

Alvarado Park Reservoir

2021 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 Alvarado Park Reservoir were surveyed in 2021 using electrofishing and in 2022 using gill netting. Historical data are presented with the 2021-2022 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: Alvarado Park Reservoir is a 507-acre impoundment located near the City of Alvarado, Johnson County, Texas and is operated by the City of Alvarado. Primary water use is recreation and flood control. Public bank access is limited to the boat ramp area and boat access is good. Habitat features consisted mainly of natural shoreline, bulk heading, boat docks and piers, and emergent aquatic vegetation.

Management History: Important sport fish include Largemouth Bass and Channel Catfish. Since 2013, management efforts have focused on posting and maintaining appropriate aquatic invasive species (AIS) signage at access points to try and prevent the spread of AIS into the reservoir - and supporting the statewide public relations campaign "Clean. Drain. Dry". The City of Alvarado successfully applied for a federal Boating Access Grant administered through Texas Parks and Wildlife Department (TPWD) and completed renovation and construction in 2020. Recent accomplishments include building and deploying fish attracting structures in the lower end of the reservoir. Management efforts from 2021-2022 include aquatic vegetation, boater access, electrofishing, and gill netting surveys.

Fish Community

- **Prey species:** The prey base as a whole is in excellent condition, based on the body condition of every sport fish sampled. Gizzard Shad were present in the reservoir in high numbers and Threadfin Shad were present in good numbers. About three-fourths of the Gizzard Shad population was available to predators as prey. Catch rates of Bluegill and other sunfishes was also good.
- **Catfishes:** Channel Catfish were abundant, and most individuals were in excellent condition. Few Channel Catfish exceed the preferred length class of 24 inches. Catch rates of Blue Catfish have improved since the 2018 stocking.
- **Largemouth Bass:** The Largemouth Bass population remains in good condition, with good catch rates, excellent body condition, and improved numbers of legal-length fish for anglers.
- **White Crappie:** The White Crappie catch rate was good and body condition was excellent across all length classes. Individuals commonly reach 14 inches.

Management Strategies: Continue managing Alvarado Park Reservoir with existing regulations. Conduct monitoring surveys with fall electrofishing and spring gill netting in 2025 and 2026 respectively. Conduct aquatic vegetation and access surveys in late summer 2025. Continue efforts to educate the public about AIS issues and protect the reservoir from AIS introductions. Continue with future artificial habitat projects pending funding and reservoir priorities within the district.

Introduction

This document is a summary of fisheries data collected from Alvarado Park Reservoir in 2021-2022. 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 2021-2022 data for comparison.

Reservoir Description

Alvarado Park Reservoir is a 507-acre impoundment located near the city of Alvarado, Johnson County, Texas and is operated by the City of Alvarado. The primary water use is recreation and flood control although the City of Alvarado has sold water rights to gas drilling companies in recent years. Alvarado Park Reservoir is eutrophic with Secchi readings generally less than two feet. Fish habitat at the time of sampling consisted of natural shoreline, bulk heading, and boat docks and piers. Mean and maximum depths were six and 20 feet respectively. Aquatic vegetation is limited to shoreline stands of bulrush (*scirpus spp.*), cattail (*typha spp.*), and American water-willow (*Justicia americana*). There are currently no sources for water level data for Alvarado Park Reservoir. Other descriptive characteristics for Alvarado Park Reservoir are in Table 1.

Angler Access

Alvarado Park Reservoir's boat access consists of one double-lane boat ramp, and bank fishing access is limited to the public boat ramp area and park. The City of Alvarado successfully applied for a federal Boating Access Grant (F-273-B-1) administered through TPWD, and renovation and construction was completed by 2020. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Baird and Tibbs 2018) included:

1. Continuing to communicate with the City of Alvarado to facilitate completion of the Boating Access Grant work.

Action: The Waco district had a number of important communications with the City of Alvarado during the process of the boat ramp and facilities renovations. For example, by acting as an intermediary, the Waco district was able to secure additional funding for the TPWD grant to construct a cofferdam around the existing boat ramp, enabling extension of the ramp with the reservoir at its natural level instead of partially dewatering the reservoir - which would have had serious impacts to the fishery.
2. Building and deploying artificial fish attracting structures into the lower end of the reservoir, monitoring these structures with side scan sonar as needed, updating the fish attractor map on the TPWD website and using social media to communicate the locations of these structures to anglers.

Action: The Waco district built and deployed a freshwater reef comprised of four Georgia cubes sunk close together, into the lower end of the reservoir during November 2021; the TPWD website was updated with a map and coordinates for the freshwater reef in early 2022.
3. Cooperating with the City of Alvarado to maintain appropriate AIS signage at access points around the reservoir and ensure that city staff are aware of the AIS threats and have information to provide to their customers.

Action: AIS signage was posted at the Alvarado Park Reservoir boat ramp during 2013 and signage has been maintained ever since. District staff have made a speaking point about AIS, how to prevent their spread, and potential effects on other Texas reservoirs while speaking to constituents during conversations and presentations also.

4. Changing the status of White Bass from important sport fish to low-density sport fish during the next report cycle, working with the City of Alvarado to possibly implement a Sunshine Bass stocking program in Alvarado Park Reservoir, and considering performing management stockings of White Bass if applicable

Action: No White Bass were collected during spring 2022 gill netting, so the White Bass status was changed from important sport fish to sport fish with a low-density population in this report. District staff spoke to the City of Alvarado about the possibility of creating a Hybrid Striped Bass fishery at Alvarado Park Reservoir with Sunshine Bass fry purchased by the City on the private market, however the idea wasn't met with much enthusiasm at the time. Sunshine Bass stockings are still being considered as a possibility as of the date of this report.

Harvest regulation history: Sport fishes in Alvarado Park Reservoir have always been managed with statewide regulations. The statewide catfish regulation, 25 fish bag (in any combination), 12-inch minimum length limit, was replaced on September 1, 2021, with a 25 fish bag (in any combination – only 10 can be 20 inches or greater in length), and no minimum length limit (Table 3).

Stocking history: Only a few stockings were conducted prior to 2000. Blue Catfish were most recently stocked in 2009 (21,870) and 2018 (52,314). The complete stocking history is in Table 4.

Water transfer: Alvarado Park Reservoir is used primarily for recreation and flood control. There are currently no permanent pumping stations on the reservoir. The City has no immediate plans to sell water from the reservoir at this time.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Alvarado Park 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 2017).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad and Threadfin Shad were collected by daytime electrofishing (0.83 h at 10, 5-min stations). The 2021 survey is the second day-time electrofishing survey completed on Alvarado Park Reservoir. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Gill netting – Catfishes 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 (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 and creel statistics.

Habitat – A structural habitat survey was not conducted during this survey period; refer to Tibbs and Baird (2010) for the most recent structural habitat information collected. Vegetation surveys were conducted using an adaptation of the point method during 2013, 2017 and 2021 (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Twenty-five random points were generated on the shoreline. Aquatic vegetation has always been found close to the shore in Alvarado Park Reservoir, so stratifying the random points to exclude deep-water areas increased precision and resulted in better data.

Water level – There is currently no source for water level data for Alvarado Park Reservoir.

Results and Discussion

Habitat: Littoral zone habitat consisted primarily of natural shoreline, bulk heading, boat docks and piers, and emergent aquatic vegetation. Bulrush (*scirpus* spp.) was found in 72% of the random points sampled during the 2021 vegetation survey, while water willow (*Justicia americana*) and cattail (*typha* spp.) were found at around 44% and 16% of sampled points respectively (Table 6). No vegetation management actions have been performed on Alvarado Park Reservoir and no problematic species of aquatic vegetation are present. A freshwater reef, comprised of four Georgia cubes sunk close together, was deployed into the lower end of the reservoir in November 2021. Additional freshwater reef deployments are being planned during the next four years.

Prey species: Threadfin and Gizzard Shad were collected at 176/h and 641/h respectively in 2021 (Figure 1). The IOV for Gizzard Shad was good and 74% of the population was available to existing predators as forage; this was higher than the previous IOV estimate. Total Gizzard Shad CPUE was higher than both the 2017 (daytime) and 2013 (nighttime) survey catch rates (Figure 1). Total CPUE of Bluegill (434/h) was similar to the two previous surveys, as was size structure (Figure 2). Other forage species collected were Longear Sunfish, Redear Sunfish and Green Sunfish (Appendix A).

Channel Catfish: Channel Catfish were collected with gill nets at a rate of 30.2/nn in 2022, nearly twice the previous catch rate for the species (Figure 3). The OBS goal for this species, general monitoring to collect abundance (CPUE – Total; RSE \leq 25) and size structure (PSD and length-frequency; N \geq 50) data, was achieved with 151 individuals and an RSE of 12. The PSD was good (i.e., 31) and suggests the population is well balanced between small and large fish (Figure 3). No preferred-length fish (CPUE-24; i.e., 24 inches) were observed in 2022 and only a few were observed in 2018; body condition for most length classes was excellent.

Blue Catfish were caught at a rate of 7.4/nn in 2022 compared to 0.4/nn (2018) and 1.2/nn (2014). All Blue Catfish collected were in excellent condition. (Figure 4; Appendix A).

No Flathead Catfish were collected although they are still present in the reservoir.

White Bass: White Bass were not collected in 2022. The last four White Bass surveys had catch rates of 26.0/nn (2010), 1.0/nn (2014), 0.1/nn (2018), and 0.0/nn (2022). This steep decline in catch rate is puzzling however anecdotal information from anglers and fishing forums confirm this fishery has collapsed. One explanation could be a population that was supported with very infrequent spawns since there aren't any major tributaries to the reservoir. Perhaps conditions favorable to spawning did not occur during the lifespan of the individuals within the population.

Largemouth Bass: Largemouth Bass were collected by daytime electrofishing at a rate of 132.0/h in 2021 and population indices were very similar to the previous daytime survey (Figure 5). The OBS goal for this species, general monitoring to collect abundance (CPUE – Stock; RSE \leq 25) and size structure (PSD and length-frequency; $N \geq 50$) data, was achieved with 87 individuals and an RSE of 12 (Figure 5). The current PSD (63) is excellent, indicating a balanced fish population - and similar to that of the previous survey. The percentage of legal-length fish (PSD-14; i.e., 14 inches) is also higher than the previous two surveys indicating more available fish for angler harvest (Figure 5). Body condition was excellent across nearly every length class. Genetic analysis of Largemouth Bass was not conducted during this survey period; refer to Tibbs and Baird (2014) for the most recent genetics information collected.

White Crappie: White Crappie were collected with spring gill nets at a rate of 7.0/nn in 2022 (Figure 6; Appendix A). The current PSD (69) is lower than those of the previous two surveys; but illustrates a more balanced population than in the past. Body condition was optimal across all length classes.

Fisheries Management Plan for Alvarado Park Reservoir, Texas

Prepared – July 2022

ISSUE 1: Alvarado Park Reservoir is shallow and lacks woody fish habitat. Most of the available habitat is littoral in nature.

MANAGEMENT STRATEGIES

1. Build and deploy additional freshwater reefs into the lower end of Alvarado Park Reservoir.
2. Utilize side scan sonar to monitor artificial fish habitat structure condition as needed.
3. Update fish attractor map and coordinates on the TPWD website as needed
4. Utilize social media to describe the location(s) and benefits of the fish attractors to the fishery.

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 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 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 AIS are significant. Additionally, the potential for AIS to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state

MANAGEMENT STRATEGIES

1. Cooperate with the City of Alvarado to maintain appropriate AIS signage at access points around the reservoir.
2. Contact and educate marina owners about AIS, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about AIS through the use of media and the internet.
4. Make a speaking point about AIS 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)

Important sport and forage fishes: Abundant and/or important sport fishes in Alvarado Reservoir include Largemouth Bass, catfishes and White Crappie. Important forage fishes include Gizzard Shad, Threadfin Shad, Bluegill and Longear Sunfish.

Sport fishes with low-density populations: Flathead Catfish and White Bass occur in low abundance in Alvarado Reservoir and are generally caught incidentally to targeted species. We will continue collecting and reporting data for these species and upgrade their status if appropriate.

Survey objectives, fisheries metrics, and sampling objectives

Fall Electrofishing: This survey will be used to evaluate Largemouth Bass and primary forage species (Threadfin Shad, Bluegill, Gizzard Shad and Longear Sunfish). Largemouth Bass are one of the predominant sport fish in the reservoir, and their popularity justifies sampling time and effort. A minimum of 10, random five-minute day-time electrofishing stations will be sampled in fall 2025. The goals of the Largemouth Bass survey will be general monitoring (using CPUE, size structure and relative weight as metrics) to characterize the Largemouth Bass population and make comparisons with the fall 2021, and future, day-time electrofishing data. Catch per unit effort target precision will be an $RSE \leq 25$. Target sample size will be $N \geq 50$ stock-sized fish to determine population size structure, allowing us to calculate proportional size distributions with 80% confidence. Mean relative weight will be determined by measuring and weighing at least 5 fish per represented inch group \geq stock-length. If sampling objectives aren't achieved with the initial 10 stations of effort and if catch rates indicate collecting our size structure target is reasonable, sampling will continue at random stations until that target is reached.

The goals for forage species will be general monitoring (using CPUE and size structure as metrics) to characterize Bluegill, Gizzard Shad and Longear Sunfish populations to enable comparisons with historical and future data. Since trend data show large variations in catch of forage species, no catch per unit effort target precision, target sample sizes or relative weights will be assigned. Index of Vulnerability (IOV) will be calculated for Gizzard Shad to assess the relative proportion of individuals in the population suitable as prey for sport fish.

Spring Gill Netting: The gill net survey will be used to evaluate Channel and Blue Catfish. Catfishes are one of the predominant sport fish in the reservoir, and their popularity justifies sampling time and effort. A minimum of 5 random gill netting stations will be sampled over-night in spring 2026. The goal of the gill netting survey will be general monitoring (using CPUE, size structure and relative weight as metrics) to characterize catfish populations and make comparisons with historical and future data. Catch per unit effort target precision will be an $RSE \leq 25$. Target sample size will be an $N \geq 50$ stock-sized fish to determine population size structure, allowing us to calculate proportional size distributions with 80% confidence. Mean relative weight will be determined by measuring and weighing at least 5 fish per represented inch group \geq stock-length. If sampling objectives aren't achieved with the initial 5 stations and if catch rates indicate collecting our size structure target is reasonable, sampling will continue at random stations until that target is reached.

Literature Cited

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Tables and Figures

Table 1. Characteristics of Alvarado Park Reservoir, Texas.

Characteristic	Description
Year constructed	1966
Controlling authority	City of Alvarado
County	Johnson
Reservoir type	Tributary
Shoreline Development Index	1.5
Conductivity	363 $\mu\text{S/cm}$

Table 2. Public boat ramp characteristics for Alvarado Park Reservoir, Texas. Latitude and longitude are in decimal degrees.

Boat ramp	Latitude Longitude	Parking capacity	Public	Condition
Alvarado	32.3828 °N -97.2518 °W	20 trailers	Yes	Excellent

Table 3. Harvest regulations for Alvarado Park Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channels and Blues	25 ^b	No minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5 ^a	14-inch minimum
Bass: Spotted	5 ^a	No minimum
Crappie: White and Black Crappie, their hybrids and subspecies	25 (any combination)	10-inch minimum

^a Daily bag for Largemouth Bass and Spotted Bass = 5 fish in any combination.

^b Daily bag for Channels and Blues = 25 in any combination; only 10 can be 20 inches or greater.

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

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	2000	85,700	FGL	2.2
	2001	50,600	FGL	2.4
	2008	21,868	FGL	2.0
	2009	21,870	FGL	2.0
	2018	52,314	FGL	2.4
	Total	<hr/> 232,352		
Channel Catfish	1990	26,039	FGL	2.5
	Total	<hr/> 26,039		
Coppernose Bluegill	1983	27,000	UNK	UNK
	Total	<hr/> 27,000		
Florida Largemouth Bass	1997	50,857	FGL	1.3
	1998	51,495	FGL	1.5
	Total	<hr/> 102,352		

Table 5. Objective-based sampling plan components for Alvarado Park Reservoir, Texas 2018–2022.

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
	Condition	W_r	5 fish/inch group (max)
Bluegill ^a	Abundance	CPUE–Total	None
	Size structure	PSD, length frequency	None
Longear Sunfish ^a	Abundance	CPUE–Total	None
	Size structure	PSD, length frequency	None
Gizzard Shad ^a	Abundance	CPUE–Total	None
	Size structure	PSD, length frequency	None
	Prey availability	IOV	$N \geq 50$
<i>Gill netting</i>			
Channel Catfish	Abundance	CPUE–Total	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Condition	W_r	5 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 aquatic vegetation, Alvarado Park Reservoir, Texas, 2013, 2017 and 2021. The data show percentages of randomly selected points where species occurred; 95% lower and upper confidence limits are in parenthesis. Water level was near full pool during the surveys.

Vegetation	2013	2017	2021
bulrush	64% (43% - 82%)	80% (59% - 93%)	72% (51% - 88%)
common buttonbush		12% (3% - 31%)	
cattail	12% (3% - 31%)	12% (3% - 31%)	16% (5% - 36%)
American water-willow	28% (12% - 49%)	36% (18% - 57%)	44% (24% - 65%)

Gizzard Shad

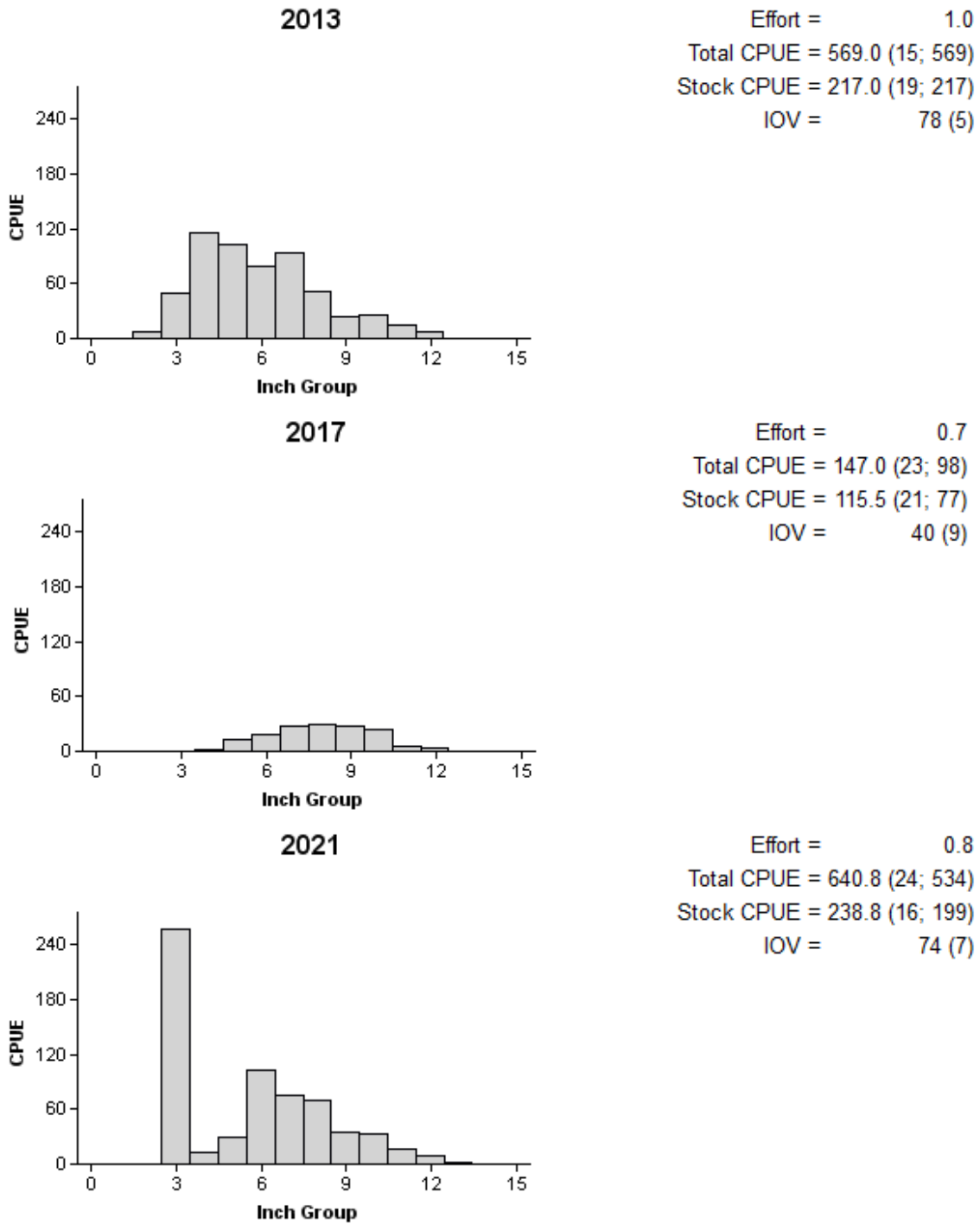


Figure 1. Number of Gizzard Shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV in parentheses) for fall electrofishing surveys, Alvarado Park Reservoir, Texas, 2013 (nighttime), 2017 (daytime), and 2021 (daytime).

Bluegill

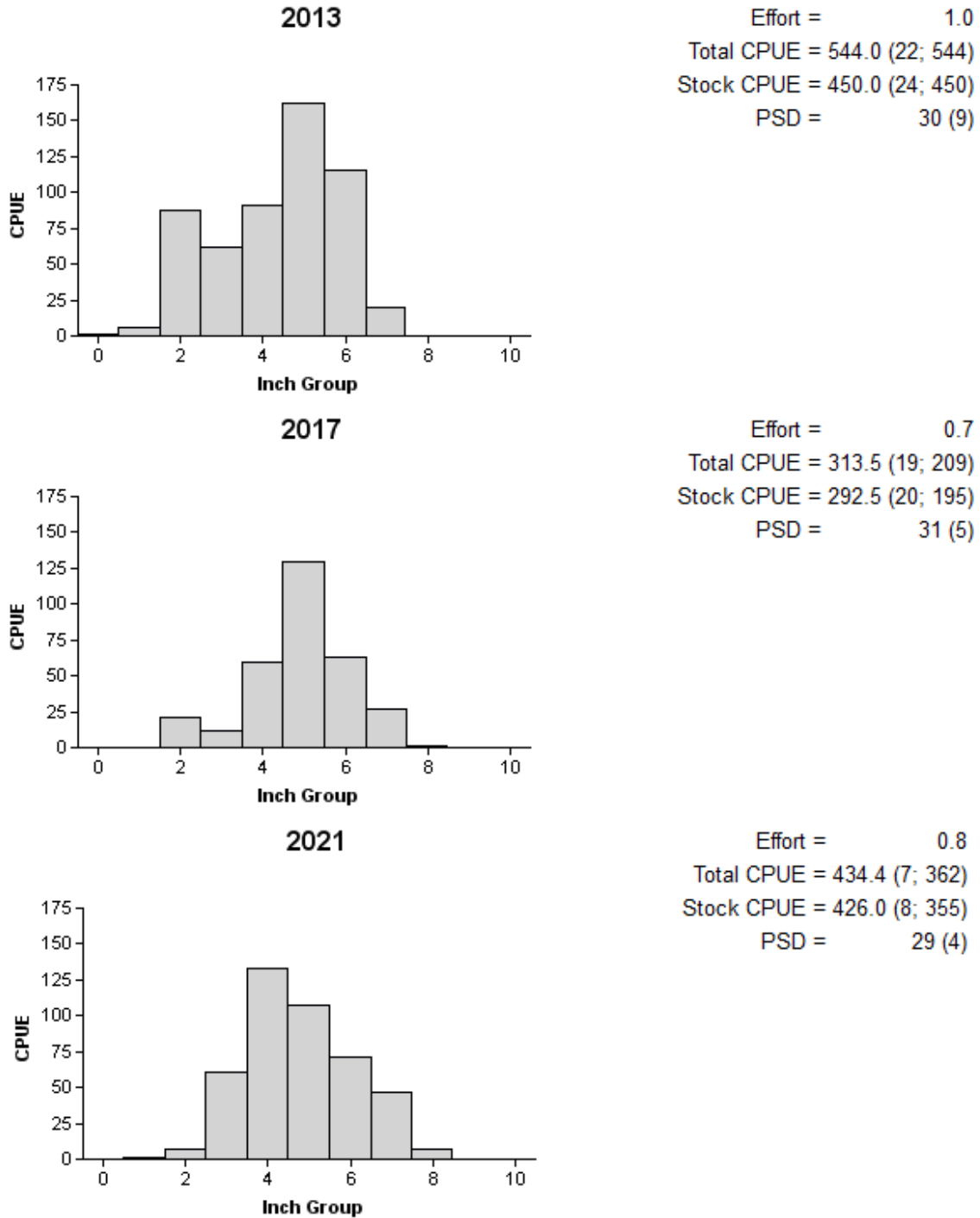


Figure 2. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure in parentheses) for fall electrofishing surveys, Alvarado Park Reservoir, Texas, 2013 (nighttime), 2017 (daytime), and 2021 (daytime).

Channel Catfish

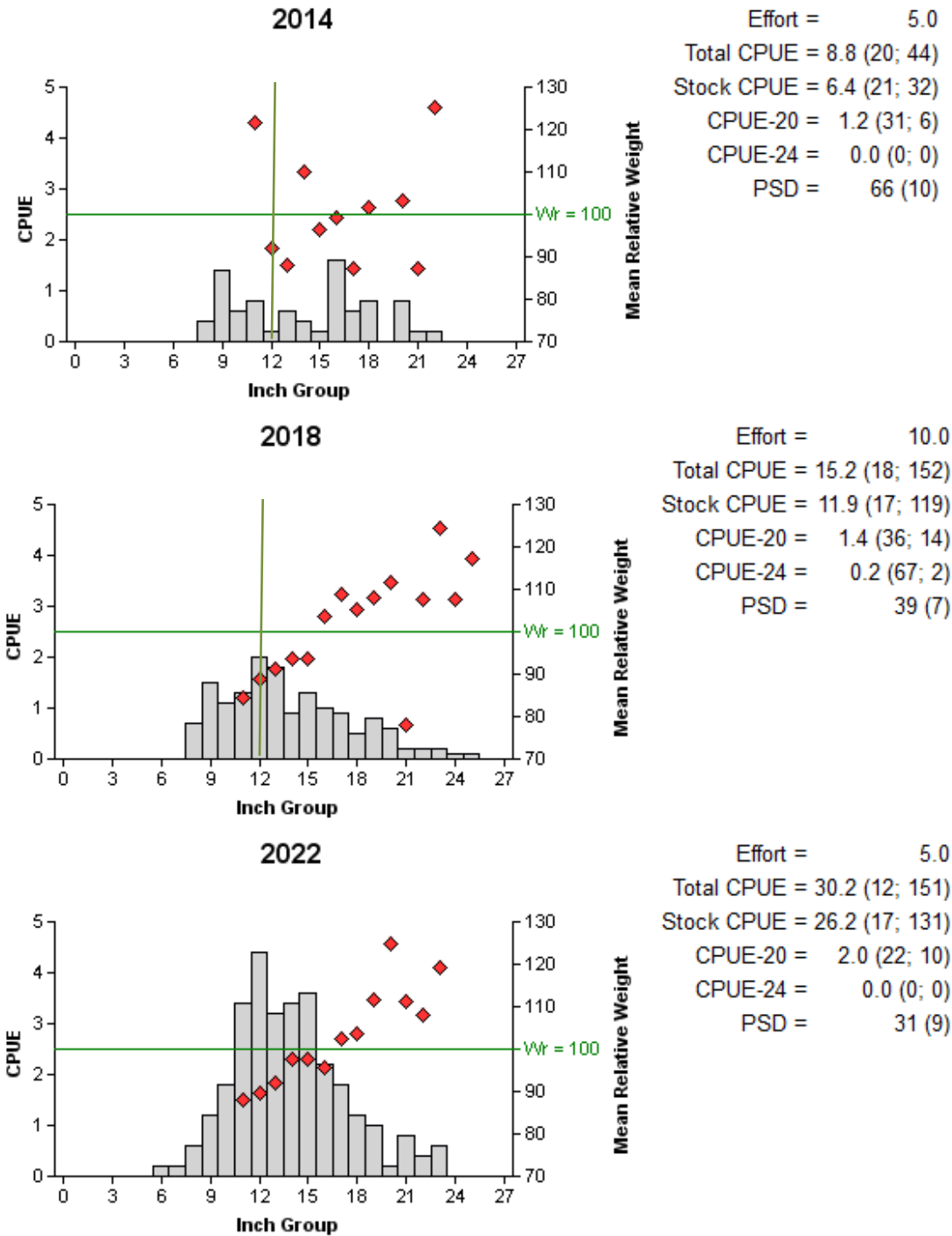


Figure 3. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure in parentheses) for spring gill net surveys, Alvarado Park Reservoir, Texas, 2014, 2018, and 2022. Vertical line indicates the minimum length limit prior to September 1, 2021. Horizontal line represents optimal body condition.

Blue Catfish

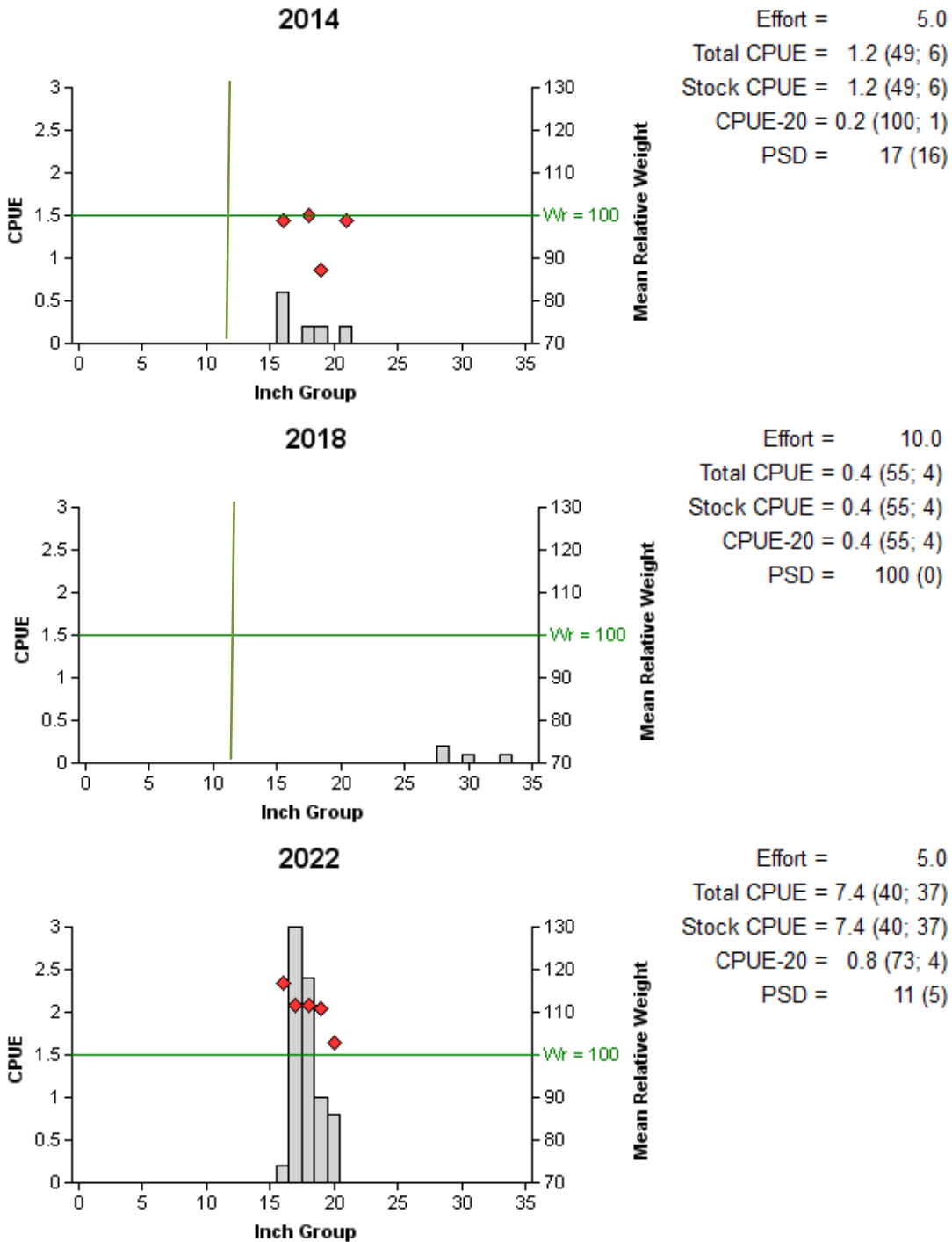


Figure 4. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure in parentheses) for spring gill net surveys, Alvarado Park Reservoir, Texas, 2014, 2018, and 2022. Vertical line indicates the minimum length limit prior to September 1, 2021. Horizontal line represents optimal body condition.

Largemouth Bass

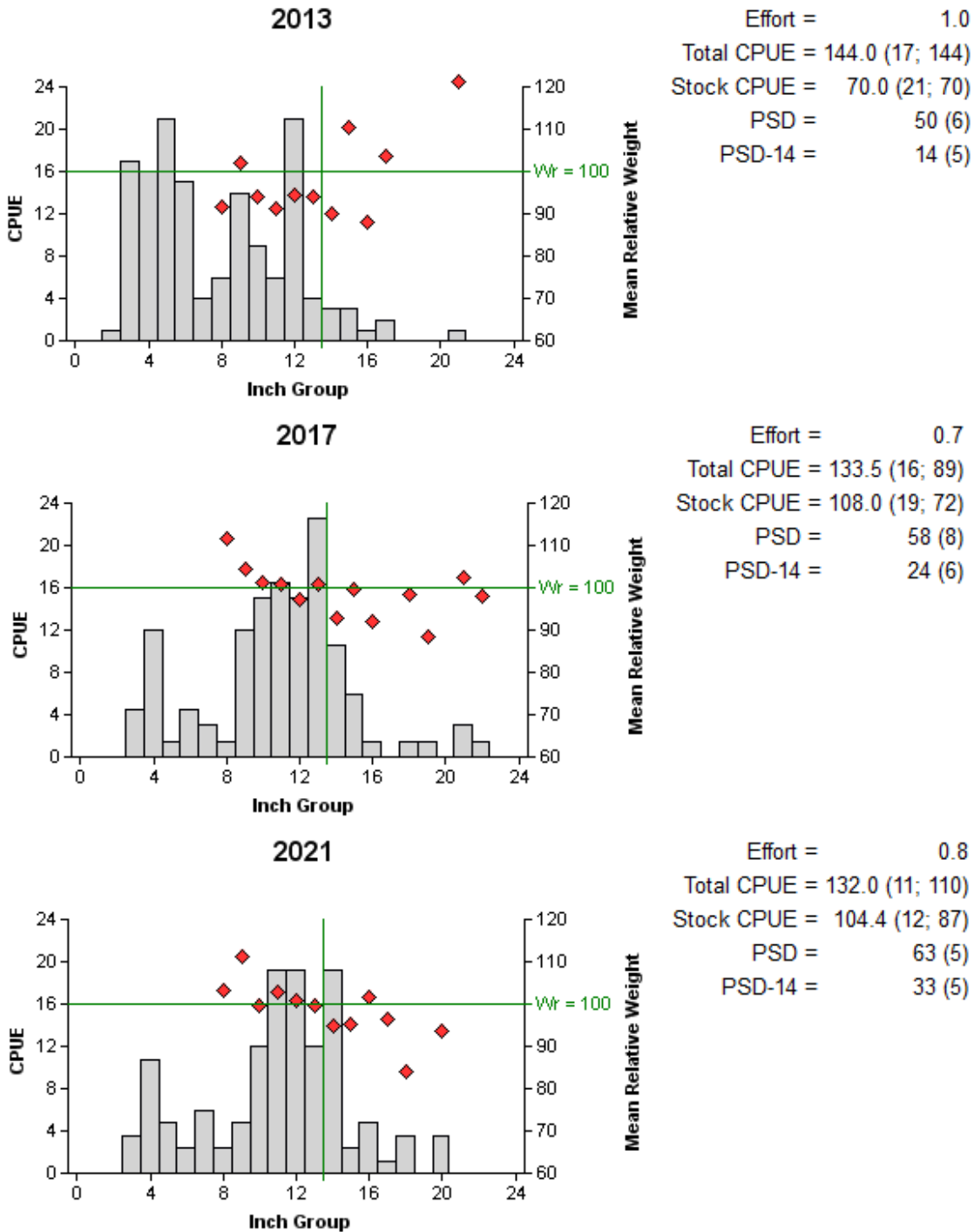


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure in parentheses) for fall electrofishing surveys, Alvarado Park Reservoir, Texas, 2013 (nighttime), 2017 (daytime), and 2021 (daytime). Vertical line indicates minimum length limit and horizontal line represents optimal body condition.

White Crappie

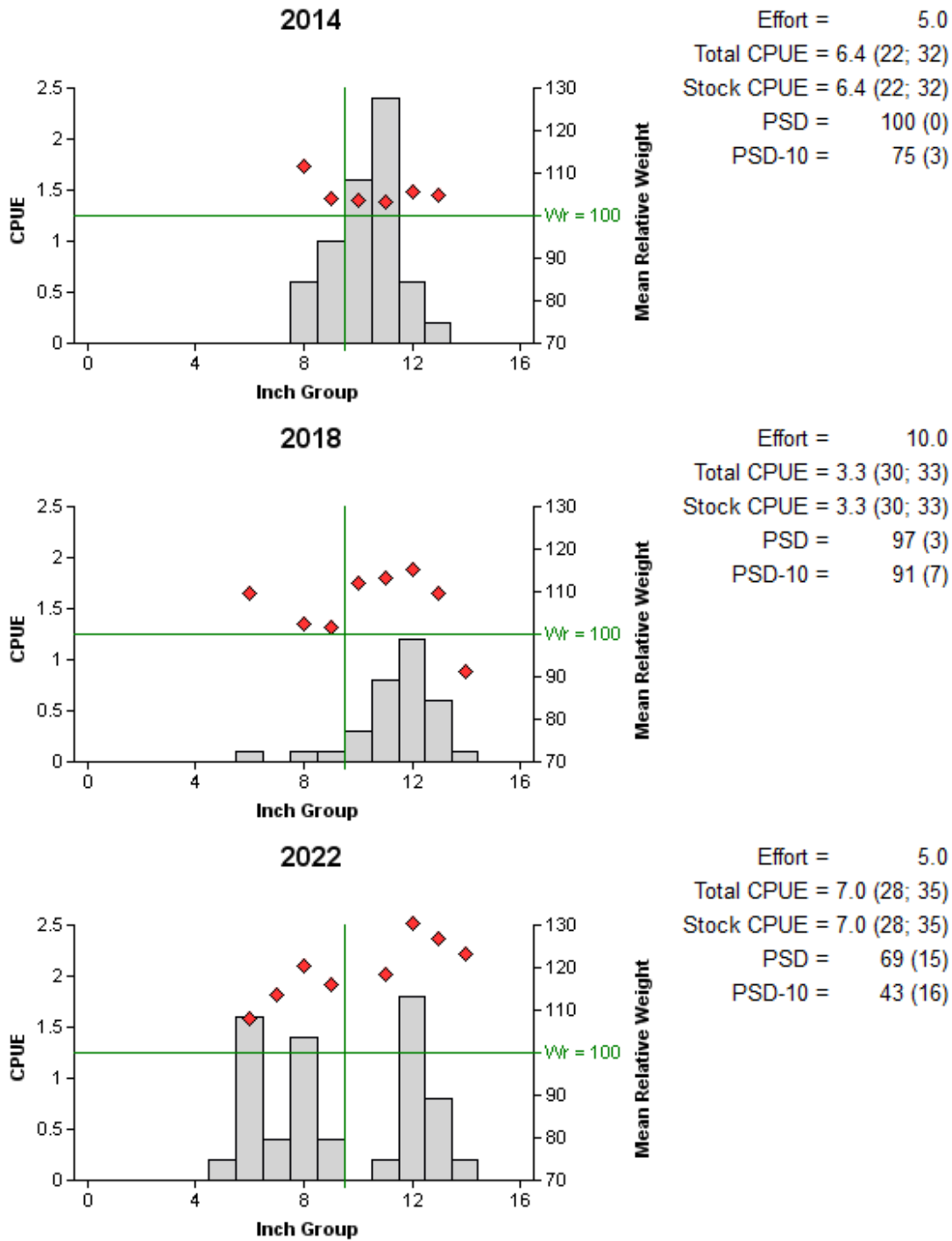


Figure 6. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure in parentheses) for spring gill net surveys, Alvarado Park Reservoir, Texas, 2014, 2018, and 2022. Vertical line indicates minimum length limit and horizontal line represents optimal body condition.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for Alvarado Park Reservoir, Texas. Survey period is June through May. Electrofishing surveys are conducted in the fall while gill netting surveys are conducted in the spring.

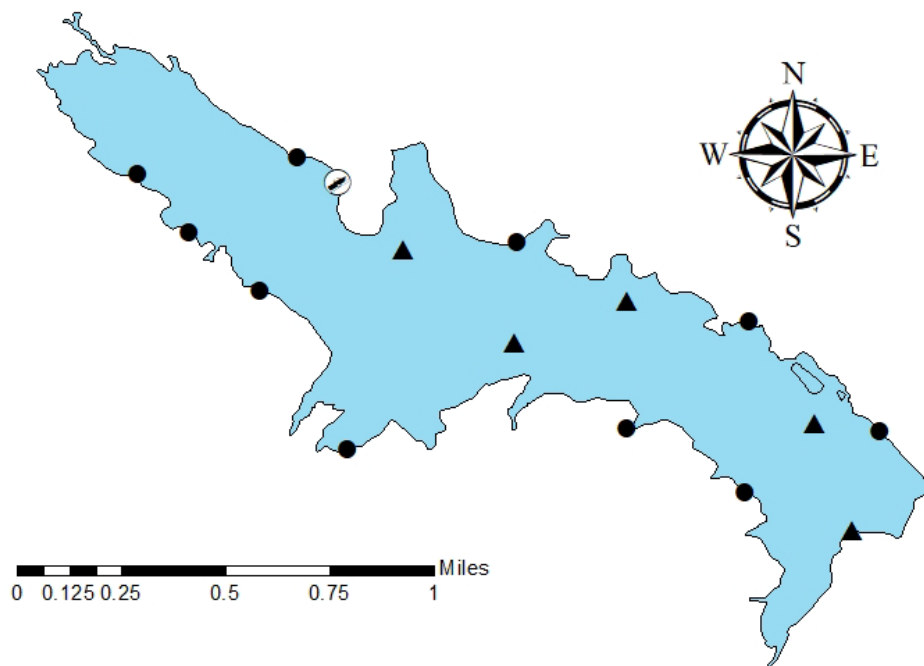
	Survey year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler access				X
Vegetation				X
Electrofishing – Fall				X
Gill netting				X
Report				X

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 Alvarado Park Reservoir, Texas, 2021-2022. Sampling effort was 5 net nights for gill netting and 0.83 h for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			534	640.8 (24)
Threadfin Shad			147	176.4 (45)
Blue Catfish	37	7.4 (40)		
Channel Catfish	151	30.2 (12)		
Green Sunfish			17	20.4 (62)
Bluegill			362	434.4 (7)
Longear Sunfish			27	32.4 (41)
Redear Sunfish			24	28.8 (23)
Largemouth Bass			110	132.0 (11)
White Crappie	35	7.0 (28)		

APPENDIX B – Map of sampling locations



Location of sampling sites, Alvarado Park Reservoir, Texas, 2021-2022. Electrofishing and gill netting stations are indicated by circles and triangles, respectively. There is currently no source for water level data for Alvarado Park Reservoir, however water level was near full pool at the time of sampling.



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