



Fact Sheet: Minnesota Statewide Mercury TMDL

<p>WATERBODY/WATERSHED</p>	<p>TMDL uses a “regional” approach. Waterbodies grouped into two regions based on similarities in waterbody properties, land use and fish tissue concentrations: northeast (NE) dominated by forest and wetlands; southwest (SW) dominated by cultivated lands.</p> <p><i>Total # of TMDLs:</i> Original TMDL (2007) covers 511 waterbody/pollutant combinations; Revised TMDL (2008) covers a cumulative total of 998 waterbody/pollutant combinations.</p>
<p>DATE TMDL APPROVED</p>	<p><i>First Approved:</i> 03/27/07; <i>Revised Approved:</i> 04/03/08. <i>Lead Agency:</i> Minnesota Pollution Control Agency (MPCA)</p>
<p>BASIS FOR 303(d) LISTING</p>	<p>High mercury water column concentrations and fish mercury levels resulting in fish consumption advisory of < one meal per week for any member of the population.</p>
<p>WATER QUALITY STANDARDS TARGET & TMDL TARGET</p>	<p><i>WQ Standard:</i> Health-based standard is 6.9 ng/L chronic standard (applicable to waters outside of the Lake Superior Basin); Wildlife-based is 1.3 ng/L chronic standard (applicable only to waters of the Lake Superior Basin)</p> <p><i>TMDL Target:</i> fish tissue target of 0.2 mg/kg, based on EPA’s methylmercury criterion for fish tissue to protect human health (0.3 mg/kg) (MN’s fish tissue criterion is more stringent than EPA’s because of higher fish consumption rate in the state).</p> <p>*TMDL uses local bioaccumulation data to demonstrate that meeting fish tissue target will meet existing water quality standard.</p>
<p>EXISTING SOURCE LOADINGS</p>	<p><u>Statewide:</u></p> <p><i>Point Source(s):</i> < 1% of current load (WWTPs, taconite processing, pulp and paper processing, coal-fired plants and one refinery)</p> <p><i>Nonpoint Source(s):</i> > 99% of current load from air deposition (natural = 30%; anthropogenic*=70%. Of the 70% Anthropogenic sources, 40% are from regional emissions (with 10% from in-state emissions), and 30% from global emissions. Of the 10% in-state emissions, 21% is from material processing, 51% is from energy production, and 28% is from purposeful use.</p> <p>*Existing loadings from stormwater are accounted for in estimates of loadings for air deposition, as no other significant sources of mercury to stormwater were found. Although existing loadings from stormwater are included in atmospheric deposition loading estimates, NPDES permitted stormwater-sources are subject to the WLA.</p> <p><u>NE</u> (Total Source Load: 1,153 kg/yr):</p> <p><i>Point Sources: Estimated Total Point Source Load is 26.2 kg/yr.</i></p> <p><i>Nonpoint Sources: Estimated Total Nonpoint Source Load is 1,127 kg/yr</i></p> <p><u>SW</u> (Total Source Load: 1,628 kg/yr):</p> <p><i>Point Sources: Estimated Total Point Source Load is 7.0 kg/yr.</i></p> <p><i>Nonpoint Sources: Estimated Total Nonpoint Source Load is 1,621 kg/yr.</i></p>



<p>METHOD FOR CHARACTERIZING EXISTING SOURCE LOADINGS</p>	<p><i>Point Sources:</i> There are 580 wastewater treatment plants (WWTPs) and publicly owned treatment works (POTWs) that discharge to the impaired Hg waters in the state, and 270 of these discharge to waters in the TMDL. Except for two WWTPs, typical Hg concentrations and design flows were used to calculate existing loads for NPDES facilities, including POTWs, taconite processing facilities, and paper and pulp mills.</p> <p><i>Nonpoint Sources:</i> Conducted sediment analysis from 1990 baseline data and compared to sediment cores from coastal Alaska to determine anthropogenic and natural atmospheric deposition percentages.</p>						
<p>METHOD FOR DETERMINING ALLOWABLE LOAD (LOADING CAPACITY)</p>	<p>MN established a loading capacity for each of the two regional TMDLs. Each loading capacity was calculated by multiplying a regional reduction factor* needed to achieve the fish tissue mercury concentration target by the total source load for each region, thus calculating a regional load reduction goal. The load reduction goal was subtracted from the total source load to arrive at the loading capacities. The total source load was considered the baseline condition from which reductions would be needed to achieve water quality standards.</p> <p><i>Loading Capacity. NE:</i> 1.10 kg/day; SW: 2.18 kg/day</p> <p>*Reduction factor is based on assumption of proportional relationship between reductions in emissions, deposition, and fish mercury levels. Reduction factor is percent reduction needed to meet the fish tissue target in 90th percentile standard length of fish.</p>						
<p>REDUCTIONS NEEDED TO REACH TARGET</p>	<p>NE: Mercury reductions of 749 kg/yr (93% reduction) SW: Mercury reductions of 830 kg/yr (73% reduction)</p> <p>*The higher reduction goal for the northeast is used as the overall statewide reduction goal. Percent reductions are from anthropogenic sources and based on 1990 levels.</p>						
<p>ALLOCATIONS</p>	<table border="0"> <tr> <td>NE:</td> <td>SW:</td> </tr> <tr> <td>Total WLA= 0.01 kg/day</td> <td>Total WLA= 0.02 kg/day</td> </tr> <tr> <td>Total LA= 1.09 kg/day</td> <td>Total LA= 1.55 kg/day</td> </tr> </table> <p><i>Note: State did not assign waterbody specific allocations; rather the state established gross allocations for each region which serves as a mass "cap" for each region. WLAs set at 1% of TMDL. Aggregate allocations are used because air deposition is the dominant source and assumed to be relatively uniform across the state. Although existing loadings from stormwater are included in atmospheric deposition loading estimates, NPDES permitted stormwater-sources are subject to the WLA.</i></p>	NE:	SW:	Total WLA= 0.01 kg/day	Total WLA= 0.02 kg/day	Total LA= 1.09 kg/day	Total LA= 1.55 kg/day
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<p>MARGIN OF SAFETY</p>	<p>NE: Implicit MOS; SW: 0.61 kg/day MOS due to greater overall reduction needed for northeast region used as statewide goal.</p>						
<p>SEASONAL VARIATION AND CRITICAL CONDITIONS</p>	<p>Seasonal variations not found to be significant because TMDL loadings are expressed as annual averages. The mercury concentration in the fish represents an integration of all temporal variation up to the time of the sample collection.</p> <p>The regional approach in the TMDL addresses critical conditions of differing water body chemistry that may make some waterbodies more sensitive to mercury loadings than others by acknowledging that the NE region is more sensitive to mercury loading than the SW region.</p>						
<p>REASONABLE ASSURANCE</p>	<p><i>Point Sources:</i> NPDES permits consistent with WLA. Sum of point sources will remain <1%.</p> <p><i>Nonpoint Sources:</i> Various voluntary mercury reduction strategies in place at the state, national, and international level are described.</p>						



IMPLEMENTATION	<p>Implementation will occur with an adaptive management approach by establishing a monitoring plan, interim targets, and a timeline.</p> <p><i>WLA:</i> Permitted point sources over 200,000 gal/day will establish mercury minimization plans. Dischargers in receiving waters dominated by point sources will be subject to permit conditions that address ambient fish tissue monitoring. Monitoring will determine the relationship of the <i>de minimus</i> assumption with actual fish tissue conditions on a more localized basis that may result in mercury limitations in NPDES permits.</p> <p><i>LA:</i> A Phased approach will be taken in meeting their emission reduction strategy, with consideration of current mercury reduction programs in MN, nationally, and internationally.</p>
MONITORING	<p>Monitoring options under consideration include: fish contaminant monitoring of previously sampled lakes and rivers (ongoing); monitoring of air, water, and fish tissue of 4-5 lakes around each of the Monitoring Deposition Network (MDN) sites in MN; lake sediment cores and recalculation of mercury deposition for representative lakes; NPDES upstream/downstream monitoring for traditional wasteload allocation studies; and continued air monitoring for wet deposition; new monitoring stations required for dry deposition and urban areas.</p>