

Fayette County Reservoir

2019 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Fayette County Reservoir were surveyed in 2017 and 2019 using electrofishing and in 2019 using hoop nets. Aquatic vegetation was monitored by annual surveys. Historical data are presented with the 2019 data for comparison. This report summarizes results of the surveys and contains a fisheries management plan for the reservoir based on those findings.

- **Reservoir Description:** Fayette County Reservoir is a 2,400-acre impoundment of Cedar Creek; an intermittent stream in the Colorado River watershed. It was constructed in 1978 by the Lower Colorado River Authority (LCRA) for the purpose of supplying cooling water for steam-electric power generation. The reservoir is located in Fayette County, approximately seven miles east of La Grange, Texas, and lies within the Post Oak Savannah ecological area.

Water in the reservoir is maintained at a near-constant level (1-2 ft. annual fluctuation) through pumping from the Colorado River. Surrounding shoreline is mostly undeveloped. Shoreline length is approximately 20 miles. Structural habitat consisted primarily of natural shoreline and rocky shoreline.

- **Management History:** Important sportfish include Largemouth Bass and Channel Catfish species. Florida Largemouth Bass were stocked into nursery ponds during 1977 prior to reservoir filling. Largemouth Bass have been managed since 1979 with several differing length limit regulations; but currently managed under a 16- to 24-inch slot length limit with a 5-fish daily bag, only one over 24 inches may be retained.

Trap netting for White Crappie was not performed due to historically low catch rates and the high cost/benefit ratio associated with collecting these data. Crappie have not been collected with any gear type since the early 1990s. There was no directed angling effort for crappie.

A volunteer angler survey was conducted from October 2004 to May 2006 to determine catch trends and length distribution of trophy Largemouth Bass and other species.

Aquatic vegetation habitat surveys have been conducted annually to monitor invasive species and evaluate angler access conditions.

- **Fish Community**
 - **Prey species:** Bluegill, Gizzard Shad, and Threadfin Shad were the predominant prey species. Catch rates for Bluegill, Gizzard Shad, and Threadfin Shad had increased since the last two surveys.
 - **Channel Catfish:** Channel Catfish abundance was very low.
 - **Largemouth Bass:** Largemouth Bass abundance declined compared to the previous two surveys, but the population was in excellent condition and the population size structure was good.

Management Strategies: Based on current information, the reservoir should continue to be managed with existing regulations. Conduct an additional electrofishing and hoop net survey in 2021-2022, a spring and summer creel survey in 2021, and general monitoring surveys with hoop nets and electrofishing surveys in 2023-2024. Aquatic vegetation surveys should be conducted biennially to monitor invasive species.

Introduction

This document is a summary of fisheries data collected from Fayette County Reservoir in 2016-2019. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fish was collected, this report deals primarily with major sportfish and important prey species. Historical data are presented with the 2016-2019 data for comparison.

Reservoir Description

Fayette County Reservoir when full, is a 2,400-acre impoundment of Cedar Creek; an intermittent stream in the Colorado River watershed. It was constructed in 1978 by the Lower Colorado River Authority for the purpose of supplying cooling water for steam-electric power generation. This is a stable-level reservoir (conservation level is 390 feet above mean sea level). The reservoir is eutrophic with a mean TSI chl-*a* of 66.6, and a 10-year change of +4.5 (Texas Commission on Environmental Quality 2020). The reservoir is located in Fayette County, approximately seven miles east of La Grange, Texas. The reservoir lies within the Post Oak Savannah ecological area.

Water in the reservoir is maintained at a near-constant level (1-2 ft. annual fluctuation). During periods of low rainfall, water is pumped into the reservoir from the Colorado River. The shoreline surrounding the reservoir was undeveloped and shoreline length was approximately 20 miles. Fayette County Reservoir was opened to fishing in 1979. Other descriptive characteristics for Fayette County Reservoir are in Table 1.

Angler Access

Shoreline access was limited within LCRA park boundaries, with main access by fishing pier in two parks. Multi-lane concrete boat ramps were located within both parks, offering adequate boat access to the reservoir. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Farooqi and De Jesus 2016) included:

1. Monitor the Channel Catfish population with hoop nets in 2017 and 2019 to determine abundance and population size structure for trend analysis.
Action: The Channel Catfish population was sampled with hoop nets in 2017 and 2019.
2. If the hoop net data is insufficient to manage the population, consider conducting a spring and summer creel survey in 2019.
Action: A creel survey was not conducted at Fayette County Reservoir as priority was given to conduct a 2019 year-long creel survey of Buchanan Reservoir.
3. Continue annual aquatic vegetation surveys to monitor aquatic vegetation coverage with particular attention to hydrilla and Eurasian watermilfoil
Action: Annual aquatic vegetation surveys were conducted from 2016 to 2019.
4. Continue biennial fall electrofishing surveys to monitor the Largemouth Bass population.
Action: Fall electrofishing surveys were conducted in 2017 and 2019.
5. Educate the public about invasive species through the use of media and the internet.
Action: Outreach efforts regarding invasive species included the district's Facebook page, press releases, and multiple television interviews.

6. Make a speaking point about invasive species when presenting to constituent and user groups.
Action: Issues related to invasive species were raised at public presentations, and through informal staff interactions with constituents.
7. Keep track of (i.e., map) future inter-basin water transfers to facilitate potential invasive species responses.
Action: There are no plans for inter-basin water transfers at Fayette County Reservoir.

Harvest regulation history: Sportfish in Fayette County Reservoir were managed with statewide regulations with the exception of Largemouth Bass. From 1979 to 1985, Largemouth Bass were managed with a 16-inch minimum length limit. Slot length limits have been implemented since September 1, 1985 to increase abundance of bass greater than 14 inches in length; increase angler catches of bass greater than 14 inches in length; and re-direct harvest at individuals less than 14 inches in length. A 14- to 24-inch slot length limit with a 5-fish daily bag, only 1 over 24-inches was implemented on September 1, 1995 to limit the harvest of very large fish. In 2018, as a result of a statewide review of existing harvest regulations for Largemouth Bass, a 16- to 24-inch slot length limit with a 5-fish daily bag, and only 1 over 24-inches was implemented on September 1, 2018 for Fayette County Reservoir. Current regulations are found in Table 3.

Stocking history: Florida Largemouth Bass and catfish were important species stocked. Florida Largemouth Bass were last stocked in 1994 and Channel Catfish were last stocked in 2018. A complete stocking history is shown in Table 4.

Vegetation/habitat management history: Fayette County Reservoir supported a mix of aquatic vegetation species. With the exception of 2011, aquatic vegetation surveys were conducted every summer from 2007 to 2019. Historically, aquatic vegetation coverage has been variable and has remained at $\leq 10\%$; marine naiad (*Najas marina*) has been the dominant species (Farooqi and De Jesus 2016). The exotic plant hydrilla (*Hydrilla verticillata*) was present in this reservoir.

Water Transfer: There were no inter-basin water diversion structures at Fayette County Reservoir.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Fayette County 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 electrofishing (1 hour at 12, 5-min stations; Appendix A). Sampling in 2017 was bass-only. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were to be determined by a category-2 evaluation requiring otoliths from 13 randomly selected fish ranging in size from 13.0 to 14.9 inches. (TPWD, Inland Fisheries Division, unpublished manual revised 2017). However, only seven fish were available in that size range.

Tandem hoop nets – Channel Catfish were collected using a total of 9 tandem hoop net series at 9 stations. Nets were baited with © Zote soap and deployed for 2-night soak duration. CPUE 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 from 2005 through 2019 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 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

Habitat – A structural habitat and vegetation survey was conducted in 2019. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Results and Discussion

Habitat: In 2019, littoral zone structural habitat consisted primarily of natural shoreline and rocky shoreline at 71.9% and 25.7% respectively (Table 6, Appendix B). Total native vegetation coverage (103 acres; predominantly water stargrass) constituted 3.4% of the reservoir's surface area compared to less than 0.8% coverage by non-native vegetation (Table 7; Appendix C). Total aquatic vegetation coverage in this reservoir from 2016 to 2020 was considerably less than that considered optimum for productive fisheries (Durocher et al. 1984, Dibble et al. 1996) and this has been the case historically. Since 2013, coverage of hydrilla has remained less than 3.0% of the reservoir's surface area. Eurasian watermilfoil was documented in 2012 (0.5 acres), but it has not been observed in subsequent annual surveys.

Prey species: Bluegill, Gizzard Shad, and Threadfin Shad were the predominant prey species in 2019 (Appendix D). Redear Sunfish, Tilapia and Rio Grande Cichlid were also available as forage. In the latter case, a new waterbody record (rod and reel) was established in 2019 (0.85 pounds, 9.6 inches).

Total CPUE of Gizzard Shad in 2019 (92.0/h) was higher than in the 2015 (55.3/h) and 2011 (14.7/h) surveys (Figure 1). In 2019, the IOV for Gizzard Shad was 23, indicating that 23% of the Gizzard Shad population was of vulnerable size (≤ 8 inches) and available to existing predators. By comparison, the IOV was 16 in 2015, 64 in 2011 and zero in 2007 (Farooqi and De Jesus 2016). Low Gizzard Shad catch

rates have been characteristic of this reservoir. Threadfin Shad were collected at the rate of 63/h in 2019 which is higher than in the 2015 survey (24.0/h; Farooqi and De Jesus 2016).

Total CPUE of Bluegill had been on a downward trend over the previous two survey periods, but improved during 2019. Total CPUE in 2019 was 93.0/h compared to 22.0/h in 2015 and 64.0/h in 2011. In 2019 and 2015, population size structure improved, and some larger fish were present (PSD-P was 4.0 and 6.0 respectively; Figure 2). A new waterbody record (rod and reel) for Bluegill was established in 2019 (1.7 pounds, 10.75 inches).

Total CPUE of Redear Sunfish has been in a declining trend since the 2011 survey. In 2019 CPUE was 18.0/h compared to 24.7/h in 2015 and 52.0/h in 2011. In 2019, in addition to there being fewer Redear Sunfish than the previous 2 surveys, the fish tended to be smaller (PSD had significantly declined, and PSD-P and PSD-M were zero; Figure 3). Increased competition for spawning habitat could be a factor. Nevertheless, a new waterbody record (rod and reel) for Redear Sunfish was established in 2019 (1.2 pounds, 10.25 inches).

Channel Catfish: Since 2015, Channel Catfish have been the focus of objective-based sampling procedures using hoop nets. In 2019, total catch rate for Channel Catfish was 0.3/tandem set compared to 0.1/tandem set in 2017, and 1.2/tandem set in 2015 (Figure 4). In all three surveys the sample of stock-size fish has been low and was less than required for precise CPUE estimates ($RSE \leq 25$). Additionally, low sample size precluded representative population size structure metrics.

Previous catch rates based on gill netting had shown a declining trend. Total gill net catch rate for Channel Catfish in 2004, 2008, and 2012 was 14.8/nn, 10.0/nn, and 3.8/nn, respectively (Cummings and De Jesus 2012). The indications are this is a low-density fishery with poor recruitment. Also, anecdotal information suggests that Channel Catfish catch rates and angler satisfaction have declined.

Largemouth Bass: Historically, this reservoir has been characterized by a high-density Largemouth Bass population relative to other bass populations in central Texas reservoirs (Farooqi and De Jesus 2016). In 2019, the total catch rate of Largemouth Bass was 106.0/h, which was lower than that recorded in 2017 (227.3/h) and 2015 (208.7/h; Figure 5). In 2019, the catch rate of Largemouth Bass greater than 16 inches (14.0/h) was lower than that obtained in 2017 (45.9/h) and 2015 (38.0/h). However, during the last six surveys, no fish above the upper slot length limit (24 inches) have been caught.

Although the minimum sample size requirement for a Category 2 evaluation ($n=13$) was not met in 2019 ($n=7$), the data that was collected indicates that some Largemouth Bass in Fayette County Reservoir reached 14 inches in length at age-1 (Figure 6). In 2019, Largemouth Bass were in excellent condition; mean relative weight for almost all size classes of fish was >100 . Population size structure was good; PSD was 62, which was within the range expected for a balanced population (Gabelhouse 1984). Larger fish were also present (PSD-P = 40, PSD-M = 4) and their size distribution was within the preferred range (Gabelhouse 1984). Florida Largemouth Bass influence in this reservoir has remained high during the last four assessments even though the reservoir was last stocked with Florida Largemouth Bass in 1994. In 2019, 94% of the sample contained Florida Largemouth Bass alleles and 40% were pure Florida Largemouth Bass (Table 8).

The long-term status of the Largemouth Bass population in this reservoir was identified as a concern by local Largemouth Bass anglers due to the prevalence and mode of operation of cast netters targeting tilapia. The cast netters work in teams, wading the shoreline to concentrate the fish and then use their cast nets. The bass anglers contend the trampling of vegetation and Largemouth Bass spawning beds is having a significant effect on the Largemouth Bass population. As can be seen from Appendix E, vegetative cover has been quite variable since 2007. The highest coverage was in 2007 (241 acres), but after 2009, total coverage declined to a low of 25 acres in 2016 and then rebounded somewhat from 2017 to 2019. The percentage coverage was a maximum of 10% in 2007 and a minimum of 1% in 2016. After 2009, percentage coverage has been consistent, averaging about 3%.

The preferred level of aquatic vegetation for productive fisheries is considered to be 20-30 % of the reservoir acreage (Durocher et al. 1984, Dibble et al. 1996). In 2007, when vegetative coverage was at its highest in Fayette County Reservoir, it was at least 10% lower than preferred. There are a lot of natural factors that affect vegetation coverage making it difficult to know what impact was made by cast netters wading in the water. It is also difficult to ascertain whether these variations in vegetative coverage could account for a discernable change in bass population dynamics and whether wading could directly impact the production of young-of-the-year Largemouth Bass. If there was a problem with juvenile bass production (fish < 8 inches) we would expect to see low and/or declining numbers of juvenile bass, which does not appear to be the case from an examination of electrofishing length-frequency data collected from 2005 to 2019 (Appendix F). In addition, Appendix G shows the CPUE of juvenile bass from 2005 to 2019. Juvenile bass CPUE was highest in 2006 (109/h) and lowest in 2009 (17/h). The last three surveys have shown the highest production of juvenile bass since 2006. Based on this data, there does not seem to be an issue with juvenile bass production at Fayette County Reservoir. Also, based on W_r , most stock-size fish have been in good to excellent condition from 2005 to 2019 (Appendix F). Thus, the available data shows no deterioration in juvenile bass production and no decline in the condition (W_r) of the population (≥ 8 inches) during the study period, beyond what could be explained due to natural variation. While the total CPUE in 2019 (106.0/h) was lower than in 2017 (227.3/h) and 2015 (208.7/h), it is comparable to the data from 2013 (108.7/h) and 2009 (88.7/h), showing that such wide fluctuations in abundance do occur at this reservoir and that the population can rebound, as occurred post 2013 and 2009.

Fisheries Management Plan for Fayette County Reservoir, Texas

Prepared – July 2020

ISSUE 1: The relatively low total catch rates from hoop netting during the last three surveys suggests a low-density Channel Catfish population with poor recruitment. Hoop netting was seen as a potentially better alternative to gill netting, since previous gill net catch rates for Channel Catfish were in decline from 2004 to 2012. However, hoop netting has also resulted in poor catch rates raising questions about gear efficiency. Historically, the reservoir had been a top destination for catfish anglers in the district.

MANAGEMENT STRATEGIES

1. Monitor the Channel Catfish population with hoop nets in 2021 and 2023 to determine abundance and population size structure, and help assess the efficacy of hoop netting using a three-night sampling period instead of the standard two-night period.
2. Request 9" Channel Catfish be stocked annually at a rate of 25/acre from 2021 to 2023. Request surplus 9" and 12" Channel Catfish if available.
3. Conduct a spring and summer creel survey in 2021 to determine Channel Catfish utilization and whether a more restrictive harvest regulation is required, and also to determine the prevalence of wading cast netters.

ISSUE 2: An examination of annual aquatic vegetation abundance and species composition in Fayette County Reservoir from 2007 to 2019 shows variability, but this was not found to be detrimental to the Largemouth Bass population or angler access. Invasive plant species coverage has been very low. Based on these findings, the frequency of aquatic vegetation sampling surveys can be reduced without compromising the integrity of monitoring efforts.

MANAGEMENT STRATEGIES

1. Conduct biennial aquatic vegetation surveys.
2. Continue biennial fall electrofishing surveys to monitor the Largemouth Bass population.

ISSUE 3: 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. Monitor the status of hydrilla and Eurasian watermilfoil during biennial aquatic vegetation surveys.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) future inter-basin water transfers to facilitate potential invasive species responses.

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

Sportfish, forage fish, and other important fishes

Sportfish in Fayette County Reservoir include Largemouth Bass and Channel Catfish. Known important forage species include Bluegill, Redear Sunfish, Redbreast Sunfish, Gizzard Shad, and Threadfin Shad.

Underutilized or low-density fisheries

Crappie: Hybrid Crappie occur in very low abundance in Fayette County Reservoir and are generally caught incidentally to other targeted species. We will continue collecting and reporting data for these species, and upgrade their status if appropriate.

Blue Catfish: Blue Catfish were stocked in Fayette Reservoir in 1976, 1985, and 1986; and appear to be extirpated. Conditions at this power plant reservoir were unsuitable for the development of a self-sustaining Blue Catfish fishery. Our gill netting surveys have failed to collect Blue Catfish specimens.

Flathead Catfish: Flathead Catfish are present in low abundance based on gill netting surveys conducted between 1999 and 2012. During this time, CPUE-total averaged 0.7 fish/nn, and ranged between 0 and 2.0 fish/nn. A creel survey in 2007 did not capture directed effort for this species, revealing little interest by anglers to pursue this species at Fayette Reservoir. Sampling this population is not a priority in 2020-2024.

White Bass: White Bass are not believed to be present in Fayette Reservoir; however, they are present in the Colorado River drainage, in which this reservoir lies. Gill netting surveys have not captured this species and no incidental catches have been reported in creel surveys nor anecdotally.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are the most popular sportfish in Fayette Reservoir. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Results from a 2007 creel survey showed directed angling effort for Largemouth Bass to be 42.7 hours/acre, and accounted for 83% of the total directed effort. Largemouth Bass are managed with a 16- to 24-inch slot regulation. This lake is known for quality fish and good catch rates (0.97/h in 2007 creel survey). Trend data on CPUE, size structure, and body condition have been collected biennially since 2006 with fall nighttime electrofishing. The population appears to be in good shape, and anglers are anecdotally satisfied with the fishing. Continuation of biennial trend data in this clear reservoir with night electrofishing in the fall will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2021 and 2023, but sampling will continue at random sites until 50 stock-size fish are collected and the RSE of CPUE-S is ≤ 25 (the anticipated effort to meet both sampling objectives is 12-15 stations with 80% confidence). Exclusive of the original 12 random stations, three additional random stations will be pre-determined in the event some extra sampling is necessary. If failure to achieve either objective has occurred after one night of sampling and objectives can be attained with 6-12 additional random stations, another night of effort will be expended.

Channel Catfish: The 2007 creel survey indicated Channel Catfish angling comprised 4.0% of total angling effort (third to Largemouth Bass and anglers fishing for anything). Total directed effort for this species was 4,481 at 1.9 hours/acre. Gill netting total CPUE ranged from 3.8 to 17.2 fish/nn (11.5 fish/nn average) from 1999 to 2012, in a steady declining trend. These data only allowed us to determine presence or absence of the population. To collect information allowing us to monitor size structure and body condition we switched from standard gill nets, set overnight to tandem hoop nets set for two nights. The hoop net results from 2015, 2017, and 2019 indicate a low-density Channel Catfish population. Due to the low catch rates obtained by hoop netting and questions of gear efficacy, we anticipate that setting a minimum of nine tandem hoop nets, with a soak time of three nights, will achieve our sampling objective

(50 Channel Catfish >11 inches; RSE of CPUE-S \leq 25). Sampling with hoop nets will continue biennially until 2023. A minimum of nine randomly selected tandem hoop netting sites will be sampled in summer 2021 and 2023 for three nights, but sampling will continue at random sites until 50 stock-size fish are collected and the RSE of CPUE-S is \leq 25 (the anticipated effort to meet both sampling objectives is nine stations with 75% confidence). Exclusive of the original nine random stations, nine additional random stations will be pre-determined in the event some extra sampling is necessary. If failure to achieve either objective has occurred after one soak session, and objectives can be attained with up to nine additional random stations, another soak session of effort will be expended. A spring and summer creel survey will be conducted in 2021 to evaluate the Channel Catfish Fishery.

Sunfish and Threadfin Shad: Bluegill, Redear Sunfish, Redbreast Sunfish, Gizzard Shad, and Threadfin Shad are the primary forage at Fayette Reservoir. Like Largemouth Bass, trend data on CPUE and size structure of these sunfish have been collected biennially since 1996. Abundance of Threadfin Shad was also measured as a function of CPUE during those surveys, and will remain the main sampling objective to measure Threadfin Shad abundance. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in sunfish relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of sunfish for size structure estimation (PSD and IOV; 50 stock-size fish minimum at 5-12 stations with 80% confidence) but not for relative abundance estimates (RSE \leq 25 of CPUE-Total (CPUE-T); anticipated effort is 25-30 stations). At the sampling effort needed to achieve sampling objectives for Largemouth Bass, the expected RSE for CPUE-T is 30 for sunfish species combined. No additional effort will be expended to achieve an RSE25 for CPUE of sunfish. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density. Relative weight of Largemouth Bass \geq 8" TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

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Tables and Figures

Table 1. Characteristics of Fayette County Reservoir, Texas.

Characteristic	Description
Year constructed	1978
Controlling authority	Lower Colorado River Authority
County	Fayette
Reservoir type	Power cooling
Shoreline development index	Unknown
Conductivity	1159 $\mu\text{S/cm}$

Table 2. Boat ramp characteristics for Fayette County Reservoir, Texas, September 2019. This is a stable-level Reservoir (conservation level is 390 feet above mean sea level).

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
Park Prairie Park	29.945867 -96.747619	Y	91	N/A	Good
Oak Thicket Park	29.947372 -96.727044	Y	96	N/A	Good

Table 3. Harvest regulations for Fayette County Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass: Largemouth	5 ^a	16- to 24-inch slot
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

^a Only one fish over 24 inches may be retained.

Table 4. Stocking history for Fayette County, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) 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, the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Black Crappie x White Crappie	1994	111,979	FRY	0.9
	1996	120,895	FRY	0.9
	1997	118,977	FRY	0.9
	Total	351,851		
Blue Catfish	1976	27,860	UNK	0.0
	1985	6,784	FGL	2.0
	1986	12,150	FGL	2.0
Channel Catfish	Total	46,794		
	1976	96,000	AFGL	7.9
	1985	13,803	AFGL	5.0
	1986	12,070	AFGL	5.0
	2018	2,928	ADL	15.0
	2018	10,248	AFGL	9.6
	2020	123,345	FRY	0.8
Flathead Catfish	Total	258,394		
	1976	12,000		0.0
Florida Largemouth Bass	1977	96,375	FRY	1.0
	1994	208	ADL	12.0

Table 5. Objective-based sampling plan components for Fayette County 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
	Age-and-growth	Age at 14 inches	$N = 13$, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	$N = 30$, any age
Bluegill ^a	Abundance	CPUE – total	RSE – stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
Redear Sunfish ^a	Abundance	CPUE – total	RSE – stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
Gizzard Shad ^a	Abundance	CPUE – total	RSE – stock ≤ 25
	Size structure	Length frequency	$N \geq 50$ stock
	Prey availability	IOV	$N \geq 50$
<i>Tandem hoop netting</i>			
Channel Catfish	Abundance	CPUE – stock	RSE – stock ≤ 25
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Condition	W_r	10 fish/inch group (max)

^a No additional effort will be expended to achieve an RSE ≤ 25 for CPUE and $N \geq 50$ stock of Bluegill, Redear Sunfish, and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of structural habitat types, Fayette County Reservoir, Texas, 2019. Shoreline habitat

type units are in miles and standing timber is acres.

Habitat type	Estimate	% of total
Natural Shoreline	13.7 miles	71.9
Rocky Shoreline	4.9 miles	25.7
Natural Shoreline with Piers and Docks	0.5 miles	2.4
Standing Timber	133.3 acres	5.6

Table 7. Survey of aquatic vegetation, Fayette County Reservoir, Texas, 2016 – 2019. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2016	2017	2018	2019
Native submersed	16.3 (0.70)	129.3 (5.39)	57.7 (2.40)	39.3 (1.60)
Native floating-leaved	1.8 (0.07)	2.8 (0.12)	0.9 (0.04)	1.3 (0.05)
Native emergent				44.4 (1.85)
Non-native				
Eurasian watermilfoil (Tier III)*				
Hydrilla (Tier III)*	6.3 (0.30)	30.3 (1.26)	16.6 (0.70)	1.5 (0.06)

* Tier III is Watch Status

Gizzard Shad

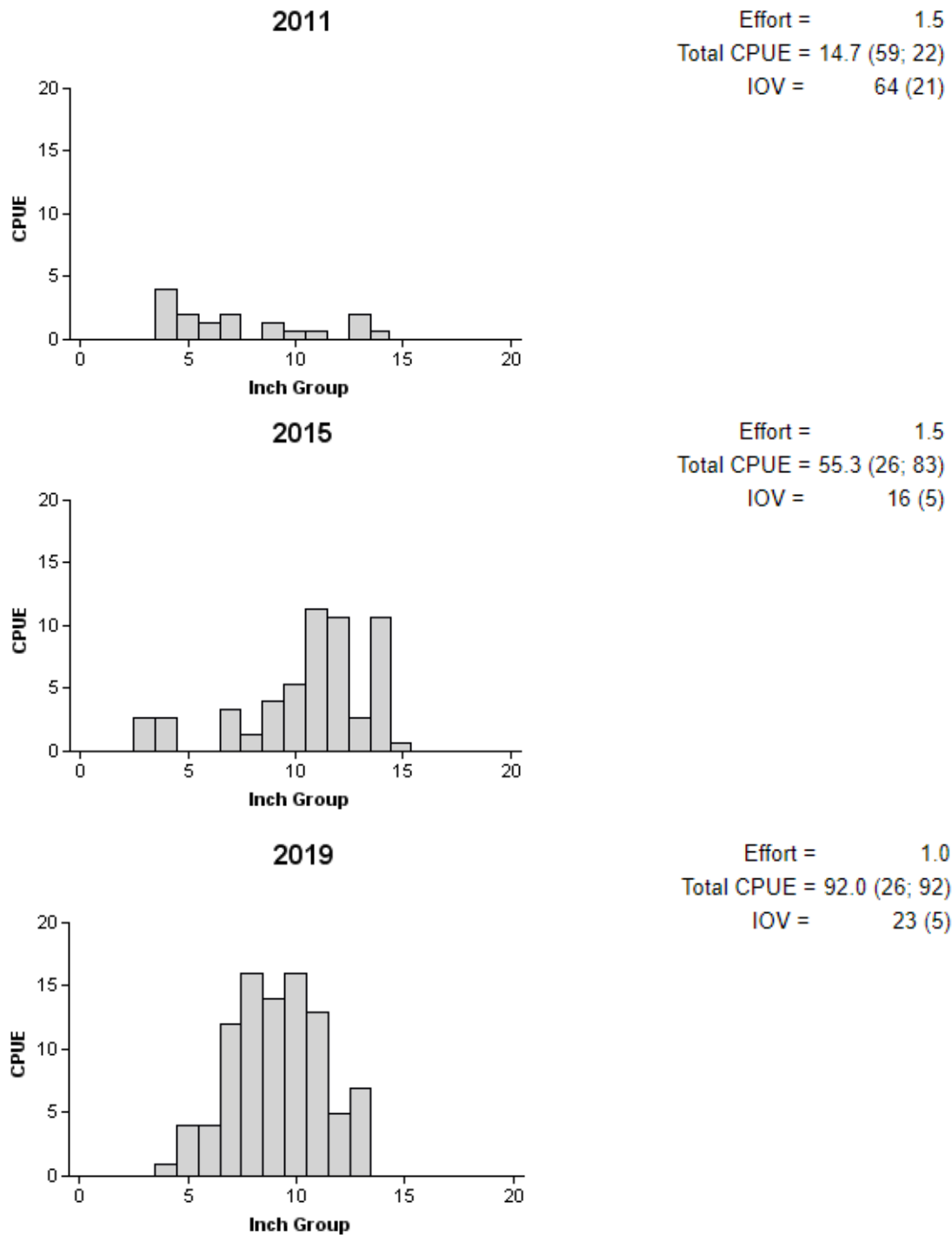


Figure 1. Number of Gizzard Shad caught per hour (CPUE) population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Fayette County Reservoir, Texas, 2011, 2015 and 2019.

Bluegill

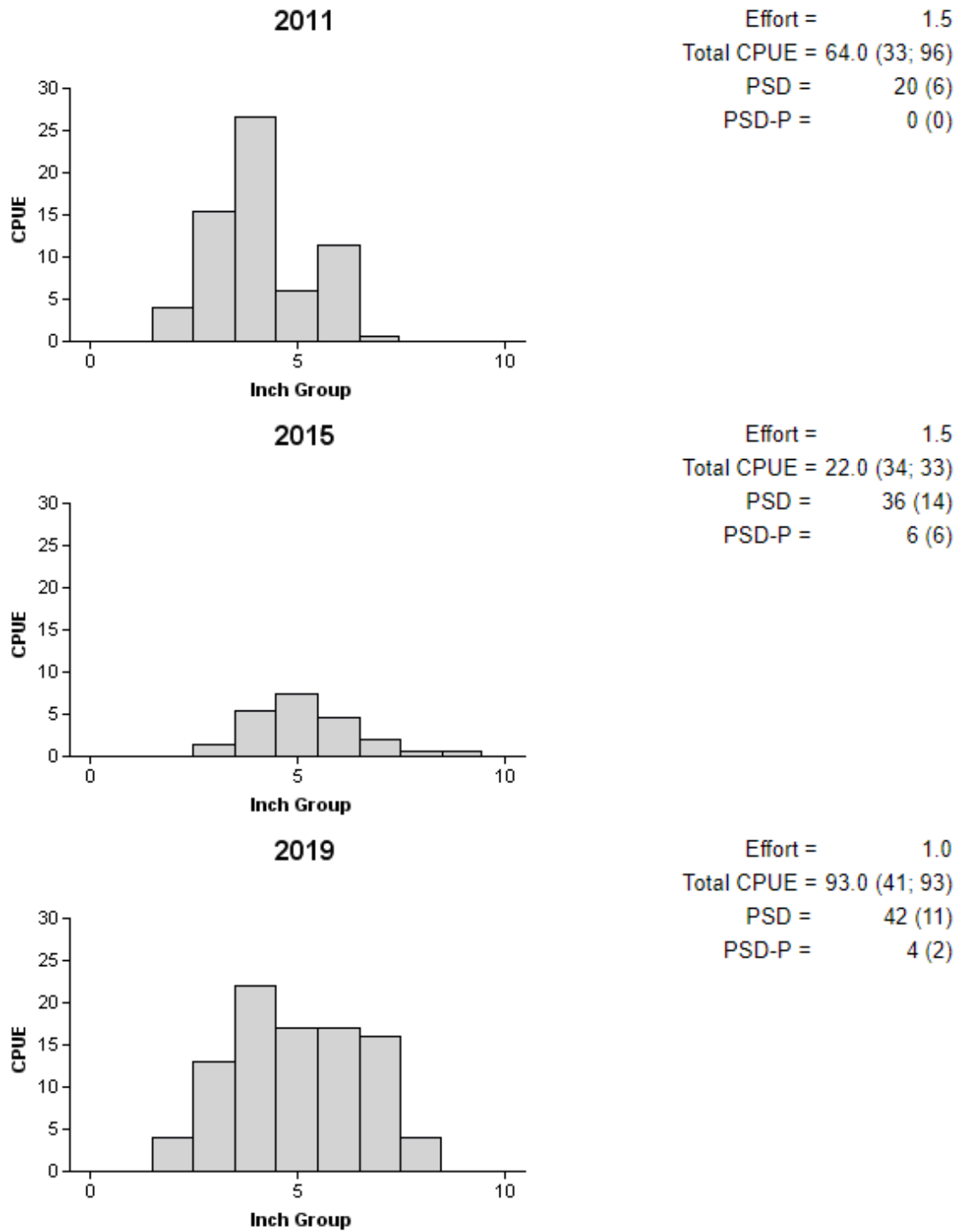


Figure 2. Number of Bluegill caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Fayette County Reservoir, Texas, 2011, 2015 and 2019.

Redear Sunfish

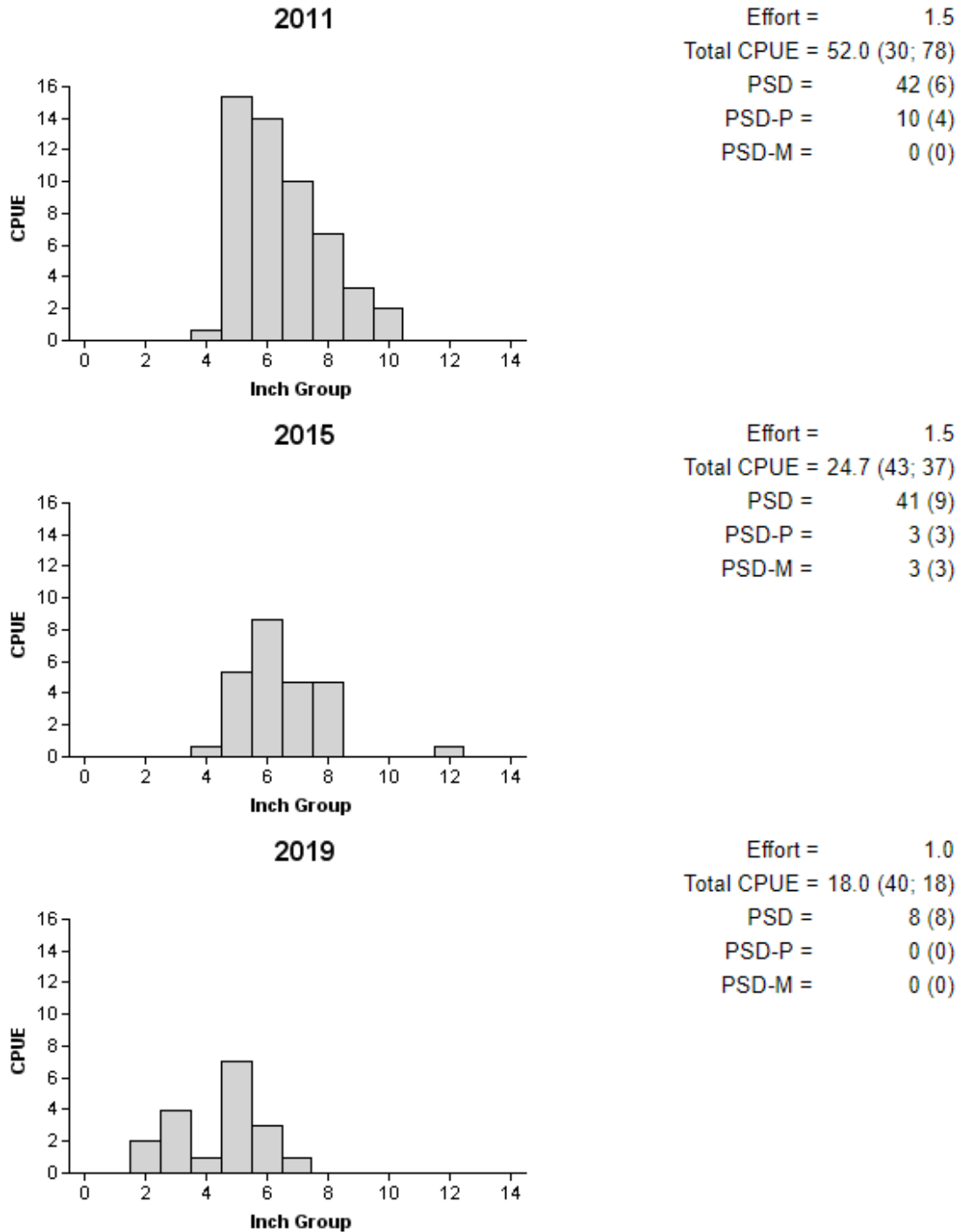


Figure 3. Number of Redear Sunfish caught per hour (CPUE) population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Fayette County Reservoir, Texas, 2011, 2015 and 2019.

Channel Catfish

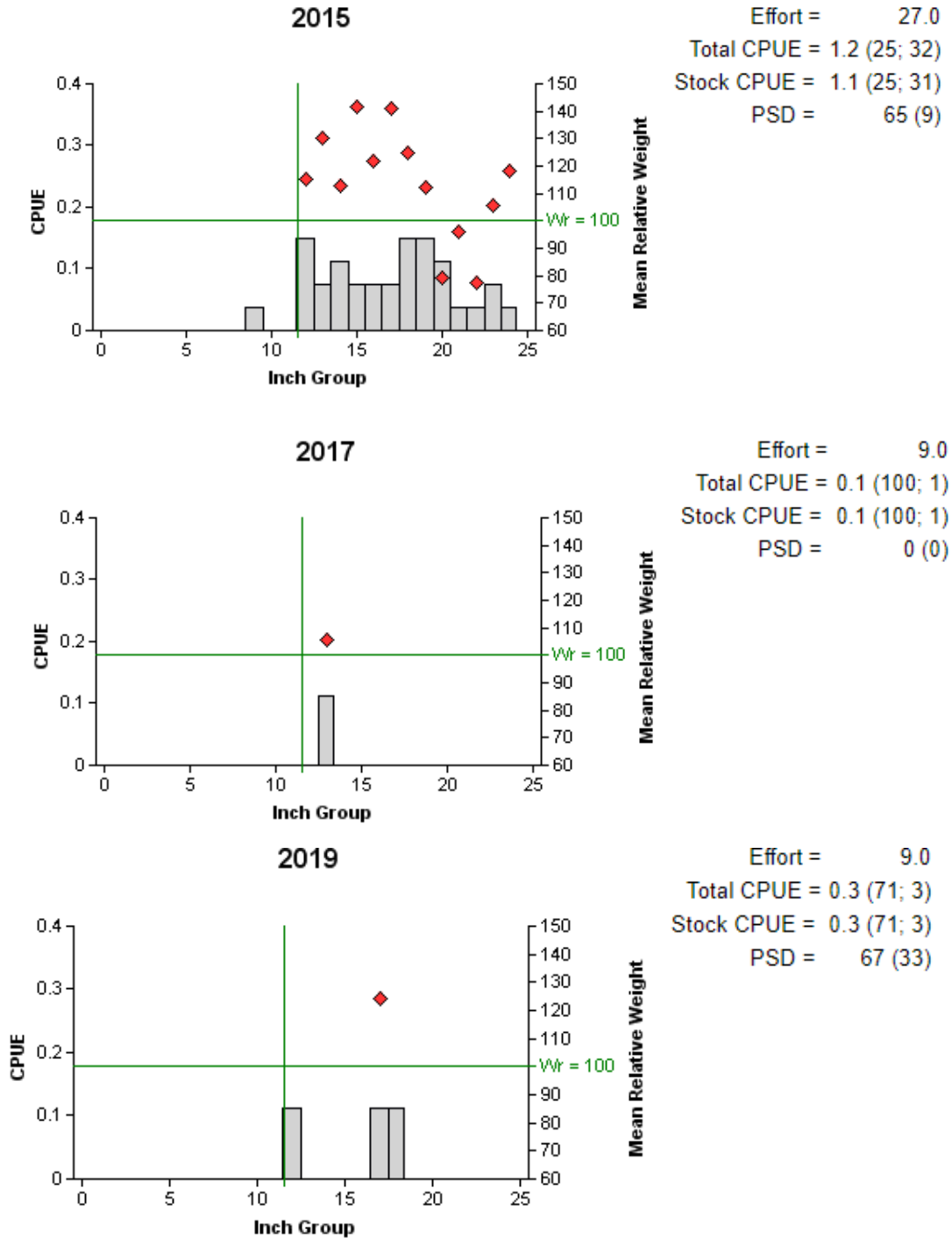


Figure 4. Number of Channel Catfish caught per tandem hoop net series (fish/series; CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for summer hoop net surveys, Fayette County Reservoir, Texas, 2015, 2017, and 2019. Vertical line represents minimum length limit at the time of sampling. The horizontal line represents optimum relative weight.

Largemouth Bass

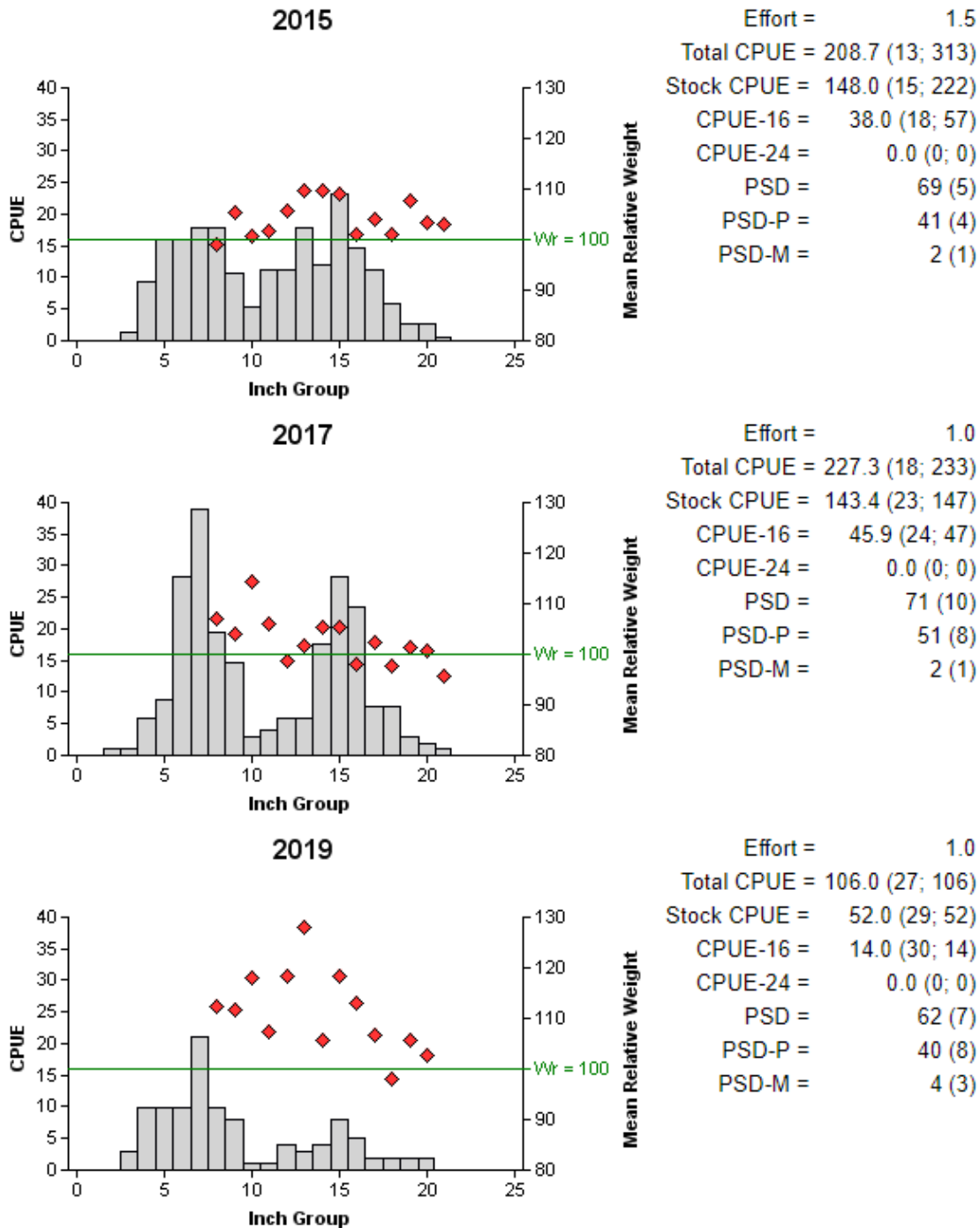


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Fayette County Reservoir, Texas, 2015, 2017 (bass-only), and 2019. The horizontal line represents optimum relative weight.

Largemouth Bass

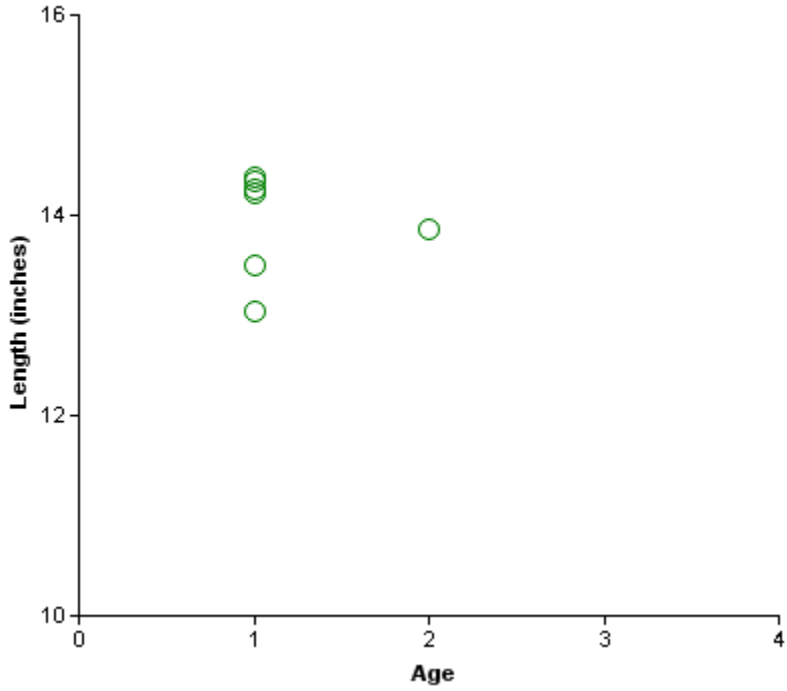


Figure 6. Length at age for Largemouth Bass (n=7) collected by electrofishing at Fayette County Reservoir, Texas, November 2019.

Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Fayette County Reservoir, Texas, 2003, 2007, 2015, and 2019. 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		
2003	30	21	9	0	90.0	70.0
2007	30	12	18	0	93.7	40.0
2015	30	9	21	0	91.0	30.0
2019	30	12	18	0	94.0	40.0

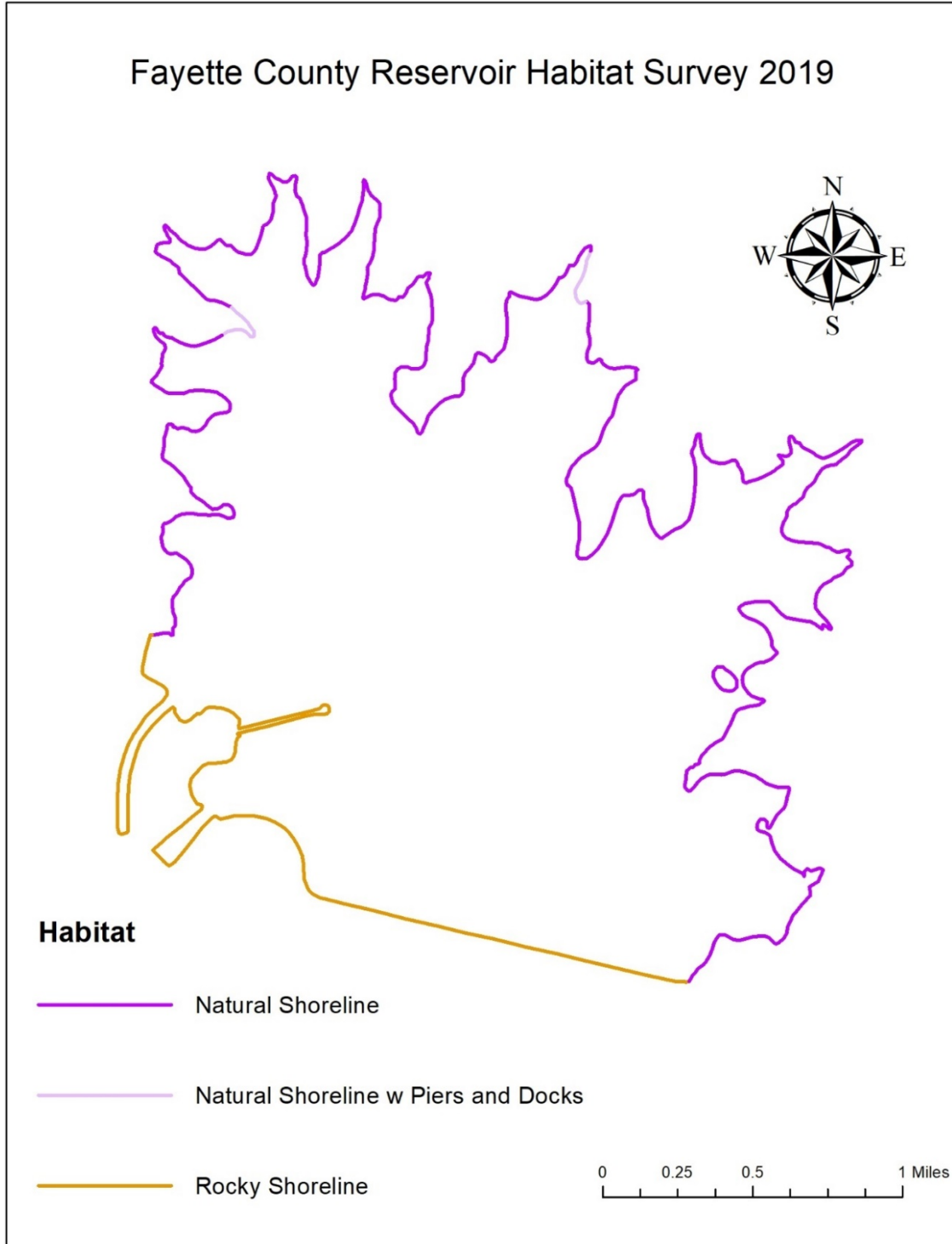
Proposed Sampling Schedule

Table 14. Proposed sampling schedule for Fayette County Reservoir, Texas. Survey period is June through May. Hoop netting surveys are conducted in the summer, and electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

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

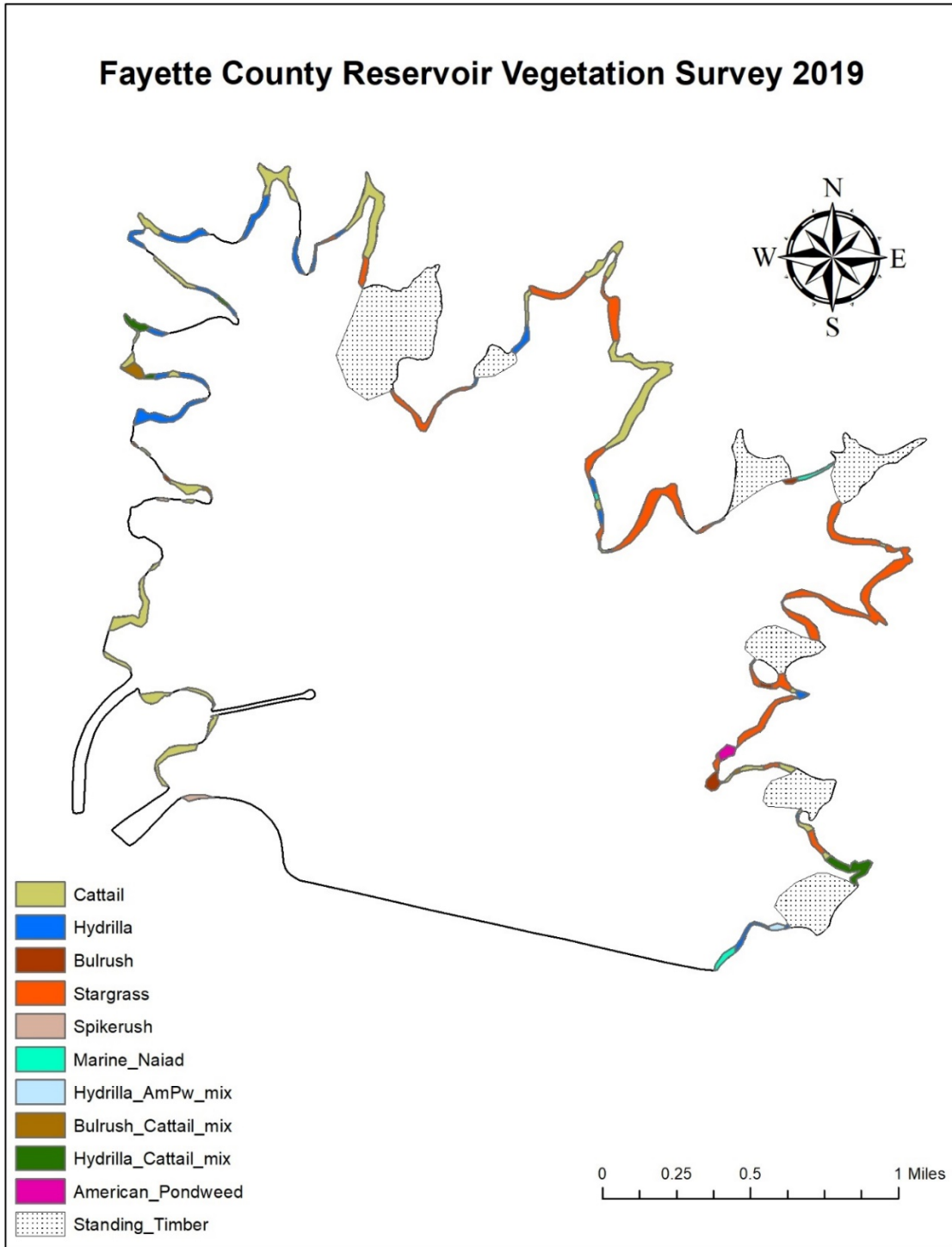
APPENDIX B

Structural habitat survey map for Fayette County Reservoir, Texas, September 2019.



APPENDIX C

Aquatic vegetation survey coverage map for Fayette County Reservoir, Texas, September 2019.



APPENDIX D

Species	Electrofishing		Hoop Netting	
	CPUE	N	CPUE	N
Gizzard Shad	92.0 (26)	92		
Threadfin Shad	63.0 (62)	63		
Channel Catfish			0.3 (71)	3
Green Sunfish	2.0 (100)	2		
Bluegill	93.0 (41)	93		
Redear Sunfish	18.0 (40)	18		
Largemouth Bass	106.0 (27)	106		
Rio Grande Cichlid	10.0 (100)	10		
Tilapia	18.0 (62)	18		

Number (N) and catch rate (CPUE, RSE in parentheses) of all target species collected from all gear types from Fayette County Reservoir, Texas, 2019. Sampling effort was nine net-nights for hoop netting and 1 hour for electrofishing.

APPENDIX E

Summary of aquatic vegetation surveys, Fayette County Reservoir 2007 – 2019

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Acres	241	172	185	73		129	43	47	92	25	163	75	103
Percent Coverage	10	7	7	3	-	5	2	2	4	1	6	3	4
Dominant Species	MN	MN	MN	MN/H Mix	-	MN	MN	MN	MN	MN	WS	MN	CT/WS
Acres	232	162	140	63	-	68	27	23	42	11	69	48	38/37
Coverage	10	7	6	3	-	1	1	2	0.5	3	2	2	2

MN = Marine naiad

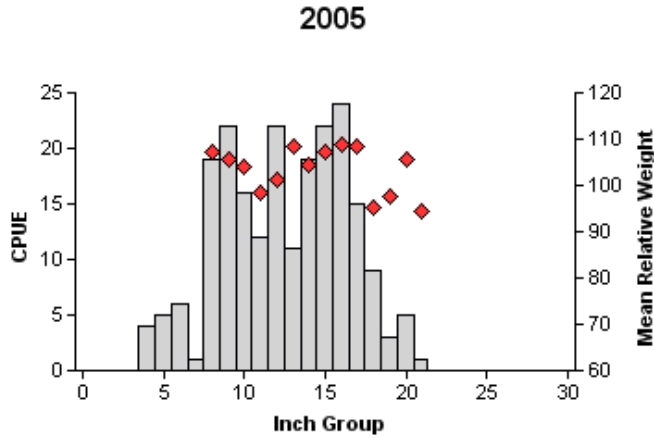
MN/H = Marine naiad and hydrilla mix

WS = Water stargrass

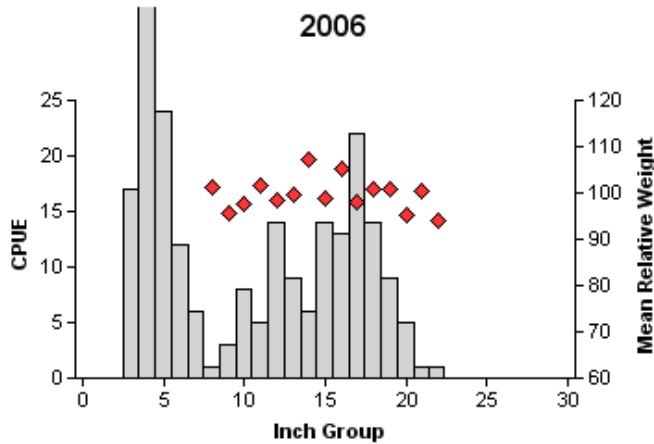
CT = Cattail

APPENDIX F

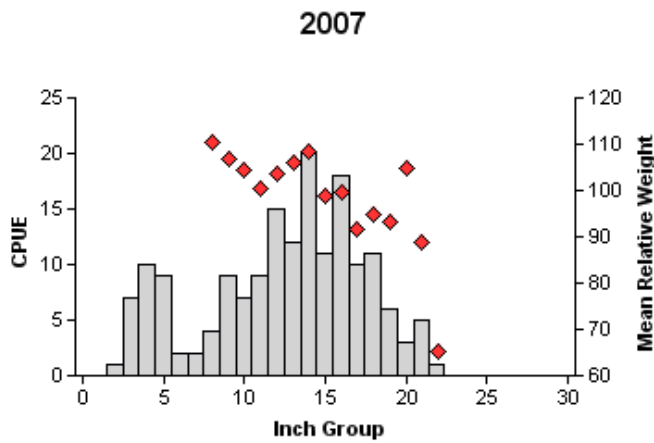
Largemouth Bass electrofishing data, Fayette County Reservoir 2005, 2006, 2007



Effort = 1.0
 Total CPUE = 216.0 (15; 216)
 Stock CPUE = 200.0 (17; 200)



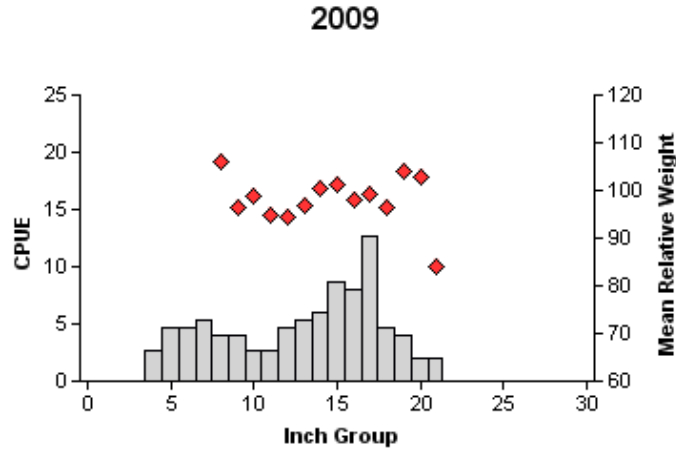
Effort = 1.0
 Total CPUE = 234.0 (30; 234)
 Stock CPUE = 125.0 (13; 125)



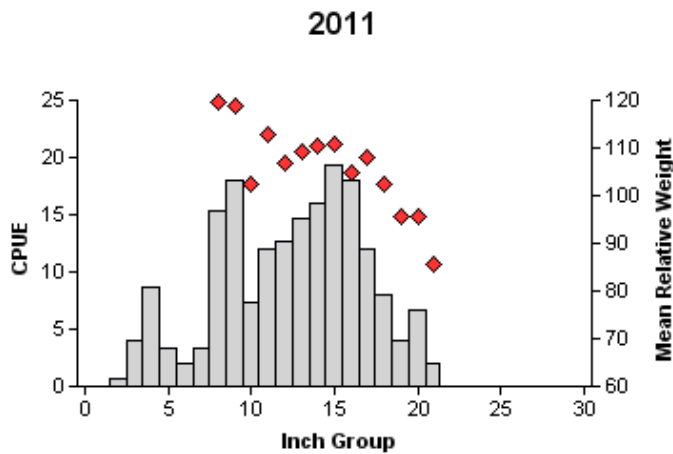
Effort = 1.0
 Total CPUE = 172.0 (16; 172)
 Stock CPUE = 141.0 (17; 141)

APPENDIX F (Cont.)

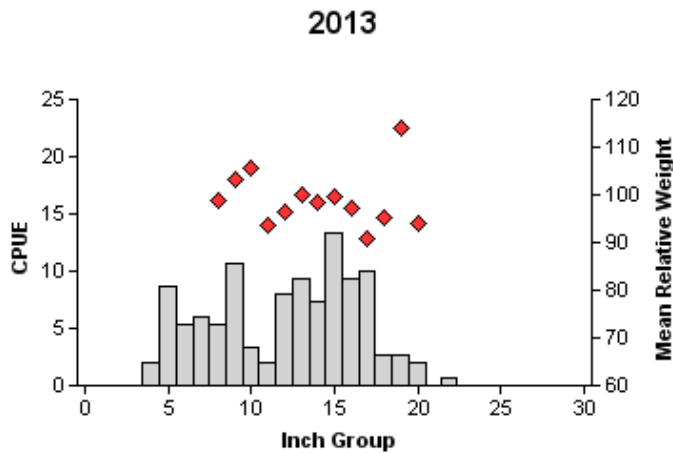
Largemouth Bass electrofishing data, Fayette County Reservoir 2009, 2011, 2013



Effort = 1.5
 Total CPUE = 88.7 (17; 133)
 Stock CPUE = 71.3 (20; 107)



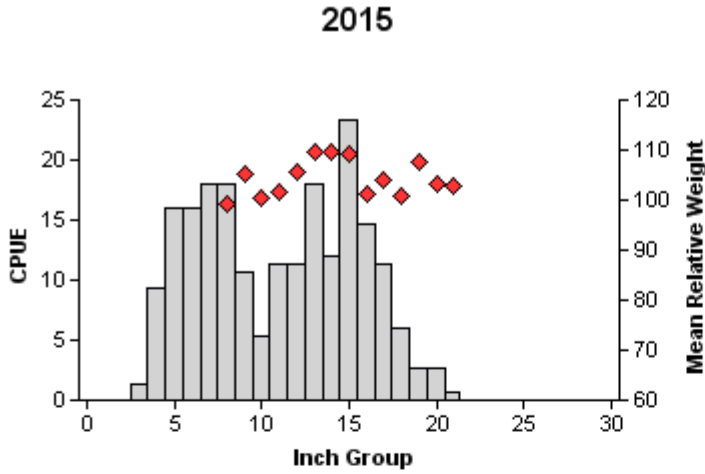
Effort = 1.5
 Total CPUE = 188.0 (15; 282)
 Stock CPUE = 166.0 (17; 249)



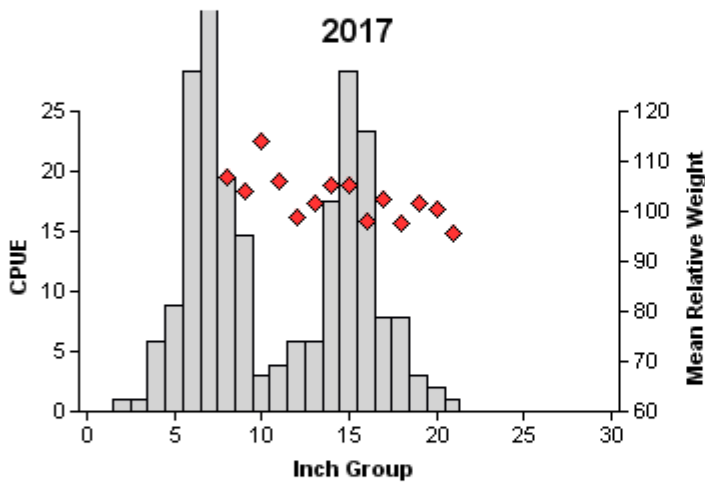
Effort = 1.5
 Total CPUE = 108.7 (16; 163)
 Stock CPUE = 86.7 (18; 130)

APPENDIX F (Cont.)

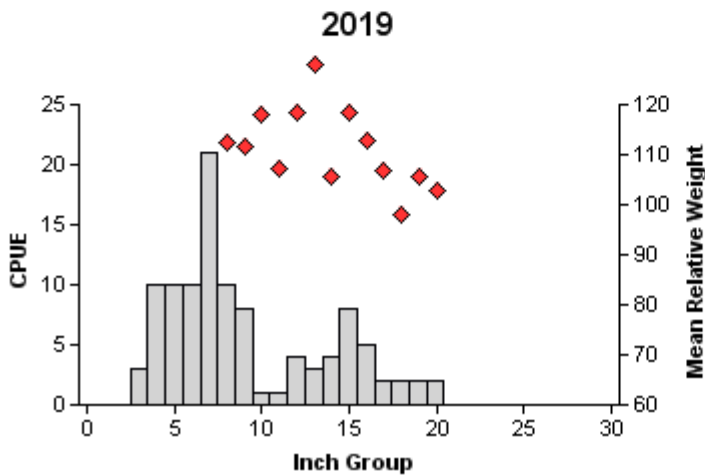
Largemouth Bass electrofishing data, Fayette County Reservoir 2015, 2017, 2019



Effort = 1.5
 Total CPUE = 208.7 (13; 313)
 Stock CPUE = 148.0 (15; 222)



Effort = 1.0
 Total CPUE = 227.3 (18; 233)
 Stock CPUE = 143.4 (23; 147)



Effort = 1.0
 Total CPUE = 106.0 (27; 106)
 Stock CPUE = 52.0 (29; 52)

APPENDIX G

The catch per unit effort (fish/h) of juvenile Largemouth Bass (< 8 inches) from 2005 to 2019, Fayette County Reservoir.

	2005	2006	2007	2009	2011	2013	2015	2017	2019
Juvenile CPUE	16	109	31	17	22	22	60	83	54



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