LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

WATERBODY MANAGEMENT PLAN PART B

TICKFAW RIVER, LOUISIANA

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY THREE YEARS

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TABLE OF CONTENTS

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 Greatest Conservation Need

Species of Greatest Conservation Need and threatened and endangered species are managed to rebuild to self-sustaining and fishable populations.

EXISTING HARVEST REGULATIONS

Recreational

All statewide regulations apply to game fish species, see link below:
https://www.wlf.louisiana.gov/page/seasons-and-regulations

Commercial

All statewide regulations apply to commercial fish species, see link below:
https://www.wlf.louisiana.gov/page/seasons-and-regulations

Species of Greatest Conservation Need

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. Gulf Sturgeon (*Acipenser oxyrinchus desotoi*) has no legal harvest or possession.
https://www.wlf.louisiana.gov/page/seasons-and-regulations

SPECIES EVALUATION

Recreational

Black bass 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 (LMB) abundance and size distribution, with the exception of large fish.

Largemouth Bass Catch Per Unit Effort and Structural Indices

Electrofishing has been used to collect LMB population data in the Tickfaw River regularly since 2006. Catch per unit effort (CPUE) results from electrofishing are normally based on the number of fish captured in one hour. This value provides an estimate of relative abundance and allows us to monitor changes in fish abundance over a period of time. Spring electrofishing results indicate lower catch-per-unit-effort (CPUE) of largemouth bass in the years following Hurricanes Gustav, Isaac, and Ida in 2008, 2012, and 2021 (Figure 1). The storms created water quality conditions, such as low dissolved oxygen, that resulted in major fish kills. The two years following Hurricanes Gustav and Isaac the mean total CPUE for Largemouth Bass rebounded steadily. Sub-stock and stock-size fish were more abundant in the spring of 2007 and 2010, and a slight increase was observed in 2014. Similarly, in 2023, an abundance of sub-stock size fish were observed, signaling that a successful spawn transpired in the spring of 2022. This indicates that natural recovery is already occurring, as is typical in years immediately following tropical weather system induced fish kills. The increase in sub-stock and stock-size fish in years following large-scale fish kills illustrates the resilience of bass populations in the Tickfaw River (Figure 2). Total CPUE for 2010 greatly exceeded the long term averages for both stock- and substock-size classes of largemouth bass as depicted in Figures 1 and 2, respectively. In 2018, 2019, and 2020 mean CPUE for substock-, stock-, quality-, and preferred-size classes of Largemouth Bass returned to long-term averages in the absence of major fish kill events (Figure 2).

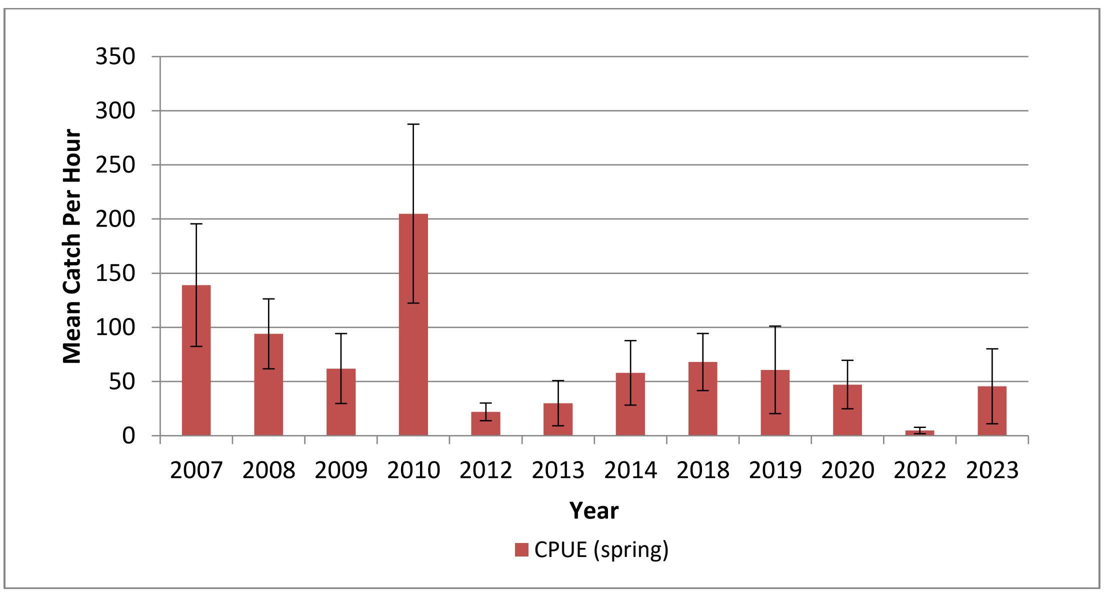

Figure 1. The mean CPUE number per hour for Largemouth Bass from Tickfaw River, LA, during spring electrofishing efforts from 2007 to 2023. Error bars represent 95% confidence limits of the mean CPUE.

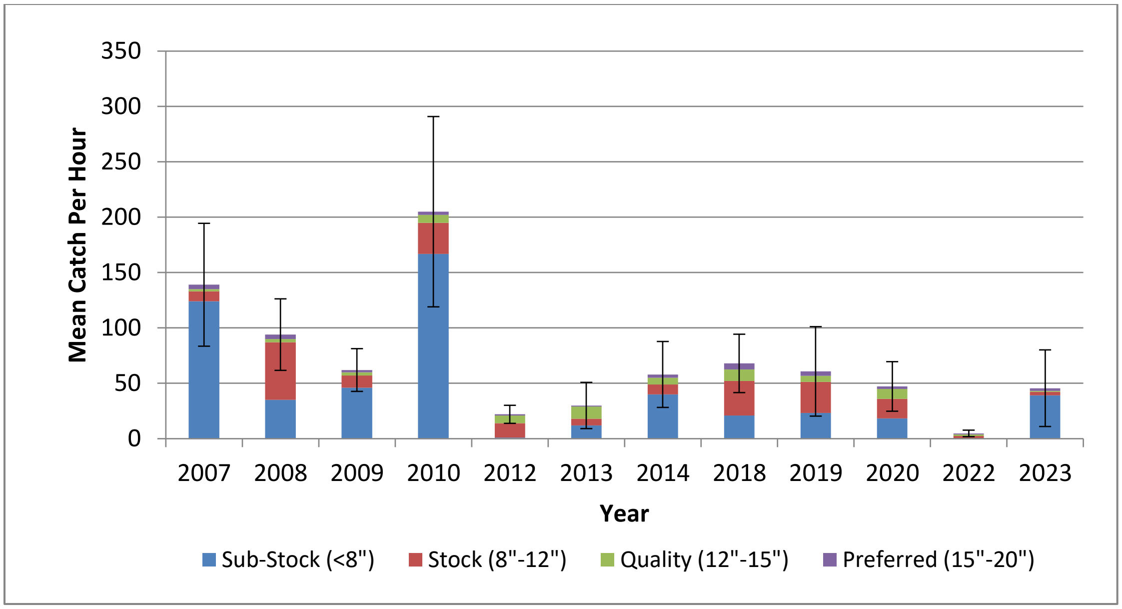

Figure 2. The mean CPUE for sub-stock- (<8"), stock- (8"-12"), quality- (12"-15") and preferred- (15"-20") sized Largemouth Bass from Tickfaw River, LA, during spring electrofishing efforts from 2006 to 2023. Error bars represent 95% confidence limits of the mean total CPUE.

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 40 for 2007. The number indicates that 40% of the bass stock (fish over 8 inches) in the sample was at least 12 inches or longer.

$$\text{PSD}= \frac{\text{Number of bass}>12\text{ inches}}{\text{Number of bass}>8\text{ inches}} \text{x100}$$

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.

$$\text{RSD}= \frac{\text{Number of bass}>15\text{ inches}}{\text{Number of bass}>8\text{ inches}} \text{x100}$$

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). However, both structural indices gradually increased from 2010 through 2014, with the RSD increasing three-fold from 2013 to 2014. Since 2014, RSD has remained stable, while PSD has steadily declined to levels in line with historic averages. The size distribution comparison (length frequencies) from 2012 to 2020 for spring electrofishing results shows that in recent years there has been a wider distribution of inch groups than in 2012 and 2013 (Figure 4).

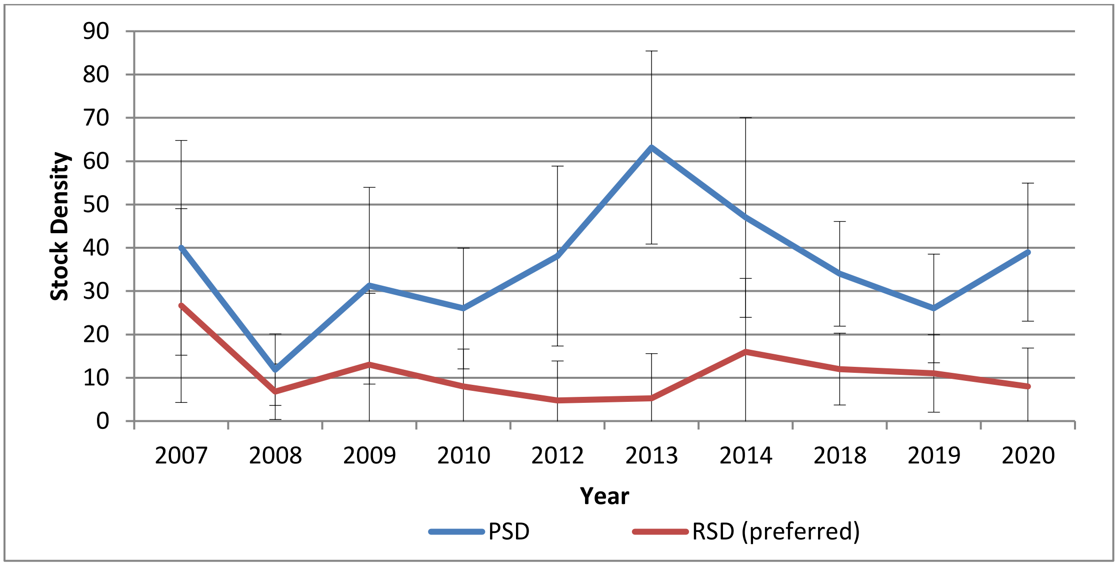

Figure 3. The mean size-structure indices (PSD and RSDp) for Largemouth Bass from Tickfaw River, LA, during spring electrofishing efforts from 2007 to 2020. Error bars represent 95% confidence limits of the mean size-structure indices.

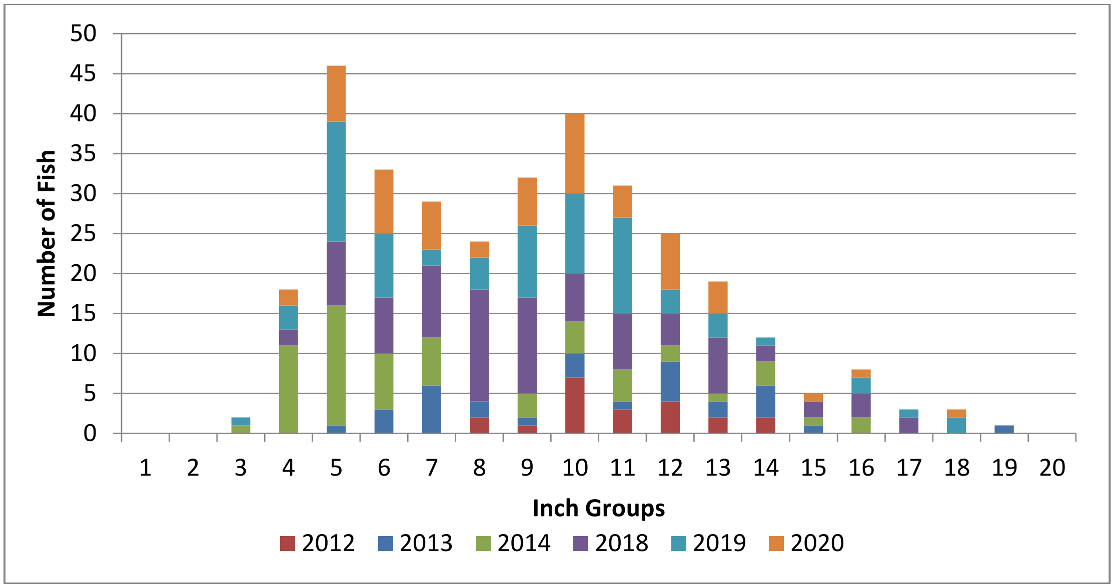

Figure 4. The size distribution (length frequencies) for Largemouth Bass from Tickfaw River, LA, during spring electrofishing efforts for 2012 to 2019. Values for n by year: n=21 (2012), n=30 (2013), n=52 (2014), n=85 (2018), n=76 (2019), n=59 (2020).

Largemouth Bass Stocking and Genetics

Over 365,000 Florida Largemouth Bass (*M. floridanus*) have been stocked into Tickfaw River since 1996 (Table 1). A majority of these fish were stocked post-Hurricanes Katrina and Gustav in response to public outcry over the massive 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 even 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 Amite 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 coastal fish populations have adapted to these periodic storm events and are resilient to these events in the long term.

Table 1. Florida Largemouth Bass stocking in the Tickfaw River, LA from 1996 – 2011.

FLORIDA LMB STOCKING	
Year	Number of Fish
1996	46,264
1997	14,000
1999	33,899
2000	14,244
2001	10,000
2002	19,585
2003	10,036
2004	10,013
2005	10,046
2006	50,260
2007	49,784
2008	49,450
2009	47,183
2011	3,450
TOTAL	**368,214**

Table 2. Results of 2010, 2018, 2019, & 2020 genetic testing for the Florida genome in Largemouth Bass from Tickfaw River, LA.

Year	Number of fish	% Northern	% Hybrid	% Florida
2010	120	93	7	0
2018	38	92	8	0
2019	102	88	12	0
2020	5	100	0	0

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, Redspotted, Warmouth and Longear sunfishes (*Lepomis macrochirus*, *L. microlophus*, *L. miniatus* and *L. gulosus*, *L. megalotis*, respectively). Currently, there are no plans to sample with lead nets in the river.

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 Tickfaw River ranged from 80 to 105 from 2007 through 2020 for all stock length-size and larger fish, indicating an adequate forage base (Figure 5). This Wr suggests that there is ample forage available for bass production.

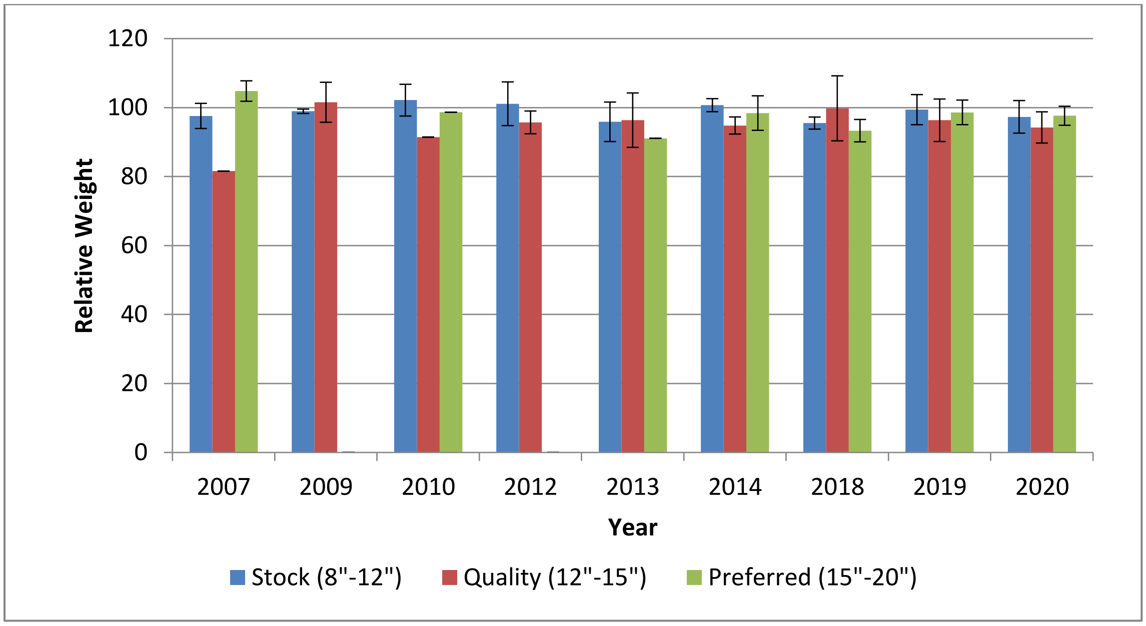

Figure 5. The mean relative weights for stock-, quality-, and preferred size Largemouth Bass collected from Tickfaw River, LA, during fall electrofishing efforts from 2007 to 2020. Error bars represent 95% confidence limits of the mean relative weights.

Electrofishing samples from fall 2012 to 2020 showed that the available forage consisted primarily of Bluegill, Redear, Redspotted and Warmouth sunfishes, Striped Mullet (*Mugil cephalus*), Blackstripe Topminnows (*Fundulus notatus*) and Inland Silversides (*Menidia beryllina*) (Figure 7).

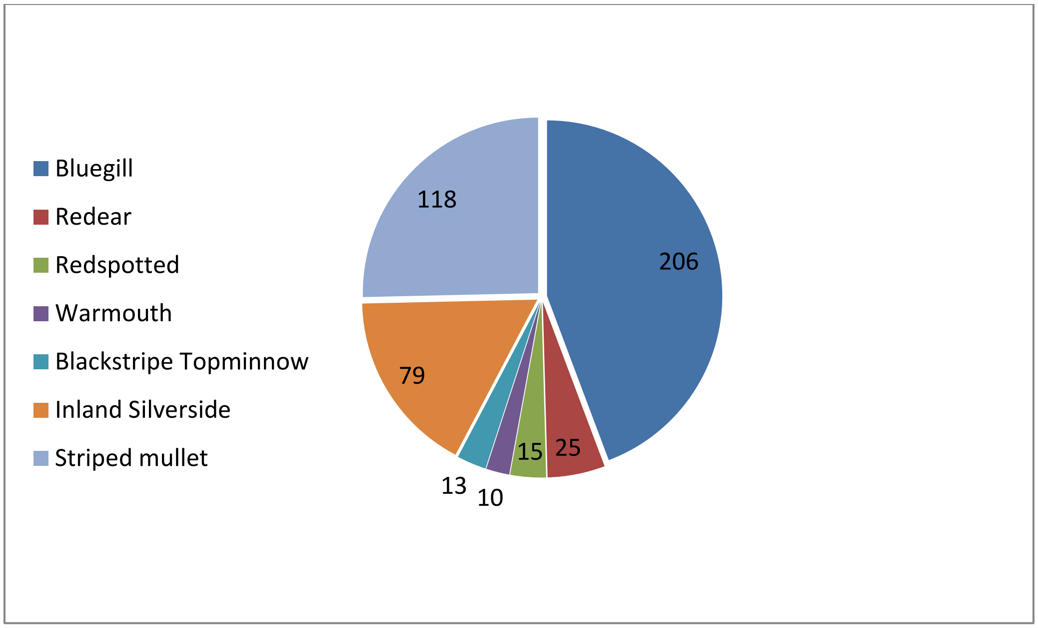

Figure 7. The mean CPUE for forage fish by species for Tickfaw River, LA, from fall electrofishing results from 2012 to 2020.

Aquatic Invasive Species

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

In 2012 and 2013, three adult Silver Carp (*Hypophthalmichthys molitrix*) were identified in the adjacent Amite River. These fish may have been introduced via the Bonnet Carré Spillway operation by the US Army Corps of Engineers during the 2011 flood event. To date, no juveniles have been observed. Sampling efforts took place in summer of 2013, 2014, and 2019 to determine if Asian carp are reproducing in the watershed. None of the samples have detected Asian carp larvae, to date.

HABITAT EVALUATION

Aquatic Vegetation

Nuisance Species

Common salvinia (*Salvinia minima*), water hyacinth (*Pontederia crassipes*), and alligator weed (*Alternanthera philoxeroides*) have been the main source of access and habitat complaints over the past several years. Common salvinia and water hyacinth are scattered throughout the basin, and are consistently restocked by draining swamps and bayous. Within the river system, the desire to own waterfront property has led to the construction of numerous manmade 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 rid themselves of floating vegetation.

Invariably, some form of aquatic vegetation makes its way into these canals each year, stays put due to the stagnant water conditions, and thrives. When the suspect vegetation in these canals reaches unacceptable levels, shoreline property owners call to complain.

Coverage
Estimates of vegetation coverage (as of February 2, 2023) are provided below:

Problematic Species
Common salvinia (*Salvinia minima*) – 10 acres
Water hyacinth (*Pontederia crassipes*) – 10 acres
Duckweed (*Lemna spp.*) – >5 acres
Alligator weed (*Alternanthera philoxeroides*) – 15 acres

Beneficial Species
Yellow water lily (*Nuphar lutea*) – 80 acres
Coontail (*Ceratophyllum demersum*) – 40 acres

Biological Control
NONE

Chemical Control
From 2007 through 2023, an average of approximately 100 acres of aquatic nuisance vegetation was treated annually. The majority of vegetation treated was water hyacinth (*Pontederia crassipes*) and common salvinia (*Salvinia minima*) (Table 3).

Table 3. Types of herbicide treatments for Tickfaw River, LA.

TICKFAW RIVER TYPES OF HERBICIDE TREATMENTS		
SPECIES	Herbicides*	Application rates
Water hyacinth	2,4-D	0.5 gal/acre
	Glyphosate	0.75 gal/acre
Common salvinia	Glyphosate/Diquat mixture	0.75 & 0.25 gal/acre
	Diquat	0.75 gal/acre

*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 the stands of dense timber and shallow water. Consequently, common salvinia and water hyacinth continues to drain out of the swamp, into the river, when water levels drop.

<u>Water Quality</u>
In 2016, the EPA listed portions of the Tickfaw River and its tributaries as an impaired waterbody due to mercury in fish tissue, low dissolved oxygen, high water temperatures, fecal

coliforms and dissolved solids. This listing was updated in 2022, with segments of the river labelled as not supporting the river's designated use for fish and wildlife propagation, as well as primary contact recreation. https://mywaterway.epa.gov/

Substrate
Sandy river bottoms, high in inorganic material.

CONDITION IMBALANCE / PROBLEM

1. Agricultural and urban development in the watershed has contributed to water quality impairment.

2. The lower reach of the river is susceptible to salt water intrusion from Lake Maurepas, this is especially evident during periods of low river flow due to drought conditions and storm water surges during tropical weather events.

3. Tickfaw River is susceptible to major fish kills, especially in the event of a tropical storm or hurricane.

4. Nuisance aquatic vegetation that impedes navigation and degrades habitat.

CORRECTIVE ACTION NEEDED

1. Practice of BMPs to reduce contaminants entering the river.

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

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

RECOMMENDATIONS

1. Work with landowners and appropriate agencies to encourage adherence to BMPs.

2. Continue to support large-scale habitat and watershed improvement projects.

3. 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 in accordance with the approved LDWF Aquatic Herbicide Application Procedures (Table 4).

Table 4. LDWF Aquatic Herbicide Application Procedures.

Plant Species	**Herbicide**	**Surfactant**
Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) + Diquat (0.25 gal/acre) or Clipper (2 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Common/Giant Salvinia (November 1 to March 31)	Diquat (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Water Hyacinth	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Water Hyacinth in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Alligator Weed (undeveloped areas)	Imazapyr (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Alligator Weed (developed areas)	Imazamox (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
American Lotus	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
American Lotus in waiver areas (March 15 to September 15)	Glyphosate (0.5 gal/acre)	Nonionic surfactant (0.25 gal/acre)
American Lotus in waiver areas with potable water intakes (March 15 to September 15)	Triclopyr (0.5gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Duckweed	Diquat (1.0 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Cuban Bulrush (*Oxycaryum cubense*)(sedge)	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Cuban Bulrush (sedge) in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Water Lettuce (*Pistia stratiotes*)	Diquat (1.0 gal/acre)	Nonionic surfactant (0.25 gal/acre)