

Wisconsin and Minnesota

**Geologic Resources Inventory
Natural Resource Stewardship and Science**



North



0 5 Kilometers

0 5 Miles



Photo Location

Geologic Contacts

— Known or certain
 - - - - - Inferred or approximate
 — Quadrangle boundary

Roads

- Major road
- St. Croix Scenic Byway
- Highway
- Small or local road

Glacial Features

>>>>	Esker
^	Direction of glacial stream flow
T	Moraine ridge
→	Trend of glacial striations
→	Generalized direction of glacial melt-water drainage
—	Dune crest
.....	Glacial linear feature
	Channel
— — — — —	Escarpment, river cutbank, or terrace margin, line dashed where approximate

Geologic Units

	Water
Qf	Alluvial fan deposit (Holocene)
Qm	Marl (Holocene)
Qws	Windblown sand (Holocene)
Qhc	Steep-slope and slope deposits (Holocene)
Qpgs	Postglacial sand and silt (Holocene)
Qsp	Postglacial stream sediment (Holocene)
Qa	Gravelly sand, clay, and silt (Holocene and late Pleistocene)
Qfg	Gravelly sand (Holocene and late Pleistocene)
Qp	Peat and muck (Holocene and late Pleistocene)
Ol	Silt, clay, and sand (Holocene and late Pleistocene)
Qst	Terraces (Pleistocene)
Qna	New Ulm Formation, sandy till (late Pleistocene)
Qnm	New Ulm Formation, loamy till (moderate-relief) (late Pleistocene)
Qni	New Ulm Formation, ice-contact stratified deposit (late Pleistocene)
Qnd	New Ulm Formation, Twin Cities Member (late Pleistocene)
Qno	New Ulm Formation, Twin Cities Member, fine-grained sand and gravelly sand (late Pleistocene)
Qnl	New Ulm Formation, Twin Cities Member, fine-grained sand, silt, and clay (late Pleistocene)
Qnt	New Ulm Formation, Twin Cities Member, diamicton (late Pleistocene)
Qsto	Trade River Formation, Oseola beach (Pleistocene)
Qpli	Trade River Formation, ice-dammed-lake plains (Pleistocene)
Qstv	Trade River Formation, stream sediment (Pleistocene)
Qplm	Trade River Formation, moraine ridges (Pleistocene)
Qgr	Trade River Formation, glacial sediment (Pleistocene)
Qbc	New Brighton Formation, silt and clay facies (Pleistocene)
Qbs	New Brighton Formation, sand facies (Pleistocene)
Qby	New Brighton Formation, sand and gravel facies (Pleistocene)
Qwr	West Campus Formation, Richfield terrace (Pleistocene)
Qwl	West Campus Formation, Langdon terrace (Pleistocene)
Qwg	West Campus Formation, Grey Cloud terrace (Pleistocene)
Qwsm	West Campus Formation, St. Mary's terrace (Pleistocene)
Qcfsi	Copper Falls Formation, silt and sand (Pleistocene)
Qcfsb	Copper Falls Formation, sand and gravel in outwash deposits, steep hill slopes in areas of deeply dissected drainage (Pleistocene)
Qcfsd	Copper Falls Formation, sand and gravel in outwash deposits, more than 50 percent collapsed surface (Pleistocene)
Qcfspp	Copper Falls Formation, sand and gravel in outwash deposits, 20 to 50 percent collapsed surface (Pleistocene)
Qcfsn	Copper Falls Formation, sand and gravel in outwash deposits, less than 20 percent collapsed surface (Pleistocene)
Qcfd	Copper Falls Formation, diamicton (Pleistocene)
Qau	Copper Falls Formation, uncapped meltwater stream sediment (Pleistocene)
Qosi	Copper Falls Formation, Sylvan Lake Member, offshore deposits (Pleistocene)
Qnsi	Copper Falls Formation, Sylvan Lake Member, nearshore deposits (Pleistocene)
Qush	Copper Falls Formation, Sylvan Lake Member, hummocky topography underlain by till (Pleistocene)
Qusn	Copper Falls Formation, Sylvan Lake Member, flat to low-relief-hummocky landscape (Pleistocene)
Qssv	Copper Falls Formation, Sylvan Lake Member, valleys (Pleistocene)
Qshh	Copper Falls Formation, Sylvan Lake Member, hummocks deposited by meltwater from the Superior Lobe (Pleistocene)
Qssp	Copper Falls Formation, Sylvan Lake Member, pitted outwash plains (Pleistocene)
Qgs	Copper Falls Formation, Sylvan Lake Member, glacial sediment (Pleistocene)
Qcd	Cromwell Formation, subglacial till (Pleistocene)
Qct	Cromwell Formation, diamicton (late Pleistocene)
Qds	Cromwell Formation, till, sand, and gravel (Pleistocene)
Qcc	Cromwell Formation, lake clay and silt (Pleistocene)
Qco	Cromwell Formation, sand to gravel (late Pleistocene)
Qcl	Cromwell Formation, fine-grained sand, silt, and clay (late Pleistocene)
Qci	Cromwell Formation, ice-contact stratified deposit (Pleistocene)
Qpc	Prairie du Chien Group (Ordovician)
Qub	Bedrock, undivided (Ordovician and Cambrian)
Qcp	Bedrock outcrop (Ordovician and Cambrian)
OCu	Bedrock at or near the surface (Ordovician and Cambrian)
Pzr	Undefined Paleozoic rock (Paleozoic)
PCc	Outcrops of Precambrian basal of the Chengwatana Group (Precambrian)
Phmc	Clam Falls volcanics (Middle Proterozoic)

This map displays geologic map data compiled by the National Park Service Geologic Resources Inventory. It is not a substitute for site-specific investigations. All GRI products are available at <https://go.nps.gov/gripubs>.

Source Maps:

Bauer, E. J., V. W. Chapp, J. R. Steenberg, A. J. Retzlaff, V. L. Stanley, G. N. Meyer, and R. S. Lively. 2016. *Geologic Atlas of Washington County, Minnesota: Minnesota Geological Survey, County Atlas Series C-39 Part A (Plates 3, 4, 6), scale 1:100,000.*

Carson, E., Rawling, J.E., III, and Rose, C. 2017. *Quaternary Geologic Map of Portions of the St. Croix National Scenic Riverway, Wisconsin: Wisconsin Geological and Natural History Survey, unpublished digital data, scale 1:100,000.*

Johnson, M.D. 2000. *Pleistocene Geology of Polk County, Wisconsin: Wisconsin Geological and Natural History Survey, Bulletin 92, scale 1:100,000.*

Kostka, S.J., Hinkle, H.J., Michelson, D.M., and Baker, R.W. 2004. *Preliminary Quaternary Geologic Map for St. Croix National Scenic Riverway, Wisconsin Geological and Natural History Survey, Open-File Report 2004-22, scale 1:100,000.*

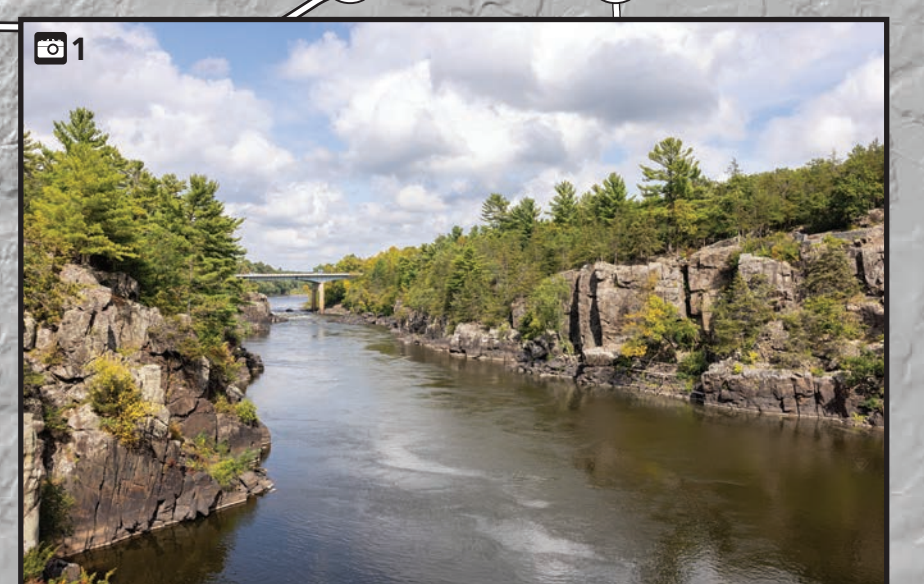
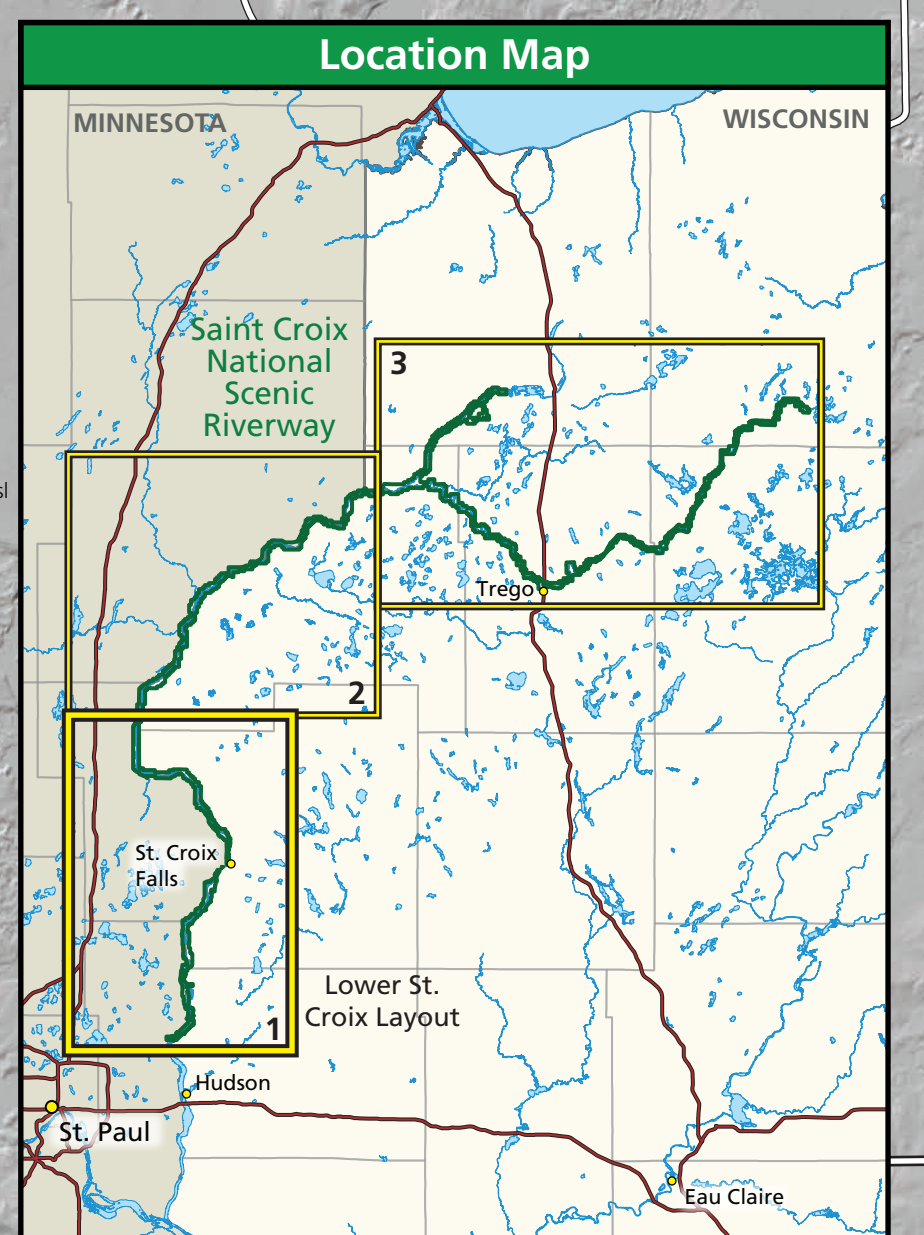
National Park Service Water Resources Division. 2000. *Saint Croix National Scenic River Small-scale Base GIS Data: National Park Service, scale 1:100,000.*

Setterholm, Dale R. 2010. *Geologic Atlas of Chisago County, Minnesota: Minnesota Geological Survey, County Atlas Series C-22 Part A (Plates 1, 3, 4, 6), scale 1:100,000.*

Source Scale: 1:100,000. According to US National Map Accuracy Standards, features are within 50.8 m (166 ft) of their true location.

Poster Layout: Matt Harrington (Colorado State University)

Poster Date: March 2026



Near the close of the last Ice Age (around 10,000 to 12,000 years ago), massive outbursts of water from Glacial Lake Duluth raged down the St. Croix river valley, carving and incising into 1.1 billion-year-old volcanic rock, forming the Dalles of the St. Croix. Evidence of past glaciations can still be seen at the Dalles in the forms of glacial potholes and striations. Photo by Matt Harrington. September 2025.

Geologic Map of Saint Croix National Scenic Riverway

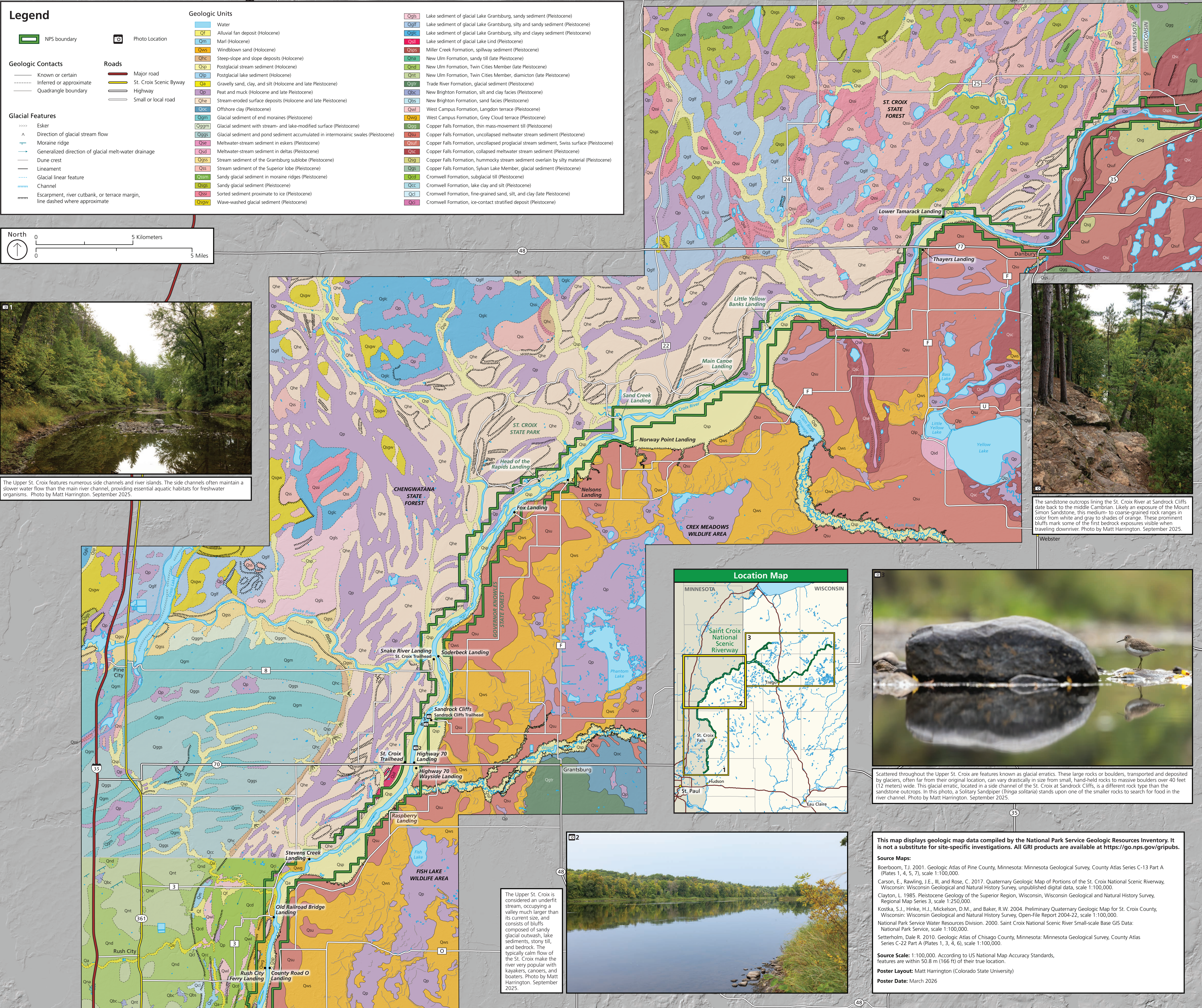
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Upper St. Croix – Sheet 2 of 3



Geologic Map of Saint Croix National Scenic Riverway

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Upper St. Croix and the Namekagon – Sheet 3 of 3

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Clayton, L. 1985. Pleistocene Geology of the Superior Region, Wisconsin. Wisconsin Geological and Natural History Survey, Regional Map Series 3, scale 1:250,000.

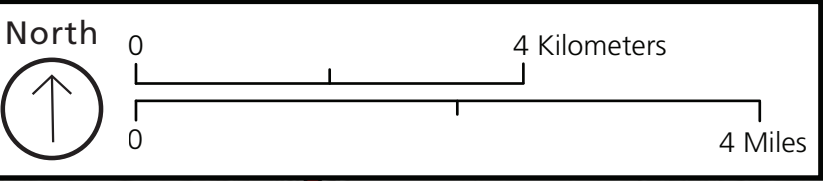
Koska, S.J., Hinkle, H.J., Mickelson, D.M., and Baker, R.W. 2004. Preliminary Quaternary Geologic Map for St. Croix County, Wisconsin. Wisconsin Geological and Natural History Survey, Open-File Report 2004-22, scale 1:100,000.

National Park Service Water Resources Division. 2000. Saint Croix National Scenic River Small-scale Base GIS Data. National Park Service, scale 1:100,000.

Source Scale: 1:100,000. According to US National Map Accuracy Standards, features are within 50.8 m (166 ft) of their true location.

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Legend

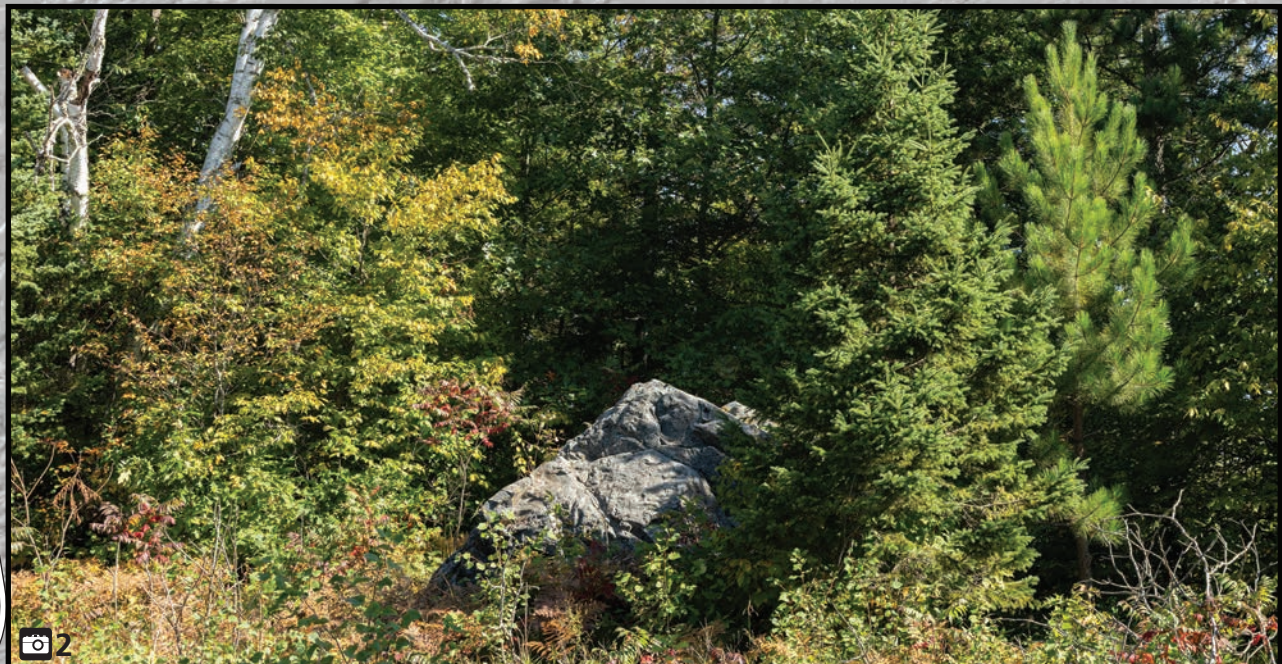
- Geologic Contacts**
- Known or certain
 - Quadrangle boundary
- Roads**
- Major road
 - Highway
 - Small or local road
- Glacial Features**
- Esker
 - Drumlin
 - Direction of glacial stream flow
 - Moraine ridge
 - Trend of glacial striations
 - Glacial Ridge
 - Channel
 - River cutbank
- Geologic Units**
- Water
 - Postglacial stream sediment (Holocene)
 - Peat and muck (Holocene and late Pleistocene)
 - Miller Creek Formation, spillway sediment (Pleistocene)
 - Copper Falls Formation, thin mass-movement till (Pleistocene)
 - Copper Falls Formation, uncollapsed meltwater stream sediment (Pleistocene)
 - Copper Falls Formation, uncollapsed proglacial stream sediment, Swiss surface (Pleistocene)
 - Copper Falls Formation, uncollapsed proglacial stream sediment, Hayward surface (Pleistocene)
 - Copper Falls Formation, uncollapsed proglacial stream sediment, Tiger Cat surface (Pleistocene)
 - Copper Falls Formation, collapsed meltwater stream sediment (Pleistocene)
 - Copper Falls Formation, hummocky stream sediment overlain by silty material (Pleistocene)
 - Copper Falls Formation, Sylvan Lake Member, glacial sediment (Pleistocene)
 - Copper Falls Formation, subglacially molded topography (Pleistocene)
 - Oronto and Bayfield Groups (Middle Proterozoic to Cambrian)
 - Middle Proterozoic volcanic rock (Middle Proterozoic)



While most of the St. Croix consists of calm, smooth water, small rapids can be found along the Upper St. Croix. In addition to rapids, submerged or partially submerged logs from historic log drives can still be found. Often water-logged and jammed in place, these logs connect recreationists to the history of the river, when the St. Croix produced hundreds of millions of board feet of lumber. Photo by Matt Harrington, September 2025.



The Upper St. Croix flows out of the St. Croix Flowage, formed by Gordon Dam. Just downriver from the dam, the North Country National Scenic Trail enters park boundaries at the Moose River, following the north bank of the river. Ancient, middle Proterozoic slate can be found along the trail and across the forest floor in this area. Photo by Matt Harrington, September 2025.



This massive boulder located at Namekagon Dam Landing is a glacial erratic deposited by the glaciers during the last Ice Age. While glacial erratics of this scale are less commonly found throughout the riverway, medium and small glacial erratics are abundant. Dragged and carried by glaciers across the region, these rocks and boulders can be used to trace the path of glacial ice flow. Photo by Matt Harrington, September 2025.



Along the St. Croix and Namekagon, dozens of landings exist for recreationists to enter and exit the river. Phipps Landing, as seen here, is located along the Namekagon just upriver from Phipps Dam. Landings provide key access points to the rivers but can also be prone to erosion. Monitoring of landings can be a helpful tool in maintaining their accessibility. Photo by Matt Harrington, September 2025.



The Namekagon River begins at Namekagon Lake in northern Wisconsin. Compared to the St. Croix, the Namekagon, particularly near its headwaters, is much narrower and shallower. Kayakers and canoers often have to be wary of vegetation and logs when navigating the river. Photo by Matt Harrington, September 2025.

