LAKE TOPIC MEETING DATA

Introduction

The Kettle River & Upper St. Croix Watershed flows south from its headwaters in Carlton County to its confluence with the Snake River just south of St. Croix State Park. Although largely forested, the watershed is dotted with farmland and small cities including Moose Lake, Sandstone and Hinckley. This watershed is lucky to have abundant healthy natural resources including rivers, streams, lakes, wetlands, groundwater and forests.

The **Kettle River & Upper St. Croix One Watershed, One Plan** (1W1P) is a planning partnership between Pine SWCD, Pine County, Carlton SWCD, Carlton County and Kanabec SWCD. The goal of this partnership is to **prioritize** restoration and protection opportunities and **target** valuable resources. The result will be the development of a comprehensive watershed management plan with actions that make progress towards **measurable** goals.

The general 1W1P process is outlined in Figure 1. For the first step, which is to gather and prioritize opportunities/issues in the watershed, a series of five topic meetings will be held. The meeting topics include: 1) lakes, 2) forests, 3) rivers, streams & wetlands, 4) agriculture & groundwater and 5) stormwater.

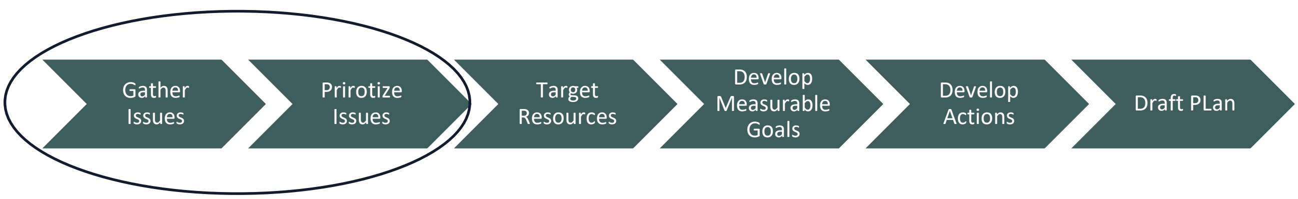

Figure 1. The 1W1P process is divided into six main steps. The topic meetings are the first step in the process (circled).

The 1W1P process is driven by local units of government, guided by an Advisory Committee made up of local stakeholders and state agencies. The decision-making body for the plan is a Policy Committee made up of elected officials from each County and SWCD.

Kettle River & Upper St. Croix Watershed Lakes

There are 57 lakes of 10 acres or more in the Kettle River & Upper St. Croix watershed, hosting a variety of species including cisco (Hanging Horn and Little Hanging Horn), trout (Grindstone) muskie (Island) and wild rice (22 lakes according to the 1854 Treaty Authority). There are 13 lakes list by the MN Department Natural Resources (DNR) as being outstanding lakes of biological significance. This means the lake has a unique plant or animal species. According to the MN DNR, the lakes with the highest health scores include Grindstone, Greigs, Little Hanging Horn, Echo, Hanging Horn, Razor and Kettle lakes.

Figure 2. Kettle Lake is a wild rice lake in the northern part of the planning area.

A full list of lake related data is available in table 1. Although many of the lakes in this watershed are healthy, a total of 13 lakes are listed as impaired by the Minnesota Pollution Control Agency (MPCA) due to high levels of nutrients. Too many nutrients, like phosphorous, can lead to algae blooms. These impaired lakes include Oak, Grindstone, Big Pine, Pine, Twentynine, Merwin, Eleven, Rock, Grace, McCormick, Fox, Elbow, Rhine. Some lakes are more sensitive to additions of nutrients, meaning that additions of nutrients could cause the lake to become impaired. A total of 10 lakes are listed by the MN DNR as having the highest sensitivity to additions of phosphorus. In addition, a total of nine lakes are listed as either nearly impaired or barely impaired by the MPCA. These lakes are very close to the nutrient standard. Finally, a total of five lake are infested with aquatic invasive species, including Bear, Sand, Sturgeon, an unnamed gravel pit and Little Hanging Horn Lake. They are all infested with Eurasian Water Milfoil.

HUC -10 Watershed	Lake Name	Aquatic Invasive Species	Shallow Lake?	Impairment Status (MPCA)	Nearly Barely Lake? (MPCA)	Mean TP (µg/L) (MPCA)	Lake of Phosphorus Sensitivity (DNR)	Secchi Trend (MPCA)	Lake of Biological Significance (DNR)	Lake Health Score (DNR)	Lake Benefit Cost Significance Class (DNR)	Unique Resources	MPCA Protection Priority
Upper Kettle River	Kettle (09004900)	---	Yes	---	---	29	High	Insufficient Data	Outstanding	85	High	Wild Rice (DNR & 1854)	Priority C
	Little Kettle	---	---	---	---	---	---	---	Outstanding	---	---	Wild Rice (1854)	---
	Merwin	---	---	Nutrients	---	39	Impaired	Insufficient Data	---	70	High	Wild Rice (1854)	---
	Split Rock	---	---	---	---	---	---	---	---	---	---	Wild Rice (DNR & 1854)	---
Moose River	Echo	---	---	---	---	16	Higher	Insufficient Data	Outstanding	85	High	---	Priority B
	Coffee	---	---			20	Higher	Insufficient Data		70	High		Priority B
	Bob	---	---	---	---	18	Higher	Insufficient Data	---	75	High	Wild Rice (DNR & 1854)	Priority C
	Bear	Yes	---	---	Yes	26	Highest	No Trend	---	70	High	---	Priority A
	Little Hanging Horn	Yes	---	---	---	17	Highest	Improving	Outstanding	85	Higher	Cisco	Priority A
	Moose	---	---	---	---	24	Higher	Insufficient data	---	70	High	Wild Rice (DNR & 1854)	Priority B
	Moosehead	---	---	---	Yes	36	High	No Trend	Outstanding	80	High	Wild Rice (DNR & 1854)	Priority B
	Park	---	Yes	---	---	16	Highest	No Trend	High	80	Higher	---	Priority B
	Hanging Horn	---	---	---	Yes	29	High	No Trend	Outstanding	85	High	Cisco	Priority C
	Sand	---	---	Fish IBI	---	19	Highest	No Trend	---	70	Higher	Wild Rice (1854)	Priority A
	Eddy	---	---	---	Yes	21	High	No Change	---	70	High	---	Priority A
	Manoomini-zaaga'iganing	---	---	---	---	18	---	---	Outstanding	---	---	Wild Rice (DNR & 1854)	---
	Twentynine	---	---	Nutrients	---	53	Impaired	Insufficient data	---	70	High	---	Priority C
	Little North Sturgeon	---	---	---			---	---	---	---	---	Wild Rice (DNR & 1854)	---
	Lords	---	---	---			---	---	High	---	---	---	---
	Island	---	---	---	Yes	28	Highest	No Change	Moderate	75	Higher	Muskie	Priority A
Willow River	Eleven (58006800)	---	---	Impaired	Yes	25	Highest	No Trend	---	70	High	---	Priority B
	Dago	---	---	---	---	13	Highest	Insufficient Data	---	80	Higher	---	Priority A
	Oak	---	---	Nutrients, Fish IBI	---	35	Impaired	No Trend	---	70	High	Wild Rice (1854)	Priority A

HUC -10 Watershed	Lake Name	Aquatic Invasive Species	Shallow Lake?	Impairment Status (MPCA)	Nearly Barely Lake? (MPCA)	Mean TP (µg/L) (MPCA)	Lake of Phosphorus Sensitivity (DNR)	Secchi Trend (MPCA)	Lake of Biological Significance (DNR)	Lake Health Score (DNR)	Lake Benefit Cost Significance Class (DNR)	Unique Resources	MPCA Protection Priority
	Sturgeon	Yes	---	---	---	13	Highest	Improving	---	75	Highest	Wild Rice (1854)	Priority A
	Passenger	---	---	---	---	13	Higher	Insufficient Data	---	75	High	---	Priority B
	Big Slough	---	---	---	---		---	---	Moderate	---	---	---	---
	Turtle	---	---	---	---		---	---	High	---	---	---	---
	Stanton	---	Yes	---	---	41	High	Insufficient Data	---	70	High	Wild Rice (DNR)	Priority C
	Willow	---	---	---	---		---	---	---	---	---	Wild Rice (DNR)	---
Pine River	Bass (58013700)	---	---	---	---	18	Highest	Insufficient Data	Moderate	70	Highest	---	---
	Little Bass	---	---	---	---	30	High	Insufficient Data	---	65	High	---	Priority B
	Bass (58012800)	---	Yes	---	---	24	High	Insufficient Data	Moderate	75	Higher	---	---
	Indian	---	---	---	---	27	High	Insufficient Data	---	70	High	---	Priority C
	Little Pine	---	---	---	---	67	High	Insufficient Data	---	70	High	---	Priority C
	Rhine	---	Yes	Nutrients	---	62	Impaired	No Trend	---	70	High	---	Priority A
	Fish	---	---	---	---	69	High	Insufficient Data	---	70	High	---	Priority C
	Fox	---	Yes	Nutrients	---	52	Impaired	---	Outstanding	80	High	Wild Rice (DNR)	Priority C
	Upper Pine	---	---	---	---	25	Higher	No Trend	---	70	High	---	Priority C
	Eleven (33000100)	---	Yes	Impaired	---	39	Impaired	Insufficient Data	High	70	High	---	Priority B
	Pine	---	---	Impaired	Yes	34	Impaired	No Trend	---	70	High	Wild Rice (DNR)	---
	Big Pine	---	---	Impaired	Yes	28	Impaired	No Change	---	70	High	Wild Rice (DNR)	---
Grindstone River	Grindstone	---	---	Nutrients	---	14	Impaired	No trend	Outstanding	85	Higher	Trout Lake (DNR)	Priority B
	Miller	---	---	---	----	36	Higher	Insufficient Data		70	High	---	Priority B
	Thirteen	---	---		---	---	---	---	High	---	---	---	---
	Elbow	---	---	Nutrients	---	41	Impaired	Insufficient Data	---	70	High	---	Priority B
	Five	---	---	---	---	17	Higher	Insufficient data	---	75	High	---	Priority C
Lower Kettle River	Second	---	---	---	---	28	Higher	Insufficient Data	Moderate	75	High	---	Priority B

HUC -10 Watershed	Lake Name	Aquatic Invasive Species	Shallow Lake?	Impairment Status (MPCA)	Nearly Barely Lake? (MPCA)	Mean TP (µg/L) (MPCA)	Lake of Phosphorus Sensitivity (DNR)	Secchi Trend (MPCA)	Lake of Biological Significance (DNR)	Lake Health Score (DNR)	Lake Benefit Cost Significance Class (DNR)	Unique Resources	MPCA Protection Priority
	Cedar	---	---	---	---	38	Higher	Insufficient Data	---	70	High	Wild Rice (DNR)	Priority B
	First	---	---	---	---	39	High	Insufficient Data	---	75	High	---	Priority B
	Long	---	---	---	Yes	27	Higher	Improving	Moderate	75	High	---	Priority B
	Mud	---	---	---	---	80	High	Insufficient Data	---	70	High	---	Priority C
	Clear	---	---	---	---	--	---	---	Moderate	---	---	---	
	McCormick	---	---	Nutrients	---	29	Impaired	Insufficient Data	Moderate	75	High	Wild Rice (DNR)	Priority C
	Little Mud	---	---	---	---	55	High	Insufficient Data	---	70	High	---	Priority C
Sand Creek	Clayton	---	Yes	---	---	55	High	---		70	High	---	Priority C
	Wallace	---	---	---	---	32	High	---		70	High	---	Priority C
Crooked Creek	Crooked	---	---	---	---	---	---		Outstanding	---	---	Wild Rice (DNR)	---
	Alma	---	---	---	---	---	---		Moderate	---	---		---
	Tamarack	---	---	---	---	15	Higher	Improving	Moderate	75	High		Priority C
	Greigs	---	---	---	---	27	Higher	Insufficient Data	Outstanding	85	High		Priority B
	McGowan	---	---	---	---	41	High	Insufficient Data	---	70	High		Priority C
	Razor	---	---	---	---	15	Higher	Insufficient Data	High	85	High		Priority C
	Lena	---	---	---	---	32	Highest	Insufficient Data	---	70	High		Priority A
Lower Tamarack	Grace	---	Yes	Nutrients	---	70	Impaired		---	70	High	---	Priority C
	Hay Creek Flowage	---	Yes	---	---	75	High	Insufficient Data	Outstanding	80	High	Wild Rice (DNR)	Priority C
	Little Tamarack	---	---	---	---	26	High	Insufficient Data	Moderate	75	High	---	Priority C
	Rock	---	Yes	---	---	35	Impaired	Insufficient Data	---	70	High	---	Priority B
	Stevens	---	---	---	---	63	High	Insufficient Data	---	70	High	---	Priority C

Lake Benefit Cost Assessment for the Kettle River/Upper St. Croix Watershed

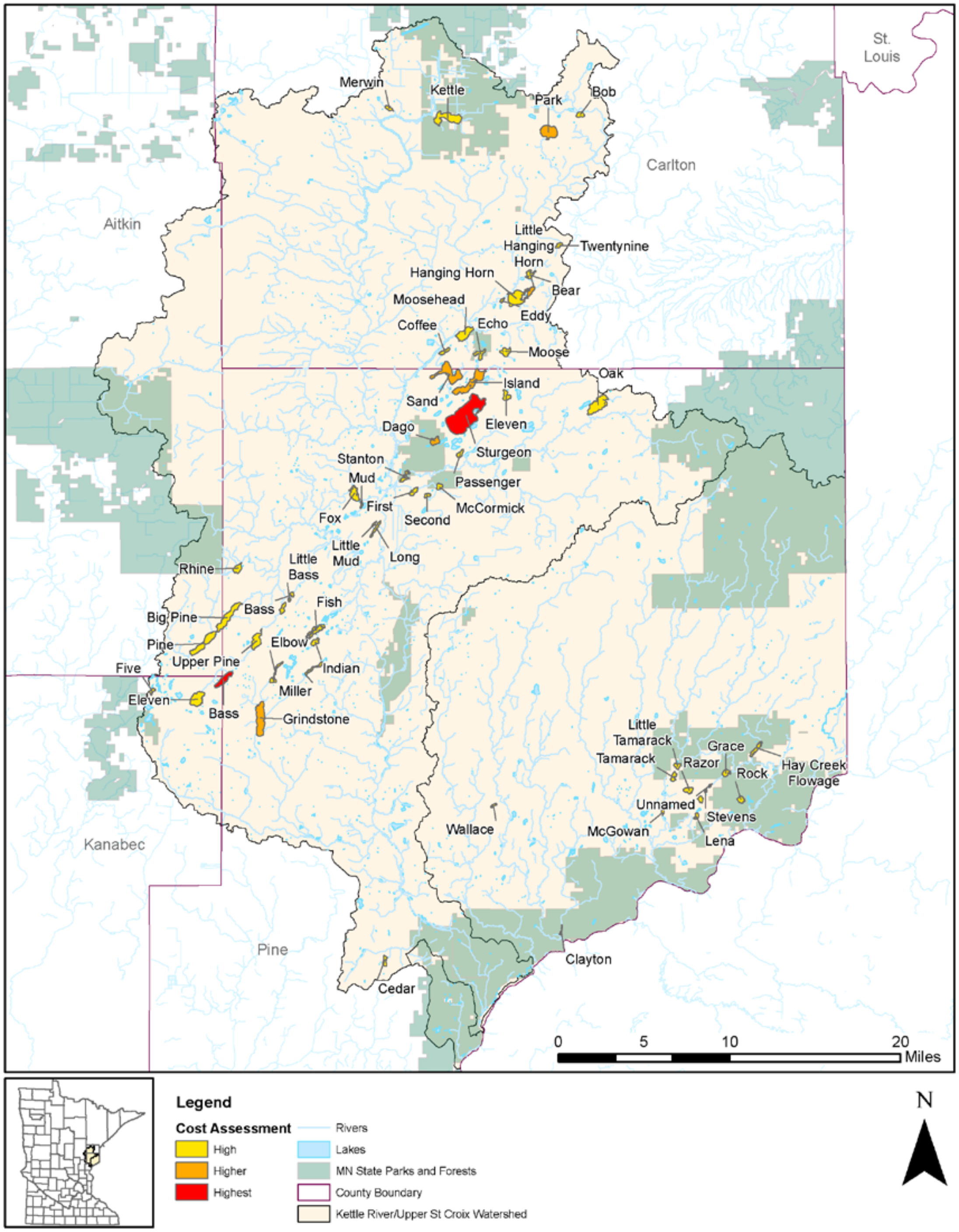

Figure 3. MN DNR lake benefit cost assessment is a grouping of waterbodies based on the lake benefit:cost assessment priority score, which is a function of phosphorus sensitivity, lake size, and catchment disturbance. Classes relate to the state's priority of focusing on high-quality, high-value lakes that likely provide the greatest return on investment.

Lake Hydrology Health Scores for the Kettle River/Upper St. Croix Watershed

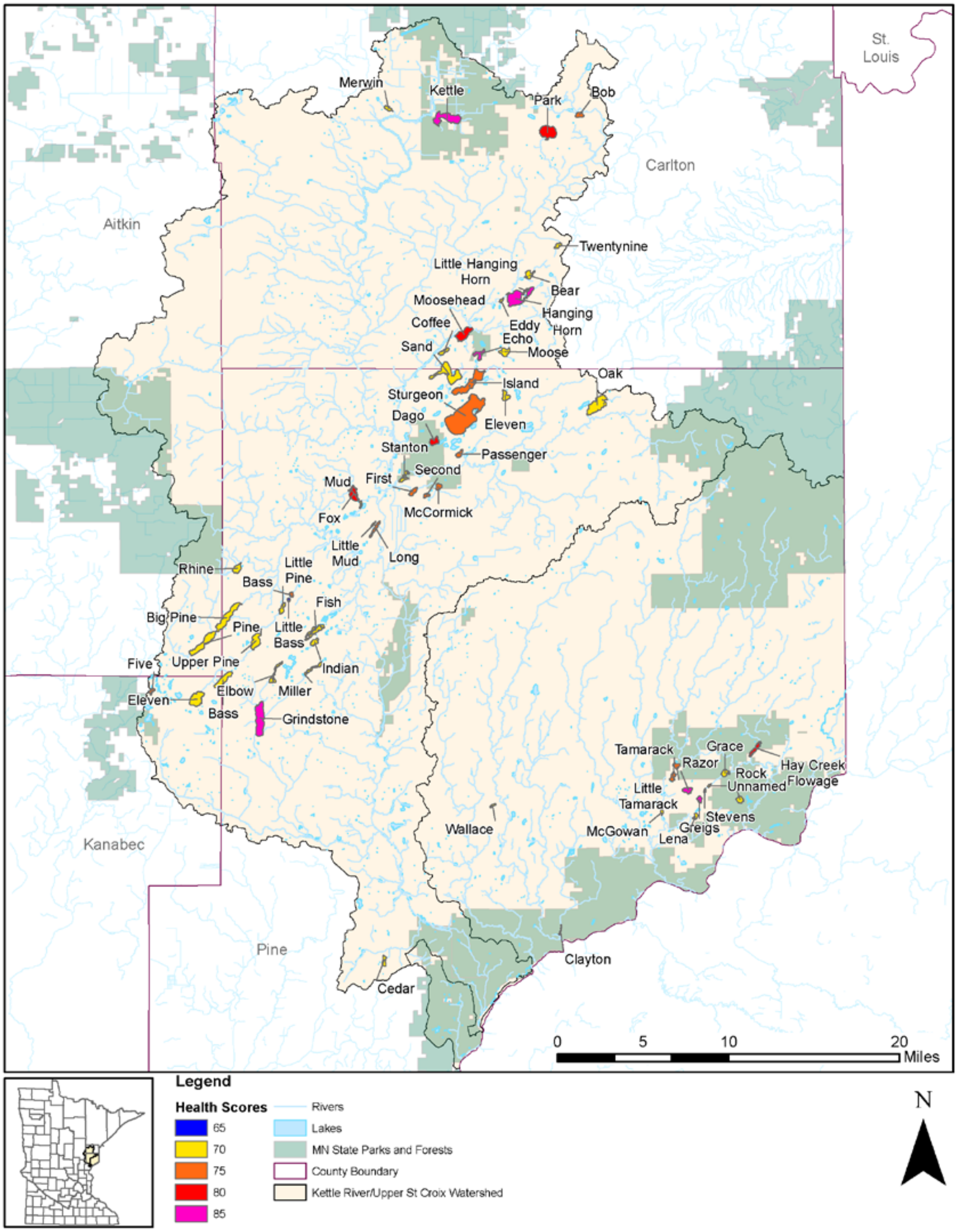

Figure 4. The MN DNR Lake Health Score provides a generalized health assessment of a lake and its watershed. Lake Health Scores above 80 indicate good health and those below 70 indicate poor health.

Hg Impaired Lakes in the Kettle River/Upper St. Croix Watershed

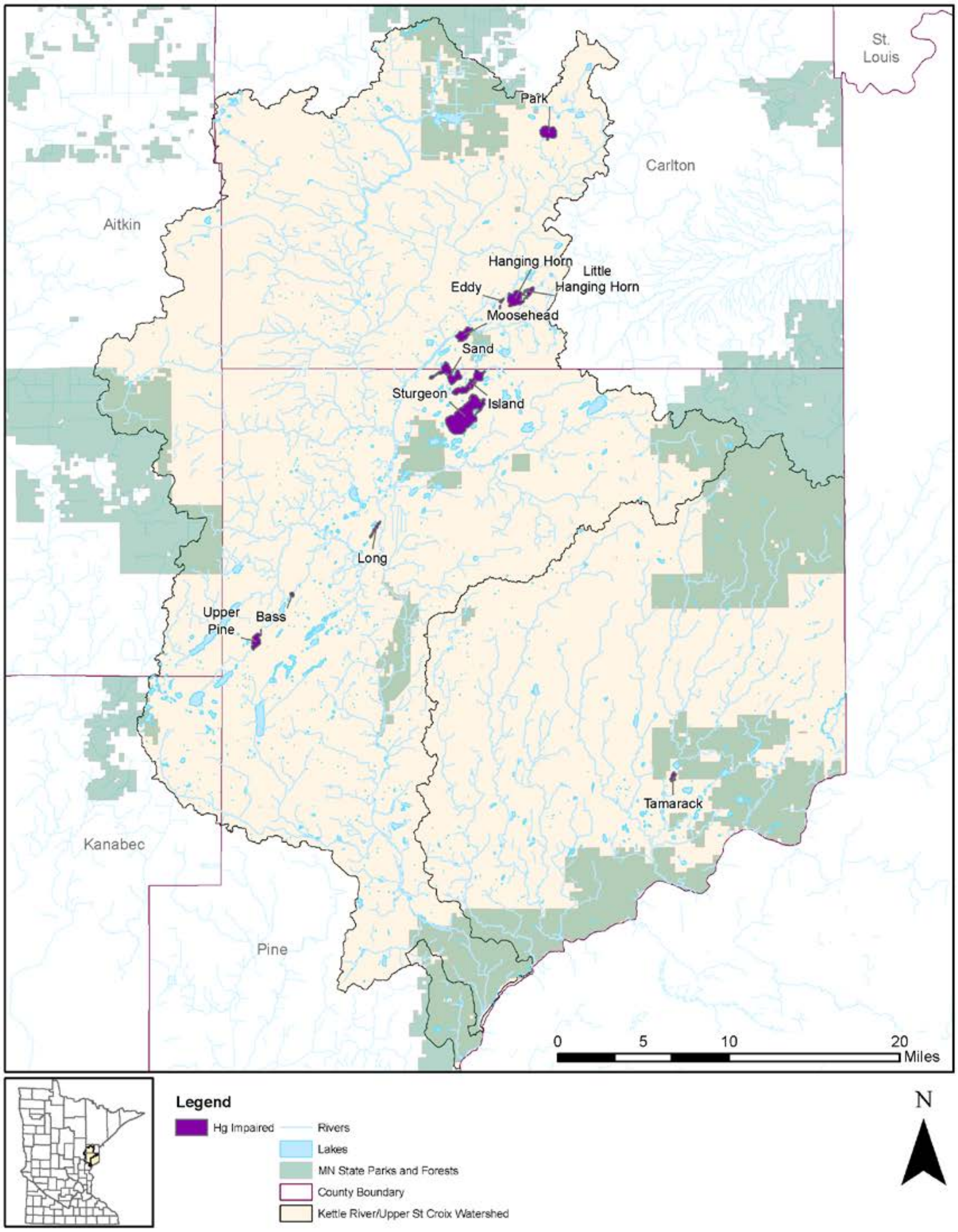

Figure 5. The MPCA has listed lakes as impaired for mercury when fish tissues have elevated mercury levels.

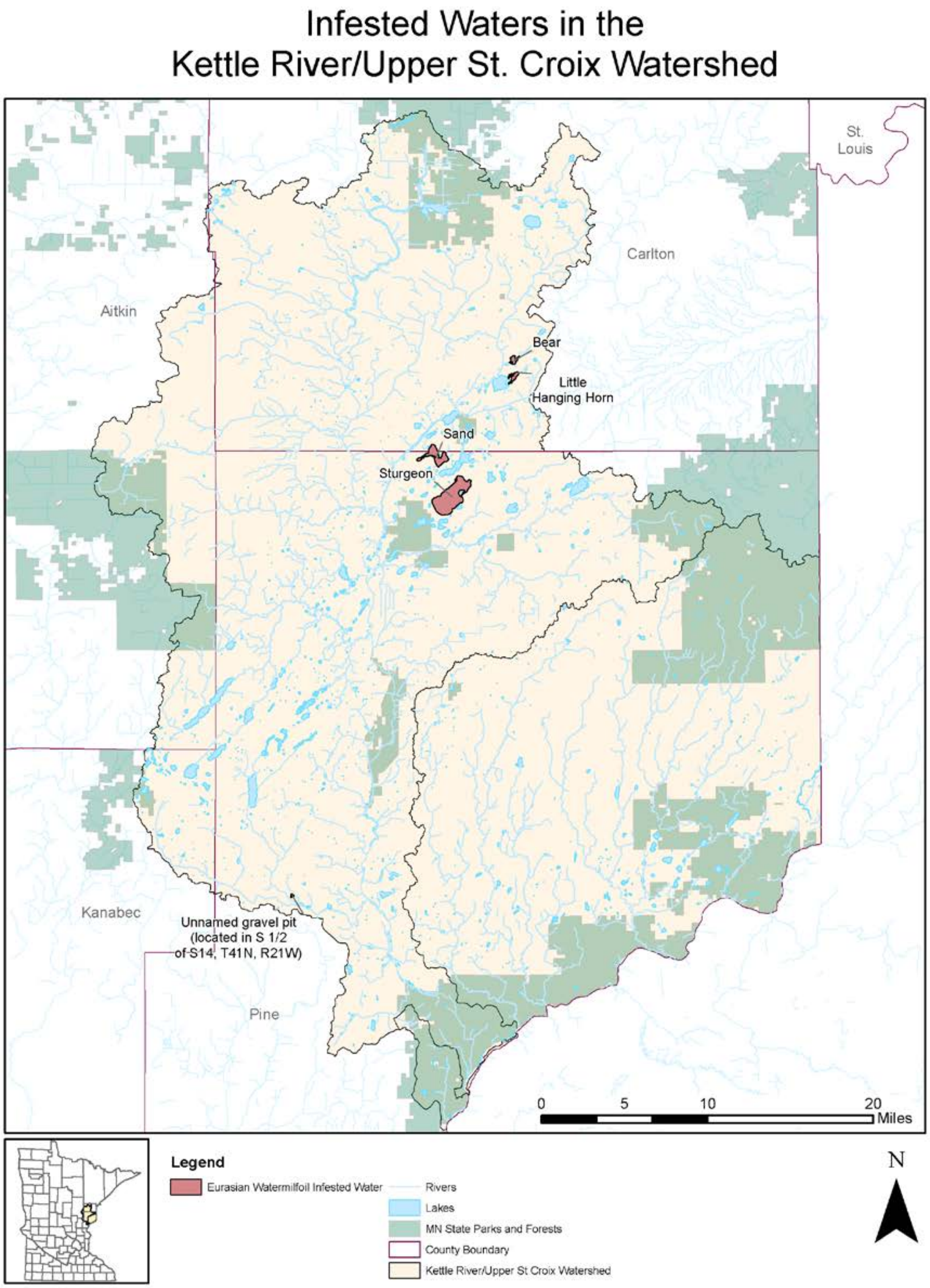

Figure 6. A total of five lakes are designated by the MN DNR as having the aquatic invasive species Eurasian water milfoil.

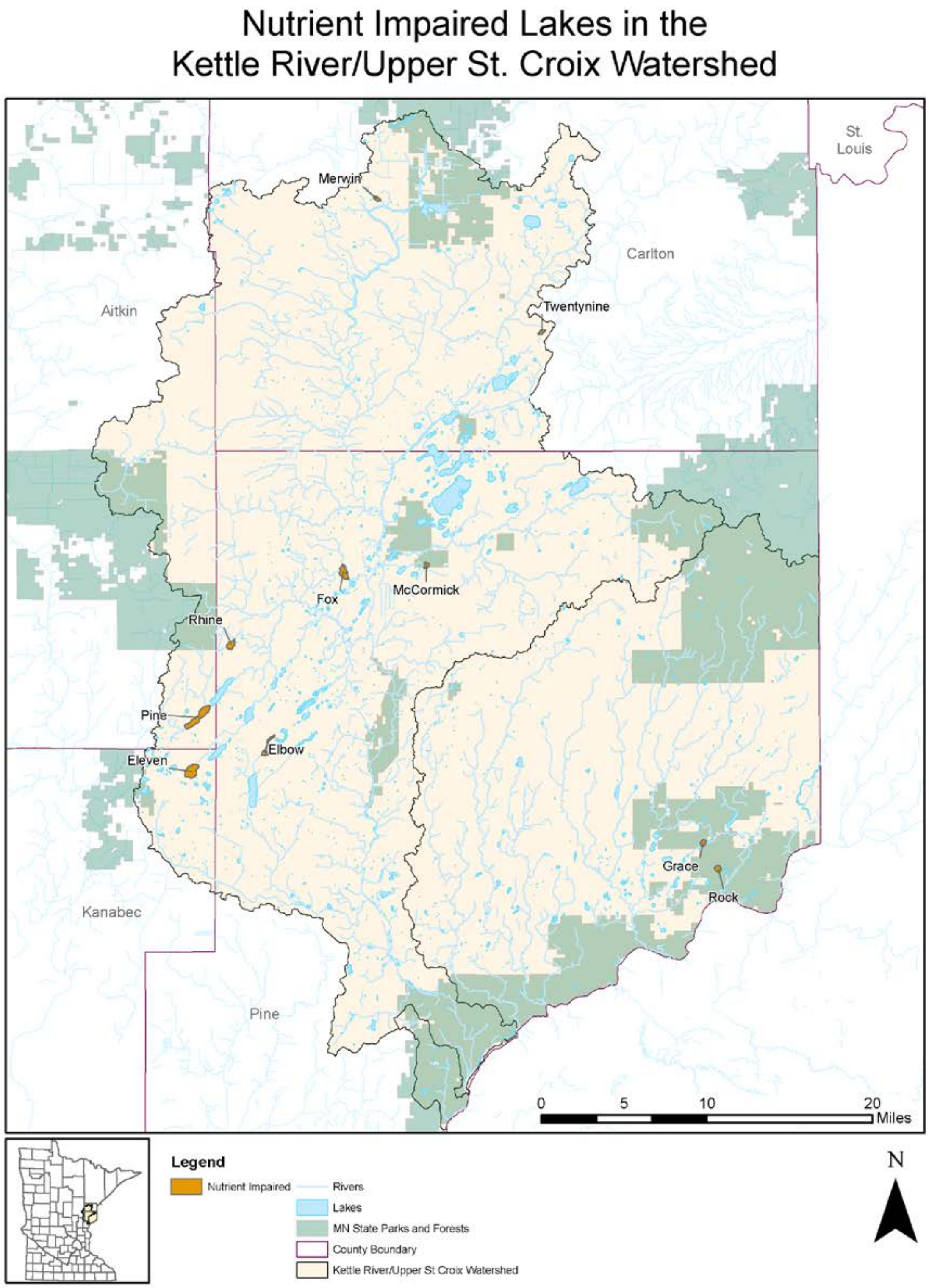

Figure 7. A total of 13 lakes are listed as impaired by the MPCA for high levels of nutrients.

Figure 8. Phosphorus sensitivity was estimated for each lake by predicting how much water clarity would be reduced with additional phosphorus loading to the lake. The phosphorus sensitivity significance index, which is a function of phosphorus sensitivity, lake size, lake total phosphorus concentration, proximity to MPCA's phosphorus impairment thresholds, and watershed disturbance, was used to determine the lake's Priority Class.

Figure 9. Wild rice lakes are designated by both the MN DNR and the 1854 Treaty authority.

Environmental Justice in the Kettle River/Upper St. Croix Watershed