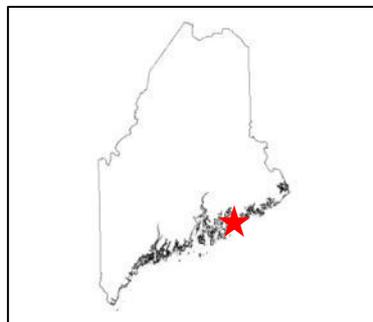


Geologic Site of the Month  
October, 2010

***Earth shattering events at Mount Desert Island!***



44° 17' 53.61" N, 68° 12' 41.59" W

Text by  
Robert Marvinney



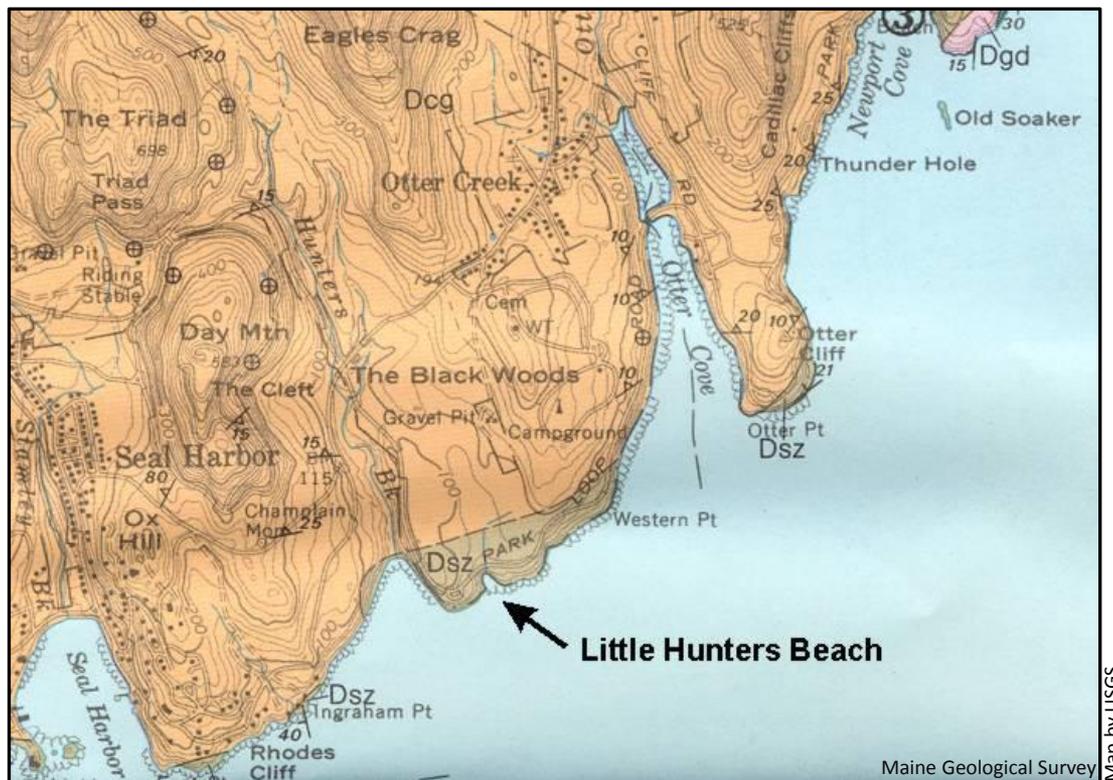
## Introduction

Back in the Silurian Period around 420 million years ago, the area that we now call Mount Desert Island was an explosive place that was best avoided! At depth in the crust, molten magma moved upward and differentiated as it cooled into several distinctive rock types. The silica-poor portions of the magma became the dark colored igneous rocks diorite and gabbro. The silica-rich magma became the light colored igneous rock granite. Through complex processes, the magmas explosively intruded into the crust to form a bowl-shaped intrusion of diorite and gabbro on the rim and granite in the center. The granite makes up a large portion of the island and is well exposed on Cadillac Mountain. The intrusion was so forceful that it violently broke the surrounding rock into which it intruded, forming an unusual feature called the Shatter Zone. This zone nearly completely surrounds the Cadillac Granite and is over a mile wide in places. The rocks in this zone are composed of great fragments of the surrounding country rocks frozen in a matrix of granite.



Bedrock Geology

The shatter zone is well exposed at a number of localities on Mount Desert Island, and quite spectacular at Little Hunters Beach, just off the Park Loop Road between Otter Cove and Seal Harbor. Here the Shatter Zone incorporates chunks of the Bar Harbor Formation: well-layered tan or lavender siltstone and sandstone.



**Figure 1.** Portion of the bedrock map of Mount Desert Island (Gilman and others, 1988) showing the location of Little Hunters Beach. "Dsz" on the map represents distribution of the shatter zone. The lighter orange color represents areas underlain with Cadillac Granite.



Little Hunters Beach



Photos by R. Marvinn



**Figure 2.** The steep steps down to Little Hunters Beach and a reminder to obey all park rules.

Shatter Zone



Photo by R. Marwinney

**Figure 3.** A typical exposure of the Shatter Zone showing blocks of layered Bar Harbor rocks floating in a soup of light-colored granite. Many blocks are angular but some are rounded, suggesting that they had begun to melt and become assimilated by the granite magma.



Shatter Zone



Photo by R. Marwinney

**Figure 4.** Some sections of the Shatter Zone contain abundant blocks of gabbro, like the dark, angular ones shown here. This suggests that the massive explosion that created the zone happened after emplacement of the gabbro.

Shatter Zone



**Figure 5.** This image shows a large block of layered siltstone (Bar Harbor Formation) that has been folded and broken. The rocks had to be fairly hot - from the intrusion of the magma - in order to be flexible enough to fold.

Shatter Zone



Photo by R. Marvinnay

**Figure 6.** Another image showing layers of siltstone folded, broken, and floating in the light-colored granite.

Shatter Zone



Photo by R. Marwinney

Maine Geological Survey

**Figure 7.** A large block of thinly layered siltstone (above the lens cap) is almost ghost-like in appearance. This block had begun to melt and was nearly assimilated into the granite when the mass cooled enough to freeze it in place.

Further Reading

[The Geology of Mount Desert Island](#), by Richard Gilman, Carleton Chapman, Thomas Lowell, and Harold Borns, 1988, Maine Geological Survey.

