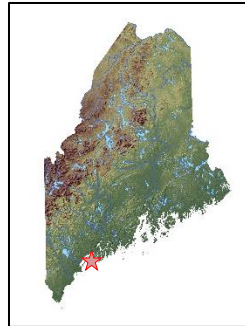


# Maine Geologic Facts and Localities

June, 2021

## *Horton Woods Preserve, Saco, Maine*



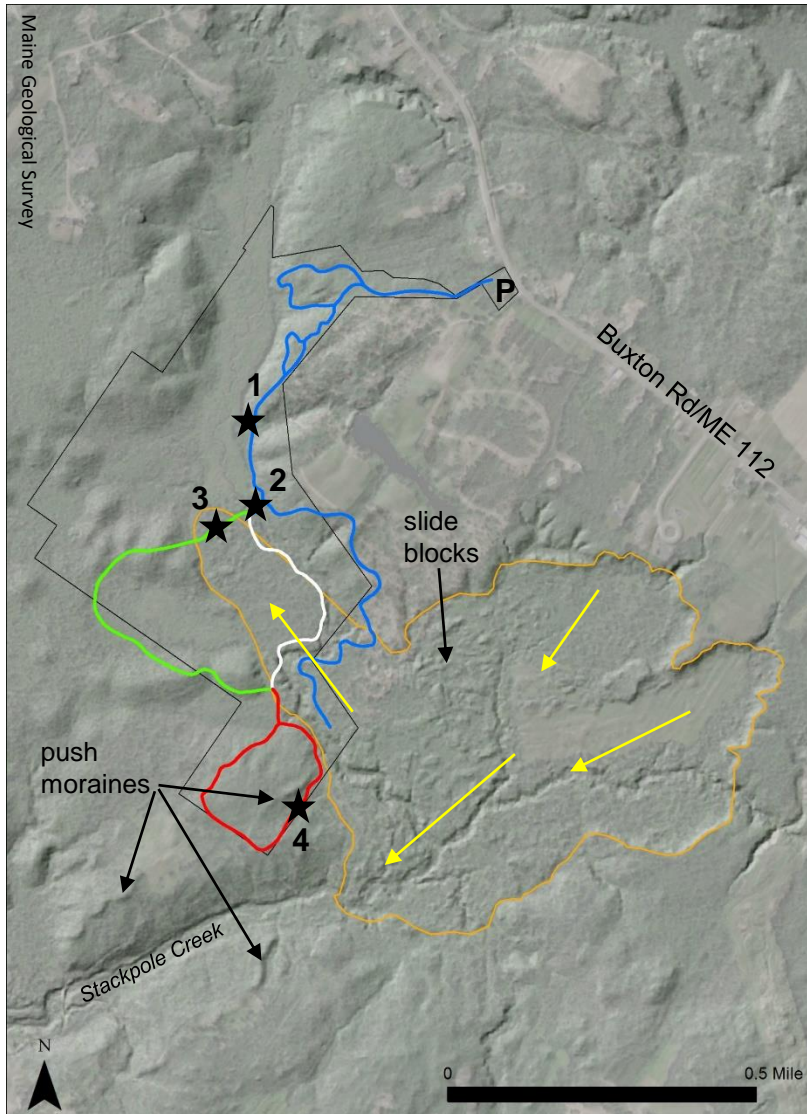
43° 34' 16" N, 70° 30' 43" W

Text by  
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## Introduction

The Horton Woods Preserve is located at 464 Buxton Road (Maine Route 112) in Saco and is part of the [Saco Bay Trails](#) network. A parking area and trail kiosk is located on the right after turning off Buxton Road. For more information and directions, see the Horton Woods page on [Maine Trail Finder](#).

Many geologic features can be viewed from easy and moderate difficulty trails in the preserve. Descriptions of suggested trail stops in Fig. 1 can be found on the following pages.



**Figure 1.** Lidar hillshade and aerial imagery for the Horton Woods area. Black line = approximate preserve boundary; orange line = approximate landslide extent; yellow arrows = landslide direction; blue line = Blue Heron/Woodchuck trails; green line = Big Pine Trail; white line = Beaver Path Trail; red line = Red Maple Trail; P = parking/kiosk; stars/numbers = trail stops. Map: MGS.

### Stop 1: Wetland Overlook

An overlook along the Blue Heron Trail offers a nice view of the wetland that drains into Stackpole Creek. This low, flat valley floor would likely be swampy regardless of the geology, but this area contains deposits of a glaciomarine mud known as the Presumpscot Formation that also limits drainage. The edge of a prehistoric landslide also blocks the southern end of the valley and restricts drainage (more on this at Stops 2 and 3).



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**Figure 2.** View of the wetland area and a small bedrock (ledge) exposure.



## Stop 1 (cont'd): Bedrock



Most of the bedrock (ledge) in the Horton Woods Preserve is covered by thick sediments deposited during the last Ice Age, but hikers can get a few glimpses of bedrock along the Blue Heron Trail and at Stop 1.

The local bedrock began as layers of ocean floor sediments that consolidated into sedimentary rocks over 400 million years ago during the Ordovician to Silurian periods. The sedimentary rocks were then subjected to heat and pressure from tectonic activity and became a type of metamorphic rock called granofels that is part of the Hutchins Corner Formation. Some of the layering from the original sedimentary rock has been preserved in the granofels, and tiny mica minerals give the rock a glittery sheen (Fig. 3). More bedrock details can be found in [Marvinney \(1995\)](#).

**Figure 3.** **A.** Close-up view of bedrock at the wetland overlook bench. **B.** A fresh piece of bedrock shows layering and shiny mica.

### Stop 2: Stackpole Creek

There are several trail intersections at the southern edge of the wetland – go west to take the bridge over Stackpole Creek (Fig. 4). While there is some sand and gravel in the stream bed and banks, much of the channel is Presumpscot Formation mud that was deposited in ocean waters that covered much of southern Maine at the end of the last Ice Age (about 15,000 years ago). At the earth's surface, Presumpscot Formation weathers into a hard brown crust but below the surface it is blue-gray, can be very soft, and is commonly known as “blue clay” ([Weddle, 2000](#)). Soft, unweathered Presumpscot Formation is what engineers call “sensitive clay” because it can deform and flow, causing landslides.

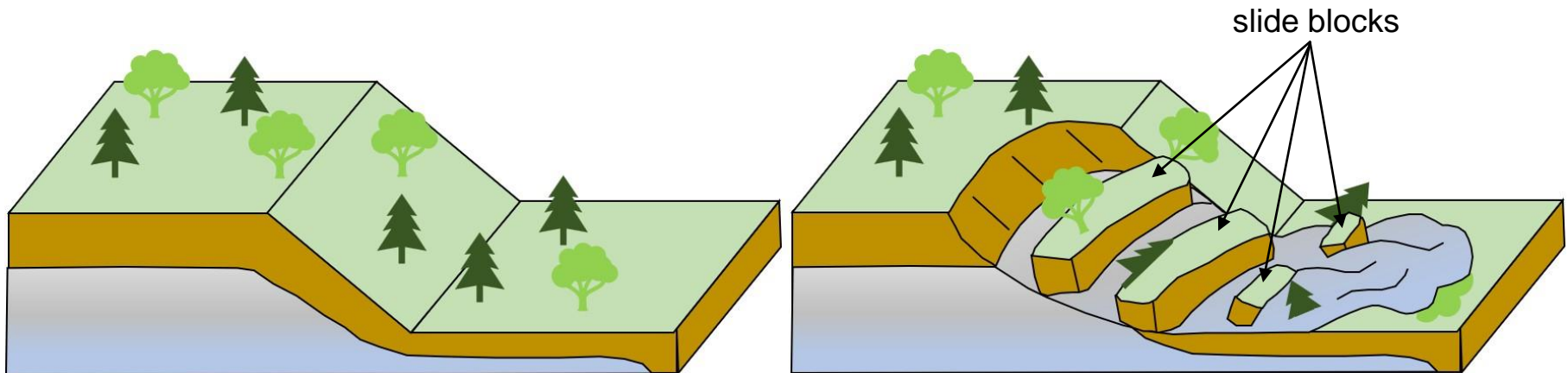


**Figure 4.** View of Stackpole Creek looking downstream from the trail bridge.



### Stop 3: Landslide

After crossing the bridge, stay right on the Big Pine Trail. You are now walking on the outer edge (toe) of a prehistoric landslide. Much of the landslide is to the southeast of the preserve (see Fig. 1) where it flowed down Stackpole Creek and out to the Saco River, but some of the debris flowed back up the Stackpole Valley to this location. This landslide is a “spread” type in which chunks of thin sand over hard, weathered Presumpscot Formation broke apart and rode along on the soft, unweathered Presumpscot Formation that was moving at depth during the landslide. The chunks are known as “slide blocks,” and these give the landslide its irregular, rumpled topography (Fig. 5).



**Figure 5.** Side-view cartoon illustration of a spread type landslide from [Spigel \(2020\)](#). The left image is before and the right image is after the landslide. The brown layer is sand and hard, weathered Presumpscot Formation while the blue layer is soft, unweathered Presumpscot Formation.

Stop 3 (cont'd): Landslide

The Big Pine Trail crosses several subtle ridges which are small slide blocks (Fig. 6).



**Figure 6.** The Big Pine Trail crosses several subtle slide blocks such as this one, just past the short bog bridge in this photo.



### Stop 3 (cont'd): Landslide

Hundreds of prehistoric landslides were hiding under Maine's thick forest cover until they were revealed in the early 2000s by a new type of topographic data called lidar, which is essentially a laser scan from airplanes that shows the earth's surface without buildings or vegetation (see [Thompson \(2011\)](#) for more details). The Horton Woods landslide was part of a project to determine the ages of some prehistoric landslides through radiocarbon dating of vegetation that was caught up in or buried by the landslide (see [Spigel \(2019\)](#) for more details). An auger hole just off the Big Pine Trail found a soil that was buried by about 8 feet of the landslide deposit (Fig. 7A). Radiocarbon analysis of twigs from this soil indicate that the landslide occurred about 500-600 years ago (Fig. 7B). The landslide may have been triggered by a large earthquake or a period of extreme climate conditions.



**Figure 7. A.** Soil auger with buried soil (brown, left) and soft Presumpscot Formation from the landslide deposit (blue-gray, right). **B.** Close-up view of plant fragments preserved in the buried soil.



### Stop 4: Push Moraine

Take the Beaver Path Trail south (crossing more slide blocks) to the Red Maple Trail, staying left on the loop. As the trail turns southwest, a noticeable ridge rises on the right trending northeast to southwest (Fig 1; Fig. 8). This ridge is one of several “push moraines” in the area that formed when the melting ice sheet stabilized and advanced a bit, plowing up the sediments along its edge. In contrast to the muddy Presumpscot Formation, this ridge is comprised of a mix of sediment sizes that melted from or tumbled off the glacier. See [Thompson \(2015\)](#) for more details about moraines.



**Figure 8.** Push moraine ridge along the Red Maple Trail with hiker for scale.

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