Summary

Stressor Identification

Pine River Watershed

Why is it important?

From its source at Pine Mountain Lake in Cass County (about a half mile west of Backus), the Pine River flows southeast to its confluence with the Mississippi River, ten miles north of Brainerd. Stony Creek and Unnamed Creek flow into Pine Mountain Lake to form the Pine River at the lake's outlet. The Pine River watershed begins in Cass County and flows into Crow Wing County, covering 779 square miles and draining approximately 498,560 acres. The watershed includes the Whitefish Chain of Lakes that runs through the center from west to east. The northern half of the watershed is predominately forest and wetland with scattered agricultural lands. The southwestern portion of the watershed is opposite, with predominately forests, agricultural lands, scattered wetlands, and small lakes

Key issues

Based on intensive watershed monitoring, which began in 2012, results indicate that a handful of lakes and tributaries do not meet water quality standards due to issues such as:

- **Low dissolved oxygen**
- **Flow alterations**
- **Increased sediment and bedded sediment**
- **Elevated nutrients**
- **Lack of physical habitat and connectivity**

Highlights of report

- Low dissolved oxygen has been identified in various parts of the watershed, but most notably in Arvig Creek. Low, or highly fluctuating concentrations of DO can have detrimental effects on many fish and macroinvertebrate species.
- Altering natural stream channels can impact stream flow and alter the amount of available stream habitat. Nearly ten percent of the watershed's 590 stream miles have been altered. Stream channelization is scattered throughout the watershed with many of the biologically impaired stream reaches located downstream of channelized stream reaches, most notably in Wilson Creek.
- When excess amounts of sediment, suspended solids and fine material are transported downstream it can settle out and fill in pools, smother rock riffles, and cause a general degradation of in-stream habitat. The loss of coarse stream substrate directly affects the biological communities that depend on this type of stream bottom. Though there is indication that this is a potential stressor in the South Fork Pine River, at this point it does not seem to be a watershed-wide problem.
- Increased nutrients, like nitrogen and phosphorus, can cause excessive plant and algal growth, which can alter physical habitat, alter food chains, and create toxic conditions. This does not appear to be a watershed-wide problem, but rather isolated to a few tributaries, most notably in Wilson Creek.

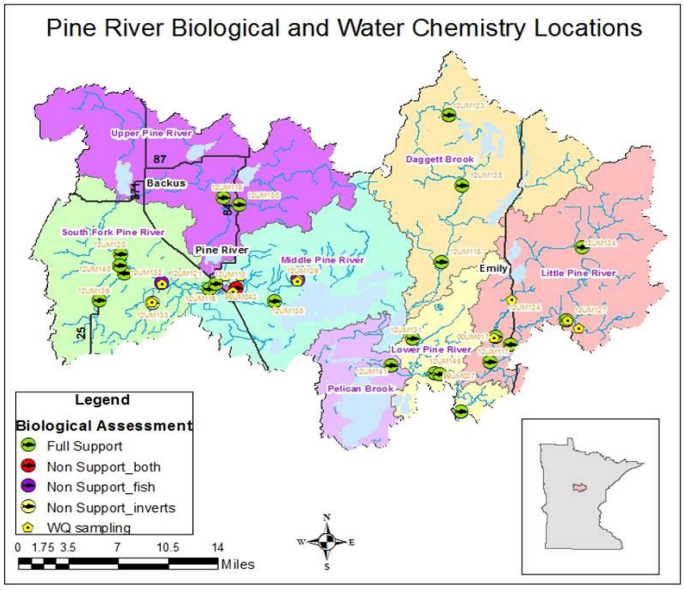
Highlights
continued

- Lack of physical habitat, caused by human activities and land uses, leads to decreased streambanks and woody debris, altered discharge patterns, and increased sediment. Forestry, urbanization, agriculture, and industry are all example causes. Lack of physical habitat is present in Wilson Creek, the South Fork Pine River, Arvig Creek, and Willow Creek.
- Networks of road crossings scattered throughout a watershed pose a threat to the physical connectivity of streams and rivers. Sometimes culverts are set at elevations that, depending on high or low flow conditions, can create barriers that can make fish passage a challenge. The South Fork Pine River has an elevated set of culverts at 36th Ave., that are causing limited fish passage and excess sediments deposited upstream of the road. Willow Creek also has a physical connectivity problem with culverts along Long Farm Road.

About this study

Monitoring of many of the lakes and streams began in 2012, as part of the MPCA's intensive watershed monitoring effort. Those results can be found in the Pine River watershed Monitoring and Assessment report, which is the first step of the watershed restoration and protection strategy (WRAPS) process, and is available on the MPCA website.

This report, the second WRAPS step, or stressor identification, is to find and evaluate factors, natural and human, which are likely responsible for the impaired condition of the fish and macroinvertebrate communities. An important part of stressor identification is to understand the natural features and processes occurring in the watershed, and gaining understanding of the extent of various human activity throughout the watershed that may have potential to degrade streams, rivers, and lakes.



Full report

To view the full report, go to http://www.pca.state.mn.us/index.php/water/water-types-and-programs/watersheds/pine-river.html

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