

# Choke Canyon Reservoir

## 2017 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 2017 using electrofishing and in 2018 using gill netting to assess population trends for important sport fishes. Anglers were surveyed from 1 January 2018 to 30 June 2018. Historical data are presented with the 2017-2018 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 13,056 acres in 2017-2018) 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 some gravel/rock. Littoral habitat consisted of native aquatic vegetation, periodically flooded terrestrial vegetation, standing timber, and seasonally abundant water hyacinth and hydrilla.

**Management History:** Important sport fish species include Largemouth Bass, Blue and Channel catfishes, White Bass, and crappie. 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, and supplementing the Largemouth Bass population with stockings. 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 totaling 926 acres. Since 2016, water hyacinth herbicide applications have been conducted through private contractors including treatments in 2016 (132 acres), 2017 (566 acres), and 2018 (104 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 and Threadfin Shad were present in the reservoir in low abundance. Sunfishes formed the primary forage base. Electrofishing catch of Bluegill was high and consistent with prior surveys. Several Bluegill greater than 6-inches were collected. The majority of prey species were adequate size for predator fish.
- **Alligator Gar:** The reservoir continues to support a robust Alligator Gar population. Anglers harvested an estimated 98 Alligator Gar through the first 6 months of 2018. A new waterbody record was caught 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 40,156 fish. Channel and Flathead Catfish were present in low abundance.
- **White Bass:** Abundance of White Bass was low throughout the survey period; however, all fish collected in 2018 were > 10 inches and thus available for angler harvest. Anglers harvested an estimated 3,101 fish in 2018 and angling catch rate decreased to 0.54/fish per hour.
- **Largemouth Bass:** Largemouth Bass abundance was high and size structure was balanced. Growth was excellent and mean age at legal length was 1.7 years. Largemouth Bass were the most sought sport fish species in the reservoir.
- **White Crappie:** White Crappie was the 4<sup>th</sup> most sought sport fish in the reservoir and was 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. Stock Florida Largemouth Bass to maintain high level of trophy production potential and continue to collect data for Largemouth Bass trophy database. Develop an Alligator Gar monitoring program to track population and fishery trends.

## Introduction

This document is a summary of fisheries data collected from Choke Canyon Reservoir in 2017-2018. 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 2017-2018 data for comparison.

## Reservoir Description

Choke Canyon is a 25,989-acre reservoir (averaged 13,056 acres in 2017-2018) 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). During the 2017-2018 sampling season the reservoir averaged 23.9 feet below conservation pool. Shoreline and boat access were adequate with six public boat ramps and substantial area for shoreline angling. Handicap (ADA) access was limited to the Choke Canyon State Park Calliham Unit. Secchi disc measurements of water clarity ranged from 13 to 56 centimeters. 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. Over the current survey period, substantial increases in vegetative habitat have occurred. 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. Three public ramps were unavailable to anglers in 2017/18 because the end of the boat ramp was above the waterline or needed dredging. The Calliham ramp courtesy dock was replaced in 2013. Southshore boat ramp repairs 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 2016) included:

1. Collection of quantitative angler data is necessary to evaluate trends in angler effort, catch, and harvest.

**Action:** An access creel survey was conducted 1 January 2018 through 30 June 2018. Continued to collect data for trophy Largemouth Bass database.

2. 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 2017 and 2018 at a rate of 1,000/km.

3. 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 press releases were disseminated to local media. Additionally, a *Passports to Texas* radio piece highlighting trophy Alligator Gar angling opportunities was aired.

4. Monitor presence, distribution, and spread of invasive aquatic vegetation through annual vegetation surveys.

**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 and other problematic vegetation on the reservoir.

**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 2017 and 2018. 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), and 2018 (104 acres through June 2018).

**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 2016). 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 2015).

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (2 hour 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 13 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).

**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.

**Genetics** – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2015 and by electrophoresis for previous years.

**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 2013/2014 and 2015/2016 and in January through June 2018. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter in 2013/2014 and 2015/2016 and on 7 weekend and 5 weekday (per spring and summer quarter) in 2018 to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Creel statistics and estimates for the 2018 survey were based on a 6-month period.

**Habitat** –Vegetation surveys were conducted in 2016–2018 to monitor expansion of water hyacinth and hydrilla. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

**Water level** – Source for water level data was the Nueces River Authority (NRA) website (<http://www.nueces-ra.org/CP/CITY/day.php>). Accessed 15 May 2018.

## Results and Discussion

**Habitat:** A structural habitat survey was last conducted in 2005 (Findeisen and Binion 2008). In 2017, total native vegetation coverage was 361 acres (3.4% coverage; Table 6), a slight increase from previous years. Water stargrass and American pondweed were the most abundant native vegetation species in 2017. Total non-native vegetation coverage was 645 acres (4.5%) in 2017; substantially higher than the 138 acres (1.0%) observed in 2015. Hydrilla and water hyacinth were the only non-native plants species observed during the 2017 vegetation survey and were present in 504 acres (3.5%) and 141 acres (1.0%) of water, respectively (Table 6). Substantial increases in submersed vegetative habitat were observed to occur since 2015. Additionally, a 4-5 foot water level rise in late 2016, early 2017 flooded substantial terrestrial vegetation further supplementing total aquatic habitat.

**Creel:** Directed fishing effort by anglers in 2018 was highest for Largemouth Bass (33%; combined tournament [10%] and non-tournament [23%] anglers), followed by any catfish species (30%), Blue Catfish (10%), no species preference (7%), White Bass (6%), and White Crappie (4%); (Table 7). Alligator Gar were also an important component to the recreational angling (> 3% total fishing effort). Notable trends in directed fishing effort in 2018 included increased effort for Largemouth Bass and Alligator Gar and decreased directed effort for all catfish species and White Crappie (Table 7). Total fishing effort for all species was an estimated 138,525 hours with total estimated expenditures of \$1,104,151 through the first half of 2018 (Table 8). While some anglers traveled great distances (> 250 miles) to fish at the reservoir, the majority (91%) resided within 250 miles (Appendix E).

**Prey species:** Gizzard Shad abundance steadily decreased over the survey period and less than half collected were available as prey in 2017 (IOV = 41; Figure 2). Catch rates of Bluegill were 172.0/h in 2017, similar to 207.5/h in 2015 and higher than 117.0/h in 2016 (Figure 3). The majority of Bluegill collected in 2017 were < 6 in total length and thus provided excellent forage to predator species. However, sampling also indicated large Bluegill (CPUE-6 = 23.0/h) were present; adding recreational value for anglers. Redear Sunfish further 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 sport fishery and the population is robust in terms of numbers and size of fish (Binion et al. 2015). Total directed effort for Alligator Gar increased to 3.3% (4,514 hours) relative to prior years (Table 9). Additionally, 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 catch rate (i.e., angling success) decreased in 2018 (0.02/h) compared to 2015/2016 (0.29/h) and total harvest for Alligator Gar in 2018 was estimated at 98 individuals (Table 9). A new waterbody record was caught in 2017 and measured over 8-feet total length and weighed 216 pounds. Anecdotal reports suggest trophy-sized (> 6-feet) catches are frequent.

**Blue Catfish:** Although Blue Catfish abundance declined over the survey period, catch rates remained high (CPUE range: 22.1 – 62.5/nn; Figure 4). Record catches were observed in 2015 (62.5/nn), while catch rates in 2016 (27.8/nn) and 2018 (22.1/nn) were consistent with the historical mean catch rate (22.4/nn). Proportional size distribution was low, consistent across years, and indicated a Blue Catfish population comprised primarily of smaller individuals. However, roughly 69% of the fish collected in 2018 were ≥ 12 in total length and available to angler harvest. CPUE-20 (0.5/nn) was low and stable over the survey period. Condition of fish greater than 12 inches remained consistent across years for most size classes and tended to increase with increased length (Figure 4). Exploratory low-frequency electrofishing (LFE) was conducted in the summer of 2016 to evaluate its utility as an alternative sampling gear. The survey yielded a catch rate of 142.0/h and reasonable RSE values (23) (Figure 5). While LFE proved effective at collecting smaller size classes, no fish over 15 inches was represented in the sample and only 35% of the sample comprised fish greater than 12 in total length compared to 69% collected in gill nets.

Blue Catfish directed effort decreased substantially over the study period and was 13,244 h in 2018 (Table 10). Angling success, represented by angler catch rate (fish/h) remained consistent and was high

(1.7/h). Total estimated harvest was substantially reduced in 2018 (40,156) relative to 2015/2016 (106,283), but similar to 2013/2014 (40,637). Angler compliance was poor and harvested fish ranged in length between 11 – 40 inches and the majority of harvest occurred between 12 – 18 inches, all years combined (Figure 6).

**Channel Catfish:** Although a slight increase in relative abundance was observed over the survey period, Channel Catfish abundance remained low (CPUE range: 0.7 – 2.9/nn; Figure 7). Size composition was dominated by small individuals and 86% of fish collected were sub-legal. Body condition in 2018 was excellent ( $W_r$  range: 112 – 136) for the few fish where relative weights were calculated (Figure 7).

Directed fishing effort, catch per hour, and total harvest for Channel Catfish showed a minimal fishery (Table 11). Fish 12 – 14 inches comprised the majority of harvest (Figure 8).

**White Bass:** White Bass catch rates were relatively consistent and low (CPUE range: 0.5 – 2.8/nn; Figure 9) across the survey period. All fish collected in 2018 were  $\geq$  the 10 in minimum length limit. Relative weight values were poor (70's – 80's) and tended to decrease with increased length (Figure 9).

Angling effort for White Bass was similar across years (range: 7,215 – 8,498 h; Table 12). Angler success declined in 2018, evidenced by decreased angling catch rate (0.54/h) and total harvest (3,101). Harvested fish ranged between 10 – 15 inches total length (Figure 10).

**Largemouth Bass:** Relative abundance of Largemouth Bass remained high over the survey period. The electrofishing catch rate of Largemouth Bass was 175.0/h in 2017, higher than 112.0/h in 2016 yet slightly lower than 2015 (207.5/h; Figure 11). Catch rates of stock-size fish increased in 2017 (108.0/h) relative to 2015 and 2016. Additionally, catch of legal-size fish increased compared to prior years. Population size structure in 2017 was balanced (PSD = 45) and comprised a wide size range of fish (Figure 11). In 2017, relative weights of Largemouth Bass were high ( $W_r \geq 90$ ) for smaller size classes (i.e.,  $\leq 14$ -in) but tended to decrease with increased length thereafter (Figure 11). Mean age at legal length in 2017 was 1.7 years ( $N = 13$ ; range: 1 – 2). Growth was considered excellent and has accelerated since 2015 (Table 13). 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 in 2018 (32.8%) relative to 2013/2014 and 2015/2016, while directed angling hours remained similar (Table 14). Tournament activity increased substantially and comprised 29.6% (13,186 h) of the total Largemouth Bass directed effort. Angling catch rate incrementally increased through time (range: 0.5 – 1.5/h). The majority (74%) of legal Largemouth Bass caught were released and percent legal released values were relatively stable across the study period (Table 14). Harvest has increased since 2013/2014; 5,073 fish were harvested in 2018. While sub-legal fish were retained ( $N = 2$ ) by anglers, angler compliance was good and harvested fish ranged from 12 – 22 inches and the majority of observed harvest occurred in the 14 – 18 in size range, all years combined (Figure 12). Over the creel survey periods, 106 Largemouth Bass weighing  $>10$  lbs. and 113 fish weighing between 7 and 10 lbs. were caught and released by anglers, yet no trophy catches were documented in the 2015/2016 or 2018 creels (Table 14).

**White Crappie:** Directed effort decreased in 2018 relative to 2015/2016 yet total harvest increased over the same period (Table 15). Angler success improved through time and angling catch rate in 2018 was 2.17/h, higher than values in previous years (Table 15). Angler compliance was excellent and harvested fish ranged in length between 10 – 15 inches, all years combined (Figure 13). Creel statistics (directed effort, angler catch rate, and total harvest) indicated a healthy White Crappie population and ample opportunity for angling success.



# Fisheries Management Plan for Choke Canyon Reservoir, Texas

Prepared – July 2018

**ISSUE 1:** Choke Canyon is valued for its high quality Largemouth Bass fishery and for catches of trophy-size fish. From 2009 – 2018, 339 Largemouth Bass weighing >10 lbs. and 957 fish weighing between 7 and 10 lbs. were caught and released by anglers. The reservoir has produced a total of 13 ShareLunkers. Further, the lake record was broken in 2009 and currently stands at 15.45 pounds.

## MANAGEMENT STRATEGY

1. Request FLMB fingerlings annually for stocking to maintain a high level Florida Bass introgression and thus maximize production of trophy fish.
2. Maintain and continue to collect data for Largemouth Bass trophy database.

**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. Develop an Alligator Gar sampling strategy to monitor trends in recruitment and adult abundance and size composition.
3. Explore feasibility of a voluntary Alligator Gar reporting system to document angler catches.
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.
7. Evaluate the water hyacinth control program and continue to cooperate with the City of Corpus Christi on all vegetation control activities.

## Objective-Based Sampling Plan and Schedule (2018–2022)

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

Sport 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 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. Presence/absence will be noted in standard gill net samples and large-scale changes in angler effort and harvest will be monitored with the 2020 creel survey (Table 16). At this time, 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 indicated from creel periods between 2009 – 2016. Presence/absence will be noted in standard gill net samples and large-scale deviations in angler effort and harvest will be monitored with the 2020 creel survey (Table 16). 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 night time bowfishing tournaments suggest a popular fishery that is utilized by anglers. Explore the feasibility in initiating a voluntary angler reporting system to document angler catches. Further, a sampling strategy will be developed to monitor trends in abundance and size composition. Directed effort, angler catch, and angler harvest will be monitored with the standard creel survey conducted in 2020 to 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 16).

**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 22.4/nn (N = 26; standard deviation = 12.5; range: 0.4 – 62.5/nn) and mean stock size CPUE is 9.6/nn (N = 26; standard deviation = 20.1; range: 0.4 – 18.5/nn). Further, Blue Catfish and catfishes as a group were the most popular sport fish sought (combined directed effort = 57.5%) by anglers in the 2015/2016 creel survey

and anglers harvested 106,283 fish during this time period. Trend data on CPUE, size structure, and body condition have been collected annually since 1989 (excluding 1990, 2017) 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  $\leq 25$ . Finally, directed effort and angler catch and harvest will be monitored with a creel survey conducted in 2020 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 16).

**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 are often an important component to the overall sport fishery (directed effort = 5.2% & harvest = 14,504 in 2015/2016) 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 2020 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. Additionally, presence/absence will be noted in standard gill net samples (Table 16).

**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 ( $N = 23$ ; standard deviation = 91.7; range: 25.5 – 421.5/h) and mean stock-size CPUE is 70.4/h ( $N = 23$ ; standard deviation = 49.1; range: 21.0 – 241.0/h). Relative abundance of LMB has increased in recent years to above historical values (i.e., 2015, 2017). This is likely attributed to reestablishment of submersed aquatic vegetation and intermittent pulses of water. Largemouth Bass remain popular with anglers and were highly sought by anglers. Trend data on CPUE, size structure, and body condition has been collected annually since 1995 with fall electrofishing. 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 annually 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. Directed effort, angler catch, and angler harvest will be monitored with a creel survey conducted in 2020 to monitor for any large-scale changes in angling effort, catch, and harvest to gain further insight into population characteristics (Table 16). 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.

**White Crappie:** White Crappie are present in the reservoir but trap net samples have yielded mixed results and low catches (historical mean CPUE = 2.6/nn;  $N = 17$ ; standard deviation = 1.3; range: 0.7 – 4.8/nn). Based on anecdotal reports and the 2015/2016 creel survey, White Crappie represent an important component to the overall sport fishery (directed fishing effort = 4.8% and harvest = 6,923 in

2015/2016) 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 2020 will be utilized to monitor large-scale deviations in crappie angler effort, catch, and harvest; lending important insight into overall crappie population dynamics (Table 16). 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. 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 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 2020 through 30 June 2020.

**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 to reduce or eliminate threats associated with invasive aquatic plants. 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. 2016. Statewide freshwater fisheries monitoring and management program survey report for: Choke Canyon Reservoir, 2015. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- Binion, G. R. and J. A. Findeisen. 2012. Statewide freshwater fisheries monitoring and management program survey report for: Choke Canyon Reservoir, 2011. Texas Parks and Wildlife Department, Federal Aid Report F-221-M, Austin.
- Binion, G. R. and J. A. Findeisen. 2014. Statewide freshwater fisheries monitoring and management program survey report for: Choke Canyon Reservoir, 2013. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- 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.
- Nueces River Authority (NRA) website (<http://www.nueces-ra.org/CP/CITY/day.php>). Accessed May 2018.

## Tables and Figures

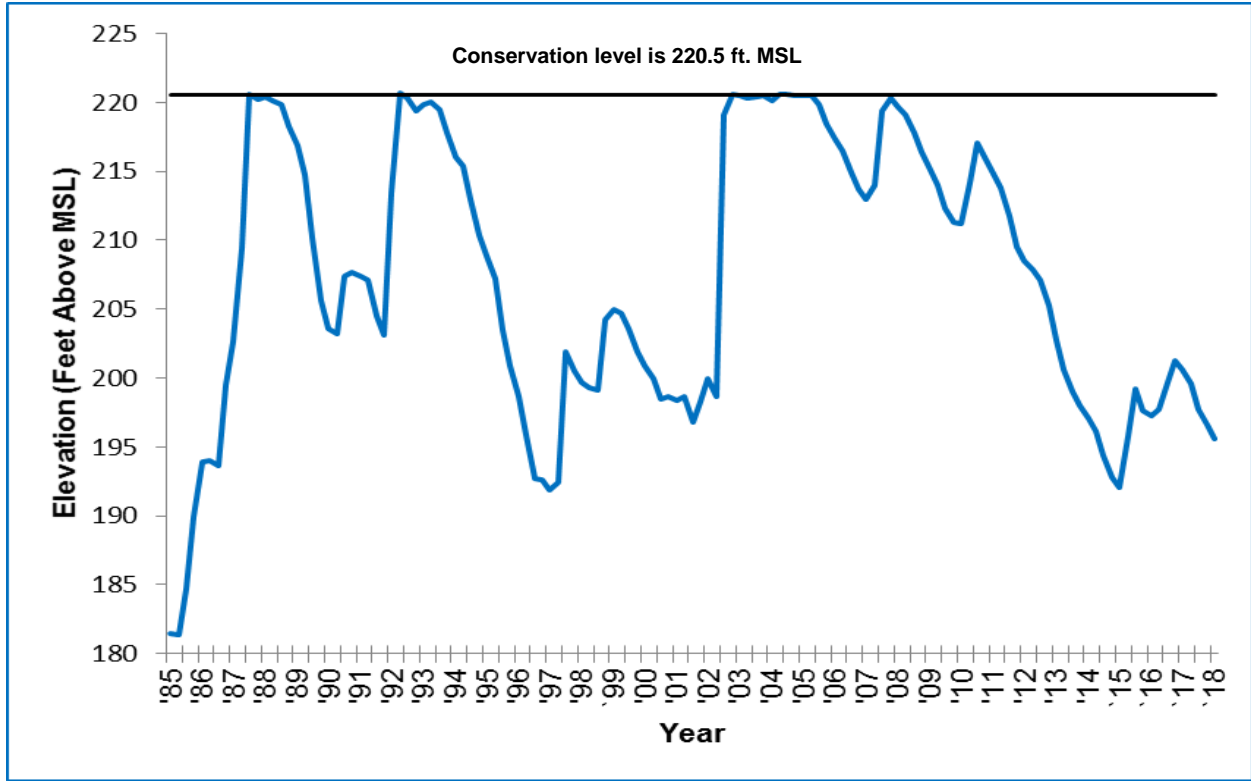


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Choke Canyon Reservoir, Texas, 1985 through April 2018.

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 (umhos/cm)	600
Access: Boat	Adequate – 6 public ramps (3 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 – concrete jetty Inadequate – South Shores State Park

Table 2. Boat ramp characteristics for Choke Canyon Reservoir, Texas, August, 2017. Reservoir elevation at time of survey was 197.7 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	Unusable. Recently repaired, but silted
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	Out of water. Extension not feasible
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	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

Table 4. Stocking history of Choke Canyon Reservoir, Texas. UNK = unknown; 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
Total	3,942,278		
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 2017–2018.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
	Genetics	% FLMB	$N = 30$ , any age
Bluegill <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE – stock	RSE-Stock $\leq 25$
	Size structure	PSD, Length frequency	$N \geq 50$ stock
	Condition	$W_r$	10 fish/inch group (max)
<i>Creel Survey</i> <sup>b</sup>			
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.

Table 6. Survey of aquatic vegetation, Choke Canyon Reservoir, Texas, 2011, 2015, and 2017. Surface area (acres) is listed with percent of total reservoir surface area in parentheses. 2011 surface area = 21,379 acres; 2015 surface area = 13,744 acres; 2017 surface area = 14,483 acres.

Vegetation	2011	2015	2017
Native submersed	300 (1.4)	259 (1.9)	354 (2.4)
Native floating-leaved		< 1 (<0.01)	7 (< 1.0)
Native emergent			
Non-native	656 (3.1)	138 (1.0)	645 (4.5)
Hydrilla (Tier III) <sup>a</sup>	616 (2.9)	133 (1.0)	504 (3.5)
Water hyacinth (Tier II) <sup>a</sup>	40 (0.1)	5 (< 1.0)	141 (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, 2013/2014, 2015/2016, and 2018. Survey periods were from 1 June through 31 May for 2013/2014 and 2015/2016 and 1 January through 30 June for 2018.

Species	2013/2014	2015/2016	2018
Alligator Gar	<1.0	1.0	3.3
Any catfish species	39.4	41.8	30.1
Blue Catfish	11.0	15.7	9.8
Channel Catfish	<1.0	2.3	0.0
White Bass	5.3	5.2	5.5
Largemouth Bass	27.6	21.6	32.8
White Crappie	10.6	6.5	4.3
Freshwater Drum	<1.0	1.3	2.6
Anything	10.6	6.5	7.1

Table 8. Total fishing effort (h) for all species and total directed expenditures at Choke Canyon Reservoir, Texas, 2013/2014, 2015/2016, and 2018. Survey periods were from 1 June through 31 May for 2013/2014 and 2015/2016 and 1 January through 30 June for 2018. Relative standard error is in parentheses.

Creel statistic	2013/2014	2015/2016	2018*
Total fishing effort	137,258 (23)	199,722 (14)	138,525 (26)
Total directed expenditures	\$1,127,986 (31)	\$1,518,961 (20)	\$1,104,151 (38)

\* Estimates based on a 6-month creel period

## Gizzard Shad

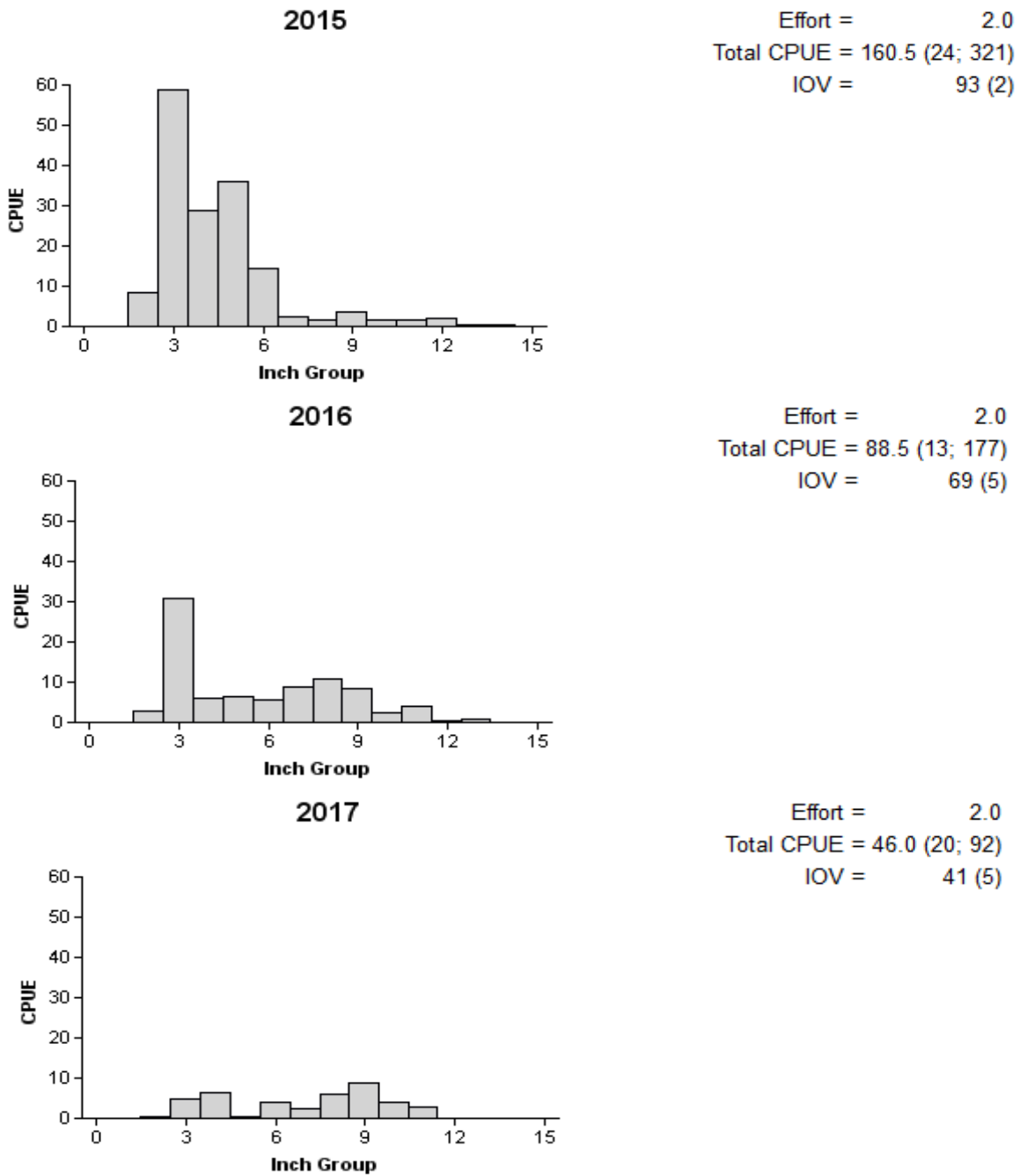


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2017.

## Bluegill

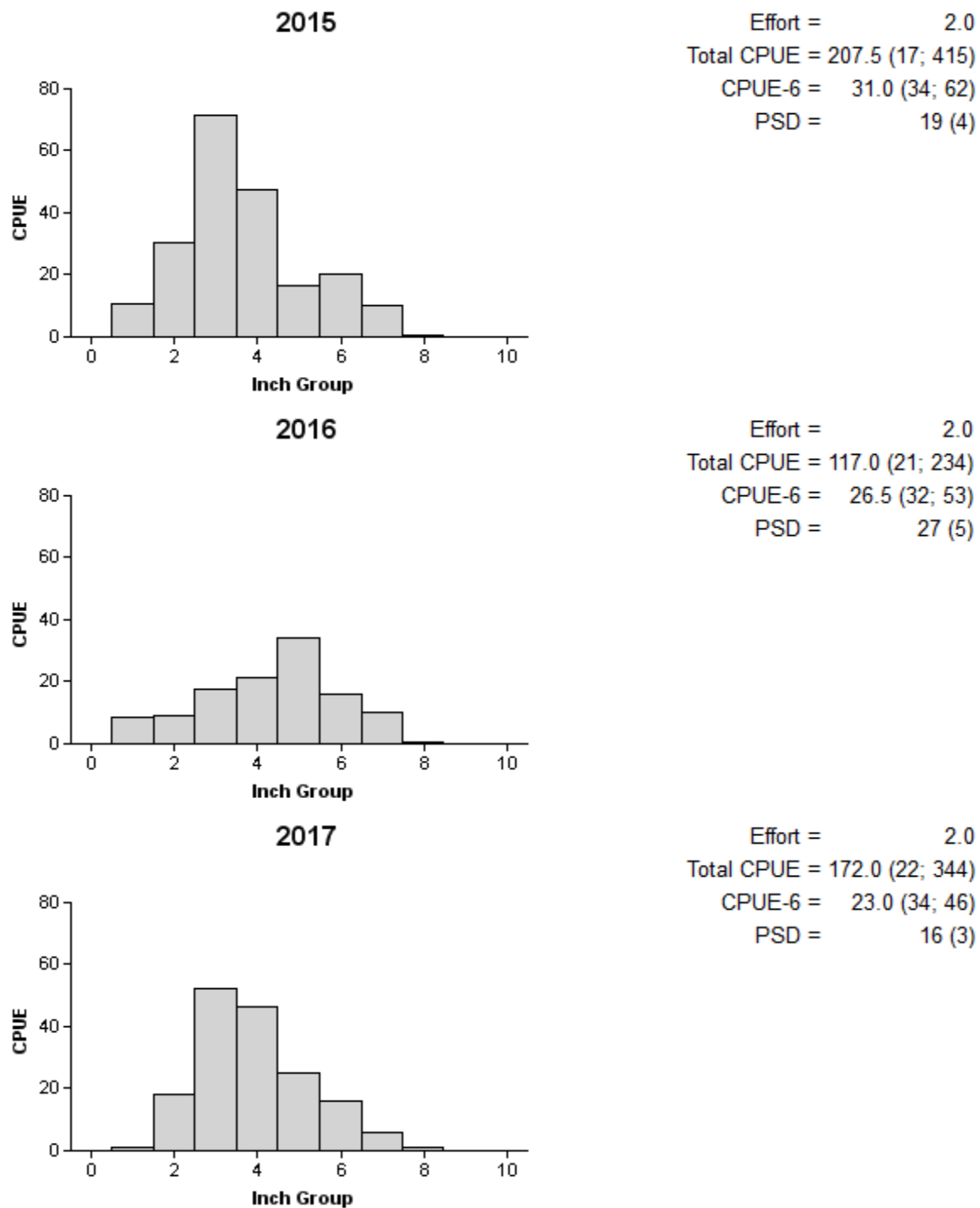


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2017.

## Alligator Gar

Table 9. Creel survey statistics for Alligator Gar at Choke Canyon Reservoir, Texas, from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. 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		
	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed effort (h)	765 (65)	1,878 (72)	4,514 (36)
Directed effort/acre	0.05 (65)	0.14 (72)	0.35 (36)
Total catch per hour	0.11 (2441)	0.29 (616)	0.02 (1553)
Total harvest	86 (2441)	337 (694)	98 (1553)
Harvest/acre	0.01 (2441)	0.02 (694)	0.01 (1553)
Percent legal released	0.0	39.1	0.0

## Blue Catfish

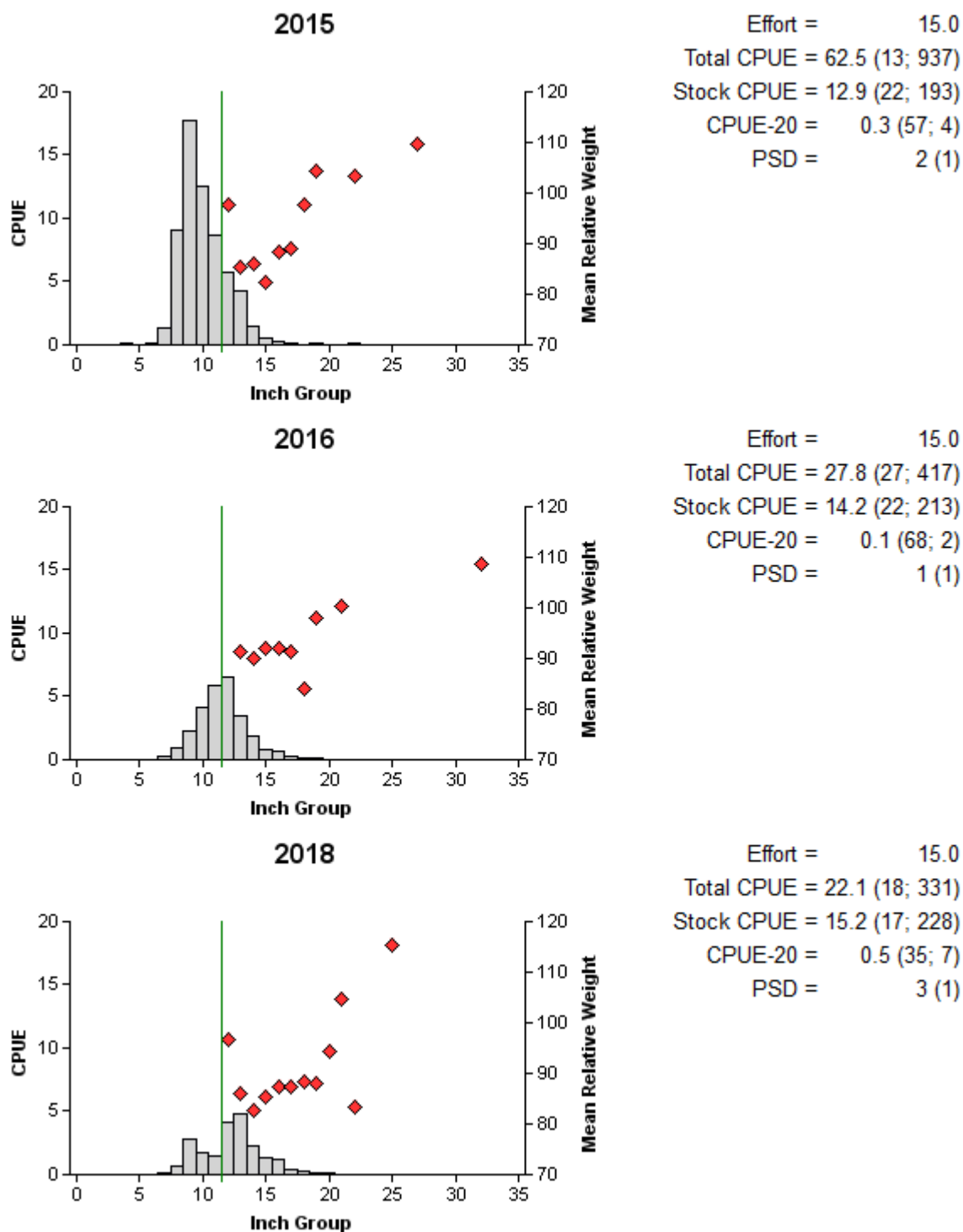


Figure 4. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2018.

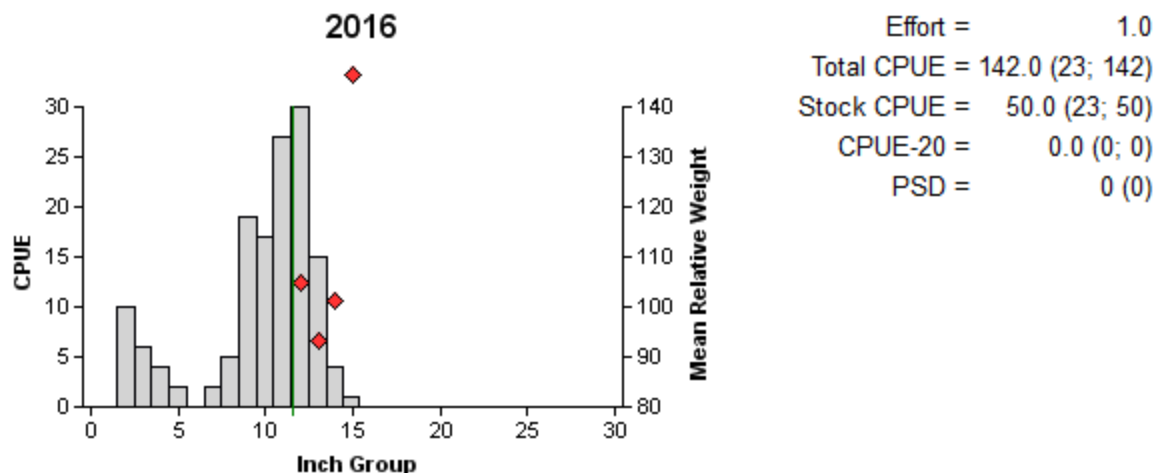


Figure 5. Number of Blue Catfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for summer low frequency electrofishing, Choke Canyon Reservoir, Texas, 2016.

Table 10. Creel survey statistics for Blue Catfish at Choke Canyon Reservoir, Texas, from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. Total catch per hour is for anglers targeting Blue Catfish and total harvest is the estimated number of Blue Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed effort (h)	15,132 (27)	31,332 (18)	13,244 (54)
Directed effort/acre	1.05 (27)	2.28 (18)	1.01 (54)
Total catch per hour	0.92 (40)	2.50 (17)	1.74 (22)
Total harvest	40,637 (43)	106,283 (28)	40,156 (33)
Harvest/acre	2.82 (43)	7.73 (28)	3.08 (33)
Percent legal released	10	11	6



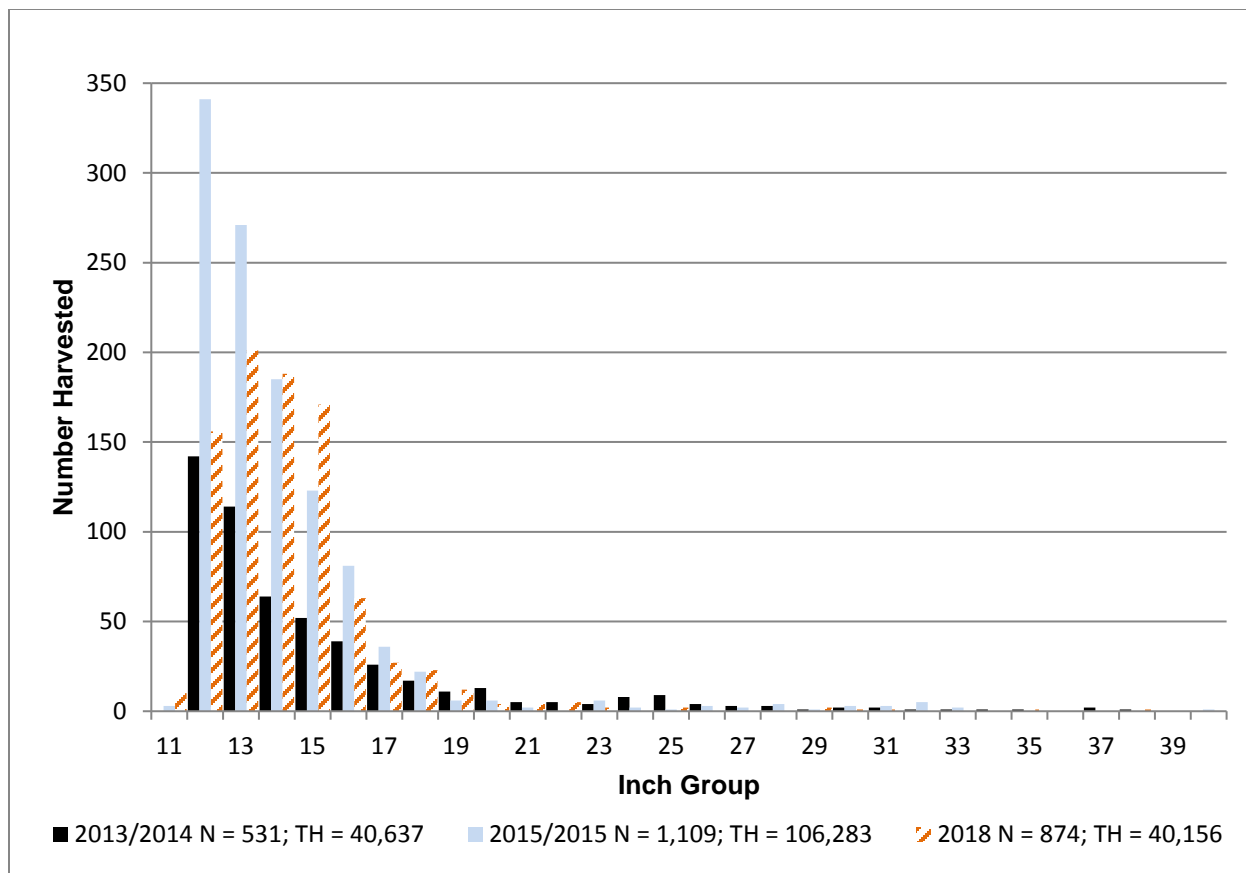


Figure 6. Length frequency of harvested Blue Catfish observed during creel surveys at Choke Canyon Reservoir, Texas, June 2013 through 2014, June 2015 through May 2016, and January 2018 through June 2018, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Channel Catfish

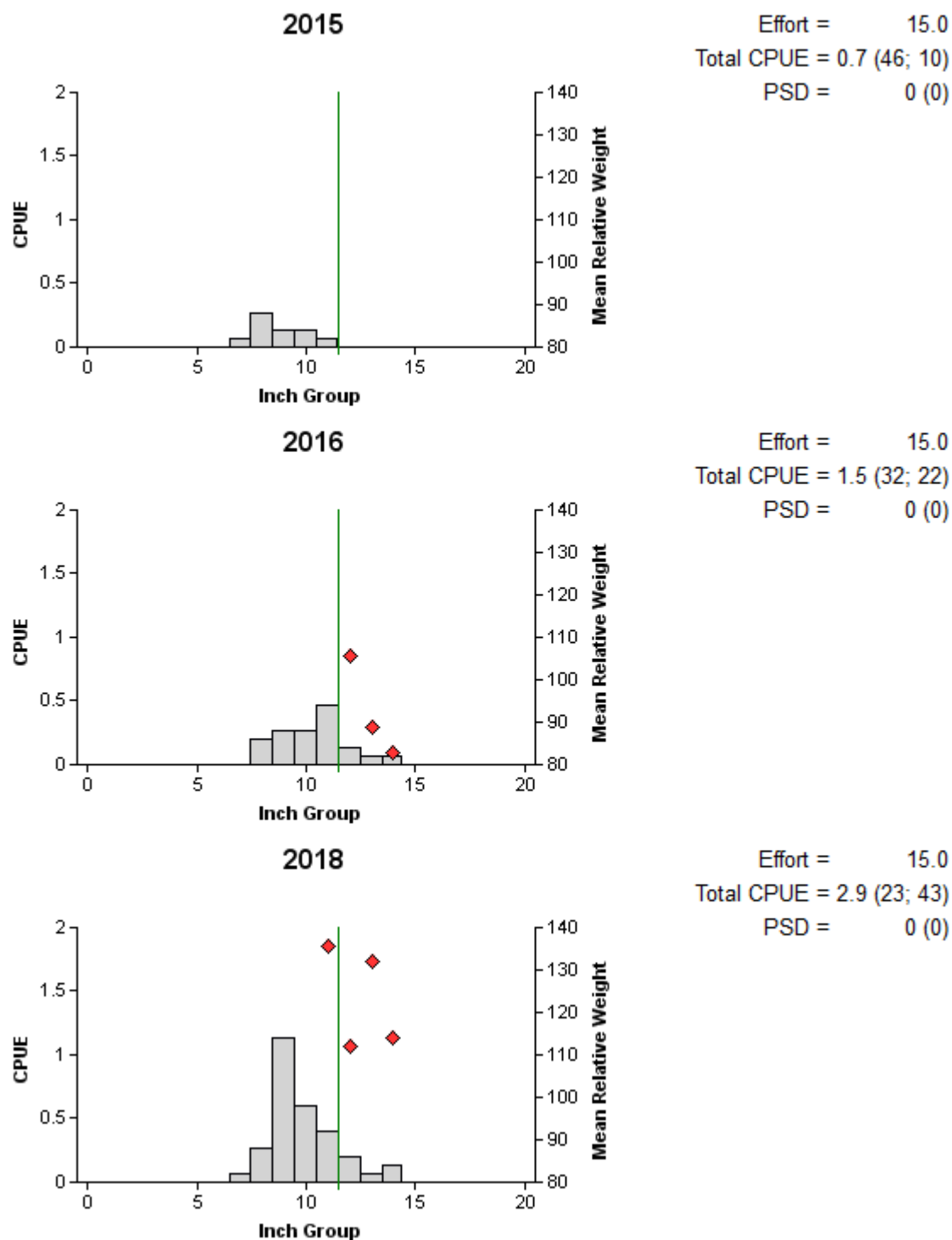


Figure 7. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2018.

Table 11. Creel survey statistics for Channel Catfish at Choke Canyon Reservoir, Texas, from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed effort (h)	629 (75)	4,525 (47)	0
Directed effort/acre	0.04 (75)	0.33 (47)	0
Total catch per hour	0.33 (43)	0.62 (25)	0.34 (39)
Total harvest	5,657 (60)	15,480 (38)	2,939 (67)
Harvest/acre	0.39 (60)	1.13 (38)	0.23 (67)
Percent legal released	5	18	10

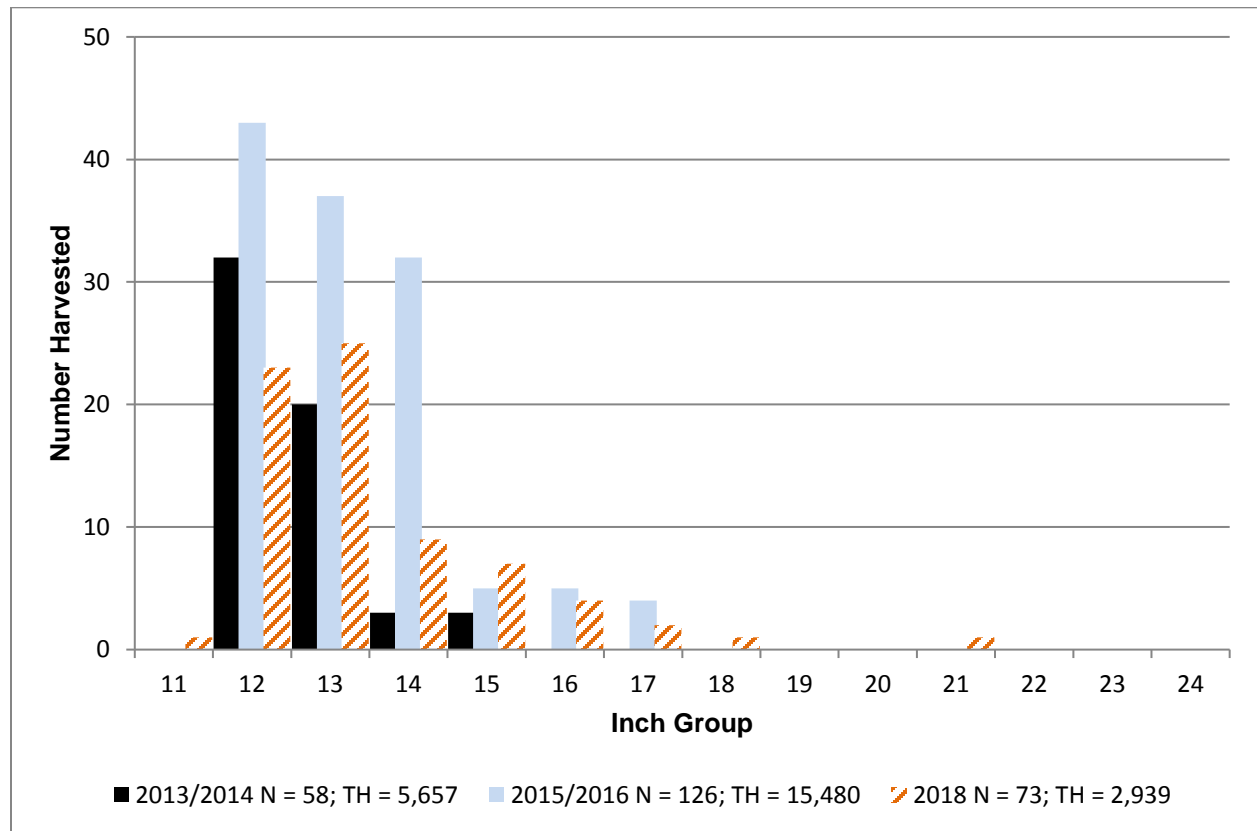


Figure 8. Length frequency of harvested Channel Catfish observed during creel surveys at Choke Canyon Reservoir, Texas, June 2013 through 2014, June 2015 through May 2016, and January 2018 through June 2018, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## White Bass

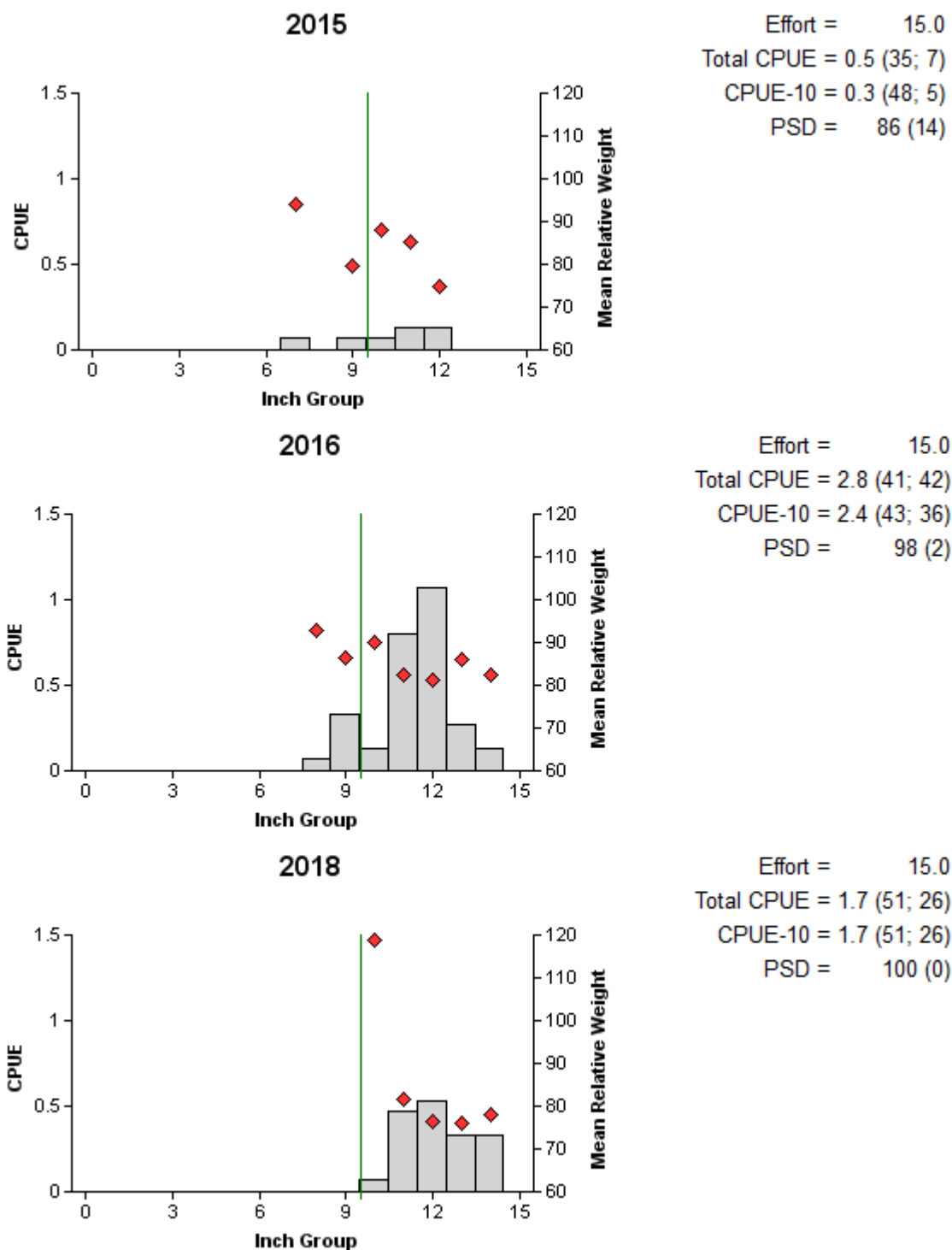


Figure 9. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2018.

Table 12. Creel survey statistics for White Bass at Choke Canyon Reservoir, Texas, from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. 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		
	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed effort (h)	7,215 (30)	8,498 (32)	7,521 (52)
Directed effort/acre	0.50 (30)	0.62 (32)	0.58 (52)
Total catch per hour	1.47 (58)	1.93 (57)	0.54 (73)
Total harvest	17,010 (42)	14,504 (72)	3,101 (74)
Harvest/acre	1.18 (42)	0.74 (72)	0.24 (74)
Percent legal released	13	38	7

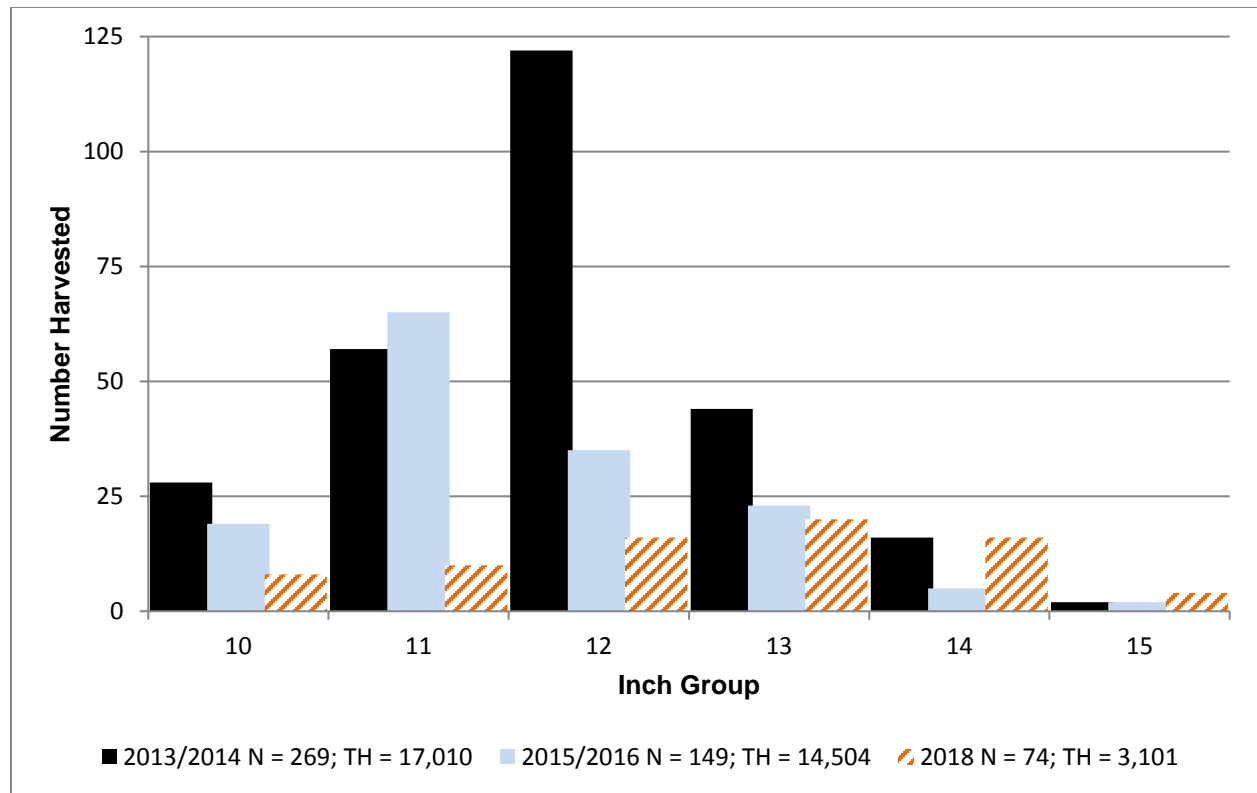


Figure 10. Length frequency of harvested White Bass observed during creel surveys at Choke Canyon Reservoir, Texas, June 2013 through 2014, June 2015 through May 2016, and January 2018 through June 2018, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Largemouth Bass

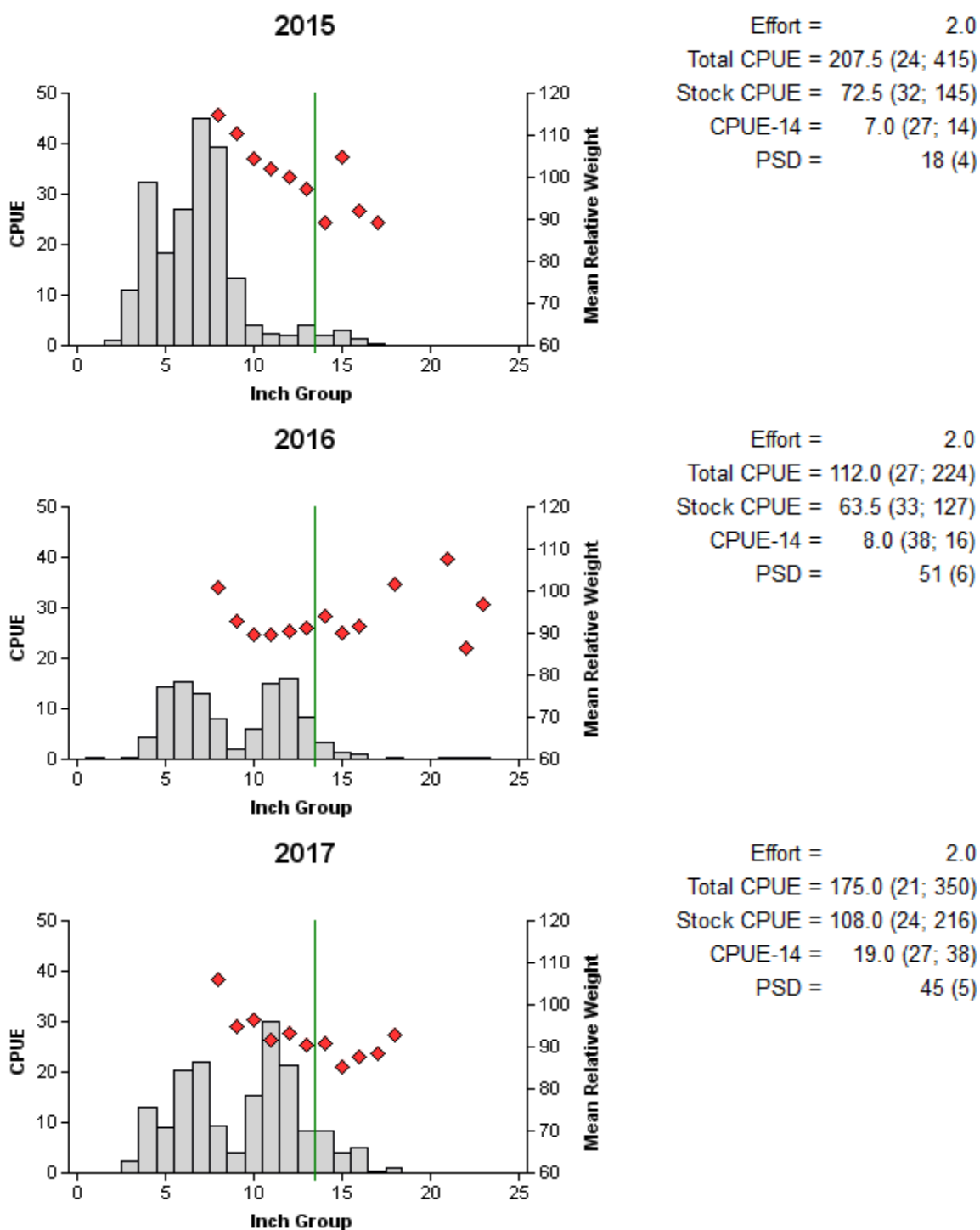


Figure 11. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Choke Canyon Reservoir, Texas, 2015, 2016, and 2017.

Table 13. Mean age at legal length (14 in) 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)

Table 14. Creel survey statistics for Largemouth Bass at Choke Canyon Reservoir, TX from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. 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	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed angling effort (h)			
Tournament	5,090 (42)	7,531 (32)	13,186 (27)
Non-tournament	32,736 (22)	35,572 (18)	31,292 (26)
All black bass anglers combined	37,826	43,103	44,478
Angling effort/acre	2.63 (22)	3.14 (18)	3.41 (22)
Catch rate (number/h)	0.49 (22)	0.96 (34)	1.46 (27)
Harvest			
Non-tournament harvest	1,843 (84)	4,669 (68)	5,073 (41)
Harvest/acre	0.13 (84)	0.34 (68)	0.39 (41)
Tournament weigh-in and release	368 (377)	1,032 (327)	2,256 (66)
Release by weight			
<4.0 lbs	21,684 (70)	35,216 (62)	53,728 (39)
4.0-6.9 lbs	91 (113)	312 (86)	3,873 (46)
7.0-9.9 lbs	113 (86)	0 (*)	0(*)
≥10.0 lbs	106 (102)	0 (*)	0(*)
Percent legal released (non-tournament)	66	67	74



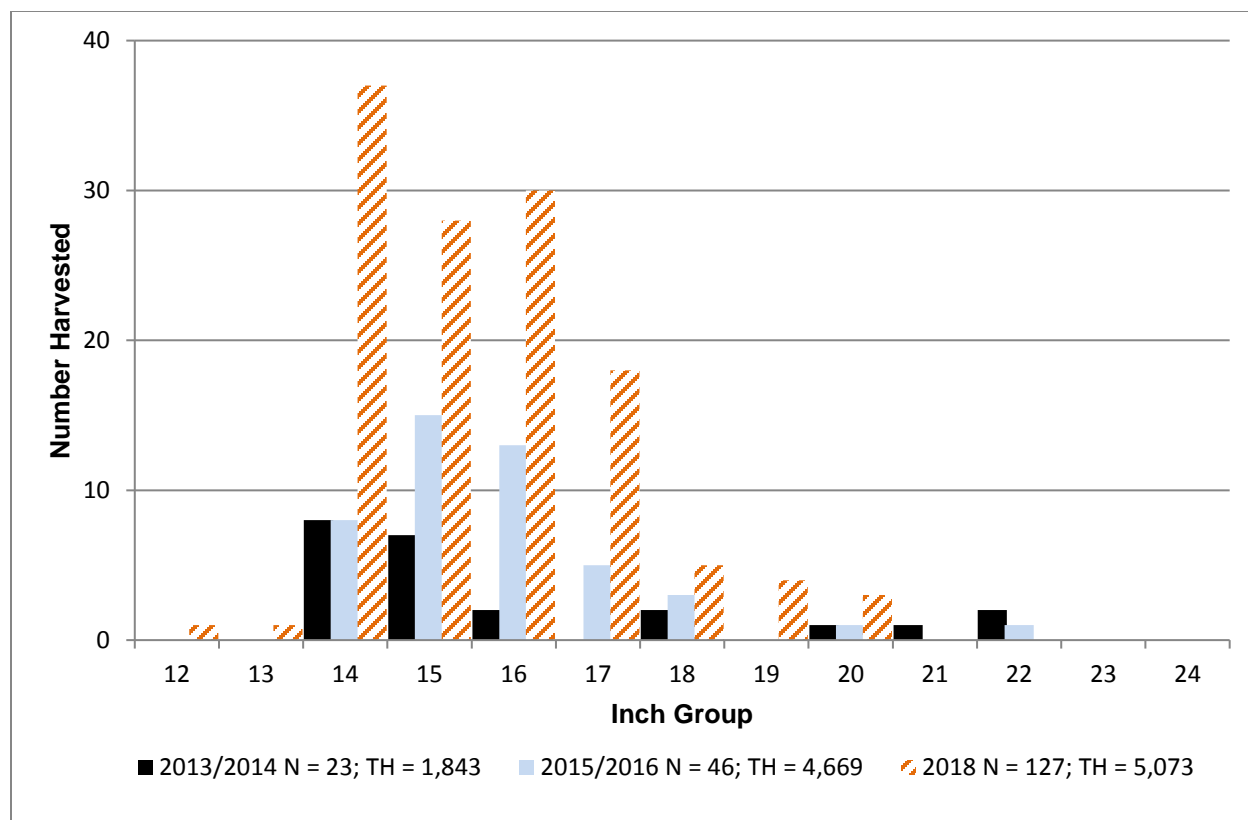


Figure 12. Length frequency of harvested Largemouth Bass observed during creel surveys at Choke Canyon Reservoir, Texas, June 2013 through 2014, June 2015 through May 2016, and January 2018 through June 2018, all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

## White Crappie

Table 15. Creel survey statistics for White Crappie at Choke Canyon Reservoir, Texas, from June 2013 through May 2014, June 2015 through May 2016, and January 2018 through June 2018. Total catch per hour is for anglers targeting White Crappie and total harvest is the estimated number of White Crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2013/2014	2015/2016	2018
Surface area (acres)	14,393	13,744	13,056
Directed effort (h)	6,897 (35)	9,559 (36)	5,813 (41)
Directed effort/acre	0.48 (35)	0.70 (36)	0.45 (41)
Total catch per hour	0.80 (43)	1.99 (61)	2.17 (36)
Total harvest	8,420 (63)	6,923 (87)	9,783 (41)
Harvest/acre	0.59 (63)	0.50 (87)	0.75 (41)
Percent legal released	3	5	2

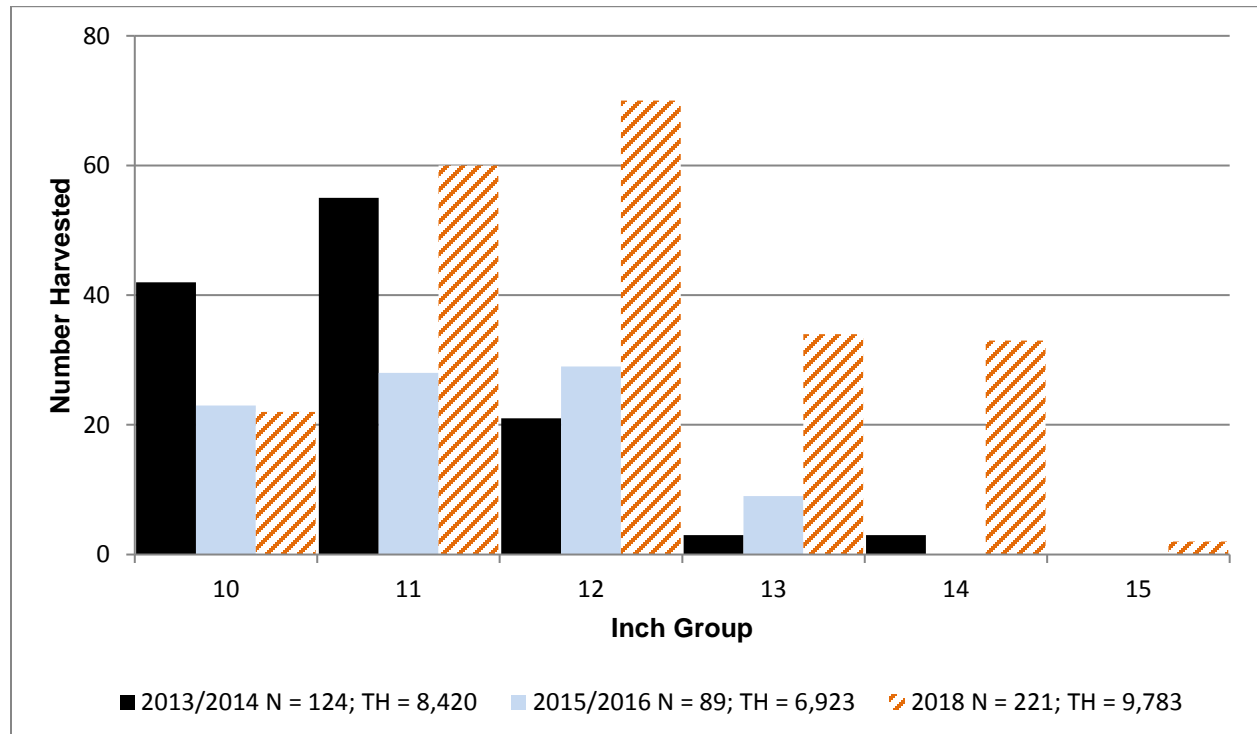


Figure 13. Length frequency of harvested White Crappie observed during creel surveys at Choke Canyon Reservoir, Texas, June 2013 through 2014, June 2015 through May 2016, and January 2018 through June 2018, all anglers combined. N is the number of harvested White Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Proposed Sampling Schedule

Table 16. 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, low frequency electrofishing surveys are conducted in the summer, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

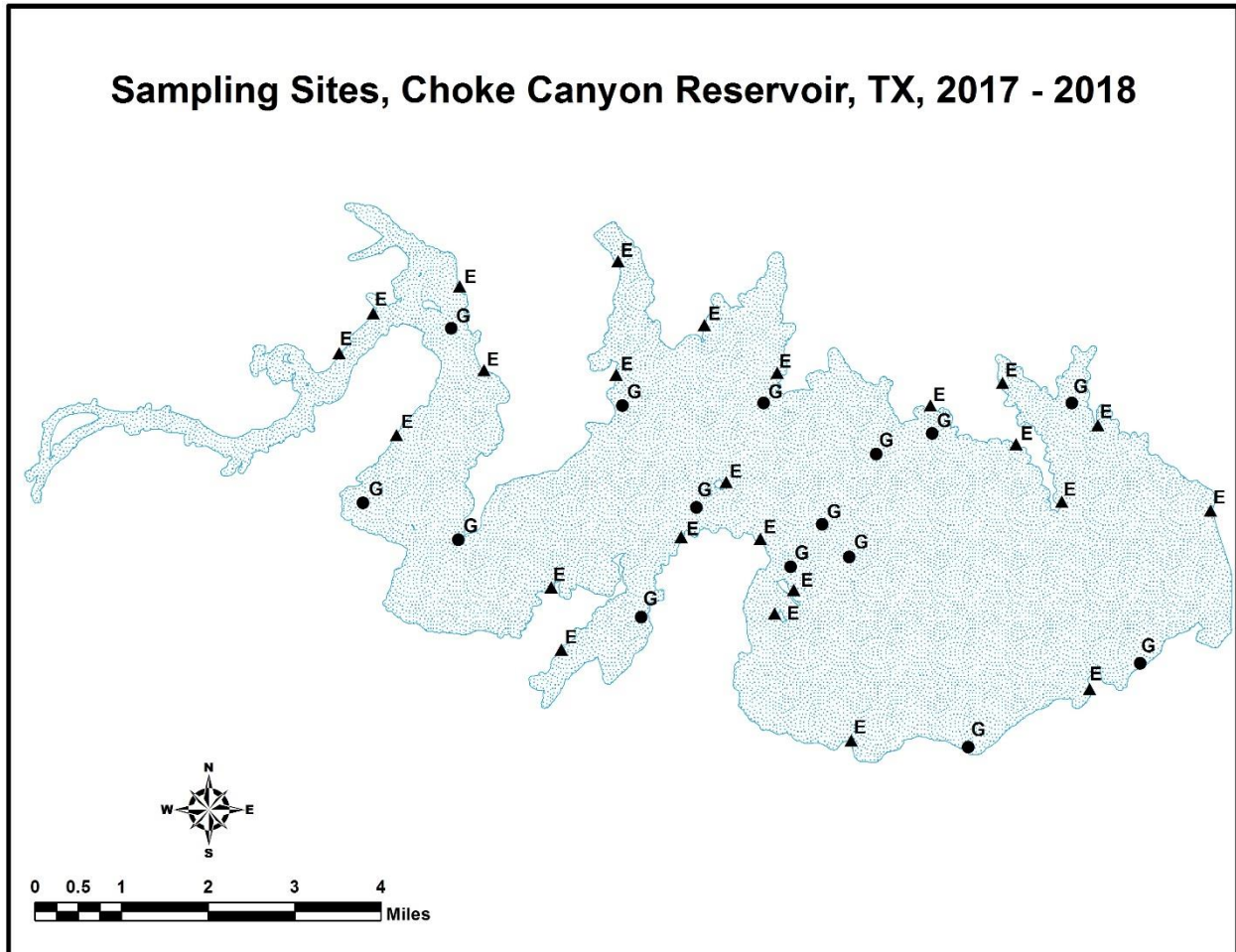
	Survey year			
	2018-2019	2019-2020	2020-2021	2021-2022
Angler Access				S
Vegetation	A	A	A	S
Electrofishing – Fall		A		S
Gill netting		A		S
Creel survey		A		S
Report		A		S

## 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, 2017-2018. Sampling effort was 15 net nights for gill netting and 2 hours for electrofishing.

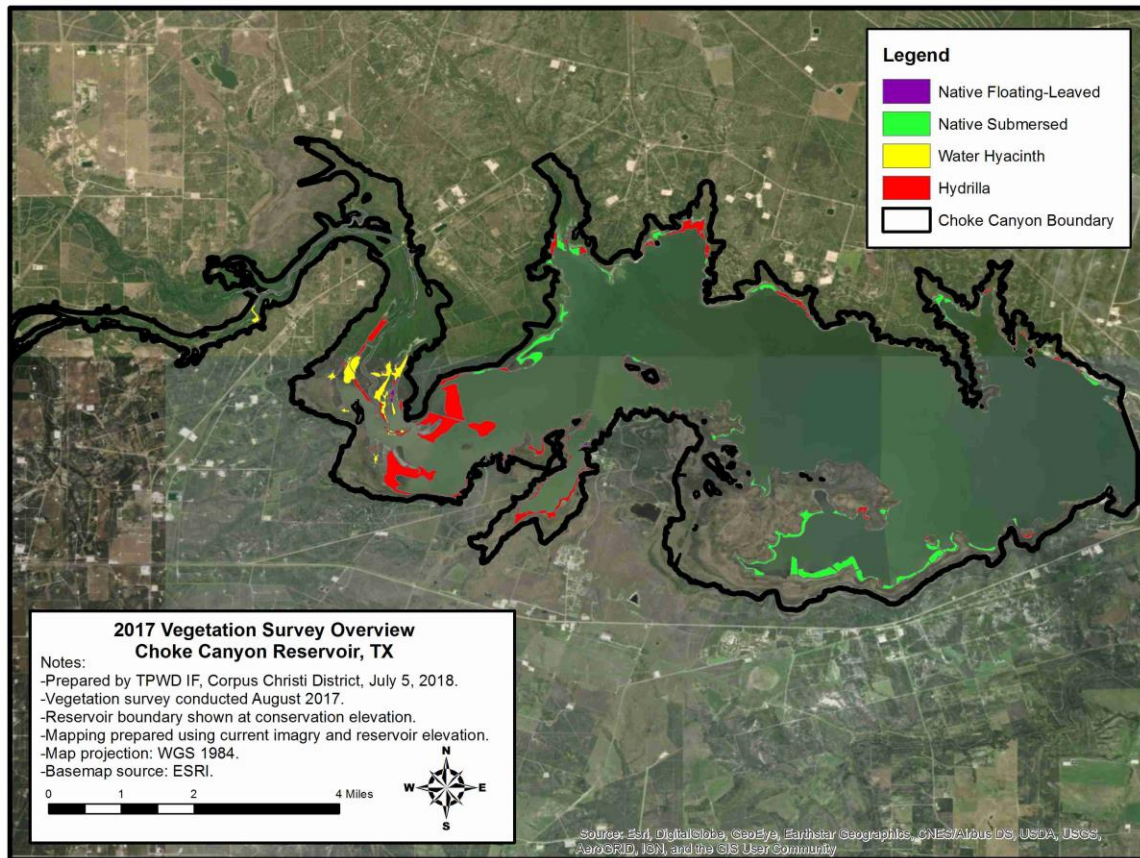
Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Spotted Gar	20	1.33 (31)		
Longnose Gar	5	0.33 (48)		
Alligator Gar	1	0.07 (100)		
Gizzard Shad	195	13.00 (10)	92	46.00 (19)
Threadfin Shad			27	13.50 (36)
Common Carp	4	0.27 (68)		
Bullhead Minnow			4	2.00 (69)
Inland Silverside			2	1.00 (69)
Smallmouth Buffalo	93	6.20 (17)		
Blue Catfish	331	22.07 (18)		
Channel Catfish	43	2.87 (23)		
Flathead Catfish	2	0.13 (68)		
White Bass	26	1.73 (51)		
Redbreast Sunfish			1	0.50 (100)
Warmouth			2	1.00 (100)
Bluegill	7	0.47 (41)	344	172.00 (21)
Longear Sunfish			1	0.50 (100)
Redear Sunfish	4	0.27 (57)	104	52.00 (24)
Largemouth Bass	4	0.27 (57)	350	175.00 (21)
White Crappie	35	2.33 (25)		
Freshwater Drum	133	8.87 (21)		
Blue Tilapia	1	0.07 (100)		

## APPENDIX B – Map of sampling locations

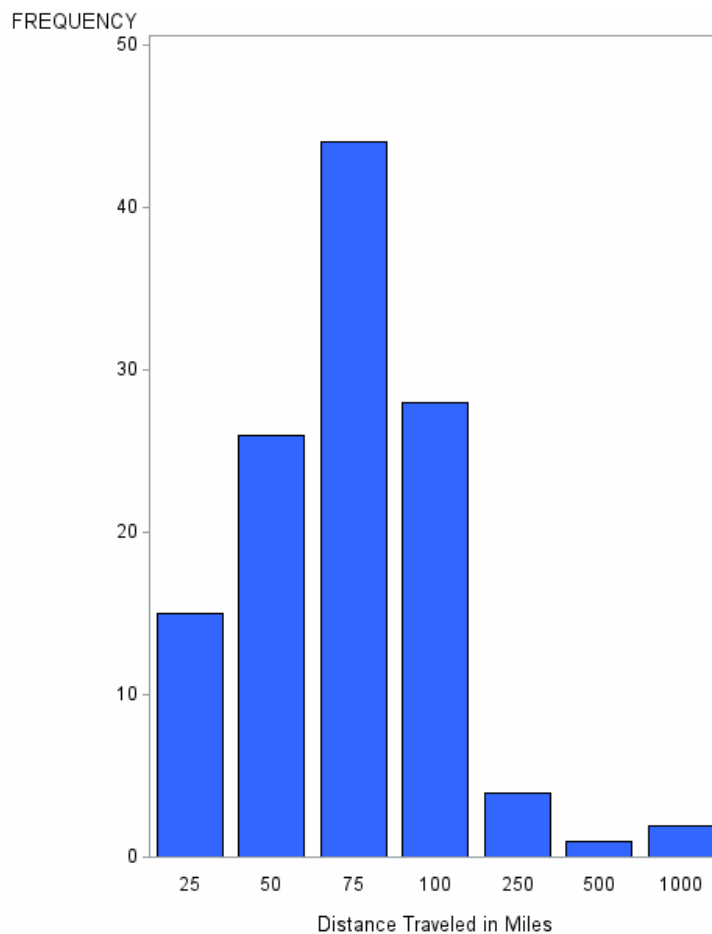


Location of sampling sites, Choke Canyon Reservoir, Texas, 2017-2018. Gill net and electrofishing stations are indicated by G and E, respectively. The reservoir was 23.9 feet below conservation pool at time of sampling.

## APPENDIX C – 2017 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 2018 through June 2018 creel survey.



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