Oneka Lake (82-0140) *Rice Creek Watershed District*

Oneka Lake is a 381-acre lake located within the City of Hugo (Washington County). The maximum depth is 1.1 m (4.0 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 2000, an aquatic plant survey was conducted on Oneka Lake. It was found that the lake has a healthy plant community (RCWD 2000 Oneka 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 Oneka 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.

Historical monitoring of Oneka Lake occurred in 1992 and then 1999-2003. The mean TP concentration in 2002 was 46.7 ug/L, the mean CLA concentration was 6.0 ug/L, and secchi transparency was 1.2 m. The secchi reading was to the lake bottom during each reading.

The 2003 water quality data shows that the TP average was 17 ug/L, CLA concentration was 3.28 ug/L, and the secchi transparency was 1.45 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 and 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 2003 the Oneka 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 “B” and for CLA was an “A”. This better represents the true chemical characteristics of Oneka 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.

Conclusion

Oneka Lakes water chemistry and biological communities are in excellent condition and deserve protection. Oneka Lake has a special aquatic plant community that is representative of a groundwater fed lake. This resource is valuable as a haven for wildlife and special plant communities. 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 150 feet in width, storm water infiltration to reduce surface runoff and allow for groundwater recharge. Maintain the lake as a wildlife lake and do not allow for aeration or introduction of fish species. In shallow lake systems, fish are detrimental to the lakes water quality. Fish feed on aquatic plants and beneficial aquatic invertebrates, which allows for sediment resuspension and release of nutrients.

Figure 1 CLA vs. SD in Oneka Lake

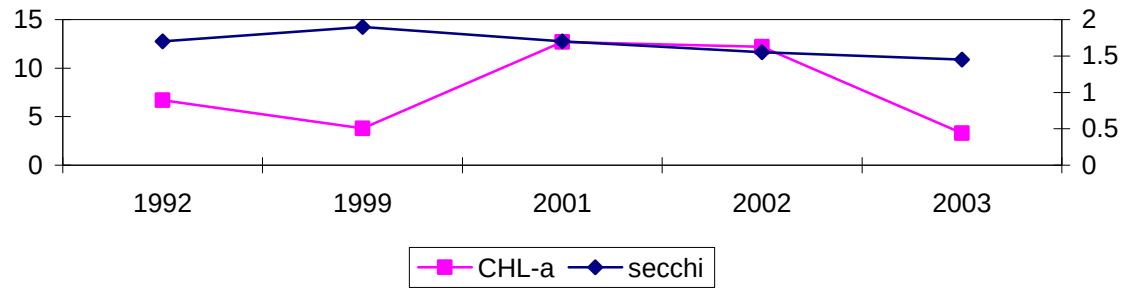

Figure 2 Oneka Lake TP versus CHL-a

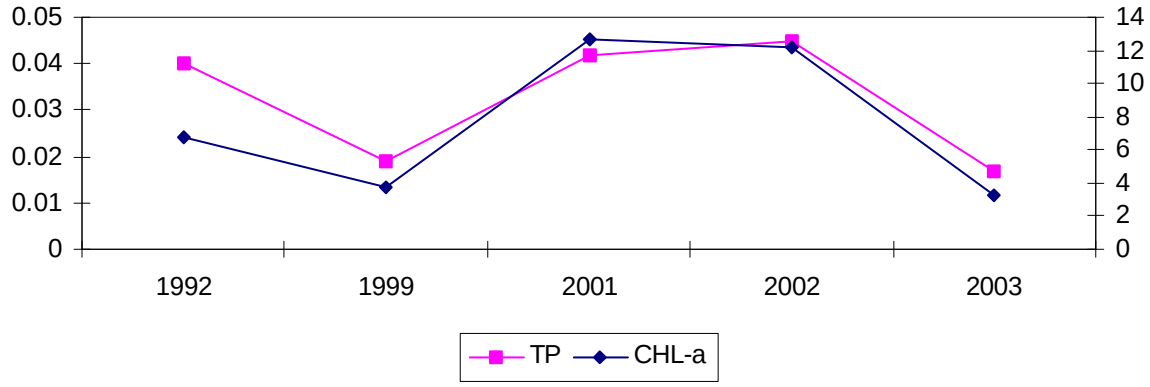

Table 1
2003 Data for Oneka Lake

DATE	TP	Chl-a	TEMP	SECCHI	DO	TKN
01-May-03	0.016	4.2	15	1.2	4.8	1
27-May-03	0.017	2	20.4	1.7	12.1	0.99
29-May-03	0.023		22.3	1.7		0.88
15-Jul-03	0.016	2.6	23.5	1.5		0.69
14-Aug-03	0.017	4.6	25.3	1.3		0.72
04-Sep-03	0.014	3	26	1.3		0.83
mean	0.017167	3.28	22.08333	1.45	8.45	0.851667

Lake Water Quality Grades Based on Averages

Year	2001	2002	2003	2004
Total Phosphorus	C	B	A	
Chlorophyll a	A	A	A	
Secchi Depth	NA	NA	NA	
Overall	B	A-	A	

NA= Not Applicable