LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

WATERBODY MANAGEMENT PLAN PART B

JOHN K. KELLY
GRAND BAYOU RESERVOIR

WATERBODY EVALUATION &
RECOMMENDATIONS 2022

CHRONOLOGY

SCHEDULED FOR UPDATE EVERY 3 YEARS

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Largemouth Bass are managed to provide the opportunity to catch fish of greater than average size. Sunfish, catfish and crappie are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish.

Commercial

Catfish, Spotted Gar, and Bowfin are managed to provide sustainable populations.

Species of Special Concern

No species of special concern are known to occur in this reservoir.

EXISTING REGULATIONS

Recreational Fishing Regulations

Largemouth Bass

14" – 17" protective slot limit for black bass, along with an 8 fish creel limit of which only 4 fish may be over 17". These regulations went into effect on June 1, 1997. (Title 76, Part VII, Chapter 1, Section 149.)

Recreational fishing regulations may be viewed at the link below:
https://www.wlf.louisiana.gov/page/seasons-and-regulations

Commercial Fishing Regulations

Louisiana's commercial fishing regulations may be viewed at the link below:
https://www.wlf.louisiana.gov/page/seasons-and-regulations
Specific Commercial Gear Types are Not Allowed

Use of gill nets, trammel nets, fish seines, hoop nets, and wire nets are prohibited on Grand Bayou Reservoir. (Title 76, Part VII, Chapter 1, Section 185.)

TITLE 76
WILDLIFE AND FISHERIES
PART VII. FISH AND OTHER AQUATIC LIFE

Chapter 1. Freshwater Sports and Commercial Fishing

185. Netting Prohibition, John K. Kelly - Grand Bayou Reservoir

The Louisiana Wildlife and Fisheries Commission hereby prohibits the possession and/or use of commercial nets, including, but not limited to, gill nets, trammel nets, flag nets, hoop nets, wire nets and fish seines in John K. Kelly - Grand Bayou Reservoir located in Red River Parish.

AUTHORITY NOTE: Promulgated in accordance with R.S. 56:22(B).
HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 24:1520 (August 1998).

SPECIES EVALUATION

Recreational Species

Electrofishing
Grand Bayou Reservoir electrofishing efforts for Largemouth Bass consist of six electrofishing samples spaced evenly from the dam to above the Hwy 784 Bridge. Each sample is 15 minutes of electrofishing time where all bass observed and caught are later calculated into catch per unit effort (hours) for each size grouping. In addition to the six samples for Largemouth Bass, there are three community samples. Community samples are taken immediately before or after a bass sample and are 7.5 minutes of electrofishing time. These samples give insight into the community structure and forage availability in the lake. All species 6 inches or less are considered Largemouth Bass forage and calculated as pounds per hour.

Largemouth Bass Relative Abundance and Relative Weight
Analysis of electrofishing data from Grand Bayou Reservoir reveals that catch per unit effort (CPUE, catch per hour, in this case) declined slightly from 1998 through 2009. Increased catches within all size groups were noted from 2013 through 2017 (Figure 1). The initial reduction is seen as part of the normal aging pattern that all reservoirs exhibit and is not cause for concern while the increased catches are likely the result of desirable habitat, recruitment, and adequate harvest rate. It is expected that these values will continue to rise and fall within a range that will mimic the pattern seen in other regional reservoirs as they have aged. Stock-size CPUE ranged from 3.7 to 73.7 bass per hour. Quality values ranged from 9.3 to 41.2 bass per hour. Preferred values ranged from 4.7 to 42.8 bass per hour. Fluctuations in CPUE over time are expected with environmental differences in waterbody conditions from year to year.

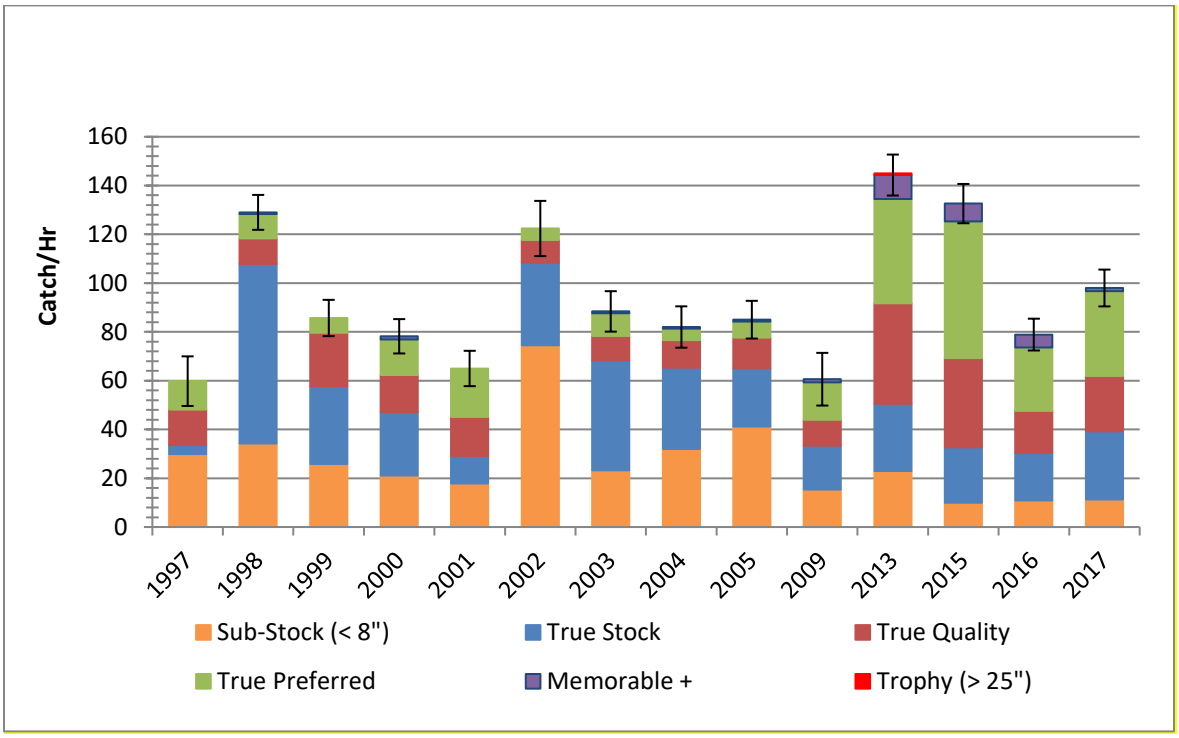


Figure 1. The CPUE (number per hour) and ±SE of the total mean for Largemouth Bass of stock, quality and preferred size fish from spring electrofishing results at Grand Bayou Reservoir, LA years 1997-2005, 2009, 2013, 2015, 2016 and 2017.

Relative Weight

The relative weight of Largemouth Bass are calculated dividing the actual weight of each size grouping by the standard weight of each size grouping times 100 for a percentage value and "relative" weight. Relative weight values under 80 can be indicative of health or forage availability problems.

Average relative weights (Wr) for different size groups of Largemouth Bass sampled from Grand Bayou Reservoir by fall electrofishing during the years 1999 – 2005, 2009, 2013 and 2022 are stock-size – 101.50, quality-size – 99.10 and preferred-size – 95.08(Figure 2).

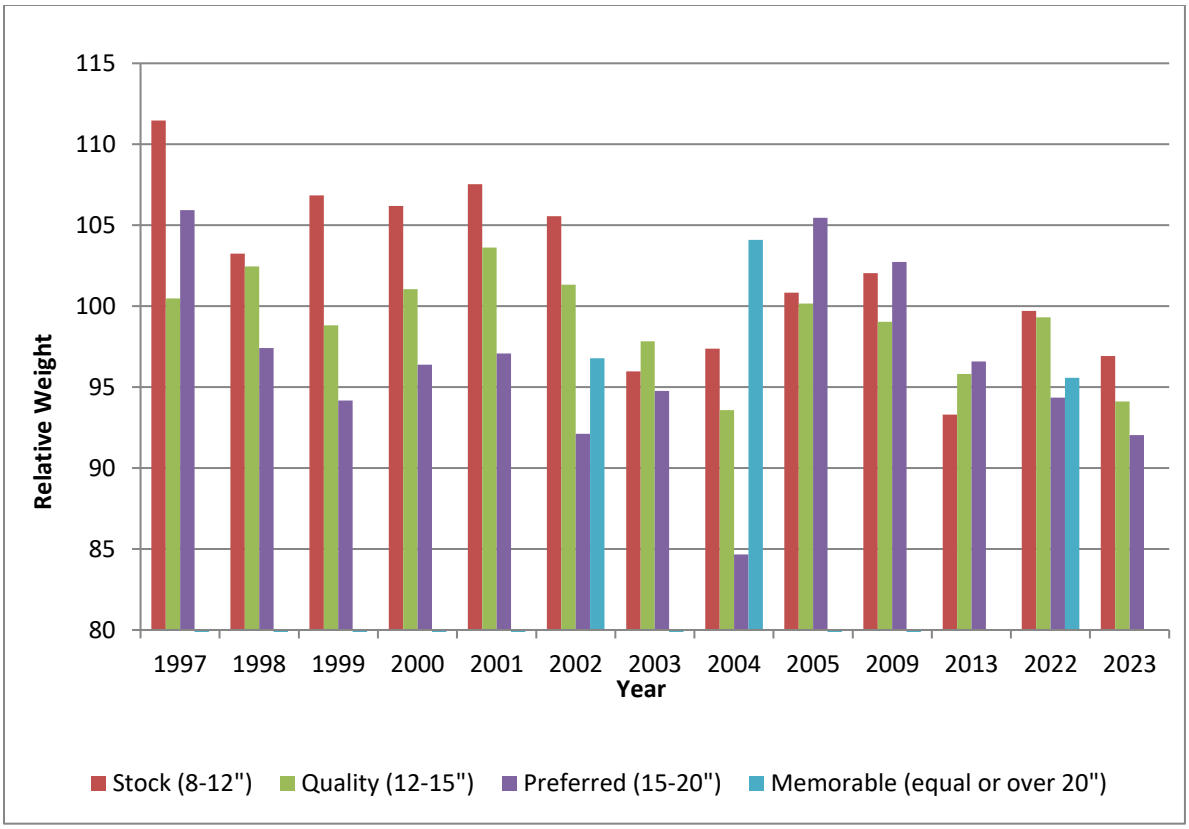


Figure 2. The relative weights of Largemouth Bass sizes stock, quality, preferred and memorable size fish sampled at Grand Bayou Reservoir, LA by fall electrofishing during years 1997 – 2005, 2009, 2013, 2022.

In comparing fall relative weights for Largemouth Bass collected in 2022 to earlier average Wr values for that species, Wr for stock size fish decreased by 1.8%, Wr for quality size fish increased by 0.22%, Wr for preferred-size fish decreased by 0.22% when compared to the previous nine-year average.

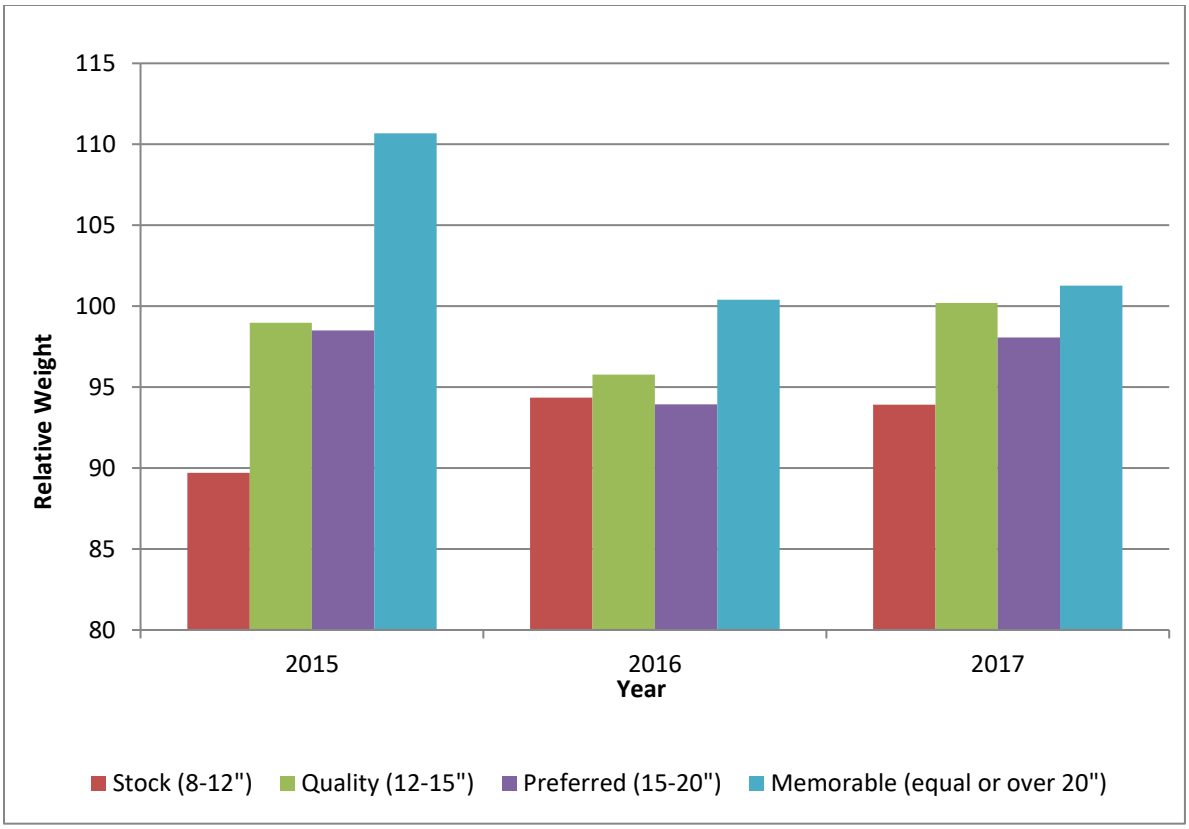


Figure 3. The relative weights of Largemouth Bass sizes stock, quality, preferred and memorable size fish sampled at Grand Bayou Reservoir, LA by spring electrofishing during years 2015, 2016 and 2017.

Spring Wr values can be influenced by spawning activities, but can be compared to other samples collected in spring. In comparing spring relative weights for Largemouth Bass collected in 2017 to earlier Wr values for that species, Wr for stock size fish increased by 1.9%, Wr for quality size fish increased by 2.6%, Wr for preferred-size fish increased by 1.9% when compared to the previous two-year average (Figure 3).

Largemouth Bass Genetics

Grand Bayou has been stocked with Florida strain Largemouth Bass since 1995. Florida strain Largemouth Bass are stocked into the reservoir to incorporate a genetic trait associated with larger maximum sized adult fish. Samples taken from electrofishing and assessed with allozyme analyses show that, over time, the percentage of bass with Florida influence (F - F_x) has ranged from 6 percent (1998-1990) to 60 percent (2003-2004). Sampling has indicated that Largemouth Bass with the genetic signature defined as pure Florida have ranged from 0 percent (1997-1998 and 2009-2010) to 19 percent (2005-2006). Genetic testing results for Largemouth Bass are shown in Table 1.

Table 1. Allozyme analysis of Largemouth Bass taken from Grand Bayou Reservoir, LA.

Year	Number	Northern	Florida	Hybrid	Florida Influence
1996	102	86%	3%	11%	14%
1997	49	86%	0%	14%	14%
1998	95	94%	2%	4%	6%
1999	59	80%	8%	12%	20%
2000	74	61%	15%	24%	39%
2001	49	63%	14%	23%	37%
2002	46	70%	11%	19%	30%
2003	52	79%	4%	17%	21%
2004	53	40%	13%	47%	60%
2005	53	49%	19%	32%	51%
2009	45	87%	0%	13%	13%
2015	172	46.5%	18%	35.5%	53.5%
2016	153	39.2%	21.6%	39.2%	60.8%
2017	138	47.8%	20.3%	31.9%	52.2%

Largemouth Bass Angler Harvest and Effort

A creel census survey was initiated in May 1997 to determine angler effort and catch rates. The access point creel survey, which included a count of trailers and bank anglers, was conducted 2 weekend days and 1 weekday per month through December 1997. In 1998, the creel survey was continued with efforts increasing to 6 days per month during the peak periods of March through October, and 3 days per month from November through February. In 2001, the creel survey followed a schedule similar to that in 1998. An angler opinion survey was also conducted in conjunction with the creel surveys to determine the popularity of the 14" – 17" slot limit on the lake. During the 1998 and 2001 creel surveys, 82% and 63% of anglers were in favor of the 14" – 17" slot limit on Grand Bayou, respectively (Seales 2001). The latest creel survey was conducted from February 2015 through January 2016, and was included as part of a three-year bass and crappie population assessment. Grand Bayou Resort launch was randomly sampled six times per month, including four weekend days and two weekdays. All harvested bass and crappie were weighed and measured while other targeted species were noted. An angler opinion survey was included for angler perceptions of current harvest regulations for bass during the latest survey. Of the 375 bass anglers interviewed, 75% were in favor of the 14" – 17" slot limit, 11% had no opinion and 14% were opposed.

The Largemouth Bass fishery is an important component of Grand Bayou Reservoir. Anglers logged 46,684.88 hours fishing on Grand Bayou Reservoir in 2001 with 26,012.99 hours (55.7%) directed toward Largemouth Bass. Specific results derived from analysis of Largemouth Bass angler information data gathered during creel surveys are given in Tables 2, 3, and 4.

Table 2. Largemouth Bass angler information taken from creel surveys with a 14”-17” slot, 8 fish creel limit of which only 4 fish may be over 17” total length (TL) conducted at Grand Bayou Reservoir.

YEAR	SURVEY DAYS	NUMBER OF LARGEMOUTH BASS ANGLERS INTERVIEWED	MEAN NUMBER OF ANGLERS IN PARTY	MEAN TRIP LENGTH (HOURS)	MEAN ONE-WAY DISTANCE TRAVELED (MILES)
1997	24	203	1.87	4.39	32
1998	61	634	1.79	4.19	34
2001	65	508	1.71	4.44	40
2015-2016	72	610	1.80	4.95	38

Table 3. Annual creel survey results, by percentage of total catch for Largemouth Bass anglers, surveys conducted at Grand Bayou Reservoir.

	YEAR 1997	YEAR 1998	YEAR 2001	YEAR 2015-2016
CATCH BELOW THE SLOT	72%	72%	41%	37%
CATCH IN THE SLOT	27%	23%	50%	42%
CATCH ABOVE THE SLOT	1%	5%	9%	21%
RELEASED (LEGAL SIZE)	70%	53%	75%	77%

Table 3. Annual creel survey results, trip and hourly means from actual Largemouth Bass angler interviews; surveys conducted at Grand Bayou Reservoir, LA.

1997 (May-December), 1998, 2001, 2015, and 2016 (January-December) 14”-17” Slot, 8 fish creel limit of which only 4 fish may be over 17” TL.				
	YEAR 1997	YEAR 1998	YEAR 2001	YEAR 2015-2016
LM BASS CAUGHT PER TRIP	4.25	3.97	2.6	1.98
LM BASS HARVESTED PER TRIP	0.87	1.25	0.5	0.23
LM BASS CAUGHT PER HOUR	1.14	1.01	0.69	0.41
LM BASS HARVESTED PER HOUR	0.2	0.3	0.14	0.05

Size distribution of angler harvested Largemouth Bass during historical creel surveys at Grand Bayou Reservoir are shown in Figure 4. Landings data indicates general angler compliance with the 14" – 17" protected slot limit. The number of bass harvested has slowly decreased, both below and above the slot, in each of the four creel periods. While referring to Table 2., the number of anglers creeled have increased with larger data surveys and the number of Largemouth Bass caught per angler hour have decreased slowly. Retention rate of legal LMB bass both below and above the slot in 2015-16 was 21.93%. As expected, most bass harvested are below the 14" minimum of the slot.

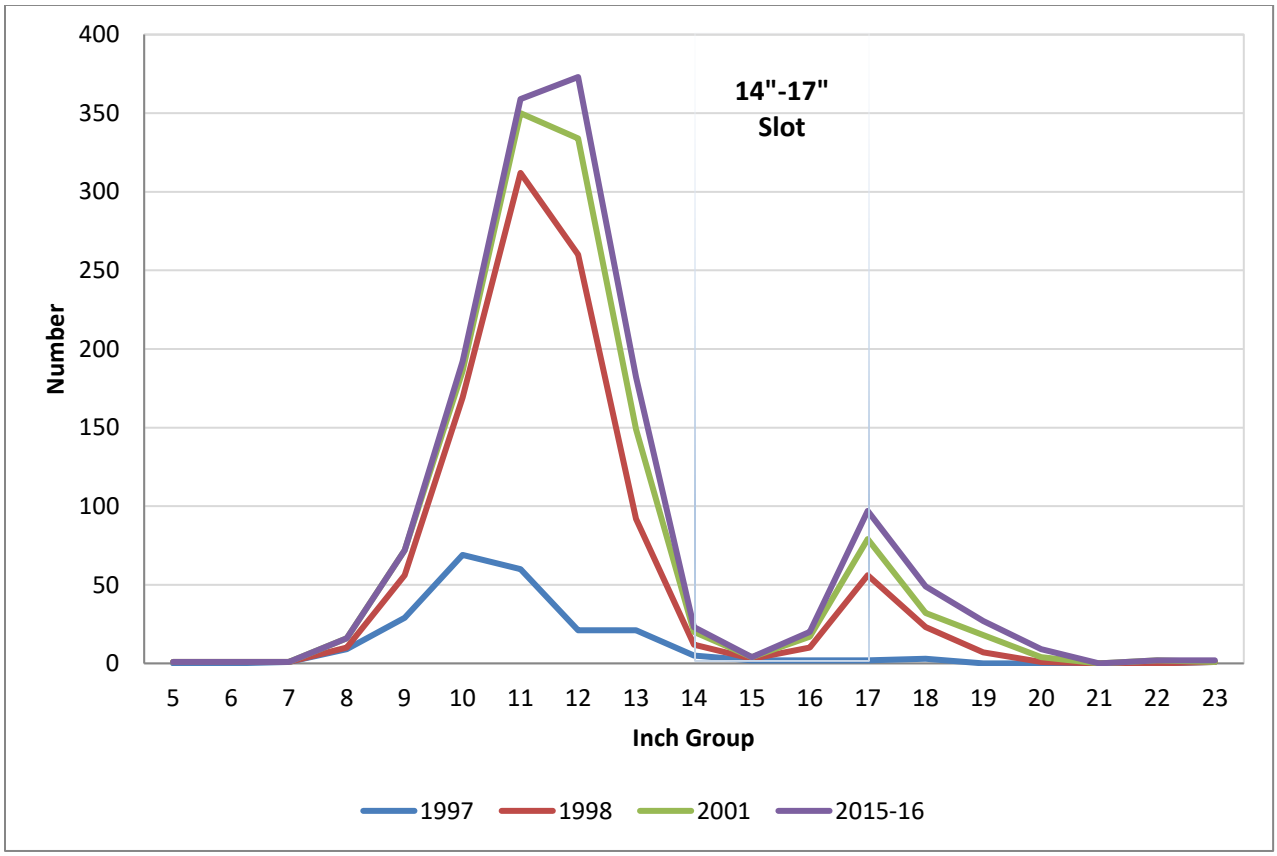


Figure 4. The size distributions (inch groups) of Largemouth Bass harvested by bass anglers during creel surveys at Grand Bayou Reservoir, LA, 1997, 1998, 2001 and 2015-16.

Sunfish (Bluegill & Redear)

Sunfish anglers comprise a small portion of the total angler group at Grand Bayou Reservoir, but as is typical statewide in Louisiana, are a devoted group. Annual catch information for Bluegill sunfish appears in Table 5.

Table 4. Bluegill catch data collected during annual creel surveys at Grand Bayou Reservoir, Red River Parish, Louisiana. Estimates are from all anglers.

1997 (May-December), 1998 and 2001 (January-December)			
	YEAR 1997	YEAR 1998	YEAR 2001
NUMBER CAUGHT	27,371.90	7,573	3,267
NUMBER HARVESTED	27,371.90 (100% of catch)	7,573 (100% of catch)	3,267 (100% of catch)
POUNDS HARVESTED	20,993	6,690	2,393
AVERAGE WEIGHT PER BLUEGILL (POUNDS)	0.77	0.88	0.73

Crappie Relative Abundance and Size Structure Indices

Crappies are a significant predator fish at Grand Bayou Reservoir, and provide recreational opportunities for many anglers. Crappie were sampled with gillnets during seven periods between 1997 and 2018. Total catch-per-unit-of-effort (number of fish caught per hour) values for those gillnet samples are given in Figure 5.

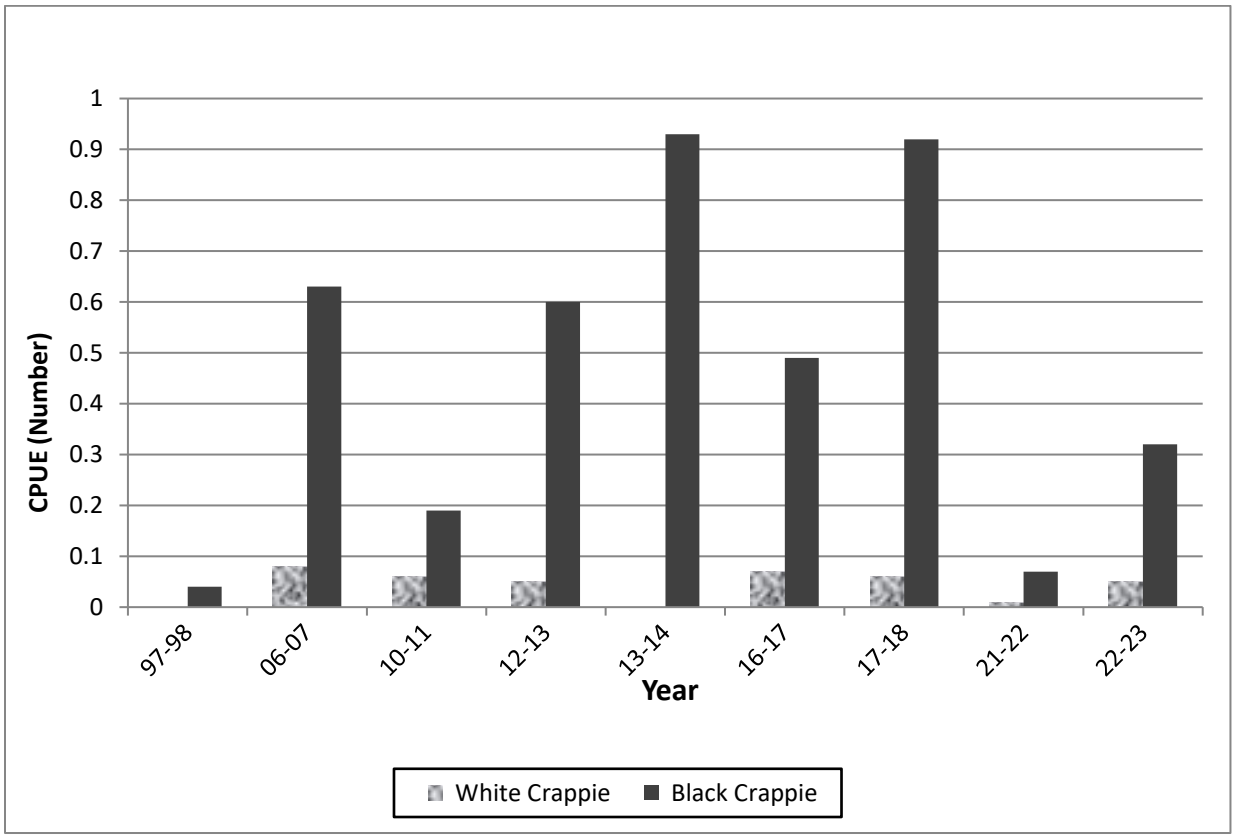


Figure 5. The catch-per-unit-effort (number caught/100'/net night) of White Crappie and Black Crappie captured in gillnets from Grand Bayou Reservoir, LA in 1997-2023.

These results indicate the presence of a stable to increasing population of crappie in this reservoir to 2018. They also indicate a higher frequency of occurrence for Black Crappie as opposed to White Crappie. The gill net sample effort in 2022 resulted in considerably lower catches and slightly higher catches in 2023 which are typical. Additional gill net samples are scheduled in winter 2024-2025 for more clarity on the current crappie population. Crappies appear to follow the cyclical pattern exhibited by these species in waterbodies statewide where populations have a boom-and-bust cycle roughly every 3-5 years.

Lead Net Samples

Lead net samples are conducted for crappie, *Lepomis* (bream) and other species. There are 6 sample sites evenly spread for lead nets on Grand Bayou Reservoir with 2 nets per sample site and a total of 12 sampled nets. Nets are usually set Thursday evening and picked up the following Monday for 90-92 hours of sample time.

Crappies were collected with leadnets in 2009, 2010, 2013, 2015, 2016, and 2017. The CPUE from these samples are illustrated in Figure 6.

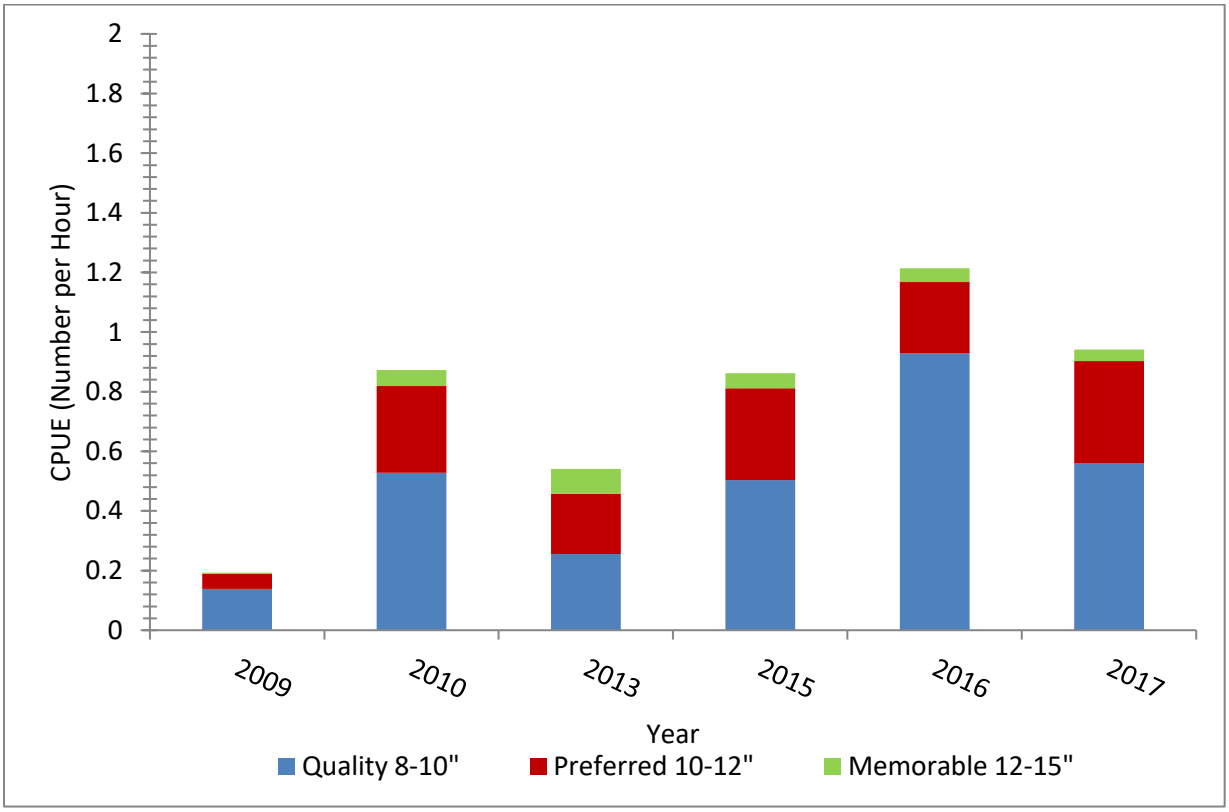


Figure 6. The CPUE for both Black and White crappie taken from lead net sampling at Grand Bayou Reservoir, LA during years 2009, 2010, 2013, 2015, 2016, and 2017.

The CPUE of crappies captured in leadnets also reflects the cyclical nature of this crappie population. Information depicted in both Figure 6 and 8 provide some insight into the size distribution of the crappie population. This population follows the typical bell curve pattern as frequency decreases with size and age.

With Black Crappie the predominant of the two species found within Grand Bayou Reservoir, further understanding of the size distribution can be gained by looking at the relative stock density (RSD) values calculated specifically for Black Crappie collected with leadnets. A crappie population with high RSD values will generally have fewer and larger crappie. Poor recruitment or high mortality (fishing and natural) could be issues with high RSD's. A crappie population with low RSD values will likely have more and smaller sized crappie. Overcrowding, high recruitment or low mortality could then be issues with low RSD's. The RSD values for both preferred and memorable size groups of Black Crappie are given in Figure 7.

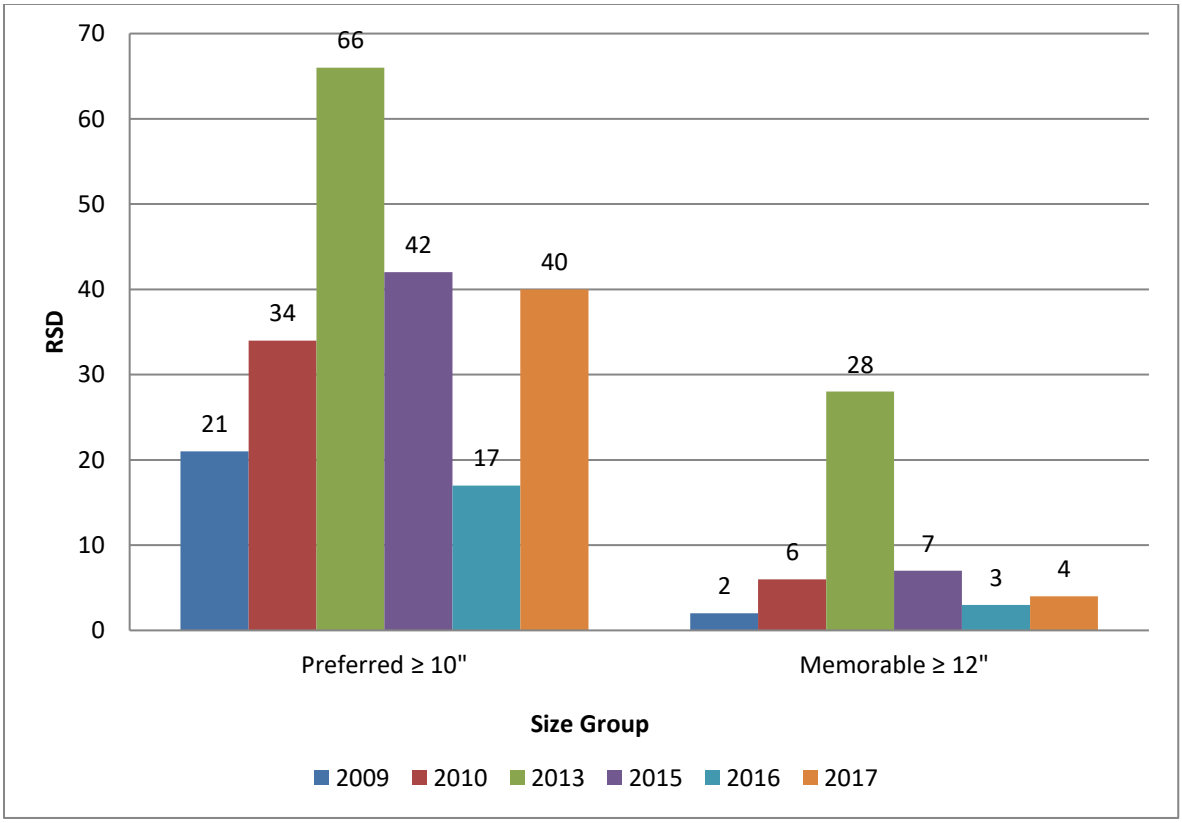


Figure 7. The relative stock density for preferred and memorable sized Black Crappie collected during lead net sampling at Grand Bayou Reservoir, LA during years 2009, 2010, 2013, 2015, 2016 and 2017.

The RSD of crappies suggests a significant portion of the crappie population is in the preferred-size group (TL ≥ 10 in.). Memorable-sized fish are not considered as abundant in this waterbody, but are present in numbers sufficient to provide reasonable angler opportunity with memorable size crappie increasing in number every 5-7 years. The RSD of trophy-size crappies was zero, which is typical for this sampling method in most crappie populations. Relative Stocking Density Preferred ≥10" is suggested as ideal between 10-20 with a PSD between 30-60 (Gablehouse 1984b). Most sample periods except 2016 indicated higher than ideal RSD preferred with a large percentage of the Black Crappie population ≥ 10 inches and fewer juvenile crappie moving into the population indicating possible high mortality and occasional low recruitment.

Crappie Angler Harvest and Effort

Crappie anglers were interviewed as part of the aforementioned creel surveys. Size distribution results of crappie harvested from those surveys are illustrated in Figure 8.

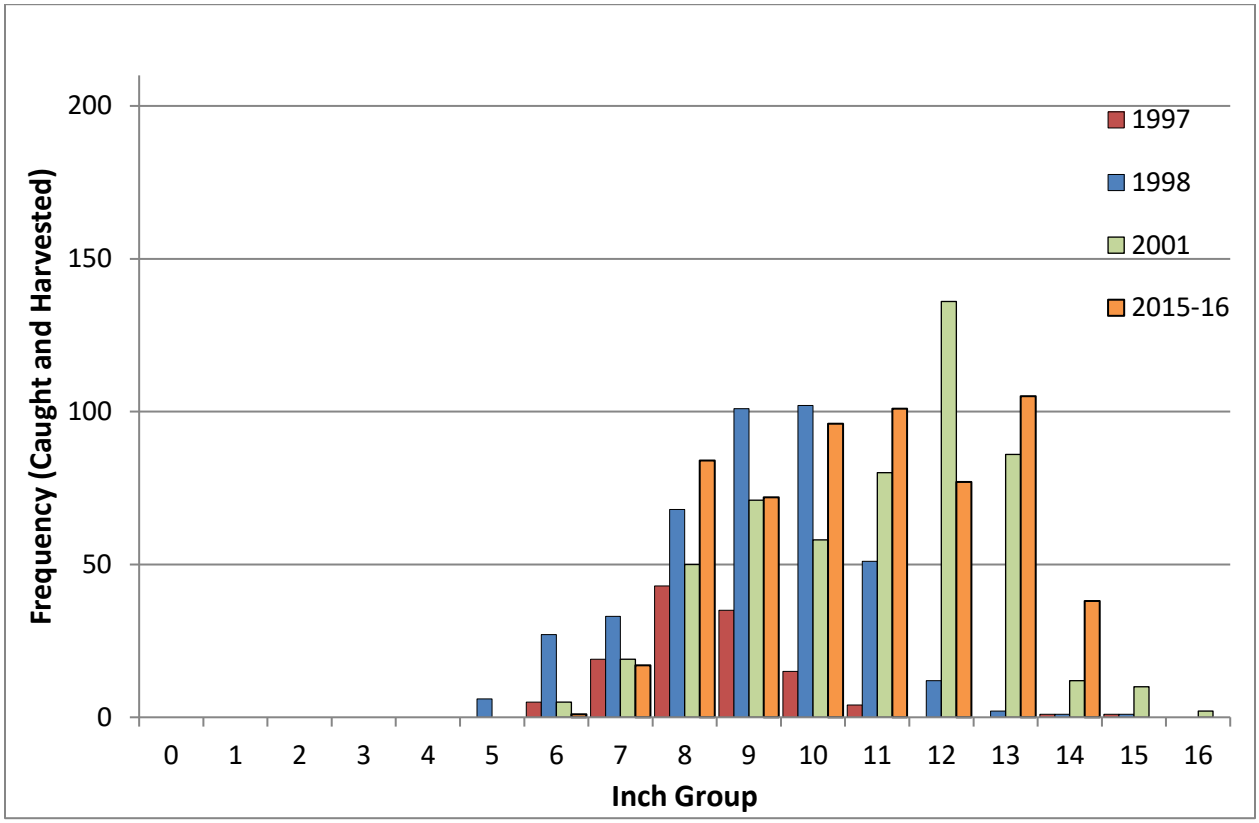


Figure 8. The size distribution (length groups) of Black and White crappie caught by anglers and measured during creel surveys at Grand Bayou Reservoir, LA in years 1997, 1998, 2001 and 2015-2016.

Most of the crappies caught and harvested by anglers were 8 to 13 inches Total Length. The minimum and maximum measurements were 5 and 16 inches Total Length.

Table 5. Size distribution of angler harvested crappies recorded during creel surveys at Grand Bayou Reservoir, LA in 1997, 1998, 2001, and 2015-2016.

ANGLER SURVEY YEAR	1997	1998	2001	2015 and 2016	1997,1998, 2001 and 2015-2016 COMBINED
CRAPPIE MEDIAN LENGTH	8 inches	9 inches	11 inches	11 inches	9.75 inches
TOTAL NUMBER OF CRAPPIE MEASURED	123	404	529	634	1,690

Notwithstanding some difference in sampling period during 1997, changes in crappie length distributions can be seen when comparing one year to another. The most common crappies measured in 1997 were 8 inches long, while the most common crappies measured in 2001 and 2016 were 11 inches long. When coupled with an increase in the number of crappies measured during each period, it appears that a strong age class of crappies, likely spawned in 1996, was moving through this population during these surveys. The most common size crappie harvested by anglers in 2015-16 increased to 13 inches, with 105 sampled and a median length of 11 inches. Sizes of harvested fish ranged of seven to 14 inches in the 2015-16 survey.

Catfish

While each of the three major species of catfish Channel Catfish *Ictalurus punctatus,* Blue Catfish *Ictalurus furcatus,* and Flathead Catfish *Pylodictis olivaris* are found in this reservoir, their abundance remains relatively low. Catfish are often found in low abundance in new reservoirs due to high levels of hydrogen sulfide gas formed when submerged terrestrial vegetation decays following impoundment. Current conditions in Grand Bayou Reservoir include few large trees and stumps left within the reservoir for catfish spawning habitat. To increase recreational angling opportunity, LDWF has stocked Channel Catfish into this reservoir since 1996. To date, 456,301 Channel Catfish have been released. Gillnetting results for the three species of catfish are shown in Figures 9 and 10.

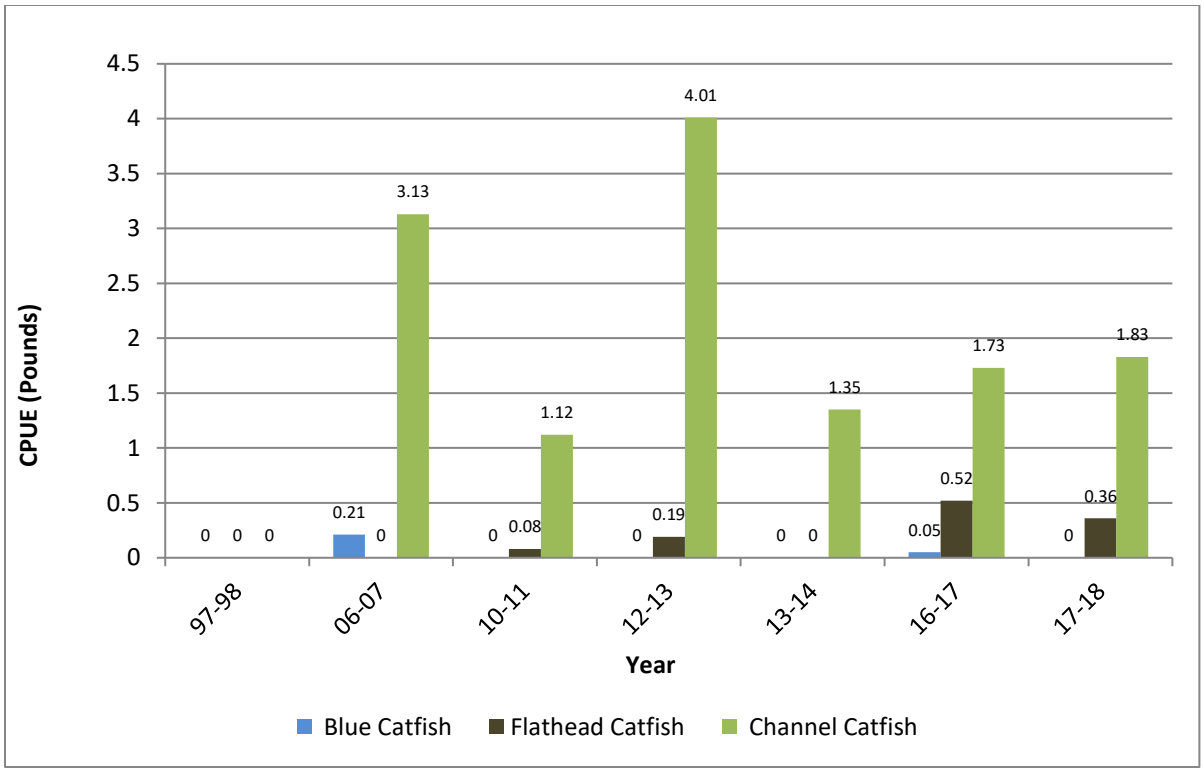


Figure 9. The total CPUE (pounds per net night) of Blue Catfish, Flathead Catfish and Channel Catfish collected in Grand Bayou Reservoir, LA by gillnet sampling 1997-2022.

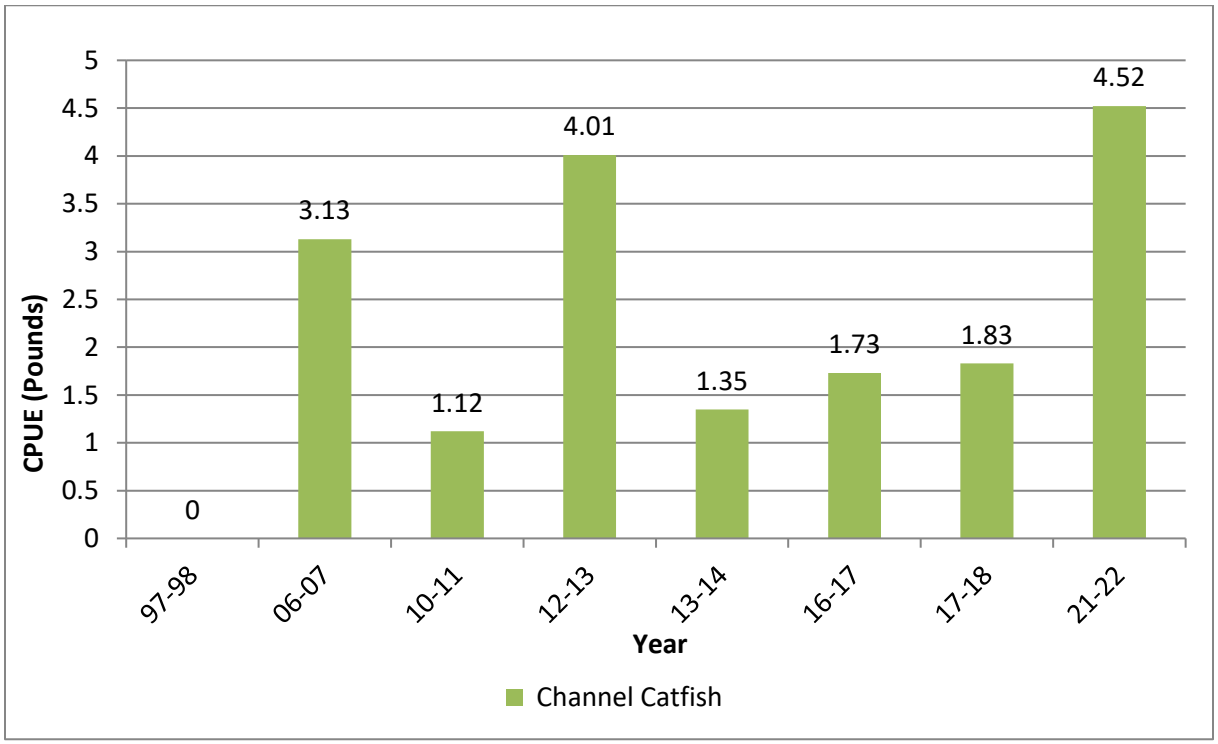


Figure 10. The total CPUE (pounds per net night) of Channel Catfish collected in Grand Bayou Reservoir, LA by gillnet sampling 1997-2022.

Blue Catfish are not found in significant numbers at this reservoir. Flathead Catfish are found with slightly increasing frequency, and are expected to increase in number and size in the future. Channel Catfish are apparently found in proportion to their stocked numbers in what amounts to a "put, grow and take" fishery. Large individuals are found in the 12-15 pound range. Channel Catfish are stocked generally once every 3-5 years in Grand Bayou Reservoir.

Forage

Forage fish are those that are available for use as food by predatory fishes. In general, all individuals up to six inches in length are forage fish, particularly when discussing forage for Largemouth Bass. Figure 11 shows the CPUE of forage fish captured during fall electrofishing from 1997 to 2017.

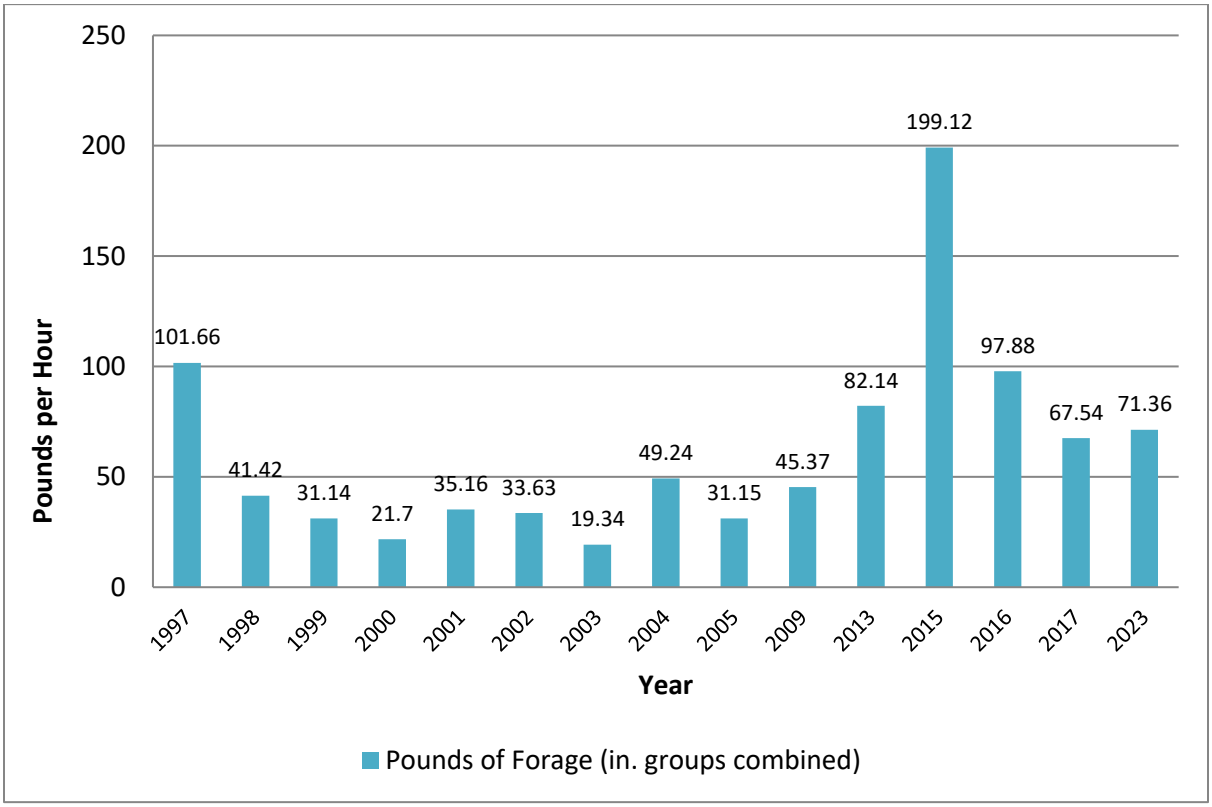


Figure 11. The pounds of forage species ≤ 6 inches in total length collected per hour during Fall electrofishing at Grand Bayou Reservoir, LA in years 1997 – 2005, 2009, 2013, 2015, 2016, 2017 and 2023.

Forage CPUE had decreased since the initial "boom" period following impoundment from 1998 through 2009. These values were steady at around 40 pounds per hour during this time frame. Pounds per hour increased to 82.14 in 2013 to a high of 199.12 in 2015. Primary forage species in this reservoir include Bluegill, silversides, Threadfin Shad, Dollar Sunfish, Red spotted Sunfish, Warmouth, Redear Sunfish and Gizzard Shad.

Commercial Species

Data collected with standardized gillnets is presented in the following graphs. Standardized gillnet sampling involves the use of 100 yards each of 2.5 inch, 3 inch, 3.5 inch and 4-inch monofilament gill nets at each station. Use of commercial gear and commercial fishing are prohibited on Grand Bayou Reservoir, but fish that are of commercial importance in Louisiana are reported, below.

Carp

While Common Carp *Cyprinus carpio* are not subject to species specific management, they are considered a commercial species and a sustainable population currently exists in Grand Bayou Reservoir. Figure 12 depicts total CPUE of common carp collected in gillnets at Grand Bayou Reservoir.

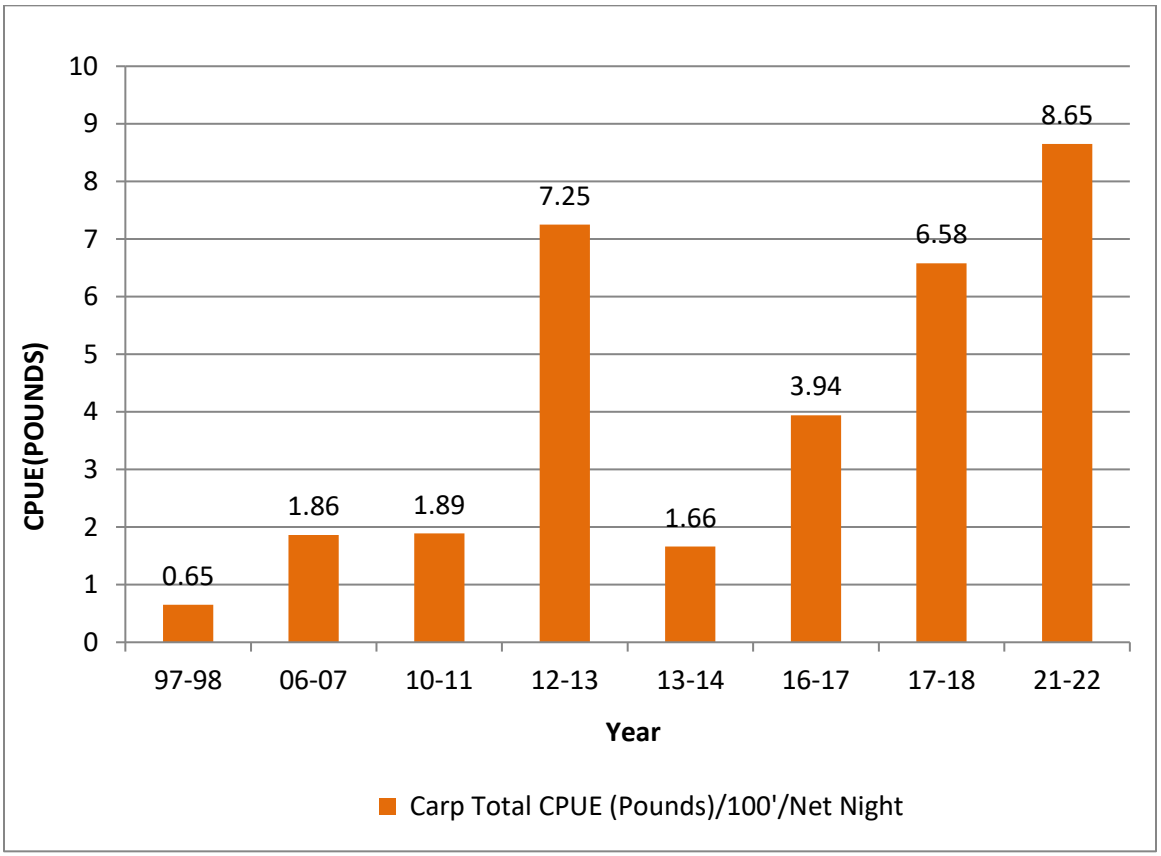


Figure 12. Total CPUE (Pounds/100'/Net Night) of Common Carp taken by gillnet sampling at Grand Bayou Reservoir, LA during sampling periods 1997-2022.

Catfish

All catfish species are managed to provide a sustainable population. Although the three major catfish species, Channel Catfish *Ictalurus punctatus*, Blue Catfish *Ictalurus furcatus*, and Flathead Catfish *Pylodictis olivaris* exhibit some fluctuation in annual relative abundance, all are found within the waterbody. Catch data from standardized gillnets was presented in Figures 8 and 9.

Freshwater Drum
Freshwater drum *Aplodinotus grunniens* has not been collected during standardized sampling at this reservoir.

Bowfin
Bowfin *Amia calva* is not a major commercial species in Grand Bayou Reservoir, however bowfin are occasionally collected during standardized sampling and are of interest. Pounds per net night of Bowfin have declined steadily. The CPUE for bowfins collected in gillnets is depicted in Figure 13.

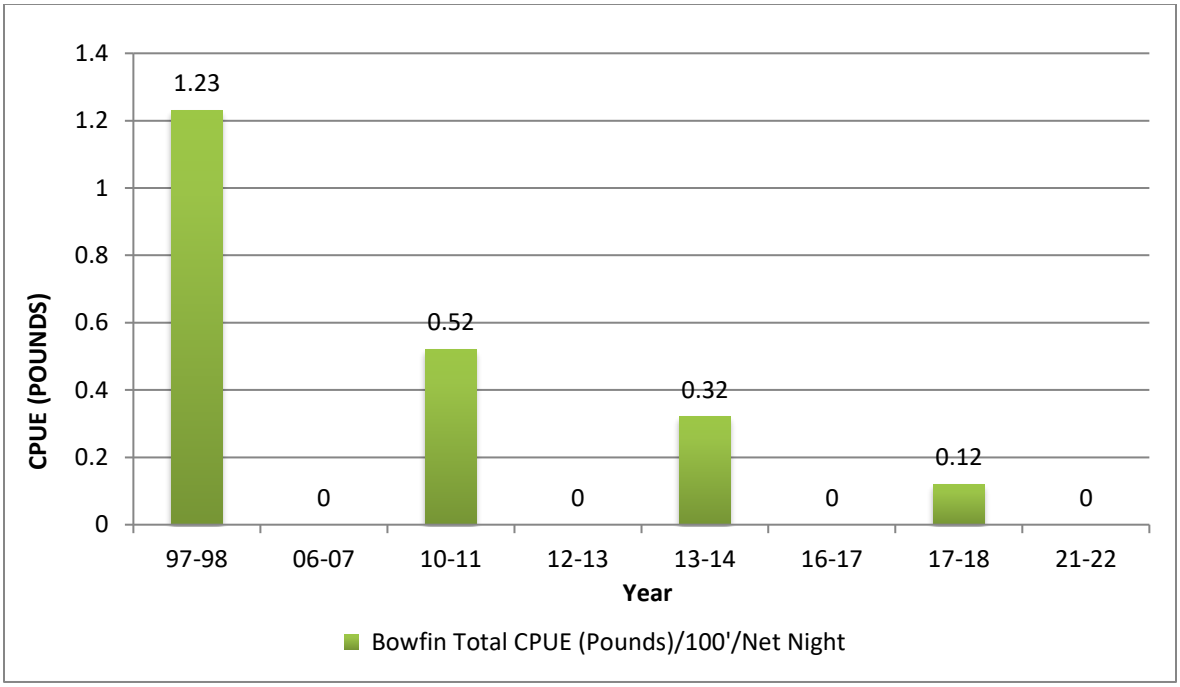


Figure 13. The CPUE of bowfins collected in gillnets from 1997 - 2022.

Garfish
Spotted Gar *Lepisosteus oculatus* are the only species of garfish that occur in this reservoir. The CPUE for Spotted Gar collected in gillnets is depicted in Figure 14.

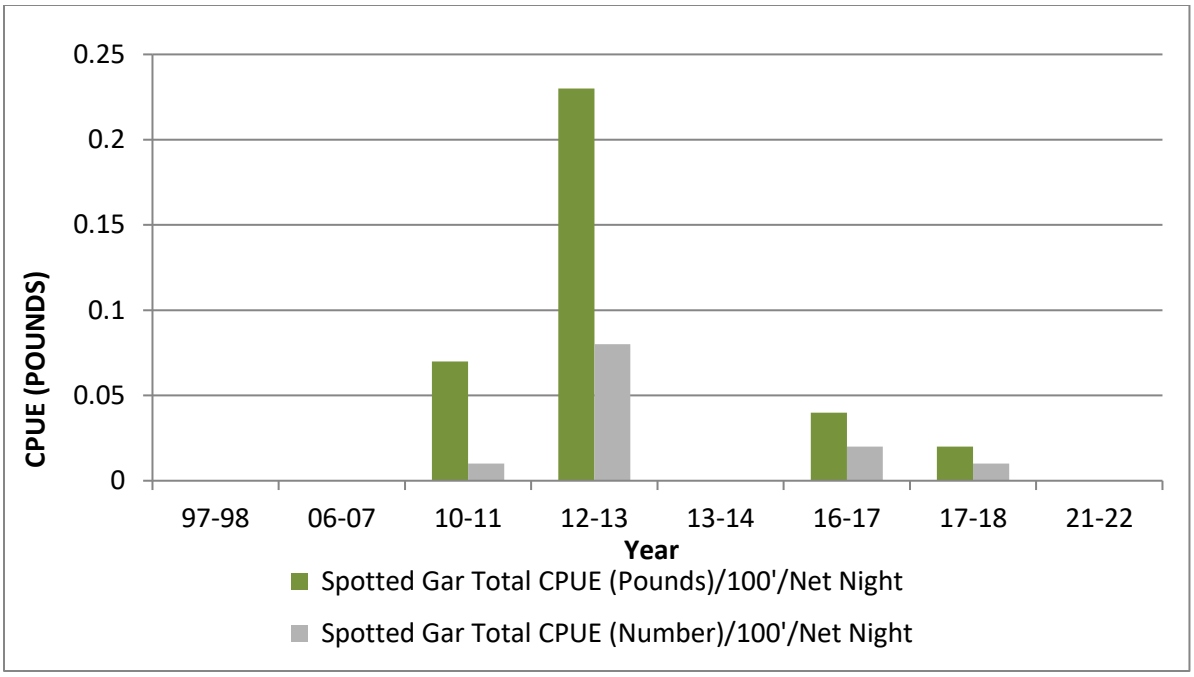


Figure 14. The CPUE of Spotted Gar collected in gillnets at Grand Bayou Reservoir from 1997- 2022.

Species of Special Concern

No species of special concern are known to occur in this reservoir.

HABITAT EVALUATION

Aquatic Vegetation

Hydrilla *Hydrilla verticillata* has been the dominant submersed aquatic plant in Grand Bayou Reservoir. It is both beneficial as fish habitat and problematic to fishing and navigation. In 2006, a drawdown was conducted to control hydrilla, followed by 2 additional drawdowns in 2007 and 2008. Drought conditions that occurred in 2010 – 2012 provided additional control of submersed aquatic vegetation (SAV). However, in September 2013, 473 acres of hydrilla were observed in the reservoir. The majority of the coverage was found above the LA 784 Bridge. Hydrilla has decreased significantly since 2013, and minimal coverage of less than one acre was found within the reservoir on August 26, 2016. Coverage has increased since that time, with 250 acres observed in September 2018. Coverage remained low though 2021 with a slight increase to 350 acres in summer of 2022.

Other SAV species currently found at Grand Bayou include chara *Chara* spp., fanwort *Cabomba* spp., American pondweed *Potamogeton nodosus* and coontail *Ceratophyllum demersum*. These plants are much less abundant than hydrilla and pose little problem to anglers and boaters.

Problematic floating vegetation is comprised of giant salvinia *Salvinia molesta* and water hyacinth *Pontederia crassipes*. Both of these species remain at low levels and are confined to the backs of coves that are protected from wind and water currents.

On August 11, 2022, LDWF surveyed the reservoir for the presence and spatial coverage of aquatic vegetation. Table 7 depicts the acreages for the major species found during this survey.

Table 6. Total acreage of major plant species found in Grand Bayou Reservoir, LA during a plant survey conducted on August 11, 2022.

Aquatic Plant Species	Acreage Covered
Hydrilla	350 Acres
Giant Salvinia	160 Acres
Chara	0 Acres
Coontail	10 Acres
Lotus	80 Acres
Alligator weed	30 Acres
Giant Cutgrass	15 Acres
American Pondweed	20 Acres
Water Primrose	20 Acres
Spatterdock	0 Acres
Water Hyacinth	0 Acres
Maidencane	0 Acres
Fanwort	0 Acres
Total Vegetative Acreage	685 Acres
Percentage Of Lake Covered By Vegetation	27.4%

A vegetative typemap created from information gathered during the December 14, 2021 survey of Grand Bayou Reservoir appears as **Appendix I.**

Durable Natural Structure

Very little woody structure exists in this reservoir due to extensive clearing of the lakebed prior to impoundment. Much of the durable natural structure such as young standing trees and brush has decayed since impoundment of the reservoir.

Substrate

Information from the Natural Resource Conservation Service shows that soils in the Grand Bayou watershed range from a sandy type at higher elevations to a silt type at moderate elevations to a clay type at lower elevations. Soil pH found at higher elevations ranges from 4.5 to 5.3. Soil pH at slightly lower elevations is found to be 4.2. The soil pH of the lowest elevations is 4.6. All of these soil types are classified as low in fertility.

Artificial Structure

An artificial reef was placed in the reservoir by LDWF staff in August 2016. The reef is approximately 1/10th acre in size and placed along a long tapering point upstream of the spillway and marked with a permanent buoy. The artificial reef may be found with the

following coordinates, latitude 31.999710 and longitude -93.214762. A second larger artificial reef approximately ¼ acre in size was placed in the reservoir in June 2022 along an underwater ridge and point that drops off sharply on each side. This artificial reef may be found with the following coordinates, latitude 32.00713 and longitude 93.21856. More structures may be added to these existing structures when material becomes available. Placement of brush piles is a common practice of local anglers.

CONDITION IMBALANCE / PROBLEM

Giant salvinia is an invasive floating fern that has been present since 2006, but has not developed into a serious problem throughout the reservoir. Giant salvinia does cause navigational problems in areas of the reservoir that are sheltered from wave action or water currents.

Hydrilla has been the dominant submersed aquatic plant in Grand Bayou Reservoir. As such, the invasive species is both beneficial as fish habitat and problematic to fishing and navigation. Removal of hydrilla from Grand Bayou Reservoir can be accomplished with biological control measures, specifically the introduction of triploid Grass Carp (TGC). However, the use of TGC in Grand Bayou Reservoir does involve significant risks. Woody material is sparse, and submersed aquatic vegetation (SAV) is the primary form of complex cover. Complex cover is most beneficial for sportfish when present in areal coverage of 15-30%. Sportfish productivity and angler success are reduced when complex cover is significantly above or below 15-30%. Efforts to introduce TGC for control of SAV within a desired range have been largely unsuccessful. Results more often include insufficient SAV control or complete removal of SAV. Recent coverage estimates of hydrilla show that the plant decreased significantly over time from 2013 to 2019, and stabilized where no aggressive control measures are warranted. To ensure that all stakeholder groups are aware of potential benefits and risks, considerable discussion is necessary before the introduction of TGC into Grand Bayou Reservoir will be recommended.

CORRECTIVE ACTION NEEDED

Annual monitoring of aquatic plant species to identify problems related to these plants. Appropriate use of herbicides, water level manipulation and biological agents to control vegetation as needed.

RECOMMENDATIONS

1. Implement an integrated management approach for Grand Bayou Reservoir to control nuisance vegetation as needed . The advantage of integrated management is the ability to achieve a combined benefit from several control methods and not be completely dependent on the success of any one approach. LDWF personnel will continue to perform annual surveys to monitor aquatic vegetation and will update recommendations as necessary. Herbicide treatments will follow LDWF's standard protocol (Table 8).

   a. Giant Salvinia
   Continue foliar herbicide applications for control of giant salvinia.
   Grand Bayou Reservoir is located within the Louisiana Department of Agriculture & Forestry's 2,4-D waiver area. Between March 15 and September 15 of each year, water hyacinth will be treated by foliar applications of glyphosate (0.75 gal/acre)/Red River 90 (0.25 gal./acre). Between September 16 and March 14 of each year, water hyacinth will be treated with foliar applications of 2,4-D (0.5 gal./acre) and Red River 90 (1 pint/acre).

   (Note): As of July, 2024 by LDWF directive, glyphosate will not be used as a herbicide mixture within Grand Bayou Reservoir.

   b. Hydrilla
   Chemical treatments should be applied to critical areas such as boat ramps and for shoreline angler access if growth becomes excessive. Chemical treatments will be made with 4.0 ppm of Aquathol K. Chemical treatments are not recommended for large-scale or long-term control of submersed aquatic vegetation. The cost for such control is prohibitive and the control of hydrilla is short-lived.

   Physical control of hydrilla and other submersed aquatic vegetation (SAV) will be accomplished by means of lake drawdowns. Drawdown measures will be considered when coverage of SAV exceeds 40% (1,000 acres) of the total waterbody surface area. The recommended drawdown period is September 1 to January 31 of the following year. The recommended drawdown rate will be 4 inches per day with a target level of 131'MSL. A minimum of two consecutive drawdowns will be necessary to achieve satisfactory reduction of hydrilla.

   Triploid grass carp are a potentially effective option for biological control of hydrilla. Triploid grass carp are not recommended for Grand Bayou Reservoir at this time. Complex cover is directly related to sportfish productivity and angler success. Woody material in Grand Bayou Reservoir is limited and complex cover is primarily comprised of submersed aquatic vegetation. Excessive removal of submersed aquatic vegetation is not a desirable management goal for Grand Bayou Reservoir. Efforts to introduce triploid grass carp to manage submersed aquatic vegetation to a desired level of coverage have been largely unsuccessful. Recommendations for the introduction of triploid grass carp into Grand Bayou Reservoir will be reserved until alternative control options have been exhausted and

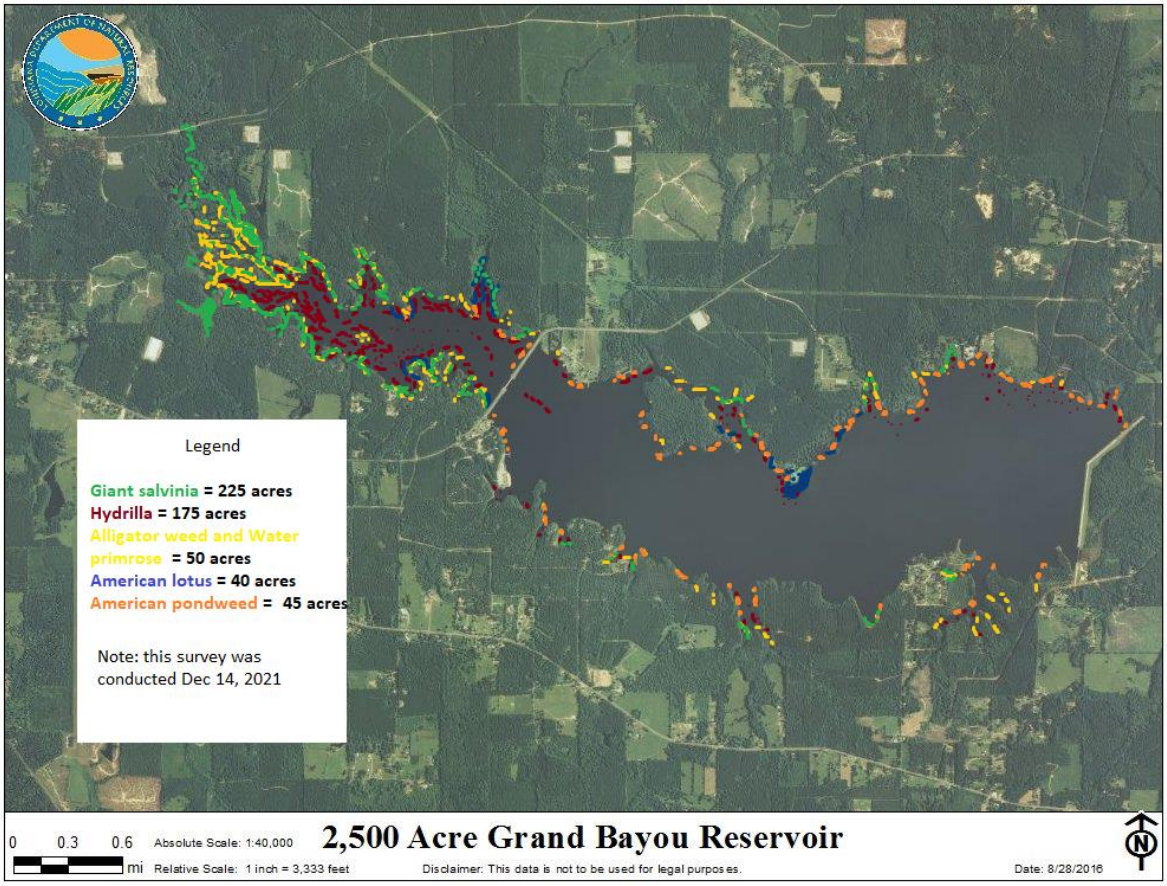
until all stakeholder groups are aware of the potential benefits and risks.

c. Continue standardized fish sampling as scheduled for Largemouth Bass and crappie, analyze size structure of the Largemouth Bass population with the 14 to 17 inch protective slot limit. Implement a creel survey in 2025 coupled with electrofish surveys for Largemouth Bass and lead nets for crappie to address current angler mortality, recruitment and length limit restrictions.

Table 7. Herbicide application rates by time of year and species of vegetation type.

Plant Species	Herbicide	Surfactant
***Salvinia spp*. Alternative 1** Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Diquat (0.25 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 2** Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Flumioxazin (2 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 3** Common/Giant Salvinia (April 1 to October 31)	MSM (1 oz./acre) Flumioxazin (1 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 4** Common/Giant Salvinia (November 1 to March 31)	Diquat (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
***Salvinia spp*. Alternative 5** Common/Giant Salvinia (November 1 to March 31)	Flumioxazin (12 oz./acre)	Turbulence (or approved equivalent, 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/Giant Cut Grass (undeveloped areas)	Imazapyr (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Alligator weed/Giant Cut Grass (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) or Flumioxazin (8 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)
Cuban Bulrush (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	Diquat (1.0 gal/acre) or Flumioxazin (6 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)

APPENDIX I
(**click** to return)



Grand Bayou Reservoir was surveyed and mapped for vegetation type and coverage on December 14, 2021. Survey was conducted by Villis Dowden, Biologist III. The reservoir level was 138.50 MSL. The weather was fair with a light northerly wind.

The submerged aquatic plant community was comprised of 55% hydrilla and 45% American pondweed. The total submersed aquatic plant coverage was 220 acres. The submersed vegetation found in the lake during this survey was mostly above the Hwy 784 Bridge, and within protected pockets. Drags and anchors were utilized to detect and identify submersed aquatic vegetation and was found in depths to six feet.

The following are total estimates from the December 14, 2021 survey.

Giant salvinia *(Salvinia molesta)* was found mostly above the Hwy 784 Bridge, within alligator weed, in the backs of coves and behind a beaver dam. Total coverage of giant salvinia was 225 acres.

Lotus *(Nelumbo lutea)* was found throughout the lake but limited to areas of three to five acres in size. Total lotus coverage was 40 acres.

Giant cutgrass *(Zizaniopsis miliacea)* was found in scattered patches along the reservoir shoreline and totaled 5 acres in coverage.

Illinois pondweed *(Potamogeton illinoensis)* was found in scattered patches throughout the reservoir and totaled 30 acres in coverage.

Alligator weed (*Alternanthera philoxeroides*) and Water primrose (*Ludwigia hexapetala*) were mixed and found along the banks of Grand Bayou above the Hwy 784 Bridge. Coverage of these species totaled 50 acres.

Water hyacinth *(Pontederia crassipes)* was only found in extremely light amounts and totaled less than one acre.

Maidencane *(Panicum hemitomon)* was noted in patches along the eastern shoreline near the dam. Total coverage by this species was less than 2 acres.

The total vegetative coverage found during the survey was 352 acres resulting in 14% coverage of the reservoir.

LITERATURE CITED

Gablehouse, D.W. 1984b. An Assessment of Crappie Stocks in Small Midwestern Private Impoundments. North American Journal of Fisheries Management 4:371-384

Seales, James. 2001. Grand Bayou Bass Regulations Opinion Survey Report. Louisiana Department of Wildlife & Fisheries. Interagency Report.