PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2012 Fisheries Management Survey Report

Coleman Reservoir

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TABLE OF CONTENTS

Survey and Management Summary 2

Introduction 3

Reservoir Description 3

Angler Access 3

Management History 3

Methods 4

Results and Discussion 4

Fisheries Management Plan 5

Literature Cited 6

Figures and Tables 7-20
- Water Level (Figure 1) 7
- Reservoir Characteristics (Table 1) 8
- 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 2) 11
- Bluegill (Figure 3) 12
- Channel Catfish (Figure 4) 13
- Palmetto Bass (Figure 5) 14
- Largemouth Bass (Figure 6; Table 6) 15-17
- White Crappie (Figure 7) 18-19
- Proposed Sampling Schedule (Table 7) 20

Appendix A
- Catch Rates for all Species from all Gear Types 21

Appendix B
- Map of 2004-2013 Sampling Locations 22

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Coleman Reservoir were surveyed in 2012 using electrofishing and trap netting and in 2013 using gill netting. Historical data are presented with the 2012-2013 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: Coleman Reservoir is a 1,783-acre impoundment owned and controlled by the City of Coleman, Texas. It was impounded in 1966 on Jim Ned Creek, a tributary of the Colorado River, and is located 11 miles north of Coleman. The reservoir provides municipal and industrial water supply for the City of Coleman and is also used for flood control and recreation. Water levels steadily declined since 2007. At the time of sampling, the reservoir was approximately 15 feet low. Some aquatic vegetation was still present. Boat access is limited to one shoreline area near a private RV park at current water levels.

Management History: Important sport fish include Largemouth Bass, Palmetto Bass, White Crappie, and Channel Catfish. Largemouth Bass have been managed with several different regulations, and are currently managed under statewide regulations and Florida Largemouth Bass fingerlings were stocked in 2012. Palmetto Bass are stocked when available to sustain the population. Native vegetation was planted to enhance habitat, but long term increases in native vegetation have not been realized.

- **Fish Community**
  - **Prey species:** Gizzard and Threadfin Shad provide ample forage for predators. Relative abundance of Bluegill and other sunfishes was low.
  - **Catfishes:** Channel Catfish abundance has been consistent, with a large proportion of the fish available for harvest. Flathead Catfish were present in the reservoir.
  - **Palmetto bass:** Palmetto Bass abundance has declined and no fish below 15 inches were collected in the last two samples.
  - **Largemouth bass:** Total Largemouth Bass abundance has declined, but proportion of legal sized bass has increased.
  - **White crappie:** White Crappie abundance decreased dramatically over the reporting period.
- **Management Strategies:** Continue stocking Palmetto Bass at 15 fish/acre. Discuss boat ramp improvements with the City of Coleman. Inform the public about the negative impacts of aquatic invasive species. Conduct general monitoring surveys with trap nets, gill nets, and electrofishing surveys and access and vegetation surveys in 2016-2017.

INTRODUCTION

This document is a summary of fisheries data collected from Coleman Reservoir in 2012-2013. 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 2012-2013 data for comparison.

Reservoir Description

Coleman Reservoir is a 1,783-acre impoundment owned and controlled by the City of Coleman, Texas. It was impounded in 1966 on Jim Ned creek, a tributary of the Colorado River. It is located 11 miles north of Coleman. The reservoir provides municipal and industrial water supply for the City of Coleman and is also used for flood control and recreation. Coleman Reservoir is classified as eutrophic with a mean TSI chlorophyll-*a* of 45.56 (Texas Commission on Environmental Quality 2011) up from mesotrophic in 2008 when the mean TSI chlorophyll-*a* was 43.44 (Texas Commission on Environmental Quality 2008). Land use around the reservoir includes residential and agriculture. Aquatic vegetation species present during the survey period were water stargrass, chara, and brittle naiad. Water level steadily declined from full pool in 2007 to 15-17 feet low during the 2012-2013 sampling year (Figure 1). Other descriptive characteristics for Coleman Reservoir are in Table 1.

Angler Access

Coleman Reservoir has two public boat ramps and one private boat ramp (Table 2). The two public ramps are located on either side of the causeway at the city park and the private ramp is at the Quail Creek RV Park. None of the ramps are usable at the current water levels because they end above the waterline. Anglers have been able to launch boats from the shoreline near the Quail Creek RV park ramp. Shoreline access is fair at the city park and the Quail Creek RV Park.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Neely and Dumont 2009) included:

1. Size structure of gizzard shad was skewed toward larger fish and may be attributed to inconsistent stockings of palmetto bass. Palmetto Bass can be used to re-structure the size structure of gizzard shad.
   Action: Because of the lack of available fish, Palmetto bass were only stocked in 2009, but not since.
2. Body condition and size structure of largemouth bass continued to decline. More monitoring is needed to document trends in bod condition.
   Action: An additional electrofishing survey was conducted in 2010.

Harvest regulation history: From 1985 to 1992, Largemouth Bass were managed with a 14-inch minimum length limit (MLL). A 16-inch MLL was implemented in 1992 to improve the population size structure. In 1999, the regulation was changed back to the statewide 14-inch MLL as the 16-inch MLL failed to produce satisfactory results. All other species have been managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: Florida Largemouth Bass were stocked in 2012. Palmetto Bass have been stocked since 1976, but stockings have been sporadic since 1998. Then complete stocking history is in Table 4.

Vegetation/habitat management history: Twenty-two aquatic plant species were introduced in Coleman Reservoir in 1998 as part of a statewide habitat initiative. Qualitative vegetation assessments were conducted annually by staff from the United States Army Corps of Engineers Lewisville Aquatic Ecosystem Research Facility from 1998-2007. The re-vegetation effort was unsuccessful; no introduced

aquatic plants were found in surveys after the reservoir filled in 2002.

Water transfer: No interbasin transfers are known to exist.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap 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 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 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). Palmetto bass PSD was calculated according to Dumont and Neely (2011). 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.

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2012 and by electrophoresis for previous years.

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

RESULTS AND DISCUSSION

Habitat: A littoral zone structural habitat survey was last conducted in 2008 and rock, gravel, and clay substrates were the predominate types (Neely and Dumont 2009). In 2012, water stargrass was the predominant aquatic vegetation present (Table 5).

Prey species: Gizzard Shad CPUE was 99.2/h in 2008, 262.0/h in 2010, and 194.0/h in 2012 showing an increase in abundance in the last two samples over the first one (Figure 2). Index of vulnerability (IOV) for Gizzard Shad was poor in 2008 (56), but very good in 2010 (87) and 2012 (78), indicating an increase in availability of gizzard shad to existing predators (Figure 2). Total CPUE of Bluegill was considerably lower in 2012 compared to the 2008 survey, however all Bluegill collected were 6-inches long or smaller (Figure 3). In addition to Gizzard Shad and Bluegill, Threadfin Shad and Green, Longear, and Redear sunfishes also provide a source of forage to predator fishes in Coleman Reservoir (Appendix A).

Channel Catfish: The gill net CPUE of Channel Catfish has been consistent, but low (2.0/nn) for the last three surveys and the population is dominated by larger fish, as PSDs were 89 or higher all three years (Figure 4).

Palmetto Bass: The gill net CPUE of Palmetto Bass was 3.4/nn in 2013, which is considerably lower than in 2009 (14.4/nn) and 2005 (10.4/nn; Figure 5). All Palmetto Bass collected in 2013 were 15-inches or larger. The lack of smaller fish is probably the result of no stockings since 2009.

Largemouth Bass: While the electrofishing catch rates of Largemouth Bass decreased over the last three surveys (220.0/h in 2008, 87.0/h in 2010, and 82.0/h in 2012), size structure improved as evidenced by increases in PSD and PSD-P (Figure 6). Mean relative weights also improved (Figure 6). Florida Largemouth Bass influence has been variable, but generally near 50% and Florida genotype has also been variable, ranging from 0.0-38.1 % (Table 7).

White Crappie: The trap net catch rate of White Crappie decreased tremendously in 2012 (2.0/nn) compared to 2008 (20.4/nn; Figure 7). This decrease is likely a result of the decreasing water levels.

Fisheries management plan for Coleman Reservoir, Texas

Prepared – July 2013.

ISSUE 1: Boating access at the two public access ramps at the city park was eliminated by low water levels. However, low water levels can make it easier to extend boat ramps.

MANAGEMENT STRATEGIES

1. Provide information about the Boating Access Grant and partnership program to the City of Coleman and discuss extending at least one of the ramps at the city park at Coleman Reservoir.

ISSUE 2: 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 are 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 the controlling authority 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, etc… 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 constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing in 2014 and mandatory monitoring in 2016/2017 (Table 7). Additional electrofishing survey in 2014 is necessary to maintain consistent data for trend information on this heavily used Largemouth Bass fishery. Gill net and trap net surveys are only necessary every four years at this point to ensure presence or absence of Channel Catfish, Flathead Catfish, and White Crappie.

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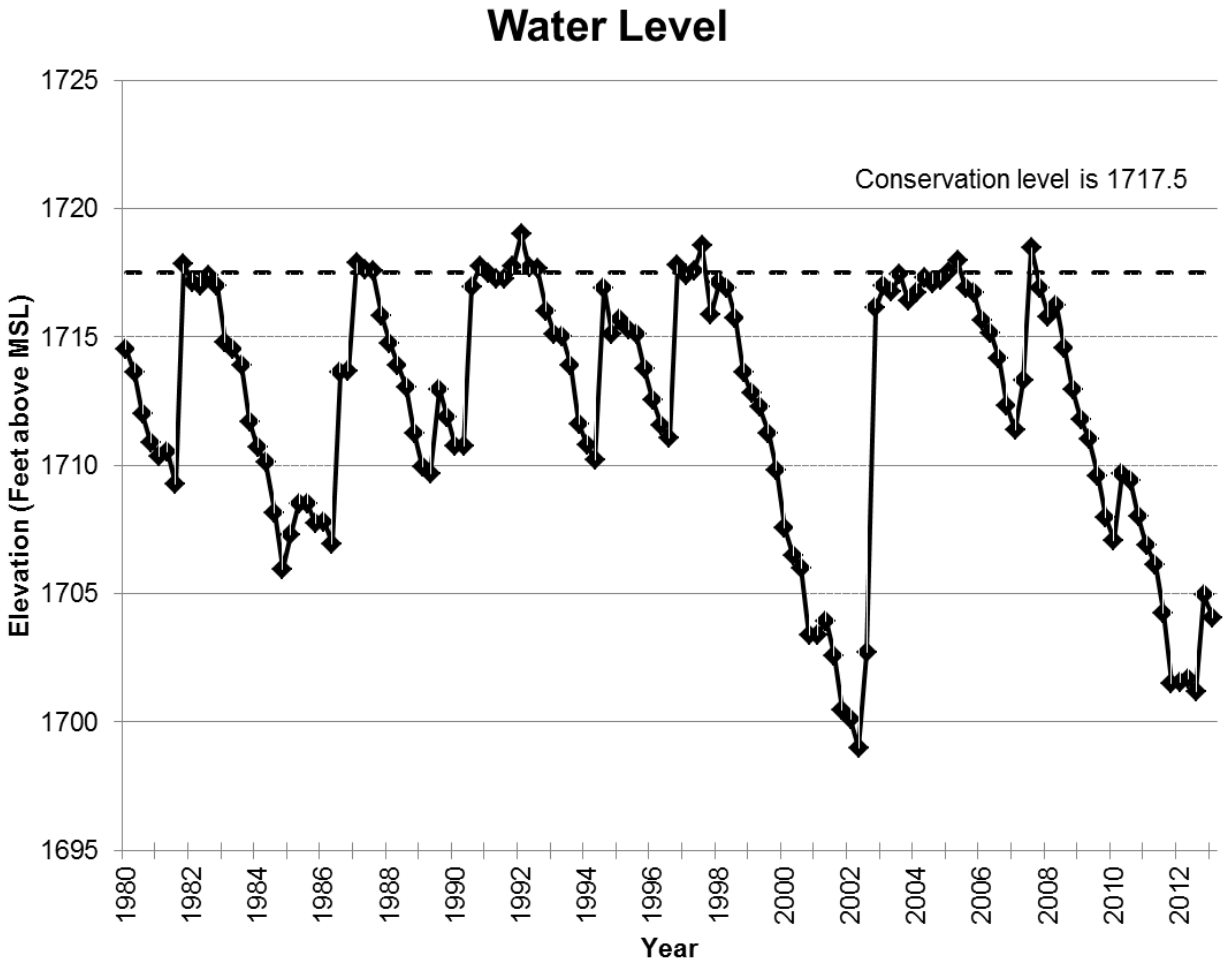


Figure 1. Mean quarterly water level elevations in feet above mean sea level (MSL) recorded for Coleman Reservoir, Texas. Conservation level is 1717.5 feet MSL.

Table 1. Characteristics of Coleman Reservoir, Texas.

Characteristic	Description
Year constructed	1966
Controlling authority	City of Coleman, Texas
County	Coleman
Reservoir type	Tributary
Shoreline Development Index (SDI)	4.05
Conductivity	550 µS/cm

Table 2. Boat ramp characteristics for Coleman Reservoir, Texas, August, 2012. Reservoir elevation at time of survey was 1700 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Press Morris Park, South	32.03813 −99.46277	Y	8	1721	Out of water. Extension is not feasible
Press Morris Park, North	32.03775 −99.46311	Y	15	1722	Out of water. Extension is feasible
Quail Creek RV Park	32.03636 −99.47128	N	5	unknown	Out of water, no access issues

Table 3. Harvest regulations for Coleman Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Palmetto	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 in Coleman Reservoir, Texas from 1966 – 2012. Size categories are: FRY < 1 inch; FGL = 1-3 inches; ADL = adults; blank indicates size at stocking is unknown.

Species	Year	Number Stocked	Size
Bass, Florida Largemouth	2012	104,477	Fingerling
Bass, Florida Largemouth	2001	201,471	Fingerling
Bass, Florida Largemouth	1991	100,465	Fingerling
Bass, Kemp's Largemouth	1985	102,528	Fingerling
Bass, Largemouth	1970	100,000	
Bass, Largemouth	1967	8,000	
Bass, Largemouth	1966	246,000	
Bass, Palmetto	2009	10,220	Fingerling
Bass, Palmetto	2007	10,119	Fingerling
Bass, Palmetto	2007	523,122	Fry
Bass, Palmetto	2004	9,998	Fingerling
Bass, Palmetto	1998	10,087	Fingerling
Bass, Palmetto	1997	10,235	Fingerling
Bass, Palmetto	1996	10,096	Fingerling
Bass, Palmetto	1995	14,950	Fingerling
Bass, Palmetto	1994	24,786	Fingerling
Bass, Palmetto	1992	24,400	Fingerling
Bass, Palmetto	1991	32,030	Fingerling
Bass, Palmetto	1989	250,000	Fry
Bass, Palmetto	1988	300,000	Fry
Bass, Palmetto	1987	40,050	Fingerling
Bass, Palmetto	1986	35,180	Fingerling
Bass, Palmetto	1983	9,999	
Bass, Palmetto	1981	10,575	
Bass, Palmetto	1979	13,950	
Bass, Palmetto	1977	16,656	
Bass, Palmetto	1976	21,280	
Catfish, Channel	2003	33,584	Fingerling
Catfish, Channel	2002	1,081	Fingerling
Catfish, Channel	1967	350	
Catfish, Channel	1966	84,000	
Crappie, Black	1966	2,000	
Shad, Threadfin	1985	1,200	
Shad, Threadfin	1984	1,950	
Sunfish, Green x Redear	1979	400	
Sunfish, Green x Redear	1966	10,000	

Table 5. Percent occurrence with lower and upper 95% confidence limits (CL) of aquatic vegetation habitat at 92 random sites in Coleman Reservoir, Texas, August, 2012. Water level at time of survey was 17 feet below conservation elevation. Acreage was not calculated since actual acreage of the reservoir at the current water level was unknown.

Vegetation	Percent occurrence	Lower CL	Upper CL
Open water	83	73	89
Brittle Naiad	1	0	6
Chara	8	2	13
Stargrass	16	9	24

Gizzard Shad

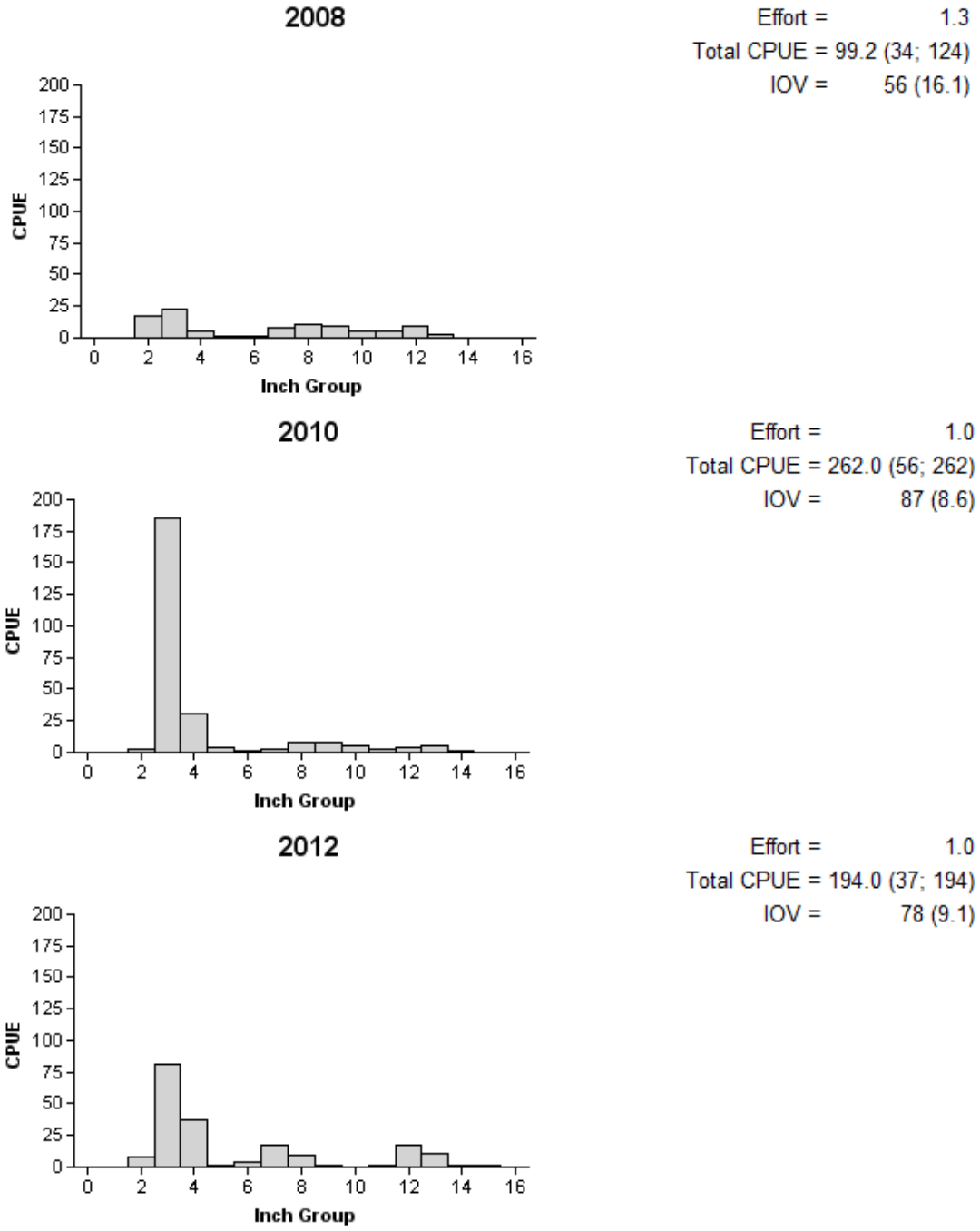


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Coleman Reservoir, Texas, 2008, 2010, and 2012.

Bluegill

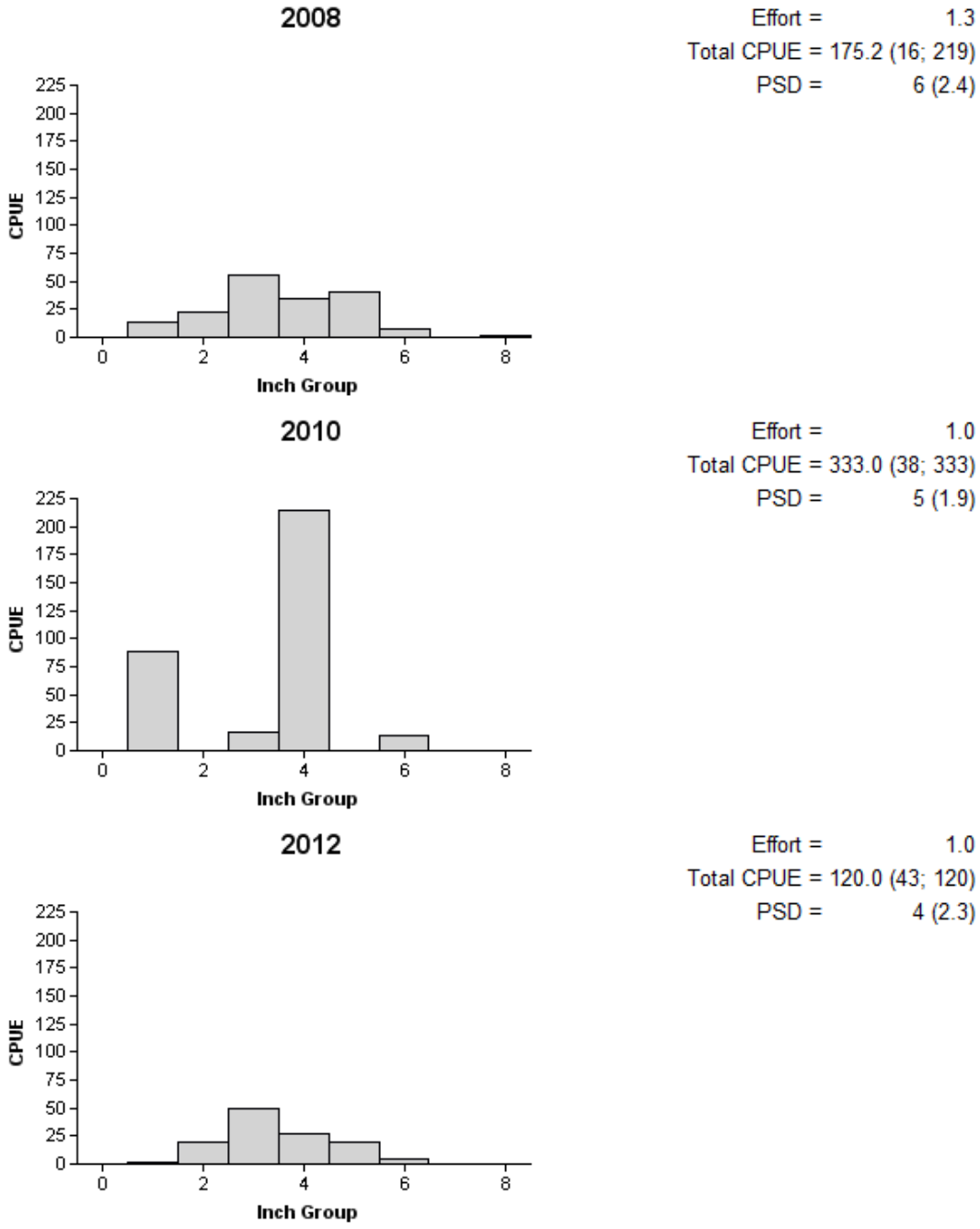


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleman Reservoir, Texas, 2008, 2010, and 2012

Channel Catfish

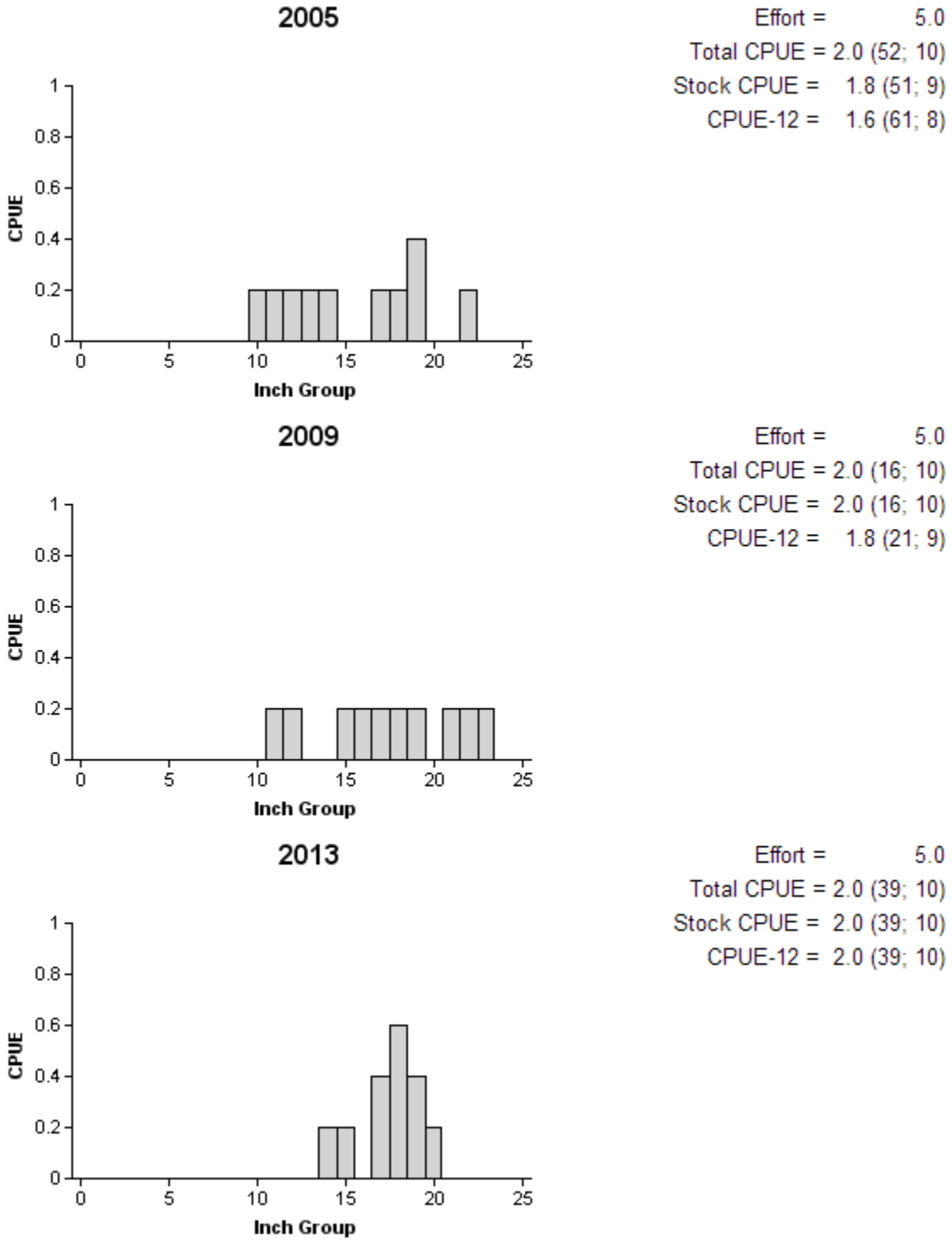


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Coleman Reservoir, Texas, 2005, 2009, and 2013

Palmetto Bass

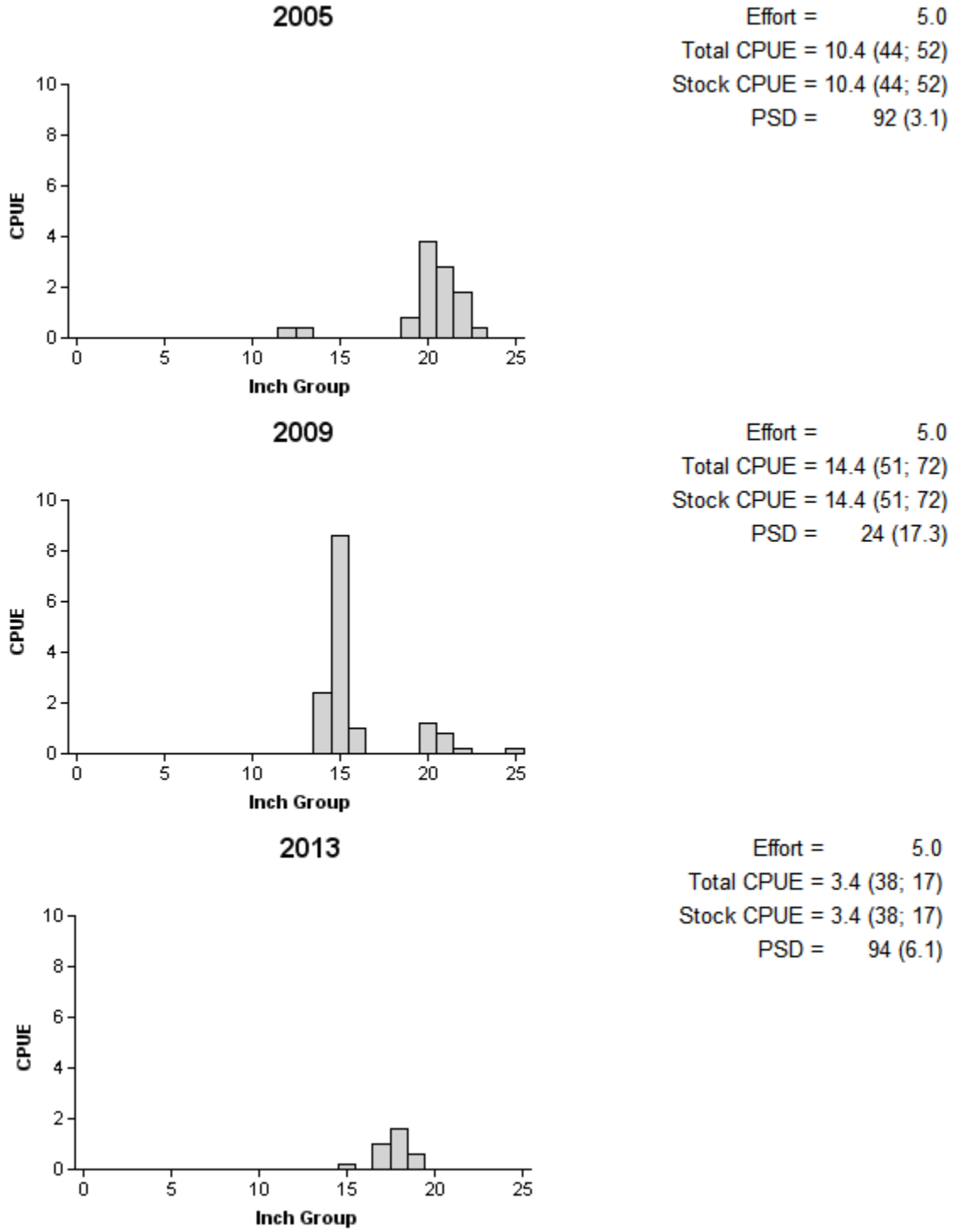


Figure 5. Number of Palmetto Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Coleman Reservoir, Texas, 2005, 2009, and 2013

Largemouth Bass

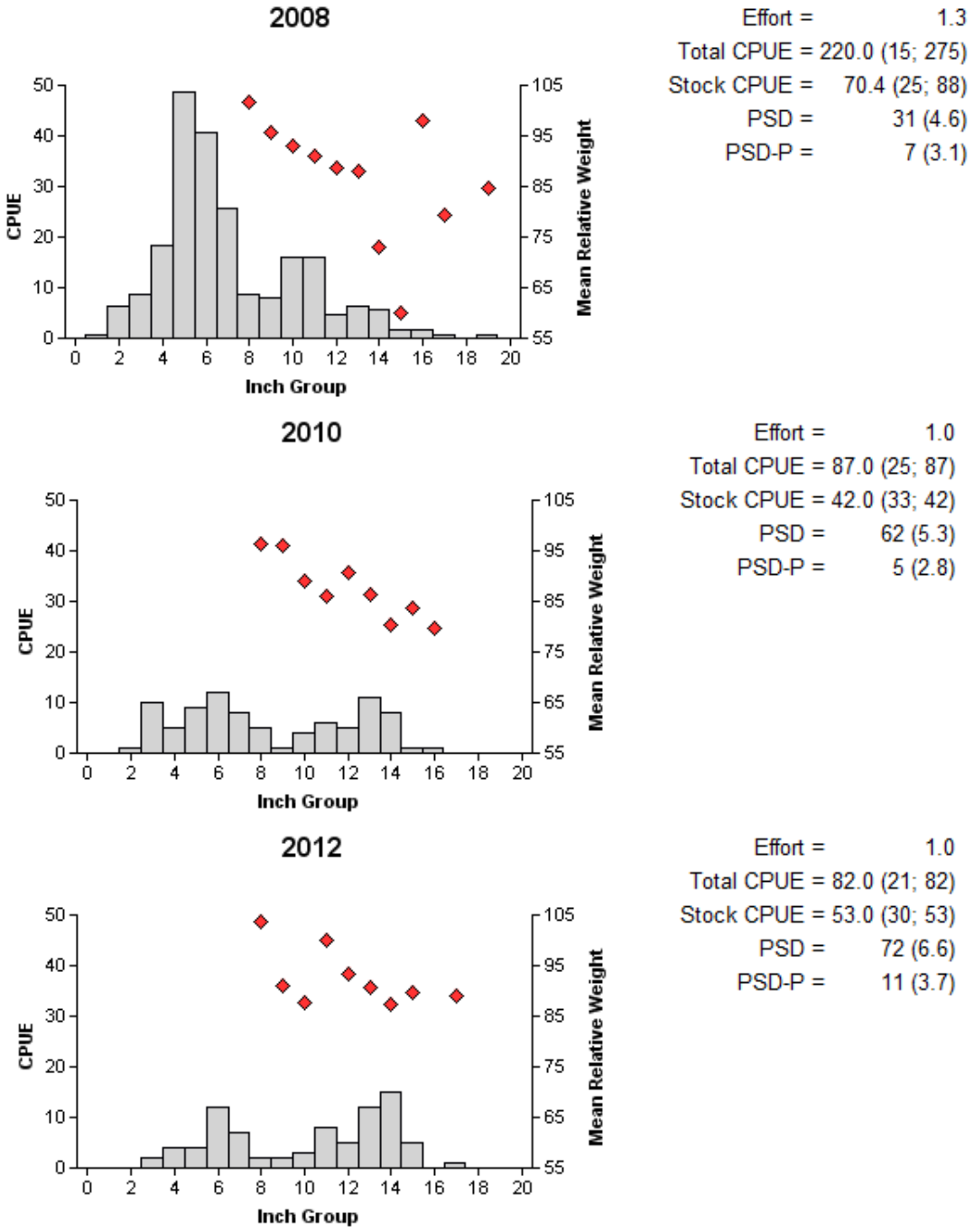


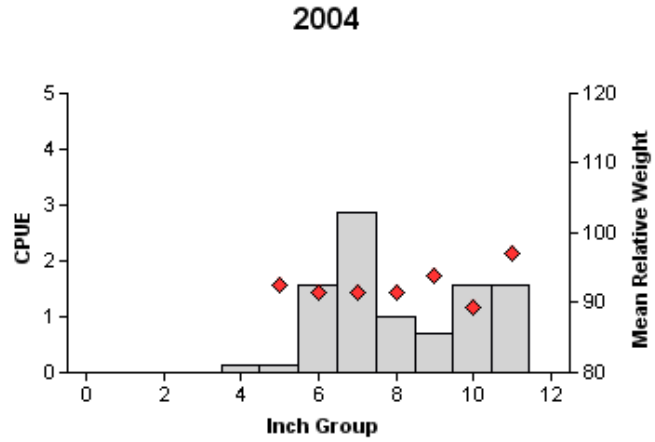
Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleman Reservoir, Texas, 2008, 2010, and 2012.

Largemouth Bass

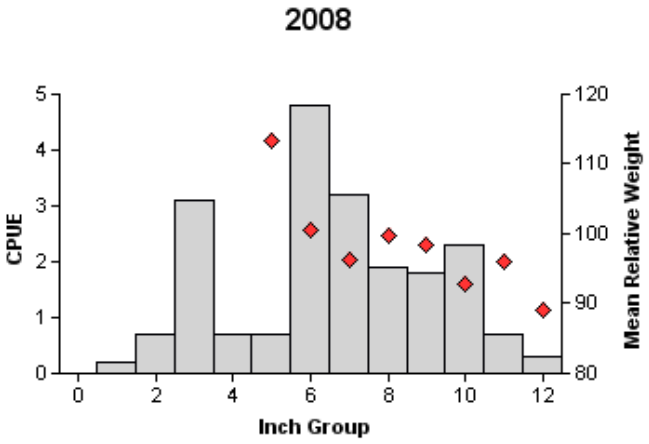
Table 6. History of genetic analysis of Largemouth Bass collected by fall electrofishing, Coleman Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
1987	41	0	4	37	3.0	0.0
1991	30	0	17	13	17.5	0.0
1994	21	8	12	1	71.5	38.1
1997	30	1	21	8	31.7	3.3
2000	30	2	26	2	48.3	6.7
2002	41	4	31	6	48.7	8.8
2004	34	5	23	6	46.2	15.2
2006	30	0	30	0	48.0	0.0
2012	30	1	29	0	59.0	3.0

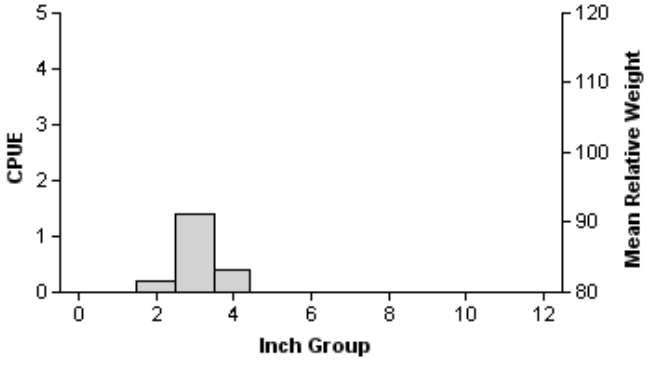
White Crappie



Effort = 7.0
Total CPUE = 9.6 (64; 67)
Stock CPUE = 9.4 (63; 66)
CPUE-10 = 3.1 (42; 22)
PSD-P = 33 (9.7)
PSD-10 = 33 (9.7)



Effort = 10.0
Total CPUE = 20.4 (27; 204)
Stock CPUE = 15.7 (29; 157)
CPUE-10 = 3.3 (38; 33)
PSD-P = 21 (5.8)
PSD-10 = 21 (5.8)



Effort = 5.0
Total CPUE = 2.0 (100; 10)
Stock CPUE = 0.0 (0; 0)
CPUE-10 = 0.0 (0; 0)
PSD-P = 0 (5.8)
PSD-10 = 0 (5.8)

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 net surveys, Coleman Reservoir, Texas, 2004, 2008 and 2012.

Table 7. Proposed sampling schedule for Coleman 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.

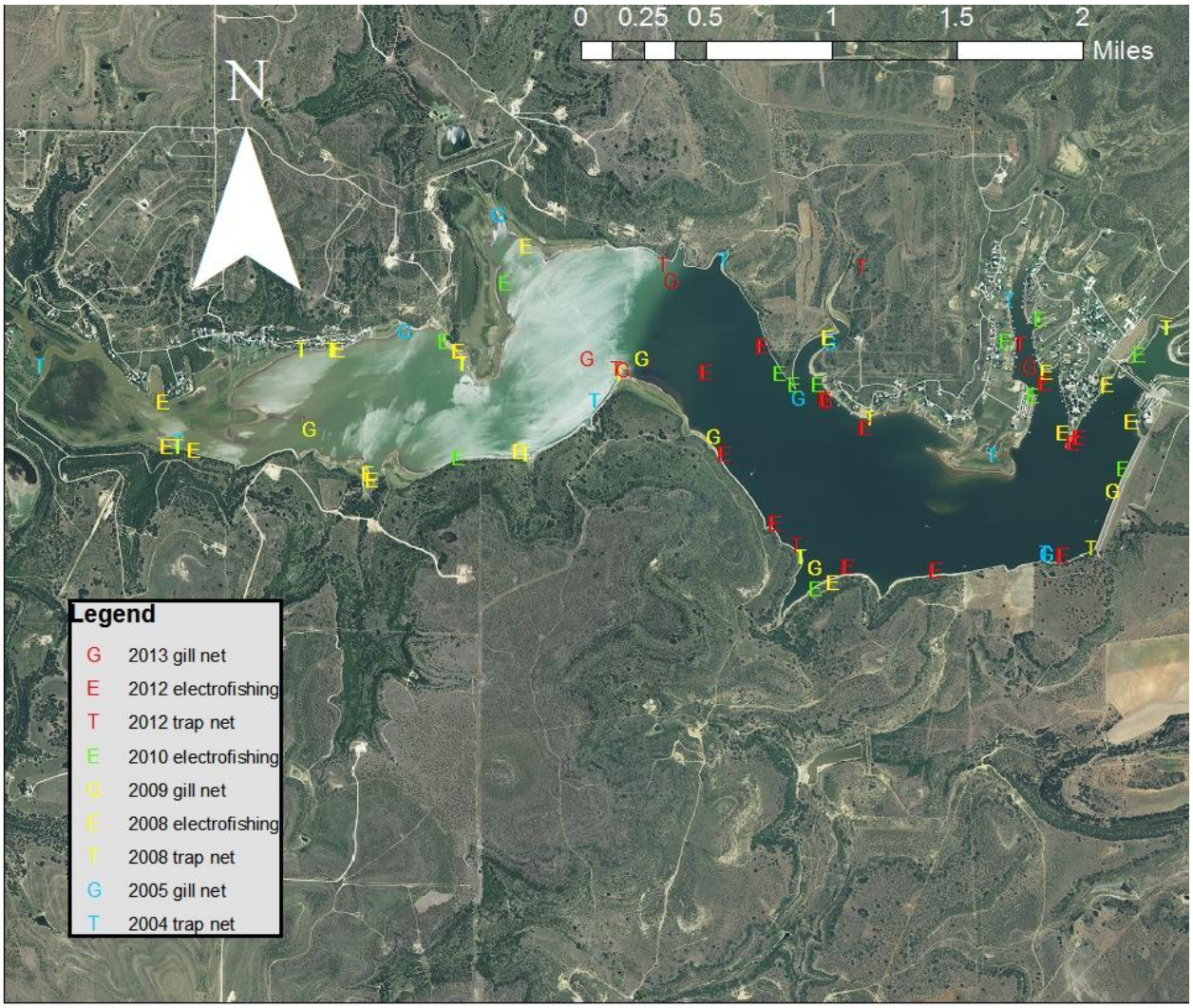
Survey year	Electrofish Fall	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2013-2014								
2014-2015	A							
2015-2016								
2016-2017	S	A	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Coleman Reservoir, Texas, 2012-2013. Sampling effort was 1 hour for electrofishing, 5 net nights for trap netting, and 5 net nights for gill netting.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					194	194.0
Threadfin shad					70	70.0
Channel catfish	10	2.0				
Flathead catfish	7	1.4				
Palmetto bass	17	3.4				
Green Sunfish					8	8.0
Bluegill					120	120.0
Longear Sunfish					14	14.0
Redear Sunfish					4	4.0
Largemouth Bass					82	82.0
Largemouth bass			10	2.0		
Black Crappie			1	0.2		

APPENDIX B



Location of sampling sites, Coleman Reservoir, Texas, 2004-2013. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was approximately 15 feet low during sampling in 2012-2013.