Targeted Summary: Minnesota Water Quality Assessment Report 2016

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Targeted Summary of Minnesota Water Quality Assessment Report 2016

Abstract

Each year the Minnesota Pollution Control Board (MPCB) releases a report on the quality of water bodies in Minnesota. The MPCB is mandated by the US Environmental Protection Agency (EPA) to comply with water quality standards codified in the Clean Water Act: 33 U.S.C. §1251 et seq. (1972). TO this end the MPCB oversees assessment of the water quality of Minnesota rivers, lakes, streams, ponds, reservoirs, wetlands and Great Lakes shorelines. This report is a targeted summary of the Minnesota Water Quality Assessment Report for 2016. It describes the methods used to assess water quality, site specific monitoring results for the US and for Minnesota, the causes of water body impairment, and a summary of total maximum daily load (TMDL) for Minnesota water bodies. The impairment rate for Minnesota's rivers and streams is less than the U.S while the impairment rate for Minnesota's lakes, reservoirs, and ponds if higher than the U.S.
As in previous years, the number one pollutant is mercury. A review of the cumulative numbers of Minnesota TMDLs illustrates an increase in the number of TMDLs beginning in 2006. This increase is due in part to the passage in 2006 of the Minnesota Clean Water Legacy Act (CWLA). This legislation provided a policy framework and resources to state and local governments to accelerate efforts to monitor, assess, and restore impaired waters, and to protect unimpaired waters.

The monitoring of pollutants continues to occur on a statewide basis. Assessment of those parameters is done statewide every two years, to reflect the monitoring design. The watershed approach provides a unifying focus on the water resource as the starting point for water quality (WQ) assessment, planning, and results measures.

Introduction

The Minnesota Pollution Control Agency (MPCA) is charged under both federal and state law with protecting the water quality of Minnesota's lakes, rivers, streams, and wetlands. It is the responsibility of the MPCA to monitor Minnesota's water bodies, to assess water quality, and to report the results to the public.

This report includes a subset of the results of the water quality assessment for the state of Minnesota performed by the MPCA, as required by the federal Environmental Protection Agency (EPA). This report includes water quality data for 2016.

The federal Clean Water Act (CWA) requires the MPCA to assess all waters in the state to determine if they meet federal water quality standards. Minnesota water quality standards protect lakes, rivers, streams, and wetlands by defining how much of a pollutant such as bacteria or nutrients can be in water before it is no longer drinkable, swimmable, fishable, or useable in other, designated ways called "beneficial uses". The MPCA performs this assessment and creates a list of waters that do not meet the standards. Waters that do not meet the standards are called "impaired waters". The list is updated each even-numbered year. Waters considered impaired must be studied to determine total maximum daily load (TMDL). The TMDL is the maximum amount of a pollutant a body of water can receive without violating water quality standards.

The Inventory of Impaired Waters includes those waters needing a TMDL plan, those for which a plan has already been developed and approved by EPA, and water bodies that do not require a TMDL.

Method

Pollutant sources are characterized as either point sources that receive a wasteload allocation (WLA), or nonpoint sources that receive a load allocation (LA). Point sources include all sources subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program, including wastewater treatment facilities, some stormwater discharges and concentrated animal feeding operations (CAFOs). For purposes of assigning LAs, nonpoint sources include all remaining sources of the pollutant as well as natural background sources. TMDLs must also account for seasonal variations in water quality, and include a margin of safety (MOS) to account for uncertainty in predicting how well pollutant reductions will result in meeting water quality standards.

Expressed mathematically, the TMDL equation is: TMDL = ΣWLA + ΣLA + MOS
TMDLs are developed using a range of techniques, from simple mass balance calculations to complex water quality modeling approaches. The degree of analysis depends on factors including the waterbody type, complexity of flow conditions and pollutant causing the impairment.
All point and nonpoint sources of the pollutants are identified, and they are allocated a portion of the allowable load that usually contemplates a reduction in their pollution discharge in order to help solve the problem. Natural background sources, seasonal variations and a margin of safety are all taken into account in the allocations.

The approach normally used to develop a TMDL for a particular waterbody or watershed consists of five activities:

- Selection of the pollutant(s) to consider.
- Estimation of the waterbody's assimilative capacity (i.e., loading capacity).
- Estimation of the pollutant loading from all sources to the waterbody.
- Analysis of current pollutant load and determination of needed reductions to meet assimilative capacity.
- Allocation (with a margin of safety) of the allowable pollutant load among the different pollutant sources in a manner such that water quality standards are achieved.

Site Specific Monitoring Results

In the report each water type is listed and includes the amount of water assessed, the status, total waters assessed, total waters, and the percent waters assessed. This information is provided for the United States as a whole and then for individual states.

A water body is rated “good” if it meets all intended uses, ”threatened” if it currently supports all intended uses, but may be exhibiting a deteriorating trend. A water body is rated as “impaired” if any one of its uses is not met.

See **Table 1** for the site-specific monitoring results to the United States. See **Table 2** for the site-specific monitoring results for Minnesota. waters assessment status for this reporting period.

Table 1: Site-Specific Targeted Monitoring Results United States 2016

	Rivers, Streams (miles)	Lakes, Reservoirs, Ponds (Acres)	Bays, Estuaries (Square Miles)	Coastal shoreline (Miles)	Ocean, Near Costal (Square Miles)	Wetlands (Acres)	Great Lakes Shoreline (Miles)	Great Lakes Open Water (Square Miles)
Good Waters	518,293	5,390,57	11,516	1,298	726	569,328	106	1
Threatened Waters	4,495	30,309						
Impaired Waters	588,173	13,208,917	44,625	3,329	6,218	642,924	4,354	39,230
Total Assessed	1,110,961	18,629,795	56,141	4,627	6,944	1,242,252	4,460	39,231
Total Waters	3,533,205	41,666,409	87,791	58,618	54,120	107,700,000	5,202	196,343
Percent Waters Assessed	31.4	44.7	63.9	7.9	12.8	1.2	85.7	20.0

Table 2: Site Specific Targeted Monitoring Results Minnesota 2016

	Rivers/Stream (miles)	Lakes, Reservoirs, and Ponds (acres)	Wetlands (acres)	Great Lakes Shoreline (miles)
Good Waters	4,0035.7	201,148.0		4.7
Previously impaired, now attaining all uses	511.1	38, 247.0		0
Impaired waters	15,493.7	3,712,902.2	995.0	1.1
TMDLs Completed	3,064.3	1,352,431.0	55.0	
TMDLs Needed	12,335.1	2,357,267.2	940.0	1.1
New TMDLs Completed	1,639.0	45,342.0	0	0
Remaining TMDLs Needed	10,696.1	2,311,925.2	940.0	1.1
Total Waters Assessed	19,529.5	3,914,050.2	995.0	5.7
Total Waters	91,944.0	4,500,000.0	Unavailable	Unavailable
Percent Waters Assessed	21.2	87.0	Unavailable	Unavailable

The report includes a list of pollution sources that contributed to impairment for each water body type. The list includes the number of miles, acres, or square miles threatened or impaired. Causes for impairment for Minnesota rivers and streams are presented in **Table 3.** Causes of Impairment for Minnesota lakes, reservoirs and ponds are presented in **Table 4**.

Table 3: Causes for Impairment for Minnesota Rivers and Streams

Cause of Impairment	Cause of Impairment Group	Miles Threatened or Impaired
Mercury in Fish Tissue	Mercury	6,069.1
Turbidity	Turbidity	5,795.5
Fish Bioassessments	Cause Unknown - Impaired Biota	4,852.0
Aquatic Macroinvertebrate Bioassessments	Cause Unknown - Impaired Biota	4,389.1
Escherichia Coli (E. Coli)	Pathogens	4,180.7
Fecal Coliform	Pathogens	3,216.3
Dissolved Oxygen	Organic Enrichment/Oxygen Depletion	1,922.1
PCB(s) in Fish Tissue	Polychlorinated Biphenyls (PCBs)	1,352.3
Mercury in Water Column	Mercury	689.6
Nutrient/Eutrophication Biological Indicators	Nutrients	611.5
Chloride	Salinity/Total Dissolved Solids/Chlorides/Sulfates	235.1
Total Suspended Solids (TSS)	Turbidity	204.2
Arsenic	Metals (other than Mercury)	146.6
Nitrates	Nutrients	126.6
Ammonia, Un-ionized	Ammonia	80.1
pH	pH/Acidity/Caustic Conditions	56.2
Polychlorinated Biphenyls (PCBs)	Polychlorinated Biphenyls (PCBs)	43.1
Chlorpyrifos	Pesticides	39.6
Lack of a Coldwater Assemblage	Other Cause	38.1
DDT	Pesticides	19.0
Dieldrin	Pesticides	19.0
Perfluorooctane Sulfonate (PFOS)	Toxic Organics	14.4
Perfluorooctane Sulfonate (PFOS) in Fish Tissue	Toxic Organics	14.5
Acetochlor	Toxic Organics	13.4
Toxaphene	Pesticides	12.5
Dioxin (Including 2,3,7,8-TCDD)	Dioxins	12.5
Temperature, Water	Temperature	9.6

Table 4: Causes for Impairment for Minnesota Lakes, Reservoirs and Ponds

Cause of Impairment	Cause of Impairment Group	Acres Threatened or Impaired
Mercury in Fish Tissue	Mercury	3,559,458.2
PCBs in Fish Tissue	PCBs	1,627,561.5
Nutrient/Eutrophication Biological Indicators	Nutrients	598,325.0
Mercury in Water Column	Mercury	7,555.0
Fish Bioassessments	Cause Unknown	5,741.0
Perfluorooctane Sulfonate (PFSOS) in Fish Tissue	Toxic Organics	1,576.0
Chloride	Salinity/Total Dissolved Solids/Sulfites	1,400.0

TDMLs for Minnesota Water Bodies

The report lists, by TMDL pollutant, the number of TMDLs approved, as well as the number of causes of impairments associated with all TMDLs for that pollutant. See **Table 5** for the cumulative number of TMDLs for Minnesota by pollutant. The list includes TMDLs since October 1, 1995.

Table 5: Minnesota Cumulative TMDLs by Pollutant

Pollutant	Number of TMDLs	Number of Causes of Impairment Addressed
Mercury	1,257	1,279
Phosphorous, Total	388	474
E Coli	233	233
Total Suspended Solids	167	206
Fecal Coliform	121	124
Chloride	40	41
Nitrate	17	17
Phosphorous	17	13
Oxygen Demand	13	13
Carbonaceous BOD	12	13
Fecal	10	10
Sediment	7	7
Temperature	5	8
Nitrogenous BOD	4	4
Biochemical Oxygen Demand	3	3
Ammonia, Total	2	2

Pollutant	Number of TMDLs	Number of Causes of Impairment Addressed
Dissolved Oxygen	1	1
Sediment Oxygen Demand	1	1
Total Suspended Sediment	1	2

The report lists, by EPA fiscal year, the number of TMDLs approved, as well as the number of causes of impairments associated with all TMDLs for each year. See **Table 6** for the cumulative number of TMDLs for Minnesota from 2003-2016. The EPA's fiscal year runs from October 1 through September 30.

Table 6: Minnesota Cumulative Number of TMDLs

EPA Fiscal Year	Number of TMDLs	Number of Causes of Impairment Addressed
2003	20	20
2004	2	2
2005	7	7
2006	24	24
2007	541	556
2008	516	525
2009	56	58
2010	132	132
2011	31	31
2012	51	52
2013	163	173
2014	131	155
2015	128	173
2016	120	123
TOTAL	**1,922**	**2,031**

Analysis

The water body assessment for Minnesota's rivers and streams shows a 52% impairment rate with 21.2% of waters assessed, compared to a 79% impairment rate for the US with 31.4 % assessed. The water body assessment rate for lakes, reservoirs, and ponds shows a 92% impairment rate for Minnesota with 87% assessed compared to a 70.9% impairment rate for the US with 44.7 % assessed.

As in previous years, the number one pollutant is mercury. In March 2007 Minnesota implemented a statewide mercury reduction plan that was subsequently approved by the U.S. EPA. Since then, the MPCA has worked with stakeholders representing a broad range of interests to identify

strategies and timelines that would be included in an implementation plan. The stakeholders' recommendations, completed in June 2008, are contained on the Plan to reduce mercury releases by 2025 webpage.

A review of the cumulative numbers of Minnesota TMDLs presented in Table 6, illustrates an increase in the number of TMDLs beginning in 2006. This increase is due in part to the passage in 2006 of the Minnesota Clean Water Legacy Act (CWLA). This legislation provided a policy framework and resources to state and local governments to accelerate efforts to monitor, assess, and restore impaired waters, and to protect unimpaired waters. The monitoring of pollutants continues to occur on a statewide basis. Assessment of those parameters is done statewide every two years, to reflect the monitoring design. The watershed approach provides a unifying focus on the water resource as the starting point for water quality (WQ) assessment, planning, and results measures.

Minnesota is fortunate to have many water bodies that are in good condition because their terrestrial watersheds still have minimal development, although all surface waters are affected by atmospheric pollutants such as mercury. It is important to protect the good condition of many water bodies, while also addressing degraded water resources

The Minnesota's Water Quality Monitoring Strategy, 2011-2021 (Monitoring Strategy), describes elements of the state's surface water and groundwater monitoring programs. The Monitoring Strategy satisfies the EPA monitoring program strategy requirement and serves as the guide to MPCA monitoring programs. Minnesota's WQ monitoring strategy is available at: https://www.pca.state.mn.us/sites/default/files/pgen1-10.pdf

Minnesota's TMDL Priority Framework: https://www.pca.state.mn.us/sites/default/files/wq-iw1-54.pdf · EPA's Long-Term Vision: https://www.epa.gov/sites/production/files/2015- 07/documents/vision_303d_program_dec_2013.pdf · Water Governance Evaluation: https://www.pca.state.mn.us/sites/default/files/lrwq-gen1sy13.pdf

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