

Winters-Elm Creek Reservoir

2019 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:

Lynn Wright, District Management Supervisor

Inland Fisheries Division
San Angelo District, San Angelo, Texas



Carter Smith
Executive Director

Craig Bonds
Director, Inland Fisheries

July 31, 2020



Contents

Survey and Management Summary	1
Introduction.....	2
Reservoir Description	2
Angler Access.....	2
Management History	2
Methods.....	3
Results and Discussion.....	3
Fisheries Management Plan for Winters-Elm Creek Reservoir, Texas	6
Objective-Based Sampling Plan and Schedule (2021–2024).....	7
Literature Cited.....	9
Tables and Figures	10
Reservoir Characteristics	10
Boat Ramp Characteristics.....	10
Harvest Regulations	10
Stocking History.....	11
Objective-Based Sampling Plan for 2017-2020	12
Structural Habitat Survey.....	13
Percent Directed Angler Effort per Species.....	13
Total Fishing Effort and Fishing Expenditures.....	13
Gizzard Shad.....	14
Bluegill	15
Blue Catfish	16
Channel Catfish	17
White Bass.....	19
Largemouth Bass	20
White Crappie	22
Proposed Sampling Schedule	24
APPENDIX A – Catch rates for all species from all gear types	25
APPENDIX B – Map of sampling locations.....	26
APPENDIX C – Map of angler ZIP codes	27

Survey and Management Summary

Fish populations in Winters-Elm Creek Reservoir were surveyed in 2017 and 2019 using electrofishing and trap netting and in 2018 and 2020 using gill netting. Anglers were surveyed from March 2017 through May 2017 with a spring creel survey. Historical data are presented with the 2017-2020 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: Winters-Elm Creek Reservoir is a 337-acre impoundment located east of Winters, Texas in Runnels County. It is situated on Elm Creek, directly downstream of Old Winters Reservoir. Boat access is good at the city-maintained boat ramp, and bank access is good at the city park.

Management History: Important sport fishes include Largemouth Bass, catfish species and White Crappie. Blue Catfish were stocked several times in the years just after impoundment. Largemouth Bass have been frequently stocked in recent years. Statewide harvest regulations have been used to manage this fishery.

Fish Community

- **Prey species:** Electrofishing catch of Gizzard Shad was very high, and size structure was good as 82% of Gizzard Shad were available as prey to most sport fish. Electrofishing catch of Bluegill has increased over the past three surveys.
- **Catfishes:** Blue, Channel, and Flathead were all present in the reservoir. Blue Catfish abundance was lower than past surveys, but many fish over 20 inches were observed. Channel Catfish abundance remained low. Angler effort for catfish species comprised 15% of all angler effort in spring 2017.
- **White bass:** White Bass were present in the reservoir in low abundance. Size structure was good as large fish comprised the majority of White Bass observed in the survey. There was no directed effort for White Bass in the spring 2017 and an estimated 39 were harvested.
- **Largemouth Bass:** Largemouth Bass abundance was similar to previous surveys. Size structure has improved from recent surveys and growth was fast. Florida bass influence was excellent as the Largemouth Bass population was comprised of 79% of Florida alleles while 18% were pure Florida strain Largemouth Bass.
- **White Crappie:** White Crappie were abundant but had poor size structure. During the spring creel 85% of all angling effort was targeted at White Crappie and an estimated 509 White Crappie were harvested.

Management Strategies: Continue to manage the fishery with statewide regulations. Conduct additional electrofishing, trap netting, and gill netting surveys in 2021-2022, and general monitoring electrofishing, trap net, and gill net surveys in 2023-2024. Vegetation surveys will be conducted in 2023.

Introduction

This document is a summary of fisheries data collected from Winters-Elm Creek Reservoir in 2017-2020. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2017-2020 data for comparison.

Reservoir Description

Winters-Elm Creek Reservoir is a 337-acre impoundment completed in 1983 on Elm Creek. The reservoir is located in Runnels County, east of Winters, Texas and is operated and controlled by the City of Winters. Primary reservoir water uses include municipal water supply and recreation. Old Winters Reservoir, constructed in 1945, is situated directly upstream and feeds water to Winters-Elm Creek through a spillway. Conservation pool is 1,790 feet above mean sea level, and water level was approximately four feet low at time of sampling. Standing timber and natural rocky shoreline have been the dominant habitat features in the reservoir. Other descriptive characteristics for Winters-Elm Creek Reservoir are in Table 1.

Angler Access

Winters-Elm Creek Reservoir has one public boat ramp and no private boat ramps. Boat access was good at a city-maintained boat ramp. Bank fishing access was good at W. Lee Colburn Park and a floating fishing pier was available. Ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Wright 2016) included:

1. Conduct standard monitoring of Blue Catfish with gill nets in spring 2018 and 2020 and promote the fishery.
Action: Blue Catfish were surveyed with gill netting in 2018 and 2020.
2. Conduct standard trap netting in 2017 and 2019 to monitor White Crappie population abundance, size structure, condition, and growth.
Action: Trap netting surveys were conducted in 2017 and 2019.
3. Cooperate with the City of Winters to post signage, educate the public about invasive species, and track existing and future inter-basin water transfers to facilitate potential invasive species responses.

Action: The San Angelo District continued to work with the City of Winters to post signage and to educate the public on invasive species threats through media outlets.

Harvest regulation history: Sportfish in Winters-Elm Creek Reservoir are managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: Blue Catfish were stocked in 1984 and 1986 following impoundment and a fishery was established. Smallmouth Bass and Walleye were stocked in the mid-80's but failed to establish a fishery. Florida-strain Largemouth Bass have been stocked from 2016-2019. The complete stocking history is in Table 4.

Vegetation/habitat management history: Fish attractors were placed around the floating fishing pier in 2017. No other significant vegetation management history exists for this reservoir.

Water transfer: Winters-Elm Creek Reservoir is primarily used for municipal water supply and recreation. A spillway on the south end of the Old Winters Reservoir deposits water directly into Winters-Elm Creek Reservoir. No interbasin water transfer occurs on these reservoirs.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Winters-Elm Creek Reservoir (Wright 2016). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 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. Ages for Largemouth Bass were determined using otoliths from 13 randomly selected fish (range 13.0 to 14.9 inches).

Trap netting – Crappie were collected using trap nets (20 net nights at 20 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 13 randomly selected fish (range 9.0 to 10.9 inches).

Gill netting – Blue Catfish, Channel Catfish, and White Bass were collected by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Micro-satellite DNA analysis was used to determine genetic composition of individual fish.

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 and creel statistics.

Creel survey – A spring access-point creel survey was conducted from March 2017 through May 2017. Angler interviews were conducted on five weekend days and four weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Habitat – A structural habitat and vegetation survey was conducted in 2019. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Results and Discussion

Habitat: Aquatic vegetation is limited in Winters-Elm Creek due to fluctuating water levels. No aquatic vegetation was observed in 2019. Limited amounts of emergent vegetation (Water willow and Bull rush) was observed during the spring but falling water levels resulted in no aquatic vegetation at the time of survey in September. No vegetation was observed in 2015 as water levels rose 13 feet two months prior to survey (Wright 2016). Littoral zone structural habitat consisted natural shoreline and riprap, while 15% of the reservoir contained standing timber (Table 6). Conservation License Plate funds were used in 2017 to place six trophy tree kits around the floating fishing pier at W. Lee Colburn Park for the purpose of enhancing angler catch rates.

Creel: Directed fishing effort by anglers during the spring was primarily directed towards White Crappie (85.5%), followed by catfish anglers (14.5%) (Table 8). Total fishing effort for all species was 3,999 hours (11.9 h/acre) and direct expenditures during the spring was \$14,342 (Table 9). Boat anglers accounted for 81.6% of angler effort. ZIP code data indicated most anglers were from the local area as approx. 85% of anglers traveled less than 50 miles to fish at Winters-Elm Creek Reservoir (Appendix C).

Prey species: Predominant prey species were Gizzard Shad and Blue Gill, but other sunfishes such as Longear Sunfish, Warmouth, and Green Sunfish were present in low relative abundance (Appendix A). Electrofishing catch rates of Gizzard Shad was excellent in 2019 with 1,031.0/h, which was higher than 699.0/h in 2017 and 421.7/h in 2015 (Figure 1). Index of Vulnerability for Gizzard Shad was good, indicating that 82% of Gizzard Shad were available to existing predators (Figure 2). From 2011-2019, IOV has ranged from 78 to 96 and averaged 88 over the past three surveys. Total CPUE of Bluegill in 2019 was 191.0/h, which was higher than 100.0/h in 2017 and 41.1/h in 2015 (Figure 2). Size structure continued to be dominated by small individuals as PSD has ranged from 0 to 7 over the past three surveys (Figure 2). Overall, the prey base has improved in numbers in recent years and provides a quality prey base to most sportfish. The Gizzard Shad population in Winters-Elm Creek has the highest catch rate in the San Angelo District and from year-to-year has consistently maintained a desirable IOV.

Catfishes: The gill net catch rate of stock-size Blue Catfish has declined from 8.2/nn in 2016 to 1.5/nn in 2020 (Figure 3); however, significant changes in water levels during those surveys may have influenced catch rates. Despite the overall decline in catch rates, the catch rate of sub-legal fish has increased from 2.1/nn 2016 to 4.6/nn in 2020 and indicates adequate recruitment is occurring. Blue Catfish up to 25 inches were encountered during surveys. Condition of Blue Catfish was marginal in 2020 with most inch groups relative weights ranging from 85 to 95 (Figure 3). This is a decline in condition as previous surveys have shown higher relative weights. There was no documented harvest of Blue Catfish in the recent creel survey (Table 9). Due to lower than anticipated catch rates, our survey objective to collect 50 stock size fish was not met.

The gill net catch rate of Channel Catfish has remained low and was less than 1.0/nn in 2018 and 2020 (Figure 4). Over the past three surveys, no Channel Catfish over 20 inches have been collected. Of the few Channel Catfish collected, condition was good, with relative weights near or above 100 (Figure 4). Directed fishing effort towards catfish was 580 hours with an estimated seven Channel Catfish harvested (Table 9).

Gill net catch rate of Flathead Catfish was low in 2020 (0.6/nn) and similar to previous surveys. Six Flathead Catfish were collected in 2020 ranging from 21 to 27 inches. Of the few Flathead Catfish collected; condition was generally good with relative weights exceeding 100 for most fish.

White Bass: The gill net catch rate of White Bass was 2.5/nn in 2019, which was slightly higher than the previous two surveys, but overall was still low (Figure 6). Despite the low numbers, large individuals in good condition have been observed over the past three surveys. White Bass up to 17 inches were sampled in 2020, and relative weights ranged from 100 to 120 (Figure 6). No fishing effort was directed towards White Bass, and only 36 were estimated to have been harvested during the spring 2017 creel survey.

Largemouth Bass: The electrofishing catch rate of Largemouth Bass over 8 inches was 28.0/h in 2019, down from the 65.0/h in 2017, but similar to the 30.9/h in 2015. Size structure has generally improved over the past three surveys as growth of Largemouth Bass have begun to fill out larger size classes (Figure 7). The catch rate of Largemouth Bass over 18 inches has increased over the past 3 surveys from 0.9/h in 2015 to 10.0/h in 2019 (Figure 7). Growth of Largemouth Bass was excellent in 2017; average age at 14 inches (13.0 to 14.9 inches) was 2.0 years (N = 13; all 2 years old). Condition in 2019 was excellent for all size classes of fish and tended to increase with fish length (Figure 7). The spring creel survey in 2017 did not detect any directed effort for Largemouth Bass, and only seven Largemouth Bass were estimated to have been harvested. Florida Largemouth Bass influence was estimated for the first time in 2019. The percentage of Florida alleles was high at 79%, and five pure Florida Largemouth Bass were identified in the sample (Table 10). Due to low catch rates, we did not meet the survey objectives to

collect 50 stock size fish and it was unlikely additional sampling would have achieved this objective with reasonable effort.

White Crappie: The trap net catch rate of White Crappie has been high over the past three surveys, but catch has been dominated by fish less than 10 inches. While the total catch rate has ranged from 25.4/nn to 8.3/nn over the past three surveys, the catch rate of 10 inch or larger crappie has been less than 0.5/nn and the PSD-P has ranged from 1 to 7 (Figure 8). Mean relative weights were less than 85 for crappie from 6 to 8 inches in 2017 and 2019, but condition was adequate for fish over 10 inches (Figure 8). Too few White Crappie near legal size were collected to get an adequate growth sample; however, the White Crappie sample from 2013 indicated that crappie reached legal-size in 2.2 years (Wright 2016). An estimated 509 White Crappie were harvested during the spring quarter (1.5/acre) while only 11% of legal-size crappie were released (Table 11). Harvested crappie ranged from 10 to 16 inches, though the majority harvested were from 12 to 13 inches (Figure 9). Overall, trap net and creel data confirm there is low numbers of legal-size crappie in Winters-Elm Creek Reservoir. The fact that 10 hours of angler effort resulted in only 1.5 harvested per acre supports the trap net data that legal-size crappie are not abundant. While abundance of crappie over 10 inches may be low, they are still popular with local anglers and are an important sportfish in this reservoir. Due to variable catch rates, our survey objective of an CPUE-stock RSE ≤ 25 was not met.

Fisheries Management Plan for Winters-Elm Creek Reservoir, Texas

Prepared – July 2020

ISSUE 1: The White Crappie population has been characterized by poor size structure and poor condition for sub-legal crappie. PSD-P has averaged 5 over the past 6 surveys and relative weights of small crappie typically range from the mid-70's to mid-80's. Previous reports (Scott and Farooqi 2012 and Wright 2016) have identified stunting or high angler harvest as potential issues affecting the White Crappie population. Gizzard Shad are known to compete with young crappies for zooplankton and Winters-Elm Creek has Gizzard Shad catch rates exceeding 1,000/h of electrofishing. However, growth data are lacking and too few crappies around 10 inches have been caught to assess mean age at length. Assessing the growth rates would shed light on whether the lack of legal-size fish is due to slow growth, angler harvest, or combination of both.

MANAGEMENT STRATEGIES

1. Conduct standard trap netting in 2021 and 2023 to monitor the population abundance, size structure, and condition.
2. Retain 5 crappie per 10 mm length group in 2021 to estimate mean length at age for ages 1-3 (category 3).

ISSUE 2: 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 and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2021–2024)

Sport fish, forage fish, and other important fishes

Important sport fish in Winters-Elm Creek Reservoir include Blue Catfish, Largemouth Bass, and White Crappie. Important prey species include Gizzard Shad and Bluegill.

Low-density fisheries

Channel Catfish: Channel Catfish are present in Winters-Elm Creek Reservoir, but population abundance is low. Gill net CPUE of stock-size fish have been $\leq 2.0/\text{nn}$ over the past five surveys. No Channel Catfish over 20 inches have been collected over the past five surveys. Sampling Channel Catfish is not necessary in FY 2021-2024; however, length/weight data may be collected during Blue Catfish gill net sampling.

Flathead Catfish: Flathead Catfish are present in Winters-Elm Creek Reservoir, but population abundance is low. Gill net CPUE of stock-size fish have been $\leq 1.0/\text{nn}$ over the past six surveys. Sampling Flathead Catfish is not necessary in FY 2021-2024; however, length/weight data may be collected during Blue Catfish gill net sampling.

White Bass: White Bass have been present in Winters-Elm Creek Reservoir, but population abundance is low. White Bass gill net catch rates have ranged from 0.5 to 2.5/nn over the past three surveys. Sampling White Bass is not necessary in FY 2021-2024; however, length/weight data may be collected during Blue Catfish gill net sampling.

Survey objectives, fisheries metrics, and sampling objectives

Blue Catfish: Gill net catch rates of stock size fish peaked in 2016 at 8.2/nn but has since declined to low levels. Blue Catfish up to 36 inches have been collected and the potential exists for quality fishery. Our survey objective is to monitor abundance, size structure, and condition. A CPUE-stock RSE ≤ 25 has been achieved with 10 nets over the past three surveys. Length frequency data will be collected, but it is unlikely the minimum of 50 stock size fish will be collected for size structure estimation. No objectives will be set for number of stock size fish, but size structure indices will be estimated if enough fish are collected. A minimum of 10 randomly selected stations will be sampled in 2022 and 2024 (Table 12). Exclusive of the original 10 random stations, five additional random stations will be pre-determined in the event some extra sampling is necessary. A maximum of 15 gill net stations will be sampled.

Largemouth Bass: Largemouth Bass stock abundance has been moderate and consistent, ranging from 28.0/h to 65.0/h over the past five surveys. Size structure has improved since 2015 when water levels rose approx. 13 feet and a strong year-class was produced. Large fish up to 23 inches have been observed in recent surveys and given the productive prey base, the potential exists to development of a quality fishery. Our objectives are to monitor abundance, size structure, condition, and growth with biennial trend data. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2021 and 2023 (Table 12) Our objectives will be to collect 50 stock-size fish for size structure analysis and achieve a CPUE-Stock RSE ≤ 25 . Twelve random stations will be determined. Exclusive of the original 12 random stations, six additional random stations will be pre-determined in the event some extra sampling is necessary. A maximum of 18 stations will be sampled.

White Crappie: White Crappie were the most sought-after species during the spring creel survey in 2017. Additionally, White Crappie are very abundant in Winters-Elm Creek Reservoir with catch rates ranging from 8.3/nn to 69.8/nn over the past five surveys. However, poor size structure and conditions have been

reoccurring issue. Further monitoring is warranted for this fishery. Our objective is to monitor abundance, size structure, condition, and growth. Ten stations should be adequate to achieve sample objectives to estimate size structure ($N \geq 50$), condition, abundance (RSE of CPUE-Stock is ≤ 25). Crappie collected in 2021 will be retained (5 fish per 10 mm length group) to assess growth rates. A minimum of 10 randomly selected trap net sites will be sampled in 2021 and 2023 (Table 12). Exclusive of the original 10 random stations, five additional random stations will be predetermined in the event extra sampling is necessary. A maximum of 15 stations will be sampled.

Gizzard Shad and Bluegill: Gizzard Shad and Bluegill are the primary forage fish in Winters-Elm Creek Reservoir. Sampling effort based on sampling objectives for Largemouth Bass will be sufficient to determine IOV and CPUE-Total of Gizzard Shad and CPUE-Total and size structure of Bluegill. No additional sampling effort will be expended to achieve an RSE ≤ 25 for CPUE-Total for Gizzard Shad or Bluegill.

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.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- 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.
- Scott, M. K. and M. A. Farooqi. 2012. Statewide freshwater fisheries monitoring and management program survey report for Winters-Elm Creek Reservoir, 2011. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-2, Austin.
- Wright, L. D. 2016. Statewide freshwater fisheries monitoring and management program survey report for Winters-Elm Creek Reservoir, 2015. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-6, Austin.

Tables and Figures

Table 1. Characteristics of Winters-Elm Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1983
Controlling authority	City of Winters
County	Runnels
Reservoir type	Tributary – Colorado River Basin
Shoreline Development Index	1.9
Conductivity	467 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristics for Winters-Elm Creek Reservoir, Texas, October, 2019. Reservoir elevation at time of survey was approx. 4 feet below conservation pool.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
W. Lee Colburn Park	31.94061 -99.86391	Y	15	1,780	Excellent, no access issues

Table 3. Harvest regulations for Winters-Elm Creek 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 of Winters-Elm Creek Reservoir, Texas. FGL = fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Threadfin Shad	1982	2,000	UNK
	1984	1,050	UNK
	1985	1,200	UNK
	Total	4,250	
Blue Catfish	1984	8,640	FGL
	1986	4,420	FGL
	Total	13,060	
Channel Catfish	2003	25,199	FGL
	2004	7,897	FGL
	2016	32,416	FGL
	Total	65,242	
Bluegill	2002	169,930	FGL
	2016	32,758	FGL
	Total	202,688	
Smallmouth Bass	1984	8,992	FGL
Florida Largemouth Bass	2002	16,845	FGL
	2003	32,206	FGL
	2016	44,658	FGL
	2017	33,675	FGL
	2018	31,887	FGL
	2019	32,449	FGL
	Total	191,720	
Walleye	1988	140,000	FRY
Coppernose Bluegill	1981	700	UNK
	1984	45,000	UNK
	Total	45,700	

Table 5. Objective-based sampling plan components for Winters-Elm Creek Reservoir, Texas 2017–2020.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	N = 30, any age
Bluegill ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
	Prey availability	IOV	N ≥ 50
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure	Length frequency	N ≥ 50 stock
	Condition	W_r	10 fish/inch group (max)
<i>Trap netting</i>			
White Crappie	Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N = 50
	Condition	W_r	10 fish/inch group (max)
	Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches

^a No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of structural habitat types, Winters-Elm Creek Reservoir, Texas, 2019. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural	3.7 miles	78.7
Riprap	1.0 miles	21.3
Standing timber	50.0 acres	15.0

Table 7. Percent directed angler effort by species for Winters-Elm Creek Reservoir, Texas, 2017. Survey period was from 1 March through 31 May 2017.

Species	2017
Catfish Species	14.5
White Crappie	85.5

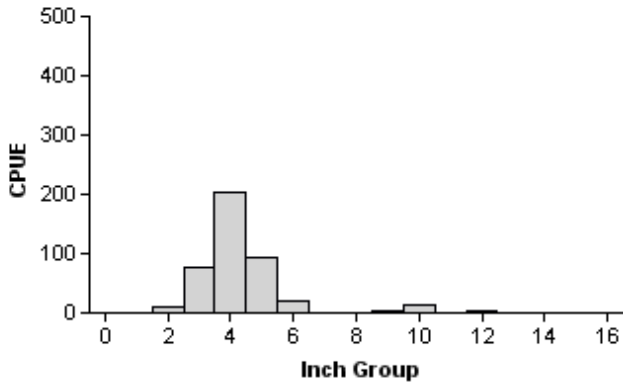
Table 8. Total fishing effort (h) for all species and total directed expenditures at Winters-Elm Creek Reservoir, Texas, 2017. Survey periods were from 1 March through 31 May, 2017. Relative standard error is in parentheses.

Creel statistic	2017
Total fishing effort	3,999 (48)
Total directed Expenditures	\$14,342 (89)

Gizzard Shad

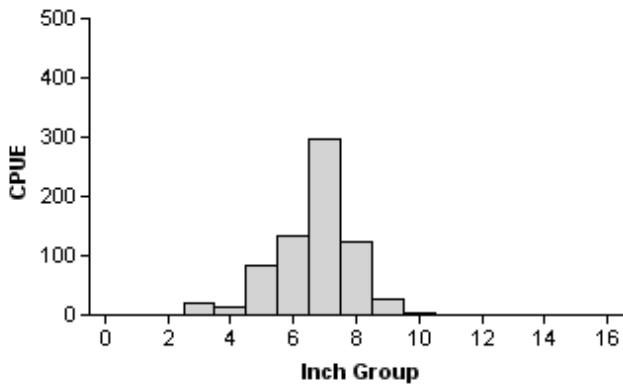
2015

Effort = 1.2
 Total CPUE = 421.7 (20; 492)
 IOV = 96 (2)



2017

Effort = 1.0
 Total CPUE = 699.0 (20; 699)
 IOV = 78 (7)



2019

Effort = 1.0
 Total CPUE = 1,031.0 (29; 1031)
 IOV = 82 (7)

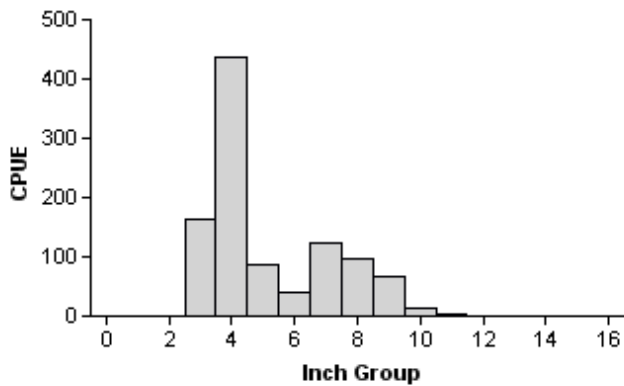
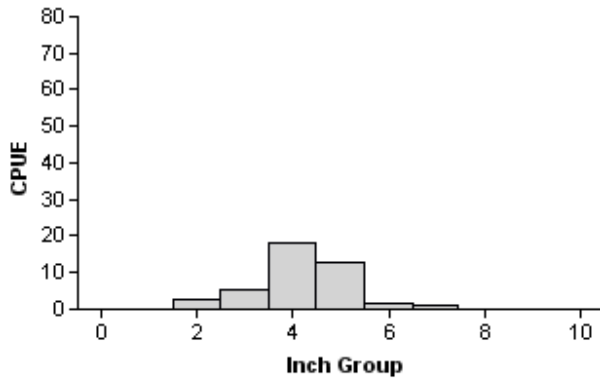


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2015, 2017, and 2019.

Bluegill

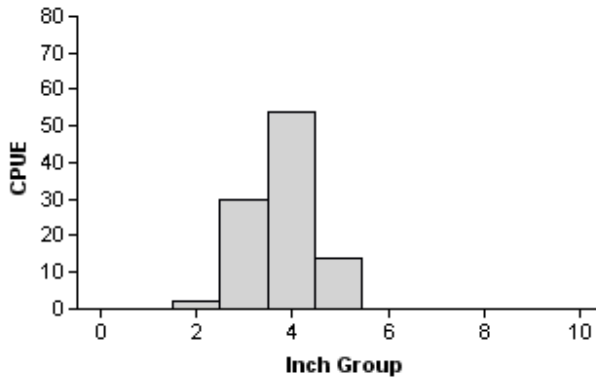
2015

Effort = 1.2
 Total CPUE = 41.1 (27; 48)
 PSD = 7 (3)



2017

Effort = 1.0
 Total CPUE = 100.0 (22; 100)
 PSD = 0 (0)



2019

Effort = 1.0
 Total CPUE = 191.0 (21; 191)
 PSD = 4 (1)

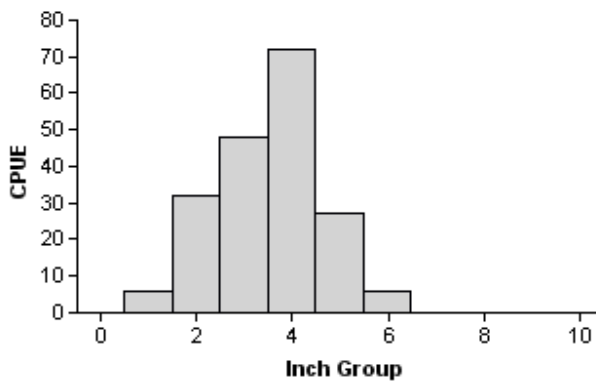


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2015, 2017, and 2019.

Blue Catfish

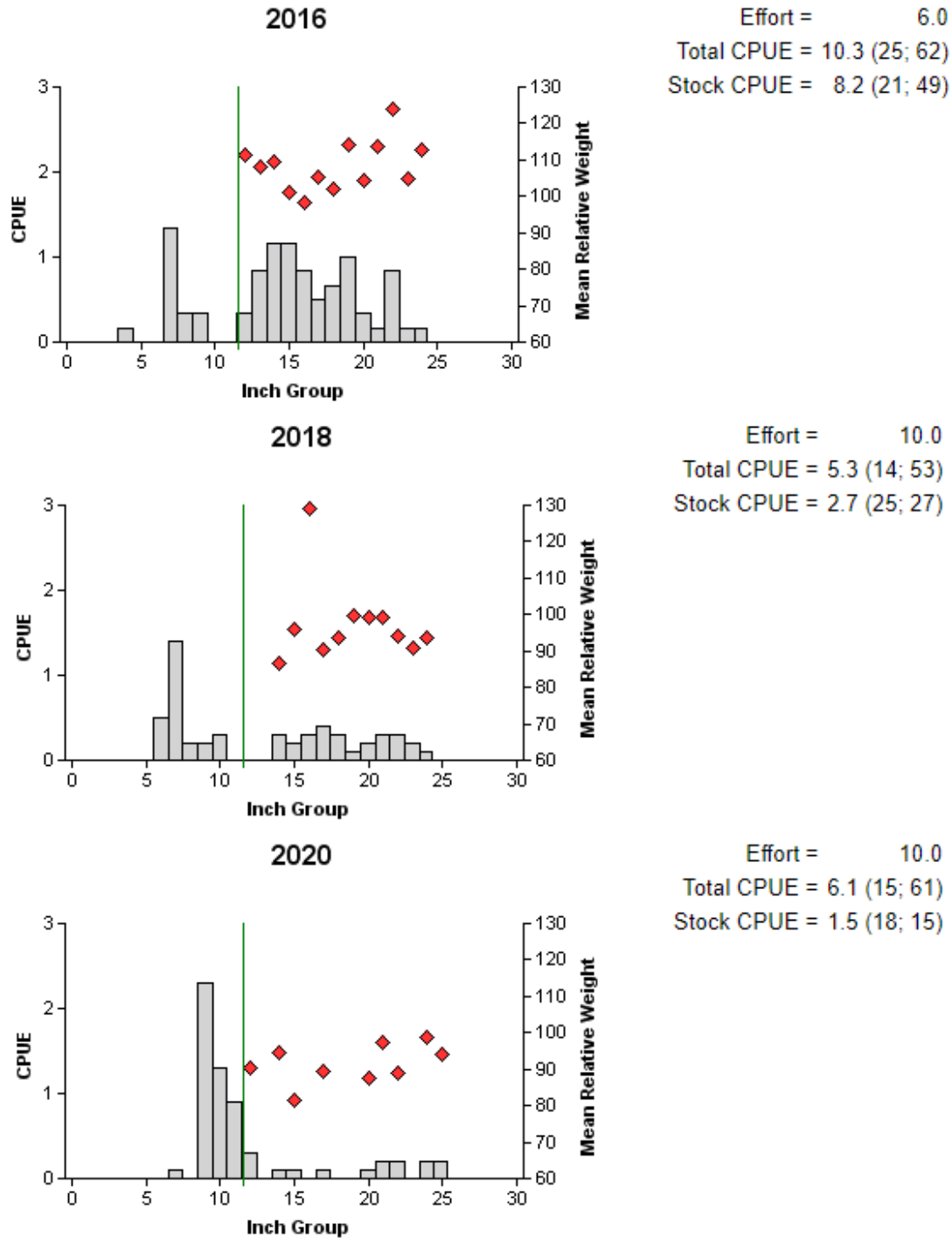


Figure 3. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2016, 2018, and 2020. Vertical line indicates minimum length limit.

Channel Catfish

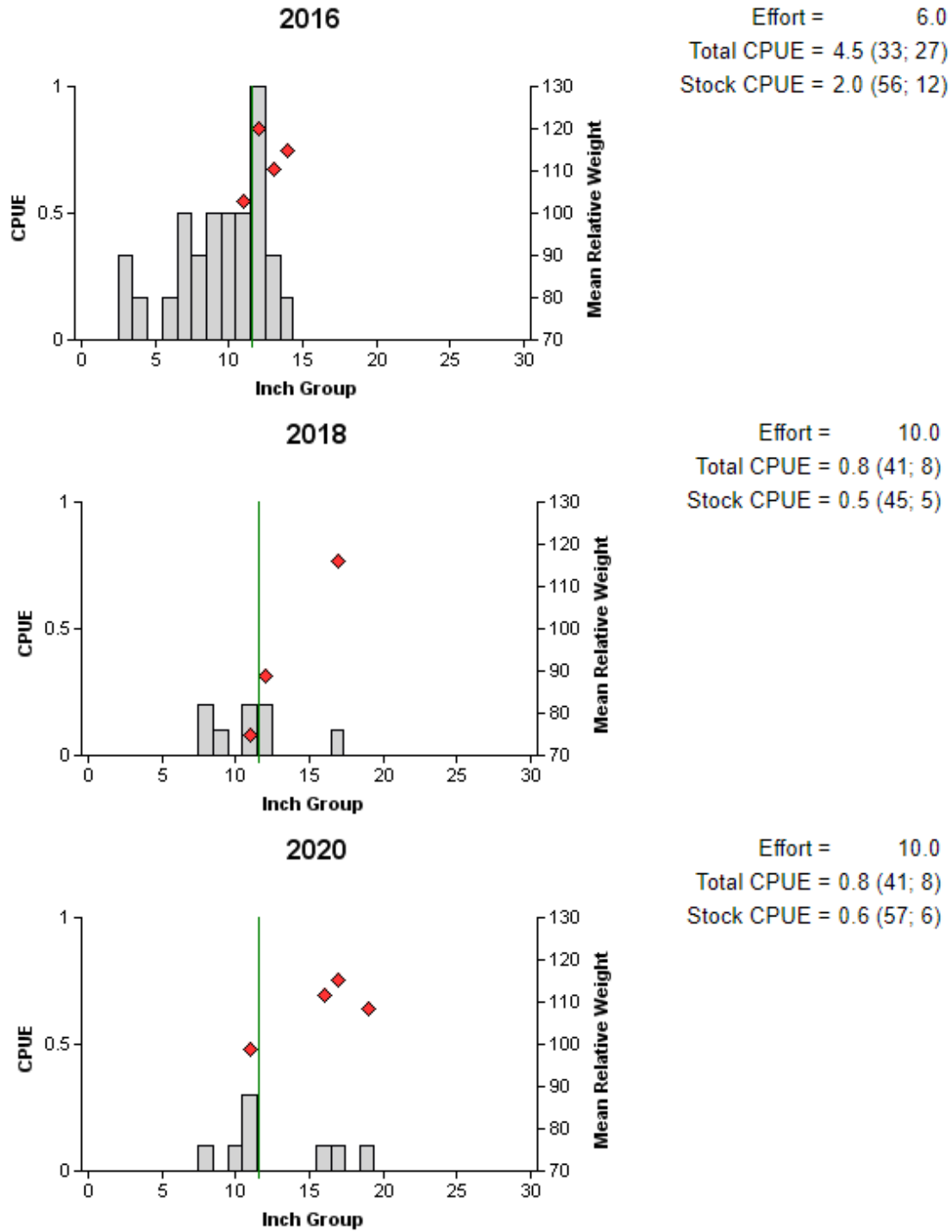


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2016, 2018, and 2020. Vertical line indicates minimum length limit.

Table 9. Creel survey statistics for Channel Catfish at Winters-Elm Creek Reservoir, Texas, from March 2017 through May 2017. Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2017
Surface area (acres)	337
Directed effort (h)	580 (62)
Directed effort/acre	1.72 (62)
Total catch per hour	0.13 (-)
Total harvest	7.2 (84)
Harvest/acre	0.11 (63)
Percent legal released	74

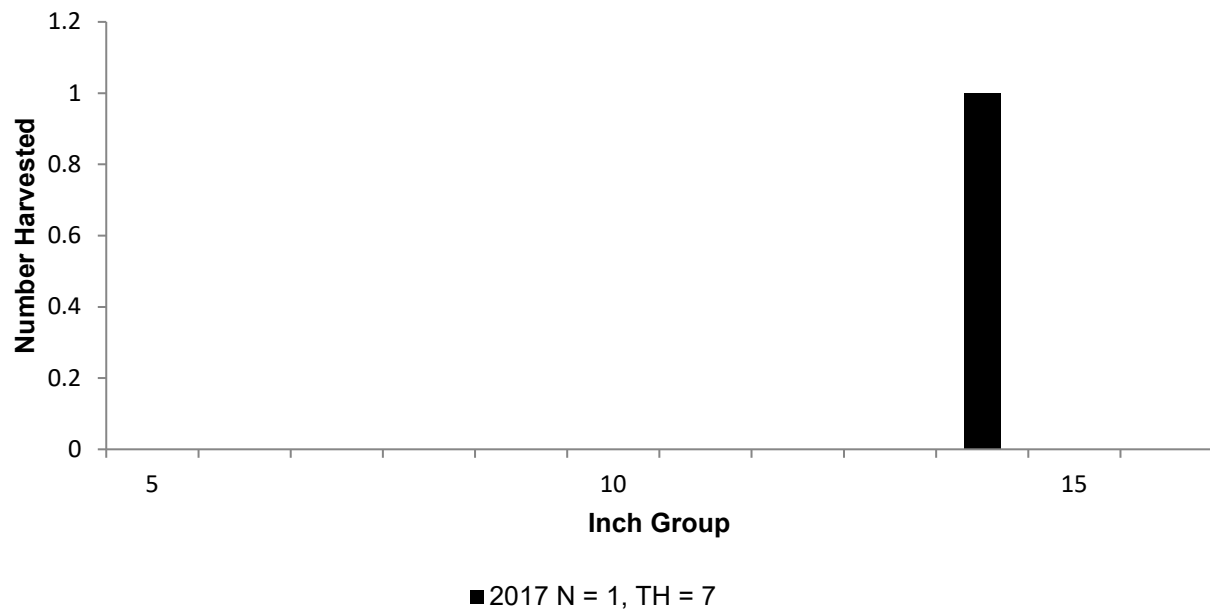


Figure 5. Length frequency of harvested Channel Catfish observed during creel surveys at Winters-Elm Creek Reservoir, Texas, March 2017 through May 2017, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

White Bass

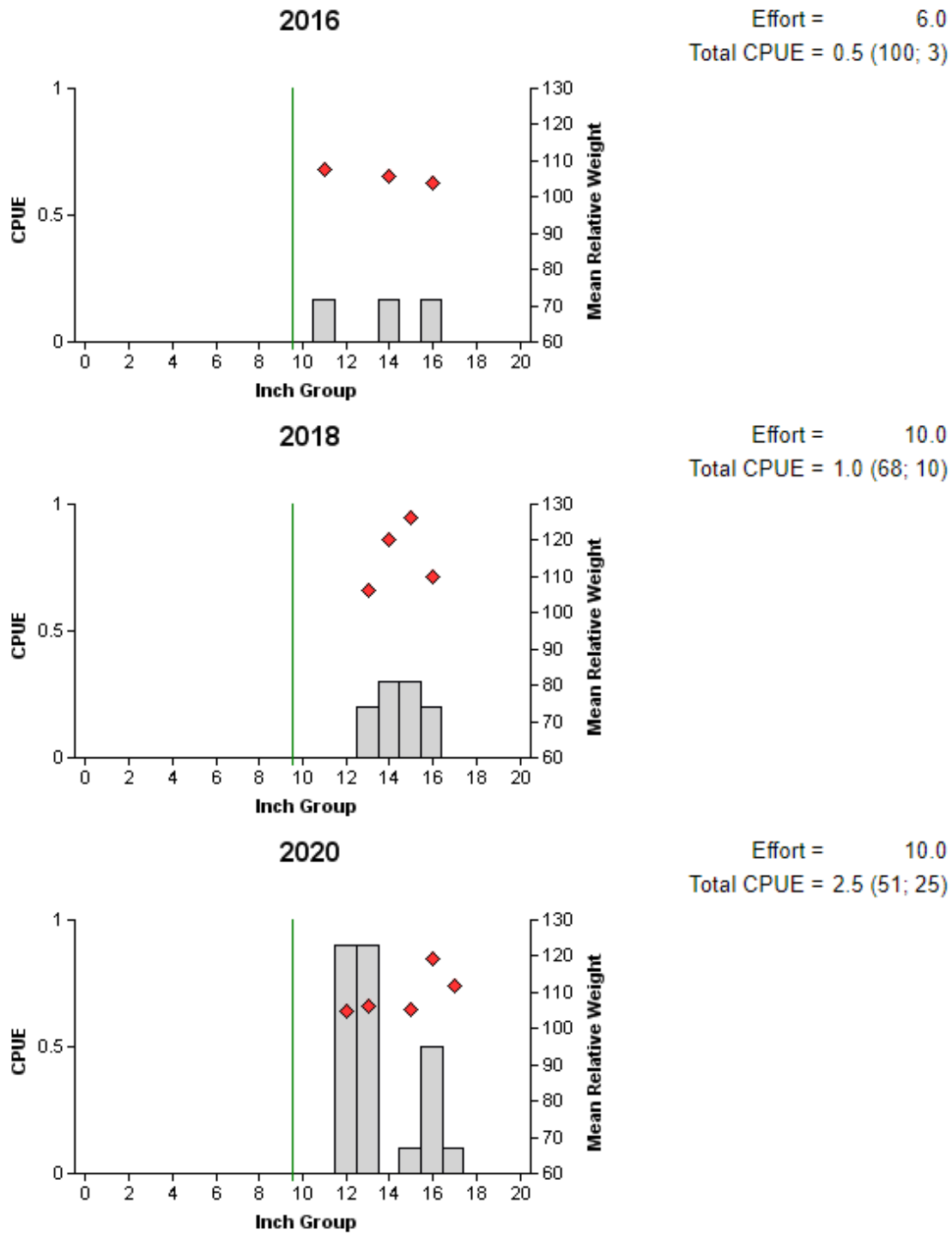


Figure 6. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2016, 2018, and 2020. Vertical line indicates minimum length limit.

Largemouth Bass

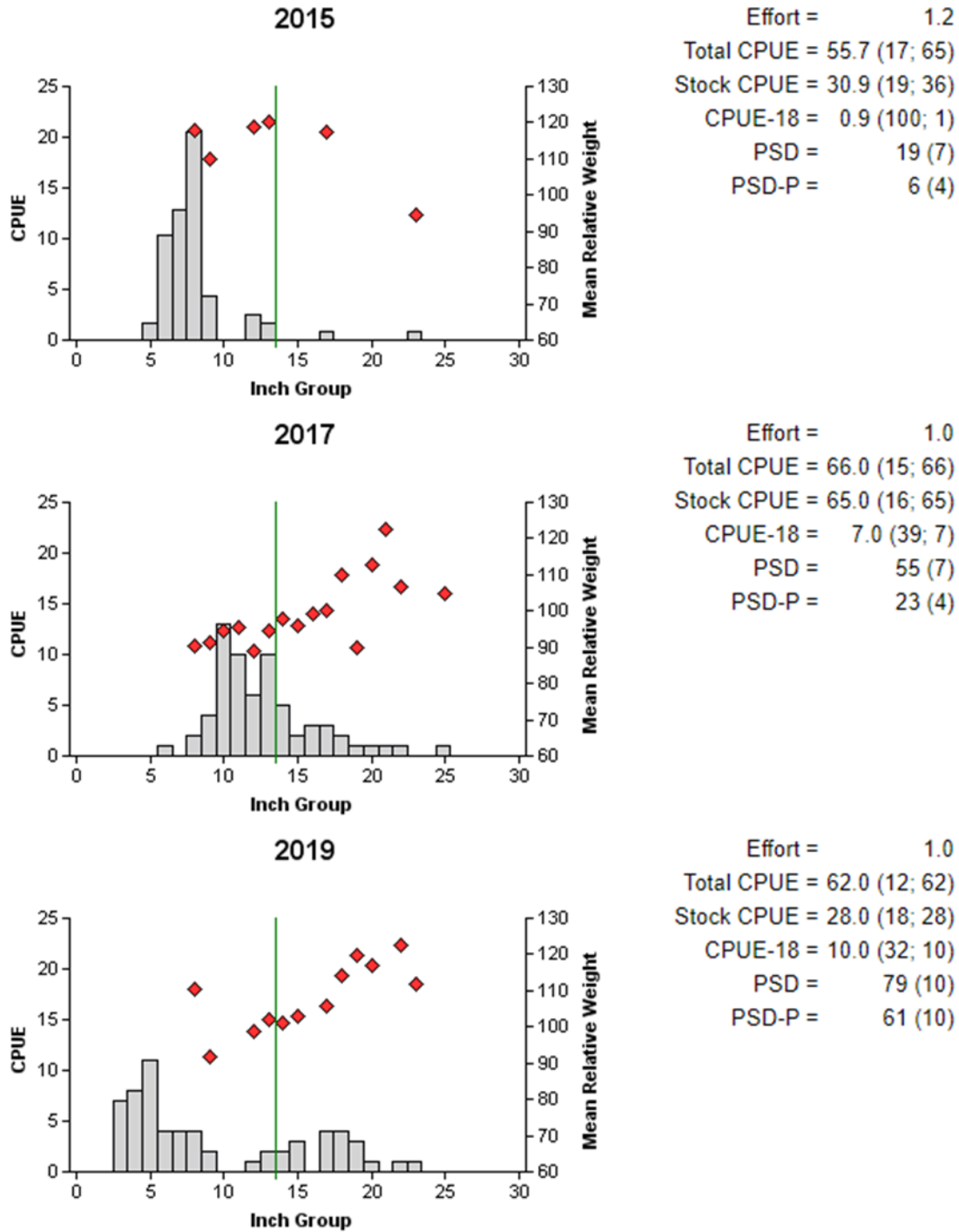


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2015, 2017, and 2019. Vertical line indicates minimum length limit.

Table 10. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Winters-Elm Creek Reservoir, Texas, 2019. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by micro-satellite DNA analysis.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
2019	28	5	23	0	79	18

White Crappie

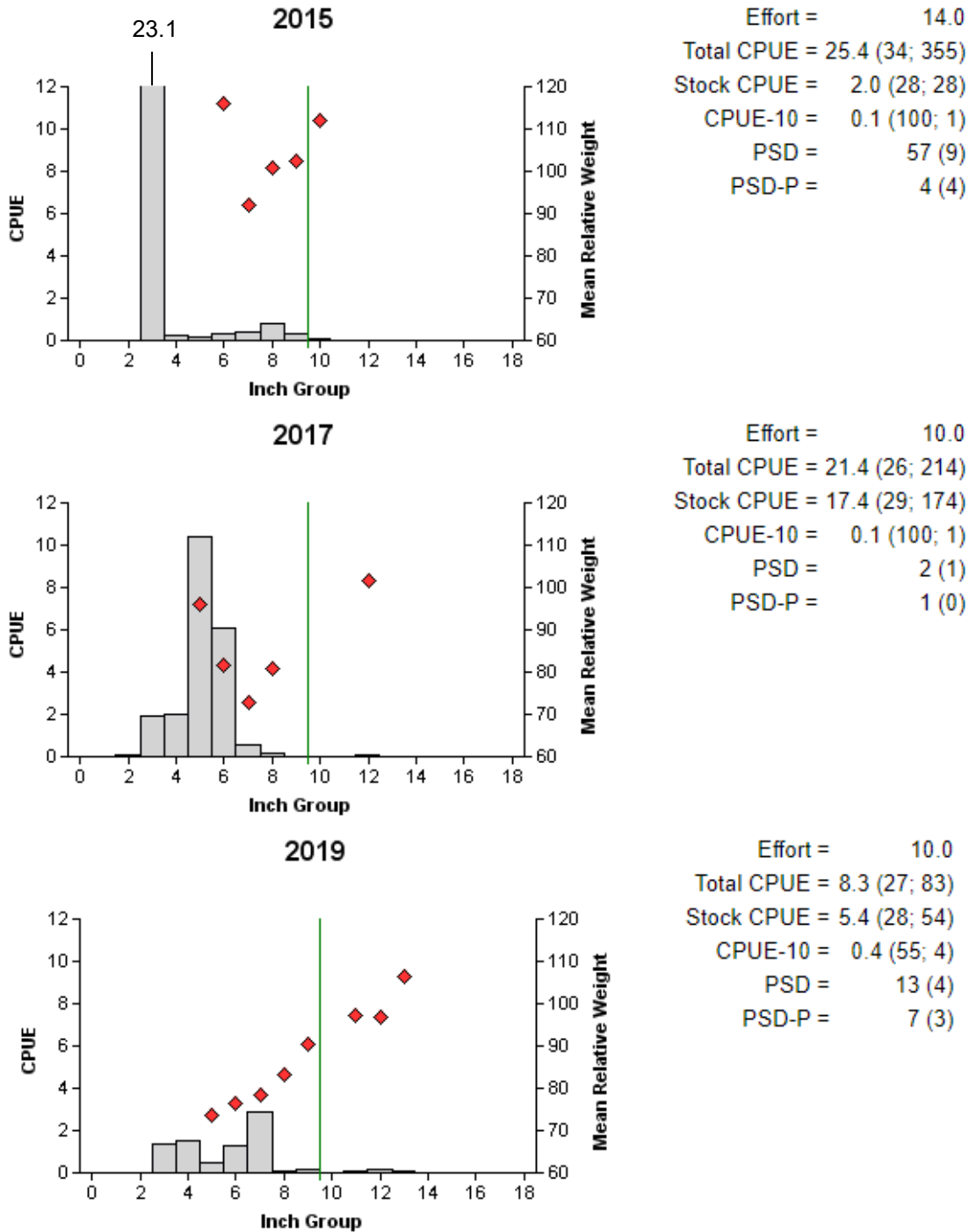


Figure 8. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Winters-Elm Creek Reservoir, Texas, 2015, 2017, and 2019. Vertical line indicates minimum length limit.

Table 11. Creel survey statistics for White Crappie at Winters-Elm Creek Reservoir, Texas, from March 2017 through May 2017. Total catch per hour is for anglers targeting White Crappie and total harvest is the estimated number of White Crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2017
Surface area (acres)	337
Directed effort (h)	3,419 (51)
Directed effort/acre	10.15 (24)
Total catch per hour	0.36 (32)
Total harvest	509 (84)
Harvest/acre	1.51 (84)
Percent legal released	11

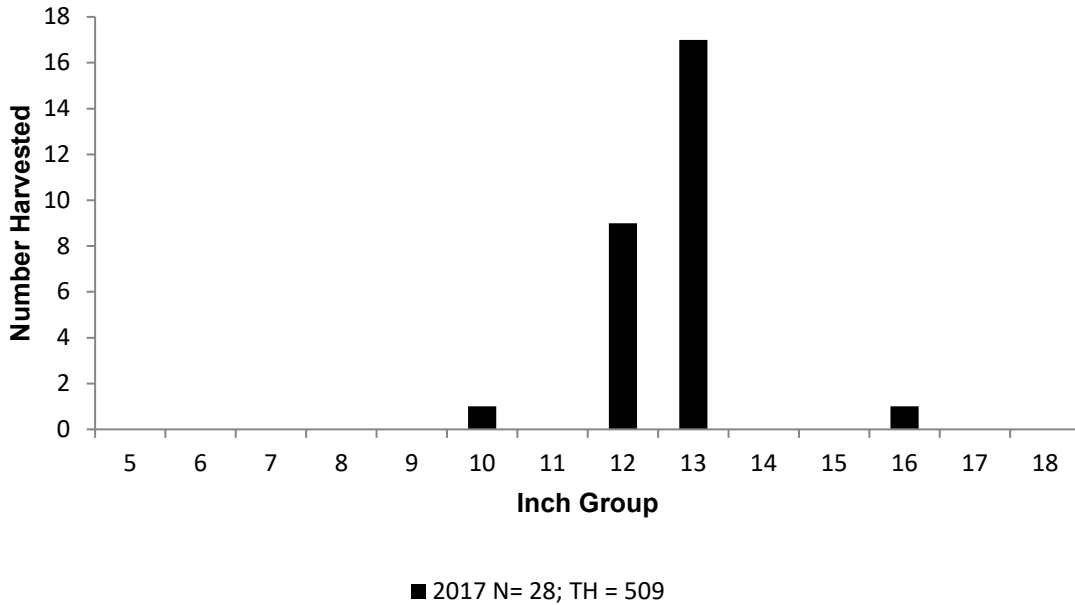


Figure 9. Length frequency of harvested White Crappie observed during creel surveys at Winters-Elm Creek Reservoir, Texas, March 2017 through May 2017, all anglers combined. N is the number of harvested White Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 12. Proposed sampling schedule for Winters-Elm Creek 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.

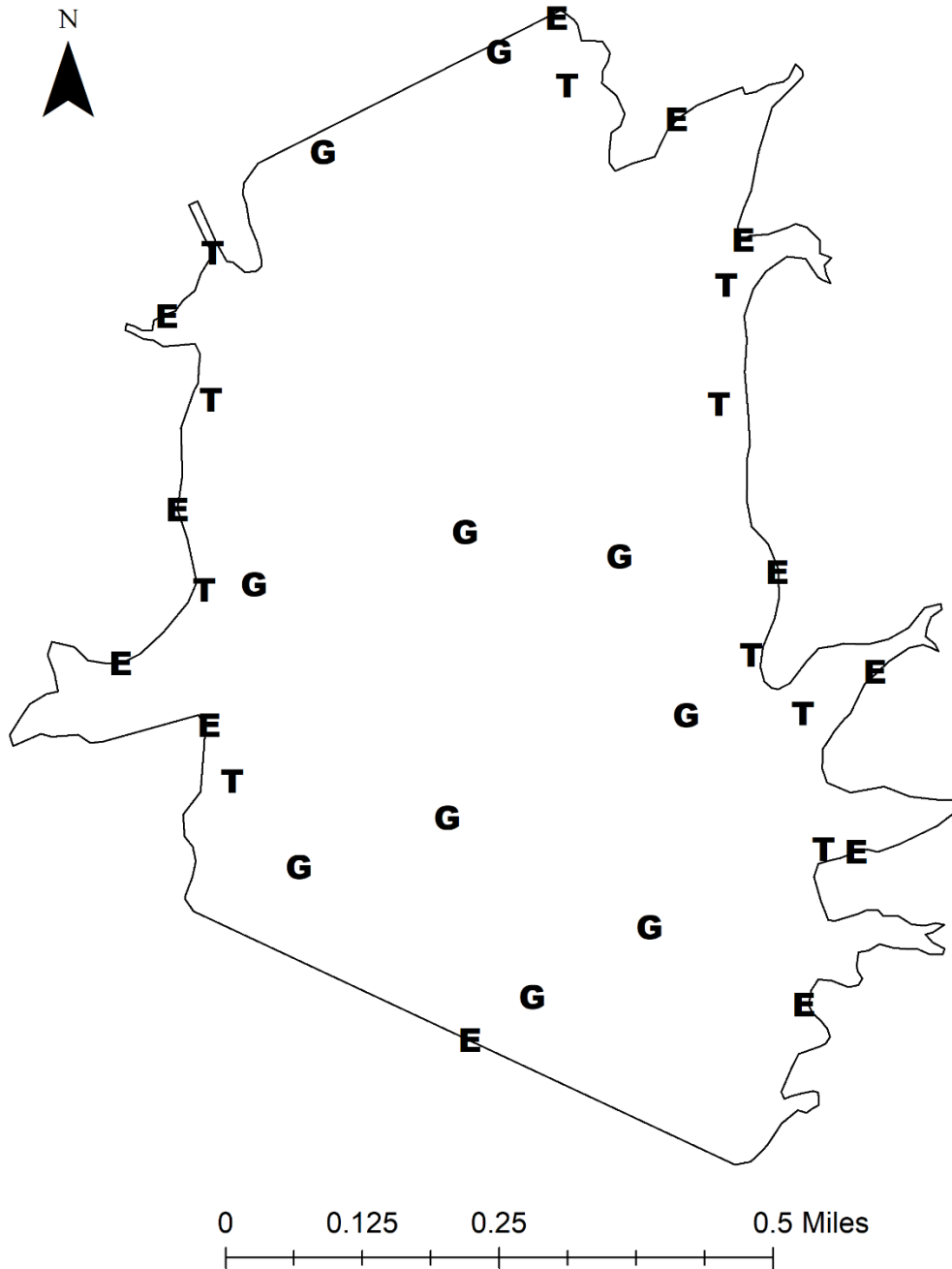
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Vegetation				S
Electrofishing – Fall		A		S
Trap netting		A		S
Gill netting		A		S
Creel survey				
Report				S

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

Number (N) and catch rate (CPUE; RSE in parentheses) of all target species collected from all gear types from Winters-Elm Creek Reservoir, Texas, 2019-2020. Sampling effort was 10 net nights for gill netting, 10 net nights for trap netting, and 1 hour for electrofishing.

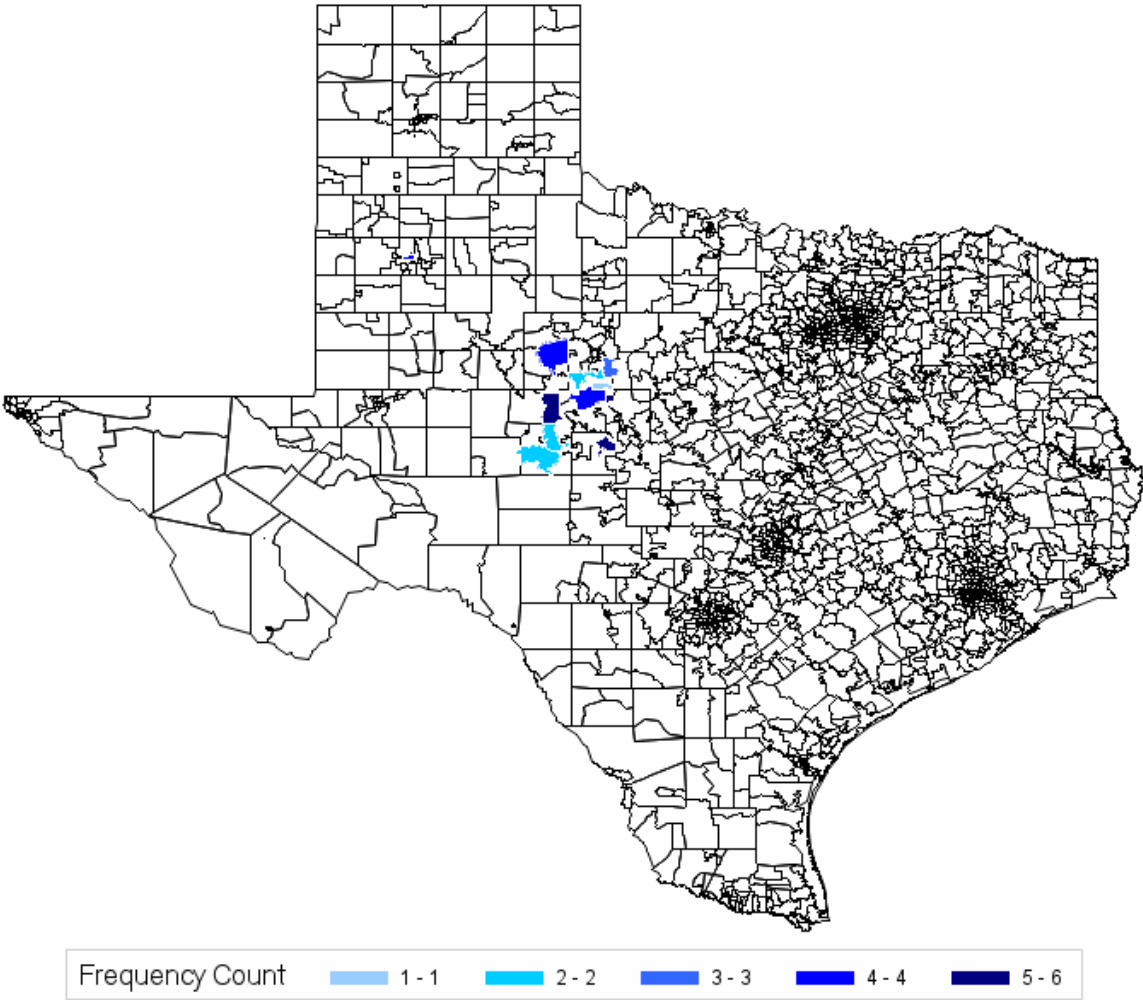
Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					1,031	1,031.0 (29)
Blue Catfish	61	6.1 (15)				
Channel Catfish	8	0.8 (41)				
Flathead Catfish	6	0.6 (44)				
White Bass	25	2.5 (51)				
Green Sunfish					50	50.0 (23)
Warmouth					12	12.0 (35)
Bluegill					191	191.0 (21)
Longear Sunfish					20	20.0 (34)
Largemouth Bass					62	62.0 (12)
White Crappie			83	8.3 (27)		

APPENDIX B – Map of sampling locations



Location of sampling sites, Winters-Elm Creek Reservoir, Texas, 2019-2020. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was approximately four feet below conservation pool at time of sampling.

APPENDIX C – Map of angler ZIP codes



Location, by ZIP code, and frequency of anglers that were interviewed at Winters-Elm Creek Reservoir, Texas, during the March 2017 through May 2017 creel survey.



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 T3200-1943 (08/20)

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.