# Lake Texana Reservoir

## 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 Texana Reservoir were surveyed in 2019 using trap netting, in 2022 using electrofishing (fall) and trap netting, and in 2023 using gill netting. Historical data are presented with the 2019-2023 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

**Reservoir Description:** Lake Texana Reservoir is a 9,727-acre reservoir, controlled by the Lavaca-Navidad River Authority (LNRA), located on the Navidad River in the Lavaca River Basin, approximately 20 miles east of Victoria, Texas. It receives water from the Navidad River, Sandy Creek, and Mustang Creek and is used for water supply and recreation. Water level typically fluctuates 2-4 feet annually but has fluctuated as much as 12 feet.

**Management History**: Important sport fish species include Blue and Channel catfish, White Bass, Largemouth Bass, and crappie. Management strategies from the 2018 management plan focused on promoting the fisheries and assisting LNRA with vegetation control, determining the utility of White Bass electrofishing, and informing the public about non-native species in the reservoir. Water hyacinth and giant salvinia herbicide applications have been conducted through hired contractors with treatments in 2019 (52 acres), 2020 (59 acres), 2021 (141 acres) and 2022 (59 acres). The Texas Parks and Wildlife Department (TPWD) assisted as consultants for vegetation control and provided cost share for herbicide treatments.

**Fish Community**

- **Prey species:** Both Threadfin Shad and Gizzard Shad were in low abundance in the reservoir. Electrofishing catch rates of Bluegill were also low and few fish were over 6-inches long.
- **Catfish:** Blue, Channel and Flathead catfish were present in the reservoir with Blue Catfish being the predominant species. Blue Catfish abundance and size structure was good and provided quality angling opportunities. Channel Catfish were present in low abundance.
- **White Bass:** Gill net catches of White Bass were low over the survey period. Additionally, targeted sampling to catch White Bass during the spawning run also suggested low abundance. However, a new waterbody record (17.5 inches) was reported in 2020.
- **Largemouth Bass:** Largemouth Bass abundance was higher than the 2018 survey. The population had an adequate balance of size classes. Largemouth Bass were in good condition.
- **Crappie:** Both Black and White crappie were present in the reservoir. A new waterbody record occurred in 2019 (15 inches).

**Management Strategies**: Continue to manage fisheries under current regulations. Continue to work with the LNRA on invasive aquatic vegetation control and consider applying for a grant to install additional artificial and/or natural fish habitat structures.

# Introduction

This document is a summary of fisheries data collected from Lake Texana Reservoir in 2019-2023. 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 2019-2023 data for comparison.

## Reservoir Description

Lake Texana Reservoir is a 9,727-acre reservoir used primarily for water supply and recreation. This reservoir is controlled by the Lavaca-Navidad River Authority (LNRA), located on the Navidad River in the Lavaca River Basin, approximately 20 miles east of Victoria. It receives water from the Navidad River, Sandy and Mustang creeks. Water level typically fluctuates 2-4 feet annually but has fluctuated as much as 12 feet (Figure 1). Substrate was composed primarily of clays, deep loams, and saline soils. Littoral habitat consisted of several native aquatic vegetation species (American pondweed, coontail, duckweed, American lotus, cattail, and bulrush), non-native vegetation, and standing timber. Exotic aquatic vegetation species present included hydrilla, water hyacinth, giant salvinia, and parrot feather. The lake is windswept and generally turbid throughout the year; however, clear water can be found in coves with dense stands of submersed vegetation. Other reservoir characteristics for Lake Texana Reservoir can be found in Table 1.

## Angler Access

Lake Texana Reservoir has ten public ramps and no private boat ramps. Additional boat ramp characteristics are in Table 2. Shoreline access is excellent and available at all public boat ramp sites. Additionally, one fishing pier was available to shoreline anglers at Texana Park. Access for the physically challenged is adequate with ample shoreline access and the one fishing pier.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (McDonald and Binion 2019) included:

1. Continue to assist LNRA with the control of water hyacinth and giant salvinia.

   **Action:** District staff annually reviewed and provided comments on vegetation treatment proposals submitted for the chemical treatment of water hyacinth and giant salvinia.

2. Due to recent minimal collections of White Bass using the gillnet gear, alternate collections using electrofishing during spring runs were utilized for the local river and creek input of Lake Texana Reservoir.

   **Action:** A considerable amount of effort of electrofishing was conducted at Mustang Creek in Lake Texana Reservoir (0.5 hour in 2020 and 1 hour in 2023; no captures), and 0.6 hour in 2020 and 1 hour in 2023 for the Navidad River (one capture). Angler interceptions during these sampling trips were minimal (N=2 boat anglers) suggesting that this species is not heavily sought after.

3. Work closely with LNRA staff on educating the public about the non-native aquatic plant species found in Lake Texana Reservoir. These plants include water hyacinth, alligatorweed, and giant salvinia.

   **Action**: District staff continued to provide LNRA staff with signs to post at boat ramps and electronic copies of brochures to be printed and posted at local bait stores and gas stations.

**Harvest regulation history:** Sport fish in Lake Texana Reservoir are currently managed with statewide regulations (Table 3).

**Stocking history:** Florida Largemouth Bass were last stocked in Lake Texana Reservoir in 2016. A complete stocking history is in Table 4.

**Vegetation/habitat management history:** Water hyacinth and giant salvinia are problematic species and can be found throughout the reservoir. Both water hyacinth and giant salvinia are treated annually with herbicides. LNRA hired contractors and sprayed in 2019 (52 acres), 2020 (59 acres), 2021 (141 acres) and 2022 (59 acres). Several hundred salvinia weevils were released by TPWD between 2002 and 2005 as part of a cooperative research project with the United States Department of Agriculture. An additional 11,939 weevils were released in 2016, and 5,661 weevils were released by TPWD in 2020. Hydrilla and several native aquatic vegetation species have continued to expand in the reservoir as a result of vegetation control efforts on water hyacinth and giant salvinia. Historically, hydrilla had been present in the reservoir but was only problematic shortly after the reservoir filled. At that time grass carp were released in the reservoir for hydrilla control. Additionally, approximately 700,000 hydrilla flies were released by TPWD in 2005 to control hydrilla around the Navidad River boat ramp.

**Water transfer:** Currently, there are two permanent pumping stations on the reservoir that transfer water to other locations. Both stations are operated by the LNRA. One pumping station provides water to the local municipal and industrial water users and the other pumping station provides water to the city of Corpus Christi via the Mary Rhodes Pipeline. Annual inter-basin transfer of 41,840 acre-feet water occurs through the Mary Rhodes Pipeline to the O.N. Stevens water treatment plant in Corpus Christi. The city of Corpus Christi may make two additional requests for water, the first for 4,500 acre-feet and the second for 7,500 acre-feet. These additional requests will only be granted if several criteria are met including the city of Corpus Christi having storage capacity for the water and if Lake Texana Reservoir is at or above 43 feet above mean sea level (one foot below conservation pool).

# Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Lake Texana Reservoir (McDonald and Binion 2018). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2022).

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing using an Apex system (1.5 hours at 18, 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).

**Trap netting** – Crappie were collected using trap nets (10 net nights at 10 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn).

**Gill netting** – Catfish and White Bass were collected by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

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

**Habitat** – A structural habitat survey was conducted in 2006. Vegetation surveys were conducted in 2010–2022 to monitor abundance and distribution of both native and non-native aquatic vegetation. Habitat was assessed with the digital shapefile method in 2022 (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:** Shoreline habitat consisted of natural shoreline, concrete, and gravel (Findeisen and Neahr 2007; Table 6). Standing timber comprised 795.0 acres, roughly 8.2% of reservoir surface area. Native vegetation covered 3.5% of the reservoir surface area compared to 7.9% coverage by non-native vegetation (Table 7). Native vegetation has increased (+2.4%) whereas non-native coverage has decreased (-0.6%) since 2018. American Lotus was the primary native vegetation species. Both water hyacinth and giant salvinia are treated annually with herbicides. LNRA hired contractors and sprayed in 2019 (52 acres), 2020 (59 acres), 2021 (141 acres) and 2022 (59 acres). Salvinia weevils (N = 5,661) were released by TPWD in 2020. In January of 2019, LNRA staff along with the Corpus Christi Fisheries Management Team partnered together to deploy 24 Georgia fish habitat structures at five locations within the lower half of the reservoir, materials were paid for with a state conservation license plate grant (www.conservationplate.org). Locations of these sites were posted on our TPWD homepage (Locations of Fish Habitat Structures (texas.gov)).

**Prey species:** Electrofishing catch rates of Gizzard Shad and Bluegill were 41.3/h and 92.0/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was high, indicating that 100% of Gizzard Shad were available to existing predators; this has been similar to IOV estimates in previous years (Figure 2). Total CPUE of Gizzard Shad and Threadfin Shad decreased from 2014 and 2018 surveys (Figure 3). The decrease in the populations of shad species was evident in the 2022 electrofishing survey, however this survey coincided with a severe water level drop (> 6 feet). Future electrofishing surveys will help signify whether forage has continued to be impacted. Total CPUE of Bluegill in 2022 has remained stable since 2014 after the historical high of 142.0/h reported in 2010. Size structure of Bluegill continued to be dominated by small individuals (Figure 4).

**Blue Catfish:** The gill net catch rate of Blue Catfish increased in 2023 (9.7/nn) since the 2019 report (8.7/nn) and has converged to the historical average of 9.7/nn. Stock-sized (≥ 12 inches) Blue Catfish relative abundance remained high (5.2/nn) increasing slightly from the 2019 survey (4.0/nn; Figure 5). The overall condition of Blue Catfish, as determined by relative weight (average 92) was adequate and improved with size of fish.

**Channel Catfish:** Gill net catch rates of Channel Catfish remained low (0.5/nn) for the 2023 gill net survey. Historically, gill net CPUEs of Channel Catfish have been near or below 0.5/nn. The historically low abundance using gill nets and previous attempts using hoop nets are indicative of a low-density Channel Catfish population.

**White Bass:** The 2023 gill net CPUE for White Bass was low (0.1/nn); similar to what was caught in 2019 (0.1/nn) and 2015 (0.1/nn). Winter electrofishing targeting the annual spawning runs were unsuccessful for the Navidad River in 2020 (N=0) and 2023 (N=1), and for Mustang creek in 2020 and in 2023 (N=0). Anecdotal information suggested that anglers targeted a short-lived run of White Bass in the Navidad River in March of 2023, whereas our surveys were conducted in February. Historically, White Bass were found to grow fast and reach legal size (>10 inches) by age 1 (Findeisen and Binion 2011).

**Largemouth Bass:** The 2022 electrofishing CPUE for Largemouth Bass was 36.7/h, an increase from the 2018 survey (17.3/h) but lower than the 2014 survey (52.7/h) (Figure 6). Historically, the average catch rates have been low (21.5/h). Mean relative weights for Largemouth Bass were adequate; averaging ≥ 90 for all length classes, indicating forage was readily available. Insufficient numbers of Largemouth Bass of the appropriate size (i.e., 13 – 14.9 inches) prevented adequate age and growth analysis, however of the few collected we estimated age at length in 2022 to be 2.2 years (N=6; range 2-3). Objective metrics were not met, however researching our historical data, only one survey in over 25 years of sampling have our surveys reported anything close to 50 stock-sized fish (N = 48; year 2022). The inability to achieve the objective metrics historically is indicative of a poor population. Future work that may benefit the Largemouth Bass fishery could be to improve the fish habitat within the reservoir.

**White Crappie**: The 2022 trap net CPUE for White Crappie was 5.1/nn, considerably lower than the CPUEs in 2019 (23.5/nn) and 2014 (19.0/nn) (Figure 7). Efforts were made to detect whether biologist-selected sites at historically producing sites compared to randomly selected sites in 2019 to help fine-tune our collection methods for the future. Results suggested that biologist-selected sites resulted in a higher

total CPUE (37.7/nn) compared to randomly selected sites (23.5/nn). However, comparisons of CPUE of stock-sized (≥ 5 inches) and legal-sized (≥ 10 inches) fish were similar between surveys (Figure 8). In Fall of 2022, an attempt at biologist-selected sites based on high collections of crappie at the previous month's electrofishing survey resulted in an extremely poor CPUE suggesting that biologist-selected site may actually negatively bias total abundance. Based on this information the continuation of randomly-selected sites would be the most accurate method for detecting population changes in crappie and will be pursued for all future trap net sampling on Texana Reservoir.

# Fisheries Management Plan for Lake Texana Reservoir, Texas

Prepared – July 2023

**ISSUE 1:** Water hyacinth and giant salvinia continue to create access problems on Lake Texana Reservoir and prohibit the colonization and growth of more desirable submersed aquatic vegetation. LNRA has conducted herbicide treatments on the reservoir resulting in the increase of submersed aquatic vegetation in a few areas.

MANAGEMENT STRATEGIES

1. Continue to provide support for LNRA on control of water hyacinth and giant salvinia.
2. LNRA conducts routine monitoring for exotic floating aquatic vegetation and our TPWD- Aquatic Habitat Enhancement Team provides funding (reimbursement) for treating invasive vegetation (e.g. salvinia and water hyacinth).
3. TPWD will survey for both native and exotic aquatic vegetation every four years.

**ISSUE 2:** Aquatic vegetation habitat is somewhat sparse (just over 11% coverage in 2022) and fluctuates due in part to variable water levels. Previous attempts to increase fish habitat have focused on deploying artificial fish habitat (Georgia structures) which has led to mixed angler experiences, anecdotally. Lake Texana Reservoir could benefit with the addition of properly installed natural fish habitat at sites historically known for harboring crappie. This could enhance angler experiences.

MANAGEMENT STRATEGY

1. Partner with LNRA and volunteers for some natural and/or artificial fish habitat deployment. Begin by applying for a Conservation License Plate grant for some supplies that can be used to connect and weigh/anchor donated Christmas trees. Trees could be requested/sourced from supermarket post-holiday overstock or request for public donation of retired Christmas trees post-holidays. Trees can then be consolidated, rigged together, weighted and placed at locations via boats at sites that have historically held crappie.
2. Publish locations of Christmas tree deployment sites on the TPWD- Locations of Fish Habitat Structures website.

**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 (*Dreissena polymorpha*) 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 (*Salvinia molesta*) and water hyacinth (*Pontederia crassipes*) can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

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

Sport fish, forage fish, and other important fishes

Sport fish in Lake Texana Reservoir include Blue, Channel, and Flathead Catfish, White Bass, Largemouth Bass, and crappie. Important forage species include Bluegill, Gizzard and Threadfin Shad.

Low density or underutilized fisheries

**Channel Catfish**: Channel Catfish are present in Lake Texana Reservoir, but abundance has remained low. Since 1987, the mean gill net CPUE was 0.4/nn (N = 13; standard deviation = 0.3; range = 0.0/nn – 1.0/nn). An exploratory baited tandem hoop net survey was attempted in spring of 2019, however catches were too low to make any conclusions regarding the trend data on CPUE, size structure, and body condition. Due to low catches with gill netting and hoop netting, we will proceed with presence/absence data collections in future standard gill net samples.

**Flathead Catfish:** Flathead Catfish are present in the reservoir in low abundance. Since 1987, the mean CPUE is 0.2/nn (N = 13; standard deviation = 0.2; range: 0.0/nn – 0.6/nn). Due to low catches, the population does not warrant expending additional sampling effort. We will proceed with presence/absence data collections in future standard gill net samples.

**White Bass:** White Bass are present in the reservoir in low abundance. Since 1987, the mean CPUE is 1.6/nn (N = 13; standard deviation = 2.3; range 0.1/nn – 7.5/nn). Attempts to target the spring run in the Navidad River and Mustang Creek in recent years were unsuccessful and may be due to the variability in water level of the reservoir and thus future White Bass only surveys will no longer be pursued. We will proceed with presence/absence data collections in future standard gill net samples.

Survey objectives, fisheries metrics, and sampling objectives

**Blue Catfish:** Blue Catfish are the dominant catfish species in the reservoir. Annual gill net total CPUE since 1987 has averaged 9.7/nn (N = 13; standard deviation = 5.7; range: 2.7 – 23.1/nn) and mean stock size CPUE is 5.1/nn (N = 13; standard deviation = 2.3; range: 1.7 – 9.0/nn). Further, the reservoir typically produces good numbers of quality-size (≥ 20 inches) fish available to anglers. Trend data on CPUE, size structure, and body condition were collected at least biennially from 1993 – 2003 and every four years since with spring gill netting. The population has increased in the most recent survey. Collection of trend data with spring gill netting every four years will allow for determination of large-scale changes in population dynamics that may warrant further investigation and more intensive sampling. A minimum of 10 randomly-selected gill net sites will be sampled in spring of 2027 (Table 8). Additional sampling will be conducted in sets of five gill nets at random sites until 50 stock-size fish are collected and the RSE of CPUE-S is ≤ 25.

**Largemouth Bass:** Historically, relative abundance of Largemouth Bass has been low. The mean historical total CPUE for Largemouth Bass is 21.5/h (N = 11; standard deviation = 16.2; range: 2.0 – 52.7/h) and mean stock-size CPUE is 12.3/h (N = 11; standard deviation = 9.9; range: 0.5 – 32.0/h). Largemouth Bass have always been managed with the statewide 14-inch minimum length limit and 5 fish daily bag. Trend data on CPUE, size structure, and body condition has been collected at a minimum, every four years since 1993 with fall electrofishing. Collection of trend data with fall electrofishing will continue every four years and allows for determination of large-scale changes in population dynamics that may warrant further investigation and more intensive sampling. A minimum of 18 randomly selected

electrofishing sites will be sampled in the fall of 2026 (Table 8). With the current methodology of 18 electrofishing sites, achieving 50 stock-sized fish has never been achieved historically. Further, achieving a reasonable RSE (≤ 25) will likely be unattainable with practical sampling effort. Therefore, future electrofishing surveys will be daytime only surveys and large changes in relative abundance can be documented with CPUE.

**Crappie:** White Crappie have been historically present within the reservoir, but population abundance as reflected by trap netting has been variable. Collection of trend data with fall trap netting every four years will allow for determination of large-scale changes in population dynamics that may warrant further investigation and more intensive sampling. A set number of 10 randomly-selected sites will be sampled with trap netting in the fall season (within temperatures of 50° - 65°C F), of year 2027 (Table 8). Achieving a reasonable RSE (≤ 25) will unlikely be unattainable with practical sampling effort. Therefore, only large changes in relative abundance can be documented with CPUE.

**Shad and Bluegill:** Bluegill, Gizzard Shad, and Threadfin Shad are the primary forage at Lake Texana Reservoir. Trend data on CPUE and size structure of Gizzard Shad and Bluegill has been collected at a minimum every four years since 1987 with fall electrofishing. Sampling effort based on objectives for Largemouth Bass will result in sufficient numbers for size structure estimation (Gizzard Shad IOV; 50 fish minimum and Bluegill PSD; 50 fish minimum at 18 randomly selected 5- minute stations with 90% confidence) and relative abundance estimates (Table 8). The RSE ≤ 25 objective will not be set for Gizzard Shad or Bluegill; CPUE-Total RSEs fluctuate substantially from year to year and sampling has achieved RSE ≤ 25 only once in 11 surveys for Gizzard Shad and only 5 times out of 11 surveys for Bluegill.

**Habitat:** Historically, invasive plants (hydrilla, water hyacinth, giant salvinia) have been present in the reservoir. Most of these exotic plants are in the upper reaches of the reservoir (i.e. Navidad River, Sandy Creek and Mustang Creek). Water hyacinth potentially poses the most threat to angler and boater access and enhances other ecologically detrimental processes (e.g., degraded water quality, competition with desirable native vegetative species, or water loss through evapotranspiration). The Lavaca-Navidad River Authority conducts annual aquatic vegetation monitoring. This monitoring is necessary to identify potential threats to boating and angling access so that rapid response or control efforts can be employed. The next full vegetation survey (native and non-native) will occur in 2026 (Table 8).

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# Tables and Figures

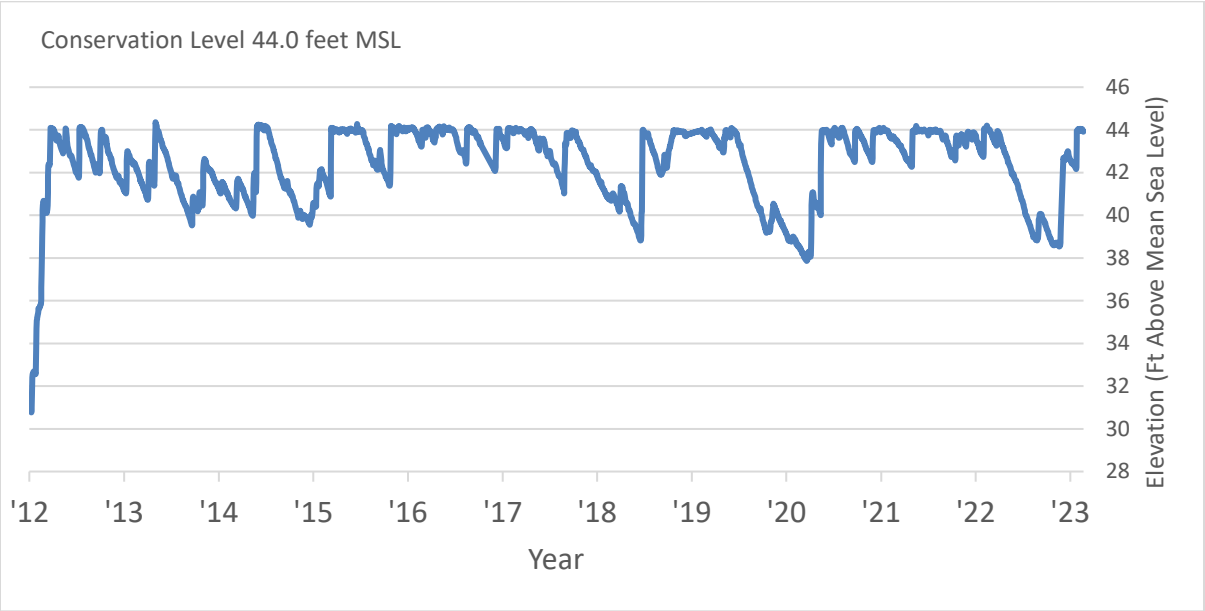



Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Texana Reservoir, Texas.

Table 1. Characteristics of Lake Texana Reservoir, Texas.

| Characteristic | Description |
|---|---|
| Year constructed | 1980 |
| Controlling authority | Lavaca-Navidad River Authority |
| County | Jackson |
| Reservoir type | Mainstem |
| Shoreline Development Index | 8.0 |
| Conductivity | 180-300 uS/cm |

Table 2. Boat ramp characteristics for Lake Texana Reservoir, Texas, August 2022. Reservoir elevation at time of survey was 42 feet above mean sea level.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|---|---|---|---|---|---|
| Navidad River | 29.021898 -96.569787 | Y | 20 | 30.0 | Excellent, no access issues |
| Sandy Creek | 29.025246 -96.549257 | Y | 20 | 34.0 | Excellent, no access issues |
| Highway 1157 | 29.043054 -96.468154 | Y | 10 | 37.0 | Excellent, no access issues |
| Mustang Creek | 29.025507 -96.506774 | Y | 20 | 30.0 | Excellent, no access issues |
| Mustang Wilderness | 28.999084 -96.529738 | Y | 20 | 27.0 | Excellent, no access issues |
| County Rd 237 | 28.973117 -96.523905 | Y | 10 | 35.0 | Excellent, no access issues |
| Texana Park | 28.956662 -96.539403 | Y | 20 | 32.0 | Excellent, no access issues |
| Highway 111 | 28.951105 -96.517503 | Y | 20 | 33.5 | Excellent, no access issues |
| Brackenridge Park | 28.936576 -96.543630 | Y | 20 | 31.0 | Excellent, no access issues |
| Simons Rd. | 28.914002 -96.568454 | Y | 20 | 28.5 | Excellent, no access issues |

Table 3. Harvest regulations for Lake Texana Reservoir, Texas.

| Species | Bag limit | Length limit |
|---|---|---|
| Catfish: Channel and Blue Catfish, their hybrids and subspecies | 25 (only 10 ≥ 20 inches) | None |
| Catfish, Flathead | 5 | 18-inch minimum |
| Bass, White | 25 | 10-inch minimum |
| Gar, Alligator | 1 | None |
| Bass, Largemouth | 5 | 14-inch minimum |
| Crappie: White and Black Crappie, their hybrids and subspecies | 25 (in any combination) | 10-inch minimum |

Table 4. Stocking history of Lake Texana Reservoir, Texas. FRY = fry, FGL = fingerling; ADL = adults; UNK = unknown.

| Year | Number | Size |
|---|---|---|
| | Threadfin Shad | |
| 1980 | 7,900 | UNK |
| | Rainbow Trout | |
| 1993 | 2,009 | ADL |
| 2016 | 177 | ADL |
| Species Total | 2,186 | |
| | Blue Catfish | |
| 1994 | 300 | ADL |
| | Channel Catfish | |
| 1980 | 285,646 | UNK |
| 1994 | 500 | ADL |
| 2012 | 106,229 | FGL |
| Species total | 392,375 | |
| | Striped Bass | |
| 1981 | 1,981,000 | UNK |
| 1982 | 1,365,507 | UNK |
| 1983 | 375,000 | UNK |
| 1984 | 1,189,600 | FRY |
| 1987 | 60,050 | FGL |
| 1988 | 700,000 | FRY |
| 1989 | 618,237 | FRY |
| Species total | 6,289,394 | |
| | Palmetto Bass | |
| 1996 | 82,500 | FGL |
| 1997 | 165,081 | FGL |
| 1998 | 165,500 | FGL |
| 1999 | 82,789 | FGL |
| Species total | 495,870 | |

| Year | Number | Size |
|---|---|---|
| | Florida Largemouth Bass | |
| 1979 | 5,000 | FGL |
| 1980 | 102,629 | FGL |
| 1981 | 553,678 | FGL |
| 1994 | 245,783 | FGL |
| 2006 | 489,326 | FGL |
| 2007 | 486,494 | FGL |
| 2013 | 485,671 | FGL |
| 2014 | 503,667 | FGL |
| 2016 | 50,641 | FGL |
| Species total | 2,922,889 | |
| | Triploid Grass Carp | |
| 1989 | 15,294 | ADL |
| 1990 | 96 | ADL |
| 1991 | 26 | ADL |
| Species Total | 15,416 | |

Table 5. Objective-based sampling plan components for Lake Texana Reservoir, Texas 2022–2023.

| 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 | |
| | Size structure | PSD, length frequency | N ≥ 50 |
| Gizzard Shad [a] | Abundance | CPUE–Total | |
| | Size structure | PSD, length frequency | N ≥ 50 |
| | Prey availability | IOV | N ≥ 50 |
| *Gill netting* | | | |
| Blue Catfish | Abundance | CPUE–stock | RSE-Stock ≤ 25 |
| | Size structure | PSD, Length frequency | N ≥ 50 stock |
| | Condition | $W_r$ | 10 fish/inch group (max) |
| *Trap netting* | | | |
| Crappie | Size structrure | PSD, length frequency | N = 50 |

[a] No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of structural habitat types, Lake Texana Reservoir, Texas, 2006. Shoreline habitat type units are in miles and standing timber is acres.

| Habitat type | Estimate | % of total |
|---|---|---|
| Boat dock | 0.3 | 0.2 |
| Boulder | <0.1 | <0.1 |
| Bulkhead | 0.6 | 0.4 |
| Concrete | 2.8 | 1.8 |
| Natural | 148.1 | 95.0 |
| Rip rap | 2.5 | 1.6 |
| Rocky/gravel | 1.9 | 1.2 |
| Standing timber | 795.0 | 8.2 |

Table 7. Survey of aquatic vegetation, Lake Texana Reservoir, Texas, 2010–2022. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

| Vegetation | 2010 | 2014 | 2018 | 2022 |
|---|---|---|---|---|
| Native submersed | 203.3 (2.1) | 762.6 (7.8) | 92.4 (0.9) | 22.9 (0.3) |
| Native floating-leaved | 252.2 (2.6) | 185.3 (1.9) | 13.1 (0.1) | 3.3 (<0.1) |
| Native emergent | None | None | 16.2 (0.2) | 260.9 (3.2) |
| Flooded terrestrial vegetation | None | None | None | None |
| Non-native | | | | |
| Alligatorweed (Tier III) * | 394.1 (4.1) | 48.3 (0.5) | 95.9 (1.0) | None |
| Giant salvinia (Tier II) * | 160.9 (1.7) | 818.8 (8.4) | 10.2 (0.1) | 35.4 (0.4) |
| Hydrilla (Tier III) * | 607.3 (6.2) | 973.8 (10.0) | 231.9 (2.4) | 367.5 (4.5) |
| Water hyacinth (Tier II) * | 1169.0 (12.0) | 1510.9 (15.5) | 380.8 (3.9) | 249.6 (3.0) |
| Parrot Feather (Tier III)* | None | None | None | 3.2 (<0.1) |

*Tier II is Maintenance Status, Tier III is Watch Status

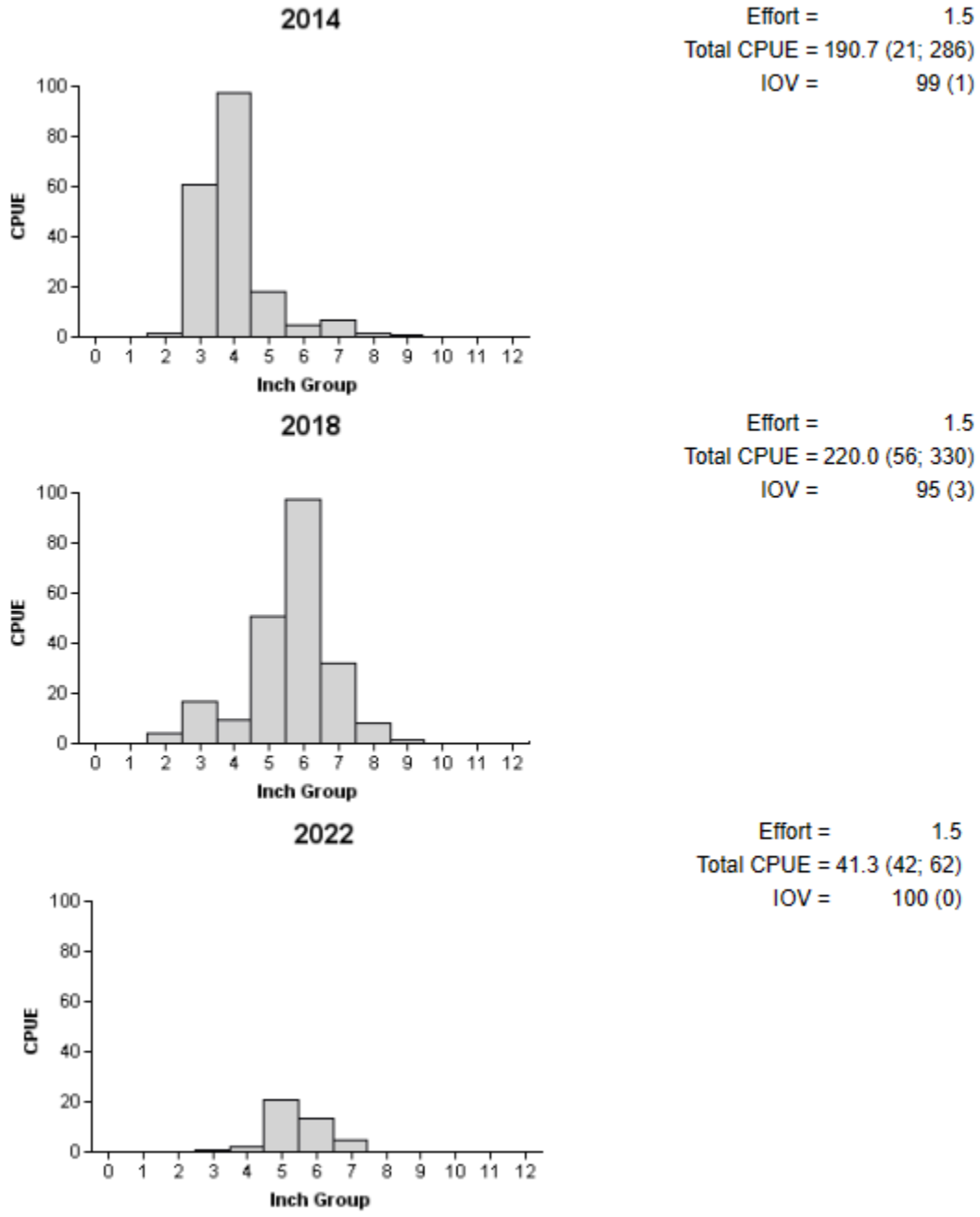



Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Texana Reservoir, Texas, 2014, 2018, and 2022.

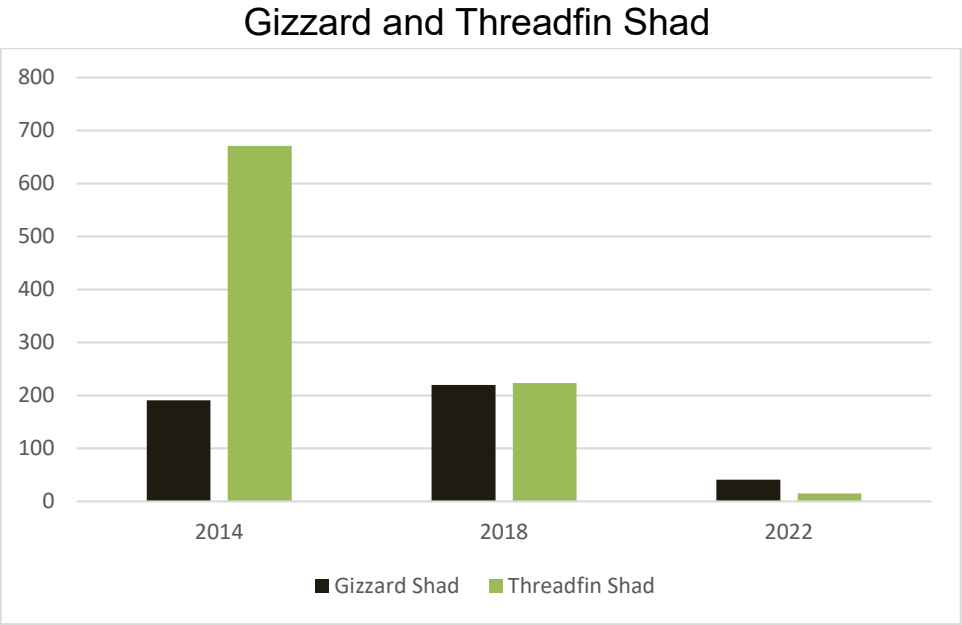



Figure 3. Comparison of total CPUE for Gizzard and Threadfin Shad for fall electrofishing surveys, Lake Texana Reservoir, Texas, 2014, 2018, and 2022. Sampling effort was 18, 5-minute stations for each sampling year.

# Bluegill

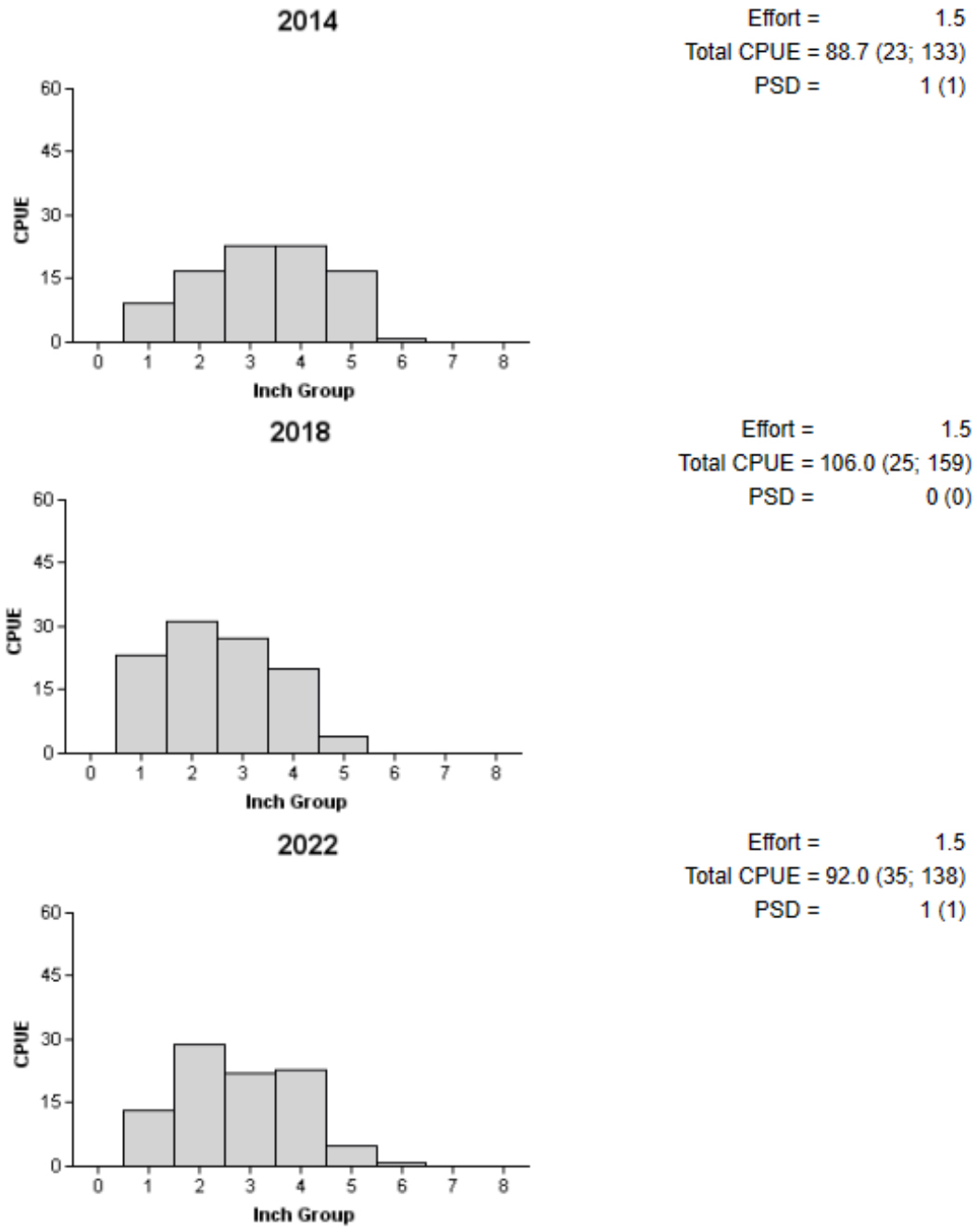



Figure 4. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Texana Reservoir, Texas, 2014, 2018, and 2022.

# Blue Catfish

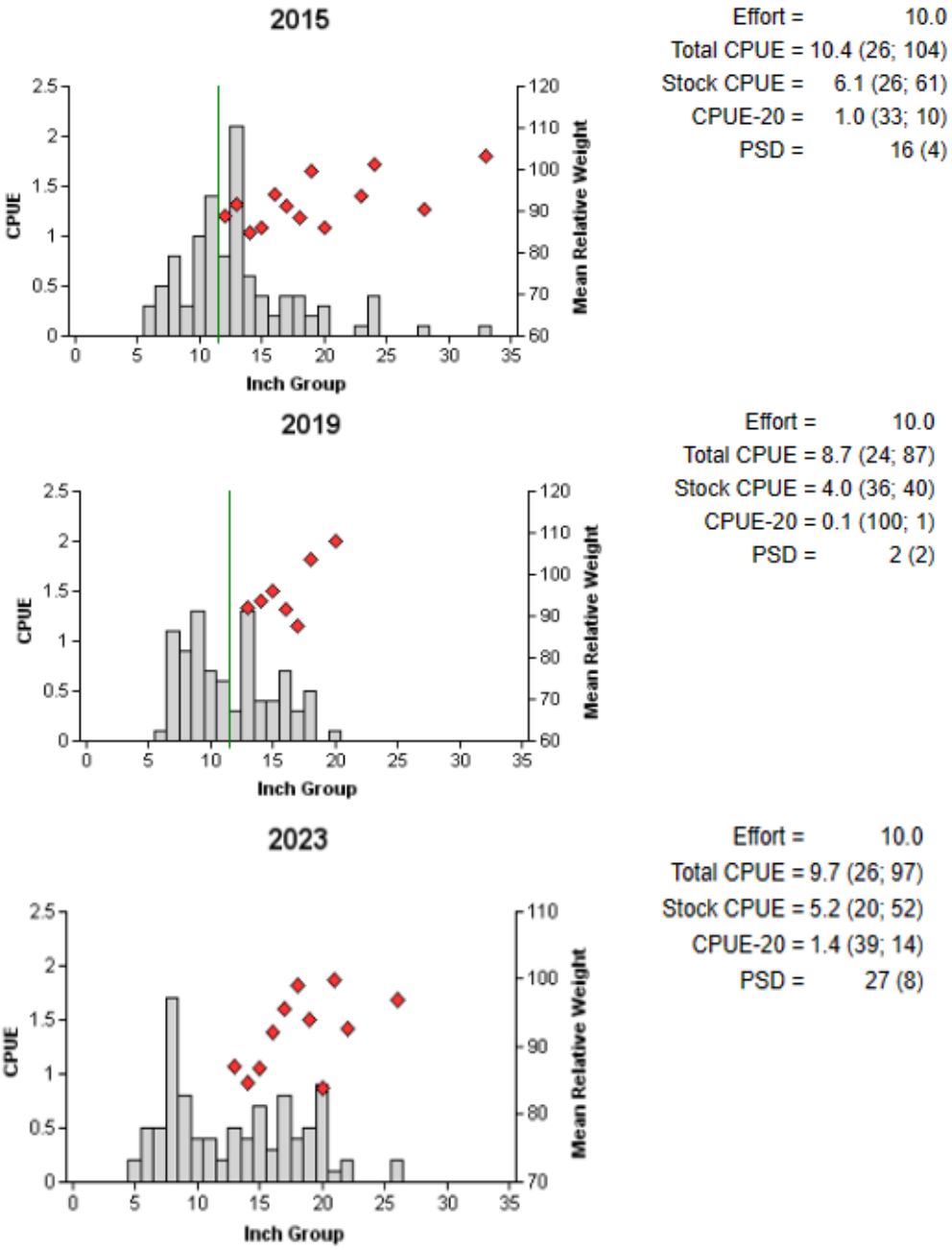



Figure 5. Number of Blue Catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Texana Reservoir, Texas, 2015, 2019, and 2023. Vertical line denotes 12-inch minimum length limit for 2015 and 2019.

# Largemouth Bass

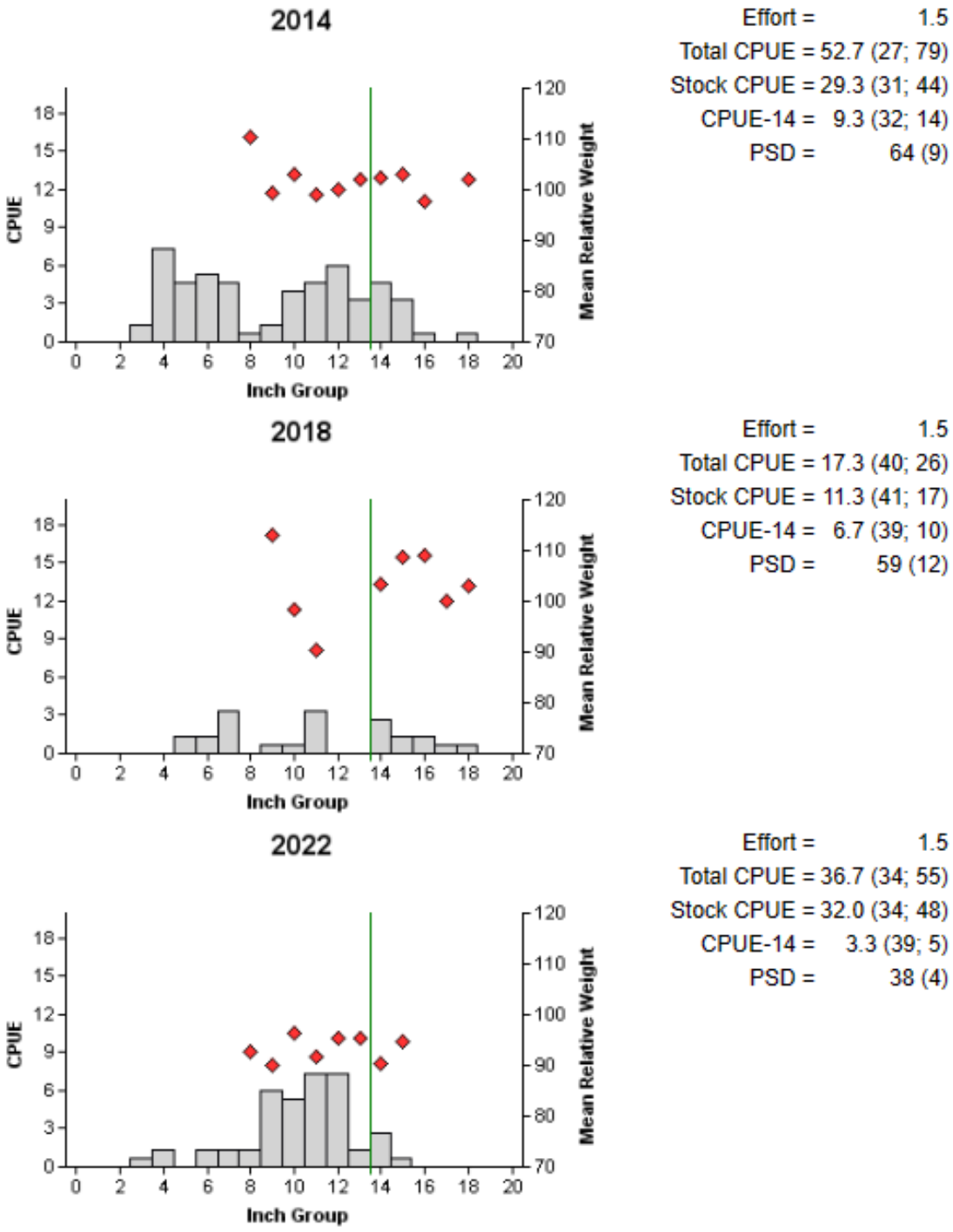



Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Texana Reservoir, Texas, 2014, 2018, and 2022. Vertical line denotes 14-inch minimum length limit.

# White Crappie

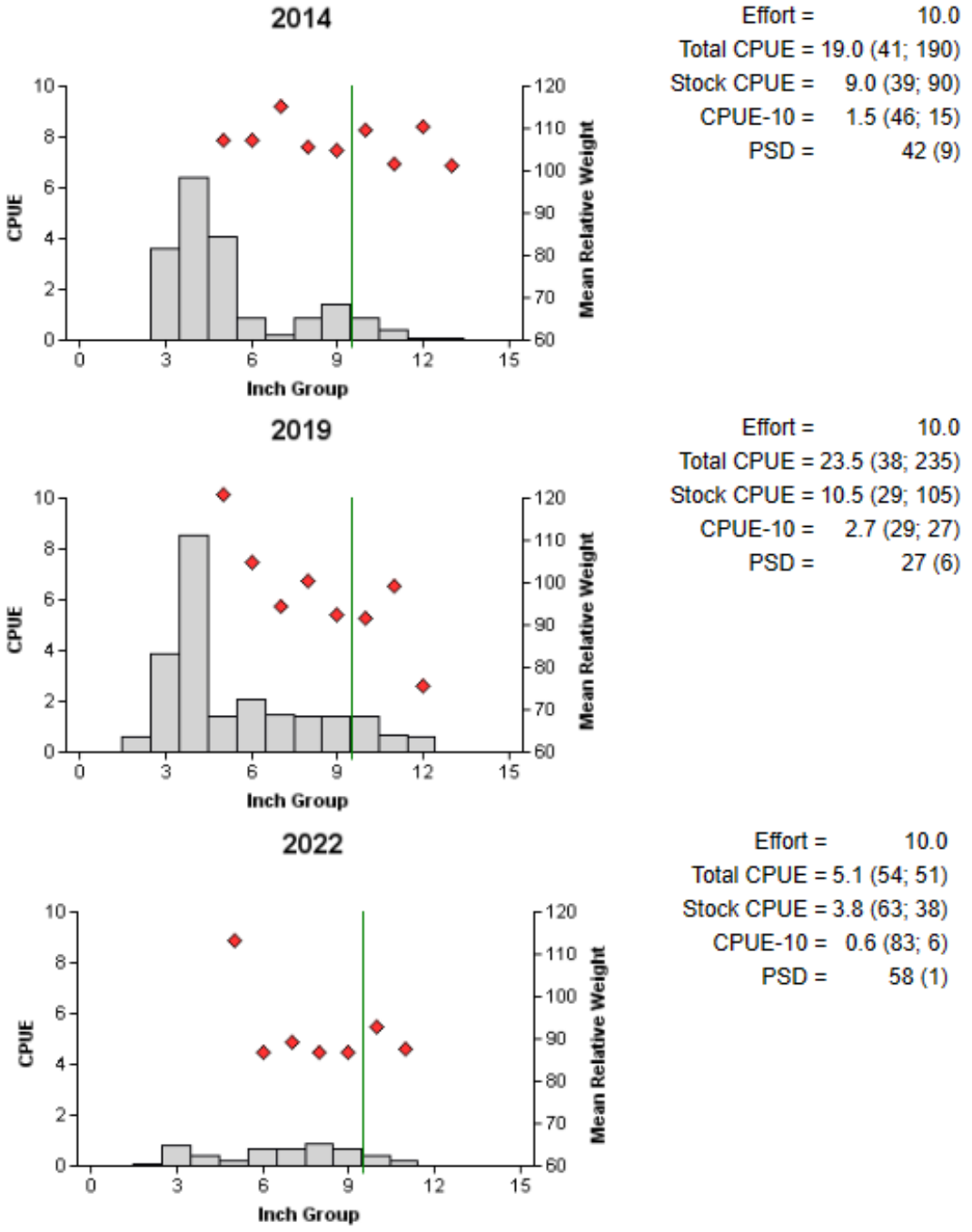
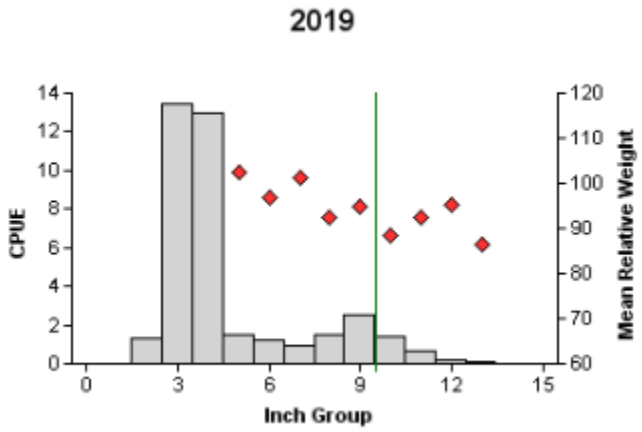



Figure 7. Number of White Crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Texana Reservoir, Texas, 2014, 2019, and 2022. Vertical line denotes 10-inch minimum length limit.

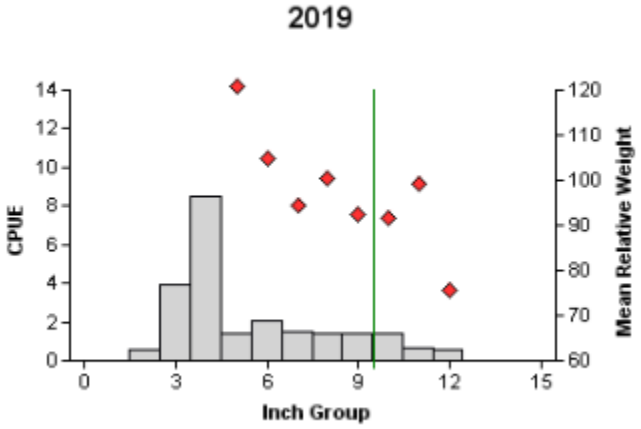
# White Crappie (Biologist vs. Randomly-Selected Sites)

Biologist-Selected




Effort = 10.0
Total CPUE = 37.7 (30; 377)
Stock CPUE = 10.0 (35; 100)
CPUE-10 = 2.4 (38; 24)
PSD = 31 (9)

Randomly-Selected




Effort = 10.0
Total CPUE = 23.5 (38; 235)
Stock CPUE = 10.5 (29; 105)
CPUE-10 = 2.7 (29; 27)
PSD = 27 (6)

Figure 8. Number of White Crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Texana Reservoir, Texas, 2019 (biologist-selected sites and randomly generated sites). Vertical line denotes 10-inch minimum length limit.

# Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Lake Texana Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall.

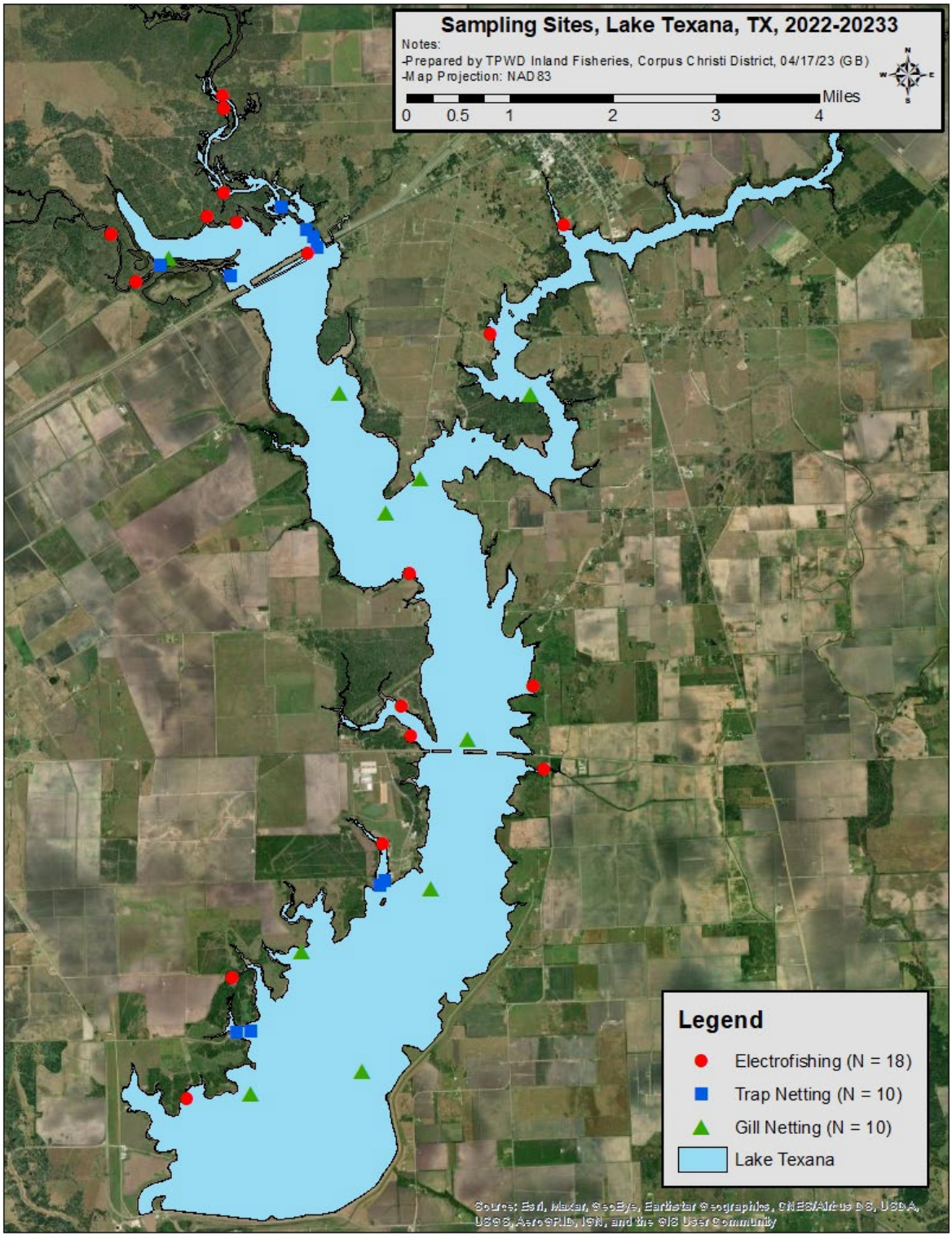
| | Survey year | | | |
|---|---|---|---|---|
| | 2023-2024 | 2024-2025 | 2025-2026 | 2026-2027 |
| Angler Access | | | | X |
| Shoreline Habitat | | | | X |
| Vegetation | | | | X |
| Electrofishing (daytime) – Fall | | | | X |
| Trap netting – Fall | | | | X |
| Gill netting | | | | X |
| Report | | | | X |

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

Number (N) and catch rate (CPUE; RSE in parentheses) of all species collected from all gear types from Lake Texana Reservoir, Texas, 2022-2023. Sampling effort was 10 net nights for gill netting, 10 net nights for trap netting, and 1.5 hour for electrofishing.

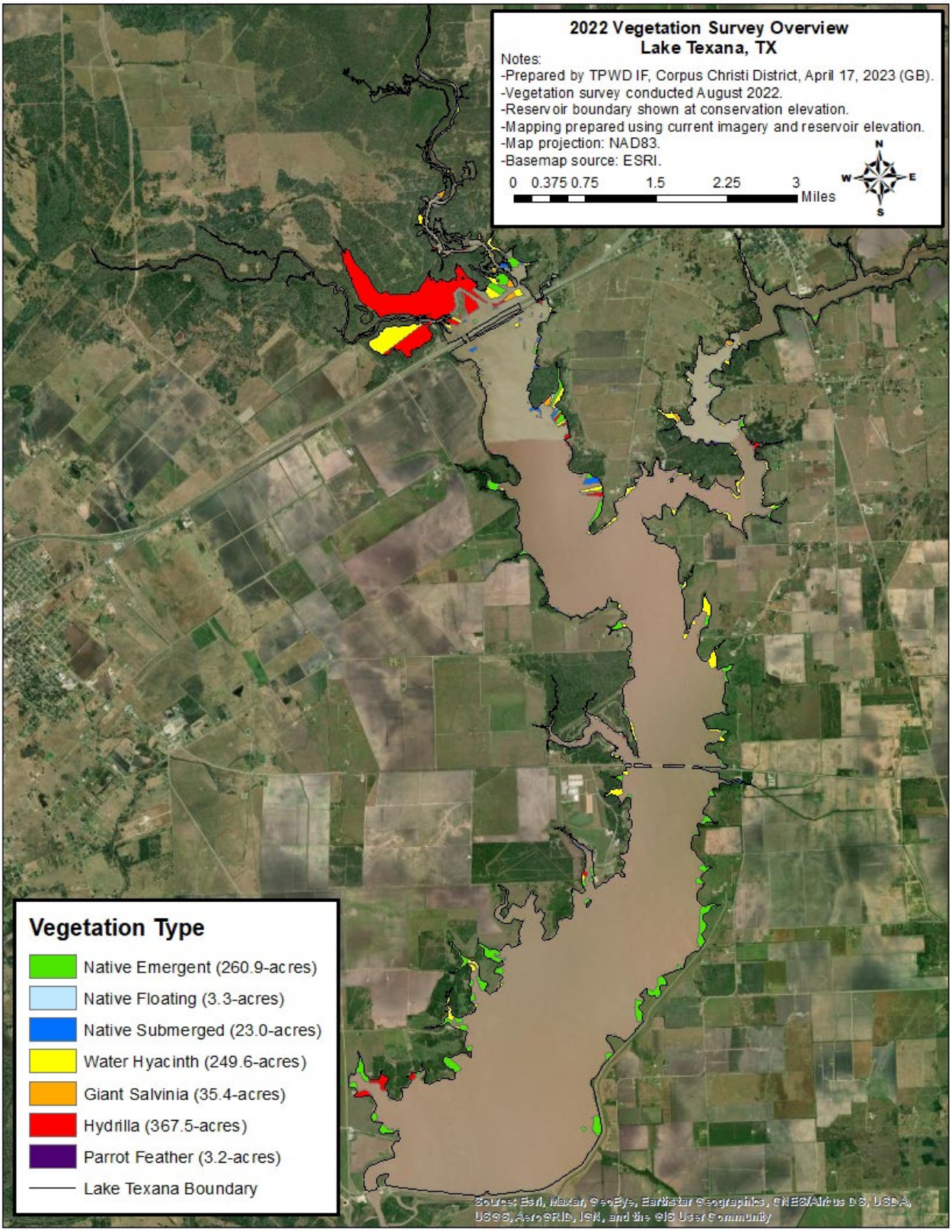
| Species | Gill Netting | | Trap Netting | | Electrofishing | |
|---|---|---|---|---|---|---|
| | N | CPUE | N | CPUE | N | CPUE |
| Spotted Gar | 1 | 0.1 (100) | | | | |
| Longnose Gar | 7 | 0.7 (60) | | | | |
| Alligator Gar | 2 | 0.2 (67) | | | | |
| Gizzard Shad | 8 | 0.8 (87) | 2 | 0.2 (100) | 62 | 41.3 (42) |
| Threadfin Shad | | | | | 23 | 15.3 (70) |
| Inland Silverside | | | | | 4 | 2.7 (78) |
| Smallmouth Buffalo | 16 | 1.6 (63) | 2 | 0.2 (100) | | |
| Channel Catfish | 5 | 5.0 (80) | 2 | 0.2 (67) | | |
| Blue Catfish | 97 | 9.7 (26) | 16 | 1.6 (73) | | |
| Flathead Catfish | 2 | 0.2 (67) | | | | |
| Pirate Perch | | | 10 | 1.0 (54) | | |
| White Bass | 1 | 0.1 (100) | | | 1 | 0.7 (100) |
| Green Sunfish | | | 1 | 0.1 (100) | 1 | 0.7 (100) |
| Warmouth | | | | | 2 | 1.3 (69) |
| Freshwater Drum | 6 | 0.6 (27) | 2 | 0.2 (67) | | |
| Bluegill | | | 12 | 1.2 (68) | 138 | 92 (35) |
| Longear Sunfish | | | 2 | 0.2 (67) | 8 | 5.3 (45) |
| Redear Sunfish | | | | | 4 | 2.7 (58) |
| Largemouth Bass | | | | | 55 | 37.7 (55) |
| Black Crappie | 6 | 0.6 (71) | | | | |
| White Crappie | 24 | 2.4 (32) | 51 | 5.1 (54) | | |

# APPENDIX B – Map of sampling locations




Location of sampling sites, Lake Texana Reservoir, Texas, 2022-2023. Electrofishing, trap net, and gill net stations are indicated by red circle, blue square, and green triangle, respectively. Water level was near full pool at time of sampling.

# APPENDIX C– Distribution map of aquatic vegetation

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