

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES DIVISION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LOWER SUNK LAKE

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sport fishes are managed to provide sustainable populations and to provide anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts.

Commercial

Commercial species are managed with statewide regulations.

Species of Special Concern

No known threatened or endangered fish species are found in this lake; however, periodic flooding occurs from the Red River and introduces riverine species including non-native Asian carp.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations apply to all recreational species.

Commercial

The use of legal commercial gear is permitted.

Commercial regulations are as follows:

- Statewide regulations apply to all commercial species.
- Commercial fishing is prohibited during regular waterfowl seasons on Lower Sunk Lake on Three Rivers WMA.

Species of Special Concern

No regulations regarding threatened or endangered fish species in this water body.

SPECIES EVALUATION

Recreational

Largemouth bass are targeted for sampling as a species indicative of the overall fish population due to their high position in the food chain, and because they are highly sought after by anglers. Electrofishing samples provide a good indicator of largemouth bass abundance and size distribution. For larger bass in particular, gill net sampling is generally the preferred method to determine the status of these fish and other large-bodied fish species (e.g., gar, buffalo). However gill net sampling in Lower Sunk Lake has not been conducted due to extensive shallow water and dense vegetation, preventing nets from being fished properly.

Largemouth Bass-

Electrofishing results are used as an indicator of largemouth bass relative abundance with total catch-per-unit-effort (CPUE: fish per hour). Springtime electrofishing samples conducted in 2005 resulted in a low CPUE of largemouth bass; however, relative weights for

the fish were good (Figures 1 and 2). In 2006, a major fish kill occurred in late summer due to low dissolved oxygen levels. The low dissolved oxygen level was caused by high water temperature and excessive submersed aquatic weeds. The lake was treated with the herbicide Sonar® in 2007. Electrofishing samples were conducted in the spring of 2008 to determine the extent of the fish kill and only one bass was collected. In 2009, Lower Sunk Lake was inundated for several months due to a high water event that occurred on the Red River. Electrofishing samples were taken again in 2010 and results showed a modest increase in largemouth bass numbers. The flood of 2011 on the Mississippi River necessitated releases through the Old River Control structures, which again backed water into Lower Sunk Lake for several months. Due to sporadic water levels, severe submergent vegetation and periodic fish kills occurred and resulted from low dissolved oxygen levels in the warm summer months. The largemouth bass population in this lake fluctuates with and is dependent upon the backwater flood pulse from the Mississippi and Red rivers. That is, water must generally be high in the cooler spring months and low in the warm summer months to prevent fish kills and augment reproductive success. Due to this natural response to fluctuation in water levels, active management or stocking of this lake is of little benefit to the game fish population.

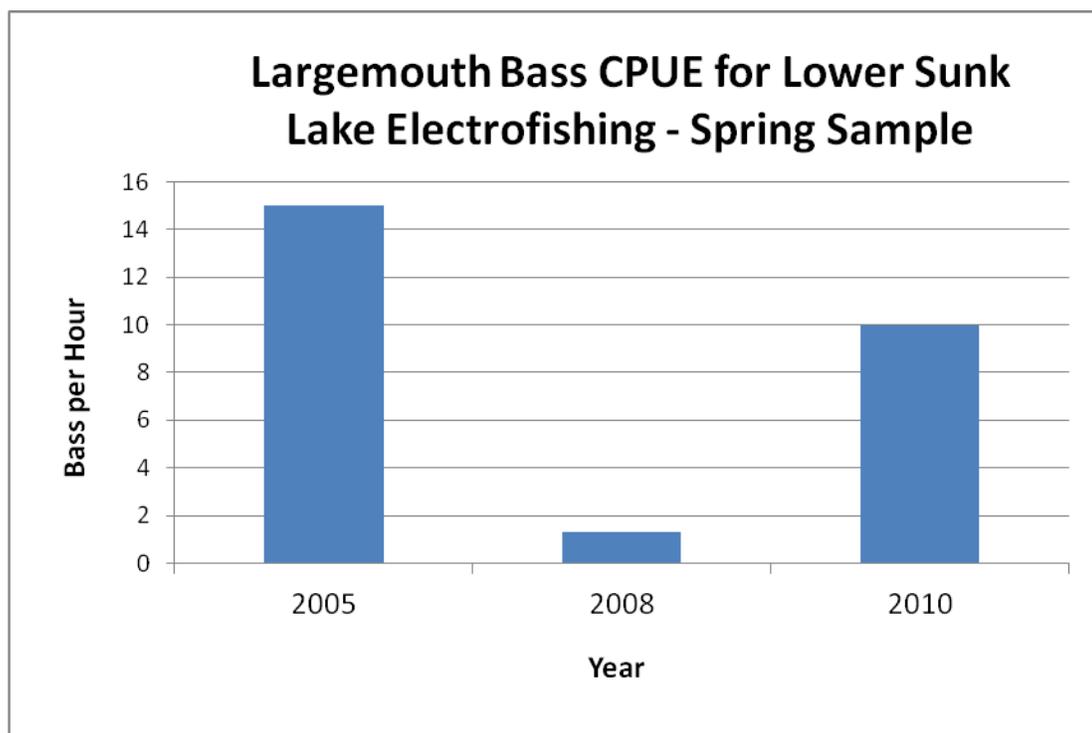


Figure 1. Total catch-per-unit-effort in fish per hour for largemouth bass collected from Lower Sunk Lake, LA in spring electrofishing samples from 2005, 2008, and 2010.

Trends in sampling results indicate Lower Sunk Lake may not be a suitable waterbody for intensive management of largemouth bass or other game fish. During periods of drought the lake water suffers from low dissolved oxygen and aquatic vegetation infestations. Water quality is variable and productivity is highly dependent upon receiving flood water from the Red River.

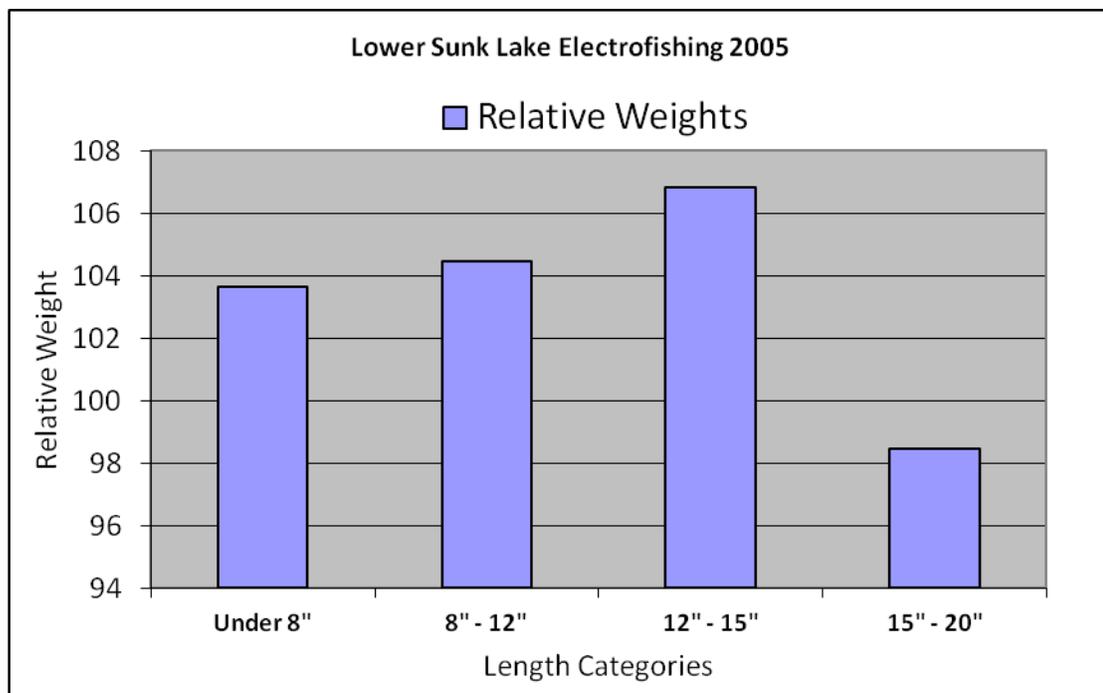


Figure 2. Mean relative weights for sub-stock-, stock-, quality- and preferred-size largemouth bass from Lower Sunk Lake, LA for 2005.

Largemouth Bass Genetics-

Florida bass have been stocked for four years into Lower Sunk Lake (Table 1). These stockings were to re-establish the population of largemouth bass into the lake after catastrophic fish kills of the past and not intended to introduce the Florida LMB genome into the existing population. The first three years of stockings were to restore the fish population after the lake dried up completely in 2000. In 2005, genetic testing was conducted and the results were: Northern 89%, Hybrid 7%, and pure Florida comprised 4%. Thus, the total Florida genome influence for the largemouth bass population was 11%. Lower Sunk Lake has been stocked with over 265,000 Florida LMB, with stockings occurring in 2002, 2003, and 2004. Stocking pure Florida LMB into a waterbody with no existing LMB population should have resulted in a much higher occurrence of Florida bass than was found. A result of these stocking and subsequent genetic testing indicates that the native bass population in Lower Sunk Lake will restock naturally from the flood pulse of the Red River and stocking of Florida bass in this waterbody is of little benefit.

Table 1. Florida largemouth bass stocking history for Lower Sunk Lake, Louisiana from 2002 thru 2009.

| YEAR | SIZE | FLMB STOCKED |
|------|----------------------|--------------|
| 2002 | Phase II fingerlings | 3,699 |
| 2002 | Fingerlings | 84,876 |
| 2003 | Fingerlings | 2,531 |
| | Fingerlings | 86,112 |
| 2004 | Fingerlings | 25,212 |
| | Fingerlings | 63,140 |
| 2009 | Fingerlings | 42,818 |
| | Fingerlings | 7,348 |
| 2009 | Fingerlings | 29,568 |

Age and Growth-

No age and growth studies have been conducted on Lower Sunk Lake. The inconsistent bass population has made it difficult to collect an adequate number of fish to assess age and growth.

Forage-

Forage availability is measured through two methods. These include shoreline seining and electrofishing. Forage availability is also measured indirectly through measurement of largemouth bass body condition or relative weight. Relative weight (W_r) is the ratio of a fish's weight to the weight of a "standard" fish of the same length. The index is calculated by dividing the weight of a fish by the standard weight for its length and multiplying the quotient by 100. Largemouth bass relative weights below 80 indicate a potential problem with forage availability. The relative weights of the majority of LMB collected from Lower Sunk Lake exceeded 100 for all size groups, indicating an abundance of available forage. Largemouth bass values below 80 typically indicate a shortage of available forage. The W_r values in Figure 2 were derived from a relatively small sample (16 LMB) therefore results or conclusions may not represent the entire population of bass. No W_r indices were calculated in 2008 (1 LMB) and 2010 (10 LMB) due to the small numbers of LMB collected.

Crappie-

No lead net samples have been conducted on Lower Sunk Lake which is the preferred sampling gear used to target crappie. The shallow water and extensive aquatic vegetation are not conducive to lead net sampling. In 2008, after the Red River backwater flooding had receded from the lake, frame nets were deployed to determine if previously stocked triploid grass carp (TGC) had migrated out of the lake. No grass carp were caught, but young-of-the-year (YOY) crappies ranging from 1 to 4 inches total length were found in all three samples taken (Figure 3). No standardized sampling data exists for crappie other than these YOY crappie collected as incidentals in 2008. Fishermen have reported good catches of crappie in years following periods of backwater flooding from the Red River.

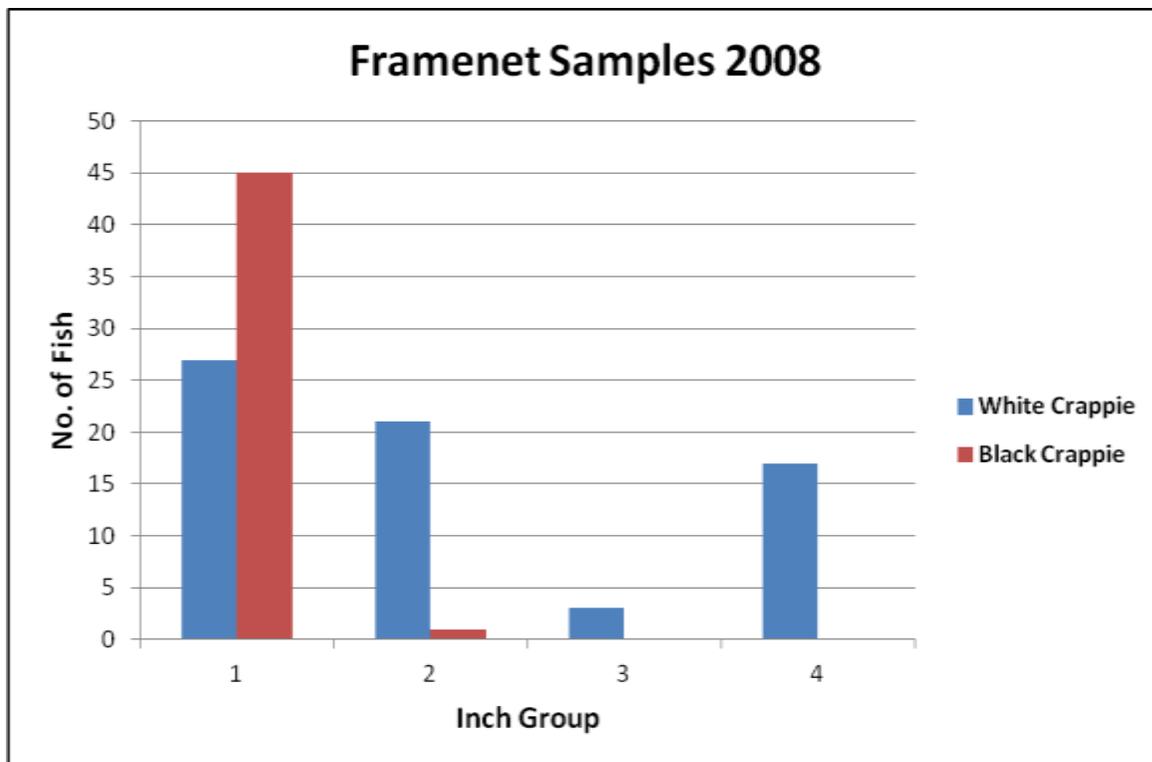


Figure 3. Catch rates for YOY crappies (by inch group) collected with frame nets in Lower Sunk Lake, LA during 2008.

HABITAT EVALUATION

Aquatic Vegetation

Lower Sunk Lake is lined with cypress trees that cover about 5% of the lake area. Submerged vegetation includes coontail (*Ceratophyllum demersum*), hydrilla (*Hydrilla verticillata*), and filamentous algae. Emergent vegetation includes lotus, alligator weed, and water primrose. The coverage and severity of aquatic vegetation varies between years, ranging from sparse to total coverage depending upon water level fluctuation. Vegetation is generally sparse following periods when the lake is inundated with backwater from the Red River. In 2006 the lake became 90% covered with hydrilla. In 2007 the lake was treated with sonar which successfully reduced the hydrilla. In 2009 Red River flood water entered the lake and did not recede for several months. During this period the lake remained relatively clear of vegetation. In 2010 hydrilla began to return in a large portion of the lake; but in 2011 Red/Mississippi river flood water returned and removed most of the submergent vegetation. However, by late fall submergent vegetation growth was beginning to return.

Substrate

Natural water level fluctuations historically controlled organic build-up. A natural water level regime that includes high spring and low fall water levels is a necessary component of a backwater ecosystem. Organic matter that remains underwater decomposes at a slower rate than that exposed to the air. Sedimentation on the bottom of Lower Sunk Lake varies depending on the natural water level fluctuations. The annual senescence of aquatic vegetation contributes to the accumulation of organic matter. Natural sedimentation flushing occurs during periods of high water entering the lake from the Red River. A noticeable cleaner substrate is obvious following periods of high water.

Special Research Projects-

In 2008 a research project was conducted to determine the efficacy of using Triploid Grass Carp (TGC) to control the regrowth of submerged aquatic species, primarily hydrilla, post herbicidal treatments. This was done by constructing exclosures measuring 10' by 10', which subsequently created herbivore protection zones to compare the rate of hydrilla re-growth following chemical (Sonar©) treatment. This project is still being monitored and to this date has shown total re-growth of hydrilla in the exclosures yet minimal re-growth in the remaining portion of the lake. These preliminary results, in addition to other research on the effectiveness of TGC, suggest that a stocking rate of five TGC per acre supplemented with chemical treatment will effectively control the growth of hydrilla. Due to the re-growth in more areas of the lake in the spring of 2010, this may suggest that TGC left the lake during high water; stocking rates were not sufficient for control, or the carp have not reached sufficient size to maintain control.

Artificial Structure

Lower Sunk Lake has an overabundance of natural complex cover including aquatic vegetation and cypress trees. No artificial structure is necessary.

CONDITION IMBALANCE / PROBLEM

Lower Sunk Lake is a shallow backwater lake which is prone to inundation from the Red River during periods of high water. Prior to the Red River Navigation Project, which allowed the building of five locks and dams in the Red River, backwater flooding occurred frequently in Lower Sunk Lake. Historical flood waters prior to the Locks and Dams were also more turbid than current flood waters. United States Army Corps of Engineers projects on the Red and Mississippi Rivers have changed the frequency and duration of Red River floods. During extended periods with minimum or no backwater inundation, the lake is prone to have severe aquatic vegetation problems.

In addition to aquatic vegetation problems, the lake is also prone to periodic fish kills due low dissolved oxygen, and low water levels at the wrong time of year. The lake completely dried up in 2000 which completely eradicated the fish population. In 2001, prior to the lake refilling, a dirt and rock weir was installed to increase the water level.

CORRECTIVE ACTION NEEDED

The best case scenario for Lower Sunk Lake is annual backwater flooding from the Red River. Extended periods of high water will shade out the aquatic vegetation and provide ideal habitat. Conduct maintenance spraying of American Lotus for boat access during the summer. Monitor submerged vegetation to determine the presence and effect of TGC.

RECOMMENDATIONS

1. Manage the lake as a natural backwater ecosystem, which would allow seasonal water level fluctuations.
2. Artificial stocking of this lake is not productive nor does it seem necessary. In years when backwater is plentiful the river system replenishes the lake.
3. Continue maintenance spraying of emergent vegetation for boat access.