Lake Winnsboro

2022 Fisheries Management Survey Report

PERFORMANCE REPORT

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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Contents

Survey and Management Summary

Fish populations in Lake Winnsboro were surveyed in 2022 using electrofishing and in 2023 using gill netting. Historical data are presented with the 2022-2023 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: 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 limited 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 abundant in the reservoir. Electrofishing catch rate of Gizzard Shad was high and 98% were available as prey to most sport fish. Electrofishing catch of Bluegill was moderate with the majority of the fish < 5 inches.
- **Channel Catfish:** Channel Catfish were abundant in the reservoir and provided good angling opportunities. Gill net catch rates have increased over the last three surveys and 12 to 16-inch fish were abundant.
- **Largemouth Bass:** Largemouth Bass size structure continued to suggest a balanced population however relative abundance has decreased over the past several surveys. Relative weights remained good for most size classes and fish reached legal length (14 inches) in 2.2 years on average.
- **Crappie:** Both Black and White Crappie have historically provided a popular fishery.

Management Strategies: Introduce native aquatic vegetation for fish habitat. When aquatic vegetation is at a level that will provide adequate habitat, request Florida Largemouth Bass stockings to enhance the quality and trophy potential of the fishery. Continue to manage all sport fish under statewide harvest regulations. 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 2022-2023. 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 2022-2023 data for comparison.

Reservoir Description

Lake Winnsboro is an eutrophic, 875-acre impoundment constructed in 1962 on Big Sandy 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 limited 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 (Norman and Cartabiano 2019) included:

1. Biennial stocking of Florida Largemouth Bass fingerlings

   Action: Florida Largemouth Bass fingerlings were requested in 2021 and 2022, however fish were unavailable for stocking.

2. Establish colonies of water willow in suitable habitat and monitor reestablishment.

   Action: Water willow was introduced at several sites in the lake and monitoring of reestablishment is on-going.

Harvest regulation history: Sport fish in Lake Winnsboro are managed under statewide regulations (Table 3). The statewide Blue and Channel Catfish regulation was changed in 2021, allowing for the harvest of 25 fish (species combined) with no minimum length limit, and only 10 catfish ≥ 20-inches.

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 (Norman and Cartabiano 2019). 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 2022).

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 9 randomly selected fish (range 13.0 to 14.9 inches).

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 statistics.

Habitat – An aquatic vegetation survey was conducted in 2022. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Results and Discussion

Habitat: Native vegetation covered less than 1% of the reservoir surface area (Table 6). Aquatic vegetation has historically been at very low densities and primarily limited to emergent species. Structural habitat in the form of submerged timber is present in the lower section of the reservoir.

Prey species: Threadfin shad were very abundant in the reservoir. Electrofishing catch rate of Gizzard Shad was 374.0/h. Index of Vulnerability (IOV) was high, indicating that 98% of Gizzard Shad were available to existing predators. Both CPUE and IOV of Gizzard Shad were higher than the previous surveys (Figure 1). Total CPUE of Bluegill was higher in 2022 (324.0/h) compared to 2018 (197.6/h) but much less than that observed in 2014 (1,411.0/h). Size structure continued to be dominated by small individuals (Figure 2).Overall, forage is abundant in Lake Winnsboro.

Channel Catfish: The gill net catch rate of Channel Catfish in 2023 (21.8/nn) was higher than the surveys in 2019 (13.0/nn) and 2015 (10.2/nn) (Figure 3). Recent gill net trends continued to indicate a quality population and stable recruitment within the reservoir. Size structure has remained consistent over the last 3 surveys and several fish ≥ 20 inches were collected (PSD range: 18-25). Body condition of Channel Catfish was good (W_r range = 88 – 130) indicating a quality prey base.

Largemouth Bass: The 2022 fall electrofishing catch rate (78.0/h) was lower than the two previous surveys in 2016 (156.0/h) and 2018 (114.4/h) (Figure 4). Size structure (PSD = 51) was higher than the 2016 survey (PSD = 30) and less than the 2018 survey (PSD = 60). The sampling objective for size structure (N- stock ≥ 50) was not achieved with 12, 5-minute stations. However, the sampling objective for relative abundance (CPUE-Stock RSE ≤ 25) was well with the acceptable range (RSE = 15). Therefore, no additional effort occurred. Relative weights were good for most size classes of fish (W_r range = 86- 110) indicating a quality prey base. Growth was moderate; age to legal length (13.0 to 14.9 inches) was 2.2 years (N = 9; range = 2 – 4 years). The combination of the previous metrics illustrates a low-density population of Largemouth Bass despite good forage. Littoral habitat improvement and stocking would contribute to higher recruitment without immediate risk of density related consequences.

Fisheries Management Plan for Lake Winnsboro, Texas
Prepared – July 2023

ISSUE 1: Fish habitat, particularly aquatic vegetation, is limited in Lake Winnsboro. Water willow was introduced in 2022. Results of this introduction have yet to been seen. Future efforts to improve and diversity the aquatic vegetation community in the reservoir would benefit multiple species including Bluegill and Largemouth Bass.

MANAGEMENT STRATEGY

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

ISSUE 2: Largemouth Bass are a popular sport fish in Lake Winnsboro (Bennett and Storey 2015). However, quality littoral habitat has been variable in recent years and abundance of Largemouth Bass continues to decrease. Although abundance continues to decrease, good body condition and growth of bass coupled with abundant forage suggest that recruitment is the limiting factor in this system. The Largemouth Bass population and aquatic vegetation need to be monitored to assess changes that warrant further management actions (i.e., stocking).

MANAGEMENT STRATEGY

1. Continue to re-introduce water willow throughout the reservoir.

2. Monitor aquatic vegetation coverage and request Florida Largemouth Bass fingerlings at 1,000/km of shoreline when sufficient habitat is present (~5% coverage).

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 (2023–2027)

<u>Sport fish, forage fish, and other important fishes</u>

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.

<u>Low-density fisheries</u>

White Bass were collected in the 2019 gill net survey for the first time and abundance continues to be low (Appendix A). There is no documentation of directed effort towards White Bass in previous creel surveys. The fishery will be considered negligible until future survey results indicate otherwise.

<u>Survey objectives, fisheries metrics, and sampling objectives</u>

Largemouth Bass: Largemouth Bass are the most popular sport fish in Lake Winnsboro (Bennet and Storey 2015). 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 (2024) and fall (2026) 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 for relative abundance (RSE ≤ 25) can be met with 12 randomly selected, 5-minute sampling sites. No additional effort will be required if the size structure objective (N-Stock = 50) is not met. Otoliths will be removed from 13 specimens (13.0- 14.9 inches), if available, during the 2026 survey for age and growth analysis.

Crappie: Historical trap net data has fluctuated among survey years; catch rates were very dependent upon sample location resulting in poor survey precision. Due to the high variability of trap netting data, surveys were discontinued in 2015. Inferences about the crappie population and identification of potential management actions will be made from data collected with a creel survey in 2026.

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 2027, 5 randomly selected gill net sites will be sampled to estimate relative abundance with an RSE < 25 along with relative weights and size structure of at least 50 stock-size fish. Historical data suggests sampling objectives will be met with 5 nets. No additional effort will be conducted if survey objectives are not met after 5 net nights. A precision (RSE <30) of CPUE estimates will be acceptable due to the high sampling variability presented by netting 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 2026. No sampling objectives will be set for prey species.

Creel:

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.

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

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.

Norman, J., and E. Cartabiano. 2019. Lake Winnsboro, 2018 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-5, Austin. 22 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 2022. 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	Severely degraded
CR 4847 Ramp	32.91369 -95.34731	Y	30	414	Aging, some access issues

Table 3. Harvest regulations for Lake Winnsboro, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 [a] (in any combination)	None
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5[b]	14-inch minimum
Bass, Spotted	5[b]	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a] Only 10 ≥ 20 inches.

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

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 2022–2023.

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 = 13, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
Bluegill [a]	Relative Abundance	CPUE–Total	
	Size structure	PSD, length frequency	
Gizzard Shad [a]	Relative Abundance	CPUE–Total	
	Prey availability	IOV	
Gill netting			
Channel Catfish	Relative Abundance	CPUE–stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	W_r	

[a] Largemouth Bass body condition will provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of aquatic vegetation, Lake Winnsboro, Texas, 2014–2022. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014	2018	2022
Native submersed			
Native floating-leaved			
Native emergent	2.6 (0.3)	1.2 (0.1)	< 0.01 (< 0.01)
Non-native			
Alligatorweed (Tier III)*	5.1 (0.6)		

* Tier III is Watch Status

Gizzard Shad

2014

Effort = 1.0
Total CPUE = 178.0 (30; 178)
IOV = 96 (1)

2018

Effort = 1.3
Total CPUE = 99.2 (26; 124)
IOV = 88 (3)

2022

Effort = 1.0
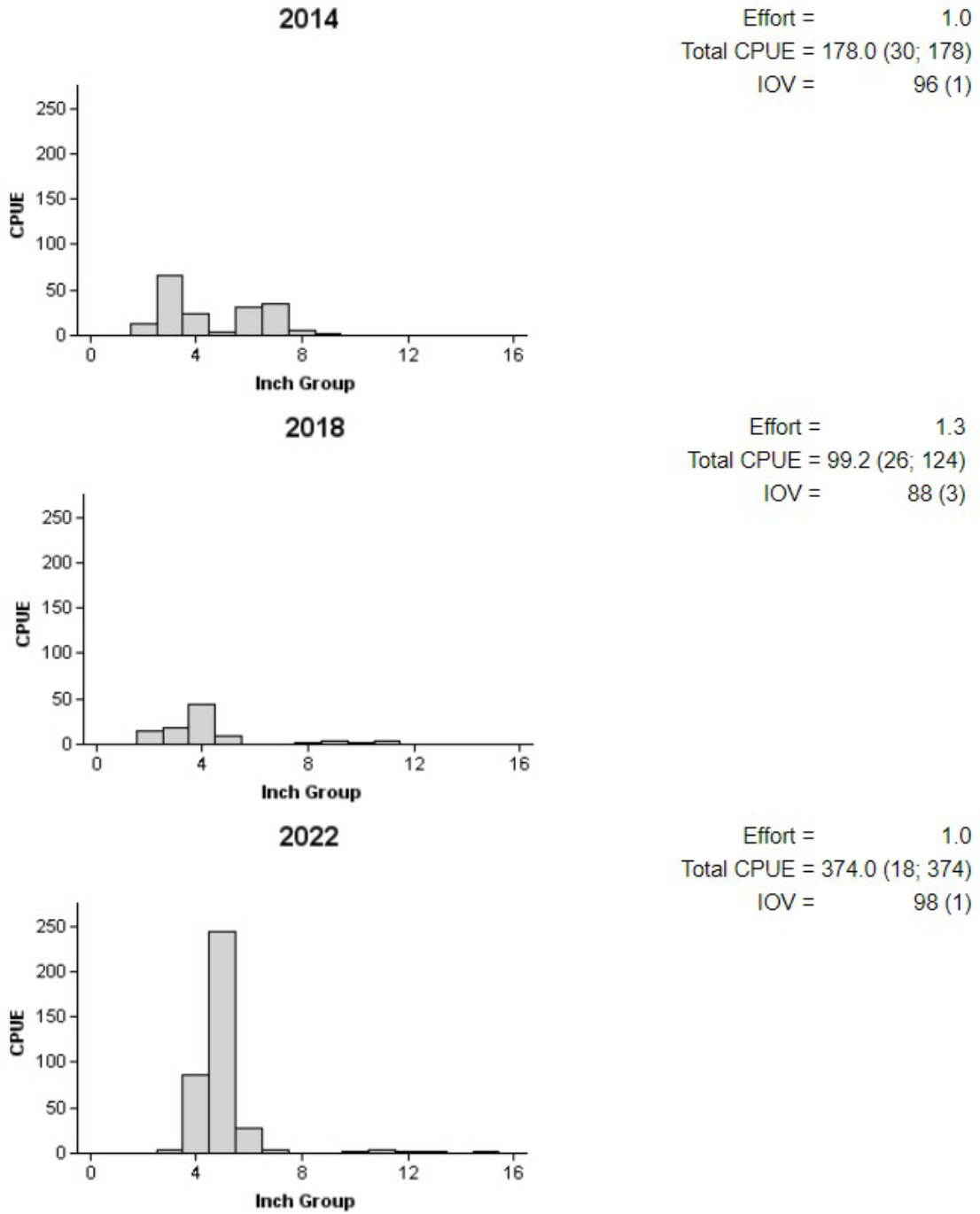Total CPUE = 374.0 (18; 374)
IOV = 98 (1)

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, 2014, 2018, and 2022.
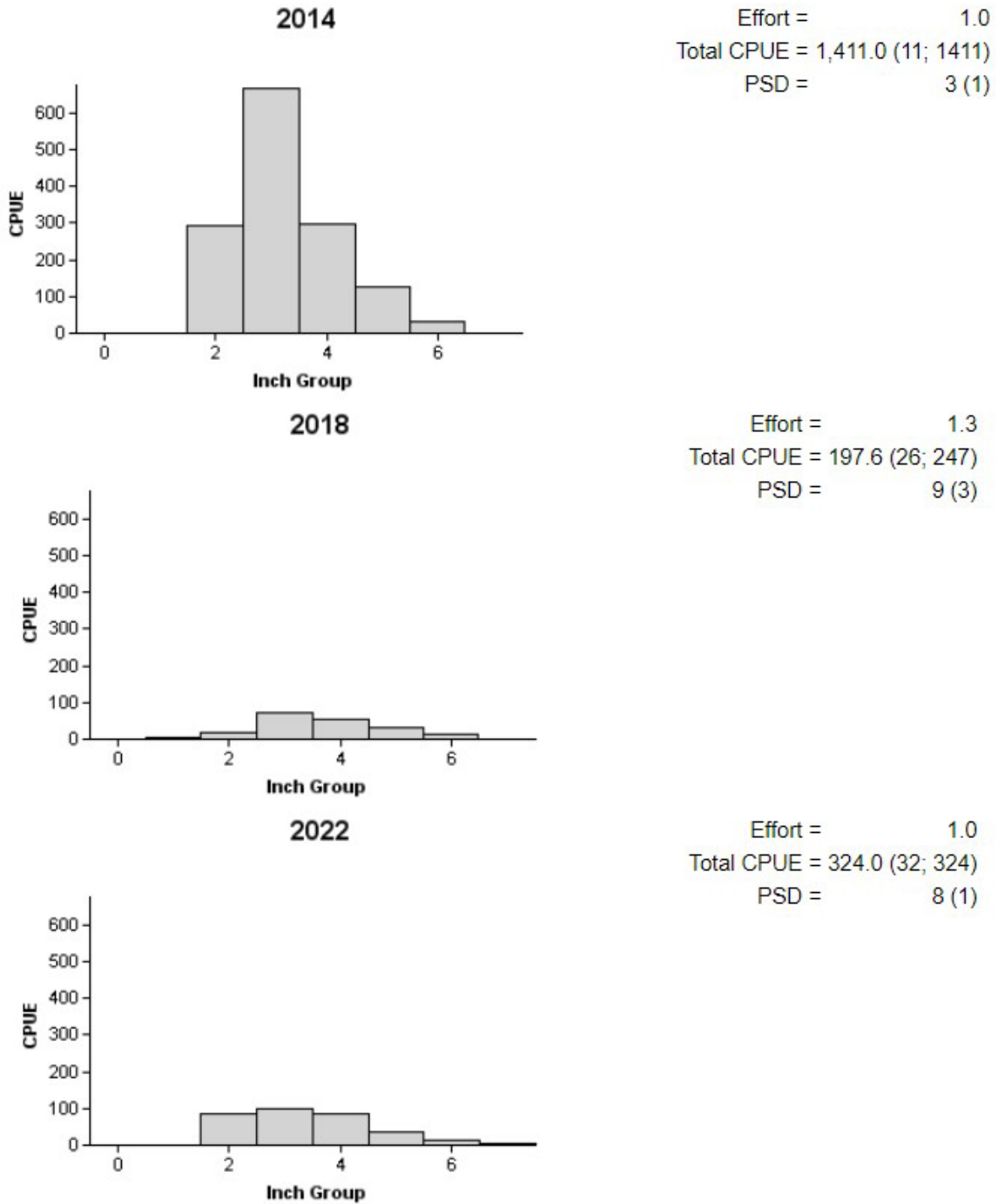
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Bluegill

2014

Effort = 1.0
Total CPUE = 1,411.0 (11; 1411)
PSD = 3 (1)

2018

Effort = 1.3
Total CPUE = 197.6 (26; 247)
PSD = 9 (3)

2022

Effort = 1.0
Total CPUE = 324.0 (32; 324)
PSD = 8 (1)

Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2014, 2018, and 2022.
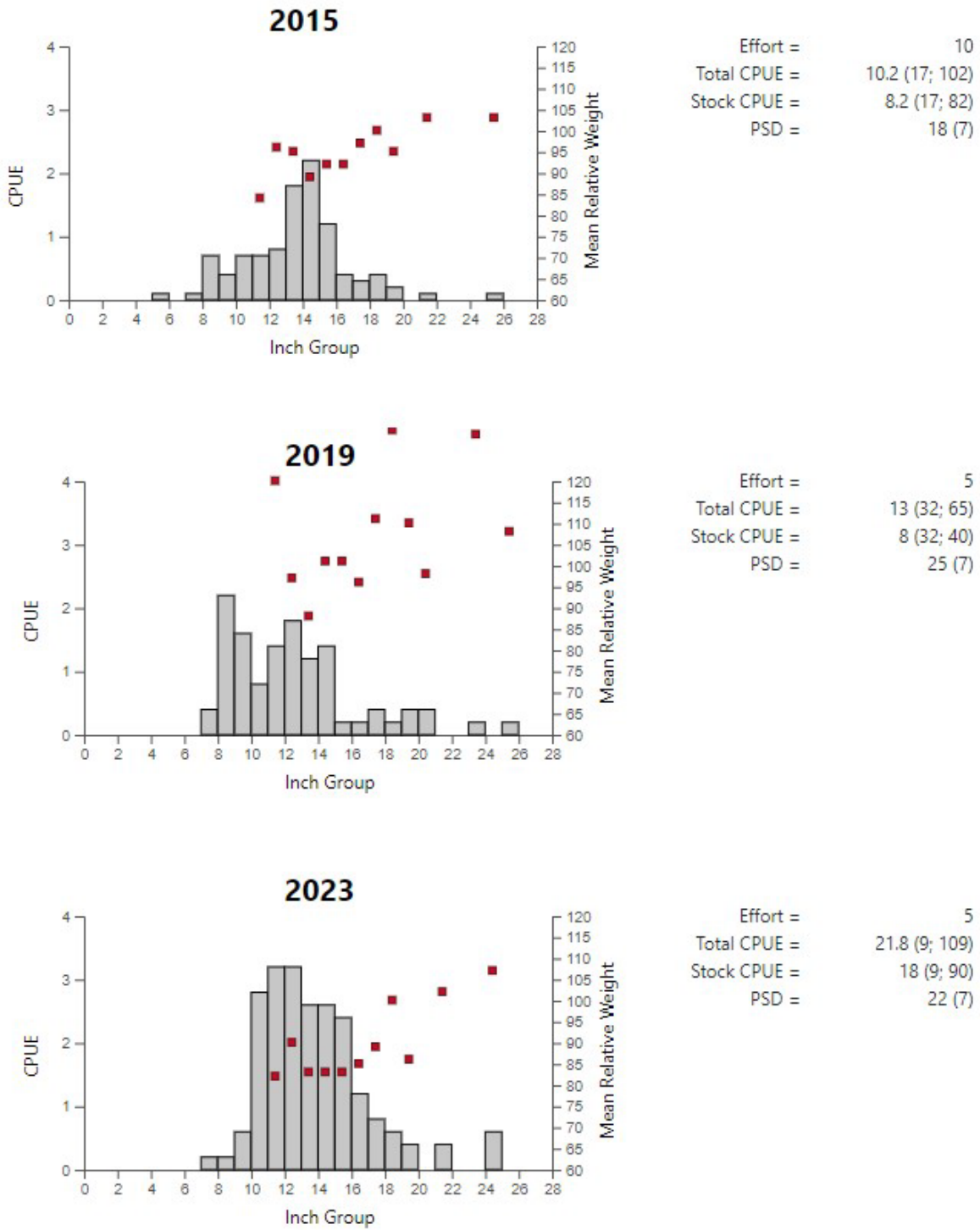
Channel Catfish

Figure 3. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Winnsboro, Texas, 2015, 2019, and 2023.
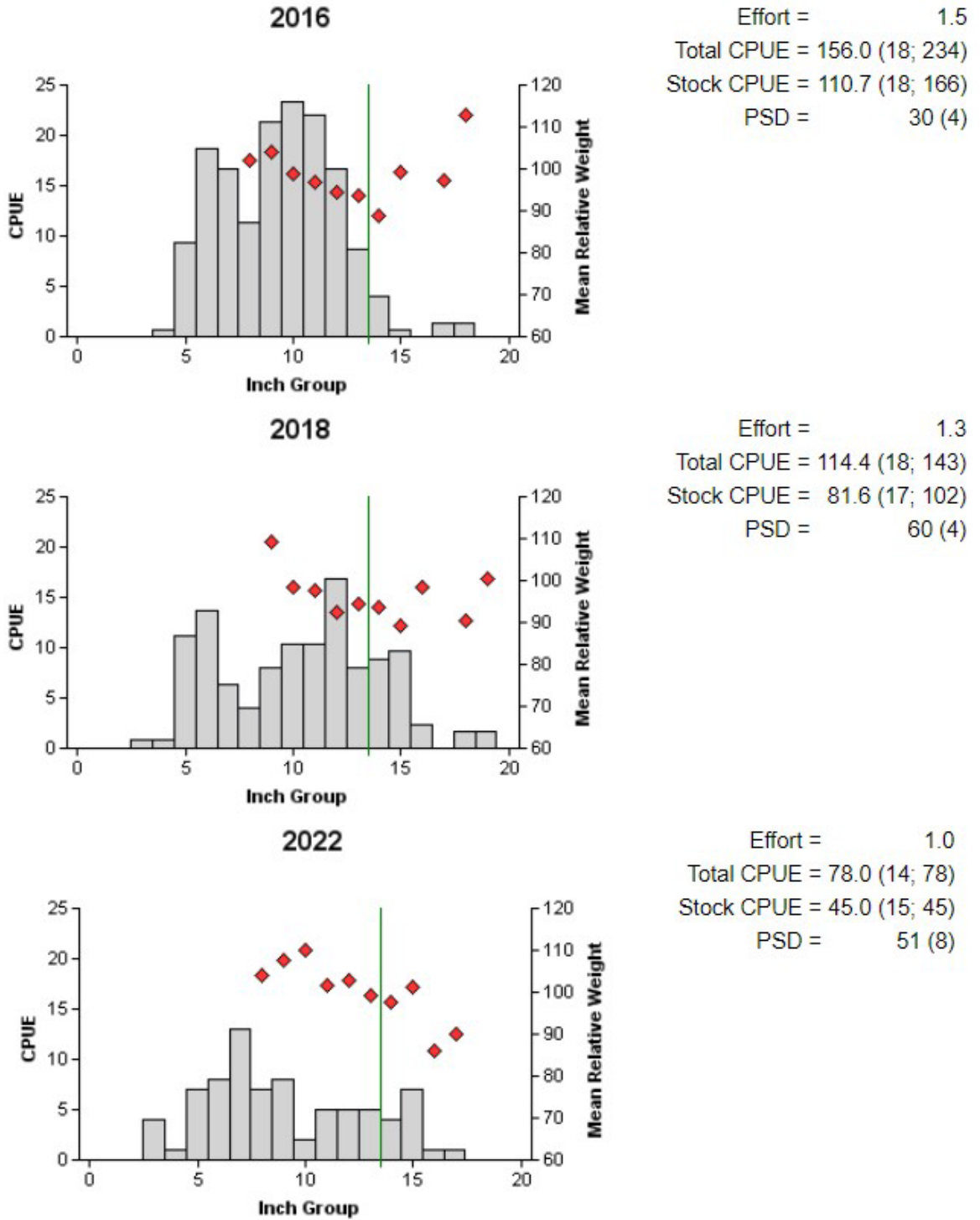
Largemouth Bass

2016

Effort = 1.5
Total CPUE = 156.0 (18; 234)
Stock CPUE = 110.7 (18; 166)
PSD = 30 (4)

2018

Effort = 1.3
Total CPUE = 114.4 (18; 143)
Stock CPUE = 81.6 (17; 102)
PSD = 60 (4)

2022

Effort = 1.0
Total CPUE = 78.0 (14; 78)
Stock CPUE = 45.0 (15; 45)
PSD = 51 (8)

Figure 4. 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, 2016, 2018, and 2022.

Proposed Sampling Schedule

Table 6. Proposed sampling schedule for Lake Winnsboro, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, and electrofishing surveys are conducted in the spring and fall.

	Survey year			
	2023-2024	2024-2025	2025-2026	2026-2027
Angler Access				X
Vegetation	X	X	X	X
Electrofishing - Fall				X
Electrofishing – Spring, bass only		X		
Gill netting				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 target species collected from all gear types from Lake Winnsboro, Texas, 2022-2023. Sampling effort was 5 net nights for gill netting and 1 hour for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			374	374.0 (18)
Threadfin Shad			19,380	19,380.0 (32)
Channel Catfish	109	21.8 (9)		
White Bass	20	4 (40)		
Bluegill			324	324.0 (32)
Longear Sunfish			75	75.0 (25)
Redear Sunfish			1	1.0 (100)
Largemouth Bass			78	78.0 (14)

APPENDIX B – Map of sampling locations
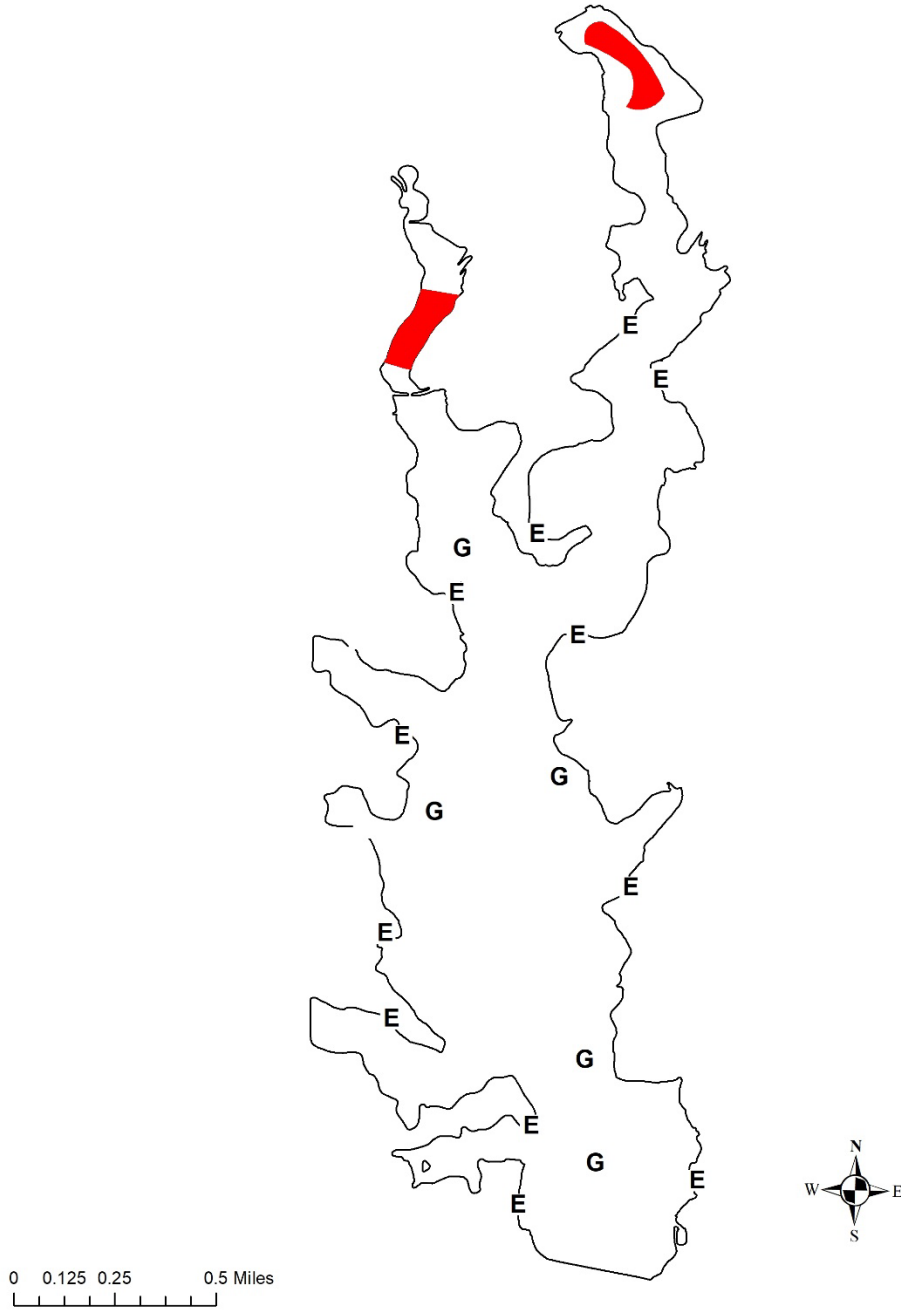
Location of sampling sites, Lake Winnsboro, Texas, 2022-2023. Gill net and electrofishing stations are indicated by G and E, respectively. Water willow introduction sites are indicated with red polygons. Water level was near full pool at time of sampling.

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