

Welsh Reservoir

2019 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Contents

| | |
|--|----|
| Contents | i |
| Survey and Management Summary | 1 |
| Introduction..... | 2 |
| Reservoir Description | 2 |
| Angler Access..... | 2 |
| Management History | 2 |
| Methods..... | 3 |
| Results and Discussion..... | 3 |
| Fisheries Management Plan for Welsh Reservoir, Texas..... | 5 |
| Objective-Based Sampling Plan and Schedule (2020–2023)..... | 6 |
| Literature Cited..... | 8 |
| Tables and Figures | 9 |
| Water Level | 9 |
| Reservoir Characteristics | 9 |
| Boat Ramp Characteristics..... | 10 |
| Harvest Regulations | 10 |
| Stocking History..... | 11 |
| Objective-Based Sampling Plan for 2019-2020 | 12 |
| Structural Habitat Survey..... | 12 |
| Bluegill | 13 |
| Redear Sunfish..... | 14 |
| Largemouth Bass | 15 |
| Proposed Sampling Schedule | 16 |
| APPENDIX A – Catch rates for all species from all gear types | 17 |
| APPENDIX B – Map of sampling locations..... | 18 |

Survey and Management Summary

Fish populations in Welsh Reservoir were surveyed in 2019 with an electrofishing survey. Historical data are presented with the 2019-2020 data for comparison. This report summarizes the results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

Reservoir Description: Welsh Reservoir is a 1,333-acre cooling reservoir for coal-fueled power generation located on Swaunano Creek in the Big Cypress River Basin. The reservoir is in Titus County. Habitat features consist of standing timber, rocky shoreline, riprap, and native aquatic plants.

Management History: Largemouth Bass is the primary sport fish in Welsh Reservoir. Largemouth Bass have been managed under an 18-inch minimum length limit, 5 fish daily bag limit since September 1994. All other sport fishes in Welsh Reservoir have been managed with statewide regulations. Florida Largemouth Bass stockings in 1975 and 1976 were successful in establishing the Florida Largemouth Bass genetics in the population.

Fish Community

- **Prey species:** Threadfin and Gizzard Shad were present in the reservoir though in low numbers similar to past surveys. Electrofishing catch rate of Bluegill increased from 2017 to 2019 but there were no Bluegill over 6-inches in length. Catch rates for Redear Sunfish were consistent from 2015 to 2019 with some individuals reaching 9-inches.
- **Catfishes:** Channel Catfish abundance has been historically low with minimal directed angling effort. No sampling was conducted to survey Channel Catfish population.
- **Largemouth Bass:** Largemouth Bass catch rate remained consistent in 2017 and 2019. The population was balanced with a good number of small fish (<8 inches), stock sized fish (>8 inches), and fish above the legal 18-inch limit.
- **Crappie:** Crappie abundance has been historically low with the last crappie individual observed in 1996. There is minimal directed angling effort. No sampling was conducted to survey this population.

Management Strategies: Conduct electrofishing surveys in 2021 and 2023, a winter creel survey in 2023/2024, and an aquatic vegetation survey in 2023. Additional vegetation surveys will be conducted from 2020-2022 to monitor non-native aquatic vegetation. Largemouth Bass will continue to be managed under the current 18-inch minimum length limit while all other sport fish will be managed under statewide harvest regulations. No additional sampling for Channel Catfish or Black Crappie is necessary during this time period.

Introduction

This document is a summary of fisheries data collected from Welsh Reservoir in 2019-2020. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2019-2020 data for comparison.

Reservoir Description

Welsh Reservoir is a 1,333-acre impoundment constructed in 1976 on Swaunano Creek in the Cypress River Basin. The reservoir is in Titus County approximately 10 miles southeast of Mt. Pleasant. The controlling authority is American Electric Power Company. Welsh Reservoir is a cooling reservoir for coal-fueled power generation. It has a watershed of approximately 34 square miles and a shoreline length of 27 miles. Annual water level fluctuation was approximately 2 feet from 2013 to 2020 but was 3 feet low during sampling in 2019 (Figure 1). Habitat features consist of standing timber, rocky shoreline, and limited amounts of aquatic vegetation. Other descriptive characteristics for Welsh Reservoir are in Table 1.

Angler Access

Welsh Reservoir has one public boat ramp and no private boat ramps. American Electric Power controls the boat ramp and public parking area while Titus county maintains the public road the leads directly to the boat ramp. Recent improvements have been made by American Electric Power to the boat ramp parking area. However, additional issues at the boat ramp, such as water level and siltation, can cause difficulties launching a vessel. Shoreline access is limited to the public boat ramp area. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Wright and Bister 2016) included:

1. Monitor and manage Largemouth Bass at an 18-inch minimum length limit to improve fishing quality.

Action: Largemouth Bass and prey species were monitored using electrofishing during 2017 and 2019.
2. Conduct annual aquatic vegetation surveys to monitor hydrilla and other invasive species.

Action: Aquatic vegetation surveys were conducted in August 2016 through 2019 to monitor hydrilla coverage and other invasive species.

Harvest regulation history: Largemouth Bass have been managed under an 18-inch minimum length limit, 5 fish daily bag limit since September 1994. All other sport fishes in Welsh Reservoir have been, and currently are, managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: Florida Largemouth Bass were stocked in the reservoir in 1975 and 1976 (Table 4). Florida Largemouth Bass alleles have not dropped below 89% after stocking and thus were not sampled this survey period. Channel Catfish fingerlings were also stocked in 1975 and 1976. Blue Catfish were stocked in 1978 but a population did not establish. Black Crappie were stocked from 1988 to 1990, but a self-sustaining fishery never developed. The complete stocking history is presented in Table 4.

Vegetation/habitat management history: Hydrilla was still the dominant vegetation type and has increased in acreage from previous years. Native pondweed was present though in low densities (<1% of the reservoir area) in 2019. A small amount of alligator weed was also observed in 2019 in similar amounts dating back to 2015.

Water transfer: Lake Welsh receives supplemental water from Lake O' The Pines to help maintain necessary water levels to function as a cooling reservoir for the American Electric Power generation plant. This water transfer is within the Cypress River Basin.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Welsh Reservoir (Wright and Bister, 2016). Primary components of the 2016 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 2017).

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

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). Standard error (SE) was calculated for structural indices. Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUEs.

Habitat – A structural shoreline habitat survey was last conducted in 1995 and a survey of standing timber (open water structural habitat) was conducted in 2011. Annual nuisance aquatic vegetation surveys were conducted in 2016–2019 to monitor expansion of hydrilla. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Water level – Source for water level data was the American Electric Power Company.

Results and Discussion

Habitat: Structural and shoreline habitat has not changed significantly since surveyed in 1995 and 2011, respectively. The shoreline is 90.4% natural shoreline with some soil cement (6.3%) and rip rap (3.3%) making up the remainder (Ryan and Brice 1996). Standing timber covered 32.7% of the reservoir surface area (Wright and Bister 2012). In 2019, native vegetation covered 17 acres of the reservoir's surface with a majority being American Lotus with a small area (<1%) of pondweed (Table 6). Hydrilla coverage continued to increase from 68 acres in 2016 to 265 acres in 2019. Alligatorweed was present but at very low abundance.

Prey species: Gizzard Shad were present in the most recent electrofishing survey, but catch rate was very low (1.0/h, Appendix A). Electrofishing catch rates of Threadfin Shad increased from 16.0/h in 2015 (Wright and Bister, 2016) to 113.0/h in 2019. Total CPUE of Bluegill increased from 400.0/h in 2017 to 795.0/hr in 2019 but was lower than in 2015 (1,748.0/h). The Bluegill population continues to be dominated by small individuals (Figure 2). Redear Sunfish electrofishing catch rate has been variable over the past three surveys (41.0/h in 2015, 24.0/h in 2017, and 32.0/h in 2019; Figure 3). The size range of Redear Sunfish was 3 – 9 inches potentially providing a recreational angling opportunity.

Largemouth Bass: The total catch rate of Largemouth Bass during the electrofishing surveys was variable over the past three surveys with 199.0/h in 2015, 308.0/h in 2017, and 286.0/h in 2019 (Figure 4). Comparatively, catch rates of stock-sized Largemouth Bass (8 inches or greater) increased since the last report cycle in 2015 when CPUE was 147.0/h (2017 = 285.0/h; 2019 = 244.0/h). There has also been an increase in the CPUE of 18-inch Largemouth Bass since the last report cycle (2015 = 9.0/h; 2017

= 29.0/h; 2019 = 20.0/h) indicating a good number of legal sized 18-inch fish available for angling opportunities. Size structure has remained consistent over the last few surveys with PSD values of 52, 59, and 53 in 2015, 2017, and 2019, respectively. Largemouth Bass growth rate was fast. The average age of 14-inch Largemouth Bass (13.0 – 14.8 inches) was 1.1 years (N = 13, Range = 1 – 3) in 2017 and 1.6 years (N = 13, Range = 1 – 3) in 2019. The body condition of Largemouth Bass in 2017 and 2019 was good for most length groups with a mean $W_r \geq 90$, which was an indication of adequate prey availability.

Fisheries Management Plan for Welsh Reservoir, Texas

Prepared – July 2020

ISSUE 1: An 18-inch minimum length limit (5 fish daily bag limit) was implemented in September 1994 to improve Largemouth Bass fishing quality. Welsh Reservoir Largemouth Bass have fast initial growth rates, above average condition, and improved recruitment that has coincided with the recent increase in submerged vegetation. In the past, creel data indicated Lake Welsh is a popular winter bass fishing location and draws significant numbers of anglers from outside the local area. Continued sampling of the Largemouth Bass population is necessary to monitor this fishery.

MANAGEMENT STRATEGY

1. Monitor the Largemouth Bass and prey species with electrofishing in 2021 and 2023 to ensure the population benefits from the special harvest regulation.
2. Monitor Largemouth Bass growth (average age at 14 inches) to ensure protection of fish with the 18-inch minimum length limit is not having any adverse impacts on the population.
3. Conduct creel survey in 2023/2024 to monitor angler utilization and success of 18-inch minimum length limit.

ISSUE 2: The public boat ramp and parking lot have needed improvements over the past several years. The controlling authority (American Electric Power) of the public parking area has been working to make many improvements including repaving as well as installing new signs at the boat ramp. The public road that leads directly to the boat ramp is owned by Titus County. The boat ramp has the tendency to become silted in with sediment that washed downhill from the county road and may require periodic dredging to maintain good boater access.

MANAGEMENT STRATEGY

1. Encourage Titus County to perform necessary silt removal from the boat ramp as necessary.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. 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. Exotic plants such as hydrilla have historically been present in Welsh Reservoir. And while hydrilla currently does not inhibit access, it should be monitored. Additionally, Welsh Reservoir's is located near lakes that have other aquatic invasive plants such as giant salvinia and water hyacinth. It is important to monitor Welsh Reservoir as a way to quickly respond in hopes of eradicating any new introductions.

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.

6. Monitor hydrilla coverage and identify any new introductions during annual AIS vegetation survey and work with AHE and the controlling authority mitigation is required.

Objective-Based Sampling Plan and Schedule (2020–2023)

Sport fish, forage fish, and other important fishes

Largemouth Bass are the primary sport fish in Welsh Reservoir. Known important forage species include Bluegill and Threadfin Shad.

Low-density fisheries

Crappie: Crappie species are present in Welsh Reservoir, but population abundances are extremely low. Only one White Crappie has been observed during an electrofishing survey in 1996. Trap net Black Crappie CPUE from 1989-2003 ranged from 0.0 to 0.2 fish/nn. Trap netting has since been discontinued. Winter creel surveys in 2007/2008 and 2015/2016 indicated that no directed effort or catch of crappie occurred. Sampling this population is unnecessary in FYs 2020-2023.

Channel Catfish: Channel Catfish are present in Welsh Reservoir, but the catch rates of recent surveys have been low and variable. From 1989-2012, catch per unit effort of stock sized fish (CPUE-S) in gill nets ranged from 2.6 to 25.4 fish/nn and only two of the last 9 gill net surveys collected more than 50 stock size fish. Winter creel data from 2007/2008 and 2015/2016 indicate very few anglers target Channel Catfish at Welsh Reservoir. Sampling this population is unnecessary in FYs 2020-2023.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth bass are the most popular sport fish in Welsh Reservoir. Previous winter-quarter creel surveys from 2007/2008 and 2015/2016 indicate Largemouth Bass angling comprised 98.7% and 95.6% of total angling effort, respectively. Largemouth Bass have been managed with an 18-in MLL regulation since 1994. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrants sampling time and effort.

Trend data on CPUE, size structure, and body condition (mean W_r) have been collected biennially since 1999 with fall nighttime electrofishing. Continuation of biennial trend data with night electrofishing in the falls of 2021 and 2023 will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. The anticipated effort required to collect 50 stock sized fish and a sampling RSE < 25 is 12 stations with 80% confidence and will provide data of sufficient quality to make management decisions. Should the two sampling objectives not be met in the first 12 stations, three additional random sites will be sampled at pre-determined sites. A maximum of 15 stations will be sampled. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected to determine mean age at 14 inches to identify whether growth issues are occurring due to overabundance of fish at this size range that may be caused by the 18-inch minimum length limit.

Bluegill and Redear Sunfish: Bluegill are the primary forage species at Welsh Reservoir. Redear Sunfish are also present at low densities but individuals over 8 inches are present and may provide for panfish angling. Like Largemouth Bass, trend data on CPUE and size structure of Bluegill and other sunfish have been collected biennially since 1999. 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 sufficient

numbers of Bluegill for size structure estimation (PSD using 50 fish minimum) and relative abundance estimates ($RSE \leq 25$ of CPUE-Total) at 12 stations with 80% confidence. No additional effort will be expended beyond that required to meet Largemouth Bass survey objectives. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Threadfin Shad: Threadfin Shad are a secondary source of forage in Welsh Reservoir. Summer fish kills that primarily affect shad have occurred periodically at Welsh Reservoir and have caused the absence of Threadfin Shad during some surveys, however, they were present in the 2019 fall electrofishing survey. Sampling effort based on sampling objectives for Largemouth Bass will be sufficient to determine presence or absence of shad species.

Creel Survey: An angler creel survey will be conducted December 2023 through February 2024 for general monitoring of total fishing effort, number of fish harvested, directed angling effort for all sport fish, catch rates, and angler expenditure. Creel data will be used to guide management goals/strategies and may provide presence/absence data of less commonly sampled fish species.

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Tables and Figures

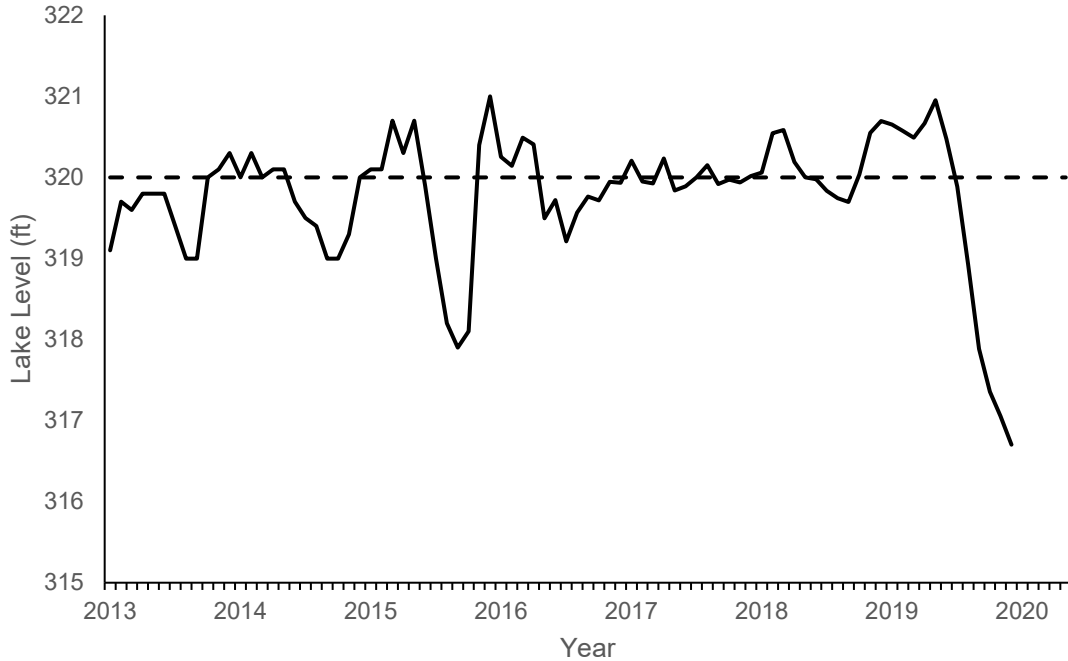


Figure 1. Monthly lake level in feet recorded for Welsh Reservoir, Texas, from the American Electric Power Company.

Table 1. Characteristics of Welsh Reservoir, Texas.

| Characteristic | Description |
|-----------------------------|---------------------------------|
| Year constructed | 1976 |
| Controlling authority | American Electric Power Company |
| County | Titus |
| Reservoir type | Tributary, cooling |
| Shoreline Development Index | 5.3 |
| Conductivity | 480 μ S/cm |

Table 2. Boat ramp characteristics for Welsh Reservoir, Texas, May, 2016. Reservoir elevation at time of survey was 320 feet above mean sea level.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|----------------|-------------------------------|--------|----------------------------|--|--|
| County Rd 4855 | 33.07473 -94.84585 | Y | 40 | 312 | Adequate parking, boat ramp issues during low water events |

Table 3. Harvest regulations for Welsh 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, Largemouth | 5 | 18-inch minimum |
| Crappie: White and Black crappie, their hybrids and subspecies | 25 (in any combination) | 10-inch minimum |

Table 4. Stocking history of Welsh Reservoir, Texas. FRY = fry; AFGL = advanced fingerling; UNK = unknown.

| Species | Year(s) Stocked | Number of Years | Number Stocked | Life Stage |
|-------------------------|--------------------|--------------------|----------------|---------------|
| Blue Catfish | 1978 | 1 | 33,230 | UNK |
| | Total | | 33,230 | |
| Channel Catfish | 1975 | 1 | 64,115 | AFGL |
| | 1976 | 1 | 50,000 | AFGL |
| | Total | | 114,115 | |
| Florida Largemouth Bass | 1975 | 1 | 73,350 | FRY |
| | 1976 | 1 | 55,000 | FRY |
| | Total | | 128,350 | |
| Black Crappie | 1988 | 1 | 34,125 | UNK |
| | 1989 | 1 | 36,769 | UNK |
| | 1990 | 1 | 69,176 | UNK |
| | Total | | 140,070 | |
| Flathead Catfish | 1978 | 1 | 68 | UNK |
| | 1979 | 1 | 4,800 | UNK |
| | Total | | 4,868 | |
| Threadfin Shad | 1982 | 1 | 16,000 | AFGL |
| | Total | | 16,000 | |

Table 5. Objective-based sampling plan components for Welsh Reservoir, Texas 2019–2020.

| Gear/target species | Survey objective | Metrics | Sampling objective |
|-----------------------------|------------------|-----------------------|------------------------------|
| <i>Electrofishing</i> | | | |
| Largemouth Bass | Abundance | CPUE–Stock | RSE-Stock ≤ 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 ^a | Abundance | CPUE–Total | RSE ≤ 25 |
| | Size structure | PSD, length frequency | $N \geq 50$ |
| Threadfin Shad ^a | | | Presence/Absence |
| Gizzard Shad ^a | | | Presence/Absence |

^a No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and shad species 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, Welsh Reservoir, Texas, 2016–2019. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

| Vegetation | 2016 | 2017 | 2018 | 2019 |
|---------------------------|----------|-----------|------------|------------|
| Native submersed | | | | |
| Native floating-leaved | | | | 17 (1.3) |
| Native emergent | | | | < 1 (<0.1) |
| Non-native | | | | |
| Hydrilla (Tier III)* | 68 (5.1) | 104 (7.8) | 165 (12.4) | 265 (19.9) |
| AlligatorWeed (Tier III)* | 1 (<0.1) | 6 (0.5) | 3 (0.2) | 6 (0.5) |

* Tier III is Watch Status

Bluegill

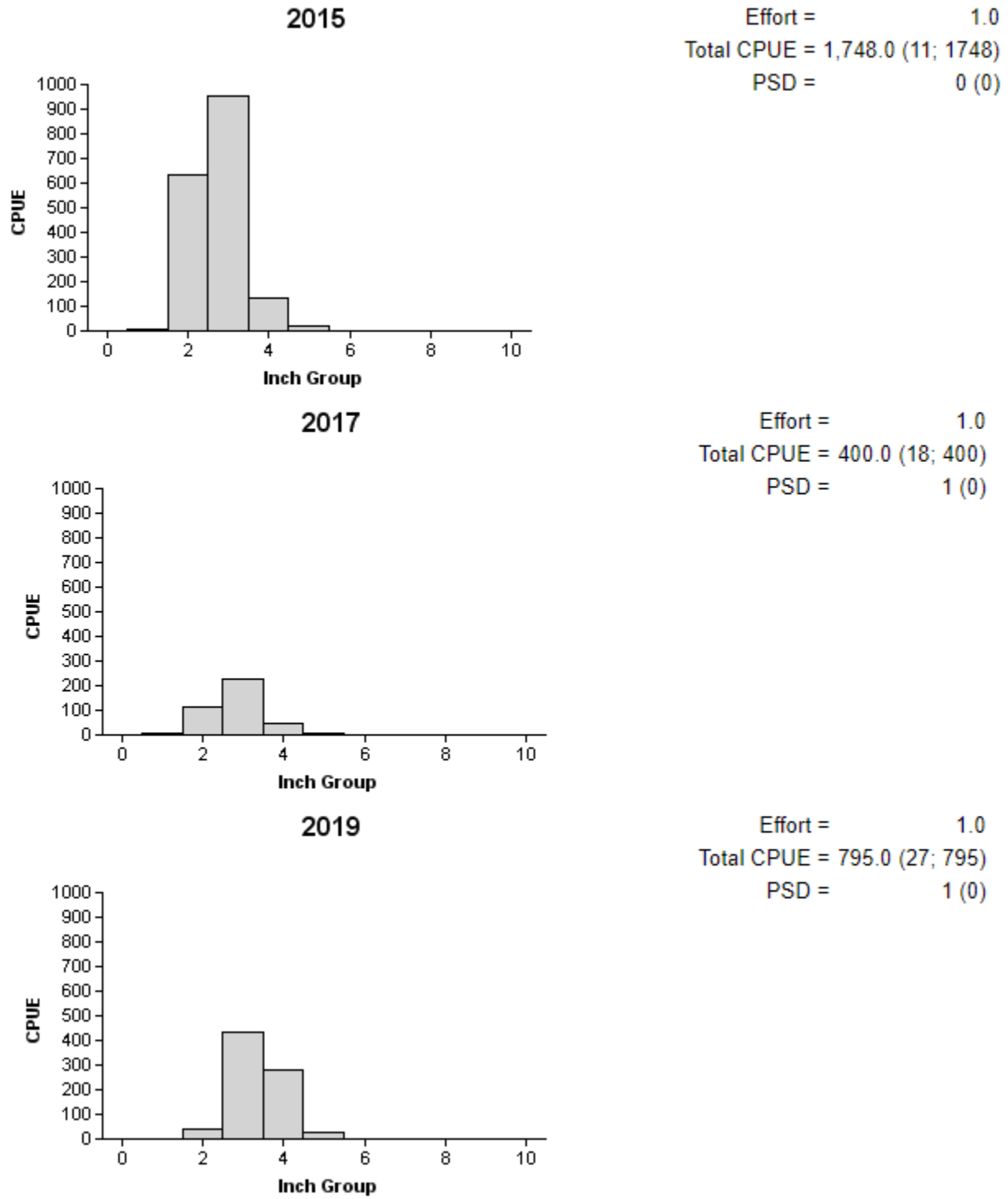


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Welsh Reservoir, Texas, 2015, 2017, and 2019.

Redear Sunfish

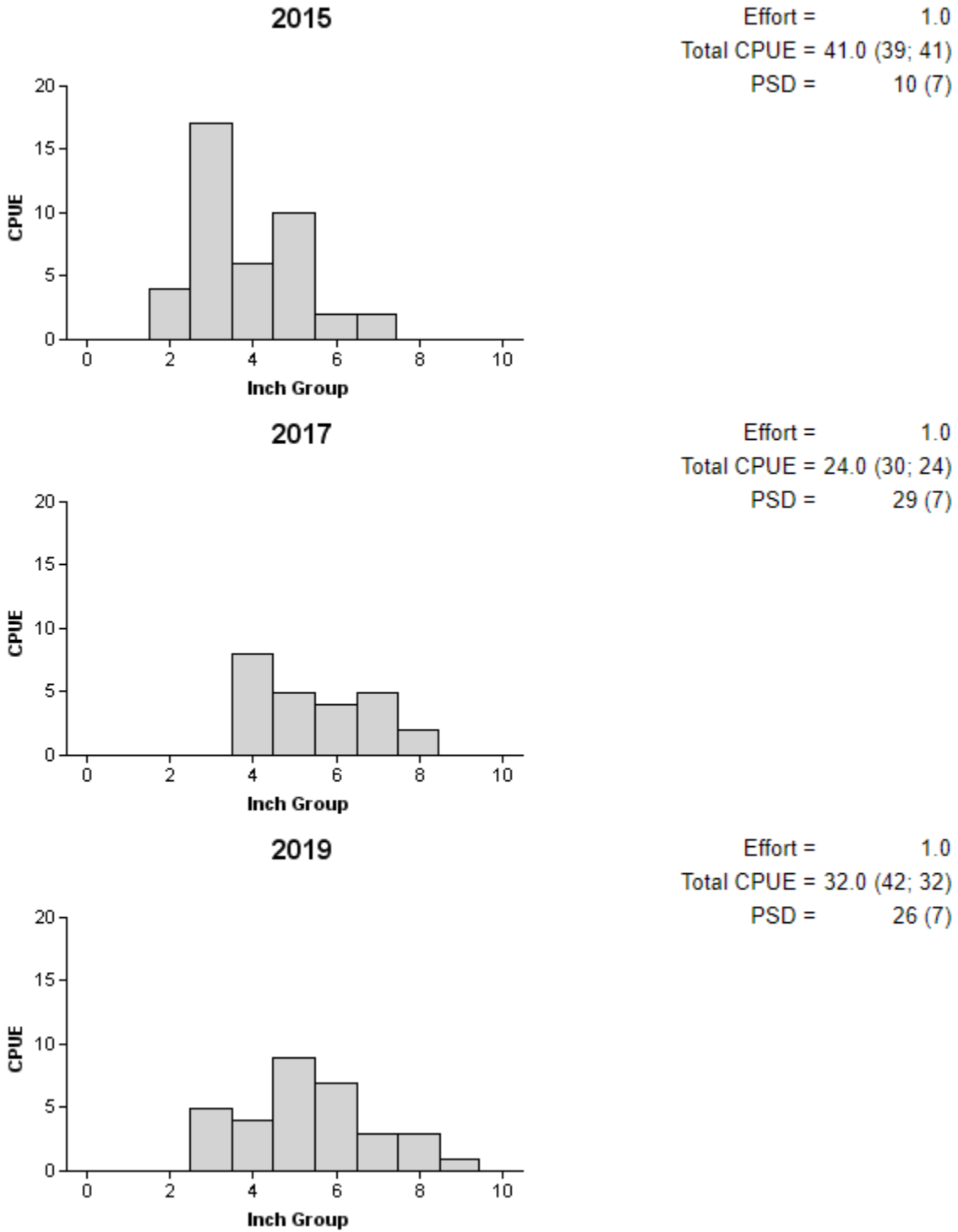


Figure 2. Number of Redear Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Welsh Reservoir, Texas, 2015, 2017, and 2019.

Largemouth Bass

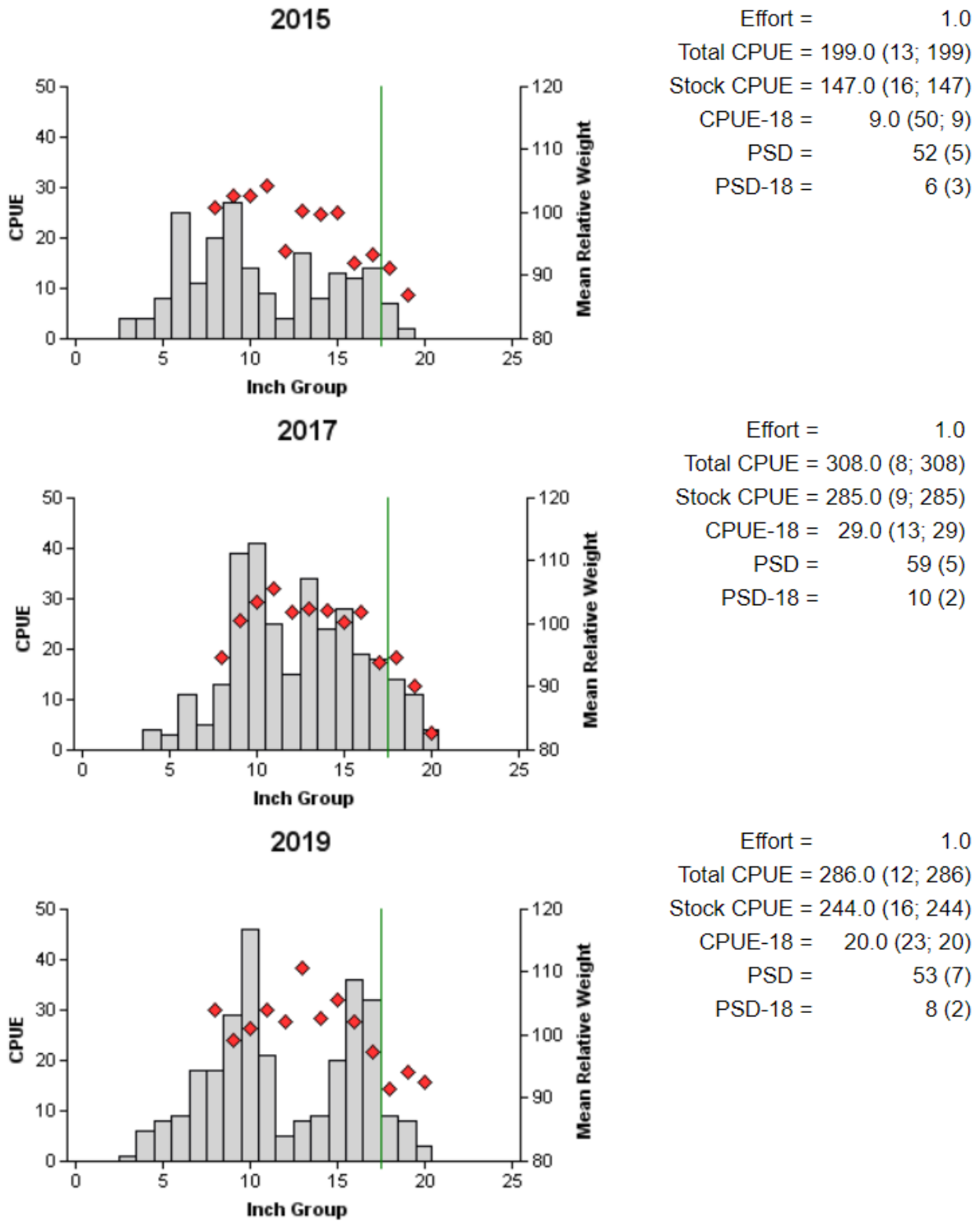


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for all electrofishing surveys, Welsh Reservoir, Texas, 2015, 2017, and 2019.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for Welsh Reservoir, Texas. Survey period is June through May. Electrofishing is conducted in the fall Standard survey denoted by S and additional survey denoted by A.

| | Survey year | | | |
|-----------------------|-------------|-----------|-----------|-----------|
| | 2020-2021 | 2021-2022 | 2022-2023 | 2023-2024 |
| Angler Access | | | | S |
| Structural Habitat | | | | S |
| Vegetation | A | A | A | S |
| Electrofishing – Fall | | A | | S |
| Creel survey | | | | S |
| 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 Welsh Reservoir, Texas, 2019-2020. Sampling effort was 1 hour for electrofishing.

| Species | Electrofishing | |
|-----------------|----------------|------------|
| | N | CPUE |
| Gizzard Shad | 1 | 1.0 (100) |
| Threadfin Shad | 113 | 113.0 (31) |
| Green Sunfish | 9 | 9.0 (44) |
| Bluegill | 795 | 795.0 (27) |
| Longear Sunfish | 22 | 22.0 (28) |
| Redear Sunfish | 32 | 32.0 (42) |
| Largemouth Bass | 286 | 286.0 (12) |

APPENDIX B – Map of sampling locations



Location of sampling sites, Welsh Reservoir, Texas, 2019-2020. Fall electrofishing stations are indicated by the E. Water level was 3 ft below mean water level during the time of sampling.



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