

# Choke Canyon Reservoir

## 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:

Greg Binion, District Management Supervisor  
and  
Dusty McDonald, Assistant District Management Supervisor

Inland Fisheries Division  
Corpus Christi District, Mathis, Texas

Carter Smith  
Executive Director

Craig Bonds  
Director, Inland Fisheries

July 31, 2022



# Contents

<b>Contents</b> .....	i
Survey and Management Summary .....	2
Introduction .....	3
Reservoir Description .....	3
Angler Access.....	3
Management History .....	3
Methods.....	5
Results and Discussion.....	6
Fisheries Management Plan for Choke Canyon Reservoir, Texas.....	8
Objective-Based Sampling Plan and Schedule (2022–2024).....	9
Literature Cited.....	12
Tables and Figures .....	13
Water Level .....	13
Reservoir Characteristics .....	13
Boat Ramp Characteristics.....	14
Harvest Regulations .....	14
Stocking History.....	15
Objective-Based Sampling Plan for 2019-2020 .....	16
Aquatic Vegetation Survey .....	17
Gizzard Shad.....	18
Bluegill .....	19
Alligator Gar.....	20
Blue Catfish .....	22
Channel Catfish.....	23
White Bass .....	24
Largemouth Bass .....	25
Proposed Sampling Schedule.....	28
APPENDIX A – Catch rates for all species from all gear types .....	29
APPENDIX B – Map of sampling locations.....	30
APPENDIX C – 2021 Distribution map of aquatic vegetation.....	31

## Survey and Management Summary

Fish populations were surveyed in 2021 using electrofishing and fyke nets and in 2022 using gill netting, spring electrofishing, and multifilament gill netting to assess population trends for important fisheries. Historical data are presented with the 2021-2022 data for comparison. This report summarizes the survey results and contains a management plan for the reservoir based on those findings.

**Reservoir Description:** Choke Canyon is a 25,989-acre reservoir (averaged 16,004 acres in 2021-2022) located on the Frio River in the Nueces River Basin, approximately 80 miles south of San Antonio. Its main purposes are water supply and recreation. The reservoir has a history of substantial water level fluctuations. The substrate is composed primarily of silt, sand, clay, and gravel/rock. Littoral habitat consisted of native aquatic vegetation, periodically flooded terrestrial vegetation, standing timber, hydrilla, and seasonally abundant water hyacinth.

**Management History:** Important sport fish species include Largemouth Bass, Blue and Channel Catfishes, White Bass, and crappies. Alligator Gar are also an important component to the overall fishery. Recent management efforts have focused on control of nuisance aquatic vegetation, documenting catch of trophy Largemouth Bass and promoting the ShareLunker Program, enhancing the Largemouth Bass population with stockings, and developing an Alligator Gar monitoring program. Staff annually monitored access areas where invasive vegetation could restrict use. The district has worked with the City of Corpus Christi to develop and implement a water hyacinth control program. District staff conducted herbicide treatments of water hyacinth from 2008 through 2015 (926 total acres). Since 2016, water hyacinth herbicide applications have been conducted through private contractors including treatments in 2016 (132 acres), 2017 (566 acres), 2018 (104 acres), 2019 (5 acres), and 2022 (310 acres). Prior to 2021, angler harvest of all sport fishes had been regulated according to statewide size and bag limits. In September 2021, the regulation for Blue and Channel Catfish changed from the statewide regulation to a 14-inch minimum length, 15-fish daily bag limit.

### Fish Community

- **Prey species:** Gizzard Shad, Threadfin Shad, and Bluegill were present in moderate abundance. Collectively, these species formed the primary forage base. The majority of prey species collected were adequate size for most predator fish.
- **Alligator Gar:** The reservoir continues to support a robust Alligator Gar population and popular fishery. Fifty-six (N = 56) Alligator Gar were reported as harvested through the mandatory reporting system in 2020-2021. Several trophy-sized ( $\geq 6$  ft) Alligator Gar were harvested by anglers.
- **Catfishes:** Blue Catfish abundance remained high and size structure comprised a wide size range of fish. Channel and Flathead Catfish were present in low abundance.
- **White Bass:** Abundance of White Bass was low throughout the survey period. All of the fish collected in 2022 were > 10 inches.
- **Largemouth Bass:** Largemouth Bass abundance was moderate. Size structure indices indicated excellent size composition with abundant preferred size (15 inch) available. Growth was good and mean age at legal length was 1.9 years.
- **Crappies:** Anecdotally, crappies remained an important component to the overall sport fishery, especially for harvest-oriented anglers.

**Management Strategies:** Continue to manage sport fish populations under existing harvest regulations. Continue to assist the City of Corpus Christi with the water hyacinth control program. Monitor access areas with annual nuisance vegetation surveys where water hyacinth and hydrilla could restrict use. Assist Texas State University with annual zebra mussel veliger monitoring. Stock Lone Star Bass to maintain high level of trophy production potential and continue to collect data for the Largemouth Bass trophy database. Continue to refine the Alligator Gar monitoring program to track population trends and monitor harvest through the mandatory harvest reporting system.

## Introduction

This document is a summary of fisheries data collected from Choke Canyon Reservoir in 2021-2022. 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 2021-2022 data for comparison.

## Reservoir Description

Choke Canyon is a 25,989-acre reservoir (averaged 16,004 acres in 2021-2022) located in the Nueces River Basin on the Frio River. The reservoir was impounded in 1982 and lies approximately 80 miles south of San Antonio. The controlling authority is the City of Corpus Christi. Its main purposes are water supply and recreation. The reservoir has a history of substantial water level fluctuations (Figure 1) and experienced a 6-foot water level rise in the spring and summer of 2021. During the 2021-2022 sampling season the reservoir averaged 19.2 feet below conservation pool. Choke Canyon Reservoir was classified as eutrophic with a mean TSI cl-a of 59.74 (Texas Commission on Environment Quality 2022). Secchi disc measurements of water clarity ranged from 12 to 30 inches. The substrate was composed primarily of silt, clay, sand, and small rock. Littoral habitat consisted of timber stands, periodically flooded terrestrial vegetation, native aquatic vegetation, and seasonally abundant non-native vegetation. Native aquatic vegetation and hydrilla reestablished and became more widespread in the reservoir after a substantial water level rise in 2002. Water hyacinth became established in 2006 and has been treated with herbicides annually, excluding 2014, 2020, and 2021. Other descriptive characteristics of the reservoir are in Table 1.

## Angler Access

Choke Canyon Reservoir has six public boat ramps and no private boat ramps. One public ramp was unavailable to anglers in 2021-2022 because the end of the boat ramp was above the waterline (extension not feasible). The Calliham and Southshore ramp courtesy docks were replaced in 2013 and 2018, respectively. A boat ramp repair project at Southshore commenced in 2017 and repairs were completed early in 2018 and the launch reopened for public use in February 2018. Additional boat ramp characteristics are in Table 2. Shoreline access is adequate and available at all boat ramp launch sites as well as extensive shoreline located at Southshore and Calliham units within Choke Canyon State Park. An extended fishing jetty is available at the Calliham unit.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Binion and McDonald 2020) included:

1. Stock Florida Largemouth Bass annually to enhance growth potential in the population and therefore, increase trophy production potential. Promote the ShareLunker program and monitor entries.
 

**Action:** Florida Largemouth Bass (FLMB) were stocked in 2020 and 2021 at a rate of 1,000/km. ShareLunker signage was distributed to Choke Canyon State Park staff and signs were mounted at each public boater access location.
2. Monitor Alligator Gar population trends (recruitment, adult abundance, harvest, harvest size composition) and promote the fishery through press releases.
 

**Action:** The one-fish daily bag was maintained, and harvest of Alligator Gar was monitored through the mandatory harvest reporting system. District staff assessed young of year abundance with fyke nets after a water level rise in summer 2021 and monitored adult population abundance with multifilament gill nets in summer 2022. Press releases were disseminated to statewide and local media.
3. Monitor presence, distribution, and spread of aquatic invasive species (i.e., aquatic vegetation, zebra mussels) and implement control measures, as needed.

**Action:** Invasive vegetation was monitored annually with vegetation surveys. District staff coordinated with the Aquatic Habitat Enhancement (AHE) team, the City of Corpus Christi, and private contractors to manage and control water hyacinth through herbicide applications. Three-hundred ten acres of water hyacinth were treated in 2022. District staff assisted Texas State University with annual zebra mussel veliger monitoring as part of the Texas Early Detection Project.

**Harvest regulation history:** Historically, harvest of sport fishes in Choke Canyon Reservoir have been managed with statewide regulations. In 2009, a one-fish daily bag limit was implemented for Alligator Gar. In 2021, the regulation for Blue and Channel Catfish was changed from a 12-inch minimum length limit (MLL), 25-fish daily bag to a 14-inch MLL, 15-fish daily bag limit (Table 3).

**Stocking history:** Florida Largemouth Bass fingerlings have been stocked annually since 2016. Northern Largemouth Bass (NLMB) were stocked from 2003 to 2005 as part of a research project examining the potential for increasing NLMB alleles in reservoirs with high FLMB introgression. A complete stocking history can be found in Table 4.

**Vegetation/habitat management history:** Historically, growth of hydrilla at boat ramps has been controlled with herbicides. Isolated colonies of water hyacinth were found in the reservoir from 1998 through 2005. These colonies were initially removed by hand. In 2006, herbicide treatments were initiated as water hyacinth coverage was too great to mechanically remove. District staff conducted herbicide treatments on water hyacinth in 2008 (195 acres), 2009 (80 acres), 2010 (525 acres), 2011 (45 acres), 2012 (51 acres), and in 2015 (30 acres). Starting in 2016, water hyacinth control was conducted through private contractors with coordination and oversight by TPWD Aquatic Habitat Enhancement (AHE) Team and the City of Corpus Christi. This included treatments in 2016 (132 acres), 2017 (566 acres), 2018 (104 acres), 2019 (5 acres), and 2022 (310 acres).

**Water transfer:** Choke Canyon Reservoir is primarily used for municipal/industrial water supply, recreation, and to lesser extent, flood control. Fifty-eight acre-feet of water continued to be released daily to downstream Lake Corpus Christi Reservoir. Intermittent larger releases of water were dependent on water level at Lake Corpus Christi. There is one permanent pumping station on the reservoir transferring water to the municipality of Three Rivers. There are currently no proposals to install additional pumping stations. No inter-basin transfers exist.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Choke Canyon Reservoir (Binion and McDonald 2020). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly-selected (excluding Alligator Gar sampling – fyke netting and multifilament gill netting) 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 fall electrofishing (2 hours at 24, 5-min stations). Largemouth Bass were also collected with spring electrofishing (2 hours at 24, 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. Ages for Largemouth Bass were determined using otoliths from 14 randomly selected fish (range 13.0 to 14.9 inches).

**Gill netting** – Blue Catfish, Channel Catfish, and White Bass were collected by gill netting (15 net nights at 15 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for Blue Catfish were determined using otoliths from 24 randomly selected fish (range 13.0 to 14.9 inches).

**Fyke netting** – Young of the year (YOY) Alligator Gar were collected by fyke netting (20 net nights at 20 stations) utilizing modified floating mini fyke nets as outlined by Smith et al. (2020). CPUE for fyke netting was recorded as the number of fish caught per net night (fish/nn).

**Multifilament gill netting** – Alligator Gar were collected by gill netting (26.2 hours at 38 sites) utilizing multifilament gill nets. Catch per unit effort (CPUE) for gill netting was recorded as the number of fish caught per hour (fish/h). Gill net sets were rapid and averaged roughly 30 minutes per soak following an active predator sampling strategy (Bodine et al. 2015).

**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 from 2005 through 2021.

**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.

**Habitat** –Vegetation surveys were conducted in 2018–2022 to monitor expansion of water hyacinth and hydrilla. 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 Geological Service (USGS) website (<https://waterdata.usgs.gov>). Accessed 1 May 2022.

## Results and Discussion

**Habitat:** A structural habitat survey was last conducted in 2005 (Findeisen and Binion 2008). In 2021, total native vegetation coverage was 128 acres (0.8%; Table 6), slightly reduced from the total native vegetation coverage recorded in 2019 (179 acres). Water stargrass and coontail were the most abundant native vegetation species encountered. Total non-native vegetation coverage in 2021 was 1,221 acres (7.6%); considerably higher to the non-native coverage observed in 2017 (622 acres; 3.6%). Hydrilla comprised the majority of non-native vegetation observed during 2021 and was present in 1,150 acres (7.2%) of water (Table 6). Additionally, a 6-foot water level rise mid 2021 flooded substantial terrestrial vegetation further supplementing total aquatic habitat.

**Prey species:** Gizzard Shad abundance decreased in 2021 (52.5/h) relative to 2019 (151.0/h) and only half of the Gizzard Shad collected in 2021 were available as prey (IOV = 50; Figure 2). Catch rates of Bluegill in 2021 (48.5/h) were consistent with catches observed in 2019 (47.0/h), but substantially lower when compared to 2017 (172.0/h; Figure 3). The majority of Bluegill collected since 2017 were < 6-inches total length (TL) and thus provided supplemental forage to predator species. However, sampling also indicated the presence of larger Bluegill (CPUE-6 = 17.0/h); adding recreational value for anglers. Redear Sunfish, Threadfin Shad, Golden Shiner, and Inland Silverside also contributed to the overall forage base (Appendix A). Overall, survey results indicated adequate prey base for sport fish and that availability of prey should not be a limiting factor to the growth and condition of sport fish in the reservoir.

**Alligator Gar:** Alligator Gar are an important component to the overall fishery and the population is robust in terms of numbers and size of fish (Binion et al. 2015). Multifilament gill net catch rates for adult Alligator Gar were 1.8/h in 2022, substantially higher than 0.3/h recorded in 2019 (Figure 4). Catch of large fish ( $\geq$  5-foot TL) represented 90% of the total gill net catch, indicating good numbers of larger fish available to anglers. One YOY Alligator Gar was captured with fyke netting (0.05/nn), documenting a spawning event did occur in 2021, following a 5-foot water level rise in early summer.

A total of 102 and 56 harvested Alligator Gar were reported through the mandatory harvest system from September 2019 – August 2020 and September 2020 – August 2021, respectively (Figure 5). Reported harvest was substantially reduced in 2020-2021 when compared to the prior year and only one fish has been reported since September 2021 through April 2022. Additionally, 63% of the harvested Alligator Gar reported in 2020-2021 were  $\geq$  5-foot TL and 27% were  $\geq$  6-foot TL (Figure 5), indicating frequent catch and harvest of trophy Alligator Gar. Bow anglers comprised the majority (75.0%) of reported harvest relative to rod and reel (17.9%) and passive gear (7.1%) methods of take. While the lack of reported harvest in the current year (2021-2022) is concerning, it is likely the result of substantial underreporting as fisheries independent abundance and size composition data suggests a healthy and balanced adult population comprising abundant fish  $\geq$  5-ft total length.

**Catfishes:** Blue Catfish abundance remained high over the survey period (CPUE range: 19.1 – 30.4/nn; Figure 6) yet the catch rate in 2022 (19.1/nn) was reduced relative to 2020 (30.4/nn) and slightly lower than the historical average (22.7/nn). Proportional size distribution indicated an improvement in size structure in 2022 (PSD = 18) relative to 2018 (PSD = 3) and 2020 (PSD = 8) and 68% of the fish collected in 2022 were  $\geq$  14-inches and available to angler harvest. Several quality-sized fish were collected in 2022, as indicated by an increase in CPUE-20 (3.1/nn) when compared to 2018 (0.5/nn) and 2020 (1.3/nn). Condition of stock-size fish ( $\geq$  12 inches) remained consistent across years for most size classes and tended to increase with increased length (Figure 6). Growth was adequate and mean age at legal length (14 inches) in 2020 was 4.3 years (N = 24; range: 2 – 9).

Channel Catfish relative abundance remained low (CPUE range: 1.2 – 3.1/nn; Figure 7) and was slightly reduced in 2022 (1.2/nn) when compared with 2018 (2.9/nn) and 2020 (3.1/nn). Size composition was dominated by small individuals and 83% of fish collected were sub-legal (< 14 inches). Body condition in 2022 was desirable ( $W_r$  range: 94 – 123) for the few fish where relative weights were calculated, and values were consistent with prior years.

**White Bass:** White Bass gill net catch rates were low (CPUE range: 0.7 – 2.6/nn; Figure 8) across the survey period. All of the fish collected in 2022 were  $\geq$  to the 10-inch minimum length limit. Relative

weight values were adequate for legal-sized fish (range: 87 – 93) and no trends were discernible based on size (Figure 8).

**Largemouth Bass:** Relative abundance of Largemouth Bass increased slightly in 2021 (96.5/h) relative to 2019 (85.5/h) yet was still below the historical mean CPUE (135.3/h) and the catch rate observed in 2017 (175.0/h; Figure 9). Nevertheless, catch rates of stock-size fish were greatly improved (77.0/h) in 2021 relative to 2019 (28.0/h) and roughly 30% of the total electrofishing catch comprised legal-sized fish (CPUE-14 = 28.5/h). Population size structure in 2021 was excellent (PSD = 62) and comprised a wide size range of fish (Figure 9). In 2021, relative weights of Largemouth Bass were adequate ( $W_r \geq 90$ ) for most size classes and no discernible trends were evident based on size. The 2022 spring electrofishing catch rate was 85.5/h and indicated abundant legal-size fish (CPUE-14 = 45.0/h) available for angler catch (Figure 10). Growth was good and mean age at legal length in 2021 was 1.9 years (N = 14; range: 1 – 2; Table 7). Introgression of FLMB genetics in the population has remained high over the last two decades (Table 8).

Twelve (N = 12) trophy-sized ( $\geq 8$  lbs.) Largemouth Bass were caught and submitted to the ShareLunker Program in the 2021 season including four fish  $\geq 10$  pounds. Overall, while the data indicated moderate Largemouth Bass abundance, the population offers ample quality angling opportunities, including opportunity to catch trophy size ( $\geq 8$  lbs.) fish.

**Crappies:** While no data were collected on crappies over the current survey period, crappies remain an important component to the overall sport fishery based on anecdotal angler reports and frequent discarding at fish cleaning stations located at Calliham and South Shore State Park units.



# Fisheries Management Plan for Choke Canyon Reservoir, Texas

Prepared – July 2022

**ISSUE 1:** Choke Canyon is valued for its high-quality Largemouth Bass fishery and for catches of trophy-size fish. Through creel and ShareLunker catch records, 362 Largemouth Bass weighing >10 lbs. and 1,046 fish weighing between 7 and 10 lbs. were caught and released by anglers from 2009 – 2022. The reservoir has produced a total of 13 Legacy ShareLunkers. Further, the lake record was broken in 2009 and currently stands at 15.45 pounds. Continued introduction of Florida Largemouth Bass genetics is necessary to enhance growth potential in the population and maintain the trophy legacy of this fishery, important to our anglers.

## 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.
2. Maintain Largemouth Bass trophy database.
3. Promote the ShareLunker Program and monitor reservoir entries to the program.

**ISSUE 2:** Choke Canyon Reservoir supports a robust and healthy population of Alligator Gar in terms of number and size of fish. The reservoir continues to be a popular destination for anglers seeking trophy Alligator Gar.

## MANAGEMENT STRATEGIES

1. Maintain the 1-fish daily bag to further promote and enhance the trophy characteristics of the Alligator Gar population.
2. Continue to refine an Alligator Gar sampling strategy to monitor trends in recruitment and adult abundance and size composition.
3. Monitor Alligator Gar harvest and harvest size composition through the mandatory harvest reporting system.
4. Promote the Alligator Gar fishery and angling opportunities by disseminating press releases to local and statewide media.

**ISSUE 3:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. The financial costs of controlling and/or eradicating 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. Exotic plants such as water hyacinth and hydrilla have historically been a severe problem, primarily in the upper end and tributaries of the reservoir. These exotic plants restrict recreational use and can impact the quality of fish and wildlife habitat restricting growth and colonization of native vegetation. Further, in 2020 Choke Canyon Reservoir was added to a list of reservoirs for invasive mussel monitoring as part of the Texas Early Detection Project, in collaboration with Texas State University and other project partners.

## 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.
6. Monitor water hyacinth and other invasive nuisance vegetation through vegetation surveys on an annual basis and continue to cooperate with the City of Corpus Christi on all vegetation control activities.
7. In cooperation with Texas State University, assist with annual zebra mussel veliger monitoring.

## Objective-Based Sampling Plan and Schedule (2022–2024)

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

Sport and other recreationally important fish in Choke Canyon Reservoir include Alligator Gar, Blue, Channel, and Flathead Catfish, White Bass, Largemouth Bass, and Black and White Crappie. Important forage species include Gizzard and Threadfin Shad, and Bluegill.

### Low Density or Under-Utilized Fisheries

**Channel Catfish:** Channel Catfish are present, but abundance is relatively low compared to the predominant catfish species (Blue Catfish) in the reservoir. Since 1989, the mean gill net CPUE was 2.4/nn. An exploratory baited tandem hoop net survey was conducted in the summer 2015 and yielded a catch rate of 2.0 fish/series. Further, directed fishing effort for Channel Catfish is low (< 1.0%) based on the last three creel surveys. CPUE will be recorded for standard gill net samples and large-scale changes in angler effort and harvest will be monitored with the 2024 creel survey (Table 9). Currently, the population does not warrant expending additional sampling effort.

**Flathead Catfish:** Flathead Catfish are present in the reservoir in low abundance. Since 1989, the mean gill net CPUE was 0.3/nn. Historically, directed fishing effort is low (< 1.0%) and only 34 fish have been harvested as indicated from creel periods between 2009 – 2020. CPUE will be recorded for standard gill net samples and large-scale deviations in angler effort and harvest will be monitored with the 2024 creel survey. Currently, the population does not warrant expending additional sampling effort.

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

**Alligator Gar:** Alligator Gar represent an important component to the overall sport fishery at the reservoir. A mark-recapture, exploitation, and population dynamics study completed on the reservoir in 2013 revealed a robust population (> 5,000 adult individuals) with trophy potential and low exploitation (range: 0 – 2.3%; Binion et al. 2015). While total directed fishing effort estimated by creel surveys has been historically low (< 1.0%), anecdotal reports and nighttime bowfishing tournaments suggest a popular fishery. Mandatory harvest monitoring was implemented in September 2019 and indicated frequent harvest by anglers. An adaptive sampling strategy and monitoring program was developed in 2019. A combination of gear types (fyke nets, multifilament gill nets) will be deployed using an adaptive sampling strategy based on reservoir (e.g., water level) and environmental (i.e., flow, flood pulse, etc.) conditions to monitor trends in recruitment, abundance, and size composition. Annual harvest will be monitored through the mandatory harvest reporting system; and directed effort, angler catch, and angler harvest will be monitored with a standard creel survey conducted in 2024. Collectively, these data should allow the ability to detect changes in Alligator Gar abundance, fishing effort, catch, and harvest; lending important insight into population dynamics and potential problems that may warrant more intensive sampling.

**Blue Catfish:** Blue Catfish are present in Choke Canyon Reservoir in high abundance and represent a popular recreational fishery. Annual gill net total CPUE since 1989 has averaged 22.7/nn (N = 30;

standard deviation = 11.7; range: 0.4 – 62.5/nn) and mean stock size CPUE is 10.2/nn (N = 30; standard deviation = 4.5; range: 0.4 – 18.5/nn). Further, Blue Catfish and catfishes as a group were the most popular sport fish sought (combined directed effort = 23%) by anglers in the 2020 creel survey and anglers harvested 61,635 fish during this time period. Trend data on CPUE, size structure, and body condition have been collected annually since 1989 (excluding 1990) and every other year since 2017 with spring gill netting. Currently, the population appears to be in good shape, and anglers are anecdotally satisfied with the fishing. Collection of trend data every two years with spring gill netting will allow for determination of large-scale changes in basic population dynamics (relative abundance, size frequency, and body condition) that may warrant further investigation and more intensive sampling. A minimum of 15 randomly selected gill net sites will be sampled. Sampling will continue at additional random sites until 100 stock-size ( $\geq 12$  inches) fish are collected and the RSE of CPUE-S is  $\leq 25$ . Finally, directed effort and angler catch and harvest will be monitored with a creel survey conducted in 2024 to assess large-scale changes in angler effort, catch, and harvest; lending important insight into overall population dynamics and potential problems that may warrant more thorough study.

**White Bass:** White Bass are present in the reservoir, but population metrics and relative abundance are highly variable from sample to sample. Depending on reservoir conditions (e.g., water level, flood pulses, etc.) and population abundance, White Bass often represent an important component to the overall sport fishery (directed effort = 17% & harvest = 37,348 in 2020) at the reservoir. However, minimal conclusions regarding the trend data on CPUE, size structure, and body condition of White Bass can be made due to high variability in the gill net catch data. Therefore, directed effort, angler catch, and angler harvest will be monitored with a creel survey conducted in 2024 to detect any large-scale shifts in White Bass angling effort, catch, and harvest; lending important insight into overall population status and dynamics that may justify more intensive investigation. CPUE will be recorded for standard gill net samples.

**Largemouth Bass:** Historically, Largemouth Bass have been present in the reservoir in good numbers and supported a very popular fishery. The mean historical total CPUE for Largemouth Bass is 135.4/h (N = 28; standard deviation = 85.2; range: 25.5 – 421.5/h) and mean stock-size CPUE is 70.3/h (N = 28; standard deviation = 45.7; range: 21.0 – 241.0/h). Relative abundance of LMB decreased in 2019 and 2021 relative to prior years to below the historical average. However, Largemouth Bass remain popular with anglers and were highly sought by anglers; typically representing the single-most sought sport fish. Trend data on CPUE, size structure, and body condition was collected annually from 1995 – 2017 with fall electrofishing and every other year since. The continued collection of trend data with fall electrofishing every two years will allow for determination of large-scale changes in basic population dynamics (abundance, size structure indices, body condition, age-at-length) that may warrant further investigation with more intensive sampling and/or management action. A minimum of 24 randomly selected electrofishing sites will be sampled to collect 50 stock-size fish for PSD indices and relative weight. The desired level of precision is  $RSE \leq 25$  for CPUE-S. Further, category 2 age and growth analysis [mean age at legal length (14 in), N = minimum of 13 fish between 13.0 – 14.9 in] will be conducted in 2023 to assess any changes in growth to the minimum length limit. Sampling will continue up to an additional 12 stations until all objectives are attained. In addition to fall electrofishing in 2023, a spring bass-only electrofishing survey will be conducted in 2024. Directed effort, angler catch, and angler harvest will be monitored with a creel survey conducted in 2024 to monitor for any large-scale changes in angling effort, catch, and harvest to gain further insight into population characteristics. Largemouth Bass catch data recorded from creel surveys will be categorized by weight (<4, 4 – 6.9, 7 – 9.9, >10) to document catches of trophy-sized fish and to maintain the trophy LMB database at the reservoir.

**Crappies:** Crappies are present in the reservoir, but trap net samples have yielded low and variable catch rates (White Crappie: historical mean CPUE = 2.6/nn; N = 17; standard deviation = 1.3; range: 0.7 –

4.8/nn). Based on anecdotal reports and the 2020 creel survey, crappies represent an important component to the overall sport fishery (directed fishing effort = 5% and harvest = 10,682 in 2020) at the reservoir. However, due to low catches and inconsistent, highly variable trap net data (CPUE-T mean RSE = 37.2) and the inability to assess trends in important population metrics, creel survey data collected in 2024 will be utilized to monitor large-scale deviations in crappie angler effort, catch, and harvest; lending important insight into overall crappie population dynamics.

**Shad and Bluegill:** Gizzard Shad and Bluegill are the primary forage at Choke Canyon Reservoir. Like Largemouth Bass, trend data on CPUE and size structure of Gizzard Shad and Bluegill were collected annually 1995 - 2017 with fall electrofishing and every other year since. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in Gizzard Shad and Bluegill relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers for size structure estimation (Gizzard Shad IOV; 50 fish minimum, Bluegill PSD; 50 fish minimum at 24 randomly selected 5-minute stations with 90% confidence) and relative abundance estimates (Gizzard Shad and Bluegill CPUE-Total; RSE  $\leq$  25). Threadfin Shad presence/absence will be noted in electrofishing collections. No additional effort will be expended beyond sampling effort conducted for Largemouth Bass data collection.

**Creel:** The reservoir continues to be a popular destination for anglers. Collection of quantitative data (e.g., angler effort, catch, harvest) is necessary to evaluate trends in fishery statistics for important sport fish populations. An access creel survey will be conducted from January through June 2024.

**Habitat:** Historically, invasive plants (water hyacinth, hydrilla) have been problematic at the reservoir; particularly in the upper third and Frio River. Specifically, water hyacinth potentially poses a threat to angler and boater access and enhances other ecologically detrimental processes (e.g., degraded water quality, competition with desirable native vegetative species, water loss through evapotranspiration, etc.). Annual aquatic vegetation monitoring is required to identify potential threats to boating and angling access so control and rapid response efforts can be implemented as needed. The reservoir will be circumnavigated annually, and invasive species encountered will be georeferenced.

## Literature Cited

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, second edition. American Fisheries Society, Bethesda, Maryland.
- DiCenzo, V.J., M.J. Maceina, and M.R. Stimpert. 1996. Relationships between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. *North American Journal of Fisheries Management* 16:888-895.
- Binion, G. R., D. J. Daugherty, and K. A. Bodine. 2015. Population dynamics of Alligator Gar in Choke Canyon Reservoir, Texas: implications for management. *Journal of the Southeastern Association of Fish and Wildlife Agencies* 2:57-63.
- Binion, G. R. and D. L. McDonald. 2020. Statewide freshwater fisheries monitoring and management program survey report for: Choke Canyon Reservoir, 2019. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-4, Austin.
- Bodine, K. A., D. J. Daugherty, W. A. Schlechte, and G. R. Binion. 2015. A strategy for increasing gill-net catch rates and minimizing sampling mortality of Alligator Gar. *North American Journal of Fisheries Management* 35:611 – 615.
- Findeisen, J. A., and G. R. Binion. 2008. Statewide freshwater fisheries monitoring and management program survey report for: Choke Canyon Reservoir, 2007. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution: A further refinement of population size structure index terminology. *Fisheries* 32: 348.
- Smith, N. G., D. L. Buckmeier, D. J. Daugherty, D. L. Bennett, P. C. Sakaris, and C. R. Robertson. 2020. Hydrologic Correlates of Reproductive Success in the Alligator Gar. *North American Journal of Fisheries Management* 40:595 – 606.
- Texas Commission on Environmental Quality. 2022. Trophic classification of Texas reservoirs. 2022 Texas Water Quality Inventory and 303 (d) List, Austin. 17 pp.
- United States Geological Service (USGS) website (<https://waterdata.usgs.gov>). Accessed May 2022.

## Tables and Figures

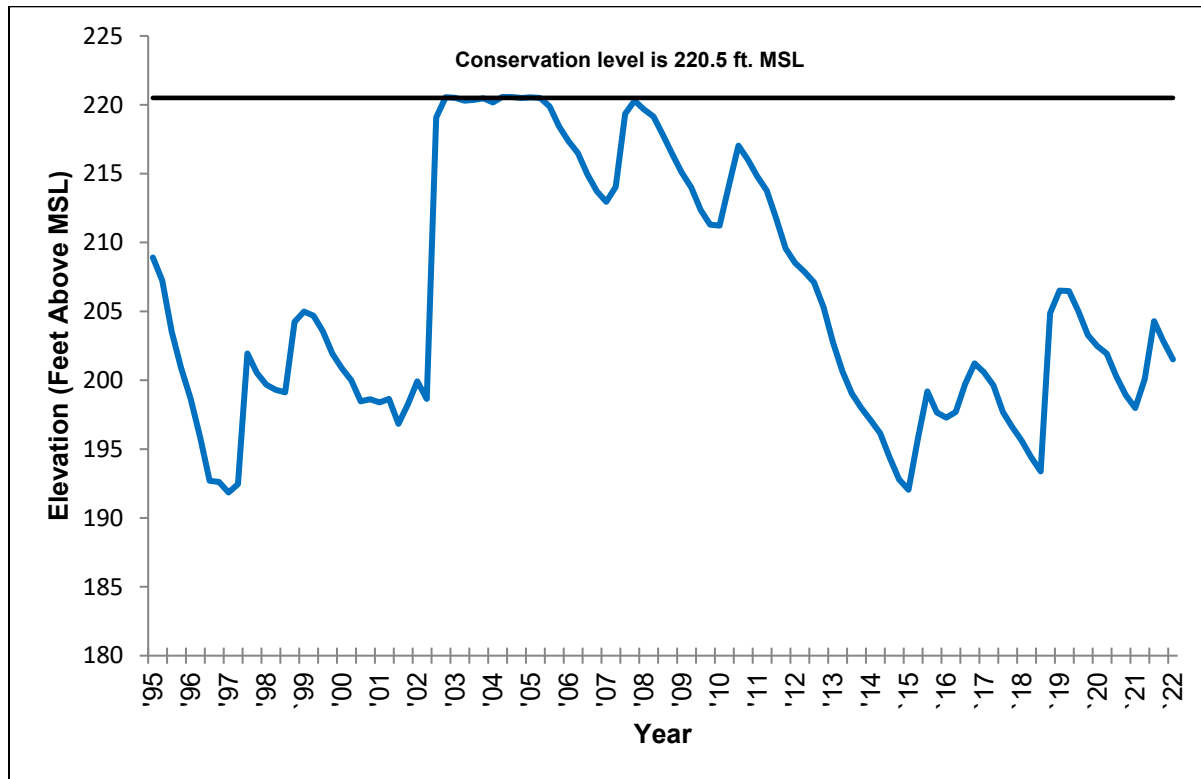


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Choke Canyon Reservoir, Texas, 1995 through April 2022.

Table 1. Characteristics of Choke Canyon Reservoir, Texas.

Characteristic	Description
Year constructed	1982
Controlling authority	City of Corpus Christi, Nueces River Authority, U.S. Bureau of Reclamation, TPWD (surrounding lands)
Counties	Live Oak, McMullen
Reservoir type	Mainstem
Shoreline Development Index	7.1
Conductivity ( $\mu$ mhos)	600
Access: Boat	Adequate – 6 public ramps (5 currently useable)
Bank	Adequate – 6 public ramp areas, 1 fishing jetty, Wildlife Management Area access, State Park shoreline access
Physically challenged	Adequate – Calliham State Park Unit – concrete jetty Inadequate – Southshore State Park Unit

Table 2. Boat ramp characteristics for Choke Canyon Reservoir, Texas, August 2021. Reservoir elevation at time of survey was 201.3 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Southshore Unit	28.47328° -98.25134°	Y	72	194.0	Excellent, no access issues
Calliham Unit	28.48221° -98.35354°	Y	128	190.0	Excellent, no access issues
Mason Point	28.48047° -98.37375°	Y	28	194.0	Excellent, no access issues
FM 99 Bridge	28.52331° -98.38835°	Y	20	192.0	Excellent, no access issues
Daughtery WMA	28.50895° -98.44010°	Y	15	UNK	Excellent, no access issues
Bracken	28.47658° -98.50475°	Y	16	UNK	Out of water. Extension not feasible

Table 3. Harvest regulations for Choke Canyon Reservoir, Texas.

Species	Bag Limit	Length Limit
Gar, Alligator	1 <sup>a</sup>	none
Catfish: Channel and Blue, their hybrids and subspecies <sup>b</sup>	15 (in any combination)	14-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<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> Catfish exemption regulation was implemented 1 September 2021

Table 4. Stocking history of Choke Canyon Reservoir, Texas. UNK = unknown; FRY = fry; FGL = fingerling; ADL = adults.

Species	Year	Number	Size
Threadfin Shad	1981	10,000	ADL
	1982	4,000	ADL
	1983	8,000	ADL
	Total	22,000	
Fathead Minnow	1981	Unknown	ADL
	Total	Unknown	
Blue Catfish	1982	98,800	FGL
	1983	102,088	FGL
	Total	200,888	
Channel Catfish	1981	92,200	FGL
	1982	307,000	FGL
	1983	91,256	FGL
	Total	490,456	
Coppernose Bluegill	1981	2,500	UNK
	1982	659,034	UNK
	1983	112,000	UNK
	Total	773,534	
Striped Bass	1983	102,600	FGL
	Total	102,600	
Largemouth Bass	2003	107,137	FGL
	2004	99,632	FGL
	2005	102,314	FGL
	Total	309,083	
Florida Largemouth Bass	1981	19,906	FGL
	1982	146,030	FGL
	1983	143,368	FGL
	1990	375,790	FRY
	1998	383,565	FGL
	2002	384,236	FGL
	2003	180,014	FGL
	2009	5,151	FGL
	2010	526,015	FGL
	2011	653,297	FGL
	2013	423,378	FGL
	2016	214,362	FGL
	2017	147,285	FGL
	2018	339,881	FGL
	2019	324,737	FGL
	2020	165,364	FGL
2021	316,985	FGL	
Total	4,749,364		
Lone Star Bass <sup>a</sup>	2022	325,954	FGL
White Crappie	1992	148,294	FRY
	1992	33,380	FGL
	Total	181,674	



<sup>a</sup> Lone Star Bass 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.

Table 5. Objective-based sampling plan components for Choke Canyon Reservoir, 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 <sub>r</sub>	10 fish/inch group (max)
Bluegill <sup>a</sup>	Abundance	CPUE – Total	
	Size structure	PSD, length frequency	N $\geq 50$
Gizzard Shad <sup>a</sup>	Abundance	CPUE – Total	
	Prey availability	IOV	N $\geq 50$
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE – stock	RSE-Stock $\leq 25$
	Size structure	PSD, Length frequency	N $\geq 100$ stock
	Condition	W <sub>r</sub>	10 fish/inch group (max)
<i>Fyke netting (floating)</i>			
Alligator Gar (YOY)	Presence/absence	CPUE	
<i>Multifilament gill netting</i>			
Alligator Gar (adult)	Abundance	CPUE – Total	
	Size structure	Length frequency	N $\geq 25$
<i>Creel survey<sup>b</sup></i>			
Alligator Gar	Trend information on angler effort, catch, and harvest	Angler effort, angler CPUE, total harvest, and size composition of harvest	
White Bass	Trend information on angler effort, catch, and harvest	Angler effort, angler CPUE, total harvest, and size composition of harvest	
Crappies	Trend information on angler effort, catch, and harvest	Angler effort, angler CPUE, total harvest, and size composition of harvest	

<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> Angler utilization data and associated statistics will be calculated for all sport fish and non-game species. Creel survey was cancelled in 2022 as district resources were distributed to other sampling initiatives and priority projects.

Table 6. Survey of aquatic vegetation, Choke Canyon Reservoir, Texas, 2017, 2019, and 2021. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

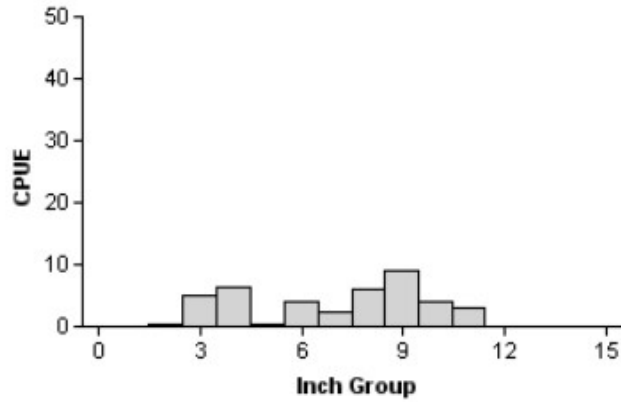
Vegetation	2017	2019	2021
Surface area (acres)	14,483	17,147	16,004
Native submersed	354 (2.4)	171 (1.0)	118 (< 1.0)
Native floating-leaved	7 (< 1.0)	< 1 (< 1.0)	2 (< 1.0)
Native emergent		8 (< 1.0)	8 (< 1.0)
Non-native	645 (4.5)	622 (3.6)	1,221 (7.6)
Hydrilla (Tier III)*	504 (3.5)	601 (3.5)	1,150 (7.2)
Water hyacinth (Tier II)*	141 (1.0)	21 (< 1.0)	71 (< 1.0)

\*Tier II is Maintenance Status, Tier III is Watch Status

## Gizzard Shad

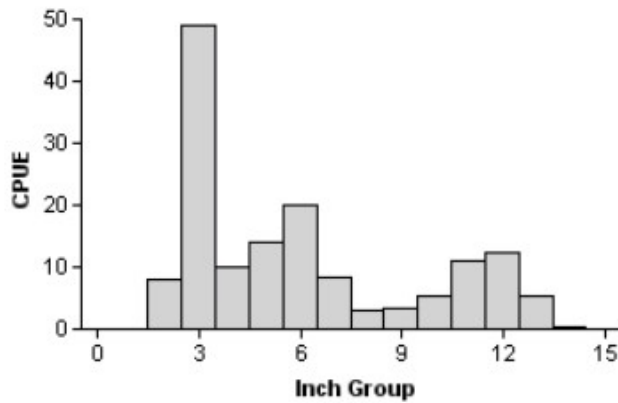
2017

Effort = 2.0  
 Total CPUE = 46.0 (20; 92)  
 IOV = 41 (5)



2019

Effort = 2.0  
 Total CPUE = 151.0 (22; 302)  
 IOV = 73 (7)



2021

Effort = 2.0  
 Total CPUE = 52.5 (16; 105)  
 IOV = 50 (7)

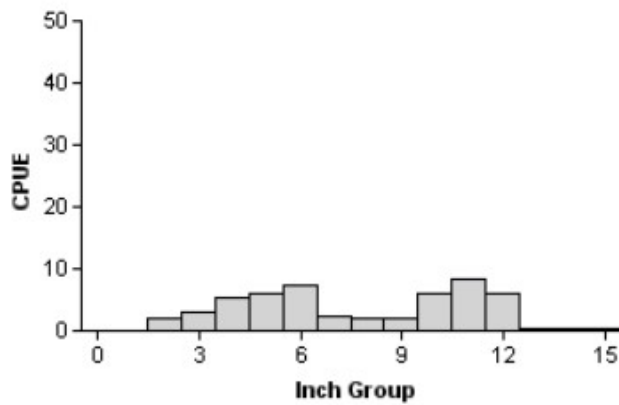


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2017, 2019, and 2021.

## Bluegill

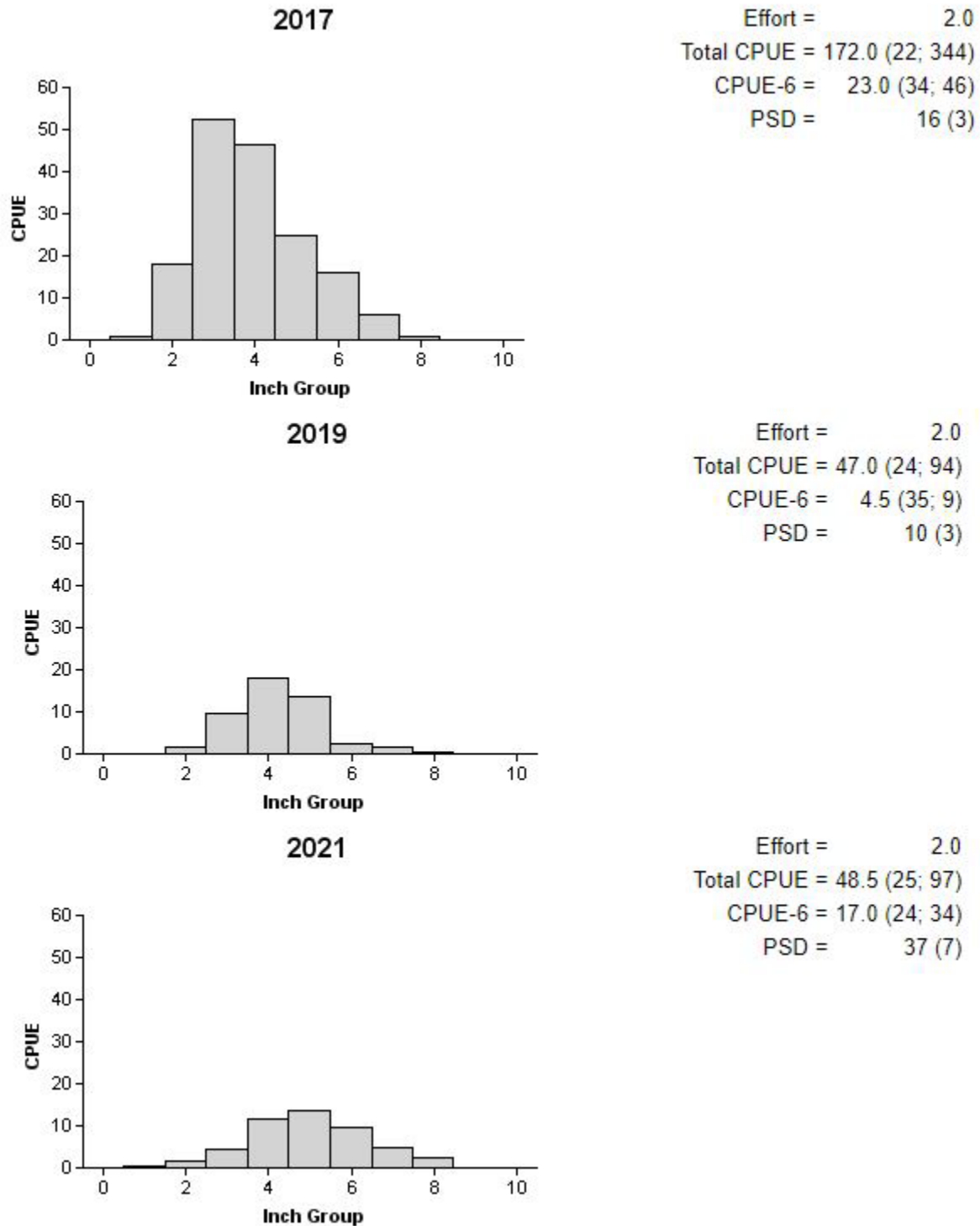


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2017, 2019, and 2021.

### Alligator Gar

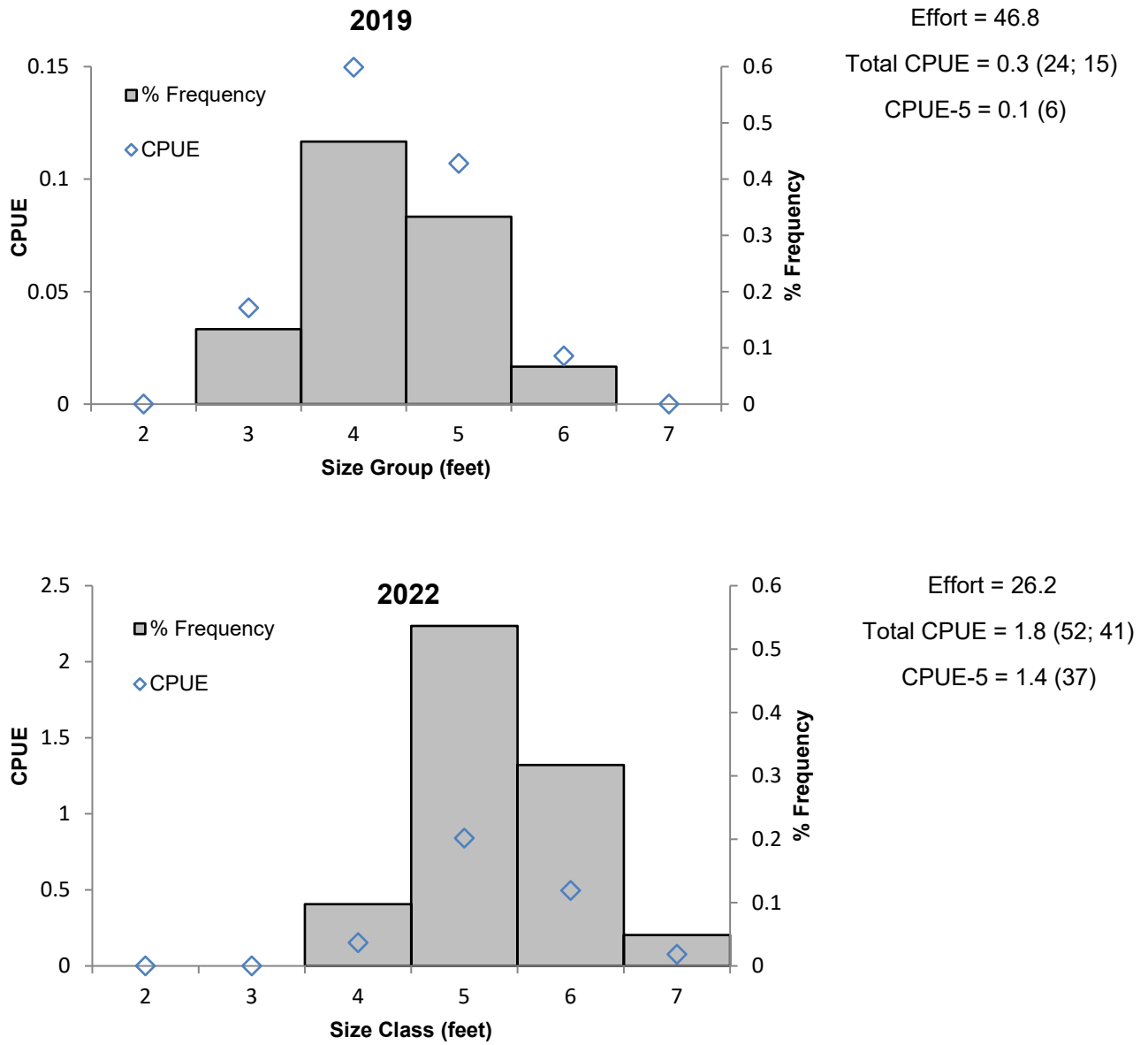


Figure 4. Number of Alligator Gar caught per hour (CPUE), population indices (RSE and N for Total CPUE and N for CPUE-5 in parentheses), and percent frequency by size (feet) for summer multifilament gill netting survey, Choke Canyon Reservoir, Texas, 2019 and 2022.

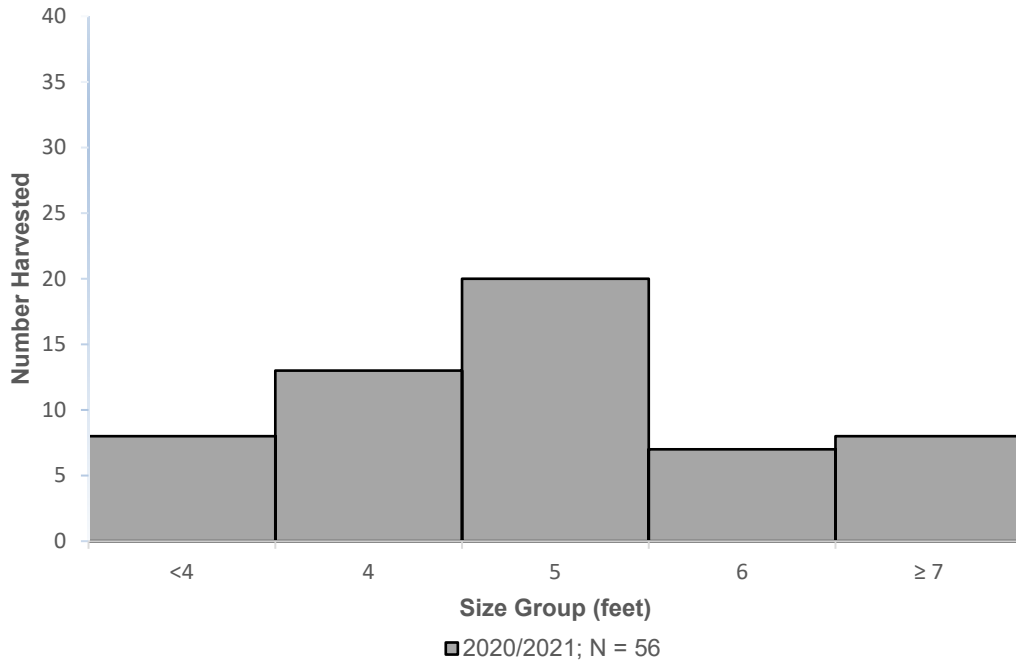
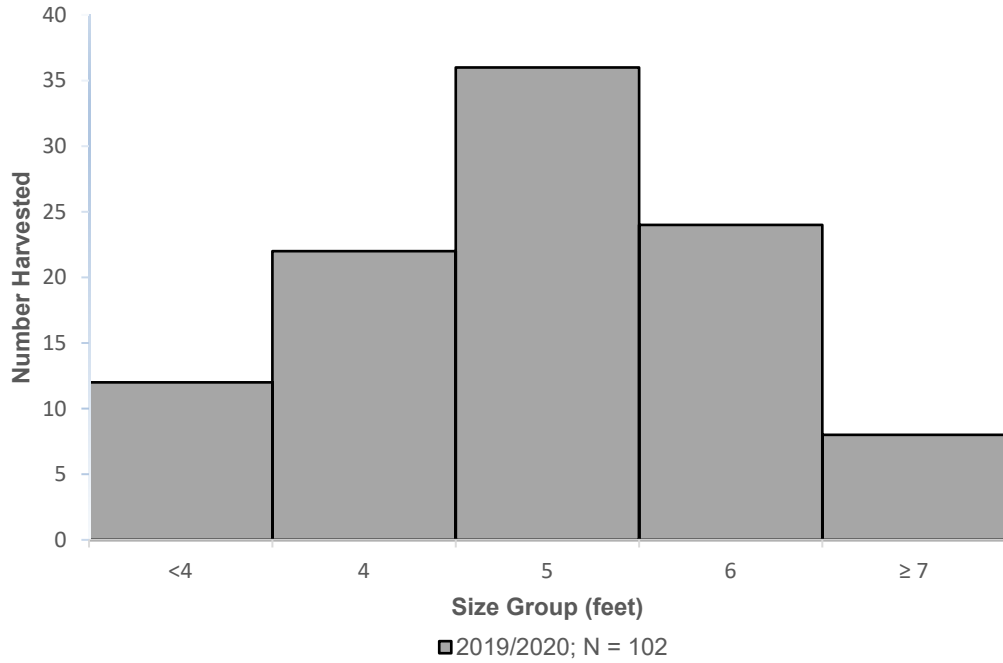


Figure 5. Length frequency of harvested Alligator Gar reported through the mandatory harvest reporting system, Choke Canyon Reservoir, Texas, September 2019 through August 2020 and September 2020 through August 2021. N is the number of harvested Alligator Gar reported.

## Blue Catfish

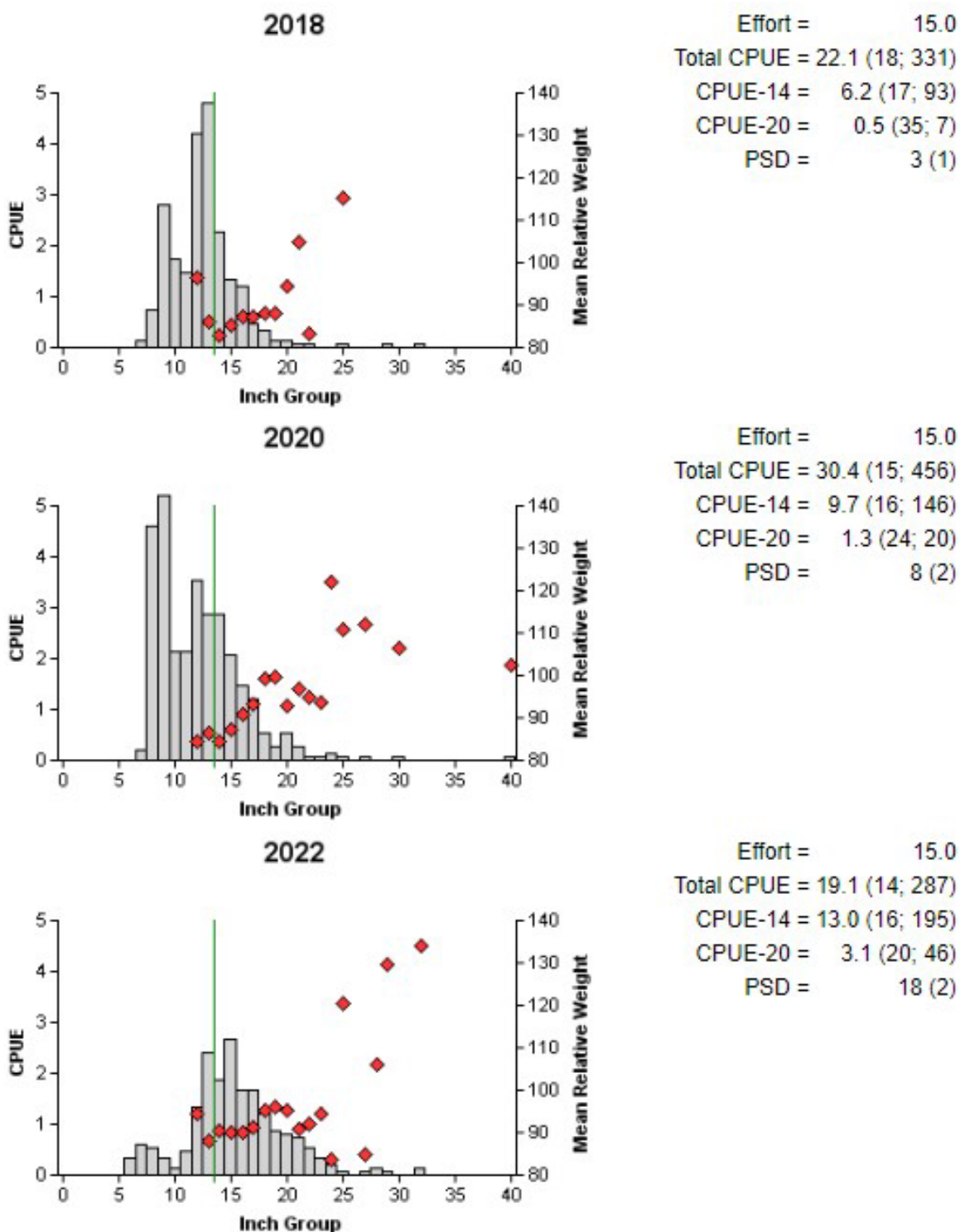


Figure 6. Number of Blue Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2018, 2020, and 2022. Vertical line represents the minimum length limit.

### Channel Catfish

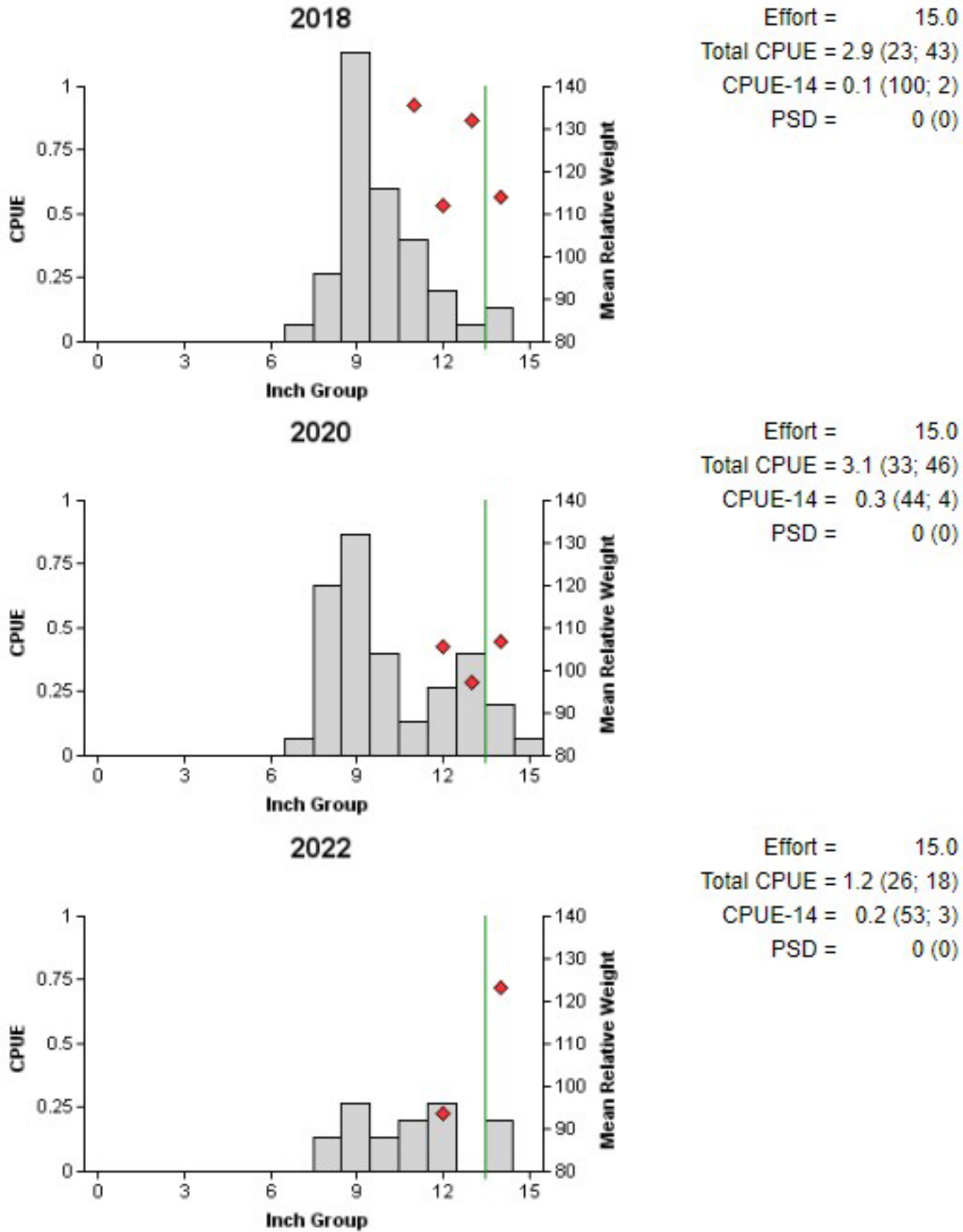


Figure 7. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2018, 2020, and 2022. Vertical line represents the minimum length limit.



## White Bass

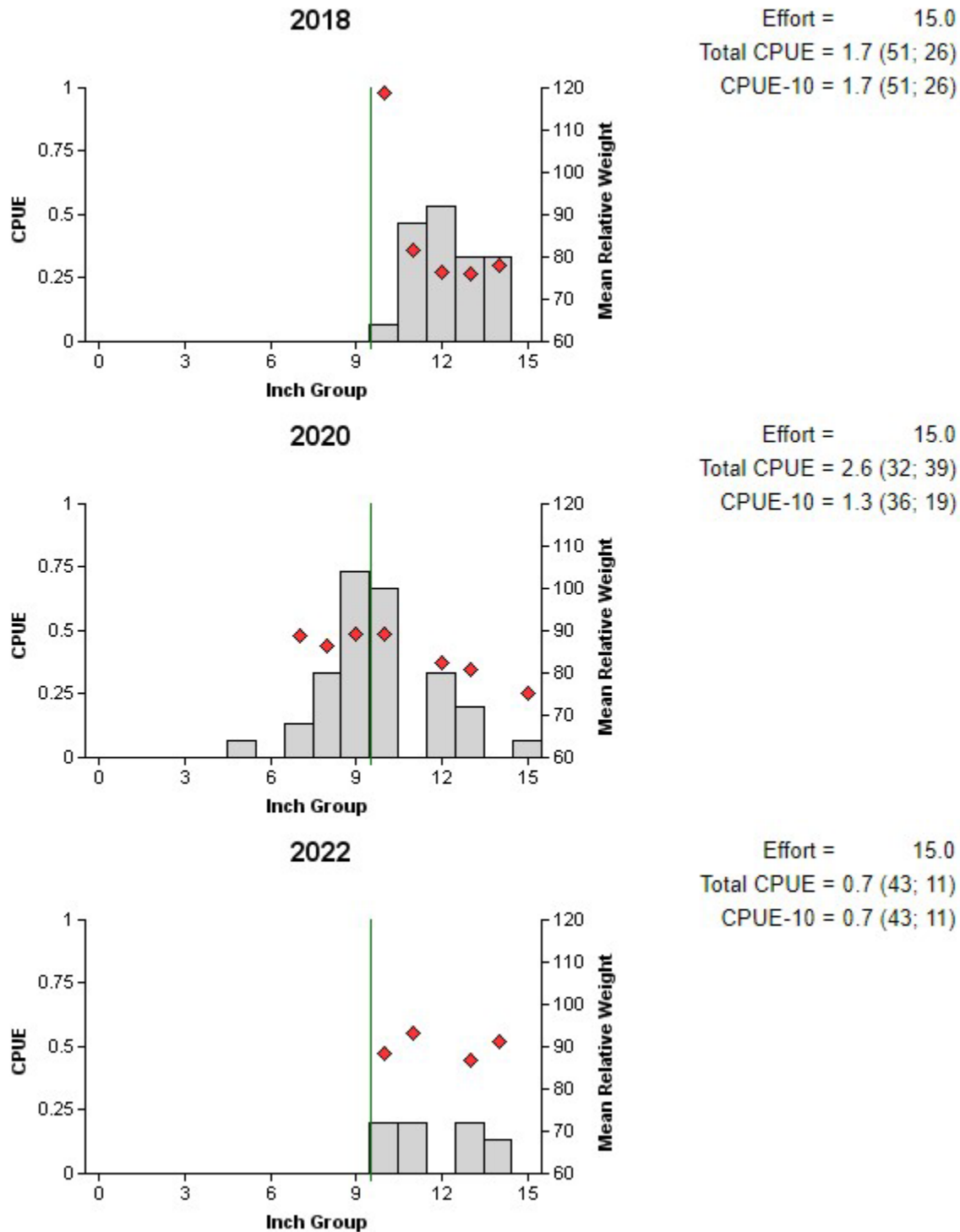


Figure 8. Number of White Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2018, 2020, and 2022. Vertical line represents the minimum length limit.

## Largemouth Bass

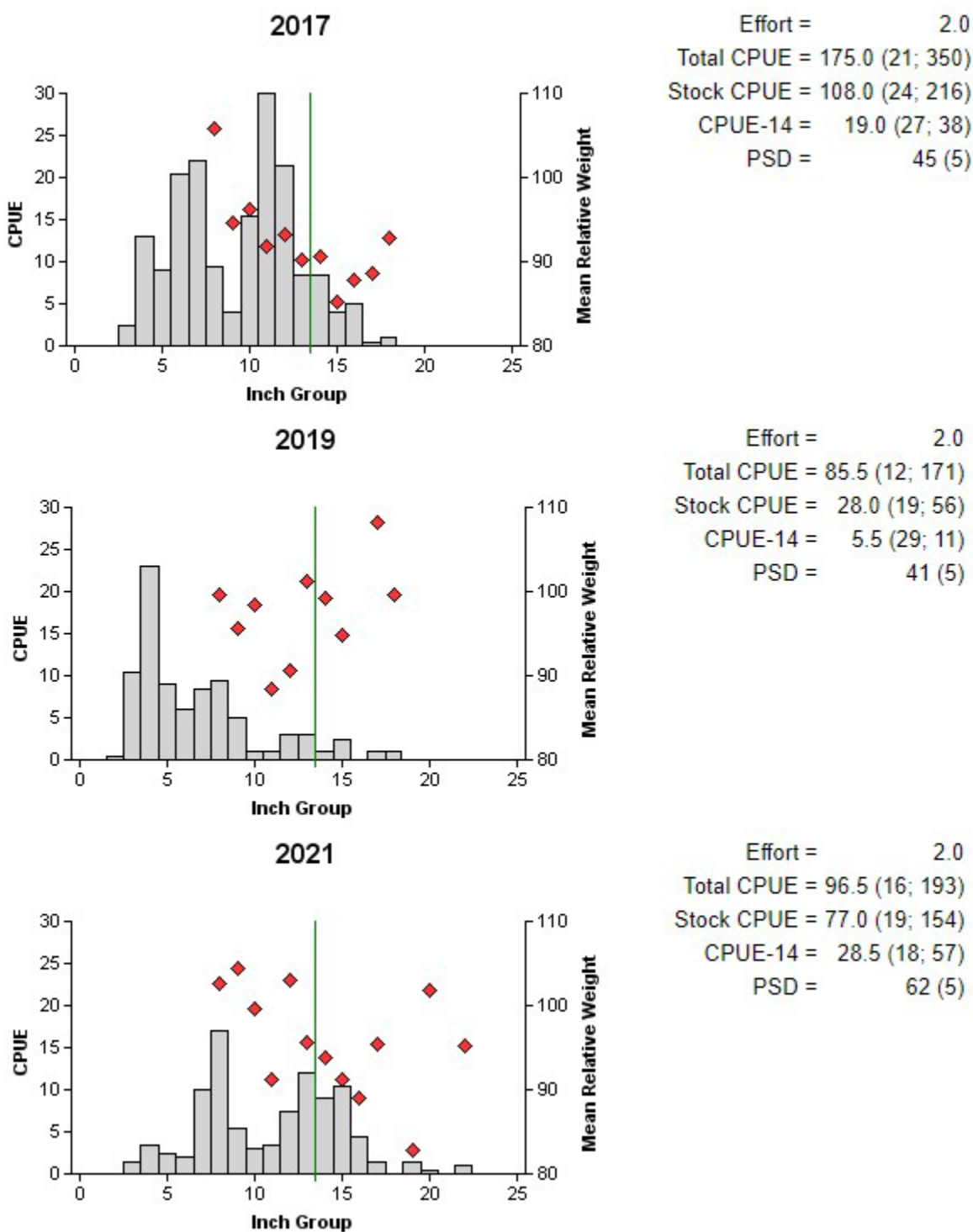


Figure 9. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2017, 2019, and 2021. Vertical line represents the minimum length limit.

## Largemouth Bass

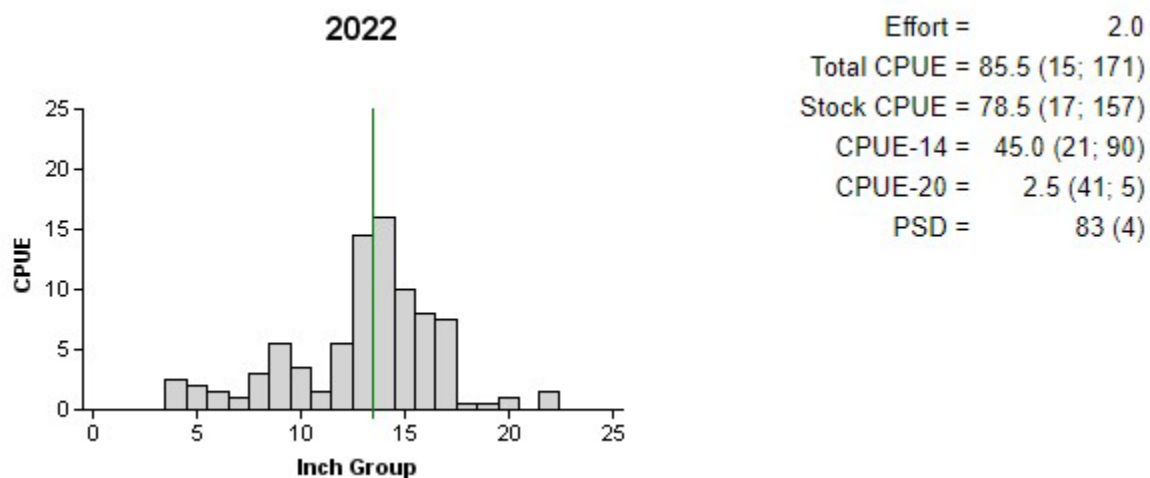


Figure 10. Number of Largemouth Bass caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring bass-only electrofishing survey, Choke Canyon Reservoir, Texas, 2022. Vertical line represents the minimum length limit.

Table 7. Mean age at legal length (14-inches) for Largemouth Bass collected by fall electrofishing, Choke Canyon Reservoir, Texas. Standard deviations are in parentheses.

Year	N	Age Range	Age-at-Length
2008	53	1 – 4	1.7 (0.79)
2009	13	1 – 3	2.0 (0.40)
2010	15	1 – 3	2.2 (0.77)
2011	13	1 – 4	2.4 (0.86)
2012	13	1 – 4	2.3 (0.75)
2013	14	1 – 4	2.8 (0.70)
2014	14	2 – 4	2.9 (0.62)
2015	13	1 – 5	2.7 (1.03)
2016	13	1 – 3	1.4 (0.65)
2017	13	1 – 2	1.7 (0.48)
2019	15	1 – 3	1.8 (0.77)
2021	14	1 – 2	1.9 (0.27)

Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Choke Canyon Reservoir, Texas, 2005 – 2007, 2009 – 2013, 2015, and 2021. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Largemouth Bass genetic composition was determined with micro-satellite DNA analysis.

Year	Sample size	Number of fish			% FLMB alleles	% NLMB alleles
		FLMB	Intergrade	NLMB		
2005	30	15	15	0	78	22
2006	30	3	27	0	80	20
2007	30	8	22	0	83	17
2009	30	5	25	0	82	18
2010	30	3	27	0	80	20
2011	30	5	25	0	83	17
2012	30	1	29	0	79	21
2013	30	5	25	0	80	20
2015	30	6	24	0	86	14
2021	30	5	25	0	86	14

## Proposed Sampling Schedule

Table 9. Proposed sampling schedule for Choke Canyon Reservoir, Texas. Survey period is June through May. Creel surveys are conducted over a 6-month period from January through June with a total of 24 creel days. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the spring and fall.

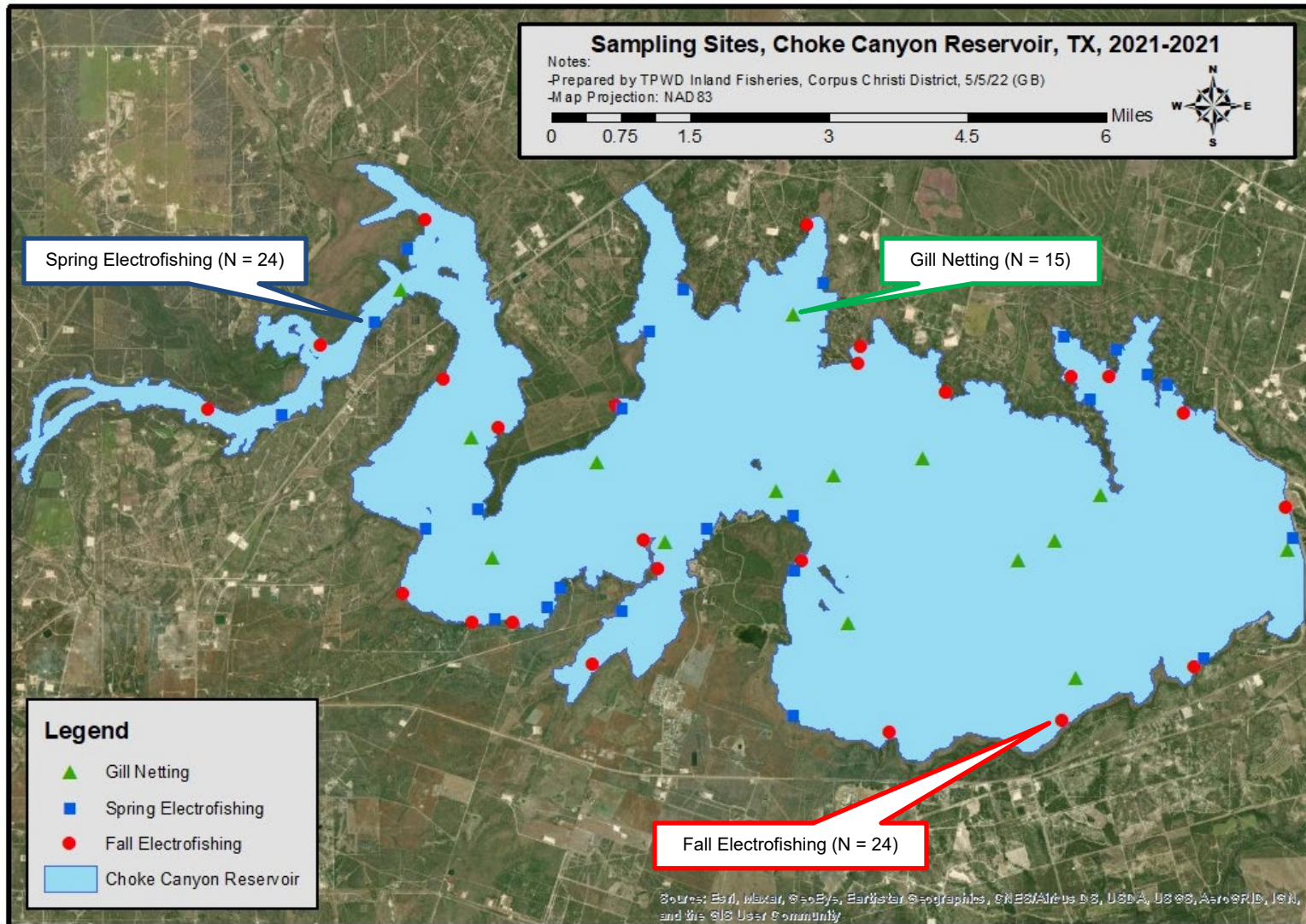
	Survey year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler access		X		
Structural habitat		X		
Vegetation	X	X	X	X
Electrofishing – Fall		X		X
Electrofishing – Spring		X		
Gill netting		X		X
Creel survey		X		
Report		X		

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all species collected from all gear types from Choke Canyon Reservoir, Texas, 2021-2022. Sampling effort was 2 hours for electrofishing, 15 net nights for gill netting, and 26.2 hours for multifilament gill netting.

Species	Electrofishing		Gill Netting		Gill Netting (multifilament)	
	N	CPUE	N	CPUE	N	CPUE
Spotted Gar			48	3.20 (33)		
Longnose Gar			11	0.73 (67)		
Alligator Gar			1	0.07 (100)	41	1.8 (52)
Gizzard Shad	105	52.50 (16)	331	22.07 (12)		
Threadfin Shad	98	49.00 (62)				
Common Carp			25	1.67 (35)		
Golden Shiner	26	13.00 (29)				
Bullhead Minnow	1	0.50 (100)				
Inland Silverside	17	8.50 (37)				
Smallmouth Buffalo			113	7.53 (19)		
Blue Catfish			287	19.13 (14)		
Channel Catfish			18	1.20 (26)		
Flathead Catfish			2	0.13 (100)		
White Bass	4	2.00 (100)	11	0.73 (43)		
Warmouth			2	0.13 (100)		
Bluegill	97	48.50 (25)	35	2.33 (20)		
Redear Sunfish	17	8.50 (45)	2	0.13 (68)		
Largemouth Bass	193	96.50 (16)	4	0.27 (57)		
White Crappie			6	0.40 (68)		
Black Crappie			24	1.60 (39)		
Freshwater Drum			172	11.47 (11)		

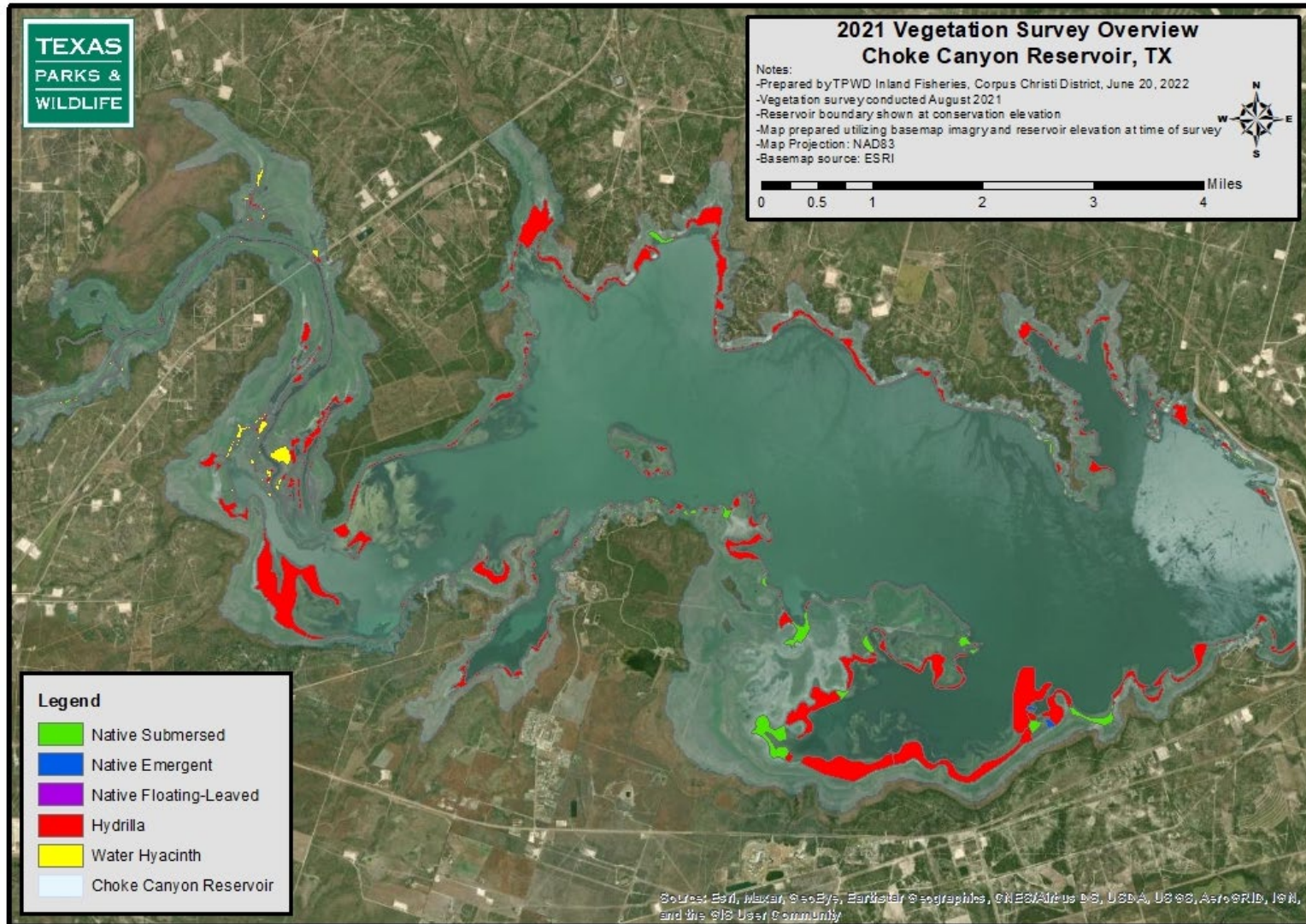
## APPENDIX B – Map of sampling locations



Location of sampling sites, Choke Canyon Reservoir, Texas, 2021-2022. The reservoir was 19.2 feet below conservation pool at time of sampling.



## APPENDIX C – 2021 Distribution map of aquatic vegetation







**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 T3200-1269 (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.