

SUMMARY: Comprehensive Water Quality Assessment of Select Metropolitan Area Streams

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ENVIRONMENTAL SERVICES

Water quality has improved over the past three decades in the majority of 21 metro area streams studied by Metropolitan Council Environmental Services (MCES).

All the streams flow into one of the region's three major rivers – the Mississippi, Minnesota, and St. Croix. All together, the streams drain half the geographic area of the seven-county Twin Cities metropolitan area.

The streams with improved water quality showed reduced concentrations of sediment, phosphorus, and nitrate. "Concentration" is the amount of pollutant in a specified volume of stream water.

What makes water quality good or not so good?

For the streams, by what **should not be** there (pollutants) and by what **should be** – aquatic insects, an important food source for larger creatures.

SEDIMENT	Sand, soil, silt, or clay particles. Too much can reduce light for plant growth, increase water temperature for cold-water creatures, clog fish gills, and smother habitat of valuable aquatic insects. Measured as "Total Suspended Solids" (TSS).
NUTRIENTS	Too much phosphorus and nitrogen can cause severe algae growth, reduce oxygen in the water, burden aquatic life, and add to the Gulf of Mexico dead zone. Measured as "Total Phosphorus" (TP) and "nitrate" (NO ₃).
CHLORIDE	A component of salt. High concentrations of salt can harm aquatic life.
AQUATIC INSECTS	Macroinvertebrates are a key link in food chain for fish, birds, and other wildlife. Highly sensitive to pollution. Numbers and variety a good indicator of overall stream health.

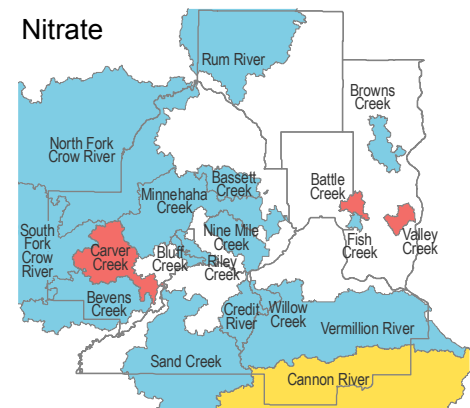
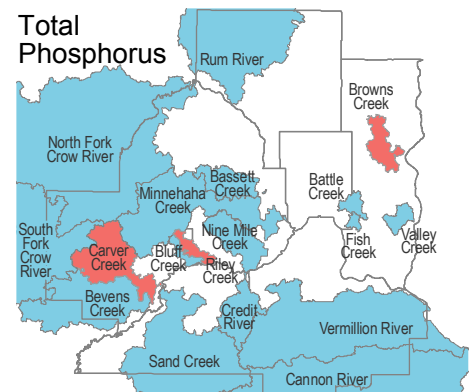
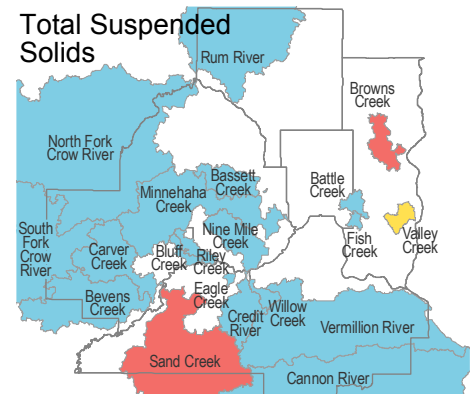
Stream Study Results are compiled in MCES's *Comprehensive Water Quality Assessment of Select Metropolitan Area Streams*. The Council and partner organizations collected the data. Then the Council analyzed it and used computer modeling to determine whether water quality is improving or declining.

Water quality has likely improved because of all the actions carried out over the years in response to the 1972 federal Clean Water Act, including:

- Water quality standards established by the Minnesota Pollution Control Agency and projects aimed to meet them
- Less phosphorus discharged from wastewater treatment plants statewide
- Minnesota Phosphorus Lawn Fertilizer law, which prohibits use of phosphorus-containing fertilizers except in special situations
- Protective measures like ponds, rain gardens, grass buffers next to streams, green roofs, and prairies installed by local government, water organizations and private property owners.

Are the streams improving?

Water Quality Trends: Metro area streams, 2008-2012



Note: The cause of improvement in nitrate is not certain. It may have resulted from the breakdown of nitrate in temporarily wet soils, not less fertilizer runoff or agricultural practices. More monitoring is necessary.

- Improving Water Quality
- Little or No Change
- Declining Water Quality



Study Facts

- One of the most extensive assessments of streams done in the Twin Cities metropolitan area
- Stream data collected between 1989 and 2012
 - 13 million flow measurements
 - 9,400 water samples
- Carried out by MCES in cooperation with local water management organizations, cities, conservation districts, and counties

Next Steps

Even with improved water quality, there is still work to do – additional studies, potential improvement actions, and partnership projects with local watershed management organizations, counties, and cities. The goal is to continue water quality improvements and help improve those streams with declining water quality.

For all streams, MCES intends to:

- Work with partners to identify how various types of projects and activities affect water quality trends.
- Assist local water management organizations to identify vulnerable streams and lakes where groundwater withdrawals would adversely affect them.
- Continue working relationships with local water management organizations and technical advisory committees of state agencies to plan and carry out projects to improve stream water quality.
- Repeat the trend assessment in future years.
- Continue to monitor streams.



- Educational programs that raised public awareness and encouraged practices that protect water quality.
- Environmental advocacy and public education provided by a wide variety of nonprofit organizations.
- Changes in agricultural practices, including conservation tillage and manure management.
- Grant programs created to fund water quality improvement projects, such as the Minnesota Clean Water, Land and Legacy Amendment.

Despite improvements, all streams carry a burden of pollutants.

Where do pollutants come from?

SEDIMENTS	poorly managed construction sites, farm fields, eroded stream banks and gullies
PHOSPHORUS	fertilizers, leaves and grass clippings, pet waste, waterfowl (especially geese) droppings, manure, eroded soil, malfunctioning septic systems, wastewater treatment plants
NITROGEN	lawn or agricultural fertilizers, agricultural drain tiles, malfunctioning septic systems, grass clippings, manure, pet wastes, wastewater treatment plants
CHLORIDE	runoff from de-iced roadways, parking lots, sidewalks; home water softening brine discharged through wastewater treatment plants and septic systems

High concentrations of pollutants often correspond to the type of watershed where the stream is located.

Generally, the highest average concentrations of...	...are found in streams...
SEDIMENTS	flowing into the Minnesota River
PHOSPHORUS	with agricultural watersheds
NITROGEN	with agricultural watersheds
CHLORIDE	with urban watersheds

Protecting the region's water resources

This work supports the regional policies established in the Metropolitan Council's Thrive MSP 2040 and Water Resources Policy Plan to collaborate with partners to promote the long-term sustainability and health of the region's water resources, including surface water, wastewater and water supply.

For more information

About the study or this fact sheet, contact Karen Jensen: karen.jensen@metc.state.mn.us, 651-602-1401.

Visit www.metrocouncil.org/streams for the full results of the Comprehensive Water Quality Assessment of Select Metropolitan Area Streams.