LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LAKE ST. JOHN

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sport fish species in Lake St. John are managed to provide sustainable populations while providing anglers the opportunity to catch or harvest adequate numbers of fish to maintain angler interest and efforts. Largemouth bass (LMB) anglers are afforded the opportunity to catch quality - sized largemouth bass through the introduction of Florida largemouth bass. Hybrid striped bass are stocked to provide an open water predatory species to utilize the abundant shad population and provide additional recreational fishing opportunities.

Commercial

Commercial species of fish are managed to provide a sustainable population.

Species of Special Concern

No threatened or endangered fish species are known to inhabit this lake. However, Lake St. John is one of a few landlocked Mississippi oxbow lakes with a self-sustaining population of gulf pipefish.

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

SPECIES EVALUATION

Recreational

Largemouth Bass

Largemouth bass are targeted as a species indicative of the overall fish population due to their high position in the food chain. Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large bass. Spring and fall electrofishing are used to determine population trends, age and growth, and genetic information. Gill net sampling is used to determine the status of large bass and other large fish species.

Largemouth bass catch per unit effort and relative weight -

Electrofishing has been used to collect LMB for population data in Lake St. John since 1991. Spring and fall electrofishing results are used to develop information which serves as indicators of LMB relative abundance for various size classes from year to year. Total catch-per-unit-effort (CPUE) for LMB is found in Figure 1 below. Total CPUE is broken into stock-, quality-, and preferred-size groups in Figure 2 below. Fish populations fluctuate due to various factors. The LMB population in St. John is no exception. 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 fluctuated substantially between 1991 and 2013. Annual drawdowns occurred in the lake from 1983 until 1998. The increase in the LMB population from 1991 through 1997 may have been the result of improved spawning habitat created by the drawdowns. During the late 1990's and early 2000's severe drought conditions occurred in the southeast. This is suspected to have reduced spawning success in area lakes including St. John. In Figures 2 and 3, spring and fall electrofishing sample results are divided into stock-, quality-, and preferred-size classes.

Fall electrofishing data is used to determine LMB relative weight (Wr) which is the ratio of a fish's weight to the weight of a standard fish of the same length. Largemouth bass Wr below 80 are indicative of a potential problem with forage availability. In Figure 4 below, Wr values are shown for LMB since 1994. The lowest Wr found in all size classes was 89. Relative weights for Lake St. John LMB consistently indicate a population with abundant and available forage.

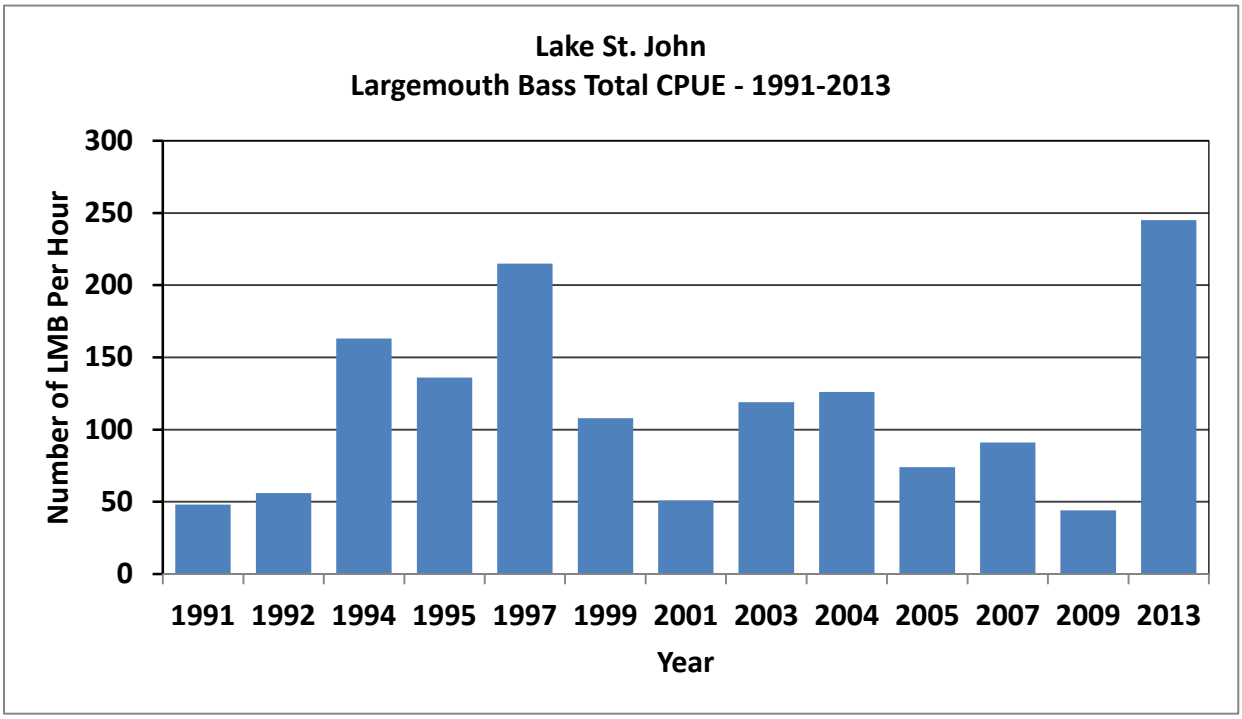

Figure 1. The total CPUE (number per hour) for largemouth bass from Lake St. John, Louisiana for spring electrofishing results from 1991 - 2013.

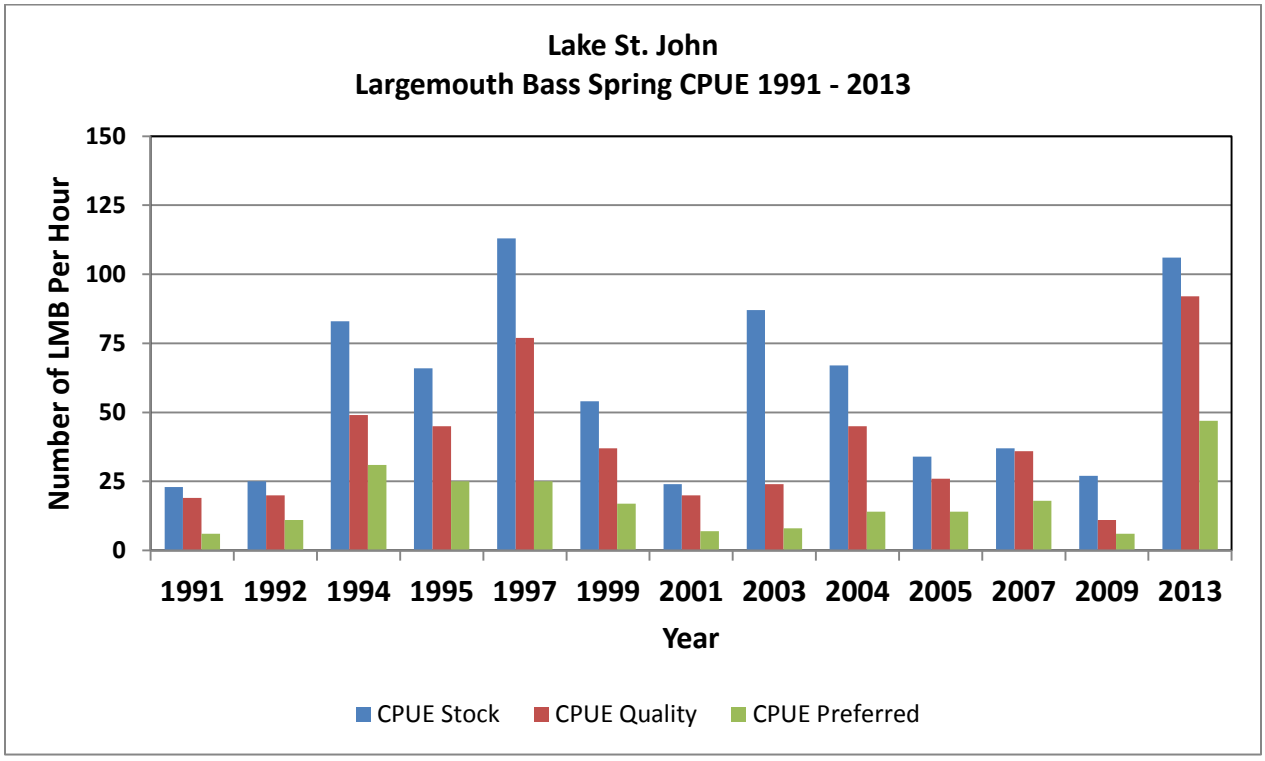

Figure 2. The CPUE for stock-, quality- and preferred-size classes of largemouth bass on Lake St. John, Louisiana for the spring from 1991 - 2013.

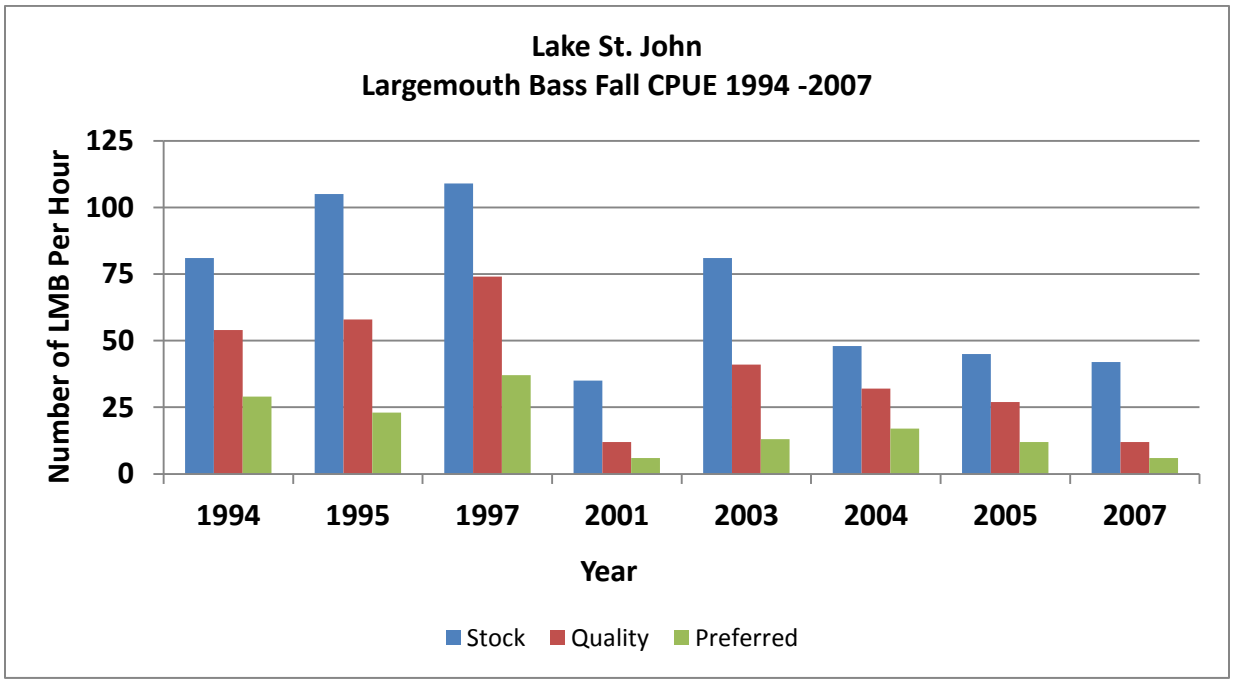

Figure 3. The CPUE for stock-, quality- and preferred-size classes of largemouth bass on Lake St. John, Louisiana for the fall season from 1994 through 2007.

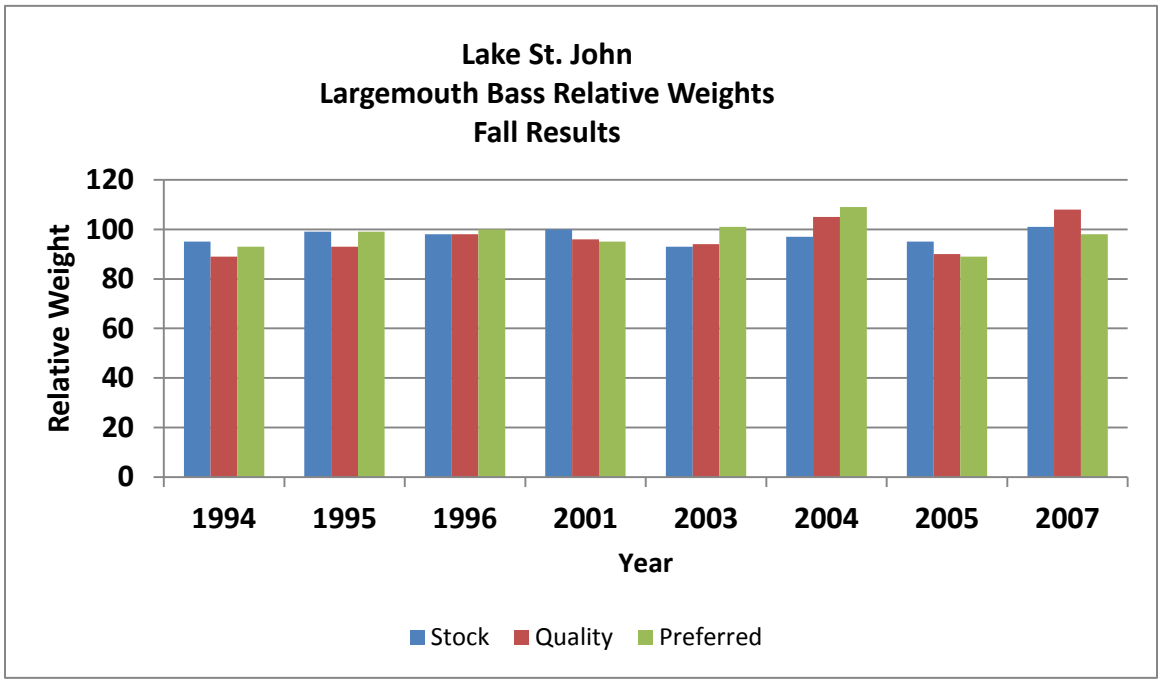

Figure 4. The relative weights for stock-, quality-, and preferred-size classes of largemouth bass collected during fall electrofishing for Lake St. John, Louisiana from 1994 to 2007.

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 5 below indicates a PSD of 41 for 2009. The number indicates that 41% 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.

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

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

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

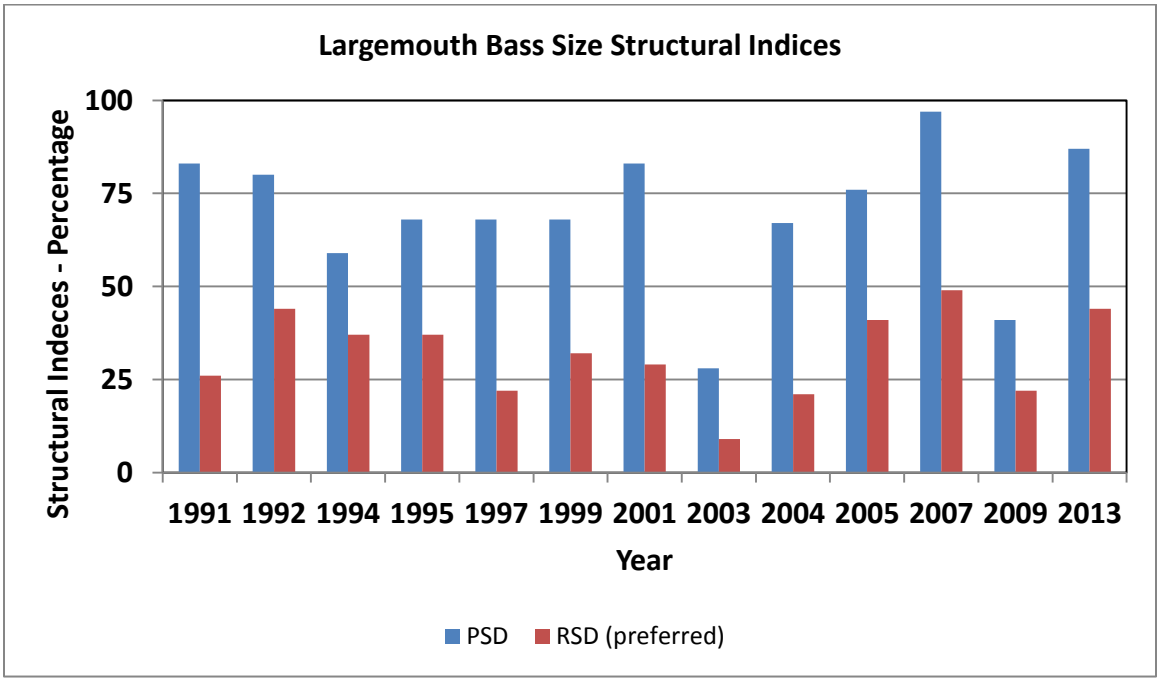

Figure 5. The PSD and RSD-$_P$ of largemouth bass collected from Lake St. John, Louisiana for spring electrofishing results from 1991-2013.

Trends in Lake St. John sampling results indicate PSD's and RSD's have had an overall increase from 2003 through 2013.

Largemouth bass age and growth-

The largemouth bass age structure for Lake St. John was analyzed in 2004. The results for 2004 are found in Figure 6. The majority of the LMB were found to fall into age classes 1, 2 and 3 with over 45% of the fish found to be age 3. The growth rates for LMB were similar to other Mississippi River oxbow lakes. Bass growth rates are found in Table 1.

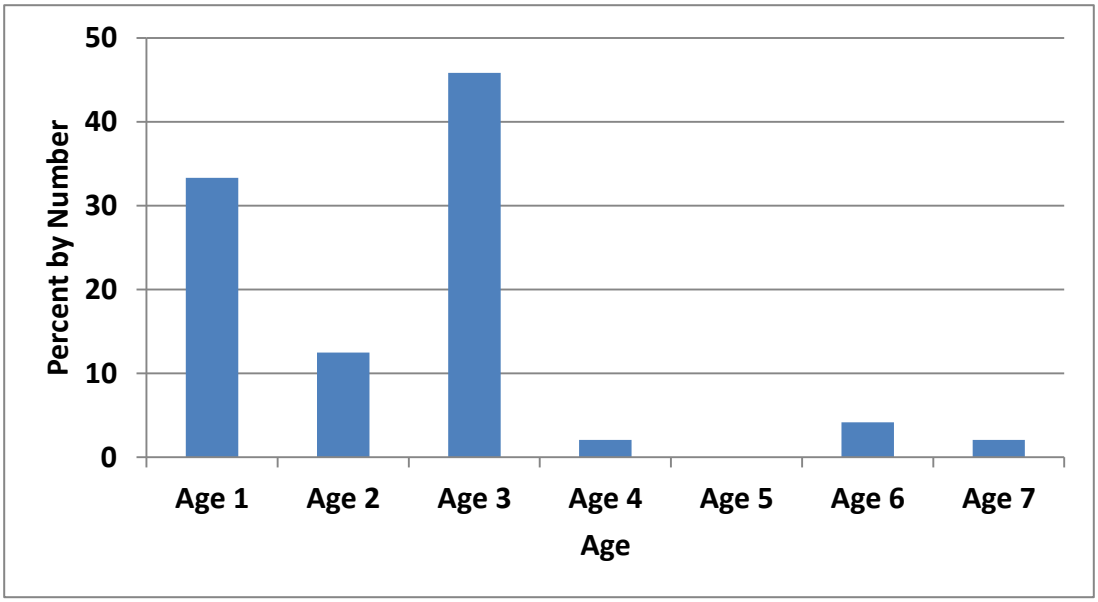

Figure 6. The age structure composition (percent by number) for largemouth bass from Lake St. John, Louisiana for 2004. N = 48.

Table 1. Average length at age of capture for largemouth bass in Lake St. John, Louisiana 2004. N = 48.

AGE	Average Length at Capture (inches)
1	10.4
2	13.9
3	15.1
4	15.7
5	--
6	18.3
7	20.5

Largemouth bass genetics-

Table 2 below shows the history and results of LMB genetic testing. Florida largemouth bass (FLMB) stockings occurred 10 times between 1999 and 2011 in Lake St. John. Electrophoretic analysis of largemouth bass in 2004 showed 100% northern strain. No Florida genes were found in the population. Additional LMB genetic testing is planned for the fall of 2013.

Table 2. Largemouth bass genetic testing results for Lake St. John, Louisiana.

Year	% NLMB	% FLMB	% FLMB x NLMB	Total FLMB Influence
2004	100	0	0	0

Forage

Lake St. John is a fertile lake with an abundance of forage. Figure 7 below shows historical biomass (rotenone) sampling results. Standing crop results for forage species were at or above two hundred pounds per acre from 1985 through 1992. Rotenone sampling has been discontinued; currently forage availability is measured through summertime shoreline seining, fall forage electrofishing, and indirectly by measuring LMB relative weights. Shoreline seining results can be found below in Figure 8. Predominant forage species included gizzard shad, threadfin shad, minnows, shiners and silversides. Sunfish species are also plentiful. As previously discussed, 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 Lake St. John exceeded a value of 89 for all size groups, indicating an abundance of available forage. Relative weights for LMB in Lake St. John can be found above in Figure 4.

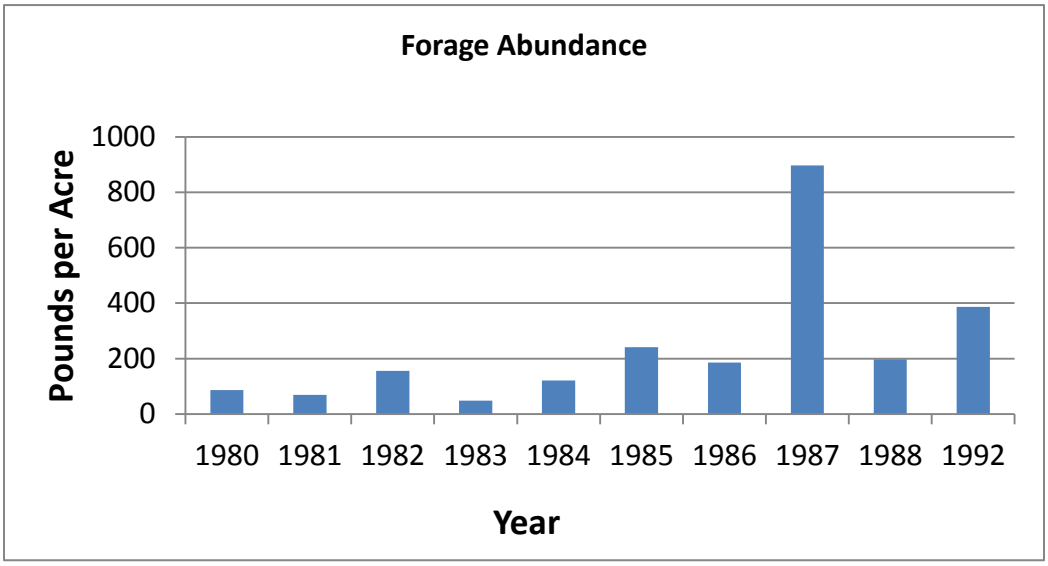

Figure 7. The biomass (standing crop) estimates of forage species collected by rotenone sampling for Lake St. John, Louisiana from 1980 through 1992.

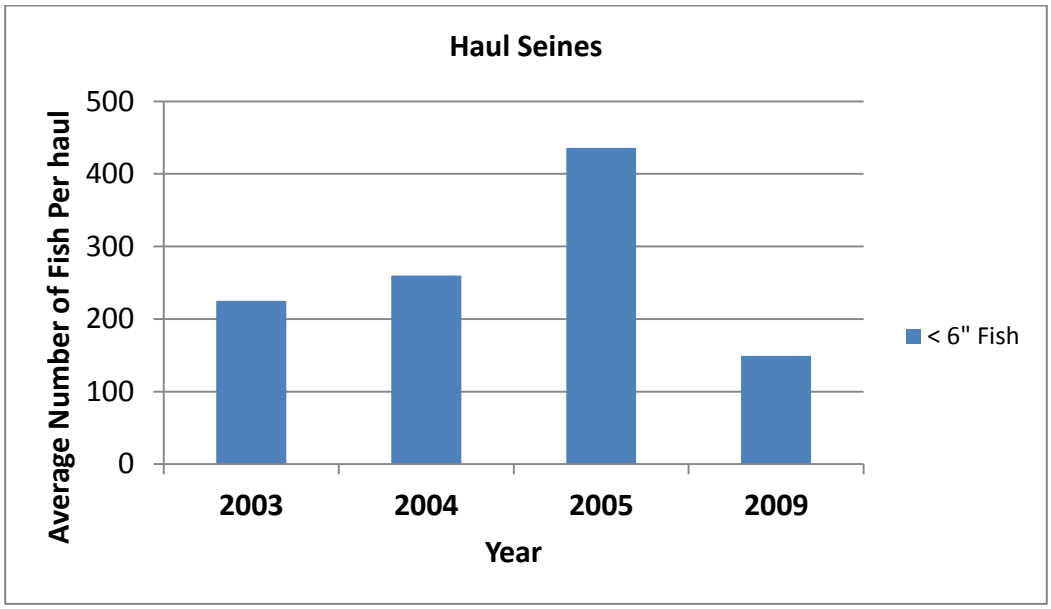

Figure 8. The average number of fish less than 6 inches TL (potential forage) captured per seine haul in Lake St. John, Louisiana for the years 2003, 2004, 2005, and 2009.

Crappie

Both black and white crappie occur in Lake St. John and are popular with recreational anglers. Crappie populations and angler satisfaction have varied considerably over the years indicating both the cyclic nature of the species and the difficulty in obtaining reliable population data with standard sampling techniques. Crappie populations were sampled by biomass (rotenone) methods from 1971-1992. Results varied from a low of 3 pounds per acre to 18 pounds per acre. See results below in Figure 9. Crappies were collected in electrofishing samples from 1990 to present. Catch rate has been variable ranging between 0 and 22 fish per hour of sample time. The technique of sampling crappie with lead nets has become a standardized sampling method for LDWF biologists. It has been used with good success and will be used in the future to monitor the crappie population in Lake St. John.

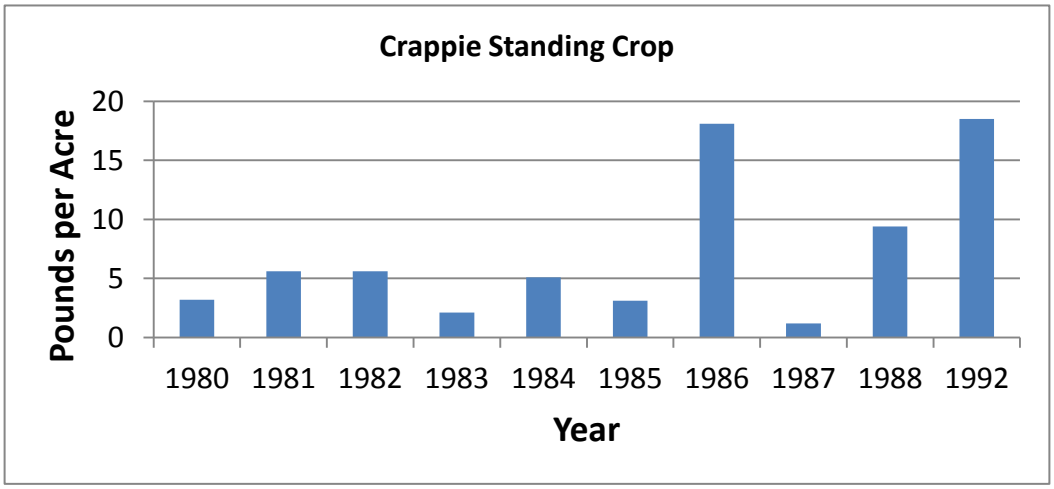

Figure 9. The biomass (standing crop) estimates of crappie in pounds per acre by year for Lake St. John, Louisiana from 1980 through 1992.

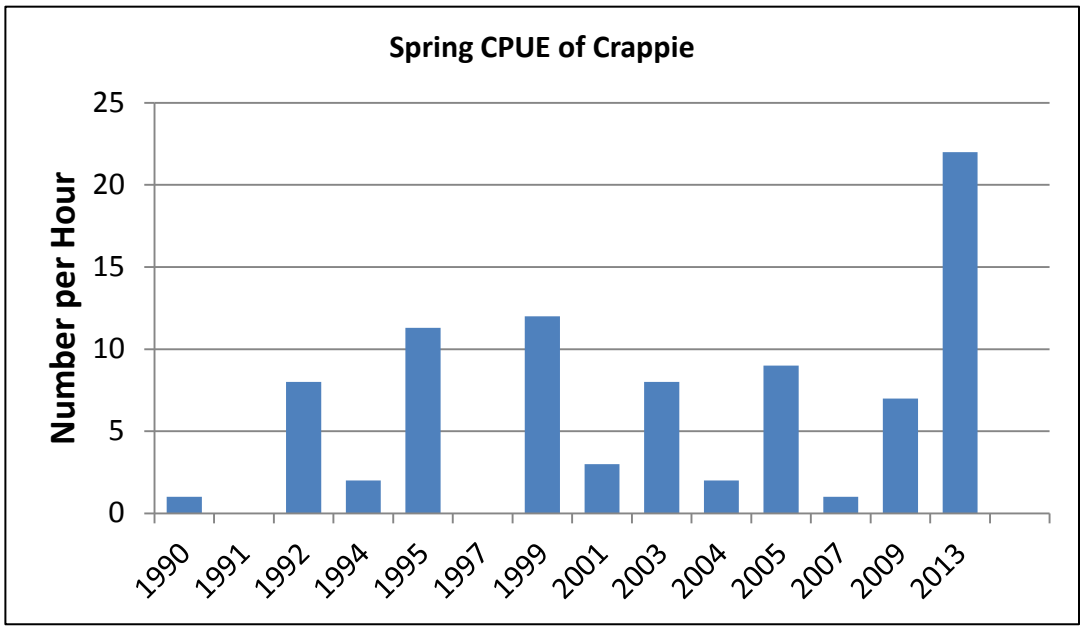

Figure 10. The total CPUE for crappie from Lake St. John, Louisiana for spring electrofishing results from 1990 - 2013.

Commercial

Large rough fish species that comprise a commercial fishery are found in abundance in Lake St. John. Species found in the lake include all species of catfish, freshwater drum, buffalo, carp and gar. Commercial harvest of these species is allowed in accordance with statewide regulations. The results of standardized biomass (rotenone) sampling are found below in Figure 11. Gill net sampling also found a number of commercial species, primarily catfish. Gill netting results are depicted in Figure 12 below.

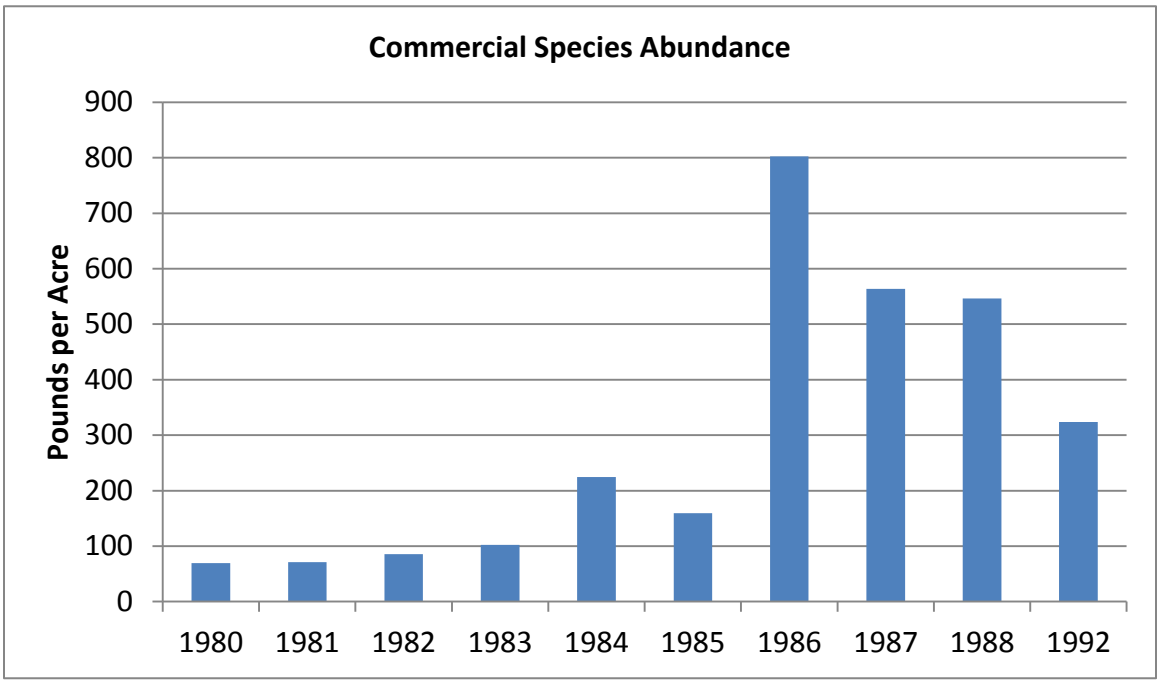

Figure 11. The standing crop estimates of Commercial species for Lake St. John, Louisiana from 1980 through 1992.

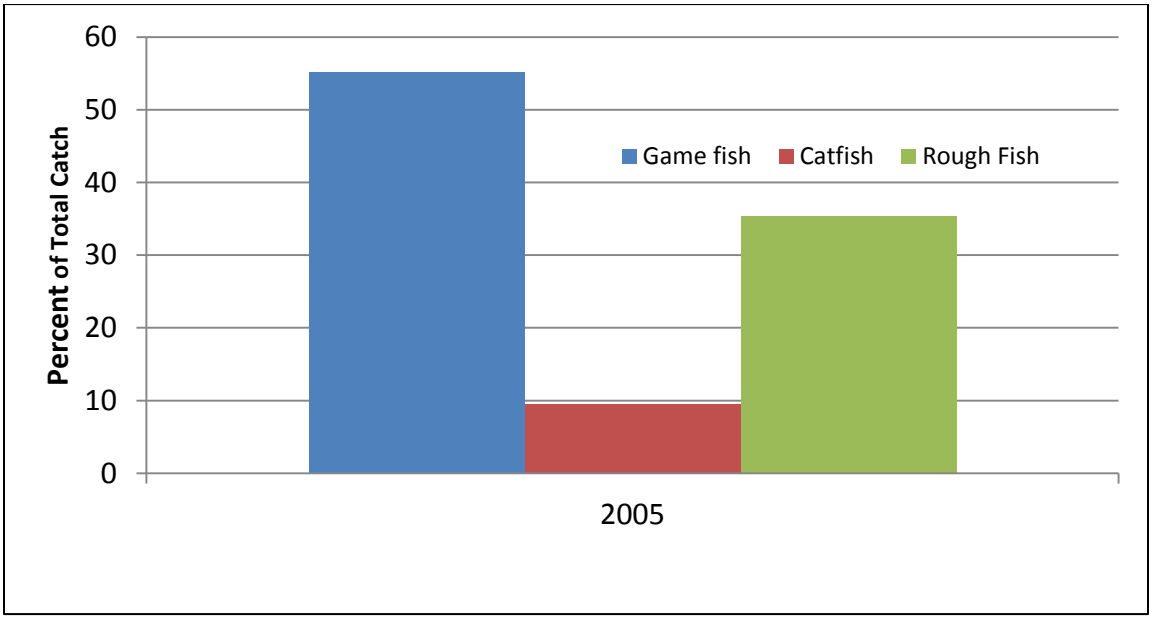

Figure 12. The percentage (by number) of fish species captured by category in 2005 in Lake St. John, Louisiana with standardized gill nets.

Creel Survey

Creel surveys were conducted on Lake St. John in 2004 and 2005 to gather data on recreational fishing efforts and harvest. Figure 13 below gives a summary of the results.

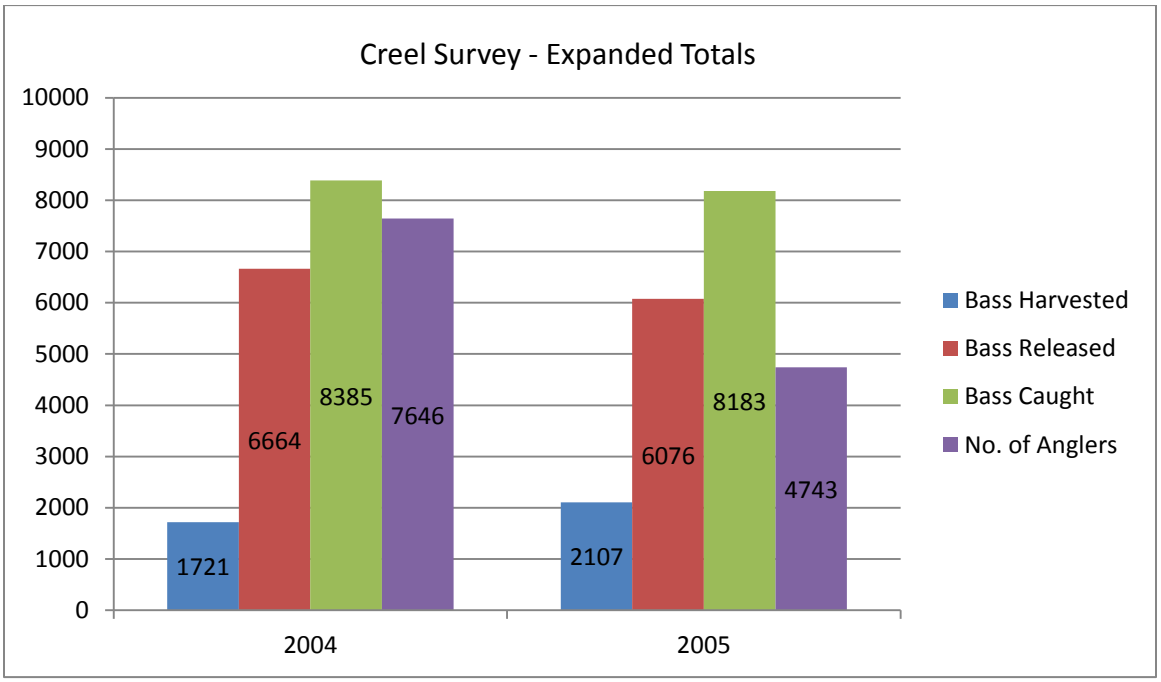

Figure 13. The LMB harvest and angler effort for Lake St. John, Louisiana in 2004 and 2005.

HABITAT EVALUATION

Aquatic Vegetation

Historically, aquatic vegetation has not been a serious issue in Lake St, John. Total aquatic vegetation coverage ranges from 5%-15%. Although it has not been a problem to fisheries, occasional complaints from lakeshore residents are received. Maintenance spraying is periodically used to keep public access areas open to boating. Generally less than 100 acres of emergent vegetation is sprayed annually. Giant salvinia was reported in the lake in 2009. Spray records indicate 1 acre was treated; however no other incidence of giant salvinia has been documented. The most recent vegetation survey occurred in July of 2013. No significant submersed vegetation was observed. Floating vegetation found included water hyacinth (*Eichhoria crassipes*) and common salvinia (*Salivinia minima*). The total acreage for both species combined was less than 25 acres. Emergent vegetation found included giant cutgrass (*Zizaniopsis miliacea*), water primrose (*Ludwigia spp.*), and water pennywort (*Hydrocotyle spp.*). Giant cutgrass is the primary emergent vegetation and is found in a fringe along approximately 50% of the lake shoreline. This likely reduces shoreline erosion by buffering waves created by extensive water recreation that occurs on the lake. Large cypress trees (*Taxodium disticum*) line the entire shoreline and extend out into the lake on the "island" side of the lake and in the flats on each end of the lake. Cypress trees cover about 10% of the lake.

Substrate

Sedimentation of oxbow lakes is a natural process that normally occurs over many centuries. This process is accelerated by land use changes that increase erosion and runoff in the watershed of a lake. Conversion of bottomland hardwood forests to row crop cultivation has increased soil erosion and silt laden runoff entering Lake St. John. In addition, construction of the spillway in the 1950's, raised the summer pool stage of the lake, stabilized the water levels and essentially eliminated the naturally occurring annual low water season that occurred prior to the spillway construction. Consequently, the drying conditions that served to harden and stabilize these sediments no longer occur with regularity. These changes have resulted in the deposition of soft silts over parts of the lake bottom, particularly in the shallow flats at each end of the lake. These soft bottom sediments can reduce spawning success of bottom nesting game fish species. Also, in the past, the Concordia Parish Police Jury regularly opened the spillway gates in the spring to reduce pier flooding. This reduction of spring high water during the spawning season reduces spawning success of game fish, particularly bass and crappie. By the early 1980's, anglers complained that fishing in general and especially crappie fishing was not as good as it has been in the past and we were asked to investigate the problem and make recommendations to the Police Jury and Lake Commission. LDWF recommendations included a series of limited lake drawdowns to emulate the natural flooding and drying cycle that occurred prior to spillway construction.

Artificial Structure

Almost the entire shoreline of Lake St. John is developed with numerous large piers supplementing the natural shoreline cover provided by the cypress trees and aquatic vegetation. Open water cover is scarce, however. In order to provide additional open water cover in Lake St. John, LDWF built and placed plastic pallet type artificial reefs in Lake St. John in 2004. See Part A for reef locations.

CONDITION IMBALANCE / PROBLEM

Drying conditions that served to harden and stabilize these sediments no longer occur with regularity. Soft bottom sediments reduce spawning success of nesting game fish species.

CORRECTIVE ACTION NEEDED

Water fluctuation to the extent possible would improve spawning substrate, oxidize organic sediments and increase the consistency of game fish recruitment.

RECOMMENDATIONS

1. Water level fluctuation has proven to be a successful Lake St. John management technique. Annual water fluctuation should be in accordance with the following schedule:

    A. Fall – Beginning the first Tuesday of September (the day after Labor Day), the gates in the control structure will be opened to dewater Lake St. John. The lake will be dewatered at a rate not to exceed 4" per day. The lake level will be reduced from the pool stage elevation of 53.4' MSL to 47.9' MSL exposing approximately 10-15% of the lake bed.

    B. Winter – The gates should remain open and the water level should be held at or slightly below the drawdown level through the end of December but no later than January 15th at which time the gates should be closed to allow the lake to refill.

    C. Spring – With normal rainfall, the lake should refill to the 54.3' MSL pool stage by the onset of the spring fish spawning/nursery season (March-May). Water in excess of the 54.3' level will exit the lake by overtopping the structure. Opening the gates to eliminate storm runoff during this time should be avoided since dropping water levels too fast while fish are nesting in shallow areas and can be detrimental to recruitment. The gates should remain closed through this critical fish spawning/nursery season (March-May).

    D. Summer – Maintain lake levels at or near pool stage throughout the summer.

2. Conduct standardized sampling of fisheries populations on a 3 year rotation.

3. Annual stocking of hybrid striped bass to utilize available forage and to provide an additional sport fishing opportunity.

4. Meet with the Concordia Parish Police Jury and the Lake St. John Recreation and Water Conservation District at least once per year to report LDWF activities and a Lake St. John status update.

5. Floating and emergent aquatic weeds will be treated as necessary in accordance with the approved LDWF Aquatic Herbicide Recommendations.