Lake Winnsboro

2018 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Lake Winnsboro were surveyed in 2018 using electrofishing and in 2019 using gill netting. Historical data are presented with the 2018-2019 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: Lake Winnsboro is an 875-acre impoundment located on Big Sandy Creek in the Sabine River Basin approximately 6 miles southwest of Winnsboro, Texas. Primary water uses included flood control and recreation. Habitat features consisted of natural shoreline and native emergent vegetation.

Management History: Important sport fish include Largemouth Bass, crappie and Channel Catfish. Florida Largemouth Bass have been periodically stocked in the reservoir since 1974; most recently in 2015-2017. Water-willow was planted in 2010 to improve littoral habitat.

Fish Community

- **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch rate of Gizzard Shad was moderate and 88% were available as prey to most sport fish. Electrofishing catch of Bluegill was moderate and all were less than 7-inches long.
- **Channel Catfish:** Channel Catfish were abundant in the reservoir and have the potential to provide angling opportunities.
- **Largemouth Bass:** Largemouth Bass were abundant in the reservoir, and the size structure continued to suggest a balanced population. Relative weights remained good for most size classes and fish reached legal length (14 inches) in 2.5 years on average.
- **Crappie:** Both Black and White Crappie have historically provided a popular fishery. Conventional sampling gear (trap netting) produced inconsistent results and were discontinued in 2015. Going forward, inferences about the crappie population will be made through creel survey data.

Management Strategies: Stock Florida Largemouth Bass fingerlings at 1000/km shoreline biennially to improve trophy potential within the reservoir. Inform the public about the negative impacts of aquatic invasive species.

Introduction

This document is a summary of fisheries data collected from Lake Winnsboro in 2018-2019. 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 2018-2019 data for comparison.

Reservoir Description

Lake Winnsboro is an 875-acre impoundment constructed in 1962 on Big Sand Creek, a tributary of the Sabine River. It is located in Wood County approximately 6 miles southwest of Winnsboro, Texas and is operated and controlled by Wood County. Primary water uses included flood control and recreation. Habitat at time of sampling consisted of natural shoreline and native emergent vegetation. Other descriptive characteristics for Lake Winnsboro are in Table 1.

Angler Access

Lake Winnsboro has three public boat ramps and no private boat ramps. Additional boat ramp characteristics are in Table 2. Shoreline access is available around all public boat ramps, a fishing barge near the dam and along three bridges in the upper end of the reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Bennett and Storey 2015) included:

1. Monitor the Largemouth Bass population dynamics with electrofishing in 2016 and 2018, genetic analysis in 2018 and a spring creel survey in 2019. Evaluate angler satisfaction of current Largemouth Bass regulation and consider alternative regulations that may increase abundance of legal-length bass.

   Action: Electrofishing was conducted in 2016 and 2018. Genetic samples were not taken due to stable Florida Largemouth Bass allele frequency observed in previous samples (Bennett and Storey 2015) and modifications to TPWD genetic monitoring protocols. The creel survey was canceled due to scheduling and staffing constraints.

2. Evaluate the growth of water-willow at planting sites and document the spread to new areas during vegetation surveys. Augment existing sites with supplemental plantings and establish colonies in new sites. Introduce additional native submersed plant species

   Action: Vegetation survey was conducted in 2018; however, no additional plantings were conducted due to poor growth of previously planted water-willow.

Harvest regulation history: Sport fish in Lake Winnsboro are managed under statewide regulations (Table 3).

Stocking history: Florida Largemouth Bass were originally stocked in 1974 and are the most common fish stocked in Lake Winnsboro. Blue and Flathead Catfish were introduced in 1977 and Channel Catfish were first stocked in 1982. The complete stocking history is in Table 4.

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 Lake Winnsboro (TPWD unpublished). 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 (1.25 hours at 15, 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.

Gill netting – Channel Catfish and White Bass were collected by gill netting (5 net nights at 5 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

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 vegetation survey was conducted in 2018. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Results and Discussion

Habitat: Aquatic vegetation in Lake Winnsboro continued to be limited (<1% of total reservoir surface area) and likely attributable to fluctuating water levels and substrate composition. Water-willow, giant cutgrass and maidencane were all present in limited coverage; total coverage of all species combined was 1.2 acres (Table 6).

Prey species: Electrofishing catch rates of Bluegill and Gizzard Shad were 197.6.0/h and 99.2/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was high and similar to previous surveys, indicating 88% of Gizzard Shad were available to existing predators (Figure 1). Total CPUE of Gizzard Shad was lower than the previous two surveys in 2010 and 2014 (281.0/h and 178.0/h, respectively). Sunfish continued to offer a quality forage option in the reservoir (Appendix A). Total CPUE of Bluegill was lower than the previous two surveys in 2010 and 2014 (582.0/h and 1,411.0/h, respectively) and size structure continued to be dominated by small individuals (Figure 2).

Channel Catfish: The 2019 gill net catch rate of Channel Catfish (13.0/nn) was higher than the 2015 survey (10.2/nn) and lower than the 2011 survey (39.6/nn). Recent gill net trends continued to indicate a quality population and stable recruitment within the reservoir. Size structure improved over the last 3 surveys and several fish ≥ 20 inches were collected (PSD = 25; Figure 3). Body condition of Channel Catfish was good (W_r range = 88 – 130) indicating a quality prey base.

White Bass: Although White Bass were collected in the reservoir for the first time during the 2019 gill net survey, the catch rate (22.2/nn) and size structure (PSD = 100) suggest a strong year class from a recent undocumented introduction (Figure 4.)

Largemouth Bass: The 2018 electrofishing catch rate (114.4/h) was lower than the two previous surveys in 2014 (296.0/h) and 2016 (156.0/h) (Figure 5). Size structure (PSD = 60) was higher than the 2014 and 2016 surveys (PSD = 51 and 30, respectively). Relative weights were good for most size classes of fish (W_r range = 89- 110) indicating a quality prey base. Growth was moderate; average age at 14 inches (13.0 to 14.9 inches) was 2.5 years (N = 15; range = 2 – 4 years).

Crappie: Both Black and White Crappie have historically been present in the reservoir and offered a popular fishery (Bennett and Storey 2015). Trap net surveys produced inconsistent results and were discontinued in 2015. Future crappie monitoring efforts are described in the objective-based sampling plan below.

Fisheries Management Plan for Lake Winnsboro, Texas

Prepared – July 2018

ISSUE 1: Anecdotal tournament results and creel data indicate Lake Winnsboro has the potential to produce trophy Largemouth Bass; however, electrofishing data suggests the population consists primarily of small fish (80% of fish collected were < 14 inches). The prey base is excellent (abundant Threadfin shad, Gizzard Shad and sunfish) and fish reach legal length on average within 2.5 years. The 2015 creel survey indicated 80% of legal-length fish were released. Given the adequate growth, abundant forage, and moderate harvest rates, stocking Florida Largemouth Bass should increase trophy fish abundance.

MANAGEMENT STRATEGY

1. Stock Florida Largemouth Bass fingerlings every other year at 1000/km of shoreline to increase the trophy potential in the reservoir. Sampling objectives outlined in the OBS plan will be focused on monitoring Largemouth Bass size structure to help justify and continue biennial stocking strategy.

ISSUE 2: Habitat on Lake Winnsboro consists primarily of terrestrial vegetation, lay downs and boat docks. Establishing aquatic vegetation will improve the abundance of quality littoral habitat and provide additional shallow cover for both juvenile and adult fish.

MANAGEMENT STRATEGY

1. Identify 2-4 locations with limited littoral habitat that are protected from strong wind and wave actions to plant water-willow. Utilize cut water willow stems and place them flat in water ≤ 6” under a 10’x10’ piece of protective fencing and stabilize fence in place. This method has demonstrated success in previous attempts on other reservoirs and requires less time and labor to establish than planting bare root or potted water willow

2. Monitor water willow introduction sites and determine suitability of this establishment method for future locations.

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

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.

2. Educate the public about invasive species through the use of media and the internet.

3. Make a speaking point about invasive species when presenting to constituent and user groups.

4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2019–2023)

Sport fish, forage fish, and other important fishes

Sport fishes in Lake Winnsboro include Largemouth Bass, White Crappie, Black Crappie, and Channel Catfish. Important forage species include Gizzard and Threadfin Shad, and sunfish.

Low-density fisheries

White Bass were collected in the 2018 gill net survey for the first time. There is no previous documentation of directed effort towards White Bass and the fishery will be considered negligible until future survey results indicate otherwise.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are the most popular sport fish in Lake Winnsboro. The reservoir is a frequent destination for tournament anglers; live-release tournaments in spring 2015 were responsible for 73% of the directed effort for Largemouth Bass. Due to the relative importance of this fishery, Largemouth Bass trend data on relative abundance, size structure, body condition, and growth (CPUE, PSD, W_r, average age at 14") will continue to be monitored with biennial nighttime electrofishing, alternating between spring (2020) and fall (2022) surveys. The spring sampling should result in a more accurate size structure estimate, as fall surveys have been typically dominated by fish < 12 inches in length; anecdotal evidence and creel survey data indicate quality bass are present in the reservoir. Historical fall electrofishing data suggests that sampling objectives (RSE ≤ 25, N > 50 can be met with 12 randomly-selected 5-minute sampling sites. Otoliths will be removed from 13 specimens (13.0- 14.9 inches), if available, during the 2022 survey for age and growth analysis and fin clips will be taken from 30 individuals for genetic analysis.

Crappie: Historical trap net data has fluctuated among survey years; catch rates were very dependent upon sample location resulting in poor survey precision. The results of the last two trap net surveys suggest at least 28 net nights may be necessary to estimate relative abundance with an acceptable level of precision (RSE<25). Due to the unpredictability of trap net survey success and the large sample size required to reliably estimate crappie trend data (CPUE, PSD, W_r), trap net surveys were discontinued in 2015. Inferences about the crappie population and identification of potential applied management actions will be made from data collected with a creel survey in 2023.

Channel Catfish: Historical survey results indicate gill net surveys are effective at monitoring Channel Catfish trend data (CPUE, PSD, W_r) on Lake Winnsboro. Gill net surveys will be conducted every four years to monitor large-scale changes in the population that may spur further investigation. In the spring of 2023, a minimum of 5 randomly selected gill net sites will be sampled, with up to 5 additional sites if necessary, to estimate relative abundance with an RSE < 25 along with relative weights and size structure of at least 50 stock-size fish. No additional effort will be conducted if survey objectives are not met after 10 total net nights. However, lower precision (RSE <35) of CPUE estimates will be acceptable, if

necessary, to make historical comparisons and determine further sampling needs (e.g. age and growth analysis).

Prey Species: Gizzard Shad, Threadfin Shad and sunfish are important prey species in Lake Winnsboro. Long-term trend data is desired for these populations to evaluate their relative abundance (CPUE) and size structure (PSD). Relative weights of the Largemouth Bass population, along with size structure of Bluegill and the IOV of Gizzard Shad, will be used to gauge prey fish availability for sport fishes from electrofishing sampling conducted in fall 2021. No sampling objectives will be set for prey species.

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.

Bennett, D., and K. Storey. 2015. Statewide freshwater fisheries monitoring and management program survey report for Lake Winnsboro, 2014. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-5, Austin. 34 pp.

Tables and Figures

Table 1. Characteristics of Lake Winnsboro, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
County	Wood
Reservoir type	Tributary
Shoreline Development Index	4.25
Conductivity	110 µS/cm

Table 2. Boat ramp characteristics for Lake Winnsboro, Texas, July 2018. Reservoir elevation at time of survey was 417 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
CR 4890 Ramp	32.88834 -95.34883	Y	30	412	Excellent, no access issues
CR 4864 Ramp	32.89387 -95.34967	Y	10	414	Aging, concrete in poor condition
CR 4847 Ramp	32.91369 -95.34731	Y	30	414	Excellent, no access issues

Table 3. Harvest regulations for Lake Winnsboro, Texas.

Species	Bag limit	Length limit
Catfishes: Channel and Blue, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Lake Winnsboro, Texas. FGL = fingerling; AFGL = advanced fingerling; FRY = fry; UNK = unknown.

Species	Year	Number	Size
Blue Catfish	1977	11,000	FGL
	1979	10,990	FGL
	1981	16,000	FGL
	Total	37,990	
Channel Catfish	1982	300	AFGL
	1992	11,028	AFGL
	Total	11,328	
Flathead Catfish	1977	700	UNK
Florida Largemouth Bass	1974	55,100	FGL
	1998	110,423	FGL
	1999	118,218	FGL
	2015	101,145	FRY
	2016	81,323	FGL
	2017	74,015	FGL
	Total	540,204	

Table 5. Objective-based sampling plan components for Lake Winnsboro, Texas, 2018–2019.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Relative Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 14 inches	N = 15, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
Bluegill [a]	Relative Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad [a]	Relative Abundance	CPUE–Total	RSE ≤ 25
	Prey availability	IOV	N ≥ 50
Gill netting			
Channel Catfish	Relative Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	W_r	10 fish/inch group (max)

[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 aquatic vegetation, Lake Winnsboro, Texas, 2014 and2018. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014	2018
Native emergent	2.6 (0.3)[1]	1.2 (0.1)[2]
Non-native		
Alligatorweed (Tier III)*	5.1 (0.6)	

*Tier III is Watch Status

[1] American lotus, giant cutgrass, maidencane, water-willow

[2] Giant cutgrass, maidencane, water-willow

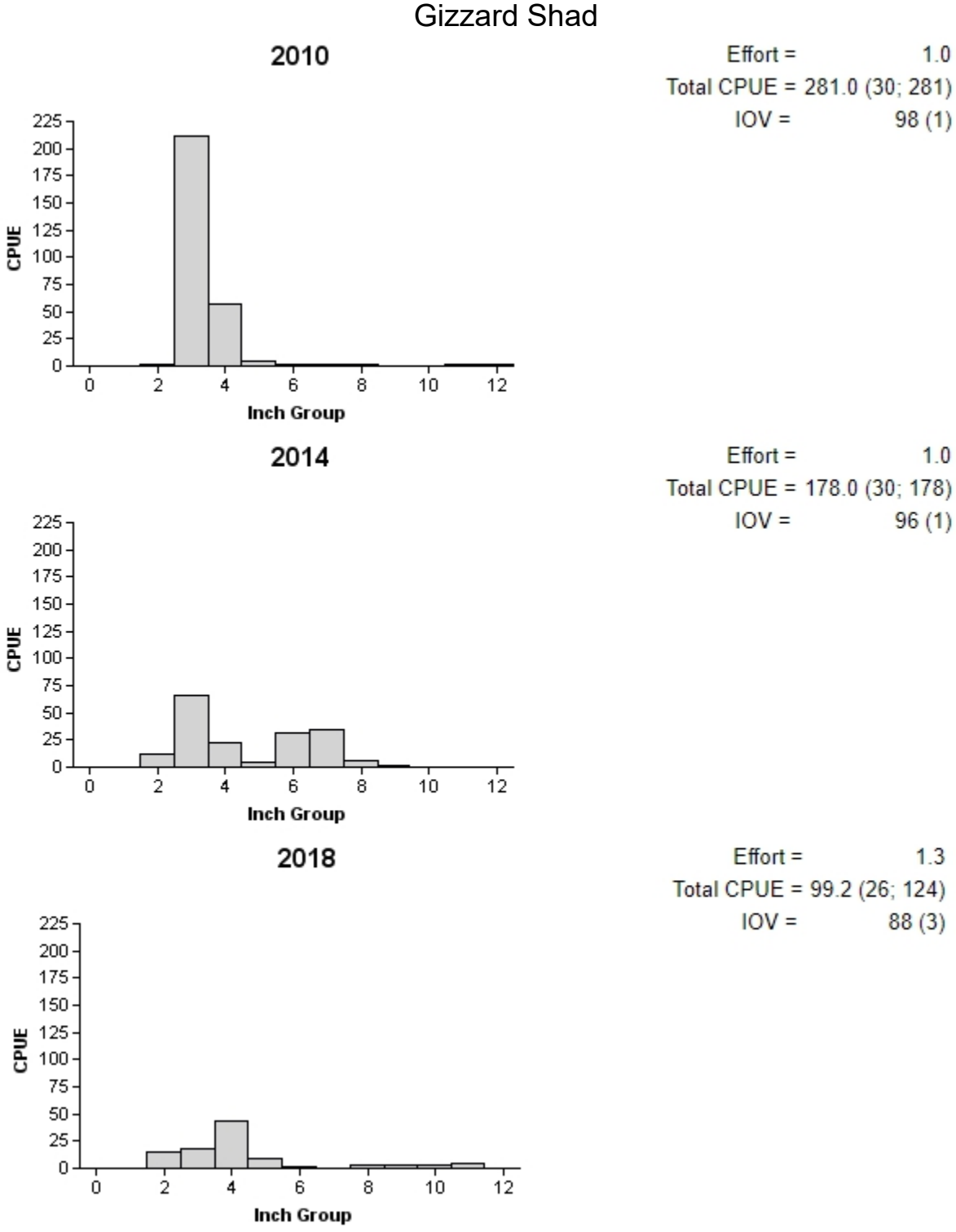


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2010, 2014 and 2018.

Bluegill

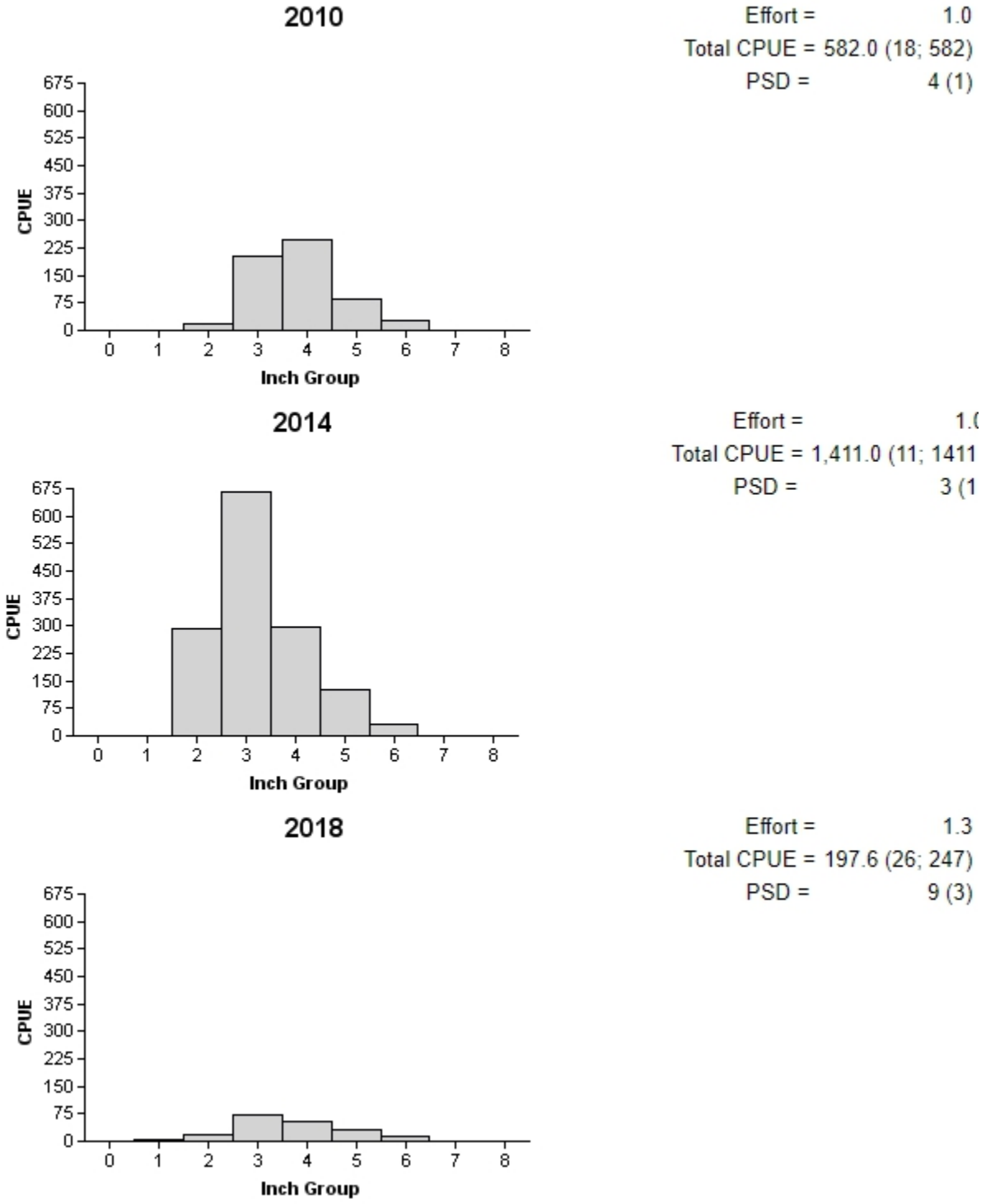


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2010, 2014 and 2018.

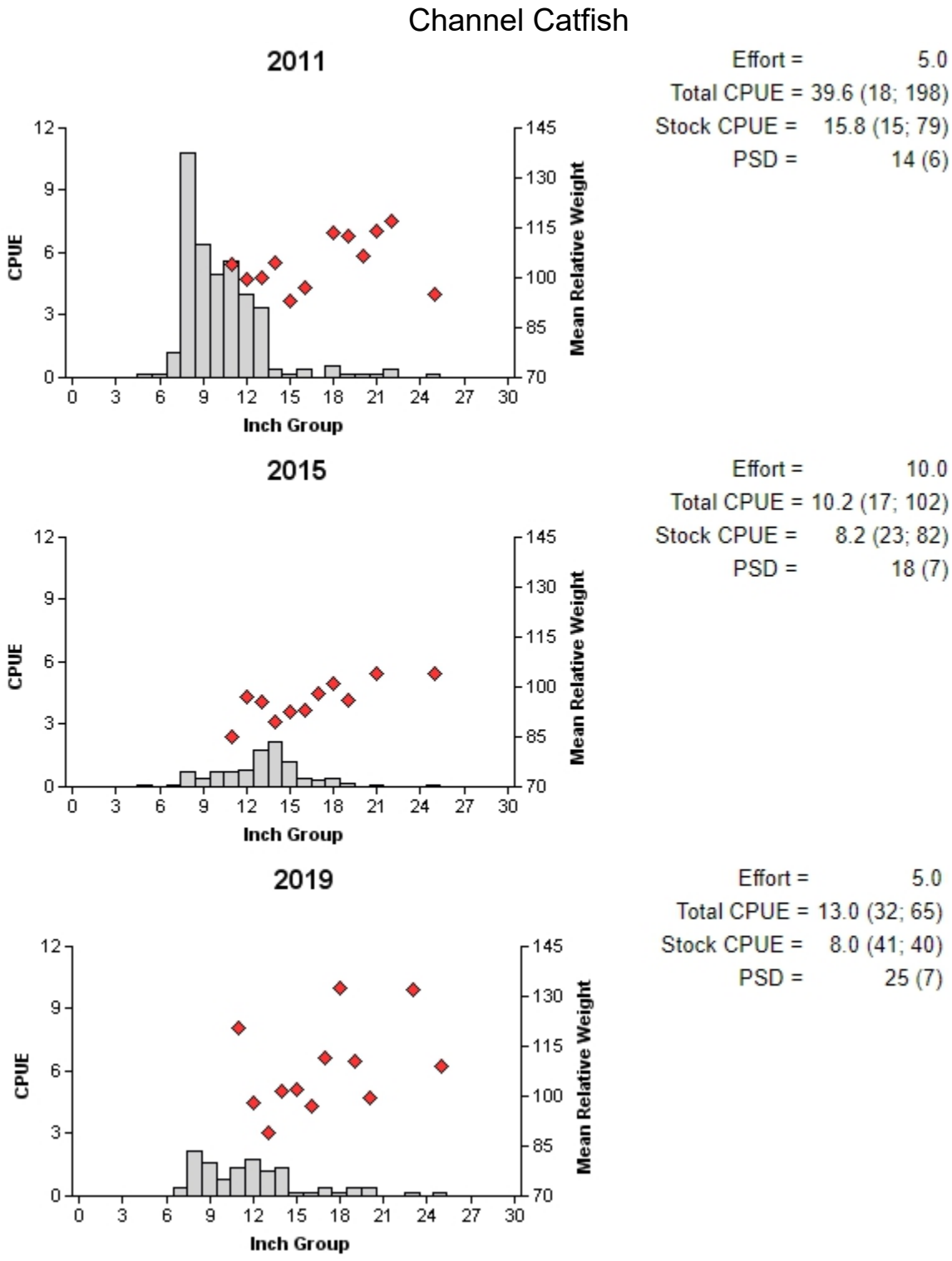


Figure 3 Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Winnsboro, Texas, 2011, 2015 and 2019

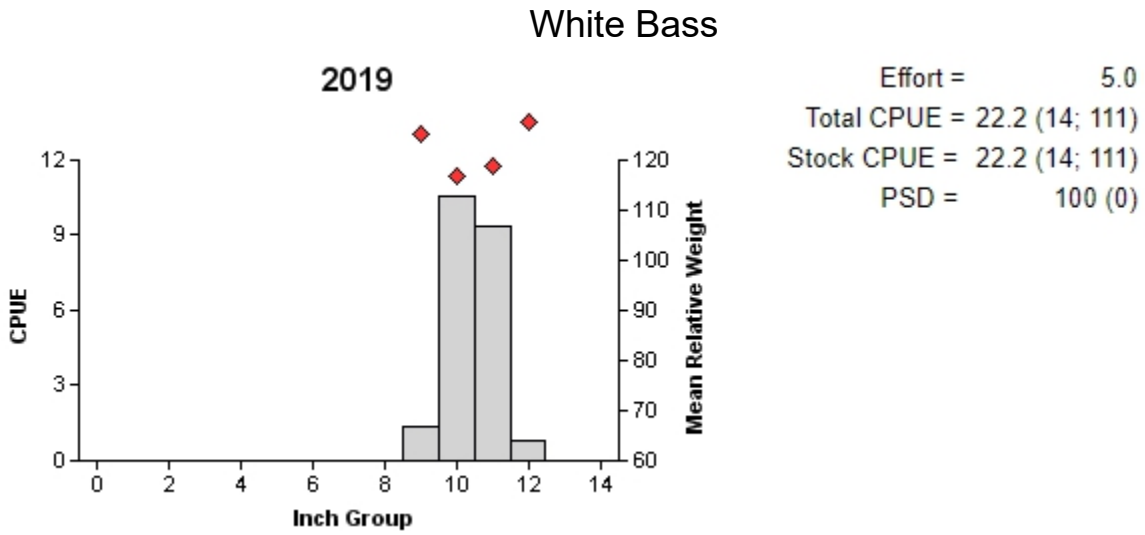


Figure 4. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net survey, Lake Winnsboro, Texas, 2019.

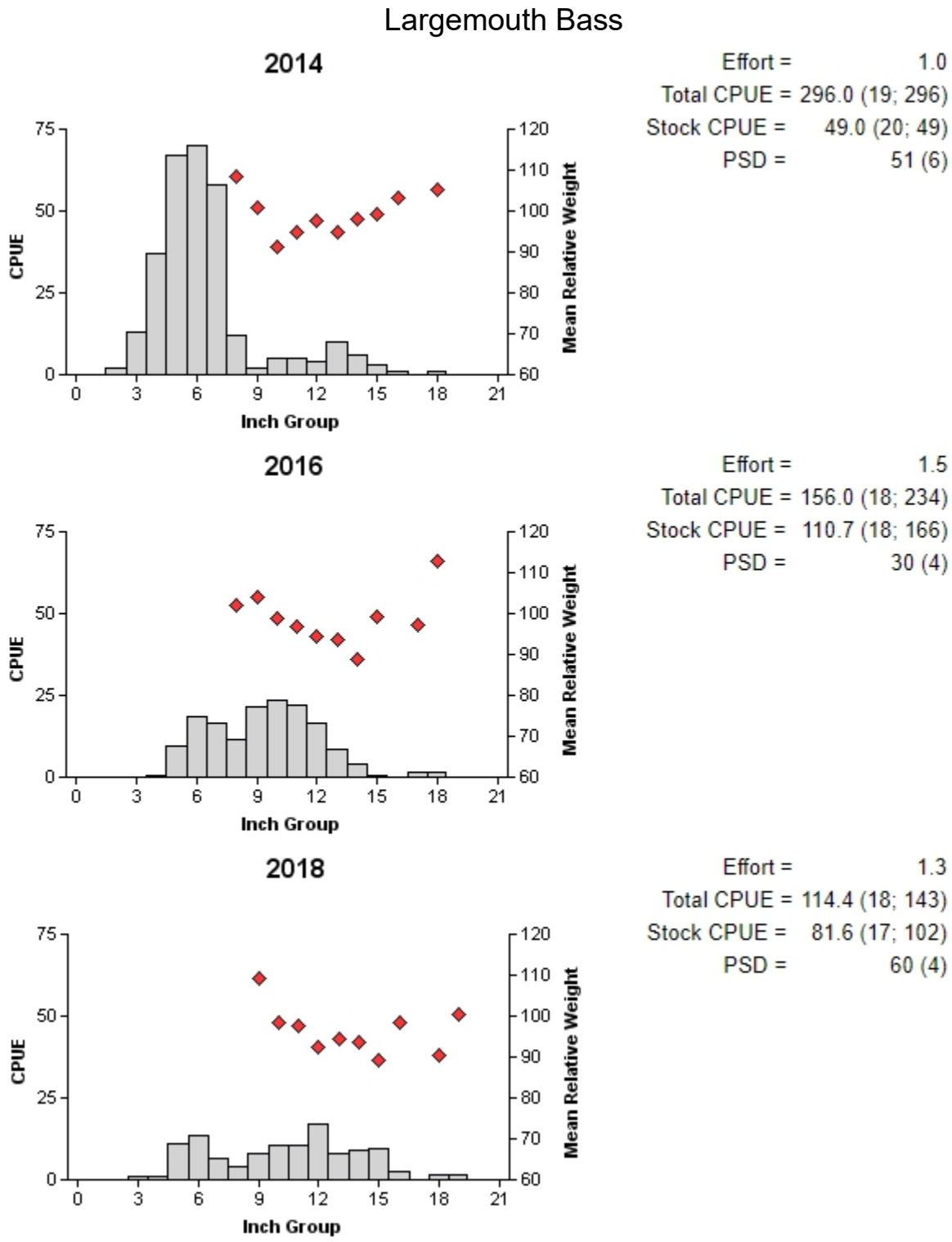


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2014, 2016 and 2018.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for Lake Winnsboro, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, trap netting surveys are conducted in the fall and electrofishing surveys are conducted either spring or fall. Standard survey denoted by S and additional survey denoted by A.

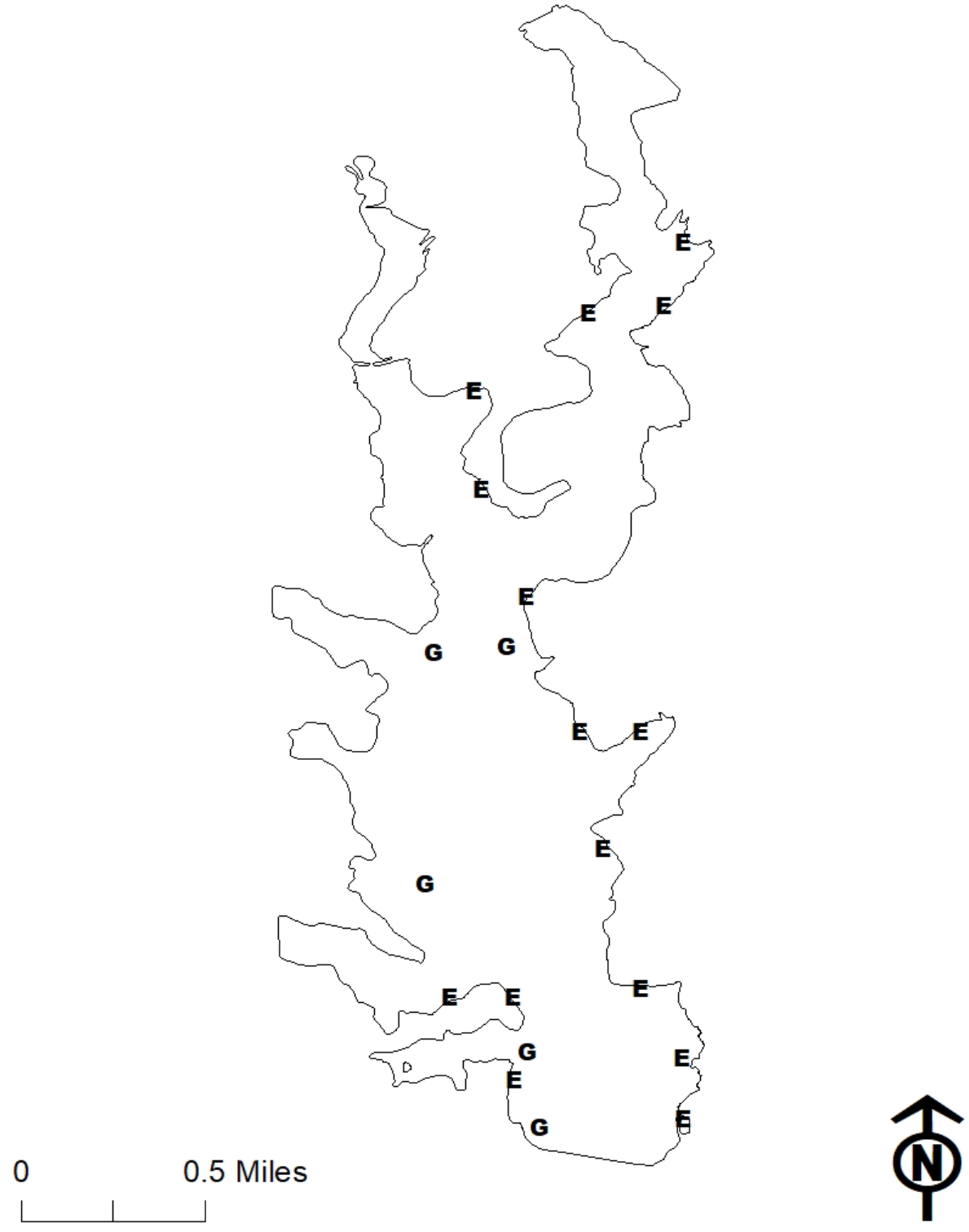
	Survey year			
	2019-2020	2020-2021	2021-2022	2022-2023
Angler Access				S
Vegetation				S
Electrofishing - Fall				S
Electrofishing – (Spring, Bass Only)	A			
Gill netting				S
Creel survey		S		
Report				S

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Lake Winnsboro, Texas, 2018-2019. Sampling effort was 5 net nights for gill netting, and 1.25 hours for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			124	99.2(26)
Threadfin Shad			2954	2363.2(46)
Channel Catfish	65	13.0(32)		
White Bass	111	22..2(14)		
Bluegill			247	197.6(26)
Longear Sunfish			145	116.0(33)
Redear Sunfish			11	8.8(45)
Largemouth Bass			143	114.4(18)

APPENDIX B – Map of sampling locations



Location of sampling sites, Lake Winnsboro, Texas, 2018-2019. Gill net and electrofishing stations are indicated by G and E, respectively. Water level was near full pool at time of sampling.

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