PERFORMANCE REPORT

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STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2007 Survey Report

Baylor Creek Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Baylor Creek Reservoir were surveyed in 2007 using electrofishing and trap nets and in 2008 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:** Baylor Creek Reservoir is a 600-acre impoundment constructed in 1950 on Baylor Creek, a tributary of the Red River, located 9 miles west of Childress, Texas. There are no official water level records. Personal observation indicates water level has declined since 2000 due to drought conditions. Habitat features consisted primarily of non-descript shoreline. The reservoir has been severely impacted by golden alga (*Prymnesium parvum*) blooms and related fish kills annually since 2003.

- **Management history:** Important sport fish has included largemouth bass, white crappie, and catfish. The sport fish populations have only been managed with statewide harvest regulations but the reservoir had previously been known as a trophy largemouth bass fishery prior to 2003. Crappie and catfish were popular secondary species.

- **Fish Community**
  - **Prey species:** No gizzard shad and few bluegills were collected in 2007 electrofishing surveys.

  - **Catfishes:** No channel catfish have been collected in gill net samples from 2004 or 2008.

  - **Largemouth bass:** The catch rate for largemouth bass in electrofishing surveys was very low with only 8 fish, all of which were below <10 inches. Population size structure was poor.

  - **White crappie:** No white crappies were collected in trap net surveys.

- **Management Strategies:** Reduce sampling to minimum required until water levels return to normal and *Prymnesium parvum* blooms abate.

INTRODUCTION

This document is a summary of fisheries data collected from Baylor Creek Reservoir in 2007-2008. 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 for comparison.

Reservoir Description

Baylor Creek Reservoir is a 600-acre impoundment constructed in 1950 on Baylor Creek, a tributary of the Red River, located 9 miles west of Childress, Texas. The reservoir is owned by the City of Childress and maintained for recreation. The reservoir was completely renovated in 1969 to eradicate a stunted white crappie population. There are no official water level records. Personal observation indicates water level has declined to approximately 100 acres since 2000 due to drought conditions. In spring 2003 and repeated in subsequent years, Baylor Creek Reservoir experienced fish kills caused by golden alga (*Prymnesium parvum*) blooms. Conductivity of the water has increased from an average of 1,150 µmhos/cm in the 1980's to over 10,000 µmhos/cm by 2007. At the time of sampling, the habitat was primarily non-descript shoreline. There were two boat ramps with minimal handicap specific facilities. By spring 2008, neither boat ramp was usable. Other descriptive characteristics for Baylor Creek Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Munger and Henegar 2004) included:
1. Investigate increased salinity and impact on Centrarchids.
   Action: Standard electrofishing was conducted to monitor Centrarchid populations. Salinity had not increased enough to impact fish populations but P. parvum did. Watershed investigations for salinity sources were begun but have not been completed.
2. Prymnesium parvum monitoring.
   Action: P. parvum levels were monitored during spring months and restocking of bluegill, channel catfish and largemouth bass was conducted to speed population recovery. Stocking was ineffective as fish kills occurred each spring thereafter.

Harvest regulation history: Sportfishes in Baylor Creek Reservoir are currently managed with statewide regulations (Table 2).

Stocking history: Baylor Creek Reservoir was stocked in 2005 with channel catfish, bluegill and Florida largemouth bass following *Prymnesium parvum* fish kills. The complete stocking history is in Table 3.

Vegetation/habitat history: Vegetation is very limited in Baylor Creek Reservoir due to turbid water. Habitat was primarily non-descript mud shoreline. The last habitat survey conducted on the reservoir was by Munger and Henegar (2004).

METHODS

Fishes were collected by electrofishing (1 hour at 12 5-min stations), gill netting (3 net nights at 3 stations), and trap netting (5 net nights at 5 stations). Gill net effort was reduced due to extreme low water conditions. 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 2005).

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 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 2003 (Munger and Henegar 2004).

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 0.0/h (Figure 1) and 2.0/h (Figure 2), respectively. Electrofishing catch rates of gizzard shad were 54.0/h in 2003 and 75.0/h in 2005. Total CPUE of bluegill has remained low at less than 10.0/h since *P. parvum* blooms began in 2003.

Channel catfish: The gill net catch rate of channel catfish was 0.0/nn in 2004 and 2008 (Figure 3).

Largemouth bass: The electrofishing catch rate of largemouth bass was 8.0/h in 2007 (Figure 4). All fish collected were less than 10 inches and sample size was not adequate to provide meaningful results.

White crappie: The trap net catch rate of white crappie was 0.0/nn in 2007 (Figure 5). The population has been severely impacted by persistent *P. parvum* blooms.

Fisheries management plan for Baylor Creek Reservoir, Texas

Prepared – July 2008.

ISSUE 1: Baylor Creek Reservoir has been repeatedly impacted by *Prymnesium parvum*. Repeated blooms have decimated the fish populations.

MANAGEMENT STRATEGY
1. Delay stocking until conditions improve to where *P. parvum* blooms are less likely.

ISSUE 2: Baylor Creek Reservoir has been impacted by a long-term drought and has very low water levels. Conductivity data collected during electrofishing surveys were over 10,000 µmhos/cm and precluded effective sampling.

MANAGEMENT STRATEGY
1. Reduce sampling to minimum levels every four years until water levels recover and conductivity decline.

SAMPLING SCHEDULE JUSTIFICATION:
The proposed sampling schedule includes electrofishing and trap net sampling in 2011 and gill netting in 2012 (Table 4). Sampling has been reduced due to continued drought conditions and persistent *P. parvum* blooms.

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.

Munger, C., and J. Henegar. 2004. Statewide freshwater fisheries monitoring and management program survey report for Baylor Creek Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Table 1. Characteristics of Baylor Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1950
Controlling authority	City of Childress
County	Childress
Reservoir type	Main stream
Shoreline Development Index (SDI)	2.39
Conductivity	10,400 µmhos/cm

Table 2. Harvest regulations for Baylor Creek Reservoir.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - 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 Baylor Creek, Texas. Size categories are fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Average total length (TL; mm) of each species stocked is given by size category and year.

Species	Year	Number	Life Stage	Length (mm)
Blue catfish	1981	15,682	UNK	UNK
	Total	15,682		
Bluegill	2005	66,101	FGL	25 - 51
	Total	66,101		
Channel catfish	1965	6,000	AFGL	102 - 279
	1966	4,000	AFGL	102 - 279
	1967	3,500	AFGL	102 - 279
	1967	500	UNK	UNK
	1968	5,000	AFGL	102 - 279
	1969	5,000	AFGL	102 - 279
	1971	5,000	AFGL	102 - 279
	1972	10,000	AFGL	102 - 279
	1973	10,000	AFGL	102 - 279
	1975	5,000	AFGL	102 - 279
	1976	6,000	AFGL	102 - 279
	1977	6,000	AFGL	102 - 279
	1978	6,000	AFGL	102 - 279
	2005	17,151	FGL	25 - 102
	Total	89,151		
Coppernose bluegill x green sunfish	1981	60,000	UNK	UNK
	1982	60,000	UNK	UNK
	Total	120,000		
Flathead catfish	1975	2,000	UNK	UNK
	Total	2,000		
Florida Largemouth bass	1981	32,000	FGL	25 - 102
	1999	280	FGL	25 - 102
	2000	60,069	FGL	25 - 102
	2002	61,000	FGL	25 - 102
	2004	72,668	FGL	25 - 102
	2005	61,222	FGL	25 - 102
	Total	287,239		

Table 3 continued

Largemouth bass	1967	20,000	UNK	UNK
	1968	9,400	UNK	UNK
	1970	20,000	UNK	UNK
	1971	24,000	UNK	UNK
	1972	10,000	UNK	UNK
	1973	5,000	UNK	UNK
	2002	11	ADL	>=203
	Total	88,411		

Gizzard Shad

2003

Effort =   1.0
Total CPUE = 54.0 (37; 54)
Stock CPUE = 48.0 (33; 48)
IOV =   33 (12)

2005

Effort =   1.0
Total CPUE = 75.0 (23; 75)
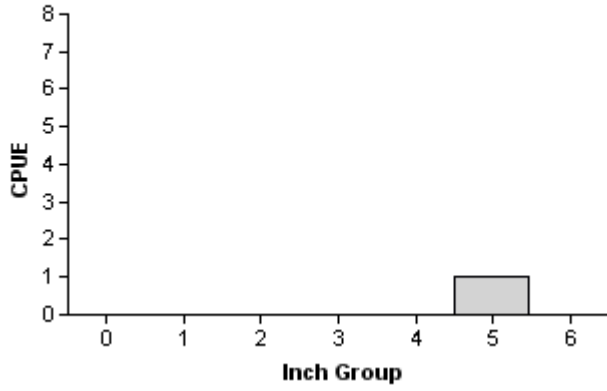Stock CPUE = 35.0 (23; 35)
IOV =   89 (5)
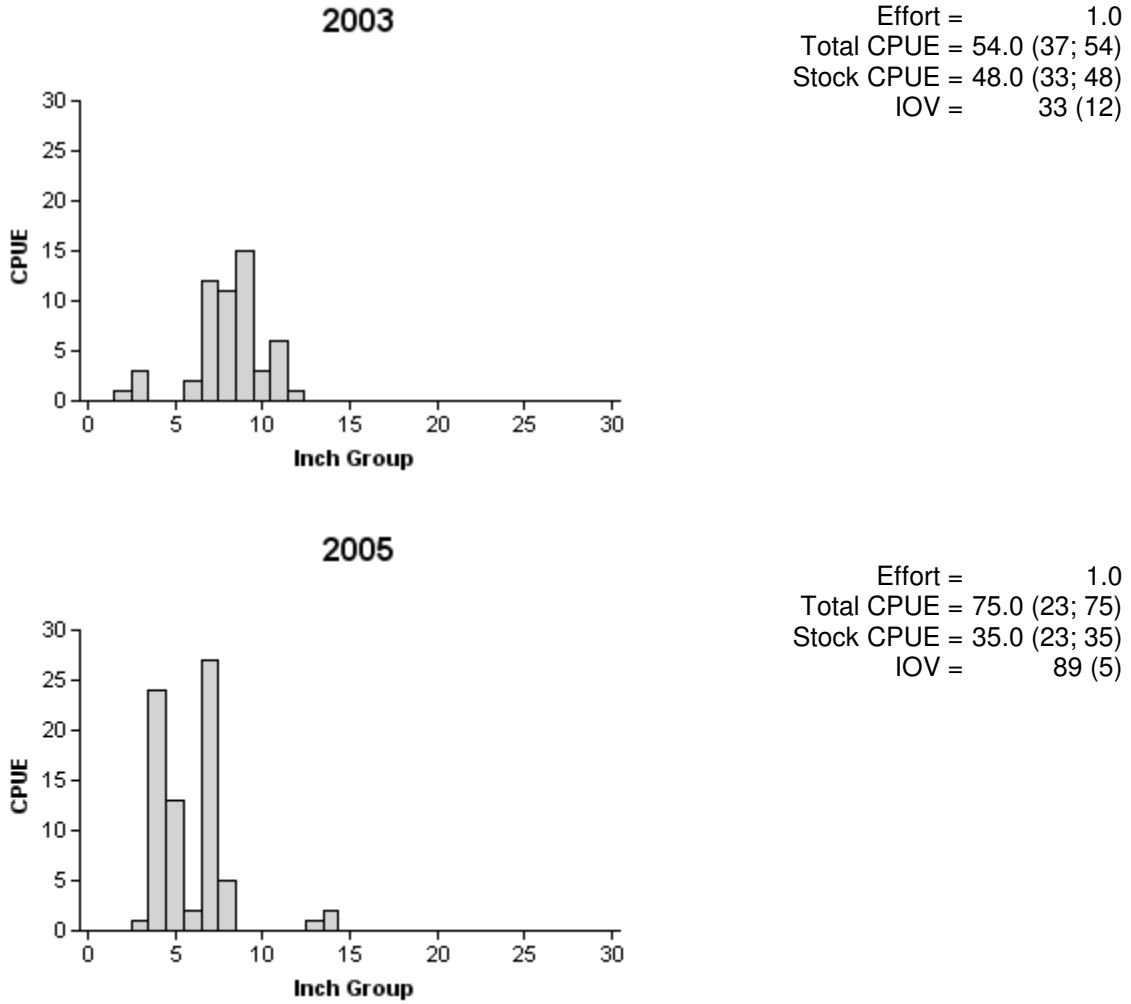
Figure 1. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Baylor Creek Reservoir, Texas, 2003 and 2005. No gizzard shad were collected in 2007 surveys.
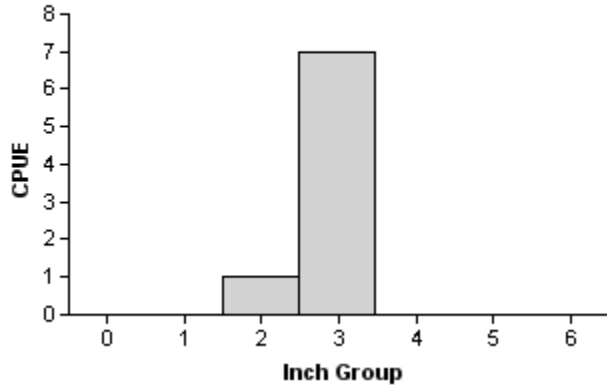
Bluegill

2003

Effort = 1.0
Total CPUE = 1.0 (100; 1)
Stock CPUE = 1.0 (100; 1)

2005

Effort = 1.0
Total CPUE = 8.0 (34; 8)
Stock CPUE = 7.0 (33; 7)

2007

Effort = 1.0
Total CPUE = 2.0 (67; 2)
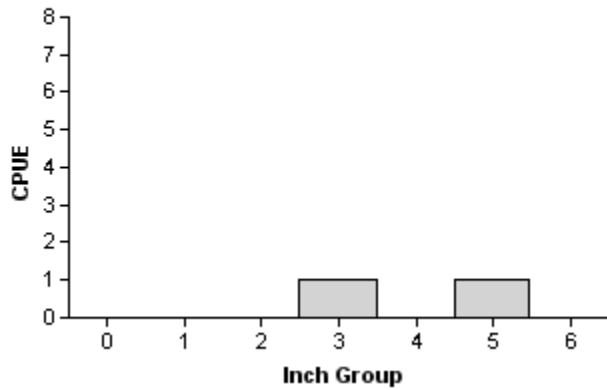Stock CPUE = 2.0 (67; 2)

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, Baylor Creek Reservoir, Texas, 2003, 2005, and 2007.

Channel Catfish

1999

Effort =   5.0
Total CPUE = 2.6 (45; 13)
Stock CPUE = 2.6 (45; 13)
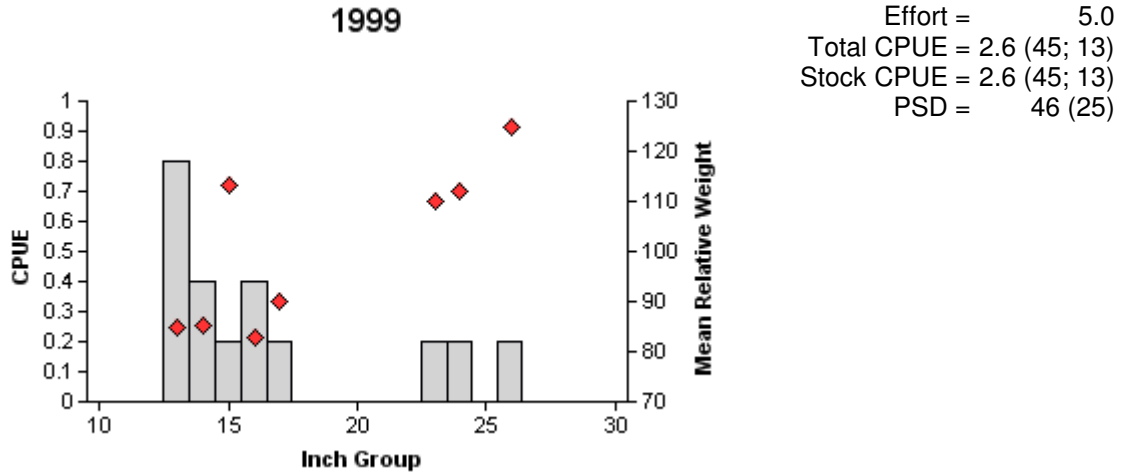PSD =   46 (25)

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, Baylor Creek Reservoir, Texas, 1999. No channel catfish were collected in 2004 or 2008 surveys.

Largemouth Bass

2004

Effort = 0.8
Total CPUE = 16.8 (29; 14)
Stock CPUE = 16.8 (29; 14)
PSD = 0 (44)

2005

Effort = 1.0
Total CPUE = 128.0 (14; 128)
Stock CPUE = 41.0 (13; 41)
PSD = 17 (6)

2007

Effort = 1.0
Total CPUE = 8.0 (50; 8)
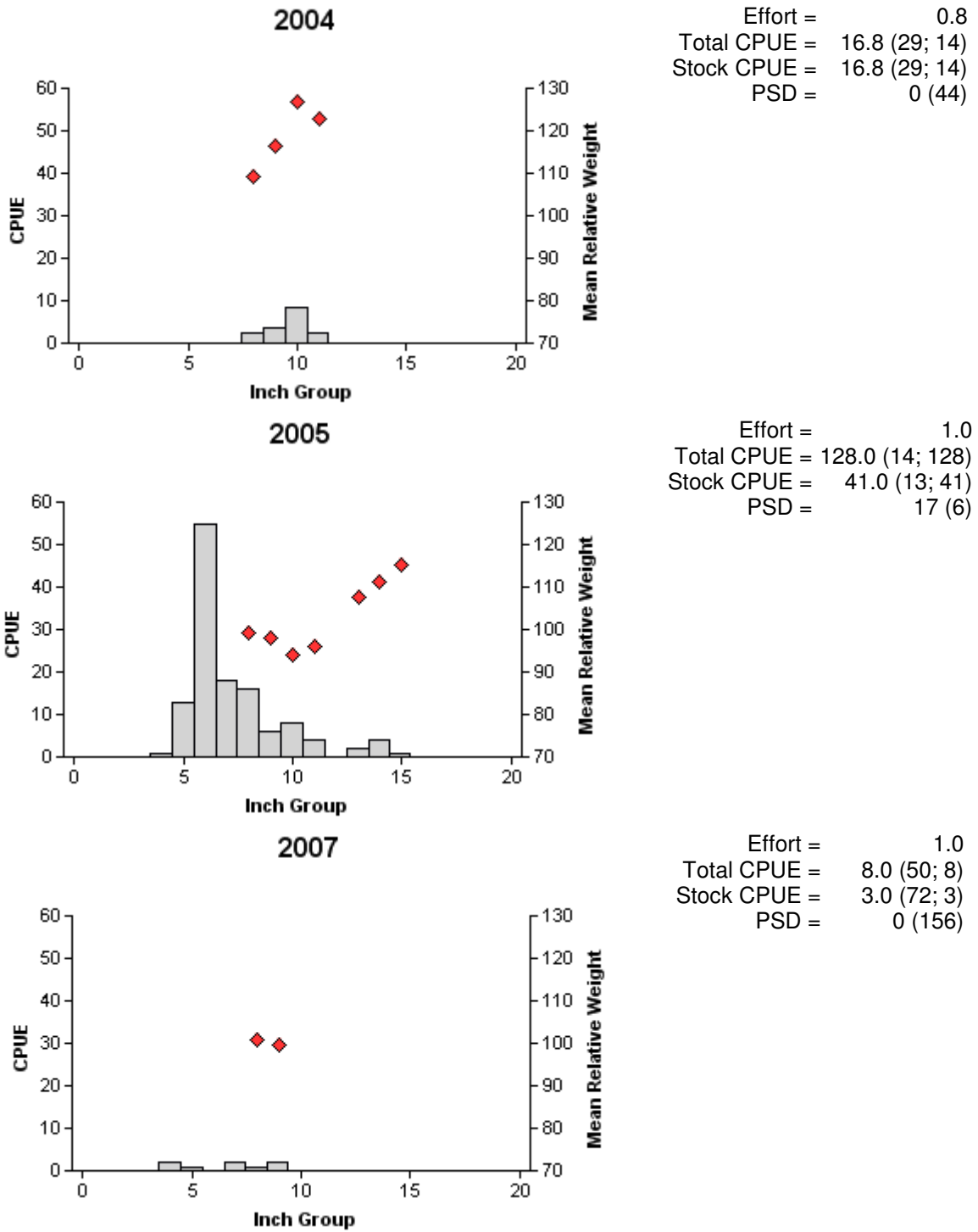Stock CPUE = 3.0 (72; 3)
PSD = 0 (156)

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, Baylor Creek Reservoir, Texas, 2004, 2005, and 2007.
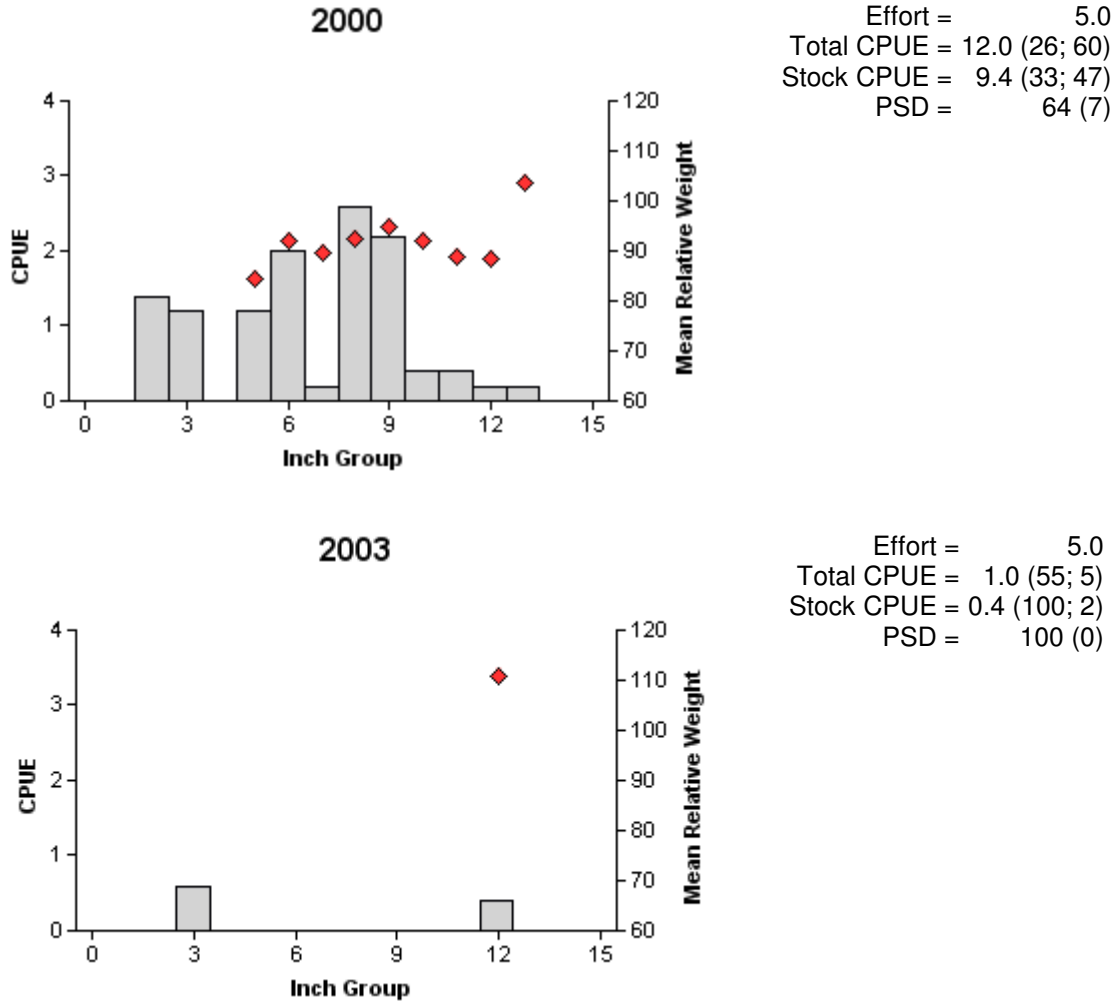
White Crappie

2000

2003

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 net surveys, Baylor Creek Reservoir, Texas, 2000, and 2003. No fish were collected in the 2007 survey.

Table 4. Proposed sampling schedule for Baylor Creek Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S.

Survey Year	Electrofisher	Trap Net	Gill Net	Report
Fall 2008-Spring 2009				
Fall 2009-Spring 2010				
Fall 2010-Spring 2011				
Fall 2011-Spring 2012	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Baylor Creek Reservoir, Texas, 2007-2008. Sampling effort was 3 gill nets, 5 trap nets, and 1 hour of electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Common carp	2	0.7			10	10.0
Channel catfish					1	1.0
Bluegill					2	2.0
Largemouth bass					8	8.0

APPENDIX B
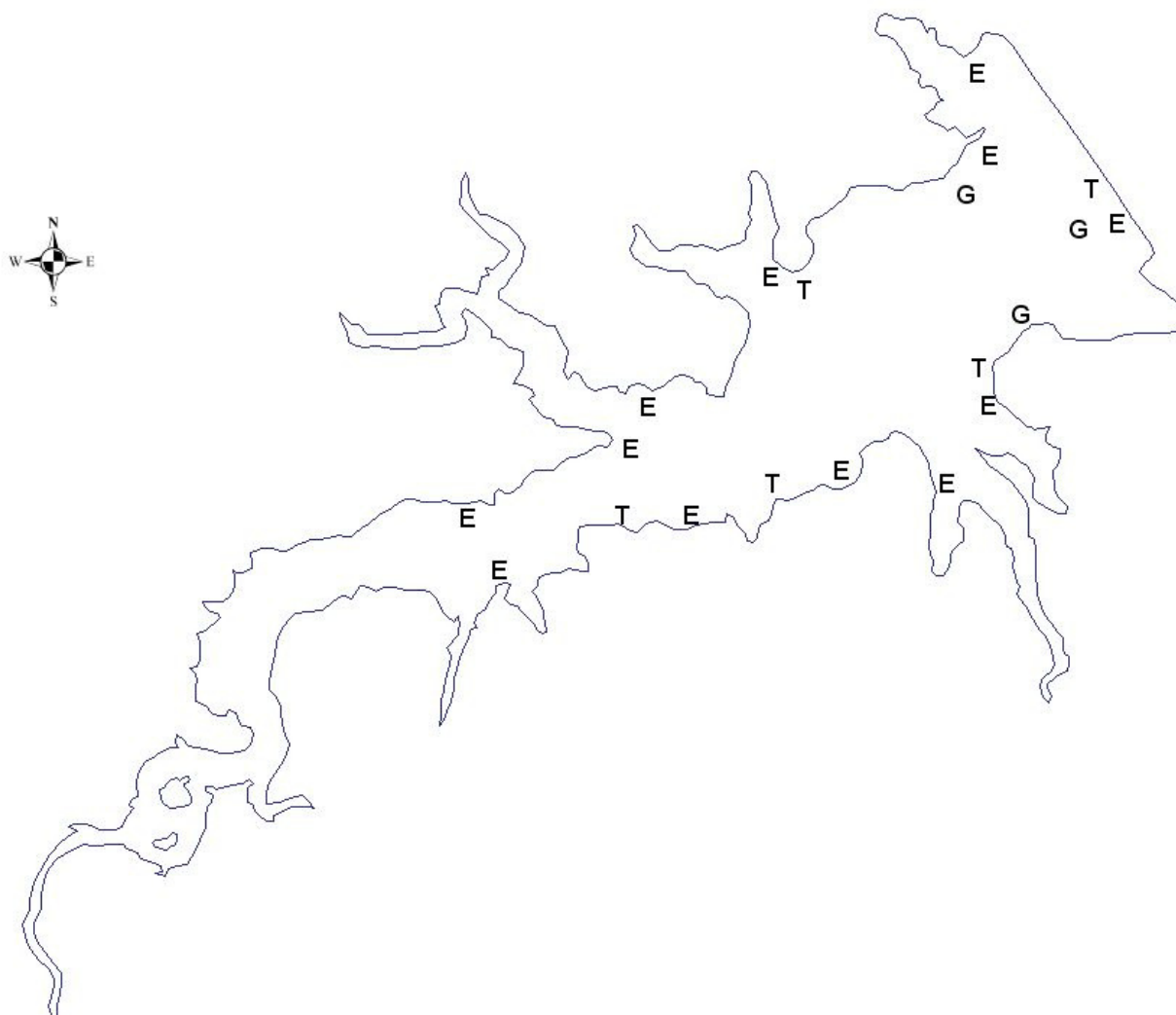
Location of sampling sites, Baylor Creek Reservoir, Texas, 2007-2008. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was extremely low at the time of sampling.