

Winters-Elm Creek Reservoir

2023 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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July 31, 2024



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Survey and Management Summary

Fish populations in Winters-Elm Creek Reservoir were surveyed in 2021 and 2023 using electrofishing and trap netting, and in 2022 and 2024 using gill netting and tandem hoop netting. Historical data are presented with the 2021-2024 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 high, and 96% were available as prey to most sport fish. Electrofishing catch of Bluegill was moderate; most Bluegill were around 4 inches long. Electrofishing catch of Green Sunfish was high, most were 3 to 4 inches long.
- **Catfishes:** Blue Catfish abundance increased from previous years, and quality-size fish were available to anglers. Channel Catfish abundance remained low; most individuals observed in sampling were less than 12 inches in length. Condition was good for both Blue Catfish and Channel Catfish. Flathead Catfish were present in the reservoir.
- **White Bass:** White Bass abundance was highest on record in 2024. The majority of fish sampled were available to anglers with fish up to 16 inches.
- **Largemouth Bass:** Largemouth Bass abundance was lower than previous surveys. Legal-size fish were available to anglers. Largemouth Bass size structure was similar to previous surveys and relative weights were good for most size classes.
- **White Crappie:** White Crappie were abundant with legal-size fish available to anglers. White Crappie growth was very slow, most White Crappie reached legal size in 6.6 years. Relative weights were low for size classes under 8 inches and fair for larger size classes.

Management Strategies: Continue to manage the fishery with statewide regulations. Conduct additional electrofishing and trap netting surveys in 2025, and general monitoring electrofishing, trap net, and gill net surveys in 2027-2028. Conduct spring-only creel survey in 2028. Vegetation surveys will be conducted in 2027.

Introduction

This document is a summary of fisheries data collected from Winters-Elm Creek Reservoir from 2021-2024. 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 2021-2024 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 available at a city-maintained boat ramp. Bank fishing access was limited to 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 2020) included:

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

Action: A category 3 age and growth survey was conducted in 2023; 5 White Crappie per 10 mm length group were retained for analysis. The age and growth survey was planned for 2021 but was pushed back to 2023 due to scheduling conflicts.

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 2020). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected (Appendix B), and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Common names of fishes and their hybrids in this report are used following Page et al. (2023) with an exception for Largemouth Bass. While we recognize recent changes to black bass names, Texas reservoirs contain a mix of Florida Bass, Largemouth Bass, and their intergrade offspring. Therefore, Largemouth Bass is used in this report for simplicity as well as consistency with previous reports.

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. Age at legal harvest length 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 (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 5 individuals per 10 mm length group (n = 100).

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 2022). 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 Neumann et al. (2012). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics. For White Crappie, total annual mortality was estimated using a catch curve described by Miranda and Bettoli (2007). Growth was estimated using a Von Bertalanffy growth curve (Isely and Grabowski 2007).

Habitat – A structural habitat and vegetation survey was conducted in 2023 (Table 6). Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Results and Discussion

Habitat: No aquatic vegetation was observed in 2023, which was similar to past surveys. Historically, aquatic vegetation has been limited in Winters-Elm Creek due to fluctuating water levels. A structural habitat survey conducted in 2023 showed 78.7% of the shoreline was natural while 21.3% was riprap (Table 6). The reservoir had 50 acres of flooded trees which covered approximately 15% of the reservoir surface area (Table 6).

Prey species: Gizzard Shad were the primary prey species in Winters-Elm Creek Reservoir. Electrofishing catch of Gizzard Shad was 638.0/h in 2023, higher than 257.0/h in 2021 and lower than 1031.0/h in 2019 (Figure 1). Index of Vulnerability was high in the most recent survey; 96% of Gizzard Shad were available to most predators. In recent years, the Bluegill population has remained stable. Electrofishing catch rates of Bluegill was 166.0/h in 2023, lower than 204.0/h in 2021 and 191.0/h in 2019 (Figure 2). Size structure of Bluegill remained similar across the last three surveys with fish ranging from 1 to 6 inches in length. Size structure was very low; PSD was 2 in 2021 and 1 in 2023. Other sunfish species were present, but Green Sunfish had the highest abundance in the most recent survey. Electrofishing catch of Green Sunfish was 341.0/h in 2023 (Appendix A), higher than 23.0/h and 50.0/h in 2021 and 2019, respectively. Most Green Sunfish observed in sampling were less than 5 inches in length, providing a good prey source for most predators. Total electrofishing catch of all sunfish species combined was 508.0/h in 2023.

Catfishes: The Blue Catfish population was moderately abundant. The gill net catch rate of Blue Catfish was 6.6/nn in 2024, higher than 3.4/nn in 2022, and similar to 6.1/nn in 2020 (Figure 3). The catch rate of stock-size individuals increased from 2.2/nn in 2022 to 4.4/nn in 2024, indicating increased recruitment to the fishery over previous surveys. Catchable-size fish were available to anglers, but most fish were around 12 inches in the most recent survey. Though most fish observed in recent surveys were between 10 to 15 inches in total length, Blue Catfish between 25 to 30 inches provide a quality fishery for anglers targeting larger fish. Condition was fair for smaller individuals and good for larger fish. Blue Catfish growth was slow, average age at 12 inches was 8.7 years (N=14, range 6-10). The slow growth observed in the Blue Catfish population is likely the cause of the absence of large individuals (>30 inches) in the population.

The Channel Catfish population continued to have low relative abundance. The gill net catch rate of Channel Catfish was 1.5/nn in 2024, similar to 1.9/nn and 0.9/nn in 2022 and 2020, respectively (Figure 4). Catchable-size Channel Catfish were available to anglers, but few quality-size fish were observed. Channel Catfish condition was good; relative weights ranged from 92-118 from 2020-2024.

White Bass: White Bass were abundant in the reservoir with the highest gill net catch rate recorded in 2024. The gill net catch rate of White Bass was 14.9/nn in 2024, higher than 6.2/nn and 2.5/nn in 2022 and 2020, respectively (Figure 5). White Bass PSD was high in the three most recent surveys; the majority of fish observed in sampling were available to anglers for harvest. White Bass condition was good, relative weights were above 90 for most inch classes.

Largemouth Bass: The electrofishing catch rate of stock-size Largemouth Bass was 28.0/h in 2023, lower than 65.0/h in 2021 but equal to 28.0/h in 2019 (Figure 6). Only four individuals between 13.0 and 14.9 inches were captured during sampling in fall 2023, the objective of 13 individuals for age and growth analysis was not met; however, based on the four fish captured, growth of Largemouth Bass in Winters-Elm Creek Reservoir was good. The average age at 14 inches was 2.25 years (n = 4; range 2 – 3 years). Body condition for Largemouth Bass was good during the survey period, nearly all size classes had relative weights of 90 or above. Florida Largemouth Bass influence has remained relatively constant as Florida alleles have ranged from 77% to 79% since 2019 (Table 7).

White Crappie: The trap net catch rate of White Crappie was 25.9/nn in 2023, lower than 32.9/nn in 2021 and higher than 8.3/nn in 2019 (Figure 7). White Crappie size structure was low; PSD was 24 in 2023, higher than 12 in 2021 and 13 in 2019. Legal-sized fish were available to anglers, PSD-P (proportion of stock size fish 10 inches or greater) was 10 in 2023. Body condition was poor in 2023 with most size classes having relative weights below 90; condition varied in 2019 and 2021 but was generally poor to fair for most size classes.

An age and growth survey was conducted in 2023 to obtain growth and mortality estimates. A total of 221 stock-size fish were collected and five White Crappie per 10 mm length group were retained for aging. A total of 100 White Crappie were aged and an age-length key was used to assign ages to un-aged fish. Fish collected ranged from 0-6 years and age structure was dominated by age-2 individuals produced in 2021. A linearized catch curve estimated total annual mortality to be 70% ($Z = -1.2267$, $R_2 = 0.91$) (Figure 8). The Von Bertalanffy growth curve provided a good fit for the length-at-age data. The Von Bertalanffy

growth equation predicted that White Crappie would reach legal size (10 inches) in 6.6 years. Overall, the low relative weights and slow growth are indicative of a stunted crappie population. Indirect estimates of natural mortality using the Quinn and Deriso (1999) and Hoeing (1983) methods range from 51-54%.

A spring-only access creel was conducted at Winters-Elm Creek Reservoir in 2017 (Wright 2020). Total angler effort was low, less than 4,000 hours; 85% of fishing effort was allocated to White Crappie, with the remaining 15% of total effort spent by anglers fishing for catfishes. Effort per acre for White Crappie was high at 10.15 hours, but harvest was relatively low at an estimated 509 fish or 1.51 fish/acre. Most anglers fishing Winters-Elm Creek lived locally, and an estimated \$14,342 was spent by anglers during the 2017 spring creel. The 2017 creel survey is the only historic creel survey for this waterbody. Previous survey data, age and growth analysis, and population trends, coupled with angler creel data indicate that this fishery would benefit from the removal of the 10-inch minimum length limit. However, more contemporary creel data to compliment the one previous creel survey would be beneficial to determine if a regulation change would be effective. A spring-only creel survey is planned for spring 2028; if appropriate, a regulation change proposal will be submitted in fall 2028.

Fisheries Management Plan for Winters-Elm Creek Reservoir, Texas

Prepared – July 2024

ISSUE 1 The White Crappie population in Winters-Elm Creek Reservoir has long been characterized by high abundance, slow growth, poor condition, high natural mortality, and limited numbers of legal-size fish. Growth data from 2023 shows crappie taking over 6 years on average to reach legal size. Due to high natural mortality and slow growth, most White Crappie die before reaching 10 inches. Spring quarter creel data in 2017 showed that White Crappie were the most sought-after species, however, harvest of White Crappie was low relative to the level of fishing effort. Based on our data, Winters-Elm Creek appears to be a good candidate for removal of the 10-inch MLL. Continued monitoring of the population with trap netting, as well as a spring-only creel survey are warranted to collect additional data to support a potential regulation change for Winters-Elm Creek Reservoir.

MANAGEMENT STRATEGY

1. Conduct standard trap netting in 2025 and 2027 to monitor the population abundance, size structure, growth, and condition.
2. Conduct Spring-only creel survey in 2028 to assess angler effort, catch rate, and harvest.
3. If sampling data in 2025 and 2027 continues to show a slow growth, poor size structure, high natural mortality, and sufficient harvest by anglers, submit a regulation change proposal in 2028 and recommend the removal of the 10-inch minimum length limit.

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 (2024-2028)

Sport fish, forage fish, and other important fishes

Important sport fish in Winters-Elm Creek Reservoir include Blue Catfish, Largemouth Bass, White 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 2025-2028; however, length/weight data will 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 2025-2028; however, length/weight data will be collected during Blue Catfish gill net sampling.

Survey objectives, fisheries metrics, and sampling objectives

Blue Catfish: Since 2016, the total gill net catch rates has averaged 7.6/nn and ranged from 3.4 to 10.3/nn. Recent surveys have consistently collected Blue Catfish over 20 inches and creel data from 2017 showed catfish as the second most popular species group. Our survey objective is to monitor abundance, size structure, condition, and growth. A CPUE-stock RSE ≤ 25 has been achieved with 10 nets over the past three surveys. Fifteen randomly selected stations will be sampled in 2028 (Table 8). We are increasing our effort from 10 to 15 nets to increase the probability of collecting at least 50 stock size fish for size structure estimation. No additional sampling will be conducted beyond the 15 net nights. Otoliths from 13 fish between 11.0 and 12.9 inches will be collected to determine mean age at 12 inches in 2028.

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 2025 and 2027 (Table 8). Our objectives will be to collect 50 stock-size fish for size structure analysis and achieve a CPUE-Stock RSE ≤ 25 . Otoliths from 13 fish between 13.0 and 14.9 inches will be collected to determine mean age at 14 inches. 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. Largemouth Bass genetics will be assessed with pelvic fin clips from 30 randomly selected fish in 2027.

White Bass: White Bass population abundance in Winters-Elm Creek Reservoir has historically been low but has increased over the past 3 surveys. Gill net CPUE of stock-size White Bass was 14.9/nn in 2024, an increase from 6.2/nn and 2.5/nn in 2022 and 2020, respectively. Our survey objectives will be to monitor White Bass abundance, length frequency, and condition. Fifteen randomly selected stations will be sampled in 2028 (Table 8) concurrent with Blue Catfish sampling. No additional effort will be expended

beyond the original 15 nets. Given the unpredictable catch rates of the White Bass population in Winters-Elm Creek, no level of precision will be set for White Bass sampling objectives.

White Crappie: The White Crappie population in Winters-Elm Creek is characterized by slow growth, high mortality, and few large individuals. Our objectives are to monitor trends in abundance, size structure, condition, and growth. A minimum of 10 randomly selected trap net sites will be sampled in 2025 and 2027 (Table 8). Sampling objectives are to obtain 50 stock-size fish, an RSE of CPUE-Stock < 25, and otoliths from 13 fish between 9.0 and 10.9 inches will be collected to determine mean age at 10 inches. The anticipated effort to meet these sampling objectives is 10-15 stations. Beyond the original 10 random stations, 5 additional random stations will be pre-determined in the event some extra sampling is necessary. A maximum of 15 stations will be sampled. A spring only access creel will be conducted in the spring of 2028 to assess angler catch rate, harvest, and effort.

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 \leq 25 for CPUE-Total for Gizzard Shad or Bluegill.

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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 μ S/cm

Table 2. Boat ramp characteristics for Winters-Elm Creek Reservoir, Texas, October 2023. Reservoir elevation at time of survey was approx. 10 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	Good. Ramp usable, pier unusable at low water level.

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 (only 10 \geq 20 inches)	None
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; FRY = fry; 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 2021-2024.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	$N = 30$, any age
Bluegill ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad ^a	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE–stock	RSE ≤ 25
	Size structure	Length frequency	$N \geq 50$ stock
	Condition	W_r	10 fish/inch group (max)
	Age-and-growth	Mean age at 12 inches	$N = 13, 11.0 - 12.9$ inches
<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	Mean length at age	retain 5 fish per 10 mm 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 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, 2024. Shoreline habitat type units are in miles and standing timber is acres. The standing timber in the reservoir is submerged, and the percentage does not factor into the shoreline habitat total.

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

Gizzard Shad

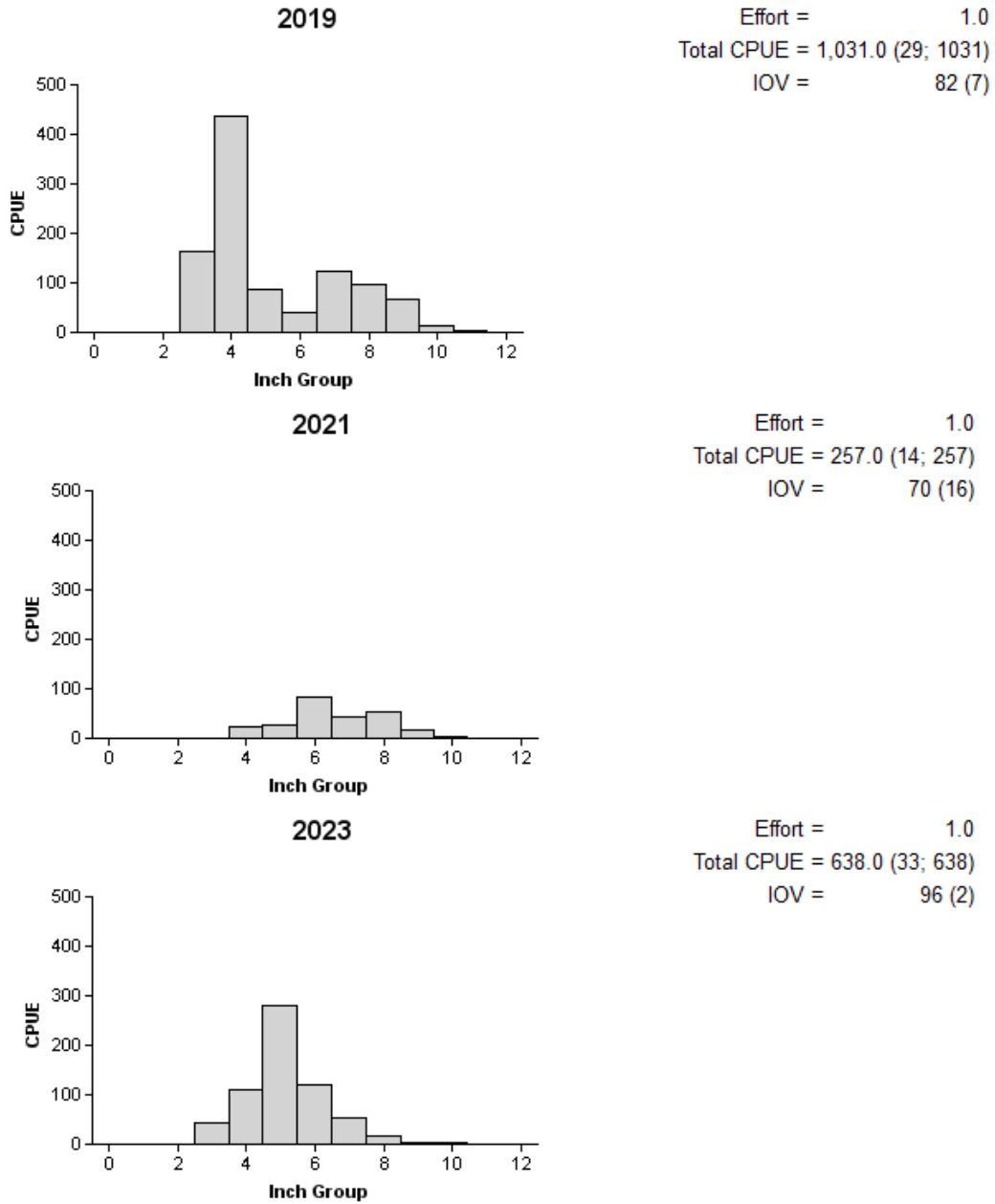


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2019, 2021, and 2023.

Bluegill

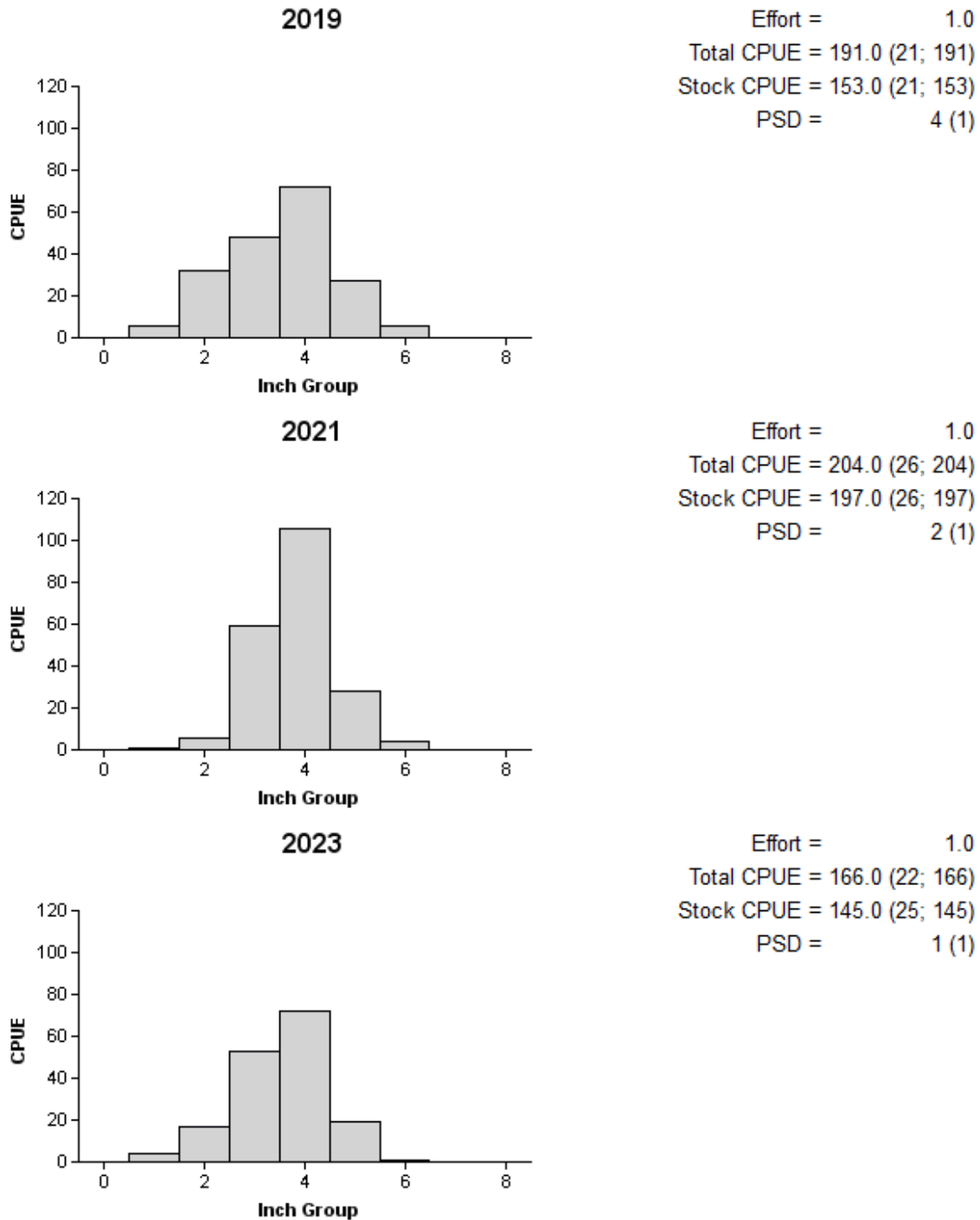


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2019, 2021, and 2023.

Blue Catfish

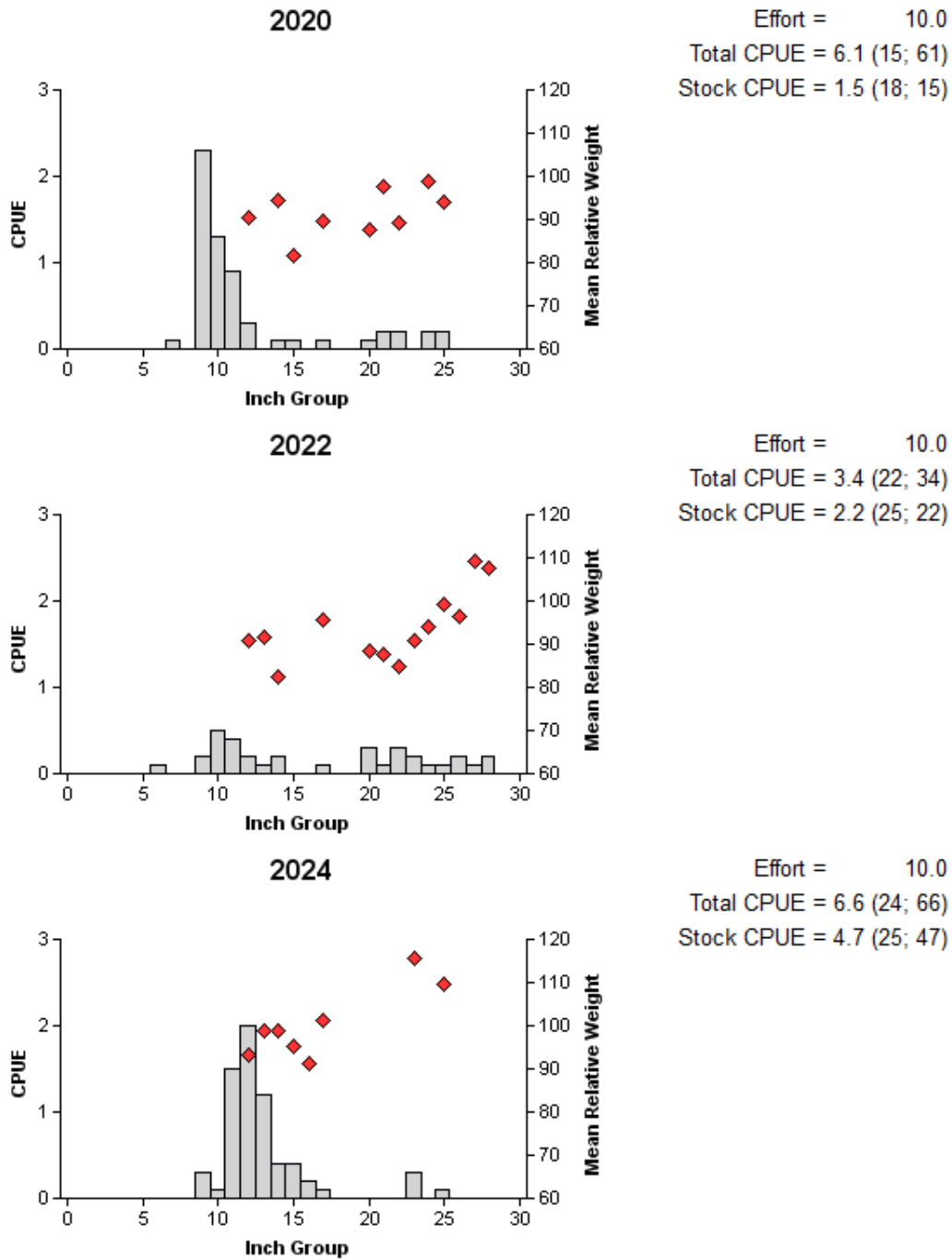


Figure 3. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2020, 2022, and 2024.

Channel Catfish

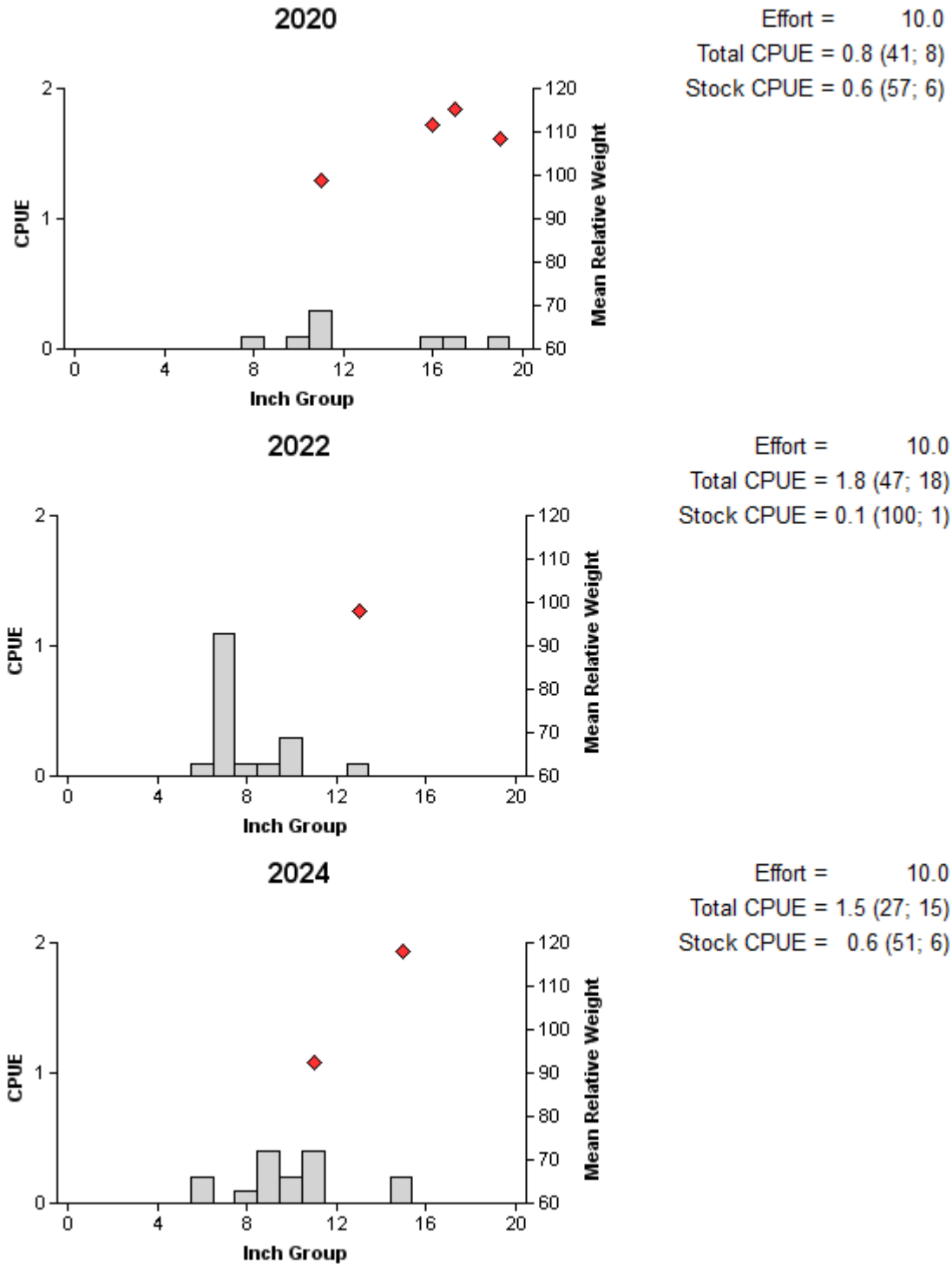


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2020, 2022, and 2024.

White Bass

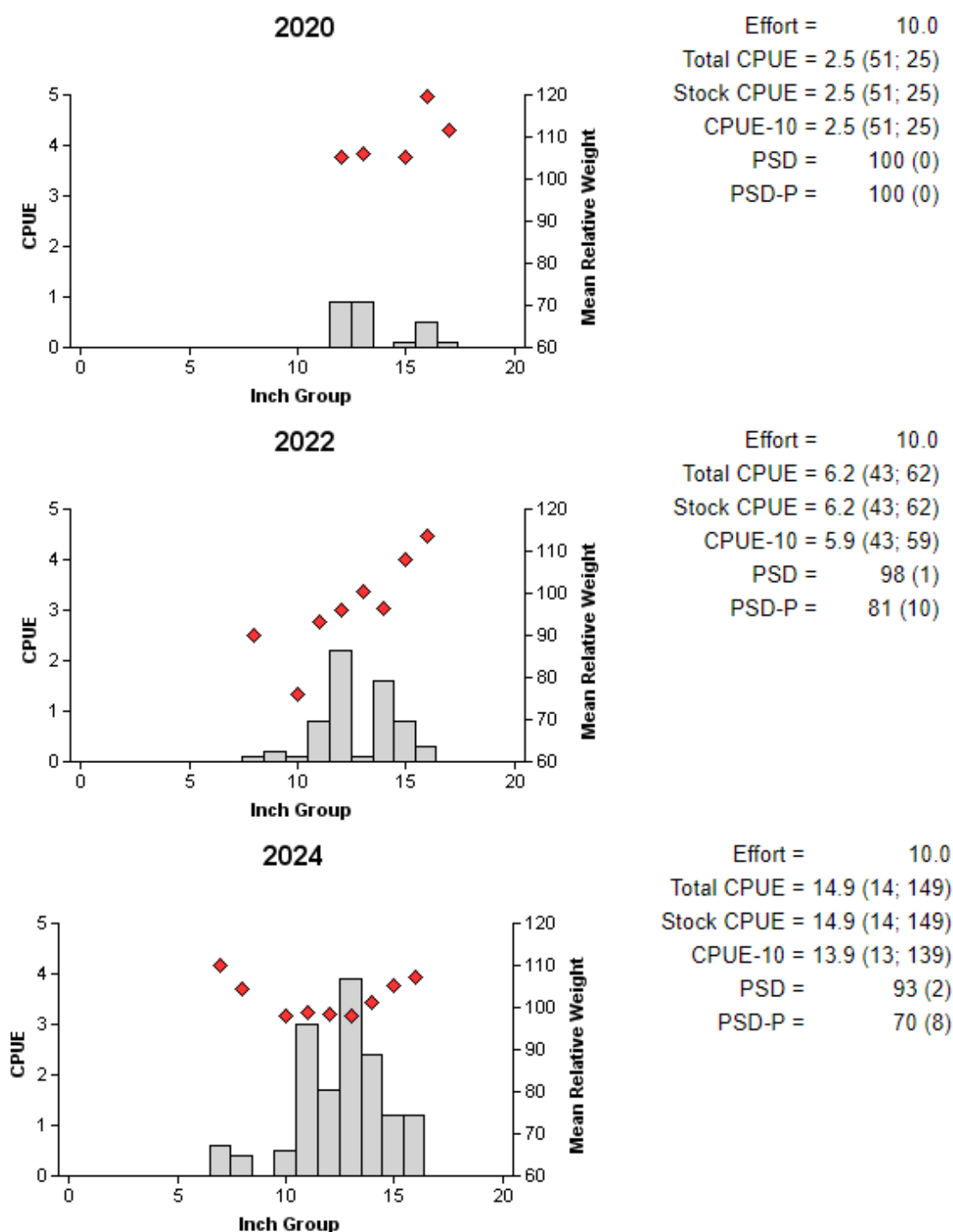


Figure 5. Number of White Bass caught per net night (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Winters-Elm Creek Reservoir, Texas, 2020, 2022, and 2024.

Largemouth Bass

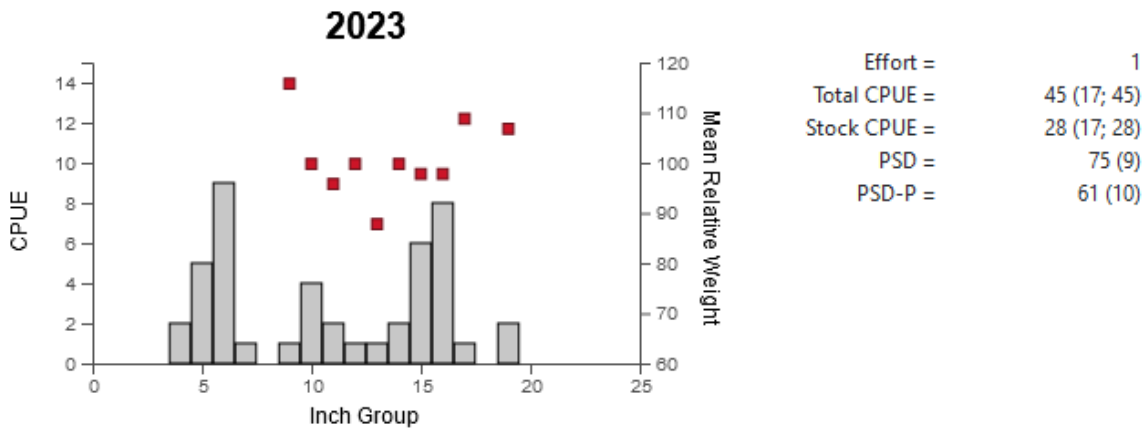
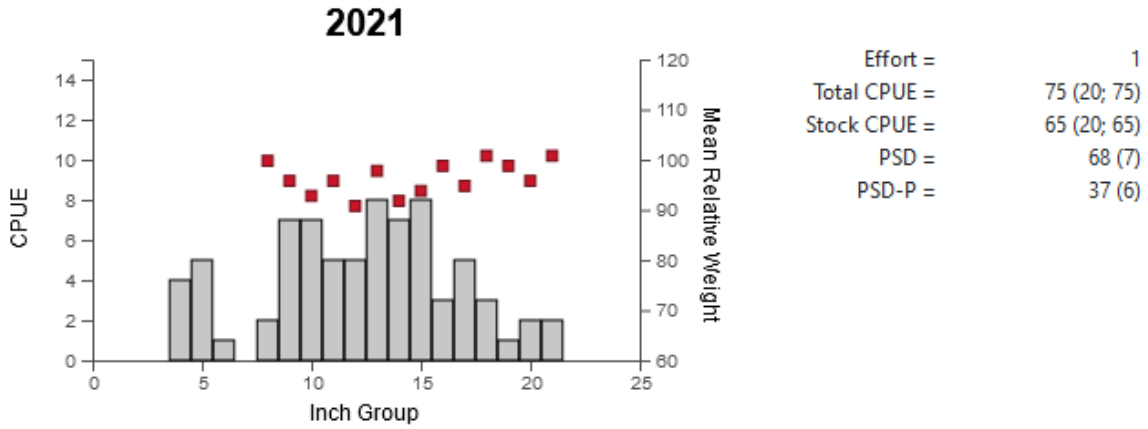
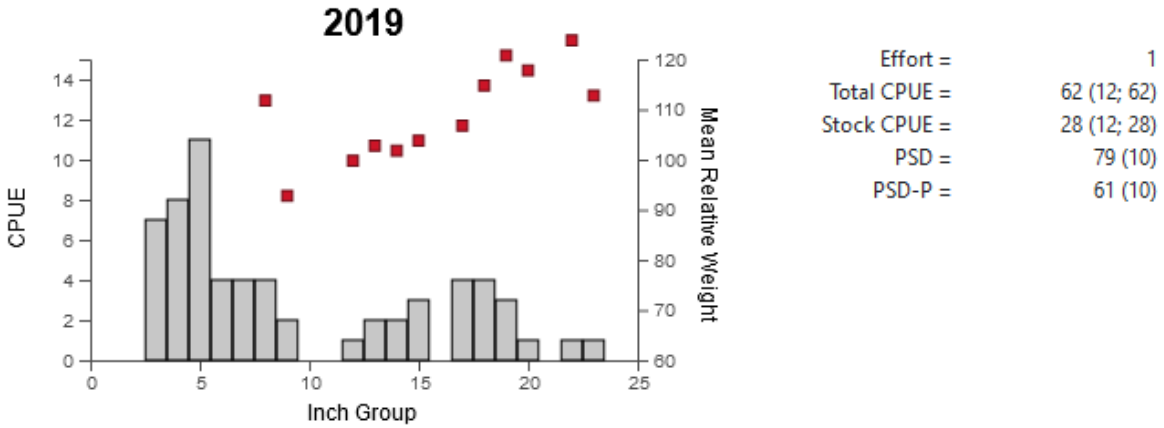


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Winters-Elm Creek Reservoir, Texas, 2019, 2021, and 2023.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Winters-Elm Creek Reservoir, Texas, 2019-2023. 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
2023	30	2	28	0	77	7

White Crappie

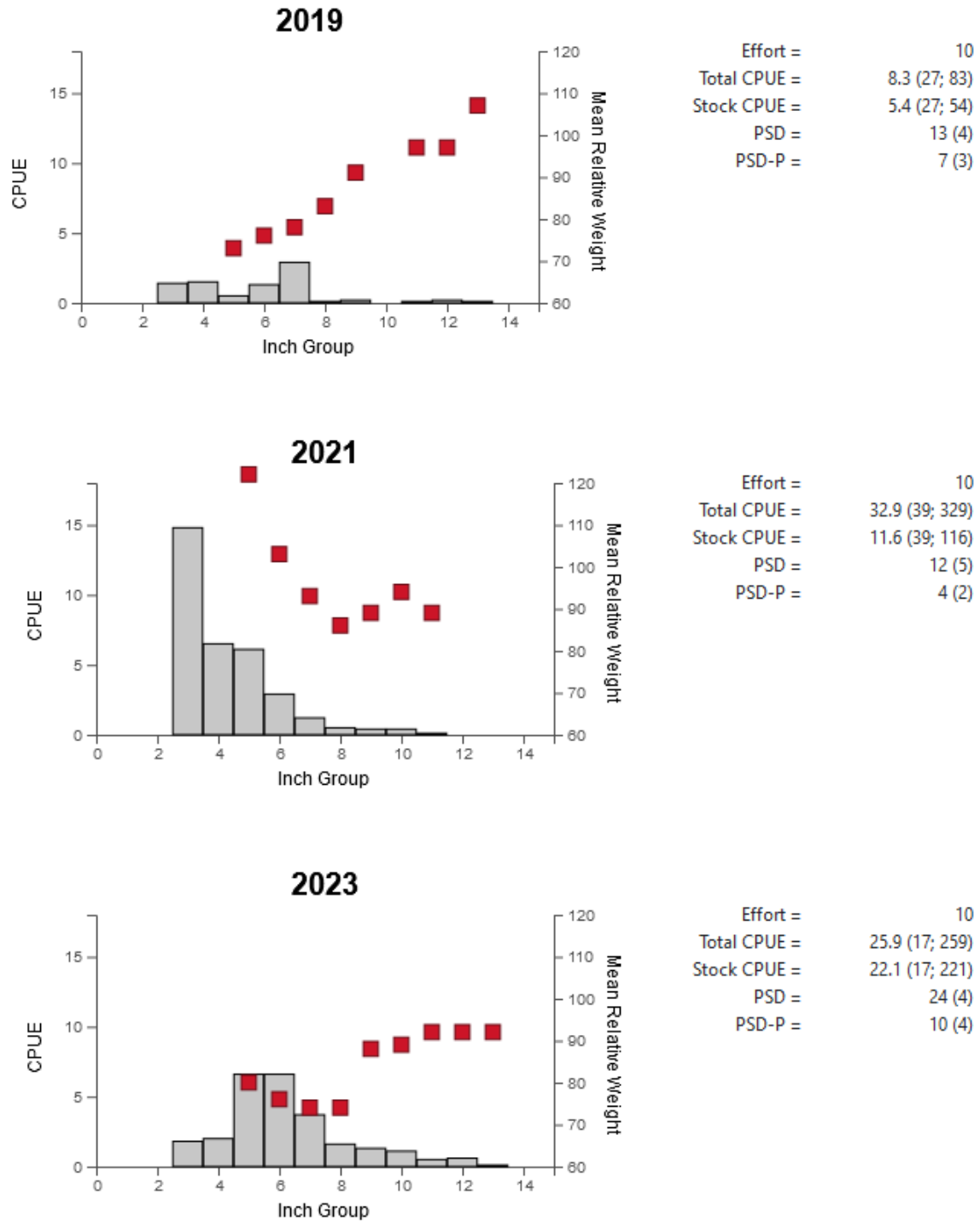


Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Winters-Elm Creek Reservoir, Texas, 2019, 2021, and 2023.

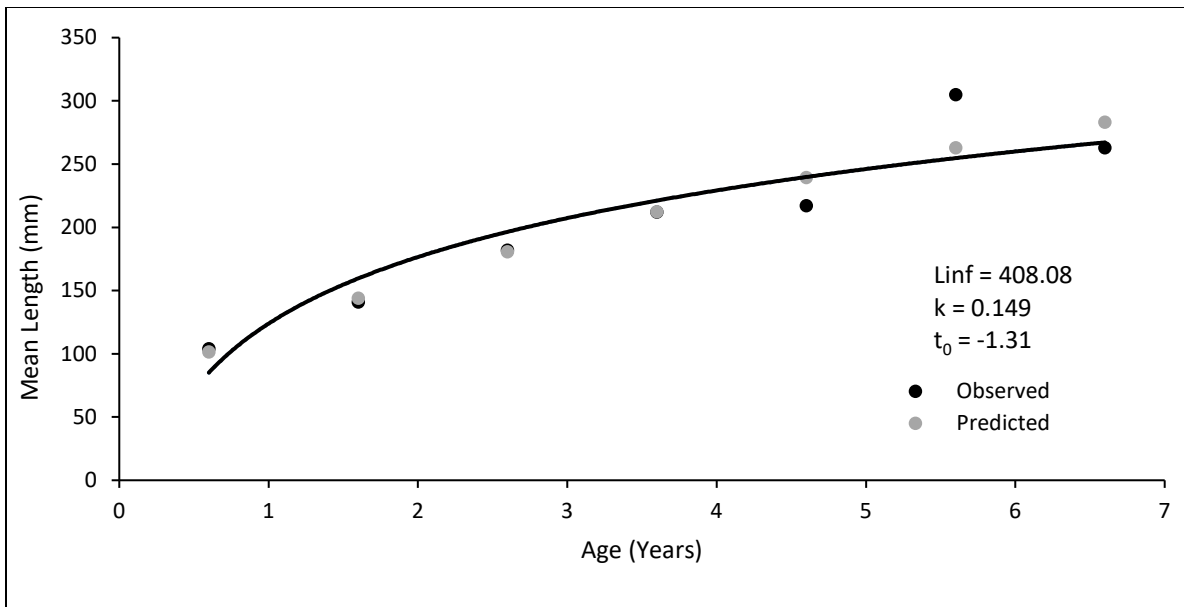
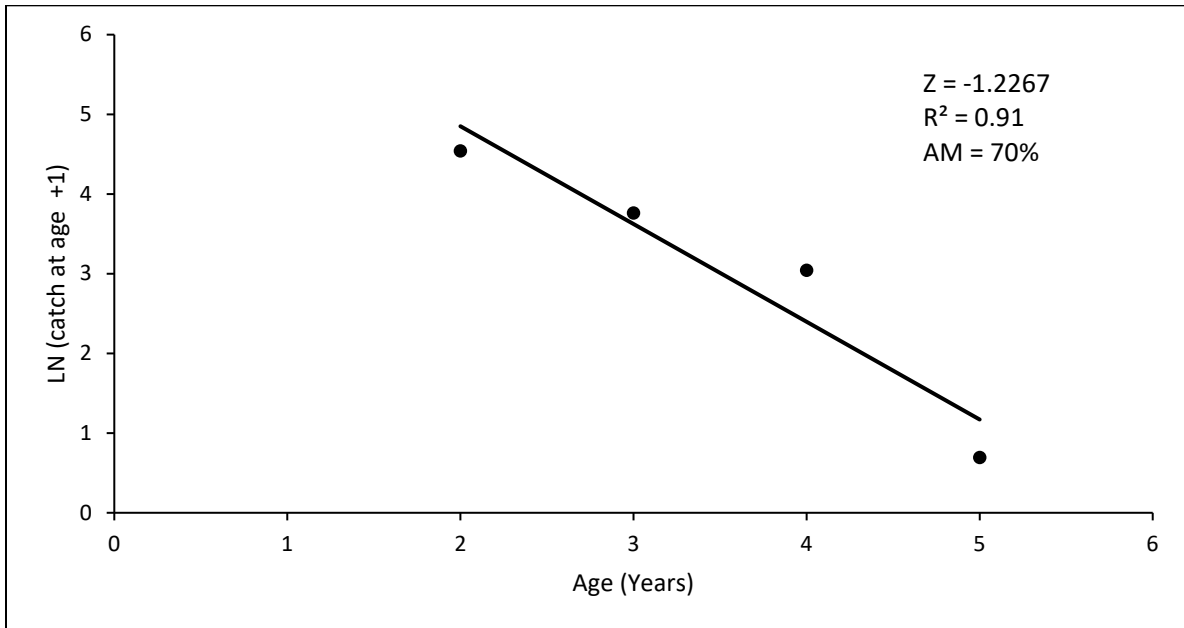


Figure 8. Catch curve (top) and Von Bertalanffy growth model (bottom) for White Crappie collected from trap netting at Winters-Elm Creek Reservoir, Texas, December 2023.

Proposed Sampling Schedule

Table 8. 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.

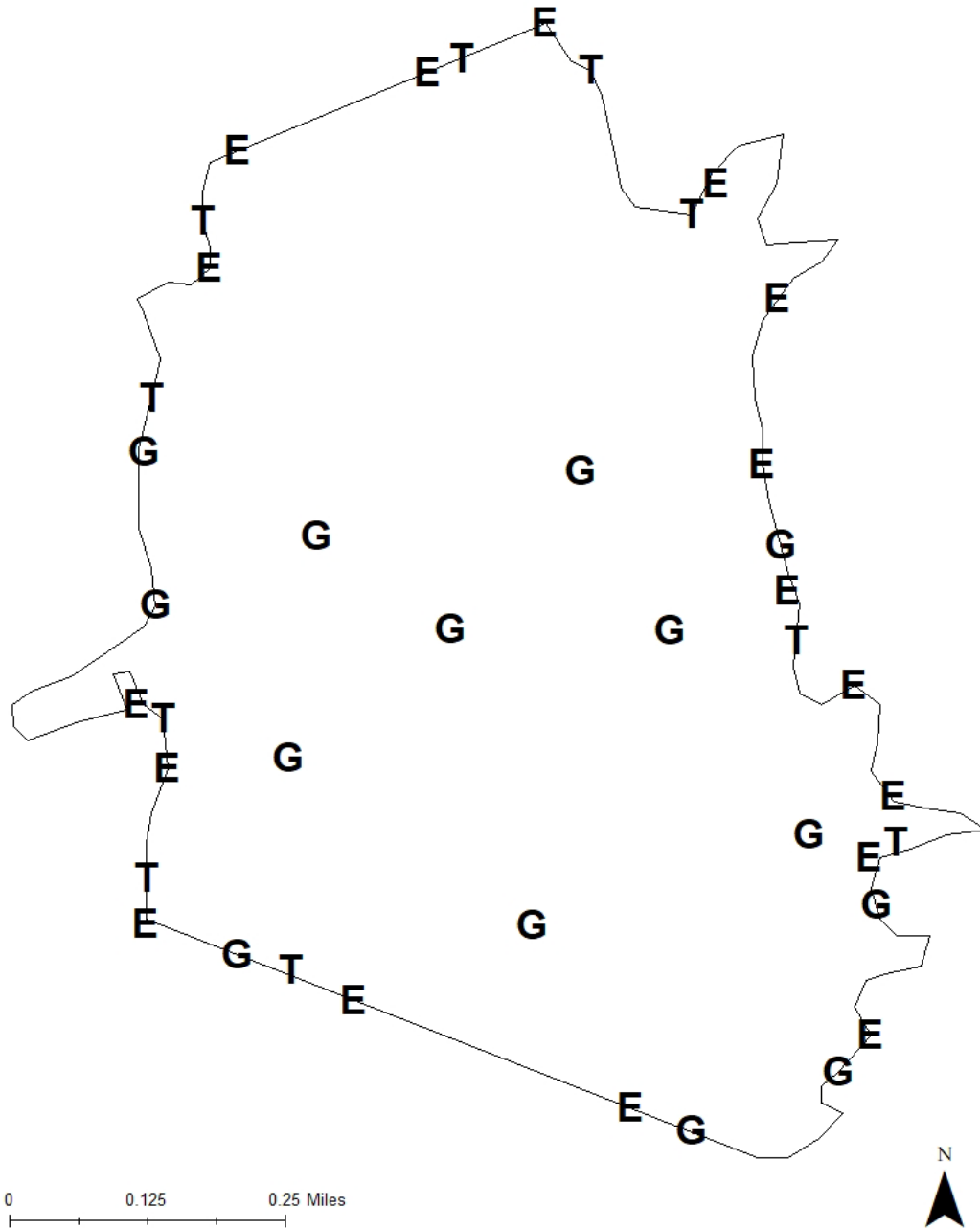
	Survey year			
	2024-2025	2025-2026	2026-2027	2027-2028
Angler Access				X
Vegetation				X
Electrofishing – Fall		X		X
Trap netting		X		X
Gill netting				X
Spring-Only Creel survey				X
Report				X

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, 2023-2024. 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	66	6.6 (24)				
Channel Catfish	15	1.5 (27)				
Flathead Catfish	3	0.3 (51)				
White Bass	149	14.9 (14)				
Green Sunfish					341	341.0 (66)
Bluegill					166	166.0 (22)
Longear Sunfish					1	1.0 (100)
Largemouth Bass					45	45.0 (17)
White Crappie			259	25.9 (17)		

Appendix B - Map of sampling locations



Location of sampling sites, Winters-Elm Creek Reservoir, Texas, 2023-2024. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was approximately 10 feet below conservation pool at time of sampling.



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