
Clear Lake (82-0147) Rice Creek Watershed District

Clear Lake is a 424-acre lake located within the City of Forest Lake (Washington County). The maximum depth is 8.75 m (28 ft). The lake has 267 acres considered littoral (area of aquatic plant dominance) and it does maintain a thermocline (a density gradient created by changing water temperatures in the lakes water column). The lake is considered dimictic (meaning that it turns over twice a year – once in spring and fall)

As part of the RCWD monitoring program Clear Lake was sampled 3 times in 2005. Surface samples were collected for Chlorophyll-a (CLA), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN). Surface Dissolved Oxygen, Temperature, Specific Conductivity, pH, and secchi transparency were also recorded.

Historical monitoring of Clear Lake occurred in 1991, 1993, 1999-2003. The mean TP concentration in 2003 was 27.7 ug/L, the mean CLA concentration was 7.8 ug/L, and secchi transparency was 1.8 m. Figure 1 and 2 graphically present the historical water quality data.

The 2005 water quality data shows that the TP average was 39.7 ug/L, CLA concentration was 13 ug/L, and the secchi transparency was 1.8 m. Lake water quality ranking is based on the lake water quality report card developed by the Metropolitan Council (Osgood 1989b). With this method a lake is ranked against other lakes in the metropolitan area following the same methodology. Lakes receiving an “A” can be deemed exceptional with no recreational impairments. A “B”-grade lake is considered to have good water quality and some recreational impairment, while lakes receiving a “C”-grade are considered to have average water quality are recreationally impaired. A “D”-grade lake has a very poor ranking (severely impaired), and an “F”-grade would mean extremely poor water quality with little to no recreational use. The lakes are ranked based on Secchi Depth, TP and CLA concentrations. For lakes greater than 10 feet deep the three parameters work fairly well to assess a lakes water quality.

Conclusion

Clear Lakes water chemistry and biological communities are in excellent condition and deserve protection. Clear lake has been listed on the EPA impaired waters list for mercury. Currently the MNPCA is conducting a TMDL for mercury in lakes throughout Minnesota. The lakeshore is currently developed and many of the residential properties along the lakeshore are either ripped or maintain lawns down to the waters edge. An educational effort directed at the benefits of creating natural shoreline areas should be started for Clear Lake. Natural shorelines create valuable habitat for fish and wildlife, reduce shoreline erosion and the need for rip-rap, and reduce the external nutrient inputs that manicured lawns can enhance. Any future development around the lake should be certain to implement water quality BMP's to help protect this lake. Suggested BMP's include a natural buffer area around the lake perimeter of a minimum of 20 feet, stormwater infiltration to reduce surface runoff and allow for groundwater recharge. Maintain the lake as a quality fishery through maintenance of the predator fish base.

Future monitoring should include conducting a plant survey of the lake along with additional water quality monitoring to evaluate any significant trends in water quality. In 2007 lake monitoring will continue and a point intercept aquatic plant map will be created.

Figure 1 Clear Lake Mean Chlorophyll-a versus Secchi Transparency Readings

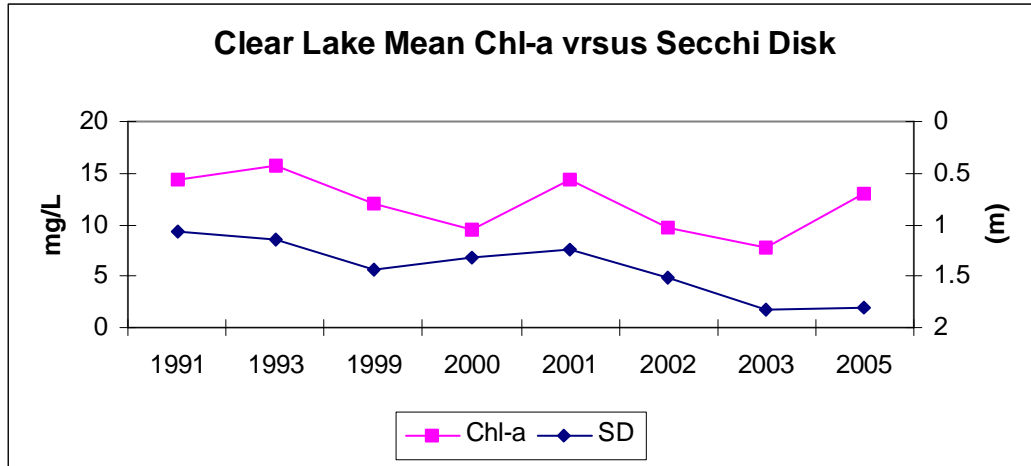
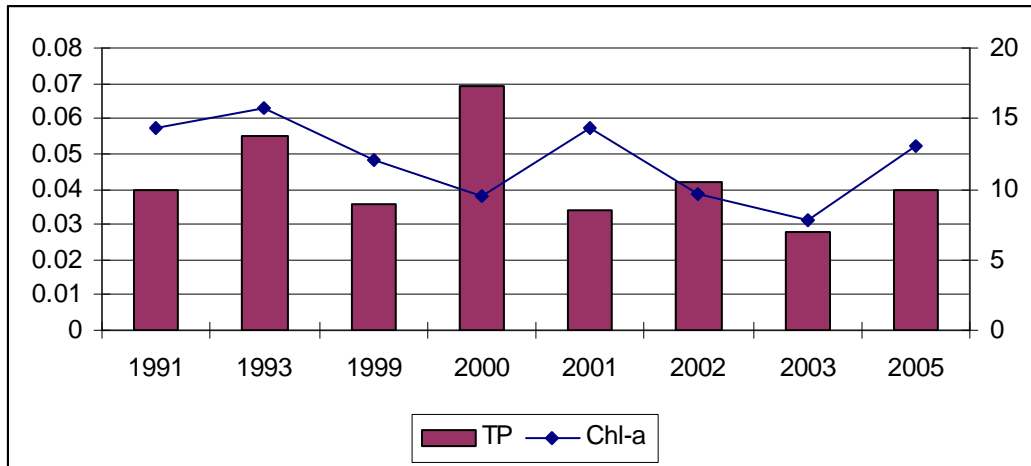


Figure 2 Clear Lake Mean Total Phosphorus versus Chlorophyll-a Concentrations



**Table 1
Mean Water Quality Data**

Year	TP	Chl-a	SD
1991	0.04	14.33	1.07
1993	0.055	15.72	1.15
1999	0.036	12.04	1.43
2000	0.069	9.56	1.33
2001	0.034	14.3	1.24
2002	0.042	9.62	1.51
2003	0.028	7.81	1.83
2005	0.0397	13.06	1.8

Lake Water Quality Grades Based on Averages

Year	2001	2002	2003	2005
Total Phosphorus	C	C	B	C
Chlorophyll a	B	A	A	B
Secchi Depth	C	C	C	C
Overall	C+	B	B	C+

NA= Not Applicable