Howard Lake (02-0016) *Rice Creek Watershed District*

Howard Lake is a 436-acre lake located within Columbus Township (Anoka County). The maximum depth is 1.1 m (4.5 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 2001 and 2002, an aquatic plant survey was conducted on Howard Lake. It was found that the lake has a recovering plant community (RCWD 2001and 2002 Howard 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. Prior to 2001 there were virtually no rooted aquatic plants in Howard Lake. During that period the lake was over overran by black bullheads and carp. These two fish species were suspending bottom sediment through their feeding mechanics. The suspension of bottom sediment led to reduced water clarity. The reduced water clarity was responsible for more plant communities and increased algal productivity. The suspension of bottom sediment also led to high amounts of Total Phosphorus (TP). The winter of 2000, Howard Lake experienced a partial fish-kill which reduced the number of fish in the lake and allowed for aquatic plants to reestablish. However the plant response will be short term unless the remaining fish are eradicated. During the 2002 monitoring season, there were many observations of carp and black bullhead still present in Howard Lake.

As part of the RCWD monitoring program Howard Lake was sampled 9 times in 2002. Surface samples were collected for Chlorophyll-a (CLA), (TP), and Total Kjeldahl Nitrogen (TKN). Surface Dissolved Oxygen, Temperature, Specific Conductivity, pH, and secchi transparency were also recorded.

Historical monitoring of Howard Lake occurred in 1991, 1993, and 1998-2002. The mean TP concentrations are presented in Figure 1 and the CLA concentrations along with the secchi transparency are presented in Figure 2. After to the 2001 season the secchi reading was to the lake bottom during each reading.

The 2002 water quality data shows that the TP average was 31.75 ug/L, CLA concentration was 5.87 ug/L, and the secchi transparency was 1.07 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 Egg 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 Howard Lake. I have chosen to leave the secchi depth grade out 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

Howard Lakes water chemistry and biological communities are in excellent condition and deserve protection. Howard lake has a special concern to the RCWD because it is a headwater lake for Rice Creek. There was documentation of a major heron rookery on Howard Lake through 1995, and historically Howard Lake was noted as a migratory stop for tens of thousands of waterfowl and shorebirds. Preservation of the existing biological community will require elimination of the rough

fish still present in the lake. This will be accomplished through the scheduled rotenone treatment in 2003. The current lakeshore is undeveloped and is in good condition. This riparian area should have a buffer regulation placed on it of at least 50 feet to insure that it remains in good condition. The private drainage ditches leading into the lake should have buffer strips placed on them of at least 15 feet to maintain the channel characteristics and prevent bank erosion.

Figure 1 Average TP and CLA Concentrations for Howard Lake

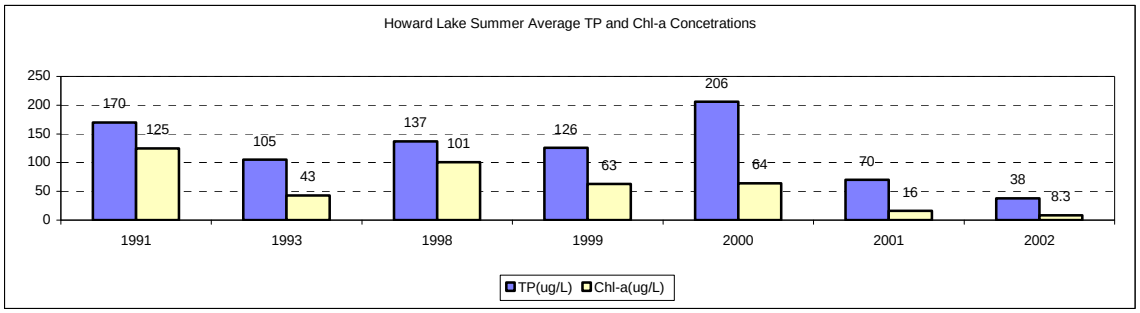

Figure 2 Average CLA and Secchi Depth Readings for Howard Lake

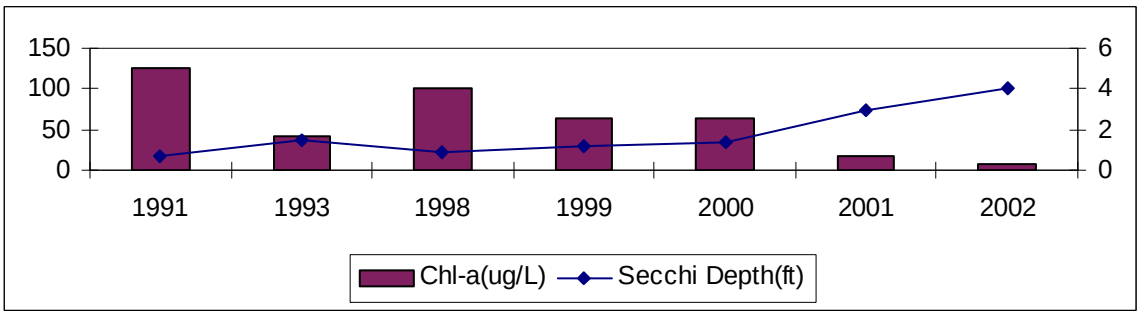

Table 1
2002 Data

Date	TP mg/L	Chl-a ug/L	secchi (m)	Temp C	D.O. Mg/L	pH	TKN Mg/L
4/17/02	0.049	13		16.2	7.74	8.21	
5/10/02	0.048	9.8	0.9	8			1.87
5/23/02	0.047	8.2	0.9	16.06	8.51	9.11	1.83
6/12/02	0.03	4.4	1.5	23.9	7.7	9.43	1.05
6/27/02	0.012	3.2	1.7	26.3	7.2	8.69	1.14
7/17/02	0.044	9.9	1.5	28.5	9.1	9.2	
7/30/02	0.056	13	1.5	27	8	9.39	1.72
8/22/02	0.023	4.9	1.5	22.1	5.37	9.06	
9/24/02	0.031						
average	0.038	8.3	1.5				1.522

Lake Water Quality Grades Based on Averages

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

NA= Not Applicable