LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES
INLAND FISHERIES SECTION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

TCHEFUNCTE RIVER COMPLEX

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 numbers of fish adequate to maintain angler interest and efforts. Gulf strain striped bass (*Morone saxatilis*) are managed to maintain a put-grow-take recreational fishery and develop a broodstock source (Gulf States Marine Fisheries Commission 2006).

Commercial

Commercial species are managed with statewide regulations to provide for a sustainable fishery.

Species of Special Concern

Species of greatest conservation concern in the Tchefuncte River include: Gulf Sturgeon (*Acipenser oxyrinchus desotoi*), Paddlefish (*Polyodon spathula*), Flagfin Shiner (*Pteronotropis signipinnis*), River Redhorse (*Moxostoma carinatum*), and the Gulf Logperch (*Percina suttkusi*; Holcomb et al. 2015). Louisiana prohibited the take of all sturgeons in 1990. LDWF biologists established a recovery plan for Gulf Sturgeon in Louisiana. Critical habitat for the Gulf Sturgeon was established in the Pontchartrain Basin. However, it does not extend westward past the Lake Pontchartrain Causeway Bridge to include the Tchefuncte River. The Tchefuncte River has been designated as a Louisiana Natural and Scenic River. Guidelines within this program incorporate strategies that are beneficial to the conservation of Gulf Sturgeon and the other species listed above. Examples include prohibition of dredging, channel realignment, stream clearing, and reservoir construction.

EXISTING HARVEST REGULATIONS

Recreational

Recreational fishing regulations may be viewed at

https://www.wlf.louisiana.gov/page/seasons-and-regulations

STATEWIDE REGULATIONS BY SPECIES	
FRESHWATER	
Crappie	50 daily per person; no size restriction
Largemouth Bass	10 daily per person; no size restriction
Catfish	100 daily per person, with the following minimums: **Note: A maximum of 25 undersize fish of a single or combination of all 3 may be kept within the 100 fish daily creel limit**
Channel Catfish	11" minimum TL
Blue Catfish	12" minimum TL
Flathead Catfish	14" minimum TL
Striped Bass	5 daily per person; no more than 2 bass >30”
Lepomis (all sunfish species)	No limit
White Bass	50 daily per person; no size restriction
Freshwater Drum	25 daily per person; 12” minimum TL
Buffalo Fish	25 daily per person; 16” minimum TL
Bowfin	No limit; 16” minimum TL
SALTWATER	
Red Drum	5 daily per person; 16” minimum TL; only 1 > 27” max TL
Black Drum	5 daily per person; 16” minimum TL; only 1 > 27” max TL
Spotted Seatrout	25 daily per person; 12” minimum TL
Southern Flounder	10 daily per person; no size restriction

Commercial

Statewide species and gear specific regulations apply. There are no special regulations for the Tchefuncte River.

Species of Special Concern

Gulf sturgeon is a federally threatened species. Louisiana prohibited the take of all sturgeon species in 1991. It is also illegal in Louisiana to possess a threatened or endangered species. The daily possession limit for paddlefish is two per person per day with a maximum lower jaw fork length of 30 inches.

SPECIES EVALUATION

Recreational/Sportfish

Largemouth Bass Relative Abundance, Structural Indices and Relative Weight

Largemouth Bass (LMB) occur throughout the Tchefuncte River Complex and its tributaries. Prior to 2017, LMB electrofishing samples in the spring and fall were inconsistent. Beginning in 2017, LDWF began sampling 15 stations in the summer of every fourth year to evaluate LMB populations. Relative abundance or catch per unit effort (CPUE), length frequency, the structural indices of proportional stock density (PSD), relative stock density

(RSD-p), and relative weight (Wr) are calculated for each sample. A summary of electrofishing results from 1990-2020 for stock and quality size fish (Figures 1 and 2) suggests an upward trend in the LMB population in recent years.

The most recent length distributions for Largemouth Bass collected in the summer of 2020 in the Tchefuncte River are presented in Figure 3. The LMB ranged from 3 inches to 21 inches total length (TL). Mean relative weight (Wr) of LMB sampled in 2020 is within the acceptable range (i.e., above 80). Wr is the ratio of a fish's actual weight to the weight of a ''standard'' fish of the same length. This "standard" represents what a "normal" fish would weigh at a given length, and was developed by fisheries scientists over many decades of research. The index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. LMB mean relative weights below 80 may indicate a potential problem with forage abundance and/or availability.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe size distribution (length-frequency) of the population data (Anderson and Neumann 1996). Proportional stock density compares the number of quality size bass (greater than 12 inches for Largemouth Bass) to the number of stock size bass ($\geq$8 inches in length). The PSD is expressed as a percent. A fish population with a high PSD consists mainly of larger individuals. A population with a low PSD consists mainly of smaller fish.

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

Relative stock density (RSD_P) is the proportion of Largemouth Bass in a stock (fish over 8 inches) that are 15 inches or longer.

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

Ideal PSD and RSD_p values for LMB range from 40-70 and 10-40, respectively. PSD and RSD_p percentages for LMB collected in the Tchefuncte River in 2020 are 39.7590 & 10 respectively, (Figures 4). indicatings a LMB population moving toward becoming balanced. Furturemore, results from 2011, 2017, and 2020 CPUE and length frequenceis point to a population recovery from recent hurricanes, as size groups are now simular to those found in 1990 before the recent storms. Similar results have been reported by LDWF biologists in the southwestern part of Louisiana from rivers impacted by Hurricane Rita. The resilience to rebound following major hurricanes (Katrina 2005, and Gustav 2008) appears to be an adaptive trait inherent of coastal fisheries populations.

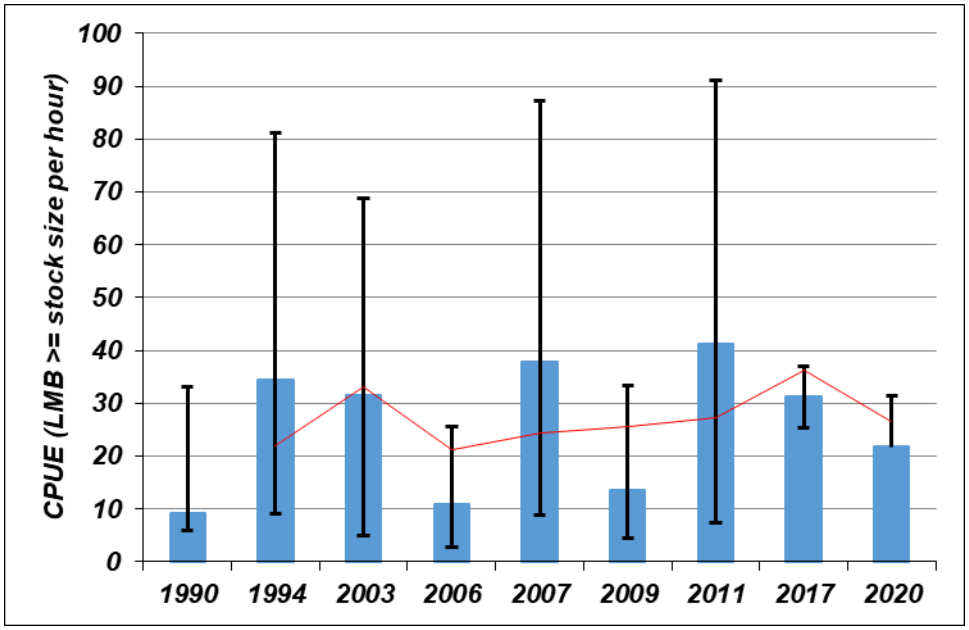

Figure 1. The mean relative abundance (CPUE ± SE) for stock-size LMB collected in electrofishing samples in the Tchefuncte River, Louisiana from 1990 to 2020. * Prior to 2017, samples were collected in the spring and fall. The 2017 & 2020 samples were collected in the summer.

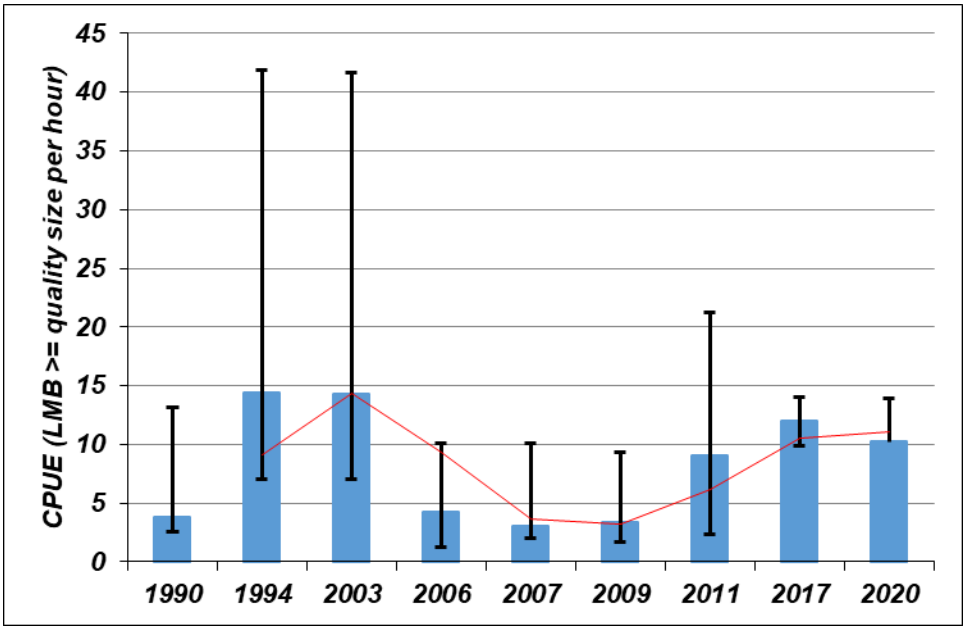

Figure 2. The mean relative abundance (CPUE ± SE) for quality-size LMB collected in electrofishing samples in the Tchefuncte River, Louisiana from 1990 to 2020. * Prior to 2017, samples were collected in the spring and fall. The 2017 & 2020 samples were collected under the new sampling protocol in the summer.

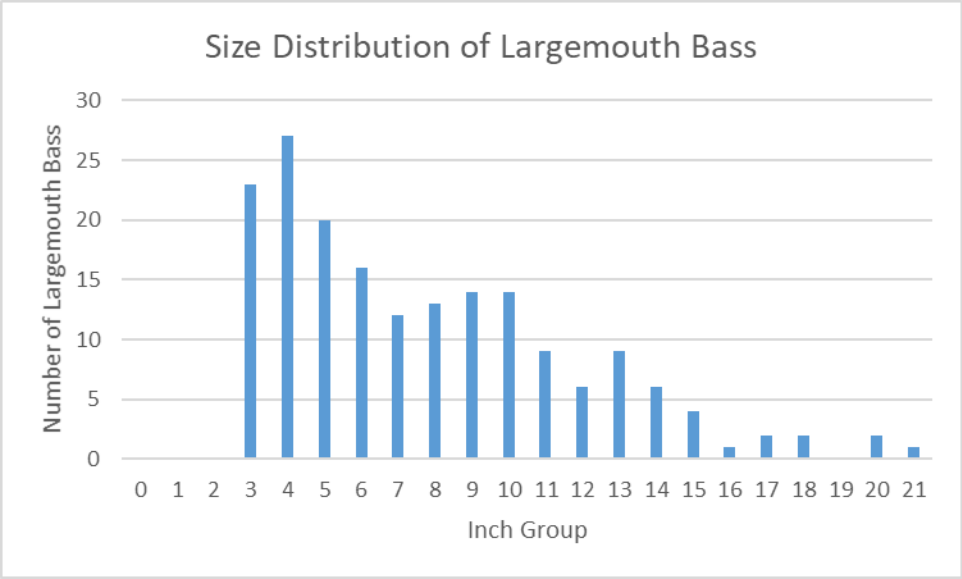

Figure 3. Size distribution by inch group of LMB collected from the Tchefuncte River, Louisiana, in the summer of 2020, n=181.

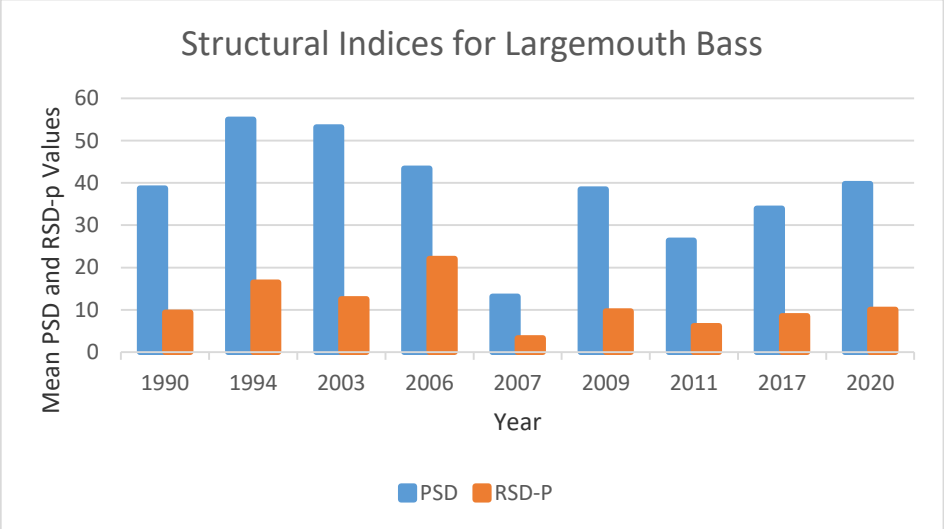

Figure 4. The mean PSD's and RSD-p for LMB collected in electrofishing samples in the Tchefuncte River, Louisiana from 1990 to 2020. * Prior to 2017, samples were collected in the spring and fall. The 2017 & 2020 samples were collected under the new sampling protocol (in the summer).

Forage

Forage availability can be measured indirectly by calculating bass body condition or relative weight. Relative weight (Wr) is a measure of a fish's "plumpness" and is the ratio of the fish weight to that of a determined standard weight for a healthy fish. Largemouth Bass Wr below 80 may indicate a potential problem with forage availability, while Wr near or above 100 indicates a healthy forage base. Mean relative weight (Wr) of LMB sampled in 2020 ranged from 91.65to 109.19and have displayed positive results throughout the years (Figure 5). This indicates that all class sizes of LMB are in fair to good condition, and forage does not appear to be a limiting factor. Crawfish, crabs, river shrimp, grass shrimp and other invertebrates, in addition to common fish species (Table 2), are available as forage to LMB in the Tchefuncte River.

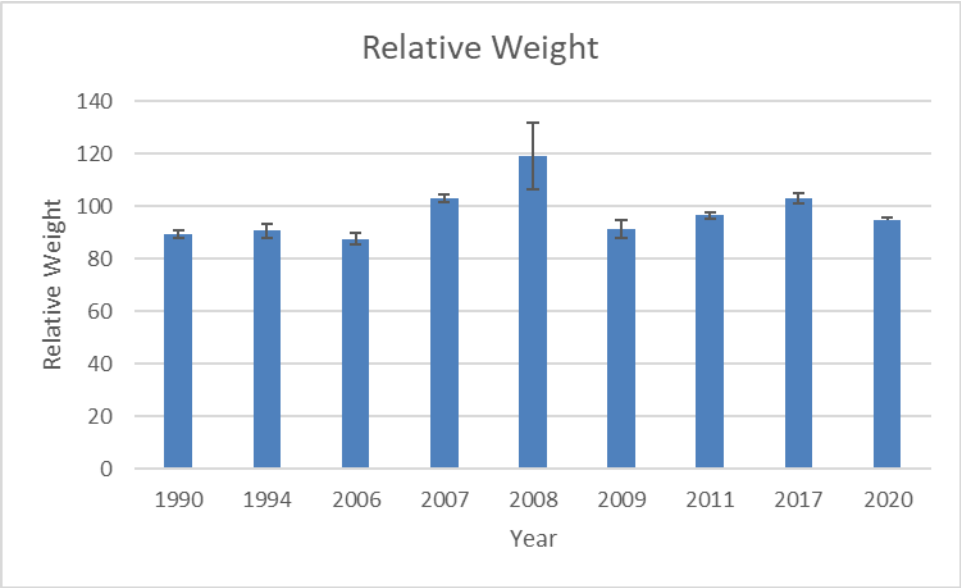

Figure 5. Mean relative weight of stock-size LMB collected in electrofishing samples in the Tchefuncte River, Louisiana from 1990 to 2020. * Prior to 2017, samples were collected in the spring and fall. The 2017 and 2020 samples were collected under the new sampling protocol (in the summer).

Table 2. Available forage for LMB collected in electrofishing samples in the Tchefuncte River, Louisiana in 2020.

Species	CPUE Less than 6 Inches
Largemouth Bass	31.111
Spotted Bass	1.333
Black Crappie	0.444
Bluegill	111.111
Redear Sunfish	29.778
Longear Sunfish	20.889
Redspotted Sunfish	8.444
Warmouth	7.111
Dollar Sunfish	1.778
Golden Shiner	1.333
Weed Shiner	0.444
Blacktail Shiner	5.333
Golden Topminnow	1.333
Blackstripe Topminnow	1.333
Brook Silverside	0.889
Gulf log perch	0.444

Largemouth Bass Genetics

Although Florida Largemouth Bass have been stocked into the Tchefuncte River, no genetic data has been collected to date.

Crappie

Only 2 Black and White Crappies were collected by LDWF standardized electrofishing in the Tchefuncte River in 2020. Crappie continue to occupy a lower position in the total fish composition of the watershed.

Striped Bass

According to the Gulf States Marine Fisheries Commission (GSMFC), the Tchefuncte River supported the highest abundance of Gulf strain striped bass in Louisiana. However, Monzyk et al. (2001) reported catching only 6 striped bass during 1,798 man-days of gill net sampling in the Tchefuncte River (GSMFC 2006) from 1997-2000. It was concluded that flow in the Tchefuncte River was not sufficient for striped bass spawning (GSMFC 2006). Habitat alterations such as shoreline development, siltation, and canal dredging for real estate access may be responsible for the decrease in striped bass in the Tchefuncte River system.

Phase I and II Gulf strain striped bass were stocked into the Tchefuncte River from 1997-1999 to determine the most efficient stocking methods for this species. Rogillio and Rabalais (2000) reported short term survival rates of 0.07% and 36% for phase I and II Gulf strain striped bass, respectively. No striped bass reproduction has been documented and no specimens have been collected in recent LDWF standardized sampling efforts.

Community Assemblage

Fish Assemblages in the Main Stems of the River Complex
A total of 1,139 fish were collected from the main stems of the Tchefuncte River Complex in 2020 (Table 3). Theses samples represent 33 distinct species.

Table 3. Species collected on the main stem of the Tchefuncte River Complex in 2020.

Common Name	Scientific Name	Total
Bluegill	*Lepomis macrochirus*	389
Largemouth Bass	*Micropterus salmoides*	219
Redear Sunfish	*Lepomis microlophus*	113
Longear Sunfish	*Lepomis megalotis*	93
Blacktail Shiner	*Cyprinella venusta*	49
Spotted Gar	*Lepisosteus oculatus*	38
Spotted Bass	*Micropterus punctulatus*	27
Channel Catfish	*Ictalurus punctatus*	25
Gizzard Shad	*Dorosoma cepedianum*	23
Spotted Sucker	*Minytrema melanops*	21
Redspotted Sunfish	*Lepomis miniatus*	20
Warmouth	*Lepomis gulosus*	20
Blacktail Redhorse	*Moxostoma poecilurum*	18
Striped Mullet	*Mugil cephalus*	16
Bowfin	*Amia calva*	14
Blackstripe Topminnow	*Fundulus notatus*	10
Longnose Gar	*Lepisosteus osseus*	6
Weed Shiner	*Notropis texanus*	5
Brook Silverside	*Labidesthes sicculus*	4
Dollar Sunfish	*Lepomis marginatus*	4
Golden Shiner	*Notemigonus crysoleucas*	4
Freshwater Drum	*Aplodinotus grunniens*	3
Golden Topminnow	*Fundulus chrysotus*	3
Smallmouth Buffalo	*Ictiobus bubalus*	3
Black Crappie	*Pomoxis nigromaculatus*	2
Blue Catfish	*Ictalurus furcatus*	2
Gulf log perch	*Percina suttkusi*	2

Common Name	Scientific Name	Total
American Eel	*Anguilla rostrata*	1
Carp	*Cyprinus carpio*	1
Pugnose Minnow	*Opsopoeodus emiliae*	1
Shadow Bass	*Ambloplites ariommus*	1
Striped Bass	*Morone saxatilis*	1
Yellow Bullhead	*Ameiurus natalis*	1
Total		**1139**
Shannon's (H') Diversity Index		**1.7336**
Simpson's (1-D) Diversity Index		**0.7412**
Species Richness		**33**

Fish Assemblage in Wadeable Tributaries and Headwaters
A total of 536 fish were collected from 1st, 2nd, 3rd and 4th order streams in 2020 representing the headwaters through the middle reaches of the complex (Table 4). Theses samples represent 32 distinct species.

Table 4. Fish species collected during tributary sampling in 2020 in the Tchefuncte River Complex.

Common Name	Scientific Name	Number
Longear Sunfish	*Lepomis megalotis*	114
Black Banded Darter	*Percina nigrofasciata*	111
Blacktail Shiner	*Cyprinella venusta*	67
Bluegill	*Lepomis macrochirus*	62
Blackstripe Topminnow	*Fundulus notatus*	24
Shadow Bass	*Ambloplites ariommus*	23
Spotted Bass	*Micropterus punctulatus*	15
Longnose Shiner	*Notropis longirostris*	10
Warmouth	*Lepomis gulosus*	10
Northern Hog Sucker	*Hypentelium nigricans*	9
Gulf Darter	*Etheostoma swaini*	8
Speckled Madtom	*Noturus leptacanthus*	8
Brindled Madtom	*Noturus miurus*	7
Channel Catfish	*Ictalurus punctatus*	7
Weed Shiner	*Notropis texanus*	7
Blackspotted Topminnow	*Fundulus olivaceus*	6
Clear Chub	*Hybopsis winchelli*	6
Dollar Sunfish	*Lepomis marginatus*	6
Pirate Perch	*Aphredoderus sayanus*	6

Common Name	Scientific Name	Number
Harlequin Darter	*Etheostoma histrio*	5
Southern Brook Lamprey	*Ichthyomyzon gagei*	5
Blacktail Redhorse	*Moxostoma poecilurum*	4
Naked Sand Darter	*Ammocrypta beani*	4
Green Sunfish	*Lepomis cyanellus*	2
Redear Sunfish	*Lepomis microlophus*	2
Banded Pygmy Sunfish	*Elassoma zonatum*	1
Black Crappie	*Pomoxis nigromaculatus*	1
Cherryfin Shiner	*Lythrurus roseipinnis*	1
Largemouth Bass	*Micropterus salmoides*	1
Silver Chub	*Hybopsis storeriana*	1
Silvery Minnow	*Hybognathus nuchalis*	1
Spotted Sucker	*Minytrema melanops*	1
Total		536
Shannon's (H') Diversity Index		2.09209
Simpson's (1-D) Diversity Index		0.82389
Species Richness		32

Commercial

The Tchefuncte River supports a small trotline commercial fishery for catfishes The Tchefuncte River commercial fishery is limited by a seine, nets and webbing prohibition.

Species of Special Concern

Gulf Sturgeon (*Acipenser oxyrinchus desotoi*): The Gulf Sturgeon is listed as a threatened species by the USFWS and is considered an endangered species in Louisiana. Although most Gulf Sturgeon in Louisiana are observed in the Pearl River, they have been caught near the mouth of the Tchefuncte River in Lake Pontchartrain during the winter months. This species has experienced a severe decline in population size over the last several decades. Population decline is a result of habitat destruction, siltation, overfishing and the blocking of waterways. Gulf Sturgeon migrate upstream each year to spawn, and the construction of navigational dams has restricted sturgeon from reaching their ancestral spawning grounds. The Gulf Sturgeon requires very specific spawning habitats that are threatened by development and agricultural practices (Gulf Sturgeon Recovery Plan 1995). http://ecos.fws.gov/docs/recovery_plans/1995/950922.pdf

Paddlefish (*Polyodon spathula*): Although Paddlefish were historically abundant throughout the Mississippi River drainage, their numbers have declined in recent years due to habitat alterations, overfishing, and pollution (Ross 2001). The demand for Paddlefish roe has created an aggressive commercial fishery. Louisiana does not allow commercial fishing for Paddlefish. Recreational anglers are only allowed to keep two incidentally caught Paddlefish. Although LDWF does not specifically monitor Paddlefish populations in the

Tchefuncte River, there is a statewide concern to conserve this ancient species. LDWF, through its Native Fishes in the Classroom Program, promotes education and conservation of this species in Louisiana.

Flagfin Shiner (*Pteronotropis signipinnis*): The Flagfin Shiner is found in the headwaters of streams located in the Florida Parishes in southeastern Louisiana. This shiner has become a species of concern because of of habitat destruction from agricultural and residential development (Ross 2001). Development continues to spread throughout the range of this species.

River Redhorse (*Moxostoma carinatum*): R.E. Jenkins (1980) noted nationwide population declines of this species. Researchers believe the decline in this species may have resulted from a decline in the population of native mussels, the primary diet of the River Redhorse. In addition, siltation of spawning grounds may have caused a decrease in the number of river redhorse (Ross 2001).

Gulf Logperch (*Percina suttkusi*): Two Gulf Logperch were observed in the Tchefuncte River watershed in 2020, the current status of the Gulf Logperch in Louisiana is unknown.

HABITAT EVALUATION

Habitat Evaluation of Tributaries and Headwaters

Habitats were evaluated on the tributaries and the headwater portion of the watershed in the summer of 2017 and 2020. A visual-based habitat assessment defined in the EPA's Rapid Habitat Assessment (RHA) protocol was used in 2017 to rate the quality of the habitat. Habitat ratings ranged from 17.8 to 12.8, with no habitats ranking in the marginal to poor category. Physical parameters including turbidity (NTU), water temperature (°C), dissolved oxygen (mg/L), and conductivity (u mhos/cm), were collected in 2020 (Table 5).

Table 5. Physical data collected on the tributaries sampled in 2020 in the Tchefuncte River Complex.

Station code	Latitude	Longitude	Water Temp.	Conductivity	Salinity	pH	Turbidity (NTU)	D.O.
4307	30.48550	-90.00930	23.91	0.04	0.02	6.17	13.46	5.29
4306	30.48230	-90.02670	24.50	0.04	0.02	6.10	12.70	5.00
4312	30.81940	-90.29050	22.30	0.04	0.02	6.00	39.76	6.61
4311	30.55620	-90.22040	25.53	0.04	0.01	6.59	32.92	6.76
4310	30.53420	-90.20360	25.19	0.04	0.01	6.59	13.63	6.76
4315	30.49150	-90.07540	24.36	0.04	0.02	6.42	10.34	6.69
4316	30.49970	-90.06350	24.17	0.04	0.02	6.25	11.48	6.75
4317	30.53360	-90.05620	24.05	0.03	0.01	6.36	9.62	6.39
4318	30.52440	-90.77310	24.84	0.05	0.02	6.85	13.80	6.93
4319	30.55670	-90.14610	23.43	0.03	0.01	6.00	15.81	7.03

Station code	Latitude	Longitude	Water Temp.	Conductivity	Salinity	pH	Turbidity (NTU)	D.O.
4320	30.58490	-90.14900	23.58	0.03	0.01	6.00	6.14	6.81
4321	30.62870	-90.17140	23.01	0.02	0.01	5.88	10.96	6.36

Aquatic Vegetation

Giant salvinia (*Salvinia molesta)* was discovered in the Tchefuncte watershed in 2014. The exotic invasive species is currently being managed and monitored on a regular basis. Infestations of giant salvinia persist in the shallow marshes east and west of the Tchefuncte River. Access to these areas is limited to surface drive vessels or air boats. In addition, water lettuce (*Pistia stratiotes)* is being managed in response to resident complaints. Although aquatic plant issues do not typically restrict access in these areas, common salvinia, giant salvinia, water hyacinth, primrose, and alligator weed have been the primary focus of nuisance aquatic plant control efforts in the system (Table 6).

Plant Coverage Estimates as of December 2020

Water hyacinth	100 acres
Common Salvinia	50 acres
Giant Salvinia	50 acres
Duckweed	10 acres
Alligator weed	100 acres

Table 6. Area (acres) of aquatic nuisance vegetation sprayed by year (2011 – 2020) and species on the Tchefuncte River, LA.

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2020**	**Total**
Alligator Weed	20	14	0	6	18.7	35	47	4	144.7
Pennywort	8	0	0	0	0	8	0	7	23
Primrose	0	0	0	5	0.06	24	3.5	35	67.56
Common Salvinia	9	2	17	31	13.03	9	24	17	122.03
Duckweed	0	0	3	0	0	0	0	0	3
Water Hyacinth	0	0	0	84		115.8	109	258	566.75
Giant Salvinia	0	0	0	4	5.06	0	57	8	74.06
Torpedo Grass	0	0	0	0	0	0	0	1	1
Total	37	16	20	130	36.85	191.8	240	330	1001.6

Substrate

The substrate consists of sand, gravel, and organic material.

Dams, Weirs, and Reservoirs

There are currently no dams, weirs or reservoirs on the river.

CONDITION IMBALANCE / PROBLEM

Habitat alterations such as shoreline development, siltation, and canal dredging for real estate access may be responsible for the decline of several fish and mussel species in the Tchefuncte River system. The Flagfin Shiner is found in the headwaters of streams located in the Florida Parishes. This shiner has become a species of concern as a result of habitat destruction from agricultural and residential development (Ross 2001).
Researchers believe the decline in the river redhorse population may have resulted from siltation of spawning habitat and a decline in native mussels within the watershed (Ross 2001).

A fish consumption advisory is in effect for the Bogue Falaya and Tchefuncte Rivers. Primary water contact (swimming) advisories exist for the Tchefuncte River, the Bogue Falaya River, and bordering waters, due to excessive levels of the *Escherichia coli* bacterium.

CORRECTIVE ACTION NEEDED

Increased coordination between appropriate agencies, non-governmental organizations, and other interested parties are needed to identify and remediate habitat alterations within the watershed.

RECOMMENDATIONS

1. Continue regular assessments and herbicide applications will be made to ensure all major waterways in the complex are open and accessible.

    a. Chemical Control
    Additional requests for nuisance plant treatments primarily come from waterfront residents. LDWF will continue to prioritize and make treatments as necessary in this area. Further assessments and herbicide applications will be made in areas containing significant infestations of giant salvinia. Herbicide applications will be conducted as needed per the LDWF Aquatic Herbicide Application Procedures (Table 1).

    b. Physical Control
    None at this time.

    c. Biological Control
    Introduce giant salvinia weevils (*Cyrtobagous salviniae*) into areas that contain concentrations of giant salvinia when necessary and available.

2. Continue the use of existing recreational harvest regulations until LDWF sampling results

indicate that change is necessary from a biological perspective.

3. Continue scheduled rivers and stream sampling protocol on a four-year rotation of fish populations and habitat evaluation

Table 7. LDWF Aquatic Herbicide Application Procedures.

Plant Species	Herbicide	Surfactant
***Salvinia spp*. Alternative 1** Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Diquat (0.25 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 2** Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Flumioxazin (2 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 3** Common/Giant Salvinia (April 1 to October 31)	MSM (1 oz./acre) Flumioxazin (1 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
***Salvinia spp*. Alternative 4** Common/Giant Salvinia (November 1 to March 31)	Diquat (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
***Salvinia spp*. Alternative 5** Common/Giant Salvinia (November 1 to March 31)	Flumioxazin (12 oz./acre)	Turbulence (or approved equivalent, 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/Giant Cut Grass (undeveloped areas)	Imazapyr (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Alligator Weed/Giant Cut Grass (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) or Flumioxazin (8 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)
Cuban Bulrush (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	Diquat (1.0 gal/acre) or Flumioxazin (6 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)

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