LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

SPANISH LAKE

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY FOUR YEARS

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Proposed management recommendations are designed to provide sustained recreational fishing.

Commercial
Proposed management recommendations will not initially include a commercial fishing component.

Species of Special Concern
No threatened or endangered species have been observed in Spanish Lake.

EXISTING HARVEST REGULATIONS

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

Commercial
Commercial fishing activities are allowed; effective June 2014. Statewide commercial fishing regulations may be viewed at the link below:
http://www.wlf.louisiana.gov/regulations

SPECIES EVALUATION

Recreational

Largemouth Bass (Micropterus salmoides, M. floridanus, and M. salmoides x floridanus Hybrids, LMB) are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain and because they are highly sought after by anglers. Electrofishing is the best indicator of Largemouth Bass abundance and size distribution, with the exception of large fish.

Largemouth Bass Relative abundance, Size Structure Indices
Electrofishing results in the fall of 1998 revealed large numbers of Largemouth Bass. The total catch per effort (CPE) was 122 Bass per hour. This number consisted of all size classes of Bass mainly from three to eight inches total length and from 10 to 16 inches in total length. Age and growth data from this fall sample showed age 0 fish to be from 4.3 to 10.1 inches in total length at capture with an average of 6.8 inches. Age one fish ranged from 10.8 to 17.1 inches total length at capture with an average of 14.0 inches. These were exceedingly fast growth rates and reflected the phenomenon normally called “the new reservoir effect”.

The fall electrofishing samples CPE in 1999 recorded only 44.8 Bass per hour and the size classes were again between three and 16 inches total length. Growth rates were similar to those of 1998. Spring samples in 2001 revealed that the total CPE had dropped to 23.1 and have never been as high again to the lowest in the 2008 spring CPE of 8.7.

After 2000, Largemouth Bass CPUE's decreased due to lack of habitat, causing recruitment to steadily decline. This is evident in the angler harvest in 2002 where Crappie became the most common species harvested.

The 2001 spring samples already showed a lack of juvenile YOY Largemouth Bass as size classes were mostly 10 inches total length and larger. Succeeding years had almost no fish under 13 inches total length in spite of annual stocking rates of about 124,000 Florida Largemouth Bass fingerlings. It was apparent that almost no successful spawning was taking place and the few individual fingerlings that were captured were from the stocking efforts. The increase annually of the percent of Florida genetic influence lends evidence to this theory.

Figure 1 represents the spring electrofishing catch-per-unit-of-effort (CPUE = Bass per hour) of LMB since 2002. There was an overall decline in annual spring catches from 2006 – 2013 as indicated by the downward trend in electrofishing CPUE. The LMB population has rebounded since 2016 and the electrofishing CPUE has increased along with natural recruitment of sub-stock individuals as seen in figure 2 below. The increase in sub-stock individuals in 2021 fall electrofishing samples has the potential to lead to a self-sustaining LMB population.

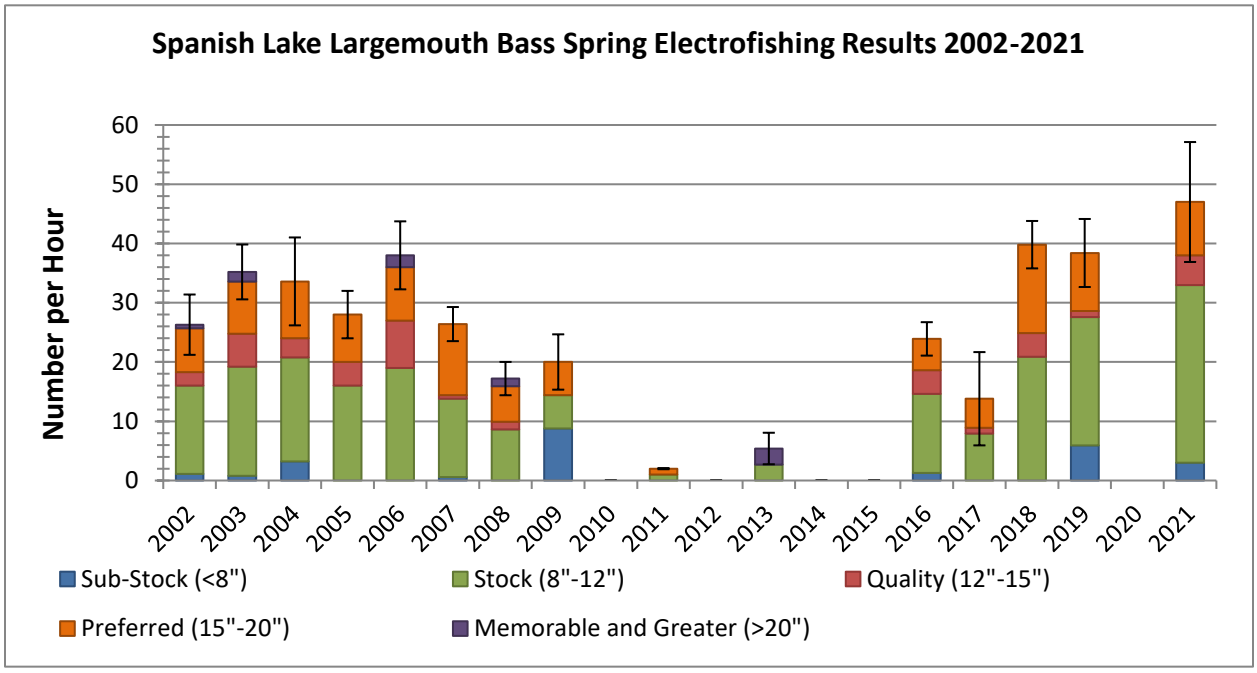

Figure 1. The mean CPUE for sub-stock- (<8"), stock- (8"-12"), quality- (12"-15"), preferred- (15"-20"), and memorable and greater- (>20") Largemouth Bass collected from Spanish Lake, LA during spring electrofishing from 2002 – 2021.

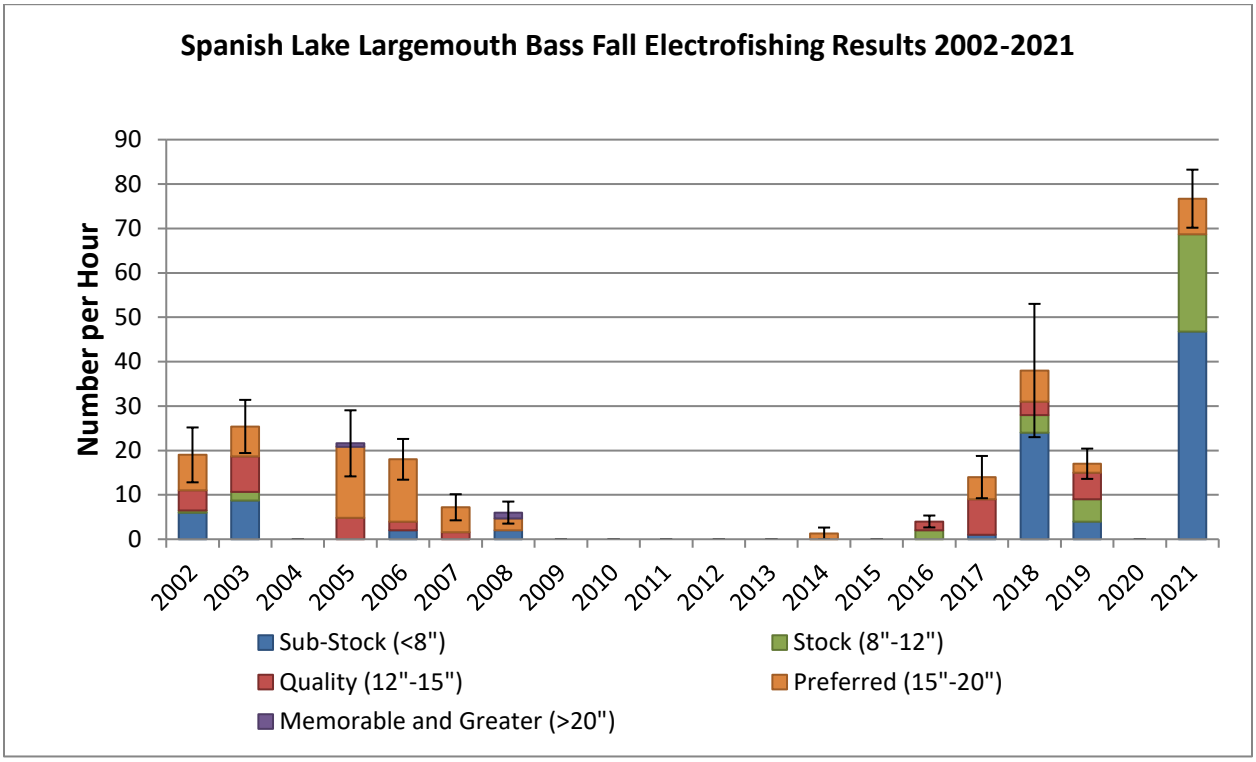

Figure 2. The mean CPUE for sub-stock- (<8”), stock- (8”-12”), quality- (12”-15”), preferred- (15”-20”), and memorable and greater- (>20”) Largemouth Bass collected from Spanish Lake, LA during fall electrofishing from 2002 – 2021.

Largemouth Bass Size Structure Indices

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” for LMB) to the number of bass of stock-size (8” in length). The PSD is expressed as a percent and is calculated by the formula:

$$PSD = \frac{\text{Number of bass>12 inches}}{\text{Number of bass>8 inches}} \text{ x100}$$

A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish; a PSD between 30 and 70 is ideal. For example, Figure 3 below indicates a PSD of 87 for 2003. The number indicates that 83% of the Bass stock (fish over 8”) in the sample was at least 12” or longer. The historical data shows an over abundance of larger fish with little to no recruitment. From the years 2008 – 2013 the electrofishing samples show a few to no small fish captured hence the PSD and RSD numbers being so high. Since 2019, the Spanish Lake Largemouth Bass population is showing recruitment and this may lead to a more stable population over time.

Relative stock density (preferred, RSD) is the percentage of Largemouth Bass in a stock (fish over 8”) that are 15” total length or longer, and is calculated by the formula:

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

An RSD value between 10 and 40 indicates a balanced Bass population, while values between 30 and 60 indicate a higher abundance of larger fish.

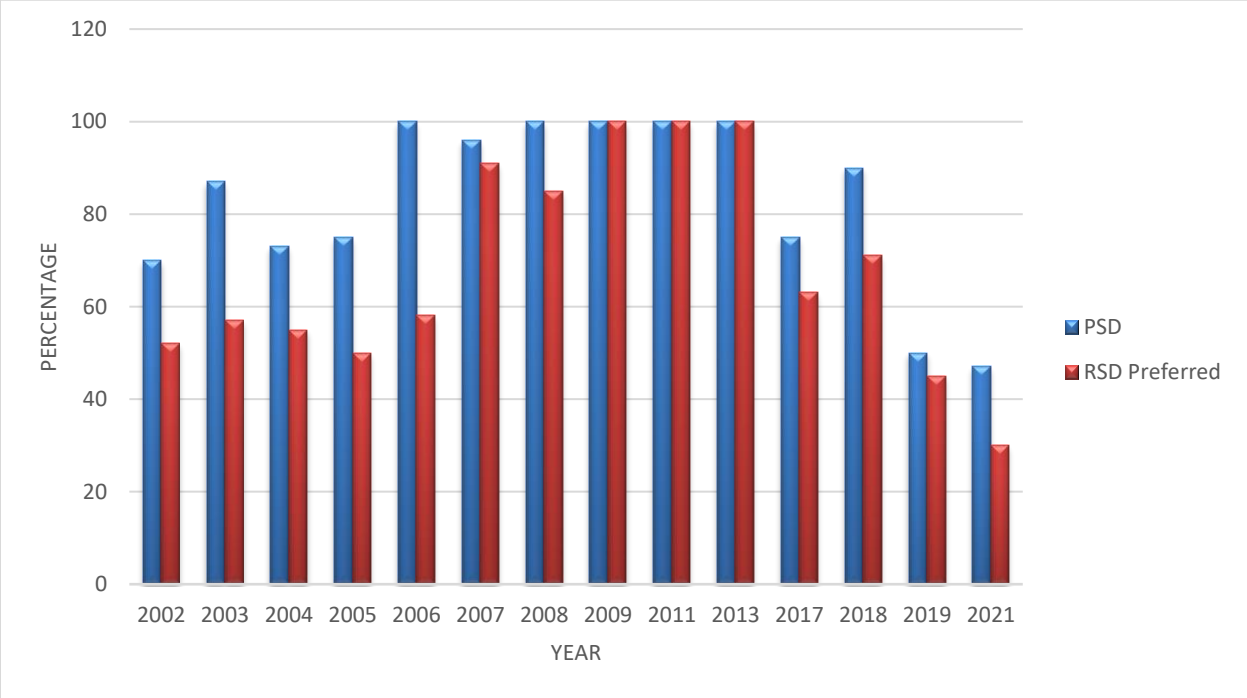

Figure 3. Proportional stock density (PSD) and relative stock density (RSD-preferred) of Largemouth Bass collected during spring electrofiahing on Spanish Lake from 2002 – 2021.

Bass up to 10 pounds have been captured over the years of sampling with electrofishing and gill nets. However, LDWF sampling catch per unit effort (CPUE) for Largemouth Bass has decreased dramatically during the first half of the 2010s, likely due to the reduced habitat quality. Production for Largemouth Bass and forage species (Sunfishes) has been negatively influenced as turbidity and algal blooms in Spanish Lake. Recently, CPUEs have improved in the lake due to improving conditions.

Largemouth Bass Genetics

The majority of Spanish Lake Largemouth Bass collected for genetic determination were collected during annual fall standardized electrofishing sampling. Total length and weight were recorded for each specimen, and otoliths (ear bones) and liver tissue were removed for growth and genetic analysis. Liver tissue was analyzed at the Louisiana State University genetics laboratory with starch gel electrophoresis. The percentage of Spanish Lake Largemouth Bass population with the Florida Bass (FLMB) genome increased steadily through 2007 (Table 1). However, FLMB introductions were discontinued after 2006 when LMB populations all but disappeared (Figure 2). The initial increase of the Florida genetic influence in Spanish Lake could be perceived as a positive management result. Unfortunately, the increased presence of stocked fish is more likely an indicator of failed natural reproduction due to habitat impairment.

Genetic results from 1998 and 1999 showed only 21% Florida gene influence. This is evidence that the remaining population of fish were not completely killed when the lake was drained or the unauthorized stocking by local Bass anglers had been successful. The Florida gene influence increased steadily throughout the years and was 45% in 2001, 55% in 2006 and 89% in 2007. The results of stocking were appearing in the genetic sampling but not in the numbers of bass available for harvest in the lake.

Table 1. Largemouth Bass stockings and genetic analyses results for Spanish Lake, LA, 1998 – 2007.

GENETICS/STOCKING OF LARGEMOUTH BASS						
Year	FLMB Stockings	Sample Size	Northern	Florida	Hybrid	Florida Influence
1998	54,033	59	79%	7%	14%	21%
1999	99,252	7	72%	14%	14%	28%
2000	129,716					
2001	125,266	51	55%	29%	16%	45%
2002	125,898					
2003	135,552					
2004	125,676	7	72%	14%	14%	28%
2006	12,810	27	45%	22%	33%	55%
2007		9	11%	45%	44%	89%

Forage

Forage fish are abundant in Spanish Lake. Electrofishing CPUE for Bluegill, Redear Sunfish, Warmouth, Green Sunfish and Longear Sunfish is presented in Figure 4. Sunfish are primarily located in the immediate vicinity of the rip rap along the ring levee. The open waters of Spanish Lake are teeming with Threadfin and Gizzard Shad of all size classes. Threadfin Shad were the dominant species in five rotenone samples from 2005 and 2007 (Figure 5).

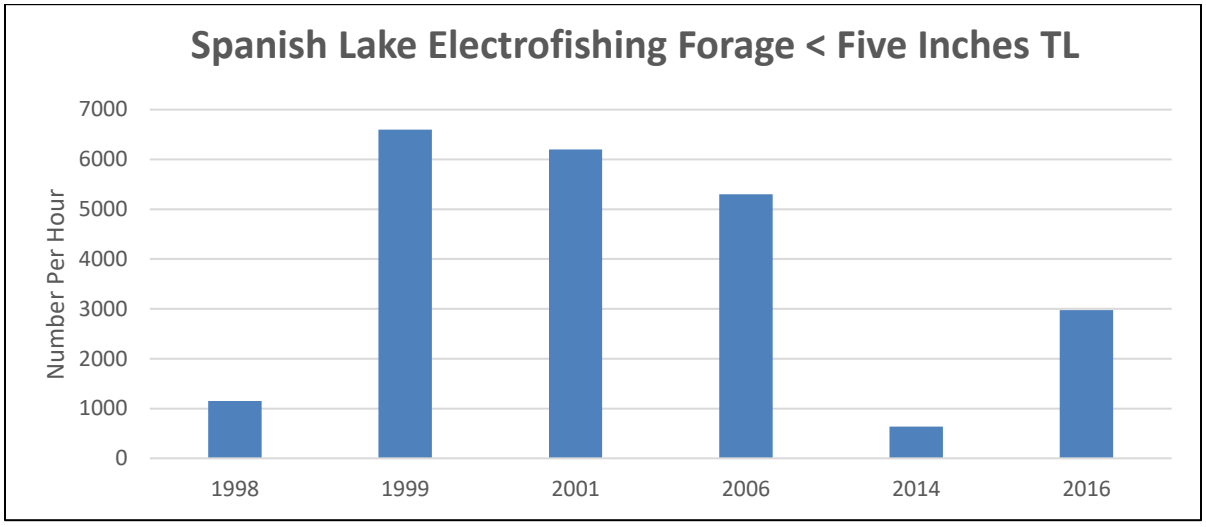

Figure 4. The CPUE for forage fishes < five inches in TL collected in fall electrofishing samples in Spanish Lake, Louisiana from 1998 – 2016.

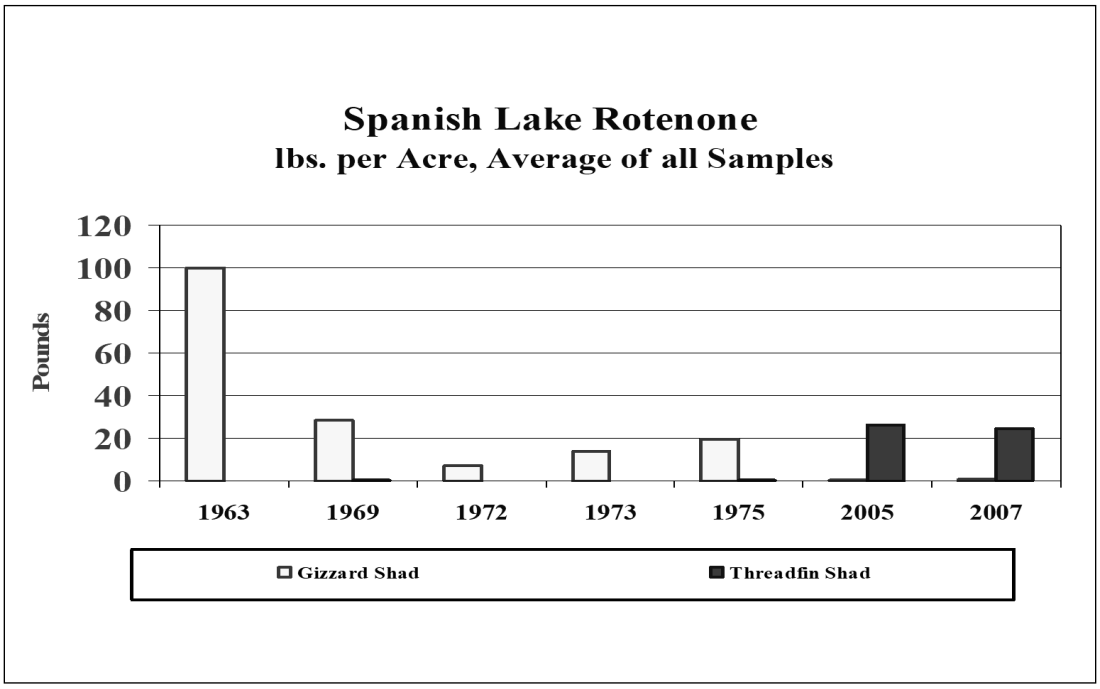

Figure 5. The pounds per acre of shad from biomass (rotenone) sampling on Spanish Lake, Louisiana conducted from 1963-2007.

Crappie

Similar patterns of abundance to Largemouth Bass have been found for Crappie in Spanish Lake. Historically, observations of Crappies have been very low in LDWF electrofishing and gill net sampling efforts (Figures 6-8). Both White Crappie and Black Crappie are combined in this section for CPUE analysis purposes. Sampling years with no available data have also been removed. In Figures 6, 7, and 8 below, the trend of CPUE for Crappie captured by electrofishing and gill nets in the lake over time is shown. Sub-stock or young-of-the-year (YOY) Crappie numbers have greatly diminished from sampling efforts, along with adults. Since 2002, the electrofishing sampling results have steadily declined with the exception of

the most recent sampling events. Fall electrofishing in 2007 indicated a CPUE of 0.8 fish per hour for White Crappie and 0.0 fish per hour for Black Crappie. Beginning in 2003, no Crappies were captured that measured less than 12 inches in total length until the fall electrofishing samples of 2018, where crappie populations seem to have begun to rebound. In 2016, approximately 200 adult White Crappie were stocked into Spanish Lake in an attempt to establish a self-sustaining population. Figure 8 shows excellent recruitment of sub-stock Crappie in 2018 likely due to the adult stocking of White Crappie in 2016. This is one of the species that is best suited for the existing shallow and turbid water habitats. Sub-stock individuals were captured in both 2018 and 2019 as the overall Crappie populations rebounded slightly. Unfortunanly, no sub-stock individuals were catured in 2021 sampling effforts. It is evident that the lack of successful spawning has prevented these two species from sustaining a viable population.

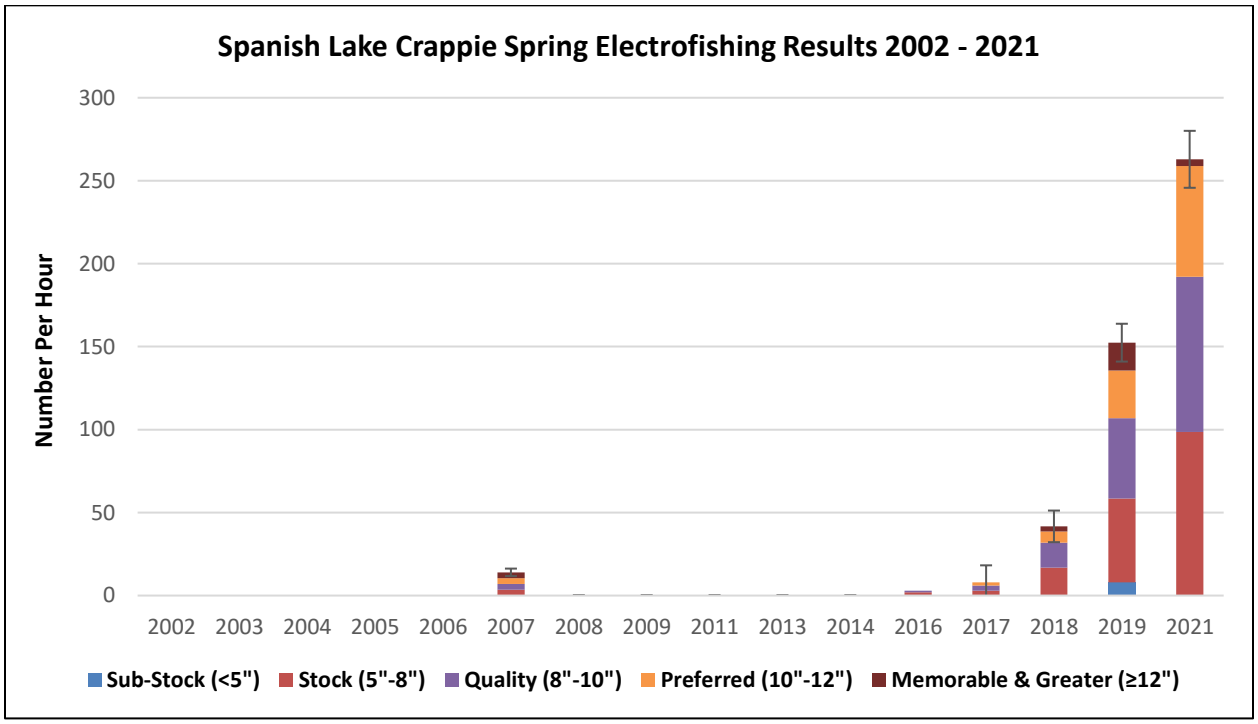

Figure 6. The CPUE of Crappie captured during spring electrofishing samples from Spanish Lake, LA from 2002 – 2021.

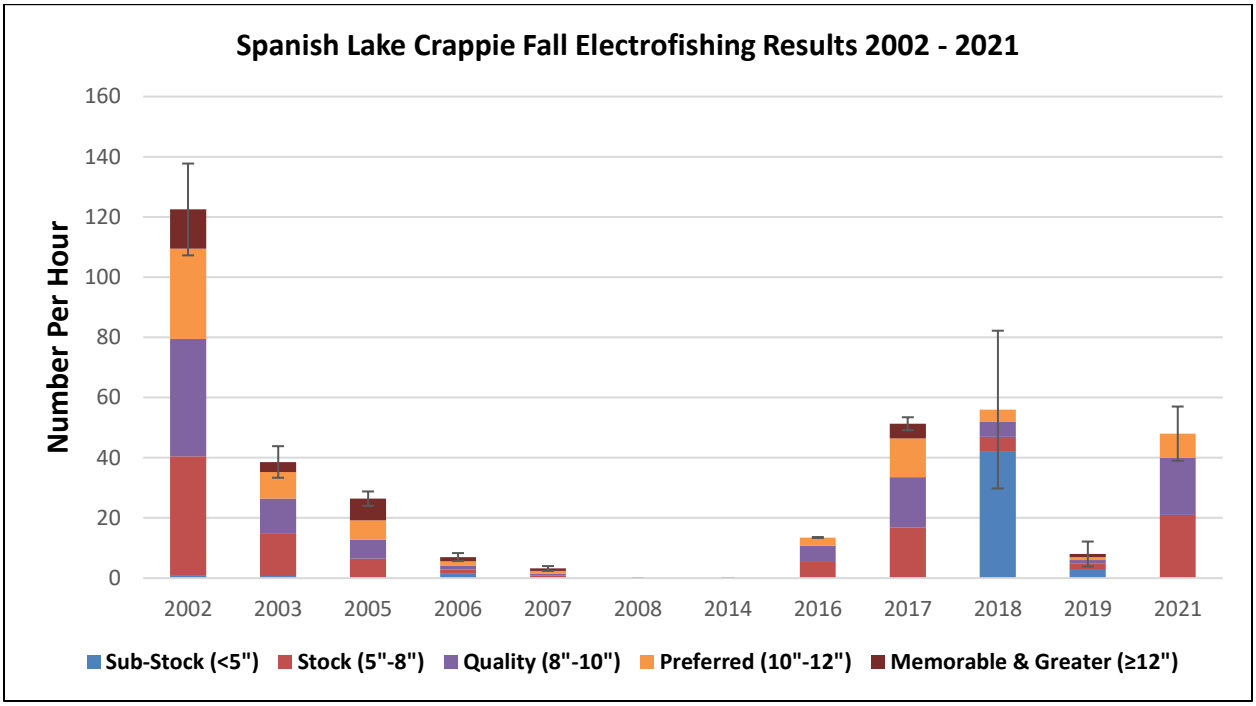

Figure 7. The CPUE of Crappie captured during fall electrofishing samples from Spanish Lake, LA from 2002 – 2021.

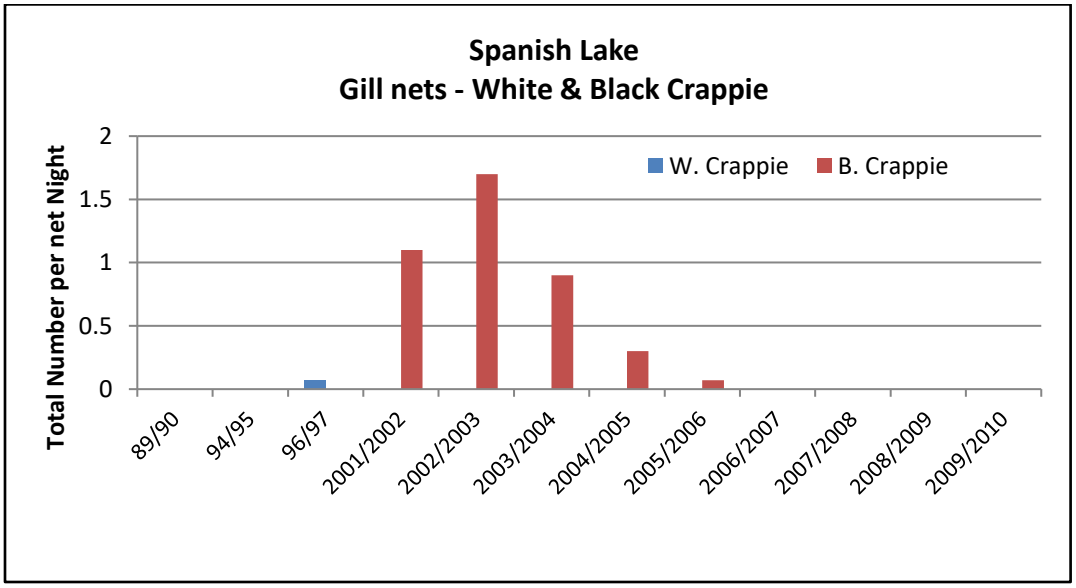

Figure 8. The CPUE for Crappie sampled by gill nets at Spanish Lake, Louisiana, for the years 1989-2010.

Catfish

Spanish Lake supports an abundant Catfish population. Biomass sampling from 2005 and 2007 (Table 2) indicates that Blue Catfish and Channel Catfish are some of the dominant recreational fish species found in the lake.

Table 2. Number and pounds of species collected during rotenone samples for Spanish Lake, Louisiana for 2005 and 2007.

Species	Site 1				Site 2			
	2005		2007		2005		2007	
	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
Yellow Bass	2	0.3	36	5.7	24	1.6	35	1.9
White Crappie			2	3.3				
Bluegill			1	0.1				
Redear Sunfish					10	0.0		
Longear Sunfish			2	0.0	13	0.0		
Warmouth			1	0.0				
Freshwater Drum	27	27.9	77	57.8	9	10.9	35	19.8
Yellow Bullhead			20	1.4				
Channel Catfish	62	21.6	653	112.6	82	30.2	112	24.6
Blue Catfish	42	25.6			52	22.6	7	10.8

Commercial

The historical record shows only one permit to harvest rough fish issued. It was issued by the Spanish Lake Game and Fish Preserve Commission before regulatory authority was placed under the Louisiana Wildlife and Fisheries Commission. No related harvest records were found.

It is unlikely that commercial harvest would have the desired effect of significantly reducing the Common Carp and Buffalo populations. Literature and past experience indicate that removing larger, older specimens from these populations is likely to induce a spawn to replace the harvested fish. Anecdotal evidence suggests that in the winter of 2007/2008 a commercial fisherman inadvertently caught over 3,000 pounds of Common Carp and Buffalo while illegally fishing hoop nets in Spanish Lake.

In Figure 9 below, Common Carp abundance has remained high as indicated in gill net catches over the past 15 years. Note that the abundance increased dramatically following the drawdown of the mid 1990's.

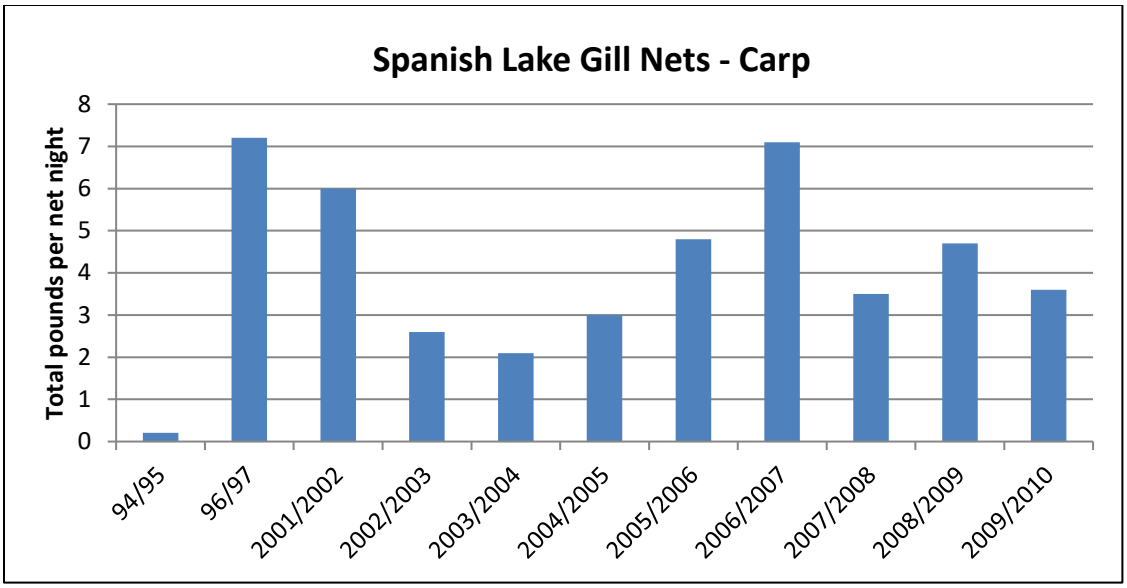

Figure 9. The total pounds per net night of Common Carp from gill net samples taken on Spanish Lake, Louisiana from 1994/1995 – 2009/2010.

The CPUE (by number) of Buffalo species made up most of the catch taken in gill nets during sampling in 2016, but Common Carp, Hybrid Striped Bass and Blue Catfish also showed high numbers captured (Figure 10). It is believed that abundant Hybrid Striped Bass and Blue Catfish numbers were due to the stockings that took place in 2015 and 2016.

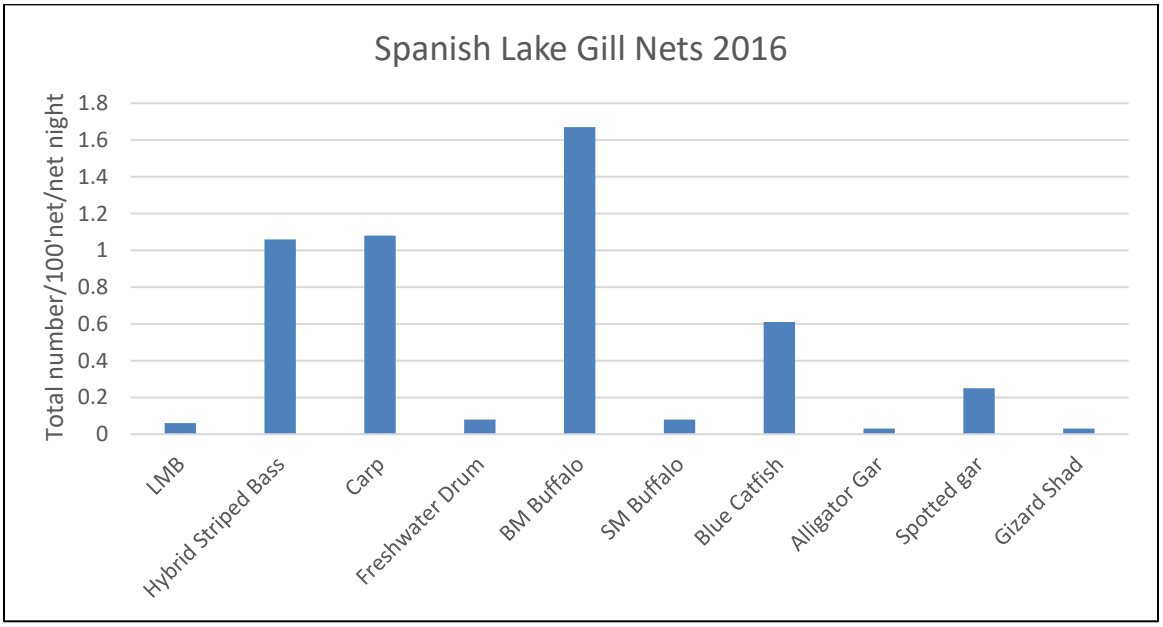

Figure 10. Total CPUE by (number of fish species captured per net night) from gill nets samples taken on Spanish Lake, La. in 2016.

Spanish Lake Creel Surveys

In 2000, creel surveys were conducted for six months out of the year (May - October). Largemouth Bass was the most abundant species harvested (40%) by anglers throughout the creel year followed by Black Crappie at 24% (Figure 11). Total number of all fish harvested was 455. In 2002, ten months out of the year were creeled, February – December, except

July. White Crappie was the most abundant species harvested (57%) by anglers during the creel year (Figure 12). Total number of all species harvested was 673.

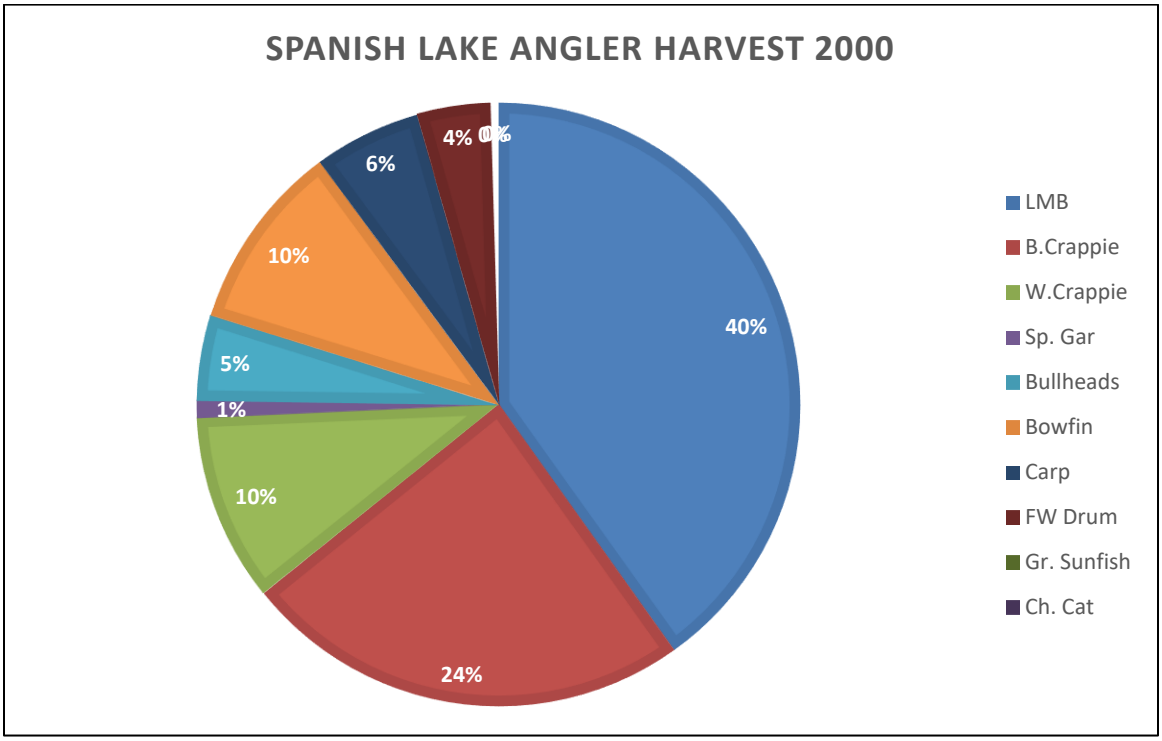

Figure 11. The percentage (%) by number of total fish species harvested by anglers from Spanish Lake, La. during the 2000 creel survey.

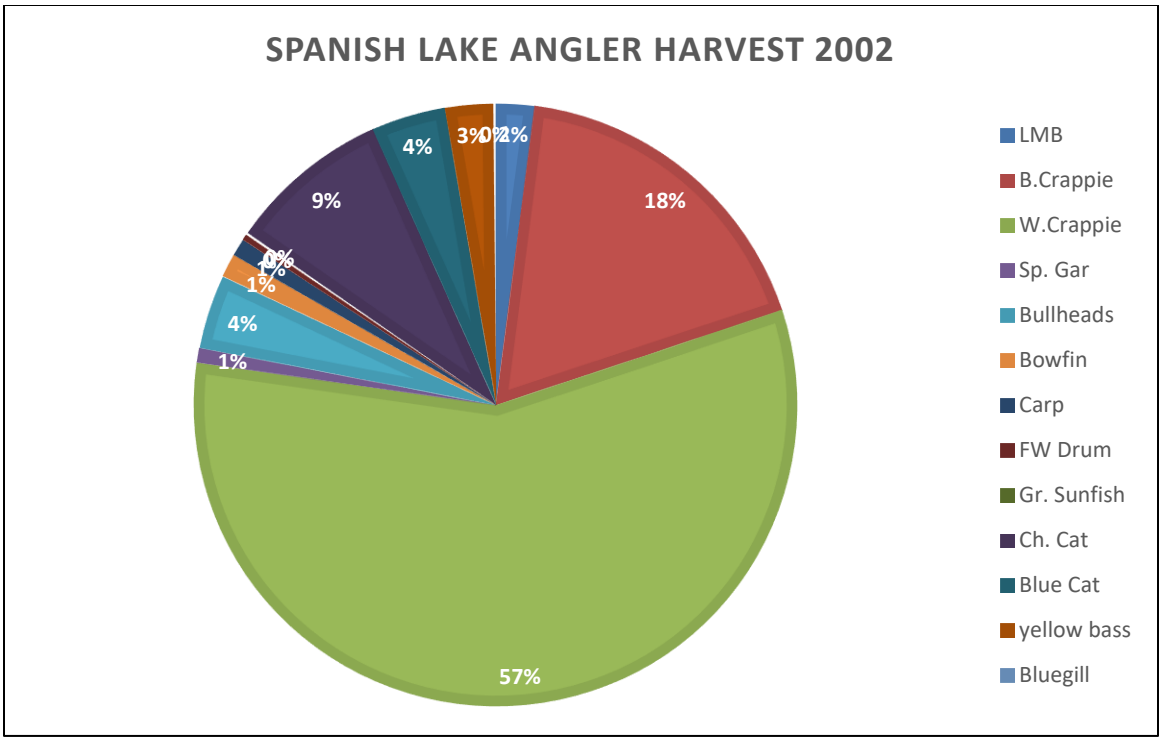

Figure 12. The percentage (%) by number of total fish species harvested by anglers from Spanish Lake, La. during the 2002 creel survey.

Species of Special Concern

No threatened, endangered or species of special concern have been found in the lake.

HABITAT EVALUATION

AQUATIC VEGETATION

Type Map

The most current type map from 2011 shows the lake had no submerged aquatic vegetation. (SEE MP-A, APPENDIX II)

Biomass

No biomass sampling conducted to date.

Past Control Measures

Spanish Lake continues to support heavy phytoplankton blooms throughout much of the calendar year. The combination of phytoplankton turbidity and inorganic turbidity precludes macrophyte growth. Overall, Spanish Lake is free of submersed aquatic vegetation.

During a vegetative survey in October 2017, moderate amounts of American lotus (*Nelumbo lutea*) were observed in two locations along the breakwater levees A small amount of water hyacinth (*Pontederia crassipes*) was observed in the boat landing access channel. Emersed

plant species observed along the shoreline include alligatorweed (*Alternanthera philoxeroides*), maidencane (*Panicum hemitomon*), water primrose (*Ludwigia peploides*), duck potato (*Sagittaria latifolia*), Roseau cane (*Phragmites australis*), and cattail (*Typha latifolia*).

In November of 2018, water hyacinth, alligator weed, water primrose and American lotus covered approximately 10 acres total throughout the lake. American lotus was located on the northeast end of the lake and all other species were sighted on the south end of the lake.

In September of 2019, very little aquatic vegetation was observed in the lake. Water hyacinth, water primrose and alligator weed covered approximately 10 acres throughout the lake. No American lotus was observed in the lake.

In November of 2020, very little aquatic vegetation was observed in the lake. Water hyacinth and common salvinia was seen by the boat launch. No American lotus was observed in the lake.

Aquatic Vegetation Status

In December of 2021, very little aquatic vegetation was observed. Water hyacinth, water primrose, alligatorweed, water pennywort (*Hydrocotyle* sp.) and cattails were observed on the southern portion totaling less than two acres. Rousseau cane and maidencane was observed in small patches throughout the lake, totaling less than ten acres.

Substrate

The bottom of Spanish Lake is covered with soft organic material that is not a suitable spawning substrate for nesting fish. This material covers the entire bottom of the lake and varies in thickness from one foot to 17 feet. Below this soft organic material is a hard clay bottom that varies in depth below the waterline from four feet to 17 feet. This organic material contributes a high nutrient load which promotes dense plankton "blooms" in the water column. The soft sediment provides generous foraging areas for Common Carp and buffalo species.

Artificial Structure

In 2006, seventy-eight plastic reef structures were built by LDWF personnel and placed in the lake. The structures were placed over an area of approximately 1 acre. The area was marked by buoys at four corners. Coordinates for the reef are (30.059626, -91.864273).

As an evaluation of fish use, two separate biomass (rotenone) samples were conducted. Preliminary evaluation of the reef site was conducted in 2005. Two follow-up biomass samples were conducted in 2007 at the same sites. A 953% increase in Channel Catfish abundance was measured after reef construction. An increase of 37% was measured at the control site. The comparison demonstrates the potential for attraction of Channel Catfish to artificial structure in a formerly open water habitat.

Threadfin Shad were in high abundance at both sites for both years. The reef site ranged from 10,512 fish per acre to 14,137 fish per acre at the reef site and from 12,452 to 4,925 per acre at the control site. Removing Shad from the equation, it is apparent that more pounds of fish were present at the reef site with the greatest contributor being Channel Catfish. Small Blue Catfish were at both sites in 2005, with only a few remaining at the non-reef site in 2007. With the exception of Channel Catfish, Freshwater Drum and Threadfin Shad, little difference in fish species composition or abundance was measured between the reef site and the control site.

In 2016, 28 catfish spawning containers were deployed at four locations in the lake and were marked by white PVC pipe at each location. Coordinates to these locations can be found in Part A under Appendix 1 – Maps.

CONDITION IMBALANCE / PROBLEM

The lake bottom is covered with an excessive layer of soft organic material. The organics have resulted in excessive algal blooms and water quality impairment. Additionally, the soft "fluff" substrate prevents the successful reproduction of nesting fish by smothering nests and eggs.

The high volume of soft organic sediment is a significant factor in the impairment of Spanish Lake. Removal of these sediments could decrease the available nutrient load and uncover a more suitable substrate for aquatic plant growth and fish spawning. Unfortunately, removal of the material is cost prohibitive.

Carp and Buffalo were observed more often in electrofishing sampling than other species of fish in the lake since 2001. Some of the highest CPUE for gill net sampling in all years since 2001 were for Carp and Buffalo. Blue Catfish were stocked in 1998 followed by stockings of both Blue and Channel Catfish were in 2004. These fish, although present in gill net sampling for all years following 1998, increased in size and number through the 2007/2008 sampling year. Anecdotal evidence indicates that the most successful fishing currently at Spanish Lake is for Catfish. There are some anglers visiting the lake that are willing to catch and keep a few Carp and there is also a small contingent of visitors using dip nets to catch Grass Shrimp along the banks.

Common Carp are well suited to the habitat conditions of Spanish Lake and are overabundant to the extent that they inhibit the establishment of self-sustaining sport fish populations. Physical activity of the carp population promotes increased water turbidity and impedes sport fish nesting. The feeding activity ("mumbling") of the carp on the lake bottoms also serves to inhibit growth of submersed vegetation.

The cumulative factors noted above have led to severe habitat impairment in Spanish Lake. These impairments have caused a shift in the fish community away from desirable fish species such as Largemouth Bass, crappie and sunfish, to more turbidity-tolerant species such as catfish, carp, buffalo and shad.

CORRECTIVE ACTION NEEDED

The current fish community is dominated by undesirable species that can sustain and even thrive in the existing conditions. Drawdowns and rotenone applications are an efficient means of removing unwanted fish populations from lakes, but those tools may not be appropriate for Spanish Lake. Due to the limited watershed size, the refilling of Spanish Lake could take up to four years. Such a scenario would be unpopular with the local community. As an alternative, actions necessary to address overabundant populations of carp and buffalo could be accomplished through the application of commercial fishing. As of June 2014, the use of commercial nets, including hoop nets, trammel nets, gill nets, and fish seines are legal in Spanish Lake.

RECOMMENDATIONS

1. Continue to stock Species that are suitable to this habitat:

   LDWF standardized sampling will continue to monitor fish population trends. Stocked species that are adapted to the existing habitat such as White Crappie, Catfish (Blue, Channel, and Flathead), Hybrid Stripped Bass and Alligator Gar will continue to be stocked along with phase II Largemouth Bass for sportfish harvest oppurtunities.

   Reduction of undesirable species such as Common Carp and buffalo (rough fish) is highly recommended. This can now be accomplished on Spanish Lake through the use of legal commercial fishing gear.

2. Draw the lake down and let the lake bed dry and allow the lake to refill naturally, then restock with game fish species: Largemouth Bass, crappie and bream. May not be feasible based due to lack of watershed and extended refill time.

3. A complete lake renovation: drain the lake, remove existing lake bed, build wind rows and restock with desireable gamefish.

   It is believed that it is the high volume of soft sediment is the root of fisheries management problems since impoundment. Removal of soft sediment would decrease the available nutrient load for plankton blooms and provide a more suitable substrate for submerged aquatic growth and gamefish spawning.

   Suggested methods of removal are through the use of a suction dredge during a lake drawdown or by land based equipment subsequent to a drawdown and a drying period. In the past the sediment has been moved around the lake but none of it has been removed since 1954. In that effort, 8,900 cubic yards were excavated, 14,000 cubic yards were used for levee embankment, and 249,000 cubic yards of peat moss were harvested.

4. Spanish Lake will be assessed monthly during the growing season for nuisance aquatic plant infestations. Public complaints will receive a timely response. Problem areas will be treated as they arise with foliar applications of the appropriate herbicide as per the

approved Aquatic Herbicide Application Procedures (Table 3). Contractor spraying may be employed if deemed necessary by District 6 and Aquatic Plant Control personnel.

LDWF will share recommendations and status updates with the Spanish Lake State Game and Fishing Commission and any other interested public entity on a timely basis.

Table 3. LDWF aquatic weed control chemicals and rates.

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)