

# Walter E. Long Reservoir

## 2018 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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## Survey and Management Summary

Fish populations in Walter E. Long Reservoir were surveyed in 2018 using electrofishing and in 2019 using gill netting. Anglers were surveyed from September 2018 through November 2018, and March 2019 through May 2019 with a creel survey. Historical data are presented with the 2018-2019 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:** Walter E. Long Reservoir is a 1,269-acre constant-level impoundment of Decker Creek, a tributary of the Colorado River, and is located east of Austin, Travis County, Texas. The dam was constructed in 1967 for supplying water to a power plant operated by the City of Austin. The reservoir is eutrophic, has a drainage area of 9.3 square miles, a shoreline length of 16 miles, and a shoreline development index of 3.3. The reservoir lies within the blackland prairies ecological region. Habitat features consisted of standing timber, rocks, native submerged aquatic plants, and hydrilla.

**Management History:** Important sport fish included Largemouth Bass, Hybrid Striped Bass (Palmetto Bass and Sunshine Bass), and Channel Catfish. Palmetto Bass were stocked from 2007-2010 at a reduced rate of 5/acre to evaluate density-dependent growth and condition of the predatory fish population. Sunshine Bass were first stocked in 2014 in addition to Palmetto Bass, and separately in 2015. Largemouth Bass have been managed since 1993 with a 14- to 21-inch slot-length limit. An analysis of that length limit change suggested it had been successful in increasing density and angler catch rate of bass greater than 14 inches in length. However, anglers did not harvest enough sub-slot fish which we believed would increase growth rates. Florida Largemouth Bass were last stocked in 1995. Aquatic vegetation habitat surveys have been conducted annually to monitor invasive species and evaluate angler access conditions.

### Fish Community

- **Prey species:** Redbreast Sunfish, Bluegill, Redear Sunfish, and Threadfin Shad were the predominant prey species. Inland Silverside and Gizzard Shad were also available as prey, but the Index of Vulnerability (IOV) for Gizzard Shad was zero, indicating that no Gizzard Shad of vulnerable size ( $\leq 8$  inches) were available to existing predators. Large sunfish, up to 10 inches in length were present.
- **Channel Catfish:** Abundance, size and body condition of Channel Catfish were excellent. This is one of the best Channel Catfish fisheries in the district. Fish up to 27 inches in length were present.
- **Hybrid Striped Bass:** Overall abundance was good and there was an increase in harvestable-size fish ( $\geq 18$  inches) in the last two surveys. Body condition was good ( $>90$ ) for most length classes of fish. On average, Hybrid Striped Bass reached legal length (18 inches) between age 2 and 3. The largest fish sampled measured 24 inches in length.
- **Largemouth Bass:** Largemouth Bass were very abundant, displayed good body condition, and adequate growth. Fish above the slot limit ( $\geq 21$  inches) were present as well. This is the most sought-after species at this reservoir.
- **Smallmouth Buffalo:** The Smallmouth Buffalo population provides a low-density trophy fishery. Thirteen Smallmouth Buffalo were caught (and released) with gill nets, weighing from 22.9 lbs to 60.6 lbs; eight of the fish caught were over 40.0 lbs each.

**Management Strategies:** Continue stocking Hybrid Striped Bass at 5 fish/acre for Palmetto Bass fingerlings and/or an equivalent rate for Sunshine Bass fry. Promote the excellent Channel Catfish fishery. Inform the public about the negative impacts of aquatic invasive species. Continue monitoring for Smallmouth Buffalo and determine age and growth characteristics. Conduct additional electrofishing and gill netting surveys in 2020-2021, and general monitoring surveys with gill nets and electrofishing surveys and an access survey in 2022-2023. Aquatic vegetation surveys should be conducted annually to monitor invasive species.

## Introduction

This document is a summary of fisheries data collected from Walter E. Long Reservoir in 2018-2019. 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 2018-2019 data for comparison.

## Reservoir Description

Walter E. Long Reservoir is a 1,269-acre stable-level (555 ft. above mean sea level) impoundment of Decker Creek, a tributary of the Colorado River, and is located east of Austin, Travis County, Texas. The dam was constructed in 1967 for supplying water to a power plant operated by the City of Austin. The power plant operates on a limited schedule. The reservoir has a drainage area of 9.3 square miles, a shoreline length of 16 miles, and a shoreline development index of 3.3. Walter E. Long Reservoir is eutrophic with a mean TSI chl-*a* of 57.06, and a 10-year change of +7.12 (Texas Commission on Environmental Quality 2018). The reservoir lies within the blackland prairies ecological region. Bulrush was the most abundant vegetation followed by submerged vegetation in the form of coontail and hydrilla. Other descriptive characteristics for Walter E. Long Reservoir are in Table 1.

## Angler Access

Although the entire reservoir shoreline is owned by the City of Austin, bank access is limited to a city-operated park on the south shore. Shoreline access was good within the park boundaries. An ADA compliant fishing pier was available in the park. Two multi-lane, concrete boat ramps were located close together within the park, offering adequate boat access to the reservoir. ADA compliant parking was available. A TPWD grant was used to make repairs on one boat ramp and add the ADA compliant parking. Additional boat ramp characteristics are in Table 2.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Farooqi and De Jesus 2015) included:

1. Continue stocking Palmetto Bass fingerlings and/or Sunshine Bass fry at rates equivalent to 5/acre.
 

**Action:** Sunshine Bass were last stocked in 2015 and Palmetto Bass were stocked from 2016 through 2018. Palmetto Bass were not available in 2019.
2. Future gill net surveys for Hybrid Striped Bass and Channel Catfish should revert to 10 net-nights of effort.
 

**Action:** Gill net surveys remained at 15 net-nights of effort to help ensure OBS objectives for abundance and precision are met for Hybrid Striped Bass and Channel Catfish.
3. Keep abreast of proposals dealing with future development of the reservoir and provide input to minimize any impact to the fishery.
 

**Action:** The City of Austin was considering several proposals (including reducing the lake to a couple of small impoundments) that could have had major implications for the existing fishery. Input was provided by concerned anglers and TPWD. The new site plan allows for the reservoir to remain in its current form with the addition of a golf course.
4. Continue annual aquatic vegetation surveys.
 

**Action:** Annual aquatic vegetation surveys have been conducted through 2018.

5. Continue to promote the Channel Catfish fishery using print and social media.

**Action:** The Channel Catfish fishery was promoted through social media and general interactions with anglers as well as during the 2018-2019 creel survey.

6. Continue to engage partners and the public about the negative impacts of aquatic invasive species using print media, social media, and public engagements/interactions.

**Action:** Outreach efforts have included social media, print media, public presentations, and one-on-one interactions with constituents to help slow the spread of aquatic invasive species. Special emphasis has been placed on the “clean, drain, and dry” procedure to reduce the spread of zebra mussels.

7. Consult with City of Austin and Lower Colorado River Authority, at the request of Smallmouth Buffalo anglers, to develop a plan to clear selected areas to provide additional bank access.

**Action:** Since the City of Austin was considering several proposals that could have had major implications for the existing fishery (including reducing the lake to a couple of small impoundments) the plan to clear selected areas to provide additional bank access was postponed.

**Harvest regulation history:** Sport fish in Walter E. Long Reservoir were managed with statewide regulations except for Largemouth Bass. From 1986 to 1993, Largemouth Bass were managed with a 14-inch minimum length limit. A 14- to 21-inch slot-length limit was implemented on September 1, 1993 to: increase abundance of bass greater than 14 inches in length; increase angler catches of bass greater than 14 inches in length; and, re-direct harvest at individuals less than 14 inches in length. Only one fish over 21 inches may be retained. Current regulations are found in Table 3.

**Stocking history:** Florida Largemouth Bass and Hybrid Striped Bass were important species which were requested and stocked. Walter E. Long Reservoir has been stocked with Palmetto Bass (female Striped Bass X male White Bass offspring) most years since 1978. However, Sunshine Bass (male Striped Bass X female White Bass offspring) were available and stocked 2014 and 2015 to maintain the Hybrid Striped Bass fishery. The complete stocking history is in Table 4.

**Vegetation/habitat management history:** The exotic plant hydrilla (*Hydrilla verticillata*) was present in this reservoir along with a diverse group of native aquatic plant species. In the past, the City of Austin has facilitated several herbicide treatments (e.g., 1989, 1993, 1996) to control hydrilla. In recent years, these treatments have not been necessary, as hydrilla coverage has not become problematic to power plant operations. Aquatic plants offered excellent fish habitat, especially for Largemouth Bass and sunfishes.

**Water transfer:** There are no inter-basin water diversion structures at Walter E. Long Reservoir. Water from the Colorado River is pumped into Walter E. Long Reservoir to maintain stable level.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Walter E. Long Reservoir (TPWD unpublished). Primary components of the OBS plan are listed in Table 5. All survey sites (Appendix A) were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Electrofishing** – Largemouth 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 by a Category 2 evaluation using otoliths from 13 randomly-selected fish (range 13.0 to 14.9 inches; TPWD, Inland Fisheries Division, unpublished manual revised 2017)

**Gill netting** – Hybrid Striped Bass and Channel Catfish were collected by gill netting (15 net nights at 15 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Age and growth for Hybrid Striped Bass were determined using otoliths for all stock-size fish ( $\geq 10$  inches) collected in 2019 (Category 1, variable sample size; TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**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). Palmetto Bass PSD was calculated according to Dumont and Neely (2011). 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 =  $100 \times \text{SE of the estimate/estimate}$ ) was calculated for all CPUE and creel statistics.

**Creel survey** – A fall and spring roving creel survey was conducted in 2018 and 2019 respectively. The fall creel period was September through November 2018, and the spring creel period was March through May 2019. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Habitat** –Vegetation surveys were conducted annually from 2015 through 2018 with emphasis on potential expansion of hydrilla. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

## Results and Discussion

**Habitat:** A habitat survey was last conducted in 2014 (Farooqi and De Jesus 2015). At that time, littoral zone structural habitat consisted primarily of natural shoreline (93.9%). In 2018, native vegetation covered 12.6% of the reservoir's surface area compared to approximately 4.3% coverage by non-native vegetation which consisted of 52.8 acres of hydrilla (Table 6; Appendix B).

**Creel:** Directed fishing effort by anglers was highest for Largemouth Bass (53.2%), followed by anglers fishing for "anything" (12.3%), and Smallmouth Buffalo (9.9%; Table 7). Total fishing effort for all species was 37,191 h and direct expenditure was \$197,101 (Table 8). Fifty percent of anglers interviewed traveled  $\leq 25$  miles to fish at Walter E. Long Reservoir (Appendix C). Notably, approximately 5% of anglers traveled  $\geq 1000$  miles, these included anglers from California, Arizona, and England that were targeting Smallmouth Buffalo.

**Prey species:** Redbreast Sunfish, Bluegill, Redear Sunfish, and Threadfin Shad were the predominant prey species in 2018 (Appendix D). Inland Silverside and Gizzard Shad were also available as prey. The

IOV for Gizzard Shad was zero, indicating that no Gizzard Shad of vulnerable size ( $\leq 8$  inches) were available to existing predators. The IOV was also zero in 2014 and was low in 2017 (IOV = 11). Total CPUE of Gizzard Shad in 2018 (18.0/h) was relatively low as was the case in the 2017 (9.0/h) and 2014 (4.0/h) surveys (Figure 1). Threadfin Shad were collected at the rate of 48.0/h in 2018, similar to that recorded in 2017 (34.0/h) and 2014 (53.0/h). This reservoir is known to provide some excellent fishing opportunities for panfish anglers. Total CPUE of Redbreast Sunfish in 2018 was 102.0/h compared to 150.0/h in 2017 and 50.0/h in 2014. In 2018, larger fish (7 to 9 inches in length) were present (CPUE-7 = 21.0/h; Figure 2). Total CPUE of Bluegill in 2018 (98.0/h) was much lower than that obtained in 2017 (352.0/h) nevertheless, some larger fish were present (CPUE-7 = 7.0/h; Figure 3). A new water body record (rod and reel) for Bluegill was established in 2019 (0.9 pound, 8.5 inches). Total CPUE of Redear Sunfish in 2018 was 61.0/h compared to 107.0/h in 2017 and 40.0/h in 2014. Catch rates for larger fish were very good during the last three surveys (2018, CPUE-7 = 28.0/h), 2017 (CPUE-7 = 33.0/h), and 2014 (CPUE-7 = 22.0/h; Figure 4). A new water body record (rod and reel) for Redear Sunfish was set in 2019 (1.1 pounds, 9.5 inches).

**Smallmouth Buffalo:** Walter E. Long Reservoir is renowned as a trophy Smallmouth Buffalo fishery. This fishery was featured on the Fish My City television show hosted by Mike Iaconelli (2018). The rod and reel waterbody record is 62.3 pounds (2013). An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed directed effort was 9.9%, making Smallmouth Buffalo the third most sought-after species behind Largemouth Bass and “anything” (Table 7). Thirteen Smallmouth Buffalo were caught (and released) during gill netting in 2019 (CPUE = 0.9/nn; Figure 5). These fish ranged in weight from 22.9 lbs to 60.6 lbs and eight of the 13 fish caught were over 40.0 lbs. All these Smallmouth Buffalo are classified as trophy fish (Gabelhouse 1984). The 2018-2019 creel survey showed there was no harvest by rod-and-reel anglers and total catch per hour was 0.2 (Table 9.)

**Channel Catfish:** The gill netting catch rate for Channel Catfish was 5.3/nn in 2019, compared to 3.0/nn in 2017 and 5.2/nn in 2015. In addition, abundance of harvestable-size fish was good in the last three surveys (2018: CPUE-12 = 4.0/nn, 2017: CPUE-12 = 2.7/nn, 2015: CPUE-12 = 4.9/nn). In 2019, the largest fish measured 27 inches in length (Figure 6). In 2019 and 2015, body condition for Channel Catfish was excellent, with all sizes averaging relative weights well above 100. This was also true for the majority of fish caught in 2017. This is one of the best Channel Catfish fisheries in the district. However, the 2018-2019 creel survey showed directed effort for Channel Catfish was 0.4% and for catfishes it was 1.7% (Table 7). Directed fishing effort, catch per hour, and total harvest for Channel Catfish showed a minimal catfish fishery (Table 10, Figure 7). Channel Catfish anglers were not harvest-oriented, 93% of the legal-length fish were released.

**Hybrid Striped Bass:** The total CPUE of Hybrid Striped Bass has been relatively consistent in recent years. The gill netting catch rate of Hybrid Striped Bass in 2015 was 5.9/nn which is higher than in 2013 (1.3/nn) and 2011 (4.2/nn; Figure 8). This is probably due to the higher stocking rate of Palmetto Bass in 2013, and the stocking of Palmetto Bass and Sunshine Bass in 2014. While total CPUE in 2019 (4.1/nn) and 2017 (5.1/nn; Figure 9) remained similar to previous years, the increased stocking rates in 2013 and 2014 may have contributed to the increase in harvestable-length fish in 2019 (CPUE-18 = 3.9/nn) and 2017 (CPUE-18 = 3.1/nn) compared to previous years (2015: CPUE-18 = 1.8/nn, 2013: CPUE-18 = 1.1/nn, 2011: CPUE-18 = 1.7/nn.) In 2019, body condition ( $W_r$ ) was good ( $>90$ ) for most length classes of fish (Figure 9). The 2018-2019 creel survey showed directed effort for Hybrid Striped Bass was 8.0% making it the 5<sup>th</sup> most sought-after species, closely ranked with Smallmouth Buffalo (9.9% directed effort) and crappie (8.6% directed effort; Table 7). Total catch rate of Hybrid Striped Bass was 0.3 fish/h. Hybrid Striped Bass anglers were harvest-oriented, only 4.0% of the legal-length fish were released (Table 11). Harvested fish ranged in size from 18 to 24 inches in length (Figure 10). In 2019, on average, Hybrid Striped Bass reached legal length (18 inches) between age 2 and 3 (Figure 11).

**Largemouth Bass:** Walter E. Long Reservoir has a very popular and consistently high performing Largemouth Bass fishery. In 2012, Walter E. Long and Sam Rayburn reservoirs tied for the title of the best overall reservoir in the state, based on a combination of small, quality and preferred-size bass caught during electrofishing surveys that year (TPWD unpublished data). In 2018 (and in 2017), the reservoir contained a high-density Largemouth Bass population relative to bass populations in other central Texas reservoirs. The total catch rate of Largemouth Bass was 255.0/h in 2018 and 262.0/h in 2017 compared to 143.0/h in 2014 (Figure 12), 179.0/h in 2012, and 134.0/h in 2010. Total CPUE in 2018 and 2017 (255.0/h and 262.0/h, respectively) was higher than the reservoir average (171.1/h) since the start of the slot length limit (September 1, 1993) (De Jesus and Magnelia 2011). In 2018 and 2017, the electrofishing catch rate of Largemouth Bass greater than 14 inches (2018: CPUE-14 = 145.0/h, 2017:CPUE-14 = 136.0/h) was higher than that obtained in recent surveys (2014: 81.0/h, 2012: (88.0/h, 2010: 56.0/h). The CPUE-14 for the 2018, 2017, 2014, and 2012 surveys was higher than the post-slot length limit mean CPUE-14 of 59.5/hour (De Jesus and Magnelia 2011). In 2018, CPUE-21 was 3.0/h compared to 4.0/h in 2017, 6.0/h in 2012 and 1.3/h in 2010. An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed total directed fishing effort, catch per hour, and non-tournament harvest for Largemouth Bass was 21,483 h (92% was non-tournament), 1.3 fish/h, and 141 fish (tournament weigh and release was 1,389), respectively (Table 12). Largemouth Bass anglers were not harvest-oriented, 99% of the legal-length fish (non-tournament) were released. Harvest was evident for fish within the slot limit, particularly for tournament anglers (Figure 13). On average, Largemouth Bass in Walter E. Long Reservoir reached 14 inches by age 2 to 3 (Figure 14) which is about average compared to values for the Edwards Plateau ecological area (Prentice 1987). Mean relative weight for the majority of fish was good ( $\geq 90$ ). The reservoir was last stocked with Florida Largemouth Bass in 1995. Florida Largemouth Bass influence in 2014 was 86.0%.

**Crappie:** White Crappie are thought to be present in low abundance at Walter E. Long Reservoir based on historic trap netting surveys. These surveys failed to capture enough fish to generate a confident estimate. The last trap netting survey was in 2002. Anglers did not specifically target White or Black Crappie during the creel survey of fall 2018 and spring 2019. Instead, anglers targeted crappie as a group. The directed effort for crappie was 8.6%, ranking as the 4<sup>th</sup> most sought-after species (Table 7). Angling catch rate was very high at 2.9/h and total harvest was 578. The majority of fish caught were harvested as percent legal released was 35 and all the fish harvested were between 12 to 15 inches in length (Table 13, Figures 15). A new water body record for Black Crappie was set in 2018 (1.8 pounds, 14.0 inches) and one for White Crappie was set in 2019 (2.0 pounds, 15.2 inches).



# Fisheries Management Plan for Walter E. Long Reservoir, Texas

Prepared – July 2019

**ISSUE 1:** The Hybrid Striped Bass population is maintained by stocking and supported a fishery. It has remained relatively stable under the 5/acre stocking regime.

## MANAGEMENT STRATEGY

1. Continue stocking Palmetto Bass fingerlings at 5/acre and/or Sunshine Bass fry at equivalent rates.

**ISSUE 2:** The City of Austin was considering several proposals (including reducing the lake to a couple of small impoundments) that could have had major implications for the existing fishery at Walter E. Long Reservoir. The new site plan allows for the reservoir to remain in its current form with the addition of a new golf course and possible other modifications to land use around the reservoir.

## MANAGEMENT STRATEGY

1. Keep abreast of proposals that affect the management of the reservoir and provide input to the City of Austin to minimize impacts to the fishery such as a possible reduction in bank fishing access or limiting access to certain areas of the Reservoir.

**ISSUE 3:** Herbicide treatments have historically been utilized by the City of Austin to control aquatic plants, especially non-native hydrilla. Monitoring aquatic vegetation is important from a fisheries management perspective in this power plant reservoir.

## MANAGEMENT STRATEGY

1. Continue annual aquatic vegetation surveys.

**ISSUE 4:** Walter E. Long Reservoir has Channel Catfish and sunfish populations that offer excellent opportunities for anglers but have been shown to be under-utilized.

## MANAGEMENT STRATEGY

1. Continue to promote the Channel Catfish and sunfish fishery using print and social media.

**ISSUE 5:** 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 City of Austin to maintain appropriate signage at access points around the reservoir.
2. Visually inspect rocks along the shoreline of the reservoir to confirm presence or absence of zebra mussels.
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 existing and future inter-basin water transfers to facilitate potential invasive species responses.

**ISSUE 6:** Walter E. Long Reservoir has become the premier trophy Smallmouth Buffalo angling destination that attracts anglers from around the nation and overseas. A creel survey in 2018-2019 showed directed effort was 9.9%, making Smallmouth Buffalo the third most sought-after species at the reservoir. In 2019, 13 Smallmouth Buffalo were caught during gill netting and these were all trophy fish ranging in weight from 22.9 lbs to 60.6 lbs; eight of the fish caught were over 40.0 lbs each. Little is known about this native species in Texas.

#### MANAGEMENT STRATEGY

1. Continue monitoring this species and consider collecting additional data on age and growth.

## Objective-Based Sampling Plan and Schedule (2019–2023)

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

Sport fish in Walter E. Long Reservoir include Largemouth Bass, Hybrid Striped Bass (Palmetto Bass and Sunshine Bass), Channel Catfish, Flathead Catfish, White Bass, White Crappie, and Smallmouth Buffalo. Predominant forage fish species include Redbreast Sunfish, Bluegill, Redear Sunfish, Threadfin Shad, and Gizzard Shad.

#### Underutilized or low-density fisheries

**Flathead Catfish:** Flathead Catfish are present in low density at Walter E. Long Reservoir, based on relative abundance estimates from our monitoring program. The total gill net catch rate of Flathead Catfish ranged between 0.2/nn to 0.7/nn during eight surveys conducted between 2005 to 2019. In a June 2004 to May 2005 creel survey, directed effort for catfish in general was 5.6% and there was no directed effort specifically for Flathead Catfish. Similarly, an angler creel survey in the fall quarter of 2018 and spring quarter of 2019 showed directed effort for catfish in general was 1.7% and there was no directed effort for Flathead Catfish. General monitoring with no established sampling objectives during targeted gill netting for Hybrid Striped Bass and Channel Catfish will be sufficient for this species.

**White Crappie:** White Crappie are present in low abundance at Walter E. Long Reservoir based on trap netting surveys. Historic trap netting surveys have failed to capture enough fish to generate a confident abundance estimate. The last trap netting survey was in 2002. In a June 2004 to May 2005 creel survey, directed effort for White Crappie was 0.7%. An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed no directed effort for White Crappie, however directed effort for crappie in general was 8.6%. Since historic trap netting surveys have failed to capture enough fish to generate a confident estimate, sampling for this species with trap nets is not a priority for this reporting cycle. Trap

netting is the standard sampling method for crappie, however, though gill netting is less efficient, it can provide an indication of relative abundance. Therefore, we will conduct general monitoring with no established sampling objectives for crappie during gill net sampling for Hybrid Striped Bass and Channel Catfish.

**White Bass:** Walter E. Long Reservoir has historically supported a low-density White Bass population. Historical gill netting catch rates since 1991 seldom surpassed 2.2/nn. The total gill netting catch rate of White Bass ranged between 0.0/nn to 5.2/nn during nine surveys conducted between 2003 to 2019. In a June 2004 to May 2005 creel survey, directed effort for White Bass was 2.6%. An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed no directed effort for White Bass. General monitoring with no established sampling objectives during targeted gill netting for Hybrid Striped Bass and Channel Catfish will be enough for this species.

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

**Smallmouth Buffalo:** Walter E. Long Reservoir is renowned as a trophy Smallmouth Buffalo fishery and was featured on the Fish My City television show hosted by Mike Iaconelli (2018). An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed directed effort was 9.9%, making Smallmouth Buffalo the third most sought-after species behind Largemouth Bass and “anything”. Thirteen Smallmouth Buffalo were caught during gill netting in 2019 (CPUE = 0.9/nn). These fish ranged in weight from 22.9 lbs to 60.6 lbs. We will conduct general monitoring with no established precision requirements for Smallmouth Buffalo during gill net sampling for Hybrid Striped Bass and Channel Catfish.

**Channel Catfish:** Walter E. Long Reservoir is one of the better Channel Catfish fisheries in the district. The total gill netting catch rate of Channel Catfish ranged between 2.0/nn to 5.3/nn during 11 surveys conducted between 2001 to 2019. In a June 2004 to May 2005 creel survey, directed effort for Channel Catfish was 4.1% and 5.6% for catfish in general. However, an angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed directed effort for Channel Catfish was 0.4%, and 1.7% for catfish in general. Abundance of harvestable-size fish was relatively good during the last five surveys (2019: CPUE-12 = 4.0/nn, 2017: CPUE-12 = 2.7/nn, 2015: CPUE-12 = 4.9/nn, 2013: CPUE-12 = 2.9/nn, 2011: CPUE-12 = 4.0/nn). In 2019, body condition for Channel Catfish was excellent, with all sizes averaging relative weights above 100 and the largest fish measured 27 inches in length.

Based on surveys in 2011 (CPUE-stock RSE = 24, N = 66), 2013 (CPUE-stock RSE = 18, N = 47), 2015 (CPUE-stock RSE = 24, N = 75), 2017 (CPUE-stock RSE = 29, N = 42), and 2019 (CPUE-stock RSE = 13, N = 64), it is highly likely that sampling objectives (50 stock-size fish with an RSE of CPUE-S  $\leq$  30) for Channel Catfish can be achieved while sampling for Hybrid Striped Bass with an effort of 15 net-nights in 2021 and 2023. If a minimum of 50 stock-size fish and an RSE of CPUE-S  $\leq$  30 is not obtained in the 15 gill-net nights, an additional 5 gill-net nights will be conducted. If this approach does not achieve the goal, no other efforts will be expended for this species.

**Hybrid Striped Bass:** Hybrid Striped Bass are a popular sport fish in Walter E. Long Reservoir. An angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed directed effort for Hybrid Striped Bass was 8.0%, coming behind Largemouth Bass (53.2%), “anything” (12.3%), Smallmouth Buffalo (9.9%), and crappie (8.6%). The gill netting catch rate of Hybrid Striped Bass has been reasonably consistent in recent years. In 2019, CPUE was 4.1/nn compared to 5.1/nn in 2017, 5.9/nn in 2015, 1.3/nn in 2013, and 4.2/nn in 2011. Catch rate of harvestable-size fish was slightly higher than in previous years (2019: CPUE-18 = 3.9/nn, 2017: CPUE-18 = 3.1/nn, 2015: CPUE-18 = 1.8/nn, 2013: CPUE-18 = 1.1/nn, 2011: CPUE-18 = 1.7/nn).

Based on survey data from 2011 (CPUE-stock RSE = 26, N = 63), 2015 (CPUE-stock RSE = 34, N = 88), 2017 (CPUE-stock RSE = 33, N = 76) and 2019 (CPUE-stock RSE = 30, N = 61) a minimum of 15 randomly selected gill netting sites should be enough to achieve a CPUE-stock RSE approximating to  $\leq$  30. Collecting a minimum of 50 stock-length Hybrid Striped Bass in 2021 and 2023 should allow us to

calculate size structure indices with a 70% confidence interval. In addition to the original 15 random stations, five additional random stations will be pre-determined in the event extra sampling is necessary. If this approach does not achieve the goal, no other efforts will be expended for this species. Otoliths will be collected from all Hybrid Striped Bass sampled to get an idea of growth rates; 10 fish/inch group (max).

**Largemouth Bass:** Largemouth Bass is the most sought-after sport fish in Walter E. Long Reservoir. In a June 2004 to May 2005 creel survey, directed effort for Largemouth Bass was 40.6%. Similarly, an angler creel survey during the fall quarter of 2018 and spring quarter of 2019 showed directed effort for Largemouth Bass was 53.2%. The total catch rate of Largemouth Bass was 255.0/h in 2018 compared to 262.0/h in 2017, 143.0/h in 2014, 179.0/h in 2012, and 134.0/h in 2010. In 2018, the electrofishing catch rate of Largemouth Bass greater than 14 inches (CPUE-14 = 145.0/h) was higher than that obtained in previous years (2017: CPUE-14 = 136.0/h, 2014: CPUE-14 = 81.0/h, 2012: 88.0/h, 2010: 56.0/h). In 2012, Walter E. Long and Sam Rayburn reservoirs tied for the title of the best overall reservoir in the state, based on a combination of small, quality and preferred-size bass caught during electrofishing surveys.

A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in fall 2020 and 2022 to determine relative abundance, size structure, condition, and growth; but sampling will continue at random sites until 50 stock-size fish are collected and the RSE of CPUE-S is  $\leq 25$ . Exclusive of the original 12 random stations, six additional random stations will be pre-determined in the event some extra sampling is necessary. If failure to achieve either objective has occurred after 18 stations, no other efforts will be expended for this species.

An age and growth sample of 13 fish between 13.0 and 14.9 inches in length will be collected to assess the time required for Largemouth Bass to grow to the lower end of the slot length limit (14-18 inches).

**Gizzard Shad, Threadfin Shad, and sunfishes:** Redbreast Sunfish, Bluegill, Redear Sunfish, Threadfin Shad and Gizzard Shad are the primary forage at Walter E. Long Reservoir. Like Largemouth Bass, trend data on CPUE and size structure of these sunfish have been collected since 1985. Abundance of Threadfin Shad was also measured as a function of CPUE during those surveys and will remain the main sampling objective to measure Threadfin Shad abundance. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in sunfish relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in enough numbers of sunfish for size structure estimation (PSD and IOV; 50 fish minimum at 5-12 stations with 80% confidence) but not for relative abundance estimates (RSE  $\leq 25$  of CPUE-Total; anticipated effort is 25-30 stations). At the sampling effort needed to achieve sampling objectives for Largemouth Bass, the expected RSE for CPUE-T is 30 for sunfish species combined. No additional effort will be expended to achieve an RSE-25 for CPUE of sunfish. Instead, Largemouth Bass body condition could indirectly gauge forage availability. Relative weight of Largemouth Bass  $\geq 8$  inches TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

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## Tables and Figures

Table 1. Characteristics of Walter E. Long Reservoir, Texas.

Characteristic	Description
Year constructed	1967
Controlling authority	City of Austin
County	Travis
Reservoir type	Tributary
Shoreline Development Index	3.3
Conductivity	533 $\mu$ S/cm

Table 2. Boat ramp characteristics for Walter E. Long Reservoir, Texas, September 2014. This is a stable-level Reservoir (conservation level is 555 feet above mean sea level).

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
Walter E. Long Metro. Park	30.284356 -97.607122	Y	50	N/A	Good

Table 3. Harvest regulations for Walter E. Long Reservoir, Texas.

Species	Bag limit	Length limit
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, Hybrid Striped	5	18-inch minimum
Bass, Largemouth	5 <sup>a</sup>	14- to 21-inch slot
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>a</sup> Only one fish over 21 inches may be retained.

Table 4. Stocking history for Walter E. Long Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
Black Crappie x White Crappie	1987	50,851	FRY	1.0
	1993	120,800	FRY	0.9
	1996	101,794	FRY	0.9
	Total	273,445		
Blue Catfish	1967	2,200	UNK	UNK
	Total	2,200		
Channel Catfish	1967	39,050	AFGL	7.9
	1986	3,595	FRY	1.0
	Total	42,645		
Flathead Catfish	1969	10		0.0
	1970	35		0.0
	Total	45		
Florida Largemouth Bass	1979	15,078	FGL	2.0
	1980	20,290	FGL	2.0
	1988	52,078	FRY	1.0
	1994	122,316	FGL	1.3
	1994	1,977,457	FRY	0.7
	1995	121,022	FGL	1.4
	1995	982,908	FRY	0.7
	Total	3,291,149		
Green Sunfish x Redear Sunfish	1969	12,500	UNK	UNK
	Total	12,500		
Palmetto Bass (Striped X White Bass hybrid)	1978	9,950	UNK	UNK
	1979	560,000	FRY	0.4
	1982	12,787	UNK	0.0
	1986	24,112	FRY	1.0
	1988	30,120	FRY	1.0

Table 4. Stocking history for Walter E. Long Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
Palmetto Bass (Striped x White Bass Hybrid)	1989	27,554	FGL	1.9
	1991	12,258	FGL	1.8
	1992	10,087	FGL	1.5
	1993	10,000	FGL	1.5
	1994	19,600	FGL	1.9
	1995	21,710	FGL	1.4
	1996	19,800	FGL	1.7
	1997	20,400	FGL	1.8
	1998	19,980	FGL	1.7
	1999	18,247	FGL	1.5
	2000	18,369	FGL	1.5
	2002	18,162	FGL	2.1
	2004	18,260	FGL	1.6
	2005	6,073	FGL	1.5
	2006	6,070	FGL	1.8
	2007	6,740	FGL	1.8
	2008	6,733	FGL	1.5
	2009	6,345	FGL	1.5
	2010	6,667	FGL	1.7
	2011	6,449	FGL	1.5
2013	19,438	FGL	1.8	
2014	7,609	FGL	1.5	
2016	13,107	FGL	1.7	
2017	14,819	FGL	1.9	
2018	7,044	FGL	2.0	
	<b>Total</b>	<b>978,490</b>		
Red Drum	1974	600	UNK	UNK
	1975	33,300	UNK	UNK
	1981	146,500	UNK	UNK
	<b>Total</b>	<b>180,400</b>		
Sunshine Bass (White Bass x Striped Bass hybrid)	2014	6,723	FGL	1.5
	2015	75,000	FRY	0.2
	<b>Total</b>	<b>81,723</b>		



Table 5. Objective-based sampling plan components for Walter E. Long Reservoir, Texas 2018 – 2019.

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	$N = 13, 12.9 - 14.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
Redbreast Sunfish <sup>a</sup>	Abundance	CPUE – total	RSE $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
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	Length frequency	$N \geq 50$
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Channel Catfish	Abundance	CPUE – stock	RSE-stock $\leq 30$
	Size structure	Length frequency	$N = 50$ stock
	Condition	$W_r$	10 fish/inch group (max)
Hybrid Striped Bass	Abundance	CPUE – stock	RSE-stock $\leq 30$
	Size structure	Length frequency	$N \geq 50$ stock
	Age and growth	Rough estimate of growth	10 fish/inch group (max)
	Condition	$W_r$	10 fish/inch group (max)

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE and  $N \geq 50$  for Redbreast Sunfish, 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 aquatic vegetation, Walter E. Long Reservoir, Texas, 2015–2018. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2015	2016	2017	2018
Native submersed	78.7 (6.2)	108.5 (8.5)	99.16 (7.8)	60.0 (4.9)
Native floating-leaved	2.8 (0.2)	4.5 (0.4)	8.1 (0.6)	4.8 (0.4)
Native emergent	106.2 (8.3)	106.2 (8.3)	106.2 (8.3)	89.2 (7.3)
Non-native				
Hydrilla (Tier III)*	1.0 (<1)	29.6 (2.3)	65.8 (5.1)	52.8 (4.2)
Eurasian Watermilfoil (Tier III)*	0.0	0.4 (<1)	0.9 (<1)	0.0

\*Tier II is Maintenance Status; Tier III is Watch Status

Table 7. Percent directed angler effort by species for Walter E. Long Reservoir, Texas, 2018-2019. Survey periods were from September through November 2018, and March through May 2019. Tournament effort for Largemouth Bass is included.

Species	2018/2019
Smallmouth Buffalo	9.9
Channel Catfish	0.4
Bluegill	0.5
Largemouth Bass (Tour)	57.7
Anything	12.3
Hybrid Striped Bass	8.0
Crappies	8.6
Catfishes	1.7
Panfishes	0.8

Table 8. Total fishing effort (h) for all species and total directed expenditures at Walter E. Long Reservoir, Texas, 2018-2019. Survey periods were from September through November 2018, and March through May 2019. Relative standard error is in parentheses.

Creel statistic	2018/2019
Total fishing effort	37,191 (11)
Total directed expenditures	\$197,101 (27)

## Gizzard Shad

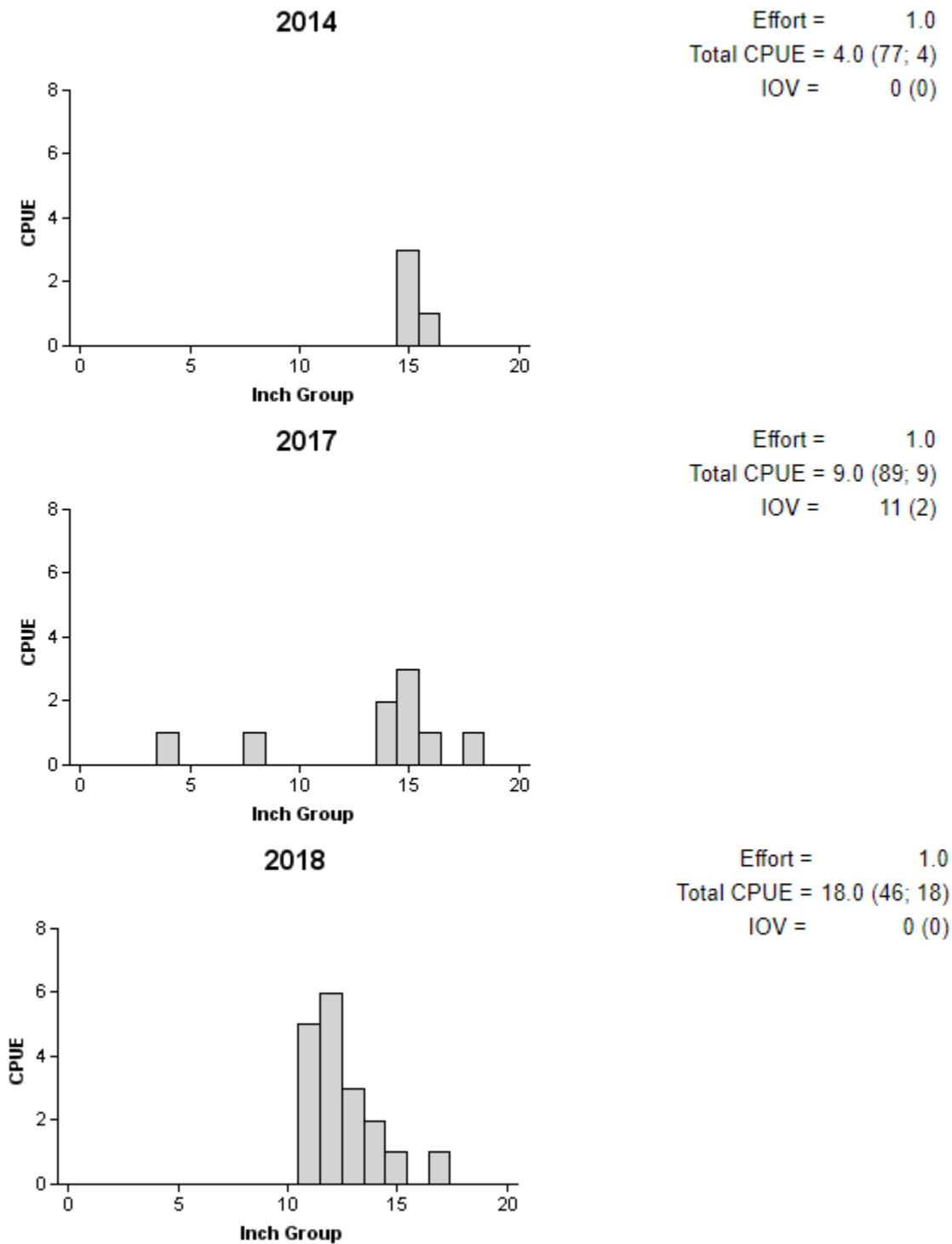


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2014, 2017, and 2018.

## Redbreast Sunfish

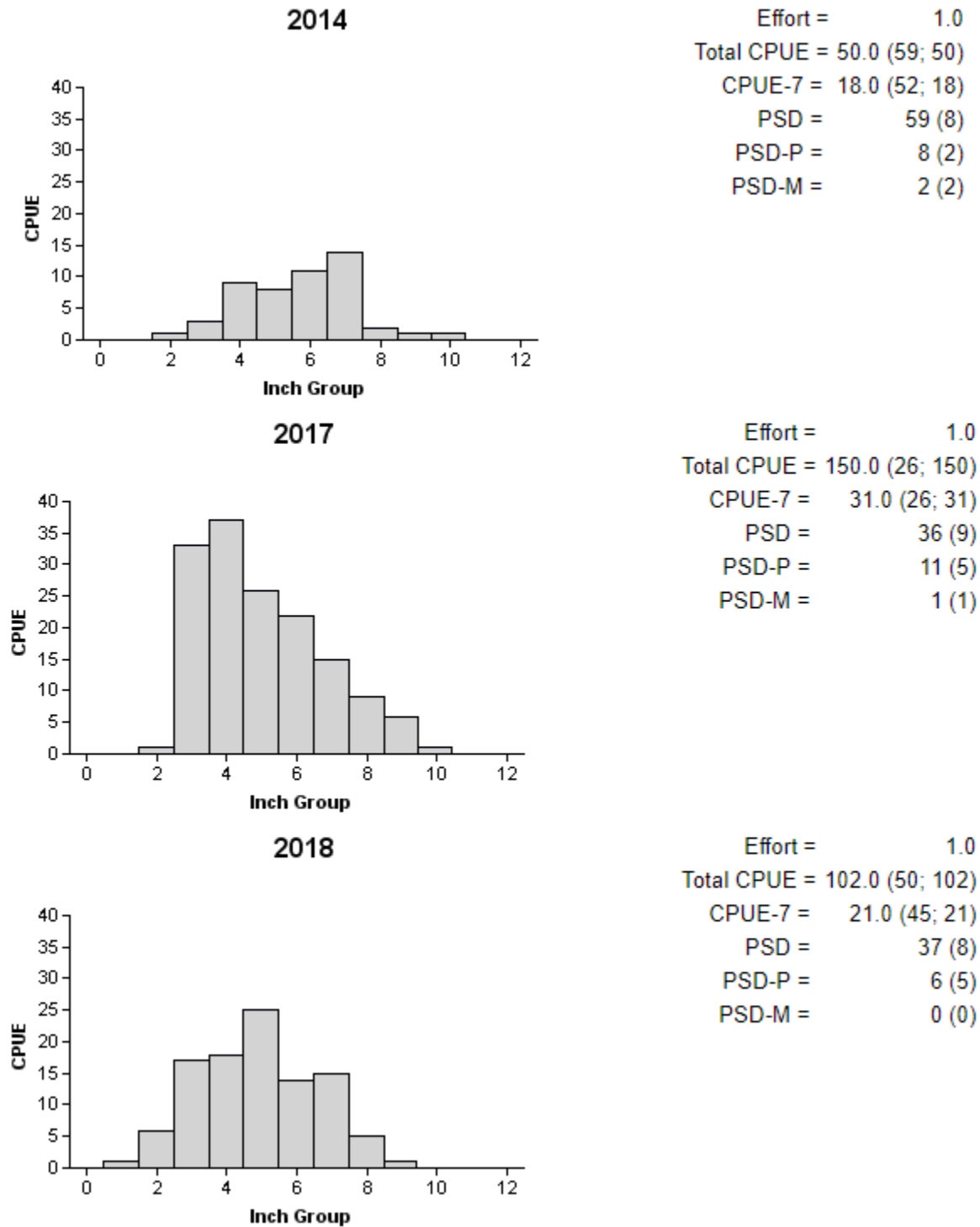
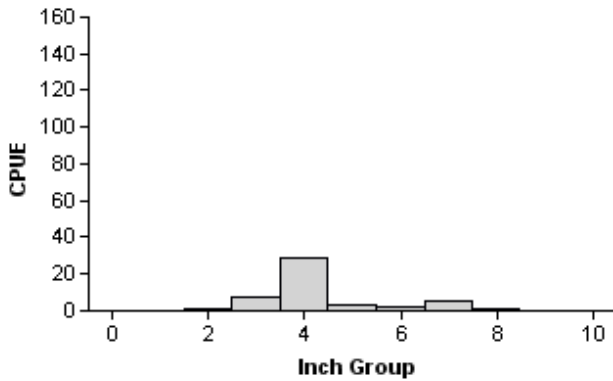


Figure 2. Number of Redbreast Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2014, 2017, and 2018.

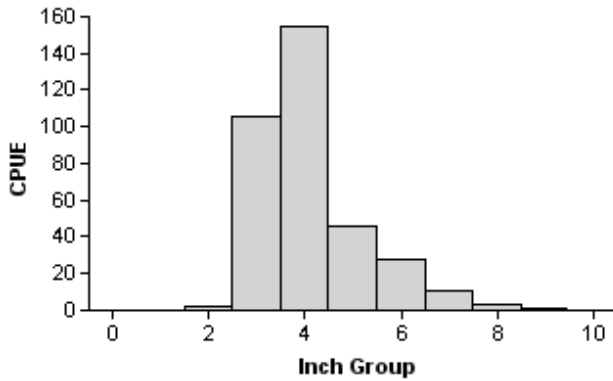
## Bluegill

**2014**



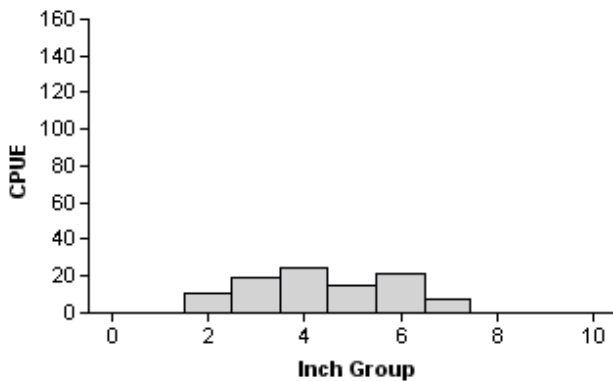
Effort = 1.0  
 Total CPUE = 48.0 (32; 48)  
 CPUE-7 = 6.0 (39; 6)  
 PSD = 17 (4)  
 PSD-P = 2 (2)

**2017**



Effort = 1.0  
 Total CPUE = 352.0 (18; 352)  
 CPUE-7 = 15.0 (31; 15)  
 PSD = 12 (3)  
 PSD-P = 1 (1)

**2018**



Effort = 1.0  
 Total CPUE = 98.0 (17; 98)  
 CPUE-7 = 7.0 (49; 7)  
 PSD = 32 (7)  
 PSD-P = 0 (0)

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, Walter E. Long Reservoir, Texas, 2014, 2017, and 2018.

## Redear sunfish

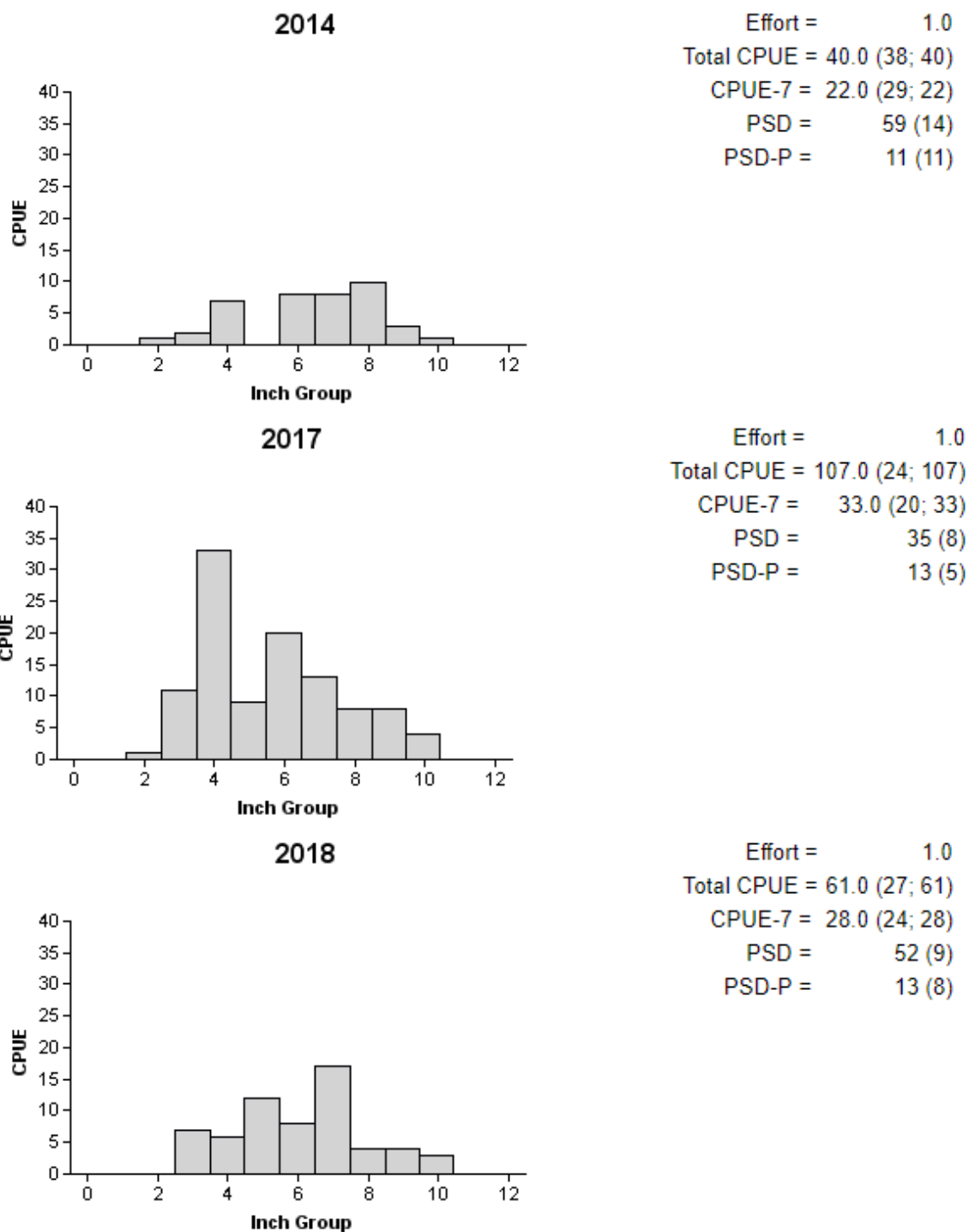


Figure 4. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2014, 2017, and 2018.

## Smallmouth Buffalo

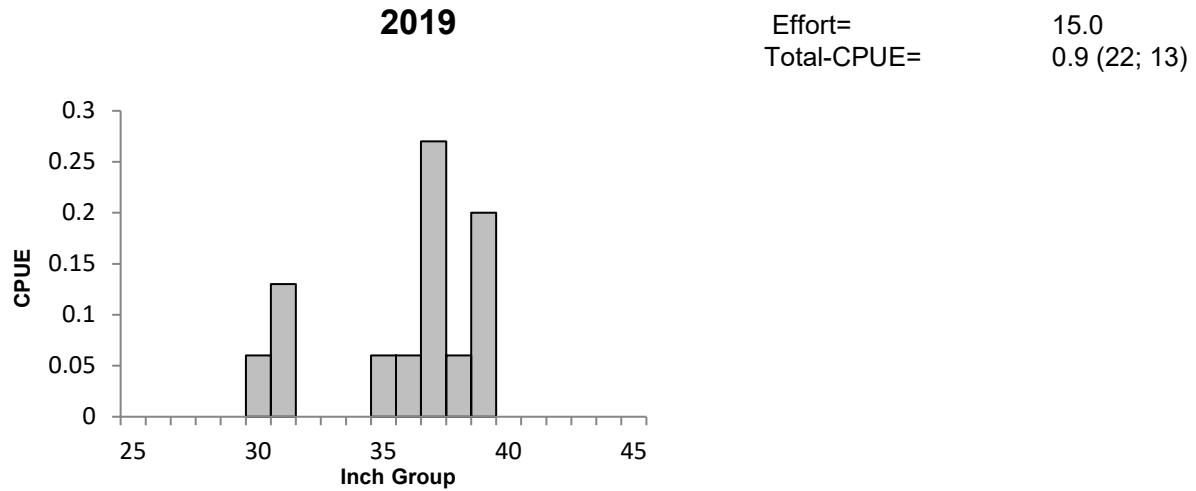


Figure 5. Number of Smallmouth Buffalo caught per net night (CPUE) and population indices (RSE and N for CPUE) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2019.

Table 9. Creel survey statistics for Smallmouth Buffalo at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019. Total catch per hour is for anglers targeting Smallmouth Buffalo and total harvest is the estimated number of Smallmouth Buffalo harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2018/2019
Surface area (acres)	1,269
Directed effort (h)	3,674 (26)
Directed effort/acre	2.90 (26)
Total catch per hour	0.20 (82)
Total harvest	0 (-)
Harvest/acre	0.00 (-)
Percent legal released	100



## Channel Catfish

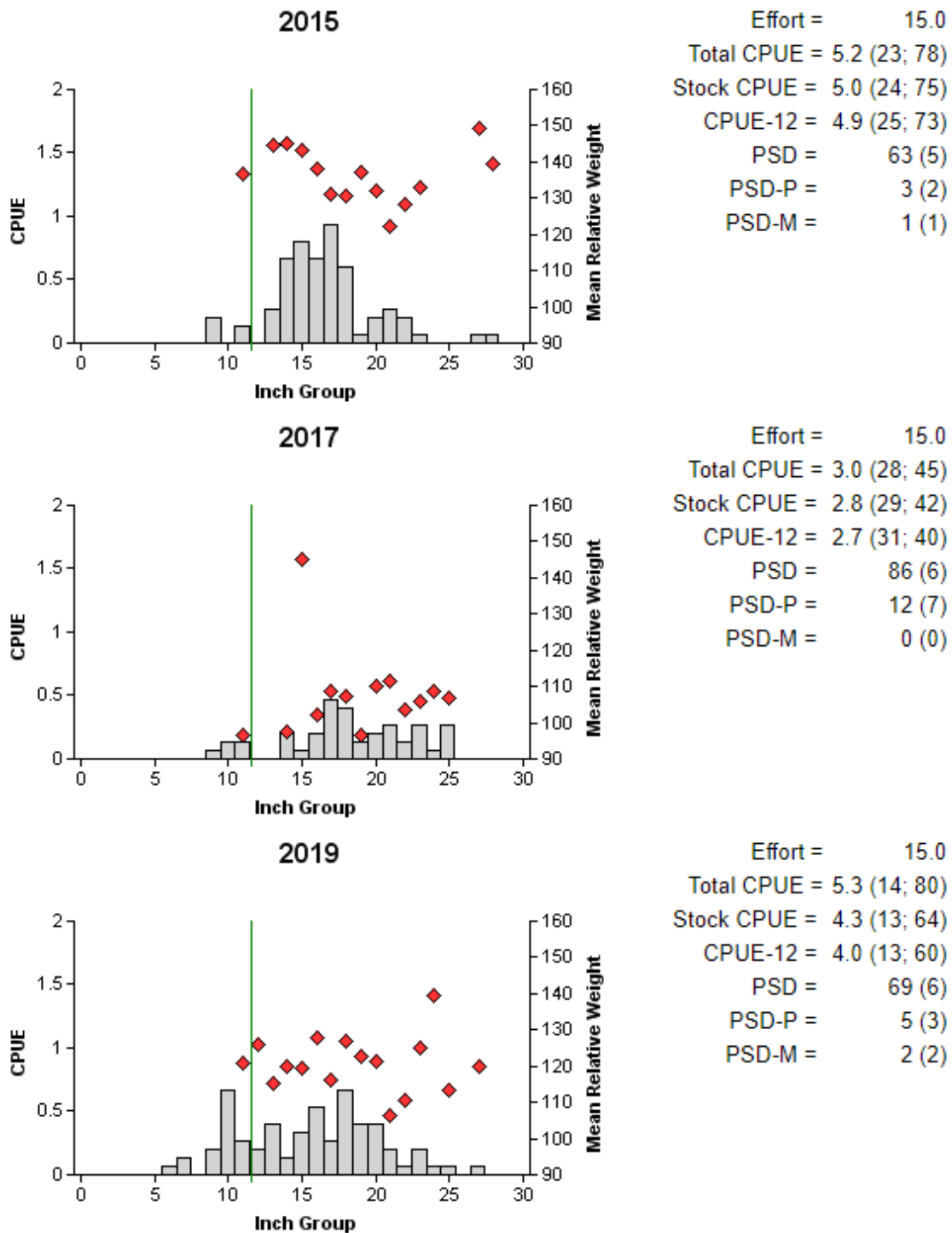


Figure 6. Number of Channel Catfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2015, 2017, and 2019. Vertical line represents legal length at time of survey.

Table 10. Creel survey statistics for Channel Catfish at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019. Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2018/2019
Surface area (acres)	1,269
Directed effort (h)	138.43 (118)
Directed effort/acre	0.11 (118)
Total catch per hour	0.00 (-)
Total harvest	40.62 (100)
Harvest/acre	0.03 (100)
Percent legal released	93

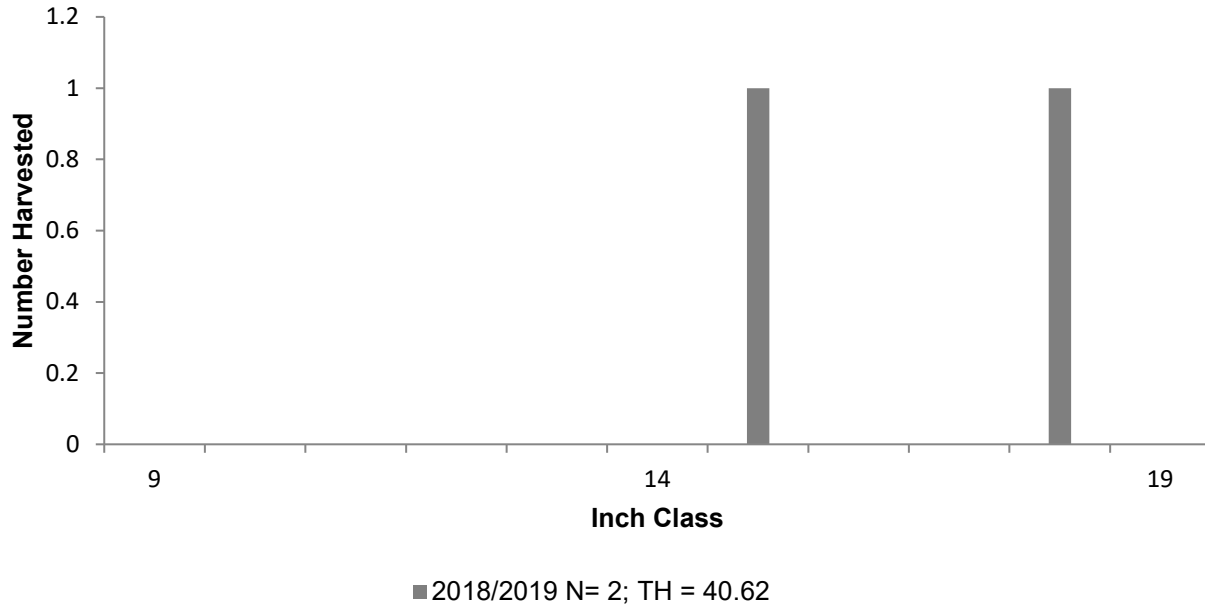


Figure 7. Length frequency of harvested Channel Catfish observed during creel surveys at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Hybrid Striped Bass (Palmetto and Sunshine Bass)

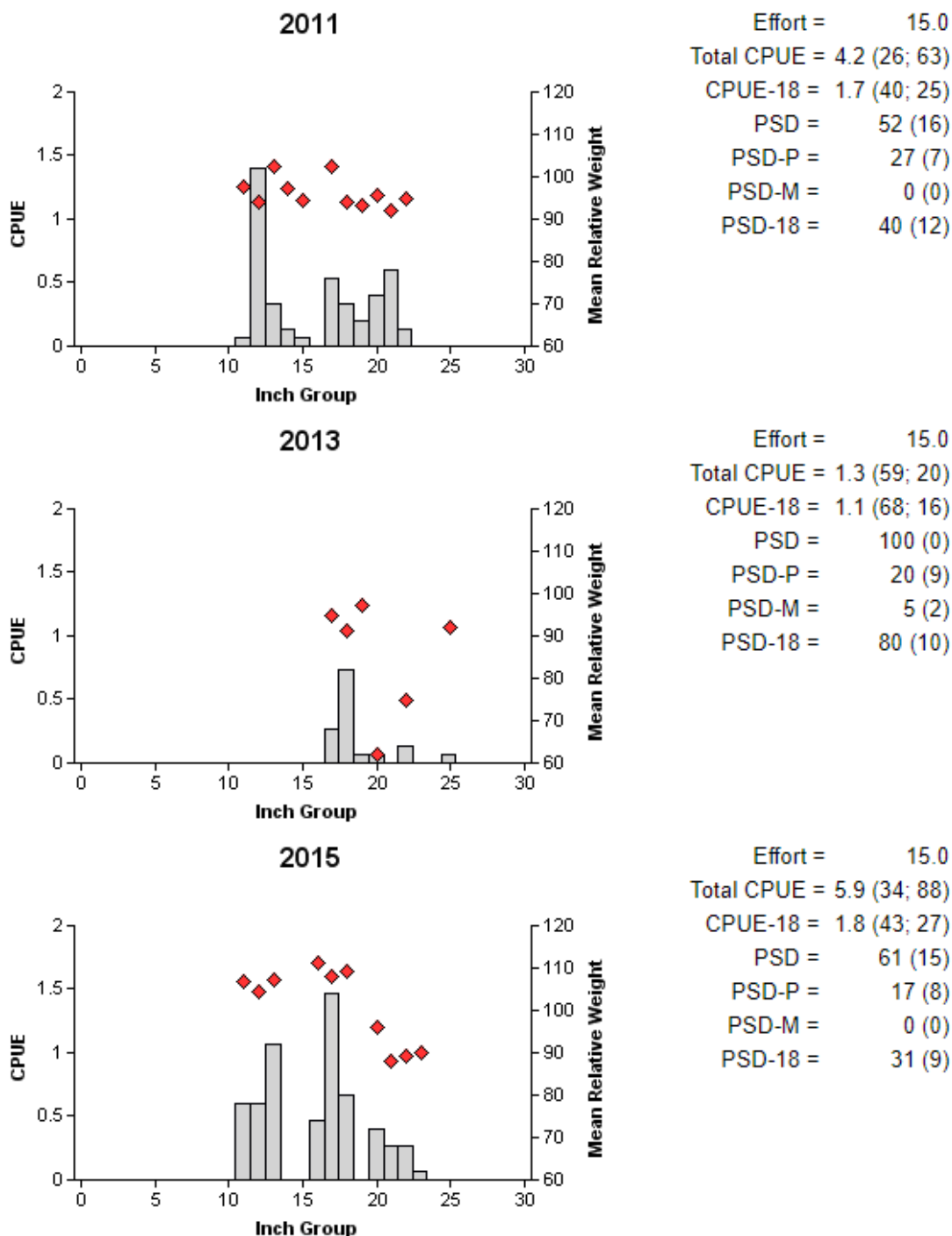


Figure 8. Number of Hybrid Striped Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2011, 2013, and 2015.

## Hybrid Striped Bass (Palmetto and Sunshine Bass)

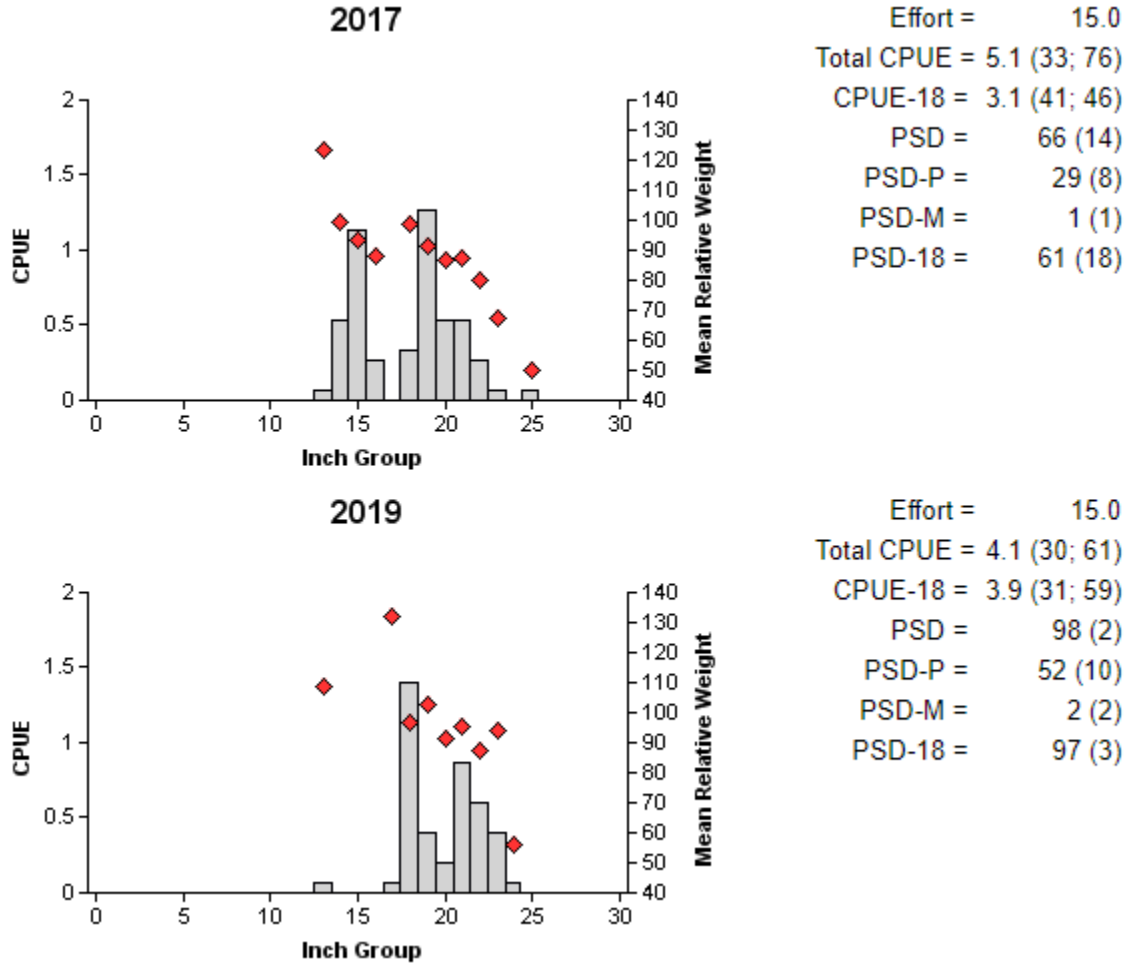


Figure 9. Number of Hybrid Striped Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Walter E. Long Reservoir, Texas, 2017 and 2019.

Table 11. Creel survey statistics for Hybrid Striped Bass at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019. Total catch per hour is for anglers targeting Hybrid Striped Bass and total harvest is the estimated number of Hybrid Striped Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2018/2019
Surface area (acres)	1,269
Directed effort (h)	2,957 (64)
Directed effort/acre	2.33 (68)
Total catch per hour	0.33 (58)
Total harvest	694.53 (83)
Harvest/acre	0.55 (83)
Percent legal released	4

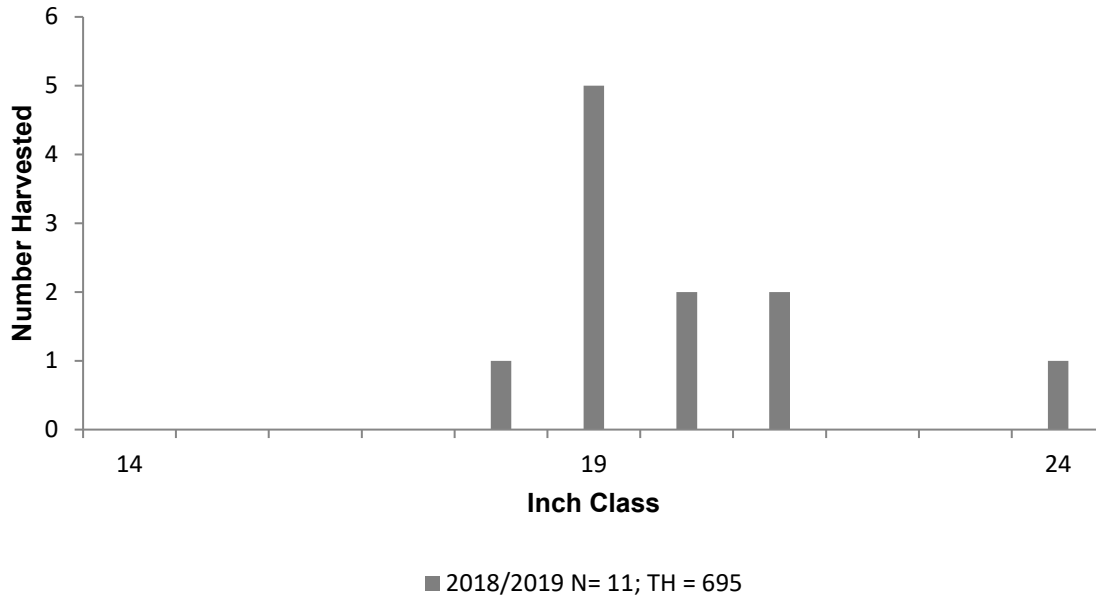


Figure 10. Length frequency of harvested Hybrid Striped Bass observed during creel surveys at Walter E. Long Reservoir, Texas, September through November 2018, and March through May 2019, all anglers combined. N is the number of harvested Hybrid Striped Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

### Hybrid Striped Bass

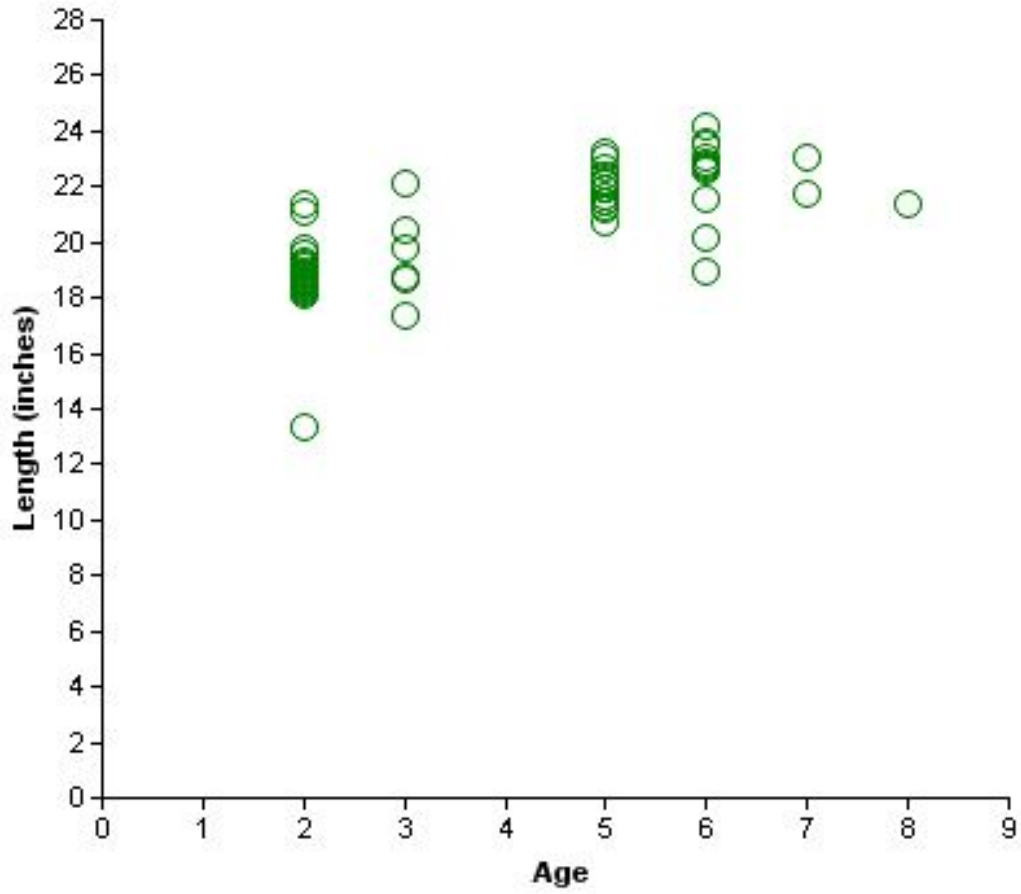


Figure 11. Length at age for Hybrid Striped Bass (N = 61) collected from gill nets at Walter E. Long Reservoir, Texas, March 2019.

## Largemouth Bass

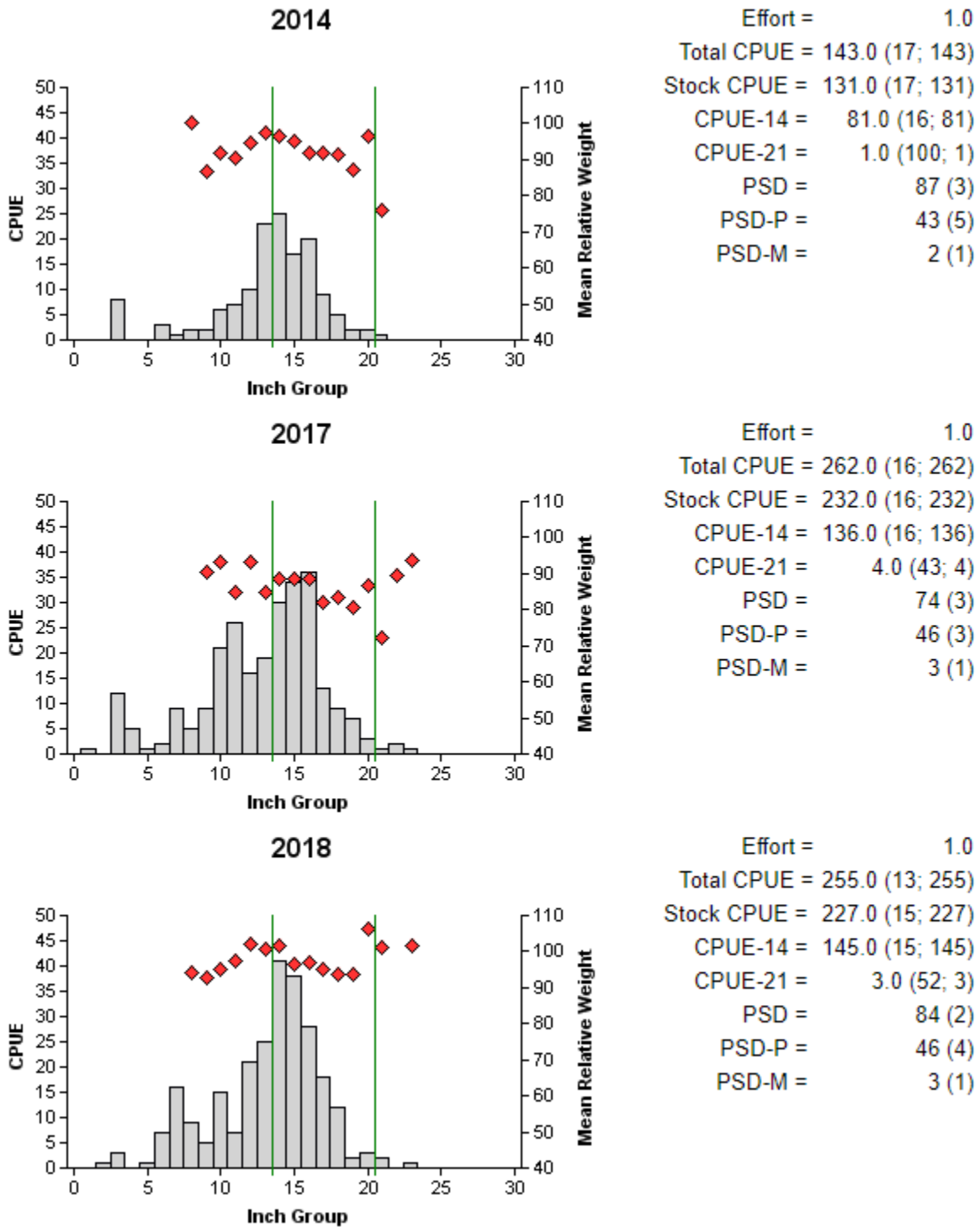


Figure 12. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Walter E. Long Reservoir, Texas, 2014, 2017, and 2018.

Table 12. Creel survey statistics for Largemouth Bass at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019. Catch rate is for all anglers targeting Largemouth Bass. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. Relative standard errors (RSE) are in parentheses.

Statistic	2010/2011
Surface area (acres)	1,269
Directed angling effort (h)	
Tournament	1,679 (35)
Non-tournament	19,804 (15)
All black bass anglers combined	21,483 (27)
Angling effort/acre	16.9 (41)
Catch rate (number/h)	1.3 (31)
Harvest	
Non-tournament harvest	141 (79)
Harvest/acre	0.1 (79)
Tournament weigh-in and release	1,389 (69)
Percent legal released (non-tournament)	99



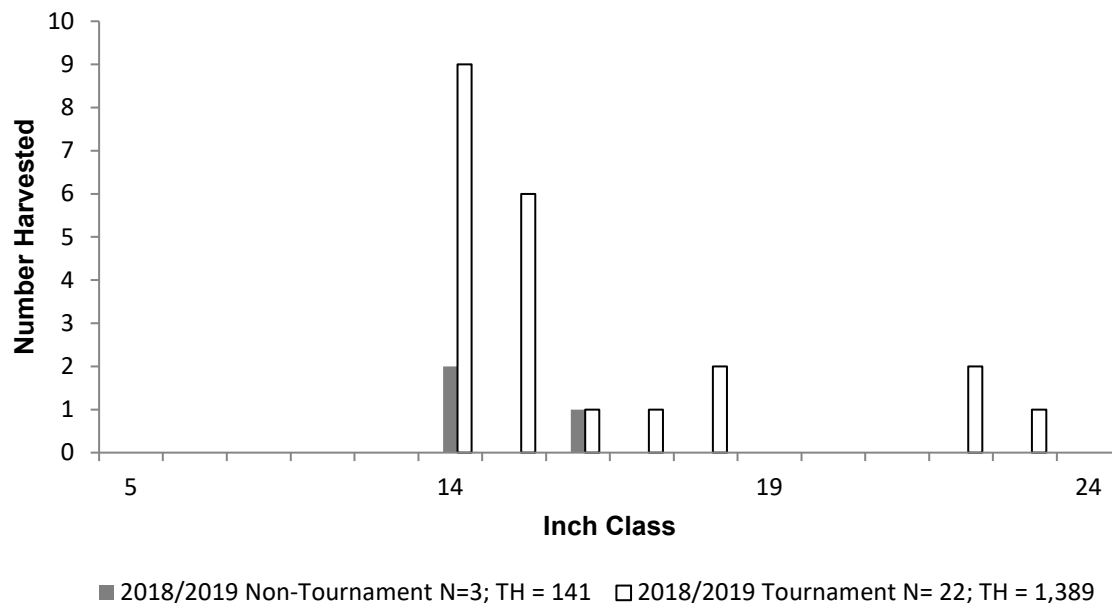


Figure 13. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Walter E. Long Reservoir, Texas, September through November 2018, and March through May 2019, all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and NTH is the estimated non-tournament harvest for the creel period and TH is the total estimated tournament harvest for the creel period.

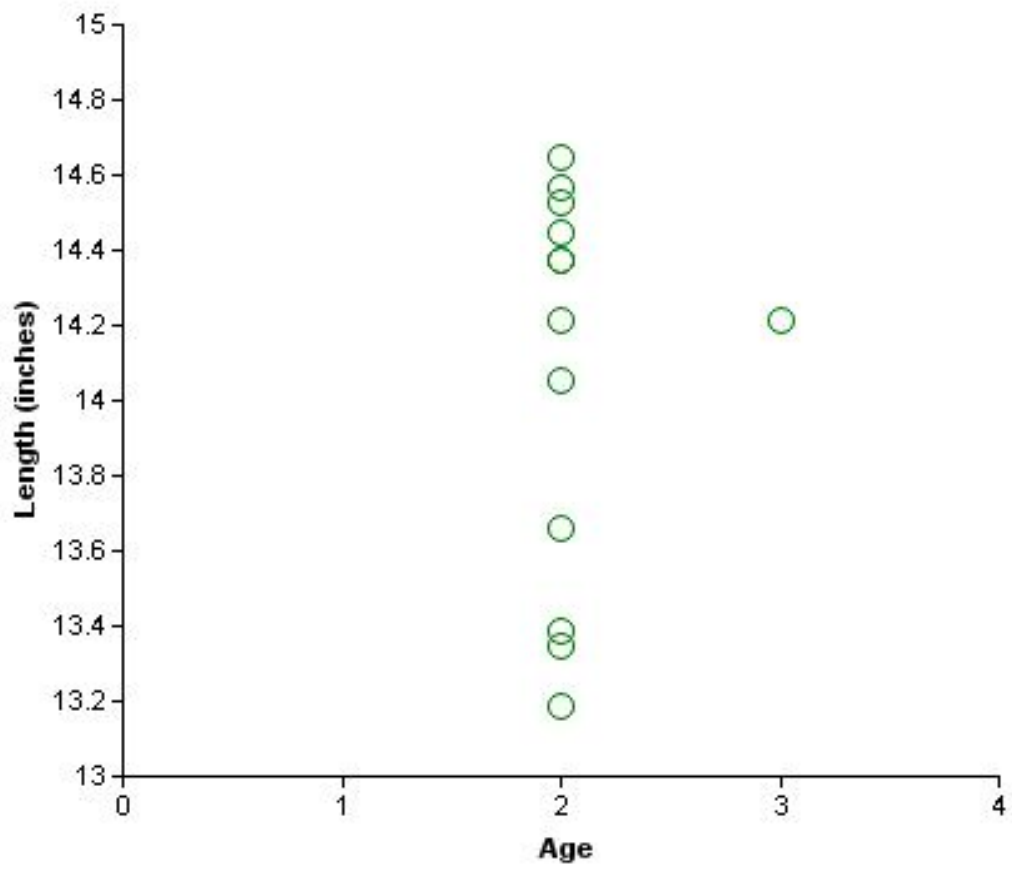


Figure 14. Length at age for Largemouth Bass collected from electrofishing at Walter E. Long Reservoir, Texas, November 2018.

## Crappie

Table 13. Creel survey statistics for crappie at Walter E. Long Reservoir, Texas, from September through November 2018, and March through May 2019. 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
Surface area (acres)	1,269
Directed effort (h)	853 (49)
Directed effort/acre	0.7 (49)
Total catch per hour	2.9 (81)
Total harvest	578 (132)
Harvest/acre	0.5 (63)
Percent legal released	35

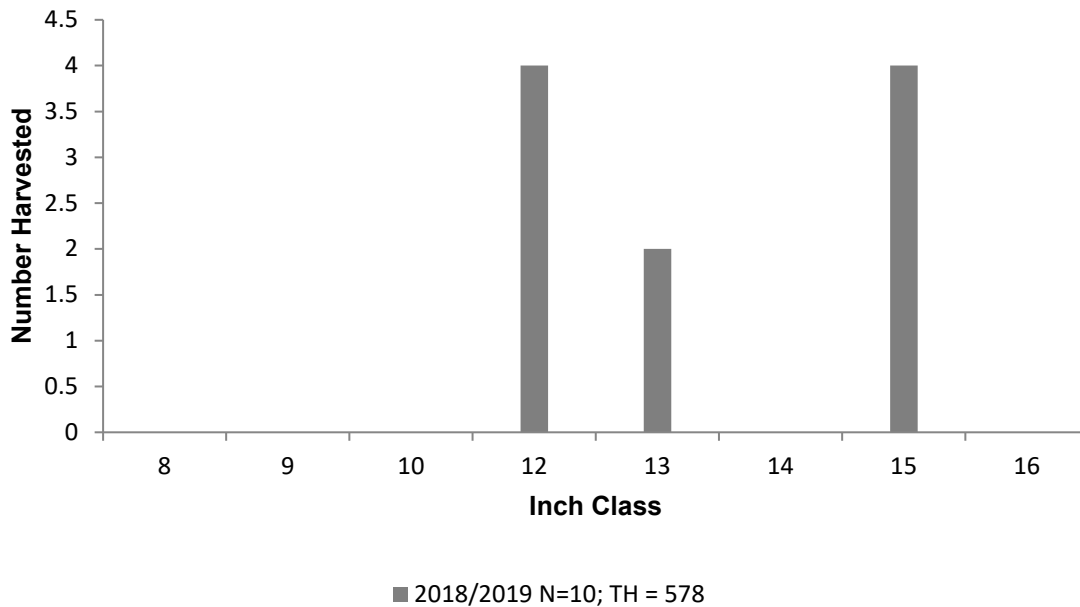


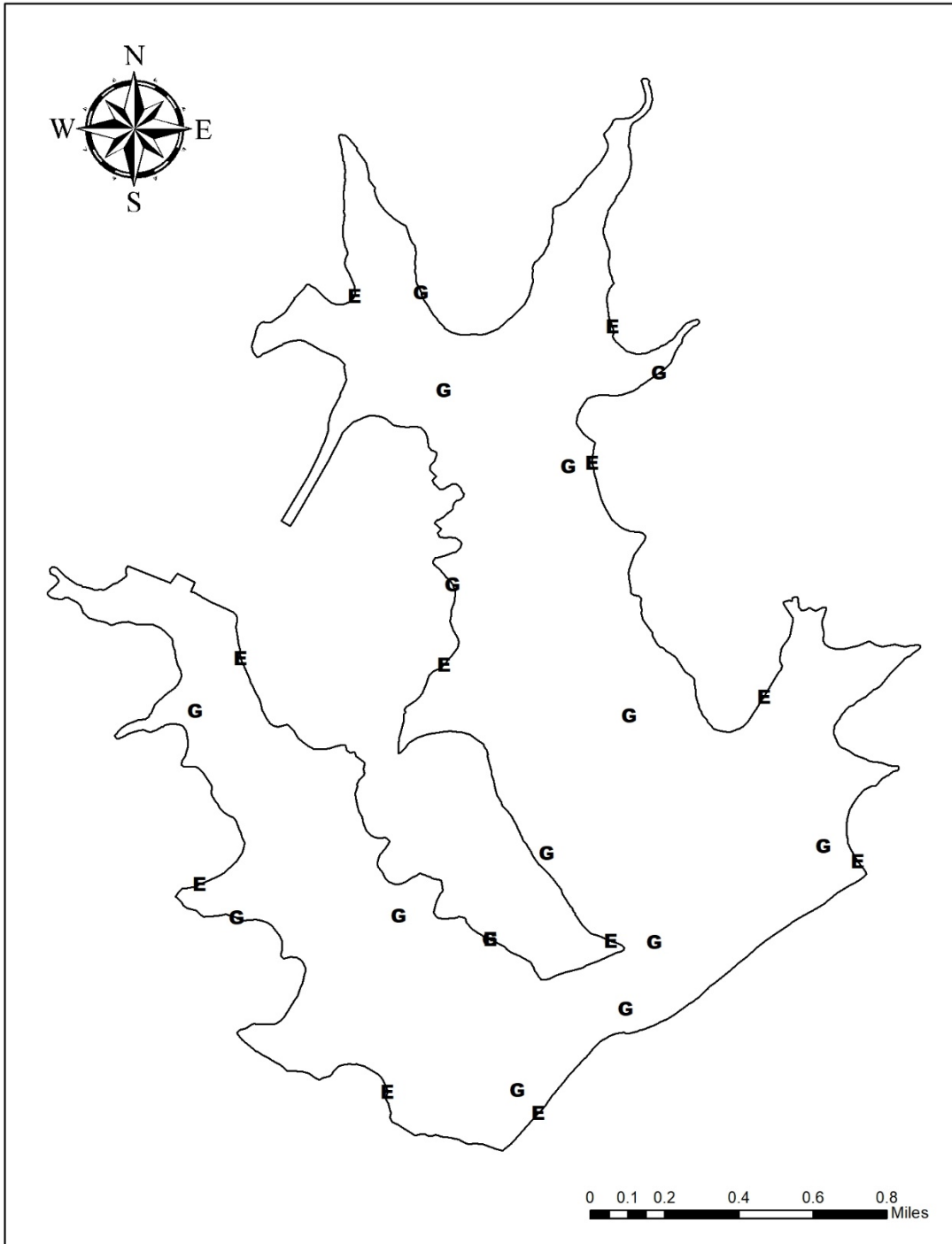
Figure 15. Length frequency of harvested crappie observed during creel surveys at Walter E. Long Reservoir, Texas, September through November 2018, and March through May 2019, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Proposed Sampling Schedule

Table 14. Proposed sampling schedule for Walter E. Long 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. Standard survey denoted by S and additional survey denoted by A.

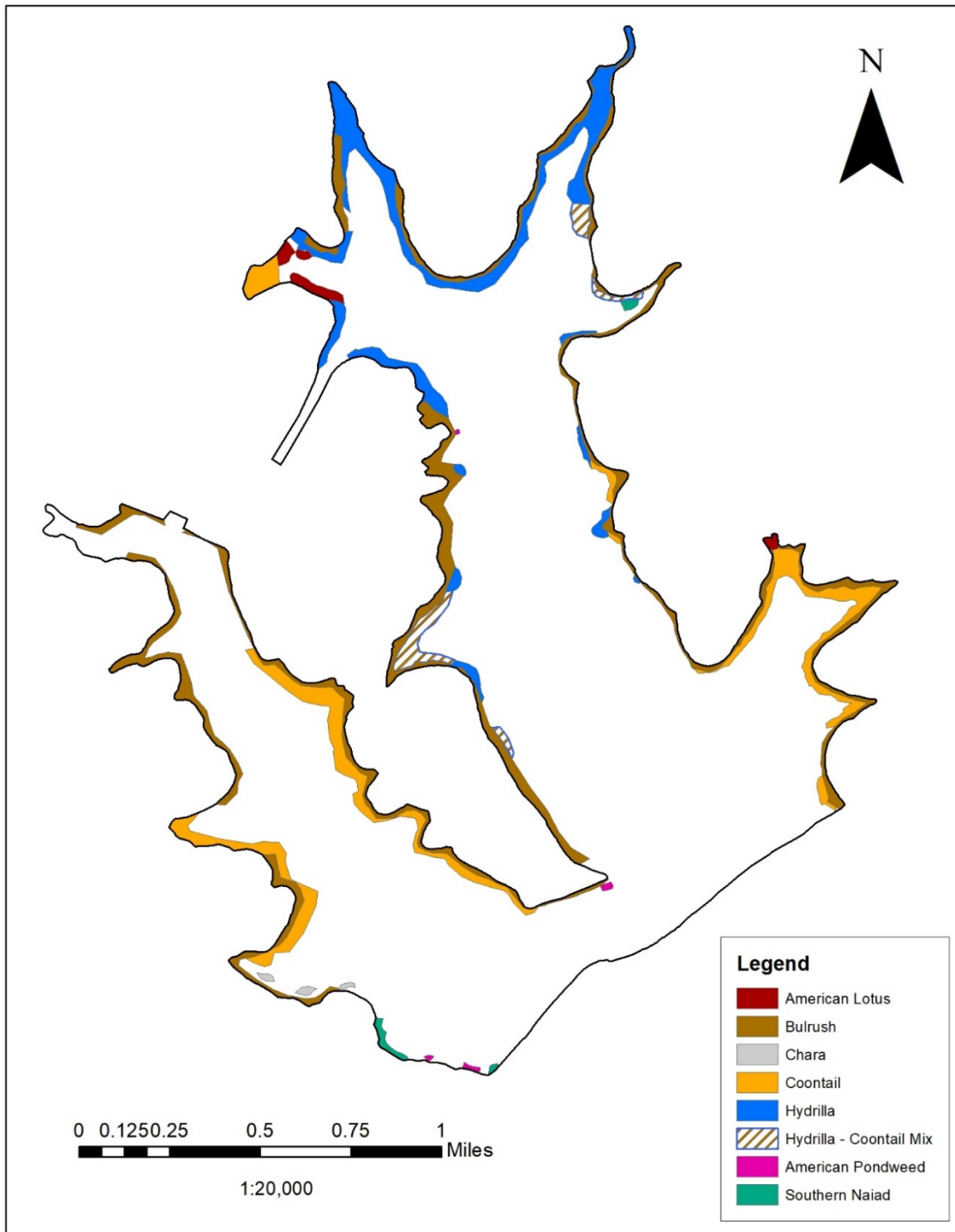
	Survey year			
	2019-2020	2020-2021	2021-2022	2022-2023
Angler Access				S
Structural Habitat				S
Vegetation	A	A	A	S
Electrofishing – Fall		A		S
Electrofishing – Spring				
Electrofishing – Low frequency				
Trap netting				
Gill netting		A		S
Baited tandem hoop netting				
Creel survey				
Report				S

APPENDIX A



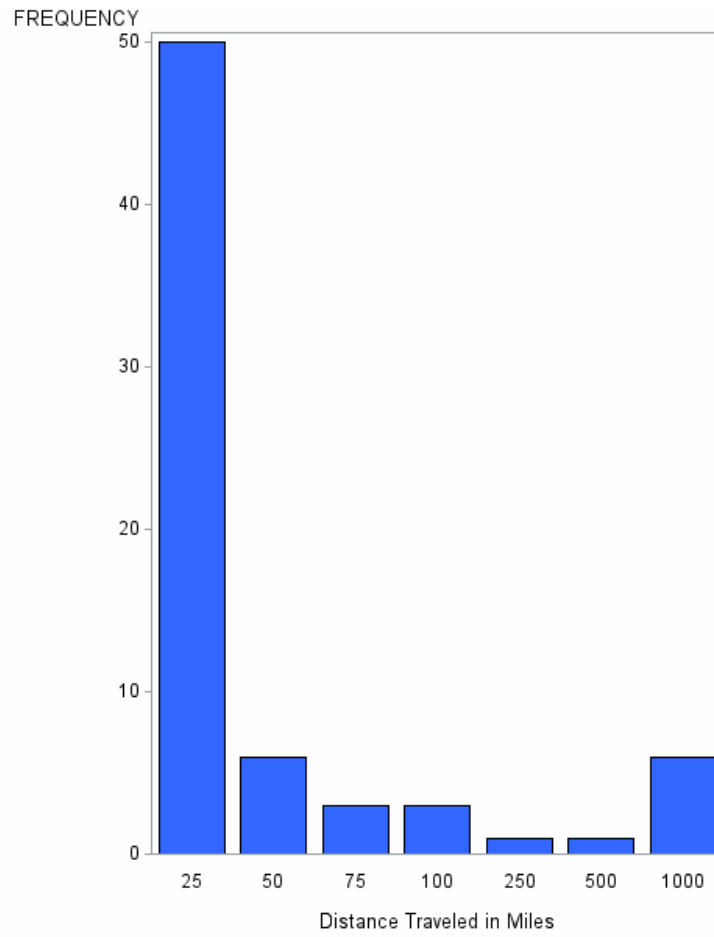
Location of sampling sites, Walter E. Long Reservoir, Texas, 2018-2019. Gill net, and electrofishing stations are indicated by G and E, respectively. Water level was near full pool at time of sampling.

APPENDIX B



Aquatic vegetation survey coverage map for Walter E. Long Reservoir, Texas, September 2018.

### APPENDIX C



Frequency of anglers that traveled various distances (miles) to Walter E. Long Reservoir, Texas, as determined from the September through November 2018, and March through May 2019 creel survey.

## APPENDIX D

Number (N) and catch rate (CPUE; RSE in parentheses) of all target species collected from all gear types from Walter E. Long Reservoir, Texas, 2018-2019. Sampling effort was 15 net nights for gill netting, and 1.0 h for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			18	18.0 (46)
Threadfin Shad			48	48.0 (67)
Inland Silverside			21	21.0 (85)
Smallmouth Buffalo	13	0.9 (22)		
Channel Catfish	80	5.3 (14)		
Flathead Catfish	11	0.7 (45)		
Western Mosquitofish			1	1.0 (100)
Redbreast Sunfish			102	102.0 (50)
Bluegill			98	98.0 (17)
Redear Sunfish			61	61.0 (27)
Redspotted Sunfish			6	6.0 (100)
Largemouth Bass			255	255.0 (21)
Hybrid Striped Bass	61	4.1 (30)		





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