LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI - B

WATERBODY MANAGEMENT PLAN SERIES

AMITE RIVER, LOUISIANA

WATERBODY EVALUATION & RECOMMENDATIONS
CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY THREE YEARS

May 2014 - Prepared by
Rachel Walley, Biologist Manager, District 7

July 2017 – Updated by
Brian Heimann, Biologist Manager, District 7

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 of Special Concern.................................................................................................................. 4

Species Evaluation.................................................................................................................................. 4
  Recreational........................................................................................................................................ 4
  Recreational / Other Species................................................................................................................ 9

Habitat Evaluation................................................................................................................................. 11
  Aquatic Vegetation ............................................................................................................................ 11
  Water Quality ...................................................................................................................................... 13
  Substrate............................................................................................................................................. 13

Condition Imbalance / Problem.............................................................................................................. 14

Corrective Action Needed..................................................................................................................... 14

Recommendations................................................................................................................................... 15
WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational
Recreational fish species are managed to maintain sustainable populations while providing anglers the opportunity to catch or harvest numbers of fish.

Commercial
Commercial fish species are managed to provide sustainable populations.

Species of Special Concern
Species of special concern are managed toward viable, self-sustaining populations.

EXISTING HARVEST REGULATIONS

Recreational
All statewide regulations apply to game fish species, see link below:
http://www.wlf.louisiana.gov/regulations

Commercial
All statewide regulations apply to commercial fish species, see link below:
http://www.wlf.louisiana.gov/regulations

Species of Special Concern
Paddlefish (*Polyodon spathula*) 30” max lower jaw fork length, 2 fish daily limit, fish cannot be retained alive; fish cannot be harvested by snagging methods. Pallid sturgeon (*Scaphirhynchus albus*), shovelnose sturgeon (*Scaphirhynchus platorynchus*), and Gulf sturgeon (*Acipenser oxyrinchus desotoi*) no legal harvest or possession.
http://www.wlf.louisiana.gov/regulations

SPECIES EVALUATION

Recreational
Largemouth bass (*Micropterus salmoides*) are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain and because they are highly sought after by anglers. Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large fish.
Largemouth Bass

Catch per unit effort, relative weight and structural indices
Spring electrofishing results indicate considerable variability of catch-per-unit-effort (CPUE) of largemouth bass following Hurricanes Katrina, Gustav and Isaac in 2005, 2008 and 2012, respectively (Figure 1). The storms created unfavorable water quality conditions, such as low dissolved oxygen, that resulted in major fish kills. In the second year following Hurricane Gustav, 2010, the mean total CPUE for largemouth bass rebounded to nearly 120 fish per hour. A similar rebound was observed in the second year following Hurricane Isaac, 2014, with a mean total CPUE of nearly 100 fish per hour. Sub-stock and stock-size fish rebounded in the fall of 2009 and 2010, and also in the fall of 2013 and 2014 (Figure 2).

Figure 1. The mean CPUE (± 95% CI) number per hour for largemouth bass from Amite River, LA, in spring electrofishing results from 2006 to 2014.
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 for largemouth bass) to the number of bass of stock-size (8 inches in length). 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, Figure 3 below indicates a PSD of 50 for 2009. The number indicates that 50% of the bass stock (fish over 8 inches) in the sample was at least 12 inches or longer.

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

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

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

Although there was an increase in the overall mean CPUE in 2010, the size-structure indices for largemouth bass decreased in both the proportion of quality-size and preferred-size fish (Figure 3). Overall mean CPUE also increased in spring 2014, but no preferred-size fish were
observed. The size distribution comparison (length frequencies) from 2009, 2010, 2012, 2013 and 2014 for spring electrofishing results show that in 2010, 2012, and 2014 there were more stock-size fish present than in 2009 and 2013 (Figure 4).

Figure 3. The mean size-structure indices (PSD and RSDp) for largemouth bass from Amite River, LA, for spring electrofishing results from 2006 to 2014. Error bars represent 95% confidence limits of the mean size-structure indices.

Figure 4. The size distribution (length frequencies) for largemouth bass on Amite River, LA, from spring electrofishing results for 2009 to 2014. Values for n by year: n=23 (2009), n=119 (2010), n=20 (2012), n=1 (2013), n=94 (2014).
Stocking and Genetics
Over 780,000 Florida bass (M. floridanus) have been stocked into the Amite River since 1996 (Table 1). A majority of these fish were stocked post Hurricanes Katrina and Gustav in response to public concern regarding extensive fish kills that occurred following these storms. In the post storm absence of predation and competition, the Florida largemouth bass should have become dominant in this coastal river, when in fact this species did not become established. Genetic testing conducted in 2010 indicated that less than 10% of the Florida genome was present in the sample results (Table 2). Additionally, higher CPUE’s in 2010 (Figures 1 and 2), along with the genetic results, indicate that the remaining native largemouth bass population, although greatly reduced from pre-storm levels, recovered robustly and that any stocking efforts were unnecessary. The stocking of Florida largemouth bass in the adjacent Blind and Tickfaw rivers showed a similar fate; the ineffectiveness to establish this genotype during post hurricane recovery. This tenacity for recovery of native largemouth bass populations has also been noted in other coastal river systems including the Calcasieu, Mermentau and Sabine rivers in southwest Louisiana following hurricanes Rita (2005) and Ike (2008). These systems received little to no stockings of largemouth bass before and after the hurricane related fish kills, yet yielded record CPUE’s two years into recovery. These observations suggest that native coastal populations of largemouth bass (and other indigenous fish species) have adapted to these periodic storm events and rapid recovery is part of the natural selection process.

Table 1. Florida largemouth bass stockings into Amite River, LA from 1996 – 2010.

<table>
<thead>
<tr>
<th>FLORIDA LMB STOCKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>1996</td>
</tr>
<tr>
<td>1997</td>
</tr>
<tr>
<td>1999</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>2002</td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>2004</td>
</tr>
<tr>
<td>2005</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2008</td>
</tr>
<tr>
<td>2009</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>
Table 2. Results of 2010 genetic testing for the Florida genome in largemouth bass from Amite River, LA.

<table>
<thead>
<tr>
<th>Number of fish</th>
<th>% Northern</th>
<th>% Hybrid</th>
<th>% Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>151</td>
<td>91</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Recreational / Other Species

Crappie and Sunfish
Black and white crappies (Pomoxis nigromaculatus and P. annularis) have both been observed but not monitored in the river, as well as bluegill, redear, spotted, warmouth and longear sunfishes (Lepomis macrochirus, L. microlophus, L. miniatus and L. gulosus, L. megalotis, respectively).

Forage
Forage availability is typically measured directly through electrofishing and shoreline seine sampling and 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 indicate a potential problem with forage availability. Relative weights of largemouth bass caught in the Amite River ranged from 83 to 104 from 2006 to 2014 for all stock length-size and larger fish, indicating an adequate forage base (Figure 5). The mean Wr of largemouth bass from 2006, 2007, 2009,2010, 2013, and 2014 is approximately 96 (Figure 6). This high Wr suggests that there is ample forage available for bass production.

Figure 5. The mean relative weights (+ 95% CI) for stock-, quality-, and preferred-size largemouth bass collected from Amite River, LA, in fall electrofishing samples.
from 2006 to 2014. Error bars represent 95% confidence limits of the mean relative weights.

Figure 6. The mean relative weights (+ 95% CI) for all largemouth bass collected from Amite River, LA, in fall electrofishing samples from 2006 to 2014. Error bars represent 95% confidence limits of the mean relative weights.

Electrofishing samples from fall 2012 through 2014 showed that the available forage was bluegill, longear, spotted and warmouth sunfishes, along with inland silversides (Menidia beryllina), gizzard and threadfin shad (Dorosoma cepedianum and D. petenense respectively; Figure 7).
Figure 7. Forage composition in total numbers by species on Amite River, LA, from fall electrofishing results 2012 to 2014.

Aquatic Invasive Species

Though their population has not been monitored, common carp (*Cyprinus carpio*) are commonly observed in the river.

In early summer of 2012, two adult silver carp (*Hypophthalmichthys molitrix*) were observed in the river. An adult silver carp was also observed in late summer of 2013. These fish may have been introduced via the Bonnet Carré Spillway operation by the US Army Corps of Engineers during the 2011 Mississippi River flood event. To date, no juveniles have been observed.

In winter 2012, following Hurricane Isaac, a commercial fisherman caught a plecostomus (*Hyphostomus plecostomus*) measuring over ten inches in length in a hoop net.

The invasive apple snails (*Pomacea maculata*) have been documented in the New River Canal, a discharge canal that empties into the Petite Amite River. As of late summer 2017, heavy infestations of the snail have been reported throughout the lower Amite River from Port Vincent to Lake Maurepas.

HABITAT EVALUATION

Aquatic Vegetation

*Nuisance species*
Common salvinia and water hyacinth have been the main source of access and habitat complaints over the past several years. Common salvinia is scattered throughout the basin and is constantly being restocked by draining swamps and bayous. Within the river system, the desire to own/sell waterfront property has led to the construction of numerous man-made canals over the past 4 decades. These canals are typically 50 to 200 feet wide, dead-end offshoots of the main river channel. The canals are lined with houses, camps, boat slips, docks, and an occasional boat ramp. The canal systems are rarely designed so that river water can flow through unimpeded (i.e. horseshoe in shape, etc.). Consequently, these dead-end canals have no inherent “flushing” mechanism to remove floating vegetation. Invariably, some form of aquatic vegetation makes its way into these canals each year is stranded due to the stagnant water conditions, and thrives. When the undesirable vegetation in these canals has reached unacceptable levels, shoreline property owners call LDWF to complain.

Coverage
Estimates of vegetation coverage (as of November 13, 2017) are provided below:
Problematic Species -
Common Salvinia (*Salvinia minima*) – 25 acres
Water Hyacinth (*Eichhornia crassipes*) – 15 acres
Duckweed (*Lemma spp.*) – 15 acres
Duck Lettuce (*Ottelia alismoides*) – 50 acres
Crested Floating Heart (*Nymphoides cristata*) – 6 acres

Beneficial Species -
Yellow Water Lily (*Nymphaea mexicana*) – 100 acres
Coontail (*Ceratophyllum demersum*) – 100 acres

Biological Control
Salvinia weevils were stocked in the adjacent Blind River area in 2008, and will continue to be stocked as necessary and as they become available. Shortly after the initial stocking, Hurricane Gustav impacted the region and flooded the small slough where our weevil enclosure was located. The flood waters widely dispersed the very small concentration of weevils, inhibiting the ability for them to colonize the area. A site visit was made in 2009, samples were taken, and weevils were not found in samples pulled from the immediate or surrounding area. In late 2013, salvinia weevils living on common salvinia were again introduced into the Blind River area. Follow-up site visits have indicated that weevils are reproducing and spreading in the stocked area. Weevils have been, and will continue to be, stocked as they become available.

Chemical Control
A total of 117 acres of nuisance aquatic vegetation was treated in 2017 by department personnel (Table 3).

**AMITE RIVER HERBICIDE TREATMENTS**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>Herbicides*</th>
<th>Application rates</th>
<th>Acres Treated</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2014</td>
<td>2015</td>
</tr>
<tr>
<td>Water hyacinth</td>
<td>2,4-D</td>
<td>0.5 gal/acre</td>
<td>20</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Glyphosate</td>
<td>0.75 gal/acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common salvinia</td>
<td>Glyphosate/Diquat mixture</td>
<td>0.75 &amp; 0.25 gal/acre</td>
<td>77</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>Diquat</td>
<td>0.75 gal/acre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Glyphosate/Diquat mixture</td>
<td>0.75 gal/acre</td>
<td>81</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>2,4-D</td>
<td>0.5 gal/acre</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All foliar herbicide applications included surfactant at a rate of 0.25 gal/acre, except for 2,4-D which includes a non-ionic surfactant at a rate of 0.125 gal/acre.

**Limitations**

During high water periods within this river complex, common salvinia floods into the surrounding swamps where it flourishes. LDWF spray crews are unable to access these areas due to dense timber and shallow water. Consequently, common salvinia is transported from the swamp into the river when water levels drop.

**Water Quality**

In 2010 (updated in 2016), the EPA listed Amite River as an impaired river due to mercury, fecal coliform, dissolved oxygen levels, chloride and other dissolved solids. Large segments of the river are labelled as not supporting the river’s designated use for fish and wildlife propagation.

https://www.epa.gov/tmdl/impaired-waters-and-tmdls-region-6

**Substrate**

Sandy river bottoms, high in inorganic material.
CONDITION IMBALANCE / PROBLEM

1. Agricultural and urban development in the watershed has resulted in water quality impairment via contaminated runoff.

2. Channel modification and the creation of spoil banks have disconnected much of the surrounding swamp from the river system. As a result, there has been alteration in the natural hydrology, wetland degradation and loss, tree mortality, saltwater intrusion, swamp impoundment, reduced swamp access to aquatic life, and swamp subsidence.

3. Sand and gravel mining in the river has led to vegetation loss, bank instability and increased turbidity and sedimentation. Extensively mined reaches of the river have geomorphically changed from a meandering to a braided stream that is wide and shallow and void of riffle/pool complexes.

4. Amite River is very susceptible to major fish kills, especially in the event of a tropical storm or hurricane.

5. Nuisance aquatic vegetation impedes navigation and degrades habitat.

CORRECTIVE ACTION NEEDED

1. Practice of BMPs to reduce contaminants entering the river, thus improving water quality.

2. Restore the hydrology between the river and the adjacent swamp.

3. Restoration of reaches of the river that have been subject to mining activity.

4. Identify, protect and restore critical fisheries habitat in the watershed.

5. Control nuisance aquatic vegetation in the system and upstream at its source.
RECOMMENDATIONS

1. Work with landowners and other agencies to implement BMPs.

2. Continue to work with land owners and other agencies on projects to restore the hydrology between the river and the adjacent swamp.

3. Work with the mining industry and other agencies on projects to restore reaches of the river that have been subject to mining activity.

4. Initiate a 3-year Age, Growth, & Mortality Study on largemouth bass in order to more effectively evaluate population dynamics within the fish stock.

5. This area will be assessed monthly during the growing season for nuisance aquatic plant infestations. Public complaints will receive a timely response. Problem areas will be treated as they arise with foliar applications in accordance with the approved LDWF Aquatic Herbicide Application Procedures. Common salvinia should be treated from April 1 – October 31 with a mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Turbulence surfactant (0.25 gal/acre). From November 1 – March 31, common salvinia will be controlled with diquat (0.75 gal/acre) and a 90:10 surfactant ratio (0.25 gal/acre). Water hyacinth should be controlled with 2,4-D (0.5 gal/acre) and a 90:10 surfactant ratio (1 pint/acre) or glyphosate (0.75 gal/acre) and a 90:10 surfactant ratio (0.25 gal/acre). Alligator weed should be treated with imazapyr (0.5 gal/acre) and Turbulence surfactant (0.25 gal/acre). Alligator weed growth in developed areas will be treated with imazamox (0.5 gal/acre) and Turbulence surfactant (0.25 gal/acre).