

PERFORMANCE REPORT

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STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Hords Creek Reservoir

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TABLE OF CONTENTS

Survey and management summary	1
Introduction.....	2
Reservoir description	2
Management history.....	2
Methods.....	3
Results and discussion	3
Fisheries management plan.....	4
Literature cited	5
Figures and tables.....	6-15
Water level (Figure 1).....	6
Reservoir characteristics (Table 1)	6
Harvest regulations (Table 2).....	6
Stocking history (Table 3)	7
Gizzard shad (Figure 2)	8
Bluegill (Figure 3)	9
Channel catfish (Figure 4).....	10
Flathead catfish (Figure 5)	11
Largemouth bass (Figure 6; Table 4).....	12
White crappie (Figure 7)	14
Proposed sampling schedule (Table 5)	15
Appendix A	
Catch rates for all species from all gear types	15
Appendix B	
Map of 2005-2006 sampling locations	16

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Hords Creek Reservoir were surveyed in 2005 using electrofishing and trap nets, and in 2006 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:** Hords Creek Reservoir is a 510-acre impoundment located on Hords Creek in the Colorado River Basin approximately 55 miles southeast of Abilene. The reservoir was under drought conditions from 1998 to 2004, and during this period the water level had dropped to 20 feet below conservation pool. Hords Creek Reservoir has been at or near full pool since December of 2004. Habitat features at the time of sampling consisted primarily of rocky shoreline and extensive areas of flooded terrestrial vegetation. Boat access is very good. There are three designated areas for bank fishing and three fishing piers.
- **Management History:** Important sport fish include largemouth bass, white crappie, and catfish. Florida strain largemouth bass (FLMB) were originally introduced in 1986, but genotype frequency has been low in recent surveys with reference to trophy bass management objectives. The management plans from the 2001 survey report included stocking FLMB to increase the FLMB genotype frequency of the population to a minimum of 20%. Imperial strain and native strain channel catfish were stocked in 1998 as part of a study to determine which strain would be most effective to use in future stocking efforts in the district. Smallmouth bass were stocked in 1984 and 1985, but failed to establish.
- **Fish Community**
 - **Prey species:** Electrofishing catch of gizzard shad was adequate and a high proportion was available as prey to most sport fish. Electrofishing catch of bluegill was high; the vast majority of were three to four inches long.
 - **Catfish:** The catch rate for channel catfish was low, however all of the fish caught during the survey were over the legal length limit (≥ 12 inches in length) and available to anglers for harvest. Fish up to 23 inches in length were recorded. Flathead catfish were present in low numbers. All the fish in the sample were of harvestable size; the largest measuring 29 inches in length.
 - **Largemouth bass:** Largemouth bass were relatively abundant and there was good evidence of reproductive success; this bodes well for future fishing opportunities as these fish recruit to larger size classes. However, overall size structure was poor; only 1% of the sample consisted of harvestable-size fish (≥ 14 inches in length). Genetic analysis revealed that all of the bass caught were second or higher generation intergrades between FLMB and northern strain largemouth (NLMB).
 - **White crappie:** Abundance of white crappie was poor compared to previous surveys. The population structure was inadequate; only 6% of the sample consisted of legal-size fish.
- **Management Strategies:** Based on current data, this reservoir should continue to be managed with existing regulations. An additional electrofishing survey should be conducted in 2007 with the primary goal of monitoring the development of the bass population. A mandatory standard survey is scheduled to be carried out in 2009-2010 with trap nets, gill nets, and electrofishing gear to assess the status of the fishery as a whole. Efforts should be made to continue the dialogue initiated with the U.S. Army Corps of Engineers (USACE) lake manager to monitor shoreline development and its implications for fish habitat.

INTRODUCTION

This document is a summary of fisheries data collected from Hords Creek 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 fish was collected, this report deals primarily with major sport fish and important prey species. Historical data are presented with the 2005-2006 data for comparison.

Reservoir Description

Hords Creek Reservoir is a 510-acre impoundment constructed in 1948 on Hords Creek. It is located in Coleman County approximately 55 miles south of Abilene and is operated and controlled by the USACE. Primary water uses include flood control, municipal water supply, and recreation. Soil types are rocky and clay loam associations. Habitat at time of sampling consisted mainly of a rocky shoreline and substantial areas of submerged terrestrial vegetation. There was very little in the way of submerged aquatic vegetation in the reservoir; patches of *Chara* and American pondweed were present. Water level has been highly variable; the last major decline was from 1998 to 2004. During this time the water level dropped to 20 feet below conservation pool. By the beginning of 2005, the water level had returned back to conservation pool (Figure 1). Boat access consisted of seven public boat ramps. There were three designated areas for bank fishing and three handicap accessible fishing piers. Other descriptive characteristics for Hords Creek Reservoir are shown in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Dumont and Jons 2002) included:

1. Discuss concerns regarding shoreline development and maintaining or increasing littoral fish habitat with USACE.

Action: From 1998 to 2004 the reservoir was exposed to drought conditions resulting in the water level dropping 20 feet below conservation pool. During this time terrestrial vegetation became firmly established along the shoreline and consequently provided substantial littoral habitat for fish when the reservoir filled up. Shoreline development has not been an issue during this period.

2. Determine percentage of FLMB genotypes in fall of 2003. Stock FLMB in 2004 and 2005 if necessary to increase FLMB genotypes.

Action: The percentage of FLMB genotypes was 9.1% in 2003, therefore stocking was requested to increase the FLMB genotypes to at least 20% as indicated by Texas Parks and Wildlife Department (TPWD) stocking guidelines for trophy largemouth bass waters. No stocking took place in 2004 due to low water conditions, and no fish were available for stocking in 2005. However, FLMB were stocked in 2006.

Harvest regulation history: Sport fish in Hords Creek Reservoir are currently managed with statewide regulations (Table 2). These were revised in 1995 when the minimum length limit for flathead catfish changed from 24 inches to 18 inches and the minimum length limit for channel catfish changed from 9 inches to 12 inches.

Stocking history: FLMB were first stocked in 1986 to help develop a trophy bass fishery, however recent surveys showed the FLMB genotype frequency was low (Dumont and Jons 2002). In an effort to improve this situation FLMB stocking was requested for 2004 and 2005, but could not be carried out until 2006 due to low water levels in 2004 and production shortfalls in 2005. Lake chubsuckers were introduced in 1981, threadfin shad in 1984, and smallmouth bass in 1984. Channel catfish in this reservoir had exhibited the best growth characteristics of area lakes and as a consequence this reservoir was selected for a research project involving the use of Imperial strain channel catfish (Dumont 2005). Native and Imperial strain channel catfish were stocked in 1998 to evaluate growth and survival, and hence determine which strain would be most suitable for stocking purposes in west Texas reservoirs. The complete stocking history is shown in Table 3.

Vegetation/habitat history: Hords Creek Reservoir has limited diversity and abundance of aquatic vegetation. During the last habitat survey submerged aquatic vegetation accounted for only 2.2% of linear shoreline distance (Jons and Dumont 1999).

METHODS

Fish were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (five net-nights at five stations), and trap netting (five net-nights at five 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). Microsatellite DNA analysis was used to determine largemouth bass genetic composition. Prior to 2005, genetic analysis was done by electrophoresis. 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. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 1998 (Jons and Dumont 1999).

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 274.0/h and 374.0/h, respectively in 2005. The IOV for gizzard shad was good, indicating that 81% of gizzard shad were available to existing predators; this was similar to IOV estimates in previous years (Figure 2). However, total CPUE of gizzard shad was considerably lower in 2005 than in 2001 and 1998 (Figure 2), and fish below six inches in length were poorly represented. Total CPUE of bluegill in 2005 was higher than in 2001 and 1998, and as is typical of many west Texas reservoirs, the population continued to be dominated by small individuals (Figure 3).

Channel catfish: The gill net catch rate of channel catfish was 1.0/nn in 2006, which is similar to that recorded in 2002 (CPUE = 1.9/nn) and 1998 (CPUE = 1.8/nn). The sample was completely dominated by harvestable-size fish; no fish less than 16 inches in length were caught during the 2006 survey (Figure 4).

Flathead catfish: The gill net catch rate of flathead catfish was 1.6/nn in 2006. All of the fish in the sample were of legal size for harvest, but abundance was low and size structure was poor compared to the results of the 2002 survey (Figure 5).

Largemouth bass: The electrofishing catch rate of stock-length largemouth bass was 46.0/h in 2005, which is lower than the 109.0/h recorded in 2001. Size structure was adequate in previous years, but this was not the case in 2005 as indicated by a PSD of 9 and RSD-P of 2 (Figure 6). For a balanced fishery, PSD should range from 40 to 70 and RSD-P from 10 to 40 (Gabelhouse 1984). Only 1% of the sample consisted of legal-size fish. However, the 2005 length-frequency data indicated this situation should improve as fish from the 3 to 6-inch and 8 to 10-inch size classes recruit to legal harvestable size (Figure 6). Body condition in 2005 was adequate for 8 to 12-inch fish (W_r ranged from 88 to 93), which was the dominant size class among stock-length bass. Florida largemouth bass influence has remained relatively constant as Florida alleles have ranged from 46 to 54% from 1998 to 2005, but Florida genotype was low, ranging from 0 to 10% over the same period (Table 4). In 2005, 100% of the bass tested were Fx intergrades (i.e., second or higher generation).

White crappie: The trap net catch rate of white crappie was 3.2/nn in 2005, which is much lower than recorded in 2001 (16.1/nn) and 1998 (15.4/nn). Compared to the results of the 2001 survey (PSD = 7) there were some improvements in population structure with a slight shift to larger fish in 2005 (PSD = 19). The percentage of legal-size fish was low, but was an improvement from the 2001 survey in which none were recorded in the sample.

Fisheries management plan for Hords Creek Reservoir, Texas

Prepared – July 2006.

ISSUE 1: Based on the results of previous surveys, Hords Creek Reservoir was considered to have trophy largemouth bass potential. To help promote the development of a trophy bass fishery a higher percentage of FLMB genotype (at least 20%) was sought through stocking of FLMB. However, the bass population (generally consisting of quality size fish, with occasional larger fish) has not given any further indication of fulfilling trophy potential under existing conditions, and FLMB genotype has continued to decline (10% in 1998, 9.1 % in 2003 and 0% in 2005).

MANAGEMENT STRATEGY

1. Discontinue FLMB stocking efforts that were specifically aimed at increasing the percentage of FLMB genotype to at least 20%.

ISSUE 2: Only 1% of the largemouth bass sample in 2005 consisted of legal-size fish. The current size structure of the population indicates that the abundance of younger year classes should result in a better population size structure in the coming years.

MANAGEMENT STRATEGY

1. Monitor the largemouth bass population to document status of fish over 14 inches in length by conducting electrofishing surveys in fall 2007 and 2009.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing in 2007 and mandatory monitoring in 2009/2010 (Table 5). An additional electrofishing survey in 2007 is necessary to maintain consistent data for trend information on largemouth bass and forage fish following the recovery of this reservoir from low-water conditions. Gill net surveys are only necessary every four years at this point to monitor abundance of channel catfish and flathead catfish. Similarly, trap netting for white crappie at four-year intervals should be adequate.

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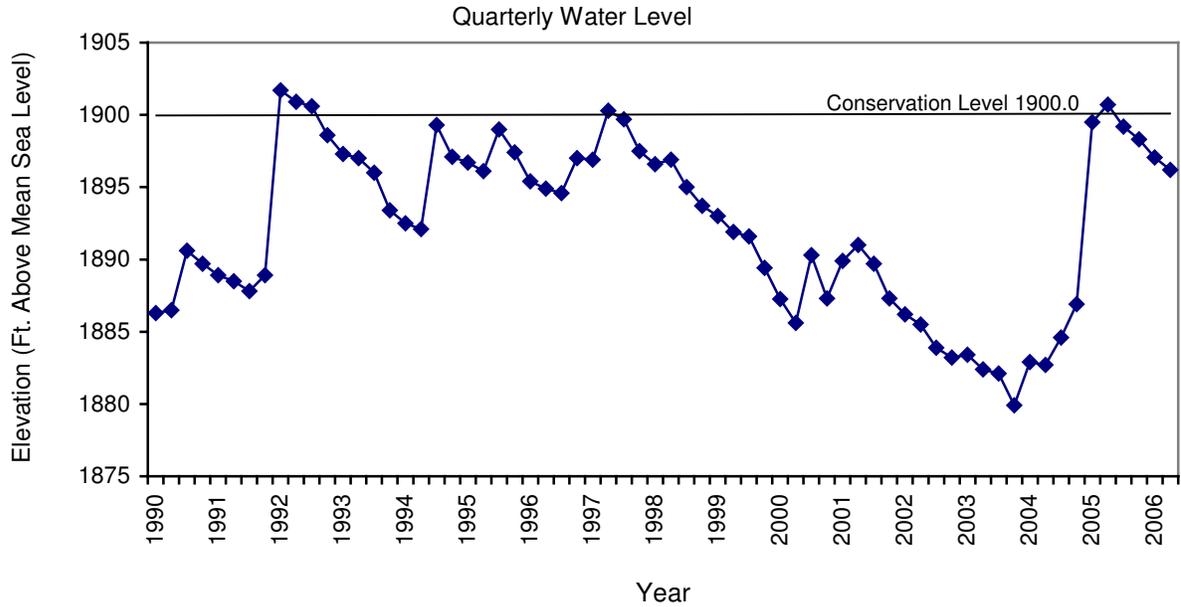


Figure 1. Quarterly water level elevations in feet above mean sea level recorded for Hords Creek Reservoir, Texas.

Table 1. Characteristics of Hords Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1948
Controlling authority	U.S. Army Corps of Engineers
County	Coleman
Reservoir type	Tributary
Shoreline Development Index	3.18
Conductivity	640 umhos/cm

Table 2. Harvest regulations for Hords Creek 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, largemouth	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

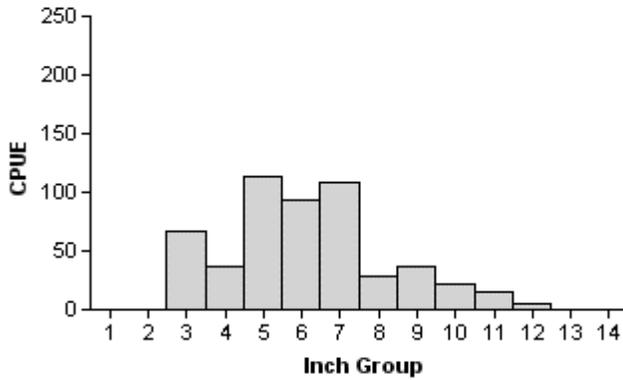
Table 3. Stocking history of Hords Creek Reservoir, Texas. Size categories are: FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
Threadfin shad	1984	1,070	ADL
Channel catfish			
- Native strain	1998	7,708	AFGL
- Imperial strain	1998	7,703	AFGL
	Total	15,411	
Smallmouth bass			
	1984	20,000	FGL
	1985	19,800	FGL
	Total	39,800	
Largemouth bass	1970	115,000	FGL
Florida largemouth bass			
	1986	18,108	FGL
	1987	9,993	FGL
	1994	25,500	FGL
	2001	42,352	FGL
	2006	52,712	FGL
	Total	148,665	
Lake chubsuckers	1981	19,200	ADL

Gizzard Shad

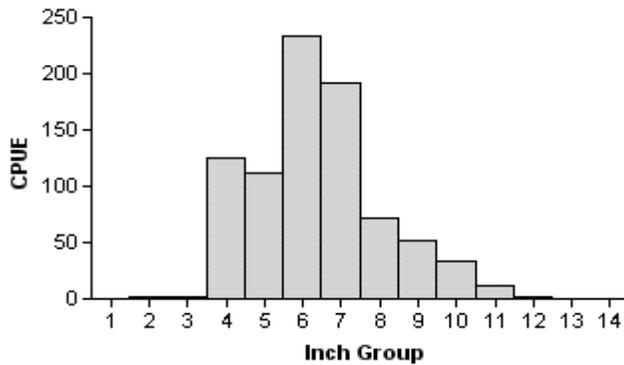
1998

Effort = 1.0
Total CPUE = 528.0 (15; 528)
IOV = 80 (4)



2001

Effort = 1.0
Total CPUE = 833.0 (14; 833)
IOV = 80 (5)



2005

Effort = 1.0
Total CPUE = 274.0 (21; 274)
IOV = 81 (5)

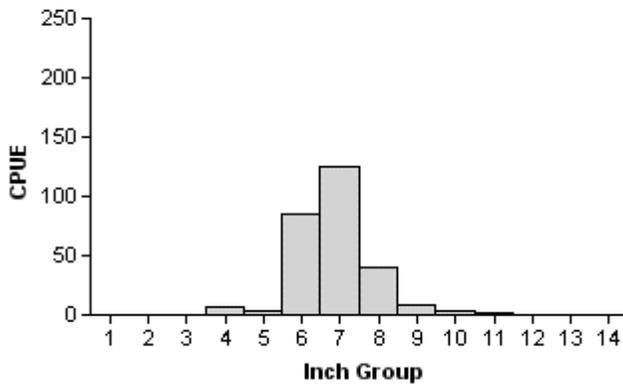
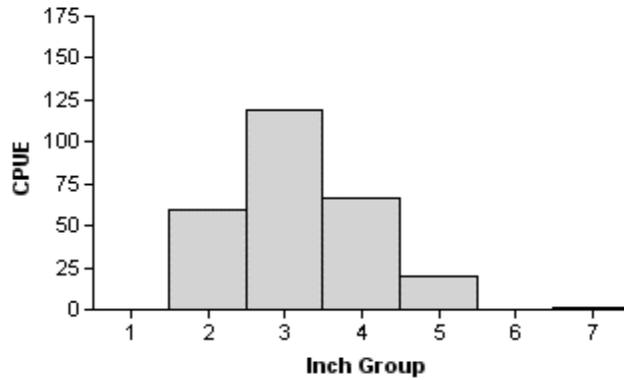


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 1998, 2001, and 2005.

Bluegill

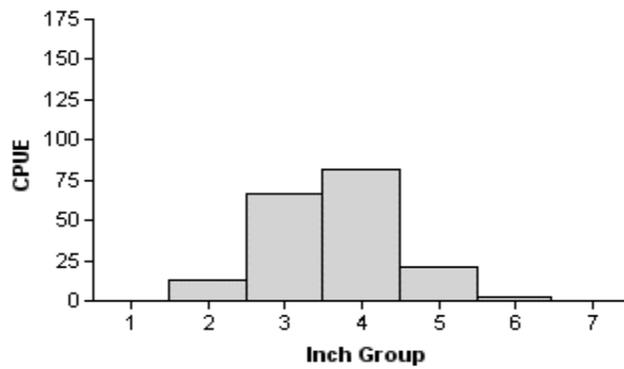
1998

Effort = 1.0
Total CPUE = 266.0 (17; 266)
PSD = 0 (0)



2001

Effort = 1.0
Total CPUE = 185.0 (11; 185)
PSD = 1 (1)



2005

Effort = 1.0
Total CPUE = 374.0 (18; 374)
PSD = 0 (0)

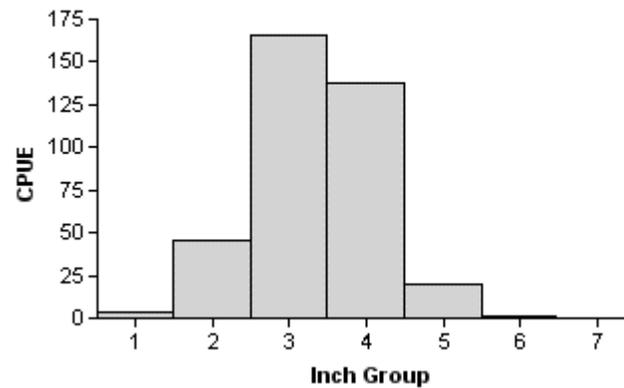


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 1998, 2001, and 2005.

Channel Catfish

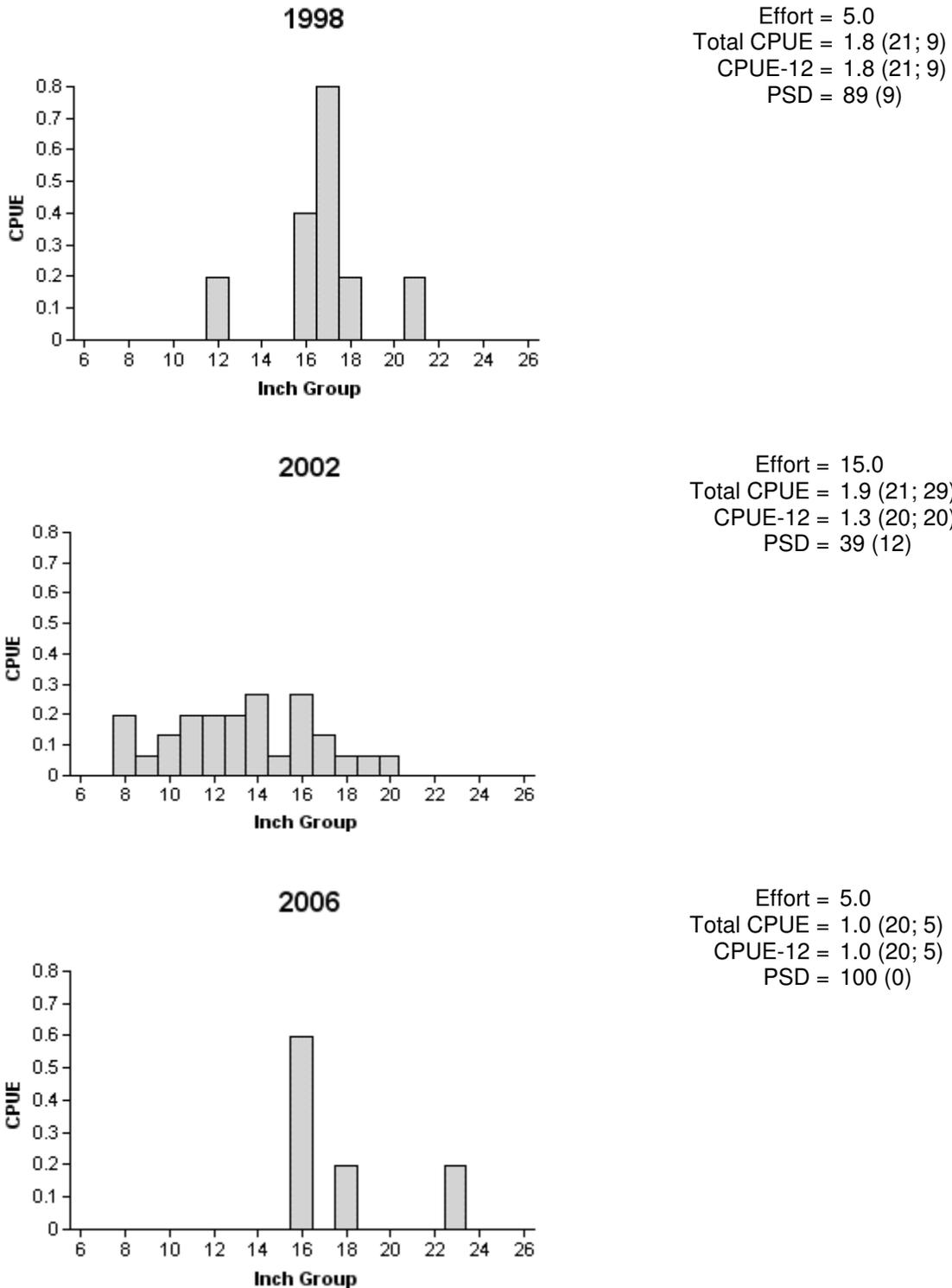
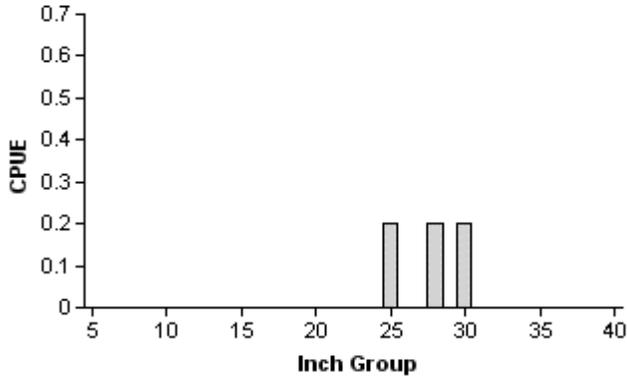


Figure 4. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Hords Creek Reservoir, Texas, 1998, 2002, and 2006.

Flathead Catfish

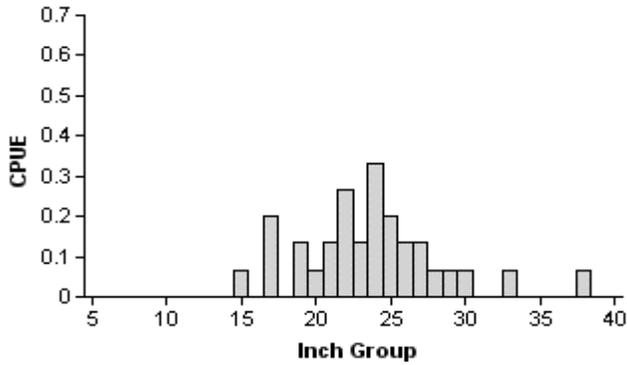
1998

Effort = 5.0
 Total CPUE = 0.6 (33; 3)
 CPUE-18 = 0.6 (33; 3)
 PSD = 100 (0)



2002

Effort = 15.0
 Total CPUE = 2.1 (13; 32)
 CPUE-18 = 1.9 (16; 28)
 PSD = 81 (9)



2006

Effort = 5.0
 Total CPUE = 1.6 (25; 8)
 CPUE-18 = 1.6 (25; 8)
 PSD = 100 (0)

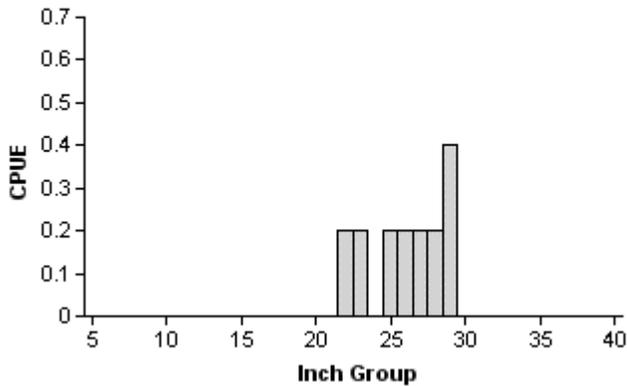


Figure 5. Number of flathead catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Hords Creek Reservoir, Texas, 1998, 2002, and 2006.

Largemouth Bass

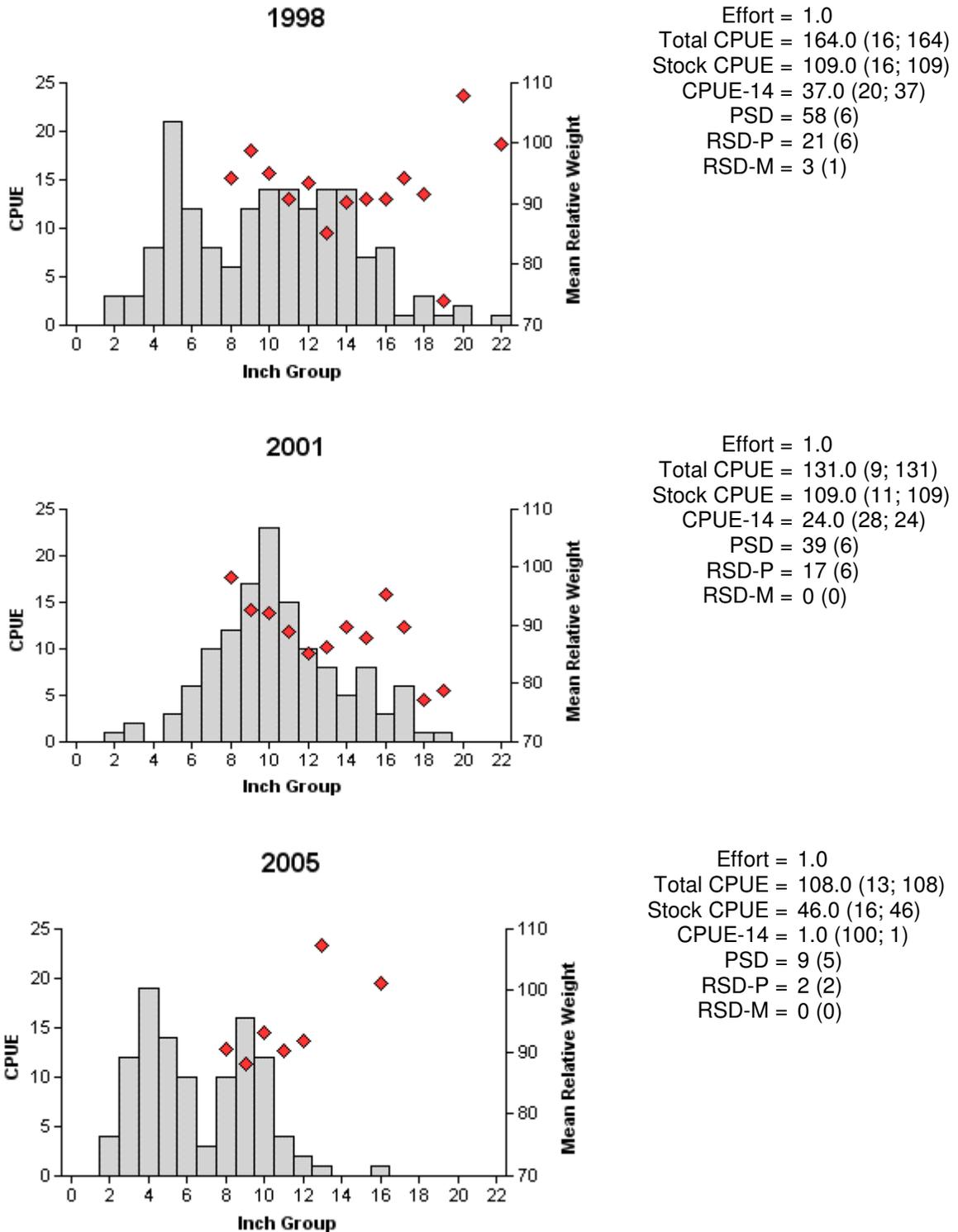


Figure 6. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 1998, 2001, and 2005.

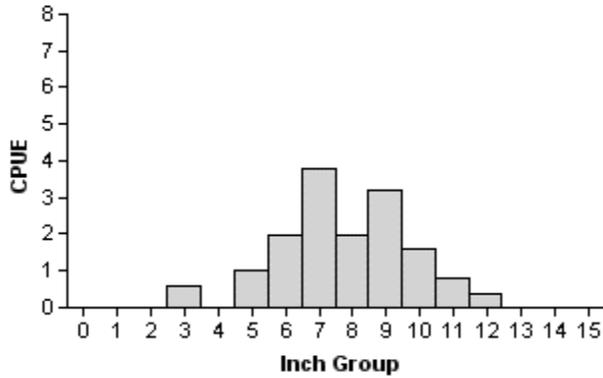
Table 4. Results of genetic analysis of largemouth bass collected by fall electrofishing, Hords Creek Reservoir, Texas, 1998, 2003, and 2005. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype				% FLMB alleles	% Pure FLMB
		FLMB	F1	Fx	NLMB		
1998	30	3	14	8	5	45.8	10.0
2003	33	3	10	16	4	48.4	9.1
2005	24	0	0	24	0	54.3	0.0

White Crappie

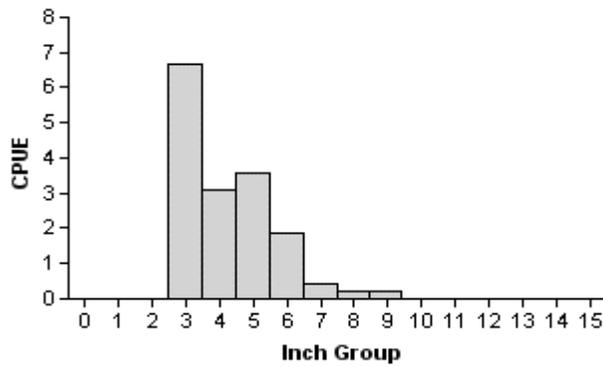
1998

Effort = 5.0
 Total CPUE = 15.4 (27; 77)
 PSD = 54 (14)
 RSD-10 = 19 (9)



2001

Effort = 9.0
 Total CPUE = 16.1 (65; 145)
 PSD = 7 (5)
 RSD-10 = 0 (0)



2005

Effort = 5.0
 Total CPUE = 3.2 (49; 16)
 PSD = 19 (9)
 RSD-10 = 6 (9)

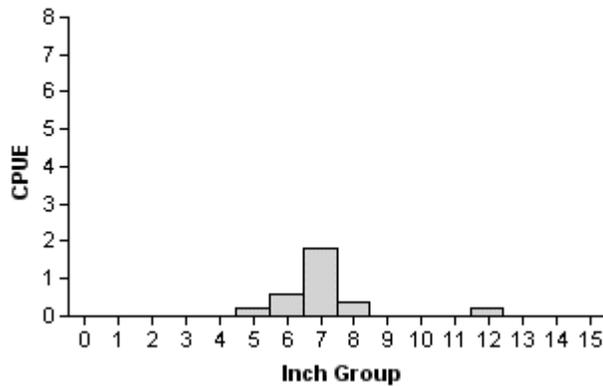


Figure 7. Number of white crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Hords Creek Reservoir, Texas, 1998, 2001, and 2005.

Table 5. Proposed sampling schedule for Hords Creek 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.

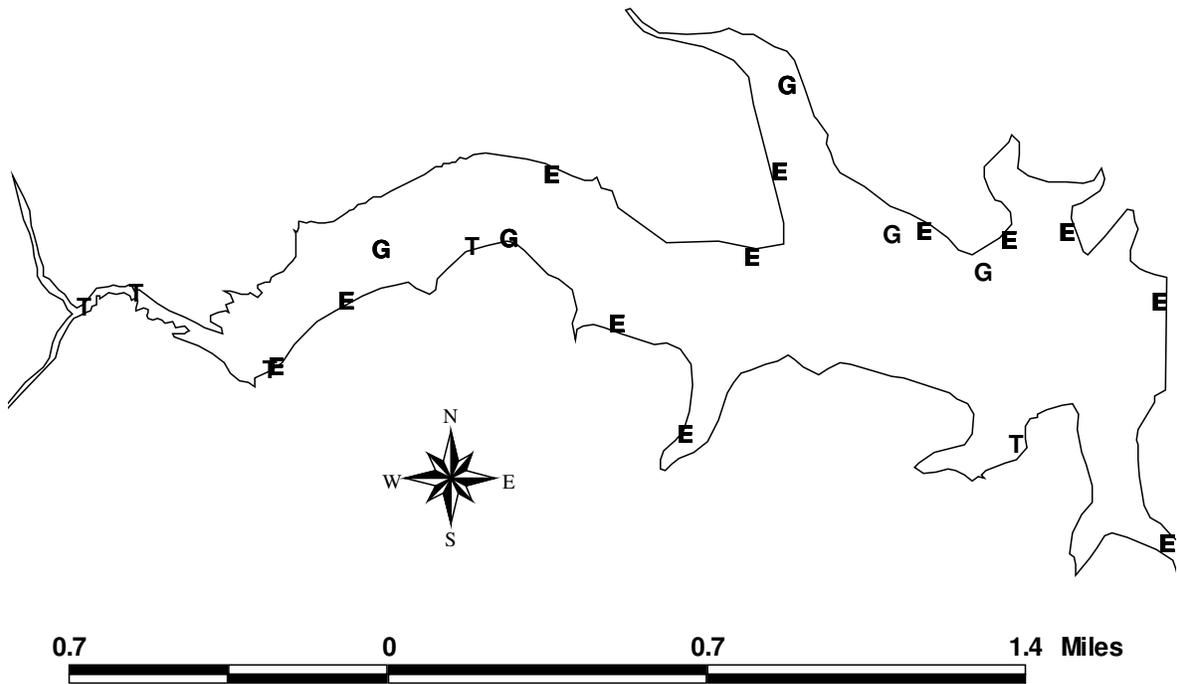
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2006-Spring 2007					
Fall 2007-Spring 2008	S				
Fall 2008-Spring 2009					
Fall 2009-Spring 2010	S	S	S		S

APPENDIX A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					274	274.0
Channel catfish	5	1.0				
Flathead catfish	8	1.6				
Redbreast sunfish					1	1.0
Green sunfish					94	94.0
Warmouth					2	2.0
Bluegill					374	374.0
Longear sunfish					4	4.0
Redear sunfish					4	4.0
Largemouth bass					108	108.0
White crappie			16	3.2		

APPENDIX B



Location of sampling sites, Hords Creek Reservoir, Texas, 2005-2006. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was near full pool at the time of sampling.