

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Lake Bob Sandlin

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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	4
Fisheries Management Plan	6
Literature Cited.....	8
Figures and Tables.....	9-32
Water Level (Figure 1).....	9
Reservoir Characteristics (Table 1)	9
Boat Ramp Characteristics (Table 2).....	10
Harvest Regulations (Table 3).....	10
Stocking History (Table 4).....	11
Structural Habitat Survey (Table 5).....	12
Aquatic Vegetation Survey (Table 6)	12
Percent Directed Angler Effort per Species (Table 7).....	13
Total Fishing Effort and Fishing Expenditures (Table 8).....	13
Gizzard Shad (Figure 2).....	14
Sunfishes (Figures 3-5; Table 9)	15
Catfishes (Figures 6-8; Table 10)	18
White Bass (Figures 9-10; Table 11)	21
Black Bass (Figures 11-13; Tables 12-13).....	23
Crappie (Figures 14-16; Table 14)	28
Proposed Sampling Schedule (Table 15)	32
Appendix A	
Catch Rates for all Species from all Gear Types.....	33
Appendix B	
Map of 2012-2013 Sampling Locations.....	34
Appendix C	
Reporting of Creel ZIP Code Data.....	35

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Bob Sandlin, Texas, were surveyed in 2013 using electrofishing and trap netting and in 2014 using gill netting. Anglers were surveyed from June 2013 through May 2014 with a creel survey. 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:** Lake Bob Sandlin is a 9,116-acre impoundment located on Big Cypress Creek in the Cypress River Basin. The lake is located in Titus, Camp, and Franklin Counties. Habitat features consisted of standing timber, bulkhead, piers and docks, rock and gravel, and native aquatic plants. Coverage of hydrilla, alligatorweed, and Eurasian watermilfoil has been low in recent years.
- **Management History:** Important sport fishes include Blue Catfish, Channel Catfish, White Bass, Largemouth Bass, and crappie. All sport fish at Lake Bob Sandlin have historically been managed with statewide harvest regulations. Florida Largemouth Bass and Blue Catfish have been stocked to improve angling opportunities.
- **Fish Community**
 - **Prey species:** Threadfin Shad continued to be present in the reservoir. Electrofishing catch of Gizzard Shad has increased, and many Gizzard Shad were available as prey to most sport fish. Bluegill were abundant. Redear Sunfish and Longear Sunfish also added to the prey fish community.
 - **Catfishes:** The Blue Catfish population has continued to improve through additional stocking; however, stocked Blue Catfish have yet to reach sexual maturity. The Channel Catfish population was excellent with fish collected in gill netting surveys as long as 28 inches. Flathead Catfish were also present in the reservoir.
 - **White Bass:** White Bass were present in the reservoir; however, few anglers targeted them. Because spawning habitat is limited for White Bass, population relative abundance is generally low.
 - **Largemouth Bass:** Largemouth Bass catch rate in the most recent electrofishing survey was lower than it was in previous years. This is likely due to low water levels in the reservoir for the past 4 years. Largemouth Bass had fast growth (age at 14 inches long was 2.0 years). Approximately 35% of angling effort was directed at Largemouth Bass from June 2013 through May 2014. Spotted Bass were also present and provided additional opportunities to anglers.
 - **White Crappie:** Directed angling effort was higher for crappie during the 2013/2014 creel survey. Trap netting catch rates for White Crappie and Black Crappie were low.
- **Management Strategies:** Continue stocking Largemouth Bass at 50 fish/acre every two years. Conduct additional electrofishing in fall 2015 to monitor the Largemouth Bass and prey fish populations. Conduct low-pulse electrofishing during summer 2015 to evaluate natural reproduction of Blue Catfish. Conduct additional gill netting in spring 2016 to monitor the Blue Catfish population. Inform the public about the negative impacts of aquatic invasive species. Conduct general monitoring surveys with trap nets, gill nets, and electrofishing in 2017-2018.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Bob Sandlin from June 2013 through May 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

Lake Bob Sandlin is a 9,116-acre impoundment constructed in 1977 on Big Cypress Creek in the Cypress River Basin. It is located in Camp, Titus, and Franklin Counties centrally located approximately 10 miles between the cities of Pittsburg and Mt. Pleasant. The controlling authority is Titus County Fresh Water District No. 1. Primary water uses are municipal and industrial water supply and public recreation. The reservoir has a drainage area of approximately 128 square miles and a shoreline length of 85 miles. Average annual water fluctuation is generally 1-3 feet; however, water levels in 2005 and 2006 dropped 5.8 and 10.6 feet below conservation pool (337.5 msl), respectively. Since 2010, reservoir water level has been as low as 9 feet below conservation pool. Habitat features consisted of standing timber, bulkhead, piers and docks, rock and gravel, and native submersed aquatic plants. Other descriptive characteristics for Lake Bob Sandlin are recorded in Table 1.

Angler Access

Lake Bob Sandlin has seven public boat ramps. Water levels have been low enough in recent years for some ramps to become periodically unusable. The ramps at Lake Bob Sandlin State Park and the north side of the Highway 21 bridge would benefit from dredging. Repairs to the concrete at the north Highway 21 bridge ramp are needed. Additional boat ramp characteristics are recorded in Table 2. Bank fishing access is limited. There is one fishing pier located at Lake Bob Sandlin State Park and one at Titus County Park.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brice and Bister 2010) included:

1. Conduct annual aquatic vegetation surveys and provide technical guidance to property owners and the controlling authority on the treatment of nuisance aquatic vegetation.
Action: Annual surveys have been conducted and a few property owners have submitted aquatic vegetation treatment proposals to manage alligatorweed and hydrilla to allow boat access in front of their properties.
2. Conduct gill netting in 2012 and 2014 and low pulse electrofishing in summer 2014 to monitor the blue catfish population; conduct a roving creel survey from June 2013 through May 2014 to assess angler use of the developing blue catfish fishery.
Action: Gill netting was not conducted in 2012 because stocked Blue Catfish were not yet mature and no reproduction was expected at that time. Gill netting was conducted in 2014 and the 2013/2014 creel survey was completed. The 2014 low-pulse electrofishing is planned to be completed in summer 2015.
3. Conduct fall electrofishing in 2011 and 2013 to monitor the Largemouth Bass and important prey populations; conduct a roving creel survey from June 2013 through May 2014 to assess angler use of the Largemouth Bass fishery; stock Florida Largemouth Bass annually to enhance the trophy potential of the Largemouth Bass population.

Action: Electrofishing and creel surveys have been conducted as scheduled. Florida Largemouth Bass were stocked in 2010 and 2012. Stocking every other year will help to meet other district Florida Largemouth Bass stocking priorities.

4. Provide fisheries related information to the public.

Action: No specific news releases were made, but district staff disseminated information to anglers while conducting the 2013/2014 creel survey. Other general fishing information was provided to the public about Lake Bob Sandlin and other district reservoirs during public presentations and contact via telephone calls received during the last four years.

Harvest regulation history: All sport fishes in Lake Bob Sandlin are currently managed with statewide regulations (Table 3). Largemouth Bass have been managed under a 14-inch minimum length limit and 5-fish daily bag (in combination with Spotted Bass) since 1986. Other black basses were included under this regulation in 1988. In 2000, the 12-inch minimum length limit for Spotted Bass was dropped to no minimum length limit. The 12-inch minimum length limit and 25-fish daily bag for Channel and Blue Catfish (in any combination) has been in effect since 1995. The minimum length limit for Flathead Catfish was reduced from 24 inches to 18 inches in 1994. There is a 5-fish daily bag on Flathead Catfish. Crappie (White and Black) have been managed under a 10-inch minimum length limit and 25-fish daily bag (combination of both species) since 1990.

Stocking history: Lake Bob Sandlin was stocked with Blue Catfish in 2008, 2009, 2010, 2012, and 2013. Channel Catfish were stocked in 1976, 1978, and 2000. The 812 Channel Catfish stocked in 2000 were inadvertently stocked into Lake Bob Sandlin and not Lake Bob Sandlin State Park Pond. Florida Largemouth Bass were introduced in 1977 and again stocked in 1998, 2006, 2007, 2009, 2010, and 2012. The complete stocking history is recorded in Table 4.

Water transfer: Lake Bob Sandlin is primarily used for municipal water supply and recreation. No interbasin transfers are known to exist.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18, 5-min stations), gill netting (10 net nights at 10 stations), and trap netting (10 net nights at 10 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), except electrofishing in 2011 was conducted during daylight hours because of navigation hazards due to low reservoir water level.

A roving creel survey was conducted from June 2013 through May 2014. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with 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 ($RSE = 100 \times SE \text{ of the estimate/estimate}$) was calculated for

all CPUE and creel statistics. Average age at length was determined using otoliths for Largemouth Bass from 13 fish 13.1 to 14.8 inches in 2011 and 2013 and for 13 White Bass 9.6 to 10.8 inches in 2013.

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 2013 and by electrophoresis for previous years.

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

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 2009 (Brice and Bister 2010) but is displayed in Table 5 for reference. Structural habitat consisted of standing timber (1,678 acres), bulkhead, piers and docks, and rocks. Shoreline habitat was mostly natural shoreline (66%) and bulkhead with piers and docks (25%). Total bulkhead for the lake was 31% of the entire shoreline. Low reservoir water levels since 2010 have had a negative impact on the amount of aquatic vegetation present. For example, only 225 acres of native submersed vegetation was observed in 2013 compared to 910 acres in 2009 reported by Brice and Bister (2010). Non-native vegetation is monitored annually, and coverage has been limited or non-existent in recent surveys (Table 6). However, some shoreline property owners, especially in small coves, do experience access issues due to alligatorweed and hydrilla, and some individuals have submitted Aquatic Vegetation Treatment Proposals to conduct herbicide treatments or mechanical removal of nuisance vegetation. Hydrilla coverage has been as high as 1,800 acres (20% of reservoir surface; Brice and Bister 2006), but even this level of coverage did not pose a biological concern in the reservoir or cause access issues at public boat ramps.

Creel: Directed fishing effort by anglers was highest for crappie (43%), followed by anglers fishing for black basses and catfishes (Table 7). Total fishing effort for all species and direct expenditures at Lake Bob Sandlin were slightly lower in the most recent survey compared to the one conducted in 2004/2005 (Table 8). According to angler ZIP Code data, 43% and 76% of anglers surveyed traveled less than 20 and 50 miles, respectively, to fish at Lake Bob Sandlin. Approximately 8% of anglers surveyed were from out-of-state.

Prey species: The electrofishing catch rate of Gizzard Shad had increased compared to previous surveys, especially for fish ≤ 5 inches (Figure 2). Index of vulnerability (IOV) for Gizzard Shad was high, indicating that 72% of Gizzard Shad were available to existing adult predators; this was higher than the IOV estimate in 2009 (Figure 2). The catch rate of Bluegill (286.7/h) was higher compared to the 2009 survey (192.7/h) (Figure 3). Threadfin Shad, Redear Sunfish, and Longear Sunfish were also present in the 2013 electrofishing survey. Directed angling effort for sunfishes was low (0.15 h/A) (Table 9).

Catfish: Gill netting catch rates of Blue Catfish were higher in 2014 (5.9/nn) compared to 2010 (1.3/nn) (Figure 6), which indicates good survival of stocked fish in recent years. Body condition is good for Blue Catfish with mean W_r values at or above 90 for most inch groups. Because the first stocking of Blue Catfish was in 2008, fish had likely not reached maturity; therefore, no natural reproduction has been expected. No anglers specifically targeting Blue Catfish were encountered in the 2013/2014 creel survey. However, an estimated 878 Blue Catfish were harvested by all anglers during the survey period (Table 10). The gill net catch rate of Channel Catfish was 13.8/nn in 2014, which was higher than it was in 2010 (8.1/nn) and 2006 (6.6/nn) (Figure 7). The size structure of the Channel Catfish population was excellent with fish as large as 28 inches observed in the gill netting survey (Figure 7). Six Flathead Catfish were caught during the 2014 gill netting survey (Appendix A). Angling catch rate of catfish was 2.16/h in 2013/2014, which was double the estimate of the previous survey (Table 10). Catfish anglers were

harvest-oriented; only 3.8% of legal-sized catfish caught were released (Table 10).

White Bass: The 2014 gill net catch rate (3.2/nn) of White Bass was lower than in 2010 (10.6/nn), but similar in 2006 (3.3/nn) (Figure 9). Growth of White Bass sampled in 2014 was fast. Average age at 10 inches (9.6 to 10.8 inches) was 1.0 year (N = 13; all fish were age 1). There is a minimal fishery for White Bass at Lake Bob Sandlin. Directed fishing effort was only 1,536 hours for the entire year-long survey in 2013/2014 (Table 11).

Black Bass: Because electrofishing in 2011 was conducted during daylight hours to allow safer navigation during low water conditions, estimates of CPUE are not comparable to other years. However, genetic composition and growth analyses are comparable. The 2013 electrofishing catch rate (59.3/h) of Spotted Bass was higher than in 2009 (10.7/h) (Figure 11). During the 2013/2014 creel survey, anglers harvested an estimated 2,037 Spotted Bass, ranging from 11 to 16 inches (Figure 13). Relative abundance of Largemouth Bass was lower in 2013 (86.7/h) than 2009 (167.3/h) and is likely related to low water levels and sparse aquatic vegetation in recent years (Figure 12). Growth of Largemouth Bass was fast. In 2013, the average age at 14 inches (13.1 to 14.8 inches) was 2.0 years (N = 13; range = 1 – 5 years). This was faster than the 2011 average age at 14 inches (13.1 to 14.8 inches) of 3.0 years (N = 13; range = 2 – 4 years). Average age at 14 inches in previous surveys was 2.0 years in 2009 and 2.3 years in 2005 (Brice and Bister 2010). Condition of Largemouth Bass was good with mean W_r for most inch groups exceeding 90 (Figure 12). Directed fishing effort for black basses in 2013/2014 (28,650 h) was much lower than it was in 2004/2005 (77,769 h) (Table 12). Tournament fishing accounted for 60% of directed effort in 2013/2014. Angling catch per hour for black basses was 0.9/h (Table 12). Total harvest for Largemouth Bass was only 439 fish, while an estimated 6,721 fish were held in livewells for later weigh-in and release following fishing tournaments. Florida Largemouth Bass genetic influence in the population has been moderate and relatively stable. Florida Largemouth Bass alleles ranged from 33% to 59% since 2001 (Table 13).

Crappie: Trap netting catch rates of White (1.5/nn) and Black (0.7/nn) Crappie were low in 2013 (Figures 14-15). No crappie were collected from trap nets during the 2009 survey. However, both White and Black Crappie have been caught in previous years [(2001, 2.6/nn (Ryan and Brice 2002); 2005, 2.9/nn (Brice and Bister 2006)] using standard trap netting procedures. Directed angling effort toward crappie almost tripled in the 2013/2014 creel survey compared to the 2004/2005 survey (Table 14). Total crappie harvest doubled from 20,098 fish in 2004/2005 to 41,832 fish in 2013/2014 (Table 14).

Fisheries management plan for Lake Bob Sandlin, Texas

Prepared – July 2014.

ISSUE 1: Hydrilla, alligatorweed, and Eurasian watermilfoil have all been present in the reservoir at varying acreages. While coverage of hydrilla and Eurasian watermilfoil is not problematic at this time, they should be monitored to identify future management needs. Alligatorweed coverage has dramatically increased in 2014 and would benefit from future control efforts.

MANAGEMENT STRATEGIES

1. Provide technical guidance to property owners and the controlling authority on treating nuisance aquatic vegetation in the lake. Procedural requirements as outlined in *Aquatic Vegetation Management in Texas: A Guidance Document* will be followed.
2. Conduct annual aquatic vegetation surveys to monitor trends and estimate coverage of hydrilla, Eurasian watermilfoil, and alligatorweed.
3. Request alligatorweed flea beetles from U. S. Army Corps of Engineers in Florida for release at Lake Bob Sandlin during spring 2015.

ISSUE 2: Blue Catfish were introduced into Lake Bob Sandlin in 2008 in an effort to increase sportfish angling opportunities. Fingerlings were stocked in 2008, 2009, and 2010 at 50 fish/acre. Additional stockings with fewer fish were made in 2012 and 2013. Gill netting catch rates of Blue Catfish have improved, indicating stocking success. The population should be monitored to identify natural reproduction as stocked fish attain sexual maturity. Angling opportunities for Blue Catfish in Lake Bob Sandlin should be shared with the public.

MANAGEMENT STRATEGIES

1. Continue building and maintaining working relationships among program partners (i.e., anglers, fishing guides, local businesses, news media, etc.).
2. Continue collecting and analyzing angler-volunteered data.
3. Conduct low-pulse electrofishing in summer 2015 to assess reproduction.
4. Conduct additional gill netting in spring 2016 to more closely monitor the population.

ISSUE 3: Lake Bob Sandlin supports a quality Largemouth Bass fishery. The population can be characterized as one of consistent recruitment, fast growth rate, moderate relative abundance, and good size distribution with many year classes. Lake Bob Sandlin has a history of producing trophy fish. The waterbody record for largemouth bass is 14.31 pounds and big bass at a Media Bass event in March 2008 were 9.90 lbs and 8.21 lbs. Fish have been collected to 24 inches in electrofishing surveys and fish have been documented in creel surveys up to 24 inches. A diverse, moderately abundant aquatic plant community has contributed to the success of the bass fishery in the past. In an effort to maintain a quality fishery, Florida Largemouth Bass have been stocked at 50/acre in 1998, 2006, 2007, 2009, 2010, 2012, and 2014. Brice and Bister (2008) also indicate Largemouth Bass are highly sought sport fish at Lake Bob Sandlin. Largemouth Bass population dynamics as well as angler utilization of these fish should be monitored.

MANAGEMENT STRATEGIES

1. Conduct standard electrofishing surveys in fall 2015 and 2017 to monitor the Largemouth Bass and prey species populations.
2. Continue to stock Florida Largemouth Bass every other year at 50/acre.

ISSUE 3: Boating access at several public access sites (most importantly Lake Bob Sandlin State Park) have been impeded by low water levels in recent years. Dredging has been conducted in the past and may need to be done periodically to maintain boater access at the state park during low water conditions. The ramp at the north end of the Highway 21 bridge has broken concrete and needs repair.

MANAGEMENT STRATEGIES

1. Work with state park staff to investigate opportunities to fund dredging operations when needed.
2. Contact Titus County officials and recommend improvements to the Highway 21 north bridge ramp.

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 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 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 fall 2015, additional gill netting in spring 2016, and mandatory monitoring in 2017/2018 (Table 15). An additional electrofishing survey in 2015 is necessary to maintain consistent data for trend information regarding the Largemouth Bass population. The additional gill netting in 2016 is necessary to monitor the developing Blue Catfish population. Trap net surveys are necessary only every four years at this point to ensure presence or absence of crappie in the reservoir.

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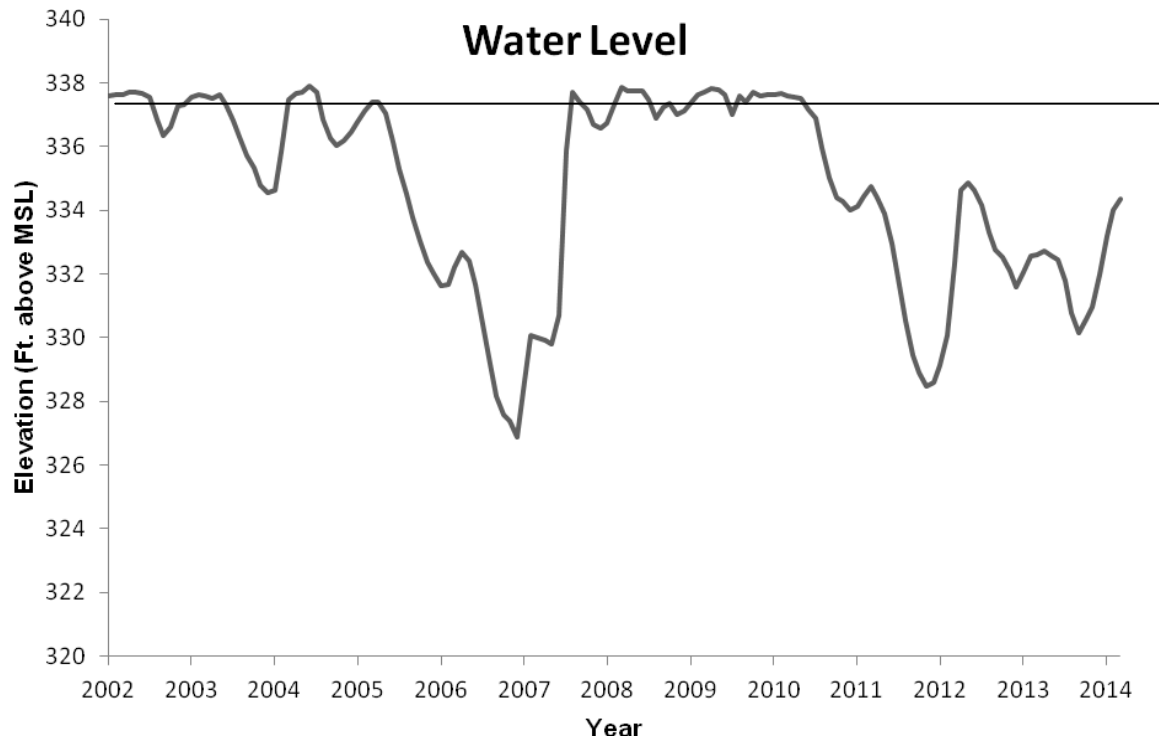


Figure 1. Monthly mean water level elevations in feet above mean sea level (MSL) recorded for Lake Bob Sandlin, Texas. Horizontal line denotes conservation pool elevation (337.5 MSL).

Table 1. Characteristics of Lake Bob Sandlin, Texas.

Characteristic		Description
Year Constructed	1977	
Controlling authority	Titus County Freshwater District No.1	
Counties	Camp, Titus, Franklin	
Reservoir type	Mainstream	
Shoreline Development Index (SDI)	5.5	
Conductivity	349 umhos/cm	

Table 2. Boat ramp characteristics for Lake Bob Sandlin Reservoir, Texas, June 2014. Reservoir elevation at time of survey was 336.75 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Titus County Water District Park	33.09426 -95.01371	Y	20	329.75	Excellent
Titus County Water District Park – 3 rd lane	33.09426 -95.01371	Y	20	324.25	Excellent
Barefoot Bay Marina	33.05208 -95.02199	Y	20	329.75	Excellent
Hwy 21 Bridge South	33.09484 -95.09355	Y	20	330.25	Good
Hwy 21 Bridge North	33.04758 -95.09647	Y	10	327.75	Poor
Bob Sandlin State Park	33.04790 -95.09473	Y	30	327.75	Excellent
Titus County Park	33.08274 -95.05701	Y	20	332.75	Good
Titus County Old Ramp	33.09141 -95.01288	Y	20	327.25	Good

Table 3. Harvest regulations for Lake Bob Sandlin, 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, White	25	10 - No Limit
Bass: Largemouth	5 ^a	14 - No Limit
Bass: Spotted	5 ^a	No Limit - No Limit
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

^a Daily bag for largemouth bass and spotted bass = 5 in any combination.

Table 4. Stocking history of Bob Sandlin, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults, FRY = fry.

Species	Year	Number	Size
Blue Catfish	2008	456,126	FGL
	2009	470,431	FGL
	2010	502,086	FGL
	2012	105,810	FGL
	2013	45,993	FGL
	Total	1,580,446	
Channel Catfish	1976	42,498	AFGL
	1978	149,315	AFGL
	2000	812	AFGL
	Total	192,625	
Florida Largemouth Bass	1977	450,000	FRY
	1998	238,477	FGL
	2006	385,675	FGL
	2007	455,600	FGL
	2009	456,468	FGL
	2010	480,554	FGL
	2012	500,450	FGL
	2014	TBD	FGL
	Total	2,967,224	

Table 5. Survey of structural habitat types, Lake Bob Sandlin, Texas, 2009. Shoreline habitat type units are in miles and standing timber unit is acres.

Habitat type	Estimate	% of total
Bulkhead	5.1 miles	6.0
Bulkhead with boat docks	21.1 miles	24.8
Natural	53.0 miles	62.4
Natural with boat docks	3.4 miles	4.0
Rocky	1.6 miles	1.9
Rocky with boat docks	0.3 miles	0.4
Gravel	0.1 miles	0.1
Standing timber	1678.0 acres	18.4

Table 6. Survey of aquatic vegetation, Lake Bob Sandlin, Texas, 2010 – 2013. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2010	2011	2012	2013
Native submersed				225 (2.5)
Native floating-leaved				3 (<0.1)
Native emergent				<1 (<0.1)
Non-native				
Alligatorweed (Tier II) ^a	20 (0.2)	50 (0.7)	<1 (<0.1)	<1 (<0.1)
Hydrilla (Tier II) ^a	92 (1.0)	0	6 (0.1)	0
Eurasian watermilfoil (Tier III) ^a	14 (0.2)	0	0	0

^a Tier I is Immediate Response, Tier II is Maintenance, and Tier III is Watch Status.

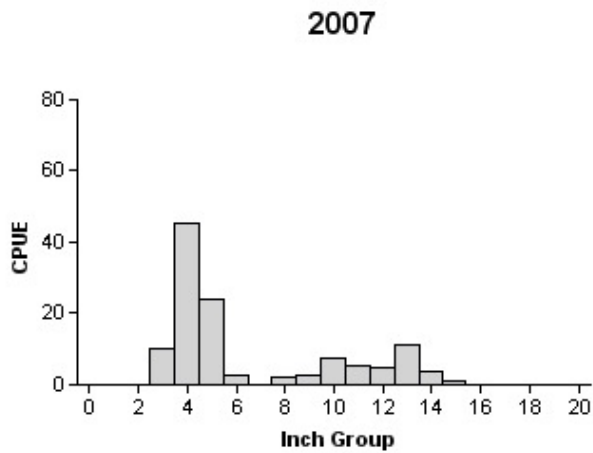
Table 7. Percent directed angler effort by species for Lake Bob Sandlin, Texas, 2004 – 2014. Survey periods were from 1 June through 31 May.

Species	2004/2005	2013/2014
White Bass	1.7	1.9
Black Basses	65.8	35.3
Crappies	10.4	43.1
Catfishes	7.3	13.8
Sunfishes	1.0	1.7
Anything	13.9	4.2

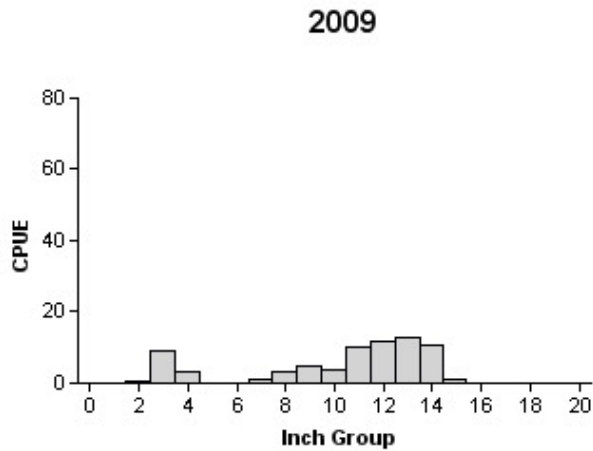
Table 8. Total fishing effort (h) for all species and total directed expenditures at Lake Bob Sandlin, Texas, 2004/2005 and 2013/2014. Survey periods were from 1 June through 31 May. Relative standard error is in parentheses.

Creel statistic	2004/2005	2013/2014
Total fishing effort	118,370 (11)	81,167 (19)
Total directed expenditures	\$668,730 (22)	\$537,329 (58)

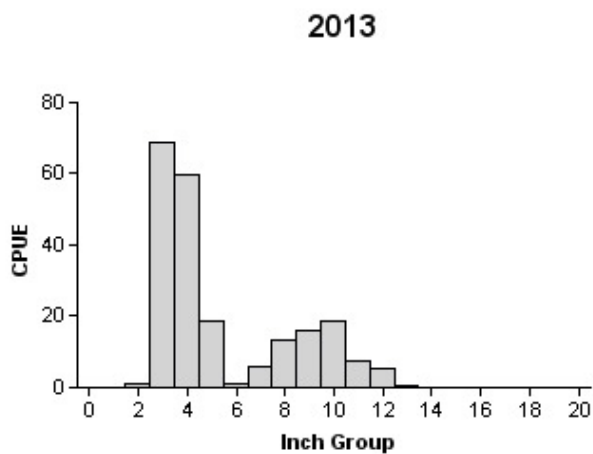
Gizzard Shad



Effort = 1.5
 Total CPUE = 120.7 (14; 181)
 IOV = 68 (5.5)



Effort = 1.5
 Total CPUE = 73.3 (20; 110)
 IOV = 20 (8.5)



Effort = 1.5
 Total CPUE = 217.3 (24; 326)
 IOV = 72 (7)

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, Lake Bob Sandlin, Texas, 2007, 2009, and 2013.

Bluegill

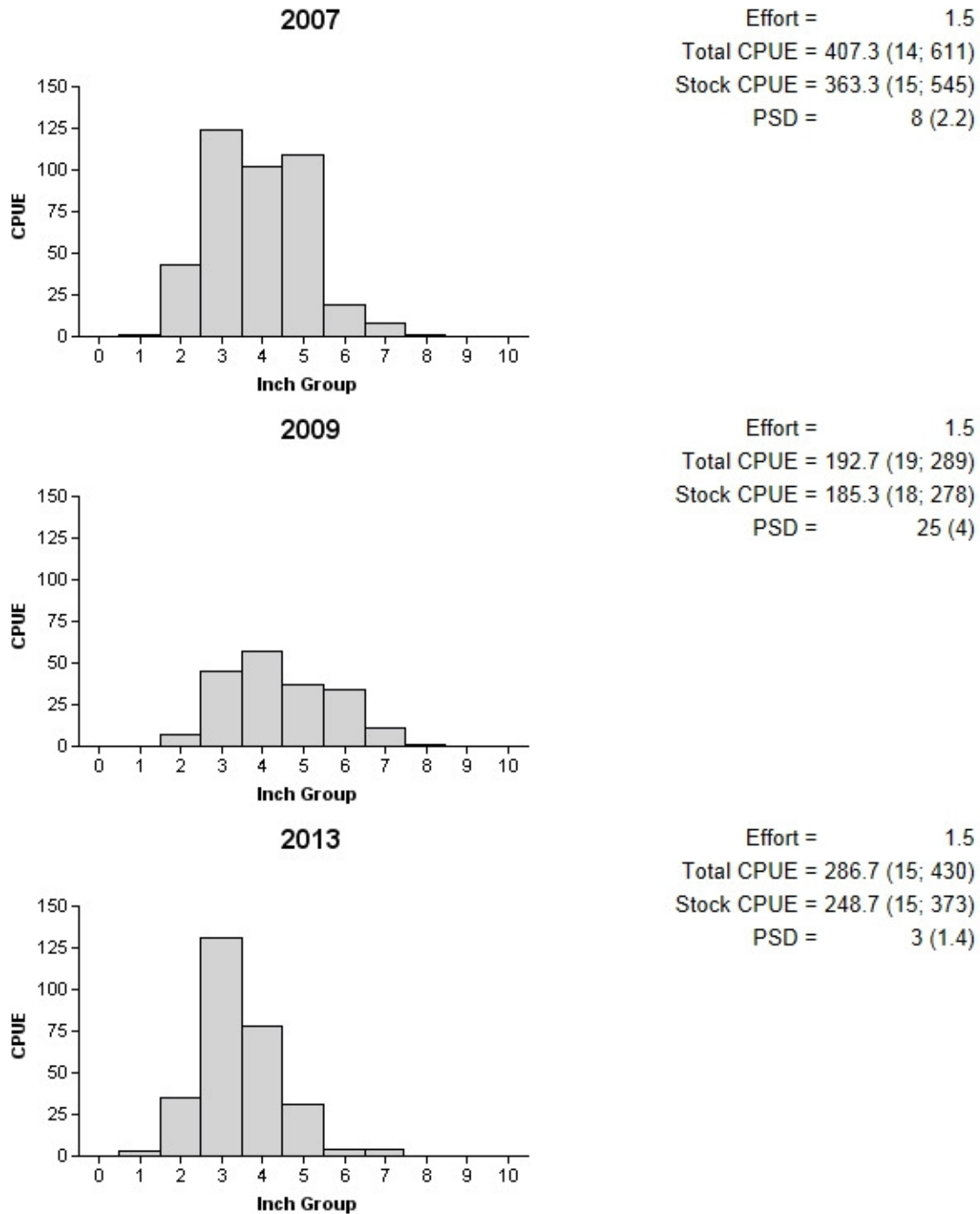


Figure 3. Number of Bluegill caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2007, 2009, and 2013.

Redear Sunfish

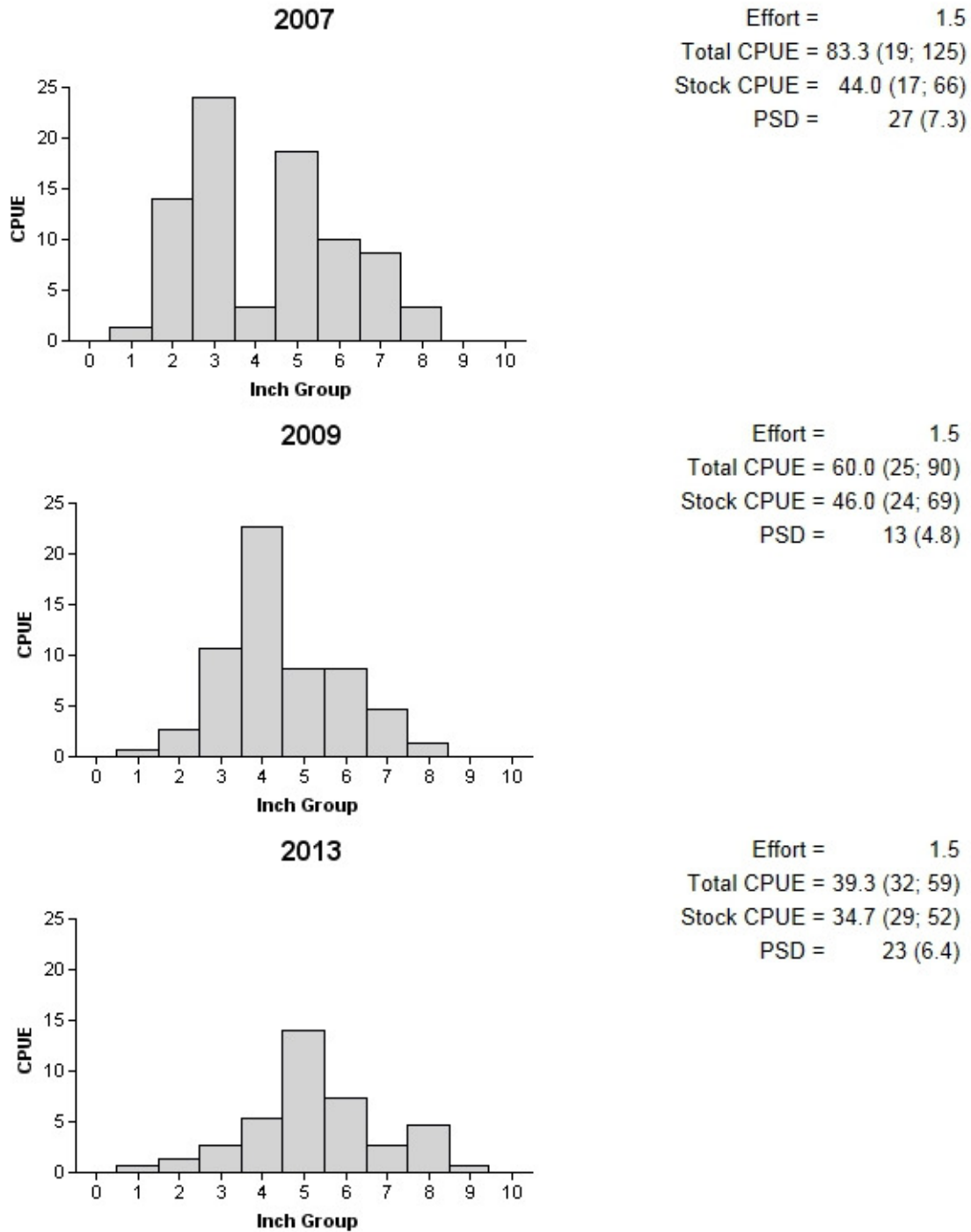


Figure 4. Number of Redear Sunfish caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2007, 2009, and 2013.

Sunfishes

Table 9. Creel survey statistics for sunfishes at Lake Bob Sandlin, Texas from June 2004 through May 2005, and June 2013 through May 2014. Total catch per hour is for anglers targeting sunfishes and total harvest is the estimated number of sunfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2004/2005	2013/2014
Directed effort (h)	1,175.10 (56)	1,374.00 (66)
Directed effort/acre	0.13 (56)	0.15 (66)
Total catch per hour	14.65 (*)	2.22 (*)
Total harvest	5,843 (71)	4,152 (130)
Bluegill	5,843 (71)	4,084 (129)
Redear sunfish	0	68 (244)
Harvest/acre	0.64 (71)	0.46 (130)
Percent legal released	48.0	5.6

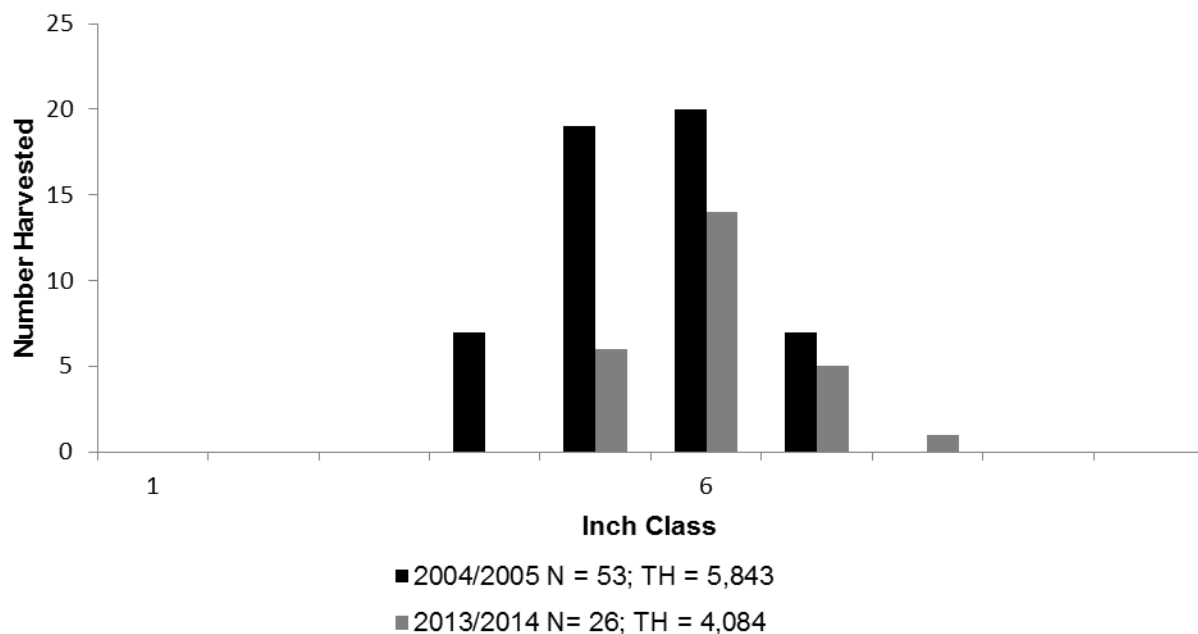


Figure 5. Length frequency of harvested Bluegill observed during creel surveys at Lake Bob Sandlin, Texas, June 2004 through May 2005 and June 2013 through May 2014, all anglers combined. N is the number of harvested Bluegill observed during creel surveys, and TH is the total estimated harvest for the creel period.

Blue Catfish

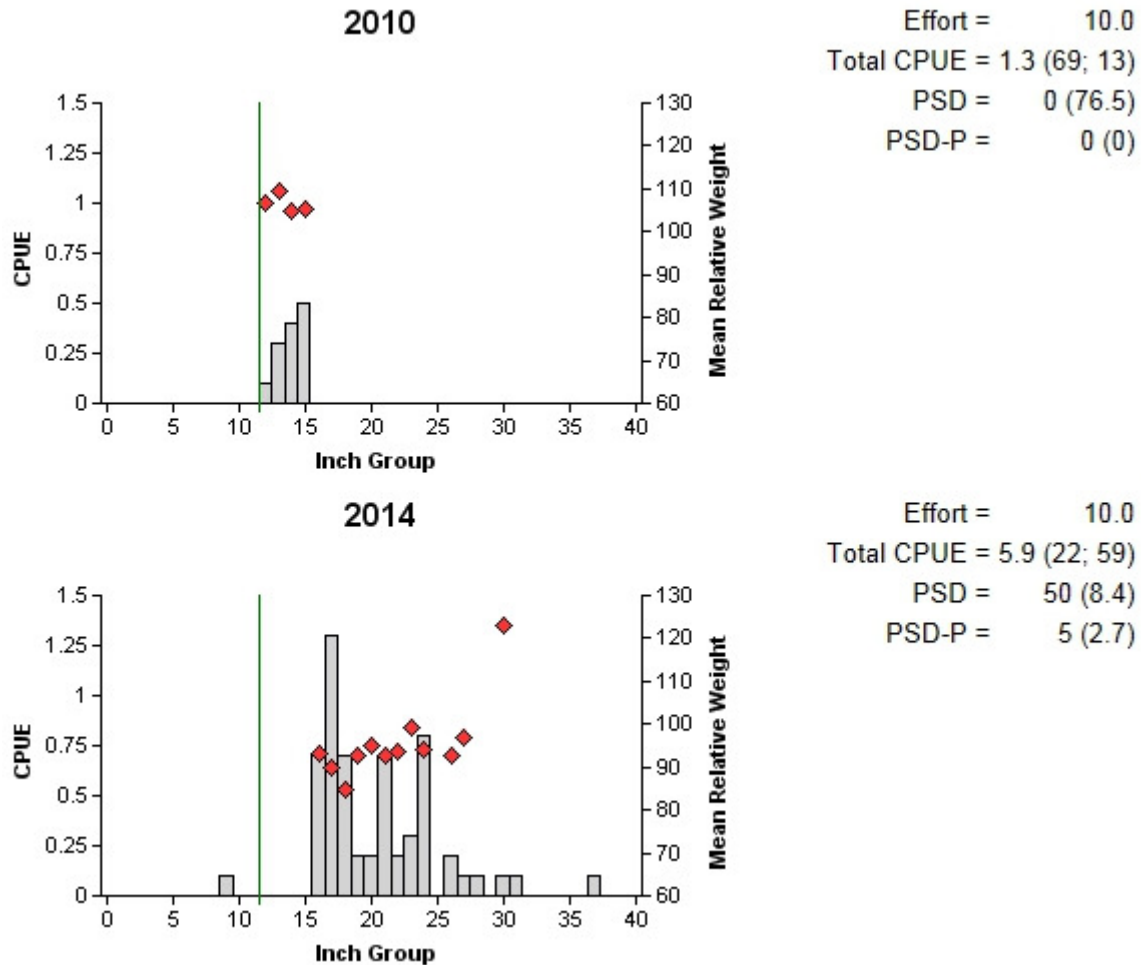


Figure 6. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2010 and 2014. Vertical line indicates minimum length limit.

Channel Catfish

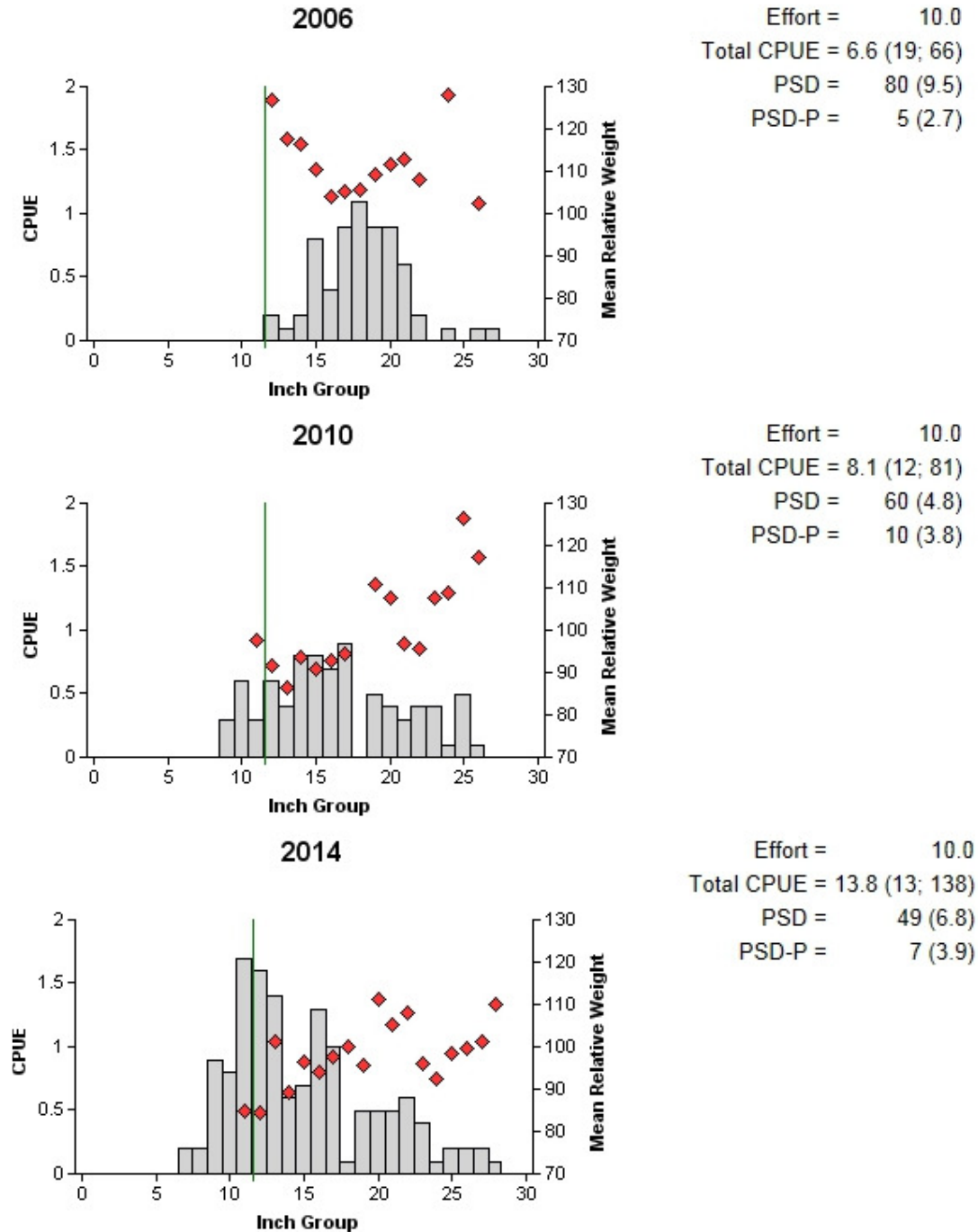


Figure 7. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2006, 2010, and 2014. Vertical line indicates minimum length limit.

Catfish

Table 10. Creel survey statistics for Blue Catfish and Channel Catfish at Lake Bob Sandlin, Texas from June 2004 through May 2005 and June 2013 through May 2014. Total catch per hour is for anglers targeting catfishes, and total harvest is the estimated number of Blue Catfish and Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2004/2005	2013/2014
Directed effort (h)	8,584.8 (26)	11,196 (31)
Directed effort/acre	0.94 (26)	1.23 (31)
Total catch per hour	1.0 (63)	2.16 (76)
Total harvest	11,129 (34)	17,270 (65)
Blue Catfish	0	878 (317)
Channel Catfish	11,129 (34)	16,392 (52)
Harvest/acre	1.22 (34)	1.89 (65)
Percent legal released	9.3	3.8

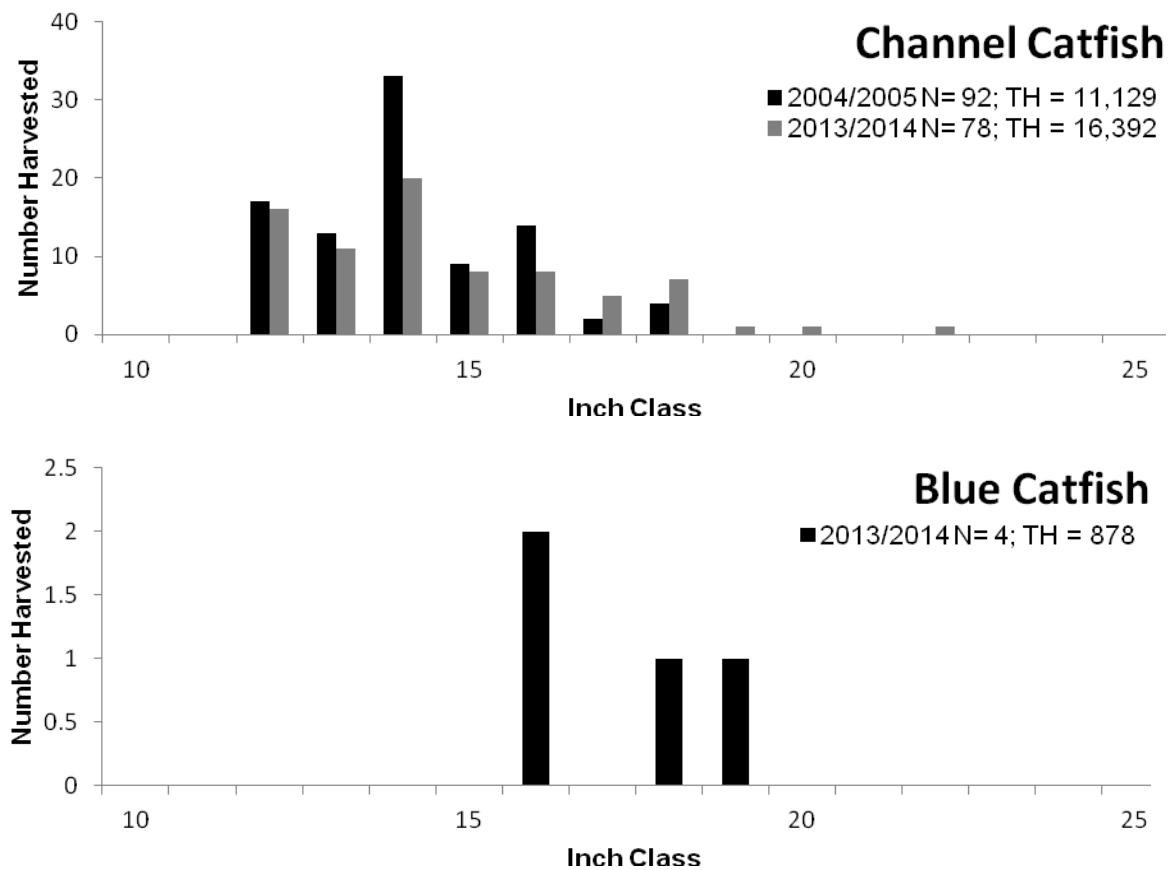
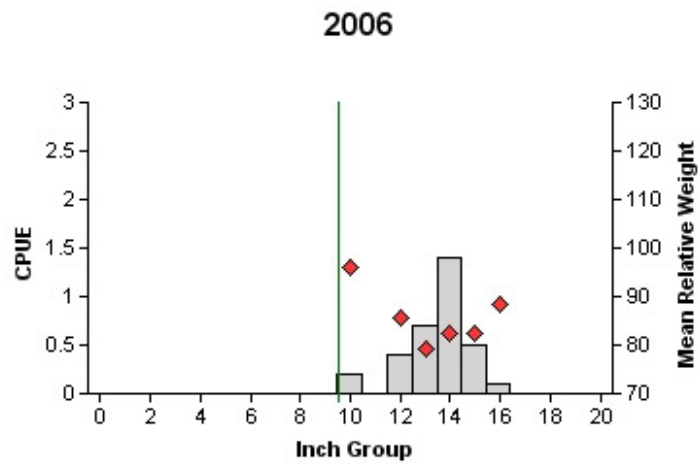
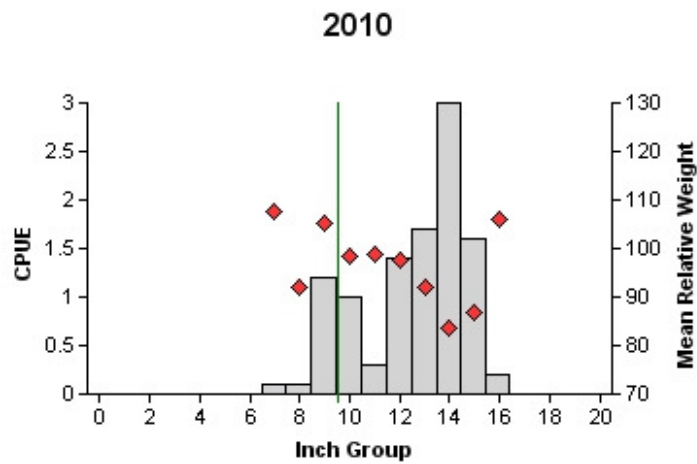


Figure 8. Length frequency of harvested Channel Catfish and Blue Catfish observed during creel surveys at Lake Bob Sandlin, Texas, June 2004 through May 2005 and June 2013 through May 2014, all anglers combined. N is the number of harvested fish observed during creel surveys, and TH is the total estimated harvest for the creel period.

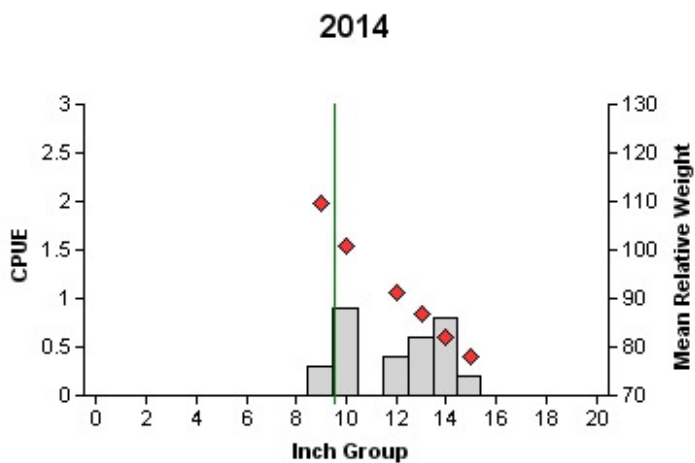
White Bass



Effort = 10.0
 Total CPUE = 3.3 (38; 33)
 PSD = 100 (0)
 PSD-P = 94 (4.9)



Effort = 10.0
 Total CPUE = 10.6 (26; 106)
 PSD = 98 (1.2)
 PSD-P = 75 (7.4)



Effort = 10.0
 Total CPUE = 3.2 (35; 32)
 PSD = 100 (0)
 PSD-P = 62 (21.8)

Figure 9. Number of White Bass caught per net night (CPUE) and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Bob Sandlin, Texas, 2006, 2010, and 2014. Vertical line indicates minimum length limit.

White Bass

Table 11. Creel survey statistics for White Bass at Lake Bob Sandlin, Texas from June 2004 through May 2005 and June 2013 through May 2014. Total catch per hour is for anglers targeting White Bass and total harvest is the estimated number of White Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2004/2005	2013/2014
Directed effort (h)	2,051.8 (40)	1,536 (74)
Directed effort/acre	0.23 (40)	0.17 (74)
Total catch per hour	3.90 (63)	^a (*)
Total harvest	2,888 (87)	7,501 (69)
Harvest/acre	0.32 (87)	0.82 (69)
Percent legal released	74	59

^a No White Bass were observed caught by anglers targeting this species during the creel period.

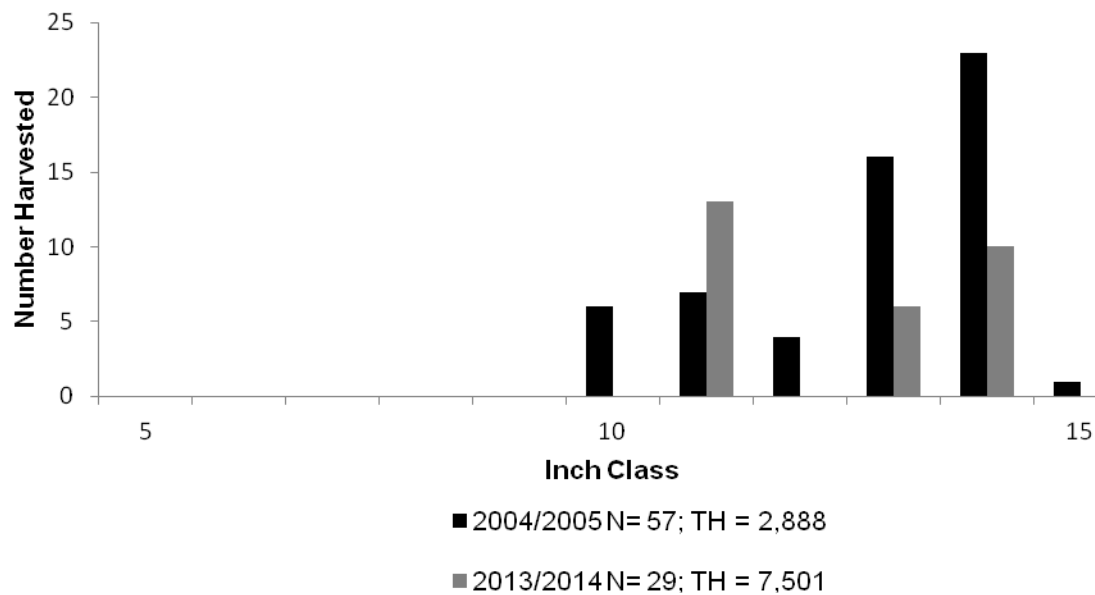


Figure 10. Length frequency of harvested White Bass observed during creel surveys at Lake Bob Sandlin, Texas, June 2004 through May 2005 and June 2013 through May 2014, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Spotted Bass

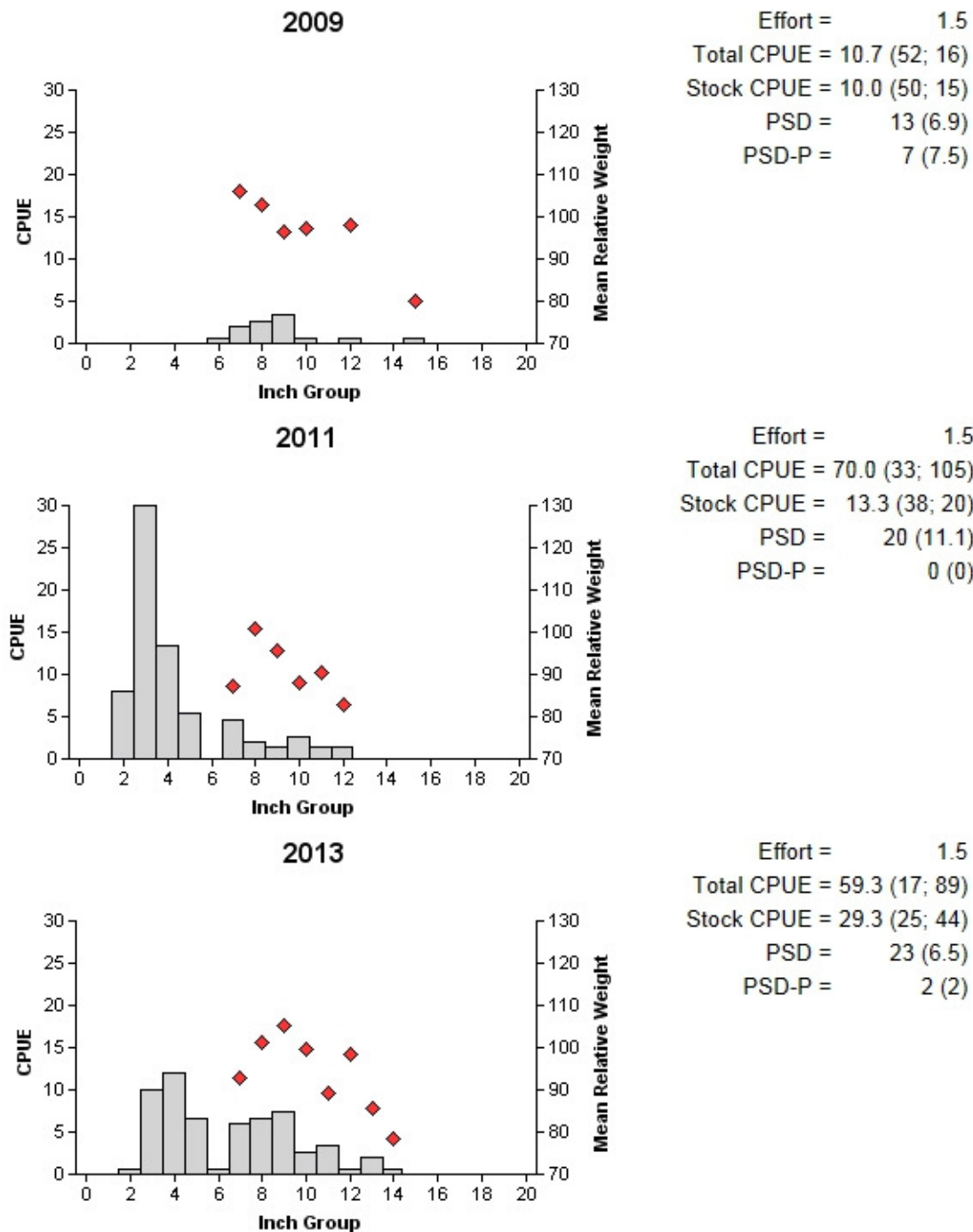


Figure 11. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2009, 2011, and 2013. Sampling in 2011 was conducted during daylight hours and is not directly comparable to data from other years.

Largemouth Bass

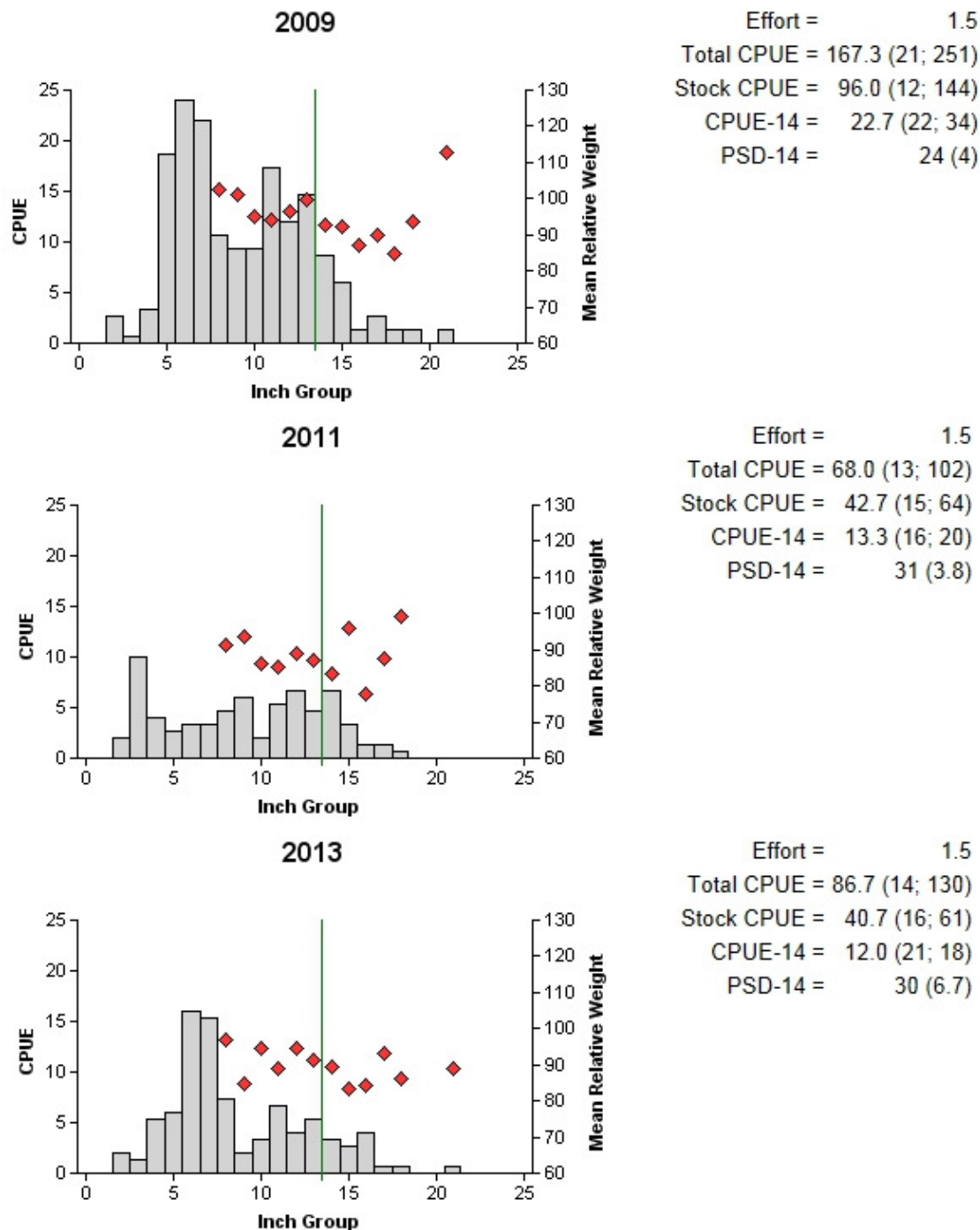


Figure 12. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Bob Sandlin, Texas, 2009, 2011, and 2013. Sampling in 2011 was conducted during daylight hours and is not directly comparable to data from other years. Vertical lines indicate minimum length limit.

Black Bass

Table 12. Creel survey statistics for black bass at Lake Bob Sandlin, TX from June 2004 through May 2005, and June 2013 through May 2014. Catch rate is for all anglers targeting Largemouth Bass. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. The estimated number of fish released by weight category is for anglers targeting Largemouth Bass. Relative standard errors (RSE) are in parentheses.

Statistic	2004/2005 ^{a, b}	2013/2014
Directed angling effort (h)		
Tournament		17,152 (23)
Non-tournament		11,498 (29)
All black bass anglers combined	77,769.0 (12)	28,650 (20)
Angling effort/acre	8.53 (12)	3.1 (20)
Catch rate (number/h)	1.10 (12)	0.9 (45)
Harvest		
Non-tournament harvest		439 (260)
Harvest/acre		0.05 (260)
Tournament weigh-in and release		6,721 (58)
Release by weight		
<4.0 lbs		12,378 (99)
4.0-6.9 lbs		0 (*)
7.0-9.9 lbs		0 (*)
≥10.0 lbs		0 (*)
Percent legal released (non-tournament)	47 ^{c, d}	93 ^c

^a Partitioned tournament data was not available for the 2004/2005 creel survey.

^b Release by weight was not recorded during the 2004/2005 creel survey.

^c Includes Spotted Bass.

^d Fish held in livewell during live-release tournaments were considered harvested.

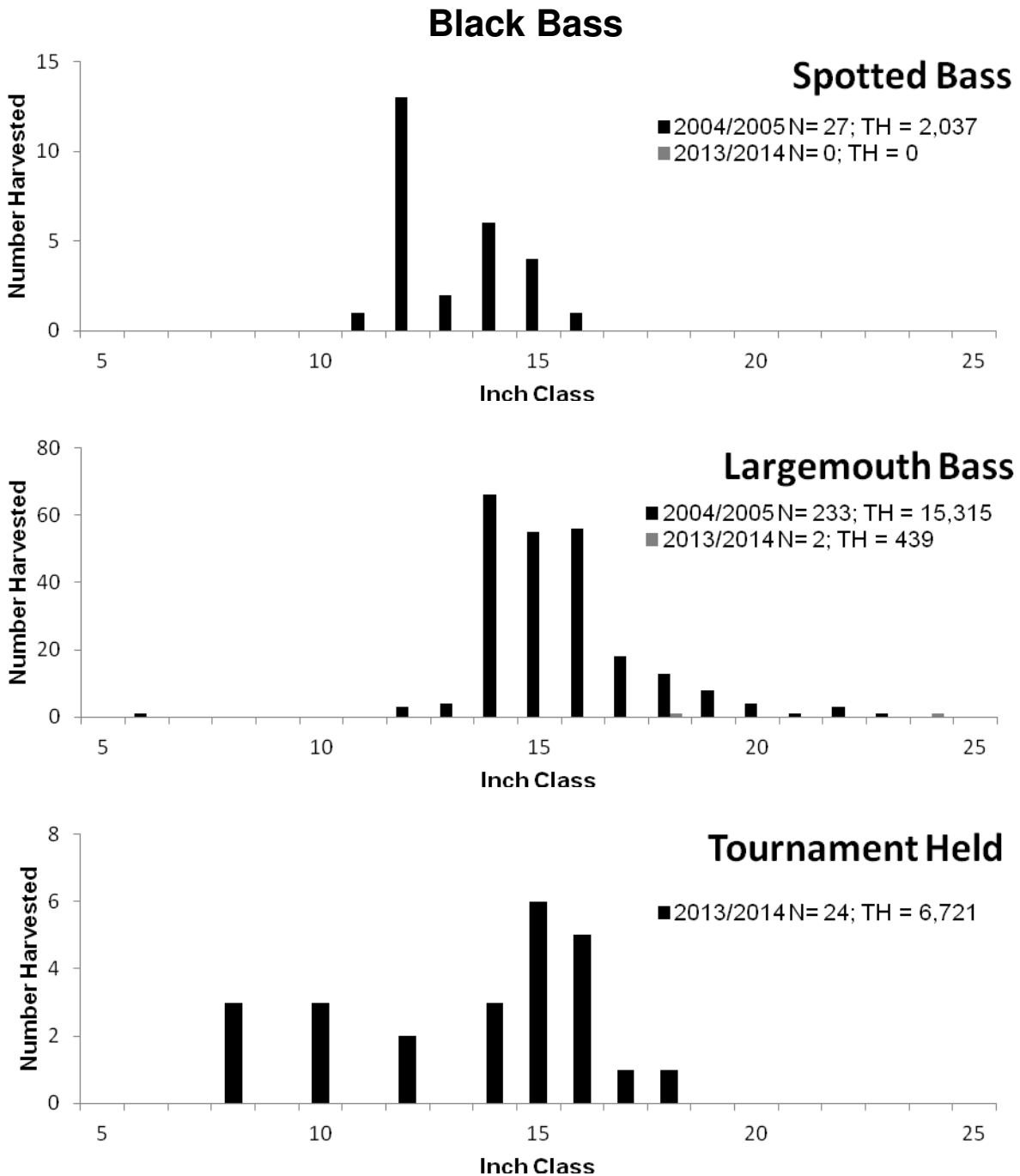


Figure 13. Length frequency of black basses harvested or held in livewell for later release during live-release tournaments observed during creel surveys at Lake Bob Sandlin, Texas, June 2004 through May 2005 and June 2013 through May 2014, all anglers combined. N is the number of harvested fish observed during creel surveys, and TH is the estimated harvest for the creel period. Tournament partitioned data were not available for the 2004/2005 creel survey.

Largemouth Bass

Table 13. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lake Bob Sandlin, Texas, 1990, 1997, 2001, 2005, 2011, and 2013. 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		
1990	30	11	8	10	11	62.1	0.0
1997	41	0	9	21	11	31.1	0.0
2001	30	1	4	18	7	32.5	3.3
2005	75	0	3	69	3	36.8	0.0
2011	29	0	0	29	0	59.0	0.0
2013	30	1	1	26	2	40.0	3.3

White Crappie

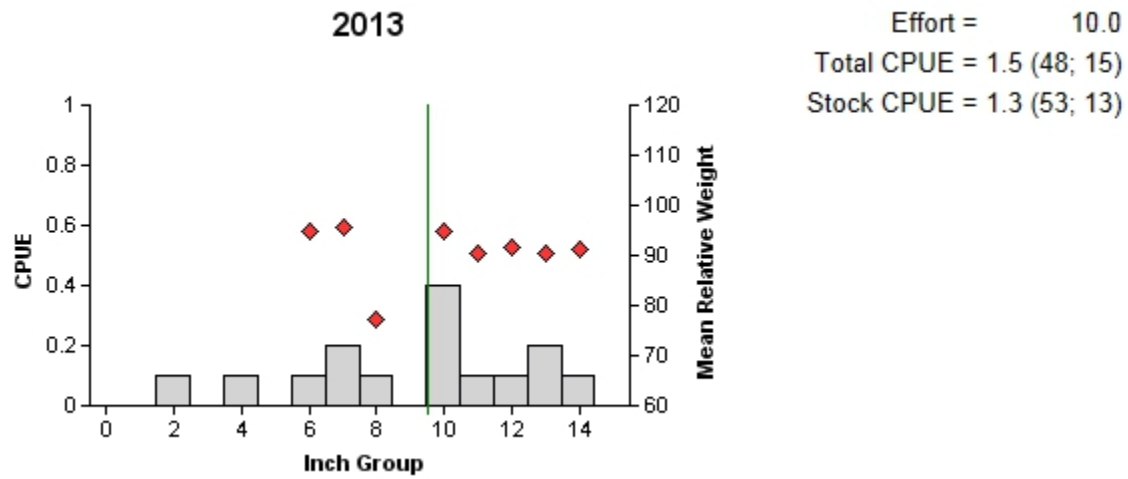


Figure 14. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net survey, Lake Bob Sandlin, Texas, 2013. Vertical line indicates minimum length limit.

Black Crappie

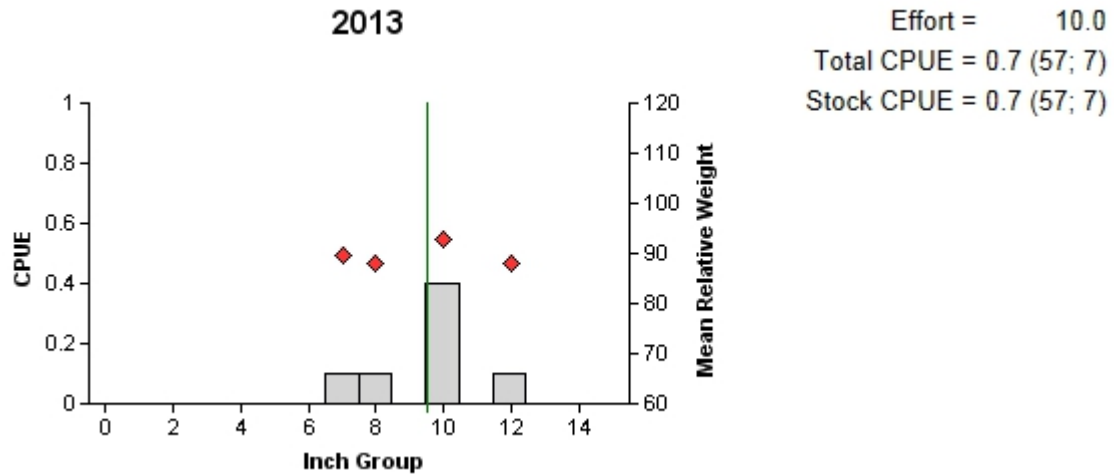


Figure 15. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net survey, Lake Bob Sandlin, Texas, 2013. Vertical line indicates minimum length limit.

Crappie

Table 14. Creel survey statistics for crappie at Lake Bob Sandlin from June 2004 through May 2005 and June 2013 through May 2014. Total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	2004/2005	2013/2014
Directed effort (h)	12,121 (24)	35,012 (22)
Directed effort/acre	1.33 (24)	3.84 (22)
Total catch per hour	2.41 (35)	1.89 (37)
Total harvest	20,098 (53)	41,832 (40)
Harvest/acre	2.20 (53)	4.59 (40)
Percent legal released	3.6	13.6

Crappie

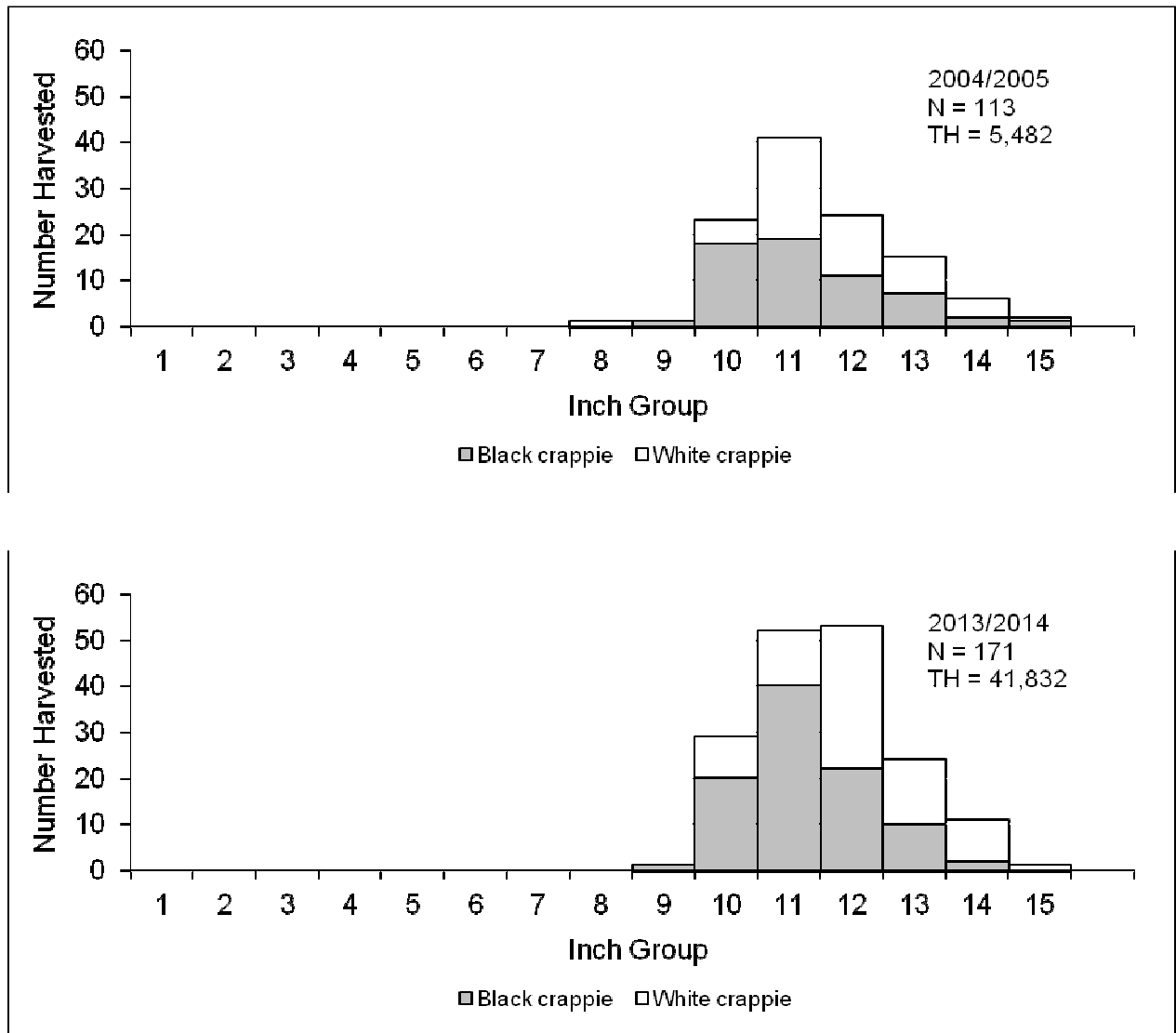


Figure 16. Length frequency of harvested White and Black Crappie observed during creel surveys at Lake Bob Sandlin, Texas, June 2004 through May 2005 and June 2013 through May 2014, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 15. Proposed sampling schedule for Lake Bob Sandlin, 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 Fall	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2014-2015					A			
2015-2016	A ^a		A		A			
2016-2017					A			
2017-2018	S	A	S		S	S		S

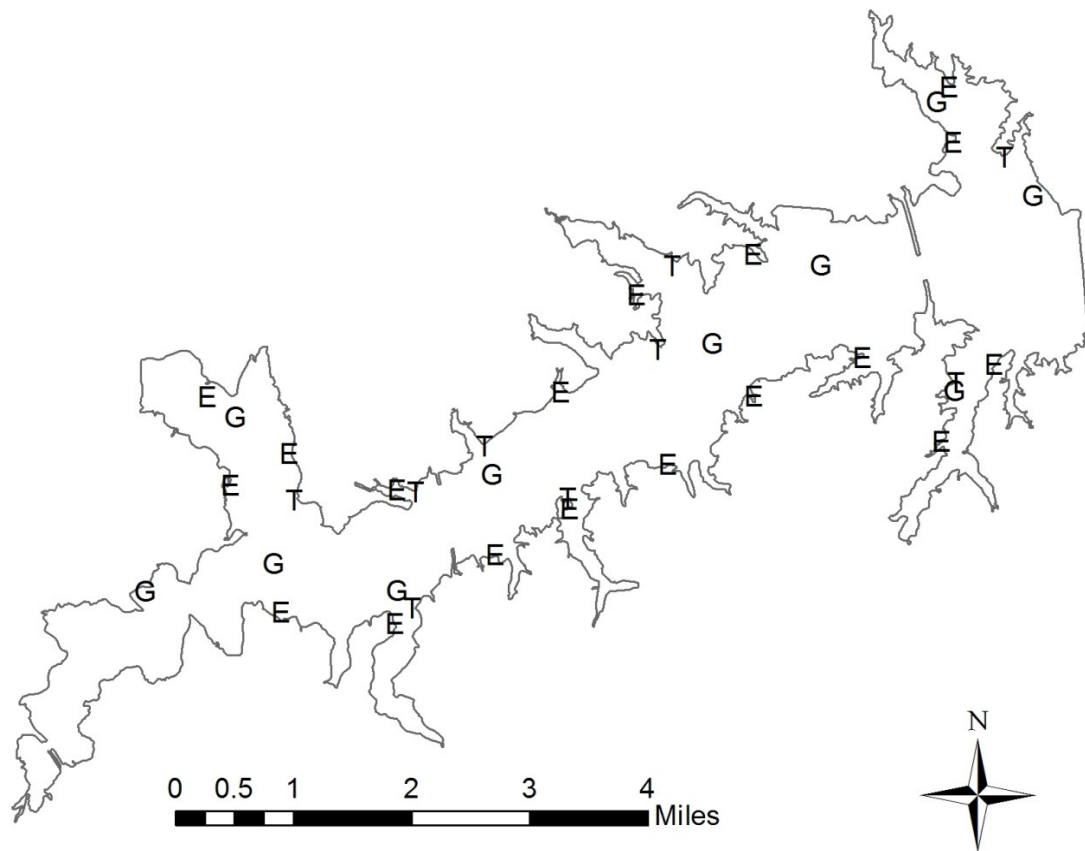
^a 2015 electrofishing will include low-pulse survey in the summer and traditional nighttime survey in the fall.

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Bob Sandlin, Texas, 2013-2014. Sampling effort was 10 net nights for gill netting, 10 net nights for trap netting, and 1.5 hours for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					326	217.3
Threadfin Shad					576	384.0
Blue Catfish	59	5.9				
Channel Catfish	138	13.8				
Flathead Catfish	6	0.6				
White Bass	32	3.2				
Warmouth					2	1.3
Bluegill					430	286.7
Longear Sunfish					49	32.7
Redear Sunfish					59	39.3
Spotted Bass					89	59.3
Largemouth Bass					130	86.7
White Crappie			15	1.5		
Black Crappie			7	0.7		

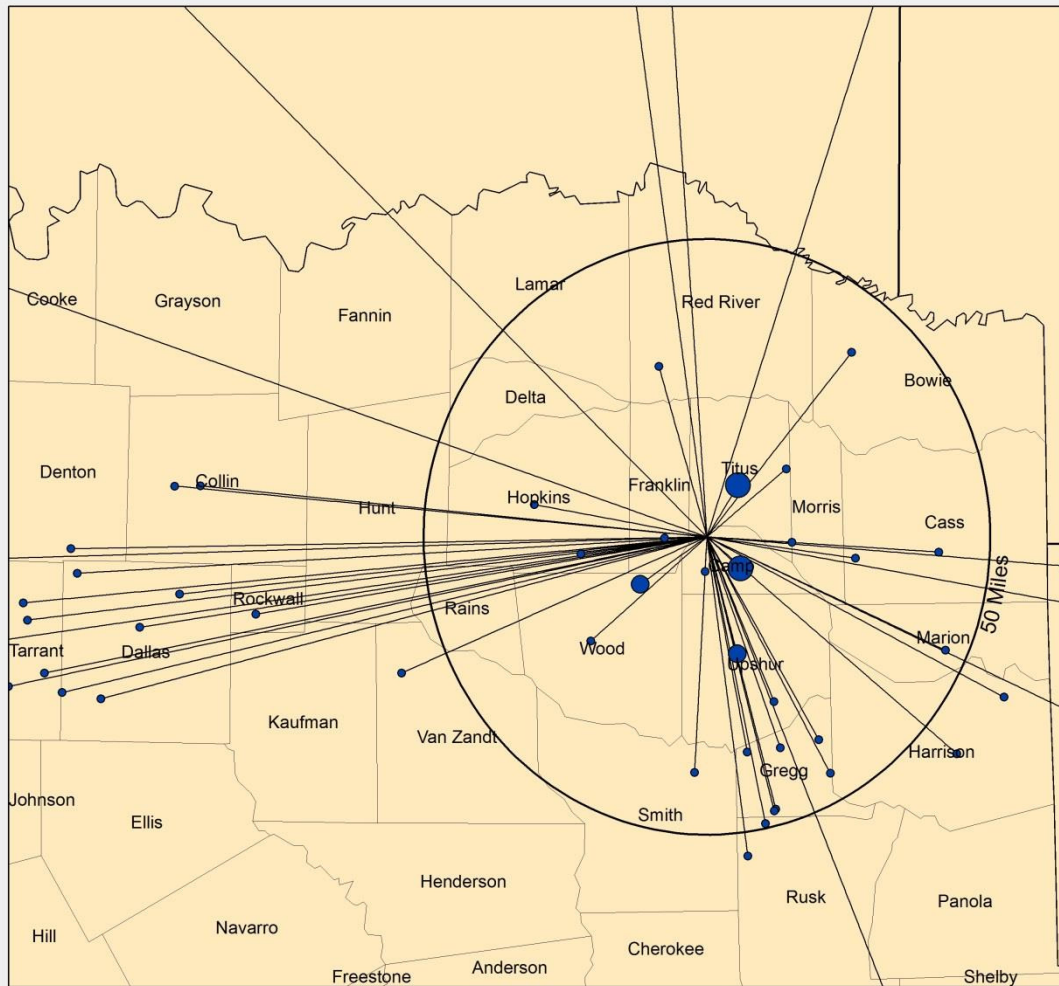
APPENDIX B



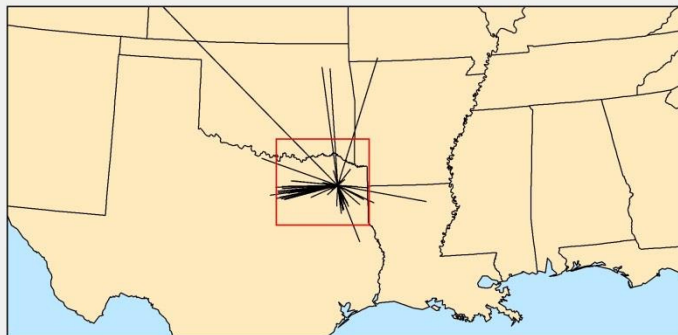
Location of sampling sites, Lake Bob Sandlin, Texas, 2013-2014. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was near full pool at time of sampling.

APPENDIX C

Angler ZIP codes, Bob Sandlin creel survey, June 2013 to May 2014

Angler Counts
by Zip Code

- 1 - 9
- 10 - 19
- 20+



Distribution of angler-reported ZIP codes at Lake Bob Sandlin, Texas from June 2013 through May 2014.