

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

RODEMACHER LAKE

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sport fish species in Lake Rodemacher are managed to provide sustainable populations while providing anglers the opportunity to catch or harvest adequate numbers of fish to maintain angler interest and efforts. .

Commercial

Commercial fishing is minimal in Rodemacher Lake. The fisheries habitat does not support high numbers of commercial species. A commercial fisheries management strategy is not used, however in recent years a small amount of commercial hoop netting has occurred. This is in response to the proliferation of the channel catfish population due to habitat impairment.

Species of Special Concern

No threatened or endangered fish species are known to inhabit this waterbody.

EXISTING HARVEST REGULATIONS

Recreational

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

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

Rodemacher Lake was designated as a quality lake in 1991 and a 14"- 17" protected slot limit was in effect on black bass from 1991-2014. The slot limit was removed in April of 2014 after a biological evaluation determined the length regulations have not been effective. The removal of the slot limit regulation will increase the opportunities for angler harvest.

Commercial

The commercial fishing regulations may be viewed at the link below:

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

SPECIES EVALUATION

Recreational

Largemouth bass (LMB) populations are targeted for assessment because they are a species indicative of the overall health of the fish population due to their high position in the food chain. Electrofishing is the most efficient sampling method for collecting largemouth bass to evaluate abundance and size distribution, with the exception of large bass. Gill net sampling is generally the preferred method to determine the status of large bass and other large fish species.

Largemouth Bass

Relative abundance, length distribution and size structure indices-

Spring and fall electrofishing sampling has been used to collect largemouth bass population data in Rodemacher Lake since 1992. The compiled results of this sampling may serve as an indicator of LMB relative abundance over time. Springtime electrofishing results are used as an indicator of largemouth bass relative abundance. Total catch-per-unit-effort (CPUE) since 1992 is shown in Figure 1 and total mean CPUE for stock, quality and preferred size classes of LMB is found in Figure 2. Sampling was conducted in the spring and fall on a bi-annual basis from 1992 through 2013 unless habitat conditions prevented sampling. Fish populations fluctuate due to various factors and the LMB population in Rodemacher Lake is no exception. The LMB population increase observed in 2004 and 2006 is thought to be the result of improved spawning conditions. Drought conditions occurred in 2001 and 2002 and dried out shallow water areas; this reduced organic matter and solidified the substrate resulting in improved spawning success. Results presented in Figure 2 indicate trends in CPUE for all largemouth bass size groups are varied. From 1992 until 2008 the CPUE values indicated the Rodemacher Lake LMB population was sustainable and comparable to other upland reservoirs in central Louisiana. However, beginning in 2004 Rodemacher Lake began experiencing increased turbidity levels and by 2009 LMB populations had declined significantly due to habitat impairment. The CPUE results for 2013 indicated that the turbidity issues may be improving slightly as the LMB CPUE had increased since 2009 (Figures 1 and 2).

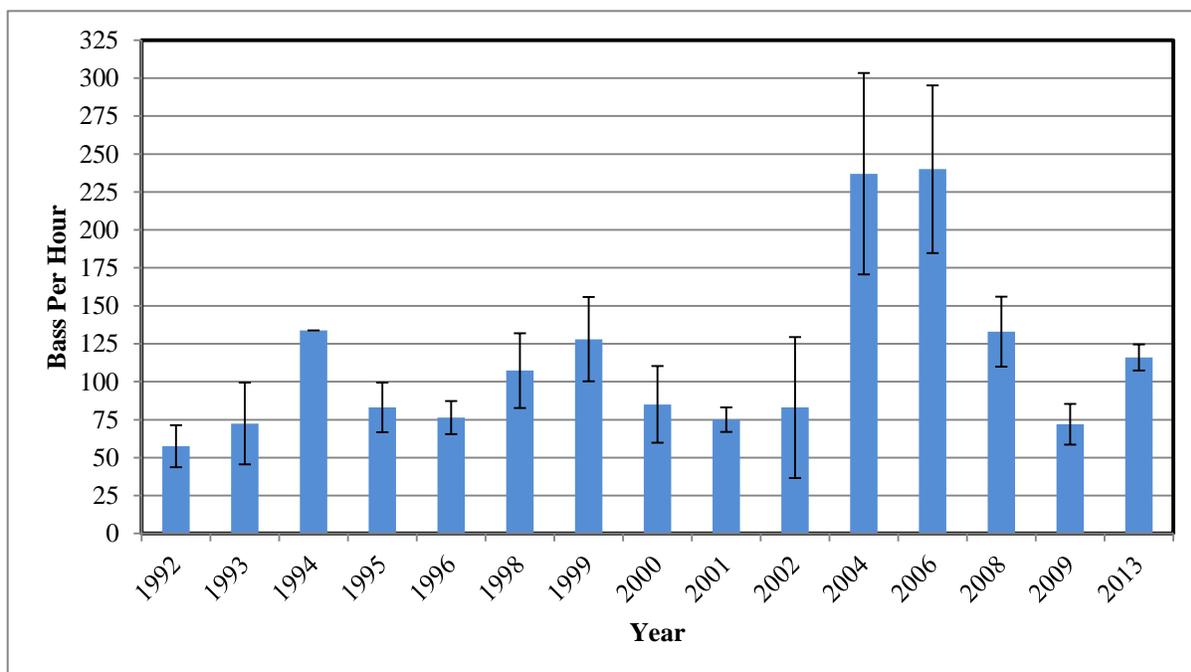


Figure 1. The total CPUE (\pm SE) for largemouth bass on Rodemacher Lake, Louisiana, from spring electrofishing results 1992 – 2013. Error bars represent standard error of total CPUE.

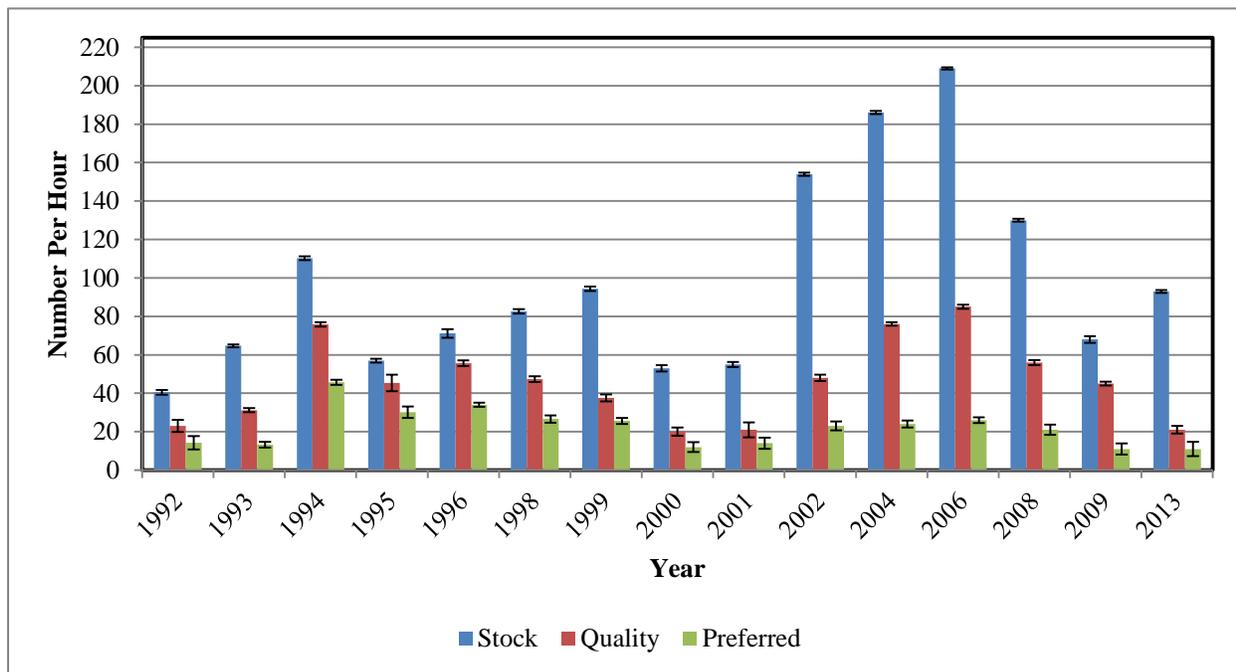


Figure 2. The mean CPUE (\pm SE) for stock-, quality-, and preferred-size classes of largemouth bass on Rodemacher Lake, Louisiana for spring season from 1992 – 2013.

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 inches total length (TL) for largemouth bass] to the number of bass of stock-size (>8 inches TL). PSD is expressed as a percent. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish.

For example, Figure 3, indicates a PSD of 23 for 2013. This value indicates that 23% of the stock-size bass (fish > 8 inches) in the sample was at least 12 inches or longer. Generally PSD's between 40 and 60 are considered good for central Louisiana lakes.

$$\text{PSD} = \frac{\text{Number of bass } >12 \text{ inches}}{\text{Number of bass } >8 \text{ inches}} \times 100$$

Relative stock density (RSD) is the proportion of largemouth bass in a stock (fish > 8 inches) that are 15 inches or longer.

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

Historical trends in largemouth bass structural indices indicate PSD and RSD values in Rodemacher Lake are generally within the normal range for upland reservoirs with relatively infertile water and stable habitat. However the PSD of 23 found in 2013 is significantly lower than previous years and is likely a result of the elevated turbidity levels the lake has been experiencing since 2004.

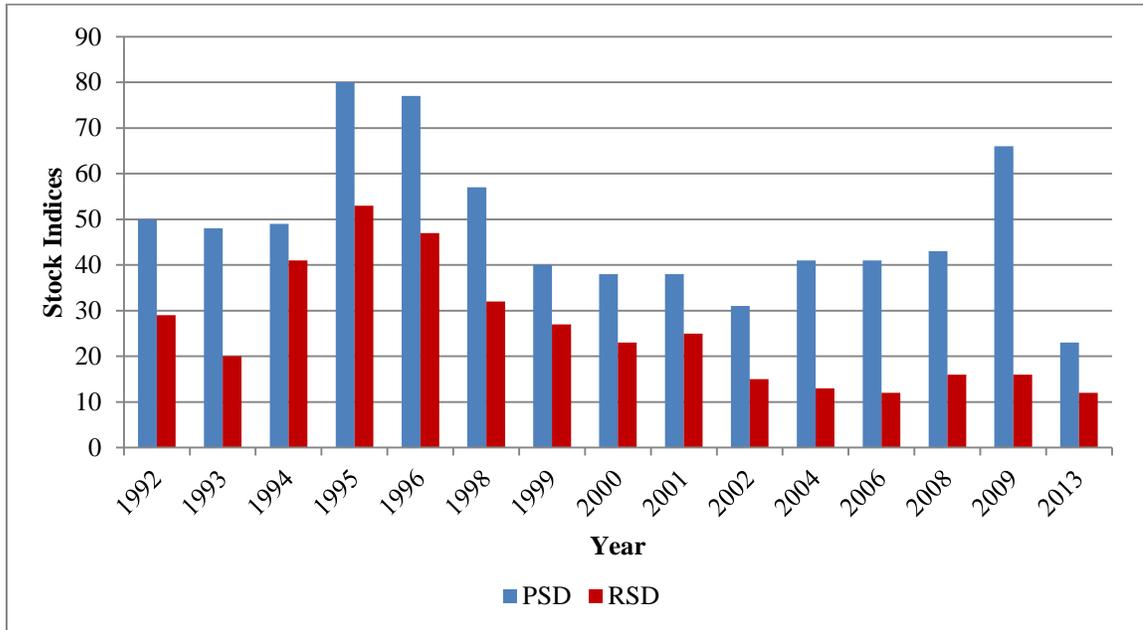


Figure 3. The size structure indices (PSD and RSD-p) for largemouth bass collected from Rodemacher Lake, Louisiana for spring electrofishing samples from 1992 – 2013.

The most recent size distribution (TL) results for LMB collected during spring and fall electrofishing in 2013 is presented in Figure 4. Bass ranged from 4 to 19 inches TL with the most abundant groups ranging from 8 to 11 inches TL. The size distribution of Rodemacher Lake LMB is similar to other central Louisiana lakes even though the overall CPUE is lower than previous years.

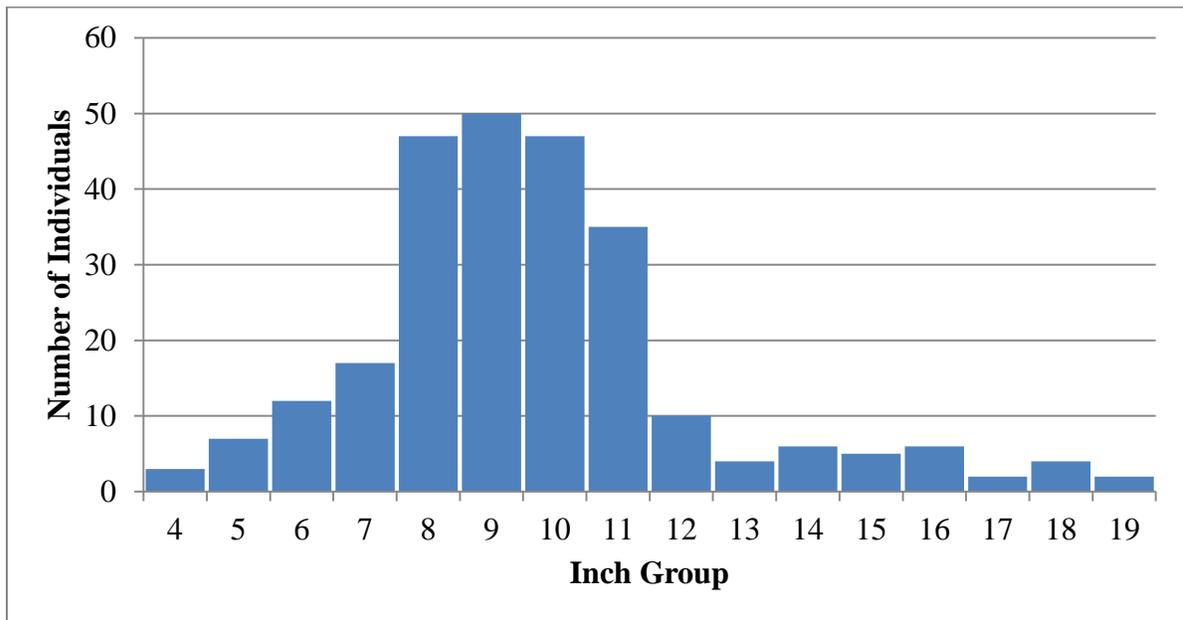


Figure 4. The size distribution (inch groups) for largemouth bass in Rodemacher Lake, Louisiana from electrofishing results for spring and fall of 2013. N = 257.

Largemouth bass age and growth

Age and growth data were collected in 1998, and 2006-2009. The results of these samples are shown in Figure 5. Growth rates for age-1+ and age-2+ year old bass were below the state average but growth rates reached the state average by age-3+.

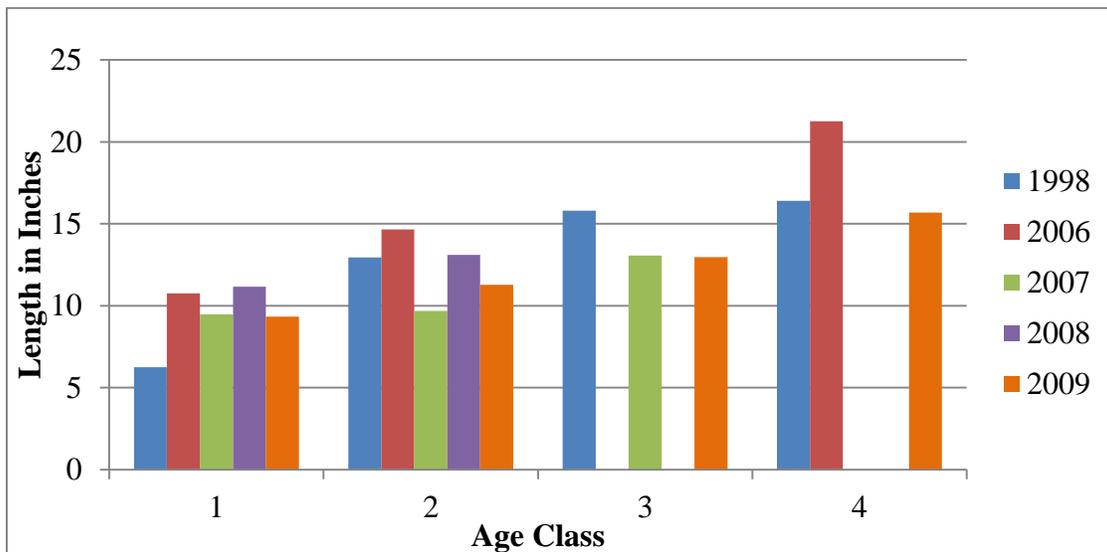


Figure 5. Average length at age of capture for largemouth bass in Rodemacher Lake, Louisiana 1998 (n =31), 2006 (n=52), 2007 (n=102), 2008 (n=61), and 2009 (n=31).

Largemouth bass genetics

Florida largemouth bass (FLMB) stockings have been successful in Rodemacher Lake. Stockings were initiated in 1993 and continued until 2006. Stocking rates have varied from 10 to 100 per acre. Genetic analysis was conducted on the LMB population in 1998, 2006, 2008 and 2009. See Table 1 for the genetic testing results.

Table 1. Genetic analysis for the LMB population on Rodemacher Lake, Louisiana, 1998, 2006, 2008 and 2009.

Year	% Northern	% Florida	% Hybrids	Total FLMB Influence %
1998	70 (n=26)	6 (n=2)	24 (n=9)	30
2006	40 (n=27)	15 (n=10)	45 (n=30)	60
2008	46 (n=30)	15 (n=10)	39 (n=26)	54
2009	43 (n=15)	14 (n=5)	43 (n=15)	57

Forage

Primary forage for largemouth bass in Rodemacher Lake is shad and sunfish. Forage availability is measured by shoreline seine sampling (Figure 6) and by fall electrofishing sampling (Figure 7).

Forage availability is also measured indirectly through measurement of largemouth bass body condition or relative weight. Relative weight (Wr) is the ratio of a fish's weight to the weight of a "standard" fish of the same length. The 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 Wr below 80 may indicate a potential problem with forage availability. The Wr 's of LMB collected from Rodemacher Lake have been relatively stable for all size classes since 1990. Relative weight results (Figure 8) indicate that the Rodemacher Lake LMB population is within an acceptable range for all size classes.

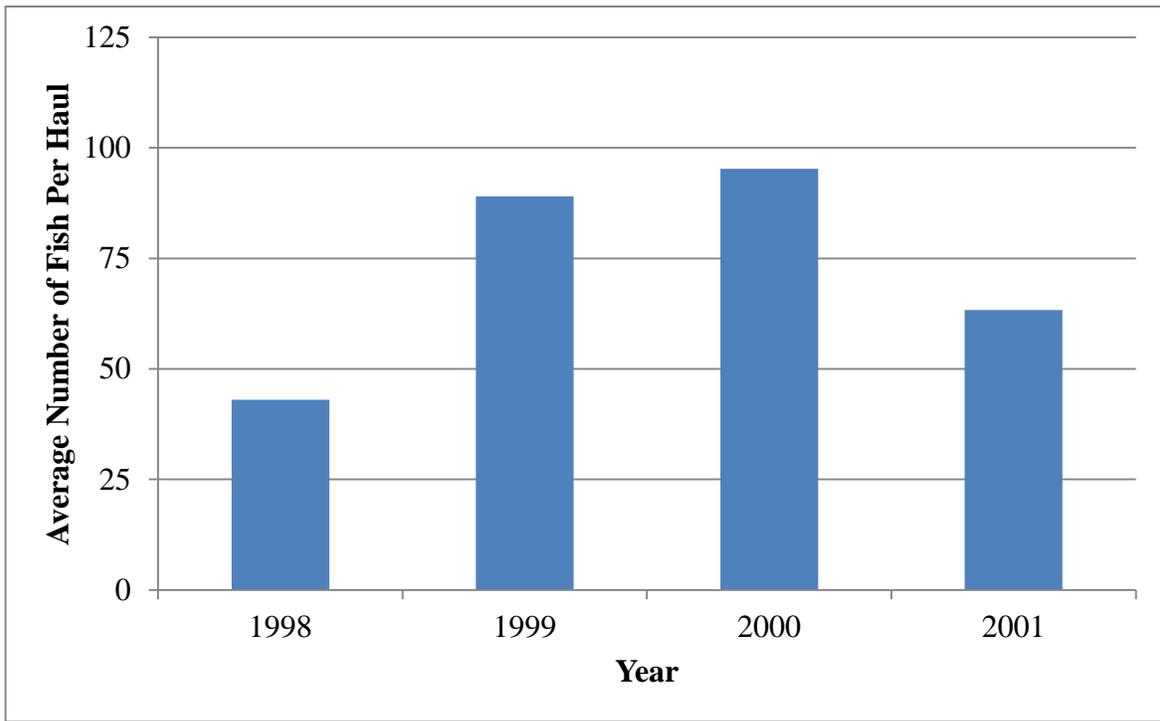


Figure 6. The CPUE (average number per seine haul) of fish < 5 inches TL from shoreline seining for Rodemacher Lake, LA, for 1998, 1999, 2000, and 2001.

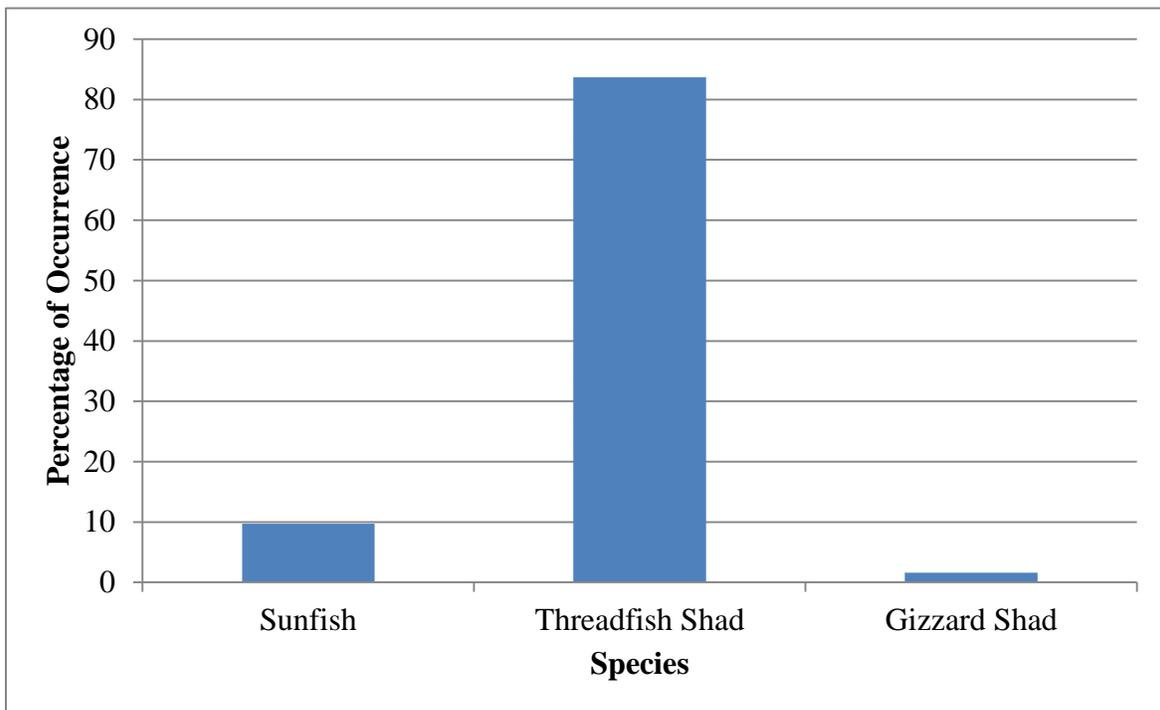


Figure 7. Percent frequency of occurrence by number for forage species (< 5 inches TL) found in Rodemacher Lake, Louisiana from electrofishing results for 2013.



Figure 8. Relative weights for stock-, quality-, and preferred-size classes of largemouth bass collected during fall electrofishing for Rodemacher Lake, Louisiana from 1990 – 2013.

Crappie

Significant changes to the crappie population have occurred in Rodemacher Lake over time. Lead net sampling initiated in 2003 revealed the crappie population consisted predominantly of black crappie. After the habitat began declining in 2004, the population has shifted to the more turbidity tolerant white crappie. Crappie populations were sampled in 2003, 2004, and 2007 (Figure 9). The results indicated a crappie population similar to other infertile central Louisiana lakes.

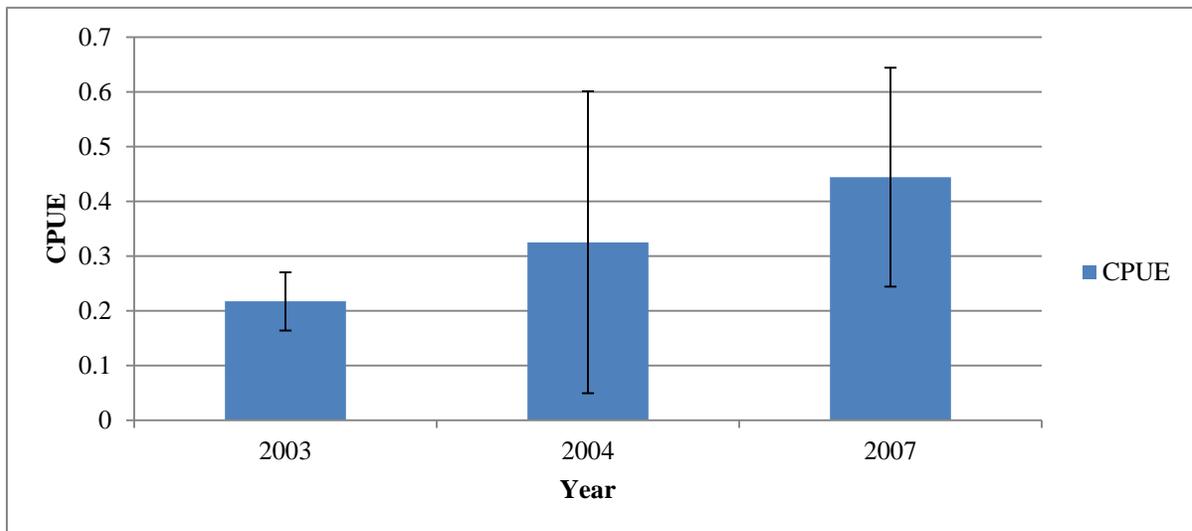


Figure 9. Lead net CPUE for crappie in Rodemacher Lake, Louisiana from 2003 through 2007.

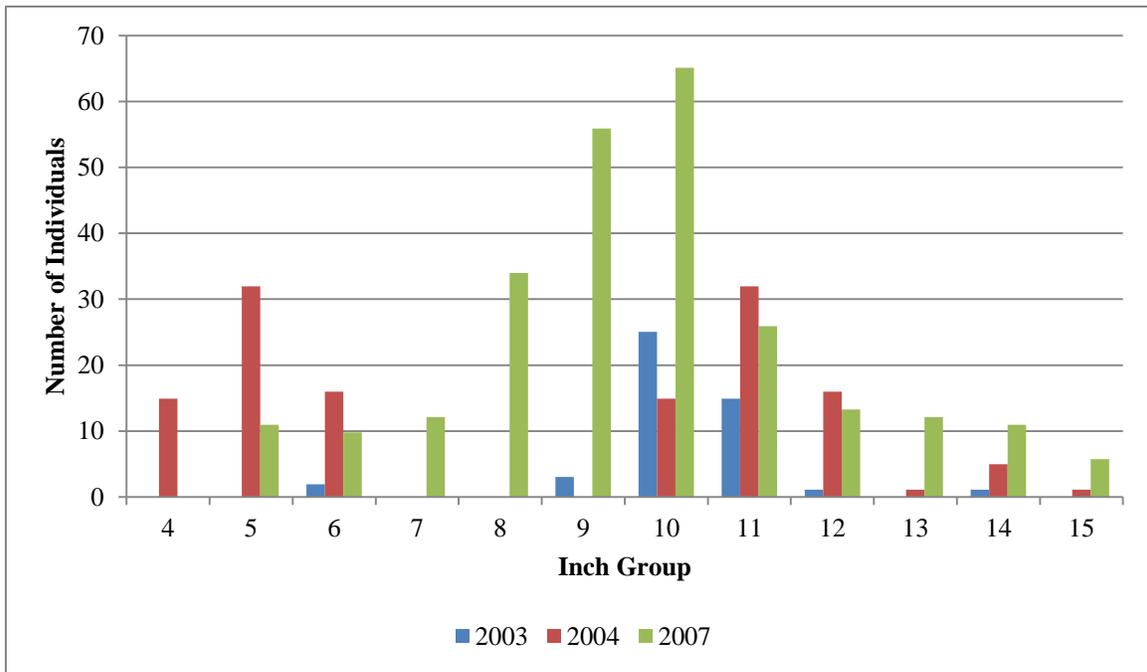


Figure 10. Crappie size distributions (inch groups TL) from lead net sampling results in Rodemacher Lake, Louisiana for 2003, 2004 and 2007.

Table 2. Crappie age and growth results from Rodemacher Lake, Louisiana for 2007.

Age Group	Mean TL in Inches
0 (n=7)	8
1 (n=46)	9
2 (n=54)	10
3 (n=2)	13

Commercial

Large rough fish species that normally comprise a commercial fishery are not found in sufficient numbers to support a viable commercial fishery in Rodemacher Lake. Gill net sampling was conducted between 1993 and 2008. Channel catfish were the only commercial species collected in significant numbers. Channel catfish abundance was indicated to be low. Gill nets results are found in Figure 11 and 12.

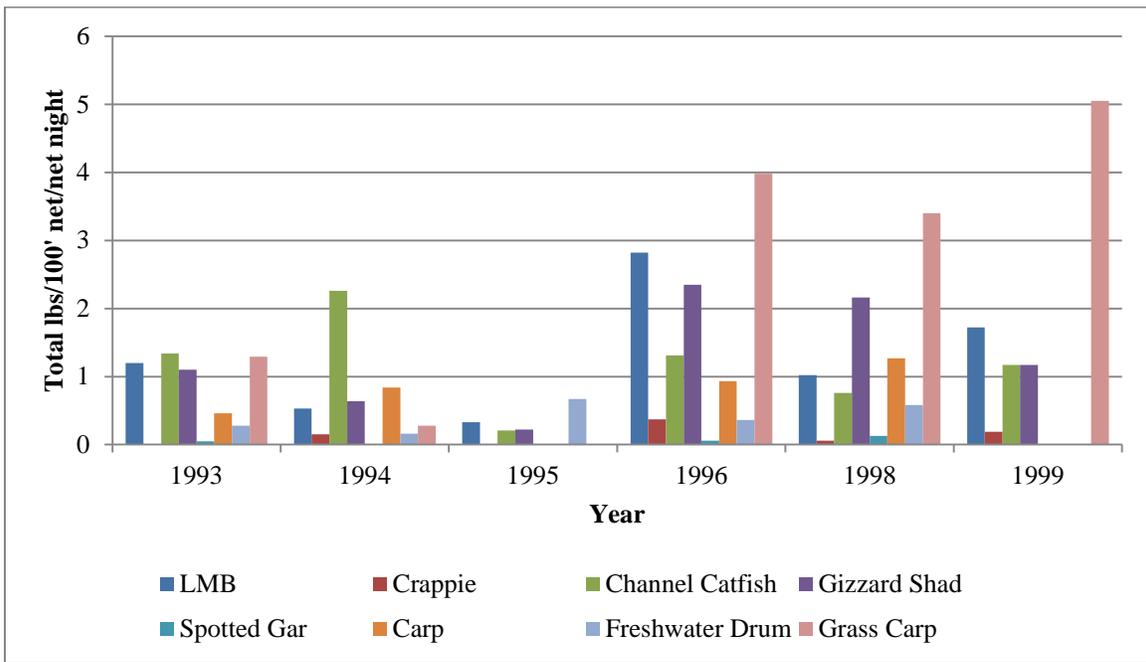


Figure 11. Total CPUE (in pounds per net night) by species by year for Rodemacher Lake, Louisiana, collected with standardized gill nets from 1993-1999.

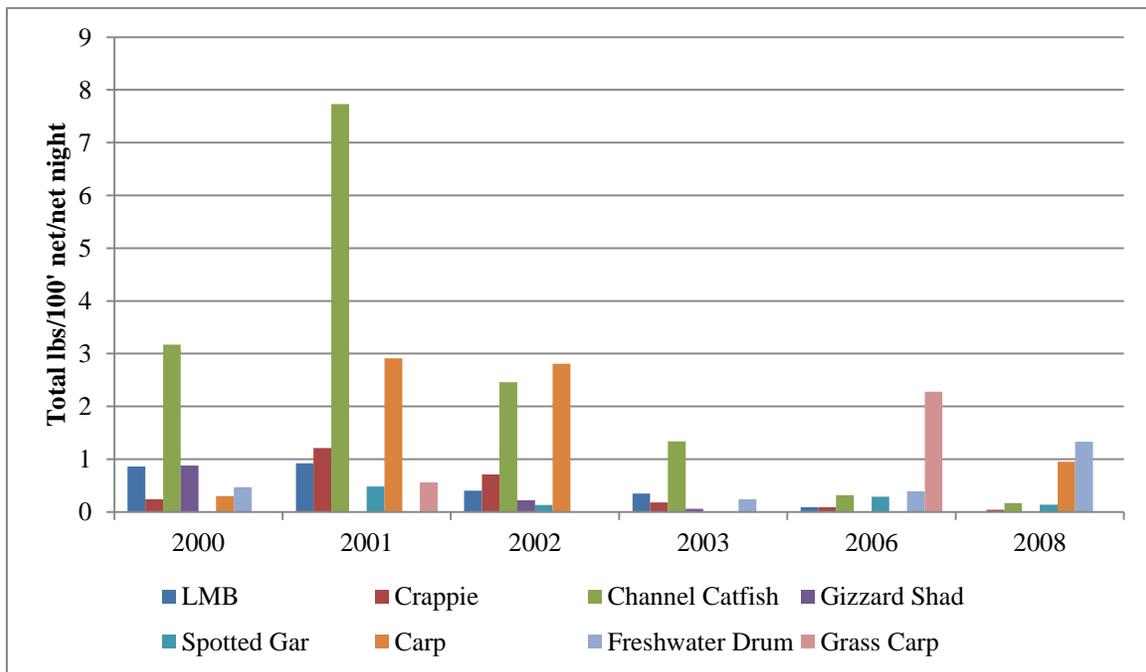


Figure 12. Total CPUE (in pounds per net night) by species by year for Rodemacher Lake, Louisiana, collected with standardized gill nets from 2000-2008.

Creel Survey

Angler creel surveys were conducted on Rodemacher Lake in 1993 and 1999 to gather data on recreational fishing efforts and harvest. Results are found in Figure 13.

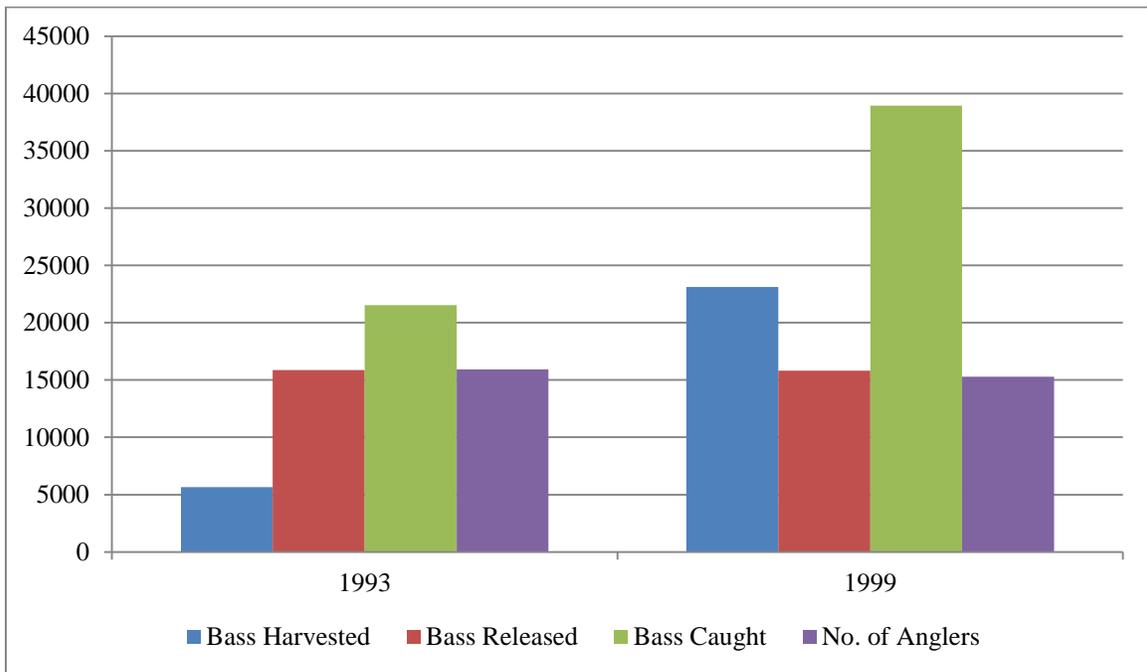


Figure 13. The largemouth bass harvest and angler usage determined from recreational creel surveys on Rodemacher Lake, Louisiana in 1993 and 1999.

HABITAT EVALUATION

Aquatic Vegetation

Since 1997, there have been no significant aquatic vegetation problems in Rodemacher Lake. A vegetation survey was conducted on April 2, 2013. Approximately 90 acres of water hyacinth were documented. The hyacinths were treated with 2,4-D at a rate of 0.5 gal/acre as per the standard operating procedures for the application of herbicides as adopted by the LDWF Inland Fisheries Section.

An additional vegetation survey was conducted on July, 30, 2013. There was no submerged vegetation in the lake. Emergent vegetation observed included alligator weed (*Alternanthera philoxeroides*), American lotus (*Nelumbo lutea*), primrose (*Ludwigia spp.*), and a small remnant population of water hyacinth (*Eichhornia crassipes*). The combined acreage of these species was less than 50 acres. Approximately 40 acres of white water lily (*Nymphaea odorata*) were found in shallow coves on the east side of the lake. This vegetation provides beneficial cover for fish and protection from shoreline erosion.

No vegetation problems are expected in 2016. Vegetation species or acreage has not changed in several years and is expected to be similar to those listed above in 2013.

Substrate

Rodemacher Lake has experienced increased turbidity since 2004. Several factors have likely combined to cause and exacerbate the turbidity problem. These include the lack of

submerged vegetation, land use practices in the watershed, and continuous water circulation by the power company.

There is no row crop agriculture in the watershed. Historically the lake bottom substrate provided adequate nesting habitat, however the recent addition of the silt and clay particles introduced into the lake may be detrimental to spawning.

Artificial Structure

LDWF, in conjunction with CLECO Corporation, placed four artificial reef structures in Rodemacher Lake. The reefs are marked with buoys at Latitude and Longitude as follows:

- Reef 1 – Lat: 31.388611 N; Long: -92.713611 W
- Reef 2 – Lat: 31.382639 N; Long: -92.720917 W
- Reef 3 – Lat: 31.391528 N; Long: -92.724639 W
- Reef 4 – Lat: 31.393750 N; Long: -92.721556 W

CONDITION IMBALANCE / PROBLEM

Currently Rodemacher Lake is experiencing high turbidity levels. The increased turbidity levels were first documented in 2004. Louisiana Department of Wildlife and Fisheries (LDWF) sampling have documented a significant decrease in sport fish populations including largemouth bass. Several factors are involved that may be contributing to the high turbidity.

- The majority of the timber in the watershed has been clear cut and site preparation for replanting has included a deep bedding process that exposes clay particles to run-off.
- The CLECO Boyce power plant circulates the water through the plant to cool boilers; this creates a mixing effect of the lake water.
- There is no submersed vegetation in the lake to act as a filter to remove clay particles from the lake water.

CORRECTIVE ACTION NEEDED

The majority of the 21,000 acres surrounding the Rodemacher Lake watershed has been cutover. The area has been site prepped and re-planted with pine trees. The area has re-grown with significant ground cover; and the addition of clay particles entering the lake has decreased. CLECO Corporation environmental personnel monitor the lake turbidity levels closely and feel the turbidity issue may be improving.

RECOMMENDATIONS

1. Continue existing harvest regulations until LDWF sampling results indicate that a change is appropriate and necessary from a biological perspective or until such time as a change in management strategy is indicated by the collective opinion of Rodemacher Lake anglers.
2. Continue LDWF standardized fisheries sampling every four years.
3. LDWF personnel will continue to work with CLECO Corporation to spray emergent vegetation as per the Aquatic Herbicide Application Procedures for the application of herbicides as adopted by the LDWF Inland Fisheries Section.
4. Continue monitoring turbidity levels for change.