



Geology and Glacial History

The diverse physiographic and topographic features of the St. Croix River valley result from at least four different glacial epochs that extended from 1 million to 10,000 years ago. The St. Croix River itself is an important component of past and present physiographic changes. During the last glacial period the St. Croix served as a major drainage for glacial melt waters. In pre-glacial times, the major course of the river was farther west in Minnesota. In addition to carrying melt waters from the glacier, the St. Croix carried overflow waters from large glacial lakes that occurred in the Lake Superior basin. Topography of the valley includes flat-topped, steep-sided sedimentary hills adjacent to the river, and narrow stream valleys in the extreme lower reaches. The remainder of the valley is composed primarily of broad, flat glacial outwash plains and kettle and knob topography associated with terminal and end moraines.

Lakes and marshes are abundant in the northern half of the valley where surface drainage systems are poorly developed. One unique drainage system in southern Pine County is separated from all other watersheds in the region by a zone of elevated igneous bedrock. Marshes and streams in this region are characterized by low alkalinity and a deep brownish stained color. In the southern reaches of the valley, alkalinity and vegetation of lakes and marshes become progressively greater owing primarily to limestone and sandstone bedrock. Many springs along the riverbanks occur where the river valley has eroded through the glacial gravel to release water trapped between the sediments.

The entire St. Croix watershed encompasses about 11,550 km². The river drains about 7,233 km² in Wisconsin and 4,317 km² in Minnesota. Included in the watershed are all or part of 18 counties, 9 in each State. There are eight major streams or watersheds that are tributary to the St. Croix, including the Snake, Kettle and Sunrise rivers in Minnesota, and the Namekagon, Clam, Trade, Apple, Willow, and Kinnickinnic rivers in Wisconsin.

St. Croix Scenic Byway

The St. Croix River valley is an area rich in geologic history. Sediments and rock formations throughout the valley range in geologic age from the 1-billion-year-old Precambrian lava flows at Interstate Park to very recent sediment deposition at the mouth of the Kinnickinnic River. Bedrock in the upper portion of the valley consists primarily of Precambrian igneous lava flows, shales, sandstones, and igneous and metamorphic crystalline formations. Bedrock of the lower portions of the valley consists of marine sandstones, shales, and limestones that were deposited during the Cambrian and Ordovician periods. Outcroppings southward through the valley indicate that bedrock formations are progressively younger.

The most notable geologic feature along the St. Croix Scenic Byway is the Dalles of the St. Croix River, a deep gorge cut by runoff from Glacial Lake Duluth into the ancient bedrock at the Interstate Parks. Within the parks are a magnificent series of potholes formed by glacial meltwater 10,000 years ago. More than 100 large glacial potholes mark the landscape in the two Interstate Parks. The only other place in the world with this kind of pothole display is in Switzerland. Numerous potholes are at least 40 feet deep, and the largest is 68 feet deep. While most of the potholes can only be viewed from the top looking down, visitors can walk in and explore one of the potholes on foot.



Photo: Osceola Historical Society