

# **LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES**



**OFFICE OF FISHERIES  
INLAND FISHERIES SECTION**

**PART VI -B**

**WATERBODY MANAGEMENT PLAN SERIES**

**INDIAN CREEK LAKE**

**WATERBODY EVALUATION &  
RECOMMENDATIONS**

# CHRONOLOGY

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# WATERBODY EVALUATION

## STRATEGY STATEMENT

### Recreational

Sportfish species, primarily largemouth bass (LMB) are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest adequate numbers of fish to maintain angler interest and efforts. Due to a high percentage (above 30%) of the largemouth bass population carrying the Florida genome the opportunity exists to catch preferred-size and trophy-size LMB in Indian Creek Lake.

### Commercial

Indian Creek Lake does not support high numbers of commercial fish species. The clear, relatively infertile water is not conducive to the production of commercial fish species; therefore a commercial fisheries management strategy is not used.

### Species of Special Concern

No threatened or endangered fish species are known to inhabit this waterbody.

## EXISTING HARVEST REGULATIONS

### Recreational

Statewide regulations for all fish species, the recreational fishing regulations may be viewed at the link below:

<http://www.wlf.louisiana.gov/fishing/regulations>

### Commercial

The commercial fishing regulations may be viewed at the link below:

<http://www.wlf.louisiana.gov/fishing/regulations>

Rapides Parish Ordinance Article I, Section 19.5 -1. Rules and Regulations for Recreational Areas: Part B (4) b3. – prohibits the use of fishing nets, seines, slat traps or similar devices. The complete Rapides Parish Ordinance can be viewed at the following link. This regulation is a not a state law thus it cannot be enforced by the LDWF enforcement division personnel. It is enforced by the authority of the local Rapides Parish Sheriff's Office.

<http://library.municode.com/index.aspx?clientId=10429>

## SPECIES EVALUATION

### Recreational

Largemouth bass populations are targeted for assessment because they are a species indicative of the overall health of the fish population due to their high position in the food chain. Electrofishing is the most efficient sampling method for collecting largemouth bass to evaluate abundance and size distribution, with the exception of large bass. Gill net sampling is generally the preferred sampling method to determine the status of large bass and other large bodied fish species.

## *Largemouth Bass*

### Relative abundance and size structure indices-

Electrofishing has been used to collect largemouth bass population data in Indian Creek Lake since 1990. In Figure 1, springtime electrofishing results are used as an indicator of largemouth bass relative abundance in total catch per unit effort (CPUE). These results show the LMB catch per unit effort has increased considerably since 1990. In Figures 2 and 3, spring and fall electrofishing sample results are divided into stock-, quality-, and preferred-size classes. Since 1999, largemouth bass electrofishing results have indicated a sharp increase in all size classes of LMB. This may likely be attributed to the increase in complex cover in the lake due to the establishment of hydrilla. Hydrilla was discovered in the lake in the late 1990's and by 2002 it was growing out to the 12 foot contour.

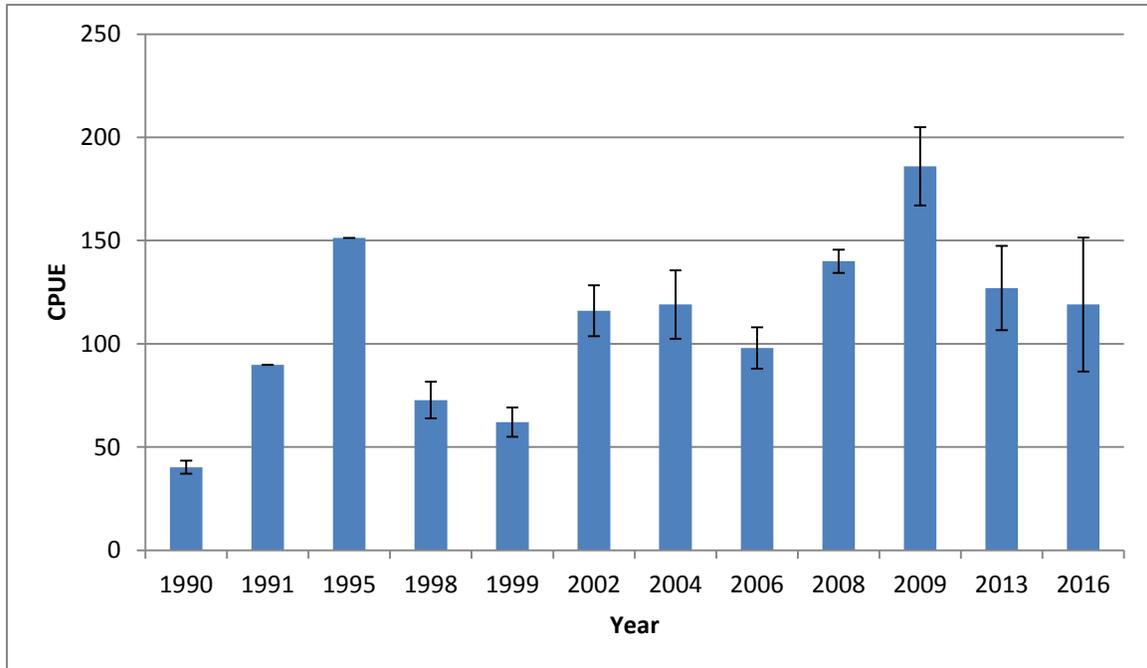


Figure 1. The total CPUE ( $\pm$  SE) for largemouth bass from Indian Creek Lake, Louisiana for spring electrofishing results from 1990 - 2016.

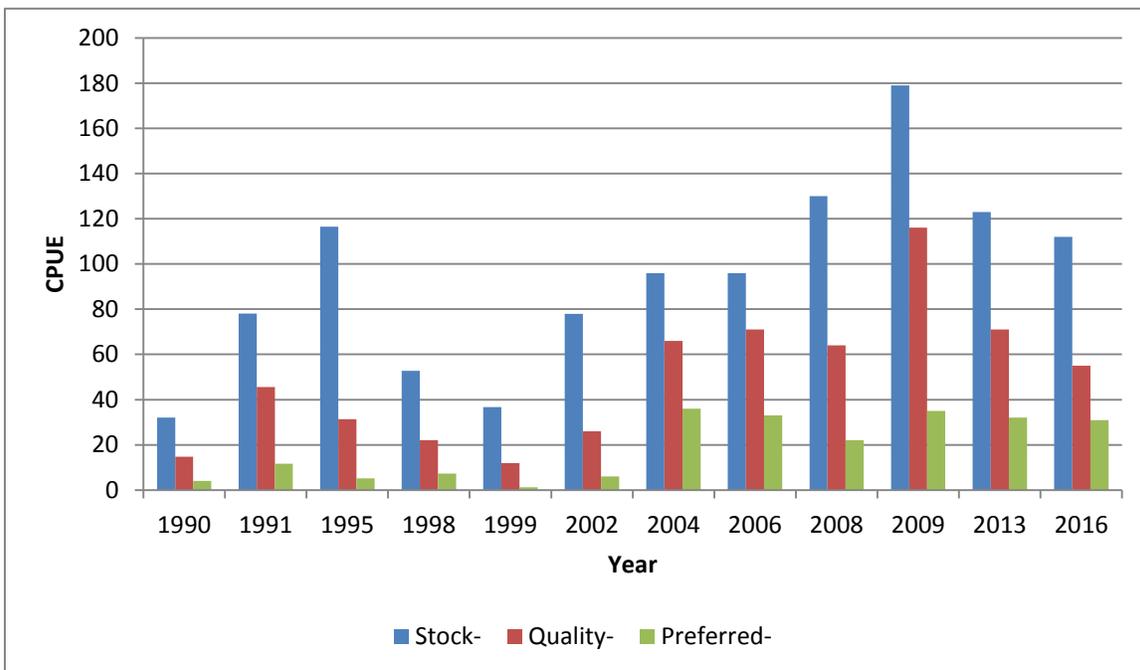


Figure 2. The CPUE for stock-, quality- and preferred-size classes of largemouth bass on Indian Creek Lake, Louisiana for the spring season from 1990 - 2016.

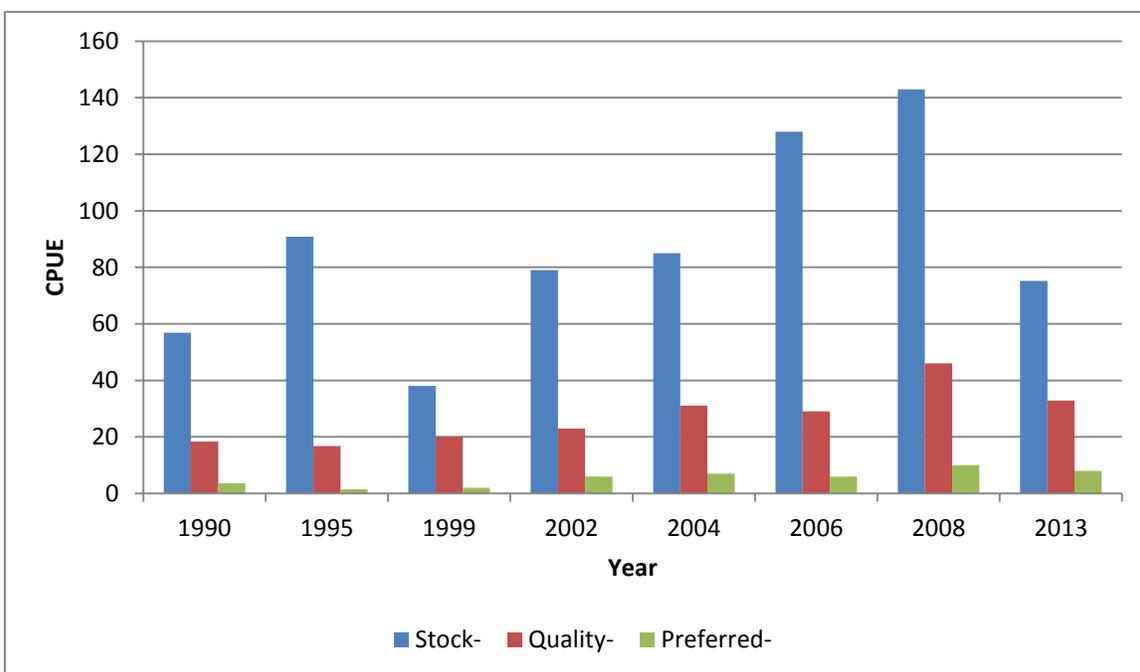


Figure 3. The CPUE for stock-, quality- and preferred-size classes of largemouth bass on Indian Creek Lake, Louisiana for the fall season from 1990 through 2013.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe LMB length-frequency data. Proportional stock density compares the number of fish of quality size (greater than 12 inches for largemouth bass) to the number of bass of stock size (8 inches in length). PSD is expressed as a percent. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. For example, Figure 4 below indicates a PSD of 65 for 2009.

The number indicates that 65% of the bass stock (fish over 8 inches) in the sample was at least 12 inches total length (TL) or longer. Individual lakes vary widely in their ability to support populations of bass; generally PSD's between 40 and 60 are considered good.

$$\text{PSD} = \frac{\text{Number of bass} > 12 \text{ inches}}{\text{Number of bass} > 8 \text{ inches}} \times 100$$

Relative stock density (RSD) is the proportion of largemouth bass in a stock (fish over 8 inches) that are 15 inches or longer.

$$\text{RSD} = \frac{\text{Number of bass} > 15 \text{ inches}}{\text{Number of bass} > 8 \text{ inches}} \times 100$$

Trends in the Indian Creek Lake largemouth bass population indicate that PSD's have decreased since 2009, while RSD's have increased moderately over the same period.

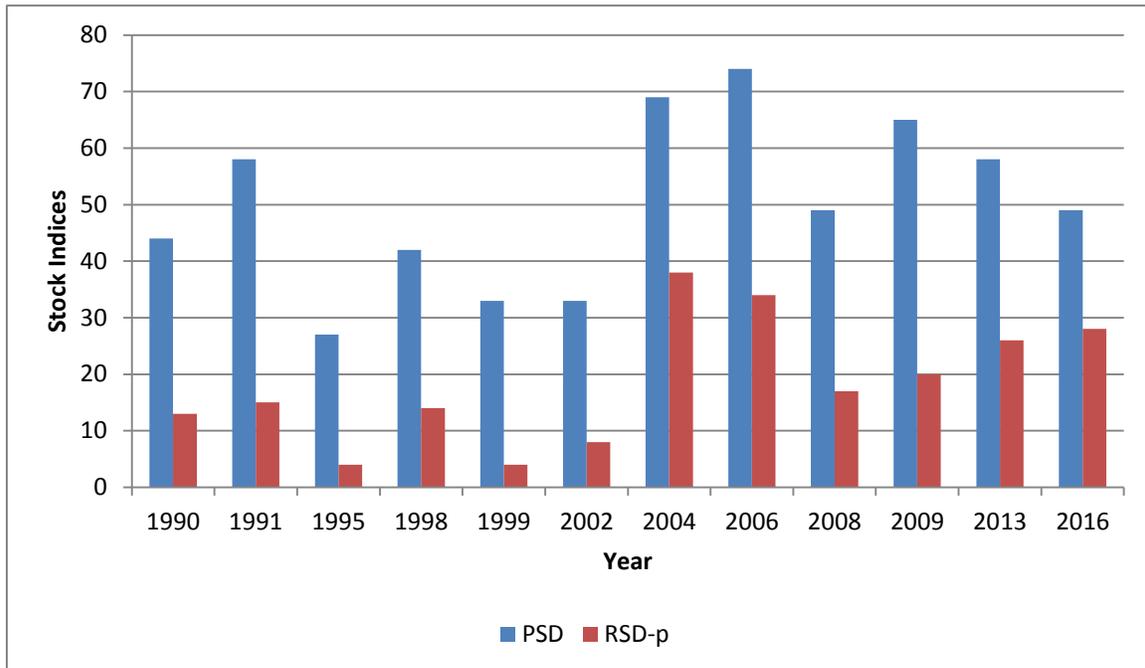


Figure 4. Structural indices (PSD and RSD-p) for largemouth bass collected from Indian Creek Lake, Louisiana for spring electrofishing samples from 1990-2016.

Largemouth Bass Age and Growth-

The largemouth bass age structure for Indian Creek Lake was analyzed in 2006 and 2008, and results were similar for both years. The results for 2006 and 2008 are found in Figure 5. The majority of the LMB were found to fall into age classes 0, 1, and 2 with the majority of the fish found to be age 1. Indian Creek bass growth rates were calculated in 1990. Growth rates for 1 and 2 year old bass were below the state average but growth rates reached the state average by age 3. Bass growth rates are found in Table 1. Indian Creek bass age structure and growth rates are similar to other bass populations found in lakes of central Louisiana.

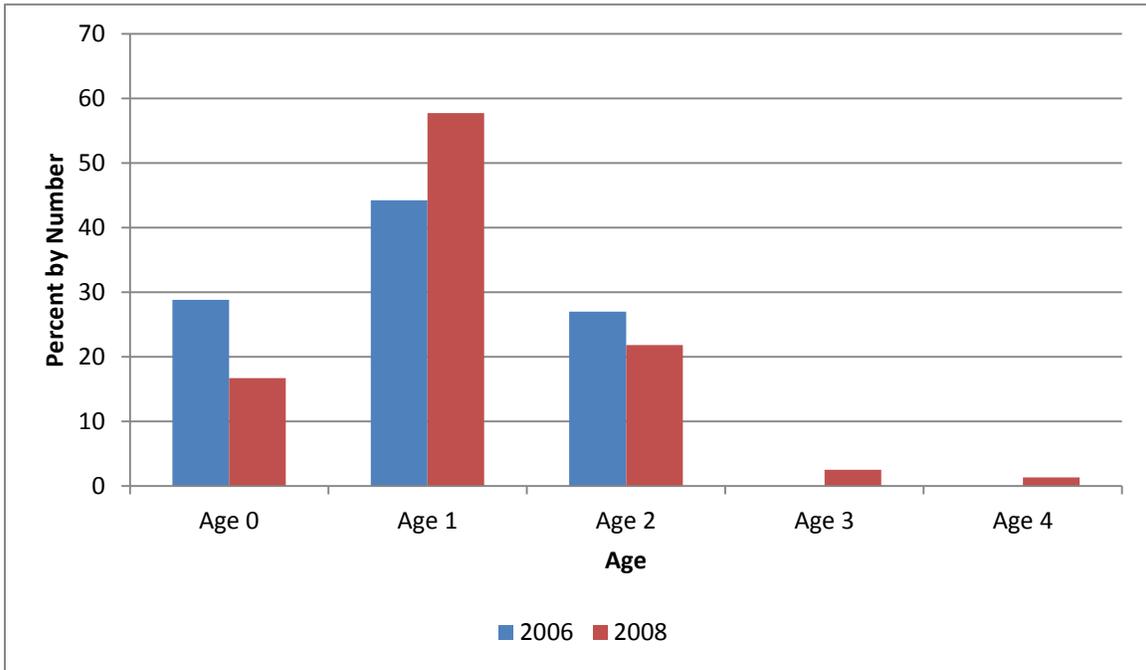


Figure 5. The age structure composition (percentage) for largemouth bass from Indian Creek Lake, Louisiana for 2006 (N=52) and 2008 (N=78).

Table 1. Average length at age of capture for largemouth bass in Indian Creek Lake, Louisiana for 1990, 2006, and 2008.

AGE	1990 (N=19)	2006 (N=52)	2008 (N=78)
0	5.6	7.4	7.2
1	10.6	11.2	11.2
2	14.4	14.9	14.09
3	17.6	-	18.89
4	18.9	-	21.65
5	19.6	-	-
6	-	-	-

*Forage*

Forage availability is measured through two methods. These include summertime shoreline sampling with haul seines and fall community assemblage sampling through electrofishing. Shoreline seining results can be found below in Figure 6. The most prevalent forage species included sunfishes, minnows, shiners and silversides. Fall electrofishing sampling in 2013 indicated that sunfishes are the major forage group available to predators (Figure 7). Forage availability is also measured indirectly through measurement of largemouth bass body condition or relative weight. Relative weight (Wr) 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 may indicate a potential problem with forage availability. The relative weights of LMB collected from Indian Creek Lake exceeded a value of 85 for all size groups, indicating an abundance of available forage. Relative weights can be found in Figure 8.

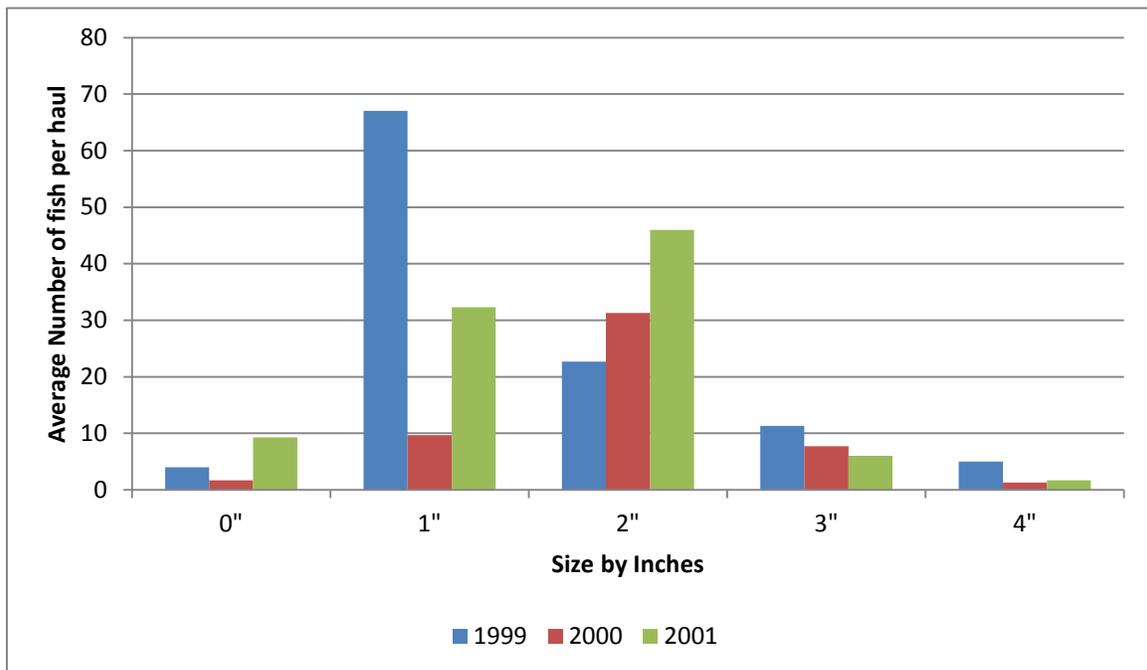


Figure 6. Average number of fish (potential forage) captured per haul seine in Indian Creek Lake, Louisiana from 1999-2001.

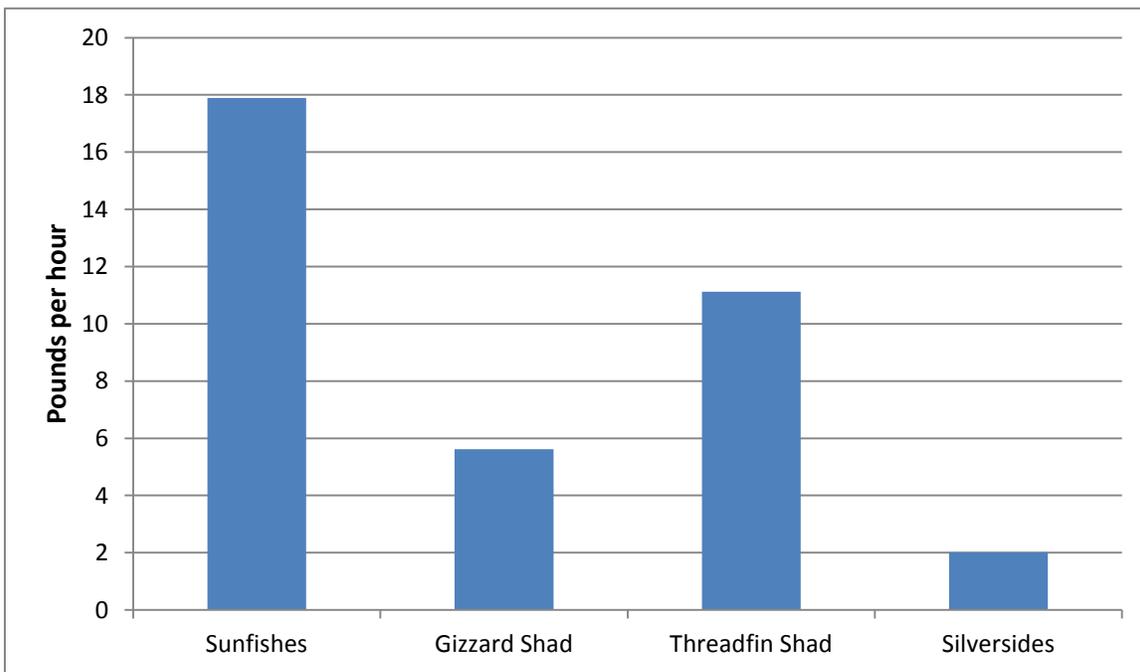


Figure 7. The CPUE (pounds per hour of electrofishing) of forage fish species found in Indian Creek Lake, Louisiana for 2013.

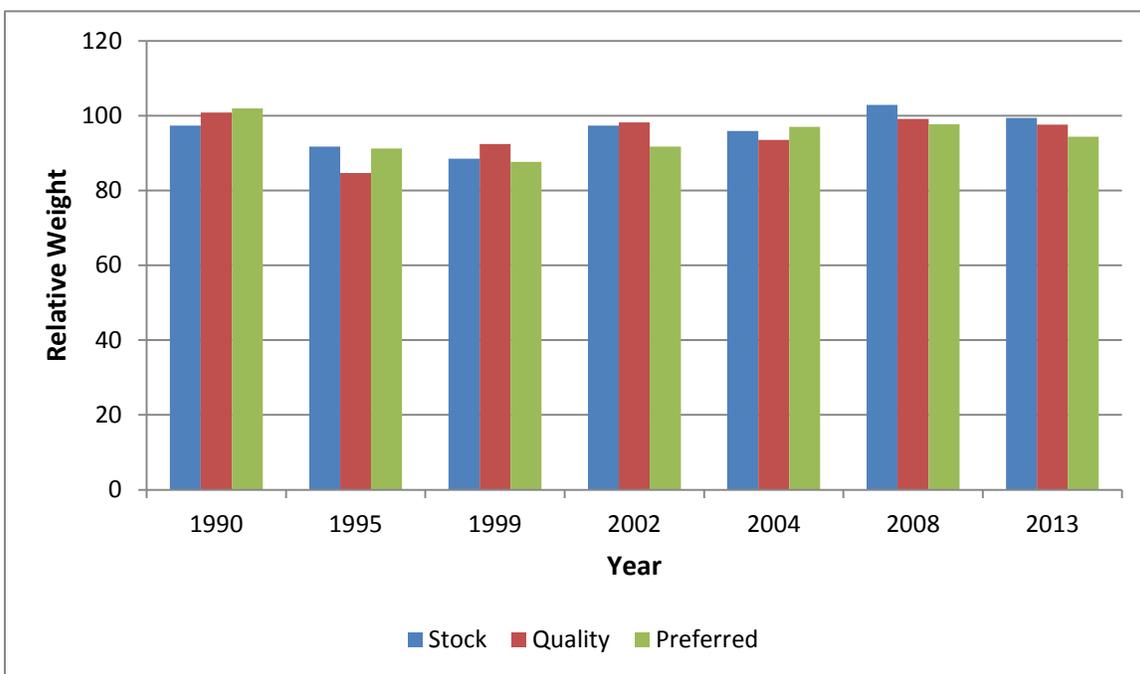


Figure 8. The relative weights for stock-, quality-, and preferred-size classes of largemouth bass collected during fall electrofishing for Indian Creek Lake, Louisiana from 1990 to 2013.

Largemouth bass genetics-

Florida largemouth bass (FLMB) stockings have been minimal in Indian Creek Lake. A

small stocking of FLMB fry were introduced into the lake in 1995. A total of 49 adult FLMB were stocked in 2008 and 2009. Surplus Florida largemouth bass fry stockings occurred in 2013 and 2016, for a total of 1,243,600 fry stocked. In addition, incidental fish stockings do occur from the adjacent Booker Fowler Fish Hatchery which utilizes water from Indian Creek Lake for operational purposes. Lake water, after flowing through a series of fish fingerling production ponds at the hatchery is allowed to drain back into the lake. Genetic analysis of largemouth bass conducted in 2001, 2006, and 2008 found that no less than 30% of the fish tested contained Florida alleles. See Table 2 below for the complete genetic testing results.

Table 2. Largemouth bass genetic testing results for Indian Creek Lake, Louisiana.

<b>Year</b>	<b>% NLMB</b>	<b>% FLMB</b>	<b>% FLMB x NLMB</b>	<b>Total FLMB Influence</b>
1990	98	0	2	2
2001	63	7	30	37
2006	52	10	38	48
2008	70	4	26	30

### *Crappie*

Aquatic habitat in Indian Creek Lake is conducive to the production of black crappies. No white crappies have been documented since 1979. Historical rotenone sampling results from 1979 through 1987 found low numbers of crappie. Lead net sampling for crappie was conducted in Indian Creek in 2005 and 2007. Sample CPUE was low, with only six crappies collected in 2005 and 18 in 2007. However, this was at a time when LDWF was just beginning to utilize lead nets for crappie sampling, and gear deployment techniques and proficiency is questionable. Crappie fishermen do utilize the lake heavily during certain times of the year. Anecdotal reports suggest that the crappie population in Indian Creek is similar to other clear, infertile lakes of central Louisiana. Additional crappie population sampling is needed at this time.

### Commercial

Large rough fish species that comprise a commercial fishery are not found in sufficient numbers to support a viable commercial fishery. Gill net sampling found a small number of commercial species, primarily catfish. The quantity of each species was low. Gill netting results from 1998 to 2009 are depicted in Figure 9 below.

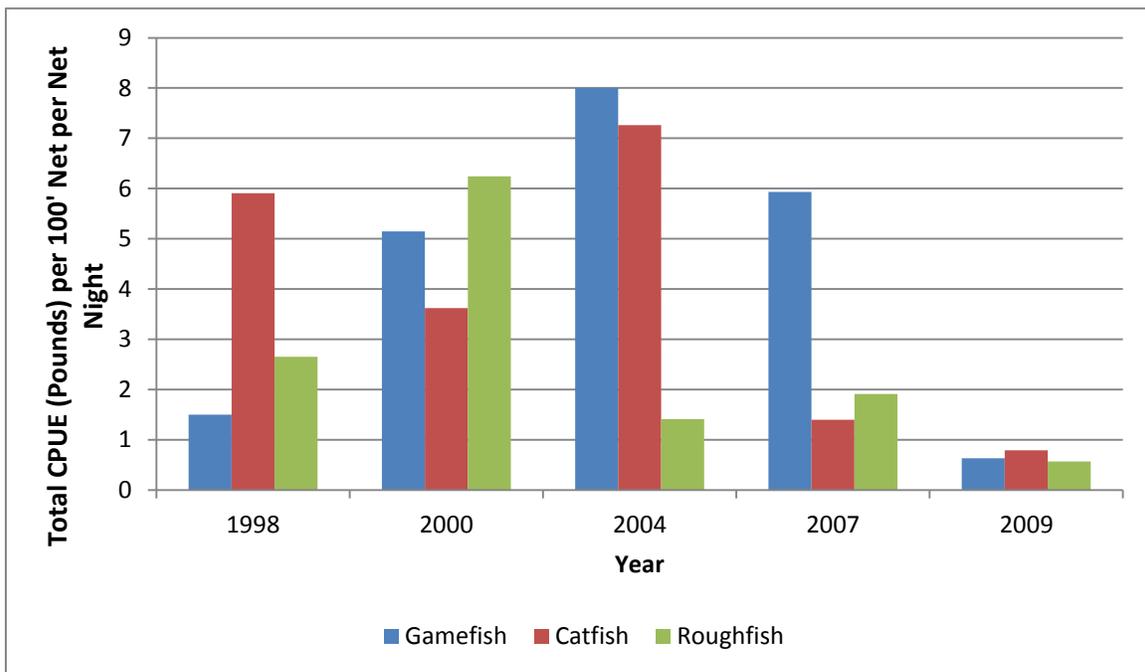


Figure 9. The total CPUE (pounds) per 100' net per net night of fish species captured by category by year in Indian Creek Lake, Louisiana with standardized gill nets from 1998 through 2009.

## HABITAT EVALUATION

### Aquatic Vegetation

Hydrilla was discovered in the reservoir in the late 1990's. By 2002, it could be found outward to the 12 foot contour in some locations. Since that time, hydrilla has been a constant problem as it has created an access impediment for anglers and recreational boaters. Hydrilla has encroached on the beaches at the Indian Creek recreation area at all three of the designated swimming areas. It also causes access problems for boaters wishing to access the camping area from the water. Booker Fowler Fish Hatchery has had problems with hydrilla blocking the water intake in recent years. Numerous complaints have been received by home and camp owners around the reservoir. The majority of the shallow water areas and the entire perimeter of the reservoir are matted with hydrilla.

As of August 2012, approximately 50% of the lake was infested with hydrilla. Hydrilla is the only significant problem vegetation in the lake. It has colonized out to the 14 foot contour and approximately 1,000 acres are infested. There is a fringe of giant cutgrass along 75 % of the shoreline, and approximately 100 acres of American lotus. Salvinia, both common and giant, can be found in the reservoir, but are not causing serious problems. Coverage is less than 100 acres. Alligator weed can be found but does not cause problems. It is treated incidentally during routine applications to control salvinia. Giant salvinia was not problematic at that time.

Triploid grass carp (TGC), when stocked at the appropriate rates, have proven to be effective at controlling submergent vegetation, especially hydrilla. Due to the limited effectiveness of herbicide treatments discussed above and the numerous problems associated with the use of

drawdowns, triploid grass carp have been introduced as a control measure. Three thousand (3000) TGC were stocked at 5 locations around the lake on May 11, 2012. The fish were stocked at a rate of 3 fish per vegetated acre and were 8” to 12” in total length (TL). Booker Fowler Fish hatchery stocked an additional five (5) TGC that were 38” TL into the lake on November 15, 2012. Annual vegetation surveys will be conducted each summer (July - August) to determine the success of the TGC in reducing hydrilla growth.

A vegetation survey of Indian Creek Reservoir was conducted on July 1 and July 16 of 2015. Hydrilla was matted to the surface out to the 13 foot depth contour, and covered approximately 1,000 acres. This was approximately 50% on the lake’s surface area. There was a fringe of giant cutgrass along 75 % of the shoreline and approximately 30 acres of American lotus was scattered throughout the lake. Both common and giant salvinia were found in the reservoir, but were not causing serious problems. Coverage was less than 100 acres total for both species. However, spraying is required two to four days per month to keep it from becoming problematic. Alligator weed was present, but did not present a problem. It was sprayed incidentally during applications to control salvinia. Hydrilla is expected to continue to be problematic in 2016 and acreage will be near 1,000 acres. Giant salvinia coverage may approach 300 acres in 2016 due to the mild winter in 2015.

An additional 3,000 TGC were stocked in the fall of 2015. This increased the total number of TGC stocked to 6,005. The TGC have been stocked at a rate of 6 per acre of submersed aquatic vegetation.

#### Substrate

Indian Creek Lake has a small watershed which results in very little sedimentation and turbidity flowing into the lake. The majority of the watershed is found within the Kisatchie National Forest and no agricultural farming except silviculture occurs there. The lake bottom substrate consists primarily of coarse and medium grain sands which provide excellent spawning areas for bottom nesting fish such as largemouth bass, crappie and other sunfish species.

#### Water Quality

Water quality in Indian Creek Lake has been good. The water is deep, clear and relatively infertile. Conductivity is low, similar to other upland reservoirs. In 2015, monthly water quality samples were conducted at 3 stations from February through November. The above average dissolved oxygen value observed in May was likely the result of heavy rainfall immediately prior to water quality sampling. Monthly temperatures in degrees Celsius (C°) and dissolved oxygen in parts per million (ppm) are reported in Figure 10.

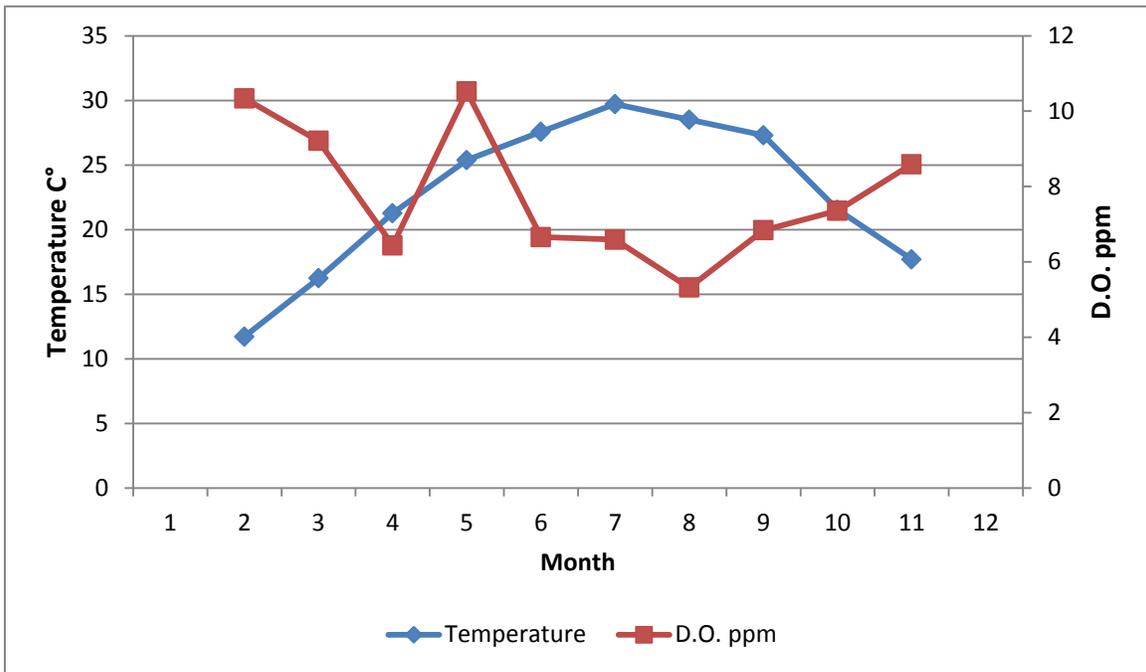


Figure 10. Monthly water temperatures in Celsius (C°) and dissolved oxygen (DO) in ppm for Indian Creek Lake, LA, from February through November 2015.

#### Artificial Structure

The Louisiana Department of Wildlife and Fisheries has not placed artificial structure in Indian Creek Lake. The only manmade structure found in the lake consists of a small number of boat docks and piers, located near Martin Spring’s boat ramp on the south end of the lake. There is sufficient complex cover in the lake for fish production due to an abundance of submersed aquatic vegetation.

### **CONDITION IMBALANCE / PROBLEM**

There is currently an overabundance of submergent vegetation in Indian Creek. Studies have determined a range of 15-30% coverage of complex cover is considered most desirable for sportfish productivity. Indian Creek vegetation typemap surveys conducted since 2006 have documented the lake with at least 50% vegetation coverage, well above optimal range for fisheries habitat and angler access.

### **CORRECTIVE ACTION NEEDED**

Indian Creek Lake would benefit from a reduction in submersed aquatic plants. Aquatic vegetation is recognized as a beneficial component of the Indian Creek Lake aquatic habitat. Complete eradication of submersed vegetation is not a desirable outcome.

## RECOMMENDATIONS

1. Continue aquatic vegetation surveys each summer to determine species composition and coverage of aquatic vegetation. This will provide a method to monitor the success of the TGC stocking and determine if additional vegetation control is necessary.
2. LDWF spray crews will continue treating emergent vegetation several days per month as needed with either glyphosate or diquat and an approved surfactant. These herbicides are applied at the rate of 0.75 gallons per acre with the surfactant applied at 0.25 gallons per acre. A diquat/glyphosate mix may be applied to giant salvinia infestations at a rate of 0.75 gal/acre glyphosate, 0.25 gal/acre diquat, 0.25 gal/acre Turbulence. Alligator weed will be controlled with imazapyr (0.5 gal/acre) in undeveloped areas and with Clearcast (0.5 gal/acre) near houses and developed shorelines.
3. Continue scheduled standardized fisheries sampling to determine status of sportfish and forage populations.
4. A fall/winter drawdown is recommended for 2016. Vegetation surveys conducted in 2012 found 40% of the lake covered in hydrilla. Vegetation surveys in 2014 and 2015 indicate hydrilla coverage is increasing and has spread throughout most of the lake. It is growing out to the 14 foot depth contour. Numerous complaints from home and camp owners indicate that hydrilla is restricting recreational use of the lake. Hydrilla coverage in the summer of 2015 was greater than 1,000 acres. If the drawdown is approved by the governing body (RPPJ), the following recommendations would apply:
  - A. Lower the lake water level at a rate of four (4) inches per day to a maximum of 8 feet below pool stage. This will ensure adequate available water in the lake for irrigation purposes and to support the existing fish population.
  - B. Begin the drawdown in early September after Labor Day to allow for maximum recreational opportunities and minimize the inconvenience to lake users and residents.
  - C. Close the gates no later than December 15, 2016. This will allow the lake time to return to normal pool level prior to the fish spawn and ensure adequate water available for spring/summer irrigation.