White River Reservoir

2022 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:

John Clayton, Assistant District Management Supervisor
and
Caleb Huber, District Management Supervisor

Inland Fisheries Division
Amarillo District, Canyon, Texas

David Yoskowitz, Ph.D.
Executive Director

Timothy Birdsong
Director, Inland Fisheries

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Survey and Management Summary

Fish populations in White River Reservoir were surveyed in 2020 and 2022 using electrofishing, in 2021 and 2023 using gill netting, and in 2021 using trap netting. Historical data are presented with the 2019-2023 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: At conservation pool (2,372.2 feet MSL), White River Reservoir is a 2,020-acre impoundment constructed in 1963 on the White River, a tributary of the Salt Fork of the Brazos River. The reservoir is located in Crosby County approximately 55 miles east of Lubbock, Texas. From 1992 to 2014, White River Reservoir experienced a declining trend in lake levels. A record low was set in May 2014 when the reservoir dropped to an elevation of 2336.7 feet MSL and a surface area of 239 acres. During sampling, the reservoir maintained an elevation near 2,350 feet MSL and 689 acres. Habitat features consisted of natural non-descript shoreline, rocks, and standing timber. White River Reservoir is owned and operated by the White River Municipal Water District as a municipal water supply and for recreational purposes. The reservoir has three boat ramps; during extremely low water levels there is a permanent low water launch site.

Management History: Sport fish in the reservoir included Walleye, White Bass, Largemouth Bass, White Crappie, and catfishes. Past surveys have shown that White Crappie were overabundant in the reservoir and exhibited poor growth. Walleye stockings have been utilized in part to mitigate overabundance of White Crappie; Walleye were last stocked in May 2023. Florida Largemouth Bass were stocked in 1982, 2000, 2003, 2009, 2012, 2016, and 2019 in order to maintain a trophy Largemouth Bass fishery.

Fish Community

- **Prey species:** Gizzard Shad and Bluegill served as the primary prey species in the reservoir. The 2022 electrofishing catch rate of Gizzard Shad declined slightly, but still showed a high number available as prey to most sport fish. Electrofishing catch of Bluegill increased, and all Bluegill were small enough to be consumed by predators.
- **Catfishes:** Gill net catch rate for Channel Catfish has decreased since 2019, but the majority of fish sampled were greater than 12 inches. The 2023 Blue Catfish catch is similar to 2019, and the majority of fish sampled ranged between 12 and 28 inches. Flathead Catfish were also present in the reservoir.
- **Largemouth Bass:** Electrofishing catch rate for Largemouth Bass has declined since 2018. Sampled fish ranged between 7 and 19 inches.
- **White Crappie:** White Crappie were moderately abundant with legal-size fish available to anglers.
- **Walleye:** Gill net catch rates of Walleye have decreased, but all Walleye sampled were 18 to 26 inches with most measuring 23 inches and larger.

Management Strategies: Continue stocking Walleye and Florida Largemouth Bass. Inform the public about the negative impacts of aquatic invasive species. Conduct additional electrofishing survey in 2024, additional gill net survey in 2025, and general monitoring surveys with gill nets, trap nets, and electrofishing surveys in 2026-2027. Access and vegetation surveys will be conducted in 2026.

Introduction

This document is a summary of fisheries data collected from White River Reservoir from 2019-2023. 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 2019-2023 data for comparison.

Reservoir Description

At conservation pool (2,372.2 feet MSL), White River Reservoir is a 2,020-acre impoundment constructed in 1963 on the White River, a tributary of the Salt Fork of the Brazos River. The reservoir is located in Crosby County approximately 55 miles east of Lubbock, Texas. Since 1992 White River Reservoir has experienced a general decline in lake level (Figure 1). Several heavy rain events have been recorded over the past 31 years that have resulted in substantial increases in lake level elevation; however, extended periods of drought have resulted in continued water level decline (Figure 1). A record low was set in May 2014 when the lake dropped to an elevation of 2,336.7 feet MSL and a surface area of 239 acres. During sampling the reservoir maintained an elevation near 2,350 feet MSL with approximately 689 surface acres. White River Reservoir is owned and operated by the White River Municipal Water District as a municipal water supply and for recreational purposes. Other descriptive characteristics for White River Reservoir are presented in Table 1.

Angler Access

White River Reservoir has three public boat ramps and one low water ramp. The boat ramp at White River Marina was unavailable to anglers during the 2019-2023 sampling season; during this time one of the public boat ramps at River Crest Road was available to anglers while the second ramp was unavailable because the end of the boat ramp was above the waterline. Extension of the ramps is not feasible. The low water ramp was also usable. Additional boat ramp characteristics are in Table 2. There is abundant shoreline access around several areas of the reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Clayton and Huber 2019) included:

1. Maintain the Walleye fishery through biennial stockings of 3,000 fry/acre.

   Action: Due to difficulties in acquiring adequate numbers of fertilized Walleye eggs to meet all district stocking requests, Walleye stockings have been sporadic. Walleye were last stocked in 2023.

2. Conduct age and growth analysis on Walleye during 2023 gill net survey to determine success of fry stockings.

   Action: Age and growth analysis was conducted in 2023.

3. Promote the Walleye fishery through local media outlets and on the district Facebook page.

   Action: Due to the inability to acquire adequate numbers of Walleye to meet district stocking needs, no attempts have been made to publicize the Walleye fishery at the reservoir.

4. Monitor White Crappie population with various survey techniques; electrofishing in fall 2020 and 2022; gill netting in spring 2021 and 2023; and trap netting in spring 2022.

   Action: White Crappie length and weight were collected during the fall 2020 and 2022 electrofishing survey; 2023 gill net survey; and the 2022 trap net survey.

5. Conduct a category 2 age and growth analysis for White Crappie in 2021.

   Action: Age and growth analysis was conducted for White Crappie collected during the 2021 trap net survey.

6. Monitor Largemouth Bass population with additional electrofishing in 2020 and standard electrofishing in 2022 to evaluate impact of lake level.

   Action: Largemouth Bass were surveyed with electrofishing in 2020 and 2022.

7. Stock Florida Largemouth Bass at a rate of 1,000/km of shoreline in 2020 and 2021 to increase Florida Bass alleles, collect genetic samples in 2022.

   Action: Due to declining lake levels and loss of habitat, the reservoir did not meet the stocking criteria for Florida Largemouth Bass.

8. Cooperate with the White River Municipal Water District to post appropriate signage at access points around the reservoir; contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers; educate the public about invasive species through the use of media and the internet; and make a speaking point about invasive species when presenting to constituents and user groups. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

   Action: Presentations have been given to the Region O water planning group and various area civic groups and school groups. Interviews and new releases concerning invasive species have been done for area and statewide media. Stories and posts have been added to the district Facebook page. Signage has been sent to the controlling authority that also operates the marina.

Harvest regulation history: Sport fishes in White River Reservoir are currently managed with statewide regulations (Table 3). From 1993 to 2001, Smallmouth Bass were managed with an 18-inch minimum length limit and 3-fish daily bag limit in an effort to increase relative abundance and improve size structure. In 2001, harvest regulations for Smallmouth Bass were changed to the statewide 14-inch minimum length limit and 5-fish bag as no discernable change in the population was observed. Regulations on harvest of Walleye changed from 16-inch minimum and 5-fish bag, to a 5-fish bag with no more than 2 Walleye under 16 inches on September 1, 1999. Current regulations are found in Table 3.

Stocking history: White River Reservoir has been stocked with multiple species since impoundment in 1963. The latest fish stocking occurred in 2023. The complete stocking history is available in Table 4.

Vegetation/habitat management history: White River Reservoir has no vegetation/ habitat management history.

Water transfer: White River Reservoir is primarily used for municipal water supply and recreation. The reservoir currently supplies water to the Cities of Crosbyton, Post, Ralls, and Spur in a rural region located approximately 65 miles southeast of Lubbock. There is one permanent pumping station on the reservoir that pumps water to the White River Municipal Water District's water treatment plant to be distributed to the 4 member cities. Regional water planning proposals include negotiations with the City of Lubbock to purchase the water rights in the reservoir. If purchased, water management strategies could include the use of reclaimed effluent from the City of Lubbock being pumped to the reservoir. Other strategies include the possible transfer of water to and from Alan Henry Reservoir and the proposed Post Reservoir. Currently, no interbasin transfers are known to exist.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for White River Reservoir (Clayton and Huber 2019). Primary components of the OBS plan are listed in Table 5. All electrofishing, trap net, and gill net survey sites were randomly selected, and exploratory trap net sights were biologist-selected sites. All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and White Crappie 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 (5 net nights at 5 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 – Channel Catfish, Walleye, White Crappie, and White Bass were collected by gill netting (6 net nights at 6 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for Walleye were determined by using otoliths from 12 randomly sampled fish (range 18.0 to 26.0 inches).

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 Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

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

Water level – Source for water level data was the United States Geological Survey (USGS 2023).

Results and Discussion

Habitat: No man-made changes have occurred at the reservoir since 2006; a habitat survey was last conducted in 2022. Habitat was typified by natural shoreline (eroded bank, clay, silt, or sand) with scattered areas of gravel (rock <4 in) and rocky shoreline (rock >4 in). Shoreline habitat consisted of mostly natural shoreline with some small, scattered areas of rock bluff, boulder, and rip rap (Table 6). Past vegetation surveys in the reservoir typically show several acres of native emergent vegetation; however, the 2022 survey consisted of 46.1 acres of flooded timber and no observed aquatic vegetation (Table 7).

Prey species: Electrofishing catch rates (CPUE) of Gizzard Shad and Bluegill were 190.0/h and 142.0/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was excellent, indicating that 96% of Gizzard Shad were available to existing predators; this was similar to IOV estimates in previous years (Figure 2). Total CPUE of Gizzard Shad in 2022 was considerably lower than total CPUE in 2020 and 2018 (Figure 2); however, total CPUE of Bluegill in 2022 was much higher than previous year's surveys, and size structure continued to be dominated by small individuals (Figure 3). The higher CPUEs since 2018 are most likely attributed to flooded spawning habitat due to small lake level increases experienced in 2020 and 2022. Gizzard Shad and Bluegill objectives were met.

Blue Catfish: Blue Catfish in White River Reservoir are historically a low-density fishery that receives very little directed angling effort (Clayton and Huber 2019). Although the gill net surveys conducted in 2019, 2021, and 2023 all had total CPUEs greater than 4.0/nn, lower CPUEs of less than 4.0/nn are more typical (Figure 4). During the 2016 creel survey Blue Catfish received only 119.50 hours of directed angler effort, and no harvested Blue Catfish were observed during the creel survey (Clayton and Huber 2019). Blue Catfish are classified as a low-density fishery with little angler effort, so no survey objectives were established.

Channel Catfish: The gill net CPUE of Channel Catfish was 3.5/nn in 2019 which is lower than previous surveys (Figure 5). Although total CPUE was lower, the Channel Catfish population has shifted from being dominated by smaller individuals (PSD = 17) to a more balanced size distribution with a PSD of 33 (Figure 5). The declining CPUEs can most likely be attributed to a declining lake level trend and loss of preferred spawning habitat. All fish surveyed appear to have healthy body condition as all relative weights measured greater than 95. While the objective for Channel Catfish abundance was achieved with an RSE = 23, the objective for size structure was not met as only 18 of the needed 50 stock length fish were surveyed.

Flathead Catfish: Flathead Catfish are present in the reservoir in very low abundance. The gill net CPUE for 2023 was 0.2/nn, which is lower than 2021 (CPUE = 1.7/nn), but similar to 2019 (CPUE = 0.5/nn; Figure 6). Flathead Catfish are considered a low-density fishery and no survey objectives were established.

Largemouth Bass: The electrofishing CPUE of stock-length Largemouth Bass was 7.0/h in 2022 (Figure 7). There has been a declining trend in Largemouth Bass CPUE since 2016 (CPUE = 89.0/hr; Clayton and Huber 2019). Size structure in 2022 was good as PSD was 71 and fish surveyed ranged from 7 to 19 inches in length (Figure 7). Body condition in 2022 was fair (relative weight ranged between 75 and 99) for all size classes of fish (Figure 7). Florida Largemouth Bass influence has remained relatively constant as Florida alleles have ranged from 17 to 28% (Table 7). Category 2 Age and Growth was not possible due to low CPUE of fish between 330 mm and 381 mm; only 7 fish total were surveyed during the 2022 electrofishing survey. Due to much lower-than-expected CPUE, Largemouth Bass objectives for abundance, size structure, and age and growth were not met, and only 9 of the targeted 30 fish for genetic analysis were collected. Additional stations were not added to the electrofishing survey due to the extremely low CPUE experienced during the survey period.

White Crappie: Typically, trap net CPUE and size structure for White Crappie in White River Reservoir have been highly variable as evidenced by the 2015, 2017 and 2021 trap net surveys (Figure 8). Presence/absence was determined through the electrofishing survey in 2022 and gill net survey in 2023. Electrofishing in 2022 resulted in 28 White Crappie (CPUE=28.0/hr) that ranged from 3 to 7 inches with the majority measuring 6 inches or smaller (Figure 9). The 2023 gill net survey collected an additional 57 White Crappie (CPUE=9.5/nn) that measured between 5 and 14 inches (Figure 10). Age and growth analysis on White Crappie collected during the 2021 trap net survey showed good growth as all otoliths analyzed showed all fish reaching greater than 9 inches in 2 to 3 years (N=13, Figure 11). According to the 2016 creel survey, White Crappie were the most sought-after species by anglers with a directed effort of 5,481.82 hours and estimated total harvest of 1,017 fish (Clayton and Huber 2019). Due to highly variable survey data, White Crappie objectives for this sampling period were presence/absence.

Walleye: As natural recruitment in the reservoir is limited, the fishery is maintained by stocking. Declining water levels, between 2001 and 2014, and loss of viable habitat have impacted nearly all species in the reservoir including Walleye. In 2015, water level increases improved conditions at the reservoir, and limited Walleye stocking was resumed. Gill net CPUE has increased from 1.6/nn in 2015 to 11.7/nn in 2019. Since 2019, the CPUE has declined to 4.5/nn in 2021 and 6.3/nn in 2023. The population is dominated by larger individuals showing little to no natural reproduction in the reservoir (Figure 12). The six largest and six smallest Walleye were collected for age and growth analysis to determine if these fish were from the 2015 stocking; of the 12 fish that were aged, 8 were from the 2015

stocking year, two were from natural reproduction in 2016, and two were from natural in 2020 (Figure 13). All fish collected were greater than the 16-inch minimum length limit (Figure 13).

Fisheries Management Plan for White River Reservoir, Texas

Prepared – July 2023

ISSUE 1: The Walleye fishery was developed in White River Reservoir through a stocking program beginning in the early 1970s. Due to higher than optimal water temperatures during the winter, natural recruitment in the reservoir is limited, and the population needs to be maintained by supplemental stockings.

MANAGEMENT STRATEGIES

1. Maintain the Walleye fishery through biennial stockings of 2,000 fry/acre.
2. If adequate numbers of Walleye are obtained to resume supplemental stocking, conduct age and growth analysis during 2025 and 2027 gill net surveys to determine success of a 2023 fingerling stocking and future fry stockings.
3. If supplemental stocking is resumed, promote the Walleye fishery through the district social media.

ISSUE 2: Historically, the reservoir has had an overabundant White Crappie population with poor size structure and growth. Age and growth data for White Crappie in the reservoir showed that growth slowed from a mean length of 13 inches at age 5 in 1999 (Hutt 2003) to 7 inches at age 5 in 2006 (Henegar and Munger 2007). While the 2021 survey showed a favorable size structure, it is possible that low relative abundance of predatory fish may result in a rapid increase of White Crappie allowing them to become overly abundant and stunting growth.

MANAGEMENT STRATEGIES

1. Angler data from a standard creel survey conducted in spring 2024 will also be used to provide additional information about the White Crappie population.
2. Monitor White Crappie population with trap netting in spring 2026.
3. Conduct a category 2 age and growth analysis in 2026.

ISSUE 3: The Largemouth Bass fishery in White River Reservoir has suffered from poor recruitment for several years due to low water level.

MANAGEMENT STRATEGIES

1. If the reservoir experiences a lake level increase above 2,351 ft MSL, stock Florida Largemouth Bass at a rate of 1,000/km of shoreline.

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

invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the White River Municipal Water District to maintain 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 (2023–2027)

Sport fish, forage fish, and other important fishes

Sport fishes in White River Reservoir include Blue Catfish, Channel Catfish, Largemouth Bass, White Crappie, White Bass, and Walleye. Known important forage species include Bluegill and Gizzard Shad. The proposed sampling schedule is available in Table 8.

Low-density fisheries

Blue Catfish: Blue Catfish are present in White River Reservoir, but population abundance is typically low. Although, gill net surveys in 2019, 2021, and 2023 sampled an average of 8.6 fish per net night, the 2016 spring-quarter creel also showed less than 1% of directed angler effort targeting Blue Catfish (Clayton and Huber 2019). Targeted sampling of Blue Catfish is not necessary during the 2023-2027 survey period; however, due to the popularity of catfish angling at the reservoir, Blue Catfish trend data will continue to be collected based on sampling procedures used for Channel Catfish.

Flathead Catfish: Flathead Catfish are present in White River Reservoir, but population abundance is typically low. Gill net surveys fluctuated between a low of 0.2/nn in 2023 and a high of 1.7/nn in 2023, and the 2016 spring-quarter creel showed no directed angler effort targeting Flathead Catfish (Clayton and Huber 2019). Targeted sampling of Flathead Catfish is not necessary during the 2023-2027 survey period; however, due to the popularity of catfish angling at the reservoir, Flathead Catfish trend data will continue to be collected based on sampling procedures used for Channel Catfish.

White Bass: White Bass are present in White River Reservoir, but population abundance fluctuates greatly due to extended periods of low and declining water levels. Historically gill net catch rates are variable and often times below 1.5 fish/nn. The 2019 and 2023 surveys showed the two highest, and only, CPUEs over 4.4 fish /nn (2019 CPUE=12.5/nn, 2023 CPUE=7.0/nn). This higher CPUE, in 2019, is most likely attributed to the significant amount of rainfall that occurred on the watershed in 2014 and 2015 providing greatly increased lake levels and spawning habitat during the 2015 and 2016 spawning season. Spring-quarter 2016 Creel survey showed less than 0.5% directed effort (Clayton and Huber 2019). Targeted sampling of White Bass is not necessary during the 2023-2027 survey period; however, trend data on White Bass will be collected from the Channel Catfish gill net survey.

Walleye: Recent creel data indicates that Walleye are a negligible fishery with no direct angler effort (Clayton and Huber 2019). The 2019 CPUE showed a much higher relative abundance (CPUE=11.7/nn), most likely due to a successful 2015 fry stocking following recent rains and reservoir level improvements.

Declining reservoir levels and only one additional stocking (2019) have resulted in lower CPUEs in 2021 and 2023 (CPUE=4.5/nn, CPEU=6.3/nn respectively). Drought conditions and difficulty in obtaining adequate numbers of Walleye fry have resulted in infrequent stockings from 2008 to present. Low relative abundance has likely resulted in some Walleye anglers travelling to different reservoirs or switching target species; however, anecdotal evidence suggests that some anglers are still targeting Walleye. While attempting to promote the Walleye fishery, sampling efforts will be exploratory until consistent biennial stockings can be established. Trend data on Walleye will be collected during sampling for Largemouth Bass and Channel Catfish. Walleye collected during the 2025 and 2027 gill net surveys will be retained for age and growth analysis.

Survey objectives, fisheries metrics, and sampling objectives

Channel Catfish: Channel Catfish are the second most sought-after species in White River Reservoir (Clayton and Huber 2019). Trend data on relative abundance and size structure of Channel Catfish has been collected biennially since 1999 with spring gill netting. Continuation of trend data with spring gill netting will allow for general monitoring of any large-scale changes in the Channel Catfish population that may spur further investigation. Analysis of past sampling indicates that it would require a minimum of 10 gill net sites to achieve a CPUE-S RSE≤ 25 and a size structure estimation (PSD; 50 fish minimum with 80% confidence). Due to declining water levels, only six random gill net sites will be sampled during spring 2025 and 2027. If surface acreage increases to greater than 700 acres, one additional random gill net site will be sampled per 100-acre increase until a maximum of 10 gill net sites is achieved.

Largemouth Bass: The Largemouth Bass fishery in White River Reservoir has suffered from poor recruitment for several years due to low lake levels. According to a 2016 spring-quarter creel survey, Largemouth Bass were the fourth most popular sport fish in White River Reservoir, accounting for 15.7% of the total angling effort (Clayton and Huber 2019). Trend data on relative abundance and size structure of Largemouth Bass has been collected biennially since 2000 with fall, nighttime electrofishing. Continuation of trend data with nighttime electrofishing in the fall will allow for general monitoring of any large-scale changes in the Largemouth Bass population that may spur further investigation. Analysis of past sampling indicates that it would require a minimum of 28 electrofishing sites to achieve a CPUE-S RSE≤ 25 and 40 sites to achieve size structure estimation (PSD; 50 fish minimum with 80% confidence). Twelve random electrofishing stations will be sampled during the 2024 and 2026 nighttime electrofishing seasons (Table 15). Age and growth will be evaluated with a Category 2 analysis in fall 2026. Due to six-foot lake level rise in early 2023, fin clips will be collected from a minimum of 30 Largemouth Bass for genetic analysis in fall 2024.

White Crappie: Historically White Crappie have been very abundant in White River Reservoir; however, they have typically exhibited stunted growth. A 2016 spring-quarter creel survey indicated White Crappie are the most popular fish in the reservoir with an angling effort of 31.2% (Clayton and Huber 2019). Prior trap netting CPUE averaged 34.3/nn during the last 3 surveys, providing an average of 81 stock-size and larger fish per survey. It is anticipated that setting a minimum of 7 trap nets will achieve a sampling objective of 50 White Crappies >5 inches, and 13 fish between 9 and 11 inches for aging. Since CPUE of trap nets in White River Reservoir is highly variable resulting in some year's sampling no legal-sized fish, a trap net survey scheduled in 2026 will use ten trap nets in an attempt to collect enough White Crappie for Category 2 age and growth (Table 15). Angler data from a standard creel survey conducted in spring 2024 will also be used to provide additional information about the White Crappie population.

Bluegill and Gizzard Shad: Bluegill and Gizzard Shad are the primary forage at White River Reservoir. Like Largemouth Bass, trend data on CPUE and size structure of Bluegill and Gizzard Shad have been collected biennially since 2000. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in Bluegill and Gizzard Shad relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass should result in sufficient numbers of Bluegill and Gizzard Shad for size structure estimation (PSD and IOV; 50 fish minimum with 80% confidence) and for relative abundance estimates (RSE $\leq$ 25 of CPUE-Total). Largemouth Bass body condition can also provide information on forage abundance, vulnerability, or both relative to

predator density. Relative weight of Largemouth Bass ≥ 8” TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

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Tables and Figures

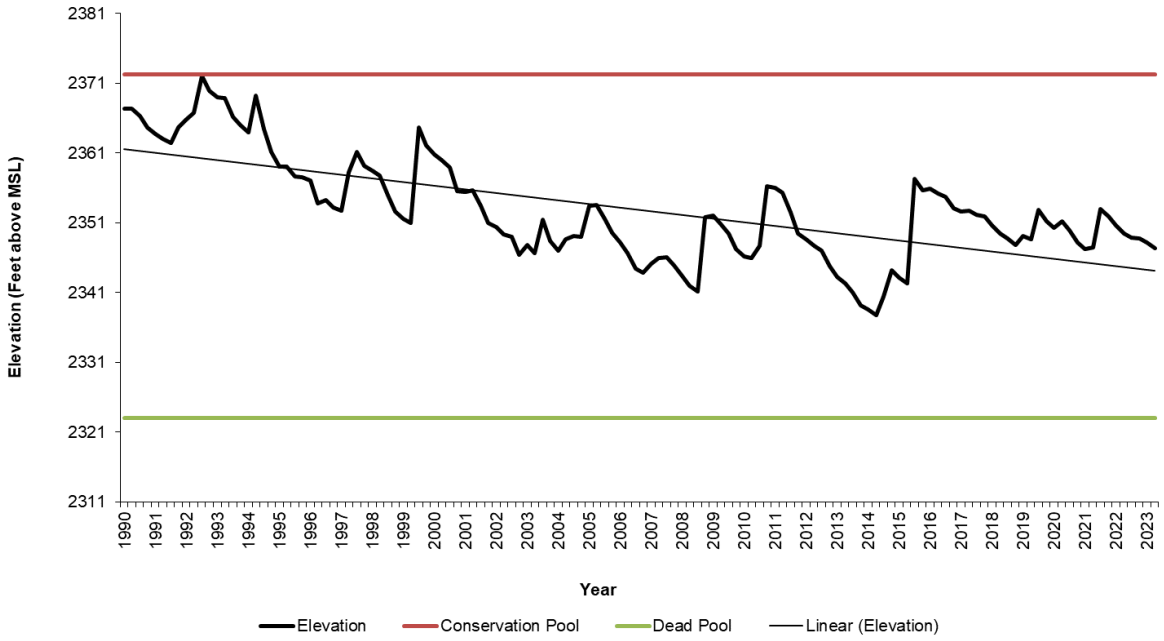


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for White River Reservoir, Texas. Conservation pool is 2372.2 feel MSL.

Table 1. Characteristics of White River Reservoir, Texas.

Characteristic	Description
Year constructed	1963
Controlling authority	White River Municipal Water District
County	Crosby
Reservoir type	Main stem
Mean depth (ft)	11
Maximum depth (ft)	65
Watershed (mi^2)	3,069
Contributing Watershed (mi^2)	689
Shoreline Development Index (SDI)	5.64
Conductivity	1,213 µmhos/cm

Table 2. Boat ramp characteristics for White River Reservoir, Texas, August 2022. Reservoir elevation at time of survey was 2,348 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
White River Marina	32.46014 -101.09301	Y	30	UNK	Out of water. Extension is not feasible
River Crest Road (2 ramps)	33.46090 -101.08558	Y	20	UNK	One of the ramps was usable. Extension is not feasible
Low Water	33.45996 -101.08340	Y	5	2340	Usable. Extension is not feasible.

Table 3. Harvest regulations for White River Reservoir, Texas

Species	Bag limit	Length limit
Catfish: Channel and Blue, their hybrids and subspecies	25 (only 10 ≥ 20 inches)	None
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass: Smallmouth	5[a]	14-inch minimum
Bass: Largemouth	5[a]	14-inch minimum
Crappie: White and Black hybrids and subspecies	25 (in any combination)	10-inch minimum
Walleye	5	Only 2 fish allowed under 16 inches

[a]Bag limit of Largemouth and Smallmouth Bass is 5 fish in any combination.

Table 4. Stocking history of White River Reservoir, Texas. FGL = fingerling; FRY = fry; UNK = unknown.

Year	Number	Size
	Blue Catfish	
1970	5,000	UNK
1975	9,300	UNK
Species Total	14,300	
	Channel Catfish	
1967	30,000	FGL
1970	9,000	FGL
1972	21,000	FGL
1973	25,000	FGL
1974	10,000	FGL
Species Total	95,000	
	Flathead Catfish	
1971	1,500	UNK
1972	1,500	UNK
1973	1,500	UNK
Species Total	4,500	
	Green X Redear Sunfish	
1969	3,000	UNK
1970	7,500	UNK
1971	7,500	UNK
1972	1,000	UNK
Species Total	19,000	
	Smallmouth Bass	
1979	15,654	UNK
1980	5,212	UNK
1981	50,300	UNK
Species Total	71,166	
	Largemouth Bass	
1964	100,000	UNK
1972	15,000	UNK
Species Total	115,000	
	Florida Largemouth Bass	
1982	105,000	FGL
2000	200,000	FGL
2003	19,105	FGL
2009	143,705	FGL
2012	37,067	FGL
2016	99,067	FGL
2019	20,596	FGL
Species Total	625,071	
	Walleye	
1975	500,000	FRY
1976	500,000	FRY
1979	2,456,250	FRY
1980	5,478,500	FRY
1983	5,800,004	FRY
1988	1,515,488	FRY
1989	3,989,200	FRY
1990	3,762,064	FRY
1991	5,000,000	FRY
1994	4,100,000	FRY
2000	58,000	FGL
2005	2,385,745	FRY
2007	2,145,000	FRY
2010	2,958,150	FRY
2012	1,620,000	FRY
2015	618,025	FRY
2019	594,060	FRY
2023	11,350	FGL
Species Total	43,491,836	
	Yellow Perch	
1994	200,000	UNK
1996	116,700	UNK
1997	3,745	UNK
Species Total	320,645	
	Red Drum	
1975	14,415	UNK

Table 5. Objective-based sampling plan components for White River Reservoir, Texas 2019-2023.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
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
	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
White Crappie	Exploratory	Presence/Absence	Trend Data
Trap netting			
White Crappie	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 10 inches	N = 13, any age
Gill netting			
Blue Catfish	Exploratory	Presence/Absence	Trend Data
Channel Catfish	Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure		N ≥ 50 stock
White Bass	Exploratory	Presence/Absence	Trend Data
White Crappie	Exploratory	Presence/Absence	Trend Data

[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 3. Survey of structural habitat types, White River Reservoir, Texas, 2022. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural	11.0 miles	79.1
Boulder	1.0 miles	7.2
Rock Bluff	0.8 miles	5.8
Natural with Docks	0.6 miles	4.3
Rip Rap	0.3 miles	2.2
Gravel	0.2 miles	1.4
Standing timber	46.1 acres	7.3

Table 7. Survey of aquatic vegetation, White River Reservoir, Texas, 2014, 2018, and 2022. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014	2018	2022
Native emergent (Smartweed)	142.2 (29.4)	21.3 (<0.1)	0 (0)

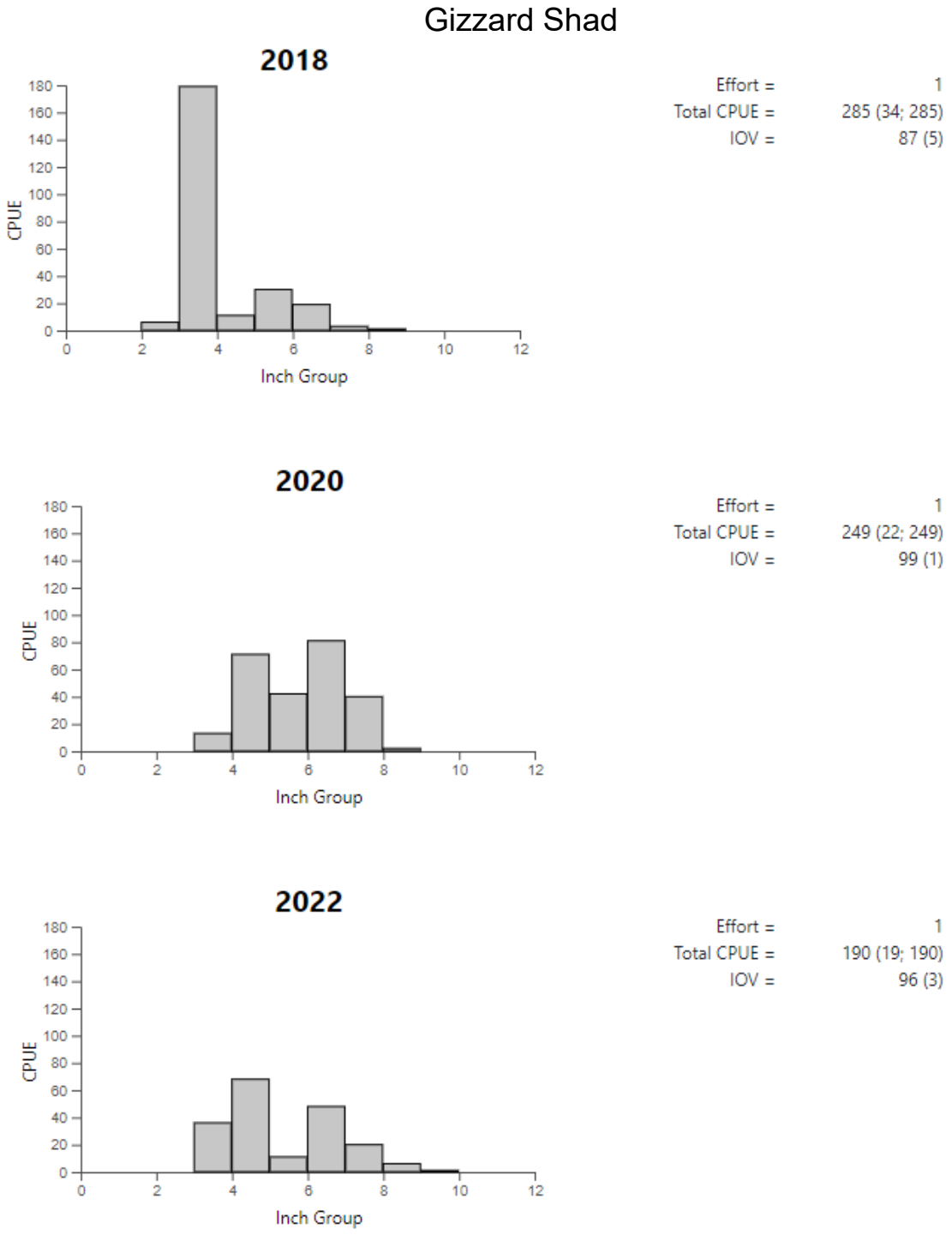


Figure 2. Number of Gizzard Shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2018, 2020, and 2022.

Bluegill

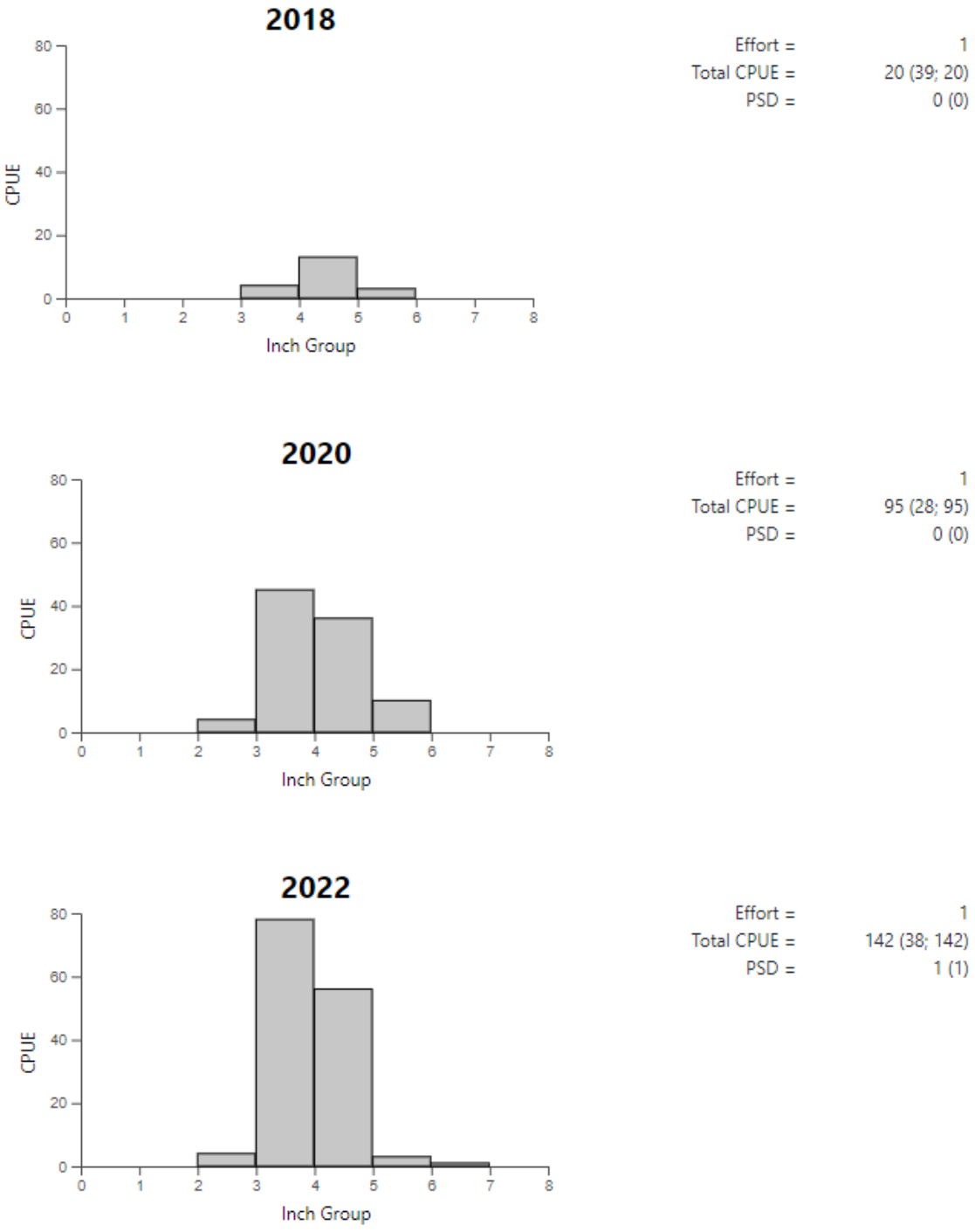


Figure 3. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2018, 2020, and 2022.

Blue Catfish

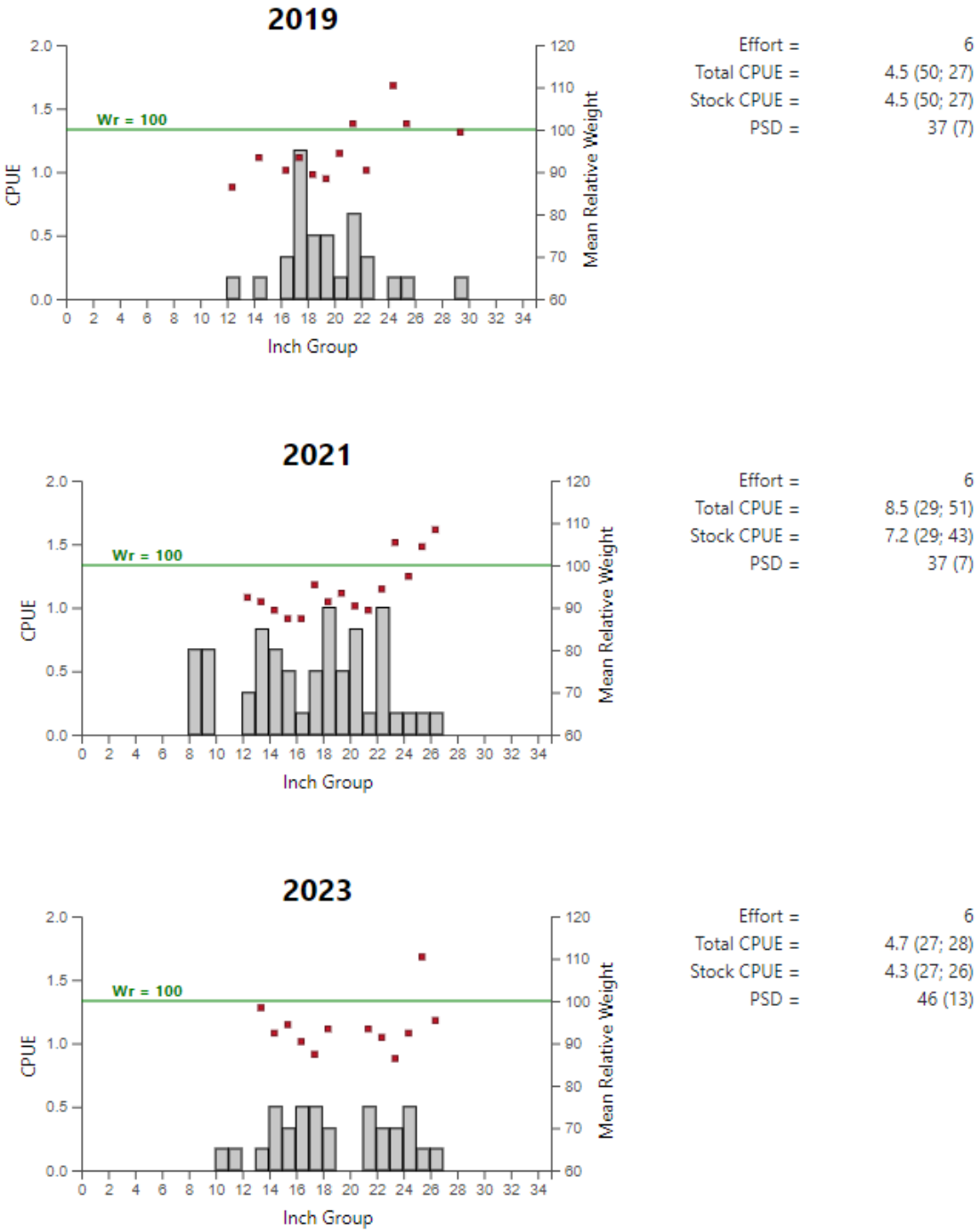


Figure 4. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2019, 2021, and 2023. Horizontal line represents relative weight of 100.

Channel Catfish

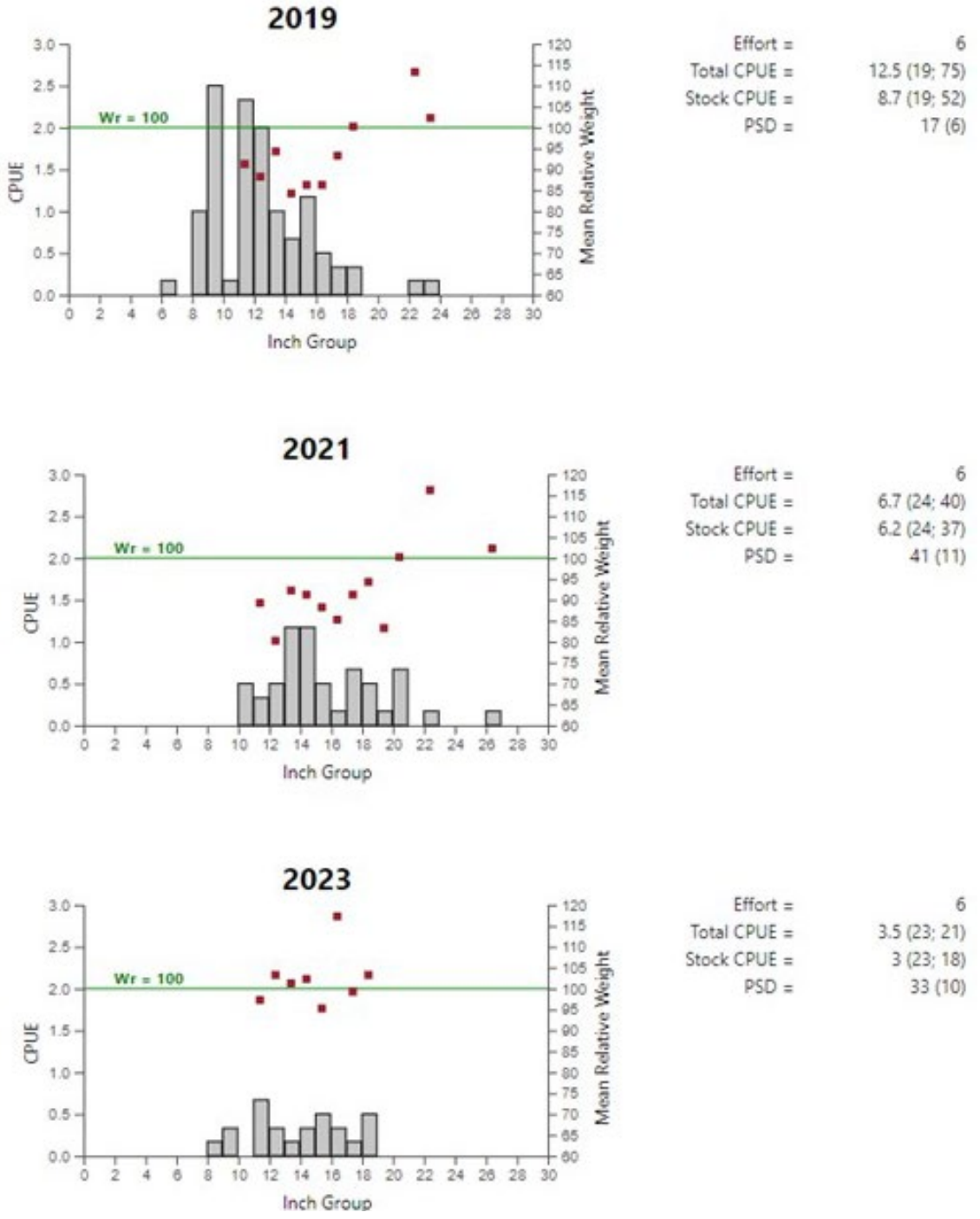


Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2019, 2021, and 2023. Horizontal line represents relative weight of 100.

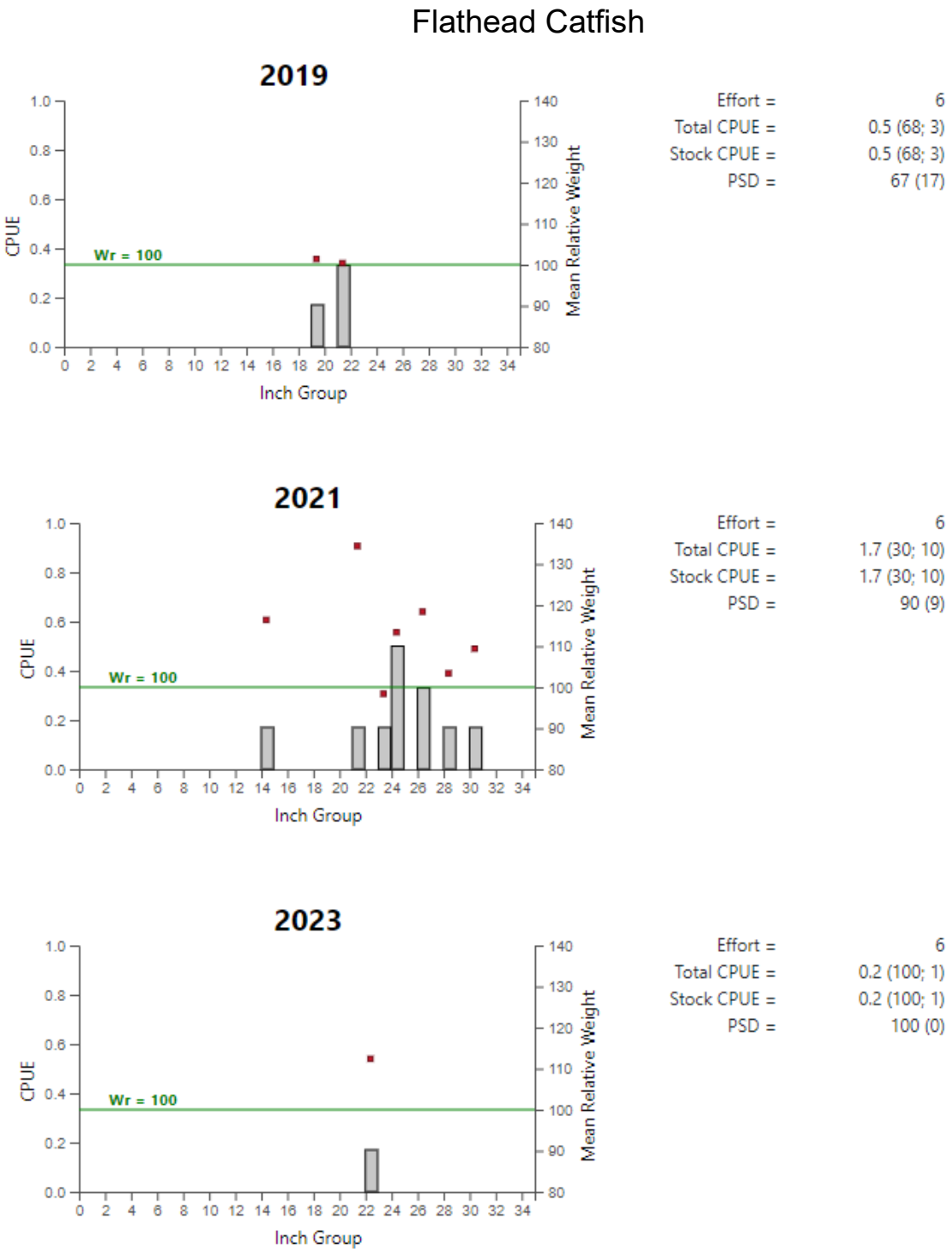


Figure 6. Number of Flathead Catfish caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2019, 2021, and 2023. Horizontal line represents relative weight of 100.

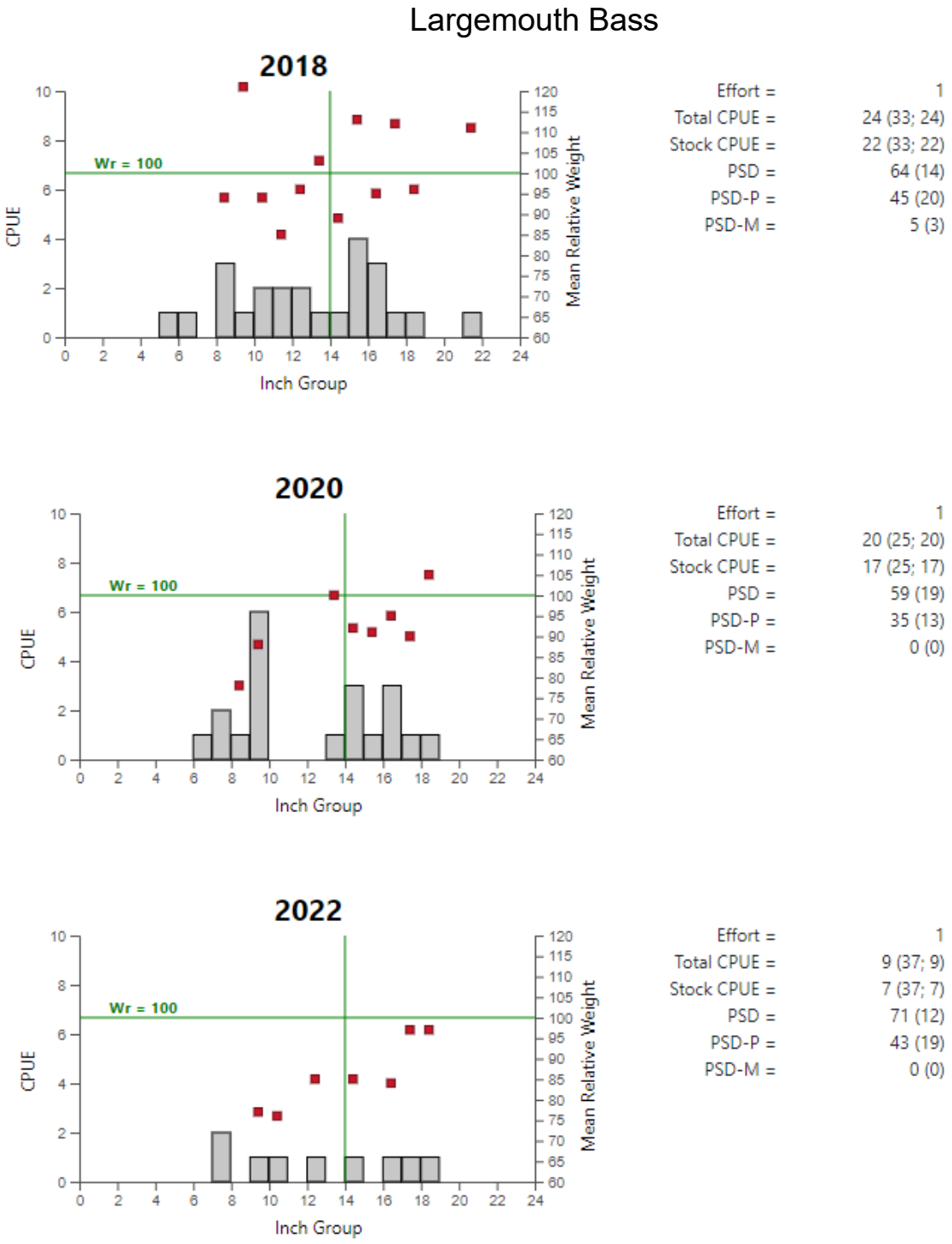


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2018, 2020, and 2022. Vertical line indicates the minimum length limit, and horizontal line represents relative weight of 100.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, White River Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB. Genetic composition was determined with micro-satellite DNA analysis.

Year	Sample size	Number of fish				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
2014	6	0	0	5	1	17	0
2018	24	0	0	19	5	25	0
2022	9	0	0	8	1	28	0

White Crappie

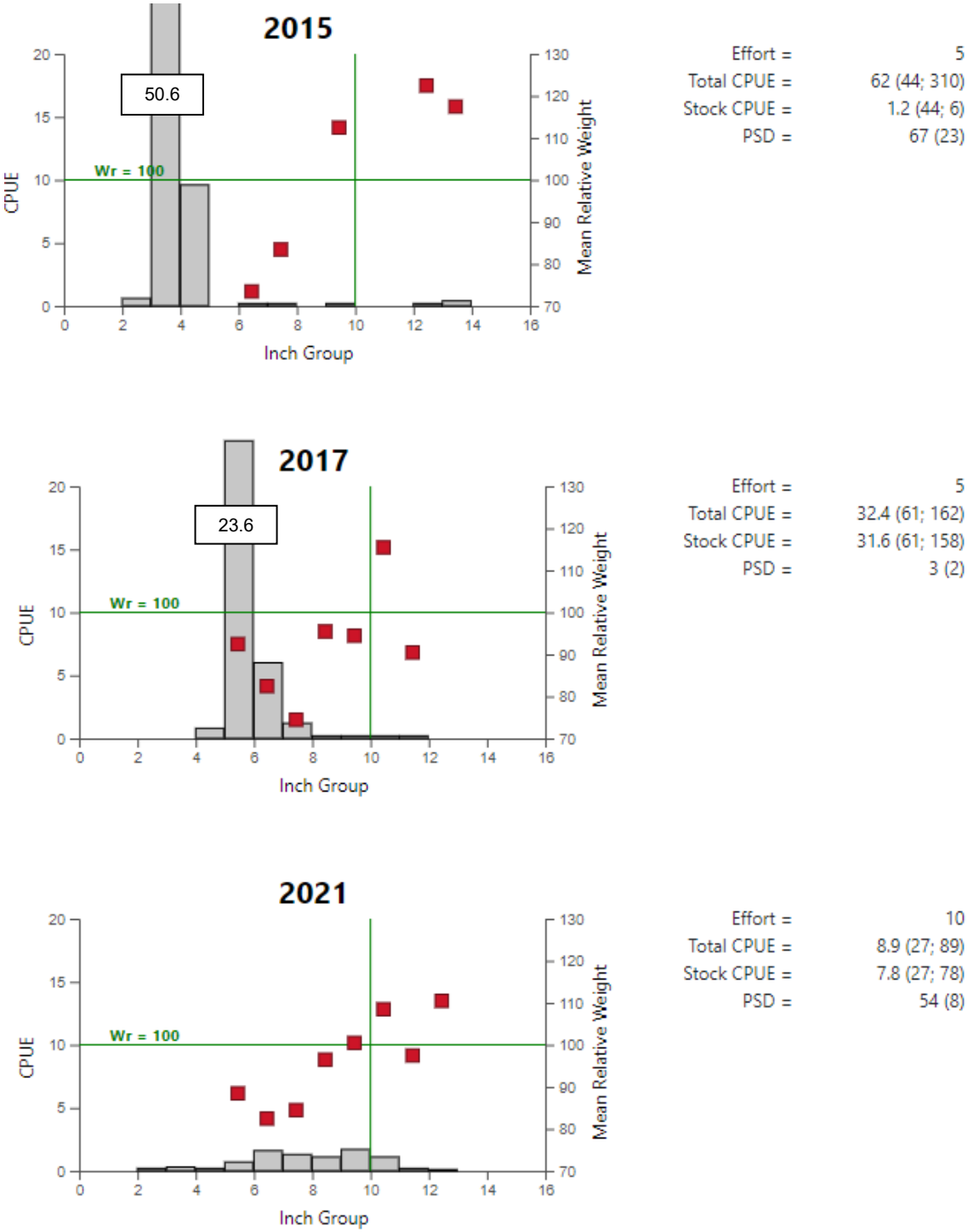


Figure 8. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, White River Reservoir, Texas, 2015, 2017, and 2021. Vertical line indicates the minimum length limit, and horizontal line represents relative weight of 100.

White Crappie

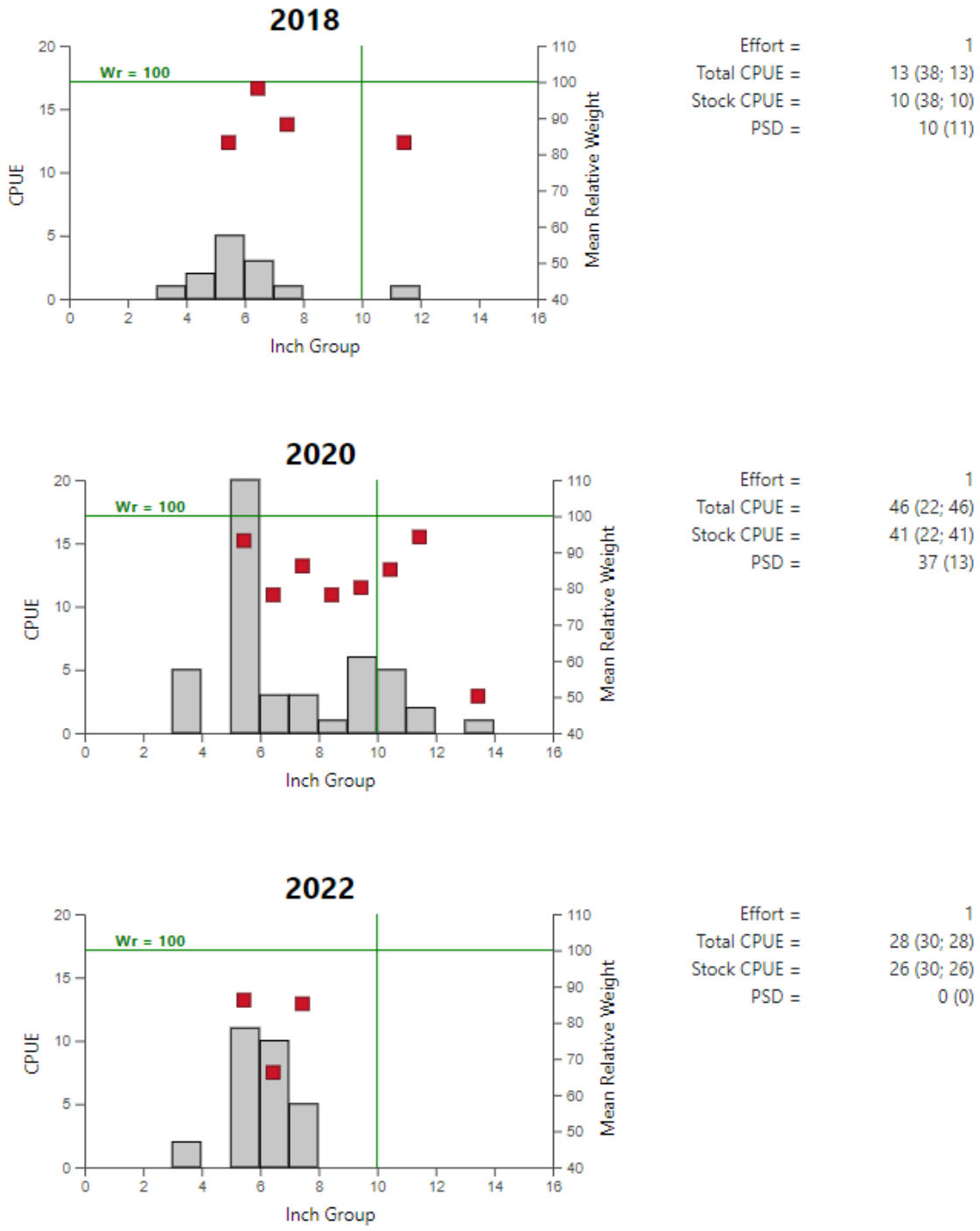


Figure 9. Number of White Crappie caught per hour (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2018, 2020, and 2022. Vertical line indicates the minimum length limit, and horizontal line represents relative weight of 100.

White Crappie

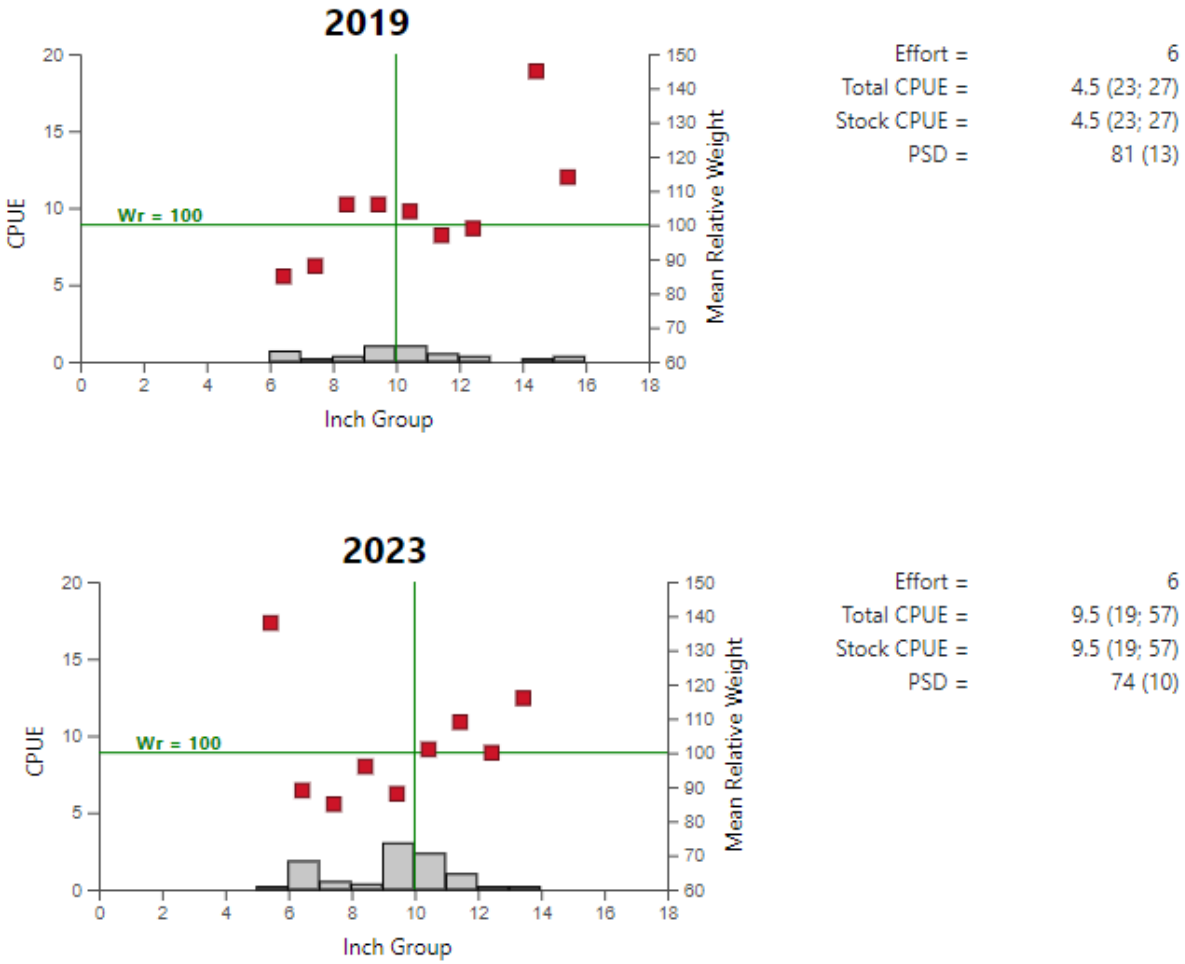


Figure 10. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2019 and 2023. Vertical line indicates the minimum length limit, and horizontal line represents relative weight of 100.

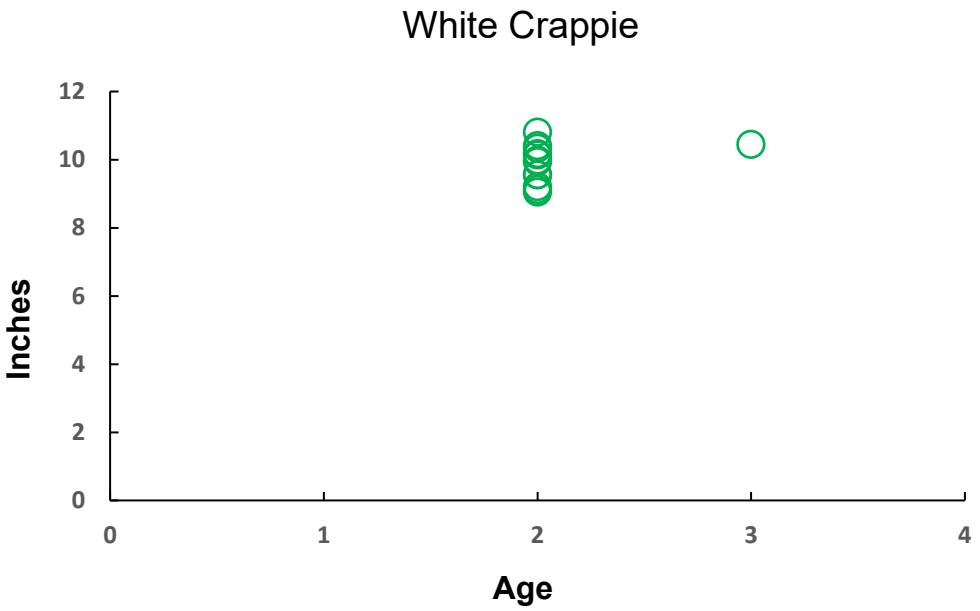


Figure 11. Length at age for White Crappie collected from trap nets at White River Reservoir, Texas, December 2021.

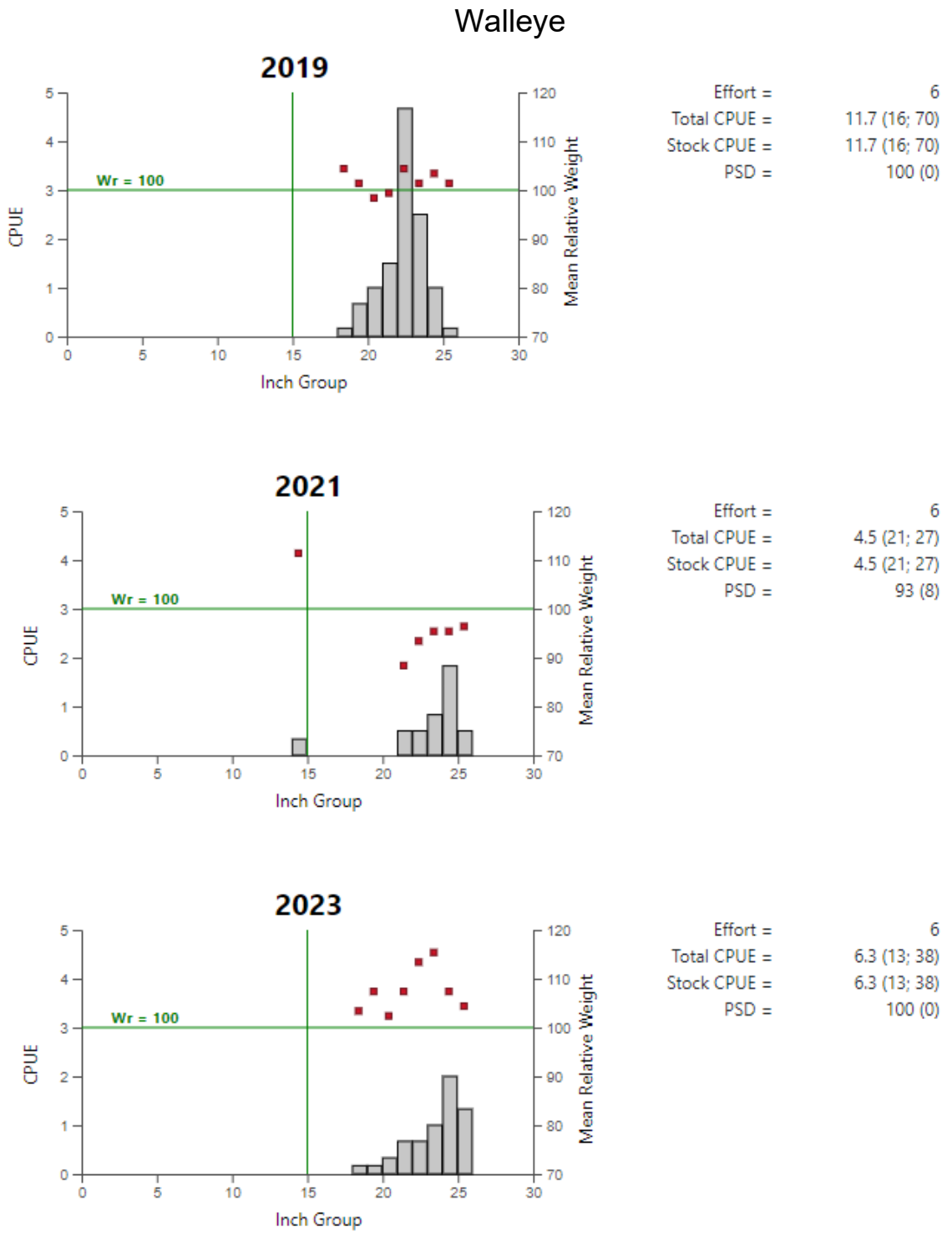


Figure 12. Number of Walleye caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2019, 2021, and 2023. Vertical line indicates the minimum length limit, and horizontal line represents relative weight of 100.

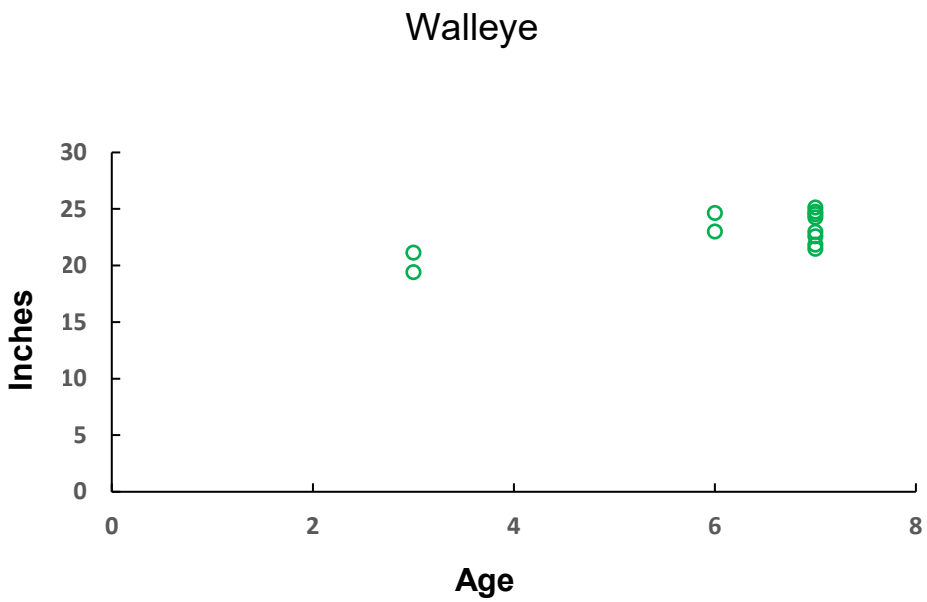


Figure 13. Length at age for Walleye collected from gill nets at White River Reservoir, Texas, March 2023.

Proposed Sampling Schedule

Table 8. Proposed sampling schedule for White River Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, and electrofishing and trap netting surveys are conducted in the fall.

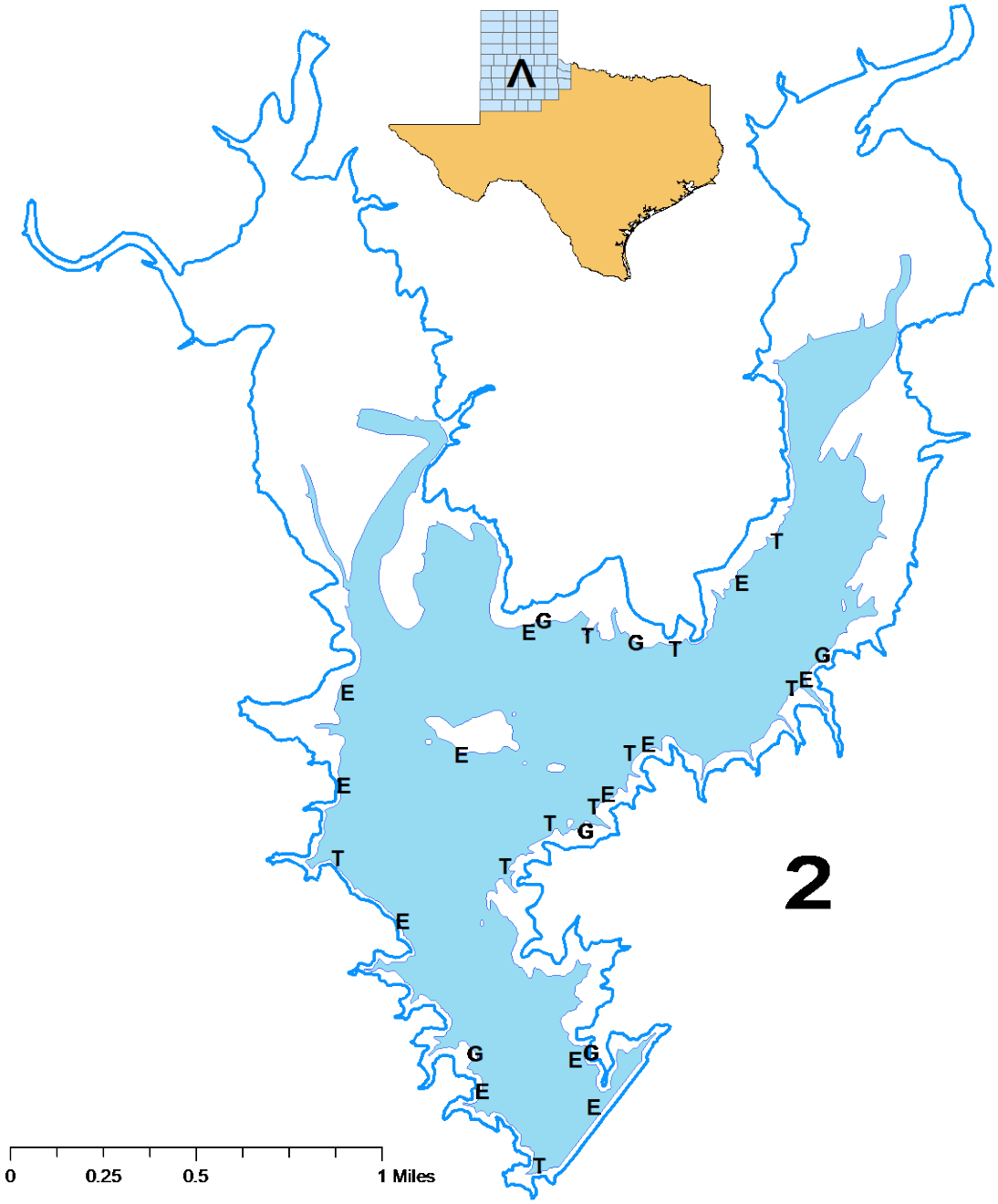
	Survey year			
	2023-2024	2024-2025	2025-2026	2026-2027
Angler Access				X
Structural Habitat				X
Vegetation				X
Electrofishing – Fall		X		X
Trap netting				X
Gill netting		X		X
Creel survey	X			
Report				X

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

Number (N) and catch rate (CPUE; RSE in parentheses) of all species collected from all gear types from White River Reservoir, Texas, 2021 trap net survey, 2022 electrofishing survey, and 2023 gill net survey. Sampling effort was 10 net nights for trap netting, 6 net nights for gill netting, and 1 hour for electrofishing.

Species	Trap Netting		Electrofishing		Gill Netting	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad			190	190.0 (19)	184	30.7 (36)
Common Carp	1	0.1 (100)	203	203.0 (28)	86	14.3 (9)
River Carpsucker			53	53.0 (77)	72	12.0 (16)
Blue Catfish					28	4.7 (27)
Channel Catfish			5	5.0 (46)	21	3.5 (23)
Flathead Catfish			7	7.0 (100)	1	0.2 (100)
White Bass			1	1.0 (100)	42	7.0 (24)
Green Sunfish			5	5.0 (81)		
Bluegill	146	14.6 (60)	142	142.0 (38)	1	0.7 (100)
Longear Sunfish	18	1.8 (45)	72	72.0 (39)		
Largemouth Bass			9	9.0 (37)	3	0.5 (68)
White Crappie	89	8.9 (26)	28	28.0 (30)	57	9.5 (19)
Walleye	1	0.1 (100)	1	1.0 (100)	38	6.3 (13)
Freshwater Drum			84	84.0 (24)		

APPENDIX B – Map of sampling locations



Location of sampling sites, White River Reservoir, Texas, 2022-2023. Gill net, trap nets, and electrofishing stations are indicated by G, T, and E, respectively. Blue line represents full pool (2,370 ft MSL) and blue polygon represents closest contour line (water level) at time of sampling (2,350 ft MSL).

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