

Wisconsin Department of Natural Resources

Elkhart Lake - Deep Hole 2017 Results



Elkhart Lake - Deep Hole was sampled **8** different days during the 2017 season. Parameters sampled included:

- water clarity
- temperature
- total phosphorus
- chlorophyll

The average summer (July-Aug) secchi disk reading for Elkhart Lake - Deep Hole (Sheboygan County, WBIC: 59300) was 11.25 feet. The average for the Southeast Georegion was 7 feet. Typically the summer (July-Aug) water was reported as **CLEAR** and **BLUE**.

Chemistry data was collected on Elkhart Lake - Deep Hole. The average summer Chlorophyll was 2.7 µg/l (compared to a Southeast Georegion summer average of 23.9 µg/l). The summer Total Phosphorus average was 9.6 µg/l. Lakes that have more than 20 µg/l and impoundments that have more than 30 µg/l of total phosphorus may experience noticeable algae blooms.

The overall Trophic State Index (based on chlorophyll) for Elkhart Lake - Deep Hole was 42. The TSI suggests that Elkhart Lake - Deep Hole was **mesotrophic**. Mesotrophic lakes are characterized by moderately clear water, but have an increasing chance of low dissolved oxygen in deep water during the summer.

Wisconsin Department of Natural Resources

Lake Water Quality 2017 Annual Report

Elkhart Lake

Sheboygan County

Waterbody Number: 59300

Lake Type: SPRING

DNR Region: SE

GEO Region:SW

Site Name	Storet #
Elkhart Lake - Deep Hole	603458

Date	SD (ft)	SD (m)	Hit Bottom	CHL	TP	TSI (SD)	TSI (CHL)	TSI (TP)	Lake Level	Clarity	Color	Perception
05/26/2017	14	4.3	NO			39			NORMAL	MURKY	GREEN	2-Very minor aesthetic problems
06/02/2017					11.8			47				
06/20/2017	17	5.2	NO	1.73	16.1	36	39	50	NORMAL	CLEAR	BLUE	1-Beautiful, could not be nicer
07/13/2017	10.5	3.2	NO	2.26	10.6	43	41	46	NORMAL	MURKY	BLUE	2-Very minor aesthetic problems
08/22/2017	12	3.7	NO			41			NORMAL	CLEAR	BLUE	2-Very minor aesthetic problems
08/31/2017				3.05	8.63		43	45				
09/19/2017				2.09	10.5		40	46				
09/19/2017	16	4.9	NO			37			NORMAL	CLEAR	BLUE	1-Beautiful, could not be nicer

05/26/2017		
Depth FEET	Temp. DEGREES F	D.O.
0	59.3	
5	59.3	
10	59	
15	58.8	
25	55.2	
35	50	
45	48	
55	44.4	
65	43.3	
75	42.8	
85	42	
95	32.7	

07/13/2017		
Depth FEET	Temp. DEGREES F	D.O.
0	78	
10	78	
15	78	
20	73	
45	53	
100	32	

08/22/2017		
Depth FEET	Temp. DEGREES F	D.O.
0	74	
10	74	
25	74	
30	64	
100	33.6	

09/19/2017		
Depth FEET	Temp. DEGREES F	D.O.

0	69.9	
5	69.8	
10	69.4	
15	69.4	
20	67.8	
30	64.7	
40	50.5	
50	46.5	
60	44.4	
70	43.9	
80	39.5	
90	32	

Date	Data Collectors	Project
05/26/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
06/02/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
06/20/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
07/13/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
08/22/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
08/31/2017	Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole
09/19/2017	Data Collectors	Bacteria + Plankton (Paid Private)
09/19/2017	Joe and Sarah Majerus	Citizen Lake Monitoring - Water Quality - Elkhart Lake; Deep Hole

SD = Secchi depth measured in feet converted to meters; Chl = Chlorophyll a in micrograms per liter(ug/l); TP = Total phosphorus in ug/l, surface sample only; TSI(SD), TSI(CHL), TSI(TP) = Trophic state index based on SD, CHL, TP respectively; Depth measured in feet.

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Wisconsin Lakes Partnership

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Elkhart Lake

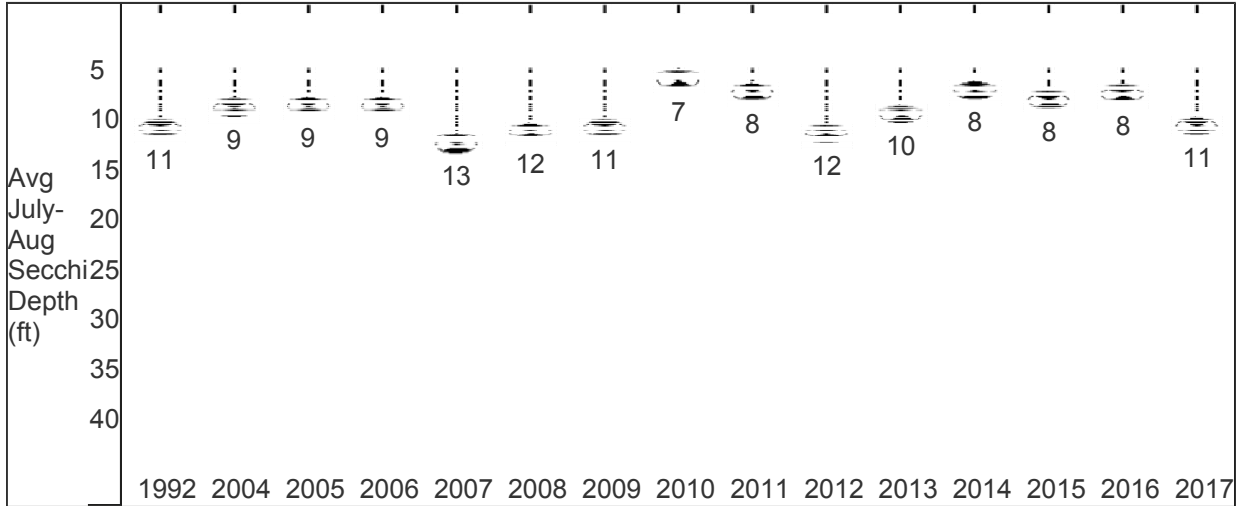
Sheboygan County

Waterbody Number: 59300

Lake Type: SPRING

DNR Region: SE

GEO Region: SE



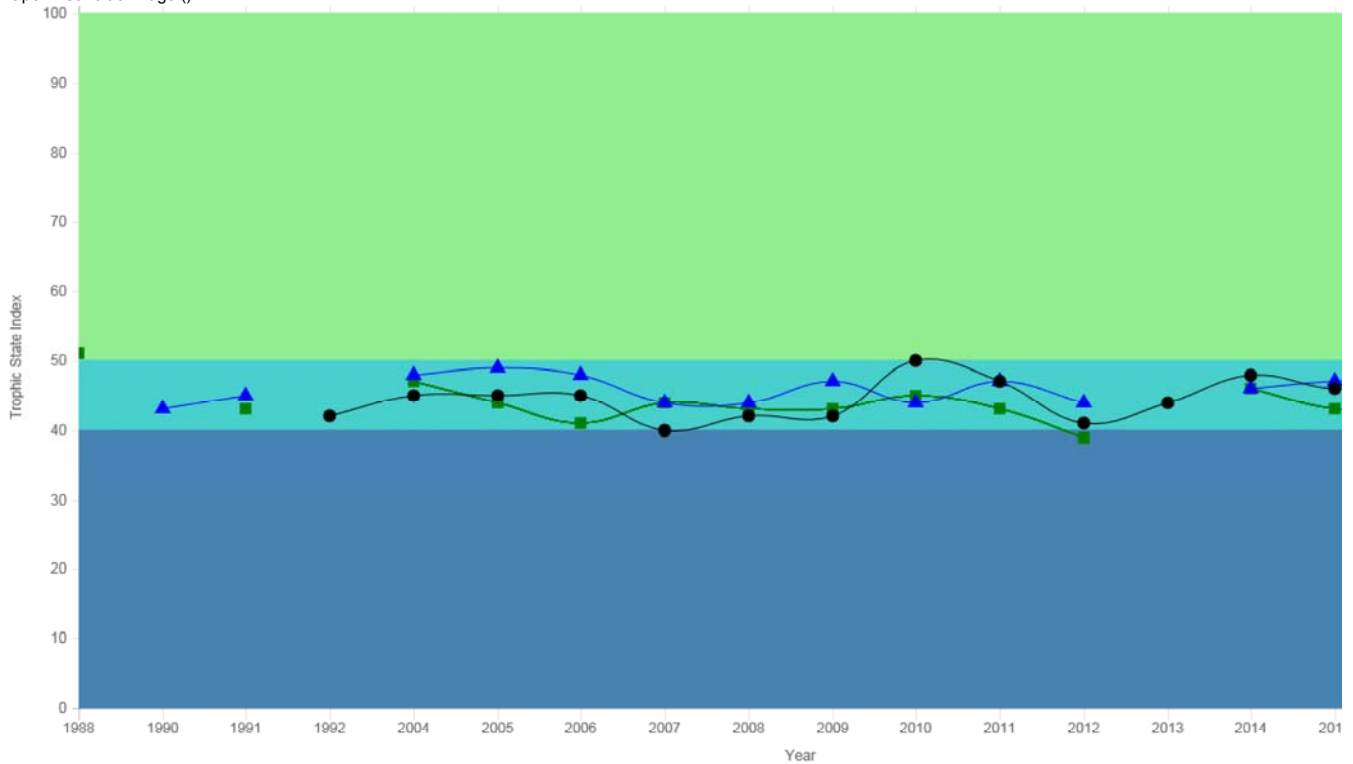
Past secchi averages in feet (July and August only).

Year	Secchi Mean	Secchi Min	Secchi Max	Secchi Count
1992	11.42	9.5	14	9
2004	9.38	6	15	6
2005	9.25	5.5	15.25	4
2006	9.19	8	10.5	4
2007	13.06	8.5	19	9
2008	11.79	6.5	17	7
2009	11.33	8	15	7
2010	6.67	5	8	3
2011	7.88	5.75	10	2
2012	12	12	12	1
2013	10	10	10	1
2014	7.5	5	10	2
2015	8.5	7	10	2
2016	8	8	8	1
2017	11.25	10.5	12	2

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Trophic State Index Graph: Elkhart Lake - Deep Hole, Sheboygan County

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● Secchi TSI ▲ Total Phosphorus TSI ■ Chlorophyll TSI
Past Summer (July-August) Trophic State Index (TSI) averages.

TSI(Chl) = TSI(TP) = TSI(Sec)	It is likely that algae dominate light attenuation.
TSI(Chl) > TSI(Sec)	Large particulates, such as Aphanizomenon flakes dominate
TSI(TP) = TSI(Sec) > TSI(Chl)	Non-algal particulate or color dominate light attenuation
TSI(Sec) = TSI(Chl) >= TSI(TP)	The algae biomass in your lake is limited by phosphorus
TSI(TP) > TSI(Chl) = TSI(Sec)	Zooplankton grazing, nitrogen, or some factor other than phosphorus is limiting algae biomass

TSI	TSI Description
TSI < 30	Classical oligotrophy: clear water, many algal species, oxygen throughout the year in bottom water, cold water, oxygen-sensitive fish species in deep lakes. Excellent water quality.
TSI 30-40	Deeper lakes still oligotrophic, but bottom water of some shallower lakes will become oxygen-depleted during the summer.
TSI 40-50	Water moderately clear, but increasing chance of low dissolved oxygen in deep water during the summer.
TSI 50-60	Lakes becoming eutrophic: decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries (pike, perch, bass, etc.) only.
TSI 60-70	Blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.
TSI 70-80	Becoming very eutrophic. Heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight).
TSI > 80	Algal scums, summer fishkills, few plants, rough fish dominant. Very poor water quality.

Trophic state index (TSI) is determined using a mathematical formula (Wisconsin has its own version). The TSI is a score from 0 to 110, with lakes that are less fertile having a low TSI. We base the overall TSI on the Chlorophyll TSI when we have Chlorophyll data. If we don't have chemistry data, we use TSI Secchi. We do this rather than averaging, because the TSI is used to predict biomass. This makes chlorophyll the best indicator.