
Rice Lake (82-0146) Rice Creek Watershed District

Rice Lake is a 277-acre lake located within the City of Hugo (Washington County). The maximum depth is 1.0 m (3.3 ft). The entire lake is considered littoral area (area of aquatic plant dominance) and it does not maintain a thermocline (a density gradient created by changing water temperatures in the lakes water column).

In 2002, an aquatic plant survey was conducted on Rice Lake. It was found that the lake has a healthy plant community (RCWD 2002 Rice Lake Macrophyte report). The strength of the aquatic plant community helps to reduce the algae abundance. Aquatic plants and algae compete for the same nutrients during the growing season. Strong aquatic plant communities will tie up nutrients and store them during the growing season preventing or reducing nuisance algal blooms.

As part of the RCWD monitoring program Rice Lake was sampled 7 times in 2003. 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.

Search of the STORET database revealed that there was no previous water quality data for Rice Lake. The 2003 water quality data shows that the TP average was 81 ug/L, CLA concentration was 7.6 ug/L, and the secchi transparency was 1.0 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, however in lakes less than 10 feet deep the secchi transparency may give an underestimated water clarity grade. For example, in 2002 the Rice lake secchi transparency was to the bottom during every sampling event, however the grade for secchi depth is a D. When in reality the water transparency was exceptional and the grade should have been an A. The lake grades for TP was a C and for CLA was an A. This better represents the true chemical characteristics of Rice Lake. I have chosen to leave the secchi depth grade off of the Districts shallow lakes because of the possibility of misleading people to believe that the water quality is worse than it really is.

Conclusions

Rice Lakes water chemistry and biological communities are in excellent condition and deserve protection. Rice lake has a special mixture of aquatic plants that are highly beneficial to local and migratory wildlife. This lake will require periodic monitoring to record any changes in water quality. Any future development in the immediate area should be done with care to help minimize water quality impacts to the lake. A natural buffer of at least 150 feet should be left intact around the high water perimeter of the lake. Restoration of any drained wetlands in the immediate drainage area would help to mitigate the nutrient loadings. Grass buffers of at least 25 feet along the ditch corridors would help reduce nutrient runoff from adjacent land and also stabilize the ditch banks. This would also help to reduce sediment and nutrient loads.

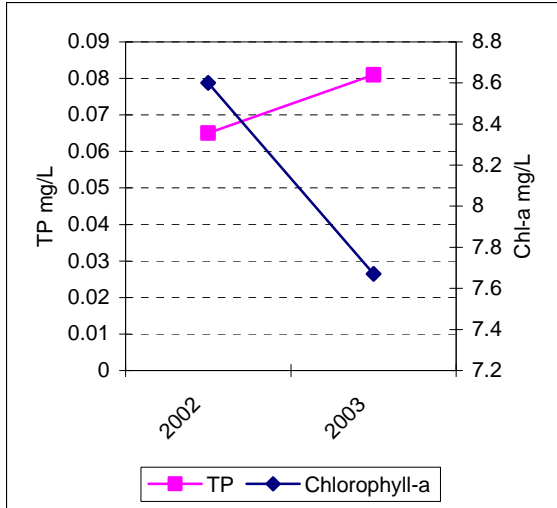


Figure 1: TP versus CLA concentrations For Rice Lake (Hugo)

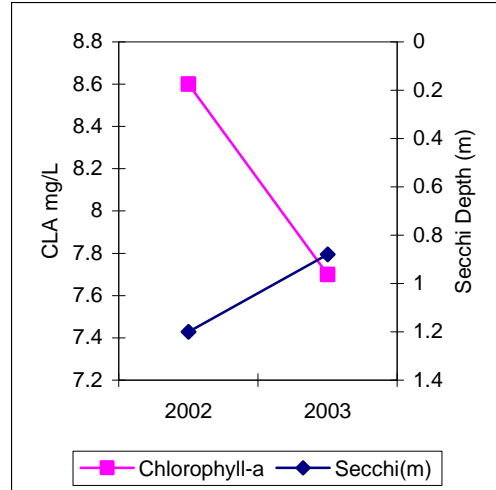


Figure 2: CLA versus Secchi Transparency For Rice Lake (Hugo)

**Table 1
2003 Data for Rice Lake (Hugo)**

DATE	pH	SRP	TP	Chl-a	TEMP	SECCHI	DO	TKN
01-May-03	9.68		0.072	2.1	14.9	1	12.3	1.13
27-May-03	7.15		0.081	5	19.6	0.8	6.48	0.938
13-Jun-03			0.136	12.7				1.77
15-Jul-03	7.86			10.7	23.95	1	8	1.48
23-Jul-03	7.54	0.009	0.048		24.6		4.5	1.44
06-Aug-03	8.09	0.049	0.119	14.3	26.5		5.5	1.33
04-Sep-03	9.15		0.047	5.6	21.4	0.75	10.5	
25-Sep-03	10.09	0.038	0.063	3.3	13.2	0.5	6.28	0.907
Average	8.509	0.032	0.081	7.671	20.593	0.810	7.651	1.285

Lake Water Quality Grades Based on Averages

Year	2002	2003	2004	2005
Total Phosphorus	C	C		
Chlorophyll a	A	A		
Secchi Depth	NA	NA		
Overall	B	B		

NA= Not Applicable