

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Hords Creek Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Hords Creek Reservoir were surveyed in 2009 using electrofishing and trap nets and in 2010 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 constructed in 1948 on Hords Creek. It is located in Coleman County approximately 55 miles south of Abilene and is controlled by the United States Army Corps of Engineers. Primary water uses included flood control and recreation. Water level was high and relatively stable from 1992 to 1998, followed by a steady decline from 1998 through 2004. It filled in 2005, dropped 7 feet in 2006, and filled in 2007. Water level has steadily dropped since summer 2007 and was nearly 12 ft. below conservation pool in April 2010. Boat access consisted of several public boat ramps. Bank fishing access was excellent, and there were three handicap accessible fishing piers.
- **Management History:** Efforts to increase Florida largemouth bass genotype to 20% have been discontinued because there was no chance of achieving a 20% level. Largemouth bass were monitored in 2009 and the population was abundant and had excellent size structure.
- **Habitat:** The most prevalent habitat type was dead brush and open water. Aquatic vegetation was comprised of watermilfoil and Illinois pondweed. However, occurrence of these plants at the time of the survey was limited to shore/water interface and provided little value as fish habitat. Substrate consisted primarily of various-sized rock, but a clay/silt/sand composite was common as well.
- **Fish Community**
 - **Prey species:** Forage was abundant and consisted primarily of gizzard shad and bluegill. They were of a size that was available to most sport fish.
 - **Catfishes:** The channel catfish population improved since our last survey in 2006, and fish ranged in size from 9" to 25". Flathead catfish were present.
 - **Largemouth bass:** Abundance and size structure of largemouth bass substantially improved since 2005.
 - **White crappie:** Relative abundance and size structure of white crappie improved since 2005 and was similar to historical data from this reservoir.
- **Management Strategies:** Survey largemouth bass and forage fish populations every other year. Consider volunteer creel survey to determine angler effort and catch of sport fishes.

INTRODUCTION

This document is a summary of fisheries data collected from Hords Creek Reservoir in 2009-2010. 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 are presented 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 U. S. Army Corps of Engineers. Primary water uses included flood control and recreation. Habitat at time of sampling consisted of rocky shoreline and brush. Water level history is marred with long periods of dropping water levels broken by occasional heavy rain events that fill the reservoir (Figure 1). Water level was high and relatively stable from 1992 to 1998, followed by a steady decline in water level from 1998 through 2004. It filled in 2005, dropped 7 ft. in 2006 and early 2007, and filled in summer 2007. Water level has steadily dropped since summer 2007 and was nearly 12 ft. low in April 2010. Boat access consisted of several public boat ramps. Bank fishing access was excellent, and there were three handicap accessible fishing piers. Other descriptive characteristics for Hords Creek Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Farooqi and Dumont 2006) included:

1. Discontinue stocking efforts of Florida largemouth bass to specifically increase the Florida genotype to 20%.
Action: Florida largemouth bass were not requested under the criteria of increasing the Florida genotype to 20%.
2. Monitor largemouth bass population in 2007 and 2009 to determine if a strong year class produced in 2005 improved the relatively poor largemouth bass population observed in 2005.
Action: Fish populations were surveyed in 2009. Largemouth bass population dynamics improved compared to the 2005 survey as evidenced by CPUE, CPUE-14, and PSD estimates.

Harvest regulation history: All sport fish have always been regulated with statewide harvest regulations (Table 2).

Stocking history: Florida largemouth bass were introduced in 1986 and were last stocked in 2006. Unsuccessful stockings of smallmouth bass and lake chubsuckers occurred in the 1980s. Threadfin shad were introduced in 1984 but are not known to exist any longer. The complete stocking history is shown in Table 3.

Vegetation/habitat management history: Hords Creek Reservoir has no vegetation/habitat management history.

METHODS

Fishes were collected by electrofishing (1.1 hour at 13 5-min stations), gill netting (5 net nights at 5 sites), and trap netting (10 net nights at 10 sites). 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 2009). Habitat composition was determined by assessing habitat at 110 random points distributed throughout the reservoir. Water level at time of habitat sampling was 9 ft. below conservation level. Presence or absence was determined for each habitat type at each point. Percent occurrence was determined for each habitat type and 95% confidence intervals were calculated with 1,000 resamples of the original data (with replacement) by the percentile method.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight (W_r)] were calculated for some target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Sub-stock ratio (SSR) was calculated for largemouth bass and is defined as the number of sub-stock fish divided by the number of stock-sized fish and multiplying the quotient by 100. Relative standard error (RSE = $100 \times \text{SE of the estimate/estimate}$) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Confidence intervals were determined with 1,000 resamples of the original data (with replacement) by the percentile method. Source for water level data was the United States Geological Survey website. Resampling Stats in Excel, Version 2, was used for all resample analyses.

RESULTS AND DISCUSSION

Habitat: The most prevalent nearshore and offshore habitat type was dead brush and open water (Figures 2 and 3). Aquatic vegetation occurred in approximately 30% of nearshore sites and was comprised of watermilfoil and Illinois pondweed. However, occurrence of these plants at the time of the survey was limited to the shore/water interface and provided little value as fish habitat. Substrate consisted primarily of rock, but a clay/silt/sand composite was common in many sites as well (Figure 2).

Prey species: Electrofishing CPUE of gizzard shad was 470.8/h and was 373.8/h for bluegill. IOV of gizzard shad was similar in 2003, 2005, and 2009 and ranged from 70 to 81 (Figure 4). No trend in gizzard shad abundance was observed from 2003-2009. Bluegill CPUE was similar in 2005 and 2009 and was much higher compared to bluegill CPUE in 2003 (Figure 5). Size structure of bluegill consisted primarily of small fish (Figure 5).

Catfishes: Channel catfish CPUE was higher in 2010 compared to 2003 and 2006 (Figure 6). Size structure was excellent as 88% of fish collected were ≥ 12 inches long. Flathead catfish were present.

Largemouth bass: Electrofishing CPUE of all largemouth bass (total CPUE) was 168.9/h in 2009 and higher than catch rates in 2003 and 2005 (Figure 7). There was also a corresponding increase in electrofishing CPUE of stock-size largemouth bass in 2009 (Figure 7). Reproduction, as measured with sub-stock ratio (SSR) was 100 in 2003 and 135 in 2005, compared to the district average of 120. The SSR was 26 in 2009, considerably lower than 2003 and 2005, and was likely the result of a large influx of stock-size fish from strong year classes in previous years combined with lower CPUE of sub-stock fish. Size structure, evaluated with PSD and PSD-14, improved in 2009 compared to 2003 and 2005 (Figure 7). In addition, CPUE-14 in 2009 (36.9/h) was considerably higher compared to 2003 (11.0/h) and 2005 (1.0/h). Relative weights in 2009 ranged from 89-93 per size group, were below estimates from the 2003 survey, and were similar to estimates in 2005 (Table 4). Relative weight estimates from 2009 were lower than desired (≥ 95) for all sizes, indicating some limited forage or poor vulnerability to existing largemouth bass.

Crappie: Trap net catch of crappie was 8.7/nn in 2010, compared to 3.2/nn in 2005 and 16.1/nn in 2001. Catch of stock-size crappie in 2009 was similar to 2001 as most of the catch in 2001 was composed of sub-stock fish (Figure 8). White crappie size structure, as measured with PSD and PSD-P, improved in 2009 compared to previous surveys (Figure 8). Relative abundance and size structure of white crappie in 2009 was similar to the historical average for Hords Creek Reservoir (1988-2009; CPUE-S = 5.2/nn; CPUE-P =

0.9/nn; PSD-P = 17). Relative weight of white crappie increased with size and ranged from 82 to 89. Body condition was lower than desired (≥ 95) for all sizes, indicating limited forage abundance or poor vulnerability to existing crappie.

Fisheries management plan for Hords Creek Reservoir, Texas

Prepared – July 2010.

ISSUE 1: The small size of Hords Creek Reservoir and its tendency for long periods of water loss increases the possibility of over exploitation, particularly for largemouth bass.

MANAGEMENT STRATEGY

1. Continue every other year electrofishing surveys of existing largemouth bass and forage populations.
2. Determine legitimacy of using an on-site volunteer fishing survey to estimate directed effort, catch, and harvest of sport fishes.

SAMPLING SCHEDULE JUSTIFICATION:

Sampling once every four years is sufficient to monitor catfish and crappie populations. An additional electrofishing survey in 2011 would be important to monitor forage and largemouth bass populations. The proposed sampling schedule is in Table 5.

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.
- Farooqi, M. and S. Dumont. 2006. Statewide freshwater fisheries monitoring and management program survey report for Hords Creek Reservoir, 2005. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-31, Austin.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. *Fisheries* 32(7): 348.

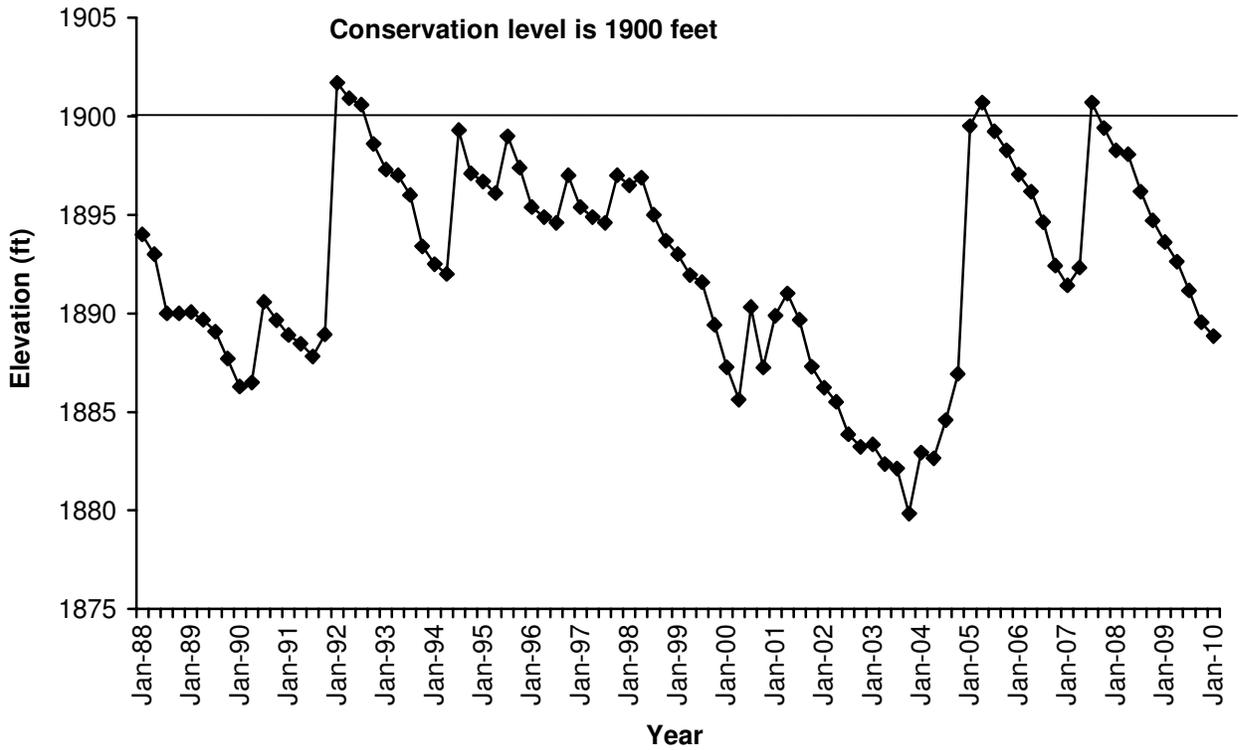


Figure 1. Quarterly water level elevations in feet above mean sea level for Hords Creek Reservoir, Texas.

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	3.2
Conductivity	810 $\mu\text{mhos/cm}$

Table 2. Harvest regulations for Hords Creek Reservoir, Texas

Species	Bag Limit	Minimum Length Limit (inches)
Catfish: channel catfish	25	12
Catfish, flathead	5	18
Bass, largemouth	5	14
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10

Table 3. Stocking of Hords Creek Reservoir, Texas. Size categories are: FGL = 1-3 inches, AFGL = 6-9 inches, and ADL = adults.

Species	Year	Number	Size
Threadfin shad	1984	1,074	ADL
Channel catfish	1998	15,411	AFGL
Smallmouth bass	1984	20,000	FGL
	1985	19,800	FGL
		<u>39,800</u>	
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	<u>52,712</u>	FGL
	Total	<u>148,665</u>	
Lake chubsuckers	1981	19,200	ADL

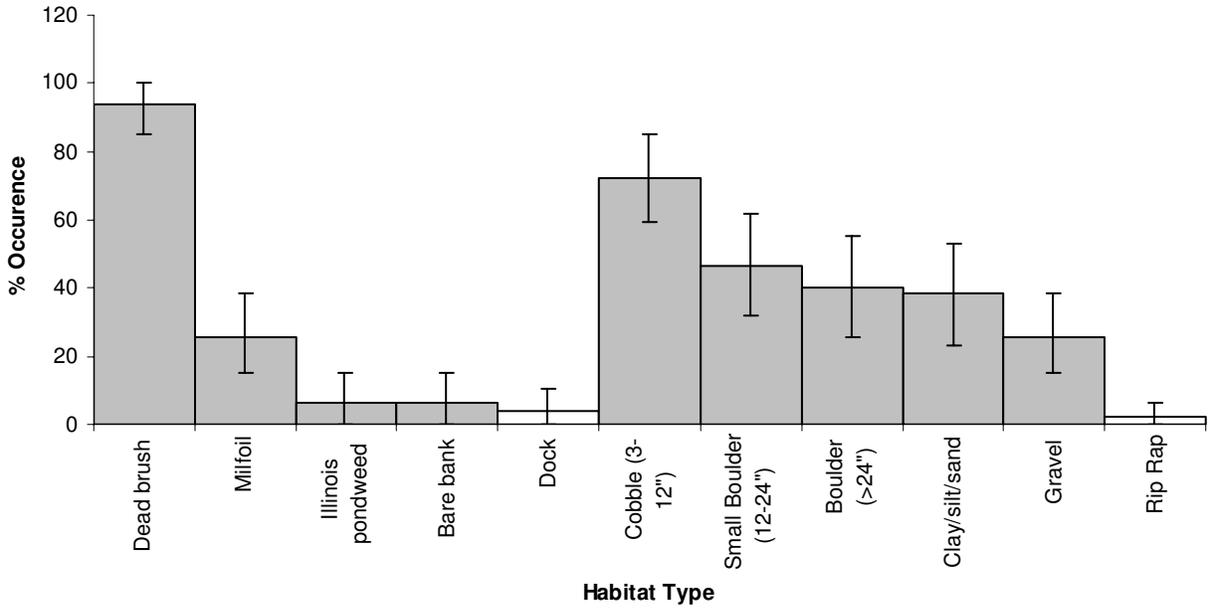


Figure 2. Percent occurrence (\pm 95% C.I., derived from 1,000 resamples, with replacement, of the original data; N=47) of nearshore habitat and substrate types at Hords Creek Reservoir, Texas, 2009.

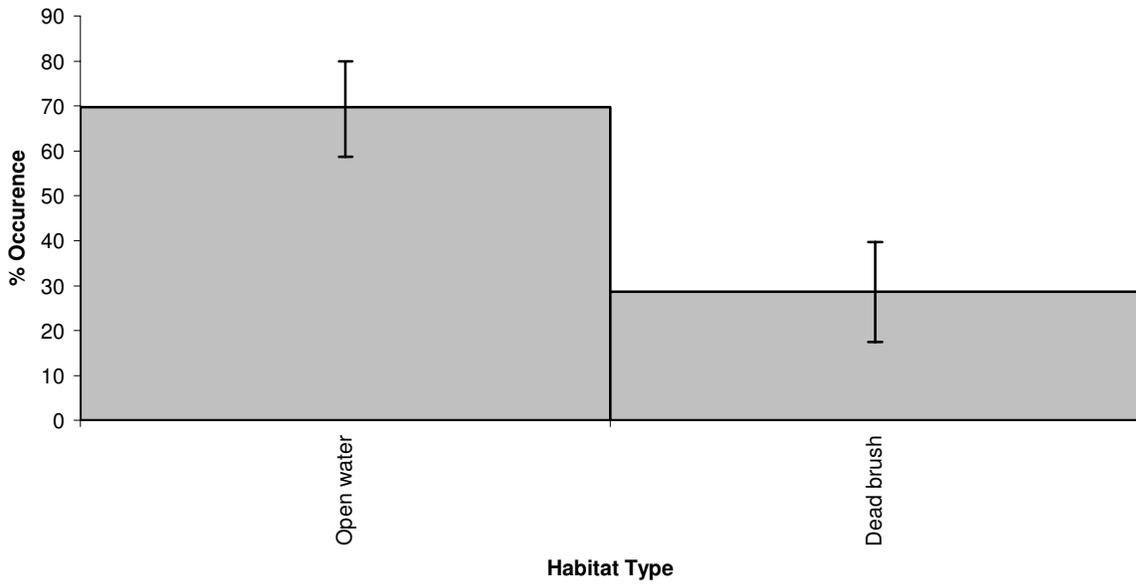


Figure 3. Percent occurrence (\pm 95% C.I., derived from 1,000 resamples, with replacement, of the original data; N=63) of offshore habitat at Hords Creek Reservoir, Texas, 2009.

Gizzard Shad

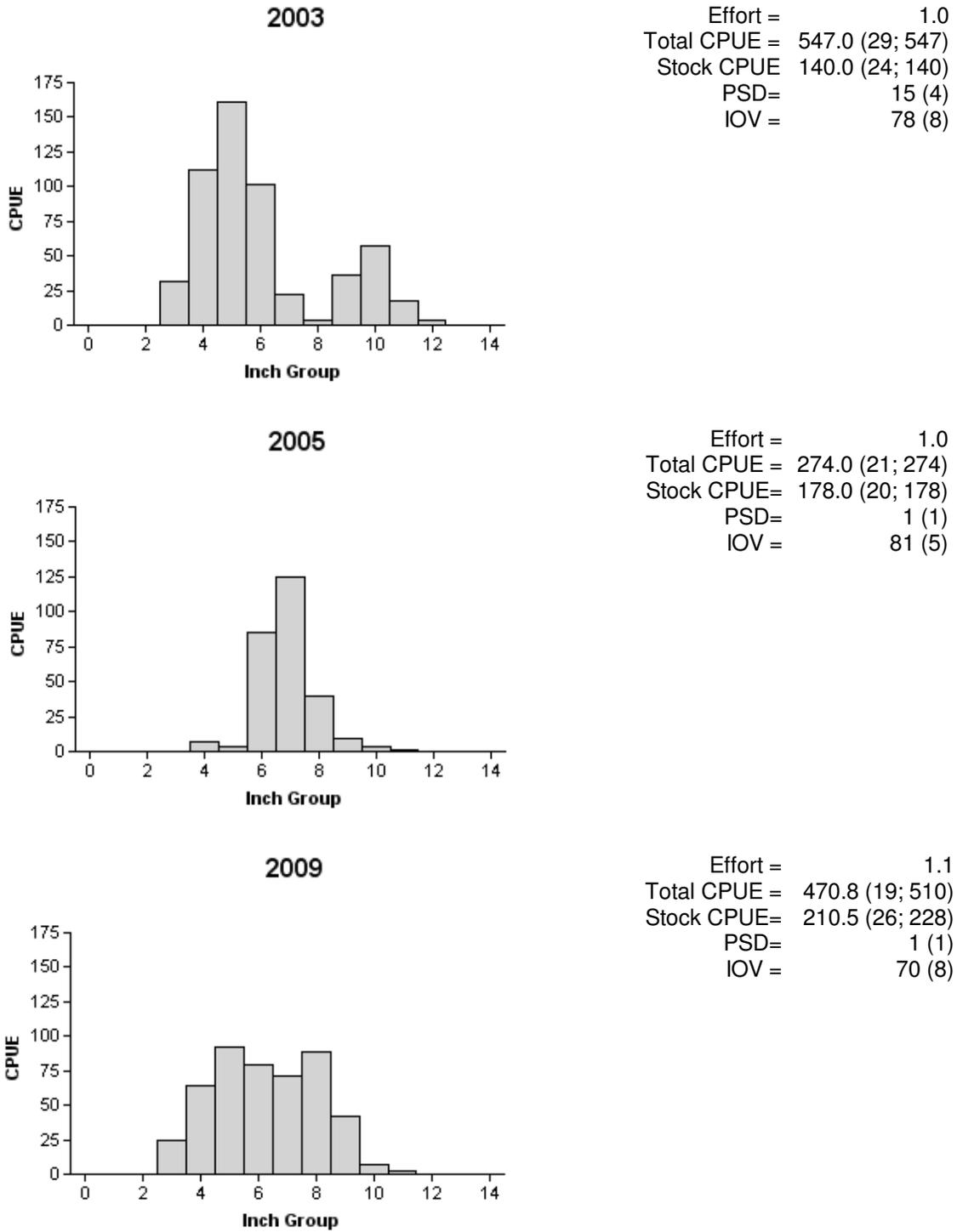
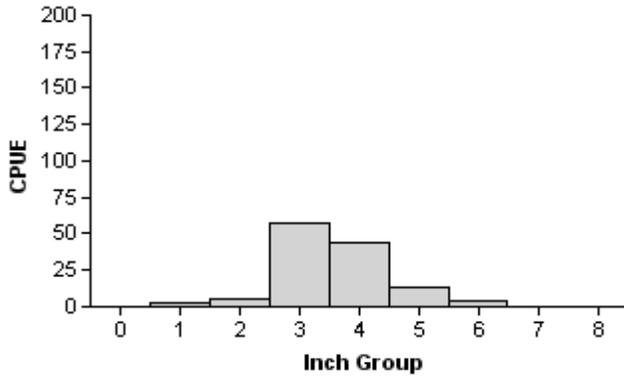


Figure 4. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for PSD and IOV are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2003, 2005, and 2009.

Bluegill

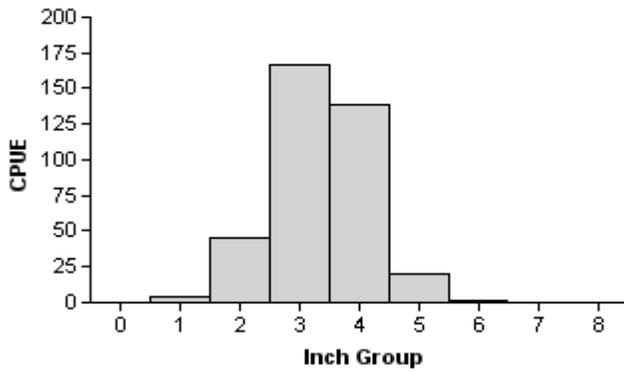
2003

Effort = 1.0
 Total CPUE = 128.0 (27; 128)
 PSD = 3 (2)



2005

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



2009

Effort = 1.1
 Total CPUE = 373.8 (30; 405)
 PSD = 0

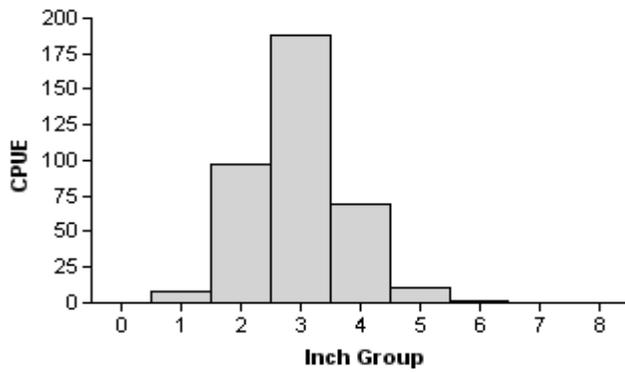
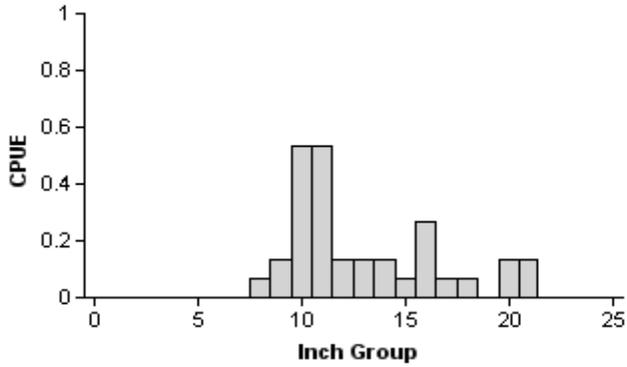


Figure 5. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2003, 2005, and 2009.

Channel Catfish

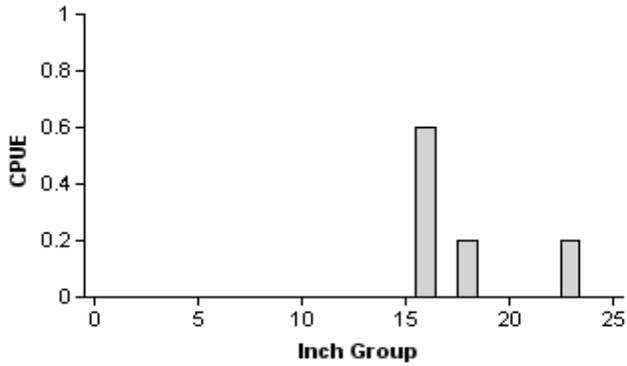
2003

Effort = 15.0
 Total CPUE = 2.4 (24; 36)
 CPUE-12 = 1.1 (35; 17)
 PSD = 40 (8)



2006

Effort = 5.0
 Total CPUE = 1.0 (45; 5)
 CPUE-12 = 1.0 (45; 5)
 PSD = 100 (0)



2010

Effort = 5.0
 Total CPUE = 3.4 (46; 17)
 CPUE-12 = 3.0 (53; 15)
 PSD = 47 (7)

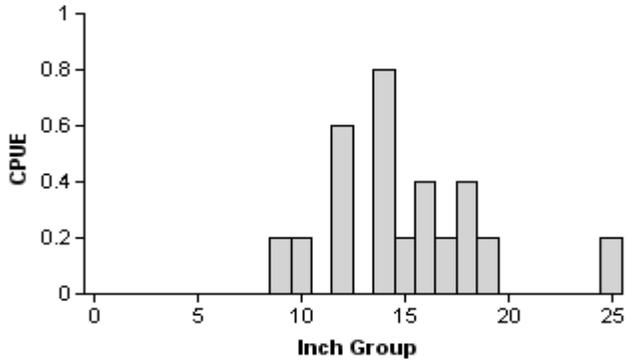
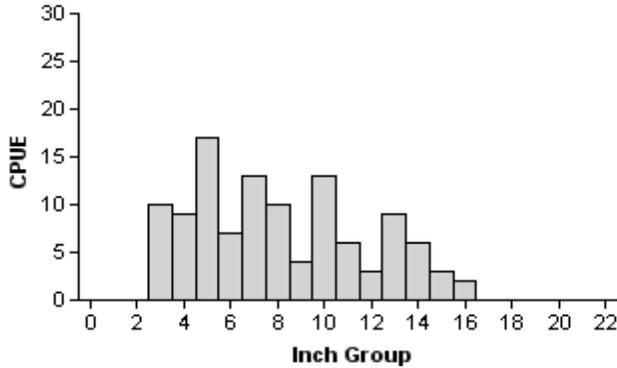


Figure 6. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Hords Creek Reservoir, Texas, 2003, 2006, and 2010.

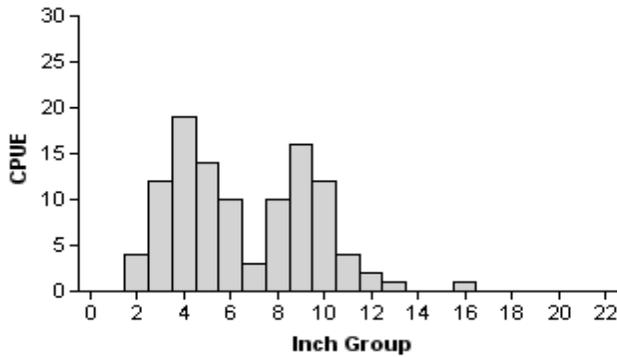
Largemouth Bass

2003



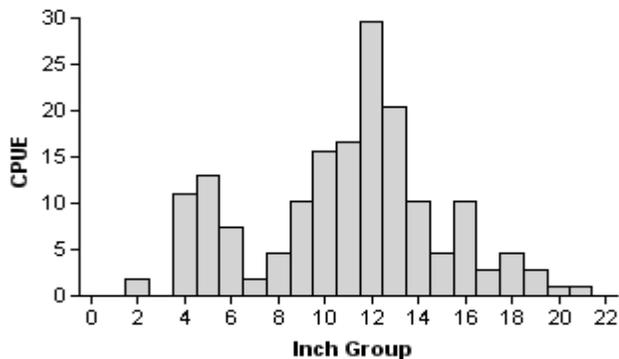
Effort = 1.0
 Total CPUE = 112.0 (15; 112)
 Stock CPUE = 56.0 (12; 56)
 CPUE-14 = 11.0 (21; 11)
 PSD = 41 (6)
 PSD-14 = 20 (4)

2005



Effort = 1.0
 Total CPUE = 108.0 (13; 108)
 Stock CPUE = 46.0 (16; 46)
 CPUE-14 = 1.0 (100; 1)
 PSD = 9 (5)
 PSD-14 = 2 (2)

2009



Effort = 1.1
 Total CPUE = 168.9 (11; 183)
 Stock CPUE = 133.8 (13; 145)
 CPUE-14 = 36.9 (24; 40)
 PSD = 65 (5)
 PSD-14 = 28 (4)

Figure 7. Number of largemouth bass 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, 2003, 2005, and 2009.

Largemouth Bass

Table 4. Average relative weight of 8.0-11.9-inch, 12.0-14.9-inch, and ≥ 15 -inch largemouth bass from 1997, 2008, and 2009 at Daniel Reservoir, Texas. 95% confidence interval is in parentheses. Confidence intervals were derived from 1,000 resamples, with replacement, of the original data.

Year	Mean W_r /size category		
	8.0-11.9 in	12.0-14.9 in	≥ 15 in
2003	96 (94-98)	96 (93-98)	98 (94-102)
2005	90 (89-92)	--	--
2009	90 (88-92)	89 (87-91)	93 (90-97)

White Crappie

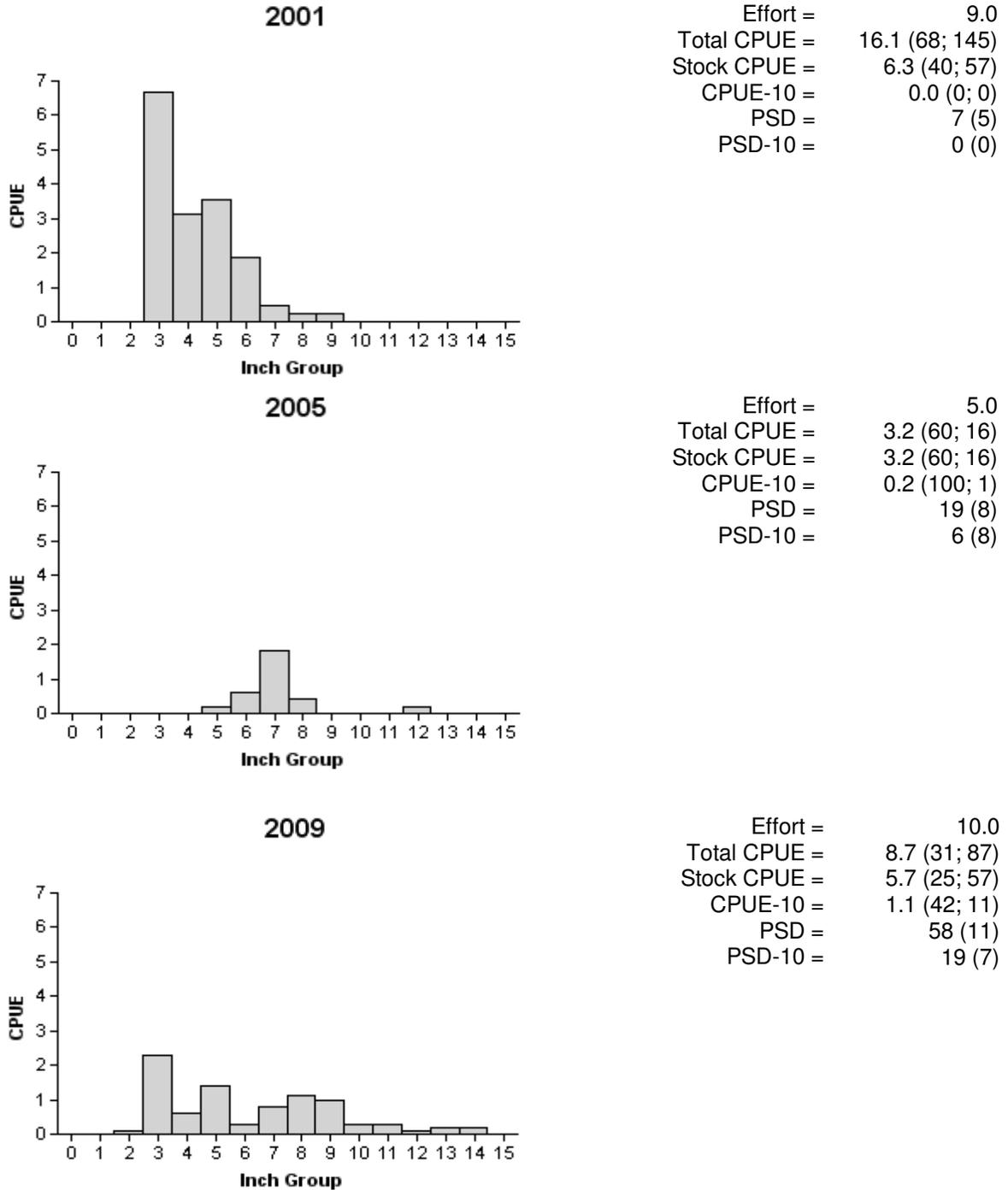


Figure 9. Number of white crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Hords Creek Reservoir, Texas, 2001, 2005, and 2009.

White Crappie

Table 5. Average relative weight of 5.0-7.9-inch and 8.0-9.9-inch, and ≥ 10 -inch white crappie in 2001 and 2009 at Hords Creek Reservoir, Texas. Number of fish is in parentheses. TS = sample size too small to calculate relative weight.

Year	Mean W_r /size category		
	5.0-7.9 in	8.0-9.9 in	≥ 10 in
2001	86 (26)	TS	TS
2009	82 (25)	85 (21)	89 (8)

Table 6. Proposed sampling schedule for Hords Creek Reservoir, Texas. Hoop net surveys will be conducted in summer 2013, and electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

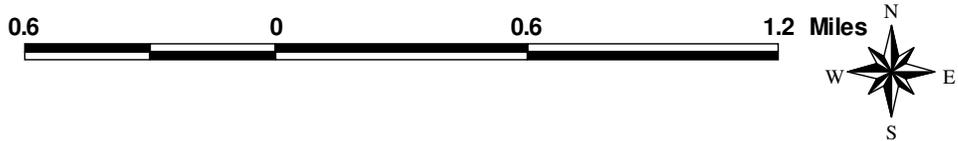
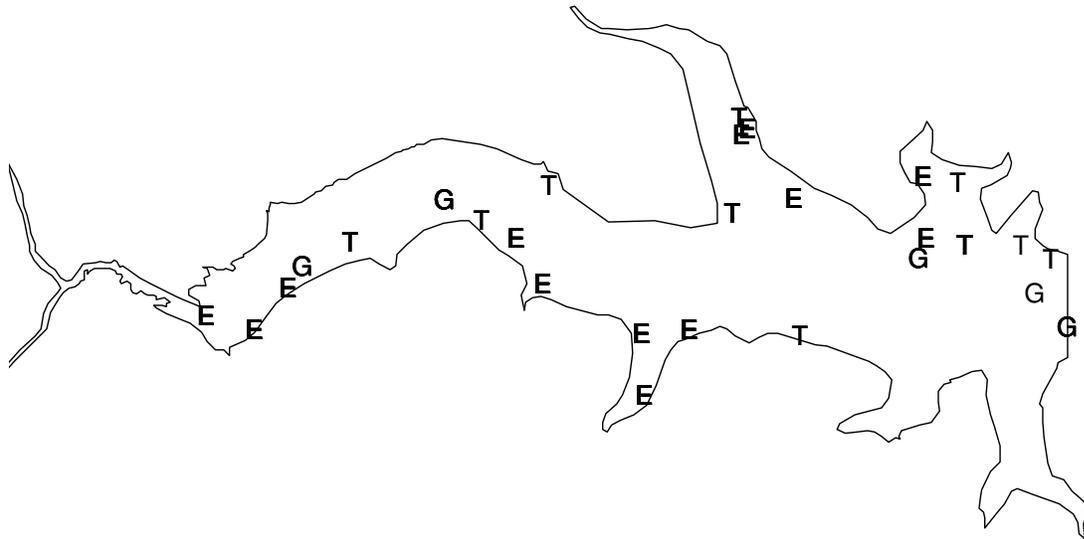
Survey Year	Hoop Net	Electrofisher	Trap Net	Gill Net	Report
Fall 2010-Spring 2011					
Fall 2011-Spring 2012		A			
Fall 2012-Spring 2013					
Fall 2013-Spring 2014	A	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species and presence of other species collected from Hords Creek Reservoir, Texas, 2009-2010.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad			Present		510	470.8
Common carp	Present				Present	
River carpsucker	Present					
Inland silverside					Present	
Spottail shiner					Present	
Channel catfish	17	3.4			Present	
Flathead catfish	8	1.6			Present	
Green sunfish					32	29.5
Warmouth					31	28.6
Orangespotted sunfish					6	5.5
Bluegill					405	373.8
Longear sunfish					12	11.1
Redear sunfish					70	64.6
Largemouth bass					183	168.9
White crappie	Present		87	8.7	Present	
Black crappie					Present	
Logperch					Present	

APPENDIX B



Location of sampling sites, Hords Creek Reservoir, Texas, 2009-2010. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.