Stormwater and TMDLs: Minnesota’s Experience

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• TMDLs in MN
• MS4 general permits
• MS4 WLA calculation approaches
• Challenges with implementing current MS4 permit
• New approaches
• Next permit
The framework connects state programs and local partners, encourages public participation, and uses the best available science to support decisions.

Local partners carry out actions to address sources of both point and non-point source pollution with state support.

State and local agencies systematically monitor and assess the condition of lakes and streams on a 10-year cycle. The timing of groundwater monitoring and assessment varies. Other resource monitoring is tailored to specific state and local needs.

Agencies support or create watershed and groundwater models, maps, research projects, and tools to provide technical information to water planning efforts and support best management practices.

Local partners commit to prioritized, targeted and measurable action through the One Watershed, One Plan (IWIP) program, which connects state and other information with local values.

State and local partners develop Watershed Restoration and Protection Strategies (WRAPS) and Groundwater Restoration and Protection Strategies (GRAPS).
MN Watershed Approach

- 80 HUC8 (“major”) watersheds, 10-year cycle

https://www.pca.state.mn.us/air-water-land-climate/watershed-approach-to-water-quality
MN Clean Water Fund

- Funded by 2008 amendment

![Clean Water Fund Logo]

- Over $1,359.5 million
  - Minnesota Pollution Control Agency: $326,184,000

Clean Water Legacy Appropriations from All (2010-Present)

[https://www.legacy.mn.gov/clean-water-fund](https://www.legacy.mn.gov/clean-water-fund)
## MS4 general permit history

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2013</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># statewide approved TMDLs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>339</td>
<td>1,576</td>
</tr>
<tr>
<td><strong># MS4s w/WLAs</strong></td>
<td>~30</td>
<td>126</td>
<td>216</td>
</tr>
<tr>
<td><strong>WLA compliance approach</strong></td>
<td>Permittee checks 303(d) list, determines compliance, adjusts SWPPP as needed</td>
<td>MPCA provides WLA list spreadsheet; permittee lists WLAs, states whether meeting WLA; and lists BMPs (interim milestones as applicable)</td>
<td>BMP implementation: Bacteria, chloride, temperature, Numeric implementation: TP, TSS, oxygen demand, nitrate</td>
</tr>
</tbody>
</table>
2020 permit application

• BMP implementation: Bacteria, chloride, temperature
• Numeric implementation: TP, TSS, oxygen demand, nitrate

Is numeric WLA met?

Y

Reductions for WLA
BMPs for WLA

N

Compliance schedule
Compliance schedule BMPs
Why numeric limits based on WLA?

- Previous permits: not enough progress
- Numeric limits based on WLA to hold MS4s more accountable

Table 8.2. TSS TMDL summary, Porter Creek (07020012-817)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Flow Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>TSS Load (lbs/day)</td>
<td></td>
</tr>
<tr>
<td>Loading Capacity</td>
<td>36,156</td>
</tr>
<tr>
<td>Unallocated Load</td>
<td>0</td>
</tr>
<tr>
<td>Total WLA</td>
<td>320</td>
</tr>
<tr>
<td>WLA</td>
<td></td>
</tr>
<tr>
<td>Elko New Market City MS4 (MS400237)</td>
<td>162</td>
</tr>
<tr>
<td>Construction Stormwater (MNR100001)</td>
<td>79</td>
</tr>
<tr>
<td>Industrial Stormwater (MNR050000)</td>
<td>79</td>
</tr>
<tr>
<td>Load Allocation</td>
<td>34,028</td>
</tr>
<tr>
<td>MOS</td>
<td>1,808</td>
</tr>
</tbody>
</table>

6/16/2023
Approaches to delineating MS4-regulated areas

- Cities and townships
  - A. Entire jurisdictional area
  - B. Delineating area as watershed to regulated stormwater conveyance
  - C. Approximate with land cover data: impervious or developed area

- Linear MS4s (road authorities)
  - Mapped by MnDOT
  - Approximate right-of-way width of roads applied to GIS road (line) layers
Approaches to developing MS4 WLAs

- Area
- Concentration target in runoff
- Model scenario
Challenges with implementing current MS4 permit

- Unachievable WLAs
- MS4 boundaries
- Overlapping WLAs
Unachievable WLAs

- Permitted MS4s assigned WLAs
- High percent load reduction needs
- Channel erosion not allocated a load

<table>
<thead>
<tr>
<th>TMDL Parameter</th>
<th>Flow Regime</th>
<th>TSS Load (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>(37–1,128 cfs)</td>
<td>(6–37 cfs)</td>
</tr>
<tr>
<td>Duluth City MS4 (MS400086)</td>
<td>198</td>
<td>38</td>
</tr>
<tr>
<td>Rice Lake City MS4 (MS400151)</td>
<td>181</td>
<td>35</td>
</tr>
<tr>
<td>St. Louis County MS4 (MS400158)</td>
<td>8.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Industrial Stormwater (MNR050000)</td>
<td>65</td>
<td>12</td>
</tr>
<tr>
<td>Construction Stormwater (MNR100001)</td>
<td>33</td>
<td>6.2</td>
</tr>
</tbody>
</table>

| Load Allocation | 2,765 | 527 | 167 | 54 | 15 |
| MOS             | 361   | 69  | 22  | 7.1 | 1.9 |
| Loading Capacity | 3,611 | 689 | 218 | 71 | 19 |
| Existing Load   | 270,118 | 11,599 | 387 | 17 | - |
| Percent Load Reduction | 99% | 94% | 44% | 0% | - |

Contested case hearing petition filed during public notice
• Changing MS4 boundaries (development changes watershed boundaries)

• Incorrect in TMDL report: didn’t consider stormsewer locations

• Unclear in TMDL report (e.g., scale of maps, land cover data as “boundary”)
• Multiple TMDLs for different water bodies at different scales.

TSS and TP WLA study areas for one municipal MS4
Recent WLA approach: Runoff concentration target

- In addition to load, express WLA either as concentration or unit area load (export coefficient)

<table>
<thead>
<tr>
<th>MS4 name and permit number</th>
<th>Estimated regulated area (ac)</th>
<th>Estimated regulated percent area of the watershed</th>
<th>Impaired water body</th>
<th>Impaired water body AUIDs</th>
<th>Phosphorus wasteload allocation (lb/season)</th>
<th>Target watershed runoff phosphorus concentration (μg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Fairmont (MS400239)</td>
<td>5,095</td>
<td>19%</td>
<td>Fairmont Chain: Amber, Hall, Budd, Sisseton, George</td>
<td>46-0034-00, 46-0031-00, 46-0030-00, 46-0025-00, 46-0024-00</td>
<td>1,855 b</td>
<td>183</td>
</tr>
</tbody>
</table>

a. Does not include surface area of impaired lakes.
b. Assumes a TP watershed runoff concentration of 183 μg/L.

https://www.pca.state.mn.us/watershed-information/blue-earth-river
Recent WLA approach:
Percent reductions from HSPF model scenario

Baseline

60% reduction in TSS from developed land and near-channel sources
• What should the next permit look like?
  • BMP-based (state-wide) for more pollutant types?
  • Stick with current approach?
Thank you!

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