

Geologic Site of the Month
September, 2010

***Geology of the 'Little Knife Edge'
Baxter State Park, Maine***



46° 4' 13.43" N, 68° 50' 37.45" W

Text by
Robert A. Johnston



Introduction

The 'Little Knife Edge' is a short portion of trail (~1/2 mile) on the Traveler Mountain Loop in Baxter State Park between the Peak of the Ridges summit and Traveler Mountain peak (Figure 1). The trail, named because its spectacular exposure is similar to the Knife Edge Trail near Baxter Peak, crosses the Black Cat Member of the Traveler Rhyolite.



Photo by Robert A. Johnston

Figure 1. Photograph of the 'Little Knife Edge' looking back from the scree slope on Traveler Mountain. Peak of the Ridges is the high point on the photograph.



Introduction

The rock is a highly compacted, welded ash-flow tuff containing ten percent small phenocrysts of plagioclase and pyroxene (Rankin and Caldwell, 2010). Structural features in this rock make for interesting terrain (Figure 2).

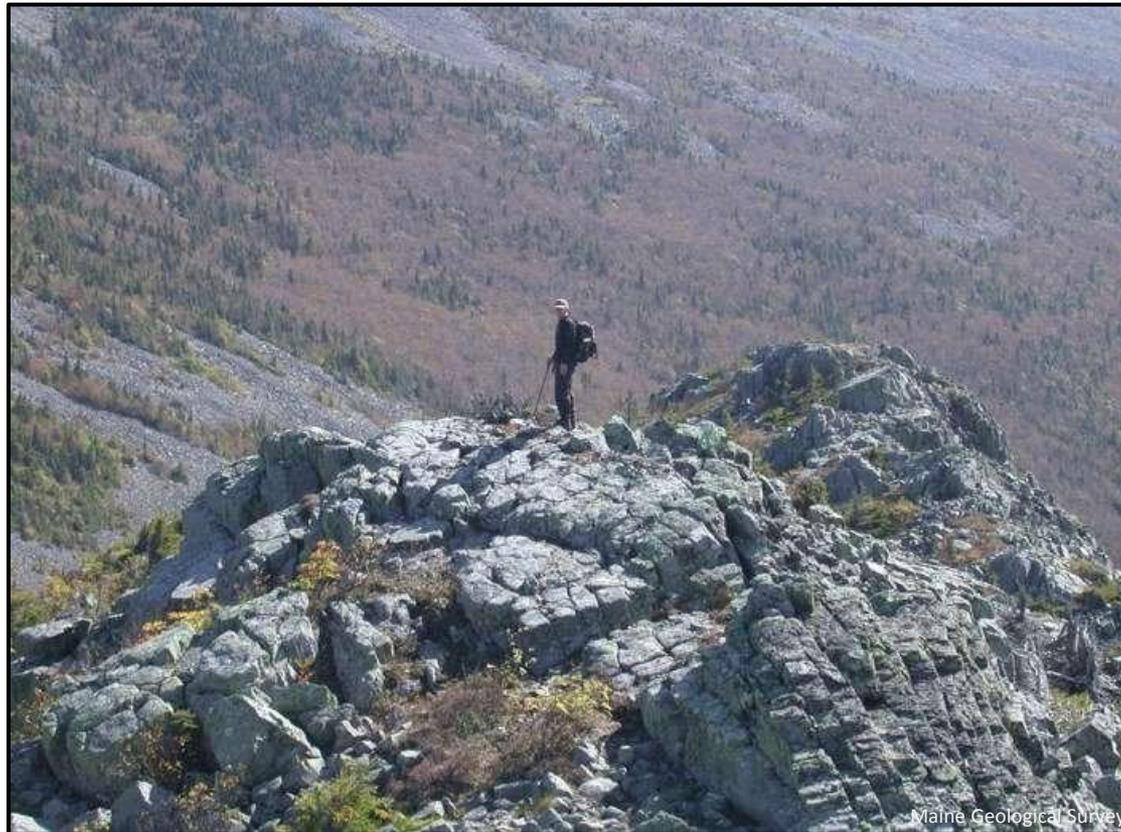


Photo by Robert A. Johnston

Figure 2. Columnar jointing in the Black Cat Member of the Traveler Rhyolite along the 'Little Knife Edge'.



Traveler Mountain Loop

The Traveler Mountain Loop is a rugged 10.1 mile hike from the South Branch Pond Campground (Figure 3). Spectacular views from the mountain tops and ridges make this a worthwhile hike. Average hiking time for fit hikers is between 9 and 10 hours and the trail covers three mountain summits over 3000 feet: Peak of the Ridges (3254'), Traveler Mountain (3541') and North Traveler Mountain (3152'). It is recommended that hikers do the loop in a counterclockwise direction, going from the Center Ridge Trail to Traveler, over to North Traveler, and then down to South Branch Pond.

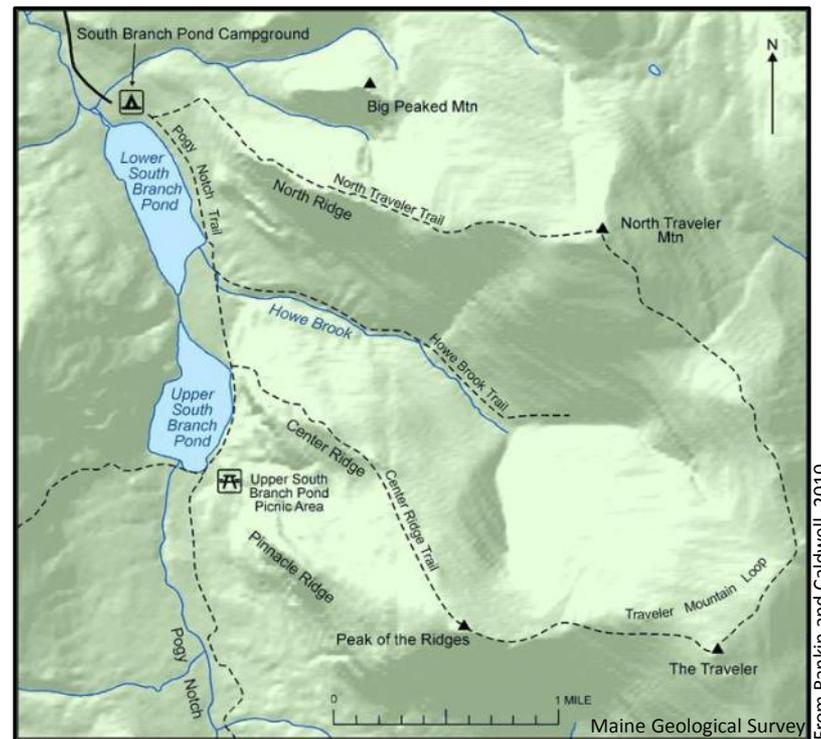
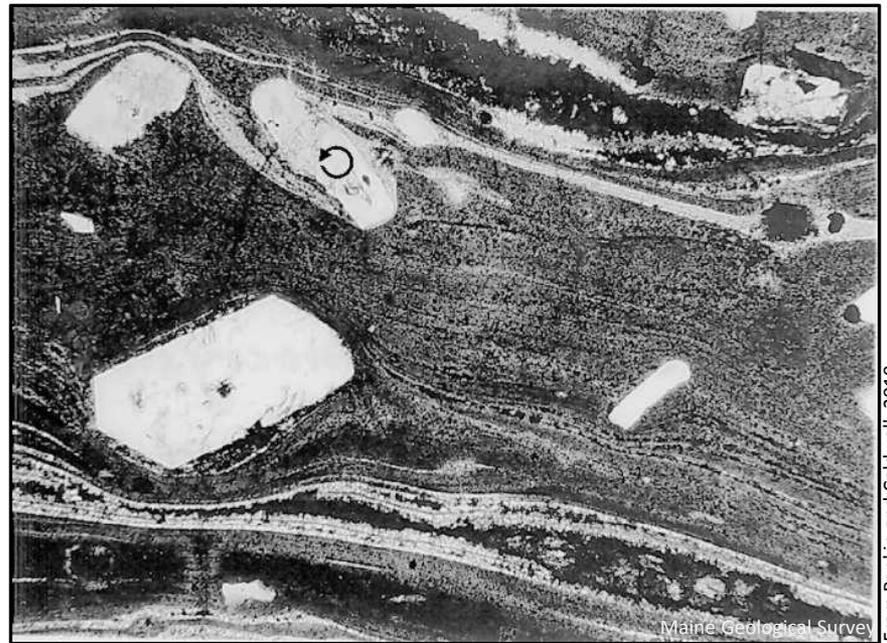


Figure 3. Location map for the Traveler Mountain Loop (from Rankin and Caldwell, 2010).



Traveler Rhyolite

The entire loop trail is over the Black Cat Member of the Traveler Rhyolite. This deposit is named for outcrops on nearby Black Cat Mountain. The Black Cat Member overlies the slightly older Pogy Member of the Traveler Rhyolite (also an ash-flow tuff deposit). The Traveler Rhyolite is composed of a series of hot ash flows that are now stacked upon each other with the older Pogy Member on the bottom. The Black Cat Member is about 7000 feet thick and shows signs of being emplaced at a very high temperature. A number of the phenocrysts appear to have rolled or have end-to-end rotation indicating a down-slope movement after the welding and flattening of the pumice fragments (Figure 4).



From Rankin and Caldwell, 2010

Figure 4. Photograph taken through a microscope of a thin section Black Cat Member welded tuff. A rotated plagioclase phenocryst (shown by arrow) indicates movement (right to left) after welding (from Rankin and Caldwell, 2010).



Traveler Rhyolite

Ash flows that make up the Traveler Rhyolite were deposited as nearly flat layers. These horizontal layers have been folded since emplacement by a variety of geologic processes. Also quite noticeable on the 'Little Knife Edge' are the columnar joints. They range in diameter from a few inches to a few feet and can be upwards of tens of yards long (Figure 5).



Photo by Robert A. Johnston

Maine Geological Survey

Figure 5. Columnar joints along the 'Little Knife Edge' section of the trail.



Traveler Rhyolite

Often a hexagonal shape is visible at the top end of the column like these from the summit of the Peak of the Ridges (Figure 6).

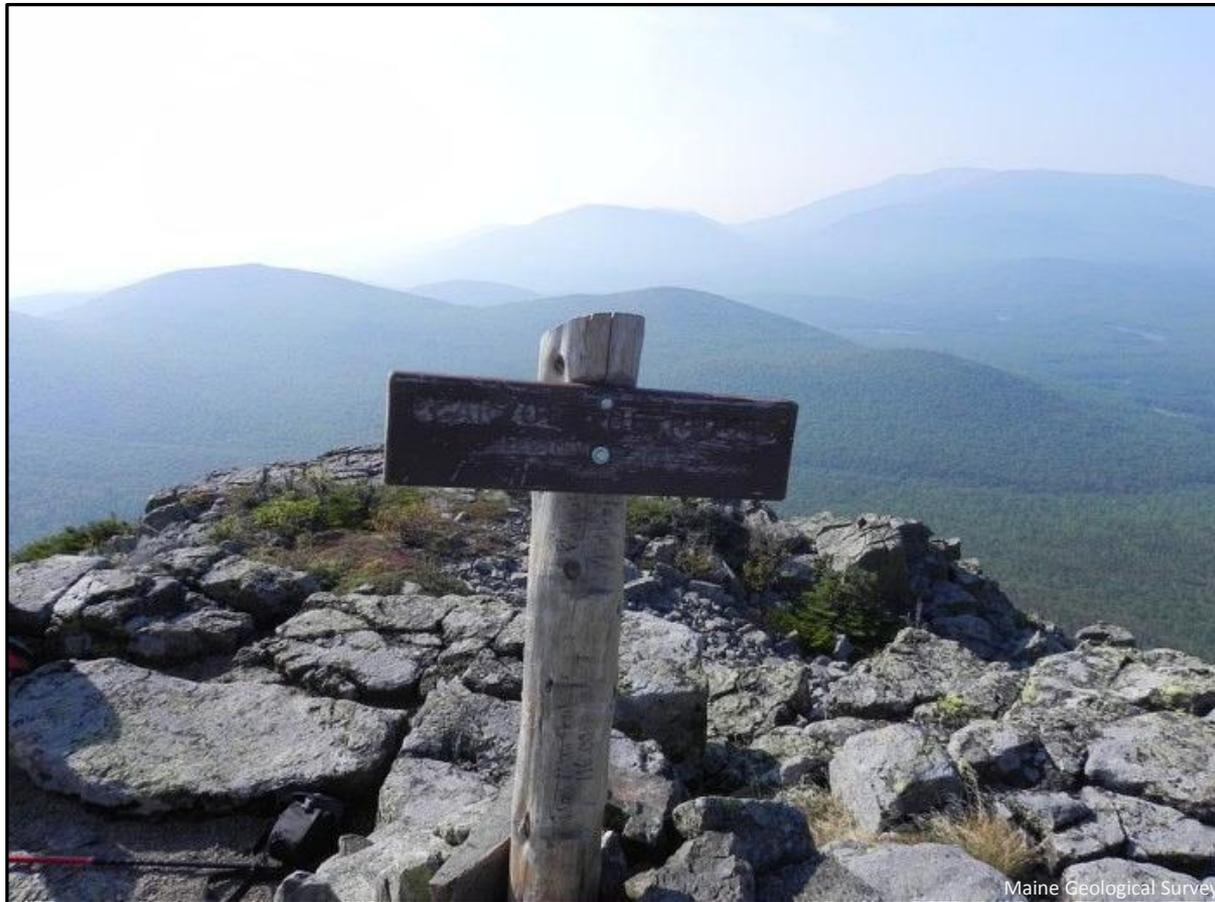


Photo by Robert A. Johnston

Maine Geological Survey

Figure 6. Hexagonal shapes can be seen at the ends of the columns here at the summit of the Peak of the Ridges.



Little Knife Edge

One of the most beautiful areas of Baxter State Park is found along the 'Little Knife Edge' on the Traveler Loop Trail (Figure 7).



Figure 7. Hikers along the 'Little Knife Edge' on the Traveler Mountain Loop Trail in Baxter State Park.

Little Knife Edge

Spectacular views can really be enjoyed after some moderate hiking. This rugged environment is a great place to enjoy some of Maine's interesting flora (Figure 8), fauna and geology.



Photo by Robert A. Johnston

Maine Geological Survey

Figure 8. Mountain cranberry (*Vaccinium vitis-idaea*) and other alpine flora along the ridge of the 'Little Knife Edge'.

References and Additional Information

Nation, P. and Cummings, B., 2005, AMC Maine mountain guide (9th edition): Appalachian Mountain Club Books, Boston, 261 p.

Rankin, D.W., and Caldwell, D.W., 2010. A Guide to the Geology of Baxter State Park and Katahdin. Maine Geological Survey, Bulletin 43, 80 p., 2 maps.

