

Grapevine Reservoir

2019 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Contents

Contents	i
Survey and Management Summary	1
Introduction.....	2
Reservoir Description	2
Angler Access.....	2
Management History	2
Methods.....	4
Results and Discussion.....	4
Fisheries Management Plan for Grapevine Reservoir, Texas	7
Objective-Based Sampling Plan and Schedule (2020–2024).....	9
Literature Cited.....	11
Tables and Figures	12
Reservoir Characteristics	12
Boat Ramp Characteristics.....	13
Harvest Regulations	14
Stocking History.....	15
Objective Based Sampling Plan	16
Percent Directed Angler Effort per Species.....	17
Total Fishing Effort and Fishing Expenditures.....	17
Gizzard Shad	18
Bluegill	19
Blue Catfish	20
Channel Catfish	23
White Bass.....	25
Smallmouth Bass.....	27
Spotted Bass	29
Largemouth Bass	31
White Crappie	34
Proposed Sampling Schedule	36
APPENDIX A – Catch rates for most species from all gear types	37
APPENDIX B – Map of sampling locations and boat ramps.....	38
APPENDIX C – Historical catch rates of targeted species by gear type for Grapevine Reservoir, Texas.	39
APPENDIX C – Continued.....	40

Survey and Management Summary

Fish populations in Grapevine Reservoir were surveyed in 2019 using, low frequency electrofishing, electrofishing, and trap nets, and in 2020 using gill nets. A roving creel was also conducted from June 2019 thru March 2020. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers in 1952 to provide flood control, municipal and industrial water, and recreation. Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) and has an average maximum depth of 65.0 feet. Angler and boat access are adequate. At the time of sampling the fishery habitat was primarily rocky and natural shoreline.

Management History: Important sport fishes include Largemouth Bass, Smallmouth Bass, Spotted Bass, White Crappie, White Bass, and Blue and Channel Catfish. The Largemouth Bass population had been managed with a 14 to 18-inch slot-length limit from 1994-2016. It is currently managed with no minimum length limit but only 2 fish under 18 inches may be retained. All other species have been managed with statewide regulations.

Fish Community

- **Prey species:** Gizzard and Threadfin Shad were present in the reservoir. Catch rates of these species were high. Bluegill catch rates were also very high.
- **Catfishes:** Catch rates of Blue Catfish was high with all gear types with quality fish available for anglers. Channel Catfish catch rate remained low.
- **White Bass:** White Bass catch rate remained low. This could be the result of spawning activity during sampling. However, anglers reports of White Bass catch was high.
- **Black Bass:** The Smallmouth Bass catch rate increased from the previous survey but remained low. The Spotted Bass catch rate was high with quality fish available for anglers. The Largemouth Bass catch rate was average but catch of fish above 14 inches was high.
- **White Crappie:** The White Crappie catch rates were higher than the previous survey. The catch rate of White Crappie ≥ 10 inches also increased slightly.

Management Strategies: An additional largemouth bass only electrofishing survey will be conducted in fall 2021. A springtime smallmouth bass only electrofishing survey will be conducted in 2022 and 2024. Additional low frequency electrofishing will be conducted in summer of 2021 and 2023. Gill netting will not be conducted. A creel survey will also be conducted in 2023-2024

Introduction

This document is a summary of fisheries data collected from Grapevine Reservoir in 2016-2020. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2016-2020 data for comparison.

Reservoir Description

Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers (USACOE) in 1952 to provide flood control, municipal and industrial water, and recreation (Table 1). Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) and has a maximum depth of 65.0 feet. Angler and boat access is good. At the time of sampling the fishery habitat was natural and rocky shoreline. It is classified as Eutrophic by the Texas Commission of Environmental Quality (TCEQ) (Texas Commission on Environmental Quality 20).

Angler Access

Grapevine Reservoir has 15 public boat ramps and 2 private boat ramps. There are two high water ramps which are located at Katie's Woods and Murrell Parks. Access was limited during several high water events from 2016-2020. Additional boat ramp characteristics are in Table 2. Shoreline access is good within numerous parks located around the reservoir. Many of the parks which were once managed by the USACOE are now being leased by surrounding municipalities.

Management History

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

1. Requesting annual stockings of Smallmouth bass

Action: Smallmouth Bass were requested annually from 2016-2019. In 2018 a stocking of 47,637 Smallmouth Bass was conducted.
2. Conduct a 36 day annual creel survey to update angling pressure and species preference information. The last creel survey was conducted in year 2003-2004.

Action: A 36 day creel was scheduled. However the summer quarter creel was canceled because of boat ramp closures that occurred because of high water levels. Also the spring quarter creel was canceled because of Coronavirus health emergency.
3. Request stockings of Florida Largemouth Bass (FLMB) in 2017 and 2018 and evaluate genetics of the stockings in 2019

Action: High water levels resulted in high recruitment of resident Largemouth Bass, This could have negatively impacted the success of the FLMB, stockings. Thus, FLMB were not requested. However, FLMB were requested from surplus production and stocked in Spring of 2019. No FLMB genetic analysis was conducted.
4. Since Largemouth Bass are the most popular sought after species on Grapevine Reservoir additional monitoring of the population was planned for fall 2017.

Action: An additional 18-station electrofishing survey was conducted and results are presented in this report.

5. The Blue Catfish population is increasing in quality. However standard gillnet surveys may not be the most efficient method to obtain adequate sampling statistics. Additional low frequency electrofishing surveys were proposed for summer of 2017 and 2018 to evaluate efficiency.

Action: Low frequency electrofishing surveys were conducted in summer of 2017 and 2018.

6. The invasive species zebra mussels (*Dreissena polymorpha*) are a big threat to Grapevine Reservoir. It is currently classified as a positive zebra mussel reservoir.

Action: Communicated with controlling authority and local municipalities regarding invasive species information and provided educational materials when requested. Zebra mussel boat ramp stamps were also repaired.

Harvest regulation history: The Largemouth Bass population was managed with a 14 to 18-inch slot-length limit from 1994-2016. It is currently managed with no minimum length limit but only 2 fish under 18 inches allowed. All other species have been managed with statewide regulations (Table 3)

Stocking history: Grapevine Reservoir was stocked in 2018 with Smallmouth Bass, and in 2019 with Florida Largemouth Bass. The complete stocking history is in Table 4.

Vegetation/habitat management history: The last habitat survey was conducted in 2011 (Brock and Hungerford 2012). During sampling, littoral zone habitat consisted primarily of rocky and natural shoreline.

Zebra mussels: The exotic species zebra mussels have been found in several DFW area reservoirs including Grapevine Reservoir. Grapevine Reservoir is currently listed as positive for Zebra Mussels. This means zebra mussels or their larvae have been detected on more than one occasion. However, there is no evidence of a reproducing population.

Water transfer: Grapevine Reservoir is the main water supply for the City of Grapevine. 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 Grapevine Reservoir (Brock and Hungerford 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 – Smallmouth Bass, Spotted Bass, Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1.5 hours at 18, 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 (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).

Gill netting – Blue Catfish, Channel Catfish, and White Bass 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).

Low Frequency Electrofishing – Blue Catfish were collected by low frequency electrofishing (1.7 hours at 20, 5-min stations). Catch per unit effort for low frequency electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

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 from 2005 through 2012 and by electrophoresis for previous years.

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 ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE and creel statistics.

Habitat – A structural habitat survey was last conducted in 2011.

Water level – Source for water level data was the United States Geological Survey (USGS 2020).

Creel survey – An abbreviated roving creel survey was conducted from September 2019 through March 2020. The creel survey was originally planned to be an annual survey that would be conducted from June 2019 through May 2020. Because of high water levels that impacted access during the summer of 2019 and the Coronavirus health emergency in the spring of 2020, the survey had to be adjusted. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Results and Discussion

Habitat: No surveys were conducted.

Prey species: The 2019 electrofishing catch rate of Threadfin Shad (227.3/h) was lower than the previous samples but near the reservoir average (Appendix A and C). The Gizzard Shad electrofishing catch rate in 2019 (696.7/h) was higher than the previous samples (Figure 2). Index of vulnerability for Gizzard Shad (85) was higher when compared to the previous sample (Figure 2). This indicated that 85% of Gizzard Shad captured in 2019 were available as forage. The electrofishing catch rate of Bluegill in

2019 (620.0/h) was much higher than the previous sample and higher than reservoir average (Figure 3; Appendix C). The most recent survey revealed some larger sunfish available for anglers as the CPUE-6 of Bluegill was much higher than the previous sample (Figure 3). The Longear Sunfish catch rate observed in 2019 (110.7/h) was higher than previous sample and higher than reservoir average (Appendix A and C). The OBS sampling objectives were achieved for Bluegill and Gizzard Shad

Catfishes: The gill net catch rate of Blue Catfish continued to increase from previous samples. The catch rate of 9.0/nn was the highest on record (Figure 4). Size structure as measured by PSD also increased from previous sample. Low frequency electrofishing (LFE) for Blue Catfish began in summer of 2017. A catch rate of 72.6/h was observed (Figure 5). LFE was again conducted in summer of 2019 and catch rate of Blue Catfish had increased (102.0/h) (Figure 5). It appears LFE provides better population assessment statistics for Blue Catfish when compared to gill net sampling statistics. The gill net catch rate of Channel Catfish remained low in 2020 (1.4/nn) but similar to past samples (Figure 7).

Catfishes were the third most sought after fish (8.3%) in Grapevine Reservoir (Table 6). Directed fishing effort for Blue and Channel Catfish combined was estimated to be 1,301.3 h with anglers catching an estimated 0.3 fish per hour of directed effort (Table 9). Although percent directed effort was low (2.7%), some anglers also specifically targeted Blue Catfish (Table 8). Directed fishing effort for Blue Catfish was estimated to be 618.3 h for 2019/2020 with anglers catching an estimated 0.3 Blue Catfish per hour of directed effort (Table 8). Harvest of Blue Catfish was estimated to be 408.0 fish in 2019/2020 and fish between 12 and 20 inches were observed in the creel (Figure 6). Although no directed effort was estimated for Channel Catfish, harvest of Channel Catfish was estimated to be 464.0 fish in 2019/2020.

White Bass: The gill netting catch rates of White Bass in Grapevine have continued to be low during the past several samples (Figure 9). The 2020 gill net catch rate (1.2/nn) was no exception although it was higher when compared to previous samples (Figure 9). It is possible the fish were in the upper portions of the reservoir spawning. However, anecdotal evidence from anglers indicated a very large population of White Bass. This is probably the result of the past several years of high water levels. White Bass was the second most targeted species by anglers (16.0%; Table 6). This was similar to previous creel survey results (Table 6). Directed fishing effort for White Bass was estimated to be 3,701 h for 2019/2020 with anglers catching an estimated 3.4 fish per hour of directed effort (Table 10). Harvest of White Bass was estimated to be 3,760 fish in 2019/2020 and fish between 10 and 14 inches were observed in the creel (Figure 10).

Black basses: The total electrofishing catch rate of Smallmouth Bass in 2019 (9.3/h) was higher than the previous samples and just above the reservoir average (Figure 11; Appendix C). Although the frequent stockings are required to maintain population, evidence of natural reproduction has been observed (Figure 11). The catch rate of Smallmouth Bass \geq 14 inches continued to be low. Although population is low density, there was angler directed effort (96.9 h) for Smallmouth Bass (Table 11).

The total electrofishing catch rate of Spotted Bass in 2019 (25.3) was similar to previous sample but below the reservoir record observed in 2015 (Figure 12). The size structure of the Spotted Bass population shifted to larger fish as evidence of PSD 67 compared to previous sample (PSD=22). The catch rate of Spotted Bass \geq 12 inches (9.3/h) also increased from previous sample (Figure 12). Although no directed effort was determined for Spotted Bass, harvest was estimated to be 52 fish with one fish measuring 12 inches recorded during creel (Figure 13).

Largemouth Bass total electrofishing catch rate (158.0/h) was higher than previous sample (Figure 14). The catch rate of Largemouth Bass \geq 14 inches also increased greatly from the previous survey. Size structure was skewed towards larger fish in 2019 (Figure 14). No genetic sampling was performed, but previous testing revealed a Florida Largemouth Bass (FLMB) influence of (29%) (Table 13).

Black basses (Smallmouth, Spotted, and Largemouth combined) were the most sought after fish in Grapevine Reservoir (64.6%; Table 6.) This is higher than previous creel survey (Table 6). Directed fishing effort for black basses was estimated to be 14,959 h for 2019/2020 with anglers catching an estimated 0.69 fish per hour of directed effort (Table 12). Harvest of black basses was estimated to be

1,363 fish in 2019/2020 and fish between 12 and 20 inches were observed in the creel (Figure 15). With the change in the harvest regulations for Largemouth Bass, it appears anglers are exploiting Largemouth Bass between 15 and 17 inches compared to previous creel during which those fish were protected with the 14 – 18 inch slot length limit (Figure 15). These fish were mainly caught by tournament anglers.

White Crappie: The trap net catch rate of White Crappie was 9.7/nn in 2019 and was higher than the previous sample (Figure 16). The body condition (W_r) of the White Crappie population was good with most inch classes at or above 90. The size structure of size structure of stock-length crappie is biased towards larger fish as indicated by a PSD value of 72. The catch rate of fish over 10 inches (3.2/nn) was higher than the previous sample. Crappie were the fourth most sought after fish by anglers (7.7%) (Table 6). This was similar to previous creel survey results (Table 6). Directed fishing effort for White Crappie was estimated to be 1,780.6 h for 2019/2020 with anglers catching an estimated 5.6 fish per hour of directed effort (Table 14). Harvest of White Crappie was estimated to be 2,770 fish during the 2019/2020 creel and fish between 10 and 14 inches were observed in the creel (Figure 17).

Fisheries Management Plan for Grapevine Reservoir, Texas

Prepared – July 2020

ISSUE 1: Smallmouth Bass have been stocked intermittently from 2008-2019. A population is developing.

MANAGEMENT STRATEGIES

1. Request fingerling Smallmouth Bass for stocking in 2020-2024 at a rate of 25/acre.
2. Monitor population through fall electrofishing in 2021 and 2023, and spring electrofishing in 2022 and 2024.
3. If catch rates warrant, conduct age and growth on individuals to determine age structure and extent of natural reproduction.

ISSUE 2: The last creel survey was conducted in 2019-2020. However, the creel was interrupted by high water levels and the coronavirus health emergency. Accurate and updated angling effort, and harvest statistics need to be obtained.

MANAGEMENT STRATEGY

1. Conduct a year long creel in 2023-2024 to monitor catch and harvest statistics of major sport fishes.

ISSUE 3: Largemouth Bass are the most sought after species in the reservoir. The harvest regulation was recently changed. Additional sampling is needed to monitor possible population changes. Updated FLMB genetics of the Largemouth Bass population is also needed.

MANAGEMENT STRATEGIES

1. Conduct additional fall electrofishing in 2021 to monitor Largemouth Bass population.
2. Conduct genetic sampling in fall 2021 to evaluate FLMB genetics.
3. If warranted request FLMB for stocking in 2022 and 2023 at 1,000/km of shoreline.

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 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 using 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

Important sport fishes in Grapevine Reservoir include Largemouth Bass, Spotted Bass, Smallmouth Bass, Channel and Blue Catfish, White Bass, and White Crappie. Known important forage species include Bluegill, Longear Sunfish, Threadfin and Gizzard Shad.

Low Density fisheries:

Spotted Bass: Although a quality population of Spotted Bass are present in Grapevine there is no directed effort for the species. Catch information on Spotted Bass will be collected during sampling for Largemouth Bass and forage species.

Smallmouth Bass: Smallmouth Bass are present in Grapevine, but the population is at a low density and is dependent on stocking to maintain population. Catch information on Smallmouth Bass will be collected during sampling for Largemouth Bass and forage species. Spring electrofishing will also be conducted to determine if that will provide better catch rates for smallmouth during the spawning period. If enough individuals are collected, exploratory age and growth will be performed to determine the extent of natural reproduction.

Channel Catfish: Although Channel Catfish are present in Grapevine. The population is low density based on historic catch rates.

Survey objectives, fisheries metrics, and sampling objectives

Creel Survey: A 36 day annual creel survey will be conducted from June 2023 – May 2024. Creel will be conducted and data collected to monitor trends and changes in catch and harvest statistics of sportfish populations.

Largemouth Bass: According to the most recent creel survey conducted on Grapevine Reservoir (2019-2020), 65% of anglers target Largemouth Bass and they are the most popular sport fish in Grapevine Reservoir. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Largemouth Bass had been managed with a 14-18 in slot length limit regulation with a 5 fish bag limit from 1994-2016. The regulation was recently changed to no minimum length limit; however, only two Largemouth Bass less than 18 inches may be retained each day with 5 fish total bag limit. Fall nighttime electrofishing will be conducted in 2021 and 2023. This should allow for determination of any large-scale changes in the Largemouth Bass population. A minimum of 18 randomly selected 5-min electrofishing sites will be sampled in 2021 and 2023. Based on past catch rates, this should be adequate to obtain an RSE of CPUE-S ≤ 25 (the anticipated effort to meet both sampling objectives is 18 stations with 80% confidence). If the RSE objective is not met, additional electrofishing sampling will only continue if 50 stocked sized fish or larger are not captured in the 18 sample sites for size structure estimation (PSD 50 fish minimum at 20 stations with 80% confidence). Genetic sampling will also be conducted in 2021 to determine population genetics and if the stocking of FLMB would be justified.

Blue Catfish: Catfishes are the third most sought after sport fish in Grapevine Reservoir (8 % of total angling effort). The creel survey conducted in 2019-220 indicated some directed effort towards Blue Catfish (2.7%). The popularity and reputation for quality catfish fishing at this reservoir warrant sampling time and effort. A low frequency electrofishing survey consisting of 20 stations will be conducted in 2021 and 2023. Based on past catch rates, this should be adequate to obtain an RSE of CPUE-S ≤ 25 (the anticipated effort to sampling objectives is 20 stations with 80% confidence) for Blue Catfish. Size structure estimation (PSD 50 fish minimum at 20 stations with 80% confidence). If RSE objectives are not met no additional sampling will be conducted.

Bluegill, Longear Sunfish, Threadfin and Gizzard Shad: Bluegill, Longear Sunfish, Threadfin, and Gizzard Shad are the primary forage in Grapevine Reservoir. Like Largemouth Bass, trend data on CPUE and size structure have been collected with fall nighttime electrofishing. Sampling, as with Largemouth Bass above, will allow for monitoring of large-scale changes in Bluegill, Longear Sunfish, Threadfin and Gizzard Shad relative abundance. Sampling effort based on achieving sampling objectives for Largemouth Bass should result in sufficient numbers of Bluegill and Gizzard Shad for size structure estimation (PSD and IOV; 50 fish minimum at 18 stations with 80% confidence)

White Crappie: Previous creel survey data indicate White Crappie angling comprised only 8% of total angling effort. A 10 single-cod shoreline trap netting survey will be conducted in fall of 2023. This should provide basic population trend data information. No sampling objectives will be set for White Crappie.

White Bass: Although creel survey data indicated 16% of anglers targeted White Bass, no sampling data will be collected on the White Bass Population. Information regarding the White Bass population will be gathered during 2023-2024 creel survey.

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Tables and Figures

Figure 1. Water level elevations in feet above mean sea level (MSL) recorded for Grapevine Reservoir, Texas, January 2014- March 2020. Conservation pool (535 MSL) is noted with solid black line.

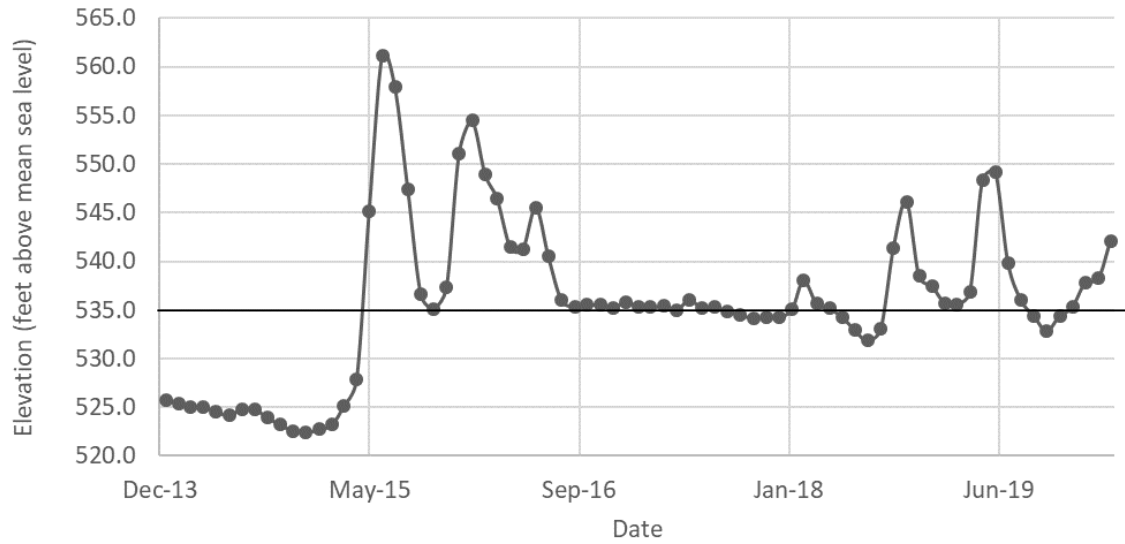


Table 1. Characteristics of Grapevine Reservoir, Texas.

Characteristic	Description
Year constructed	1952
Controlling authority	United States Corps of Engineers
Counties	Tarrant and Denton
Reservoir type	Tributary of Trinity River
Conductivity	375 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristics for Grapevine Reservoir, Texas, August 2019.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Trophy Club Park	32.0292 -99.1798	Y	10	NA	Small boat only
Meadowmere Park 1	32.98167 -97.1119	Y	28	528.5	Excellent, no access issues
Meadowmere Park 2	32.9789 -97.1139	Y	24	NA	Excellent, no access issues
Lakeview 1	32.9807 -97.0968	Y	15	NA	Excellent, no access issues
Lakeview 2	32.9771 -97.0964	Y	15	528.2	Excellent, no access issues
Oak Grove Park McPherson Slough	32.9669 -97.0943	Y	25	NA	Excellent, no access issues
Oak Grove Park Dove Loop Ramp	32.9700 -97.0903	Y	65	NA	Excellent, no access issues
Oak Grove Park Trawick Ramp	32.9697 -97.0808	Y	42	NA	Excellent, no access issues
Oak Grove Park Sand Bass Point Ramp	32.9641 -97.0726	Y	30	528.0	Excellent, no access issues
Katie's Woods Ramp	32.9597 -97.0667	Y	47	NA	Excellent, no access issues
Katie's Woods High Water Ramp	32.9588 -97.0674	Y	NA	NA	Excellent, no access issues
Silver Lake Marina	32.9559 -97.0585	Y	NA	NA	Fair, no access issues, limited parking
Murrell Park 1	32.9931 -97.0847	Y	16	526.9	Fair, no access issues
Murrell Park 2	32.9961 -97.0919	Y	22	528.9	Good, no access issues

Table 2 Continued

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Twine Coves Park	32.0028 -97.1047	Y	15	NA	Excellent, no access issues

Table 3. Harvest regulations for Grapevine 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, White	25	10-inch minimum
Bass, Spotted	none ^a	none
Bass, Smallmouth	5 ^a	14-inch minimum
Bass, Largemouth	5 Total; only 2 < 18 inches ^a	none
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

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

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

Year	Species	Size
Channel Catfish		
1969	25,000	AFGL
1970	50,000	AFGL
1971	50,000	AFGL
1972	87,000	AFGL
Species Total	212,000	
Florida Largemouth Bass		
1990	218,848	FGL
1990	147,286	FGL
1996	363,499	FGL
2001	195,900	FGL
2007	335,768	FGL
2019	92,079	FGL
Species Total	1,353,380	
Largemouth Bass		
1967	320,000	FRY
1968	50,000	UNK
1969	450,000	FRY
1971	400,000	FRY
Species Total	1,220,000	
Mixed Largemouth Bass		
1988	364,004	UNK
Species Total	364,004	
Palmetto-Bass (Striped x White Bass hybrid)		
1978	36,400	UNK
1979	74,390	UNK
1982	87,000	UNK
Species Total	197,790	
Smallmouth Bass		
1999	183,186	FGL
2008	27,977	AFGL
2009	103,586	FGL
2010	112,208	FGL
2011	104,650	FGL
2013	67,212	FGL
2014	99,098	FGL
2018	47,637	FGL
Species Total	745,554	

Table 4. Stocking history continued.

Year	Species	Size
1984	Threadfin Shad	AFGL
	800	
Species Total	800	
1975	Walleye	FRY
	144,600	
1976	2,500,000	FRY
Species Total	2,644,600	

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

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	None
Smallmouth and Spotted Bass	Abundance	CPUE – stock	None
	Size structure	PSD, length frequency	None
	Condition	W_r	None
Bluegill ^a	Abundance	CPUE – Total	RSE ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$
Gizzard Shad ^a	Abundance	CPUE – Total	RSE ≤ 25
	Size structure	IOV, length frequency	$N \geq 50$
<i>Trap netting</i>			
Crappie	Abundance	CPUE	None
	Size structure	PSD, length frequency	None
	Condition	W_r	None
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE – Total	RSE ≤ 25
	Size structure		$N \geq 50$ stock
	Condition	W_r	10 fish/inch group (max)

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

Table 5. Continued

<i>Gill netting</i>				
Channel Catfish	Abundance		CPUE– stock	None
	Size structure		PSD, length frequency	None
	Condition		W_r	None)
White Bass	Abundance		CPUE-stock	None
	Size structure		PSD, length frequency	None
	Condition		W_r	None
Low-frequency electrofishing				
Blue Catfish	Abundance		CPUE	None
	Size structure		PSD	None
	Condition		W_r	None

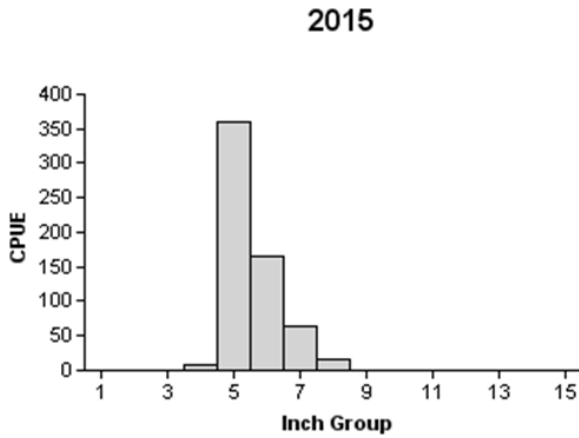
Table 6. Percent directed angler effort by species for Grapevine Reservoir, Texas. Survey periods were from 1 June 2003 through 31 May 2004 and 1 September 2019 through 31 March 2020.

Species	2003/2004	2019/2020
Blue Catfish	NA	2.7
Catfish	24.0	5.6
White Bass	17.0	16.0
Smallmouth Bass	NA	0.4
Black Bass	43.0	64.6
Crappie	10.0	7.7
Anything	NA	3.4

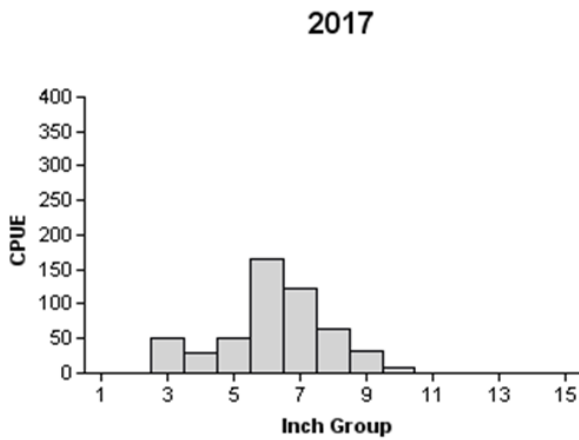
Table 7. Total fishing effort (h) for all species and total directed expenditures at Grapevine Reservoir, Texas, 2019-2020. Survey period was from 1 September 2019 through 31 March 2020. Relative standard error is in parentheses.

Creel statistic	2019/2020
Total fishing effort	35,710.0 (20.7)
Total directed expenditures	\$96,566 (35.7)

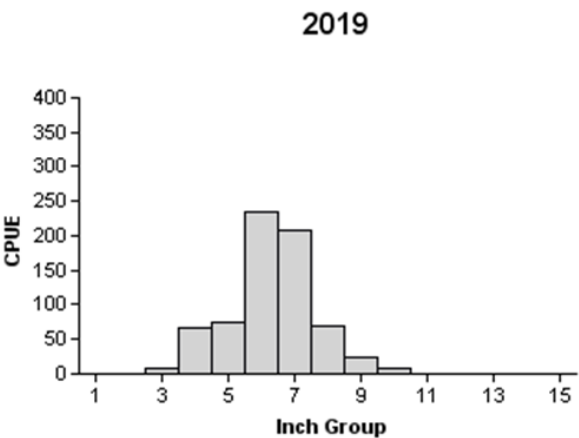
Gizzard Shad



Effort = 1.5
 Total CPUE = 616.7 (27; 925)
 Stock CPUE = 82.7 (23; 124)
 IOV = 97 (1)



Effort = 1.5
 Total CPUE = 525.3 (17; 788)
 Stock CPUE = 227.3 (19; 341)
 IOV = 80 (4)



Effort = 1.5
 Total CPUE = 696.7 (18; 1045)
 Stock CPUE = 310.0 (19; 465)
 IOV = 85 (5)

Figure 2. 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, Grapevine Reservoir, Texas, 2015, 2017, and 2019.

Bluegill

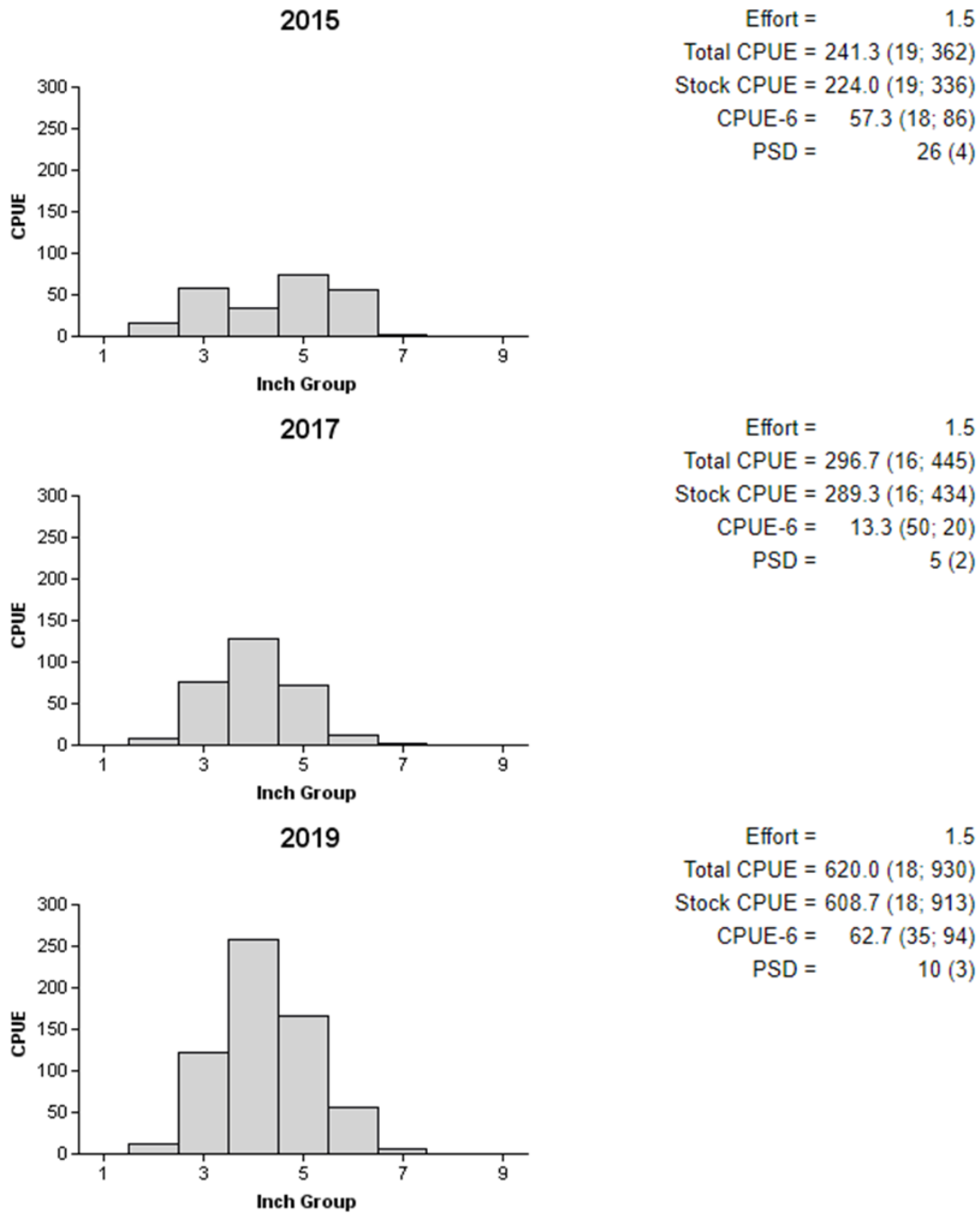


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2015, 2017, and 2019.

Blue Catfish

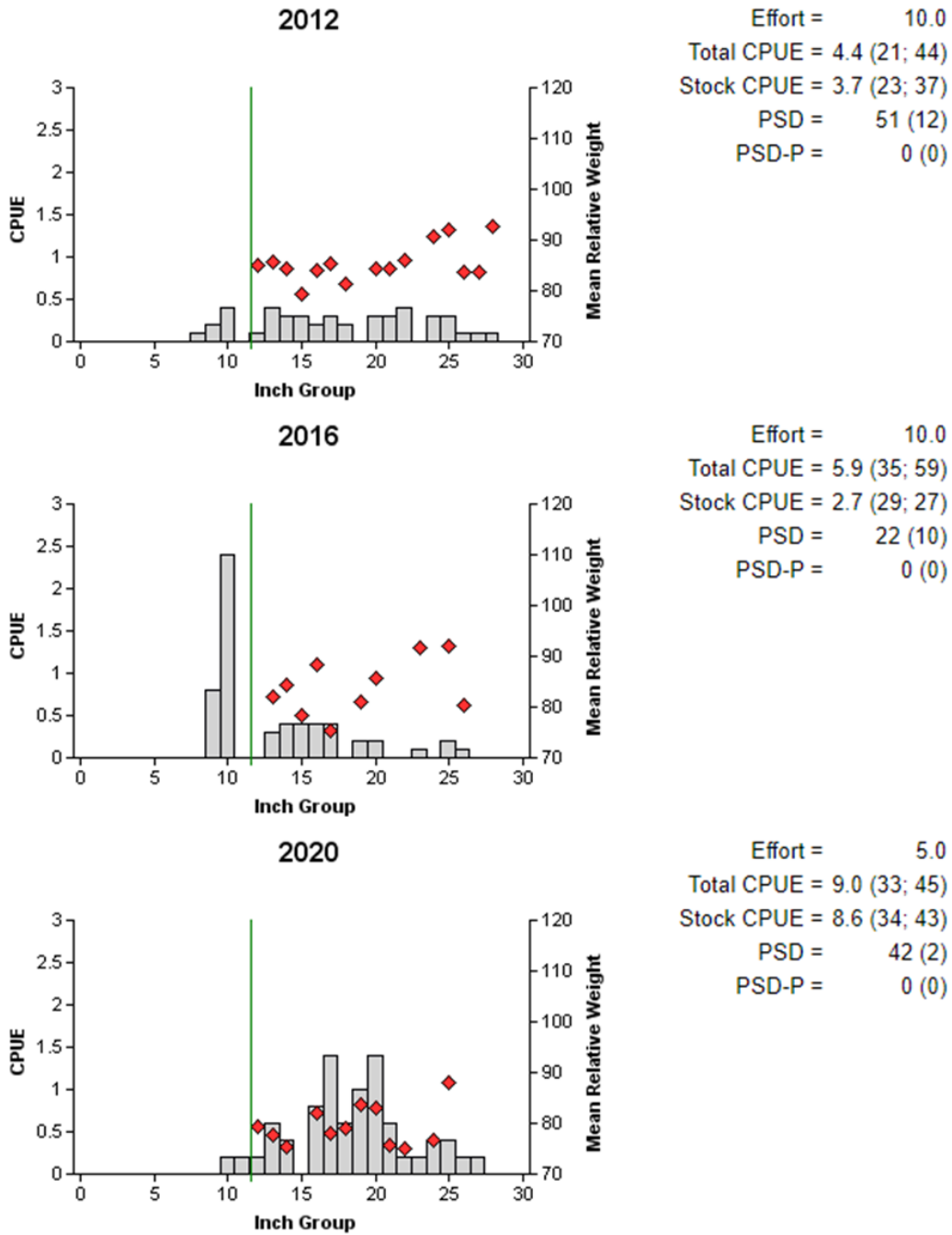


Figure 4. Number of Blue Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2012, 2016, 2020. Vertical line represents length limit at time of sampling.

Blue Catfish

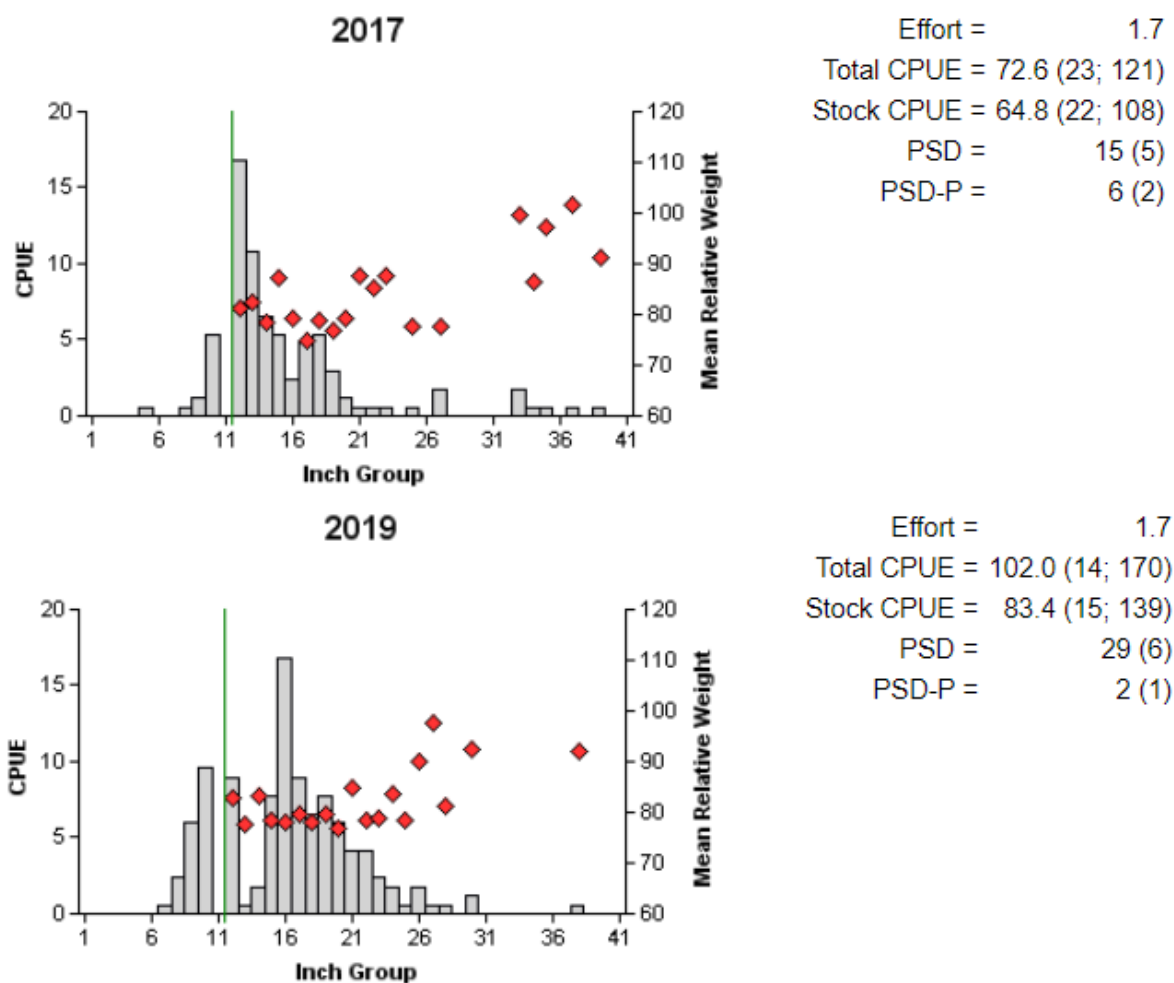


Figure 5. Number of Blue Catfish caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for summer low frequency electrofishing surveys, Grapevine Reservoir, Texas, 2017 and 2019. Vertical line represents length limit at time of sampling. Vertical line represents length limit at time of sampling.

Table 8. Creel survey statistics for Blue Catfish at Grapevine Reservoir, Texas, from September 2019 through March 2020. Total catch per hour is for anglers targeting Blue Catfish and total harvest is the estimated number of Blue Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6684
Directed effort (h)	618.3 (55)
Directed effort/acre	0.1 (55)
Total catch per hour	0.3 (35)
Total harvest	408.0 (148)
Harvest/acre	0.06 (148)
Percent legal released	28

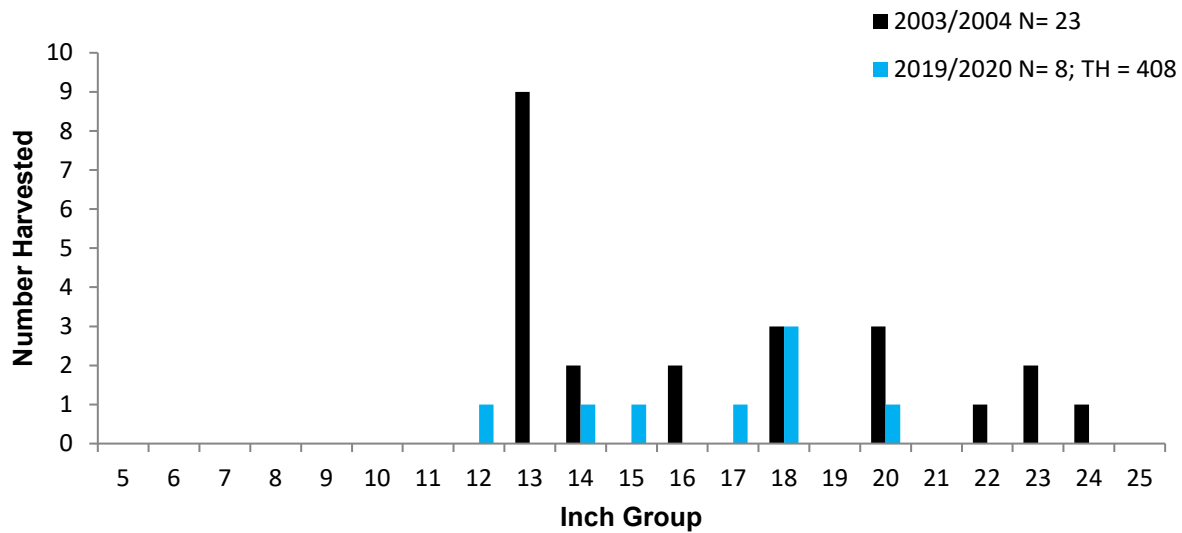


Figure 6. Length frequency of harvested Blue Catfish observed during creel surveys at Grapevine Reservoir, Texas, June 2003 through May 2004 and September 2019 through March 2020, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Channel Catfish

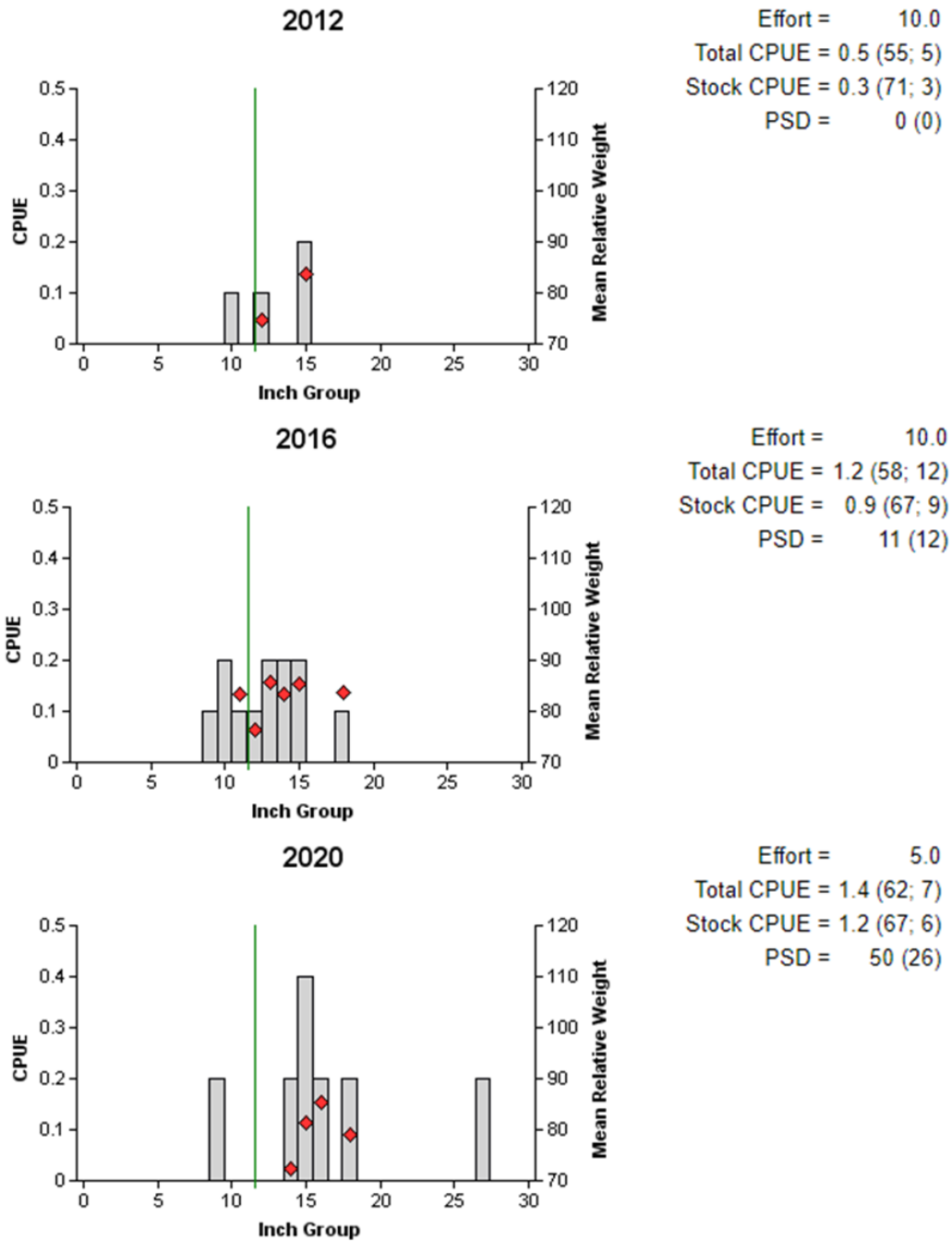


Figure 7. Number of Channel Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2012, 2016, 2020. Vertical line represents length limit at time of sampling.

Table 9. Creel survey statistics for Catfish at Grapevine Reservoir, Texas, from September 2019 through March 2020. Total catch per hour is for anglers targeting Catfish (Blue and Channel) and total harvest is the estimated number of Catfish (Blue and Channel) harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6,684
Directed effort (h)	1301.3 (40)
Directed effort/acre	0.2
Total catch per hour	0.3 (84)
Total harvest	872.6
Harvest/acre	0.13
Percent legal released	18

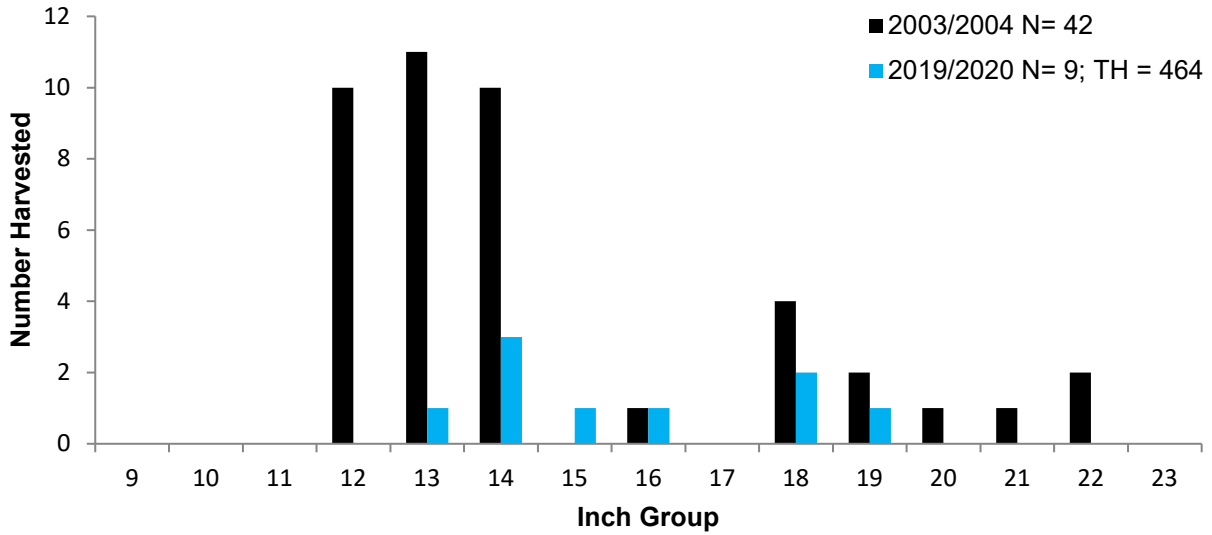


Figure 8. Length frequency of harvested Channel Catfish observed during creel surveys at Reservoir, Texas, June 2003 through May 2004 and September 2019 through March 2020, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

White Bass

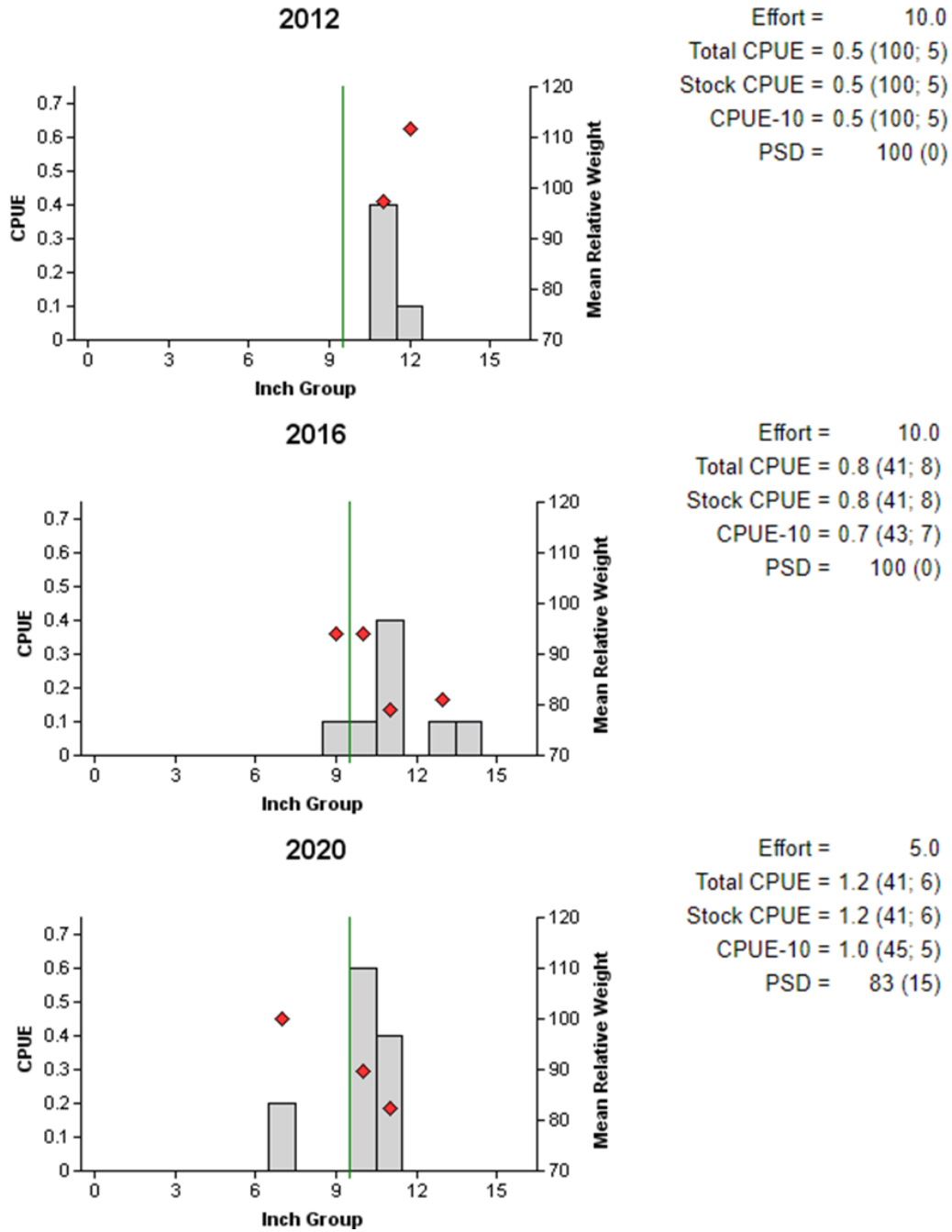


Figure 9. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2012, 2016, and 2020. Vertical line represents length limit at time of sampling.

Table 10. Creel survey statistics for White Bass at Grapevine Reservoir, Texas, from September 2019 through March 2020. Total catch per hour is for anglers targeting White Bass and total harvest is the estimated number of White Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6,664
Directed effort (h)	3,701 (30)
Directed effort/acre	0.56 (30)
Total catch per hour	3.4 (27)
Total harvest	3,760.2 (46)
Harvest/acre	0.56 (46)
Percent legal released	64

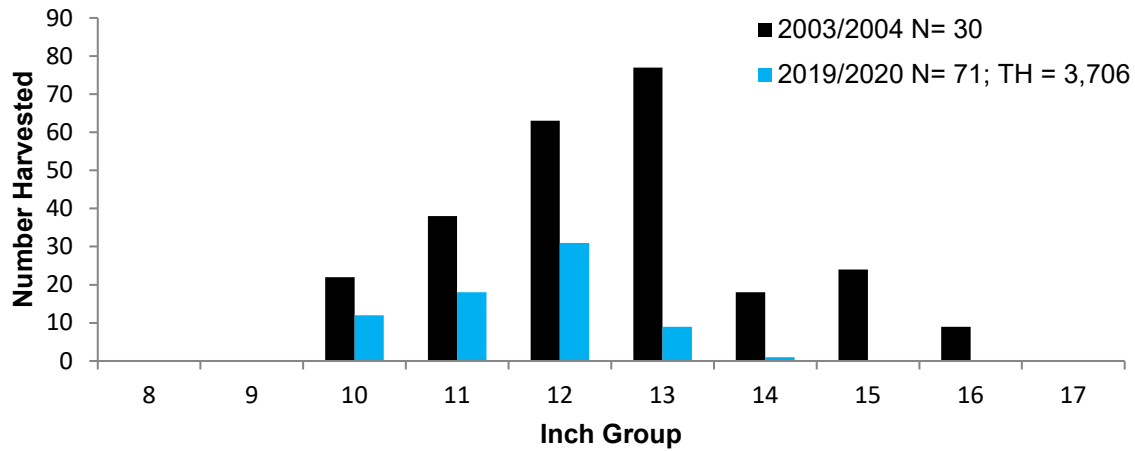


Figure 10. Length frequency of harvested White Bass observed during creel surveys at Grapevine Reservoir, Texas, June 2003 through May 2004 and September 2019 through March 2020 all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Smallmouth Bass

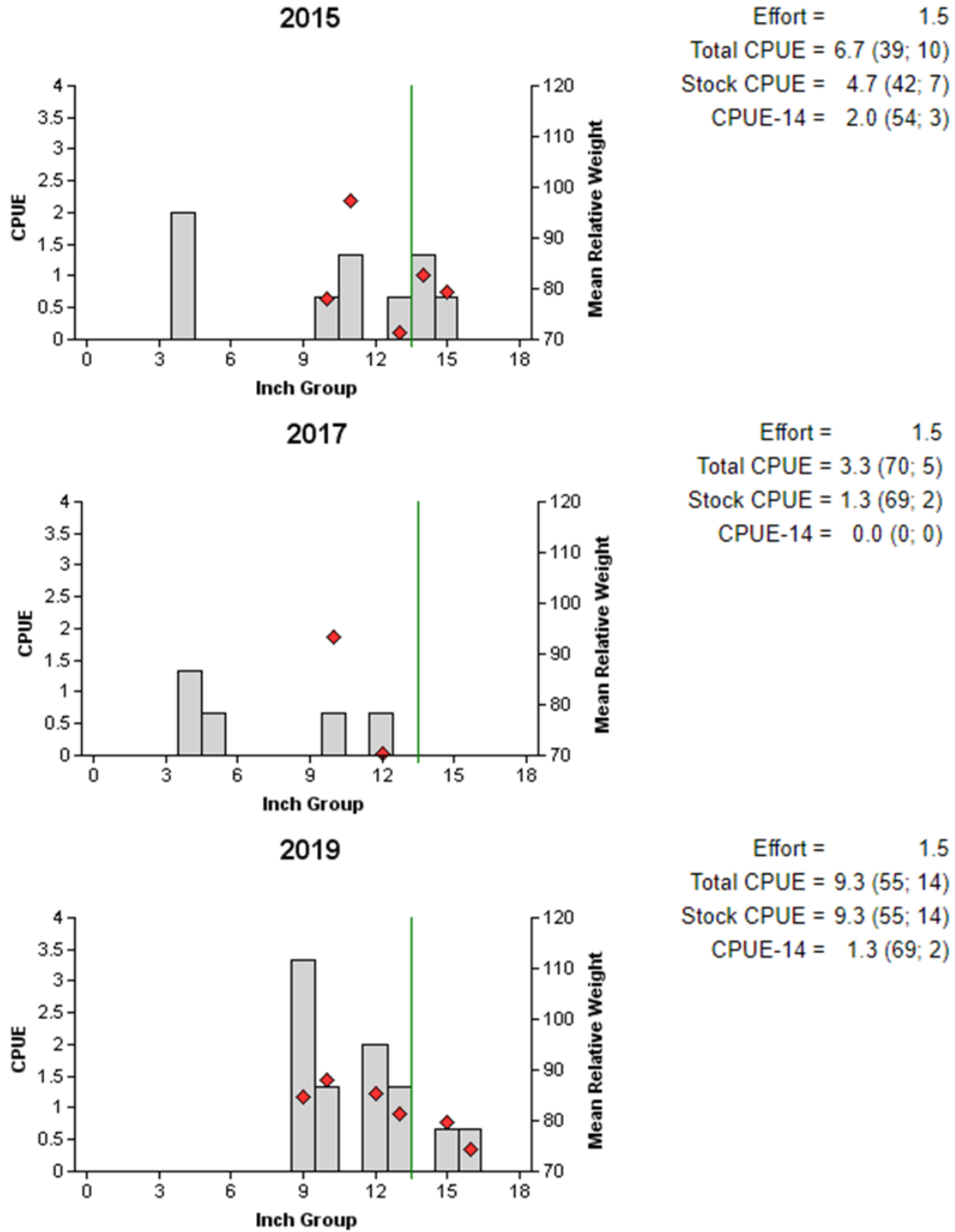


Figure 11. Number of Smallmouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2015, 2017, and 2019. Vertical line represents length limit at time of sampling.

Table 11. Creel survey statistics for Smallmouth Bass at Grapevine Reservoir, Texas, from September 2019 through March 2020. Total catch per hour is for anglers targeting Smallmouth Bass and total harvest is the estimated number of Smallmouth Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6,664
Directed effort (h)	96.9 (121)
Directed effort/acre	0.01 (12)
Total catch per hour	0.0 (0)
Total harvest	0.00 (0)
Harvest/acre	0.0 (0)
Percent legal released	NA

Spotted Bass

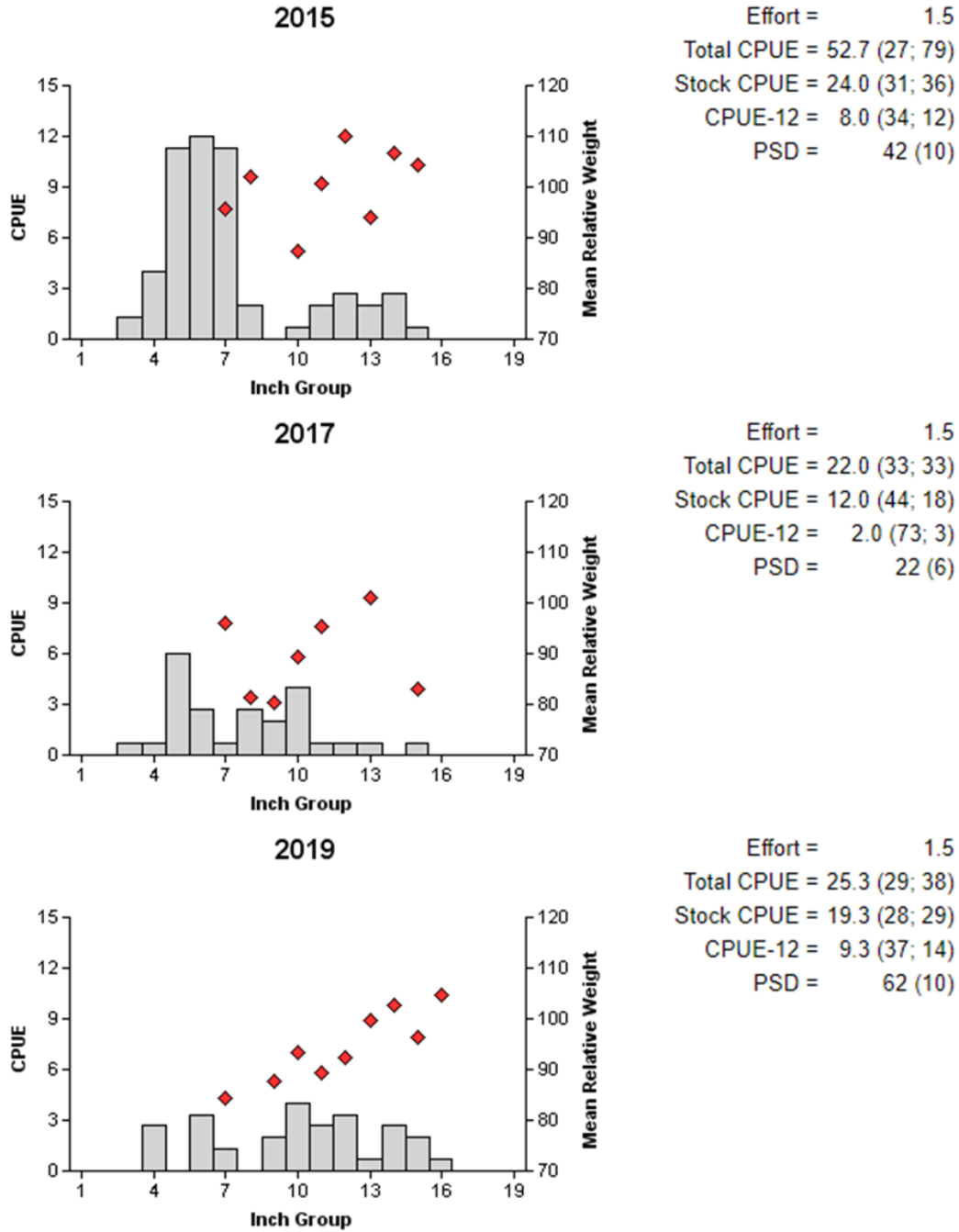


Figure 12. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2015, 2017, and 2019.

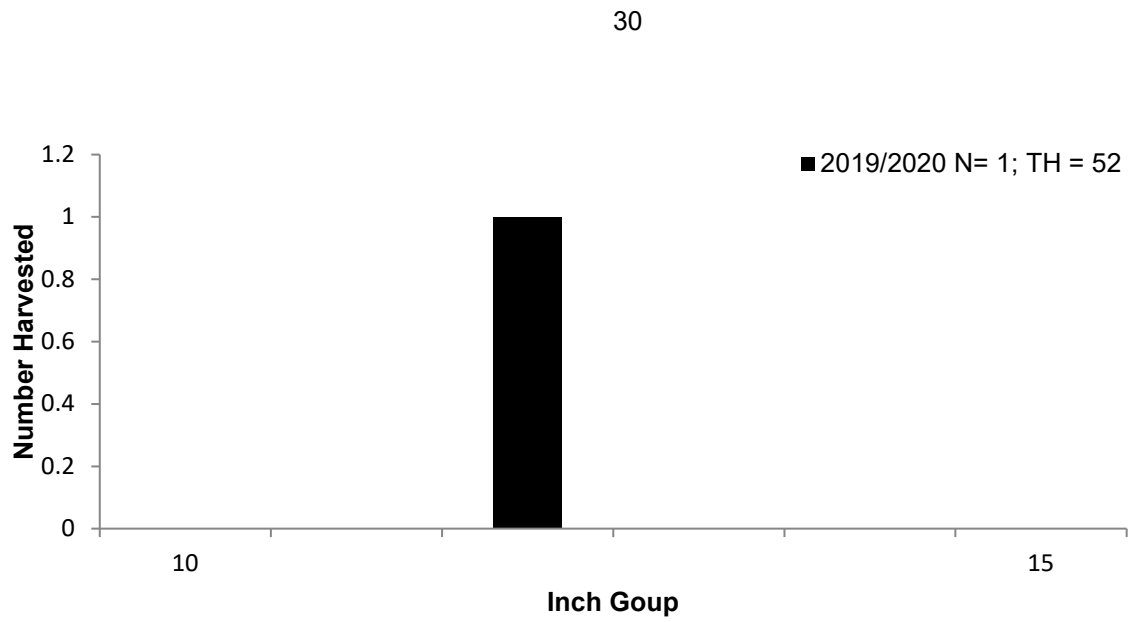


Figure 13. Length frequency of harvested Spotted Bass observed during creel surveys at Grapevine Reservoir, Texas, September 2019 through March 2020, all anglers combined. N is the number of harvested Spotted Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

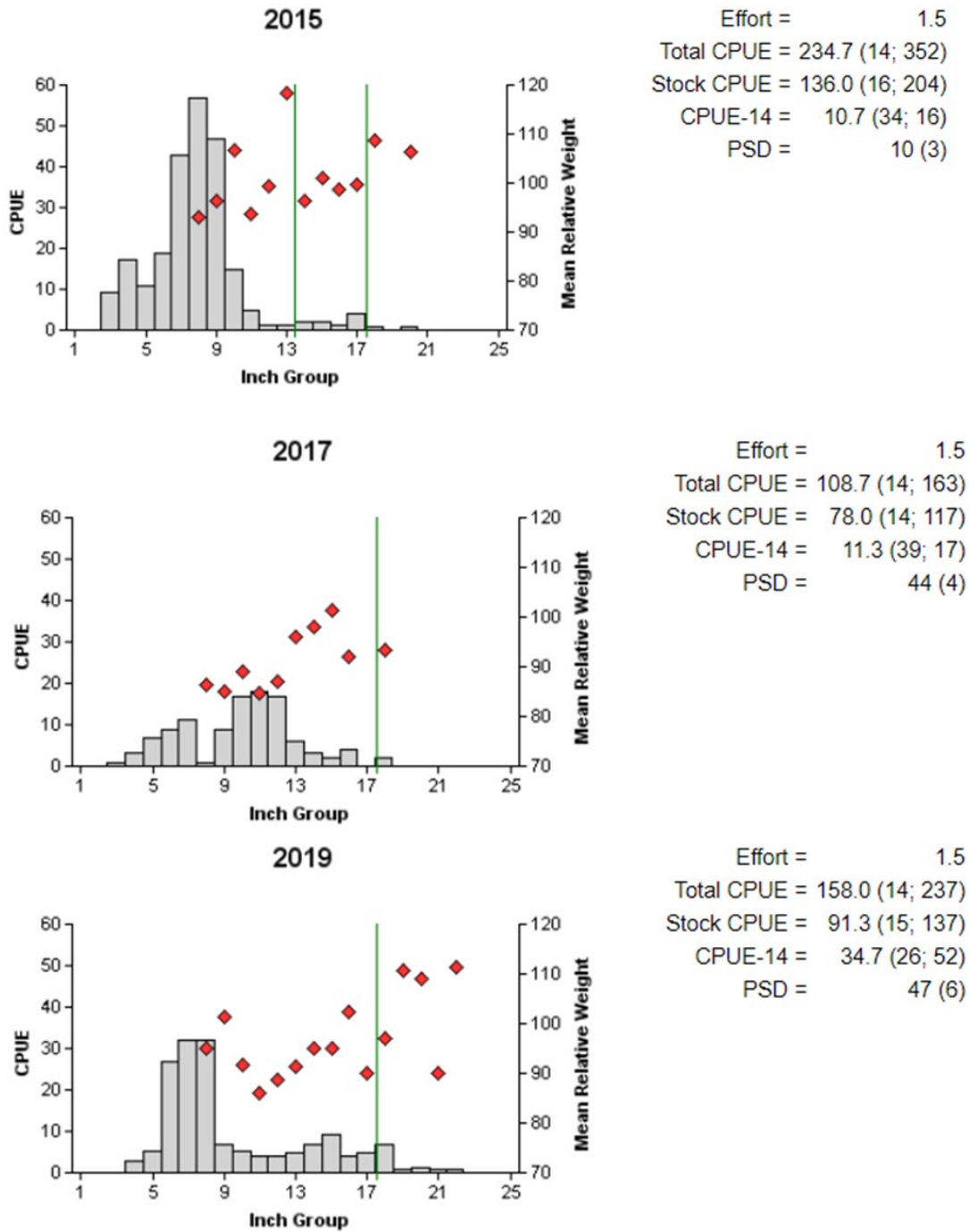


Figure 14. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2015, 2017, and 2019. Vertical line represents length limit at time of sampling. In 2015 length limit was 14-18 inch slot length limit.

Table 12. Creel survey statistics for black basses (Smallmouth, Spotted, and Largemouth) combined for Grapevine Reservoir, Texas, from June 2003 through May 2004 and September 2019 through March 2020. Total catch per hour is for anglers targeting Black Basses (Smallmouth, Spotted, and Largemouth) and total harvest is the estimated number of black basses (Smallmouth, Spotted, and Largemouth) harvested by all anglers. Percent legal released is for Largemouth Bass only. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6,664
Directed effort (h)	14,959.1 (22)
Directed effort/acre	2.24 (22)
Total catch per hour	0.59 (18)
Total harvest	1,363.0 (NA)
Harvest/acre	0.20 (NA)
Percent legal released	90

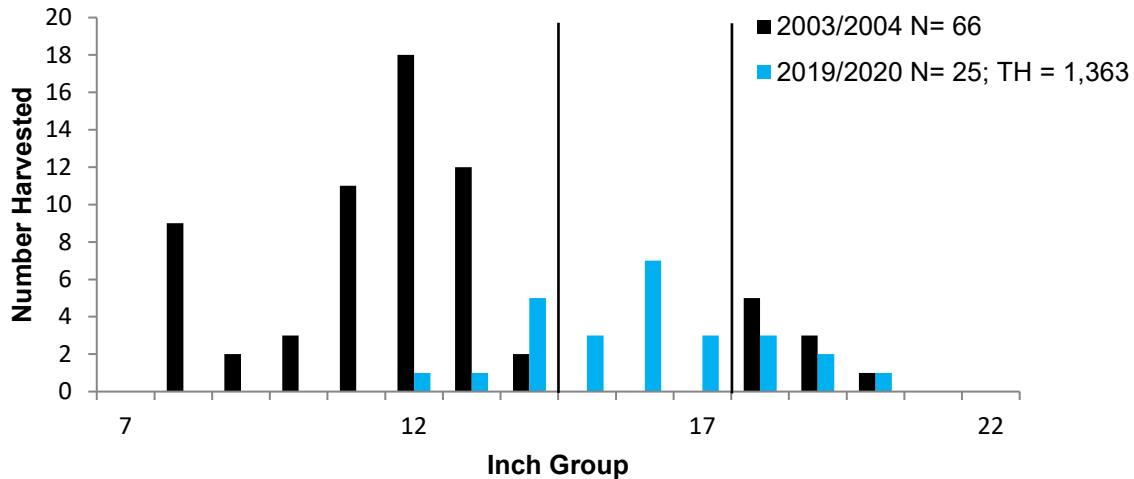


Figure 15. Length frequency of harvested Largemouth Bass observed during creel surveys at Grapevine Reservoir, Texas, June 2003 through May 2004, and September 2019 through March 2020, all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical lines represent slot length limit regulation that was in place until 2016.

Table 13. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Grapevine Reservoir, Texas, 2011 and 2015. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB.

Year	Sample size	Number of fish				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
2011	30	0	1	NA	1	37	0
2015	29	0	0	21	8	29	0

White Crappie

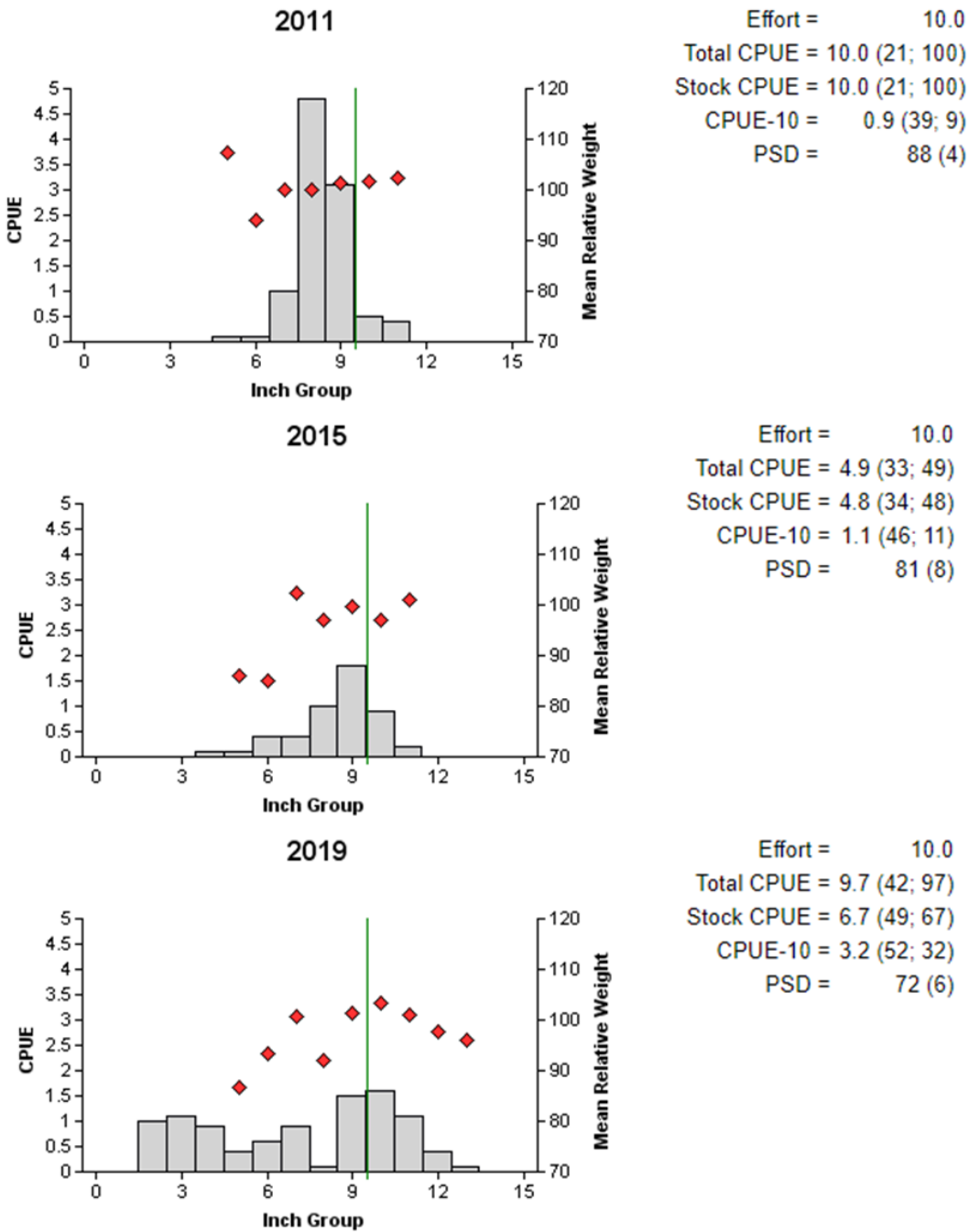


Figure 16. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Grapevine Reservoir, Texas, 2011, 2015, and 2019. Vertical line indicates minimum length limit.

Table 14. Creel survey statistics for crappie at Grapevine Reservoir, Texas, from June 2009 through May 2010, and June 2019 through March 2020. Total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year
	2019/2020
Surface area (acres)	6,664
Directed effort (h)	1,780.60 (36)
Directed effort/acre	0.27 (36)
Total catch per hour	5.6 (25)
Total harvest	2,770 (54)
Harvest/acre	0.22 (54)
Percent legal released	37

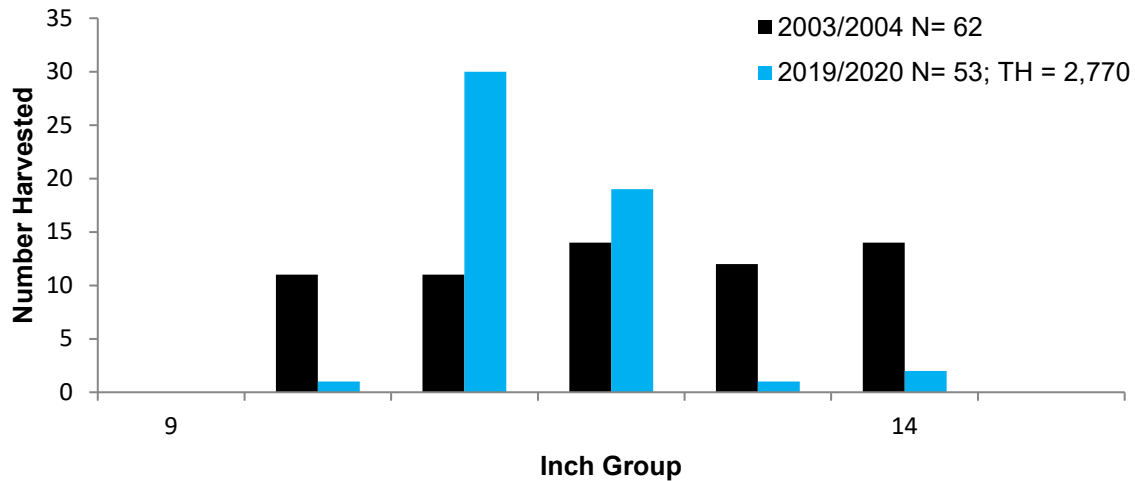


Figure 17. Length frequency of harvested White Crappie observed during creel surveys at Grapevine Reservoir, Texas, June 2003 through May 2004, and September 2019 through March 2020, all anglers combined. N is the number of harvested White Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Proposed Sampling Schedule

Table 15. Proposed sampling schedule for Grapevine 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.

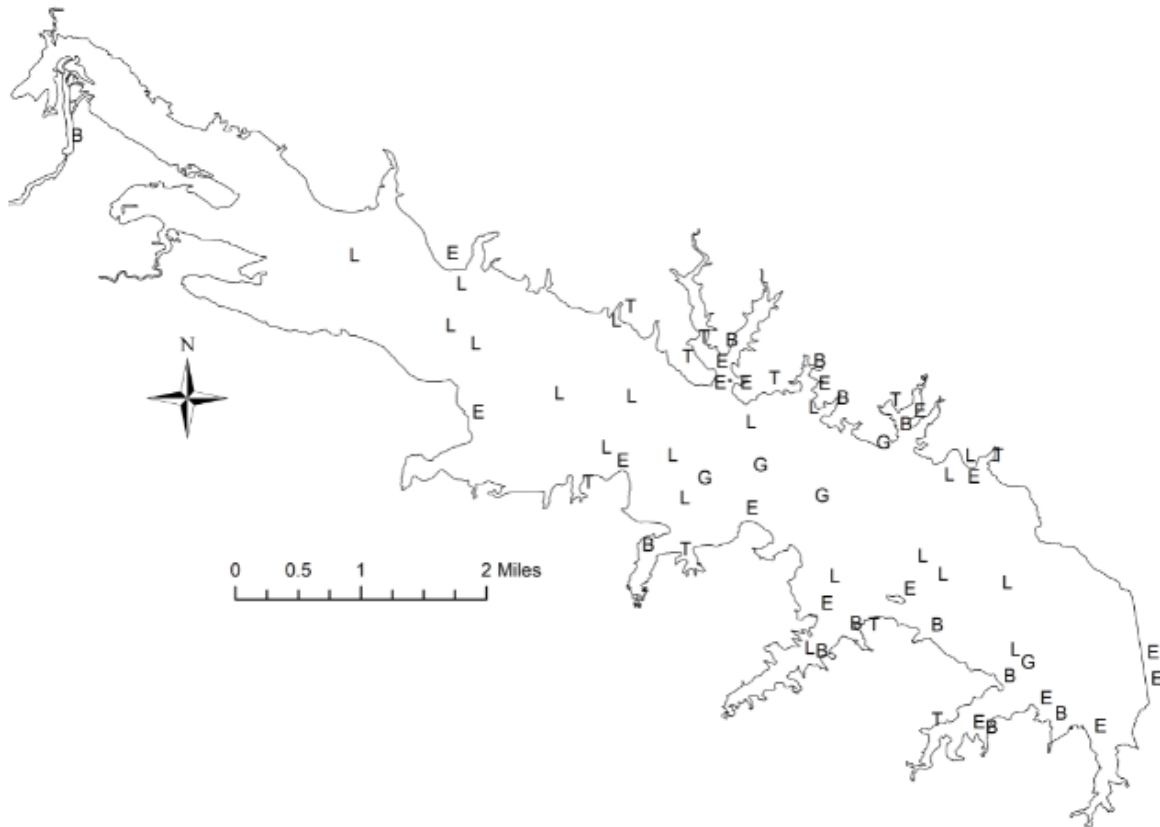
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Creel				A
Vegetation				
Electrofishing – Fall		A		S
Electrofishing – Spring		A		A
Trap netting				S
Low Frequency Electrofishing – Summer		A		S
Report				S

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of most species collected from all gear types from Grapevine Reservoir, Texas, 2019-2020. Sampling effort was 10 net nights for gill netting, 10 net nights for trap netting, and 1.5 hours for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing		Low Frequency Electrofishing	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Longnose Gar	1	0.2 (100)						
Gizzard Shad	95	19 (22)			1,045	696.7 (18)		
Threadfin Shad	5	1 (100)			341	227.2 (56)		
River Carp Sucker	2	0.4 (100)						
Smallmouth Buffalo	31	6.2 (55)						
Blue Catfish	45	9.0 (33)					172	102 (14)
Channel Catfish	7	1.4 (62)						
White Bass	6	1.2 (41)						
Bluegill					930	620.0 (18)		
Longear Sunfish					166	110.7 (27)		
Redear Sunfish					2	1.3 (100)		
Smallmouth Bass					14	9.3(55)		
Spotted Bass					38	25.3 (29)		
Largemouth Bass					257	158.0 (14)		
White Crappie			97	9.7 (42)				
Black Crappie			7	0.7 (37)				

APPENDIX B – Map of sampling locations and boat ramps



Location of sampling sites, Grapevine Reservoir, Texas, 2019-2020. Trap net, gill net, low frequency electrofishing, electrofishing stations, and boat ramps are indicated by T, G, L, E, and B respectively. Water level was near or above full pool at time of all surveys.

APPENDIX C – Continued

Appendix C continued.

Gear	Species	Year						
		2013	2015	2016	2017	2019	2020	Ave
Gill Netting (fish/net night)	Blue Catfish			5.9			9.0	4.0
	Channel Catfish			1.2			1.4	2.8
	White Bass			0.8			1.2	2.6
Electrofishing (fish/hour)	Gizzard Shad	678.7	616.7		523.3	696.7		437.8
	Threadfin Shad	578.0	494.7		406.7	227.3		250.0
	Bluegill	204.7	241.3		296.7	620.0		236.1
	Longear Sunfish	93.3	56.7		70.0	110.7		93.3
	Redear Sunfish	0.7	3.3		0.0	1.3		2.9
	Smallmouth Bass	16.7	6.7		3.3	9.3		3.6
	Spotted Bass	31.3	52.7		22.0	25.3		29.7
	Largemouth Bass	146.0	234.7		108.7	158.0		150.6
Trap Netting (fish/net night)	White Crappie		4.9			9.7		8.3
Low Frequency Electrofishing (fish/hour)					72.6	102.0		87.3



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