Lake O' the Pines

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 O' the Pines were surveyed in 2020 and 2022 using electrofishing, low-pulse electrofishing in 2022, and tandem hoop nets in 2023. Anglers were surveyed from June 2022 through May 2023 with a creel survey. Historical data are presented with the 2020-2023 data for comparison. This report summarizes the results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

Reservoir Description: Lake O' the Pines is a 16,269-acre reservoir located on Big Cypress Creek which was constructed in 1956 by the U.S. Army Corps of Engineers (USACE) for flood control, municipal and industrial water supply, and public recreation. Habitat features consisted of inundated timber, brush, creek channels, and riprap. Native aquatic vegetation covered less than 2% of the reservoir in 2022, while non-native invasive species (i.e., hydrilla, water hyacinth, and giant salvinia) accounted for approximately 11% of the reservoir surface.

Management History: Important sport fish include Largemouth Bass, Channel Catfish, sunfish, and crappie. All fish species except for crappie are currently managed under statewide harvest regulations. From 1 December until the last day of February, anglers are required to keep the first 25 crappie they catch each day regardless of size to minimize excess mortality due to fish being caught in deep water.

Fish Community

- **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch of Gizzard Shad has been stable over the last few surveys with many being available as prey to most sport fish. The relative abundance of Bluegill was high providing good forage for sport fish. Electrofishing catch rate of Redear Sunfish increased in 2022, with fish up to 10 inches in length, providing an excellent angling opportunity.
- **Catfishes:** Channel Catfish catch rates in tandem hoop nets have been variable over the past three surveys. However, abundance and size structure have been indicative of a quality population. Low frequency electrofishing was conducted to survey Flathead Catfish and only four fish were collected. Fishing for catfish accounted for 5% of total directed angling effort during the 2022/2023 angler creel survey.
- **Largemouth Bass:** Largemouth Bass electrofishing catch rates have been stable in recent surveys. Growth rates were moderate and body condition indicated adequate prey availability. Sixty percent of overall angling effort was directed towards Largemouth Bass in the 2018/2019 creel survey.
- **Crappie:** Historically, crappie catches in standard trap nets were poor. In 2019 and 2013, crappie were surveyed using tandem hoop nets. The number of fish collected has been insufficient to meet sampling objectives. Crappie were the second highest targeted species by anglers during the 2022/2023 creel survey accounting for 32% of overall angling effort.

Management Strategies: We will request Lone Star Bass stocking every other year to maintain contribution of Florida Largemouth Bass genetics in the reservoir. Additionally, electrofishing surveys in 2024 and 2026 will be used to monitor Largemouth Bass and prey fish populations. Tandem hoop netting for Channel Catfish and crappie 2027. An angler creel survey will be conducted from June 2026 through May 2027. Finally, annual vegetation surveys will be conducted to monitor invasive plant species.

Introduction

This document is a summary of fisheries data collected from Lake O' the Pines 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 2022-2023 data for comparison.

Reservoir Description

Lake O' the Pines is a 16,269-acre impoundment located in Marion, Morris, Upshur, and Camp counties on Big Cypress Creek. It was constructed in 1956 by the U.S. Army Corps of Engineers (USACE) for flood control, municipal and industrial water supply, and public recreation. Shoreline length is 144 miles with a shoreline development index of 7.5. Normal annual water level fluctuation is 2-3 feet; however, the reservoir experienced a drought in 2006 and 2011 to 2013. High water levels have been documented in 2015, and 2019 (Figure 1). Other descriptive characteristics for Lake O' the Pines are listed in Table 1.

Angler Access

Lake O' the Pines has 16 boat ramps operated by USACE and 11 boat ramps that are either county-controlled or privately owned. Bank angling access is available at numerous USACE parks. Additional boat ramp characteristics are recorded in Table 2.

Management History

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

1. Conduct annual surveys for invasive vegetation and work with USACE and Northeast Texas Municipal Water District (NETMWD) to develop management strategies.

   Action: Annual invasive aquatic species surveys have been conducted as well as periodic inspections of high-use boat ramps throughout the year. USACE, NETMWD, and TPWD have cooperated to fund herbicide treatment of giant salvinia.

2. Continue to monitor and manage the Largemouth Bass population with electrofishing and stocking of Florida-strain Largemouth Bass.

   Action: Florida-strain Largemouth Bass were stocked in 2019, 2021, and 2023. Additional electrofishing was conducted in 2020 to monitor Largemouth Bass and important prey species populations.

3. Investigate ways to better monitor crappie populations in Lake O' the Pines.

   Action: Otoliths were collected from fish caught by anglers for age and growth analysis. Population data were recorded for crappie during baited tandem hoop net sampling for Channel Catfish during spring 2023.

4. Develop strategies to inform anglers about Bighead Carp in Big Cypress Bayou below Lake O' the Pines and take steps to avoid transport of these invasive fish to other waters.

   Action: Informational signs have been posted at the spillway. The regulation that prevents the movement of live nongame fish from below the Lake O' the Pines spillway remains in effect to prevent potential spread of juvenile invasive carp.

Harvest regulation history: Sport fishes in Lake O' the Pines are currently managed with statewide regulations, except for the winter crappie fishery (Table 3). Largemouth Bass have been managed with a 14-inch minimum length and 5-fish daily bag since 1986 and other black bass were included under this regulation in 1988. The minimum length limit on Spotted Bass was removed in 2000, but the daily bag for

black bass in any combination remained at 5 fish/day. The statewide harvest regulation for Channel Catfish and Blue Catfish was changed from a 12-inch minimum length limit and combined daily bag limit of 25 fish in 2021 to no minimum length limit with 25 fish daily bag limit (in any combination), of which no more than 10 fish can be over 20 inches in length. In 1991, a special winter season regulation for crappie was implemented, which states that for Black and White Crappie caught from 1 December through the last day of February, there is no minimum length limit, the daily bag limit is 25 fish in any combination, and all crappie caught must be retained.

Stocking history: Channel Catfish stockings in the late 1960s and 1970 established a self-sustaining population. Blue Catfish were stocked in 1971 and 1994, but a self-sustaining population was not established. Florida-strain Largemouth Bass were most recently stocked in 2011, 2013, 2015, 2017, 2019, 2021, and 2023. Palmetto Bass were stocked from 1977 to 2000 to create and sustain the fishery but was discontinued due to low angler utilization. The complete stocking history is in Table 4.

Vegetation/habitat management history: Historically, hydrilla has not caused any access issues at the reservoir and has not required treatment. Alligatorweed and water hyacinth have required treatment to prevent excessive growth and provide access to boaters in the Lone Star Landing area of the reservoir in past years. The USACE conducted herbicide treatments in 2014 and 2015 for both species while alligatorweed flea beetles were released by USACE in 2015. Giant salvinia was discovered on Lake O' the Pines near boat ramp access in 2014 but did not establish until 2017 when about 28 acres was discovered (<1 % of the total surface area of Lake O' the Pines). An aquatic vegetation management plan was developed by TPWD, USACE, and NETMWD in January 2015 to guide invasive plant management in the reservoir. This plan also included the management of giant salvinia that has continued to spread in the upper end of the reservoir. The USACE, NETMWD, and TPWD have managed giant salvinia with herbicides and giant salvinia weevils to mitigate its spread. In 2017, artificial fish habitat structures were deployed at 27 locations to improve fish habitat and angling success. The locations of these structures can be viewed using TPWD's Habitat Structure Viewer located at https://tpwd.texas.gov/fishboat/fish/recreational/lakes/fish_attractors.phtml.

Water transfer: Lake O' the Pines provides water for eight cities, numerous rural water districts, and several steel manufacturers and electricity generators. Current authorized inter-basin transfers include the City of Longview and Brandy Branch Reservoir (American Electric Power), both of which are in the Sabine River watershed.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Lake O' the Pines (TPWD unpublished). Primary components of the 2022-2023 OBS plan are listed in Table 5. All survey sites were randomly selected and conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

Electrofishing – Largemouth Bass, sunfish, Gizzard Shad, and Threadfin Shad were collected by fall nighttime electrofishing (1 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 13 randomly selected fish (range 13.0 to 14.9 inches).

Low-frequency electrofishing – Flathead Catfish were experimentally sampled by daytime low-frequency electrofishing at 20 stations. The minimum duration of electrofishing at each station was 3 minutes. CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Tandem hoop nets – Channel Catfish and crappie were collected using 10 tandem hoop-net series in the spring at 10 stations. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series). Ages for White Crappie and Black Crappie were determined using otoliths obtained in December 2022 from 13 randomly selected angler-caught fish (range 9.0 to 10.9 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 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 2022 through May 2023. 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). Estimates of angling effort, catch, and harvest were only calculated based on boat anglers. Access locations were chosen at random from the 6 most popular boat ramps at the reservoir. In addition to standard creel survey procedures, a separate boat trailer count was conducted at every boat ramp around the entire reservoir during each creel survey day to determine boat ramp use reservoir-wide.

Habitat – Vegetation surveys were conducted in 2019–2022 to monitor coverage of invasive plants. 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: The majority of the reservoir shoreline perimeter consisted of natural shoreline with no perceived changes since the structural habitat survey conducted in 2010 (Bister 2011). Native aquatic vegetation coverage has declined resulting in only 1.6% of the reservoir's surface area covered by native plants in 2022 compared to 3.3% in 2018 (Stadig and Bister 2019) and 10.9% in 2014 (Bister and Wright, 2015). Emergent vegetation was the dominant native aquatic vegetation type in 2022 (Table 6). Non-native vegetation covered about 10.6% of the surface area in 2022 (Table 6). This was mostly hydrilla, which has expanded coverage from 6 acres (<0.1%) in 2019 to 1,444 acres (8.9%) in 2022. A trace amount of water hyacinth was found on Lake O' the Pines during the 2022 survey but will likely return in future years from seeds present in the reservoir. Giant salvinia coverage has increased to 279 acres (1.7%) in 2022 from 39 acres (0.2%) in 2021 (Table 6).

Creel: The access point creel survey conducted in 2022-2023 produced estimates of effort, catch, and harvest based only on boat anglers surveyed at the six most used boat ramps on the reservoir. The decision to switch to an access point creel survey was based on the fact most anglers could be contacted at boat ramps since there are no waterfront homes where anglers can access the reservoir. Also, information from completed fishing trips (access point surveys) provide preferable estimations of angling effort and fishing success compared to incomplete trips (roving surveys). Directed fishing effort by anglers in Lake O' the Pines was greatest for Largemouth Bass (60.1%) followed by crappie (32.4%; Table 7), which was similar to percentages during previous roving surveys. Total fishing effort for all species and direct expenditures at Lake O' the Pines was higher in the 2022/2023 surveys (252,965 h and $2,010,110) compared to the 2018/2019 survey (Table 8). While some anglers traveled more than 500 miles, most angler ZIP codes were within 50 miles of the reservoir (Appendix C). Boat trailer counts from the 2022/2023 survey are summarized in Appendix D. Boat ramp use probabilities were not used to select access points during the most recent survey, nor were they used in the calculation of fishing effort, but these data will be useful in the future to fine-tune creel survey data collection. The six boat ramps that were used during the 2022/2023 survey received the highest use when looking at the entire year. However, there were seasonal differences that will be helpful in selecting ramps to include during future surveys.

Prey species: Electrofishing catch rate for Gizzard Shad was 298.0/h in 2022, which was similar to recent years (303.0/h in 2018 and 381.1/h in 2020; Figure 2). The index of vulnerability (IOV) has been stable within the last three surveys, with 50 – 80% of Gizzard Shad available for predators (Figure 2). Bluegill were the dominant prey species available in Lake O' the Pines. Even though catch rates for Bluegill have been variable in recent surveys (2022 = 490.0/h, 2020 = 337.0/h, and 2018 =775.0/h; Figure 3), they have remained relatively abundant. Catch rates for Redear Sunfish doubled in 2022 (112.0/h) compared to 50.0/h in 2020 (Figure 4). Redear Sunfish up to 10 inches in length were documented in the 2022 survey, which provide an excellent angling opportunity. There was no targeted effort toward sunfish by anglers during the 2022/2023 survey, but this component of the fishery has always been low (Table 9).

Channel Catfish: The tandem hoop net catch rate of Channel Catfish was 28.3/series in 2023, which was lower than 2019 (59.4/series) and 2015 (34.2/series; Figure 5). Despite lower catch rates, Channel Catfish remained abundant and provided good fishing opportunities to anglers. Body condition for Channel Catfish was good in 2023 with relative weights of ≥90 for most inch groups indicating adequate food availability. Directed fishing effort for Channel Catfish declined compared to previous surveys (Table 10), which may be due to the switch from a roving to access point survey and only surveying boat anglers. Anglers targeting catfish from the bank during the 2010/2011 and 2018/2019 surveys accounted for 14% and 61% of the total directed effort for catfish. However, the angling catch rate for catfish in 2022/2023 was 4.66/h, which was higher than previous surveys. This was an indication that boat anglers are likely more effective at catching catfish than bank anglers. Harvested Channel Catfish ranged between 11 and 17 inches (Figure 6).

Flathead Catfish: Only four Flathead Catfish were caught (range 16 to 26 inches) during low-frequency electrofishing (effort = 1 hour) on Lake O' the Pines in 2022. No fish were caught during a 2019 survey (Stadig and Bister 2019).

Largemouth Bass: The electrofishing catch rate of Largemouth Bass in 2022 (213.0/h) was higher than 2020 (159.0/h) but similar to 2018 (202.0/h; Figure 7). Catch rates of stock-size Largemouth Bass (≥ 8 inches) have been stable (2022 = 93.0; 2020 = 107.0; 2018 = 117.0/h; Figure 7). Largemouth Bass growth rates were moderate in 2022. The average age of 14-inch fish (13.0 – 14.8 inches) was 2.5 years (N = 13, range = 1 – 7). Estimated growth was faster during the 2020 sample with the average age of 14-inch fish (13.0 – 14.7 inches) equal to 1.8 years (N = 13, range = 1 – 5). Largemouth Bass body condition indicated adequate prey availability. Mean relative weight was ≥ 90 for most inch groups in each of the most recent 3 surveys (Figure 7).

Directed angling effort toward black bass was higher for completed trip estimates in 2022/2023 (151,888 h) compared to previous roving creel surveys (Table 11). Non-tournament directed effort was 80% of total effort. Total angling catch rate of black bass was 0.79/h, which was lower than previous surveys. This difference may be a function of completed trip interviews. Anglers were successful catching quality-sized fish and released over 5,000 fish >4 pounds during the latest year-long survey. Voluntary catch and release remained high; 98% of legal-size fish were released. Only 4 harvested Largemouth Bass were observed during the 2022/2023 survey, which expanded to an estimated of 744 harvest fish for the entire year (Figure 8).

Crappie: Growth of crappie populations were assessed using otoliths collected from angler-caught fish during December 2022. White Crappie average age at 10 inches (9.2 – 10.6 inches) was 1.2 years (N = 13, range 1- 2 years). Black Crappie average age at 10 inches (9.7 – 10.8 inches) was 2.1 years (N = 13, range 1 – 3 years). Crappie populations were surveyed with tandem hoop nets in spring 2019 and 2023. While anecdotal information suggests that baited tandem hoop nets can be effective at capturing crappie in other reservoir systems, they were not as effective in Lake O' the Pines. Of the 10 tandem hoop net series deployed in 2023, 18 Black Crappie (length range: 4 – 13 inches) and 5 White Crappie (length range: 9 – 12 inches) were captured (Figures 9 and 10).

Lake O' the Pines has been routinely ranked among the best crappie fisheries in the state. Directed fishing effort for crappie in 2022/2023 was 81,711 h from completed trip surveys, which was higher than the 2018/2019 survey (40,020 h) but less than the 2010/2011 survey (90,888 h; Table 12). Total angling catch per hour was lower in 2022/2023 (1.78/h) compared to previous surveys. Total harvest was higher in 2022/2023 (133,720 fish) compared to 2010/2011 and 2018/2019. Although there were differences in creel estimates among years, the change from historical roving creel surveys (incomplete trip interviews) to the most recent access point survey (completed trip interviews) should be taken into consideration. The fishery remained highly consumptive with only 2% of legal-size fish released. Harvested White and Black Crappie ranged from 8 – 15 inches, which includes the special winter season regulation period that requires anglers to keep the first 25 fish they catch regardless of size (Figures 11 and 12).

Fisheries Management Plan for Lake O' the Pines, Texas

Prepared – July 2023

ISSUE 1: Lake O' the Pines has experienced infestations of invasive aquatic plants. In the past, giant salvinia was discovered at two boat ramps on the reservoir. In recent years, larger mats of giant salvinia have been observed in northern sections of the reservoir. The USACE, NETMWD, and TPWD have reduced the spread of giant salvinia through herbicide application. Regular monitoring will be conducted to identify future spread of giant salvinia, hydrilla, water hyacinth, and alligatorweed also occur in the reservoir. The coverage of alligatorweed and water hyacinth has the potential to cause boater access issues and has been treated by the USACE in recent years. Access restrictions due to these invasive plants should be monitored.

MANAGEMENT STRATEGY

1. Maintain communication with the USACE and NETMWD regarding invasive aquatic plant infestations.
2. Work with USACE and NETMWD to develop aquatic vegetation treatment proposals as necessary to manage nuisance aquatic plant species.
3. Conduct an annual survey of invasive aquatic plants in the reservoir.

ISSUE 2: Lake O' the Pines has a quality Largemouth Bass fishery and has demonstrated the ability to produce trophy fish. Three Toyota ShareLunker Legacy-Class fish have come from Lake O' the Pines since 2010 with the most recent being a 13.23 lb fish caught in 2013. In addition, 18 fish ≥ 8 pounds have been documented through the ShareLunker Program. The reservoir is popular for big bass fishing including the KYKX Big Bass Bonanza, which continues to be a big tournament that draws hundreds of anglers to Lake O' the Pines for the weekend. Continued introduction of Florida Largemouth Bass genetics is necessary to maintain the trophy potential of this fishery. In addition, supplemental electrofishing surveys should be conducted to monitor the Largemouth Bass and prey fish populations.

MANAGEMENT STRATEGY

1. Conduct electrofishing survey in fall 2024 and 2026 to monitor Largemouth Bass and prey species populations.
2. 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 biennially in 2025 and 2027.

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. 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. Effective July 1, 2014 boaters are required to drain all water from boats, live wells, and bait buckets when leaving the reservoir to prevent the spread of invasive aquatic species. Live bait cannot be transported from the reservoir where the

fish were caught. Bighead Carp have been documented in the Big Cypress Bayou below Lake O' the Pines in the past; however, subsequent investigations could not document their presence. Bighead Carp abundance is low enough to not cause any issues at this time.

MANAGEMENT STRATEGY

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 (2023-2027)

Sport fish, forage fish, and other important fishes

Sport fishes in Lake O' the Pines include Largemouth Bass, White Crappie, Black Crappie, Channel Catfish, and Flathead Catfish. Known important forage species include Bluegill, Redear Sunfish, Gizzard Shad, and Threadfin Shad. The proposed sampling schedule to meet the following OBS plan can be found in Table 13.

Low-density or underutilized fisheries

White Bass are present in Lake O' the Pines, but population abundance has been low. Additionally, past creel surveys have indicated that there is minimal directed effort towards this species and thus sampling this population is unnecessary. Spotted Bass are also present in Lake O' the Pines; however, fish are generally <14 inches, and abundance observed during electrofishing surveys has been low. This species comprises a small portion of the black bass fishery at the reservoir. No specific directed angling effort toward Spotted Bass was documented in the 2022/2023 creel survey. Sampling this population is unnecessary, but their presence will be noted during other surveys. Flathead Catfish are present in the reservoir but attempts to obtain population data with gill nets and low-frequency electrofishing has not been successful. Efforts to collect Flathead Catfish population data will be discontinued.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are the most popular sport fish in Lake O' the Pines. Sixty percent of angling effort was directed toward Largemouth Bass during the 2022/2023 creel survey. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Trend data on relative abundance, size structure, growth, and body condition have been collected biennially since 1996 with fall nighttime electrofishing. Continuation of biennial trend data listed above in this reservoir with fall night electrofishing 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 2024 and 2026 to assess relative abundance, size structure (PSD and length frequency), growth, and condition (mean W_r using lengths and weights

from 10 fish per inch group). A minimum of 12 randomly selected 5-min electrofishing sites will be sampled and sampling will continue at up to 12 additional random sites until 50 stock-size fish are collected and the RSE of CPUE-S is ≤ 25. This objective was met after 12 stations in 2018, but the anticipated effort to meet both sampling objectives with an 80% confidence interval is 14-16 stations. A maximum of 24 stations will be surveyed. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected in 2024 and 2026 to determine mean age at 14 inches.

Channel Catfish: Channel Catfish was the third most popular species for anglers to fish for during the 2022/2023 creel survey. Tandem hoop nets have been effective at achieving sampling objectives in 2019 and 2023 surveys. We will continue to use tandem hoop nets in 2027 to gather information on relative abundance and size structure. Our target sampling precision will be RSE ≤ 25 for CPUE-Stock. Our targeted minimum sample size for size structure will be 100 stock-size fish. We will set a minimum of 10 net series.

Crappie: Traditional trap netting and dual-cod trap netting has not been successful for adequately sampling the crappie populations at Lake O' the Pines. A popular fishery exists for crappie at the reservoir, and there is a special harvest regulation in place from December through February that requires anglers to keep the first 25 crappie they catch regardless of size to reduce unnecessary mortality of fish caught from deep water. For these reasons, it is important to determine the best way to sample the crappie populations. Recent efforts to collect data from crappie populations during spring tandem hoop netting has had poor results. However, future data will be recorded during Channel Catfish tandem hoop netting surveys. This gear has been effective in obtaining adequate crappie population data at other reservoirs. Additionally, we will collect otoliths from 13 fish (range 9.0-10.9 inches) caught by anglers in December 2026 to monitor growth of Black Crappie and White Crappie.

Prey Species: Bluegill, Redear Sunfish, and Gizzard Shad are the primary forage at Lake O' the Pines. Trend data on relative abundance and size structure of forage species has been collected biennially since 1996. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in sunfish and shad relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of Bluegill, Redear Sunfish, and Gizzard Shad for size structure estimation (PSD and IOV; 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 each year. No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of sunfish and 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. Relative weight of Largemouth Bass ≥ 8" TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch group).

Creel Survey: An access point angler creel survey will be conducted from June 2026 through May 2027 for general monitoring of total fishing effort, angler expenditures, directed angling effort for all sport fish, catch rates, and the number of fish harvested. Surveys will be conducted at boat ramps that received the highest angler use during the 2022/2023 boat trailer count.

Literature Cited

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Bister, T. J. 2011. Lake O' the Pines, 2010 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-1, Austin.

Bister, T. J., L. D. Wright. 2015. Lake O' the Pines, 2014 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.

Stadig, M. H., and T. J. Bister. 2019. Lake O' the Pines, 2018 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.

United States Geological Society (USGS). 2023. National water information system: Web interface. Available: http://waterdata.usgs.gov/tx/nwis (May 2023).

Tables and Figures

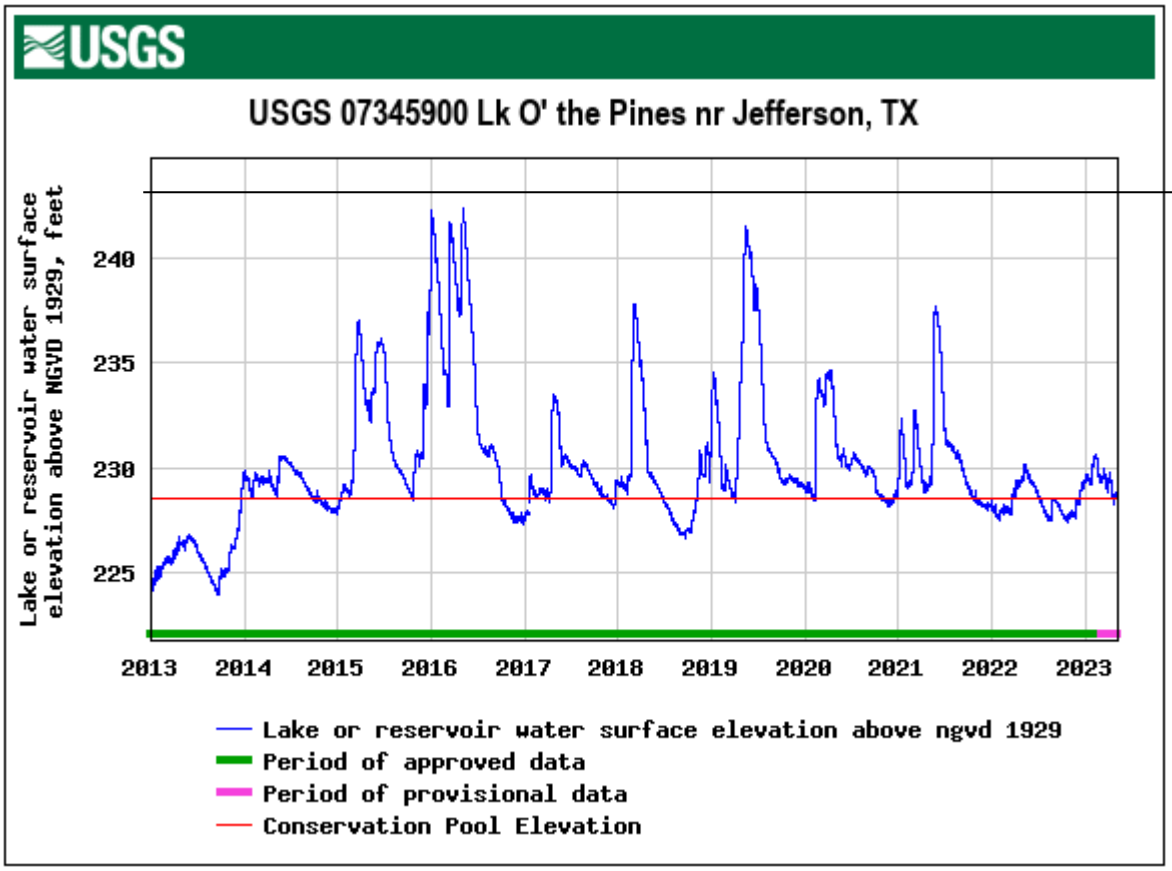


Figure 1. Daily water level elevations in feet above mean sea level (MSL) recorded for Lake O' the Pines, Texas. Conservation pool elevation is 228.5 feet. Source for water level data is U.S. Geological Survey website.

Table 1. Characteristics of Lake O' the Pines, Texas.

Characteristic	Description
Year constructed	1956
Controlling authority	U.S. Army Corps of Engineers
County	Marion, Morris, Upshur, and Camp
Reservoir type	Mainstem
Shoreline Development Index	7.5
Conductivity	137 µS/cm

Table 2. Boat ramp characteristics for Lake O' the Pines, Texas, March 2023. Reservoir elevation at time of survey was 229 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Lone Star Landing	32.901055 -94.715666	Y	15	222	Good
Highway 155	32.848450 -94.708011	Y	10	225	Good
Cedar Springs	32.842407 -94.696842	Y	25	226	Good
Pine Hill	32.802333 -94.654667	Y	15	222	Good
Pop's Landing	32.798812 -94.639817	Y	10	227	Good
Oak Ridge	32.787618 -94.628884	Y	5	227	Good
Woody's	32.759955 -94.609482	Y	5	N/A	Fair
Copeland Creek	32.754607 -94.597067	Y	10	224	Good
Tejas	32.740709 -94.546065	Y	15	224	Good
Brushy Creek (day use)	32.739067 -94.523765	Y	15	223	Good
Brushy Creek (park)	32.744889 -94.534965	Y	5	224	Good
Lakeside Park	32.749776 -94.510197	Y	15	223	Good
Hurricane Creek	32.785813 -94.514513	Y	10	222	Good
Pine Harbor	32.769332 -94.506584	Y	5	225	Good.
Holiday Harbor	32.764255 -94.498785	Y	5	227	Fair
Big Cypress Marina	32.762829 -94.496966	Y	20	228	Good
Overlook Park	32.754756 -94.498329	Y	40	219	Good
Buckhorn Creek	32.758198 -94.496686	Y	15	222	Good
Bull Frog Marina	32.795569 -94.546075	Y	15	224	Good
Johnson Creek Park (day use)	32.788982 -94.547710	Y	30	221	Good
Johnson Creek Park (campground)	32.780667 -94.547367	Y	5	223	Good
Lakeshore Estates East	32.80304 -94.54765	Y	5	N/A	Fair
Lakeshore Estates West	32.80884 -94.57971	Y	3	N/A	Fair
Alley Creek Park (day use)	32.798761 -94.589058	Y	35	222	Good
Alley Creek Park (campground)	32.795868 -94.598268	Y	10	224	Good
Mims Chapel	32.8 18591 -94.629681	Y	5	225	Good
Oak Valley Park	32.828958 -94.663758	Y	5	N/A	Good

Table 3. Harvest regulations for Lake O' the Pines, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	No minimum length – only 10 can be 20 inches or greater in length
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Palmetto	5	18-inch minimum
Bass, Largemouth	5[a]	14-inch minimum
Bass, Spotted	5[a]	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum[b]

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

[b] For Black and White Crappie caught from 1 December through the last day of February, there is no minimum length limit, daily bag = 25 in any combination, and all crappie must be retained.

Table 4. Stocking history of Lake O' the Pines, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; UNK = unknown.

Species	Year(s) Stocked	Number of Years	Number Stocked	Life Stage
Blue Catfish	1971	1	19,654	UNK
	1994	1	307,248	FGL
	Total		326,902	
Channel Catfish	1968-1970	3	550,763	AFGL
Florida Largemouth Bass	1982	1	500	AFGL
	1982-2000	6	2,206,972	FGL
	2009	5	408,658	FGL
	2010	1	407,949	FGL
	2011	1	408,862	FGL
	2013	1	408,581	FGL
	2015	1	184,935	FGL
	2017	1	142,242	FGL
	2019	1	149,420	FGL
	2021	1	91,332	FGL
	Total		4,409,451	
Lone Star Bass[a]	2023	1	141,284	FGL
Paddlefish	1992	1	15,401	
	1998	1	9,646	
	Total		25,047	
Palmetto Bass (striped X white bass hybrid)	1977-1981	3	515,320	UNK
	1994-2000	6	821,700	FGL
	1996	1	140,612	FRY
	Total		1,477,632	
ShareLunker Largemouth Bass[b]	2010	1	2,017	FGL
	2013	1	4,677	FGL
	Total		6,694	
Smallmouth Bass	1980-1982	2	315,000	UNK

[a] Lone Star Bass are 2nd generation offspring of pure Florida strain ShareLunker Largemouth Bass that have proven to be able to grow to ≥ 13 pounds.

[b] ShareLunker Largemouth Bass are 1st generation offspring from angler-donated Largemouth Bass ≥ 13 pounds from the Toyota ShareLunker program.

Table 5. Objective-based sampling plan components for Lake O' the Pines, Texas 2018–2019.

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]	Abundance	CPUE-Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
	Prey availability	IOV	
Low-frequency electrofishing			
Flathead Catfish	Abundance	CPUE-Stock	RSE-Stock ≤ 25
	Size structure	Length frequency	N ≥ 50 stock
Tandem hoop netting			
Channel Catfish	Abundance	CPUE-Stock	RSE-Stock ≤ 25
	Size structure		N ≥ 50 stock
Crappie	Size structure	PSD, length frequency	RSE-Stock ≤ 25
			N ≥ 50 stock
	Age-and-growth[b]	Age at 10 inches	N = 13 9.0 – 10.9 inches

[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.

[b] Angler-caught crappie will be used to collect otoliths for age-and-growth analysis.

Table 6. Survey of aquatic vegetation, Lake O' the Pines, Texas, 2019–2022. Surface area (acres) is listed with percent of total reservoir surface area in parentheses. Native vegetation was not surveyed 2019–2021.

Vegetation	2019	2020	2021	2022
Native submersed				5.8 (<0.1)
Native floating-leaved				70.9 (0.4)
Native emergent				177.9 (1.1)
Non-native				
Giant Salvinia (Tier II)*	2.0 (<0.1)	243.0 (1.5)	39.0 (0.2)	279.0 (1.7)
Hydrilla (Tier III)*	6.0 (<0.1)	535.0 (3.3)	517.0 (3.2)	1,444.0 (8.9)
Water Hyacinth (Tier II)*	4.0 (<0.1)	9.0 (<0.1)	Trace	Trace
Alligatorweed (Tier III)	Trace	Trace	2.0 (<0.1)	

*Tier I is immediate response, Tier II is maintenance, Tier III is watch status

Table 7. Percent directed angler effort by species for Lake O' the Pines, Texas, for roving creel surveys in 2010/2011 and 2018/2019 (boat and bank anglers); and an access point creel survey in 2022/2023 (boat anglers only). Survey periods were from 1 June through 31 May.

Species	2010/2011	2018/2019	2022/2023
Catfish	16.5	15.8	5.2
White Bass	0.4	0.0	0.2
Sunfishes	1.2	0.6	0.0
Black Bass	47.4	53.1	60.1
Crappie	34.0	24.5	32.4
Anything	0.6	6.0	2.1

Table 8. Total fishing effort (h) for all species and total directed expenditures at Lake O' the Pines, Texas, for roving creel surveys in 2010/2011 and 2018/2019 (boat and bank anglers); and an access point creel survey in 2022/2023 (boat anglers only). Survey periods were from 1 June through 31 May. Relative standard error is in parentheses.

Creel statistic	2010/2011	2018/2019	2022/2023
Total fishing effort	267,245 (22)	180,757 (21)	252,965 (22)
Total directed expenditures	$1,604,036 (28)	$1,219,903 (39)	$2,010,110 (33)

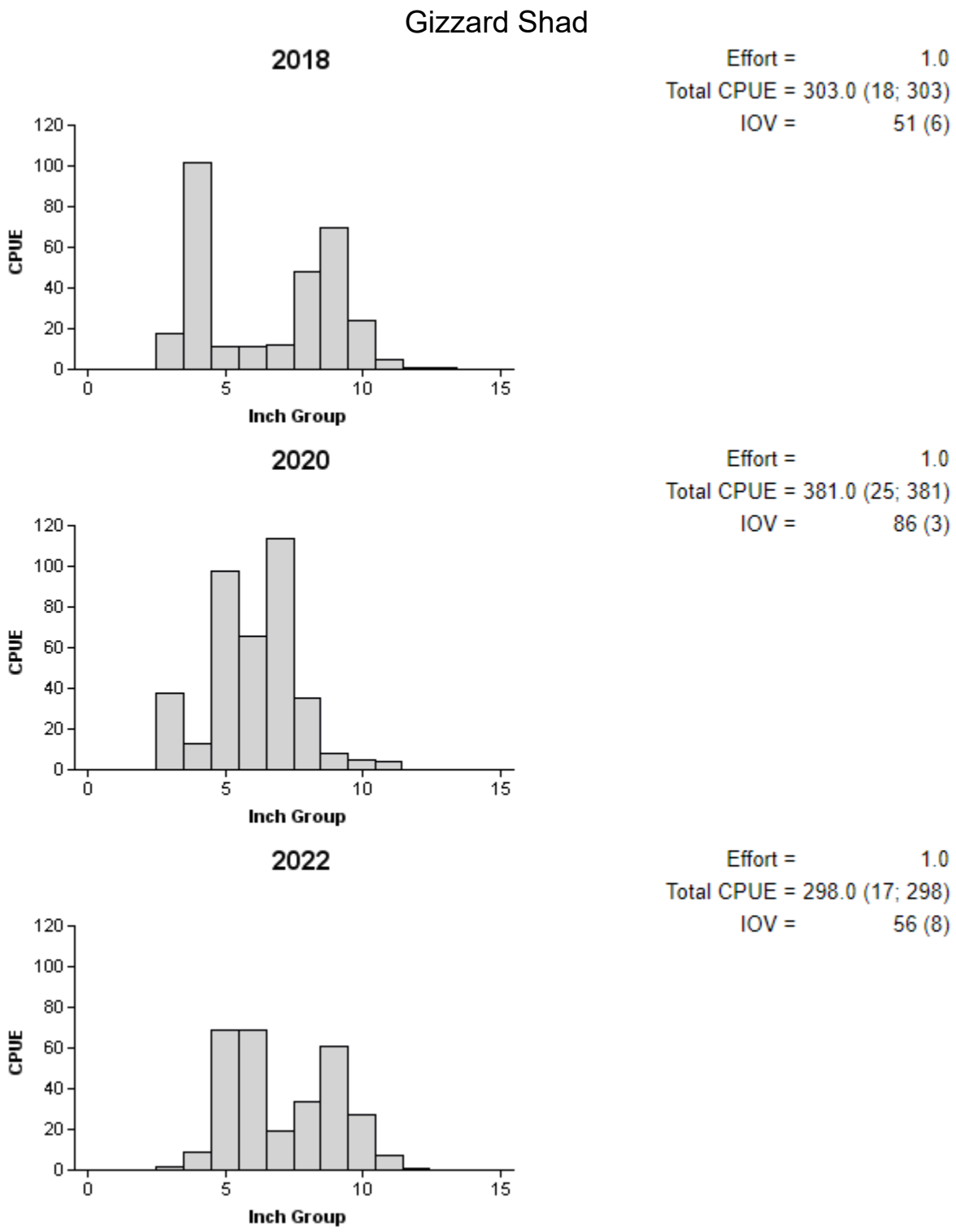


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2018, 2020, and 2022.

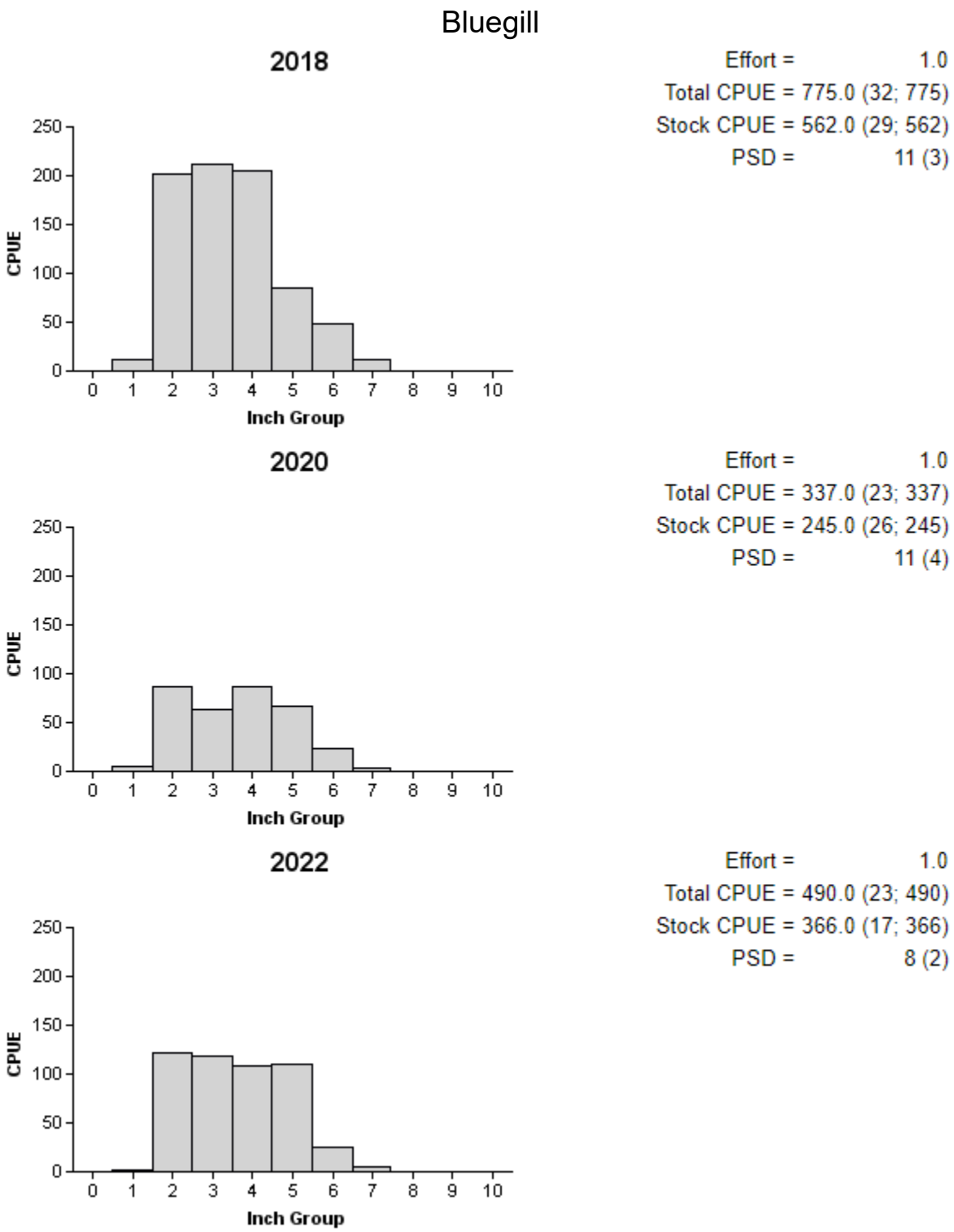


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2018, 2020, and 2022.

Redear Sunfish

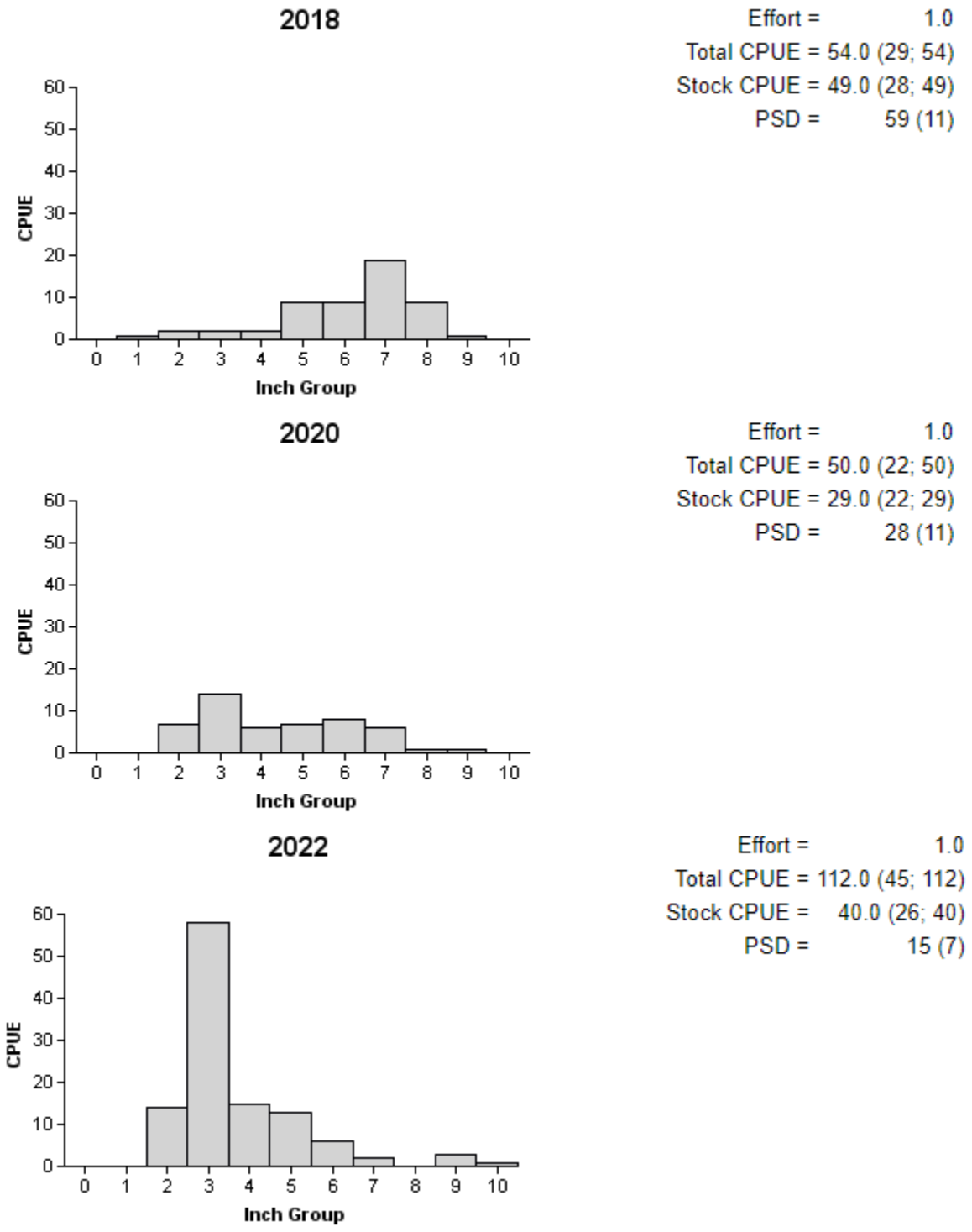


Figure 4. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2018, 2020, and 2022.

Table 9. Creel survey statistics for sunfishes at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey). Total catch per hour is for anglers targeting sunfish and total harvest is the estimated number of sunfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2010/2011	2018/2019	2022/2023
Surface area (acres)	16,269	16,269	16,269
Directed effort (h)	3,117 (59)	1,048 (144)	0
Directed effort/acre	0.19 (59)	0.06 (144)	0
Total catch per hour	7.02 (18)	0.0	0
Total harvest	2,680 (232)	244 (722)	796 (424)
Sunfish (unidentified)	379 (210)	0.0	0.0
Bluegill	1,273 (195)	244 (722)	796 (424)
Redear Sunfish	1,028 (286)	0.0	0.0
Harvest/acre	0.16 (232)	0.02 (722)	0.05 (424)
Percent legal released	90	98	54

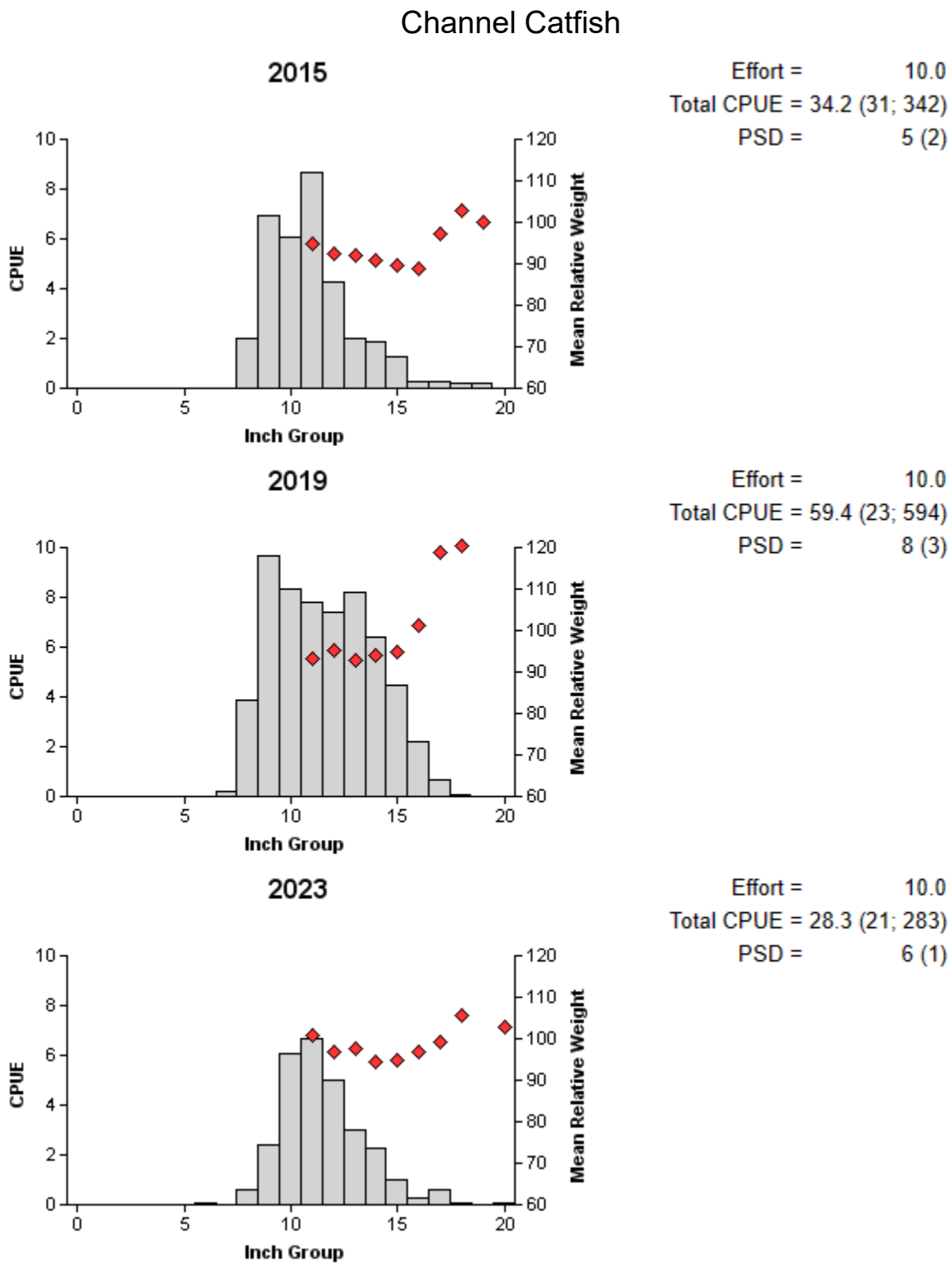


Figure 5. Number of Channel Catfish caught per series (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring tandem hoop net surveys, Lake O' the Pines, Texas, 2015, 2019, and 2023.

Table 10. Creel survey statistics for Channel Catfish at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey). Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2010/2011	2018/2019	2022/2023
Surface area (acres)	16,269	16,269	16,269
Directed effort (h)	44,010 (22)	25,902 (29)	13,163 (34)
Directed effort/acre	2.71 (22)	1.59 (29)	0.81 (34)
Total catch per hour	3.17 (38)	1.35 (57)	4.66 (89)
Total harvest	52,571 (51)	9,837 (43)	31,648 (46)
Harvest/acre	3.2 (51)	0.6 (43)	1.9 (46)
Percent legal released[a]	12	28	78

[a]The harvest regulation for Channel and Blue Catfish changed to no minimum length limit prior to the 2022/2023 survey.

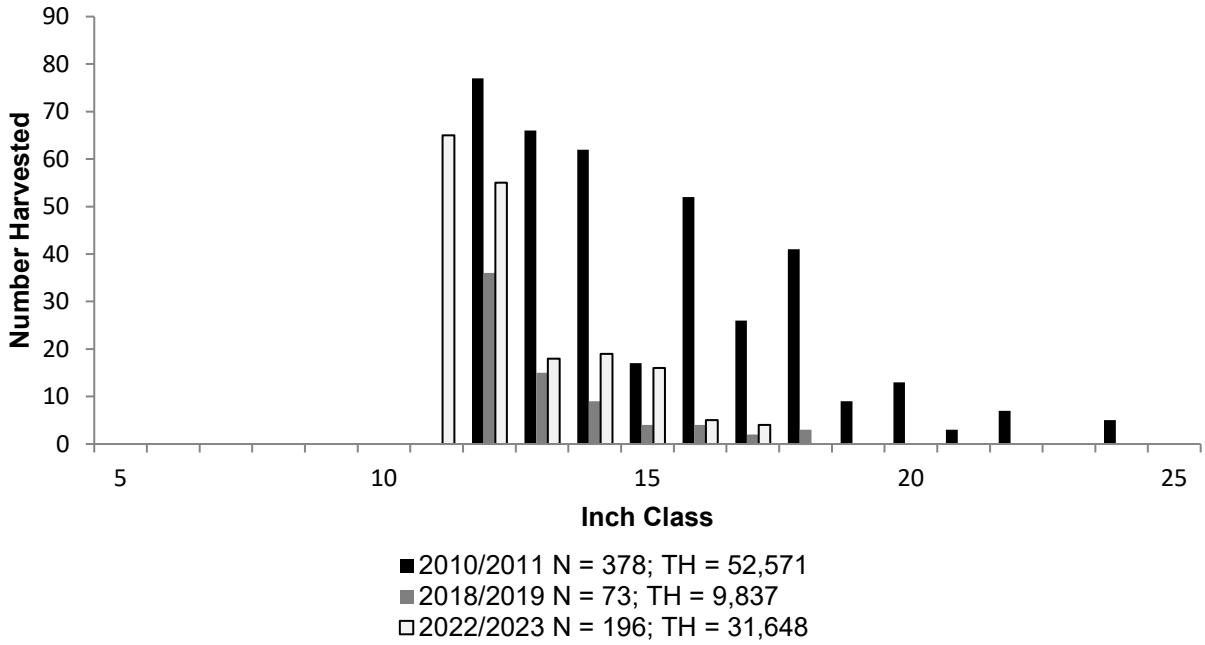


Figure 6. Length frequency of harvested Channel Catfish observed at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

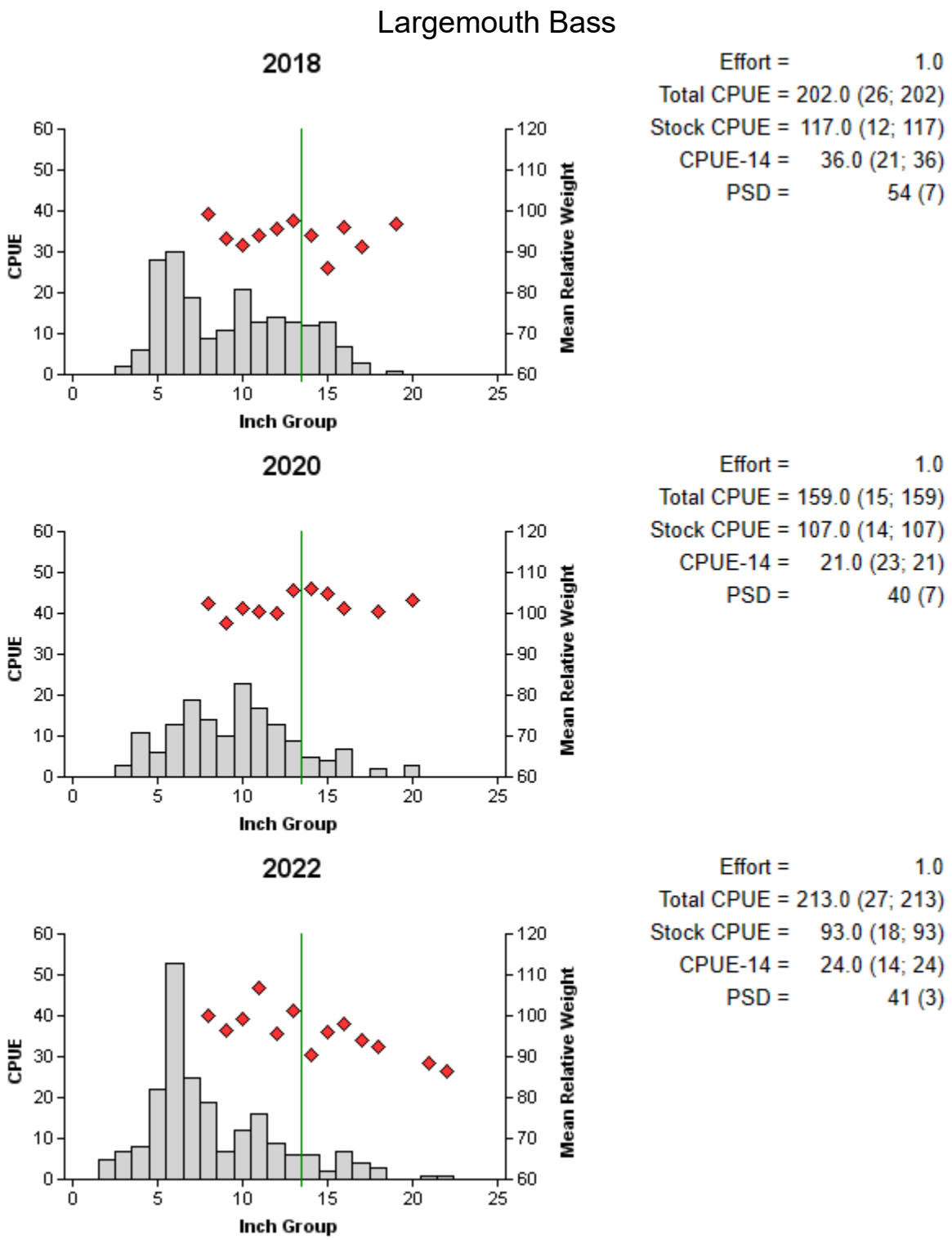


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2018, 2020, and 2022. Vertical line indicates minimum length limit

Table 11. Creel survey statistics for Largemouth Bass at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey). 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.

Statistic	2010/2011	2018/2019	2022/2023
Surface area (acres)	16,269	16,269	16,269
Directed angling effort (h)			
Tournament	28,491 (24)	35,037 (29)	29,756 (48)
Non-tournament	97,579 (28)	51,729 (30)	122,132 (22)
All black bass anglers combined	126,520 (23)	86,766 (28)	151,888 (23)
Angling effort/acre	7.78 (23)	5.33 (24)	9.34 (23)
Catch rate (number/h)	1.01 (23)	1.02 (24)	0.79 (18)
Harvest			
Non-tournament harvest	14,974 (69)	2,111 (73)	744 (161)
Harvest/acre	0.92 (69)	0.13 (73)	0.05
Tournament weigh-in and release	9,742 (52)	11,083 (46)	7,650 (70)
Release by weight			
<4.0 lbs		72,748 (54)	94,937 (63)
4.0-6.9 lbs		7,064 (68)	4,439 (83)
7.0-9.9 lbs		2,284 (78)	736 (115)
≥10.0 lbs		0.0	0.0
Percent legal released (non-tournament)	86	95	98

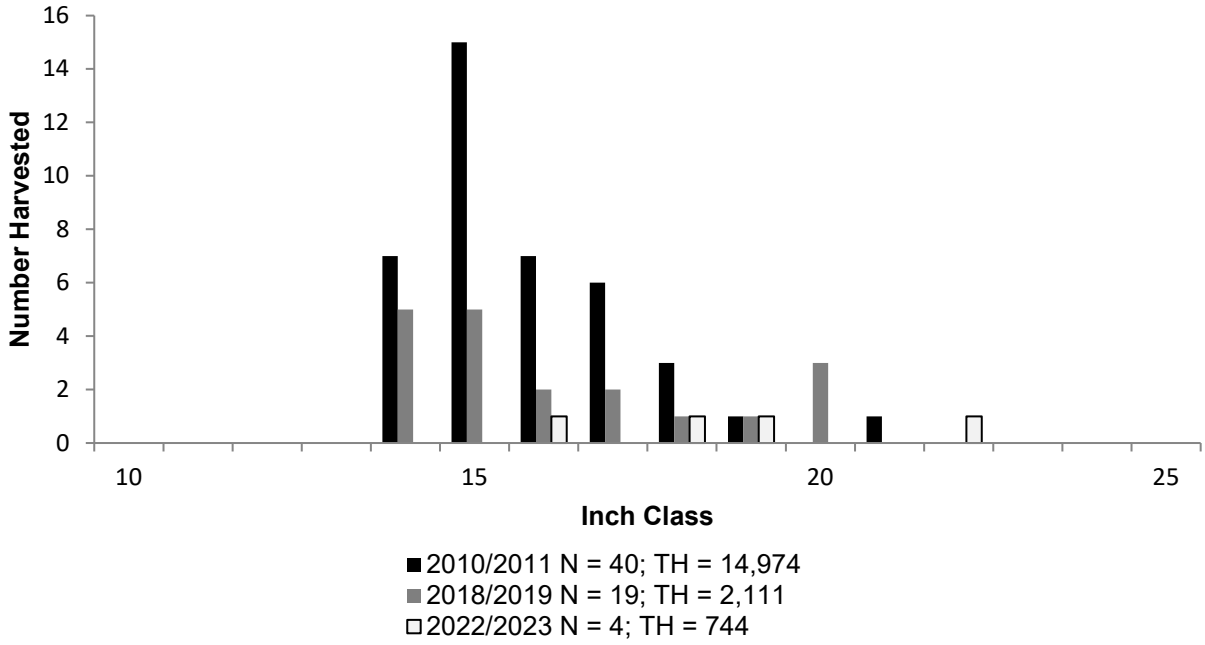


Figure 8. Length frequency of non-tournament harvested Largemouth Bass observed at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey), all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

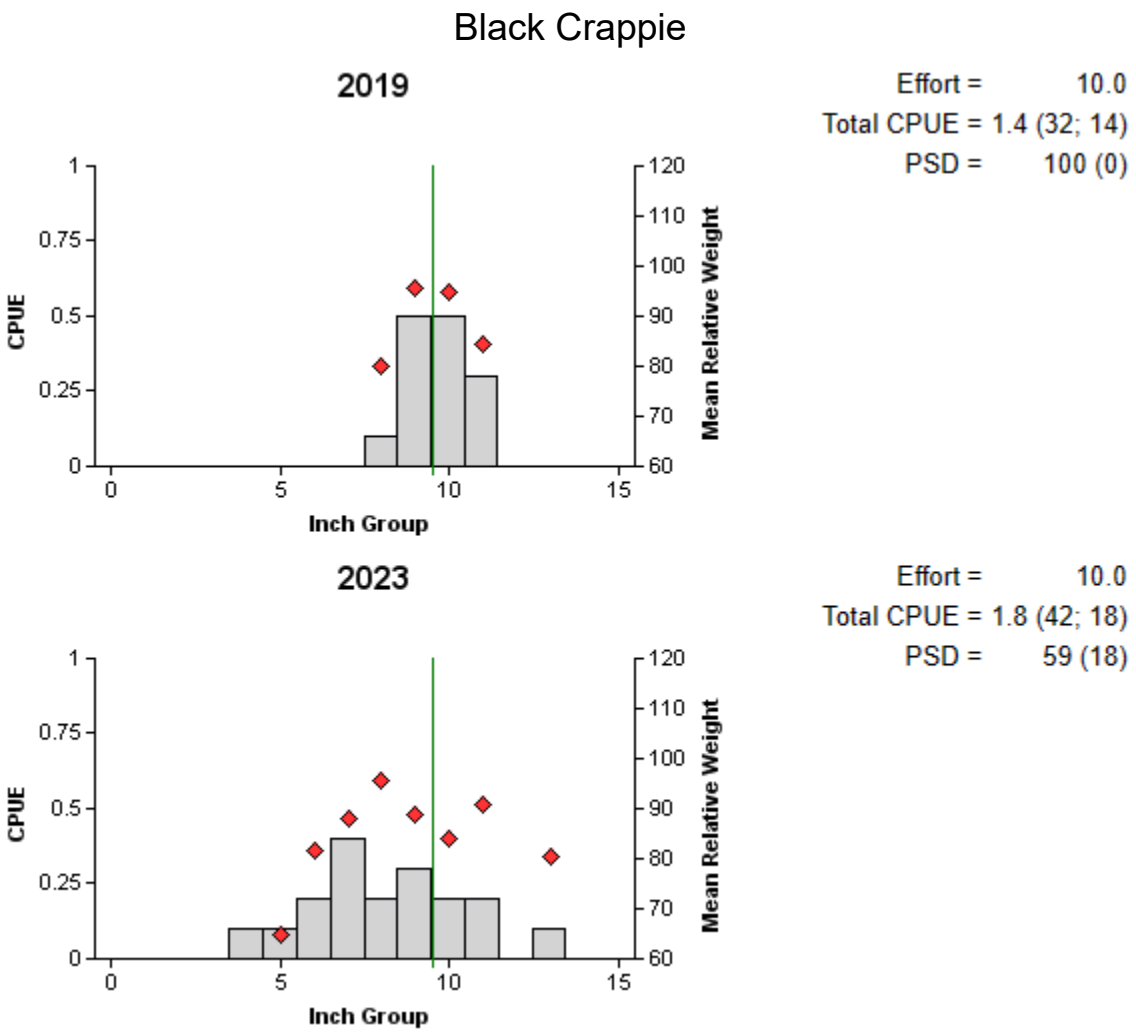


Figure 9. Number of Black Crappie caught per net set (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring tandem hoop net surveys, Lake O' the Pines, Texas, 2019 and 2023. Vertical line indicates minimum length limit.

White Crappie

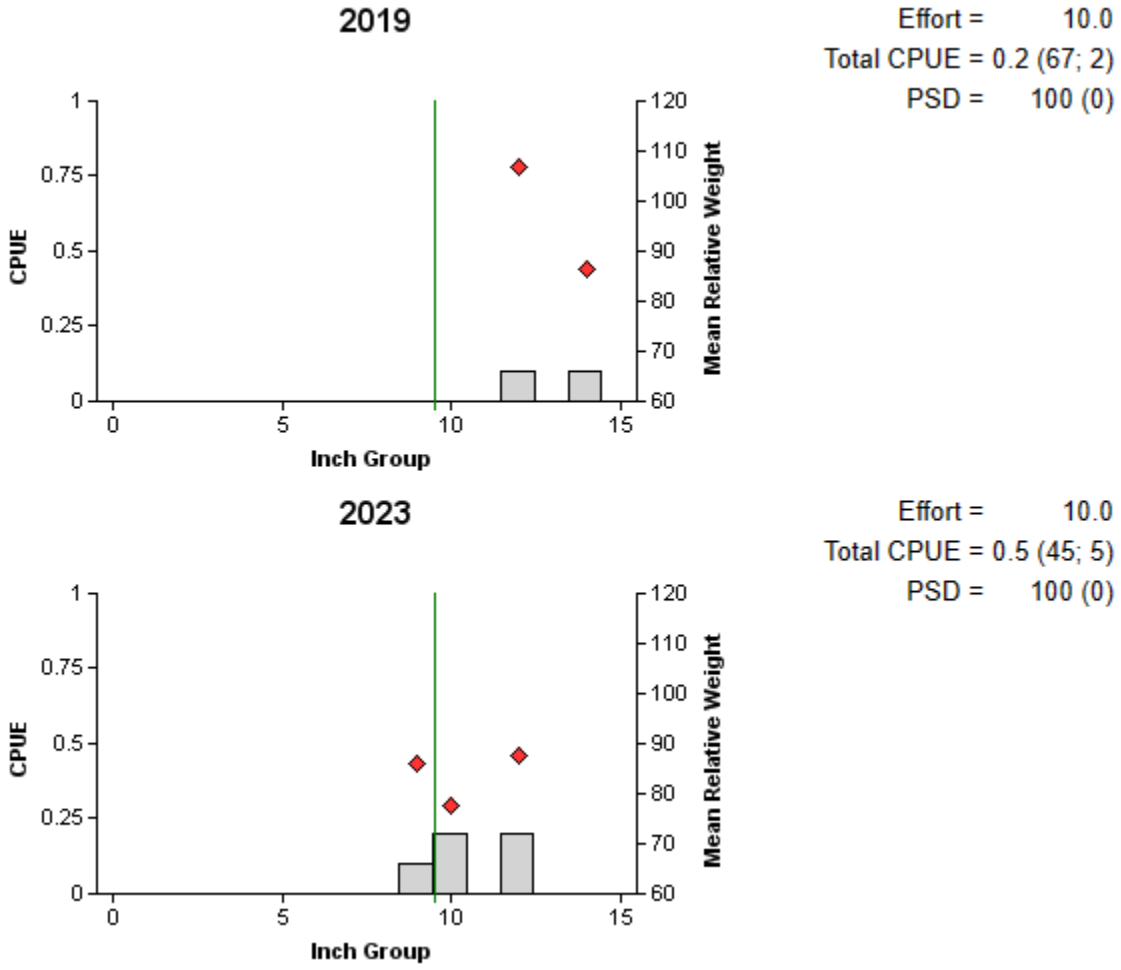


Figure 10. Number of White Crappie caught per net set (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring tandem hoop net surveys, Lake O' the Pines, Texas, 2019 and 2023. Vertical line indicates minimum length limit.

Table 12. Creel survey statistics for crappie species at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey). Total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie species harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year		
	2010/2011	2018/2019	2022/2023
Surface area (acres)	16,269	16,269	16,269
Directed effort (h)	90,888 (40)	40,020 (24)	81,711 (25)
Directed effort/acre	5.59 (40)	2.46 (24)	5.02 (25)
Total catch per hour	1.93 (18)	2.75 (35)	1.78 (25)
Total harvest	119,942 (60)	65,651 (40)	133,720 (37)
Crappie (unidentified)	31,951 (71)	0.0	0.0
White Crappie	17,981 (56)	9,725 (51)	32,017 (39)
Black Crappie	70,010 (56)	55,926 (38)	101,703 (36)
Harvest/acre	7.37 (60)	4.04	8.22 (37)
Percent legal released	1	2	2

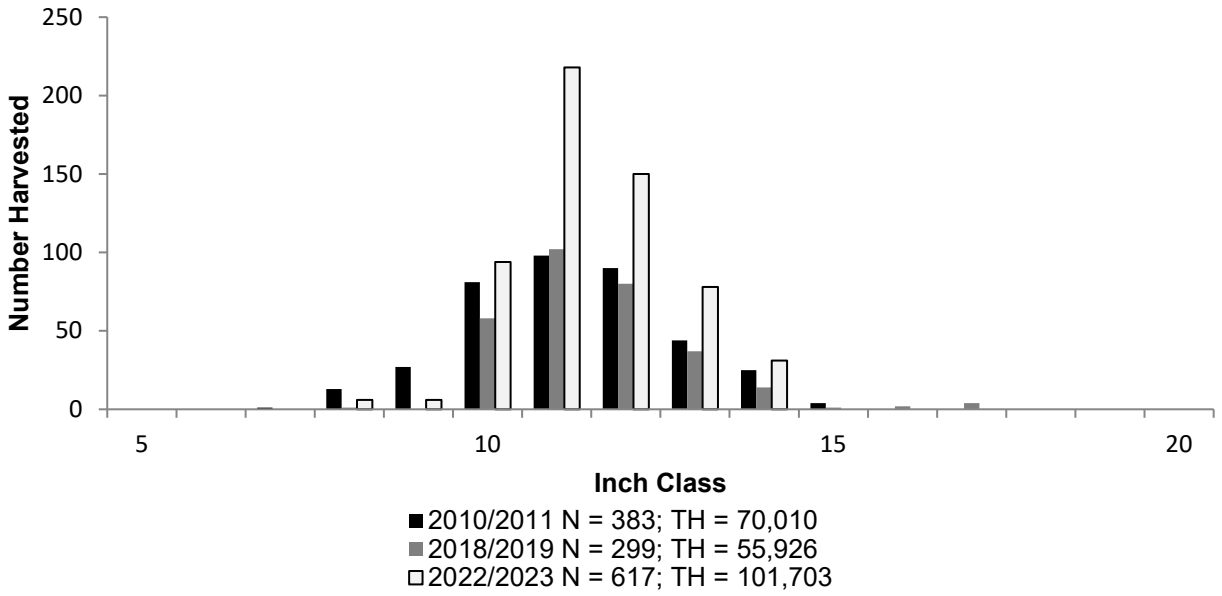


Figure 11. Length frequency of harvested Black Crappie observed during creel surveys at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey), all anglers combined. N is the number of harvested crappie species observed during creel surveys, and TH is the total estimated harvest for the creel period.

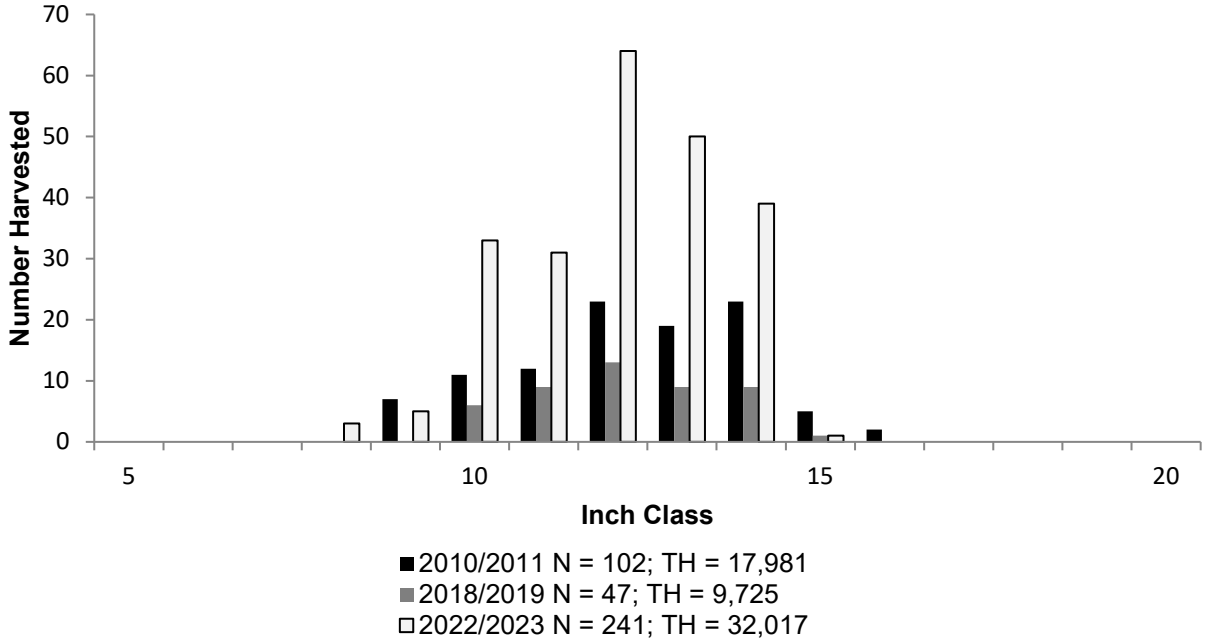


Figure 12. Length frequency of harvested White Crappie observed during creel surveys at Lake O' the Pines, Texas, from June 2010 through May 2011 (roving survey), June 2018 through May 2019 (roving survey), and June 2022 through May 2023 (access point survey), all anglers combined. N is the number of harvested crappie species observed during creel surveys, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 13. Proposed sampling schedule for Lake O' the Pines, Texas. Survey period is June through May. Electrofishing surveys are conducted in the fall and tandem hoop netting surveys are conducted in the spring.

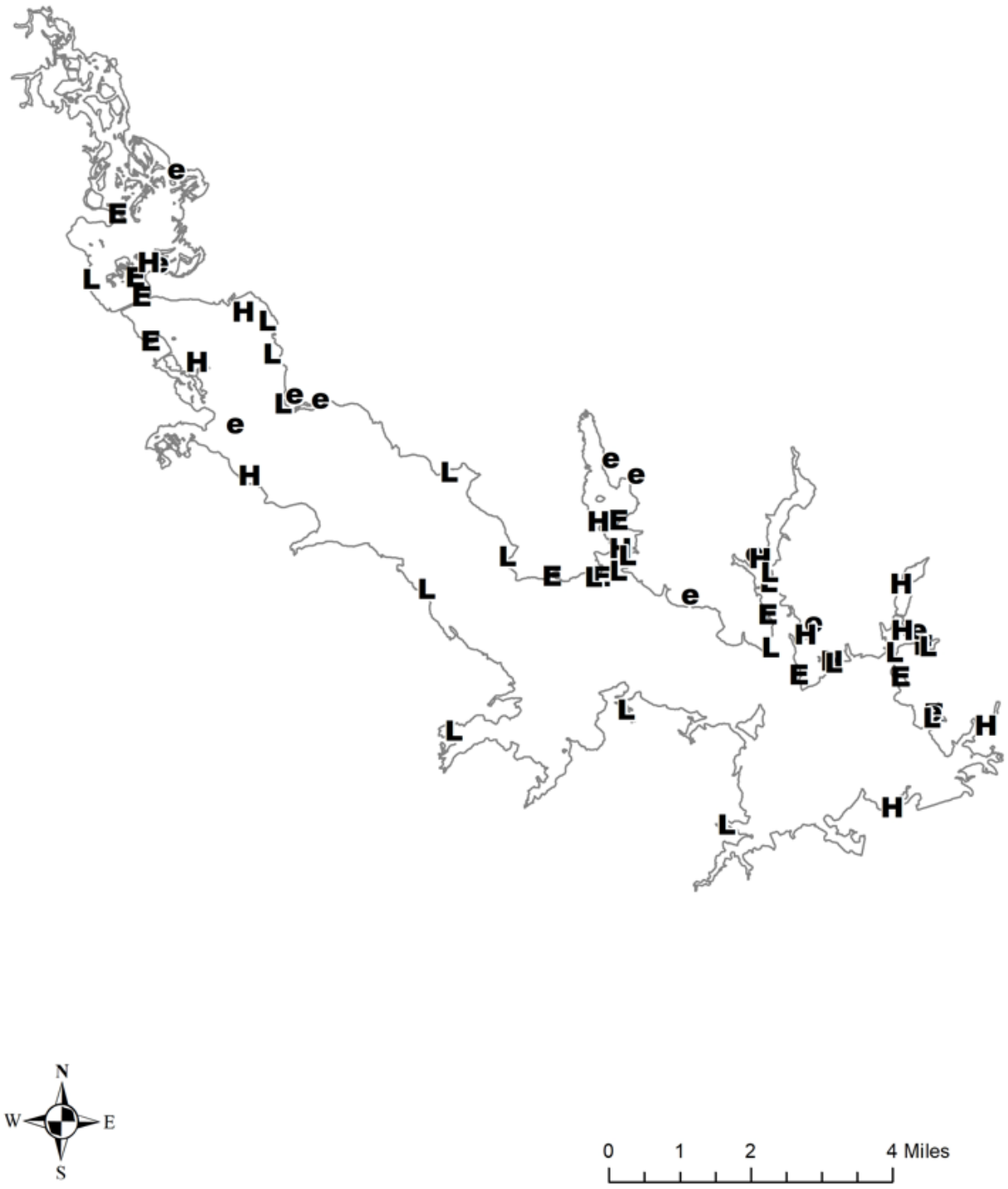
	Survey year			
	2023-2024	2024-2025	2025-2026	2026-2027
Angler Access				X
Structural Habitat				X
Vegetation	X	X	X	X
Electrofishing – Fall		X		X
Tandem hoop netting				X
Creel Survey				X
Report				X

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Lake O' the Pines, Texas, 2022-2023. Sampling effort was 10 net nights for hoop netting, 1 hour for electrofishing, and 1 hour for low-frequency electrofishing.

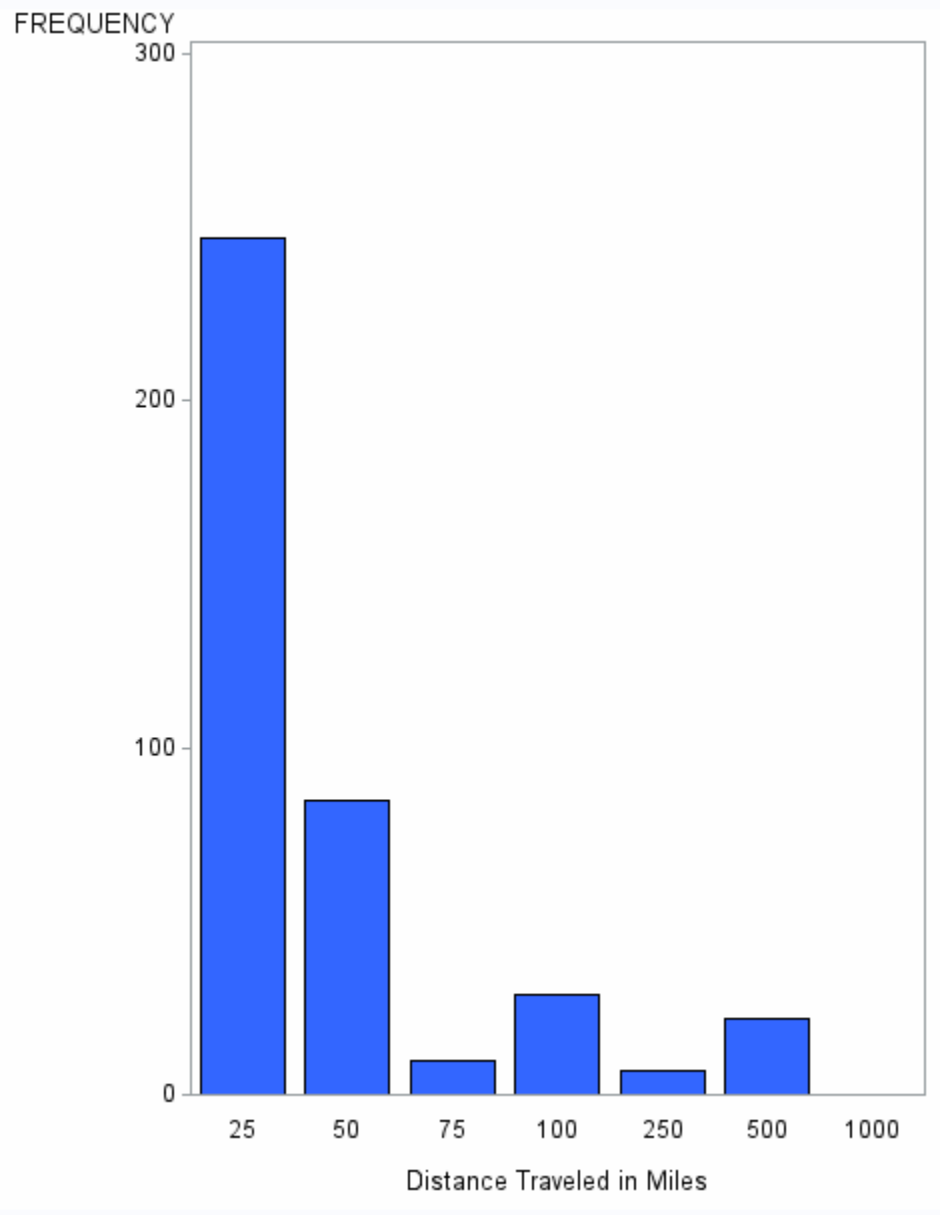
Species	Tandem Hoop Nets		Electrofishing		Low-Frequency Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad			298	298.0 (17)		
Threadfin Shad			906	906.0 (32)		
Channel Catfish	283	28.3 (21)				
Flathead Catfish					4	4.0 (58)
Redbreast Sunfish			5	5.0 (62)		
Bluegill			490	490.0 (23)		
Longear Sunfish			76	76.0 (38)		
Redear Sunfish			112	112.0 (45)		
Redspotted Sunfish			3	3.0 (72)		
Spotted Bass			39	39.0 (35)		
Largemouth Bass			213	213.0 (27)		
White Crappie	5	0.5 (45)				
Black Crappie	18	1.8 (42)				

APPENDIX B – Map of sampling locations



Location of sampling sites, Lake O' the Pines, Texas, 2020-2023. Tandem hoop net (H), nighttime electrofishing (e = 2020; E = 2022), and low-pulse electrofishing (L). 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 O' the Pines, Texas, as determined from the June 2022 through May 2023 creel survey.

APPENDIX D – Trailer Counts June 2022 – May 2023

	Summer		Fall		Winter		Spring		Total	
Boat Ramp	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	%
Cedar Springs	34	10.33	91	15.85	118	21.18	235	22.53	478	19.10
Alley Creek Day Use	31	9.42	99	17.25	50	8.98	156	14.96	336	13.42
Johnson Creek Day Use	44	13.37	82	14.29	87	15.62	97	9.30	310	12.39
Brushy Creek Day Use	57	17.33	31	5.40	26	4.67	72	6.90	186	7.43
Hurricane Creek	20	6.08	44	7.67	63	11.31	49	4.70	176	7.03
Overlook	32	9.73	44	7.67	36	6.46	51	4.89	163	6.51
Tejas	26	7.90	38	6.62	22	3.95	76	7.29	162	6.47
Lone Star	5	1.52	19	3.31	64	11.49	54	5.18	142	5.67
Lakeside	22	6.69	28	4.88	23	4.13	25	2.40	98	3.92
Hwy 155 Ramp	6	1.82	16	2.79	10	1.80	59	5.66	91	3.64
Buckhorn	6	1.82	18	3.14	20	3.59	13	1.25	57	2.28
Johnson Creek (camp)	8	2.43	11	1.92	14	2.51	18	1.73	51	2.04
Pine Hill	2	0.61	14	2.44	4	0.72	23	2.21	43	1.72
Copeland Creek	8	2.43	6	1.05	3	0.54	20	1.92	37	1.48
Alley Creek (camp)	5	1.52	4	0.70	0	0.00	25	2.40	34	1.36
Brushy Creek (camp)	14	4.26	1	0.17	0	0.00	16	1.53	31	1.24
Bullfrog Marina	2	0.61	9	1.57	8	1.44	8	0.77	27	1.08
Big Cypress Marina	2	0.61	6	1.05	2	0.36	8	0.77	18	0.72
Woodie's	1	0.30	1	0.17	0	0.00	16	1.53	18	0.72
Oak Valley	3	0.91	3	0.52	3	0.54	7	0.67	16	0.64
Mims Chapel	1	0.30	5	0.87	1	0.18	9	0.86	16	0.64
Lakeshore East	0	0.00	3	0.52	2	0.36	1	0.10	6	0.24
Holiday Harbor	0	0.00	1	0.17	1	0.18	4	0.38	4	0.16
Pop's Landing	0	0.00	0	0.00	0	0.00	1	0.10	3	0.12
Pine Harbor	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Oak Ridge	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Lakeshore West	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Grand Total	**329**	**100.00**	**574**	**100.00**	**557**	**100.00**	**1,043**	**100.00**	**2,503**	**100.00**

Summary of boat ramp trailer counts in conjunction with 2022-2023 angler creel survey. Counts were conducted on the same day and during the same time period as access point creel survey. Summer = June through August, Fall = September through November, Winter = December through February, and Spring = March through May.

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