THE FRENCH CREEK *watershed*

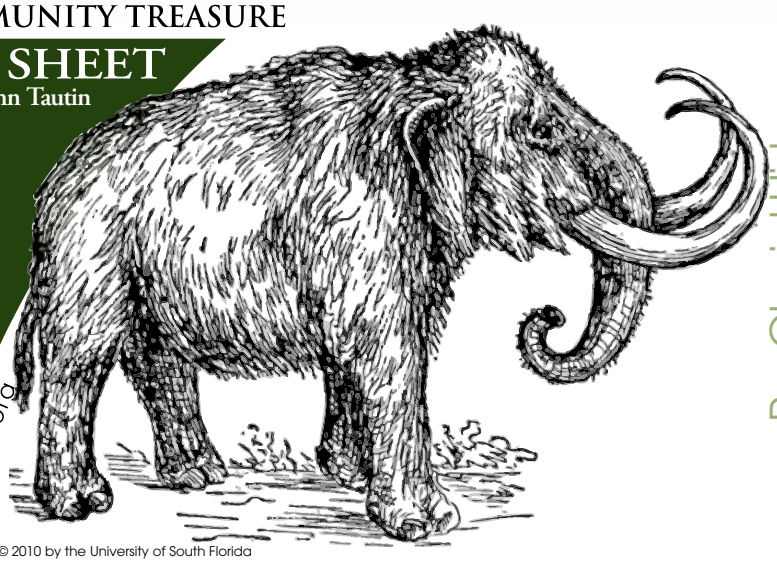
A COMMUNITY TREASURE

FACT SHEET

written by John Tautin

Glacial History & Stream Processes

Affecting French Creek



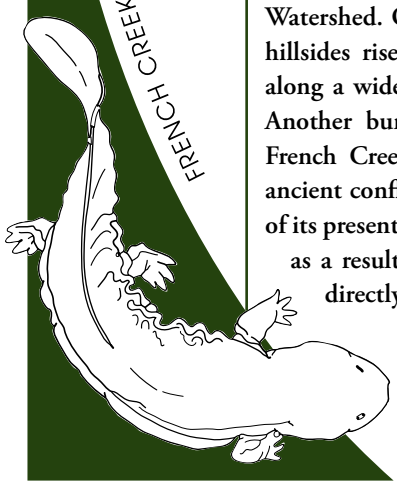
Glaciation

Glaciers moved down into northwestern Pennsylvania a total of 7 times during the Ice Age, beginning two million years ago. The glacial movement into this portion of the country is designated the *Erie Lobe*. This lobe advanced twice during the Illinoian Age and five times during the Wisconsin Age resulting in major alterations in the geology of the French Creek Watershed. Because these glaciers blocked the northward flow of the Creek, and left huge deposits of boulders, rocks, unsorted sand, silt, and clay in the wake of the melting ice, French Creek consequently reversed its flow to southward.

Buried Valleys

The glacial melt-water also left deposits of glacial outwash, sand, and gravel. Consequently, buried valleys which represent pre-glacial streams or areas excavated by glacial movement are presently filled with glacial deposits, either partially or completely. These mixed glacial deposits result from various eroded sediments carried southward from Canada.

There are numerous buried valleys in the French Creek Watershed. On the west side of Cussewago Creek Valley, the hillsides rise abruptly and the creek meanders side to side along a wide drift plain over a deeply buried ancient valley. Another buried valley exists where Cussewago Creek and French Creek met in pre-glacial times. **(See Figure 2)** The ancient confluence is approximately six miles west-northwest of its present location. Woodcock Creek also changed its valley as a result of the glaciation. Old Woodcock Creek passed directly across French Creek through a depression that is now filled with glacial deposits. At the point of the crossing, the width of the valley was nearly double that of the present French Creek.



Pre-Glacial History

Three main continental Tectonic Plate collisions occurring over the last 1.2 billion years formed the current geologic setting of French Creek. The most recent was about 290 million years ago when the North American Plate collided with the African Plate causing the formation of the Appalachian Mountain Range, *Alleghenian Oregeny*.

During this ancient time, French Creek began near the mouth of the current Clarion River, was much larger in size, and flowed Northward past present day Franklin and Meadville. **(See Figure 1)** Just past Meadville, it connected with Conneaut Lake and moved onto the Lake Erie Basin and into Lake Ontario. From Lake Ontario, drainage flowed into the St. Lawrence River and then into the Atlantic Ocean.

Figure 1: Pre-glacial drainage of the upper Ohio drainage system showing the northward path of French Creek.

Adapted from Leverette's Figure 35, 1957

The glaciation did not have the same type of effect on the shaping of the southern end of the French Creek Valley. Existence of old channels and oxbow curves of pre-glacial streams are readily evident.

FRENCH CREEK VALLEY CONSERVANCY

Stream Captures

Because of the glaciations and the reversal of the flow to the south, French Creek became part of the Allegheny and Ohio rivers system, which feed the Mississippi River. These dramatic geologic changes also resulted in the Creek acquiring a diverse mixture of aquatic species through various "stream captures". Captures occurred when existing watershed divides were breached by glacial movement or seismic activity, resulting in flows from other biogeographic provinces to find their way into the Creek. Because of these stream captures, French Creek has fauna mixed from three different systems or watersheds – the Ohio River basin, the Great Lakes, and the Susquehanna River watershed.

Present Day Watershed

French Creek begins in Chautauqua County, New York, near the community of Sherman. It winds southward for 117 miles through mostly rural areas of the northwestern Pennsylvania counties of Erie, Crawford, Mercer and Venango before its confluence with the Allegheny River at Franklin, Pennsylvania. The Allegheny flows southward to Pittsburgh where it meets the Monongahela River to form the Ohio River. The Ohio then flows into the Mississippi River.

The Watershed encompasses 1270 square miles in area and constitutes approximately 10 percent of the drainage basin of the Allegheny River. The Watershed itself is determined by connecting the topographic highlands surrounding the Creek, including all areas where any falling water inside of its ends up within the primary stream, ie. French Creek. Therefore, the Creek and nine major tributaries including the Cussewago Creek west of Meadville and Sugar Creek west of Franklin, join together with numerous smaller tributaries to form the intricate system draining the landscape within the Watershed.

Lasting effects of Glaciation

The vast glacial deposits continue to play a major role in maintaining the quality of the water of the French Creek Watershed. Most of the glacial material contains limestone (calcium carbonate) from Canada which acts as a natural buffer to the acid rainfall in the area. This buffering capacity keeps the waters of French Creek from becoming so acidic that they can no longer support certain species of plants and animals. French Creek's relatively healthy ecosystem has lost few species over the years and continues to support more species of fish (over 80) and freshwater mussels (26) than any other stream in the state. Several of the aquatic animals still found in French Creek are now listed as endangered in Pennsylvania or the entire world.

The massive deposits of sediments left by the glaciers have also benefited the people of the Watershed. Combined with a Cussewago Sandstone layer of rock, the glacial deposits act as a vast aquifer. The porous, water-saturated layers of sand, gravel, and bedrock are capable of filtering and yielding large capacities of water, and thus provides water to most people in the Watershed.

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