LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

HENDERSON LAKE

WATERBODY EVALUATION & RECOMMENDATIONS
CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

May 2007 - Prepared by
Jody T. David, Biologist Manager, District 6

January 2012 – Vegetation recommendations updated by
Mike Walker, Biologist Manager, District 9

February 2014 - Updated by
Brac Salyers, Biologist Manager, District 9

August 2014 – Updated by
Brac Salyers, Biologist Manager, District 9

August 2015 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2016 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2017 – Updated by
Brac Salyers, Biologist Manager, District 9

September 2018 – Updated by
Brac Salyers, Biologist Manager, District 9

Remainder of this page left intentionally blank.
# TABLE OF CONTENTS

**WATERBODY EVALUATION** .............................................................................................................................. 4  
  Strategy Statement ........................................................................................................................................... 4  
    Recreational .................................................................................................................................................. 4  
    Commercial .................................................................................................................................................. 4  
    Species of Special Concern ......................................................................................................................... 4  
  Existing Harvest Regulations ......................................................................................................................... 4  
    Recreational .................................................................................................................................................. 4  
    Commercial .................................................................................................................................................. 4  
  Species Evaluation ......................................................................................................................................... 4  
  Habitat Evaluation ......................................................................................................................................... 17  
    Aquatic Vegetation ..................................................................................................................................... 17  
    Condition Imbalance / Problem .................................................................................................................. 21  
    Corrective Action Needed ......................................................................................................................... 21  
  Recommendations .......................................................................................................................................... 23  
  References ....................................................................................................................................................... 24
WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Black bass, crappie, and catfish in Henderson Lake are managed to provide anglers the greatest opportunity to catch and harvest a limit of fish. Sunfish are managed to provide a sustainable population while providing anglers the opportunity to catch and harvest numbers of fish.

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

Species of Special Concern
No threatened or endangered fish species have been documented in this waterbody.

EXISTING HARVEST REGULATIONS

Recreational
The Louisiana Wildlife and Fisheries Commission amended a rule to repeal the 14-inch minimum length limit (MLL) on black bass in the Atchafalaya Basin and adjacent waters. Effective June 20, 2013, the new regulations were a seven fish daily creel limit with no MLL. This regulation was in effect for two years. In June 2015, the regulation expired, and the area reverted to the statewide regulation of 10 black bass per day with no MLL.

Black Bass – no minimum length limit, 10 fish daily bag limit.

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

http://www.wlf.louisiana.gov/fishing/recreational-fishing

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

http://www.wlf.louisiana.gov/fishing/commercial-fishing

SPECIES EVALUATION

Recreational
Electrofishing is the most commonly used sampling technique to assess largemouth bass (LMB) relative abundance (catch per unit effort = CPUE), size distribution, and relative weight (physical body condition). Data collected during fall electrofishing is used to describe population trends, age composition, growth rate and mortality rate. The water in Henderson Lake is typically under influence from the Atchafalaya River in the springtime. High, turbid waters are an inconsistent influence to sampling. For that reason, electrofishing sampling is conducted in the fall only.
**Largemouth Bass**

Relative abundance, size structure indices, and length distribution
Electrofishing catch per unit effort (CPUE) fluctuated significantly from 1988 through 1997 (Figure 1). The total catch rates for 1988 and 1989 were below 50 LMB per hour, while the average for 1992 and 1993 were over 150 an hour. The numbers declined again over the next two years and sharply increased the following two years. Results depicted in Figure 2 show LMB catch rates to be highly variable. In relation to total CPUE, catch rates of individual size classes provide a more detailed description of the variations.

![Figure 1](image-url)

Figure 1. The mean total CPUE (+ SE) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988-1997).
Sample catch indices in Figure 3 clearly show a sharp peak in reproduction (substock-size) in 1993 following Hurricane Andrew. Stock-size bass continued to increase with each successive year. The discovery of hydrilla in 1994 is associated with an upward trend of bass. In Figure 4, lower catch rates for ’06, ’07, and ’09 are likely related to the series of fish kills resulting from Hurricanes Rita (2005) and Gustav and Ike (2008). The increased abundance observed in the 2010 sample reflects natural recovery from storm related fish kills.
Figure 3. The CPUE for sub-stock-, stock-, quality- and preferred-size largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988-1997).

Figure 4. The CPUE for sub-stock-, stock-, quality- and preferred-size largemouth bass collected from Henderson Lake, LA during fall electrofishing (2006-2017).
Results from 2017 sampling represent current largemouth bass size distribution for Henderson Lake (Figure 5). Young-of-the-year (YOY) bass (3 to 6 inches) represent 32% of the sample. Stock and quality-size bass (8 to 14 inches) represent 48% of the sample. Bass greater than 14 inches represent 5% of the sample.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-frequency data (Anderson and Neumann 1996). Proportional stock density compares the number of fish of quality size (> 12 inches for largemouth bass) to the number of bass of stock size (> 8 inches in length), and is calculated by the formula:

\[
PSD = \frac{\text{Number of bass} \geq 12 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100
\]

PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. A value between 40 and 70 generally indicates a balanced bass population.

Relative stock density (preferred, RSD_{15}) is the percentage of largemouth bass in a stock (fish over 8 inches) that are also 15 inches TL or longer, and is calculated by the formula:

\[
RSD_{15} = \frac{\text{Number of bass} \geq 15 \text{ inches}}{\text{Number of bass} \geq 8 \text{ inches}} \times 100
\]

An RSD_{15} value between 10 and 40 indicates a balanced bass population, while values
between 30 and 60 indicate a higher abundance of larger fish.

As seen in Figure 6, these 10 years of data show a viable bass population, with seven of 10 years having favorable PSD values, and eight of 10 years having favorable RSD_{15} values. The poorest stock density values (1992) reflect sampling conducted in the wake of Hurricane Andrew.

![Proportional stock density (PSD) and relative stock density (RSD_{15}) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (1988 – 1997).](image)

The last 11 years of stock density data (Figure 7) indicate that the Henderson Lake bass population is lacking in abundance of bass larger than 15 inches. The influence of environmental conditions is undoubtedly a significant contributing factor. Events occurring within this time frame include two major hurricanes, two floods, and a year of very low water levels.
Figure 7. Proportional stock density (PSD) and relative stock density (RSD\textsubscript{15}) for largemouth bass collected from Henderson Lake, LA during fall electrofishing (2006 – 2017).

Relative weight
Mean relative weight (Wr) for each inch group is shown below in Figure 8. This measurement is defined as the ratio of fish 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 that sufficient forage is available. A description of the forage species and relative abundance is described below. Mean relative weights for almost all size classes of largemouth bass from Henderson Lake are at or above the 95 value. Relative weights for 2012-2017 were all near or exceeded the 100 value. The robust body condition of Henderson Lake bass is an indication that bass forage is abundant and available.
Figure 8. The mean relative weights by length category for largemouth bass collected from fall electrofishing (2006-2017; n=1,298).

Forage
Henderson Lake forage is primarily comprised of shad and sunfish. An average of three 1-acre rotenone samples/year is shown below. The results provide an indication that forage has not been a limiting factor in largemouth bass growth.

Table 1. Total weight (lbs.) of forage fishes collected from Henderson Lake, LA (1981-1998).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total lbs./acre — forage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>215.7</td>
</tr>
<tr>
<td>1985</td>
<td>1,835.2</td>
</tr>
<tr>
<td>1987</td>
<td>372.1</td>
</tr>
<tr>
<td>1990</td>
<td>131.5</td>
</tr>
<tr>
<td>1997</td>
<td>166.0</td>
</tr>
<tr>
<td>1998</td>
<td>224.4</td>
</tr>
</tbody>
</table>

Largemouth bass genetics
Genetic analyses of largemouth bass through electrophoresis of liver tissues show a range of 0 to 1% total Florida largemouth bass (FLMB) genome influence from the years 1999 and 2004 (Table 2). Florida largemouth bass were stocked annually from 2000 to 2006 at a rate of approximately 10 fish per acre. Despite the multiple stockings, genetic sampling conducted in 2004 indicates that only 9% of the Henderson Lake bass population carried genetic material characteristic of Florida bass. Such results may be disappointing in terms of providing genetic potential for large bass size but, they are not entirely negative. The failure of a larger Florida bass influence provides additional confirmation that the native bass population is particularly resilient, and that recruitment is strong. Because of the lack of
establishment of the Florida gene in Henderson Lake, the decision was made to no longer stock FLMB fingerlings, but rather to rely on the native bass population for recruitment. However, in April 2018, a surplus of advanced FLMB fry were produced from LDWF spawning efforts, and places were needed to stock these extra juvenile fish. Upon request, hatchery staff stocked an estimated 337,200 of these advanced Florida bass fry in Henderson Lake.

Table 2. Genetic analysis of largemouth bass samples from Henderson Lake, LA (1999 and 2004).

<table>
<thead>
<tr>
<th>Year</th>
<th>Northern</th>
<th>Florida</th>
<th>Hybrid</th>
<th>Florida Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2004</td>
<td>91%</td>
<td>1%</td>
<td>8%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Black Crappie

Relative abundance and size distribution-
As shown in Figure 9, fall electrofishing CPUE for black crappie on Henderson Lake showed consistently lower numbers from 1988 through 1992. Hurricane Andrew struck in August of 1992. Fish kills related to Hurricane Andrew were massive. Increased abundance of sub-stock size (YOY) crappie in 1993 is evidence of fish population recovery from those kills. Diminished predation allowed high survival of newly spawned fish. Except for 2013, crappie catch rates were low and somewhat variable from 2006-2017 (Figure 10). The high catch rate of 2013 followed successive years of drought in the region from 2010 to 2012.
Black crappie catch indices show consistently lower catch rates from 1988-1992 with an increased number of stock-size crappie (5-8 inch) collected in 1990 (Figure 11). The large increase in sub-stock and stock size crappie in 1993 indicates recovery from Hurricane Andrew related fish kills. The increase in sub-stock size fish (4 inches or smaller) in 2009 indicates recovery after Hurricane Gustav (Figure 12). That cohort can be followed into the next year (2010) with an increase in stock-size fish (5-8 inch) abundance. The upward spike in total CPUE in 2013 (primarily sub-stock and stock-size fish) seen in Figures 10 and 12 are believed to be a very strong year class of crappies that were spawned following the drought conditions of 2010 – 2012.
Figure 11. The CPUE for sub-stock-, stock-, quality-, and preferred-size black crappie collected from Henderson Lake, LA during fall electrofishing (1988-1994).

Figure 12. The CPUE for sub-stock-, stock-, quality- and preferred-size black crappie collected from Henderson Lake, LA during fall electrofishing (2006-2017).

Size distribution for black crappie in 2017 is shown in Figure 13. The majority of fish collected were quality-size fish (8-10 inches) followed by a few preferred-size fish (10-12 inch) and a few from the memorable size (12-13 inch) range.
Figure 13. Size distribution for black crappie collected from one hour of electrofishing at Henderson Lake, LA in fall 2017 (n=7).

Sunfish
Shoreline seine sampling is conducted to collect information related to species composition, year class strength, and prey availability. Henderson Lake sampling was conducted in summertime periods of 2000, 2001, and 2005. 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 x 6-foot seine, was conducted at each sampling station. A total of three samples were taken each year at 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 was then swept back around to the shoreline, keeping the lead line tight and on the bottom. After the seine haul is completed, all fish from the seine are placed in a plastic bag, properly marked, and placed on ice. Fish specimens were sorted to species, and by length. Total number of sunfish collected is provided in Table 3.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL NUMBER CAUGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1,110</td>
</tr>
<tr>
<td>2001</td>
<td>738</td>
</tr>
<tr>
<td>2005</td>
<td>1,450</td>
</tr>
</tbody>
</table>

Commercial
Commercial landings statistics are reported by parish and not by waterbody. As a result, landings data specific to Henderson Lake is not available. However, Henderson Lake has a thriving commercial fishery. Harvest includes crawfish, catfish, buffalo, and freshwater drum.
Aquatic invasive species
Asian carp are present in Henderson Lake. They include the grass carp, common, bighead, and silver carp. Asian carp fish kills have been observed during periods of rapidly decreasing water levels.

Creel Surveys
Angler creel surveys were conducted in 2000, 2001, and 2005. The survey method used was an access point survey of completed fishing trips. Percent of total harvest by species is presented in Table 4.

Table 4. The results of creel surveys conducted on Henderson Lake, LA, by year. Results are presented as the percent of total harvest of fish by species.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>2000</th>
<th>2001</th>
<th>2005</th>
<th>AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluegill</td>
<td>34.9%</td>
<td>55.0%</td>
<td>53.2%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Black Crappie</td>
<td>25.9%</td>
<td>14.9%</td>
<td>25.2%</td>
<td>23.6%</td>
</tr>
<tr>
<td>White Crappie</td>
<td>23.0%</td>
<td>6.6%</td>
<td>5.7%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Largemouth Bass</td>
<td>7.0%</td>
<td>3.7%</td>
<td>4.1%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Warmouth</td>
<td>1.7%</td>
<td>2.2%</td>
<td>4.9%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Redear Sunfish</td>
<td>1.7%</td>
<td>2.7%</td>
<td>2.9%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Freshwater Drum</td>
<td>1.0%</td>
<td>8.1%</td>
<td>0.2%</td>
<td>2.0%</td>
</tr>
<tr>
<td>White Bass</td>
<td>0.5%</td>
<td>1.9%</td>
<td>0.7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Blue Catfish</td>
<td>0.1%</td>
<td>1.4%</td>
<td>1.1%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Channel Catfish</td>
<td>0.4%</td>
<td>1.8%</td>
<td>0.2%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Yellow Bullhead</td>
<td>0.2%</td>
<td>0.0%</td>
<td>1.3%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Buffalo</td>
<td>1.3%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Yellow Bass</td>
<td>0.4%</td>
<td>1.6%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Bowfin</td>
<td>0.6%</td>
<td>0.0%</td>
<td>0.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Spotted Gar</td>
<td>0.8%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Spotted Sunfish</td>
<td>0.1%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Carp</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Another angler creel survey was recently conducted from July 1, 2013 through Dec. 31, 2014. The survey method used was an access point survey of completed fishing trips. The size distribution of angler harvested largemouth bass for the 18-month duration of the creel is presented in Figure 14. The majority of fish harvested were in the 13 and 14 inch groups. During this time period, it is estimated that 55,934 largemouth bass were caught. Of those, 15,428 were harvested and 40,506 were released, for a release rate of 72%. The next creel survey scheduled for Henderson Lake is in 2019.
HABITAT EVALUATION

Aquatic Vegetation
There is ongoing concern with overabundant aquatic vegetation in Henderson Lake. The primary species of concern are hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes*), and recently, giant salvinia (*Salvinia molesta*). Complaints related to boating access are common from fishermen, hunters, camp owners, and boat launch operators. Unfortunately, immediate relief is typically expected. However, the chemicals used to control these plants are systemic herbicides. Systemic herbicides are effective, but a few days to several weeks may be required for complete plant mortality. The effects of systemic herbicides are directly related to plant metabolism, which is related to air temperature. Private boat landings, as well as the public launch at the I-10 Butte La Rose Welcome Center, are often cleared of water hyacinth only to have rafts of new plants block the ramps following a change in water levels or wind direction. Hydrilla was first discovered in the lake in 1994. For many years following, and up until the summer and fall of 2013 and 2014, there was approximately 50% coverage, or 2,500 acres of hydrilla in Henderson Lake as seen in Map 1 below. By late summer, the north and south flats would typically ‘top out’ with hydrilla to the water surface, expanding growth throughout the entire water column. Presently, the coverage is substantially lower, around 5% or 250 acres, but has appeared to be showing up in more places throughout the year. From 2015-2017, none of the excessive growth was seen. Although small patches of hydrilla were seen during the winter of 2017/2018, excessive regrowth had not occurred through September of 2018.

Recently, giant salvinia has also become another seriously problematic aquatic invasive
species in the lake. Surveys in the fall and winter of 2015/2016 showed the plant expand from a moderate amount of material in December, to a massive infestation by April (estimation of acreage unknown). Surveys found that the entire flooded northern woods were filled with the plant. This huge increase in giant salvinia was believed to have occurred as the result of high waters earlier than normal in the winter months providing an abundance of inaccessible and sheltered backwater habitat, along with very mild winter temperatures.

Giant salvinia was first detected in Henderson Lake in the fall of 2012. Though eradication efforts were attempted, plants were observed again in 2013. Biological controls were introduced in September 2013 with the release of plant material containing giant salvinia weevils (*Cyrtobagous salviniae*). An estimated 19,360 adult weevils were released at that time. Another release conducted in late July 2015, included an estimated 14,580 adult weevils. Weevils were also released in April 2016, with an estimated 13,986 adult weevils placed in heavy infestations of giant salvinia. In June 2017, another release was conducted with an estimated 31,500 weevils placed in the lake. A total of almost 79,500 weevils have been released within the last five years. It appears that plant control from weevil herbivory is working well in Henderson Lake, as damaged salvinia plants have been noted throughout the lake, and weevil densities remain high. It also appears that some of the weevils have survived through previous winters and continue to feed on the plants the following spring.

Record low temperatures during the winter of 2017/2018 saw a decline in the abundance of aquatic nuisance vegetation, as many plants died from freezing temperatures. Unfortunately, the tenacity of these invasive species persevered, and the spring/summer of 2018 has shown a slow but steady rebound of the plants both in Henderson, and other state waterbodies. It is unknown at this time how the record low temperatures affected the weevils in the lake.

During 2014, LDWF spray crews treated 2,215 acres of water hyacinth and 63 acres of alligator weed with 2,4-D, 34 acres of common salvinia and 56 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year. During November 1st-March 31st, only diquat is used to spray salvinia species, while a glyphosate/diquat mixture is used from April 1st-October 31st based on the differences in plant metabolism and air temperatures. Also, eight acres of pennywort were treated with 2,4-D. No contract spraying was necessary in 2014.

At the end of 2014, LDWF’s Inland Fisheries Division began an attempt to downsize the aquatic plant program by ending temporary sprayer positions and focus more on private applicator contracts to treat problematic areas. This cost-savings effort removed two sprayers from the District 9 office that assisted in spraying efforts on Henderson Lake. Because of this, there is no longer a dedicated LDWF spray crew on the lake. Vegetation management will instead be achieved primarily through privately contracted treatments.

During 2015, LDWF crews treated 123.5 acres of water hyacinth and six acres of alligator weed with 2,4-D. Also treated were 31 acres of duckweed using diquat, 12 acres of common salvinia and 17 acres of giant salvinia with either a glyphosate/diquat mixture, or diquat depending on the time of year as mentioned above. Two contracts utilizing by private applicators were also needed in 2015 to spray additional areas. The first contract was in February and treated 99 acres of water hyacinth with 49.5 gallons of 2,4-D. This herbicide
application included a non-ionic surfactant at a rate of 0.125 gallons per acre. A second contract in December treated 80 acres of giant salvinia with 60 gallons of diquat. This herbicide application also included a non-ionic surfactant at a rate of 0.25 gallons per acre.

During 2016, LDWF spray crews made foliar herbicide applications on nuisance plants such as alligator weed, duckweed, pennywort, primrose, common and giant salvinia, and water hyacinth. A total of 59 gallons were applied to 81 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth. Common and giant salvinia were controlled with a glyphosate/diquat mixture of glyphosate (0.75 gal/acre) / diquat (0.25gal/acre). Diquat was applied at 1.0 gallons per acre to control duckweed.

The alligator weed, pennywort, and primrose were not the targeted species of plants during those applications, but rather were incidentally treated with those plants that were being targeted. Additionally, two contracts utilizing private applicators were initiated to spray additional concentrations of giant salvinia. The first contract in May treated 480 acres, and the second was in June also treated 480 acres. These two contracts treated a combined 960 acres of giant salvinia using 720 gallons of glyphosate, 240 gallons of diquat, and 240 gallons of Turbulence.

For 2017, LDWF spray crews made foliar herbicide applications on nuisance plants such as duckweed, primrose, common and giant salvinia, sedge, water hyacinth, and water paspalum. A total of 67 gallons were applied to 97 acres. Foliar applications of 2,4-D (0.5 gal/acre) were used to control water hyacinth. Common and giant salvinia were controlled with a glyphosate/diquat mixture consisting of glyphosate (0.75 gal/acre) / diquat (0.25gal/acre), or diquat (0.75 gal/acre) depending on the time of year as mentioned above. Diquat was applied at 1.0 gallon per acre to control duckweed. Primrose, sedge, and water paspalum while not the targeted species during most applications, were incidentally mixed in and treated with those plants that were being targeted. No contract spraying was needed in 2017.

The winter of 2018 saw the coldest sustained temperatures in roughly 20 years for south Louisiana. Much of the aquatic nuisance vegetation was killed or greatly reduced as a result. Subsequently, no LDWF herbicide applications have been made thus far in 2018, nor has any contract spraying been necessary.

Estimates of nuisance vegetation coverage as of September, 2018 are as follows:

**Floating / Emergent Plants -**
- Water Hyacinth (*Eichhornia crassipes*) – 1000 acres
- Common Salvinia (*Salvinia minima*) – 250 acres
- Giant Salvinia (*Salvinia molesta*) – 250 acres
- Alligator Weed (*Alternanthera philoxeroides*) – 250 acres

**Submerged Plants –**
- Hydrilla (*Hydrilla verticillata*) – 250 acres

Triploid grass carp (TGC) were stocked in 2014 (25,000 fish, 12+ inches in length) to assist with the ongoing hydrilla problem within the lake. The fish were certified as being triploid

(sterile) by the U.S. Fish and Wildlife Service.
CONDITION IMBALANCE / PROBLEM

1. In the absence of natural controls, invasive aquatic vegetation, including water hyacinth, giant salvinia, and hydrilla become overabundant each growing season.

2. Atchafalaya River water inundates Henderson Lake during high river flows. During a river flood pulse, water enters the control structure on the south end of the impoundment and then drains out of the same structure when the water later recedes. This hydrologic condition often creates a low dissolved oxygen situation and associated fish kills.

CORRECTIVE ACTION NEEDED

1. Reduce overabundant vegetation through available means of control. In 2013, LDWF met with officials from St. Martin Parish and the town of Henderson, LA and proposed a fall 2013 drawdown. All parties were in favor of the proposed action. Mr. Guy Cormier, former St. Martin Parish President, applied for a drawdown permit with the USACE in the summer of 2013. This permit is required because of the USACE’s 28,500 acre, Indian Bayou Wildlife Management Area, but also due to a Chitimachan Indian burial site that could be exposed with a reduction in water level. The permit was not issued that year because of the length of the permit process and a federal government shutdown (USACE, personal communication). The LDWF recommended a drawdown for the fall of 2014, and the St. Martin Parish Government re-applied for a permit. The permit was issued in August 2014 and is valid for 5 years. A drawdown was initiated in mid-August of 2014, and water levels were maintained at 6.0 ft. MSL until November 1st. Another drawdown was scheduled for the fall of 2015, but due to persistent high river levels throughout the summer, the drawdown was not able to be conducted as planned. In July 2016, LDWF met with St. Martin Parish officials to discuss having another drawdown in the fall. Two weeks later they held a public meeting in Henderson, LA to give a presentation on the drawdown proposal and to hear public concerns. By the conclusion of the meeting, it was agreed upon to go ahead with another fall/winter drawdown. The structure was opened on August 8th, and 5 days later south Louisiana was hit with unprecedented amounts of rainfall from an unnamed storm system resulting in 20+ inches of rain in many areas, and widespread flooding that would later come to be known as the “Flood of 2016”. The lake level at the Pelba gauge jumped from almost 8 ft. during the beginning of the drawdown, to nearly 15 ft. in those two weeks afterwards. Although nearly two months of drying time was lost due to the high water levels associated with the August floods, the lake reached pool stage again in late September and the drawdown was attempted again. Water levels were lowered and maintained during the month of October, and despite the drawdown ending on Nov. 1st, a lack of rainfall during November kept the lake under 8 ft. MSL until heavy rains came in early December. Though abbreviated, the drawdown was successful in stranding large amounts of giant salvinia and water hyacinth. The effect on the remaining hydrilla was likely minimal. Another drawdown was planned for the fall of 2017, but mechanical issues with the control structure made it unable to be opened. The inability to open the structure further
slowed the drainage of water from the lake. Heavy summer rains delayed repairs until the water levels dropped to a safe level later that fall. St. Martin Parish Government replaced the damaged line in November 2017 (Guy Cormier, pers. comm.). In early 2018, Inland Fisheries staff met with Interim-Parish President for St. Martin Parish, Mr. Chester Cedars, and proposed having another drawdown. At Mr. Cedar’s request, Inland staff then gave a presentation for a drawdown proposal at a St. Martin Parish Council meeting in May. No opposition was voiced at this meeting, and a 2018 drawdown was agreed upon. The drawdown began August 1st, and at the time of this update, is currently still underway. The scheduled end date is November 1st. An annual fall/winter drawdown is recommended for five consecutive years for hydrilla control. LDWF will continue to recommend drawdowns, monitor problematic vegetation during that time, evaluate their effectiveness, and make recommendations for future control efforts.

2. There are two solutions to the recurring fish kills in Henderson Lake.
   a. The first option would be for Henderson Lake to be completely separated from the Atchafalaya Basin and become a reservoir kept at pool stage with a structure that prohibits Atchafalaya flood waters from entering and draining from the southern end. The structure would need to be constructed with an overflow feature to allow rain water to drain from the lake and have the capability to conduct annual drawdowns for vegetation control.
   b. The second option would be to completely remove the control structure at the drain and have openings to the Atchafalaya River in the northern portion of the lake. This would allow Henderson Lake to fluctuate naturally with the river stage and have water flow from north to south through the system. The annual drying and flooding of Henderson Lake would then more closely mimic historical conditions.
RECOMMENDATIONS

1. Five consecutive years of summer/fall drawdowns beginning in 2014 are recommended for Henderson Lake. Previous efforts have proven that single year drawdowns have little effect on hydrilla in Henderson Lake. The southern control structure should be opened after the spring/summer flood cycle has fallen below 9 ft. MSL at the Butte La Rose gauge. The structure should remain open until the water level is three ft. below pool stage (6.0 ft. MSL). The dewatering rate should not exceed 4-inches per day. The 6.0 ft. MSL water level should be maintained as long as possible to achieve maximum potential. The heat from the summer months, as well as the possible freezing temps from the winter months, could provide a potential ‘double impact’ to vegetative propagules during a drawdown. After the first drawdown, as many as 80-90% of hydrilla tubers in the bottom sediment will sprout, giving the false impression of failure. Consecutive drawdowns will be necessary to deplete hydrilla propagules in Henderson Lake. Natural water level fluctuation in the Mississippi/Atchafalaya Rivers will re-flood the lake during the winter and early spring months.

2. EPA-approved herbicides will be applied to nuisance aquatic weeds in accordance with the LDWF Aquatic Herbicide Application Procedure. Water hyacinth will be controlled with 2,4-D (0.5 gal/acre) and a non-ionic surfactant (1 pint/acre). Both common salvinia and giant salvinia will be controlled with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence (or approved equivalent, 0.25 gal/acre) surfactant from April 1 to October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25 gal/acre) will be used. Sedge will be controlled with the aforementioned salvinia treatments if it is associated with those plants. If it is targeted specifically, 2,4-D (0.5gal/acre) will be used in conjunction with a non-ionic surfactant (one pt./acre).

3. Standardized sampling will be conducted as per LDWF protocol.


5. Triploid grass carp (TGC) retention will be monitored through LDWF standardized sampling. As a preliminary measure to reduce TGC escapement, an agreement with the St. Martin Parish government should be reached to limit control structure openings.

6. Continue to closely monitor and treat giant salvinia infestations as necessary. Giant salvinia weevil releases will continue on a routine basis.
REFERENCES