Texoma Reservoir

2020 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 Texoma Reservoir were surveyed in 2017 and 2020 using low-frequency electrofishing, trap netting in 2020, electrofishing in 2021, and annually using gill netting. Anglers were surveyed from December 2018 through November 2020 with a joint creel survey conducted with Oklahoma Department of Wildlife Conservation (ODWC). Historical data are presented with the 2017-2021 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: Texoma Reservoir is a 74,686-acre impoundment on the Red and Washita Rivers on the Texas and Oklahoma border with a conservation elevation of 617 feet above mean sea level (msl). Texoma Reservoir exhibits high productivity. Habitat features consisted mainly of natural features, rocky and gravel shoreline, and boat docks. Aquatic vegetation is typically limited. A small amount of yellow floating heart (<1 acre) has occurred near Sunset Camp Public Use area in Oklahoma since the early 2000's. Buttonbush and flooded terrestrial vegetation provide fish cover during periods of high water.

Management History: Important sport fish included Blue and Channel Catfish, White Bass, Striped Bass, Smallmouth Bass, Spotted Bass, Largemouth Bass, and Black and White Crappie. A population of Alligator Gar are present, and portions of the reservoir are closed to harvest during May. Striped Bass were stocked between 1965 and 1985 and have been managed with a 10-fish bag limit, of which no more than two can be longer than 20-inches since 1996. In 2009, a special regulation was implemented for catfish. The 12-inch minimum length limit for Blue Catfish and Channel Catfish and the 18-inch minimum length limit for flathead catfish were removed in September 2020 to better align with Oklahoma statewide regulations. Smallmouth Bass were introduced through four separate stockings from 1981 to 1987. Zebra mussels were first identified in the reservoir in 2009, and are monitored in cooperation with other resource agencies, the U.S. Army Corps of Engineers (USACE), and North Texas Municipal Water District (NTMWD).

Fish Community

- **Prey species:** Threadfin Shad and Gizzard Shad provide an abundant forage base for sport fish and support numerous live-bait guides. Bluegill and other sunfish species also provide a diverse prey base.
- **Catfishes:** Blue Catfish and Channel Catfish are abundant. Many large Blue Catfish support a trophy fishery.
- **Temperate basses:** White Bass abundance fluctuates from year to year, and record catch rates of Striped Bass have been observed during the last three gillnet surveys.
- **Black basses:** Smallmouth Bass, Spotted Bass, and Largemouth Bass are present in Texoma Reservoir and support popular recreational and tournament fisheries.
- **Crappie:** White Crappie and Black Crappie provide a popular fishery at Lake Texoma. Trap net catch rate was lower in 2020 than previous years.

Management Strategies: Based on current information, Texoma Reservoir should continue to be managed with existing harvest regulations. Sampling will include annual gill netting at set locations to monitor Striped Bass in cooperation with ODWC (Oklahoma Department of Wildlife Conservation), and low-pulse electrofishing (LFE) for Blue Catfish will be conducted every third August. A joint electrofishing survey will be conducted with ODWC in spring 2023, and trap netting will be conducted in fall 2024 at randomly selected sites.

Introduction

This document is a summary of fisheries data collected from Texoma Reservoir from 2017-2021. 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 species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2017-2021 data for comparison.

Reservoir Description

Texoma Reservoir is a 74,686-acre impoundment with 580 miles of shoreline constructed in 1944 on the Red and Washita Rivers along the border between Texas and Oklahoma. Denison Dam impounds waters of the upper Red River basin and the entire Washita River basin for a total watershed of 40,000 square miles in west Texas and central and western Oklahoma. Texoma Reservoir is operated and controlled by the USACE. The reservoir purposes include flood control, hydropower, municipal, industrial, and agricultural water supply, and recreation. Water level is managed according to the Seasonal Pool Elevation Management Plan developed by the Lake Texoma Advisory Committee and adopted in 1992 by the USACE. The plan varies from the conventional reservoir conservation elevation (617 ft-MSL; Figure 1 and Figure 2). This unique plan attempts to minimize negative impacts of extreme high and low water conditions. Fish habitat consists primarily of natural features, rocky and gravel shoreline, and boat docks. Aquatic vegetation is seldom present. Texoma Reservoir was eutrophic with a mean trophic state index (TSI) of 57.2 based on Secchi disc readings (Texas Commission on Environmental Quality 2020). Other descriptive characteristics for Texoma Reservoir are listed in Table 1.

Angler Access

Boat access is adequate with 39 public boat ramps at 21 sites on the Texas side of the reservoir, which also have bank angling access available (Table 2). However, some public facilities are leased to private operations which charge a fee for access. Access to facilities for the physically challenged are provided. Two fishing piers (one lighted) are located at Eisenhower State Park. Underwater fishing lights were added to the Eisenhower Yacht Club fuel dock in 2021 across from the lighted fishing pier using funding from the state's Conservation License Plate Program.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Bennett 2017) included:

1. Conduct a creel survey and economic valuation of the Texoma Reservoir fishery. Conduct annual monitoring of Striped Bass along with ODWC.

   Action: A joint creel survey was conducted from December 2018 to November 2020 along with a two-year economic survey conducted by Texas A&M extension service. Annual monitoring of the Striped Bass population has been conducted in February each year.

2. Conduct a Smallmouth Bass electrofishing survey in 2017, explore strategies to improve precision of Smallmouth Bass population metrics in conjunction with ODWC, and monitor tournament catches of Smallmouth Bass.

   Action: An electrofishing survey targeting Smallmouth Bass was conducted in fall 2017. A spring, daytime, bass-only electrofishing survey using ODWC's sampling methods was conducted to compare catch rates of all black bass species with previous results recorded by ODWC.

3. Conduct LFE with ODWC in August 2017.

   Action: Low frequency electrofishing was conducted in 2017 and 2020 to monitor Blue Catfish populations.

4. Recommended continuing our inter-agency role along with personnel from ODWC, USACE, U.S. Fish and Wildlife Service (USFWS), and Dr. Robert McMahon (retired UT Arlington) in monitoring zebra mussels in Texoma Reservoir.

   Action: Fisheries personnel from TPWD and ODWC, USACE, and USFWS conducted observations of zebra mussels while in the field conducting other sampling. The zebra mussel population continues to persist, and staff has continued to disseminate information and signage to stakeholders and the public. TPWD staff has assisted in the replacement of signage and boat ramp stencils as needed.

Harvest regulation history: Only Smallmouth Bass, Spotted Bass, and Largemouth Bass in Texoma Reservoir are currently managed with statewide regulations. All other sport fishes are managed with exceptions to statewide regulations in partnership with ODWC (Table 3). The current 10-fish bag limit with only two fish over 20-inches for Striped Bass has been in effect since 1996. Certain areas of the reservoir (Hagerman National Wildlife Refuge and areas west of State Highway 377) are closed to the harvest of Alligator Gar during the month of May. In 2019, ODWC passed an emergency rule, and proposed a permanent rule, prohibiting the harvest of Alligator Gar statewide during the month of May. Minimum length limits for Blue Catfish, Channel Catfish, and Flathead Catfish were dropped in 2020 to align with Texas and Oklahoma statewide regulations and reduce exemptions in both states.

Stocking history: Texoma's first stocking occurred in 1944 with 67,000 Channel Catfish fingerlings; 2,400 Coppernose Bluegill fingerlings; 225,000 Largemouth Bass fingerlings; and 18,000 Redear Sunfish fingerlings (Table 4). The reservoir was last stocked in 2010 with Threadfin Shad following a large winter die-off, and with 200 adult Channel Catfish each year between 2012 and 2015 following an annual youth fishing event at Eisenhower State Park. Striped Bass were first introduced in 1965, and Smallmouth Bass were introduced through four stockings occurring between 1981 and 1987.

Water transfer: With the discovery of zebra mussels in Texoma Reservoir in 2009, NTMWD ceased water transfer activity to Lavon Reservoir via a tributary (Sister Grove Creek). A direct pipeline to the NTMWD water treatment facility was constructed and became operational in 2014. Raw water is also directly transferred into Randell Lake, a water supply reservoir for the City of Denison, which drains into the Red River below Denison Dam. A damaged raw water pipeline under Dean Gilbert Lake (a 45-acre community fishing lake in Sherman, Texas) resulted in the establishment of zebra mussels in the small waterbody in 2015.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Texoma Reservoir (Bennett 2017). Primary components of the OBS plan are listed in Table 5. Gill netting has been conducted annually in February at 30 fixed sites since 1993, primarily targeting Striped Bass. Survey sites for bass-only electrofishing and low-frequency electrofishing were biologist-selected and randomly selected for trap nets. All survey sites were randomly selected, unless otherwise specified, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Electrofishing – A fall, nighttime electrofishing survey at biologist-selected stations, targeting Smallmouth Bass was conducted in 2017. Largemouth Bass, Spotted Bass, and Smallmouth Bass were collected during spring, daytime electrofishing in 2021 (2.5 hours at 15, 10-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 10 randomly selected fish (range 13.0 to 14.9 inches).

Trap netting – Crappie were collected using trap nets (15 net nights at 15 stations) in Fall 2020. Catch per unit effort for trap netting was recorded as the number of fish caught per net night (fish/nn). Ages for crappie were determined using otoliths from 13 randomly selected fish (range 9.0 to 10.9 inches).

Gill netting – Blue Catfish, Channel Catfish, White Bass, and Striped Bass were collected by gill netting (30 net nights at 30 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for Striped Bass were determined using otoliths from 10 randomly selected fish per inch-group in 2019 (243), and used to develop an age-length key to conduct a catch curve analysis and estimate total annual mortality.

Low-frequency electrofishing – Blue Catfish were collected by low-frequency electrofishing (1.7 hours at 20, 5-min stations) in August of 2017 and 2020. CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

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. Catch Curves and mortality estimates for Striped Bass were calculated using the Fishery Analysis and Modeling Simulator (Slipke and Maceina 2014).

Creel survey – An annual roving creel survey was conducted from November 2018 through December 2020. Angler interviews were conducted on 10 weekend days and 8 weekdays per quarter (9 by TPWD personnel and 9 by ODWC personnel) to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). To accommodate collection of angler contact information and additional questions for economic surveys, lengths of all harvested Striped Bass were categorized by pre-determined length groups.

Habitat – Results of a structural habitat survey were last presented in a 2012 report (Hysmith and Moczygemba 2013). Aquatic vegetation status was assessed during concurrent creel surveys in 2019 and 2020.

Water level – Source for water level data was the United States Geological Survey (USGS 2021).

Results and Discussion

Habitat: Structural and littoral zone habitat availability varies widely at Texoma Reservoir due to water level fluctuations (Figure 1). Results of a structural habitat survey were last presented in a 2012 report (Hysmith and Moczygemba 2013) which reported approximately two-thirds of shoreline habitat consisted of natural shoreline, and the remainder was dominated by gravel or rocky shoreline. Less than one-acre of yellow floating heart was present near Sunset Cove Campground in Oklahoma during creel surveys from 2018 to 2020. Yellow floating heart has been present in this area since the early 2000's yet has not expanded. Lake levels above the seasonal pool elevation (Figure 2) occasionally provide beneficial littoral habitat in the form of inundated buttonbush and terrestrial vegetation during the spring and early summer. Approximately 490 acres of floating piers, boat docks, and marinas also provide habitat (Hysmith and Moczygemba 2013).

Creel: Directed fishing effort by anglers was highest for Striped Bass, accounting for 54.4% (549,371 h) and 43.6% (610,661 h) of the overall angling effort in 2019 and 2020, respectively. Effort for Striped Bass appears to have declined since previous annual creel surveys conducted from 1987 to 1999, when an average of 63.6% (954,000 h) of all angler effort was for Striped Bass (Hysmith and Moczygemba 2000). However, this apparent decline was likely at least partially impacted by extensive flooding in spring/summer 2019 and travel impacts related to the COVID19 pandemic in 2020. We encountered anglers from 21 U.S. states in 2019 yet surveyed anglers from only the six U.S. states in closest proximity to Texoma Reservoir in 2020, indicating long range travelers were not visiting the Texoma area.

An economic valuation was conducted during concurrent creel surveys in 2019 and 2020, indicating anglers spend over 40 million dollars to fish Texoma Reservoir annually (Table 7; Dudensing and Ropicki 2021). Non-regional striped bass anglers accounted for most expenditures associated with fishing at Texoma (Schorr et al. 1995, Dudensing and Ropicki 2021). Hunt and Ditton (1998) found that 18% of Texoma anglers were guided in a 1996 to 1997 attitude and opinion survey, and we found that 16% and 13% of Texoma anglers were guided in 2019 and 2020. This perceived decline likely resulted from flood conditions in 2019 and the Covid pandemic in 2020. Anglers were also asked what fishing license types they possessed during the 2019 creel survey, and we found that 30% of bank anglers and 73% of boat anglers had purchased the special Texoma fishing license ($12) which allowed them access to fish the entire reservoir. This estimate of Texoma license sales may be used in the future to track trends in overall fishing effort at Lake Texoma (Appendix E)

The overall effort for black basses increased from an average of 7.0% from 1987 to 1999, to approximately 20% in 2019 and 2020. Angling effort for catfish and crappie remained consistent with prior creel surveys (Table 6). Angler effort was negatively impacted in both years the creel was conducted from December 2018 to November 2020; still, more than one million hours were spent fishing at Lake Texoma each year.

Prey species: A standard fall electrofishing survey was not conducted in 2020, in favor of a spring survey to estimate catch rates of black basses and determine the merits of partnering with ODWC to conduct a joint lake-wide black bass survey. The primary forage species in Lake Texoma are Gizzard Shad and Threadfin Shad. Historical catch rates are variable and littoral electrofishing is not representative of abundance. Gizzard Shad and Threadfin Shad were observed during sampling for sport fishes, although not enumerated. Catch rates of prey species during fall surveys indicate consistent catch rates of sunfish dominated by Bluegill Sunfish, and moderate catch rates of Longear Sunfish, Redear Sunfish, and Green Sunfish (Appendix C). Body condition of sport fish was adequate ($\geq$85) for most species and was believed to have been reduced for some species by above average density of Striped Bass in recent years.

Catfish: Gill net CPUE of Blue Catfish is not typically representative of population abundance in Texoma Reservoir. Only eight individuals were collected in 2021 (Figure 3), although three fish over 30-inches were collected, including one 45-inch fish. Body condition of Blue Catfish collected in gill nets was adequate and over 90 for most size classes. Low-frequency electrofishing (Figure 4) in August 2017 and

2020, indicated an abundance of Blue Catfish available for harvest by Texoma anglers. The abundance of larger individuals (>30 inches) appears to have declined over the last three surveys; the CPUE-30 declined from 4.7/h in 2014 to 0.6/h in 2020. Low-frequency electrofishing in 2014, 2017, and 2020 produced a stock CPUE of 164/h, 131/h, and 216/h, respectively. Recruitment of a strong year-class of Blue Catfish in 2015 or 2016 was evident in 2017 and 2020 samples. Catfish accounted for an estimated 9% (2019) and 12% (2020) of the overall angling effort at Texoma Reservoir. The catfish fishery supports a few local guide services. Creel surveys estimated 53,363 and 27,583 Blue Catfish were harvested in 2019 and 2020 (Table 8, Figure 6). Higher effort for Blue Catfish, yet lower catch rates and harvest was observed in the 2020 creel survey, likely the result of increased shore-based angler effort observed during the COVID19 pandemic.

Channel Catfish and Flathead Catfish are present in the reservoir but are infrequently collected during gill-netting or targeted low-frequency electrofishing for Blue Catfish (Appendix C). Gill net CPUE of Channel Catfish (0.8/nn; Figure 5) remained low during the targeted February sampling for Striped Bass. Catch rate of Channel Catfish in 2019 and 2020 indicated good recruitment in years since the 2015 flood event. Like Blue Catfish, body condition of Channel Catfish was adequate and increased with size. An estimated 12,230 and 15,671 Channel Catfish were harvested in 2019 and 2020, respectively (Figure 7). The majority of harvested Channel Catfish were between 12- and 20-inches in length.

Temperate Basses: White Bass abundance is cyclical at Texoma Reservoir, and harvest follows suit. An estimated 6,390 White Bass were harvested in 2019 and 36,566 were harvested in 2020 (Table 10). The catch rate of White Bass in 2021 was 9.5/nn, the highest in the last three sampling years. Large White Bass from 12- to 16-inches were collected in gillnets with relative weights as high as 120 (Figure 8).

The latest three gillnet surveys have revealed the Striped Bass population to be more abundant that any prior period since at least 1993 when annual surveys were initiated (Appendix C). This abundance of Striped Bass resulted in depressed shad abundance in late 2019 and early 2020, as reported by guides and apparent during sonar surveys. The paucity of forage was evident in the poor body condition of Striped Bass over 20-inches (Figure 9). However, the population rebounded in 2021 with relative weights above 90 for most size classes. The proportion of Striped Bass above 20-inches has remained above our target of 20% for multiple years. Extensive age samples have been conducted in recent years to monitor impacts of drought and flood events on the Striped Bass population. Missing year classes in 2014 and 2011 (Table 9) resulted from limited river-reservoir connection during extensive drought. Growth has varied among years, and is density dependent, but most Striped Bass reach 20-inches by age 3 or 4 (Table 9). The 2015-year class exhibited an above average growth and recruitment rate due to the virtual absence of a 2014-year class. Catch-curve analysis conducted in 2019 (Appendix F) samples indicated overall total annual mortality of Striped Bass was 53%, and the theoretical maximum age in Texoma was 10 years.

Temperate Bass account for over half-a-million hours of angling effort each year at Texoma Reservoir (Table 10), and over half-a-million Striped Bass are harvested each year. Mean angler catch rates of Striped Bass (2.0/h and 2.3/h) in 2019 and 2020 were high, and anglers harvested 7.3 and 6.5 Striped Bass per acre (Table 10 and Figure 11).

Black Basses: Largemouth Bass CPUE was 56.4 during a 2021 spring electrofishing survey (Figure 12). This CPUE estimate was like that typically observed by ODWC (58.3) using similar sampling methods (ODWC pers. Comm.). CPUE-14 was low to moderate, and only one fish over 18-inches was collected. The PSD of Largemouth Bass was 79. Most Largemouth Bass aged between 13.0 to 14.9 inches were age 2 (N = 10; range 2 - 5); only three Largemouth Bass aged were older.

Electrofishing catch rates of Smallmouth Bass are highly dependent on water temperatures and lake level. A 2017 fall nighttime sample of biologist selected sites allowed us to obtain a record catch rate of Smallmouth Bass; however, the population was comprised primarily of fish between 8- and 12-inches (Figure 13). These fish likely indicated above average recruitment of fish produced during the flood year of 2015. The PSD of Smallmouth Bass in 2017 (23) was like prior years, and the PSD-P was consistent

with prior years. Our spring 2021 bass-only electrofishing survey allowed us to collect larger fish up to 19-inches, and our CPUE-14 was 7.6 (Figure 14). Relative weight indices for Smallmouth Bass have always suggested Smallmouth are in poor condition. However, Smallmouth Bass often support winning Texoma tournament angler's bag limits. Approximately 15% and 13% of tournament retained black bass were Smallmouth Bass in 2019 and 2020, respectively.

Spotted Bass electrofishing catch rates (15.6/h, Appendix C) were similar to catch rates of Smallmouth at Texoma. Body condition of Spotted Bass was similarly low (W_r = 85-90) for most size-classes.

Little traditional harvest of Black Bass was observed during the creel surveys; five Largemouth Bass from 14- to 20-inches were observed harvested in the creel each year in 2019 and 2020 (Figure 15). No documented traditional harvest of Spotted Bass occurred during 2019 or 2020 creel surveys; however, Spotted Bass were likely reported by anglers as released Largemouth Bass. An estimated 18,683 Largemouth Bass, 3,854 Smallmouth Bass, and 3,022 Spotted Bass were retained for weigh-in by tournament anglers in 2019 (Table 11 and Figure 16), and 10,734 Largemouth Bass, 1,903 Smallmouth Bass, and 4,041 Spotted Bass were retained in 2020 (Table 11 and Figure 17). Tournament effort accounted for 65% of all effort for black bass in 2019 and 54% in 2020. Some tournaments were cancelled or postponed during the height of the COVID19 pandemic, which likely accounted for the reduced tournament effort in 2020.

White Crappie: The trap net catch rate of Crappie was 5.5/nn in 2020, down from a record CPUE of 19.3/nn in 2016 (Figure 17). The catch rate of legal length crappie (0.7/nn) has also steadily declined since 2012 (4.2/nn). White Crappie are markedly more abundant than Black Crappie, although both provide a popular fishery. Crappie accounted for 7.9% and 9.1% of overall angling effort at Lake Texoma in 2019 and 2020, respectively. Body condition of crappie was excellent for most size classes ($W_r \geq 100$). All White Crappie aged (N=13) reached the minimum length limit (10-inches) by age one.

Anglers harvested an estimated 114,157 and 167,073 crappies in 2019 and 2020, respectively (Table 12). Mean angler catch rate (2.9/h in 2019, 2.7/h in 2020) was high for crappie anglers. Crappie up to 17-inches were observed in the creel surveys (Figure 18).

Fisheries Management Plan for Texoma Reservoir, Texas

Prepared – July 2021

ISSUE 1: Texoma Reservoir supports a popular and valuable Striped Bass fishery that support hundreds of fishing guides and contributed more than $40 million to the local regional economy (Dudensing et al. 2021). It is important for fisheries managers in Texas and Oklahoma to annually monitor the population especially since extreme water level fluctuations can significantly impact fish populations.

MANAGEMENT STRATEGIES

1. Conduct annual gill netting surveys at 30 established stations. ODWC personnel will set 15 stations, and TPWD personnel will conduct 15 stations.
2. TPWD and ODWC will partner to access recruitment by seining each June if lake levels allow access to open shoreline areas.
3. Resulting data will be shared, analyzed, and presented annually at a Texoma Reservoir management meeting and Lake Texoma Stakeholder meetings.

ISSUE 2: The proportion of Texoma anglers targeting black basses has tripled, and tournament activity has increased.

MANAGEMENT STRATEGIES

1. Conduct a spring electrofishing survey in 2023 in conjunction with ODWC to improve precision and efficiency of all Black Bass monitoring efforts.
2. Monitor tournament catches of Smallmouth Bass to assess trends and their overall contribution to the black bass tournament fishery.

ISSUE 3: Passive gear effort and harvest is believed to be considerable for catfish at Lake Texoma. Recent creel surveys and the economic surveys have systematically avoided passive gear anglers.

MANAGEMENT STRATEGY

1. Coordinate with ODWC to conduct a passive gear creel survey at Texoma to supplement catfish effort, catch, and harvest information.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, water skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the USACE to maintain appropriate signage at access points around the

reservoir.
2. Provide USACE with up-to-date information on invasive species. Provide them with posters, literature, etc… so that they can in turn educate their reservoir visitors.
3. Educate the public about invasive species through 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.
6. Continue to implement clean, drain, and dry protocols for office equipment.

Objective-Based Sampling Plan and Schedule (2021-2025)

Sport fish, forage fish, and other important fishes

Sport fishes in Texoma Reservoir include Striped Bass, White Bass, Blue Catfish, Channel Catfish, crappies, Largemouth Bass, Spotted Bass, and Smallmouth Bass. Important forage species include Bluegill, Gizzard Shad, and Threadfin Shad. A complete sampling schedule is listed in Table 13.

Survey objectives, fisheries metrics, and sampling objectives

Temperate Basses: Striped Bass are the most sought-after sport fish in Texoma Reservoir. General monitoring trend data has been collected annually since 1993 through cooperative sampling efforts with the ODWC Fisheries team. Routine monitoring will be conducted via winter gill netting at 30 fixed sampling stations. Data collected are sufficient for evaluating relative abundance, size structure, and body condition with high precision. Age-and-growth data will be periodically collected to estimate growth, mortality, and recruitment.

White Bass are abundant in Texoma Reservoir and provide a popular fishery. White Bass are frequently targeted and harvested by anglers also targeting Striped Bass. Long term monitoring trend data for White Bass will be collected along with gill netting to monitor the Striped Bass fishery. Gill netting conducted at 30 fixed sampling stations typically yields high precision data for evaluating White Bass relative abundance, size structure, and body condition. No additional effort will be expended to collect White Bass beyond that needed to reach sampling objectives for Striped Bass.

Catfishes: Blue Catfish and Channel Catfish are both present in Texoma Reservoir, and data for both species will be collected annually using gill nets while sampling for Striped Bass. Sampling precision is highly variable for both species during targeted sampling for Striped Bass, thus no specific sampling objectives using gillnets will be set for Blue Catfish or Channel Catfish will be set.

Low-frequency electrofishing will be conducted every third summer in cooperation with ODWC to collect additional, high-precision trend data (RSE $\leq$ 25 for CPUE-S) for Blue Catfish to monitor relative abundance, size structure, and body condition. Low Frequency Electrofishing will be conducted in August 2023.

Black Basses: Largemouth Bass, Spotted Bass, and Smallmouth Bass are present in Texoma Reservoir, and these species provide a popular fishery. General monitoring trend data has been collected once every four years with fall, nighttime electrofishing; however, we will suspend fall sampling

in an effort to improve efficiency and precision (RSE ≤ 25 for CPUE-S for Largemouth Bass and Smallmouth Bass) by partnering with ODWC to conduct a joint spring electrofishing survey for a total of 5 hours of sampling effort at 30 sites. This level of effort should provide high precision data for all black bass species and provide a robust data set to monitor trends in abundance and size structure over time. Trend data on CPUE and body condition for stock-size and larger Largemouth Bass and Smallmouth Bass will be collected. Body condition of Spotted Bass will also be determined. Thirteen Largemouth Bass between 13.0 and 14.9 inches will be collected to estimate age at the minimum length limit (14 inches). Relative weight of Largemouth Bass ≥ 8" TL, and Smallmouth Bass and Spotted Bass ≥ 7" TL, will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class for each species). For Spotted Bass, effort beyond that necessary to meet objectives for Largemouth Bass and Smallmouth Bass will not be conducted.

Crappie: Both White and Black Crappie are present in Texoma Reservoir; however, Black Crappie are lower in abundance. Crappie in Texoma Reservoir are managed with a 37 fish/day bag limit and a 10" MLL. To monitor for any large-scale changes in the White Crappie population, we will collect trend data to evaluate relative abundance, size structure, growth to the MLL, and body condition with fall, single-cod shoreline trap nets every four years. We estimate that we can collect a minimum of 50 stock-size White Crappie, with an RSE of CPUE-S ≤ 25, with 15 to 19 net nights. A minimum of 15 stratified, random sample sites will be determined along the upper, middle, and lower Texas shoreline of Texoma Reservoir; however, additional sample sites will be prepared if it is determined our objectives can be met with reasonable additional effort. This level of sampling should provide a sufficient number of White Crappie between 9.0 and 10.9 inches to estimate mean age at legal length (10 inches). Data on Black Crappie will be collected along with White Crappie; however, no additional effort will be expended beyond that which is necessary to achieve sampling objectives for White Crappie.

Bluegill and shad: Sampling of forage species will be suspended to accommodate an intensive bass-only spring electrofishing survey with ODWC. Predator body condition will provide information on forage abundance, vulnerability, or both relative to predator density, and determine if additional monitoring is needed.

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Tables and Figures

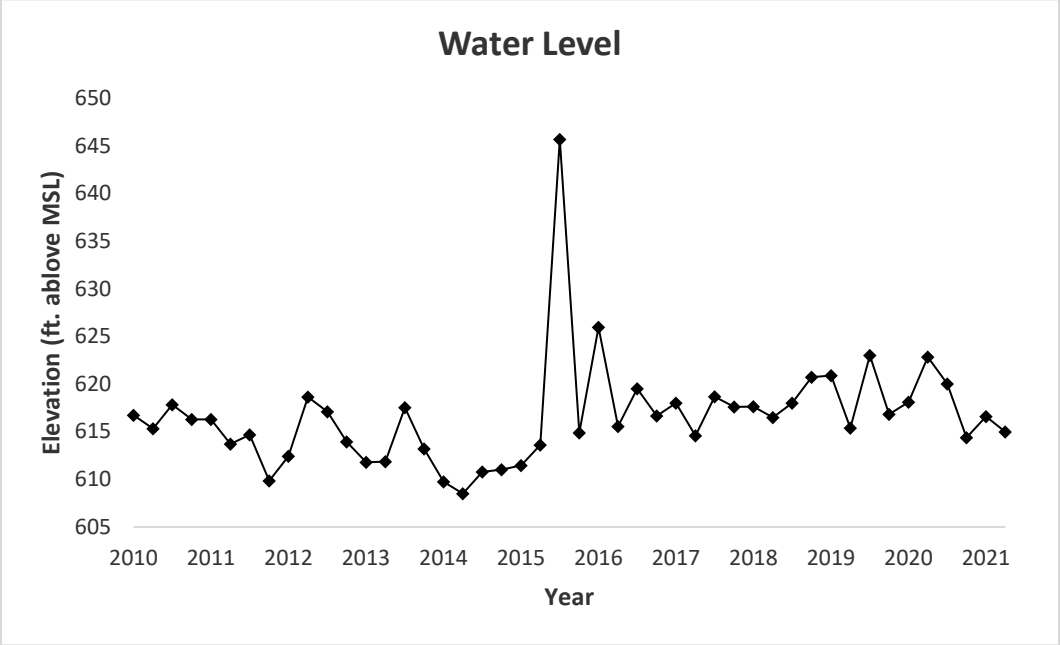


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Texoma Reservoir, Texas.

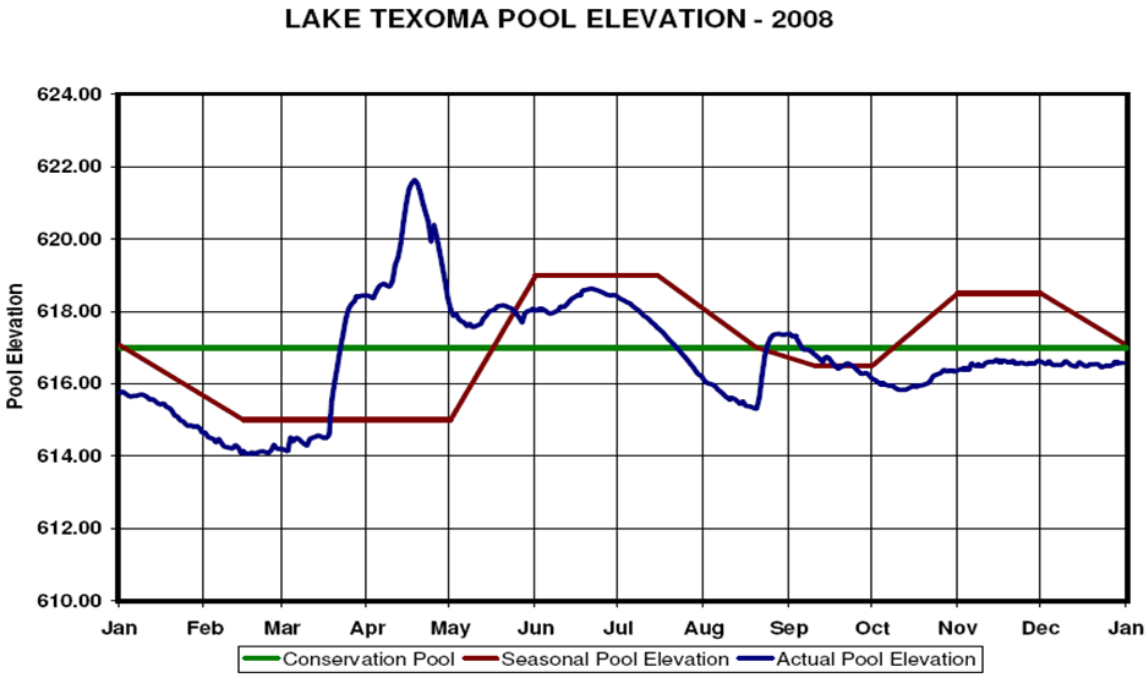


Figure 2. Example of the seasonal pool elevation management plan for Texoma Reservoir 2008.

Table 1. Characteristics of Texoma Reservoir, Texas.

Characteristic	Description
Year constructed	1944
Controlling authority	U.S. Army Corps of Engineers
County	Grayson and Cooke, Texas; Bryan, Marshall, and Love, Oklahoma
Reservoir type	Mainstem
Shoreline Development Index	13.9
Conductivity	1,000-2,000 µS/cm

Table 2. Boat ramp characteristics for Texoma Reservoir, Texas, August 2020. Reservoir elevation at time of survey was 618 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Dam site	33.8165 -96.5764	90	607	Excellent
Eisenhower State Park West	33.8141 -96.6080	30	611	Adequate
Eisenhower State Park East	33.8141 -96.6079	30	604	Excellent
Grandpappy Point	33.8580 -96.6446	5	606	Excellent
Preston Bend Recreation Area	33.8745 -96.6440	10	612	Adequate
Little Mineral Marina	33.8716 -96.6474	10	605	Excellent
Lighthouse Marina North	33.8608 -96.6607	10	605	Adequate
Lighthouse Marina South	33.8598 -96.6601	10	608	Adequate
Preston Shores	33.8438 -96.6691	5	607	Excellent
Simmons Shores	33.8242 -96.6680	20	609	Excellent
Walnut Creek	33.8107 -96.8340	20	608	Excellent
Big Mineral Camp	33.7865 -96.8061	20	610	Adequate
Cedar Mills Marina	33.8294 -96.8115	10	604	Adequate
Flowing Wells Resort	33.7773 -96.7712	15	610	Excellent
Highport Marina	33.8263 -96.7050	84	604	Excellent
Mill Creek Marina	33.8201 -96.7712	10	612	Adequate
Juniper Point East	33.8614 -96.8294	25	613	Adequate
Juniper Point West	33.8619 -96.8351	16	607	Excellent
Texoma Marina and Resort	33.8683 -96.8914	15	606	Excellent
Cedar Bayou Marina	33.8440 -96.8527	10	607	Excellent
Paradise Cove	33.7871 -96.7841	20	610	Adequate

Table 3. Harvest regulations for Texoma Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	15 (in any combination)	No minimum (only one blue catfish ≥ 30 inches)
Catfish, Flathead	5	None
Bass, White	25	None
Bass, Striped: its hybrids and subspecies	10 (in any combination)	None (only 2 ≥ 20 inches)
Bass, Largemouth, Spotted, and Smallmouth	5 (in any combination)	14-inch minimum for Largemouth and Smallmouth Bass
Crappie: White and Black crappie, their hybrids and subspecies	37 (in any combination)	10-inch minimum
Alligator Gar	1 (certain areas closed to harvest in May)	None

Table 4. Stocking history of Texoma Reservoir, Texas (TPWD-only). Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), sub-adults (SADL), and adults (ADL).

Year	Number	Size
Threadfin Shad		
1979	31,181	AFGL
1982	1,500	AFGL
1984	19,176	AFGL
1985	271,959	AFGL
2010	2,000	ADL
Total	325,816	
Bluegill		
1945	22,400	AFGL
1948	15,500	AFGL
1949	18,000	AFGL
1951	4000	AFGL
1979	20,400	AFGL
Species Total	80,300	
Coppernose Bluegill		
1944	2,400	AFGL
Redear Sunfish		
1944	18,000	FGL
1945	220,500	FGL
1946	116,000	FGL
1947	16,000	FGL
1948	82,500	FGL
1949	87,000	FGL
1951	4,000	FGL
Species Total	544,000	
Warmouth		
1947	4,000	FGL
Other sunfishes		
1945	14,000	FGL

Year	Number	Size
Channel Catfish		
1944	67,000	FGL
1945	104,500	FGL
1946	43,000	FGL
1947	18,000	FGL
1948	6,000	FGL
1949	9,000	FGL
1974	30,000	FGL
1979	12,200	FGL
2002	67,000	FGL
2012	200	ADL
2013	200	ADL
2014	200	ADL
2015	200	ADL
Species Total	357,500	
Kemp's Largemouth Bass		
1975	80,000	FGL
Largemouth Bass		
1944	225,000	FGL
1945	61,000	FGL
1946	7,000	FGL
1947	14,500	FGL
1948	28,000	FGL
1949	34,000	FGL
1949	425,000	FRY
1951	34,000	FGL
1953	142,000	FGL
1954	8,000	FGL
1980	30,976	FGL
Species Total	1,009,476	

Table 4. Stocking history continued.

Year	Number	Size
Florida Largemouth Bass		
1975	200,000	FGL
1975	112,000	FRY
1976	25,000	FGL
1977	23,748	FGL
1977	200,000	FRY
1986	231,850	FGL
1997	109,950	FGL
1998	110,500	FGL
1999	327,191	FGL
2000	324,444	FGL
Species Total	1,664,683	
Smallmouth Bass		
1981	576,655	FGL
1982	452,372	FGL
1983	48,104	FGL
1987	6,800	FGL
Species Total	1,083,931	
Paddlefish		
1999	5,757	SADL
2000	20,846	SADL
2001	770	SADL
2002	16,792	SADL
2003	4,421	SADL
2004	26,330	SADL
2005	30,478	SADL
2006	10,920	SADL
2007	2,029	SADL
Species Total	118,343	
Rock Bass		
1945	21,000	FGL
1947	4,000	FGL
Species Total	25,000	
Walleye		
1968	50,400	FGL
1968	400	FRY
1969	500,000	FGL
1970	3,219,891	FRY
1975	8,398,000	FRY
1976	98,000	FGL
1976	180,000	FRY
1977	2,261,000	FRY
Species Total	14,707,691	
Striped Bass		
1965	138	FGL
1967	200,000	FRY
1968	5,000	FGL
1969	284,614	FGL
1970	77,640	FGL
1971	96,839	FGL
1972	208,340	FGL
1973	141,612	FGL
1974	548,898	FGL
1977	1,600	FGL
1984	490	FGL
1985	500	FGL
Species Total	1,565,671	
White Crappie		
1945	3,000	FGL
1946	28,000	FGL
1948	11,100	FGL
1953	12,000	FGL
Species Total	54,100	

Table 5. Objective-based sampling plan components for Texoma Reservoir, Texas 2017 – 2021.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Smallmouth Bass	Abundance	CPUE – stock	exploratory
	Size structure	PSD, length frequency	N ≥ 25 stock
	Condition	W_r	10 fish/inch group (max)
Spotted Bass	Abundance	CPUE – stock	exploratory
	Condition	W_r	10 fish/inch group (max)
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)
Low-frequency electrofishing			
Blue Catfish	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	Length frequency	N ≥ 50 stock
Trap netting			
White Crappie	Abundance	CPUE – Total	RSE ≤ 25
	Size structure	PSD, length frequency	N = 50
	Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches
Gill netting			
Striped Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Mean length at age	10 fish/inch group (ODWC)
	Condition	W_r	10 fish/inch group (max)
White Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	Wr	10 fish/inch group (max)
Blue and Channel Catfish	Abundance	CPUE– Total	exploratory
	Size structure		exploratory

Table 6. Percent directed angler effort by species for Texoma Reservoir, Texas, 1987–1999, 2019, and 2020. Survey periods were from 1 Dec through 30 Nov. Tournament effort for Black Bass in parentheses.

Species	1987-1999	2019	2020
Catfish	8.5	8.7	12.7
White Bass	3.3	1.2	0.9
Striped Bass	63.6	54.4	43.6
Black Bass	7.0	20.4 (13)	19.6 (11)
Crappie	5.5	7.9	9.1
Anything	12.1	7.4	14.5

Table 7. Total fishing effort (h) for all species and total directed expenditures at Texoma Reservoir, Texas, 1987 to 1999 (average), 2018-2019, and 2019-2020. Survey periods were from 1 Dec. through 30 Nov. Relative standard error is in parentheses.

Creel statistic	1987-1999	2018-2019	2019-2020
Total fishing effort	1,500,000 (range 1,200,000 to 2,100,000)	1,006,061 (10)	1,399,718 (11)
Total directed expenditures	$25,641,000 (Schorr et al. 1995)	$46,007,709	$42,100,268

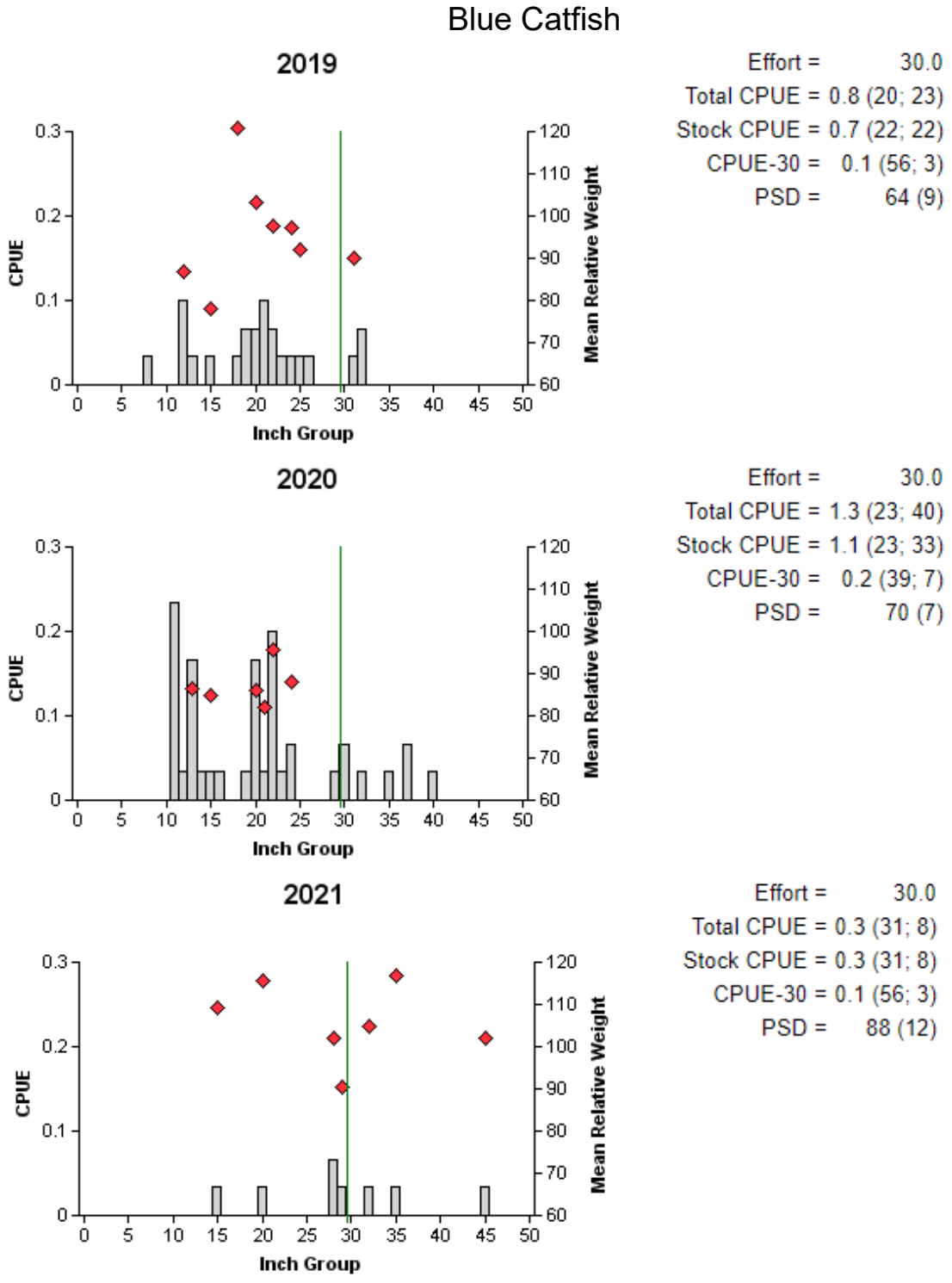


Figure 3. Number of Blue Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Texoma Reservoir, Texas, 2019, 2020, and 2021. Vertical line indicates 30-inch graduated bag limit.

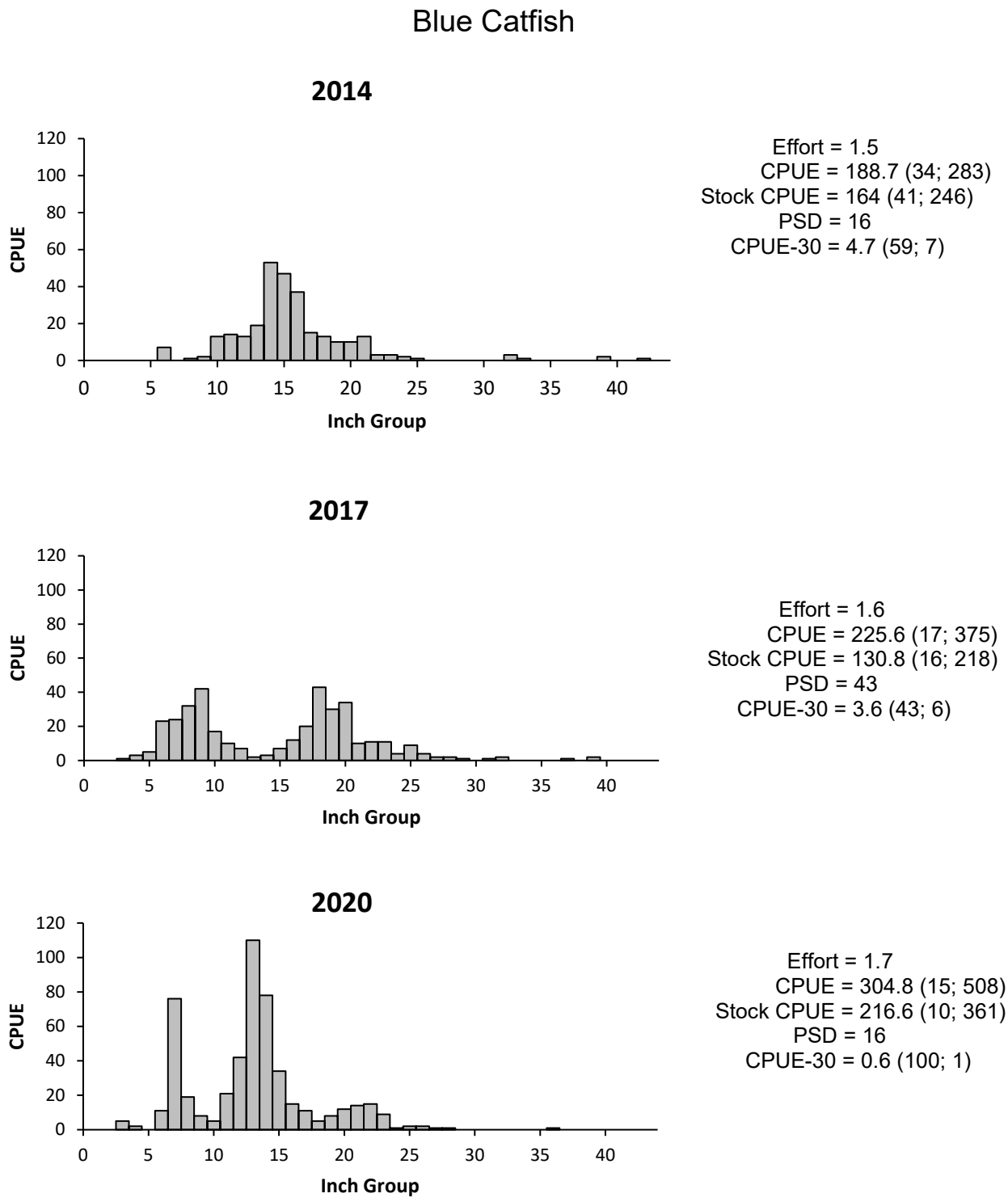


Figure 4. Number of Blue Catfish (CPUE, bars) caught with summer low-pulse electrofishing survey, Texoma Reservoir in 2014, 2017, and 2020. Survey conducted by Oklahoma Department of Wildlife Conservation and Texas Parks and Wildlife Department.

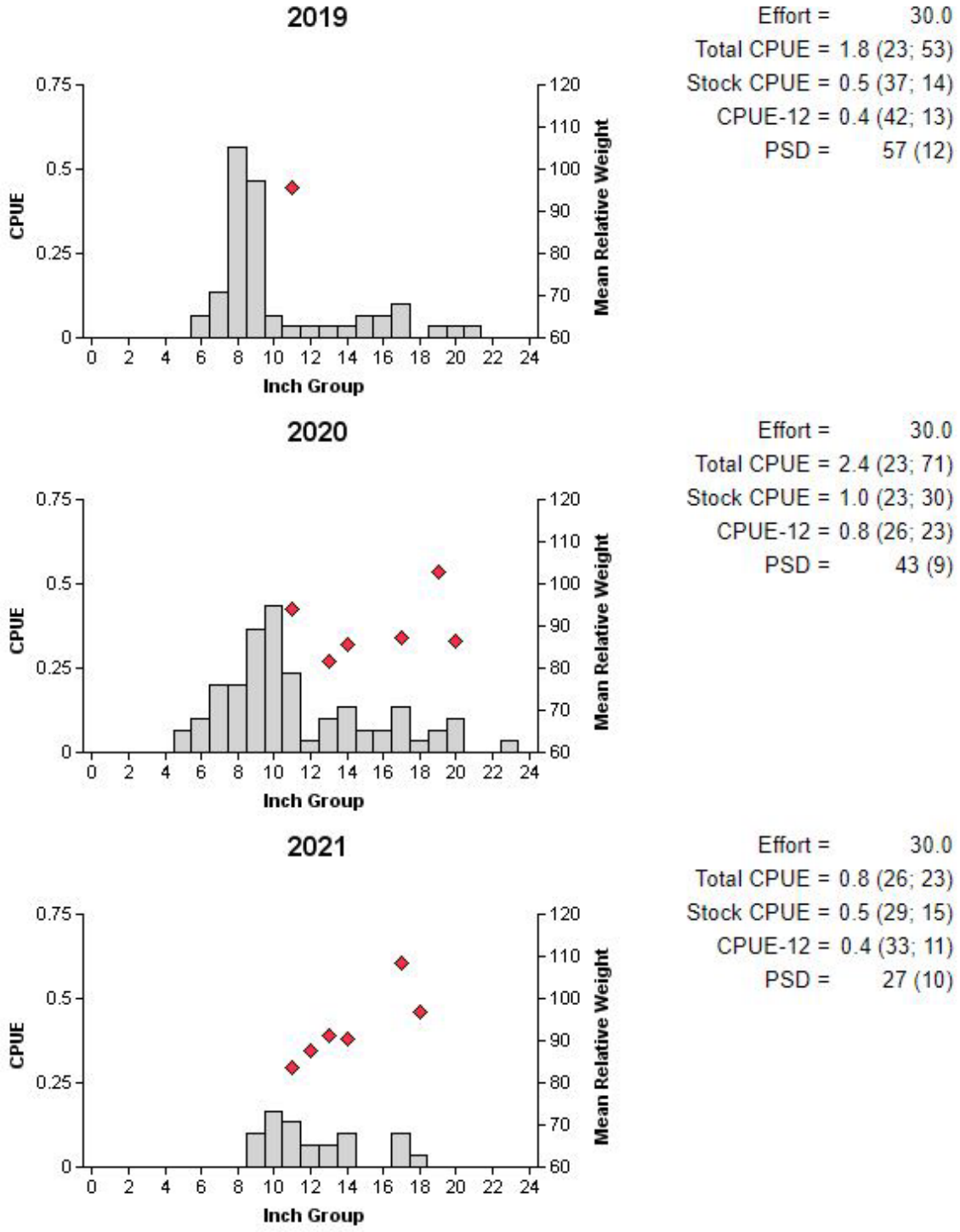


Figure 5. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Texoma Reservoir, Texas, 2019, 2020, and 2021.

Catfishes

Table 8. Creel survey statistics for catfish at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020. 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	Year	
	2018/2019	2019/2020
Surface area (acres)	77,588	77,259
Directed effort (h)	87,089 (15)	178,513 (14)
Directed effort/acre	1.1 (15)	2.3 (14)
Total catch per hour	1.5 (56)	0.6 (83)
Total harvest		
Blue Catfish	53,363 (44)	27,583 (64)
Channel Catfish	12,230 (106)	15,671 (109)
Harvest/acre		
Blue Catfish	0.7 (44)	0.4 (64)
Channel Catfish	0.2 (106)	0.2 (109)
Percent legal released	18	19

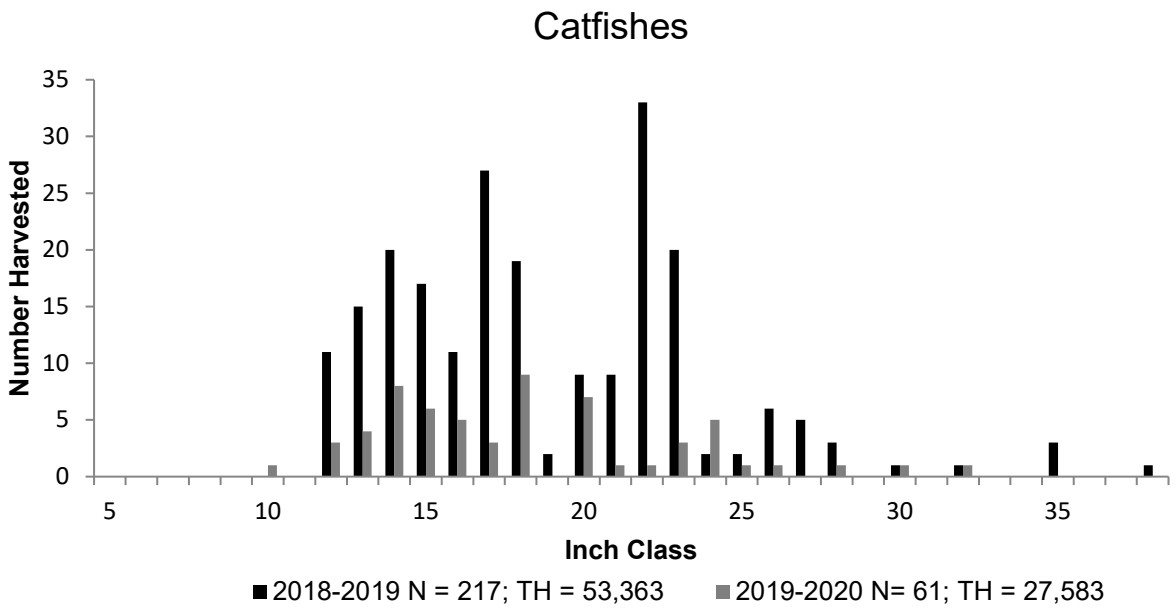


Figure 6. Length frequency of harvested Blue Catfish observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020 all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

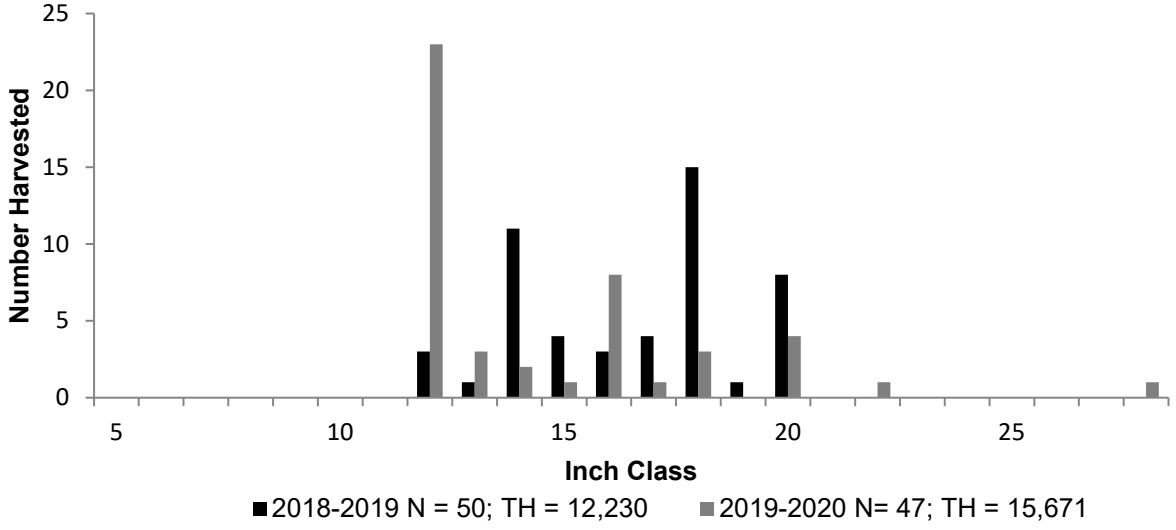


Figure 7. Length frequency of harvested Channel Catfish observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020 all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

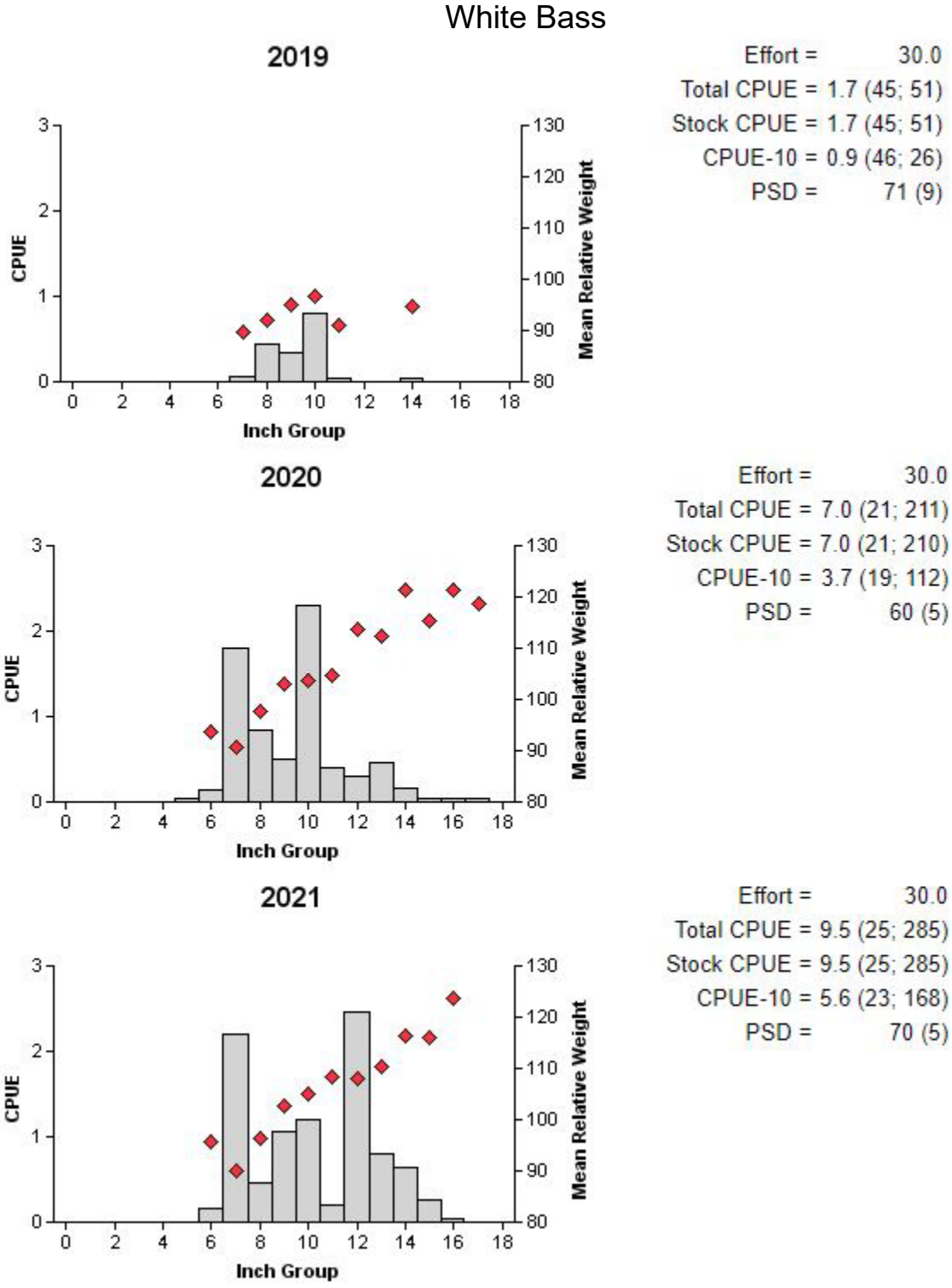


Figure 8. Number of White Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Texoma Reservoir, Texas, 2019, 2020, and 2021.

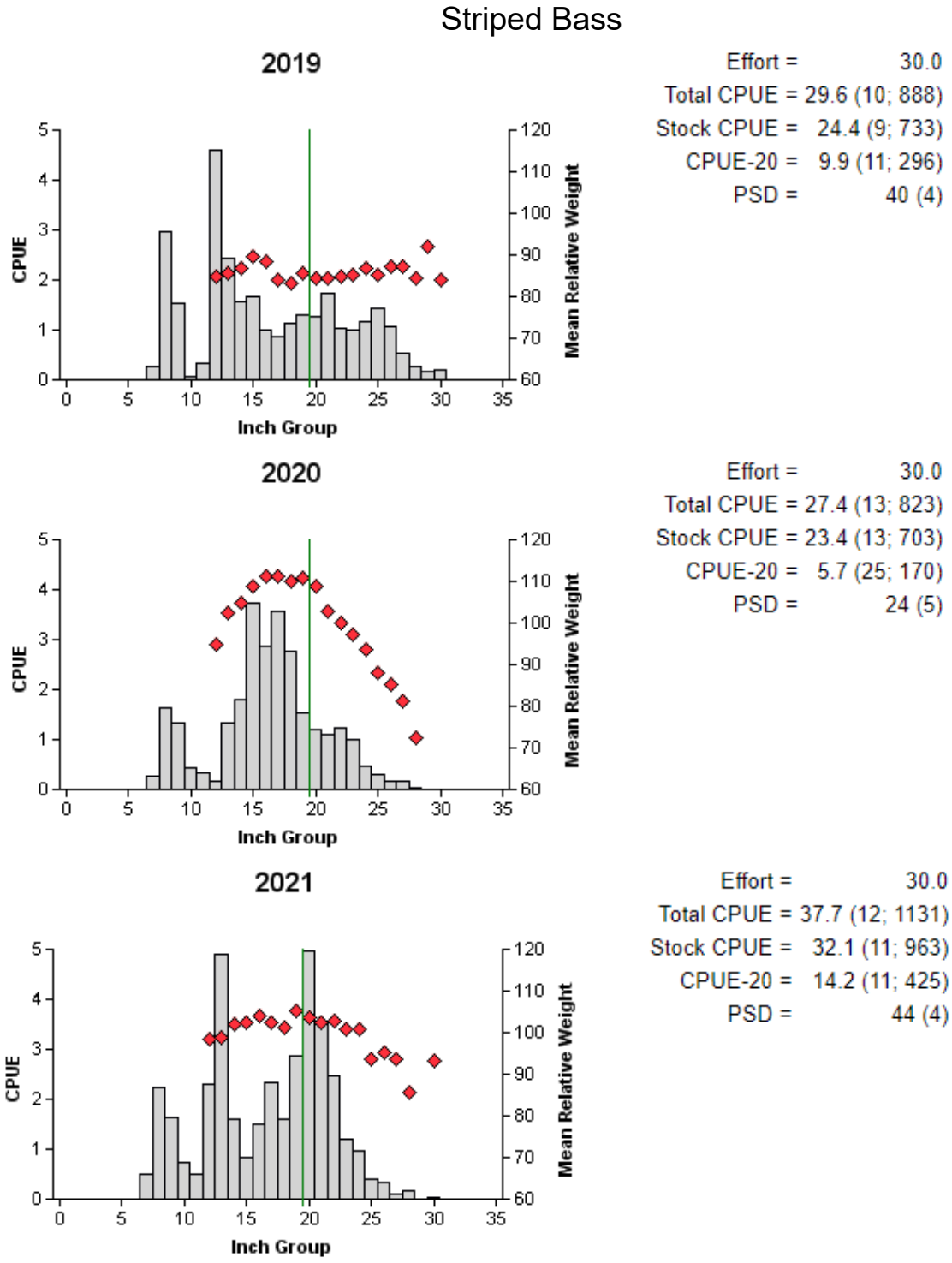


Figure 9. Number of Striped Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Texoma Reservoir, Texas, 2019, 2020, and 2021. Vertical line indicates graduated bag limit length.

Temperate Basses

Table 9. Average length (inches) at capture for Striped Bass (sexes combined) ages 1 – 8 collected in gill net surveys, Texoma Reservoir, Texas, 2018, 2019, and 2020. Lengths are followed by the standard error and sample size in parenthesis (SE; N). No data indicates no fish of that age class were collected.

Age	Date of sample		
	February 2018	February 2019	February 2020
1	9.2 (1.9; 29)	8.9 (0.9; 31)	9.9 (1.8; 42)
2	16.1 (1.6; 85)	13.8 (1.2; 73)	14.8 (1.2; 46)
3	22.6 (1.0; 55)	20.3 (1.2; 83)	18.1 (0.8; 62)
4		25.9 (1.0; 38)	22.5 (1.0; 86)
5	25.9 (1.0; 10)		26.2 (1.5; 8)
6	27.3 (1.5; 14)	28.4 (1.7; 7)	
7		28.9 (1.9; 10)	28.5 (N/A; 1)
8	31.0 (1.3; 2)	27.2 (N/A; 1)	

Table 10. Creel survey statistics for Striped Bass and White Bass at Texoma Reservoir, Texas, from December 2018 through November 2019, and December 2019 through November 2020. Total catch per hour is for anglers targeting Striped Bass and White Bass. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2018/2019	2019/2020
Surface area (acres)	77,588	77,259
Directed effort (h)	549,371 (12)	610,661 (13)
Directed effort/acre	7.1 (12)	7.9 (13)
Total catch per hour	2.0 (15)	2.3 (17)
Total harvest		
Striped Bass	564,362 (19)	504,149 (20)
White Bass	6,390 (113)	36,556 (44)
Harvest/acre		
Striped Bass	7.3 (19)	6.5 (20)
White Bass	0.1 (113)	0.5 (44)
Percent released		
Striped Bass	47	55
White Bass	84	85

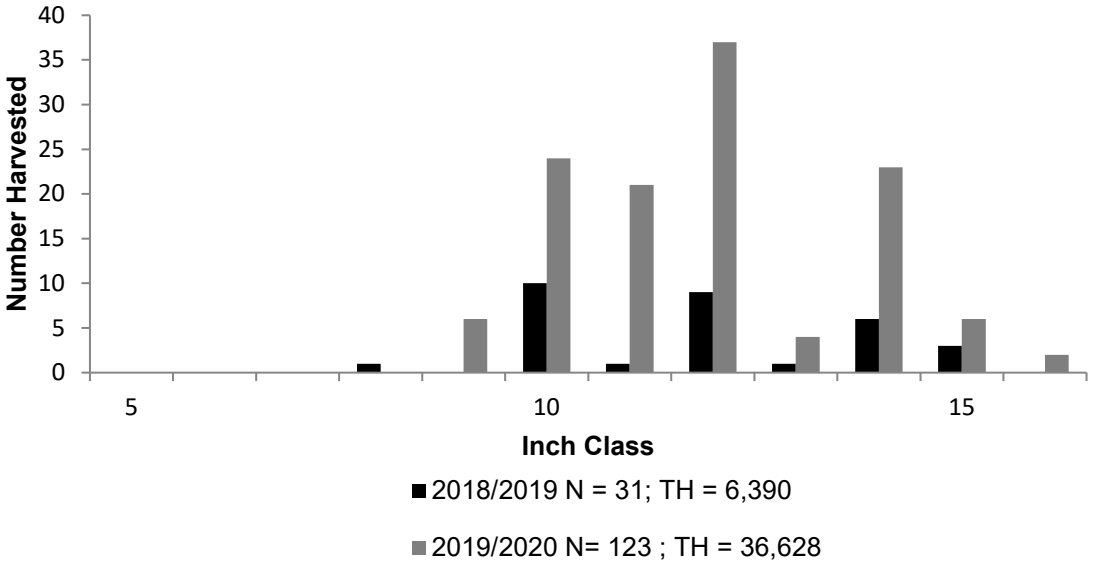


Figure 10. Length frequency of harvested White Bass observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

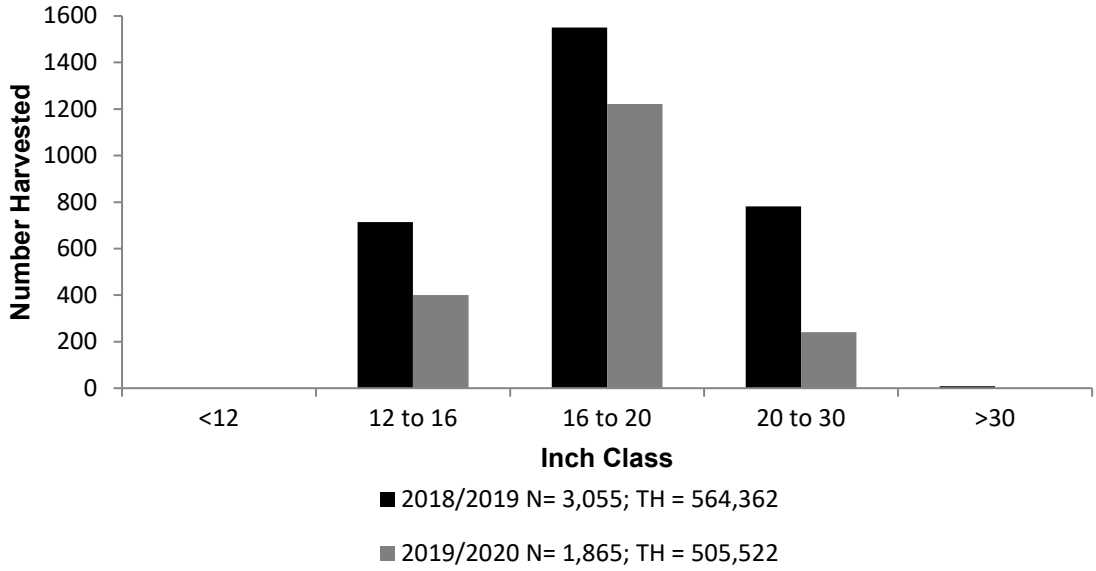


Figure 11. Length frequency of harvested Striped Bass observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020, all anglers combined. N is the number of harvested Striped Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

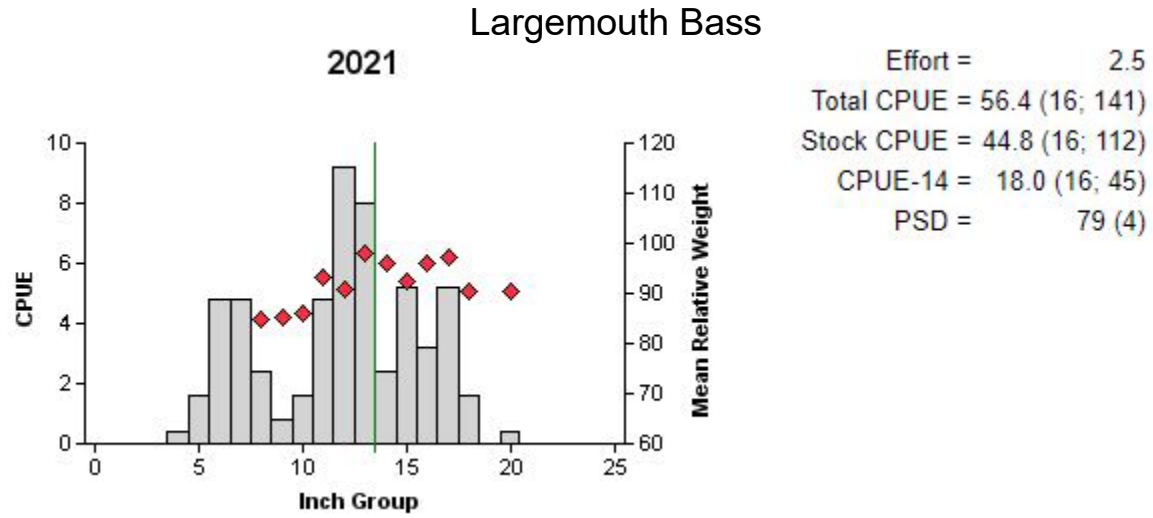


Figure 12. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for a spring electrofishing survey, Texoma Reservoir, Texas, 2021. Vertical line represents minimum length limit.

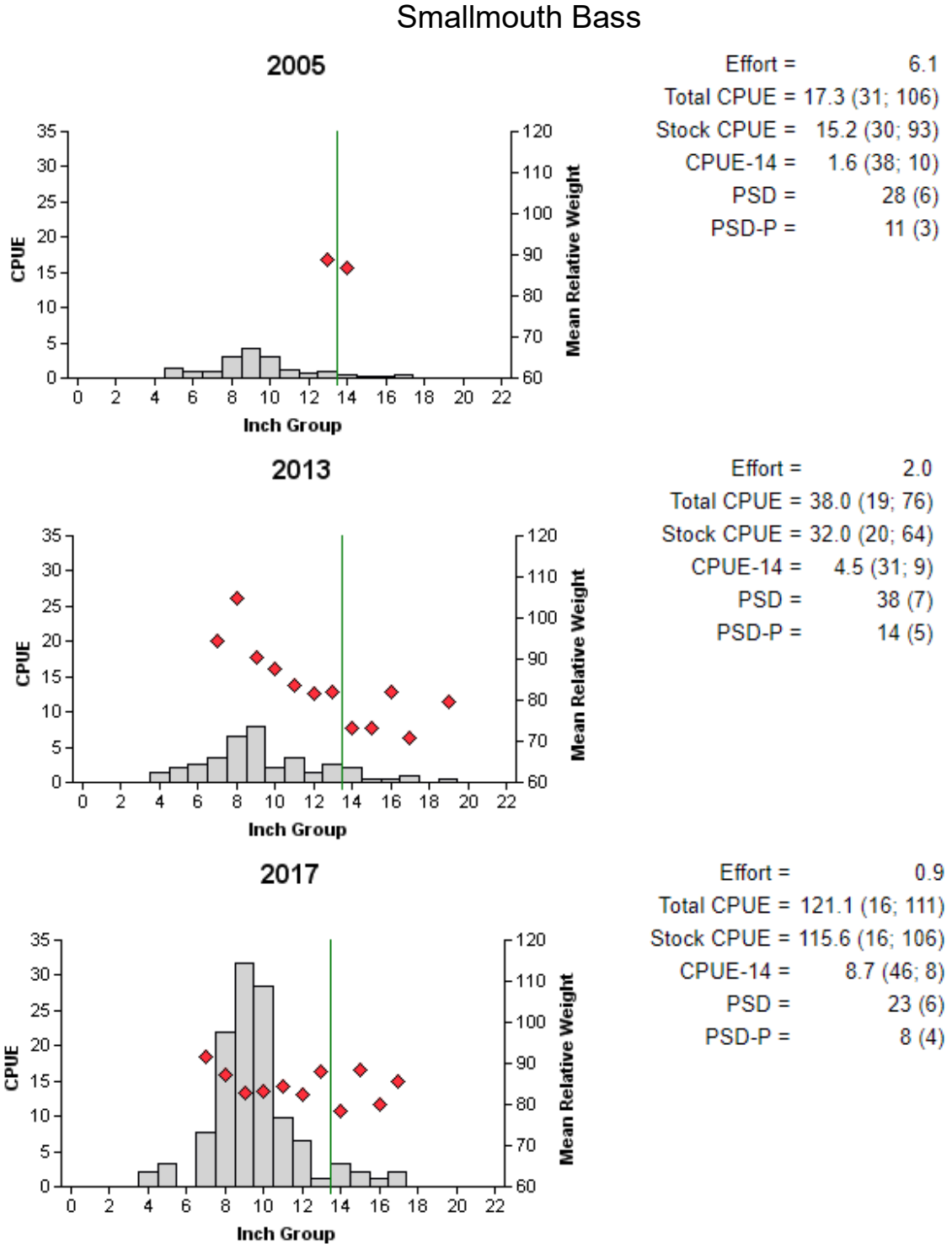
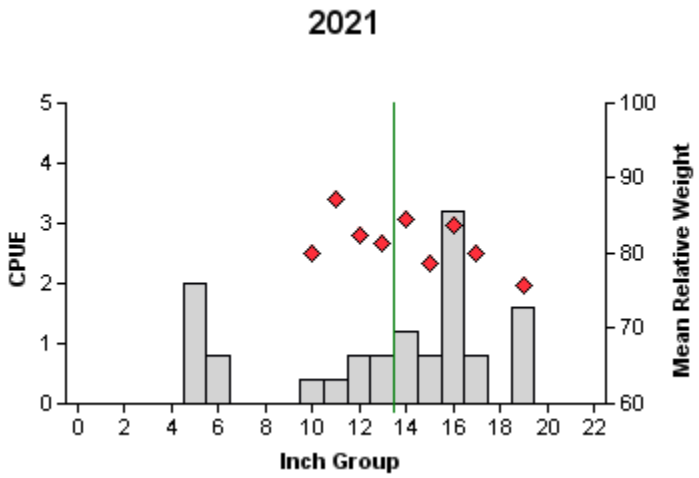


Figure 13. Number of Smallmouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall bass-only electrofishing surveys, Texoma Reservoir, Texas, 2005, 2013, and 2017. Vertical line represents minimum length limit.



Effort =	2.5
Total CPUE =	12.8 (32; 32)
Stock CPUE =	10.0 (39; 25)
CPUE-14 =	7.6 (43; 19)
PSD =	96 (3)
PSD-P =	76 (7)
PSD-M =	24 (11)

Figure 14. Number of Smallmouth 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 a spring electrofishing survey, Texoma Reservoir, Texas, 2021. Vertical line represents minimum length limit.

Black Basses

Table 11. Creel survey statistics for Black Basses at Texoma Reservoir, Texas, from December 2018 through November 2019 and December 2019 through November 2020. Catch rate is for all anglers targeting Black Basses. 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. Relative standard errors (RSE) are in parentheses.

Statistic	2018/2019	2019/2020
Surface area (acres)	77,588	77,259
Directed angling effort (h)		
Tournament	133,793 (15)	147,315 (16)
Non-tournament	71,296 (16)	127,538 (18)
Smallmouth Bass	18,369 (29)	14,642 (44)
All black bass anglers combined	205,089 (13)	274,853 (14)
Angling effort/acre	2.6 (13)	3.6 (14)
Catch rate (number/h)	0.7 (51)	0.6 (70)
Harvest		
Non-tournament harvest		
Largemouth Bass	1,073 (316)	2,039 (276)
Smallmouth Bass	119 (1069)	230 (865)
Spotted Bass	0	0
Harvest/acre	<0.1	<0.1
Tournament weigh-in and release		
Largemouth Bass	18,683 (63)	10,734 (108)
Smallmouth Bass	3,854 (217)	1,903 (393)
Spotted Bass	3,022 (285)	4,041 (235)
Percent legal released (non-tournament)	91	93

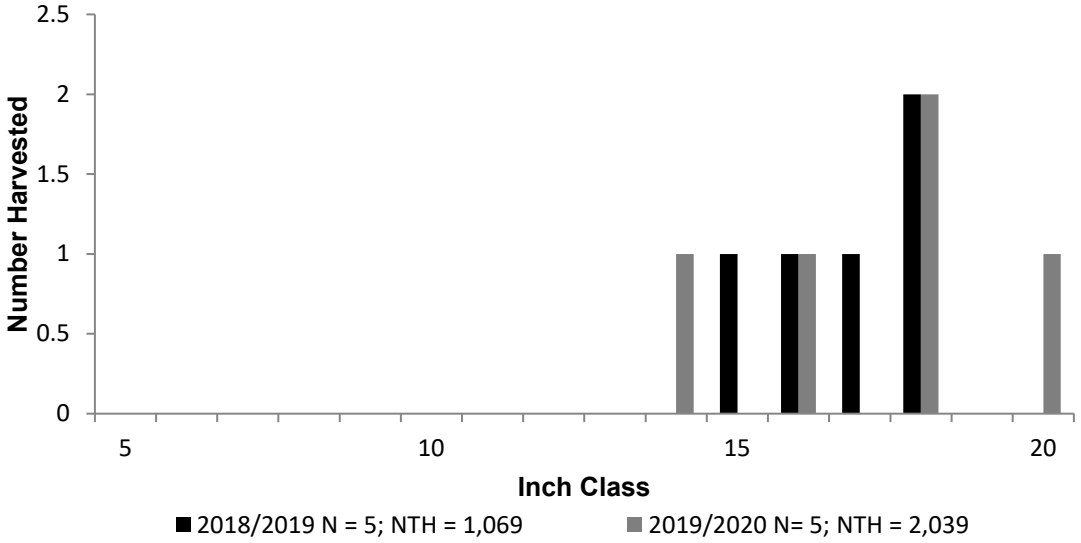


Figure 15. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, and December 2019 through November 2020 all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and NTH is the estimated non-tournament harvest for the creel period.

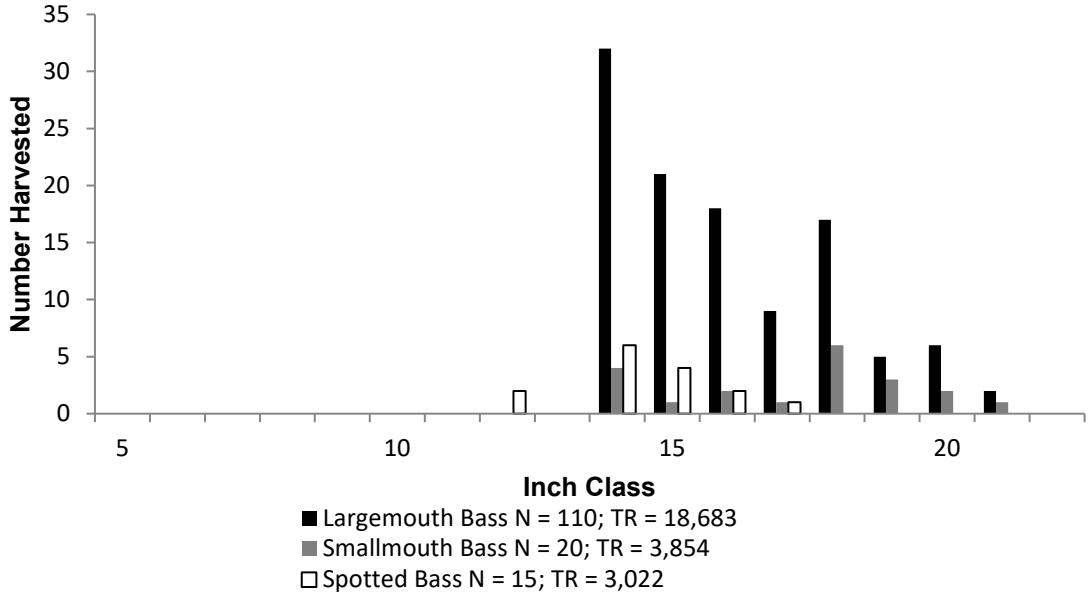


Figure 16. Length frequency of tournament retained Black Bass observed during creel surveys at Texoma Reservoir, Texas, December 2018 through November 2019, all anglers combined. N is the number of Black Basses observed retained during creel surveys, and TR is the estimated number tournament retained for the creel period.

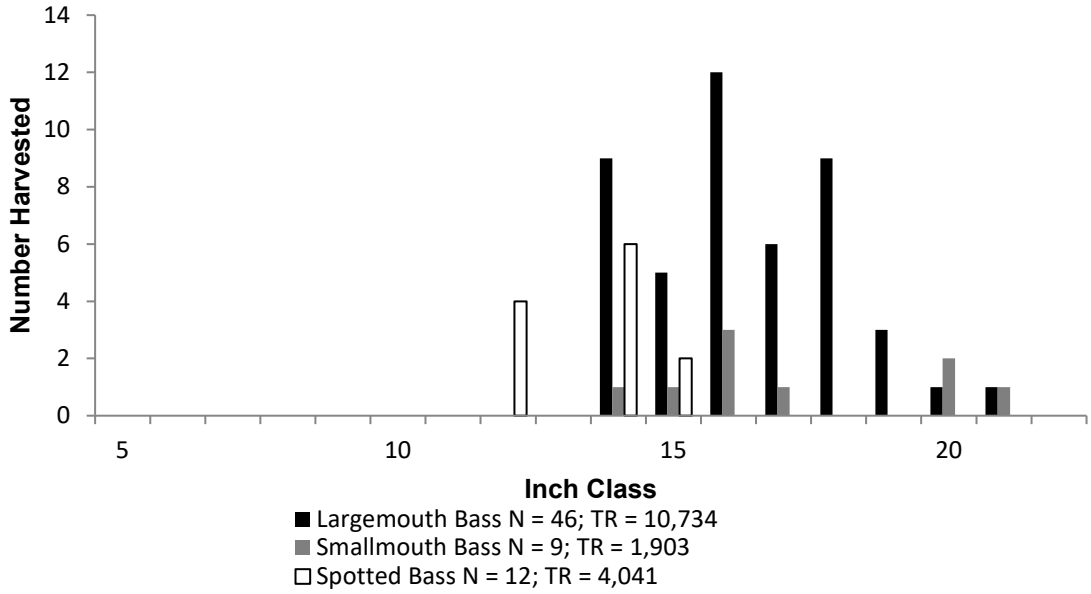
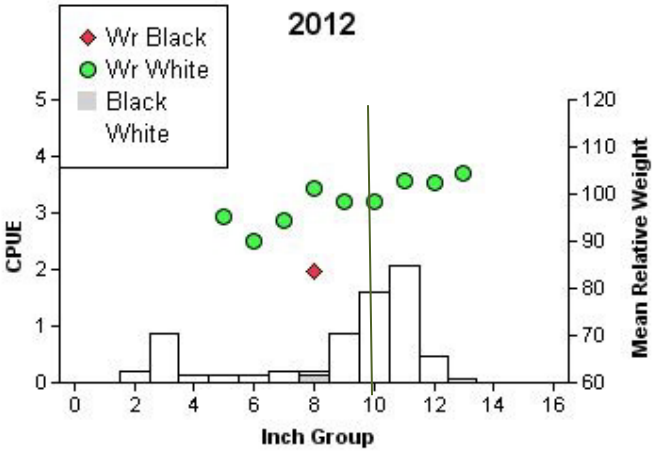
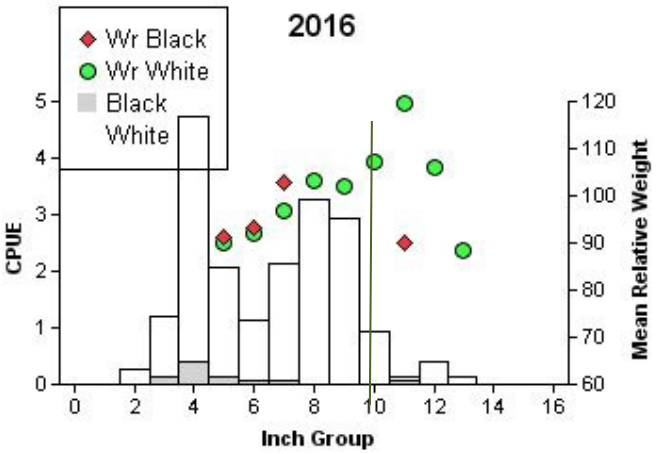


Figure 17. Length frequency of tournament retained Black Bass observed during creel surveys at Texoma Reservoir, Texas, December 2019 through November 2020, all anglers combined. N is the number of Black Basses observed retained during creel surveys, and TR is the estimated number tournament retained for the creel period.

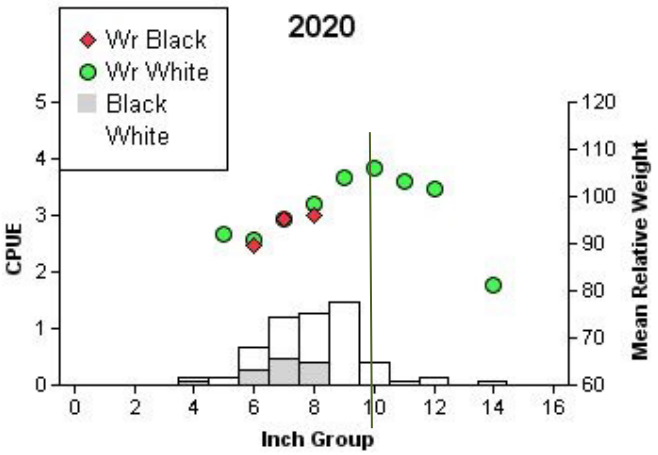
Crappies



Effort =	15.0
Total CPUE =	6.9 (21; 104)
Stock CPUE =	5.7 (22; 86)
CPUE-10 =	4.2 (24; 63)
PSD =	92 (3)



Effort =	15.0
Total CPUE =	19.3 (23; 290)
Stock CPUE =	13.1 (18; 197)
CPUE-10 =	1.6 (32; 24)
PSD =	59 (7)



Effort =	15.0
Total CPUE =	5.5 (30; 83)
Stock CPUE =	5.4 (31; 81)
CPUE-10 =	0.7 (38; 10)
PSD =	63 (8)

Figure 18. Number of crappie caught per net night (CPUE, bars), mean relative weight (diamonds and green circles), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Texoma Reservoir, Texas, 2012, 2016, and 2020. Vertical line indicates minimum length limit.

Table 12. Creel survey statistics for Crappie at Texoma Reservoir, Texas, from December 2018 through November 2019, and December 2019 through November 2020, all anglers combined. 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	Year	
	2018/2019	2019/2020
Surface area (acres)	77,588	77,259
Directed effort (h)	79,118 (16)	127,273 (17)
Directed effort/acre	1.0 (16)	1.7 (17)
Total catch per hour	2.9 (37)	2.7 (38)
Total harvest	114,157 (54)	167,073 (47)
Harvest/acre	1.5 (54)	2.2 (47)
Percent legal released	32	15

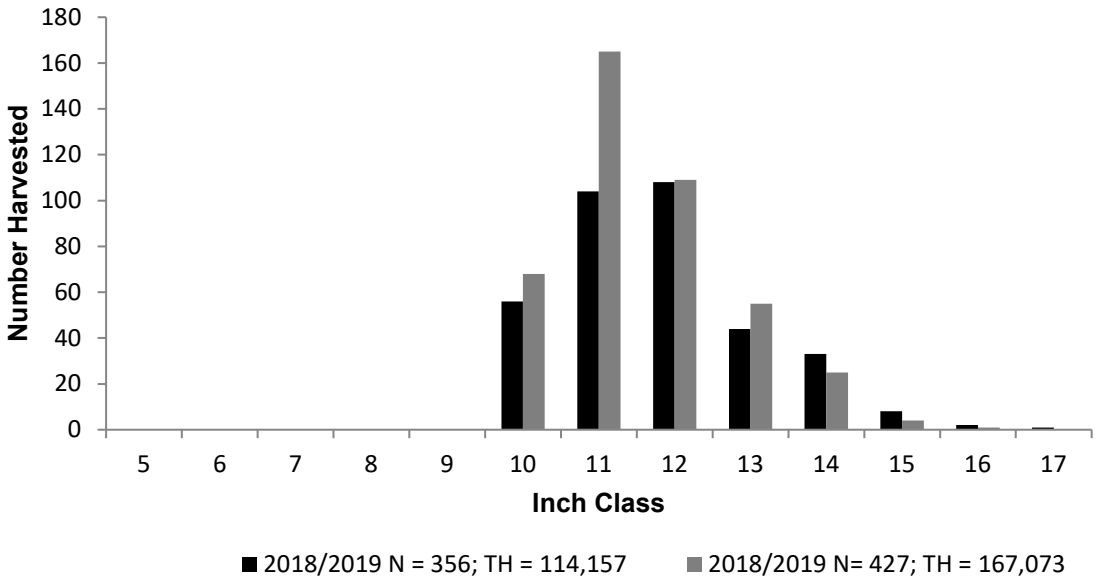


Figure 19. Length frequency of harvested Crappie observed during creel surveys at Texoma Reservoir, Texas, from December 2018 through November 2019, and December 2019 through November 2020, all anglers combined. N is the number of harvested Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 13. Proposed sampling schedule for Texoma Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in February, electrofishing is conducted in spring for black basses, low frequency electrofishing is conducted in August, and trap netting surveys are conducted in the fall.

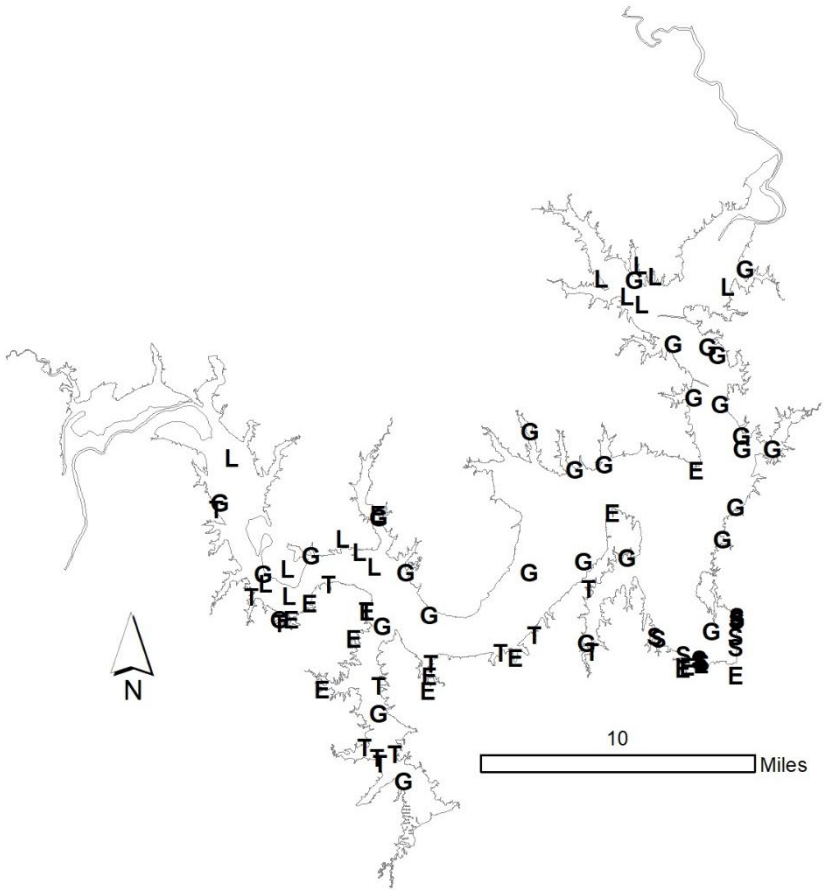
	Survey year			
	2021-2022	2022-2023	2023-2024	2024-2025
Angler Access				X
Vegetation				X
Electrofishing – Spring			X	
Electrofishing – Low frequency			X	
Trap netting				X
Gill netting	X	X	X	X
Creel survey				
Report				X

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Texoma Reservoir, Texas, 2019-2020. Sampling effort was 30 net nights for gill netting, 15 net nights for trap netting, 2.5 hours for bass-only electrofishing, and 1.7 hours for low-frequency electrofishing.

Species	Gill Netting		Trap Netting		Bass-only Electrofishing		Low-frequency Electrofishing	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Blue Catfish	8	0.3 (32)					508	304.8 (15)
Channel Catfish	23	0.8 (28)					3	1.8 (100)
Flathead Catfish	1	0.03 (100)					16	9.6 (48)
White Bass	285	9.5 (27)						
Striped Bass	1,131	37.7 (16)						
Largemouth Bass					141	56.4 (16)		
Spotted Bass					39	15.6 (21)		
Smallmouth Bass					32	12.8 (32)		
White Crappie			65	4.3 (37)				
Black Crappie			18	1.2 (45)				

APPENDIX B – Map of sampling locations



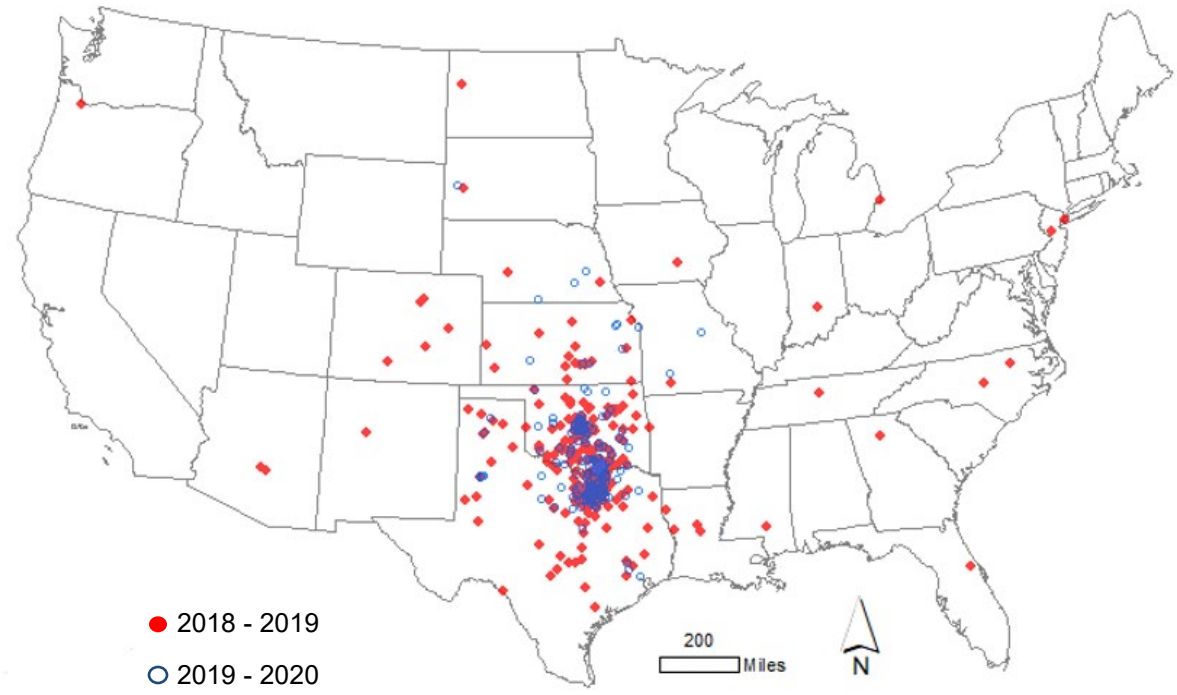
Location of sampling sites, Texoma Reservoir, Texas, 2017-2021. Trap net, gill net, electrofishing, Smallmouth Bass only electrofishing, and low-frequency electrofishing stations are indicated by T, G, E, S and L respectively. Water level was near full pool at time of sampling.

APPENDIX C – Long-term Catch Rates

Catch rates (CPUE) of targeted species by gear type and year for Texoma Reservoir.

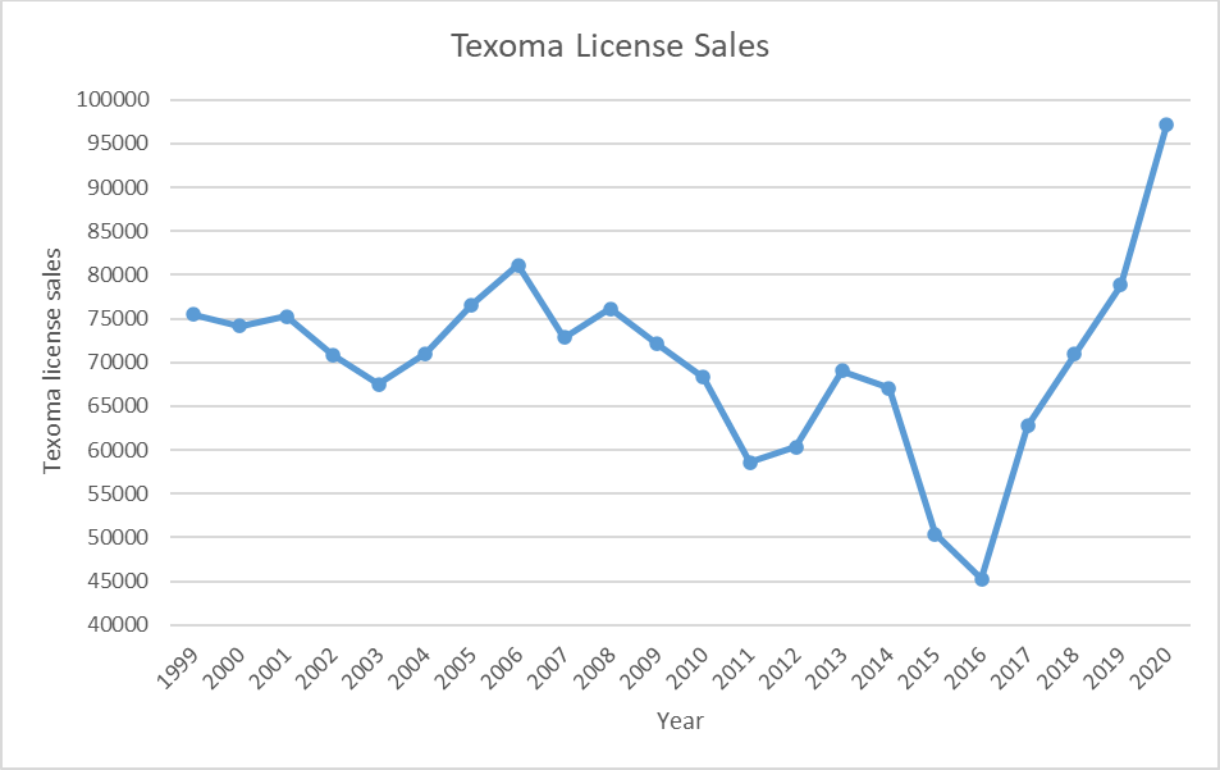
Gear	Species	Year											Average (1993-2021)
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Gill Netting	Blue Catfish	1.5	0.8	0.6	0.2	0.7	3.3	1.9	1.8	0.8	1.3	0.3	**0.8**
	Channel Catfish	3.4	2.3	2.3	1.9	1.9	1.9	1.4	2.6	1.8	2.4	0.7	**1.8**
	Flathead Catfish	<0.1		<0.1			0.2				0.1	0.03	**0.1**
	White Bass	5.7	5.7	4.8	5.27	1.3	11.8	13.2	7.9	1.7	7.0	9.5	**5.6**
	Striped Bass	11.6	22.6	15.9	21.8	12.8	6.4	16.3	16.9	29.6	27.4	37.7	**19.8**
Electrofishing	Gizzard Shad		229.5				219.0						**194.1**
	Threadfin Shad		972.5				21.0						**111.6**
	Green Sunfish		23.5				15.5						**16.4**
	Warmouth		4.5				0.5						**3.5**
	Bluegill Sunfish		174.0				263.5						**207.6**
	Longear Sunfish		16.5				30.0						**36.6**
	Redear Sunfish		5.0				2.0						**6.0**
	Smallmouth Bass		25.5	38.0	31.7		13.0	121.1				12.8	**23.4**
	Spotted Bass		35.5	6.0	6.0		22.0					15.6	**27.0**
	Largemouth Bass		50.0	10.5	11.3		44.5					56.4	**56.8**
Low-frequency Electrofishing	Blue Catfish		228.8		188.7			225.6			304.8		**237.0**
	Channel Catfish				14			6.25			1.8		**7.4**
	Flathead Catfish				5			7.2			9.6		**7.3**
Trap Netting	White Crappie		6.8				18.47				4.3		**8.2**
	Black Crappie		0.1				0.87				1.2		**0.4**

APPENDIX D – Angler Residence by Zip Code



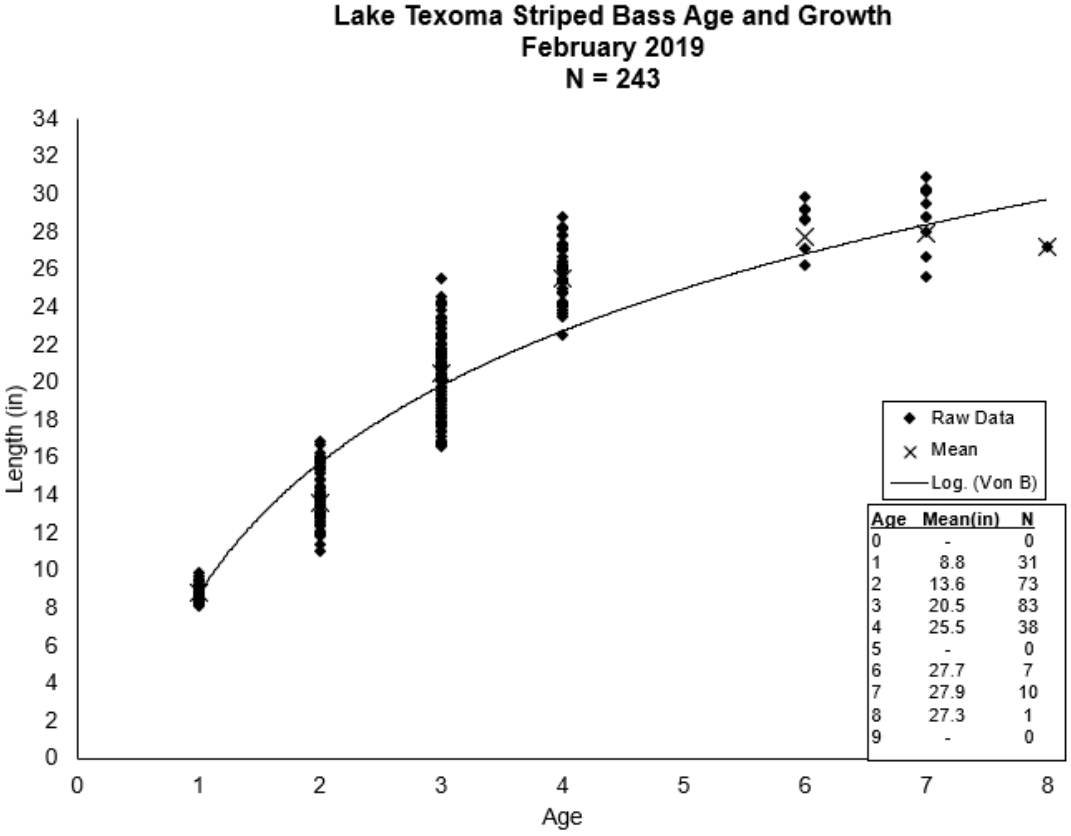
Location, by ZIP code, of anglers traveling to fish Texoma Reservoir, Texas, as determined from the December 2018 to November 2019 and December 2019 to November 2020 creel survey.

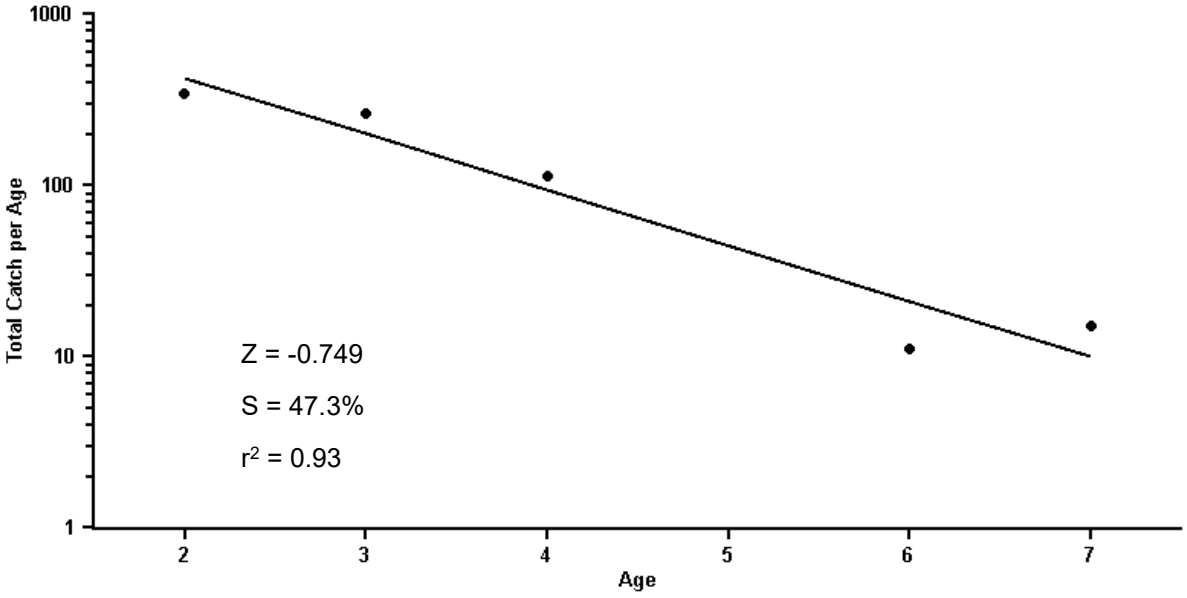
APPENDIX E – Volume of Texoma License Sales



Total number of Texoma Licenses ($12) sold annually in Oklahoma and Texas 1999-2020.

APPENDIX F – Striped Bass Age & Mortality





Weighted catch-curve regression for age 2 to 7 Striped Bass (N=744) collected at Lake Texoma February 2019. An age-length key was used to assign ages to unaged fish in the sample.

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