

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

LAKE CONCORDIA

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sport fish species other than bass, are managed to provide sustainable populations while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts. Bass anglers are afforded the opportunity to catch quality-sized largemouth bass through the introduction of Florida largemouth bass. Hybrid striped bass are stocked to provide an open water predatory species to utilize the abundant shad population and provide additional recreational fishing opportunities.

Commercial

Commercial species of fish are managed to provide a sustainable population.

Species of Special Concern

No threatened or endangered fish species are found in this lake. However, Lake Concordia is one of a few landlocked Mississippi oxbow lakes with a self-sustaining population of gulf pipefish.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations for all species

Commercial

Statewide regulations for all species (EXCEPT)

Special Gear Restriction

R.S. 56:22 (B) prohibits the use of gill nets, trammel nets, and fish seines.

Species of Special Concern

No threatened or endangered fish species are found in this water body.

SPECIES EVALUATION

Recreational

Largemouth Bass

Largemouth bass are targeted as 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 bass. Spring and fall electrofishing are used to determine population trends, age and growth, and genetic information. Gill net sampling is used to determine the status of large bass and other large fish species. The Department of Wildlife and Fisheries (LDWF) began a three year mortality study on largemouth bass (LMB) in Lake Concordia in 2010. Additionally, a creel survey of anglers will also be conducted within the same three year period. Results of the study should be available after 2012.

The objectives of the study will be to:

- Develop a statewide database that will include both population-level and human-dimension components of Louisiana (LA) LMB fisheries.
- Evaluate current and alternative harvest regulations of LA LMB populations.
 - Evaluate LA LMB angler behavior and perception of current harvest regulation.
 - Assess the effects of LMB harvest regulations on the fisheries.
- Use the results of this study to help redefine LA LMB management goals and update the LDWF Black Bass Management Plan (1989).

Largemouth bass Catch per unit effort and relative weight-

Spring and fall electrofishing data are used to develop information which serves as indicators of LMB relative abundance for various size classes from year to year. Total catch-per-unit-effort (CPUE) for LMB size groups greater than 8 inches total length (TL) is charted in Figure 1 and total combined CPUE for LMB is found in Figure 2 below. Fish populations fluctuate due to various factors. The LMB population in Concordia is no exception. Initial electrofishing sampling began in Concordia Lake in 1989 and continues through 2011. Electrofishing sampling indicated the LMB population increased from 1991 until it reached a peak in 1998. This LMB population increase may be the result of increased stocking efforts by the LDWF. Concordia Lake was designated a Trophy Lake in 1990 and received priority stocking from 1990 thru 2002. It was stocked annually with 100,000 LMB fingerlings.

From 1998 through 2000, the LMB population declined slightly; however, the overall population remained above the long-term average. Largemouth bass populations continued to decline from 2001 until 2008. The reason for this decline is unknown, but may be due to several factors. In 2001 the lake was removed from Trophy Lake designation and 2002 was the last year the lake received 100,000 fingerlings. Largemouth bass stocking was reduced to 10,000 fingerlings bi-annually. Also the presence of the

largemouth bass virus was discovered in the lake in 2001. The virus caused widespread LMB mortality. Due to the extended nature of the event, an accurate assessment of mortality was not determined. During this same time period, severe drought conditions are suspected to have reduced spawning success in areas lakes, including Lake Concordia. Since 2008, LDWF sampling indicates the LMB population has rebounded. In fact, 2011 sampling numbers show the LMB population has almost returned to the record numbers of 1998.

Fall electrofishing data is used to determine LMB relative weight (W_r) which is the ratio of a fish's weight to the weight of a standard fish of the same length. Largemouth bass W_r below 80 are indicative of a potential problem with forage availability. In Figure 3 below, W_r values are shown for LMB since 2005. The lowest W_r found in all size classes was 94. Relative weights for Lake Concordia LMB consistently indicate a population with abundant and available forage.

A 15"-19" protected slot limit was in effect for LMB on Lake Concordia from 1991-2001. Consideration to rescind the regulation was prompted in part by growing angler dissatisfaction. The size restriction was removed by LDWF Commission rule. Subsequent sampling data indicates an improved growth rate for Age 1 bass (Figure 4). LMB regulations for Lake Concordia are now consistent with statewide regulations.

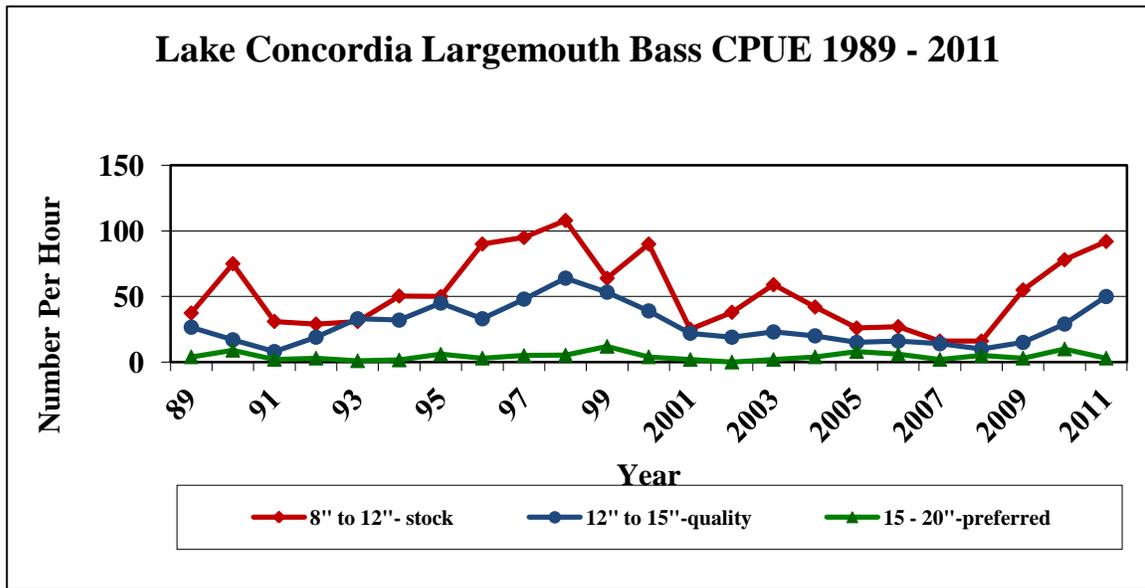


Figure 1. Largemouth bass CPUE for size groups greater than 8 inches in Lake Concordia, LA, from 1989 thru 2011.

Note: The 15 – 19 inch protected slot was in effect from 1991 – 2001.

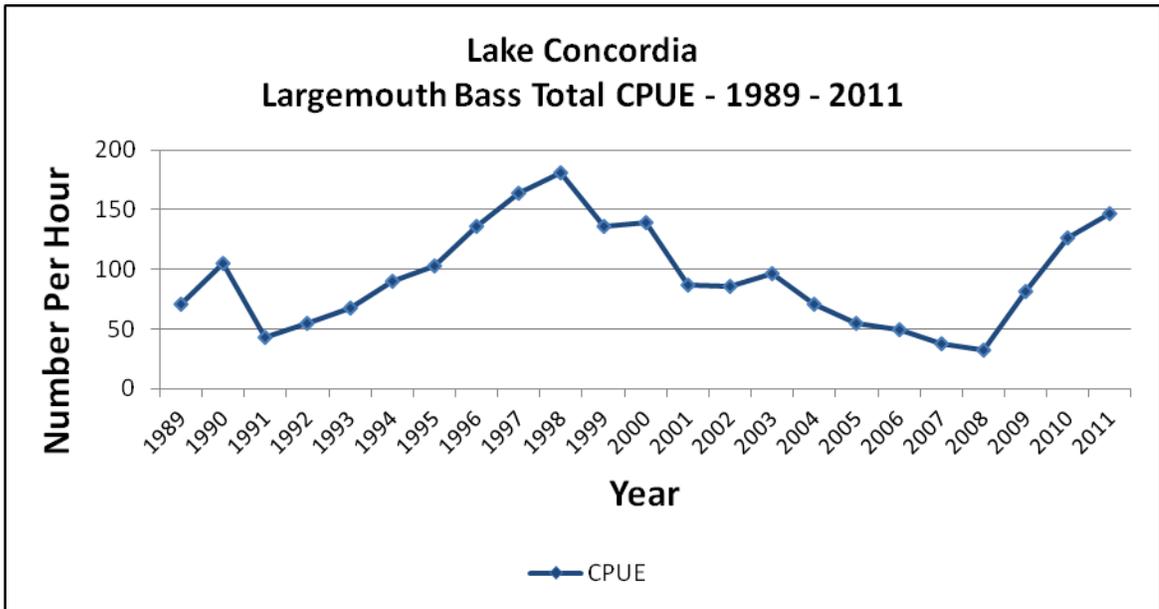


Figure 2. Total CPUE for largemouth bass from Lake Concordia, Louisiana for 1989 through 2011.

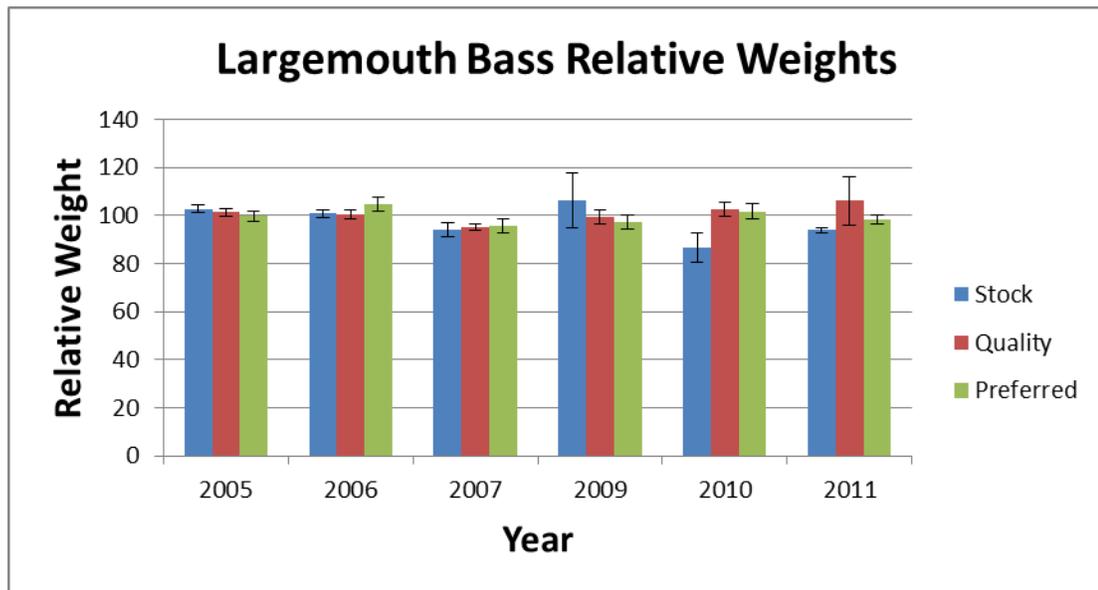


Figure 3. Mean relative weights (\pm SE) for stock-, quality-, and preferred-sized Largemouth bass in Lake Concordia, Louisiana from 2005 thru 2011.

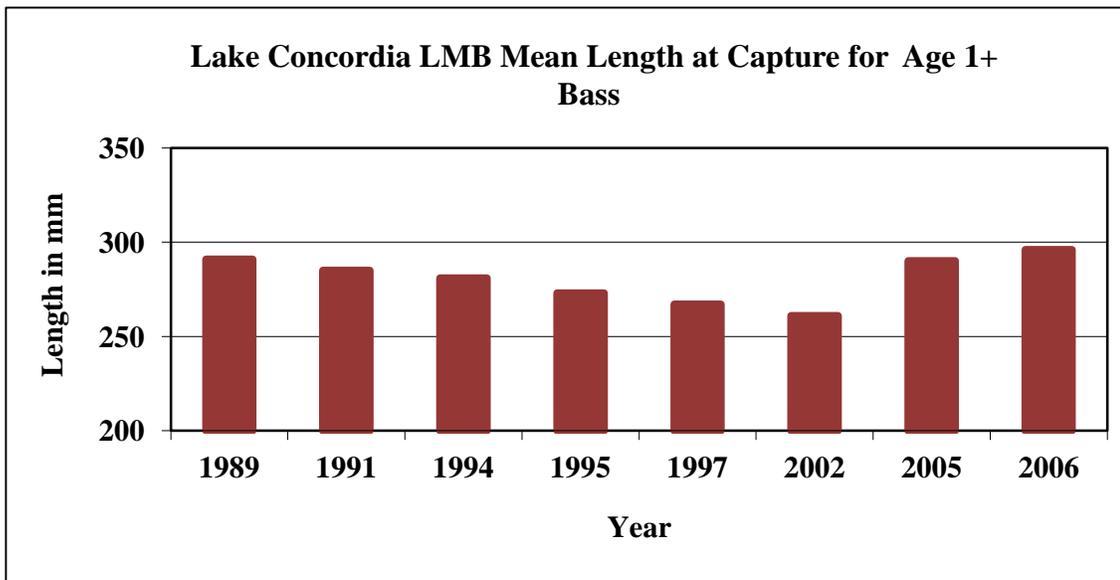


Figure 4. Mean length at capture for age 1+ largemouth bass from Lake Concordia, LA, from 1989 thru 2006.

Largemouth bass age and growth-

Age and growth analyses were conducted for LMB collected in 1997 and 2010 fall electrofishing samples. Growth rates of LMB in Lake Concordia were generally at, or above the state average (Figure 5). This growth rate is similar to other Mississippi River oxbow lakes that generally have higher growth rates than less fertile upland reservoirs.

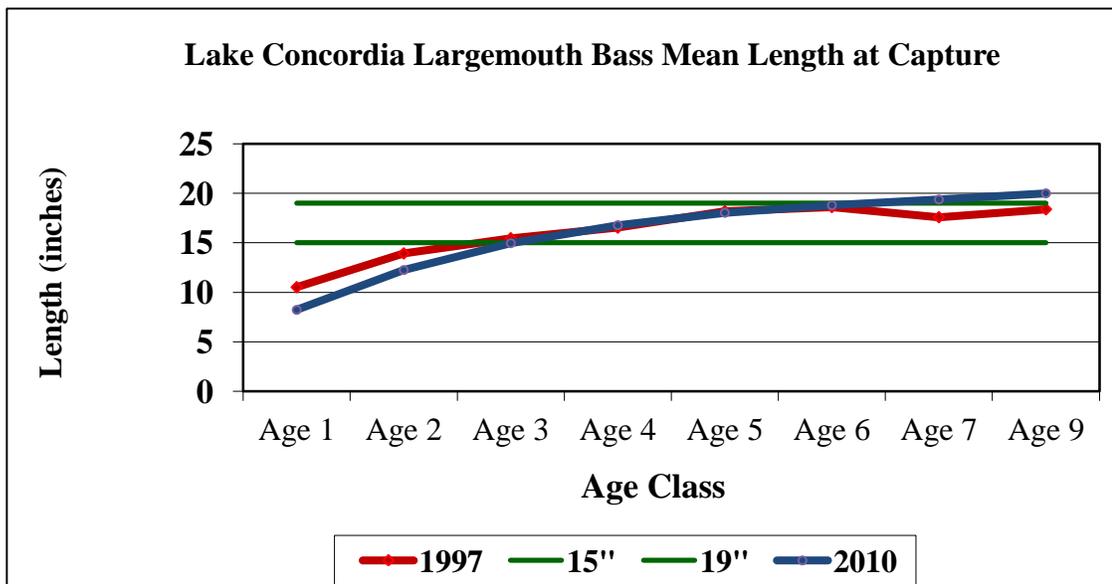


Figure 5. Mean length at capture for largemouth bass from Lake Concordia, Louisiana for 1997 and 2010. The 15 to 19 inch protected slot is displayed as horizontal lines.

Largemouth bass genetics-

Table 1 below shows the history and results of LMB genetic testing from 1994 to 2012. Lake Concordia has been stocked with Florida Largemouth Bass since 1989. Stocking rates have varied from 10 to 100 per acre. Florida genome influence peaked at 38% in 1999 and appears somewhat stable at around 27%, even though the 2011 sample spiked to 38%. Genetic testing remained at 31%. Future genetic sampling will determine if this is an anomaly.

Table 1. Largemouth bass genetic influence in Lake Concordia, LA, from 1994 thru 2011.

Year	% Northern	% Florida	% Hybrid	% Florida Influence
1994	87	4	9	13
1995	80	3	17	20
1997	65	5	30	35
1999	62	4	34	38
2002	71	3	26	29
2005	73	5	22	27
2006	72	5	23	28
2010	76	6	18	24
2011	62	10	28	38
2012	69	5	26	31

Crappie

Historically the crappie population in Lake Concordia has been low compared to many other lakes in LA. Lake Concordia habitat is not conducive to crappie production. The deep open water fluctuates very little and less than 5% of the lake has aquatic vegetation. Standing crop estimates from biomass (rotenone) samples show .79 lbs. /acre in 1992, .83 lbs. /acre in 1995, and .09 lbs. /acre in 1997. Gill netting and electrofishing results from 1997 through 2011 also indicate a low crappie population. Results of gill netting are reported in Figure 6 and electrofishing results are found in Figure 7.

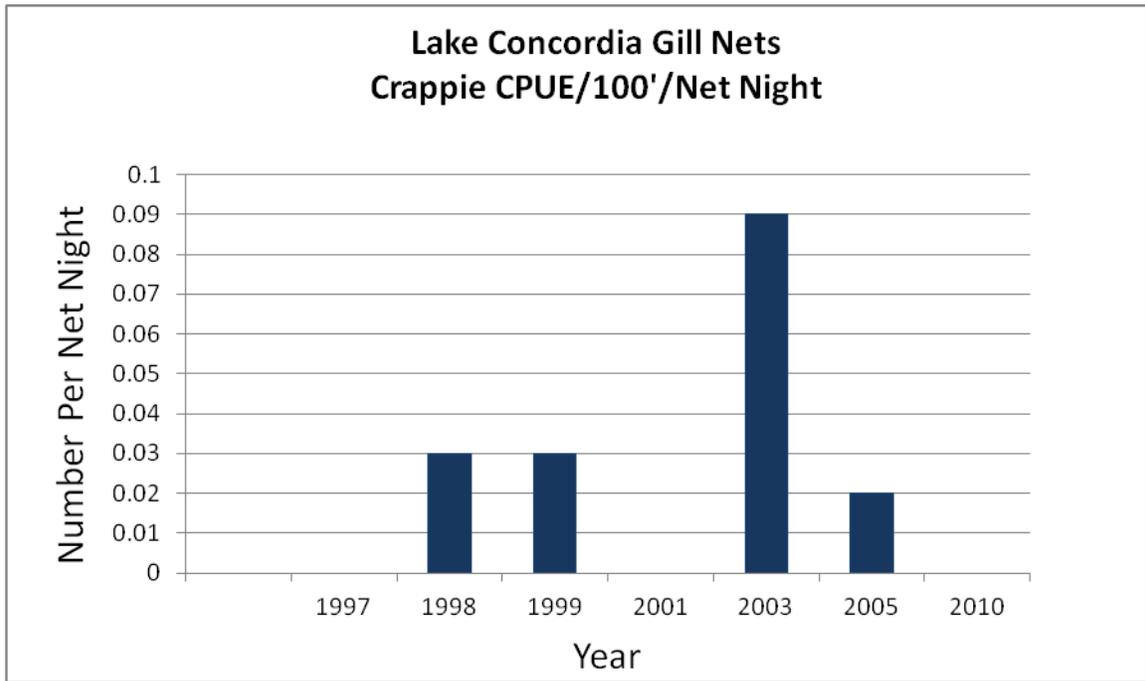


Figure 6. Crappie CPUE (number per net night) taken in gill nets from Lake Concordia, Louisiana from 1997 through 2010.

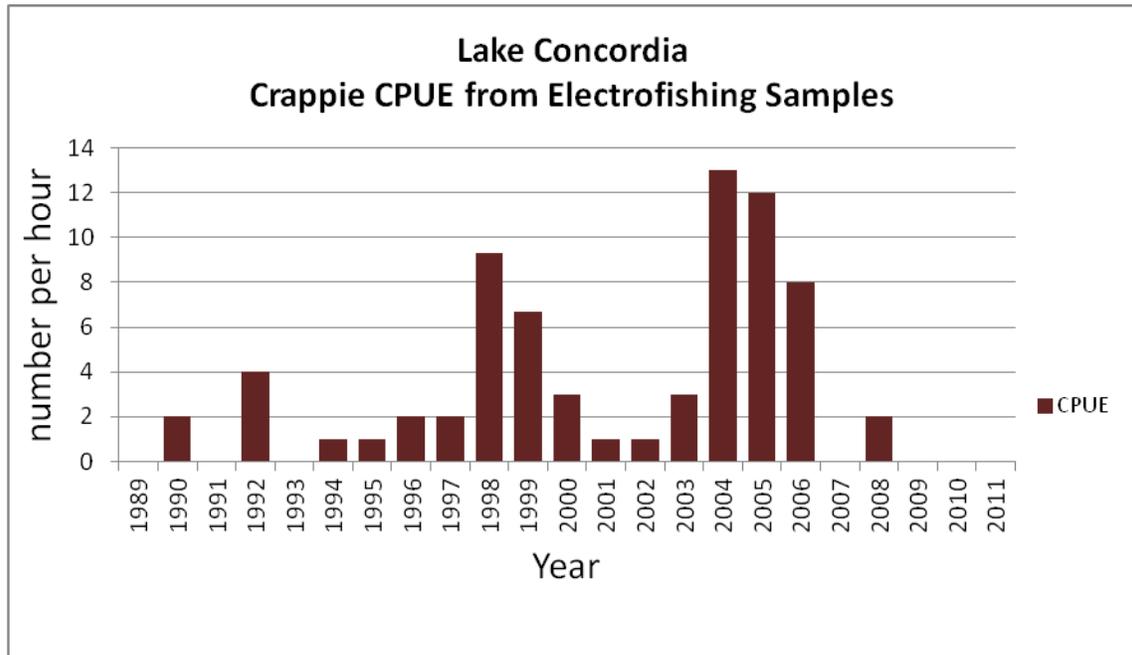


Figure 7. Total CPUE (number per hour) electrofishing trends for crappie from Lake Concordia, Louisiana from 1998 through 2011.

Forage

The most abundant forage fish species in Lake Concordia are gizzard and threadfin shad. Mississippi silversides and various minnows, shiners and darters occur in abundance. Sunfish species including bluegill and redear are also abundant. Biomass samples showed 387 lbs. /acre for 1992, 200lbs/acre for 1995, and 251 lbs. /acre for 1997 of available forage species (Figure 8).

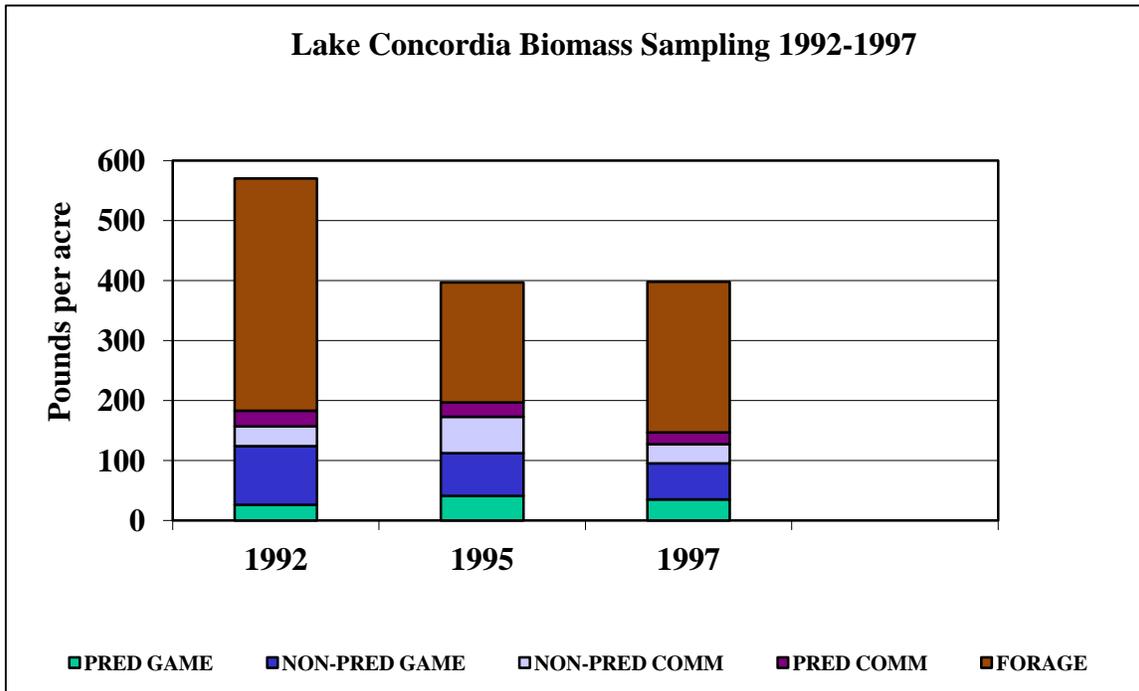


Figure 8. Biomass (standing crop) estimates of fish production in pounds per acre from Lake Concordia, Louisiana as determined from rotenone samples taken from 1992 - 1997.

Commercial Species

In September 1991, the Louisiana Wildlife and Fisheries Commission prohibited the use of gill nets, trammel nets and fish seines in Lake Concordia (Promulgated in acc. with R.S. 56:22(B)). The existing prohibition on commercial fishing gear followed the previous recreational strategy chosen for largemouth bass by providing the greatest opportunity of catching a trophy-sized fish.

A small number of commercial fishermen utilize the remaining legal commercial gear types,

Channel catfish, blue catfish, flathead catfish, freshwater drum, buffalo fish, common carp and garfish are all found in Lake Concordia. Figure 8 above shows standing crop estimates of fish species in pounds per acre from biomass (rotenone) samples taken in 1992, 1995, and 1997. Gill net and biomass sampling results for commercial species are found in Figures 9 and 10 below. A significant population of channel catfish is present. Commercial fishermen successfully harvest this species with hoop nets.

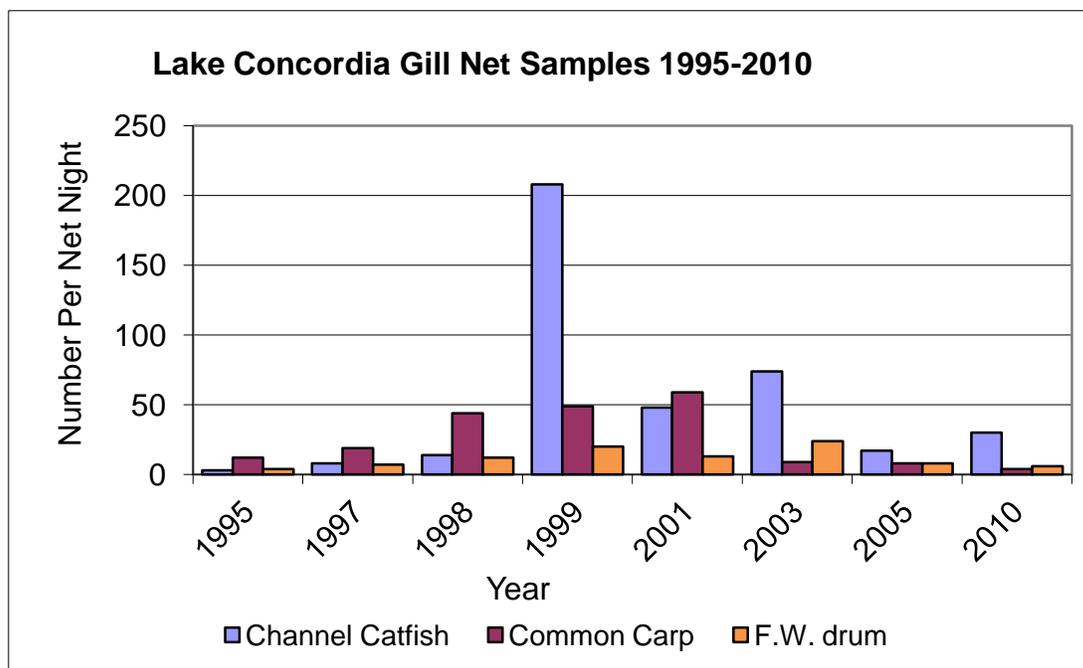


Figure 9. Catch per net night (number of fish) for channel catfish, common carp and freshwater drum collected in gill nets from Lake Concordia, LA from 1995 through 2010.

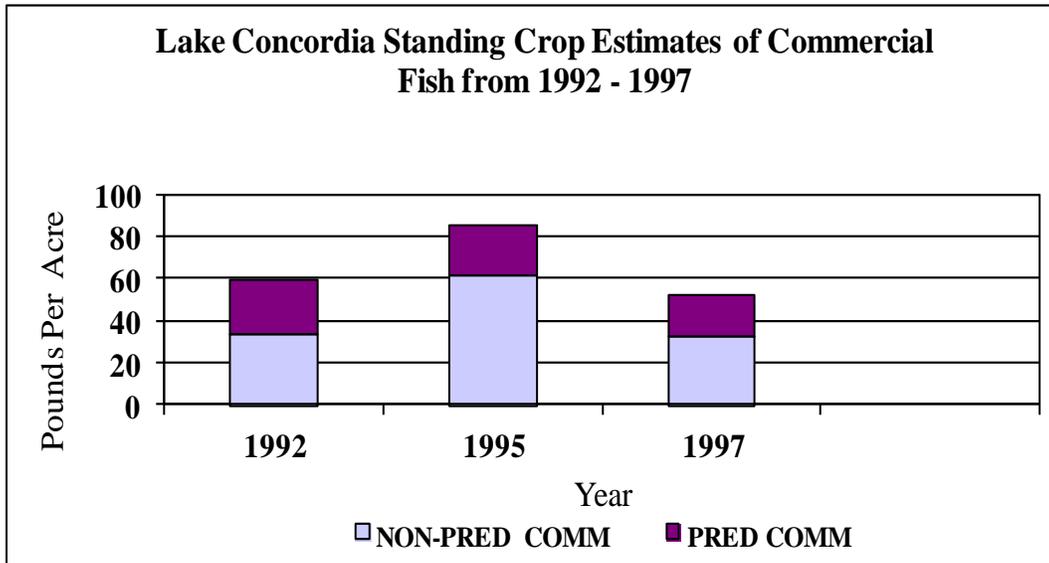


Figure 10. Standing crop estimates of fish production in pounds per acre of commercial species from Lake Concordia, Louisiana as determined from rotenone samples taken from 1992 - 1997.

HABITAT EVALUATION

Aquatic Vegetation

The Lake Concordia shoreline is lined with cut grass and cypress trees. At one time, both ends of the lake had an accumulation of southern naiad and coontail. Over the years, a decline of submerged vegetation has been observed. Currently less than 5% of the lake has submergent vegetation coverage. Agricultural siltation is a potential factor. During the mid to late summer, an increase in filamentous algae growth and extensive plankton blooms are typical.

Substrate

Accretion in inactive oxbow lakes is a natural process that normally occurs over very slowly. This process can be accelerated by land use practices that increase erosion and sedimentation. Conversion of bottomland hardwood forests to row crop cultivation has increased the rate and extent of soil erosion in the watershed of Lake Concordia. Though no measurements have been conducted, increased sediment contributions are suspected to be occurring at an accelerated rate. The turbidity and sedimentation associated with such contributions are potential problem.

Artificial Structure

A large portion of the Lake Concordia shoreline is developed with piers and boat houses that have replaced the natural shoreline cover of cypress trees and aquatic vegetation.

Like many oxbows, a large percentage of the surface area of the lake is open, with little complex cover. In order to provide additional cover in the open water sections of Lake Concordia, LDWF built 2 artificial reefs. The reefs are located on each side of an area of the lake known by locals as “the blue hole”. The individual reef structures are made of PVC pipe and plastic pallets and are pictured below in figure 11. Thirty of the structures pictured below are placed at each of the designated reef sites.

Reefs are marked with buoys at Latitude and Longitude:

Reef # 1: 31° 40' 7.8" N; -91° 30' 30.8" W

Reef # 2: 31° 40' 4.6" N; -91° 30' 35.2" W



Figure 11. Photograph of artificial reef structures built and placed in Concordia Lake by LDWF in 2003.

CONDITION IMBALANCE / PROBLEM

Long periods of stable water conditions, increased siltation from row crops around the lake, and reduction of aquatic vegetation in the lake may be hindering the reproductive success of game species. Increased human developments, primarily residential development along the shoreline, has also increased nutrient loading in the lake, which increases algal blooms. In the future this may lead to an increase in fish kills occurring in the summer months.

Lake users disagree in the proper level to maintain the pool stage of the lake. Some users have suggested that the current pool stage be elevated to increase the amount of shallow water in the lake for fish reproduction. Shoreline property owners have expressed concern that the action would increase shoreline erosion and damage piers and boathouses. The LDWF is currently working with the Concordia Parish Police Jury and concerned user groups on the issue.

CORRECTIVE ACTION NEEDED

Periodic drawdowns mimicking natural (seasonal) fluctuations would likely help reduce some of the sediment accretion occurring in the lake. However, the small watershed make refill in acceptable time questionable.

RECOMMENDATIONS

1. Analyze the results of the three year largemouth bass stock assessment. Determine effects of current regulations.
2. Conduct largemouth bass biological sampling on a 3 year rotation.
3. Work with the Concordia Parish Police Jury to establish an acceptable conservation pool level.
4. Continue annual stocking of hybrid striped bass to utilize available forage and provide additional sport fishing opportunities.
5. Continue spraying shoreline vegetation as complaints are received from home owners.
6. Attend Concordia Parish Police Jury meetings as requested and at least once per year to report LDWF activities and a Lake Concordia status update.