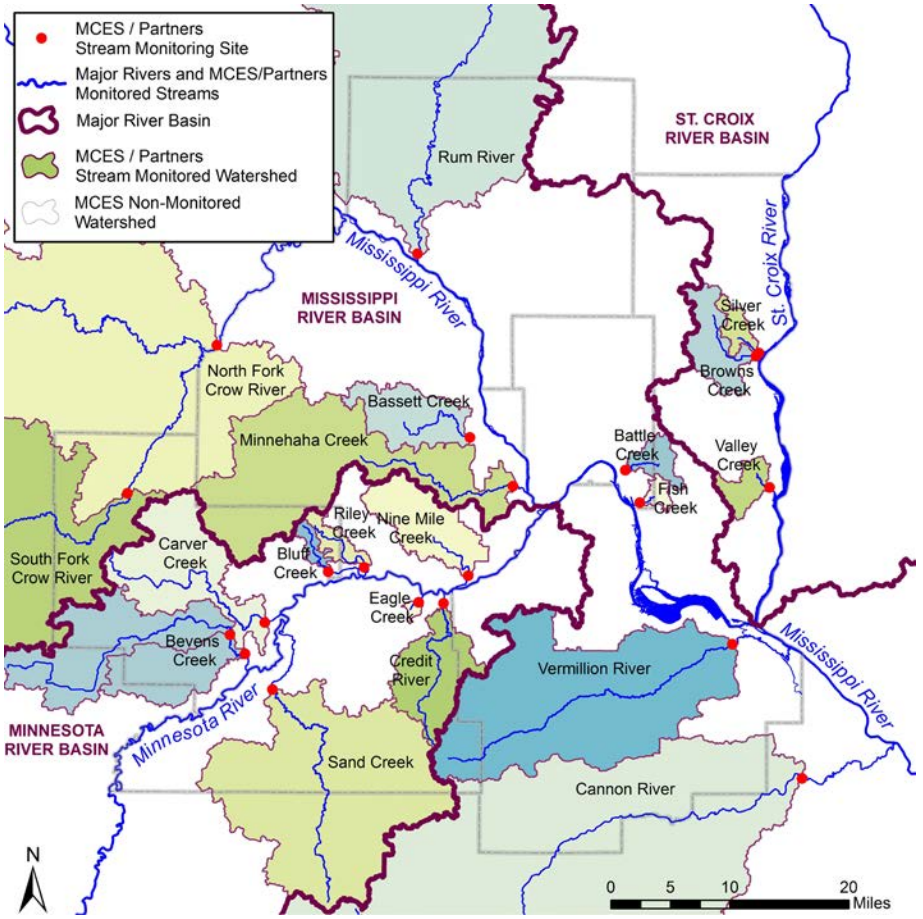
METROPOLITAN COUNCIL

Environmental Services

2011

Stream Water Quality Summary for the Twin Cities Metropolitan Area

This document is a summary of the 2011 results from the Metropolitan Council Environmental Services (MCES) Stream Monitoring program. The Metropolitan Council has a long history of leadership in protecting the quality of water in the seven-county Twin Cities metropolitan area (metro area). As the metro area population continues to grow, it is the job of the Council to plan for and oversee growth that helps maintain the region's environmental integrity.



MCES began monitoring metro area streams in 1989 to determine the extent of nonpoint-source pollution loading from tributaries to the Mississippi, Minnesota, and St. Croix Rivers. The monitoring assists in developing management objectives and target pollution loads in accordance with Minnesota Statute 473.157 and in evaluating the effectiveness of watershed management practices for reducing nonpoint-source pollution and improving water quality in metro area streams and rivers. To carry out this monitoring, MCES collaborates with various federal, state, and local groups including municipalities, counties, watershed management organizations and districts, and local soil and water conservation districts. In 2011, MCES and its partners operated monitoring stations at 21 sites on 20 streams in the metro area.

What follows is a summary of the 2011 average annual concentrations of key water quality variables in MCES monitored streams. The streams are grouped by major river basin: Minnesota, Mississippi, and St. Croix. In general, streams in the same major river basin will have similar characteristics to each other because of predominant land uses and geology within the basin. However, even within each basin, the monitored streams may have very different water quality, depending on a number of factors including watershed size, level of urbanization, and soil type.

To provide a historical perspective, 2011 values are compared to 10-year average values for the 2002-2011 time period. Whether a 2011 concentration is higher or lower than the 10-year average should not be taken as an indication of an increasing or decreasing trend in water quality, but rather as a comparison to normal stream conditions. Concentration in any given year is highly affected by the timing and quantity of stream flow. Concentrations are also compared to state water quality standards where applicable. Table 1 contains a summary of results by major river basin.

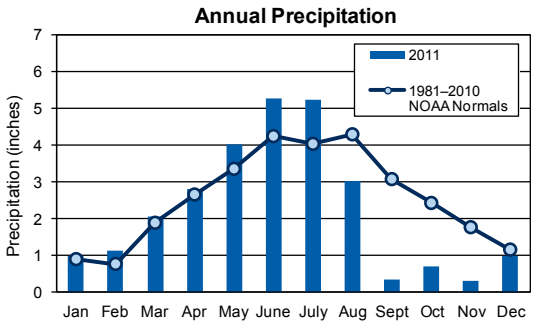
Table 1: 2011 Water Quality as Compared to the 10-Year Average (2002-2011)

	Flow	Chloride	TSS*	Nitrate	Phosphorus
Minnesota River Basin streams	Higher	Higher	Lower	Lower	Lower
Mississippi River Basin streams	Higher	Mixed	Lower	Lower	Lower
St. Croix River Basin streams	Higher	Higher	Higher	Mixed	Higher

TSS = Total Suspended Solids

Precipitation and Flow

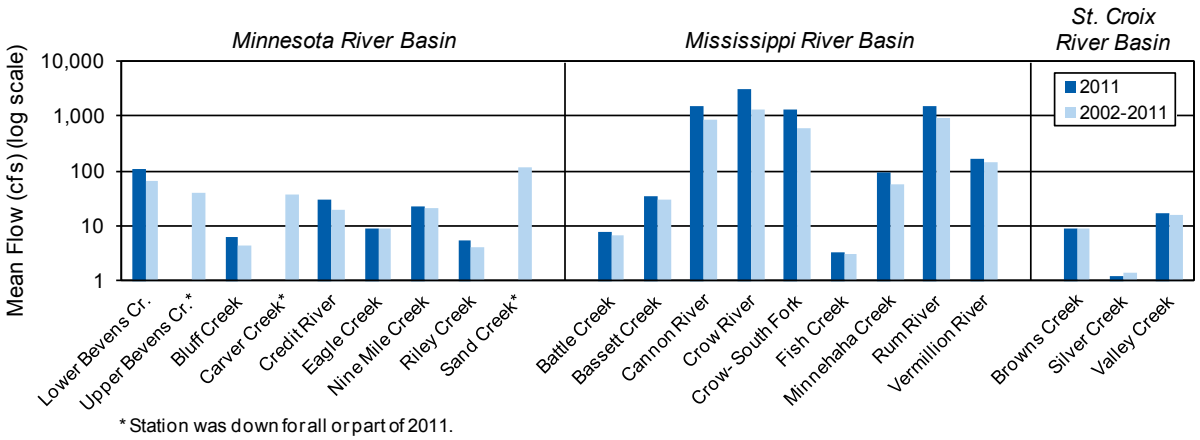
Description: For this analysis, regional precipitation is measured at the Minneapolis-St. Paul International Airport because of its central location, even though actual precipitation varies throughout the metro area. During wet periods, nonpoint-source pollutants run off of fields, lawns, and impervious surfaces, and are carried through open channels and storm sewer systems to the streams. Higher flows can also cause stream bank erosion, habitat destruction and flooding. During dry periods, flows may be too low to sufficiently dilute pollution, sediment deposition increases, and habitat quality may be adversely affected.



2011 Results: Precipitation in the metro area during 2011 was about 3.7 inches below the National Oceanic and Atmospheric Administration (NOAA) 1981-2010 normal precipitation for the area (a data set updated once every 10 years), though departures from normal differed greatly between the beginning and end of 2011. Precipitation in the metro area from January through July was 3.7 inches above normal. The higher-than-average precipitation, coupled with heavy winter snowpack and high soil moisture, caused many streams and rivers throughout the metro area to reach flood stage, with stream flows during spring runoff in the upper 90th percentile historically. A drought began in late July that lasted through the winter, resulting in an August-December rainfall deficit of 7.4 inches. The year ended with below average flows, above average temperatures, low soil moisture, and little to no snowpack.

Due primarily to spring runoff, the majority of monitored streams' average flows were above or equal to the 10-year average, though Browns and Silver Creeks both had slight declines in average flow. The highest flow of monitored streams was the Crow River, which is typical. Upper Bevens, Carver, and Sand Creeks' flow monitoring stations all had equipment problems that made it impossible to determine 2011 annual flow.

Annual Stream Flow



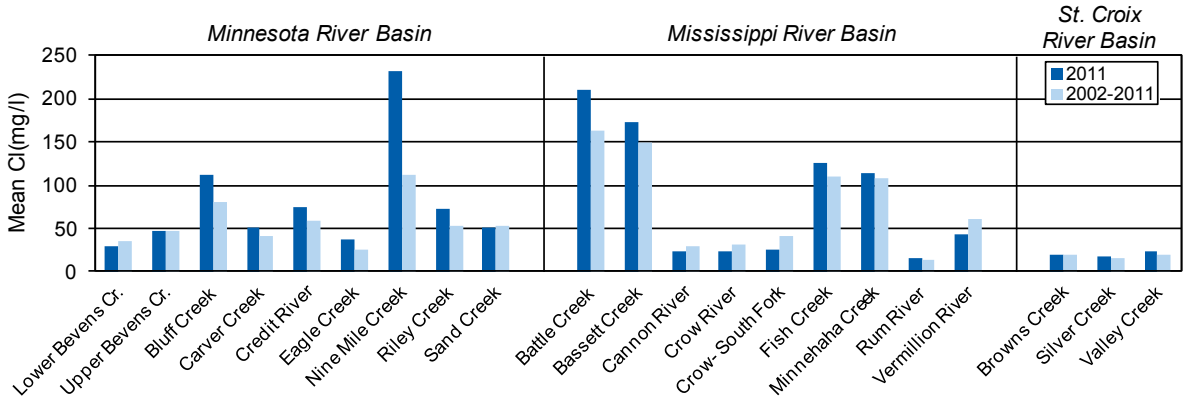
Chloride

Description: Excess levels of chloride can be toxic to aquatic and terrestrial organisms. Although some chloride is derived from natural sources, the majority of chloride in the metro area is from urban sources such as road deicing and water softening.

Standard: Chloride concentration must not exceed a four-day average of 230 mg/l or a one-hour average of 860 mg/l.

2011 Results: Chloride concentrations were generally above 10-year averages in streams in the Minnesota and St. Croix basins. Within the Mississippi River basin, the more urbanized streams had concentrations above their 10-year averages, while the streams in larger and more agricultural/rural watersheds had concentrations below their 10-year averages. The three streams in the St. Croix River basin have traditionally had low concentrations, and this was true again in 2011. The highest average concentrations were found in Nine Mile Creek in the Minnesota River basin. Although not directly comparable to the chloride standard, Battle Creek (3 samples), Bassett Creek (4), Minnehaha Creek (2), and Nine Mile Creek (9) all had samples exceed 230 mg/L. Additionally, one sample at Battle Creek exceeded 860 mg/L.

Chloride (Cl) Concentration



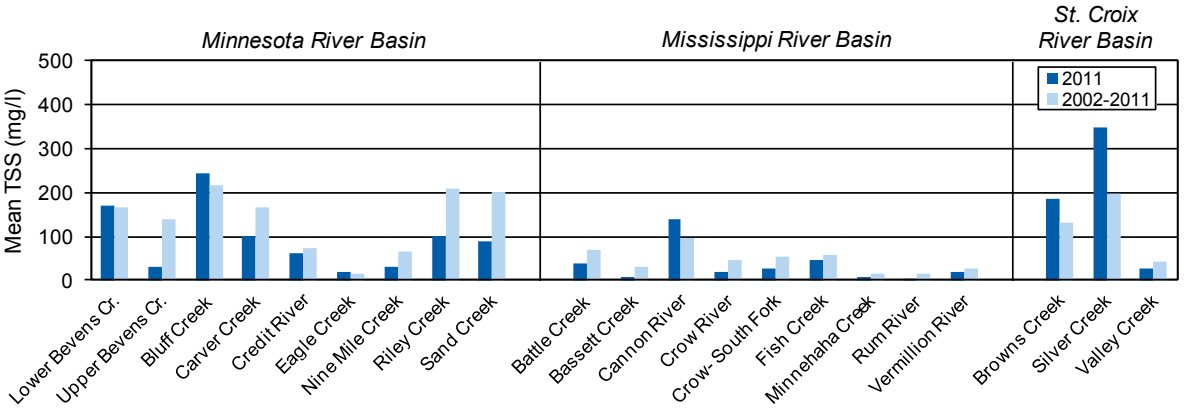
Total Suspended Solids (TSS) mg/L

Description: Particulate matter in streams may decrease the light available for plant growth, increase water temperature, clog gills of aquatic inhabitants and cover habitat. Particulate matter in the water can be both from sediment and organic matter. The amount of particulate matter can be measured as turbidity or TSS.

Standard: The turbidity standard is a daily maximum of 25 Nephelometric Turbidity Units (NTU). The MCES lab has measured turbidity in Nephelometric Turbidity Ratio Units (NTRUs) since 2006, and the standard of 25 NTU has been approximated as 39 NTRU by the Minnesota Pollution Control Agency. At this time, no TSS river standard exists.

2011 Results: TSS concentrations in streams in the Mississippi and Minnesota River basins were generally below their 10-year averages. Browns Creek and Silver Creek concentrations were both significantly above their 10-year averages, but both sites had large variability in samples, and the high average values were influenced by a few very high samples during storm events.

Total Suspended Solids (TSS) Concentration



Nutrients

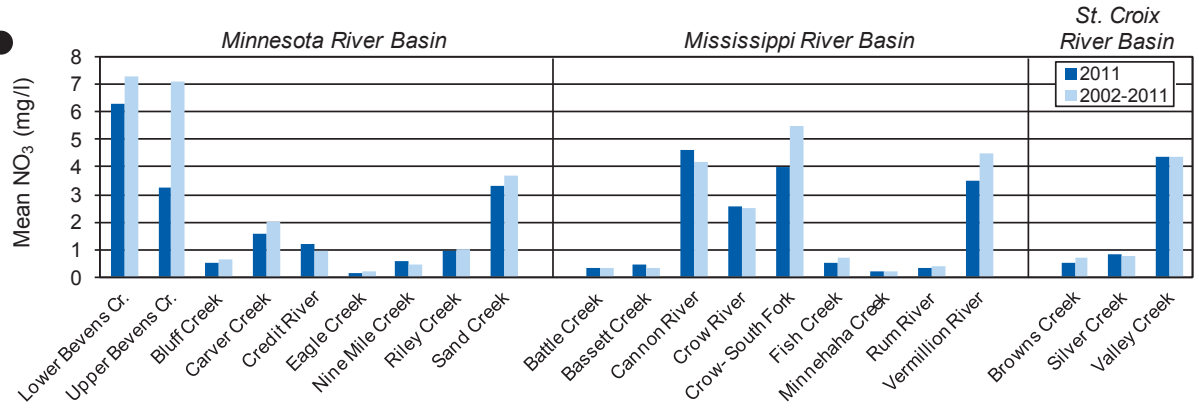
Description: Nitrogen and phosphorus are essential nutrients for plant growth and are often the limiting nutrient(s) in aquatic systems. Nitrogen and phosphorus are common components of wastewater treatment plant discharges and urban and agricultural runoff. They can stimulate excessive plant growth leading to unsightly algae blooms, oxygen depletion, and odor upon decay, making the water unsuitable for aquatic life when levels in streams are too high.

Standards: Class 2Bd drinking waters cannot exceed 10 mg/l nitrate-nitrogen. No river standard for total phosphorus exists.

Nitrate – Nitrogen mg/L

2011 Results: Nitrate-nitrogen concentrations generally were lower than the 10-year averages in the Minnesota and Mississippi River basins, and about equal to 10-year averages in the St. Croix basin. The most significant differences from average were Lower Bevens Creek, Upper Bevens Creek, Crow River-South Fork, and the Vermillion River. None of the MCES monitored streams are Class 2Bd drinking waters. The Mississippi River above Upper St. Anthony Falls and the St. Croix River are assessed as Class 3Bd drinking waters, but none of the streams discharging to these reaches exceeded the 10 mg/l standard.

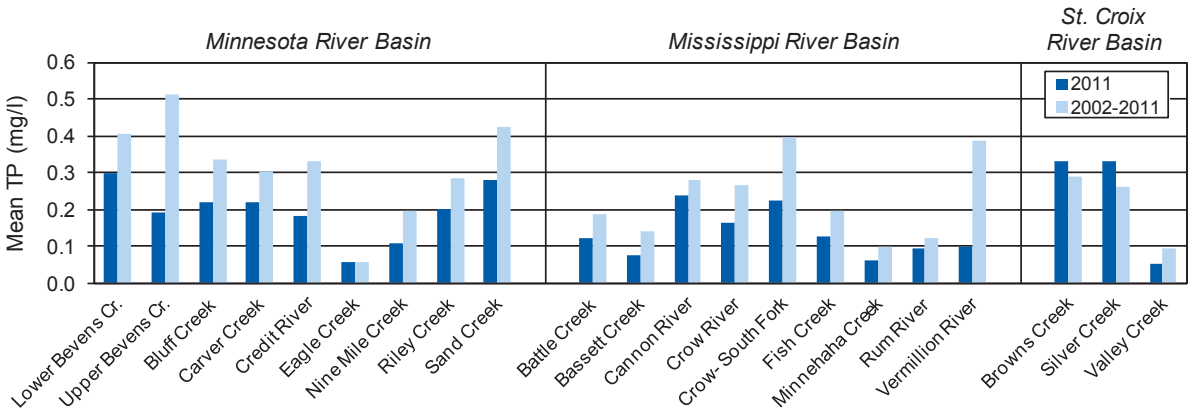
Nitrate - Nitrogen (NO_3) Concentration



Total Phosphorus mg/L

2011 Results: Phosphorus concentrations in all monitored streams in both the Mississippi and Minnesota River basins were below their 10-year average. Phosphorus concentrations in Browns and Silver Creeks were above their 10-year average. The basin wide patterns of phosphorus were similar to the 2011 patterns in TSS.

Total Phosphorus (TP) Concentration



About the Metropolitan Council

The Metropolitan Council is the regional planning organization in the seven-county Twin Cities metropolitan area. The Council runs the regional bus and light rail system and Northstar commuter rail, collects and treats wastewater, coordinates regional water resources, plans regional parks and administers funds that provide housing opportunities for low- and moderate-income families. The Council board is appointed by and serves at the pleasure of the Governor.

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