PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Coffee Mill Reservoir

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Fish populations in Coffee Mill Reservoir were surveyed in 2009 using an electrofisher and trap nets and in 2010 using gill nets. Habitat was surveyed in 2009. 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 3 feet of the spillway since 2006. Coffee Mill Reservoir has moderate and increasing primary productivity. 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 2005 considered the lack of lighting at the boat ramp, parking lot, and fishing pier, and an unsafe fishing pier. A recommendation was passed on to the U.S. Forest Service to install and maintain lighting and the fishing pier has since been removed.
- Fish community
 - **Prey species:** Electrofishing catch rate of gizzard shad was lowest on record, but over half were vulnerable to predation. Collected for the first time, threadfin shad electrofishing catch rates augmented the low gizzard shad catch rates. Although lower than the previous sample, electrofishing catch rate of bluegills was high and most were 4 inches and smaller, ideal prey.
 - **Channel catfish:** Gill net catch rate of channel catfish was low, but most of the population was legal-size and in fair to good condition.
 - Largemouth bass: The electrofishing catch rate of largemouth bass was highest on record, growth was good, and they were in excellent condition
 - **Crappie:** Trap net catch rate of white crappie was fair and lower than the 18-year historical average. Growth was great and condition was good
- **Management strategy:** Encourage the U.S. Forest Service to install and maintain lighting from the boat ramp to the west end of the parking lot. Inform U.S. Forest Service 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 2009-2010. 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 is presented with the 2009-2010 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 35.5 cm for 2009-2010 and suggests mesotrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2008). Mesotrophic 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. Native aquatic plants present were southern naiad, coontail, American lotus, and water willow. 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 2006. Boat access consisted of one public boat ramp. There was bank fishing access in the campground near the boat ramp. The boat ramp and parking lot were not lighted. Lighting would provide more convenience for the angler. Other descriptive characteristics for Coffee Mill Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Hysmith and Moczygemba 2006) included:

- 1. Encourage U.S. Forest Service to install and maintain exterior illumination at the boat ramp, parking lot, and repair existing pier.
 - Action: Lighting was not installed but the unsafe pier was removed.

Harvest regulation history: Sport fishes in Coffee Mill Reservoir are currently managed with statewide regulations (Table 2).

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 3.

Vegetation/habitat history: Coffee Mill Reservoir supported submersed, emergent, and floating-leaved aquatic vegetation (Table 4). Historically, submersed aquatic vegetation (southern naiad and coontail) was common, but not problematic (Hysmith 1993). 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).

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Water Transfer: Coffee Mill Reservoir is used exclusively for wildlife management and recreation and water is not transferred to 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 2009).

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 for creel statistics and SE was calculated for structural indices and IOV. Ages were determined using Category 2 protocol and otoliths from 13 to 33 fish according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008). The manual specifies for largemouth bass only, but we adapted crappie and catfishes to the protocol for identifying the number of fish to sample. No target size (11 – 12 inches) channel catfish was collected; so, otoliths were removed from 6 various size fish.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of native floating-leaved vegetation (Table 4). The pelagic zone is mostly open water but standing timber and stumps are present in the upper end.

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 169.0/h and 278.0/h, respectively (Figure 1 and 2). Index of vulnerability (IOV) for gizzard shad was good, indicating that 64.5 % of gizzard shad were available to existing predators; however, this was lower than IOV estimates in previous years (Figure 1). Total CPUE of gizzard shad was lowest on record (Appendix C), but was augmented by an electrofishing total CPUE for threadfin shad of 702.0/h (Appendix C). This was the first collection of threadfin shad in Coffee Mill Reservoir. Anglers must have brought them in as bait since we have not stocked them. Total CPUE of bluegill (278.0/h) was third 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 (7.6/nn) was below the 18-year average of 14.4/nn (Figure 3 and Appendix C). Recruitment of stock size fish seems to vary, however, historically an acceptable population of \geq 12-inch is always available. Relative weights were fair to good, indicating a healthy population and 86% of the sample was legal-size and larger. Our limited age and growth sample indicated average age at 9.4 inches (N=2) was 1 year; average age 5 was 17.8 inches (N=2), and average age 6 was 19.9 inches (N=2).

Largemouth bass: The highest electrofishing total CPUE on record (210.0/h) was collected in 2009 (Figure 4 and Appendix C). Size structure was good at PSD = 30.0 and 7% of the population was \geq 14 inches. Growth of largemouth bass in Coffee Mill Reservoir was above the state average (Prentice 1987) almost 14 inches (13.2 to 14.4 inches) in 2 years (N = 14; range = 2 - 4 years). Relative weight was good for most sizes of largemouth bass and was just slightly lower than previous years (Figure 4).

Crappies: The trap net total CPUE of white crappie (24.0/nn) was well below the historical average of 54.5/nn (Figure 6 and Appendix C). The PSD was 77.0 with 17% of the sample population being legal

size (10 inches). Growth of white crappie exceeded statewide average (Prentice 1987) attaining almost 10 inches (9.1 to 10.0 inches) in 1+ years (N= 13; range = 1 - 2 years). Relative weight indicated a very healthy population dominated by values \geq 100%. The catch of only 3 black crappie precluded meaningful data analysis.

Fisheries management plan for Coffee Mill Reservoir, Texas

Prepared – July 2010.

ISSUE 1: Angler usage was compromised by the lack of nighttime exterior illumination at the boat ramp and parking lot.

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: 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 2013/2014 (Table 5).

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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. Harvest regulations for Coffee Mill Reservoir, Texas.									
Species Bag Limit Length Limit (i									
Catfish: channel	25	12							
Bass, largemouth	5	14							
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10							

Table 3. 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.

			Life	Mean
Species	Year	Number	Stage	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 4. Survey of shoreline habitat and littoral and pelagic habitat types, Coffee Mill Reservoir, Texas, 2009. A linear shoreline distance (miles) and percent of total was recorded for each shoreline habitat type found. Surface area (acres) and percent of total was determined for each type of littoral and pelagic habitat type found.

	Shore	eline distance	Surfac	e area
	Miles	% of total	Coverage (acres)	% of total
Shoreline habitat type				
Natural shoreline	6.4	89		
Bulkhead	0.8	11		
Littoral and pelagic habitat type				
Standing timber, stumps			22	3.4
Native emergent			3	0.5
Native floating leaved			53	8.2
Native submersed			1	0.2
Open water		571	87.7	

10 **Gizzard Shad**







8

Inch Group

6 7

2 Ĵ.

4

0



Effort =

IOV =

Effort =

IOV =

1.0

1.0

81.0 (20; 81)

64.5 (7.4)

79.09 (4.0)

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, 2001, 2005, and 2009.



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, 2001, 2005, and 2009.



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, 2002, 2006, and 2010. 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, 2001, 2005, and 2009. Vertical lines represent length limit at time of collection.



Figure 6. 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, 2001, 2005, and 2009. Vertical lines represent length limit at time of collection.

Table 5. Proposed sampling schedule for Coffee Mill Reservoir, Texas. Electrofishing and trap netting surveys are conducted in the fall, while gill netting surveys are conducted during the following spring. Standard survey denoted by S.

	•				
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2010-Spring 2011					
Fall 2011-Spring 2012					
Fall 2012-Spring 2013					
Fall 2013-Spring 2014	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, 2009-2010.

	Gill Netting		Trap I	Netting	Electro	Electrofishing		
Species	N	CPUE	N	CPUE	N	CPUE		
Gizzard shad					169	169.0		
Threadfin shad					702	702.0		
Channel catfish	38	7.6						
Warmouth					1	1.0		
Bluegill					278	278.0		
Longear sunfish					3	3.0		
Redear sunfish					1	1.0		
Largemouth bass					210	210.0		
White crappie			120	24.0				
Black crappie			3	0.6				



Location of sampling sites, Coffee Mill Reservoir, Texas, 2009-2010. Trap netting, gill netting, electrofishing, and water sampling stations are indicated by T, G, and E, respectively. Water level was at conservation for all sampling.

APPENDIX C

Historical catch rates of targeted species by gear type for Coffee Mill Reservoir, Texas, 1992, 1995, 1998, 1999, 2001, 2002, 2005, 2006, 2009, and 2010.

							Year					
Gear	Species	1992	1995	1998	1999	2001	2002	2005	2006	2009	2010	Avg.
Gill Netting (fish/net night)	Channel catfish	5.2	10.6	11.0			19.2		32.8		7.6	14.4
Electrofishing	Gizzard shad	223.0	3,819.0	1,008.0		984.0		722.0		169.0		1154.2
(fish/hour)	I hreadfin shad									702.0		702.0
	Green sunfish			2.0				4.0				3.0
	Warmouth	2.0	2.0	6.0		6.0		14.0		1.0		5.2
	Bluegill	73.0	114.0	446.0		124.0		672.0		278.0		284.5
	Longear sunfish	2.0	3.0	2.0		3.0		14.0		3.0		4.5
	Redear sunfish	1.0						1.0		1.0		1.0
	Largemouth bass	53.0	79.0	93.0		90.0		100.0		210.0		104.2
Trap Netting	White crappie	65.2	85.8	6.2	47.0	93.4		59.8		24.0		54.5
(fish/net night)	Black crappie				1.0					0.6		0.8