

Typo Lake

Linwood Township, Lake ID # 03-0009

Background

Typo Lake is located in the northeast portion of Anoka County and the southeast portion of Isanti County. It has a surface area of 290 acres and maximum depth of 6 feet (1.82 m), though most of the lake is about 3 feet deep. The lake has a mucky, loose, and unconsolidated bottom in most areas, while some portions of the lake have a sandy bottom. Public access is at the south end of the lake along Fawn Lake Drive. The lake is used very little for fishing or recreational boating. The lake's shoreline is mostly undeveloped, with only 21 homes within 300 feet of the lakeshore. The lake's watershed of 11,520 acres is 3% residential, 33% agricultural, 28% wetlands, with the remainder being forested or grassland.

Typo Lake, along with Martin Lake to its south, are currently the subject of a intensive study of water quality impairments. This TMDL study (total maximum daily load) will result in documentation of nutrient sources, the degree to which each is impacting the lake, and a remedial strategy. TMDL studies are required of the Minnesota Pollution Control Agency for all impaired waters. Martin and Typo Lakes are on the 303(d) impaired waters list.

2003 Results

In 2003 Typo Lake had very poor water quality compared to other lakes in this region (NCHF Ecoregion), receiving an overall F letter grade; the same as during the last eight years it was monitored. The lake is hypereutrophic. While only some algae was present through the beginning of June, the lake had a severe and persistent algae bloom for the remainder of the summer and into September. The lake was deemed not suitable for swimming the entire open-water season and was suitable for boating only through the first part of June. Almost no aquatic vegetation is present in the lake, as in all previous years with records.

Trend Analysis

Nine years of water quality monitoring have been conducted by the Minnesota Pollution Control Agency (1993, '94, and '95) and the Anoka Conservation District (1997-2001 and 2003). Water quality has not significantly changed from 1993 to 2003 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,6}=1.38$, $p=0.32$). Minnesota DNR fisheries data has anecdotal notes of severe algae blooms back to the earliest records in 1960. Locals familiar with the lake before 1960 indicate that the lake used to have better water quality, had dense stands of aquatic plants including large stands of wild rice, and was heavily used by waterfowl.

Discussion

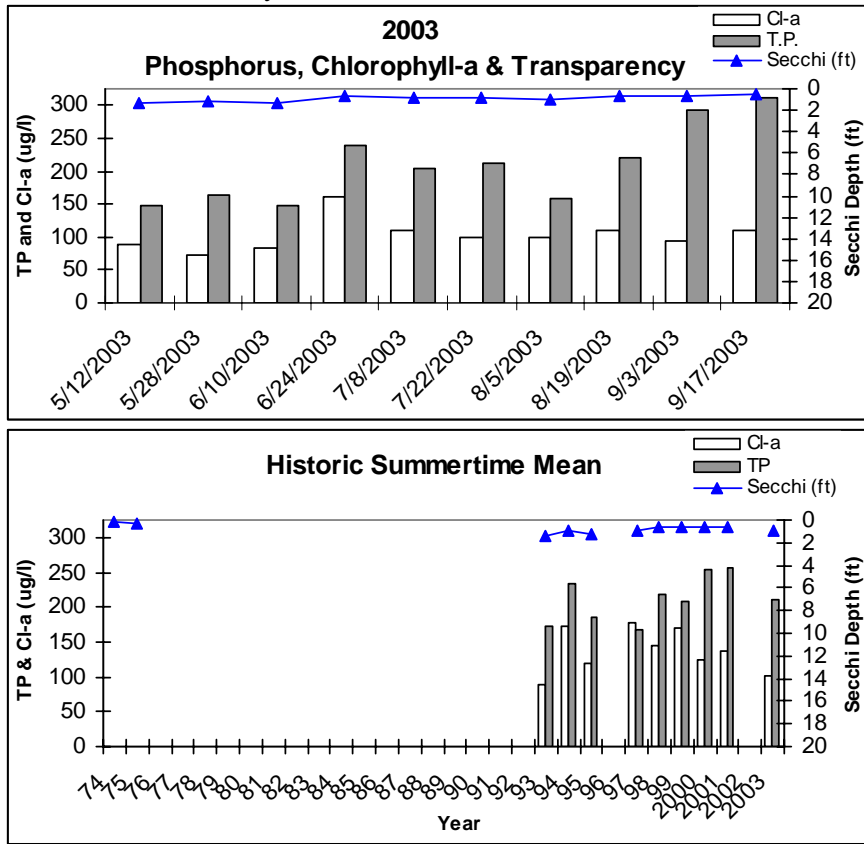
Updates on the Martin and Typo Lakes TMDL study can be found at www.AnokaNaturalResources.com. At this time, the study has revealed a number of factors impacting water quality on Typo Lake, including roughfish, high phosphorus inputs from a ditched wetland west of the lake, and lake sediments.

Refer to Chapter 1 for information on interpreting the information found in this section.

Table 2-4: 2003 Typo Lake Water Quality Data

Typo Lake		2003 Water Quality Data													
Units	R.L.*	5/12/2003	5/28/2003	6/10/2003	6/24/2003	7/8/2003	7/22/2003	8/5/2003	8/19/2003	9/3/2003	9/17/2003	Average	Min	Max	
		Results	Results	Results	Results	Results	Results	Results	Results	Results	Results				
pH		0.1	8.54	8.93	9.03	8.64	9.08	8.85	9.27	9.46	9.35	9.31	9.05	8.54	9.46
Conductivity	mS/cm	0.01	0.216	0.233	0.259	0.264	0.237	0.245	0.258	0.261	0.260	0.260	0.249	0.216	0.264
Turbidity	NTU	1	18	27	19	35	36	27	19	29	40	43	29	18	43
D.O.	mg/l	0.01	N/A	10.50	10.90	9.20	13.50	10.30	13.40	10.53	9.60	9.65	10.84	9.20	13.50
Temp.	°C	0.1	13.1	20.4	19.0	24.3	26.5	23.8	22.7	28.4	20.2	21.3	21.97	13.10	28.40
Temp.	°F	0.1	55.6	68.7	66.2	75.7	79.7	74.8	72.9	83.1	68.4	70.3	72	56	83
Salinity	%	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Cl-a	ug/l	0.5	89.0	72.0	82.0	160.0	110.0	99.0	100.0	110.0	93.0	110.0	102.5	72.0	160.0
T.P.	mg/l	0.01	0.149	0.165	0.147	0.240	0.204	0.213	0.158	0.219	0.292	0.311	0.210	0.147	0.311
T.P.	ug/l	10	149.0	165.0	147.0	240.0	204.0	213.0	158.0	219.0	292.0	311.0	209.8	147.0	311.0
T.S.S.	mg/l	5	47.0		45.0	70.0	58.0	69.0	40.0	57.0	90.0	180.0	72.9	40.0	180.0
V.S.S.	mg/l	5	20.0		32.0	8.0	32.0	46.0	24.0	46.0	62.0	100.0	41.1	8.0	100.0
Secchi	ft	0.1	1.3	1.1	1.4	0.7	0.8	0.8	1.0	0.7	0.6	0.5	0.9	0.5	1.4
Secchi	m	0.1	0.4	0.3	0.4	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.4
Field Observations															
Physical			2.0	2.0	2.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	4.1	2.0	5.0
Recreational			4.0	4.0	4.0	4.5	5.0	4.5	5.0	4.0	5.0	4.5	4.5	4.0	5.0
Trophic State Index															
TSIP			76	78	76	83	81	81	77	82	86	87	81	76	87
TSIC			75	73	74	80	77	76	76	77	75	77	76	73	80
TSIS			73	76	72	82	80	80	77	82	84	87	80	72	87
Mean TSI			75	75	74	82	79	79	77	80	82	84	79	74	84

Figure 2-19: Typo Lake Water Quality Results



Typo Lake Historical Summertime Mean Values

Agency	CAMP	CAMP	MPCA	MPCA	MPCA	ACD	ACD	ACD	ACD	ACD	ACD
Year	74	75	93	94	95	97	98	99	2000	2001	2003
TP			172.0	233.0	185.6	168.0	225.7	202.1	254.9	256.0	209.8
Cl-a			88.1	172.8	119.6	177.8	134.7	67.5	125.3	136.0	102.5
Secchi (m)	0.23	0.27	0.43	0.29	0.38	0.27	0.21	0.25	0.18	0.19	0.3
Secchi (ft)	0.2	0.3	1.4	1.0	1.3	0.9	0.7	0.8	0.6	0.6	0.9
TSIP			78	83	79	78	82	81	83	82	81
TSIC			75	81	78	82	79	72	74	77	76
TSIS			72	78	74	79	82	80	86	85	77
TSI			75	81	77	79	81	78	81	81	78

Typo Lake Water Quality Report Card

Year	74	75	93	94	95	97	98	99	2000	2001	2003
TP			F	F	F	F	F	F	F	F	F
Cl-a			F	F	F	F	F	D	F	F	F
Secchi	F	F	F	F	F	F	F	F	F	F	F
Overall			F	F	F	F	F	F	F	F	F

Carlson's Trophic State Index

