

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Lost Creek Reservoir

Prepared by:

Mark Howell and Robert Mauk
Inland Fisheries Division
District 2-E, Wichita Falls, Texas



Robert L. Cook
Executive Director

Phil Durocher
Director, Inland Fisheries

July 31, 2007

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.....	8-23
Water level (Figure 1).....	8
Reservoir characteristics (Table 1)	8
Harvest regulations (Table 2).....	9
Stocking history (Table 3).....	10
Habitat survey (Table 4).....	11
Gizzard shad (Figure 2).....	12
Bluegill (Figure 3)	13
Channel catfish (Figure 4).....	14
White bass (Figure 5).....	16
Largemouth bass (Figure 6; Table 5-6).....	17
White crappie (Figure 8).....	20
Proposed sampling schedule (Table 7)	21
Appendix A	
Catch rates for all species from all gear types	22
Appendix B	
Map of 2006-2007 sampling locations	23

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lost Creek Reservoir were surveyed in 2006 using trap nets and electrofishing and in 2007 using gill nets. This report summarizes the results of the surveys and contains a reservoir management plan based on those findings.

- **Reservoir Description:** Lost Creek Reservoir is a 385-acre impoundment located on Lost Creek, a tributary of the West Fork of the Trinity River approximately 58 miles south of Wichita Falls. It has a primarily rocky shoreline with submerged and flooded terrestrial vegetation. The reservoir was within five feet of conservation pool from January of 2003 through March 2007. Lost Creek water quality was good with very little turbidity.
- **Management history:** Historically important sport fish include channel catfish, white bass, largemouth bass and white crappie. The 2002 management plan recommended reducing the largemouth bass minimum size limit from the historic 16 inches to the statewide 14 inch regulation which occurred September 1, 2003. Stocking of advanced size channel catfish was also recommended and did occur in 2006.

- **Fish Community**

- **Prey species:** The gizzard shad catch rate was low and below average for the reservoir, but the index of vulnerability (IOV) remained high. The CPUE for bluegill and other sunfishes was higher than district averages and helped to supplement the reduced gizzard shad prey base. No threadfin shad were sampled by any gear despite being present in relatively high numbers during the 2002 electrofishing survey.
- **Catfishes:** A blue catfish was sampled for the first time in 2007. The fish might have entered the reservoir from the spillway of Jacksboro City Lake which empties into Lost Creek. In 2004, their presence was first documented in Jacksboro City Lake, most likely a result of illegal introduction.

Channel catfish abundance increased since the 2003 survey. A length range of 11-21 inches was sampled in 2007. The reservoir was stocked in 2006 with 4,000 advanced channel catfish averaging 9.4 inches total length.

Flathead catfish have historically been present in the reservoir and are still present as evident by two small flathead catfish sampled during the 2007 gill net survey.

- **White bass:** White bass remained present in relatively low abundance with sizes ranging from 7-16 inches. This species was illegally introduced by the public in 1994. The reproducing population puts an increased demand on the limited shad prey base.
- **Largemouth bass:** Largemouth bass had the highest electrofishing catch rate recorded since the initial survey in 1991. Growth rates improved from 2002, but remained below ecological region averages. Relative weights improved for every inch class from 8 to 13 inches since 2002. The population is heavily dominated by sub-legal largemouth bass.
- **White crappie:** The catch rate for this species quadrupled from the previous trap net survey of 2002. While not as abundant as at other district lakes, crappie are often overlooked by Lost Creek anglers. The 2006 survey showed an increasing majority of above legal size fish including some smaller ones indicating a reproducing population.
- **Management Strategies:** Conduct general monitoring by using trap nets, gill nets and electrofishing during 2010-11. Conduct at least one additional creel survey beginning in spring 2008 to assess angler effort and harvest preferences. Consider restocking threadfin shad as a supplementary species to the prey base during 2008.

INTRODUCTION

This document is a summary of fisheries data collected from Lost Creek Reservoir in 2006-2007. 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 2006-2007 data for comparison.

Reservoir Description

Lost Creek Reservoir is a 385-acre impoundment constructed in 1990 on Lost Creek, a tributary of the West Fork of the Trinity River. It is located in Jack County approximately 58 miles south of Wichita Falls and is controlled by the City of Jacksboro. Primary uses include municipal water supply and recreation. Mean depth was 30 feet, shoreline development index was 2.3, and conductivity was 312 $\mu\text{mhos/cm}$. Habitat consisted of aquatic vegetation, rocks, and dead trees. The water level has been within 5 feet of conservation pool since 2003 (Figure 1). Boat access consisted of one two-lane public boat ramp. Bank fishing is available at the public access points including the boat ramp as well as a fishing pier managed by Fort Richardson State Park. Other descriptive characteristics for Lost Creek Reservoir are in Table 1.

Management History

Previous management issues and actions: Management issues and actions from the previous survey report (Howell and Mauk 2003) included:

1. Channel catfish abundance had dropped off greatly. Recruitment appeared to be a problem, possibly caused by predation from centrarchid species in this clear water reservoir. When both fingerling and advanced fingerlings were stocked in 1993, gill net catch rates were higher in 1995 and 1998.

Action: There were 4,000 advanced fingerling (mean 9.4 inches TL) channel catfish stocked in 2006 at the rate of 10.4/acre. Gill net catch rate was improved in 2007.

2. Slow growth rates and relatively high recruitment for largemouth bass have been documented. Few of the 2002 bass sampled exceeded the 16-inch minimum length limit.

Action: Changed the minimum length limit for largemouth bass to the 14-inch statewide length limit. This change became effective on September 1, 2003.

3. There is a fishable population of legal-length crappie; however few people are fishing for them.

Action: Placed fish attracting brush (Christmas trees) around the large fishing pier operated by the state park on the east side of the lake and wrote a news release publicizing the crappie fishery.

Harvest regulation history: Sport fish species in Lost Creek are currently managed under statewide regulations, with the largemouth minimum length limit having been changed from 16 inches to 14 inches on September 1, 2003 (Table 2).

Stocking history: During the past 13 years, advanced size channel catfish have been stocked twice to supplement poor catfish recruitment. Adequate numbers of advanced size fish are only available from the state hatcheries during certain years. The complete stocking history is shown in Table 3.

4 METHODS

Fishes were collected by electrofishing (one hour at 12 five-minute stations), gill netting (10 net nights at 10 stations), and trap netting (10 net nights at 10 stations). Catch per unit effort 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 the surveys were conducted according to standardized 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 was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error ($RSE = 100 \times SE \text{ of the estimate/estimate}$) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from 5 fish per centimeter group by collecting 200 largemouth bass from 150 to 399 mm. Source for the water level data is the United States Geological Survey.

RESULTS AND DISCUSSION

Habitat: A physical habitat survey was conducted July 19, 2006 and indicated that the littoral zone habitat consisted primarily of rocky shoreline, some aquatic vegetation and flooded dead trees (Table 4). The previous physical habitat survey was conducted in 2002 (Howell and Mauk 2003). There were very few, if any observed manmade changes to the physical habitat during the four year period. However, there was a noticeable increase in submergent aquatic plants compared to the 2002 survey.

Creel Survey: The most recent creel survey was from June – November 2001 and March - May 2002. Very little harvest was observed for any species. However, fishing effort for largemouth bass was fairly high at almost 8,000 hours. Approximately two out of three anglers reported trying to catch largemouth bass. White crappie and channel catfish were the second and third most sought after species respectively.

Prey species: Electrofishing catch rates of bluegill and gizzard shad were 111.0/h and 6.0/h, respectively. Index of vulnerability for gizzard shad was high although relative abundance was low. Over 80% of the sizes sampled were vulnerable to predation. Total CPUE of gizzard shad in 2006 was the same as 2002 and remained lower than desirable (Figure 2). Total CPUE of bluegill in 2006 was less than half the 2002 survey (Figure 3). Green sunfish (97.0/h) and longear sunfish (111.0/hr) help supplement the prey base, but their catch rates also dropped from 2002. No threadfin shad were sampled by any gear, while in 2002 198.0/hr were sampled by electrofishing.

Blue catfish: A blue catfish was sampled during the 2007 gill net survey which is the first time the species has been documented at Lost Creek. It might have entered the reservoir from the spillway area of Jacksboro City Lake which empties into the reservoir. Blue catfish were documented in a 2004 gill net survey at Jacksboro City Lake.

Channel catfish: Channel catfish abundance increased during the 2007 gill net survey to 1.1/nn compared to 0.3/nn in 2003 (Figure 4). A length range from 11 to 21 inches was sampled.

Flathead catfish: Flathead catfish have historically been present in the reservoir and two small flathead catfish were observed in the 2007 gill net survey.

White bass: The gill net catch rate for white bass was 1.9/nn in 2007, which was similar to the 2003 catch rate of 2.0/nn (Figure 5). White bass were illegally introduced by anglers in 1994, but have remained at relatively low abundance.

Largemouth bass: The electrofishing CPUE of largemouth bass of 133.0/h in 2006 (Figure 6), was the

highest recorded since 1993 and increased from 117.0/h in 2002 and 45.0/h in 2001. Body condition, as measured by relative weight was improved for every inch group from 8 to 13 inches compared to 2002. Percentage of Florida largemouth bass alleles remained basically unchanged from 2002 at 38 % (Table 5). Growth rates remained below the ecological region average, with bass taking three years to reach legal length (Table 6). No pure Florida largemouth bass were sampled.

White crappie: The trap net catch rate of white crappie was 2.1/n in 2006 and was the highest recorded since 1993 and quadrupled from 0.5/n in 2002 (Figure 7). Of the crappie sampled, there were 76% above legal length. All of the crappie inch classes showed desirable relative weights near 90 or above.

Fisheries management plan for Lost Creek Reservoir, Texas

Prepared – July 2007

ISSUE 1: Gizzard shad abundance is low, and no threadfin shad have been sampled since 2002. Continuing slow growth rates for largemouth bass indicates that a supplement to the prey base would be desirable. Threadfin shad introduced in 1996 reproduced and were available as prey as late as 2002, but no longer appear to be present.

MANAGEMENT STRATEGY

1. Reintroduce threadfin shad during the winter of 2007- 08 by stocking at least 300 adults.

ISSUE 2: Channel catfish reproduction and recruitment continues to be low. Historically, supplemental stockings of advanced size fingerlings have shown some measure of success.

MANAGEMENT STRATEGY

1. Continue to request advanced size channel catfish at the rate of 10/acre every other year if supplemental fish are available from the state hatchery program.

ISSUE 3: Lost Creek history has been plagued with overly abundant and small largemouth bass. Growth for the species is slow and well below ecological region averages.

MANAGEMENT STRATEGY

1. Conduct at least a one quarter creel survey beginning in spring 2008 to assess angler effort and harvest preferences for largemouth bass. Based on results, consider whether or not to change the current largemouth bass harvest regulation to one that allows the harvest of small largemouth bass.

SAMPLING SCHEDULE JUSTIFICATION:

Standard sampling will be conducted in 2010-2011 to continue monitoring species population trends. Additional sampling could take place if identified issues in the future support it, including a creel survey in 2008 (Table 7).

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.
- Howell, M. and R. Mauk. 2003. Statewide freshwater fisheries monitoring and management program survey report for Lost Creek Reservoir, 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-28, Austin, Texas.
- Prentice, J. A. 1987. Length-weight relationships and average growth rates of fishes in Texas. Inland Fisheries Data Series No. 6. Texas Parks and Wildlife Department, Inland Fisheries Division. Austin.

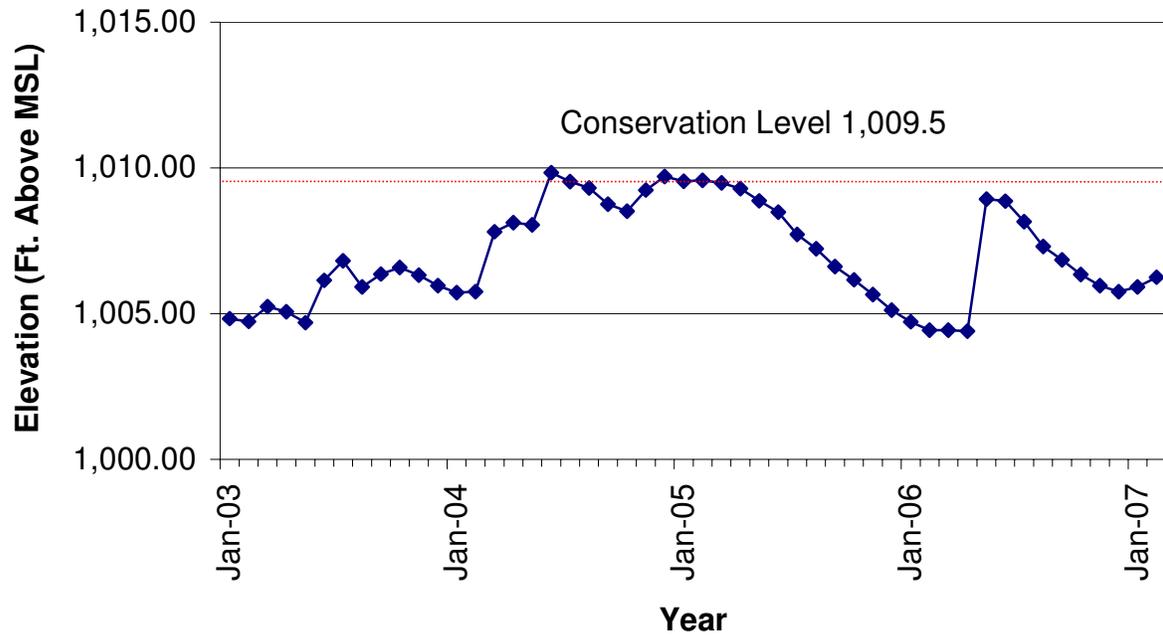


Figure 1. Average monthly water level elevations in feet above mean sea level (msl) recorded for Lost Creek Reservoir, Texas.

Table 1. Characteristics of Lost Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1990
Controlling authority	City of Jacksboro
County	Jack
Reservoir type	Tributary
Shoreline development index (SDI)	2.3
Conductivity	312 μ mhos/cm
Secchi disc reading	230 cm

Table 2. Harvest regulations for Lost Creek Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: Channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Flathead catfish	5	18 minimum
White bass	25	10 minimum
Largemouth bass ^a	5	14 minimum
White crappie	25	10 minimum

^a Largemouth bass minimum length limit changed on September 1, 2003 from 16 inches to the current 14-inch length limit.

Table 3. Stocking history of Lost Creek, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). 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.

Species	Year	Number	Life Stage	Mean TL (in)
Bluegill	1991	121,939	FGL	1.2
	Total	121,939		
Channel catfish	1991	24,450	FGL	3.3
	1993	6,120	AFGL	6.0
	1993	50,601	FGL	2.6
	2006	4,000	AFGL	9.4
	Total	85,171		
Coppernose bluegill	1991	28,902	FGL	1.5
	Total	28,902		
Florida Largemouth bass	1990	50,141	FRY	1.0
	1994	50,000	FGL	1.2
	Total	100,141		
Smallmouth bass	1991	25,088	FGL	1.3
	Total	25,088		
Threadfin shad	1996	359	ADL	4.4
	Total	359		
White crappie	1990	25,364	FRY	0.9
	Total	25,364		

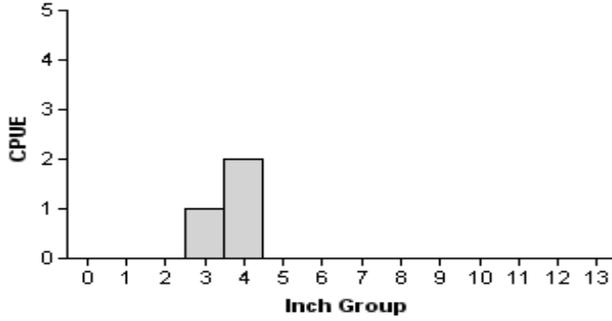
Table 4. Survey of littoral zone and physical habitat types for Lost Creek in 2006. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Rocky shore	3.2	51.6		
Riprap	0.7	11.3		
Boulder	0.6	9.7		
Rock bluff	0.2	3.2		
Featureless	0.5	8.1		
Flooded dead terrestrial	1.0	16.1		
Vegetation				
Native emerged vegetation			5.0	1.3
Native floating vegetation			0.7	<0.1
Native submerged vegetation			6.8	1.8
Habitat adjacent to shoreline				
Boat docks			0.1	<0.1
Dead trees			87.2	22.7

Gizzard Shad

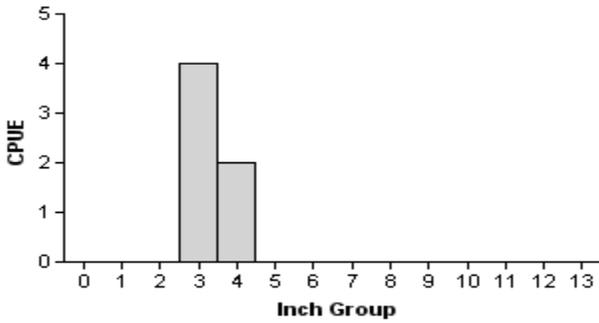
2001

Effort = 1.0
 Total CPUE = 3.0 (72; 3)
 IOV = 100.0 (0)



2002

Effort = 1.0
 Total CPUE = 6.0 (83; 6)
 IOV = 100.0 (0)



2006

Effort = 1.0
 Total CPUE = 6.0 (46; 6)
 IOV = 83.33 (0.17)

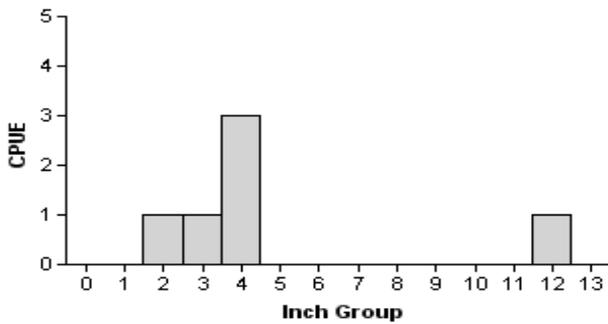
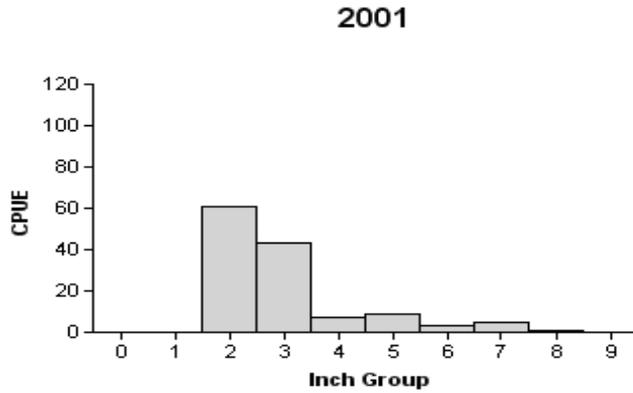
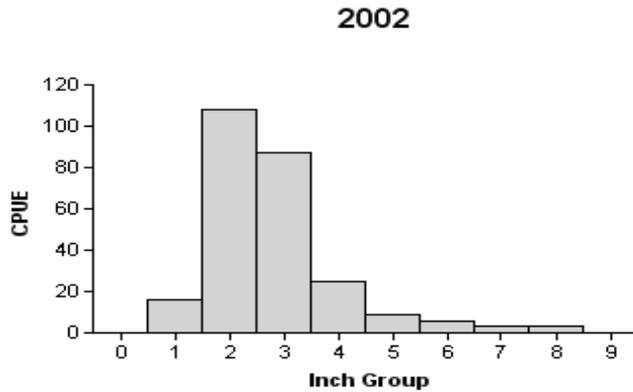


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lost Creek Reservoir, Texas, 2001, 2002, and 2006.

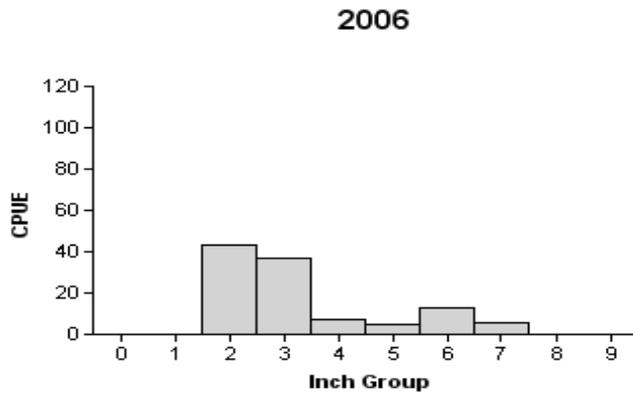
Bluegill



Effort = 1.0
 Total CPUE = 129.0 (24; 129)
 PSD = 13.0 (0.06)



Effort = 1.0
 Total CPUE = 257.0 (26; 257)
 PSD = 9.0 (0.03)



Effort = 1.0
 Total CPUE = 111.0 (25; 111)
 PSD = 28.0 (0.08)

Figure 3. 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, Lost Creek Reservoir, Texas, 2001, 2002, and 2006.

Channel Catfish

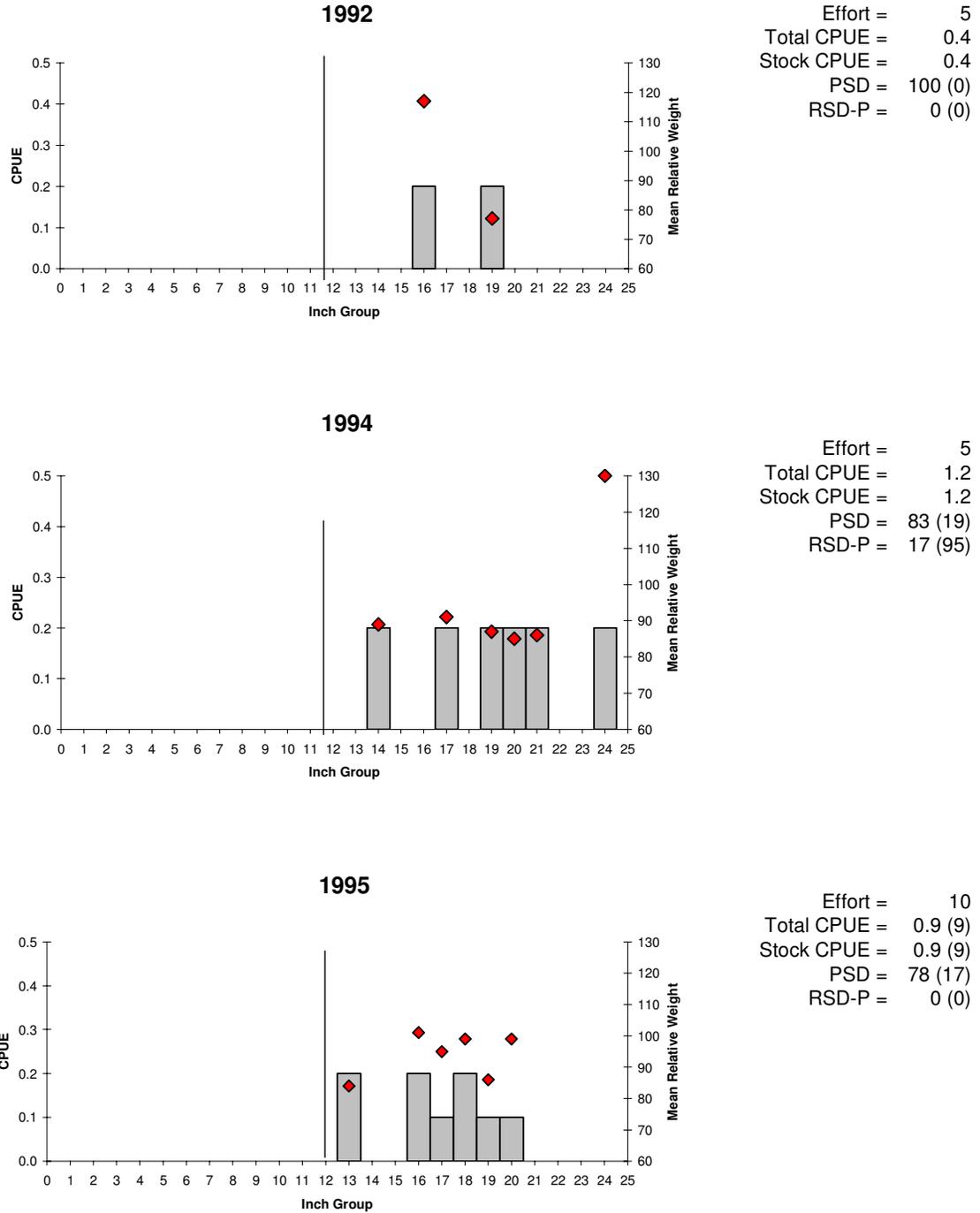


Figure 4. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Lost Creek Reservoir, Texas, 1992, 1994, and 1995. Line indicates minimum size limit at time of sampling.

Channel Catfish

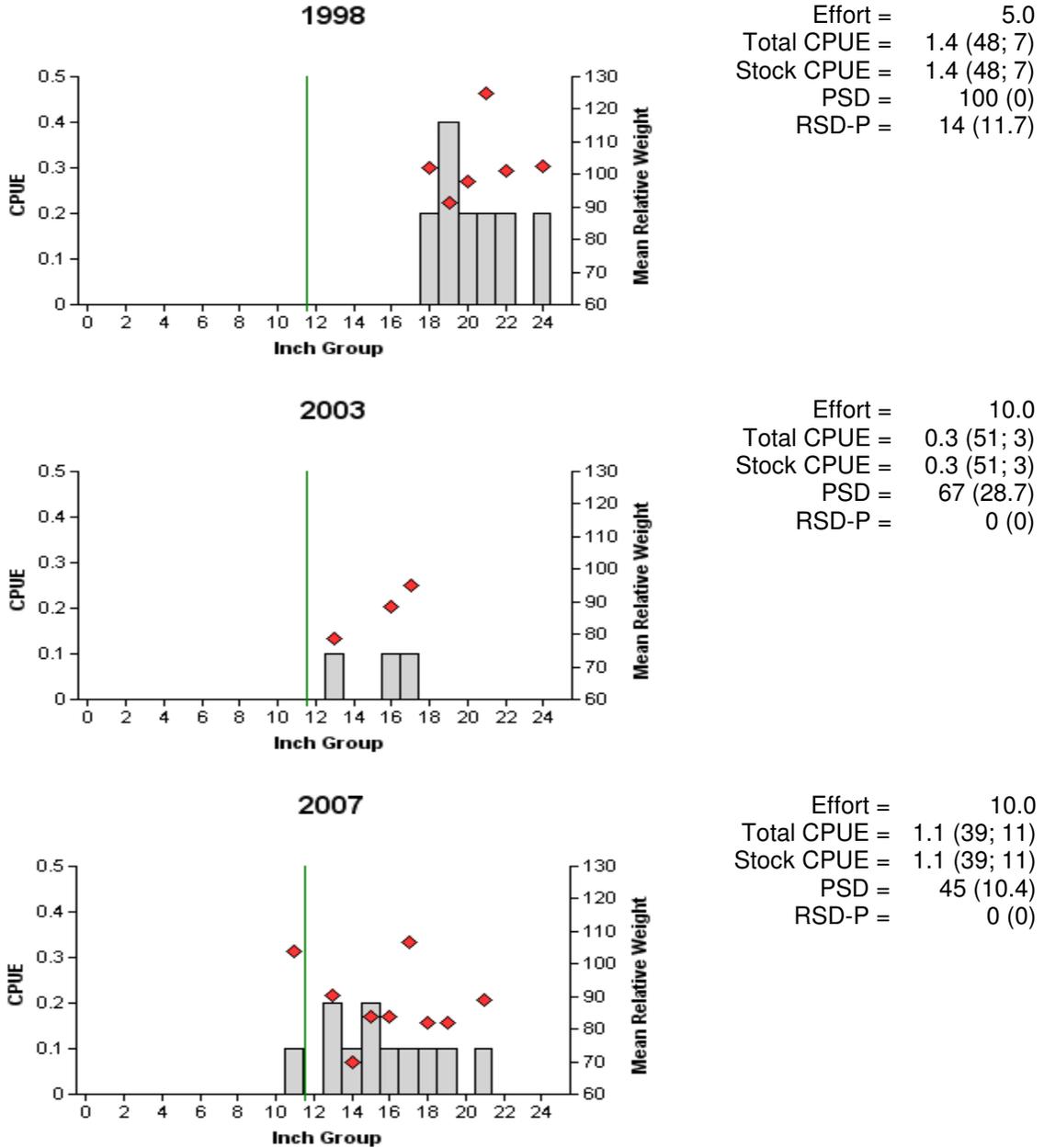


Figure 4 (continued). Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Lost Creek Reservoir, Texas, 1998, 2003, and 2007. Line indicates minimum size limit at time of sampling.

White Bass

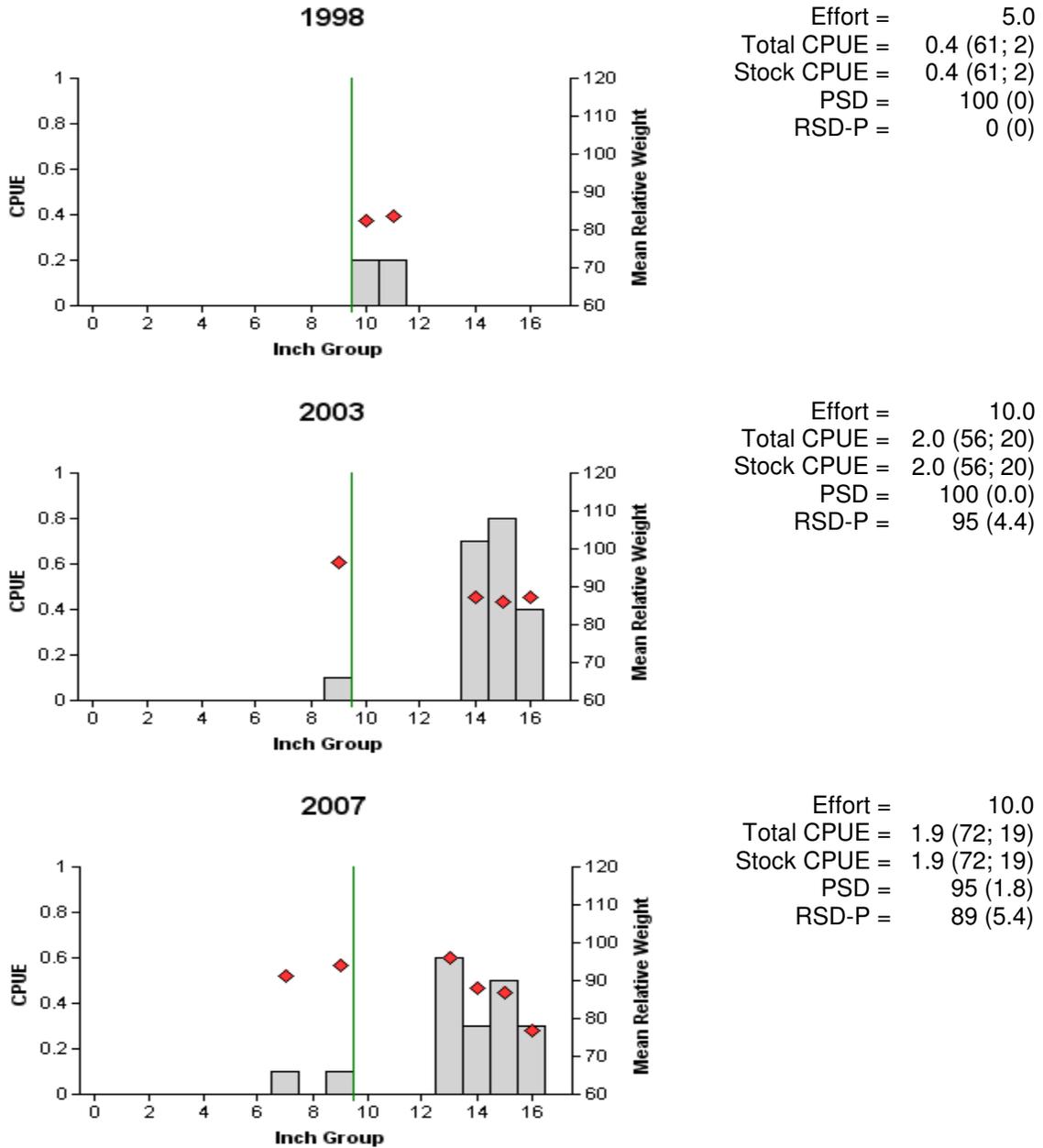


Figure 5. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Lost Creek Reservoir, Texas, 1998, 2003, and 2007. Line indicates minimum size limit at time of sampling.

Largemouth Bass

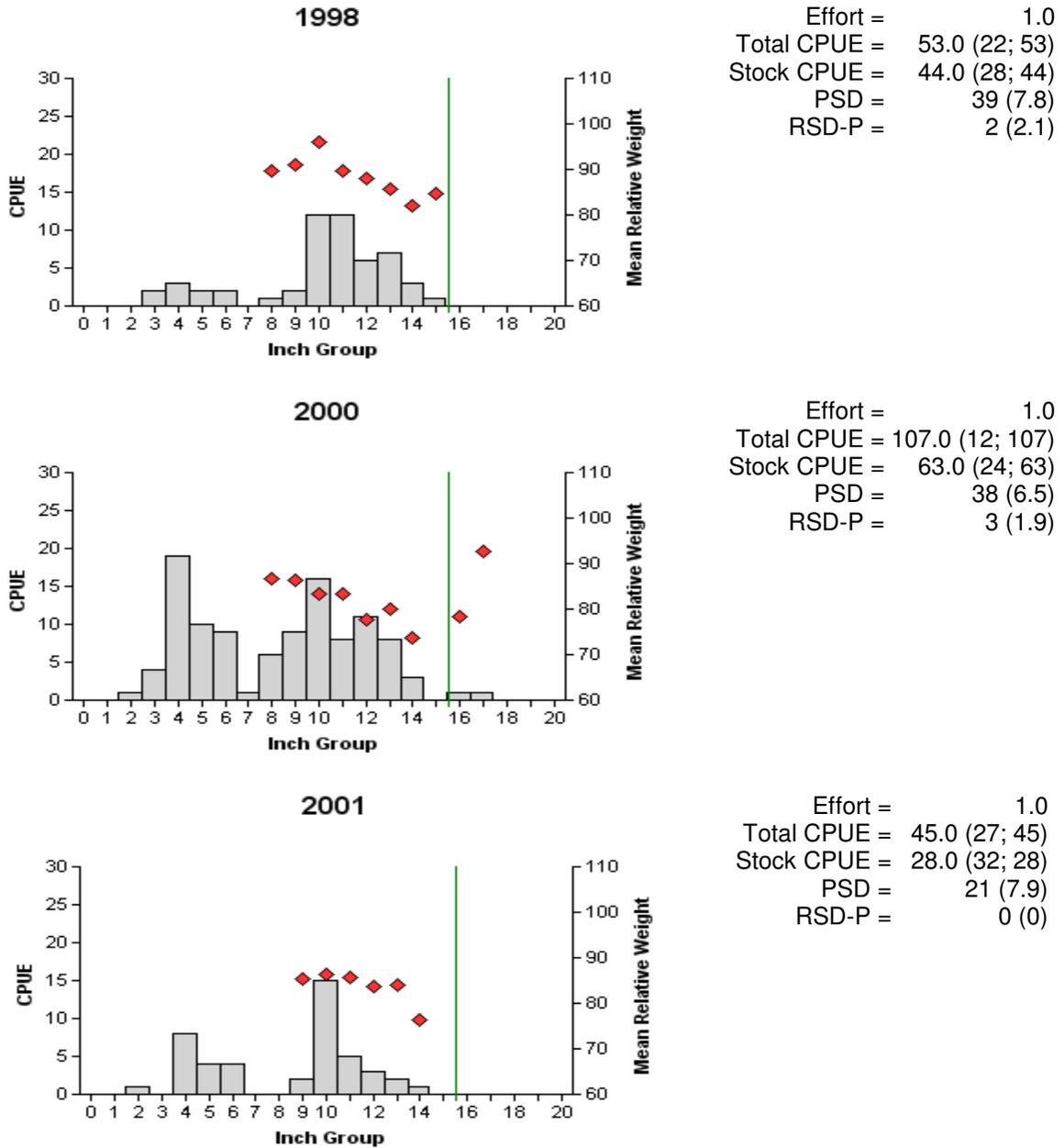


Figure 6. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lost Creek Reservoir, Texas, 1998, 2000, and 2001. Line indicates minimum size limit at time of sampling.

Largemouth Bass

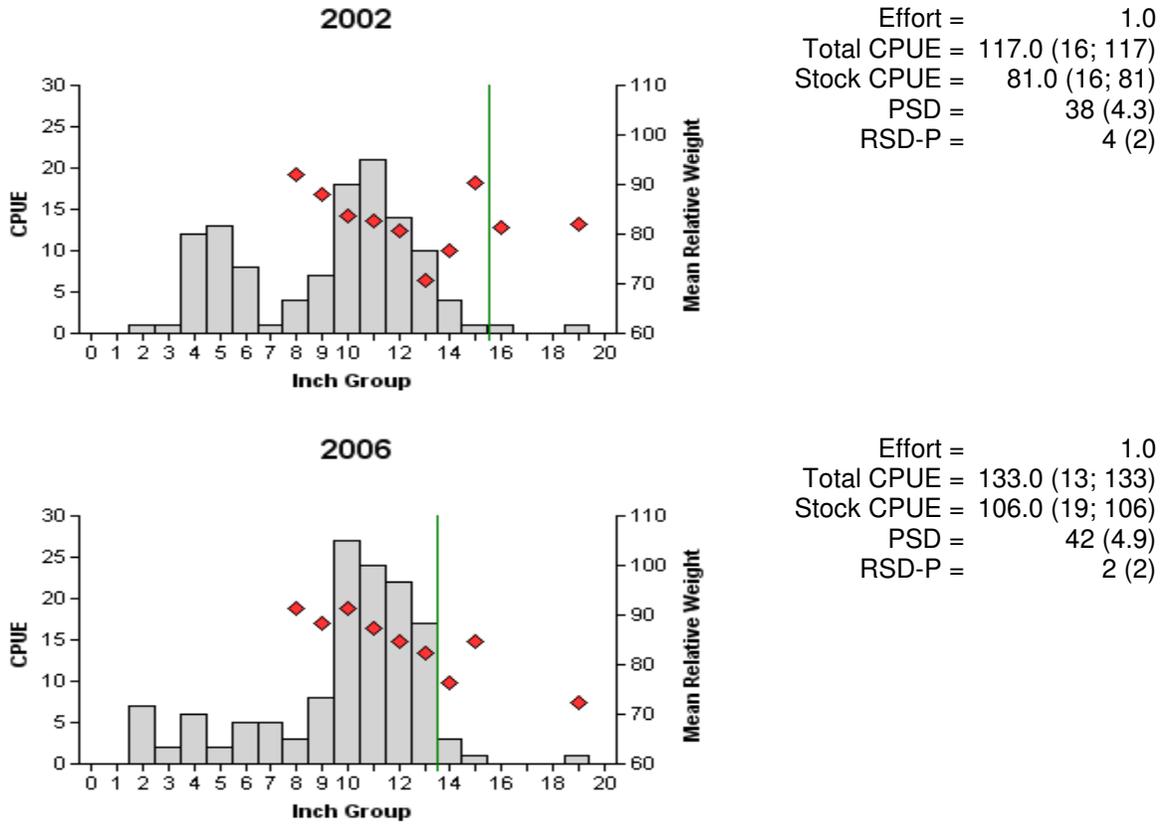


Figure 6 (continued). Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lost Creek Reservoir, Texas, 2002 and 2006. Line indicates minimum size limit at time of sampling.

Largemouth Bass

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing at Lost Creek Reservoir, Texas. 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 or Fx	NLMB		
1993	30	0	1	29	1.7	0.0
1998	9	0	4	5	21.0	0.0
2001	17	0	15	2	36.8	0.0
2002	27	2	19	6	38.6	7.4
2006	30	0	28	2	38.0	0.0

Table 6. Average length at capture for largemouth bass (sexes combined) collected by fall electrofishing surveys at Lost Creek Reservoir, Texas, 1995, 1998, 2000, 2001, 2002 and 2006 compared to ecological region averages. Lengths are followed by the sample size in parentheses (N).

Sampling date	Length (inches) at capture for age						
	1	2	3	4	5	6	7
10/24/1995	9.7(15)	11.9(9)	12.8(5)	14.8(1)			
10/14/1998	10.3(15)	12.9(6)	13.8(7)	15.4(1)			
10/04/2000	9.4(14)	11.6(9)	13.4(5)	14.3(4)	15.9(2)	14.8(1)	
10/08/2001	10.6(11)	12.5(5)	14.2(2)				
10/01/2002	10.6(11)	12.5(5)	14.2(2)				
09/26/2006	10.0(47)	12.4(16)	13.7(16)	15.6(2)		18.1(1)	19.6(1)
Averages ^a	10.1	12.9	15.1	16.9	18.3	19.4	20.3

^aEcological region 5 averages from Prentice (1987); lengths derived for October 15.

White Crappie

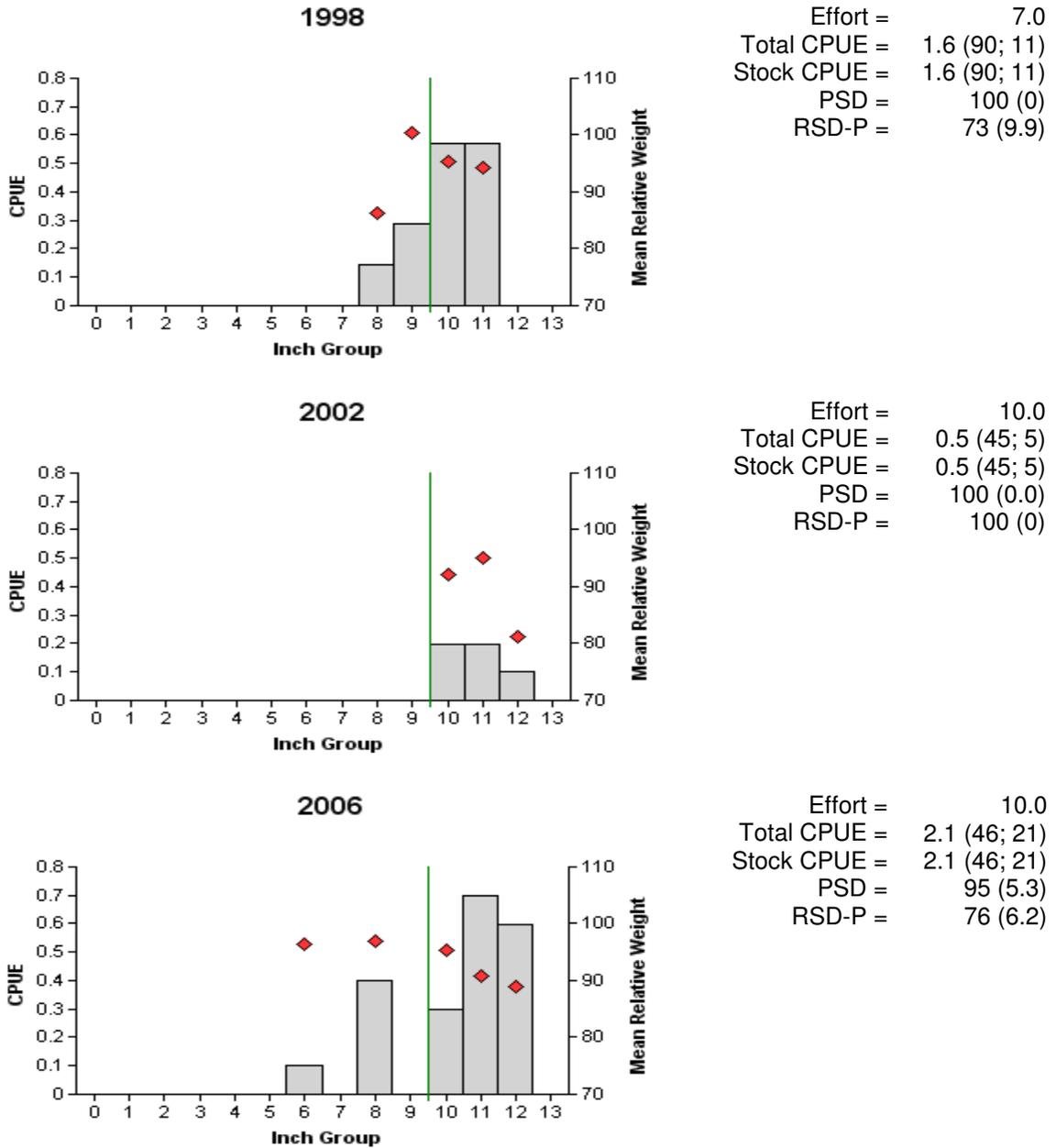


Figure 7. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Lost Creek Reservoir, Texas, 1998, 2002, and 2006. Line indicates minimum size limit at time of sampling.

Table 7. Proposed sampling schedule for Lost Creek Reservoir, Texas. Gill net surveys are conducted in the spring, while electrofishing and trap net surveys are conducted in the fall. S denotes standard survey, A denotes an additional survey.

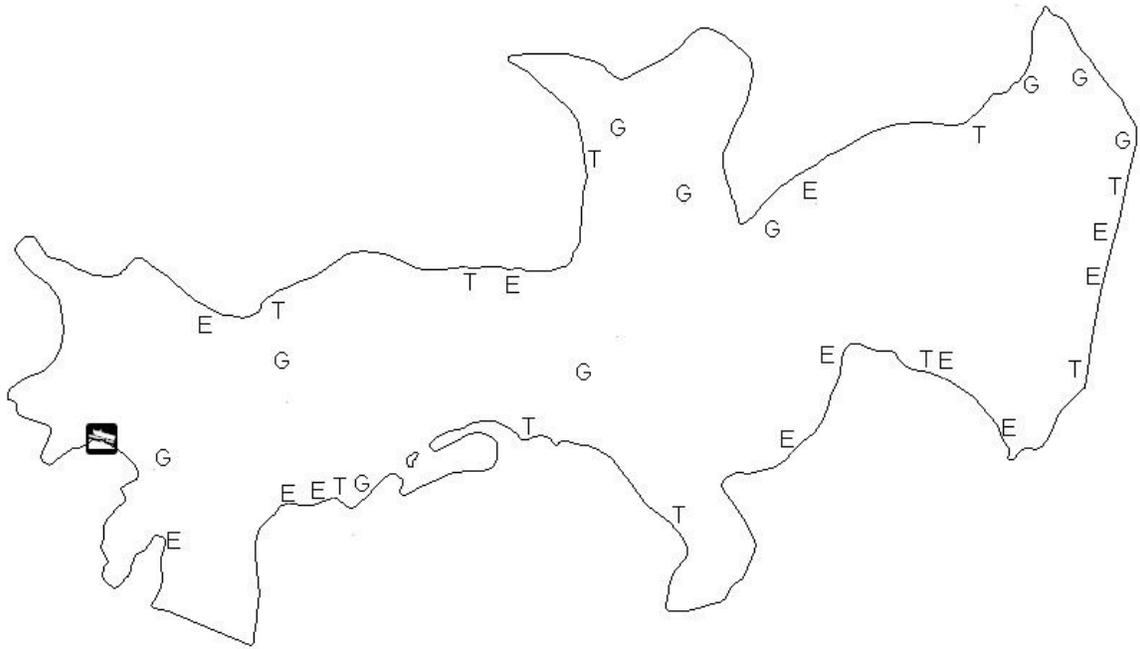
Survey Year	Electrofishing	Trap Net	Gill Net	Creel	Report
Fall 2007-Spring 2008				A	
Fall 2008-Spring 2009					
Fall 2009-Spring 2010					
Fall 2010-Spring 2011	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) for species collected from gill nets (2007), trap nets (2006) and electrofishing (2006) from Lost Creek Reservoir, Texas.

Species	Gill Nets		Trap Nets		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar	1	0.1				
Longnose gar	3	0.3				
Gizzard shad	15	1.5			6	6.0
Common carp	5	0.5				
River carpsucker	2	0.2				
Smallmouth buffalo	19	1.9				
Blue catfish	1	0.1				
Channel catfish	11	1.1				
Flathead catfish	2	0.2				
White bass	19	1.9				
Green sunfish			1	0.1	97	97.0
Warmouth			4	0.4	5	5.0
Bluegill	1	0.1	20	2.0	111	111.0
Longear sunfish			2	0.2	58	58.0
Redear sunfish	2	0.2	1	0.1	5	5.0
Largemouth bass	48	4.8			133	133.0
White crappie	4	0.4	21	2.1		
Freshwater drum	4	0.4				

APPENDIX B



Location of sampling sites, Lost Creek Reservoir, Texas, 2006-2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.