

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

**Coffee Mill Reservoir**

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## TABLE OF CONTENTS

Survey and management summary .....	2
Introduction.....	3
Reservoir description.....	3
Management history.....	3
Methods.....	4
Results and discussion.....	4
Fisheries management plan.....	6
Literature cited.....	7
Figures and Tables.....	8-16
Reservoir characteristics (Table 1) .....	8
Harvest regulations (Table 2) .....	8
Stocking history (Table 3).....	8
Habitat survey (Table 4) .....	9
Gizzard shad (Figure 1).....	10
Bluegill (Figure 2) .....	11
Channel catfish (Figure 3) .....	12
Largemouth bass (Figure 4; Table 5).....	13
White crappie (Figure 5) .....	15
Proposed sampling schedule (Table 6).....	16
Appendix A	
Catch rates for all target species from all gear types .....	17
Appendix B	
Map of 2005-2006 sampling locations .....	18
Appendix C	
Water chemistry profile .....	19
Appendix D	
Historical catch statistics 1992-2006.....	20

## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Coffee Mill Reservoir were surveyed in 2005 using an electrofisher and trap nets and in 2006 using gill nets. Habitat was surveyed in 2005. 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 2001. Coffee Mill Reservoir has moderate and increasing primary productivity. Habitat features consisted mainly of native emerged vegetation, especially along the shoreline. There was some standing timber.
- **Management history:** Important sport fish include channel catfish, largemouth bass, and white crappie. The management plan from the 2001 survey report included a recommendation to discontinue stocking Florida largemouth bass, which were stocked in 1994-1999. After 4 years of stocking, introduction of Florida alleles into the native largemouth bass population was unsuccessful. Supplemental trap netting in 1999 confirmed high abundance of white crappie and refuted data from 1998 which showed low abundance. Anglers were creelied in the summer of 2001 and the spring of 2002. Black crappie were present only in the 1999 survey.
- **Fish community**
  - **Prey species:** Electrofishing catch of gizzard shad was high, but continued to decline from previous surveys. There was an increase in relative abundance of larger gizzard shad (> 7-inches). Electrofishing catch of bluegills was a record high, which provided further evidence of an excellent prey base.
  - **Channel catfish:** Gill net catch of channel catfish was a record high, with most of the population of legal-size and in fair to excellent condition.
  - **Largemouth bass:** The electrofishing catch rate of largemouth bass continues to be high, growth rates were good, and the fish were healthy. Electrophoretic samples produced no pure Florida bass, but the sample had 17.8% Florida bass alleles.
  - **Crappies:** Trap net catch rate of white crappie was high, but lower than in 2001 and legal-size crappie were in excellent condition. Although present in previous surveys, black crappie were not found in this survey.
- **Management strategies:** Encourage U. S. Forest Service to install and maintain lighting at the boat ramp, fishing pier, and at the west end of the parking lot, and to repair fishing pier.

3  
INTRODUCTION

This document is a summary of fisheries data collected from Coffee Mill Reservoir in 2005-2006. 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 2005-2006 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. Primary water uses included wildlife management and recreation. Chl-a measurements were not available for Coffee Mill Reservoir, however average Secchi disk transparency was 51 cm for 2005-2006 and suggests mesotrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2002). 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 emerged vegetation, native submerged vegetation, and dead trees and stumps. Native aquatic plants present were southern naiad and water willow. Water level was not monitored in this reservoir, but anecdotal data from casual observations by our staff and U.S. Forest Service personnel concluded the reservoir has been at or within 3 feet of the spillway since 2001. Boat access consisted of one public boat ramp. Bank fishing access in the campground near the boat ramp was augmented by a pier, although it was in need of major repairs. The boat ramp and pier were not lighted, which 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 Moczygamba 2002) included:

1. Discontinue the stocking of Florida largemouth bass fingerlings.  
**Action:** Removed Coffee Mill Reservoir from the Florida largemouth bass stocking list.
2. Update the Coffee Mill Reservoir web page as required.  
**Action:** Recommendations were made as appropriate.

**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, 8-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. Since the reservoir was constructed in 1939, there were fish stocked between 1939 and 1969, but we have no records with which to document these stockings. Also, the reservoir was drained and treated with rotenone in 1968, and restocked in 1969 (Bonn 1969).

**Vegetation/habitat history:** Coffee Mill Reservoir supported submerged and emerged aquatic vegetation (Table 4). Historically, submerged 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).

## 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 2004).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (Wr)] 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 2004). The manual specifies for largemouth bass only, but we adapted crappie and catfishes to the protocol for identifying the number of fish to sample. Source for water level data was TPWD and U.S. Forest Service observations.

## RESULTS AND DISCUSSION

**Habitat:** Littoral zone habitat consisted primarily of native emerged vegetation and native submerged vegetation (Table 4).

**Prey species:** Electrofishing catch rates of gizzard shad and bluegill were 722.0/h and 672.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was good, indicating that 79% of gizzard shad were available to existing predators; this was lower than IOV estimates in previous years (Figure 1). Total CPUE of gizzard shad was lower in 2005 compared to surveys in 1998 and 2001 (Figure 1). Total CPUE of bluegill in 2005 was highest on record and size structure continued to be dominated by small individuals (Figure 2 and Appendix D).

**Channel catfish:** The gill net catch rate of channel catfish was 32.8/nn in 2005 and an all-time record (Figure 3 and Appendix D). Relative weights were good, indicating a healthy population and most of the sample was legal-size and larger. The sample population continued to demonstrate low catch rate of sub-legal fish, but abundance of 12-inch and larger fish remains positive. As the size structure shows, there are a few individuals we considered yearlings. Growth of channel catfish in Coffee Mill Reservoir was good. Average age at 12 inches (11.3 to 12.7) was 1.6 years (N = 14; range 1 – 2).

**Largemouth bass:** The electrofishing catch rate of stock-length largemouth bass was 62.0/h in 2005, lower than the 75.0/h in 2001 and 77.0/hr in 1998 (Figure 4). However, total CPUE (100.0/h) was higher than in the two previous surveys. Size structure was excellent at PSD = 55.0 and 17% of the population was  $\geq 14$  inches. Growth of largemouth bass in Coffee Mill Reservoir was excellent; average age at 14 inches (13.56 to 14.46 inches) was 1.5 years (N = 15; range = 1 – 2 years). Body condition in 2005 was excellent (relative weight = 100 – 114) for nearly all size classes of fish and was similar to body condition in previous surveys (Figure 4). Despite 4 years of stocking from 1994 – 1999, Florida largemouth bass influence has been marginal and Florida alleles ranged from 10.8% to 19.0% with 17.8 % in 2005 and Florida genotype has remained at 0.0 % (Table 5).

**White crappie:** The trap net catch rate of white crappie was 59.8/nn in 2005, lower than in 2001 (93.4/nn) and similar to 1999 (47.0/nn). The PSD was 53.0 and indicated a more evenly distributed size structure than was demonstrated in the survey of 2001 when PSD = 97.0 or in 1999 when PSD = 99.0 (Figure 5). The legal portion of the white crappie sample population in 2005 was about one-half what it was in 2001

and 1999. Relative weights remained fairly constant from 1999 to 2005; the best conditioned fish were in the 10-inch group. Relative weights declined for smaller and larger fish. Growth was excellent as demonstrated by our 21-crappie sample that all grew to 10 inches in 1 year.

**Fisheries management plan for Coffee Mill Reservoir, Texas**

Prepared – July 2006.

**ISSUE 1:** Angler access was compromised by the lack of lighting at the boat ramp, parking lot, and fishing pier, and a damaged and unsafe fishing pier.

**MANAGEMENT STRATEGY**

1. Encourage U.S. Forest Service to install and maintain lighting at the boat ramp and at the west side of the parking lot as well as repair existing pier.

**SAMPLING SCHEDULE JUSTIFICATION:**

The proposed sampling schedule consists of mandatory monitoring in 2009/2010 (Table 6).

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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 umhos/cm

Table 2. Harvest regulations for Coffee Mill Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish, channel	25	12
Bass, largemouth	5	14
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10

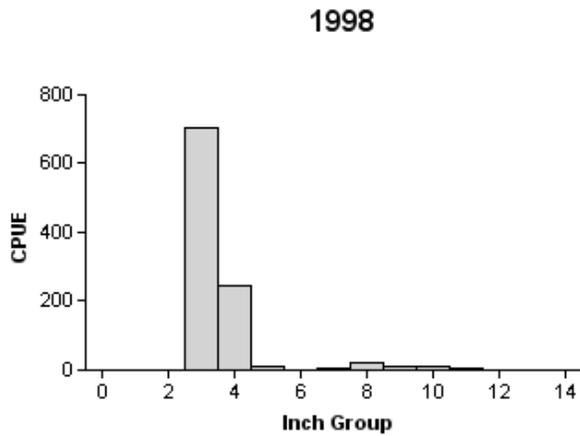
Table 3. Stocking history of Coffee Mill Reservoir, Texas. Size categories are: FRY =&lt; 1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
Channel catfish	1969	19,000	FGL
	1991	2,500	AFGL
	1992	14,191	AFGL
	1995	75	ADL
	1995	12,575	AFGL
	1999	16,255	AFGL
	Total	64,596	
Largemouth bass	1969	143,000	FRY
Florida largemouth bass	1994	65,000	FGL
	1995	40,000	FGL
	1997	76,500	FGL
	1999	65,033	FGL
	Total	246,533	

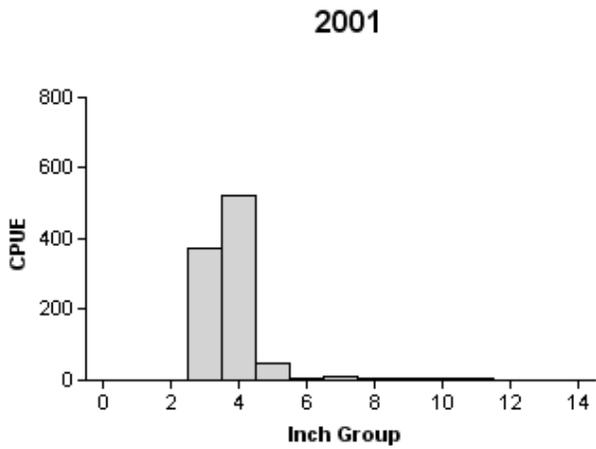
Table 4. Survey of littoral zone and physical habitat types, Coffee Mill Reservoir, Texas, 2005. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Concrete	0.8	11.1		
Cut bank	0.4	5.6		
Dead trees, stumps	1.2	16.7		
Native submerged vegetation	1.0	13.9	20.1	3.0
Native emerged vegetation	3.8	52.7	46.2	7.1

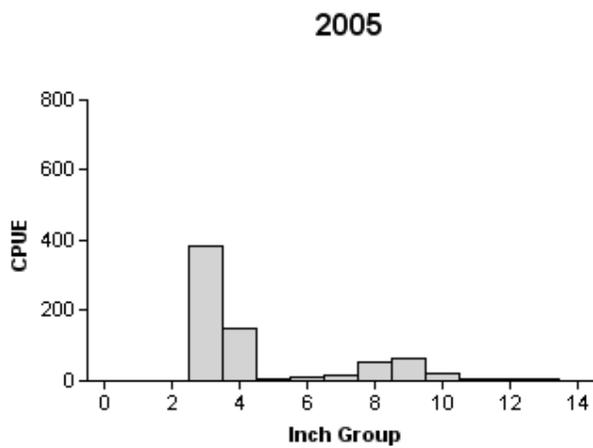
10  
**Gizzard Shad**



Effort = 1.0  
Total CPUE = 1,008.0 (34; 1008)  
IOV = 95.73 (0.02)



Effort = 1.0  
Total CPUE = 984.0 (16; 984)  
IOV = 97.36 (0.01)



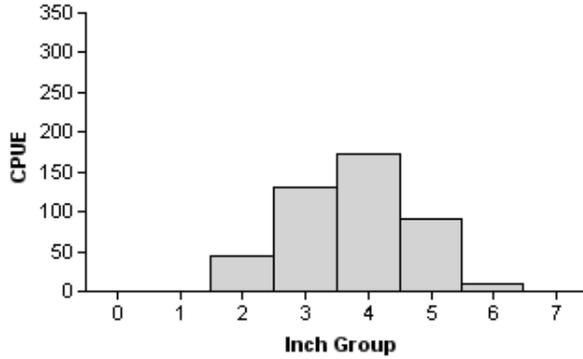
Effort = 1.0  
Total CPUE = 722.0 (20; 722)  
IOV = 79.09 (0.04)

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 1998, 2001, and 2005.

# Bluegill

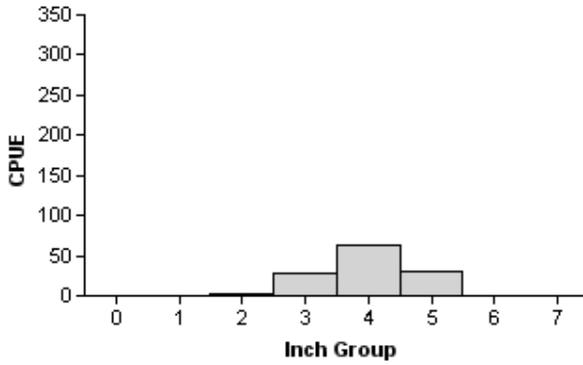
1998

Effort = 1.0  
 Total CPUE = 446.0 (17; 446)  
 PSD = 2.0 (0.01)



2001

Effort = 1.0  
 Total CPUE = 124.0 (18; 124)  
 PSD = 0.0 (0.36)



2005

Effort = 1.0  
 Total CPUE = 672.0 (17; 672)  
 PSD = 2.0 (0.01)

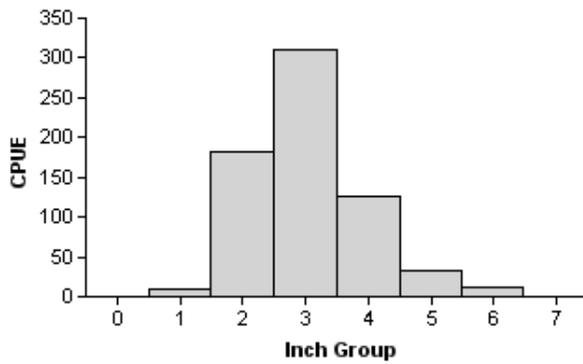


Figure 2. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coffee Mill Reservoir, Texas, 1998, 2001, and 2005.

# Channel Catfish

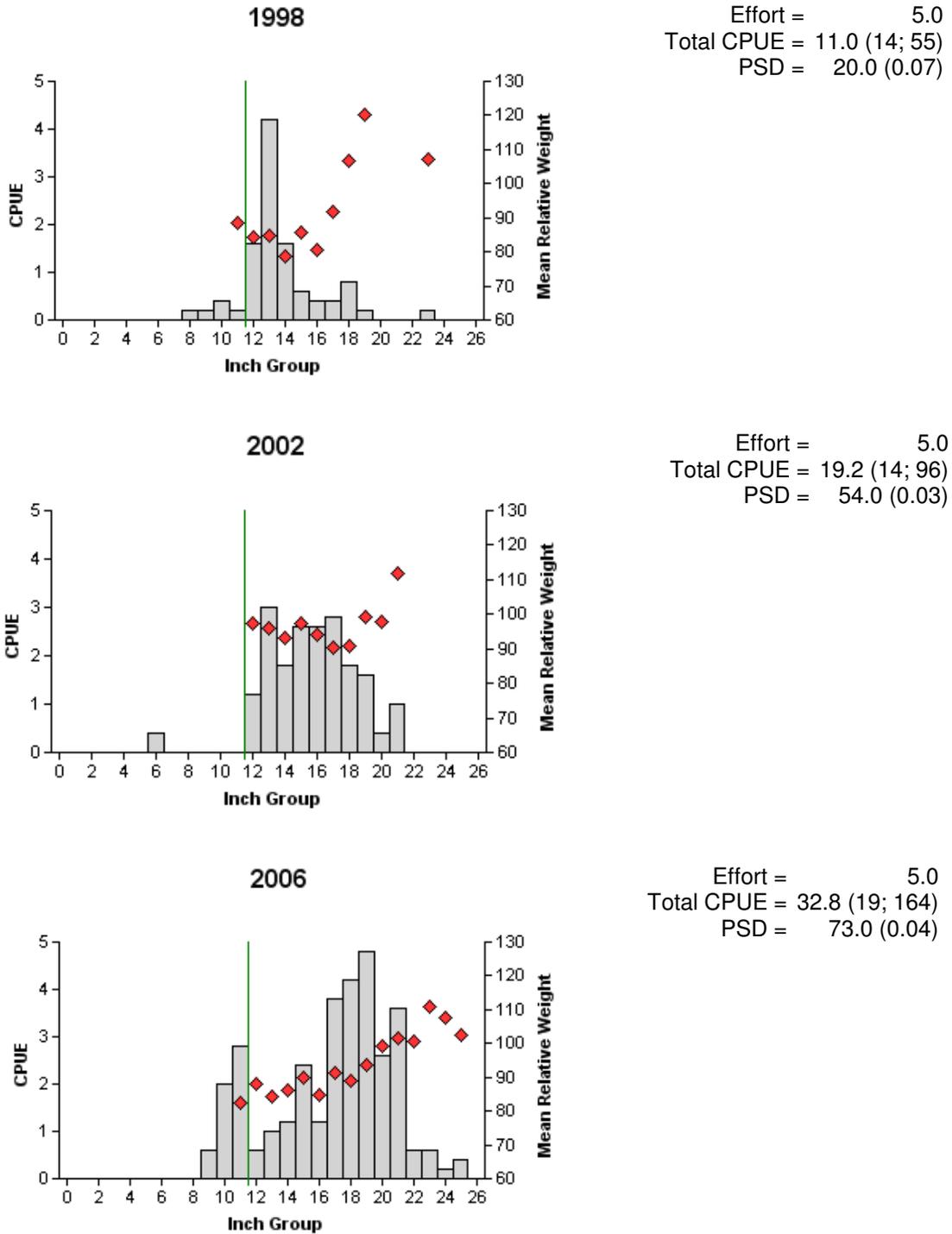
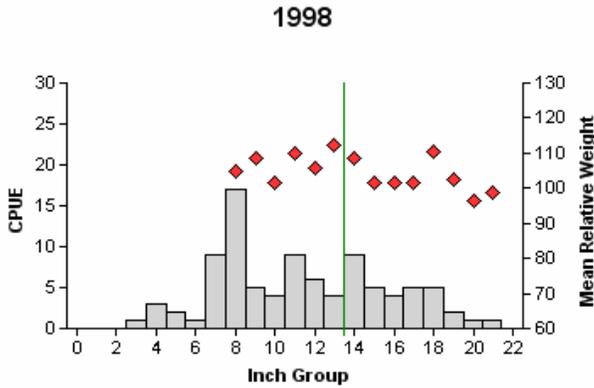
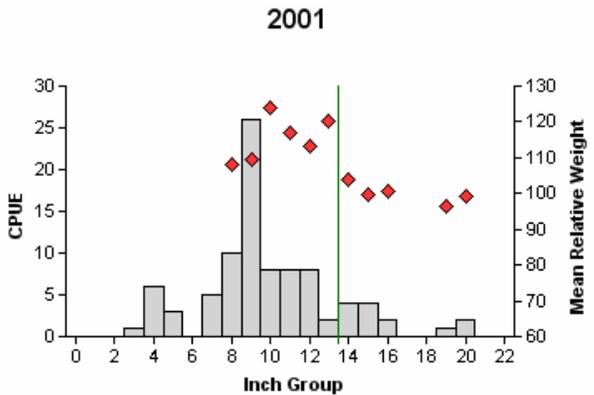


Figure 3. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Coffee Mill Reservoir, Texas, 1998, 2002, and 2006. Vertical lines represent length limit at time of collection.

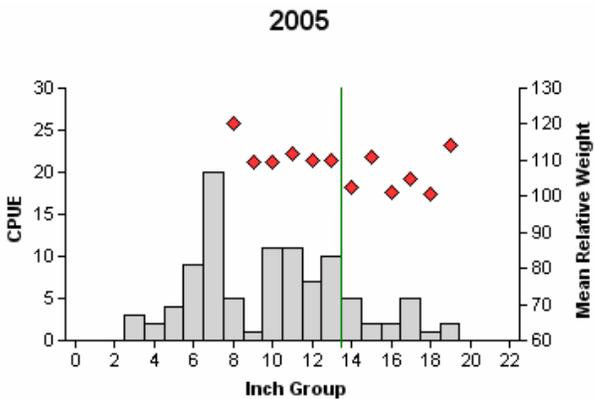
# Largemouth Bass



Effort = 1.0  
 Total CPUE = 93.0 (20; 93)  
 Stock CPUE = 77.0 (21; 77)  
 PSD = 55.0 (0.1)



Effort = 1.0  
 Total CPUE = 90.0 (21; 90)  
 Stock CPUE = 75.0 (22; 75)  
 PSD = 31.0 (0.03)



Effort = 1.0  
 Total CPUE = 100.0 (16; 100)  
 Stock CPUE = 62.0 (18; 62)  
 PSD = 55.0 (0.04)

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, 1998, 2001, and 2005. Vertical lines represent length limit at time of collection.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Coffee Mill Reservoir, Texas, 1998, 2001, and 2005. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
1998	30	0	0	8	22	10.8	0.0
2001	28	0	3	15	10	19.0	0.0
2005	30	0	1	23	6	17.8	0.0

## White Crappie

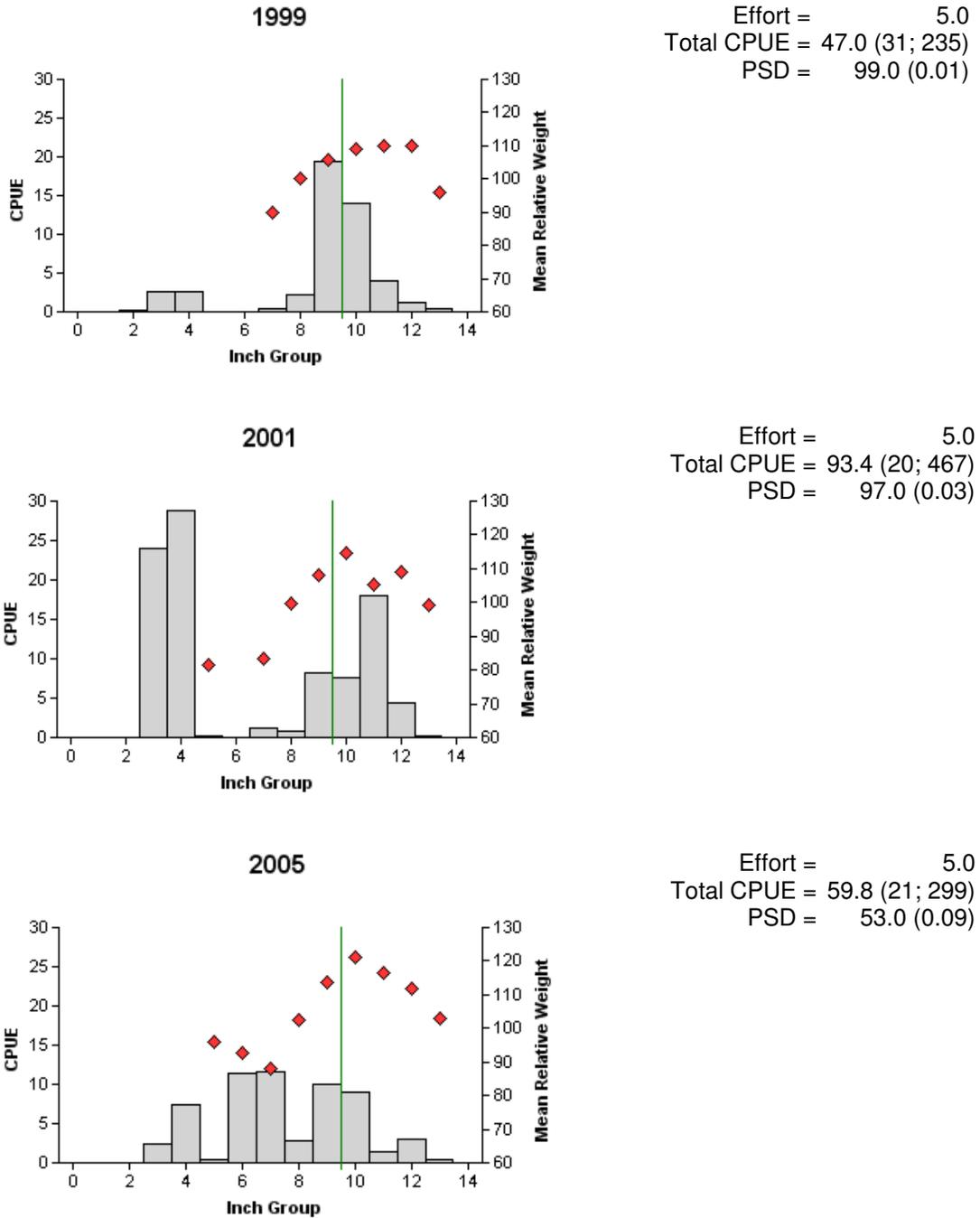


Figure 5. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Coffee Mill Reservoir, Texas, 1999, 2001, and 2005. Vertical lines represent length limit at time of collection.

Table 6. 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.

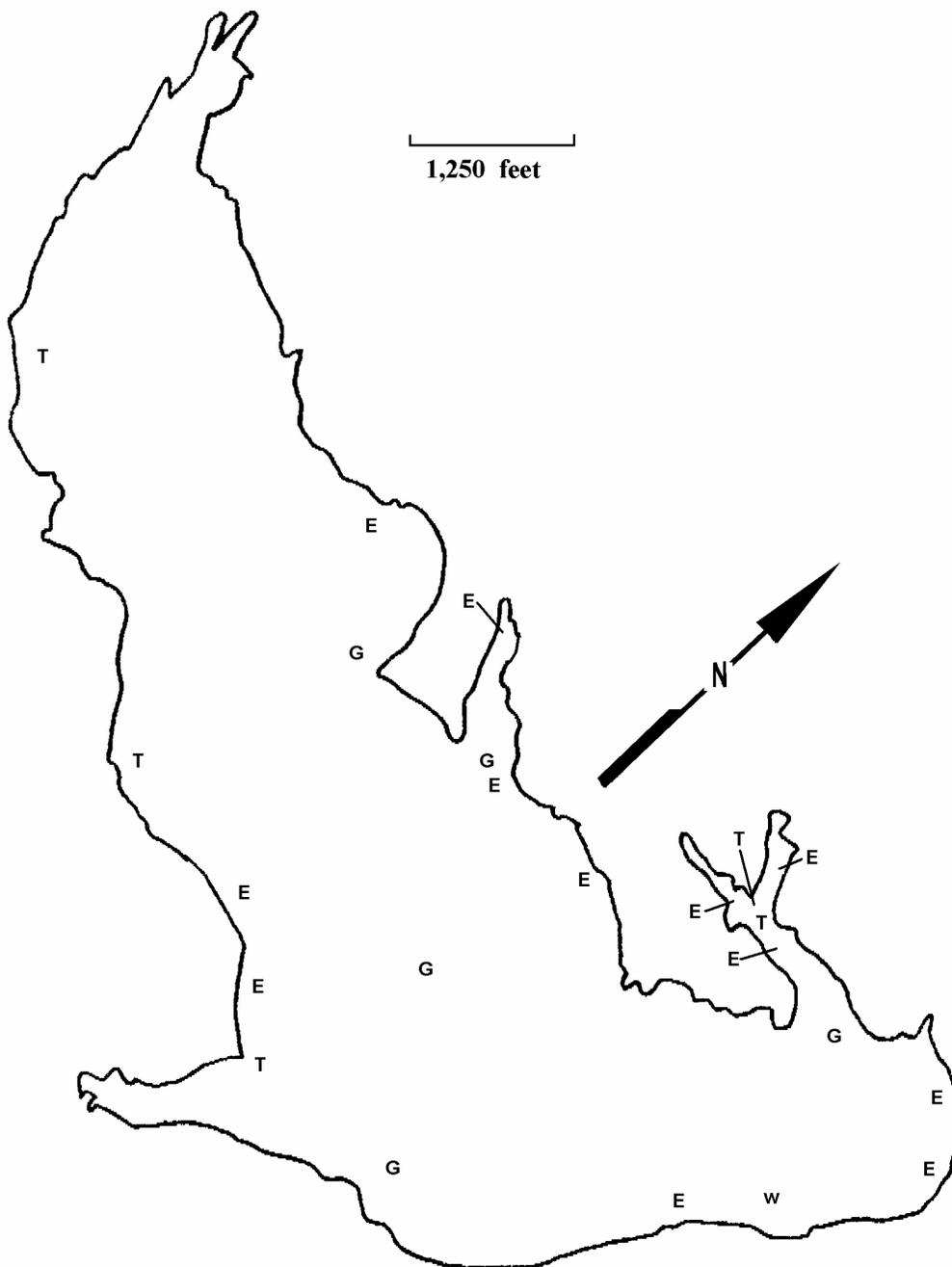
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2006-Spring2007					
Fall 2007-Spring 2008					
Fall 2008-Spring2009					
Fall 2009-Spring 2010	S	S	S		S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Coffee Mill Reservoir, Texas, 2005-2006.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					722	722.0
Channel catfish	164	32.8				
Green sunfish					4	4.0
Warmouth					14	14.0
Bluegill					672	672.0
Longear sunfish					14	14.0
Redear sunfish					1	1.0
Largemouth bass					100	100.0
White crappie			299	59.8		

## Appendix B



Location of sampling sites, Coffee Mill Reservoir, Texas, 2005-2006. Trap netting, gill netting, electrofishing, and water sampling stations are indicated by T, G, E, and W, respectively. Water level was 3 feet below conservation for trap netting and electrofishing and one foot below during gill netting.

**APPENDIX C**

Water sample parameters for Coffee Mill Reservoir, Texas, July 7, 2005.

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Depth (m)	Temp (C°)	D.O. (ppm)	Chlorides (ppm)	Conductivity (mhos/cm)	Alkalinity (ppm)	Total dissolved solids (ppm)	pH
Surface	29.5	7.3	18	238.7	62.0	155.1	7.8
1.0	29.2	6.6					
2.0	29.0	5.0					
3.0	28.8	3.7	21	254.6	65.0	165.5	7.0
4.0	28.5	1.9					
5.0	27.3	0.0	23	264.0	79.0	171.6	6.7

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**APPENDIX D**

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

Gear type	Species	Year							
		1992	1995	1998	1999	2001	2002	2005	2006
Gill Netting	Channel catfish	5.2	10.6	11.0			19.2		32.8
Electrofishing	Gizzard shad	223.0	3819.0	1008.0		984.0		722.0	
	Green sunfish			2.0				4.0	
	Warmouth	2.0	2.0	6.0		6.0		14.0	
	Bluegill	73.0	114.0	446.0		124.0		672.0	
	Longear sunfish	2.0	3.0	2.0		3.0		14.0	
	Redear sunfish	1.0						1.0	
	Largemouth bass	53.0	79.0	93.0		90.0		100.0	
Trap Netting	White crappie	65.2	85.8	6.2	47.0	93.4		59.8	
	Black crappie				1.0				