

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LAKE LOUIS

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY THREE YEARS

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sportfish species, primarily largemouth bass (LMB) and crappie, 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

Commercial

Historical fish biomass samples using rotenone indicate that Lake Louis supported an abundance of commercial fish species including catfish, (*Ictalurus* spp. and *Pylodictis olivaris*), freshwater drum (*Aplodinotus grunniens*), and buffalofish (*Ictiobus* spp.) in the past. Flood control projects over the past 60 years have changed water flow patterns and fisheries habitat in such a manner that Lake Louis currently does not support high numbers of commercial species. As a result, commercial fishing effort is minimal and a commercial fisheries management strategy is not used.

Species of Special Concern

No threatened or endangered fish species are known to inhabit this waterbody. However, due to periodic backwater flooding, exotic Asian carp (i.e., *Ctenopharyngodon idella*, *Cyprinus carpio*, *Hypophthalmichthys* spp.) and transient riverine species are likely to inhabit the lake. LDWF fisheries personnel observed silver carp leaping in numerous areas of the lake in the winter of 2015/2016.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations for all fish species, the current recreational fishing regulations may be viewed at the link below: <http://www.wlf.louisiana.gov/fishing/regulations>

Commercial

The current commercial fishing regulations may be viewed at the link below: <http://www.wlf.louisiana.gov/fishing/regulations>

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. Electrofishing is the best overall indicator of largemouth bass abundance and size distribution, with the exception of large bass. Gill net sampling is generally the preferred method to determine the status of large bass and other large bodied fish species.

Largemouth Bass

Relative abundance and size structure indices

Historical standing crop estimates from biomass (rotenone) sampling indicate that all species of game fish populations were low. In the 1960's, forage species dominated the sample. In the 1980's, commercial species were the dominant species collected (Table 1). Since 1999, electrofishing results have been used as an indicator of LMB abundance with total catch per unit effort (CPUE) indicated in Figure 1 and Figure 2. Louisiana Department of Wildlife and Fisheries (LDWF) sampling protocol calls for electrofishing to be conducted in the spring and fall. However, in Lake Louis high turbidity levels generally occur during the spring, which limits visibility and reduces the efficiency of capture. Therefore, spring electrofishing results are not a reliable indicator of bass abundance in Lake Louis as CPUE values are inconsistent and low. For this reason, fall electrofishing will be used when sampling Lake Louis fish populations. Fisheries data indicate that the current lake management plan, which includes annual fall/winter drawdowns, has been beneficial to sportfish. Bass electrofishing results indicate positive population trends since 1999. See Figures 3 and 4. The only exception to this is for the results in 2008. This fall sampling occurred after hurricane Ike had caused record rainfall and flooding in the Lake Louis watershed.

Table 1. Standing crop estimates from biomass (rotenone) sampling in Lake Louis, Louisiana, 1960-1988.

Standing Crop Estimates from Biomass (Rotenone) Results: Percent of Total Sample by Weight			
Year	Forage Species	Game Species	Commercial Species
1960	53.4%	14.7%	31.9%
1971	64.3%	11.7%	24.0%
1986	9.6%	14.8%	75.6%
1987	10.8%	6.2%	83.0%
1988	15.8%	16.0%	68.2%

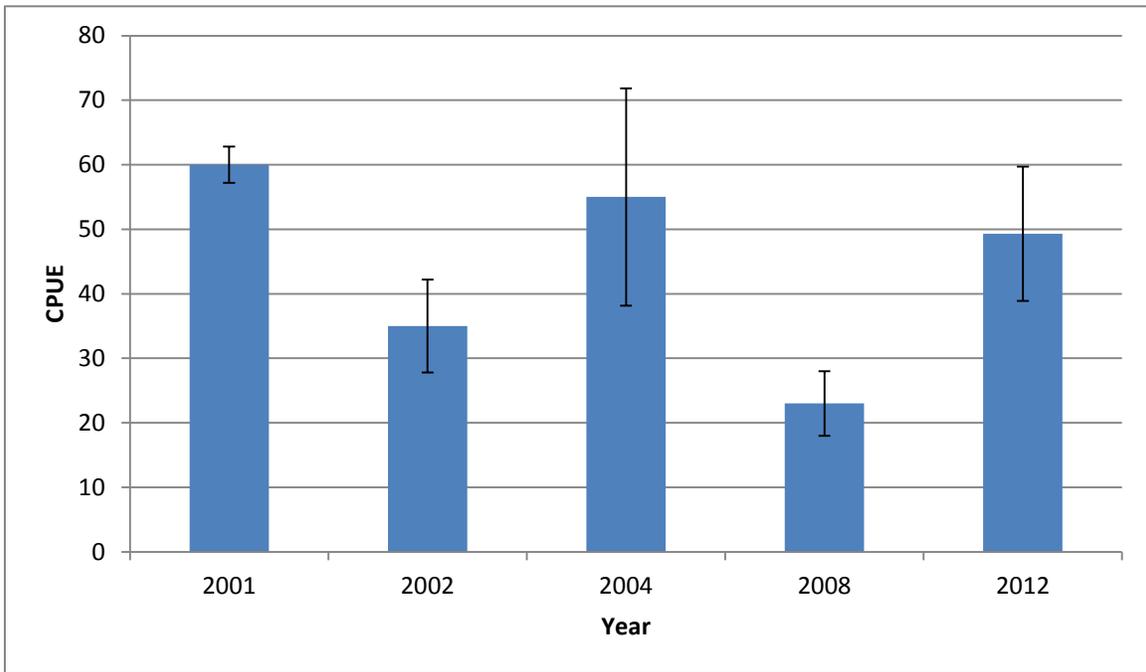


Figure 1. The total CPUE (\pm SE) for all size classes of largemouth bass from Lake Louis, Louisiana in spring electrofishing results for years between 2001 and 2012.

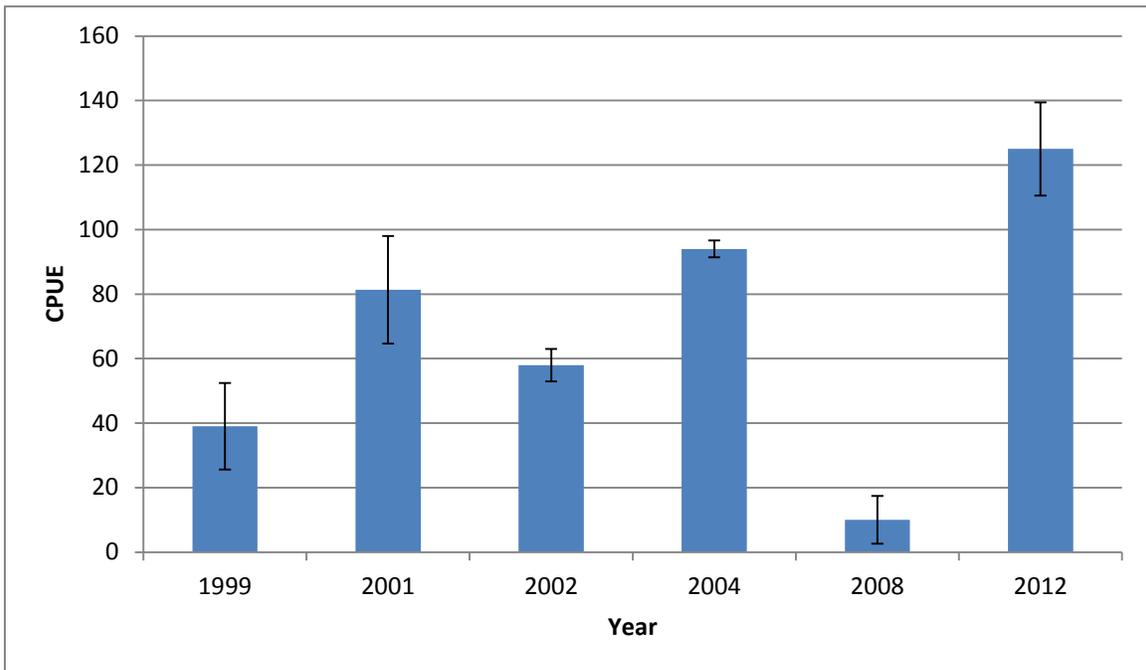


Figure 2. The total CPUE (\pm SE) for all size classes of largemouth bass from Lake Louis, Louisiana in fall electrofishing results for years between 1999 and 2012.

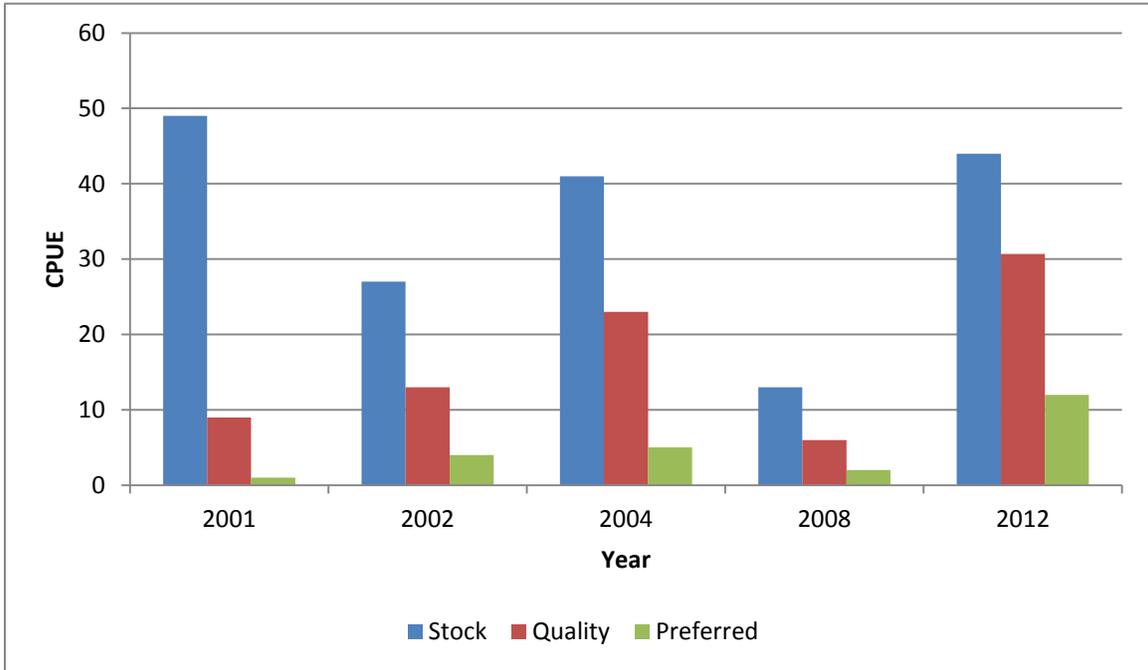


Figure 3. The CPUE for stock-, quality-, and preferred-size classes of largemouth bass on Lake Louis, Louisiana for spring season 2001 – 2012.

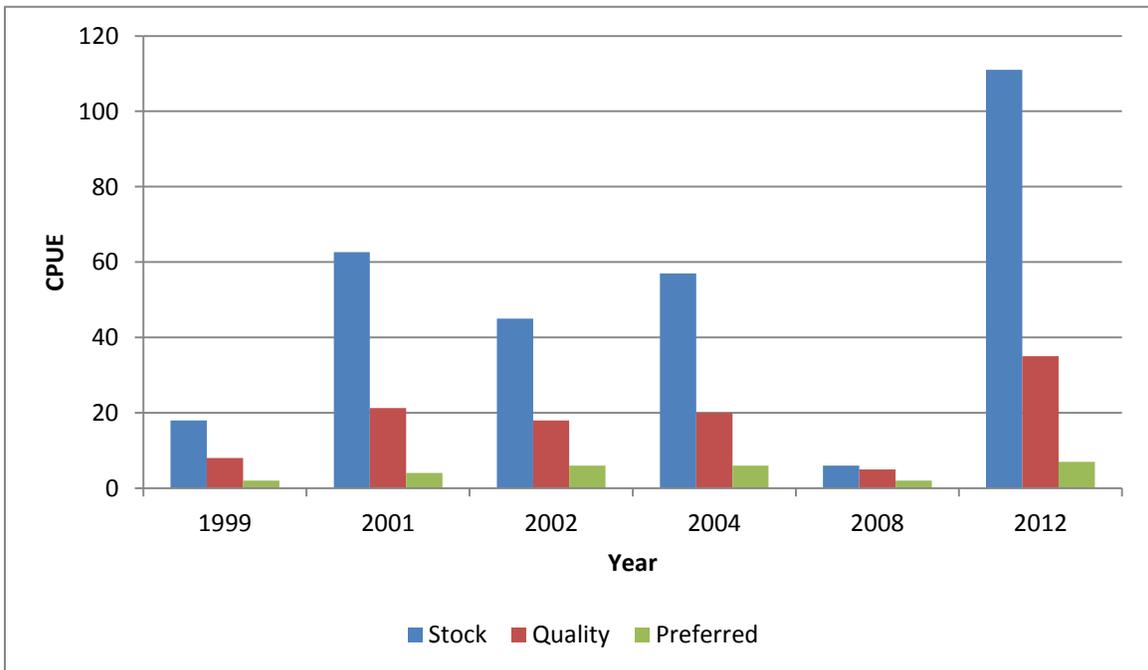


Figure 4. The CPUE for stock-, quality-, and preferred-size classes of largemouth bass on Lake Louis, Louisiana for fall season 1999 – 2012.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe 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 5 below indicates a PSD of 56 for 2004. The number indicates that 56% of the bass stock (fish over 8 inches) in the sample were at least 12 inches 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.

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

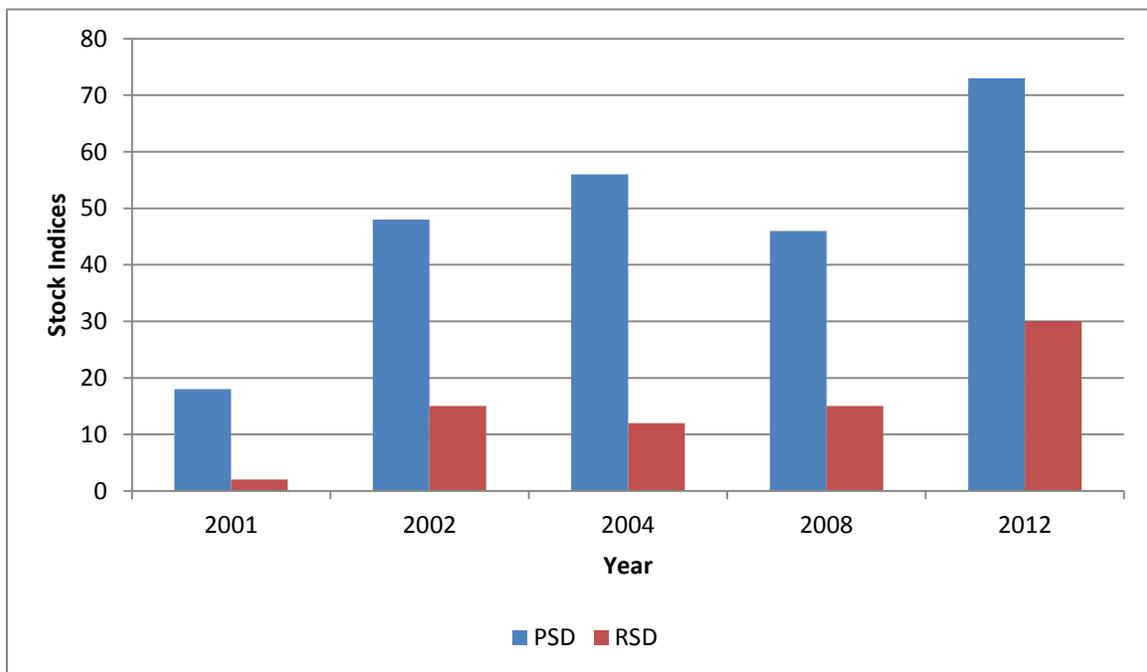


Figure 5. The size structural indices (PSD and RSD-p) for largemouth bass collected from Lake Louis, Louisiana in spring electrofishing samples from 2001 – 2012.

Trends in sampling data indicate PSD's increased from 2001 to 2004, slightly declined in 2008, and then sharply increased in 2012.

Largemouth Bass Age and Growth

The largemouth bass age structure was analyzed in 2002. Results indicate growth rates similar to other lakes in the same geographical area of the state. Results are found in Figure 6. The study found a high percentage of the LMB population to be in the 0, 1, and 2 year age classes. See Figure 7. This age structure is similar to most lakes in Louisiana. It also indicates that successful LMB recruitment occurred in Lake Louis during 2000, 2001, and 2002 following the annual fall/winter drawdowns in the previous years.

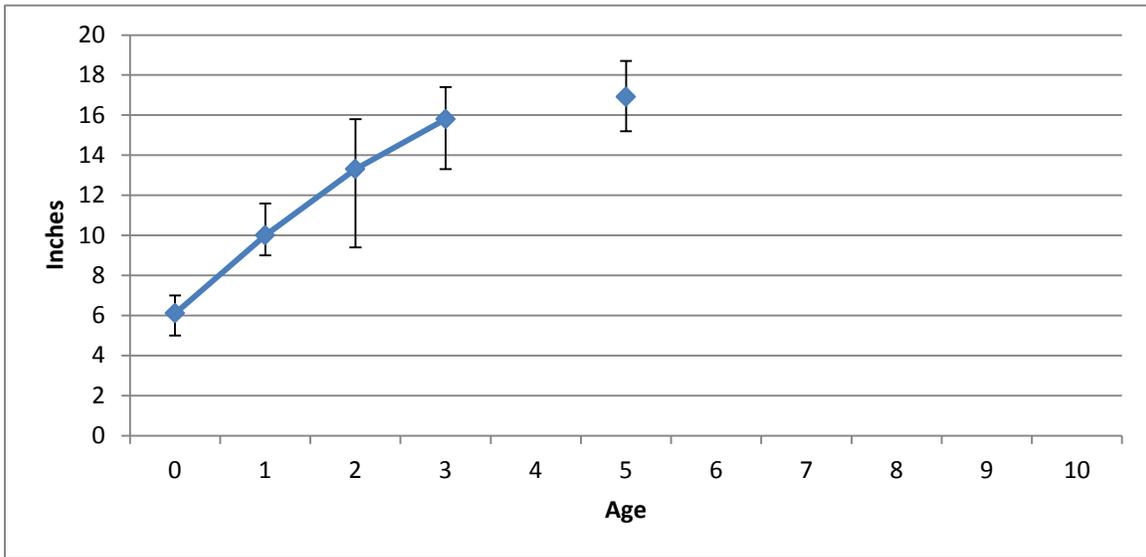


Figure 6. The mean length (\pm SE) at age of capture for largemouth bass from Lake Louis, Louisiana in 2002 (N=56).

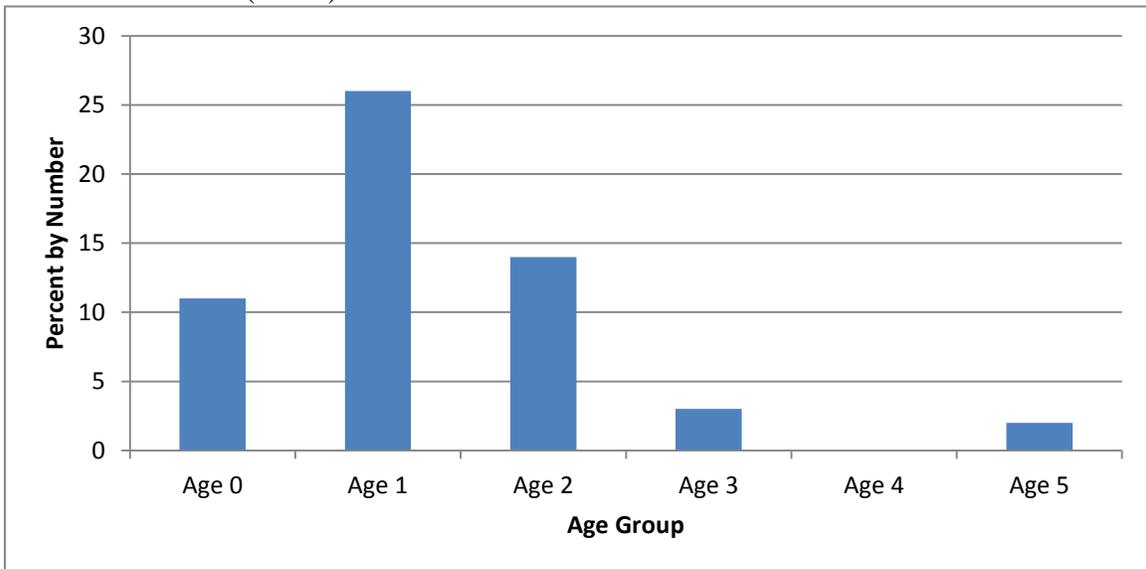


Figure 7. The age structure composition (percentage) for largemouth bass from Lake Louis, Louisiana for 2002 (N=56).

Forage

Forage availability is measured through two methods of sampling fish community composition. These methods include shoreline seine hauling and electrofishing. Shoreline seining results can be found below in Figure 8. Major forage species included various sunfishes (*Lepomis* spp.), minnows (*Fundulus* spp.), shiners (*Notropis* spp.) and shad (*Dorosoma* spp.). Fall forage electrofishing indicate that sunfishes and shad species are the major forage. Forage electrofishing results for 2012 are presented in Figure 9. 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 indicate a potential problem with forage availability. The relative weights of LMB collected from Lake Louis exceeded 85 for all size groups, indicating adequate available forage. Relative weights can be found in Figure 10.

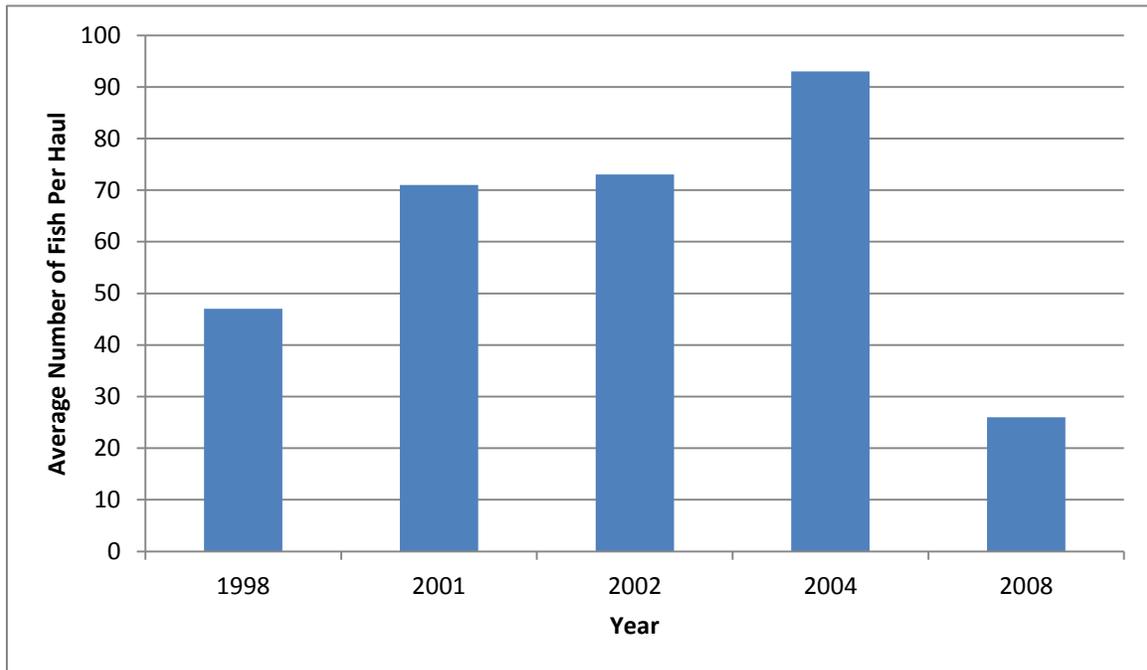


Figure 8. Average number of forage species ≤ 6 inches in total length captured in two seine hauls taken from Lake Louis, LA for 1998 through 2008.

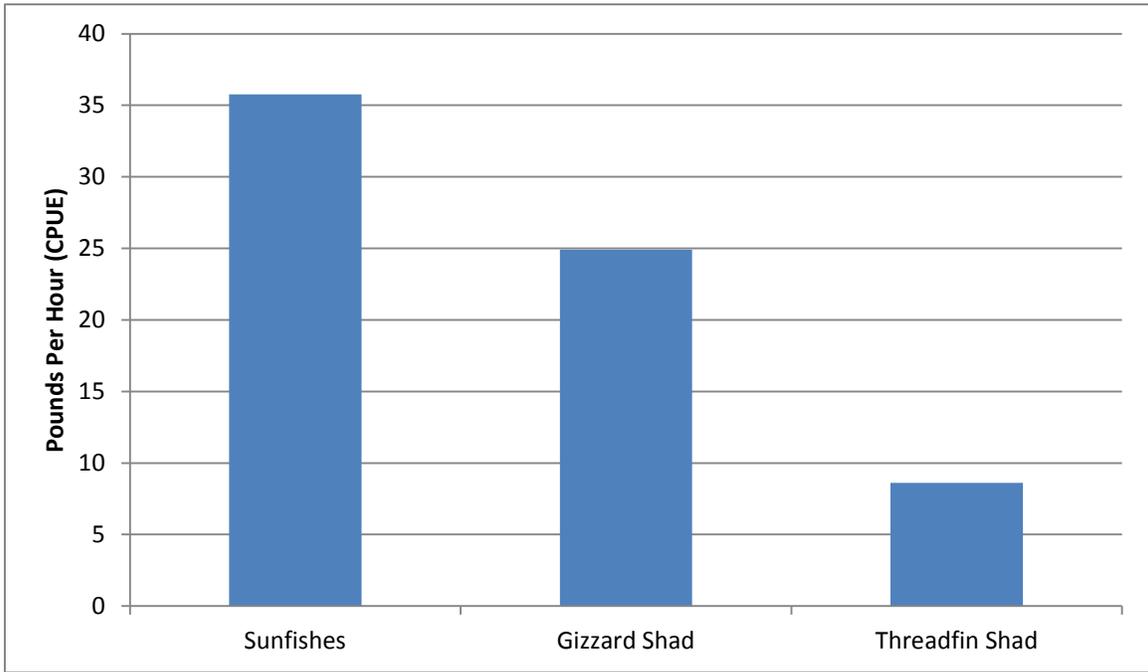


Figure 9. The CPUE (pounds per hour of electrofishing) of forage fish species found in Lake Louis, Louisiana for 2012.

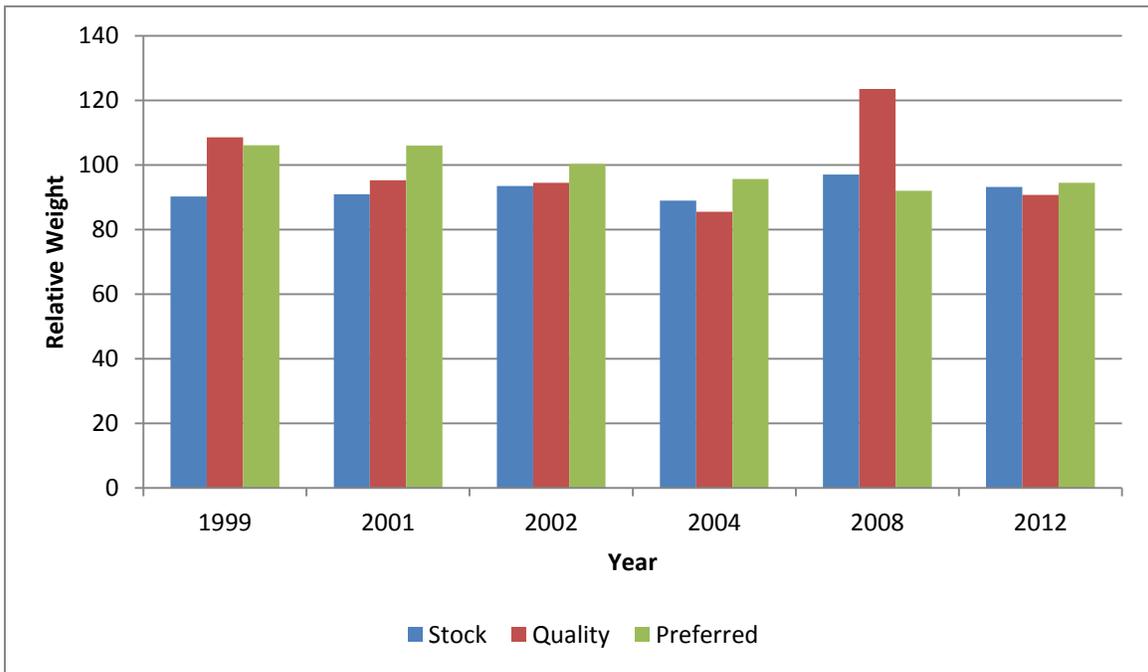


Figure 10. The relative weights for stock-, quality-, and preferred-size classes of largemouth

bass collected from Lake Louis, Louisiana during fall electrofishing from 1999 to 2012.

Largemouth bass genetics

Florida largemouth bass (FLMB) have been stocked into Lake Louis seven times since 1999. See Table 2 for complete stocking results. Stocking has not occurred since 2009 due to the lack of success with previous stockings. Historically high turbidity levels occur during the spring and summer in Lake Louis. Largemouth bass stocking during this period of high turbidity has proven to be unsuccessful for these sight feeding predators. The annual drawdowns that occur on Lake Louis may also adversely impact the success of Florida bass introduction. Genetic testing in 2002 found only 2% of the fish tested had Florida alleles, subsequent testing in 2008 found no Florida alleles in the population.

Table 2. The historical Florida largemouth bass stockings for Lake Louis, Louisiana, from 1999 until present.

Year	FLMB Stocking
1999	19,973
2000	11,970
2002	14,161
2003	14,282
2004	14,025
2008	9,900
2009	11,590

Crappie

The crappie population in Lake Louis consists primarily of white crappie with an occasional black crappie being caught. White crappies are more adapted to the turbid, open water habitat found in Lake Louis. Crappies are one of the most sought after species by fishermen who utilize the lake. Crappie populations are currently sampled with electrofishing techniques and lead nets. Prior to 1999, crappie abundance was determined in biomass samples with block-off nets (rotenone). The crappie population has responded positively to the annual drawdowns that have occurred since 1999. Results are found in Figure 11. The annual drawdowns lower the water level 4 feet in the fall/winter. The lake is allowed to refill each spring prior to fish spawning. An age and growth study was conducted in 2002 on white crappie and the results indicated a good age distribution and growth rates. Results are in Figures 12 and 13. Currently, a crappie population study is ongoing on Lake Louis and data collection will be completed in December 2016. Results of the study will be published as they become available.

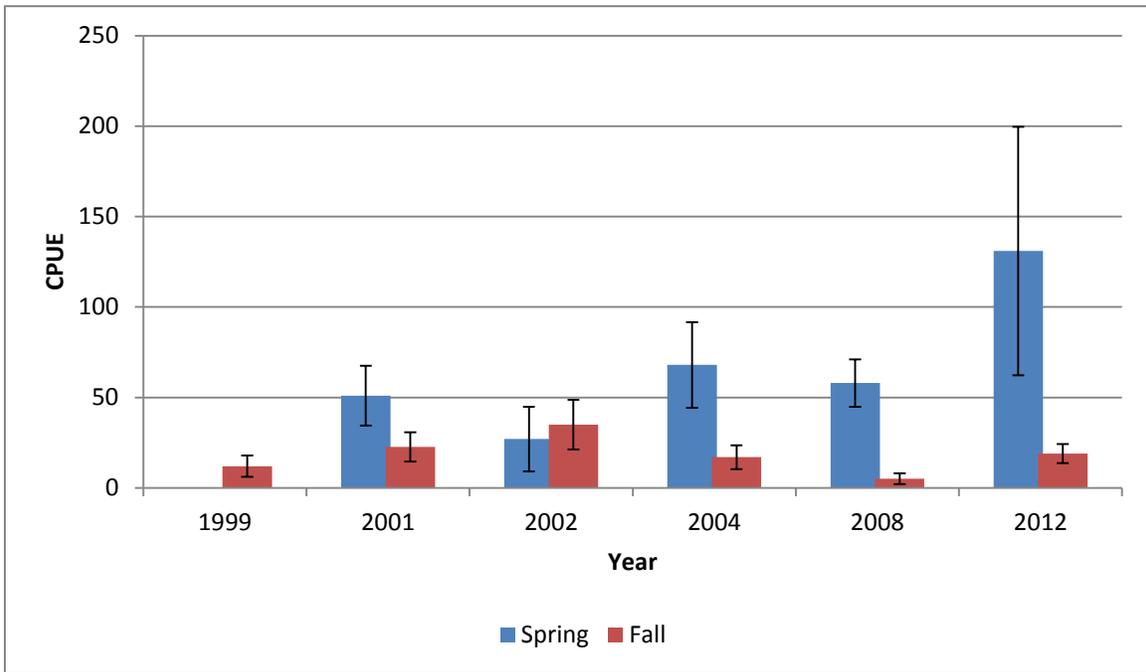


Figure 11. The total CPUE (\pm SE) for white crappie from Lake Louis, Louisiana for spring and fall electrofishing results from 1999 to 2012.

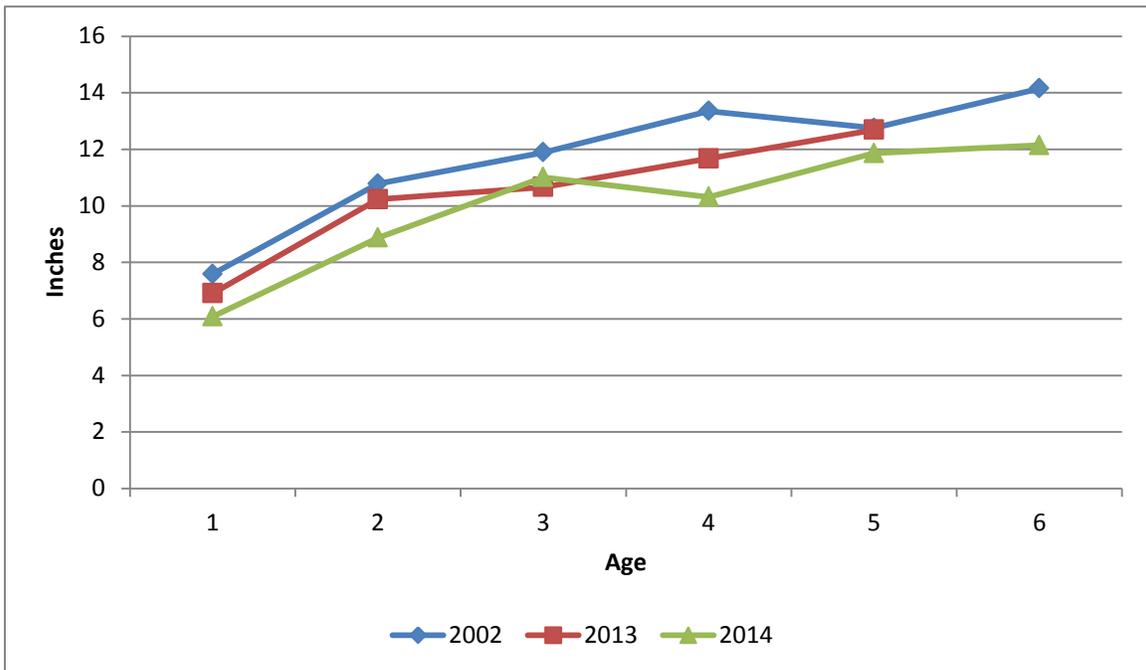


Figure 12. The mean length at age of capture for white crappie from Lake Louis, Louisiana in 2002 (N = 32), 2013 (N=95), and 2014 (N=77).

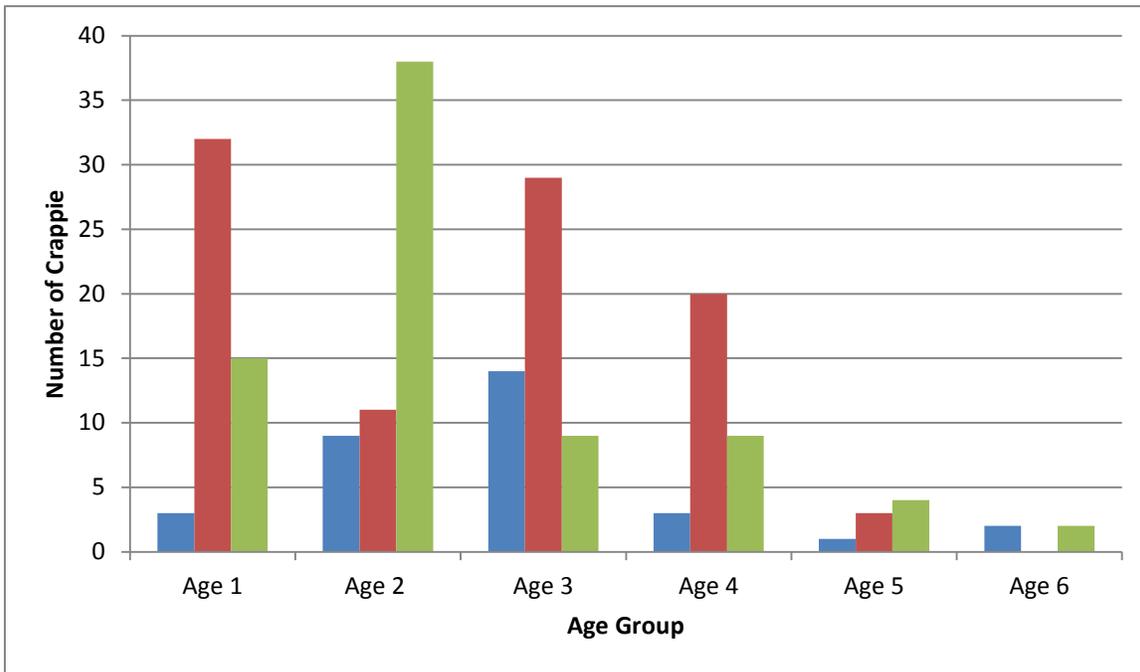


Figure 13. The age composition by number for white crappie from Lake Louis, Louisiana for 2002 (N = 32), 2013 (N=95), and 2014 (N=77).

Commercial

Large rough fish species that comprise a commercial fishery are not found in sufficient numbers to support a viable commercial fishery. However, gill netting results in 2002 and 2014 found a wide variety of commercial species but the overall quantity for each species was low. Gill net results are depicted in Figure 14.

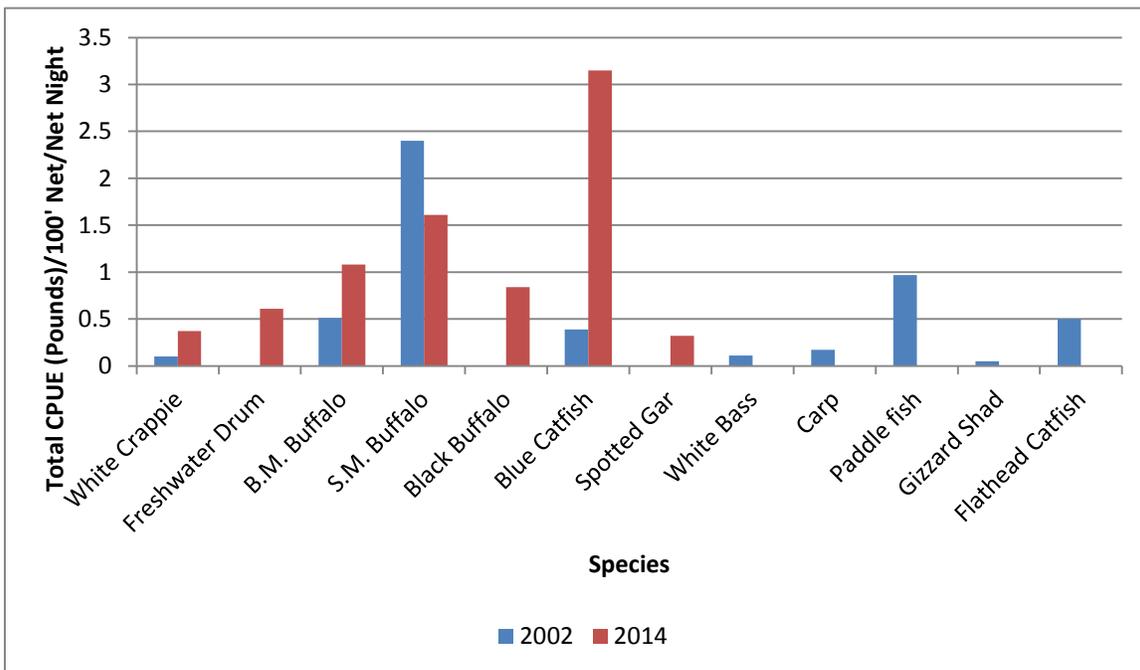


Figure 14. The CPUE (pounds per net night per 100' net) for sport-, commercial- and rough

fish collected in gill nets from Lake Louis, Louisiana for 2002 and 2014.

HABITAT EVALUATION

Aquatic Vegetation

Almost no submergent aquatic vegetation is present in Lake Louis. Several conditions exist that prevent submergent vegetation growth. The lake bottom has steep contours resulting in few shallow water areas. The high turbidity levels that occur in the spring and early summer prohibit sunlight penetration through the water column; which also restricts submergent plant growth. Annual drawdowns of four feet have occurred each fall/winter since 1999. Emergent plants in the lake consist of alligator weed and water primrose. Total aquatic vegetation coverage is less than 5%. There is a shoreline fringe of water elm, swamp privet, and cypress trees along much of the lake.

Summer survey (August 3, 2011) revealed there were no problem plant species present. There is a fringe of alligator weed along the shoreline. It is very sporadic and covers less than 10 acres. It provides limited benefit to fish species. No submerged vegetation was observed.

No problem vegetation was observed in 2012. Alligator weed coverage was similar to what was noted during the assessment in 2011.

No problem vegetation is expected for 2013. Alligator weed coverage is expected to be similar to what was present in 2011 and 2012. No submerged vegetation is expected.

A vegetation survey was conducted in the fall of 2015, and no problem vegetation was observed. No problem vegetation is expected in 2016.

Substrate

High silt loads from agricultural runoff and loss of backwater connectivity to the Ouachita River have created high silt loads in Lake Louis. This is particularly apparent on the shallow flats on the north end of the lake. The Bayou Falcon boat ramp located in Sicily Island was built in the late 1960's and is no longer usable due to sedimentation. The recent mitigation structure (Fool's River Pumping Plant) diverts Tensas River water from Lake Louis. Additional structures allow for flushing and annual drawdowns have helped compact the siltation by mimicking the seasonal cyclic flooding and drying that would occur naturally in a river backwater system. Although improved, the lake still suffers from siltation and high turbidity from nearby agricultural runoff during heavy rainfall events.

Artificial Structure

The LDWF has not placed artificial structure in Lake Louis. The only manmade structure found in the lake consists of boat docks and piers, located in the northern half of the lake.

CONDITION IMBALANCE / PROBLEM

In 1956, an earthen dam was installed between Bayou Louis and the Ouachita River. This

closure prevented historical backwater flow from the Ouachita River. This allowed the more turbid Tensas River water to become the main source of backwater entering Lake Louis. History has shown that when turbidity levels increase above a healthy threshold within a waterbody a decrease in overall aquatic productivity generally follows. This is usually followed by an increase in rough fish species and a corresponding decrease in game fish. Biomass estimates (rotenone samples) were conducted in 1960 and indicated an out of balance fish population with excess forage species and a shortage of predatory game species. Biomass samples conducted later in the 1980's showed a fish population with a high proportion of commercial fish species.

In 2002, the Sicily Island Flood Control Levee Project was completed. This project completely enclosed the lake within a levee and prohibits the turbid Tensas River water from entering the lake. Mitigation for the levee project included a control structure, a weir and pumping stations, and several plugs which would allow drawdown, flushing, and agricultural runoff diversions away from Lake Louis in order to reduce the silt load and turbidity problem. Annual drawdowns have been conducted since 1999 and water levels are allowed to exceed pool elevation during spawning months. These measures have been beneficial but during heavy rains turbidity can still be a problem due to agricultural runoff.

CORRECTIVE ACTION NEEDED

Although watershed improvements, water control structures and the current habitat management plan have improved the turbidity problem, periods of high turbidity still occur during periods of heavy rainfall. This is primarily due to agricultural land use practices and runoff into the lake. In 2012, the Natural Resource Conservation Service began a cost share incentive program for farmers in the Lake Louis watershed to encourage better farming practices. Over time this should help reduce the amount of silt runoff that goes into the lake.

RECOMMENDATIONS

1. Continue with the current habitat management plan that has been in place since 1999. This plan calls for annual water fluctuations (drawdowns) of 4 feet beginning on September 1 of each year and ending on February 15th of the following year. This plan mimics natural water level fluctuations and should continue to reduce shoreline sedimentation and improve spawning substrate. The cooperative plan can be viewed in MP-A Appendix IV.
2. Complete the ongoing creel survey in December 2016
3. Complete the Crappie Population Study - update results in the Management Plan
4. Continue scheduled standardized fisheries sampling to determine status of sportfish and forage populations.

Aquatic Plant Recommendations for 2016

5. Late summer monitoring for detection of invasive vegetation conducted annually.
6. Foliar herbicide applications will be made as necessary with appropriate herbicides as recommended by the LDWF Aquatic Plant Control Program. However, foliar applications have never been required in Lake Louis thus none are expected in 2016.