

SCREENS Initiative

St. Croix River Ecosystem Enhancement & Natural Sustainability Initiative

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Outline

- Mission Statement
- Background
- Geography
- History
- Governance
- 3 Problems
- 3 Solutions/Goals
- Recommendations





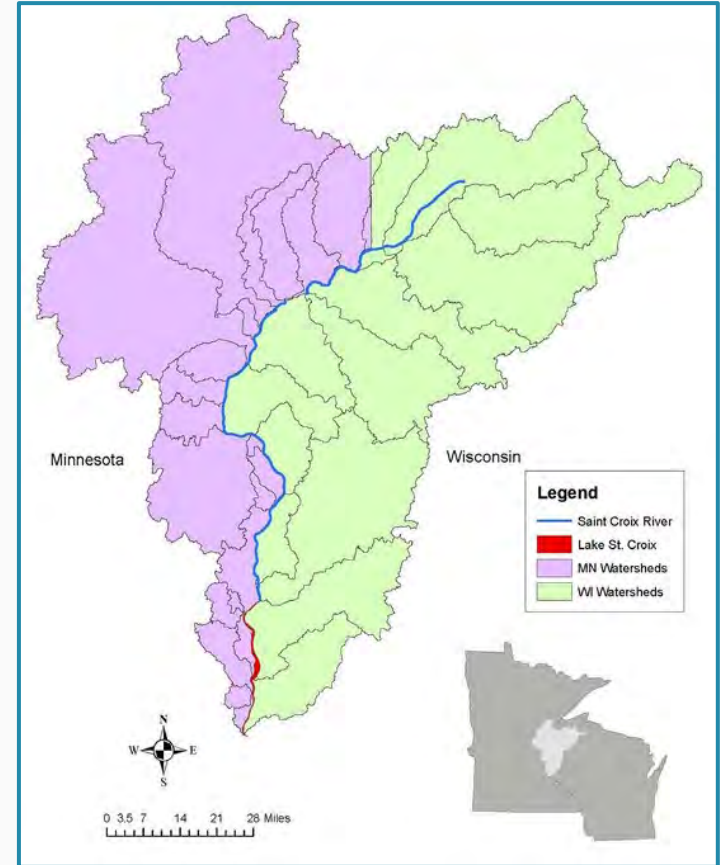
Mission Statement

SCREENS proposes scientific solutions and promotes community initiatives to improve the waters and ecosystems of the St. Croix River basin. These solutions and initiatives will be effective as of January 2027, improving river conditions by 2040.

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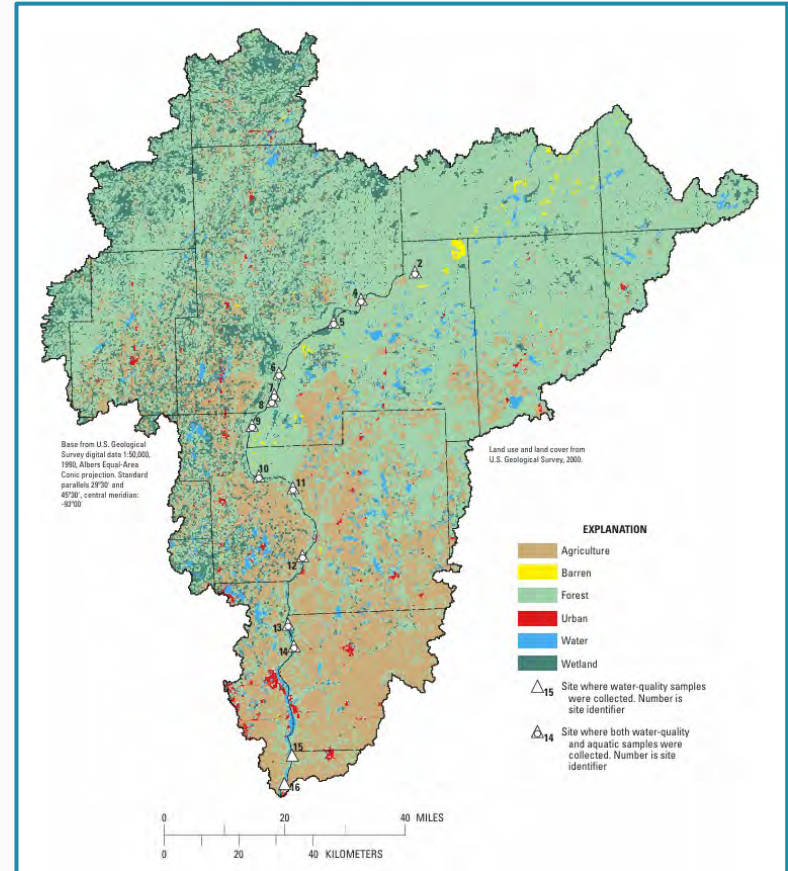
Background

- One of the last undisturbed, large floodplain rivers in the upper Mississippi River System
- Drainage Area = 7760 sq. miles
- Length = 165 miles long
- Forms Border between Wisconsin and Minnesota
 - Approximately 56% in Wisconsin and 44% in Minnesota
- Primarily meandering
- Very low gradient (average slope of 2.6 ft/mi)
- Depths vary (some pools as deep as 100 ft)



Geography

- Northern parts of the river are surrounded primarily by forests and wetlands
 - Relatively undisturbed
- Central River is primarily surrounded by mixed forests and agriculture
 - Transitional zone between the northern and southern St. Croix River
- Southern parts of the river are dominated by agriculture (still lots of forest)
 - More runoff near the major cities of Stillwater and Twin Cities





History

The St. Croix River:

- Has provided drinking water for humans for 10,000 years.
- Over 100+ fish species
- Mix of habitats
 - Coldwater tributaries
 - Warm mainstream river
 - Wetlands, forests, lakes

Historically known for:

- Fur trade
- Logging
- Hydropower development

Currently known for:

- Recreation
 - Canoeing, kayaking, tubing
- Tourism
 - Scenic views and hiking trails



Governance

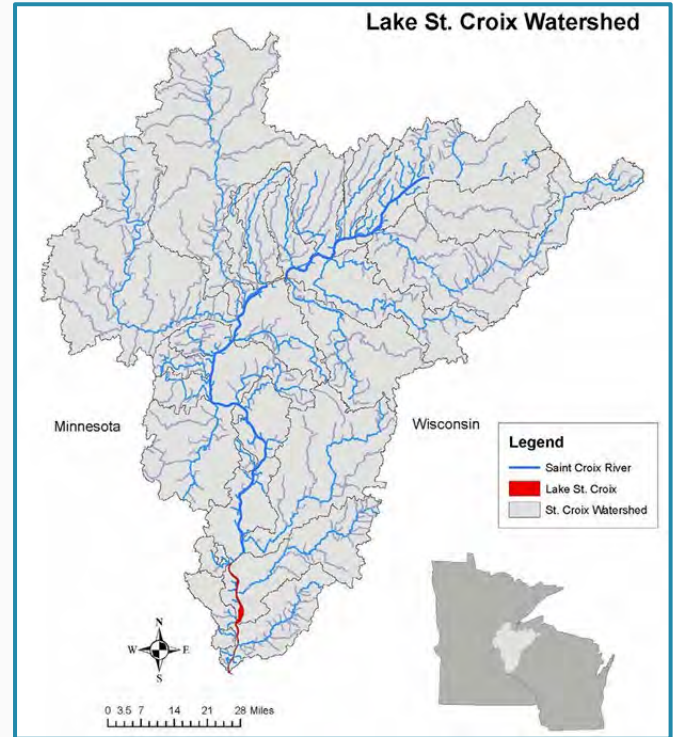
- National Wild and Scenic River Systems
 - Designated in 1968
 - Receives federal protection
- Shoreline Zoning Regulations
- Land -use Planning Strategies
 - National Park Services
 - Minnesota & Wisconsin Department of Natural Resources
- Wisconsin Farmer–Led Councils
 - Improve water quality
 - Reducing phosphorus and sediment loading
 - Increasing producer knowledge



Governance Cont.

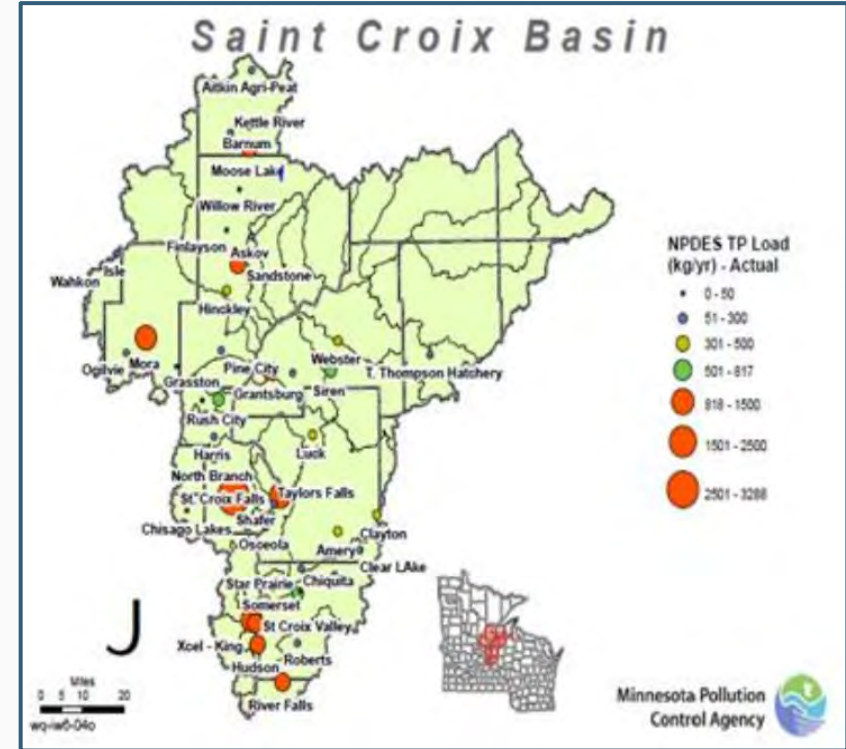
For Primarily Lake St. Croix (the last 25 miles of the river)

- Agricultural runoff and erosion control
- Total Maximum Daily Phosphorus Load of 2,172.8 pounds per day = 360 metric tons per year
 - Minnesota PCA and Wisconsin DNR
- St. Croix Basin Water Resources Planning Team
 - 40 $\mu\text{g}/\text{L}$ Total Phosphorus
 - 14 $\mu\text{g}/\text{L}$ Chlorophyll *a*
 - 1.4 m Secchi disc transparency



Problem 1: Water Quality

- Excess amounts of phosphorus are causing eutrophication.
 - Caused by agriculture and wastewater treatment plants.
 - Receives water from 52 treatment plants
- High levels of chloride are toxic to marine species
 - Caused by runoff from melting ice on roads and from fertilizers.
 - Increase in chloride levels from 1976 to 2015





Solution 1:

Reduce Phosphorus and Chloride levels by 20-30% by 2036

Phosphorus:

- Optimized Fertilization Techniques
 - Buffer strips
 - Reduce fertilizer use
 - Cover crops

Chloride:

- Reduce Road Salt Use
 - Alternative materials
 - Pre-treating





Problem 2: Invasive Species

- The Yellow Iris, a poisonous plant, has been overtaking native species.
- Purple Loosestrife has been invading wetlands.
 - Outcompeted wild rice and other valuable plants.
 - Reduced healthy habitats for species.
- Zebra Mussels colonize river bottoms.
 - Attach themselves to native mussels.
 - Deplete oxygen levels.



Solution 2:

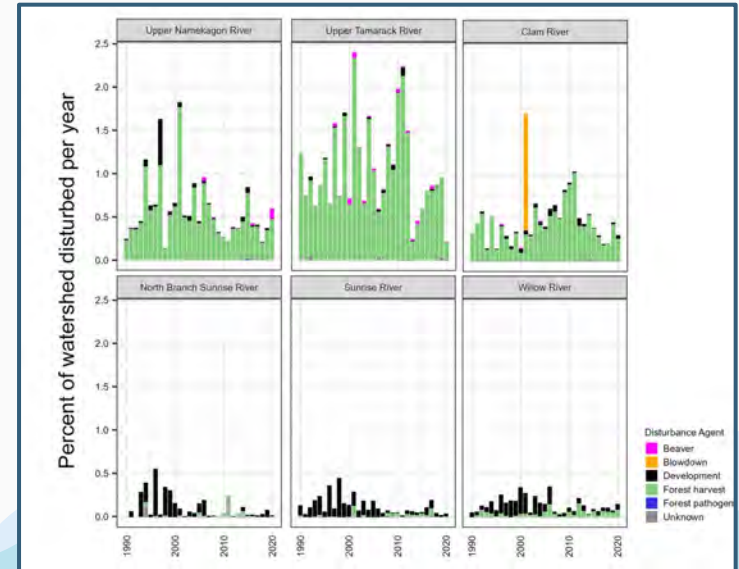
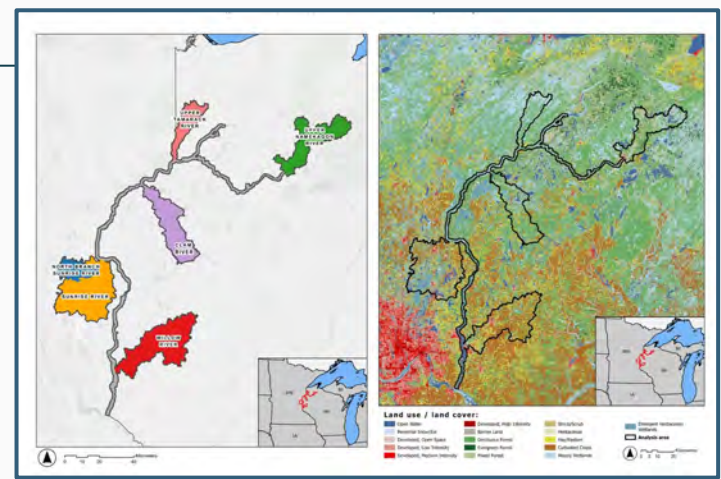
Reduce current population of invasive species by 20% by 2030
Reduce invasive plant coverage by 30% by 2030

- Reduce Human Related Transmissions
 - Education campaigns
 - Volunteer cleanups
 - Installing cleaning stations
- Control and Manage
 - Mechanical removal
 - Biological control
 - Limiting herbicide



Problem 3: Changing Landscapes

- Land cover such as trees and other vegetation are being removed.
 - Primary land cover of the watershed consists of forests, hay/pasture, and cultivated crops.
 - Forest harvest and development were the main causes of land disturbance and change from 1990 to 2020.
- Agricultural practices in the St. Croix watershed have shifted.
 - Historically, small, diversified farms with some crops, hay, and pasture land.
 - Shift to confined animal production.



Solution 3:

Protect at least 20% of disturbed forest area by
Reduce stormwater runoff from urban areas by

2040
20% by 2036

- Limit deforestation
 - Land-use restrictions
 - Reforestation projects
- Limit impervious surfaces and manage runoff
 - Cities adopt green infrastructure
 - Zoning laws
- Sustainable Agricultural Practices



Conclusions/Recommendations:

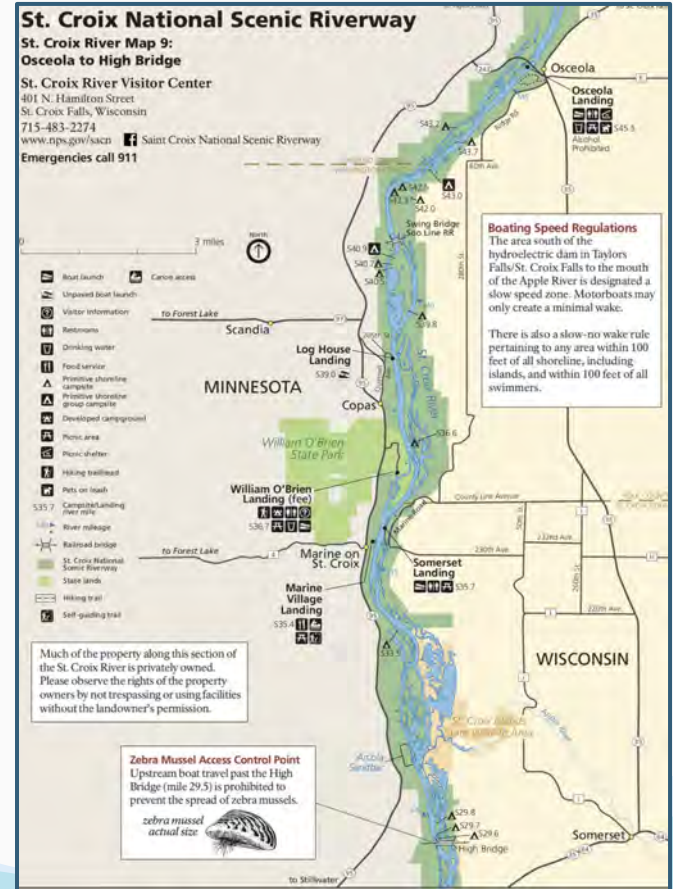
The St. Croix River is currently healthy, but is being threatened by the issues of water quality, invasive species, and changing landscapes.

Our recommendations include:

R1: Buffer Zones

R2: Green Infrastructure

R3: Educational programs for agriculture and the public



Sources:

- Payne, G. A., Lee, K. E., Montz, G. R., Talmage, P. J., Hirsch, J. K., & Larson, J. D. (2002). Water Quality and Aquatic Community characteristics of selected reaches of the St. Croix River, Minnesota and Wisconsin, 2000. In Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, & U.S. Geological Survey, *Water-Resources Investigations Report 02-4147*.
<https://pubs.usgs.gov/wri/wri024147/pdf/wrir024147.pdf>
- St. Croix River Association, & Dahlberg, A. (2016). St. Croix River Basin Aquatic Invasive Species Strategic Plan. In *St. Croix River Association*. <https://wildriversconservancy.org/wp-content/uploads/2019/09/AIS-Strategic-Plan-for-the-St-Croix-River-Basin-2.pdf>
- Minnesota Pollution Control Agency, Wisconsin Department of Natural Resources, St. Croix Basin Water Resources Planning Team, Science Museum of Minnesota, St. Croix Watershed Research Station, & Barr Engineering Company. (2012). LAKE ST. CROIX NUTRIENT TOTAL MAXIMUM DAILY LOAD.
https://dnr.wisconsin.gov/sites/default/files/topic/TMDLs/LakeStCroix_TMDLFinalReport.pdf
- St. Croix Basin Water Resources Planning Team. (2022). PROGRESS REPORT 2020 & 2021 LAKE ST. CROIX TOTAL MAXIMUM DAILY LOAD 2022. https://dnr.wisconsin.gov/sites/default/files/topic/TMDLs/StCroixTMDL_2020-2021ProgressReport.pdf

Thank You For Listening!

The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of light blue and teal, creating a soft, water-like effect.