Gladewater City Lake

2021 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

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Survey and Management Summary

Fish populations in Gladewater City Lake were surveyed in 2021 using electrofishing and in 2022 using hoop netting. Historical data are presented with the 2018-2022 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: Gladewater City Lake is a 481-acre reservoir located on Glade Creek, a tributary of the Sabine River. It was constructed in 1953 by the City of Gladewater for use as municipal and industrial water supply. Habitat features consisted of inundated timber, brush, creek channels, and riprap. The lake has a history of limited aquatic vegetation. Water hyacinth, a non-native invasive plant, was detected at the reservoir in 2005. Periodic herbicide treatments have prevented the spread of water hyacinth in the reservoir.

Management History: Important sport fish include Largemouth Bass, Channel Catfish, Bluegill, Redear Sunfish, and crappie. Texas Parks and Wildlife Department (TPWD) Inland Fisheries Marshall District staff stocked Threadfin Shad in 2008 to improve the prey fish community. The City of Gladewater purchased (from a private fish retailer) and stocked the reservoir with 15,000 pure Florida Largemouth Bass fingerlings each year from 2008-2010. TPWD has stocked Florida Largemouth Bass fingerlings in both 2016 and 2020.

Fish Community

- **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch of Gizzard Shad was lower than the previous survey, and only 31% were small enough to be available as prey to most sport fish. Electrofishing catch rates of Bluegill in 2021 were higher than in 2017. Bluegill size structure indicates that they are an excellent prey source for most sport fish. Redear Sunfish serve as an additional prey source for predators and grow to sizes desirable to anglers.
- **Catfishes:** Channel Catfish were collected using tandem hoop nets; however, too few fish were collected to make inferences about the population. Fish ranged from 14-16 inches.
- **Largemouth Bass:** While Largemouth Bass electrofishing catch rates were lower than the 2017 survey, they were greater than the 2013 survey. The population displayed good size structure with multiple fish collected over 20 inches in length. Body condition for most Largemouth Bass size classes was adequate and improved with length. Spotted Bass catch rates continued to decline; however, this fishery provided additional angling opportunities.
- **White Crappie:** Crappie were collected using tandem hoop nets. White Crappie were more abundant than Black Crappie with multiple fish collected up to 13 inches.

Management Strategies: Continue to stock Florida Largemouth Bass fingerlings every 4 years to maintain a quality bass population. Florida Largemouth Bass will next be stocked in 2024 at a rate of 100 fish/acre. Monitor water hyacinth and provide technical guidance to the City of Gladewater regarding invasive vegetation management and consult with TWPD's Aquatic Habitat Enhancement team on vegetation control as necessary. Improve fish habitat and angling success through the deployment of artificial habitat structures.

Introduction

This document is a summary of fisheries data collected from Gladewater City Lake from 2018-2022. 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 2018-2022 data for comparison.

Reservoir Description

Gladewater City Lake is a 481-acre reservoir located in Upshur County on Glade Creek, a tributary of the Sabine River. It was constructed in 1953 by the City of Gladewater for municipal use, industrial water supply, and for public recreation. The lake has a drainage area of approximately 42 square miles. Shoreline length is 10 miles with a shoreline development index (SDI) of 2.7. USGS gauge station operation was discontinued after August 2011, but water level has been relatively stable historically, and during dry periods the water level has not dropped more than 3 feet (Figure 1). Water hyacinth was discovered in the reservoir during the 2005 vegetation survey and continues to be managed with herbicide. Less than 1 acre of water hyacinth has been observed on the lake during annual surveys over the last 4 years. Abundant residential development exists along the lower half of the reservoir. Other descriptive characteristics of Gladewater City Lake are recorded in Table 1.

Angler Access

Gladewater City Lake has a public boat ramp located at the Garland P. Ferguson City Park with parking for about 15 trucks/trailers. The park has two boat ramps located at each end of the parking area. Additional boat ramp characteristics are recorded in Table 2. Shoreline access is limited to the public boat ramp areas, lighted fishing piers, and city park shoreline. Boat ramps are operated by the City of Gladewater and a day use fee is required.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Lechelt and Bister 2018) included:

1. Stock Florida Largemouth Bass to increase potential for production of trophy-sized fish.

   Action: Florida Largemouth Bass were stocked at a rate of 100 fish/acre in 2016 and 2020.

2. Monitor invasive aquatic plants and treat as necessary.

   Action: Annual surveys were completed and herbicide treatments were conducted by TPWD Aquatic Habitat Enhancement team (AHE).

Harvest regulation history: Sport fishes in Gladewater City Lake are currently managed with statewide regulations (Table 3). Largemouth Bass have been managed with a 14-inch minimum length and 5-fish daily bag since 1986. Other black basses were included under this regulation in 1988. The minimum length limit on Spotted Bass was removed in 2000, but the daily bag for black basses in any combination remains at 5 fish/day. The statewide harvest regulation for Channel Catfish and Blue Catfish was changed in 2021 to no minimum length limit with 25 fish daily bag limit (in any combination), of which no more than 10 fish can be over 20 inches in length. The minimum length limit for Flathead Catfish was reduced from 24 inches to 18 inches in 1995. There is a 5 fish daily bag on Flathead Catfish. Current regulations are found in Table 3.

Stocking history: Channel Catfish were stocked from the early 1970s to the mid-1990s in order to maintain a fishable population. The population has maintained itself at a low level of abundance since the last stocking in 1996. TPWD stocked Threadfin Shad in 2008 to improve the prey fish community. The Gladewater City Lake Advisory Board stocked 15,000 Florida Largemouth Bass obtained from a private fish retailer annually from 2008 to 2010 to further improve the fishery. Florida Largemouth Bass were

stocked in 2016 and 2020 by TPWD to enhance the genetics of the population. The complete stocking history is in Table 4.

Vegetation/habitat management history: The discovery of water hyacinth during the 2005 aquatic vegetation survey was the first case of a non-native plant species identified in Gladewater City Lake. Water hyacinth has been spot treated with herbicide when necessary and coverage has remained at low levels without inhibiting recreational access.

Water transfer: No interbasin transfers are known to exist.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Gladewater City Lake (Lechelt and Bister 2018). 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).

Tandem hoop nets – Channel Catfish and White and Black Crappie were collected using 10 tandem hoop-net series at 10 stations. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series). Ages for White Crappie were determined using otoliths from 13 randomly selected fish (range 9.0 to 10.9 inches).

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.

Habitat – A structural habitat survey was conducted in 2013. No further development had occurred at the reservoir, and there was no perceived change in structural habitat. Vegetation surveys were conducted annually from 2018–2020 by the Aquatic Habitat Enhancement crew to monitor expansion of water hyacinth. A full vegetation survey was conducted in 2021 and assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Water level – Source for water level data was the United States Geological Survey (USGS 2022).

Results and Discussion

Habitat: Wright and Bister (2014) reported that littoral zone structural habitat consisted primarily of natural shoreline, bulkhead, and submerged timber. Native vegetation covered roughly 11% of the reservoir's surface area and was primarily located in the upper end of the reservoir (Table 7). Water hyacinth was present but at low densities (1 acre). Water hyacinth continues to be maintained through herbicide application. Alligatorweed has been present in the reservoir but has not been observed since 2014.

Prey species: Electrofishing catch rate of Gizzard Shad decreased from the 2017 survey (244.0/h) to the 2021 survey (160.0/h). Catches of Gizzard Shad have continued to be of two distinct size groups with most individuals between 8-10 inches and another group of individuals between 3-5 inches (Figure 2). This is reflected in a consistent IOV of approximately 31% for both 2017 and 2021. Electrofishing catch rates for Bluegill was 679.0/h in 2021, which was an increase from 2017 (446.0/h) though both years indicate sufficient forage with a size structure dominant by smaller individuals (Figure 3). In 2021, larger individual Bluegill were observed up to 7 inches. While Redear Sunfish did not make up the dominant prey base in 2017 and 2021 (49.0/h and 51.0/h, respectively), there were larger individuals (up to 9 inches) which provided an additional angling opportunity (Figure 4).

Channel Catfish: The Channel Catfish population was surveyed in spring 2018 and 2022 using baited tandem hoop nets as an alternative method to historical gill netting. Tandem hoop nets have been successful in other reservoirs and have also been used to collect population data for crappie. No other target species traditionally caught by gill netting were present in Gladewater City Lake. Switching from gill netting to tandem hoop netting also reduced bycatch of non-target species and potential unnecessary

mortality. The sampling objective was to catch ≥ 50 stock-size Channel Catfish for size structure analysis. However, after 10 net series, only 9 fish had been collected during the 2022 survey (Figure 5). Due to low catch rates, no additional effort was implemented. Fish ranged from 14 to 16 inches (Figure 5). While the Channel Catfish population had low density, baited tandem hoop nets were effective in collecting White Crappie. Future surveys should record catfish population data.

Spotted Bass: Total catch rate of Spotted Bass was 29.0/h in 2021 which was lower than 2017 (40.0/h) and 2013 (48.0/h; Figure 6). Size structure did increase from 2017 (PSD = 5) to 2021 (PSD = 29). Multiple individuals were caught over 10 inches with one individual caught at 13 inches in 2021. Body condition of Spotted Bass was better in 2021 than 2017 with relative weights between 84 and 101 for all size classes. While there was a decrease in the total catch rate of Spotted Bass, this species continues to provide an additional angling opportunity at Gladewater City Lake.

Largemouth Bass: Electrofishing catch rates (total CPUE) of Largemouth Bass have been relatively stable in recent surveys (2013 = 79.0/h; 2017 = 113.0/h; 2021 = 93.0/h; Figure 7). The CPUE-stock and CPUE-14 have also been stable. Body condition in 2021 was variable but most average W_r values were above 90 for each inch group (Figure 7). These relative weights were consistent with those observed in 2017. Growth of Largemouth Bass in Gladewater City Lake was fast with an average age at 14 inches (13.0 to 14.9 inches) being 1.9 years (N = 13; range = 1 – 4 years).

White Crappie: Both White and Black Crappie were present in Gladewater City Lake, but White Crappie have been the more abundant species (Wright and Bister 2014). Historical fall trap netting surveys have been inconsistent. Therefore, crappie were surveyed using baited tandem hoop nets during spring 2018 and 2022. White Crappie catch rate was slightly lower in 2022 (8.9/series) compared to 2018 (10.7/series; Figure 8). The catch of Black Crappie declined from 2.7/series in 2018 to 1.3/series in 2022 (Figure 9). Body condition was poor for both species with average $W_r < 90$ for most inch groups. White Crappie growth was moderate. Average age at 10 inches (9.0 to 10.8 inches) was 3.0 years (N = 13, range = 2-6 years) for fish collected during spring hoop netting.

Fisheries Management Plan for Gladewater City Lake, Texas

Prepared – July 2022

ISSUE 1: Gladewater City Lake has the potential to produce Largemouth Bass ≥ 8 pounds as evidenced by Toyota ShareLunker entries, tournament results, and angler reports. Fingerling Florida Largemouth Bass have been stocked in 2016 and 2020. The continued stocking of Florida Largemouth Bass will help maintain the quality fishery.

MANAGEMENT STRATEGY

1. Stock Lone Star Bass fingerlings, which are 2nd generation offspring of pure Florida strain ShareLunker Largemouth Bass that have proven to be able to grow to ≥ 13 pounds, at a rate of 100 fish/acre every 4 years (next stocking in 2024).
2. Encourage anglers to report catches of bass over 8 pounds to the ShareLunker program to improve supplemental reporting of trophy Largemouth Bass catches within the reservoir, which can be tracked over time.

ISSUE 2: Water hyacinth is currently present and alligatorweed has been historically present in Gladewater City Lake. Periodic herbicide treatment has kept water hyacinth coverage at a manageable level.

MANAGEMENT STRATEGIES

1. Continue to monitor invasive aquatic plants with annual surveys.
2. Advise the City of Gladewater and Lake Advisory Board as needed if coverage increases.
3. Coordinate with TPWD's Aquatic Habitat Enhancement team to treat nuisance aquatic invasive vegetation with herbicide when necessary.

ISSUE 3: Most of the native aquatic vegetation in Gladewater City Lake is in the northern end of the lake. While some vegetation exists at the southern end of the lake, it mostly consists of emergent vegetation. The addition of submersed artificial structures would improve fish habitat in the lower end of the reservoir. Additionally, most of the publicly accessible bank angling fishing locations are located on the southern end of the reservoir.

MANAGEMENT STRATEGY

1. Construct and deploy artificial habitats around the pier system in the southern portion of the reservoir as well as other locations throughout the reservoir to improve fish habitat and angling success.

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

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate lake stakeholders (e.g., marina owners, tackle shops) about invasive species and provide them with various literature (e.g., posters, pamphlets) to 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 (2022–2026)

Sport fish, forage fish, and other important fishes

Sport fishes in Gladewater City Lake include White Crappie, Black Crappie, Channel Catfish, Spotted Bass, and Largemouth Bass. Known important forage species include Bluegill, Redear Sunfish, Gizzard Shad, and Threadfin Shad. The proposed sampling schedule to meet the following OBS Plan can be found in Table 5.

Low-density fisheries

Catfish: Directed angling effort toward Channel Catfish has historically been low with only one percent of the total effort during a spring quarter angler creel survey in 2008. With limited directed angling effort for this species at Gladewater City Lake, population information will continue to be collected through tandem hoop netting in 2026, but no specific sampling objective will be set for Channel Catfish.

Survey objectives, fisheries metrics, and sampling objectives

Black Bass: The last creel survey on Gladewater City Lake during spring (March – May 2008) indicated that 54% of angling effort was for Largemouth Bass. Largemouth Bass are managed with a 14-inch minimum length limit. Trend data on relative abundance and size structure have been collected every 4 years during fall nighttime electrofishing surveys with 1 hour of effort at 12, 5-minute stations. The continuation of trend data collection in this reservoir every 4 years with fall nighttime electrofishing will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation.

A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2025, but sampling will continue at random sites until 50 stock-sized fish are collected and the RSE of CPUE-Stock is ≤ 25. Historic sampling indicates that we can achieve appropriate levels of precision (RSE of CPUE-Stock ≤ 25) with the minimum sampling effort. An additional 3 random stations will be determined in the event they are necessary to meet our sampling objectives. A maximum of 15 stations will be sampled.

Sampling metrics for Largemouth Bass will include size structure (PSD and length frequency), growth (mean age at 14 inches using a sample size of 13 fish between 13.0 and 14.9 inches), relative abundance (stock size fish N > 50, CPUE-Stock with RSE < 25), body condition (mean W_r using lengths and weights from 10 fish per inch-group).

Population trend data will also be collected for Spotted Bass (PSD, length frequency, and condition). However, sampling objectives set for Largemouth Bass will determine our extent of electrofishing effort.

Crappie: White Crappie and Black Crappie are present in the reservoir. The spring 2008 angler creel survey estimated 21% of total fishing effort was for crappie. While traditional trap netting has been unsuccessful in collecting population trend data, tandem hoop nets baited with soap were successful in collecting an adequate number of crappie for population assessment. Therefore, we will deploy 10 baited tandem hoop net series during the spring of 2026. Sampling objectives for crappie will include size structure (PSD and length frequency; N ≥ 50), relative abundance (CPUE-stock with RSE < 25), and body condition (mean W_r using lengths and weights from 10 fish per inch group).

Forage Fish: Trend data on relative abundance and size structure of sunfish, Gizzard Shad, and Threadfin Shad have been collected every 2 to 4 years since 1998 with more recent surveys being every 4 years. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in sunfish and shad relative abundance and size structure. No additional effort will be expended beyond effort necessary to achieve Largemouth Bass objectives. Instead, Largemouth Bass body condition can provide information on forage abundance.

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.

Lechelt, J.D., and T.J. Bister. 2018. Gladewater City Lake, 2017 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3

United States Geological Society (USGS). 2022. National water information system: Web interface. Available: http://waterdata.usgs.gov/tx/nwis (May 2022).

Wright, L.D., and T.J. Bister. 2014. Gladewater City Lake, 2014 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-4, Austin.

Tables and Figures

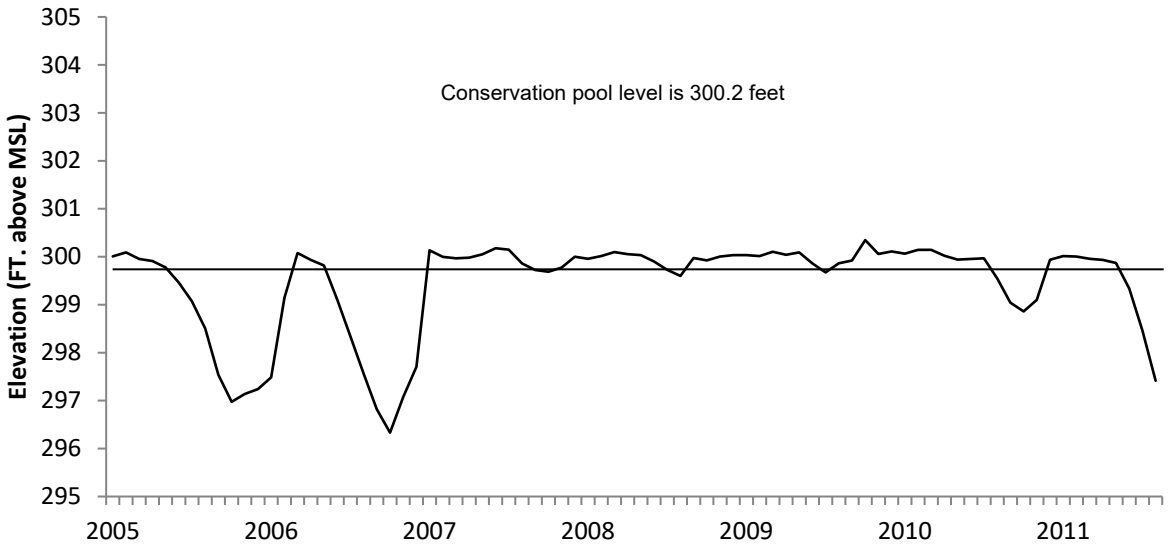


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Gladewater City Lake, Texas. USGS gauge station operation at Gladewater City Lake was discontinued after August 2011.

Table 1. Characteristics of Gladewater City Lake, Texas.

Characteristic	Description
Year constructed	1953
Controlling authority	City of Gladewater
County	Upshur
Reservoir type	Tributary
Surface Area	481 Acres
Shoreline Development Index	2.7
Drainage Area	42 Square Miles
Conductivity	78 µS/cm

Table 2. Boat ramp characteristics for Gladewater City Lake, Texas, August 2021. Reservoir elevation at time of survey was near full pool.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
G.P. Ferguson City Park east ramp	32.55730 -94.96225	Y	15	294.7	Good, no access issues
G.P. Ferguson City Park west ramp	32.55754 -94.96319	Y	15	296.7	Good, no access issues

Table 3. Harvest regulations for Gladewater City Lake, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	No minimum length – only 10 can be 20 inches or greater in length
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Palmetto	5	18-inch minimum
Bass, Largemouth	5[a]	14-inch minimum
Bass: Spotted	5[a]	None Limit
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a] Daily bag for Largemouth Bass, Spotted Bass, and Guadalupe Bass = 5 fish in any combination.

Table 4. Stocking history of Gladewater City Lake, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults, FRY = fry.

Species	Year	Number	Size
Threadfin Shad	1984	2,600	
	2008	3,000	
	Total	5,600	
Channel Catfish	1972	6,000	AFGL
	1974	3,000	AFGL
	1975	4,000	AFGL
	1976	2,000	AFGL
	1978	3,000	AFGL
	1979	3,000	AFGL
	1982	9,160	AFGL
	1983	10,000	AFGL
	1984	2,000	FGL
	1985	1,998	AFGL
	1986	2,000	FRY
	1989	2,193	FGL
	1991	10,005	FGL
	1992	5,100	FGL
	1993	9,420	FGL
	1995	5,156	FGL
	1996	5,066	FGL
	Total	83,098	
Paradise Bass (Yellow bass X Striped bass)	1977	40,000	
Redbreast Sunfish	1985	3,438	
Largemouth Bass	1969	6,000	FGL
Florida Largemouth Bass	1976	84,000	FRY
	1977	3,000	FRY
	1979	2,499	FRY
	1989	6	ADL
	1992	13,667	FGL
	2008	15,000	FGL
	2009	15,000	FGL
	2010	15,000	FGL
	2016	52,113	FGL
	2020	50,642	FGL
	Total	250,927	

Table 5. Objective-based sampling plan components for Gladewater City Lake, Texas 2021–2022.

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
	Condition	W_r	10 fish/inch group (max)
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
Threadfin Shad [a]			Presence/Absence
Tandem hoop netting			
Channel Catfish	Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
Crappie [b]	Abundance	CPUE - stock	RSE-stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
	Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches
	Condition	W_r	10 fish/inch group

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

[b] Sampling objectives are based off the catch of both Black and White Crappie. Due to past variability in CPUE, we will not increase sampling to achieve RSE of CPUE-Stock ≤ 25,

Table 6. Survey of structural habitat types, Gladewater City Lake, Texas, 2013. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Bulkhead	3.7 miles	37.0
Natural	5.9 miles	59.0
Rocky	0.4 miles	4.0
Standing timber	8.7 acres	1.8

Table 7. Survey of aquatic vegetation, Gladewater City Lake, Texas, 2018–2021. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2018	2019	2020	2021
Native floating-leaved				19.0 (4.0)
Native emergent				33.0 (1.5)
Non-native				
Water hyacinth (Tier II)*	3 (0.6)	1 (0.2)	<1 (0.1)	<1 (0.1)

* Tier II is Maintenance

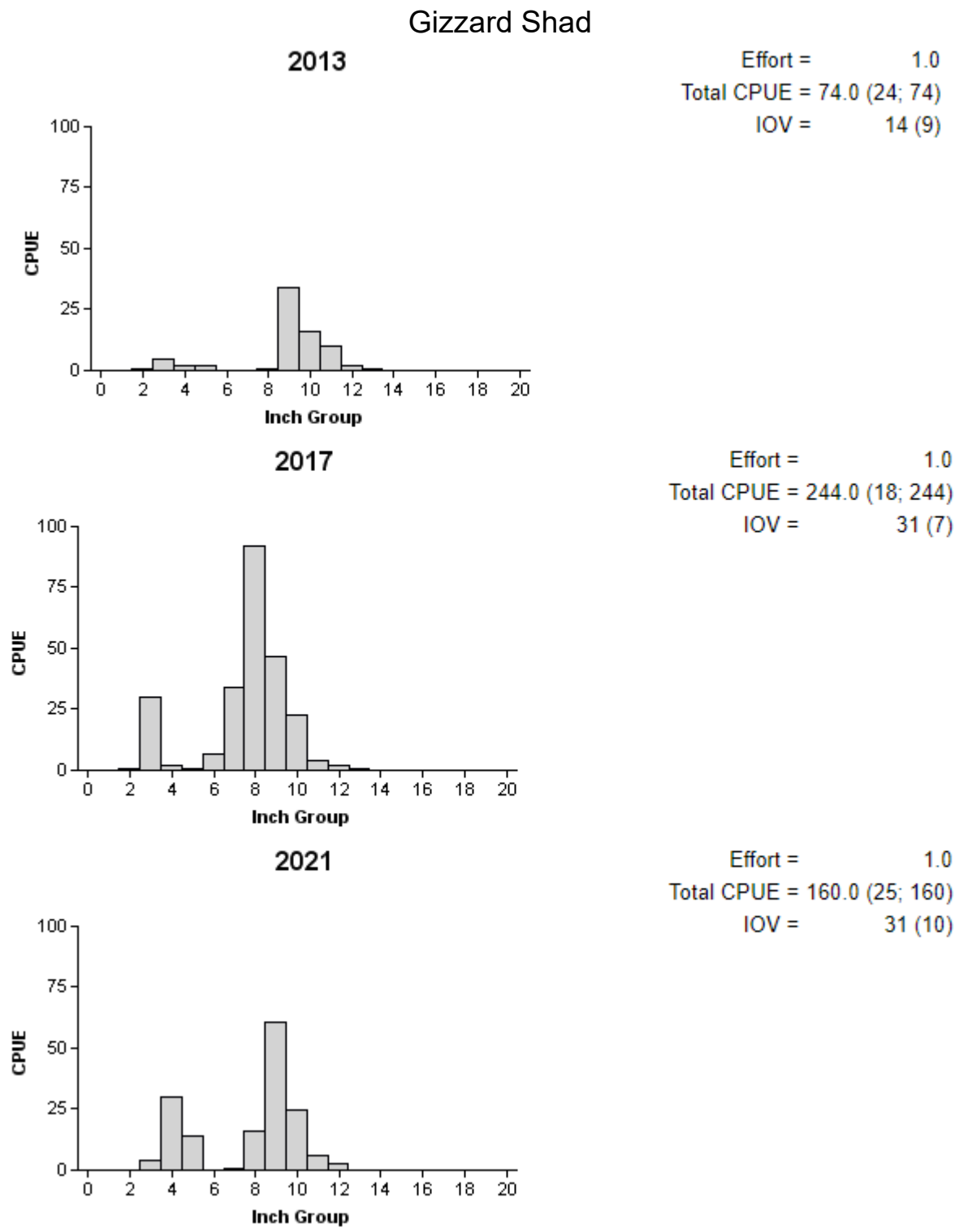


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Gladewater City Lake, Texas, 2013, 2017, and 2021.

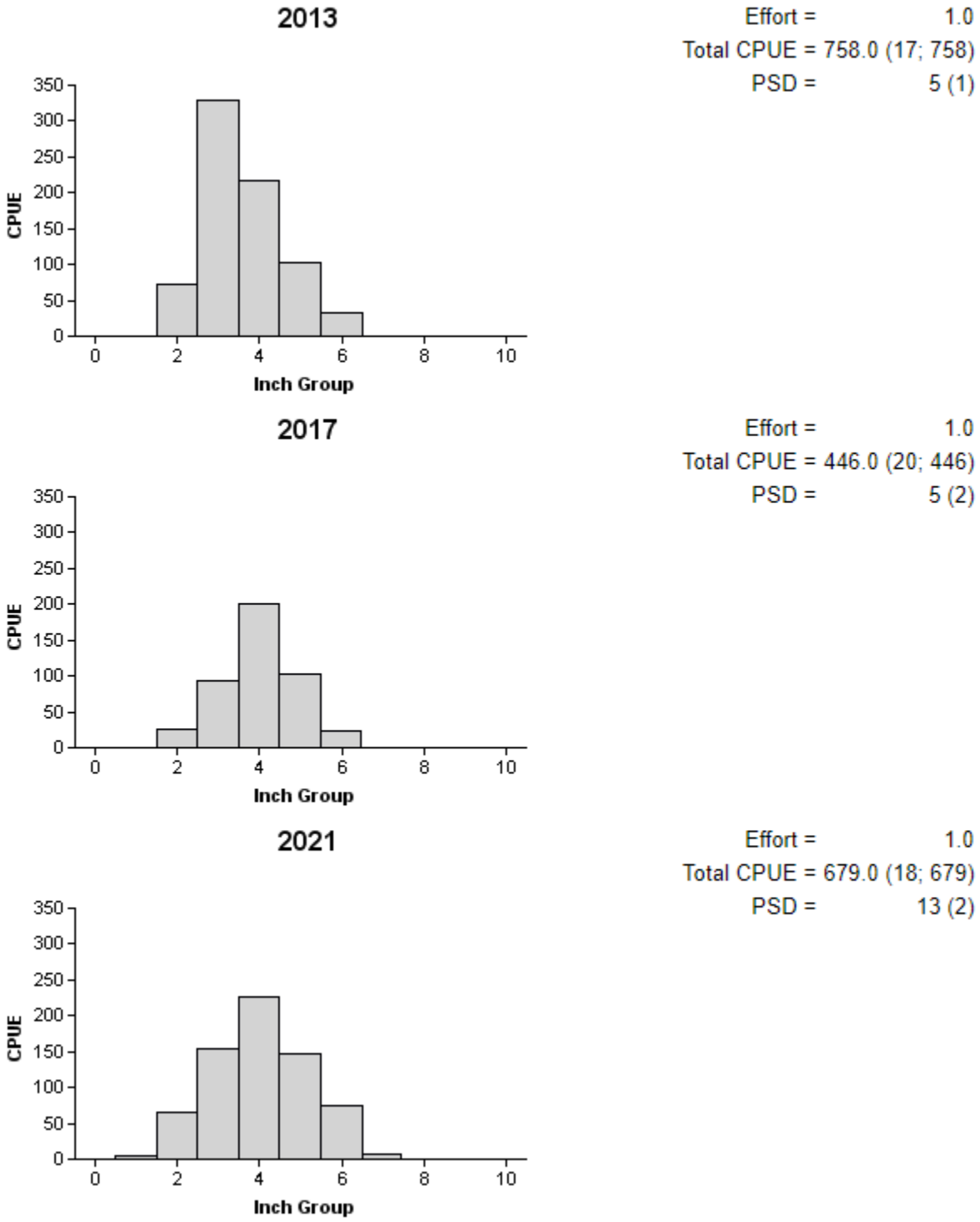


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Gladewater City Lake, Texas, 2013, 2017, and 2021.

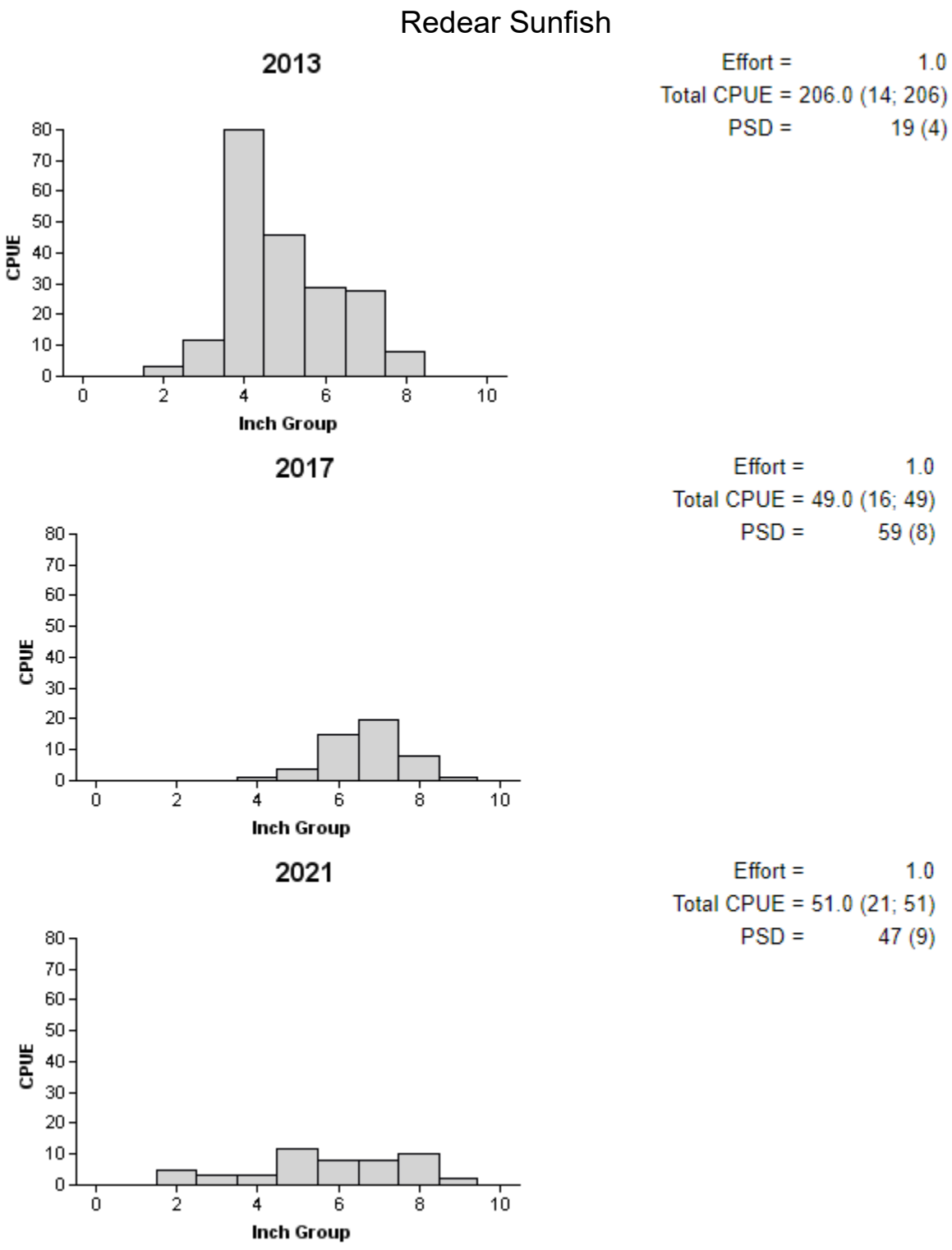


Figure 4. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Gladewater City Lake, Texas, 2013, 2017, and 2021.

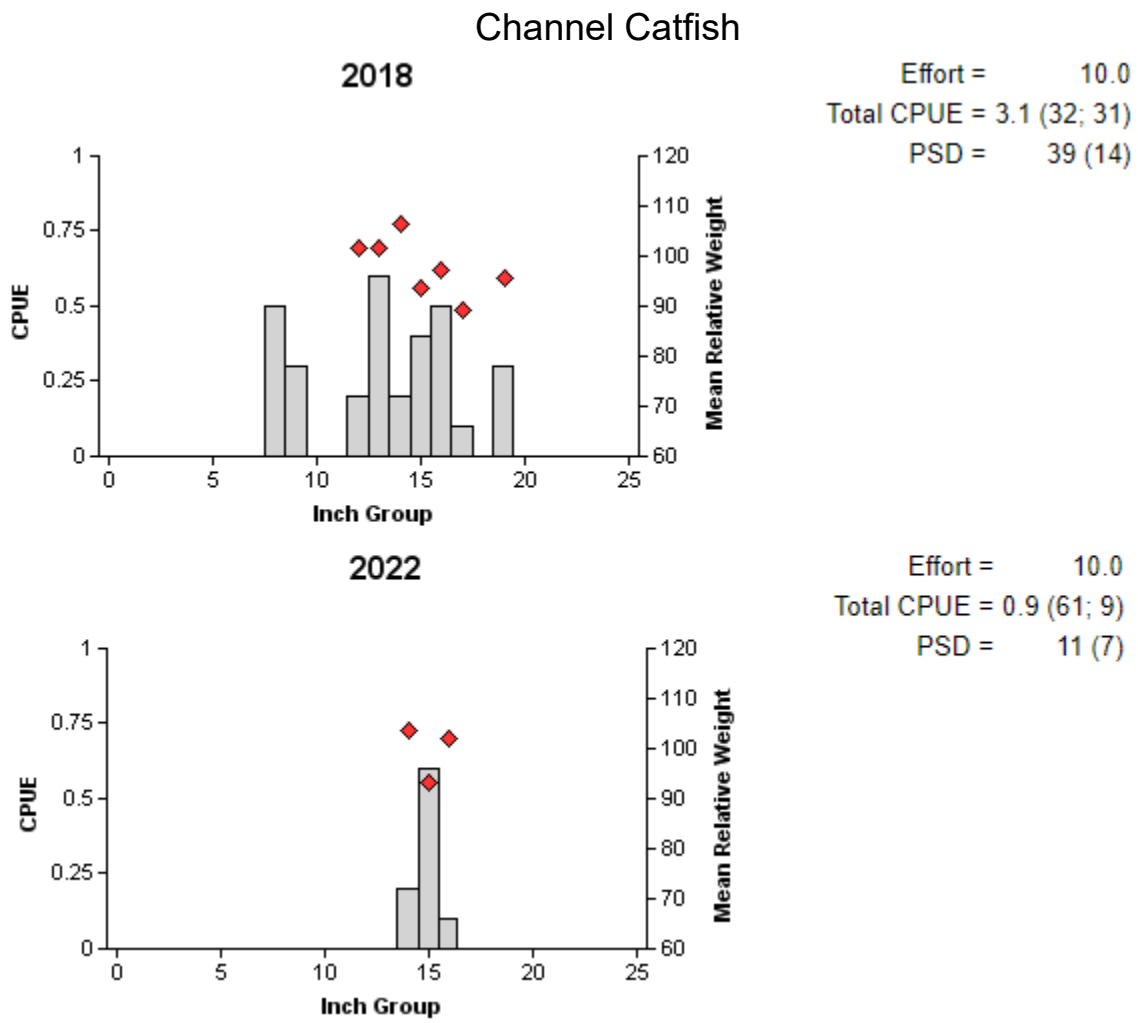


Figure 5. Number of Channel Catfish caught per net series (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop net surveys, Gladewater City Lake, Texas, 2018 and 2022.

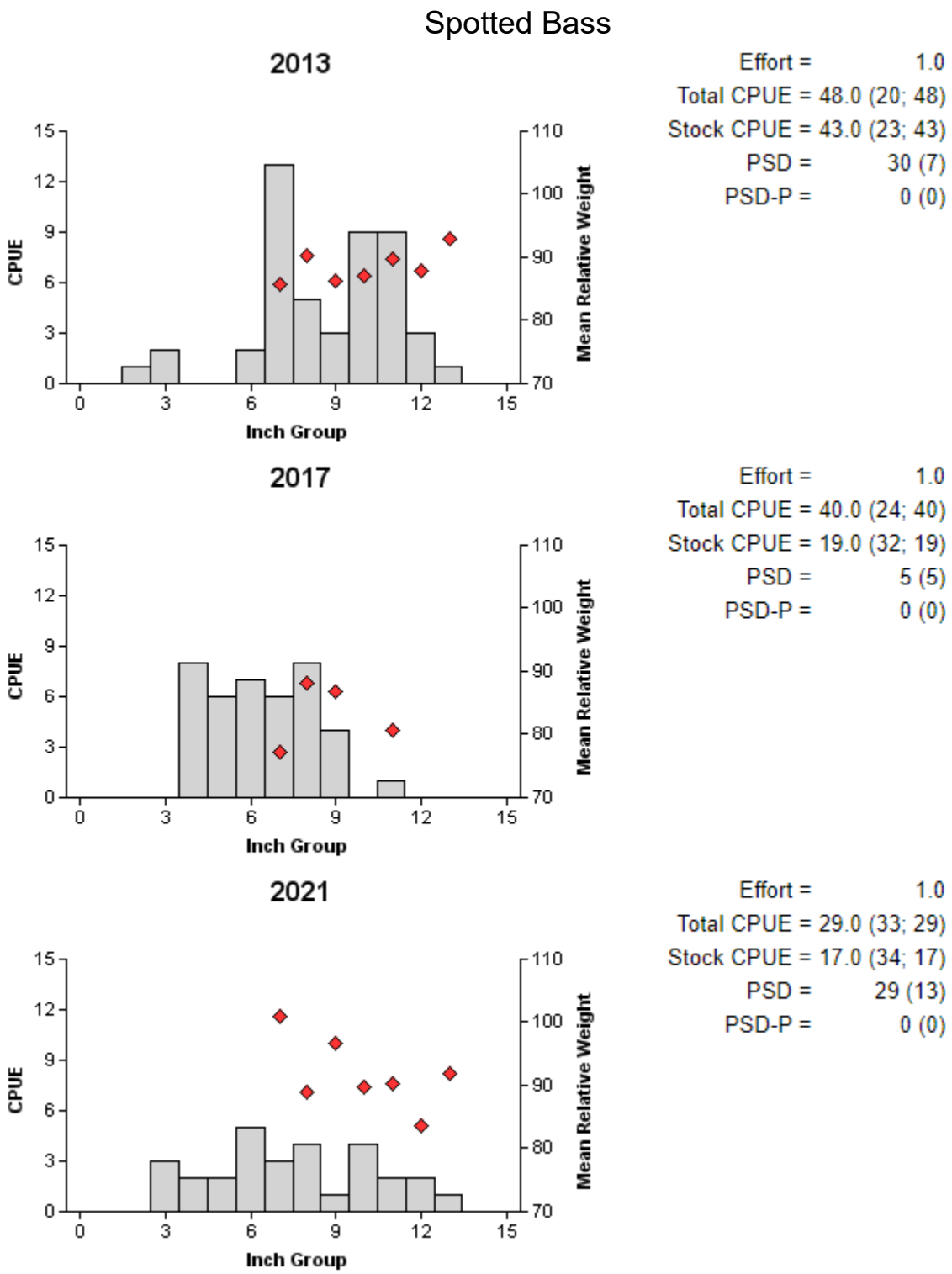


Figure 6. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Gladewater City Lake, Texas, 2013, 2017, and 2021.

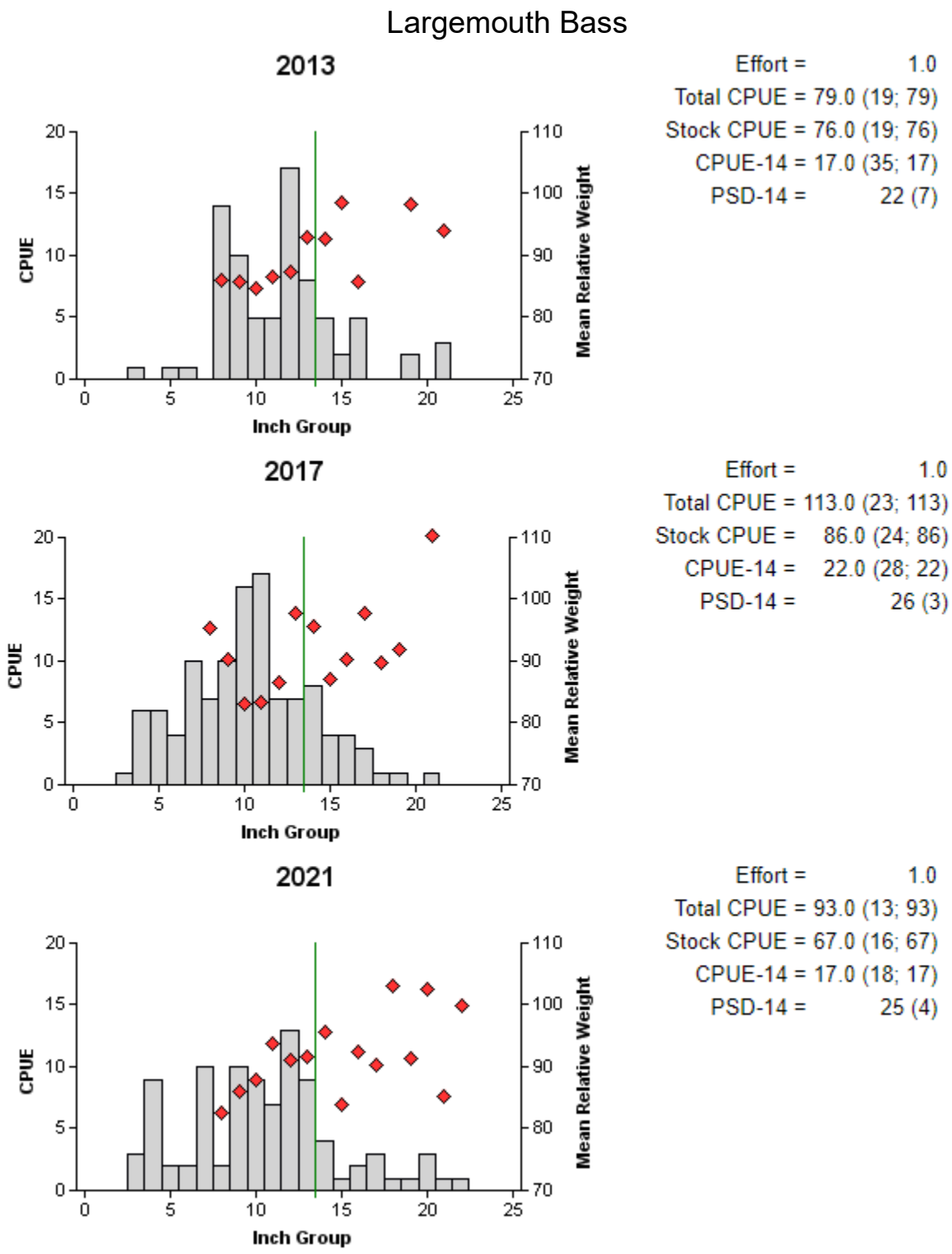


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Gladewater City Lake, Texas, 2013, 2017, and 2021. Vertical line indicates minimum length limit.

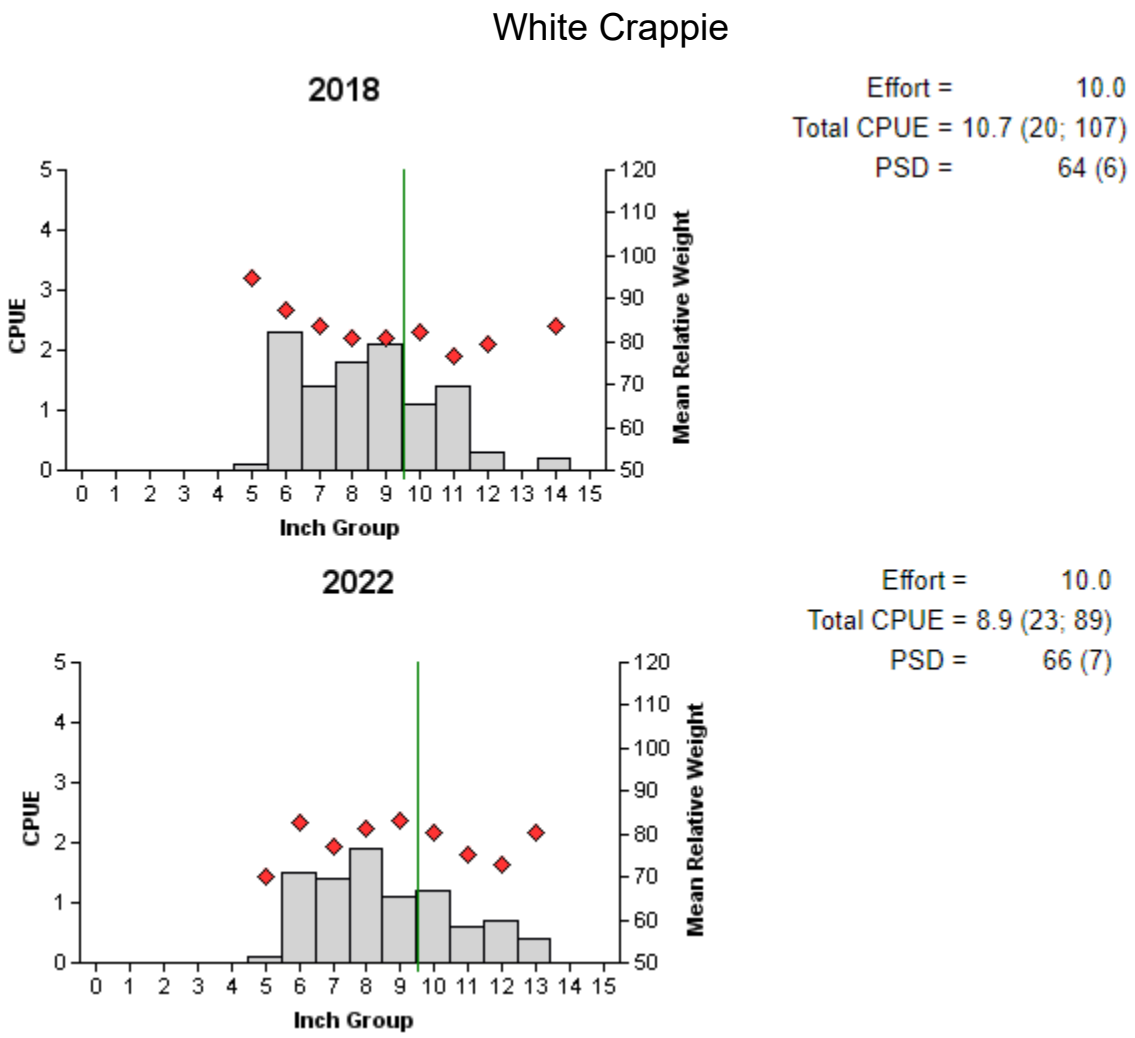


Figure 8. Number of White Crappie caught per net series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop netting surveys, Gladewater City Lake, Texas, 2018 and 2022. Vertical line indicates minimum length limit.

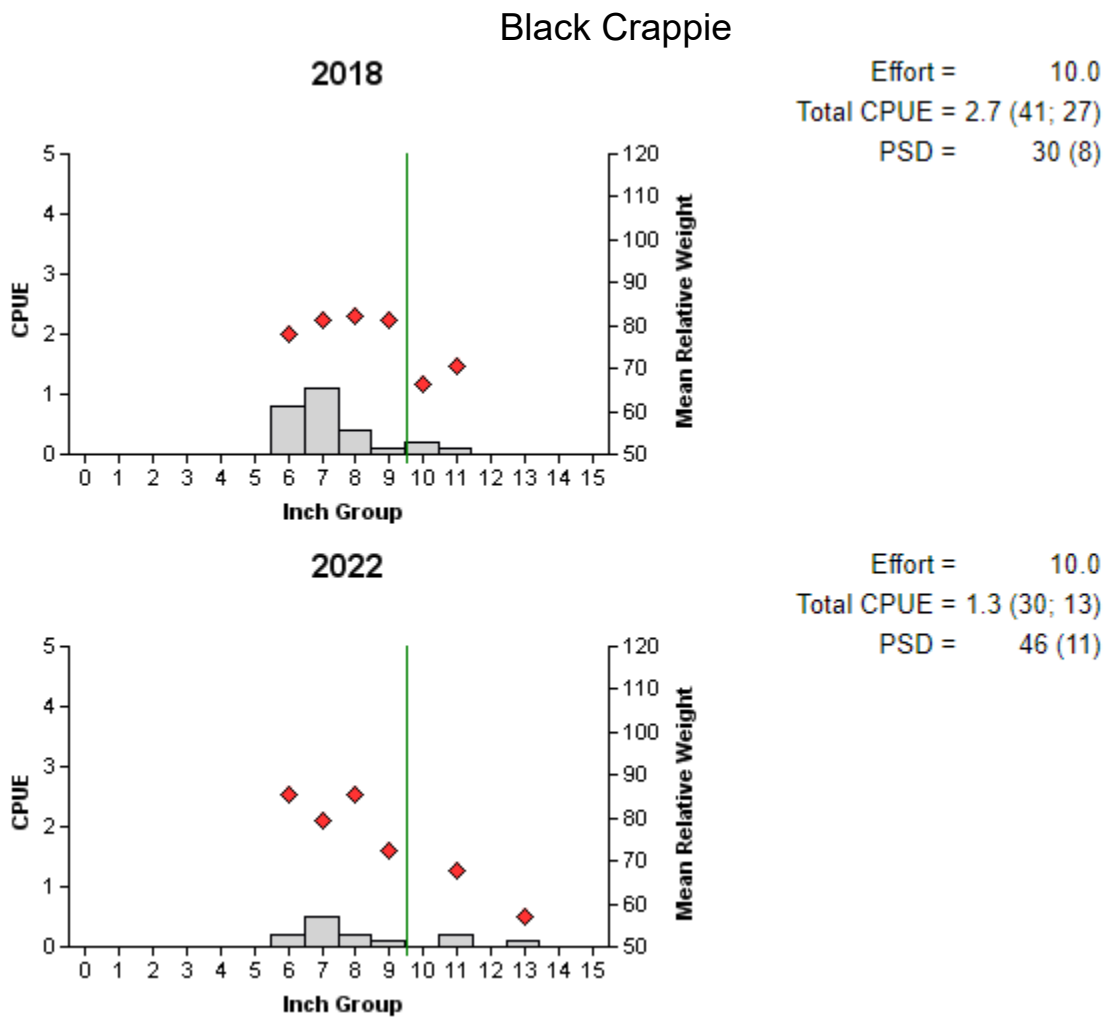


Figure 9. Number of Black Crappie caught per net series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop netting surveys, Gladewater City Lake, Texas, 2018 and 2022. Vertical line indicates minimum length limit.

Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Gladewater City Lake, Texas. Survey period is June through May. Hoop netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall.

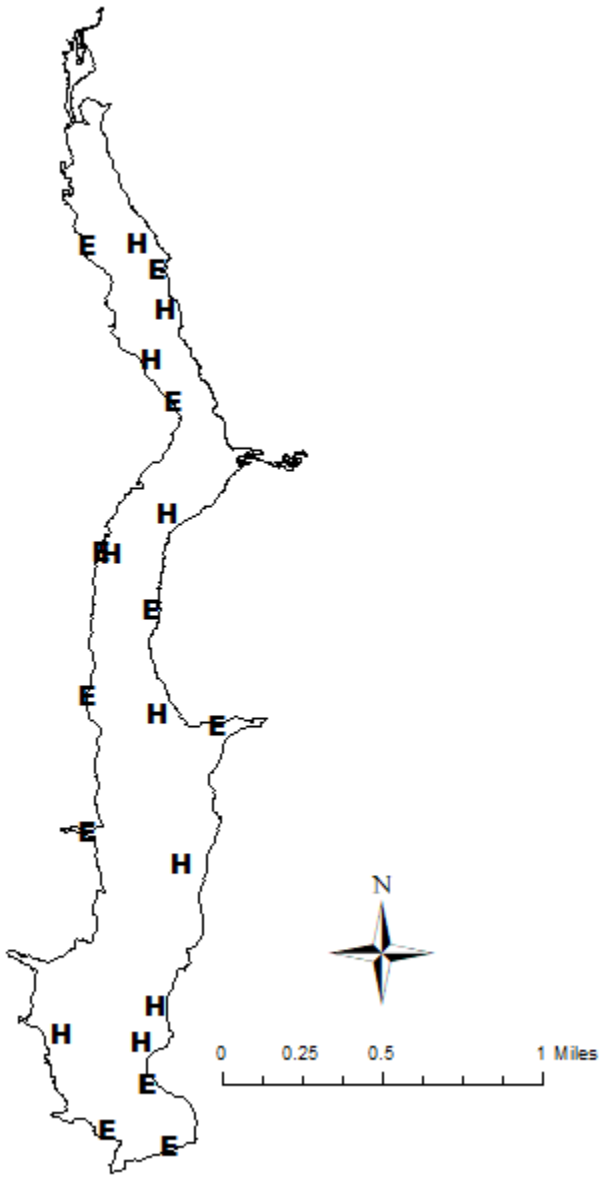
	Survey year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler Access				X
Structural Habitat				X
Vegetation	X	X	X	X
Electrofishing – Fall				X
Hoop netting				X
Report				X

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 Gladewater City Lake, Texas, 2021-2022. Sampling effort was 10 net series for hoop netting and 1 hour for electrofishing.

Species	Electrofishing		Hoop Netting	
	N	CPUE	N	CPUE
Gizzard Shad	160	160.0 (25)		
Threadfin Shad	94	94.0 (40)		
Channel Catfish			9	0.9 (61)
Warmouth	17	17.0 (36)		
Bluegill	679	679.0 (18)		
Longear Sunfish	92	92.0 (29)		
Redear Sunfish	51	51.0 (21)		
Redspotted Sunfish	1	1.0 (100)		
Spotted Bass	29	29.0 (33)		
Largemouth Bass	93	93.0 (13)		
White Crappie			89	8.9 (23)
Black Crappie			13	1.3 (30)

APPENDIX B – Map of sampling locations



Location of sampling sites, Gladewater City Lake, Texas, 2021-2022. Hoop netting and electrofishing stations are indicated by H and E, respectively. Water level was near full pool at time of sampling.

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