Pond is 3.3 miles up the trail from Roaring Brook Campground. Chimney Pond is a small circular lake that occupies the bottom of South Basin. Geologically, it is called a tarn, a lake found in the basin of a cirque (Figure 7). It is fed by runoff from the surrounding steep mountain slopes and is often dammed downslope by bedrock or a moraine. The Chimney Pond cirque initially formed by glacial processes and erosion continues today by way of freeze-thaw action and mass-wasting.

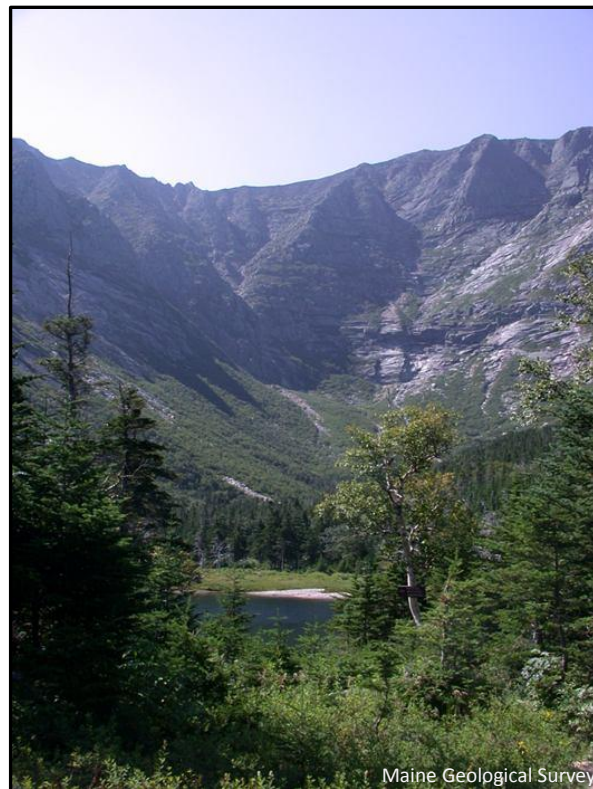


Photo by Robert A. Johnston

**Figure 7.** Chimney Pond (2914') in the center of the South Basin, Baxter State Park.



### Arêtes

Looking south from the Chimney Pond Campground, one can view the Knife Edge (Figure 8), a feature known as an arête, a sharp, steep-sided ridge which separates two areas of glaciation. It forms from the headward erosion of two alpine glaciers and is kept sharp by modern active physical erosion processes.



Photo by Robert A. Johnston

**Figure 8.** Looking south from the Chimney Pond area at Pamola Peak and the Knife Edge Trail, Baxter State Park.



### Arêtes

A hiking trail follows the Knife Edge from Pamola Peak to Baxter Peak. Looking north from Chimney Pond, one views Hamlin Ridge, also an arête, separating the South Basin cirque from the North Basin (Figure 9).

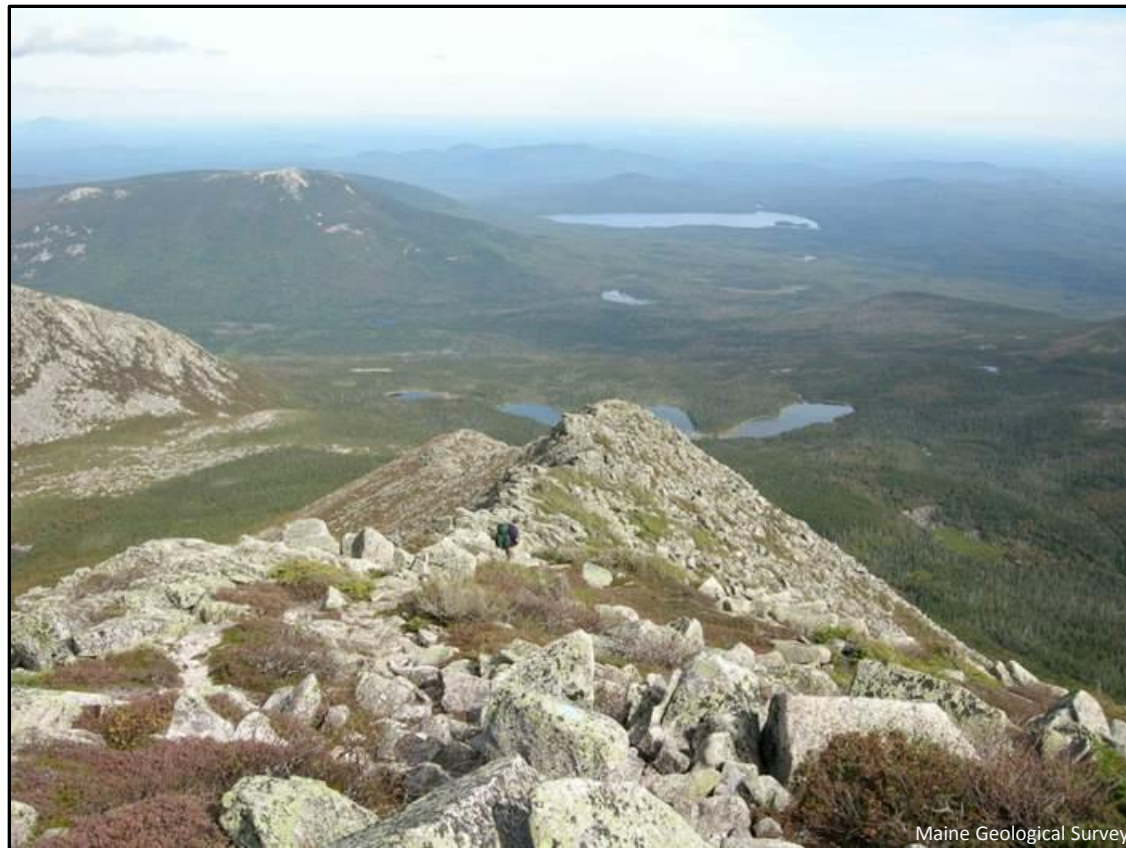


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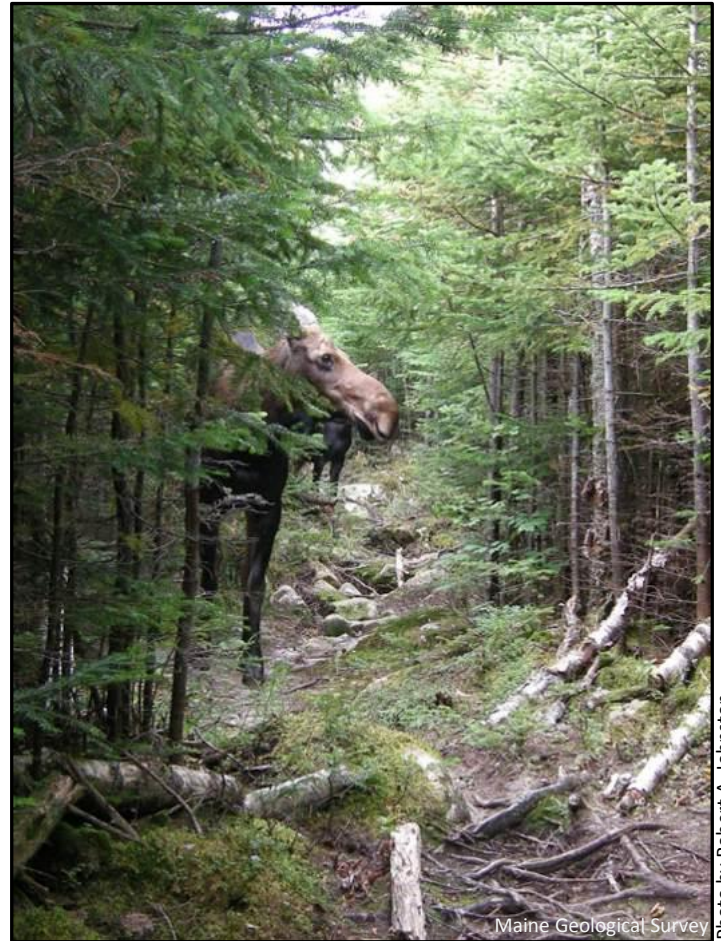
**Figure 9.** Hamlin ridge arête.





## Local Fauna

As you continue, watch for the local fauna! (Figure 10 and Figure 11)



**Figure 10.** Keep your distance from a mother moose and calf on the hiking trails!

Local Fauna



Photo by Robert A. Johnston

**Figure 11.** Spruce grouse.

References and Additional Information

- Caldwell, D. W., and Davis, P. T., 1983, The timing of alpine glaciation of Mt. Katahdin, in Caldwell, D. W., and Hanson, L. S. (editors), A guidebook for the Greenville-Millinocket regions, north central Maine: New England Intercollegiate Geological Conference, 75th Annual Meeting, Boston University, Boston, Massachusetts, p. 79-86.
- Davis, P. T., 1989, Late Quaternary glacial history of Mt. Katahdin and the nunatak hypothesis, in Tucker, R. D., and Marvinney, R. G. (editors), Studies in Maine geology: Volume 6: Quaternary geology: Maine Geological Survey, p. 119-134.
- Hon, R., 1980, Geology and petrology of igneous rock bodies within the Katahdin pluton, in Roy, D. C., and Naylor, R. G. (editors), New England Intercollegiate Geological Conference guidebook for field trips in northern Maine and neighboring New Brunswick, p. 65-79.

