

Granger Reservoir

2020 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

Prepared by:

Mukhtar Farooqi, Assistant District Management Supervisor
and
Patrick Ireland, District Management Supervisor

Inland Fisheries Division
San Marcos/Austin District, San Marcos, Texas

Carter Smith
Executive Director

Craig Bonds
Director, Inland Fisheries

July 31, 2021



Contents

Survey and Management Summary	1
Introduction.....	3
Reservoir Description	3
Angler Access.....	3
Management History	3
Methods.....	5
Results and Discussion.....	5
Fisheries Management Plan for Granger Reservoir, Texas	8
Objective-Based Sampling Plan and Schedule (2021–2025).....	9
Literature Cited.....	11
Tables and Figures	12
Water Level	12
Reservoir Characteristics	12
Boat Ramp Characteristics.....	13
Harvest Regulations	13
Stocking History.....	14
Objective-Based Sampling Plan for 2020-2021	15
Structural Habitat Survey.....	16
Aquatic Vegetation Survey	16
Gizzard Shad.....	17
Bluegill	18
Blue Catfish	19
Channel Catfish	20
Flathead Catfish	21
White Bass.....	22
Largemouth Bass	24
White Crappie.....	25
Proposed Sampling Schedule	27
APPENDIX A – Map of sampling locations.....	28
APPENDIX B – Map Shoreline Habitat and Vegetation	29
APPENDIX C – Catch rates for all target species from all gear types.....	30

Survey and Management Summary

Fish populations in Granger Reservoir were surveyed in 2020 using electrofishing, trap netting and in 2021 using gill netting. Historical data are presented with the 2017-2021 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: Granger Reservoir is a 4,009-acre impoundment of the San Gabriel River in Williamson County, Texas. The reservoir is located approximately 40 miles northeast of Austin, Texas, within the Brazos River drainage basin. It was constructed in 1980 by the U. S. Army Corps of Engineers (USACE) for purposes of flood control and water conservation. Granger Reservoir has a drainage area of approximately 709 square miles and a shoreline length of about 29 miles. High turbidity and fluctuating water levels have deterred the establishment of aquatic vegetation in the past. Reservoir bank slope is relatively flat and small changes in water level (1-2 feet) can have a large impact on the abundance of shoreline habitat and river/reservoir connectivity. Granger Reservoir was classified as “infested” with zebra mussels in December 2019.

Management History: Important sport fish include White Crappie, White Bass, and Blue Catfish. The last creel survey was conducted in the spring of 2005 and showed White Crappie was the most sought-after species (61.5% directed angler effort) followed by catfishes (16.8%), White Bass (5.1%), and Largemouth Bass (2.5%; Bonds and Magnelia 2005). Blue Catfish were stocked in 1995 and 1996 to provide additional angling opportunities and utilize an abundant shad population. No additional stocking has been conducted since 1996. In collaboration with the Brazos River Authority (BRA), a fishery assessment (habitat availability, river/reservoir connectivity, and access at various lake levels) was conducted at Granger Reservoir for a multi-year system operating plan for the Brazos River Basin (Farooqi and De Jesus 2013). Based on these multiple assessments, threshold recommendations were provided to decrease potential impacts to the fishery during future basin-wide water level manipulations. The Granger Reservoir management threshold recommendation was 504 ft. above mean sea level (MSL), which is the same as conservation pool. A critical threshold for fisheries applications was set at 498 ft. MSL. As a consequence, other than under exceptional circumstances, water level fluctuations at Granger Reservoir will be minimal and therefore have little impact on the fishery. Low to negligible vegetative coverage has been descriptive of Granger Reservoir.

Fish Community

- **Prey species:** Gizzard Shad and Threadfin Shad were the dominant prey species in 2020. Catch rates for Gizzard Shad and Threadfin Shad had significantly increased compared to previous surveys.
- **Catfishes:** Blue Catfish was the dominant catfish species. Total catch rate was much higher than in the previous two surveys and body condition of all stock-size fish collected was high, indicating very heavy fish. Most Blue Catfish were of harvestable size (12 to 19 inches) and the largest fish measured 32 inches in length. The abundance of Channel Catfish had increased since the last two surveys and the body condition of all stock-size fish was high. No flathead catfish were caught in 2021; catch rates have been very low in previous surveys.
- **White Bass:** Total catch rate for White Bass was considerably higher than in the last two surveys. A large proportion of fish were of harvestable size (i.e., 10 inches), with the largest fish up to 15 inches in length.
- **Largemouth Bass:** Largemouth Bass were present in very low numbers, as has been the case in previous surveys. Only one harvestable-size fish was caught.
- **White Crappie:** White Crappie abundance had declined compared to the previous two surveys. Nevertheless, the catch rate was similar to historical levels. Body condition was high for most fish.

Management Strategies: Based on current information, the reservoir should continue to be managed with existing regulations. White Crappie is the most sought-after species at this reservoir; therefore, trap net surveys will be conducted biennially to monitor the population dynamics of this species. Conduct general monitoring surveys with electrofishing and gill nets in 2024-2025. Access, shoreline structural habitat, and vegetation surveys will be conducted in 2024. Inform the public about the negative impacts of aquatic invasive species.

Introduction

This document is a summary of fisheries data collected from Granger Reservoir from 2017-2021. 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 2017-2021 data for comparison.

Reservoir Description

Granger Reservoir is a 4,009-acre impoundment of the San Gabriel River in Williamson County, Texas. The reservoir is located approximately 40 miles northeast of Austin, Texas, within the Brazos River drainage basin. It was constructed in 1980 by the U. S. Army Corps of Engineers (USACE) for purposes of flood control and water conservation. The reservoir is eutrophic with a mean TSI chl-a of 56.82, and a 10-year change of +8.36. (Texas Commission on Environmental Quality 2020). Hydrilla, a non-native aquatic plant, was first discovered near Wilson Fox 2 boat ramp in 2003. It was eliminated with an herbicide applied by the USACE. Since 2016, the reservoir has been at or above conservation pool for the majority of the time (Figure 1). Land management in the watershed and non-existent shoreline and riparian vegetation has led to increased bank erosion and siltation around the reservoir. A shoreline, structural habitat survey in 2020 revealed that the majority of the reservoir perimeter was natural shoreline. Granger Reservoir was classified as “infested” with zebra mussels in December 2019. Other descriptive characteristics for Granger Reservoir are in Table 1.

Angler Access

Boat access consisted of five public boat ramps. Bank fishing access is good within the San Gabriel Wildlife Management Area, which includes a primitive boat launch for canoes and kayaks. The USACE operates four parks with good bank access. Wilson Fox Park 2 contains a fishing pier with accommodations for the physically challenged. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Farooqi and De Jesus 2017) included:

1. Use funding from the BRA Interlocal Agreement to install a network of 10 Fishiding Stakeout vertical crappie stake bed complexes.

Action: A network of 10 Fishiding Stakeout vertical crappie stake bed complexes were installed in 2017 with the help of BRA, Boy Scouts of America, and USACE.
2. Use print and electronic media to inform the public about these habitat structures and their location (GPS coordinates and map).

Action: Details about these habitat structures and their locations were posted on the Texas Parks and Wildlife Department website. Print and social media were used to promote utilization of the habitat structures.
3. Cooperate with USACE to post appropriate signage at access points around the reservoir and educate the public about invasive species through the use of media, the internet and in person.

Action: Since Granger Reservoir was designated as infested with zebra mussels in December 2019, we collaborated with USACE to ensure appropriate zebra mussel signage and boat ramp stencils.

Harvest regulation history: Sport fish in Granger Reservoir have been, and are currently managed with statewide regulations (Table 3).

Stocking history: Granger Reservoir has not been stocked since 1996. Blue Catfish were stocked in 1995 and 1996. Channel Catfish were stocked in 1979, 1990, and 1996. The complete stocking history is in Table 4.

Vegetation/habitat management history: Historically, high turbidity and fluctuating water level of Granger Reservoir have made it difficult for aquatic vegetation to become established. Water clarity (Secchi depth) is typically less than 1 foot. Few aquatic plants were observed in Granger Reservoir prior to 2003. In 2003, hydrilla was discovered near Wilson Fox Park 2 boat ramp and was eliminated by the USACE with an aquatic herbicide. In 2004, water hyacinth was observed in the upper San Gabriel arm of the reservoir, but has not been documented since 2004. In 2013, waterwillow was planted in five enclosures around the reservoir with the assistance of volunteers from the Sun City Hunting and Fishing Club. However, these plantings were unable to become established.

In 2012, BRA in negotiations with TPWD, asked for a fishery assessment to be provided for all eleven BRA jurisdictional reservoirs (Farooqi and De Jesus 2013). These assessments have been taken into consideration for a multi-year system operating plan for the Brazos River Basin. Assessments for Granger Reservoir included habitat availability, river/reservoir connectivity, and access at various lake levels. Based on these multiple assessments, threshold recommendations were provided to decrease potential impacts to the fishery during future basin-wide water level manipulations. The Granger Reservoir management threshold recommendation was 504 ft. above MSL, which is the same as conservation pool. A critical threshold for fisheries applications was set at 498 ft. above MSL. As a consequence, other than under exceptional circumstances, water level fluctuations at Granger Reservoir will be minimal and therefore have little impact on the fishery.

Water transfer: No interbasin water transfers are known to exist at Granger Reservoir.

Methods

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

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 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 (15 net nights at 15 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn). Age and growth characteristics were determined using a sub-sample (maximum of 10 fish per inch class) of stock-size (≥ 5 inches) White Crappie collected (Category 1, variable sample size; TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Gill netting – Blue Catfish, Channel Catfish, and White Bass were collected by gill netting (15 net nights at 15 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for White Bass were determined by a Category 2 evaluation using otoliths from 13 fish (ranging from 9.0 to 10.9 inches; TPWD, Inland Fisheries Division, unpublished manual revised 2017).

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 ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics.

Habitat – A shoreline structural habitat, access, and vegetation survey was conducted in 2020. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Water level – Source for water level data was the USGS website (2021).

Results and Discussion

Habitat: In 2020, littoral habitat consisted primarily of natural shoreline (83.5%; Table 6; Appendix B). Aquatic vegetation was sparse. American pondweed covered less than 1 acre and patches of hydrilla covered 3 acres.

Prey species: Gizzard Shad and Threadfin Shad were the most abundant prey species caught in 2020. Total CPUE of Gizzard Shad in 2020 (713.0/h) was considerably higher than in the 2016 (290.0/h), and 2012 (96.0/h) surveys, as shown in Figure 2. It was also much higher than in the 2008 survey (129.0/h). The IOV for Gizzard Shad was 98, indicating that 98% of the Gizzard Shad population (≤ 8 inches in length) were vulnerable to existing predators. High IOV values were also obtained in 2016 (86), 2012 (99), and 2008 (91). Threadfin Shad catch rate was higher in 2020 (402.0/h) than 2016 (99.0/h), 2012 (228.0/h), and 2008 (62.0/h).

Total electrofishing CPUE for Bluegill is typically relatively low for this reservoir. However, in 2020 the total CPUE was extremely low (1.0/h) compared to the 2016 survey (96.0/h). The catch rate was also

extremely low in 2012 (6.0/h; Figure 3). Visibility is very poor at this reservoir (Secchi depth = 1.5 feet) and that may have contributed to the low catch rates.

Blue Catfish: The total gill net catch rate of Blue Catfish was 20.7/nn in 2021, which is much higher than in previous surveys (4.0/nn in 2017 and 1.4/nn in 2013; Figure 4). Also, stock CPUE (18.6/nn) was much higher than in previous years, although population size structure (PSD=4) had declined compared to the 2017 (PSD = 45) and 2013 (PSD = 29) surveys. Most Blue Catfish were of harvestable size (12 to 19 inches), and the largest fish measured 32 inches in length. The presence of juvenile fish indicates some spawning success, considering the last stocking of Blue Catfish was in 1996. Body condition for all stock-size fish collected in 2021 was extremely high, indicating very healthy fish. Relative weight ranged from 104 to 163 (W_r of 100 is optimum). The reason for the high W_r was the fact that these fish had gorged themselves with shad (as determined by gut content examination). Both Gizzard Shad and Threadfin Shad abundance was very high at the time of the fall electrofishing survey and they may have become more vulnerable to predation as temperatures fell dramatically during the recent winter storm (Winter Storm Uri, February 13-17, 2021). In addition, a new water body record (rod and reel) for Blue Catfish was established in 2019 (38.5 pounds).

Channel Catfish: The abundance of Channel Catfish had increased since the last two surveys. In 2021, the gill netting catch rate for Channel Catfish was 3.0/nn (comprised mainly of stock size fish - 2.3/nn) compared to 1.4/nn in 2017 and 1.2/nn in 2013 (Figure 5). The majority of fish were between 12 and 19 inches and the largest fish was 22 inches in length. Juvenile Channel Catfish were present. Proportional Stock Density (PSD = 35) was similar to that recorded in 2017 (PSD = 30). PSD-P and PSD-M indicated that larger fish were not present in 2021 and 2013, but a 30-inch fish was caught in 2017 (PSD-P = 10 PSD-M = 10). As was the case with Blue Catfish, Channel Catfish body condition was high, with W_r ranging from 101 to 132 and was most likely due to the high availability of shad. In addition, a new water body record (rod and reel) for Channel Catfish was established in 2017 (6.9 pounds).

Flathead Catfish: No Flathead Catfish were caught in 2021 or 2013 (Figure 6). Catch rates have been very low in other surveys (0.2/nn in 2017, and 0.4/nn in both 2009 and 2005). A new water body record (rod and reel) for Flathead Catfish was established in 2016 (16.5 pounds).

White Bass: The total gill net catch rate of White Bass was 35.2/nn in 2021. This was considerably higher than in 2017 (5.2/nn) and 2013 (3.2/nn; Figure 7). A large proportion of fish were of harvestable size i.e., ≥ 10 inches (CPUE-10 = 21.2) with the largest fish up to 15 inches in length. Body condition of fish ≥ 10 inches was good, with W_r ranging from 99 to 104 (indicating the fish were quite plump). In 2021, PSD (69) and PSD-P (22) were adequate. Based on a Category 2 age and growth analysis, all 13 fish were 2 years old (Figure 8). Thus, White Bass reached harvestable size (10 inches) at age 2.

Largemouth Bass: Based on historical records, the reservoir contains a very low-density Largemouth Bass population relative to those in other central Texas reservoirs. Total CPUE has been low for the last five surveys. The total catch rate of Largemouth Bass was 3.0/h in 2020 compared to catch rates of 18.0/h in 2016 and 5.0/h in 2012 (Figure 9), and 33.0/h in 2008 and 7.0/h in 2004. In 2020, there was only one harvestable size fish caught, measuring 14 inches in length. Visibility is very poor at this reservoir (Secchi depth = 1.5 feet) which may partially explain the low catch rates. In addition, the lack of aquatic vegetation in this reservoir has likely hindered the production of a desirable Largemouth Bass population. Fluctuating water levels impacted the Largemouth Bass population prior to 2013. However, the BRA has agreed to maintain Granger Reservoir at conservation level (except for under exceptional circumstances). Thus, water level fluctuations at Granger Reservoir will be minimal and therefore should have reduced impact on the fishery in the future.

White Crappie: The last creel survey was conducted in spring 2005 when White Crappie was the most sought-after species (61.5% directed angler effort; Bonds and Magnelia 2005). Since then, anecdotal information from anglers suggests that White Crappie is still the most popular species in Granger Reservoir. The total trap net catch rate for White Crappie decreased to 12.6/nn in 2020 from 34.7/nn in

2018 and 29.1/n in 2016. (Figure 10). However, the 2020 catch rate is similar to previous surveys (13.5/n in 2013, 20.0/n in 2012, 6.4/n in 2011, 13.5/n in 2010, and 9.7/n in 2009). Similarly, stock CPUE declined in 2020 (Figure 10). The trap net CPUE of harvestable-size White Crappie (≥ 10 inches) decreased compared to the last two surveys. CPUE-10 was 1.3/n in 2020, 6.2/n in 2018, and 2.2/n in 2016. Population size structure was good based on PSD, PSD-P, and PSD-M (Figure 10). In 2020, relative weight was above optimum (≥ 100) for most fish, indicating good condition. This was also the case in 2018 when W_r was > 100 for all stock-size fish (Figure 10). On average, White Crappie reached harvestable size between age 1 and 2 (Figure 11).

Fisheries Management Plan for Granger Reservoir, Texas

Prepared – July 2021

ISSUE 1: Granger Reservoir was last stocked with Blue Catfish in 1995 and 1996 and they have been able to establish a self-sustaining population. In 2021, there was a significant increase in the harvestable component of the Blue Catfish population and their body condition.

MANAGEMENT STRATEGY

1. Promote the Blue Catfish fishery using print and social media to encourage angler utilization of this resource.

ISSUE 2: In 2021, harvestable size White Bass abundance and body condition significantly increased.

MANAGEMENT STRATEGY

1. Promote the White Bass fishery using print and social media to encourage angler utilization of this resource.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Since Granger Reservoir is now infested with zebra mussels, continue working with USACE to ensure there is adequate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. 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 (2021–2025)

Sport fish, forage fish, and other important fishes

Sport fishes in Granger Reservoir include White Crappie, White Bass, Largemouth Bass, Blue Catfish, and Channel Catfish. Known important forage species include Gizzard Shad, Threadfin Shad, Bluegill, Longear Sunfish, and Inland Silverside.

Low density fisheries

Largemouth Bass: Bass angling popularity among anglers ranked fourth behind White Crappie, catfishes, and White Bass during the last creel survey (spring 2005). However, only 2.5% of all anglers targeted Largemouth Bass and they spent 0.2 hours/acre fishing for them. Too few angler interviews precluded the estimation of meaningful catch statistics for this species. Largemouth Bass total CPUE has been low for the last six surveys. Largemouth Bass CPUE in 2020, 2016, 2012, 2008, 2004, 2000, and 1997 were 3.0, 18.0, 5.0, 33.3, 7.0, 4.0, and 15.3/h, respectively.

In view of limited angler interest and very low density of Largemouth Bass in Granger Reservoir, sampling will be limited to general monitoring trend data (without precision or sample size requirements). A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in fall 2024.

Channel Catfish: Channel Catfish were first stocked in Granger Reservoir in 1979 and then twice in the 1990s. Recent catch rates have been relatively low. Channel Catfish CPUE in 2021, 2017, 2013, 2009, 2005, and 2003 were 3.0, 1.4, 1.2, 1.8, 0.9, and 1.8/nn, respectively. In the spring 2005 creel survey 16.8% of rod-and-reel angler effort was directed for catfish; however, anglers specifically targeting Blue Catfish comprised the highest portion of that percentage. Anglers targeting Channel Catfish were too few to estimate meaningful catch statistics.

Sampling the Channel Catfish population in Granger Reservoir is not a priority for the 2021-2025 survey period. We will monitor presence/absence and record relevant data while conducting gill netting surveys for Blue Catfish.

Flathead Catfish: Flathead Catfish are present in low abundance based on gill netting surveys. Total CPUE was 0.0/nn in 2021, 0.2/nn in 2017, 0.0/nn in 2013, and 0.4/nn in both 2009 and 2005. The last creel survey was conducted in 2005; Anglers targeting Flathead Catfish were too few to calculate meaningful catch statistics. Sampling this population is not a priority for 2021-2025. We will monitor presence/absence while conducting gill netting surveys for Blue Catfish.

Forage Species

Gizzard Shad, Threadfin Shad, Bluegill, Longear Sunfish, and Inland Silverside: Gizzard Shad and Threadfin Shad are the primary forage species in Granger Reservoir. Additional forage species are present in low densities and include Bluegill, Longear Sunfish, and Inland Silverside. As with Largemouth Bass, general monitoring trend data (without precision or sample size requirements) will be gathered for these species by sampling a minimum of 12 randomly selected 5-min electrofishing sites in fall 2024.

Survey objectives, fisheries metrics, and sampling objectives

White Crappie: White Crappie are the most popular sport fish in Granger Reservoir. White Crappie accounted for 61.5% of the directed fishing effort in the last creel survey (spring, 2005). White Crappie anglers caught an estimated 55,057 (RSE = 22.0) White Crappie of which 41.8% were harvested. Of legal-sized White Crappie caught by anglers, 96.2% were harvested. The majority of White Crappie harvested were between 10 and 14 inches. White Crappie catch per unit effort in 2020, 2018, 2016, 2015, 2014 and 2013 were 12.6, 34.7, 29.1, 40.3, 40.9, and 13.5/nn respectively.

White Crappie will be collected biennially using a minimum of 15 shoreline-set single-cod trap nets. Target sample sizes to evaluate size structure and CPUE will be 50 stock-length fish, and an RSE of $CPUE-S \leq 30$. Sampling will continue at random stations until a minimum of 50 stock size White Crappie have been collected. In addition to the original 15 random stations, five additional random stations will be pre-determined in the event extra sampling is necessary. Individual weights will be collected for a minimum of 10 White Crappie per inch-class to determine relative weights. Age and growth characteristics will be determined using a sub-sample (maximum of 10 fish per inch class) of stock-size (≥ 5 inches) White Crappie (Category 1, variable sample size).

Blue Catfish: Blue Catfish were stocked in Granger Reservoir in 1995 and 1996. Catfish were the second most sought after fish in Granger Reservoir (16.8% directed angler effort, 1.5 h/acre) during a spring 2005 creel survey. Anglers specifically targeting Blue Catfish comprised the highest percentage (31.4%) of that effort. Of the estimated 1,365 Blue Catfish caught, 78.3% were harvested. Ninety-four percent of legal-sized Blue Catfish were harvested. Catch per unit effort (CPUE) from gill netting surveys in 2021, 2017, 2013, 2009, and 2005 were 20.7, 4.0, 1.4, 2.4, and 3.0/nn, respectively.

Target sample sizes to evaluate size structure and CPUE will be 50 stock-length fish, and an RSE of $CPUE-S \leq 30$. A minimum of 15 randomly selected gill net stations will be sampled in spring, 2024, but sampling will continue at random stations until a minimum of 50 stock size fish have been collected. In addition to the original 15 random stations, five additional random stations will be pre-determined in the event extra sampling is necessary.

White Bass: White Bass anglers comprised 5.1% of the total directed angling effort during the spring 2005 creel survey making it the third most sought after species in Granger Reservoir. Angler catch rate for White Bass was high (3.3 fish/h; RSE = 60.7). Of the 11,321 (RSE = 38.1) White Bass caught, 30.8% were harvested. Of the legal-sized White Bass caught, 82.2% were harvested. White Bass CPUE in 2020, 2017, 2013, 2009, 2005, and 2003 were 35.2, 5.2, 3.2, 5.8, and 2.9/nn, respectively.

White Bass will be collected when sampling for Blue Catfish with gill nets. Sampling will be limited to general monitoring trend data (without precision or sample size requirements). An age and growth sample with a minimum of 13 fish between 9.0 and 10.9 inches in length will be collected from gill netting to assess the time required for White Bass to grow to the minimum length limit for harvest.

Literature Cited

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Bonds, C. C., and S. J. Magnelia. 2005. Statewide freshwater fisheries monitoring and management program survey report for Granger Reservoir, 2004. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-30, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Farooqi, M. A. and M. J. De Jesus. 2017. Statewide freshwater fisheries monitoring and management program survey report for Granger Reservoir, 2016. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.
- Texas Commission on Environmental Quality. 2020. Trophic classification of Texas reservoirs. 2020 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d), Austin. 15 pp.
- United States Geological Society (USGS). 2021. National water information system: Web interface. Available: <http://waterdata.usgs.gov/tx/nwis>.

Tables and Figures

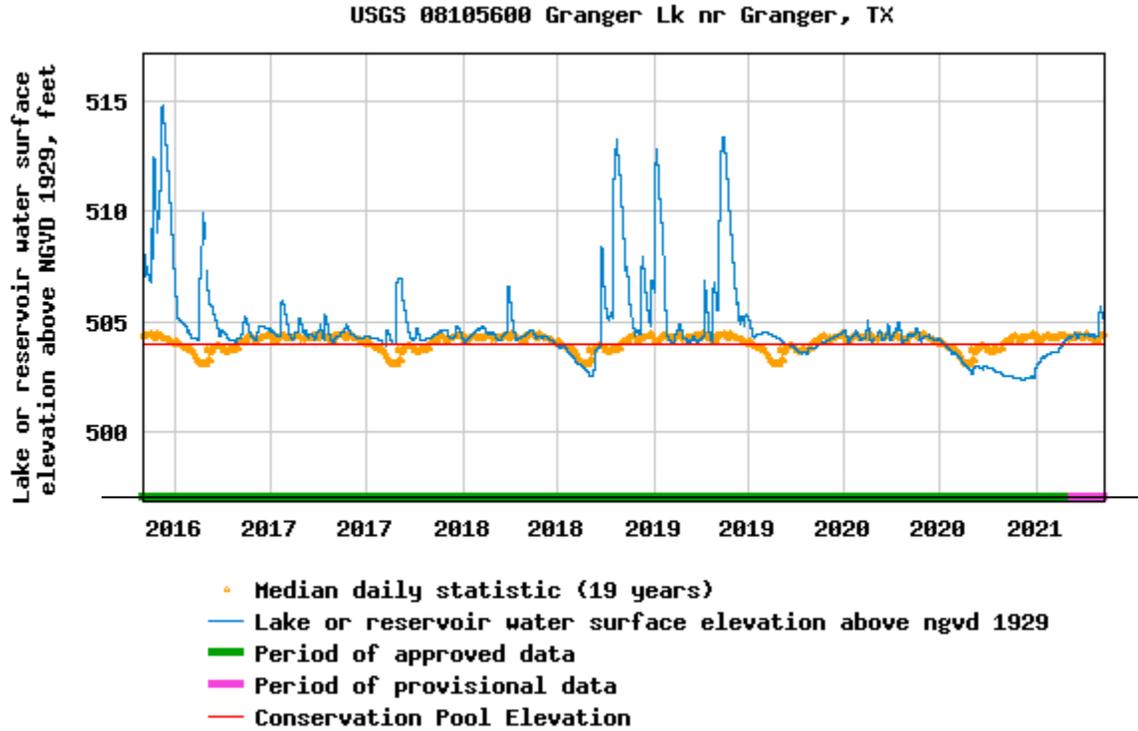


Figure 1. Water level elevations in feet above mean sea level (MSL) recorded for Granger Reservoir, Texas 2016-2021 (USGS 2021).

Table 1. Characteristics of Granger Reservoir, Texas.

Characteristic	Description
Year constructed	1980
Controlling authority	United States Army Corps of Engineers
County	Williamson
Reservoir type	Mainstream: San Gabriel River
Shoreline Development Index	4.3
Conductivity	345 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristics for Granger Reservoir, Texas, last updated September 2016. Reservoir elevation at time of survey was 504 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
Taylor Park	30.675756 -97.364161	Y	51	495	Good
Wilson Fox Park 1	30.683283 -97.363978	Y	20	494	Good
Wilson Fox Park 2	30.682850 -97.354486	Y	50	494	Good
Friendship Park	30.717533 -97.336525	Y	36	501	Good
Willis Creek	30.696628 -97.385142	Y	38	501	Poor (silted in)

Table 3. Harvest regulations for Granger 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, 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 for Granger Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	1995	247,224	FGL	1.9
	1996	<u>220,000</u>	FGL	1.7
	Total	467,224		
Channel Catfish	1979	31,860	AFGL	7.9
	1990	64,998	AFGL	4.0
	1996	<u>220,429</u>	FGL	1.8
	Total	317,287		
Coppernose Bluegill	1981	<u>100,000</u>	UNK	0.0
	Total	100,000		
Florida Largemouth Bass	1980	50,584	FRY	1.0
	1992	44,470	FGL	1.1
	1992	175,696	FRY	0.9
	1994	<u>220,976</u>	FGL	1.3
	Total	491,726		
Striped Bass	1981	110,371	UNK	0.0
	1983	<u>15,927</u>	UNK	0.0
	Total	126,298		

Table 5. Objective-based sampling plan components for Granger Reservoir, Texas 2020–2021.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Total	General monitoring
	Size structure	Length frequency	
	Condition	W_r	10 fish/inch group (max)
Redbreast Sunfish	Abundance	CPUE–Total	General monitoring
	Size structure	Length frequency	
Bluegill	Abundance	CPUE–Total	General monitoring
	Size structure	Length frequency	
Redear Sunfish	Abundance	CPUE–Total	General monitoring
	Size structure	Length frequency	
Gizzard Shad	Abundance	CPUE–Total	General monitoring
	Size structure	Length frequency	
	Prey availability	IOV	
<i>Trap netting</i>			
Crappie	Abundance	CPUE – Stock	RSE-stock ≤ 30
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Rough estimate of growth	10 fish/inch group (max)
	Condition	W_r	10 fish/inch group (max)
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE–Stock	RSE-Stock ≤ 30
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Condition	W_r	10 fish/inch group (max)

Table 6. Survey of shoreline structural habitat types, Granger Reservoir, Texas, 2020.

Habitat type	Estimate	% of total
Gravel shoreline	2.1 miles	7.2
Rocky shoreline	2.7 miles	9.3
Natural shoreline	24.2 miles	83.5

Table 7. Survey of aquatic vegetation, Granger Reservoir, Texas, 2017–2020. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2017	2018	2019	2020
Native submersed	0.0	0.0	0.0	<1.0 (<0.02)
Native floating-leaved	0.0	0.0	0.0	0.0
Native emergent	0.0	0.0	0.0	0.0
Non-native				
Hydrilla (Tier III)*	0.0	0.0	0.0	3.0 (<0.07)

* Tier III is Watch Status

Gizzard Shad

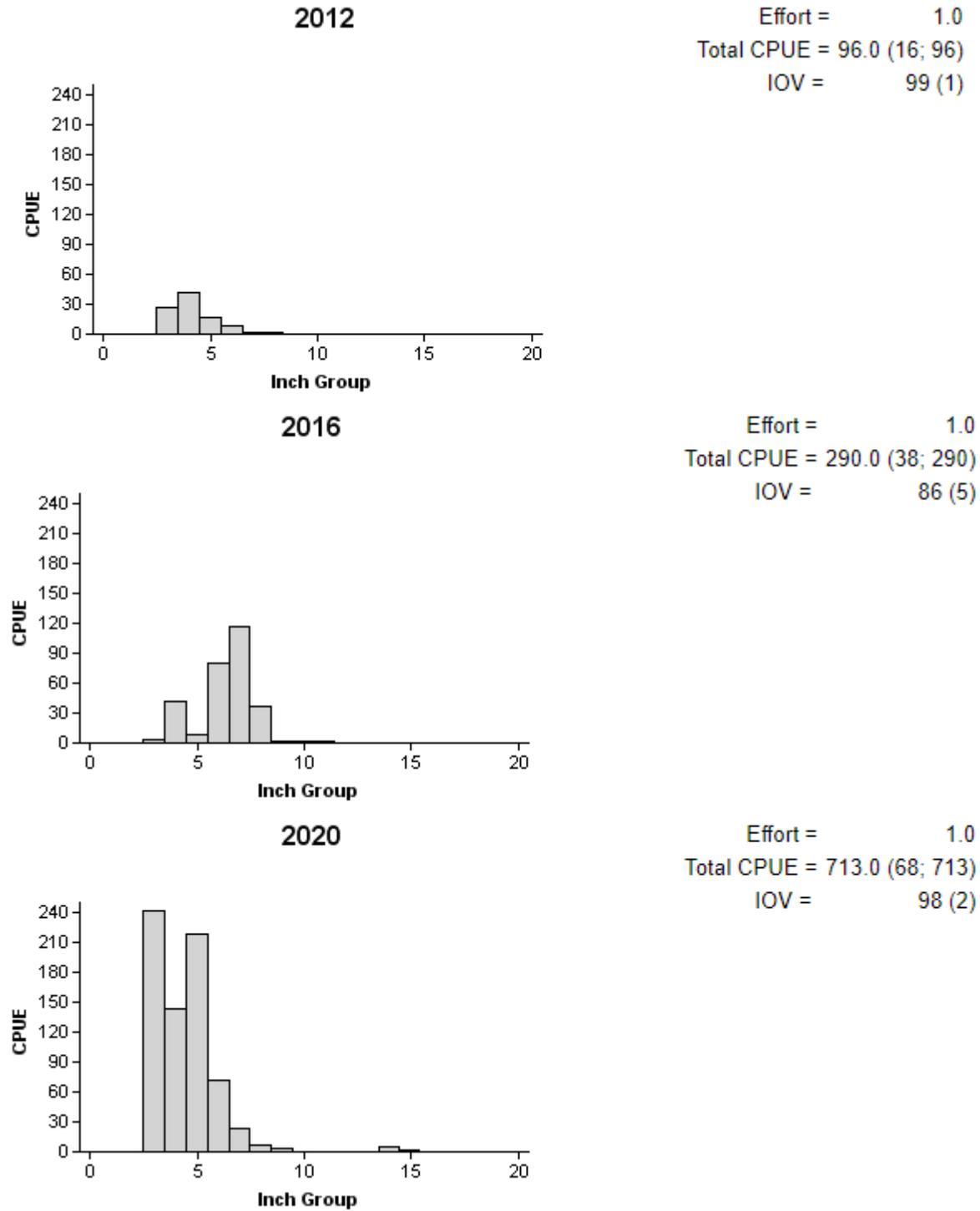


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Granger Reservoir, Texas, 2012, 2016, and 2020.

Bluegill

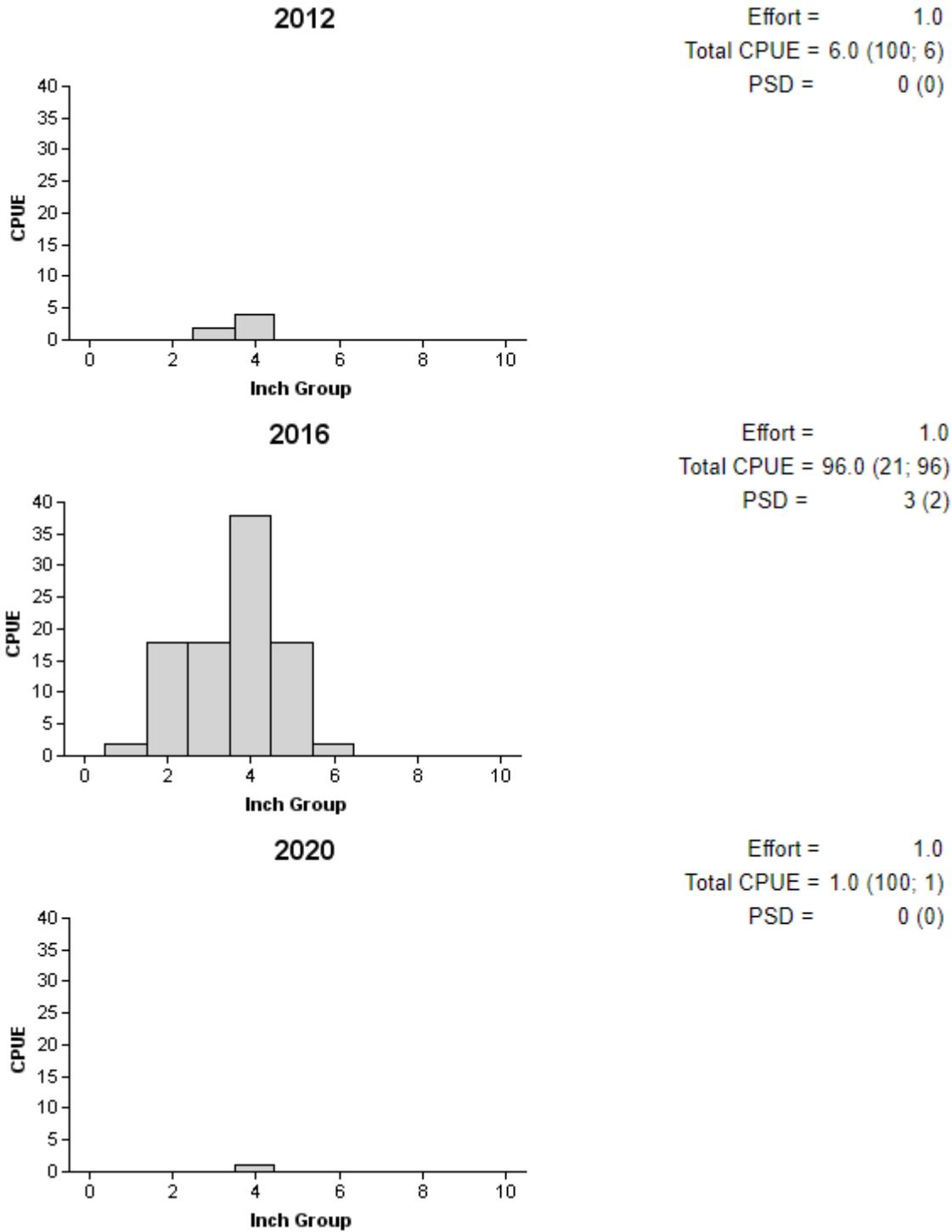


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Granger Reservoir, Texas, 2012, 2016, and 2020.

Blue Catfish

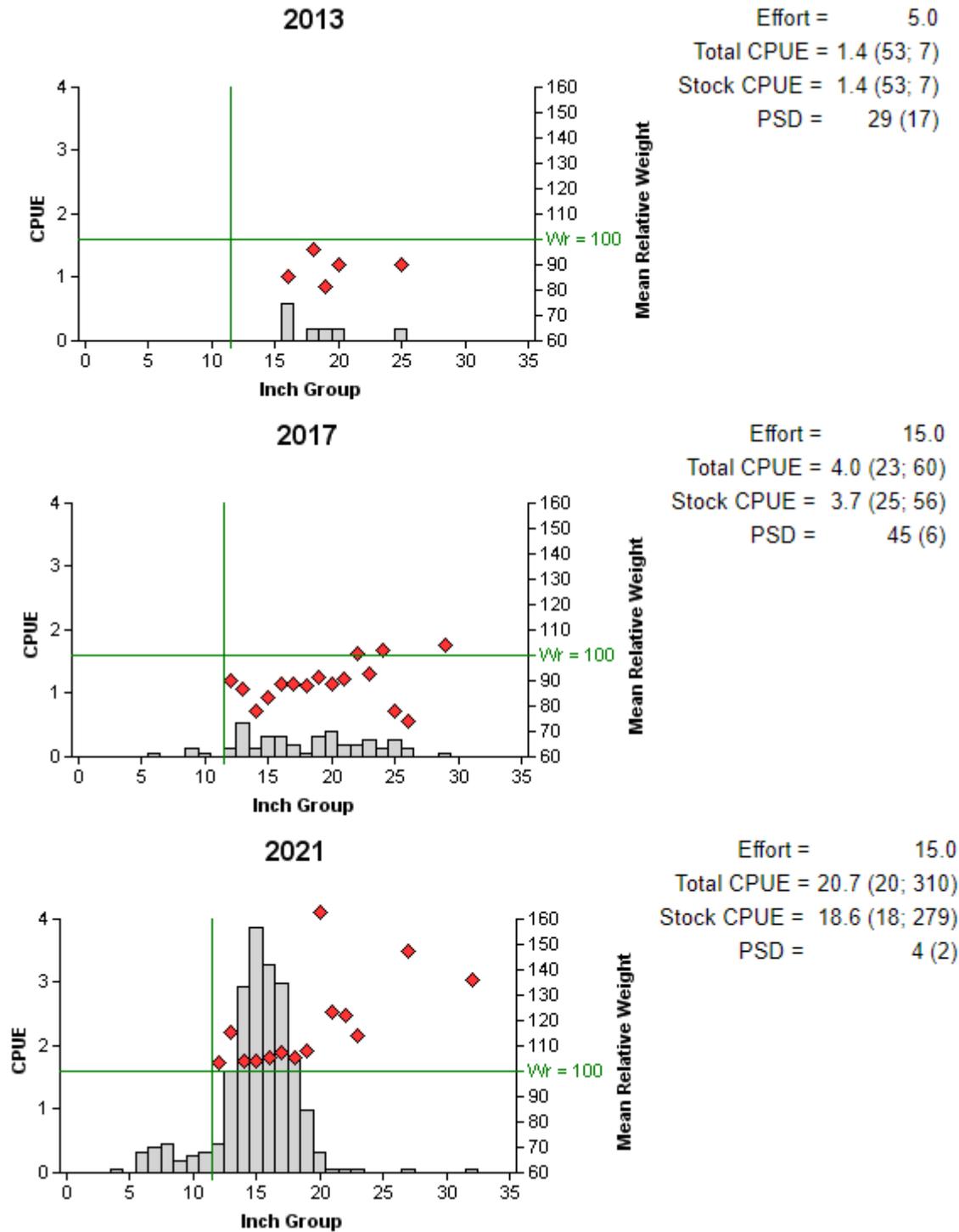


Figure 4. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Granger Reservoir, Texas, 2013, 2017, and 2021. Vertical line represents minimum length limit at the time of sampling.

Channel Catfish

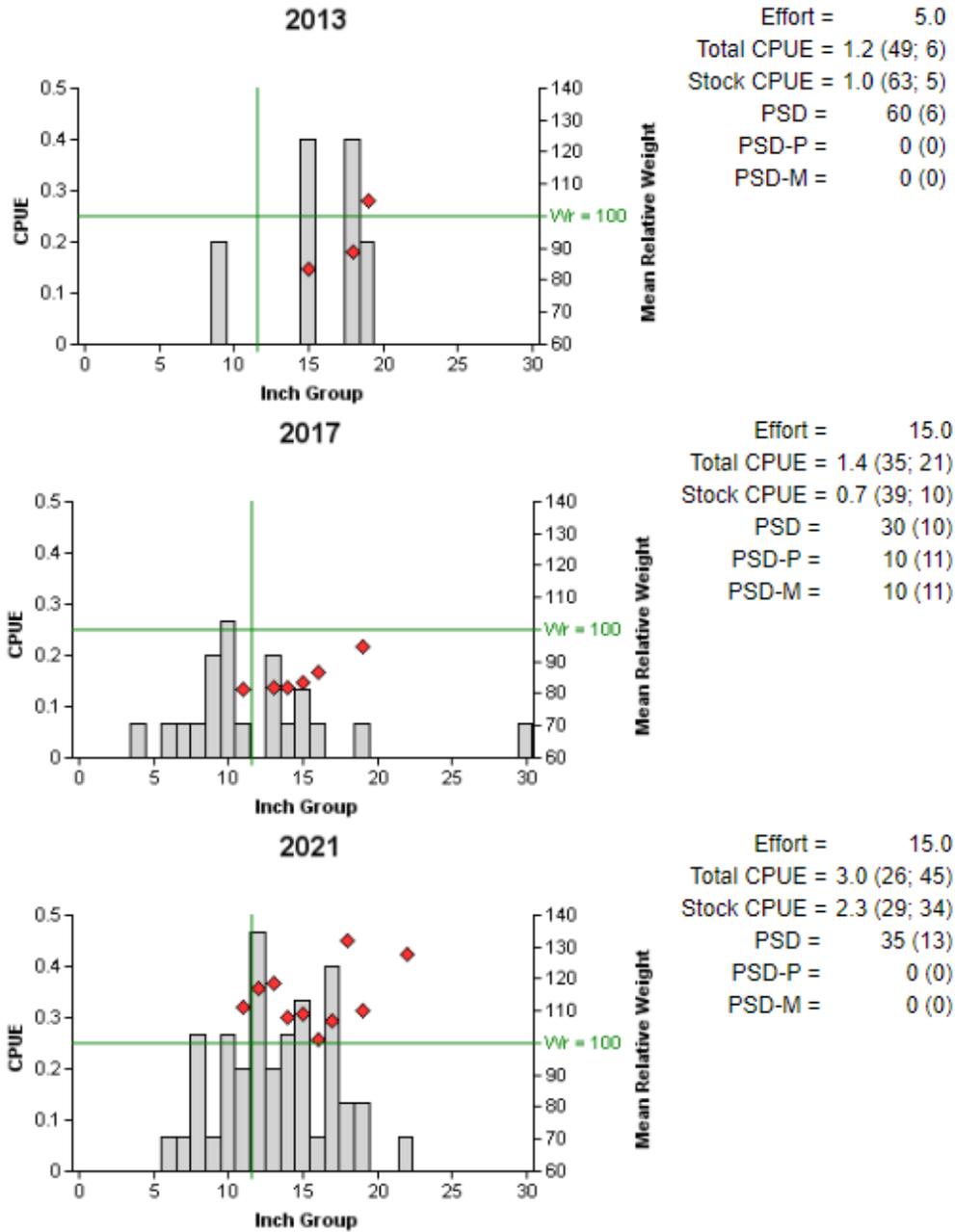


Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Granger Reservoir, Texas, 2013, 2017, and 2021. Vertical line represents minimum length limit at the time of sampling.

Flathead Catfish

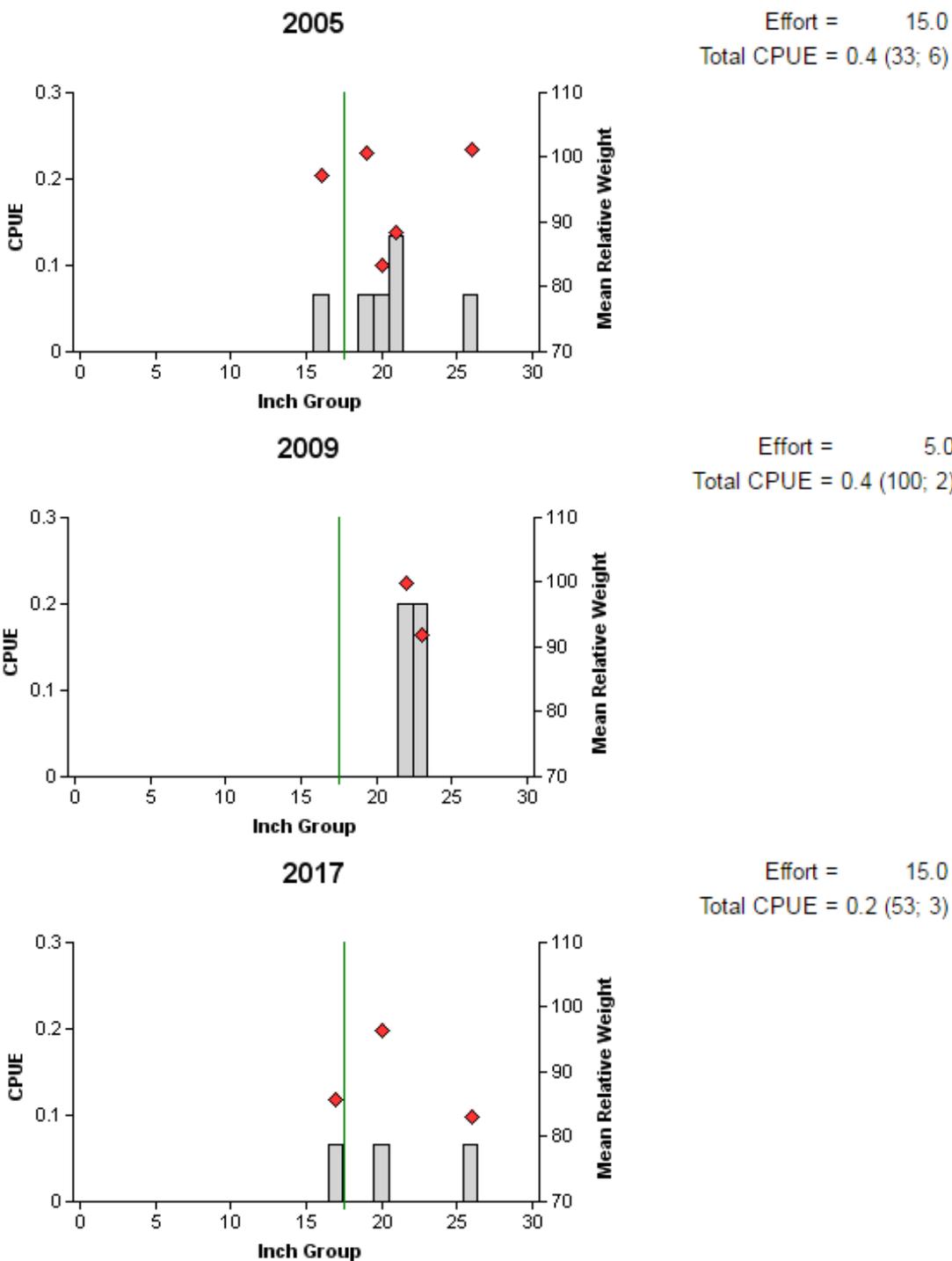


Figure 6. Number of Flathead Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Granger Reservoir, Texas, 2005, 2009, and 2017. No Flathead Catfish were caught in 2013 and 2021. Vertical line represents minimum length limit at the time of sampling.

White Bass

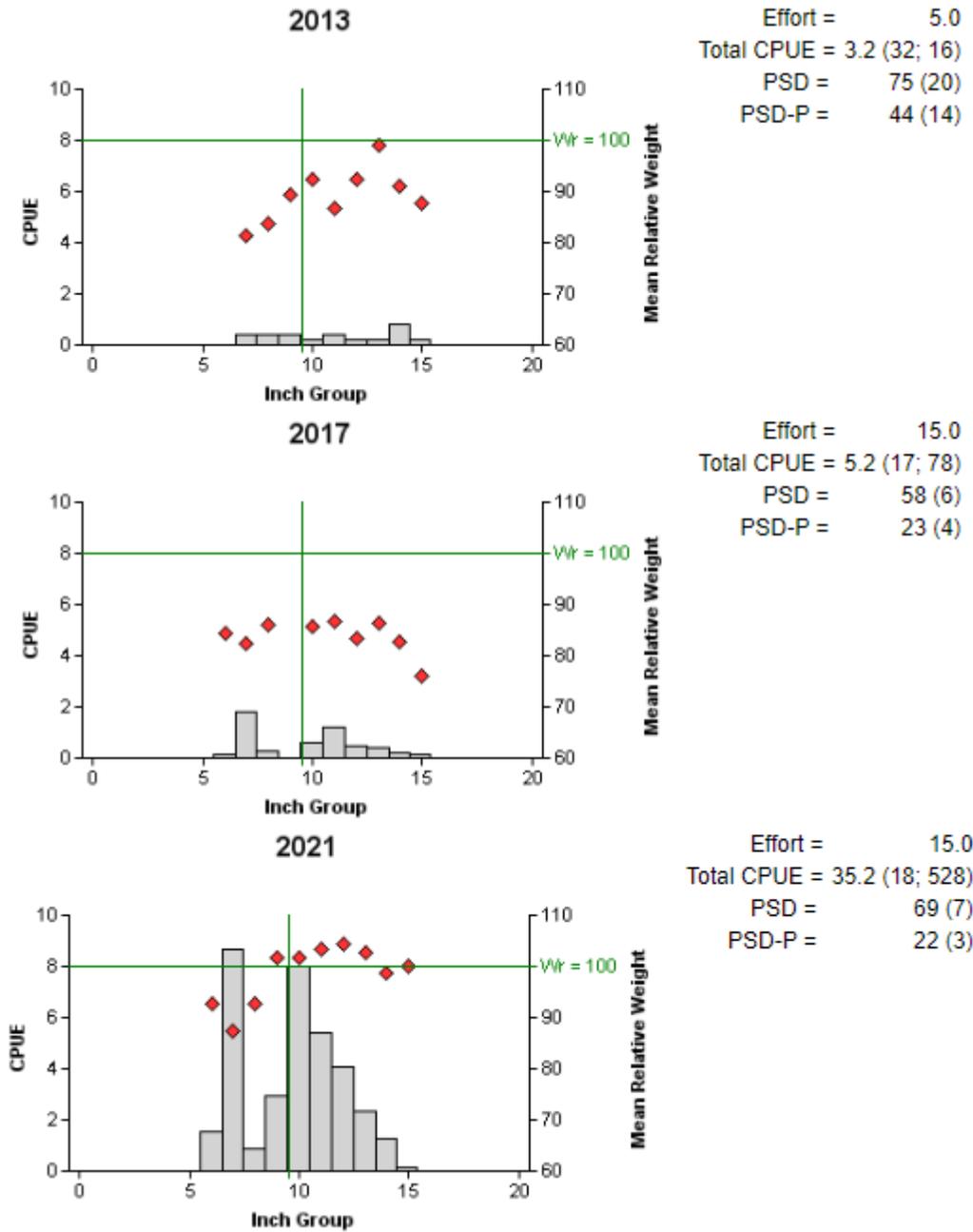


Figure 7. Number of White Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Granger Reservoir, Texas, 2013, 2017, and 2021. Vertical line represents minimum length limit at the time of sampling.

White Bass

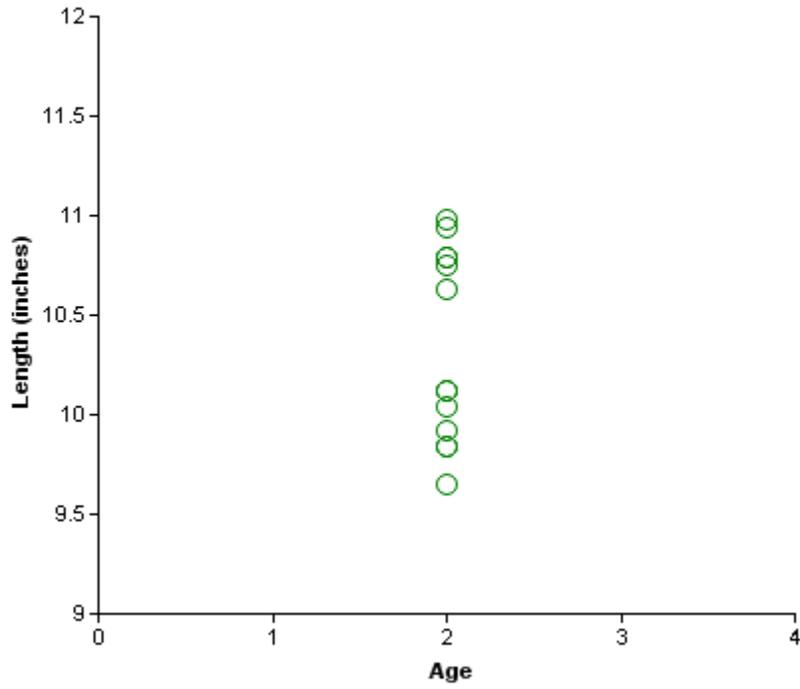


Figure 8. Length at age for White Bass (n=13) collected by gill netting at Granger Reservoir, Texas, February 2021.

Largemouth Bass

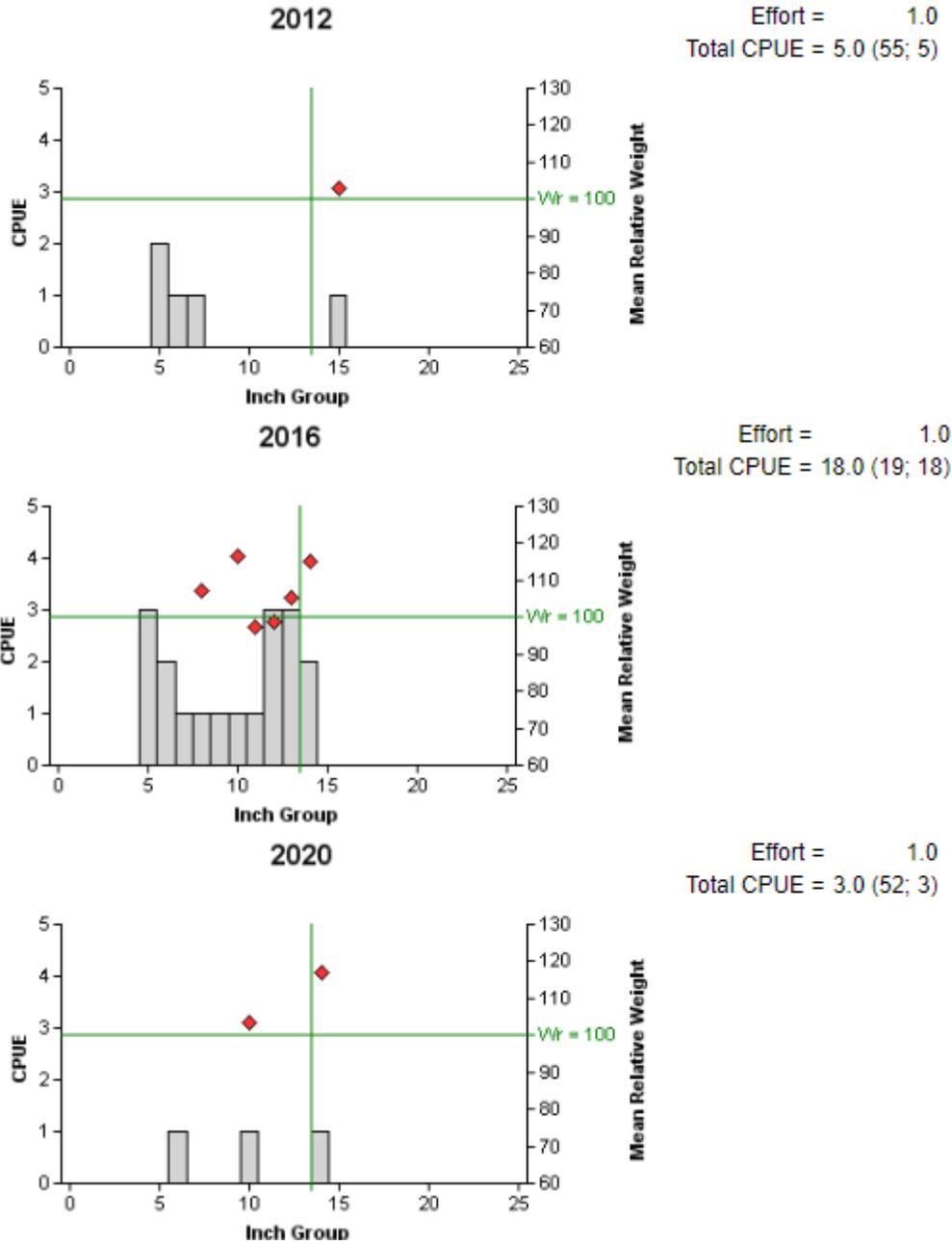


Figure 9. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Granger Reservoir, Texas, 2012, 2016, and 2020. Vertical line represents minimum length limit at the time of sampling.

White Crappie

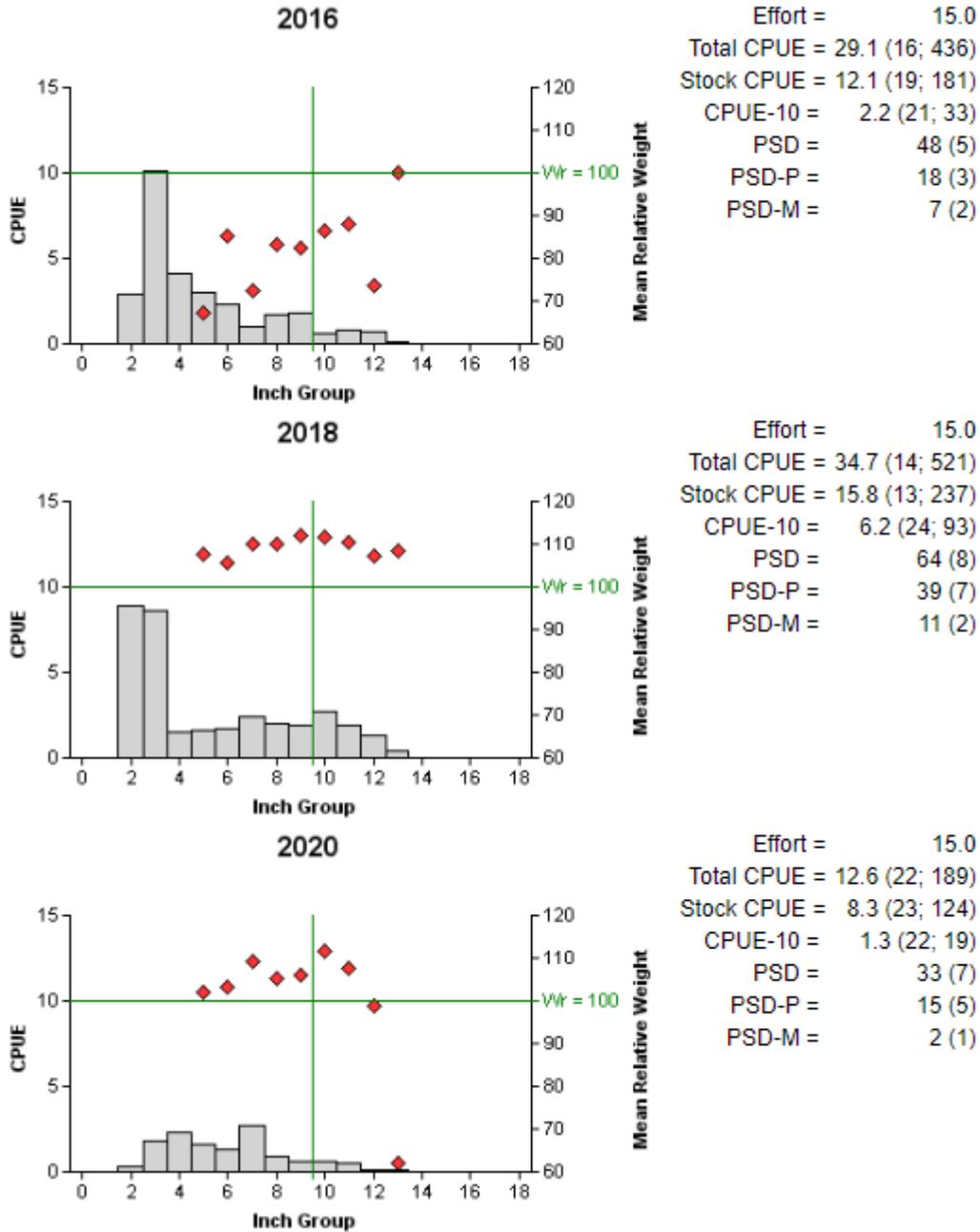


Figure 10. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (W_r , diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Granger Reservoir, Texas, 2016, 2018, and 2020. Vertical line represents minimum length limit at the time of sampling.

White Crappie

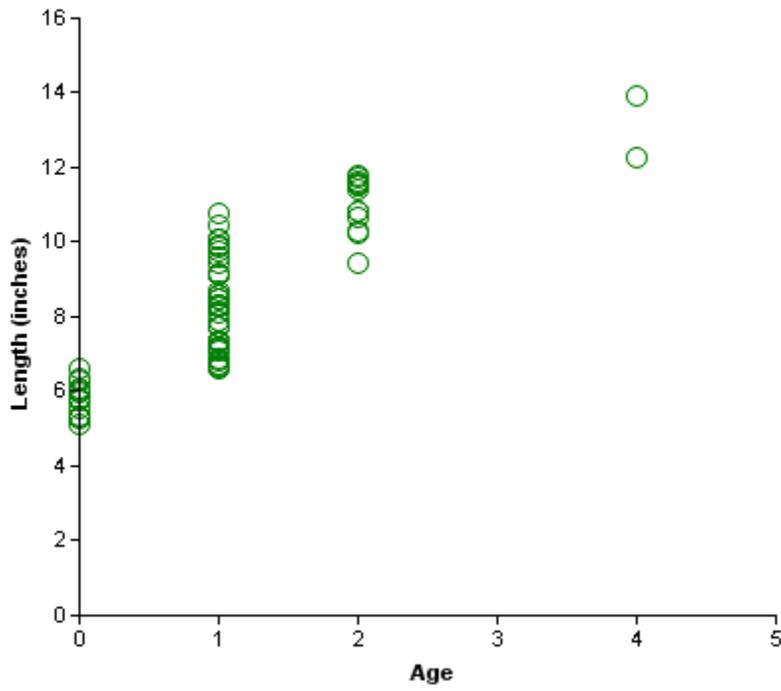


Figure 11. Length at age for White Crappie collected from trap nets at Granger Reservoir, Texas, December 2020 (N = 69).

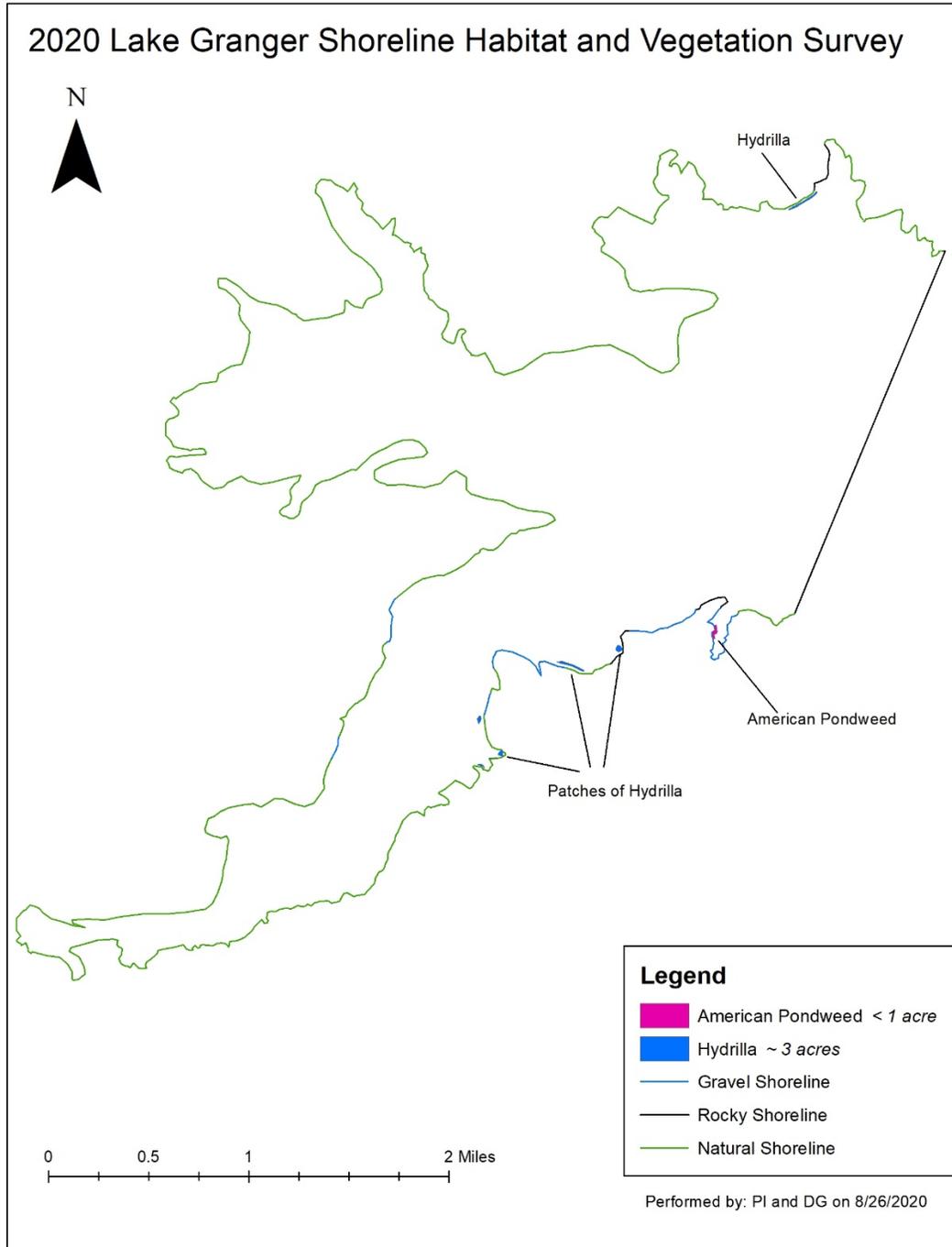
Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Granger 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.

	Survey year			
	2021-2022	2022-2023	2023-2024	2024-2025
Angler Access				X
Structural Habitat				X
Vegetation				X
Electrofishing – Fall				X
Electrofishing – Spring				
Electrofishing – Low frequency				
Trap netting		X		X
Gill netting				X
Baited tandem hoop netting				
Creel survey				
Report				X

APPENDIX B – Map Shoreline Habitat and Vegetation

Structural habitat survey map for Granger Reservoir, Texas, August 2020.



APPENDIX C – Catch rates for all target species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Granger Reservoir, Texas, 2020-2021. Sampling effort was 15 net nights for gill netting and trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					713	713.0 (68)
Threadfin Shad					402	402.0 (27)
Blue Catfish	310	20.7 (20)				
Channel Catfish	45	3.0 (26)				
White Bass	528	35.2 (18)				
Bluegill					1	1.0 (100)
Largemouth Bass					3	3.0 (52)
White Crappie	95	6.3 (16)	189	12.6 (22)		



Life's better outside.®

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

© Texas Parks and Wildlife, PWD RP T3200-1301 (07/21)

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