Brandy Branch 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

Prepared by:

Timothy J. Bister, District Management Supervisor
and
Quintin Dean, Assistant District Management Supervisor

Inland Fisheries Division
Marshall District, Marshall, Texas

David Yoskowitz, Ph.D.
Executive Director

Timothy Birdsong
Director, Inland Fisheries

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Survey and Management Summary

Fish populations in Brandy Branch Reservoir were surveyed in 2021 and 2023 using electrofishing. Historical data are presented with the 2020-2023 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: Brandy Branch Reservoir is a 1,257-acre impoundment of Brandy Branch Creek in the Sabine River Basin located in Harrison County. It was used for power plant cooling and recreation, but the power plant ceased operation in spring 2023. Structural habitat consisted primarily of inundated timber. Hydrilla continued to dominate the aquatic plant community. Eurasian watermilfoil was discovered in 2007 and has occupied similar areas over the survey period. Since 2008, numerous giant salvinia introductions have been successfully eradicated with herbicide applications and physical remova. Tilapia were discovered in the reservoir in 2015, however they will likely die off because of the lack of warm water input to the reservoir due to the closure of the power plant.

Management History: Largemouth Bass are the primary sport fish in Brandy Branch reservoir. All sport fish have historically been managed with statewide harvest regulations.

Fish Community

- **Prey species:** Threadfin Shad were present in the reservoir, but no Gizzard Shad were collected during the 2023 electrofishing survey. Sunfish were the most abundant prey species in recent surveys, which were dominated by Bluegill.
- **Catfishes:** Due to historically low density and lack of directed angling effort, no sampling was conducted to assess the Channel Catfish population. However, Channel Catfish were stocked in 2020 and 2021 in an effort to increase the number of fish in the population.
- **Largemouth Bass:** Largemouth Bass were moderately abundant; the electrofishing catch rate in 2023 was similar to 2019. Fish were collected up to 21 inches. Growth rate of Largemouth Bass was fast with the average age of 14-inch fish equal to 1.9 years.
- **Black Crappie:** Historically, crappie populations have low abundance with Black Crappie being the only crappie species collected during previous surveys. The last Black Crappie collected was in 1993. There has been limited directed angling effort and thus no sampling was conducted to index crappie populations.

Management Strategies: Continue biennial electrofishing surveys in 2025 and 2027. Invasive aquatic species will be monitored annually through vegetation surveys. Due to repeated salvinia introductions, the boat ramp will be periodically inspected. Continue to manage sport fish with statewide harvest regulations.

Introduction

This document is a summary of fisheries data collected from Brandy Branch Reservoir in 2020-2023. 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 2020-2023 data for comparison.

Reservoir Description

Brandy Branch Reservoir is a 1,257-acre impoundment constructed in 1983 on Brandy Branch Creek in the Sabine River Basin. It is located in Harrison County, Texas, near the city of Hallsville. The controlling authority is American Electric Power Company. Historical water use was for power plant cooling and public recreation, but the power plant shut down during spring 2023. Annual water level fluctuation was 1 to 5 feet with a 5-foot decrease in late 2017 (Figure 1). Brandy Branch has a relatively small watershed of approximately 4.1 square miles, a shoreline length of 17 miles, and a shoreline development index of 4.1. Additional descriptive characteristics for Brandy Branch Reservoir are in Table 1. The reservoir is mesotrophic with a mean TSI Chl-*a* of 48.2 (Texas Commission on Environment Quality 2022).Supplemental water was historically pumped in from Big Cypress River, below Lake O' the Pines, by the controlling authority to maintain sufficient water level for power plant cooling, but water transfer is not expected because the power plant was closed. Structural habitat consisted primarily of inundated timber with hydrilla being the most abundant aquatic plant. Tilapia were discovered in the reservoir in 2015 from an unknown introduction source, but they are expected to be eliminated the first winter following the closure of the power plant.

Angler Access

Brandy Branch Reservoir has one public boat ramp. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the public boat ramp area.

Management History

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

1. Monitor aquatic invasive vegetation around the boat ramp where giant salvinia has been observed and where separate introductions have been eradicated in the past.

   Action: Annual surveys for invasive aquatic vegetation have been conducted as well as periodic inspections of the public boat ramp. Giant salvinia was observed at the Brandy Branch boat ramp during 2021. Herbicide was applied to eliminate the infestation.

2. Manage aquatic invasive vegetation around the Pirkey Environmental Park to promote good fishing access.

   Action: Even though previous efforts were made to control nuisance aquatic vegetation around the fishing pier, access to Pirkey Environmental Park was restricted during the COVID-19 pandemic. This area has been closed to the public since the power plant was retired in spring 2023.

3. Invasive species continue to threaten Texas waters.

   Action: Efforts have been made to provide information about invasive species to the controlling authority and the public. Appropriate signs and boat ramp stencils have been erected to inform boats and anglers of the necessity to clean, drain, and dry their boat. Since the power plant retired in spring 2023, no water transfer from Big Cypress Bayou below Lake O' the Pines to Brandy Branch Reservoir has occurred to maintain water levels.

Harvest regulation history: Sport fishes in Brandy Branch Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Brandy Branch Reservoir was stocked initially with Florida Largemouth Bass, Channel Catfish, Coppernose Bluegill, Redear Sunfish, and Green Sunfish in 1983. Gizzard Shad and Threadfin Shad were stocked to supplement the prey base in the late 1980s and early 1990s. Channel Catfish were stocked in 2015, 2020 and 2021. The complete stocking history is presented in Table 4.

Vegetation/habitat management history: Hydrilla continues to be the most dominant aquatic vegetation but has not presented frequent angling access problems in Brandy Branch Reservoir. Giant salvinia and water hyacinth were first introduced in 2008. Both were swiftly eradicated with the help of herbicide application and physical removal. Separate introductions of giant salvinia have occurred since, most recently during 2021. After the introduction in 2021, TPWD responded quickly to eradicate the giant salvinia through herbicide application and physical removal.

Water transfer: Brandy Branch Reservoir historically received water from Big Cypress Bayou (below Lake O' the Pines) to maintain adequate water level for power plant operation. However, due to the power plant closure, this inter-basin water transfer is not expected to continue.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Brandy Branch Reservoir (Stadig and Bister, 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, Gizzard Shad, and Threadfin Shad were collected by nighttime electrofishing in the fall (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. To assess mean age of Largemouth Bass at minimum legal length (14 inches), fish ages were determined using otoliths from 13 randomly selected fish (range 13.0 to 14.9 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 Neumann et al. (2012). Standard error (SE) was calculated for structural indices. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUEs.

Habitat – A structural habitat survey was conducted in 2011. Vegetation surveys were conducted in 2020 – 2023. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Water level – Source of water level data was American Electric Power.

Results and Discussion

Habitat: Structural habitat has not shown significant change since it was last assessed in 2011, where it consisted primarily of standing timber (240 acres) and natural shoreline (Bister and Wright 2012). Hydrilla coverage expanded to 547 acres (43.5%) in 2023, primarily in the area of previous hot water discharge from the power plant. Since the power plant retired in spring 2023, summer water temperature has been more suitable for plant growth. Eurasian watermilfoil was still present in the reservoir and acreage has remained consistent since 2020 (Table 6). Less than 3% of the reservoir area contained native vegetation, which consisted of cutgrass, American lotus, pondweed, and coontail. The abundance of submerged aquatic vegetation has provided beneficial habitat for fish populations but has not caused any boating access issues.

Prey species: Threadfin Shad were present in the reservoir, but abundance was low (36.0/h; Appendix A). Gizzard Shad were not collected during the 2023 electrofishing survey. Tilapia were present in the reservoir and added an additional prey species during this report period, but likely died off during winter 2023/2024 because the power plant was no longer running to provide the needed warm water refuge. The majority of prey fish was comprised of several sunfish species. Total CPUE of Bluegill in 2023 (996.0/h) was higher than 2021 (467.2/h) but lower than 2019 (1,237.0/h; Figure 2). Redear sunfish CPUE in 2023 (101.0/h) was similar to 2019 (120.0/h). Redear sunfish size structure had a good number of small individuals and several larger fish up to 8 inches were collected, presenting a quality sunfish angling opportunity (Figure 3).

Largemouth Bass: The total CPUE of Largemouth Bass in 2023 (79.0/h) was higher than 2021 (40.8/h) but similar to 2019 (68.0/h) (Figure 4). Electrofishing CPUE of stock-sized fish (≥ 8 inches) exhibited a similar pattern. The catch rate of fish 14 inches or greater was 30.0/h in 2023, 8.8/h in 2021, and 35.0/h

in 2019 (Figure 4). Because CPUE values were similar between 2023 and 2019, the lower catch rates in 2021 were likely more related to sampling than actual population changes. Submersed aquatic vegetation, primarily hydrilla, provided good habitat for fish. However, population abundance was moderate primarily due to lower productivity in the reservoir as evidenced by TCEQ's trophic class assessment. Largemouth Bass growth was fast. Average age at legal length (14 inches) was 1.9 years (N=13; range = 1 – 2 years) in 2023. Future age-and-growth analysis will be important to assess potential changes in growth related to lower average water temperatures throughout the year. Body condition was moderate; average W_r was 88 or 89 in the past three surveys (Figure 4). Previous angler creel surveys indicated most directed effort (98.6%) was toward Largemouth Bass (Bister and Wright 2016).

Fisheries Management Plan for Brandy Branch Reservoir, Texas

Prepared – July 2024

ISSUE 1: Hydrilla and Eurasian watermilfoil are present in the reservoir but have not been problematic. Giant salvinia was introduced during February 2008 by a boater. The immediate response to contain, remove, and spray with herbicide resulted in the elimination of the infestation. There have been several similar introductions since; most recently during 2021. A floating boom was erected around the boat ramp to contain giant salvinia spread, sprayed with herbicide, and physically removed. The boom has lost its effectiveness and needs to be replaced or removed. Invasive species require annual monitoring to determine if any management actions are necessary.

MANAGEMENT STRATEGY

1. Provide technical guidance to American Electric Power Company regarding invasive aquatic plant management.
2. Work with TPWD AHE to remove the containment boom.
3. Conduct annual surveys to monitor trends and estimate coverage of invasive aquatic plants.

ISSUE 2: Pirkey Power Plant ceased operation in spring 2023, no longer using the reservoir as a cooling water source. This change in reservoir operation may cause changes to the fish community, aquatic habitat, and angling effort and catch rates.

MANAGEMENT STRATEGY

1. Conduct an angler creel survey from December 2024 through May 2025 to monitor angling effort and catch.
2. Consider potential impacts from any changes in reservoir temperature when conducting fish sampling and aquatic vegetation surveys.

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 inter-basin water transfers to facilitate potential invasive species responses.

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

Sport fish, forage fish, and other important fishes

Largemouth Bass is the primary sport fish in Brandy Branch Reservoir. The most important forage species is Bluegill. Threadfin Shad and Redear Sunfish were present in the most recent survey, but in low numbers. Gizzard Shad have been present in the past, but abundance has historically been very low. The proposed sampling schedule to meet the following OBS plan can be found in Table 7.

Low-density fisheries

Channel Catfish: Channel catfish are present in Brandy Branch Reservoir, but population abundance is extremely low likely attributed to high water clarity, abundant submersed aquatic vegetation, and potential predation from Largemouth Bass on smaller size classes and young of year fish. Gill netting surveys in 2008 and 2012 only caught three Channel Catfish in each year. A creel survey from December 2015 through February 2016 indicated that no directed effort or catch of Channel Catfish occurred. Sampling this population is unnecessary in 2024 – 2028.

Crappie: Trap netting surveys were discontinued in this reservoir due to historically low catch rates. No White Crappie have been caught during any survey and the last survey to collect Black Crappie was in 1993, in which one fish was caught. During the most recent angler creel survey during winter 2015/2016, only 1% of directed effort was toward crappie. Sampling this population is unnecessary in 2024 – 2028.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are the most popular sport fish in Brandy Branch Reservoir. An angler creel survey conducted December 2015 through February 2016 indicated 98.6% of directed angling effort was for Largemouth Bass. Largemouth Bass have always been managed with the statewide 14-in MLL regulation. Trend data on CPUE, size structure, growth, and body condition have been collected biennially since 1996 with fall nighttime electrofishing. Continuation of biennial trend data in this reservoir with night electrofishing in the fall will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation.

Fall nighttime electrofishing surveys will be conducted in 2025 and 2027 to assess relative abundance (CPUE), size structure (PSD and length frequency), growth, and condition (W_r using lengths and weights from 5 fish per inch group). A minimum of 12 randomly selected 5- min electrofishing sites will be sampled and will continue at an additional 6 randomly selected stations until 50 stock-size fish are collected and the RSE of CPUE-S is < 25. Past sampling has consistently achieved RSE of CPUE-S <

25, so we are confident we will achieve this level of precision with the minimum sampling effort. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected in 2025 and 2027 to determine mean age at 14 inches to monitor large-scale changes in growth that may indicate the need for further investigation. We will continue to monitor W_r, especially in larger fish where recent W_r have declined, to detect any negative impacts hydrilla abundances may have on feeding efficiency. Due to consistent Florida Largemouth Bass genetic influence in the population, and no anticipated stocking plans, genetic analysis will only be conducted once every 8 years beginning in 2027.

Prey Species: Bluegill is the primary prey species at Brandy Branch Reservoir. Redear Sunfish are also present in increasing densities though not in high enough densities to be a primary prey species. Trend data on CPUE and size structure of Bluegill and Redear Sunfish have been collected biennially since 1996. Continuation of sampling will allow for monitoring of large-scale changes in prey species relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of Bluegill and Redear Sunfish for size structure estimation (PSD; 50 fish at a minimum of 12 stations with 80% confidence). RSE for relative abundance estimates has been < 25 of CPUE-Total using the traditional 12 randomly selected stations during the past three electrofishing surveys. No additional effort will be expended to achieve an RSE ≤ 25 for CPUE-Total of Bluegill 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. Relative weight of largemouth bass > 8-inch TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

Gizzard Shad and Threadfin Shad are present in the reservoir but in low densities. They are not considered primary prey species. Documentation of their presence/absence during fall electrofishing surveys will continue in fall 2025 and 2027.

Creel Survey: An angler creel survey will be conducted December 2024 through May 2025 for general monitoring of total fishing effort, angler expenditures, directed angling effort for all sport fish, catch rates, and number of fish harvested.

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Tables and Figures

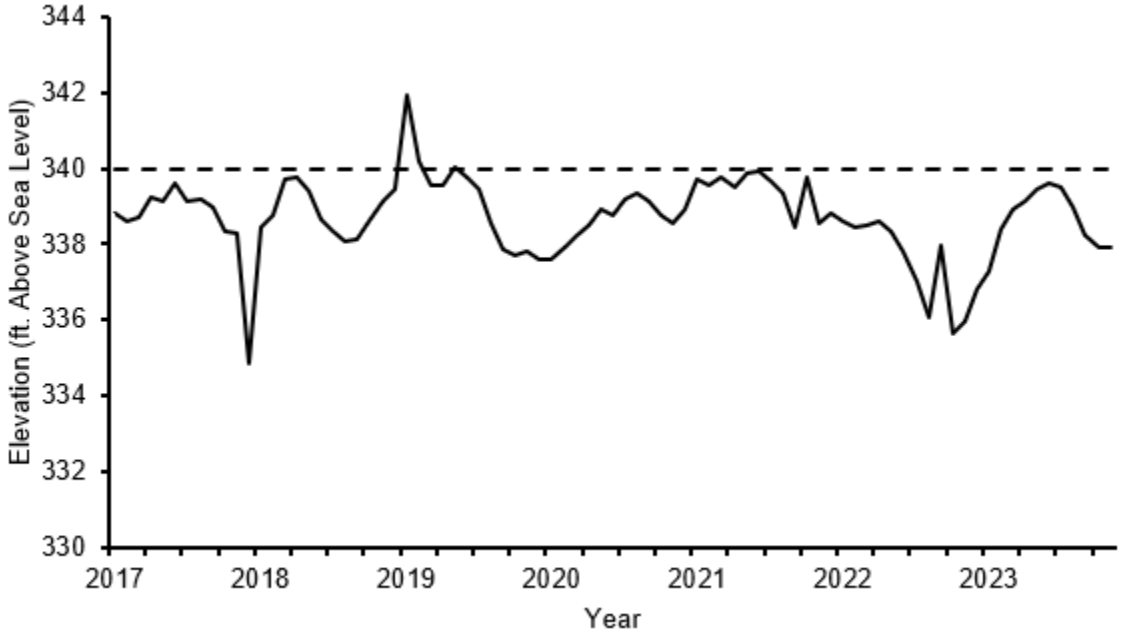


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Brandy Branch Reservoir, Texas by the American Electric Power. Conservation pool elevation = 340.0 feet MSL.

Table 1. Characteristics of Brandy Branch Reservoir, Texas.

Characteristic	Description
Year constructed	1983
Controlling authority	American Electric Power Company (AEP)
County	Harrison
Reservoir type	Tributary/Cooling[a]
Shoreline Development Index	4.1
Conductivity	364 µS/cm

[a] Power plant ceased operation during spring 2023.

Table 2. Boat ramp characteristics for Brandy Branch Reservoir, Texas, August 2023. Reservoir elevation at time of survey was 339 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Public ramp	32.437993 -94.46505	Y	30	[a]	Excellent, no access issues

[a] End of ramp is unknown due to sand.

Table 3. Harvest regulations for Brandy Branch Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel Catfish and Blue Catfish, their hybrids and subspecies	25 (only 10 ≥ 20 inches)	None
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Brandy Branch Reservoir, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year(s) Stocked	Number of Years	Number Stocked	Life Stage
Black crappie	1990	1	78,648	
	Total		78,648	
Bluegill	1993	1	416,780	FGL
	1993	1	9,984	FRY
	Total		426,764	
Channel Catfish	1983 - 1986	2	133,404	AFGL
	1984 - 1986	2	70,687	FGL
	2004	1	10,624	AFGL
	2004	1	64,412	FGL
	2015	1	6,565	ADL
	2020	1	117,549	FRY
	2021	1	56,390	FGL
	Total		459,631	
Coppernose Bluegill	1983	1	123,000	UNK
	1985	1	88,014	FRY
	Total		211,014	
Flathead Catfish	1983	1	16	UNK
	Total		16	
Florida Largemouth Bass	1983	1	120,952	FRY
	1984	1	242,000	FGL
	Total		362,952	
Gizzard Shad	1991	1	1,260	UNK
	1992	1	1,000	UNK
	Total		2,260	
Green Sunfish	1983	1	67,200	UNK
	Total		67,200	
Redear Sunfish	1983	1	129,450	UNK
	Total		129,450	
Threadfin Shad	1986	1	1,500	AFGL
	1991 - 1992	2	2,490	ADL
	Total		3,990	
White Crappie	1986	1	170	ADL
	1987	1	15,072	FRY
	Total		15,242	

Table 5. Objective-based sampling plan components for Brandy Branch Reservoir, Texas 2020–2024.

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
	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]			Presence/Absence
Threadfin Shad [a]			Presence/Absence

[a] No additional effort was expended to achieve an RSE ≤ 25 for CPUE of Bluegill and shad species if not reached from designated Largemouth Bass sampling effort.

Table 6. Survey of aquatic vegetation, Brandy Branch Reservoir, Texas, 2020–2023. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2020	2021	2022	2023
Native submersed				11.6 (0.9)
Native floating-leaved				5.8 (0.5)
Native emergent				18.2 (1.4)
Non-native				
Giant salvinia (Tier I)*	0[a]	0[a]	0[a]	0[a]
Hydrilla (Tier III)*	429.0 (34.1)	409.0 (32.5)	391.0 (31.1)	547.0 (43.5)
Eurasian Milfoil (Tier III)*	67.0 (5.3)	72.0 (5.7)	73.5 (5.8)	39.0 (3.1)

*Tier I is immediate Response, Tier III is Watch Status

[a] Giant Salvinia not found during surveys but has been repeatedly found at the boat ramp and control measures implemented.

Bluegill

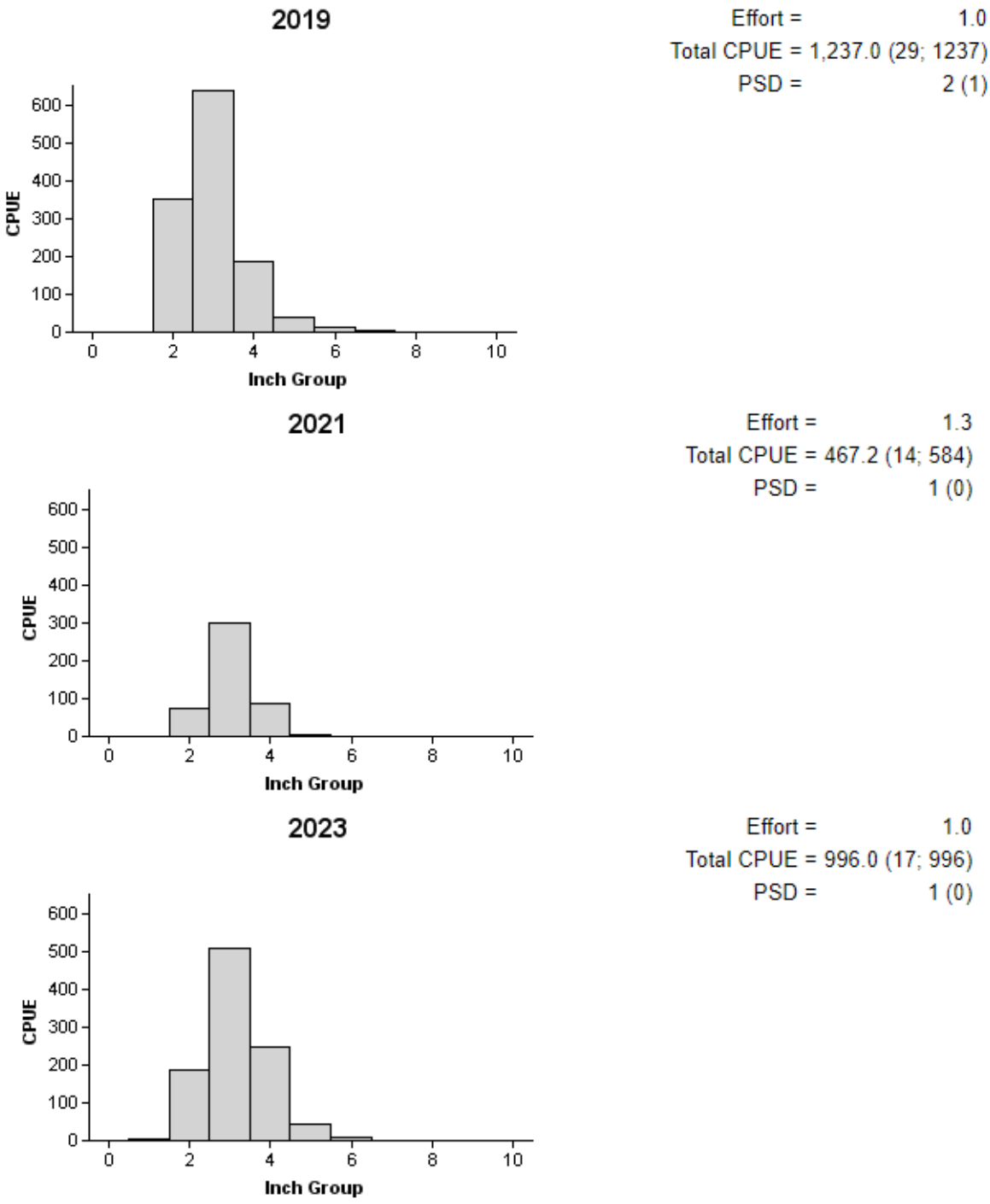


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Brandy Branch Reservoir, Texas, 2019, 2021, and 2023.

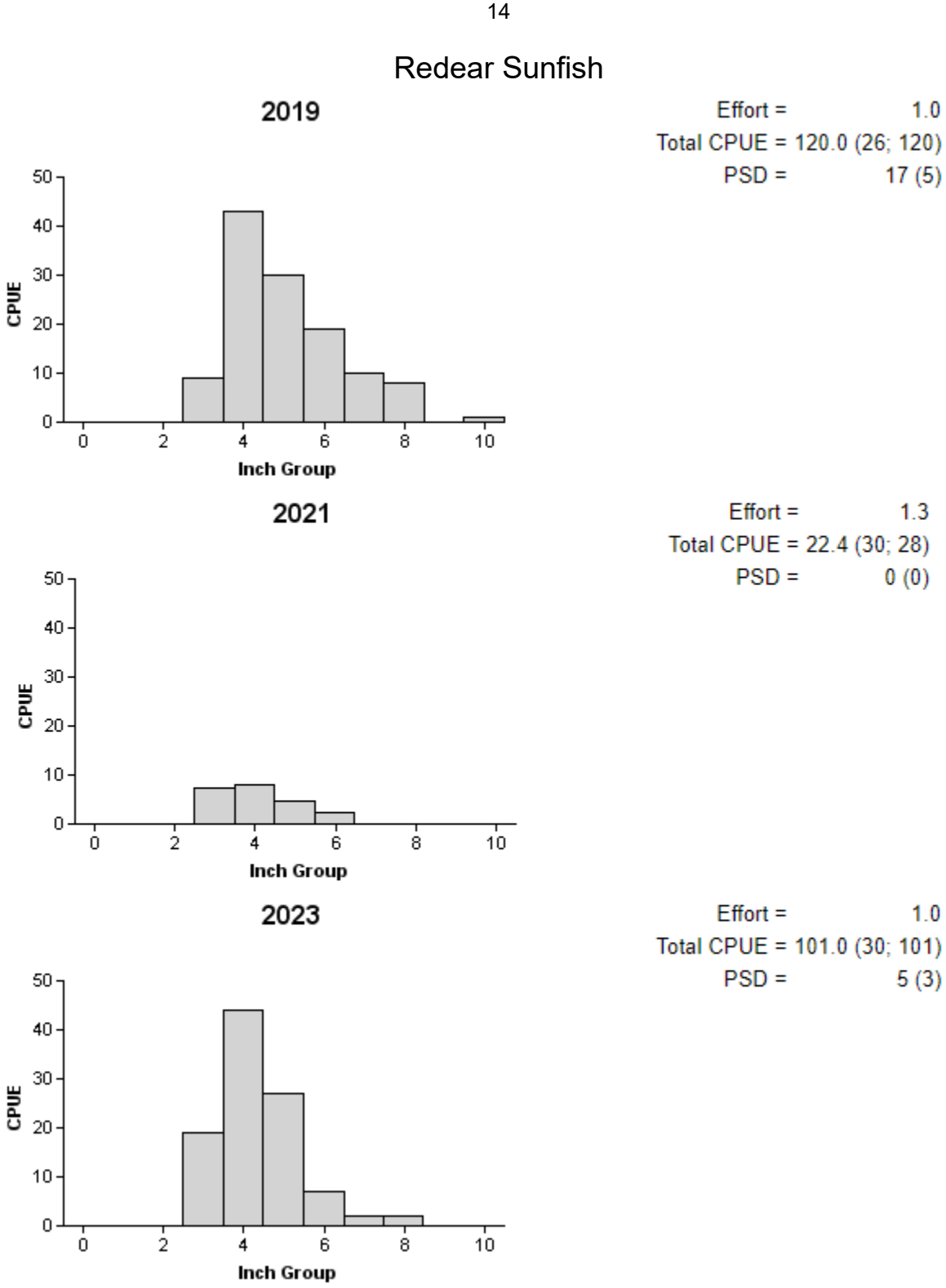


Figure 3. Number of Redear sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Brandy Branch Reservoir, Texas, 2019, 2021, and 2023.

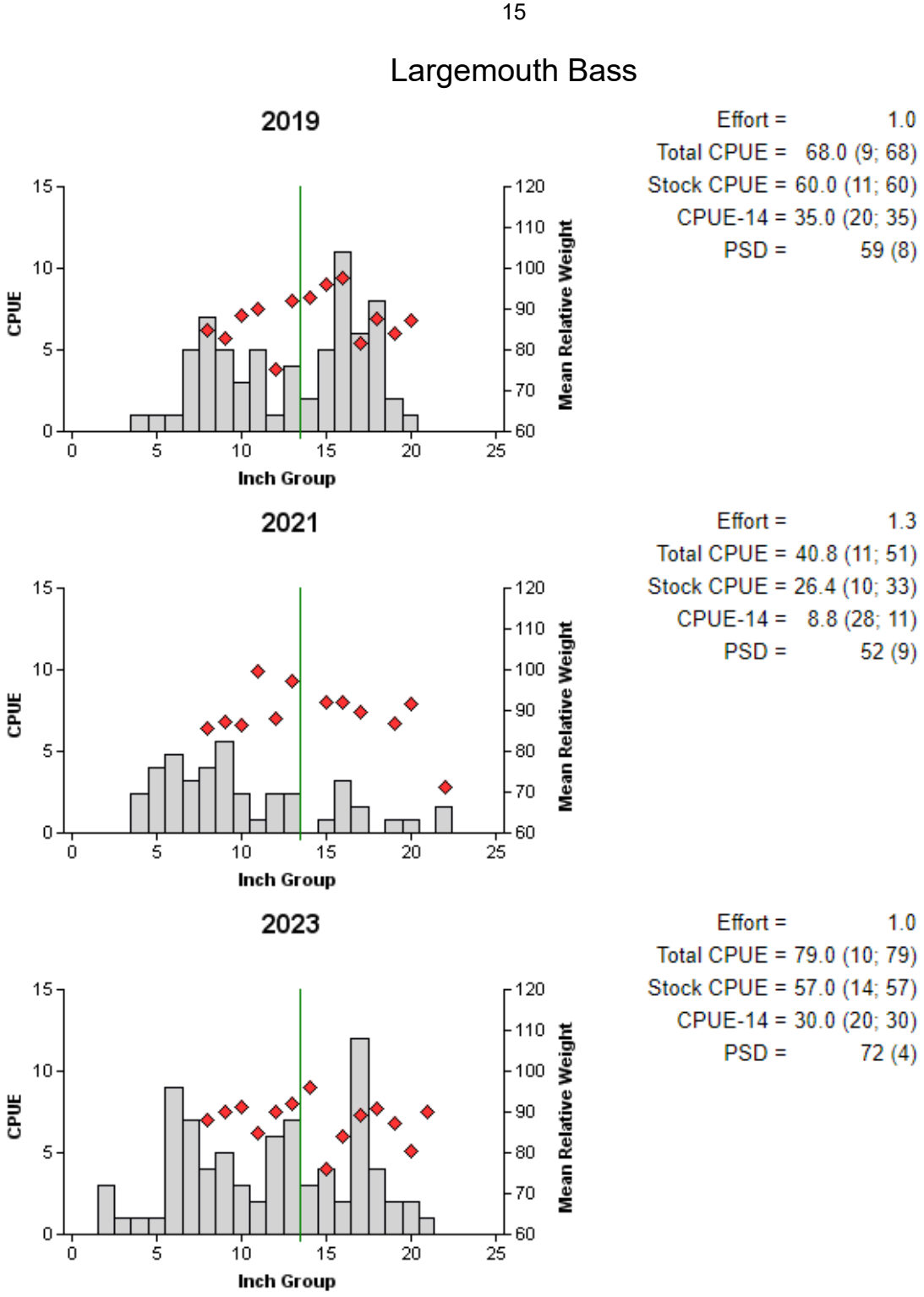


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Brandy Branch Reservoir, Texas, 2019, 2021, and 2023. Vertical lines indicate minimum length limit.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for Brandy Branch Reservoir, Texas. Survey period is June through May. Electrofishing surveys are conducted in the fall.

	Survey year			
	2024-2025	2025-2026	2026-2027	2027-2028
Angler Access				X
Vegetation	X	X	X	X
Electrofishing – Fall		X		X
Creel survey	X[a]			
Report				X

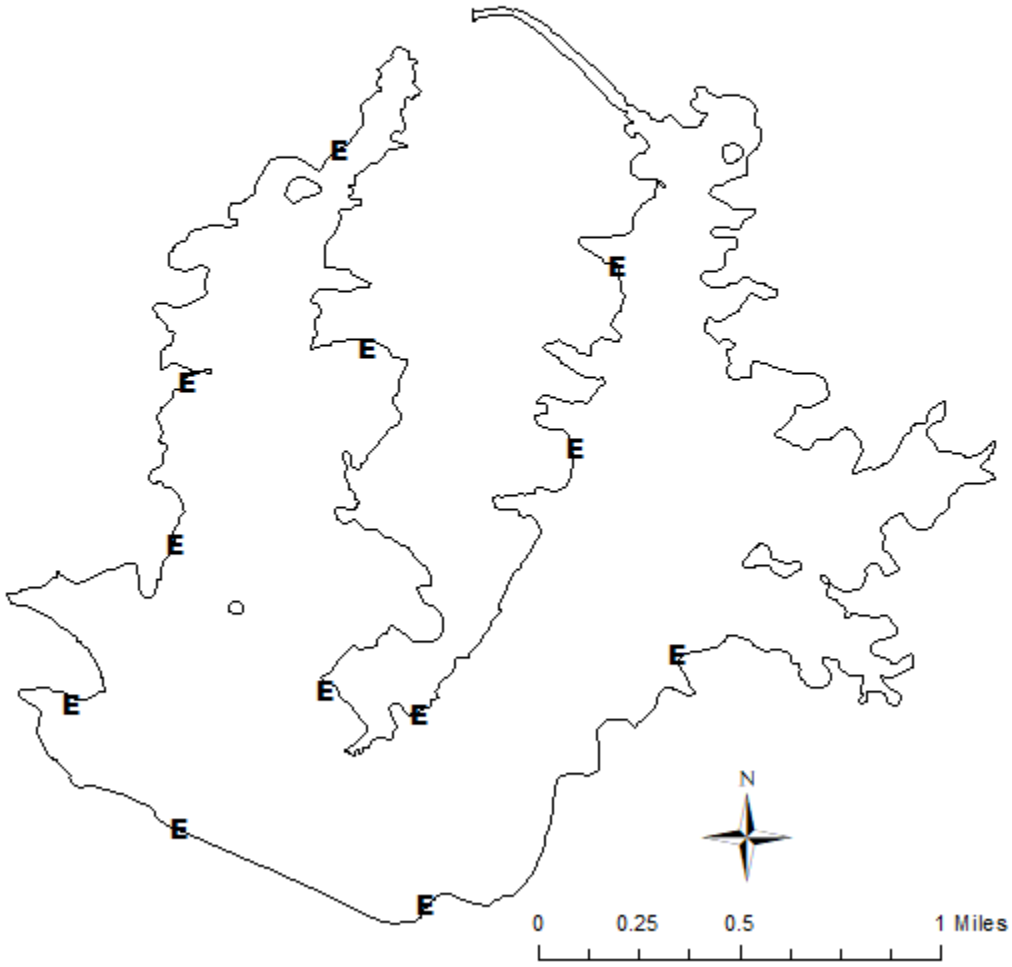
[a] Creel survey will be conducted 1 December 2024 through 31 May 2025.

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 fall electrofishing surveys from Brandy Branch Reservoir, Texas, 2021 and 2023. Sampling effort was 1.25 hours for electrofishing in 2021 and 1 hour in 2023.

	Electrofishing (2021)		Electrofishing (2023)	
Species	N	CPUE	N	CPUE
Threadfin Shad			36	36.0 (27)
Warmouth	1	0.8 (100)	3	3.0 (52)
Bluegill	584	467.2 (14)	996	996.0 (17)
Longear Sunfish			2	2.0 (67)
Redear Sunfish	28	22.4 (30)	101	101.0 (30)
Redspotted Sunfish	3	2.4 (100)	1	1.0 (100)
Largemouth Bass	51	40.8 (11)	79	79.0 (10)

APPENDIX B – Map of sampling locations



Location of sampling sites, Brandy Branch Reservoir, Texas, 2023. Electrofishing stations are indicated by an E. Water level was 2 feet low at the time of sampling.

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