Report on Phosphorus Levels and Water Quality of Hamlin Lake and its Tributaries

Michelle Carter, Intern

Submitted 8/28/24

This update summarizes the activities and findings of my internship for Hamlin Lake Preservation Society. The main objective of my internship is to study the phosphorus levels and water quality of Hamlin Lake and its tributaries. I have worked under the supervision of Bruce Pelletier, Ken and Joe Muzzo, Peggy Haverberg, and collaborated with other staff members, such as Jim Clark. My internship project is scheduled to last for about 15 weeks, from June 10th to September 31, 2024.

The first part of my internship project involved taking water samples, with HLPS'S water quality director, Bruce Pelletier from 12 tributaries that flow into Hamlin Lake: Sable River, Davis Creek, Freeman Creek, Dennis Creek, Fountain Road Creek (West), Fountain Road Creek (East), North Bayou, Middle Bayou, South Bayou, Indian Pete Bayou, and the Forestry Service access stream off Nurenberg Road. The samples were sent to Trace Analytical Laboratories, Inc. for analysis to determine the total phosphorus concentrations. Phosphorus is a nutrient that has the potential to cause excessive plant and algal growth and increase eutrophication in lakes, negatively affecting the water quality and the aquatic life. The source of phosphorus can be natural or anthropogenic, such as runoff from agricultural lands, septic systems, or stormwater drains.

In conjunction with the water sampling, Bruce and I conducted flow measurements at each sampling site using a flow meter. The flow measurements were made at 1 to 2-foot increments across the width of each tributary, taking into account the variations in depth and velocity. The flow measurements were used to calculate the cubic feet per minute (CFM) discharge of each tributary. The CFM discharge, multiplied by the phosphorus concentration, gives the total amount of phosphorus entering the lake from each tributary (in pounds per day).

I was also involved in measuring the dissolved oxygen of the upper and lower lakes along with transparency tests. Dissolved oxygen (DO) is the amount of oxygen available in the water for aquatic organisms. Levels can vary depending on the temperature, depth and

biological activity of the water which is an important indicator of the health of the aquatic ecosystem. A DO concentration of 5 mg/L or higher is recommended by the EPA for optimum fish growth and survival. Transparency testing is the measure of how far light can penetrate the water. Transparency can be affected by the quantity of suspended solids, algae, or color in the water. Transparency is measured using a Secchi disk, which is a circular disk with alternating black and white quadrants. The disk is lowered into the water until it disappears from sight and then raised until it reappears. The depth at which the disk is barely visible is recorded as the transparency depth. Transparency is related to productivity and the clarity of the water.

I accompanied Ken Muzzo, the vice president of HLPS to conduct the DO measurements. The measurements were collected at the deepest points of the upper and lower lakes, at 5-foot intervals from the surface to the bottom. I also joined Joe Muzzo, the Secretary of the association, to conduct the transparency measurements using a Secchi disk. The measurements were collected at the same locations as the DO measurements.

The second part of my internship has consisted of finding suitable locations to install shallow well monitors for ground water testing. With the corporation of riparian owners, Bruce and I were able to install six shallow well monitors at various locations around the upper and lower lakes. These wells are 3/4 inch in diameter and have been installed to a depth no deeper than 4 feet below the bottom of the lake and no farther than 50 feet from the shoreline. Having these wells stationary will enable us to gather ground water samples until the end of September. These samples are also being sent to Trace Analytics Laboratories, Inc. to test total phosphorus concentrations. The results will give us a better understanding of where the phosphorus is coming from and will provide HLPS with more knowledge on how to move forward with keeping the lake a happy and thriving area for years to come.

The internship program at Hamlin Lake Preservation Society has been a valuable learning experience for me. I am gaining practical skills and knowledge in water sampling, flow measurement, and water quality analysis. I would like to thank Bruce Pelletier, and the rest of the staff for their guidance and support throughout my internship. I hope that my work will contribute to the conservation and management of Hamlin Lake and its watershed.