

J.B. Thomas 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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Survey and Management Summary

Fish populations in J.B. Thomas Reservoir were surveyed in 2019 using electrofishing and trap netting and in 2018 using gill netting. 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: J.B. Thomas Reservoir is a 7,820-acre impoundment (constructed in 1952) on the Colorado River. The dam is located 16 miles southwest of Snyder and west of State Highway 208, in Scurry County, Texas. The reservoir is operated by the Colorado River Municipal Water District (CRMWD) and provides water to three member cities. The reservoir has a drainage area of 3,950 square miles; however, it experiences frequent water level fluctuations, and the reservoir was last full in 1962. The reservoir declined steadily from approximately 3,917 acres in 2005 to 320 acres in 2012 due to drought and municipal water pumping. In 2014 and 2015 the watershed experienced large rain events, and the reservoir increased in size to 6,233 acres and was 3 feet below Conservation Pool elevation (approximate 46-foot rise). Currently the reservoir is 29.7 feet below Conservation Pool. Angler access is good as most of the shoreline is accessible, but only one of four boat ramps is open and usable. At the time of sampling, habitat consisted primarily of sand/silt and rocky shore covered with standing timber.

Management History: Important sport fish include Largemouth Bass, White Crappie, and catfishes. Florida Largemouth Bass were introduced in 1980. Due to extended drought followed by a large rise in lake level, Blue and Channel Catfish were stocked in 2015. Bluegill were stocked in 2016. Florida Largemouth Bass were stocked in 2015, 2016, and 2018. The sport fish populations have only been managed with statewide regulations.

Fish Community

- **Prey species:** Gizzard Shad and Bluegill populations in the reservoir are adequate to support the existing predator population. Ninety-nine percent of sampled shad were available as prey to most sport fish. Electrofishing catch of Bluegills for 2019 was higher than 2017 but lower than 2018. All Bluegill sampled were 5-inches in length and smaller.
- **Catfishes:** Blue Catfish catch rates appear stable since 2016 with a slight shift towards larger individuals. Juvenile Blue Catfish in the 2018 survey also indicate that natural reproduction is occurring in the reservoir. The Channel Catfish population also appears to be recovering from the extended period of drought observed through 2014; both juvenile fish as well as legal sized fish were sampled. Flathead Catfish are present in the reservoir.
- **Largemouth Bass:** Periods of high turbidity in the reservoir are believed to affect the electrofishing results from year-to-year. Although the catch rate for 2019 was lower than 2018, the population appears to be well balanced. The majority of fish sampled were of legal harvestable size with individuals as large as 22 inches observed
- **White Crappie:** White Crappie abundance appears to be increasing; however, most fish observed in the 2019 survey were below 10 inches.

Management Strategies: Conduct surveys with electrofishing in 2021 and 2023, trap nets in 2023, and gill nets in 2022 and 2024. Conduct genetic analysis and age and growth analysis of Largemouth Bass in 2023. Continue educating the public about the dangers of invasive species. Habitat and vegetation surveys will be conducted in 2023.

Introduction

This document is a summary of fisheries data collected from J.B. Thomas 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 species of 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

J.B. Thomas Reservoir is a 7,820-acre impoundment constructed in 1952 on the mainstem of the Colorado River. The dam is located 16 miles southwest of Snyder and west of State Highway 208, in Scurry County, Texas. The reservoir is owned by the Colorado River Municipal Water District (CRMWD) and provides water to three member cities. The reservoir has a drainage area of 3,950 square miles; however, it experiences frequent water level fluctuations. At conservation pool the lake is approximately 2,253 feet above mean sea level (MSL) (Figure 1). The reservoir declined steadily from approximately 3,917 acres in 2005 to 320 acres in 2012 due to drought and municipal water pumping. Also, in 2012, a fish kill was reported. In 2014 and 2015 the watershed experienced large rain events, and the reservoir increased to 6,233 acres and within 3 feet of Conservation Pool elevation (approximate 46-foot rise). Currently the reservoir is 29.7 feet below conservation pool. Water has not gone over the spillway since 1962. At the time of sampling, habitat consisted primarily of sand/silt and rocky shore covered with standing timber. Other descriptive characteristics for J.B. Thomas Reservoir are in Table 1.

Angler Access

Angler access is good, as much of the shoreline is accessible. J. B. Thomas Reservoir has four public boat ramps. Three of the ramps, Southside Park main ramp, White Island Park, and Bull Creek Park, were unavailable to anglers in 2019 due to low water levels. The White Island Park ramp was also closed by the reservoir controlling authority due to limited parking at the ramp. Extension of the ramps is not feasible. Additional boat ramp characteristics are in Table 2.

Management History

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

1. Conduct additional sampling in 2017-2018 to assess continued recovery of sportfish and forage populations and determine success of 2016 Florida Largemouth Bass stocking. Based on results from 2017-2018 surveys, create new OBS objectives for the 2019-2020 surveys and determine which species may require stocking.

Action: Due to a low catch rate of Largemouth Bass in 2017 (14.0/h), it was decided to continue exploratory surveys for 2018 and 2019.

2. Contact CRMWD about possible development of parking at White Island ramp through TPWD grants.

Action Discussions with CRMWD revealed that bordering private land makes parking lot expansion not feasible.

3. Contact CRMWD about potential of adding a new ramp at a north side location using TPWD grant money.

Action: Declining lake levels and location of private land results in no suitable location for new boat ramp.

Harvest regulation history: Sport fishes in J.B. Thomas Reservoir are managed with statewide regulations (Table 3).

Stocking history: Following a large rise in water level, J.B. Thomas Reservoir was stocked with Blue Catfish and Channel Catfish in 2015, Florida Largemouth Bass in 2015, 2016, and 2018, and Bluegill in 2016. The complete stocking history is in Table 4.

Vegetation/habitat management history: This reservoir has no vegetation/habitat management history.

Water transfer: J. B. Thomas Reservoir is used for municipal water supply and recreation. One permanent pumping station operated by CRMWD transfers water for municipal water supply. Through the use of this pumping station and current pipeline connections, CRMWD is capable of transferring water to their other water supply reservoirs within the Colorado River basin (O. H. Ivie Reservoir, and E. V. Spence Reservoir). No interbasin transfers are known to exist.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for J.B. Thomas Reservoir (Clayton and Munger 2016). 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 2017).

Electrofishing – Largemouth Bass, Sunfishes, and Gizzard 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.

Trap netting – Crappie were collected using trap nets (8 net nights at 8 stations). Catch per unit effort for trap netting was recorded as the number of fish caught per net night (fish/nn).

Gill netting Due to the COVID-19 outbreak the 2020 exploratory survey was cancelled, and data collected from the 2018 exploratory survey is being reported. Blue Catfish and 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).

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 (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

Habitat – Structural habitat and vegetation surveys were conducted in August 2019. 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 United States Geological Survey (USGS 2020).

Results and Discussion

Habitat: Littoral zone structural habitat consisted primarily of sand/silt and rocky shore. Structural habitat consisted of 268.3 acres of standing timber (Table 6). No aquatic vegetation was observed in the reservoir.

Prey species: Electrofishing surveys for prey species were exploratory; looking for presence/absence and evidence of recovery of prey species. Electrofishing CPUEs of Gizzard Shad and Bluegill in 2019 were 135.0/h and 45.0/h, respectively (Figures 2 and 3). Index of vulnerability for Gizzard Shad was high, indicating 99% were available to predators. Total CPUE of Gizzard Shad in 2019 was lower than CPUE in 2018 and 2017 (Figure 2), which is expected as predators increase in size and number. Total CPUE of Bluegill in 2019 was lower than total CPUE in 2018 (93.0/h) but higher than 2017 (14.0/h), and size structure consisted of small individuals (Figure 3).

Blue Catfish: Gill net CPUE of Blue Catfish was 13.0/nn in 2018 which is similar to 2016 (14.6/nn) and 2008 (10.4/nn) (Figure 4). Although the 2018 CPUE was slightly lower than 2016, size structure appears to have shifted to larger individuals; most fish surveyed were legal for harvest. The presence of smaller fish three years after stocking indicates that natural reproduction is occurring in the reservoir. Body condition was good for most size classes (Wr greater than 90).

Channel Catfish: The 2018 gill net CPUE of Channel Catfish was 6.2/nn, which is greater than in previous years (Figure 5). Few sub-stock fish were collected in 2016 or 2018. Most fish sampled were available for harvest. Body condition appeared good with Wr's of 90 and greater in most size classes.

Largemouth Bass The electrofishing CPUE of Largemouth Bass was 22.0/h in 2019 which was lower than in 2018 (56.0/h) but higher than 2017 (14.0/h) (Figure 6). The period of “new lake effect” following the large lake level increase in 2014 and 2015 is also beginning to settle into the reservoir’s normal pattern of productivity. Although size distribution of Largemouth Bass sampled in 2019 appears good, overall abundance was low. Body condition in 2019 was good as all most classes had W_r above 90.

White Crappie: White Crappie CPUE has increased steadily from 4.4/nn in 2015 to 13.3/nn in 2019. Although size distribution from 2017 to 2019 has shifted to larger individuals, the majority of fish sampled were below the minimum length limit (Figure 7).

Fisheries Management Plan for J. B. Thomas Reservoir, Texas

Prepared – July 2020

ISSUE 1: Historical data suggests that Largemouth Bass may be experiencing slow growth and poor recruitment in the reservoir, and recent stockings may not be contributing much to enhance the population.

MANAGEMENT STRATEGY

1. During the 2021 and 2023 surveys, 13 Largemouth Bass between 330 and 381 mm will be collected for age and growth analysis to identify different year classes and look for large scale growth anomalies.

ISSUE 2: Anecdotal evidence indicates that the majority of anglers are locals that are mainly interested in active and passive harvest of White Crappie and catfish species. Evidence also suggests that the reservoir is a low use reservoir and a traditional creel survey would result in several “zero” days.

MANAGEMENT STRATEGY

1. Explore options of developing and conducting an online creel survey to get a better idea of angler use and preference for the reservoir.

ISSUE 2: 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. 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. Current low water conditions and high chlorides have reduced the risk of infestation, but inflows could return the reservoir to high risk.

MANAGEMENT STRATEGIES

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

Objective-Based Sampling Plan and Schedule (2020–2024)

Sport fish, forage fish, and other important fishes

Sport fishes in J.B. Thomas Reservoir have historically included Blue Catfish, Channel Catfish, Flathead Catfish, White Bass, Largemouth Bass, and White Crappie. The primary forage species has been Gizzard Shad. Survey results from 2018 and 2019 indicate that all forage species and gamefish, except for White Bass, are recovering from the recent period of drought and extremely low reservoir levels.

Low-density fisheries

Past surveys have indicated low relative abundance of Flathead Catfish (1.8/nn in 2004), and White Bass (1.2/nn in 2004 and 0.6/nn in 2008). As no White Bass have been sampled since 2008, it is most likely that this species is no longer present in the reservoir. No additional effort will be extended beyond what is used to monitor for Channel and Blue Catfish.

Survey objectives, fisheries metrics, and sampling objectives

Catfishes: The 2016 (5.0/nn – Channel Catfish; 14.6/nn – Blue Catfish) and 2018 (6.2/nn – Channel Catfish; 13.0/nn – Blue Catfish) CPUEs indicate fishable populations; however, if reservoir levels continue to decline this population may decline as well. Also, historically all sampled fish have been 25 inches or smaller. Anecdotal evidence indicates that there is very little “active” angler preference for catfish species. During 2022 and 2024, five gill nets will be used to monitor for any large-scale changes in catfish populations. Options for developing and conducting an online creel survey to get a better idea of angler use and preference for the reservoir will be evaluated during the 2020-2024 survey period.

Largemouth Bass: Trend data collected with night electrofishing in the fall will allow for general monitoring of any large-scale changes in the Largemouth Bass populations that may spur further investigation. Analysis of recent surveys indicates that it would require a minimum of 17 electrofishing sites to achieve a CPUE-S $RSE \leq 25$ for Largemouth Bass. Effort for size structure estimation (PSD; 50 stock size fish minimum with 80% confidence) would require a minimum of 21 random electrofishing stations. For 2021 and 2023 twelve 5-min electrofishing sites will be randomly sampled to monitor for general trend data. In both the 2021 and the 2023 surveys Category 2 age and growth analysis will be conducted on otoliths from 13 Largemouth Bass between 330 and 381 mm. If 13 appropriately sized bass have not been collected within the 12 random stations, biologist selected locations will be targeted until the required number of fish are collected. See Table 7 for proposed sampling schedule.

White Crappie: Analysis of past sampling indicates that it would require a minimum of 95 trap net stations to achieve a CPUE-S $RSE \leq 25$. Effort for size structure estimation (PSD; 50 fish minimum with 80% confidence) would require 18 random trap net stations. Anecdotal evidence suggests that J.B. Thomas Reservoir has supported a small White Crappie fishery. White Crappie will be monitored on a quadrennial basis with 10 trap nets during the 2023 survey. Trap net stations will be randomly selected. See Table 7 for proposed sampling schedule.

Forage Species: Bluegill and Gizzard Shad are the primary forage species at J.B. Thomas Reservoir. Sampling, as per black bass above, will allow for general monitoring of large-scale changes and improvement of relative abundance, size structure, and IOV data for forage species. No additional effort will be extended beyond what is used for black bass sampling.

Literature Cited

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- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.
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Tables and Figures

Water Level

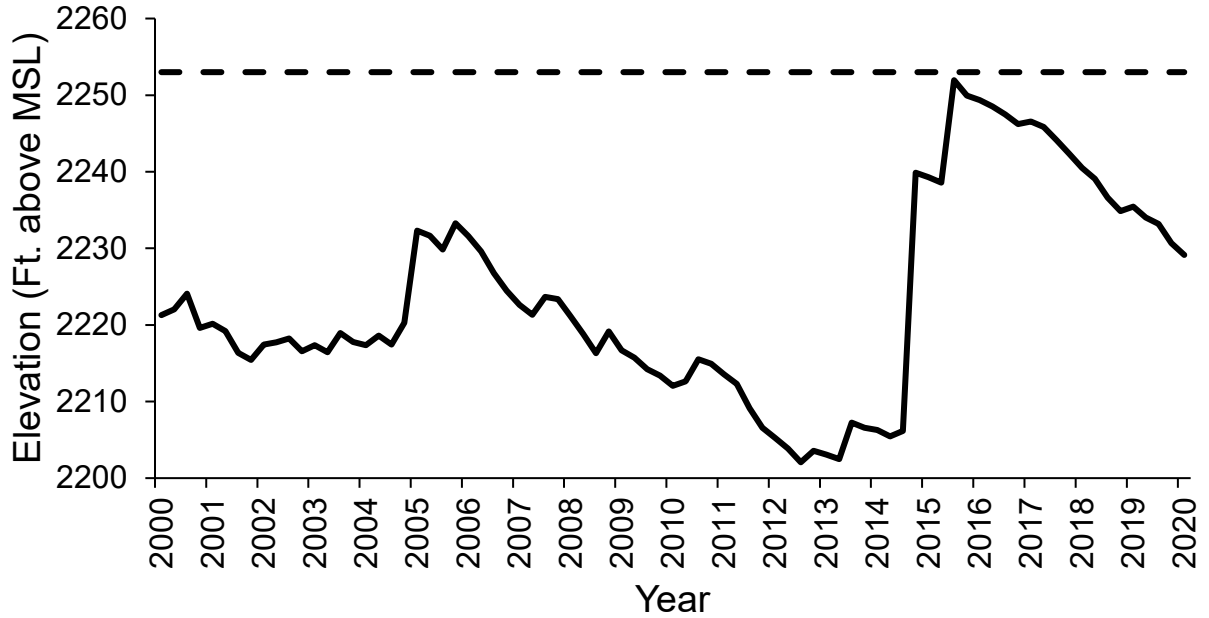


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for J.B. Thomas Reservoir, Texas. Conservation pool elevation at 2,253 feet MSL is represented by the dashed line.

Table 1. Characteristics of J.B. Thomas Reservoir, Texas.

Characteristic	Description
Year constructed	1952
Controlling authority	Colorado River Municipal Water District
County	Scurry
Reservoir type	Mainstem
Shoreline Development Index	4.38
Conductivity	593 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristic for J.B. Thomas Reservoir, Texas, August 2019 Reservoir elevation at time of survey was 2,250 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Southside Park	32.57572 - 101.14299	Y	10	Unknown	Out of water. Extension not feasible.
Low Water Ramp ^a	32.57572 -101.14299	Y	10	Unknown	Single lane ramp, Usable.
White Island Park	32.57501 -101.16809	Y	0	Unknown	Out of water. Extension not feasible.
Bull Creek Park	32.59515 -101.17079	Y	5	Unknown	Out of water. Extension not feasible.

^a The Low Water Ramp is located within Southside Park and shares the same parking lot as the Southside Park Ramp.

Table 3. Harvest regulations for J.B. Thomas 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	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4 Stocking history of J.B. Thomas Reservoir, Texas. FRY = fry; FGL = fingerling; and UNK = unknown.

Species	Year	Number	Size
Bluegill	2016	64,086	FGL
Blue Catfish	1980	32,928	UNK
	2015	233,989	FGL
	Total	266,917	
Channel Catfish	2015	242,388	FGL
Florida Largemouth Bass	1980	70,088	FGL
	1999	151,019	FGL
	2004	194,986	FGL
	2015	78,828	FGL
	2016	9,559	FGL
	2018	61,450	FGL
Total		565,930	
Largemouth Bass	1965	20,000	UNK
	1966	220,000	UNK
	1968	88,000	UNK
	1970	40,510	UNK
	1976	15,000	UNK
	Total		383,510
Walleye	1969	500,000	FRY
	1970	1,350,000	FRY
	1972	600,000	FRY
	1973	300,000	FRY
	Total		2,750,000

Table 4. Objective-based sampling plan components for J. B. Thomas Reservoir, Texas 2019 – 2020.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Exploratory	CPUE	Presence/Absence
Bluegill ^a	Exploratory	CPUE	Presence/Absence
Gizzard Shad ^a	Exploratory	CPUE	Presence/Absence
<i>Trap netting</i>			
Crappie	Exploratory	CPUE	Presence/Absence
<i>Gill netting</i>			
Blue Catfish	Exploratory	CPUE	Presence/Absence
Channel Catfish	Exploratory	CPUE	Presence/Absence

^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 5. Survey of structural habitat types, J. B. Thomas Reservoir, Texas, August 2019. Shoreline habitat type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural	33.6 miles	91.3
Rocky	3.2 miles	8.7
Standing timber	268.3 acres	8.1

Gizzard Shad

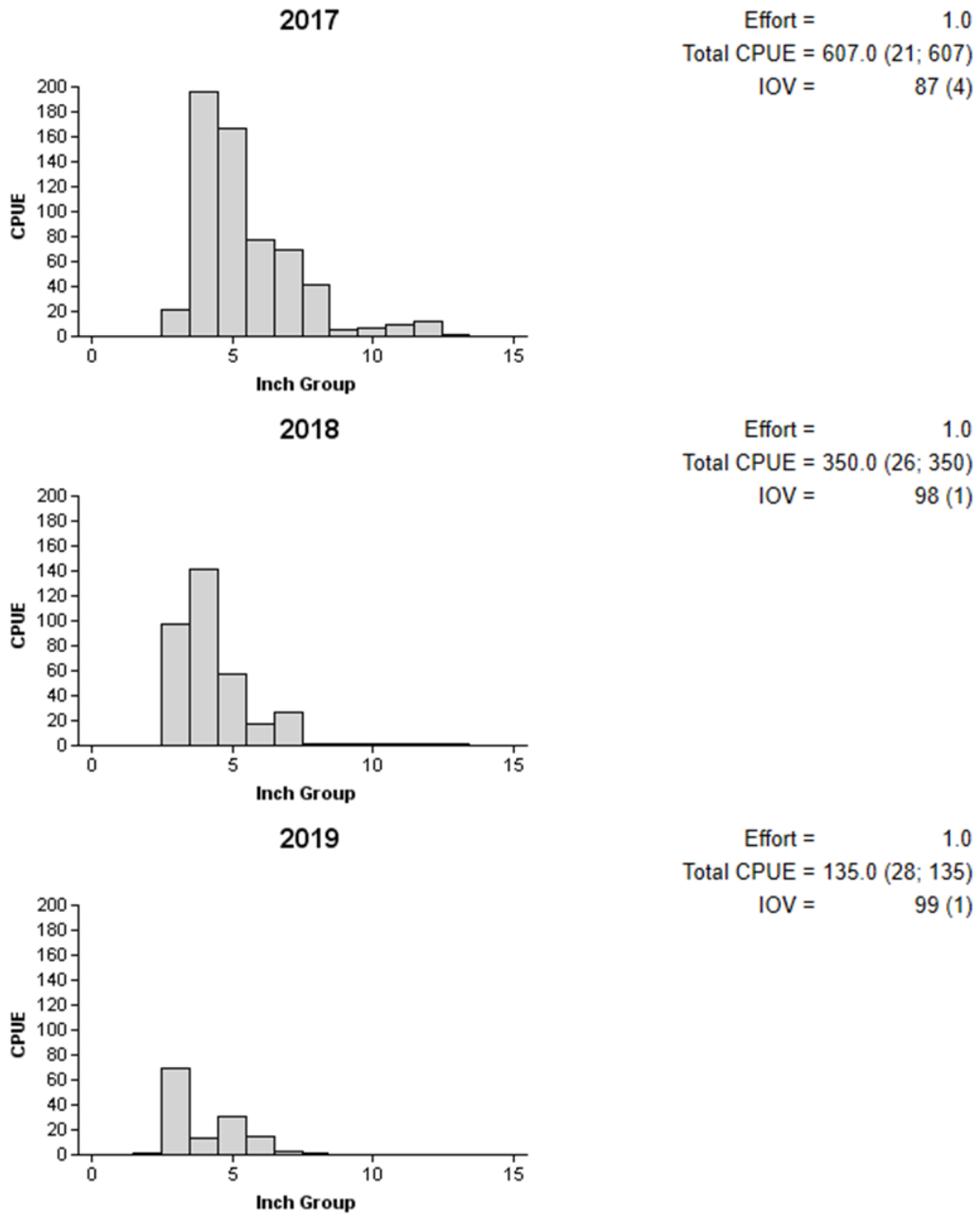


Figure 2. Number of Gizzard Shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, J.B. Thomas Reservoir, Texas, 2017, 2018 and 2019.

Bluegill

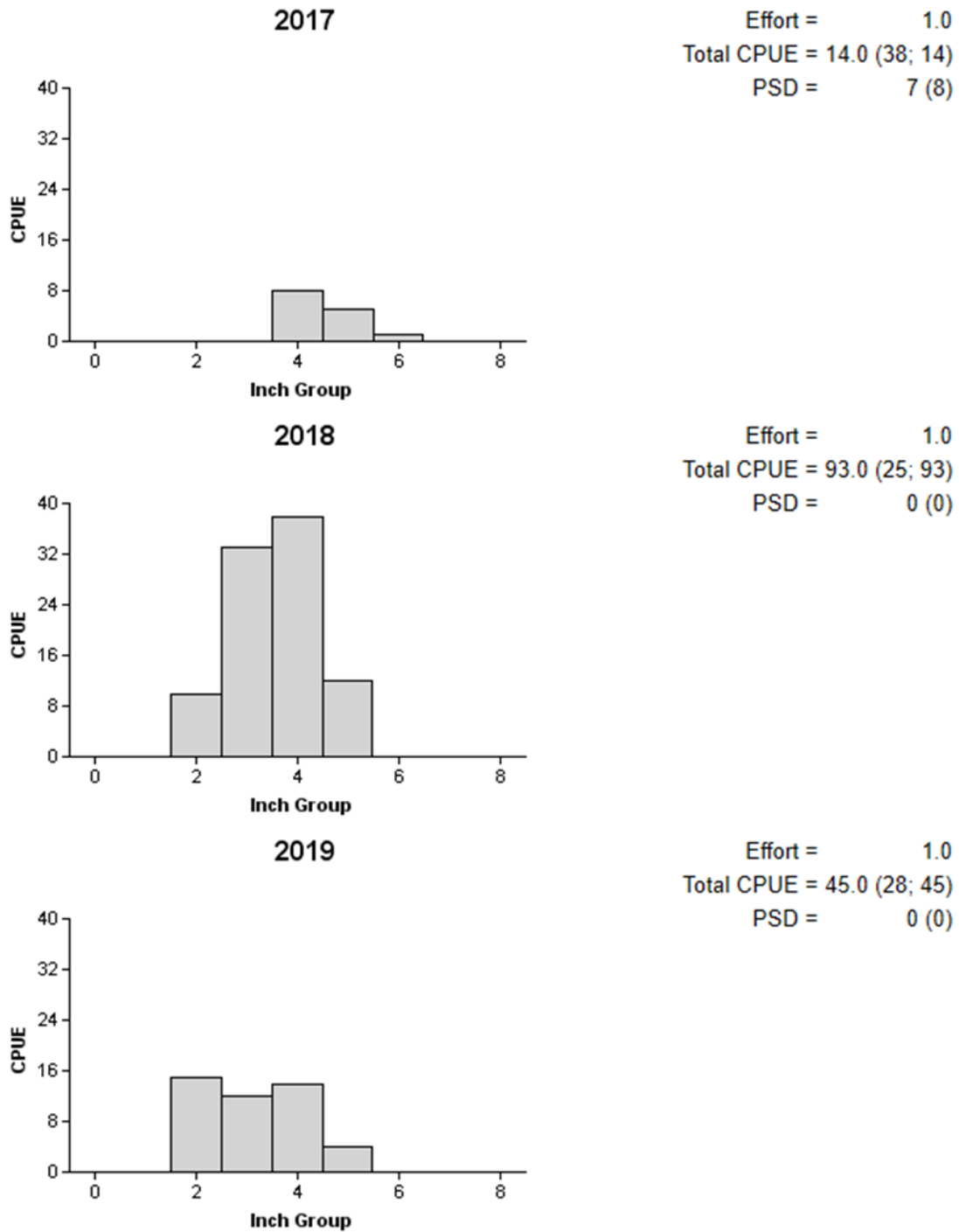


Figure 3. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, J.B. Thomas Reservoir, Texas, 2017, 2018, and 2019.

Blue Catfish

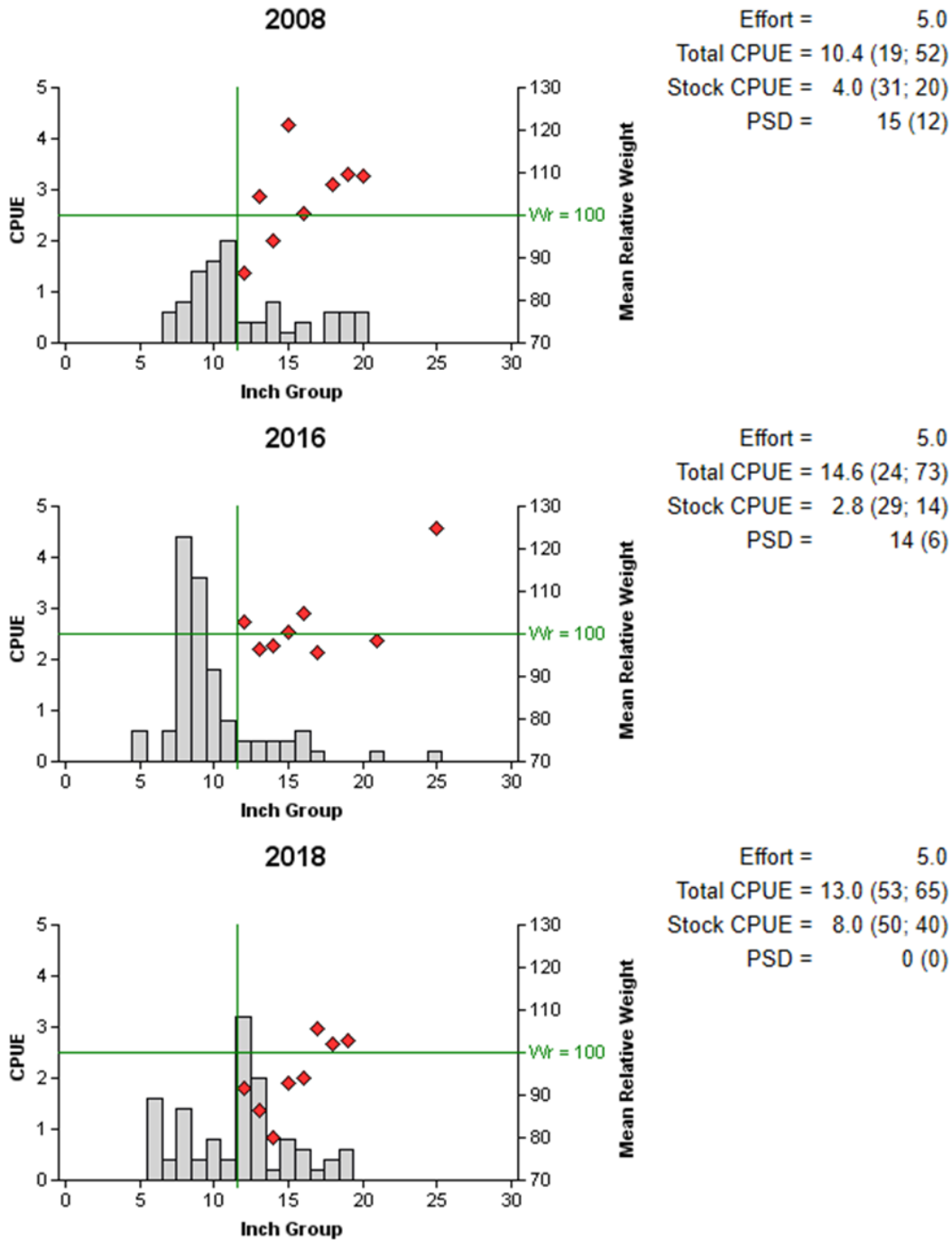


Figure 4 Number of Blue Catfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, J.B. Thomas Reservoir, Texas, 2008, 2016, and 2018. Vertical line indicates minimum length limit and horizontal line represents mean relative weight of 100.

Channel Catfish

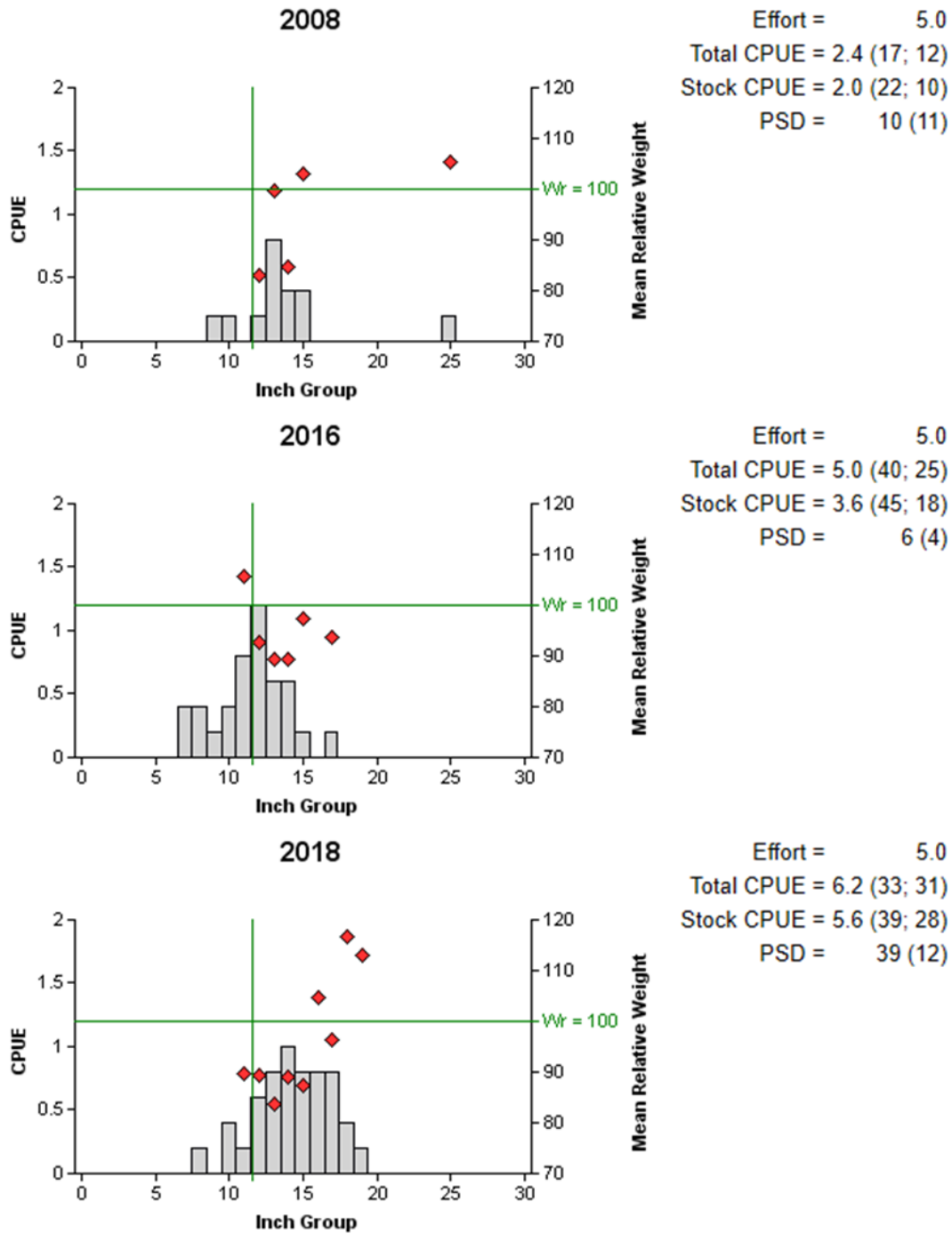


Figure 5. Number of Channel Catfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, J.B. Thomas Reservoir, Texas, 2008, 2016, and 2018. Vertical line indicates minimum length limit and horizontal line represents mean relative weight of 100.

Largemouth Bass

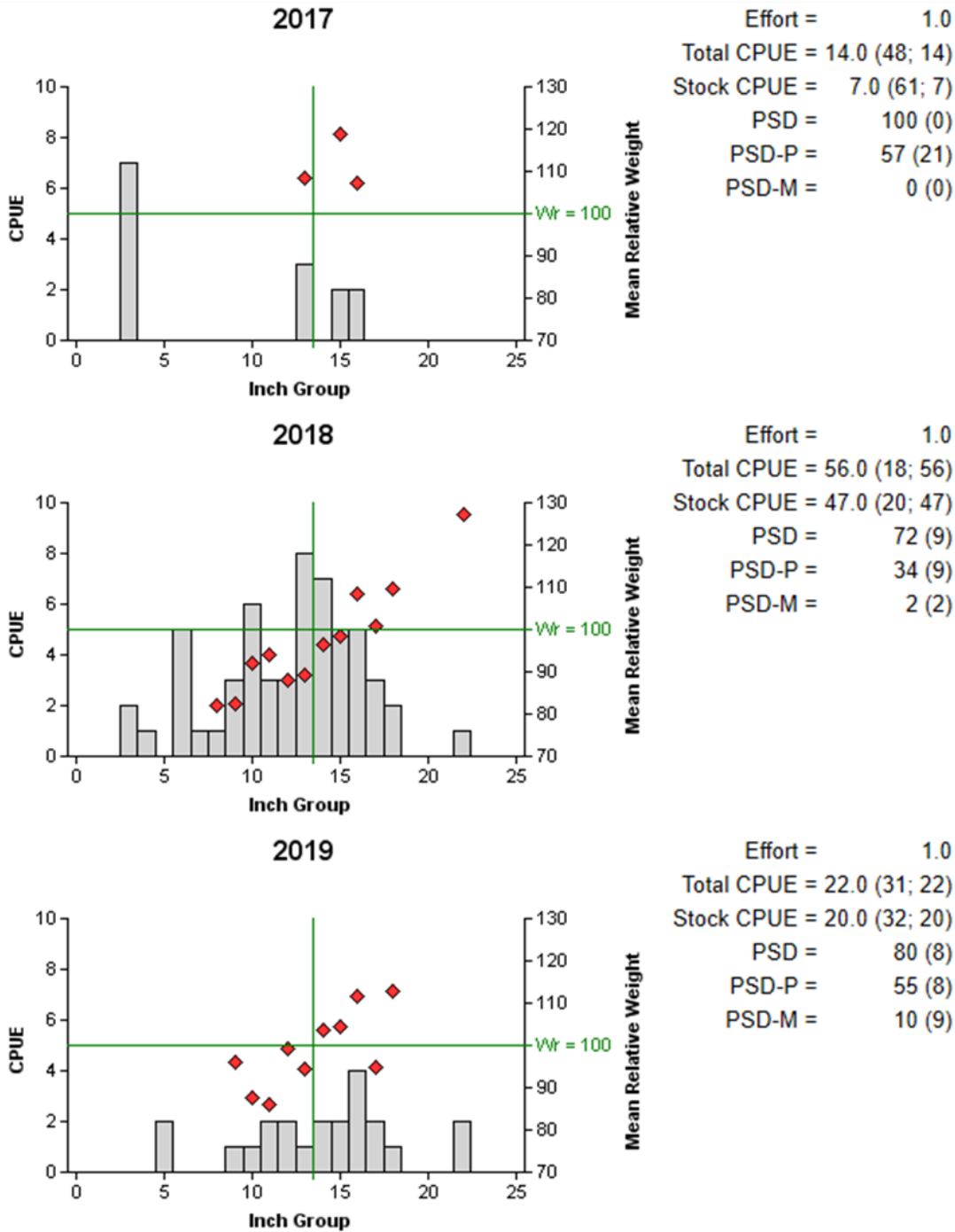


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, J.B. Thomas Reservoir, Texas, 2017, 2018, and 2019. Vertical line indicates minimum length limit and horizontal line represents mean relative weight of 100.

White Crappie

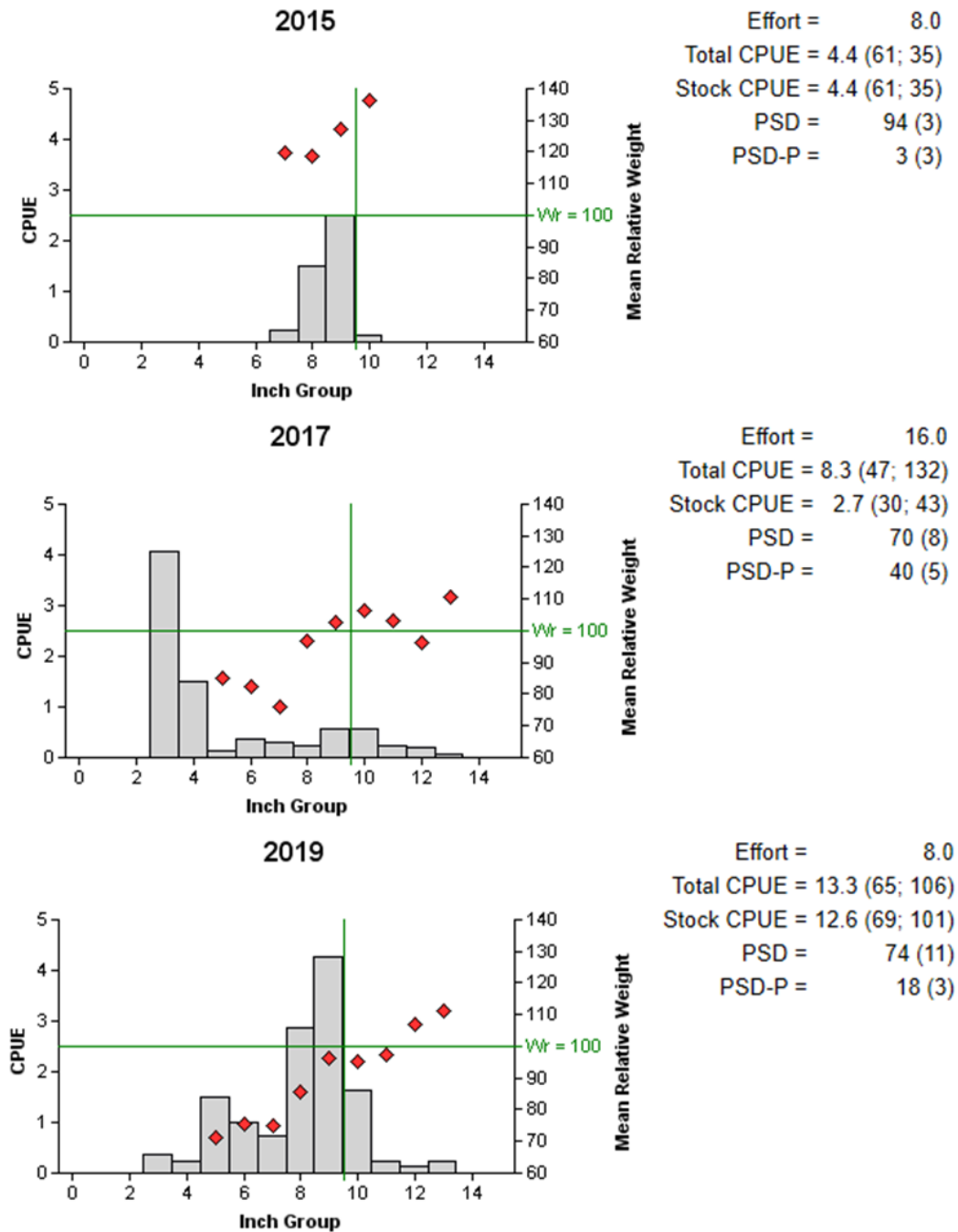


Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds, and population indices (RSE and N for CPUE and SE for size structure and in parentheses for fall trap netting surveys, J.B. Thomas Reservoir, Texas, 2015, 2017, 2019. Vertical line indicates minimum length limit and horizontal line represents mean relative weight of 100.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for J.B. Thomas 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

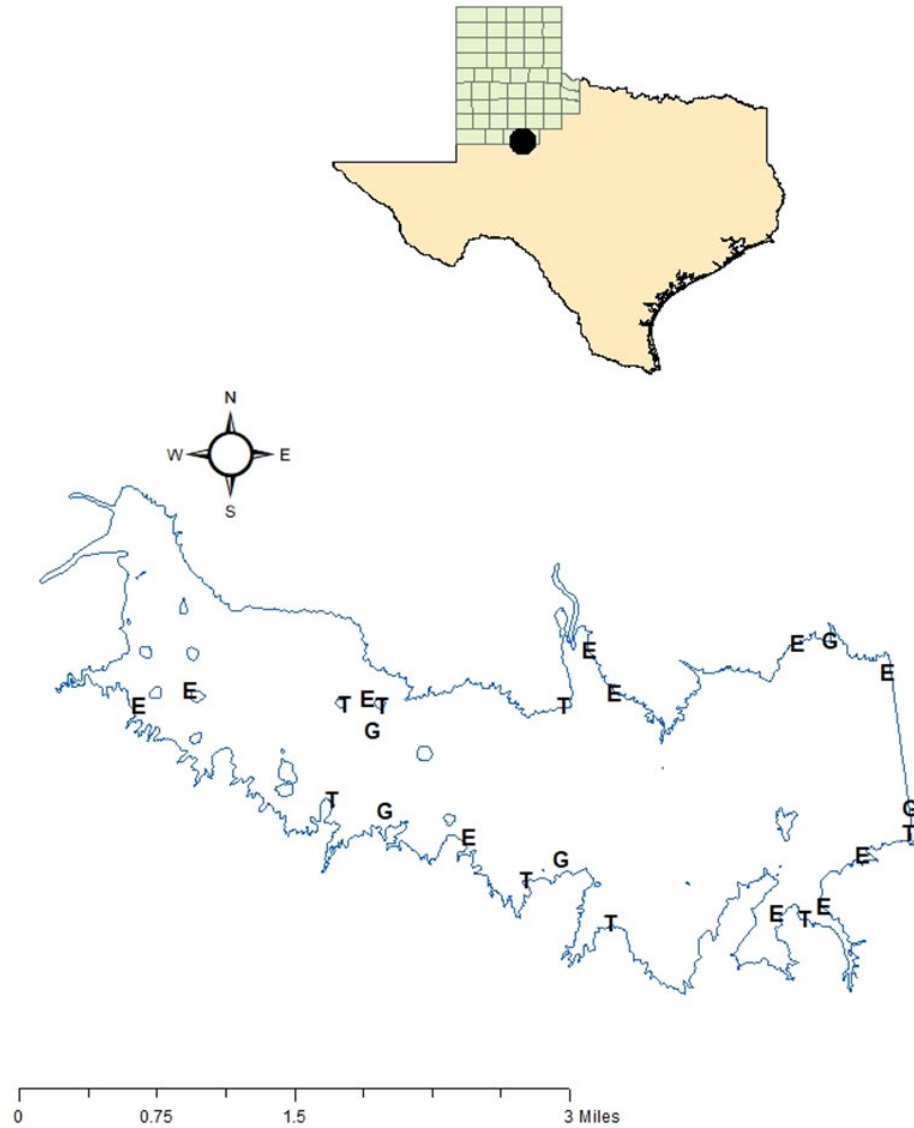
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Structural Habitat				S
Vegetation				S
Electrofishing – Fall		A		S
Trap netting				S
Gill netting		A		S
Creel survey				
Report				S

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

Number (N) and catch rate (CPUE) of all species collected from electrofishing from J.B. Thomas Reservoir, Texas, 2018-2019. Gill net data is from 2018, and trap net and electrofishing data are from 2019. Sampling effort was 5 net nights for gill netting, 8 net nights for trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	93	18.60	2	0.25	350	350.00
Common Carp	18	3.60			20	20.00
River Carpsucker	33	6.60	1	0.13		
Blue Catfish	65	13.00				
Channel Catfish	31	6.20			30	30.00
Flathead Catfish	6	1.20			1	1.00
Green Sunfish					6	6.00
Bluegill	2	0.40	2	0.25	93	93.00
Longear Sunfish			2	0.25	20	20.00
Largemouth Bass	87	17.40			56	56.00
White Crappie	34	6.80	106	13.25	7	7.00
Freshwater Drum	2	0.40			12	12.00

APPENDIX B – Map of sampling locations



Location of sampling sites, J.B. Thomas Reservoir, Texas, 2018-2019. Trap net, gill net, and electrofishing stations are indicated T, G, and E respectively. Water level was approximately 29.7 feet below conservation pool at time of sampling



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