Coffee Mill Reservoir

2017 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

Prepared by:

Dan Bennett, District Management Supervisor and Greg Cummings, Assistant District Management Supervisor

> Inland Fisheries Division Denison District, Pottsboro, Texas

> > Carter Smith Executive Director

Craig Bonds Director, Inland Fisheries

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Survey and Management Summary	1
Introduction	2
Reservoir Description	2
Angler Access	2
Management History	2
Methods	3
Results and Discussion	3
Fisheries Management Plan for Coffee Mill Reservoir	5
Objective-Based Sampling Plan and Schedule (2018-2022)	6
Literature Cited	7
Tables and Figures	8
Reservoir Characteristics	8
Boat Ramp Characteristics	8
Harvest regulations	8
Stocking history	9
Objective-based sampling plan	10
Aquatic Vegetation Survey	11
Gizzard Shad	12
Bluegill	13
Channel Catfish	14
Largemouth Bass	15
Crappie	16
Proposed Sampling Schedule	17
Appendix A – Catch rates for all species from all gear types	
Appendix B – Map of sampling locations	19
Appendix C – Historical catch rates of target species by gear type	20

Survey and Management Summary

Fish populations in Coffee Mill Reservoir were surveyed in 2017 using electrofishing and trap nets and in 2018 using gill nets. Habitat, vegetation, and angler access were surveyed in 2017. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings. Historical data are presented with the 2017-2018 data for comparison.

Reservoir Description: Coffee Mill Reservoir is a 650-acre impoundment located on Coffee Mill Creek approximately 10 miles northeast of Bonham in the Caddo National Grasslands. The reservoir is surrounded by predominately natural shoreline with emergent and submerged aquatic vegetation.

Management History: Important sport fish include Channel Catfish, Largemouth Bass, and crappie. The 2014 fisheries management plan recommended installing lighting at the boat ramp and parking lot, rip rap around the boat ramp, and removing woody vegetation from the reservoir dam.

Fish Community

- **Prey species:** Threadfin Shad, Gizzard Shad, and Bluegill were abundant providing substantial forage for sport fish.
- **Channel Catfish:** The Channel Catfish population was of moderate abundance, and most fish were of quality size or larger ranging from 15 to 25-inches. Catch rate declined from previous surveys.
- Largemouth Bass: Largemouth Bass were in excellent condition at Coffee Mill Reservoir. Electrofishing catch rate was lower, likely due to dense vegetation coverage. Fish were collected up to 18-inches.
- **Crappie:** White Crappie were more abundant than Black Crappie, and many legal-size fish were available to anglers. Catch rate of crappie was lower than the long-term average rate.

Management Strategies: Work with the United States Forest Service (USFS) staff to manage excessive aquatic vegetation. Request a stocking of advanced Channel Catfish fingerlings to maintain the fishery. Inform the public about the negative impacts of aquatic invasive species. An access survey and vegetation survey will be conducted in 2021. Conduct general monitoring surveys with trap nets, gill nets, and electrofishing in 2021 and 2022.

Introduction

This document is a summary of fisheries data collected from Coffee Mill Reservoir in 2017-2018. Historical data are presented with the 2017-2018 data for comparison. 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.

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. Habitat at time of sampling consisted of native emergent vegetation along with native floating-leaved vegetation, and submersed vegetation. The reservoir exhibits minimal water level fluctuation. Descriptive characteristics for Coffee Mill Reservoir are in Table 1.

Angler Access

Coffee Mill Reservoir has one public boat ramp. Additional boat ramp characteristics are in Table 2. 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.texas.gov and navigating within the fishing link.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Moczygemba and Hysmith 2014) included:

1. Encourage U.S. Forest Service (USFS) to install lighting at the boat ramp and parking lot.

Action: The USFS has purchased safety lighting, and installation is pending.

2. Advise USFS to install rip-rap around the boat ramp to minimize erosion from wind action.

Action: The USFS contracted to have concrete repairs completed in 2018, and plans to install rip-rap. Personnel were advised of potential funding eligibility of this project through TPWD's boater access grant program.

3. Encourage the USFS to remove woody vegetation from the reservoir dam, and install vegetation in reservoir as fish habitat.

Action: Woody vegetation was removed, and materials were placed in littoral area along the dam.

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.

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

Surveys were conducted to achieve survey and sampling objectives in accordance with the objectivebased sampling (OBS) plan for Coffee Mill 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 2015).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 hour at 12, 5-min biologist-selected 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 5 randomly-selected fish (range 13.0 to 14.9 inches).

Trap netting – Crappie were collected using trap nets (5 net nights at 5 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn). Ages for White Crappie were determined using otoliths from 13 randomly-selected fish (range 9.8 to 10.8 inches).

Gill netting – Channel Catfish were collected by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE.

Habitat – Aquatic vegetation was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Water level – No water level gauge exists at Coffee Mill Reservoir; however, water level fluctuation was minimal.

Results and Discussion

Habitat: Native submersed aquatic vegetation (i.e., coontail) has declined since 2013, while native emergent aquatic vegetation (narrow-leaved cattail, bulrush, and water willow) and native floating-leaved aquatic vegetation (American lotus and pondweed) have increased (Table 5). American lotus can be invasive, and treatment of it was recommended to the USFS in Spring 2018. Lotus has expanded and displaced much of the submersed vegetation. Structural habitat has not changed since the 2013 survey, so an additional structural habitat survey was not conducted in 2017.

Prey species: Gizzard Shad (321.0/h; Figure 1) were similar in abundance to Threadfin Shad (248.0/h). Threadfin Shad continue to persist in the reservoir since first observed in 2009 (Appendix C). The Index of Vulnerability (IOV) for Gizzard Shad (53) has declined slightly from previous surveys. In 2017, total CPUE of Bluegill (598.0/h) remained high and size structure (PSD=4) continued to be dominated by small individuals (Figure 2).

Channel Catfish: In 2018, the gill net total CPUE of Channel Catfish (3.9/nn) was the lowest on record (Figure 3 and Appendix C); however, the population consisted of primarily quality-size and larger individuals (PSD=97). Body condition (W_r) was \geq 100 for most size classes (Figure 3).

Largemouth Bass: The total catch rate of Largemouth Bass (116.0/h) declined since surveys in 2013 (140.0/h) and 2009 (210.0/h); however, this was believed to be the result of sampling inefficiency in dense vegetation. Just forty-seven stocked-size fish (RSE=23) were collected; however, this was considered adequate for evaluating changes in size structure, and additional sampling effort was not

expended to reach our goal of collecting 50 stock-sized bass. Size structure has steadily improved (Figure 4); PSD increased from 30 in 2009 to 53 in 2017. An insufficient sample size of 13- and 14-inch Largemouth Bass was obtained for estimating mean length at age. However, the <u>five fishfive-fish</u> collected between 13.0 and 14.9-inches were ages 1 and 2. Relative weight was excellent (>100) for most sizes of Largemouth Bass (Figure 4).

Crappie: The total CPUE of crappie (28.2/nn) was approximately half of the catch rate in 2013 (56.0/nn) and below the historical average of 46.4/nn (Figure 5). White Crappie remain the most abundant and dominant species. The PSD for White Crappie and Black Crappie was 92.0 with the majority of the population being available for harvest (\geq 10 inches). White Crappie (N= 13) reached legal length (10 inches) in 2 years. An insufficient sample (N=3) was collected to estimate age at legal length of Black Crappie; however, these fish were between ages 2 and 4. Body condition values of crappie were excellent (W_r \geq 100) for most size classes for both species.

Fisheries Management Plan for Coffee Mill Reservoir

Prepared – July 2018

ISSUE 1: Growth of American lotus can be excessive at times, reducing efficiency of fall electrofishing.

MANAGEMENT STRATEGIES

- 1. Work with TPWD's Aquatic Habitat Enhancement Team and USFS to explore treatment options.
- 2. Conduct a spring electrofishing survey in 2022 to improve catch rates of Largemouth Bass.
- **ISSUE 2:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (Dreissena polymorpha) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (Salvinia molesta) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

- 1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
- 2. Contact and educate local tackle shops about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
- 3. Educate the public about invasive species through the use of media and the internet.
- 4. Make a speaking point about invasive species when presenting to constituent and user groups.

Objective-Based Sampling Plan and Schedule (2018-2022)

Sport fish, forage fish and other important fishes

Important sport fish in Coffee Mill Reservoir include Largemouth Bass, crappie, and Channel Catfish. Important forage species include Bluegill, Gizzard Shad, and Threadfin Shad.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Coffee Mill Reservoir maintains a good bass fishery, and electrofishing catch rates have remained consistent as has the size structure and condition of the bass population. Sampling in spring 2022, should provide an adequate sample-size to determine 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 to meet our objectives of collecting \ge 50 stock-size fish with an RSE of CPUE-S \le 25 to evaluate size structure and CPUE. Based on previous surveys, we should meet these objectives in the original 12 random stations; however, 6 additional random stations will be pre-determined in the event some additional sampling is necessary.

Catfish: Coffee Mill Reservoir has a quality Channel Catfish fishery, and trend data will be collected in 2022 to evaluate recruitment, size structure, and CPUE. In spring of 2022, we will sample Channel Catfish with gill nets to meet our objectives of collecting \geq 50 stock-size fish with an RSE of CPUE-S \leq 30. Initially we will set 5 gillnets at random sites; up to 5 additional gill nets may be set in the event objectives are not achieved with the initial 5 nets.

Crappie: Crappie provide the most popular fishery at Coffee Mill Reservoir. Both White Crappie and Black Crappie are present in Coffee Mill Reservoir; however, White Crappie are in greater abundance. Trend data to evaluate CPUE, size structure, body condition, and growth to the MLL is needed once every 4-years to monitor for any long-term changes in the White Crappie population. We will sample White Crappie using 5 random trap net sampling stations in fall of 2021 to collect \geq 50 stock-size fish with an RSE of CPUE-S < 25. Based on previous surveys, we should meet OBS objectives in the original 5 random stations. If objectives are not met with the initial 5 sampling stations, we will set an additional 5 random trap net stations if it is determined our objectives can be achieved. Data on Black Crappie will be collected along with White Crappie; however, no additional effort will be expended beyond that which is necessary to achieve sampling objectives for White Crappie.

Sunfish and Shad: Bluegill and Gizzard and Threadfin Shad are the primary forage at Coffee Mill Reservoir. We intend to collect trend data to evaluate relative abundance (total CPUE), size structure, and prey availability for forage species by use of electrofishing once every four years. Data collection for prey species will be collected in conjunction with sampling for Largemouth Bass. Effort expended to achieve desired relative abundance estimates for Bluegill and Gizzard Shad should be similar to that required for Largemouth Bass.

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Tables and Figures

Table 1. Characteristics of Coffee Mill Reservoir.

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. 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	Adequate

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

Species	Bag limit	Length limit
Catfish, Channel	25	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Species	Year	Number	Size
Channel Catfish	1969	19,000	FGL
	1991	2,500	AFGL
	1992	14,191	AFGL
	1995	75	ADL
	1995	12,500	AFGL
	1999	16,255	AFGL
	Total	64,521	
Florida Largemouth Bass	1994	65,000	FGL
	1995	40,000	FGL
	1997	76,500	FGL
	1999	65,033	FGL
	Total	246,533	
Largemouth Bass	1969	143,000	FRY
	Total	143,000	

Table 4. Stocking history of Coffee Mill Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), and adult (ADL).

Gear/target species	i	Survey objective	Metrics	Sampling objective
Electrofishing				
Largemouth	Bass	Abundance	CPUE – Stock	RSE-Stock ≤ 25
		Size structure	PSD, length frequency	N ≥ 50 stock
		Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
		Condition	Wr	10 fish/inch group (max)
Pluogilla		Abundanaa		
Bluegili		Abundance		$RSE \leq 25$
		Size structure	PSD, length frequency	N ≥ 50
Gizzard Sha	d ^a	Abundance	CPUE – Total	RSE ≤ 25
		Size structure	PSD, length frequency	N ≥ 50
		Prey availability	IOV	N ≥ 50
Trap netting				
Crappie		Size structure	PSD, length frequency	N = 50
		Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches
Gill netting				
Channel Cat	fish	Abundance	CPUE– Stock	RSE <u><</u> 30
		Size structure, Recruitment	Length frequency	Practical effort

Table 5. Objective-based sampling plan components for Coffee Mill Reservoir, Texas 2017 – 2018.

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

Vegetation	2009	2013	2017
Native submersed ^a	1.0 (0.2)	12.1 (1.8)	1.8 (0.3)
Native floating-leaved ^b	53.0 (8.2)	46.5 (7.1)	133.6 (20.6)
Native emergent ^c	3.0 (0.5)	2.0 (0.3)	14.5 (2.2)

Table 6. Survey of aquatic vegetation for Coffee Mill Reservoir, Texas, 2009, 2013, and 2017. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

acoontail, American pondweed, and spiny pondweed

bAmerican lotus.

cbullrush, cattail, sedge, arrowhead, and water willow



Figure 1. 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, Coffee Mill Reservoir, Texas, 2009, 2013, and 2017.



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, 2009, 2013, and 2017.



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, 2010, 2014, and 2018. 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, 2009, 2013, and 2017. Vertical lines represent length limit at time of collection.

2009 Effort = 5.0 Wr Black Total CPUE = 24.6 (19; 123) Wr White Stock CPUE = 15--130 12.8 (25; 64) Black □ White PSD = 78 (9) 120 Mean Relative Weight -110 10 CPUE 100 90 5 80 0 70 ò ż 4 6 8 10 12 14 16 Inch Group 2013 Effort = 5.0 Wr Black Total CPUE = 56.0 (25; 280) Wr White Stock CPUE = 55.6 (25; 278) 15-Black r130 U White PSD = 94 (4) 120 Mean Relative Weight 0 110 10 CPUE 100 90 5 80 0 70 8 10 12 16 Ó ź 6 14 1 Inch Group 2017 Effort = 5.0 Wr Black Total CPUE = 28.2 (25; 141) Wr White Stock CPUE = 27.6 (25; 138) 15-Black r130 UWhite PSD = 92 (4) 120 Mean Relative Weight 110 10 CPUE 100 5 90 80 70 0 Ó 12 16 2 6 8 10 14 Inch Group

Figure 5. Number of White Crappie and Black Crappie caught per net night (CPUE, bars), mean relative weight (circles and 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, 2013, and 2017. Vertical lines represent length limit at time of collection.

16

Proposed Sampling Schedule

Table 8. Proposed sampling schedule for Coffee Mill Reservoir, Texas. Survey period is June through May. Electrofishing and Gill netting surveys are conducted in the spring, while trap netting surveys are conducted in the fall. Standard survey denoted by S, additional survey denoted by A.

	Survey year					
-	2018-2019	2019-2020	2020-2021	2021-2022		
Angler Access				S		
Vegetation				S		
Electrofishing – Spring				S		
Trap netting				S		
Gill netting				S		
Report				S		

Appendix A – Catch rates for all species from all gear types

Number (N), relative standard error (RSE) and catch rate (CPUE) of all target species collected from all gear types from Coffee Mill Reservoir, Texas, 2017-2018. Sampling effort was 10 net nights for gill netting, 5 net nights for trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Electro	fishing	Trap Netting	
	N/RSE	CPUE	N/RSE	CPUE	N/RSE	CPUE
Gizzard Shad			321/23	321.0		
Threadfin Shad			248/15	248.0		
Channel Catfish	39/22	3.9				
Warmouth			4/43	4.0		
Bluegill			598/20	598.0		
Longear Sunfish			33/28	33.0		
Redear Sunfish			9/47	9.0		
Largemouth Bass			116/23	116.0		
White Crappie					122/31	24.4
Black Crappie					19/42	3.8



Appendix B – Map of sampling locations

Location of electrofishing (E), trap netting (T), and gill netting (G) sites, Coffee Mill Reservoir, Texas, 2017 and 2018. Boat ramp is also marked. Water level was at or near full pool at time of sampling.

			Year					
Gear	Species	1998-99	2001-02	2005-06	2009-10	2013-14	2017-18	Avg.
Gill Netting (fish/net night)	Channel Catfish	11.0	19.2	32.8	7.6	14.8	3.9	14.9
Electrofishing (fish/hour)	Gizzard Shad	1,008.0	984.0	722.0	169.0	301.0	321.0	584.2
. ,	Threadfin Shad				702.0	988.0	248.0	646.0
	Green Sunfish	2.0	0.0	4.0	0.0	0.0	0.0	1.0
	Warmouth	6.0	6.0	14.0	1.0	11.0	4.0	7.0
	Bluegill	446.0	124.0	672.0	278.0	580.0	598.0	449.7
	Longear Sunfish	2.0	3.0	14.0	3.0	3.0	33.0	9.7
	Redear Sunfish	0.0	0.0	1.0	1.0	0.0	9.0	1.8
	Largemouth Bass	93.0	90.0	100.0	210.0	140.0	116.0	124.8
Trap Netting (fish/net night)	White Crappie	6.2, 47.0	93.4	59.8	24.0	47.8	24.4	49.9
,	Black Crappie	0.0, 1.0	0.0	0.0	0.6	8.2	3.8	2.5

Appendix C – Historical catch rates of target species by gear type

Historical catch rates of targeted species by gear type for Coffee Mill Reservoir, Texas, 1998, 1999, 2001, 2002, 2005, 2006, 2009, 2010, 2013, 2014, 2017, and 2018.



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