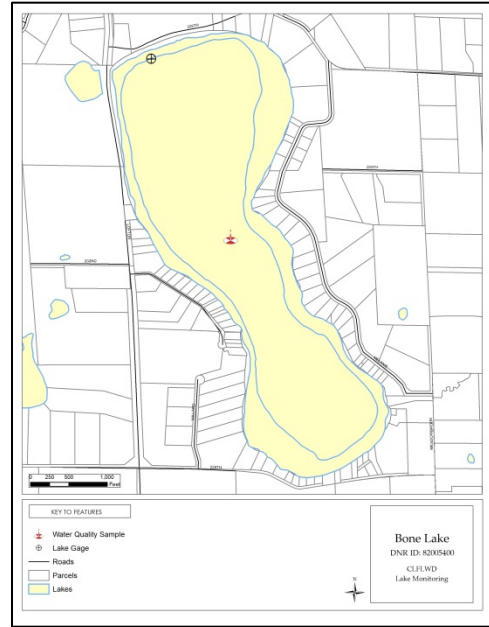


Bone Lake

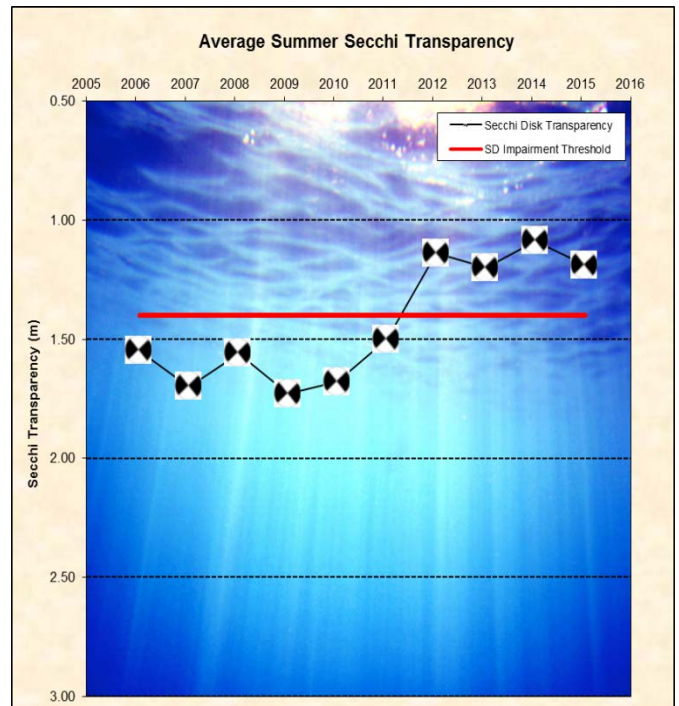
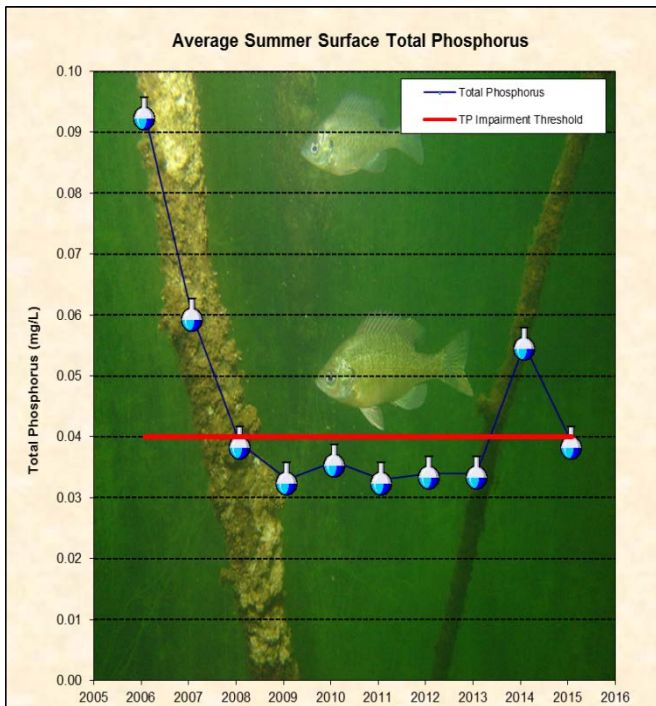
2015 Lake Grade: C

- DNR ID #: 82005400
 - Municipality: City of Scandia
 - Location: Section 5 T32N-R20W
 - Lake Size: 221.45 acres
 - Maximum Depth (2015): 30 ft.
 - Ordinary High Water Mark: 909.1 ft.
 - 56% Littoral
- Note: Littoral area is the portion of the lake <15 ft. and dominated by aquatic vegetation.

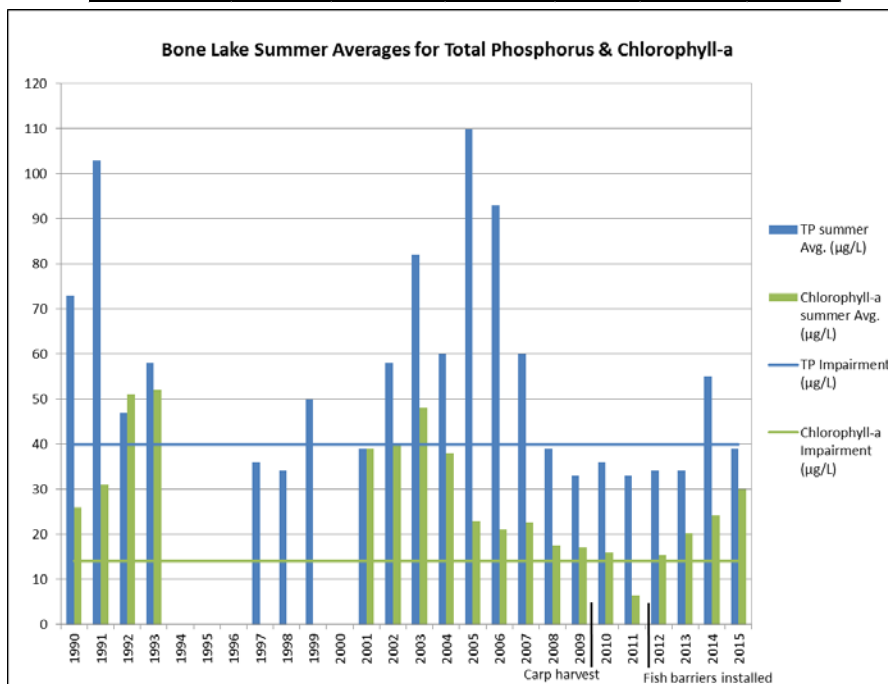


Summary Points

- Based on the chlorophyll-*a* results Bone Lake was considered eutrophic in 2015, according to the Carlson Trophic State Index.
- Using the Kendall's Tau correlation test ($p < 0.05$) there is a statistically significant **improving** trend for the average total phosphorus and no trend for the average Secchi transparency at this time.
- The major land use is rural/agricultural.
- The lake stratified in 2015 with the thermocline varying between 4 and 5 meters.
- Bone Lake is listed as impaired for nutrients on the Minnesota Pollution Control Agency's Impaired Waters List.
- Eurasian Watermilfoil and Curly-leaf Pondweed (invasive aquatic plants) are extensive in this lake.
- Carp removal was performed in the winter of 2010.
- Low velocity fish barriers were installed at Bone Lake north inlet and Bone Lake outlet in the fall of 2012.



Date	Total Phosphorus (mg/L)	Chlorophyll-a (µg/L)	Total Kjeldahl Nitrogen (mg/L)	Secchi Disk Depth (m)	Surface Temperature (Celsius)	Surface Dissolved Oxygen (mg/L)
4/22/2015 10:36	0.037	31.0	1.60	1.37	9.5	11.4
5/4/2015 14:23	0.028	14.0	1.50	1.98	16.8	11.26
5/21/2015 10:01	0.027	18.0	1.20	1.68	14.9	10.85
6/1/2015 11:32	0.040	17.0	1.40	1.37	17.9	10.33
6/15/2015 10:19	0.044	14.0	1.30	1.22	23.2	9.89
6/29/2015 10:34	0.026	13.0	1.20	1.07	25.8	9.26
7/15/2015 10:41	0.032	20.0	1.20	1.37	24.7	8.17
7/28/2015 11:42	0.036	36.0	1.40	1.22	26.6	7.98
8/12/2015 10:08	0.045	56.0	1.60	0.91	24.9	9.91
8/26/2015 14:24	0.053	33.0	1.70	1.07	21.6	8.04
9/9/2015 10:12	0.042	43.0	1.70	1.22	23.6	8.79
9/22/2015 10:20	0.037	37.0	1.60	1.22	19.5	5.68
10/6/2015 10:35	0.040	41.0	1.70	1.37	16.7	7.53
10/20/2015 11:33	0.044	52.0	1.80	1.07	12.2	10.42
2015 Average	0.038	30.4	1.49	1.30	19.9	9.25
2015 Summer Average	0.039	29.9	1.46	1.19	23.1	8.67
Volunteer Data						
05/15/2015 11:20	0.064	26.0	2.40	1.45	14.2	NA
05/28/2015 20:30	0.027	9.6	0.77	1.30	19.0	NA
06/08/2015 20:00	0.023	5.3	0.77	1.10	22.0	NA
06/28/2015 17:30	0.042	10.8	2.20	1.00	26.0	NA
07/09/2015 16:00	0.030	11.0	1.10	1.00	25.5	NA
07/26/2015 16:00	0.059	39.0	1.40	0.90	27.8	NA
08/09/2015 17:00	0.152	96.0	5.60	0.80	25.2	NA
09/06/2015 17:00	0.028	16.0	1.00	0.90	26.0	NA
09/20/2015 17:00	0.099	20.4	3.60	0.90	22.0	NA
10/01/2015 16:00	0.035	8.2	1.40	1.10	19.3	NA
10/11/2015 16:00	0.036	14.0	1.50	1.10	16.9	NA
2015 Average	0.054	23.3	1.98	1.05	22.2	NA
2015 Summer Average	0.062	28.4	2.24	0.94	24.9	NA
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*						
2015 Elevation (ft)	High	High Date	Low	Low Date	Average	
	909.89	7/23/2015	908.25	9/22/2015	90.11	
*MPCA description of Impaired Lake's Listing criteria: "At a minimum, a decision that a given lake is impaired for the 303(d) list due to excessive nutrients will be supported by data for both causal and response factors. Data requirements for 303(d) listing consist of 12 or more TP measurements collected from June through September over the most recent 10-year period. Ideally this should represent 12 separate visits to the lake over the course of two summers; however it might also reflect four monthly samples over the course of three years (a typical sampling regimen for many lake monitoring programs). In addition to exceeding the TP guideline thresholds, lakes to be considered for 303(d) listing should have at least 12 Secchi measurements and 12 chlorophyll-a measurements. This amount of data will allow for at least one season (preferably more) for paired TP, chlorophyll-a, and Secchi disk data and provide a basis for evaluating their interrelationships and hence the trophic status of the lake."						



Lake Water Quality Summary										
	Lake Grades									
	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
Total Phosphorus (mg/L)	C	C	C	C	C	C	C	C	C	C
Chlorophyll-a (µg/L)	B	C	C	B	A	B	B	B	B	B
Secchi depth (ft)	D	D	C	D	C	C	C	C	C	C
Overall	C	C-	C	C	C+	C+	C+	C+	C+	C+

Bone Lake Water Surface Elevation Statistics

Outlet Elevation (culvert): 907.3 ft.

Ordinary High Water Level (OHW) Elevation: 909.1 ft.

100 Year Flood Elevation (CLFLWD): 910.6 ft.

Highest Recorded Elevation: 910.97 ft. (07/07/1975)

Lowest Recorded Elevation: 906.7 ft. (11/07/1966)

Datum: NGVD 29 (ft.)

