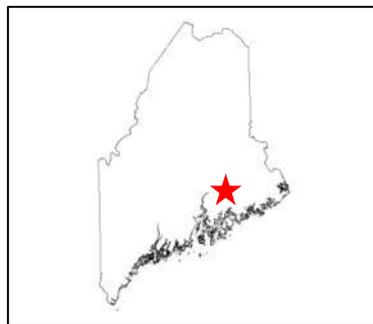


Geologic Site of the Month
November, 2012

Big Rock - An Erratic in Waltham, Maine



44 41' 20.31" N, 68 18' 43.74" W

Text by
Thomas K. Weddle



Introduction

This Geologic Site of the Month is another locally famous, very large boulder (see the websites about [Balancing Rock](#) and [Daggett Rock](#)) that was transported to its location by continental glacier during the Ice Age. Such boulders are often called erratics because they are composed of rock that is generally (but not necessarily) different from the bedrock beneath the boulder.

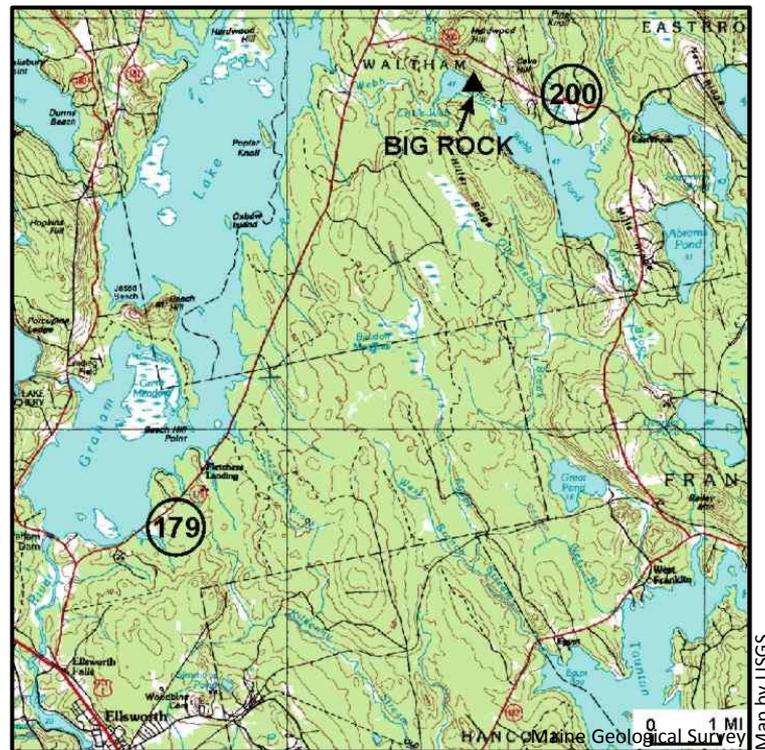


Figure 1. Location Map, showing route numbers.



Location

From Ellsworth head north on Route 179 to Cave Hill Road (Route 200) and turn right (East). Continue until you see Leona Wilbur Road and turn right (South) and follow road to intersection with road where a sign for Big Rock is seen; turn right and proceed to end of road and park. Follow path to Big Rock.



Figure 2. Aerial photo of the area.



Big Rock

Big Rock's dimensions are approximately 30 feet wide by 30 feet high by 60 feet in length. It is approximately 54,000 cubic feet and weighs about 3375 tons.



Maine Geological Survey

Photo by Thomas K. Weddle

Figure 3. Access path to Big Rock.



Big Rock

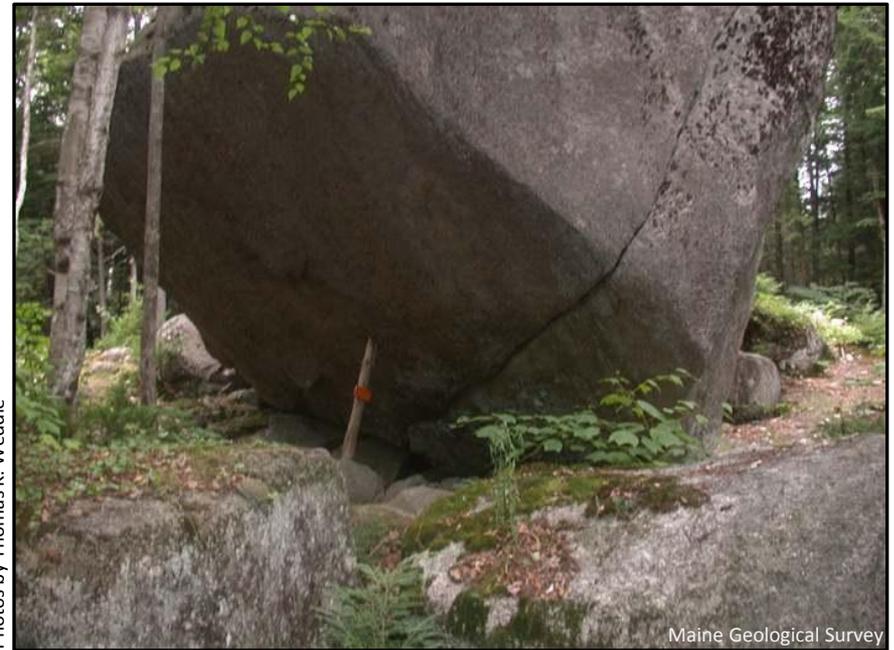


Photo by Thomas K. Weddle

Figure 4. View to the east of Big Rock



Big Rock



Photos by Thomas K. Weddle

Figure 5. Views of Big Rock from the north with a humorous stick appearing to hold it up.

Big Rock



Photo by Thomas K. Weddle

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Figure 6. View to south; orange field book for scale.



Granite

The size of the boulder itself is very impressive, but Big Rock also has features in it that tell us something about its origin, long before it became a glacial erratic boulder. Big Rock is primarily composed of granite.



Photo by Thomas K. Weddle

Figure 7. Big Rock granite. It contains the minerals quartz (medium gray), two varieties of feldspar (white to light gray), and biotite mica (black). The pinkish color on the rock is due to weathering of the granite. (Penny for scale)

Interesting Details

Embedded in the massive granite of Big Rock, there are several isolated masses of other rock types that look very different from the granite. These areas of other rock come in a variety of sizes, colors, and shapes, though most are small, dark gray, and rounded.



Photo by Thomas K. Weddle

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Figure 8. Dark gray, fine-grained enclave approximately 1 foot by 2 feet within the granite of Big Rock. The upper edge of the enclave is very irregular, due to interaction of the two types of magma before they had completely solidified.



Interesting Details

Some dark patches, called enclaves, represent blobs of magma of a different composition from granite that mixed into the granite when they were both molten (Figures 8-9).



Figure 9. Close-ups of edge of enclave shown in Figure 8. Note large light gray feldspar grains within the dark gray enclave. These grains became separated from the partially crystallized granite, and mixed into the enclave magma while it was still molten. The photo on the right has a small stringer of granite cutting the enclave.

Interesting Details

Other bits of foreign rock, called xenoliths, represent fragments of solid metamorphic rock that were engulfed by the granite magma when it rose through the earth's crust (Figure 10).



Figure 10. Small xenolith of metamorphic rock enclosed by granite of Big Rock. This feature may be a fragment of adjacent rock that was engulfed by the granite at the time the molten granite intruded.

Interesting Details

For some dark patches, it is not clear whether they are enclaves or xenoliths (Figure 11).



Figure 11. Small patches of dark rock (probably enclaves) in granite at the base of the Big Rock boulder.

Source Area

Before it was carried to this place by the glacier, Big Rock was originally part of the bedrock. The granite of Big Rock can be compared to bedrock in the area (Figure 12) to try to determine where the rock may have come from.

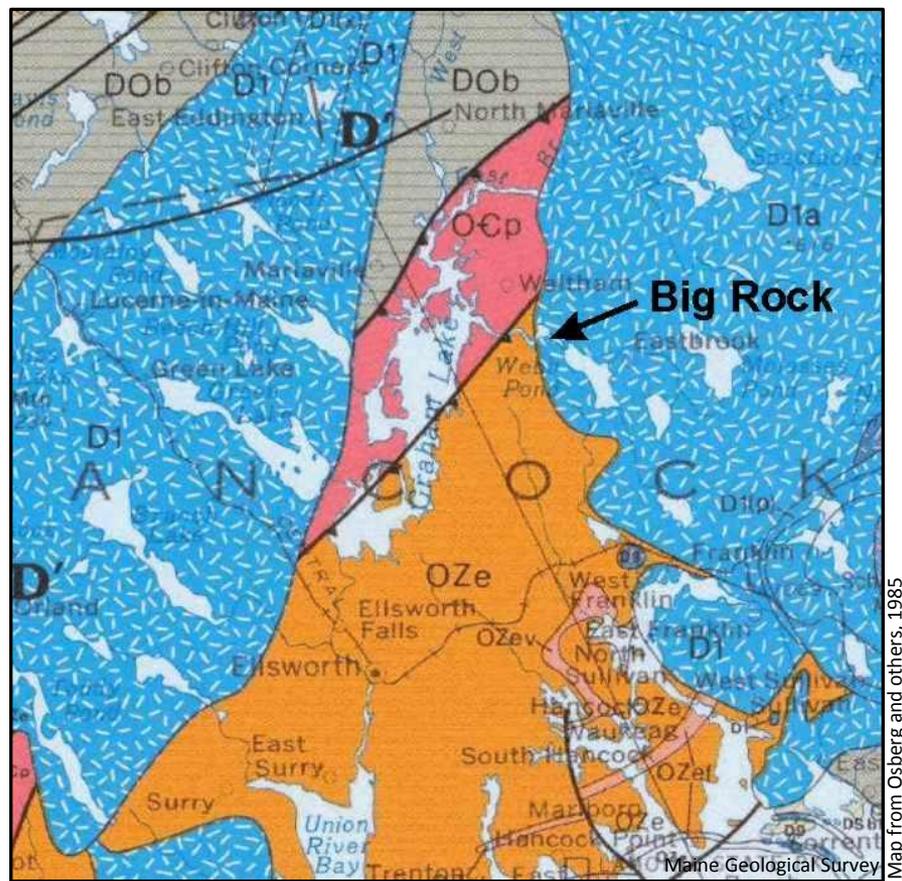


Figure 12. D1 = Lucerne Granite, D1a = Deblois Granite



Source Area

The Geologic Map (Figure 12, Osberg and others, 1985) shows that the bedrock beneath Big Rock is the Deblois Granite. There is a bedrock exposure of Deblois Granite in a small gravel pit near the Big Rock parking area.



Photo by Thomas K. Weddle

Figure 13. Deblois Granite, from a small gravel pit near the Big Rock parking area. Note rims of light-colored feldspar enclosing slightly darker feldspar. The rock type is similar to that of Big Rock. There is a small xenolith below the penny.



Source Area

Another possibility is that Big Rock could have come from the [Lucerne Granite](#), which is found to the northwest of Big Rock (Figure 12). It is characterized by large feldspar grains, although a range of smaller grains are also present. As with all true granites, the Lucerne Granite is composed of three main minerals - two types of feldspar and quartz - in roughly equal proportions. In the Lucerne Granite, the sodium-rich feldspar (plagioclase) is generally more milky white, and the potassium-rich feldspar (alkali feldspar) is generally grayish-white and slightly translucent. The quartz is a darker gray color, and more translucent like stained glass.



Photo by Henry Berry

Figure 14. Close up of Lucerne Granite from a bedrock outcrop along Route 1A in Lucerne, Maine.



Source Area

Unfortunately, the Lucerne and Deblois granites can be quite similar in mineral composition and texture, and in the size of their mineral grains. So if Big Rock is from the Deblois, it could have been transported a very short distance, and if it is from the Lucerne, it may have been transported as far as ten miles by glacier ice.

Visit Big Rock for yourself and see what you can find.



References and Additional Information

Osberg, Philip H., Hussey, Arthur M., II, and Boone, Gary M. (editors), 1985, [Bedrock geologic map of Maine](#): Maine Geological Survey (Department of Conservation), scale 1:500,000.

