

# Caddo Lake

## 2021 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

Prepared by:

Timothy J. Bister, District Management Supervisor  
and  
Margaret H. Stadig, Assistant District Management Supervisor

Inland Fisheries Division  
Marshall District, Marshall, Texas

Carter Smith  
Executive Director

Craig Bonds  
Director, Inland Fisheries

July 31, 2022



## Contents

Contents .....	i
Survey and Management Summary .....	1
Introduction .....	2
Reservoir Description .....	2
Angler Access.....	2
Management History .....	3
Methods.....	4
Results and Discussion.....	4
Fisheries Management Plan for Caddo Lake, Texas.....	7
Objective-Based Sampling Plan and Schedule (2022–2026).....	8
Literature Cited.....	10
Tables and Figures .....	11
Water Level .....	11
Reservoir Characteristics .....	11
Boat Ramp Characteristics.....	12
Harvest Regulations .....	13
Objective-Based Sampling Plan for 2020-2021 .....	15
Aquatic Vegetation Survey .....	16
Percent Directed Angler Effort per Species.....	16
Total Fishing Effort and Fishing Expenditures.....	17
Gizzard Shad.....	18
Bluegill .....	19
Redear Sunfish.....	20
Channel Catfish.....	22
Largemouth Bass .....	24
Black Crappie .....	27
Proposed Sampling Schedule .....	29
APPENDIX A – Catch rates for all species from all gear types .....	30
APPENDIX B – Map of sampling locations.....	31
APPENDIX D – reporting of creel ZIP code data.....	32

## Survey and Management Summary

Fish populations in Caddo Lake were surveyed in 2021 using electrofishing and in 2022 using tandem hoop nets. Historical data are presented with the 2018-2022 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:** Caddo Lake is a 27,472-acre lake on Big Cypress Creek located in the Cypress Creek Basin approximately 20 miles northeast of Marshall, in Harrison and Marion Counties, Texas, and Caddo Parish, Louisiana; 12,712 acres lie in Texas. Habitat features consist of bald cypress wetlands and a complex aquatic plant community including both native and non-native species. The invasive species giant salvinia, water hyacinth, crested floating heart, and hydrilla were present.

**Management History:** Important sport fishes include Largemouth Bass, Bluegill, Redear Sunfish, and crappie. The management plan from the 2017 survey report included the need for nuisance aquatic vegetation monitoring, Largemouth Bass supplemental stocking, and the need to investigate alternative sampling approaches in the presence of giant salvinia. Largemouth Bass were managed with a 14- to 18-inch slot-length limit. Efforts to control nuisance aquatic plants on the lake continued.

### Fish Community

- **Prey species:** Threadfin Shad and Gizzard Shad were present in the reservoir. However, few Gizzard Shad were available as prey to most sport fish. There was an increase in the catch rate of Bluegill from the last two surveys. Small Bluegill were a dominant prey source. Catch rates of Redear Sunfish were moderate and provided good angling opportunity within Caddo Lake.
- **Catfishes:** Channel Catfish habitat on the Texas side of Caddo Lake is not ideal. Recent survey data indicated a low-density population. Few anglers target Channel Catfish while fishing. Flathead Catfish were also present in the most recent survey.
- **Largemouth Bass:** Largemouth Bass catch rates continue to improve from the last survey report in 2017. There were fewer Largemouth Bass caught within the slot limit in 2021 compared to 2017. The size structure between the 2019 and 2021 surveys were consistent. Largemouth Bass had moderate growth (age at 14 inches long was 2.7 years) and average body condition. Largemouth Bass were the most-sought fish by anglers. Total fishing effort increased compared to the 2017/2018 survey when giant salvinia coverage was higher.
- **White Crappie:** Black Crappie have traditionally been more abundant compared to White Crappie and that was reflected in total crappie harvest in the most recent creel survey results. While White Crappie were documented in the recent angler creel survey none were collected during spring hoop netting. Almost thirty percent of directed angling effort was for crappie in 2021/2022, which was second only to black bass.

**Management Strategies:** Continue stocking Florida Largemouth Bass to support the high-quality bass fishery at Caddo Lake. Conduct invasive aquatic plant surveys annually and continue management of giant salvinia and other invasive aquatic vegetation. Continue to work with stakeholder groups on invasive species management issues.

## Introduction

This document is a summary of fisheries data collected from Caddo Lake (Texas side only) from 2018-2022. 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 2018-2022 data for comparison.

## Reservoir Description

Caddo Lake is a 27,472-acre natural lake, of which 12,712 acres are in Texas, on Big Cypress Creek in the Cypress Creek Basin approximately 20 miles northeast of Marshall, Texas, in Harrison and Marion Counties, Texas, and Caddo Parish, Louisiana. Principal tributaries include Big Cypress Creek, Big Cypress Bayou, Little Cypress Creek, Black Cypress Bayou, Jeems Bayou, and Harrison Bayou. Littoral area (depth < 15 feet) accounts for 95% of the lake. Annual average rainfall in the watershed is 44.8 inches. The lake was initially formed when water backed-up from a log jam in the Red River. The log jam sustaining the lake was removed in the late 1800s to facilitate navigation on the Red River, which contributed to the de-watering of Caddo Lake. In 1912, the U.S. Army Corps of Engineers (USACE) constructed a low-water dam near Mooringsport, Louisiana and Jefferson, Texas. The dam was modified in the 1940s and again in the 1960s to increase water levels. Entities responsible for activities on Caddo Lake include the USACE for permitting (e.g., dredging or boat house installation) and the Cypress Valley Navigation District for the maintenance of boat lanes. Average monthly water levels are shown in Figure 1. The current conservation pool elevation is 168.5 ft above mean sea level.

Approximately 7,000 acres of water, wetlands, and riparian areas of Caddo Lake were purchased by the Texas Nature Conservancy in 1991 and given to the Texas Parks and Wildlife Department (TPWD) for utilization as a wildlife management area (WMA). In 2000, the U.S. Fish and Wildlife Service (USFWS) acquired the U.S. Army Installation (formerly known as the Longhorn Ammunition Plant) and the 8,000-acre tract will be managed as a wildlife preserve. The bottomland hardwood and cypress wetland habitats present in Caddo Lake are the largest of their kind in Texas. This unique natural resource received recognition by the Ramsar Convention as a wetland of international importance in 1993. Upstream reservoir construction beginning in the late 1950s was designed for flood control and municipal water sources and has altered the hydrology in the Lower Cypress River Basin, negatively impacting the ecology of Caddo Lake.

Caddo Lake supports a diverse aquatic plant community, which includes native and non-native species. High densities of aquatic macrophytes can reduce water quality for fishes during summer and fall, as well as presenting major management problems and concerns. A survey of aquatic vegetation in the summer of 2021 indicated a decrease in giant salvinia and hydrilla. While giant salvinia and other invasive aquatic plant species have decreased in 2021, historically they quickly create problems for navigation and recreational use in many areas of the lake. Other descriptive characteristics for Caddo Lake are listed in Table 1.

## Angler Access

Caddo Lake has ten public boat ramps on the Texas side; however, most are privately owned and require a pay-to-use fee. The F. R. Camp Road ramp located on the Caddo Lake WMA is for canoe, kayak, or small boats only. Boat ramp accessibility may be limited in some areas due to infestations of giant salvinia, especially in the fall when plant coverage is at its highest. Though recent years, the combination of contract herbicide spraying and TPWD's Aquatic Habitat Enhancement (AHE) team spot spraying has maintained access sufficiently at most boat ramps. Additional boat ramp characteristics are listed in Table 2. Shoreline access is limited to the public boat ramp areas and the fishing pier located at Caddo Lake State Park.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Bister 2018) included:

1. Caddo Lake continues to experience problems with excessive growth of aquatic vegetation, especially giant salvinia, water hyacinth, hydrilla, and, most recently, crested floating heart. Continued management of invasive aquatic plants is necessary to maintain boater access, protect native aquatic plants, and improve quality habitat available for fish.

**Action:** Annual invasive vegetation surveys were conducted to monitor the coverage of invasive species and evaluate treatment efforts. District staff worked with stakeholders and TPWD's AHE team to develop and implement strategies to manage nuisance aquatic vegetation. TPWD herbicide contractors performed annual spraying for giant salvinia control (FY2018 = 7,068 acres, FY2019 = 7,389 acres, FY2020 = 7,309 acres, and FY2021 = 5,236 acres). Giant salvinia weevils have been released by TPWD and Caddo Biocontrol Alliance (CBA) as part of the integrated management plan to control giant salvinia. Presentations and news releases have been conducted to inform the public about exotic plants and their threat to Caddo Lake.

2. Continue to manage the trophy Largemouth Bass fishery at Caddo Lake.

**Action:** Florida Largemouth Bass fingerlings have been stocked every 2 years in 2019 and 2021.

**Harvest regulation history:** Sport fishes in Caddo Lake are currently managed with special regulations for black bass, catfishes, White Bass, and crappie (Table 3). On September 1, 2011 Texas and Louisiana unified harvest regulations with boundary waters, including Caddo Lake. Blue Catfish and Channel Catfish are managed with no minimum length limit (MLL) and 50-fish daily bag, of which no more than 5 may be over 30 inches. The daily bag limit for Flathead Catfish increased from 5 to 10 while the 18-inch length limit remained unchanged. White Bass and crappie have no MLL and a 25-fish daily bag. Largemouth Bass are managed with a 14-to-18-inch slot length limit and a daily bag limit of 8 fish (in combination with all black bass); no more than 4 fish can be Largemouth Bass 18 inches or longer. To prevent the potential spread of invasive carp species (e.g., Bighead Carp), it is prohibited to take live nongame fish from Caddo Lake to other waters.

**Stocking history:** Florida Largemouth Bass were introduced into Caddo Lake in 1981 and 1982. By the early 1990s, a trophy Largemouth Bass fishery developed at the lake. To maintain and enhance this trophy fishery, Florida Largemouth Bass were again stocked from 1994 – 2000. These stockings were part of a research project to evaluate the contribution of stocked fish to the resident Largemouth Bass population. To further enhance the trophy potential of the Largemouth Bass fishery, Florida Largemouth Bass have been stocked consistently since 2006. Also, ShareLunker Largemouth Bass were stocked annually from 2009 – 2011. In the spring of 2014, 36 Paddlefish, implanted with radio transmitters were stocked at the Caddo Lake State Park boat ramp as part of a USFWS research project. An additional 11 Paddlefish were stocked in the Big Cypress Bayou in the city of Jefferson, approximately 15 river miles above the Texas State Highway 43 bridge boundary for Caddo Lake. Subsequent Paddlefish stockings have occurred as part of the USFWS project. The complete stocking history is listed in Table 4.

**Water transfer:** Caddo Lake is primarily used for municipal water supply, recreation, and to a lesser extent, flood control. No interbasin water transfers exist.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Caddo Lake (Bister 2018). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1.25 hours at 15, 5-min stations) during daytime hours. 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 13 randomly selected fish (range 13.0 to 14.9 inches).

**Tandem hoop nets** – Channel Catfish and crappie were collected using 10 tandem hoop-net series at 10 stations. One net series had been tampered with while it was deployed and therefore, was excluded from analysis. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series). Ages for Black Crappie were determined using otoliths from 7 fish captured within the target size range (9.0 to 10.9 inches).

**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 = 100 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

**Creel survey** – An annual roving creel survey was conducted from June 2021 through May 2022. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Habitat** –Vegetation surveys were conducted in 2018–2021 to monitor coverage of invasive plants. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Water level** – Source for water level data was the United States Army Corps of Engineers (USACE 2022).

## Results and Discussion

**Habitat:** Littoral zone structural habitat consisted primarily of timber (e.g., cypress trees) and natural shoreline. The complexity of the lake’s shorelines and cypress tree breaks continues to make it difficult to quantify shoreline habitat with accuracy. Native vegetation covered 4.9% of the lake’s surface area compared to 15.7% coverage by non-native vegetation (Table 6). This is significantly lower than the last report when 56.4% of Caddo Lake was covered with non-native vegetation, while native aquatic vegetation coverage was similar to the previous report. Giant Salvinia continues to be the most dominant invasive species in the lake and has received the most treatment effort. Crested floating heart is the newest aquatic invasive species in Caddo Lake and coverage have increased in the last four years to 278 acres in 2021.

Giant salvinia was first detected on the Louisiana side of the lake in 2006. By the time the infestation was detected, there was at least 300 acres present in the Jeem’s Bayou arm of the lake. Immediate actions involving herbicide treatments were conducted to reduce the level of giant salvinia in this area. Despite attempts by TPWD and the Louisiana Department of Wildlife and Fisheries (LDWF), as well as efforts from local stakeholder groups, giant salvinia migrated to the Texas side of the lake during the winter of 2006/2007 and continued to expand in the spring of 2007. A separate introduction was discovered at a

private boat ramp on the upper end of the lake on the Texas side in 2007. A 2007 vegetation survey of the Texas side estimated the presence of 100 acres of giant salvinia. This plant continued to expand its coverage to more areas of the lake, and by 2008, coverage had increased to 1,092 acres. By 2009, 3,228 acres of giant salvinia was estimated on the Texas side. However, an extended flood and freezing condition during the winters of 2009/2010 drastically reduced the coverage of giant salvinia. A survey of the plant in March 2010 estimated at least a 95% reduction in coverage since the September of 2009 survey, leaving an estimated 161 acres in isolated areas. By 2012, giant salvinia coverage had again increased to 1,370 acres and combined with a mild winter, grew rapidly to 6,000 acres in 2013. A cold winter in 2013/2014 greatly reduced giant salvinia coverage although many immature plants remained present in most parts of the lake. By late summer 2014, giant salvinia coverage had increased to over 2,400 acres. Even with herbicide treatments and giant salvinia weevil releases, plant coverage continued to increase in subsequent years. Coverage had increased to over 5,300 acres in 2017, despite treatment of over 9,000 acres by TPWD. There was a reduction of plants where giant salvinia weevils were released by TPWD in Pine Island Pond. Efforts to control giant salvinia weevils by the Caddo Biocontrol Alliance in Willowson Woodyard were also showing signs of weevil population growth and impact to plants. However, another cold winter in 2017/2018 reduced the amount of salvinia to minimal amounts. Most of the giant salvinia in weevil release areas was reduced to the point that it was unclear of the impact on weevils that had survived the winter. With the continued application of herbicide throughout the year, coverage of giant salvinia has not exceeded 1,600 acres. Even though another cold winter occurred in 2020/2021 reducing giant salvinia coverage again, there were still areas where immature giant salvinia was found.

Water hyacinth was discovered in Caddo Lake in the 1940s and, until recently, some active form of control has been required to keep coverage from becoming problematic. Water hyacinth coverage was estimated at 3,700 acres in 2007, 1,350 acres in 2008, and 1,740 acres in 2009. However, the increase in giant salvinia caused water hyacinth coverage to decrease dramatically over the past few years. Coverage of water hyacinth has been suppressed to less than 100 acres for the last few years until 2021 when 111 acres were observed. This slight increase might be from the decrease in giant salvinia coverage. Despite the recent declines in water hyacinth due to giant salvinia coverage, water hyacinth needs to be monitored for possible increase in coverage that may warrant control efforts as giant salvinia mats are reduced by herbicide application and biocontrol efforts.

Hydrilla was first reported on Caddo Lake in 1993. In 1996, hydrilla expanded to 575 acres and by 1997 was estimated to cover over 5,000 acres. At that time, the infestation was concentrated in the deeper portion of the lake. From available records, hydrilla declined by 2000 and was reduced to non-problematic levels by 2001. Records do not reflect any chemical treatments targeting hydrilla on Caddo Lake during this period. Surveys in 2004 documented isolated hydrilla populations on Caddo Lake in shallow, more remote areas less frequented by resource users. The 2005 survey indicated that hydrilla cover 2,500 acres. From 2009 to 2012, hydrilla coverage hovered around 4,000 acres; however, coverage dropped to 1,269 acres in 2013 due to shading by giant salvinia. Hydrilla coverage again increased in 2018 to 4,706 acres. Yet, in the most recent survey in 2021, coverage has declined to 865 acres.

**Creel:** The angler creel survey conducted from June 2021 through May 2022 only included the Texas side of the lake. Directed fishing effort by anglers was highest for black bass (61.5%), followed by anglers fishing for crappie (28.2%, Table 7). Catfish and sunfish also represented a small fishery (3.1 and 2.7 percent directed effort, respectively). Total fishing effort for all species and direct expenditures at Caddo Lake in 2021/2022 has increased since the last creel survey in 2017/2018, which was likely attributed to enhanced angling access and fishing conditions due to lower coverage of giant salvinia (Table 8). Angling effort was higher during the 2009/2010 creel survey when giant salvinia coverage was also lower. The distance traveled by anglers, by ZIP Code, is reported in Appendix C.

**Prey species:** Daytime electrofishing catch rates of Gizzard Shad and Threadfin Shad was 64.0/h and 80.0/h, respectively (Appendix A). The 2021 catch rates for Gizzard were consistent with the last survey in 2019 (69.0/h). While Gizzard Shad catch rates in 2021 were comparable to 2019, however the percent number of Gizzard Shad available as forage for sports fish (IOV values) decreased from 58 in 2019 to 9 in 2021 (Figure 2). All Gizzard Shad in 2021 were 5 inches or greater with most fish between 9 and 11

inches. The total CPUE of Bluegill was higher in 2021 (95.2/h) than during the 2019 survey (28.0/h; Figure 3). The size structure for Bluegill was better in 2021 (PSD=19) compared to 2019 (PSD=4). Individual Bluegill were caught between 2 to 8 inches in length. This means there are Bluegill individuals available as forage for larger adult predators but also large enough individuals available as a good angling opportunity. The total catch rate of Redear Sunfish also increased from the 2017 survey (49.0/h) to the 2019 and 2021 surveys (81.0/h and 87.2/h, respectively; Figure 4). There continue to be a good number of individuals 7 inches and greater creating a great angling opportunity.

Directed angling effort for sunfishes was low (2.7%; Table 7). Anglers targeting sunfishes caught 2.3/h and harvested Bluegill and Redear Sunfish (Table 9). Anglers released 70% of all sunfishes that were caught.

**Channel Catfish:** In an effort to sample the Channel Catfish population with minimal bycatch of non-target species, tandem hoop nets baited with soap were used in spring 2018 and 2022. Hoop nets caught a total of 70 Channel Catfish in 2018 but only 12 fish in 2022 (Figure 5). Hoop nets caught fish from 9-22 inches. Continued use of hoop nets will be necessary to determine if they are a viable sampling gear for Channel Catfish in Caddo Lake.

Angling effort for Channel Catfish was only 3.1% of total directed angling effort (Table 7). Angling catch rate (0.3/h) and angler harvest (1,546 fish) were low and anglers released 71% of fish that were caught (Table 10). Harvested Channel Catfish between 10 and 20 inches were observed during the 2021/2022 angler creel survey (Figure 6).

**Largemouth Bass:** Fall electrofishing has been conducting during daylight hours since 2013 because giant salvinia coverage has prohibited nighttime electrofishing. Spotted Bass have been observed in the past but were not observed in 2021. Catch rates of stock-sized Largemouth Bass have been relatively stable in recent years (2017 = 38.5/h; 2019 = 54.0/h; 2021 = 40.8/h; Figure 7). The size structure decreased from 2017 (PSD=66) to 2021 (PSD=55). The growth rate of Largemouth Bass continues to be moderate with the average age of a 14 inch (13.0-14.8 inches) Largemouth Bass being 2.7 years (N = 13; range = 2 - 4). Body condition in 2021 was moderate ( $W_r$  above 85) for all size classes of fish.

Largemouth Bass were the most-sought species by anglers during the 2021/2022 angler survey (61.5%; Table 7). Total directed effort has increased compared to 2017/2018 likely due to lower coverage of giant salvinia in the lake (providing improved angler access) during the most recent survey. Tournament effort increased from 6,961 h to 14,104 h (Table 11). Non-tournament effort increased from 39,702 h to 52,263 h. Largemouth Bass angling catch rate was 0.8/h, which was similar to 0.9/h in the previous survey. Non-tournament anglers released 96% of legal-sized fish. Only three harvested fish were observed during the 2021/2022 survey period (Figure 8).

**Crappie:** Previous trap netting surveys have displayed low catch rates even though a popular crappie fishery suggests higher abundance. Tandem hoop net series have been used to survey crappie during spring 2018 and 2022. Even though White Crappie were present in Caddo Lake, only Black Crappie were caught during hoop netting surveys (2018 = 3.5/series; 2022 = 1.9/series; Figure 9). Growth of Black Crappie was moderate. Average age at 10 inches (9.0-10.8 inches) was 2.7 years (N = 7; range 2-3 years).

Directed angling effort for crappie during the 2021/2022 angler creel survey (30,453 h) was higher than 2017/2018 (13,251 h) when giant salvinia coverage was much higher throughout the lake (Table 12). Angler success was high as the crappie catch rate (2.58/h) and total harvest (43,297 fish) were higher in the most recent angler survey compared to previous surveys. Anglers harvested more than 5 times the number of Black Crappie than White Crappie and released 56% of all crappies caught. Harvested Black Crappie ranged from 7 to 14 inches and White Crappie ranged from 9 to 14 inches (Figure 10).



# Fisheries Management Plan for Caddo Lake, Texas

Prepared – July 2022

**ISSUE 1:** Caddo Lake continues to experience problems associated with excessive growth of aquatic vegetation, especially giant salvinia. The composition of invasive species has shifted in recent years from one dominated by water hyacinth to one dominated by giant salvinia. Currently, the threat from giant salvinia is the focal point of most management efforts. Local stakeholders formed the Caddo Biocontrol Alliance, which operates a giant salvinia weevil rearing facility near the lake to supplement giant salvinia management efforts by TPWD. Crested floating heart continues to spread and has been managed with herbicide treatments. Continued management of invasive aquatic plants on Caddo Lake is necessary to maintain boater access, protect native aquatic plants, and protect quality habitat available for fish.

## MANAGEMENT STRATEGY

1. Conduct annual aquatic vegetation survey to estimate coverage of problematic species, monitor trends, and evaluate effectiveness of treatment efforts.
2. Continue to work with Caddo Lake stakeholders to help develop strategies to manage nuisance aquatic vegetation.
3. Continue to maintain signage at boat ramps and marinas to inform boaters about exotic plants and their threats to Caddo Lake.

**ISSUE 2:** An excellent trophy Largemouth Bass fishery has developed following the introduction of Florida Largemouth Bass in the 1980s. Modification of harvest regulations and changes in angler attitudes toward catch-and-release fishing have contributed to the development of this trophy fishery. The Bass Life Associates (BLA) Trophy Replica Program had 122 Largemouth Bass  $\geq$  10 pounds entered from 2006-2013. The lake has produced nine Largemouth Bass that were donated to the Toyota ShareLunker Program between 1990 and 2017. In the last four years, four Elite class ShareLunkers (10+ lbs) have been reported to the ShareLunker Program from Caddo Lake. Continued introduction of Florida Largemouth Bass genetics is necessary to maintain the trophy potential of this fishery.

## MANAGEMENT STRATEGIES

1. Stock Lone Star Bass fingerlings, which are 2<sup>nd</sup> generation offspring of pure Florida strain ShareLunker Largemouth Bass that have proven to be able to grow to  $\geq$  13 pounds, at a rate of 1,000/km shoreline biennially in 2023 and 2025.

**ISSUE 3:** 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

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. 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 (2022–2026)

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

Sport fishes in Caddo Lake include White Crappie, Black Crappie, Channel Catfish, Blue Catfish, Flathead Catfish, Spotted Bass, and Largemouth Bass. Known important forage species include Bluegill, Redear Sunfish, Gizzard Shad, and Threadfin Shad. The proposed sampling schedule to meet the following OBS Plan can be found in Table 13. Sampling will be conducted on the Texas side of the lake.

### Low-density/underutilized fisheries

Even though Spotted Bass, Blue Catfish, Channel Catfish, and White Bass are present in Caddo Lake, few fish have been collected during previous surveys. In addition, angler creel surveys in 2009/2010, 2017/2018, and 2021/2022 indicated very little directed effort for these species.

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

**Black Bass:** Black bass were the most-sought group of fish by anglers in the angler creel at Caddo Lake. Largemouth Bass are managed with a 14- to 18-inch slot-length limit and a daily bag limit of 8 fish (in combination with Spotted Bass), of which no more than 4 may be Largemouth Bass 18 inches or longer. Traditionally, trend data on relative abundance, size structure, and condition have been collected every 2 years during fall nighttime electrofishing surveys with 2 hours of effort at 24, 5-minute stations. However, electrofishing has been conducted during daylight hours since 2013 due to excessive giant salvinia coverage. These data have been sufficient to calculate population metrics and meet sampling objectives. Continuation of data collection during the fall is desirable to maintain trend data on Largemouth Bass growth and size structure. Surveys will continue to be conducted during daylight hours. Continued sampling every 2 years with fall daytime electrofishing will be sufficient to determine large-scale changes in the Largemouth Bass population that may spur further investigation.

Sampling objectives for Largemouth Bass will include size structure (PSD and length frequency), growth (mean age at 14 inches using a sample size of 13 fish between 13.0 and 14.9 inches), and condition (mean  $W_r$  using lengths and weights from 10 fish per inch-group).

During fall 2023 and 2025, we will select 24 random 5-minute stations to electrofish during daylight hours. Sampling during the day will allow for easier navigation in the presence of large giant salvinia mats as well as give us the ability to move a site from an unsuitable location (i.e. unable to reach because of salvinia) to one that can be efficiently sampled. We will sample a minimum of 12 stations throughout the

lake, but sampling will continue at random sites until 50 stock-size fish are collected for size structure and 13 fish are collected between 13.0 and 14.9 inches for age and growth analysis.

**Crappie:** White Crappie and Black Crappie are present in Caddo Lake. The 2021/2022 angler creel survey estimated 28% of total fishing effort was for crappie. While traditional trap netting has been unsuccessful in collecting population trend data, tandem hoop nets baited with soap have indicated potential utility in collecting Black Crappie for population assessment. However, further evaluation of tandem hoop nets are needed to determine if they are a long-term viable option for crappie population surveys.

Therefore, we will deploy 10 baited tandem hoop net series during the spring of 2026. Sampling objectives for crappie will include size structure (PSD and length frequency;  $N \geq 50$  both species combined), relative abundance (CPUE with RSE  $< 25$ ), and condition (10 fish/inch group).

**Forage Fish:** Trend data on relative abundance and size structure of sunfish, Gizzard Shad, and Threadfin Shad have been collected every 2 years. Continuation of sampling, as per Largemouth Bass sampling above, will allow for monitoring of large-scale changes in sunfish and shad relative abundance and size structure. No additional effort will be expended beyond effort necessary to achieve Largemouth Bass objectives. Instead, Largemouth Bass body condition can provide information on forage abundance.

## Literature Cited

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Bister, T.J. 2018. Lake Caddo, 2017 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.
- United States Army Corps of Engineers (USACE). 2022. RiverGages.com: Water Levels of Rivers and Lakes. Web interface: <https://rivergages.mvr.usace.army.mil/> (May 2022).

## Tables and Figures

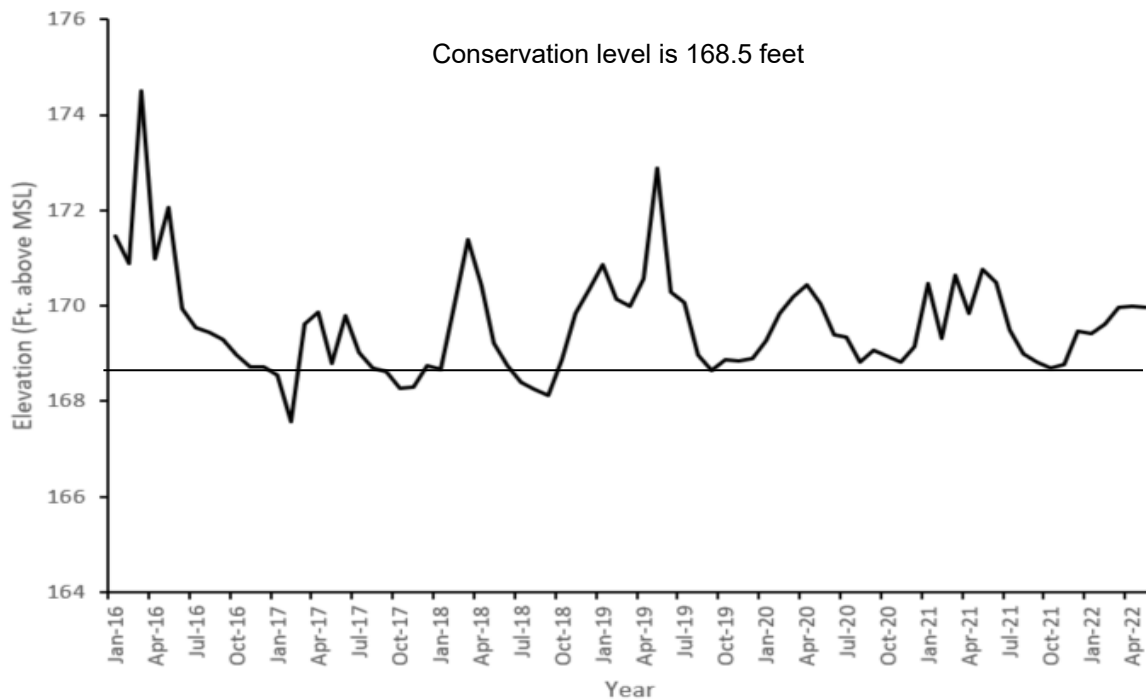


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Caddo Lake, Texas.

Table 1. Characteristics of Caddo Lake, Texas.

Characteristic	Description
Year Formed	Early 1800s (natural formation)
Year Restored	1912 low-water dam constructed with modifications in the 1940s and 1960s
Controlling authority	US Army Corps of Engineers
Permitting & Maintenance of boat roads	Cypress Valley Navigation District
Counties/Parishes	Harrison and Marion Counties, Texas Caddo Parish, Louisiana
Reservoir type	Restored natural lake
Surface Area	27,472 Acres (12,712 acres Texas side)
Shoreline Development Index	8.9
Drainage Area	2,700 Square Miles
Conductivity	140 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristics for Caddo Lake, Texas, August 2021. Reservoir elevation at time of survey was near full pool. The list includes ramps located on the Texas side of Caddo Lake.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Highway 43 Bridge	32.69624 -94.18807	Y	15	162	Excellent. No access issues
Caddo Lake State Park	32.69372 -94.17568	Y	20	161	Excellent. No access issues
F.R. Camp Rd. (Caddo Lake WMA)	32.73906 -94.16644	Y	10	N/A	Adequate, privately operated
Shady Glade Marina	32.71274 -94.12067	Y	20	164	Adequate, privately operated
Johnson's Ranch	32.70762 -94.11851	Y	15	158	Adequate, privately operated
Cripp's Camp	32.70262 -94.12218	Y	30	N/A	Adequate, privately operated
Tucker's Hunting and Fishing Camp	32.67269 -94.09593	Y	10	166	Adequate, privately operated
Buzzard Bay Landing & RV Park	32.66910 -94.04472	Y	10	163	Adequate, privately operated
Potter's Point	32.70272 -94.07063	Y	15	162	Adequate, privately operated

Table 3. Harvest regulations for Caddo Lake, Texas and Louisiana.

Species	Bag limit	Length limit
Gar, Alligator	1 <sup>a</sup>	None
Catfish: Channel and Blue Catfish, their hybrids and subspecies	50 <sup>b</sup> (in any combination)	None
Catfish, Flathead	10	18-inch minimum
Bass, White	25	None
Bass, Largemouth	8 <sup>c</sup>	14- to 18-inch slot
Bass: Spotted	8 <sup>c</sup>	None
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	None

<sup>a</sup> Mandatory harvest reporting required for all harvested Alligator Gar (reporting available through the My Texas Hunt Harvest app or at <https://apps.tpwd.state.tx.us/huntharvest/home.faces>).

<sup>b</sup> No more than 5 may be 30 inches or longer.

<sup>c</sup> Daily bag for Largemouth Bass and Spotted Bass = no more than 8 fish in any combination, of which no more than 4 may be Largemouth Bass 18 inches or longer.

Table 4. Stocking history of Caddo Lake, Texas. FGL = fingerling; AFGL = advanced fingerling; SADL = sub-adults; ADL = adults, FRY = fry.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
Blue Catfish	1988	<u>17</u>	ADL	15.8
	Total	17		
Channel Catfish	1991	<u>9,000</u>	AFGL	7.0
	Total	9,000		
Florida Largemouth Bass	1981	317,215	FGL	2.0
	1981	94,000	FRY	1.0
	1982	500,550	FGL	2.0
	1994	448,955	FGL	1.4
	1994	429,093	FRY	0.8
	1995	650,534	FGL	1.3
	1995	116,000	FRY	0.6
	1996	210,700	FGL	1.2
	1996	76,518	FRY	1.0
	1997	268,000	FGL	1.1
	1998	673,167	FGL	1.2
	1999	670,925	FGL	1.3
	2000	683,264	FGL	1.4
	2006	500,582	FGL	1.5
	2007	501,110	FGL	1.6
	2009	706,319	FGL	1.6
	2010	500,790	FGL	1.6
	2012	691,408	FGL	1.6
	2013	266,286	FGL	1.7
	2015	256,506	FGL	1.5
2017	339,454	FGL	1.6	
2019	326,606	FGL	1.9	
2021	<u>150,209</u>	FGL	1.6	
	Total	9,378,191		
Paddlefish	1992	12,970	FRY	4.1
	1994	2,460	FRY	2.3
	1998	12,254	FRY	6.4
	2014	2,007	AFGL	12.5
	2014	47	SADL	30.0
	2016	564	AFGL	24.0
	2017	2,156	FRY	2.8
	2018	12,076	AFGL	11.3
	2019	13,236	AFGL	14.8
	2019	9,220	FRY	5.5
	2020	8,009	AFGL	11.5
	2020	<u>24,268</u>	FRY	6.9
	Total	99,267		
ShareLunker Largemouth Bass <sup>a</sup>	2009	3,408	FGL	1.9
	2010	2,166	FGL	2.5
	2011	<u>32,037</u>	FGL	1.7
	Total	37,611		

<sup>a</sup> ShareLunker Largemouth Bass are 1<sup>st</sup> generation offspring from angler-donated Largemouth Bass  $\geq$  13 pounds from the Toyota ShareLunker program.



Table 5. Objective-based sampling plan components for Caddo Lake, Texas 2021–2022.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE–Stock $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
Bluegill <sup>a</sup>	Abundance	CPUE–Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad <sup>a</sup>	Abundance	CPUE–Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
Threadfin Shad <sup>a</sup>			Presence/Absence
<i>Tandem hoop netting</i>			
Channel Catfish	Abundance	CPUE	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
Crappie <sup>b</sup>	Abundance	CPUE	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
	Age-and-growth	Age at 10 inches	$N = 13, 9.0 - 10.9$ inches
	Condition	$W_r$	10 fish/inch group

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

<sup>b</sup> Sampling objectives are based off the catch of both Black and White Crappie. Due to past variability in CPUE, we will not increase sampling to achieve RSE of CPUE  $\leq 25$ .

Table 6. Survey of aquatic vegetation, Caddo Lake, Texas, 2018–2021. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2018	2019	2020	2021
Native submerged				111 (0.9)
Native floating-leaved				501 (3.9)
Native emergent				15 (0.1)
Non-native				
Giant salvinia (Tier II)*	1,319 (10.4)	671 (5.3)	1,549 (12.2)	865 (6.8)
Hydrilla (Tier III)*	4,706 (37.0)	3,292 (25.9)	1,323 (10.4)	497 (3.9)
Alligatorweed (Tier II)*	<1 (<0.1)	295 (2.3)	5 (<0.1)	8 (<0.1)
Water hyacinth (Tier II)*	32 (0.3)	57 (0.4)	29 ( )	111 (0.9)
Eurasian Watermilfoil (Tier III)*	<1 (<0.1)	0	0	8 (<0.1)
Hygrophila (Tier III)*	Present	Present	8 (<0.1)	230 (1.8)
Crested floating heart (Tier II)*	40 (0.3)	40 (0.3)	37 (0.3)	278 (2.2)

\* Tier II is active management, Tier III is watch status

Table 7. Percent directed angler effort by species for Caddo Lake, Texas, 2009/2010, 2017/2018, and 2021/2022. Survey periods were from 1 June through 31 May.

Species	2009/2010	2017/2018	2021/2022
Black bass	52.6	69.8	61.5
Sunfishes	21.1	5.1	2.7
Anything	1.9	4.1	4.5
Crappie	23.9	19.8	28.2
Catfish	0.5	0.9	3.1
Temperate bass	0	0.3	0

Table 8. Total fishing effort (h) for all species and total directed expenditures at Caddo Lake, Texas, 2009/2010, 2017/2018, and 2021/2022. Survey periods were from 1 June through 31 May. Relative standard error is in parentheses.

Creel statistic	2009/2010	2017/2018	2021/2022
Total fishing effort	140,292	73,595 (22)	108,195 (17)
Total directed expenditures	\$788,363	\$464,904 (54)	\$782,073 (36)

## Gizzard Shad

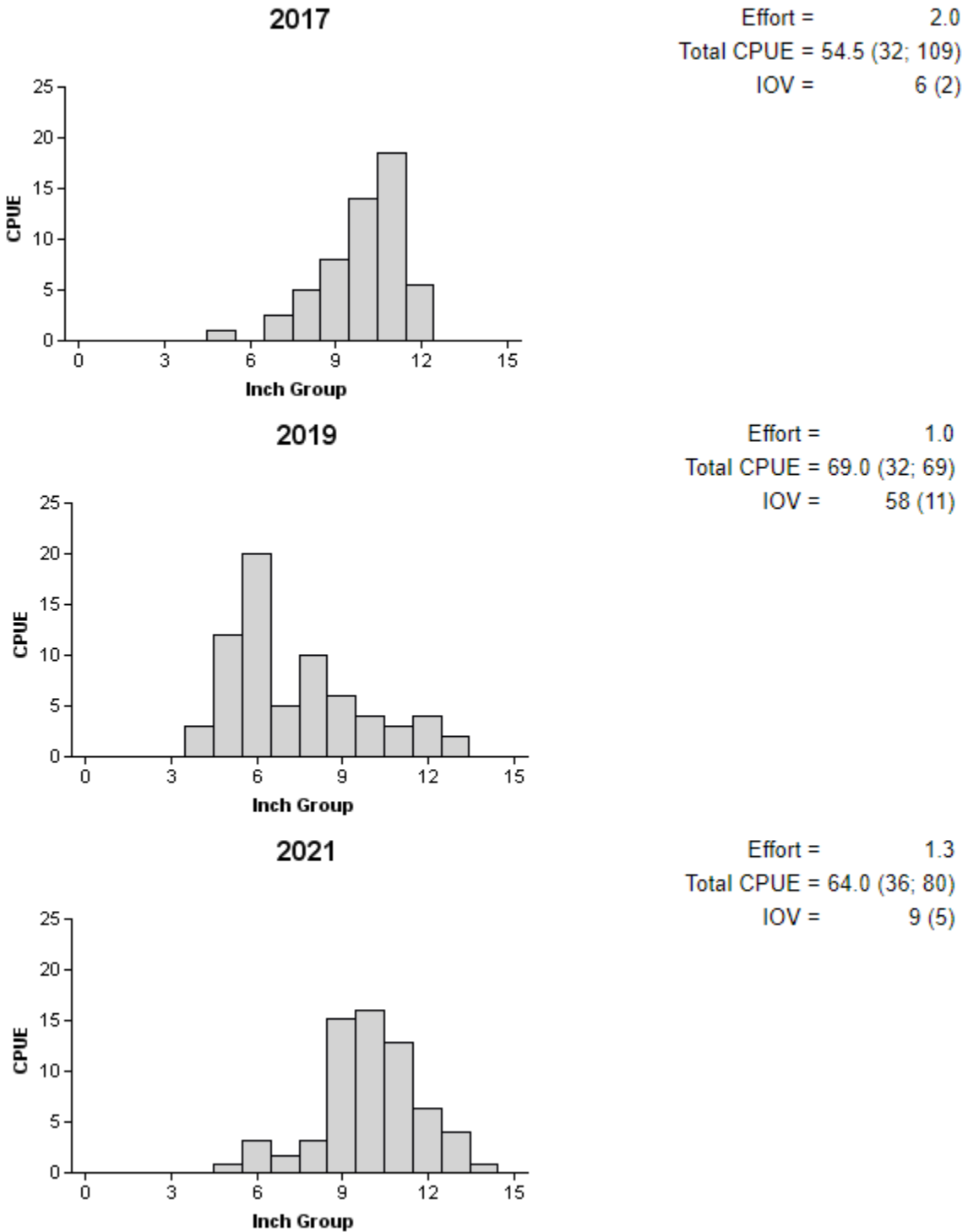


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Caddo Lake, Texas, 2017, 2019, and 2021.

## Bluegill

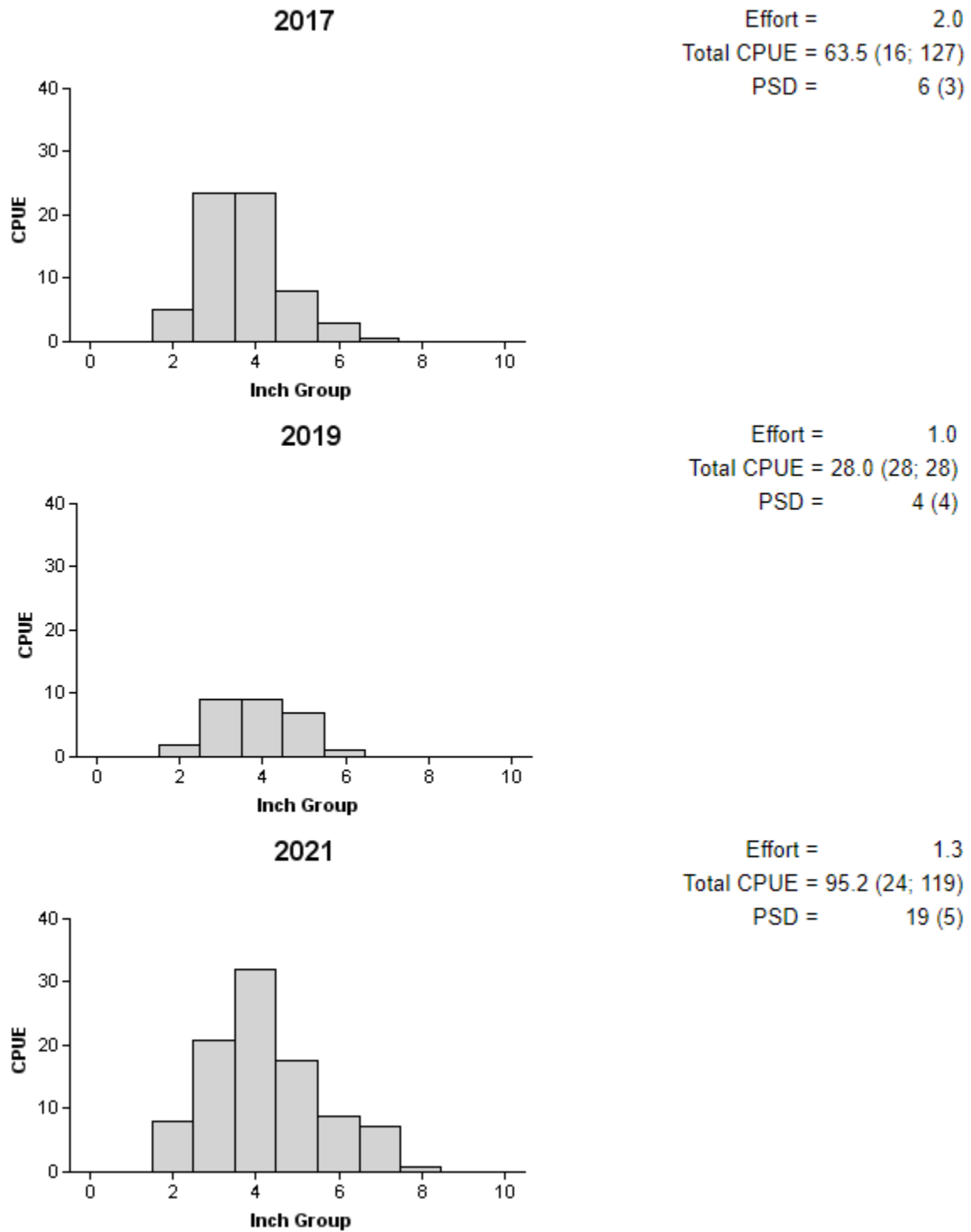


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Caddo Lake, Texas, 2017, 2019, and 2021.

### Redear Sunfish

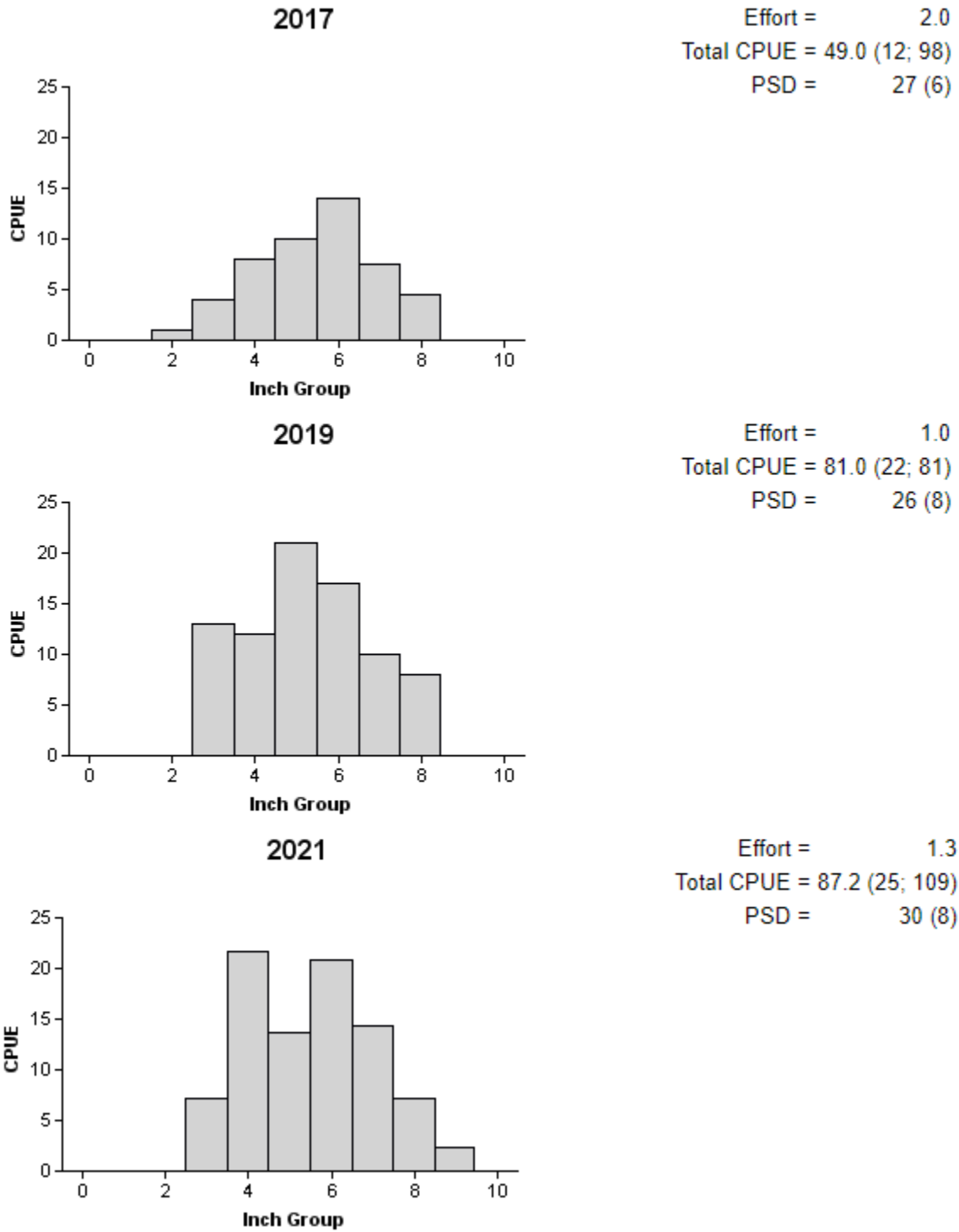


Figure 4. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Caddo Lake, Texas, 2017, 2019, and 2021.

Table 9. Creel survey statistics for sunfishes at Caddo Lake, Texas, from June 2009 through May 2010, June 2017 through May 2018, and June 2021 through May 2022. Total catch per hour is for anglers targeting sunfish and total harvest is the estimated number of sunfish harvested by all anglers. Relative standard errors (RSE) are in parentheses

Creel Survey Statistic	Year		
	2009/2010	2017/2018	2021/2022
Surface area (acres)	12,712	12,712	12,712
Directed effort (h)	29,571 (30)	3,430 (50)	2,893 (56)
Directed effort/acre	2.33 (30)	0.27 (50)	0.23 (56)
Total catch per hour	5.3 (24)	0.3 <sup>(a)</sup>	2.3 (68)
Total harvest	145,883 (52)	461 (141)	8,522 (98)
Sunfish (unidentified)	12,244 (88)	0	0
Warmouth	17,195 (75)	0	0
Bluegill	76,109 (38)	461 (141)	6,582 (62)
Longear sunfish	0	0	0
Redear sunfish	39,723 (45)	0	1,940 (222)
Spotted sunfish	612 (943)	0	0
Harvest/acre (Total)	11.5 (52)	0.4 (141)	0.7 (98)
Percent legal released	38	67	70

<sup>a</sup> Unable to calculate RSE.

### Channel Catfish

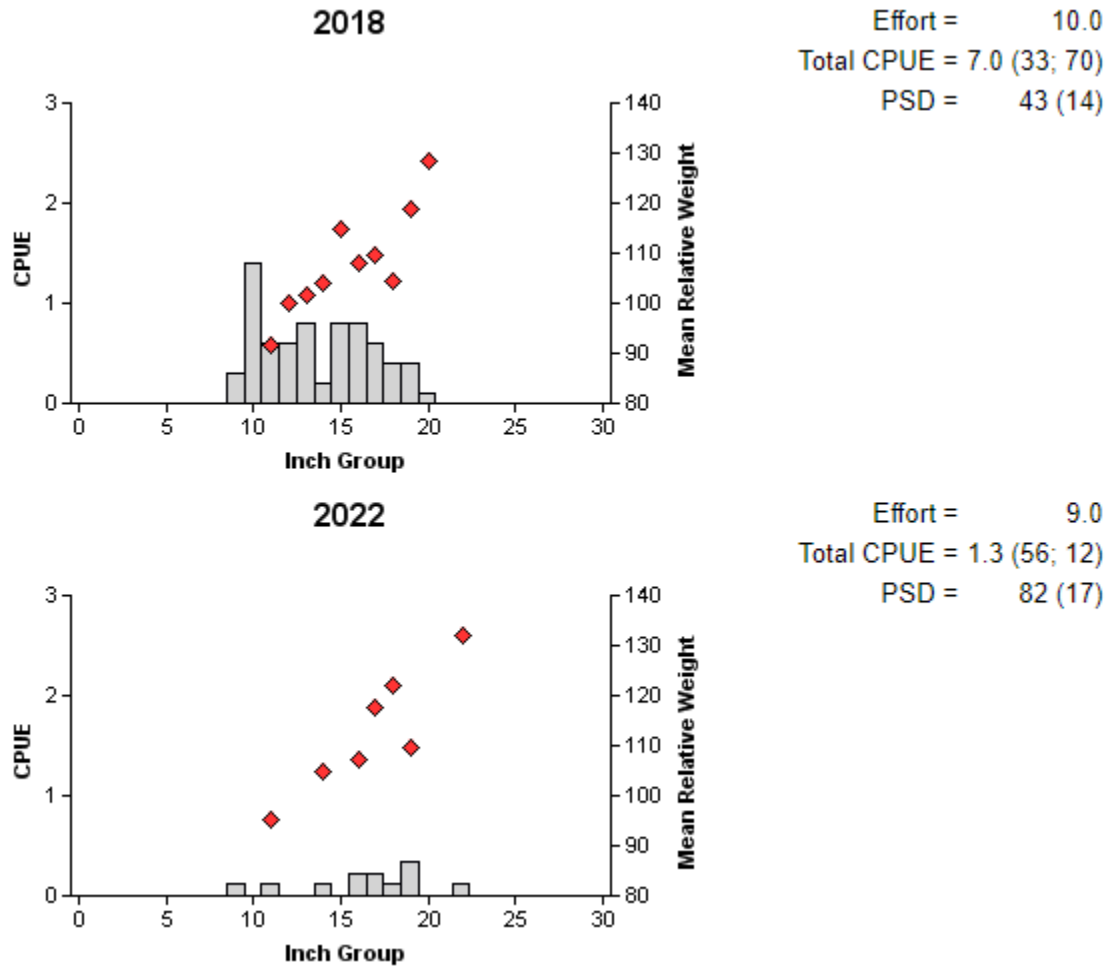


Figure 5. Number of Channel Catfish caught per series (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop net surveys, Caddo Lake, Texas, 2018 and 2022.



Table 10. Creel survey statistics for Channel Catfish at Caddo Lake, Texas, from June 2009 through May 2010, June 2017 through May 2018, and June 2021 through May 2022. Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2009/2010	2017/2018	2021/2022
Surface area (acres)	12,712	12,712	12,712
Directed effort (h)	732 (126)	597 (114)	3,389 (54)
Directed effort/acre	0.06 (126)	0.05 (114)	0.27 (54)
Total catch per hour	0 <sup>a</sup>	0 <sup>a</sup>	0.3 ( <sup>b</sup> )
Total harvest	4,714 (166)	0	1,546 (128)
Harvest/acre	0.37 (166)	0	0.12 (128)
Percent legal released	15	100	71

<sup>a</sup> No Channel Catfish were reported caught by anglers targeting Channel Catfish.

<sup>b</sup> Unable to calculate RSE.

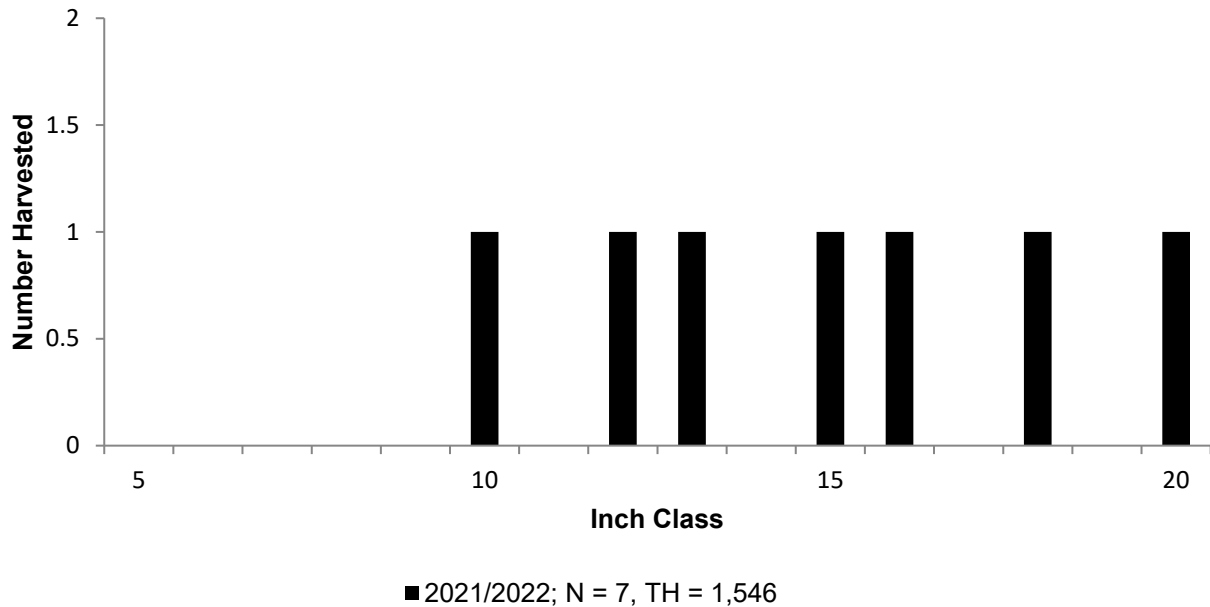


Figure 6. Length frequency of harvested Channel Catfish observed during creel surveys at Caddo Lake, Texas, June 2021 through May 2022, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Largemouth Bass

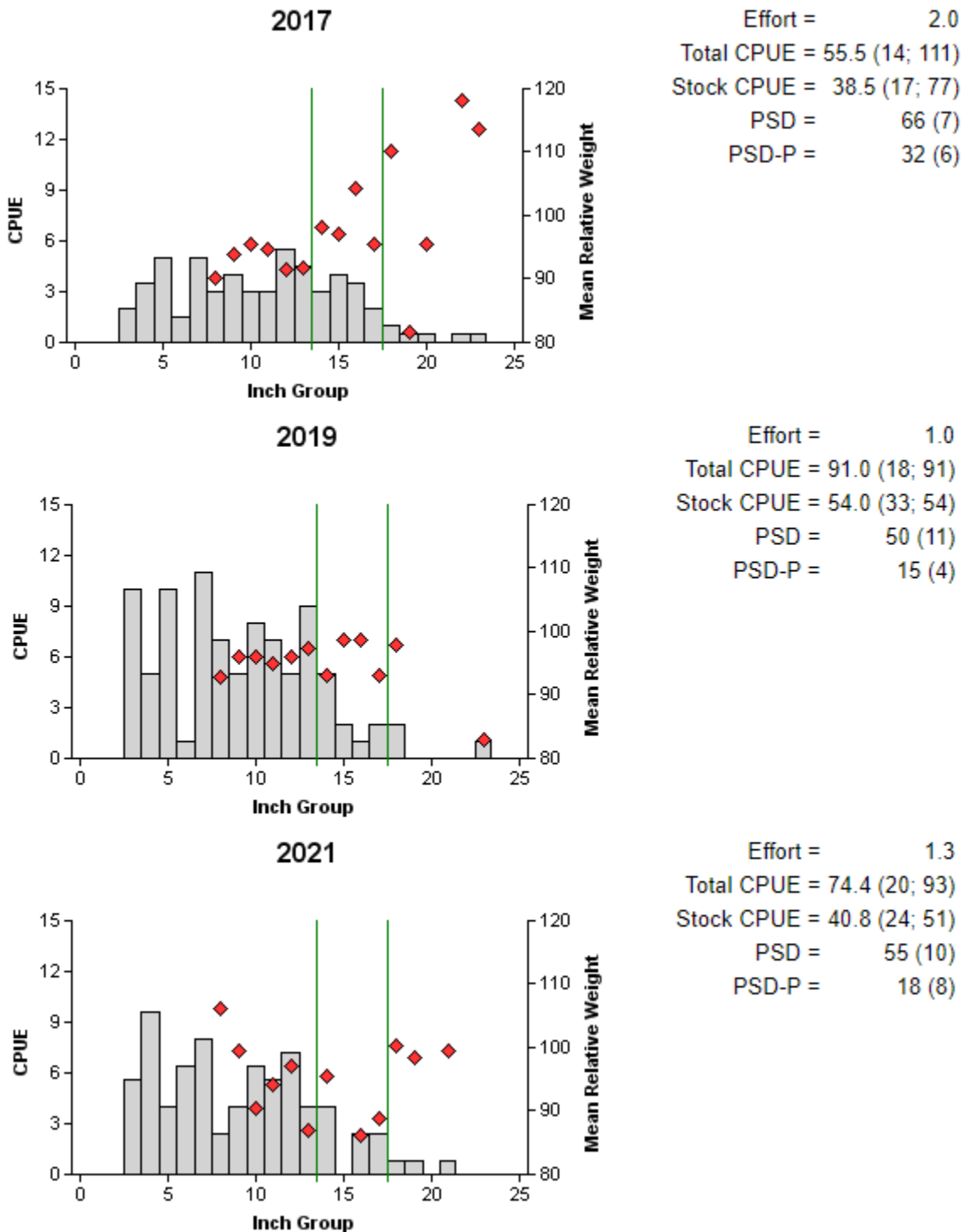


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall daytime electrofishing surveys, Caddo Lake, Texas, 2017, 2019, and 2021. Vertical lines indicate slot length limit.

Table 11. Creel survey statistics for Largemouth Bass at Caddo Lake, Texas, from June 2009 through May 2010, June 2017 through May 2018, and June 2021 through May 2022. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. The estimated number of fish released by weight category is for anglers targeting Largemouth Bass. Relative standard errors (RSE) are in parentheses.

Statistic	2009/2010	2017/2018	2021/2022
Surface area (acres)	12,712	12,712	12,712
Directed angling effort (h)			
Tournament	7,604 (38)	6,961 (44)	14,104 (27)
Non-tournament	66,175 (27)	39,702 (25)	52,263 (18)
All black bass anglers combined	73,779 (26)	46,663 (25)	66,367 (20)
Angling effort/acre	5.8 (26)	3.7 (25)	5.2 (20)
Catch rate (number/h)	0.6 (26)	0.9 (46)	0.8 (34)
Harvest			
Non-tournament harvest	12,611 (66)	1,936 (71)	1,037 (75)
Harvest/acre	1.0 (66)	0.2 (71)	0.1 (75)
Tournament weigh-in and release	0 <sup>a</sup>	0 <sup>a</sup>	1,502 (137)
Release by weight			
<4.0 lbs		28,919 (72)	49,436 (57)
4.0-6.9 lbs		2,367 (83)	5,681 (67)
7.0-9.9 lbs		204 (137)	0
≥10.0 lbs		0	0
Percent legal released (non-tournament)	77	55	96

<sup>a</sup> No Largemouth Bass were observed held for weigh-in and release during interviews of tournament anglers.

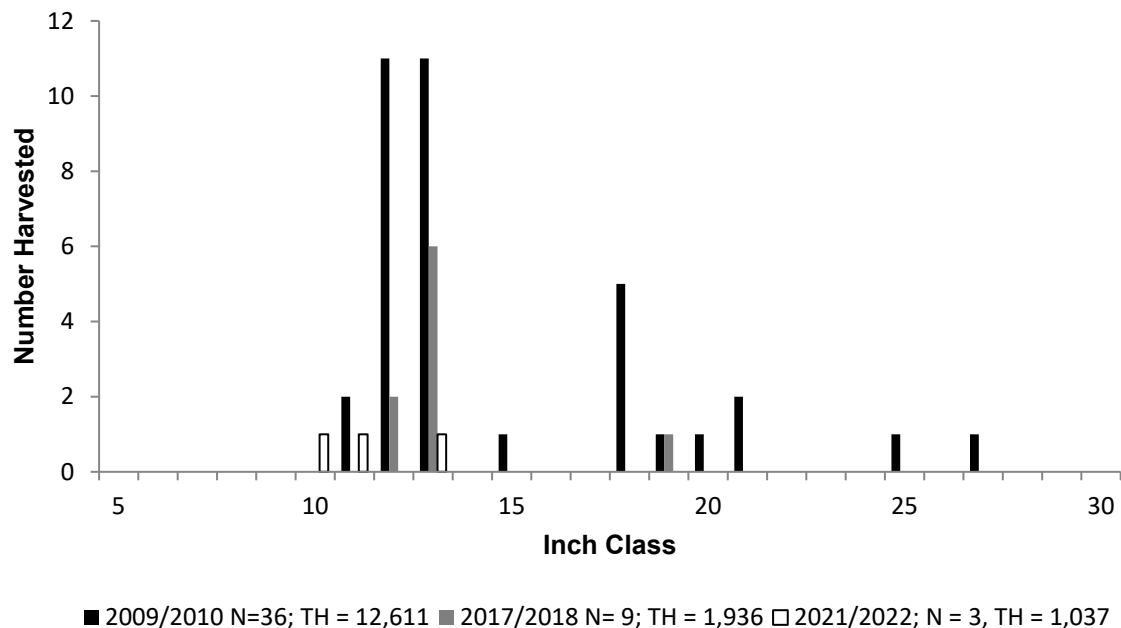


Figure 8. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Caddo Lake, Texas, June 2009 through May 2010 (Texas side), June 2017 through May 2018 (Texas side), and June 2021 through May 2022 (Texas side), all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the estimated non-tournament harvest for the creel period.

## Black Crappie

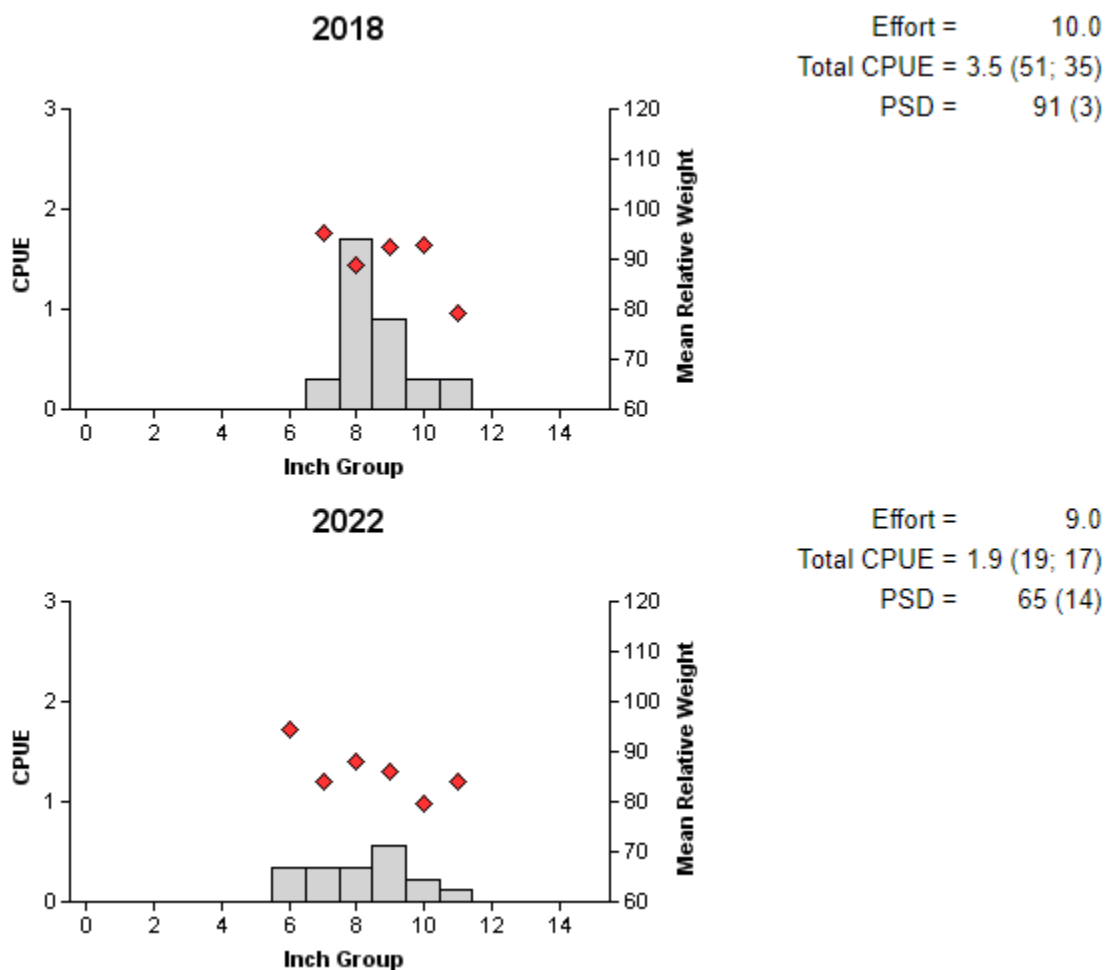


Figure 9. Number of Black Crappie caught per series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop netting surveys, Caddo Lake, Texas, 2018 and 2022.

Table 12. Creel survey statistics for crappie at Caddo Lake, Texas, from June 2009 through May 2010, June 2017 through May 2018, and June 2021 through May 2022. Total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2009/2010	2017/2018	2021/2022
Surface area (acres)	12,712	12,712	12,712
Directed effort (h)	33,587 (30)	13,251 (39)	30,453 (32)
Directed effort/acre	2.64 (30)	1.04 (39)	2.40 (32)
Total catch per hour	1.87 (20)	1.76 (44)	2.58 (33)
Total harvest	40,367 (56)	14,622 (46)	43,297 (41)
White crappie	13,162 (75)	4,836 (53)	6,830 (71)
Black crappie	27,205 (47)	9,786 (43)	36,467 (35)
Harvest/acre	3.18 (56)	1.15 (46)	3.4 (41)
Percent legal released	0	36	56

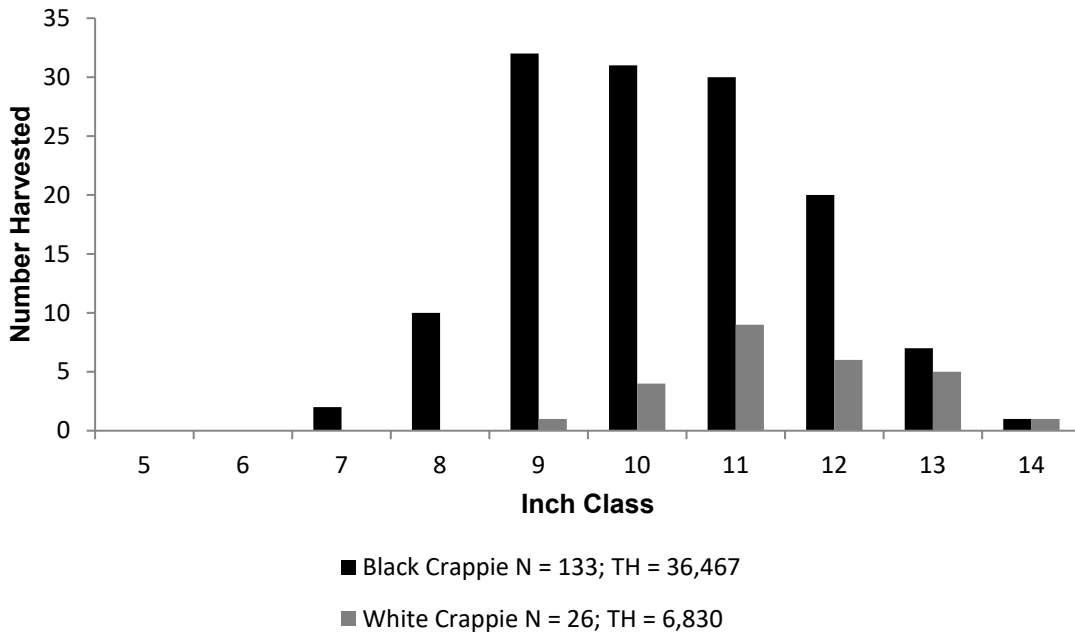


Figure 10. Length frequency of harvested Black Crappie and White Crappie observed during creel surveys at Caddo Lake, Texas, June 2021 through May 2022, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Proposed Sampling Schedule

Table 13. Proposed sampling schedule for Caddo Lake, Texas. Survey period is June through May. Hoop netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall.

	Survey year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler Access				X
Structural Habitat				X
Vegetation	X	X	X	X
Electrofishing – Fall		X		X
Baited tandem hoop netting				X
Report				X

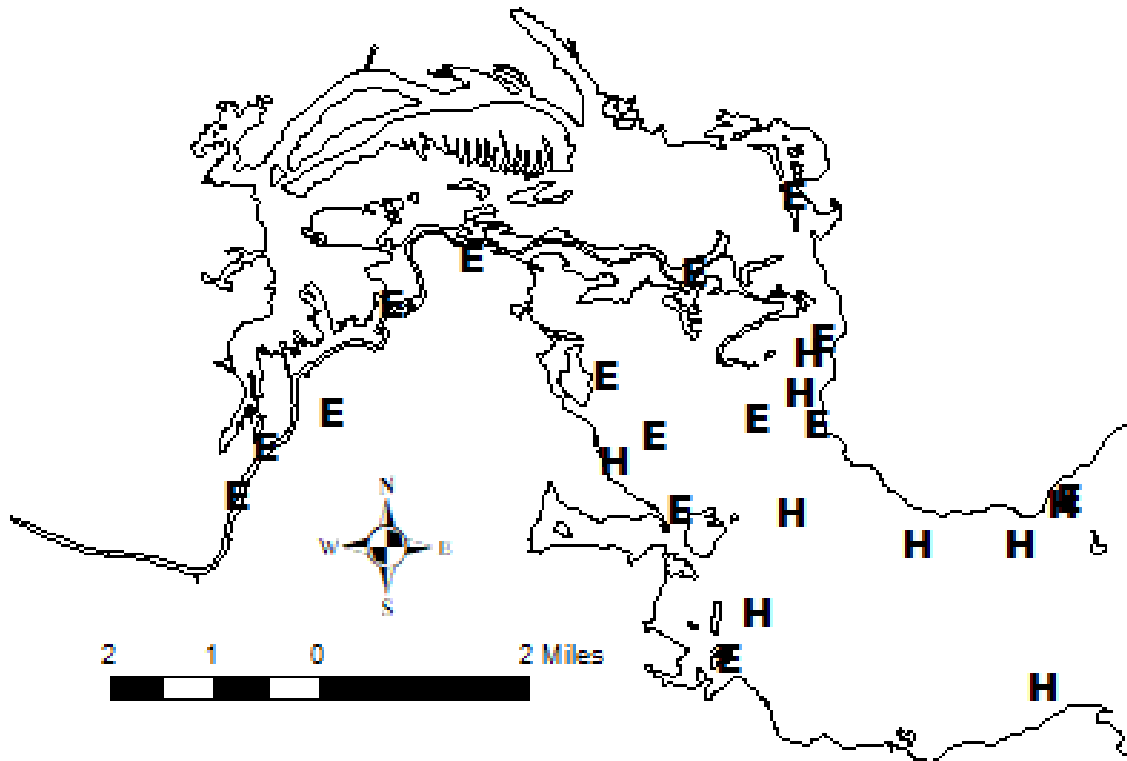
## APPENDIX A – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Caddo Lake, Texas, 2021-2022. Sampling effort was 9 net series for hoop netting and 1.25 hour for electrofishing.

Species	Electrofishing		Hoop Netting	
	N	CPUE	N	CPUE
Gizzard Shad	80	64.0 (36)		
Threadfin Shad	100	80.0 (100)		
Channel Catfish			12	1.3 (56)
Flathead Catfish			2	0.2 (66)
Warmouth	2	1.6 (68)		
Bluegill	119	95.2 (24)		
Longear Sunfish	1	0.8 (100)		
Redear Sunfish	109	87.2 (25)		
Redspotted Sunfish	1	0.8 (100)		
Largemouth Bass	93	74.4 (20)		
Black Crappie			17	1.9 (19)

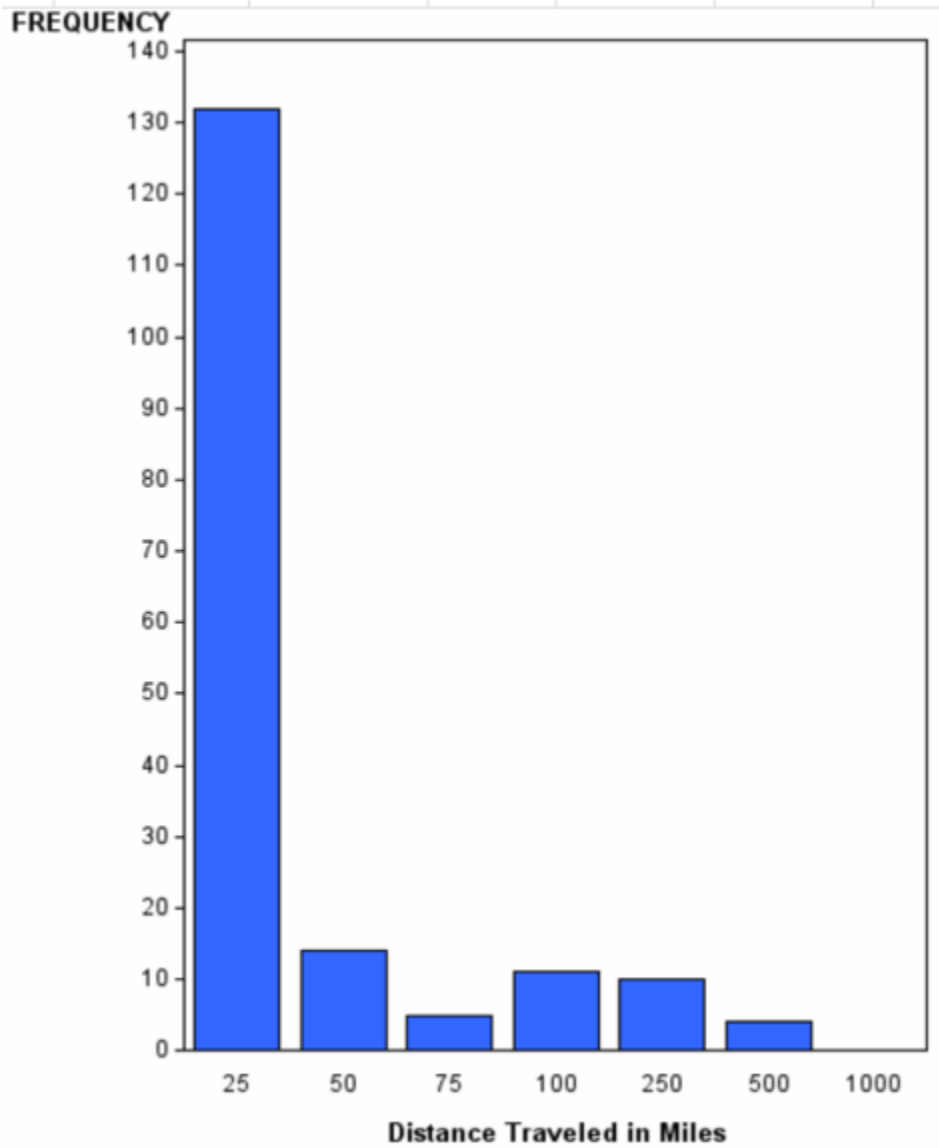


## APPENDIX B – Map of sampling locations



Location of sampling sites, Caddo Lake, TX 2021-2022. Hoop net and electrofishing stations are indicated by H and E, respectively. Water level was near full pool at time of sampling

## APPENDIX D – reporting of creel ZIP code data



Frequency of anglers that traveled various distances (miles) to Caddo Lake, Texas, as determined from the June 2021 through May 2022 creel survey.



**Life's better outside.®**

In accordance with Texas State Depository Law, this publication is available at the Texas State Publications Clearinghouse and/or Texas Depository Libraries.

© Texas Parks and Wildlife, PWD RP T3200-1262 (08/22)

TPWD receives funds from the USFWS. TPWD prohibits discrimination on the basis of race, color, religion, national origin, disability, age, and gender, pursuant to state and federal law. To request an accommodation or obtain information in an alternative format, please contact TPWD on a Text Telephone (TTY) at (512) 389-8915 or by Relay Texas at 7-1-1 or (800) 735-2989 or by email at [accessibility@tpwd.texas.gov](mailto:accessibility@tpwd.texas.gov). If you believe you have been discriminated against by TPWD, please contact TPWD, 4200 Smith School Road, Austin, TX 78744, or the U.S. Fish and Wildlife Service, Office for Diversity and Workforce Management, 5275 Leesburg Pike, Falls Church, VA 22041.