

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LAKE LAFOURCHE - CALDWELL

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sportfish species are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts.

Commercial

Commercial species of fish are typically abundant in Lake Lafourche, providing an opportunity for commercial harvest. Commercial fishing is encouraged to assist with keeping fish population in balance.

Species of Special Concern

There are no species of special concern in Lake Lafourche.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations are in effect for all fish species. Recreational fishing regulations may be viewed at the link below: <http://www.wlf.louisiana.gov/fishing/regulations>

Commercial

Statewide commercial regulations are in effect. Commercial activities are not permitted within the Boeuf Wildlife Management Area. Commercial fishing regulations may be viewed at the link below: <http://www.wlf.louisiana.gov/fishing/regulations>

SPECIES EVALUATION

Recreational

Evaluations of the fish population on Lake Lafourche have been conducted since the 1960's. More recently, common recreational species, such as largemouth bass (*Micropterus salmoides*), crappie (*Pomoxis spp.*) and sunfish (*Lepomis spp.*) have been sampled by electrofishing, seining, and lead nets. Largemouth bass (LMB) are typically targeted for evaluation with the use of electrofishing since they are a species indicative of the overall fish population due to their high position in the food chain. Electrofishing is an efficient indicator of largemouth bass abundance and size distribution, with the exception of large fish. Sampling with gill nets can also be used to determine the status of large bass and other large fish species. Shoreline seining is used to collect information related to fish reproduction and forage availability.

Largemouth Bass

Relative abundance and length distribution-

Electrofishing sampling has been conducted on Lake Lafourche numerous occasions since 1993. Catch per Unit Effort (CPUE) results from electrofishing are based on the number of fish captured in 1 hour of electrofishing. This value provides an estimate of relative abundance and allows us to monitor changes in abundance over a period of time. The mean CPUE of the last five spring samples is 71.4 LMB per hour, which indicates a satisfactory abundance of bass in Lake Lafourche. Figure 1 indicates a stable population of LMB, with only normal fluctuations in abundance. It should be noted that the 1998 sample was taken during daylight hours, whereas the other samples were taken at night.

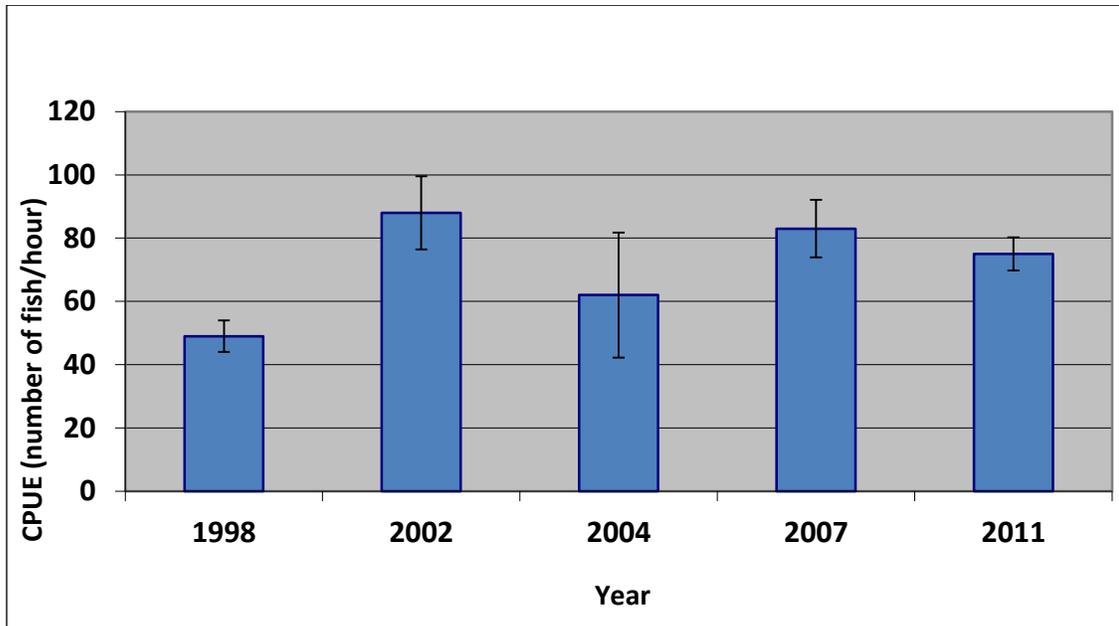


Figure 1. The mean CPUE (number of fish per hour) for largemouth bass estimated from spring electrofishing results on Lake Lafourche, LA 1998 – 2011.

The overall balance of the LMB population can also be evaluated by examining the length distribution of bass collected during electrofishing samples. The CPUE for each inch class of bass collected is portrayed in Figures 2-5. Each of these distributions appears to be normal; with most size classes represented each year and a higher frequency of quality size (12 – 15 inches) fish.

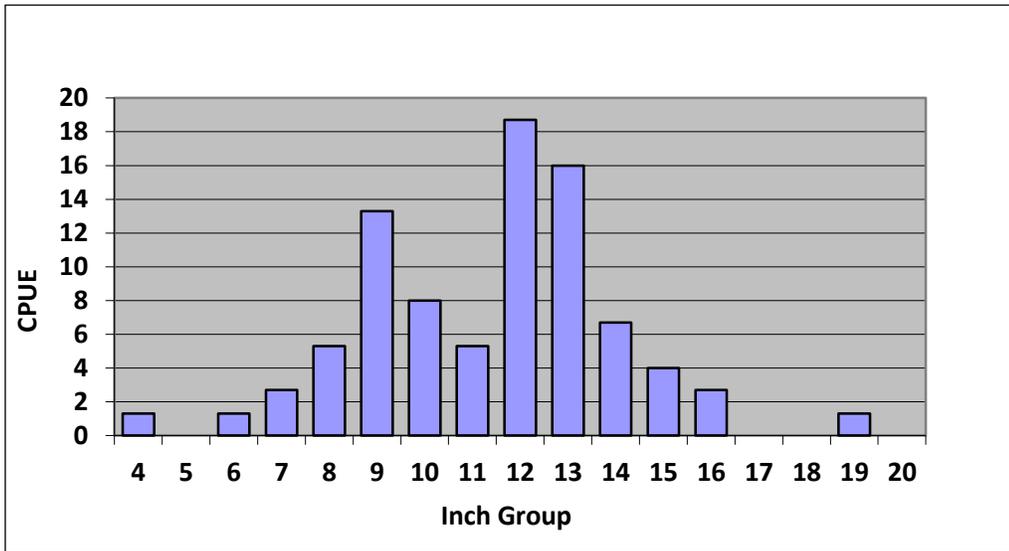


Figure 2. Length distribution of largemouth bass in catch per hour on Lake Lafourche, LA from spring electrofishing, 2002 ($n=66$).

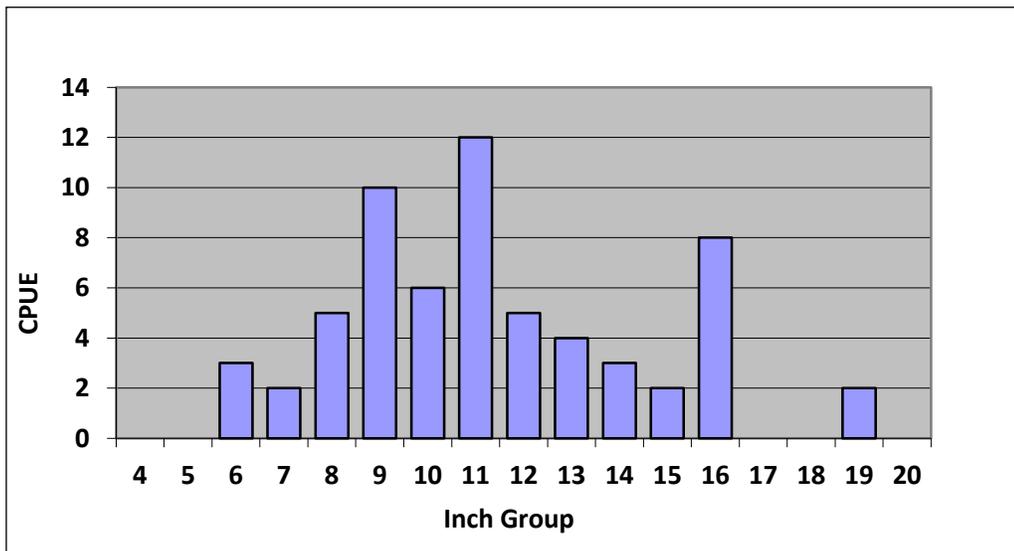


Figure 3. Length distribution of largemouth bass in catch per hour Lake Lafourche, LA from spring electrofishing, 2004 ($n=62$).

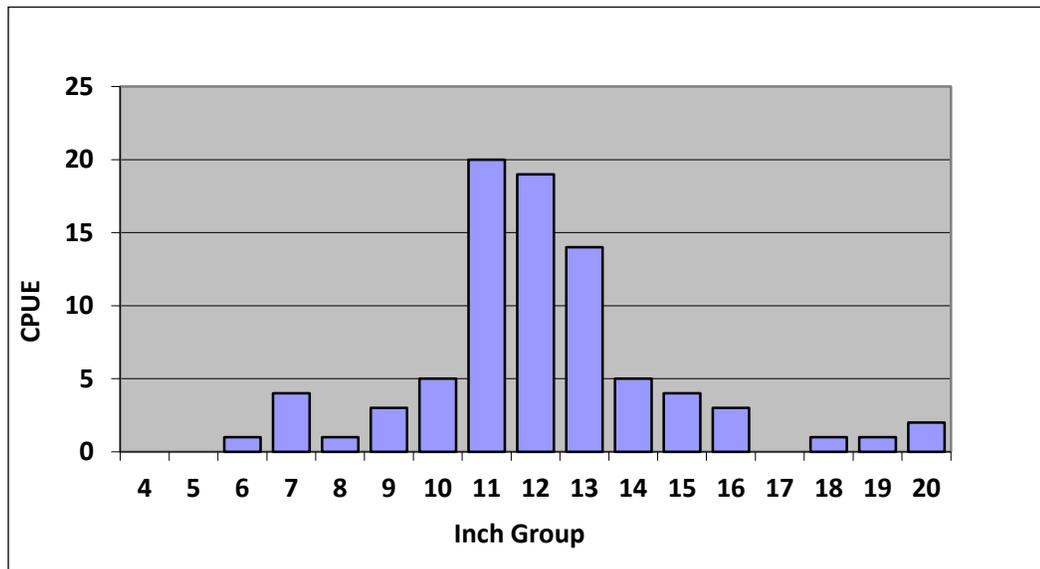


Figure 4. Length distribution of largemouth bass in catch per hour on Lake Lafourche, LA from spring electrofishing, 2007 ($n=83$).

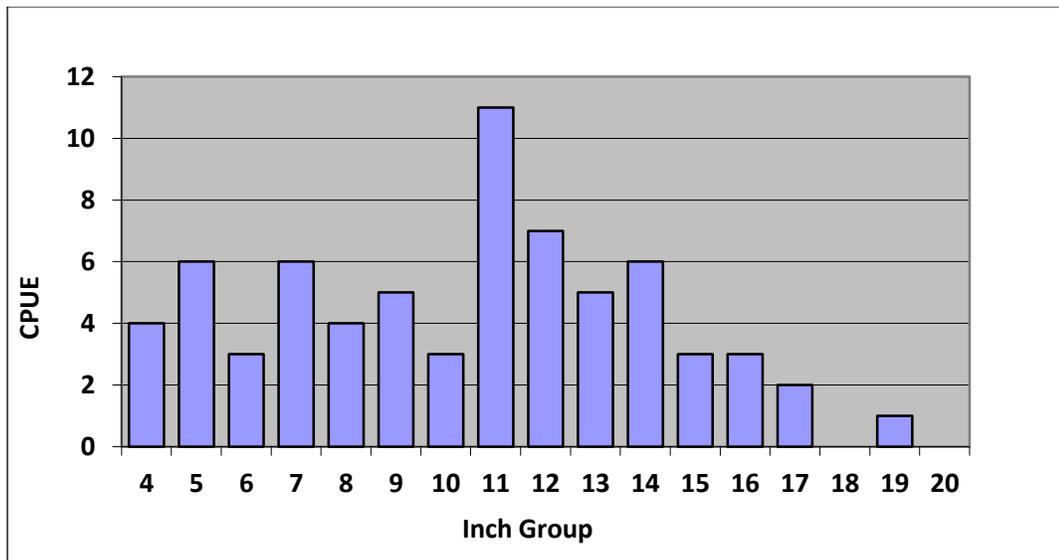


Figure 5. Length distribution of largemouth bass in catch per hour on Lake Lafourche, LA from spring electrofishing, 2011 ($n=75$).

Relative Weight-

Relative weight (W_r) is defined as the ratio of a fish's weight to the weight of a "standard" fish of the same length. The W_r 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 problem of insufficient or unavailable forage, whereas relative weights closer to 100 indicate sufficient available forage. This measurement is normally obtained from fall samples. Figure 6 shows that nearly all relative weight estimates exceeded 90, which indicates that adequate forage has been available for largemouth bass and they have been able to effectively feed on this forage.

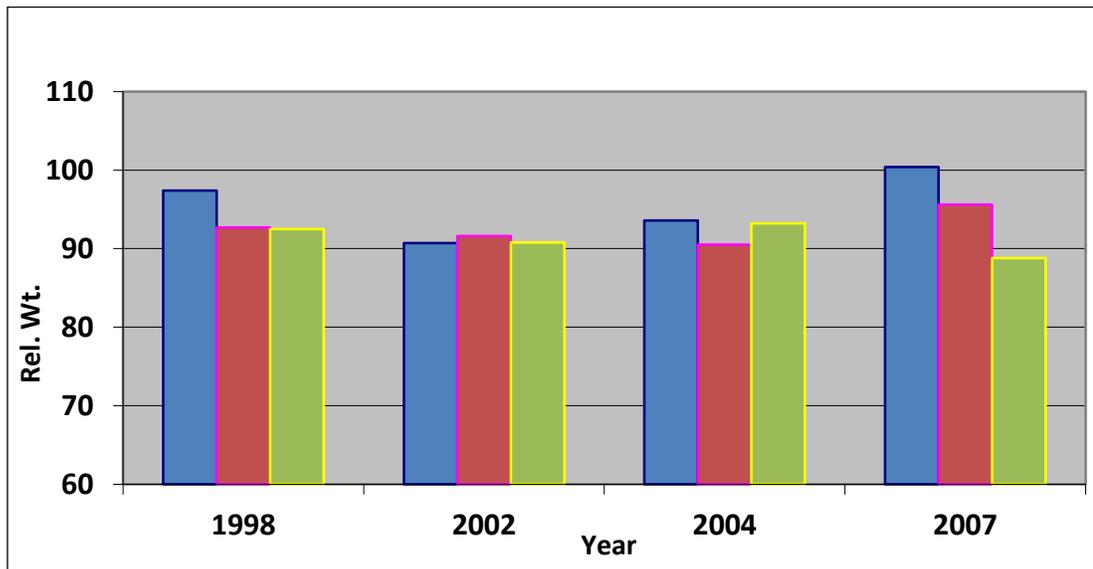


Figure 6. Estimates of largemouth bass relative weights from fall electrofishing results on Lake Lafourche, LA 1998 – 2007.

Largemouth Bass Genetics-

Multiple stockings of Florida largemouth bass (*M. floridanus*; *FLMB*) have been conducted in Lake Lafourche since the mid 1990's. The purpose of these stockings was to add FLMB genetics to the native population, which was believed to consist entirely of northern largemouth bass. Florida largemouth bass were introduced in an effort to produce bass that would be larger than what is typically expected from a population of northern bass. Genetic analyses from liver samples can determine whether individual fish are FLMB, northern bass, or are an Fx cross of both species. No subsequent evaluations of these stockings have been made.

Largemouth Bass Age and Growth-

Age and growth estimates have only been calculated for Lake Lafourche largemouth bass from the 2002 fall electrofishing sample. Age is determined by counting the number of annuli (rings) on the sagittal otoliths (ear bones). Growth is evaluated by comparing the length of the fish to its age. A small sample size in 2002 did not allow for accurate estimates, though it was determined that the mean length at capture for age 1+ bass ($n=19$) was 10.4 inches and the mean length for age 2+ bass ($n=7$) was 14.2 inches. These lengths are very similar to statewide averages, with growth considered to be adequate.

Crappie

Crappies have been a popular sportfish in Lake Lafourche for many years. White crappie (*P. annularis*) and black crappie (*P. nigromaculatus*) are both common in the lake and have been recorded from various sampling gears. Crappie had not been specifically targeted for sampling until 2007, when lead nets were first utilized in Lake Lafourche. Prior to this, crappies were often collected in biomass samples and by electrofishing. Sampling with lead nets was conducted on December 13 and 21, 2007 at three different locations each date, with two nets set at each location. The mean CPUE (fish per net) was 3.03 and 0.240 crappies per hour for the two sampling dates, respectively. The latest lead net sample (3 stations) was conducted in January 2014. Mean CPUE of these samples was determined to be 0.35 crappies per hour. Black crappie comprised 95% of the crappies captured. Though no age and growth analyses was conducted, a length distribution chart (Figure 7), indicates that the majority of the population seems to be comprised of age 0+ and age 1+ fish.

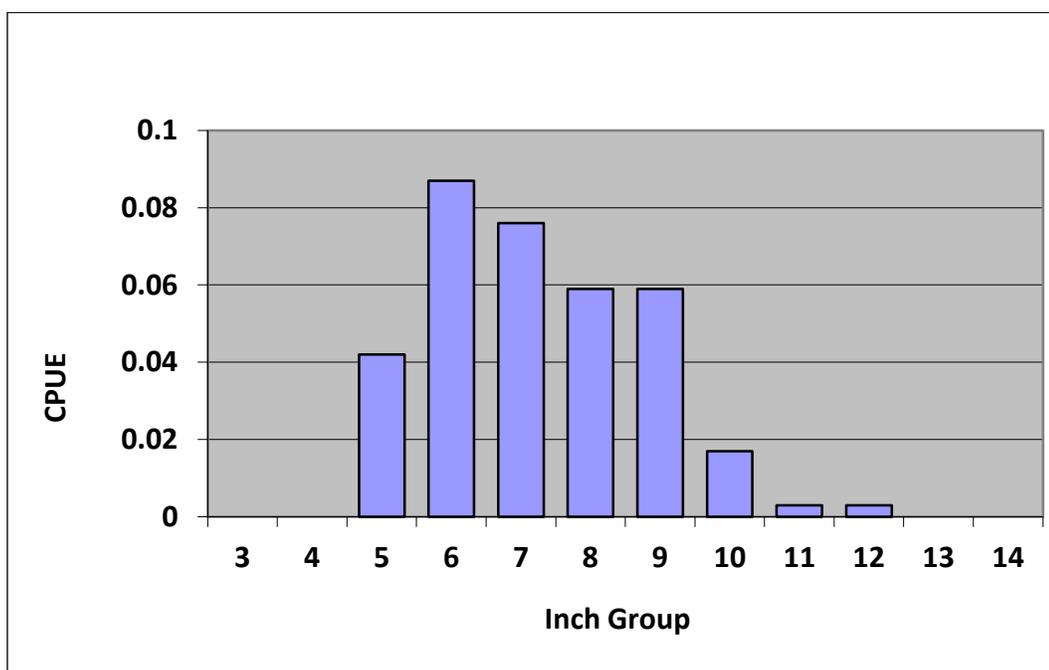


Figure 7. Length frequency distribution of crappie in number per net hour on Lake Lafourche, LA from lead net sampling conducted in January, 2014 ($n=95$).

For comparison, a length frequency distribution chart was created from the December 2007 sample, though total catch per inch group was used versus CPUE (Figure 8). The length distribution of the population was similar to 2014, in that smaller crappie were more abundant. Preferably, the peak of the distribution would be skewed slightly toward the right, but both distributions appear normal. Both samples did indicate a lower than desired abundance of preferred size (> 10 inches) crappie.

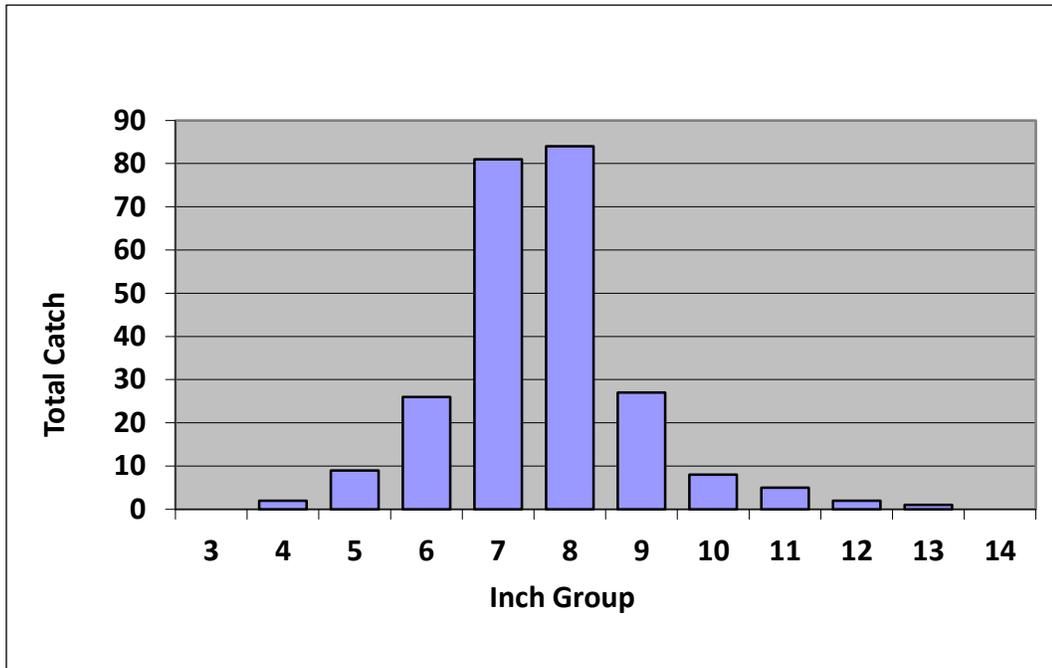


Figure 8. Length frequency distribution of crappie from lead net sampling conducted on Lake Lafourche, LA in January, 2007 ($n=246$).

Sunfish

Sunfish comprise an important component of the fisheries in Lake Lafourche. Bluegill (*L. macrochirus*) and redear sunfish (*L. microlophus*) are the most abundant and commonly fished species, while other common species documented from LDWF sampling include: longear sunfish (*L. megalotis*), warmouth (*L. gulosus*), green sunfish, (*Lepomis cyanellus*) and orangespotted sunfish (*L. humilis*). Sunfish are an important forage component for predatory species such as largemouth bass, catfish (*Ictalurus spp.*), and garfish (*Lepisosteus spp.*). Pounds per acre of sunfish species has been determined from past biomass samples (Figure 9). Length distribution of the bluegill and redear collected in the 2014 lead net sample is shown in Figure 10. Redear sunfish were in low abundance in this sample, while bluegills were abundant, though slightly smaller than desired by anglers.

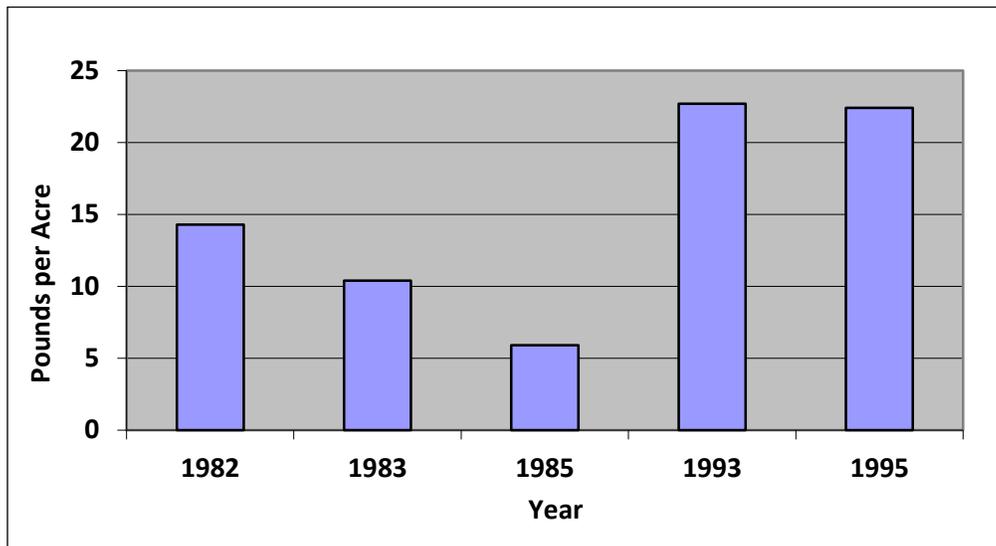


Figure 9. Pounds per acre estimates of sunfish from biomass samples taken from Lake Lafourche, 1982 – 1995.

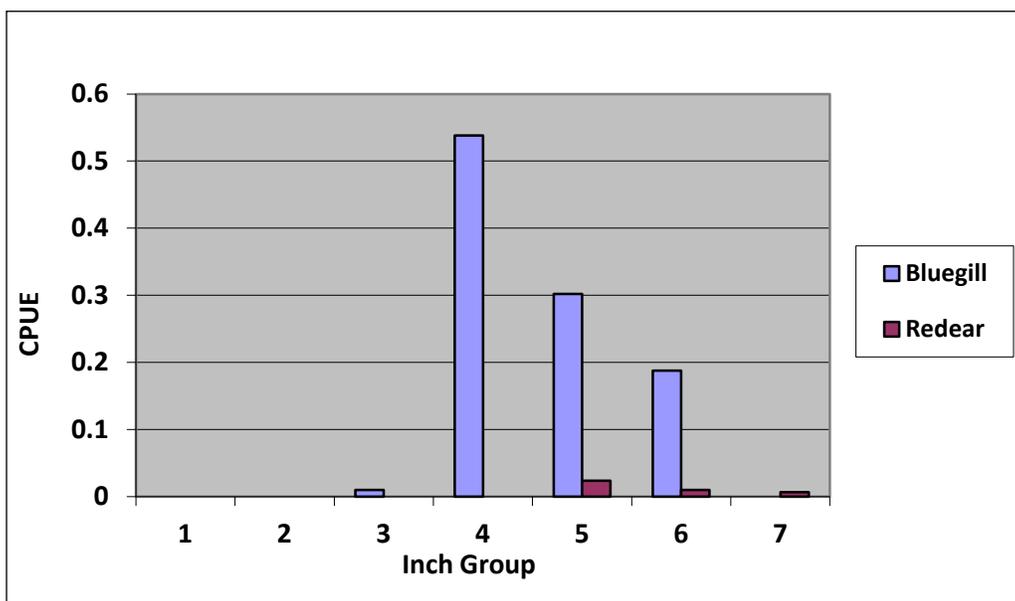


Figure 10. Length distribution of bluegill ($n=299$) and redear sunfish ($n=12$) in catch per net hour on Lake Lafourche, LA from lead net sampling conducted in January, 2014.

Forage

Silversides (*Labidesthes spp.*), gizzard shad (*Dorosoma cepedianum*), threadfin shad (*D. petenense*), western mosquitofish (*Gambusia affinis*) and cyprinid minnows (*Cyprinidae*) have been identified as other significant forage species in Lake Lafourche. The cyprinid minnows most commonly found in Lake Lafourche are bullhead minnows (*Pimephales vigilax*) and blacktail shiners (*Cyprinella venusta*). The relative weights taken from samples of largemouth bass indicate that there is a healthy forage community in the lake. Estimates of forage have been made with the use of rotenone, seines, and by electrofishing. Table 1

shows the average catch per seine haul of common forage species found in Lake Lafourche. These species provide a significant component of the predatory sportfish diet.

Table 1. Mean catch per seine haul of common forage species found in Lake Lafourche, LA for 2002 – 2010.

Year	Shad	Cyprinid minnows	Silversides	Mosquitofish
2002	-	38	3	8
2004	1	31	97	6
2007	-	5	8	8
2010	172	34	7	2

Recreational Creel Survey

No creel surveys have been conducted on Lake Lafourche. Recreational creel surveys are utilized to obtain data from angler catch and determine angler characteristics and opinions. They may also be used to collect socio-economic information.

Commercial

Evaluations of commercial species were commonly made with the use of rotenone, which provided estimates of overall fish biomass, normally on a pounds per acre basis. Numerous biomass samples were taken on Lake Lafourche until 1995, when other sampling gears became standardized to assess different components of the fishery. Biomass samples provided abundance data on all species, but were especially useful in determining abundance of common commercial species. The species commonly observed in historic samples included freshwater drum (*Aplodinotus grunniens*), buffalo (*Ictiobus spp.*), spotted gar (*Lepisosteus oculatus*), longnose gar (*Lepisosteus osseus*), common carp (*Cyprinus carpiodes*), bullhead catfish (*Ameiurus spp.*), and channel catfish (*Ictalurus punctatus*). Figure 11 shows abundance estimates in pounds per acre for these species and also the total (all species) biomass estimates from previous samples. These species are available in abundance that can sustain a commercial fishery. At times, they have been considered excessive and detrimental to the sportfish community.

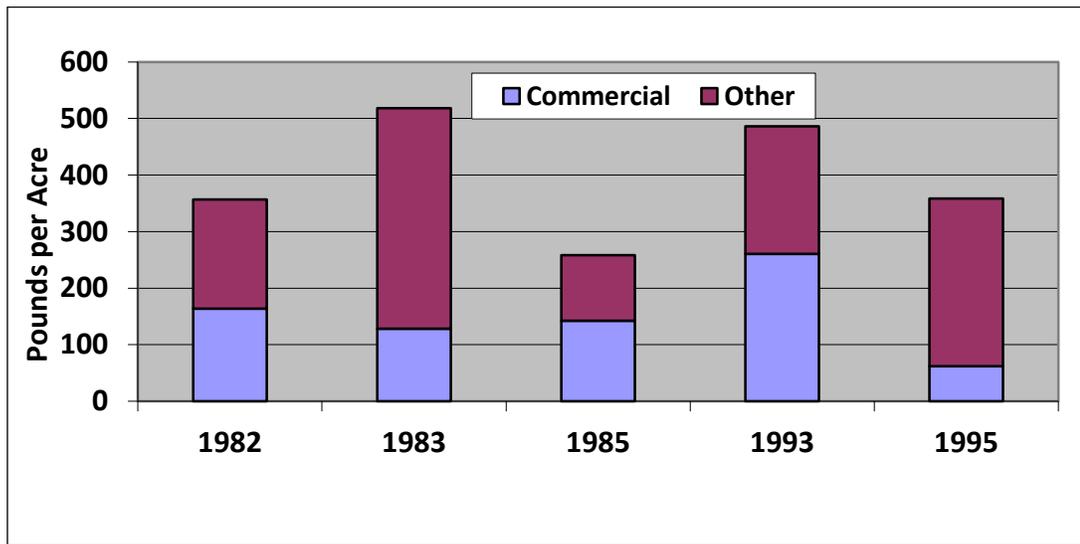


Figure 11. Estimates of biomass for commercial species and all species from biomass (rotenone) sampling on Lake Lafourche, LA for 1982 – 1995.

Aquatic Vegetation

Historically, aquatic vegetation on Lake Lafourche has been considered to be a nuisance. Excessive submerged vegetation has been identified as being a possible cause of an unbalanced fish population. Nuisance floating and emergent vegetation has impaired navigation, water flow, and been troublesome to property owners. The most problematic species have been coontail (*Ceratophyllum demersum*) and water primrose (*Ludwigia spp.*). Coontail is a native species and is normally considered desirable to the fisheries, but it can become excessive. The shallow meander scars, locally called coups, have become severely infested with both coontail and primrose. Water hyacinth (*Eichhornia crassipes*) has also been problematic. It can form large surface mats in protected coves and has impeded flow in Cross Bayou, where the drainage culverts are located. These species have routinely required control by either herbicide treatment or a lake drawdown. Recently, these species have not been as problematic in the past, likely due to the extensive drawdown in 2010. A moderate amount of coontail is desirable, but current coverage (2013) is considered to be low. Other common, but less problematic aquatic vegetation species are water pennywort (*Hydrocotyle spp.*) and alligator weed (*Alternanthera philoxeroides*).

Substrate

The substrate of the lake is comprised of a layer of silty-loam deposited over a firmer clay and sand mix. Sandy deposits are the byproduct of the historic stream channel. Surrounding soils are predominantly a complex of Perry clay with silty-clay loam deposits.

Available complex cover

Complex cover is abundant in this relatively shallow lake. Wood cover in the form of stumps and logs is found throughout the lake. Live cypress trees (*Taxodium distichum*) are also found in various areas in the lake, especially Marengo Lake. Numerous piers provide artificial, but significant, complex cover along the shoreline. A well defined stream channel running the length of the lake also provides complex cover.

CONDITION IMBALANCE / PROBLEM

There have been numerous occasions during the history of Lake Lafourche where the fish population has been described as unbalanced. Populations of commercial and undesirable species have often expanded to a higher than desirable proportion of the overall fish community, causing negative impacts to sportfish. The disproportionate abundance of these fish and subsequent growth suppression of sportfish has primarily been the result of habitat impairment and unregulated water level control. Excessive submerged vegetation has impaired the feeding ability of predatory fish and allows overprotection of forage species. Untimely drawdowns and the lack of effective drawdowns have promoted the growth of nuisance vegetation and impaired sportfish recruitment, while creating habitat more conducive to undesirable species. The lack of reliable water control structures has made effective water level management very difficult.

CORRECTIVE ACTION NEEDED

The recent maintenance and replacement work on the Boeuf River (2008) and Marengo (2010) water control structures should provide for reliable dewatering and refilling of Lake Lafourche for years to come. Drawdowns should be used to control excessive nuisance vegetation and increase the availability of forage for predatory sportfish. Water levels should be maintained at pool stage in the spring to promote successful recruitment of sportfish. Removal of commercial species should be encouraged when their abundance reaches a level that may be detrimental to sportfish.

RECOMMENDATIONS

Aquatic Vegetation Management

Implement an integrated management approach for Lake Lafourche to control overabundant vegetation. The advantage of integrated management is the ability to achieve a combined benefit from several control methods (physical, chemical and biological) and not be completely dependent on the success of any one approach.

LDWF personnel will monitor the coverage of nuisance vegetation monthly during the growing season. When coverage is determined to be detrimental to the fisheries or inhibits angling, an 8 ft. drawdown should be initiated by opening the Marengo control structure on September 1 and allowing the lake to dewater at a rate of 2 – 4 inches per day. The gate should remain open until January 15th of the following year. The recommendation for a drawdown should be made no later than July 1 if it is to occur in the same year.

An aquatic spray crew should make monthly vegetation assessments on Lake Lafourche from March – November to determine the need for control. Herbicide applications to control nuisance vegetation will be made in accordance with the approved LDWF Aquatic Herbicide Recommendations. Water hyacinth should be treated with 2,4-D (0.5 gal./acre) and a non-ionic surfactant (1pt/acre) except between March 15 and September 1, which is the 2,4-D waiver period. Glyphosate (0.75 gal/acre) should be used during this period. Glyphosate (0.75 gal/acre) or imazapyr (0.5 gal/acre) should be used on other emergent species such as water primrose and alligator weed. If treatment is required near residential or agricultural intakes, imazamox (0.5 gal./acre) should be used. Imazapyr and imazamox will be used in conjunction with a methylated seed oil surfactant (Turbulence) for increased efficacy.

Fisheries Management

If the water level is lower than 2 ft. below pool stage on March 1, the Boeuf River control structure should be opened to allow Lake Lafourche to reach pool stage. The structure should be closed as soon as this level is reached. This action will enhance spawning conditions for sportfish.