MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATEWIDE INLAND WATERS MERCURY TOTAL MAXIMUM DAILY LOAD

Fact Sheet

Introduction

Mercury is a naturally-occurring metal that is used in many items and processes. Mercury from local, regional, national and global sources, both human caused and natural, is emitted into the air and deposited by precipitation into rivers and streams. This is called atmospheric deposition. The well-known neurotoxic properties of mercury make it dangerous to both humans and wildlife, especially the young. Mercury has a strong tendency to accumulate as it goes up the food chain and its accumulation in fish tissue along with human exposure through the eating fish is the largest public health concern with mercury in our surface waters. Due to the widespread need of fish consumption advisories in Michigan's waters due to mercury (Hg), a statewide Total Maximum Daily Load (TMDL) has been developed for inland waters primarily impacted by atmospheric deposition by providing the pollutant reductions necessary to attain water quality standards (WQS) (Figure 1). Section 303(d) of the Federal Clean Water Act requires states to develop TMDLs for waters not meeting WQS.

Michigan Inland Waters

This TMDL focuses on inland waters impaired by air deposition of mercury and does not include the Great Lakes, waters influenced by the Great Lakes, or mercury legacy sites. Sediment remediation activities will continue to address historic sites contaminated by mercury.

Numeric TMDL Target

TMDLs are established to ensure WQS are met, including designated uses, numeric and narrative criteria, and antidegradation policy. A fish tissue concentration was chosen as the target for this TMDL, since humans and wildlife eating fish is the most common way they are exposed. Northern pike were used to determine mercury load reductions needed, and compliance, since they are a top predator and a preferred sport fish in Michigan. **The target northern pike mercury concentration is 0.35 mg/kg.** The current mercury concentration for a standard length Northern Pike is 1.01 mg/kg .

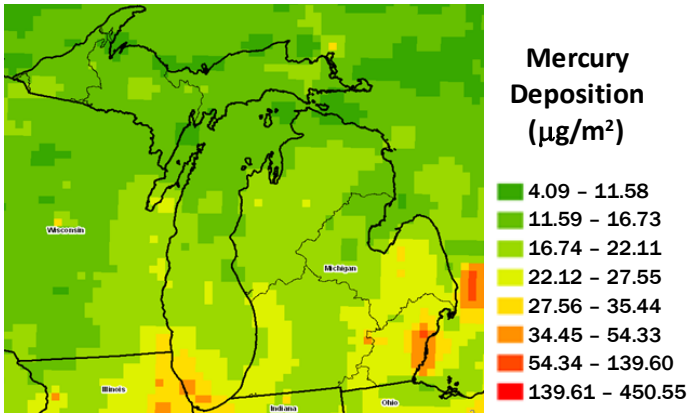

Figure 1. The 2001 loading rate of mercury from wet and dry atmospheric deposition in Michigan based on USEPA's Regional Modeling System for Aerosols Deposition (REMSAD). The model showed a higher concentration of mercury deposition in southeast Michigan. The statewide mercury load average in 2001 was 18.6 µg/m²/year (USEPA, 2012).

Mercury Reductions

The load allocation for both natural and human caused atmospheric deposition sources of mercury is 2.61 kg/day (Table 1). An 81% reduction of mercury is needed [based on 2001 air deposit levels (7.6 kg/day)] to meet the allowable mercury load.

TMDL Components

Target Fish Tissue Residue Value:
0.35 mg/kg

Current Hg Concentration for Northern Pike:
1.012 mg/kg

Load Allocation
2.61 kg/day

Required Human Caused Air Hg Reduction:
81%

Next Steps

The TMDL implementation will occur through existing programs within EGLE including National Pollutant Discharge Elimination System permits for point source discharges, nonpoint source control programs to achieve the necessary pollutant reductions from more diffuse sources, air programs to reduce inputs from air deposition, and the clean-up of legacy sources.

Table 1. Summary of Michigan's Statewide Hg TMDL

TARGET LEVEL AND REDUCTION FACTOR	Statewide Factor (in mg/kg)
Target Fish Mercury Concentration (Fish Tissue Residue Value)	.35
Current Mercury Concentration for Standard Length Northern Pike	1.012
REDUCTION FACTOR (1.012 mg/kg – 0.35 mg/kg/1.012 mg/kg)	65%

MERCURY LOAD FOR BASELINE YEAR 2001	Statewide Factor (in kg/day)
Point Source Load (39 kg/yr ÷ 365)	.11
Nonpoint Source Load (REMSAD Model) (2,734 kg/yr ÷ 365)	7.49
TOTAL SOURCE LOAD	7.6

FINAL TMDL	Statewide Factor (in kg/day)
Margin of Safety	Implicit
Waste Load Allocation (6 kg/yr ÷ 365)	0.016
Out-of-State Contribution to Load Allocation (913 kg/yr ÷ 365)	2.5

Necessary Reduction from Anthropogenic (human-made) Emission Sources: (40 kg ÷ 213 kg) ~ 19% (100% - 19% = 81%)

More Information:

The Michigan Statewide Hg TMDL is available at MIchigan.gov/TMDL or contact Marcy Knoll Wilmes at KnollM@Michigan.gov.

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