

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

SALINE LAKE

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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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 adequate numbers of fish to maintain angler interest and efforts.

Commercial

The physical characteristics Saline Lake do not support adequate numbers of rough fish species to support a commercial fishery; therefore, a commercial fishery strategy is not used for this waterbody.

Species of Special Concern

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

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations in effect for all fish species. Recreational fishing regulations for 2013 may be viewed at the link: <http://www.wlf.louisiana.gov/fishing/regulations>

Commercial

Statewide regulations in effect on all species. Commercial fishing regulations for 2013 may be viewed at the link: <http://www.wlf.louisiana.gov/fishing/regulations>

SPECIES EVALUATION

Recreational species

Largemouth Bass –

Largemouth bass relative abundance, relative weight and structural indices-

Largemouth bass are utilized as an indicator species for the overall fish population due to their high position in the food chain. Electrofishing generally provides good insight into the abundance and size distribution of largemouth bass. Electrofishing does not however effectively sample large bass. Gill net sampling is used to determine the status of large bass and other large fish species.

Catch per unit effort (CPUE) is the term used to describe the number of fish collected during a given time period of sampling. For electrofishing samples the standard CPUE time period is one hour and the unit of fish is number of fish captured. So, CPUE is an index of relative abundance for electrofishing results and is usually displayed as the number of fish captured

per hour of sampling effort.

In the chart below, springtime electrofishing data is used as an indicator of largemouth bass abundance with total catch per unit effort indicated since 2003. Sampling is conducted in the spring and fall on a bi-annual basis. Trends in catch per unit of sampling effort for most largemouth bass size groups are negative. The exceptions are memorable fish (20"- 25") and Trophy fish (over 25"). These two groups have remained constant at zero. Spring electrofishing CPUE data for Saline Lake over the last five sampling periods are given in Figure 1.

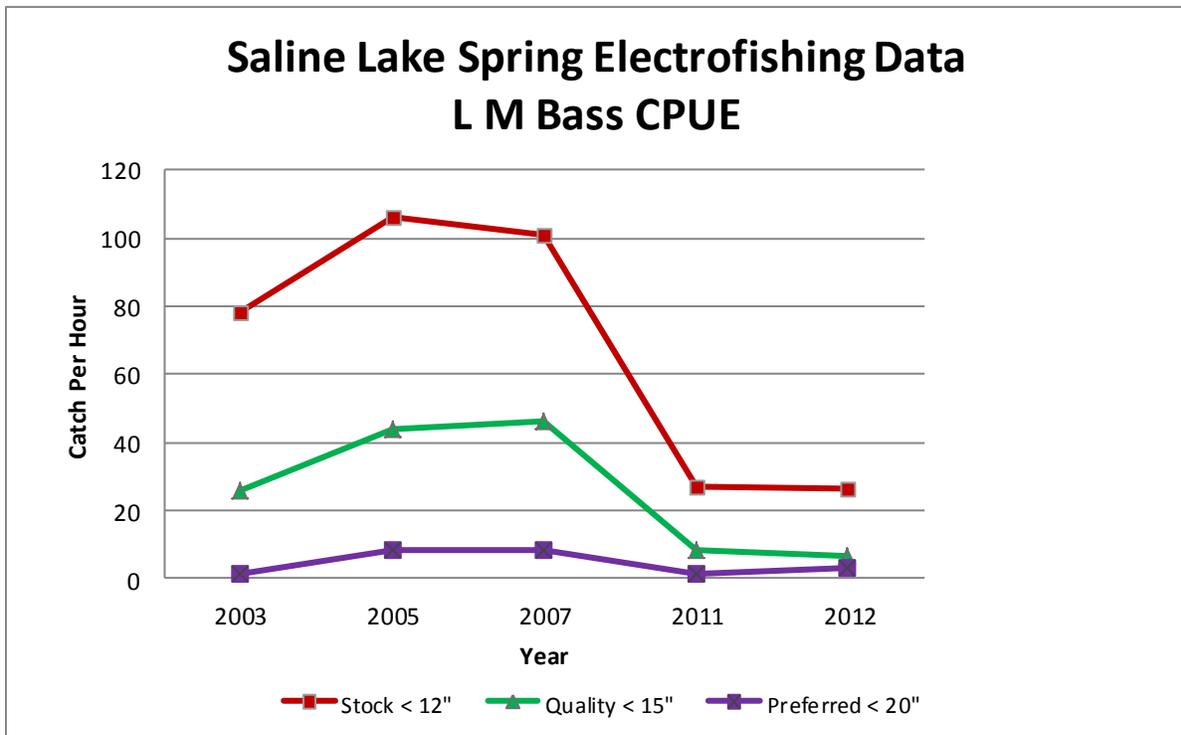


Figure 1. The CPUE (bass per hour) for largemouth bass in spring electrofishing results taken at Saline Lake, LA in years 2003 - 2012.

The downward trends depicted in Figure 1 indicates a decrease in the abundance of largemouth bass over 12 inches in length.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length distribution (frequency) data. These indices can provide not only an understanding of the size structure of the bass population for biologists but can also help anglers form expectations as to what type of angling experience they may expect from a given waterbody. Discussion of these indices for Saline Lake appears in the following paragraphs while the indices are graphically depicted in Figure 2.

Proportional stock density compares the number of fish of quality size (greater than 12 inches for largemouth bass) to the number of bass of stock size (8 inches in length). The formula for largemouth bass PSD is given as:

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

Stock size fish are the fish in a population that would be considered to be of “catchable” size. The 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, the chart below indicates a PSD of 25 for largemouth bass at Saline Lake in year 2012. The number indicates that 25% of the bass stock (fish over 8 inches) in the sample was at least 12 inches or longer.

For more detailed discussion of the proportion of sizes greater than 12 inches, we may look at relative stock density (RSD). RSD may be used to discuss the proportions of the “catchable” fish population that belong to any length group of interest. Typically, RSD values are used to discuss three size groups of largemouth bass. Those groups are Preferred (≥ 15 ”), Memorable (≥ 20 ”) and Trophy (≥ 25 ”). In the case of Saline Lake, the largemouth bass RSD values for Preferred, Memorable and Trophy sizes during year 2012 were 13, 0 and 0, respectively. These values show that of the fish sampled, 13% of the “catchable” size largemouth bass were over 15 inches but less than 20 inches in length while no fish were recorded that were longer than 20 inches. Consequently, 87% of the “catchable” largemouth bass sampled were between 8 and 11.99 inches in length. The formula for RSD (Preferred) is given as:

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

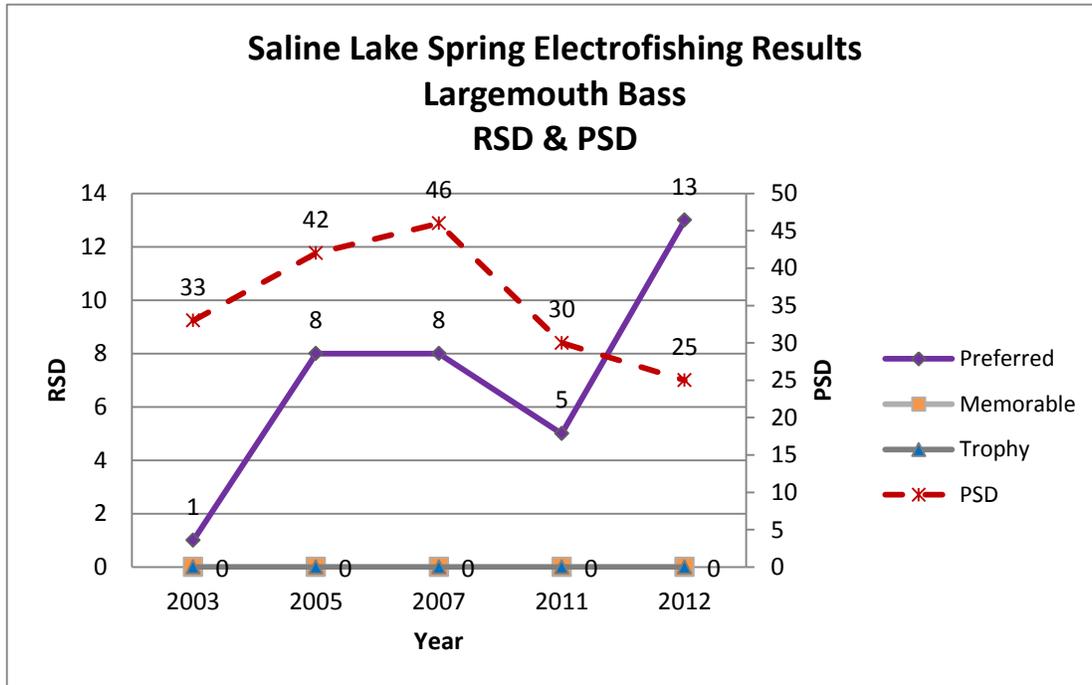


Figure 2. Relative stock densities and proportional stock densities of largemouth bass collected during spring electrofishing sampling at Saline Lake, LA during years 2003-2012.

PSD and RSD values for largemouth bass at Saline Lake in recent years indicate the presence of an undesirable size structure with a predominance of smaller fish and an absence of larger fish. This size structure coupled with the decrease in abundance of larger fish as indicated by the previously mentioned CPUE data indicate the existence of a poor quality largemouth bass fishery at Saline Lake.

Relative weight (W_r) is an index used to describe the overall “plumpness” or condition factor of fish. This value is used to indicate fish health as a function of their ability to maximize their weight per inch of length. Relative weight 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. Low largemouth bass relative weights below 80 indicate a potential problem with forage availability. W_r values for Saline Lake largemouth bass are given in Figure 3.

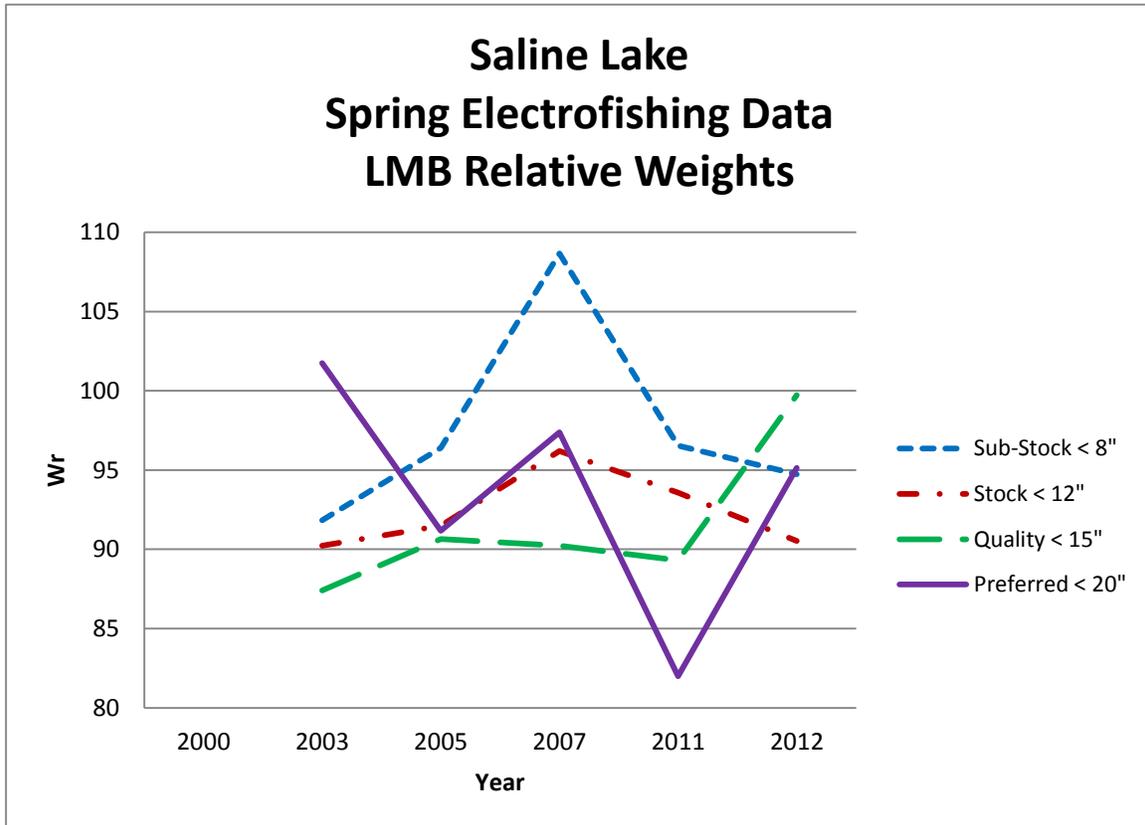


Figure 3. The Wr 's for selected largemouth bass size groups collected by springtime electrofishing at Saline Lake, LA during years 2000 - 2012.

The data depicted in Figure 3 indicate that largemouth bass are generally in good condition with regard to their length weight ratio. Relative weights for smaller sized bass are consistently higher than those of larger sized bass in most years. In the most recent sample, 2012, condition factor ranking from highest to lowest for the groups depicted ranked the groups as follows; Quality – 99.7, Preferred – 95.1, Sub-Stock – 94.7 and Stock – 90.5. It is notable for year 2012 that the sample size was small with the number of individuals (N) as follows; Sub-Stock $N=3$, Stock $N=30$, Quality $N=5$ and Preferred $N=5$. $N=0$ for both Memorable and Trophy sized bass.

Although relative weight for all groups shows variation over time, individual largemouth bass are typically in good condition at Saline Lake.

In conclusion, most results point to a low density largemouth bass population at Saline Lake with few large individuals. With the previous statement made, other considerations are in order when assessing the largemouth bass population at Saline Lake. The condition of individual bass appears healthy. In the absence of creel survey data, anecdotal information from bass anglers report good numbers of bass being caught as well as common reports of preferred-sized bass. It is likely that largemouth bass have been negatively affected by the heavy coverage of aquatic vegetation in recent years. The extent of this effect is difficult to measure since the heavy coverage of aquatic vegetation has hampered fisheries sampling in

recent years. It is quite likely that largemouth bass are being under sampled at this lake due to the vegetative coverage.

Forage

Forage is a term used to identify those species of fishes that are utilized as food by predatory fishes. Largemouth bass are the highest ranking predatory fish of the group known as sportfish or gamefish. For largemouth bass, forage fish are typically six inches or less in total length. For other gamefish such as crappie, forage fish maximum length would be somewhat shorter than six inches. Therefore, we typically describe forage fish as those fish that are six inches or less in length.

Forage is measured by various standards but at Saline Lake the primary measures of forage are electrofishing and shoreline seining. Electrofishing forage data is limited to the years of 1990, 1994 and 1995. Data from those samples appear in Figure 4.

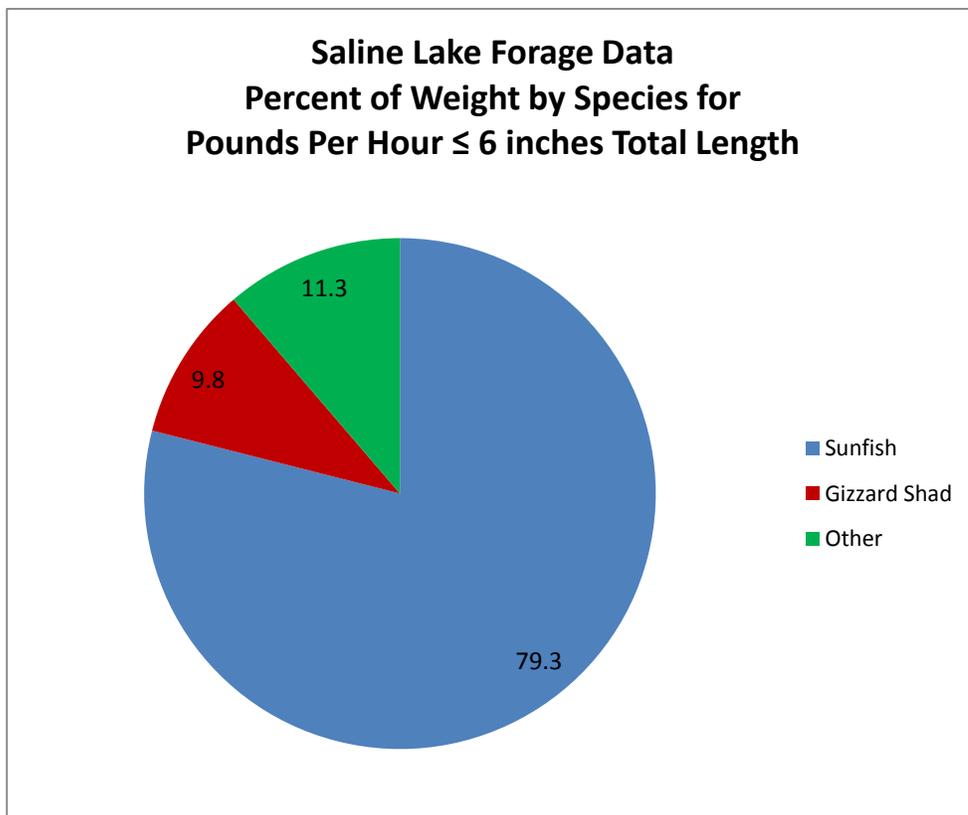


Figure 4. Percent of weight by species for electrofishing forage results collected at Saline Lake, LA in years 1991, 1994 and 1995.

The forage results depicted in Figure 4 shows a preponderance of sunfish species as would be expected in habitat dominated by relatively shallow water with a dense cypress forest canopy and heavy coverage by aquatic vegetation.

Shoreline seining is also used to assess forage availability. Shoreline seining results for

Saline Lake appears in Figure 5.

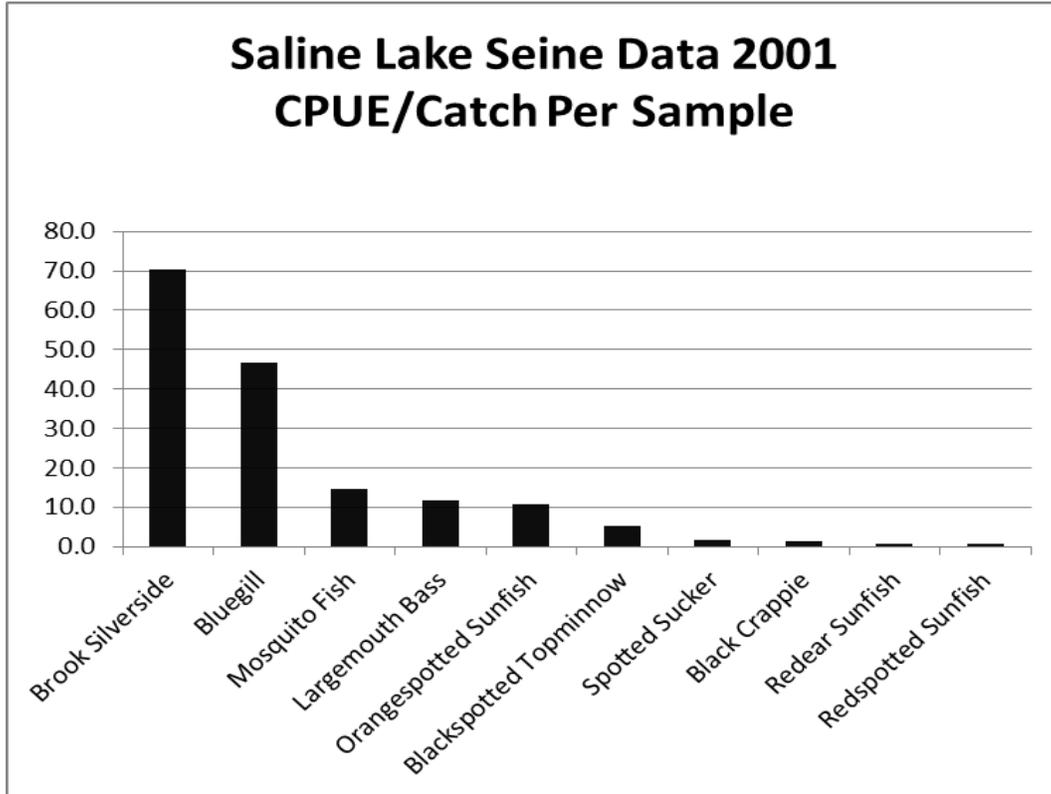


Figure 5. The CPUE expressed as catch per seining haul for shoreline seine sampling at Saline Lake, LA in year 2001.

The figure above indicates that silversides are the most common forage species by number per seine sample at Saline Lake. Bluegill is ranked second and is significantly more common than most other forage species. Notably absent in all seine samples are gizzard shad and threadfin shad. Again, this is an indication of habitat that is favorable to sunfish as opposed to shad which prefer more open water areas.

Genetics

Florida largemouth bass (FLMB) have been stocked into Saline Lake to increase abundance of large bass. Florida bass stocking was initiated in 1988 with an initial number of 57,000 fingerlings. Subsequent stockings in 1989, 1999-2001, 2005-2007, and 2009-2011 have brought the total number of FLMB stocked to 882,636.

Genetic sampling was conducted in the fall sampling season of 2007. Results of genetic sampling studies at Saline Lake are shown in Table 1.

Table 1. Largemouth bass genetic sampling results for Saline Lake, LA.

Year	Number	Northern	Florida	Hybrid	Total Florida Influence
2003	33	91%	0%	09%	09%
2005	48	94%	02%	04%	06%
2007	60	87%	0%	13%	13%

Crappie, Other sunfish species

From 1965 through 1994, biomass (rotenone) sampling was used to determine the status of crappie and sunfish populations in Saline Lake. The total weight of non-predatory game fish (sunfish) collected during these sampling efforts ranged from 10–30 pounds per acre. Crappie total weight per acre ranged from 1–8 pounds. Since 1994, electrofishing has been the primary sampling method employed at Saline Lake. Heavy aquatic vegetation prevents the use of sampling methodology directed toward crappie and sunfish at this waterbody.

Commercial

Species typically harvested by commercial fishermen are not found in significant numbers at Saline Lake. Therefore no commercial fishery currently exists at this waterbody.

Species of Special Concern

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

HABITAT EVALUATION

Aquatic Vegetation

Saline Lake has a heavy coverage of bald cypress and water tupelo throughout the lake. In the majority of the lake, water depth is less than 6 feet. That portion of the lake is typically infested with submerged vegetation, predominantly fanwort (*Cabomba caroliniana*). Currently giant salvinia (*Salvinia molesta*) is found throughout the lake. Giant salvinia forms large, dense mats in some areas. These mats are somewhat mobile depending upon wind direction and intensity. Water hyacinth is also problematic, with large impenetrable mats occasionally appearing primarily in the Chee Chee Bay area. Aquatic vegetation is currently an issue for fishermen, shoreline property owners and recreational boaters. Much of the shallow water areas of the lake are inaccessible.

Currently Saline Lake is in poor condition overall with regard to aquatic vegetation. Submergent native vegetation is a nuisance in summer months, primarily in shallow water areas. Regrowth of giant salvinia was limited following an extensive herbicide treatment utilizing Galleon (penoxsulam) in 2009. Benefits were also realized from colder than normal winters occurring in 2009/2010 and 2010/2011. A resurgence of giant salvinia was observed in the summer of 2011. Increased efforts utilizing foliar herbicide applications were made during the spring and summer of 2012. A water fluctuation regime consisting of two consecutive years of drawdowns was initiated in 2012.

As of September 13, 2013 the total infestation of the major problem plant species at Saline Lake is estimated to be as listed below:

Giant salvinia (*Salvinia molesta*) –2,000acres
Water hyacinth (*Eichhornia crassipes*) –50acres
American lotus (*Nelumbo lutea*) –50acres
Fragrant Water Lily (*Nymphaea odorata*) – 70 acres
Fanwort (*Cabomba caroliniana*) – 300 acres
Coontail (*Ceratophyllum demersum*) – 100 acres
Bladderwort (*Utricularia sp.*) – 120 acres
Duckweed (*Lemna sp.*) – 25 acres

Total vegetative coverage = 2,715 acres or 32%.

Currently, all aquatic vegetation found at Saline Lake is considered to be in the nuisance category. No efforts are being considered to introduce or reestablish any aquatic vegetation.

The use of herbicides is an important component of the LDWF integrated pest management program. The proper selection and use of herbicides is essential to achieve cost effective benefits and to avoid damage to non-target species. Each product listed has been approved by the Environmental Protection Agency for aquatic use. Aquatic vegetation is treated according to the standard operating procedures for the application of herbicides as adopted by the LDWF Inland Fisheries Section.

Herbicide spraying is conducted annually on Saline Lake for water hyacinth and salvinia control as needed. However, adequate control is difficult due to expansive shallow water areas and thick stands of trees that limit boat-based herbicide applications.

Substrate

Natural water level fluctuations that controlled leaf litter build-up were altered with the impoundment of Saline Lake. When the spillway was constructed, water levels remained constant as opposed to the former regime that included high spring and low fall water levels. Since impoundment, accretion of organic material has been continuous.

Since the 1960's, Saline Lake has been drawn down numerous times. The drawdowns were designed to emulate natural annual low water periods. These fisheries management drawdowns have been utilized to reduce the organic matter on the lake bottom and improve the quality of the substrate for nesting sport fish species. The many tons of leaf litter produced by the dense stand of cypress and tupelo trees contribute greatly to the detritus layer at Saline Lake. The annual die off of submerged vegetation also contributes to the accumulation of organic material. In low water periods, this organic matter is exposed to air and decomposes at a normal rate. The fisheries sampling program at Saline Lake indicates the population of largemouth bass has decreased since 2007. It appears that adequate spawning habitat does not exist due to the accumulated leaf litter along the perimeter of the lake. Unfortunately, due to the heavy tree and vegetation coverage in Saline Lake, organic leaf litter will continue to be a concern.

Artificial Structure

Saline Lake has abundant natural complex cover. No artificial structure is necessary.

CONDITION IMBALANCE / PROBLEM

Aquatic Vegetation

Saline Lake has a severe infestation of aquatic vegetation. Submerged and floating vegetation is causing problems with boating access and fishing. Most of the water less than 6 foot deep is matted with submerged vegetation to the point that boating access is difficult at best. Giant salvinia has formed large impenetrable mats in some areas of the lake. These mats also make it difficult for camp and home owners to access their boat houses and piers.

Excessive organic material has accumulated on the lake bottom due to the disruption of natural water level regime when the former Saline Brake was impounded to form Saline Lake. Without annual exposure to air in the late summer and fall months, leaves decompose under water through the much slower anaerobic decomposition. Throughout the life of the impoundment, the material has accumulated to such an extent that spawning substrate for nesting fish is significantly limited.

CORRECTIVE ACTION NEEDED

Control of aquatic vegetation is necessary for improvement of fisheries habitat, boating access and aesthetical properties.

A reduction in organic substrate is necessary to improve spawning substrate and sportfish production.

Increased communication between agencies and governing bodies is needed.

Frequent communication of status to Saline Lake stakeholders is essential.

RECOMMENDATIONS

1. A comprehensive vegetation control plan is recommended for Saline Lake to include chemical, biological and physical control measures.

- A. Continued foliar herbicide applications are recommended for Saline Lake. These applications will be principally directed toward control of giant salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*), but will also include control of other floating or emergent vegetation as needed. Water hyacinth will be treated by foliar application of 2, 4-D herbicide at a rate of 0.5 gallons per acre. Giant salvinia will be controlled with foliar applications of a mix of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Thoroughbred surfactants (8 oz. /acre) from April 1 to October 31. Outside of that time period, diquat at a rate of 0.75 gallons per acre will be used with 0.25 gallons per acre of a non-ionic surfactant.

Contract spray crews will be utilized in calendar year 2013. These applications will allow more acreage to be treated in a shorter time period than can be made by LDWF crews alone. Herbicide applications should be made throughout the year. Strategic herbicide applications should be made during drawdowns to areas including boat ramps and channel areas available to lake users during such periods.

- B. Introductions of giant salvinia weevils (*Cyrtobagous salviniae*) will continue. Weevil releases will focus on areas with limited access by spray vessels.

Triploid grass carp (*Ctenopharyngodon idella*) are currently present in small numbers at Saline Lake. Their limited presence appears to have little or no impact upon the aquatic plant community at this time. It is likely that any future reduction in the coverage of giant salvinia would lead to an increase in the presence of submerged aquatic vegetation that could be controlled by triploid grass carp. Based upon past and current submerged aquatic vegetation levels at Saline Lake, triploid grass carp should be stocked annually to provide control of this plant community. It is recommended that triploid grass carp be stocked at a rate of 4 fish per acre of submerged aquatic vegetation in the winter season of 2013. It is further recommended that triploid grass carp be stocked at a rate of 2 fish per acre of submerged aquatic vegetation in each successive year until acceptable control of submerged aquatic vegetation is achieved.

- C. Annual lake drawdowns are recommended. The action will achieve reduction in both vegetative coverage and organic sediment. It is likely that three successive drawdowns will be required to achieve significant benefits in this waterbody. Drawdown period should be August 1 to January 1 of the following year. The water should be drawn down at a rate of 3 – 4 inches per day. Drawdown level should be 95.0 MSL for a reduction of 8 feet below pool level. Manipulation of the lake level by opening or closing the gates repeatedly during the drawdown period should be conducted. This type of water level manipulation is effective to allow more of the plant material to be desiccated.

Saline Lake was drawn down from September 6, 2012 to January 14, 2013. A second drawdown began on July 1, 2013 and is planned to continue until at least January 1, 2014. At that time, an assessment will be made to determine if additional time is needed for this drawdown.

- D. As far back as 1971, LDWF biologists have recommended reducing the density of the cypress, tupelo forest in Saline Lake. Discussion of this topic between LDWF and SLGFPC should continue to determine feasibility.
2. Continue standardized sampling to monitor fish population status.
 3. Florida bass introductions into Saline Lake are not recommended until the aquatic vegetation problem is improved.
 4. Continue existing recreational and commercial harvest regulations until LDWF sampling results indicates that change is appropriate.
 5. LDWF staff will attend quarterly meetings of the Saline Lake Game & Fish Preserve Commission to discuss management and to share information. Open communication will be maintained between LDWF and the Red River Waterway Commission to make both agencies aware of issues relevant to the management of Saline Lake and the Red River.