LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

INDIAN CREEK LAKE

WATERBODY EVALUATION &
RECOMMENDATIONS 2022

CHRONOLOGY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sportfish species, primarily Largemouth Bass (*Micropterus nigricans*) (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 Bass (*Micropterus salmoides*) 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/regulations

Commercial

The commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/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 and are of high recreational value. 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. 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 (Figure 1). In Figures 2 and 3, spring and fall electrofishing sampling results are divided into stock-, quality-, and preferred-size classes. Since 2004, Largemouth Bass electrofishing results have shown a sharp increase in larger size classes of LMB. This is likely due to the increase in complex cover in the lake due to the establishment of hydrilla (*Hydrilla verticillata*). Hydrilla was discovered in the lake in the late 1990s, and by 2002 it was growing out to the 12-foot contour.

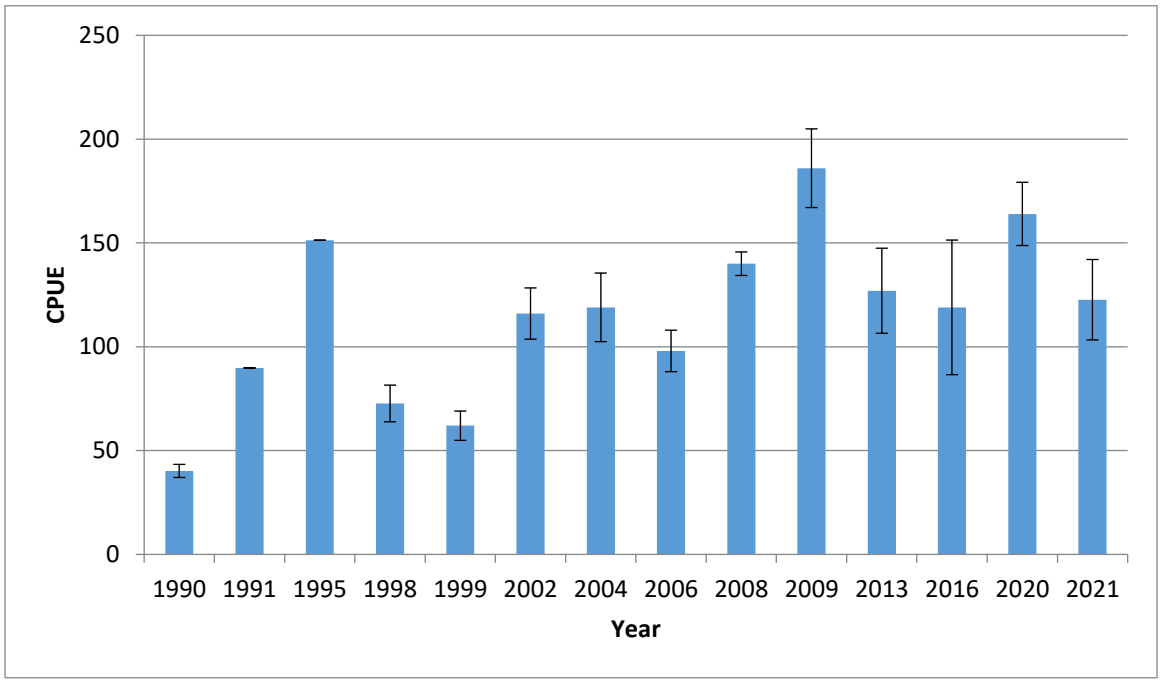

Figure 1. The total CPUE (± SE) for Largemouth Bass from Indian Creek Lake, Louisiana, for spring electrofishing results from 1990 - 2021.

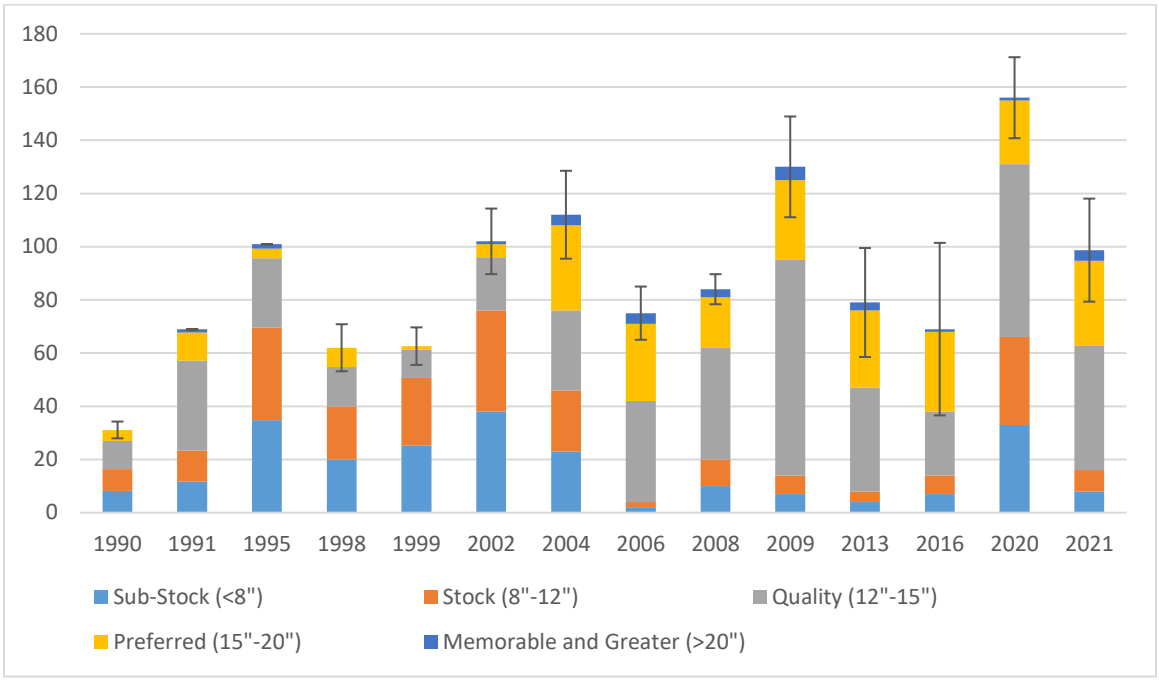

Figure 2. Mean CPUE (± SE) for Largemouth Bass by size class from standardized spring electrofishing samples 1990-2021 for Indian Creek, Louisiana. Error bars represent standard error of total mean CPUE.

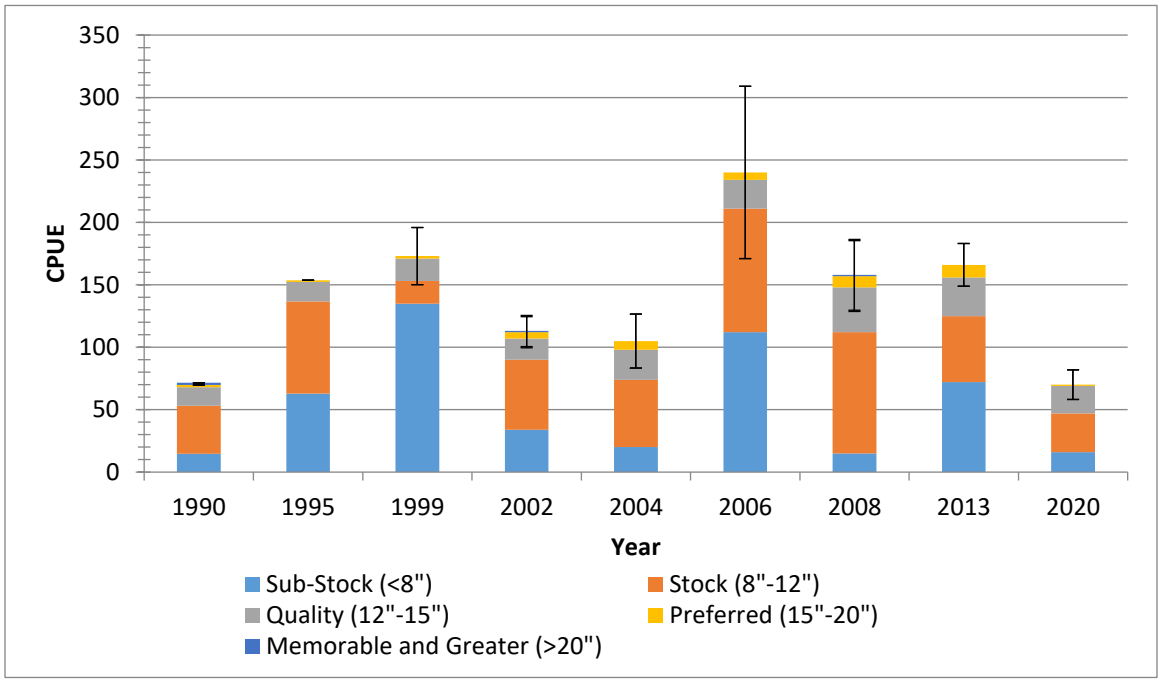

Figure 3. Mean CPUE (± SE) for Largemouth Bass by size class from standardized fall electrofishing samples 1990-2021 for Indian Creek, Louisiana. Error bars represent standard error of total mean CPUE.

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 and larger (greater than 12 inches for Largemouth Bass) to the number of bass of stock size (8 inches in length). PSD is expressed as a percentage. 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 were 12 inches in total length (TL) or longer. Individual lakes vary widely in their ability to support populations of bass; generally, PSDs between 40 and 60 are considered preferable.

$$PSD = \frac{\text{Number of bass>12 inches}}{\text{Number of bass>8 inches}} \text{ x100}$$

Relative stock density (RSD_{15}) is the proportion of Largemouth Bass in a stock (fish over 8 inches) that are 15 inches or longer.

$$RSD_{15} = \frac{\text{Number of bass>15 inches}}{\text{Number of bass>8 inches}} \text{ x100}$$

Trends in the Indian Creek Lake Largemouth Bass structural indices indicate that, compared to previous years, the population consists of more large bass since 2004.

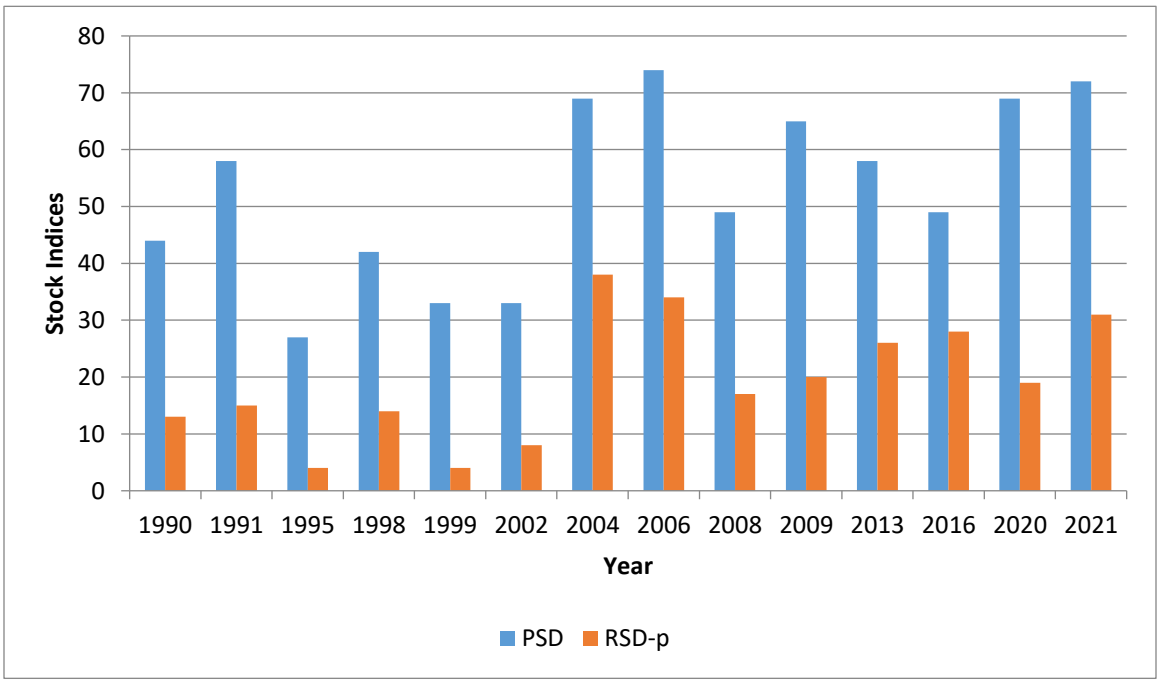

Figure 4. Structural indices (PSD and RSD-P) for Largemouth Bass collected from Indian Creek Lake, Louisiana for spring electrofishing samples from 1990-2021.

Largemouth Bass Age and Growth

The Largemouth Bass age structure for Indian Creek Lake was analyzed in 2020 and 2021 (Figure 5). Bass will also be aged in 2022 completing a three-year mortality study on bass in Indian Creek Lake. 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 Lake bass growth rates were calculated in 1990, 2006, 2008, 2020, and 2021 (Table 1). Growth rates for 1-year and 2-year-old bass were below the state average in 1990, but growth rates increased after 2006. Indian

Creek Lake bass age growth rates are higher than average compared to other bass populations found in lakes of Louisiana.

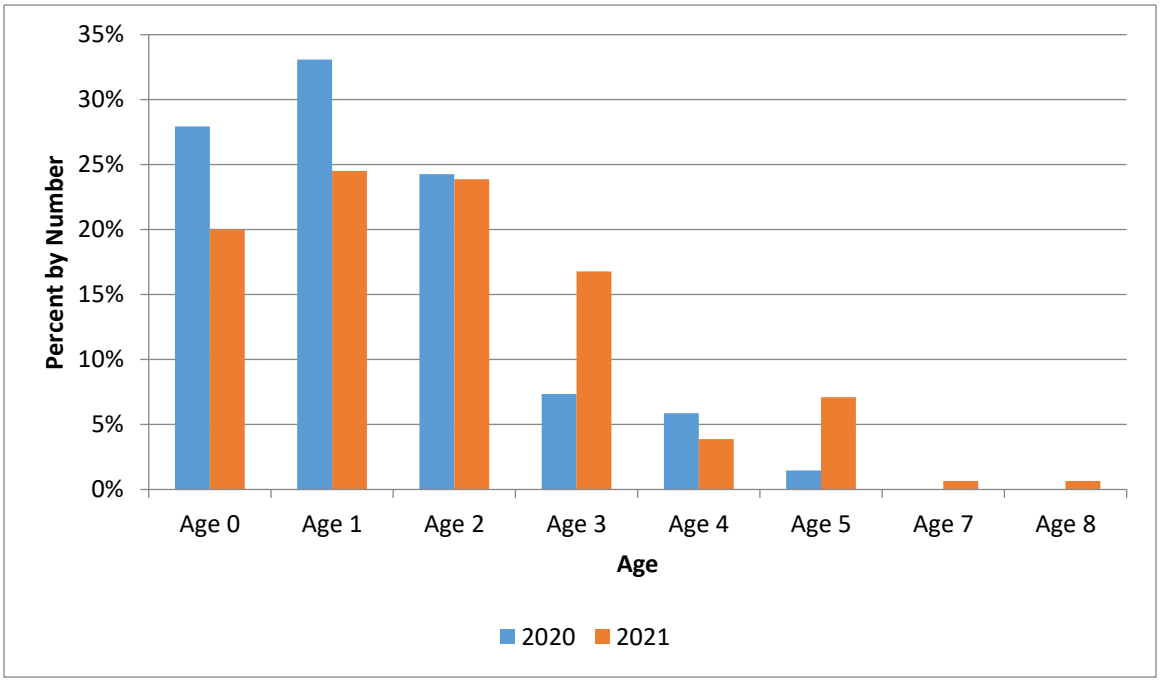

Figure 5. The age structure composition (percentage) for Largemouth Bass from Indian Creek Lake, Louisiana for 2020 (N=136) and 2020 (N=155).

Table 1. Average length at age of capture for Largemouth Bass in Indian Creek Lake, Louisiana for 1990, 2006, 2008, 2020, and 2021.

AGE	1990 (N=19)	2006 (N=52)	2008 (N=78)	2020 (N=136)	2021 (N=155)
0	5.6	7.4	7.2	7.04	7.60
1	10.6	11.2	11.2	11.41	11.22
2	14.4	14.9	14.09	14.72	14.88
3	17.6	-	18.89	17.56	16.81
4	18.9	-	21.65	19.29	17.87
5	19.6	-	-	20.19	18.42
6	-	-	-	-	19.40
7	-	-	-	-	17.99
8	-	-	-	-	22.28

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, 2008, 2020, and 2021 found that no less than 30%

and as high as 86.7% 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.

Year	% NLMB	% FLMB	% FLMB x NLMB	Total FLMB Influence
1990	98	0	2	2
2001	63	7	30	37
2006	52	10	38	48
2008	70	4	26	30
2020	40.8	15.4	43.8	59.2
2021	13.3	48.7	38	86.7

Forage and Fish Community

Forage availability and fish community makeup is measured through two methods. These include summertime shoreline sampling with haul seines (Figure 6) and fall community assemblage sampling through electrofishing. 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.

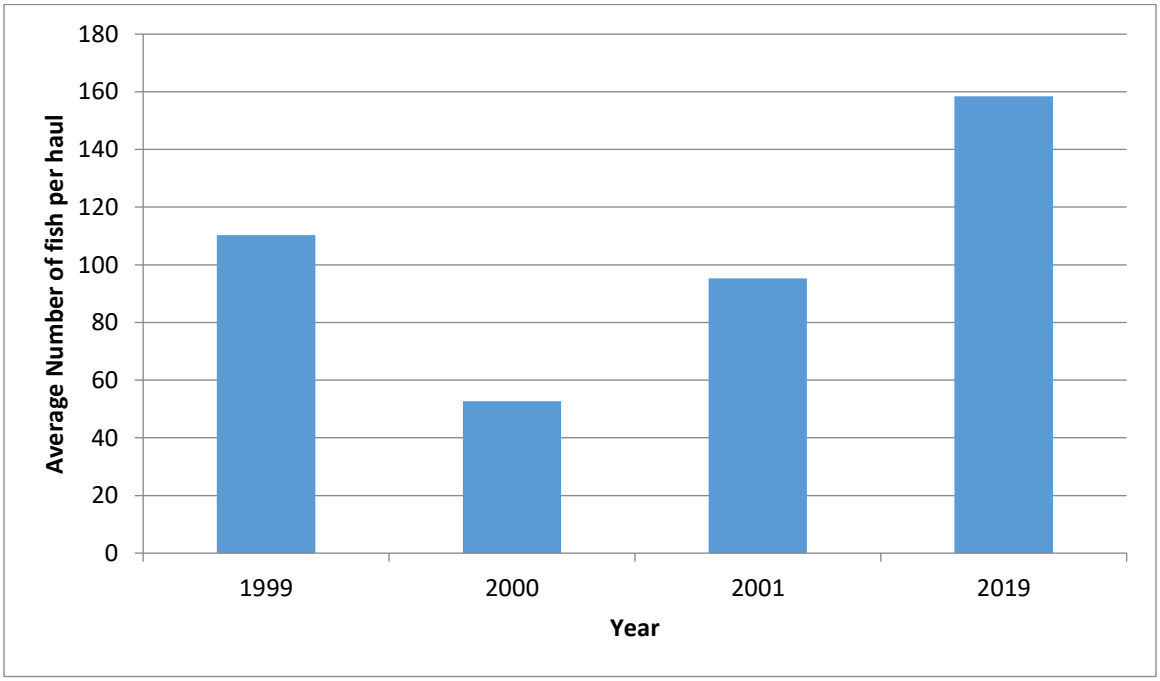

Figure 6. Average number of forage species ≤ 6 inches in total length captured per seine hauls taken in Indian Creek Lake, Louisiana from 1999-2019.

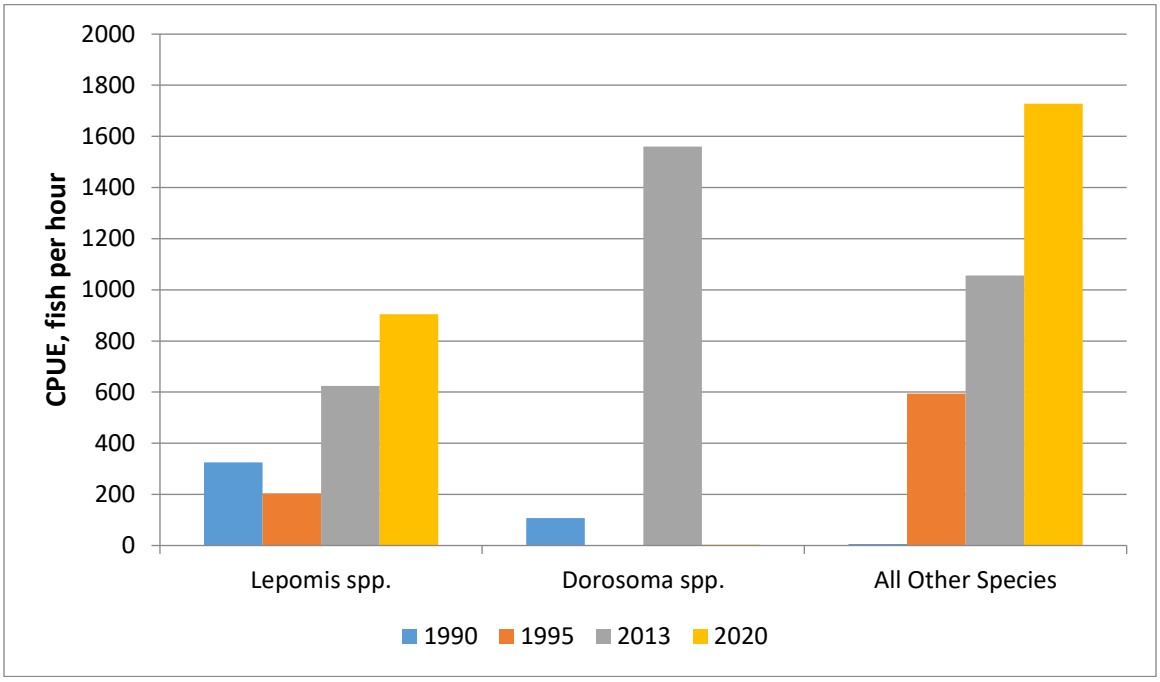

Figure 7. Number of *Lepomis* spp., *Dorosoma* spp., and all other species less than 6 inches TL captured in standardized fall forage samples on Indian Creek Lake, LA from 1990-2020.

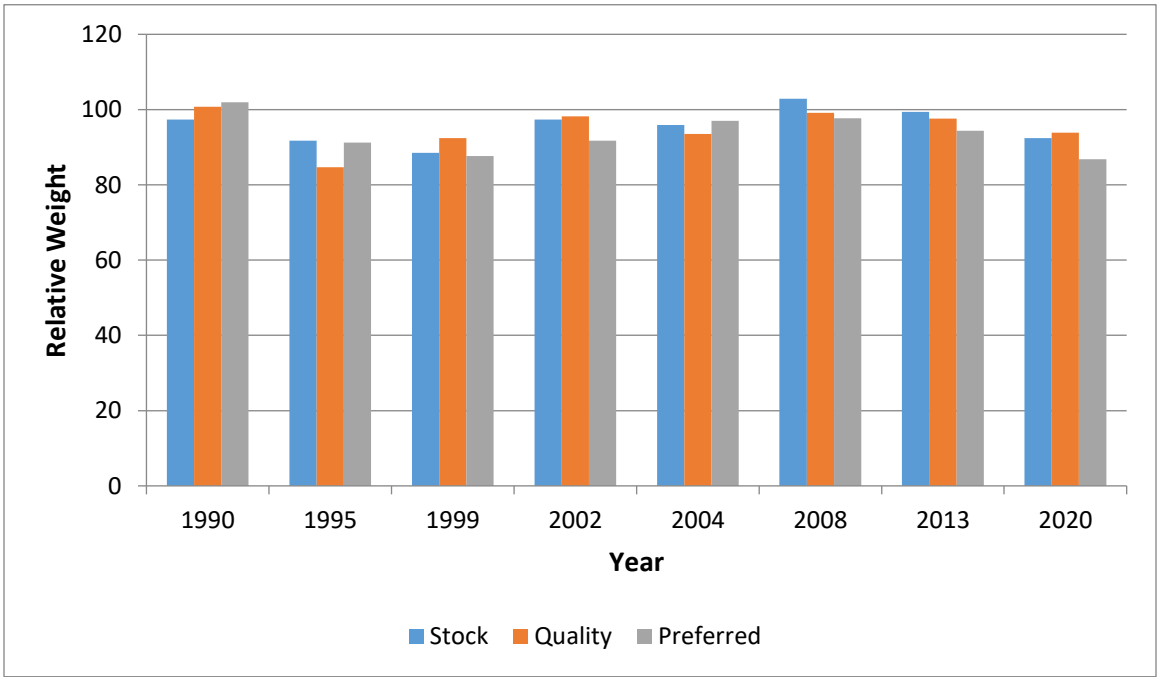

Figure 8. The relative weights for stock-, quality-, and preferred-size classes of Largemouth Bass collected during fall electrofishing for Indian Creek Lake, Louisiana from 1990 to 2020.

Crappie

Aquatic habitat in Indian Creek Lake is conducive to the production of Black Crappie (Promoxis nigromaculatus). White Crappie (Promoxis annularis) have not 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 Lake in 2005, 2007, and 2019. CPUE was low for all years. Due to the very clear water in the lake, sampling with lead nets may be biased. Crappie anglers do utilize the lake heavily during certain times of the year. Anecdotal reports suggest that the crappie population in Indian Creek Lake is similar to other clear, infertile lakes of central Louisiana.

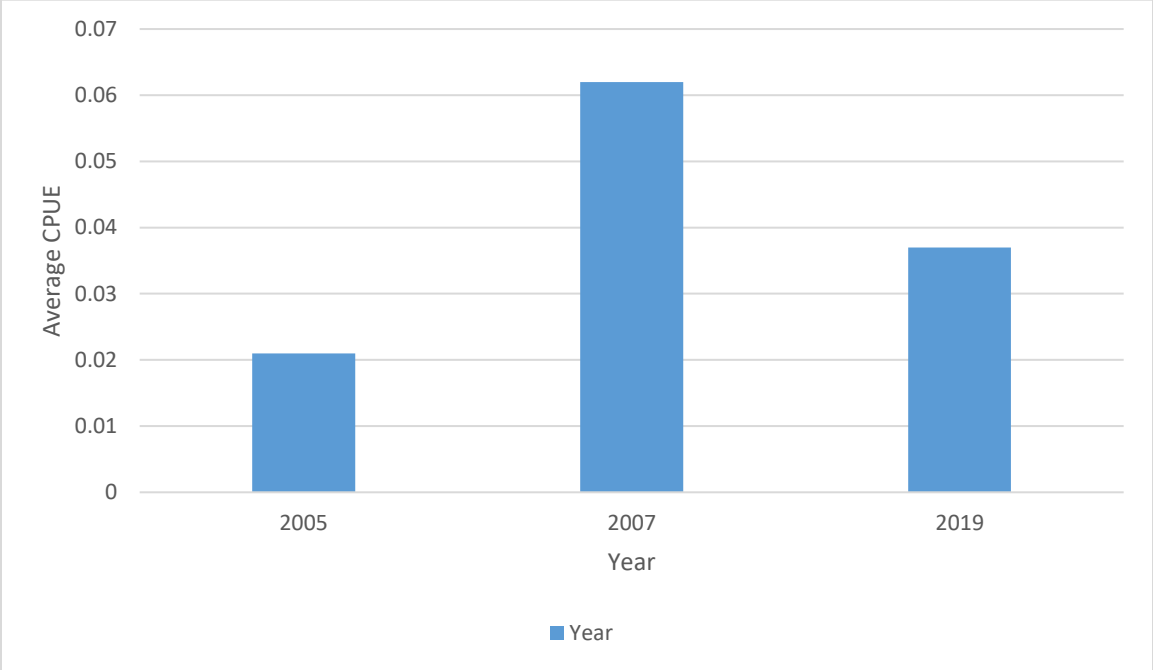

Figure 9. Average CPUE for Crappie generated from standardized lead net results from Indian Creek, Louisiana from 2005-2019.

Commercial

Large nongame 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 (Figure 10).

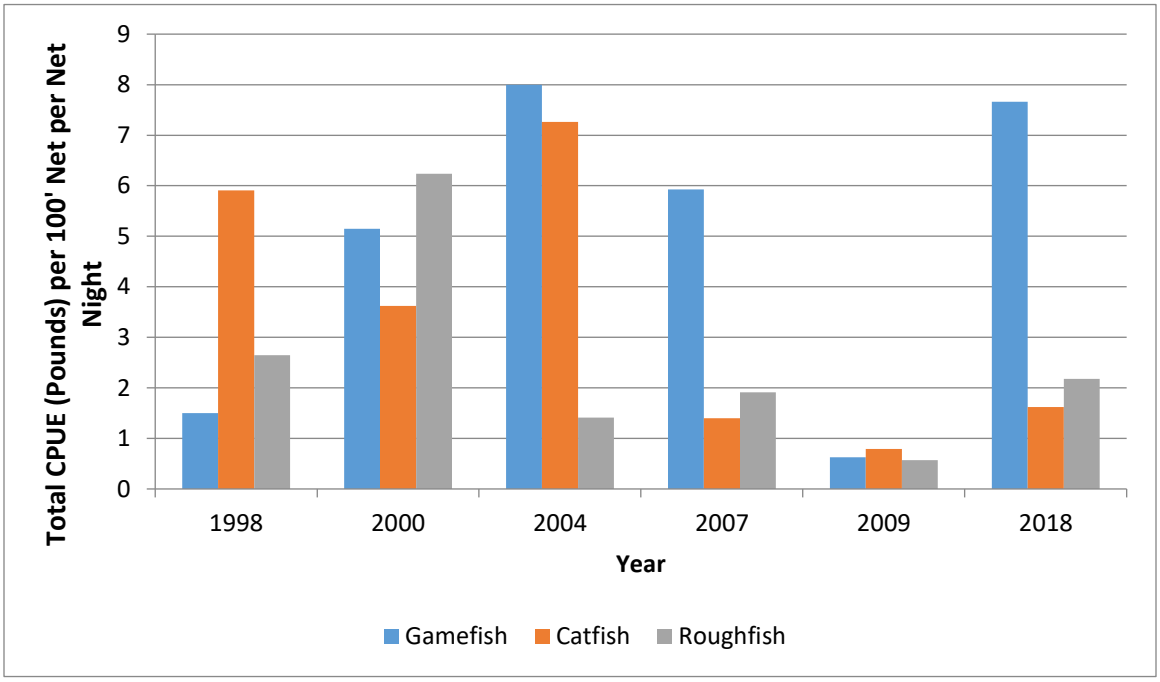

Figure 10. The total CPUE (pounds) per 100' net per net night of fish species captured by category by year in Indian Creek Lake, Louisiana with standardized gill nets from 1998 through 2018.

HABITAT EVALUATION

Aquatic Vegetation

Hydrilla was discovered in the reservoir in the late 1990s. By 2002, it could be found out 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 Lake 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.

By August 2012, approximately 50% of the lake was infested with hydrilla. Hydrilla was the only significant problem vegetation in the lake. It had colonized out to the 14-foot contour and approximately 1,000 acres were infested. There was a fringe of giant cutgrass (*Zizaniopsis miliacea*) along 75 % of the shoreline, and approximately 100 acres of American lotus (*Nelumbo lutea*). Salvinia, both common and giant, could be found in the reservoir, but were not causing serious problems. Coverage was less than 100 acres. Alligator weed (*Alternanthera philoxeroides*) was be found, but did not cause problems. It was incidentally treated during routine applications to control salvinia. Giant salvinia (*Salvinia molesta*) was not problematic at that time.

Triploid grass carp (*Ctenopharyngodon idella*) (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, TGC have been introduced as a control measure. Three thousand TGC were stocked at five locations around the lake on May 11, 2012. The fish were stocked at a rate of three fish per vegetated acre and were 8" to 12" in total length (TL). Booker Fowler Fish hatchery stocked an additional five 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 Lake 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% of 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 was 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.

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 six per acre of submersed aquatic vegetation.

A drawdown was conducted in 2016 for hydrilla reduction. The drawdown was extended into January 2017 due to the need to repair the intake screen for the Booker Fowler Fish Hatchery surface pump system. Reduction of hydrilla and giant salvinia was effective. Hydrilla was estimated to be approximately 300 acres, and giant salvinia was estimated to be less than ten acres. Shoreline vegetation is minimal other than cutgrass.

A vegetation survey was conducted on Sep. 28, 2017. Submersed vegetation present was hydrilla, chara (*Characeae spp.*) and bladderwort (*Utricularia inflate*) which, when combined, totaled about 150 acres. Emergent vegetation present was alligator weed, American lotus, water shield and smart weed. There were approximately 50 acres of alligator weed and smart weed, and about 100 acres of American lotus and water shield combined. Giant salvinia was the only floating plant observed, totaling approximately 140 acres.

A vegetation survey was conducted on August 6, 2018. Floating vegetation consisted of approximately 60 acres of giant salvinia. Emergent vegetation consisted of American lotus, banana lily, and alligator weed. There was approximately 160 acres of American lotus, ten acres of banana lily, and 100 acres of alligator weed. Submersed vegetation was a mixture of hydrilla, bladderwort, and fanwort (*Cabomba caroliniana*). There was approximately 1,000 acres of submersed vegetation, growing out to a depth of about 13 feet. In 2020, giant salvinia will continue to be a problem especially if the 2019/2020 winter is mild. The submersed vegetation will continue to be monitored to see if the grass carp will provide some level of control.

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 three stations from February through November (Figure 11). The above average dissolved oxygen value observed in May was likely the result of heavy rainfall immediately prior to water quality sampling.

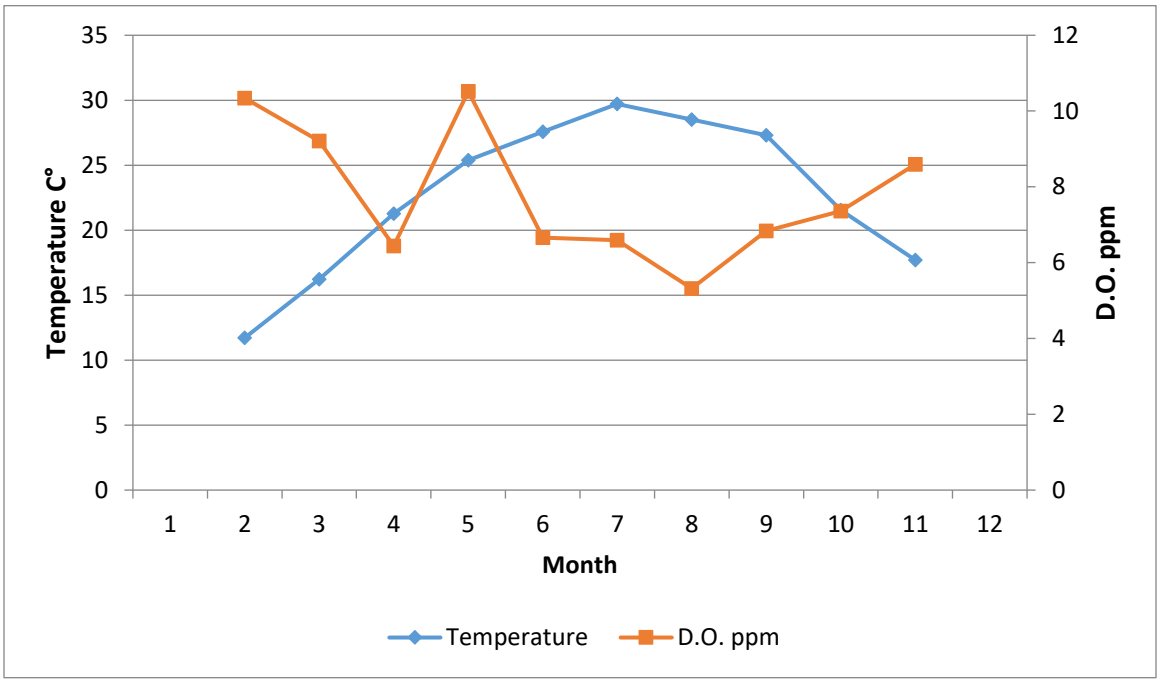

Figure 11. Monthly water temperatures in Celsius (C°) and dissolved oxygen (DO) in ppm for Indian Creek Lake, LA, from February through November 2015.

Artificial Structure

The Louisiana Department of Wildlife and Fisheries placed an artificial structure in Indian Creek Lake in 2018. The structure consists of a variety of smaller structures made of wooden pallets and PVC. The coordinates for the structure are (31.129117, -92.4672). The average depth of the structures is 14 ft.

CONDITION IMBALANCE / PROBLEM

Submersed vegetation in Indian Creek Lake, particularly hydrilla, continues to be a reoccurring problem. Studies have determined that a range of 15-30% coverage of complex cover is considered most desirable for sportfish productivity. Indian Creek Lake vegetation typemap surveys conducted in some years have documented the lake with at least 50% vegetation coverage, well above optimal range for fisheries habitat and angler access. Drawdowns temporarily reduce the submersed vegetation, but it rapidly returns.

CORRECTIVE ACTION NEEDED

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 for a good fishery. Additional TGC stockings may be required if the previously stocked TGC and the recent drawdown in 2021 provide no reduction in submersed vegetation.

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 and floating vegetation as the need arises. The LDWF standard operating procedures for vegetation control will be followed (Table 3).

3. Continue scheduled standardized fisheries sampling to determine status of sportfish and forage populations. A three-year Largemouth Bass population study will be completed in 2022. A creel survey is also scheduled to begin 2022. The creel survey will start when sufficient water is in the lake for boaters to use the Martin Springs boat launch.

Table 3. LDWF Aquatic Herbicide Application Procedures.

Plant Species	Herbicide	Surfactant
Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) + Diquat (0.25 gal/acre) or Clipper (2 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Common/Giant Salvinia (November 1 to March 31)	Diquat (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Water Hyacinth	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Water Hyacinth in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Alligator Weed (undeveloped areas)	Imazapyr (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Alligator Weed (developed areas)	Imazamox (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
American Lotus	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
American Lotus in waiver areas (March 15 to September 15)	Glyphosate (0.5 gal/acre)	Nonionic surfactant (0.25 gal/acre)
American Lotus in waiver areas with potable water intakes (March 15 to September 15)	Triclopyr (0.5gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Duckweed	Diquat (1.0 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Cuban Bulrush (*Oxycaryum cubense*)(sedge)	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Cuban Bulrush (sedge) in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Water Lettuce (*Pistia stratiotes*)	Diquat (1.0 gal/acre)	Nonionic surfactant (0.25 gal/acre)