

Fish Population and Aquatic Plant Water Quality Surveys Lake Tallavana

April 20, 2005



**Prepared By
Charles Mesing & Bob Rousseau**

Objectives

The objectives for 2005 were: (1) Measure basic water quality parameters and oxygen levels.
(2) Determine the status of Fish Population.
(3) Drawdown impacts to Largemouth bass/Crappie populations.

Water Quality

Water quality parameters measured were total hardness (68 ppm), pH (9.0), dissolved oxygen at the surface (13.0 ppm), 4.8 ppm at 5 feet and 3.8 at 10 feet. These dissolved oxygen values are higher than previous years because of cooler water temperatures and an algae bloom. The water is “super saturated” with oxygen (13 to 11.4 ppm) at the surface to 4 feet. Dissolved oxygen levels fall rapidly from 11.4 ppm to 4.8 ppm below four feet (Table 1). These oxygen level results are similar to past several years when the lake begins to stratify (by temperature and oxygen) during summer. Most of the water below 10 feet has extremely low oxygen levels and it is not suited for most sportfish. Dissolved oxygen profiles should be conducted in late June or July to determine the extent of the oxygen stratification. Water clarity or seechi readings were low due to turbid waters from recent rains. Lake Watch volunteers collect nutrient samples for nitrogen, phosphorus, and chlorophyll a each month. These values should be monitored and evaluated. Installing an aerations system in the deep section of the lake would help recycle nutrients that are in the lake bottom sediments, which cause a high Basic Oxygen Demand (BOD) and oxygen stratification.

Fish Population Survey

On April 20, 2005, six electrofishing stations were electrofished for 10 minutes (pedal time) each to evaluate the fish population and compare to previous electrofishing samples. All fish were identified, measured, and recorded. Largemouth bass were weighed individually to determine relative weights (Wr values) for general health and condition.

The results in 2005 are similar to 2004. Since the drawdown of 2001, the fish population in Lake Tallavana changed dramatically compared to all previous electrofishing results. The fish population continues to be dominated by small to intermediate sized bluegill (4-5 inches), drawdown largemouth bass (15-19 inches), common carp (16-24 inches), gizzard & threadfin shad, and redbreast sunfish. Bluegill (54%) Carp (18%) and Largemouth bass (13%) are the three dominant fish collected in 2004 and 2005 (Table 1). However there are more threadfin and gizzard shad than any other species in the lake. These species are too numerous to collect (we observe general abundances) and are extremely sensitive to handling. Threadfin shad (2-5

inches) were collected throughout the lake and they will begin spawning soon as the water temperatures begin to stay warm in May. These shad species are dependent upon phytoplankton and zooplankton for food and they are the main diet for largemouth bass that are greater than 6 inches in length.

Drawdown Largemouth Bass

Drawdown bass dominate the bass population (Figure 1). The numbers of bass collected each year has been declining probably due to the decline in aquatic vegetation and numbers of bass produced and surviving to age 1. The highest number of bass collected by electrofishing was 2002 immediately after the drawdown (Figure 1). Excellent bass reproduction and survival was documented in 2002 after the drawdown and these bass comprise most of the population. Today these drawdown bass are age-4 and range from 15-19 inches in length and weigh 2-5 lbs (Figure 2). Good bass reproduction and survival was documented in 2003 with relatively high numbers of four-inch fish. Today these bass are 10-14 inches in length as of April 2005 (Figure 1). Poor year classes were produced in 2002 and 2004 as evidenced by low numbers of age-1 bass in 2003 and 2005. We collected or observed very few age-1 bass during our electrofishing samples in 2005. The low numbers of age-1 bass in April are probably linked to the low amount of aquatic vegetation, which provides cover and food for young juvenile bass. The low numbers of age-1 bass in 2003 and 2005 suggest that future planning will be necessary to re-stock hatchery bass in 2-3 years if this trend continues for 2006 and 2007. The alternative would be to conduct another mini drawdown for 3-4 months to stimulate vegetation growth for nursery areas in the lake.

In April 2005, age-4 bass from the drawdown represented the modal peak of the population from 16 to 19 inches and comprise more than 60% of all bass > 6 inches. These bass are contributing most to the fishery and population. Bass greater than 19 inches are probably older than age-4 and represent the pre-drawdown fish population. The largest bass collected during our samples was 24 inches and weighed 9.0 lbs (Figure 2).

Largemouth Bass Condition

Relative health or condition of bass in 2005 was excellent based on the calculated relative weights (Table 2). **Relative weights** (Wrs) of largemouth bass collected in Lake Tallavanna on April 20, 2005 **averaged 104** (Table 2). Wr values greater than 90 indicate that the fish are in excellent condition and shape (Figure 2). Only 13 of 105 bass measured exhibited Wrs values

less than 90 and these fish had recently spawned. Spawning activity will reduce weights for females and males temporarily. There is plenty of forage fish such as gizzard shad and threadfin shad for the bass to eat as well as the numerous bluegill collected during our samples.

Trophy largemouth Bass

Fewer trophy-sized bass measuring 20-26 inches (5 to 10 lbs) were observed during our 2005 samples compared to 2002 (Figure 1). We collected 8 bass (8% of the total) greater than 19 inches in length. These bass weighed from 5 to 10 lbs and many will gain additional weight lost during spawning. Several very large 10 lb + bass were observed in March and April 2005 during carp removal, but they were not measured and weighed (Figure 2). Many of the larger sized trophy bass had already migrated to shore to spawn as the water temperatures approach 65 F. Although spawning had occurred we did not observe any 1-inch fry in our April 20, 2005 electrofishing samples. There are plenty of larger sized bass in the population.

Relative Abundance of Bass

The relative abundance of bass is defined as the catch rate for bass (bass/minute) during electrofishing samples. The electrofishing catch rate for all bass was 1.8 bass per minute in 2005 compared to 2.0 bass per minute in 2003. The lower catch rates for bass from 2003 through 2005 are probably the result of fewer age-1 fish in the samples due to the decline of aquatic vegetation. If this trend continues then stocking or another partial drawdown to grow temporary vegetation may be necessary to increase the numbers of bass since the aquatic vegetation is under control. The current population should support the recent bag and size limit for largemouth bass for a year or two but many drawdown bass are eligible for harvest at 18 inches. The 4-year old bass produced after the drawdown will continue carry the fishery for next 2-3 years. We recommend **No change in Largemouth Bass Regulations for 2005-2006.**

Black crappie population continues to increase since the last die off (Figure 3). We collected a total of 75 black crappies in our samples and they represented 5% of all fish collected (Table2). Several age-1 young black crappie (3-6 inches in length) were present in our samples and we observed several during the carp removal project (Figure 3). We collected 39 age-1 crappie in 2005 compared to only two individuals in 2004. Several adult black crappie (N = 36) were collected and measured during April 2005. These crappie appeared to be healthy and in good

shape (Figure 3). Although, we observed hundreds of age-0 black crappie throughout the lake in 2001, we did not observe many age-4 black crappies in our electrofishing samples in 2005 because they inhabit deeper water except for spawning in the shallows in late March or early April. However, we have observed evidence of good year classes during the carp removal electrofishing and our fish population samples. Similar to 2004, the larger black crappie appeared to be in good spawning condition. Although April 20 is generally late for black crappie spawning, we observed several adults during our carp removal in March/April 2005. We also examined gills most of the black crappie during the carp removal in 2005 and found no evidence of anemia in the fish. We will continue to monitor their recovery. **The 10-inch minimum size limit for black crappie should stay in effect.**

Bluegill population was similar to 2004. The bluegill population was dominated by 4-5 inch fish and represent more than 50% of the fish collected excluding shad (Table 2). Electrofishing samples in 2005 indicated high numbers of medium sized bluegill (Figure 3). The numbers of bluegill greater than 6 inches remains low in our April electrofishing samples from 2003-2005. The bluegill population is still recovering. Also the spring temperatures are cool and the larger sized bluegill may not have come to shoreline during our April electrofishing samples. In 2004 there were high numbers of 3-5 inches bluegill. These fish should have grown to 5-7 inches in length by 2005. We did not collect many bluegill larger than 6 inches. Sufficient numbers of 4-6 inch bluegill are still present to provide a good fishery in the near future. These fish need another year or two to grow into harvestable sizes greater than 6 inches. There is no need to stock bluegill, but homeowners should continue to feed the fish at their docks.

Common carp numbers increased dramatically immediately after the 2001 drawdown. Today in spring 2005 the bulk of the carp population ranges from 16-22 inches in length. The estimated numbers of carp observed along our electrofishing transects have declined from 250 + in 2004 to 150 + in 2005. We collected several age-0 carp in 2001, but we did not collect or observe many in 2004 and 2005. In December 2004, March and April 2005, we removed an estimated 2,800 carp. Although, there are still high numbers of carp in the lake, our continued carp removal by electrofishing maybe having an impact. Also several people reported carp leaving the lake during the high flood events in the spring of 2005. During our fish samples we observed carp

congregating in the creeks and in shore near emergent vegetation as well as coves. The carp seem to select vegetated areas compared to un-vegetated sections of the lake. As natural vegetation disappears, the numbers of carp and other sportfish fry are declining, probably because the numerous 15-19 inch larger sized bass should feed on small young fish (1-3 inches) produced each year.

Aquatic Vegetation All of the beneficial emergent aquatic vegetation plants produced during the 2001 drawdown have disappeared. The two problematic plant species, Water hyacinths and Salvinia, have been greatly reduced by the drawdown and increased spraying activities by our company. Recommendations for 2005 are similar to 2004. Exotic aquatic vegetation, which increases this summer may need to be controlled by maintenance spraying. Pennywort is coming on strong along the shoreline it does not present a problem at this time. Nutrients (phosphorus and nitrogen), and warm weather will probably continue to produce algae blooms in the summer because there are a lack of aquatic plants to uptake the nutrients in the water. There is no immediate need to spray Salvinia or Water hyacinths at this time. Small areas of Salvinia were observed in the upper end coves on the north end of the lake. The growth and expansion of these plants should be monitored this summer. It is always better to use herbicides to treat small amounts of exotic plants more frequent than a large biomass once or twice a year because the dead vegetation eventually turns into muck and reduces oxygen levels. There is a need to re-establish some littoral aquatic vegetation in the lake.

Restoration of Southern end -The shallow south end of the lake had extensive accumulated sediments removed in 2003. The restoration was successful in increasing water depths, reducing Water hyacinths, Salvina, and improving natural shoreline of aquatic habitats. As of April 2005, these plants have not returned in high densities. Extended benefits of this drawdown and restoration efforts will be obvious in future years as spraying of unwanted exotic aquatic, vegetation will be reduced. Reduced maintenance spraying of problematic plants will reduce muck build up in shallow areas. Boat access has also been greatly improved. Consistent with 2004 we observed high numbers of threadfin shad and largemouth bass were observed in this “new restored “ area in pre-spawning condition. Good numbers of bluegill were observed in the restored section of the lake.

CONCLUSIONS:

- 1) **The drawdown in 2001 was very successful in increasing the fish population.** Bluegill, Common carp, and Largemouth dominate the fish population.
- 2) **Numbers of bluegill have increased after the drawdown.** Sufficient numbers of intermediate sized bluegill are present in the population to re-establish the fishery.
- 3) Beneficial fishery aquatic plants such as **Smartweed and Panic grasses** have disappeared. Water hyacinths & Salvina are under control, but maintenance spraying is important. Pennywort has expanded in the upper end of the lake and it's continued growth and expansion should be monitored this spring and summer.
- 4) The **carp removal program** is removing significant numbers from the lake.
- 5) Largemouth bass production and age-0 sportfish growth was poor in 2004. The loss of aquatic insects (loss of beneficial aquatic plants) may have contributed to this poor survival and growth.
- 6) **Black crappie adult numbers are increasing since 2003,** The current population does not seem to have an anemia problem based on our observation of several adult fish during our samples and carp removal project.
- 7) **Threadfin and Gizzard shad numbers are high.**
- 8) **Relative weights** of adult bass indicate most bass are healthy and in good condition.
- 9) **Bluegill numbers are recovering since the kill in 2001.** Stocking is not necessary because sufficient numbers were produced after the 2001-drawdown.

RECOMMENDATIONS: The recommendations for 2005 are similar to 2004.

- 1) Develop a **Lake Management Plan** with aquatic vegetation and fishery goals.
- 2) Consider removing additional carp in May/June of 2005.
- 3) Conduct **aquatic vegetation inspections** for Water Hyacinths and Salvinia.
- 4) **Size and Bag limits** for **Largemouth bass** and **Black crappie** should remain.
- 5) Encourage **homeowners to feed bluegill** with floating fish food.
- 6) Anglers should remove all carp caught and use them as organic fertilizers.
- 7) **Establishing native emergent aquatic plants (Giant bullrush)** for fish habitat. These emergent littoral plants were successfully planted and established in Lake Talquin and provided cover and spawning areas for bass and bream species. We can provide guidance/recommendations for areas and plant densities if the homeowners desire.
- 8) 7) **Investigate an aeration system**, which could improve oxygen levels and water quality in the deeper sections near the dam and help reduce nutrients as a secondary benefit.

Table 1. Total number and percent of major fish species collected in electrofishing samples on April 20, 2005.

Species	Number	Percent of Samples
Largemouth Bass	105	13%
*Bluegill	457	54%
Redear	1	< 1%
Red Breast	40	5%
Warmouth	3	< 1%
Brown Bullhead	2	< 1%
***Black Crappie	75	5%
Dollar sunfish	7	< 1%
**Common Carp	150 +	18%
Total	840	100%

* Hundreds of 1-2 inch Bluegill were observed through out the lake (Visual estimates).

- Shad populations are good based on condition of bass and visual observations.

** Most Common Carp were estimated to be 16-22 inches (Visual Estimate).

Approximately 2,800 Common Carp were removed from Dec 04 –April, 2005. Most carp measured 16-20 inches. Very few large carp were collected.

*** Black Crappie –Several larger sized adult fish were observed during the Carp removal.

Table 3. Total Number and Size of Major Sportfish Species Collected from Lake Tallavana April 20, 2005 (Effort 60 minutes pedal time).

Inch Class	Largemouth Bass Total Numbers	Bluegill Total Numbers	Redear Sunfish Total #	Black Crappie Total #
1	-	75	0	0
2	-	30	0	0
3	-	123	0	6
4	-	108	1	4
5	-	74	-	14
6	3	35	-	15
7	-	13	-	4
8	2	5	-	7
9	1	-	-	5
10	1	-	-	10
11	3	-	-	3
12	5	-	-	3
13	8	-	-	3
14	4	-	-	1
15	15	-	-	
16	17	-	-	
17	11	-	-	
18	16	-	-	
19	11	-	-	
20	2	-	-	
21	3	-	-	
22	1	-	-	
23	1	-	-	
24	1	-	-	
Total #	105	* 457	1	75

Water Quality

pH = 9.0

Total Hardness = 51

Dissolved Oxygen = 13.0 ppm at Surface

Water Temp = 75 F

Dissolved Oxygen = 11.7 ppm at 3 feet

Water Temp = 73 F

Dissolved Oxygen = 4.8 ppm at 5 feet

Water Temp = 68 F

Dissolved Oxygen = 3.8 ppm at 7 feet

Water Temp = 67 F

Dissolved Oxygen = 3.8 ppm at 10 feet

Water Temp = 67 F

Dissolved Oxygen = 2.6 ppm at 12 feet

Water Temp = 65 F