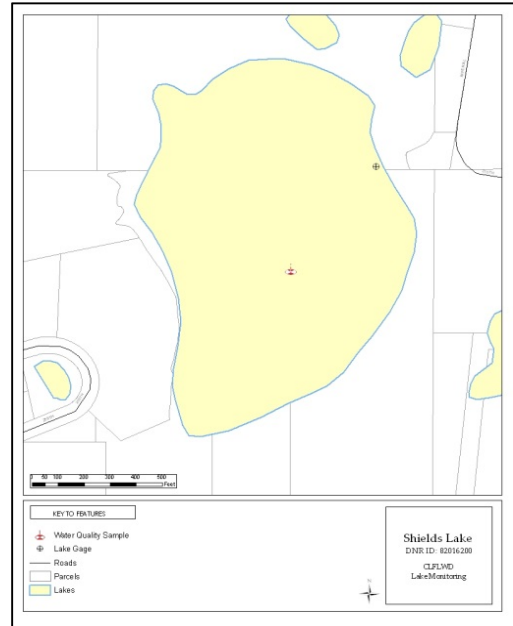


Shields Lake

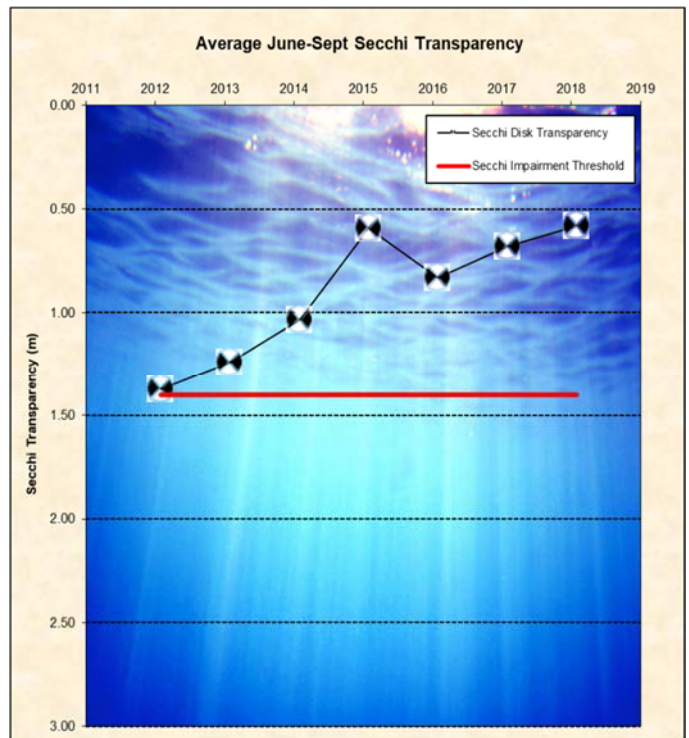
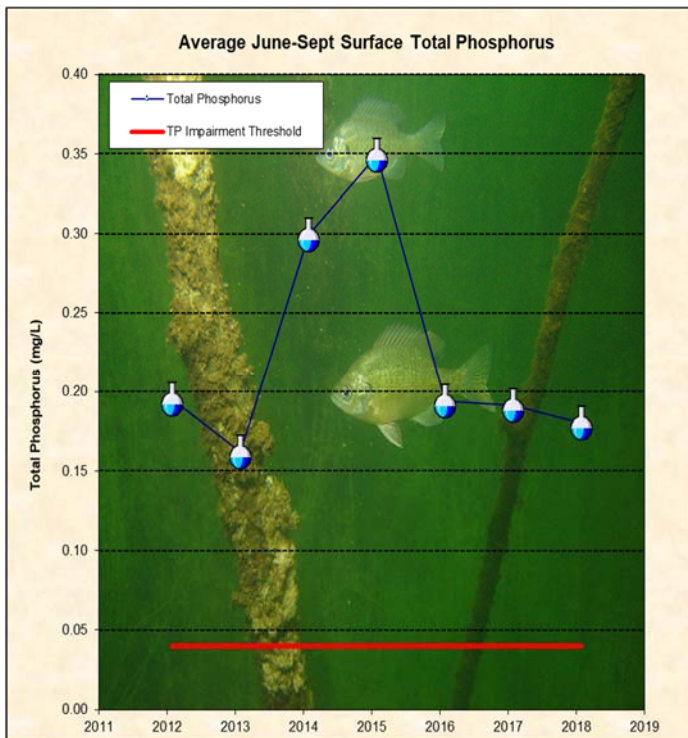
2018 Lake Grade: D-

- DNR ID #: 82016200
 - Municipality: City of Forest Lake
 - Location: NE^{1/4} Section 22 T32N-R21W
 - Lake Size: 29.58 Acres
 - Maximum Depth (2018): 25 ft.
 - Ordinary High Water Mark: 902.5 ft.
 - 74% Littoral
- Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.



Summary Points

- Based on the chlorophyll-*a* results Shields Lake was considered hypereutrophic in 2018, according to the Carlson Trophic State Index.
- Using the 2-tailed Kendall Tau correlation test ($p < 0.05$) there is a statistically significant **declining** trend for the average Secchi transparency average and chlorophyll-*a* and no trend for average total phosphorus at this time.
- The major land use is a mix of semi-urban and rural/agricultural.
- The lake stratified in 2018 with the thermocline around 3 meters.
- Shields Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.
- Curly-leaf Pondweed (an invasive aquatic plant) is extensive in this lake.

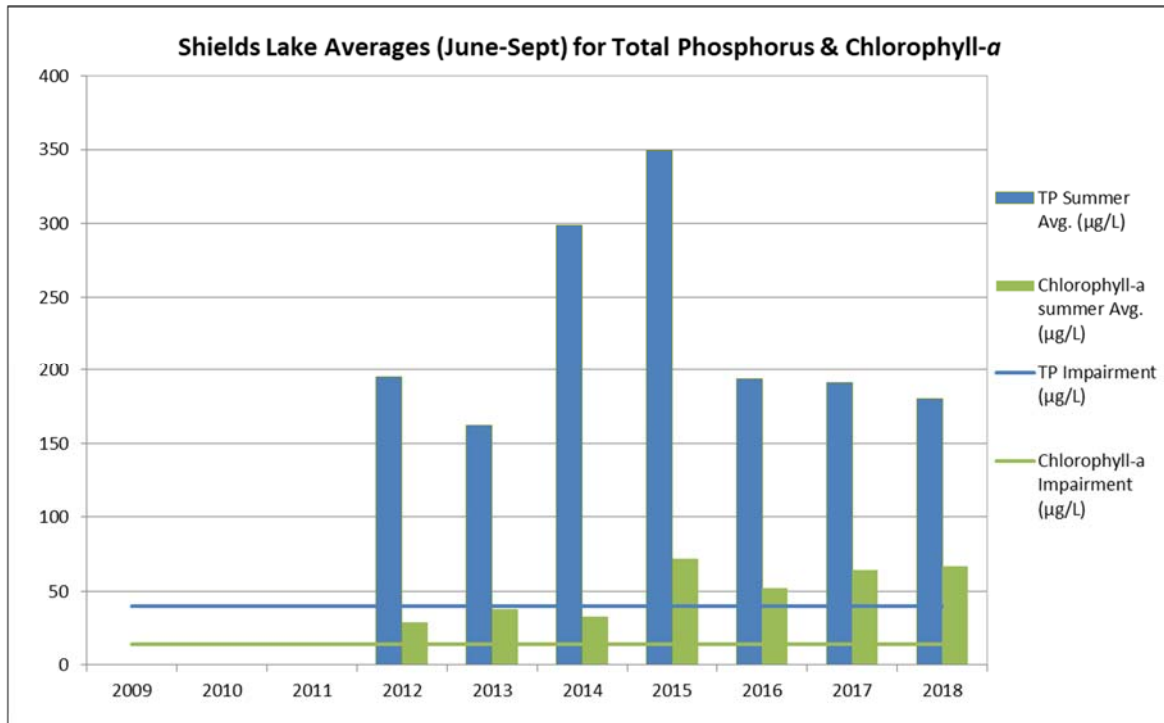


Date/Time	Total Phosphorus (mg/L)	Uncorrected Trichromatic Chlorophyll-a (µg/L)	Pheophytin-Corrected Chlorophyll-a (µg/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
5/14/2018 12:15	0.058	15.0	13.0	1.10	1.07	18.6	13.28
5/30/2018 11:09	0.035	10.0	10.0	1.10	2.90	24.1	7.58
6/14/2018 9:09	0.222	22.0	21.0	1.90	1.22	22.8	6.58
6/25/2018 12:06	0.210	160.0	160.0	3.00	0.15	25.8	13.35
7/9/2018 12:02	0.283	100.0	99.0	2.80	0.30	27.4	10.85
7/23/2018 13:30	0.201	60.0	56.0	2.40	0.46	27.1	10.15
8/7/2018 13:59	0.174	67.0	68.0	2.50	0.53	25.4	8.32
8/20/2018 11:50	0.149	51.0	47.0	2.20	0.46	26.0	5.15
9/5/2018 14:18	0.122	59.0	52.0	1.90	0.61	22.7	7.08
9/17/2018 11:27	0.076	39.0	36.0	1.80	0.91	25.1	8.24
10/2/2018 9:09	0.154	44.0	43.0	2.30	1.22	12.4	5.78
10/16/2018 13:30	0.291	3.5	2.7	2.90	1.07	7.8	8.52
2018 Average	0.165	52.5	50.6	2.16	0.91	22.1	8.74
2018 Summer Average	0.180	69.8	67.4	2.31	0.58	25.3	8.72

Water quality thresholds are 0.04 mg/L TP, 14 µg/L CL-a, 1.4 m Secchi depth*
 Shallow lake water quality thresholds are 0.06 mg/L TP, 20 µg/L CL-a, 1.0 m Secchi depth*

	High	High Date	Low	Low Date	Average
2018 Elevation (ft)	903.46	10/16/2018	902.62	8/20/2018	902.88

*Data requirements and determinations of use assessment according to the MPCA's Guidance Manual for Assessing the Quality of Minnesota Surface Waters: "Samples must be collected over a minimum of 2 years and data used for assessments must be collected from June to September. Typically, a minimum of 8 individual data points for TP, corrected chlorophyll-a (chl-a corrected for pheophytin), and Secchi are required. Data used for phosphorus and chlorophyll-a calculations are limited to those collected from the upper most 3 meters of the water column (surface). If more than one sample is collected in a lake per day, these values are averaged to yield a daily average value. Following this step, all June to September data for the 10-year assessment window are averaged to determine summer-mean values for TP, corrected chl-a, and Secchi depth. These values are then compared to the standards and the assessment is made."



Lake Water Quality Summary										
	Lake Grades (May-Sept)									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Total Phosphorus (mg/L)	F	F	F	F	F	F	F	NA	NA	NA
Chlorophyll-a (µg/L)	D	D	D	D	C	C	C	NA	NA	NA
Secchi depth (ft)	D	D	D	F	D	C	C	NA	NA	NA
Overall	D-	D-	D-	F+	D	D+	D+	NA	NA	NA

Shields Lake Water Surface Elevation Statistics

Outlet Elevation (culvert): 900.0 ft.

Ordinary High Water Level (OHW) Elevation: 902.5 ft.

100 Year Flood Elevation (FEMA): 904.5 ft.

Highest Recorded Elevation: 903.99 ft. (06/27/2003)

Lowest Recorded Elevation: 899.77 ft. (10/02/2006)

Datum: NGVD 29 (ft.)

