Schaper Pond effectiveness monitoring

May 17, 2018 Commission meeting
project background
results of effectiveness monitoring (phosphorus, solids, particle size)
potential factors limiting treatment effectiveness
recommendations for 2018
2011: BCWMC completed Sweeney Lake TMDL, with follow-up monitoring

2012: BCWMC completed Schaper Pond feasibility report

2011 monitoring showed 90% of phosphorus load came from Hwy 55 inlet, but short-circuited two-thirds of available treatment volume

BCWMC & Golden Valley installed floating water baffle to divert more flows to northwest corner of pond—expected to remove 81-156 pounds TP per year
phosphorus (µg/L)

2017
125
90

2011
118
142

105
98
total suspended solids (mg/L)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>2011</td>
<td>22</td>
<td>52</td>
</tr>
</tbody>
</table>
Particle size distributions

2011 high flow
particle size distributions
particle size distributions
Longitudinal water quality sampling results

Concentrations increase from Hwy 55 inlet to Schaper outlet

<table>
<thead>
<tr>
<th>Pond Location</th>
<th>TP (µg/L)</th>
<th>Chlorophyll-a (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>28</td>
<td>4.3</td>
</tr>
<tr>
<td>Center</td>
<td>--¹</td>
<td>--</td>
</tr>
<tr>
<td>Northwest</td>
<td>40</td>
<td>--</td>
</tr>
<tr>
<td>Northeast</td>
<td>35</td>
<td>9.2</td>
</tr>
</tbody>
</table>

¹—not reported due to disturbance of bottom sediment during sampling.
water quality summary

Comparing 2011 to 2017 results:

- TP entering pond from Hwy 55 was 37% lower in 2017 than in 2011.
- TP leaving pond was similar each year.
- All sites had lower dissolved P in 2017.
- TSS from RR inlet twice as high in 2017.
- Pond is not removing TP or TSS like it did in 2011.
water quality summary

comparing monitoring results (cont’d.)

• Particle sizes were finer in 2017 than in 2011 at all sites, including low flow events
• Pond outlet particles finer than Hwy 55 inlet under 2017 high flow
• TP and TSS leaving pond are higher than Hwy 55 inflows
  • TSS removal % worse than TP
  • low flows translate to worse removal
conclusions

potential factors limiting treatment effectiveness

- limited time to equilibrate to start-up conditions
- high water—flows above 25 cfs would lift curtain off bottom of pond
- carp—resuspend TSS in NW corner
- watershed construction—Douglas Dr.
- upstream water treatment—several projects since 2011
- changes to bathymetry
next steps

recommendations ($21,000 total)

• perform longitudinal water quality monitoring—high/low flows, seasonally (6 sampling events)
• complete bathymetric survey—compare to 2011
• conduct seasonal carp surveys (3 times)
• report on results of 2018 monitoring