

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

O.C. Fisher Reservoir

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TABLE OF CONTENTS

Survey and Management Summary	2
Introduction.....	3
Reservoir Description	3
Management History	3
Methods.....	3
Results and Discussion	4
Fisheries Management Plan.....	5
Literature Cited.....	6
Figures and Tables.....	7-17
Water level (Figure 1)	7
Reservoir characteristics (Table 1).....	7
Harvest regulations (Table 2)	7
Stocking history (Table 3).....	8
Littoral habitat survey (Table 4)	9
Gizzard shad (Figure 2).....	10
Bluegill (Figure 3)	11
Blue catfish (Figure 4)	12
Channel catfish (Figure 5)	13
White bass (Figure 6)	14
Largemouth bass (Figure 7).....	15
White crappie (Figure 8)	16
Proposed sampling schedule (Table 5).....	17
Appendix A	
Catch rates for all species from all gear types	18
Appendix B	
Map of 2008-2009 sampling locations.....	19

SURVEY AND MANAGEMENT SUMMARY

Fish populations in O.C. Fisher Reservoir were surveyed in 2008 using electrofishing and trap nets, and in 2009 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** O. C. Fisher Reservoir is a 5,440-acre reservoir at conservation pool on the west side of San Angelo, in Tom Green County. Access to the reservoir is controlled by San Angelo State Park, which surrounds most of the lake basin. The reservoir covered approximately 600 acres at the time of sampling. This hypereutrophic reservoir experiences dramatic water level fluctuations, and has extensive fish habitat mostly in the form of flooded terrestrial vegetation. Boating access is fair, with one lane currently usable at one boat ramp.
- **Management History:** Important sport fishes include largemouth bass, white crappie, and catfishes. A low-oxygen fish kill in 2004 devastated all sport fish populations; thereafter, TPWD stocked bluegill, Florida largemouth bass, white crappie, gizzard shad, and blue and channel catfishes. Sport fishes have been managed with statewide regulations.
- **Fish Community**
 - **Prey species:** Gizzard shad catch rate was fairly low, but due to their small size, vulnerability to predators was excellent. Threadfin shad were also present. Bluegill up to 6 inches were present in low numbers.
 - **Catfishes:** Blue and channel catfish populations were improving following intensive stocking of both species in 2005 and 2006. Many small and some large fish were present in 2009, indicating successful reproduction.
 - **White bass:** Although white bass were present in the 1999 and 2001 gill net samples, no white bass have been captured in surveys since the fish kill in 2004.
 - **Largemouth bass:** Although overall catch rate was low, this population has improved since the stocking in 2005, with relative abundance of legally harvestable bass increasing substantially from 2005 to 2008. Body condition was very good.
 - **White crappie:** Overall catch rate, as well as relative abundance of stock-size fish, increased dramatically between 2002 and 2008. In the latest survey, many plump individuals over 12 inches were captured and growth rate to 10 inches was excellent.
- **Management Strategies:** Keep informed of watershed issues and participate in local water planning groups, and write informational newspaper article(s) on the importance of water conservation to this and other local fisheries. Assess status of shad population with additional electrofishing, and if appropriate, conduct a management stocking of adult white bass in spring 2010. Conduct additional electrofishing in 2009, additional trap netting in 2010, and standard monitoring in 2012/2013.

INTRODUCTION

This document is a summary of fisheries data collected from O. C. Fisher Reservoir in 2008-2009. 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 2008-2009 data for comparison.

Reservoir Description

O. C. Fisher Reservoir was constructed in 1953 on the North Concho River on the northwest side of San Angelo. The 5,440-acre (when full) impoundment is used for recreation, municipal water supply and irrigation. Access to the reservoir is controlled by San Angelo State Park, which surrounds most of the lake basin. At the time of sampling the reservoir was approximately 40 feet below conservation pool and covered approximately 600 surface acres (Figure 1). O. C. Fisher Reservoir was hypereutrophic with a mean TSI chl-*a* of 63.08 (Texas Commission on Environmental Quality 2008). Habitat at time of sampling consisted primarily of flooded dead terrestrial vegetation. Boat access was fair, with one useable lane at one boat ramp. Bank fishing access was fair in the areas adjacent to the boat ramp; however, no fishing piers or disabled access facilities were available. Other descriptive characteristics for O. C. Fisher Reservoir are presented in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Scott and Van Zee 2005) included:

1. Respond to the 2004 low-oxygen fish kill by stocking prey and game fish species.
Action: We stocked over 75,000 bluegill fingerlings; 187,000 blue catfish fingerlings; 394 adult white crappie; 75,000 Florida largemouth bass fingerlings; 239 adult Florida largemouth bass; 12,000 adult channel catfish; 20,000 advanced fingerling channel catfish; and 195,000 fingerling channel catfish in the two years following the fish kill.
2. Conduct a habitat survey in late summer or early fall of 2008 to assess possible changes due to water level fluctuations.
Action: A habitat survey was conducted on the reservoir in September 2008.

Harvest regulation history: Sport fishes in O. C. Fisher Reservoir are currently managed with statewide regulations (Table 2).

Stocking history: Species stocked have included threadfin shad, blue catfish, channel catfish, flathead catfish, Florida and northern largemouth bass, and various sunfish. Walleye were stocked in the past, with no success. The complete stocking history is in Table 3.

Vegetation/habitat history: O. C. Fisher Reservoir has experienced steadily declining water levels since the early 1990s (Figure 1). Currently, most fish habitat available is in the form of flooded terrestrial vegetation (saltcedar and willow baccharis). Submerged aquatic vegetation has not been found in the reservoir.

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 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 2008), with the exception of the trap netting effort. O. C. Fisher was part of a special gear evaluation in 2008 where lighted trap nets were compared to unlighted trap nets (our standard gear). Results from the standard gear are presented alongside the historical results in this report.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], 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). Relative standard error (RSE = $100 \times \text{SE of the estimate/estimate}$) was calculated for all CPUE statistics. Ages were determined using otoliths for white crappie; we collected 16 individual white crappie from 9 to 11 inches to calculate mean-age-at-length for 10-inch white crappie. A habitat survey was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005) in late summer 2008. Water level data were provided by U.S. Geological Survey website.

RESULTS AND DISCUSSION

Habitat: In 2008, O. C. Fisher had abundant submerged terrestrial vegetation (saltcedar, willow baccharis) that provided most of the littoral fish habitat. Some rocky shoreline was also available. Complete results of the 2008 habitat survey for O. C. Fisher can be found in Table 4.

Prey species: Gizzard shad abundance in 2008 declined to 120/h from 235/h in 2005 and 354/h in 2006 (Figure 2). Although relative abundance was decreased, vulnerability to predators was high (IOV = 92) and showing an increasing trend. Bluegill relative abundance was also low (56/h in 2008), with individuals as large as six inches (Figure 3). Threadfin shad were also captured during fall electrofishing at a rate of 128/h.

Blue catfish: Total catch of blue catfish was lower in 2006 (2.8/nn) and 2009 (5.4/nn) than before the fish kill (2001 CPUE = 10.4/nn), but the population appears to be improving (Figure 4). Catch rate of stock-size fish and total catch rate increased over the past 3 years, and fish in a wide range of sizes were present in the more recent survey, indicating probable reproductive success. Body condition was fair (most W_r values 80 to 90) in 12 to 19 inch fish, and good (W_r values 95 to 105) in fish over 20 inches.

Channel catfish: Many small channel catfish (<12 inches) were captured in 2009, which increased the total catch rate to 10.4/nn from 1.4/nn and 4.6/nn in 2001 and 2006, respectively (Figure 5). Body condition, indicated by relative weight, ranged from poor (W_r = 75) to good (W_r = 100), and increased with total length. The largest channel catfish captured in 2009 was 18 inches; whereas several fish over 20 inches were caught in the 2006 sample.

White bass: Although white bass were present in the 1999 and 2001 gill net samples (Figure 6), no white bass have been captured in surveys since the fish kill in 2004.

Largemouth bass: Relative abundance of largemouth bass increased substantially after the water rise and stocking efforts in 2005 (Figures 1 and 7; Table 3). Catch rate improved from 2/h in 2002 (Scott and Van Zee 2005) to 168/h in 2005, but then declined over the next three years, to 68/h in 2006 and 29/h in 2008. However, CPUE of legally harvestable bass increased from 0/h to 10/h during the same time. Individuals up to 18 inches were captured in 2008, and body condition was very good, with W_r values ranging from 89 to 110.

White crappie: Overall relative abundance and relative abundance of stock-size fish increased

dramatically between 2002 and 2008 (Figure 8). The 2008 trap net catch rate was high (48/nn) with individuals up to 12 inches. Size structure and body condition were also good, indicated by a PSD of 55 and average W_r values above 100. Growth was excellent, with mean age of 1.1 years for 9-11 inch crappie.

Fisheries management plan for O. C. Fisher Reservoir, Texas

Prepared – July 2009.

ISSUE 1: Currently, the reservoir is 45 ft below conservation pool and at 11% capacity. The current water elevation is approximately 8 feet above the level where the low-oxygen fish kill occurred in 2004. The main threat to the fishery's viability is extremely low water levels.

MANAGEMENT STRATEGIES

1. Keep informed on local water issues, and represent TPWD Inland Fisheries at planning group meetings whenever possible. For example, continue participation on the Concho River Basin Watershed Protection Plan stakeholders' group, especially concerning the brush control project in O. C. Fisher watershed, and attend meeting(s) of the Region F Water Planning Group.
2. Write at least one article for the local newspaper on the importance of water conservation to the local fisheries.

ISSUE 2: O. C. Fisher Reservoir once had a good white bass fishery, but no white bass have been collected since the 2004 fish kill.

MANAGEMENT STRATEGY

1. Conduct an additional electrofishing survey in fall 2009 to assess the status of the shad populations.
2. If shad populations appear adequate in the additional survey, and water level is not lower than 1860 feet above Mean Sea Level, conduct a management stocking of adult white bass the following spring.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing in 2009, additional trap netting in 2010, and mandatory monitoring in 2012/2013 (Table 5). The additional electrofishing will help us to assess the prey community status, and the additional trap netting will help us assess the expanding crappie population. Otherwise, this schedule is adequate for monitoring the status of the most important game fish species: largemouth bass, white crappie, and catfish.

LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Texas Commission on Environmental Quality. 2008. Trophic classification of Texas reservoirs: 2008 water quality inventory and 303(d) list. 15 pages.
- Scott, M., and Van Zee, B. 2005. Statewide freshwater fisheries monitoring and management program survey report for O. C. Fisher Reservoir, 2004. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

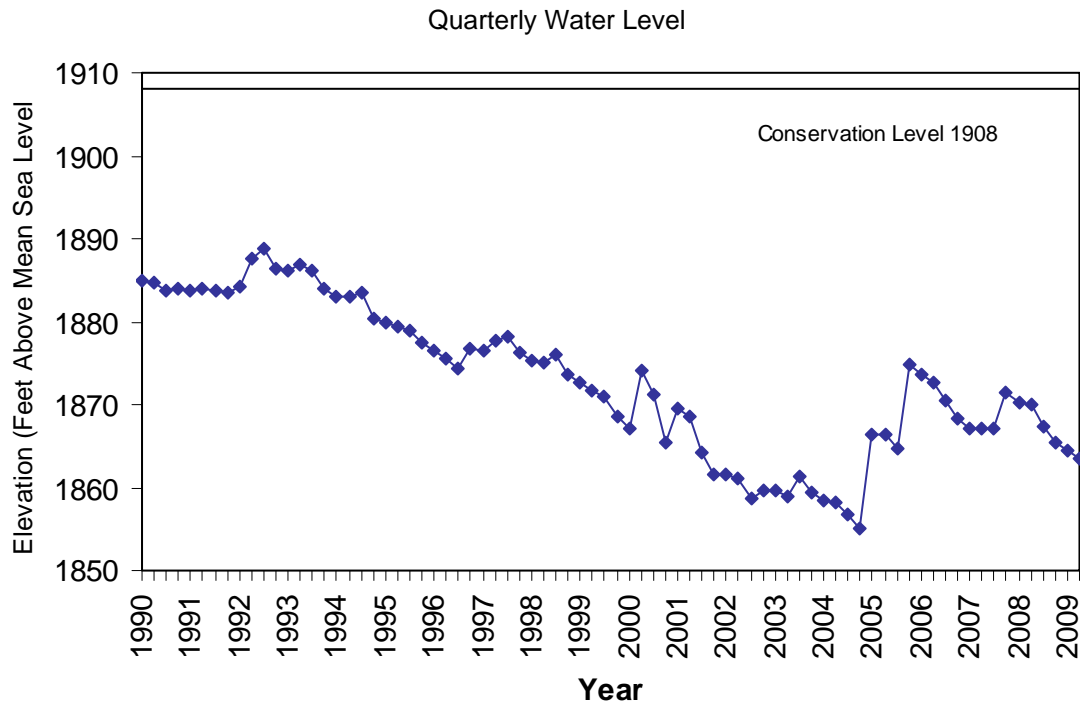


Figure 1. Quarterly water level elevations recorded for O.C. Fisher Reservoir, Texas.

Table 1. Characteristics of O. C. Fisher Reservoir, Texas.

Characteristic	Description
Year constructed	1953
Controlling authority	United States Army Corps of Engineers
County	Tom Green
Reservoir type	Mainstream
Shoreline Development Index	2.60
Conductivity	686 μ mhos/cm

Table 2. Harvest regulations for O. C. Fisher Reservoir, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 – No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass, largemouth	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

Table 3. Stocking history of O. C. Fisher Reservoir, Texas. Size categories are FGL = 1-3 inches; ADL = adult; AFGL = 8 inches; and UNK = unknown.

Year	Number	Size	Year	Number	Size
<u>Threadfin shad</u>			<u>Kemp's largemouth bass</u>		
1984	8,500	UNK	1974	4,500	FGL
<u>Gizzard shad</u>			<u>Green x Redear Sunfish</u>		
2005	160	ADL	1969	40,000	UNK
<u>Bluegill</u>			1974	100,000	UNK
2005	75,145	FGL	Total	140,000	
<u>Blue catfish</u>			<u>Redear Sunfish</u>		
1971	1,500	UNK	1970	12,000	UNK
1974	24,600	UNK	1971	5,040	UNK
1980	39,132	UNK	Total	17,040	
1981	30,004	UNK	<u>Largemouth bass</u>		
1982	30,427	UNK	1966	209,500	UNK
2005	75,000	FGL	1968	139,000	UNK
2006	112,596	FGL	1969	25,450	UNK
Total	313,259		1970	43,135	UNK
<u>Channel catfish</u>			1971	10,000	UNK
1966	3,000	UNK	1972	6,000	UNK
1969	112,100	UNK	1973	3,425	UNK
1973	12,250	UNK	Total	436,510	
1974	56,400	UNK	<u>Florida largemouth bass</u>		
1980	61,884	UNK	1987	145,249	FGL
1987	200,150	FGL	1996	107,803	FGL
1994	50,340	FGL	2003	71,426	FGL
2005	12,301	ADL	2005	239	ADL
2005	20,018	AFGL	2005	75,952	FGL
2005	75,022	FGL	Total	400,669	
2006	120,619	FGL	<u>White crappie</u>		
Total	724,084		1969	5,000	UNK
<u>Flathead catfish</u>			1972	12,000	UNK
1971	3,000	UNK	2005	394	ADL
<u>Warmouth</u>			Total	17,394	
1969	38,000	UNK			

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Table 3, continued from page 8.

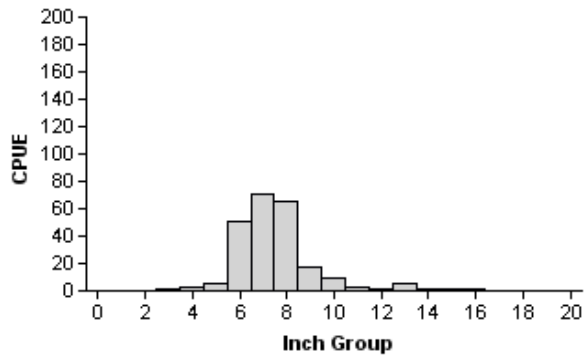
	<u>Walleye</u>	
1968	7,400	UNK
1970	1,100,000	UNK
1971	740,000	UNK
1972	1,030,000	UNK
1973	3,900,000	UNK
1974	50,000	UNK
1983	6,306,250	UNK
1989	4,787,250	FRY
1990	<u>4,962,600</u>	FRY
Total	22,883,500	

Table 4. Survey of littoral zone and physical habitat types, O. C. Fisher Reservoir, Texas, 2008. A linear shoreline distance (miles) was recorded for each shoreline habitat type found. Surface area (acres) and percent of reservoir surface area were determined for each type of offshore habitat; no aquatic vegetation was found. Flooded terrestrial vegetation consisted primarily of saltcedar and willow baccharis.

Habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of total
Rocky shoreline	2.4	25		
Natural shoreline (nondescript)	7.0	75		
Flooded terrestrial vegetation			360	60

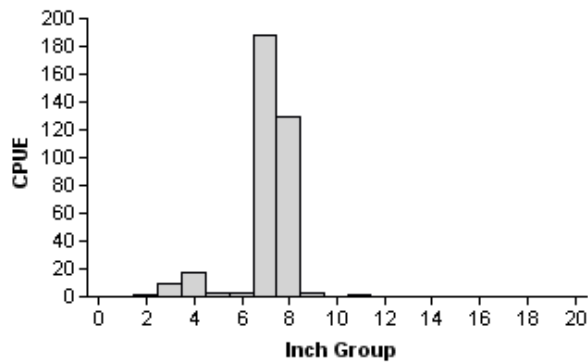
Gizzard Shad

2005



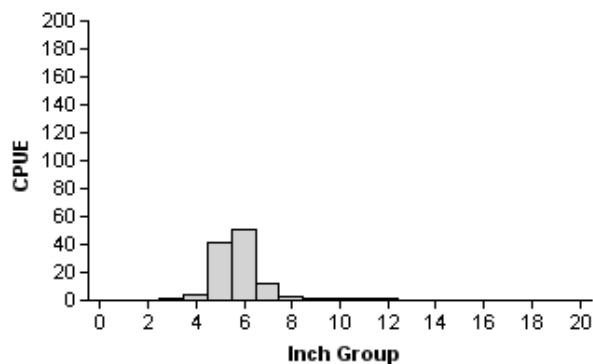
Effort = 1.0
 Total CPUE = 235.0 (26; 235)
 IOV = 56.2 (10.8)

2006



Effort = 1.0
 Total CPUE = 354.0 (22; 354)
 IOV = 62.4 (4.9)

2008

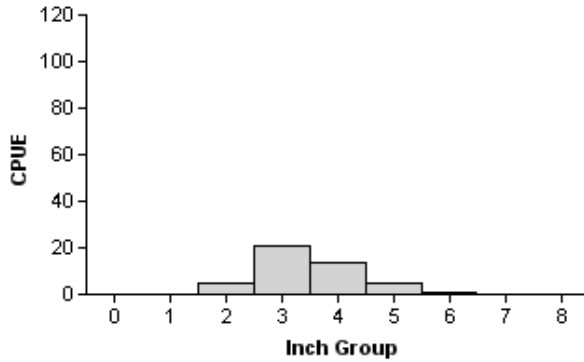


Effort = 1.0
 Total CPUE = 120.0 (31; 120)
 IOV = 91.7 (4.2)

Figure 2. Number of gizzard shad caught per hour (CPUE) and index of vulnerability (IOV; RSE and N are in parentheses) for fall electrofishing surveys, O.C. Fisher Reservoir, Texas, 2005, 2006, and 2008.

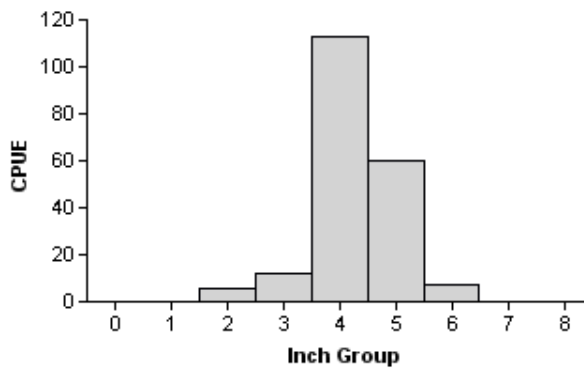
Bluegill

2005



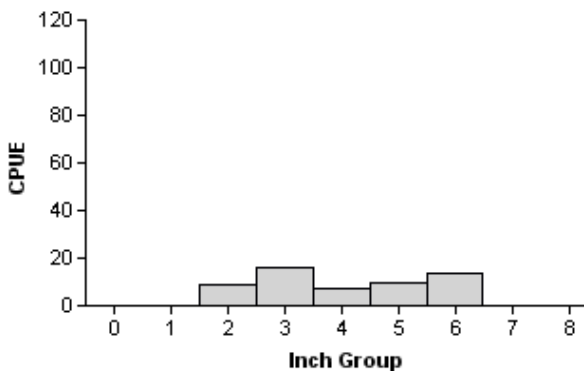
Effort = 1.0
 Total CPUE = 46.0 (28; 46)
 PSD = 2 (2.4)

2006



Effort = 1.0
 Total CPUE = 198.0 (49; 198)
 PSD = 4 (0.9)

2008

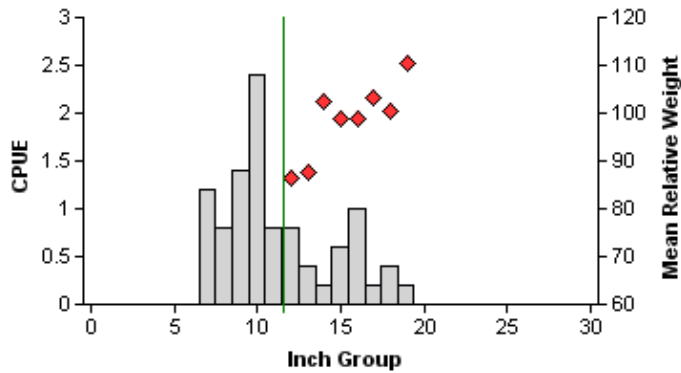


Effort = 1.0
 Total CPUE = 56.0 (42; 56)
 PSD = 30 (11.2)

Figure 3. Number of bluegill caught per hour (CPUE) and population index (RSE and N are in parentheses) for fall electrofishing surveys, O.C. Fisher Reservoir, Texas, 2005, 2006, and 2008.

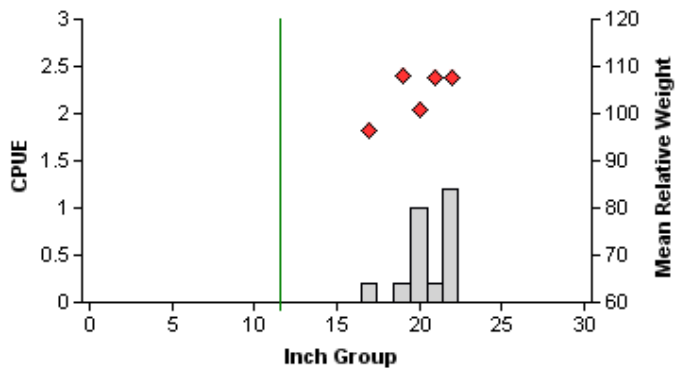
Blue Catfish

2001



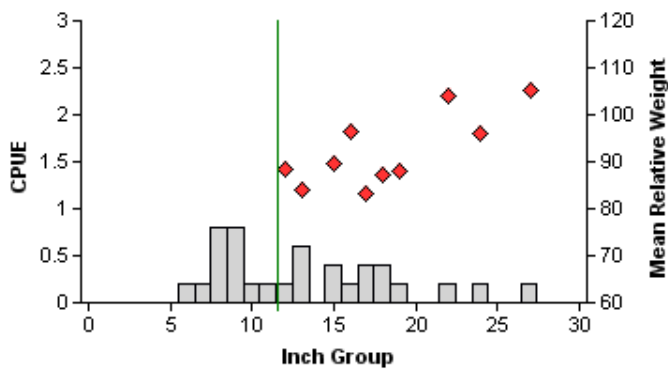
Effort = 5.0
 Total CPUE = 10.4 (16; 52)
 Stock CPUE = 3.8 (23; 19)
 PSD = 0 (0.0)

2006



Effort = 5.0
 Total CPUE = 2.8 (13; 14)
 Stock CPUE = 2.8 (13; 14)
 PSD = 86 (9.5)

2009

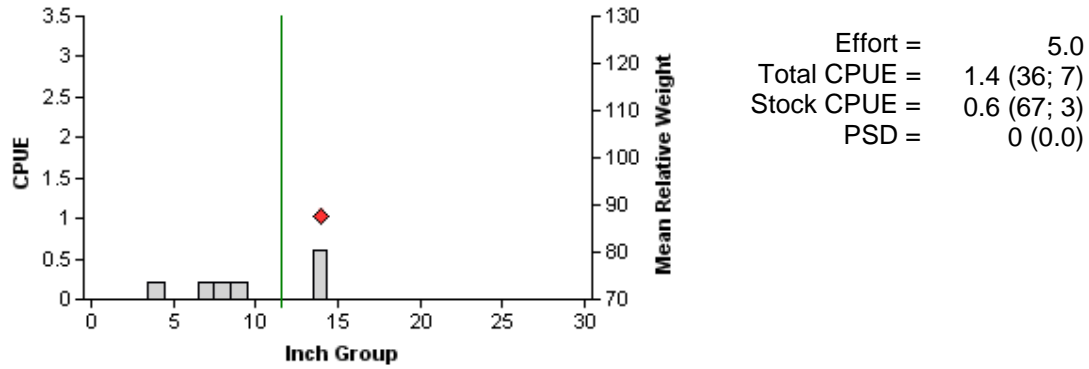


Effort = 5.0
 Total CPUE = 5.4 (36; 27)
 Stock CPUE = 3.0 (11; 15)
 PSD = 20 (12.7)

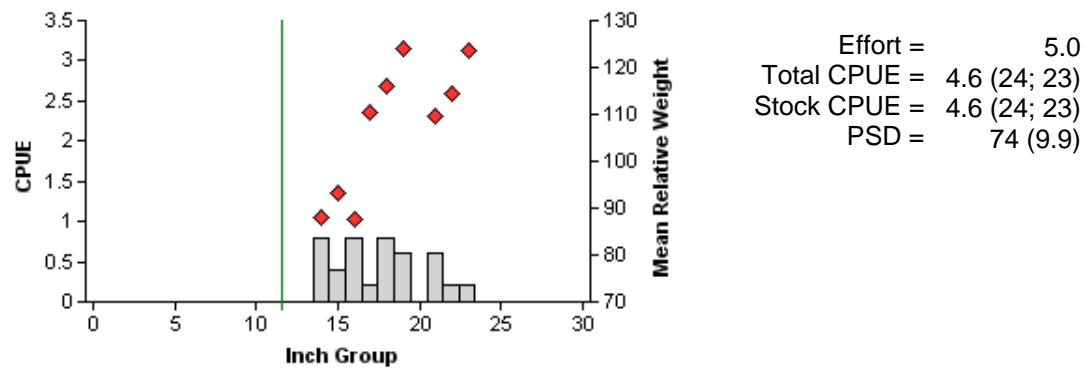
Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, O.C. Fisher Reservoir, Texas, 2001, 2006, and 2009. Vertical line represents the minimum length limit.

Channel Catfish

2001



2006



2009

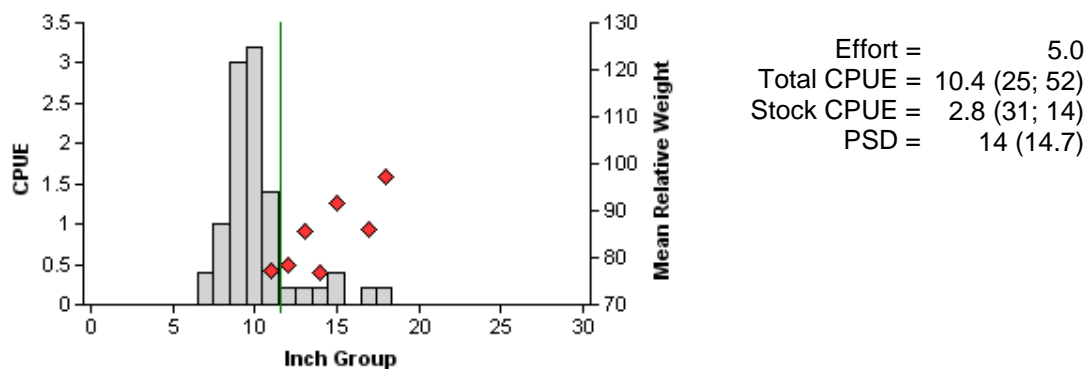


Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, O.C. Fisher Reservoir, Texas, 2001, 2006, and 2009. Vertical line represents the minimum length limit.

White Bass

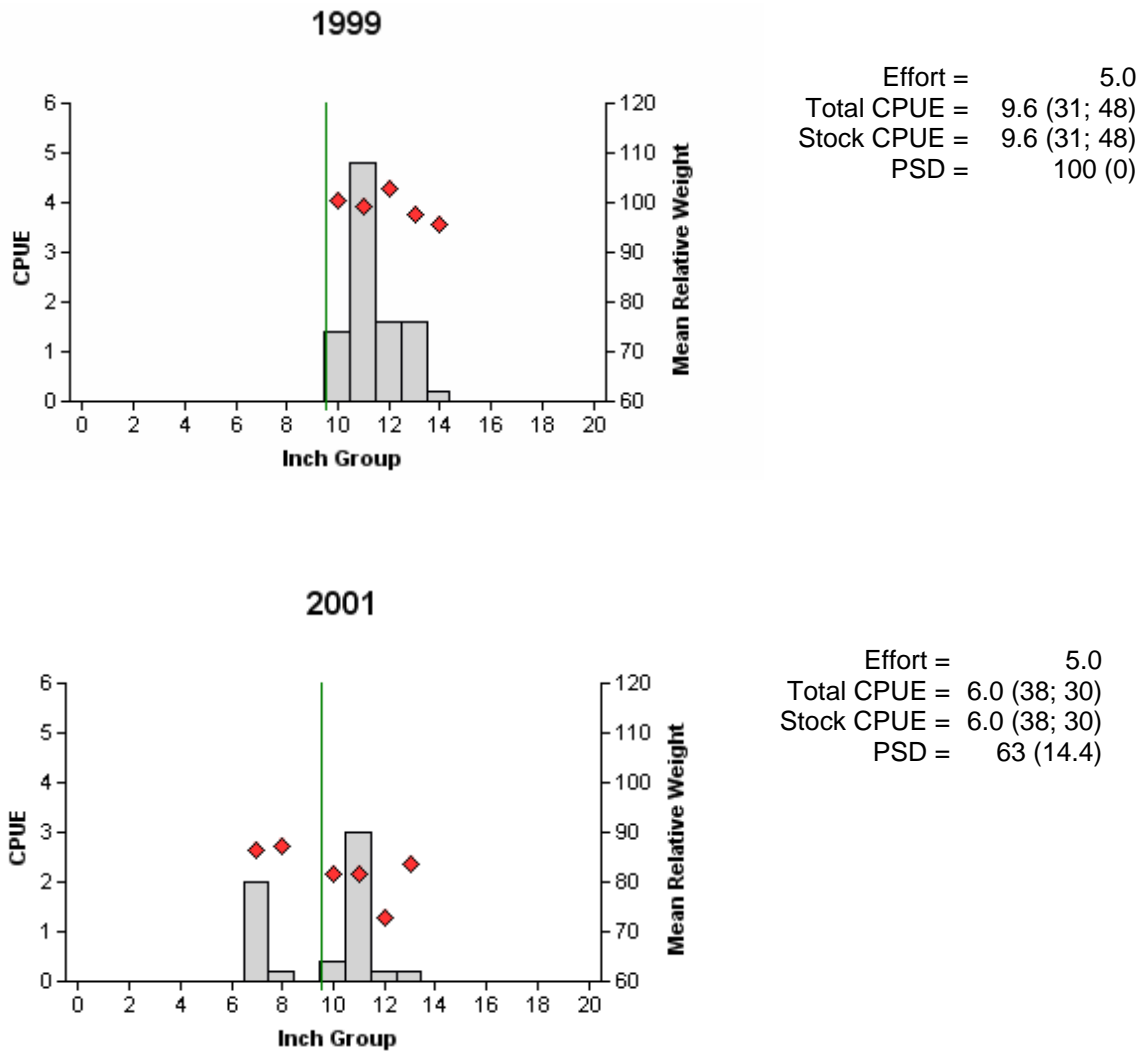


Figure 6. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, O. C. Fisher Reservoir, Texas, 1999 and 2001. Vertical line represents the minimum length limit for harvest. No white bass were captured in either 2006 or 2009.

Largemouth Bass

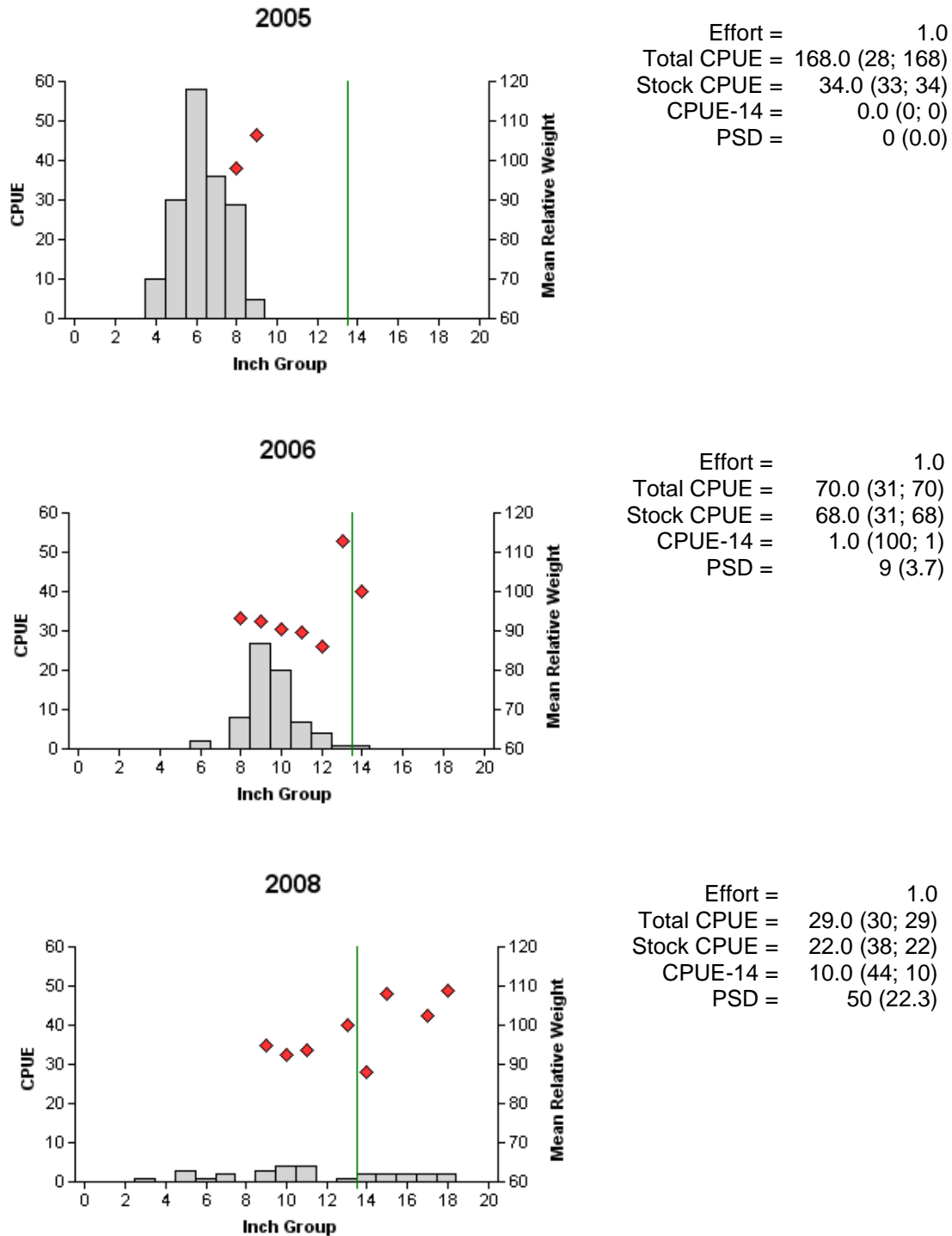


Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, O.C. Fisher Reservoir, Texas, 2005, 2006, and 2008. Vertical line represents the minimum length limit.

White Crappie

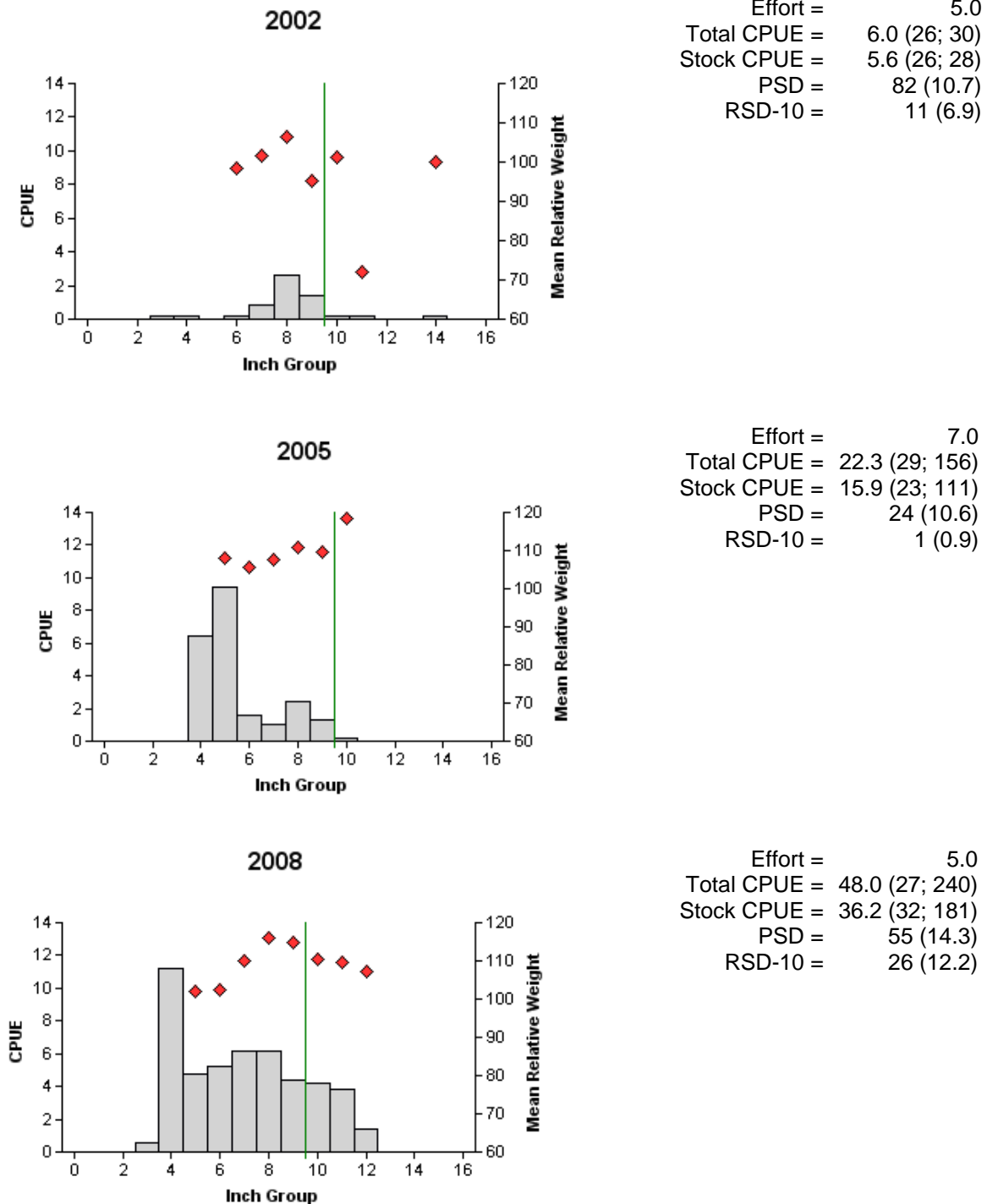


Figure 8. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall trap netting surveys, O.C. Fisher Reservoir, Texas, 2002, 2005, and 2008. Vertical line represents the minimum length limit.

Table 5. Proposed sampling schedule for O. C. Fisher Reservoir, Texas. 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.

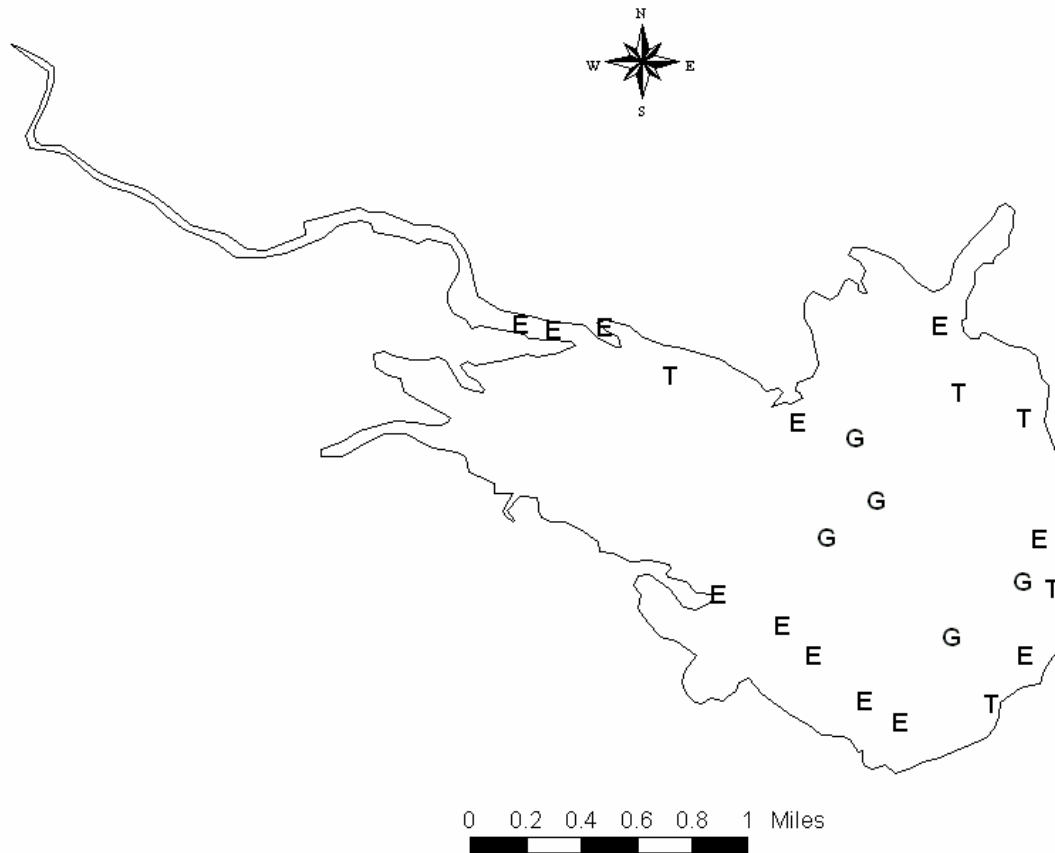
Survey Year	Electrofisher	Trap Net	Gill Net	Report
Fall 2009-Spring 2010	A			
Fall 2010-Spring 2011		A		
Fall 2011-Spring 2012				
Fall 2012-Spring 2013	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of target species collected from all gear types from O. C. Fisher Reservoir, Texas, 2008-2009.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Longnose gar	16	3.2				
Gizzard shad	331	66.2	6	1.2	120	120.0
Threadfin shad			15	3.0	128	128.0
Common carp	171	34.2	2	0.4		
River carpsucker	5	1.0				
Smallmouth buffalo	6	1.2				
Blue catfish	20	5.4				
Black bullhead	6	1.2	4	0.8		
Channel catfish	52	10.4				
Flathead catfish	1	0.2				
Warmouth			2	0.4	6	6.0
Bluegill	1	0.2	52	10.4	56	56.0
Longear sunfish			43	8.6	23	23.0
Largemouth bass					29	29.0
White crappie	96	19.2	240	48.0	10	10.0
Freshwater drum	2	0.4	1	0.2	1	1.0

APPENDIX B



Location of sampling sites, O. C. Fisher Reservoir, Texas, 2008-2009. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was 40-45 feet below conservation pool at time of sampling.