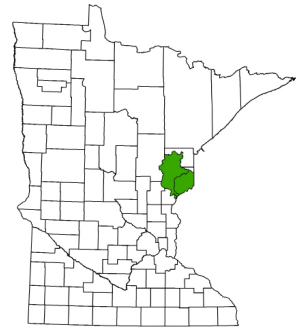


WRAPS report summary

Watershed Restoration and Protection Strategy



Kettle & Upper St. Croix River (KUSC) Watersheds

Watershed approach

Minnesota has adopted a watershed approach to address the state's 80 major watersheds. This approach looks at the drainage area as a whole instead of focusing on lakes and stream sections one at a time, thus increasing effectiveness and efficiency. This watershed approach incorporates the following activities into a 10-year cycle:

1. Monitoring water bodies and collecting data over two years on water chemistry and biology. (2016, 2017)
2. Assessing the data to determine which waters are impaired, which conditions are stressing water quality, and which factors are fostering healthy waters. (2017-2018)
3. Developing strategies to restore and protect the watershed's water bodies, and report them in a document called Watershed Restoration and Protection Strategies (WRAPS). (2018-2020)
4. Coordinating with local One Watershed-One Plan efforts for implementation of restoration and protection projects. (2020-beyond)

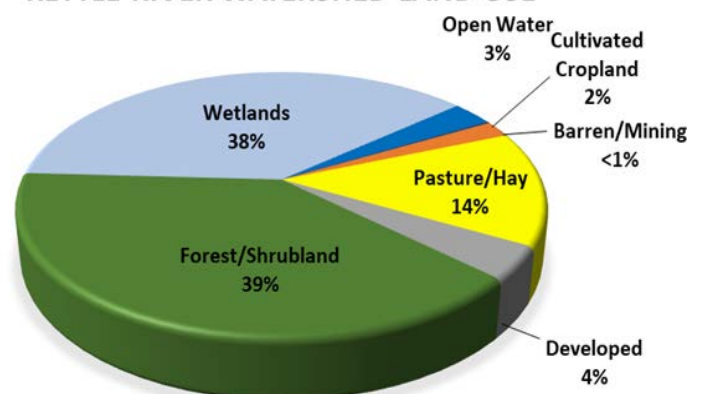
The Minnesota Pollution Control Agency (MPCA) leads the technical work and coordinates and supports strategy development with local partners. The main purpose of the WRAPS report is to summarize all the technical information so that local partners like Soil and Water Conservation Districts can use it for planning and implement the best strategies in prioritized locations.



Kettle River Watershed characteristics

- Size: 673,000 acres
- Counties: Aitkin, Carlton, Kanabec, Pine
- Ecoregion: Northern Lakes and Forest
- The land cover of the watershed is predominantly forest and shrub
- 126 lakes and 1,700 stream miles (Kettle & Upper St. Croix combined)
- The 8-digit hydrologic unit code (HUC): 07030003

KETTLE RIVER WATERSHED LAND USE

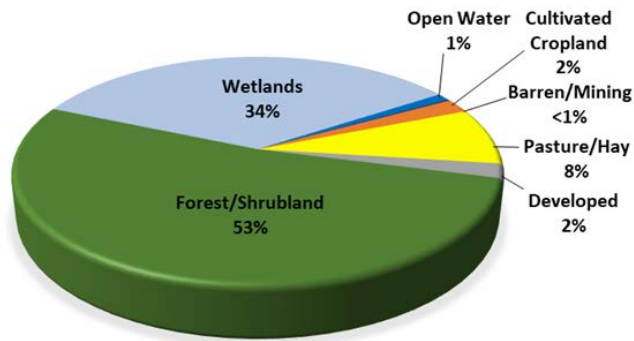


Upper St. Croix River Watershed

characteristics

- Size: 348,000 acres
- Counties: Pine
- Ecoregion: Northern Lakes and Forest
- The land cover is predominantly forest and shrub
- 126 lakes and 1,700 stream miles (Kettle & Upper St. Croix combined)
- The 8-digit hydrologic unit code (HUC): 07030001

UPPER ST. CROIX RIVER WATERSHED LAND USE



Assessments: Are waters meeting standards and providing beneficial uses

During the first phase of the watershed approach – intensive watershed monitoring – the MPCA and local partners collect data about biology such as fish populations, chemistry such as pollutant levels, and flow. Waters are “impaired” if they fail to meet standards.

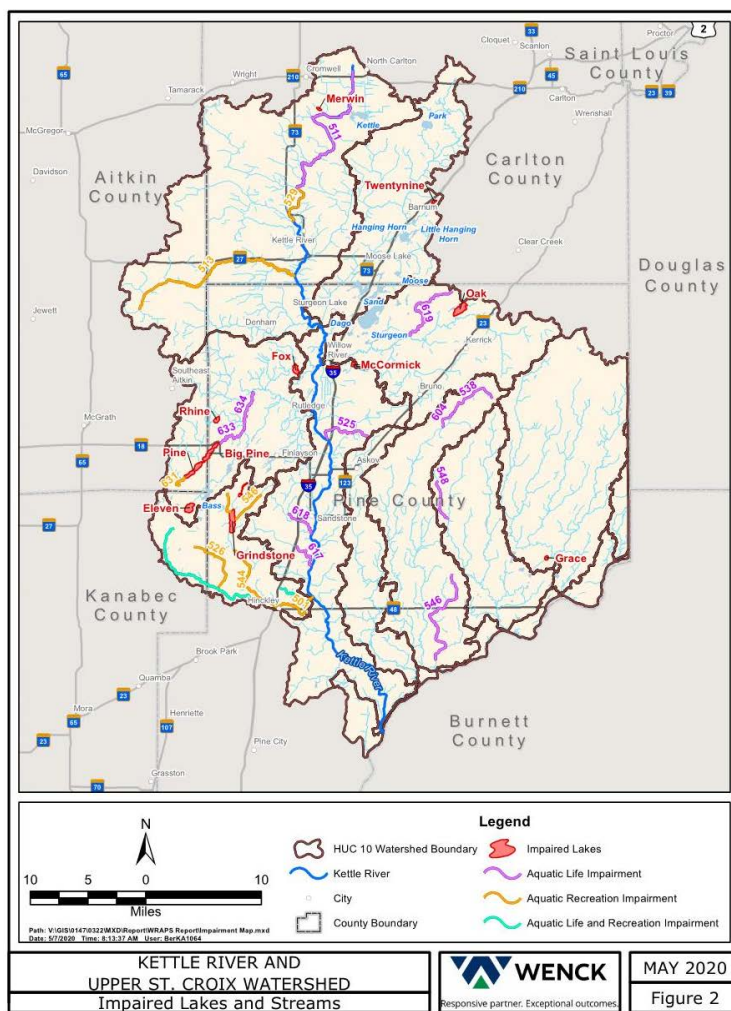
The map to the right shows all of the aquatic life and recreation impairments in the KUSC watersheds, including those determined to be impaired prior to the latest assessment cycle.

Streams

Monitoring and assessment discovered bacteria impairments on 10 stream reaches in the Kettle River Watershed, particularly in the Pine River and Grindstone River subwatersheds.

Lakes

Monitoring and assessment found nutrient impairments on some lakes throughout both watersheds, though this is a relatively small number compared to other watersheds in the state. The KUSC watersheds contain a combined 126 lakes of ten acres or larger. Of the 31 assessed lakes, 18 of them are meeting water quality standards. Of these lakes, 17 produce wild rice, a unique resource that Minnesota produces more of than any other state. There are also two lakes (Hanging Horn and Little Hanging Horn) that are designated as cisco refuge lakes, and one lake, Grindstone Lake, that is a coldwater fishery for its ability to support lake trout populations.



Conditions stressing fish and bugs, and affecting water quality

Connectivity barriers and altered hydrology are the most common stressors to biologic communities throughout the KUSC.

Connectivity barriers include both natural and anthropogenic types that disrupt fish passage and limit their natural habitat. Common natural barriers are created by beaver dams. Anthropogenic barriers include human-built dams and undersized, or raised culverts.

Altered hydrology stressors are mainly related to historical ditching of peatlands, which was fairly common throughout this area, particularly the northwestern portion of the Kettle River Watershed. This ditching has caused, and is causing, subsequent stressors, including low dissolved oxygen (DO), water highly-stained with dissolved organic compounds, physical damage to the channel via increased erosion, and degradation of habitat by sedimentation and instability of channel features.

Primary stressors to aquatic life in biologically impaired reaches in the Kettle River and Upper St. Croix River Watersheds.

HUC-10 Subwatershed	AUID (Last 3 digits)	River or Stream	Biological impairment	Primary stressor									
				Dissolved oxygen	Phosphorus	TSS	Connectivity	Altered Hydrology	Channel Alteration	Habitat	Water Temp.	Toxic chemicals	
Upper Kettle River	511	Kettle River	Fish	•						•	•		
Willow River	619	Hay Creek	Fish					◆		•	•		
Pine River	633	Pine River	MI	•									
	634	Pine River	MI	•									
Grindstone River	516	S. Branch Grindstone River	Fish	•			•						
	550	Spring Creek	Fish				•						
Lower Kettle River	525	Cane Creek	Fish, MI				•	◇			•		
	617	Friesland Ditch	Fish					◆		•	?		
	618	Skunk Creek	Fish				•						?
Sand Creek	501	Hay Creek	Fish, MI	•	?	?	•	•				?	
	503	Sand Creek	Fish	•	?	?		•					
Crooked Creek	502	Wolf Creek	MI	•	?	?		•					

MI = Macroinvertebrate

◆ A "root cause" stressor, which leads to consequences that become the direct stressors.

◇ Possible contributing root cause.

• Determined to be a direct stressor. ? Inconclusive

Restoration and protection strategies

Restoration strategies throughout the KUSC Watersheds will include addressing culverts/dams and other fish passage barriers, restoring ditched wetlands and altered stream hydrology, livestock and manure management, addressing failing septic systems in shoreland areas, and investigating and managing internal loading in certain lakes.

Protection strategies will include promoting shoreland protection, implementing programs for forest protection, aquatic invasive species (AIS) prevention and management, managing in-lake plant and fish communities, and expanded monitoring to better assess priority resources and track potential changes and trends over time.

Priorities identified in the KUSC Watersheds include:

- Protecting and restoring water quality of high recreational use lakes.
- Maximizing existing protected lands and working to expand protection on private land in the Moose River Subwatershed through programs such as Sustainable Forest Incentive Act (SFIA) and conservation easements, and integrating stormwater BMPs whenever possible.
- Protecting and restoring resources in the Grindstone River Subwatershed, which has the largest percentage of rangeland land use and the lowest percentage of wetland land use in the Kettle River Watershed.
- Protecting resources with rare/sensitive species and high biological integrity, including lake sturgeon, cisco (Hanging Horn and Little Hanging Horn Lakes), and coldwater fish species such as brook, brown, and rainbow trout.
- Protecting water quality and water levels in lakes that support wild rice.

Key conclusions of first cycle

- The main water quality issues are bacteria in streams and nutrients in lakes.
- Bacteria impairments were found in 10 stream reaches in the Kettle River watershed, particularly in the Pine River and Grindstone River HUC-10 subwatersheds.
- Sources of bacteria in streams include livestock/pastures near streams, septic systems (SSTS), cropland/manure, and for one reach (Grindstone River -501), urban sources and contributions from upstream sources.
- Livestock and manure management and addressing failing septic systems in shoreland areas were identified as the best strategies for reducing bacteria loads.
- Nutrient impairments were found in some lakes throughout both watersheds (overall a relatively small number). These watersheds do not have a lot of large lakes (only 126 >10 acres) and the majority of the lakes (18 of 31) that were assessed meet water quality standards.
- Agriculture was a primary source of nutrients for most lakes, along with SSTS, and developed shoreline.
- Internal loads (sediment release and to a lesser extent rough fish and aquatic vegetation) were significant portions of nutrients for Rhine, Twentynine, Pine, Grace, Fox, Pine Big, and Merwin lakes.
- Addressing failing septic systems in shoreland areas and investigating and managing internal loading in certain lakes were the primary strategies for addressing these nutrient impairments.
- Additionally, increasing protection of upstream forest lands was a key identified strategy, across both watersheds for all resources.
- Tillage/residue management, improving riparian vegetation, improve livestock and manure management, and AIS management were also identified as strategies necessary to restore waters.



Full report

Full reports as well as supporting documents can be found at: <https://www.pca.state.mn.us/water/watersheds/kettle-river>, or <https://www.pca.state.mn.us/water/watersheds/upper-st-croix-river>. You can also search “Kettle River Watershed”, or “Upper St. Croix River Watershed” on MPCA’s website.

Contact

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