

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Lake Quitman

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TABLE OF CONTENTS

Survey and Management Summary.....	2
Introduction	3
Reservoir Description	3
Management History	3
Methods.....	4
Results and Discussion	5
Fisheries Management Plan	7
Literature Cited	9
Figures and Tables.....	10-22
Reservoir Characteristics (Table 1)	10
Harvest Regulations (Table 2)	10
Stocking History (Table 3)	11
Habitat Survey (Table 4).....	12
Percent directed angler effort per species (Table 5)	13
Total fishing effort and fishing expenditures (Table 6)	13
Gizzard shad (Figure 1).....	14
Bluegill (Figure 2)	15
Channel catfish (Figures 3; Table 7)	16
Largemouth bass (Figures 4-5; Table 8)	18
White crappie (Figures 6-7; Table 9)	20
Proposed Sampling Schedule (Table 10)	22
Appendix A	
Catch rates for all species from all gear types.....	23
Appendix B	
Map of 2009-2010 sampling locations.....	24

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Quitman were surveyed in 2009 using electrofishing and trap netting, and in 2010 using gill netting and a roving creel survey from March through May 2010. Aquatic vegetation and habitat surveys were conducted on Lake Quitman during September 2009. An additional vegetation survey was conducted in May 2010 to assess the abundance and distribution of water hyacinth. Reconnaissance surveys were also conducted in July, August, and September to track the distribution of water hyacinth prior to treatment activities. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Quitman is an 814-acre impoundment located in Wood County, Texas, on an unnamed tributary of the Sabine River. It was constructed by Wood County for recreation and flood control. Habitat consists primarily of natural shoreline, boat docks, emergent aquatic vegetation, and the invasive aquatic plant alligatorweed. Water hyacinth is also present and presents an ongoing threat to the ecosystem.
- **Management history:** Important sport fish included largemouth bass, white crappie, and channel catfish. The management plan from the 2005 survey report recommended stocking Florida largemouth bass (FLMB) fingerlings at 100 fish/acre because the percentage of FLMB alleles in fall 2005 sampling was below 20%. Recent treatment efforts for water hyacinth have included physical removal as well as aquatic herbicide applications.
- **Fish community**
 - **Prey species:** Predominant prey species in the reservoir include gizzard shad, bluegill, and threadfin shad. Electrofishing catch of gizzard shad was high, with the majority of gizzard shad being available as prey to most sport fish. Electrofishing catch of bluegills was moderate and the population was dominated by fish under 5-inches in length. Threadfin shad provided additional prey for sport fish.
 - **Catfishes:** Catch rate of channel catfish has historically been low. Fish of harvestable size were collected during gill net sampling.
 - **Black bass:** Largemouth bass were relatively abundant. Body condition of largemouth bass was satisfactory indicating adequate prey fish availability. Although spotted bass have been collected in previous surveys, none were observed.
 - **Crappies:** White and black crappie were both present in the reservoir, but white crappie were the predominant and moderately abundant. Crappies were the most sought game fish on Lake Quitman in spring 2010.

Management strategies: Conduct additional largemouth bass-only electrofishing survey in fall 2011 and standard monitoring with trap netting, gill netting, and electrofishing surveys in 2013 to 2014. Conduct roving creel survey in spring 2014 to monitor fishing effort, catch, and harvest rates. Conduct annual aquatic vegetation surveys from 2010 to 2013 to monitor distribution and acreage of water hyacinth.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Quitman from June 2009 through May 2010. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2009 to 2010 data for comparison.

Reservoir Description

Lake Quitman is an 814-acre impoundment constructed in 1962 on an unnamed tributary of the Sabine River. It is located in Wood County approximately 34 miles north of Tyler, Texas, and is operated and controlled by Wood County. Primary water uses included municipal water supply, recreation, and flood control. Habitat at time of sampling consisted primarily of natural shoreline with limited cover in the form of native emergent vegetation, boat docks, and emergent aquatic vegetation. Water hyacinth was first discovered in September 2001 in the western one-third of the reservoir. Since that time, treatment activities have included manual removal and herbicide applications by TPWD staff. Within the last year, water hyacinth has spread to the eastern section on the reservoir. Boat access consisted of three public boat ramps and several private boat ramps. Bank fishing access was limited to three day-use areas. Other descriptive characteristics for Lake Quitman are in Table 1.

Management History

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

1. Enhancement of largemouth bass fishery.
Action: Genetic analysis of age-0 fish collected in fall 2005 indicated a Florida largemouth bass (FLMB) allele frequency of 29%, with no pure FLMB. A recommendation was made to stock FLMB at a rate of 100/acre in 2007 and 2008. Stockings were conducted in 2008 and 2009 and a total of 161,117 fingerlings were distributed. An optional largemouth bass-only electrofishing survey was conducted in fall 2007. A roving creel survey was conducted from March through May 2010.
2. Water hyacinth control.
Action: Annual aquatic vegetation surveys to monitor coverage of water hyacinth were conducted. Treatment efforts from 2006 through 2009 consisted of annual herbicide applications. In 2009, 31 acres of water hyacinth were sprayed with 2,4-D. District personnel conducted periodic manual removals and coordinated an effort in July 2009 with volunteers from three BASS-affiliated clubs to remove 42 cubic yards of plant material. Contacted controlling authority (Wood County) and requested that they make arrangements to purchase herbicide and to have staff certified to treat water hyacinth in the event that TPWD Aquatic Habitat Enhancement staff is unable to conduct treatments.
3. Increase awareness of Lake Quitman fisheries resources.
Action: Previous sampling indicated the potential for excellent catfish and crappie fisheries. Efforts have been made to promote the fisheries resources and inform anglers of current fishing regulations on Lake Quitman.

Harvest regulation history: Historically, all sport fishes in Lake Quitman have been managed with statewide regulations (Table 2).

Stocking history: Lake Quitman was stocked with Florida largemouth bass in 2008 and 2009. Florida largemouth bass were initially introduced in 1980 (311 adults) and stocked in 1999 and 2000. Channel

catfish were introduced in 1982, flathead catfish and green x redear sunfish hybrids in 1971, and striped bass in 1972; of these species, channel and flathead catfishes were still present in the reservoir. The complete stocking history is in Table 3.

Vegetation/habitat history: The aquatic vegetation in Lake Quitman was dominated by emergent species (bulrush, cattail, wild taro, and maidencane) and alligatorweed which contributed a combined area of 16.6 acres (2% of the reservoir's surface area). Shoreline habitat was primarily natural mixed with native emergent vegetation and alligatorweed. Boat docks were found along 18% of the shoreline. Modified shoreline in the form of bulkhead and rock shore contributed 7.9% and 2.9% respectively of the lake shoreline. Water hyacinth, was first documented in September 2001 (5.0 acres), and persisted in limited areas at levels below approximately 2 acres until May 2009 when coverage increased to 5.3 acres following a mild winter. Treatment efforts have consisted of periodic manual removal by District staff and annual spraying (except 2006) with aquatic herbicides by TPWD Aquatic Habitat Enhancement staff.

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 2009). A roving angler creel survey consisting of 9 survey days (4 weekdays, 5 weekend days from March through May 2010) was conducted to estimate angler catch and harvest rates and angling effort in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

Aquatic vegetation and littoral habitat surveys were performed according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). An additional aquatic vegetation survey was conducted to map the distribution and coverage of water hyacinth in May.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = $100 \times \text{SE of the estimate/estimate}$) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from largemouth bass (N=12, length range 13.3 to 14.6 inches) and white crappie (N=8, length range 9.0 to 10.8 inches).

RESULTS AND DISCUSSION

Vegetation/habitat: Shoreline habitat during fall 2009 was composed primarily of natural shoreline, native emergent vegetation, and boat docks (Table 4). Water hyacinth abundance increased from 1.0 acre in July 2008 to 5.3 acres in May 2009 as a result of expansion to the eastern section of the reservoir. This spread prompted an increased response, including two applications of 2-4,D (area treated = 31 acres) by the TPWD Aquatic Habitat Enhancement crew during summer 2009, physical removals of plants by District personnel conducted when practical, and a coordinated removal of approximately 42 cubic yards of water hyacinth and other plant material by volunteers from three bass clubs. Unseasonably cold weather in January 2010 had a marked impact on over-winter survival of water hyacinth at Lake Quitman, leading to a reduction in the quantity and distribution of plants observed in spring 2010.

Creel: Total fishing effort for all species at Lake Quitman in spring 2010 was 4,736 h and total directed

expenditures were estimated at \$17,737 (Table 6). Directed fishing effort by anglers was highest for crappie (49%), followed by largemouth bass (31%), and catfishes (16%) (Table 5).

Prey species: Total CPUE of gizzard shad in 2009 (327.0/h) was similar to 2005 (296.0/h) but lower than 2001 (488.0/h) (Figure 1). Index of vulnerability (IOV) for gizzard shad remained high, with 84% of gizzard shad available to most predator fish (Figure 1). Threadfin shad were also present (Appendix A). The sunfish community in Lake Quitman was dominated by bluegill. Bluegill CPUE in 2009 (241.0/h) was higher than in previous surveys (Figure 2) and was dominated by small (<5 inches) individuals. Relative weights of sport fish were favorable, indicating prey fish populations were adequate.

Channel catfish: Total CPUE of channel catfish in gill nets was 2.4/nn in 2009, which was lower than the previous survey in 2006 (5.0/nn) but higher than in 2002 (0.2/nn) (Figure 3). This population exhibited low density and provided a limited resource for anglers. The presence of sub-stock fish (<11 inches) in gill net samples, confirmed natural reproduction in the channel catfish population. Directed fishing effort for channel catfish in spring 2010 was 750 hr, angler catch rate was 1.75/hr, but no harvest was observed (Table 7).

Black basses: The electrofishing catch rate of largemouth bass was lower in 2009 (61/h) than in 2007 (76/h) and 2005 (99/h), but the quality of the population has improved as evidenced by increased Proportional Size Distribution (PSD) from 22 to 52 (Figure 4). The PSD of largemouth bass in Lake Quitman was in the objective range for balanced fish populations (40-70) and for big bass (50-80) recommended by Gabelhouse (1984). Body condition in 2009 was similar to previous years with most size classes averaging around 90. Growth of largemouth bass in Lake Quitman was moderate; average age at 14 inches (13.3 to 14.6 inches) was 3.8 years (N = 12; range = 2 – 6 years). Directed fishing effort for largemouth bass was 1,483 hr, angler catch rate was 0.3/hr, and anglers released 36% of legal-sized bass (Table 8). Few harvested largemouth bass were observed in the creel (Figure 5). Although spotted bass have been collected in previous surveys, none have been collected since 2001 (Myers and Storey 2002) and at that time no quality-sized fish (> 11 inches) were observed.

Crappies: Total trap net CPUE of white crappie in 2009 (15.4/nn) was similar to 2001 (12.2/nn), but lower than in 2005 (30.8/nn) (Figure 6). Mean relative weight of fish over the minimum length limit (10 inches) was good and ranged from 90 to 99. Smaller fish exhibited lower relative weights (range 79 to 93), indicating potential prey availability problems for this size range. Average age of white crappie at 10 inches (9.0 to 10.8 inches) was 1.1 years (N = 8; range = 1 to 2 years). Although white crappie and black crappie were both found in Lake Quitman, no black crappies were collected in 2009. Previous surveys collected few black crappie (≤ 3 /nn; Jubar and Storey 2006). During the spring 2010 creel survey, white crappie comprised 94% of harvested crappie (Figure 7). Illegal harvest of crappie accounted for 4% of the total. Directed effort for crappie was 2,339 hr, angler catch rate was estimated at 1.27/h, and 4.39/acre were harvested (Table 9). No legal-sized crappies were released.

Fisheries management plan for Lake Quitman, Texas

Prepared – July 2010

ISSUE 1: Largemouth bass in Lake Quitman exhibit moderate growth rates and the potential to grow to trophy size. The current lake record for largemouth bass is 13.62 pounds and was caught in 1993, and donated to the Sharelunker Program (#141). Lake Quitman was stocked with FLMB in 2008 and 2009 at 100/acre because no pure FLMB were collected in a sample of age-0 fish in fall 2005. FLMB allele frequency in that sample was 29%.

MANAGEMENT STRATEGIES

1. Conduct additional electrofishing survey during fall 2011 to monitor the largemouth bass population.
2. Conduct genetic analysis on age-0 fish sampled during fall 2011 electrofishing to monitor the impact of FLMB stockings.
3. Conduct roving creel survey in spring 2014 to monitor catch and harvest of and angler effort for largemouth bass and other game fish.
4. Collect data from sources such as club tournaments to document the trophy status of the largemouth bass population.

ISSUE 2: Water hyacinth, first documented in Lake Quitman in September 2001, poses risks to the reservoir ecosystem and recreational access, and it is imperative to continue close monitoring and implement treatment activities when necessary. Its distribution and abundance have been monitored annually through aquatic vegetation surveys. Whenever feasible, treatment efforts have included manual removal and herbicide spraying. Wood County staff is preparing to assume responsibility for herbicide treatments beginning in summer 2010.

MANAGEMENT STRATEGIES

1. Continue monitoring water hyacinth annually.
2. Provide information on distribution and abundance of water hyacinth and suggest a prioritized list of treatment areas to Wood County staff to aid in treatment activities.
3. Coordinate physical removal of water hyacinth plants using District staff and volunteers whenever practical.

ISSUE 3: There is a lack of structural habitat in Lake Quitman, which may limit growth, reproduction, and recruitment of sport fishes. Efforts to add structural habitat in nearby reservoirs have proven successful. Similar techniques are being considered for Lake Quitman.

MANAGEMENT STRATEGIES

1. Contact Wood County and other stakeholders who may be interested in improving fish habitat in the reservoir.
2. Coordinate with stakeholders to deploy submerged fish habitat structures.
3. Experiment with materials other than hardwood brush and pine branches, both of which may settle and decay rapidly, limiting their utility as long-term habitat for fishes. Reefs composed of bamboo have shown some potential as long-term structures and can be used as an alternative to pine and hardwood structures.

ISSUE 4: Aquatic vegetation in Lake Quitman is limited to emergent vegetation, primarily bulrush, cattail, maidencane, and wild taro. Enhancement of aquatic vegetation populations in the lake has the potential to provide additional available fish habitat.

MANAGEMENT STRATEGY

1. Identify sites suitable for establishment of native aquatic vegetation.
2. Transplant native emergent plants from existing colonies of waterwillow and/or pickerelweed in Lake Holbrook.
3. Submit requests for aquatic plants from the Native Aquatic Plant Nursery at the Texas Freshwater Fisheries Center for native submerged species such as pondweed and water stargrass.
4. Coordinate with local interest groups that can assist in the procurement, transportation, and distribution of native aquatic vegetation.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes annual vegetation surveys, additional electrofishing in 2011, and mandatory monitoring in 2013 to 2014 (Table 10). The additional electrofishing survey in 2011 is necessary to maintain consistent data for trend information on the largemouth bass population and to collect genetics information on the population to assess the impact of FLMB stockings in 2008 and 2009. Gill net surveys are necessary every four years to monitor channel catfish recruitment and abundance. Optional trap net sampling will be conducted every four years to monitor crappie recruitment and abundance. A spring quarter roving creel survey is planned for March through May 2014 to monitor angler catch, harvest, and effort.

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Table 1. Characteristics of Lake Quitman, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
Surface area	814 acres
Counties	Wood
Reservoir type	Tributary
Mean depth	10.0 ft.
Maximum depth	25.0 ft.
Shoreline Development Index (SDI)	3.39
Conductivity	130 μ mho / cm
Secchi disc range	4 – 6 ft.
Watershed area	31 mi ²

Table 2. Harvest regulations for Lake Quitman.

Species	Bag limit	Minimum-Maximum length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No limit
Catfish: flathead	5	18 - No limit
Bass: largemouth	5	14 - No limit
Bass: spotted	(in any combination)	No limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No limit

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

Species	Year	Number	Size
Channel catfish	1982	8,205	
	1986	40,230	AFGL
	1992	40,000	AFGL
	Total	88,435	
Flathead catfish	1971	200	
Striped bass	1972	2,160	
Green x redear sunfish	1971	5,000	
Florida largemouth bass	1980	311	ADL
	1999	81,443	FGL
	2000	82,267	FGL
	2008	80,145	FGL
	2009	80,972	FGL
	Total	325,138	

Table 4. Survey of littoral zone and physical habitat types, Lake Quitman, Texas, August 2009. A linear shoreline distance (miles) was recorded for each habitat type found. The sum of shoreline distances exceeds the lake perimeter because of overlap of habitat types.

Shoreline habitat type / Aquatic vegetation species	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	0.04	0.3		
Bulkhead /boat docks	1.13	7.6		
Native emergent /boat docks	0.04	0.3		
Natural shoreline	1.99	13.4		
Natural shoreline /alligatorweed	0.93	6.2		
Natural shoreline/boat docks	0.84	5.6		
Natural shoreline /native emergent	3.81	25.6		
Natural shoreline /native emergent / alligatorweed	3.27	21.9		
Natural shoreline /native emergent/ boat docks	0.71	4.8		
Natural shoreline /overhanging brush	0.20	1.4		
Rocky shoreline	0.43	2.9		
Not sampled	1.52	10.2		
Emergent aquatic species (<i>bulrush</i> , <i>cattail</i> , <i>wild taro</i> , <i>maidencane</i>)			7.8	1.0
Alligatorweed and Native emergents			7.0	0.9
Alligatorweed			1.8	0.2
Water hyacinth			Trace	
Total			16.6	2.0

Table 5. Percent directed angler effort by species for Lake Quitman, Texas, March through May 2010.

Spring 2010	
Catfish spp.	16
Black basses	31
Crappie spp.	49
Anything	4

Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Quitman, Texas, March through May 2010.

Creel Statistic	Spring 2010
Total fishing effort (hours)	4,736
Total directed expenditures	\$17,737

Gizzard Shad

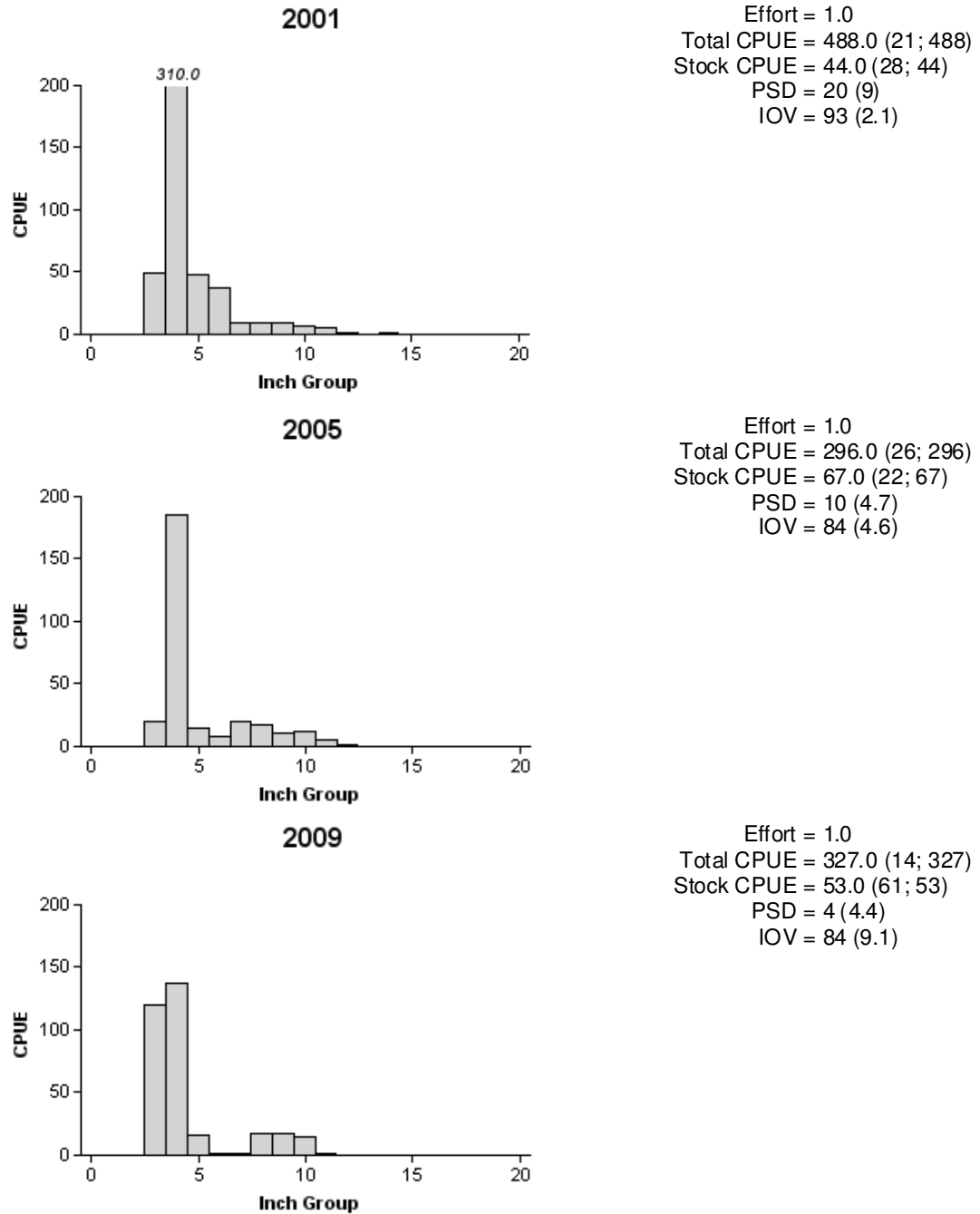


Figure 1. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2001, 2005, and 2009.

Bluegill

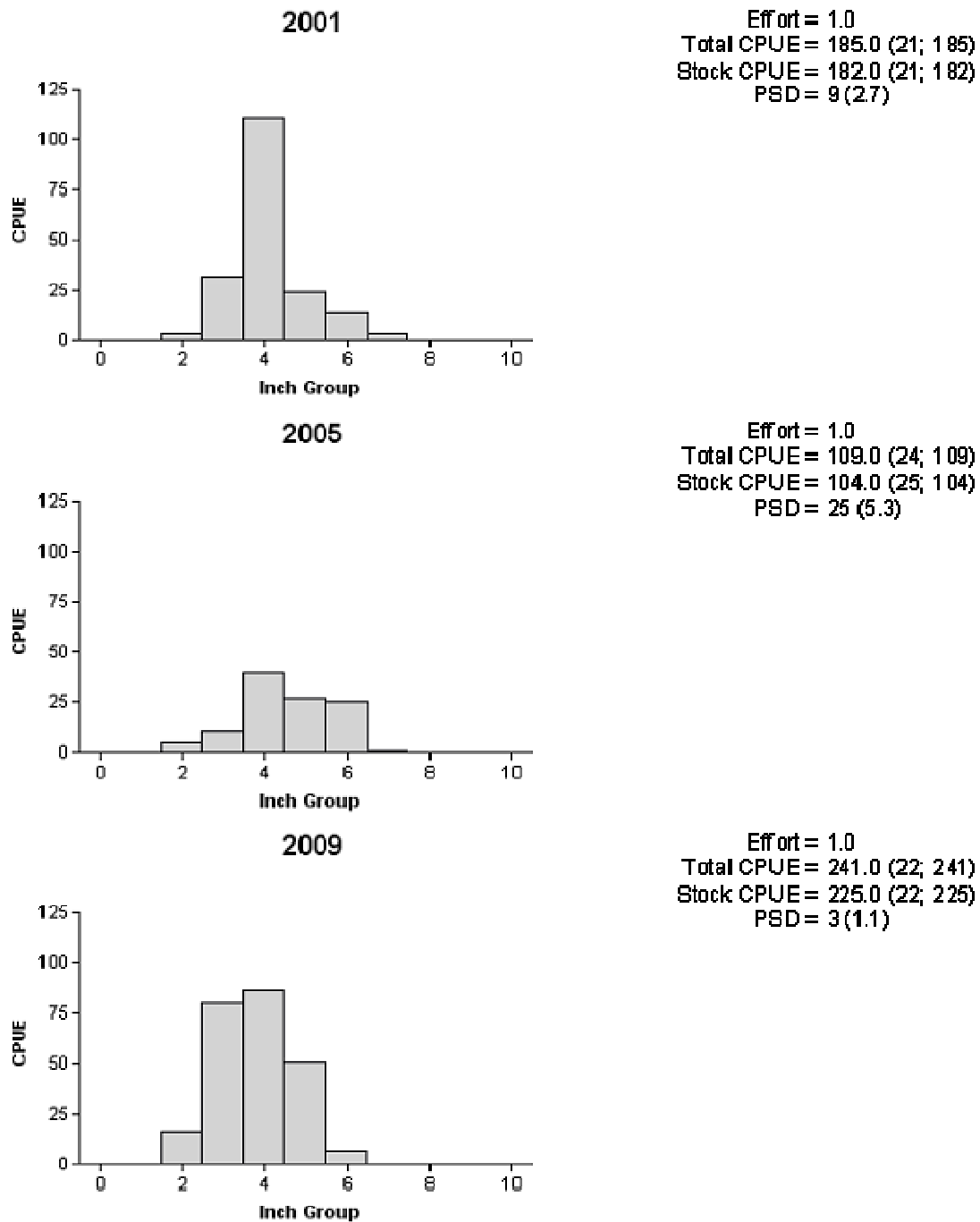


Figure 2. Number of bluegill caught per hour (CPUE, bars), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2001, 2005, and 2009.

Channel catfish

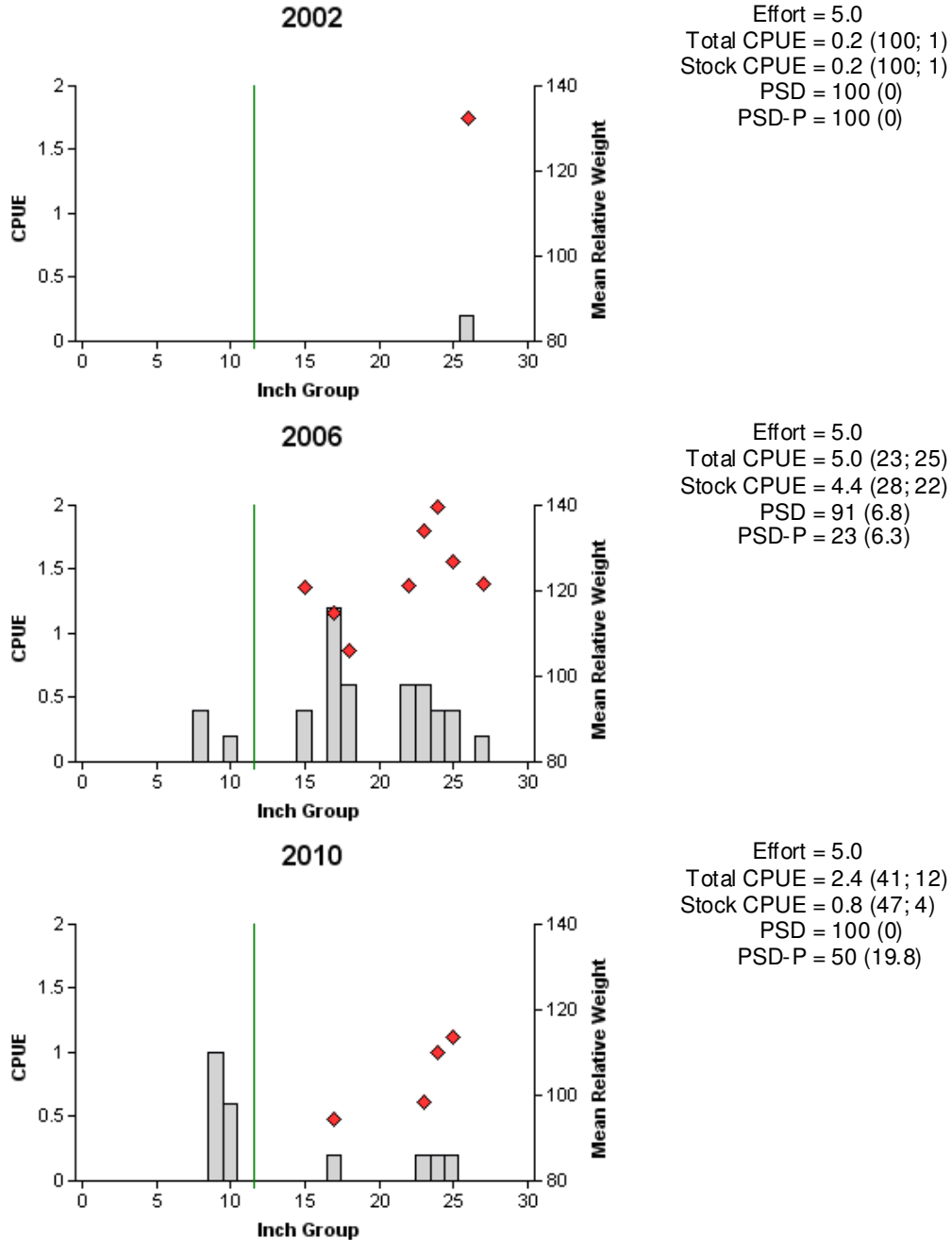


Figure 3. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Quitman, Texas, 2002, 2006, and 2010. Vertical lines indicate minimum length limit at time of survey.

Table 7. Creel survey statistics for channel catfish at Lake Quitman for March through May 2010, where total catch per hour is for anglers targeting all catfish species, and total harvest is the estimated number of channel catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Spring 2010
Directed effort (h)	750 (52)
Directed effort/acre	0.92 (52)
Total catch per hour	1.75 (87)
Total harvest	0 (0)
Harvest/acre	0 (0)
Percent legal released	0

Largemouth bass

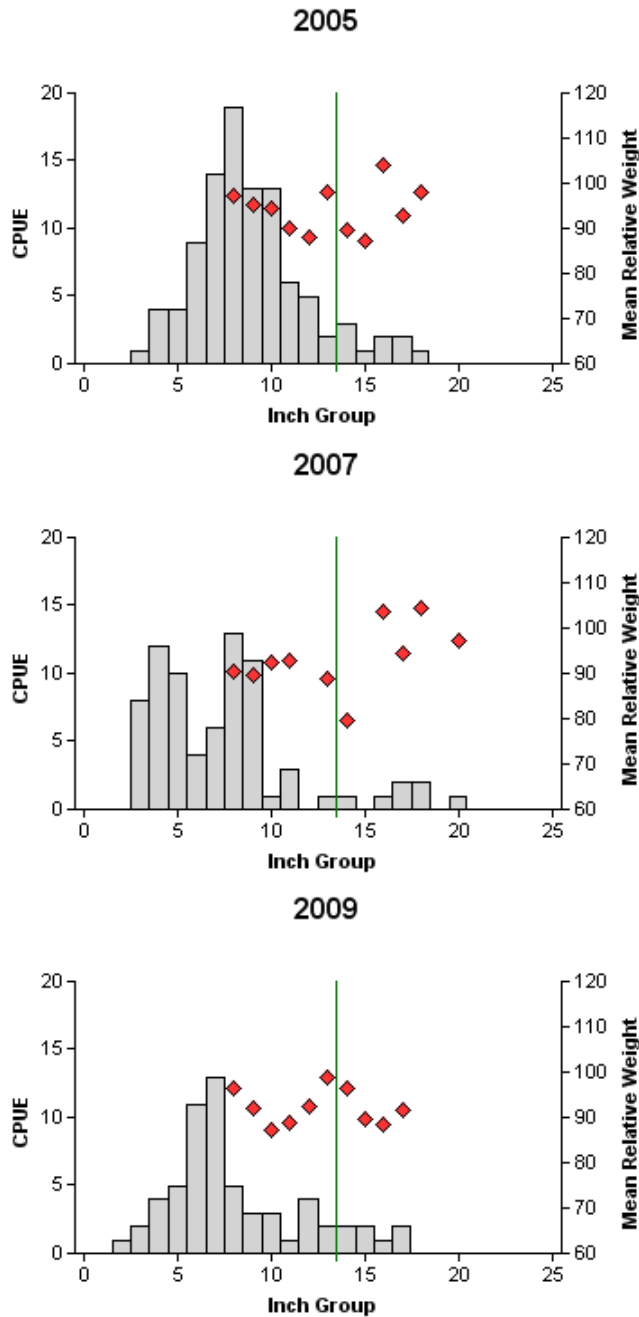


Figure 4. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2005, 2007, and 2009. Vertical lines indicate minimum length limit at time of survey. The 2007 survey was a largemouth bass-only electrofishing survey.

Table 8. Creel survey statistics for largemouth bass at Lake Quitman for March through May 2010, where total catch per hour is for anglers targeting all black bass species, and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Spring 2010
Directed effort (h)	1,483 (49)
Directed effort/acre	1.82 (49)
Total catch per hour	0.30 (24)
Total harvest	307 (117)
Harvest/acre	0.38 (117)
Percent legal released	36

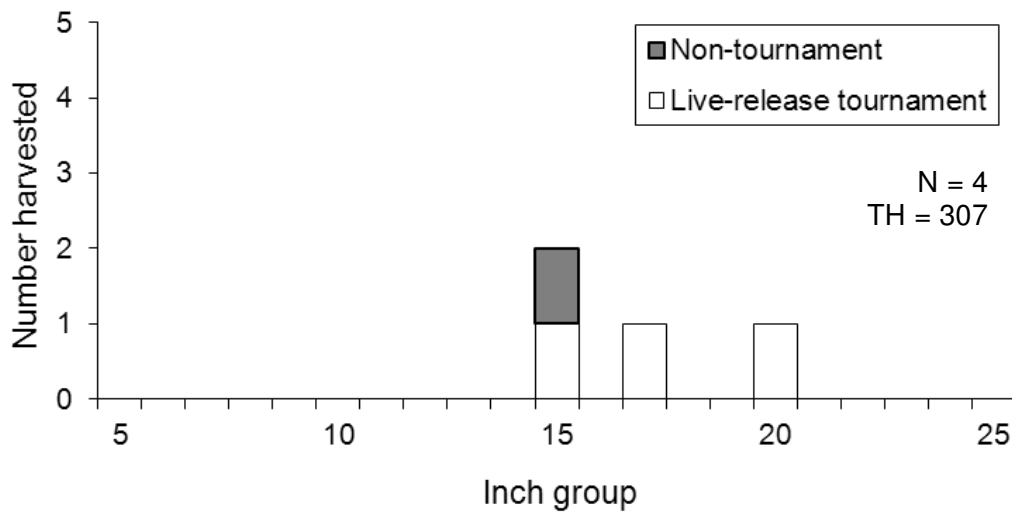


Figure 5. Length frequency of harvested largemouth bass observed during creel surveys at Lake Quitman from March through May 2010, separated by angler type. N is the number of harvested largemouth bass observed during creel surveys which includes fish transported to weigh-ins at live-release tournaments. TH is the total estimated harvest for the creel period.

White crappie

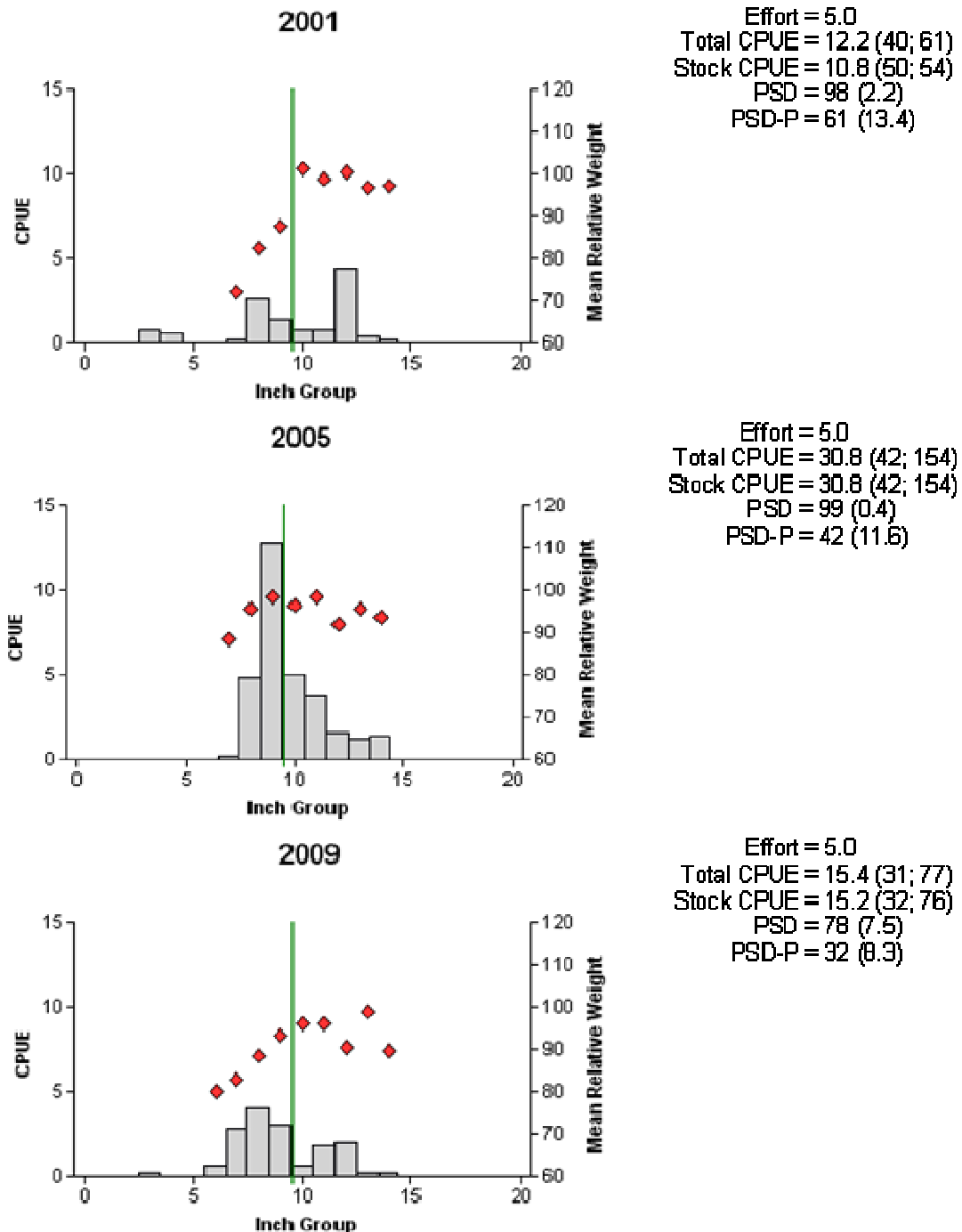


Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Quitman, Texas, 2001, 2005, 2009. Vertical lines indicate minimum length limit at time of survey.

Table 9. Creel survey statistics for crappie (species combined) at Lake Quitman for March through May 2010, where 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	Spring 2010
Directed effort (h)	2,339 (38)
Directed effort/acre	2.87 (38)
Total catch per hour	1.27 (52)
Total harvest	3,570 (81)
Harvest/acre	4.39 (81)
Percent legal released	0

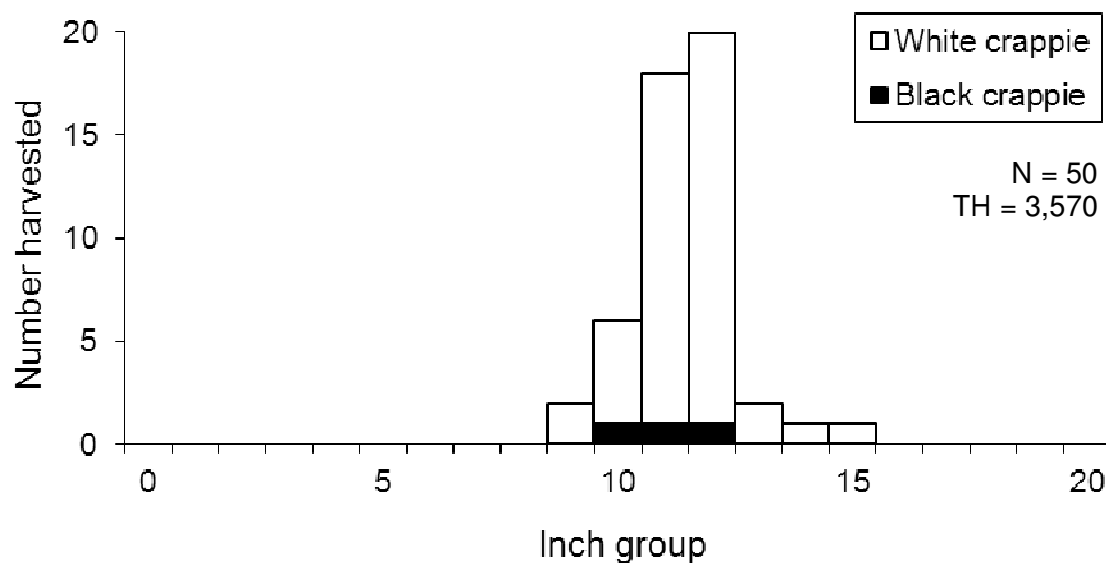


Figure 7. Length frequency of harvested crappie observed during creel surveys at Lake Quitman, Texas, March through May 2010, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 10. Proposed sampling schedule for Lake Quitman, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

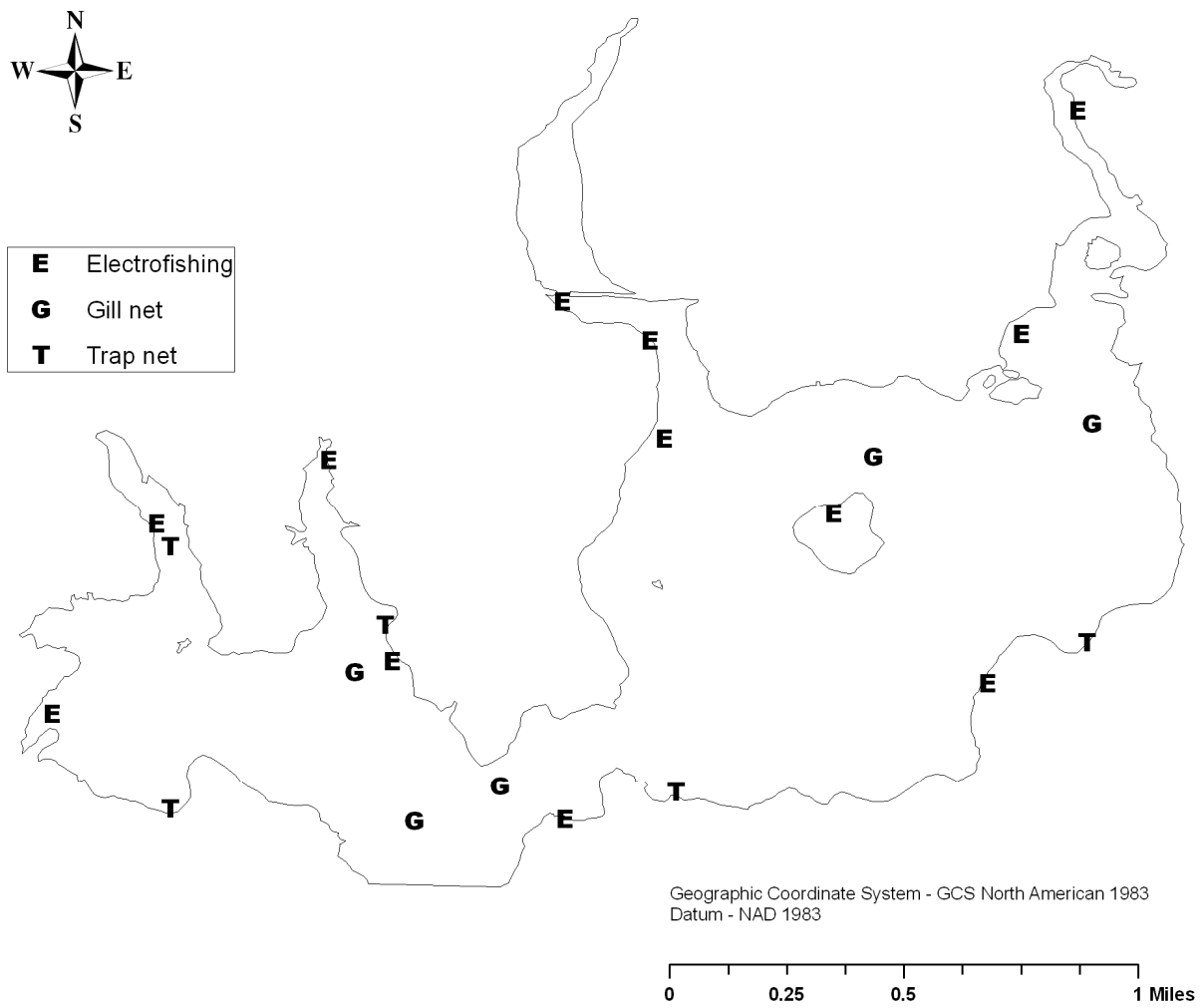
Survey Year	Electrofishing	Trap netting	Gill netting	Spring-Quarter Creel	Vegetation	Report
Fall 2010-Spring 2011					A	
Fall 2011-Spring 2012	A				A	
Fall 2012-Spring 2013					A	
Fall 2013-Spring 2014	S	A	S	A	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Quitman, Texas, 2009-2010.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					327	327.0
Threadfin shad					44	44.0
Channel catfish	12	2.4				
Warmouth					4	4.0
Bluegill					241	241.0
Longear sunfish					56	56.0
Redear sunfish					2	2.0
Spotted sunfish					1	1.0
Largemouth bass					61	61.0
White crappie			77	15.4		

APPENDIX B



Location of electrofishing, gill netting, and trap netting sampling sites, Lake Quitman, Texas, 2009-2010.