Further Reading
Blakey, R.C., 2013, Key time slices of North American geologic history—Early Mississippian Period: Colorado Plateau Geosystems, Inc.


Further Reading
Lobdell Reserve trail map showing topography of the area and features discussed in the text.
Introduction

Lobdell Reserve is home to some of the most stunning geologic exposures in Licking County. Visitors should take notice of the cliffs that Lobdell Creek has carved into the hillsides. These exposures show both bedrock and glacial deposits that tell the story of a landscape that has been altered by water and ice. During a hike, park patrons can step through geologic time by looking carefully at these exposures and learn about how this landscape has evolved geologically. This leaflet provides some background knowledge to better understand the geologic exposures at Lobdell Reserve and highlights the locations where these features can be viewed.

Bedrock Geology

The bedrock in Lobdell Reserve was deposited during the Mississippian Period (360–320 million years ago [m.y.a.]), before the initial formation of the supercontinent Pangaea, which evolved during the Pennsylvanian Period (320–300 m.y.a.). During the Mississippian Period, Ohio was located south of the equator, covered by ocean water (fig. 1), and sediments were being deposited in the Appalachian Basin. These sediments eventually lithified into the rocks exposed in Lobdell Creek today. The bedrock in the park is from the Cuyahoga Formation (Stops 1 & 2). These rocks are mostly siltstones and shales. They are composed of fine-grained materials because the original sediments were deposited far away from their source, the Appalachian Mountains.

Glacial Geology

As ice advanced into Ohio from Canada, massive amounts of rock and sediment were carried with it and eventually were deposited by ice and water (fig. 3). Many of these deposits have been concentrated in preglacial valleys. These valleys, which filled with glacial drift, were called burred valleys and can be a great source of drinking water and sand-and-gravel resources (Stops 3 & 4). Glacial drift is any unconsolidated sediment that has been transported and deposited by glacial processes. Glacial till is a type of glacial drift that is poorly sorted and usually composed of a clay and/or silt matrix surrounding pebbles of many different rock types.

Teays Drainage System

The Teays River was the principle stream draining a large portion of the Appalachian Mountains. The river system began at the end of the mountain building event, or orogeny, that created the Appalachian Mountains (≈350 m.y.a.). The building of mountains created new drainage divides and headwaters of new streams formed near these divides. The Teays River had its headwaters in North Carolina and Virginia. This drainage network eroded away any rocks or sediments that might have been deposited on top of the Mississippian rocks. This erosion creates what geologists call an unconformity. An unconformity is a surface between two geologic units that have a gap in time between their deposition.

Prior to the Pleistocene Era (Ice Age), the Teays drainage system cut deep valleys and drained about two-thirds of the state. When glaciers initially advanced into Ohio, they dammed up the northward-flowing Teays River and created the ancestral Lake Tight. The infling of the Teays River and its tributaries with lake sediments and water ultimately altered the paths of many streams in rivers in Ohio. Lobdell Creek is one example of this drainage reorganization.

Studies of the bedrock elevation beneath glacial deposits have revealed the original Teays drainage patterns, before glaciers smoothed out the landscape (fig. 3). The original stream cut through the park from east to west, while today Lobdell Creek flows, generally, from west to east. This change is drainage direction is a result of glaciation. Glaciers infilled the preglacial valleys with drift, and then new valleys were created by meltwater coming off the ice front. These meltwater streams flowed away from the glacier, which explains a change to an eastwardly flowing stream in the park.

Summary

The oldest rocks exposed in Lobdell Reserve are Mississippian siltstones and shales, which began as sediments deposited in deep ocean water, when Ohio was in a tropical location. Erosion by the Teays River and its tributaries began shaping the landscape after these sediments were compacted, lithified, and exposed to Earth’s surface. The Teays River system continued to transport surface water and erode bedrock until the first glaciers advanced into Ohio from Canada. The glaciers acted as a dam for the northward-flowing river and filled the valleys with water and lake sediment. Later, the Illinoian and Wisconsinan Glaciations built on this early glaciation and continued to infill valleys with sediments. The filling of these valleys led to the development of new stream valleys, like Lobdell Creek, which still shape the landscape at Lobdell Reserve today.