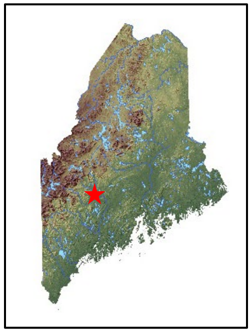
Maine Geologic Facts and Localities

October 2022

Weston Woods and Waters Madison, ME



44° 49’ 35” N, 69° 52’ 05” W

Text by
Will Robert
MGS Intern

Introduction

Weston Woods & Waters is a 308-acre property owned and maintained by the Somerset Woods Trustees. Located just north of Madison, ME (Fig. 1), this land provides a variety of trail systems that include excellent views of the Kennebec River and local geology. Parking and trail system access is available at the Nathan Street Boat Launch, Weston Avenue, and Maine Route 43. For more information on the trails and directions, visit either somersetwoodstrustees.org or mainetrailfinder.com. **NOTICE:** Sections of the trail pass through grass fields, so watch for of ticks and poison ivy.

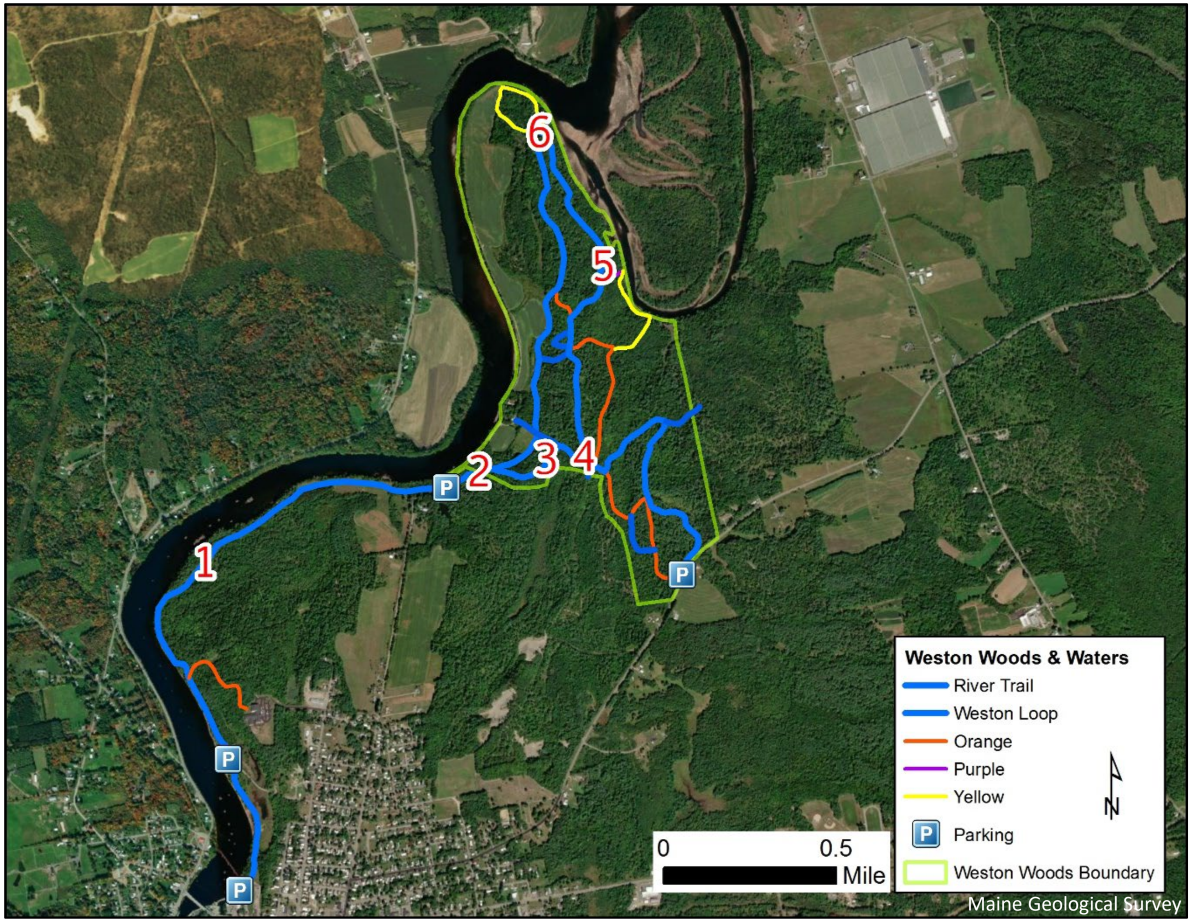


Figure 1. Weston Woods & Waters Trail Map. Red numbers represent stops along the trails that are covered in this guide.

Local Geology

The Weston Loop Trail and River Trail (blue lines in Figs. 1 and 2) provide great examples of the local surficial geology. The lidar map below allows us to see each of the geologic features in detail. Lidar is a detailed scan of the earth's surface that allows us to view the surface without the obstruction of vegetation (Thompson, 2011). Suggested stops and features are labeled on the map with red numbers.

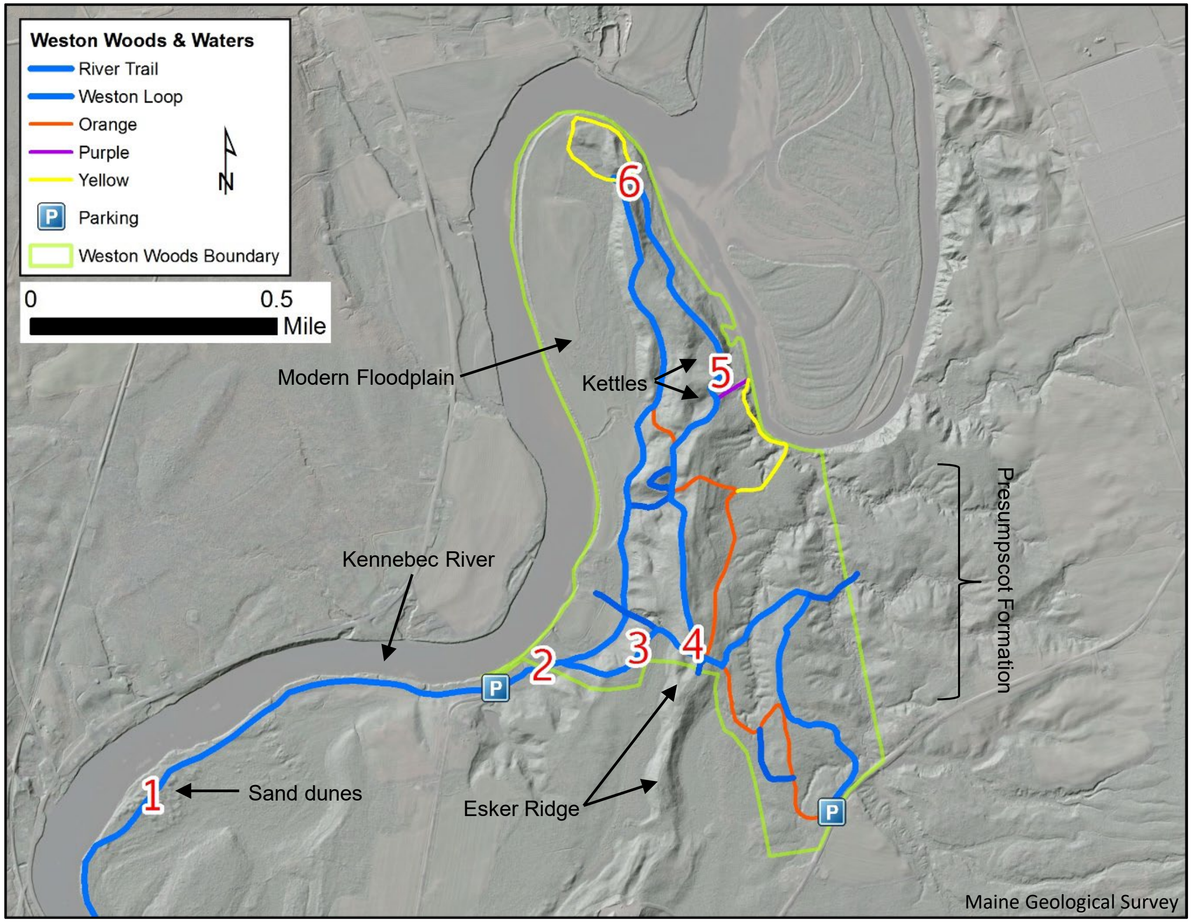
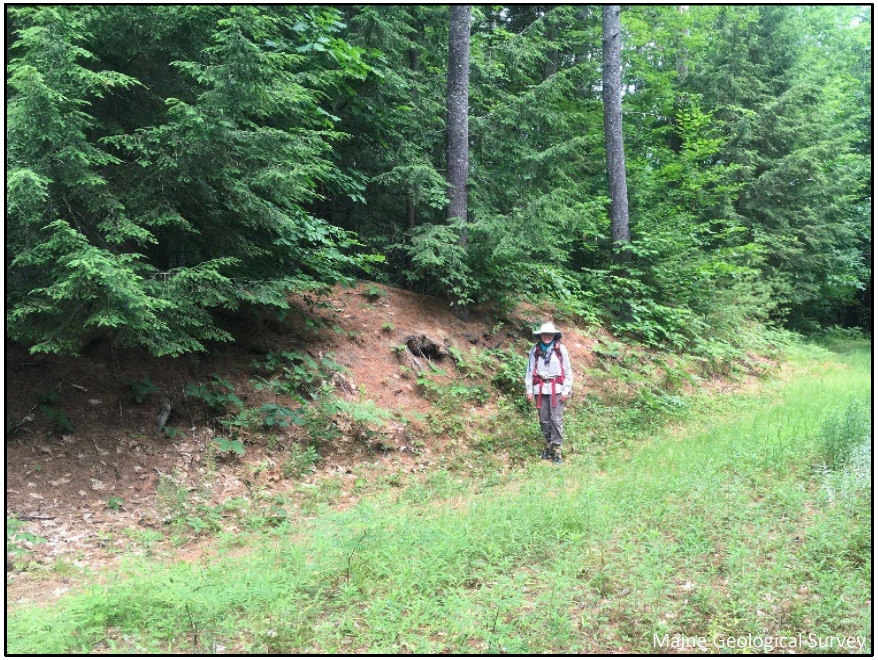


Figure 2. Lidar map, depicting the terrain of the Weston Woods lands. Trail stops marked as red numbers and conservation land outlined in green.

Sand Dunes

Sand dunes can be viewed at Stop 1 along the trail. Clearly seen on the lidar (Fig. 2), the trail cuts through a group of sand dunes (Fig. 3) that formed when wind moved exposed sandy deposits (Thompson, 2015). The dunes vary in size and consist of fine to medium-grained sand (Fig. 4). The presence of these dunes suggests that there was a brief time when the sandy Kennebec River deposits were exposed at the surface without any vegetation cover, allowing wind transport.



Photos by Will Robert

Figure 3. Sand dunes (small hills) located along the River Trail at Stop 1.

Figure 4. Trail cut exposure consists of fine to medium-grained sands

Modern Floodplain Deposits

Tree falls at Stops 2 and 3 (Fig. 5) are good opportunities to observe the materials that comprise the local soils. The exposure at Stop 2 consists of the same medium-grained sand that was seen at Stop 1. The lidar shows this area is part of the modern Kennebec floodplain (Fig. 6). However, as you walk from Stop 2 to 3, notice the change in topography. The ridge that you walked up is a stream terrace, formed when the Kennebec River incised to its modern level.

Figure 5. Tree fall exposure at Stop 2. Medium-grained sand, typical of alluvium deposits.

Photos by Will Robert

Figure 6. View of Kennebec River from the top of a cut bank. Located along the River Trail, south of Stop 1.

River Terrace (Presumpscot Formation)

Stop 3 is located on the river terrace and consists of a mix of silt and fine-grained sand (Fig. 7) which is a glaciomarine mud known as the Presumpscot Formation that was deposited as the late-glacial sea level reached as far north as Millinocket. (For more information on the Presumpscot Formation, see Weddle 2001.) Cores from a hand auger (Fig. 8) show that this area has a layer of Presumpscot Formation that is at least 13 feet thick. Intermittent seams of coarse sand were found throughout the core, illustrating different conditions that occurred as the Presumpscot Formation was deposited.

Figure 7. Tree fall exposure at Stop 3, showing a mix of silt and fine-grained sand (Presumpscot Formation).

Photos by Will Robert

Figure 8. Core sample of silty Presumpscot Formation.

Esker Ridge

One of the most prominent features in Weston Woods is the esker. Eskers are ridges of sand and gravel deposited by meltwater streams flowing through tunnels at the base of glaciers (Thompson, 2014). During the last Ice Age (~25,000 to ~12,000 years ago), a large ice sheet covered Maine. At some point, a tunnel formed at the base of the glacier and meltwater deposited sediments to create the esker we see today. When walking from Stop 3 to 4, notice the change in topography again. At Stop 4 (Fig. 9), look to either side of the trail - this is the extent of the esker ridge. Stop 6 (Fig. 10) is an area where you walk through a break in the esker and up "The Notch" to the top of the esker ridge.

Figure 9. While approaching Stop 4, walking up the esker ridge (outlined in red).

Photos by Will Robert

Figure 10. At Stop 6, the trail cuts through a break in the esker and continues up "The Notch."

Esker Ridge and Kettle

Stop 5 is located on the northern section of the Weston Loop Trail. At this location, the trail passes over a portion of the esker and along the edge of a kettle. Just before reaching stop 5, there is another kettle located on the west side of the trail. The larger of the two kettles is named *The Devil's Tannery.* On the east side of the trail is a section of the esker that was likely eroded into a steep cut bank when the river channel was once flowing along the esker ridge (Fig. 11).

Photo by Will Robert

Figure 11. Esker loop trail at Stop 5. The left side of the trail drops down into a kettle (outlined in blue); right side of trail is drops to an old river cut bank (outlined in red) formed along the esker.

Esker Sediments

The contrast between these two geologic landforms can be seen from the trail and in Figures 12 and 13.

The rounded gravel exposed at the surface of the trail (Fig. 12) is common for esker deposits. These rocks have been rounded from tumbling around in the subglacial stream before they were deposited to form the esker ridge.

Eskers act as vital sources of groundwater. The coarse sand and gravel that comprises eskers allows for high transmission and storage of groundwater (Thompson, 2014).

Photo by Will Robert

Figure 12. Rounded gravel and cobbles exposed int the trail at the top of the esker ridge.

Kettle Formation and Sediments

Figures 13 and 14 are hand auger core samples from the kettle near Stop 5. The first 3 feet of the core is a fibrous organic layer held together by vegetation (Fig. 13). Below this layer, the sediments became wet, soupy organics that extended past 15 feet in depth (Fig. 14).

Kettles form when a large block of ice breaks off the glacier and becomes buried by glacial meltwater sediments. When the ice block melts, a depression in the surface forms which is known as a kettle. Sometimes kettles retain water and become ponds and sometimes organic sediments fill in the bottom of the kettle over time, which is what happened at the Weston Woods kettles (Thompson, 2015).

Samples from the bottom of the organic kettle-fill deposits could be used to determine when glacial conditions ended and the kettle began to fill with sediments. This information helps geologist understand the local and regional timing of glacial ice retreat. Kettle peat deposits can also tell us about past environmental conditions.

Photo by Lindsay Spigel

Figure 13. Upper layer of kettle sediments.

Photo by Lindsay Spigel

Figure 14. Sample of “soupy” organics from kettle soils.

References and Additional Information

Thompson, W.B., 2011, Lidar Imagery Reveals Maine's Land Surface in Unprecedented Detail: Maine Geological Survey, Geologic Facts and Localities, Circular GFL-175, 13 p. http://digitalmaine.com/mgs_publications/465

Thompson, W.B., 2014, Maine's Eskers: Maine Geological Survey, Geologic Facts and Localities, Circular GFL-199, 17 p. http://digitalmaine.com/mgs_publications/490

Thompson, W.B., 2015, Surficial geology handbook for southern Maine: Maine Geological Survey, Bulletin 44, 97 p. http://digitalmaine.com/mgs_publications/2

Weddle, T.K., 2001, Presumpscot Formation: The Rise and Fall of the Glacial Sea in Maine: Maine Geological Survey, Geologic Facts and Localities, Circular GFL-52, 16p. http://digitalmaine.com/mgs_publications/344