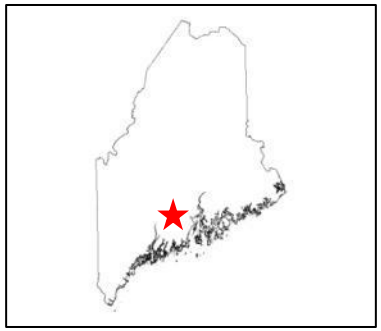
Geologic Site of the Month

June, 2007

Geology of Jamies Pond
Augusta, Hallowell, and Manchester, Maine



44° 16‘ 55.83“ N, 69° 51‘ 27.46“ W

Text by
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Introduction

Jamies Pond is the centerpiece of a 550-acre wildlife management area maintained by the Maine Department of Inland Fisheries and Wildlife. The pond's past history as a water supply for the City of Hallowell is partially responsible for its preservation in such a pristine state so close to populated areas.

Figure 1. This management area was developed cooperatively under the wildlife restoration act with assistance from the Land for Maine's Future Program, the Outdoor Heritage Fund, the city of Hallowell, and the town of Manchester.

Jamies Pond

Well-maintained trails provide the visitor easy access to a variety of habitats that are home for abundant wildlife. A hand-carry boat launch encourages boaters and fishermen to enjoy the clear waters of the pond (Figure 2).

Photo by Robert G. Marvinney

Figure 2. A view from a kayak in the pond.

Bedrock Geology

The trails and lakeshore also afford excellent opportunities to investigate the fascinating geology of the area. The colors on the geologic map (Figure 3) represent the different rock units exposed in the Jamies Pond area.

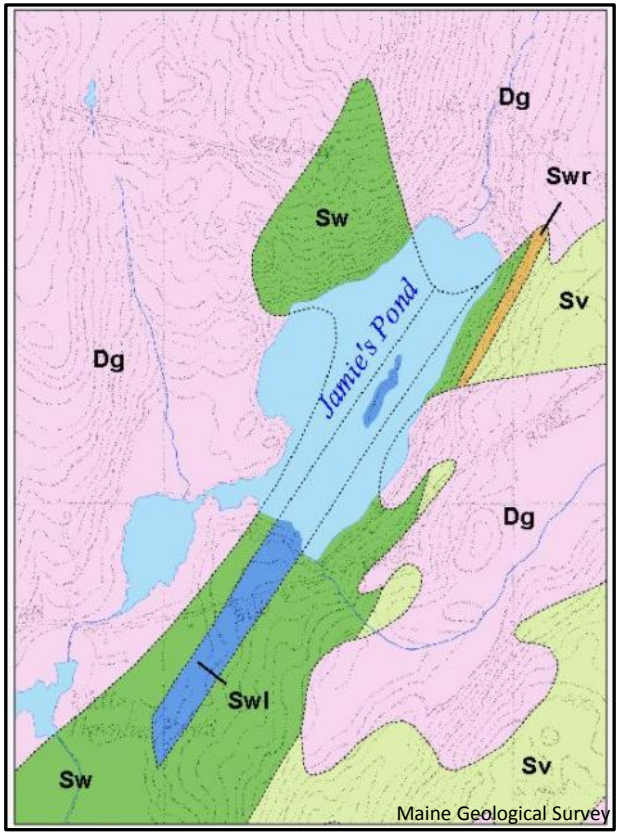

Figure 3. Bedrock geology map of the Jamies Pond area: Sw (dark green) is Waterville Formation, Swl (blue) is a marble unit within the Waterville Formation, Swr (orange) is a rusty schist within the Waterville Formation, Sv (light green) is Vassalboro Formation, and Dg is Devonian granite.

Waterville Formation

The oldest unit in the area is the Waterville Formation (Figure 4) shown in dark green on the map (also symbol Sw on the map). It consists mostly of schist in thin beds that are usually no more than a inch or so thick. The schist has much mica in it - mostly dark biotite and light muscovite. In places, the beds contain very fine layers of quartz. The best place to see schists of the Waterville Formation is in the area between Meadowhill Road and the northwest shore of the pond.

Figure 4. Thin beds of schist in the Waterville Formation. On the right side are thin layers rich in quartz. On the left side are layers rich in mica minerals. The light colored spots in the rock are clots of the metamorphic mineral sillimanite which grew when the rocks of this area were heated to very high temperatures hundreds of millions of years ago.

Waterville Formation

Within the Waterville Formation is a distinct unit of thinly bedded marble (Figure 5), shown in blue on the map (symbol Swl). The best place to see this rock is on the small island near the middle of the lake, which is nearly rimmed with exposures. Thin beds of marble, which have coarse grains of calcite are separated from each other by thin beds of mica schist. Because of their composition, the marble beds weather more easily and are usually recessed in an outcrop, while the schist is more resistant and stands up, giving these exposures a characteristic ribbed texture.

Figure 5. Marble exposed on the small island in Jamies Pond. Note the thin beds of marble that are granular in appearance because of the coarse grains of calcite that developed during metamorphism.

Waterville Formation and Vassalboro Formation

Marking the boundary of the Waterville Formation with the next youngest unit, the Vassalboro Formation, we often find a thin unit of dark gray schist (Figure 6 and Figure 7) that is full of sulfide minerals like pyrite (shown in orange on the map, symbol Swr). On fresh surfaces, the metallic sulfide minerals sparkle like gold in the sunlight, but remember, this is fool's gold!

Figure 6. Layers of rusty schist are nearly vertical in this image. The schist generally has beds less than an inch thick.

Waterville Formation and Vassalboro Formation

Left to the elements, the sulfide minerals rapidly deteriorate into rust, which gives most outcrops of this unit a distinctive rusty appearance. The best place to see this unit is near the boat launch at the north end of the pond. There, a small stream that flows into the pond just behind the former pump station exposes this schist just a few yards upstream. Look for the rusty layers.

Figure 7. A hand specimen of the rusty schist. Note the gray color of the fresh rock and rusty staining on the weathered surfaces. Bright spots on the sample are pyrite.

Vassalboro Formation

Next in our sequence of units is the Vassalboro Formation (light green, symbol Sv) (Figure 8). This unit generally has thick beds that are a mixture of quartz, feldspar, and biotite grains, giving the layers a distinct salt-and-pepper texture. These quartz-rich beds are usually separated one from another by thin beds of mica schist. This unit is not very well exposed in the Jamies Pond area, but you can see some of the beds a few hundred yards up the stream from the pump house, beyond the rusty schist and a large wall of granite. Better exposures of the Vassalboro Formation are at the western approach to the third bridge north of Augusta.

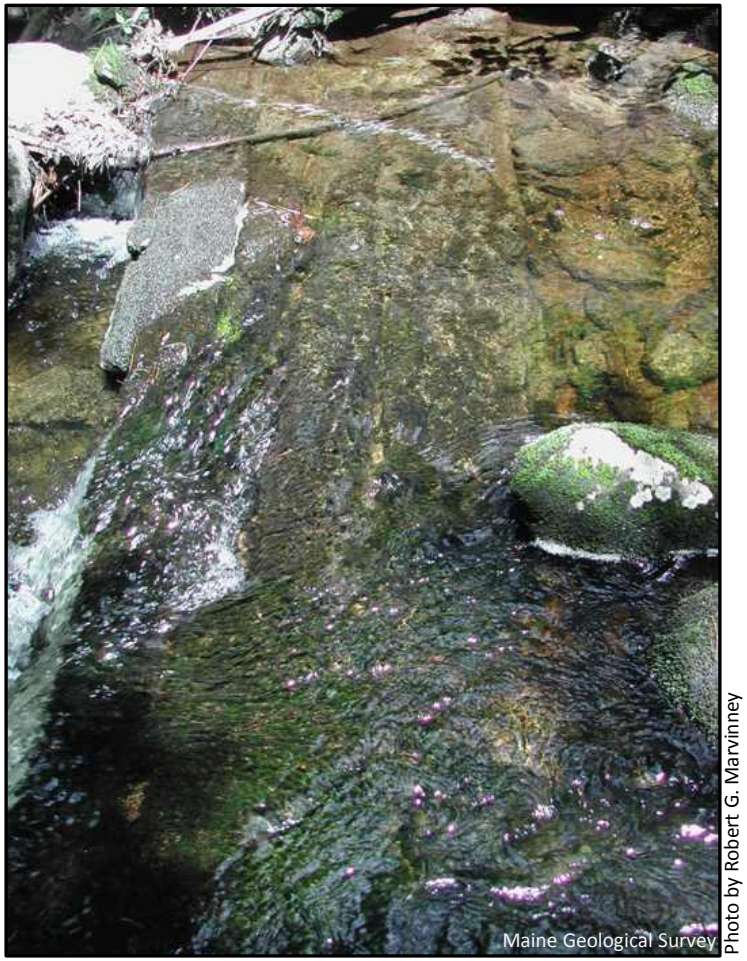

Figure 8. Thick beds of the Vassalboro Formation exposed in a small stream near Jamies Pond.

Granite

The youngest rock unit in the area is granite (pink on the map, symbol Dg) (Figure 9 and Figure 10). In the Jamies Pond area, the best exposures are on the western shore of the pond, but there are other smaller exposures scattered about many of the woods trails, and at the small former dam just north of the pond.

Figure 9. Large exposure of granite on the western shore of Jamies Pond is easily recognized by its light color.

Granite

The granite is a fine-grained mixture of gray quartz, white feldspar, and dark brown biotite mica, in which all the grains are nearly equal in size. Molten magma was the original source for this rock which subsequently cooled at depth. The exposures at Jamies Pond are part of a large body of granite, the Hallowell granite, which includes the former quarries at Granite Hill, and the new "quarries" behind the shops at Augusta's Marketplace shopping center.

Figure 10. Fractures (called joints) that are typical in granite allow the rock to be broken out in large blocks, making them favorable materials for the former quarry industry.

Surficial Geology

Many millions of years of erosion followed the development of the bedrock units such that rocks formed at depth in the crust (such as granite) are now exposed at the surface. The most significant episode of erosion to affect this area was that of glacial ice, which at its peak was many thousands of feet thick. Evidence for this episode is the basin of the pond itself which was gouged out by the ice, and glacial erratics around the area. Erratics (Figure 11) are boulders of one type of rock that do not match the rock in the solid ledge underneath and must have been transported from another area by glaciers.

Figure 11. A large erratic boulder of granite on the small island in the pond.

References and Additional Information

Kennebec Land Trust
Inland Fisheries and Wildlife