Greenbelt Reservoir

2023 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Greenbelt Reservoir were surveyed in 2021 and 2023 using electrofishing, in 2023 using trap netting and 2022 and 2024 using gill netting. Historical data are presented with the 2020-2024 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Greenbelt Reservoir is a 1,990-acre impoundment located on the Salt Fork of the Red River five miles north of Clarendon in Donley County, Texas. It is controlled by the Greenbelt Municipal and Industrial Water Authority, used for water supply and recreational purposes, and has a history of significant water level fluctuations. During spring 2024 the reservoir was about 46 feet below conservation pool and approximately 460 surface acres. Habitat features consisted primarily of natural shoreline with limited standing timber and rock bluffs. Eurasion watermilfoil is present in the waterbody but to date has not negatively affected boating or angler access. Bank access was good, but boat access was very poor.

Management History: Important sport fish included Largemouth Bass, Walleye, White Bass, White Crappie, and catfish. Harvest of most species has been managed with statewide regulations. An experimental 18-inch minimum length limit, three-fish daily bag limit was implemented on Smallmouth Bass in 1994 with no documented success. The special regulation was rescinded in 2001. Smallmouth Bass fingerlings were stocked in 2021 and Walleye fry were stocked in 2022.

Fish Community

- **Prey species:** Electrofishing catch of Gizzard Shad was high, and most Gizzard Shad were available as prey to most sport fish. Electrofishing catch of Bluegill was low but improved. The majority of Bluegill were less than 6-inches long.
- **Catfishes:** The Channel Catfish catch rate was comparable to previous years with many harvestable sized fish available for anglers. Flathead Catfish were present in the reservoir in small numbers.
- **White Bass:** White Bass catch rates have declined in 2024. All sampled fish are 10 inches or greater.
- **Largemouth Bass:** Largemouth Bass catch rates have steadily declined with water levels. However, size structure and body condition remain good. There was limited Florida Largemouth Bass genetic influence.
- **White Crappie:** White Crappie were moderately abundant with legal-size fish available to anglers. Size structure and body condition were good.
- **Walleye:** Walleye catch rates were variable but generally improved. Walleye maintain a minimal population size with good size structure with acceptable body condition.

Management Strategies: Stock Lone Star Bass, Smallmouth Bass, and Walleye if reservoir water levels recover. Conduct electrofishing surveys in 2025 and 2027, Gill net surveys in 2026 and 2028, and a trap net survey in 2027 if water levels allow boat access. Access and vegetation surveys will be conducted in 2027.

Introduction

This document is a summary of fisheries data collected from Greenbelt Reservoir from 2020-2024. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2020-2024 data for comparison.

Reservoir Description

Greenbelt Reservoir is a 1,990-acre impoundment on the Salt Fork of the Red River five miles north of Clarendon in Donley County, Texas. It is controlled by the Greenbelt Municipal and Industrial Water Authority and is used for water supply and recreational purposes. The reservoir has a history of water level fluctuations (Figure 1). The reservoir surface area was approximately 460 acres in 2023. Water levels have been declining since 2017 and currently lake water level is lower than experienced during the drought of record in 2011-12. A record low elevation of 2,616.47 ft above mean sea level (MSL) was set during December 2023. At the time of sampling, the habitat was primarily natural and gravel shoreline with some flooded timber. Other descriptive characteristics for Greenbelt Reservoir are in Table 1

Angler Access

Greenbelt Reservoir has six public boat ramps and no usable private boat ramps. At full pool, angler and boat access is good. At current water levels (April 2024, 2,618 feet above MSL), shoreline access is good, but boat access is poor and limited to launching from the reservoir bank. All boat ramps are unusable, and extension of other ramps is not feasible (Table 2). Additional boat ramp characteristics are in Table 2. There are no ADA compliant angling facilities at Greenbelt Reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Huber and Clayton 2020) included:

1. Implement management activities to reestablish Smallmouth Bass populations at Greenbelt Reservoir.

   Action: Smallmouth Bass were stocked in 2021, and electrofishing surveys were performed in 2021 and 2023. A small number of Smallmouth Bass were documented in 2021 following the stocking, but no Smallmouth Bass were documented in 2023. Reservoir water level has fallen and at the current elevation, preferred Smallmouth Bass habitat is limited.

2. Evaluate biennial Walleye fry stockings.

   Action: Walleye fry were stocked in 2019 and 2022. Gillnet data indicate a small population of Walleye primarily dominated by large adults with limited natural reproduction. Current reservoir water level is not favorable to management of Walleye due to decreased access and available habitat.

3. Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically.

   Action: Cooperated with the controlling authority and educated the public during contacts about the risks of invasive species. A vegetation survey was completed in 2023 to quantify the spread of Eurasion watermilfoil.

Harvest regulation history: Sport fishes in Greenbelt Reservoir have been and are currently managed with statewide regulations with one exception. The exception was from 1994 to 2001 when Smallmouth Bass were managed under an 18-inch minimum length limit and 3-fish daily bag limit. The statewide

catfish regulation was changed in 2022 to no minimum length limit with a daily bag of 25 of which, only 10 fish can be greater than 20 inches. Current regulations are found in Table 3.

Stocking history: The reservoir was experimentally stocked with Northern Pike (1967) and Yellow Perch (1983-1986) with limited success. Walleye were introduced in 1974, and Smallmouth Bass in 1980. Recent stockings included Smallmouth Bass in 2021 and Walleye in 2022. A complete stocking history is available in Table 4

Vegetation/habitat management history: Eurasian watermilfoil has not presented access problems under normal water levels. No vegetation or habitat management actions have been executed to date.

Water transfer: Greenbelt Municipal and Industrial Water Authority provides water from Greenbelt Reservoir, on the Salt Fork of the Red River, to approximately 25,000 people through a 121-mile aqueduct system. There are five cities that use water from this reservoir (Clarendon, Hedley, Childress, Quanah, and Crowell). 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 Greenbelt Reservoir (Huber and Clayton 2020). 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).

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

Electrofishing – Largemouth Bass, sunfishes, and Gizzard 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. Nighttime electrofishing was conducted in 2021, and daytime electrofishing was performed in 2023 due to low lake water level and difficulties launching and navigating. Electrofishing in 2023 was conducted using a Smith-Root Apex electrofisher, while previous surveys used Smith Root GPP 7.5 electrofisher.

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).

Gill netting – Channel Catfish, White Bass, and Walleye 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).

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 since 2005.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Neumann et al. (2012. Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE.

Habitat – A structural habitat and vegetation survey was conducted in 2023. 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 2024).

Results and Discussion

Habitat: Littoral zone structural habitat consisted primarily of natural shoreline with 2.3 acres of standing timber (Table 6). No native vegetation was documented in 2023, and observed Eurasian watermilfoil fell from 143.8 acres in 2019 to 0.3 acres in 2023. Aquatic vegetation is strongly linked to water levels and has decreased with falling reservoir elevation.

Prey species: Electrofishing catch rates of Bluegill and Gizzard Shad were 30.0/h and 714.0/h, respectively in 2023. Index of Vulnerability (IOV) for Gizzard Shad was fair, indicating that 66% of Gizzard Shad were available to existing predators. Gizzard Shad IOV has been consistent (range 62-66) when compared to previous years (Figure 2). Total CPUE of Gizzard Shad has been trending upwards from 96.0/h in 2019, 242.0/h in 2021 and 714/h in 2023. Total CPUE of Bluegill in 2023 was lower than observed in previous years but size structure has improved although the population was still weighted toward smaller individuals (Figure 3).

Channel Catfish: The total catch rate of Channel Catfish was 13.2/nn in 2024. The Channel Catfish catch rate has dropped slightly (15.4/nn in 2022 and 18.8/nn in 2019) but remains good, especially considering dropping reservoir water level. Size structure has improved with increased representation of larger fish as PSD in 2019 was 24 and increased to 31 in 2024. Body conditions were comparable to previous surveys (Figure 4). Survey objectives were not reached in 2024, and sampling effort was not increased due to low water levels and limited suitable sampling sights.

White Bass: The gill net catch rate of White Bass was 3.4/nn in 2024, a decrease from 4.0/nn in 2022 and 7.4/nn in 2019. Size structure metrics observed in 2024 (PSD = 100) indicated an unbalanced population with few small fish and poor reproduction or recruitment (Figure 5). Poor recruitment was most likely caused by falling reservoir water level and the corresponding loss of habitat and lack of spring inflows. Sampling objectives established in 2019 were met.

Largemouth Bass: The electrofishing catch rate of stock-length Largemouth Bass was 17.0/h in 2023, lower than the 24/h in 2021 and 109.8/h in 2019. Size structure (PSD) was good and has varied from 69 to 82 since 2019 (Figure 6). Body condition in 2023 varied across size classes but was generally good (Wr ≥ 90) for nearly all size classes of fish and were comparable to body condition in previous surveys (Figure 6). Florida Largemouth Bass genetic influence was particularly high in 2019, most likely due to a recent stocking (Table 8). However, Florida Largemouth bass influence fell in 2023 and was similar to most historic samples. Florida alleles have ranged from 15 to 38% and Florida genotype has ranged from 0 to 20%. Only sampling objectives for bass genetics were met, additional sampling was not completed due to the low water level and poor catch rates.

White Crappie: The trap net catch rate of White Crappie was 24/nn in 2023, higher than 2019 (17.2/mm) and 2017 (14.7/nn). Size structure was good with observed PSD values of 56 in 2023, down slightly from 65 in 2019 indicating a balanced population (Figure 7). Mean relative weights were under 90 for most size classes in 2023 and were similar to values observed in 2019 and 2017 (Figure 7).

Walleye: The total Walleye catch rates were 3.2/nn in 2024, up from 0.6/nn in 2022, but down slightly from 4.2/nn in 2019 (Figure 8). Size structure metrics (PSD=100 in 2022 and 88 in 2024) indicated an unbalanced population with poor reproduction. Stockings have been infrequent and natural reproduction and recruitment has been poor and sporadic. Body condition in 2024 was acceptable with calculated relative weight values greater or equal to 90 for most length categories. Catch rates in 2022 were too low to provide meaningful interpretation of body conditions and size structure.

Fisheries Management Plan for Greenbelt Reservoir, Texas

Prepared – July 2024

ISSUE 1: Greenbelt Reservoir has experienced a period of very low water levels during this last report cycle. Reservoir water levels were lower in 2023/24 than during the record drought in 2011/12. Game fish populations will need to be evaluated and likely reestablished if reservoir water levels rise substantially. A minimum target elevation of 2,625 ft above MSL will be established before any stockings take place. This minimum water level is required to reestablish boat access at the low water ramp.

MANAGEMENT STRATEGY

1. If a target water level of 2,625 ft above MSL is met, 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 1,000/km shoreline.
2. If a target water level of 2,625 ft above MSL is met, stock Walleye fry at a rate of 2,000/acre. Walleye shall be stocked biennially.

ISSUE 2: Smallmouth Bass historically maintained a self-sustaining population at Greenbelt Reservoir. Smallmouth Bass were stocked in 2021 but water levels fell following the stocking and survey data indicates that fish populations have not recovered. A minimum water level of 2,625 ft above MSL should be met before requesting Smallmouth Bass. Based on the historical water graph, an elevation of 2,625 ft above MSL should provide at least 5 years of adequate habitat and access to justify stocking Smallmouth bass.

MANAGEMENT STRATEGIES

1. If target a target water level of 2,625 ft above MSL is met, conduct supplemental stocking of Smallmouth Bass to re-establish the population and natural reproduction.
2. Following successful stocking events, personnel will monitor future reproduction to determine if regular stocking is warranted to maintain the populations. Initially reproduction will be monitored using fall electrofishing and if necessary, age and growth will be collected to determine if fish can be aged to a stocking year.

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. 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 interbasin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2024–2028)

Currently, Greenbelt Reservoir is experiencing low water and poor access. Reservoir elevation is approximately 2,618 ft/MSL (11.2% full and 46.1 ft below conservation pool) and total acreage is about 460 acres. All boat ramps are out of service and boats must be launched from the shoreline. If conditions deteriorate further it may be necessary to suspend sampling due to lack of boat access. The objective based sampling plan below is written with two options. A simplified sampling plan is described if low water conditions persist. If reservoir elevation increases to 2,625 ft/MSL, boat ramps should again be usable. Suggestions for a more detailed sampling protocol and objectives are detailed below. However, district biologists may need to alter the plan based on conditions in the field.

Low water sampling plan

Greenbelt Reservoir is experiencing low water conditions with poor access. The uncertainty of the reservoir and future boat access requires special sampling objectives. A reservoir elevation trigger of 2,625 ft/MSL will be established when defining low water conditions. If reservoir elevation is less than 2,625 ft/MSL and boat access is possible, sampling effort will be 5 randomly selected gill net stations in spring 2026 and 2028, 12 randomly selected 5-min electrofishing stations in fall 2025 and 2027, and 5 randomly selected trap net station in fall 2027. There will be no specified survey objectives other than collecting trend data to track large scale changes in fish populations. If the reservoir remains low for an extended period or experiences fish kills, exploratory sampling may be necessary before transitioning to the sampling plan below. District biologists will adjust sampling schedules as needed during low water periods based on access and data needed to reestablish populations following fish kills or rapid lake rise.

Standard sampling plan

Sport fish, forage fish, and other important fishes

Sport fishes in Greenbelt Reservoir include Channel Catfish, Flathead Catfish, White Bass, Smallmouth Bass, Largemouth Bass, White Crappie, and Walleye. The primary forage species is Gizzard Shad and Bluegill.

Low-density fisheries

Smallmouth Bass: Historically Greenbelt Reservoir maintained a population of Smallmouth Bass. The only recent record of Smallmouth Bass is from the 2021 fall electrofishing survey. All fish sampled were likely from a stocking that took place earlier that year. Currently this is a minimal or nonexistent fishery and reservoir water level does not justify efforts to reestablish this fishery unless reservoir levels recover.

Flathead Catfish: While Flathead Catfish are typically collected in gill nets at a rate of 1-2/nn, past angler surveys have indicated limited directed effort toward this species. Flathead Catfish that are sampled during planned surveys will be recorded.

Survey objectives, fisheries metrics, and sampling objectives

Channel Catfish: Analysis of past sampling effort indicates that a minimum of 11 randomly selected gill net stations would be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence) and 10 stations will be required to reach size structure indices objectives (PSD: 50 stock-length fish minimum with 80% confidence). Under this plan, minimum effort will be 6 randomly selected sampling sites in spring 2026 and 2028 (Table 9). If survey objectives are not met during the 2028 survey, additional gill net stations may be sampled but total effort will not exceed 10 random stations.

White Bass: Analysis of past sampling effort indicates that a minimum of 15 randomly selected gill net stations would be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence) and 19 stations will be required to reach size structure indices objectives (PSD: 50 stock-length fish minimum with 80% confidence). Due to excessive effort anticipated to meet minimum sampling criteria and lack of angler demand, sampling effort will be the same as described for Channel Catfish (Table 9).

Largemouth Bass: Analysis of past sampling effort indicates that a minimum of 32 randomly selected stations would be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence) and 48 stations will be required to reach size structure indices objectives (PSD: 50 stock-length fish minimum with 80% confidence). Due to excessive effort anticipated to meet minimum sampling criteria, sampling effort will remain 12 randomly selected 5-min electrofishing stations in fall 2025 and 2027 (Table 9) to maintain trend data and track large changes in population data. Additionally, a 30 fish sample of Largemouth Bass ≥ stock length (8 inches) will be collected in 2027 for genetic analysis. Ad hoc electrofishing will be performed if the required fish for genetics are not obtained during planned sampling.

White Crappie: General monitoring and trend data will be collected to document any large-scale changes in the fish population. Analysis of past sampling effort estimates that a minimum of 5 randomly selected trap net stations will be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence) and 5 stations will be necessary to calculate size structure indices (PSD: 50 stock-length fish minimum with 80% confidence). Because trap net data is highly variable, sampling effort will be 5 randomly selected trap net station in fall 2027 to document presence/absence and minimal population trend data (Table 9).

Walleye: Analysis of past sampling effort indicates that a minimum of 22 randomly selected gill net stations would be necessary to achieve population abundance objectives (CPUE-S; RSE≤25 with 80% confidence) and 32 stations will be required to reach size structure indices objectives (PSD: 50 stock-length fish minimum with 80% confidence). Due to excessive effort anticipated to meet minimum sampling criteria sampling effort will be the same as described for Channel Catfish (Table 9).

Forage: Bluegill and Gizzard Shad are the primary forage species at Greenbelt Reservoir. Continuation of sampling will allow for monitoring of large-scale changes in relative abundance and size structure. Sampling, as per Largemouth Bass above, will allow for general monitoring of large-scale changes of relative abundance, size structure, and IOV data for forage species. No additional effort will be extended beyond what is used for black bass sampling.

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Tables and Figures

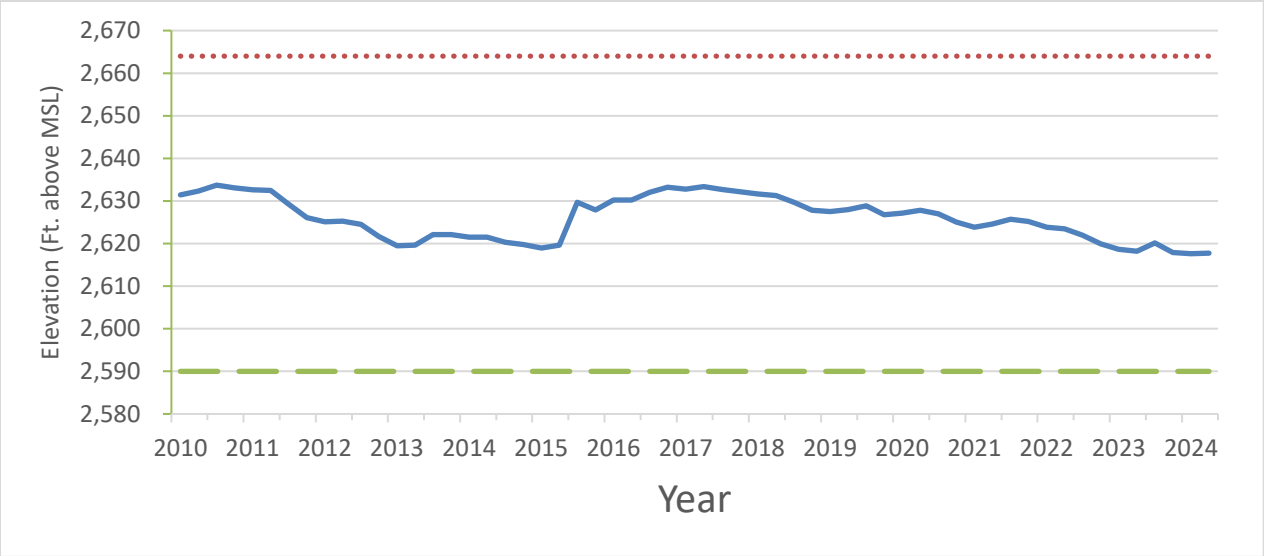


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Greenbelt Reservoir, Texas. Red dotted line indicates conservation pool equals 2,664 feet above MSL and green dashed line indicates dead pool equals 2,590 feet above MSL.

Table 1. Characteristics of Greenbelt Reservoir, Texas.

Characteristic	Description
Year constructed	1967
Controlling authority	Greenbelt Municipal and Industrial Water Authority
County	Donley
Reservoir type	Mainstem
Shoreline Development Index	2.87
Conductivity	1,226 µS/cm

Table 2. Boat ramp characteristics for Greenbelt Reservoir, Texas, August 2023. Reservoir elevation at time of survey was 2,620 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Lakeside Marina	34.99668 -100.89582	Y	20	2,647	Out of water. Extension is not feasible
Kinkaid Park	34.99331 -100.90499	Y	15	2,643	Out of water. Extension is not feasible
Kelly Creek North	34.99392 -100.91020	Y	15	2,645	Out of water. Extension is not feasible
North Ramp	35.01086 -100.89725	Y	30	2,646	Out of water. Extension is not feasible
Salt Fork	35.01721 -100.92597	Y	15	2,646	Out of water. Extension is not feasible
Low water	34.99886 -100.89896	Y	10	2,626	Adequate, rough launch and unpaved parking

Table 3. Harvest regulations for Greenbelt Reservoir, Texas.

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

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

Table 4. Stocking history of Greenbelt Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = Unknown.

Species	Year	Number	Size
Blue Catfish	1967	9,600	UNK
	1971	8,000	UNK
	1982	20,000	UNK
	1987	6,240	FGL
	Total	43,840	
Channel Catfish	1967	30,000	AFGL
	1968	45,000	AFGL
	1969	51,000	AFGL
	1971	8,000	AFGL
	1995	131,455	FGL
	2000	50,000	AFGL
	Total	315,455	
Flathead Catfish	1977	39	UNK
Florida Largemouth Bass	1982	75,333	FGL
	1982	4,000	FRY
	2000	201,025	FGL
	2019	31,140	FGL
	Total	236,165	
Green Sunfish x Redear Sunfish	1967	201,000	UNK
Largemouth Bass	1967	240,000	UNK
	1980	14,523	UNK
	1981	20,000	UNK
	2018	20,426	FGL
	Total	294,949	
Northern Pike	1967	150,000	UNK
Rainbow Trout	1991	3,339	ADL
Smallmouth Bass	1980	5,000	UNK
	1981	72,400	UNK
	1982	100,500	UNK
	1987	30	ADL
	2021	14,815	FGL
	Total	192,745	

Table 4. Stocking history continued.

Species	Year	Number	Size
Walleye	1974	100,000	FRY
	1976	100,000	FRY
	1977	4,600	FRY
	2001	99,000	FGL
	2006	41,200	FGL
	2013	815,000	FRY
	2017	1,681,620	FRY
	2018	812,360	FRY
	2019	592,634	FRY
	2022	344,404	Fry
	Total	4,590,818	
White Crappie	1967	97	UNK
	1968	96	UNK
	Total	193	
Yellow Perch	1983	7,500	FGL
	1985	1,145	FGL
	1986	330	FGL
	Total	8,975	

Table 4. Objective-based sampling plan components for Greenbelt Reservoir, Texas 2023–2024.

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
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	N = 30, any age
Bluegill [a]	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad [a]	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
	Prey availability	IOV	N ≥ 50
Trap netting			
Crappie	Abundance	CPUE–Total	Trend Data
	Size structure	PSD, length frequency	Trend Data
Gill netting			
Channel Catfish	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
White Bass	Abundance	CPUE–Stock	Trend Data
	Size structure	PSD, length frequency	Trend Data
Walleye	Abundance	CPUE–Stock	Trend Data
	Size structure	PSD, length frequency	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 5. Survey of structural habitat types, Greenbelt Reservoir, Texas, 2023. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural	7.4 miles	96.9
Rocky	0.24 miles	3.1
Standing timber	2.3 acres	0.5

Table 6. Survey of aquatic vegetation, Greenbelt Reservoir, Texas, 2011–2023. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2011	2015	2019	2023
Flooded terrestrial		32.75 (4.4)		
Native floating-leaved		0.10 (0.0)		
Native emergent		29.02 (3.9)		
Non-native				
Eurasian watermilfoil (Tier III)*	112.7 (16.0)	0.01 (0.0)	143.8 (21.6)	0.3 (0.01)
Torpedograss (Tier III)*		0.01 (0.0)		

*Tier III is Watch Status

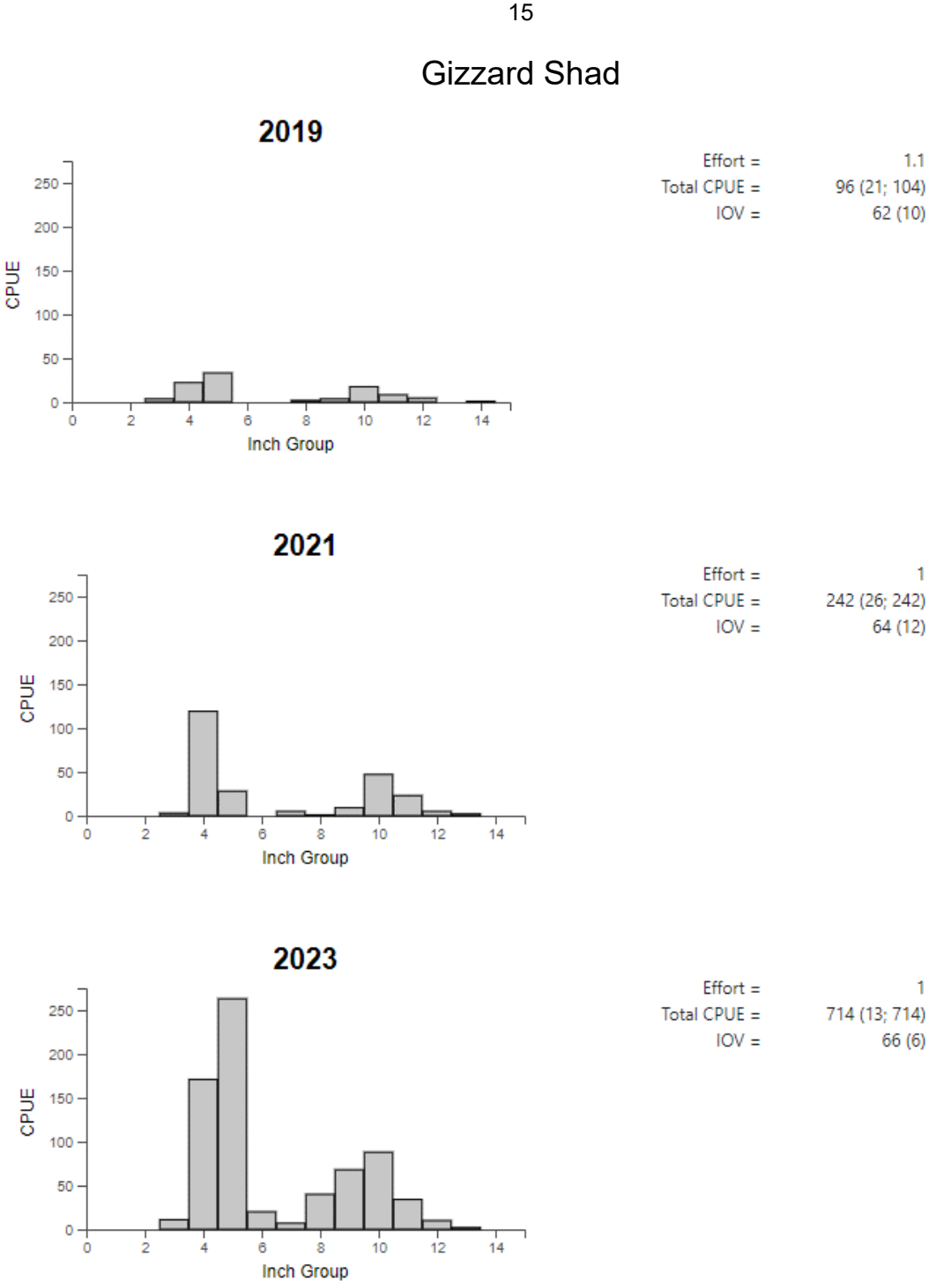


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Greenbelt Reservoir, Texas, 2019, 2021, and 2023.

Bluegill

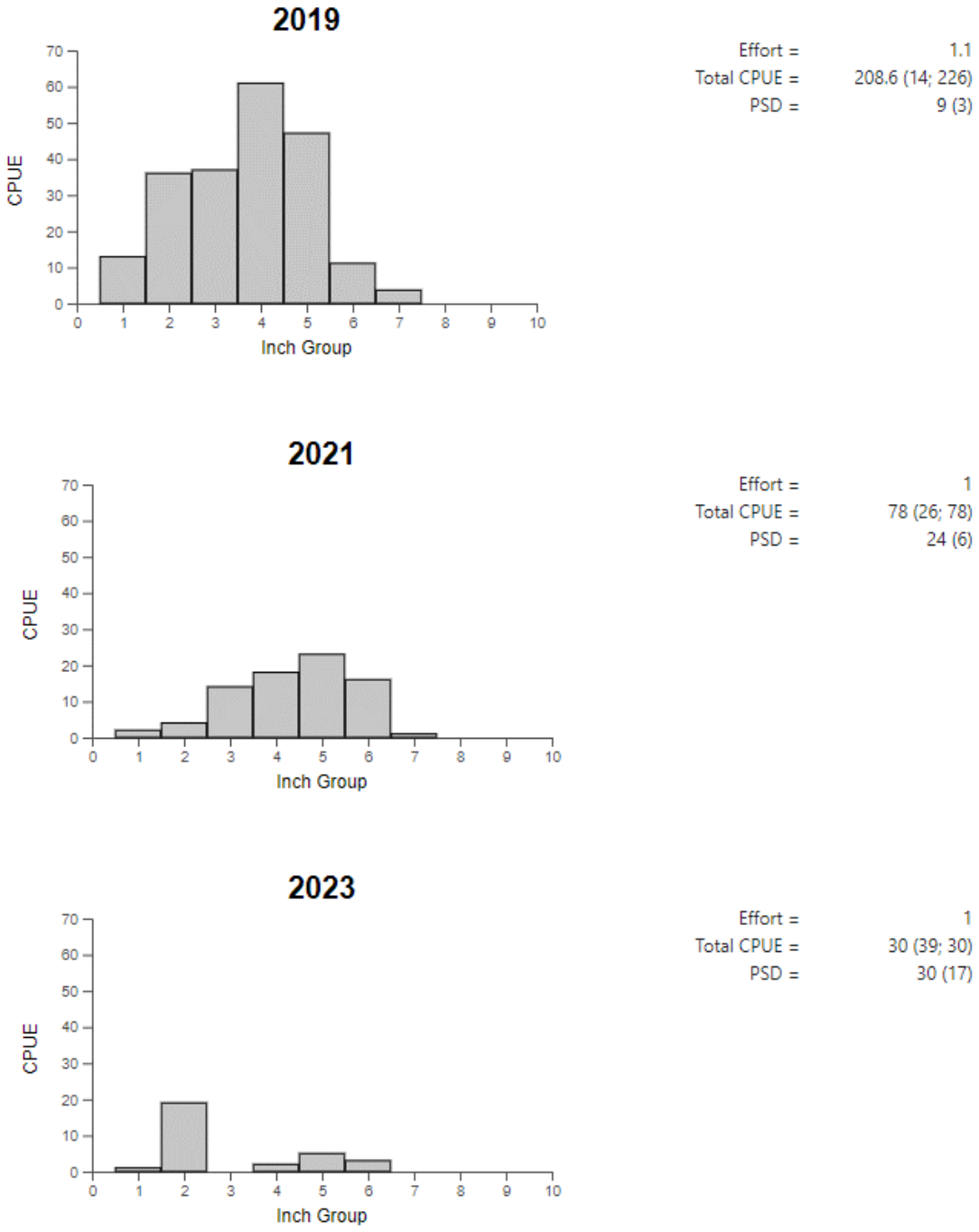


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Greenbelt Reservoir, Texas, 2019, 2021, and 2023.

Channel Catfish

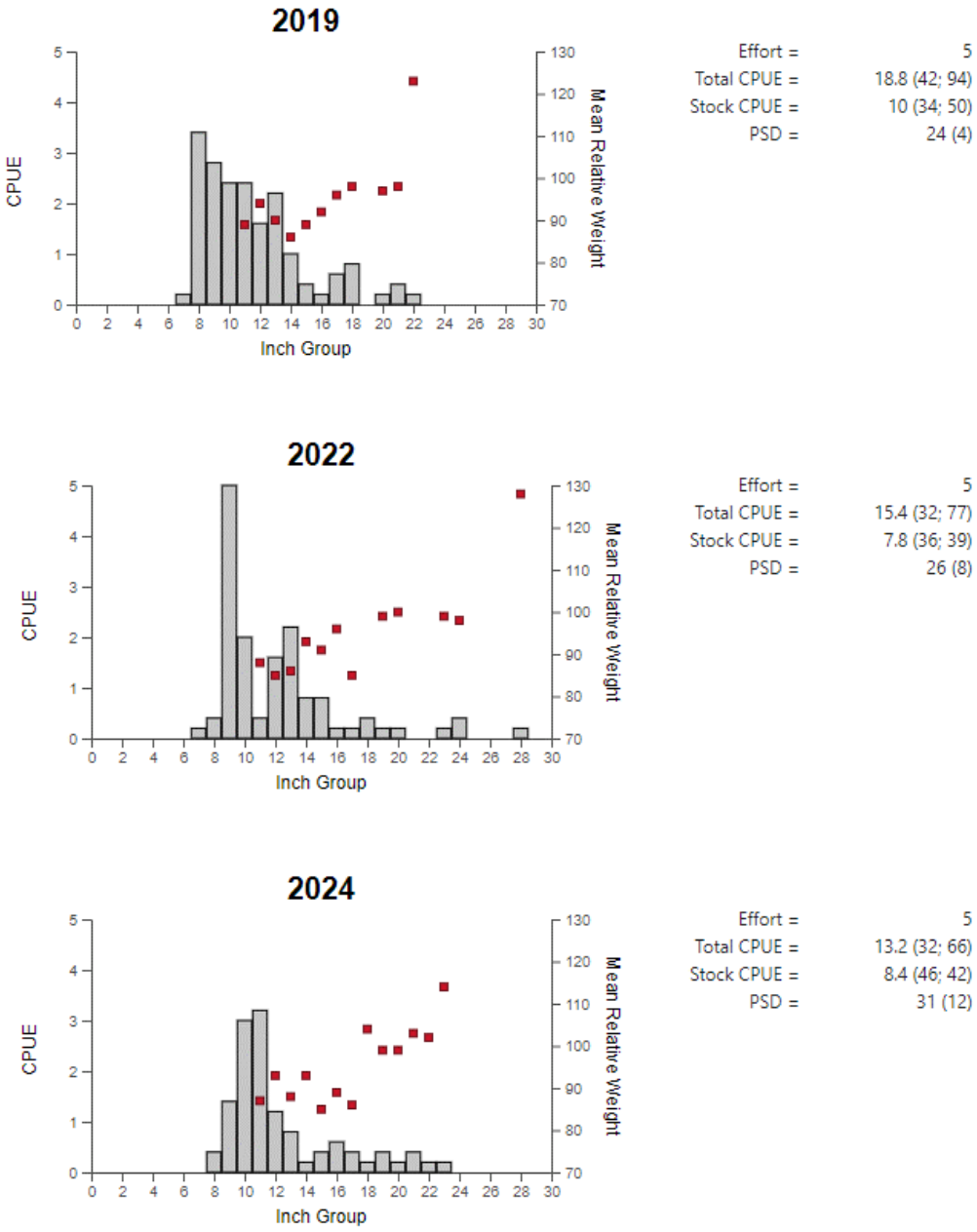


Figure 4. Number of Channel Catfish caught per net night (CPUE), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Greenbelt Reservoir, Texas, 2019, 2022, and 2024.

White Bass

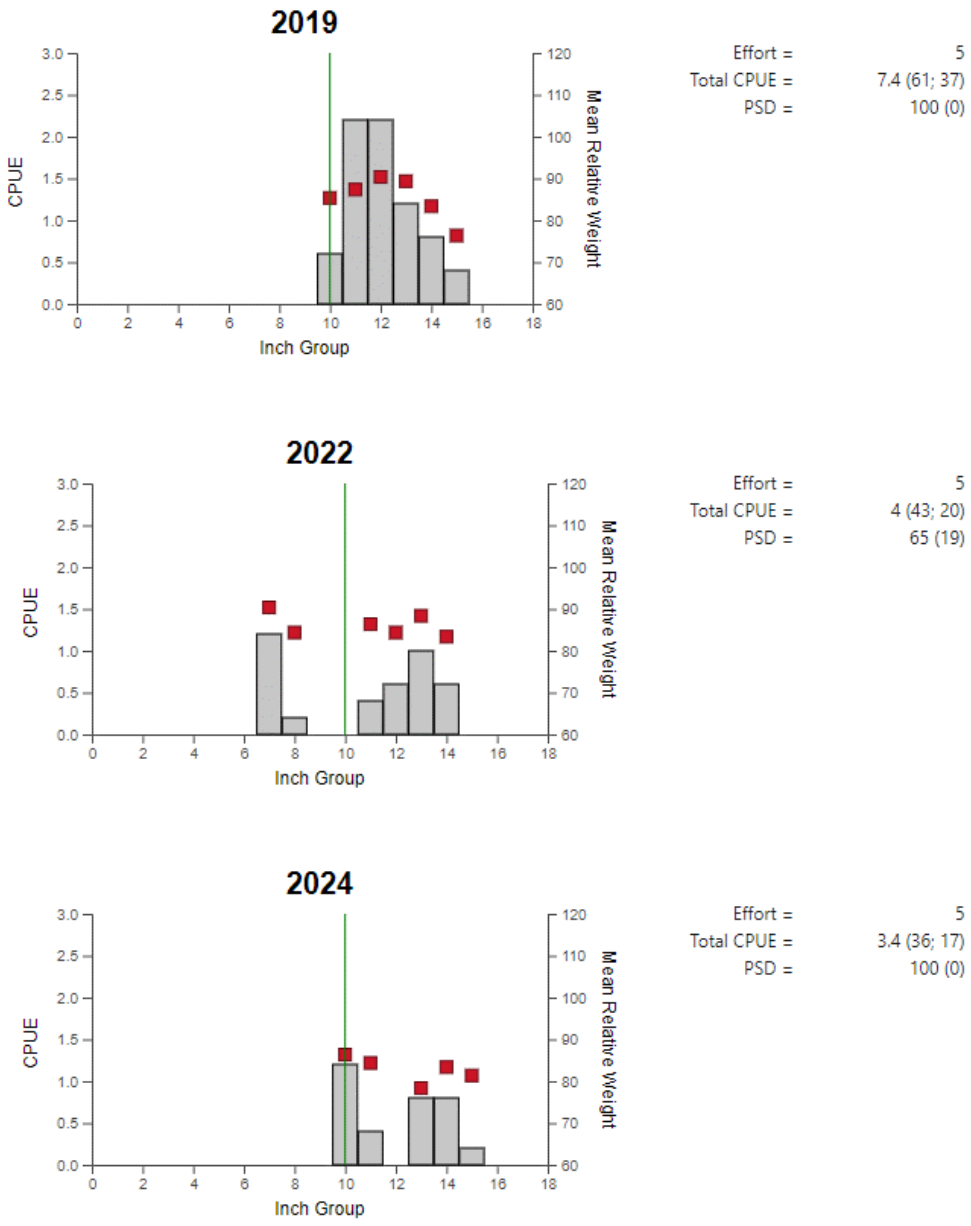


Figure 5. Number of White Bass caught per net night (CPUE) mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Greenbelt Reservoir, Texas, 2019, 2022, and 2024. Vertical line indicates minimum length limit.

Largemouth Bass

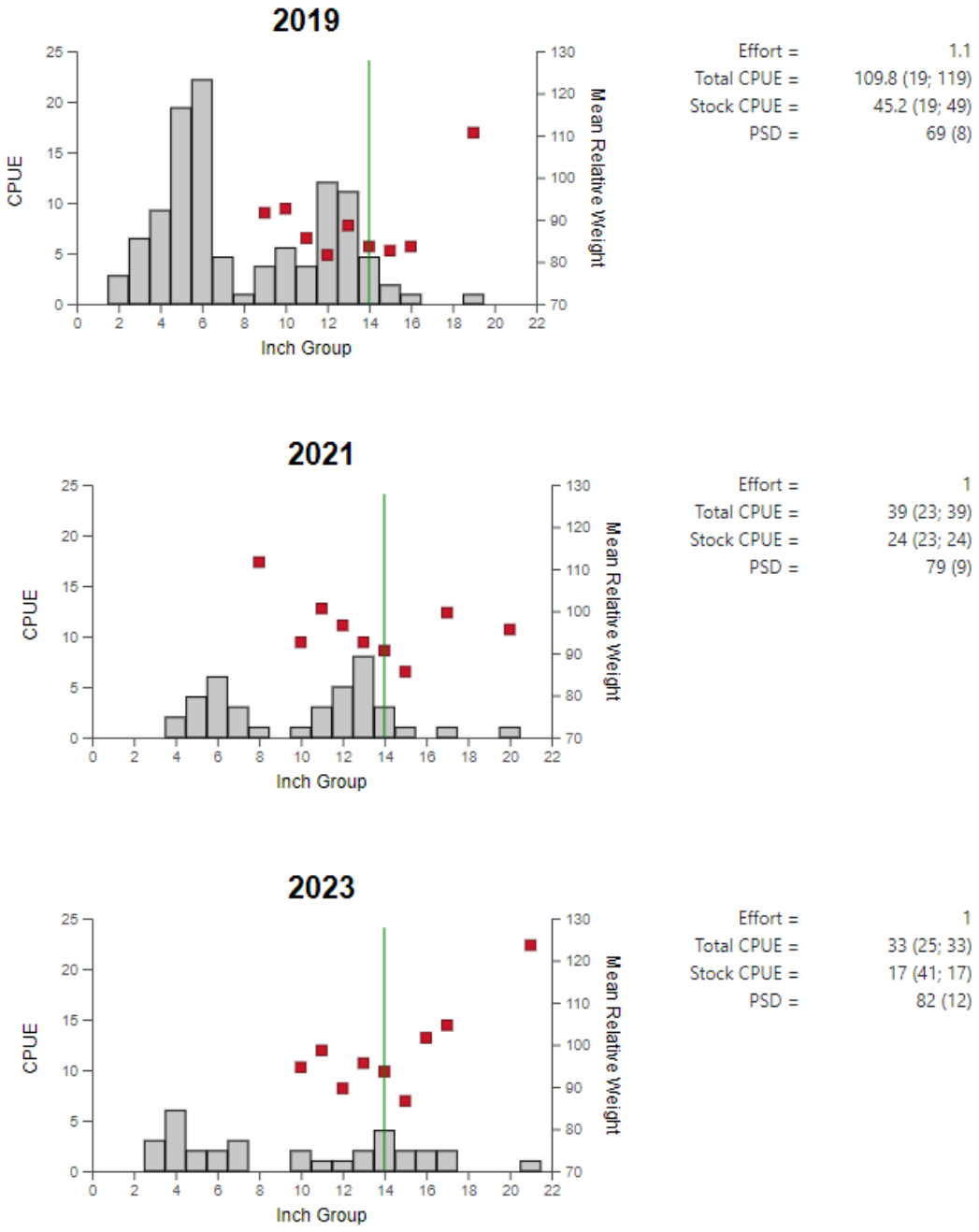


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Greenbelt Reservoir, Texas, 2019, 2021, and 2023. Vertical line indicates minimum length limit.

Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Greenbelt 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		
2005	31	0	0	16	15	15	0
2011	30	0	1	22	7	14	0
2015	30	0	0	11	13	33	0
2019	30	6	0	22	2	38	20
2023	30	0	1	22	7	22	0

White Crappie

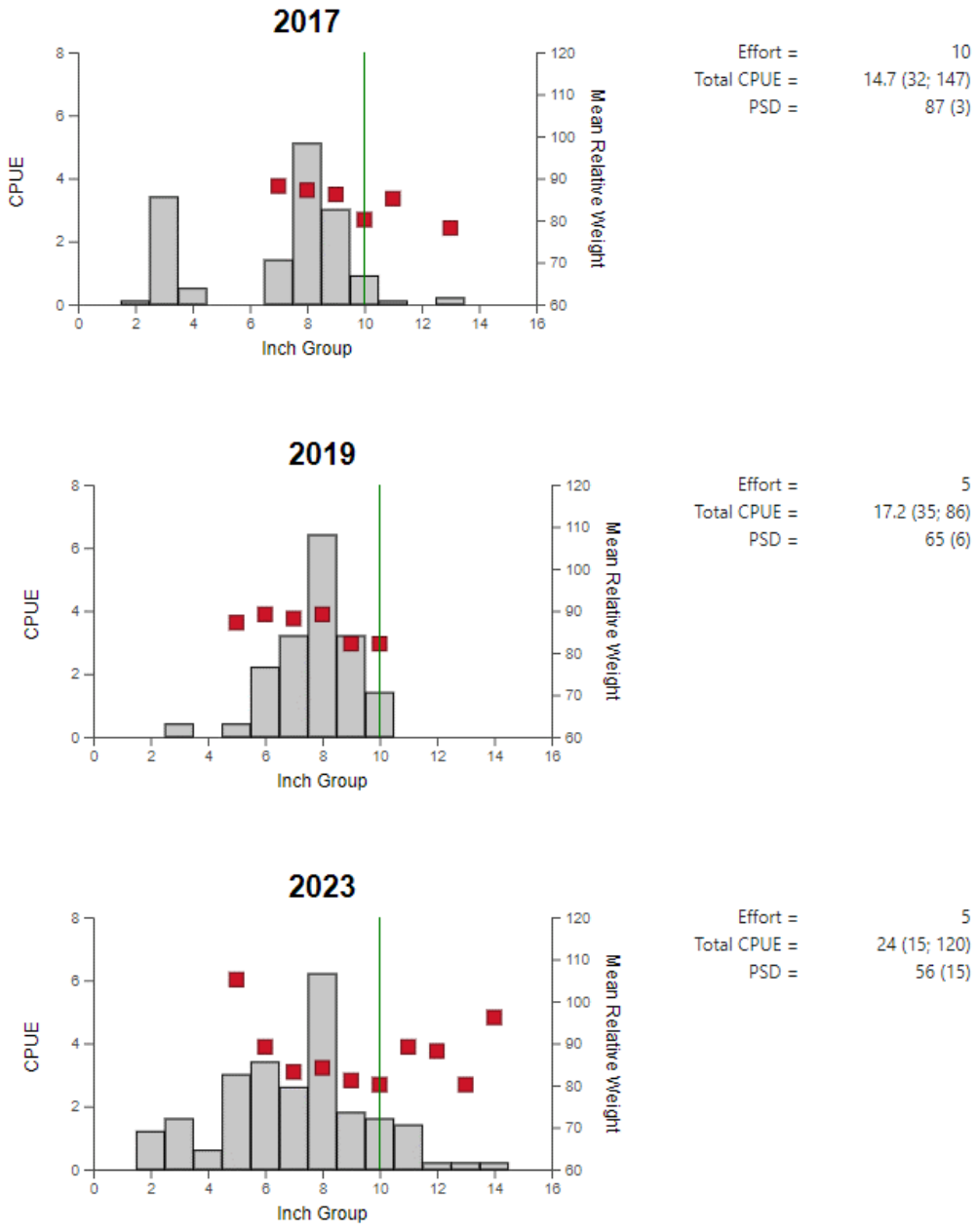


Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Greenbelt Reservoir, Texas, 2017, 2019, and 2023. Vertical line indicates minimum length limit.

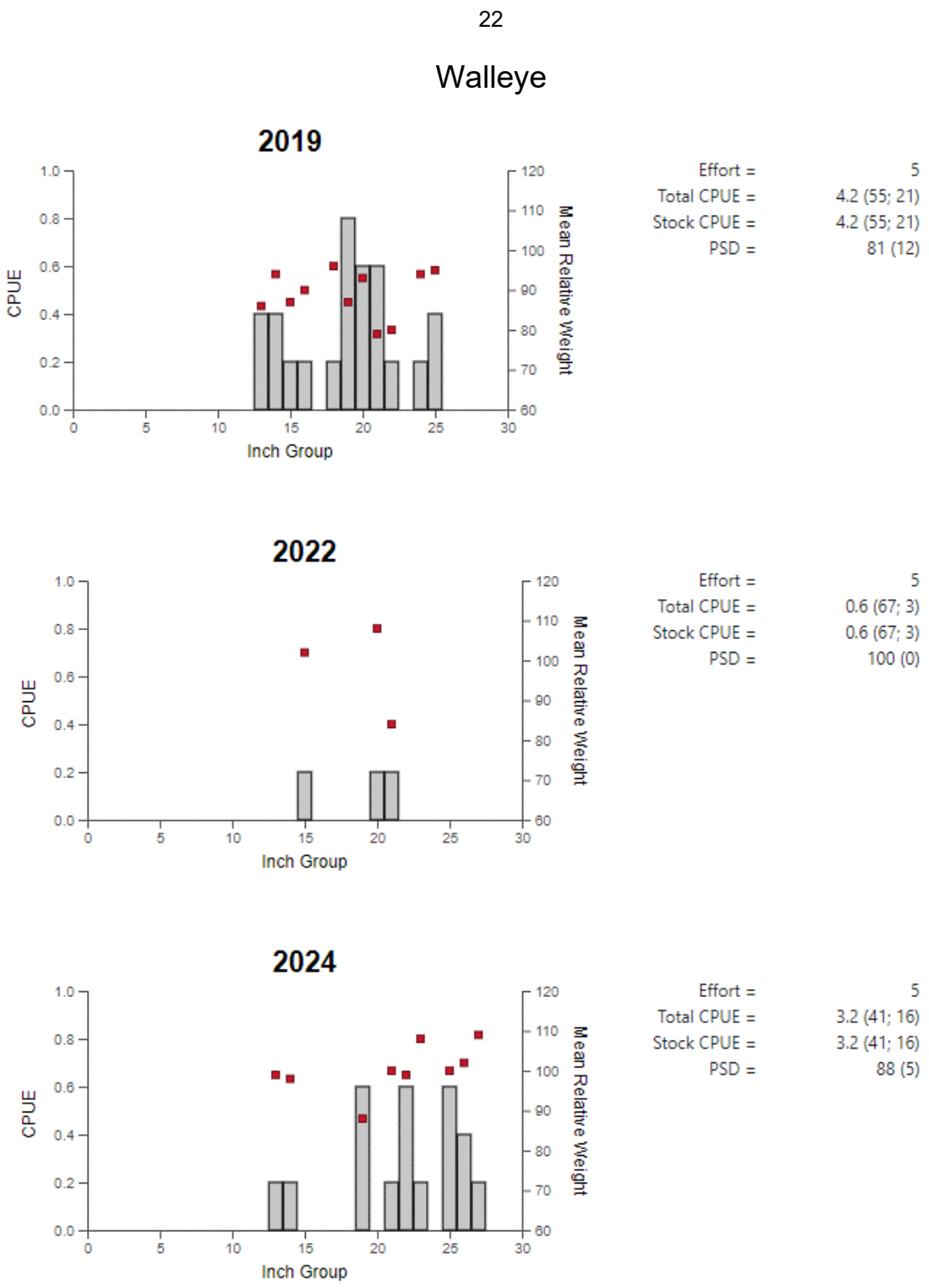


Figure 8. Number of Walleye caught per net night (CPUE, bars) mean relative weight (squares), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Greenbelt Reservoir, Texas, 2019, 2022, and 2024.

Proposed Sampling Schedule

Table 9. Proposed sampling schedule for Greenbelt Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall.

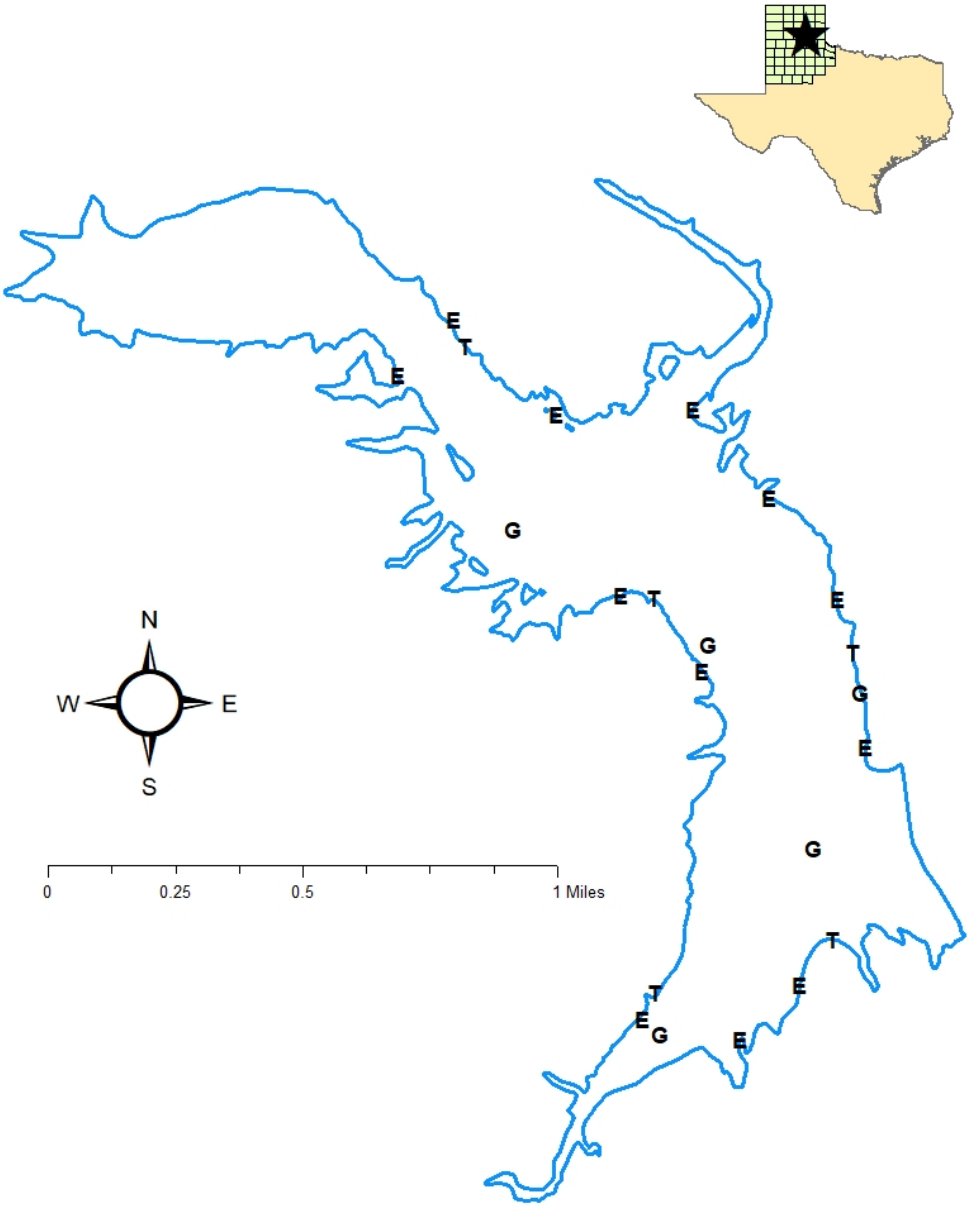
	Survey year			
	2024-2025	2025-2026	2026-2027	2027-2028
Angler Access				X
Structural Habitat				X
Vegetation				X
Electrofishing – Fall		X		X
Trap netting				X
Gill netting		X		X
Creel survey				
Report				X

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 Greenbelt Reservoir, Texas, 2023-2024. Sampling effort was 5 net nights for gill netting, 5 net nights for trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	134	26.80 (28)			714	714.00 (13)
Common Carp	10	2.00 (32)			21	21.00 (30)
River Carpsucker	3	0.60 (100)			3	3.00 (52)
Channel Catfish	66	13.20 (32)			2	2.00 (67)
Flathead Catfish	1	0.20 (100)			1	1.00 (100)
White Bass	17	3.40 (36)			2	2.00 (67)
Green Sunfish					7	7.00 (39)
Bluegill	1	0.20 (100)	29	5.80 (46)	30	30.00 (39)
Longear Sunfish					10	10.00 (53)
Largemouth Bass	2	0.40 (100)			33	33.00 (25)
White Crappie	17	3.40 (49)	120	24.00 (15)	8	8.00 (50)
Walleye	16	3.20 (41)			1	1.00 (100)

APPENDIX B – Map of sampling locations



Location of sampling sites, Greenbelt Reservoir, Texas, 2023-2024. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was approximately 2,618 ft above MSL at time of sampling.

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