Lake Tawakoni

2022 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Lake Tawakoni were surveyed in 2021 and 2023 with gill nets and in 2022 with electrofishing. Anglers were surveyed from June through May 2021/2022 with a creel survey. Historical data are presented with the 2021-2023 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 Tawakoni is a 37,325-acre impoundment located on the South Fork and Cowleech Fork at the headwaters of the Sabine River, approximately 50 miles east of Dallas, Texas. Primary water uses included municipal water supply and recreation. Water level has remained within 3.5 feet of conservation pool since 2016. Lake Tawakoni has high productivity. Habitat features consisted of natural shoreline, floating and emergent vegetation, standing timber and boat docks.

Management History: Important sport fish include Striped Bass, Hybrid Striped Bass, White Bass, Blue and Channel Catfish, Largemouth Bass and crappie. Annual requests are submitted to stock Striped Bass and Hybrid Striped Bass to maintain these fisheries. The Blue and Channel Catfish regulation was first changed from statewide regulations in 2016, to a trophy-oriented regulation allowing the harvest of 25 fish with no minimum length limit, with no more than seven over 20-inches, and no more than two of those over 30-inches. This regulation was further adjusted in 2021, allowing 25 fish per day (no minimum length limit), with no more than five fish over 20-inches and only one of those could be over 30-inches.

Fish Community

- **Prey species:** Threadfin Shad were abundant in the reservoir. Electrofishing catch rate of Gizzard Shad was moderate and 82% were available as prey to most sport fish. Only six sunfish were observed during the 2022 electrofishing survey; the reservoir has historically contained a very low-density sunfish population.
- **Catfish:** Both Blue and Channel Catfish exist in the reservoir; Blue Catfish remained more abundant and trophy fishing opportunities are still excellent. Catfish continued to provide a quality fishery and angler catch rates were comparable to the previous survey. However, directed effort and harvest in the most recent creel survey declined from the previous three surveys.
- **Temperate Bass:** Lake Tawakoni contains a diverse mix of temperate bass including White Bass, Striped Bass, and Hybrid Striped Bass supported by an ample prey base and abundant open water habitat. Temperate bass were the most targeted fish at Lake Tawakoni, accounting for 23% of angling effort. Annual requests are submitted to stock Striped Bass and Hybrid Striped Bass.
- **Largemouth Bass:** Traditional electrofishing surveys produced variable and low catch rates for Largemouth Bass, and subsequently hadn't been conducted since 2014. Creel surveys and tournament data suggested a popular fishery exists. A biologist selected daytime electrofishing survey was conducted in 2022 to further asses the bass population; 31% of the fish collected in 2022 were > 14-inches.
- **Crappie:** Black and White Crappie were present in the reservoir and continued to provide a popular fishery. Crappie were one the most popular species (equivalent to temperate bass) targeted during the most recent creel survey, accounting for 23% of all angling effort. Directed effort towards crappie increased from previous creel surveys, however, angler catch rate declined.

Management Strategies: Continue stocking Striped Bass and Hybrid Striped Bass to maintain the quality temperate bass fishery. Inform Lake Tawakoni angling groups about ongoing management and research efforts. Continue managing Blue and Channel Catfish with the current trophy-oriented regulation.

Introduction

This document is a summary of fisheries data collected from Lake Tawakoni in 2021-2023. 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 2021-2023 data for comparison.

Reservoir Description

Lake Tawakoni is a 37,325-acre reservoir impounded in 1960 on the South Fork and Cowleech Fork at the headwaters of the Sabine River. It is located approximately 50 miles east of Dallas, Texas, in Wood, Rains, and Hopkins counties. It is operated and controlled by the Sabine River Authority (SRA) primarily as a municipal water supply and for recreation. The reservoir was eutrophic with a Carlson's Trophic State Index chl-a of 64.7 (Texas Commission on Environmental Quality 2022). Aquatic vegetation coverage is limited; habitat consists primarily of standing timber and boat docks. Water levels have remained within 3.5 feet of conservation pool since 2016 (Figure 1). Other descriptive characteristics for Lake Tawakoni are shown in Table 1.

Angler Access

Lake Tawakoni has 12 public boat ramps; all but three require a fee. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to marinas (fee required) and around the boat ramps.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Cartabiano and Norman 2019) included:

1. Stock Striped Bass and Hybrid Striped Bass annually, each at 5 fish/acre.

   Action: Both species have been stocked at various rates annually, except 2020.

2. Continue to monitor the impacts of the catfish regulation change (Blue and Channel) implemented in 2016.

   Action: Gill net surveys were conducted in 2021 and 2023 to monitor catfish populations. An access-point creel survey was conducted from June 2021 to May 2022.

3. Continue to educate the public about the negative impacts of introducing aquatic invasive species.

   Action: Clean, Drain, Dry signs are posted at all popular boat ramps and stencils have been painted on the ramps at the most utilized facilities.

Harvest regulation history: Blue and Channel Catfish regulations were changed in 2016 to a trophy-oriented regulation allowing the harvest of 25 fish with no minimum length limit, with no more than seven over 20-inches, and no more than two of those over 30-inches. This regulation was further adjusted in 2021, allowing 25 fish per day (no minimum length limit), with no more than five fish over 20-inches and only one of those could be over 30-inches. Current regulations are found in Table 3.

Stocking history: Lake Tawakoni has been stocked regularly with Hybrid Striped Bass and Striped Bass fingerlings and/or fry since the late 1970s. The complete stocking history is in Table 4.

Water transfer: No interbasin transfers exist.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Lake Tawakoni (Cartabiano and Norman 2019). Primary components of the OBS plan are listed in Table 5. 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 biologist selected, daytime electrofishing (1.0 hours at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 13 randomly selected fish (range 13.0 to 14.9 inches).

Gill netting – Blue Catfish, Channel Catfish and Temperate Bass were collected by gill netting (10 net nights at 10 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.

Creel survey – An access-point creel survey was conducted from June 2021 through May 2022. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Habitat – A vegetation survey was conducted in 2022. 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 2023).

Results and Discussion

Habitat: Aquatic vegetation continued to be limited by wind and wave action around most of the lake. Total vegetation coverage was < 1% in 2022 and consisted primarily of American lotus (Table 6). The last structural habitat survey was conducted in 2010 (Storey 2011).

Creel: Both Temperate Bass and Crappie were the most popular species during the 2021/2022 creel survey, each accounting for 23% of total angling effort. However, catfish accounted for 22% of angling effort and Largemouth Bass accounted for 19% indicating all sportfish present in Lake Tawakoni offered popular fisheries during the most recent creel survey (Table 7). Total angling effort for the creel period was estimated at 154,632 hours, the lowest documented effort during a creel survey on the reservoir (range: 154,632 hours – 279,527 hours; 2008-2022). Anglers spent an estimated $1,919,491 in direct expenditures, which is comparable to the previous creel survey ($2,029,774; 2017/2018; Table 8). Ninety-eight percent of anglers interviewed during the most recent creel survey were from Texas, however, the longest distance traveled was over 1,400 miles (Appendix C).

Prey species: The primary prey base continued to be Threadfin Shad and Gizzard Shad. Yellow Bass were also present in the reservoir and offer an additional prey item to larger predators. Electrofishing catch rates of Threadfin and Gizzard Shad were 4,175/h and 376/h, respectively. Most Gizzard Shad were available to existing predators (IOV = 82; Figure 2). Despite conducting a daytime survey in 2022, Gizzard Shad catch rate was similar to previous surveys conducted at night. Lake Tawakoni continued to contain a low-density sunfish population that does not substantially contribute to the prey base.

Catfish: The gill net catch rate of Blue Catfish was 38.3/nn in 2023 and comparable to the previous two surveys (2019 and 2021; Figure 3). While anecdotal information indicates the reservoir continues to support a trophy Blue Catfish population, few large fish were observed in gill net surveys and most were < 20-inches (PSD = 10). It is plausible that the standard gill nets used are not effective at capturing larger Blue Catfish. Body condition was good (W_r range = 85-105) suggesting an adequate prey base for Blue Catfish. The gill net catch rates of Channel Catfish (≤ 4.1/nn over the last three surveys) reflect a low-density population primarily consisting of small fish (PSD = 0; Figure 4). Despite consistently low gill net catch rates, Channel Catfish accounted for 46% of harvested catfish in the recent creel. Body condition continued to be moderate (average W_r of 85).

Directed fishing effort, catch rate, and total harvest for catfish was 34,662 h, 0.75 fish/h, and 28,232 fish, respectively, from June 2021 – May 2022 (Table 9). These metrics were all down from previous surveys. Harvested Blue Catfish ranged in length from 12 - 40 inches and harvested Channel Catfish ranged in length from 11 – 28 inches (Figure 5). Only 16% of all catfish caught were released.

Temperate Bass: The gill net catch rate of all three temperate bass species in the reservoir has historically varied significantly between surveys. This variation is attributed to the gill net survey timing often coinciding with spring spawning migrations, resulting in few fish in the main lake where gill nets are set. White Bass gill net catch rates have varied over the last three surveys (CPUE range: 1.6/nn – 13.8/nn; Figure 6); the 2023 catch rate (1.6/nn) was the lowest documented since 2009 (1.5/nn). Similar to White Bass, Striped Bass, and Hybrid Striped Bass, catch rates were low in the most recent survey (0.4/nn and 1.8/nn, respectively; Figures 7-8). Body condition was desirable (W_r ≥ 90) for all species of temperate bass, indicating adequate forage.

Directed fishing effort and total harvest for temperate bass were 35,561 h and 87,702 fish, respectively, over the last creel period (Table 10). Similar to other species, these metrics are down from previous surveys. The majority (93%) of temperate bass harvested were White Bass, while Striped Bass accounted for only 3% of the total harvest and hybrids accounted for 4%. These harvest percentages were substantially different from previous surveys where White Bass accounted for 2-15% of total harvest. Some of this change can be explained by several full-time guides moving their business to private boat ramps which are not included in the access-point creel survey, effectively eliminating a substantial amount of Striped Bass and Hybrid Striped Bass harvest from the creel. Harvested White Bass, Striped Bass and Hybrid Striped Bass ranged in length from 10 – 16 inches, 12 – 26 inches and 16 – 30 inches, respectively (Figures 9-10). Anglers released 23% of legal length White Bass and 11% of legal length Striped Bass and Hybrid Striped Bass.

Largemouth Bass: Prior to 2022, electrofishing had not been conducted on the reservoir since 2014. Historical surveys produced low and variable catch rates, resulting in a belief that Lake Tawakoni supported a low-density bass population. However, creel data and tournament results highlighted quality bass fishing opportunities. The 2022 survey was conducted during the daytime at biologist selected sites, to further assess the Largemouth Bass population. While the nonrandom survey design limits reservoir-wide population abundance estimates, the moderate catch rate (CPUE: 62/h) suggests a quality bass population exists (Figure 11). Size structure also indicated a balanced population (PSD = 67) and 31% of the fish were ≥ 14-inches. Growth rate was moderate; average age at 14 inches (13.3 to 14.9 inches) was 2.4 years (N = 13; range = 2-3 years).

Directed fishing effort and total harvest for Largemouth Bass were 28,888 h and 2,979 fish, respectively, over the last creel period (Table 11). Unlike other species in the most recent creel, Largemouth Bass effort and harvest increased in 2021/2022. Anglers released an estimated 71% of legal fish caught. Approximately 91% (N=12,075) of Largemouth Bass caught and released were less than 4 pounds and 9% (N=1,235) were between 4-7 pounds. Harvested fish ranged in length from 15 – 22 inches (Figure 12).

Crappie: Black and White Crappie historically provided a moderately popular fishery on Lake Tawakoni, accounting for 3-10% of all effort most years. However, the most recent creel survey documented an increase in crappie effort (23%). Directed fishing effort, catch per hour, and total harvest for crappie was

35,254 h, 0.96 fish/h, and 20,592 fish, respectively, from June 2021 through May 2022 (Table 12). Estimated effort during the previous three creel surveys ranged from 4,246 h – 28,703 h and harvest ranged from 7,503 fish – 54,887 fish. Anglers released 6% of legal length crappie and harvested fish ranged in length from 10-15 inches (Figure 13).

Fisheries Management Plan for Lake Tawakoni, Texas

Prepared – July 2023

ISSUE 1: Striped Bass and Hybrid Striped Bass have been an important part of the fishery at Lake Tawakoni since the early 1980s, and are collectively the most popular species targeted by anglers. There is a significant number of full-time guides that make their livelihood on these fish, and subsequently harvest a significant number of temperate bass each year. Annual stockings of Striped Bass and Hybrid Striped Bass are required to sustain the populations and maintain the popular fishery.

MANAGEMENT STRATEGY

1. Stock both Striped Bass and Hybrid Striped Bass annually, each at 5 fish/acre.
2. Encourage efforts by the Lake Tawakoni Sportsman's Association to purchase Sunshine Bass in the event of reduced production from TPWD hatcheries and aid with boat stockings of any purchased fish.

ISSUE 2: The Lake Tawakoni watershed is susceptible to the introduction of invasive invertebrates including zebra mussels. 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. Additionally, problematic aquatic vegetation including giant salvinia and water hyacinth have been identified in nearby reservoirs and present a risk of being introduced into Lake Tawakoni.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Continue to work with marina owners and provide them with signs, posters, and literature to educate their customers.
3. Educate the public about invasive species through social media, presentations and news releases, when appropriate.
4. Investigate reports of unusual or unknown aquatic plants in Lake Tawakoni by anglers and homeowners at the earliest possible opportunity.
5. Document existing and future inter-basin water transfers to facilitate potential invasive species responses.

Objective-Based Sampling Plan and Schedule (2023–2027)

Sport fish, forage fish and other important fishes

Sport fish in Lake Tawakoni include Striped Bass, Hybrid Striped Bass, White Bass, Blue and Channel Catfish, Largemouth Bass and crappie. Important forage species include Gizzard and Threadfin Shad.

Survey objectives, fisheries metrics and sampling objectives

Crappie: Historical trap net data fluctuated among survey years; catch rates were very dependent upon sample location resulting in overall poor survey precision. 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 2007. Inferences about the crappie population and identification of potential applied management actions will be made from data collected with creel surveys in 2025/2026.

Catfish: Catfish remained an important species and accounted for 22% of directed angler effort during the last creel survey. Historical gill net data suggests Blue Catfish population indices (CPUE, PSD, W_r) can be estimated with acceptable precision (RSE < 25) and sample size (N ≥ 50 stock-size fish) with only 10 net-nights of gill net effort at least 80% of the time. Because of the importance of this fishery, Blue Catfish population trend data (CPUE and PSD) will be monitored every two years in order to detect any large-scale fluctuations. In the spring of 2025 and 2027, 10 gill nets will be set, with up to 10 additional nets set, in order to achieve a precise estimate (RSE < 25) of abundance and an acceptable size-structure estimate (N ≥ 50 stock-size fish). While Channel Catfish are present in the reservoir, the gill net catch rates have been too inconsistent to effectively monitor the population. Channel Catfish will be monitored with gill net surveys, but no sample objectives will be set.

Temperate Bass: Hybrid Striped Bass, Striped Bass, White Bass and Yellow Bass account for 23% of fishing effort in the 2021-2022 creel. Gill netting surveys will be used to monitor temperate bass population relative abundance, size structure while creel surveys will be conducted to monitor angler catch, harvest, and fishing effort in 2025-2026. Temperate Bass gill net catch rates have historically been variable and would likely require 30+ net nights of effort to effectively estimate relative abundance and size structure; no additional gill net effort will be expended beyond that directed at catfish.

Largemouth Bass: Approximately 19 % of fishing effort was targeted at Largemouth Bass in 2021-2022. Historically, sampling of LMB was poor due to low water levels and minimal shoreline habitat. Despite poor survey results, creel data and tournament results highlight a quality Largemouth Bass fishery. To evaluate LMB population indices, 12 biologist-selected sites will be sampled with electrofishing during fall of 2026 to determine size structure, and condition on an exploratory basis. The results of the 2026 habitat survey will be used to identify electrofishing sites. An access-point creel survey will be conducted in 2025-2026 to monitor angler catch, harvest, and fishing effort.

Prey Species: Gizzard Shad and Threadfin Shad are important prey species in Lake Tawakoni. 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 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.

Angler Data: Anglers spent approximately $1.9 million annually on direct fishing expenditures, according to the most recent creel survey. The reservoir draws anglers from across the country to target trophy Blue Catfish and the abundant temperate bass. Angler trend data will continue to be monitored every four years with from June through May 2022/2023 and 2024/2025. Due to the downward trend in angler data during the 2021/2022 creel and the belief that several full-time guides were no longer using public boat ramps, the 2025/2026 creel will shift to a roving design, in attempts to better estimate the fishery. Each creel quarter will consist of 5 randomly selected weekend days and 4 randomly selected weekdays.

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Tables and Figures

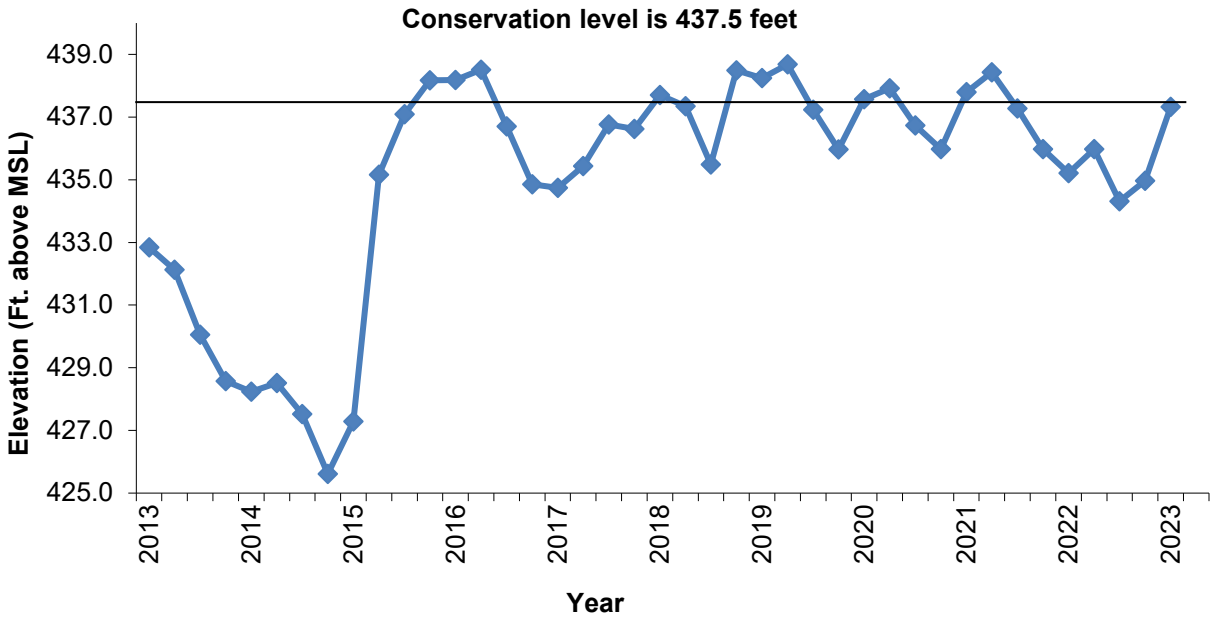


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Tawakoni, Texas.

Table 1. Characteristics of Lake Tawakoni, Texas.

Characteristic	Description
Year constructed	1960
Controlling authority	Sabine River Authority
Counties	Van Zandt, Rains & Hunt
Reservoir type	Mainstem
Shoreline Development Index	7.45
Conductivity	175 µS/cm

Table 2. Boat ramp characteristics for Lake Tawakoni, Texas September, 2014. Reservoir elevation at time of survey was 427.2 feet above mean sea level.

Boat ramp	Public	Latitude	Longitude	Elevation at end of boat ramp (ft msl)	Parking capacity (N)	Condition
429 Marina and Resort	N	32.852700	-96.071015	436.15	20	Adequate
Anchor Inn North	N	32.896975	-96.001746	436.7	20	Adequate
Anchor Inn South	N	32.887567	-96.004002	424.2	30	Adequate
Caddo Creek Road	Y	32.925170	-96.056740	436.14	15	Adequate
Cedar Cove Landing	N	32.891868	-95.902660	437.27	15	Adequate
Duck Cove Marina	N	32.854053	-96.059529	435.1	20	Adequate
Duck Cove Public	Y	32.849946	-96.056414	436.98	40	Adequate
Lake Tawakoni S.P.	Y	32.847828	-95.996166	422.7	47	Excellent
Sky Point RV Park	N	32.895367	-95.946697	422.2	50	Excellent
Walnut Cove	N	32.887629	-96.045843	436.22	20	Adequate
West Tawakoni Park	Y	32.909164	-96.017403	430.0	30	Excellent
White Point Causeway	Y	32.860698	-96.066449	425.2	34	Adequate

Table 3. Harvest regulations for Lake Tawakoni, Texas.

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

[a] Only 5 combined Blue and Channel Catfish ≥ 20 inches, of which only one ≥ 30 inches, may be retained per day.

Table 4. Stocking history of Lake Tawakoni, Texas. FGL = fingerling; FRY = fry; ADL = adult.

Species	Year	Number	Size
Blue Catfish	1989	366,675	FGL
Striped Bass	1979	755,800	FGL
	1982	195,694	FGL
	1991	352,558	FGL
	1992	203,462	FGL
	1993	184,300	FGL
	1994	722,640	FGL
	1995	382,333	FGL
	1996	183,700	FGL
	1997	257,080	FGL
	1998	135,256	FGL
	1999	262,678	FGL
	2000	189,410	FGL
	2002	288,856	FGL
	2003	369,005	FGL
	2004	78,739	FGL
	2005	100,211	FGL
	2006	156,865	FGL
	2007	916,724	FRY
	2007	320,619	FGL
	2008	283,198	FGL
	2009	1,719,115	FRY
	2009	348,921	FGL
	2010	8,000	FRY
	2010	150,970	FGL
	2013	1,000,978	FRY
	2013	244,494	FGL
	2014	499,784	FGL
	2015	349,634	FGL
	2016	796,595	FRY
	2017	1,974,269	FRY
	2018	195,695	FGL
	2018	611,612	FRY
	2019	190,572	FGL
	2020	283	ADL
	2021	682,085	FGL
	2022	127,178	FGL
	Total	15,239,313	
Palmetto Bass	1975	100,466	FGL
	1979	181,500	FGL
	1980	110,400	FGL
	1983	179,302	FGL
	1995	218,946	FGL
	1996	166,295	FGL
	1997	119,000	FGL
	1998	267,842	FGL

Table 4. Continued

Species	Year	Number	Size
	1999	128,619	FGL
	2002	92,910	FGL
	2004	189,319	FGL
	2005	189,557	FGL
	2006	188,206	FGL
	2007	172,704	FGL
	2008	190,027	FGL
	2009	97,968	FGL
	2010	182,650	FGL
	2011	152,443	FGL
	2013	297,543	FGL
	2014	143,020	FGL
	2015	1,024,683	FRY
	2016	144,662	FGL
	2017	2,507,185	FRY
	2018	147,662	FGL
	2019	60,455	FGL
	Total	7,253,364	
Sunshine Bass	2004	139,000	FGL
	2007	60,900	FGL
	2011	50,440	FGL
	2015	500,000	FRY
	2015	155,853	FGL
	2016	90,970	FGL
	2019	34,080	FGL
	2021	194,610	FGL
	2022	399,888	FGL
	Total	1,625,741	
Florida Largemouth Bass	1984	507,714	FGL
	1992	469,904	FGL
	1993	917,785	FGL
	1998	367,500	FGL
	1999	364,995	FGL
	2010	508,133	FGL
	2011	501,454	FGL
	Total	3,637,485	
Green x Redear Sunfish	1973	5,300	FGL
Walleye	1979	450,000	FGL

Table 5. Objective-based sampling plan components for Lake Tawakoni, Texas 2021–2023.

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)
	Genetics	% FLMB	N = 30, any age
Bluegill [a]	Relative abundance	CPUE–Total	
	Size structure	PSD, length frequency	
Gizzard Shad [a]	Relative abundance	CPUE–Total	
	Prey availability	IOV	
Threadfin Shad [a]	Relative abundance	CPUE-Total	
Gill Netting			
Blue Catfish	Relative abundance	CPUE– stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	W_r	10 fish/inch group (max)
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)
White, Striped & Hybrid Stiped Bass [a]	Relative abundance	CPUE– stock	
	Size structure	PSD, length frequency	
	Condition	W_r	
Creel Survey			
Largemouth Bass, Catfish, Crappie and Temperate Bass	Angler trend information	Angler effort, CPUE, harvest and size structure	

[a] No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill, Gizzard Shad, Threadfin Shad and Temperate Bass if not reached from designated Largemouth Bass or catfish sampling effort.

Table 6. Survey of aquatic vegetation, Lake Tawakoni, Texas, 2010–2022. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2010	2018	2022
American lotus	417 (1.1)	261 (<1)	105 (<1)
Pondweed	Trace	2 (<1)	Trace
Alligatorweed (Tier III)*		Trace	
Hydrilla (Tier III)*	Trace		
Phragmites (Tier III)*	Trace	Trace	
Total	417	263	105

* Tier III is Watch Status

Table 7. Percent directed angler effort by species for Lake Tawakoni, Texas, 2008 - 2022. Survey period was June 1 through May 31.

Species	2008/2009	2013/2014	2017/2018	2021/2022
Catfish	44.6	42.9	40.2	22.4
Temperate bass	35.0	33.9	28.2	23.0
Largemouth Bass	12.1	6.1	12.7	18.7
Crappie	2.6	10.3	10.2	22.8
Anything	5.7	6.9	8.6	13.1

Table 8. Total fishing effort (hours) for all species and total directed expenditures at Lake Tawakoni, Texas, 2008 - 2022. Survey period was June 1 through May 31. Relative standard error is in parentheses.

Creel statistic	2008/2009	2013/2014	2017/2018	2021/2022
Total fishing effort	162,641 (17)	279,527 (29)	208,696 (18)	154,632 (27)
Total directed expenditures	$1,433,605 (33)	$2,821,033 (46)	$2,029,774 (27)	$1,919,491 (33)

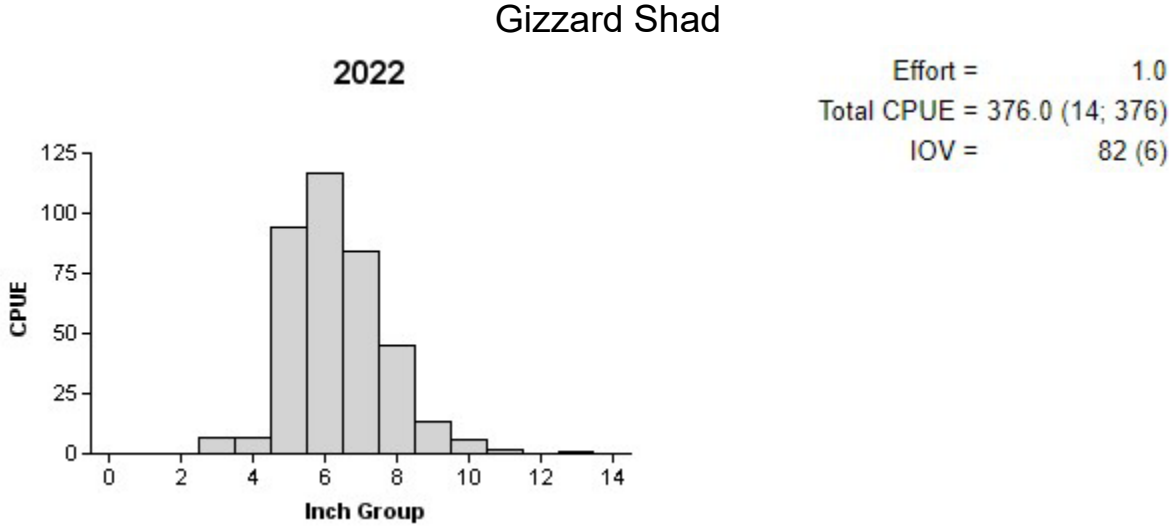


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing survey, Lake Tawakoni, Texas, 2022.

Blue Catfish

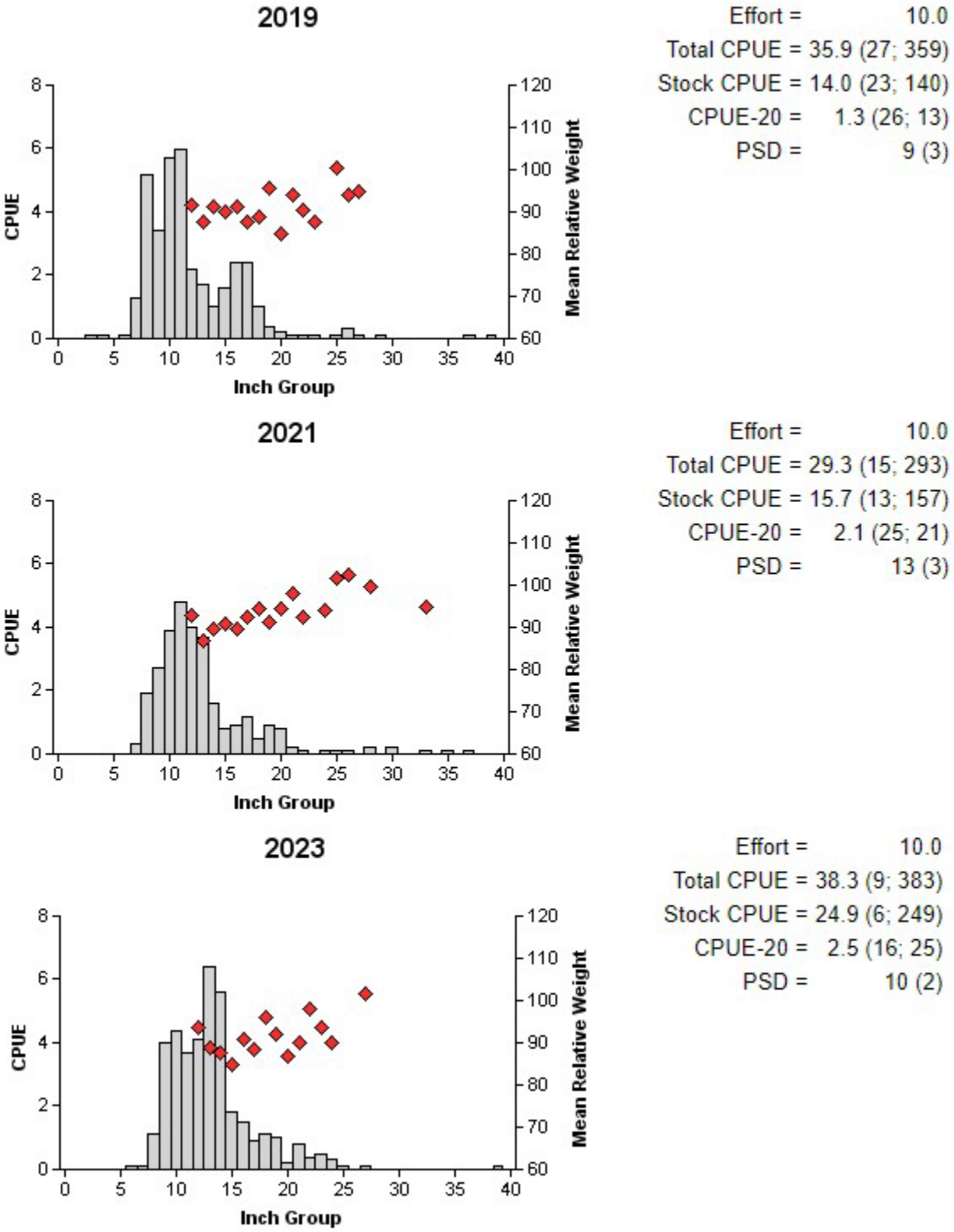


Figure 3. Number of Blue Catfish caught per net night (CPUE), mean relative weights (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2019, 2021 and 2023.

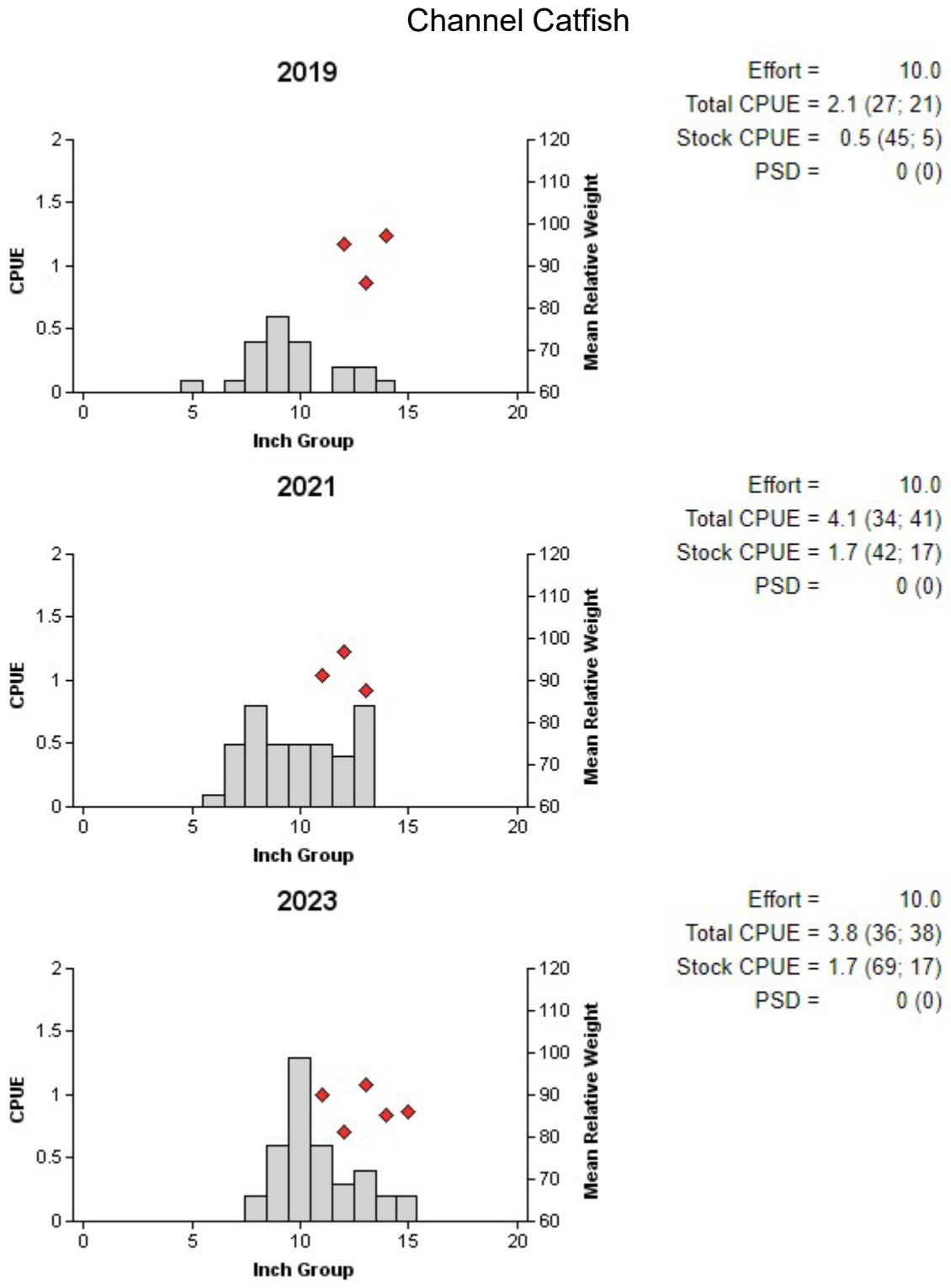


Figure 4. Number of Channel Catfish caught per net night (CPUE), mean relative weights (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2019, 2021 and 2023.

Catfish

Table 9. Creel survey statistics for Blue and Channel catfish at Lake Tawakoni, Texas, 2008 - 2022. Survey periods were June through May. Total catch per hour is for anglers targeting catfish and total harvest is the estimated number of catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	2008/2009	2013/2014	2017/2018	2021/2022
Surface area (acres)	34,476	29,504	36,825	37,000
Directed angling effort (h)	72,532 (19)	119,790 (28)	83,938 (19)	34,662 (31)
Angling effort/acre	2.10 (19)	4.06 (28)	2.28 (19)	0.94 (31)
Total catch per hour	1.20 (40)	1.34 (23)	0.74 (40)	0.75 (44)
Total harvest	65,931 (40)	116,644 (43)	53,760 (41)	28,232 (54)
Blue Catfish	20,495 (43)	49,997 (42)	34,607 (29)	15,300 (49)
Channel Catfish	45,436 (32)	66,647 (41)	19,152 (41)	12,933 (61)
Harvest/acre	3.33 (40)	4.04 (43)	1.46 (41)	0.76 (54)
Blue Catfish	0.60 (43)	1.7 (42)	0.94 (29)	0.41 (49)
Channel Catfish	1.32 (32)	2.26 (41)	0.52 (41)	0.35 (61)
Percent legal released	68	64	23	16

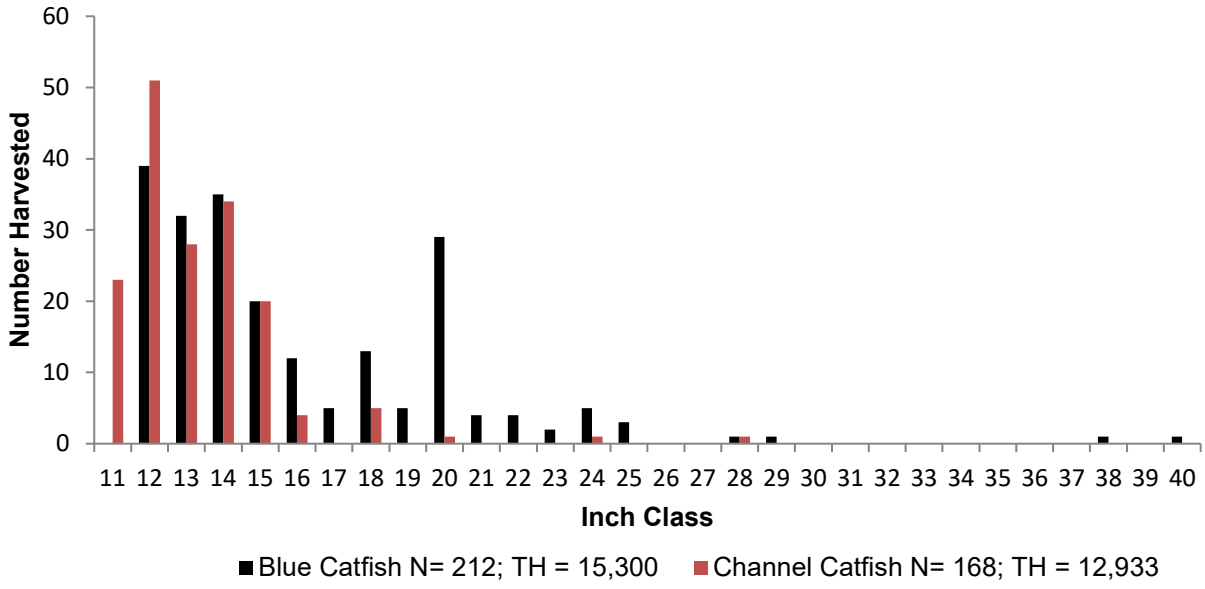


Figure 5. Length frequency of harvested catfish observed during creel survey at Lake Tawakoni, Texas, June through May 2021/2022, all anglers combined. N is the number of harvested catfish observed during the creel survey, and TH is the total estimated harvest for the creel period.

White Bass

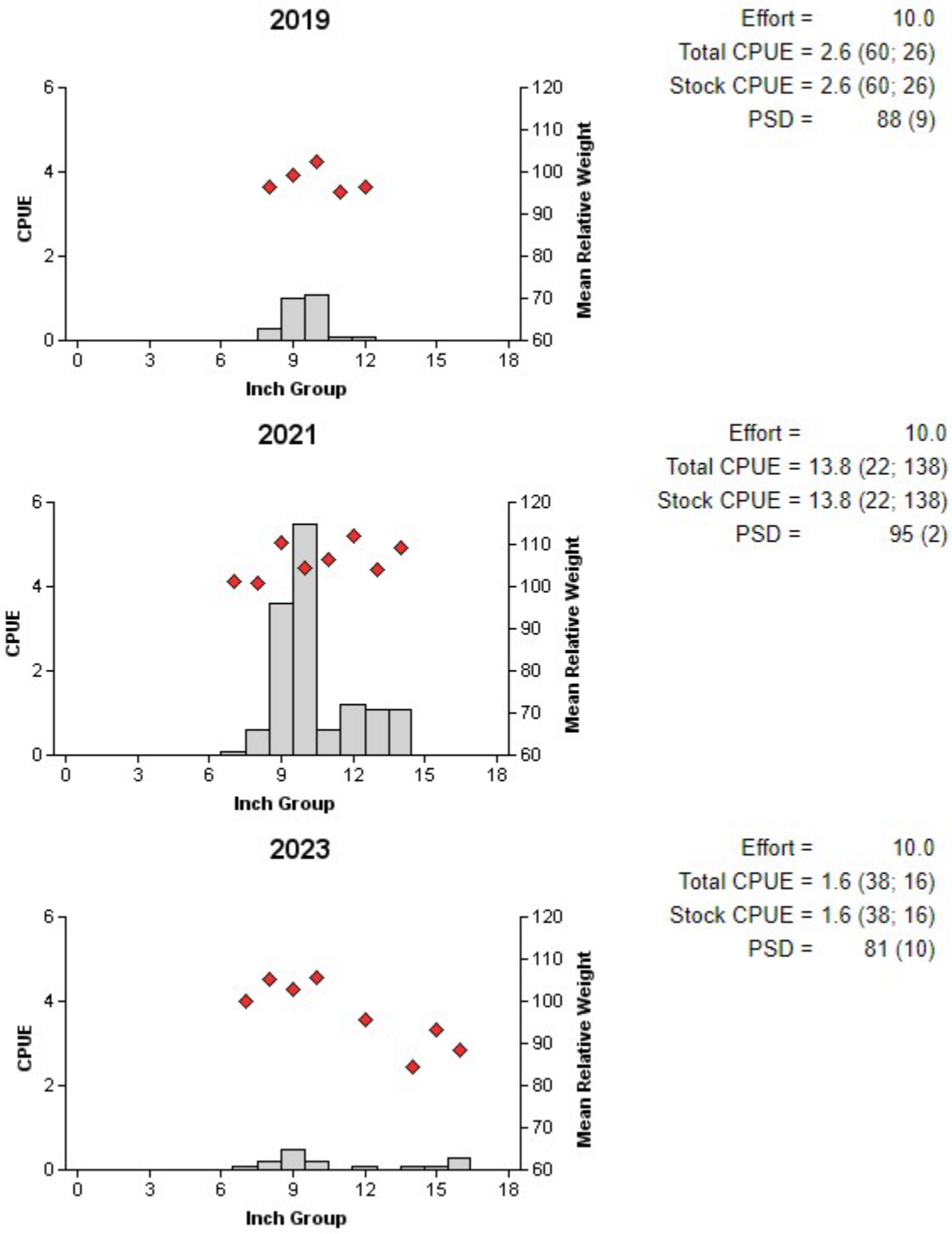


Figure 6. Number of White Bass caught per net night (CPUE), mean relative weights (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2019, 2021 and 2023.

Striped Bass

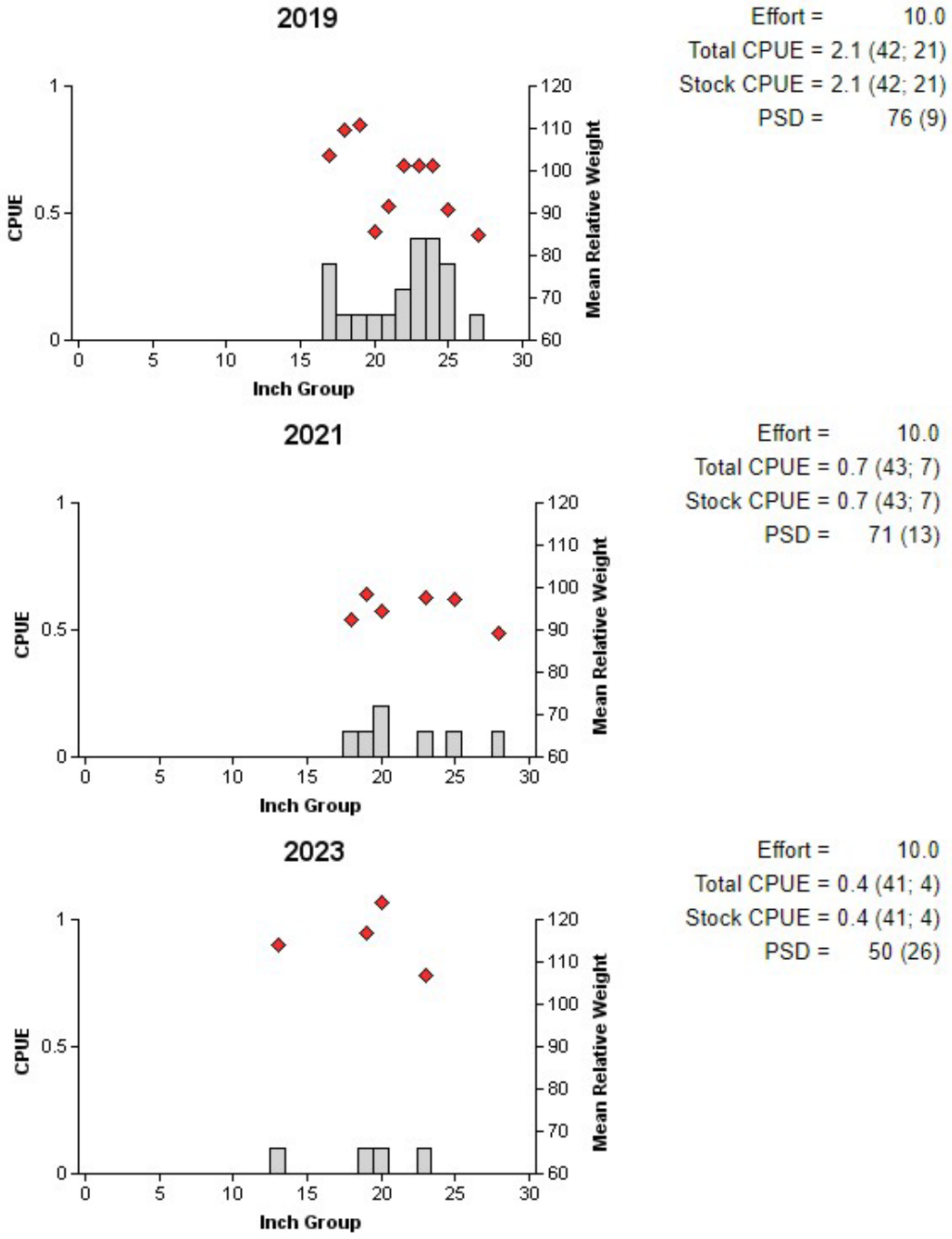


Figure 7. Number of Striped Bass caught per net night (CPUE), mean relative weights (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2019, 2021, and 2023.

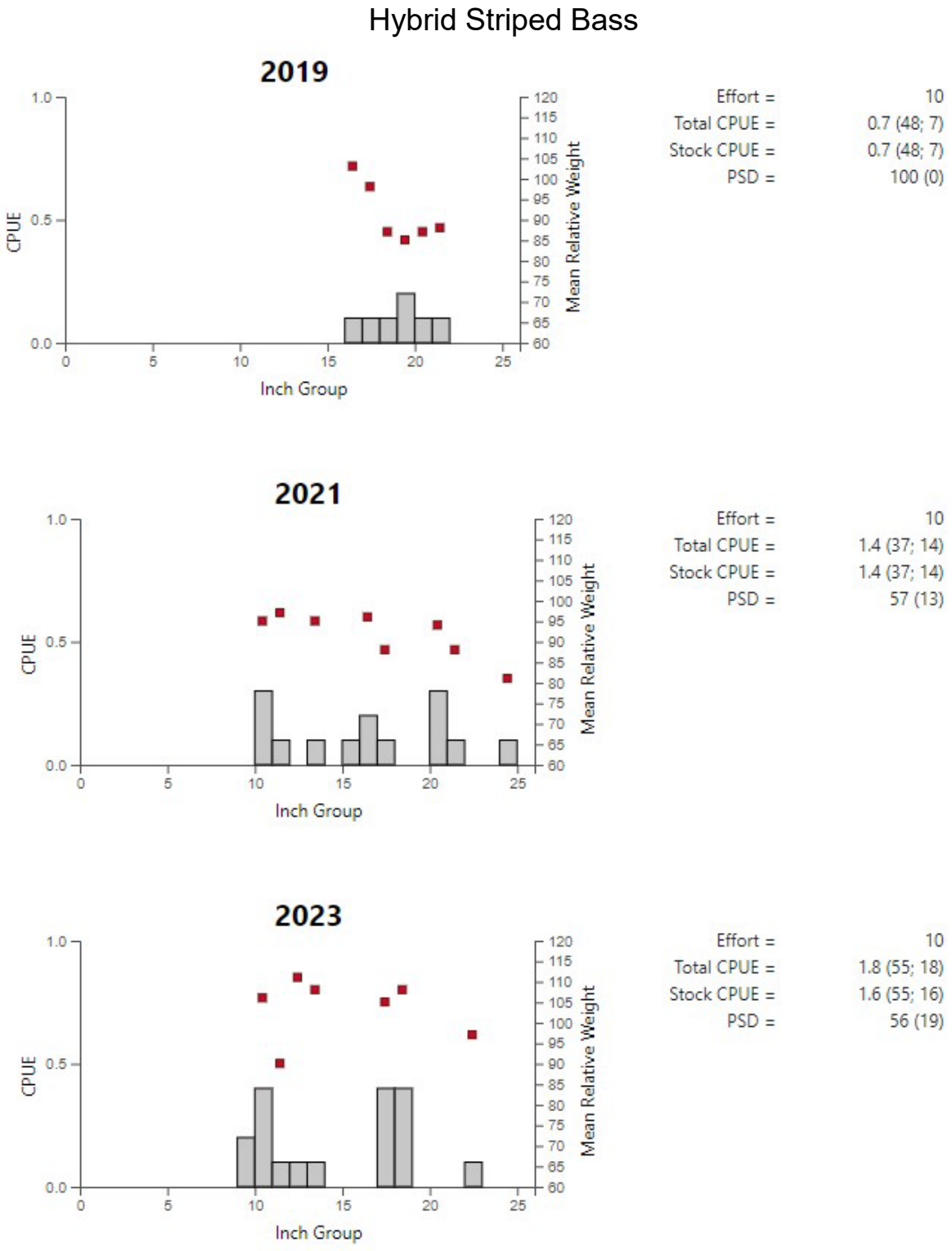


Figure 8. Number of Hybrid Striped Bass caught per net night (CPUE), mean relative weights (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2019, 2021, and 2023.

Table 10. Creel survey statistics for White, Striped and Hybrid Bass at Lake Tawakoni, Texas, from 2008 – 2022. Survey periods were June through May. Total catch per hour is for anglers targeting temperate bass and total harvest is the estimated number of temperate bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	2008/2009	2013/2014	2017/2018	2021/2022
Surface area (acres)	34,476	29,504	36,825	37,000
Directed angling effort (h)	56,863 (22)	94,724 (33)	50,247 (21)	35,561 (28)
Angling effort/acre	1.65 (22)	3.21 (33)	1.36 (21)	0.96 (28)
Total catch per hour	1.14 (39)	2.34 (17)	2.14 (20)	3.6 (30)
Total harvest	31,735 (80)	102,533 (54)	114,292 (38)	87,702 (50)
White Bass	4,860 (144)	863 (577)	9,053 (62)	81,341 (43)
Striped Bass	7,847 (99)	22,633 (55)	15,480 (50)	2,864 (155)
Hybrid Striped Bass	17,001 (49)	75,615 (42)	77,013 (27)	3,497 (111)
Harvest/acre	0.92 (80)	3.48 (54)	3.10 (38)	2.37 (50)
Percent legal released	64	35	13	
White Bass				23
Striped/Hybrid Striped Bass				11

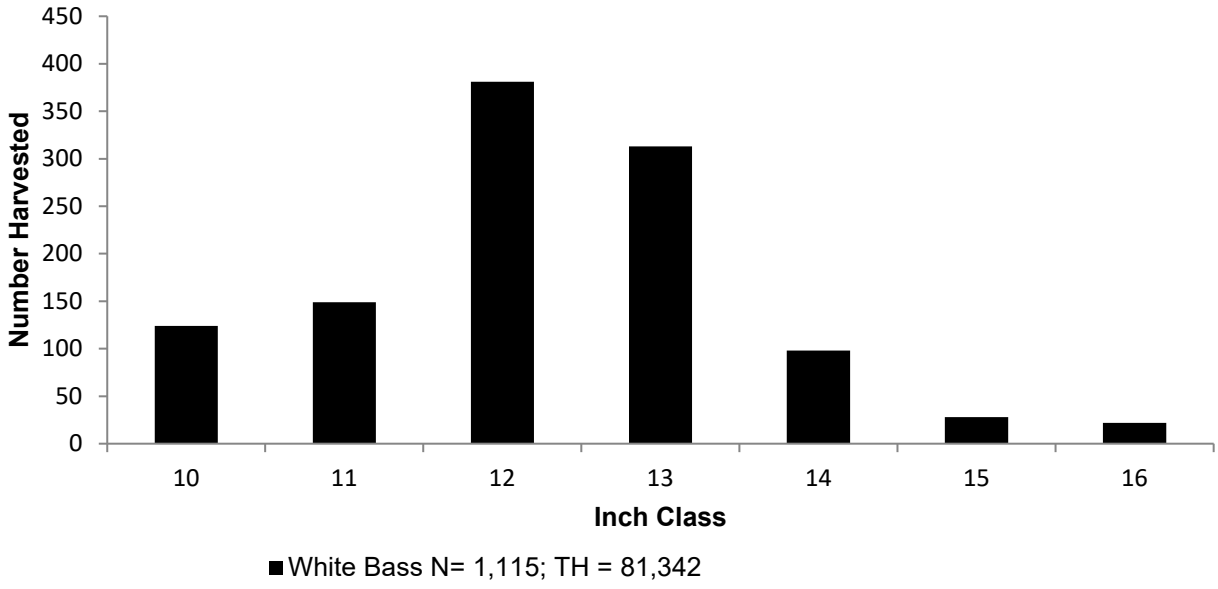


Figure 9. Length frequency of harvested White Bass observed during creel survey at Lake Tawakoni, Texas, June through May 2021/2022, all anglers combined. N is the number of harvested White Bass observed during the creel survey, and TH is the total estimated harvest for the creel period.

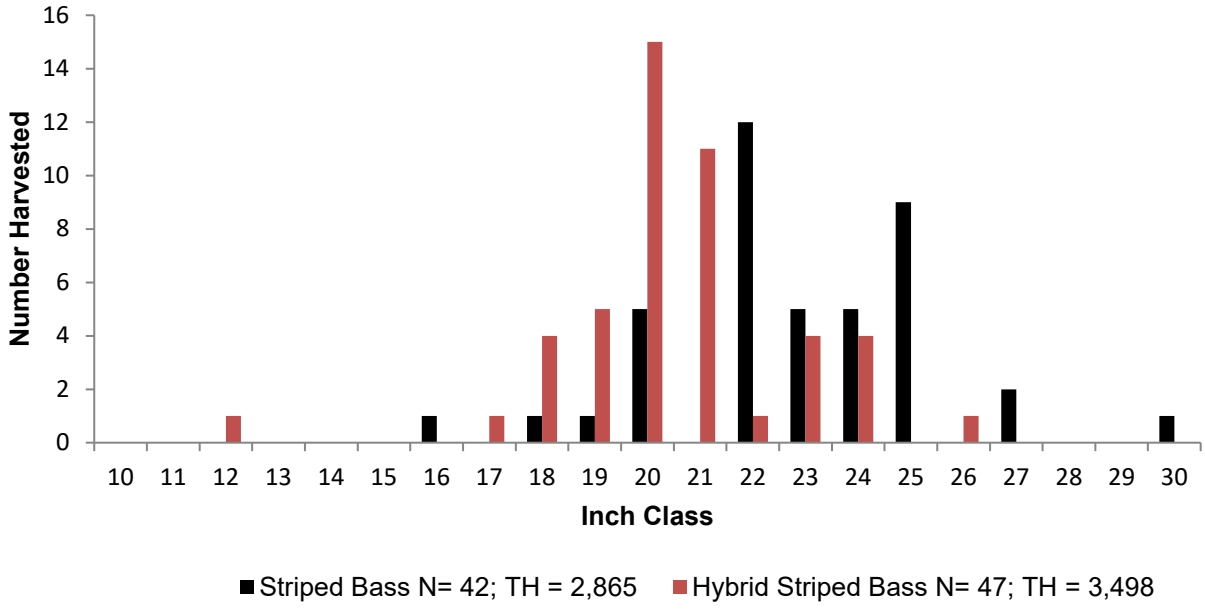


Figure 10. Length frequency of harvested Striped and Hybrid Striped Bass observed during creel survey at Lake Tawakoni, Texas, June through May 2021/2022, all anglers combined. N is the number of harvested fish observed during the creel survey, and TH is the total estimated harvest for the creel period.

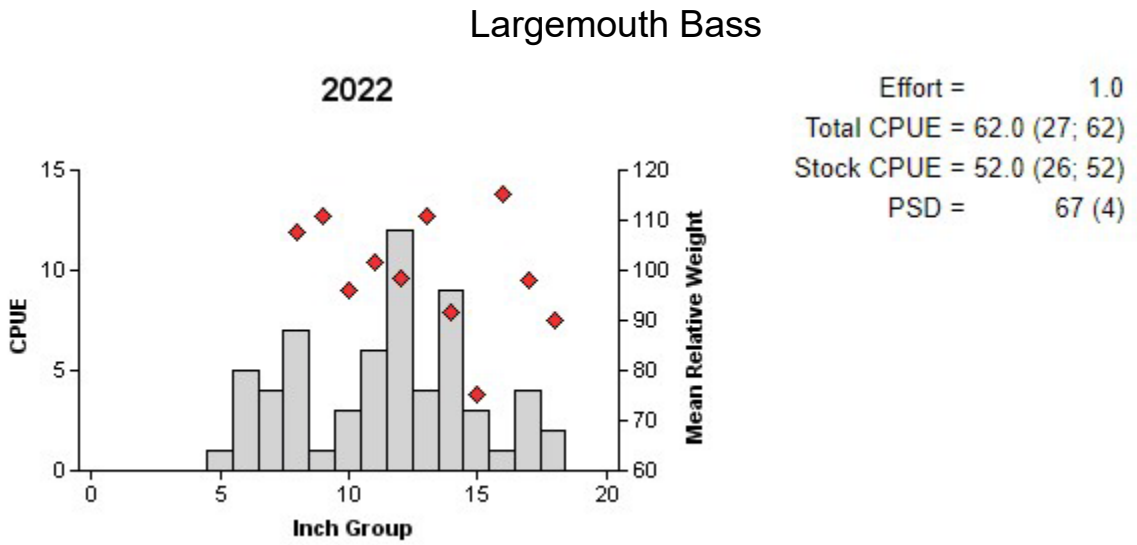


Figure 11. Number of Largemouth Bass caught per hour (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing survey, Lake Tawakoni, Texas, 2022.

Table 11. Creel survey statistics for Largemouth Bass at Lake Tawakoni, Texas, from 2008 through 2022. Survey periods were from June 1 through May 31. Catch rate is for all anglers targeting Largemouth Bass. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. The estimated number of fish released by weight category is for anglers targeting Largemouth Bass. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year			
	2008/2009	2013/2014	2017/2018	2021/2022
Surface area (acres)	34,476	29,504	36,825	37,000
Directed angling effort (h)				
Tournament	1,082 (106)	775 (114)	17,976 (33)	586 (96)
Non-tournament	18,649 (31)	16,248 (36)	8,533 (37)	28,302 (54)
All bass anglers combined	19,731 (31)	17,023 (38)	26,509 (30)	28,888 (61)
Angling effort/acre	0.57 (31)	0.58 (38)	0.72 (30)	0.78 (61)
Catch rate (number/h)	0.32 (35)	0.36 (22)	0.19 (24)	0.42 (26)
Harvest				
Non-tournament harvest	17 (0)	1,971 (218)	135 (1,331)	2,979 (74)
Tournament weigh-in and release	168 (1016)	552 (320)	2,686 (160)	0
Harvest/acre	>0.01 (0)	0.07 (128)	>0.01 (1,331)	0.08 (74)
Release by weight				
<4.0 lbs		1,955 (122)	5,433 (101)	12,075 (102)
4.0-6.9 lbs		406 (243)	387 (84)	1,235 (96
7.0-9.9 lbs		130 (552)		
≥10.0 lbs				
Percent legal released (non-tournament)	99	69	95	71

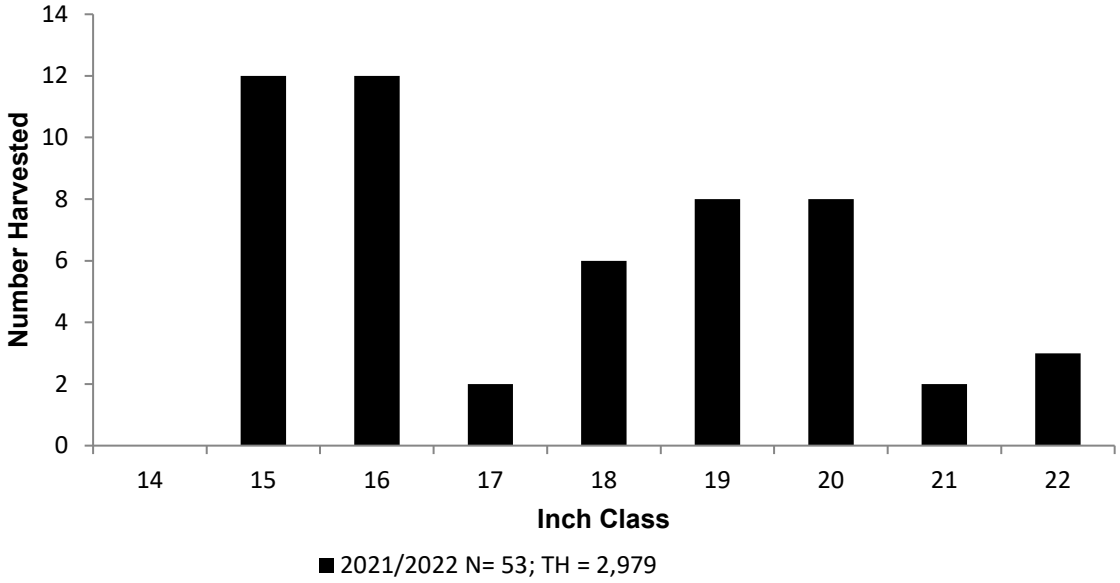


Figure 12. Length frequency of harvested Largemouth Bass observed during creel survey at Lake Tawakoni, Texas, June through May 2021/2022, all anglers combined. N is the number of harvested Largemouth Bass observed during the creel survey, and TH is the total estimated harvest for the creel period.

Crappie

Table 12. Creel survey statistics for crappie at Lake Tawakoni, Texas, from 20008 through 2022. Survey periods were from June 1 through May 31. Total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	2008/2009	2010/2011	2017/2018	2021/2022
Surface area (acres)	34,476	29,504	36,825	37,000
Directed effort (h)	4,246 (58)	28,703 (37)	21,341 (28)	35,254 (50)
Directed effort/acre	0.12 (58)	0.97 (37)	0.58 (28)	0.95 (50)
Total catch per hour	1.93 (28)	1.20 (40)	3.2 (30)	0.96 (39)
Total harvest	7,503 (88)	25,236 (82)	54,887 (53)	20,592 (57)
White Crappie				10,262 (56)
Black Crappie				10,330 (59)
Harvest/acre	0.22 (88)	0.86 (82)	1.49 (53)	0.56 (57)
Percent legal released	0	8	0	6

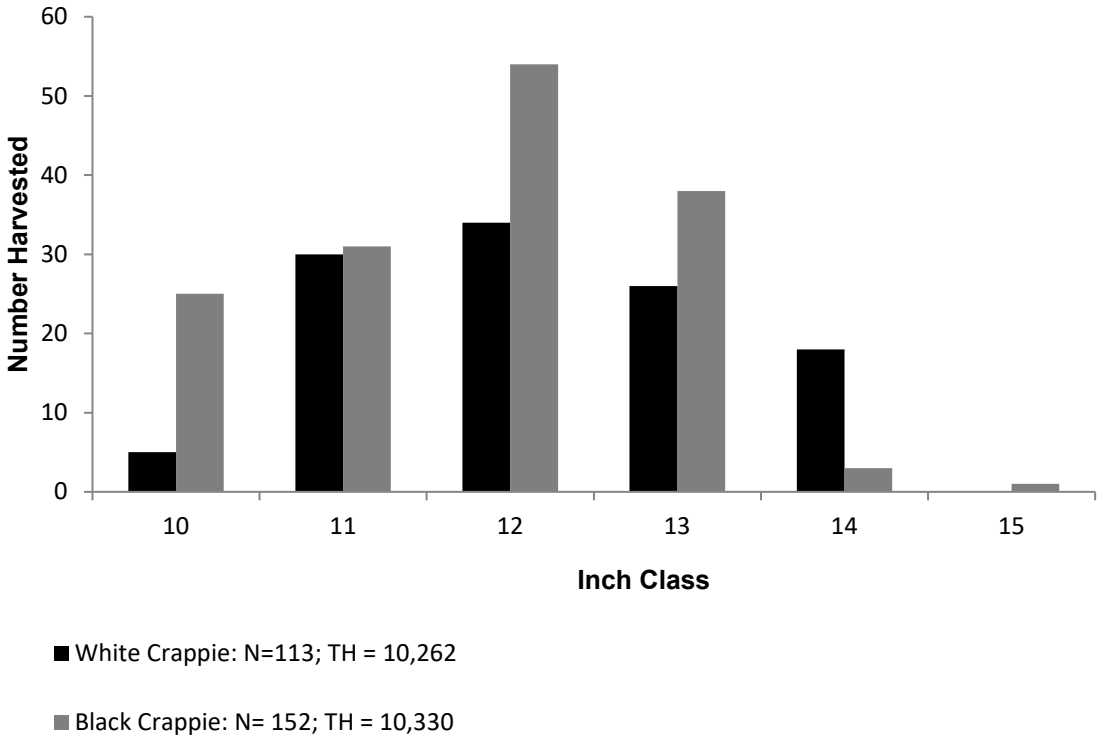


Figure 13. Length frequency of harvested White and Black Crappie observed during creel survey at Lake Tawakoni, Texas, June through May 2021/2022, all anglers combined. N is the number of harvested crappie observed during the creel survey, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 13. Proposed sampling schedule for Lake Tawakoni, Texas. Survey period is June through May.

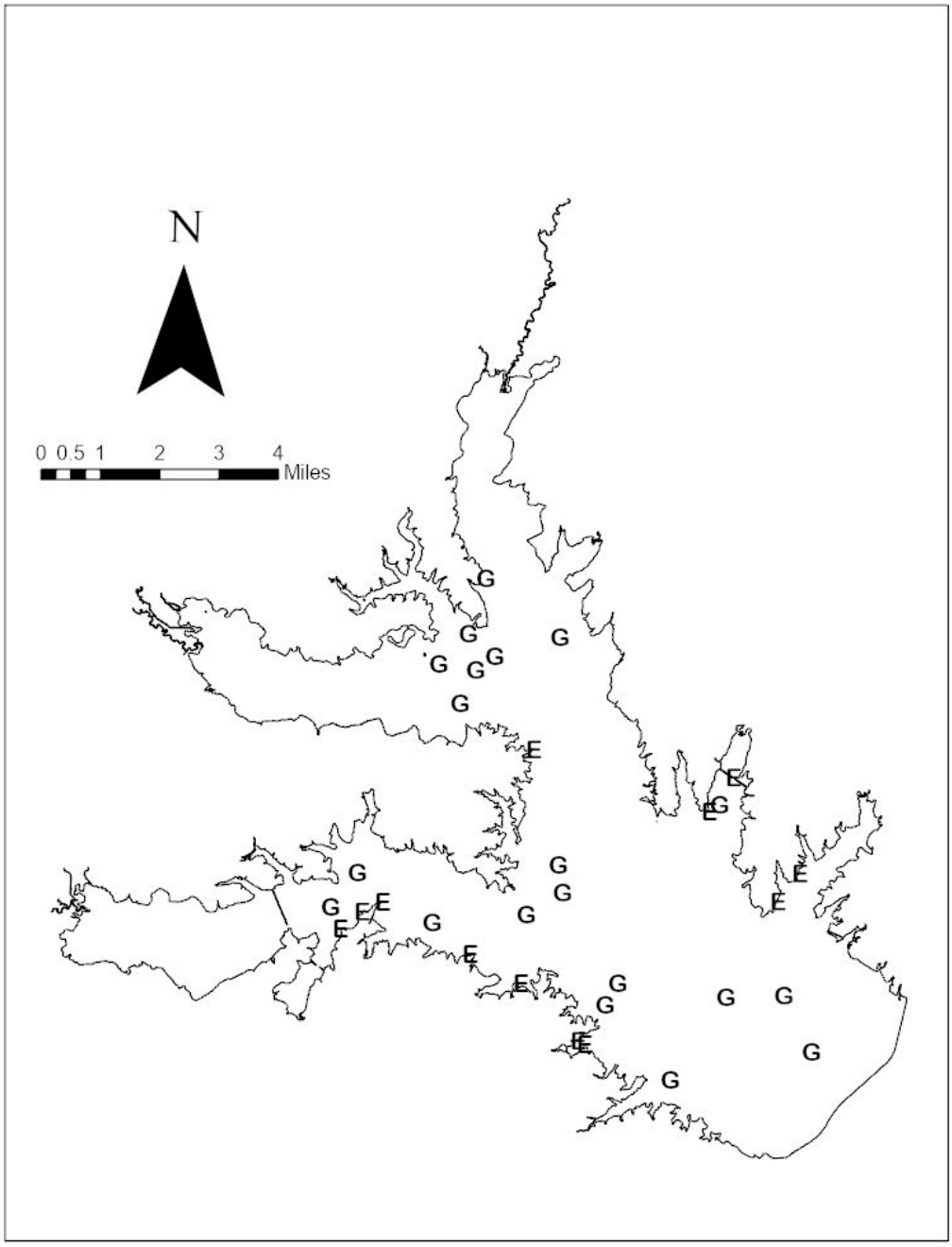
	Survey year			
	2023-2024	2024-2025	2025-2026	2026-2027
Angler access				X
Vegetation				X
Electrofishing - Fall				X
Gill netting		X		X
Creel survey			X	
Report				X

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 Tawakoni, Texas, June 2022 – May 2023. Sampling effort was 10 net nights for gill netting and 1.0 hour for electrofishing.

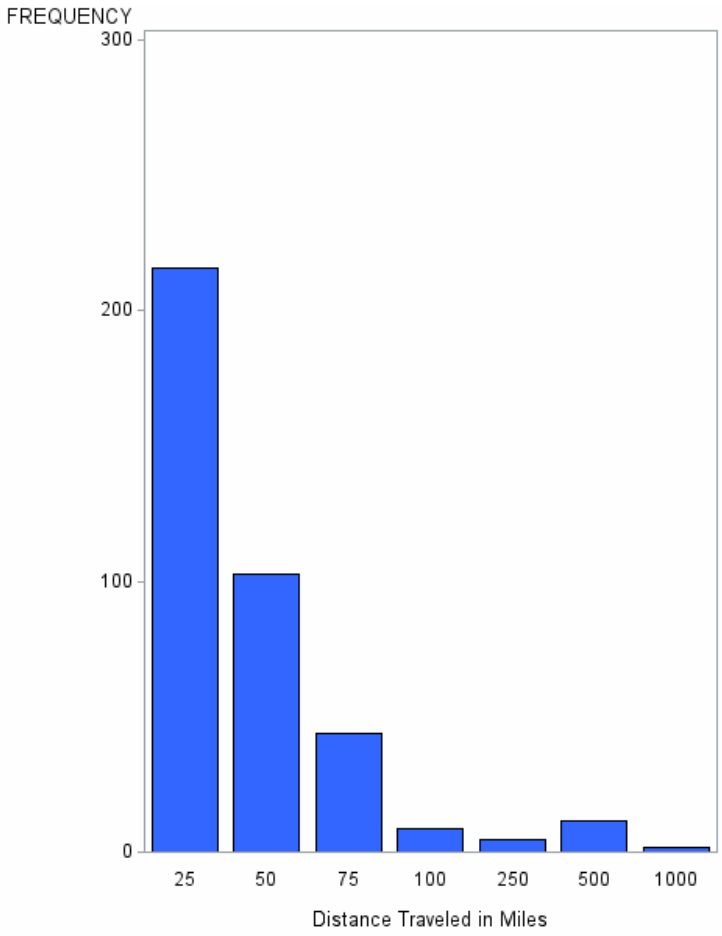
Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			376	376 (14)
Threadfin Shad			4,175	4,175 (44)
Blue Catfish	383	38.3 (9)		
Channel Catfish	38	3.8 (36)		
White Bass	16	1.6 (38)		
Bluegill			3	3.0 (72)
Longear Sunfish			2	2.0 (67)
Redear Sunfish			2	2.0 (67)
Largemouth Bass			62	62.0 (27)
Hybrid Striped Bass	18	1.8 (55)		

APPENDIX B – Map of sampling locations



Location of sampling sites, Lake Tawakoni, Texas, 2021-2023. Gill net, and fall electrofishing are indicated by a G, (winter 2021 and 2023) E (Fall 2022). Water level was near full pool at time of sampling.

APPENDIX C – reporting of creel ZIP code data



Frequency of anglers that traveled various distances (miles) to Lake Tawakoni, Texas, as determined from the June 2021 through May 2022 creel survey.

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