

# Hords Creek Reservoir

## 2021 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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## Survey and Management Summary

Fish populations in Hords Creek Reservoir were surveyed in 2021 by using tandem hoop nets, electrofishing, and trap nets. Historical data are presented with the 2021 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:** Hords Creek Reservoir is a 510-acre impoundment constructed in 1948 on Hords Creek in the Colorado River Basin. The reservoir is in Coleman County approximately 55 miles south of Abilene and is owned and operated by the United States Army Corps of Engineers (USACE). Primary water uses included flood control and recreation. Hords Creek Reservoir has experienced long periods of drought broken by occasional heavy precipitation events. In 2015, the reservoir refilled, but water level has declined to nearly 12 feet below conservation pool elevation by June 2022. Habitat consisted of riprap, flooded terrestrial vegetation, and aquatic and semi-aquatic vegetation. Boater access consisted of three useable ramps. Bank fishing access was ample throughout the USACE park areas, and there were two handicap-accessible fishing piers.

**Management History:** Sport fish include Largemouth Bass, Channel Catfish, Flathead Catfish, and White and Black Crappie. Electrofishing was conducted to monitor trends in relative abundance and size structure for Largemouth Bass and forage fish. Hoop netting was conducted to monitor trends in relative abundance, size structure, and body conditions of Channel Catfish. Trap netting was conducted to monitor trends in relative abundance, size structure, and body conditions of White Crappie. Sport fishes have been managed with statewide size and bag limits.

### Fish Community

- **Prey species:** Forage was abundant and consisted primarily of Gizzard Shad, Bluegill, and Green Sunfish. Other sunfishes were also available. Gizzard shad catch rates increased. More than half of the Gizzard Shad sampled were desirable prey lengths and available to most sport fish. Bluegill catch rates have fluctuated, but they have increased since the prior survey. Consistent with prior surveys, most Bluegill were small and of vulnerable length to most sport fish.
- **Catfishes:** Channel Catfish and Flathead Catfish were present. Channel Catfish were caught effectively with tandem hoop nets, but precision was poor and the sample size was too small to evaluate size structure confidently. Body conditions for most represented inch groups were poor to fair.
- **Largemouth Bass:** Largemouth Bass catch rates were similar to prior surveys surveys, and the relative abundance of legally harvestable fish was similar to the prior 2017 survey. Body conditions were fair to optimal, which suggested that prey availability was not an issue.  
**Crappie:** Black and White Crappie were both present, though White Crappie are more dominant. Total catch rates of White Crappie varied among the last three surveys, but relative abundance improved slightly since the 2017 survey. Relative abundance of legally harvestable White Crappie increased, and body conditions of most represented inch groups were optimal. Size structure in the 2017 and 2021 surveys were dominated by larger individuals. Black crappie catch increased since the last two surveys.

**Management Strategies:** Electrofishing will be conducted in fall 2025 to monitor prey species and Largemouth Bass. Trap netting will be conducted in fall 2025 to monitor White and Black Crappie. Access and vegetation surveys will be conducted in summer 2025. Discuss, identify, and develop potential collaborative efforts for habitat enhancement projects. Media outlets, social media, and popular press will be used to inform the public of the threat and detriments of invasive species.

## Introduction

This document is a summary of fisheries data collected from Hords Creek Reservoir in 2018-2022. 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 2018-2022 data for comparison.

## Reservoir Description

Hords Creek Reservoir is a 510-acre impoundment constructed in 1948 on Hords Creek in the Colorado River Basin. The reservoir is in Coleman County approximately 55 miles south of Abilene and is owned and operated by the United States Army Corps of Engineers (USACE). Primary water uses included flood control and recreation. Hords Creek Reservoir has experienced long periods of drought broken by occasional heavy precipitation events. In 2016, the reservoir refilled, but water level has declined to nearly 12 ft. below conservation pool elevation by June 2022 (Figure 1). Other descriptive characteristics for Hords Creek Reservoir are in Table 1.

## Angler Access

Access to the reservoir is controlled by the USACE at for-fee entry points. The COVID-19 pandemic and water level fluctuations resulted in only some ramps being open. Bank anglers had plenty of fishing access within the USACE grounds. Two handicap-accessible piers were also available. Additional boat ramp characteristics are presented in Table 2.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Goldstrohm and Homer 2018) included:

1. Map salt cedar coverage as well as discuss threats of this invasive species and possible control solutions with the USACE and TPWD invasive species experts.

**Actions:** Salt cedar within the lakebed and along the shoreline was surveyed in conjunction with other plants during the summer 2021 vegetation survey. Discussions about salt cedar at Hords Creek occurred on multiple occasions throughout the monitoring period, and USACE has used chemical control to reduce coverage of it.

2. Collaborate with stakeholders on potential habitat enhancement efforts such as artificial habitat structure deployments and native vegetation plantings.

**Actions:** Following the 2017 habitat enhancement project, the water level has been declining, which has resulted in the exposure of the artificial structures previously placed as well as the plant cages installed were out of water. The plant cages have since been removed, and many structures have been moved into deeper water. Because of the rapidly declining water level, no additional projects for habitat enhancements have been conducted.

3. Educate the public about the threats of invasive species.

**Action:** Press releases were distributed to local and statewide media. Updated signage was posted at Hords Creek Reservoir boat ramps to notify users of the potential threats of invasive species. Other information about invasive species was made available at the USACE gatehouse.

**Harvest regulation history:** Sport fishes have been managed with statewide harvest regulations. The Channel Catfish regulation was changed to no minimum length limit with no more than 10  $\geq$  20 inches (Table 3).

**Stocking history:** Unsuccessful stocking of Smallmouth Bass and Lake Chubsuckers occurred in the 1980s. Threadfin Shad were introduced in 1984. Florida Largemouth Bass were introduced in 1986 and were last stocked in 2016 and 2017. Channel Catfish were stocked in 2017 and 2019. The complete stocking history is displayed in Table 4.

**Vegetation/habitat management history:** Artificial habitat structures were deployed among four locations in the reservoir during 2014. In 2017, founder colonies of 9 aquatic plant species were planted in two coves at Hords Creek Reservoir as part of a collaborative habitat enhancement project with USACE Lewisville Aquatic Ecosystem Research Facility (Dodd et al. 2017). Artificial habitat structures were also deployed near these areas as part of the project.

**Water transfer:** No interbasin transfers are known to exist. City of Coleman has a pipeline that can be operated to pump water from Hords Creek to Coleman Reservoir.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Hords Creek Reservoir (Goldstrohm and Homer 2018)). 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. A sample of 16 Largemouth Bass at 13.0-14.9 inches TL were retained for age estimation.

**Trap netting** – Black and White Crappie were collected by using trap nets (10 net nights at 10 stations). Catch per unit effort for trap netting was recorded as the number of fish caught per net night (fish/nn). A sample of 11 Black Crappie and 15 White Crappie at 9.0-10.9 inches TL were retained and aged.

**Tandem hoop nets** – Channel Catfish were collected by deploying 5 tandem hoop net series at 8 stations. Nets were baited with soap and deployed for two-night soak durations. Catch per unit effort for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series).

**Genetics** – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Micro-satellite DNA analysis was used to determine genetic composition of individual fish.

**Statistics** – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight ( $W_r$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE.

**Habitat** – Vegetation was surveyed by circumnavigating the reservoir and use of 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 2022).

## Results and Discussion

**Habitat:** In 2021, 42 acres of flooded terrestrial vegetation were documented, and isolated locations containing cattails and timber totaling < 1acre were also found (Table 6; Figure 2). Historically, submersed

vegetation including waterstargrass has been relatively abundant, but it was not found in the 2021 survey likely due to low water level.

**Prey species:** The prey base primarily consisted of Gizzard Shad, Bluegill, and Green Sunfish. Other prey species including Redbreast Sunfish, Redear Sunfish, Longear Sunfish, and Warmouth were also caught (see APPENDIX A). Catch rate of Gizzard Shad increased from 287.0/h in 2015 to 322.0/h in 2017 to 376.0/h in 2021 (Figure 3). The IOV improved from 53 in 2017 to 67 in 2021, indicating that over half of the Gizzard Shad were of suitable prey size for sport fishes. Bluegill catch rates have fluctuated from 558.0/h in 2015 to 54.0/h in 2017 to 171.0/h in 2021 (Figure 4). The size structure of Bluegill has been represented by individuals 2-5 inches, and PSD has been consistently low and ranging from 0-4. Overall, cumulative prey catch rates appear similar to prior surveys, and prey do not appear to be deficient in Hords Creek Reservoir (see APPENDIX C).

**Channel Catfish:** Channel Catfish were sampled with an exploratory tandem hoop net survey in summer 2021, and were caught at a rate of 8.0/tandem series (Figure 5). Stock CPUE was 4.6/ tandem series. Fish ranged from 7-21 inches, and PSD was 13 and suggested that most individuals were below quality length and small. Mean relative weights of Channel Catfish ranged from poor to fair, and a trend of somewhat decreasing body conditions in relation to increased length were observed. Channel Catfish were stocked in 2017 and 2019 following increases in water level, though fish produced by natural recruitment may have had increased competition with stocked fish. Thus, undesirable relative weights may have resulted from too many Channel Catfish being present.

**Largemouth Bass:** Electrofishing catch rates for Largemouth Bass were similar between 2015-2021 and ranged from 116-125/h (Figure 6). Catch rates of stock-size Largemouth Bass ( $\geq 8$  inches) increased from 28.0/h in 2015 to 98.0/h in 2017 and slightly decreased to 86.0/h in 2021. Catch rates of legally harvestable Largemouth Bass increased from 6.0/h in 2015 to 15.0/h in 2017 to 19.0/h in 2021. Largemouth Bass PSD fluctuated from 57 in 2015 and 29 in 2017 to 55 in 2021. Shifts in the size structure may be attributed to fluctuations in water level and habitat availability and their effects on recruitment. Mean relative weights for legal-size fish were fair to optimal for most represented inch groups. Florida Largemouth Bass allele frequencies ranged from 39.7-64.0% from 2015 to 2021 (Table 7). In 2021, one pure Florida Largemouth Bass and no pure Northern Largemouth Bass were represented in the sample. Sixteen Largemouth Bass that were aged had a mean age of 3.4 years at approximately 14 inches, and fish in the sample ranged from 2-5 years old (see APPENDIX D).

**Crappie:** Trap netting catch rates for White Crappie declined from 124.5/nn in 2013 to 4.2/nn in 2017 and slightly increased to 10.8/nn in 2021 (Figure 7). Catch of White Crappie  $\geq$  stock length (i.e.  $\geq 5$  inches) also fluctuated from 14.8/nn in 2013 to 4.2/nn in 2017 to 10.5/nn in 2021. Catch rates for legally harvestable fish (i.e.  $\geq 10$  inches) increased from 1.1/nn in 2017 to 8.4/nn in 2021 (see APPENDIX E). From 2013 – 2021, size structure of White Crappie shifted from high representation of small fish to greater representation of larger fish. Specifically, PSDs increased from 14 in 2013 to 92 in 2021. Mean relative weights were variable but were optimal for most inch groups. Black Crappie were also present and caught at a rate of 3.1/nn in the 2021 trap netting survey, which was greater than the previous two surveys (Figure 8). Black Crappie catch rates were substantially lower than those for White Crappie, and total sample sizes among the three prior surveys were too low to effectively evaluate size structure. Overall, both White and Black Crappie catch rates have fluctuated, though CPUE-10 for both species combined was greater than the previous two surveys (see APPENDIX F). Mean age at approximate legal length was 2.0 years for Black Crappie and 2.5 years for White Crappie (see APPENDIX G).

# Fisheries Management Plan for Hords Creek Reservoir, Texas

Prepared – July 2022

**ISSUE 1:** Hords Creek experiences extreme droughts and fluctuations in water level. During droughts, important vegetation and structural habitat is lost to Largemouth Bass and many of their preferred prey species. Habitat enhancements may aid in mitigating loss of important habitat during these periods.

## MANAGEMENT STRATEGY

1. Continue to explore potential habitat improvements with USACE and other partners.

**ISSUE 2:** Largemouth Bass growth may be hindered by a bottleneck near legal length. Additional monitoring of Largemouth Bass growth may be necessary to see if stunting is occurring.

## MANAGEMENT STRATEGY

1. Conduct a Category III age sample in the fall 2025 electrofishing survey.

**ISSUE 3:** Channel Catfish body conditions were poor in prior surveys. Recent stockings in combination with declining water level may have resulted in higher rates of intraspecific competition, leading to poor body conditions and slow growth.

## MANAGEMENT STRATEGIES

1. Discontinue stockings of Channel Catfish until water level is at  $\geq 1894$  ft. above MSL. If water level conditions improve, stocking of fingerlings will only be conducted once during the cycle and at a reduced rate of 50/acre.

**ISSUE 4:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

## MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate USACE about invasive species threats, 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 (2022–2026)

Sport fishes, forage fishes, and other important fishes: Sport fishes present in Hords Creek Reservoir are Channel Catfish, Flathead Catfish, Largemouth Bass, and crappie. Important prey species include Gizzard Shad and Bluegill. See Table 8 for proposed sampling plan.

Low-density fisheries:

Channel Catfish: Channel Catfish are present in the reservoir and have been managed with statewide bag and length limits. Anecdotal evidence and a self-reported creel survey conducted from September 2014- August 2015 suggested that anglers seldom target catfishes. Gill netting and baited tandem hoop nets have yielded poor catches of Channel Catfish, and abundance is suspected to be low at the reservoir. Poor body conditions have also indicated that stocked individuals are facing poor conditions for adequate growth and recruitment.

Flathead Catfish: Flathead Catfish are present in the reservoir and have been managed with the statewide 18-inch MML and 5-fish daily bag limit. Based on a self-reporting creel survey, approximately 4% of anglers at Hords Creek Reservoir specifically target catfish. Since historic catch rates during gill nets have been low (catch rates in 2006-2014 ranged from 1.4/nn-1.6/nn, monitoring for Flathead Catfish will not be sampled by gill nets. Presence/absence for Flathead Catfish will be conducted during sampling efforts for other species.

Survey objectives, fisheries metrics, and sampling objectives:

**Prey Species:** Gizzard Shad and Bluegill are the primary prey species in Hords Creek Reservoir. The next electrofishing survey will be conducted in fall 2025 for 1.0 h at 12, 5-minute random stations. Target precision for CPUE-Total will be  $RSE \leq 25\%$  for both species. A sample of 50 Gizzard Shad will be collected for monitoring trends of size structure (length frequency) and to calculate Index of Vulnerability for assessing prey availability/size suitability for sport fishes. Size structure (i.e., PSD) will be determined for Bluegill by collecting 50 stock-size ( $\geq 3$  inch) fish. If desired precision for relative abundance estimates and/or sample sizes are not achieved, no additional sampling will be conducted unless additional electrofishing is needed to fulfill objectives set for Largemouth Bass. Largemouth Bass body condition will be used to infer prey availability and vulnerability to predation.

**Largemouth Bass:** Largemouth Bass have been managed with the statewide 14-inch MLL and 5-fish daily bag limit. Largemouth Bass are numerous in Hords Creek Reservoir and are an important fishery for anglers according to a self-reporting creel survey conducted in 2014-2015. Largemouth Bass were the most targeted species by anglers accounting for 46.1% of all directed fishing effort. Additionally, electrofishing catch rates have been consistent with CPUE-Total of  $\geq 116.0/h$  over the past 3 surveys. Mean growth to legal length of Largemouth Bass was approximately 3.4 years estimated from fish captured in the 2021 electrofishing survey. Furthermore, fish in the sample ranged from 2-5 years old. Presence of five-year old bass at 14 inches in the sample is concerning and may indicate a bottleneck at legal length could be occurring. Additional investigation into the growth of Largemouth Bass will be continued. To monitor Largemouth Bass, an electrofishing survey will be conducted during fall 2023 (bass-only) and fall 2025 for 1.0 h at 12, 5-minute random stations to monitor trends in relative abundance, size structure, and body conditions. A target precision of  $RSE \leq 25\%$  will be attempted for estimates of CPUE-Total and CPUE-Stock during sampling; CPUE-14 will be determined without any target precision. A target of 50 fish  $\geq$ stock length will be collected to assess size structure, and 5 fish per inch group  $\geq$ stock-size will be measured for length and weight to assess body condition. A Category III age sample will be conducted in the 2025 survey. If precision, size structure, or body condition objectives are not achieved, up to 0.5 h of additional sampling (6, 5-minute stations) may be added if deemed feasible.

**White Crappie:** White and Black Crappie are present and have been managed under the statewide 10-inch MLL and 25-fish daily bag limit. Historically, White Crappie have been more abundant than Black



Crappie in Hords Creek Reservoir, and both provide an important fishery for anglers according to a self-reporting creel survey conducted in 2014-2015. Approximately 12% of anglers targeted crappie, making them the third most sought after group behind Largemouth Bass and “anything.” Anglers also reported catching more crappie than any other species and harvesting them if they were legal length. Black Crappie catch rates nearly tripled in fall 2021, but relative abundance was still substantially less than White Crappie. Black Crappie contribute to the crappie fishery, and they will be monitored with trap net sampling in combination with White Crappie. Trap netting every four years with 10 trap nets has been adequate to detect large-scale changes in the fishery, and to sufficiently provide information to stakeholders on the fishery’s status. Trap nets will be deployed at 10 random stations in fall 2025 to monitor trends in relative abundance of both species combined. Sampling effort should be effective at obtaining optimal precision and sampling sizes for size structure and body conditions for White Crappie and both species combined based on past sampling. A target precision of  $RSE \leq 30$  will be attempted for estimates of CPUE-Total and stock CPUE. A target of 50 fish  $\geq$ stock-size will be collected to assess size structure, and  $\geq 5$  fish per inch group  $\geq$ stock-size will be measured for length and weight to assess body condition. Up to 5 additional trap nets will be set if objectives are not met.

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## Tables and Figures

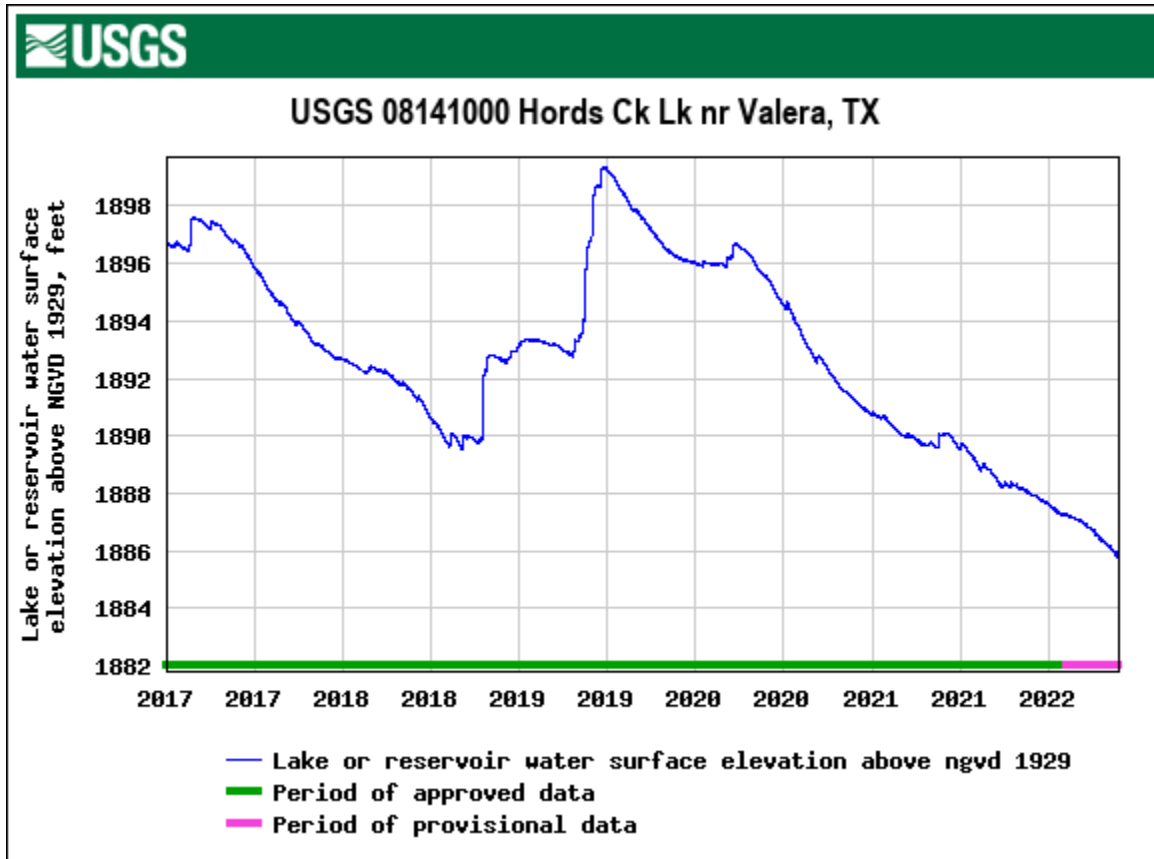


Figure 1. Mean daily water level elevations in feet above mean sea level (MSL) recorded for Hords Creek Reservoir, Texas, (USGS 2022).

Table 1. Characteristics of Hords Creek Reservoir, Texas.

Characteristic	Description
Year Constructed	1948
Controlling Authority	U.S. Army Corps of Engineers
County	Coleman
Conservation Pool	1,900 feet above mean sea level
Dead Pool	1,856 feet above mean sea level
Reservoir Type	Tributary
River Basin	Colorado (120901)
Sub-basin <sup>1</sup>	Jim Ned (12090108)
Watershed <sup>1</sup>	Lower Jim Ned Creek (1209010802)
Sub-watershed <sup>1</sup>	Upper Hords Creek (120901080201)
Shoreline Development Index	3.2
Conductivity	650 $\mu$ S/cm

<sup>1</sup>U.S. Geological Survey Hydrologic Unit Code

Table 2. Boat ramp characteristics for Hords Creek Reservoir, Texas, August, 2021 Reservoir elevation at time of survey was 1,895 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Dam	31.83105 -99.56121	Y	20	1,880	Good; Accessible
Flatrock Park	31.83337 -99.57103	Y	6	1,882	Good; Accessible
Lakeside Park	31.83815 -99.57719	Y	6	1,884	Good; Accessible

Table 3. Harvest regulations for Hords Creek Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	No minimum; no more than 10 ≥ 20 inches
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 Hords Creek Reservoir, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults.

Species	Year	Number	Size
Threadfin Shad	1984	1,070	ADL
Channel Catfish	1998	15,411	AFGL
	2017	91,784	FGL
	2019	53,992	FGL
	Total	161,187	
Smallmouth Bass	1984	20,000	FGL
	1985	19,800	FGL
	Total	39,800	FGL
Largemouth Bass	1970	115,000	UNK
Florida Largemouth Bass	1986	18,108	FRY
	1987	9,993	FGL
	1994	25,500	FGL
	1997	150,506	FGL
	2001	42,352	FGL
	2006	52,712	FGL
	2015	53,937	FGL
	2016	63,600	FGL
	2017	56,620	FGL
Total	455,220		
Lake Chubsucker	1981	19,200	ADL

Table 5. Objective-based sampling plan components for Hords Creek Reservoir, Texas 2018-2022.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Total, CPUE–Stock, CPUE–14	RSE≤25
	Size structure	PSD, length frequency	N≥50 stock
	Condition	$W_r$	5 fish/inch group (max)
	Genetics	% FLMB	N = 30, any age
	Age and Growth	Age at legal length	N=13, 13.0-14.9 inches
Bluegill <sup>a</sup>	Abundance	CPUE–Total	RSE≤25
	Size structure	PSD, length frequency	N ≥50 stock
Gizzard Shad <sup>a</sup>	Abundance	CPUE–Total	RSE≤25
	Size structure	Length frequency	N≥50
	Prey availability	IOV	N≥50
<i>Tandem hoop netting</i>			
Channel Catfish	Abundance	CPUE–Total and CPUE–Stock	Practical effort
	Size structure	PSD, Length frequency	Practical effort
	Body Condition	$W_r$	Practical effort
<i>Trap netting</i>			
Crappie	Abundance	CPUE–Total and CPUE–Stock	RSE≤25
	Size structure	PSD, length frequency	N≥50 stock
	Condition	$W_r$	5 fish/inch group (max)

<sup>a</sup> No additional effort was 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 provided information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Acres and percent coverage of vegetation types at Hords Creek Reservoir, Texas, August, 2021. Water level at time of the survey was approximately 8.5 feet below conservation pool.

Vegetation Type	Acreage	Percent Coverage
Flooded Terrestrial	42	20.9
Cattails	<1	<1.0
Stumps and Timber	<1	<1.0

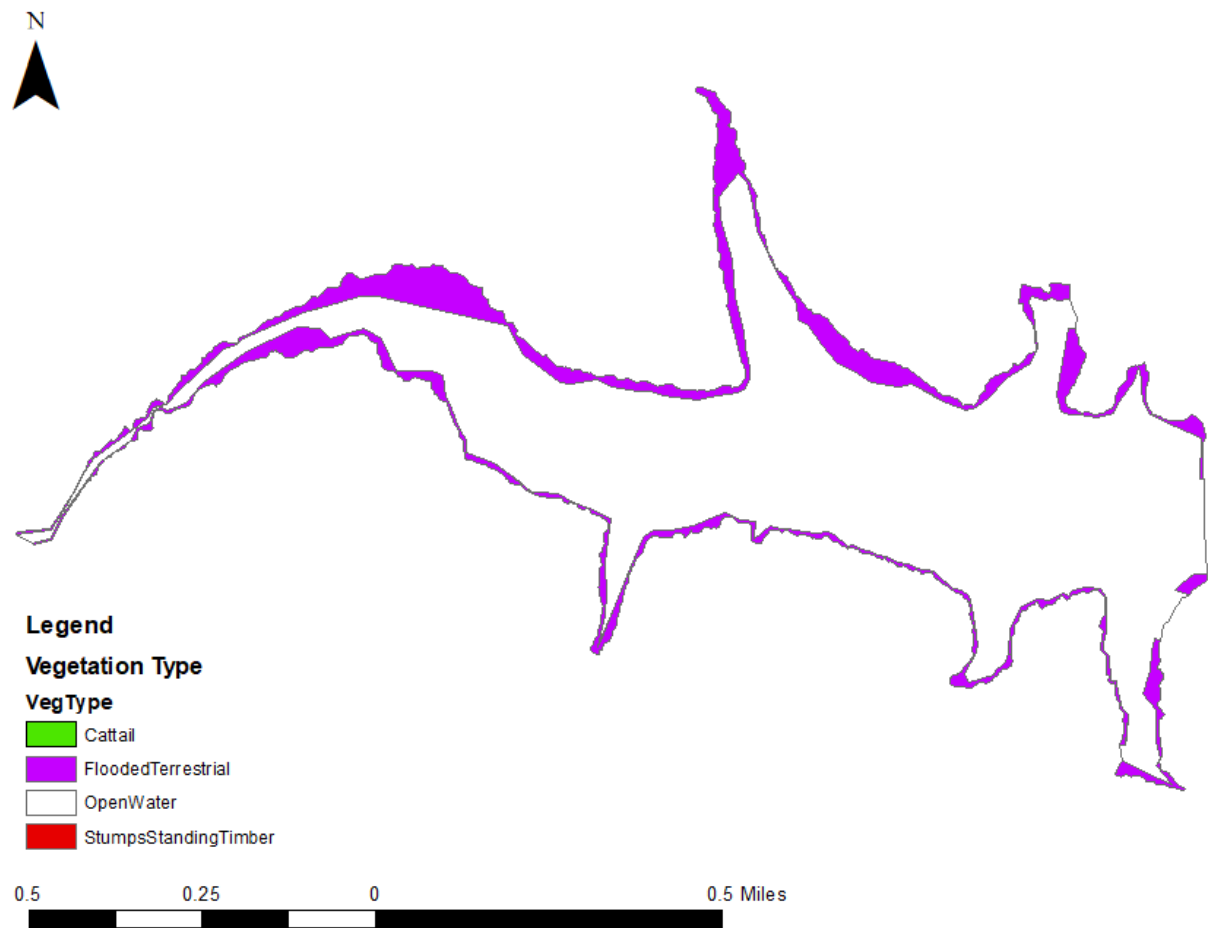


Figure 2. Map of vegetation types encountered at Hords Creek Reservoir, Texas, 2021. Water level at the time of the survey was about 8.5 feet below conservation pool elevation.



## Gizzard Shad

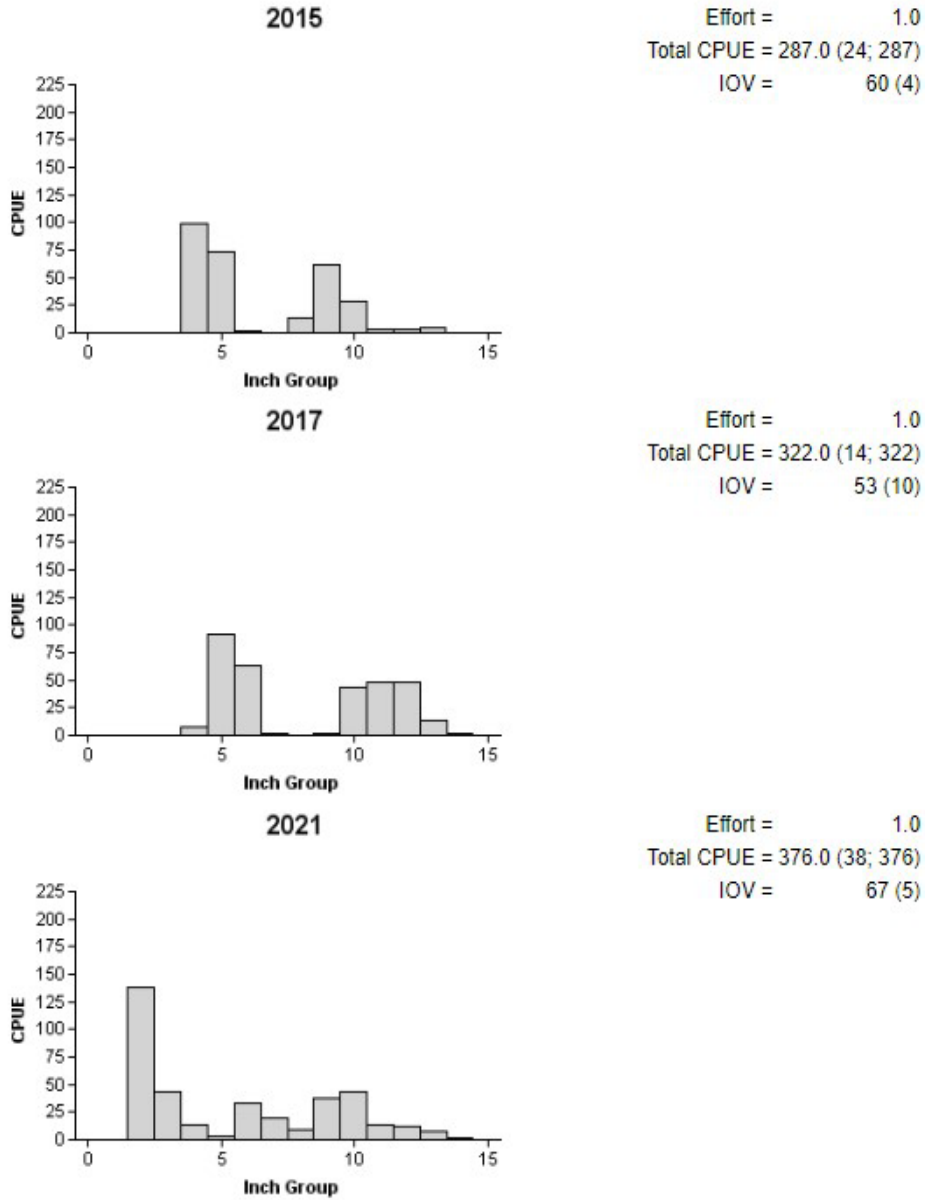


Figure 3. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2015, 2017, and 2021.

## Bluegill

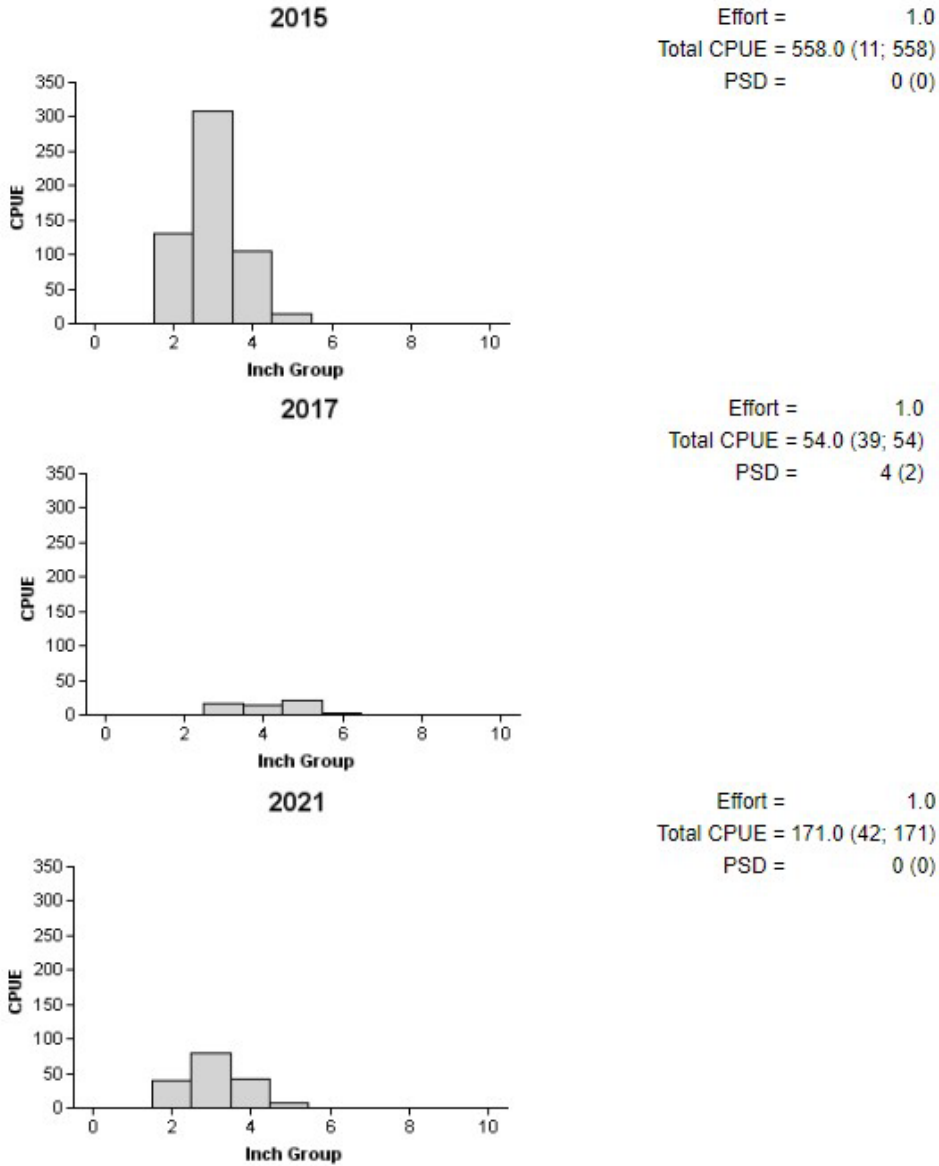


Figure 4. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2015, 2017, and 2021.

## Channel Catfish

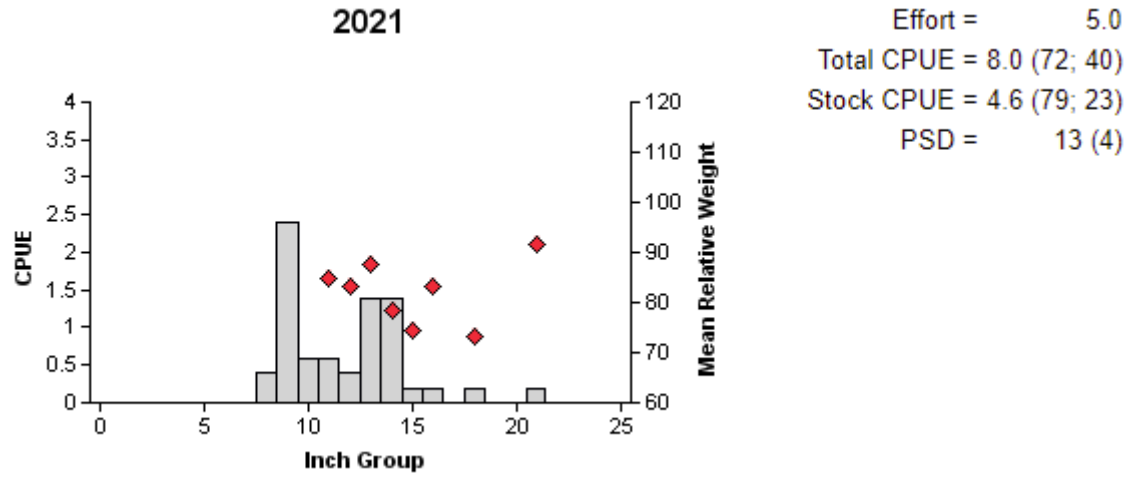


Figure 5. Number of Largemouth Bass caught per tandem series (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for a summer tandem hoop net survey, Hords Creek Reservoir, Texas, 2021.

## Largemouth Bass

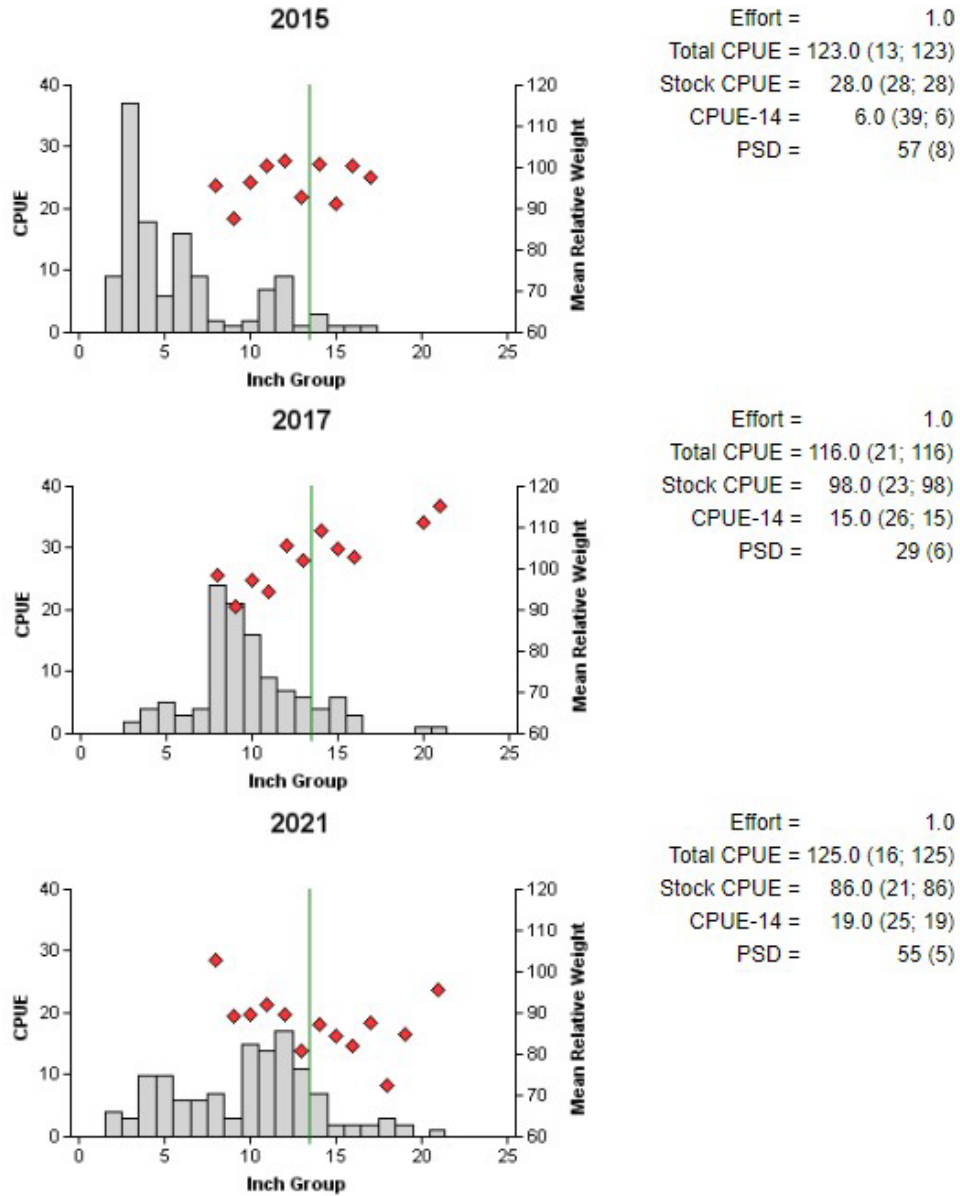


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2015, 2017, and 2021. Vertical line indicates minimum length limit.

## Largemouth Bass

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Hords Creek Reservoir, Texas, 1991 to present. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
1991	38	0	13	25	14.0	0.0
1995	28	4	19	5	46.4	14.3
1998	30	3	22	5	54.3	10.0
2003	33	3	26	4	48.4	9.1
2005	24	0	24	0	54.3	0.0
2015	30	0	28	2	39.7	0.0
2017	30	1	29	0	57.5	3.3
2021	30	1	29	0	64.0	3.3

## White Crappie

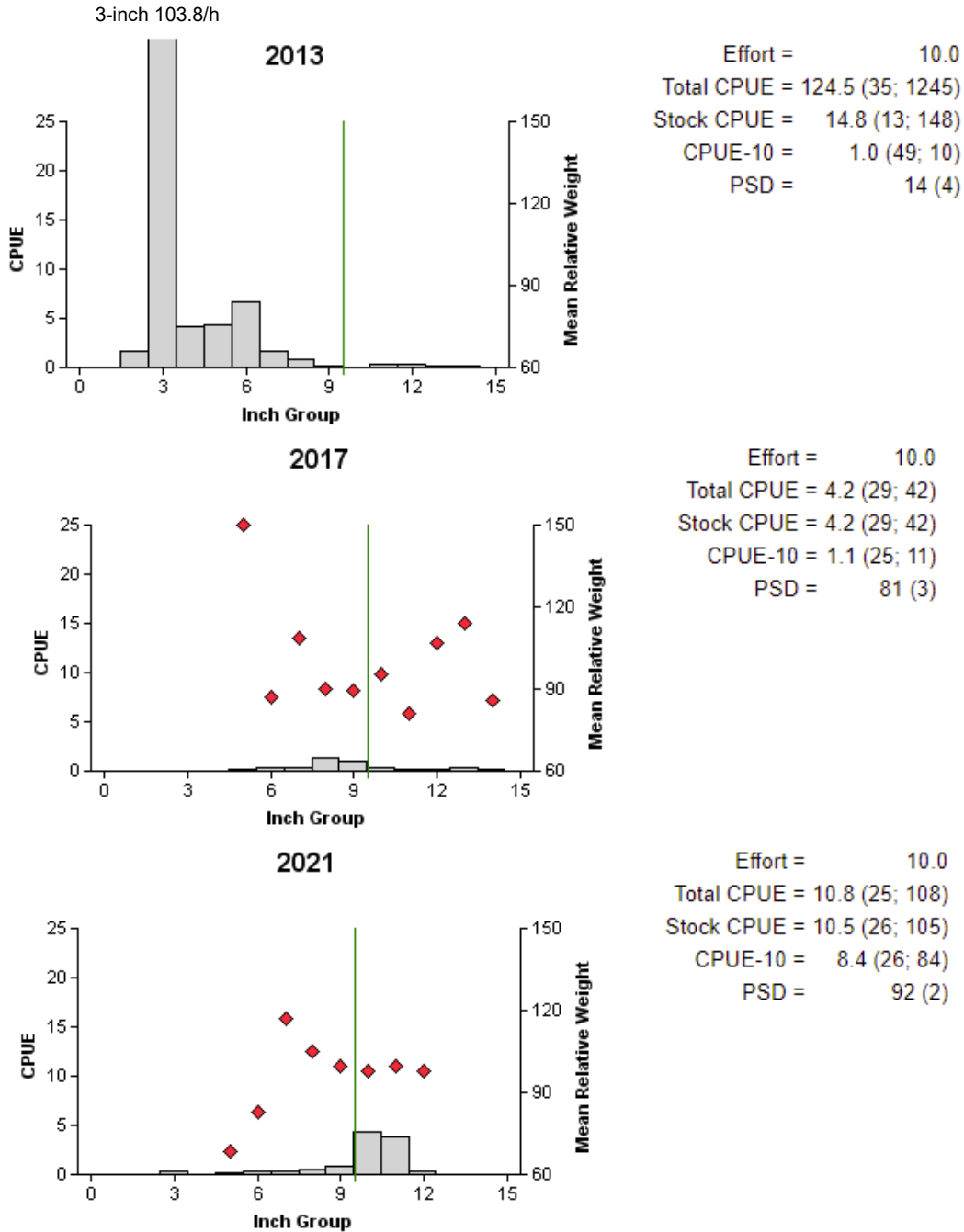


Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Hords Creek Reservoir, Texas, 2013, 2017, and 2021. Vertical line indicates minimum length limit.

## Black Crappie

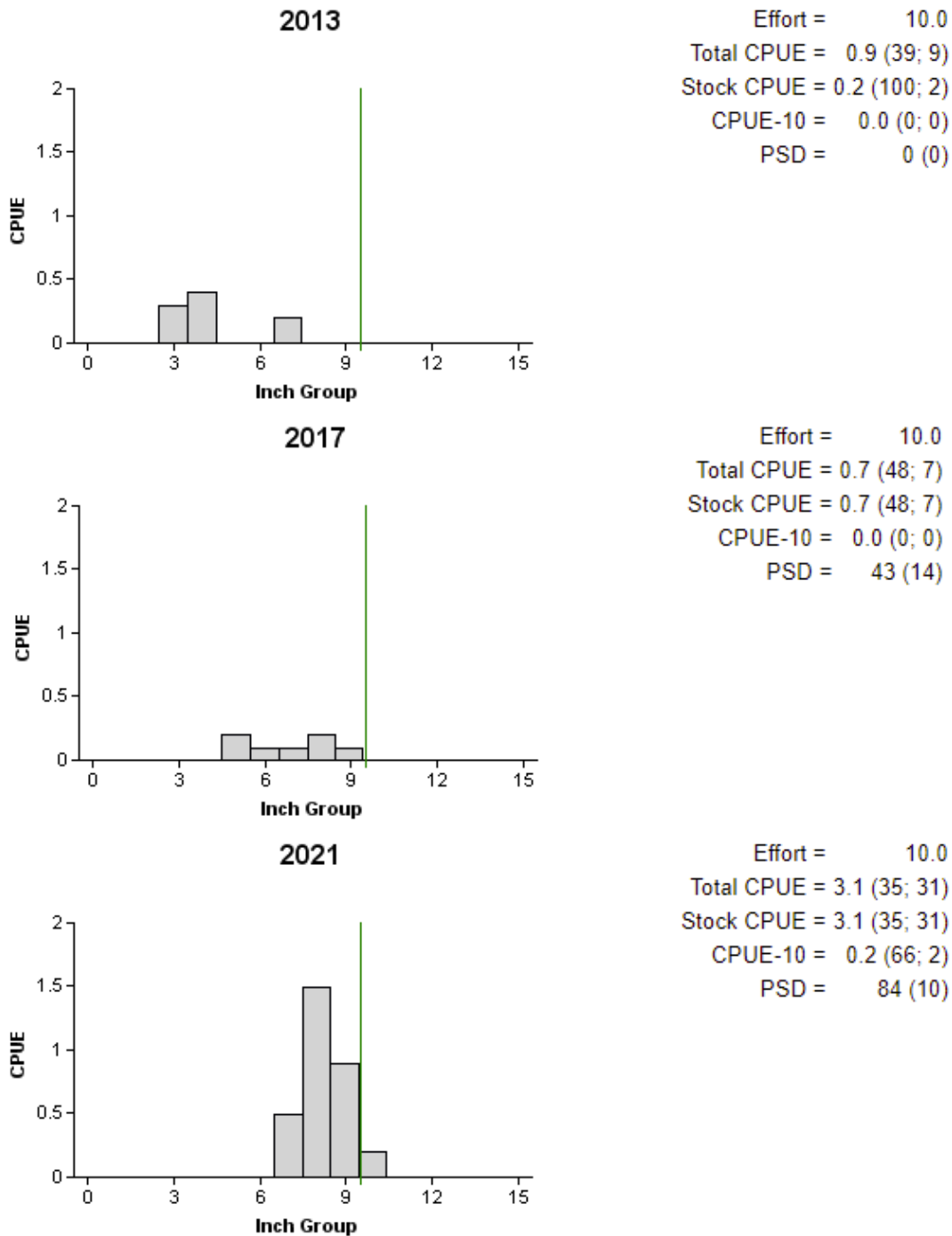


Figure 8. Number of Black Crappie caught per net night (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Hords Creek Reservoir, Texas, 2013, 2017, and 2021. Vertical line indicates minimum length limit.

## Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Hords Creek 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.

	Survey Year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler Access				S
Structural Habitat				
Vegetation				S
Electrofishing – Fall		S <sup>1</sup>		S
Electrofishing – Spring				
Electrofishing – Low Frequency				
Trap Netting				S
Gill Netting				
Baited Tandem Hoop Netting				
Creel Survey				
Report				S

<sup>1</sup>Bass-only survey

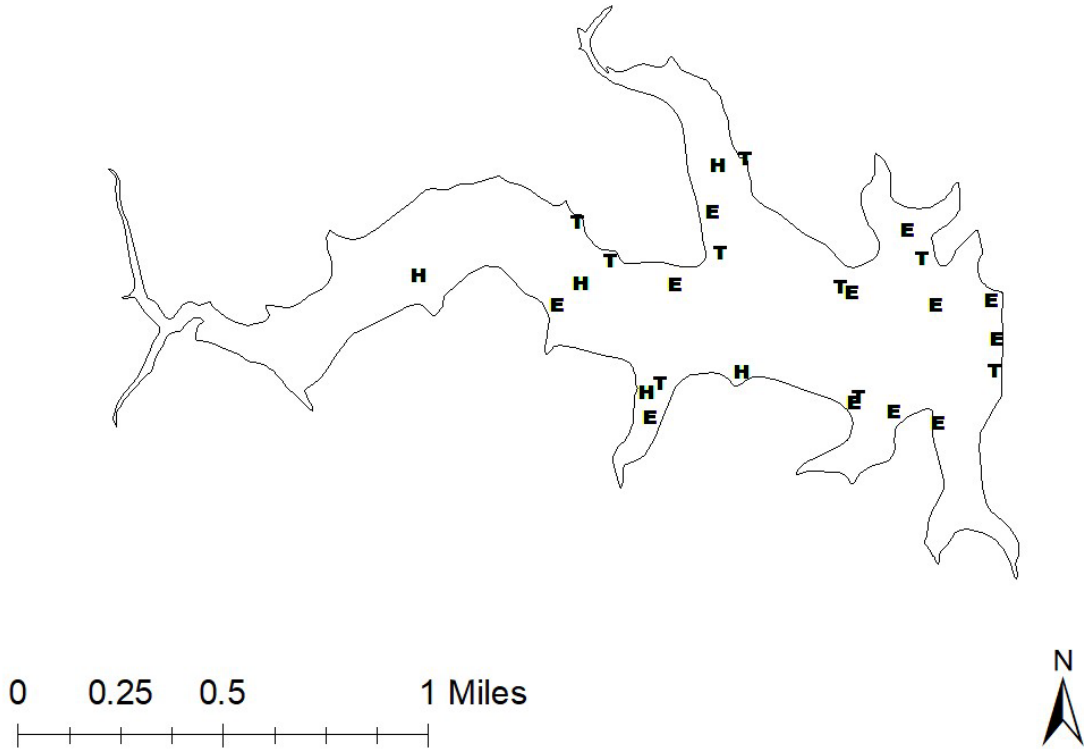


## APPENDIX A – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Hords Creek Reservoir, Texas, 2021. Sampling effort was 5 net nights for tandem hoop netting, 10 net nights for trap netting, and 1.0 hour for electrofishing.

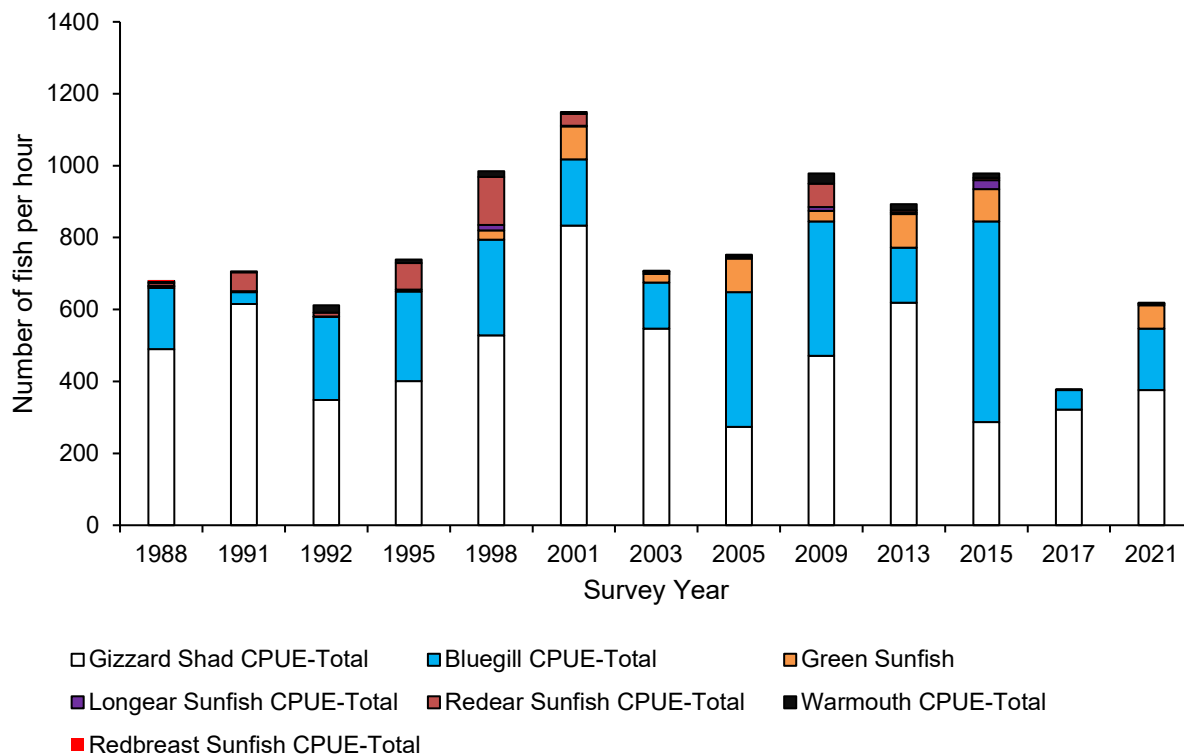
Species	Hoop Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					376	376.0 (38)
Channel Catfish	40	8.0 (72)				
Redbreast Sunfish					9	9.0 (37)
Green Sunfish					65	65.0 (66)
Warmouth					3	3.0 (72)
Bluegill	36	7.2 (54)			171	171.0 (42)
Longear Sunfish	1	0.2 (100)			3	3.0 (100)
Redear Sunfish					1	1.0 (100)
Largemouth Bass					125	125.0 (16)
White Crappie	23	4.6 (63)	108	10.8 (25)		
Black Crappie	15	3.0 (38)	31	3.1 (35)		

## APPENDIX B – Map of sampling locations



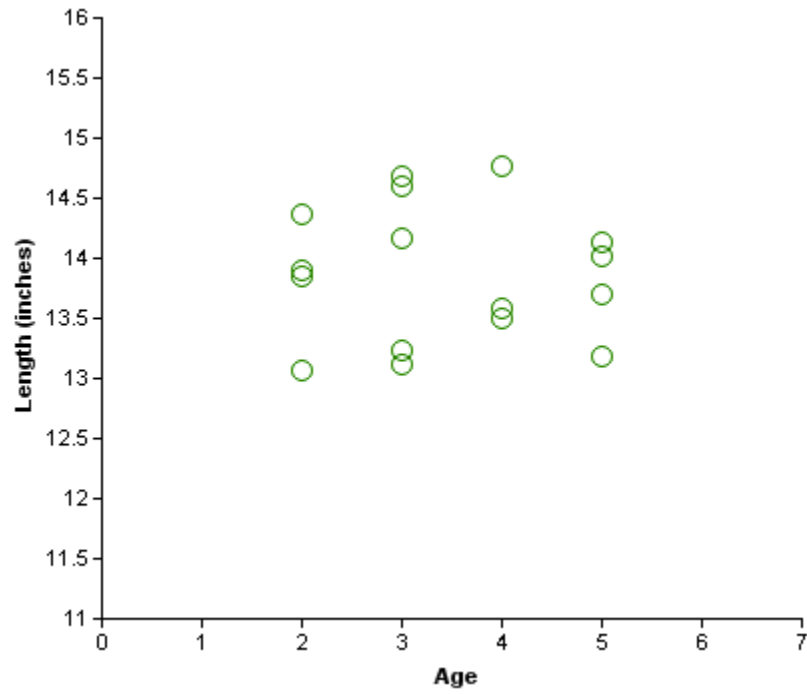
Location of Tandem hoop net (H), electrofishing (E), and trap net stations (T), Hords Creek Reservoir, Texas, 2021. Water level at the time of sampling was between 8-9 ft. below conservation pool elevation.

## APPENDIX C – Catch rates of common prey species in fall electrofishing surveys



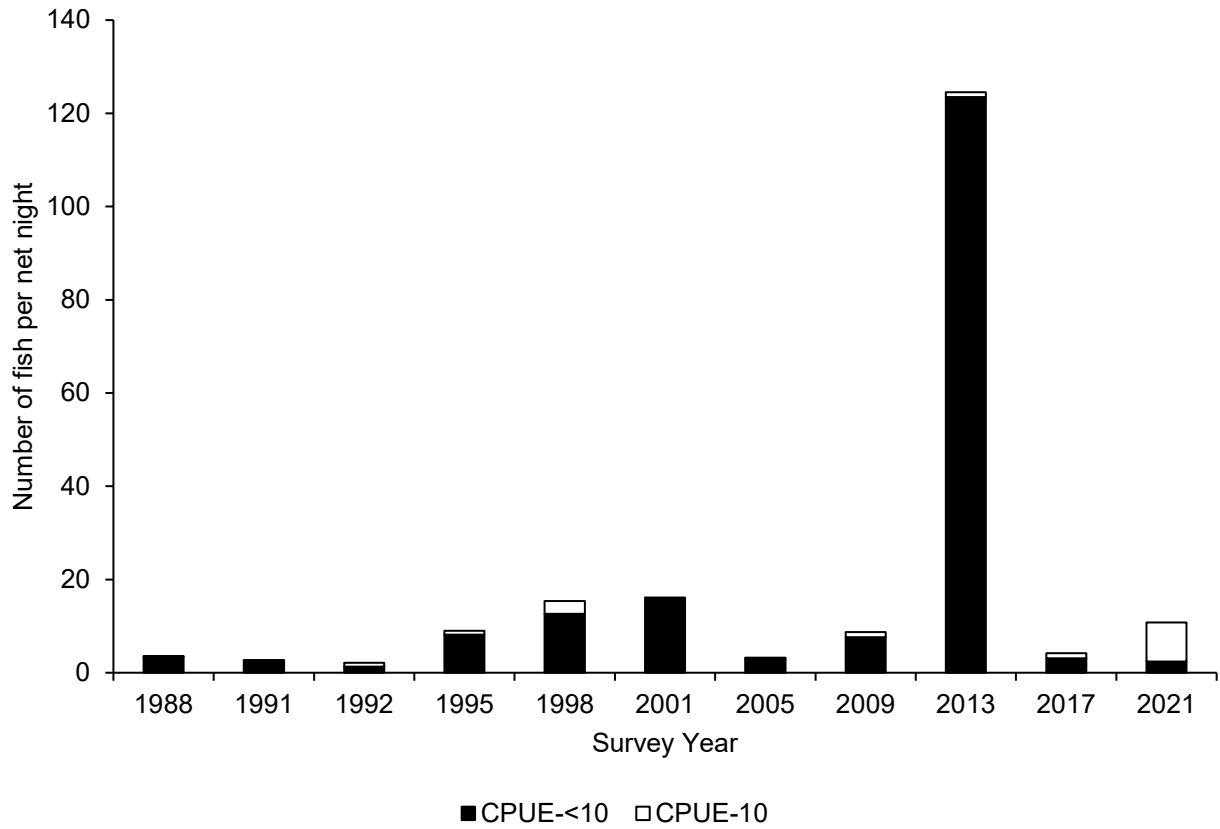
Catch rates of common prey species caught during fall electrofishing surveys conducted from 1988 – 2021, Hords Creek Reservoir, Texas.

## APPENDIX D – Length at age of Largemouth Bass



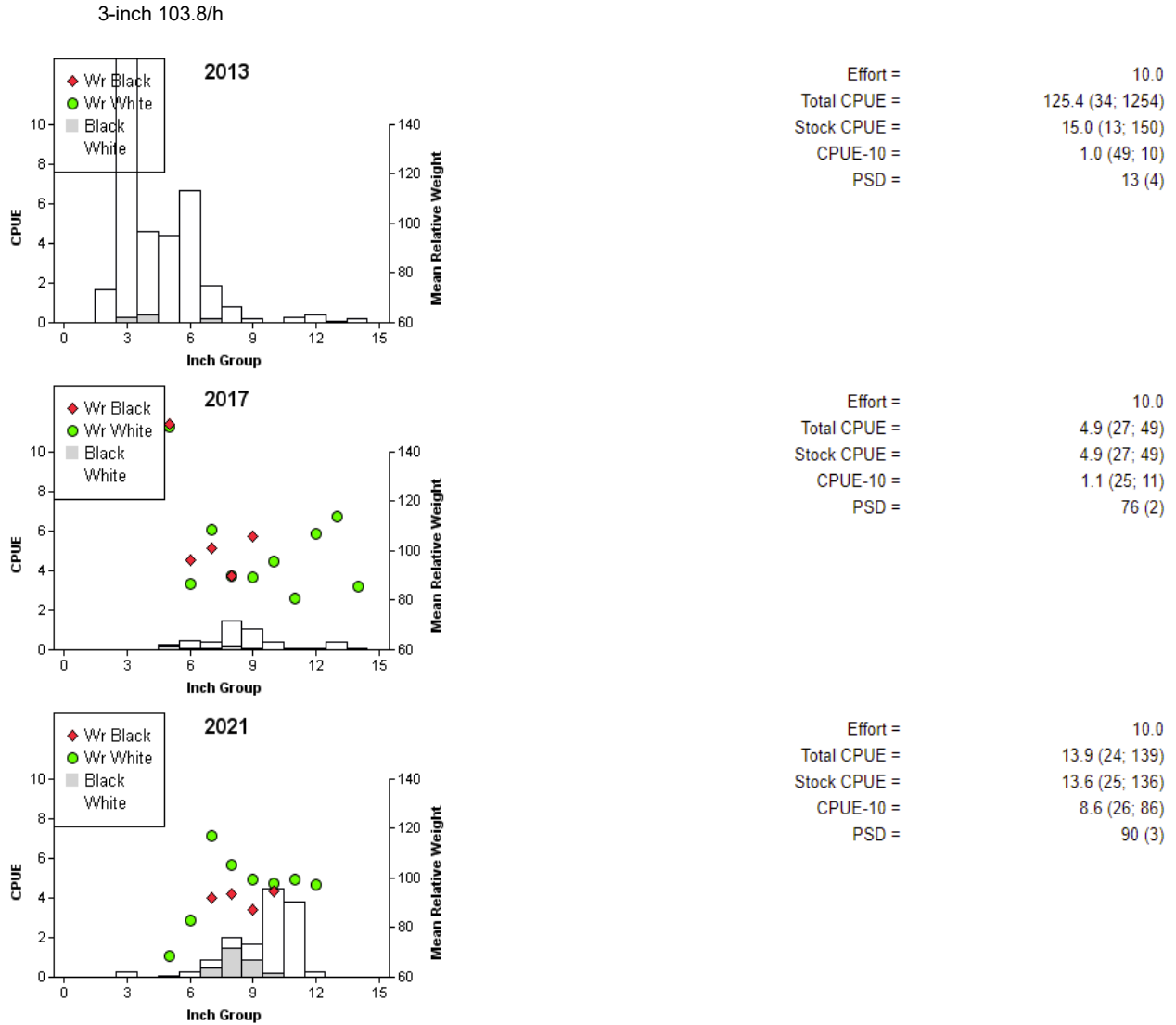
Lengths at age for 16 Largemouth Bass collected during the fall 2021 electrofishing survey at Hords Creek Reservoir, Texas. Mean age at approximately 14 inches was 3.4 years.

## APPENDIX E – Catch of legal and sub-legal length White Crappie in fall trap net surveys



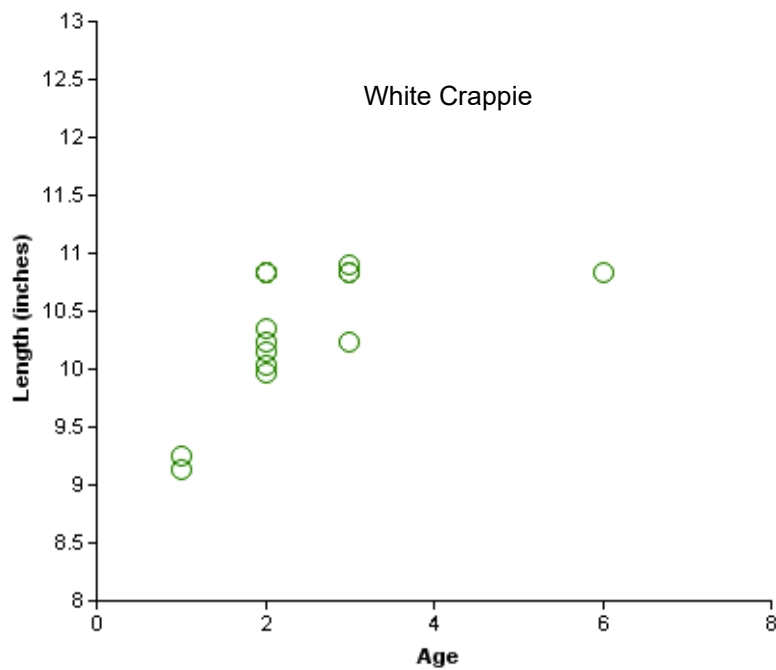
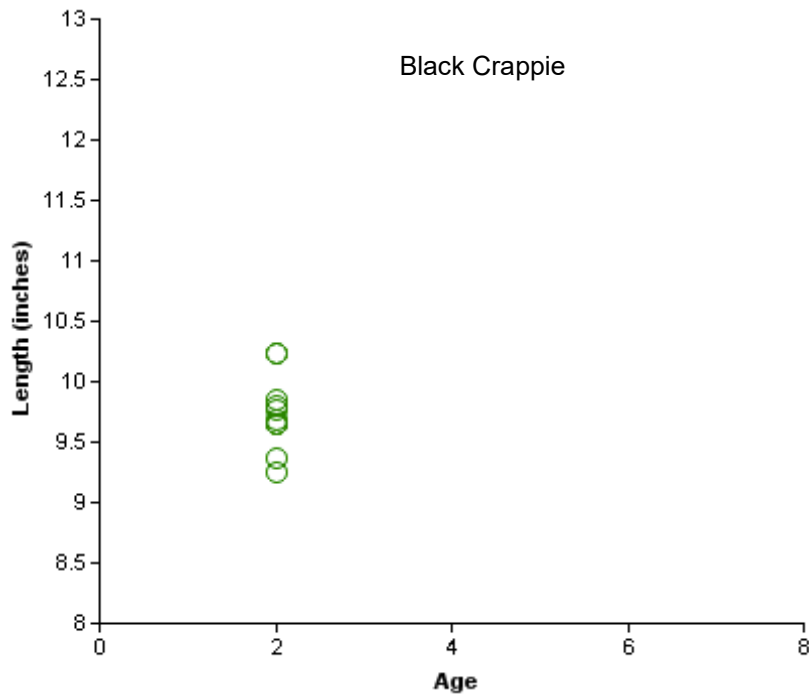
Catch per net night of legal (CPUE $\geq$ 10; white) and sublegal (CPUE<10; black) White Crappie in fall trap netting surveys conducted from 1988 – 2021, Hords Creek Reservoir, Texas.

## APPENDIX F – Stacked Crappie graphs



Number of Black (gray bars) and White Crappie (white bars) 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, Hords Creek Reservoir, Texas, 2013, 2017, and 2021. Vertical line indicates minimum length limit.

## APPENDIX G – Length at age for Black and White Crappie



Ages for 11 Black Crappie (top) and 15 White Crappie (bottom) at 9.0-10.9 inches TL collected during fall 2021 trap netting survey, Hords Creek Reservoir, Texas.

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