

Geologic Site of the Month  
October, 2009

***The Geology of Gulf Hags  
Bowdoin College Grant East, Maine***



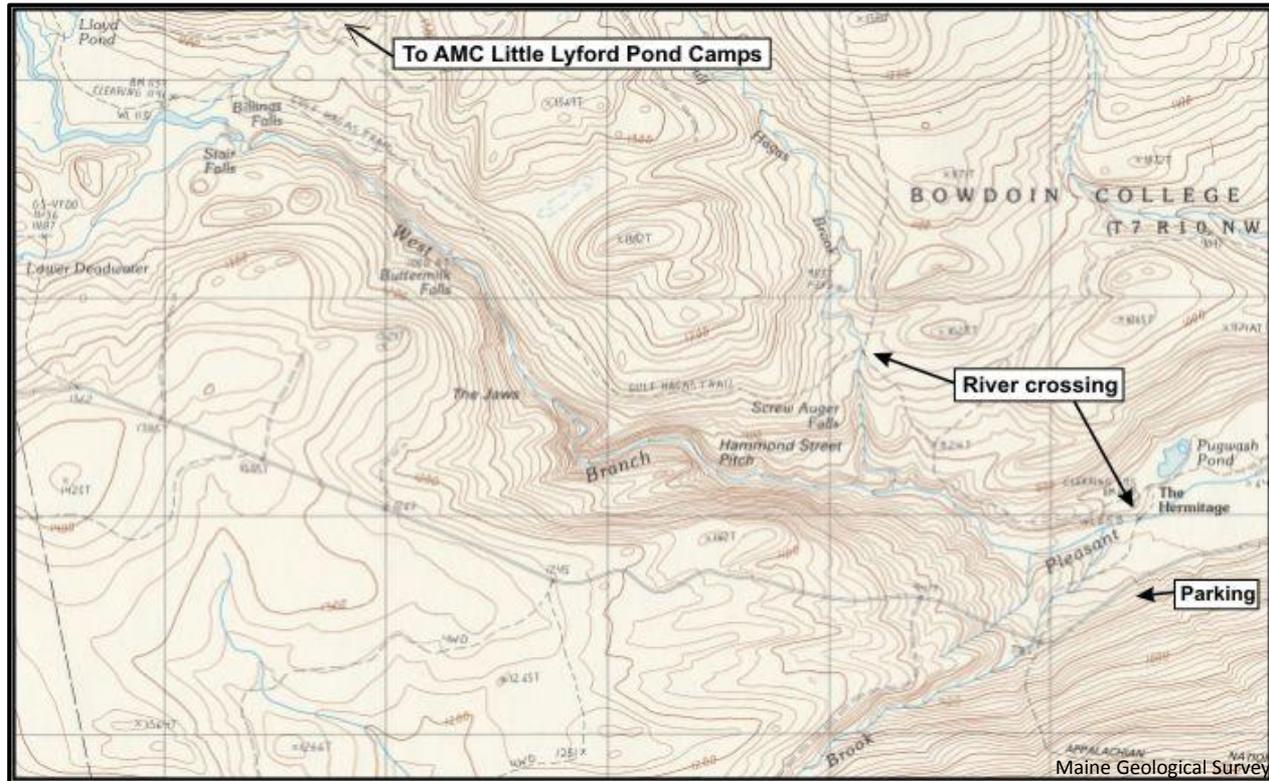
45 28' 50.69" N, 69 18' 12.75" W

Text by  
Robert A. Johnston



## Introduction

Gulf Hagas is a scenic natural area of waterfalls along the West Branch of the Pleasant River in northern Piscataquis County. Gulf Hagas is located in Bowdoin College Grant, East Township (T7 R10 NWP), approximately 15 miles northwest of Brownville Junction.



**Figure 1.** Map of the Gulf Hagas Registered National Landmark. For trail map see the AMC Maine Mountain Guide (2005).



## Introduction

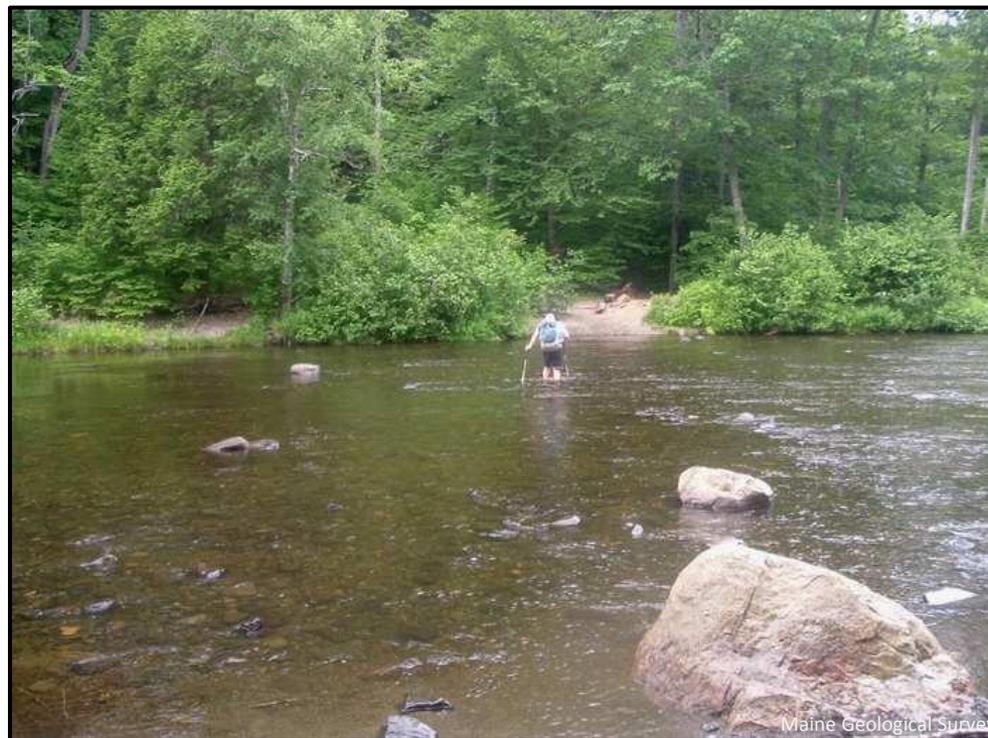
The area, owned by the National Park Service, is a Registered Natural Landmark and is close by the Appalachian Trail and the Hermitage, an old growth pine forest managed by the Nature Conservancy. It is an eight mile loop to hike the Rim Trail and Pleasant River Tote Road around Gulf Hagas, with many interesting side trails to dynamic waterfalls, pools, chutes, and rapids.



**Figure 2.** Trail sign showing distances along the Gulf Hagas Rim Trail.

### Viewing Gulf Hagas

A hike into Gulf Hagas involves the fording of both the West Branch of the Pleasant River and Gulf Hagas Brook (Figure 3). **These crossings can be dangerous in high water!** The AMC Maine Mountain Guide (2005) recommends hiking up the Rim Trail with its series of side paths to the river. It is a 4.1 mile hike from the parking area on the K-I Road to Stair Falls and then a 3.3 mile return hike along the Pleasant River Tote Road (see AMC Maine Mountain Guide map).

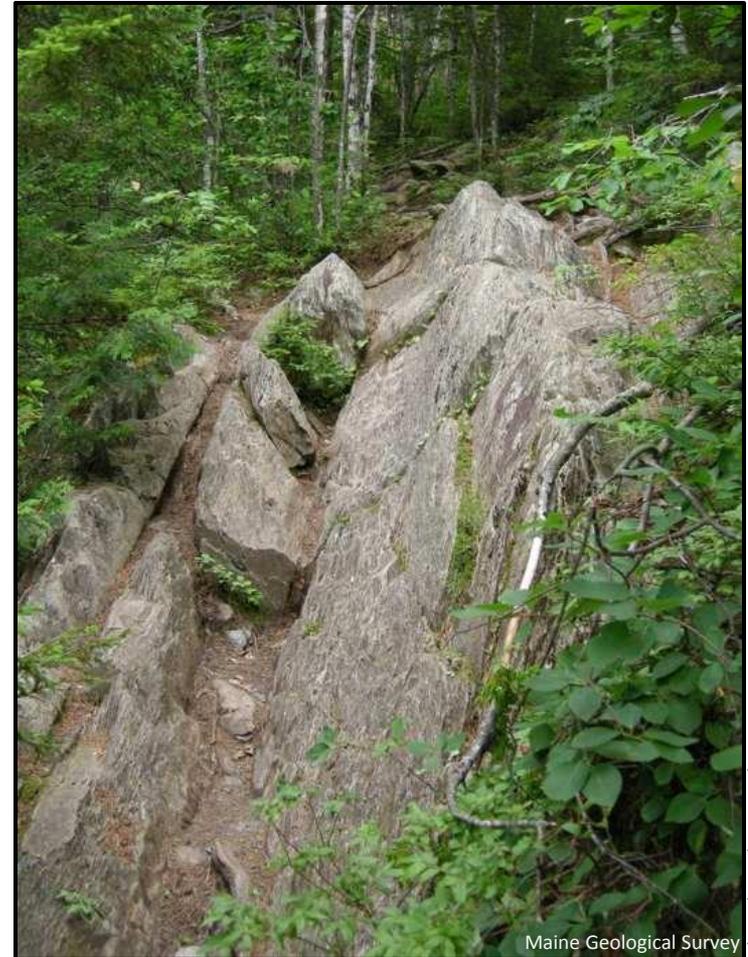


**Figure 3.** An Appalachian Trail thru-hiker crossing the West Branch of the Pleasant River in low-water conditions.



## The Geology of Gulf Hagas

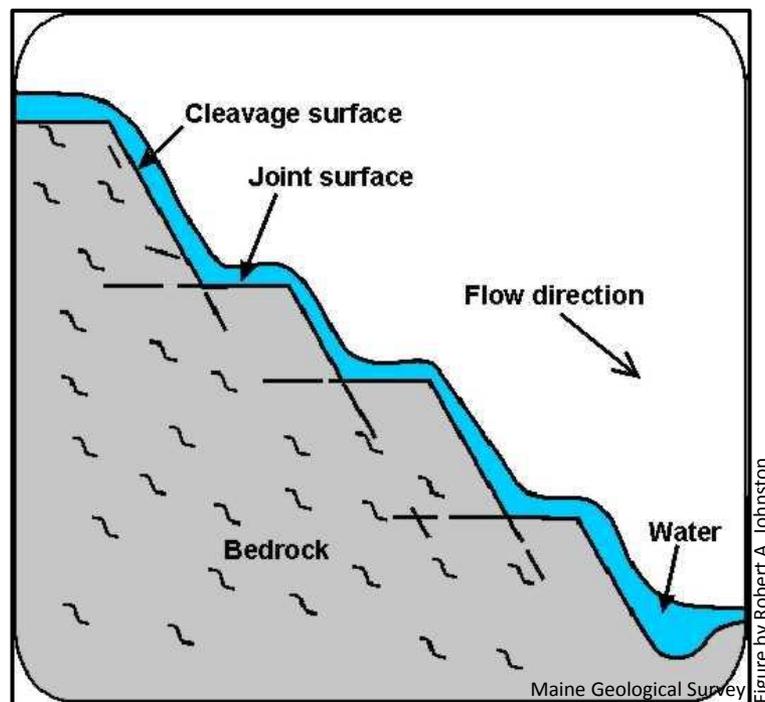
In Gulf Hagas, the West Branch of the Pleasant River falls approximately 400 feet in four miles, through a massive pelite member of the Carrabassett Formation of Devonian age. This mudstone is a medium-grade, foliated metamorphic rock (Hanson and Sauchuk, 1991) which was deposited on a submarine slope that led to a deeper basin. The slope on which the mud was deposited was unstable and tectonic activity remobilized sediments. These were redeposited in a variety of slumps and debris flows in the deeper basin. Metamorphic and tectonic activity over hundreds of millions of years has folded these rocks into their present configuration. The dip of beds in this area is close to vertical in attitude (Figure 4).



**Figure 4.** Outcrop along the Rim Trail showing the high angle bedding in the Carrabassett Formation.

### The Geology of Gulf Hagas

The modern drainage of the West Branch of the Pleasant River evolved after the final melting of the continental ice sheets over ten thousand years ago. The river followed the easiest path downhill and began downcutting into the underlying bedrock. The Gulf Hagas waterfalls developed over the foliated bedrock surface with the cleavage of the rock dipping downstream at a high angle (Figure 5). Large blocks of bedrock cannot fall away from under the lip of the falls so a series of waterfalls form over the landscape.



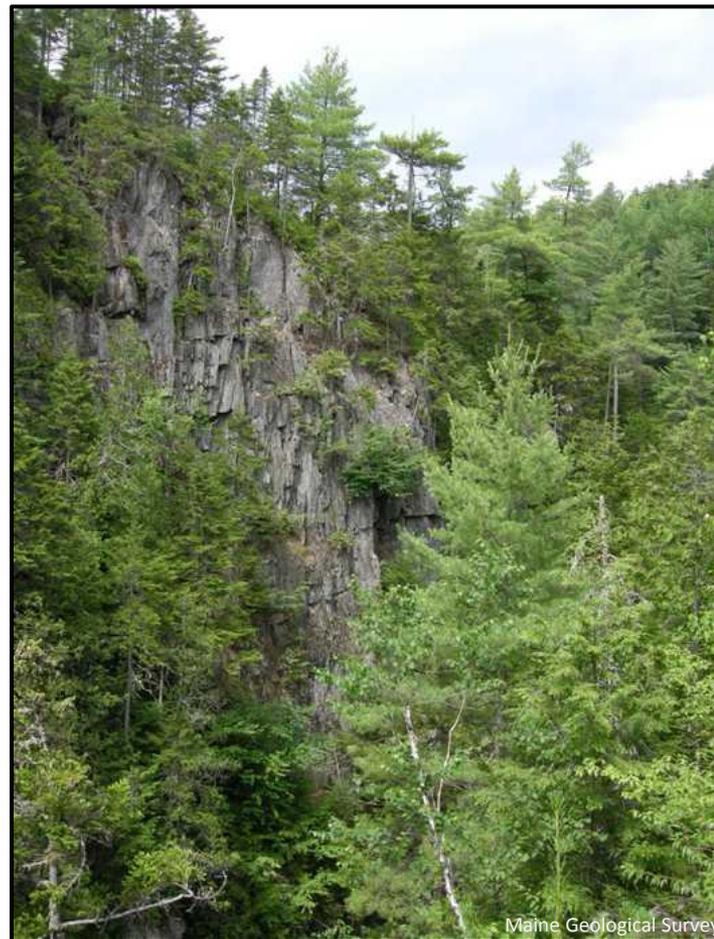
**Figure 5.** Schematic cross section of waterfall formation at Gulf Hagas over the foliated bedrock surface with the cleavage of the rock dipping downstream at a high angle (modified from Brewer, 1978).

## Gulf Hags Features

The following features are presented in order from the Rim Trail Hike.



**Figure 6.** Screw Auger Falls along Gulf Hags Brook.

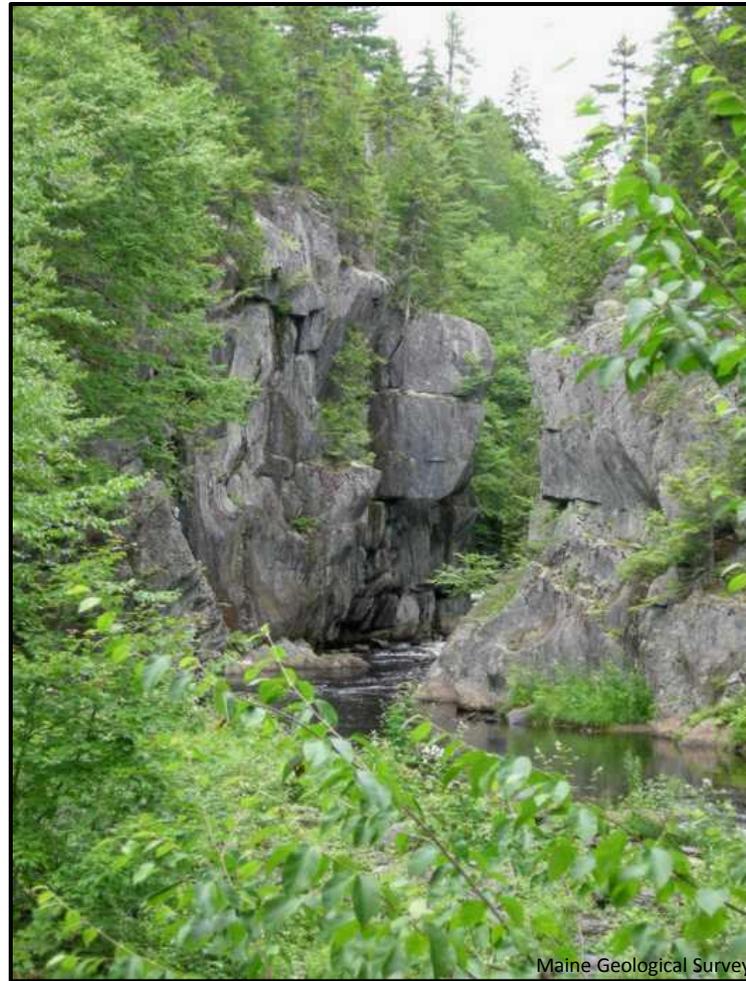


**Figure 7.** Hammond Street Pitch with its high vertical walls along the West Branch of the Pleasant River.

Photos by Robert A. Johnston



Gulf Hags Features



**Figure 8.** The Jaws. It is reported that early loggers used dynamite to expand this opening to allow for the passage of logs.

Gulf Hagas Features



Photo by Robert A. Johnston

Maine Geological Survey

**Figure 9.** Buttermilk Falls

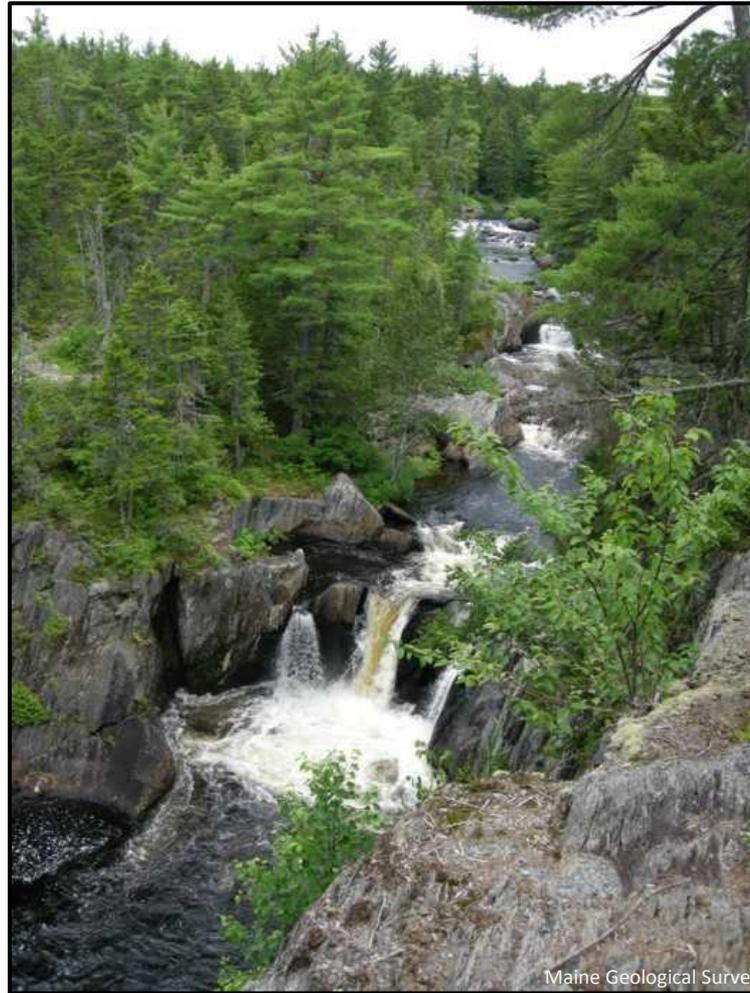


Gulf Hagas Features



**Figure 10.** Billings Falls, a popular swimming hole.

Gulf Hags Features



**Figure 11.** Stair Falls, a series of waterfalls along the West Branch of the Pleasant River.

## References and Additional Information

- Nation, P. and Cummings, B., 2005, AMC Maine Mountain Guide, 9th Edition: Appalachian Mountain Club Books, Boston, Massachusetts, 261 p.
- Brewer, T., 1978, Waterfalls in Maine and their relevance to the Critical Areas Program of the State Planning Office: Planning Report No. 60, Maine State Planning Office, 66 p.
- Caldwell, D. W., and Hanson, L. S., 1983, Guidebook for field trips in the Greenville-Millinocket regions, north-central Maine: New England Intercollegiate Geological Conference, 75th Annual Meeting, 197 p.
- Hanson, L. S., and Sauchuk, S. A., 1991, Field Guide to the geology and geomorphology of the Carrabassett Formation and economic deposits in central Maine: Geological Society of Maine, Fieldtrip Guide for the Summer Meeting, 42 p.

