

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Hords Creek Reservoir

Prepared by:

Natalie Amoroso, Assistant District Management Supervisor
and
Michael Homer Jr., District Management Supervisor

Inland Fisheries Division
District 1B, Abilene, Texas



Carter Smith
Executive Director

Gary Saul
Director, Inland Fisheries

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TABLE OF CONTENTS

Survey and Management Summary	1
Introduction.....	2
Reservoir Description.....	2
Angler Access	2
Management History	2
Methods.....	3
Results and Discussion	3
Fisheries Management Plan	5
Literature Cited.....	6
Figures and Tables	7-17
Water Level (Figure 1)	7
Reservoir Characteristics (Table 1)	7
Boat Ramp Characteristics (Table 2).....	8
Harvest Regulations (Table 3)	8
Stocking History (Table 4).....	9
Aquatic Vegetation Survey (Table 5)	10
Gizzard Shad (Figure 3).....	11
Bluegill (Figure 4)	12
Channel Catfish (Figure 5).....	13
Flathead Catfish (Figure 6)	14
Largemouth Bass (Figure 7)	15
White Crappie (Figure 8).....	16
Proposed Sampling Schedule (Table 6)	17
Appendix A	
Catch Rates for all Species from all Gear Types	18
Appendix B	
Map of 2005-2014 Sampling Locations	19

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Hords Creek Reservoir were surveyed in fall 2013 using electrofishing and trap netting and in spring 2014 using gill netting. Historical data are presented with the 2013-2014 data for comparison. 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 (USACE). Primary water uses included flood control and recreation. The reservoir has a history of large water level fluctuations. Water level reached conservation pool (CP) elevation in 2007, but has declined since summer 2007 to 19 feet below CP in May 2014. Habitat consisted of riprap, flooded terrestrial vegetation, and aquatic and semi-aquatic vegetation. Boater access consisted of one usable ramp with several others out of the water and unusable. Bank fishing access was good, and there were three handicap-accessible fishing piers.
- **Management History:** Important sport fish include Largemouth Bass, Channel Catfish, Flathead Catfish, and crappie. The management plan from 2010 survey report recommended electrofishing biennially to monitor trends in relative abundance and size structure for Largemouth Bass and forage fish. The most recent stocking was Florida Largemouth Bass in 2006. Angler harvest of all sport fishes has been regulated according to statewide size and bag limits.
- **Habitat:** The 2013 vegetation survey indicated that the majority of the lake had no vegetation and was classified as no vegetation. The most prevalent vegetation encountered during the survey was flooded terrestrial vegetation. During July 2013, water level increased 2.5 feet and increased the amount of flooded terrestrial vegetation present in the reservoir.
- **Fish Community**
 - **Prey species:** Forage was abundant and consisted primarily of Gizzard Shad and Bluegill. Green Sunfish, Warmouth, Orangespotted Sunfish, Longear Sunfish, and Redear Sunfish were also available as prey. Prey species were of sizes that were available to most sport fish.
 - **Catfishes:** Channel and Flathead catfishes were present in the reservoir. Relative abundance of Channel Catfish increased from 2010 to 2014 with many over the legal size limit (≥ 12 inch). Few Flathead Catfish were collected and were all legal-sized (≥ 18 inch) fish.
 - **Largemouth Bass:** Largemouth Bass relative abundance and number of large fish decreased from 2009 to 2013. Body condition of Largemouth Bass has slightly increased over the survey period.
 - **Crappies:** White and Black crappies were present in the reservoir; White Crappie were more abundant in the survey. White Crappie were most abundant at three inches in length, and the numbers of harvestable size White Crappie was low but consistent among sample periods.
- **Management Strategies:** Survey Largemouth Bass and forage fish populations in 2015 and 2017. Conduct trap netting, gill netting, and electrofishing surveys in 2017-2018 to obtain relative abundance, size structure, and body condition data. Access and vegetation surveys will be conducted in 2017-2018. Deploy and evaluate artificial habitat structures to improve fish habitat and potentially boost angler catch rates of game fishes. Conduct volunteer creel card surveys to determine angler effort, catch, and harvest of sport fishes. Work with USACE on possible boat ramp extension projects on ramps that may be out of the water during lower water conditions. Inform the public of the threat of invasive species and their impacts.

INTRODUCTION

This document is a summary of fisheries data collected from Hords Creek Reservoir in 2013-2014. 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 fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2013-2014 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 owned and operated by the United States Army Corps of Engineers (USACE). Primary water uses included flood control and recreation. Habitat consisted of riprap, flooded terrestrial vegetation, and aquatic and semi-aquatic vegetation. Hords Creek Reservoir has experienced long periods of reduced water levels broken by occasional heavy rain events that filled the reservoir (Figure 1). Water level was high and relatively stable from 1992 to 1998, followed by a steady decline from 1998 through 2004. The reservoir re-filled in 2005 but dropped 7 feet in 2006 and re-filled by summer 2007. Water level steadily dropped since summer 2007 but has been relatively stable since 2011. During May 2014, the water level was nearly 19 feet below conservation pool (CP) elevation. Other descriptive characteristics for Hords Creek Reservoir are in Table 1.

Angler Access

Hords Creek Reservoir had five, fee-required boat ramps controlled by USACE. Only one ramp was usable during the 2013-2014 survey period because of low water levels. Bank anglers had plenty of access within walking distance of road pull-offs. Hords Creek Reservoir also had three handicap-accessible piers that could be used at the current water levels. Additional boat ramp characteristics are located in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from previous survey report (Dumont and Neely 2010) included:

1. Conduct biennial electrofishing surveys of existing Largemouth Bass and forage populations to monitor trends in relative abundance.
 - Action:** No electrofishing survey was conducted in 2011 due to staff limitations. Completed electrofishing survey in 2013 to sample the existing Largemouth Bass and prey populations. Largemouth Bass relative abundance declined slightly compared to the 2009 survey. Also, CPUE-14 and PSD decreased from 2009 to 2013.
2. Determine legitimacy of an on-site volunteer fishing survey to estimate directed effort, catch, and harvest of sport fishes.
 - Action:** No on-site creel was completed to determine angler harvest of sport fish.

Harvest regulation history: All sport fish have always been regulated with statewide harvest regulations (Table 3).

Stocking history: Unsuccessful stocking of Smallmouth Bass and Lake Chubsuckers occurred in the 1980s. Threadfin Shad were introduced in 1984. Florida Largemouth Bass were introduced in 1986 and were last stocked in 2006. The complete stocking history is located in Table 4.

Vegetation/habitat management history: Hords Creek Reservoir has no history of management for vegetation or structural habitat.

Water transfer: No interbasin transfers are known to exist.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-minute stations), trap netting (10 net nights at 10 stations), and gill 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 netting, 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 2011).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD) terminology modified by Guy et al. (2007)], 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). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

In August 2013, vegetation composition was determined by assessing the vegetation at 100 random stations distributed throughout the reservoir and 50 random stations along the shoreline. Plants were identified at or below the waterline and marked as "1" for present or "0" for absent. Shoreline stations were sampled to increase the likelihood of encountering all aquatic and semi-aquatic plants present in the reservoir. Shoreline and main reservoir points were analyzed separately. "No vegetation" classification was assigned to any stations without vegetation present. Percent occurrence (% = [# stations present / total stations sampled] X 100) and associated 95% confidence intervals were calculated for vegetation. No structure survey was conducted during the 2013-2014 since structural features have not changed since the 2009 sampling period.

Source for water level data was the United States Geological Survey (USGS 2014).

RESULTS AND DISCUSSION

Habitat: Water level at the time of vegetative sampling was 16 feet below CP. Vegetation was found predominately along the shoreline and consisted of both aquatic vegetation and living flooded terrestrial plants. Flooded terrestrial plant species found included baccharis, and salt cedar. Semi-aquatic species present in the survey consisted of common buttonbush, flatsedge, and black willow, and aquatic species present were cattail and smartweed (Table 5). In the 2009 vegetation survey, only watermilfoil and Illinois pondweed were sampled (Dumont and Neely 2010). Substrate consisted primarily of rock, but a clay/silt/sandy composite was common in many sites during the habitat survey in 2009 (Dumont and Neely 2010).

Prey species: Prey species primarily consisted of Gizzard Shad and Bluegill. Relative abundance of Gizzard Shad (619.0/h) had doubled since the 2005 electrofishing survey (274.0/h). Gizzard Shad IOV was similar in all survey years, ranging from 70-81 and indicating most fish were available to most predators (Figure 2). Bluegill CPUE was lower in 2013 (153.0/h) compared to 2009 (373.8/h) and 2005 (374.0/h; Figure 3). The decline in Bluegill relative abundance could be attributed to lower water levels. Size structure of Bluegill consisted primarily of fish 3-4 inches, which most fish in the sample were of adequate prey size for sport fish (Figure 3). Green Sunfish, Warmouth, Orangespotted Sunfish, Longear Sunfish, and Redear Sunfish were also present (Appendix A) and of sizes available for most sport fish. Survey results indicated abundant prey base for sport fish and that availability of prey should not be a limiting factor to the growth and condition of sport fish in the reservoir.

Channel Catfish: Channel Catfish catch rates in the gill netting surveys were similar but had slight increases from 1.0/nn in 2006, to 3.4/nn in 2010, and to 5.4/nn in 2014 (Figure 4). Size structure of the 2014 sample was mostly represented by fish ≥ 12 inches, and there was greater numbers of sub-stock size fish compared to 2010 and 2006.

Flathead Catfish: Flathead Catfish had similar relative abundance in 2014 (1.4/nn) compared to 2006 (1.6/nn) and 2010 (1.6/nn). All fish caught in 2014 gill netting survey were over the legal size-limit (≥ 18 inch; Figure 5).

Largemouth Bass: Electrofishing CPUE for all Largemouth Bass was 137.0/h in 2013, which was lower than the catch reported in 2009 (168.9/h) but higher than the 2005 CPUE (108.0/h; Figure 6). In 2013, a decrease in electrofishing CPUE of stock-size Largemouth Bass occurred (Figure 6). The low water level may have decreased Largemouth Bass spawning survival and recruitment. Relative abundance of Largemouth Bass ≥ 14 inches decreased to 15.0/h in 2013 from 36.9/h in 2009. In 2013, body conditions of Largemouth Bass increased from those previous reported for most inch groups; W_r values ranged from the high 90's to 100's (Figure 6).

White Crappie: White Crappie CPUE in the trap netting surveys was much higher in 2013 (124.5/nn) compared to the previous two surveys (2009, 8.7/nn; 2005, 3.2/nn). Catch of stock-size White Crappie was greater in 2013 (14.8/nn) than 2009 (5.7/nn; Figure 7). In 2013, the White Crappie size structure was less balanced compared to previous surveys and was comprised with fish < 6 inches, which suggests that adult White Crappie successfully reproduced and provided a strong year class (Figure 7).

Black Crappie: Black Crappie were the least abundant of the crappie in the reservoir. Catch rates of Black Crappie sampled during the 2005 to 2013 trap netting survey were low, ranging from 0.1-0.9/nn. All fish captured in the 2005, 2009, and 2013 surveys were < 8 inches.

Fisheries Management Plan for Hords Creek Reservoir, Texas

Prepared – July 2014

ISSUE 1: Hords Creek Reservoir often experiences prolonged droughts resulting in vegetative and structural habitat loss for Largemouth Bass, crappie, and sunfishes.

MANAGEMENT STRATEGIES

1. Continue to monitor sport fishes and forage populations to determine trends in relative abundance, size structure, and body condition.
2. Collaborate with USACE and potentially other groups on habitat improvement projects by installing artificial habitat structures.

ISSUE 2: Quantitative data pertaining to directed effort, catch, and harvest of sport fishes by anglers do not exist for Hords Creek Reservoir.

MANAGEMENT STRATEGIES

1. Conduct an on-site volunteer creel survey in collaboration with USACE to determine angler-directed effort, catch, release, and harvest of sport fishes.

ISSUE 3: Hords Creek Reservoir has multiple boat ramps that become unusable during periods of low water levels. Only one ramp was usable at the time of the access survey.

MANAGEMENT STRATEGIES

1. Meet with USACE and discuss the potential of ramp improvement projects. Discuss extension of the dam ramp and Flatrock Park ramp during a period of low water level because access to the end of the ramps and the lake bed will be more available.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species were significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with USACE to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, and other informative materials so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituents.
5. Map existing and future interbasin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

Sampling once every four years is sufficient to monitor Channel Catfish and White Crappie. Biennial electrofishing surveys are necessary to monitor trends in relative abundance and other population demographics for Largemouth Bass and forage species. An on-site volunteer creel survey to be conducted from September 2014-August 2015 is necessary to determine directed effort, catch and harvest of sport fishes. The proposed sampling schedule is in Table 6.

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Water Level Data

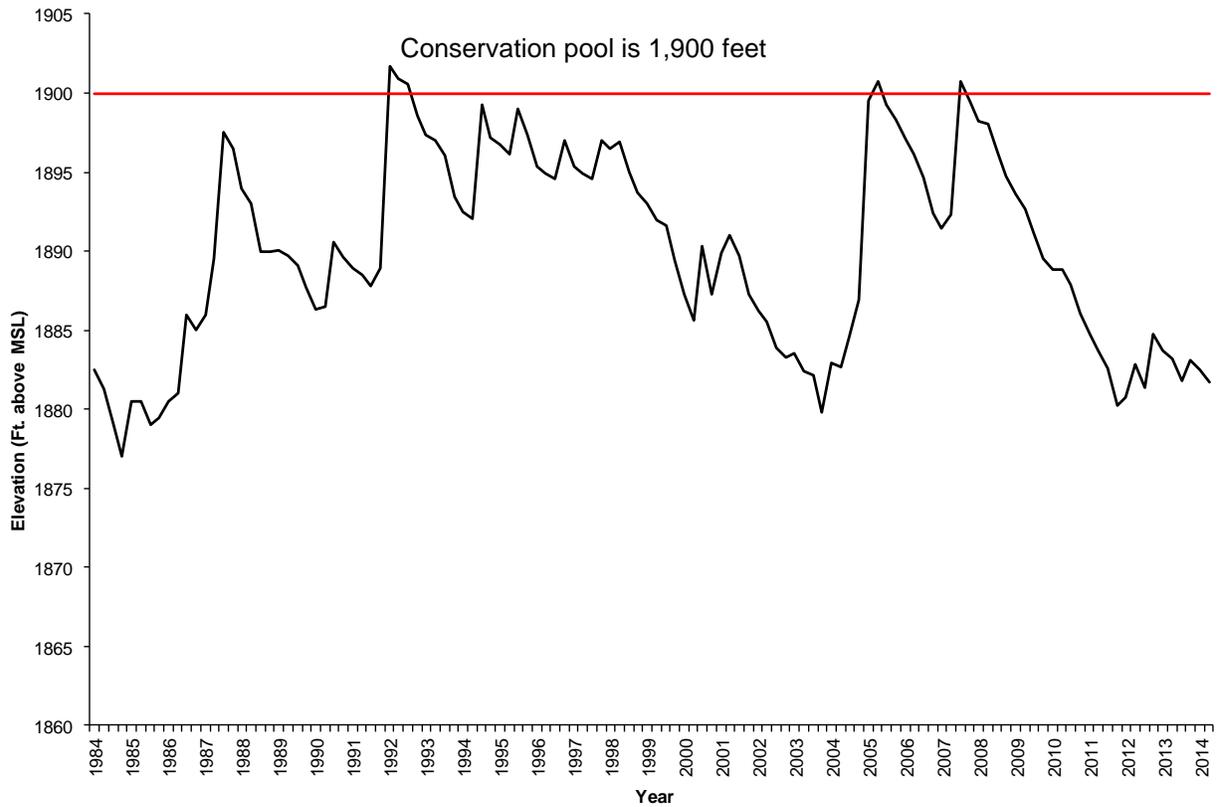


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) for Hords Creek Reservoir, Texas. Conservation pool elevation is 1,900 feet above mean sea level, shown in red. Dead pool is approximately at 1,860 feet above mean sea level.

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: Hords Creek
Shoreline Development Index	3.2
Conductivity (umhos/cm)	721-832
Access: Boat	Limited – 1 usable ramp
Bank	Excellent
Handicapped	Excellent

Table 2. Boat ramp characteristics for Hords Creek Reservoir, Texas, August, 2013. Reservoir elevation at time of survey was 1,883.95 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Dam	31.831048 -99.561213	Y	20	Unknown	Excellent, no access issues
Flatrock Park	31.833365 -99.571029	Y	6	1,882	Almost out of water; Extension possible
Flatrock Cove	31.832989 -99.575846	Y	4	Unknown	Out of water; No extension possible
Lakeside Park	31.838145 -99.577193	Y	6	1,884	Out of water; No extension possible
Friendship Park	31.841624 -99.571717	Y	8	Unknown	Out of water; No extension possible

Table 3. Harvest regulations for Hords Creek Reservoir, Texas.

Species	Bag Limit	Length limit
Catfish: Channel	25	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

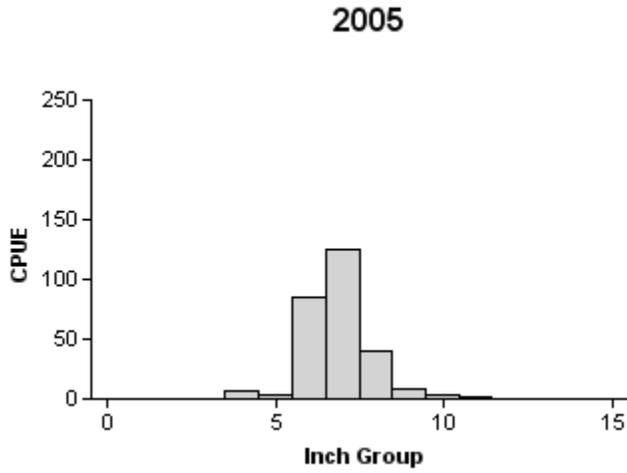
Table 4. Stocking history of Hords Creek Reservoir, Texas. Size categories were: FRY = < 1 inch; FGL = fingerling 1-3 inches; AFGL= advanced fingerling 6-9 inches; ADL = adults.

Species	Year	Number	Size
Threadfin Shad	1984	1,070	ADL
Channel Catfish	1998	15,411	AFGL
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	FRY
	1987	9,993	FGL
	1994	25,500	FGL
	1997	150,506	FGL
	2001	42,352	FGL
	2006	52,712	FGL
Total		299,171	
Lake Chubsucker	1981	19,200	ADL

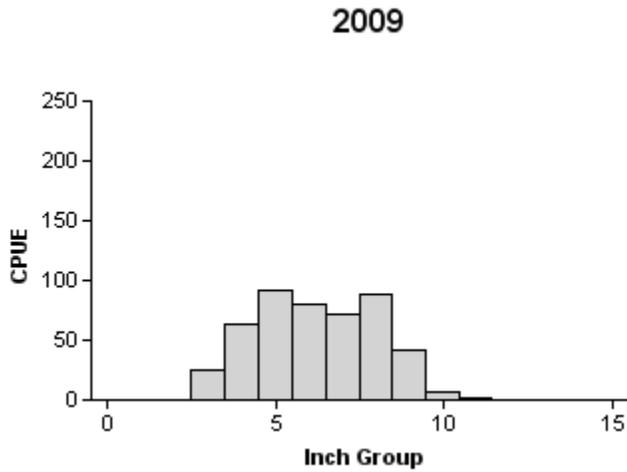
Table 5. Comparison of the percent occurrence and associated 95% confidence levels for vegetation species sampled at randomly selected stations throughout the reservoir (N=100) and along the shoreline (N=50) in Hords Creek Reservoir, Texas, 2013.

	Throughout the Reservoir			Shoreline		
	Percent Occurrence	Upper CL	Lower CL	Percent Occurrence	Upper CL	Lower CL
No Vegetation	87.0	93.6	80.4	44.7	58.9	30.5
Flooded Terrestrial	11.0	17.1	4.9	38.3	52.2	24.4
Stumps	1.0	3.0	0.0	6.4	13.4	0.0
Black Willow	5.0	9.3	0.7	21.3	33.0	9.6
Salt Cedar	3.0	6.3	0.0	17.0	27.8	6.3
Cattail	1.0	3.0	0.0	6.4	13.4	0.0
Common Buttonbush	1.0	3.0	0.0	6.4	13.4	0.0
Smartweed	0.0	0.0	0.0	2.1	6.3	0.0
Baccharis	0.0	0.0	0.0	2.1	6.3	0.0
Flatsedge	0.0	0.0	0.0	2.1	6.3	0.0

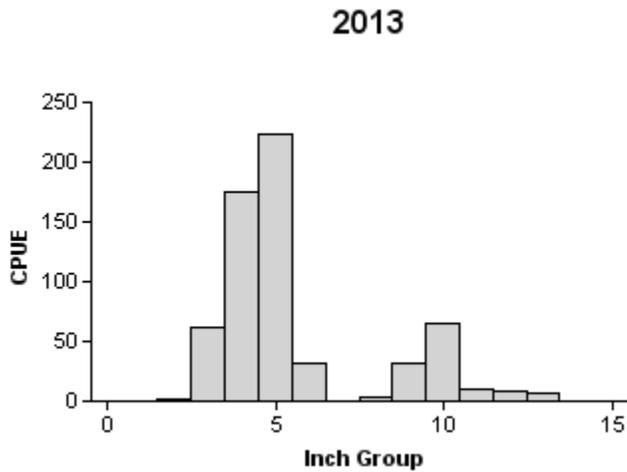
Gizzard Shad



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



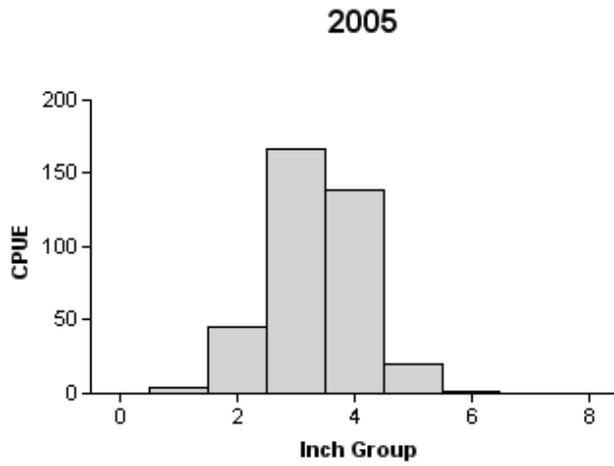
Effort = 1.1
 Total CPUE = 470.8 (19; 510)
 IOV = 70 (8)



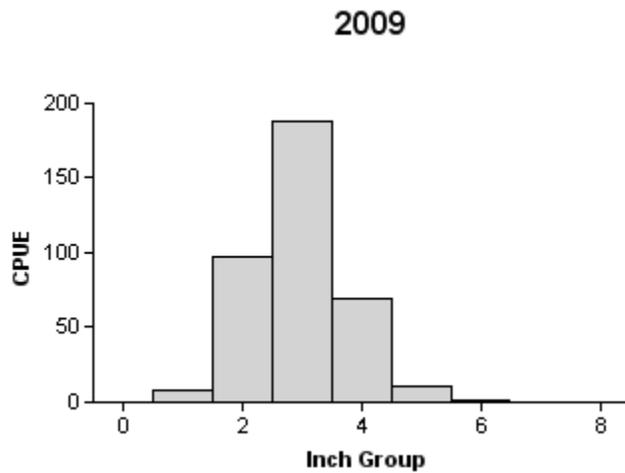
Effort = 1.0
 Total CPUE = 619.0 (20; 619)
 IOV = 80 (7)

Figure 2. Comparison of the 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, 2005, 2009, and 2013.

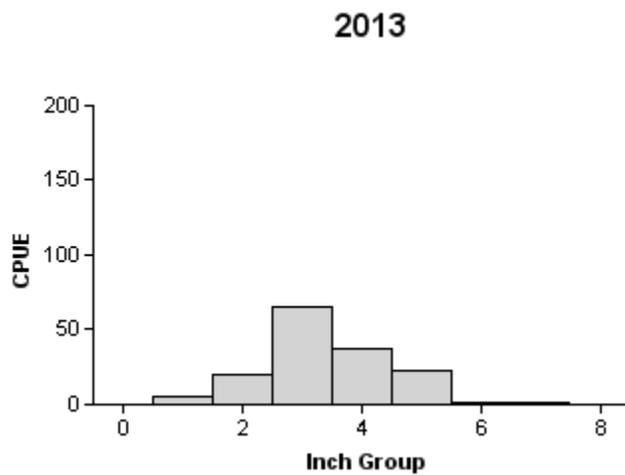
Bluegill



Effort = 1.0
 Total CPUE = 374.0 (18; 374)
 Stock CPUE = 325.0 (18; 325)
 PSD = 0 (0)



Effort = 1.1
 Total CPUE = 373.8 (30; 405)
 Stock CPUE = 268.6 (27; 291)
 PSD = 0 (0)



Effort = 1.0
 Total CPUE = 153.0 (24; 153)
 Stock CPUE = 128.0 (23; 128)
 PSD = 2 (2)

Figure 3. Comparison of the 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, 2005, 2009, and 2013.

Channel Catfish

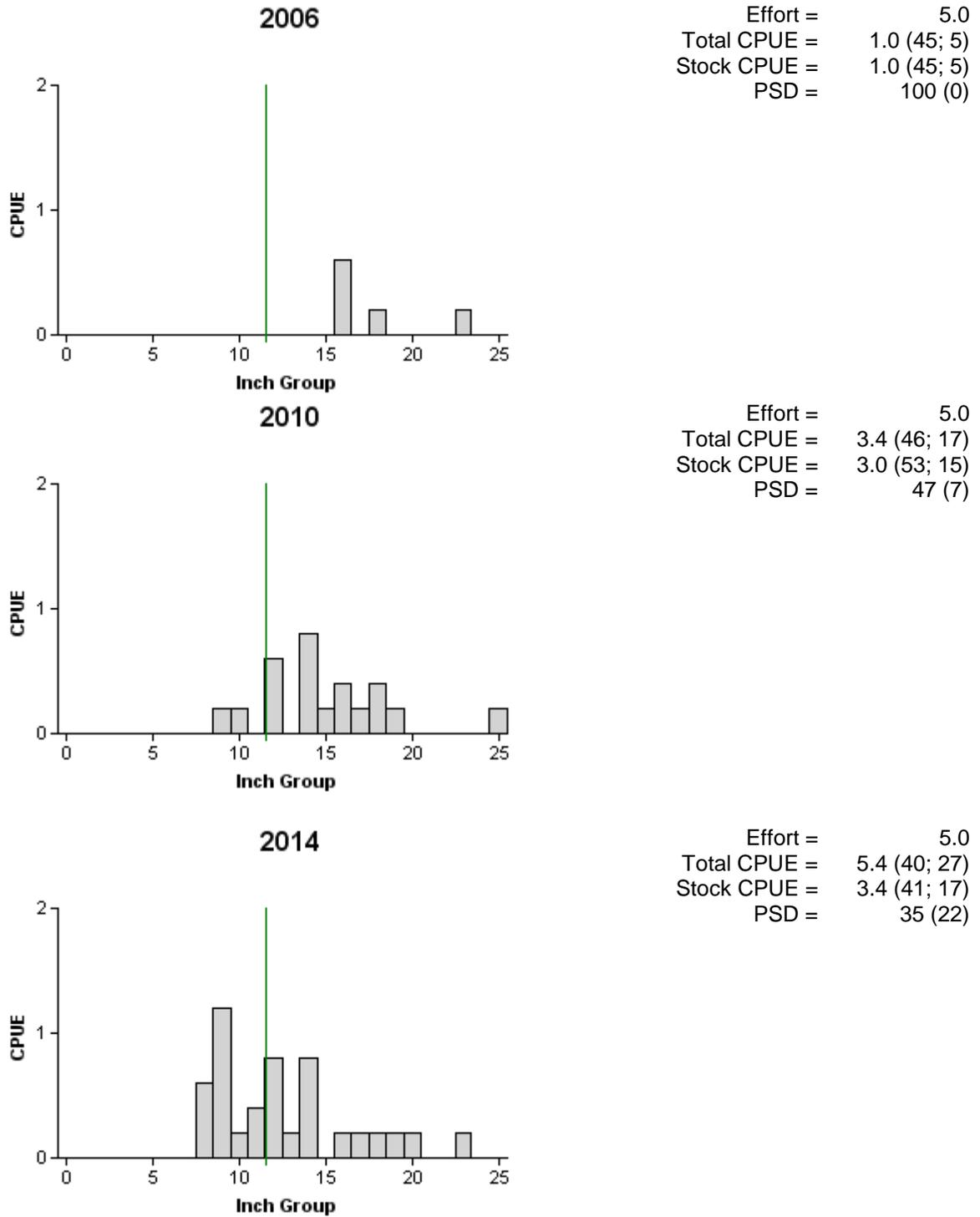


Figure 4. Comparison of the number of Channel Catfish caught per net night (CPUE, bars), and populations indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Hords Creek Reservoir, Texas, 2006, 2010, and 2014. Vertical line denotes 12-inch minimum length limit.

Flathead Catfish

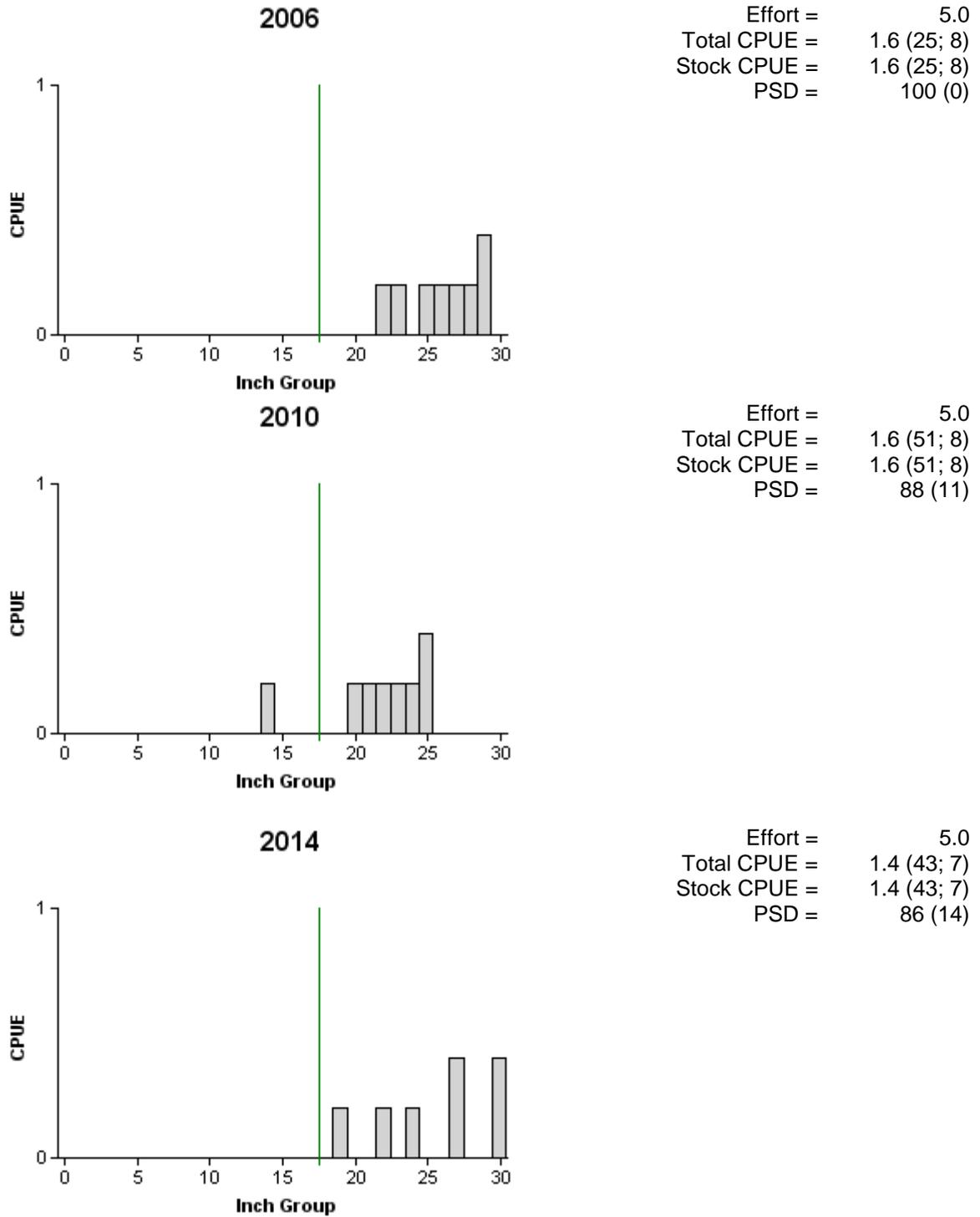


Figure 5. Comparison of the number of Flathead Catfish caught per net night (CPUE, bars), and populations indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Hords Creek Reservoir, Texas 2006, 2010, and 2014. Vertical line denotes 18-inch minimum length limit.

Largemouth Bass

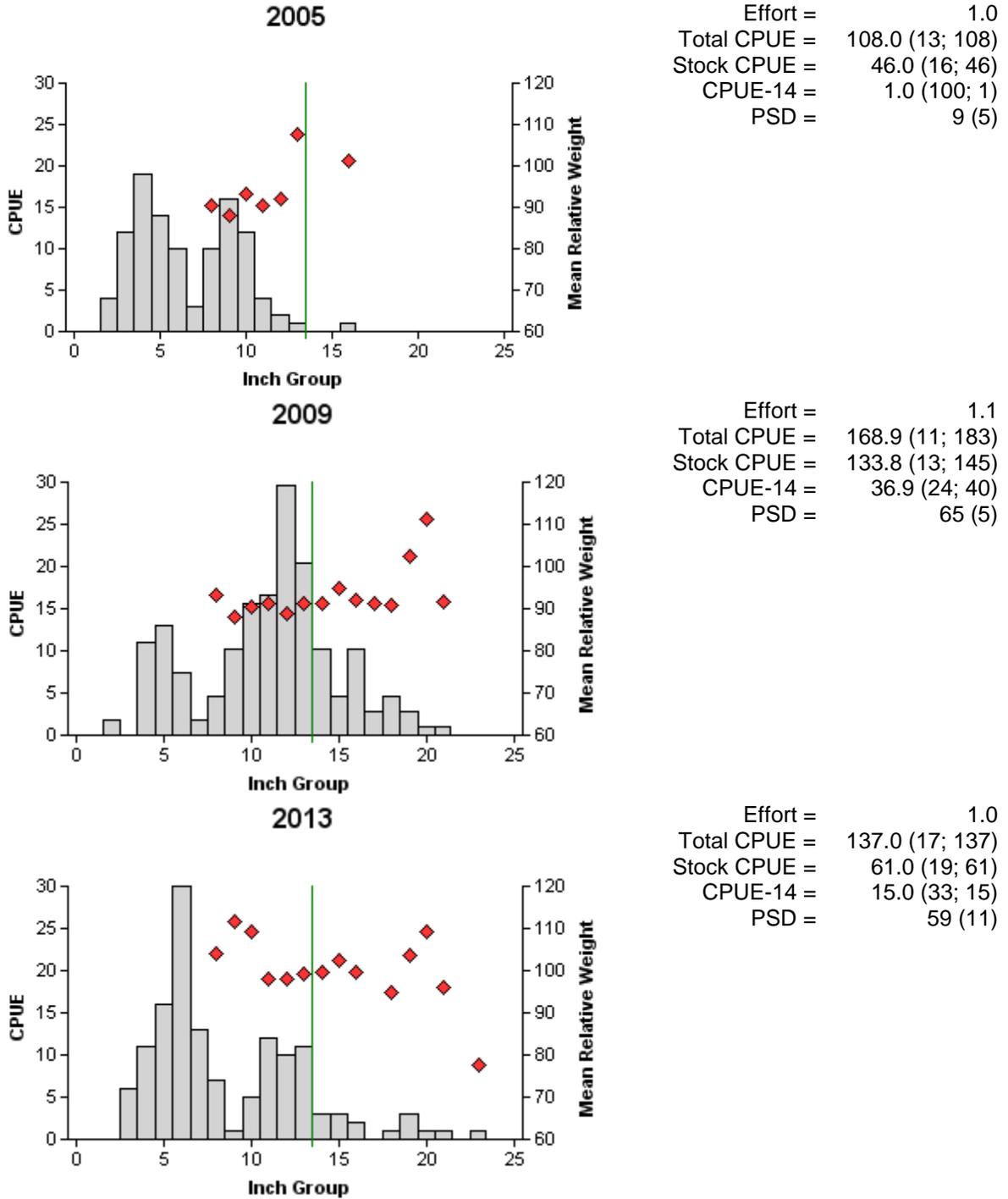


Figure 6. Comparison of the number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Hords Creek Reservoir, Texas, 2005, 2009, and 2013. Vertical line denotes 14-inch minimum length limit.

White Crappie

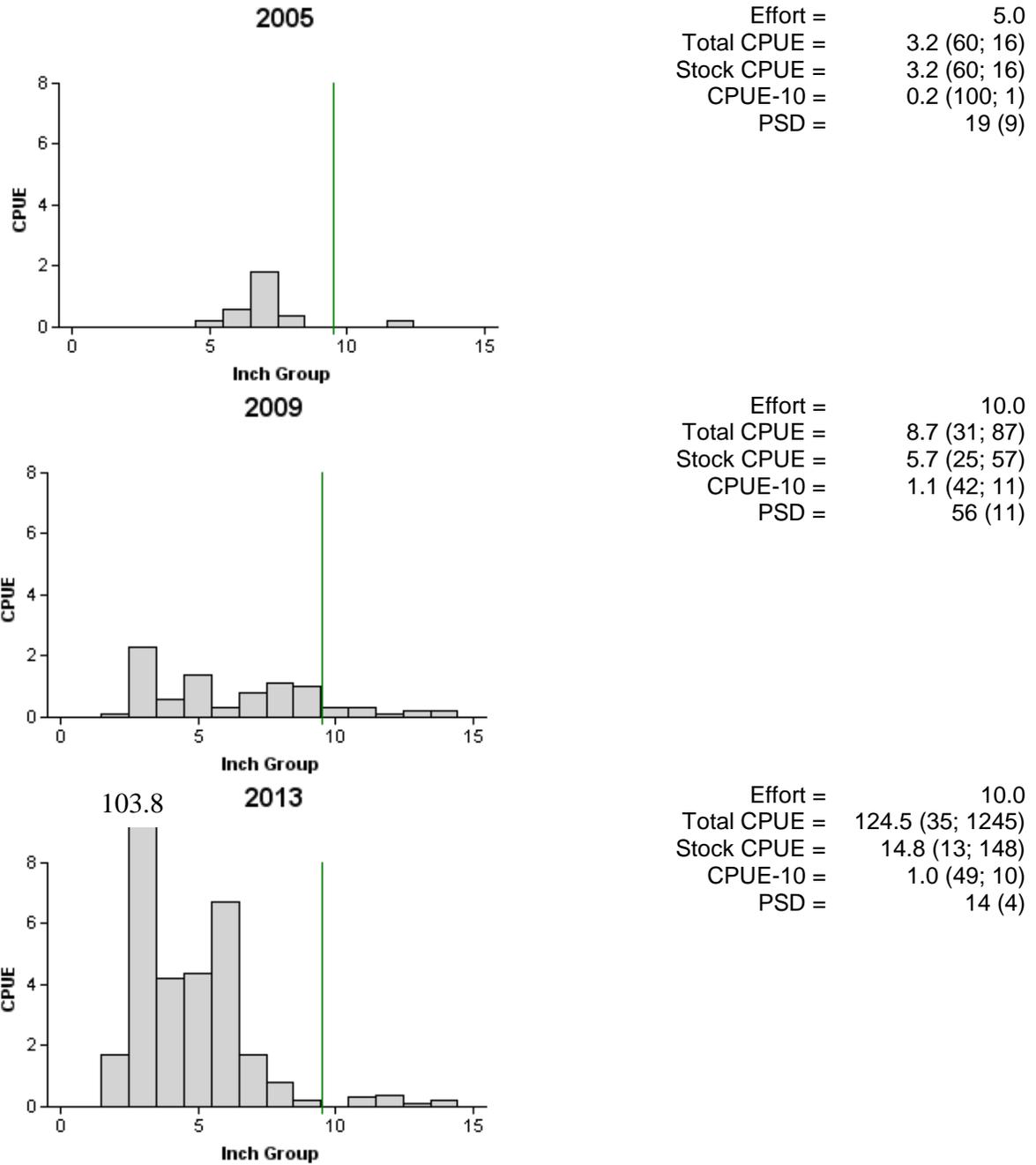


Figure 7. Comparison of the number of White Crappie caught per net night (CPUE, bars and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Hords Creek Reservoir, Texas, 2005, 2009, and 2013. Vertical line denotes 10-inch minimum length limit.

Table 6. Proposed sampling schedule for Hords Creek Reservoir, Texas. Survey period is June through May. 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.

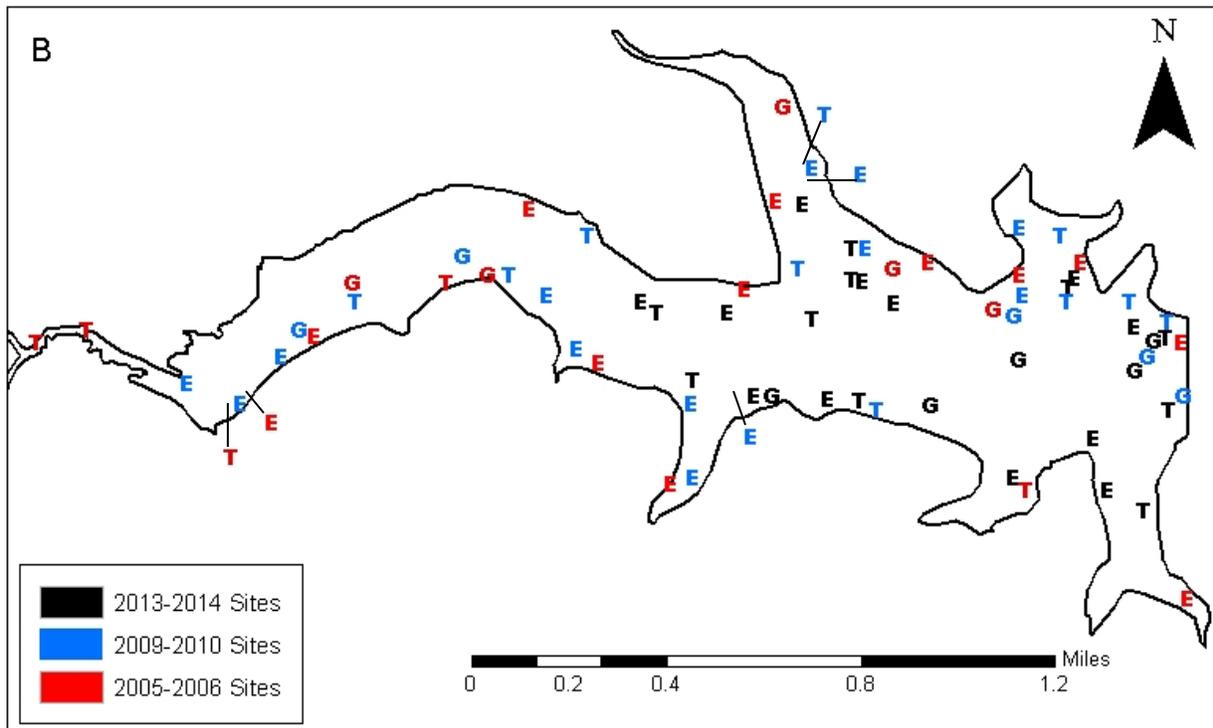
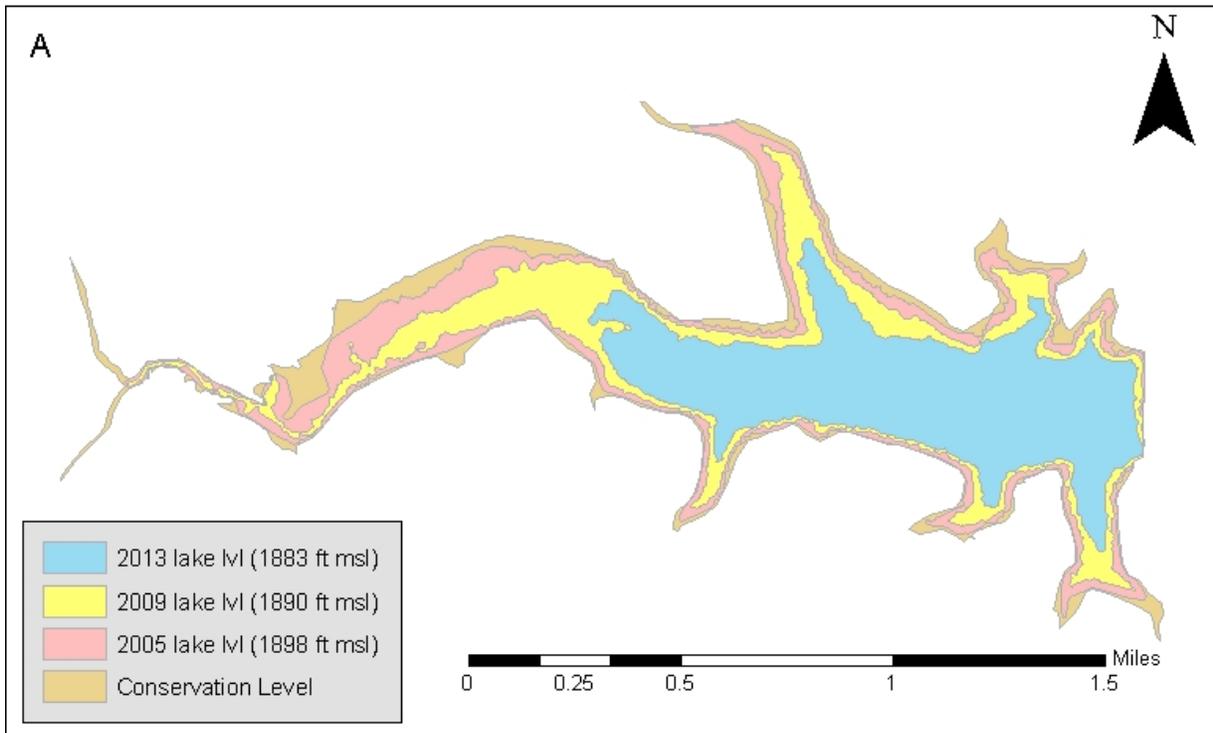
Survey year	Electrofishing	Trap netting	Gill netting	Habitat			Creel survey	Report
				Structural	Vegetation	Access		
2014-2015							A	
2015-2016	A							
2016-2017								
2017-2018	S	S	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Hords Creek Reservoir, Texas, 2013 – 2014. Sampling effort was 5 net nights for gill netting, 10 net nights for trap netting, and 1 hour for electrofishing.

Species	Electrofishing		Gill Netting		Trap netting	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	619	619.0	59	11.80		
Common Carp			7	1.40		
River Carpsucker			1	0.20		
Channel Catfish			27	5.40		
Flathead Catfish			7	1.40		
Green Sunfish	93	93			1	0.10
Warmouth	17	17			1	0.10
Orangespotted Sunfish	3	3			30	3.00
Bluegill	153	153			279	27.90
Longear Sunfish	5	5			18	1.80
Redear Sunfish	6	6				
Largemouth Bass	137	137	4	0.80		
White Crappie			12	2.40	1245	124.50
Black Crappie			1	0.20	9	0.90

APPENDIX B



Maps of Hords Creek Reservoir. A) Different colors represent different water levels during each sampling year. B) Location of sampling sites, Hords Creek Reservoir, Texas 2005-2014. Trap netting (T), gill netting (G), and electrofishing (E) stations for years 2005, 2008, and 2013 are displayed in assigned colored letters. Water level was not at full pool at time of sampling. The reservoir ranged from 2 feet low in 2005 and 17 feet low in 2014 during sampling.