LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

BARTHOLOMEW LAKE

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

September 2012 - Prepared by

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

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

Commercial

Although species comprising a commercial fishery exist in Lake Bartholomew, no commercial fishing is currently permitted.

Species of Special Concern

No threatened or endangered fish species are found in this waterbody.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations are in effect for all fish species.

Commercial

Commercial fish netting is prohibited. Effective September 20, 1991, gill nets, trammel nets, hoop nets, and fish seines were prohibited by legislative statute in conjunction with the implementation of a harvest regulations for black bass. The bass regulations have since been rescinded.

SPECIES EVALUATION

Recreational

Largemouth bass are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain. Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large fish. Sampling with gill nets determines the status of large bass and other large fish species. Shoreline seining has been used in the past to collect information related to fish reproduction and forage availability.

Largemouth Bass

Largemouth Bass CPUE and Length Frequency

In the chart below (Figure 1), fall electrofishing data is used as an indicator of largemouth bass relative abundance with total catch-per-unit-of-effort (CPUE) indicated for three size classes since 1991. There appears to be a trend of declining abundance in all three size classes since 1999. A partial explanation could be the removal of the 14 –

17 inch slot limit in 2000, which allowed for the harvest of fish within this size range. Figure 2 depicts CPUE from spring electrofishing samples over the same period of time. The trend is similar, although not as pronounced. The sharp decline in 2001 could be related to weather conditions during the sample, such as sampling immediately following a cold front or heavy rainfall. Other year to year variability can often be explained by sampling error. Also, sampling frequency was decreased to every third year after 2001, rather than every other year from 1991 - 2001.

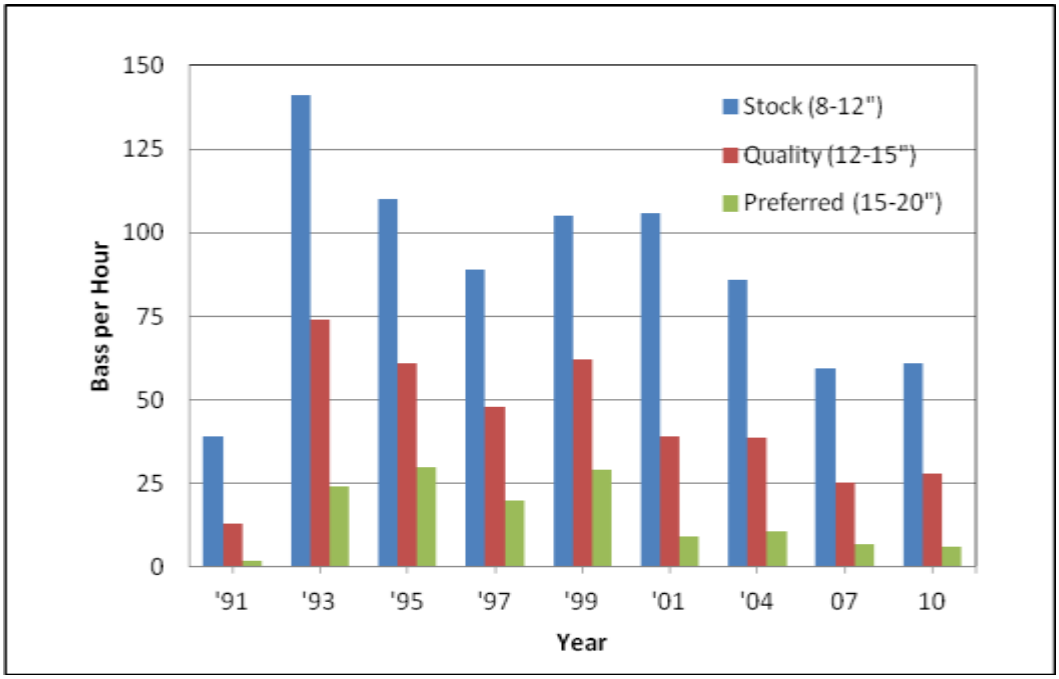

Figure 1. Catch per unit effort (bass per hour) for stock, quality, and preferred-size largemouth bass collected from fall electrofishing samples on Lake Bartholomew, LA, from1991 – 2010.

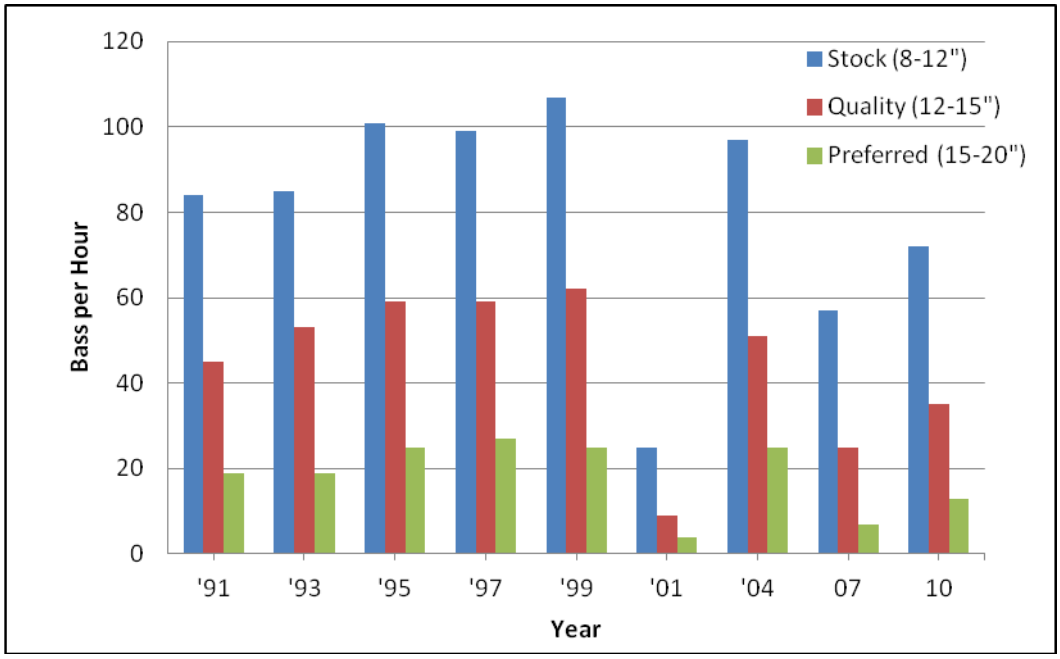

Figure 2. Catch per unit effort (bass per hour) for stock, quality, and preferred-size largemouth bass collected from spring electrofishing samples on Lake Bartholomew, LA, from 1991 – 2010.

The following charts (Figures 3, 4, 5, and 6) show length distributions in catch per hour for largemouth bass for the years 2001, 2004, 2007, and 2010, respectively. A fairly balanced population is indicated, in that nearly all of the inch groups from 6 – 18 inches are represented in each sample. However, in all years the most abundant bass in the lake are 10-12". These fish appear to be mostly age 1+ (See Figure 8 below), suggesting a relatively high level of recruitment from the juvenile to sub-adult/adult state. It should be noted that larger bass (> 20 inches) are not efficiently sampled by electrofishing gear and therefore may be under represented in these results. Relative weight (Wr) for each inch group is also shown. This measurement is obtained from fall samples only and is defined as the ratio of a fish's weight to the weight of a ''standard'' fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 may indicate a problem of insufficient or unavailable forage, whereas relative weights closer to 100 indicate sufficient available forage. A description of the forage species and sampling methods is described below. The relative weights depicted in the charts below show that there appears to be abundant forage in Lake Bartholomew.

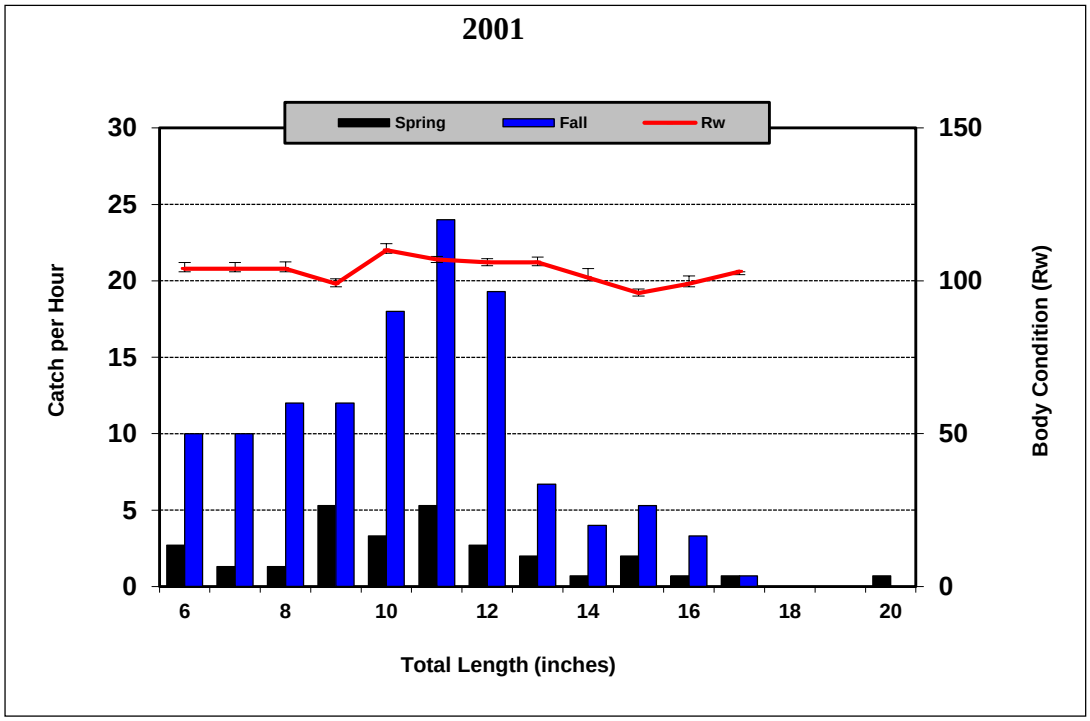

Figure 3. Size distributions (length groups) and condition factors (mean relative weights ±SE) for largemouth bass in Lake Bartholomew, LA, for the year 2001.

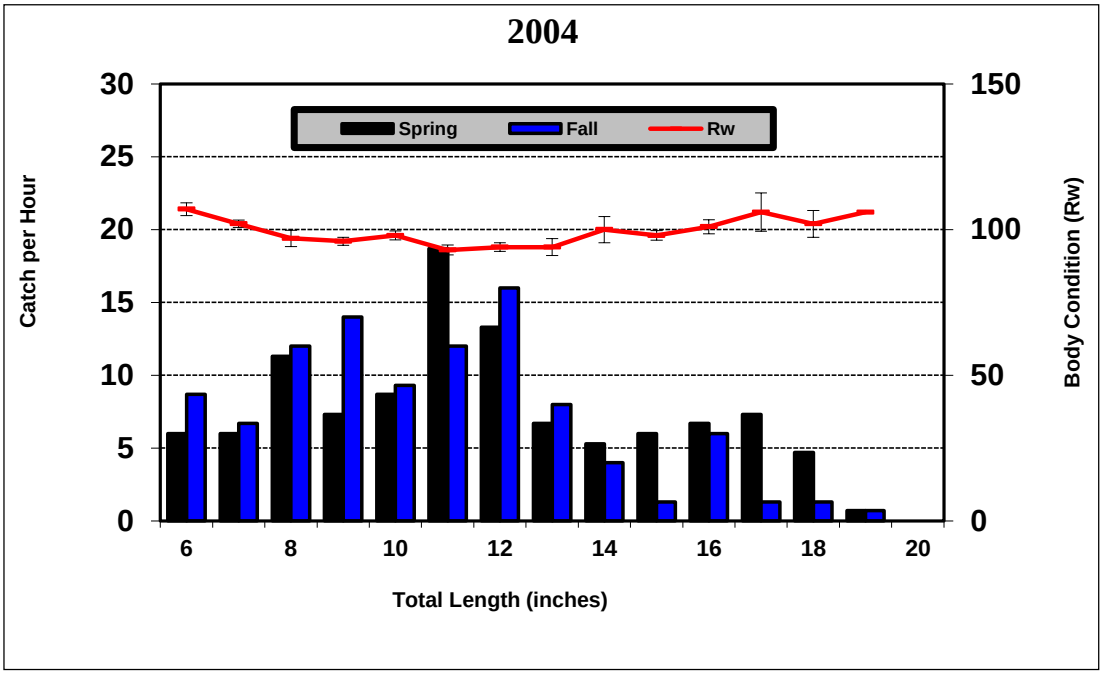

Figure 4. Size distributions (length groups) and condition factors (mean relative weights ±SE) for largemouth bass in Lake Bartholomew, LA, for the year 2004.

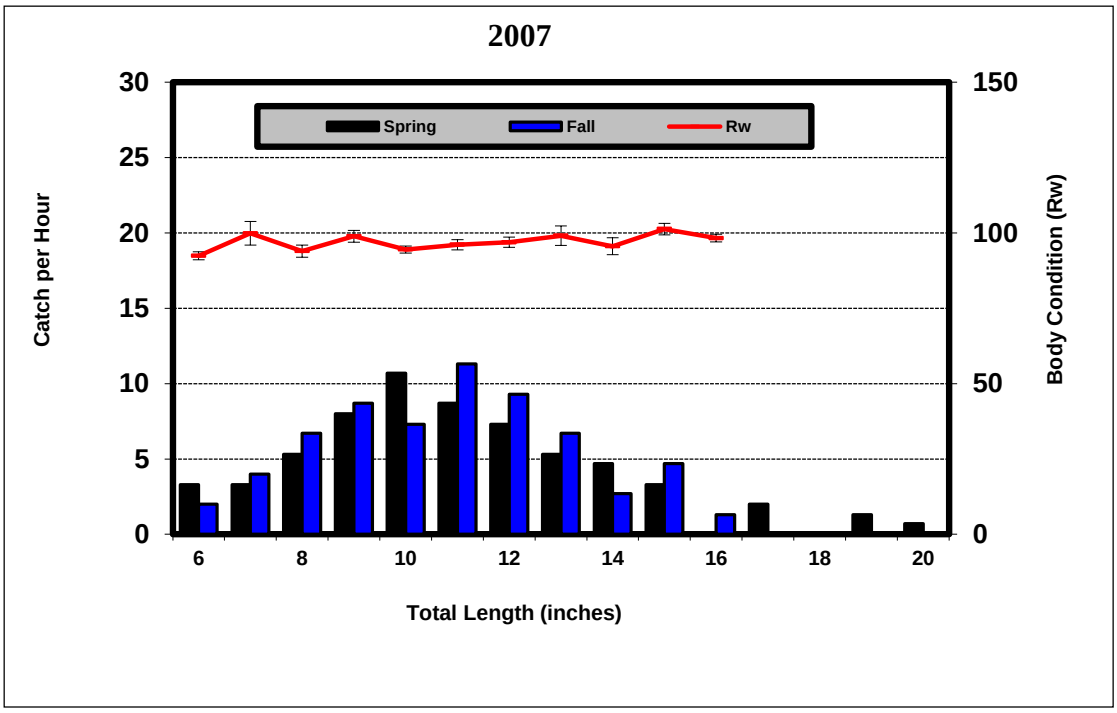

Figure 5. Size distributions (length groups) and condition factors (mean relative weights +SE) for largemouth bass in Lake Bartholomew, LA, for the year 2007.

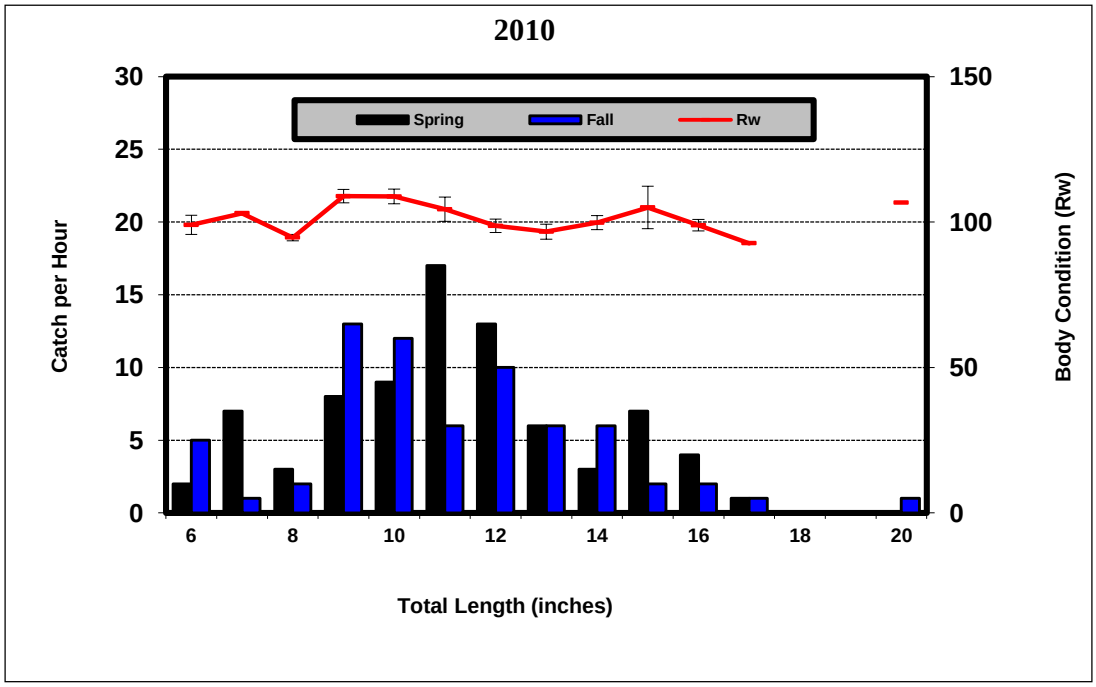

Figure 6. Size distributions (length groups) and condition factors (mean relative weights +SE) for largemouth bass in Lake Bartholomew, LA, for the year 2010.

Largemouth Bass Genetics

With the exception one northern largemouth bass stocking in 1972, Florida largemouth bass (*Micropterus floridanus*) are the only black bass that have been stocked into Lake Bartholomew. Florida bass are typically stocked into waterbodies which are believed to have the potential (fertility and forage) to grow and produce quality size bass. Stocking was initiated in 1991 and discontinued after 1998. No genetic analysis was performed before this period, but it was assumed that the population was comprised of only northern largemouth bass. A genetic sample taken in 1991 did not reveal the presence of the Florida bass in the population. Genetic samples taken during the period of 1994 and 1997 indicated an increasing Florida genome percentage in the largemouth bass population. Samples from 1994 and 1997 included Florida genetics at 18% and 33% respectively. Genetic sampling was also been conducted in 2001 and 2004. Analysis revealed the Florida genome to be present in 25% of the fish sampled, with pure Florida bass comprising 3%. Hybrids (Florida x northern) comprised 22% of both samples (Figure 7). Florida bass stockings were discontinued in 1999 and the protected slot limit for bass was removed in 2000. Justification for the change included an insufficient increase in larger bass and low angler participation.

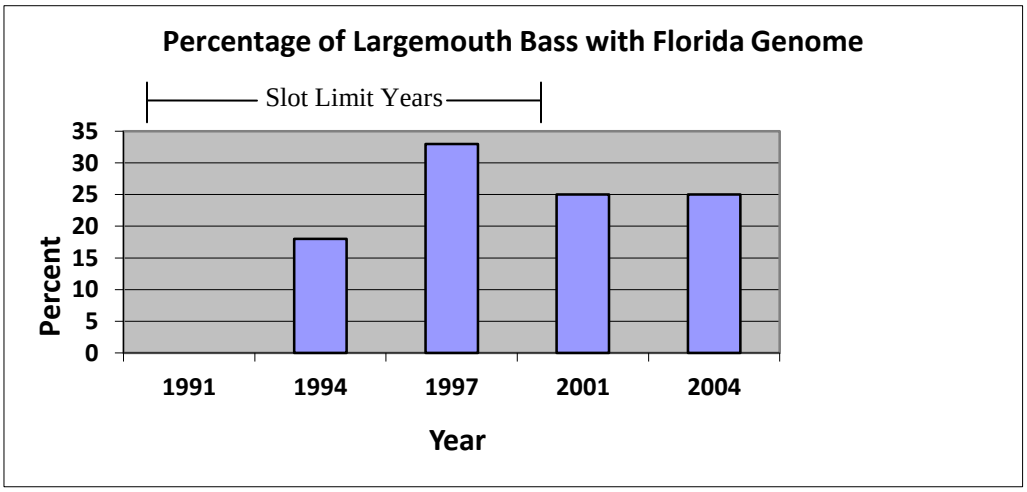

Figure 7. Percentage of Florida bass genome present in largemouth bass populations collected from Lake Bartholomew, LA, in 1991, 1994, 1997, 2001, and 2004.

Largemouth Bass Age and Growth

Age was determined for largemouth bass from fall electrofishing samples taken in 1997, 1999, 2001, and 2004. Mean lengths (mm) at capture for ages 1+ – 4+ are shown in Figure 8. Lake Bartholomew largemouth bass growth is very similar to the statewide average (age 1+ = 262 mm, age 2+ = 335 mm, age 3+ = 384 mm, and age 4+ = 424 mm). Growth appears to have been consistent among cohorts for each sample year. The variability seen in age 4+ fish is most likely due to the small sample sizes of larger fish.

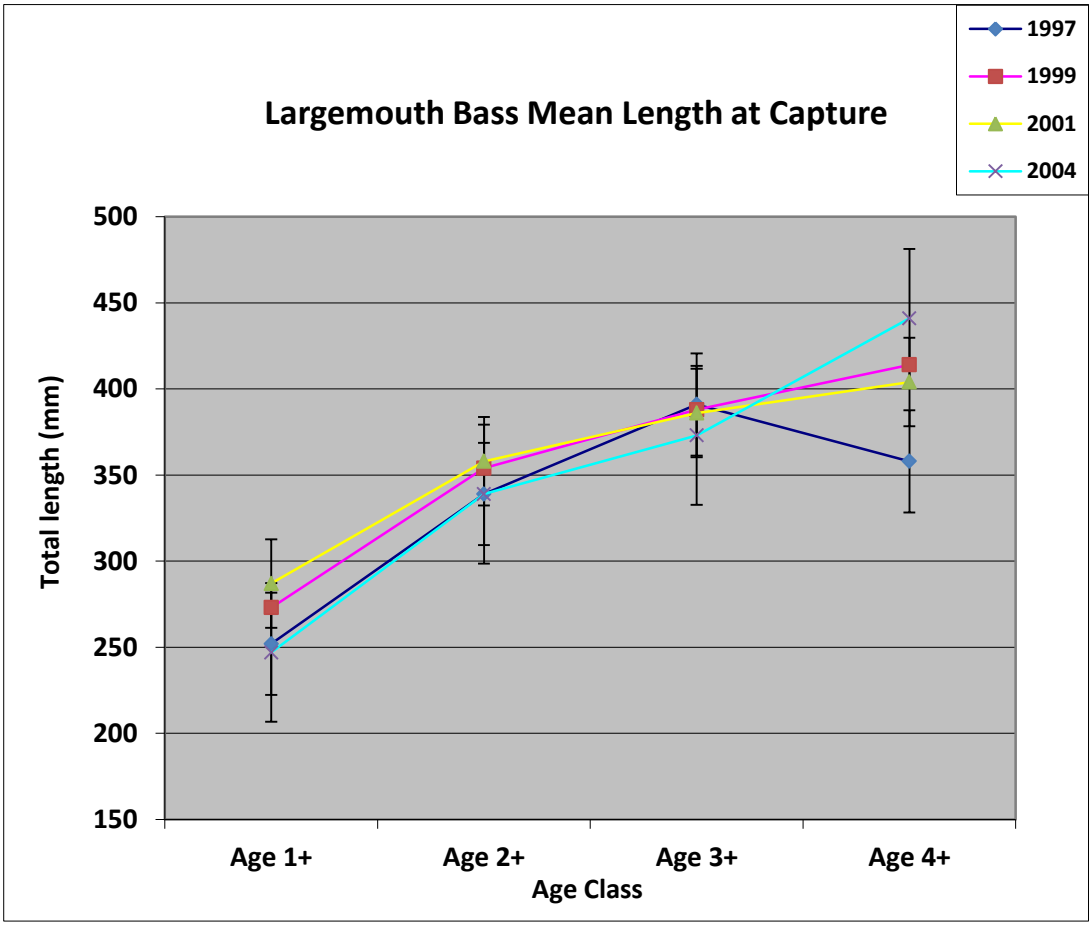

Figure 8. Largemouth bass actual mean lengths (±SE) at age for fall electrofishing samples for ages 1+, 2+, 3+, and 4+ from Lake Bartholomew for years 1997, 1999, 2001 and 2004.

Crappie

Crappies have never been specifically targeted for capture during previous sampling efforts. Both species, white and black, have been recorded from various sampling gears over the years, including gill netting, electrofishing, and biomass (rotenone) sampling. Catch rates in these samples have been minimal, thus not sufficient enough to conduct analyses or make any conclusions regarding the populations. Biomass (rotenone) sampling conducted in 1987, 1991, 1992, and 1995 showed pounds per acre of black crappie to be 21, 1, 1, and 0, respectively. Results of the 1992 recreational creel survey estimated that crappie angler's harvested 0.4 crappies/hr and an estimated total of 3,230 crappies were harvested for that year.

Forage

Sunfish, silversides, gizzard shad, threadfin shad, and cyprinid minnows have been identified as the primary bass forage species in Lake Bartholomew. In addition to calculation of largemouth bass relative weights (described above), forage availability has been measured from biomass (rotenone) sampling and shoreline seining. Figure 9 shows pounds/acre of shad, sunfish, and cyprinids (shiners) obtained during the last four biomass samples conducted on Lake Bartholomew. Shoreline seining in 1990 and 1991 revealed a total of 24 different species of fish which could potentially be eaten as forage by predatory fish.

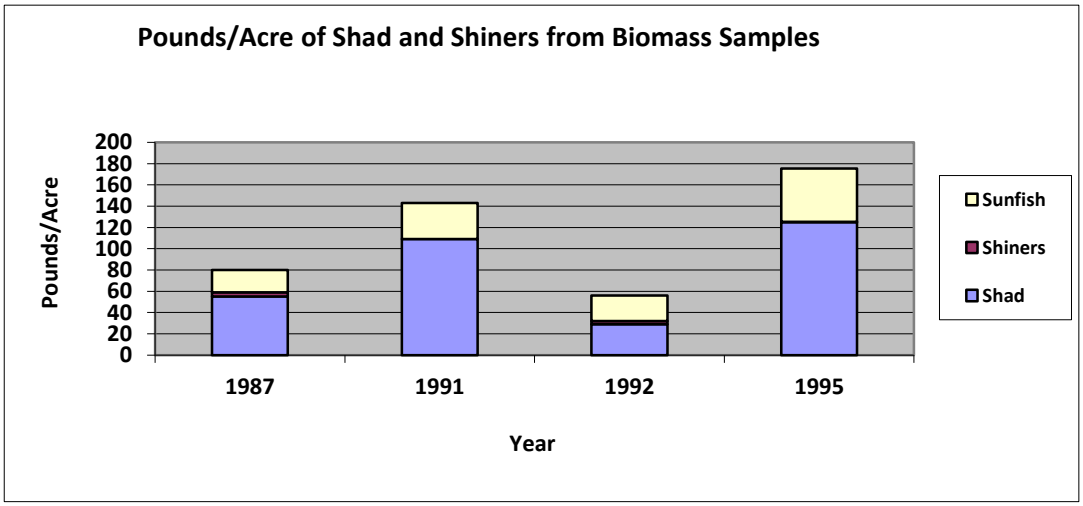

Figure 9. Pounds-per-acre estimates of shad, sunfish, and shiners from biomass samples taken from Lake Bartholomew, LA, in 1987, 1991, 1992, and 1995.

Sunfish

Bluegill and redear sunfish are the most abundant "sunfish" species in Lake Bartholomew. Other species documented from forage and seine samples include longear sunfish, dollar sunfish, spotted sunfish, and warmouth. Figure 10 shows the size distributions (total lengths) in CPUE for bluegill and redear sunfish collected during an electrofishing forage sample in fall, 2010. The total number of sunfish collected per hour for each species from 1997, 1998, 1999, and 2010 are shown in Figure 11. Bluegills were much more abundant than redear in each of the samples. The species and length distributions of the sunfish indicate an adequate and balanced forage population, as well as a desirable predator-prey relationship.

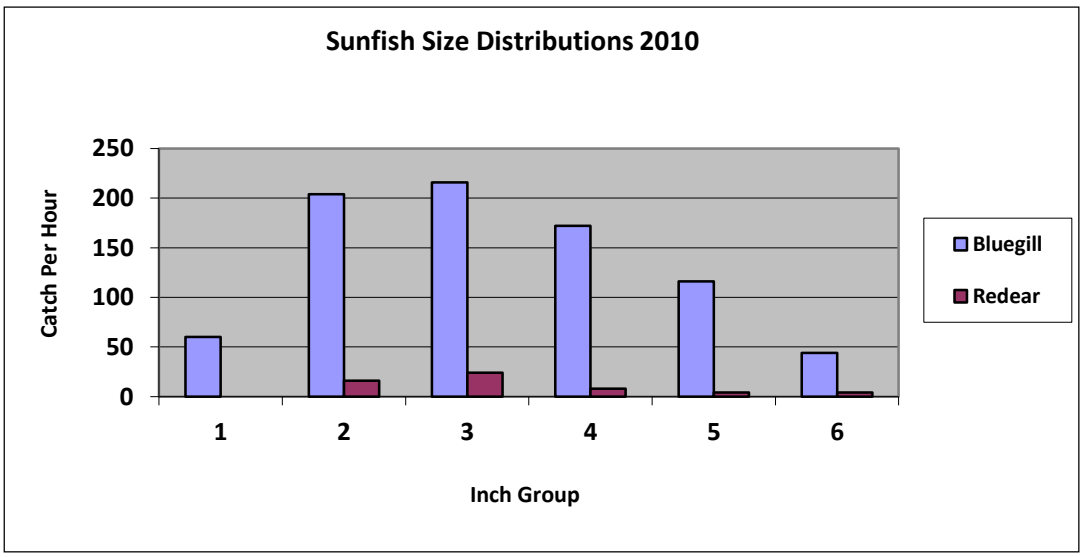

Figure 10. Size distributions of bluegill and redear sunfish collected in fall forage electrofishing samples from Lake Bartholomew, LA 2010.

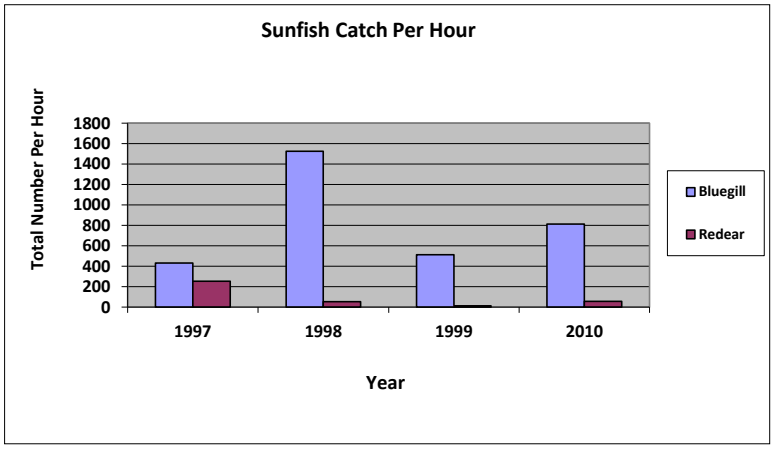

Figure 11. Catch-per-unit-effort (number per hour) of bluegill and redear sunfish collected in fall forage electrofishing samples from Lake Bartholomew, LA during 1997, 1998, 1999, and 2010.

Recreational Creel Survey

Access point creel surveys of recreational anglers were conducted in 1992 and 1995, coinciding with implementation of a protective slot limit on largemouth bass. A total of 208 and 352 interviews were conducted each year, respectively. Fishing pressure was estimated to be 41.3 hrs/acre in 1992 and 37.8 hrs/acre in 1995. Fishing for largemouth bass accounted for 75% and 81% of the total fishing pressure in 1992 and 1995, respectively. Bream and crappie were ranked as the second and third most sought after species, respectively. The estimated total harvest of these species is shown in Figure 12. Harvest for all three was lower in 1995. Catch per hour estimates for bream were 3.2 and 0.9 for the two years, while bass and crappie CPH estimates were very near 0.4 for both years.

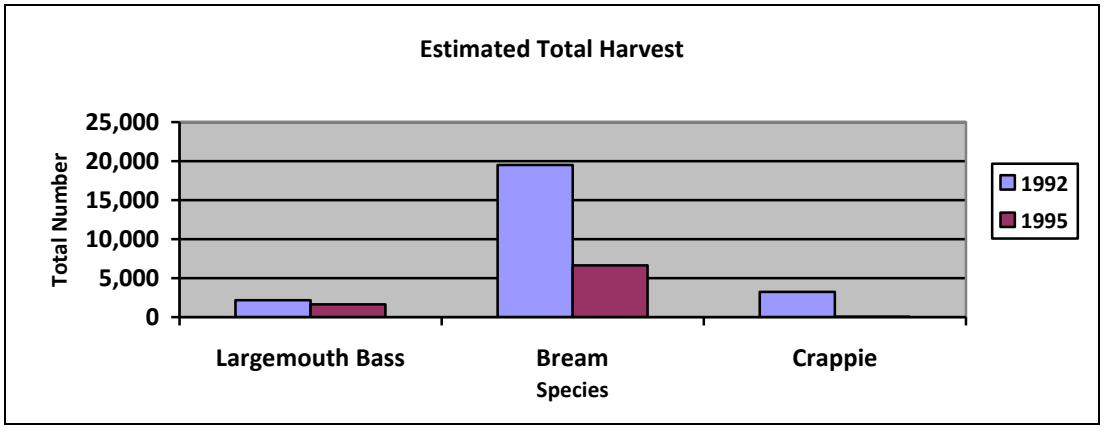

Figure 12. Estimated total harvest of largemouth bass, bream, and crappie from the 1992 and 1995 recreational creel surveys on Lake Bartholomew, LA.

The overall harvest rates for largemouth bass were 25.0% and 22.3% for the two years, respectively. Largemouth bass of legal size that were caught and released comprised 36% of the total releases in 1992 and 43% of the total releases in 1995. Of all bass caught, 47% and 45%, in 1992 and 1993 respectively, were within the protective 14 – 17 inch slot limit. Fishing pressure for bass was estimated to be 30.8 hrs/acre for both years, though total harvest declined from 2,184 in 1992 to 1,646 in 1995. The percentage of fish caught within the slot limit was nearly the same for both years, yet harvest of legal size fish had declined significantly. The reduced harvest of legal size bass was one of the factors that led to the removal of the protective slot limit in 2000.

Commercial

Several commercial or rough fish species have been collected from Lake Bartholomew during biomass and gill net sampling through the years. Although commercial fishing is now prohibited, it does not appear that recent catch effort would support a viable commercial fishery. Table 1 shows the total number of selected species captured from gill net sampling in 2004, 2005, and 2008. The low abundance of predatory commercial species (catfish and gar) should result in more forage, especially shad, being available for largemouth bass and crappie. The high relative weights of the largemouth bass may be indicative of the low abundance of other predators. Species not included in Table 1, but collected from prior biomass samples include black buffalo, bowfin, common carp,

grass carp, and spotted gar. Figure 9 shows the total pounds per acre of commercial species taken from biomass samples conducted in 1987, 1991, 1992, and 1995. The increased catch in 1992 may be a result of an increase in forage availability or productivity in 1991, as shown above in Figure 9. Otherwise, commercial fish production appears to be static and low overall.

Table 1. Total number of selected commercial species captured during gill net sampling on Lake Bartholomew, LA in 2001, 2005, and 2008.

Species	2001	2005	2008	Total
Bigmouth buffalo	-	2	1	3
Smallmouth buffalo	-	2	-	2
Blue catfish	-	-	12	12
Channel catfish	3	11	9	23
Flathead catfish	1	2	2	5
Freshwater drum	1	6	4	11

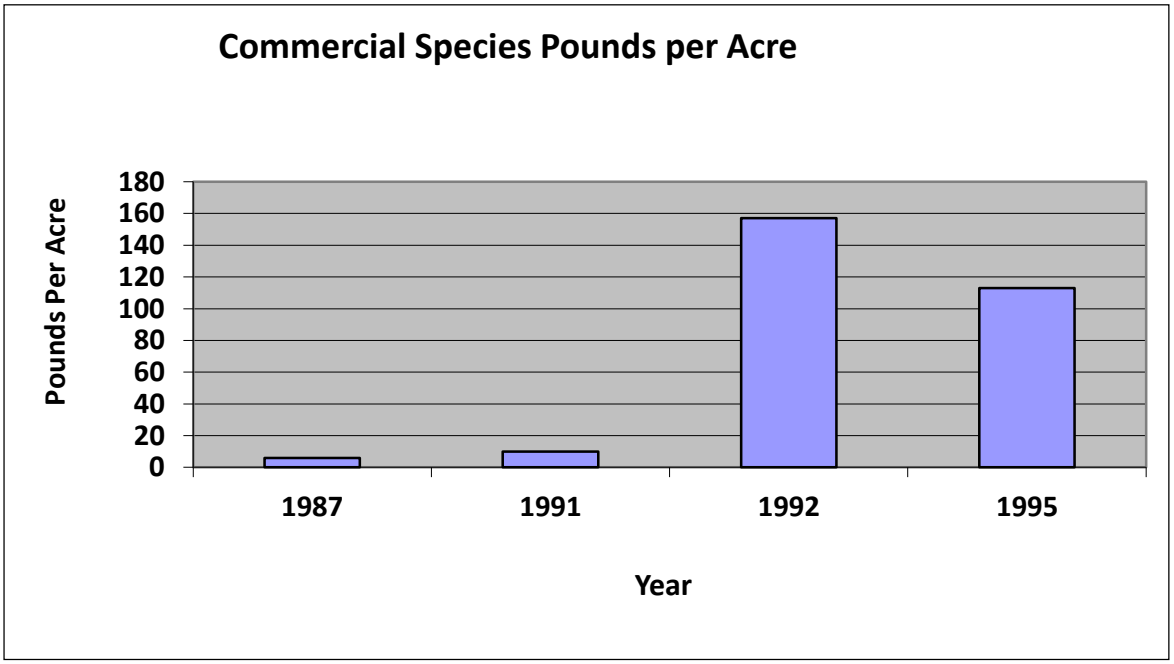

Figure 13. Estimated pounds per acre of commercial species collected from biomass samples on Lake Bartholomew, LA, in 1987, 1991, 1992, and 1995.

HABITAT EVALUATION

Aquatic Vegetation

Being a typical oxbow impoundment, vegetation in Lake Bartholomew has been primarily associated with the shoreline and small shallow coves. Historically, emergent vegetation such as alligator weed (*Alternanthera philoxeroides*) and water primrose (*Ludwigia spp.*) has been the most abundant. The floating species, water hyacinth *(Eichhornia crassipes*), has been problematic in the past, and has occasionally formed large mats crossing the entire width of the impoundment. Coontail (*Ceratophyllum demersum*), a native species, has historically been the most common submerged species. No control efforts have been necessary. The Lake Bartholomew water clarity has typically limited growth of submerged vegetation to depths less than five feet. A qualitative assessment of vegetation in May 2011 showed there to be very little vegetation of any type on the southern half of the lake. The reason for this is unknown; however it may be associated with the pump location on the north end. Water clarity was approximately 20 inches on the south end, while it was near 30 inches on the north end. The exotic species, hydrilla (*Hydrilla verticillata*) was first documented in Lake Bartholomew in 2004 near Barrett's boat launch on the north end. This small patch was immediately treated with diquat dibromide herbicide. By 2009, hydrilla coverage had expanded to 12 acres. An effort was made to control it in late summer 2010 by applying granular Endothall® at 3.5 ppm to the entire affected area. This application failed to produce desired results, possibly because of its timing -- late in the growing season. A total of 14 acres of hydrilla was treated in spring 2011 with a 3:2 mixture of Cutrine® Plus chelated copper algaecide and diquat dibromide applied at 5 gallons per acre. This application was successful in reducing the overall coverage, though re-growth has already begun. The hydrilla is not imposing any immediate threats to Lake Bartholomew, but it is impacting recreational use of some shoreline piers. There is also the threat of hydrilla being introduced into Bayou DeSiard via the culvert that connects the two waterbodies. Additional applications of herbicide have been made to the area adjacent to the culvert in an effort to prevent hydrilla from infesting Bayou DeSiard.

Substrate

The natural substrate of Lake Bartholomew is mostly clay, typical of a low order stream of the Ouachita River basin. Silt has been deposited on top of the natural stream bottom from many decades of agricultural erosion. The senescence of aquatic vegetation and accumulation of leaf litter from surrounding trees has added organic material to the lake bottom. Without any significant flow or natural fluctuations of water level, these materials have most likely caused degradation of some fish spawning habitat and decreased depth in some areas. This accretion process has not been documented and does not appear to be an imposing threat to the health of the impoundment.

Available complex cover

The most prominent forms of complex cover in Lake Bartholomew are live bald cypress (*Taxodium distichum*) trees and submerged woody material. Cypress trees are common in the shallow areas, while the woody material is found along the edge of the original creek channel. Submerged vegetation provides a varying amount of shallow water cover, with coontail and hydrilla being the dominant species. Numerous residential

piers also comprise a significant component of the available cover in the waterbody.

Artificial Structure

No artificial structure has been placed into Lake Bartholomew by LDWF.

CONDITION IMBALANCE / PROBLEM

The lack of significant water level fluctuations or drawdowns poses the greatest threat to the fisheries habitat of Lake Bartholomew. There is no documentation of a significant drawdown on this waterbody since it was impounded in the 1930's. The degradation of the natural substrate by agricultural siltation and accumulation of organic materials may be impacting the spawning success of several species of fish. Dewatering the shallow spawning areas while exposing them to air would accelerate the decomposition process and reduce the organic layers. Results would include improved water quality and more suitable substrate for nest building fishes.

Limited angler access continues to be a problem on Lake Bartholomew. The entire shoreline is privately owned with the exception of the public ramp on the north end. This public ramp is not conveniently located, is very steep, and has no designated parking area. Security is also a real concern at this ramp. A privately owned ramp which had been available to the public for a nominal fee is now in disrepair. An unimproved privately owned area adjacent to Hwy. 165 is unreliable as a boat launching area due to deteriorating conditions. There are also no public fishing piers or designated areas for shoreline anglers.

CORRECTIVE ACTION NEEDED

Lake Bartholomew could benefit from a series of water level fluctuations to expose the spawning areas and allow for the more rapid decomposition of the organic substrate. Drawdowns of this nature would provide the additional benefit of temporary or seasonal hydrilla control.

Requests for improved angler access should be made to the police juries of Ouachita and Morehouse Parishes. A concrete ramp and parking area is needed in a more convenient location. At the least, a designated parking area should be constructed at the existing public ramp.

RECOMMENDATIONS

Continue standardized fish population assessments, including evaluation of crappie and sunfish populations with the use of lead nets.

Aquatic Vegetation Control

Determine peak hydrilla coverage for 2012. If hydrilla coverage has expanded beyond 50% of shoreline length, an integrated control plan utilizing water fluctuation, biological control, and herbicides should be initiated. As of August 1, 2012, hydrilla is present along approximately half of the entire shoreline length and steadily expanding.

Water Fluctuation: Initiate discussions with the City of Monroe to determine the extent and timing that water fluctuation for management purposes could be compatible with municipal water supply. Implement water level management as allowed.

Grass Carp: Ten grass carp per acre of hydrilla should be stocked during the winter of 2012-2013. As of August 1, 2012, hydrilla coverage is near 75 acres, which would represent a total stocking of 750 grass carp. This stocking should be made in conjunction with a recommended stocking for Bayou DeSiard (see DeSiard MP-B). Grass carp should be stocked at the public ramp on the north end, and should be a minimum of 12 inches in total length to decrease loss through predation. Grass carp survival and vegetation consumption should be evaluated in spring, 2014.

Herbicide Applications: Treatments in the vicinity of the Lake Bartholomew – Bayou DeSiard control structure should continue as an effort to prevent the spread of hydrilla infestation into Bayou DeSiard. Diquat dibromide should be applied every 60 days until treatments are determined to be unnecessary. Similar applications should also be made at public boat launches. Herbicides that require extended exposure to vegetation at a designated concentration (Ex. Fluridone or penoxsulam) are not applicable for this situation. Continuous pumping of water for municipal water needs creates inadequate water retention time.

Type map surveys should be conducted annually for a period of five years to evaluate status of aquatic vegetation.