



PROGRESS REPORT 2020 & 2021

LAKE ST. CROIX TOTAL MAXIMUM DAILY LOAD

2022

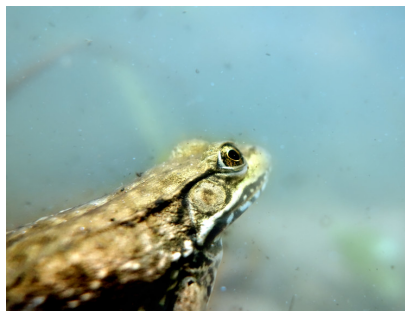


OVERVIEW

Background

The St. Croix River and Lake St. Croix are highly valued resources that provide exceptional recreational opportunities and support a highly diverse ecology of aquatic and terrestrial species. Home to 41 species of mussels, the watershed is the premier mussel watershed of the upper Mississippi River, and one of the premier freshwater mussel watersheds of the world.

Over the years, eutrophication, or nutrient enrichment, has occurred in Lake St. Croix due to excess phosphorus loading. In 2012, the US Environmental Protection Agency approved a Total Maximum Daily Load (TMDL) for Lake St. Croix, calling for a 20% reduction in the human-caused phosphorus carried to the rivers and streams of the basin by 2020.



This is the fifth progress report on phosphorus reduction activities in the St. Croix River basin by partners in Wisconsin and Minnesota. This document reports accomplishments that occurred in 2020 and 2021, primarily from survey responses from counties and local partners on Best Management Practices (BMPs) and educational efforts. It is very likely that many more projects were completed by a variety of partners and individuals than what is reported herein.

About the Watershed

The St. Croix River Basin (Figure 1) represents a large area, approximately 7,760 square miles with 44% of the basin land area located within Minnesota and 56% within Wisconsin. The St. Croix River begins near Solon Springs, Wisconsin, flowing west and south more than 160 miles until it joins the Mississippi River at Prescott, Wisconsin.

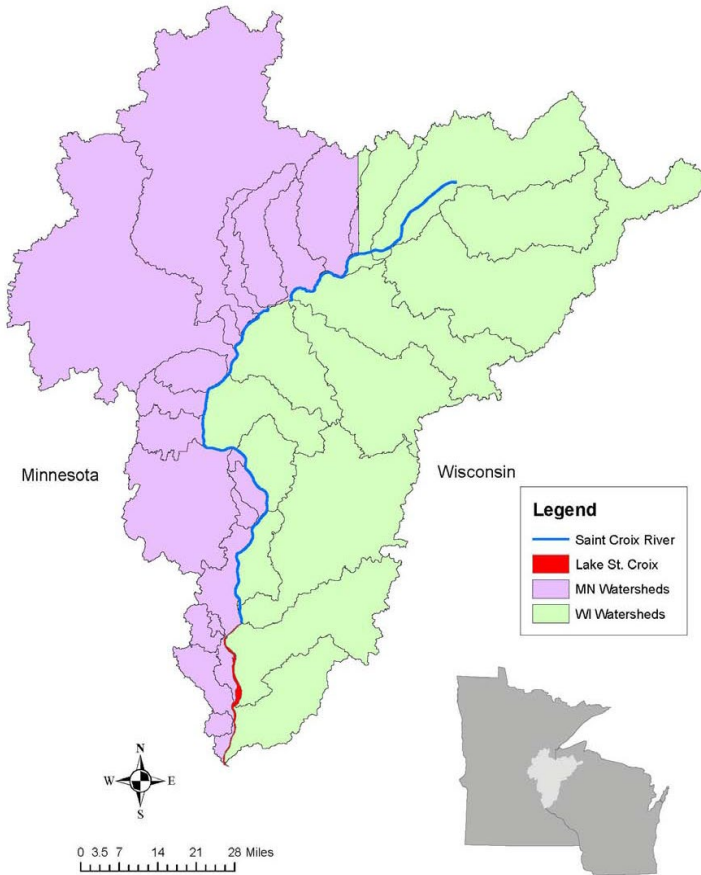


Figure 1. St. Croix Watershed

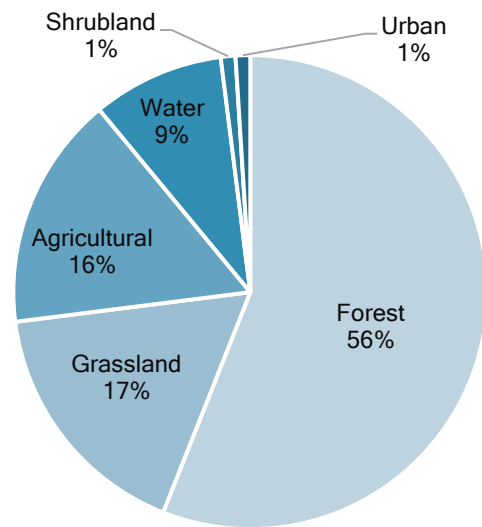
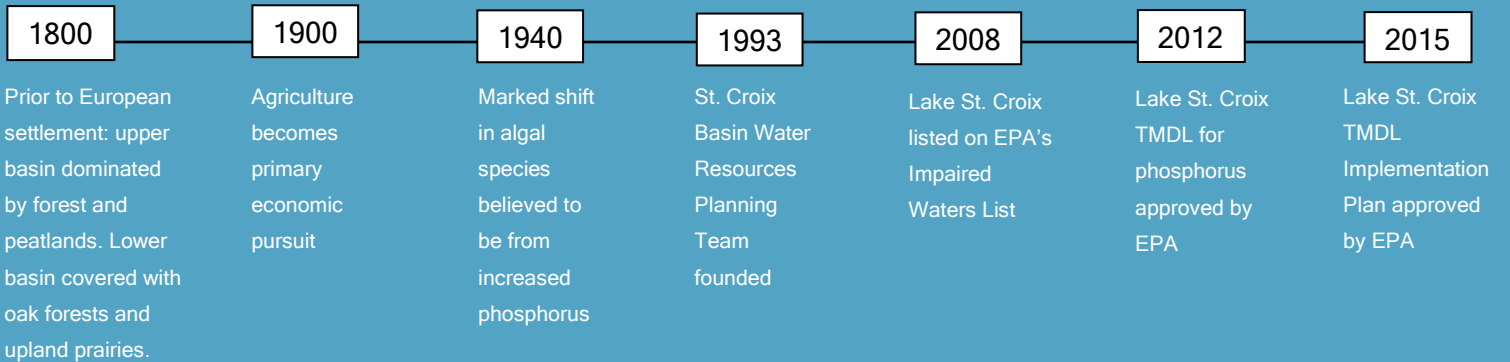


Figure 2. Land Use within the basin



ACTIVITIES SUMMARY

As with previous years, a wide range of practices were implemented to lower the phosphorus reduction within the St. Croix River basin and improve the health of these waters. These practices included:

FORESTRY



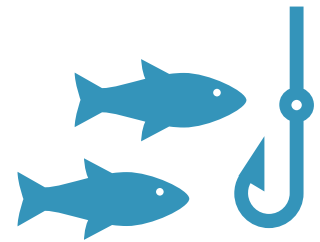
Forestry management and education

AGRICULTURE



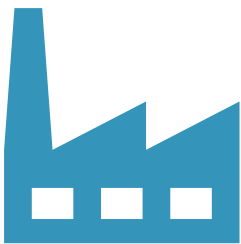
Grassed waterways, stream crossing installations, soil health and tillage practice improvements, nutrient management, and manure storage correction

SHORELINE



Lake management planning, shoreline buffer, and habitat restoration

URBAN



Stormwater practices including installation of raingardens, infiltration strips, and larger municipal stormwater improvements

LAND PROTECTION



Land protection, native plantings, and prairie restoration

EDUCATION



Educational efforts in all categories

Natural Resource Conservation Service

The Natural Resource Conservation Service (NRCS) provides funding and technical support to landowners and local conservation departments. Due to data privacy, public information is limited for NRCS funded projects. (Table 1) provides a generalized list of the practices that occurred within the St. Croix River basin in Wisconsin. It is likely that more projects were completed. This table represents practices implemented within the St. Croix River watershed.

Practice Name	Wisconsin	
Access Control	6.4	ac
Access Road	925	ft
Brush Management	65.9	ac
Conservation Cover	34.2	ac
Cover Crop	9,209.2	ac
Creating structural diversity with patch openings	22.3	ac
Critical Area Planting	4	ac
Crop tree management for mast production	5.7	ac
Diversion	326	ft
Early Successional Habitat Development-Mgt	5.7	ac
Enhance development of the forest understory to create conditions resistant to pests	5.6	ac
Establish Monarch butterfly habitat	76.5	ac
Establish pollinator and/or beneficial insect habitat continuity (space)	1.5	ac
Existing Activity Payment-Land Use	5,690.4	ac
Existing Activity Payment-Resource Concern	163	no
Fence	21,633	ft
Field Border	0.7	ac
Firebreak	5,739	ft
Forage Harvest Management	20.1	ac
Forest Management Plan - Written	12	no
Forest Stand Improvement	228.7	ac
Grade Stabilization Structure	4	no
Grassed Waterway	4.9	ac
Grassland Conservation Initiative	103.1	ac
Grazing management for improving quantity/quality of plant structure/composition for wildlife	59.1	ac
Grazing Management Plan - Written	5	no
Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape	193	ac
Heavy Use Area Protection	400	sq ft
Herbaceous weed control (plant pest pressures) for desired plant communities/habitats	1	ac
Herbaceous Weed Treatment	74.1	ac
High Tunnel System	6,265	sq ft
Improved grazing management for plant productivity/health through monitoring	28	ac
Incorporating "wildlife friendly" fencing for connectivity of wildlife food resources	1,377	ft
Irrigation Water Management	451	ac
Leave standing grain crops unharvested to benefit wildlife food sources	184.3	ac
Livestock Pipeline	4,129	ft
Mulching	3.6	ac
Obstruction Removal	3.5	ac
Pasture and Hay Planting	42.7	ac
Prescribed Burning	30.6	ac
Prescribed Grazing	141.4	ac
Pumping Plant	1	no
Residue and Tillage Management, No Till	2,180.1	ac
Residue and Tillage Management, Reduced Till	146.6	ac
Resource conserving crop rotation to reduce water erosion	620.8	ac
Snags, den trees, and coarse woody debris for wildlife habitat	10.4	ac
Spoil Disposal	2.8	ac
Stream Crossing	3	no
Trails and Walkways	960	ft
Tree/Shrub Establishment	31	ac
Tree/shrub planting for wildlife cover	3.4	ac
Tree/shrub planting for wildlife food	1.1	ac
Tree/Shrub Site Preparation	20.7	ac
Upland Wildlife Habitat Management	114.5	ac
Vegetated Treatment Area	0.9	ac
Waste Facility Closure	1	no
Watering Facility	4	no
Well Decommissioning	1	no
Wetland Restoration	0.8	ac
Wetland Wildlife Habitat Management	19.8	ac
Wildlife Habitat Planting	18.6	ac
Windbreak/Shelterbelt Establishment	808	Ft

MONITORING

In the 1970s, the Wisconsin Department of Natural Resources (DNR) developed a baseline monitoring program that tracks and analyzes water quality trends over time in Wisconsin's rivers, including two sites on the St. Croix River. In addition to DNR sampling, the United States Geological Survey (USGS) also operates stage gauges at these two sites, allowing for nutrient trend analysis. Figure 3 displays the annual total phosphorus concentration (points) over time as well as the flow normalized concentration (line) over time for these two sites. Due to shifts in monitoring priorities, gaps in the dataset exist, and therefore data collected before 2012 will not be included. Since 2012, there has been no significant decrease in phosphorus concentrations at each site; however, both sites show annual total phosphorus concentrations below the Wisconsin statewide phosphorus criteria for rivers of 0.1 mg/L.

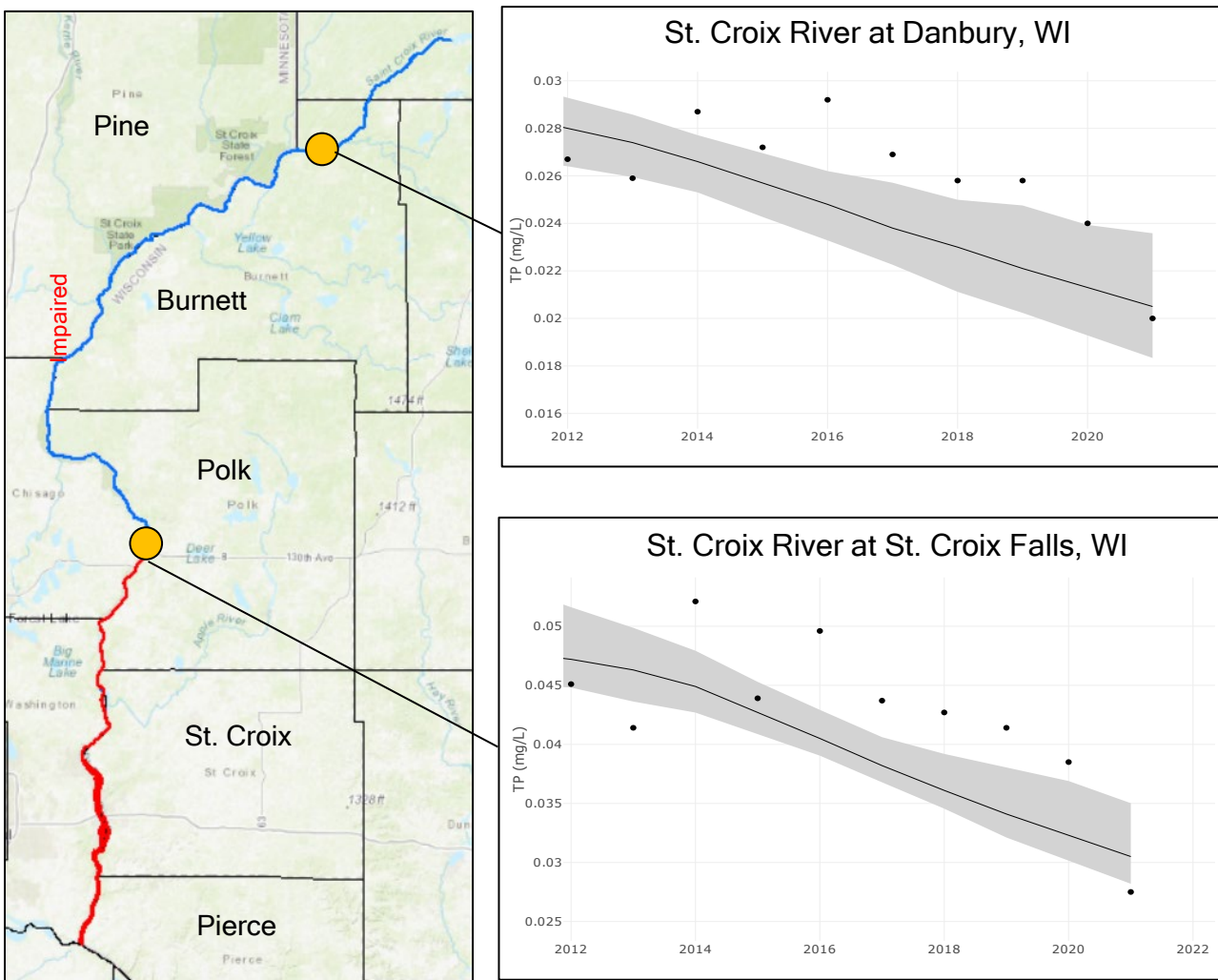
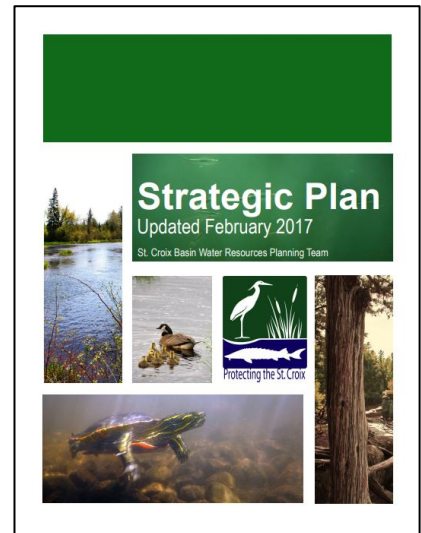
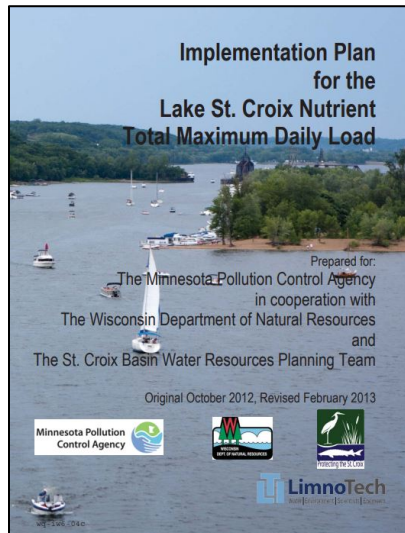
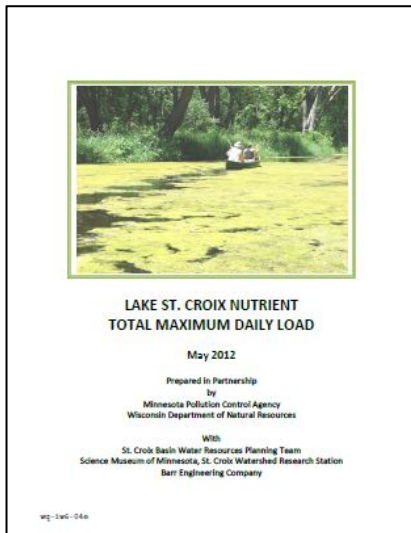


Figure 3. Annual mean total phosphorus concentration and flow normalized concentration over time at two DNR long term trend sampling sites on the St. Croix River

LAKE ST. CROIX TMDL:



CTRL + Click on report cover for a link to each report.

ANNUAL WASTEWATER DISCHARGE*:

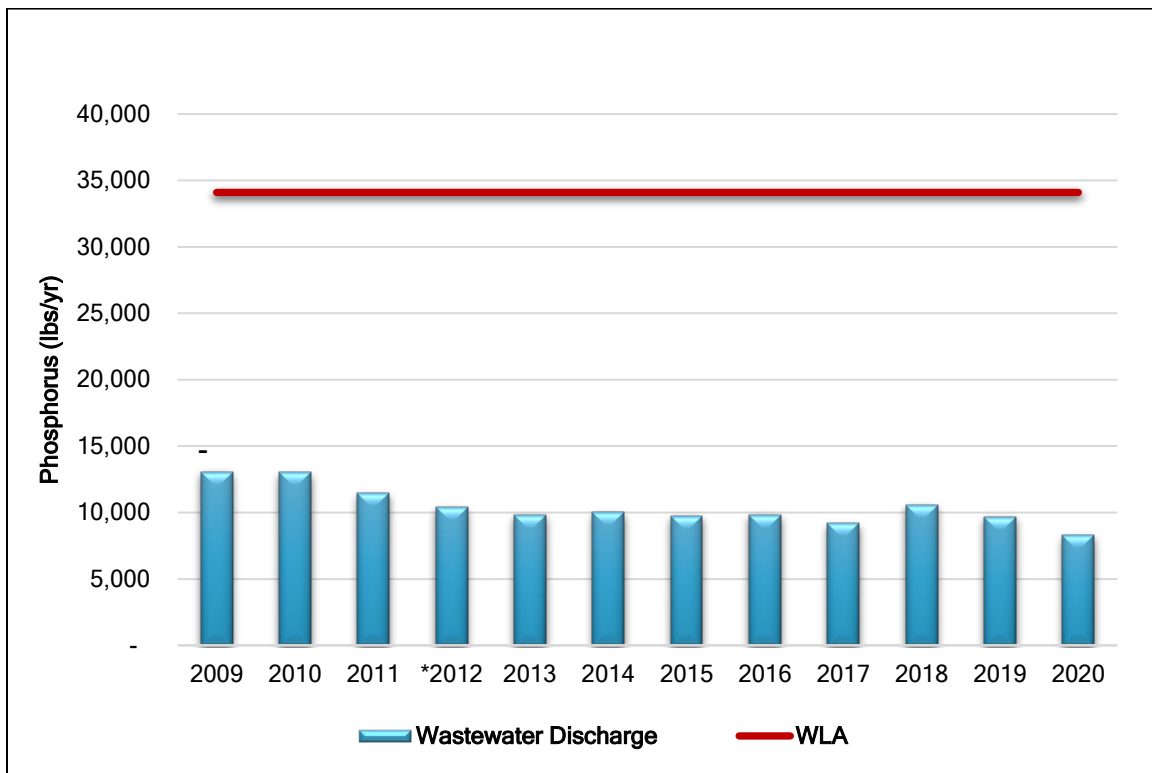


Figure 4. Lake St. Croix TMDL Annual Wastewater Discharge
 *Wasteload allocation and discharge are only reflective of dischargers within the Wisconsin area of the Lake St. Croix TMDL.

BASIN-WIDE PARTNERSHIP INITIATIVES:

ST. CROIX COUNTY WATER NETWORK (SCCWN):

The St. Croix County Water Network is a group of professionals who meet monthly to discuss topics related to the St. Croix River and the TMDL implementation. Although membership is made up of a diverse group of people, they follow civil governance principles that promotes work for the common good of the community and for the resource. Membership is currently made up of the St. Croix County Land & Water Conservation Department, WDNR, USFWS, and the Lake Mallalieu Association.

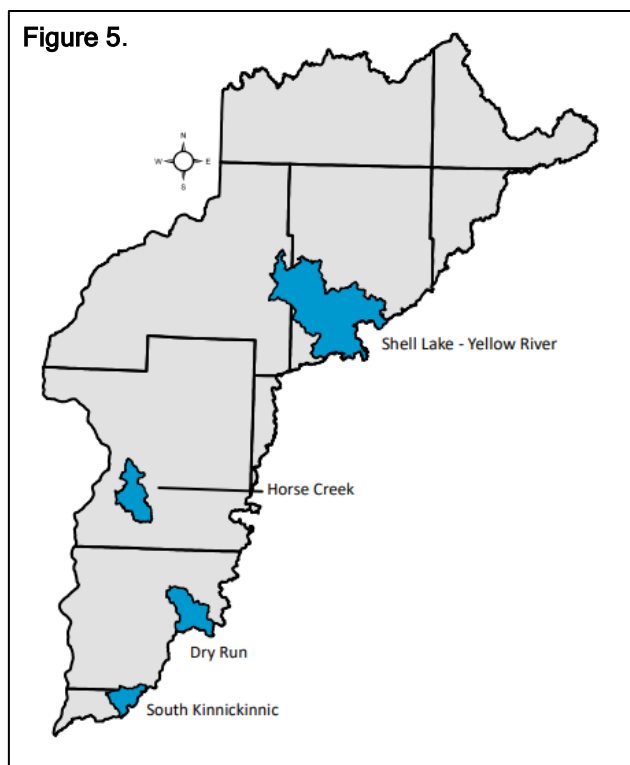
WISCONSIN FARMER-LED COUNCILS¹:

The Farmer-Led Watershed Council program was originally developed by the UW-Extension and the WDNR to improve water quality in the St. Croix River basins through reduced phosphorus and sediment loading while increasing producer knowledge and leadership on water quality issues.

There are currently four Farmer-Led Watershed Councils (FLWCs) located within the St. Croix River basin (Figure 5).

- Shell Lake - Yellow River Farmer-Led Watershed Council
- Horse Creek Area Farmer-Led Watershed Council
- South Kinnickinnic Farmer-Led Watershed Council
- Dry Run Creek Farmer-Led Council

Figure 5.



The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) offers Producer-Led Watershed Protection Grants to farmer-led groups that focus on ways to prevent and reduce runoff from farm fields. In 2020, DATCP awarded \$750,000 to 27 producer-led groups, and in 2021, DATCP awarded \$750,000 to 30 producer-led groups. This grant money allowed these groups to implement agricultural BMPs and provide educational outreach to other farmers as well as the local community.

1- https://datcp.wi.gov/Pages/Programs_Services/ProducerLedProjects.aspx

Horse Creek Area Farmer Led Watershed Council²

Established in 2013, the Horse Creek Farmer-Led Watershed Council is a group of farmers working together to improve soil and water conservation within the Horse Creek watershed. The Horse Creek watershed is located Polk and St. Croix County and covers approximately 76 square miles (Figure 6).

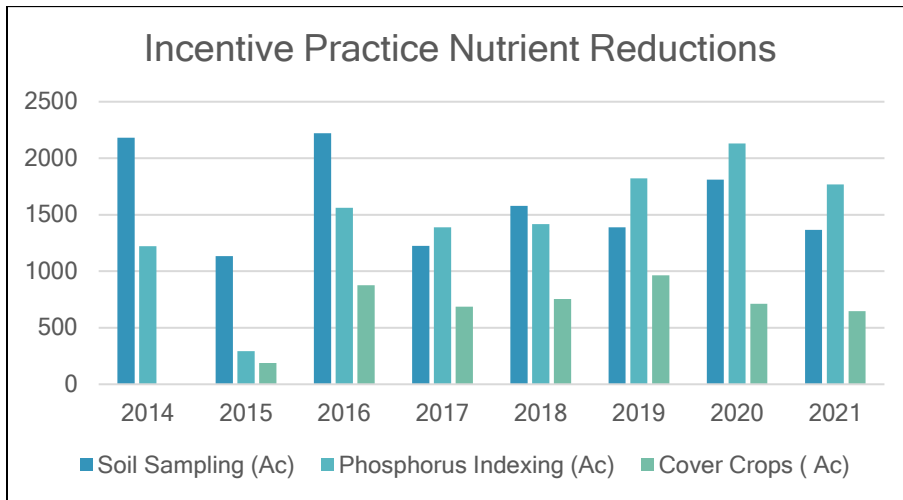


Figure 7. Incentive practice nutrient reductions for all operating years within the Horse Creek Watershed

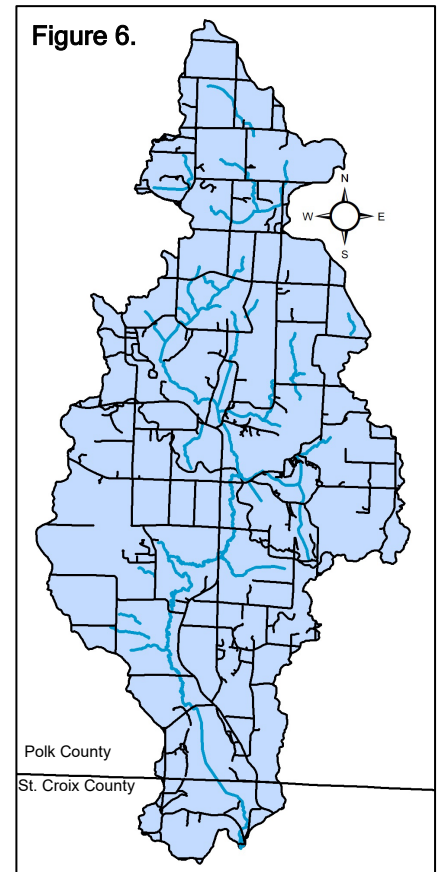


Figure 6.

Project Highlights:

Horse Creek Area Watershed Cover Crop Test Plot³ - Since 2014 the Horse Creek Cover Crop Test Plot has been testing five different trails looking at potential variations resulting from the implementation of different tillage practices and the use of various cover crops (Table 2). The Cover Crop Test Plot has also been used as a demonstration site for learning events within the watershed.

“Our mission is to help producers to adopt best management practices dedicated to protecting water quality and improving soil health²”

	Plant Population (Plants/Acre)	Residue Cover (%)	Yield Average (Adjusted to 15.5% Moisture)
Trial 1 - no till, no cover	30,778	72.3	219.6
Trial 2 - no till, multi species cover	31,944	75.4	225.9
Trial 3 - no till, cereal rye cover	31,389	77.7	229.0
Trial 4 - conventional, cereal rye cover	32,167	5.6	236.8
Trial 5 - conventional, no cover	31,111	5.8	209.8

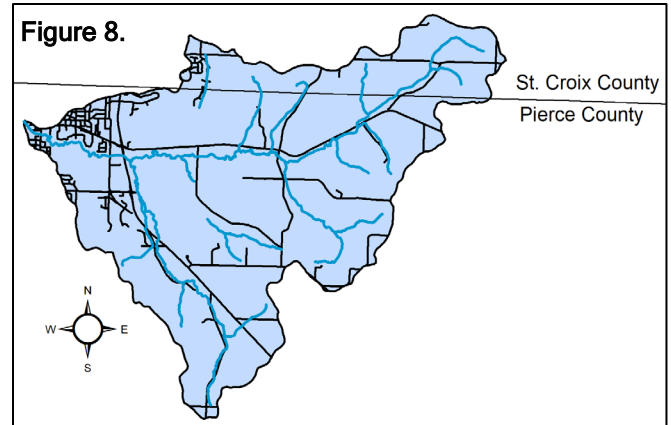
Table 2. Trial data from the Horse Creek Watershed Cover Crop Test Plot.

2- <https://farmerledwatershed.org/horse-creek-watershed/>

3-<https://farmerledwatershed.files.wordpress.com/2022/02/2021-test-plot-report-final.pdf>

South Kinnickinnic Farmer Led Watershed Council⁴

Established in 2013, the South Kinnickinnic Farmer Led Watershed Council is a group of farmers and landowners working together to improve soil and water conservation within the Rocky Branch and South Fork watersheds. The South Kinnickinnic River watershed is in Pierce and St. Croix County and covers approximately 27 square miles (Figure 8).

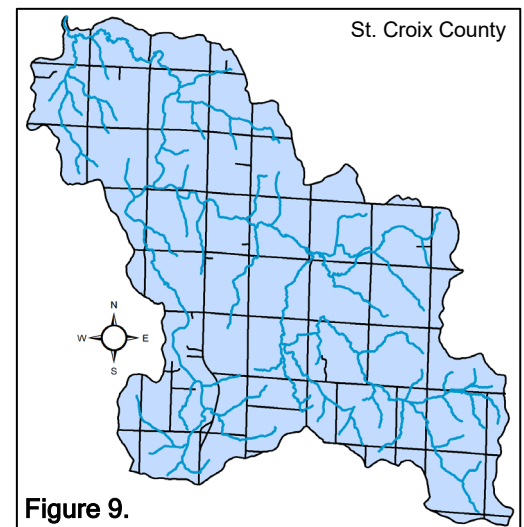


The South Kinnickinnic Farmer Led Watershed Council works to promote farmer learning by hosting regular meetings, workshops, field days and seminars promoting soil health and water quality initiatives. The council also offers incentives to farmers within the watershed for implementing conservation practices.

Dry Run Farmer Led Council⁵

Established in 2013, the Dry Run Farmer Led Council is a group of farmers and landowners working together to improve soil and water conservation (Figure 9).

The Dry Run Farmer Led Council works to promote farmer learning by hosting meetings, workshops, field days and seminars promoting soil health and water quality initiatives. The council also offers incentives to farmers within the watershed for implementing conservation practices



Project Highlights:

Farm-Lake Social Hours⁶ - The Dry Run Farmer Led Council held an event with members of the Lake Malillieu Association over two evenings to share perspectives on the challenges they face. One evening was held on a farm field within the Dry Run watershed and provided an opportunity for farmers to share their upland conservation initiatives with the lake association. Day two was a pontoon tour of lake Malillieu where conservation discussions continued. Events like this increase both groups' perspectives and help to further the shared goal of enhancing water quality.

4- <https://farmerledwatershed.org/south-kinnickinnic-watershed/>

5- <https://farmerledwatershed.org/dry-run-watershed/>

6- <https://us6.campaign-archive.comu=?8d856dc81ba03193232dcb684&id=c5fdd6bee6>

Shell Lake – Yellow River Farmer Led Council⁷

Established in 2019, the Shell Lake - Yellow River Farmer- Led Watershed Council is located in Burnett and Washburn counties. The watershed ranges from Spooner Lake and the headwaters of the Yellow River to Shell Lake. In total 60 lakes and 14 streams are covered this group (Figure 10).

The Shell Lake - Yellow River Farmer- Led Watershed Council is a group of farmers and landowners whose mission is to work as a non-profit organization to improve soil health and water quality through outreach, education, and conservation practices that improve sustainable agriculture.

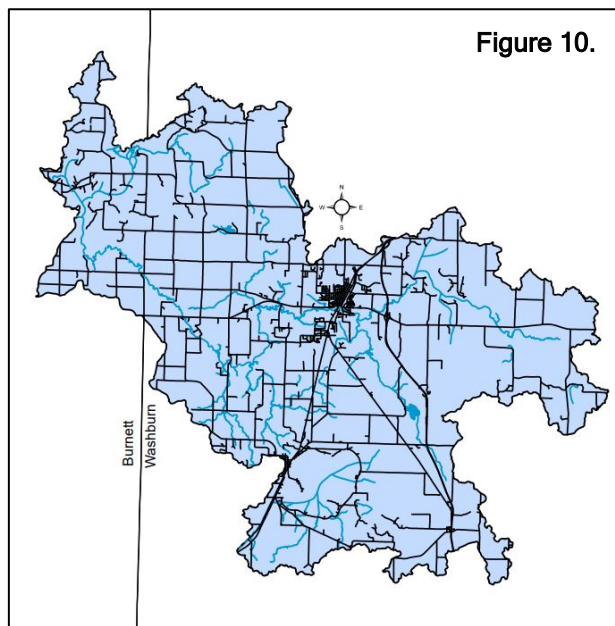


Figure 10.

Cover Crop Analysis by Farmer-Led Watershed (2021)⁸

Group	Horse Creek Farmer-Led Watershed Council	Shell Lake - Yellow River Farmer-Led Watershed Council	South Kinnickinnic Farmer-Led Watershed Council
Acres of Cover Crops	858	609	410
Average P Reduction (lb/ac/yr)	0.53	0.60	0.13
P Reduction from Cover Crops (lb/yr)	438.84	365.40	54.65
Average Sediment Reduction (t/ac/yr)	0.43	0.80	0.18
Sediment Reduction- (t/yr)	356.04	487.20	72.86

7- <https://washburn.extension.wisc.edu/agriculture/shell-lake-yellow-river-farmer-led-watershed-council/>

8 – Numbers provided by DATCP

Appendix A, Reductions and BMP Installations

2020*		Estimated Phosphorus Reduction**	Shoreline and Riparian Practices	Agricultural Practices	Forestry Practices	Residential Programs	Educational Programs
County	State	(lbs.)	Total Installed (#)	Total Installed (#)	Total Installed (#)	Total Installed (#)	Attendance (People)
Aitkin	MN	No Projects Identified for 2020					
Anoka	MN	14	X	X	X	2	X
Barron	WI	No Projects Identified for 2020					
Bayfield	WI						
Burnett	MN						
Carlton	MN						
Chisago	MN	2.84	X	X	X	2	X
Douglas	WI	No Projects Identified for 2020					
Isanti	MN						
Kanabec	MN						
Mille Lacs	MN						
Pierce	WI						
Pine	MN	14	X	X	X	3	X
Polk	WI	4092	1	7001.2 ac	X	1	692
Ramsey	MN	No Projects Identified for 2020					
St. Croix	WI	1699.5	39	78.4 ac	X	129	2398
Sawyer	WI	No Projects Identified for 2020					
Washburn	WI						
Washington	MN						

2021*		Estimated Phosphorus Reduction**	Shoreline and Riparian Practices	Agricultural Practices	Forestry Practices	Residential Programs	Educational Programs	
County	State	(lbs.)	Total Installed (#)	Total Installed (#)	Total Installed (#)	Total Installed (#)	Attendance (People)	
Aitkin	MN	No Projects Identified for 2021						
Anoka	MN							
Barron	WI							
Bayfield	WI							
Burnett	MN							
Carlton	MN							
Chisago	MN							
Douglas	WI							
Isanti	MN							
Kanabec	MN	3.93	X	X	X	X	X	
Mille Lacs	MN	No Projects Identified for 2021						
Pierce	WI	2079.94	7.74 ac	2372 ac 4 Gully	X	X	X	
Pine	MN	No Projects Identified for 2021						
Polk	WI							
Ramsey	MN							
St. Croix	WI	2224	115 sites 2.2 ac 482 ft	1479.8 ac	X	265	3316	
Sawyer	WI	No Projects Identified for 2021						
Washburn	WI							
Washington	MN	30.15	X	X	X	X	X	

* Numbers are reported from county partners. It is assumed that more projects have occurred and were not reported.

**Reductions are provided by each county's conservation department. Methods to determine reductions may be different.