

# Lake Bob Sandlin

## 2017 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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## Survey and Management Summary

Fish populations in Lake Bob Sandlin, Texas, were surveyed in 2017 using electrofishing and trap netting and in 2018 using gill netting. Historical data are presented with the 2017-2018 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 Bob Sandlin is a 9,116-acre impoundment located on Big Cypress Creek in the Cypress River Basin. The lake is located in Titus, Camp, and Franklin Counties. Habitat features consisted of standing timber, bulkhead, piers and docks, rock and gravel, and native aquatic plants. Coverage of hydrilla, alligator weed, Eurasian watermilfoil, and water hyacinth has been low in recent years.

**Management History:** Important sport fishes include Blue Catfish, Channel Catfish, White Bass, Largemouth Bass, and crappie. All sport fish at Lake Bob Sandlin have historically been managed with statewide harvest regulations. Florida Largemouth Bass and Blue Catfish have been stocked to improve angling opportunities.

### Fish Community

- **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch of Gizzard Shad was low, and few Gizzard Shad were available as prey to most sport fish. Bluegill were the most abundant prey species collected during electrofishing surveys. Redear Sunfish were also present and catches of fish > 6 inches provided additional angling opportunities.
- **Catfishes:** The Blue Catfish population consists of fish that have survived from previous stockings, but we have not documented any natural reproduction in the reservoir. Channel Catfish gill netting catch rates have declined during recent surveys, but size composition has remained stable. Flathead Catfish were present in the reservoir, but increased efforts using low-frequency electrofishing to collect baseline information on the population was not successful.
- **White Bass:** White Bass were present in the reservoir. Spawning conditions for White Bass are usually not favorable in Lake Bob Sandlin. However, gill netting catch rates have increased in the latest survey and the population was dominated by 13-14-inch fish.
- **Largemouth Bass:** Largemouth Bass electrofishing catch rates have increased in recent surveys. The number of fish over 14 inches has increased as well. Largemouth Bass had average growth (age at 14 inches was 2.1 years).
- **Crappie:** Both White and Black Crappie were present in the reservoir. Growth of each species was fast.

**Management Strategies:** Monitor the presence of invasive aquatic plants and work with the controlling authority to manage infestations and promote invasive species awareness. Continue to promote and monitor the Blue Catfish population. Continue to stock Florida Largemouth Bass every other year at a rate of 1,000 fish/km of shoreline.

## Introduction

This document is a summary of fisheries data collected from Lake Bob Sandlin in 2017-2018. 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 2017-2018 data for comparison.

## Reservoir Description

Lake Bob Sandlin is a 9,116-acre impoundment constructed in 1977 on Big Cypress Creek in the Cypress River Basin. It is located in Camp, Titus, and Franklin Counties located approximately 10 miles equidistant between the cities of Pittsburg and Mt. Pleasant. The controlling authority is Titus County Fresh Water District No. 1. Primary water uses are municipal and industrial water supply and public recreation. The reservoir has a drainage area of approximately 128 square miles and a shoreline length of 85 miles. Average annual water fluctuation is generally 1-3 feet. Since 2010, reservoir water level has been as low as 9 feet below conservation pool (337.5 msl), but the last three years it has been more stable (Figure 1). Habitat features consisted of standing timber, bulkhead, piers and docks, rock and gravel, and native submersed aquatic plants. The reservoir is monitored annually for the presence of invasive non-native plants because of historical presence of hydrilla and recent introductions of water hyacinth. Other descriptive characteristics for Lake Bob Sandlin are recorded in Table 1.

## Angler Access

Lake Bob Sandlin has seven public boat ramps. Water levels have been low enough in the past for some ramps to become periodically unusable. Repairs to the concrete at the north Highway 21 bridge ramp are needed. Additional boat ramp characteristics are recorded in Table 2. Bank fishing access is limited. There is one fishing pier located at Lake Bob Sandlin State Park and one at Titus County Park.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Bister and Wright 2014) included:

1. Conduct annual aquatic vegetation surveys to monitor invasive aquatic plants and provide technical guidance to property owners and controlling authority regarding invasive aquatic plant management.  
**Action:** Invasive vegetation has been monitored annually and technical guidance has been provided to property owners who want to control invasive aquatic vegetation.
2. Release alligatorweed flea beetles to help control alligatorweed in the spring of 2015.  
**Action:** 4,800 adult alligatorweed flea beetles were released in 2015.
3. Monitor the newly introduced Blue Catfish fishery to determine if natural reproduction is occurring.  
**Action:** Gill netting was conducted in 2016 and 2018 and low-frequency electrofishing was conducted in 2015 and 2017 to determine if natural reproduction was occurring.
4. Promote the Blue Catfish population as an additional angling opportunity.  
**Action:** Engaged in discussions with the public and local angling groups to promote the Blue Catfish fishery.
5. Stock Florida Largemouth Bass every other year at a rate of 50 fish/acre to maintain the quality Largemouth Bass fishery.  
**Action:** Florida Largemouth Bass were stocked in 2014 at a rate of 50 fish/acre and 2016 at a rate of 1,000 fish/km of shoreline; stocking rates were modified in 2016 as directed by the updated stocking guidelines (TPWD, Inland Fisheries Division, unpublished manual revised 2015).
6. Work with Lake Bob Sandlin State Park staff and Titus County to improve the conditions of some boat ramps at Lake Bob Sandlin.

**Action:** Water levels have increased, so there is no longer an access issue at Bob Sandlin State Park. No action has been taken by Titus County to improve the Highway 21 North Bridge ramp.

**Harvest regulation history:** All sport fishes in Lake Bob Sandlin are currently managed with statewide regulations (Table 3). Largemouth Bass have been managed under a 14-inch minimum length limit and 5-fish daily bag (in combination with Spotted Bass) since 1986. Other black basses were included under this regulation in 1988. In 2000, the 12-inch minimum length limit for Spotted Bass was dropped to no minimum length limit. The 12-inch minimum length limit and 25-fish daily bag for Channel and Blue Catfish (in any combination) has been in effect since 1995. The minimum length limit for Flathead Catfish was reduced from 24 inches to the statewide standard 18 inches in 1994. There is a 5-fish daily bag on Flathead Catfish. Crappie (White and Black) have been managed under a 10-inch minimum length limit and 25-fish daily bag (combination of both species) since 1990.

**Stocking history:** Lake Bob Sandlin was stocked with Blue Catfish in 2008, 2009, 2010, 2012, and 2013. Channel Catfish were stocked in 1976, 1978, and 2000. The 812 Channel Catfish stocked in 2000 were inadvertently stocked into Lake Bob Sandlin as opposed to Lake Bob Sandlin State Park Pond. Florida Largemouth Bass were introduced in 1977 and again stocked in 1998, 2006, 2007, 2009, 2010, 2012, 2014, and 2016. The complete stocking history is recorded in Table 4.

**Vegetation/habitat management history:** Non-native vegetation is monitored annually, and coverage has been limited or non-existent in recent years. However, some shoreline property owners have experienced access issues due to alligatorweed and hydrilla in the past. Some submitted Aquatic Vegetation Treatment Proposals to conduct herbicide treatments or mechanical removal of nuisance vegetation. Hydrilla coverage has been as high as 1,800 acres (20% of reservoir surface; Brice and Bister 2006), but even this level of coverage did not pose a biological concern in the reservoir or cause access issues at public boat ramps. Eurasian watermilfoil has been present in the past, but surveys have not detected any in recent years. In 2015 to further manage and control alligatorweed, 4,800 adult alligator weed flea beetles were released. In 2017, water hyacinth was found in multiple near-shore locations around the lake. The Bob Sandlin Lake Advisory Board was notified of the invasion and given the locations of the plants, which were then physically removed.

**Water transfer:** Lake Bob Sandlin is primarily used for municipal water supply and recreation. No interbasin transfers are known to exist.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Lake Bob Sandlin (TPWD Unpublished). 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 2015).

**Electrofishing** – Largemouth Bass, Spotted Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 15 randomly-selected fish (range 13.0 to 14.9 inches).

**Dual-cod trap netting** – Crappie were collected using dual-cod trap nets (10 net series at 10 stations using 2-night sets). CPUE for trap netting was recorded as the number of fish caught per net series (fish/ns). Ages for White and Black Crappies were determined using otoliths from 13 (each) randomly selected fish (range 9.0 to 10.9 inches).

**Gill netting** – Blue Catfish, Channel 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).

**Low-frequency electrofishing** – Flathead Catfish and Blue Catfish were collected by low-frequency electrofishing at 12 stations (2015) and 14 stations (2017). The minimum duration of electrofishing at each station was 3 minutes. CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

**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 2009. Vegetation surveys were conducted in 2014–2017 to monitor invasive plants including alligatorweed, hydrilla, Eurasian watermilfoil, and water hyacinth. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

**Water level** – Source for water level data was the United States Geological Survey (USGS 2018).

## Results and Discussion

**Habitat:** Brice and Bister (2010) reported the littoral zone structural habitat consisted of standing timber (1,678 acres), natural shoreline, bulkhead, piers and docks, and rocks (Table 6). Native vegetation covered 89 acres (roughly 1% of the reservoirs surface area) and less than 30 acres was covered by non-native vegetation (Table 7). Submerged native vegetation coverage decreased from 225 acres in 2013 to 66 acres in 2017 (Bister and Wright 2014) (Table 7). Alligatorweed coverage was similar in 2017 compared to that of the three previous invasive vegetation surveys (Table 7). Water hyacinth was discovered in Lake Bob Sandlin during the 2017 vegetation survey; however, coverage was less than 1 acre (Table 7) and subsequently mechanically removed.

**Prey species:** The 2017 electrofishing catch rate of Gizzard Shad (73.0/h) was similar to the 2015 survey (61.3/h) and less than the 2013 survey (217.3/h) (Figure 2). The index of vulnerability (IOV) indicated that only 16% of Gizzard Shad were available to predators (Figure 2). Bluegill was the most abundant prey species collected during the survey (CPUE = 272.0/h) (Figure 3). Threadfin Shad and

Redear Sunfish serve as additional prey species. The CPUE for Threadfin Shad and Redear Sunfish were 77.0/h and 61.0/h, respectively (Appendix A, Figure 4). The presence of sunfish greater than 6 inches provided additional angling opportunities in this reservoir (Figure 3, Figure 4).

**Catfish:** Gill netting catch rates of Blue Catfish were higher in 2018 (7.4/nn) compared to 2016 (5.6/nn) and 2014 (5.9/nn) (Figure 5). Abundance of adult Blue Catfish appeared stable, but no fish <19 inches were collected during population surveys. During future surveys, the presence of fish <11 inches will be an indication of successful reproduction and recruitment of fish in this developing population. Because the first stocking of Blue Catfish was in 2008, fish had likely not reached maturity; therefore, no natural reproduction has been expected. Body condition was good for Blue Catfish with mean  $W_r$  values at or above 90 for most inch groups. (Figure 5). The gill netting catch rates of Channel Catfish have declined from 13.8/nn in 2014 to 9.5/nn in 2016 and 5.8/nn in 2018 (Figure 6). However, the size range of fish collected was similar among years. Body condition of Channel Catfish collected in 2018 was good with average  $W_r$  for most inch groups >90 (Figure 6). We conducted low-frequency electrofishing in the fall of 2015 and 2017 to collect general population information on Flathead Catfish. However, we were unable to capture any Flathead Catfish in 2015 (12 stations) and only 2 were captured in 2017 (14 stations).

**White Bass:** Relative abundance of White Bass increased over the survey period. Gill netting catch rates of White Bass increased from 3.2/nn in 2014 to 5.3/nn in 2016, and 8.7/nn in 2018 (Figure 7). Abundance of fish is usually low, but occasionally spawning conditions will be adequate to produce a good year-class of White Bass in this reservoir. Bister and Wright (2014) reported the growth of White Bass was fast, with an average age at 10 inches of 1.0 year.

**Black Bass:** Spotted Bass were present and provided additional angling opportunity in the reservoir, but fish are generally small (< 14 inches) (Figure 8). In 2011, electrofishing for bass was conducted during daylight hours to allow safer navigation during low water conditions. Again, in 2015 we sampled bass during the day to evaluate and compare catch rates and data quality to standard nighttime electrofishing, also conducted during the 2015 sampling season (Figures 9 and 10). Survey results indicated sampling during the daylight was much less effective than nighttime sampling (daytime CPUE: 49.0/h, nighttime CPUE: 103.3/h; Figures 9 and Figure 10). We concluded that nighttime electrofishing more accurately describes the Largemouth Bass population in Lake Bob Sandlin and will be used for future sampling efforts. All results presented hereafter reflect data collected from nighttime electrofishing. The electrofishing catch rate of Largemouth Bass has increased in recent years. Total CPUE was 120.0/h in 2017, 103.3/h in 2015, and 86.7/h in 2013 (Figure 10). The CPUE of fish above 14 inches has also increased from 12.0/h in 2013 to 26.0/h in 2017 (Figure 10). Body condition in 2017 was adequate (relative weight  $\geq 85$ ) for nearly all size classes of fish (Figure 10). Growth rate was similar to recent surveys and remains well within an acceptable range; in 2017 average age at 14 inches (13.0 to 14.9 inches) was 2.1 years (N = 15; range = 1 – 3 years), in 2015 average age at 14 inches was 1.7 years (N = 14; range = 1 – 3 years), and in 2013 average age at 14 inches was 2.2 years (N = 13; range = 1 – 5 years) (Bister and Wright 2014).

**Crappie:** The 2017 dual-cod trap net catch rates of both White Crappie and Black Crappie were higher than those of previous surveys deploying standard shoreline single-cod trap nets. White Crappie CPUE was 2.9/ns in 2017 compared to 1.5/nn in 2013 using standard trap nets (Figure 11, Bister and Wright 2014). Black Crappie CPUE was 7.0/ns compared to 0.7/nn in 2013 using standard trap nets (Figure 12, Bister and Wright 2014). While catch rates were higher, data quality remained poor (i.e. high RSE Figure 11, Figure 12). Growth rate of White Crappie was fast in 2017; average age at 10 inches was 1 years (N = 13; all were 1 year old). Growth rate of Black Crappie was adequate in 2017; average age at 10 inches was 1.7 years (N = 13; range 1 - 2 years).

# Fisheries Management Plan for Lake Bob Sandlin, Texas

Prepared – July 2018

**ISSUE 1:** Invasive aquatic plants, specifically water hyacinth potentially pose a threat to angler and boater access as well as outcompete desirable native vegetative species. Water hyacinth was discovered (< 1 acre) and documented in Lake Bob Sandlin during TPWD's annual vegetation survey. The Lake Bob Sandlin Advisory Board was notified and the plants were physically removed. Given water hyacinth's fast growth rate and ability to inhibit lake access it will be important to closely monitor Lake Bob Sandlin in the future to ensure water hyacinth does not become a larger issue. Additionally, many neighboring lakes have become infested with giant salvinia. While Lake Bob Sandlin is currently not infested with giant salvinia, monitoring is required to help prevent its establishment.

## MANAGEMENT STRATEGIES

1. Coordinate with TPWD's Aquatic Habitat Enhancement team to treat nuisance aquatic vegetation with herbicide when necessary.
2. Provide technical guidance to the controlling authority and property owners regarding invasive plant management.
3. Provide signage to controlling authority to post at all boater access sites.

**ISSUE 2:** Continue to promote the Blue Catfish population. Blue Catfish were introduced into Lake Bob Sandlin in 2008 in an effort to increase sportfish angling opportunities. Fingerlings were stocked in 2008, 2009, and 2010 at 50 fish/acre. Additional stockings with fewer fish were made in 2012 and 2013. Gill netting catch rates of Blue Catfish have improved, indicating stocking success. The population should be monitored to identify natural reproduction as stocked fish attain sexual maturity. Angling opportunities for Blue Catfish in Lake Bob Sandlin should be shared with the public.

## MANAGEMENT STRATEGIES

1. Continue to promote angling opportunities for Blue Catfish.
2. Determine development of the Blue Catfish fishery during the 2021/2022 angler creel survey.
3. Document Blue Catfish natural reproduction during future sampling.

**ISSUE 3:** Lake Bob Sandlin supports a quality Largemouth Bass fishery and has a history of producing trophy fish. Fish have previously been collected to 24 inches in electrofishing surveys and fish have been documented in creel surveys up to 24 inches. Review of online bass tournament results routinely indicates fish weighed in >8 pounds. In an effort to maintain a quality fishery, Florida Largemouth Bass have been stocked at 50/acre seven occasions since 1998 and at a rate of 1,000/km of shoreline in 2018. Stocking of Florida Largemouth Bass is necessary to maintain this quality bass fishery.

## MANAGEMENT STRATEGY

1. Continue to stock Florida Largemouth Bass every other year at 1,000 fish/km of shoreline to maintain trophy production potential.

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

#### MANAGEMENT STRATEGIES

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

## Objective-Based Sampling Plan and Schedule (2018–2022)

#### Sport fish, forage fish, and other important fishes

Sport fishes in Lake Bob Sandlin include Largemouth Bass, Spotted Bass, Blue Catfish, Channel Catfish, Flathead Catfish and crappie. Known important forage species include Bluegill, Gizzard Shad, and Threadfin Shad. The proposed sampling schedule to meet the following OBS Plan can be found in Table 8.

#### Low-density fisheries

**White Bass:** White Bass relative abundance has been variable in Lake Bob Sandlin. The 2013/2014 creel survey indicated that only 1.9% of anglers were specifically targeting White Bass. Even though the White Bass fishery is negligible, we will collect population data during routine spring gill netting in 2022 although no additional effort will be expended to sample this species.

#### Survey objectives, fisheries metrics, and sampling objectives

**Black Bass:** Largemouth Bass and Spotted Bass are popular sport fishes in Lake Bob Sandlin. The 2013/2014 creel survey indicated that 35% of anglers were specifically targeting black basses and that a greater amount of directed effort was from tournament anglers (17,152 h) than from non-tournament anglers (11,498 h). Largemouth Bass and Spotted Bass have always been managed under the statewide regulation: daily bag of 5 (combination of both species), 14-inch MLL for Largemouth Bass and no length limit for Spotted Bass. Trend data on CPUE, size structure, and condition has been collected biennially since 2001 with fall nighttime electrofishing (except for 2011 when electrofishing was conducted during the day due to safety concerns as a result of low water conditions). Both daytime and nighttime electrofishing were conducted to see which one was more effective and could accurately sample the bass population. The nighttime electrofishing was much more successful and will be used for all future sampling, unless there are safety concerns. Continuation of biennial trend data with fall nighttime electrofishing will allow for determination of any large-scale changes in Largemouth Bass and Spotted Bass population that may spur further investigation. Given that Largemouth Bass have had higher catch

rates in the past and are likely preferred over Spotted Bass by anglers due to their larger maximum size, our sampling goals will be based off the catch of Largemouth Bass.

In the 2017 survey we sampled 12 stations, rather than the traditional 18 station and were successful at reaching our targeted number of stock size bass and RSE. A minimum of 12 random, 5-min electrofishing sites will be selected in 2021, but sampling will continue at random sites until 50 stock-size Largemouth Bass are collected and the RSE of CPUE-S is  $\leq 25$ . However, if we do not capture  $> 50$  stock-size Largemouth Bass with an RSE of CPUE-S  $\leq 25$  in the first 12 stations, then we will continue electrofishing up to 6 additional randomly selected stations. No more than 18 stations will be sampled.

Sampling objectives for Largemouth Bass will include size structure (PSD and length frequency), growth (mean age at 14 inches using a sample size of 13 fish between 13.0 and 14.9 inches), relative abundance (CPUE-stock  $> 50$ , RSE-S  $\leq 25$ ), and condition (mean  $W_r$  using lengths and weights from 10 fish per inch group). In addition, we will collect population trend data for Spotted Bass (PSD, length frequency, and condition).

**Catfish:** Channel Catfish, Blue Catfish, and Flathead Catfish are all present in Lake Bob Sandlin. A 2013/2014 creel survey indicated that 13.8% of anglers were specifically targeting catfishes. Increasing angling opportunities for catfishes has been a management focus at Bob Sandlin in recent years, specifically for Blue Catfish. From 2008-2013 more than 1,500,000 Blue Catfish fingerlings were stocked to provide additional sport fishing opportunities. All catfishes have historically been managed under the statewide regulation: Channel and Blue Catfish daily bag of 25 (combination of the two species) and MLL of 12 inches, Flathead Catfish daily bag of 5 and MLL of 18 inches.

Standard gill netting surveys have been conducted every four years to collect trend data on CPUE, size structure, and condition for Channel Catfish and Blue Catfish. Additional gill netting was conducted in 2016, as well as a standard gill netting survey in 2018. These surveys showed that Blue Catfish were in the system; however, no evidence of natural reproduction was found. Continuation of standard spring gill net surveys will allow for determination of any large-scale changes in Channel Catfish and Blue Catfish populations that may spur further investigation. Additionally, we will use gill net sampling to determine if Blue Catfish are naturally reproducing. Our sampling goal is to collect at least 50 Channel Catfish and 50 Blue Catfish with an RSE  $\leq 25$  for CPUE. The presence of Blue Catfish  $< 11$  inches will be used to evaluate natural reproduction. We will set 10 gill nets overnight in random locations. An additional 5 gill nets will be set if we do not reach our sampling goal. No more than 15 gill nets will be set.

Sampling objectives for Channel Catfish and Blue Catfish will include size structure (PSD and length frequency), relative abundance (CPUE-total and CPUE-stock), and condition (mean  $W_r$  using lengths and weights from 10 fish per inch group).

Anecdotal evidence suggests that a Flathead Catfish fishery (primarily hand fishing) exists in Lake Bob Sandlin; however, little is known about the population. We conducted low-frequency electrofishing in the fall of 2015 and 2017 to collect general population information on Flathead Catfish. However, we were unable to capture any Flathead Catfish in 2015 (12 stations) and only 2 were captured in 2017 (14 stations). Low-frequency electrofishing proved to be unsuccessful in capturing enough Flathead Catfish to accurately describe the population and will not be used in the 2018-2022 sampling plan. Presence/absence of Flathead Catfish will be noted in standard gill net collections.

**Crappie:** The 2013/2014 creel survey indicated that crappies were the most sought after sport fish in Lake Bob Sandlin, with 43% of anglers targeting crappies. While crappies are clearly an important

resource, effectively sampling them, using traditional trap nets, has been a challenge. In 2017 we switched to sampling crappies using dual-cod, offshore trap net sets for two nights. A total of ten net-series were set for two nights in 2017.

Our 2017 sampling objective was to collect 50 stock-size fish with an RSE of CPUE-S  $\leq$  25 to establish baseline data on size structure (PSD and length frequency), relative abundance, mean relative weight (10 fish per inch group), and growth (13 fish between 9.0 and 10.9 inches). While we were able to capture 50 stock size fish, catch rates were erratic and our RSE was  $>$  25. Given that sampling for crappies has been very inconsistent, we will discontinue sampling for crappies. For future monitoring of crappie, we will rely on angler catch data from creel surveys to determine large-scale changes in the population. The next angler creel survey is scheduled for 2021/2022.

**Prey Species:** Gizzard Shad, Threadfin Shad, and Bluegill are the important forage species at Lake Bob Sandlin. Trend data on CPUE and size structure of these prey species has been collected biennially since 2013 (previous to 2013 it was collected every 4 years). Continuation of electrofishing sampling in 2021, as per Largemouth Bass above, will allow for monitoring of large-scale changes in prey species relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass has been sufficient in collecting the desired numbers of Bluegill for size structure estimation (PSD; 50 fish) and Gizzard Shad size structure (IOV; 50 fish). No additional effort will be expended to collect additional Gizzard Shad and Bluegill if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density. Sampling effort based on sampling objectives for Largemouth Bass will also be sufficient to determine presence or absence of Threadfin Shad.

**Creel Survey:** A roving angler creel survey will be conducted from June 2021 through May 2022 for general monitoring of total fishing effort, angler expenditures, directed angling effort for all sport fish, catch rates, and number of fish harvested.

**Habitat:** Aquatic invasive plants are a serious issue at Bob Sandlin. Water hyacinth, specifically, potentially poses a threat to angler and boater access as well as outcompete desirable native vegetative species. While Lake Bob Sandlin is currently not infested with giant salvinia, this reservoir is at high risk for giant salvinia introduction. Annual aquatic vegetation monitoring is required to identify potential threats to boating and angling access so control and rapid response efforts can be implemented to reduce or eliminate threats associated with invasive aquatic plants. Each summer the reservoir will be circumnavigated and any invasive species encountered will be documented and geo-located.

## Literature Cited

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Bister, T. J., and L. D. Wright. 2014. Statewide freshwater fisheries monitoring and management program survey report for Lake Bob Sandlin, 2013. Texas Parks and Wildlife Department, Federal Aid Project Report F-221-M-3, Austin.
- Brice, M. W., and T. J. Bister. 2006. Statewide freshwater fisheries monitoring and management program survey report for Lake Bob Sandlin, 2005. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Brice, M. W., and T. J. Bister. 2010. Statewide freshwater fisheries monitoring and management program survey report for Lake Bob Sandlin, 2009. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. *North American Journal of Fisheries Management* 16:888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. *Fisheries* 32(7): 348.
- United States Geological Society (USGS). 2018. National water information system: Web interface. Available: <http://waterdata.usgs.gov/tx/nwis> (February 2018).

## Tables and Figures

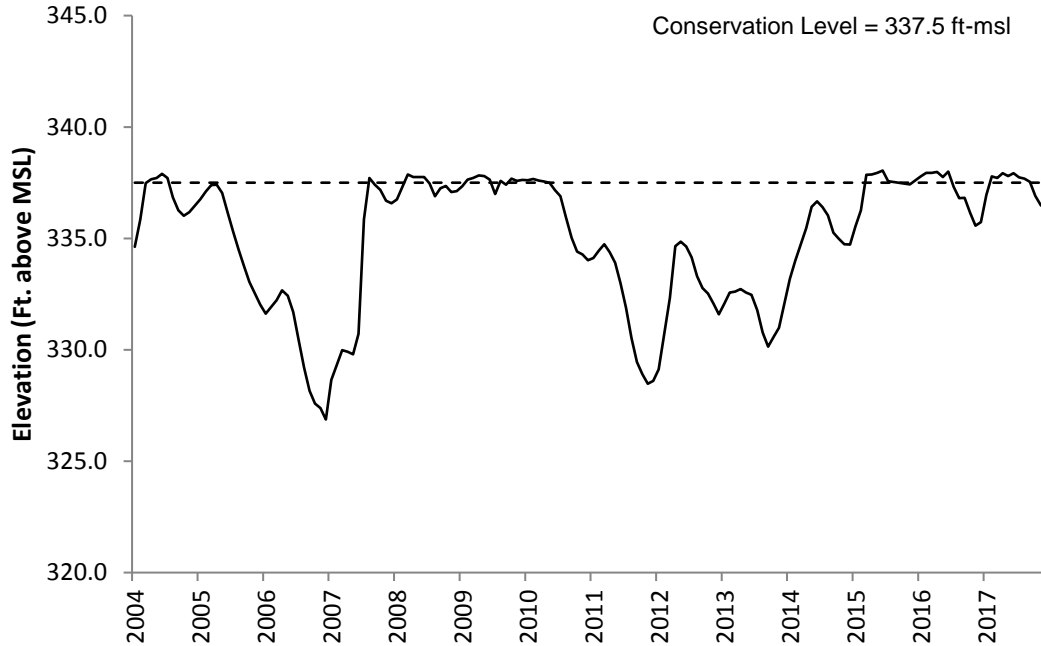


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Bob Sandlin, Texas. Horizontal line denotes conservation pool elevation (337.5 MSL).

Table 1. Characteristics of Lake Bob Sandlin, Texas.

Characteristic	Description
Year Constructed	1977
Controlling authority	Titus County Freshwater District No.1
Counties	Camp, Titus, Franklin
Reservoir type	Mainstream
Shoreline Development Index (SDI)	5.5
Conductivity	139 umhos/cm

Table 2. Boat ramp characteristics for Lake Bob Sandlin, Texas, August, 2017. Reservoir elevation at time of survey was 336.75 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Titus County Water District Park	33.09426 -95.01371	Y	20	329.75	Excellent
Titus County Water District Park – 3 <sup>rd</sup> lane	33.09426 -95.01371	Y	20	324.25	Excellent
Barefoot Bay Marina	33.05208 -95.02199	Y	20	329.75	Excellent
Hwy 21 Bridge South	33.09484 -95.09355	Y	20	330.25	Good
Hwy 21 Bridge North	33.04758 -95.09647	Y	10	327.75	Poor, repair needed
Bob Sandlin State Park	33.04790 -95.09473	Y	30	327.75	Excellent
Titus County Park	33.08274 -95.05701	Y	20	332.75	Good
Titus County Old Ramp	33.09141 -95.01288	Y	20	327.25	Good

Table 3. Harvest regulations for Lake Bob Sandlin, Texas.

Species	Bag Limit	Length Limit (inches)
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass: Largemouth	5 <sup>a</sup>	14-inch minimum
Bass: Spotted	5 <sup>a</sup>	No Limit
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>a</sup> Daily bag for Largemouth Bass and Spotted Bass = 5 in any combination.

Table 4. Stocking history of Lake Bob Sandlin, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults.

Species	Year	Number	Size
Blue Catfish	2008	456,126	FGL
	2009	470,431	FGL
	2010	502,086	FGL
	2012	105,810	FGL
	2013	45,993	FGL
	Total	1,580,446	
Channel Catfish	1976	42,498	AFGL
	1978	149,315	AFGL
	2000	812	AFGL
	Total	192,625	
Florida Largemouth Bass	1977	450,000	FRY
	1998	238,477	FGL
	2006	385,675	FGL
	2007	455,600	FGL
	2009	456,468	FGL
	2010	480,554	FGL
	2012	500,450	FGL
	2014	459,619	FGL
	2016	125,620	FGL
	2018	124,345	FGL
	Total	3,676,828	



Table 5. Objective-based sampling plan components for Lake Bob Sandlin, Texas 2017–2018.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
Bluegill <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
Threadfin Shad <sup>a</sup>			Presence/absence
<i>Low-frequency electrofishing</i>			
Flathead Catfish	Abundance	CPUE – stock	RSE-Stock $\leq 25$
	Size structure	Length frequency	$N \geq 100$ fish
	Condition	$W_r$	10 fish/inch group (max)
Blue Catfish	Recruitment		Presence of fish < 11 inches
<i>Dual-Cod Trap netting</i>			
Crappie <sup>b</sup>	Abundance	CPUE - stock	RSE-stock $\leq 25$
	Size structure	PSD, length frequency	$N = 50$
	Age-and-growth	Age at 10 inches	$N = 13, 9.0 - 10.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
<i>Gill netting</i>			
Channel Catfish	Abundance	CPUE– stock	RSE-Stock $\leq 25$
	Size structure	Length frequency	$N \geq 100$ stock
	Condition	$W_r$	10 fish/inch group (max)
Blue Catfish	Recruitment		Presence of fish < 11 inches

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE of Bluegill and Gizzard Shad. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

<sup>b</sup> Sampling objectives are based off the catch of both Black and White Crappie.

Table 6. Survey of structural habitat types, Lake Bob Sandlin, Texas, 2009. Shoreline habitat type units are in miles and standing timber is in acres.

Habitat type	Estimate	% of total
Bulkhead	5.1 miles	6.0
Bulkhead with boat docks	21.1 miles	24.8
Natural	53.0 miles	62.4
Natural with boat docks	3.4 miles	4.0
Rocky	1.6 miles	1.9
Rocky with boat docks	0.3 miles	0.4
Gravel	0.1 miles	0.1
Standing timber	1,678.0 acres	18.4

Table 7. Survey of aquatic vegetation, Lake Bob Sandlin, Texas, 2014–2017. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014	2015	2016	2017
Native submersed				66 (0.7)
Native floating-leaved				6 (<0.1)
Native emergent				17 (0.2)
Non-native				
Alligatorweed (Tier II)*	25 (0.3)	52 (0.6)	46 (0.5)	29 (0.3)
Hydrilla (Tier III)*	0	0	<1 (<0.1)	0
Water Hyacinth (Tier II)*	0	0	0	<1 (<0.1)

\* Tier I is Immediate Response, Tier II is Maintenance, and Tier III is Watch Status

## Gizzard Shad

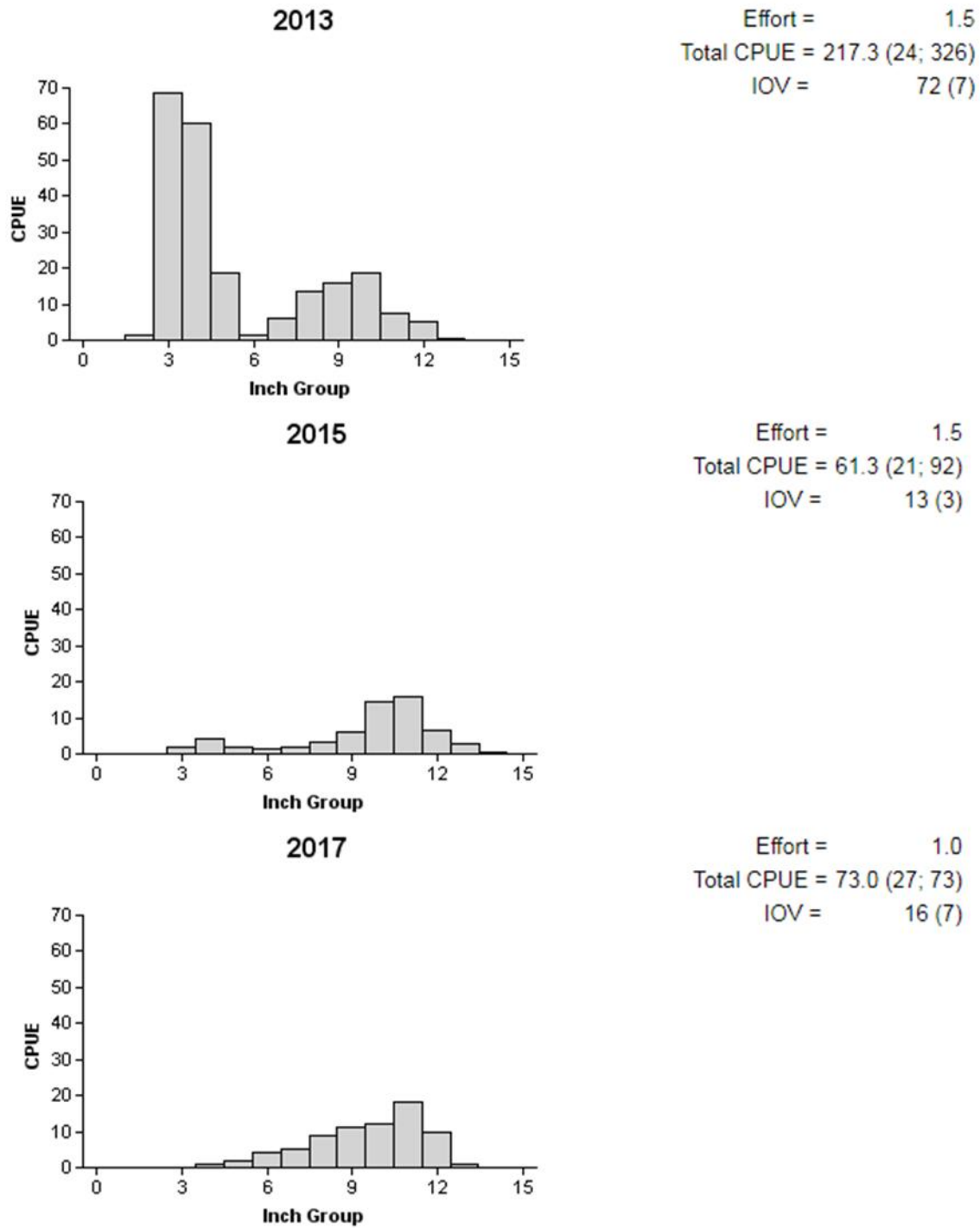


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2013, 2015, and 2017.

## Bluegill

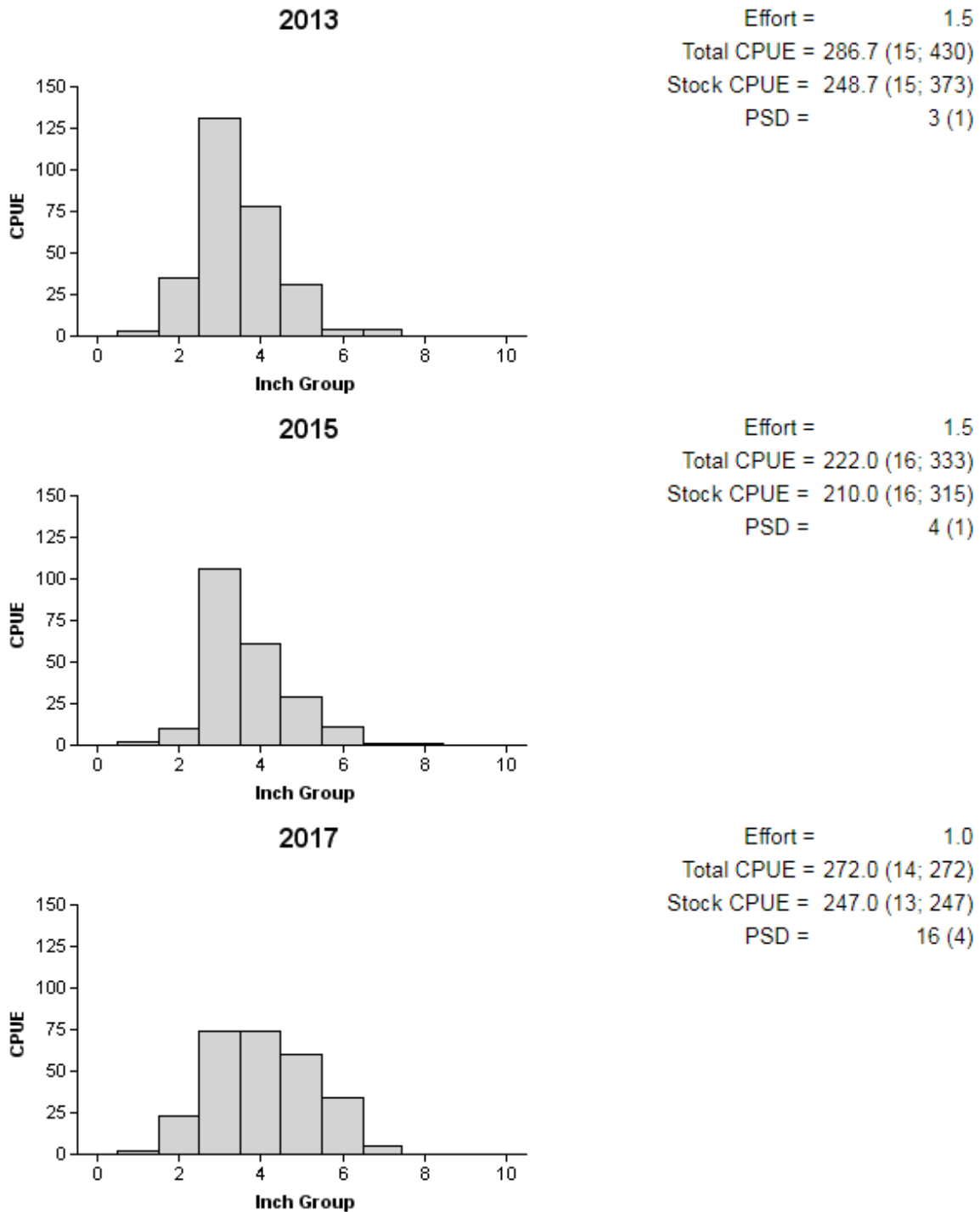


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2013, 2015, and 2017.

## Redear Sunfish

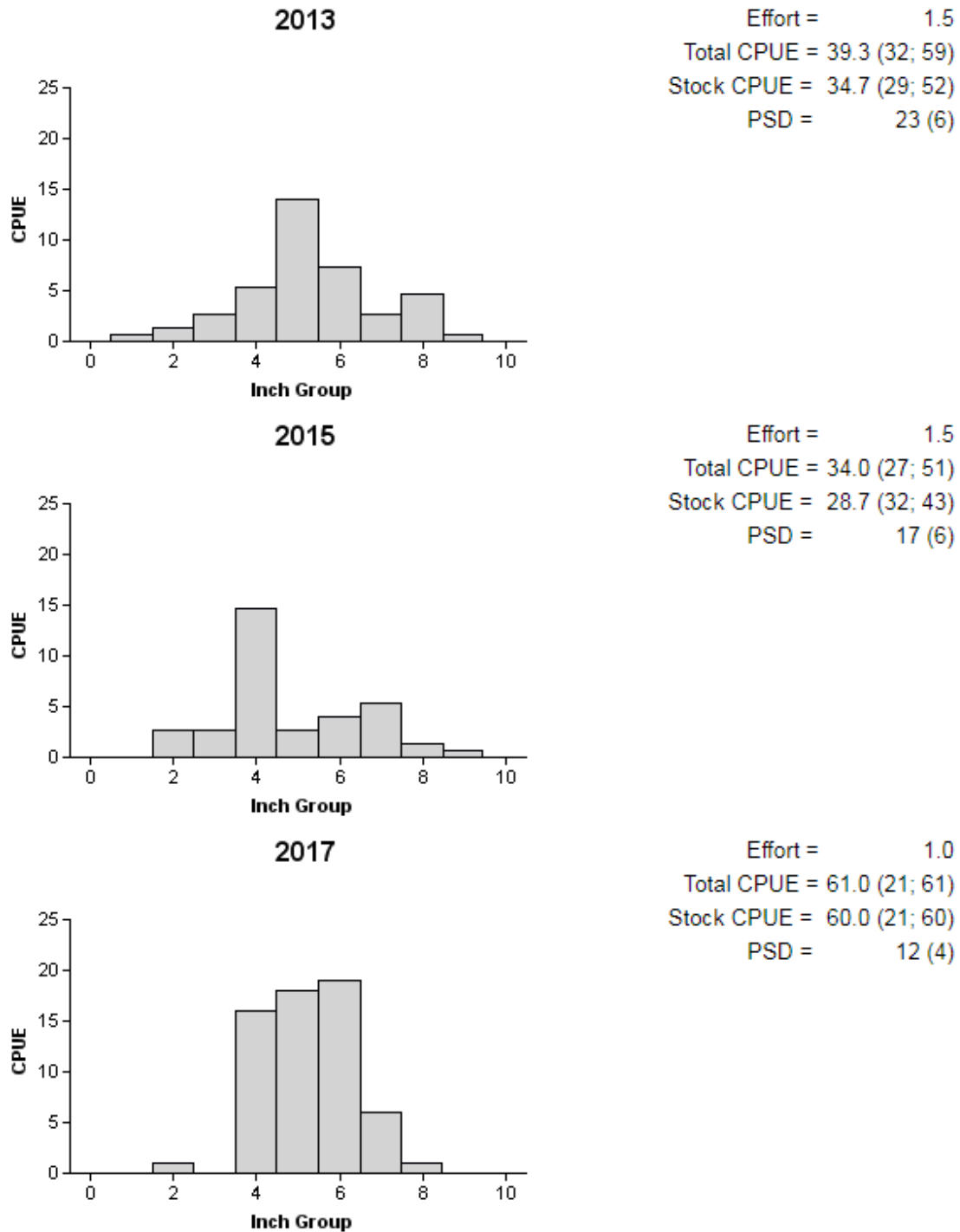


Figure 4. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2013, 2015, and 2017.

## Blue Catfish

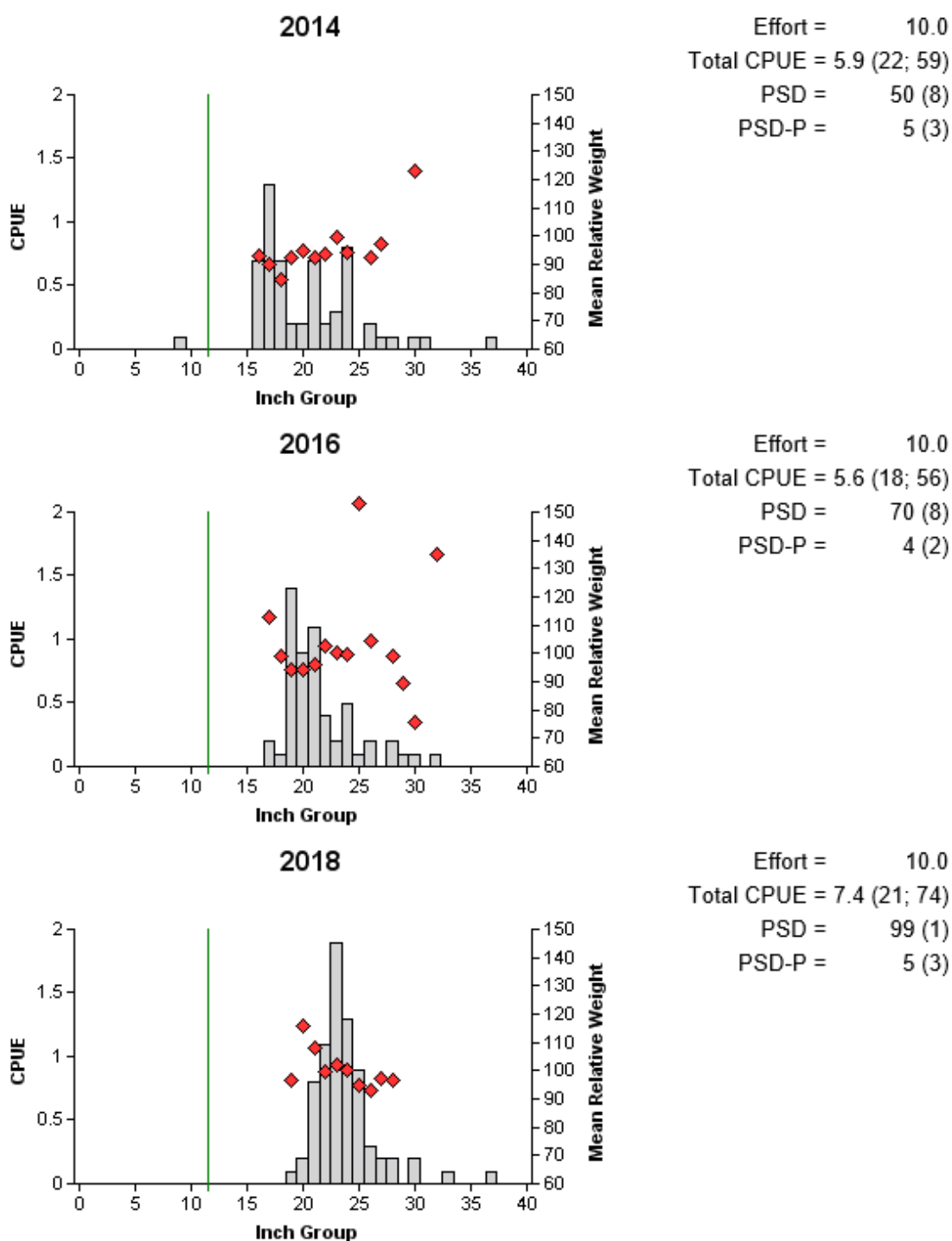


Figure 5. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2014, 2016, and 2018. Vertical line indicates minimum length limit.

## Channel Catfish

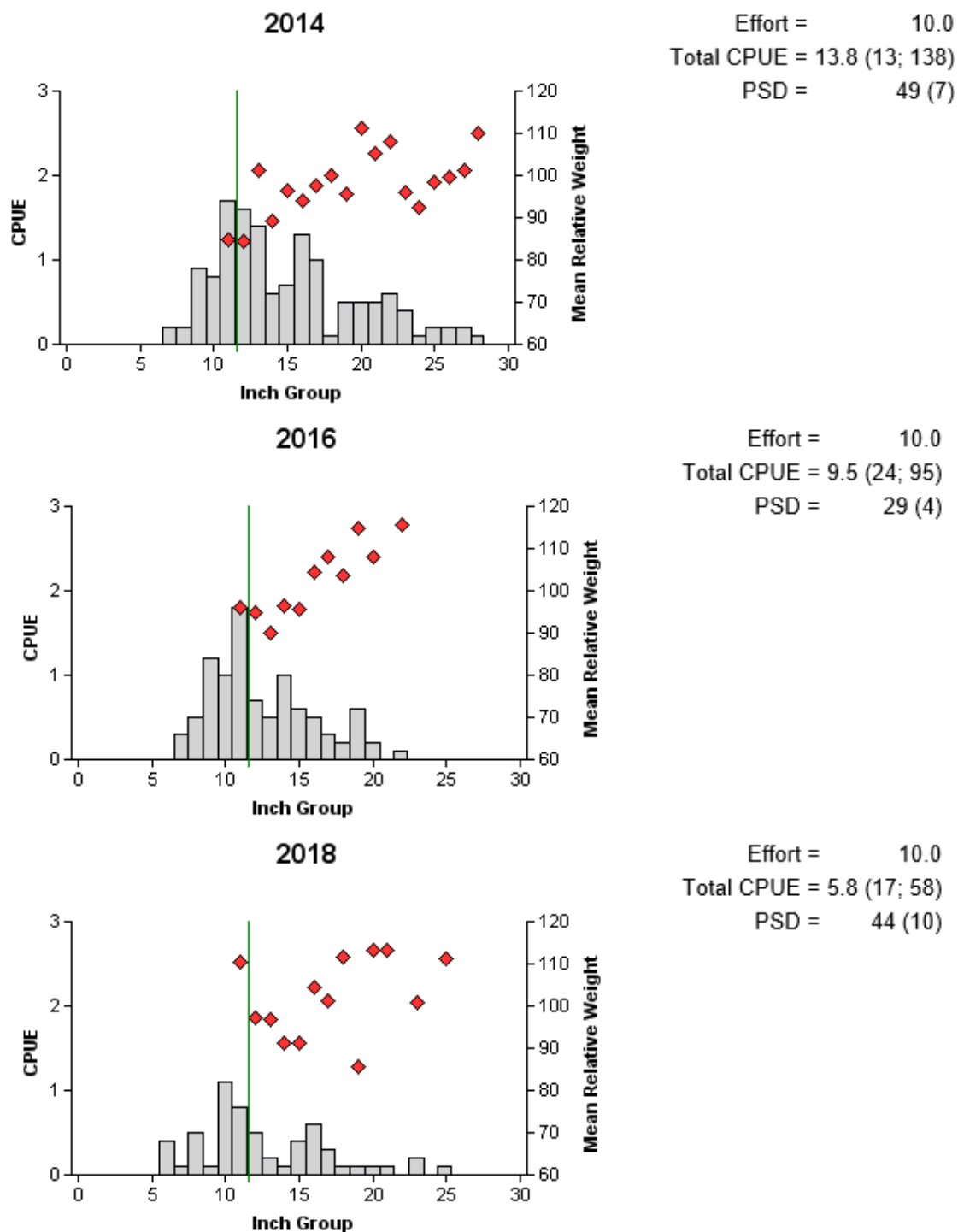


Figure 6. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2014, 2016, and 2018. Vertical line indicates minimum length limit.

## White Bass

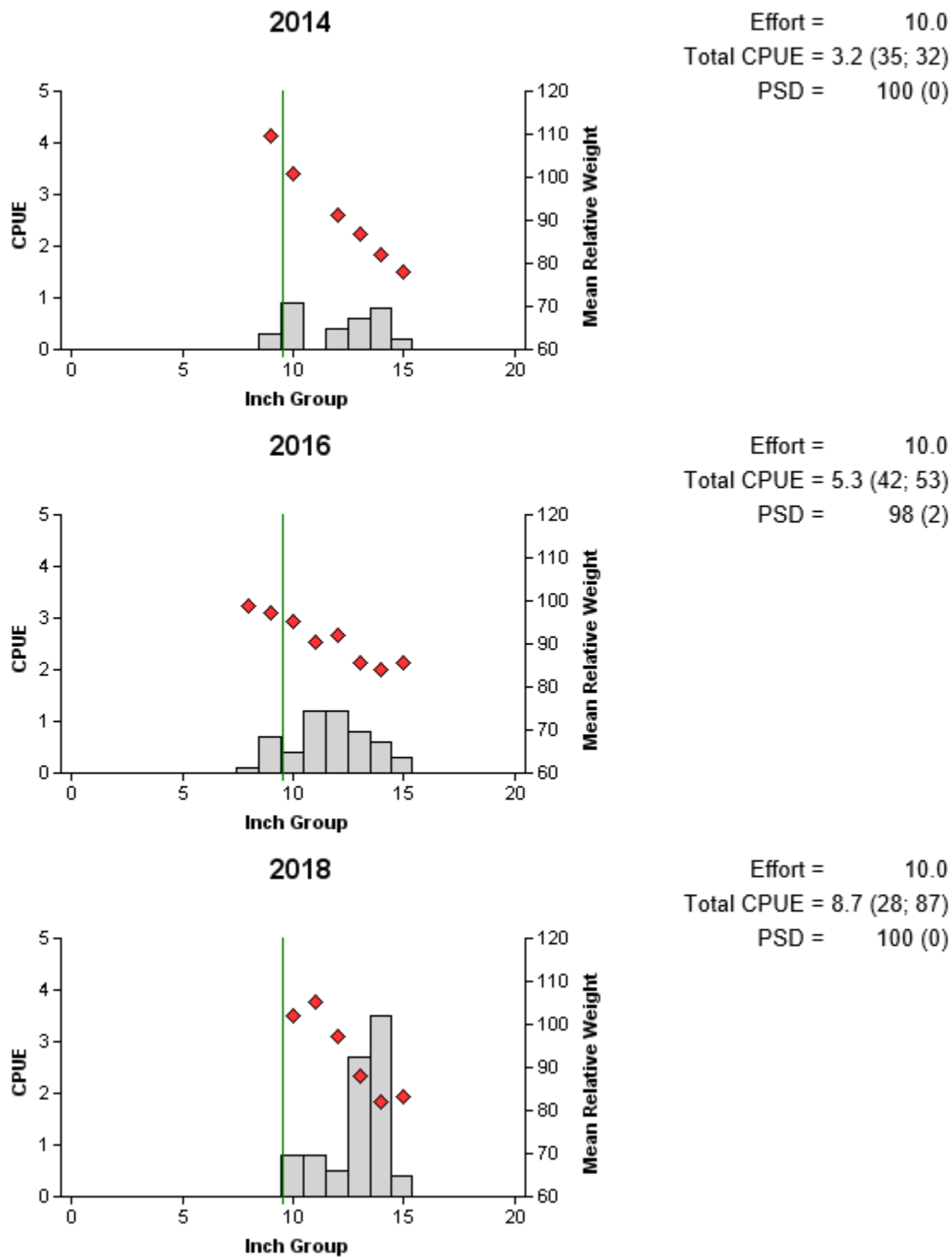


Figure 7. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2014, 2016, and 2018. Vertical line indicates minimum length limit.



## Spotted Bass

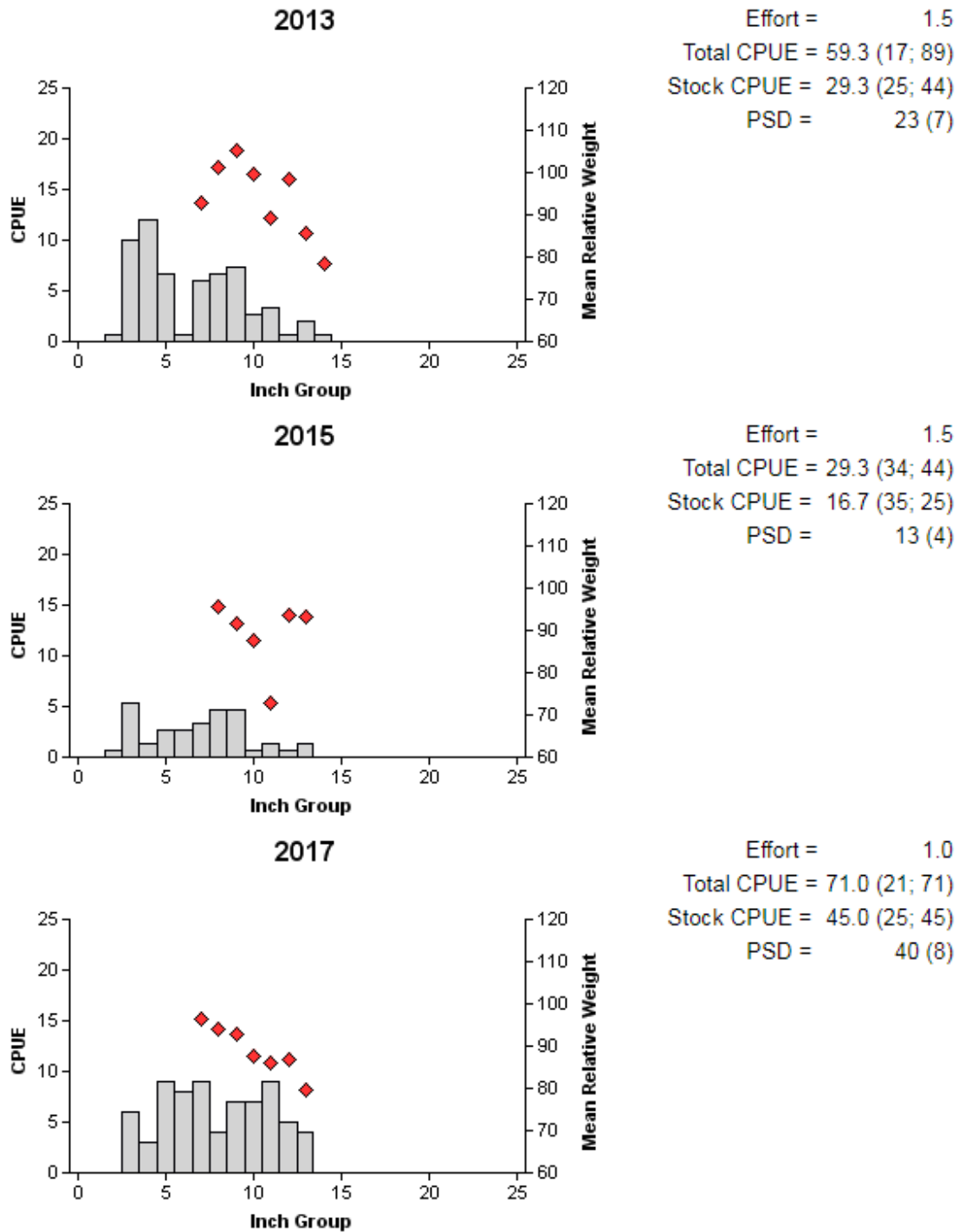


Figure 8. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2013, 2015, and 2017.

## Largemouth Bass

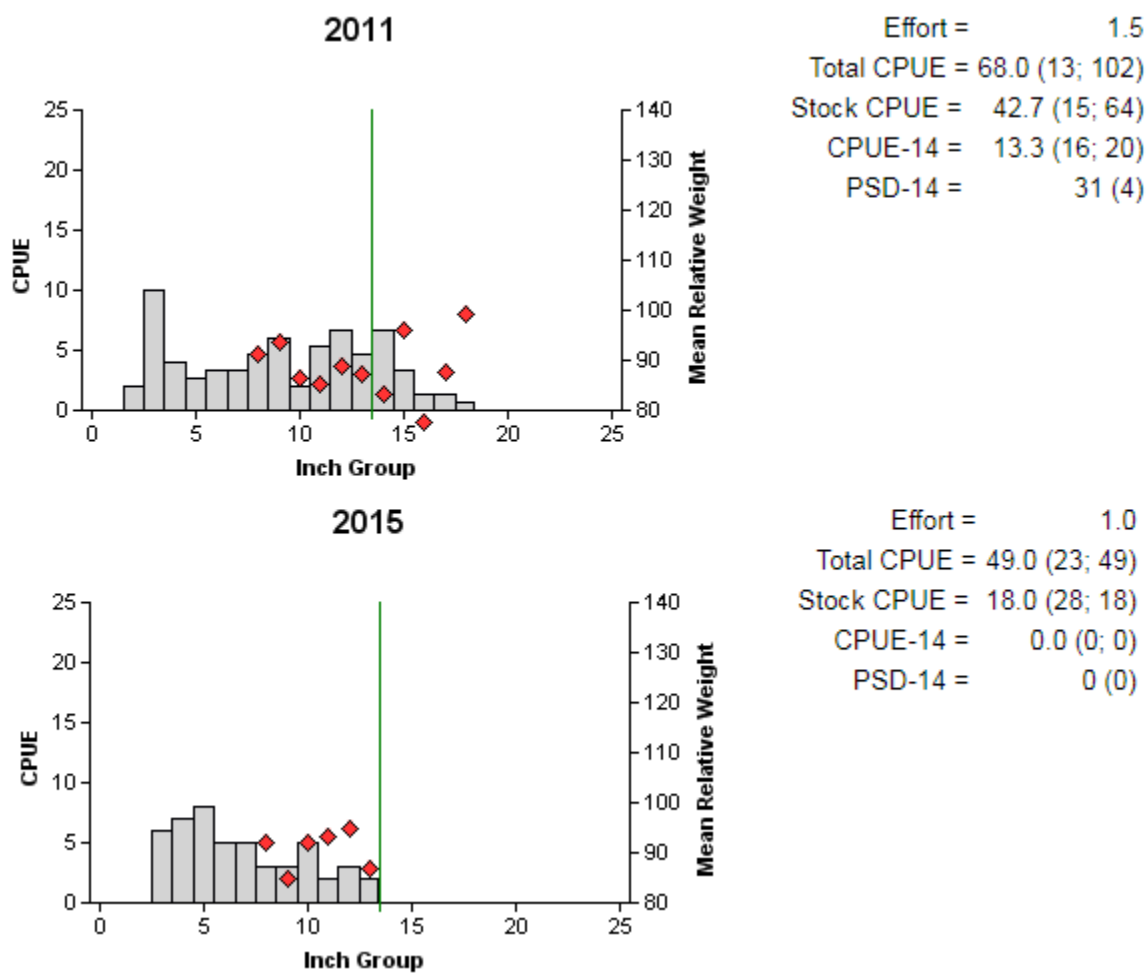


Figure 9. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall daytime electrofishing surveys Lake Bob Sandlin, Texas, 2011 and 2015. Vertical line indicates minimum length limit.

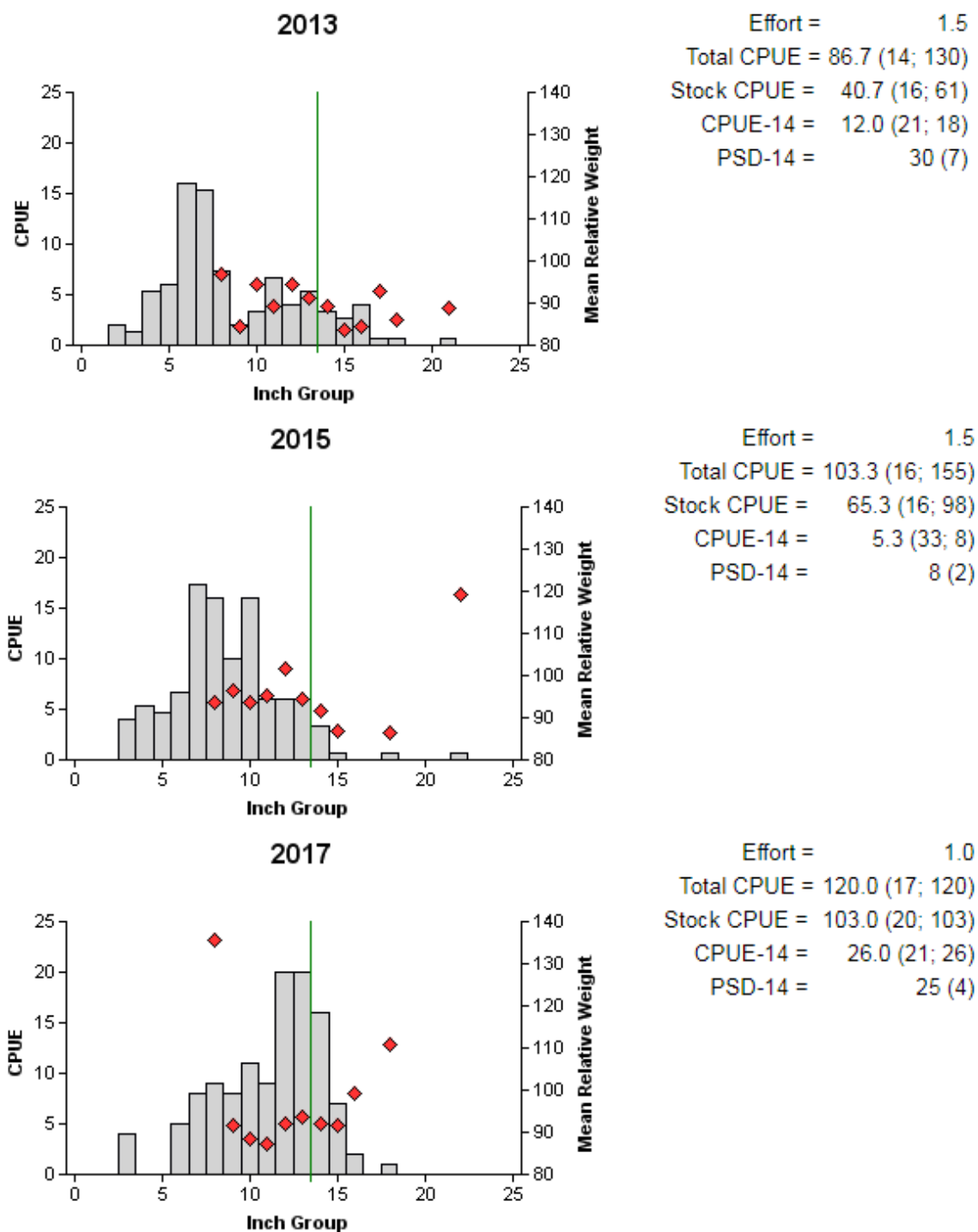


Figure 10. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall nighttime electrofishing surveys Lake Bob Sandlin, Texas, 2013, 2015, and 2017. Vertical line indicates minimum length limit.

## White Crappie

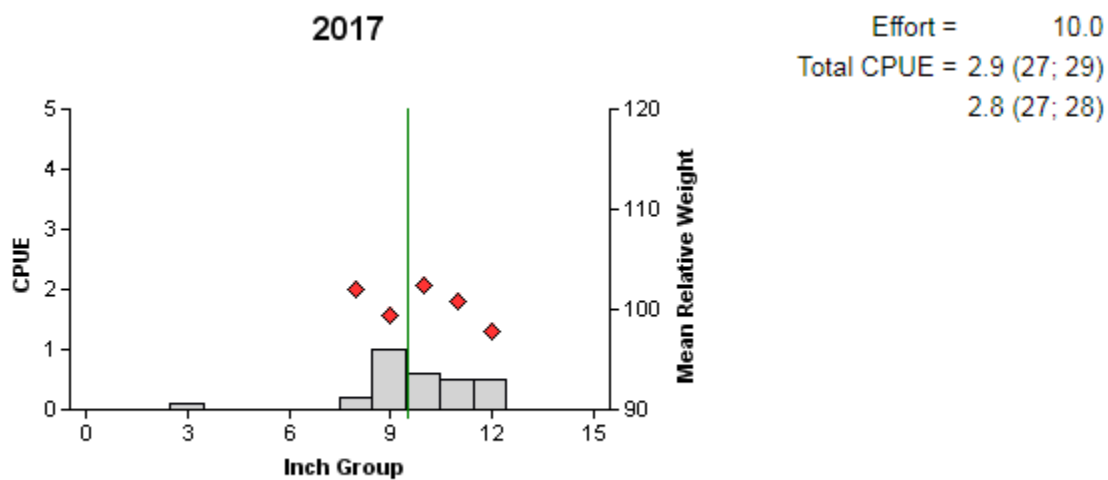


Figure 11. Number of White Crappie caught per net series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall dual-cod trap net surveys, Lake Bob Sandlin, Texas, 2017. Vertical line indicates minimum length limit.

## Black Crappie

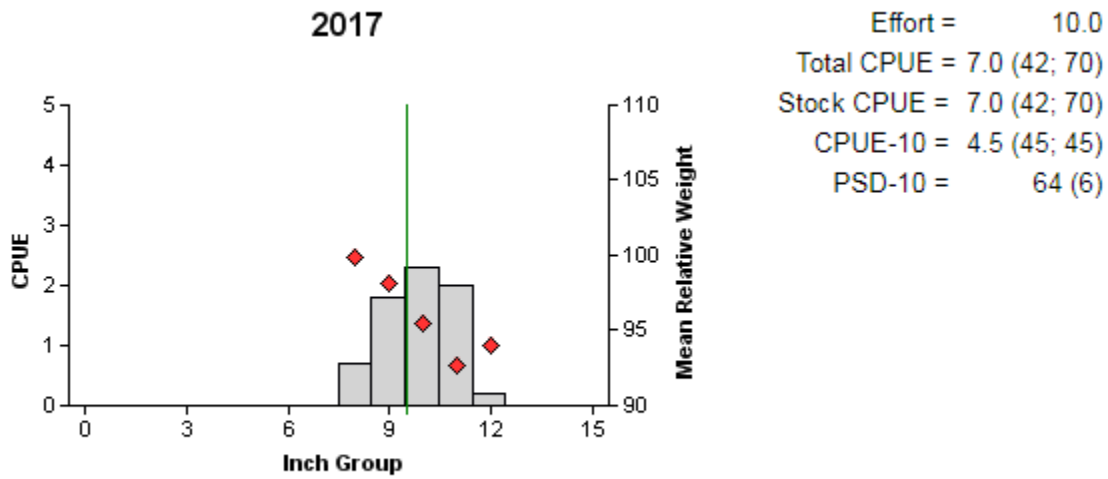


Figure 12. Number of Black Crappie caught per net series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall dual-cod trap net surveys, Lake Bob Sandlin, Texas, 2017. Vertical line indicates minimum length limit.

## Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Lake Bob Sandlin, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

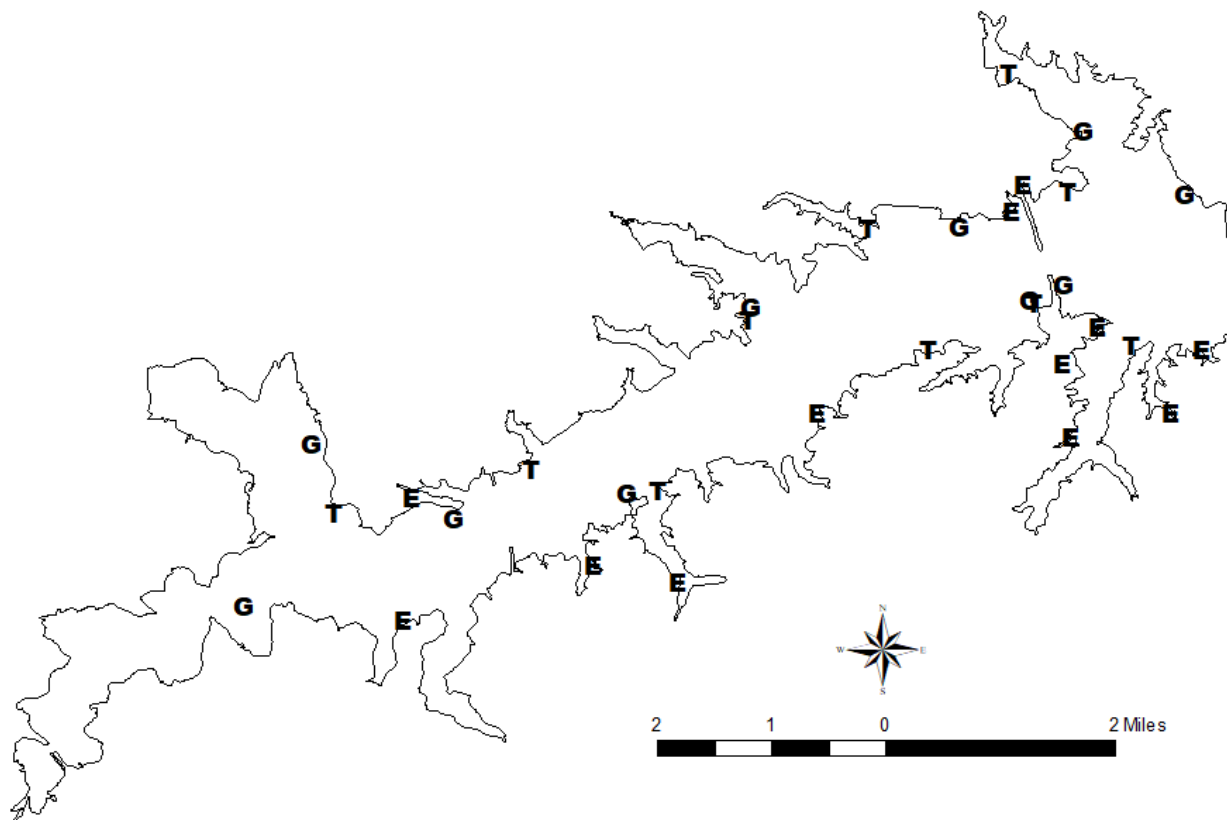
	Survey year			
	2018-2019	2019-2020	2020-2021	2021-2022
Angler Access				S
Structural Habitat				S
Vegetation	A	A	A	S
Electrofishing		A		S
Gill netting		A		S
Creel survey				A
Report				S

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Lake Bob Sandlin, Texas, 2017-2018. Sampling effort was 10 net nights for gill netting, 10 net series for dual-cod trap netting, and 1 hour for electrofishing.

Species	Electrofishing		Gill Netting		Trap Netting	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	73	73.0 (27)				
Threadfin Shad	77	77.0 (25)				
Blue Catfish			74	7.4 (21)		
Channel Catfish			58	5.8 (17)		
White Bass			87	8.7 (28)		
Green Sunfish	1	1.0 (100)				
Warmouth	3	3.0 (52)				
Bluegill	272	272.0 (14)				
Longear Sunfish	41	41.0 (25)				
Redear Sunfish	61	61.0 (21)				
Redspotted Sunfish	3	3.0 (100)				
Spotted Bass	71	71.0 (21)				
Largemouth Bass	120	120.0 (17)				
White Crappie					29	2.9 (27)
Black Crappie					70	7.0 (42)

## APPENDIX B – Map of sampling locations



Location of sampling sites, Lake Bob Sandlin, Texas, 2017-2018. Trap net (dual-cod), gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was near full pool at time of sampling.





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