

Gibbons Creek Reservoir

2018 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Gibbons Creek Reservoir were surveyed in 2019 using electrofishing and gill netting. Historical data are presented with the 2019 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Gibbons Creek Reservoir is a 2,770-acre impoundment located in the Navasota River Basin in Grimes County, Texas, 14 miles east of College Station, Texas. Impounded in 1981 by Texas Municipal Power Agency (TMPA), the reservoir was used for power-plant cooling and is now used for recreational purposes. Angler Access consists of a 5-lane boat ramp, bank access and a pier. Americans with Disabilities Act (ADA) approved restrooms are available. Water level has been within 3 feet of spillway elevation since 2017. Habitat features consisted of aquatic plants (both native and non-native species), standing timber, and rocks.

Management History: Sport fish in Gibbons Creek Reservoir include Largemouth Bass (*Micropterus salmoides*), Blue Catfish (*Ictalurus furcatus*), Channel Catfish (*I. punctatus*) and crappie. Largemouth Bass regulations have sought to protect the trophy potential of the population and are currently managed under a 16- to 24-inch slot-length limit and a five-fish daily bag limit, with one fish over 24 inches allowed per angler per day. White Crappie (*Pomoxis annularis*) and Black Crappie (*P. nigromaculatus*) have been managed under a 10-inch minimum-length limit with a combined 25-fish daily bag for since 1988. Channel Catfish and Blue Catfish were managed with a 9-inch minimum length limit and 25-fish daily bag until 1995 when the minimum-length limit was increased to 12 inches. The use of trotlines, juglines, and throwlines in Gibbons Creek Reservoir is prohibited.

Fish Community

- **Prey species:** Threadfin Shad (*Dorosoma petenense*), Gizzard Shad (*D. cepedianum*), and multiple sunfish species (*Lepomis spp.*) were present in the reservoir.
- **Catfishes:** Blue Catfish and Channel Catfish remain available to angler harvest, and anecdotal reports indicate most anglers were successful in catching both catfishes. Flathead Catfish were present in the reservoir.
- **Temperate basses:** White Bass (*Morone chrysops*) were not present in Gibbons Creek Reservoir until 2018 when anglers began reporting White Bass catches. White Bass were observed in gill netting and electrofishing surveys for the first time in 2019.
- **Largemouth Bass:** Largemouth Bass are were abundant with legal-size fish available for harvest and many fish in the 16-inch to 24-inch protective slot limit available for catch and release angling. Largemouth Bass growth was good; the average age of 16-inch fish was 3.1 years.
- **Crappies:** White Crappie and Black Crappie were observed during gill netting and electrofishing surveys.

Management Strategies: Continue regulating Largemouth Bass harvest with a 16-24-inch slot limit. Work with TMPA to keep Gibbons Creek Reservoir open for angling. Inform the public about the negative impacts of aquatic invasive species. Continue general monitoring with electrofishing in 2022, gill netting in 2023, and annual vegetation and access surveys.

Introduction

This document is a summary of fisheries data collected from Gibbons Creek Reservoir in 2019. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2019 data for comparison.

Reservoir Description

Gibbons Creek Reservoir is a 2,770-acre impoundment located in the Navasota River Basin in Grimes County, Texas, 14 miles east of College Station, Texas. The reservoir was impounded in 1981 by Texas Municipal Power Agency (TMPA) for cooling the coal-fired Gibbons Creek Steam Electric Station. TMPA discontinued regular electrical generation at Gibbons Creek Steam Electric Station in 2017 but has continued operating Gibbons Creek Reservoir and surrounding land as a park with camping and fishing access. Americans with Disabilities Act (ADA) approved restrooms are available. Water level has been within 3 feet of spillway elevation since 2017 (Figure 1). Habitat consisted of native and non-native submersed aquatic plants, standing timber, and rocks. Water hyacinth has caused access issues in the past and has been historically controlled with herbicide. Hydrilla has also been present. Additional descriptive characteristics for Gibbons Creek Reservoir are presented in Table 1.

Angler Access

Gibbons Creek Reservoir has excellent angler access infrastructure with a 5-lane boat ramp, and a 750-square-foot fishing pier, and bank access from the fishing pier to the spillway of the dam (Table 2). However, TMPA limited park operating hours to weekends for day-use visitors as operation costs have increased and power generation as ceased. Camping is publicly available seven days a week by reservation, and reservoir access is available to registered campers throughout the week.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Webb and Best 2015) included:

1. Largemouth Bass an important fishery with high trophy potential on Gibbons Creek Reservoir. Continue to monitor Largemouth Bass relative abundance, population size structure, and genetics every four years by electrofishing. Request stockings of fingerling Florida Largemouth Bass annually to continue supporting the trophy potential of Gibbons Creek Reservoir.

Action: Largemouth Bass relative abundance was monitored in 2008, 2010, 2014, and 2019. Genetic influence of Florida Largemouth Bass on the Largemouth Bass population was analyzed regularly. Florida Largemouth Bass were stocked in 2008, 2010, 2011, and 2019. Creel surveys of anglers were conducted in 2007 and 2011.
2. Blue Catfish and Channel Catfish are plentiful but an underutilized resource for anglers. Promote the Blue Catfish fishery in local media outlets. Continue to monitor the Blue Catfish population with gill netting every four years.

Action: Catfish populations were monitored by gill netting in 2015 and 2019. Gibbons Creek Reservoir was promoted as a catfish fishery to local anglers.
3. Continue to monitor hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes*) annually. Assist the controlling authority as needed with treatments.

Action: Exotic vegetation was surveyed annually. TPWD supported exotic species control efforts by TMPA.

Harvest regulation history: Sport fish in Gibbons Creek Reservoir include Largemouth Bass, Blue Catfish, Channel Catfish, White Crappie, and Black Crappie. Largemouth Bass are currently regulated with a 16- to 24-inch slot length limit. All other sport fishes are managed using statewide regulations. The use of trotlines, juglines, and throwlines in Gibbons Creek Reservoir is prohibited. All other sport fish are managed under statewide regulations. Current regulations are found in Table 3.

Gibbons Creek Reservoir has a history of producing trophy Largemouth Bass, including five Largemouth Bass over 13 lbs. that were donated to the Sharelunker Program. The current waterbody record is 16.13 lbs. Largemouth Bass regulations have sought to protect the trophy potential of the Largemouth Bass population. Gibbons Creek Reservoir opened for angling in March 1981 under a 14- to 24-inch slot-length limit for Largemouth Bass. The slot limit on bass was amended to a 14- to 21-inch slot-length limit after one year and remained under that regulation until 1992 when a catch-and-release-only regulation was adopted. From 2002-2017, the bass fishery was managed under a 14- to 24-inch slot-length limit and a five-fish daily bag limit with one fish over 24 inches allowed per angler per day. Largemouth Bass have been managed under a 16- to 24-inch slot-length limit and a five-fish daily bag limit with one fish over 24 inches allowed per angler per day since 2018.

Stocking history: Immediately after impoundment in 1981, Gibbons Creek Reservoir was stocked with Channel Catfish, Blue Catfish, Bluegill (*Lepomis macrochirus*), Redear Sunfish (*L. microlophus*), and Florida Largemouth Bass. Kemp's Largemouth Bass were stocked in 1985. Florida Largemouth Bass were stocked in 2002, 2003, 2008, 2010, and 2011 to enhance the potential for trophy bass production. A full stocking history is available in Table 4.

Vegetation/habitat management history: The primary habitat in Gibbons Creek Reservoir is aquatic vegetation, both native and exotic. From the early 1980s through the mid-1990s, hydrilla was present in moderate quantities and, along with a mixed native plant community, provided excellent fish habitat. Vegetation coverage was greatly reduced by the late 1990s; however, mixed native plants and hydrilla coverage have increased in recent years. Water hyacinth treatments have been conducted by TMPA as needed.

Water transfer: Gibbons Creek Reservoir is owned and operated by TMPA. Outflow is to Gibbons Creek, a tributary of the Navasota River in the Brazos River drainage. No inter-basin water transfer exists.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Gibbons Creek Reservoir (TPWD unpublished). Primary components of the 2015-2019 OBS plan are listed in Table 5. All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Water level – Source for water level data was the United States Geological Survey (USGS 2019).

Angler access and use – An access survey was conducted in summer 2018 and TMPA provided reservoir entry data for all day-use anglers.

Habitat – A structural habitat survey was conducted in 2018. Vegetation surveys were conducted in 2014-2018 to monitor native and non-native aquatic plants. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad (*Dorosoma cepedianum*), and Threadfin Shad (*D. petenense*) were collected by electrofishing. Daytime electrofishing took place in May of 2019 at biologist-selected stations after low conductivity (78 $\mu\text{S}/\text{cm}$) prevented successful fall nighttime

electrofishing at randomly selected survey stations. Spring electrofishing effort was doubled from the proposed 2014 Objective Based Sampling Plan to 2 hours at 24, 5-minute stations to gather sufficient population metrics and meet OBS objectives for prey species and Largemouth Bass (Webb and Best 2015). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 20 randomly selected fish (range 15.0 to 16.9 inches). Standard fall electrofishing survey was attempted in October 2018, but heavy rainfall reduced Gibbons Creek Reservoir's specific conductivity, and electrofishing success was low (Table 1, Appendix A).

Gill netting – Channel Catfish, Blue Catfish, and White Bass (*Morone chrysops*) were collected by gill netting (5 net nights at 5 randomly-selected stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Micro-satellite DNA analysis was used to determine genetic composition of individual fish.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE), which is defined as $RSE = 100 \times SE$ of the estimate/estimate, was calculated for all CPUE and creel statistics.

Results and Discussion

Angler access and use: Angler access infrastructure, such as the boat ramp and restrooms, were in good condition at Gibbons Creek Reservoir. Gibbons Creek Reservoir will remain open to the public for day-use on weekends and holidays and 7 days a week for campers. The property, including the reservoir and surround park land, are for sale, but there have been no offers from prospective buyers. TMPA will continue to be the controlling authority for Gibbons Creek Reservoir for the foreseeable future. An average of 832 day-use anglers fished Gibbons Creek Reservoir each month from May 2018 through April 2019 (Figure 2). Fishing activity by campers was not recorded but was observed.

Habitat: Littoral habitat consisted primarily of natural shoreline with vegetation and standing timber (Table 6). Total vegetation coverage has decreased slightly since 2014, and native species are still the predominant vegetation group; however, non-native species have become proportionally more abundant in recent years (Table 7). Native vegetation covered 6% of the reservoir's surface area and non-native vegetation covered 4%. The majority of non-native vegetation was composed of water hyacinth.

Prey species: Low-conductivity water affects electrofishing surveys by reducing effectiveness, leading to reduced catch rates and size bias, thus creating unreliable population metrics (Alabaster and Hartley 1962, Dolan et al. 2004, Reynolds 1996). Many small bodied fish were observed leaving the electric capture field unaffected, thus only general trends in prey species populations can be determined for the 2019 electrofishing survey. Observed 2019 population metrics (IOV, PSD, size structure) do not disagree with past surveys (Figure 3-Figure 6), and combined with acceptable predator body condition, it can be assumed that there is sufficient forage in Gibbons Creek Reservoir to support game fish production.

CPUE of Gizzard Shad and Bluegill were low (19.5/h and 68.0/h, respectively), likely due to low water conductivity and poor electrofishing results (Figure 4 and 6); however, enough fish were captured to estimate IOV for Gizzard Shad and population size structure for Bluegill. The IOV for gizzard shad in 2019 was excellent (100, Figure 4). While this IOV may be artificially high due to gear bias under low-conductivity conditions poor electrofishing conditions, past surveys indicate generally high IOV for Gizzard Shad in Gibbons Creek Reservoir, so it is reasonable to assume that a large majority of Gizzard Shad were available to predators in 2019 (Webb and Gore 2011, Webb and Best 2015). Captured

Bluegill tended to be small-bodied and available to sport fish species as prey, but likely do not provide a preferred panfish fishery, which is in line with historical surveys (Figure 5, Figure 6). Threadfin Shad were observed during the 2018 fall and 2019 spring electrofishing surveys (Appendix A).

Catfishes: Blue Catfish catch rate in 2019 was 23.2/nn, an increase from 2015 (13.3/nn) and decrease from 2011 (29.8/nn, Figure 7). Channel Catfish catch rate was 2.2/nn in 2019, a decrease from 2014 (8.8/nn) and 2010 (15.4/nn, Figure 8). Body condition for both species was good, especially at larger body sizes. Anecdotal reports indicate that catfishes are popular targets for anglers, especially those camping at the park, and most anglers harvest legal-sized fish. Flathead Catfish were present and were observed during electrofishing, but only one was successfully captured (Appendix A).

White Bass: White Bass were not historically present in Gibbons Creek Reservoir and were first observed during the 2019 gill netting survey' after which, local anglers were asked about White Bass catches and reported catching fish since, at least, summer of 2018. The method of introduction is unclear. White Bass gill net catch rate was 2.8/nn, fish were in good condition, and all observed fish were available for harvest (Figure 9).

Largemouth Bass: Gibbons Creek Reservoir historically exhibited high Largemouth Bass catch rates (Figure 10). However, low-water conductivity resulted in poor capture efficiency during the 2019 spring daytime electrofishing survey (CPUE-Stock of 41/h) and likely biased the size distribution of the observed population towards large fish (PSD = 84, Figure 11). Mean relative weights for most inch classes were good: between 90-100 in 2019. Largemouth Bass growth was also good with fish reaching 16 inches in 3.1 years on average (N=20, Range=2-5 years). While relative abundance and size distribution were likely misrepresented during the survey, the Largemouth Bass population is likely healthy as seen by good body condition and growth rate. Florida Largemouth Bass influence has remained relatively constant with Florida alleles hovering around 68% since 2007 (Table 8).

Crappies: Black Crappie and White Crappie were observed in the gill net and electrofishing surveys (Appendix A).

Fisheries Management Plan for Gibbons Creek Reservoir, Texas

Prepared-July 2019

ISSUE 1: Closure of the Gibbons Creek Steam Electric Station has brought into question future public access to Gibbons Creek Reservoir.

MANAGEMENT STRATEGY

1. Continue to work with TMPA to maintain public fishing access at Gibbons Creek Reservoir and work with future controlling authorities to maintain public fishing access should ownership change.

ISSUE 2: Largemouth Bass are an important sport fish and have a history of producing trophy-sized fish including five legacy-class ShareLunkers.

MANAGEMENT STRATEGY

1. Continue to monitor Largemouth Bass relative abundance, population size structure, growth, body condition, and Florida-strain influence on population genetics every four years by electrofishing if the reservoir remains public. Request semiannual stockings of Florida Largemouth Bass to maintain Florida genetic influence while reservoir remains public.

ISSUE 3: Water hyacinth was tightly controlled by TMPA via herbicide when Gibbons Creek Steam Electric Station was in operation. TMPA has discontinued regular herbicide treatments and water hyacinth may create access issues in the future.

MANAGEMENT STRATEGIES

1. Continue to conduct annual vegetation surveys of Gibbon Creek.
2. Conducted herbicide control of water hyacinth as needed to maintain public access to Gibbons Creek Reservoir.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*), water hyacinth, and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2019-2023)

Sport fish, forage fish, and other important fishes

Sport fishes in Gibbons Creek Reservoir include Largemouth Bass, Blue Catfish, Channel Catfish, Black Crappie, White Crappie, and White Bass. Forage species include Bluegill, Green Sunfish (*L. cyanellus*), Longear Sunfish (*L. megalotis*), Gizzard Shad, and Threadfin Shad. Future sampling will be conducted to achieve the objectives described below. This plan is subject to change based on the public status of Gibbons Creek Reservoir. A proposed sampling schedule is listed in Table 9.

Low-density fisheries

White Bass: White Bass were first observed in Gibbons Creek Reservoir in 2019. No data exists on their popularity as a sportfish. No young-of-year White Bass were observed during 2019 surveys, and it is unclear if White Bass will become permanently established. Determining presence/absence of White Bass during standard gill net surveys will be sufficient for this species.

Crappies: White Crappie and Black Crappie are present but are not common or popular sportfish in Gibbons Creek Reservoir. Historic trap net surveys of crappies have been highly variable and bootstrap analysis of historic data indicate greater than 20 trap nets would be needed to attain acceptable precision. Directed sampling for crappies is not a priority; however, presence/absence will be determined during electrofishing and gill net surveys for Largemouth Bass and catfishes, as described below.

Survey objectives, fisheries metrics, and sampling objectives

Channel Catfish and Blue Catfish: Blue Catfish and Channel Catfish have historically been the most popular sport fish in Gibbons Creek Reservoir (Webb and Best 2015). Relative abundance, size structure, and condition trend data of catfishes have been monitored by gill netting every four years since 1989 and catch rates of both species have been variable. Popularity of the catfish fishery justifies continued monitoring of the populations.

Blue Catfish and Channel Catfish relative abundance (CPUE), size structure (PSD and length frequency), and body condition (W_r) will be monitored every four years by gill netting in Gibbons Creek Reservoir. A maximum of 5 randomly-selected gillnet stations will be sampled, even if the sampling objective of 50 stock-size fish and an RSE of CPUE-S of ≤ 25 is not met.

Largemouth Bass: Gibbons Creek Reservoir has a history of producing trophy Largemouth Bass, and Largemouth Bass were the second most popular sport fish during the most recent creel survey in 2013. Local tournaments for Largemouth Bass have been held on the reservoir in the past. Trend data on CPUE, size structure, and body condition have been collected regularly since 1985. Historical popularity and the reservoir's location near the Bryan/College Station area support monitoring the Largemouth Bass population at Gibbons Creek Reservoir; however, surveys will be conducted every four years due to limited angler access.

Largemouth Bass will be monitored with electrofishing every four years to determine any large-scale changes in the Largemouth Bass population that may spur further investigation. A minimum of 12 randomly selected 5-minute electrofishing stations will be surveyed during fall in 2022. If needed, additional biologist-selected stations will be surveyed until 50 stock-size fish are collected and the RSE of CPUE-S is ≤ 25 . A maximum of 24 stations will be surveyed.

Largemouth Bass age and growth will be determined using otoliths from 13 fish between 15.0 and 16.9 inches in length to determine the age at which fish enter the 16-inch to 24-inch protective slot limit (Category 2 evaluation, TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Influence of Florida Largemouth Bass in the population will be determined by genetic analysis of 30 fish (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Prey Species: Bluegill, Green Sunfish, Longear Sunfish, Gizzard Shad, and Threadfin Shad are the primary forage species at Gibbons Creek Reservoir. Trends in forage fish relative abundance and size structure will be measured during the electrofishing survey for Largemouth Bass using CPUE and size structure metrics, as appropriate. No additional sites will be surveyed for prey species beyond those surveyed for Largemouth Bass. Largemouth Bass body condition can also provide information on forage abundance and vulnerability relative to predator density.

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Tables and Figures

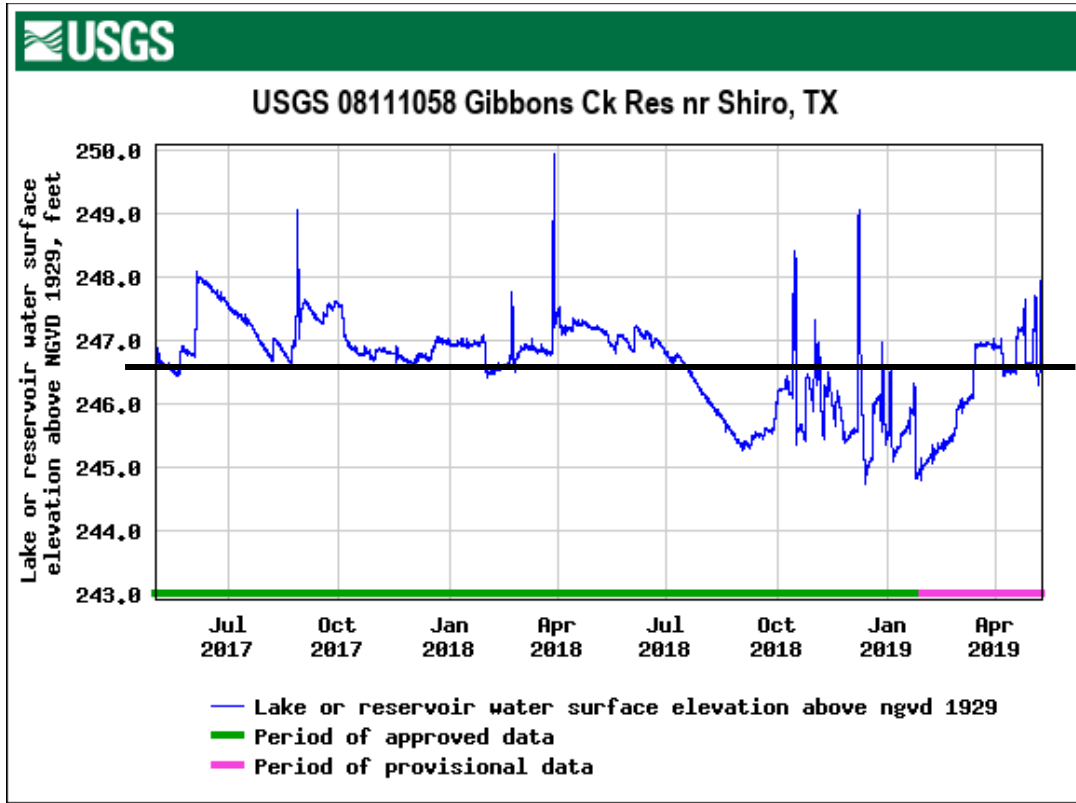


Figure 1. Daily water level elevations in feet above mean sea level (MSL) recorded for Gibbons Creek Reservoir, Texas, May 2017-May 2019.

Table 1. Characteristics of Gibbons Creek Reservoir, Texas.

Characteristic	Description														
Year constructed	1981														
Controlling authority	Texas Municipal Power Agency														
County	Grimes														
Reservoir type	Power plant cooling														
Shoreline Development Index	2.3 (TCEQ, 2011)														
Conductivity	<table border="1"> <thead> <tr> <th>Year</th> <th>Conductivity</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>337 μS/cm</td> </tr> <tr> <td>2011</td> <td>530 μS/cm</td> </tr> <tr> <td>2012</td> <td>582 μS/cm</td> </tr> <tr> <td>2014</td> <td>557 μS/cm</td> </tr> <tr> <td>2018</td> <td>78 μS/cm</td> </tr> <tr> <td>2019</td> <td>91 μS/cm</td> </tr> </tbody> </table>	Year	Conductivity	2010	337 μ S/cm	2011	530 μ S/cm	2012	582 μ S/cm	2014	557 μ S/cm	2018	78 μ S/cm	2019	91 μ S/cm
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2012	582 μ S/cm														
2014	557 μ S/cm														
2018	78 μ S/cm														
2019	91 μ S/cm														

Table 2. Boat ramp characteristics for Gibbons Creek Reservoir, Texas, August 2018. Reservoir elevation at time of survey was 246.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
TMPA Boat Ramp	30.61778 -96.05367	Y	125	243	Excellent condition, Open to day-use on weekends/holidays, open to registered campers daily

Table 3. Harvest regulations for Gibbons Creek Reservoir, Texas. The use of trotlines, juglines, and throwlines in Gibbons Creek Reservoir are prohibited.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5 (only 1 > 24 inches)	16- to 24-inch slot
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Gibbons Creek Reservoir, Texas. FGL = fingerling.

Species	Year	Number	Size
Blue Catfish	1981	115,768	FGL
	Total	115,768	
Channel Catfish	1981	120,000	FGL
	Total	120,000	
Coppernose Bluegill	1981	24,500	FGL
	Total	24,500	
Redear Sunfish	1981	8,780	FGL
	Total	8,780	
Florida Largemouth Bass	1981	121,522	FGL
	2002	126,116	FGL
	2003	211,359	FGL
	2008	138,625	FGL
	2010	59,384	FGL
	2011	140,493	FGL
	2019	30,000	FGL
Total	834,006		
Kemp's Largemouth Bass	1985	254,696	FGL
	Total	254,696	

Table 5. Objective-based sampling plan components for Gibbons Creek Reservoir, Texas 2018-2019.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 15 and 16 inches	$N \geq 13$, 15.0-16.9 inches
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	$N = 30$, any age
Bluegill ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Catfish, Channel and Blue	Abundance	CPUE	RSE ≤ 25
	Size structure	PSD, length frequency	$N = 50$

^aNo additional effort was expended to achieve an RSE ≤ 25 for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort.

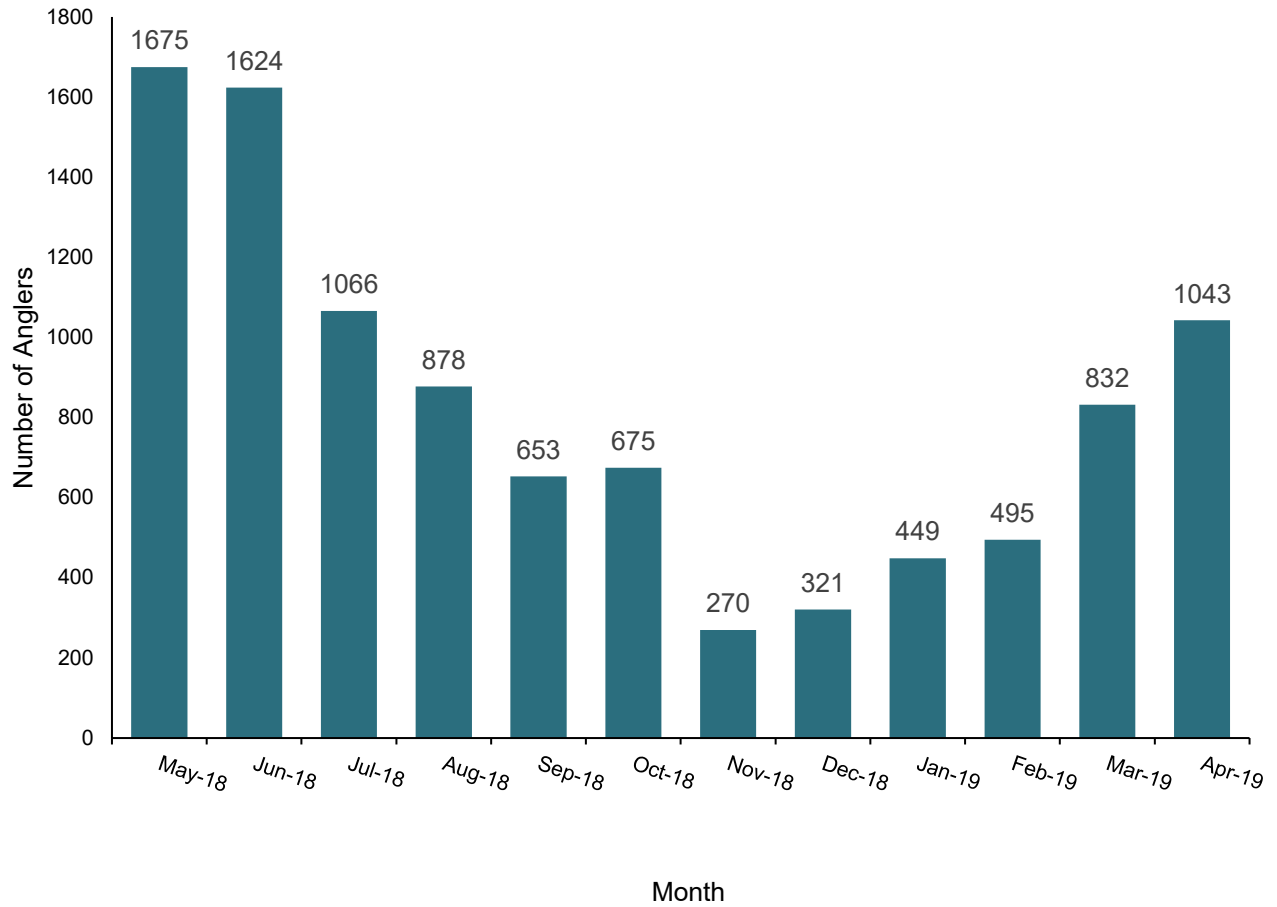


Figure 2. Monthly number of day-use anglers accessing Gibbons Creek Reservoir, Texas, May 2018-April 2019 (TMPA, May 2019).

Table 6. Survey of structural habitat types, Gibbons Creek Reservoir, Texas, 2018. Shoreline habitat type units are in miles and standing timber is acres.

Habitat Type	Estimate (acres)	% of total habitat
Featureless	3.5	23
Featureless/dead trees	3.8	25
Overhanging brush	0.6	4
Overhanging brush/dead trees	5	33
Cut bank	1.2	0.8
Rock bluff/dead trees	0.2	1
Concrete	0.8	5
Rocky shoreline/dead trees	0.1	0.4
Featureless	3.5	23
Standing timber	2.4	<1

Table 7. Survey of aquatic vegetation, Gibbons Creek Reservoir, Texas, 2014-2018. All vegetation was surveyed in 2014 and 2018. Non-native vegetation was surveyed annually. Surface area coverage of vegetation is listed in acres with percent of total reservoir surface area in parentheses.

Vegetation	2014	2015	2016	2017	2018
Native submersed	136.5 (4.9)				0 (0)
Native floating-leaved	140.3 (5.0)				111 (4)
Native emergent	97.0 (3.5)				56 (2)
Total Native	373.9 (13.5)				168 (6)
Non-native					
Hydrilla (Tier III)*	9.3 (0.3)	6 (< 0)	3 (< 0)	89 (3)	48 (2)
Water hyacinth (Tier II)*	37.4 (1.4)	250 (9)	12 (< 0)	50 (2)	55 (2)
Total Non-native	67.4 (2.4)	256 (9)	15 (< 0)	139 (5)	103 (4)

*Tier I is Immediate Response, Tier II is Maintenance Status, Tier III is Watch Status

Gizzard Shad

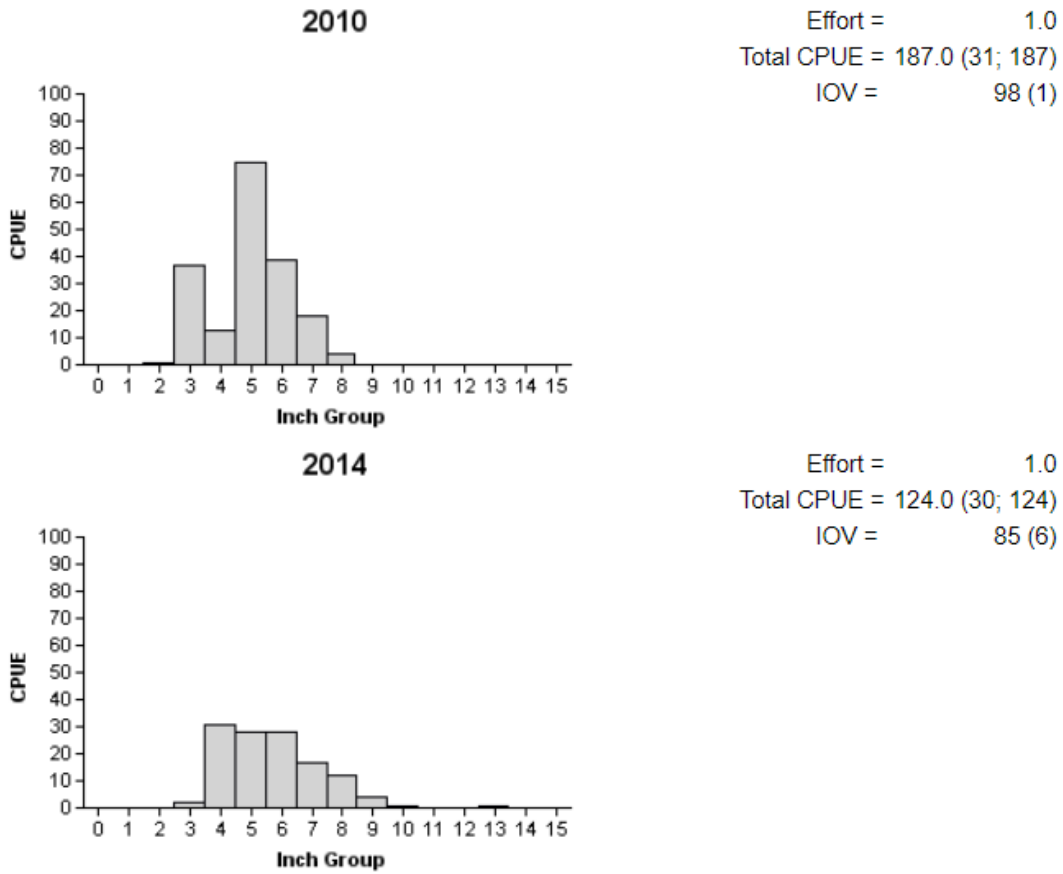


Figure 3. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE; N for CPUE and SE for IOV are in parentheses) for fall nighttime electrofishing surveys, Gibbons Creek Reservoir, Texas, 2010, and 2014.

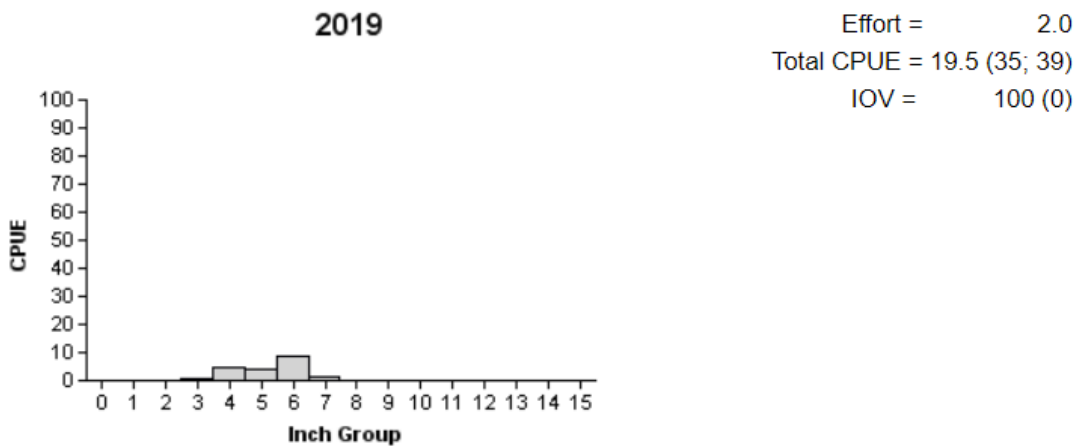


Figure 4. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE; N for CPUE and SE for IOV are in parentheses) for spring daytime electrofishing survey, Gibbons Creek Reservoir, Texas, 2019.

Bluegill

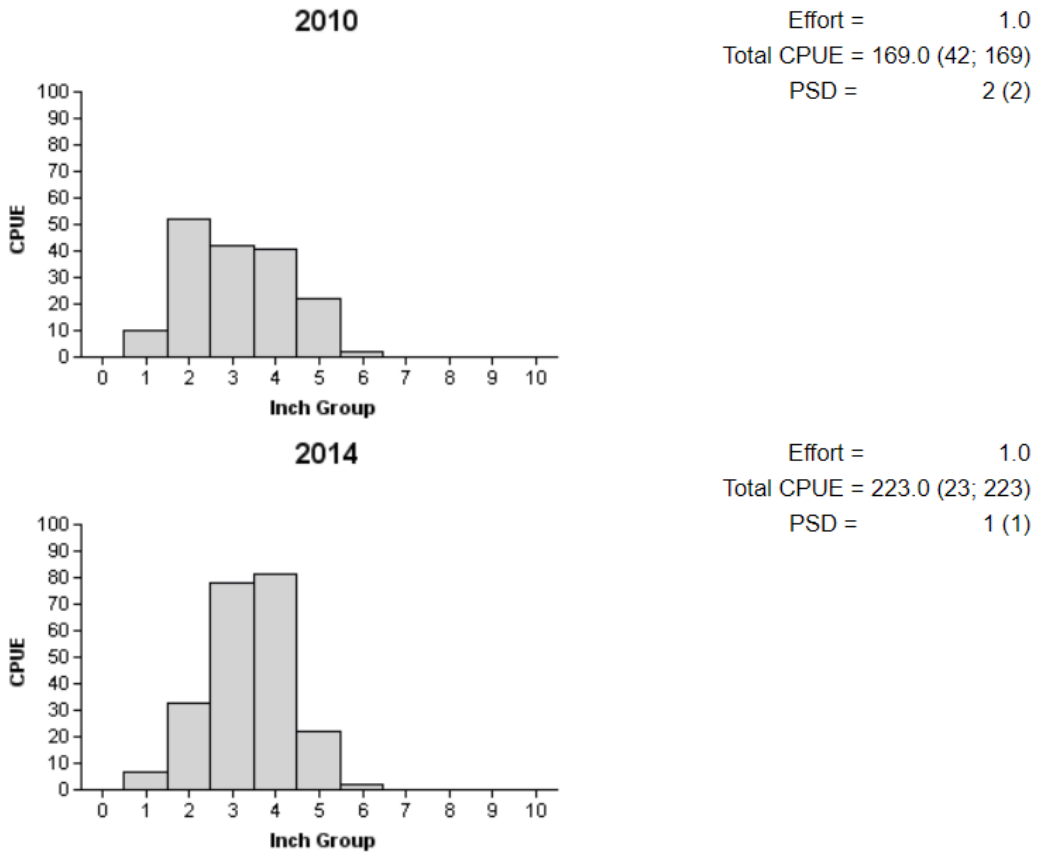


Figure 5. Number of Bluegill caught per hour (CPUE) and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for fall nighttime electrofishing surveys, Gibbons Creek Reservoir, Texas, 2010 and 2014.

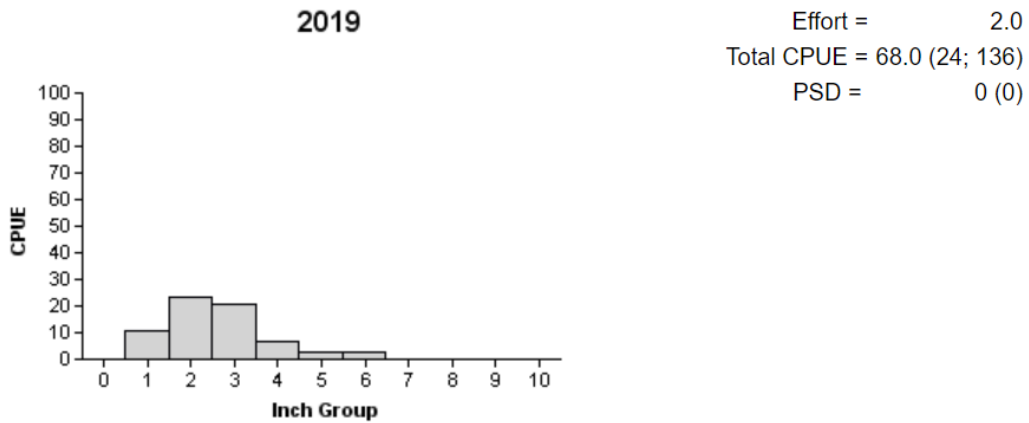


Figure 6. Number of Bluegill caught per hour (CPUE) and population indices (RSE; N for CPUE, and SE for size structure are in parentheses) for spring daytime electrofishing survey, Gibbons Creek Reservoir, Texas, 2019.

Blue Catfish

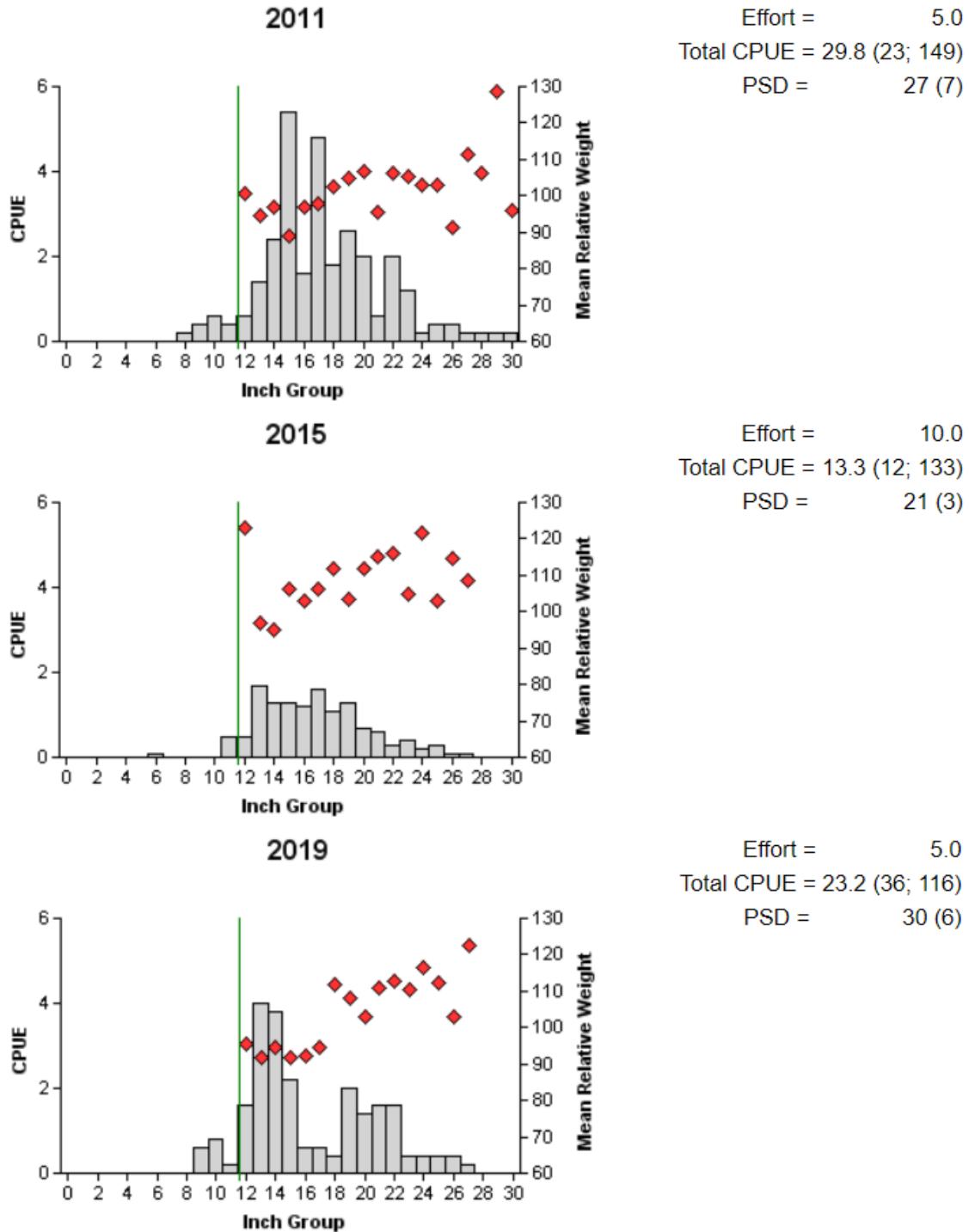


Figure 7. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Gibbons Creek Reservoir, Texas, 2011, 2015, and 2019. Vertical lines indicate the 12-inch minimum length limit for Blue Catfish.

Channel Catfish

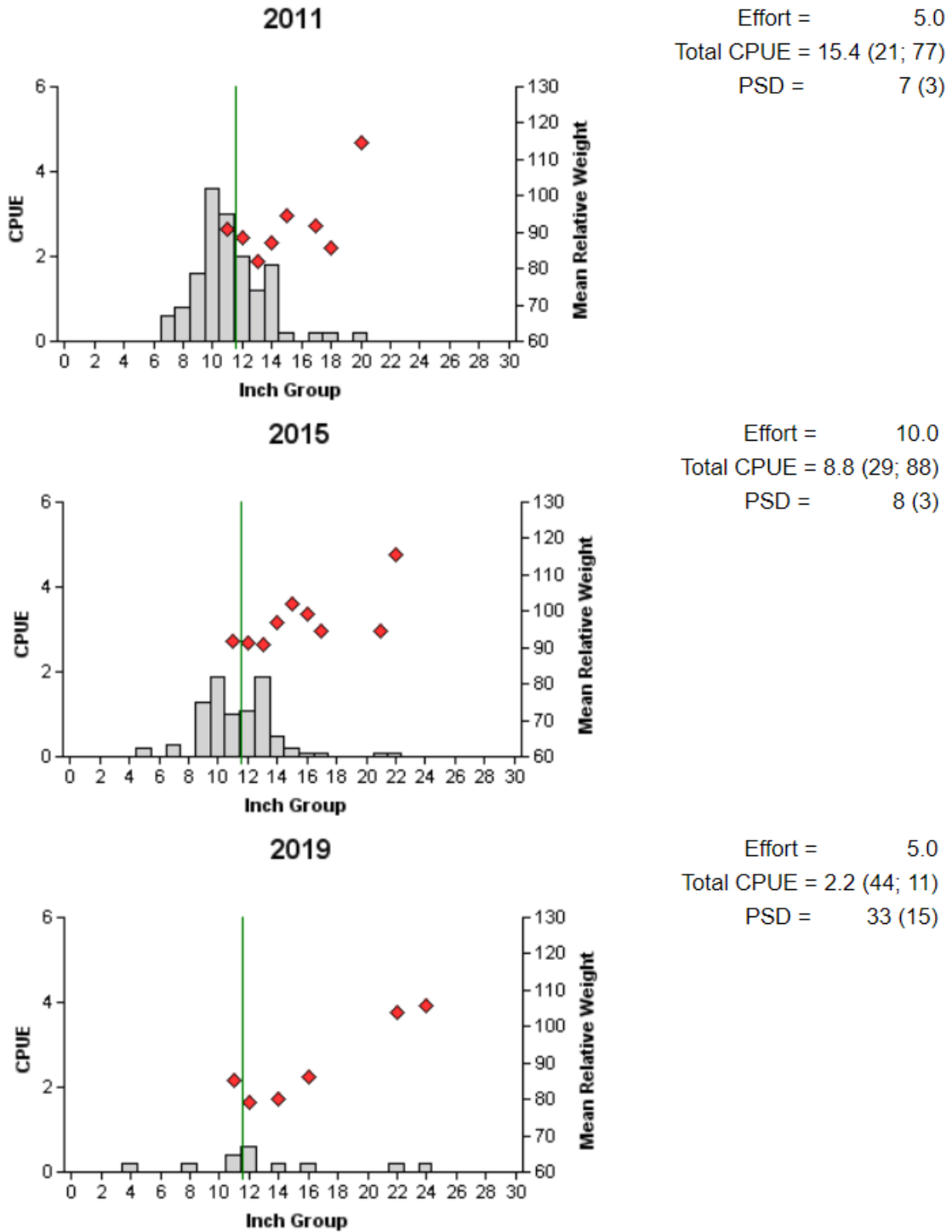


Figure 8. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Gibbons Creek Reservoir, Texas, 2011, 2015, and 2019. Vertical lines indicate the 12-inch minimum length limit for Channel Catfish.

White Bass

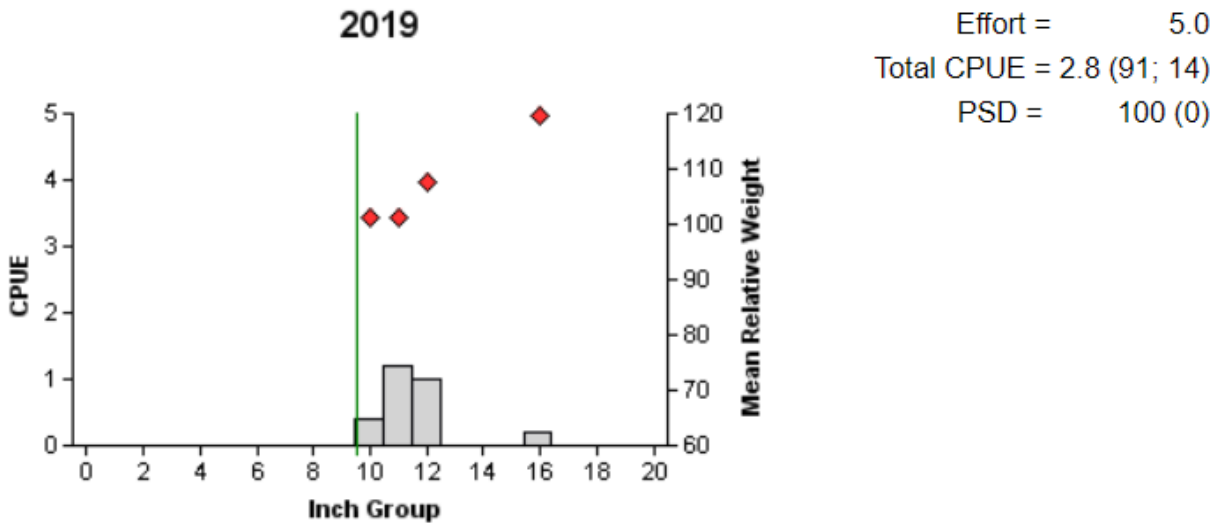


Figure 9. Number of White Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Gibbons Creek Reservoir, Texas, 2019. Vertical lines indicate the 10-inch minimum length limit for White Bass.

Largemouth Bass

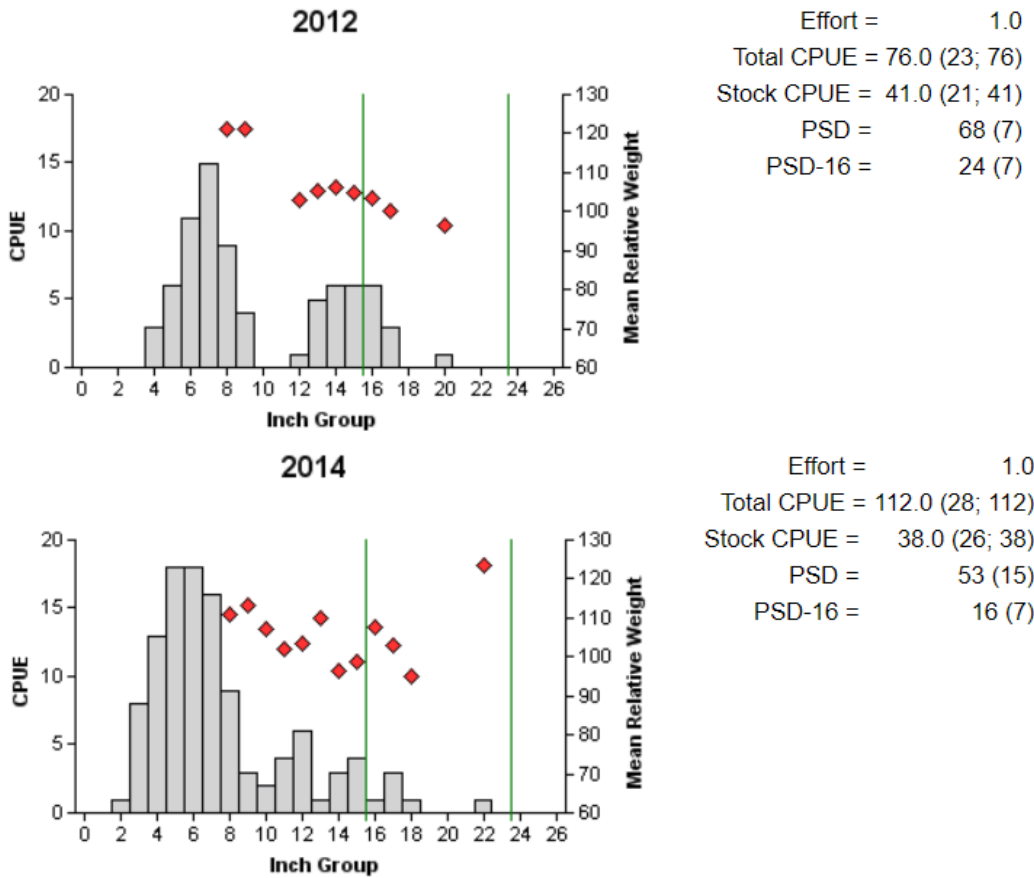


Figure 10. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for fall nighttime electrofishing surveys, Gibbons Creek Reservoir, Texas, 2012 and 2014. Vertical lines indicate the lower and upper limits of the 16- to 24-inch slot limit.

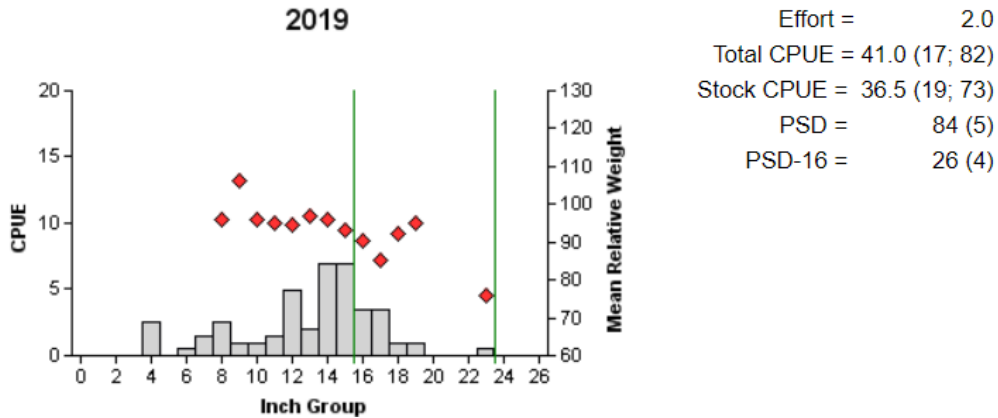


Figure 11. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE; N for CPUE and SE for size structure are in parentheses) for spring daytime electrofishing survey, Gibbons Creek Reservoir, Texas, 2019. Vertical lines indicate the lower and upper limits of the 16- to 24-inch slot limit.

Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing in 2007 and 2014, and by spring electrofishing in 2019, Gibbons Creek Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx hybrid between a FLMB and a NLMB. Genetic composition was determined by micro-satellite DNA analysis.

Year	Sample size	Number of Fish				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
2007	46	3	43 ^a			69	7
2014	30	1	1	28	0	68	3
2019	30	1	0	29	0	68	3

^aThe GOT marker was not coded in 2007, thus F1 and Fx hybrids could not be separated.

Proposed Sampling Schedule

Table 9. Proposed sampling schedule for Gibbons Creek Reservoir, Texas. Survey period is June through May. Schedule is subject to change dependent on continued angler access to the reservoir. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

	Survey year			
	2019-2020	2020-2021	2021-2022	2022-2023
Angler Access				S
Structural Habitat				S
Vegetation	A	A	A	S
Electrofishing-Fall				S
Gill netting				S
Report				S

APPENDIX A-Catch rates for all species from all gear types

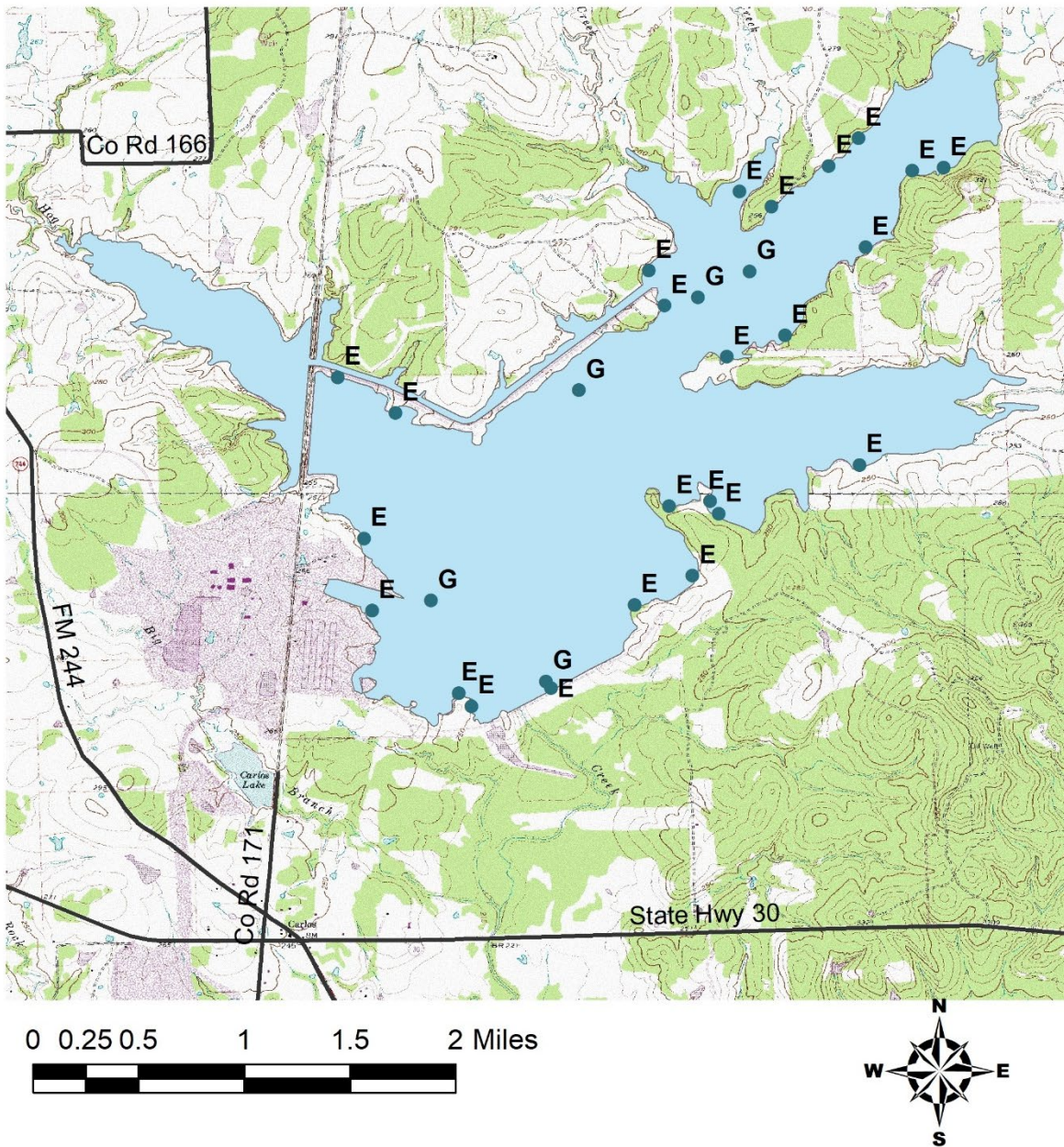
Number (N) and catch rate (CPUE, RSE in parentheses) of all species collected from all gear types from Gibbons Creek Reservoir, Texas, 2018 and 2019. Sampling effort was 5 net nights for gill netting, 1 hour nighttime electrofishing in fall 2018 and 2 hours daytime electrofishing in spring 2019. Low conductivity impeded efficiency to capture of fish during electrofishing in 2018 (78 μ S/cm) and 2019 (91 μ S/cm).

Species	Gill Netting		Electrofishing-2018		Electrofishing-2019	
	N	CPUE	N	CPUE	N	CPUE
Spotted Gar (<i>Lepisosteus oculatus</i>)					5	2.5 (50)
Gizzard Shad (<i>Dorosoma cepedianum</i>)			7	7 (49)	39	19.5 (35)
Threadfin Shad (<i>Dorosoma petenense</i>)			867	867 (73)	8	4 (43)
Common Carp (<i>Cyprinus carpio</i>)	2	0.4 (61)			1	0.5 (100)
Red Shiner (<i>Cyprinella lutrensis</i>)					4	2 (78)
Fathead Minnow (<i>Pimphales promelas</i>)					9	4.5 (55)
Bullhead Minnow (<i>Pimphales vigilax</i>)			7	7 (33)	14	7 (67)
Pugnose Minnow (<i>Opsopoeodus emiliae</i>)					21	10.5 (43)
Inland Silverside (<i>Menidia beryllina</i>)			4	4 (56)	3	1.5 (55)
Smallmouth Buffalo (<i>Ictiobus bubalus</i>)	94	1.8 (48)	2	2 (67)	5	2.5 (64)
Blue Catfish (<i>Ictalurus furcatus</i>)	116	23.2 (36)			1	0.5 (100)
Channel Catfish (<i>Ictalurus punctatus</i>)	11	2.2 (44)	2	2 (67)	11	5.5 (29)
Tadpole Madtom (<i>Noturus gyrinus</i>)			1	1 (100)		
Flathead Catfish (<i>Pylodictis olivaris</i>)					1	0.5 (100)
White Bass (<i>Morone chrysops</i>)	14	2.8 (91)			1	0.5 (100)
Green Sunfish (<i>Lepomis cyanellus</i>)			1	1 (100)	7	3.5 (53)

Appendix A Continued

Species	Gill Netting		Electrofishing-2018		Electrofishing-2019	
	N	CPUE	N		N	CPUE
Warmouth (<i>Lepomis gulosus</i>)			1	1 (100)	1	0.5 (100)
Bluegill (<i>Lepomis macrochirus</i>)			6	6 (72)	136	68 (24)
Longear Sunfish (<i>Lepomis megalotis</i>)					23	11.5 (35)
Redear Sunfish (<i>Lepomis microlophus</i>)					7	3.5 (32)
Hybrid Sunfish (<i>Lepomis</i> spp.)					2	0.5 (69)
Spotted Bass (<i>Micropterus punctatus</i>)					1	41 (100)
Largemouth Bass (<i>Micropterus salmonoides</i>)			4	4 (77)	82	4 (17)
White Crappie (<i>Poxomis annularis</i>)	4	0.8 (61)	1	1 (100)	8	1 (47)
Black Crappie (<i>Poxomis nigromaculatus</i>)	1	0.2 (100)	2	2 (100)	2	1 (69)
Logperch (<i>Percina caprodes</i>)			1	1 (100)	2	1 (29)
Freshwater Drum (<i>Aplodinotus grunniens</i>)	7	1.4 (48)			2	1 (100)

APPENDIX B-Map of sampling locations



Location of sample sites, Gibbons Creek Reservoir, Texas, 2018-2019. Gill net and 2019 spring daytime electrofishing stations are indicated by G and E, respectively. Water level was near full pool at time of sampling.



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