

Davy Crockett Reservoir

2017 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Davy Crockett Reservoir were surveyed in 2017 using electrofishing and trap netting and in 2018 using gill netting. Bass-only electrofishing was conducted in spring 2018. 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: Davy Crockett Reservoir is a 355-acre impoundment located on Dixon and Sandy Creeks approximately 14 miles northeast of Bonham in the Caddo National Grasslands. Davy Crockett Reservoir has high biological productivity. Habitat features consisted of open water, natural shoreline, and native aquatic vegetation (floating-leaved, emergent, submersed; greater than 40% coverage).

Management History: Important sport fish included Channel Catfish, Largemouth Bass, and crappie. The management plan from 2013 recommended the continued stocking of advanced fingerling Channel Catfish, keeping the 14- to 18-inch slot limit for Largemouth Bass, stocking additional Threadfin Shad, boat ramp improvement, and vegetation control to increase angler bank access. Advanced fingerling Channel Catfish were stocked in 2016. The slot limit will be changed to a 16-inch maximum length limit effective 1 September 2018. Threadfin Shad were stocked in 2016 to increase the forage base in the reservoir. Solar lighting for the boat ramp has been purchased by the Forest Service but has not been installed. Habitat surveys still indicate excessive growth of aquatic vegetation.

Fish Community

- **Prey species:** Threadfin Shad continued to be present in the reservoir. Electrofishing catch of Gizzard Shad has increased since 2009. Electrofishing catch of Bluegills remained high, with few individuals reaching 7 inches in length.
- **Catfishes:** Channel Catfish abundance has increased with stockings. All Channel Catfish sampled were legal size and had excellent body condition.
- **Largemouth Bass:** Largemouth Bass abundance increased slightly from the previous survey. Regular and supplemental sampling verified bass available above 18 inches.
- **Crappies:** White and Black Crappie were present in the reservoir. Catch rate of White Crappie was higher than the previous survey while Black Crappie was slightly lower. Both species offered legal-size fish to anglers.

Management Strategies: The slot limit for Largemouth Bass will be changed to a 16-inch maximum length limit in September 2018. Conduct supplemental electrofishing survey in spring of 2022 to avoid dense vegetation and evaluate bass over 18 inches. Discontinue advanced fingerling Channel Catfish stockings. Monitor American lotus and emergent vegetation in 2019 and 2021. Encourage Forest Service to treat American lotus and remove emergent vegetation near the west campground. Encourage Forest Service to repair leaks on dam and damaged walls on spillway. Cooperate with the Forest Service to educate the public about invasive species.

Introduction

This document is a summary of fisheries data collected from Davy Crockett Reservoir 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

Davy Crockett Reservoir is a 355-acre impoundment constructed in 1938 on Dixon and Sandy Creeks. It is located in Fannin County approximately 14 miles northeast of Bonham and is operated and controlled by the U.S. Forest Service. Primary water uses included wildlife management and recreation. The reservoir is classified as eutrophic as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2011). Eutrophic indicators include dense macrophyte growth around the shoreline and a heavily vegetated watershed that deposits organic debris on the ground resulting in allochthonous enrichment (Findenegg 1966; Sorokin 1966). Habitat at time of sampling consisted of open water, natural shoreline, and native aquatic vegetation. Since there is no gauge present, water elevation is not monitored in this reservoir. Other descriptive characteristics for Davy Crockett Reservoir are in Table 1.

Angler Access

Boat access consisted of one public boat ramp with parking, but no lighting. Additional boat ramp characteristics are in Table 2. A new, floating boarding pier was made available for the ramp in 2017. The Forest Service has obtained lighting to aid with boat launching and pick up but has not installed it as of the writing of this report. There was a campground on the west side of the reservoir with bank angler access, which was hindered by excessive growth of bulrush and cattails. Further information about Davy Crockett Reservoir and its facilities can be obtained by visiting the Texas Parks and Wildlife Department (TPWD) web site at www.tpwd.state.tx.us and navigating within the fishing web page.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Moczygemba and Hysmith 2014) included:

1. Request advanced fingerling Channel Catfish stocking every other year.
Action: Advanced fingerling Channel Catfish were stocked in 2016.
2. Maintain the 14- to 18-inch slot limit for Largemouth Bass and evaluate population structure.
Action: The Largemouth Bass population has been evaluated, and the new 16-inch maximum length limit will improve protection of larger size bass while assisting with the agency's efforts to simplify regulations.
3. Stock Threadfin Shad when available to maintain presence in fishery.
Action: Threadfin Shad were stocked in 2016, utilizing Edwards Protocol.
4. Encourage U.S. Forest Service to install lighting at boarding/fishing pier and repair boat ramp.
Action: Lighting has been purchased, but not yet installed. Boat ramp has been repaired.
5. Conduct biennial aquatic vegetation surveys and recommend treatment if necessary.

Action: An aquatic vegetation survey was conducted in August 2017. Forest Service staff have obtained applicator's certification but no plans for treatment have been made.

6. Cooperate with U.S. Forest Service to educate the public about invasive species.

Action: Discussions have begun to install invasive species signage at boat ramp.

Harvest regulation history: Sportfishes in Davy Crockett Reservoir have been managed with statewide regulations with the exception of Largemouth Bass (Table 3). From 1986 to 1996, Largemouth Bass were managed with a 14-inch minimum length limit. A 14- to 18-inch slot length limit was implemented in 1996 to improve the population size structure. In September 2018, a 16-inch maximum length limit will be placed on Largemouth Bass. This regulation is meant to protect bass over 16 inches from harvest and increase the amount of Largemouth Bass \geq 18 inches. It is also part of a statewide effort by TPWD to simplify Largemouth Bass regulations. The use of juglines, throwlines, and trotlines has been prohibited on the reservoir. Current regulations are found in Table 3.

Stocking history: Threadfin Shad and advanced fingerling Channel Catfish were stocked into Davy Crockett Reservoir in 2016. Florida Largemouth Bass were stocked annually from 1997 to 1999, and in 2018. The complete stocking history is in Table 4.

Vegetation/habitat management history: Davy Crockett Reservoir supports a diverse native aquatic vegetation community of emergent (cattail and bulrush), submersed (southern naiad and coontail), and floating-leaved plants (American lotus). Over the years aquatic vegetation has increased to cause some access problems for anglers and fish sampling. In spring of 2013, a drawdown was initiated to control emergent aquatic vegetation.

Water transfer: Davy Crockett Reservoir is used exclusively for wildlife management and recreation and water is not transferred to or from any other location.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Davy Crockett Reservoir (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, sunfishes, Gizzard Shad, and Threadfin Shad were collected by nighttime boat electrofishing (1.1 hour at 13, 5-min stations). A supplemental bass-only daytime electrofishing survey was conducted in spring of 2018 to document Largemouth Bass ≥ 18 inches (1 hour at 5, 10- to 14-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 9 randomly-selected fish (range 13.0 to 14.9 inches) collected during the standard electrofishing survey.

Trap netting – Crappie were collected using trap nets (5 net nights at 5 stations). Catch per unit effort for trap netting was recorded as the number of fish caught per net night (fish/nn). Ages for Black Crappie were determined using otoliths from 13 randomly-selected fish (range 9.0 to 10.9 inches). Age data was not collected for White Crappie due to insufficient sample size.

Gill netting – Channel Catfish were collected by gill netting (5 net nights at 5 stations). Catch per unit effort for gill netting was recorded as the number of fish caught per net night (fish/nn). An age sample was attempted to determine year class strength, but an insufficient number of catfish were sampled to complete it.

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). Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Otoliths were used for aging Largemouth Bass and Black Crappie according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Habitat – A structural habitat survey was conducted in 2013. Vegetation surveys were conducted in 2013 and 2017. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Results and Discussion

Habitat: A structural habitat survey was last conducted in 2013 (Moczygemba and Hysmith 2014). Shoreline habitat (Table 6) at Davy Crockett Reservoir was mostly natural with some rock outcroppings and bulkhead (dam face). The reservoir supported emergent, submersed, and floating-leaved native aquatic vegetation (Table 7). Emergent (common cattail and bulrush) and floating (American lotus) aquatic vegetation was common and impeded access for shoreline anglers in some areas. Submersed aquatic vegetation (coontail) was also widespread. Other species such as American pondweed, smartweed, duckweed, and water-willow were present in small quantities. As of summer 2017, native aquatic vegetation covered about 41% of the reservoir. This was a decrease from 56.5% coverage in 2013, when a drawdown exacerbated the growth of American lotus (Moczygemba and Hysmith 2014).

Prey species: Electrofishing catch rate of Gizzard Shad was 121.8/h. Index of Vulnerability (IOV) for Gizzard Shad was poor, indicating that only 35% of Gizzard Shad were available to predators. This was higher than IOV estimates in 2013 (Figure 1). Total CPUE of Gizzard Shad has increased since 2009. Total CPUE of Bluegill in 2017 (259.4/h) was almost double that of 2013 (131.0/h), and size structure continued to be dominated by small individuals (Figure 2). Bluegill PSD has remained low for the last three surveys. Total CPUE of Threadfin Shad was 156.0/h, down from 377.0/h in 2013.

Channel Catfish: The gill net catch rate of Channel Catfish was 6.8/nn in 2018, and has increased over the last three surveys (Figure 3). The absence of sub-stock fish indicated recruitment was limited. All Channel Catfish were legal length (≥ 12 inches) and some individuals over 24 inches were available to anglers. Channel Catfish PSD decreased from 84 in 2014 to 38 in 2018, likely due to the 2016 stockings. Body condition has remained good with mean relative weights ranging from 98 to 127. We did not collect a sufficient number of Channel Catfish to estimate year class strength. Past analysis has shown that Channel Catfish stockings contribute greatly to maintaining the population (Hysmith and Moczygemba 2006; Moczygemba and Hysmith 2010, 2014).

Largemouth Bass: The electrofishing catch rate of Largemouth Bass was 68.3/h in 2017 (Figure 4), which was less than the average of 100.1/h since 2001 (Moczygemba and Hysmith 2014). Catch rates have declined since the 2009 survey (99.0/h), possibly due to dense aquatic vegetation. The PSD was 71, with several individuals exceeding 18 inches (above the slot) collected. Mean relative weights were poor to good ranging from 84 to 109. Largemouth Bass reached legal length (14 inches) in 3 years ($N = 9$, range = 2-3 years), similar to previous report (Moczygemba and Hysmith 2014). A daytime bass-only electrofishing survey conducted in the spring of 2018 resulted in a total CPUE of 57/h (Figure 5). The PSD was 92, indicating more quality-size bass sampled than the fall survey. Spring electrofishing surveys avoid dense vegetation present in fall and typically catch more bass over 18 inches. Analysis of changing the regulation from a 14- to 18-inch slot limit to a 16-inch maximum length limit will focus on Largemouth Bass over 18 inches, since these regulations are meant to maintain or increase this size category. A comparison between the spring bass-only surveys in 2018 and 2011 show more bass ≥ 18 inches in 2018 (15 bass) compared to 2011 (4 bass).

Crappies: The trap net catch rate of White Crappie was 7.0/nn in 2017, higher than in 2013 (3.4/nn) and 2009 (4.2/nn) (Figure 6). The PSD was 100, higher than the two previous surveys. Optimal PSD for crappie has been suggested to be 30-60% (Gabelhouse 1984). All White Crappie sampled were over 10 inches, possibly an indication of poor recruitment due to habitat conditions or predation. Previous surveys include smaller size crappie so this issue may be temporary or cyclical. Mean relative weight was over 90 for all size classes. Growth was not analyzed due to low sample size of 10-inch White Crappie.

The trap net catch rate of Black Crappie was 11.0/nn in 2017, slightly lower than the previous sample of 15.4/nn in 2013 (Figure 7). The PSD was also 100, similar to the two previous surveys. All fish sampled were over 8 inches. Mean relative weight was over 90 for all size classes. Black Crappie reached legal-length (10 inches) in 2.5 years ($N = 13$, range = 2-3 years).

Fisheries Management Plan for Davy Crockett Reservoir, Texas

Prepared – July 2018

ISSUE 1: The Largemouth Bass regulation will change from a 14- to 18-inch slot limit to a 16-inch maximum length limit on September 1, 2018. Both regulations were adopted to maintain or increase the number of bass over 18 inches.

MANAGEMENT STRATEGIES

1. Post signage reminding anglers of the new regulation on the reservoir.
2. Conduct standard fall electrofishing in 2021 for comparability between samples (pre/post regulation change).
3. Conduct spring daytime bass-only electrofishing in 2022 to document bass over 18 inches.

ISSUE 2: Directed effort for Channel Catfish was only 4.2% in 2011. Without supplemental stocking the Channel Catfish fishery will decline. Advanced fingerlings are costly and are typically stocked in lakes with more directed effort toward Channel Catfish.

MANAGEMENT STRATEGIES

1. Discontinue stocking advanced fingerling Channel Catfish unless directed effort increases.
2. Continue gill netting every four years to assess size structure and recruitment of Channel Catfish.

ISSUE 3: Davy Crockett Reservoir was impounded in 1938 and suffers from aging infrastructure. Two significant leaks have formed in the dam and a retaining wall has fallen in the spillway.

MANAGEMENT STRATEGY

1. Encourage the U.S. Forest Service to repair the leaks on the dam and replace retaining wall in spillway.

ISSUE 4: American lotus and emergent vegetation have limited angler access to the reservoir. American lotus impedes boat access and shoreline access, while cattails and bulrush impede shoreline access. Excessive vegetation also impacts sampling efforts.

MANAGEMENT STRATEGIES

1. Advise the U.S. Forest Service on treatment methods of American lotus.
2. Advise the U.S. Forest Service to remove bulrush and cattails from the shoreline of the west campground to improve angler access.
3. Monitor aquatic vegetation every four years.

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 U.S. Forest Service to post appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.

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

Sport fish, forage fish, and other important fishes

Important sport fish in Davy Crockett Reservoir include Largemouth Bass, White Crappie, Black Crappie, and Channel Catfish. Important forage species include Bluegill and Gizzard and Threadfin Shad.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are the most targeted species at Davy Crockett with 42.6% directed effort (Moczygemba and Hysmith 2014). In September 2018, the 14- to 18-inch slot length limit will be changed to a 16-inch maximum length limit. Florida Largemouth Bass were stocked in 2018.

A minimum of 12 randomly selected 5-min nighttime electrofishing sites will be sampled in the fall of 2021. Objectives will include ≥ 50 stock-size fish with an RSE of CPUE-S ≤ 25 to evaluate size structure, body condition, genetics, and CPUE. Based on previous surveys, objectives should be met in 12 stations. If objectives are not met, 6 additional random stations will be sampled. Thirteen Largemouth Bass between 13.0 and 14.9 inches will be collected to estimate age at 14 inches.

Daytime, bass-only electrofishing will occur in the spring of 2022 as a supplement to fall sampling. Spring sampling should avoid sampling issues caused by dense vegetation and increase the catch of Largemouth Bass over 18 inches to aid in evaluating the regulation change. Random sites at 5- to 10-minute intervals, totaling 1 hour will be sampled. Objectives will include ≥ 50 stock-size fish with an RSE of CPUE-S ≤ 25 to evaluate size structure and CPUE. Fish length only will be measured. No additional effort will be expended if objectives are not met. Spring and fall sampling for this next four year cycle will be sufficient to collect long-term monitoring trend data and monitor the response to the regulation change (Table 8).

Channel Catfish: Channel Catfish in Davy Crockett Reservoir have limited natural reproduction, requiring maintenance stockings from TPWD hatcheries. The reservoir has maintained a quality Channel Catfish fishery utilized by few anglers. Directed effort for Channel Catfish was only 4.2% in 2011. Until directed effort increases, stockings will be discontinued.

Based on previous catch rates and variability in stockings, obtaining quality trend data to evaluate size structure for Channel Catfish is unlikely with reasonable effort. Out of the last 8 gill net surveys only two had $RSE \leq 25$. A minimum of 5 randomly selected sites will be sampled with gill nets in spring of 2022. Sampling every four years should be sufficient to determine size structure and recruitment of Channel Catfish.

Crappie: Both White and Black Crappie are present in Davy Crockett Reservoir. Davy Crockett supports a popular crappie fishery and they are second to Largemouth Bass in directed effort (37%).

Based on variability in previous surveys, trap net sampling is unlikely to obtain high precision data with reasonable effort. However, a minimum of 5 randomly selected sites will be sampled with trap nets in fall of 2021 to collect trend data on CPUE and body condition. If at least 13 fish between 9.0 and 10.9 inches are collected of either species, a category-2 age and growth analysis will be conducted to estimate age at minimum legal length. If necessary, an additional 5 random sites will be sampled with trap nets to collect at least 50 fish of either species. Sampling every four years should be sufficient to monitor changes in the population.

Sunfish and Shad: Bluegill, Gizzard Shad, and Threadfin Shad are the primary forage species at Davy Crockett Reservoir. Trend data on abundance, size structure, and prey availability for forage species will be collected with Largemouth Bass sampling every four years. No additional effort will be expended for forage species, unless additional stations are necessary to meet Largemouth Bass objectives.

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Tables and Figures

Table 1. Characteristics of Davy Crockett Reservoir, Texas.

| Characteristic | Description |
|-----------------------------|--------------------------------|
| Year constructed | 1938 |
| Controlling authority | United States Forestry Service |
| County | Fannin |
| Reservoir type | Offstream |
| Shoreline Development Index | 2.1 |
| Conductivity | 164 $\mu\text{S}/\text{cm}$ |

Table 2. Boat ramp characteristics for Davy Crockett Reservoir, Texas, August, 2017.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|---------------|-------------------------------|--------|----------------------------|--|-----------|
| Crockett East | 33.73755 -95.92195 | Y | 5 | 477 | Fair |

Table 3. Harvest regulations for Davy Crockett Reservoir, Texas.

| Species | Bag limit | Length limit |
|---|----------------------------|----------------------|
| Channel Catfish | 25 | 12-inch minimum |
| Largemouth Bass | 5 | 14- to 18-inch slot* |
| Crappie: White and Black crappie, their hybrids and subspecies | 25 (in any combination) | 10-inch minimum |

*16-inch maximum length limit effective September 1, 2018

Table 4. Stocking history of Davy Crockett Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults, UNK = unknown.

| Species | Year | Number | Life Stage |
|--------------------------------|-------------|---------------|-------------------|
| Channel catfish | 1968 | 48,680 | AFGL |
| | 1978 | 10,859 | AFGL |
| | 1991 | 7,500 | AFGL |
| | 1992 | 6,106 | AFGL |
| | 1994 | 1,100 | ADL |
| | 1995 | 1,200 | AFGL |
| | 1999 | 8,776 | AFGL |
| | 2006 | 3,559 | AFGL |
| | 2008 | 4,449 | AFGL |
| | 2008 | 38,640 | FGL |
| | 2010 | 4,008 | AFGL |
| | 2011 | 37,722 | AFGL |
| | 2016 | 8,772 | AFGL |
| Total | 181,371 | | |
| Florida largemouth bass | 1997 | 35,000 | FGL |
| | 1998 | 35,004 | FGL |
| | 1999 | 35,281 | FGL |
| | 2018 | 36,200 | FGL |
| | Total | 141,485 | |
| Green sunfish x redear sunfish | 1976 | 260 | UNK |
| | 1978 | 17,785 | UNK |
| | Total | 18,045 | |
| Largemouth bass | 1976 | 260 | UNK |
| | Total | 260 | |
| Threadfin shad | 2008 | 245 | ADL |
| | 2009 | 800 | ADL |
| | 2011 | 400 | AFGL |
| | 2016 | 400 | AFGL |
| | Total | 1,845 | |

Table 5. Objective-based sampling plan components for Davy Crockett Reservoir, Texas 2017 - 2018.

| 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 | $N \geq 50$ |
| Gizzard Shad ^a | Abundance | CPUE - Total | RSE ≤ 25 |
| | Size structure | PSD, length frequency | $N \geq 50$ |
| | Prey availability | IOV | $N \geq 50$ |
| <i>Gill netting</i> | | | |
| Channel Catfish | Abundance | CPUE - Total | General monitoring trend data |
| | Size structure | PSD, length frequency | General monitoring trend data |
| | Age-and-growth | Year class strength | 5 fish/inch group (max) |
| <i>Trap netting</i> | | | |
| Crappie | Abundance | CPUE - Total | General monitoring trend data |
| | Size structure | PSD, length frequency | $N \geq 50$ stock |
| | Age-and-growth | Age at 10 inches | $N = 13, 9.0 - 10.9$ inches |
| | Condition | W_r | 10 fish/inch group (max) |

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

Table 6. Survey of structural habitat types, Davy Crockett Reservoir, Texas, 2013. Shoreline habitat type units are in miles.

| Habitat type | Estimate | % of total |
|--------------|-----------|------------|
| Natural | 5.1 miles | 93.0 |
| Bulkhead | 0.2 miles | 3.5 |
| Rocky | 0.2 miles | 3.5 |

Table 7. Survey of aquatic vegetation, Davy Crockett Reservoir, Texas, 2013–2017. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

| Vegetation | 2013 | 2017 |
|------------------------|--------------|--------------|
| Native submersed | 44.5 (12.5) | 12.4 (3.5) |
| Native floating-leaved | 100.6 (28.3) | 119.0 (33.5) |
| Native emergent | 55.6 (15.7) | 14.5 (4.1) |

Gizzard Shad

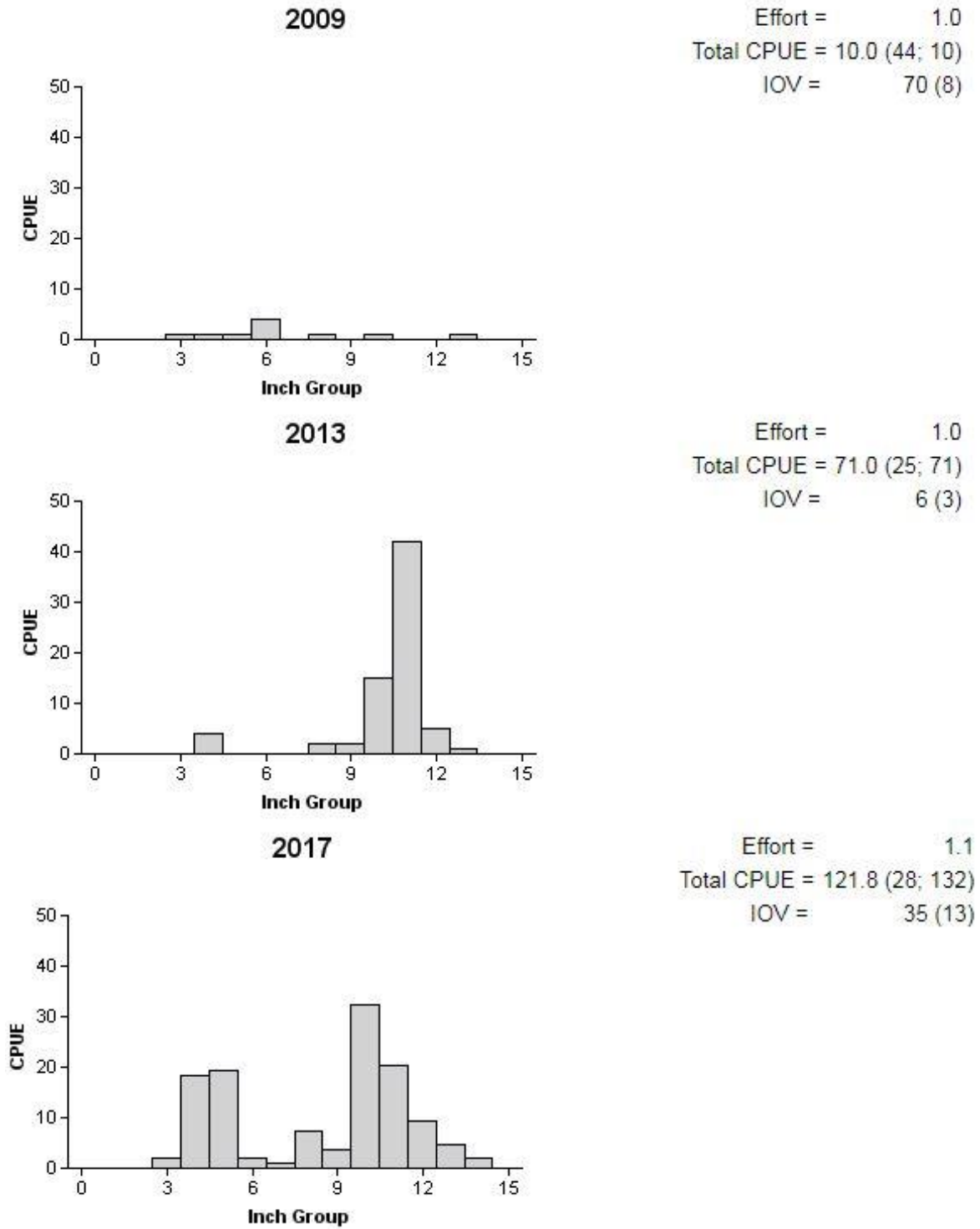


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Davy Crockett Reservoir, Texas, 2009, 2013, and 2017.

Bluegill

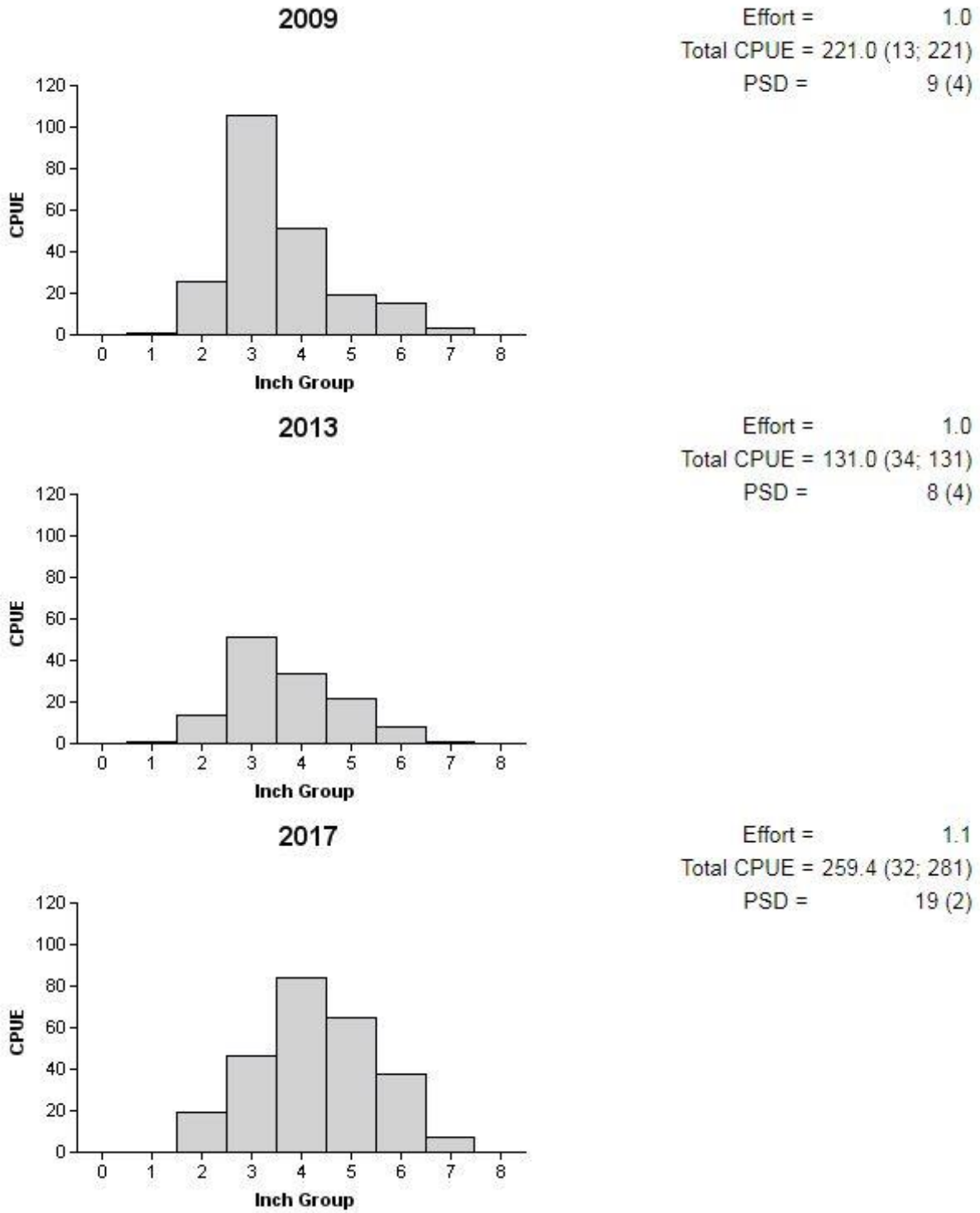


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Davy Crockett Reservoir, Texas, 2009, 2013, and 2017.

Channel Catfish

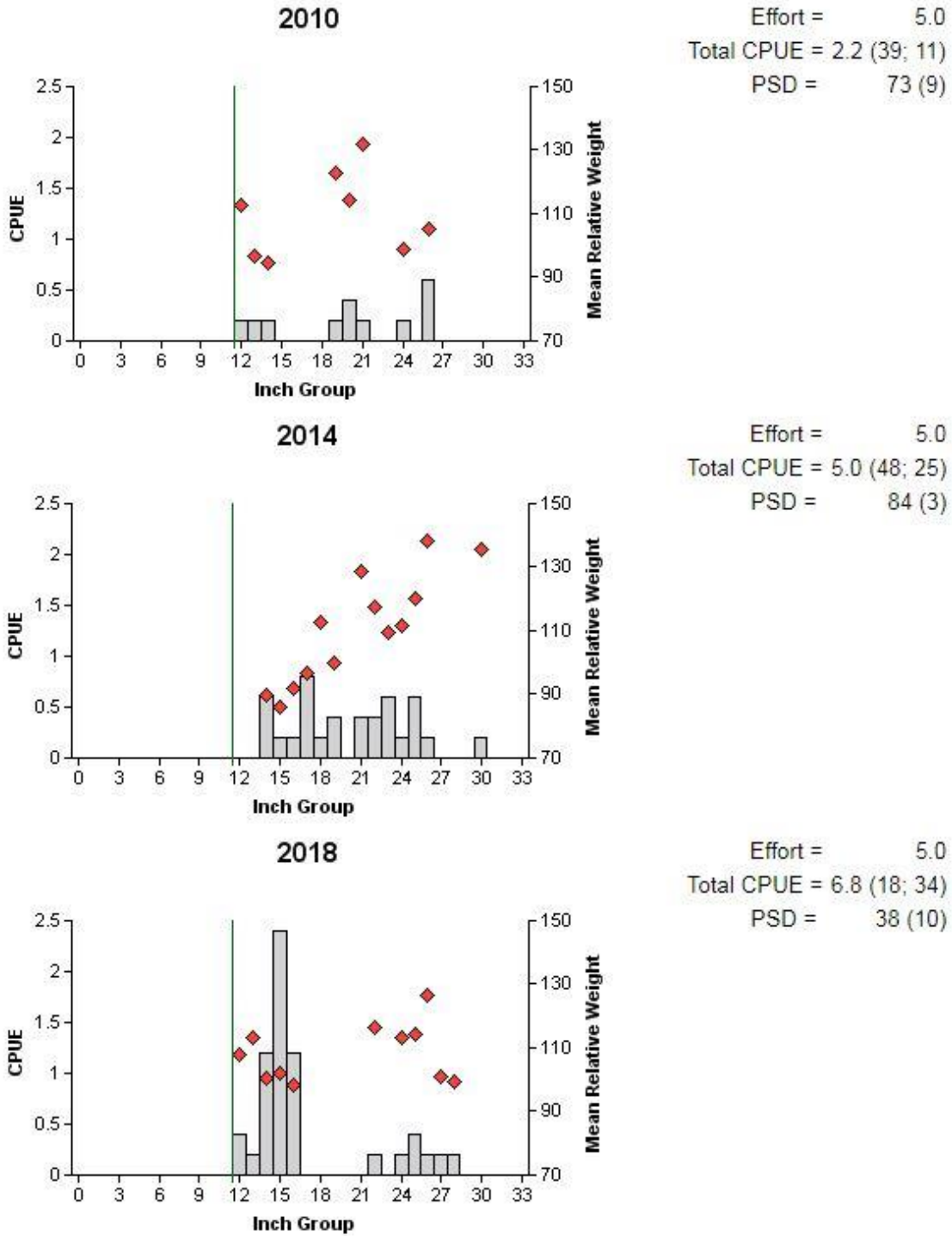


Figure 3. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Davy Crockett Reservoir, Texas, 2010, 2014, and 2018. Vertical line indicates minimum length limit at time of collection.

Largemouth Bass

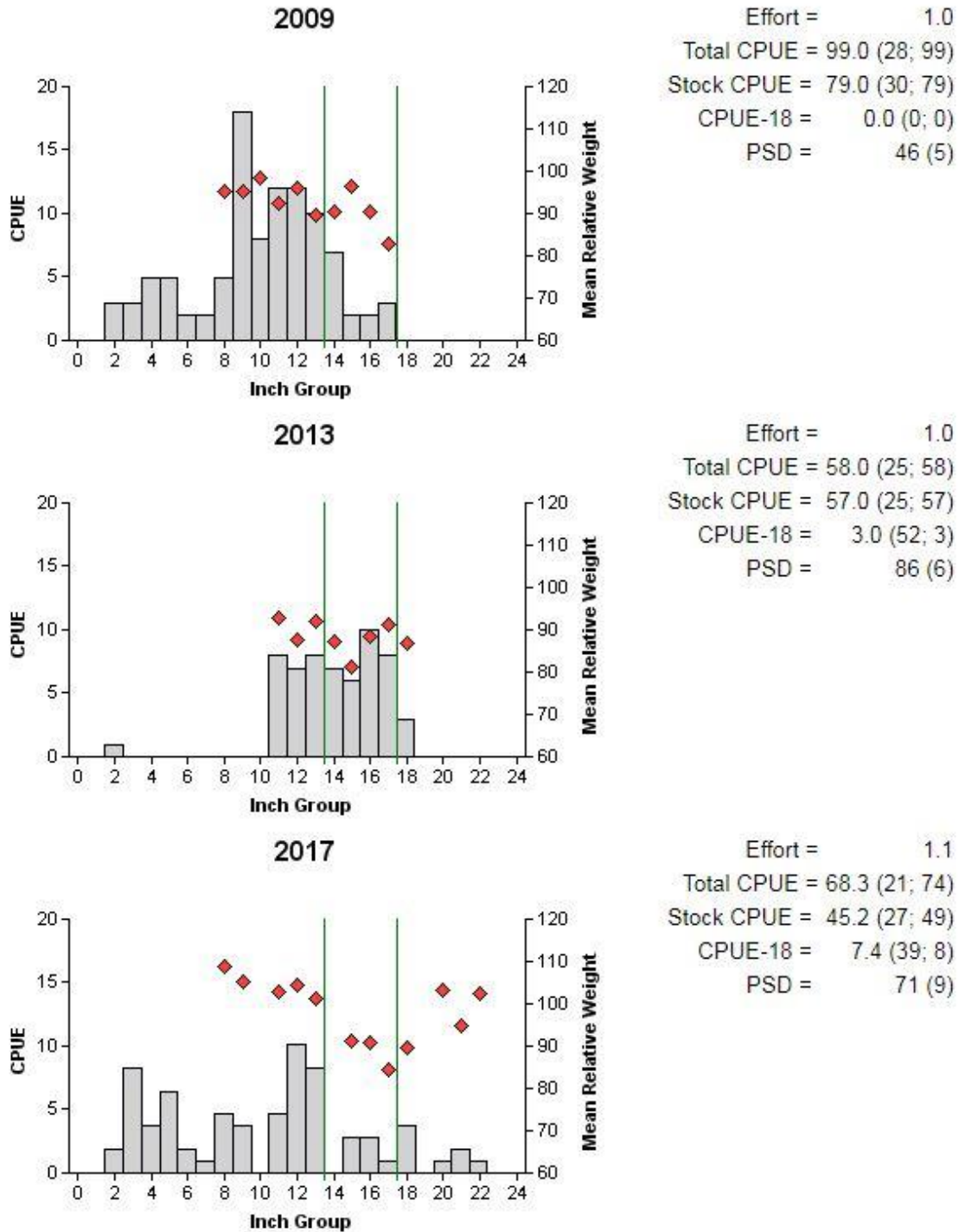


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Davy Crockett Reservoir, Texas, 2009, 2013, and 2017. Vertical lines represent slot length limit at time of collection.

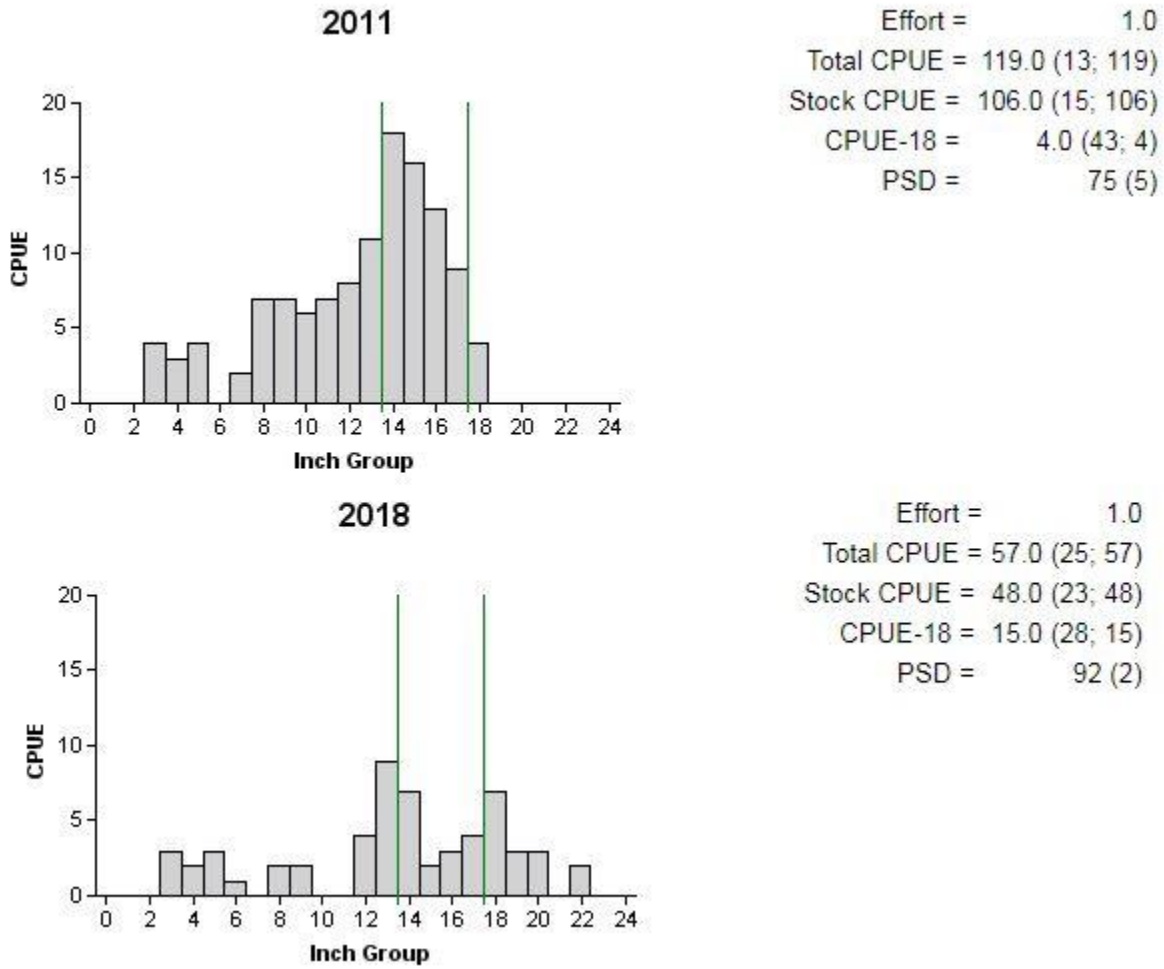


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for daytime bass-only spring electrofishing surveys, Davy Crockett Reservoir, Texas, March 2011 and April 2018. Vertical lines represent slot length limit at time of collection.

White Crappie

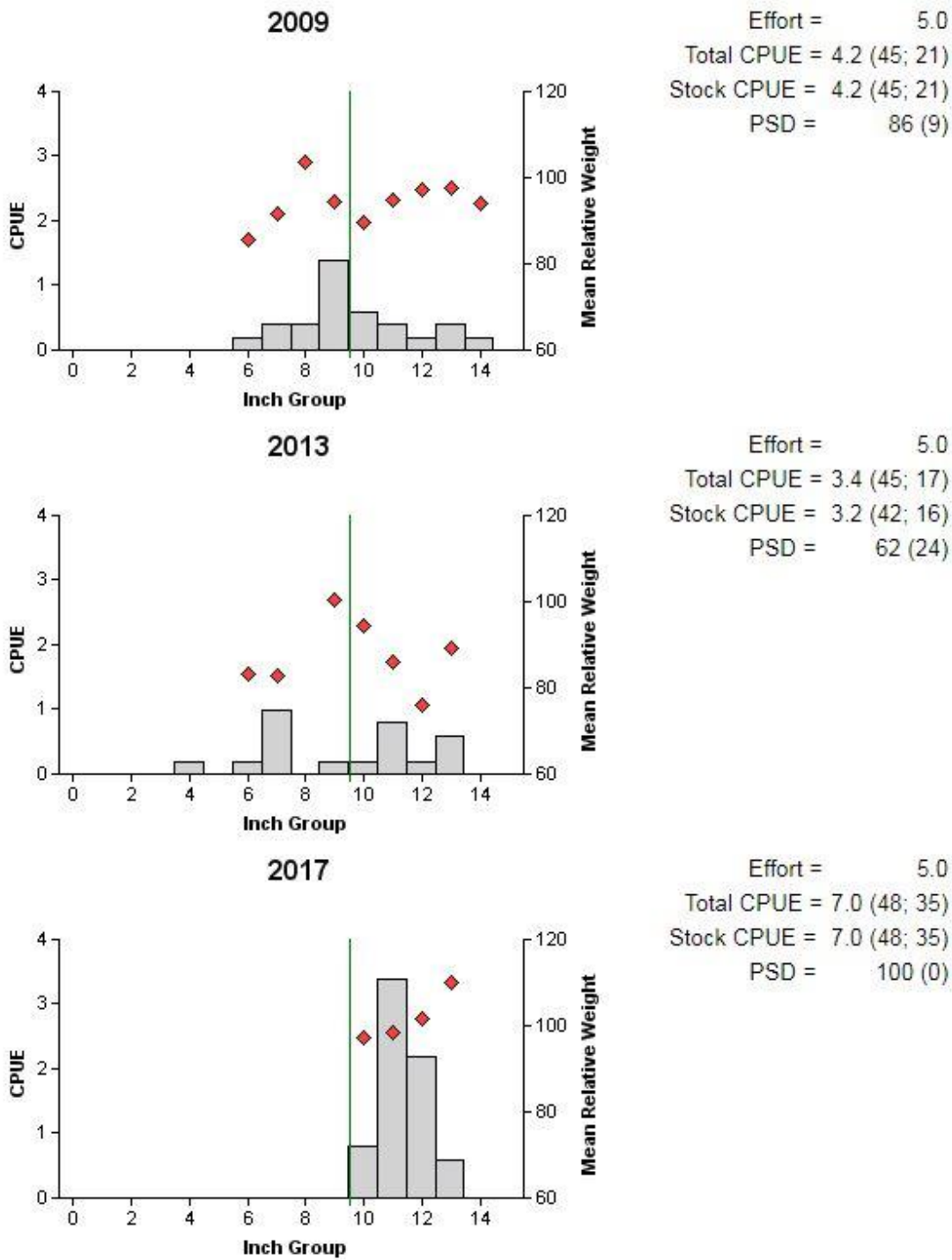


Figure 6. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Davy Crockett Reservoir, Texas, 2009, 2013, and 2017. Vertical line indicates minimum length limit.

Black Crappie

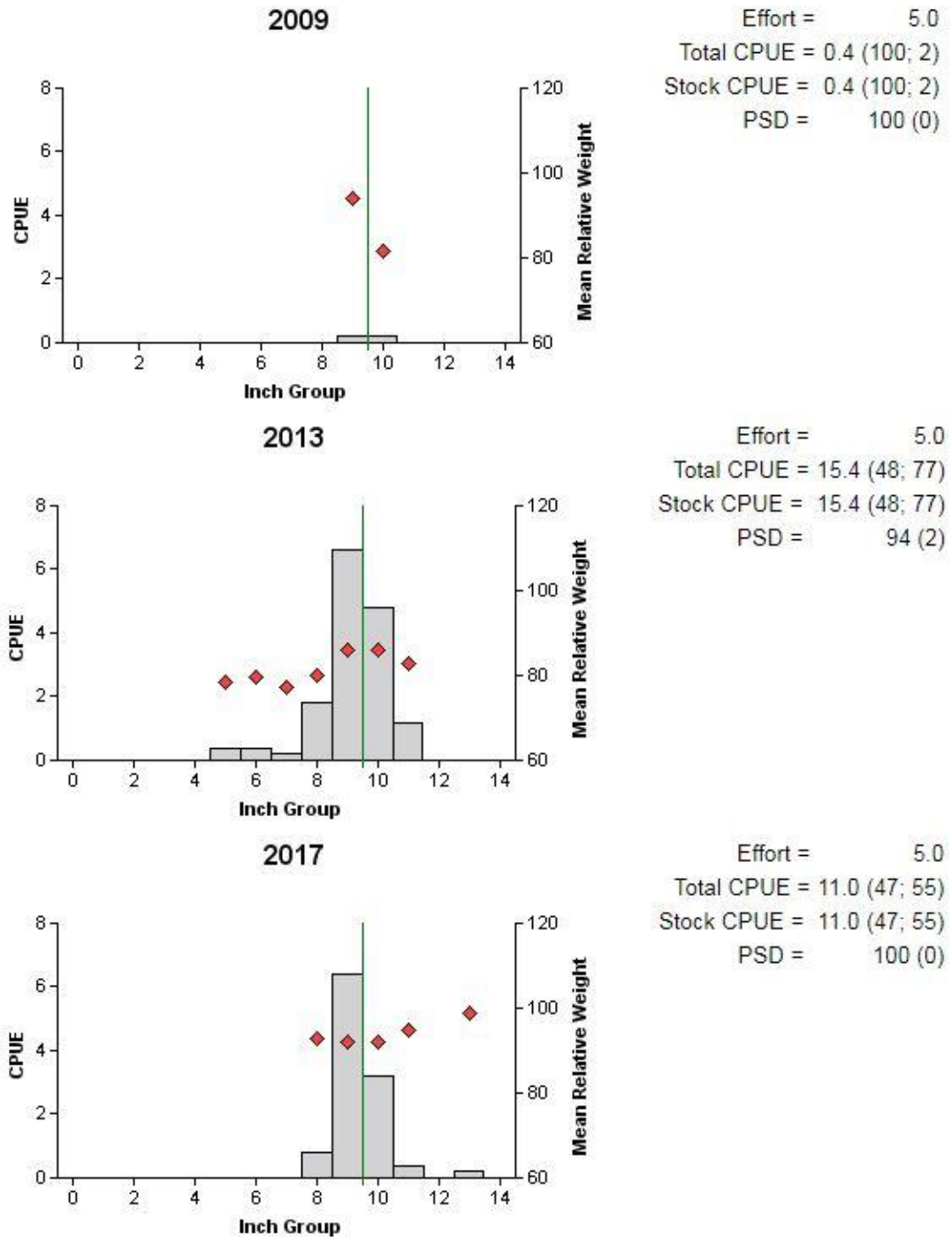


Figure 7. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Davy Crockett Reservoir, Texas, 2009, 2013, and 2017. Vertical line indicates minimum length limit.

Proposed Sampling Schedule

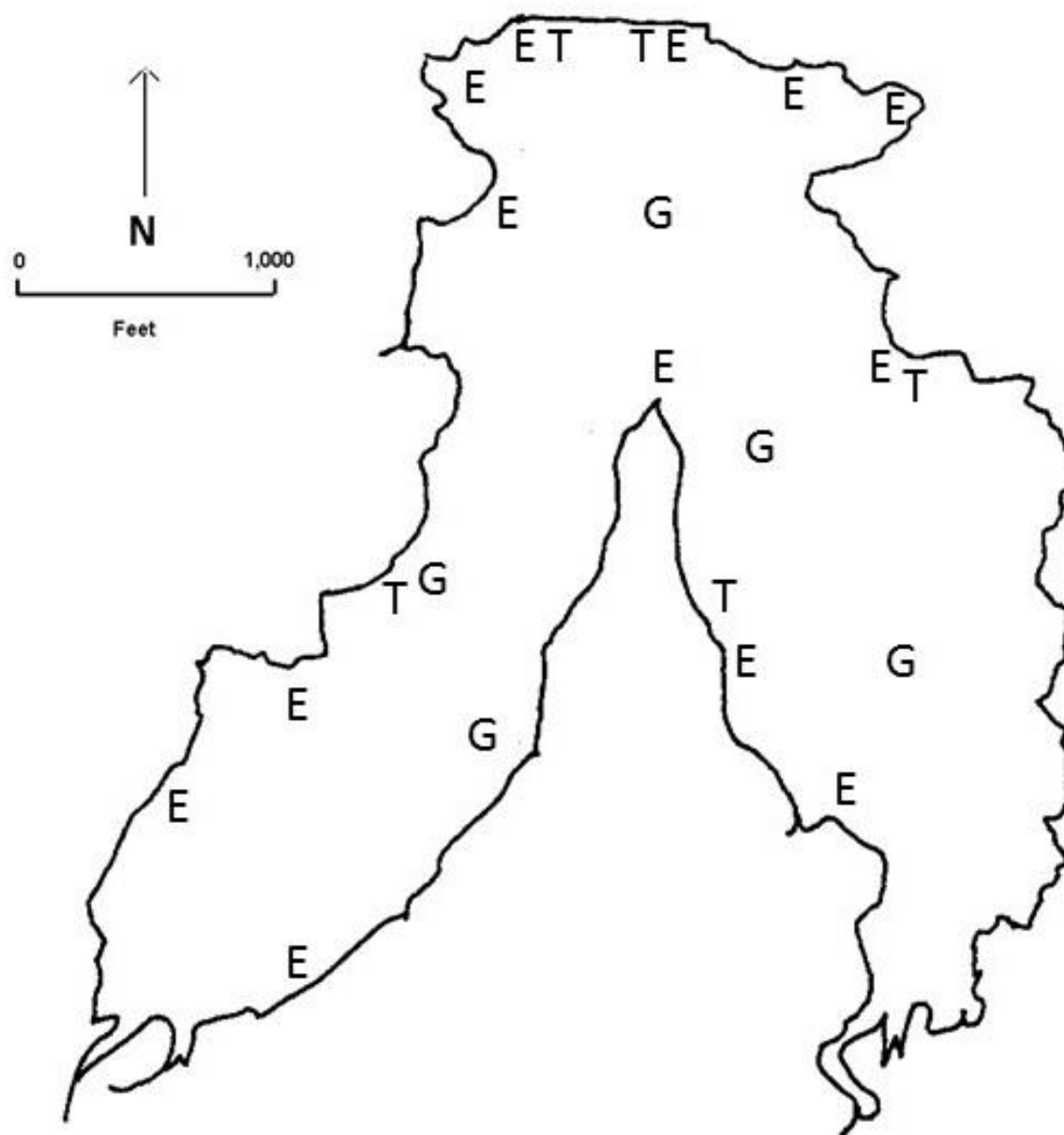
Table 8. Proposed sampling schedule for Davy Crockett Reservoir, Texas. Survey period is June through May. Gill netting and bass-only electrofishing surveys are conducted in the spring, while trap netting and standard electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

| | Survey year | | | |
|-------------------------------------|-------------|-----------|-----------|-----------|
| | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
| Angler access | | | | S |
| Structural habitat | | | | |
| Vegetation | | | | S |
| Electrofishing - Fall | | | | S |
| Electrofishing (Bass-only) – Spring | | | | A |
| Trap netting | | | | S |
| Gill netting | | | | S |
| Creel survey | | | | |
| 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 Davy Crockett Reservoir, Texas, 2017-2018. Sampling effort was 5 net nights for gill netting, 5 net nights for trap netting, 1.1 hour for standard fall electrofishing, and 1.0 hour for bass-only electrofishing.

| Species | Gill Netting | | Trap Netting | | Electrofishing | | Bass-only Electrofishing | |
|-----------------|--------------|----------|--------------|-----------|----------------|------------|--------------------------|-----------|
| | N | CPUE | N | CPUE | N | CPUE | N | CPUE |
| Gizzard Shad | | | | | 132 | 121.9 (28) | | |
| Threadfin Shad | | | | | 169 | 156.0 (64) | | |
| Channel Catfish | 34 | 6.8 (18) | | | | | | |
| Green Sunfish | | | | | 10 | 9.2 (64) | | |
| Warmouth | | | | | 7 | 6.4 (50) | | |
| Bluegill | | | | | 281 | 259.4 (32) | | |
| Longear Sunfish | | | | | 1 | 0.9 (100) | | |
| Redear Sunfish | | | | | 20 | 18.5 (30) | | |
| Largemouth Bass | | | | | 74 | 68.3 (21) | 57 | 57.0 (25) |
| White Crappie | | | 35 | 7.0 (48) | | | | |
| Black Crappie | | | 55 | 11.0 (47) | | | | |

APPENDIX B – Map of sampling locations

Location of sampling sites, Davy Crockett Reservoir, Texas, 2017-2018. Trap net, 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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