# Lake Holbrook

# 2024 Fisheries Management Survey Report

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-5

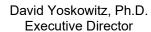
INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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# Contents

Contents	i
Survey and Management Summary	1
Introduction	2
Reservoir Description	2
Angler Access	2
Management History	2
Methods	3
Results and Discussion	3
Fisheries Management Plan for Lake Holbrook, Texas	5
Objective-Based Sampling Plan and Schedule (2025–2029)	6
Literature Cited	7
Tables and Figures	8
Reservoir Characteristics	8
Boat Ramp Characteristics	8
Harvest Regulations	9
Stocking History	9
Objective-Based Sampling Plan for 2022-2024	10
Aquatic Vegetation Survey	11
Gizzard Shad	12
Bluegill	13
Redear Sunfish	14
Spotted Bass	15
Largemouth Bass	16
Proposed Sampling Schedule	18
APPENDIX A – Catch rates for all species from all gear types	19
APPENDIX B – Map of sampling locations	20

# **Survey and Management Summary**

Fish populations in Lake Holbrook were surveyed in 2022 and 2024 using electrofishing. Historical data are presented with the 2022-2024 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:** Lake Holbrook is a 650-acre impoundment located on Lankford Creek in the Sabine River Basin approximately 5 miles northwest of Mineola, Texas. Primary water uses include flood control and recreation. Habitat features consist of natural shoreline, standing timber, boat docks, and submerged and emergent vegetation. Coontail, pondweed and cutgrass were the predominant aquatic vegetation present in the reservoir in 2024.

**Management History**: Important sport fish include Largemouth Bass and crappie. Florida Largemouth Bass were initially stocked in 1978 and last stocked in 2024 to improve the trophy potential of the reservoir. Efforts were made to establish native emergent vegetation in the reservoir to enhance littoral habitat and district staff worked with the Friends of Lake Holbrook Association to construct and deploy natural brush piles (last deployed in 2014).

#### **Fish Community**

- **Prey species:** Threadfin Shad were abundant in the reservoir. Electrofishing catch rate of Gizzard Shad was low. Electrofishing catch rate of Bluegill was very high and most were less than 6-inches long. Collectively, sunfish and Threadfin Shad are the primary forage in the reservoir. The reservoir contains a quality population of Redear Sunfish greater than 6-inhces.
- Catfishes: Channel Catfish were stocked most recently in 2018, but very few fish have been collected during population surveys or documented during creel surveys. Catfish recruitment is likely limited by Largemouth Bass predation.
- Black Bass: Largemouth Bass were moderately abundant and displayed both a balanced size structure and good body condition. Largemouth Bass growth to legal length was moderate (average age at 14 inches was 2.2 years). Spotted Bass remained present in the reservoir at low densities and provide additional bass angling opportunities.
- **Crappie:** Black and White Crappie are present in the reservoir and anecdotal information suggests a quality fishery is still present. Traditional sampling methods produced inconsistent results and were discontinued in 2008. A creel survey will be conducted in 2028 to make future inferences on the crappie population.

**Management Strategies**: Continue to stock Lone Star Bass fingerlings biennially at 1000/km of shoreline to increase the trophy potential in the reservoir. Inform the public about the negative impacts of aquatic invasive species and work with controlling authority as needed to provide technical guidance with aquatic nuisance species. Continue managing all sport fish under statewide harvest regulations.

### Introduction

This document is a summary of fisheries data collected from Lake Holbrook in 2022-2024. 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 fish were collected, this report deals primarily with major sport fish and important prey species. Historical data are presented with the 2022-2024 data for comparison.

### Reservoir Description

Lake Holbrook is a 650-acre impoundment constructed in 1962 on Lankford Creek, a tributary of the Sabine River. It is located in Wood County approximately 5 miles northwest of Mineola, Texas, and is operated and controlled by Wood County. Primary water uses are flood control and recreation. Lake Holbrook is eutrophic with a mean trophic state index (TSI, chl-a) of 55.4 (Texas Commission on Environmental Quality 2022). Habitat at time of sampling consisted of natural shoreline and both submersed and emergent vegetation. Abundant boat docks and patches of standing timber provide additional habitat for fish. Other descriptive characteristics for Lake Holbrook are in Table 1.

### **Angler Access**

Lake Holbrook has three public boat ramps. Additional boat ramp characteristics are in Table 2. Shoreline access is available at all boat ramp sites and bridge crossing right-of-ways.

### Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Norman et al. 2021) included:

1. Stock Florida Largemouth Bass at 1000/km of shoreline, biennially starting in 2020.

**Action:** Due to lack of fingerling availability, Lone Star fry were stocked in 2020; Lone Star Bass fingerlings were stocked in 2022 and 2024.

2. Work with Friends of Lake Holbrook Association (FOLHA) to construct and deploy additional artificial structures.

Action: The lake association has not been active since 2020.

**Harvest regulation history:** Sport fish in Lake Holbrook are managed under statewide regulations (Table 3). In 2021, the statewide Blue and Channel Catfish regulation changed to allow 25 fish per day (no minimum length limit), with no more than 10 fish over 20-inches.

**Stocking history:** Florida Largemouth Bass were initially introduced in 1978 and stocked periodically from 1978-2020. Lone Star Bass were stocked in 2022 and 2024. Black Crappie, exhibiting the "black-stripe" trait, were purchased by the Lake Holbrook Association and stocked by TPWD staff in 2003. Channel Catfish were last stocked in 2018. A complete stocking history is found in Table 4.

**Vegetation/habitat management history:** American water willow was initially planted in 2006 and 2007 and plant colonies increased in coverage and spread to new areas throughout the reservoir (Storey and Bennett 2013). In 2013, American pondweed, Illinois pondweed, and water stargrass were planted in wire enclosures at three sites for each species. Illinois pondweed initially displayed vigorous growth, and more was planted in 2016. District staff and volunteers from the Friends of Lake Holbrook Association assembled and deployed fish attractors consisting of natural brush in 2007 and 2008, bamboo structures in 2009, 2012 and 2014, and Georgia Cubes in 2018.

Water transfer: No interbasin transfers exist.

### **Methods**

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Lake Holbrook (Norman et al. 2021). Primary components of the OBS plan are listed in Table 5. All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Common names of fishes and their hybrids in this report are used following Page et al. (2023) with an exception for Largemouth Bass. While we recognize recent changes to black bass names, Texas reservoirs contain a mix of Florida Bass, Largemouth Bass, and their intergrade offspring. Therefore, Largemouth Bass is used in this report for simplicity as well as consistency with previous reports.

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1.0 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. In 2024, age at legal length for Largemouth Bass was determined using otoliths from 14 randomly selected fish (range 13.0 to 14.8 inches; category II, TPWD, Inland Fisheries Division, unpublished manual revised 2022). Electrofishing in 2022 was conducted with a Smith-Root GPP 5.0 electrofisher and in 2024 using a Smith-Root Apex electrofisher.

**Genetics** – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022). Micro-satellite DNA analysis was used to determine genetic composition of individual fish since 2005.

**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<sub>r</sub>)] were calculated for target fishes according to Neumann et al. (2012). 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 = 100 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

**Habitat** – A comprehensive vegetation survey was conducted in 2024. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

## **Results and Discussion**

**Habitat:** A mixture of submersed and emergent vegetation covered approximately 11% (70 acres) of the reservoir surface area during the 2024 survey. Coontail and pondweed increased substantially over the last several years, providing quality habitat for sportfish (Table 6). The last structural habitat survey was conducted in 2012 (Storey and Bennett 2013) and minimal changes have been observed since.

**Prey species:** The primary prey base continued to be Threadfin Shad and sunfish. The 2024 Gizzard Shad electrofishing catch rate was low (34.0/h) and similar to previous surveys (Figure 1). Overall, the majority of Gizzard Shad were large and less than 20% were available to most sport fish as prey (IOV = 18). Bluegill remained very abundant in 2024 (CPUE = 940.0/h) and catch rates increased each year over the last three surveys (Figure 2). The Bluegill size structure (PSD = 4) indicated most fish were small, comprising an important component of the forage base. The 2024 Redear Sunfish electrofishing catch rate (194.0/h) was similar to the 2020 survey, however fewer quality sized Redear were collected in 2024 (PSD = 9). However, the abundance of fish surveyed over the last two surveys suggest the potential for a quality sunfish fishery exists (Figure 3).

**Black Bass:** Spotted Bass remained present in the reservoir and supplemented black bass angling opportunities. Electrofishing catch rates over the last three surveys suggest a variable and low-density population consisting primarily of fish < 12-inches (CPUE range: 16 - 47/h; Figure 4).

The 2024 Largemouth Bass fall electrofishing catch rate (106.0/h) was lower than the previous two fall surveys (2018 and 2020; Figure 5). While Largemouth Bass relative abundance was slightly lower in 2024, an increase in legal length fish (29% of total) was observed. Size structure was similar over the past three fall surveys and suggested a balanced population (PSD range = 33 - 51). Body condition of Largemouth Bass was adequate (Wr  $\geq$  90) for all size classes of fish. Growth was moderate; average age at 14 inches (13.0 to 14.8 inches) was 2.2 years (N = 14; range = 1-3 years). The spring 2022 electrofishing survey indicated a quality population of 15 to 18-inch bass (CPUE-14 = 84.0; PSD 84; Figure 6). All electrofishing data collected from 2022 and 2024 suggest Lake Holbrook will continue to support a quality Largemouth Bass population and fishing opportunities. Florida allele frequencies (44%) increased from the previous genetic analysis in 2016 (38%)(Table 7). Fin clips will be collected again in 2028 to determine if Florida Largemouth allele influence is increasing from recent stockings, or simply spiked in 2024 from natural cycles

## Fisheries Management Plan for Lake Holbrook, Texas

Prepared - July 2025

#### **ISSUE 1:**

Anecdotal tournament results, recent lake record (13.13 pounds; 2019), and creel data indicate Lake Holbrook has the potential to produce trophy Largemouth Bass. However, fall electrofishing data suggests the population consists primarily of small fish (71% of fish collected were < 14 inches). The prey base is excellent (abundant Threadfin Shad and sunfish) and fish reach legal length within 2.2 years on average. The most recent creel survey (2017) indicated 99% of legal-length fish were released. Given the adequate conditions for recruitment and growth, stocking Lone Star Bass could augment trophy fish management objectives.

#### MANAGEMENT STRATEGY

- 1. Stock Lone Star Bass fingerlings biennially at 1,000/km of shoreline to increase the trophy-size potential in the reservoir.
- 2. Improve ShareLunker signage at all popular access sites to promote the program. Use future ShareLunker entries to help justify stocking requests.

#### **ISSUE 2:**

Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels 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 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

- Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
- Educate the public about invasive species through the use of media and the internet, when appropriate.
- 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 (2025–2029)

### Sport fish, forage fish and other important fishes

Sport fish in Lake Holbrook include Largemouth Bass, Spotted Bass, Channel Catfish, and crappie. Sunfish and Threadfin Shad are the primary prey species. The proposed sampling schedule can be found in Table 8.

#### Low-density fisheries

Channel Catfish and Spotted Bass have historically been present in the reservoir; population surveys have produced low and variable catch rates. Gill net surveys were discontinued in 2013 and creel data suggested minimal directed effort towards either species.

#### Survey objectives, fisheries metrics and sampling objectives

**Crappie:** Historical trap net data fluctuated among survey years; catch rates were very dependent upon sample location resulting in overall poor survey precision. Due to the unpredictability of trap net survey success and the large sample size required to reliably estimate crappie trend data (CPUE, PSD, W<sub>r</sub>), trap net surveys were discontinued in 2008. Inferences about the crappie population and identification of potential applied management actions will be made from data collected with a creel survey in 2028.

**Largemouth Bass:** Largemouth Bass are the most popular sport fish in Lake Holbrook. Due to the importance and popularity of this fishery, Largemouth Bass trend data on relative abundance, size structure, body condition, and growth (CPUE, PSD,  $W_r$ , average age at 14 inches) will continue to be monitored with biennial nighttime electrofishing, alternating between spring (2026) and fall (2028) surveys. Historical electrofishing data suggests that sampling objectives (RSE  $\leq$  25, N > 50) can be met with 12-18 randomly selected 5-minute sampling sites. Otoliths will be removed from 13 specimens (13.0- 14.9 inches), if available, during the 2028 survey for age and growth analysis and fin clips will be taken from 30 individuals to continue monitoring changes in Florida alleles.

**Prey Species:** Threadfin Shad and sunfish are important prey species in Lake Holbrook. Long-term trend data is desired for these populations to evaluate their relative abundance (CPUE) and size structure (PSD for sunfishes). Relative weights of the Largemouth Bass population, along with size structure of Bluegill will be used to gauge prey fish availability for sport fishes from electrofishing sampling effort conducted in fall 2028. No additional survey effort will be implemented, as no sampling objectives will be set for prey species.

**Angler Data:** In addition to electrofishing, sportfish will be monitored through angler data collected every 8 years with a spring-quarter creel survey, beginning in March 2028. The quarter-long survey will consist of 5 randomly selected weekend days and 4 randomly selected weekdays.

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# **Tables and Figures**

Table 1. Characteristics of Lake Holbrook, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
County	Wood
Reservoir type	Tributary
Mean depth	8.0 ft.
Maximum depth	30.0 ft.
Shoreline Development Index	4.96
Conductivity	155 μS/cm
Secchi disc range	4-6 ft.

Table 2. Boat ramp characteristics for Lake Holbrook, Texas, July 2024. Elevation at time of survey was 363 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
CR 2260	32.690179 -95.544251	Υ	20	357.5	Excellent, no access issues
CR 2298	32.699644 -95.556130	Y	20	358.5	Excellent, no access issues
CR 2275	32.713134 -95.539590	Υ	6	358.0	Good, no access issues

Table 3. Harvest regulations for Lake Holbrook, Texas.

Species	Bag limit	Length limit
Catfishes: Channel and Blue, their hybrids and subspecies	25 (only 10 ≥ 20 inches)	None
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5 <sup>a</sup>	14-inch minimum
Bass, Spotted	5ª	None
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>&</sup>lt;sup>a</sup> Bag limit for Largemouth and Spotted Bass is 5 in the aggregate.

Table 4. Stocking history of Lake Holbrook, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adult.

Species	Year	Number	Size
Blue Catfish	1982	54,154	FGL
Channel Catfish	1992	10,526	FGL
	2018	2,534	FGL
	Total	13,060	
Threadfin Shad	2004	5,500	ADL
Lone Star Bass	2022	18,771	FGL
	2024	19,760	FGL
	Total	38,531	
Florida Largemouth Bass	1978	1,085	AFGL
· ·	1980	39,845	FGL
	1983	52,902	FGL
	1999	106,197	FGL
	2000	105,080	FGL
	2005	211	ADL
	2007	67,769	FGL
	2008	65,058	FGL
Table 4 Charling history continued	2014	65,397	FGL

Table 4. Stocking history continued.

Species	Year	Number	Size
Florida Largemouth Bass	2015	66,244	FGL
	2020	209,935	FRY
	Total	779,723	
Black Crappie	2003	10,800	FGL

Table 5. Objective-based sampling plan components for Lake Holbrook, Texas 2022–2024.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Relative abundance	CPUE-Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	Wr	10 fish/inch group (max)
	Age-and-growth	Age at 14 inches	N = 13, 13.0 - 14.9 inches
	Genetics	% FLMB	N = 30, any age
Bluegill <sup>a</sup>	Relative abundance	CPUE-Total	
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shada	Abundance	CPUE-Total	
	Size structure	IOV	N ≥ 50
Threadfin Shada	Abundance	CPUE-Total	

<sup>&</sup>lt;sup>a</sup> No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill, Gizzard and Threadfin Shad if not reached from designated Largemouth Bass sampling effort.

Table 6. Survey of aquatic vegetation, Lake Holbrook, Texas, 2012, 2016, 2020 and 2024. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation type	2012	2016	2020	2024
Floating-leaved				Trace <sup>c</sup>
Emergent	15.6 (2)	13.8 (2)	29.7 (5) <sup>a</sup>	7.3 (1) <sup>d</sup>
Submersed	2.5 (<1)	16.5 (3)	9.3 (1) <sup>b</sup>	62.2 (10) <sup>e</sup>
Total	18.1 (3)	30.3 (5)	39.0 (6)	69.5 (11)

<sup>&</sup>lt;sup>a</sup> Cattail, cutgrass, maidencane, smartweed and water willow

<sup>&</sup>lt;sup>b</sup> Coontail and pondweed

<sup>c</sup> American lotus and spatterdock

<sup>d</sup> Cutgrass, water willow and water primrose

<sup>e</sup> Coontail, chara and Illinois pondweed

## Gizzard Shad

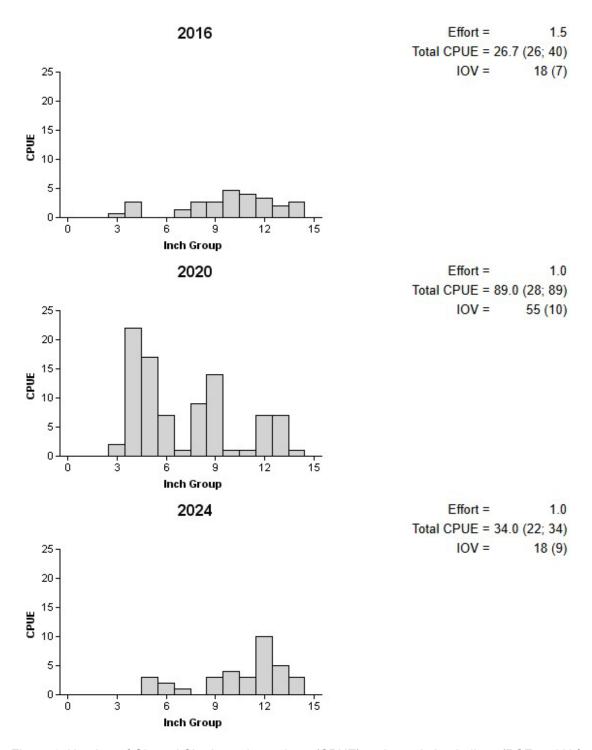


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Holbrook, Texas, 2016, 2020, and 2024.

## Bluegill

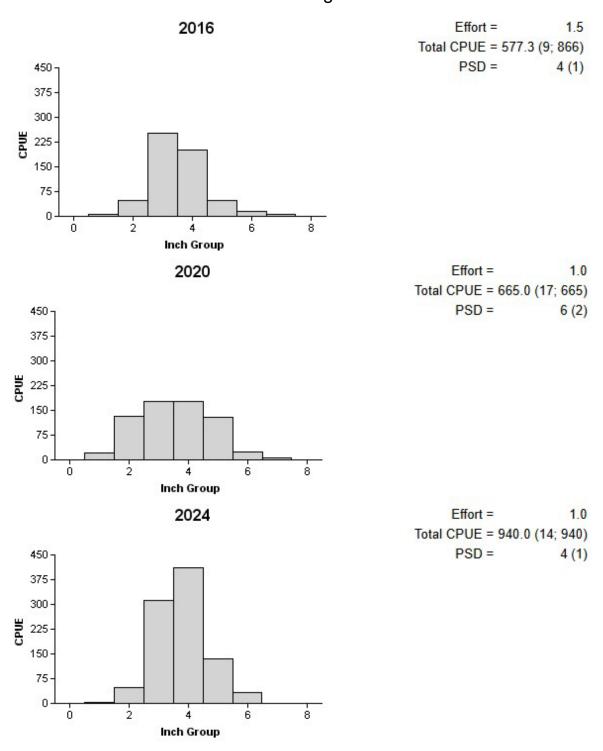


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Holbrook, Texas, 2016, 2020, and 2024.

## Redear Sunfish 2016 Effort = 1.5 Total CPUE = 106.0 (17; 159) 100 -PSD = 20 (3) 75 50 25 0 10 Inch Group 2020 Effort = 1.0 Total CPUE = 182.0 (30; 182) PSD = 36 (6) 100 75 CPUE 50 25 Inch Group 2024 Effort = 1.0 Total CPUE = 194.0 (36; 194) PSD = 9 (4) 100 -75 50 25 0

Figure 3. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Holbrook, Texas, 2016, 2020, and 2024.

10

Inch Group

## **Spotted Bass**

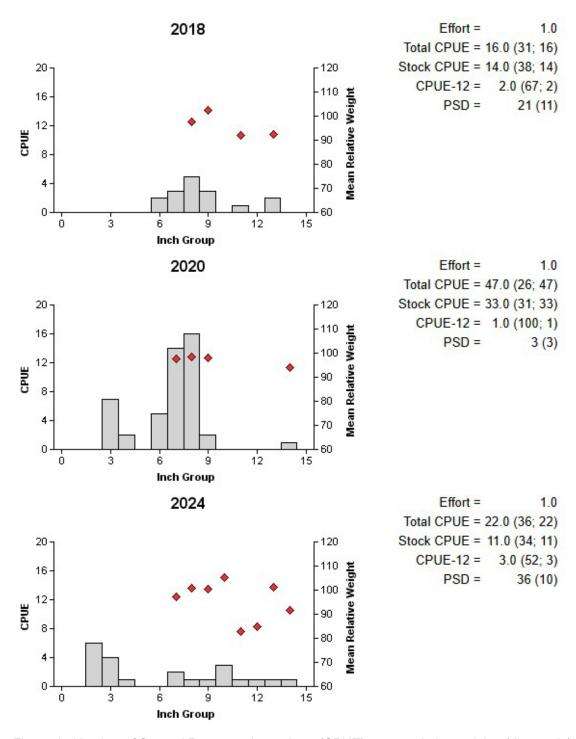


Figure 4. Number of Spotted Bass caught per hour (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Holbrook, Texas, 2018, 2020 and 2024.

## Largemouth Bass

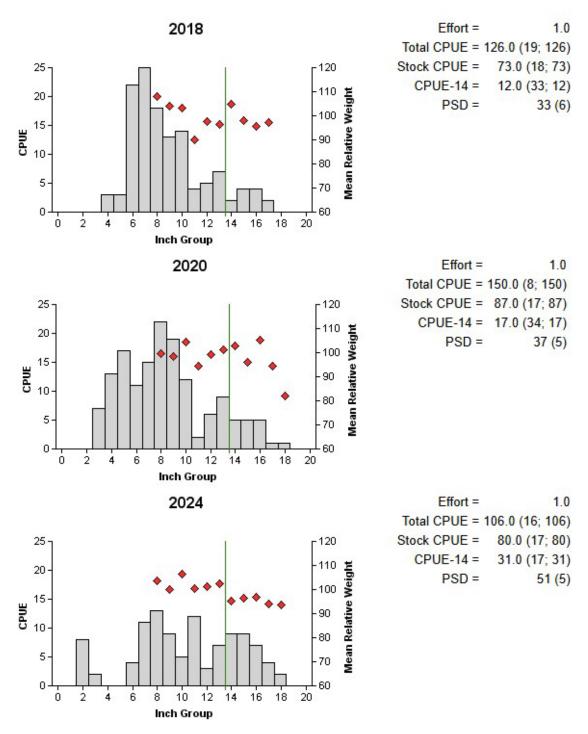
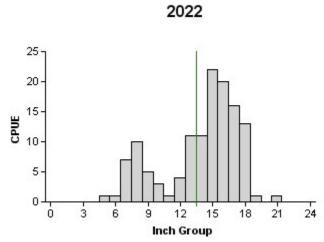


Figure 5. Number of Largemouth Bass caught per hour (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Holbrook, Texas, 2018, 2020 and 2024. Vertical line represents minimum length limit.



Effort =	1.0
Total CPUE =	127.0 (14; 127)
Stock CPUE =	118.0 (15; 118)
CPUE-14 =	84.0 (17; 84)
PSD =	84 (4)

Figure 6. Number of Largemouth Bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring electrofishing survey, Lake Holbrook, Texas, 2022. Vertical line represents minimum length limit.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lake Tyler, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB. Genetic composition was determined with micro-satellite DNA analysis.

	Number of Fish							
Year	Sample size	FLMB	F1	Fx	Combined intergrades	NLMB	% FLMB alleles	% FLMB
2002	30	0	1	27	28	2	27	0
2016	30	0	0	0	28ª	2	38	0
2024	27	0	0	5	27 <sup>b</sup>	0	44	0

<sup>&</sup>lt;sup>a</sup> 8 Fx-F and 20 Fx-N

<sup>&</sup>lt;sup>b</sup> 7 Fx-F and 15 Fx-N

# Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Lake Holbrook, Texas. Survey period is June through May.

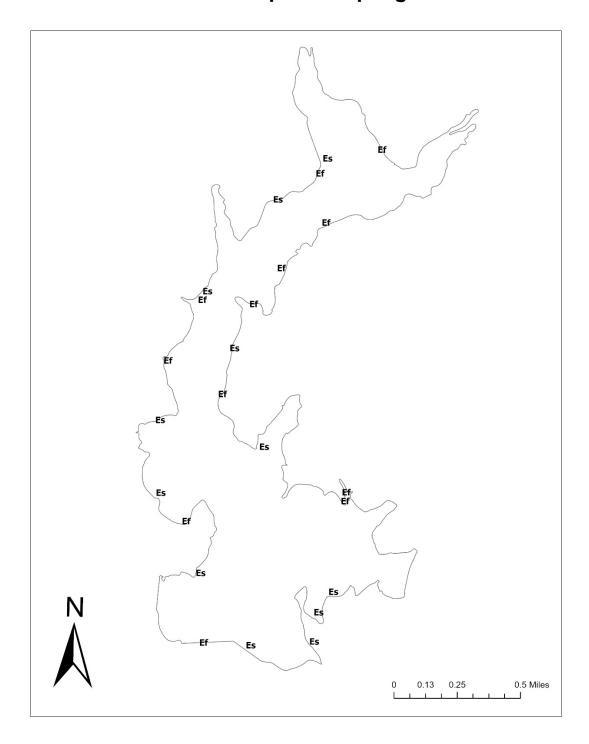
		Survey year			
	2025-2026	2026-2027	2027-2028	2028-2029	
Angler Access				Х	
Vegetation				X	
Structural Habitat Survey				х	
Electrofishing – Fall				х	
Electrofishing – Spring (Bass Only)	Х				
Creel Survey (Spring Quarter)			x		
Report				х	

# APPENDIX A – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from fall electrofishing from Lake Holbrook, Texas, 2024. Sampling effort was 1.0 hour of electrofishing.

Species	N	CPUE
Gizzard Shad	34	34.0 (22)
Threadfin Shad	2,474	2,474.0 (24)
Bluegill	940	940.0 (14)
Longear Sunfish	29	29.0 (42)
Redear Sunfish	194	194.0 (36)
Green Sunfish	1	1.0 (100)
Warmouth	2	2.0 (100)
Spotted Bass	22	22.0 (36)
Largemouth Bass	106	106.0 (16)

# **APPENDIX B – Map of sampling locations**



Location of sampling sites, Lake Holbrook, Texas, 2022-2024. Fall electrofishing stations are indicated by E, spring electrofishing stations are indicated by a S. Water level was near full pool at time of sampling.



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