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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Coffee Mill Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Coffee Mill Reservoir were surveyed in 2013 using an electrofisher and trap nets and in 2014 using gill nets. Habitat, vegetation, and angler access was surveyed in 2013. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Coffee Mill Reservoir is a 650-acre impoundment located on Coffee Mill Creek approximately 10 miles northeast of Bonham. Water level has been within three feet of the spillway since 2010. Coffee Mill Reservoir has moderate eutrophication. Habitat features consists mainly of native aquatic vegetation and open water. There is some standing timber.

- **Management History:** Important sport fish include Channel Catfish, Largemouth Bass, and White Crappie. The management plan from the 2009 report considered the lack of lighting at the boat ramp and parking lot, and invasive species awareness information. A recommendation was passed on to the U.S. Forest Service to install and maintain lighting. Zebra Mussel signage has been posted at the launch ramp area.

- **Fish community**

  - **Prey species:** Electrofishing catch rate of Gizzard and Threadfin Shad have increased. Over half of the Gizzard Shad are vulnerable to predation. Electrofishing catch rate of Bluegill has increased to above the historical average and most were four inches and smaller. The forage base is in excellent condition.

  - **Channel Catfish:** Gill net catch rate of Channel Catfish was good with most of the population being legal-size. They were in good to excellent condition.

  - **Largemouth Bass:** The electrofishing catch rate of Largemouth Bass was above the historical average, growth was good, and they were in excellent condition

  - **Crappie:** Trap net catch rate of White Crappie was good and the highest in the district. Black Crappie catch rate was the highest on record. Growth and condition for both species were excellent.

- **Management Strategies:** Encourage the U.S. Forest Service to install and maintain lighting from the boat ramp to the west end of the parking lot. Recommend that the U.S. Forest Service repair boat ramp and remove vegetation on dam for safety reasons. Keep U.S. Forest Service informed about new exotic species threats to Texas waters, and work with them to display appropriate signage, educate constituents, and understand appropriate enforcement actions.

INTRODUCTION

This document is a summary of fisheries data collected from Coffee Mill Reservoir in 2013-2014. 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 species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2013-2014 data for comparison.

Reservoir Description

Coffee Mill Reservoir is a 650-acre impoundment constructed in 1939 on Coffee Mill Creek. It is located in Fannin County approximately 10 miles northeast of Bonham and is operated and controlled by the U.S. Forest Service. The reservoir was drained and treated with rotenone in 1968, and restocked with appropriate fishes in 1969 (Bonn 1969). Primary water uses included wildlife management and recreation. Average Secchi disk transparency was 18.9 inches for 2013-2014 and suggests eutrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2011). Eutrophic conditions are further supported by a heavily vegetated watershed that deposits organic debris on the ground resulting in allochthonous enrichment (Findenegg 1966; Sorokin 1966). Habitat at time of sampling consisted of native emergent vegetation, native floating-leaved vegetation, native submersed vegetation, and dead trees and stumps. Water level was not monitored in this reservoir, but anecdotal observations by our staff and U.S. Forest Service personnel concluded the reservoir has been at or within 3 feet of the spillway since 2010. Descriptive characteristics for Coffee Mill Reservoir are in Table 1.

Angler Access

Coffee Mill Reservoir has one public boat ramp. Erosion damage was observed underneath the boat ramp, which, if unaddressed, will become a safety issue in the future. Additional boat ramp characteristics are in Table 2. The boat ramp and parking lot were not lighted. Lighting would provide more convenience for the angler. There was bank fishing access in the campground near the boat ramp. Further information about Coffee Mill Reservoir and its facilities can be obtained by visiting the Texas Parks and Wildlife Department (TPWD) web site at www.tpwd.state.tx.us and navigating within the fishing link.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Hysmith and Moczygemba 2010) included:

1. Encourage U.S. Forest Service to install and maintain exterior illumination at the boat ramp and parking lot.
   Action: The U.S. Forest Service was informed of the situation through discussions and a copy of the management report, lighting was not installed.
2. Cooperate with the U.S. Forest Service to post appropriate signage at access points around the reservoir.
   Action: Signage was posted at access points and U.S. Forest Service personnel were informed of invasive species program.

Harvest regulation history: Sport fishes in Coffee Mill Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Coffee Mill Reservoir has not been stocked since 1999 (Channel Catfish and Florida Largemouth Bass). Prior to 1999, 7-inch Channel Catfish were stocked occasionally from 1991 through 1999. Florida Largemouth Bass fingerlings were stocked annually from 1994 through 1999. The complete stocking history since 1969 is in Table 4.

Vegetation/habitat management history: Coffee Mill Reservoir supported submersed, emergent, and floating-leaved aquatic vegetation (Table 5). Historically American lotus, narrow-leaved cattail, and bulrush were common. These species persist currently and provide fish habitat. Historically and currently, water willow was abundant along most of the shoreline. The persistence of water willow along the shoreline probably contributes to the success of Largemouth Bass in this reservoir (Aggus and Elliott 1975).

Water Transfer: Coffee Mill Reservoir is used exclusively for wildlife management and recreation and water is not transferred to or from any other location.

METHODS

Fishes were collected by electrofishing (1 hour at 12 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill and trap nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights (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). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Otoliths were used for aging Channel Catfish, Largemouth Bass, and Black and White Crappie according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Tier 2 protocol of the aging procedures in the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011) was used to select the sizes of target species for aging. The manual specifies procedures for Largemouth Bass only, but we adapted the protocol to other target fishes for identifying the number and size(s) of target fish to sample.

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2013 and by electrophoresis for previous years.

Vegetation, habitat, and access surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of natural shoreline and bulkhead (Table 6). Native submersed (coontail) aquatic vegetation has increased since 2009, while native emergent aquatic vegetation (narrow-leaved cattail, bulrush, and water willow) and native floating-leaved aquatic vegetation (lotus and pondweed) have not changed much since 2009 (Table 5). Excessive growth of young trees was once again observed on the dam and may compromise dam stability in the future.

Prey species: Electrofishing catch rates of Gizzard Shad were 301.0/h (Figure 1). Index of vulnerability (IOV) for Gizzard Shad was good, indicating that 59 % of Gizzard Shad were available to existing predators; however, the IOV has been decreasing since 2005 (Figure 1). Total CPUE of Gizzard Shad increased from the 2009 survey which was the lowest on record (Appendix C). Total CPUE for Threadfin

Shad was 988.0/h (Appendix C). Threadfin Shad were first observed in 2009 and seemed to be increasing (Appendix C). Total CPUE of Bluegill (580.0/h) was second highest on record and size structure continued to be dominated by small individuals (Figure 2 and Appendix C).

Channel Catfish: The gill net total CPUE of Channel Catfish (14.8/nn) was similar to the 16-year average of 14.4/nn (Figure 3 and Appendix C). Relative weights increased with size, indicating a healthy population and 97% of the sample was legal-size.

Largemouth Bass: The second highest electrofishing total CPUE on record (140.0/h) was collected in 2013 (Figure 4 and Appendix C). Size structure was good with PSD = 43 and 9% of the sample population was ≥14 inches. Growth of Largemouth Bass was better than the statewide average (Prentice 1987) reaching 14 inches (legal size) in 3+ years (N= 13; range = 1 – 4 years). Relative weight was excellent (≥100) for most sizes of Largemouth Bass (Figure 4).

Genetic analysis of Largemouth Bass collected by electrofishing indicated Florida Largemouth Bass alleles made up 16.0% of the total bass alleles (Table 7), which was lower than found in 2005. However the number of intergrades in the sample has increased each survey (83%) with the number of pure northern Largemouth Bass decreasing.

Crappies: The trap net total CPUE of White Crappie (47.8/nn) was near the historical average of 46.4/nn (Figure 5 and Appendix C). The PSD was 95.0 with 50% of the sample population being legal size (10 inches). Growth of White Crappie exceeded statewide average (Prentice 1987) attaining 10 inches in 1+ years (N= 13; range = 1 – 3 years). Relative weight indicated a very healthy population dominated by values ≥ 100%.

The trap net total CPUE of Black Crappie of 8.2 (Figure 6) was well above the historical catch of 1.6 and highest on record (Appendix C). Increased Black Crappie catches have been observed at other district reservoirs this year. Only 7.3% of the sample population was legal size (10 inches). This implies Black Crappie had a very successful spawn in 2012 in Coffee Mill Reservoir. As with White Crappie, relative weights for Black Crappie were excellent (Figure 6).

Fisheries management plan for Coffee Mill Reservoir, Texas

Prepared – July 2014.

ISSUE 1: The lack of nighttime exterior illumination at the boat ramp and parking lot was not contributing to the safety and convenience of the angler.

MANAGEMENT STRATEGY

Encourage U.S. Forest Service to install and maintain lighting at the boat ramp and along a pathway to the west side of the parking lot.

ISSUE 2: The integrity of the only boat ramp was compromised by erosion underneath the ramp caused by wave action.

MANAGEMENT STRATEGY

Advise U.S. Forest Service to install rip-rapping around the boat ramp to protect from erosion due to wave action.

ISSUE 3: Dam safety may be threatened due to excessive terrestrial vegetation.

MANAGEMENT STRATEGIES

1. Encourage the U.S. Forest Service to remove vegetation.
2. Install removed vegetation into reservoir as fish habitat.

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 U.S. Forest Service to post appropriate 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. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule consists of standard monitoring in 2017/2018 (Table 8).

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Table 1. Characteristics of Coffee Mill Reservoir, Texas.

Characteristic	Description
Year constructed	1939
Controlling authority	U.S. Forest Service
County	Fannin
Reservoir type	Offstream
Shoreline development index	2.02
Conductivity	195 µmhos/cm

Table 2. Boat ramp characteristics for Coffee Mill Reservoir, Texas, October, 2013. Reservoir elevation at time of survey was 494 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Public Access	33.73610 -95.97236	Y	20	489.3	Needs rip rap along edges of boat ramp to prevent erosion form wave action.

Table 3. Harvest regulations for Coffee Mill Reservoir, Texas.

Species	Bag Limit	Length Limit
Catfish, Channel	25	12-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 Coffee Mill, Texas. Life stages are fry (FRY), fingerlings (FGL), and advanced fingerlings (AFGL). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Channel Catfish	1969	19,000	AFGL	7.9
	1991	2,500	AFGL	6.0
	1992	14,191	AFGL	5.8
	1995	12,575	AFGL	8.5
	1999	16,255	AFGL	7.9
	Total	64,521		
Florida Largemouth Bass	1994	65,000	FGL	1.1
	1995	40,000	FGL	1.1
	1997	76,500	FGL	1.3
	1999	65,033	FGL	1.3
	Total	246,533		
Largemouth Bass	1969	143,000	FRY	FRY
	Total	143,000		

Table 5. Survey of aquatic vegetation for Coffee Mill Reservoir, Texas, 2009 and 2013. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2009	2013
Native submersed	1.0 (0.2)	12.1 (1.8)
Native floating-leaved	53.0 (8.2)	46.5 (7.1)
Native emergent	3.0 (0.5)	2.0 (0.3)

Table 6. Survey of structural habitat types for Coffee Mill Reservoir, October 2013. Shoreline habitat type units are in miles and standing timber is in acres.

Habitat type	Estimate	% of total
Natural	6.4 miles	89.0
Bulkhead	0.8 miles	11.0
Standing timber	22.0 acres	3.4

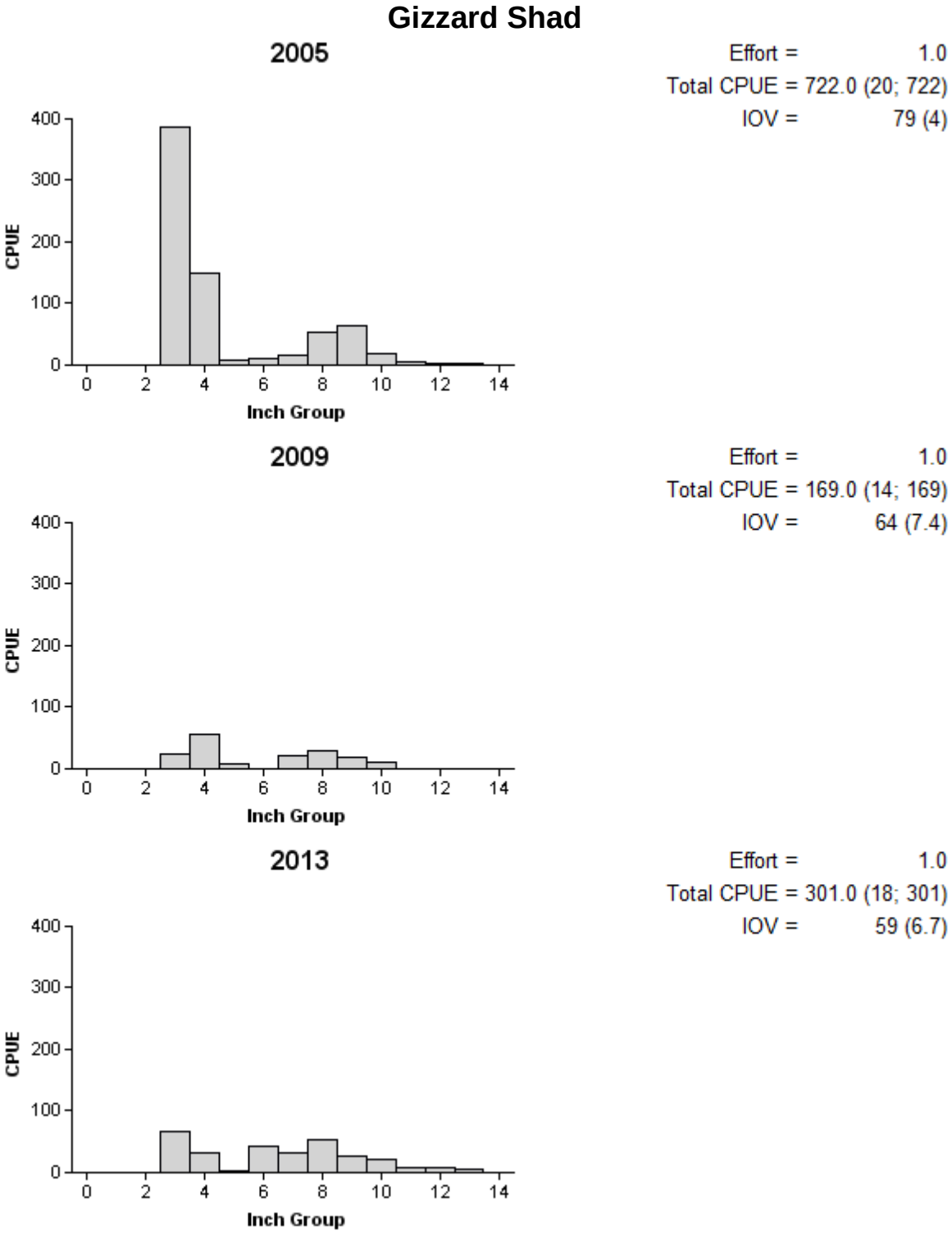


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coffee Mill Reservoir, Texas , 2005, 2009, and 2013.

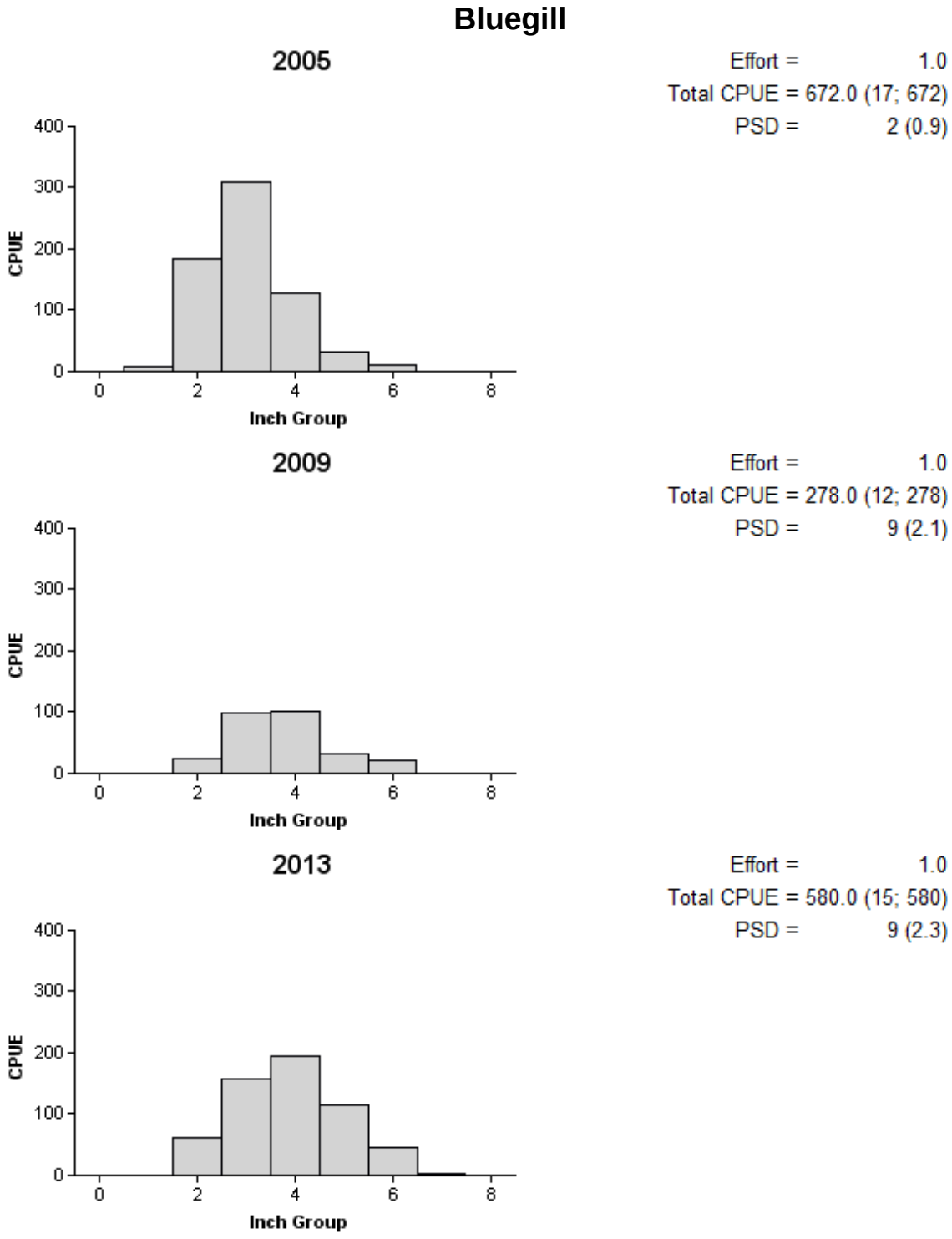


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coffee Mill Reservoir, Texas, 2005, 2009, and 2013.

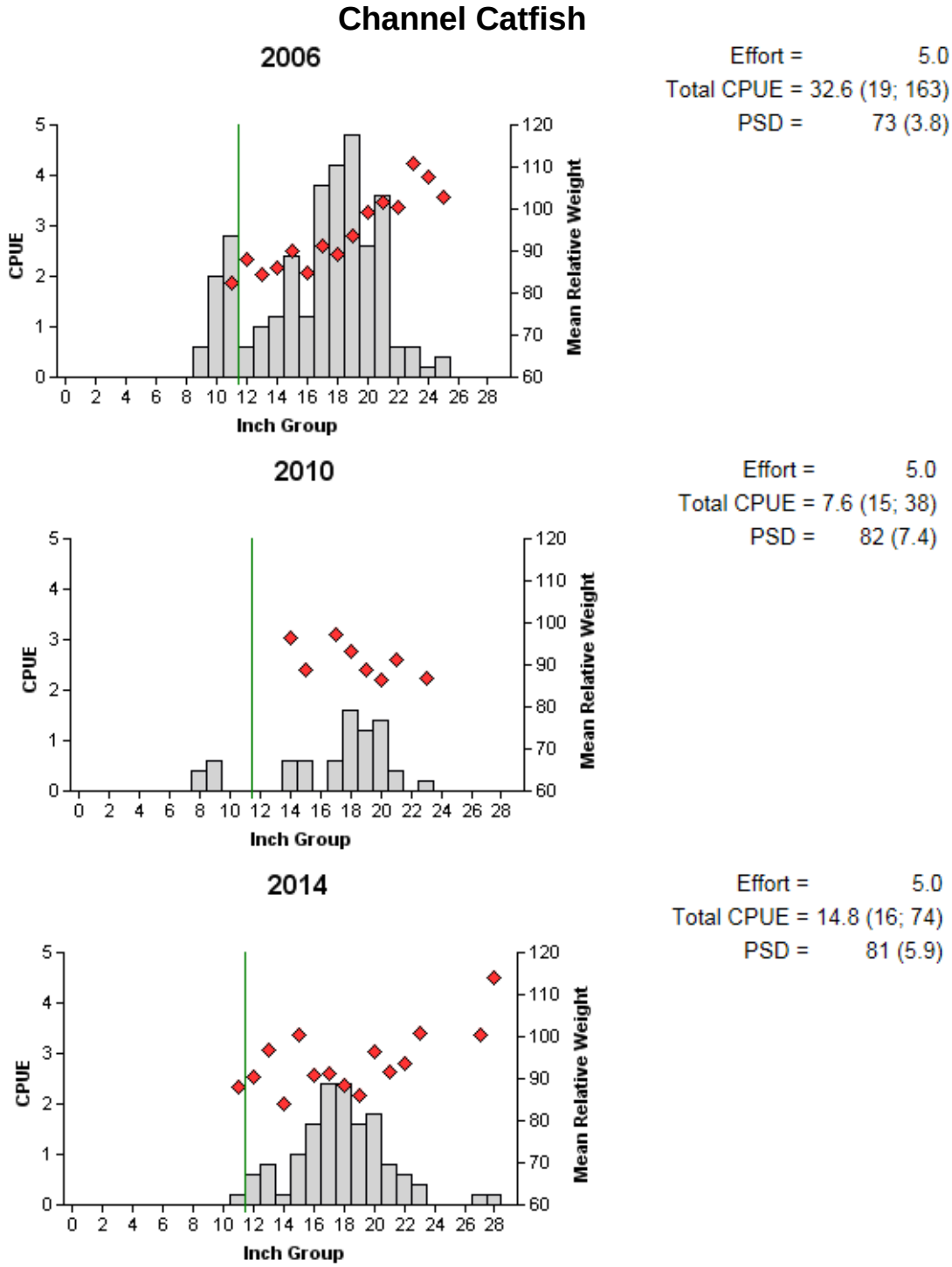


Figure 3. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Coffee Mill Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of collection.

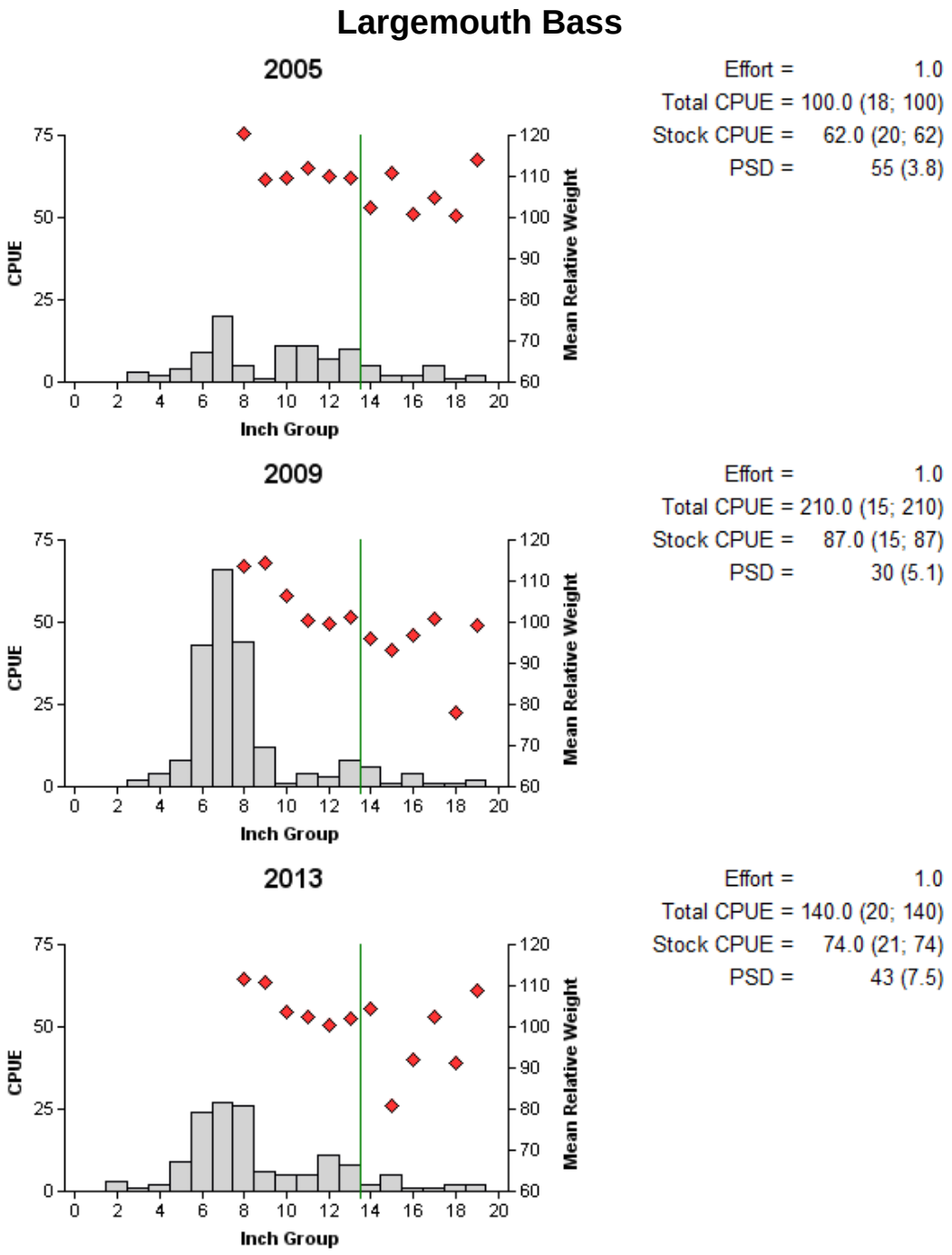


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coffee Mill Reservoir, Texas, 2005, 2009, and 2013. Vertical lines represent length limit at time of collection.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Coffee Mill Reservoir, Texas, 1998, 2001, 2005, and 2013. 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		
1998	30	0	8	22	10.8	0.0
2001	28	0	18	10	19.0	0.0
2005	30	0	24	6	17.8	0.0
2013	30	0	25	5	16.0	0.0

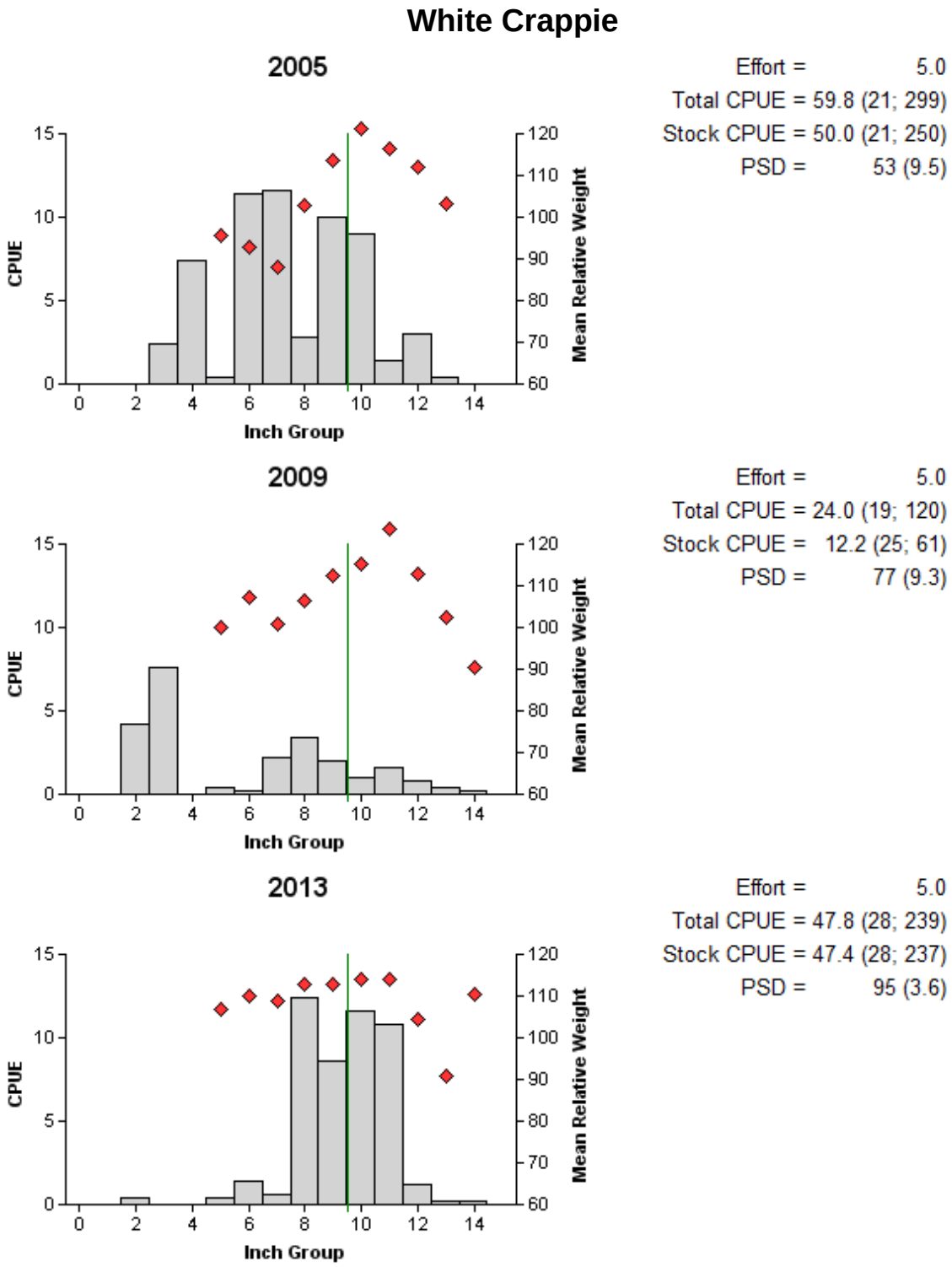


Figure 5. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Coffee Mill Reservoir, Texas, 2005, 2009, and 2013. Vertical lines represent length limit at time of collection.

Black Crappie

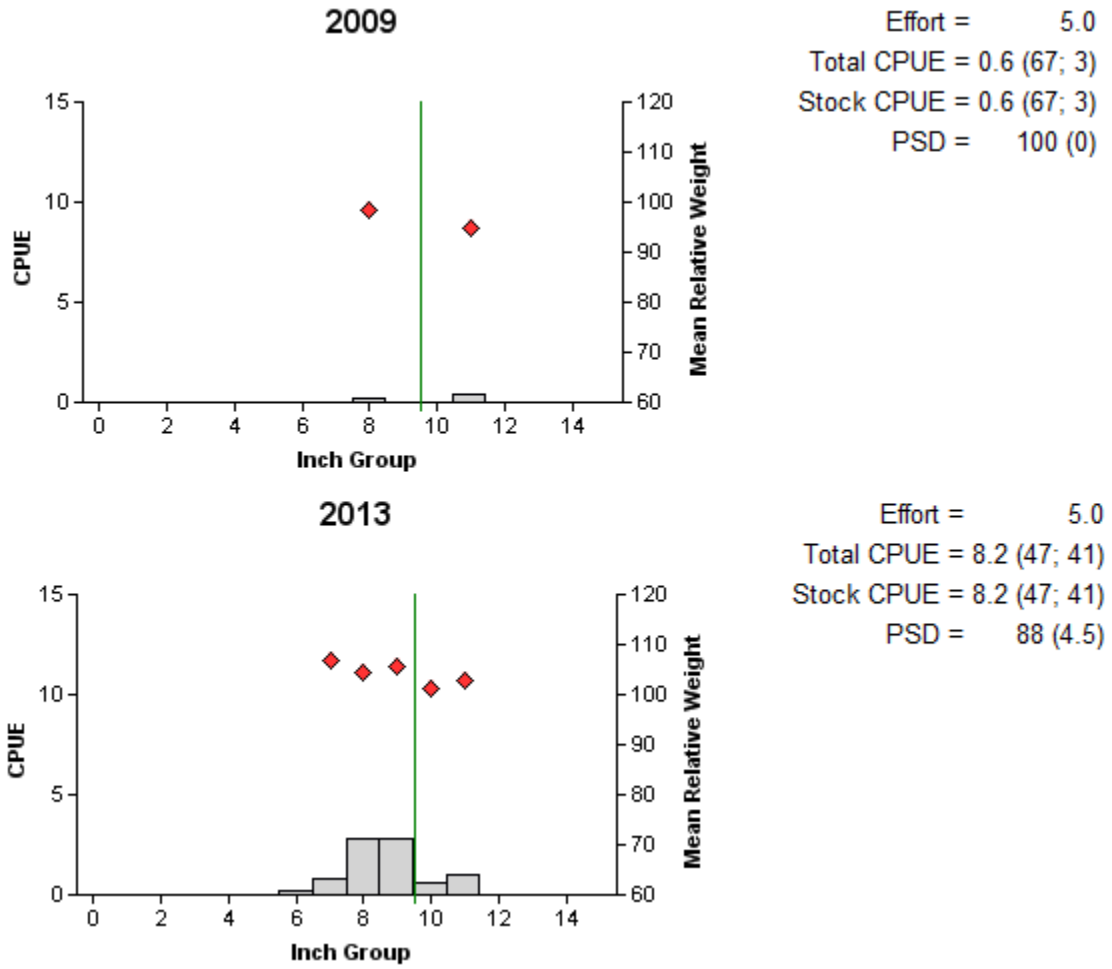


Figure 6. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Coffee Mill Reservoir, Texas, 2009 and 2013. Vertical lines represent length limit at time of collection.

Table 8. Proposed sampling schedule for Coffee Mill 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.

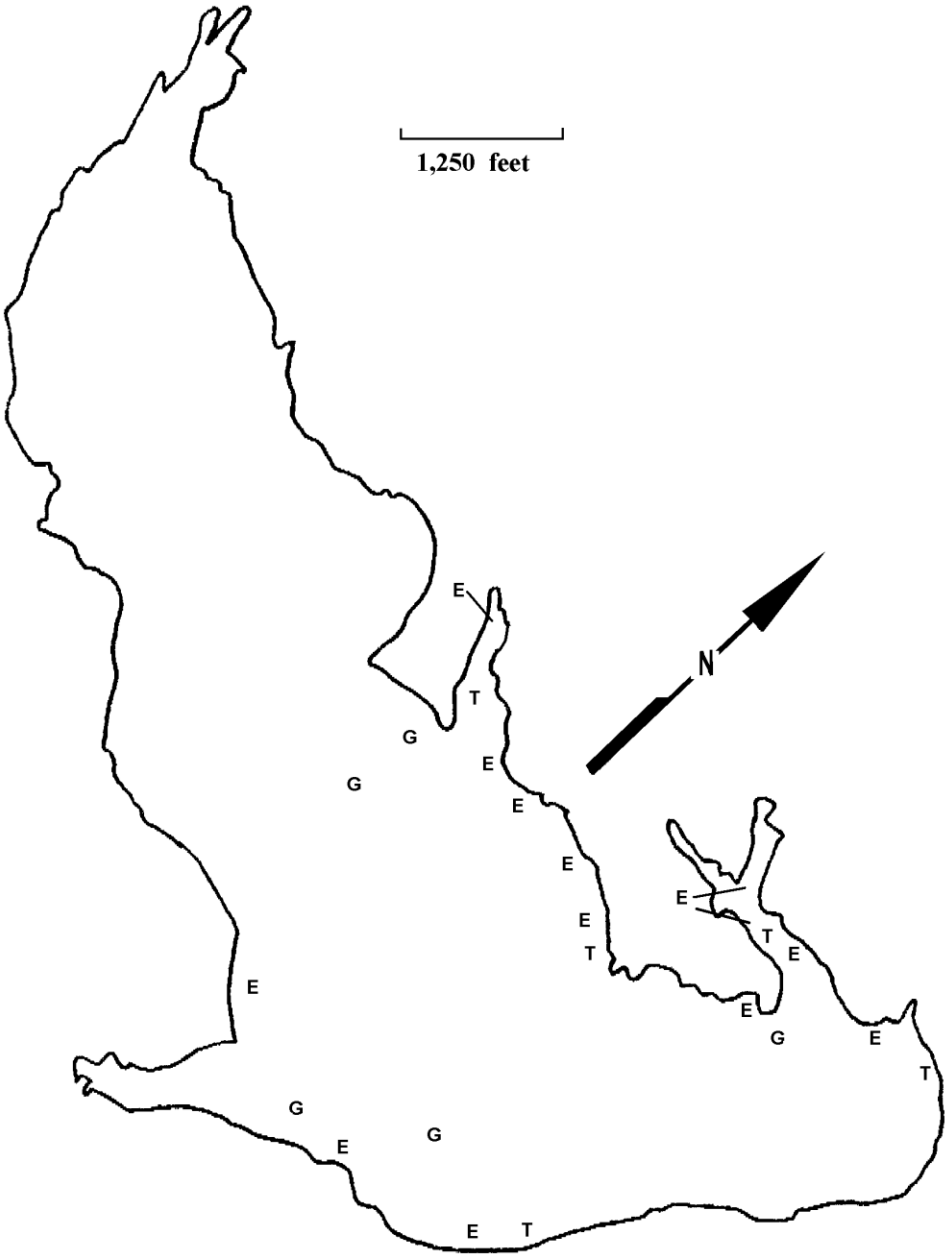
Survey year	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2014-2015								
2015-2016								
2016-2017								
2017-2018	S	S	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Coffee Mill Reservoir, Texas, 2013-2014. Sampling effort was 5 net nights for gill netting, 5 net nights for trap netting, and 1 hour for electrofishing.

	Gill Netting		Trap Netting		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					301	301.0
Threadfin Shad					988	988.0
Channel Catfish	74	14.8				
Warmouth					11	11.0
Bluegill					580	580.0
Longear Sunfish					3	3.0
Redear Sunfish					9	9.0
Largemouth Bass					140	140.0
White Crappie			239	47.8		
Black Crappie			41	8.2		

APPENDIX B



Location of sampling sites, Coffee Mill Reservoir, Texas, 2013-2014. Trap netting, gill netting, and electrofishing are indicated by T, G, and E, respectively. Water level was 2 feet below conservation level for electrofishing, 2.2 feet below conservation level for trap netting, and 0.6 feet below conservation level for gill netting.

APPENDIX C

Historical catch rates of targeted species by gear type for Coffee Mill Reservoir, Texas, 1998, 1999, 2001, 2002, 2005, 2006, 2009, 2010, 2013, and 2014.

		Year										
Gear	Species	1998	1999	2001	2002	2005	2006	2009	2010	2013	2014	**Avg.**
Gill Netting (fish/net night)	Channel Catfish	11.0			19.2		32.8		7.6		14.8	**17.1**
Electrofishing (fish/hour)	Gizzard Shad	1,008.0		984.0		722.0		169.0		301.0		**636.8**
	Threadfin Shad							702.0		988.0		**845.0**
	Green Sunfish	2.0		0.0		4.0		0.0		0.0		**1.2**
	Warmouth	6.0		6.0		14.0		1.0		11.0		**7.6**
	Bluegill	446.0		124.0		672.0		278.0		580.0		**420.0**
	Longear Sunfish	2.0		3.0		14.0		3.0		3.0		**5.0**
	Redear Sunfish	0.0		0.0		1.0		1.0		0.0		**0.4**
	Largemouth Bass	93.0		90.0		100.0		210.0		140.0		**126.6**
Trap Netting (fish/net night)	White Crappie	6.2	47.0	93.4		59.8		24.0		47.8		**46.4**
	Black Crappie	0.0	1.0	0.0		0.0		0.6		8.2		**1.6**