

Nocona 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 Nocona Reservoir were surveyed in 2019 using electrofishing and trap netting. Aquatic vegetation was surveyed in 2019. Historical data are presented with the 2019 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: Nocona Reservoir is a 1,362-acre impoundment of Farmers Creek, a tributary of the Red River, located in Montague County. In 2015, water level returned to conservation pool elevation after having been at a much lower level for a prolonged period. Water level remained near conservation pool elevation during the study period. In 2019, the reservoir contained minimal vegetation.

Management History: Important sport fish include Largemouth Bass and White Crappie. Blue and Channel Catfish as well as White Bass are available to anglers. Sport fishes were managed with statewide regulations. Threadfin Shad and Florida Largemouth Bass (FLMB) have been periodically stocked in the reservoir. Aquatic vegetation was problematic in the past, but has become minimal in recent years. The management plan from the 2015 survey report included recommendations to stock Threadfin Shad and Florida Largemouth Bass (FLMB), evaluate genetics, and continue to educate the public about the threats from invasive species.

Fish Community

- **Prey species:** Threadfin Shad were collected in 2019, whereas they were not collected in the previous survey. Electrofishing catch of Gizzard Shad was lower in 2019 than in previous years. Most Gizzard Shad were suitable length to be prey for predator species. Electrofishing catch of Bluegill remained high in 2019.
- **Catfishes:** Sampling was not conducted for catfish in 2019. Historically, Blue and Channel Catfish have been present in low-density.
- **White Bass:** Sampling was not conducted for White Bass in 2019. Historically, White Bass have been present in low-density.
- **Largemouth Bass:** Largemouth Bass abundance was similar to previous surveys. However, more legal-length fish were available to anglers. Genetic introgression of FLMB increased in 2019.
- **White Crappie:** Trap net catch rate of White Crappie was a new record. The catch rate of legal-length crappie was also a new record. Most crappie are in good condition, but growth rate has declined. Elevated water levels have allowed White Crappie to flourish.

Management Strategies: Continue stocking FLMB to maintain genetic influence and trophy potential. Promote the White Crappie and Largemouth Bass fisheries in Nocona Reservoir. Conduct general monitoring surveys with trap nets and electrofishing surveys in 2023. Access and vegetation surveys will be conducted in 2023. Continue public education about invasive species.

Introduction

This document is a summary of fisheries data collected from Nocona Reservoir in 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 fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2019 data for comparison.

Reservoir Description

Nocona Reservoir is a 1,362-acre impoundment on Farmers Creek, a tributary of the Red River, in Montague County. It was constructed by the North Montague County Water Supply District in 1961 for municipal water supply and recreation. The reservoir has a drainage area of approximately 94 square miles and a shoreline length of 24 miles. Nocona Reservoir was eutrophic with a mean TSI chl-*a* of 59.52, which was higher than the 2010 mean of 47.66 (Texas Commission on Environmental Quality 2020). The water level at Nocona Reservoir returned to conservation pool elevation in 2015 after having been at a much lower level for a prolonged period (Figure 1). Since 2015, water level has remained within several feet of conservation pool elevation. Habitat at time of sampling consisted of rocky shoreline and minimal amounts of native emergent and submerged vegetation. Standing timber was also present, along with docks and piers. Other descriptive characteristics for Nocona Reservoir are in Table 1.

Angler Access

Nocona Reservoir has three public boat ramps with parking, boarding piers, and sufficient lighting. Shoreline access is limited to the areas adjacent to the boat ramps. There is a fishing dock in Joe Benton Park. Further information about Nocona Reservoir and its facilities can be found at the Texas Parks & Wildlife Department (TPWD) website (<http://www.tpwd.texas.gov>). Additional boat ramp characteristics are in Table 2.

Management History

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

1. Stock adult Threadfin Shad at 1/acre minimum during the 2016 spawning season and evaluate the stocking success.

Action: Approximately 1,500 adult Threadfin Shad were stocked in 2016. The 2019 electrofishing survey revealed an abundant Threadfin Shad population.
2. Stock Florida Largemouth Bass at 100/acre in 2017 and 2018 to increase the percent FLMB alleles in the Largemouth Bass population. Check genetic influence during the fall 2019 electrofishing survey.

Action: Florida Largemouth Bass fingerlings were stocked in 2018 (133,825) and 2019 (28,387). Introgression of FLMB genetics was assessed in 2019.
3. Continue public education campaign on the threats of invasive species.

Action: Clean, Drain, Dry signage were posted at each public boat ramp.

Harvest regulation history: Sport fishes in Nocona Reservoir have always been managed with statewide regulations (Table 3).

Stocking history: Threadfin Shad have been periodically stocked since 1976 and were last stocked in 2016 to supplement the existing population. Florida Largemouth Bass fingerlings were stocked in the early 1980s and in 2018-2019 to increase Largemouth Bass trophy potential. Additionally, ShareLunker Largemouth Bass fingerlings were stocked in 2010. Annual stockings of palmetto bass fingerlings occurred in 1983 and 1994-1997 to provide an additional angling opportunity, but these stockings ceased because of low angler success. The complete stocking history is in Table 4.

Vegetation/habitat management history: Historically, non-native Eurasian watermilfoil was common and problematic (Hysmith and Moczygemba 1994 and 1997). Chemical treatment was not conducted due to the proximity of the water intake structure for municipal water supply.

Water transfer: No interbasin water transfer occurs.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Nocona Reservoir (Moczygemba and Bennett 2016). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing [1 hour (h) at 12, 5-min stations]. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 13 randomly-selected fish between 13.0 and 15.0 inches.

Trap netting – Crappie were collected using trap nets [5 net nights (nn) at 5 stations] and CPUE for trap netting was recorded as the number of fish caught per nn. Ages for crappie were determined using otoliths from 13 randomly-selected fish between 9.0 and 11.0 inches.

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). The micro-satellite DNA procedure was used since 2005 and electrophoresis was used prior to 2005.

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) was calculated for all CPUE and creel statistics.

Habitat – A vegetation survey was conducted in 2019. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017). A structural habitat survey was last conducted in 2015.

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

Results and Discussion

Habitat: In 2019, black willow, American pondweed, and American lotus together occupied 5% of the reservoir area (Table 6). A trace amount of non-native Eurasian water milfoil was detected. A structural habitat survey was last conducted in 2015 (Moczygemba and Bennett 2016).

Prey species: Electrofishing catch rates of Bluegill and Gizzard Shad were 249.0/h and 490.0/h, respectively. Gizzard Shad IOV was good, indicating that 65% of Gizzard Shad were available to existing predators; this was lower than IOV estimates in previous years (Figure 2). Total CPUE of Gizzard Shad was lower in 2019 compared to the 2015 survey (Figure 2). Total CPUE of Bluegill in 2019 was higher than total CPUE in 2011 and 2015, and size structure continued to be dominated by small individuals (Figure 3). Bluegill CPUE was the highest on record for Nocona Reservoir (Appendix C). All sampling objectives were met for Bluegill and Gizzard Shad (Table 5). Other sunfish species were sampled, providing additional forage for predators (Appendix A). Threadfin Shad were more abundant in 2019 (229.0/h) since the stocking in 2016, but considerably lower than in 2011 (Appendix C).

Catfishes: Historical gill net catch rates for Blue and Channel Catfish have been low to moderate for Nocona Reservoir (Appendix C). A creel survey in 2009 indicated there was low directed angler effort for both species (Moczygemba and Hysmith 2012). The catfish fisheries were considered low-density, so no sampling was conducted for these species.

White Bass: Historical gill net catch rates for White Bass have always been low (Appendix C). Spawning success has been sporadic, possibly due to the small watershed and variable inflows. The angler directed effort from a 2009 creel survey was very low at 0.8% (Moczygemba and Hysmith 2012). The White Bass fishery was considered low-density, so no sampling was conducted for this species.

Largemouth Bass: The electrofishing catch rate of Largemouth Bass was similar for the last three surveys. However, CPUE-Stock was 79.0/h in 2019, higher than in 2015 (35.3/h). Size-structure improved as PSD was 48 in 2019 compared to 18 in 2015 (Figure 4). Average age at 14 inches was 2.9 years (N = 13; range = 2-4 years). Body condition in 2019 was poor (relative weight under 90) for many size classes of fish, but greatly improved for fish ≥ 20 inches (relative weight 108-124). This may be due to a wider array of prey items available to larger fish and low prey availability for smaller fish. Density of smaller fish could also contribute to a decline in condition. Florida Largemouth Bass genetic introgression was higher in 2019 (62%) than in 2015 (24%; Table 8). One pure FLMB was identified in the sample, and five F1 hybrids were also present. ShareLunker stockings in 2010 could have contributed to the increase in F1 hybrids. All sampling objectives were met for Largemouth Bass (Table 5). Four Largemouth Bass over 8 pounds have been submitted to date through the ShareLunker Program. Previous electrofishing surveys have collected six Largemouth Bass over 8 pounds and one over 10 pounds (Moczygemba and Bennett 2016). Tournament results have also documented bass over 8 pounds (Appendix D).

White Crappie: The trap net catch rate of White Crappie was 82.6/nn in 2019, higher than in 2015 (45.7/nn) and a new record. The catch rate of legal-length fish (37.6/nn) was also a record, and made up 46% of the sample. The PSD in 2019 was 93 and similar to the two previous surveys (Figure 5). A high PSD usually indicates an unbalanced population, which risks collapse if the larger fish are removed by anglers or natural mortality. However, elevated water levels in recent years have provided adequate spawning conditions and good year classes could replace those older fish. Crappie populations tend to be cyclical and management options to counteract that are limited (Maceina 2003). Mean relative weight was over 90 for most size classes in 2019. White Crappie reached 10 inches in 3.4 years on average (N = 13, range = 2-4 years). This was much slower growth compared to 2015 when fish reached 10 inches in 1.2 years (Moczygemba and Bennett 2016). Thus, growth may have been influenced by density. This was not necessarily contradicted by good body condition exhibited in 2019, since relative weight for previous years are unknown. The Threadfin Shad stocking in 2016 and stable water levels may have contributed to improved condition only recently. Sampling objectives were adequately met for White Crappie (Table 5).

Fisheries Management Plan for Nocona Reservoir, Texas

Prepared – July 2020

ISSUE 1: Florida Largemouth Bass have been stocked periodically since the 1980s. Genetic introgression of FLMB has improved in recent years along with size structure. Nocona Reservoir has a history of producing trophy bass (≥ 8 pounds), including a ShareLunker (13.34 pounds in 2010).

MANAGEMENT STRATEGIES

1. Request a stocking of FLMB at a rate of 1,000/km shoreline in 2022 to maintain/increase the proportion of FLMB genetics in the population.

ISSUE 2: The White Crappie and Largemouth Bass populations in Nocona Reservoir have improved with abundant and large fish available for anglers. Some anglers in the area may not be aware of these improvements.

MANAGEMENT STRATEGY

1. Promote the White Crappie and Largemouth Bass fisheries through social media, news releases, or articles in the TPWD magazine.

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. 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 North Montague County Water Supply District to maintain signage at access points around the reservoir.
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. Continue to check zebra mussel sampler installed on the reservoir.
5. 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)

Sport fish, forage fish, and other important fishes: Sport fishes in Nocona Reservoir include Blue and Channel Catfish, White Bass, Largemouth Bass, and White Crappie. Important forage species include Gizzard and Threadfin Shad and Bluegill.

Low-density fisheries:

White Bass: In a 2009 spring quarter creel, one angler was observed targeting White Bass during a time when effort is usually elevated for that species. White Bass were the least targeted species with 0.8 percent directed effort. While White Bass were estimated to have the second highest catch and harvest for that quarter, those conditions may not be reflected most years due to fluctuations with inflow. Harvest of White Bass was predominately by anglers targeting crappie and Largemouth Bass. White Bass relative abundance declined between 2005 and 2012, and the historical average gill net catch rate was 1.1 fish per net night. Using the last gill net data from 2012, collecting 50 stock-length White Bass has no probability, and it would take over 75 net nights to get a CPUE-Stock RSE ≤ 25 (80% confidence). Due to low abundance and low directed angling effort, White Bass were considered a low-density fishery and will not be monitored by gill nets.

Catfishes: No directed effort was observed for Blue Catfish in the 2009 creel survey. Blue Catfish gill net catch rates have fluctuated with an overall average of 3.0 fish per net night. Using the 2012 gill net data, it would take 40+ net nights to collect 50 stock-length fish. Channel Catfish were the fourth most targeted category in the 2009 creel after “anything”, and the fourth most harvested fish. Relative abundance increased between 2005 and 2012, and catch rates have averaged 2.8 fish per net night. Like Blue Catfish, it would take 40+ net nights to collect 50 stock-length fish, which is considered excessive for this fishery. Due to low to moderate abundance and marginal directed angling effort and harvest, Blue and Channel Catfish were considered low-density fisheries and will not be monitored by gill nets.

Survey objectives, fisheries metrics, and sampling objectives:

Largemouth Bass: Based on a creel survey from March 1 – May 31, 2009, Largemouth Bass were the most-sought sport fish in Nocona Reservoir. Largemouth Bass CPUE, size structure, and body condition have been collected at multi-year intervals since 1996 using fall nighttime electrofishing. Continuation of nighttime electrofishing every four years in the fall should allow for determination of any large-scale changes in the Largemouth Bass population. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 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 objectives is 12 stations). If either objective is not met after one night of sampling and they can be attained with 6-12 additional random stations, another night of effort will be expended. A category-2 age analysis of 13 Largemouth Bass between 13.0 and 15.0 inches will be conducted to determine average age at legal length.

White Crappie: A 2009 spring-quarter creel survey indicated White Crappie angling comprised 31% of total angling effort and were the second most-sought species. Continuation of multi-year trend data collection on White Crappie with single-cod trap netting every four years in the fall should allow for determination of any large-scale changes in the White Crappie population. A minimum of five randomly selected single-cod trap netting stations will be sampled in fall 2023, but sampling will continue at random sites until 50 stock-size fish are collected and the CPUE-Stock RSE is ≤ 25 (the anticipated effort to meet both objectives is five net-nights). If either objective is not met after five net-nights additional sampling will be conducted if feasible. A category-2 age analysis of 13 White Crappie between 9.0 and 11.0 inches in total length will be conducted to determine average age at legal length. Abundance, size structure, and body condition will also be assessed.

Prey species: Bluegill along with Gizzard and Threadfin Shad are the primary forage at Nocona Reservoir. Abundance and size structure has been estimated for these species on 3-4 year intervals.

Continuation of this survey frequency and protocol will allow for determination of any large-scale changes in the Gizzard Shad, Threadfin Shad, and Bluegill populations. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2023, but sampling will continue in conjunction with Largemouth Bass sampling and/or until sufficient numbers for Bluegill PSD and IOV (50 fish) have been collected. No additional effort will be expended to achieve an $RSE \leq 25$ for CPUE of Bluegill and Gizzard Shad. Instead, Largemouth Bass body condition (relative weight of Largemouth Bass ≥ 8 ") can provide information on forage abundance, vulnerability, or both, relative to predator density.

Creel survey: The last creel survey performed on Nocona Reservoir was in 2009 and was conducted only in the spring quarter. Since it was only one quarter, it may have provided incomplete data concerning percent directed effort, total catch, and harvest of sport fish. Fisheries and angling characteristics may have changed since 2009 as well. For some fish species, such as White Bass, that survey could have overestimated the typical catch and harvest experienced in recent years. An updated creel survey spanning at least two quarters is needed to confirm or amend the findings from 2009 and compare the two for changes to the fishery. However, other creels and priorities in the district prevent us from scheduling a creel survey before the next report. When time and resources are available, we will perform a creel survey for at least two consecutive quarters on Nocona Reservoir.

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Tables and Figures

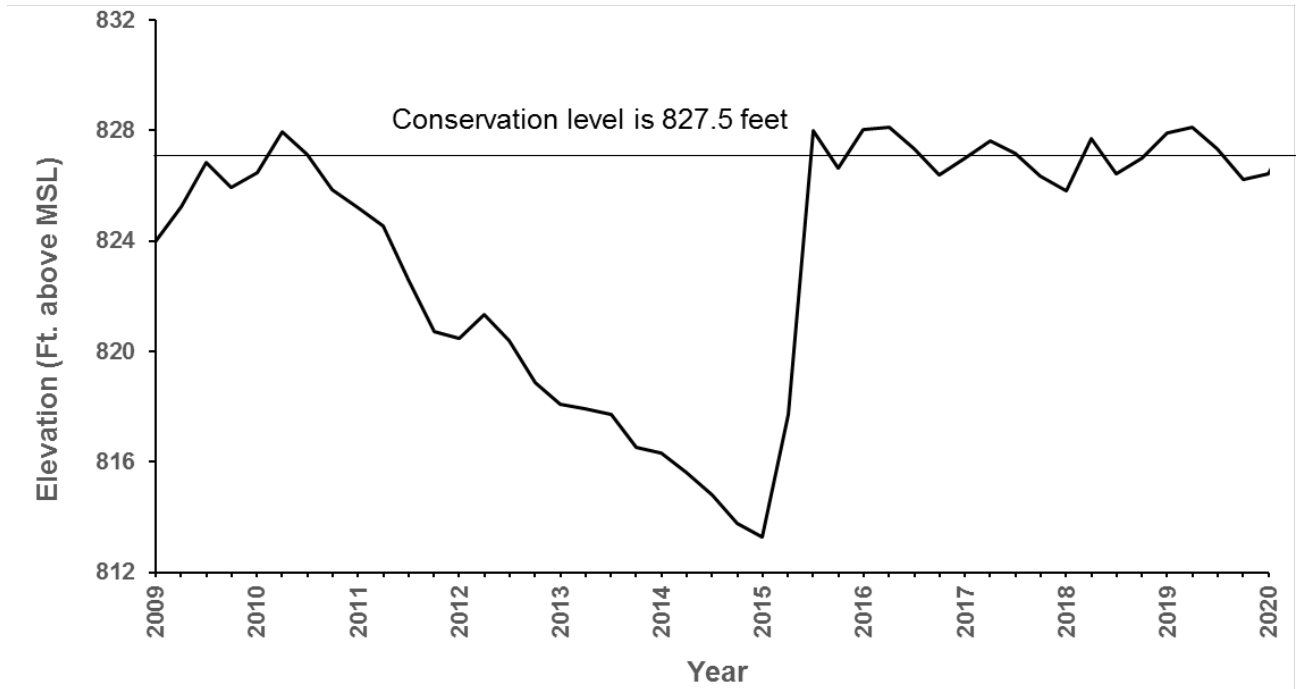


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Nocona Reservoir, January 2009 to March 2020.

Table 1. Characteristics of Nocona Reservoir, Texas.

Characteristic	Description
Year constructed	1961
Controlling authority	North Montague County Water Supply District
County	Montague
Reservoir type	Tributary
Shoreline Development Index	9.3
Conductivity	707 $\mu\text{S/cm}$

Table 2. Boat ramp characteristics for Nocona Reservoir, Texas, August, 2019. Reservoir was near conservation elevation at time of survey.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Weldon Robb	33.86151 -97.65984	Y	40	818.66	Excellent, extension not feasible
Joe Benton	33.87873 -97.65749	Y	40	817.16	Excellent, extension is feasible
Boone	33.88087 -97.64581	Y	20	818.16	Excellent, no access issues

Table 3. Harvest regulations for Nocona 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, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Nocona Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Life Stage
Florida Largemouth Bass	1981	75,600	FGL
	1982	73,692	FGL
	2018	133,825	FGL
	2019	28,387	FGL
	Total	311,504	
Northern Pike x Muskellunge	1976	747	
	Total	747	
Palmetto Bass (Striped X White Bass hybrid)	1983	16,362	UNK
	1994	23,700	FGL
	1995	29,439	FGL
	1996	20,055	FGL
	1997	14,700	FGL
	Total	104,256	
ShareLunker Largemouth Bass	2010	2,220	FGL
	Total	2,220	
Threadfin Shad	1976	8,500	AFGL
	1984	1,500	AFGL
	1985	700	AFGL
	2003	1,295	ADL
	2016	1,500	AFGL
	Total	13,495	

Table 5. Objective-based sampling plan components for Nocona Reservoir, Texas 2019.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock \leq 25
	Size structure	PSD, length frequency	N \geq 50 stock
	Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
	Genetics	% FLMB	N = 30, any age
	Condition	W_r	10 fish/inch group (max)
Bluegill ^a	Abundance	CPUE–Total	RSE \leq 25
	Size structure	PSD, length frequency	N \geq 50
Gizzard Shad ^a	Abundance	CPUE–Total	RSE \leq 25
	Size structure	PSD, length frequency	N \geq 50
	Prey availability	IOV	N \geq 50
<i>Trap netting</i>			
White Crappie	Abundance	CPUE-Stock	RSE-Stock \leq 25
	Size structure	PSD, length frequency	N = 50
	Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches

^a No additional effort will be expended to achieve an RSE \leq 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, Nocona Reservoir, Texas, 2007 – 2019. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2007	2011	2015	2019
Native terrestrial (black willow, inundated)	66.2(5.0)	66.2(5.0)	135.0(10.2)	22.6(1.7)
Native floating leaved (American lotus)	<0.1(<0.1)		0.1(<0.1)	10.5(0.8)
Native submerged (American pondweed)	1.0(<0.1)	1.0(<0.1)	6.1(0.5)	19.4(1.5)
Non-Native				
Eurasian water milfoil (Tier III)*	1.0(<0.1)	1.0(<0.1)	<0.1(<0.1)	trace

*Tier III is watch status.

Gizzard Shad

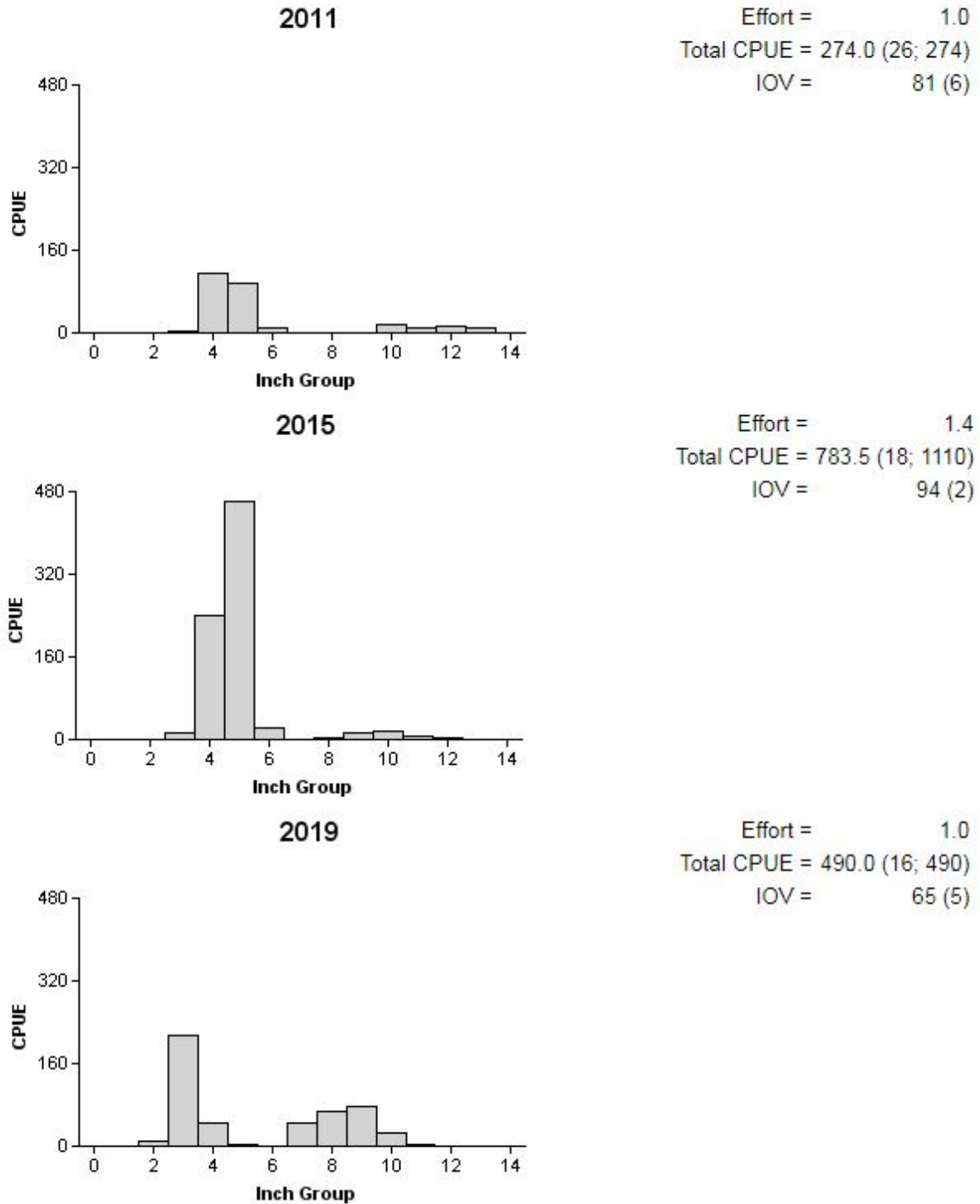


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Nocona Reservoir, Texas, 2011, 2015, and 2019.

Bluegill

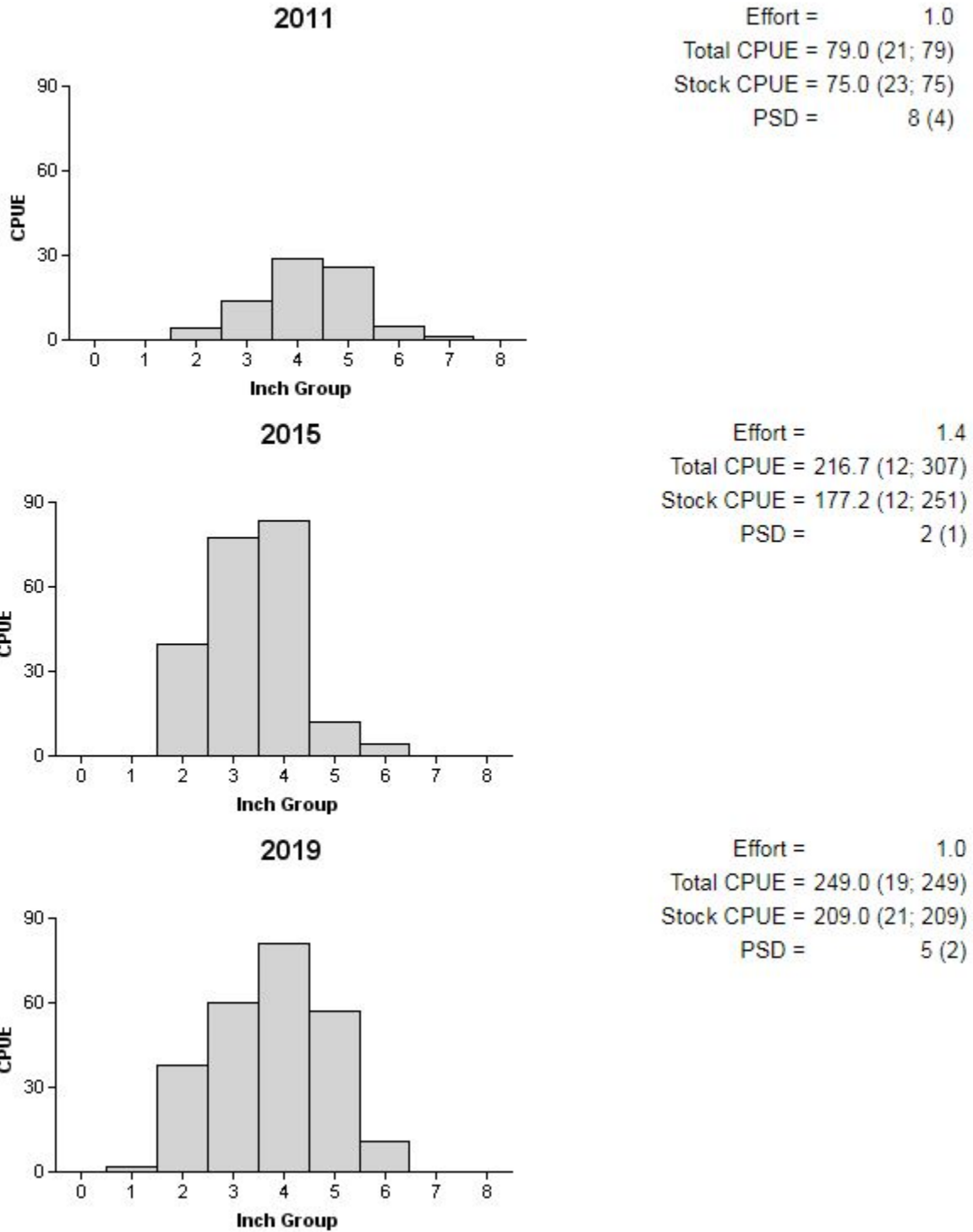


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Nocona Reservoir, Texas, 2011, 2015, and 2019.

Largemouth Bass

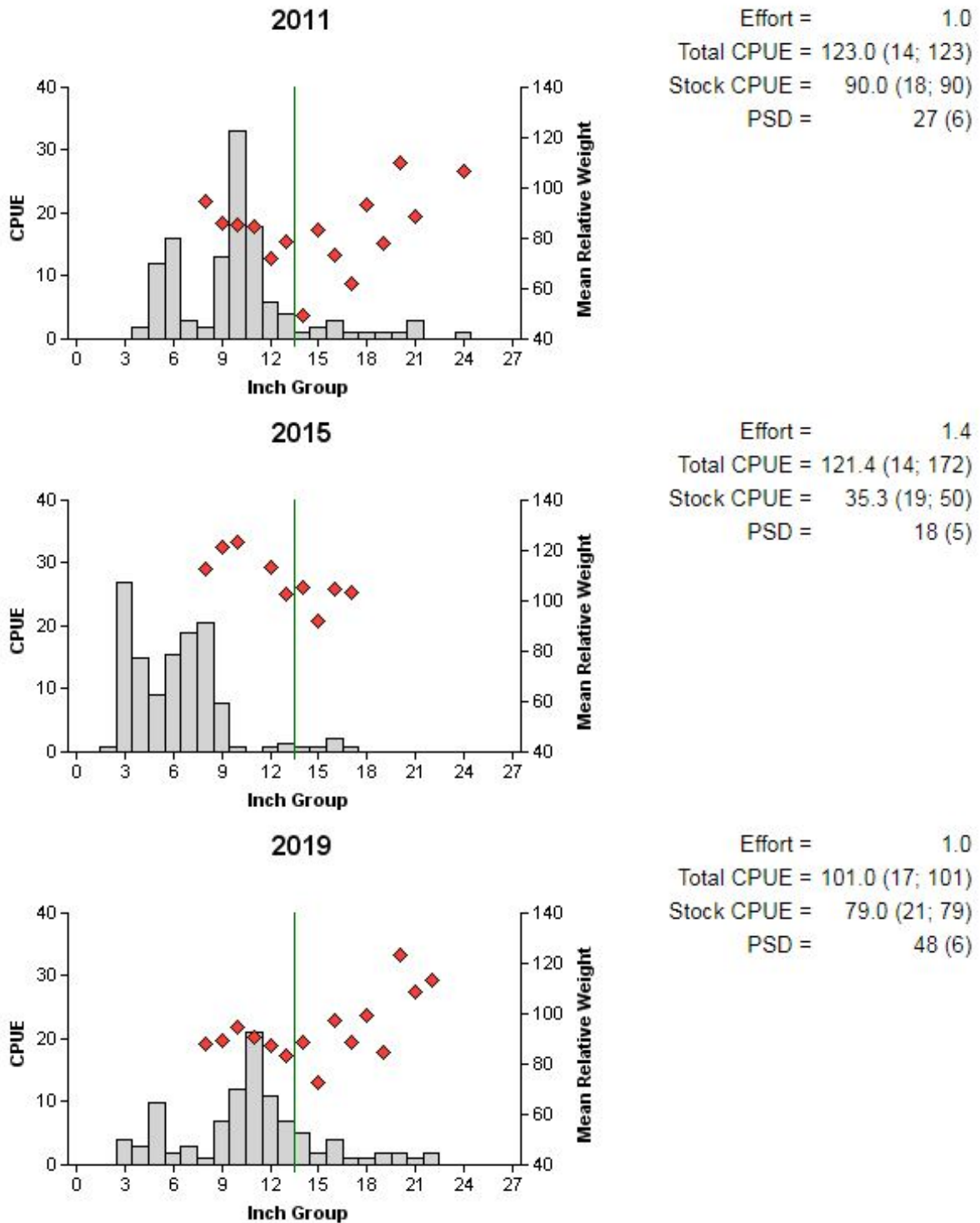


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Nocona Reservoir, Texas, 2011, 2015, and 2019. Vertical line indicates minimum length limit.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Nocona Reservoir, Texas, 1988, 1996, 1999, 2003, 2007, 2015, and 2019. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and NLMB, Fx = second or higher generation hybrid between a FLMB and 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	F1	Intergrade	NLMB		
1988	33	4	N/A	21	8	34.0	12.0
1996	29	4	N/A	21	4	54.3	13.8
1999	34	9	N/A	24	1	63.2	26.4
2003	30	6	N/A	24	0	63.3	20.0
2007	30	2	N/A	22	6	39.6	6.7
2015	30	0	1	26	4	24.0	0.0
2019	30	1	5	23	1	62.0	0.3

White Crappie

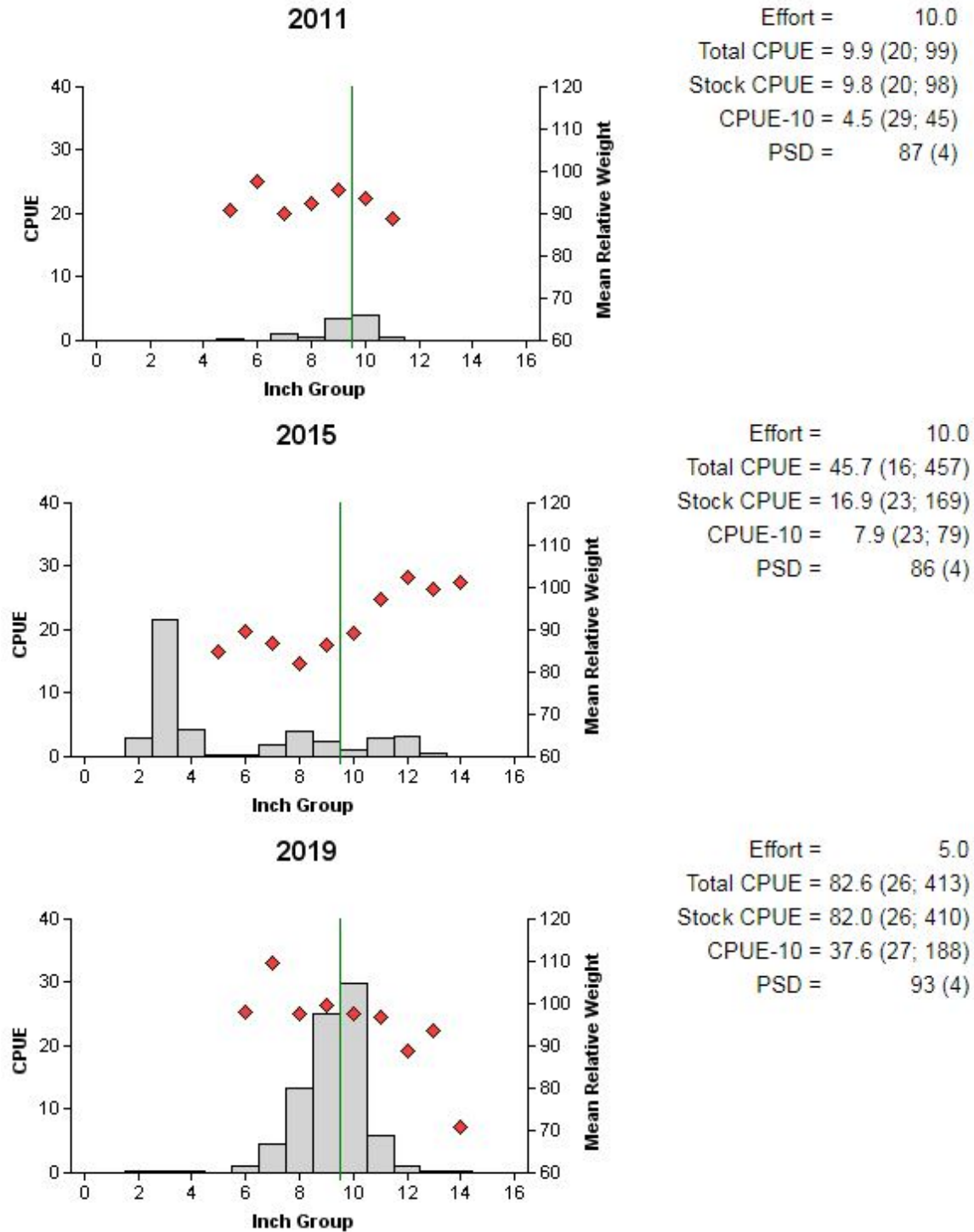


Figure 5. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Nocona Reservoir, Texas, 2011, 2015, and 2019. Vertical line indicates minimum length limit.

Proposed Sampling Schedule

Table 6. Proposed sampling schedule for Nocona Reservoir, Texas. Survey period is June through May. Electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

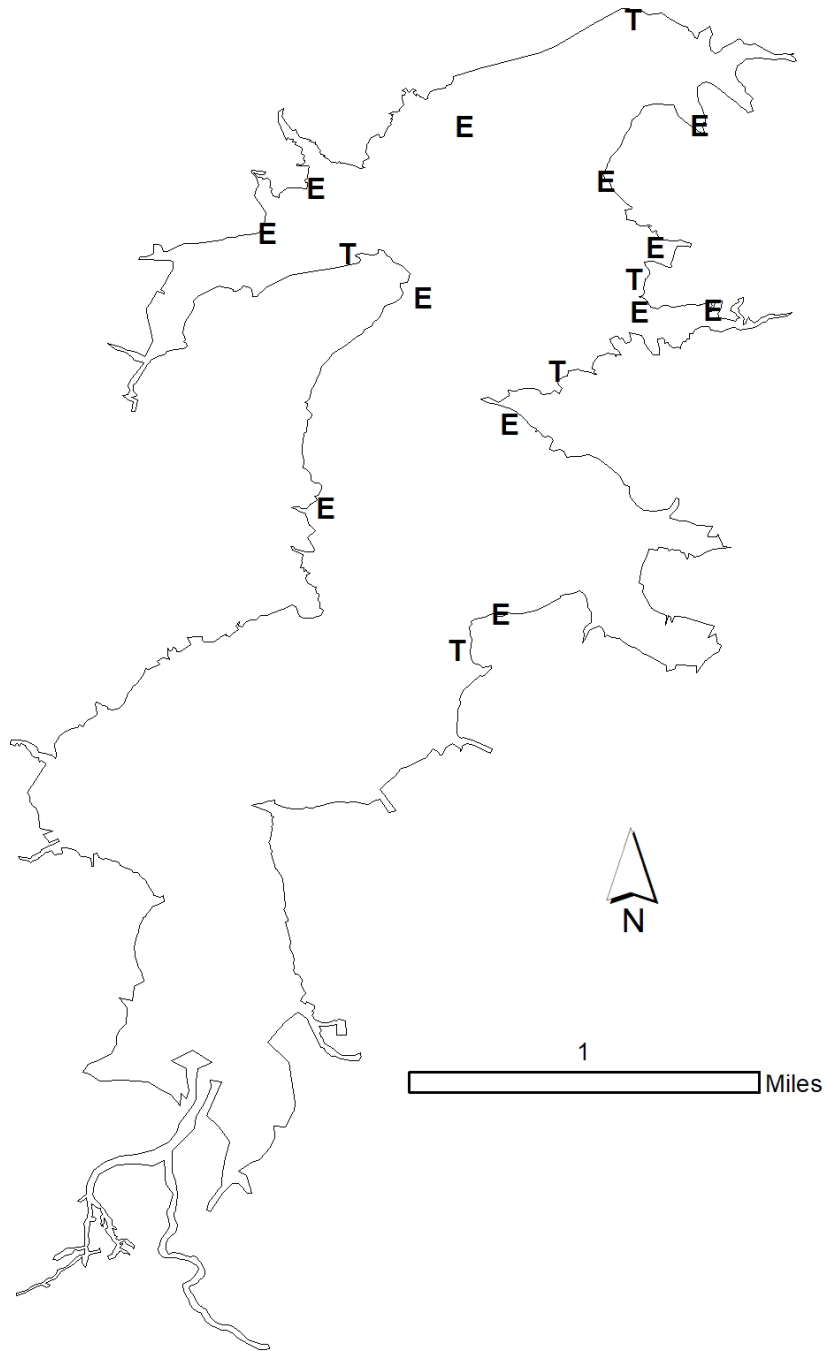
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Structural Habitat				
Vegetation				S
Electrofishing – Fall				S
Trap netting				S
Creel survey				
Report				S

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 Nocona Reservoir, Texas, 2019. Sampling effort was 5 net nights for trap netting, and 1 hour for electrofishing.

Species	Trap Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			490	490.0 (16)
Threadfin Shad			229	229.0 (47)
Green Sunfish			2	2.0 (67)
Bluegill			249	249.0 (19)
Longear Sunfish			57	57.0 (26)
Redear Sunfish			1	1.0 (100)
Largemouth Bass			101	101.0 (17)
White Crappie	413	82.6 (26)		

APPENDIX B – Map of sampling locations



Location of sampling sites, Nocona Reservoir, Texas, 2019. Trap net and electrofishing stations are indicated by T and E, respectively. Upper (south) end of reservoir has been silted in, so water is shallow and flooded black willow prevents navigation for sampling. Water level was near full pool at time of sampling.

APPENDIX C – Historical catch rates

Catch rates (CPUE) of targeted species by gear type for standard surveys on Nocona Reservoir, Texas, 1996 - 2019. Electrofishing surveys in 2007 and after were conducted using a 7.5 Smith-Root Gas Powered Pulsator (GPP). Electrofishing surveys prior to 2007 were conducted using a Smith-Root 5.0 GPP.

Gear	Species	Year							Avg.
		1996	1999	2003	2007	2011	2015	2019	
Gill Net (fish/net night)	Blue Catfish	6.8	4.4	1.4	0.8	1.4			3.0
	Channel Catfish	1.8	1.0	5.0	2.4	3.6			2.8
	Flathead Catfish	0.4	0.0	0.2	0.2	0.4			0.2
	White Bass	1.4	1.8	1.4	0.6	0.2			1.1
	Palmetto Bass	2.6	13.2	0.0	0.4	0.0			3.2
Electrofisher (fish/hour)	Gizzard Shad	120.7	362.0	177.0	76.0	274.0	783.5	490.0	326.2
	Threadfin Shad	0.0	0.0	138.0	656.0	1,284.0	0.0	229.0	329.6
	Green Sunfish	10.0	3.0	5.0	10.0	1.0	4.2	2.0	5.0
	Warmouth	4.7	2.0	0.0	2.0	3.0	1.4	0.0	1.9
	Bluegill	36.0	41.0	100.0	229.0	79.0	216.7	249.0	135.8
	Longear Sunfish	4.0	7.0	30.0	70.0	11.0	62.1	57.0	34.4
	Redear Sunfish	4.0	3.0	6.0	9.0	3.0	1.4	1.0	3.9
	Largemouth Bass	129.3	80.0	70.0	90.0	123.0	121.4	101.0	102.1
Trap Net (fish/net night)	White Crappie	28.4	16.0	17.8	5.4	9.9	45.7	82.6	29.4

APPENDIX D – Bass tournament summary

Bass tournament summary of publicly available tournament results for Nocona Reservoir, Texas, 2017-2020. Bag weights and big bass are in pounds.

Tournament/Club	Date	Bag weights			# over 8 pounds	Big bass weight
		1st	2nd	3rd		
Wichita Falls Texas Team Trail	April 9, 2017	25.53	21.15	15.39	1	8.78
Gainesville Bass Club	March 4, 2018	20.80	19.13	15.78	1	9.01
North Texas Bass Wranglers	June 2, 2019	30.69	20.28	18.38	2	8.56
Bass Pro Shops Fishing Tour	March 14, 2020	27.51	27.32	23.19	5	10.08
Gainesville Bass Club	March 22, 2020	29.11	28.62	23.40	4	9.30
North Texas Bass Wranglers	June 7, 2020	27.51	20.67	13.40	1	8.73



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