LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

NANTACHIE LAKE

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), 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

Nantachie Lake does not support high numbers of commercial fish species. The physical characteristics (i.e., acreage and fertility) of Nantachie Lake are 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 LDWF recreational fishing regulations, may be viewed at the link below:
https://www.paperturn-view.com/us/rene-lebreton/2020-ldwf-recreational-fishing-regulations?pid=NjM63878&v=2.9

Commercial

The LDWF commercial fishing regulations may be viewed at the link below:
https://www.paperturn-view.com/us/rene-lebreton/2019-ldwf-commercial-fishing-regs?pid=NjM63879&v=2

SPECIES EVALUATION

Recreational

Largemouth Bass (LMB) 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 method to determine the status of large bass and other large fish species.

Largemouth Bass Relative Abundance, Length Distribution, and Size Structure Indices

Electrofishing has been used to collect LMB population data in Nantachie Lake since 1990. Catch per Unit Effort (CPUE) results from electrofishing are normally based on the number of fish captured in one hour of electrofishing. This value provides an estimate of relative abundance and allows us to monitor changes in abundance over a period of time. In Figure 1,

springtime electrofishing results are used as an indicator of LMB relative abundance with total CPUE indicated since 1990. Sampling was conducted in the spring and fall on a bi-annual basis from 2001 through 2014, except during years when the lake was undergoing a fall drawdown and in 2018. Figure 2 indicates that CPUE for all Largemouth Bass size groups are slightly variable over time. Sampling from 1991 through 2018 indicated a relatively normal LMB population with good annual recruitment of stock-size bass. The slight decrease in CPUE in 2003 may be a result of decreased sampling efficiency due to excessive submersed vegetation, primarily hydrilla (*Hydrilla verticillata*). Electrofishing sampling is primarily conducted in waters less than 6 feet deep, which were matted to the surface with submersed vegetation in 2003. Nantachie Lake underwent three consecutive years of drawdowns for vegetation control in 2005, 2006, and 2007. This annual shoreline drying improved spawning habitat for nesting fishes as electrofishing results for 2010 indicate that the relative abundance of stock-size LMB was above historical levels (Figure 2).

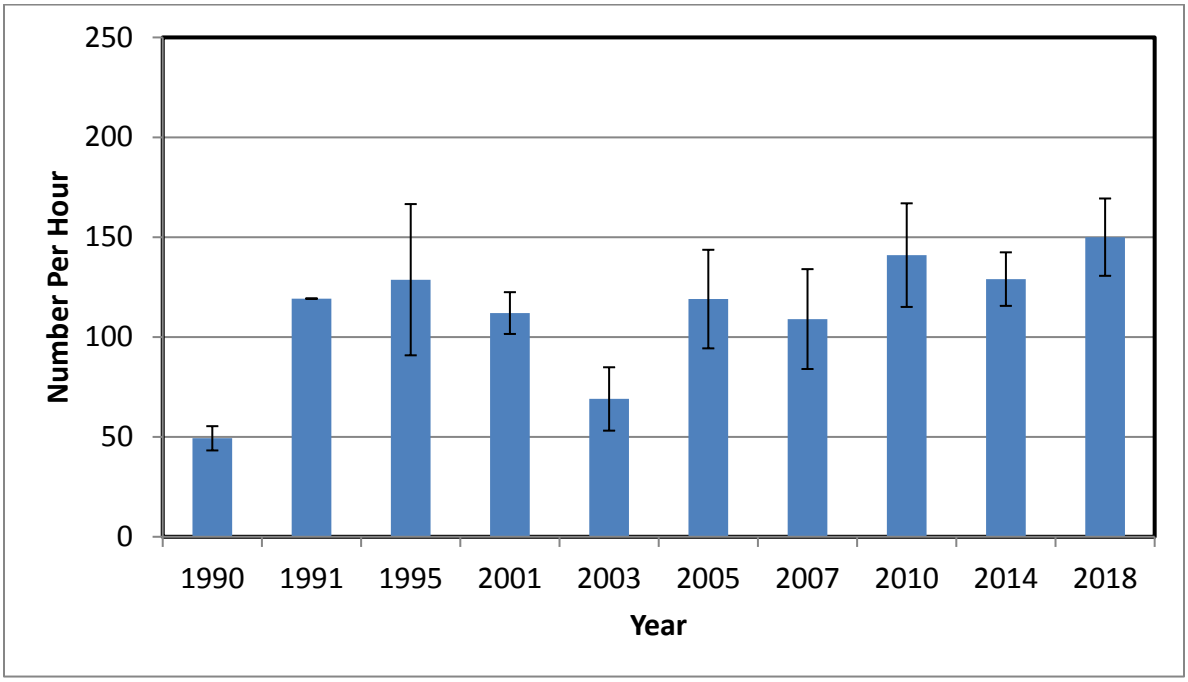

Figure 1. The total CPUE (± SE) for Largemouth Bass for spring electrofishing results from Nantachie Lake, Louisiana from 1990 – 2018. Error bars represent standard error of total CPUE.

Catch rate is sorted by inch-groups to provide a size distribution model of the population at the time of sampling. The spring 2018 length distribution of the bass population ranged from 4 to 22 inches with strong representation from the 12 through 14-inch size groups and high abundance of the 7 to 9-inch groups. (Figure 3).

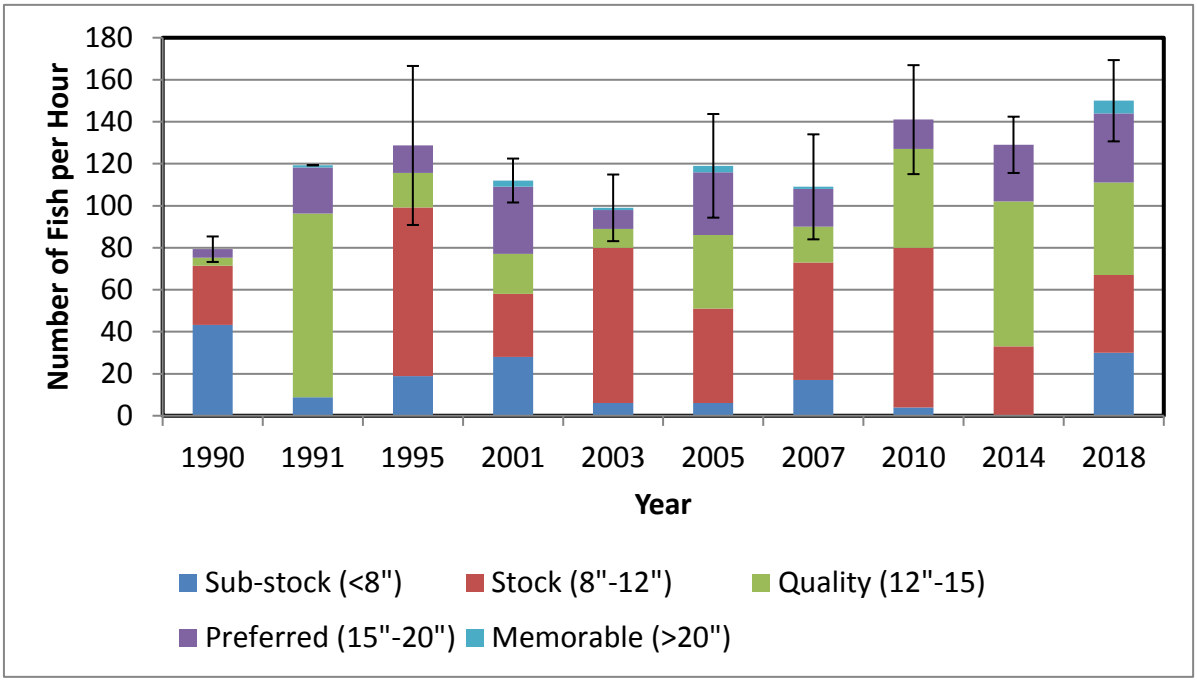

Figure 2. The CPUE for sub-stock-, stock-, quality-, preferred-, and memorable size classes of Largemouth Bass on Nantachie Lake, Louisiana for spring season from 1990 – 2018.

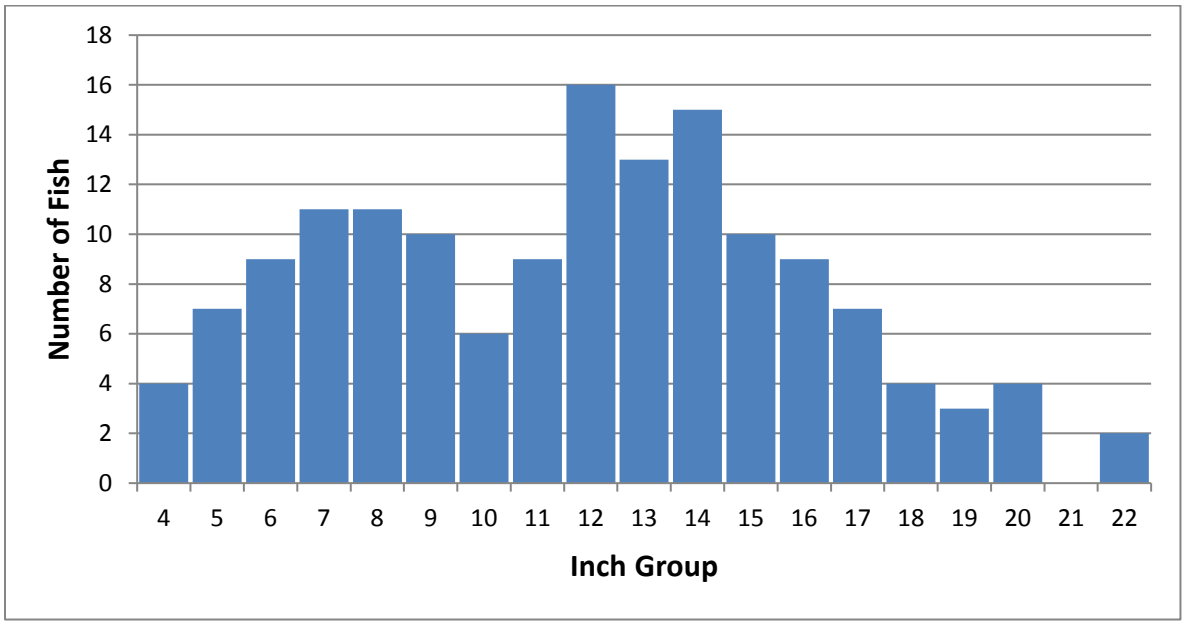

Figure 3. The size distribution (inch groups) of Largemouth Bass per hour of electrofishing for Nantachie Lake, Louisiana from spring 2018 (n = 150).

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 4, below indicates a PSD of 60 for 2005. The number indicates that 60% of the bass stock (fish over 8 inches) in the sample was at least 12 inches or longer. Generally, PSD's between 40 and 70 are considered good for Largemouth Bass.

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

Relative stock density of preferred LMB (RSD-p) is the proportion of Largemouth Bass in a stock (fish over 8 inches) that are 15 inches or longer.

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

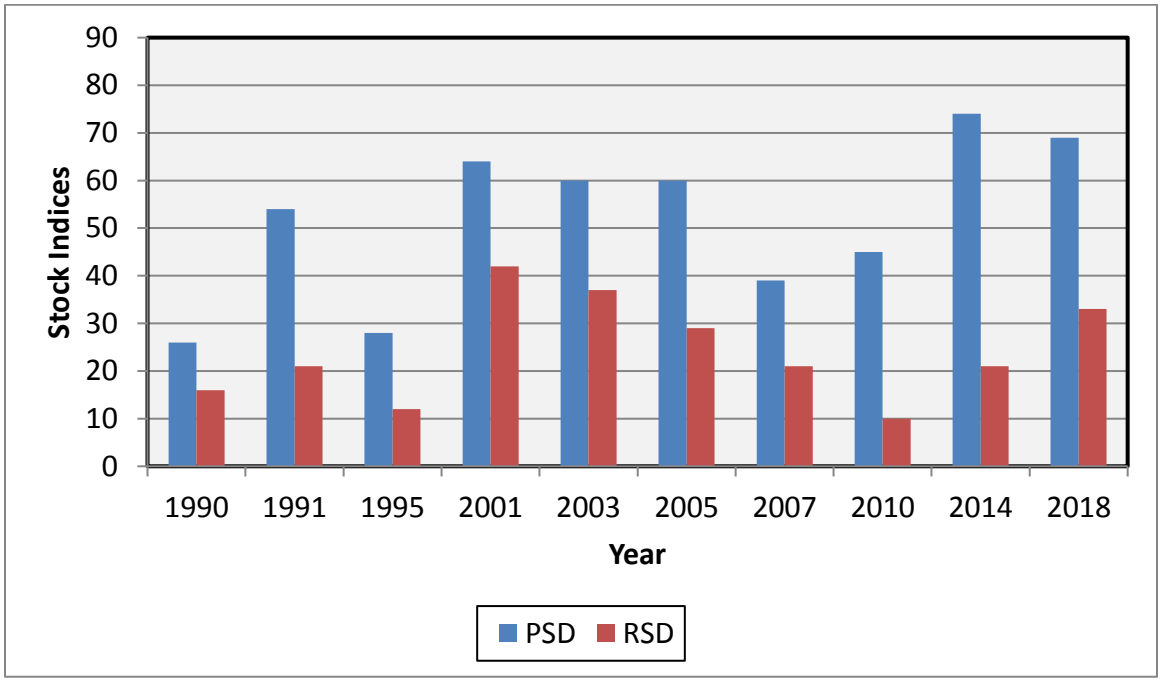

Figure 4. The size structure indices (PSD and RSD-p) for Largemouth Bass collected from Nantachie Lake, Louisiana during spring electrofishing samples from 1990 – 2018.

Trends in Largemouth Bass structural indices indicate PSD and RSD-p values have remained relatively stable from 2001 through 2018. The slight decrease in 2007 and 2010 may be due to the drawdowns in 2005, 2006, and 2007. Spring sampling of 2014 and 2018 shows that the Largemouth Bass population is near the upper preferred range for both PSD and RSD. This indicates the bass population has a high proportion of larger size fish. The most recent high values may be attributed to high water events in the springs of 2015 and 2016, which likely produced good spawning conditions and a good balance between submersed cover and open water that resulted in a strong year class.

Largemouth Bass Age and Growth

Age and growth data was collected from 74 LMB in the spring of 2010 and 80 LMB in the spring of 2014. The results of these samples are listed in Table 1 below.

Table 1. Average length at age of capture for Largemouth Bass in Nantachie Lake, Louisiana in 2010 and 2014.

Age	2010 (n=74)	2014 (n=80)
1	11.06	11.33
2	14.84	14.21
3	15.90	16.45
4	16.92	16.57
5	17.08	18.26
6	19.01	-
7	17.87	-

Largemouth Bass Genetics

Florida Largemouth Bass (FLMB) have been stocked into Nantachie Lake, primarily to improve public relationships with the local fishermen and lake users following lake drawdowns. The first stocking was initiated in 1984 and included 65,300 fingerlings. An additional 2,800 fingerlings were stocked in 1986. These initial limited stockings did not increase the Florida genetic influence. Florida bass stocking has occurred 8 times between 2002 and 2014. The most recent genetic testing occurred in 2014, and results indicated that 34% of the 80 bass tested contained the Florida genome. See Table 2 for the complete genetic testing results.

Table 2. Largemouth Bass genetic testing results in Nantachie Lake, Louisiana.

Year	**% Northern**	**% Florida**	**% Hybrid**	**% Florida Influence**
1990 (n=28)	82	0	18	18
2001 (n=96)	75	3	22	25
2010 (n=74)	85	1	14	15
2014 (n=80)	66	1	33	34

Forage

Forage availability is measured through two methods: summertime shoreline sampling with haul seines and fall community assemblage electrofishing. Shoreline seine haul results for 1999 – 2001 are shown in Figure 5. The two major forage species found in 2018 community assemblage electrofishing results included sunfishes and Threadfin Shad (Figure 6). 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 Nantachie Lake have been relatively stable for all size classes since 1990. Relative weight sampling results indicate Nantachie Lake relative weights for Largemouth Bass are indicative of a healthy forage base. The 2018 Fall forage samples

also show good number of forage species, particularly shad species. (Figure 6 and 7).

Figure 5. The CPUE (average number per seine haul) of fish from shoreline seining for Nantachie Lake, LA, for 1999, 2000, 2001, and 2020.

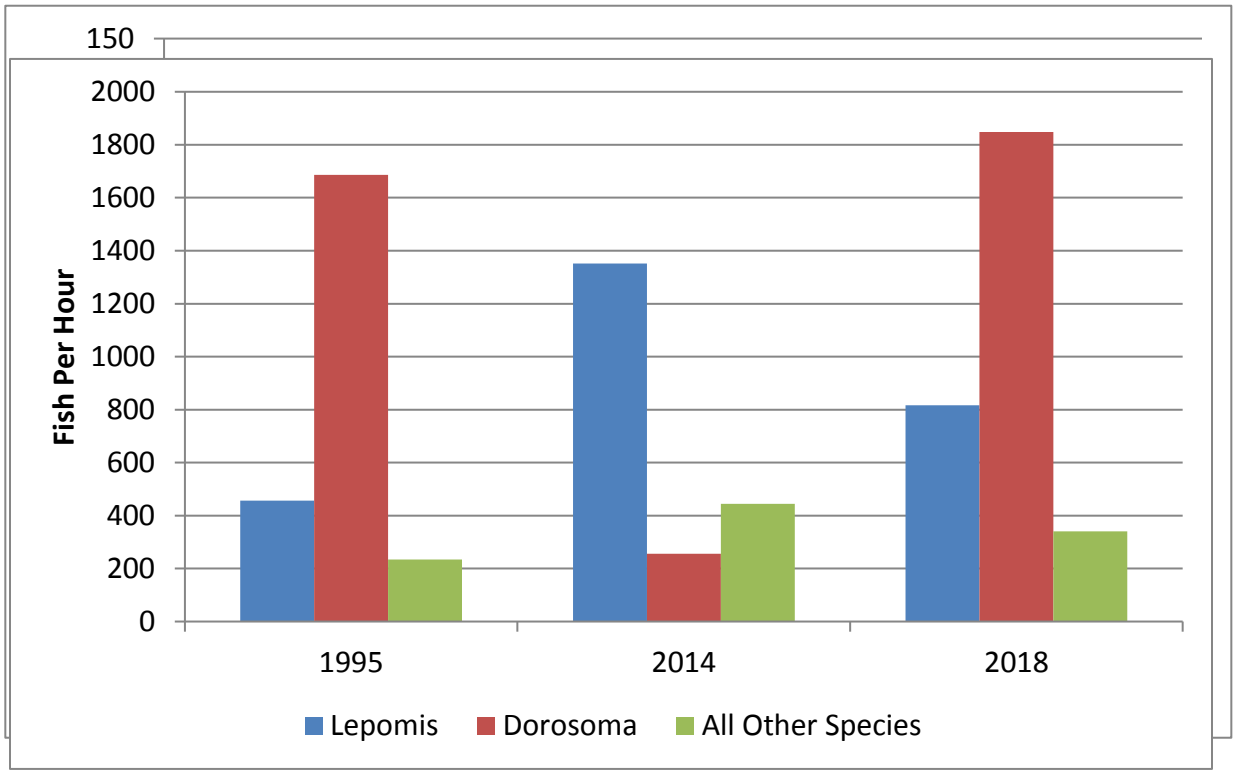

Figure 6. CPUE (Fish per Hour) of forage species (<6 inches TL) found in Nantachie Lake, Louisiana from 1995, 2014, and 2018 fall electrofishing results.

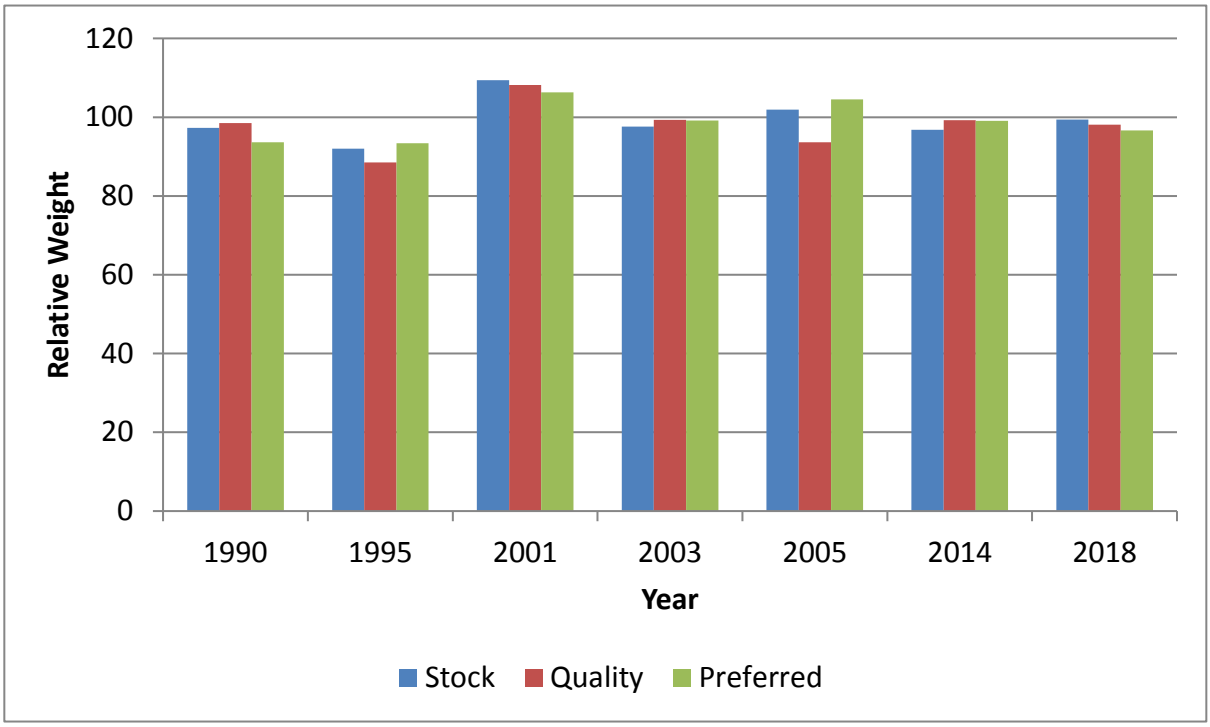

Figure 7. Relative weights for stock-, quality-, and preferred-size classes of Largemouth Bass collected during fall electrofishing for Nantachie Lake, Louisiana in 1990, 1995, 2001, 2003, 2005, 2014, and 2018.

Crappie

Biomass (rotenone) sampling occurred in 1980, 1984 and 1994. Very few crappies were collected in these samples. Standing crop sampling averages for each year were less than 0.5 pounds of crappie per acre in Nantachie Lake. Additional sampling for crappie was conducted with lead nets in 2004. Eight experimental lead nets of various mesh sizes were each fished a total of 72 hours soak time. A total of 35 crappies were collected from the lead net efforts. Nantachie Lake crappie sampling results indicate the crappie population in Nantachie may be lower than other central Louisiana lakes. Standardized sampling of lead nets was conducted in 2017, which showed a low catch rate of crappie. A total of 34 crappies were caught ranging from 5-12 inches in length. However, a significant number of crappie anglers utilize the lake. Primarily, the fish are caught in the winter and early spring prior to the emergence of aquatic vegetation. Also, fishing yo-yos from cypress trees is popular during the winter months. Additional crappie population sampling is needed at this time.

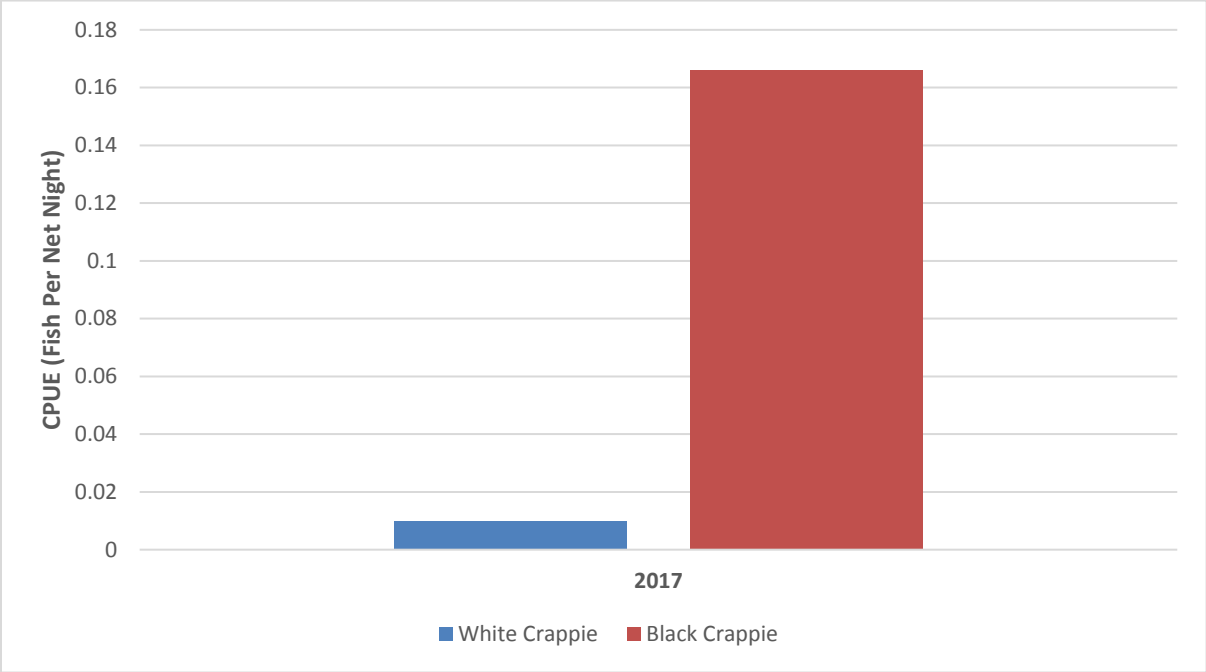

Figure 8. CPUE (Fish Per Net Night) for crappie generated from standardized lead net results from 2017.

Commercial

Large fish species that normally comprise a commercial fishery are not found in this waterbody in sufficient numbers to support a viable commercial fishery. Gill net sampling was conducted by LDWF personnel in 2007 and 2013. A variety of commercial fish species were collected, but abundance was found to be low. Gill net results are found in Figure 9.

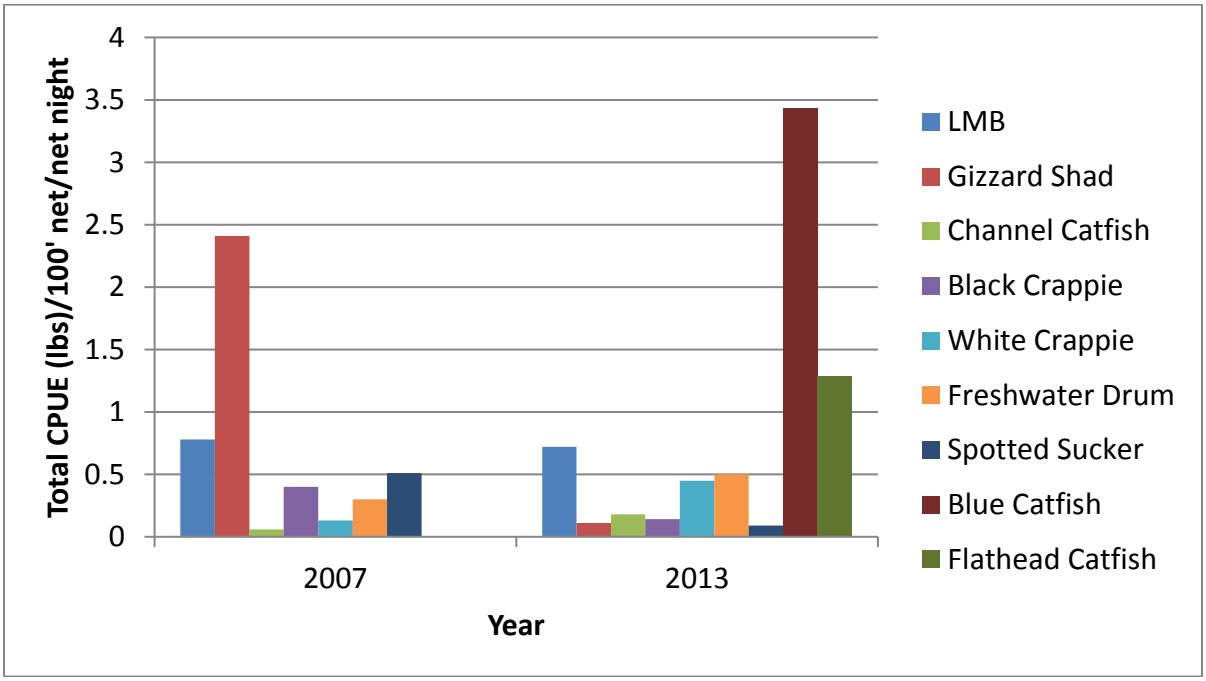

Figure 9. The total CPUE by species by year collected with gill nets (100' net/net night) for Nantachie Lake, Louisiana, for 2007 and 2013.

Species of Special Concern

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

HABITAT EVALUATION

Aquatic Vegetation

Nantachie Lake has been plagued with aquatic vegetation for a long period of time. The first drawdown occurred in 1974. A second drawdown occurred in 1979; both were for submersed aquatic vegetation control. In the 1970's, native aquatic vegetation was predominantly found in the shallow water areas of the lake. Submersed vegetation included fanwort (*Cabomba caroliniana*) and bladderwort (*Utricularia* spp.). No emergent vegetation was reported as being problematic during this time.

Hydrilla was first recorded in the lake in 1998 near the public boat launch on LA 1240. By 2000, hydrilla was the most abundant submersed vegetation in the lake. The majority of water less than six feet deep was matted to the surface by hydrilla. Since that time, hydrilla has been a continuous problem. Drawdowns were conducted for three consecutive years in 2005, 2006, and 2007 to reduce hydrilla. The results were mixed, and hydrilla has become established in deep water that cannot be dried during drawdowns.

By fall 2012, hydrilla was again causing serious problems. At this time, approximately 56% of Nantachie Lake was infested with hydrilla. The majority of waters out to the 8' depth contour was matted to the surface with hydrilla. In the fall of 2012, LDWF developed an aquatic vegetation plan that included a 4' drawdown in 2012/2013. This was followed in the spring of 2013 with the introduction of triploid Grass Carp (TGC).

When stocked at sufficient rates, TGC have proven to be effective at controlling submersed vegetation, especially hydrilla. Due to the limited success from drawdowns on hydrilla, triploid grass carp were introduced as a control measure. Two thousand (2000) TGC were stocked in Nantachie Lake on April 3, 2013. The 8" to 12" carp were stocked at a rate of 4 fish per vegetated acre. Annual vegetation surveys are conducted each summer (July - August) to determine the success of the TGC in reducing hydrilla growth.

Giant salvinia (*Salvinia molesta*) was discovered in the lake in 2008. The invasive fern had not caused major problems to date. However, LDWF personnel conducted maintenance spraying 2 to 4 days each month during the growing season to prevent the spread of giant salvinia. On October 9, 2013, less than 50 acres of giant salvinia were observed scattered throughout the impoundment. No major mats of giant salvinia were present. A fringe of alligator weed (*Alternanthera philoxeroides*) and scattered water hyacinth (*Pontaderia crassipes*) was present along the shoreline. Combined coverage of these two species was less than 50 acres.

Emergent vegetation, including giant salvinia, may be less of a problem in 2014 due to colder than normal temperatures in January of 2014. During this period a thin layer of ice formed on shallow water areas of central Louisiana lakes.

The vegetation survey that was conducted in 2015 showed the presence of coontail

(*Ceratophyllum demersum*) and hydrilla out to about the six-foot depth. The lake will continue to be monitored to determine if additional grass carp stocking or drawdowns are required to maintain submersed vegetation control. Giant salvinia was observed around the shoreline and coves. Periodic maintenance spraying had prevented giant salvinia from becoming a major problem.

A vegetation assessment was conducted on 8/17/16. There was approximately 30 acres of giant salvinia present on the lake. Submersed vegetation consisted of coontail and hydrilla. There was a fringe of coontail growing to about the 6-foot contour. Hydrilla was growing along the dam levee. The two species combined consisted of about 30 acres. Emergent vegetation consisted mainly of primrose and alligator weed. There was approximately 30 acres of emergent combined. Overall the lake was very clean.

A vegetation survey was conducted on August 14, 2017. Submersed vegetation consisted of approximately 400 acres of hydrilla and 10 acres of coontail. Hydrilla was growing out to 8 feet deep. Emergent vegetation present was approximately 5 acres of alligator weed (*Alternanthera philoxeroides*). Other emergent vegetation observed was American lotus (*Nelumbo lutea*), water primrose (*Ludwigia spp*.), bur marigold (*Bidens spp*.), and panicgrass (*Panicum spp*.). None of these were in enough abundance to be of concern. The floating vegetation present was approximately 100 acres of giant salvinia (*Salvinia molesta*). Giant salvinia was mainly located on the northern flat, with light coverage throughout the lake and along the shoreline.

A vegetation survey was conducted on August 2, 2018. Submersed vegetation consisted of approximately 400 acres of a mixture of hydrilla, coontail, and fanwort. It was growing out to the six-foot contour. Emergent vegetation consisted of approximately 75 acres of water primrose and alligator weed. Other emergent vegetation present consisted of American lotus, bur marigold and panic grass. Floating vegetation consisted of approximately 150 acres of giant salvinia and 5 acres of water hyacinth.

A vegetation survey was conducted on September 4, 2019. Submersed vegetation consisted of approximately 500 acres of a mixture of hydrilla, coontatil, and fanwort. Submersed vegetation was topped out at a depth of 6 feet on the north end. The consecutive years of Red River flooding of the lake has kept the south end of the lake relatively clean of submersed vegetation. Emergent vegetation consisted of water primrose and alligator weed. There was approximately 15 acres of emergent vegetation total. Floating vegetation consisted of giant salvinia. There were approximately 125 acres of giant salvinia.

In 2020, the submersed vegetation will potentially increase if a high water event does not occur and allow Red River water to enter the lake. The effectiveness of the grass carp on controlling submersed vegetation is difficult to assess due to other factors affecting the plants. The amount of giant salvinia coverage will depend on the severity of the 2019-2020 winter, but will likely stay the same as 2019.

Substrate

Nantachie Lake has a watershed ratio of 32 to 1. Water level fluctuation is moderate. Turbidity

fluctuates depending on rainfall; however due to the extensive coverage of submersed vegetation, water clarity is generally good. The majority of the watershed is forested. There is a minimal amount of agricultural farming in the watershed and little sediment inflow into the lake. 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.

Artificial Structure

Nantachie Lake has an overabundance of natural complex cover including aquatic vegetation and cypress and tupelo timber. No artificial structure is necessary.

CONDITION IMBALANCE / PROBLEM

The completion of the Red River Navigation project in 1993 prevents future use of the Nantachie Lake Dam No. 1 gate to dewater the lake. A control structure in Dam No. 2 was constructed by USACE to alleviate this problem. This structure allows dewatering to approximately 7 feet below pool stage. Dewatering through Dam No.1 allowed for the lake water level to be lowered 10 feet.

In the fall of 2010, the Grant Parish Police Jury (GPPJ) and the Lake Nantachie Property Owners Association (LNPOA) requested an opening of Dam No. 1 to allow Red River water to backflow into Nantachie Lake. The action was requested in an effort to raise the level of the impoundment to alleviate low water issues. A parallel action to open Dam No. 2 was requested by the GPPJ to provide irrigation water for farmers and ranchers downstream in Bayou Darrow. LDWF requested an opinion from DOTD on operation of Dam No.1 for back flow. In a recommendation against the action, DOTD explained that the structure was not designed for reverse flow and that there is no trash rack on the downstream side for protection. Obstruction of the gate opening is a concern. Operations to close an obstructed gate could cause extensive damage to the gate and structure. LDWF advised that the action carried long term risk for all Nantachie Lake users to attain short term gain for a small number of users and did not forward a request for the gate opening to DOTD.

On November 7, 2011 a joint agreement was signed by GPPJ and LDWF. In the agreement, the Police Jury assumed liability and responsibility for all damages due to the operation of Dams No. 1 and 2. Nantachie Dam No.1 was opened to allow Red River water to back flow into the impoundment. Dam No. 2 was opened to provide water for drought relief to downstream farmers and ranchers in western Grant Parish.

On December 7, 2016, the GPPJ made a motion to open these structures for the purpose of increasing water flow for agriculture and recreational purposes in Bayou Darrow during periods of need. This proposal was contested by many land owners surrounding the lake. A special meeting was held on January 17, 2017 and the GPPJ rescinded the motion.

In 2017, the possibility of using flow from Red River through Nantachie Lake to allow for downstream irrigation was being considered again. NRCS was funded to conduct a study on the best way of achieving irrigation to North Hydrologic Unit Code – 111402070807 and South Hydrologic Unit Code - 111402070807. At this time, there are two potential plans to achieve

this. One is to flow water through Nantachie Lake. The other is conveying water from Nantachie Creek, near its confluence with the Red River, to Corfeine Bayou where it can provide water to the network of tributaries in the proposed area.

CORRECTIVE ACTION NEEDED

Due to consecutive years of high water and Red River water entering the lake, the ability of grass carp to maintain control of hydrilla is difficult to determine. If hydrilla begins to encroach to the 8 foot contour, a lake drawdown will be recommended.

LDWF aquatic spray crews will foliar spray for giant salvinia as needed throughout the year.

RECOMMENDATIONS

1. Continue existing harvest regulations until LDWF sampling results indicate that change is appropriate and necessary from a biological perspective or such time as a change in management strategy is indicated by the collective opinion of Nantachie Lake anglers.

2. Continue LDWF standardized sampling to assess fish populations.

3. Floating and emergent aquatic weeds will be treated as necessary in accordance with the approved LDWF Aquatic Herbicide Application Procedures (Table 3).

Table 3. LDWF Aquatic Herbicide Application Procedure.

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)

4. 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.