Proctor Reservoir

2018 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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July 31, 2019

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Survey and Management Summary

Fish populations in Proctor Reservoir were surveyed in 2016 and 2018 using electrofishing and trap netting, and in 2017 and 2019 using gill netting. Historical data are presented with the 2016-2019 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Proctor Reservoir is a 4,615-acre impoundment constructed in 1963 on the Leon River and is located 10 miles north of the City of Comanche. Proctor Reservoir is controlled by the United States Army Corps of Engineers. Primary water uses include flood control, water supply, and recreation. Recent water level has remained near conservation pool (CP) with average annual fluctuations between 5-10 feet below CP. The reservoir has a history of large water level fluctuations. Water level has gone over CP several times during the last ten years with the most recent time being in June 2019. Since the water level has fluctuated over time, aquatic vegetation was limited and was not observed in the reservoir. After the water level rise, habitat features included flooded terrestrial vegetation, rocks, and standing timber. An artificial habitat project was completed in summer 2016 by using Mossback, Fishiding, and American Fish Tree structures. Ample bank fishing access was in the park areas, and handicap-accessible fishing piers exist.

Management History: Important sport fish included White Bass, Hybrid Striped Bass, Largemouth Bass, crappie, and catfish. Sunshine Bass fry were stocked as part of a special study from 2014-2017. After the Sunshine Bass had poor recruitment, Palmetto Bass were stocked in 2017 and 2018. The most recent stocking of Florida Largemouth Bass was in 2019. Sport fishes have always been managed by statewide length and bag limits. In 2016, a habitat enhancement project was conducted by deploying artificial structures and brush piles with locations publicized.

Fish Community

- **Prey species:** The prey base was primarily comprised of Gizzard Shad and Bluegill; however, other sunfish were present. Electrofishing catch rate of Gizzard Shad was high and most were suitable sizes to be utilized by most sport fish. Electrofishing catch of Bluegill was good and provided another prey resource, but few Bluegill were greater than 6-inches long.
- **Catfishes:** Channel Catfish, Blue Catfish, and Flathead Catfish were present in the reservoir. Blue Catfish and Channel Catfish catch rates were low. However, both populations contained fish of legal length.
- **Temperate basses:** White Bass and Hybrid Striped Bass were present in the reservoir. White Bass catch rates were good, and body conditions were excellent. Hybrid Striped Bass catch rate improved since the drought and possible escapement from the reservoir during flooding. However, few fish of legal length were available for anglers. With continued stocking, catch rates will likely improve.
- **Largemouth Bass:** Largemouth Bass were present in the reservoir. The population was recovering from drought conditions and flooding during recent years. There were few legal-length fish available to anglers. Nearly 50% of Largemouth Bass sample at Proctor Reservoir was pure Florida Largemouth Bass.
- **Crappie:** White Crappie were more abundant than Black Crappie. White Crappie catch rates have been declining, but there were still harvestable length White Crappie available for anglers. Black Crappie continued to have low catch rates.

Management Strategies: Continue stocking Hybrid Striped Bass fingerlings at 15 fish/acre. Stock Blue Catfish fingerlings. Inform the public about the negative impacts of aquatic invasive species. Conduct general monitoring of the Blue Catfish with low-frequency electrofishing once during the 2019-2023 survey period. Conduct general monitoring for Largemouth Bass and prey fish with electrofishing in 2020 and 2022. Conduct general monitoring surveys with trap nets and gill nets surveys in 2022-2023. Access and vegetation surveys will be conducted in 2022.

Introduction

This document is a summary of fisheries data collected from Proctor Reservoir in 2016-2019. 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 2016-2019 data for comparison.

Reservoir Description

Proctor Reservoir is a 4,615-acre impoundment constructed in 1963 on the Leon River. It is in Comanche County approximately 10 miles north of the City of Comanche and is owned and operated by the United States Army Corps of Engineers (USACE). Primary water uses included flood control, water supply, and recreation. Prior to 2015 was level remained below Conservation Pool (CP) and average annual fluctuations between 5-10 feet below CP. Following 2015, water level remained within 7 feet of CP and exceeded CP during 5 major rain events where water level was at least 5 feet over CP. These recent water level spikes were short term lasting approximately a month to nearly four months (Figure 1). In 2016, Proctor Reservoir was eutrophic with TSI *chl-a* values of 56.2 and 68.2 respectively (Texas Commission on Environmental Quality Habitat 2018). The TSC *chl-a* value in 2016 was nearing hypereutrophic trophic classification (TSI *chl-a* value of >70). At time of sampling, habitat consisted of rocks, standing timber, and flooded terrestrial vegetation. No aquatic plants were present. Other descriptive characteristics for Proctor Reservoir are in Table 1.

Angler Access

Proctor Reservoir had seven, fee-required boat ramps controlled by USACE. There were two additional ramps outside USACE property that were available. All ramps were accessible in spring 2019. Bank anglers had adequate access within walking distance of road pull-offs. Proctor Reservoir also had handicap-accessible piers that could be used at the current water level. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Goldstrohm and Homer 2015) included:

1. Seek partners for potential collaborations for fisheries habitat enhancement projects.

   Action: A fisheries habitat enhancement project was conducted in 2016 in collaboration with the USACE Fort Worth District and Brazos River Authority (BRA). Eight areas and 19 brush piles were created in various locations to enhance structural habitat.

2. Meet with USACE and discuss the potential of ramp improvement projects.

   Action: During 2017, USACE extended the ramp at Sowell Creek South.

3. Stock Hybrid Striped Bass at a rate of 15 fingerlings/acre annually to maintain fishery.

   Action: Sunshine Bass fry were stocked annually from 2014 through 2017. Palmetto Bass were stocked in 2017 as fry and in 2018 as fingerlings.

4. Determine the year class strength from the 2014 and 2015 Sunshine Bass fry stockings.

   Action: Attributed to small gill netting sample sizes, strength of the 2014 (N=6) and 2015 (N=0) year classes could not be determined. Survival of Sunshine Bass fry stocked in 2014 and 2015 was low likely due to poor recruitment or escapement from the reservoir during flooding events.

5. Use age data collected to determine total annual mortality, theoretical maximum age, theoretical maximum length, and year class strength for Sunshine Bass.

   Action: Because of small sample sizes of fish collected from the 2014 stocking (N=6) and 2015 stocking (N=0), total annual mortality, theoretical minimum age, theoretical maximum length and year class strength for Sunshine Bass at Proctor Reservoir could not be determined.

6. Continue to monitor the population of Hybrid Striped Bass.

   Action: Gill net surveys were conducted in 2017 and 2019. Otoliths were collected from most Hybrid Striped Bass to determine age and growth and fin clips were sampled in 2019 and determined if fish were Sunshine Bass or Palmetto Bass since both hybrid types were stocked in 2017 and age alone could not determine hybrid type.

7. Educate the public about invasive species with media and the internet. Make a speaking point about invasive species when presenting to constituents.

   Action: Multiple popular press articles were written during the survey period, as well as several interviews were conducted with media to discuss the threats of invasive species. Multiple presentations were also given to bass clubs and other groups. Discussed the threat of invasive species with USACE team at Proctor Reservoir and signage was placed at all boat ramps.

Harvest regulation history: All sport fish are currently managed under statewide harvest regulations (Table 3). During 2002, the minimum length limit for Largemouth Bass changed from 14 to 16 inches. However, the regulation reverted to the statewide harvest regulation in September 2012.

Stocking history: Palmetto Bass fingerlings were originally stocked in 1978 and have been stocked nearly every year since to maintain the fishery. From 2014 through 2017, Sunshine Bass fry were stocked. Florida Largemouth Bass were first stocked in 1979 and were most recently stocked in 2019. Blue Catfish were introduced in 1991 and restocked in 2019. The complete stocking history is in Table 4.

Vegetation/habitat management history: Proctor Reservoir has no history of management for vegetation. To improve the quality of fish habitat and fishing at Proctor Reservoir, TPWD partnered with BRA and USACE to create eight areas with artificial structures as well as 19 recycled Christmas tree brush piles. Each of the areas and brush pile locations were selected based on depth, minimal slope of reservoir bottom, and lack of other structures to provide maximum fisheries benefit and to minimize any potential risk to watercrafts, swimmers, and other equipment. Areas of habitat enhancement consisted of 14-21 artificial fish habitat structures clustered close together creating a habitat similar to a coral reef-like habitat and brush piles were comprised of 10-20 recycled trees. Creation of habitat by using different combinations of the artificial structures was intended to create habitat complexity. Coordinates of brush piles and artificial habitat structures were provided to the public.

Water transfer: No interbasin transfers are known to exist.

Methods

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

Electrofishing – Largemouth Bass, sunfishes, and Gizzard Shad were collected by electrofishing (1 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Trap netting – Crappie were collected using trap nets (10 net nights at 10 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn). Ages for crappie were determined using otoliths from 14 randomly-selected fish (range 10.0 to 10.9 inches).

Gill netting – Channel Catfish, Blue Catfish, White Bass, and Hybrid Striped Bass were collected by gill netting (10 net nights at 10 stations in 2017 and 5 net nights at 5 stations in 2019). Gill nets were also set for 5 net nights at 5 biologist selected stations in 2017. CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for Hybrid Striped Bass were determined using otoliths from all dead fish in 2017 and 2019 and fin clips were collected on all Hybrid Striped Bass sampled in 2019.

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. Genetic analysis was conducted for discriminating between Palmetto Bass and Sunshine Bass. Tissue samples were collected during 2019 gill netting. Following DNA isolation, each tissue sample was evaluated by using the reaction MPX1-Morone (Msa5-11 and Msa5-71) to verify the hybrid status of each fish (Dijar Lutz-Carrillo, personal communication). Each fish was evaluated with a single base extension (SBE-Morone) assay using Cytochrome Oxidase Subunit-1 as a substrate to amplify single nucleotide polymorphisms (SNPs) at three sites, this allowed for the resolution of species-specific SNPs which identified the maternal contributor to the hybrid.

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). Hybrid Striped Bass PSD was calculated according to Dumont and Neely (2011). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV.

Habitat – Vegetation and structural habitat surveys were conducted in July 2018; water level was approximately 5.5 feet below conservation pool elevation at the time of the survey. For the structural habitat survey, a total of 150 points were randomly selected along the shoreline and 53 points were discarded because water level near point was too shallow to navigate to by boat or the point was on dry land, thus could not be sampled. During the vegetation habitat survey, a total of 150 points were randomly selected throughout the reservoir and 50 points were discarded because they could not be sampled. During both habitat surveys, presence/absence was determined for habitat types identified at or below the waterline at all points. Percent occurrence (% = [# stations present / total stations sampled] X 100) and associated Wilson 95% confidence intervals (Ausvet 2019) were calculated for each habitat feature type.

Water level – Source for water level data was the United States Geological Survey (USGS 2019).

Results and Discussion

Habitat: In 2018, 61.9% of the reservoir was either natural or featureless shoreline. Rocky shoreline comprised 25.8% of the shoreline habitat and remaining locations had gravel shoreline and rocky bluff (Table 6). Most of the reservoir was open water and aquatic habitat types were present only in low percent occurrence. No aquatic vegetation was sampled in 2018. The only aquatic habitat types sampled were flooded terrestrial vegetation and standing timber (Table 7).

Prey species: The prey base primarily consisted of Gizzard Shad and Bluegill. Other prey species encountered during the survey period included Green Sunfish and Longear Sunfish. Catch rate of Gizzard Shad in 2018 had substantially increased to 1,184.0/h from 649.0/h in 2016. IOV was similar in 2018 (95) to 2016 (100) and 2014 (100), which suggested that most of the Gizzard Shad were suitable prey sizes for most sport fishes (Figure 2). Bluegill catch rate decreased from 256.0/h in 2016 to 129.0/h in 2018. PSD increased from 0 in 2016 to 23 in 2018 (Figure 3) but still indicated there were not many quality-length Bluegill. All Bluegill caught were ≤ 7 inches, optimal prey size for sport fishes. Prey species were ample and should be available to sport fish.

Blue Catfish: Blue Catfish relative abundance has been poor since they were first introduced into the reservoir in 1991. Catch rates in most recent gill net surveys remained low and was 0.2/nn in 2015, 1.2/nn in 2017, and 3.6/nn in 2019. Stock CPUE also remained low ranging from 0.2/nn in 2015 to 3.4/nn in 2019. PSD was similar in 2019 (53) compared to 2017 (42; Figure 4) indicating that there was a balanced population with similar numbers of stock-length fish and quality-length fish in Proctor Reservoir. While data to calculate W_r was collected during sampling, it is not included in this report because of low sample size.

Channel Catfish: Channel Catfish were present in the reservoir but have low catch rates in gill net surveys. Catch in gill net surveys was 2.2/nn in 2015, 2.7/nn in 2017 and 1.0/nn in 2019 (Figure 5). While data to calculate PSD was collected during sampling, it is not included in this report because of low sample size.

White Bass: Catch rates and Stock CPUE increased from to 4.2/nn in 2015 and 5.7/nn in 2017 to 10.6/nn in 2019. Similar to the 2015 and 2017 surveys, size structure of the 2019 sample was mostly represented by fish ≥10 inches (Figure 6). All fish caught in 2019 were > stock length (PSD=100). Mean relative weights (W_r) of White Bass were excellent and ranged from 107 to118 in 2019.

Hybrid Striped Bass: Gill netting CPUE for Hybrid Striped Bass fluctuated from 12.6/nn in 2015 to 1.1/nn in 2017 to 14.8/nn in 2019. In 2017, only one Hybrid Striped Bass was sampled from biologist-selected stations to improve the age and growth sample. In 2015, PSD decreased from 69 to 27 in 2019 (Figure 7). In 2019, there were fewer legal-length fish compared to 2015 and 2017. Mean relative weights (W_r) for fish caught in 2019 were good to excellent and ranged from 100 to 108. Ages for Hybrid Striped Bass were determined using otoliths from dead fish in 2017 (N=11 for random stations and N=1 for biologist selected stations) and 2019 (N=49). All fish aged in 2019 were either one or two years old. In 2019, age one fish were on average 11.1 inches and age two fish were 17.6 inches (Table 8). In 2017 no age one or two fish were sampled, but age three fish were 21.7 inches and age four fish were 22.4 inches (Table 8). Additionally, an age seven fish was also sampled in 2017. Age data indicated only six Sunshine Bass from the 2014-2017 fry stockings were captured during the 2017 gill netting survey (Figure 8). Fin clips were collected on all Hybrid Striped Bass sampled in 2019 (N=73). All the fish sampled during the 2019 gill net survey were Palmetto Bass according to the genetics results (Figure 9). The poor catch of individuals from the Sunshine Bass fry stockings may be attributed to severe flooding in 2015 and 2016 that may have resulted in loss of fish through the spillway and downstream or low survival.

Largemouth Bass: Electrofishing catch rate for Largemouth Bass was 4.0/h in 2014, 47.0/h in 2016, and 18.0/h in 2019. Catch rates of stock- length Largemouth Bass (≥8 inches) fluctuated from 3.0/h in 2014 to 17.0/h in 2016 and to 12.0/h in 2018. Values for PSD increased from 29 in 2016 to 67 in 2018 (Figure 10). Differences in catch rate was likely attributed to water level, habitat availability, and prey availability. Mean relative weight for legal-length fish in 2018 were optimal to excellent and ranged from 92 to 118. Florida Largemouth Bass allele frequency increased to 80.4% in 2018 (N=17) from 56.0% in 2010 (N=47). Multiple stockings of Florida Largemouth Bass in 2015, 2017, and 2018 have likely been successful given the high number of Largemouth Bass in the recent survey that have Florida Bass alleles. In 2018, nearly half of the Largemouth Bass sampled were pure Florida Largemouth Bass, nearly half were a hybrid between a Florida Largemouth Bass and a Northern Largemouth Bass, and no pure Northern Largemouth Bass were represented in the sample (Table 9).

Crappie: White Crappie and Black Crappie were sampled in Proctor Reservoir using trap nets. Trap netting catch rates for White Crappie declined from 45.2/nn in 2014 to 34.4/nn in 2016, to 17.1/nn in 2018. Catch of stock- length White Crappie (≥5 inches) also increased from 1.6/nn in 2014 to 33.9/nn in 2016, then decreased to 16.0 in 2018. Size structure of White Crappie shifted from lower representation of quality-length individuals in 2014 (PSD=38) to more representation of quality fish in 2018 (PSD=83). Mean relative weight for most inch classes were excellent ranging from 110-119. White Crappie that were 5 inches had a mean relative weight of 74 (Figure 11). Age at 10-10.9 inches was 1-3 years old. On average, one-year old White Crappie were 10.6 inches. Black Crappie were present in the reservoir but catch rates remained low ranging from 0.9/nn in 2014 to 1.5/nn in 2018.

Fisheries Management Plan for Proctor Reservoir, Texas
Prepared – July 2019

ISSUE 1:   Hybrid Striped Bass have been a part of the fishery at Proctor Reservoir since the early 1978. Annual stocking of Hybrid Striped Bass is required to sustain the population and maintain a fishery.

MANAGEMENT STRATEGY

1. Stock Hybrid Striped Bass fingerlings annually at 15 fish/acre.

ISSUE 2:   Catfishes support an anecdotally popular fishery at Proctor Reservoir. Yet, recent surveys have indicated poor recruitment. Stockings may be necessary to improve the future quality of the fishery.

MANAGEMENT STRATEGY

1. Stock Blue Catfish fingerlings 15 fish/acre at least once during 2020-2023, preferably twice in 2021 and 2023.

ISSUE 3:   Prolonged droughts and siltation has resulted in degradation and loss of vegetation and structural habitat because of reservoir aging have contributed to poor habitat at Proctor Reservoir.

MANAGEMENT STRATEGIES

1. Continue BRA and USACE partnerships for fisheries habitat enhancement projects.

2. Seek other interested partners for potential collaborations for fisheries habitat enhancement projects.

ISSUE 4:   Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.

2. Contact controlling authority and provide them with posters, literature, etc… so that they can in turn educate their customers.

3. Educate the public about invasive species with media and the internet.

4. Make a speaking point about invasive species when presenting to constituent and user groups.

5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2019–2023)

<u>Sport fish, forage fish, and other important fishes:</u> Sport fishes present in Proctor Reservoir are Blue Catfish, Channel Catfish, Flathead Catfish, Hybrid Striped Bass, White Bass, Largemouth Bass, Black Crappie, and White Crappie. Important prey species include Gizzard Shad and Bluegill. For sampling schedule, see Table 10.

<u>Low-density fisheries:</u>

<u>Flathead Catfish:</u> Flathead Catfish are present in the reservoir and have been managed with the statewide 18-inch minimum length limit (MLL) and 5-fish daily bag limit. Historic catch rates have been low in monitoring surveys. Catch rate in 1992 was 0.2/nn and 0.2/nn in 2003. A baseline low-frequency electrofishing survey for Flathead Catfish was conducted in summer 2014. Catch rate was 2.5/h. Additional monitoring for Flathead Catfish will not be conducted during the 2019-2023 survey period. Presence/absence for Flathead Catfish will be conducted during sampling efforts for other species.

<u>Survey objectives, fisheries metrics, and sampling objectives:</u>

<u>Prey Species:</u> Gizzard Shad and Bluegill are the primary prey species in Proctor Reservoir. The next electrofishing survey will be conducted in fall 2020 and 2022 for 1.0 h at 12, 5-minute random stations. Total catch-per-unit-effort (CPUE) will be determined for prey species with no target level of precision. A sample of ≥50 Gizzard Shad will be collected for monitoring trends of size structure (length frequency) and to calculate Index of Vulnerability for assessing prey availability/size suitability for sport fishes. Size structure (i.e., PSD) will be determined for Bluegill by collecting ≥50 stock- length (≥3 inch) fish. If desired precision for relative abundance estimates and/or sample sizes are not achieved, no additional sampling will be conducted. No specific targets will be attempted for other prey species present and will be collected with practical effort.

<u>Largemouth Bass:</u> Largemouth Bass have been managed with the statewide 14-inch MLL and 5-fish daily bag limit. From 2012-2015, water level declined to 12 ft. below conservation pool. The water level decline resulted in loss of shoreline habitat and lower abundance of Largemouth Bass. The combination of the low water level followed by the flooding has led to low relative abundance of Largemouth Bass at Proctor Reservoir over the last four years. Monitoring relative abundance is necessary for maintaining trend information for this fishery as well as to provide current information regarding the fishery to constituents. To monitor Largemouth Bass, electrofishing will be conducted during fall 2020 and 2022 for 1.0 h at 12, 5-minute random stations to monitor trends in relative abundance, size structure, and body conditions. Based on the most recent electrofishing survey data collected in fall 2018, desired level of precision (i.e., RSE≤25) for CPUE-Total, and CPUE-Stock may not be possible with reasonable effort. Additionally, based on the 2014, 2016, and 2018 survey, >50 stations would be needed to collect ≥50 stock-length fish. Therefore, sampling for the 2020 and 2022 electrofishing survey will be conducted with practical effort, and no target levels for precision of relative abundance estimates or sample size will be set. However, if ≥50 stock-length fish are collected, PSD will be calculated to assess size structure. Furthermore, if five per inch group ≥stock-length are sampled, those fish will be measured for length and weight and body conditions will be assessed. Thirty (N=30) fin clips will be collected from Largemouth Bass to assess allele frequencies of Florida and Northern Largemouth Bass. Additional sampling will not be conducted to improve data precision and/or sample size.

<u>Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass):</u> Hybrid Striped Bass have been managed with the statewide 18-inch MLL and 5-fish daily bag limit. Since 1978, frequent stockings have been necessary to provide and maintain the fishery. Stocking efforts for Palmetto Bass have been successful and were once relatively abundant in the reservoir. Though, from 2014-2017, Sunshine Bass fry were stocked, and only six fish from these stockings were caught in monitoring surveys. Severe flooding at Proctor Reservoir in 2016 with water level approximately 32 feet over conservation pool likely resulted in loss of fish down river. Traditional monitoring of Palmetto Bass has been achieved with spring gill net

surveys with effort of five net nights (nn). During the 2017 gill net survey, CPUE-Total was 1.1/nn and no fish <21 inches was sampled with increased effort of 10 net nights. The combination of the poor stocking success and prior flooding has resulted in the poor catch rate. Monitoring is necessary to determine the status of the fishery, to ascertain additional stocking needs, and to better inform constituents about the fishery. Gill nets will be deployed during spring 2023 at 5 random stations at depths ≤30 feet to collect relative abundance data. If there is not a stocking of Hybrid Striped Bass during the 2019-2023 survey period, then there will be no set goals for Hybrid Striped Bass. Only if Hybrid Striped Bass are stocked during the 2019-2023 survey period and the fish are expected to be large enough to recruit to the gear, will targets be set for relative abundance, size structure, and body conduction. A target precision of RSE≤25 will be attempted for CPUE-Total. A target of ≥50 stock- length Hybrid Striped Bass will be collected to monitor trends in size structure, and five fish per inch group ≥stock-length will be measured and weighed to assess body conditions. Fish that are dead will be used to assess age and growth and fish that are in good condition will be released. Fin clips will be taken on all Hybrid Striped Bass to determine if the fish was from Sunshine Bass fry stockings or Palmetto Bass fingerling stockings. Additional sampling will be considered if objectives are not met.

White Bass: White Bass are present in the reservoir and have been managed with the 10-inch MLL and 25-fish daily bag limit. White Bass contribute to the popular Morone fishery at Proctor Reservoir. Anglers are likely interested in catching White Bass while fishing for Hybrid Striped Bass. Continued gill netting is needed to maintain trend data. This will allow for determination of any large-scale changes in the White Bass population that may warrant further investigation as well as allow for better communication about the fishery to our constituents. Gill nets will be deployed during spring 2023 at 5 random stations at depths ≤30 feet. No target levels of precision will be attempted for estimates of CPUE-Total or CPUE-Stock. A target of ≥50 stock- length fish will be collected to assess size structure, five fish per inch group ≥stock- length will be measured for length and weight to assess body conditions.

Blue Catfish: Blue Catfish are present in the reservoir and have been managed with the 12-inch MLL and 25-fish (in combination with Channel Catfish) daily bag limit. Anecdotal information suggests that interest in fishing Blue Catfish has increased in popularity (personal communication, USACE - Proctor Reservoir). Blue Catfish have had poor relative abundance in monitoring surveys since they were first introduced into the reservoir in 1991. Based on previous sampling, it is likely that neither 1 hour of low-frequency electrofishing effort nor 10 gill nets will result in ≥50 stock- length fish or data precision of RSE≤25. Thus, monitoring for Blue Catfish relative abundance will be conducted in conjunction with gill net sampling for Hybrid Striped Bass and White Bass. No other specific sampling objectives will be set for Blue Catfish using gill nets. If ≥50 stock- length fish are sampled, then PSD will be calculated. If possible, five fish per inch group ≥stock- length will be measured and weighed to assess body conditions. No additional gill net sampling effort will be conducted to improve data precision or sample size. In addition to gill netting survey, low-frequency electrofishing for Blue Catfish will be conducted once during the 2019-2023 survey period for 1.0 h at 20 randomly selected 3-minute stations if weather permits. If low-frequency electrofishing is conducted, a target precision of RSE≤25 will be attempted for CPUE-Total. Proportional Size Distribution will be evaluated during low-frequency electrofishing. If possible, 5 fish per inch group ≥stock-length will be measured and weighed to assess body conditions. No additional sampling effort will be conducted to improve data precision or sample size.

Channel Catfish: Channel Catfish are present in the reservoir and have been managed with the 12-inch MLL and 25-fish (in combination with Blue Catfish) daily bag limit. Anecdotal information suggests that interest in fishing for catfish has increased in popularity (personal communication, USACE - Proctor Reservoir). Channel Catfish have traditionally had poor relative abundance in gill netting surveys. Though, continuation of monitoring this gear is useful in monitoring presence/absence of the species and maintain trend information. Gill nets will be deployed during spring 2023 at 5 random stations at depths ≤30 feet. Monitoring of Channel Catfish relative abundance (CPUE-Total) will be conducted in conjunction with gill net sampling for Hybrid Striped Bass and White Bass. No other specific sampling goals will be set for Channel Catfish.

White Crappie: White Crappie are present and have been managed under the statewide 10-inch MLL and 25-fish daily bag limit. Anecdotal information suggests that interest in fishing for crappie has remained popular (personal communication, USACE - Proctor Reservoir). Continuation of biennial trap netting to maintain trend data will allow for determination of any large-scale changes in the crappie population that may warrant further investigation as well as allow for better communication about the fishery to our constituents. Trap nets will be deployed at 10 random stations in fall 2022 to obtain estimates of CPUE-Total and CPUE-Stock at a target precision of RSE≤25. A target of ≥50 stock- length White Crappie will be collected to monitor trends in size structure, and five fish per inch group ≥stock- length will be measured and weighed to assess body conditions. Five additional random stations may be added if data objectives are not met and if extra sampling is deemed feasible.

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Tables and Figures

Conservation pool is 1,162 Ft. above MSL
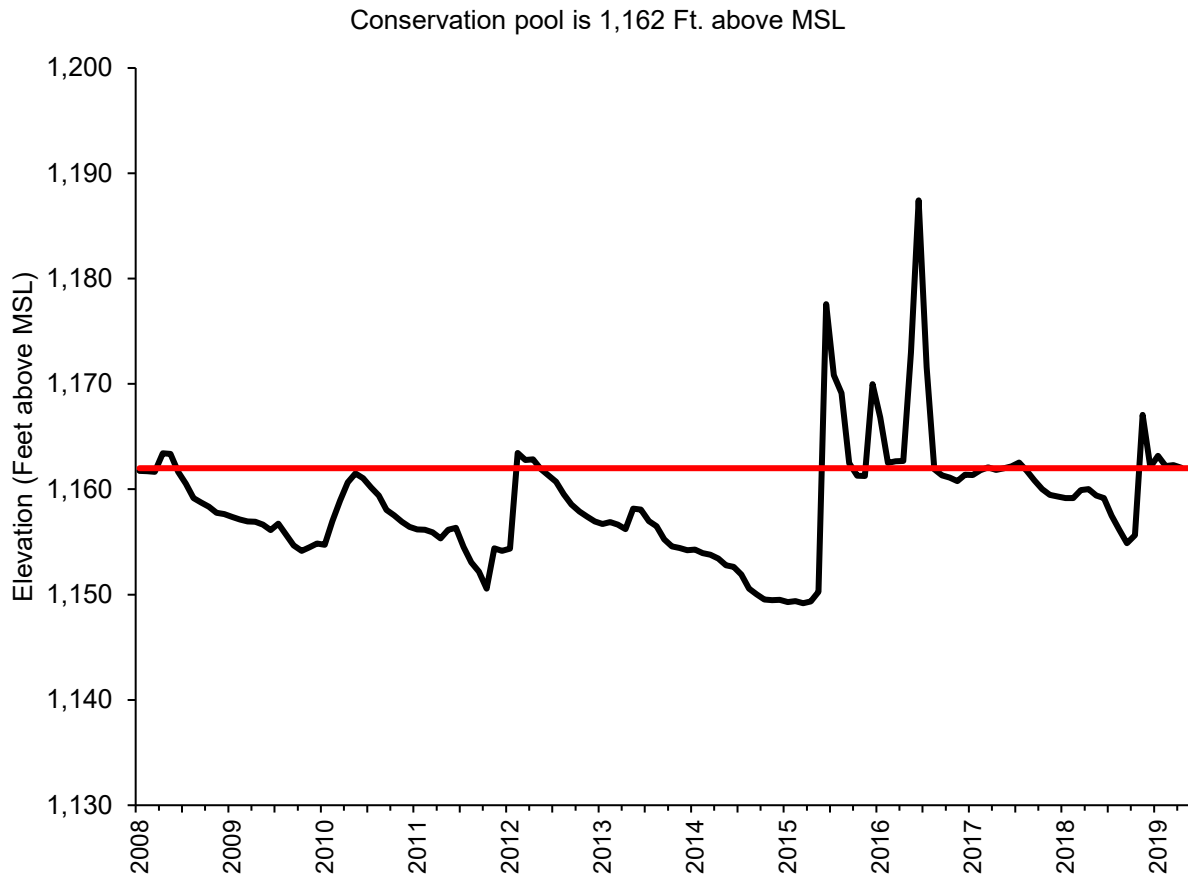
Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Proctor Reservoir, Texas. Conservation pool is 1,162 feet above mean sea level, shown in red. Maximum depth is approximately at 1,128 feet above mean sea level.

Table 1. Characteristics of Proctor Reservoir, Texas.

Characteristic	Description
Year constructed	1963
Conservation pool (CP)	1,162 feet above mean sea level
Maximum depth	1,128 feet above mean sea level
Controlling authority	U.S. Army Corps of Engineers
County	Comanche
Reservoir type	Tributary
River basin	Brazos River Basin
Shoreline Development Index	4.73
USGS 8-Digit HUC Watershed	12070201 (Leon)
Conductivity	302-663 µS/cm

Table 2. Boat ramp characteristics for Proctor Reservoir, Texas, July 2018. Reservoir elevation at time of survey was 1,156.5 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Boat ramp closure elevation (ft)	Condition
Copperas East	31.97003 -98.49956	Y	20	1,150.5	No access issues
Copperas West	31.97375 -98.50571	Y	20	1,152.0	No access issues
Sowell Creek North	31.99155 -98.46024	Y	20	1,152.0	No access issues
Sowell Creek South	31.97241 -98.46847	Y	30	1,150.0	No access issues
Spillway	31.96916 -98.48876	Y	15	1,155.0	No access issues
Promontory East	31.98787 -98.48265	Y	20	1,152.0	No access issues
Promontory West	31.97825 -98.49659	Y	15	1,154.0	No access issues
Foley's Landing*	32.0081 -98.4825	Y	10	Unknown	No access issues
Buffalo Springs*	31.99003 -98.49764	Y	5	Unknown	No access issues

* Boat ramp is not on USACE property, is not managed by USACE, and does not have the USACE entry fee.

Table 3. Harvest regulations for Proctor Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Hybrid Striped Bass	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

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

Species	Year	Number	
Shad, Threadfin	1984	1,000	ADL
Catfish, Blue	1991	46,417	FGL
	2019	161,811	FGL
	Total	208,228	
Bass, Palmetto (female Striped Bass x male White Bass)	1978-1983	117,063	UNK
	1984-1989	516,296	FGL
	1991-1999	685,659	FGL
	2000	34,980	FGL
	2002	34,630	FGL
	2004	67,985	FGL
	2005	67,524	FGL
	2006	66,925	FGL
	2007	62,776	FGL
	2008	67,447	FGL
	2009	66,247	FGL
	2010	67,305	FGL
	2011	32,630	FGL
	2013	67,142	FGL
	2017	151,821	FRY
	2018	71,460	FGL
	Total	2,177,890	
Bass, Sunshine (female White Bass x male Striped Bass)	2014	293,267	FRY
	2015	253,175	FRY
	2016	279,050	FRY
	2017	323,000	FRY
	Total	1,148,492	
Bass, Largemouth	1970	100,000	UNK
Bass, Florida Largemouth	1979	100,215	FGL
	1993	230,621	FGL
	1994	232,436	FGL
	2001	232,002	FGL
	2014	224,664	FGL
	2015	79,396	FGL
	2017	52,030	FGL
	2018	59,179	FGL
	2019	90,669	FGL
	Total	1,301,212	
Green x Redear Sunfish	1971	5,000	UNK

Table 5. Objective-based sampling plan components for Proctor Reservoir, Texas 2018–2019.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing (general monitoring)			
Largemouth Bass	Relative Abundance	CPUE–Total, CPUE–Stock	Practical Effort
	Size Structure	PSD, Length Frequency	Practical Effort
	Body Conditions	W_r	Practical Effort
	Genetics	% FLMB	N=30 fish
Bluegill [a]	Relative Abundance	CPUE–Total	RSE≤25
	Size Structure	PSD, Length Frequency	N ≥50 stock
Gizzard Shad [a]	Relative Abundance	CPUE–Total	RSE≤25
	Size Structure	Length Frequency	N≥50
	Prey Availability	IOV	N≥50
Gill netting			
Hybrid Striped Bass	Relative Abundance	CPUE–Total, CPUE–Stock	Practical Effort
	Size structure	PSD, length frequency	Practical Effort
	Body Conditions	W_r	Practical Effort
	Genetics	Sunshine vs Palmetto	Practical Effort
	Age and Growth	Age Structure	Practical Effort
White Bass	Abundance	CPUE–Total, CPUE–Stock	Practical Effort
	Size structure	PSD, Length Frequency	N≥50 stock
	Body Conditions	W_r	N≥5 fish/inch group (max)
Blue Catfish	Relative Abundance	CPUE–Total and CPUE–Stock	Practical Effort
	Size Structure	PSD, Length Frequency	Practical Effort
	Body Conditions	W_r	Practical Effort

Table 5. Continued: Objective-based sampling plan components for Proctor Reservoir, Texas 2018–2019.

Gear/target species	Survey objective	Metrics	Sampling objective
Gill netting			
Channel Catfish	Relative Abundance	CPUE–Total and CPUE–Stock	Practical Effort
	Size Structure	PSD, Length Frequency	Practical Effort
	Body Conditions	W_r	Practical Effort
Trap netting			
Crappie	Relative Abundance	CPUE–Total, CPUE–Stock	RSE≤25
	Size Structure	PSD, Length Frequency	N≥50 stock
	Body Conditions	W_r	N≥5 fish/inch group

[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 conditions can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of structural habitat types, Proctor Reservoir, Texas, July 2018. Percent occurrence with lower and upper 95% confidence limits (CL) of shoreline structural habitat at 97 random sites. Water level at time of survey was 5.5 feet below conservation pool elevation.

Habitat type	Percent occurrence	Lower CL	Upper CL
Gravel	11.3	11.2	11.5
Natural Shoreline	61.9	61.4	62.6
Rocky Bluff	1.0	1.0	1.1
Rocky Shoreline	25.8	25.6	26.1
Docks	2.1	2.1	2.2

Table 7. Percent occurrence with lower and upper 95% confidence limits (CL) of structural habitat at 100 random sites throughout the reservoir and 97 sites along the shoreline in Proctor Reservoir, Texas, July 2018. Water level at time of survey was 5.5 feet below conservation pool elevation.

Structural Habitat	Throughout the Reservoir			Shoreline		
	Percent Occurrence	Lower CL	Upper CL	Percent Occurrence	Lower CL	Upper CL
Open Water	85.0	84.2	85.9	78.4	77.7	79.3
Flooded Terrestrial	5.0	5.0	5.1	14.4	14.3	14.6
Standing Timber	10.0	9.9	10.2	7.2	7.2	7.3

Gizzard Shad

2014

Effort = 1.0
Total CPUE = 733.0 (26; 733)
IOV = 100 (0)

2016

Effort = 1.0
Total CPUE = 649.0 (17; 649)
IOV = 100 (0)

2018

Effort = 1.0
Total CPUE = 1,184.0 (33; 1184)
IOV = 95 (2)
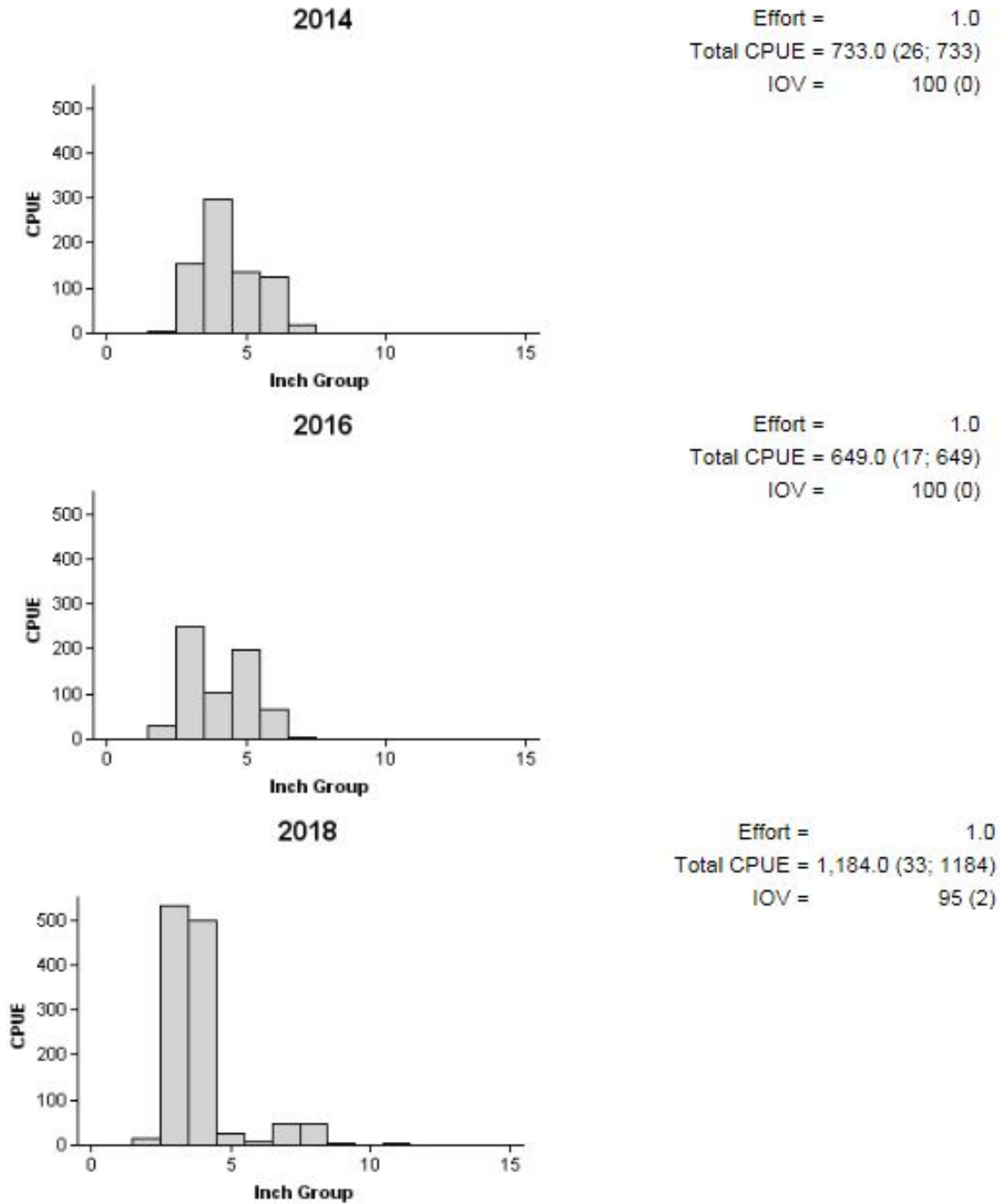
Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Proctor Reservoir, Texas, 2014, 2016, and 2018.

Bluegill

2014

Effort = 1.0
Total CPUE = 18.0 (34; 18)
PSD = 29 (13)

2016

Effort = 1.0
Total CPUE = 256.0 (22; 256)
PSD = 0 (0)

2018

Effort = 1.0
Total CPUE = 129.0 (38; 129)
PSD = 23 (4)
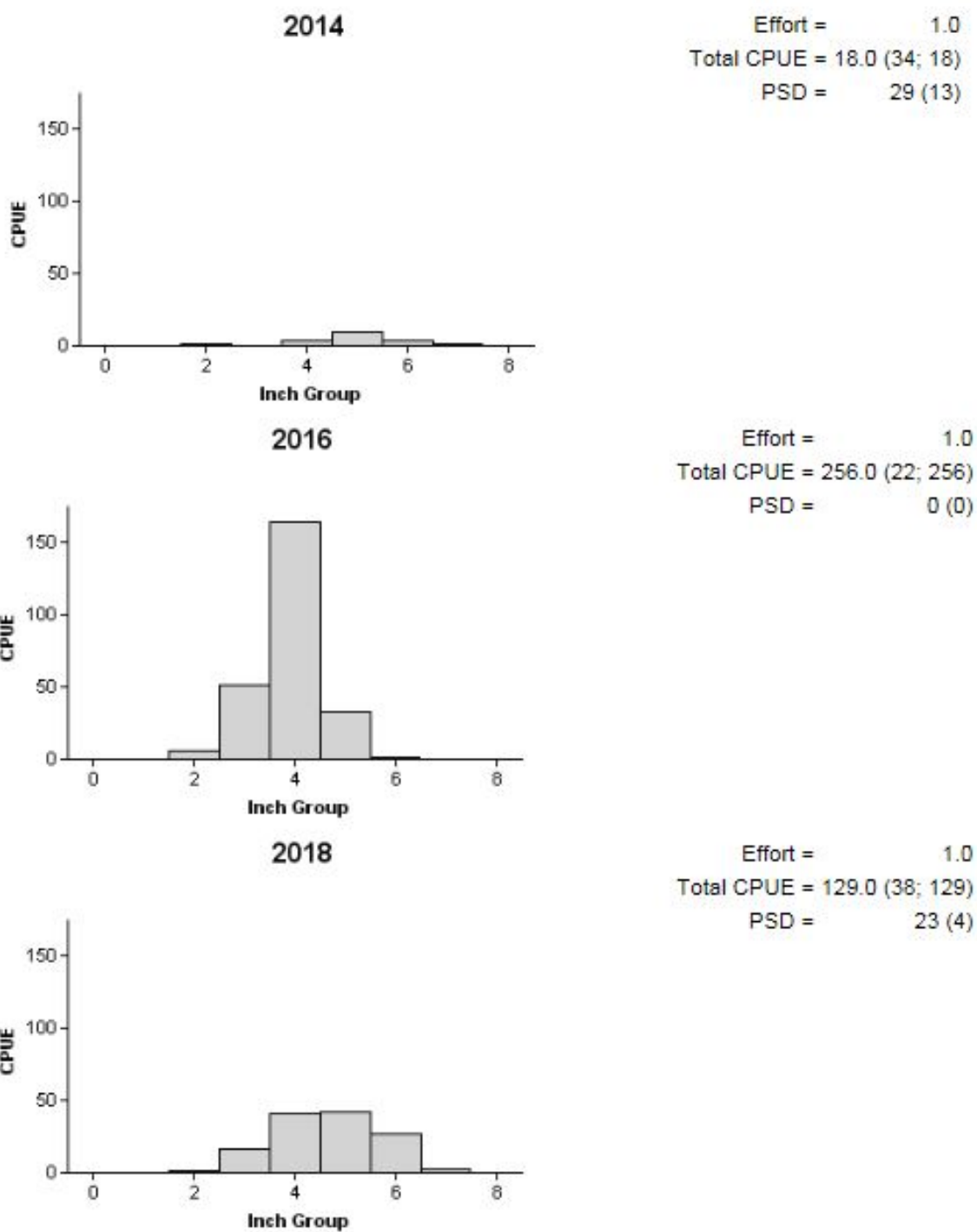
Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Proctor Reservoir, Texas, 2014, 2016, and 2018.

Blue Catfish
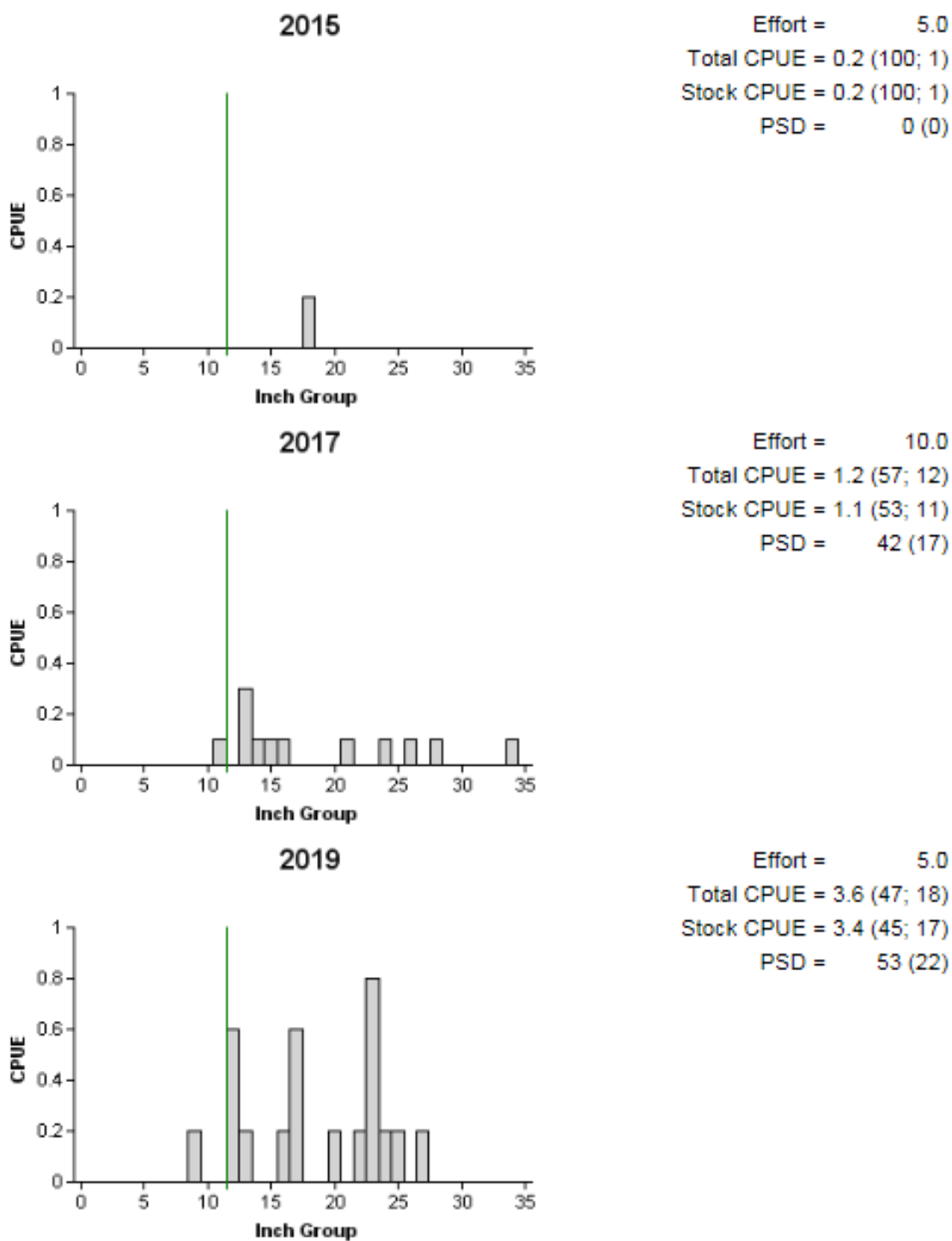
Figure 4. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Proctor Reservoir, Texas, 2015, 2017, and 2019. Vertical line denotes 12-inch minimum length limit.

Channel Catfish

2015

Effort = 5.0
Total CPUE = 2.2 (22; 11)
PSD = 27 (12)

2017

Effort = 10.0
Total CPUE = 2.7 (29; 27)
PSD = 45 (12)

2019

Effort = 5.0
Total CPUE = 1.0 (45; 5)
PSD = 67 (35)

Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Proctor Reservoir, Texas, 2015, 2017, and 2019. Vertical line denotes 12-inch minimum length limit.

White Bass

2015

2017

2019
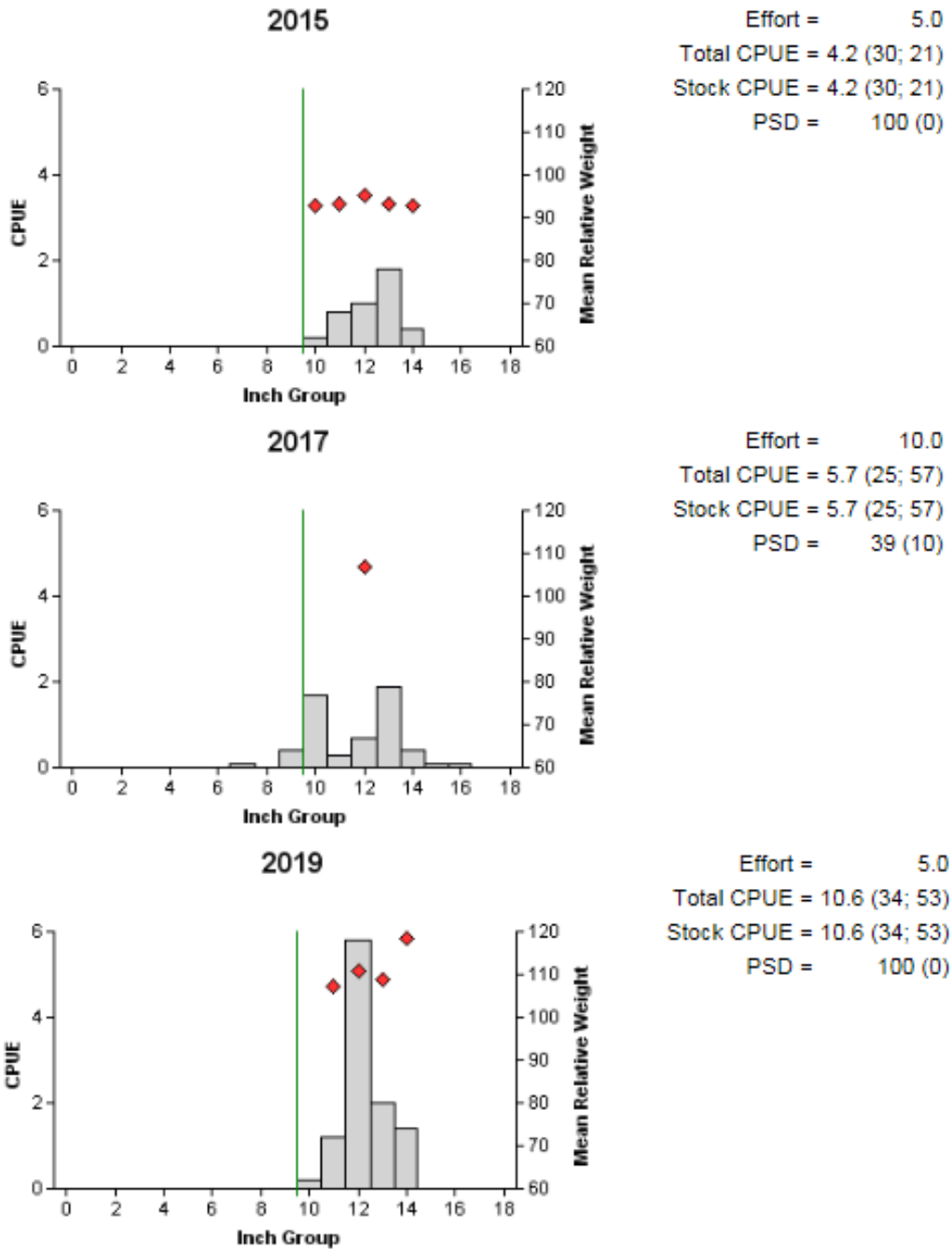
Figure 6. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Proctor Reservoir, Texas, 2015, 2017, and 2019. Vertical line denotes 10-inch minimum length limit.

Hybrid Striped Bass

2015

Effort = 5.0
Total CPUE = 12.6 (31; 63)
Stock CPUE = 12.4 (32; 62)
PSD = 69 (5)

2017

Effort = 10.0
Total CPUE = 1.1 (100; 11)
Stock CPUE = 1.1 (100; 11)
PSD = 92 (8)

2019

Effort = 5.0
Total CPUE = 14.8 (29; 74)
Stock CPUE = 14.6 (29; 73)
PSD = 27 (14)

Figure 7. Number of Hybrid Striped Bass caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Proctor Reservoir, Texas, 2015, 2017, and 2019. Vertical line denotes 18-inch minimum length limit.

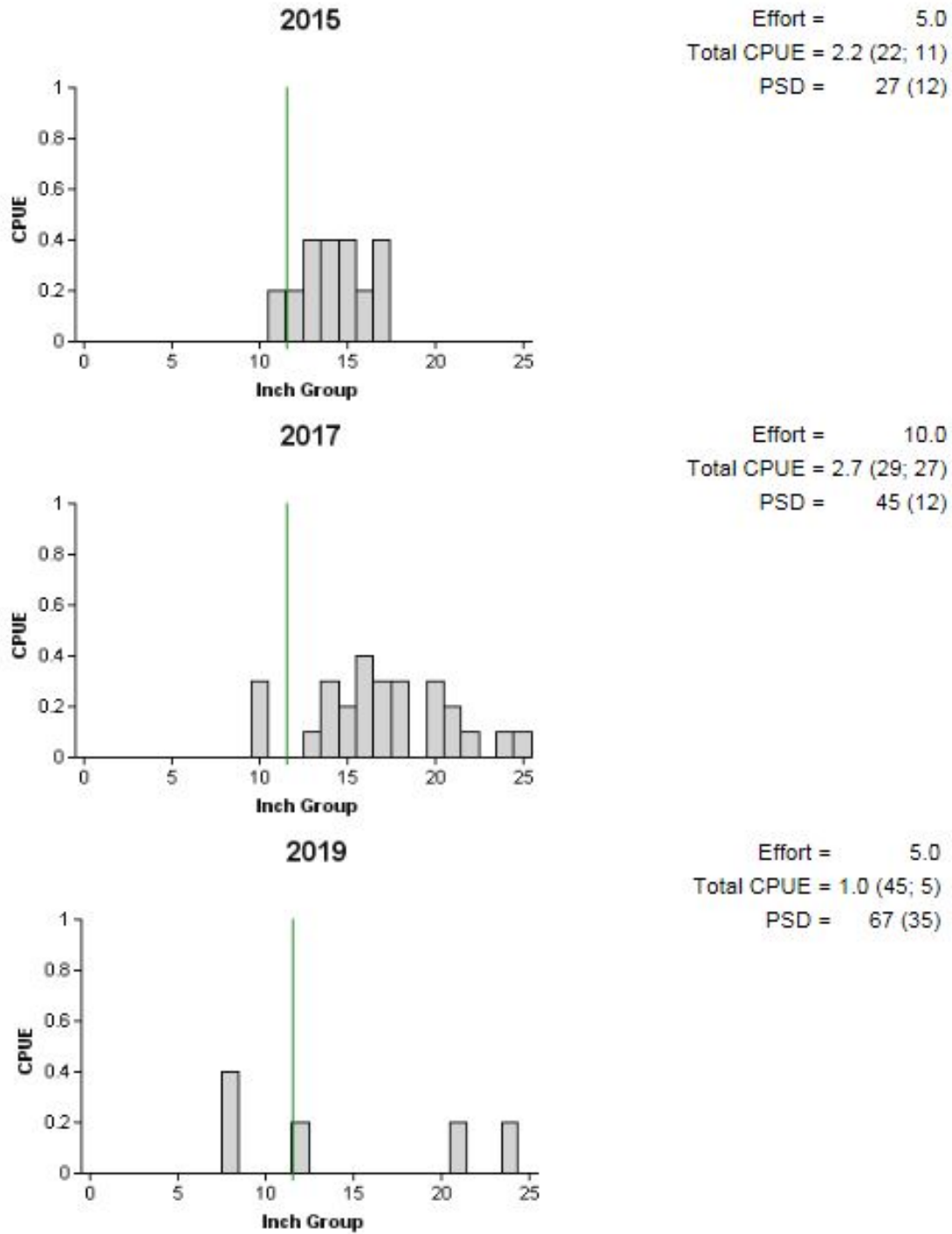Table 8. Average length at capture for Hybrid Striped Bass (sexes combined) ages 1 – 4 collected in gill net surveys (random and biologist selected stations), Proctor Reservoir, Texas, 2017 and 2019. Standard error and sample size are shown in in parenthesis.

Sampling year	Length (inches) at capture for age			
	1	2	3	4
2017			21.7 (3.0, 6)	22.4 (4.1, 5)
2019	11.1 (4.5; 33)	17.6 (2.6; 16)		
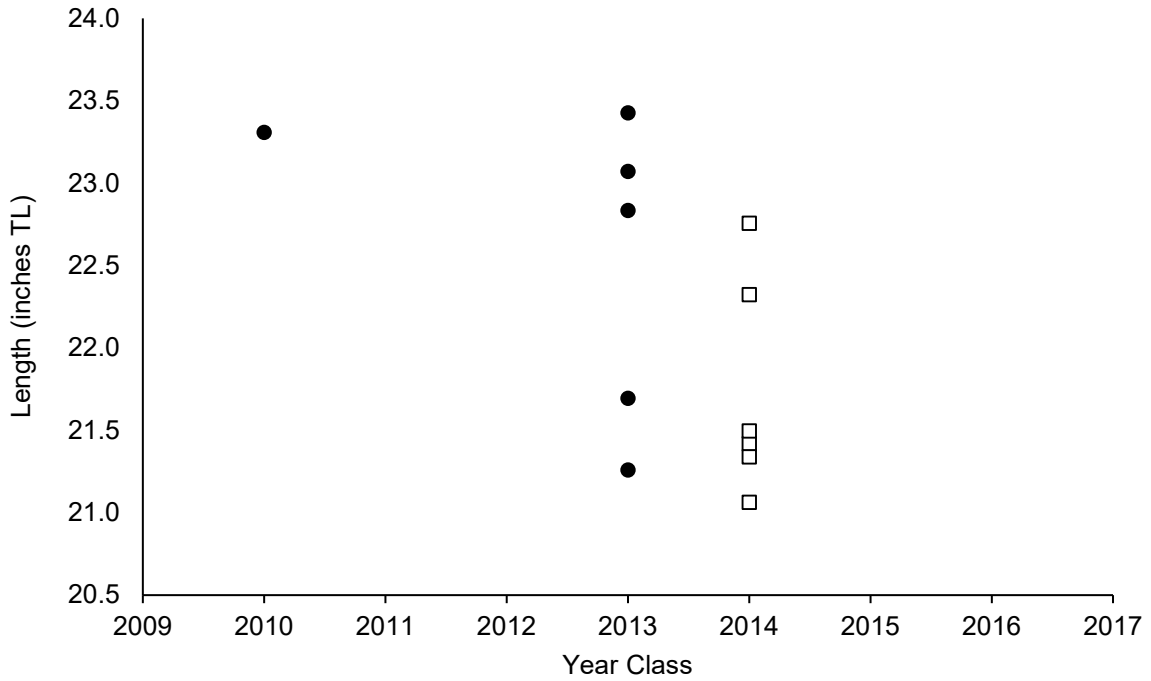
Figure 8. Lengths-at-age for Palmetto Bass (black circles) and Sunshine Bass (white squares) for spring gill net survey, Proctor Reservoir, Texas 2017.
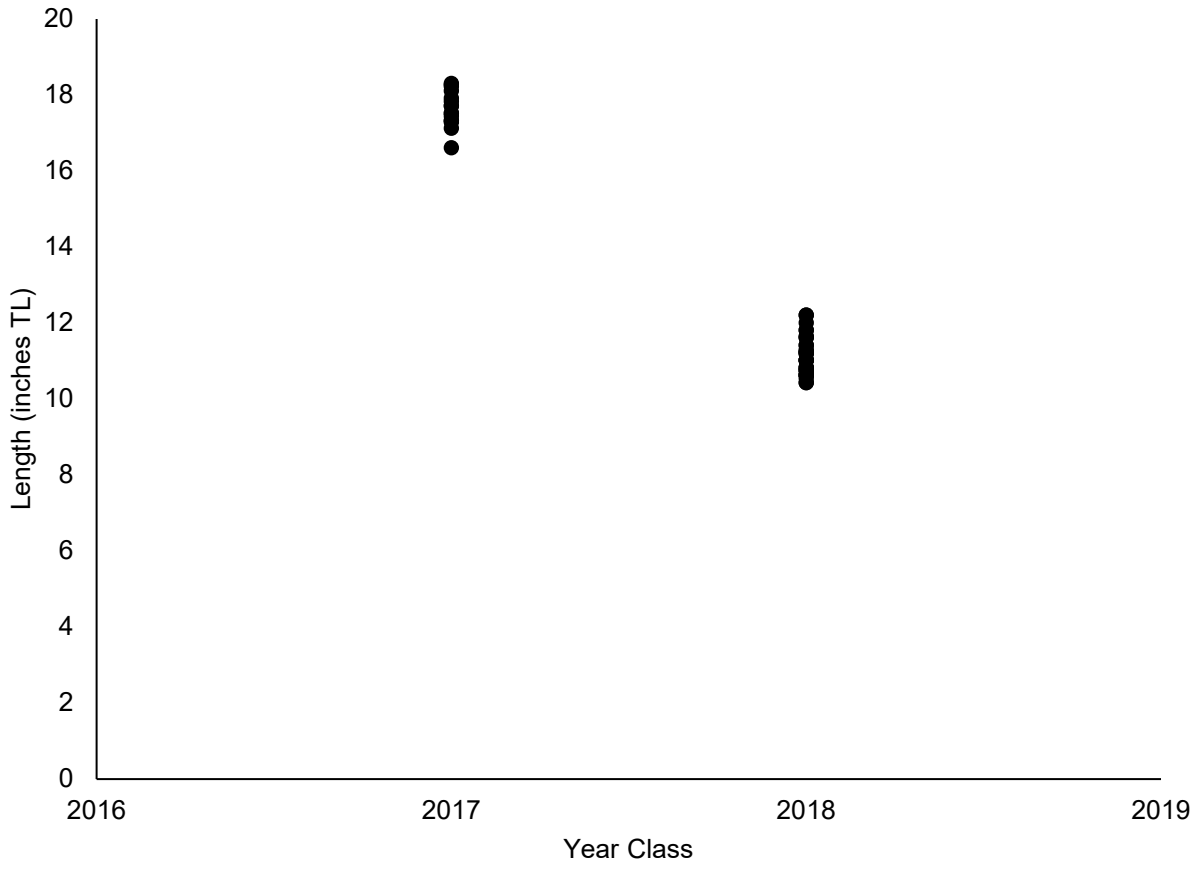
Figure 9. Lengths-at-age for Palmetto Bass (black circles) for spring gill net survey, Proctor Reservoir, Texas 2019. No Sunshine Bass were sampled in 2019.

Largemouth Bass

2014

Effort =   1.0
Total CPUE = 4.0 (67; 4)
Stock CPUE = 3.0 (72; 3)
PSD =   100 (0)

2016

Effort =   1.0
Total CPUE = 47.0 (37; 47)
Stock CPUE = 17.0 (46; 17)
PSD =   29 (14)

2018

Effort =   1.0
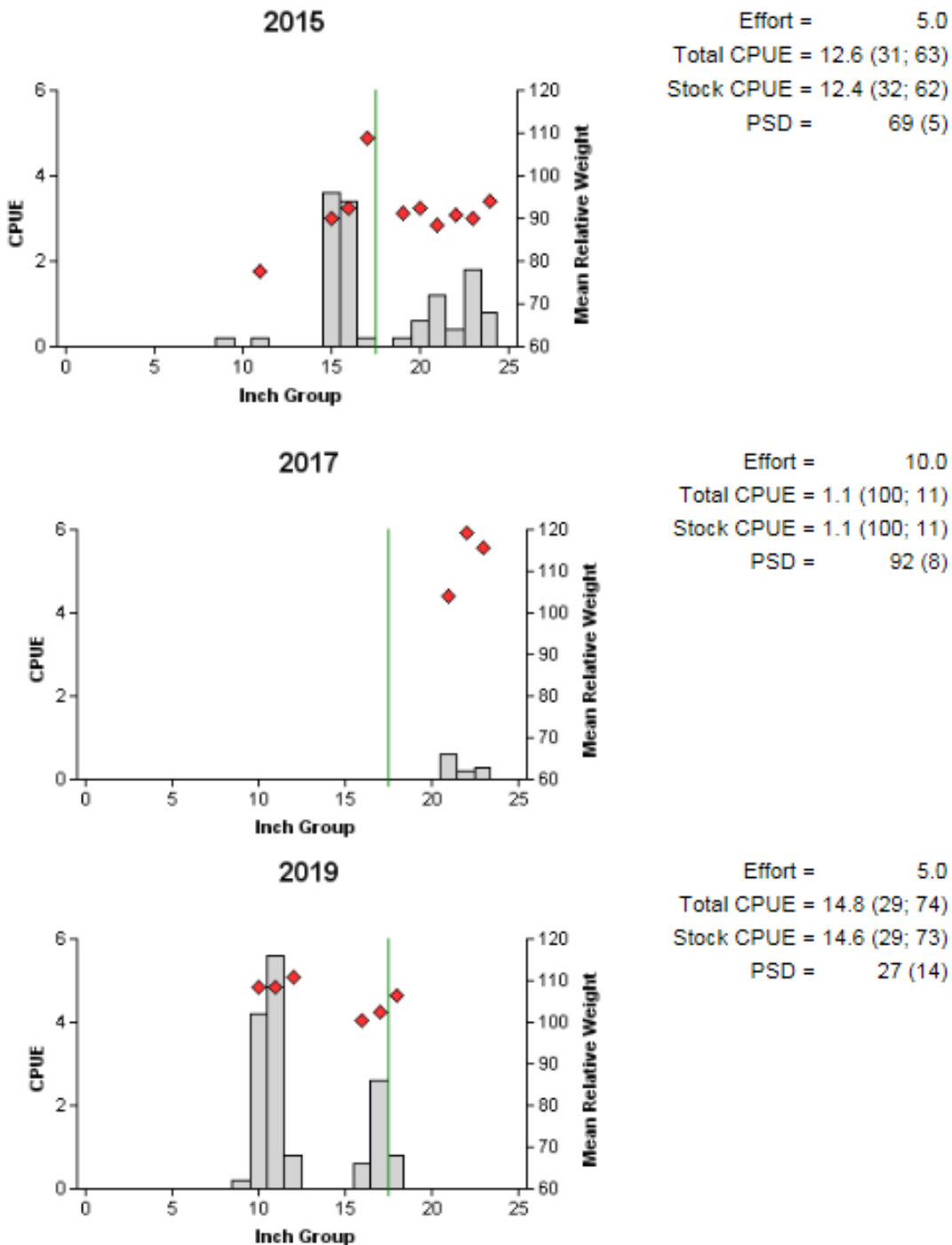Total CPUE = 18.0 (43; 18)
Stock CPUE = 12.0 (37; 12)
PSD =   67 (14)

Figure 10. 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, Proctor Reservoir, Texas, 2014, 2016, and 2018. Vertical line denotes 14-inch minimum length limit.

Table 9. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Proctor Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB. Genetic composition was determined with micro-satellite DNA analysis.

| Year | Sample size | Number of fish | | | | % FLMB alleles | % pure FLMB |
		FLMB	F1	Fx	NLMB		
2010	47	3	7	37	0	56.0	6.4
2018	17	8	0	9	0	80.4	47.1

White Crappie

2014

Effort = 10.0
Total CPUE = 45.2 (31; 452)
Stock CPUE = 1.6 (35; 16)
PSD = 38 (9)

2016

Effort = 10.0
Total CPUE = 34.4 (28; 344)
Stock CPUE = 33.9 (28; 339)
PSD = 92 (2)

2018

Effort = 10.0
Total CPUE = 17.1 (26; 171)
Stock CPUE = 16.0 (28; 160)
PSD = 83 (6)
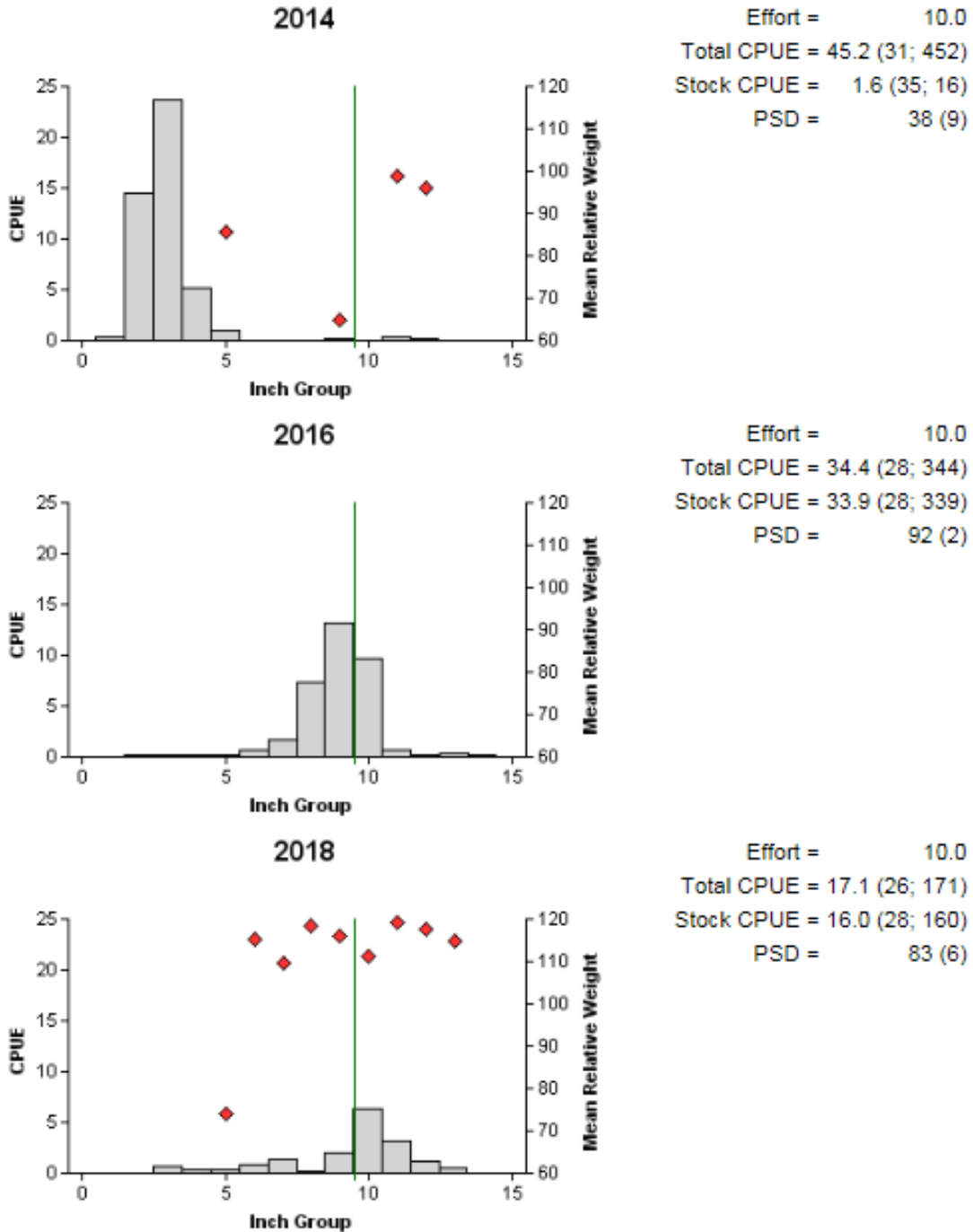
Figure 11. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RS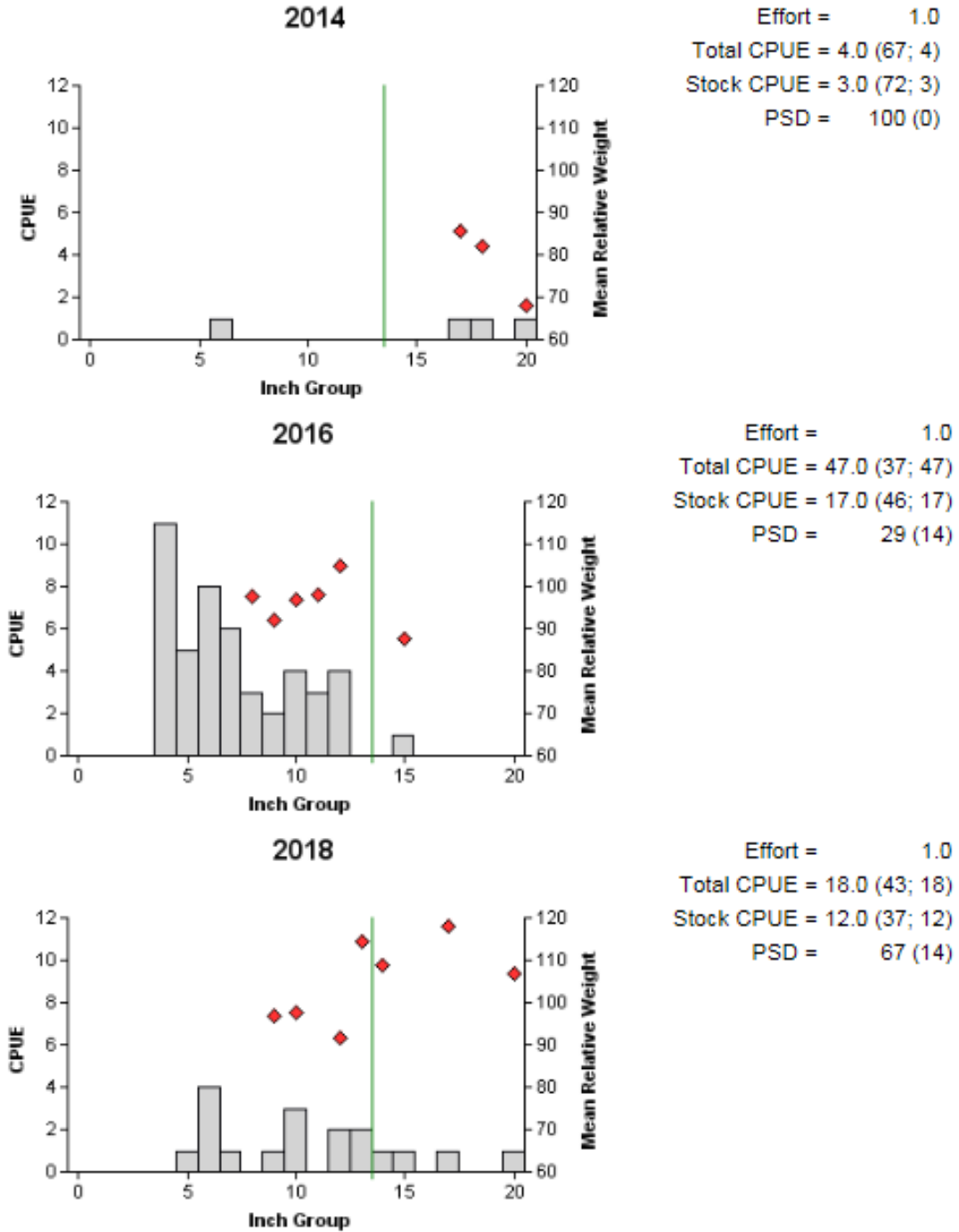E and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Proctor Reservoir, Texas, 2014, 2016, and 2018. Vertical line indicates minimum length limit.

Proposed Sampling Schedule

Table 10. Proposed sampling schedule for Proctor Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

	Survey year			
	2019-2020	2020-2021	2021-2022	2022-2023
Angler Access				S
Vegetation				S
Electrofishing – Fall		A		S
Electrofishing – Low frequency				S
Trap netting				S
Gill netting				S
Report				S

Appendix A

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Proctor Reservoir, Texas, 2018-2019. Sampling effort was 5 net nights for gill netting, 10 net nights for trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					1,184	1,184.0 (33)
Blue Catfish	18	3.6 (47)				
Channel Catfish	5	1.0 (45)				
Hybrid Striped Bass	74	14.8 (29)				
White Bass	53	10.6 (34)				
Green Sunfish					7	7.0 (39)
Bluegill					129	129.0 (36)
Longear Sunfish					39	39.0 (41)
Largemouth Bass					18	18.0 (43)
White Crappie			171	17.1 (26)		
Black Crappie			15	1.5 (45)		

Appendix B
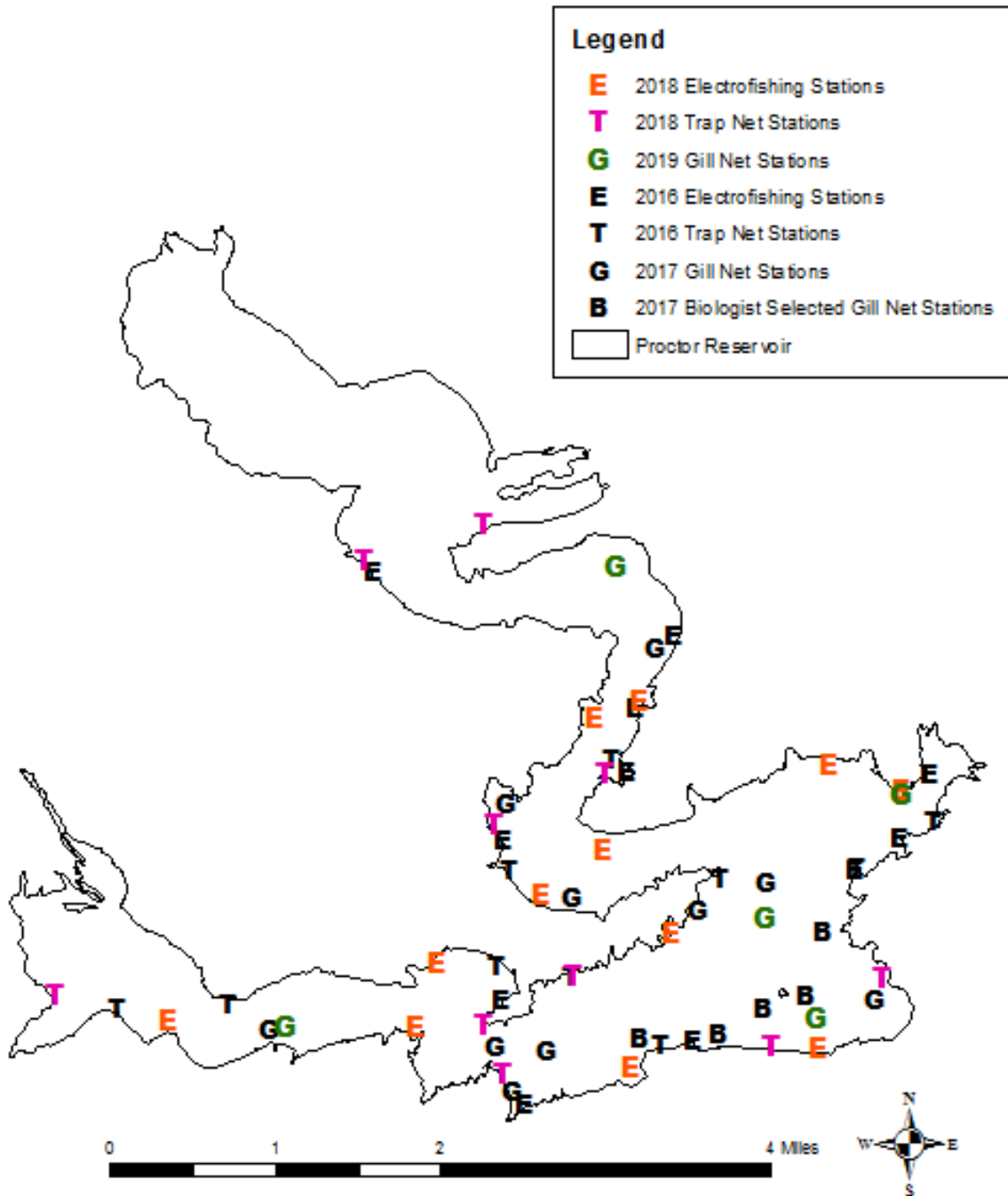
Location of sampling sites, Proctor Reservoir, Texas, 2016-2019. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Non-random, biologist selected gill net stations in 2017 are indicated by B. In 2016, water level was 1.5 feet over conservation pool during electrofishing survey and 5.9 feet over conservation pool during trap net survey. In 2017, water level was at conservation pool during gill netting survey and biologist selected gill net surveys. In 2018, water level was 6.2 feet below conservation pool during the electrofishing survey. Water level was at conservation pool during the 2018 trap net survey and during the 2019 gill net survey.

Appendix C

Habitat Project at Lake Proctor
Comanche County, Texas
October, 2016

Site	Latitude	Longitude
T1	31.9777	-98.51186
T2	31.97764	-98.51079
T3	31.99151	-98.46193
T4	31.99654	-98.48825

Coordinates of habitat locations in orange zone boxes are listed on Page two (2).

Legend

- 🌲 Brush Pile ——— Road
- 🐟 Reef-Area ▭ Lake Proctor
- ▭ Fish Habitat Zones

TEXAS PARKS & WILDLIFE

Maps were created 31 October 2016 by:
Texas Parks & Wildlife Department
Inland Fisheries-Abilene (325) 692-0921.

This project was supported by The Brazos River Authority and The Lake Proctor U.S. Army Corps of Engineers. Recycled trees were donated by Home Depot-Abilene, Walmart-Sweetwater, City of Abilene Recycling Center, and Sorrells Farms.

NOTE: THIS MAP IS FOR REFERENCE ONLY

The requestor must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to certain data. Map scale is 1:57,000.

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Page 1 of 2

Page 1 of 2 of the reference maps for brush pile and artificial reef areas created for the Proctor Reservoir Fish Habitat Enhancement Project, Comanche County, Texas, 2016. Map scaled to show all locations of habitat enhancement. Latitude and longitude are given in decimal degrees.

Appendix C

Zone 1		
Site	Latitude	Longitude
S1	31.98007	-98.50054
S2	31.97977	-98.49917
T5	31.97993	-98.50283
T6	31.98014	-98.50226
T7	31.98010	-98.50150
T8	31.98031	-98.50091
T9	31.98016	-98.49977
T10	31.97982	-98.49881
T11	31.97906	-98.49783

Zone 2		
Site	Latitude	Longitude
S3	31.97878	-98.48911
S4	31.97910	-98.48799
T12	31.97915	-98.48890
T13	31.97921	-98.48867
T14	31.97945	-98.48786
T15	31.97982	-98.48789

Zone 3		
Site	Latitude	Longitude
S5	31.99658	-98.47086
S6	31.99677	-98.46941
T16	31.99703	-98.47032
T17	31.99707	-98.46854

Zone 4		
Site	Latitude	Longitude
S7	31.99114	-98.49645
S8	31.99210	-98.49595
T18	31.99141	-98.49692
T19	31.99200	-98.49650

Habitat Project at Lake Proctor Comanche, Texas October, 2016

Legend
- Lake Proctor
- Fish Habitat Zones
- Brush Pile
- Reef-Area

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Page 2 of 2

Page 2 of 2 of the reference maps for brush piles and artificial reef areas created for the Proctor Reservoir Fish Habitat Enhancement Project, Comanche County, Texas, 2016. The map is scaled to show all locations of habitat enhancement within each of the four zones. The shoreline is represented by the blue line.

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