

# **LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES**



**OFFICE OF FISHERIES  
INLAND FISHERIES SECTION**

**PART VI -B**

**WATERBODY MANAGEMENT PLAN SERIES**

**CHICOT LAKE**

**WATERBODY EVALUATION &  
RECOMMENDATIONS**

# **CHRONOLOGY**

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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# WATERBODY EVALUATION

## STRATEGY STATEMENT

### Recreational

Largemouth bass (LMB) are managed to provide anglers the greatest opportunity of catching quality-, preferred-, and memorable-size largemouth bass, while occasionally catching a larger bass of trophy size. Frequent introductions of Florida largemouth bass provide the foundation for quality and memorable bass through the incorporation of genetic material into the bass population. Sunfish and crappie are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish.

### Commercial

No commercial fishery exists in Chicot Lake.

### Species of special concern

No threatened or endangered species have been observed in Chicot Lake.

## EXISTING HARVEST REGULATIONS

### Recreational

Black Bass (largemouth *Micropterus salmoides*, Florida *M. floridanus*, and spotted *M. punctulatus*): 8 daily with a protected slot limit of 14 to 17 inches total length (TL), no more than four fish may exceed 17 inches maximum TL.

Statewide regulations for all other fish species; the 2013 recreational fishing regulations may be viewed at the link below:

<http://www.wlf.louisiana.gov/fishing/regulations>

## SPECIES EVALUATION

### Recreational

Chicot Lake was designated as a Louisiana Quality Bass Lake in April 1991, as a result of the implementation of the state-wide Black Bass Management Plan. The designation was limited to seven Louisiana water bodies that have the potential to consistently produce largemouth bass in the “quality to memorable” size range of 5 to 8 lbs. It is based on the following criteria:

1. Successful introduction of Florida largemouth bass genome.
2. Habitat with stable, relatively clear, and productive waters with an abundance of LMB forage.
3. No incompatible gear conflicts (webbing).
4. Long term Louisiana Department of Wildlife and Fisheries (LDWF) regulatory control.
5. Angler understanding and support of associated regulations.

Quality bass in Louisiana are the product of 1) suitable habitat with abundant and suitable forage, 2) adequate longevity to fulfill growth potential. Introduction of Florida largemouth bass can increase opportunities for anglers to catch quality-, preferred-, and memorable-size bass. The current black bass regulation is a 14”-17” protected slot limit with an 8 fish daily

creel, of which only 4 fish may be harvested over 17" TL. This protected slot strategy is designed to maximize growth potential and increase relative abundance of larger bass by increasing the harvest of bass smaller than 14" TL (Eder 1984). Removal of the more abundant smaller bass increases available forage for larger bass, thereby increasing growth rates of remaining bass. Harvest of larger bass (>17" TL) is also important to optimize growth rates. Removal of surplus bass through harvest is paramount to a quality bass management strategy and is encouraged by the Inland Fisheries Section.

Electrofishing is the most commonly used sampling technique to assess largemouth bass relative abundance (catch per unit effort = CPUE) and size distribution. Data collected during spring and fall electrofishing are used to describe population trends, age composition, growth rate, mortality rate and the genetic composition of a LMB population. LDWF began a three year population assessment on LMB in Chicot Lake in 2010. Additionally, a creel survey of anglers was also conducted within the same three year period (2010). Results of the study are projected to be available during 2013.

#### Largemouth bass relative abundance, size distribution and relative weight –

The CPUE of largemouth bass collected from Chicot Lake by electrofishing from 1991 to 2013 indicate annual variability over time (Figure 1). CPUE has been declining from 2009 – 2013 in all indicated size groups. Electrofishing sampling is conducted during night time hours. Sample time for each station is approximately 900 seconds of actual shocking time. The number of sample sites is determined by the total acres of a waterbody. In the case of Chicot Lake, four samples are conducted each spring and fall season. The four sample sites at Chicot Lake represent different habitats such as grass- line, shoreline, heavy timber, etc. As indicated in Figure 1, abundance of stock-size bass was indicated to be lowest in 2001. The sharp decline in CPUE for stock-size bass is likely related to the drought years of 1999 and 2000. The lake level fell to two feet below pool and remained for several months. Low survival of stock-size and quality-size largemouth bass due to predation is suspected. However, the water level returned to pool (46.2 ft. MSL) in 2001. Sample CPUE began a slow upward trend after 2001. Normal water levels once again provided the availability of shallow water escapement and nursery habitat for young-of-the-year (YOY) and substock-size bass. CPUE for Chicot Lake stock-size largemouth bass peaked in 2004 and 2009.

Figure 2 depicts CPUE for largemouth bass by size class. CPUE for the three size classes is indicated to be variable over time, with the lowest CPUE for fish up to 14" TL in 2001. CPUE for bass greater than 17" TL generally increased from 1993 – 2009. Declines are noted in 2010 and 2013. Linear forecast trend lines for bass in the protected slot (14 – 17") and above the slot (>17") have shown a gradual increase in CPUE from 1991 – 2013.

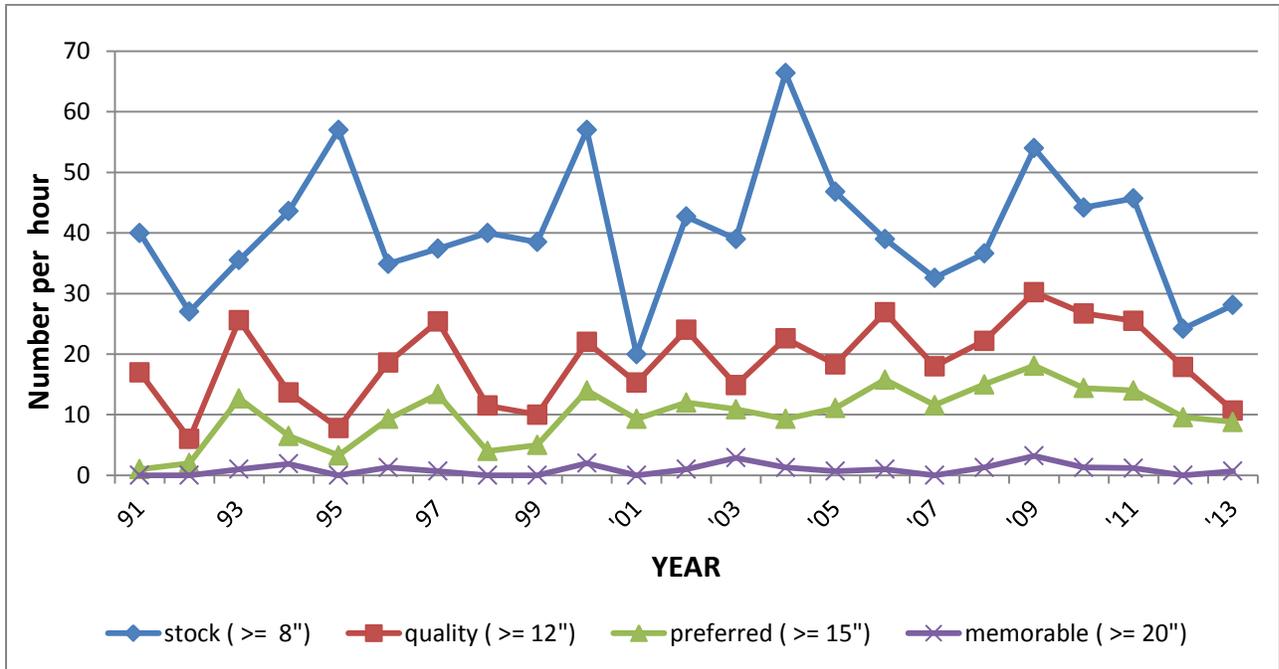


Figure 1. Spring electrofishing CPUE for stock-, quality-, preferred-, and memorable-size groups of Chicot Lake largemouth bass during the period 1991-2013.

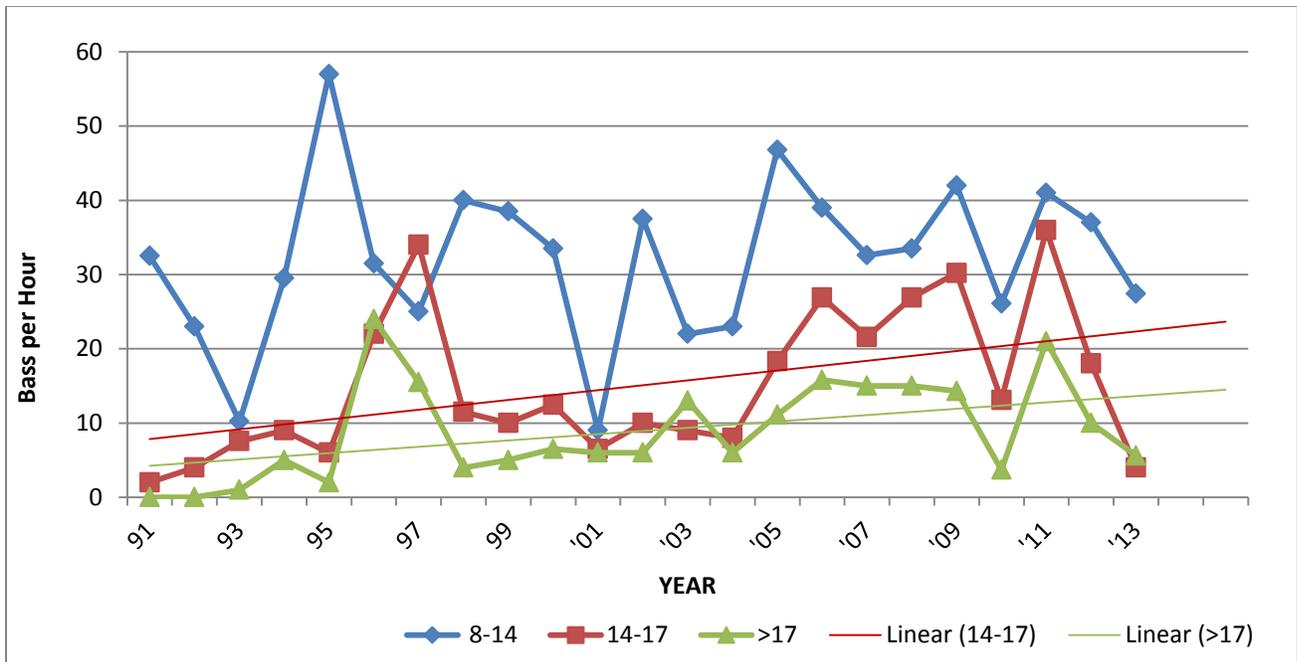


Figure 2. CPUE for three size classes of largemouth bass (8 – 14 inches, 14 – 17 inches, and fish > 17 inches TL) collected in Chicot Lake, Louisiana for the period 1991 – 2013.

Sampling CPUE for bass between 8 and 13 inches has been variable. Interference to sampling from the overabundant growth of the Hydrilla is attributed as a partial cause. The first observance of hydrilla in Chicot Lake was in 1996. Drawdowns were conducted in

1996 and 1997 to control the invasive species. Drawdowns were also conducted in 2003, 2005, 2008, 2010, 2011 and 2012. The sharp decline in CPUE for 2001 is related to the drought of 1999 and 2000. The lake level was significantly lower than normal resulting in low largemouth bass recruitment. CPUE increased from 2005 through 2011 in all inch groups. This trend may be the combined result of increased recruitment and reduced aquatic vegetation. In 2012 and in 2013, sampling CPUE decreased again. A heavy infestation of common salvinia is suspected as a contributing cause.

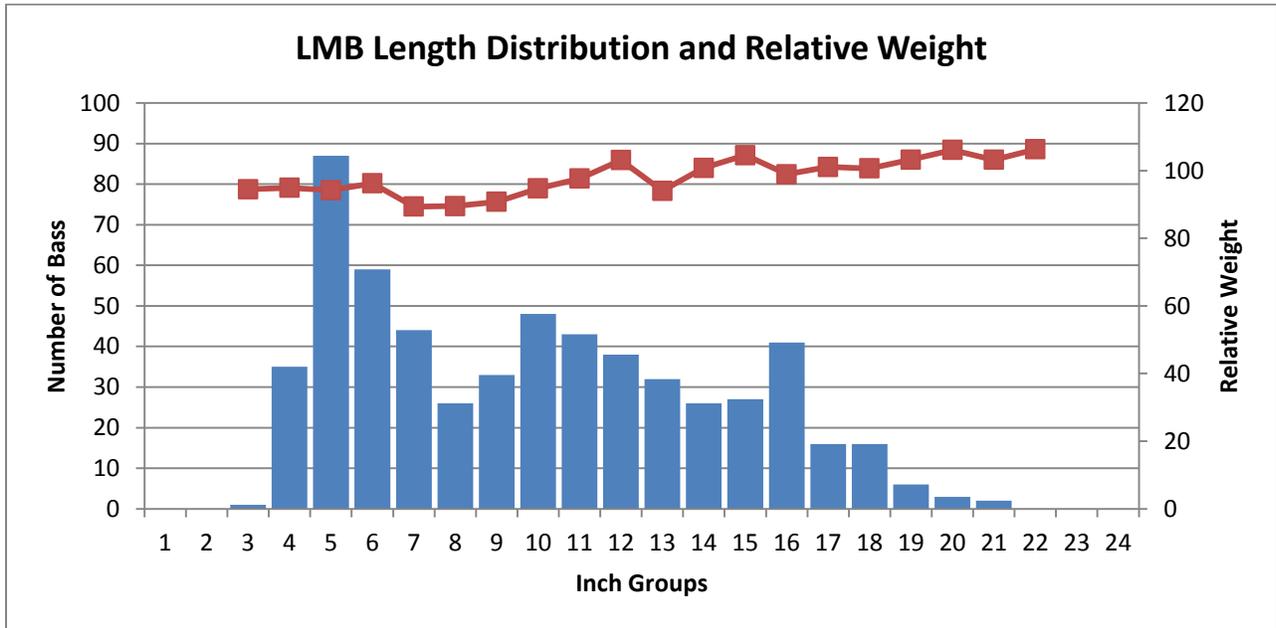


Figure 3. Chicot Lake largemouth bass size distribution and relative weight by inch group for 2010 – 2013. N=583.

Size distribution in inch groups for largemouth bass from 2010 – 2013 is shown in Figure 3. The bass population ranged from 3-21 inches TL during this time period. Strong representation is noted in the 4-16 inch size groups.

Relative weight ( $W_r$ ) is a measure of fish “plumpness” and is the ratio of fish weight to that of a determined standard. The relative weight ( $W_r$ ) is calculated by dividing the weight of individual fish by the standard weight for fish of the same length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 may indicate a potential problem with forage availability. Relative weights for Chicot Lake largemouth bass average near 98 in all size groups. The value indicates a healthy bass population with abundant and available forage.

Largemouth bass age, growth and mortality-

Figure 4 displays the results of largemouth bass age determination for inch groups analyzed. Otoliths were utilized for age determination. Figure 3 is an average of all bass for each inch group collected through the period 1991 – 2007. Largemouth bass were growing past 17 inches in 3-5 years.

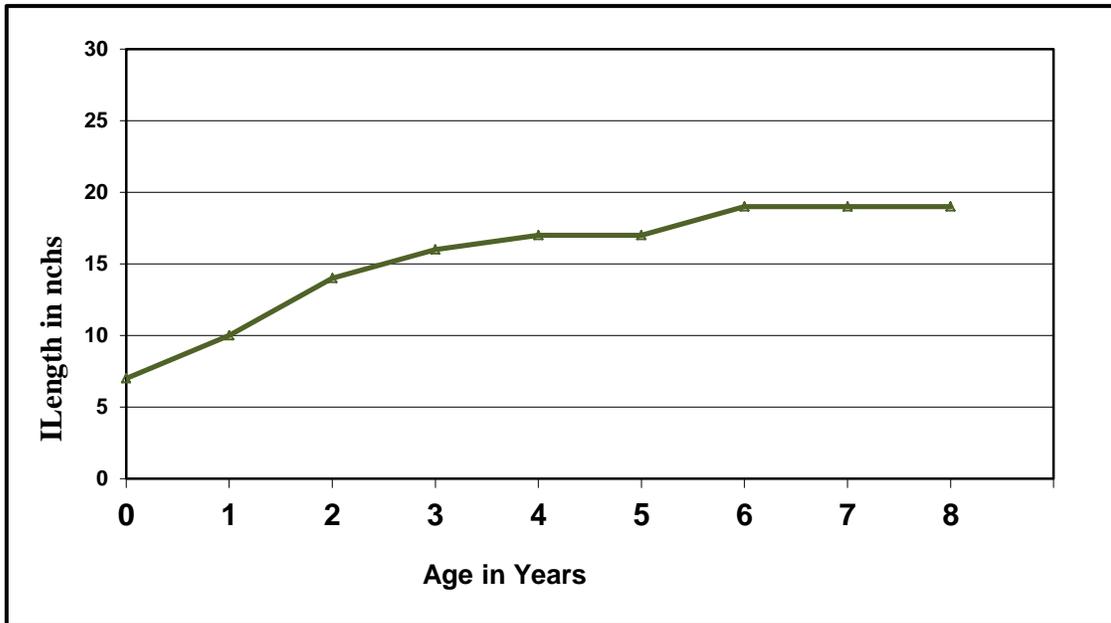


Figure 4. The average length at capture of largemouth bass from Chicot Lake, LA, 1991 – 2007. Total N = 335, N (age 1) = 6, N (age 2) = 153, N (age 3) = 70, N (age 4) = 36, N (age 5) = 6, N (age 6) = 7, N (age 7) = 5 and N (age 8) = 2.

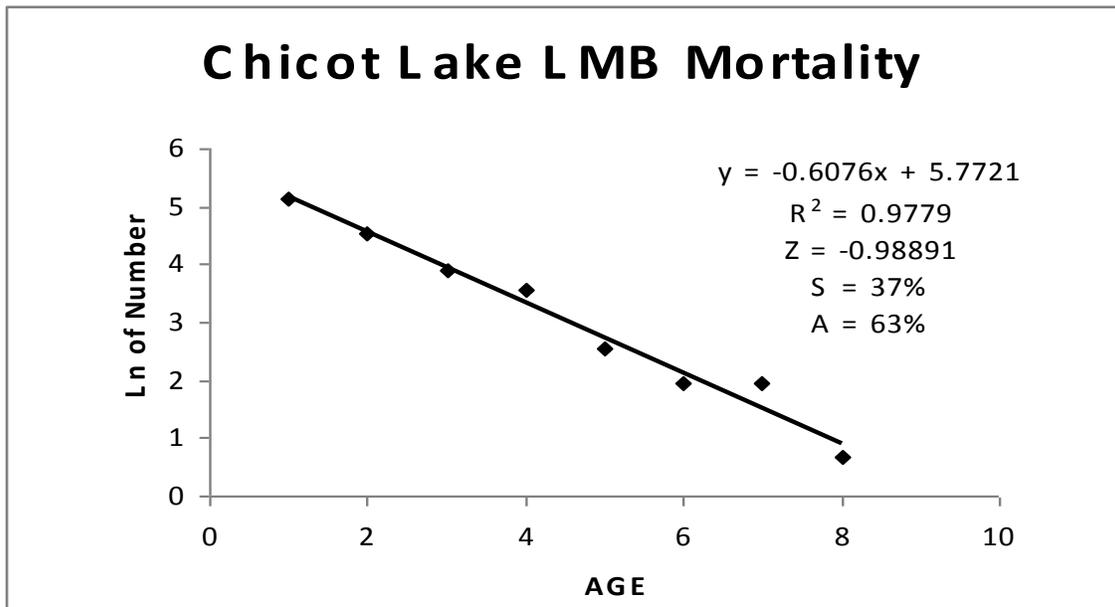


Figure 4. The mortality estimate for Chicot Lake largemouth bass for the combined years 1990 – 2007.  $R^2$  = the fit of the correlation variables;  $Z$  = slope of the descending catch curve;  $S$  = survival estimate;  $A$  = annual total mortality estimate.  $N = 385$ .

A total of 385 largemouth bass from Chicot Lake have been aged (Figure 4). Six (6) bass less than 1 year old have been omitted from this mortality analysis. An attempt was made to collect at least 10 fish from each inch group during standardized electrofishing samples. Eighty three percent (83%) of all bass analyzed ranged from 1 to 3 years old. It has been determined that the annual mortality rate of bass from Chicot Lake is relatively high at 63%.

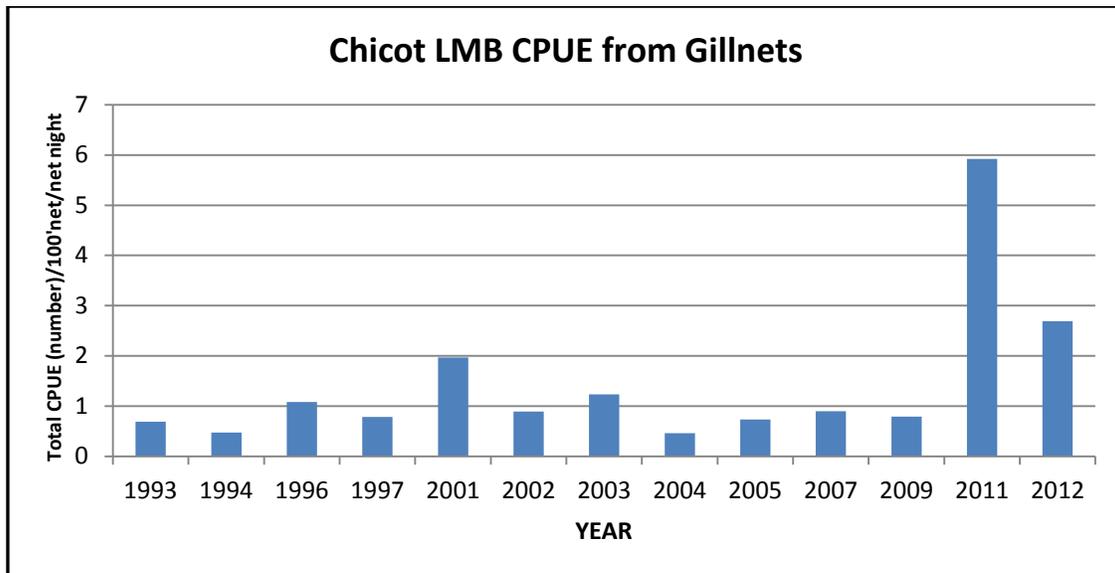


Figure 5. CPUE for largemouth bass collected from Chicot Lake, LA in gill net samples from 1993 – 2012.

An increase is noted for number of largemouth bass caught per 100 yard/ net night throughout the years sampled. A significant increase occurred in 2011 (total CPUE - 5.92). Largemouth bass captured in gill nets typically exceed 17 inches TL.

#### Largemouth bass genetics and stocking

The majority of largemouth bass collected for genome determination are taken during the fall standardized electrofishing samples. Some larger sized bass ( $\geq 20$  inches) were collected by gill net samples during the winter months. Ten bass per inch group, were used for growth and genetic analysis. Total length and weight is recorded for each specimen. Otoliths and livers are removed for age/growth and genetic analysis. In the years prior to 2008, LMB age were determined in Louisiana State University age and growth lab and in the District 6 office by staff biologist. Otoliths are now sent to the LDWF Office of Fisheries age and growth lab in Baton Rouge for age determination. Liver tissues are sent to the LSU genetics lab for electrophoresis analysis. A three year largemouth bass age & growth mortality study was conducted between 2010 and 2012. In 2010, 141 otoliths were collected. In 2011 and 2012, 156 and 128 were used respectively.

In 1997, bass were collected while the lake was drawn down. A higher CPUE was the result. Florida largemouth bass have been stocked in Chicot Lake from 1988 – 2012 as reported in Table 1. The greatest number of Florida bass fingerlings were stocked in 1988 and the fewest number of bass stocked was in 1996. Total number of Florida largemouth bass stocked in Chicot Lake is 2,393,520.

Table 1. Largemouth bass stockings and genetic results (percent of number sampled) for Chicot Lake Reservoir, LA, 1988 – 2012.

YEAR	NUMBER STOCKED	GENETICS SAMPLE SIZE	NATIVE LMB	FLORIDA LMB	F <sub>x</sub> Hybrids	TOTAL FLORIDA INFLUENCE
1988	342,668					
1989	150,000					
1990	127,564	37	82%	02%	16%	18%
1991	132,619					
1992	107,221					
1993	80,595					
1994	85,250	52	56%	19%	25%	44%
1995	153,475	51	56%	15%	29%	44%
1996	18,792					
1997	19,178	152	54%	15%	31%	46%
1998	55,800	35	83%	0%	17%	17%
1999	152,872	33	58%	6%	36%	42%
2000	87,891					
2001	89,568	29	52%	3%	45%	48%
2002	73,322					
2003	83,989					
2004	80,748	33	76%	16%	8%	24%
2005	84,310					
2006	82,425					
2007	84,192	57	44%	2%	54%	56%
2009	86,241	51	56%	38%	6%	42%
2010	75,529	141	62%	11%	27%	39%
2011	72,331	156	70%	8%	22%	30%
2012	66,940	128	70%	6%	24%	30%
TOTAL	2,393,520					

### Forage

Sunfish, gizzard shad, silversides and golden shiners have been identified as primary forage species for Chicot Lake largemouth bass. During fall electrofishing, a 450 second sample is conducted to determine forage abundance. Shoreline seine sampling is conducted each summer to determine young-of-the-year production. However, there is a difference between forage abundance and availability. In conditions of aquatic vegetation overabundance, abundant forage may not be available for predation. Measurements of largemouth bass body condition are recorded to determine utilization of forage.

Table 2. The percent by number of forage species  $\leq 5$  inches TL collected during electrofishing samples from 2000 – 2012 in Chicot Lake, Louisiana.

Forage – Electrofishing Samples							
Year	Bluegill	Redear Sunfish	Longear Sunfish	Silversides	Gizzard Shad	Golden Shiner	Warmouth
2000	69%			2.8%		1.4%	
2001	55.2%				1.1%	2.6%	6.9%
2002	44%			7.1%			2.4%
2003	74.4%	0.6%		1.9%			5.7%
2004	39.2%	0.8%			4.2%		2.5%
2005	84.2%	1%					0.5%
2006	89.9%			0.6%			0.6%
2007	84%	1.4%					2.1%
2008	65.7%	3.2%		7.1%		5.5%	4%
2009	56.5%		0.5%	24.4%			1.9%
2011	65.9%	2.4%		3.7%			1.2%
2012	73.6%	3.2%	0.5%	9.4%			1.9%

During fall electrofishing samples, a separate sample is collected to determine forage abundance. In Chicot Lake, bluegill make up the majority of forage available for predator fish such as largemouth bass and crappie.

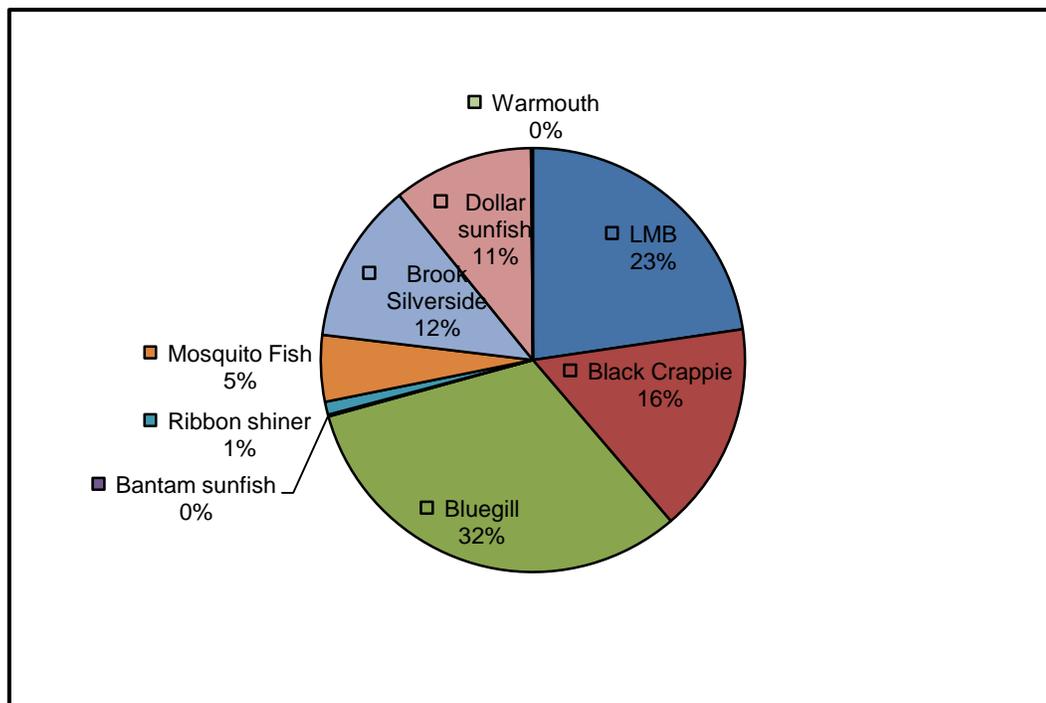


Figure 6. The percent by number of forage species collected in haul seines from Chicot Lake, Louisiana for 2003.

Figure 6 clearly shows that sunfish (bluegill and dollar sunfish) make up the largest percentage of Chicot Lake forage. Silversides and shiners are also numerous.

Table 3. Total number of all fish species less than 5 inches total length captured by seine hauls from Chicot Lake, LA, 2000 – 2009.

Forage – Seine Samples			Catch by Species			
YEAR	Bluegill	Silversides	Golden Shiner	Mosquito Fish	Redear Sunfish	Longear Sunfish
2000	1066	160	30	13	10	70
2001	240	92	43	48	22	70
2002	543	158	123	49	13	61
2003	227	87	0	36	0	77
2004	531	176	1	0	2	40
2008	218	73	6	2	0	5
2009	1278	9	1	3	2	20

Shoreline seine samples are conducted in the summer months, June – August. All samples were conducted at night from one-half hour after sunset until one –half hour before sunrise. One quadrant haul, using a 25 foot / six foot seine, was conducted at each sampling station. A total of three samples were taken each year at the three boat ramps, one per ramp. The quadrant haul was conducted by anchoring one end of the seine at the shoreline and the other stretched perpendicular to the shoreline. The distal end will then swing around back to the shoreline, keeping the lead line tight and on the bottom. After the seine haul is completed, all fish from the seine is placed in a plastic bag, properly marked, and placed on ice. Fish specimens are sorted to species, and by length.

Crappie

Chicot Lake 2000 Frame Net Catch

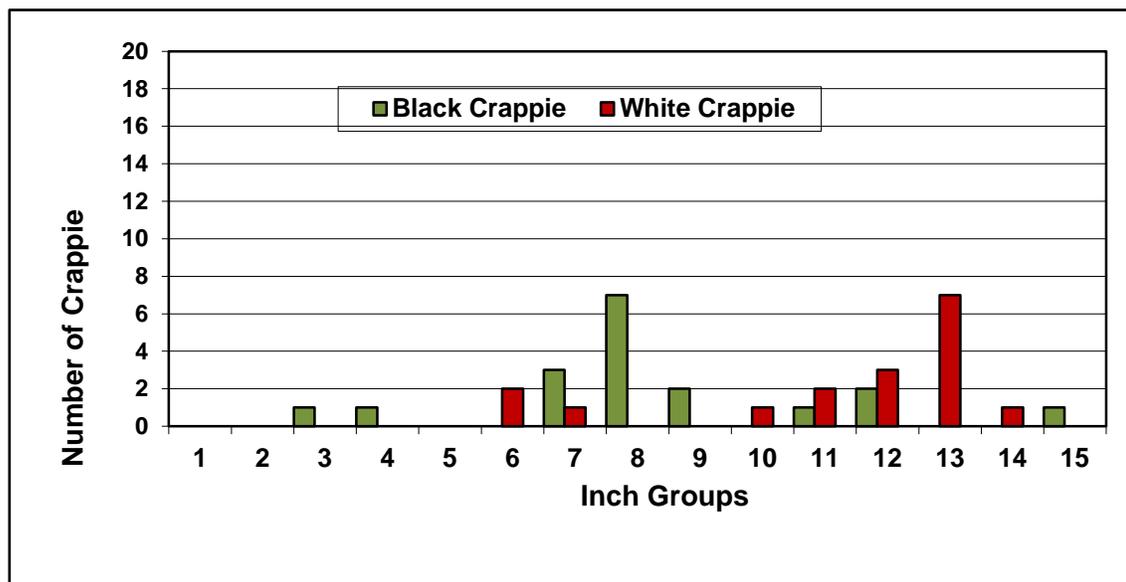


Figure 7. Size distribution (inch groups) of black crappie and white crappie captured in frame nets from Chicot Lake, LA, 2000.

Chicot Lake 2002 Frame Net Catch

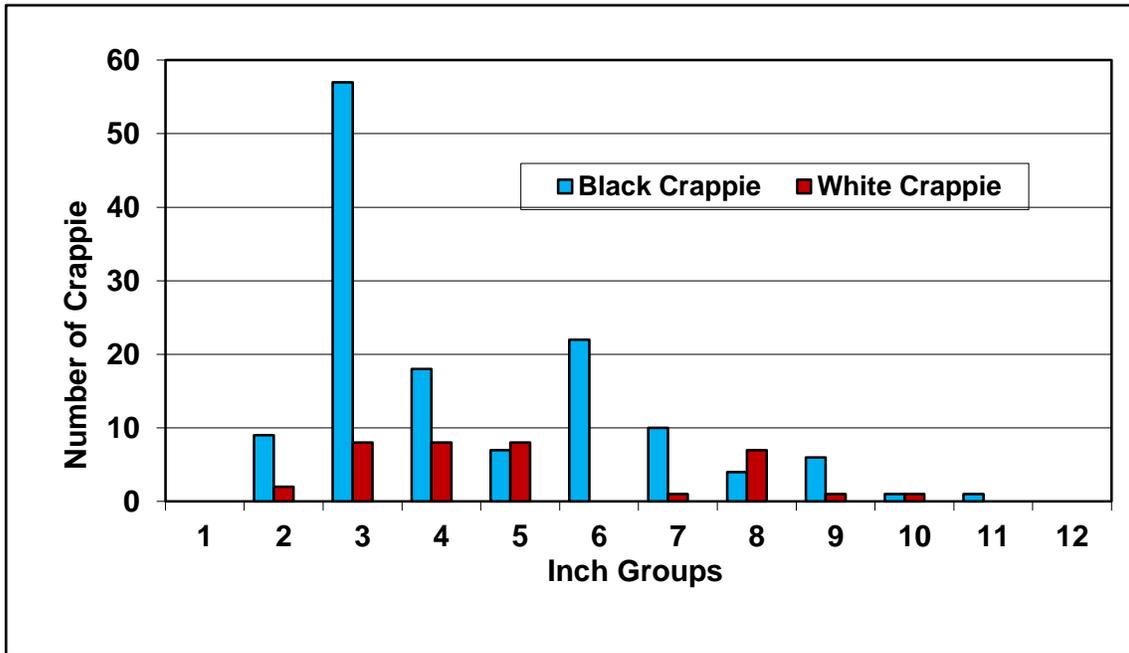


Figure 8. Size distribution (inch groups) of black crappie and white crappie captured in frame nets from Chicot Lake, LA, 2002.

In the above Figures 7 and 8, frame nets produced low catch rates overall in 2000, but a significant number of white crappie in the 11-13 inch groups were included in the samples. In 2002, catch rates of crappie were significantly higher which indicates good recruitment occurred in 2001 and 2002 following the drought. The Chicot Lake crappie population consists mainly of black crappie.

#### Chicot Lake 2006 Lead Net Catch

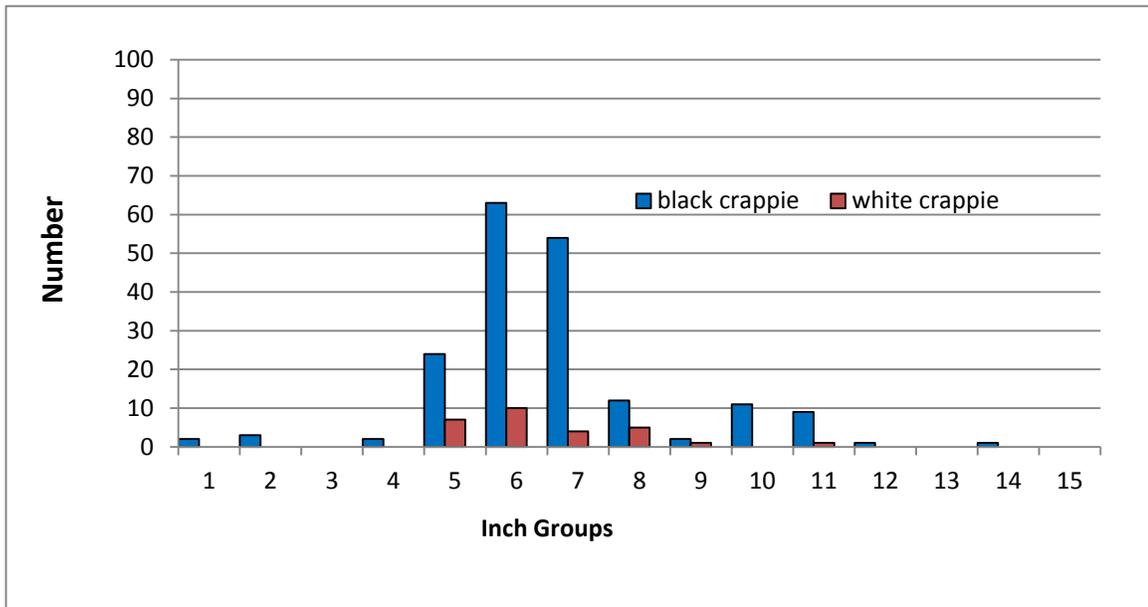


Figure 9. Total number and size by inch group of black crappie and white crappie captured in lead nets in Chicot Lake, 2006.

## Chicot Lake 2008 Lead Net Catch

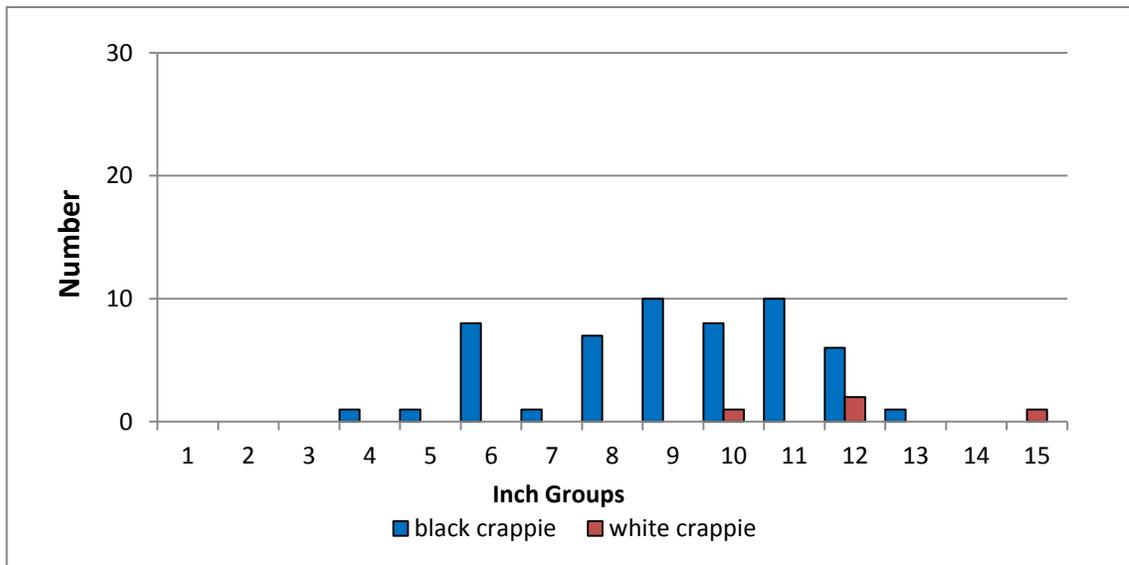


Figure 10. Total number and size by inch group of black crappie and white crappie captured in lead nets in Chicot Lake, 2008.

## Chicot Lake 2009 Lead Net Catch

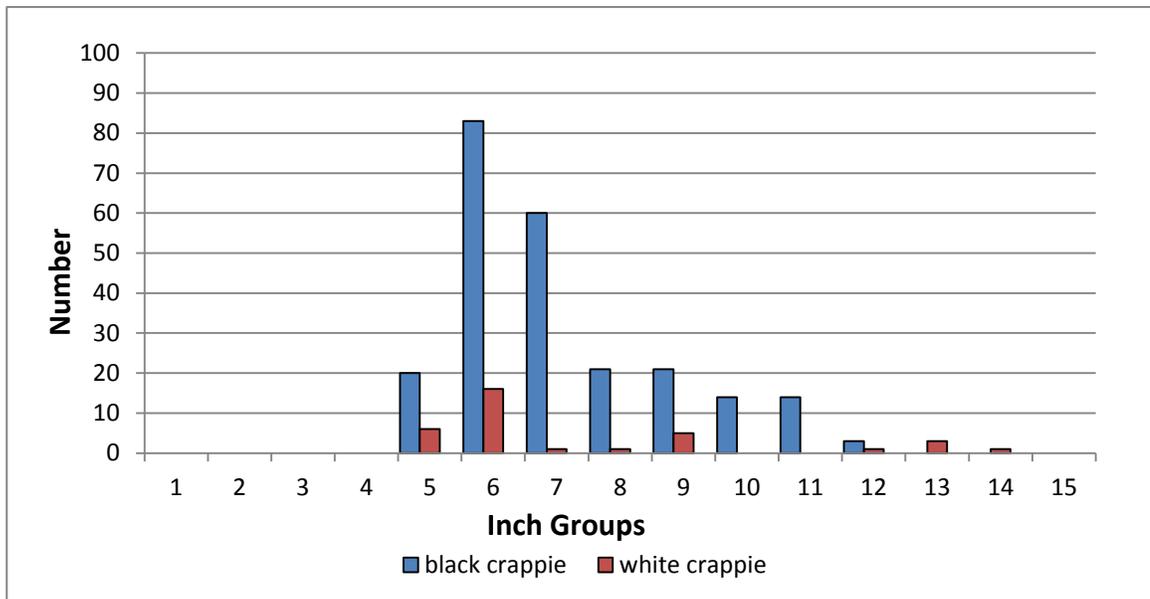


Figure 11. Total number and size by inch group of black crappie and white crappie captured in lead nets in Chicot Lake, 2009

Except for 2008, crappie populations (Figures 8, 9, and 10) have shown improvement in the last few years. In 2006 and 2009, increased numbers of six and seven inch crappies are prevalent as well as 10-12 inch fish. In 2008, the numbers decreased, possibly due to fish kills resulting from Hurricane Gustav. Sampling was conducted two months after the storm.

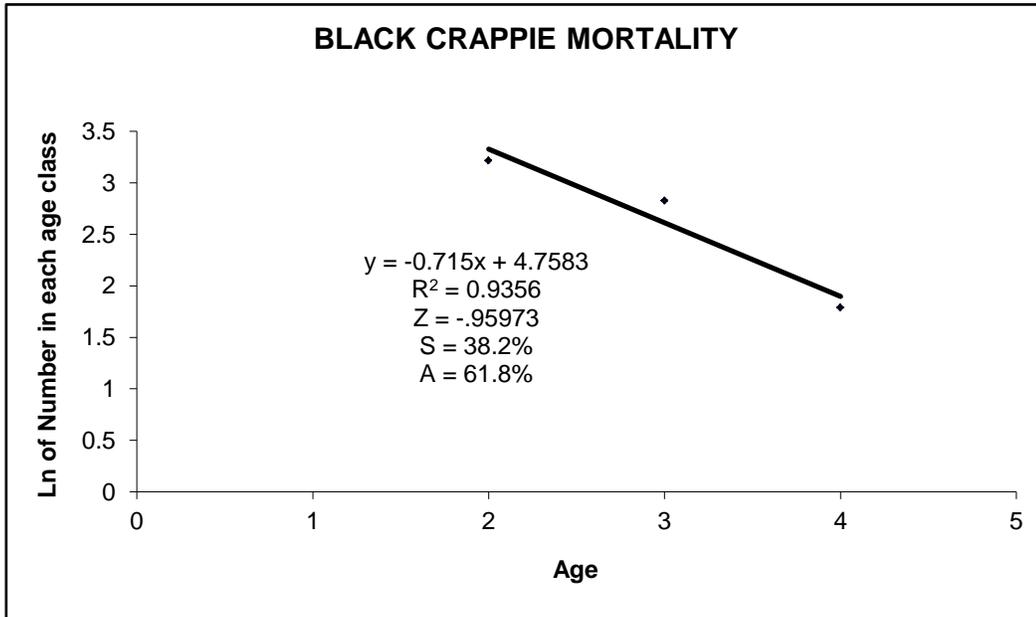


Figure 12. Black crappie mortality and survival estimates for Chicot Lake, LA, from data collected in 2006 and 2008 lead net samples.  $R^2$  = the fit of the correlation variables;  $Z$  = slope of the descending catch curve;  $S$  = survival estimate;  $A$  = annual total mortality estimate.  $N = 50$ .

Figure 12 depicts the mortality and survival estimates from a sample of 50 black crappie captured from Chicot Lake, La. from the 2006 and 2008 lead net samples. The age of these fish are from 2-4 years old. It has been determined that approximately 62% of crappie in these age groups will perish, with a corresponding 38% survival rate.

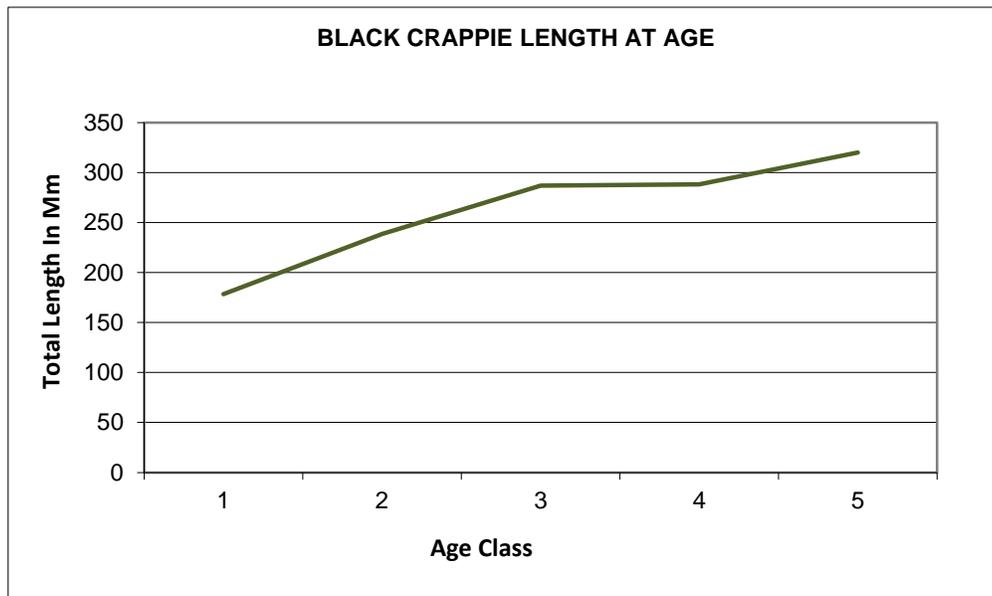


Figure 13. Black crappie length at age from data collected in 2006 and 2008 lead net samples from Chicot Lake, LA.  $N=65$ .

Figure 13 includes data from a sample of 65 Chicot Lake black crappie. Black crappie reach 7'' at age 1, 9.4'' at age 2, 11.2'' at age 3, 11.4'' at age 4 and 12.5'' at age 5. Crappie growth is rapid during the first three years of life, and then slows at the onset of sexual maturity.

### Sunfish

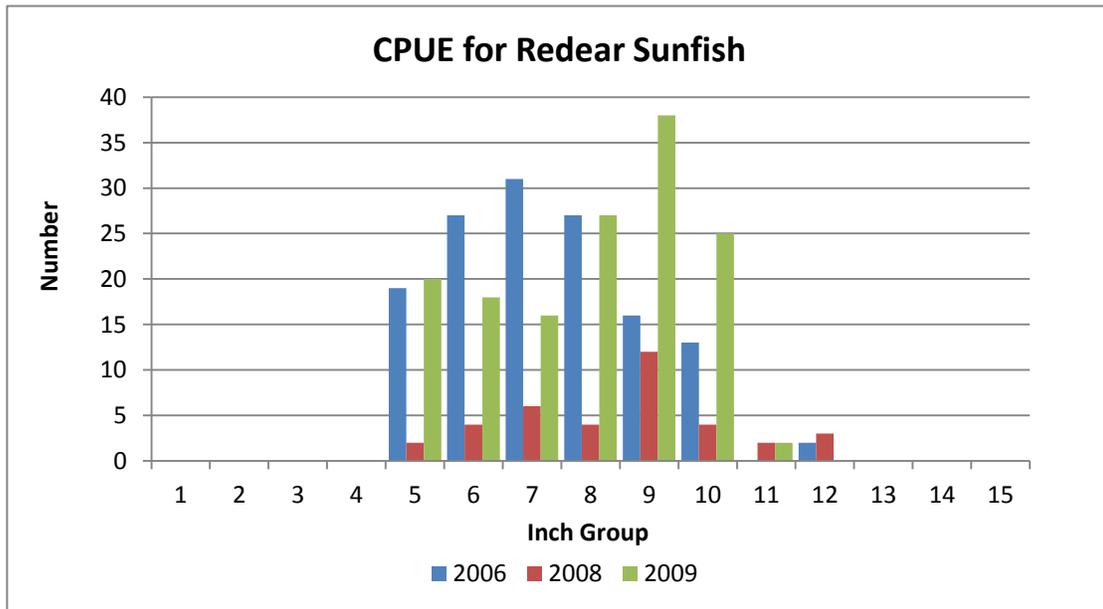


Figure 14. Size structure (inch groups) of redear sunfish captured in lead nets from Chicot Lake, LA during 2006, 2008, and 2009.

Figure 14 depicts the size structure of redear sunfish collected with lead nets from Chicot Lake. Redear sunfish were captured along with crappies and other sunfish species. Large numbers of 7 – 10 inch fish suggest that the redear sunfish population is thriving well in Chicot Lake.

Table 4. Chicot Lake standing crop estimates from rotenone samples reported in total pounds of fish per acre from 1954 – 1996.

<b>YEAR</b>	<b>GAME SPECIES</b>	<b>NON-GAME SPECIES</b>	<b>TOTAL LBS./ACRE</b>
1954	N/A	N/A	146
1958	N/A	N/A	19
1967	45.4 LBS.	32.6 LBS.	219
1968	100.9 LBS.	106.5 LBS.	230
1969	N/A	N/A	188
1970	N/A	N/A	204
1971	N/A	N/A	301
1975	34.7 LBS.	8.6 LBS.	141
1976	N/A	N/A	434
1977	54.7 LBS.	7.3 LBS.	276
1978	N/A	N/A	362
1980	61.2 LBS.	259.1 LBS.	647
1981	61.9 LBS.	126.5 LBS.	394
1982	N/A	N/A	258
1989	N/A	N/A	50
1990	61.4 LBS.	4.01LBS.	102
1991	26.5 LBS.	0.97 LBS.	69
1994	50.4 LBS.	7.69 LBS.	116
1996	63.6 LBS.	3.67 LBS.	153

Non-game species such as garfish, bowfin, carp and buffalo fish comprised a large percentage of the early 1980's. But when the lake was drawn down in 1985 – 1987 non-game fish declined and have not recovered.

Table 4 above depicts a high standing crop of fish taken in biomass (rotenone) samples in the years 1967 through 1982. In these years, numerous predatory species and game fish species dominated the population. From 1989 through 1996, total pounds per acre diminished due to the reconstruction of the spillway from 1985 – 1987. Chicot Lake remained dry and the fish population was depleted. The total pounds per acre of fish in 1989, 1990, 1991, 1994 and 1996 consisted mainly of game species and rough fish (carp, buffalo).

#### Commercial

Commercial fishing is prohibited in Chicot Lake, but due to an overpopulation of buffalo fish, a controlled commercial harvest was conducted in 1967, 1968, 1970 and 1980. Rotenone samples taken by LDWF in 1968 and 1980 averaged 94 and 250 pounds/acre of buffalo fish. The commercial harvest was conducted because excessive abundance of large commercial fish species can limit the production and survival of sport fish. In 1968, 67,897 lbs were harvested. In 1980, 31,404 lbs. were harvested. No harvest records are available for 1967 or for 1970.

The overabundance of rough species in 1968-1980 may have been due to the influence of water from Bayou Choctaw which enters from the south end of the lake. At the time, Chicot had abundant native submerged vegetation and was ideal as buffalo fish habitat.

During the spillway reconstruction period in 1985-1987, all remaining fish in the channel

were removed with the use of rotenone. Commercial species such as buffalo, freshwater drum and common carp are shown in Table 4. The numbers of these species have remained low since the lake was refilled in 1988.

Table 5. Species captured/year by gill net for Chicot Lake, LA, 1990 - 1996.

SPECIES	YEAR						
	1990	1991	1992	1993	1994	1995	1996
Largemouth Bass	4	13	25	15	19	39	28
Crappie		1	1	1	7	11	20
Common Carp		2	6	2			2
Bullhead	21	1	8	2	2	1	11
Chain Pickerel				1		1	
Bowfin	5	1	19	11	10	23	11
Spotted Gar		1		2		2	5
Gizzard Shad	14	2	34	69	23	60	9

Table 6. Total number of species captured/year by gill net for Chicot Lake, LA. 2000 – 2012.

SPECIES	YEAR									
	2000	2001	2002	2003	2004	2005	2007	2009	2011	2012
Largemouth Bass	19	99	32	59	22	35	43	38	71	134
Crappie	3	13	1	5	3	4	13	3	7	2
Common Carp	5	4		5	3	3	2		1	15
Bullhead	11	3	5	6	4	5	5	5	7	2
Bigmouth Buffalo						1	1			
Freshwater Drum			1							
Chain Pickerel		1		1						
Bowfin		10	1	10	13	7	5	24	12	22
Spotted Gar	2	5		7	6	3	5	2		1
Gizzard Shad	15	49	116	151		110	50	4	4	4
Channel Catfish				2	1					

For LDWF standardized gill net sampling, 4-100 yard nets are used. A net set consist of four, 100 yard nets of the following specified mesh sizes: 2.5 inches, 3 inches, 3.5 inches and 4 inches. The minimum number of net sets is determined by the surface area of the impoundment. Gill nets are set within one hour of sunset and retrieved as soon as possible after sunrise. Sampling is conducted between December 1 and February 28.

#### Creel Surveys

Access point creel surveys are conducted to collect fisheries dependant data including fishing

pressure, catch, harvest, success and species fish for.

Table 7. Average number of largemouth bass anglers, time fished, and distanced traveled for Chicot Lake creel surveys conducted from 1989 – 2010.

<b>BASS ANGLERS (89-91 – 14 &amp; 16inch minimum) (14 – 17 inch slot since April 1991)</b>			
Year	Mean # of anglers in party	Mean trip length (hours)	Mean one-way distance traveled to ramp
1989	1.92	3.65	28.39
1990	1.98	4.09	37.87
1991	1.79	4.49	27.04
1992	1.80	3.89	32.38
1996	1.68	3.95	32.73
1998	1.63	4.08	35.36
2002	1.58	4.26	30.89
2006	1.62	4.10	30.69
2010	1.82	3.98	45.00

Bass anglers in Chicot Lake averaged fishing for 4 hours per trip after having driven approximately 32 miles to the ramp where they launched their boat. Participation by local largemouth bass fishermen make up the majority of fishermen interviewed. These areas include Evangeline, St. Landry, Allen and Avoyelles parishes.

Table 8. Largemouth bass caught, released and harvested per trip per hour on Chicot lake, LA, from 1989 – 2010.

<b>BASS ANGLERS (89-91 – 14 &amp; 16 inch minimum) (14 - 17 inch slot since 1991)</b>				
Year	LMB caught per trip/per hr.	LMB released per trip/per hr.	LMB harvested per trip/per hr.	LMB Av. weight
1989	2.39 / 0.55	2.29 / 0.53	0.10 / 0.02	1.83
1990	1.91 / 0.46	1.89 / 0.46	0.01 / 0.00	2.25
1991	1.34 / 0.29	0.99 / 0.21	0.34 / 0.08	1.19
1992	0.64 / 0.15	0.41 / 0.10	0.24 / 0.05	1.07
1996	1.15 / 0.27	0.87 / 0.21	0.28 / 0.07	2.07
1998	1.03 / 0.25	0.81 / 0.20	0.22 / 0.05	2.14
2002	1.44 / 0.32	1.14 / 0.26	0.30 / 0.06	1.66
2006	0.79 / 0.20	0.63 / 0.17	0.16 / 0.03	2.46
2010	1.10 / 0.26	0.85 / 0.22	0.25 / 0.05	1.38

Catch and release rates by bass anglers in Chicot Lake were higher in 1989 and 1990 when large numbers of sub-stock and stock bass were. The minimum lengths limits imposed (14” in 1989 and 16” in 1990) protected this strong year class. In 1991, a 14” – 17” protected slot limit was implemented and harvest of bass below 14” increased. The average weights for harvested bass have been higher since the slot limit was imposed. Bass catch rates have remained stable. Number of bass harvested is relatively low due to legal protection provided by the protected slot regulation.

Table 9. The percent (%) by number of total fish species harvested from Chicot Lake, LA by fishermen per year from 1989 through 2010.

Total Number Harvested by Year										
Species	1989	1990	1991	1992	1996	1998	2002	2006	2010	%
Largemouth bass	1.6	0.07	6.8	8.0	7.2	14.0	11.1	10.0	13.0	8.0
Black Crappie	69.4	76	0.4	62.5	17	32.8	21.6	44.0	26	39.1
White Crappie	0	0	44.1	0.3	0	0.3	1.6	1.8	.005	5.3
Bluegill	16.4	21.4	40.7	23.6	63.6	37.7	53.1	32.6	49	37.6
Redear Sunfish	1.7	1.6	5.2	3.1	9.2	8.6	11.3	7.6	11	6.6
Warmouth	0.1	0.03	1.4	0.3	1.2	0.1	0.8	0.1	.008	0.45
Yellow Bullhead	10.8	0.08	1.3	1.8	1.6	6.5	0.5	3.8	.003	2.9
Orange-spotted sunfish	0	0	0	0	0	0	0	0.1	0	0.01
Spotted sunfish	0	0	0.03	0	0.2	0	0	0	0	0.03
Bowfin	0	0.03	0.04	0.1	0	0	0	0	0	0.02
Green Sunfish	0	0	0.03	0.3	0	0	0	0	0	0.04

Although averaging only 7.3% of the harvest, largemouth bass are one of the most pursued by Chicot Lake fishermen. Crappie and bluegill are the most common species pursued throughout all creel years combined.

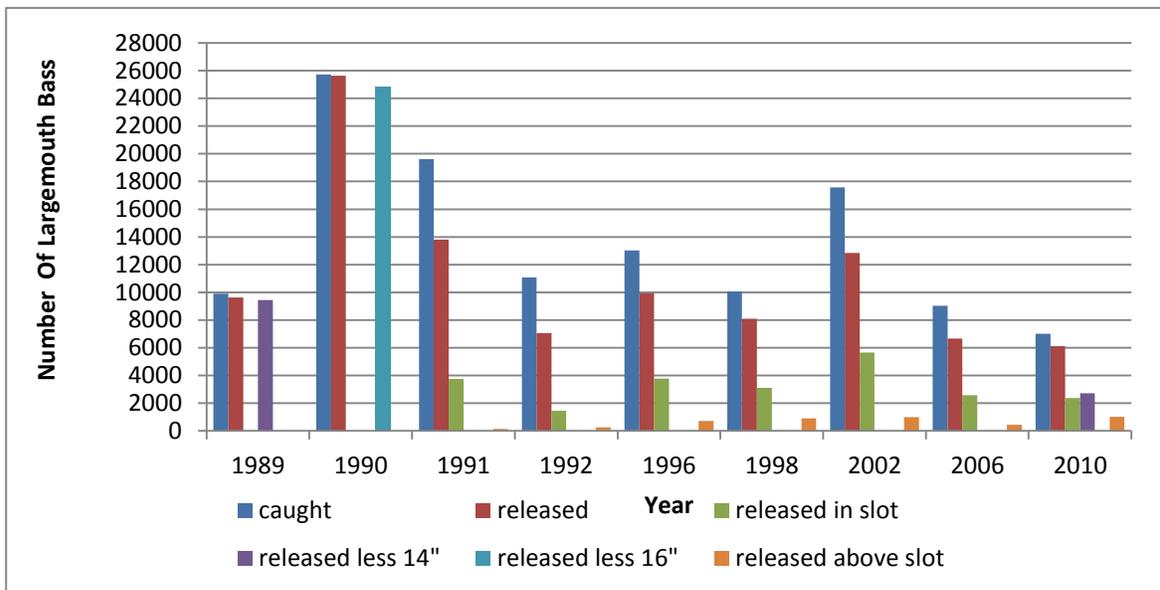


Figure 15. Estimated total number of LMB caught and released in Chicot Lake, LA 1989 – 2010.

Table 10. Angler hours of effort directed by largemouth bass fishermen per acre per year for Chicot Lake, LA for the time period 1989 – 2010.

YEAR	ANGLING HOURS FOR BASS
1989	12.6
1990	78.2
1991	82.8
1992	65.7
1996	40.0
1998	48.5
2002	45.7
2006	41.7
2010	22.2

In 1989, a 14 inch minimum length limit was implemented for largemouth bass. In 1990, the minimum length regulation was increased to 16 inches. In 1991, a protected slot limit of 14 - 17 inches was implemented and it remains in effect. Angler effort was highest in the early 90's, and has declined since. For a protected slot regulation to be effective, sufficient angler effort is necessary (at least 30 angler hours / acre / year). Angling efforts exceeded 30 hours / acre / year in all years but 2010.

During creel surveys, questions were asked of fishermen as they completed their fishing trip. One of the questions was; "What do you think about the present bass regulation on Chicot Lake, (14-17 inch slot)?" If the fishermen disagreed with the regulation, they were asked, "If you don't like it, how would you like it changed?"

Table 11. The results of angler opinion surveys taken at boat ramps on Chicot Lake, LA during creel surveys in 1998, 2002, 2006 and 2010.

Chicot Lake Angler Opinion Survey Results								
Preference	Bass Anglers				All Anglers			
	1998 N = 886	2002 N = 494	2006 N = 385	2010 N = 313	1998 N = 1,349	2002 N = 983	2006 N = 749	2010 N = 333
14" min.	6.8 %	16.4 %	7.3 %	22%	5.1 %	11.6 %	4.3 %	9.0%
13" min.	0.2 %	0.0 %	0.0 %	0.0%	0.2 %	0.0 %	0.0 %	0.0%
12" min.	1.0 %	1.6 %	1.3 %	2.0%	0.9 %	1.3 %	1.3 %	0.6%
Other min.	1.9 %	0.6%	1.0 %	2.4%	1.4 %	0.3 %	1.1 %	0.6%
14-17 Slot	75.6%	69.4%	85.5%	68%	65%	67%	78.9%	77%
13-16 Slot	0.0%	0.4%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
15-19 Slot	0.7%	0.2%	0.0%	0.0%	0.6%	0.1	0.0%	0.0%
Other Slot	3.8 %	1.8 %	1.0%	4.0%	3.3 %	1.0%	0.7 %	0.8%
No length restriction	0.6 %	2.0 %	0.8 %	0.5%	0.4 %	1.4 %	0.7 %	2.0%
No opinion	8.7 %	6.3 %	1.8 %	0.5%	22.6 %	16.4 %	12.1 %	10%
Other	0.5 %	1 %	1.3 %	0%	0.3 %	0.6%	0.9 %	0.0%
Catch & Release	0.2%	0.2%	0.0%	0.6%	0.2%	0.0%	0.0%	0.0%

## Sunfish

As reported in Table 12 below, sunfishes make up the greatest percentage of all species harvested in Chicot Lake. Bluegill makes up the majority of sunfish harvested in Chicot Lake, followed by redear sunfish. The best opportunity to harvest these sunfish is during the months of May and June when they are spawning.

Table 12. Percentage of common sunfish species harvested by anglers, in Chicot Lake, LA, for the years 1989 – 2006.

List of species sorted by percent of total number harvested										
Species	1989	1990	1991	1992	1996	1998	2002	2006	2010	Average
Bluegill	16.4	21.4	40.7	23.6	63.6	37.7	53.1	32.6	49.0	37.6
Redear Sunfish	1.7	1.6	5.2	3.1	9.2	8.6	11.3	7.6	11.0	6.5
Warmouth	0.1	0.03	1.4	0.3	1.2	0.1	0.8	0.1	.008	0.45
Orange-spotted sunfish	0	0	0	0	0	0	0	0.1	0	0.01
Spotted sunfish	0	0	0.03	0	0.2	0	0	0	0	0.03
Green Sunfish	0	0	0.03	0.3	0	0	0	0	0	0.04

## Crappie

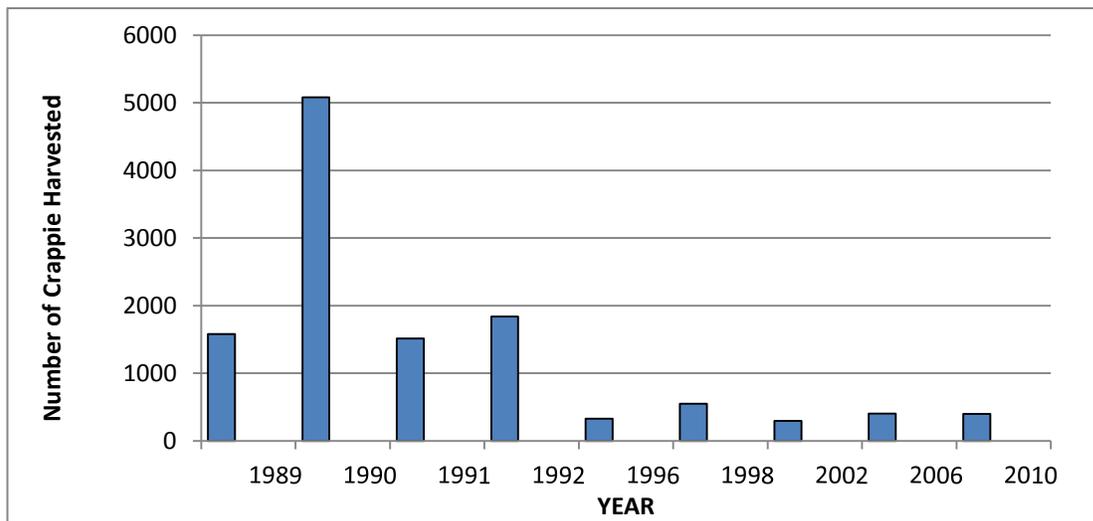


Figure 16. Total estimated number of Crappie harvested by anglers per year on Chicot Lake, LA, 1989 – 2010.

In 1985, it was determined that the original floodgate structure needed to be replaced. The lake was drained to the main channel in late 1985 to allow for the original spillway and floodgate to be demolished. Construction of the new spillway and floodgate began in 1986. For that year the lake bottom was allowed to dry. The process improved spawning habitat throughout the lake. Spillway construction was completed in 1987. Large numbers of crappie were harvested from Chicot Lake (Figure 16) in the late 80's and early 90's after the renovation and refill in 1988. This circumstance, as well as increased fishing participation due to the excitement of the re-opened lake, best explains the higher than average number of crappie harvested for 1990. Since that time crappie harvest has remained stable.

Table 13. Number of crappie harvested per trip and angler hours per acre of water for Chicot Lake, LA, 1989 – 2010.

<b>Year</b>	<b>Harvested/Trip</b>	<b>Angler hours/acre - Effort</b>
1989	8.7	30.0
1990	7.4	40.2
1991	1.9	26.6
1992	4.9	28.6
1996	1.1	12.6
1998	1.2	16.0
2002	2.4	11.3
2006	2.5	17.1
2010	2.7	10.3

## **HABITAT EVALUATION**

### Aquatic Vegetation

Aquatic plants have always played a key role in the management of Chicot Lake. The north end of Chicot Lake is conducive to overabundance of vegetation because of its shallow depth. In addition, floating plants such as duckweed, common salvinia and water hyacinth are common throughout the lake. In 1991, 1996 and 1997 seven foot drawdowns were conducted to control aquatic vegetation. LDWF and the Office of State Parks closed the lake to the public during this time for safety reasons. In 2003, 2005 and 2008, starting in the month of May – July, two foot drawdowns along with herbicide applications helped to retard aquatic vegetation growth. The lake remained open to fishing.

In May 2010, Chicot Lake was lowered 2 feet below pool stage to help facilitate application of the herbicide Sonar (fluridone) to control the spread of hydrilla. Sonar Q® (quick release) and Sonar PR® (precision release) were applied by LDWF spray crews on May 5<sup>th</sup>, 2010, to approximately 400 acres throughout the lake. Areas treated were near the South Landing, Walker Branch, Conservation Lodge, and from the spillway to the north landing. A total of 2,040 pounds of Sonar Q and 1,830 pounds of Sonar PR were applied. The largest area treated was near the spillway and totaled 235 acres. In this area, Sonar Q was applied at a rate of 89.63 ppb and Sonar PR was applied at a rate of 85 ppb. Results from this herbicide application were good, as hydrilla infestations were considerably reduced.

The Louisiana Department of Transportation and Development (DOTD) lowered the water level in Chicot Lake to repair the bridge that crosses the lake in Walker Branch. On September 7<sup>th</sup>, 2010 the gates were opened and water levels were reduced to 5 feet below pool stage. Lake levels remained very low due to drought conditions in the fall and winter months. By November of 2011, lake levels had not reached pool stage since that time. These conditions dried the shallow areas of the lake which substantially reduced the occurrence of submerged vegetation and improved spawning substrate.

In April of 2011, an early season, low rate treatment of Sonar was applied to hydrilla infestations near the spillway to reduce hydrilla tubers that remained despite previous applications. In Florida, this early season approach has been found to be successful at reducing the amount of tubers in a hydrilla bed. A total of 240 pounds each of Sonar Q and Sonar PR were applied to the 235 acre section for an herbicide concentration of 5.4 ppb. In

June of 2011, 120 pounds of SONAR PR and 80 pounds of SONAR Q were applied. This is considered a “bump” treatment in the same areas to keep the chemical concentrations at an effective level. This approach was a success, and hydrilla did not become a problem near the spillway during the 2011 growing season. Multiple applications of this systemic herbicide had reduced the spread of hydrilla throughout the lake.

The systemic herbicides Sonar PR® and Sonar Q® were applied early in the spring of 2012. Two hundred forty pounds each of Sonar PR and Sonar Q were applied in April. A follow-up application of Sonar PR (120 pounds) and Sonar Q (80 pounds) took place 4 weeks after the initial treatment to keep the herbicide concentration at an effective level. The area targeted for treatment was approximately 235 acres located on the north end of the lake between the north landing and the spillway.

A two foot drawdown in the fall of 2012 helped to retard aquatic plant growth in Chicot Lake. The control structure was opened on September 10, 2012 to allow dewatering at a rate of 3 inches per day. The control structure was closed on September 17<sup>th</sup> 2012 when water levels reached two feet below pool stage.

In 2010, foliar herbicide applications were made on nuisance plants such as duckweed and common salvinia in areas that are used by recreational fishermen. A total of 135 gallons were applied to 135 acres. To control these plants, diquat dibromide (Knockout) was applied at a rate of 1 gallon per acre.

In October of 2011, 95 gallons of foliar herbicides were applied to 135 acres of nuisance aquatic vegetation. To control water hyacinth, pennywort and American lotus, 2,4-D was applied at a rate of 0.5 gallons per acre. Diquat dibromide was applied at a rate of 1 gallon per acre for duckweed, and glyphosate at 0.75 gallons per acre to control common salvinia.

In 2012, 335 gallons of foliar herbicides were applied to 742 acres of nuisance aquatic vegetation. To control water hyacinth, alligator weed, primrose and American lotus, 2,4-D was applied at a rate of 0.5 gallons per acre. Diquat and glyphosate were applied at 0.75 gallons per acre to control common salvinia and duckweed.

As of 2013 the most abundant aquatic vegetation species is hydrilla.

## **Nuisance Aquatic Vegetation Problems:**

Plant growth projections for summer 2013:

Hydrilla - up to 200 acres on the north end of the lake

Other submerged vegetation (coontail, fanwort and naiad in the aggregate) – 450 acres

Water hyacinth, pennywort & American lotus - up to 100 acres located throughout the lake

Duckweed & common salvinia - up to 200 acres located on the south end of the lake

### Substrate

Chicot Lake receives an annual contribution of leaf litter from a heavy canopy of tupelo and cypress trees. Drawdowns allow for aerobic decomposition of the leaf litter.

### Artificial Structure

Reef structures have been placed along the south fishing pier. These structures consist of feed pallets (17x24 inches) that are placed over a single PVC pipe stem (2 inches in diameter). The structures are ballasted with a concrete base. (See photos below). There are nine artificial structures in proximity of the south fishing pier.

## **CONDITION IMBALANCE / PROBLEM**

Aquatic vegetation in Chicot Lake is above the recommended 15 - 30 % range of areal coverage. Fishermen and other user groups at the State Park do not approve of extensive drawdowns due to associated fishing closures and limitations on other forms of water sports. Excess submerged vegetation (primarily hydrilla) is an ongoing problem.

## **CORRECTIVE ACTION NEEDED**

1. Need to control invasive aquatic vegetation.
3. Need to provide public information to explain management recommendations, particularly with regard to water fluctuation).

## RECOMMENDATIONS

1. Implement the integrated management plan that has been developed for Chicot Lake to control overabundant submergent vegetation. 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 type map surveys and sampling to monitor aquatic vegetation and will update recommendations as necessary.
  - a. Foliar herbicide applications on Chicot Lake will be conducted as needed by LDWF spray crews in areas that are accessible to the public. Herbicides will be applied according to LDWF approved standard operating procedure for aquatic plant control.
  - b. Water level fluctuation is an important tool for lake management. Drawdowns mimic natural low water periods of the fall and can provide many of the same benefits including aquatic vegetation control and fish population management. In addition, exposure to air is critical to decomposition of organic materials on the lake bottom. The re-flooded habitat is an improved and more productive spawning substrate for nesting fish. Cooler water temperatures in the fall also reduce potential for fish kills. Therefore, annual fall drawdowns three feet below pool stage are recommended for Chicot Lake. The control structure will be opened soon after Labor Day to allow de-watering at a rate of 3-4 inches per day. The target water level is to be maintained until early January of the following year. The lake will remain open for recreational activities.
  - c. A total of 450 TGC will be stocked in the winter of 2013 - 2014. Triploid grass carp are sterile and are effective in the control of hydrilla when stocked in appropriate numbers and contained within the waterbody. A stocking rate of 3 fish per vegetated acre has been selected. To reduce potential for loss through predation, the minimum size for the stocked TGC will be  $\geq 12$  inches in total length. Annual sampling will be conducted to determine the effects of the TGC stocking. These samples include standardized gill net samples in the winter months as well as vegetative type maps. If necessary after a three year period, the introduction of additional TGC will be considered.
2. Continue to evaluate the stocking success of Florida strain largemouth bass.
3. Continue standardized sampling and use results for consideration of recommendations.
4. Provide annual management plan updates for public review.