Water Quality Standards, Permitting and Costs

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It’s About:

Aging infrastructure + Demographics and Economics + Water Goals
Wastewater Investment Needs

- **Sewer System Rehabilitation,** $1,697.42, 40%
- **Infiltration / Inflow,** $272.26, 7%
- **New Collection,** $360.65, 9%
- **New Interception,** $397.53, 9%
- **Combined Sewer Overflow (CSO),** $7.63, 0%
- **Secondary Treatment,** $1,249.72, 30%
- **Advanced Treatment,** $222.46, 5%
How have funding sources changed over time?

Construction Grant Era (1984)
- State & Federal: 90%
- Ratepayer: 10%

Current Era (2017)
- State & Federal: 67%
- Ratepayer: 33%
Statewide Funding Contributions

Projects funded by year

Collection  Treatment  Collection/treatment  Stormwater  Dollars Awarded

$0  $50,000,000  $100,000,000  $150,000,000  $200,000,000  $250,000,000  $300,000,000  $350,000,000

Projects

0  10  20  30  40  50  60
## Monthly Sewer Bills for Greater Minnesota Communities ($)

<table>
<thead>
<tr>
<th>Population</th>
<th>Average</th>
<th>Low</th>
<th>High</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 500</td>
<td>30.67</td>
<td>1.67</td>
<td>102.05</td>
<td>100.38</td>
</tr>
<tr>
<td>500 to 999</td>
<td>35.79</td>
<td>8.17</td>
<td>116.00</td>
<td>108.87</td>
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<tr>
<td>1,000 to 2,499</td>
<td>37.56</td>
<td>12.50</td>
<td>96.90</td>
<td>84.40</td>
</tr>
<tr>
<td>2,500 to 4,999</td>
<td>36.25</td>
<td>13.50</td>
<td>83.00</td>
<td>69.70</td>
</tr>
<tr>
<td>5,000 to 9,999</td>
<td>40.67</td>
<td>10.25</td>
<td>88.33</td>
<td>78.09</td>
</tr>
<tr>
<td>10,000 to 24,999</td>
<td>33.09</td>
<td>15.37</td>
<td>46.50</td>
<td>31.13</td>
</tr>
<tr>
<td>25,000 and up</td>
<td>26.91</td>
<td>16.42</td>
<td>42.69</td>
<td>26.27</td>
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</table>

## Monthly Sewer Bills for Met Council Enviro Services ($)

<table>
<thead>
<tr>
<th>All metro service areas</th>
<th>Average</th>
<th>Low</th>
<th>High</th>
<th>Range</th>
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<tr>
<td></td>
<td>23.23</td>
<td>10.23</td>
<td>56.00</td>
<td>45.77</td>
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</table>
Water Quality Improvement Needs

• Significant progress has been made
• More is needed:
  • Nearly 700 impairments in Minnesota due to excess nutrients
  • About 40% of lakes and streams are impaired due to "conventional" pollutants
  • We risk losing the gains we've made if aging infrastructure is not addressed

Progress reducing phosphorus
So what are we to do?

Invest, Innovate and Communicate!
Water Quality Standards

- State responsibility established in the federal Clean Water Act
- Fundamental tool for clean water
- Set water quality goals based on who and what is being protected
Water Quality Standards ≠ Permit Requirements

• Standards identify the goal based on desired use and environmental science

• Permits specify facility requirements including costs, timeline and feasibility considerations
Considerable analysis and expertise goes into developing effluent limits (i.e. permit requirements)

• Typical steps:
  1. Collect effluent data: Permittee, typically over a permit cycle
  2. Collect ambient water quality data: MPCA
  3. Effluent limit review (“reasonable potential”): Facility-specific analysis
  4. If limit is needed, feasibility and cost considerations
  5. Permit issuance. If effluent limit is needed, may include a schedule of compliance or variance

Makes general cost analysis difficult
Water Quality Standards Cost Analysis

• Results reflect assumptions
• Predictive tool
• Why predict the future?
  • To be prepared
  • To avoid
Example: Stormwater BMPs and MIDs
Stormwater Case Studies

• Many cities and watershed districts require stormwater control at development/redevelopment
  • Example: Capitol Region Watershed District

• Many also retrofitting improvements
  • Example: Inver Grove Heights efforts to address TSS impairment in the Mississippi River
  • Installing 12 stormwater BMPs over 5 years to reduce pollutant loads, runoff volume, and peak discharge
  • Eligible for PFA funding
Example: River Eutrophication Standards

- Permittees only required to address their share.
Example: Chloride

- About 78% of the wastewater costs estimated in the standards study are to meet the 1990 chloride standard.
- Chloride treatment is generally not affordable; variances are currently the best tool.
Detroit Lakes is similar to many Minnesota cities:

• Aging wastewater infrastructure
• Current WWTP not fully protective of water quality
• Affordability and equity concerns
“... with each upgrade the city has implemented we have seen marked change in the downstream water quality of our lakes"
Detroit Lakes and Chloride

Chloride (mg/L)

Effluent Chloride

230 mg/L Limit

Chloride (mg/L)

Where is chloride coming from?

**Centralized Softening**

- **Source**
- **Water Treatment With Softening**
- **Wastewater Treatment Plant**

**Point-of-Entry Softening (IX)**

- **Source**
- **Water Treatment Without Softening**
- **Private Well**
- **Wastewater Treatment Plant**

=Sends lots of Chloride to WWTP! = Ion Exchange Softener
Detroit Lakes WWTP Upgrade

Current Technologies
RIBs, Spray Irrigation, Stabilizing & Aerated Ponds, Trickling filters, Chemical Precipitation, Dual Media Filters
(Plant currently not meeting effluent limits)

Proposed Technologies
Membrane Bio-Reacto Plant
$30.5 Million in Capital Costs

Bonus!
New plant will eliminate spray irrigation and allow DL airport to extend the runway!
Detroit Lakes Options/Costs to Address Chloride

<table>
<thead>
<tr>
<th>Upgrade to high efficiency softeners</th>
<th>Lime Softening*</th>
<th>RO Softening*</th>
<th>RO at WWTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital $ Mil</td>
<td>N/A</td>
<td>12.3</td>
<td>8.2</td>
</tr>
<tr>
<td>O&amp;M $ Mil per Year</td>
<td>N/A</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Affordable maybe</td>
<td></td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Will achieve compliance with limit?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Assumes uninstalling all water softeners
Would DL, and your city, be eligible for a variance from chloride?

And we have a streamlined approach!!

YES!
Detroit Lakes Case Study: Summary

• New facility will reduce phosphorus discharge 91%

• Treating for chloride not affordable – Variance is being considered for the future

• New facility construction supported by $13.7M in grants and $16.4M in 1% loans

• Other benefits of new facility;
  • Smaller footprint
  • Capacity for future growth
1976 Secondary Treatment Costs Compared to 2017 Tertiary Treatment Costs

WWTP’s have not gotten more expensive over time!
Better value for the same money!
What to do when costs are unaffordable?

Where the MPCA wants you to be!
Water Quality Standards and Water Infrastructure

• Costs of upgrading/replacing wastewater treatment facilities and addressing stormwater can be daunting

• Aged-out infrastructure is driving the costs; WQ improvements also needed in some areas

• Need to innovate to minimize costs as much as possible and still maintain public health and water quality

• Need to communicate/collaborate more on standards development, permitting
  • Enhanced peer review; wastewater listening sessions; issue-specific work groups all efforts towards this.

• 2017 Bonding bill will help; further investment is needed
Thank you!

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