Grand Falls and Spencer Rips, Dead River

Maine Geologic Facts and Localities
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45° 17' 50" N, 70° 13' 20" W

Text by
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Flowing freely through the mountains of west-central Maine, the Dead River in its sinuous, deeply incised valley attracts outdoor enthusiasts of all types, from canoeists who seek the challenge of its legendary boulder-strewn rapids to determined fly fishermen angling for brook trout and land-locked salmon. Beneath this dramatic landscape and flowing waters is a fascinating geologic story revealed in ledge and boulders.

Figure 1. Fly-fishing the Dead at Spencer Rips.
Bedrock Geology

A portion of a geologic map of western Maine by Moench and others (1999). The river gorge slices through a mix of metamorphosed sedimentary and volcanic rocks, shown in orange and yellow on the map, that formed in a volcanically active narrow ocean basin during the Cambrian and Ordovician periods. Younger, fossiliferous sedimentary rocks are shown in blue and green. Igneous intrusions and some older metamorphic rocks are shown with various patterns.

Figure 2. Bedrock map of the lower Dead River valley and vicinity.
Grand Falls

Located about 10 miles below Flagstaff Lake, Grand Falls marks the instantaneous Jekyll-and-Hyde change of the Dead from tranquil, meandering broad-valleyed deadwater (source of the river’s name), to turbulent, deep-gorged, fast-paced whitewater. Steadfastly guarding this transition since the last Ice Age is a layer of erosion-resistant Cambrian quartzite which underlies Grand Falls.

Figure 3. Grand Falls. A dark quartzite within the Hurricane Mountain Formation that is resistant to erosion creates this falls of 40 feet.
Spencer Rips

A short distance below the falls, Spencer Stream joins the Dead, marking the put-in spot for a whitewater trip on the Dead. And that whitewater experience begins just a short distance downstream at Spencer Rips, a jumble of glacially transported boulders that presses the canoeist against ledges hard to the right side of the channel. The boulders have much to say about the geology of this region.

Figure 4. Spencer Rips. Ledge on the far shore is of Cambrian Hurricane Mountain Formation.
Boulders at Spencer Rips – Metamorphic Rock

The boulders at the Rips were carried by glacial ice from the northwest and by the river from the west. Most of the bedrock units in the region are represented in the boulders here. The images below are of rocks plucked from the Chain Lakes massif (stippled area labeled CPc on the bedrock map), a region of metamorphic and igneous rocks about 10 miles to the northwest.

Figure 5. A highly banded metamorphic rock, gneiss, from the Sarampus Falls lithology of the Chain Lakes. Lighter layers contain mostly quartz and feldspar. Darker layers contain mostly dark biotite mica and other dark minerals. In the left image, layering is wildly folded. Large white quartz knots float in a sheared matrix on the right, attesting to great geologic forces that molded these rocks.
Several examples of volcanic rocks among the boulders were probably derived from the Cambrian Jim Pond Formation, a unit exposed just to the north of the Dead River valley (labeled Cov on the map). Rocks of this formation formed mostly through submarine volcanic activity, some of it quite explosive in nature.

**Figure 6.** The boulder on the left is of pillow basalt, with outlines of pillows visible on the lower left face, in particular, of this boulder. The rock on the right is of fine-grained volcanic material, probably an ash fall in a marine environment. The web-like pattern is due to thin veins of quartz and epidote (a green calcium-silicate mineral) that are more resistant to weathering.
Examples of explosive volcanic rocks derived from the Cambrian Jim Pond Formation. Both include fragments of light-colored rhyolite in a darker matrix. The matrix was originally volcanic ash. These examples are technically sedimentary rocks of volcanic origin, since the materials were probably transported some distance down a submarine slope.

**Figure 7.** Rhyolite fragments in the boulder on the left are angular, indicating minimal transport of the slurry of ash, fragments, and water before coming to rest. In the boulder on the right, fragments with similar composition to those in the boulder on the left are highly rounded, indicating that the volcanic slurry traveled a considerable distance before coming to rest, allowing the corners of fragments to become rounded by abrasion.
Boulders at Spencer Rips – Attean Granite

Boulders of the Ordovician Attean quartz monzonite (a cousin to granite with more plagioclase feldspar; stippled area labeled Ohu on the map). These boulders have been carried about 10 miles from the north by glacial action.

Figure 8. A distinctive feature of the Attean granite are two varieties of feldspar. One has a salmon-pink color (potassium feldspar) and the other is mostly white (plagioclase feldspar; some crystals slightly green), particularly apparent in the rock on the right. Gray areas are quartz.
Boulders at Spencer Rips – Fossils

If you have a sharp eye, you may be lucky enough to find some fossils in the boulders at Spencer Rips. Many of the younger rocks units (units in blue on the bedrock map in Figure 2) to the north of the Dead River contain abundant fossils that are important not only for establishing the Devonian age of the rocks, but for demonstrating their shallow-marine depositional environment favorable for a variety of marine organisms. The sediments in this younger marine basin were derived from mountains being built to the southeast in the major phase of the Acadian orogeny – collision of North America and Europe.

Figure 9. Brachiopod impression in sandstone, center of image.
Directions

You can get to Spencer Rips by driving north from The Forks on Route 201 towards Jackman (Directions). Shortly after completing the long grind up Durgin Hill, turn left on Lower Enchanted Road. Follow the most traveled dirt road all the way to Spencer Stream. Park in the large parking area where Spencer Stream joins the Dead River. To get to the falls, cross the foot bridge and follow that path upstream about ¼ mile. To get to Spencer Rips, walk downstream from the parking area along a well-established foot path. The more adventurous might consider paddling the deadwater from just below Long Falls downstream to just above Grand Falls, where the AMC has placed a small dock. Walk downstream from there and across the foot bridge over the Dead River just above the falls. It can be a scenic trip on a bugless fall day. The paddle back upstream is easy.

Figure 10. The Dead River deadwater
References and Additional Information


