

Choke Canyon Reservoir

2019 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations were surveyed in 2019 using electrofishing and multifilament gill netting (Alligator Gar) and in 2020 using gill netting and low frequency electrofishing to assess population trends for important sport fishes. Anglers were surveyed from January through June 2020. Historical data are presented with the 2019-2020 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 17,147 acres in 2019-2020) 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 crappie. Alligator Gar are also an important component to the overall fishery. Recent management efforts have focused on control of nuisance aquatic vegetation, compiling catch and harvest statistics on important sport fish species, documenting catch of trophy Largemouth Bass, supplementing the Largemouth Bass population with stockings, and developing an Alligator Gar monitoring program. 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), and 2019 (5 acres). Staff annually monitored access areas where invasive vegetation could restrict use. Angler harvest of all sport fishes has been regulated according to statewide size and bag limits.

Fish Community

- **Prey species:** Gizzard Shad were present in high abundance and formed the primary forage base. Bluegill and Redear Sunfish were present in low abundance. 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. Anglers harvested an estimated 185 Alligator Gar through the first 6 months of 2020. Several trophy-sized (≥ 6 ft) Alligator Gar were harvested by anglers. A new waterbody record was established in 2017 (8-feet, 216 pounds).
- **Catfishes:** Blue Catfish abundance remained high and size structure comprised a wide size range of fish. Angler success for Blue Catfish was high and anglers harvested an estimated 52,384 fish. Channel and Flathead Catfish were present in low abundance.
- **White Bass:** Abundance of White Bass was low throughout the survey period; half of the fish collected in 2020 were > 10 inches and thus available for angler harvest. Angler harvest was high in 2020 and angling catch rate increased to 1.3/fish per hour.
- **Largemouth Bass:** Largemouth Bass abundance decreased from prior surveys and size structure was primarily comprised of smaller individuals. Growth was excellent and mean age at legal length was 1.8 years. Largemouth Bass were the most sought sport fish species in the reservoir; including both tournament and non-tournament anglers.
- **Crappies:** Crappies remained an important component to the overall sport fishery, especially for harvest-oriented anglers. Angling catch was 1.3/h and total harvest was 10,682 fish.

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. Stock Florida Largemouth 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 2019-2020. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2019-2020 data for comparison.

Reservoir Description

Choke Canyon is a 25,989-acre reservoir (averaged 17,147 acres in 2019-2020) 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 13-foot water level rise in late 2018 through early 2019. During the 2019-2020 sampling season the reservoir averaged 16.8 feet below conservation pool. Choke Canyon Reservoir was classified as eutrophic with a mean TSI cl-a of 58.06 (Texas Commission on Environment Quality 2020). Secchi disc measurements of water clarity ranged from 30 to 149 centimeters. Shoreline and boat access were adequate with six public boat ramps and substantial area for shoreline angling. 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. Other descriptive characteristics of this 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 2019/2020 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; 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 also available at the Calliham unit.

Management History

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

1. Choke Canyon is valued for its high-quality Largemouth Bass population and for catches of trophy-size fish. Stock Florida Largemouth Bass annually to maintain Florida genetics and trophy production potential.

Action: Florida Largemouth Bass (FLMB) were stocked in 2018 and 2019 at a rate of 1,000/km.
2. Preserve and enhance the trophy characteristics of the Alligator Gar population and promote the fishery through press releases.

Action: The one-fish daily bag was maintained and mandatory harvest reporting of Alligator Gar was implemented on 1 September 2019. District staff developed an Alligator Gar monitoring program and monitored adult abundance and size structure with multifilament gill nets in 2019. Press releases were disseminated to statewide and local media.
3. Monitor presence, distribution, and spread of invasive aquatic vegetation and implement control measures, as needed.

Action: Invasive vegetation was monitored annually with pre- and post-treatment vegetation surveys. District staff coordinated with the Aquatic Habitat Enhancement (AHE) team, City of Corpus Christi, and private contractors to manage and control water hyacinth through herbicide applications.

Harvest regulation history: Harvest of sport fishes in Choke Canyon Reservoir has always been managed with statewide regulations (Table 3).

Stocking history: Florida Largemouth Bass fingerlings were stocked in the reservoir in 2018 and 2019. 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, water hyacinth expanded and coverage was too great to mechanically remove and herbicide treatments were initiated. 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 and the City of Corpus Christi. This included treatments in 2016 (132 acres), 2017 (566 acres), 2018 (104 acres), and 2019 (5 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 were 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 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 (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 15 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).

Multifilament gill netting – Alligator Gar were collected by gill netting (46.75 hours at 89 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).

Low-frequency electrofishing – Blue Catfish were collected by low-frequency electrofishing (1 hour at 20, 3-minute stations). CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

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 access-point creel survey was conducted from June through May in 2015/2016 and January through June in 2018 and 2020. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter in 2015/2016 and on 7 weekend and 5 weekday (per quarter) in 2018 and 2020 to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Creel statistics and estimates for the 2018 and 2020 surveys were based on a 6-month period. Mandatory harvest reporting for Alligator Gar was implemented 1 September 2019.

Habitat –Vegetation surveys were conducted in 2016–2020 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 2020.

Results and Discussion

Habitat: A structural habitat survey was last conducted in 2005 (Findeisen and Binion 2008). In 2019, total native vegetation coverage was 179 acres (1.0%; Table 6), a decrease from the total native vegetation coverage recorded in 2017 (361 acres). Water stargrass, coontail, and American pondweed were the most abundant native vegetation species encountered. Total non-native vegetation coverage in 2019 was 622 acres (3.6%); similar to the non-native coverage observed in 2017 (645 acres; 4.5%). Hydrilla comprised the majority of non-native vegetation observed during 2019 and was present in 601 acres (3.5%) of water (Table 6). Additionally, a 13-foot water level rise in late 2018 through early 2019 flooded substantial terrestrial vegetation further supplementing total aquatic habitat.

Creel: Percent directed fishing effort by anglers was highest for Largemouth Bass (47%; tournament [13%] and non-tournament [34%]), followed by catfishes (23%), White Bass (17%), no species preference (6%), and crappies (5%; Table 7). Notable trends in directed fishing effort in 2020 included increased effort for Largemouth Bass and White Bass and decreased directed effort for catfishes and Alligator Gar. While directed effort was low, mandatory harvest reporting indicated Alligator Gar were an important component of recreational angling. Total fishing effort for all species was 205,645 hours with total expenditures of \$1,608,752 through the first half of 2020 (Table 8). While some anglers traveled great distances (> 250 miles) to fish at the reservoir, the majority (88%) resided within 250 miles (Appendix D).

Prey species: Gizzard Shad abundance increased in 2019 (151.0/h) relative to 2016 (88.5/h) and 2017 (46.0/h) and the majority of Gizzard Shad collected in 2019 were available as prey (IOV = 73; Figure 2). Catch rates of Bluegill were substantially reduced in 2019 (47.0/h) when compared to 2016 (117.0/h) and 2017 (172.0/h; Figure 3). The majority of Bluegill collected since 2016 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 = 4.5/h); adding recreational value for anglers. Redear Sunfish, Threadfin Shad, Golden Shiner, and Bullhead Minnow 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 0.3/h in 2019 (Figure 4). Catch of larger fish (\geq 5-foot TL) represented 39% of the total gill net catch, indicating good numbers of larger fish available to anglers.

Total directed effort for Alligator Gar decreased to < 1.0% (480 hours) relative to 2018 (3.3%; 4,514 hours; Table 9). Total directed effort is likely underrepresented due to nighttime fishing effort and bow fishing tournaments that are not captured in the standard creel survey design. Angler success was high and angling catch rate increased substantially in 2020 (0.90/h) compared to 2018 (0.02/h). Total harvest for Alligator Gar in 2020 was estimated at 185 individuals (Table 9). Additionally, a total of 94 harvested Alligator Gar were reported through the mandatory harvest reporting system from September 2019 – June 2020; 68% of the harvested Alligator Gar reported were \geq 5-foot TL and 33% were \geq 6-foot TL (Figure 5), indicating frequent catch and harvest of trophy Alligator Gar. Bow anglers comprised the majority (89.4%) of harvest relative to passive gear (5.3%) and rod and reel (5.3%) anglers. A new waterbody record was caught in 2017 and measured over 8-foot total length and weighed 216 pounds.

Catfishes: Blue Catfish abundance remained high over the survey period (CPUE range: 22.1 – 30.4/nn; Figure 6) and the catch rate in 2020 (30.4/nn) was higher than the historical average (22.9/nn). Proportional size distribution indicated slight improvement in size structure in 2020 (PSD = 8) relative to 2016 (PSD = 1) and 2018 (PSD = 3) and 53% of the fish collected in 2020 were \geq 12-inches and available to angler harvest. Several quality sized fish were collected in 2020, as indicated by an increase in CPUE-20 (1.3/nn) when compared to 2016 (0.1/nn) and 2018 (0.5/nn). Condition of fish \geq 12 inches remained consistent across years for most size classes and tended to increase with increased length (Figure 6). Exploratory low-frequency electrofishing (LFE) was conducted in 2016 to evaluate its utility as an alternative sampling gear. The survey yielded a catch rate of 142.0/h and desirable RSE value (23) (Figure 7). While LFE proved effective at collecting smaller size classes, no fish \geq 15 inches was represented in the sample and only 35% of the sample comprised fish \geq 12 inches compared to 69% collected in gill nets. Low frequency electrofishing was utilized in 2020 to collect supplemental fish

associated with a statewide evaluation of catfish age and growth. Results yielded a catch rate of 136.0/h, similar to the catch rate observed in 2016 (Figure 7).

Although a slight increase in relative abundance was observed over the survey period, Channel Catfish abundance remained low (CPUE range: 1.5 – 3.1/nn; Figure 8). Size composition was dominated by small individuals and 70% of fish collected were sub-legal. Body condition in 2020 was desirable (W_r range: 97 – 107) for the few fish where relative weights were calculated.

Total catfish directed effort has decreased substantially since 2015/2016 and catfish anglers accounted for 23% of the total fishing effort in 2020 (Table 10). Angler catch rate (fish/h) remained consistent and was high (2.9/h). Total estimated harvest was 61,635 fish; 85% of harvested fish were Blue Catfish. Harvested fish ranged in length between 11 – 40 inches and the majority of harvest occurred between 12 – 18 inches, all years combined (Figures 9 & 10).

White Bass: White Bass gill net catch rates were relatively consistent and low (CPUE range: 1.7 – 2.8/nn; Figure 11) across the survey period. Roughly half of the fish collected in 2020 were \geq to the 10-inch minimum length limit. Relative weight values were poor for legal-sized fish (< 90) and tended to decrease with increased length (Figure 11).

White Bass anglers accounted for 17% of the total fishing effort. Angling success for White Bass was high as indicated by angler catch (1.4/h) and total harvest (37,348 fish; Table 11) and reflected an abundant White Bass population. Harvested fish ranged between 10 – 16 inches total length (Figure 12).

Largemouth Bass: Relative abundance of Largemouth Bass decreased over the survey period. Total electrofishing catch rate was 85.5/h in 2019, lower than 112.0/h in 2016 and considerably lower than 2017 (175.0/h; Figure 13). Catch rates of stock-size fish were poor (28.0/h) relative to 2016 (63.5/h) and 2017 (108.0/h). Only 6% of the total electrofishing catch comprised legal sized fish (CPUE-14 = 5.5/h). Population size structure in 2019 was lower (PSD = 41) than prior years yet comprised a wide size range of fish (Figure 13). In 2019, relative weights of Largemouth Bass were high ($W_r \geq 90$) for most size classes and tended to improve with increased length. Mean age at legal length in 2019 was 1.8 years ($N = 15$; range: 1 – 3). Growth was considered excellent and has accelerated since 2015 (Table 12). Introgression of FLMB genetics in the population has remained high over the past decade (Binion 2016).

Largemouth Bass was the most sought sport fish in the reservoir. Percent directed effort increased substantially in 2020 (47%) relative to 2015/2016 and 2018 (Table 7) and directed fishing hours more than doubled over the same period (Table 13). Tournament activity represented an important component of Largemouth Bass angling and comprised 28% (27,018 h) of the total Largemouth Bass directed effort. Angling catch rate decreased to 0.6/h in 2020 and suggest a reduction in Largemouth Bass population abundance. The majority (83%) of legal Largemouth Bass caught were released and percent legal release values increased across the study period (Table 13). Harvest decreased relative to 2015/2016 (4,669) and 2018 (5,073); 3,234 fish were harvested in 2020. Harvested fish ranged from 12 – 22 inches and the majority of observed harvest occurred in the 14 – 18-inch size range, all years combined (Figure 14). Several trophy-sized Largemouth Bass were caught and released by anglers in 2020 including 19 fish weighing >10 lbs. and 81 fish weighing between 7 – 10 lbs. (Table 13).

Crappies: Crappies remained an important component to the overall sport fishery and directed effort has remained consistent across years (range: 9,559 – 11,838 hours). Angler success in 2018 and 2020 (1.3/h) were reduced relative to 2015/2016 (2.0/h), but total harvest increased (10,682 fish; Table 14). Angler compliance was excellent and harvested fish ranged in length between 10 – 15 inches, all years combined (Figure 15). Creel statistics (directed effort, angler catch rate, and total harvest) indicated a quality crappie population and ample opportunity for angling success.

Fisheries Management Plan for Choke Canyon Reservoir, Texas

Prepared – July 2020

ISSUE 1: Choke Canyon is valued for its high-quality Largemouth Bass fishery and for catches of trophy-size fish. From 2009 – 2020, 358 Largemouth Bass weighing >10 lbs. and 1,038 fish weighing between 7 and 10 lbs. were caught and released by anglers. 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.

MANAGEMENT STRATEGIES

1. Request FLMB fingerlings annually for stocking to maintain a high-level Florida Bass genetic influence and thus maximize production potential of trophy fish.
2. Maintain and continue to collect data for 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 exhibited potential for management of an Alligator Gar trophy fishery.

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.

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 exotic nuisance vegetation through vegetation surveys on an annual basis and continue to cooperate with the City of Corpus Christi on all vegetation control activities.

Objective-Based Sampling Plan and Schedule (2020–2024)

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 2.5/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 anglers specifically targeting 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 2022 creel survey (Table 15). 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 2022 creel survey (Table 15). At this time, 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 that is utilized by anglers. A sampling strategy and monitoring program was developed in 2019 and will henceforth be further refined to monitor trends in 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 2022. Collectively, these data should allow the ability to detect changes in Alligator Gar fishing effort, catch, and harvest; lending important insight into population dynamics and potential problems that may warrant more intensive sampling (Table 15).

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 22.9/nn (N = 29; standard deviation = 11.9; range: 0.4 – 62.5/nn) and mean stock size CPUE is 10.2/nn (N = 29; 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, 2017, 2019) with spring gill netting. Currently, the population appears to be in good shape, and anglers are anecdotally satisfied with the fishing. Collection of biennial trend data 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 fish are collected and the RSE of CPUE-S is ≤ 25 . Finally, directed effort and angler catch and harvest will be monitored with a creel survey conducted in 2022 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 (Table 15).

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 2022 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 (Table 15).

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 136.8/h (N = 27; standard deviation = 86.5; range: 25.5 – 421.5/h) and mean stock-size CPUE is 70.1/h (N = 27; standard deviation = 46.6; range: 21.0 – 241.0/h). Relative abundance of LMB decreased in 2020 relative to prior years to below the historical average. 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 has been collected annually since 1995 with fall electrofishing (excluding 2018). The collection of biennial trend data with fall electrofishing 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 biennially 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 for each sample year (i.e., biennially) 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 biennial fall electrofishing and primarily attributed to the reduced abundance observed in 2019 – 2020, a spring bass-only electrofishing survey will be conducted in 2022. Directed effort, angler catch, and angler harvest will be monitored with a creel survey conducted in 2022 to monitor for any large-scale changes in angling effort, catch, and harvest to gain further insight into population characteristics (Table 15). 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 mixed results and low catches (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 2022 will be utilized to monitor large-scale deviations in crappie angler effort, catch, and harvest; lending important insight into overall crappie population dynamics (Table 15). If feasible, otoliths (N = 13 between 10.0 – 10.9 inches) will be collected from angler-caught fish to determine and monitor growth to the minimum length limit.

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 have been collected annually since 1995 with fall electrofishing (excluding 2018). 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 such as angler effort, catch, and harvest is necessary to evaluate trends in fishery statistics for important sport fish populations. An access creel survey will be conducted spanning 1 January 2022 through 30 June 2022.

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 (i.e., 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.

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Tables and Figures

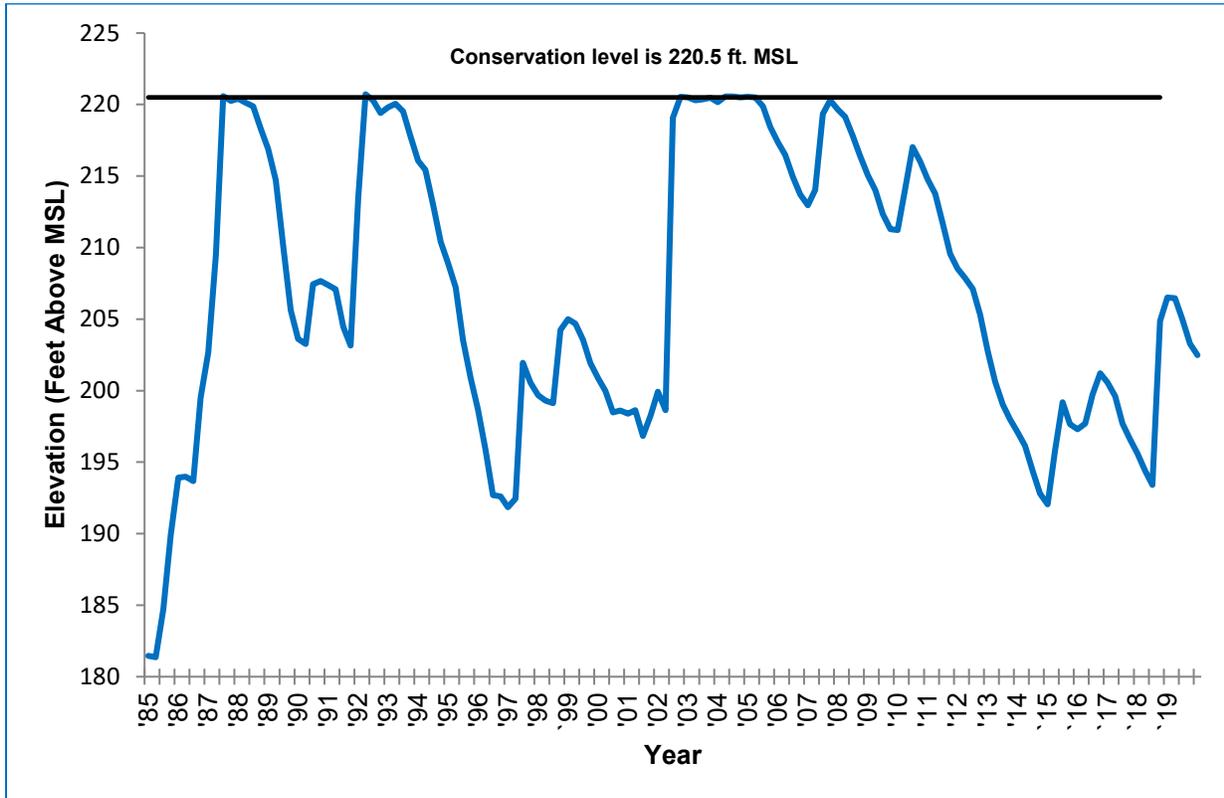


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Choke Canyon Reservoir, Texas, 1985 through April 2020.

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 (μmhos)	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 2019. Reservoir elevation at time of survey was 204.9 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 ^a	none
Catfish: Channel and Blue, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

^a 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>)

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
Total	4,267,015		
White Crappie	1992	148,294	FRY
	1992	33,380	FGL
	Total	181,674	

Table 5. Objective-based sampling plan components for Choke Canyon Reservoir, Texas 2019–2020.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	W_r	10 fish/inch group (max)
Bluegill ^a	Abundance	CPUE – Total	
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad ^a	Abundance	CPUE – Total	
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, Length frequency	$N \geq 100$ stock
	Condition	W_r	10 fish/inch group (max)
<i>Creel survey^b</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	

^a No additional effort will be expended to achieve an RSE ≤ 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.

^b Angler utilization data and associated statistics will be calculated for all sport fish and non-game species.

Table 6. Survey of aquatic vegetation, Choke Canyon Reservoir, Texas, 2015, 2017, and 2019. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2015	2017	2019
Surface area (acres)	13,744	14,483	17,147
Native submersed	259 (1.9)	354 (2.4)	171 (1.0)
Native floating-leaved	< 1 (< 1.0)	7 (< 1.0)	< 1 (< 1.0)
Native emergent			8 (< 1.0)
Non-native	138 (1.0)	645 (4.5)	622 (3.6)
Hydrilla (Tier III)*	133 (1.0)	504 (3.5)	601 (3.5)
Water hyacinth (Tier II)*	5 (< 1.0)	141 (1.0)	21 (< 1.0)

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

Table 7. Percent directed angler effort by species for Choke Canyon Reservoir, Texas, 2015/2016, 2018, and 2020. Survey periods were from 1 June through 31 May for 2015/2016 and 1 January through 30 June for 2018 and 2020.

Species	2015/2016	2018	2020
Alligator Gar	1.0	3.3	0.2
Catfishes	59.8	39.9	23.1
White Bass	5.2	5.5	17.0
Largemouth Bass	21.6	32.8	46.7
Crappies	4.8	8.7	5.0
Freshwater Drum	1.3	2.6	1.2
Anything	6.5	7.1	6.4

Table 8. Total fishing effort (h) for all species and total directed expenditures at Choke Canyon Reservoir, Texas, 2015/2016, 2018, and 2020. Survey periods were from 1 June through 31 May for 2015/2016 and 1 January through 30 June for 2018 and 2020. Relative standard error is in parentheses.

Creel statistic	2015/2016	2018*	2020*
Total fishing effort	199,722 (14)	138,525 (26)	205,645 (19)
Total directed expenditures	\$1,518,961 (20)	\$1,104,151 (38)	\$1,608,752 (26)

* Estimates based on a 6-month creel period

Gizzard Shad

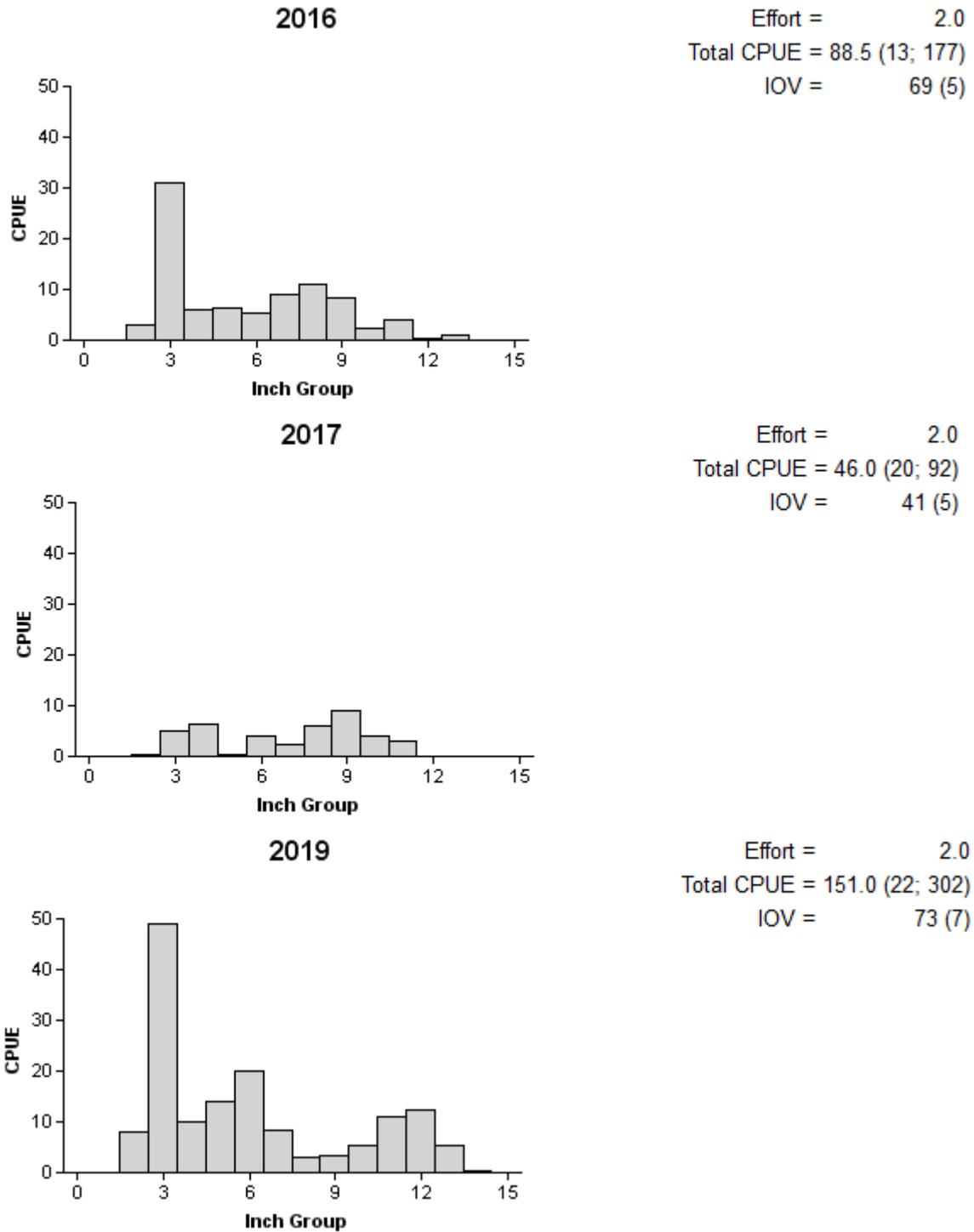


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2016, 2017, and 2019.

Bluegill

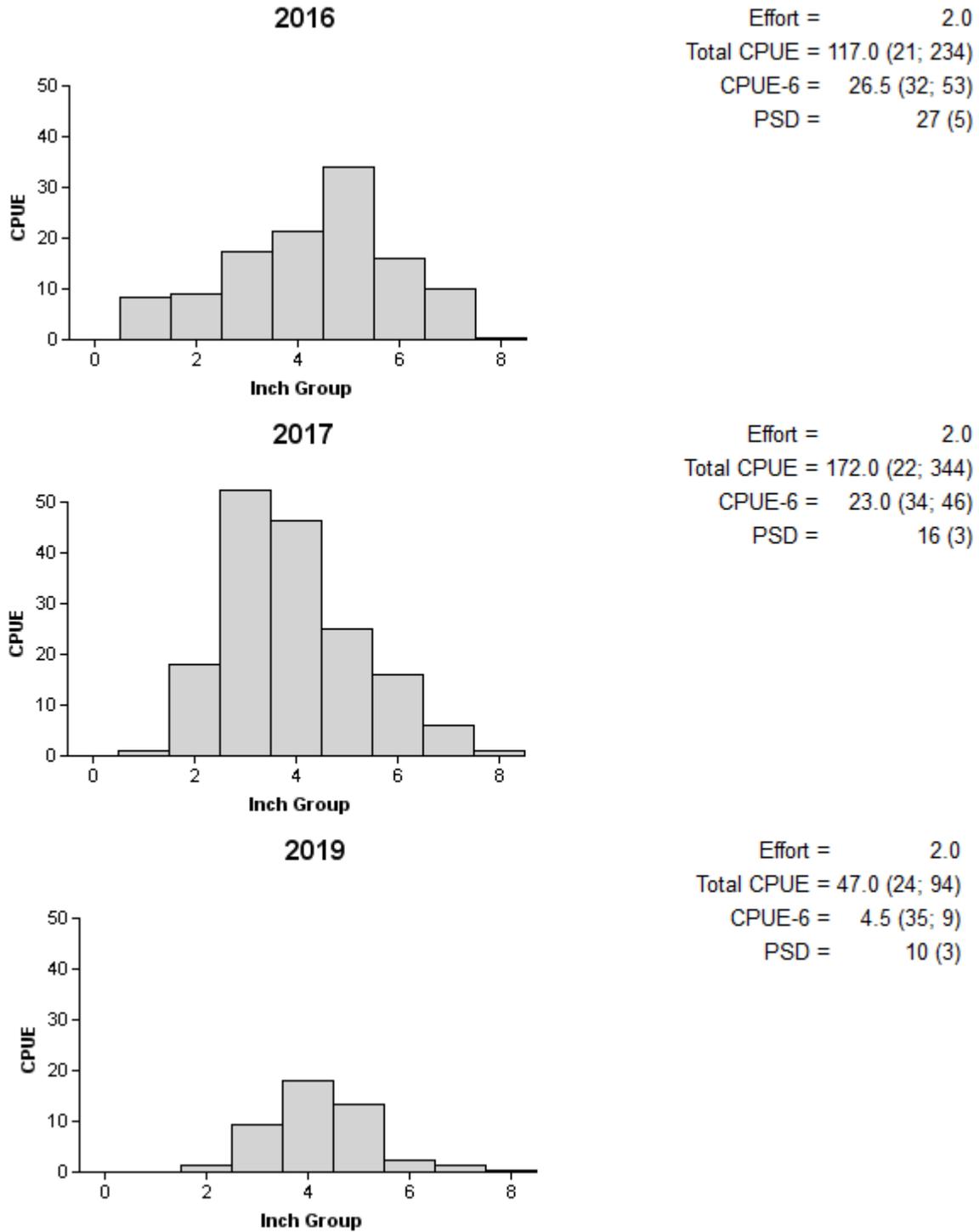


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2016, 2017, and 2019.

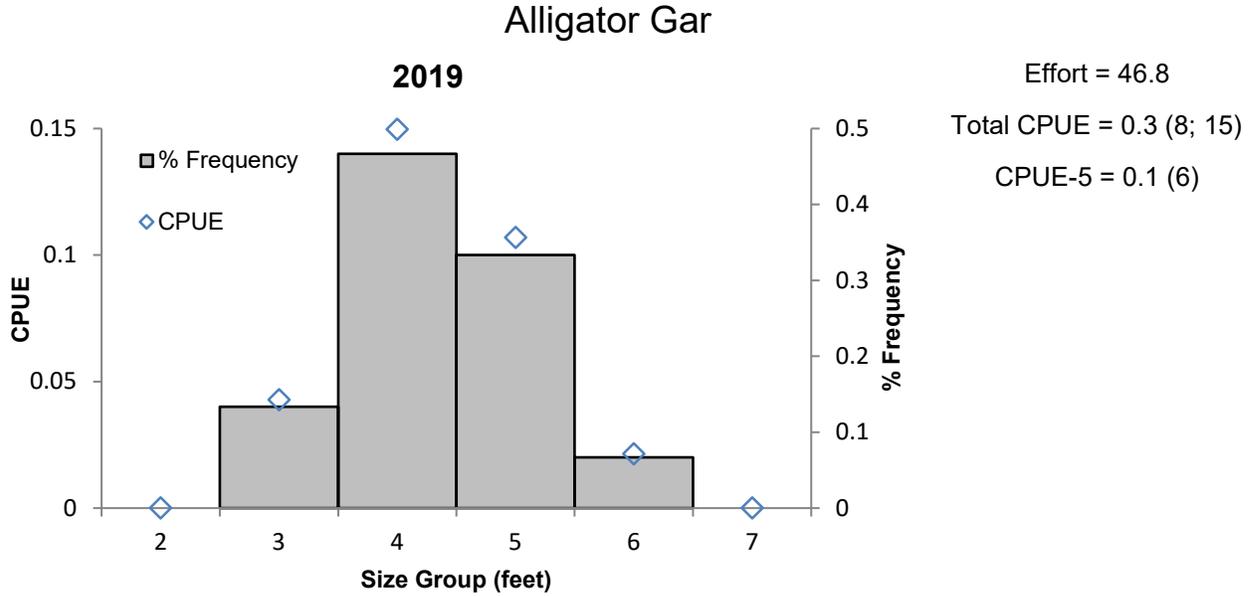


Figure 4. Number of Alligator Gar caught per hour (CPUE), population indices (RSE and N for Total CPUE and N for CPUE-5 in parentheses), and percent frequency by size (feet) for summer multifilament gill netting survey, Choke Canyon Reservoir, Texas, 2019.

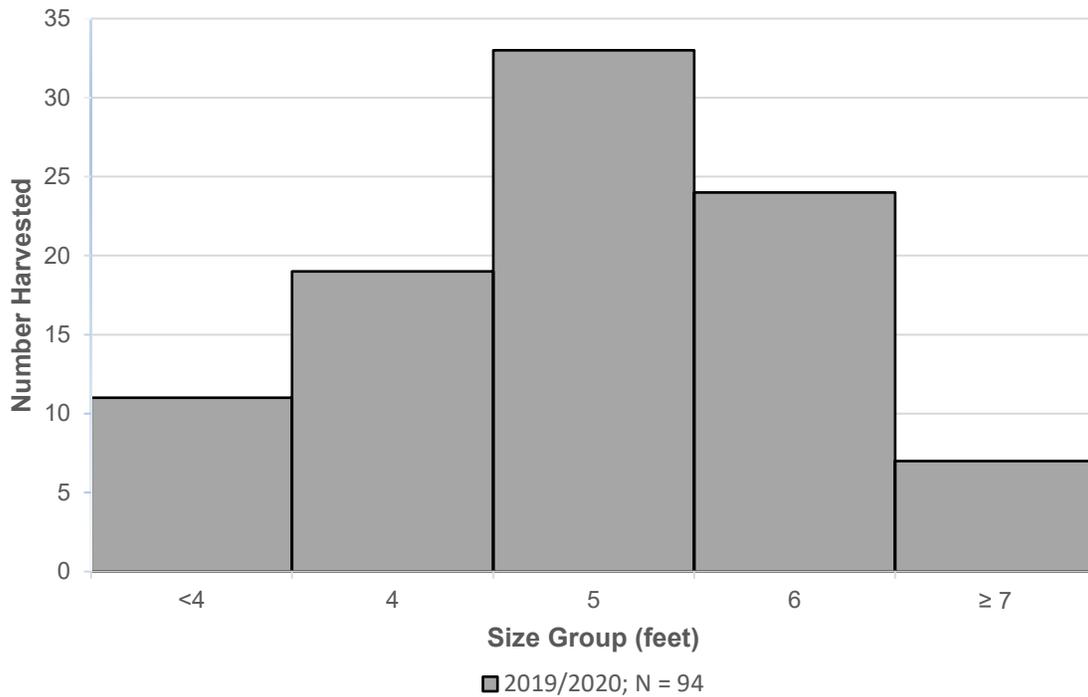


Figure 5. Length frequency of harvested Alligator Gar reported through the mandatory harvest reporting system, Choke Canyon Reservoir, Texas, September 2019 through April 2020. N is the number of harvested Alligator Gar reported.

Table 9. Creel survey statistics for Alligator Gar at Choke Canyon Reservoir, Texas, from June 2015 through May 2016, January through June 2018, and January through June 2020. Total catch per hour is for anglers targeting Alligator Gar and total harvest is the estimated number of Alligator Gar harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2015/2016	2018	2020
Surface area (acres)	13,744	13,056	17,147
Directed effort (h)	1,878 (72)	4,514 (36)	480 (103)
Directed effort/acre	0.14 (72)	0.35 (36)	0.03 (103)
Total catch per hour	0.29 (616)	0.02 (1553)	0.90 (643)
Total harvest	337 (694)	98 (1553)	185 (1002)
Harvest/acre	0.02 (694)	0.01 (1553)	0.01 (1002)
Percent legal released	39	0	57

Blue Catfish

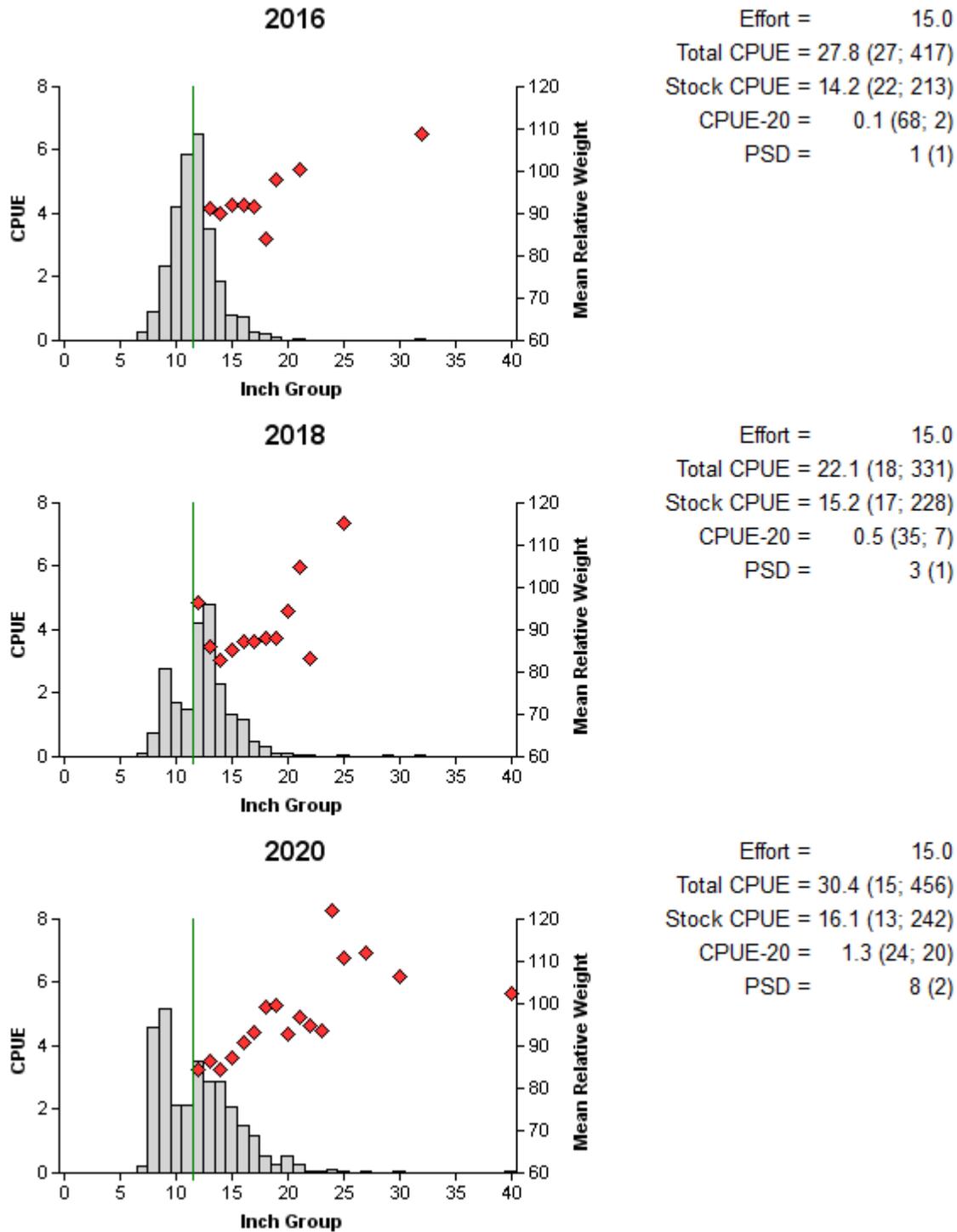


Figure 6. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2016, 2018, and 2020.

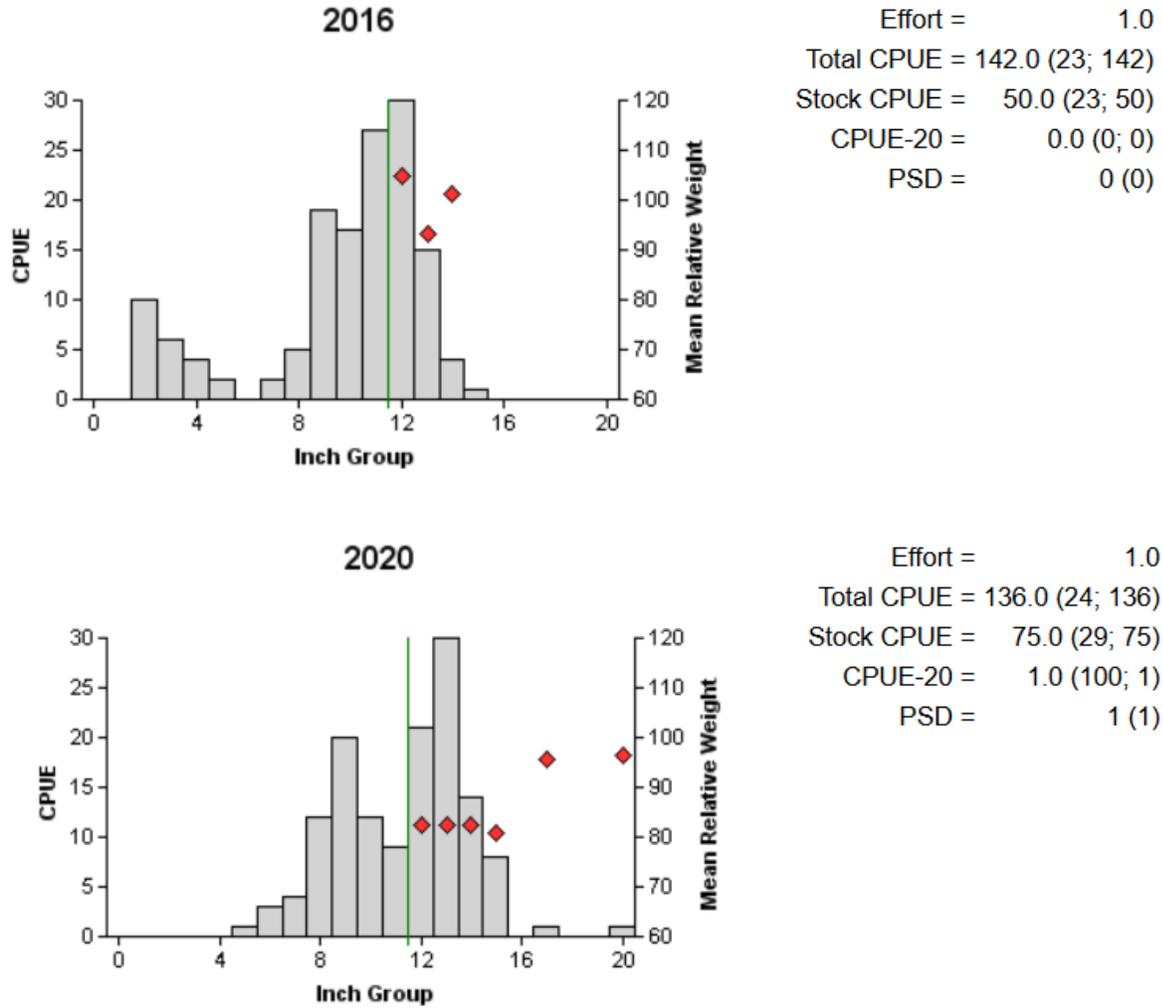


Figure 7. Number of Blue Catfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for summer low frequency electrofishing, Choke Canyon Reservoir, Texas, 2016 and 2020.

Channel Catfish

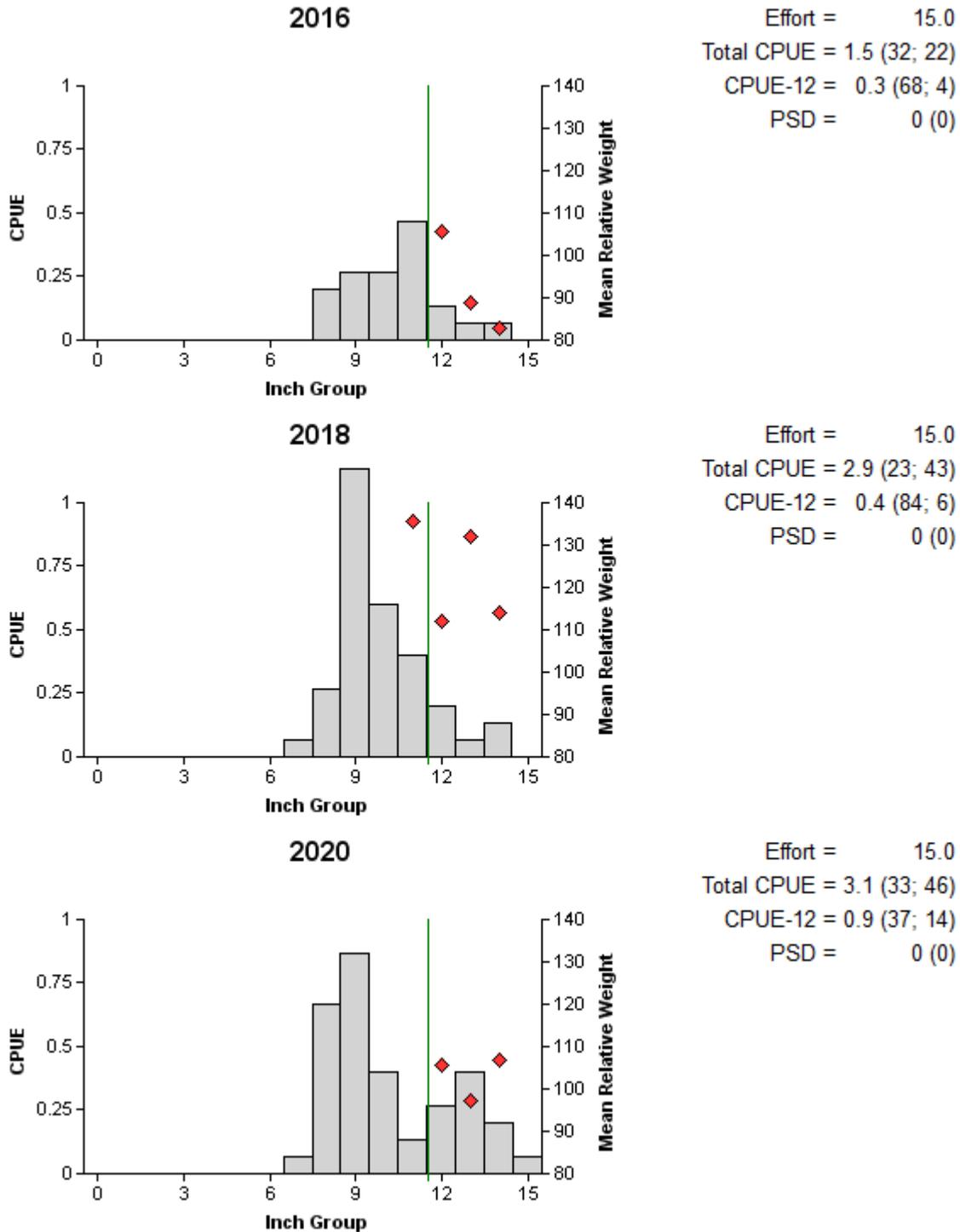


Figure 8. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2016, 2018, and 2020.

Catfishes

Table 10. Creel survey statistics for catfishes at Choke Canyon Reservoir, Texas, from June 2015 through May 2016, January through June 2018, and January through June 2020. Total catch per hour is for anglers targeting catfishes and total harvest is the estimated number of catfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2015/2016	2018	2020
Surface area (acres)	13,744	13,056	17,147
Directed effort (h)	119,297 (15)	54,038 (30)	47,555 (23)
Directed effort/acre	8.68 (15)	4.12 (30)	2.77 (23)
Total catch per hour	2.86 (17)	2.04 (22)	2.87 (18)
Total harvest	121,763 (28)	43,095 (33)	61,635 (24)
Harvest/acre	8.86 (28)	3.30 (33)	3.59 (24)
Percent legal released	12	6	15

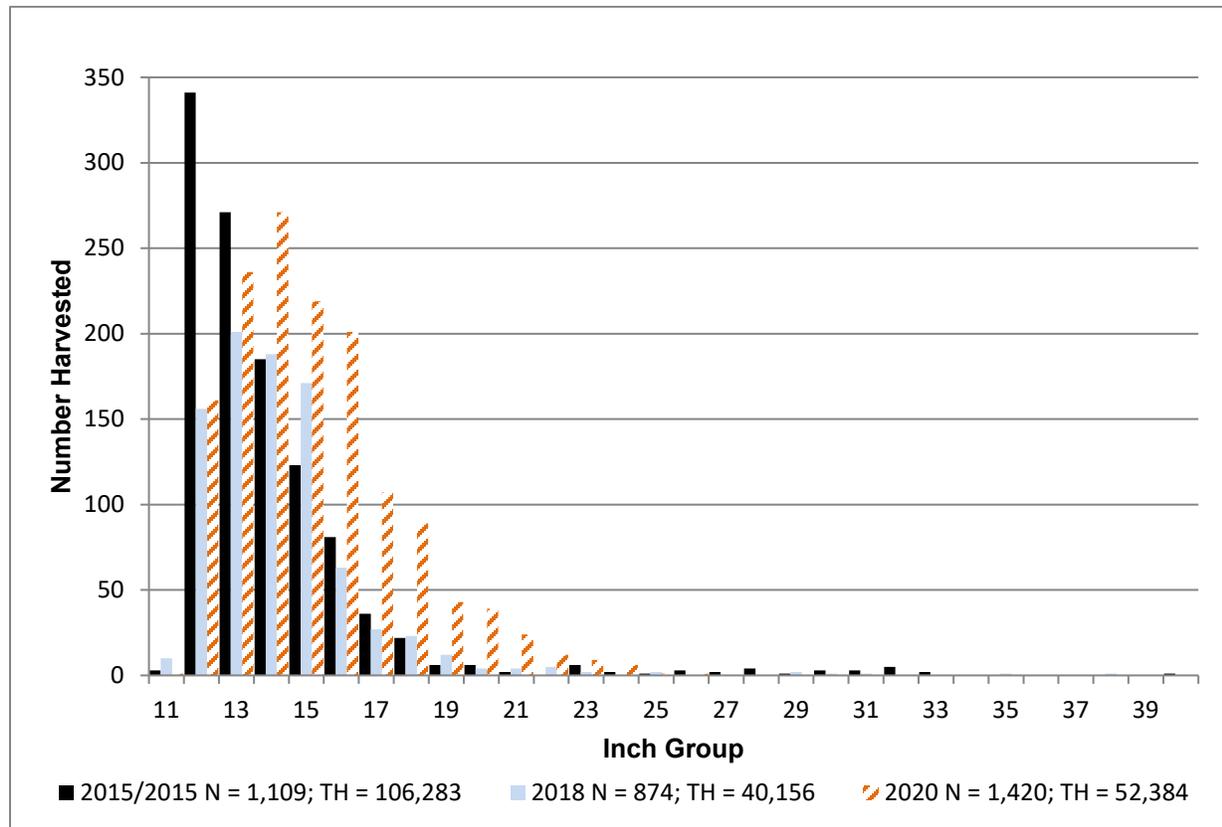


Figure 9. Length frequency of harvested Blue Catfish observed during creel surveys at Choke Canyon Reservoir, Texas, June 2015 through May 2016, January through June 2018, and January through June 2020, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

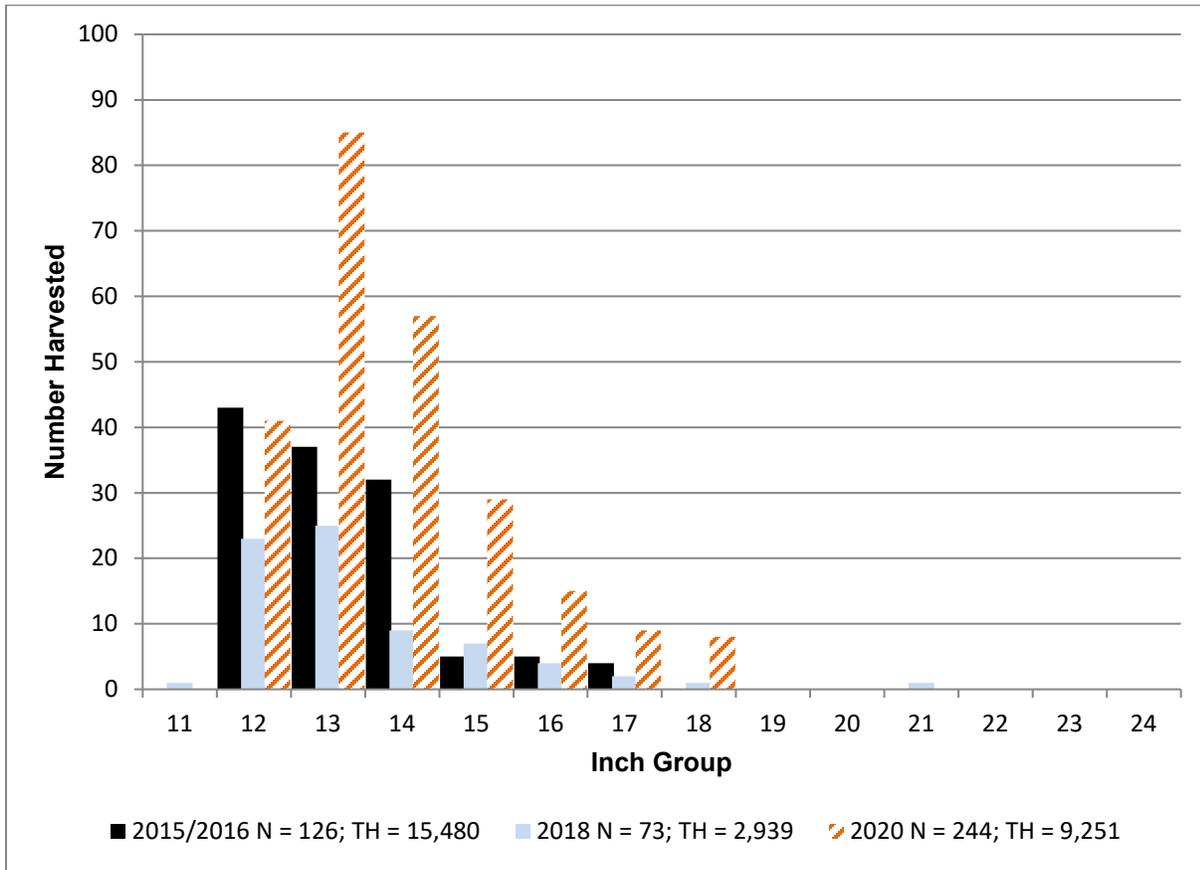


Figure 10. Length frequency of harvested Channel Catfish observed during creel surveys at Choke Canyon Reservoir, Texas, June 2015 through May 2016, January 2018 through June 2018, and January 2020 through June 2020, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

White Bass

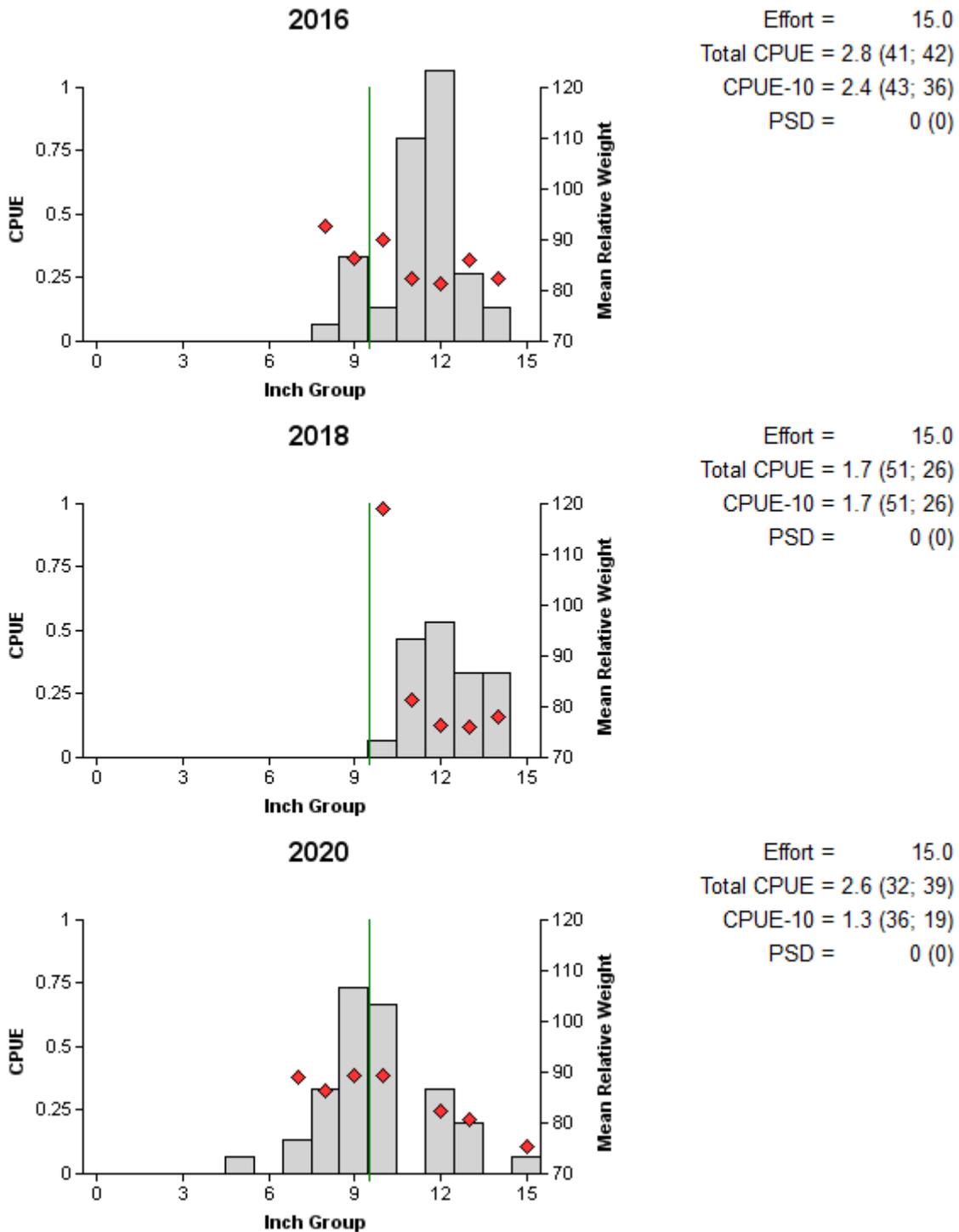


Figure 11. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2016, 2018, and 2020.

Table 11. Creel survey statistics for White Bass at Choke Canyon Reservoir, Texas, from June 2015 through May 2016, January through June 2018, and January through June 2020. Total catch per hour is for anglers targeting White Bass and total harvest is the estimated number of White Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2015/2016	2018	2020
Surface area (acres)	13,744	13,056	17,147
Directed effort (h)	8,498 (32)	7,521 (52)	34,999 (28)
Directed effort/acre	0.62 (32)	0.58 (52)	2.04 (28)
Total catch per hour	1.93 (57)	0.54 (73)	1.36 (29)
Total harvest	14,504 (72)	3,101 (74)	37,348 (36)
Harvest/acre	0.74 (72)	0.24 (74)	2.18 (36)
Percent legal released	38	7	2

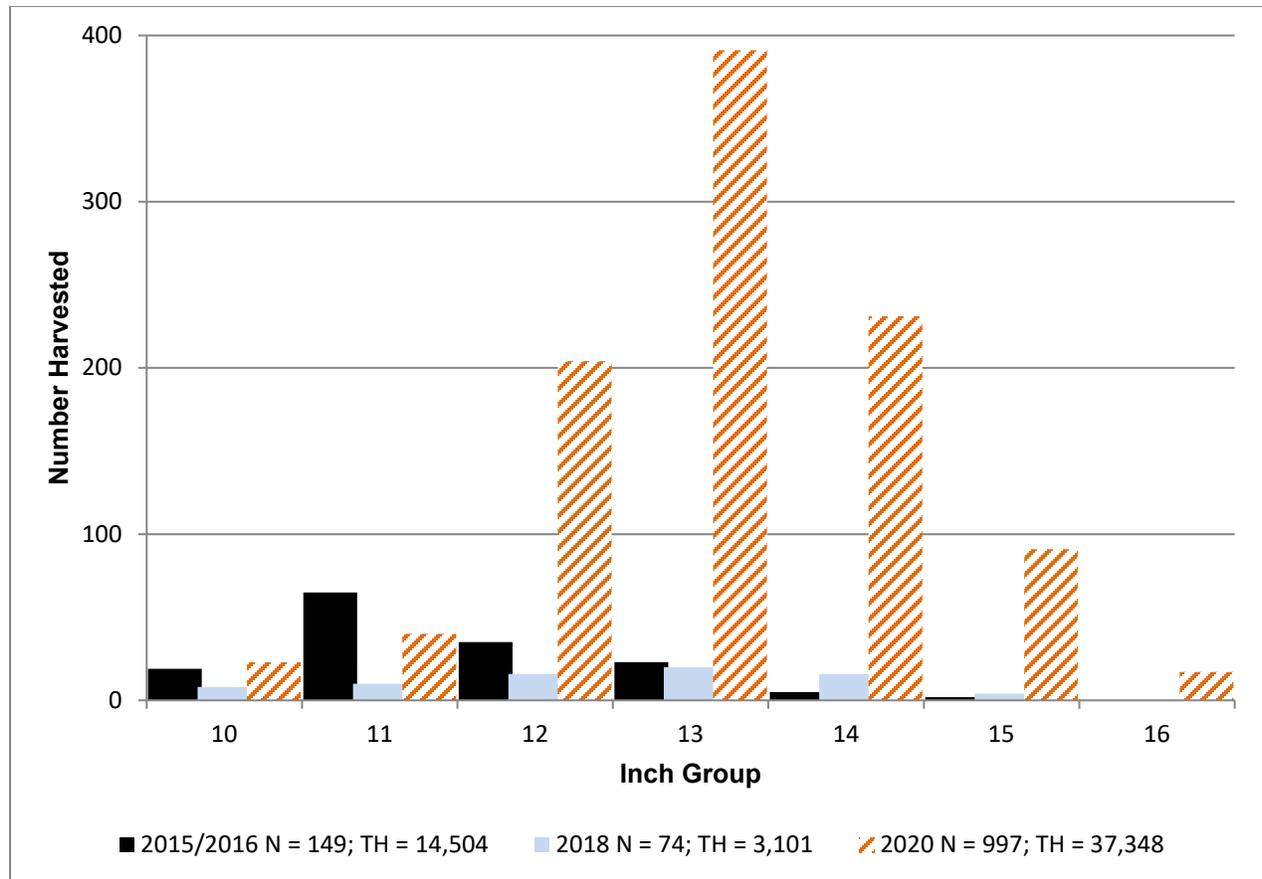


Figure 12. Length frequency of harvested White Bass observed during creel surveys at Choke Canyon Reservoir, Texas, June 2015 through May 2016, January through June 2018, and January through June 2020, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

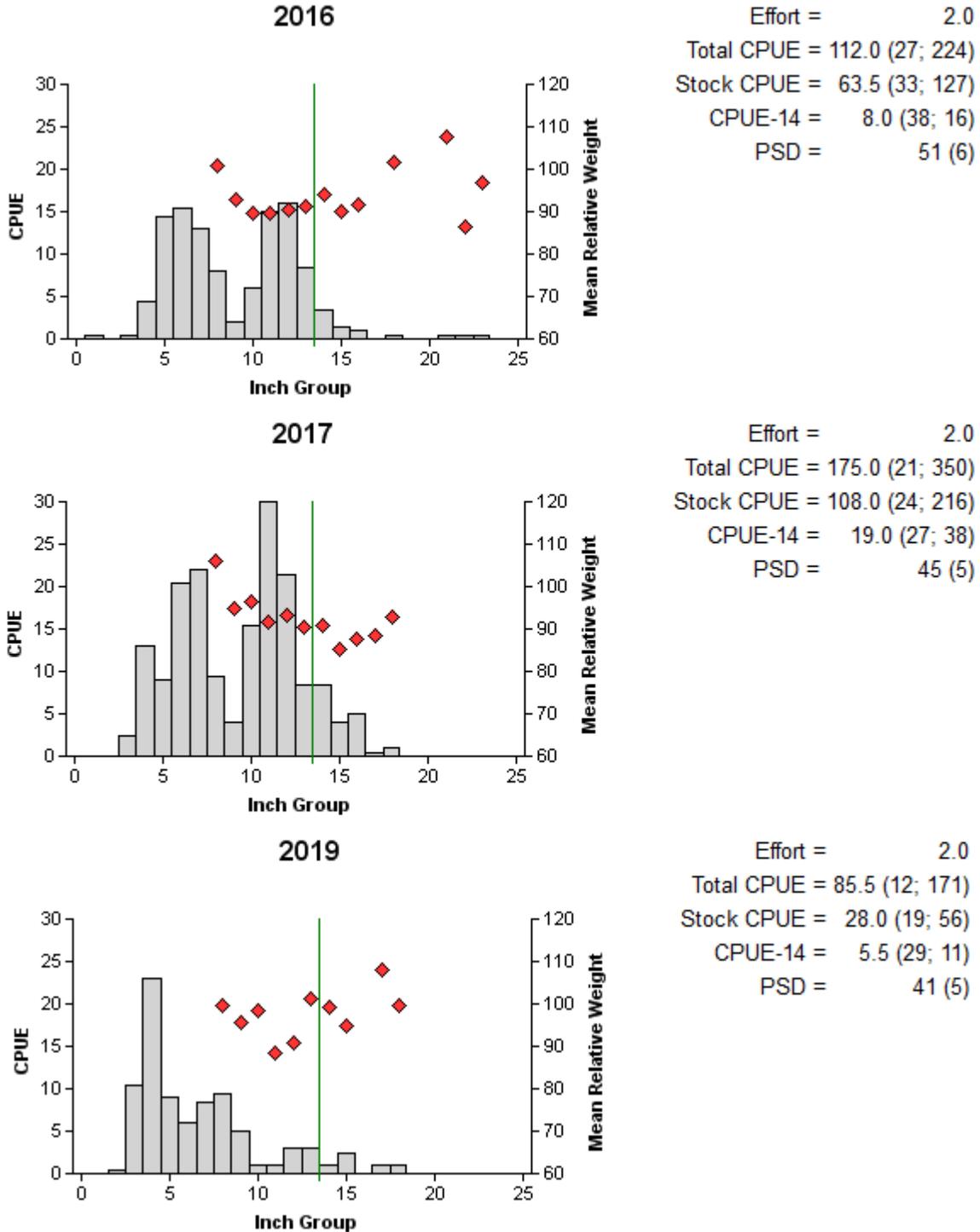


Figure 13. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2016, 2017, and 2019.

Table 12. 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)

Table 13. Creel survey statistics for Largemouth Bass at Choke Canyon Reservoir, TX from June 2015 through May 2016, January through June 2018, and January through June 2020. Catch rate is for all anglers targeting Largemouth Bass. 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	2015/2016	2018	2020
Surface area (acres)	13,744	13,056	17,147
Directed angling effort (h)			
Tournament	7,531 (32)	13,186 (27)	27,018 (29)
Non-tournament	35,572 (18)	31,292 (26)	69,267 (20)
All black bass anglers combined	43,103	44,478	96,228
Angling effort/acre	3.14 (18)	3.41 (22)	5.62 (20)
Catch rate (number/h)	0.96 (34)	1.46 (27)	0.61 (23)
Harvest			
Non-tournament harvest	4,669 (68)	5,073 (41)	3,234 (45)
Harvest/acre	0.34 (68)	0.39 (41)	0.19 (45)
Tournament weigh-in and release	1,032 (327)	2,256 (66)	1,169 (89)
Release by weight			
<4.0 lbs	35,216 (62)	53,728 (39)	52,292 (33)
4.0-6.9 lbs	312 (86)	3,873 (46)	1,879 (45)
7.0-9.9 lbs	0 (*)	0(*)	81 (120)
≥10.0 lbs	0 (*)	0(*)	19 (214)
Percent legal released (non-tournament)	67	74	83

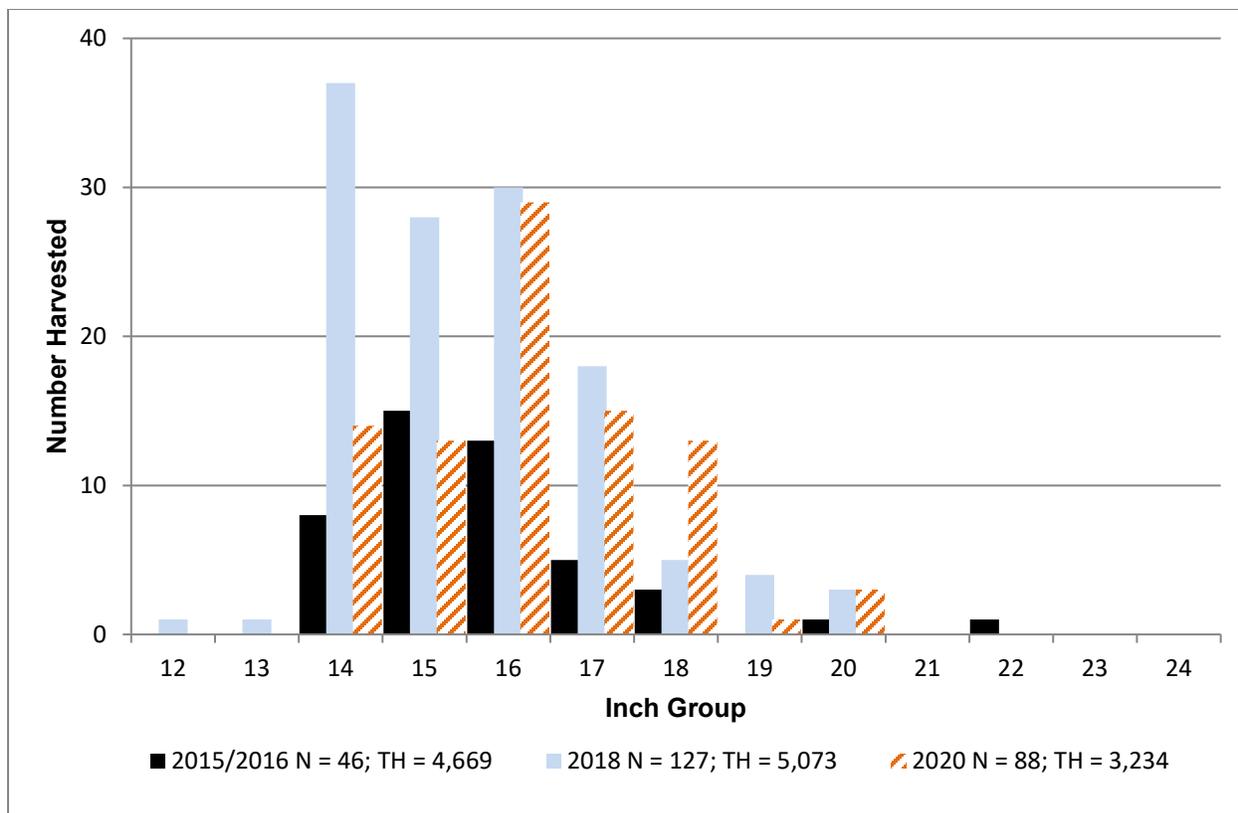


Figure 14. Length frequency of harvested Largemouth Bass observed during creel surveys at Choke Canyon Reservoir, Texas, June 2015 through May 2016, January through June 2018, and January through June 2020, all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Crappies

Table 14. Creel survey statistics for crappies at Choke Canyon Reservoir, Texas, from June 2015 through May 2016, January through June 2018, and January through June 2020. Total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2015/2016	2018	2020
Surface area (acres)	13,744	13,056	17,147
Directed effort (h)	9,559 (36)	11,838 (41)	10,341 (32)
Directed effort/acre	0.70 (36)	0.91 (41)	0.60 (32)
Total catch per hour	2.01 (61)	1.27 (36)	1.27 (48)
Total harvest	7,123 (87)	11,924 (41)	10,682 (54)
Harvest/acre	0.52 (87)	0.91 (41)	0.62 (54)
Percent legal released	5	2	2

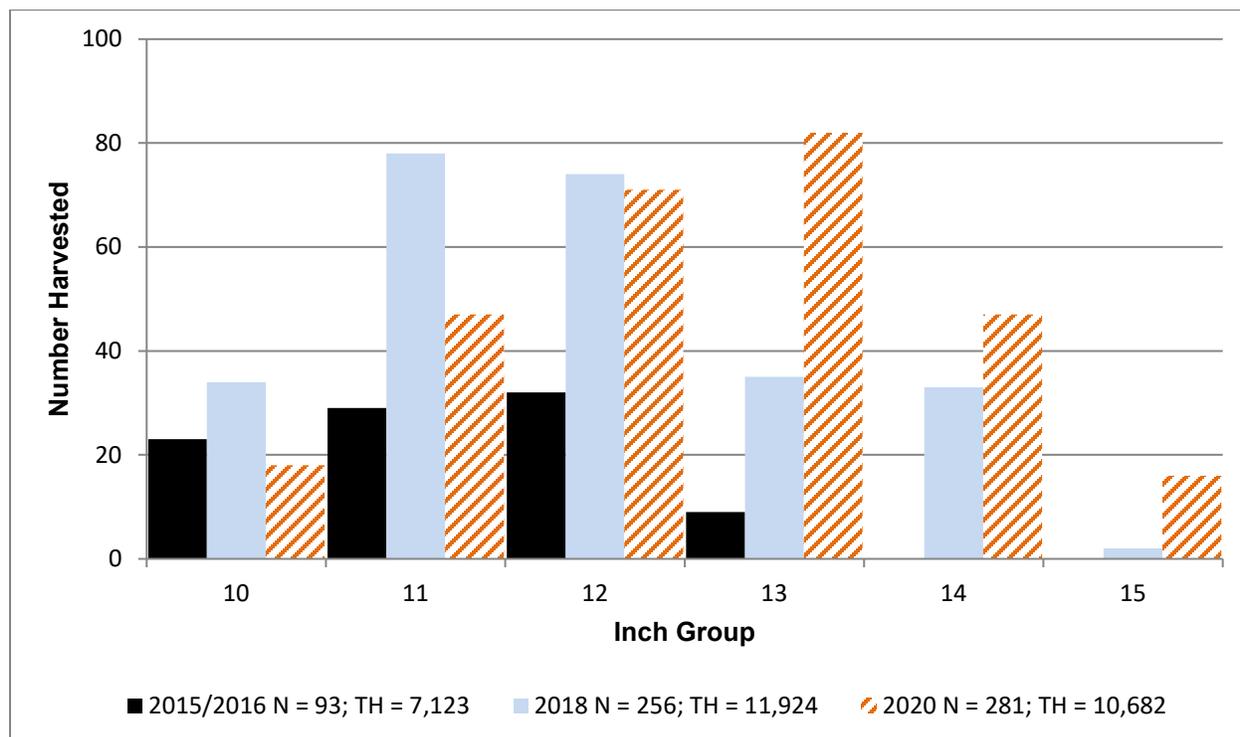


Figure 15. Length frequency of harvested crappies observed during creel surveys at Choke Canyon Reservoir, Texas, June 2015 through May 2016, January through June 2018, and January through June 2020, all anglers combined. N is the number of harvested crappies observed during creel surveys, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 15. 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 fall. Standard survey denoted by S and additional survey denoted by A.

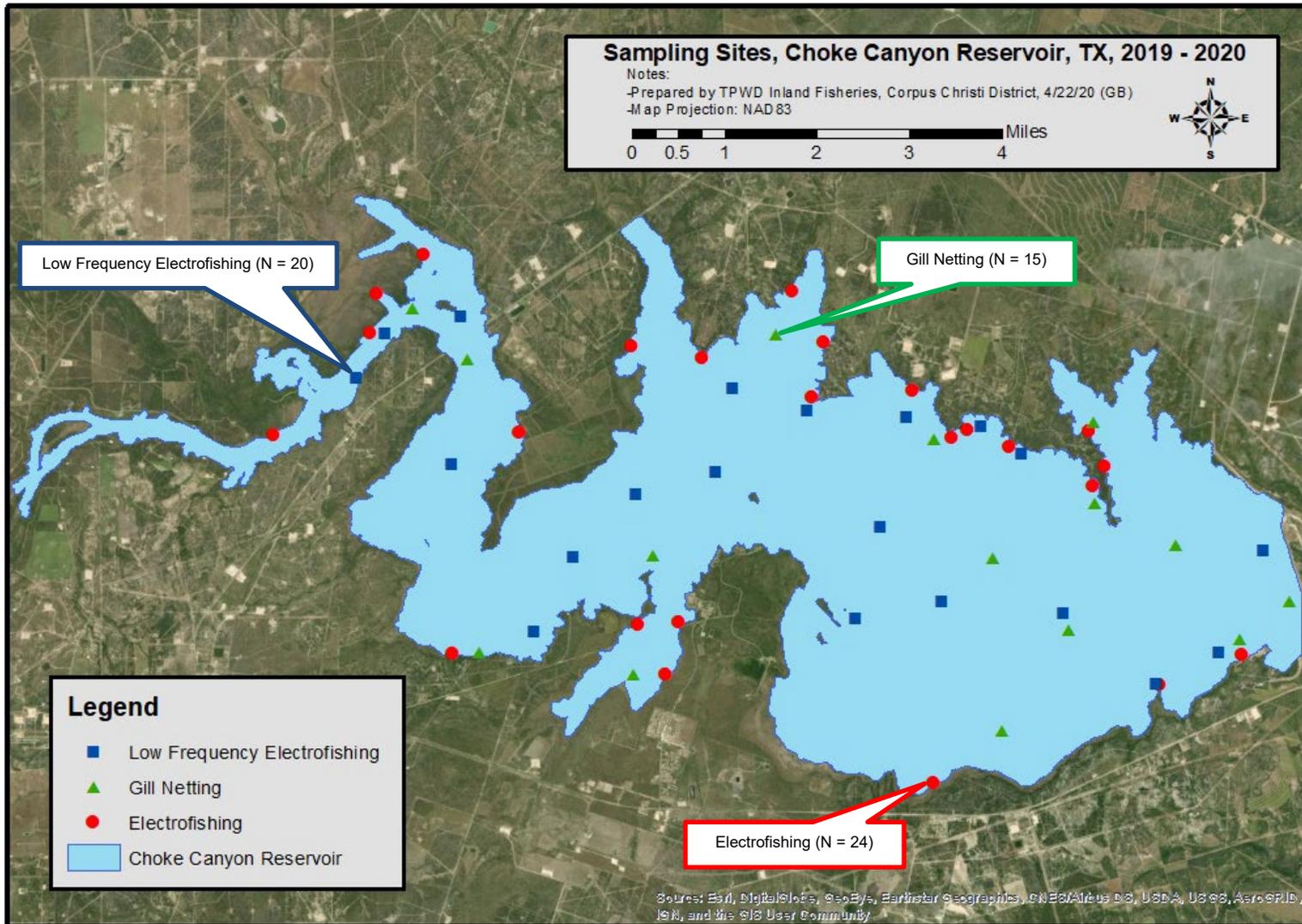
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Vegetation	A	A	A	S
Electrofishing – Fall		A		S
Electrofishing – Spring		A		
Gill netting		A		S
Creel survey		A		S
Report		A		S

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all species collected from all gear types from Choke Canyon Reservoir, Texas, 2019-2020. Sampling effort was 2 hours for electrofishing, 15 net nights for gill netting, and 1 hour for low frequency electrofishing.

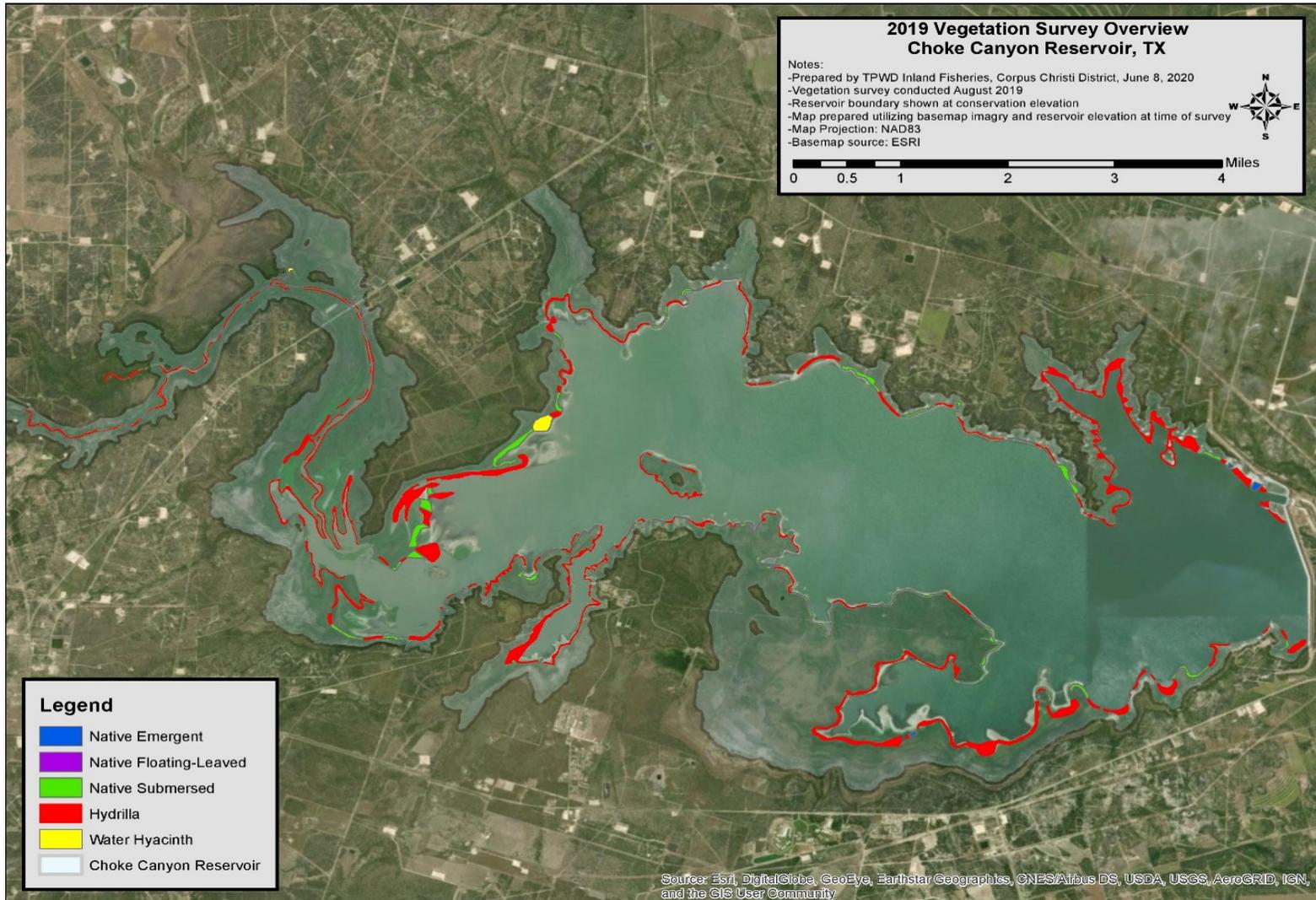
Species	Electrofishing		Gill Netting		LF Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted Gar			18	1.20 (34)		
Longnose Gar			2	0.13 (68)		
Alligator Gar			3	0.20 (72)		
Gizzard Shad	302	151.00 (22)	266	17.73 (20)		
Threadfin Shad	17	8.50 (47)				
Common Carp			41	2.73 (33)		
Golden Shiner	4	2.00 (59)				
Bullhead Minnow	13	6.50 (43)				
Smallmouth Buffalo			25	1.67 (39)		
Blue Catfish			456	30.40 (15)	136	136.00 (24)
Channel Catfish			46	3.07 (33)	1	1.00 (100)
Flathead Catfish			2	0.13 (68)	2	2.00 (69)
White Bass	5	2.50 (58)	39	2.60 (30)		
Bluegill	94	47.00 (24)	17	1.13 (44)		
Redear Sunfish	19	9.50 (28)	9	0.60 (39)		
Largemouth Bass	171	85.50 (12)	6	0.40 (41)		
White Crappie			19	1.27 (27)		
Black Crappie			23	1.53 (49)		
Freshwater Drum			54	3.60 (25)		

APPENDIX B – Map of sampling locations

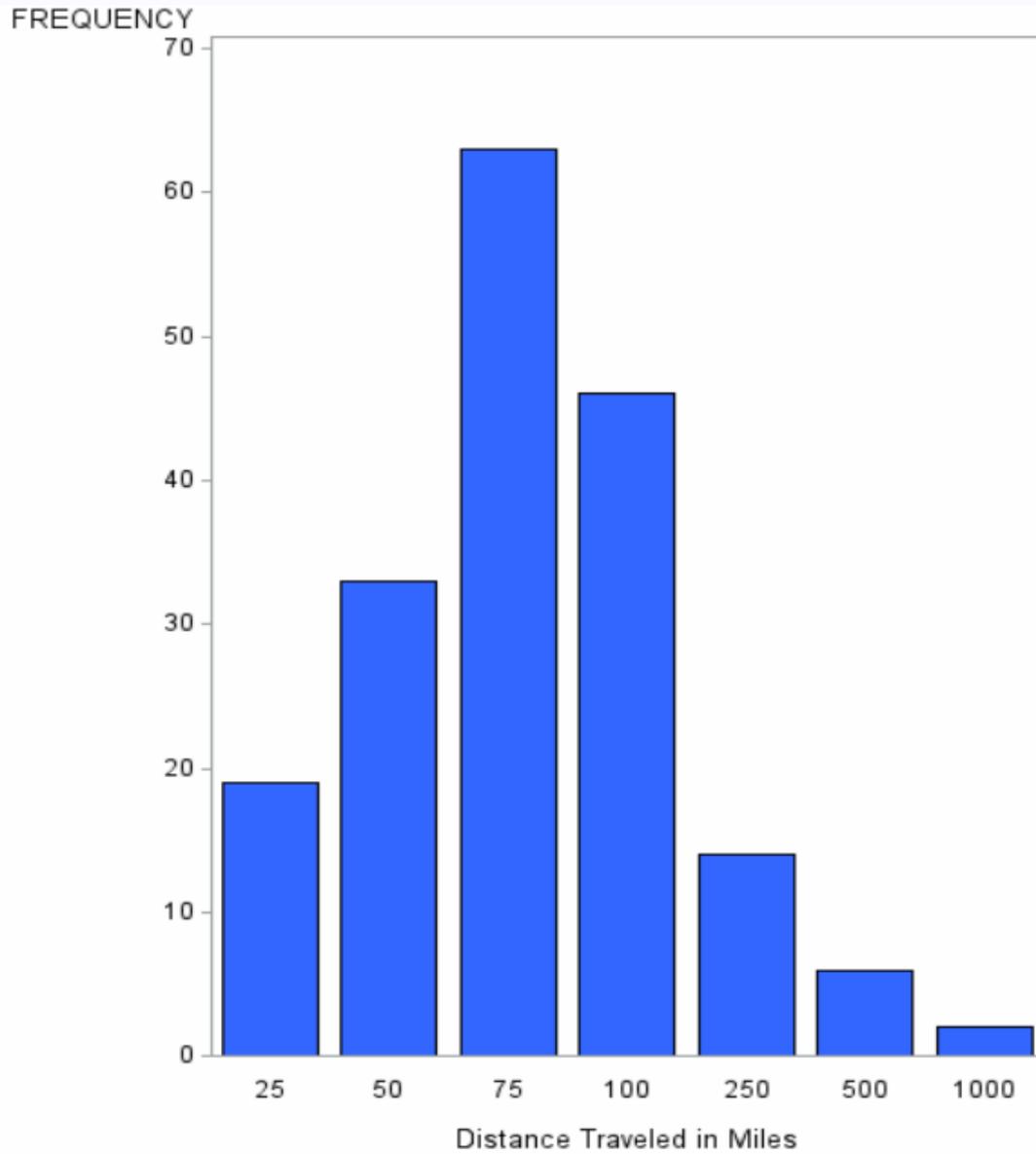


Location of sampling sites, Choke Canyon Reservoir, Texas, 2019-2020. The reservoir was 16.8 feet below conservation pool at time of sampling.

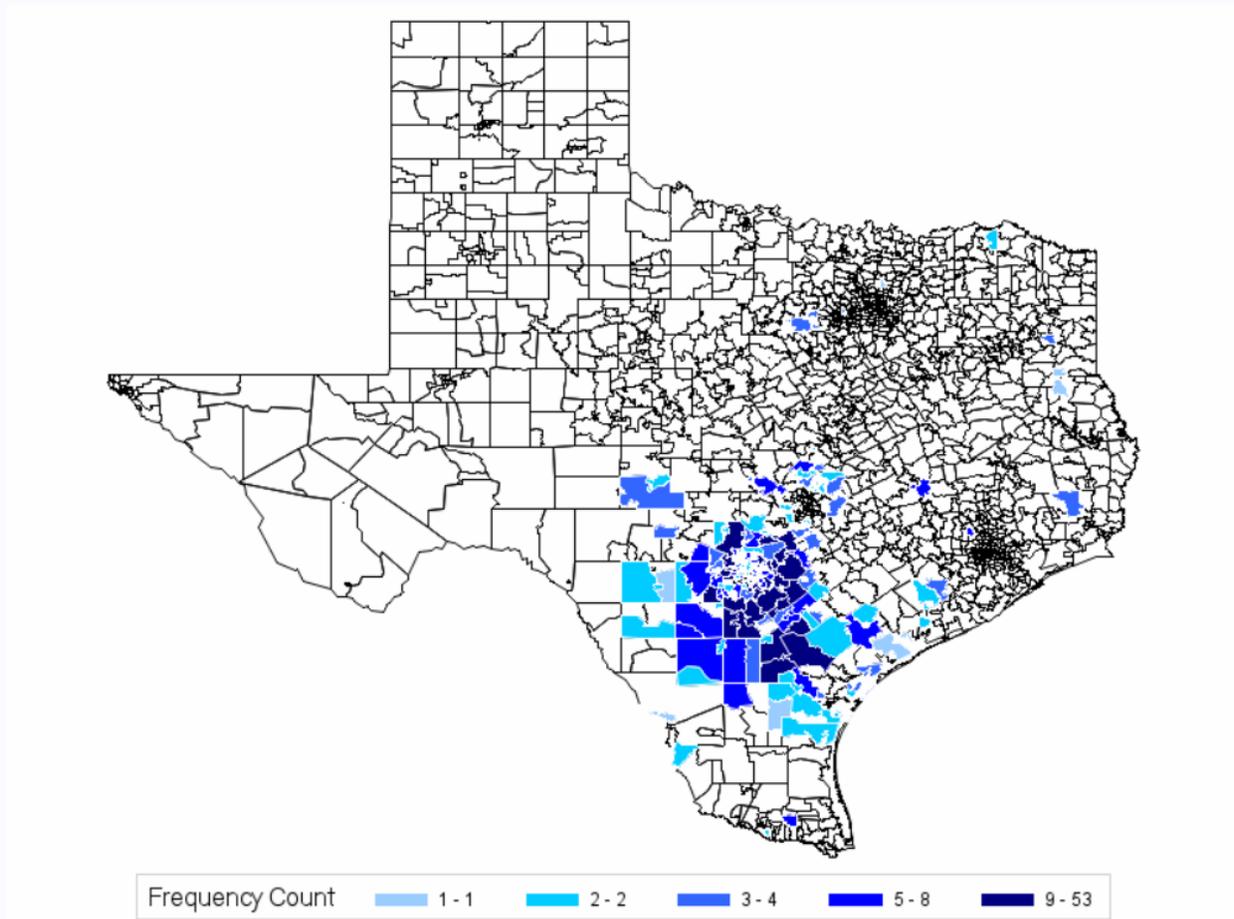
APPENDIX C – 2019 Distribution map of aquatic vegetation



APPENDIX D – Reporting of creel ZIP code data



Frequency of anglers that traveled various distances (miles) to Choke Canyon Reservoir, Texas, as determined from the January through June 2020 creel survey.



Location, by ZIP code, and frequency of anglers that were interviewed at Choke Canyon Reservoir, Texas, as determined from the January through June 2020 creel survey.



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