Schaper Pond effectiveness monitoring

May 17, 2018 Commission meeting

outline

- project background
- results of effectiveness monitoring (phosphorus, solids, particle size)
- potential factors limiting treatment effectiveness
- recommendations for 2018

Schaper Pond background

2011: BCWMC completed Sweeney Lake TMDL, with follow-up monitoring

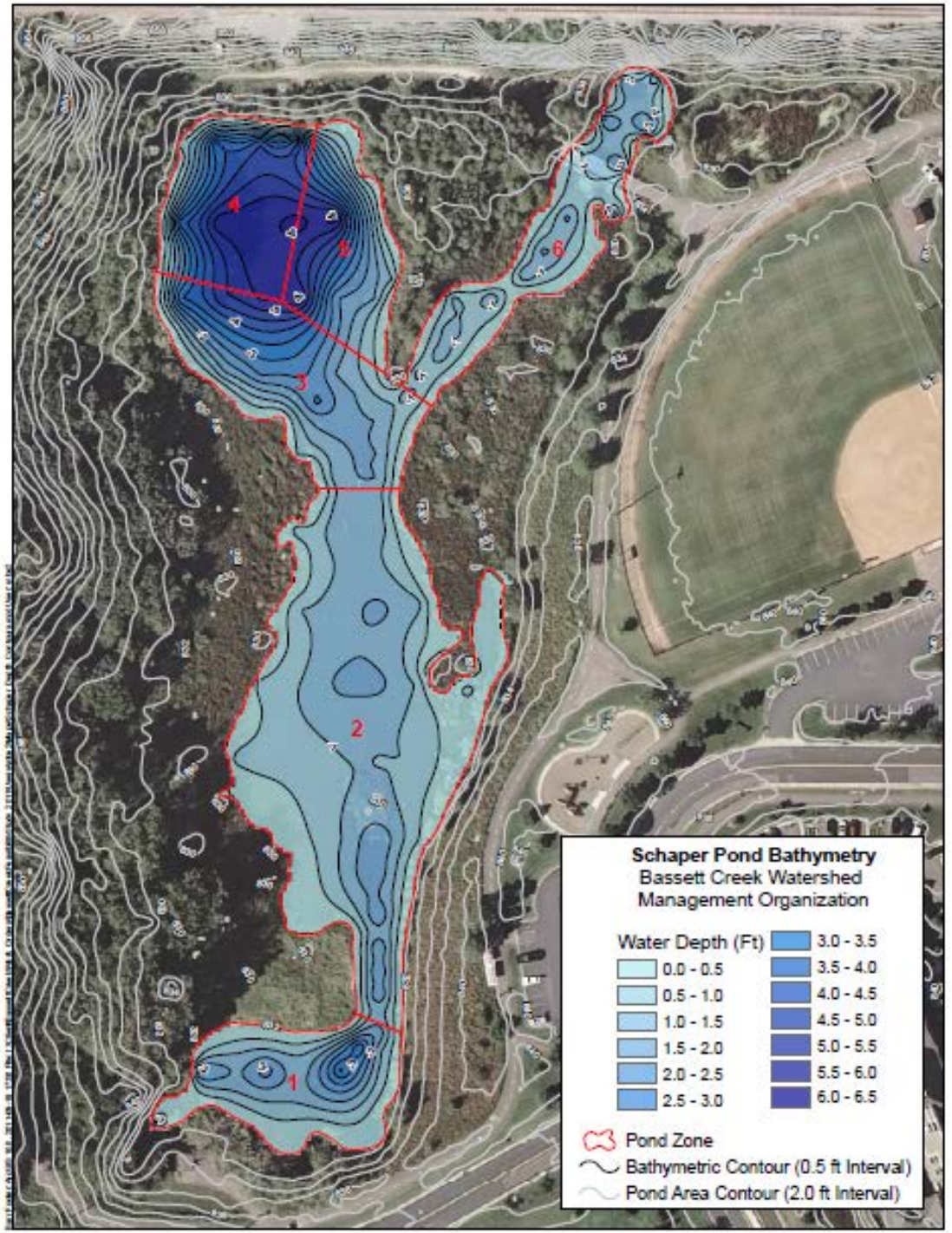
2012: BCWMC completed Schaper Pond feasibility report

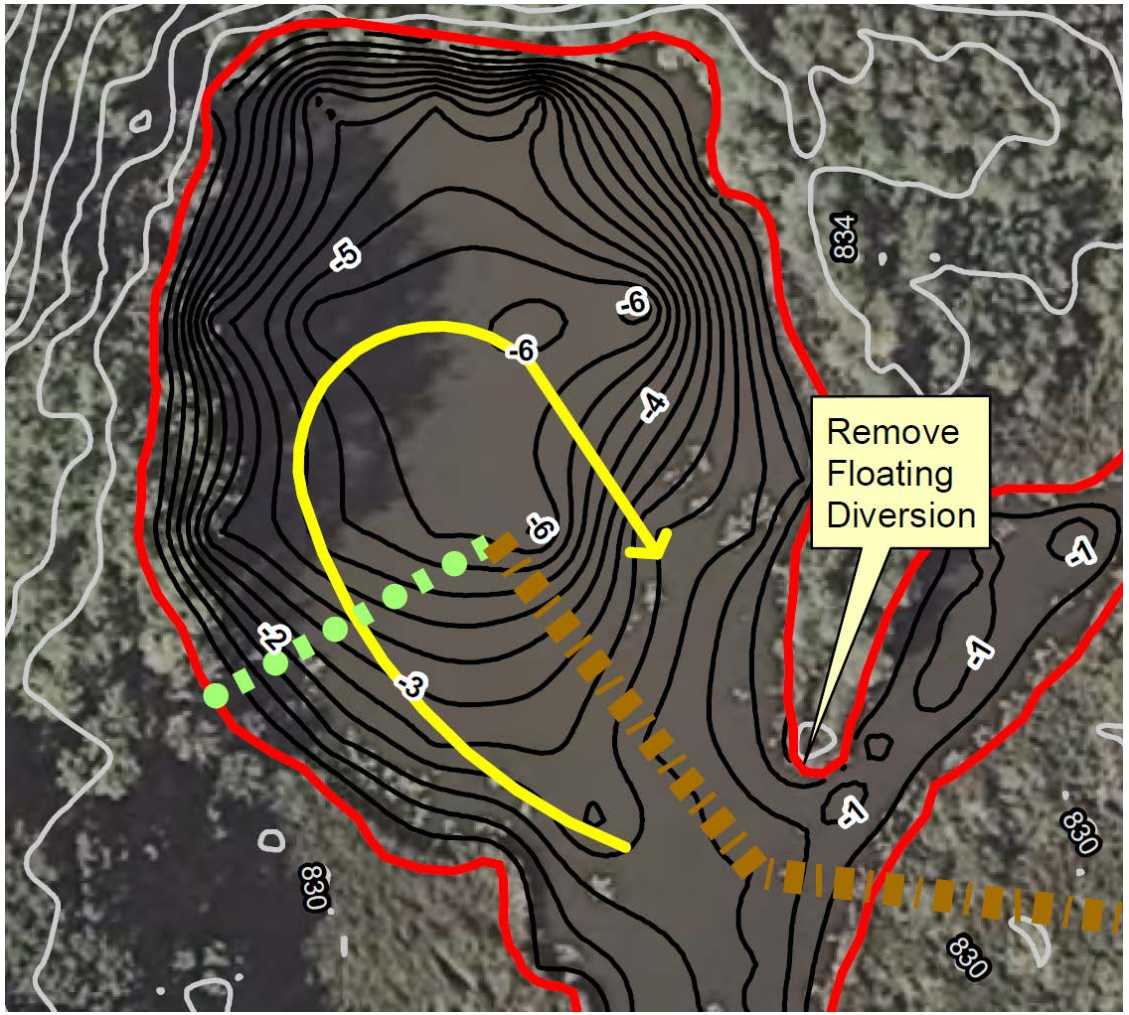
2011 monitoring showed 90% of phosphorus load came from Hwy 55 inlet, but short-circuited two-thirds of available treatment volume

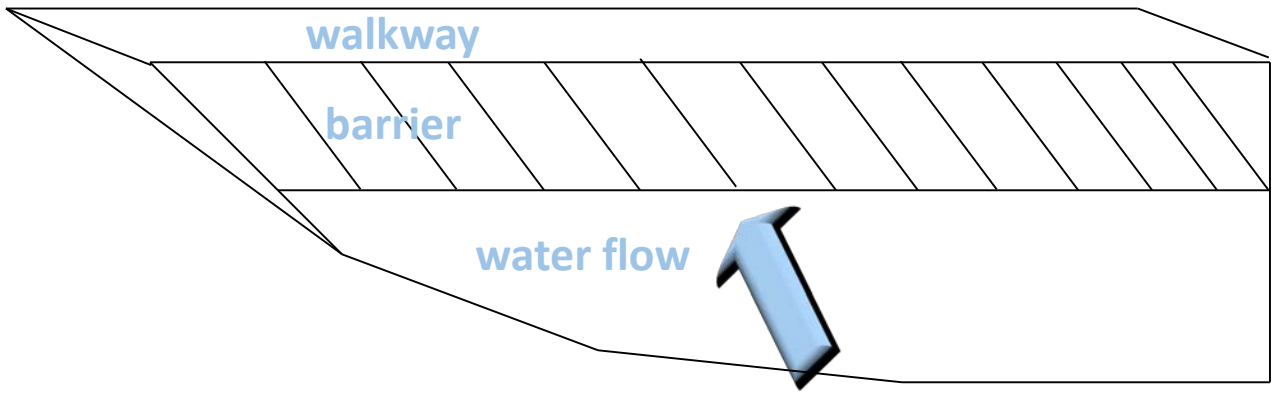
BCWMC & Golden Valley installed floating water baffle to divert more flows to northwest corner of pond—expected to remove 81-156 pounds TP per year

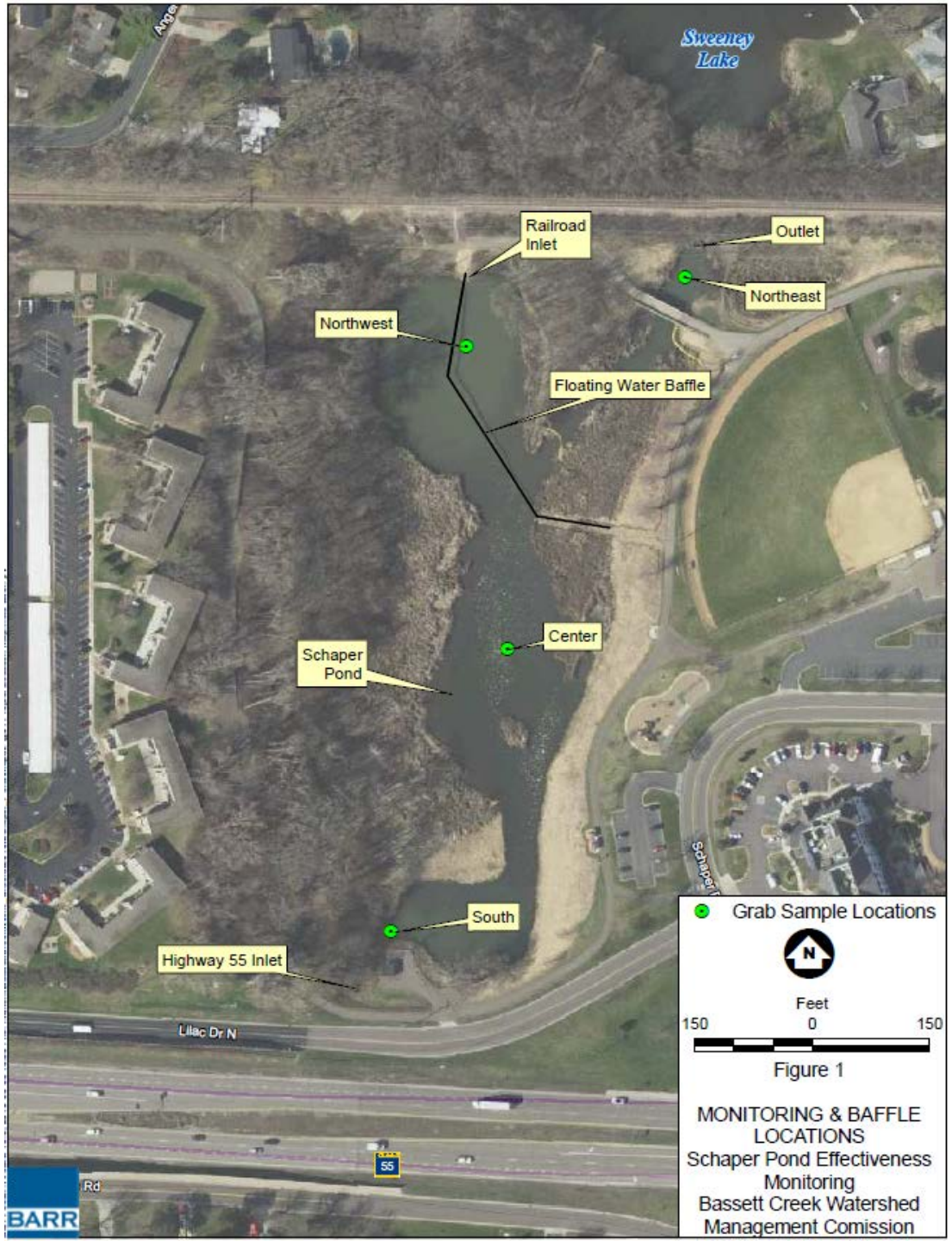
2011


To Sweeney Lake
Railroad Inlet
Highway 55 Inlet


Schaper Pond Bathymetry
Bassett Creek Watershed Management Organization
Water Depth (Ft)
0.0 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
3.0 - 3.5
3.5 - 4.0
4.0 - 4.5
4.5 - 5.0
5.0 - 5.5
5.5 - 6.0
6.0 - 6.5
Pond Zone
Bathymetric Contour (0.5 ft Interval)
Pond Area Contour (2.0 ft Interval)


834
-5
-6
-6
-4
-6
-2
-3
Remove
Floating
Diversion
-7
-4
-4
830
830
830


walkway
barrier
water flow


Sweeney
Lake
Railroad
Inlet
Outlet
Northeast
Northwest
Floating Water Baffle
Center
Schaper
Pond
South
Highway 55 Inlet
Lilac Dr N
55
Rd
BARR
Grab Sample Locations
N
Feet
150
0
150
Figure 1
MONITORING & BAFFLE
LOCATIONS
Schaper Pond Effectiveness
Monitoring
Bassett Creek Watershed
Management Comission

phosphorus (µg/L)

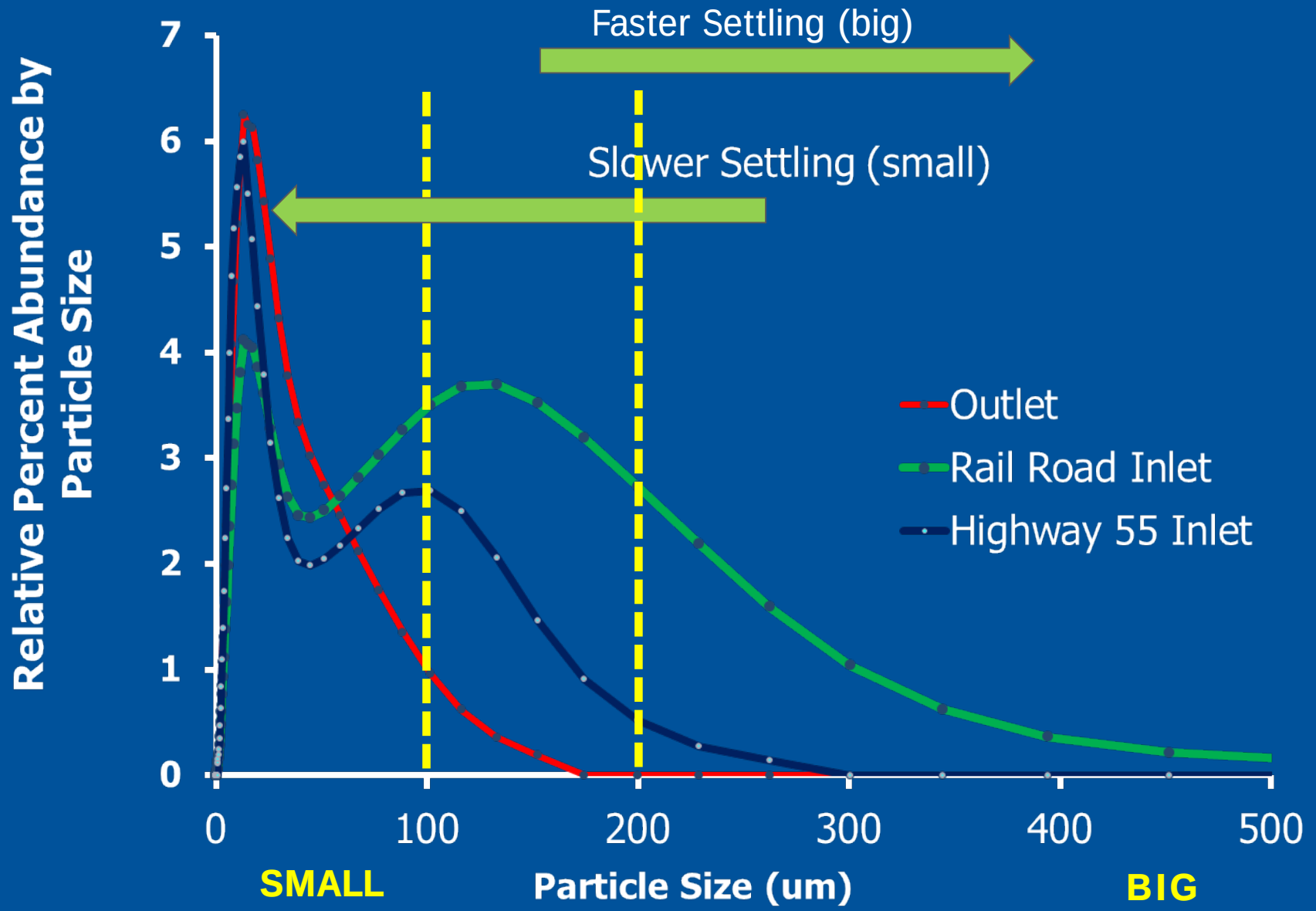
2017
2011

total suspended solids (mg/L)

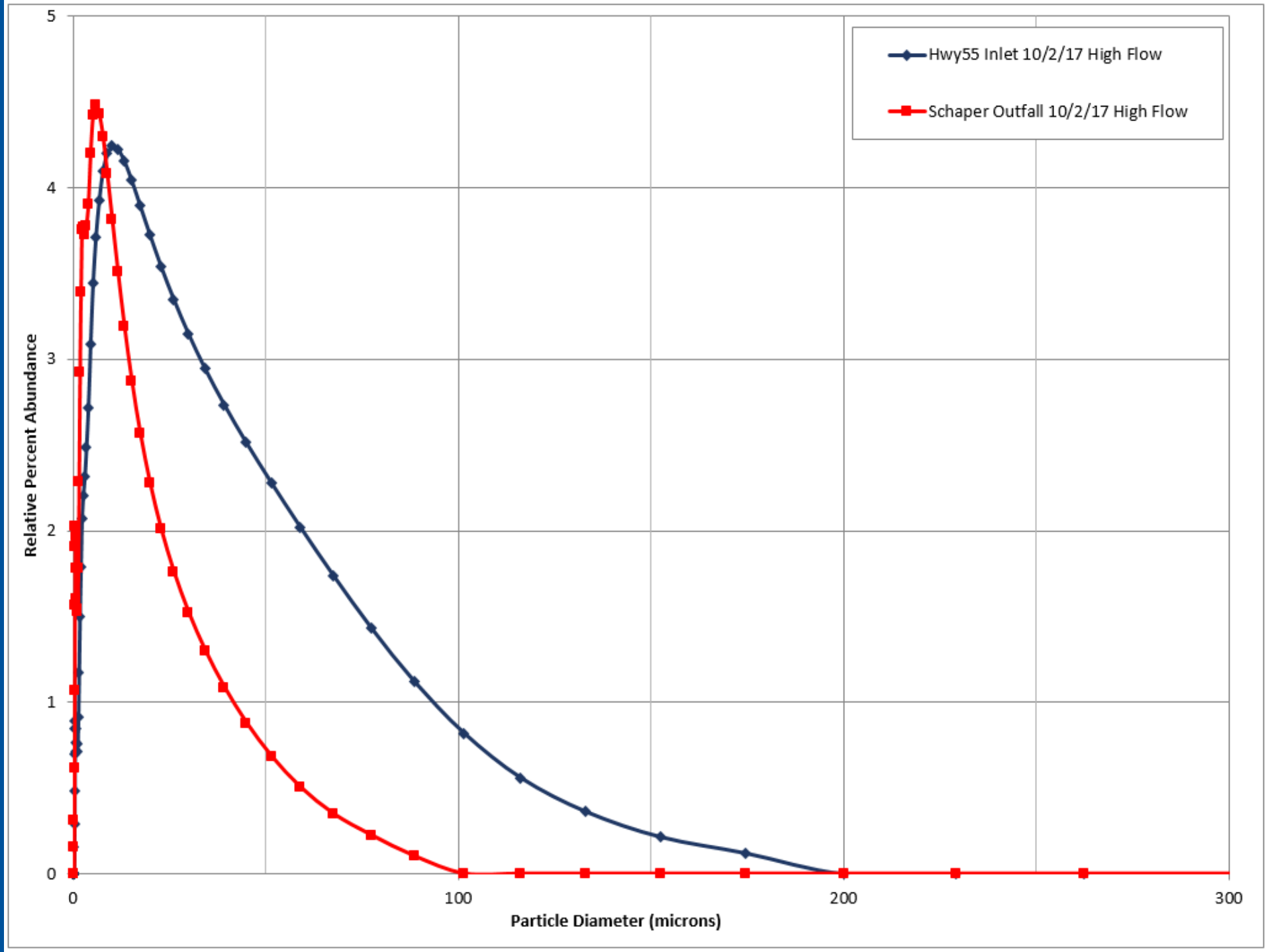
2017
2011

particle size distributions

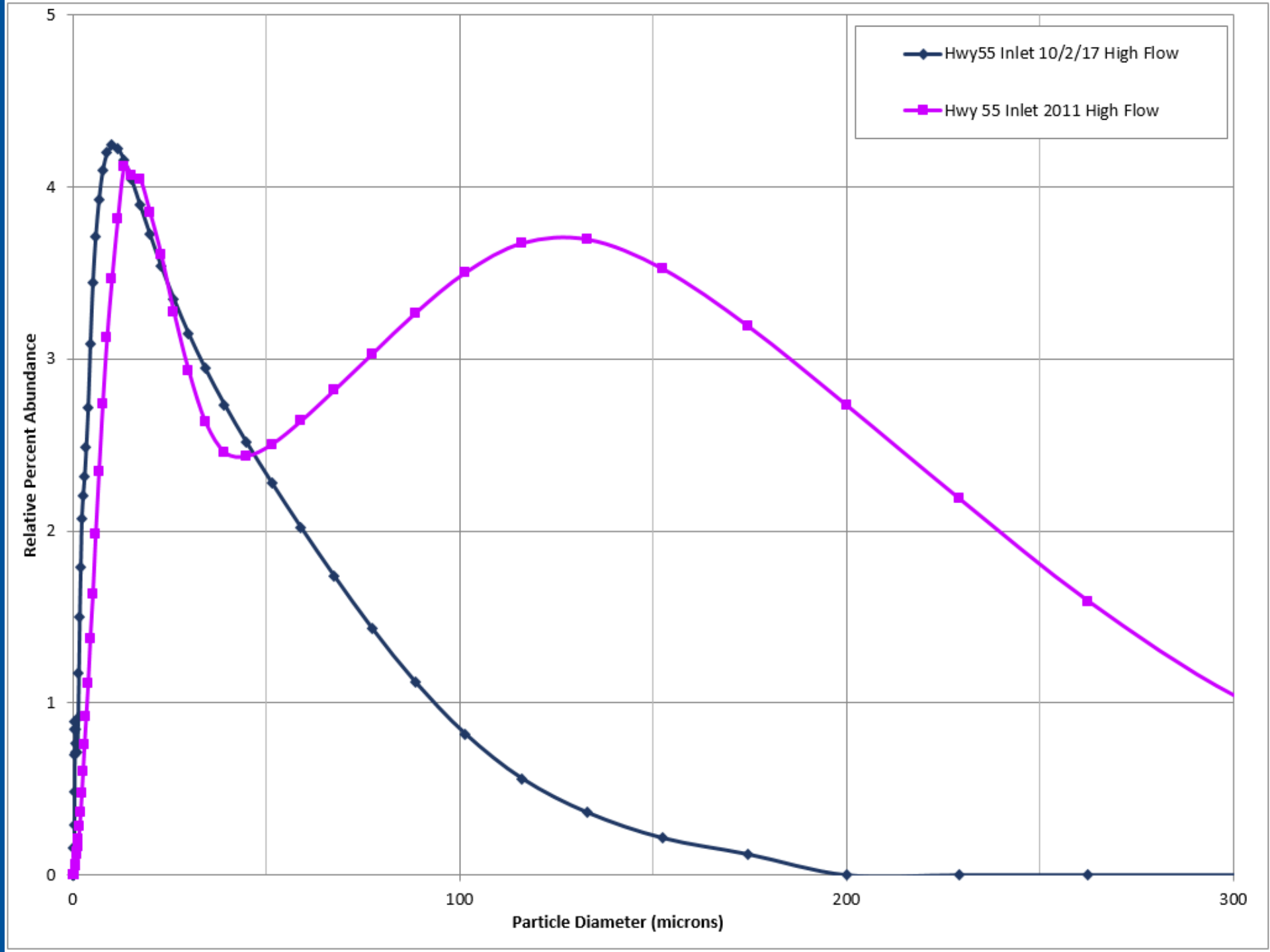
2011 high flow



particle size distributions



particle size distributions



longitudinal water quality sampling results

concentrations increase from Hwy 55 inlet to Schaper outlet

Pond Location	TP (µg/L)	Chlorophyll-a (µg/L)
South	28	4.3
Center	--[1]	--
Northwest	40	--
Northeast	35	9.2

[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

Questions?