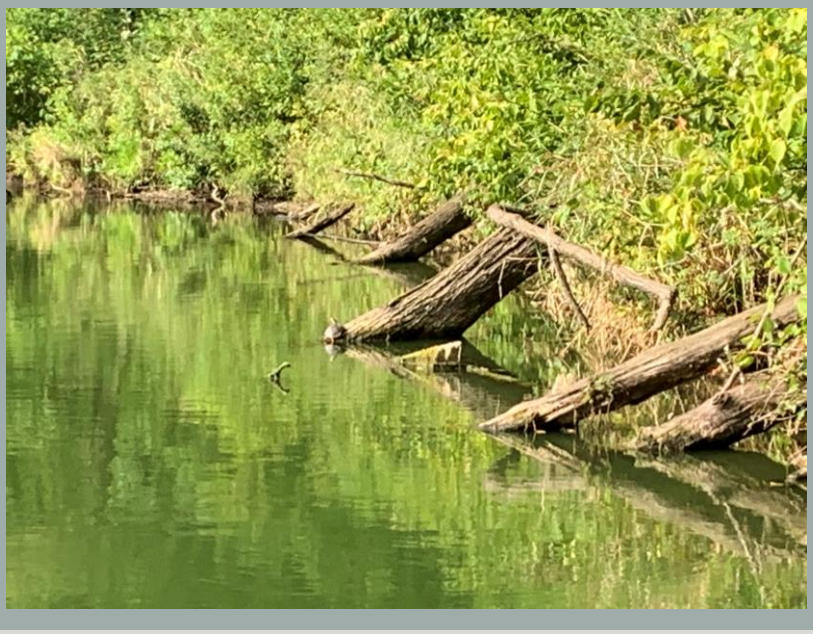
Lake Tanglewood

2020 Fish Survey



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Prepared For

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Executive Summary

This study was conducted for the Lake Wildwood Association to provide comprehensive biological data of fish composition of Lake Tanglewood in Varna, Illinois. The primary objective of this survey was to measure and count the gamefish and panfish species to assess current fish population. The entire shoreline and all available habitats were sampled within Lake Tanglewood.

Lake Tanglewood was boat electrofished on September 2, 2020. The electrofishing was conducted in a counterclockwise direction around the lake with a total pedal time of 40 minutes. There was a total of 121 fish representing 2 families and 6 species collected during the electrofishing effort. The catch was dominated by Largemouth Bass (53%) and Bluegill (43%).

Lake Tanglewood is primarily a Largemouth Bass and Bluegill fishery. The Largemouth Bass and Bluegill population was within all management goals. Lake Tanglewood has a good population of mature size Largemouth Bass and Bluegill which has created a self-sustaining population of those species. There were other species present in very low numbers. All the other fish collected were of good length/weight proportion.

Recommendations to improve the fishing and water quality of Lake Tanglewood over the next three years include:

- Fish stocking
- Fish creel limits
- Algae management
- Future fish surveys
- Watershed management
- Develop a lake management plan

1 Introduction

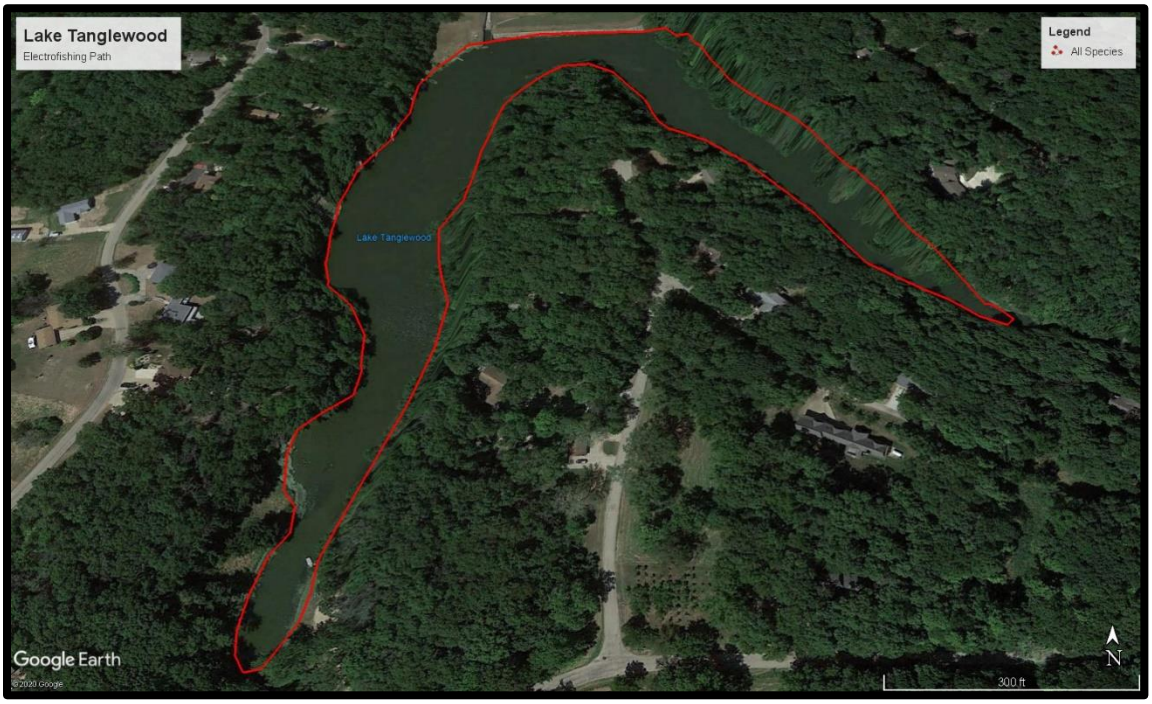
1.1 Purpose

Deuchler Engineering Corporation (Deuchler) was contracted by the Lake Wildwood Association to provide comprehensive biological data of the fish community of Lake Tanglewood. This report will summarize the results from the Deuchler sampling.

1.2 Sample Location Description

Lake Wildwood Association is a private, gated recreational community that is centrally located between Chicago and Peoria, just north of Varna, Illinois. The Association boasts two lakes – Lake Wildwood and Lake Tanglewood. Lake Wildwood is 220 acres and offers boating, fishing, and swimming. Lake Tanglewood is 18 acres and is strictly a fishing lake located near the private campground (Figure 1). The Lake Wildwood Association has established fish creel limits and fishing regulations for the lake to enhance sport fishing opportunities for residents.

Figure 1. Lake Tanglewood



2 Materials and Methods

2.1 Sampling Plan

One person netted stunned fish off the front of the boat and the boat operator also had a net to collect additional stunned fish. All fish encountered were collected. These fish collected were identified, measured to the nearest millimeter (mm), and weighed to the nearest gram (g). All fish were released back into Lake Tanglewood.

The primary objective of this survey was to count and measure gamefish and panfish for Lake Wildwood Association's use in fish population management. Boat electrofishing was conducted on September 2, 2020. Electrofishing is a standard gear type for sampling lakes and rivers used by various government research agencies, including the Illinois Department of Natural Resources and Illinois Natural History Survey. Electrofishing is a shallow water gear that targets all sizes and species of fish.

A 16' Alumacraft boat equipped with a Smith-Root 5.0 Generator Powered Pulsator (GPP) electrofisher system was used to sample the perimeter of Lake Wildwood (Photo 1). The electrode array consisted of the aluminum boat hull as the cathode and 6 droppers suspended from two booms as the anode. Each anode dropper is 3/8" woven steel cable that has a length of three feet. The booms extend eight feet in front of the bow of the boat.

The electrofishing sampling crew consisted of one person on the front of the boat that netted stunned fish and the boat operator that also had a net to collect additional stunned fish. Electrofishing was conducted in a counterclockwise direction around Lake Tanglewood with a total pedal time of 40 minutes. The electrofishing boat was maneuvered along the shoreline and other available habitat. A concerted effort was made to net every stunned fish. The catch was placed into a 75-gallon stock tank that was aerated with oxygen. All fish collected were measured to the nearest millimeter (mm) and weighed to the nearest gram (g). All fish were released back into Lake Tanglewood.

Photo 1. Boat Electrofishing

3 Results

Abundance of fish species provides an overview of the total number of each species present in the survey area. The study yielded a total of 121 individual fish representing 2 families and 6 species (Table 1). The catch was dominated by Largemouth Bass (53%) and Bluegill (43%).

Table 1. Total Number and Percent Composition of Fish Species Collected in 2020

Family	Common Name	Scientific Name	Total	%
Centrarchidae	Black Crappie	*Pomoxis nigromaculatus*	1	0.8%
	Bluegill	*Lepomis macrochirus*	52	43.0%
	Largemouth Bass	*Micropterus salmoides*	64	52.9%
	Redear Sunfish	*Lepomis microlophus*	2	1.7%
	White Crappie	*Pomoxis annularis*	1	0.8%
Ictaluridae	Channel Catfish	*Ictalurus punctatus*	1	0.8%
		Total	121	100.0%

3.1 Assessment Metrics

Various metrics are utilized to determine the health of a fishery. Catch per unit effort (CPUE, fish collected/hour) illustrates fish abundance. The lake was dominated by Largemouth Bass with a CPUE of 96 fish per hour followed by Bluegill (78 fish/hour).

A proportional stock density (PSD) value is used to evaluate the condition of the fishery. The index compares the number of fish longer than a species-specific quality size to the number of fish longer than a species-specific stock size (Murphy 1996). The PSD value generated can be used to compare samples among different years and different lakes. The PSD value also represents the percent of sexually mature fish in the sample and the sample is assumed to be representative of the population. A balanced population has a PSD value between 40% and 60%.

The relative weight (Wr) is an index used to determine the body condition of fish (Murphy 1996). The Wr is calculated by dividing the weight of the individual by the expected weight for a fish of the same species at the same length. The mean Wr should be between 90 and 100.

3.2 Largemouth Bass

The CPUE for Largemouth Bass in Lake Tanglewood was 1.6 fish per minute. The IDNR sets the management goal at 1.0 bass per minute so this indicated the Largemouth Bass population is slightly above the recommended abundance. The PSD for Largemouth Bass uses a stock size of 8 inches, a quality size of 12 inches and a preferred size of 15 inches. The Largemouth Bass PSD value was calculated to be 57 and is within the recommended management goal. The RSD-14 value for Largemouth Bass greater 14 inches was 29 (goal 20-40) and the RSD-15 value for Largemouth Bass greater than 15 inches was 3 (goal 10-20). Except for the preferred size Largemouth Bass, the RSD values were within the management goals. These indices are used to assess if any changes in abundance have occurred due to harvest or natural mortality. The

Largemouth Bass population appears to be in good condition. There were five different year classes present in Lake Tanglewood with a 42 percent of the Largemouth Bass being juvenile (Figure 2). There were 32 Largemouth Bass collected between 10 and 14.9 inches. Only 10 Largemouth Bass were collected over 14 inches with the largest being 17.5 inches (Photo 2). These numbers show the mature Largemouth Bass population in Lake Tanglewood is dominated by fish less than 15 inches.

The mean Wr for Largemouth Bass in was 96 indicating they are in good condition and proportional in length and weight. Overall, the Largemouth Bass in Lake Tanglewood have a good size distribution and body condition. There is a good portion of the Largemouth Bass population that are of reproductive size as well as a significant number of young of the year indicating successful reproduction.

Figure 2. Length Distribution of Largemouth Bass Collected in 2020

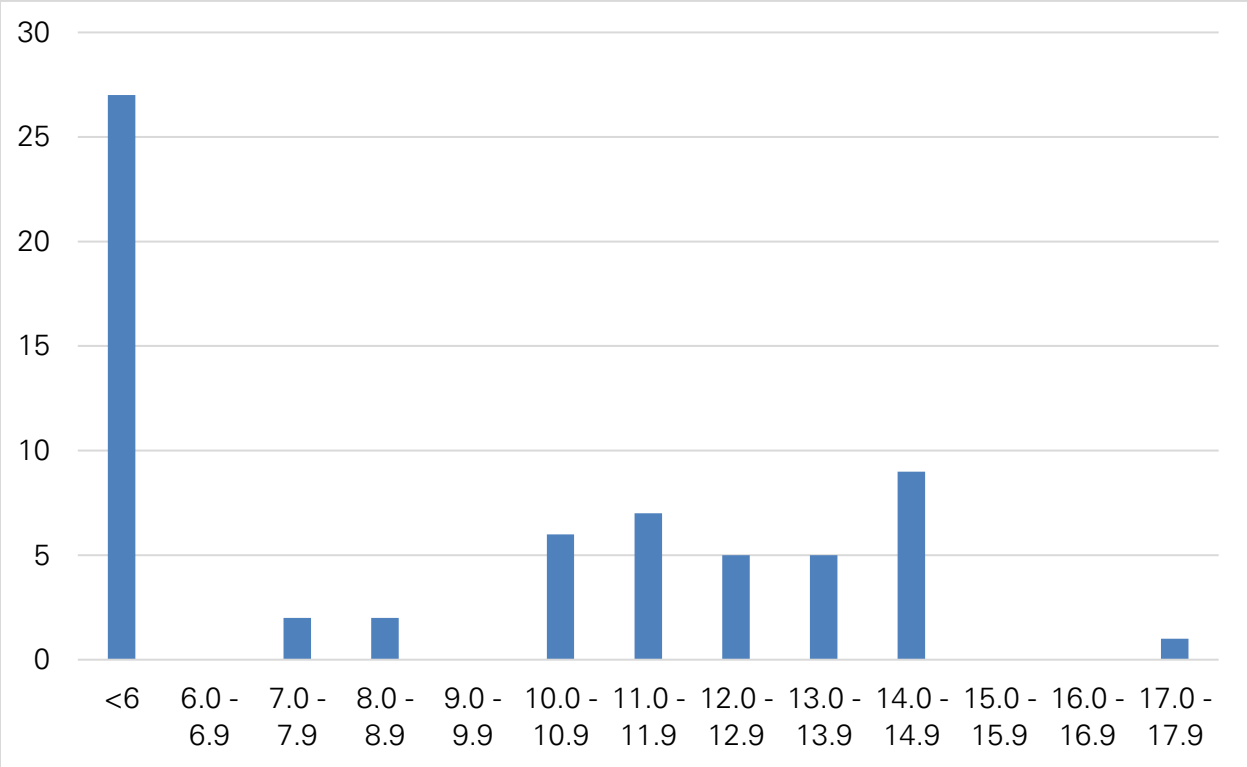


Photo 2. Largemouth Bass

3.3 Bluegill

The PSD for Bluegill uses a stock size of three inches and a quality size of six inches with a preferred size of eight inches. The PSD value was calculated to be 45 which was within the management goal of 40 to 60. The RSD-8 for Bluegills greater than 8 inches was 26. There were 11 Bluegills collected over eight inches with the largest at 9.5 inches (Photo 3). Thirty-seven percent of Bluegill catch was greater than the quality size of six inches and 21 percent was over the preferred size of eight inches (Figure 5).

The mean Wr of 143 for Bluegill showed they were in very good condition. There were no areas of vegetation, however there was an abundance of fallen tree and other woody debris habitat around the lake to provide refuge sites to escape predators.

Figure 3. Length Distribution of Bluegill Collected in 2020

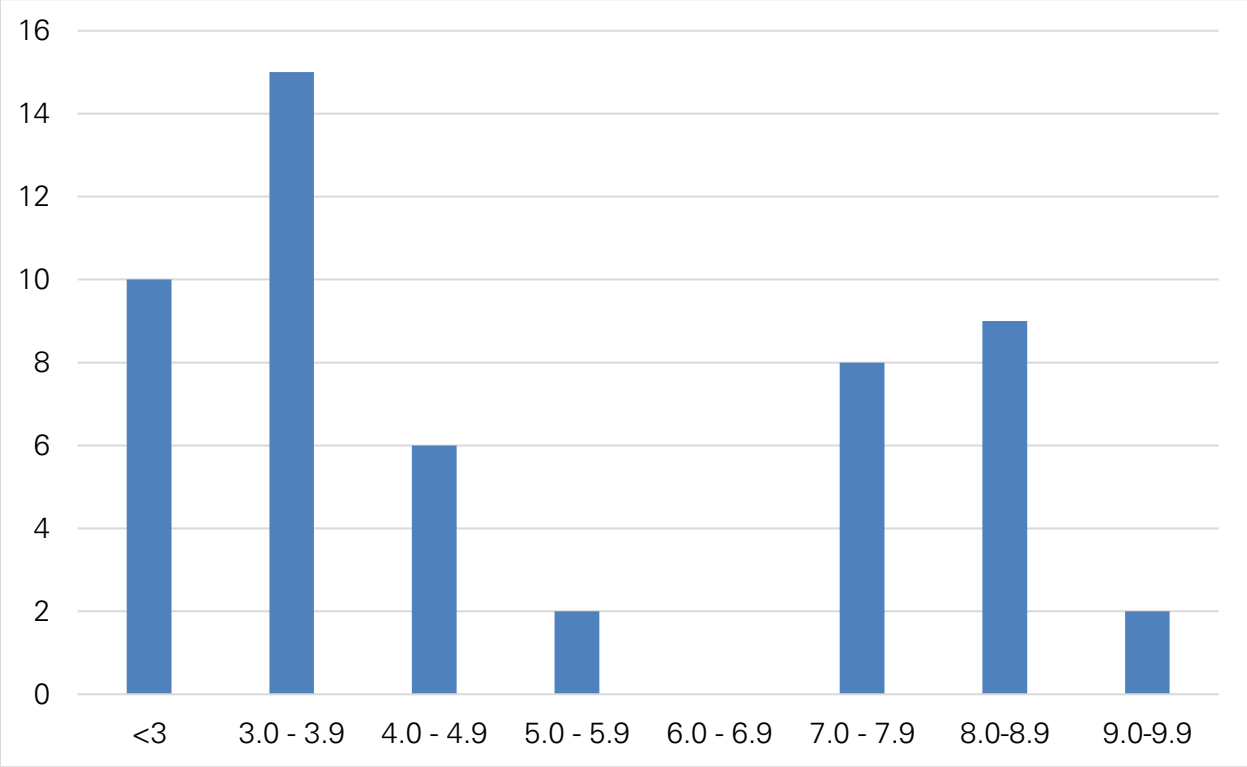


Photo 3. Bluegill

3.4 Other Species

Other species collected include Black Crappie, White Crappie, Redear Sunfish, and Channel Catfish. None of these species were collected in large numbers but were present in the lake and add to the species diversity.

There was one 11.6-inch Black Crappie (Photo 4) and one 10.3-inch White Crappie (Photo 5) collected. Both fish were in good health with an average Wr of 95. There were two six-inch Redear Sunfish collected (Photo 6). These fish were also very healthy with a Wr of 162. The Channel Catfish that was collected was 27.6 inches and very healthy as well with a Wr of 118 (Photo 7).

Photo 4. Black Crappie

Photo 5. White Crappie

Photo 6. Redear Sunfish

Photo 7. Channel Catfish

4 Discussion

4.1 Fish

Lake Tanglewood is primarily a Largemouth Bass and Bluegill fishery. The Largemouth Bass and Bluegill populations were within all management goals. Lake Tanglewood has a good population of mature size Largemouth Bass and Bluegill which has created a self-sustaining population of those species. There were other species present in very low numbers. All the other fish collected were of good length/weight proportion.

4.2 Recommendations

To maintain the diversity and health of Lake Tanglewood, Deuchler has the following recommendations.

4.2.1 Fish stocking

If there is a desire to increase the species diversity within Lake Tanglewood, it would be recommended to stock 250 4-inch Black Crappie ($440) annually until the population shows signs of becoming self-sustaining and 250 10-inch Channel Catfish ($440) every three years to maintain the species

These stocking recommendations would cost approximately $440 annually with an additional $440 every third year. These prices are based on the 2018 fish price list from Keystone Hatcheries in Richmond, Illinois. Prices may vary between fish sources and years.

4.2.2 Fish Creel Limits

There were no creel limits posted at the lake access point. It is highly recommended to have the same type of sign that is at Lake Wildwood installed at Lake Tanglewood. The regulations are currently the same for both lakes and appear to be working. The Largemouth Bass and Bluegill are self-sustaining populations and currently in good health. There were many juvenile Largemouth and Bluegill collected indicating successful reproduction. If Crappie will be part of the stocking program, the Crappie regulation should continue with the nine-inch minimum size limit, but the daily bag limit should be reduced to 10 to allow for more natural reproduction. To protect the Bluegill population, a creel limit should be implemented to only keep 10 panfish with a minimum size of 7 inches to increase their overall abundance and size structure.

4.2.3 Algae Management

Lake Tanglewood had an extensive blue-green algae bloom happening during the sampling event. Bluegreen algae can be toxic to humans, pets, and other wildlife. It is recommended to have the algae monitored and treated to prevent any harmful blooms in the future. The establishment of aquatic plants will also help to reduce the nutrients available for algae growth.

4.2.4 Future fish surveys

A comprehensive fish survey should be completed in three to five years to evaluate the stocking program, creel limits, and ensure the fish population is continuing to meet the expectations of the Lake Wildwood Association.

4.2.5 Watershed Management

Stormwater brings detrimental nutrients such as phosphorus and chloride into the lake. Nutrients will lead to algae blooms and abundant aquatic plants. A lot of the shoreline around Lake Tanglewood was natural and appears to be allowing good infiltration of stormwater run-off. Creating buffer strips, limiting lawn fertilizer containing phosphorus, and using chloride alternatives for winter de-icing will help improve the quality of Lake Tanglewood. To the extent possible, steps should be taken to reduce the impacts caused by run-off from the watershed. It is recommended the use of best management practices be implemented to reduce run-off and promote infiltration.

4.2.6 Development of a Lake Management Plan

A lake management plan is an essential tool that guides management decisions. A properly written plan will bring together all stakeholders to identify the concerns regarding the lake and sets realistic goals, objectives, and actions. The plan will identify the necessary funds and personnel to execute the actions. Finally, the plan can be changed over time as lake issues or management techniques change.

5 References

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