

***Progress Report for Comparison of Trophic Levels in Miami Whitewater
Lake in Late Spring and A Fish Survey including
Predator and Prey Relationship Analysis***

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On June 24, 1997 Limnological data within Miami Whitewater Lake was collected by Alicia Shelton and Frank Buschelman. Two separate sites demonstrating different habitats were sampled in order to compare the outside influences on these separate habitats. Secchi depth, chlorophyll a, phosphorus, nitrate, ammonium, dissolved oxygen and temperature data was collected. The data comparison clearly demonstrates stresses placed on the lake in the Spring and Summer months.

The first samples were taken from the southeastern area of the lake off the golf course shore. The depths within this area of the lake were shallower (6-7 Feet) due to algal deposition, sedimentation and unvegetated shoreline erosion. As well, the fertilizer runoff from the golf course has increased the amount of algae found in this part of the lake decreasing the clarity of the water. The Secchi Depth measurement was .35 meters in this part of the lake. The overall temperature of this part of the lake is high due to the shallow water column (31C at the surface) and the dissolved oxygen drops to nearly 1 ppm at 1.5 meters (Figure 1). This poses a great threat to fish and creates conditions in which the fish are unlikely to survive. PO₄, NH₄, and NO₃ concentrations were measured as well and are shown in Table 1. In comparison to Site 2 the levels of each of these were higher due to fertilizer runoff from the golf course.

The second set of samples were taken from the Northwestern area of the lake near the dam. This water is clearer and significantly deeper over all (9-10 Feet) Algal bloom was not a problem in this end of the lake. The Secchi Depth of this clearer part of the lake was .8 meters. The Dissolved Oxygen and Temperature dropped dramatically after 1.5 meters which was deeper

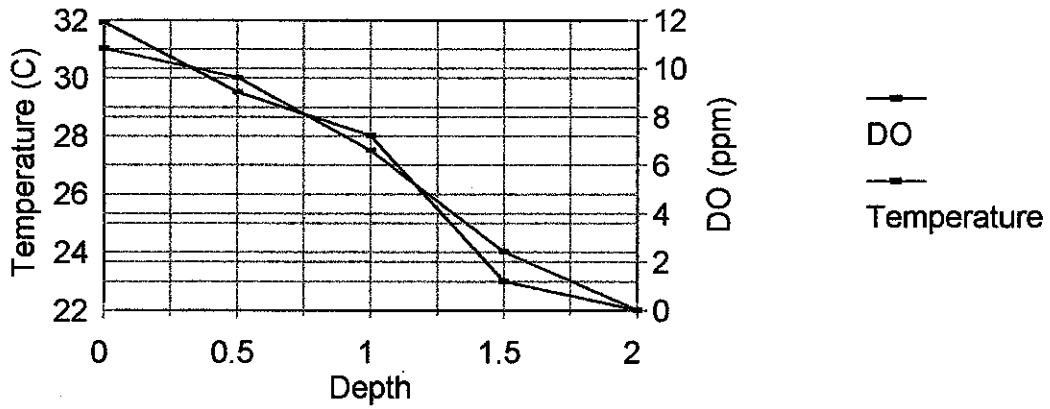
than that of site 1 (figure 2). Oxygen levels at 2 meters and below were low (zero at 2.5 and 3 meters) and capable of causing stressful conditions for fish. PO_4 , NO_3 , NH_4 was also measured and are also shown in Table 1. Phosphorous and Ammonium was nearly absent. The Ammonium present at 2 meters (.015 mg/l) is caused by sediment retention. Nitrate solubility allows it to be found in any part of the lake and the higher concentration at 2 meters (.848 mg/l) can be caused by the retained NO_3 in the sediments diffusing up into the water column. Nitrates easily flow from the land into watersheds and are very soluble and therefore likely to be found in higher concentrations.

It was found that Limnologically the lake included at least two dynamically different conditions. The Eastern part of the lake has illustrated how fertilizer runoff can increase the algal bloom of a lake. These low oxygen/high temperature conditions encountered can lead to a fish kill in a smaller lake. Fortunately fish are mobile creatures able to swim to a part of the lake with a more suitable environment to survive. However this decreases the available nesting and foraging habitat per fish and may lead to overcrowding. Since about 40 percent of the lake is surrounded by unvegetated shoreline, the Habitat available to fish for living is cut. The forested shore provides the best habitat for hiding, nesting and foraging for the fish.

The fish data for the study has not been obtained yet. With this data the complete picture can be painted and will tell the predator/prey relationship story. The limnological part of the study has revealed important information about the type of habitat the fish in the lake have to live and the stresses they may encounter that complicate survival.

Figure 1

DO/Temperature Curve For Site 1 Miami Whitewater Lake



DO/Temperature Curve For Site 2 Miami Whitewater Lake

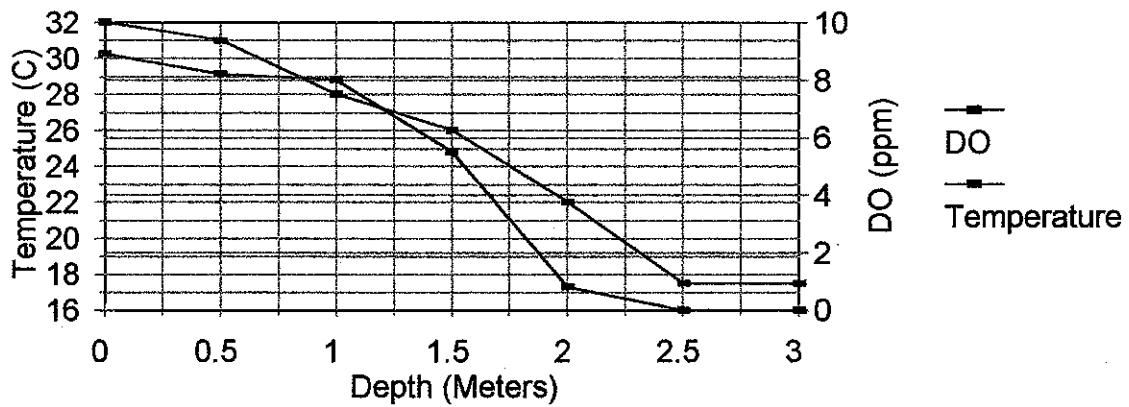


Figure 2

Table 1 Concentration Values in mg/l for Miami Whitewater Lake for Sites 1 and 2

Site 1

Depth	PO4	NH4	NO3
0m	.132	.025	.849
1m	.059	.029	.811

Site 2

0m	-.006	-.018	.513
1m	-.023	-.006	.587
2m	0	.015	.848