

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

**Lake Quitman**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Quitman were surveyed in 2013 using electrofishing and trap netting, and in 2014 using gill netting. Aquatic vegetation and habitat surveys were conducted on Lake Quitman during August 2013. Vegetation reconnaissance surveys were also conducted in April and June 2014 to track the distribution of water hyacinth prior to treatment activities. 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 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, and emergent aquatic vegetation including the exotic species 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 2009 survey report recommended stocking Florida Largemouth Bass (FLMB) fingerlings at 100/acre. 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 included 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 rate of Bluegill was moderate with a majority of small individuals. Threadfin Shad were present.
  - **Catfishes:** Catch rate of Channel Catfish has historically been low, yet increased in the 2014 survey. The majority of fish were of harvestable size.
  - **Black bass:** Largemouth Bass and Spotted Bass were both present in the reservoir in moderate density. The Largemouth Bass population was dominated by fish under 14 inches.
  - **Crappies:** White and Black Crappie were both present in the reservoir, and were the most sought after sport fish in a 2010 spring creel survey. White Crappie was the predominant species in the reservoir.

**Management Strategies:** Conduct standard monitoring with trap nets, gill nets, and electrofishing surveys in 2017 to 2018. Conduct a roving creel survey in spring 2018 to monitor fishing effort, catch, and harvest rates. Conduct annual surveys to monitor distribution and acreage of water hyacinth and recommend treatments as required.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Quitman 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 species of 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 Quitman is an 814-acre impoundment constructed in 1962 on Dry Creek, a tributary of Lake Fork Creek, which is a 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 recreation and flood control. Habitat at time of sampling consisted primarily of natural shoreline with limited cover in the form of native emergent vegetation and boat docks. Water hyacinth was first discovered in September 2001 in the western one-third of the reservoir and persists in a limited area in Brushy Creek. Since that time, treatment activities have included manual removal and herbicide applications. Other descriptive characteristics for Lake Quitman are in Table 1.

### *Angler Access*

Boat access at Lake Quitman consists of three public boat ramps and several private individual and community restricted boat ramps. Bank fishing access was adequate within three day-use areas. Boat ramps provide adequate access to the reservoir.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Jubar and Storey 2010) included:

1. Monitoring of Largemouth Bass fishery.  
**Action:** An additional bass-only electrofishing survey and genetic analysis was conducted during fall 2011. A roving creel survey was not conducted in 2014 as a result of manpower limitations.
2. Monitor and control Water hyacinth.  
**Action:** Annual aquatic vegetation surveys to monitor coverage of water hyacinth were conducted. From 2010 through fall of 2013 no treatment was required because low water levels, induced by drought, confined water hyacinth in Brushy Creek. In October 2013 following heavy rainfall, plants were flushed out of the creek into the main lake which prompted manual removal by District staff and herbicide applications by TPWD Aquatic Habitat Enhancement (AHE) staff. A containment boom was also installed across the creek in an attempt to limit the spread of any additional water hyacinth plants. The controlling authority, Wood County, has purchased herbicide in the past and has staff certified to treat water hyacinth.
3. Add structural habitat in Lake Quitman to improve growth and recruitment of sport fishes.  
**Action:** Coordination with stakeholders to deploy submerged structures has not yet occurred.
4. Enhance aquatic vegetation in the lake to improve available fish habitat.  
**Action:** The native plant American waterwillow was introduced in 2013 at three locations

in the reservoir to provide additional habitat.

**Harvest regulation history:** Historically, all sport fishes in Lake Quitman have been managed with statewide regulations (Table 3).

**Stocking history:** Lake Quitman was stocked with Florida Largemouth Bass (FLMB) in 2008 and 2009. FLMB were initially introduced in 1980 (311 adults) and also stocked in 1999 and 2000. Channel Catfish were introduced in 1982, and a fishery persists. Flathead Catfish and Green x Redear Sunfish hybrids were stocked in 1971, and Striped Bass were stocked once in 1972. A complete stocking history is in Table 4.

**Vegetation/habitat management history:** Water hyacinth was first documented in September 2001 and has persisted in limited areas. Treatment efforts have consisted of periodic manual removal by district staff and volunteers from fishing clubs and periodic spraying with aquatic herbicides by AHE staff. Water hyacinth was not detected during the standard vegetation survey in 2013. However, it was subsequently discovered after rainfall allowed plants to escape a restricted population in Brushy Creek. This spread prompted physical removal by district staff in fall 2013, installation of a containment boom, and herbicide applications by the TPWD AHE crew during fall 2013 and summer 2014. Alligatorweed has not required treatment. The native plant American waterwillow was introduced in multiple locations in 2013 to improve fish habitat.

**Water transfer:** Lake Quitman is not a water supply reservoir. Water released from the reservoir spillway travels downstream to Lake Fork Creek and subsequently the Sabine River. Raw water has the potential to impact downstream water intake structures such as the Sabine River Pump Station located between Longview and Kilgore, Texas.

## 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).

Aquatic vegetation and structural habitat surveys were performed according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). An additional aquatic vegetation survey was conducted to map the distribution and coverage of water hyacinth.

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). For Largemouth Bass, mean relative weight and standard deviation (SD) was calculated for stock length and larger fish for 20 and 24 individuals in 2011 and 2013, respectively. Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X 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=13, length range 13.1 to 15.0 inches), and White Crappie (N=18, length range 9.1 to 10.9 inches).

## RESULTS AND DISCUSSION

**Vegetation/habitat:** Shoreline habitat during summer 2013 was composed primarily of natural shoreline,

native emergent vegetation, and boat docks (Table 5). Boat docks contribute to the limited structure in the reservoir with 174 existing boat docks (9/shoreline mile). Modified shoreline in the form of bulkhead and rock shore contributed 8% of the lake shoreline. The exotic plant species alligatorweed and water hyacinth are both present in the reservoir. The aquatic vegetation in Lake Quitman was dominated by emergent species (cattails, maidencane, waterwillow, and water primrose) and alligatorweed which contributed a combined area of 17 acres (2% of the reservoir's surface area) (Table 6).

**Prey species:** Total CPUE of Gizzard Shad was high in 2013 (202.0/h) although lower than in 2009 (327.0/h) and 2005 (296.0/h) (Figure 1). Index of Vulnerability (IOV) for Gizzard Shad remained consistently high with most fish available to adult predator fishes (Figure 1). Threadfin Shad were also present (Appendix A). The sunfish community in Lake Quitman was dominated by Bluegill. Bluegill CPUE in 2013 (111.0/h) was consistent with CPUE in 2005 (109.0/h) yet down from a high of 241.0/h in 2009. Bluegill PSD is consistently low (Figure 2) and may suggest a lack of available habitat. Longear Sunfish also contributed to the prey base.

**Channel Catfish:** Total gill net CPUE of Channel Catfish in 2014 increased from previous surveys to a high of 10.0/nn. Gill net catch rate of Channel Catfish was 2.4/nn in 2009 and 5.0/nn in 2006 (Figure 3). The majority of fish were over 12 inches and available for angler harvest (PSD-12 = 89). Channel Catfish was the third most sought after species in a 2010 spring creel survey with 16% of the directed fishing effort (Jubar and Storey 2010).

**Black basses:** The electrofishing catch rate of Largemouth Bass was lower in 2013 (48.0/h) than previous surveys in 2011 (121.0/h) and 2009 (61.0/h). The PSD of Largemouth Bass was low in 2011 (19) and 2013 (17), down from 52 in 2009. Few legal-length bass were collected in 2011 and 2013. For Largemouth Bass greater than stock length ( $\geq 8$  inches), mean relative weight ( $W_r$ ) was 89 (SD = 6) in 2013 and 94 (SD = 9). Growth of Largemouth Bass in Lake Quitman was moderate with a mean age at 14 inches (13.1 to 15.0 inches) of 2.5 years (N = 13 range = 2 to 5 years). Genetic analysis indicated a low percentage of Florida Largemouth Bass alleles in 2013 (26%) despite FLMB stockings in 2008 and 2009 (Table 7). Largemouth Bass were the second most sought after species in a spring 2010 creel survey with 31% of the directed effort (Storey and Jubar 2010). Spotted Bass were collected in the 2013 survey for the first time since 2001 (Myers and Storey 2002) but all were 10 inches or less in length (Figure 4).

**Crappies:** Total CPUE of White Crappie in trap nets in 2013 (15.2/nn) was consistent with the survey in 2009 (15.4/nn); although lower than the survey in 2005 (30.8/nn) (Figure 6). Mean relative weight of fish above stock length (5 inches) was adequate ( $W_r = 90$ ), and indicated sufficient forage availability. Average age of White Crappie at 10 inches (9.1 to 10.9 inches) was 1.5 years (N = 18; range = 1 to 3 years). Although both White and Black Crappie were present in Lake Quitman, Black Crappie were historically lower in abundance and were not collected in 2009 (Figure 7). Crappies were the most important sport fish group at Lake Quitman in a spring 2010 creel survey, accounting for 49% of the directed fishing effort (Storey and Jubar, 2010).

## Fisheries management plan for Lake Quitman, Texas

Prepared – July 2014

**ISSUE 1:** Few legal-length Largemouth Bass have been collected in recent surveys. Poor size structure of Largemouth Bass and Bluegill may be related to lack of habitat. Lake Quitman exhibits a limited potential to produce Largemouth Bass > 8 lbs, and a low frequency of FLMB alleles in spite of stockings of FLMB in 2008 and 2009 at 100/acre.

### MANAGEMENT STRATEGIES

1. Continue to exploit opportunities to improve aquatic habitat through the introduction of native aquatic plants and natural and artificial fish attractors. Seek partners interested in coordinating efforts to improve habitat.
2. Conduct a standard electrofishing survey during fall 2017 to monitor growth rates, genetics, and the length distribution of the Largemouth Bass population.
3. Conduct genetic analysis on 30 randomly-collected Largemouth Bass from fall 2017 electrofishing.
4. Conduct roving creel survey in spring 2018 to monitor angler catch and harvest of and effort for Largemouth Bass and other game fishes.
5. Develop strategies to document catches of trophy Largemouth Bass.

**ISSUE 2:** Water hyacinth, first documented in Lake Quitman in September 2001, poses a risk 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, efforts have included manual removal and chemical treatment to control the infestation.

### MANAGEMENT STRATEGIES

1. Continue monitoring water hyacinth annually.
2. Provide information on distribution and abundance of water hyacinth and recommend treatments to Wood County staff.
3. Coordinate chemical treatment and physical removal of water hyacinth plants using district staff, volunteers, or contractors whenever practical.

**ISSUE 3:** 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. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. 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 annual vegetation surveys and mandatory monitoring in 2017 to 2018 (Table 8). Gill net surveys are necessary every four years to monitor Channel Catfish recruitment and relative abundance. Optional trap net sampling will be conducted every four years to monitor crappie recruitment and relative abundance. A spring-quarter roving creel survey is planned for March through May, 2018, to monitor angler catch, harvest, and effort.

## LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
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- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson 2007. Proportional Size Distribution (PSD): A further refinement of population size structure index terminology. Fisheries 32(7):348.
- Jubar, A. and K. Storey. 2010. Statewide freshwater fisheries monitoring and management program survey report for Lake Quitman, 2009. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-35, Austin.
- Myers, R., and K. Storey. 2002. Statewide freshwater fisheries monitoring and management program survey report for Lake Quitman, 2001. Texas Parks and Wildlife Department, Federal Aid Performance Report F-30-R-27, Austin.

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 $\mu\text{mho} / \text{cm}$
Secchi disc range	4 – 6 ft.
Watershed area	31 $\text{mi}^2$

Table 2. Boat Ramp characteristics for Lake Quitman, Texas, August 2013. Reservoir elevation at time of survey was 395 feet above mean sea level (msl).

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft. msl)	Condition
East Dam	32.85896 -95.45095	Y	30	391	Excellent.
West Dam	32.86011 -95.45878	Y	5	393	Adequate. Extension is feasible
North Access	32.87566 -95.44687	Y	3	393	Adequate for small boats/kayaks, Parking limited

Table 3. Harvest regulations for Lake Quitman, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5 <sup>a</sup>	14-inch minimum
Bass, Spotted	5 <sup>a</sup>	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>a</sup>Daily bag for Largemouth and Spotted Bass = 5 fish in any combination.

Table 4. 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 5. Survey of structural habitat types, Lake Quitman, Texas, August 2013.

Habitat type	Sum	Percent (%)
Boat docks	5.5	29
Bulkhead	1.2	6
Natural shoreline/emergent	10.7	55
Rocky shoreline	0.4	2
Not sampled	1.5	8

Table 6. Survey of aquatic vegetation, Sulphur Springs Reservoir, Texas, 2013. Surface area in acres is listed with percent coverage in parentheses.

Vegetation	2005	2009	2013
Native Emergent <sup>1</sup>	2.3 (0.3)	8 (1)	4 (0.5)
Alligatorweed	0	9 (1)	13 (1.5)
Water Hyacinth	tr	tr	2 (0.2)

<sup>1</sup> maidencane, cattails, water primrose, waterwillow

## Gizzard Shad

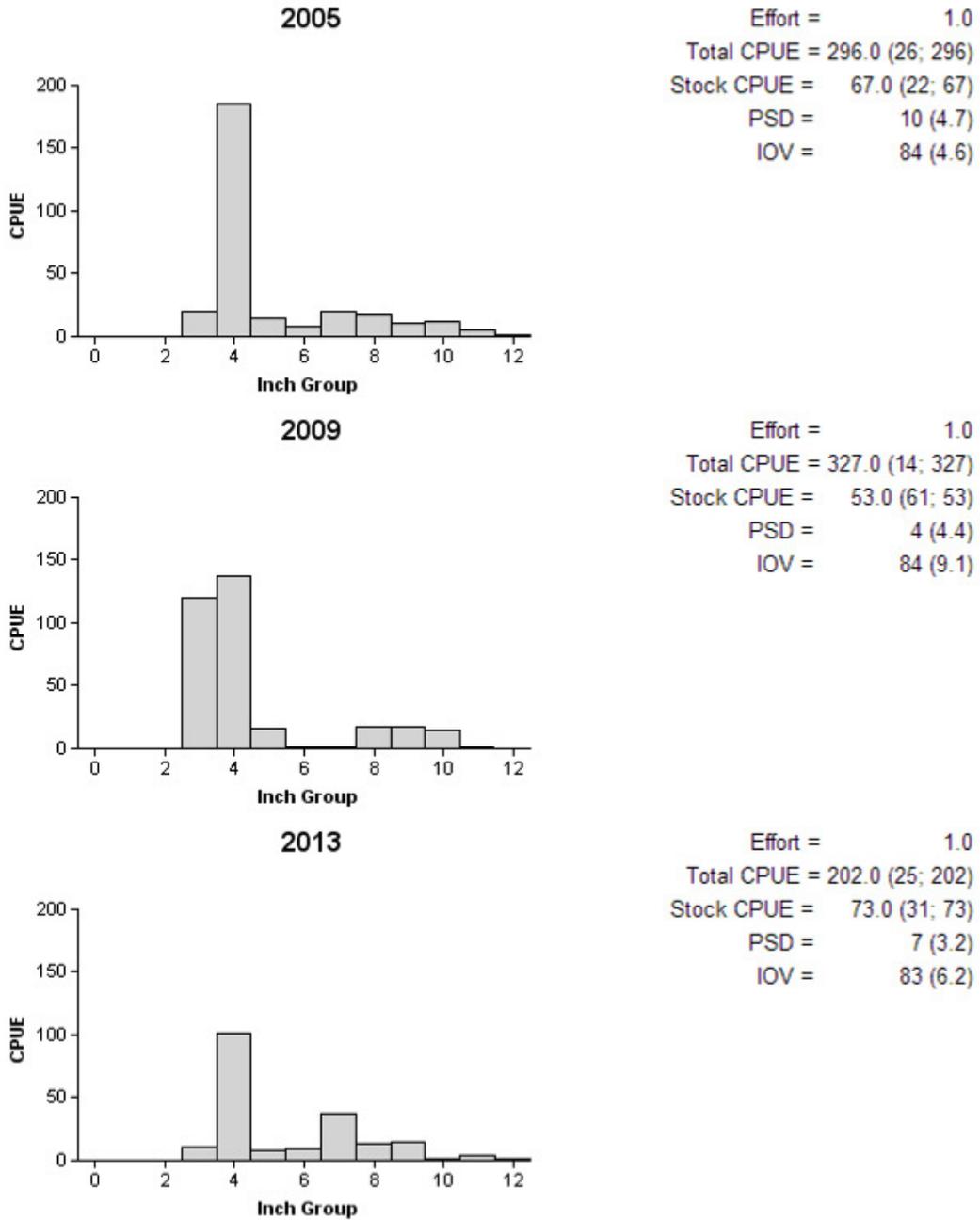


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2005, 2009, and 2013.

# Bluegill

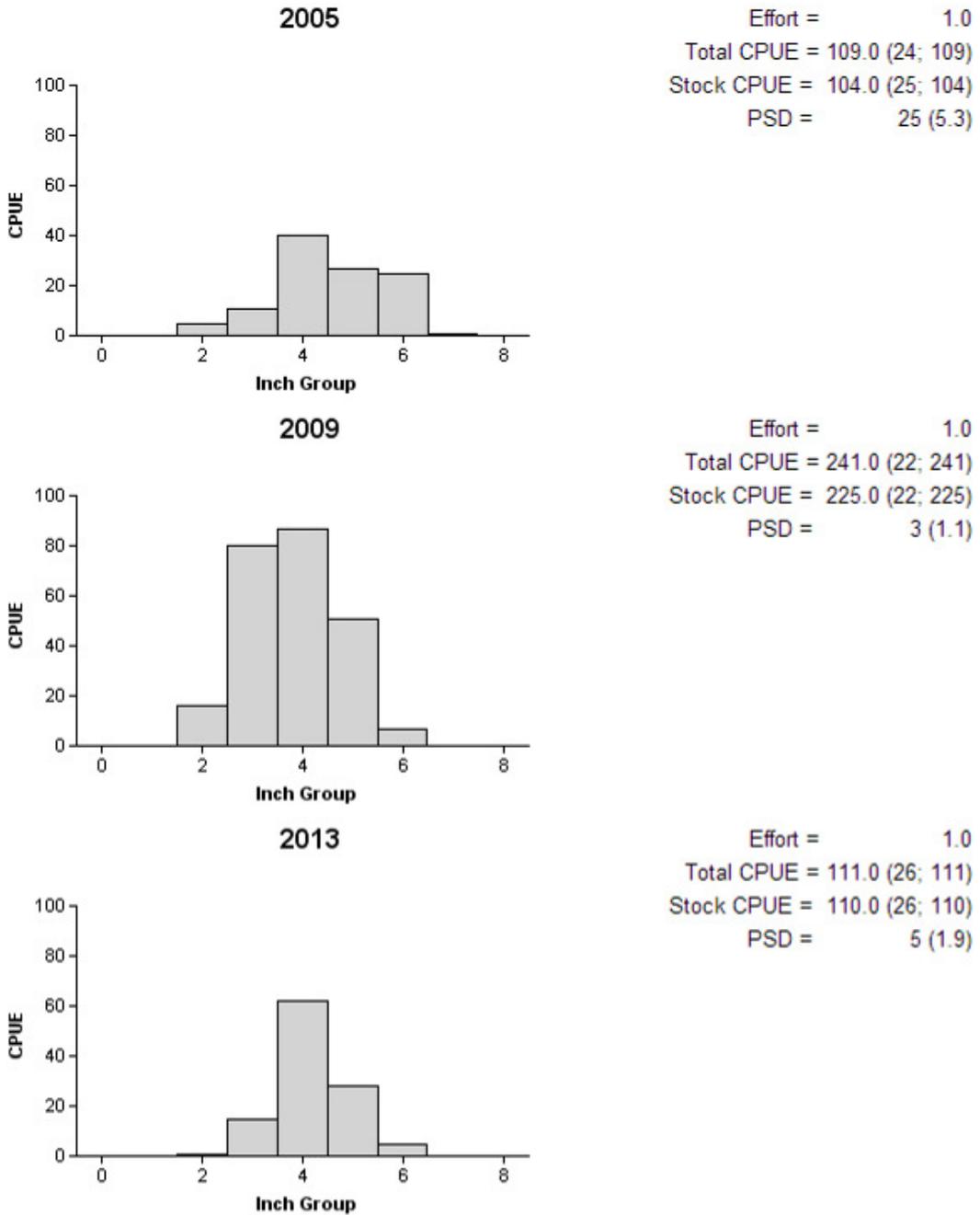


Figure 2. Number of Bluegill caught per hour (CPUE, bars), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2005, 2009, and 2013.

## Channel Catfish

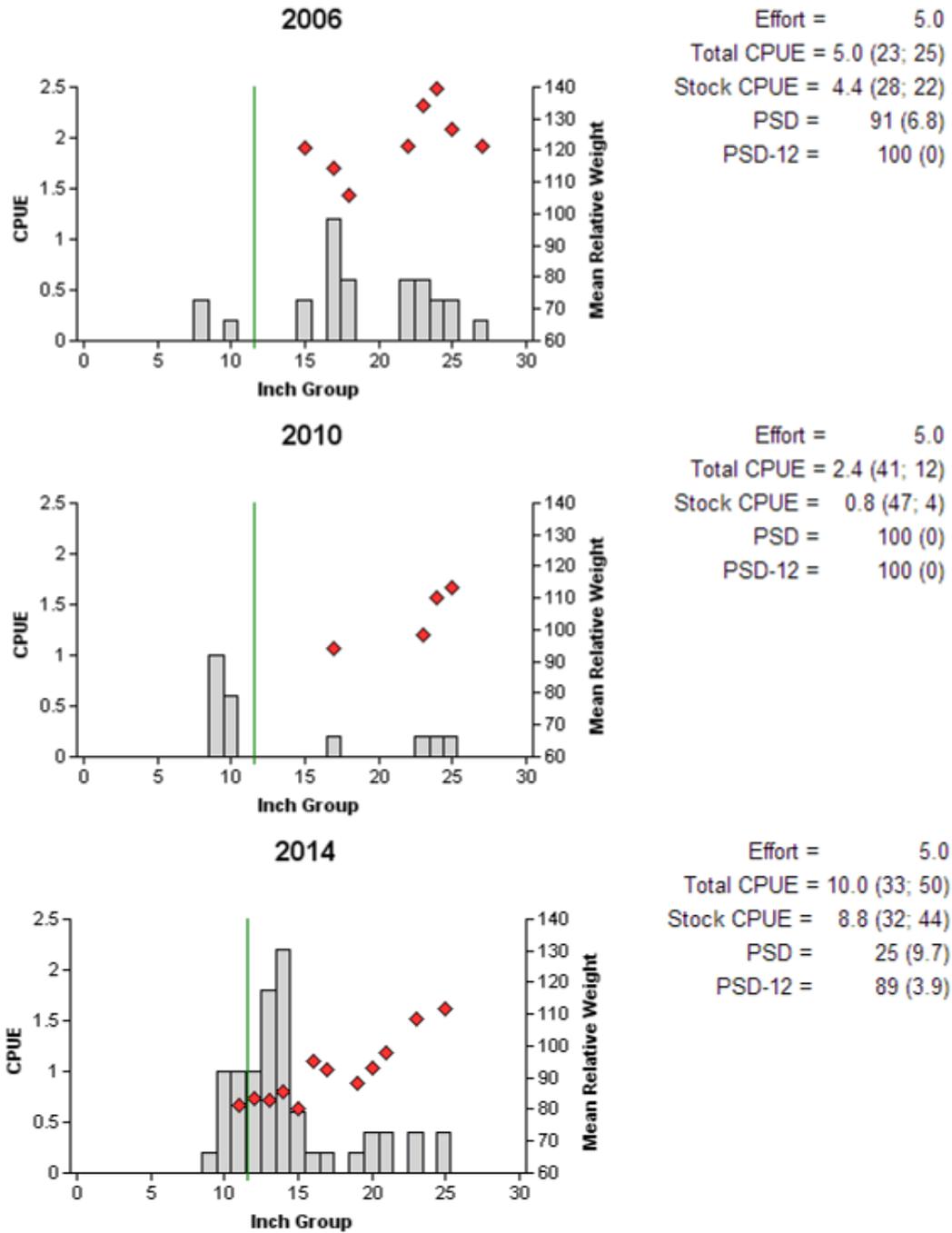


Figure 3. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Quitman, Texas, 2006, 2010, and 2014. Vertical lines indicate minimum length limit at time of survey.

## Spotted Bass

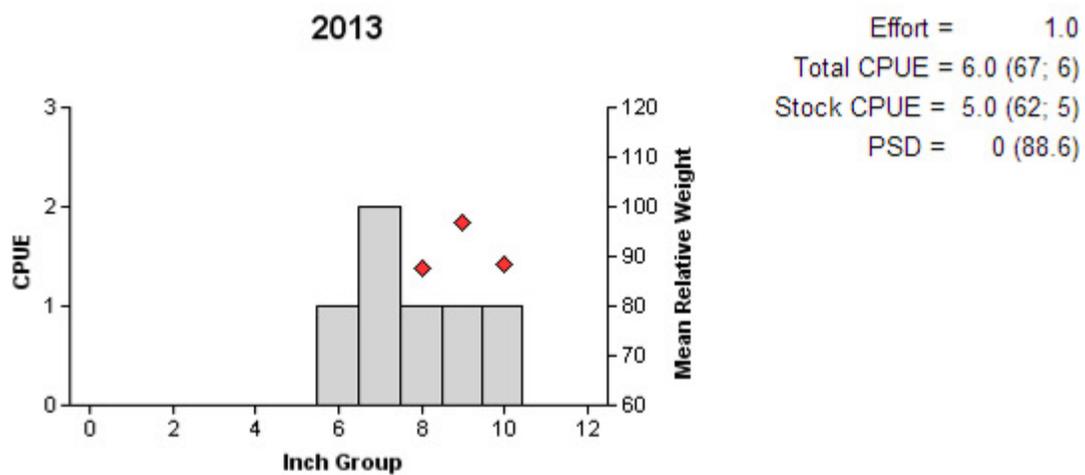


Figure 4. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2013.

## Largemouth bass

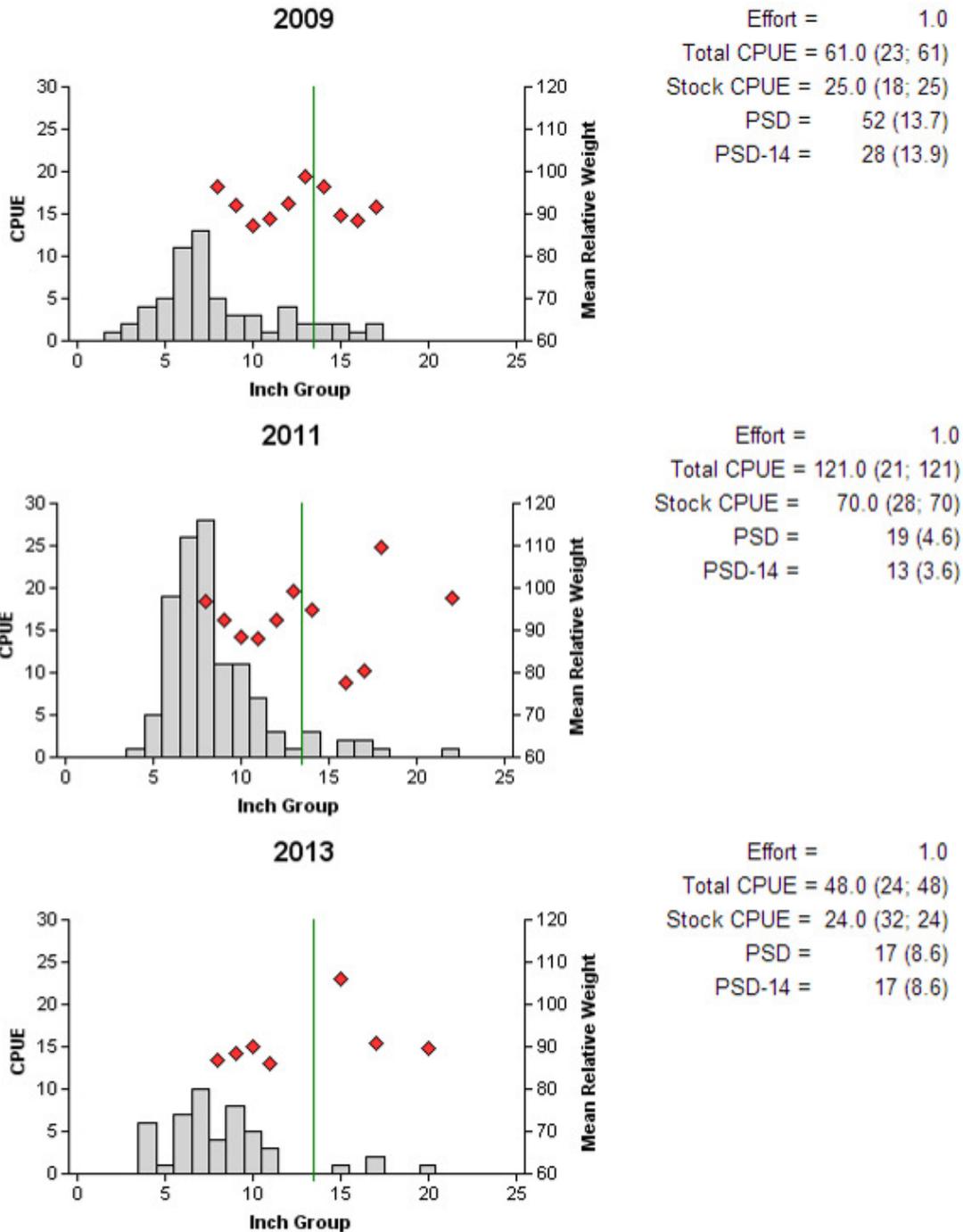


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2009, 2011, and 2013. Vertical lines indicate minimum length limit at time of survey.

## Largemouth Bass

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lake Quitman, Texas, 2005, 2009, and 2013. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype			% FLMB alleles	% Pure FLMB
		FLMB	Intergrade(F1)	NLMB		
2005	30	0	23(0)	7	29	0
2008	30	3	23(0)	4	39	3.3
2013	30	0	29(1)	1	26	0

## White crappie

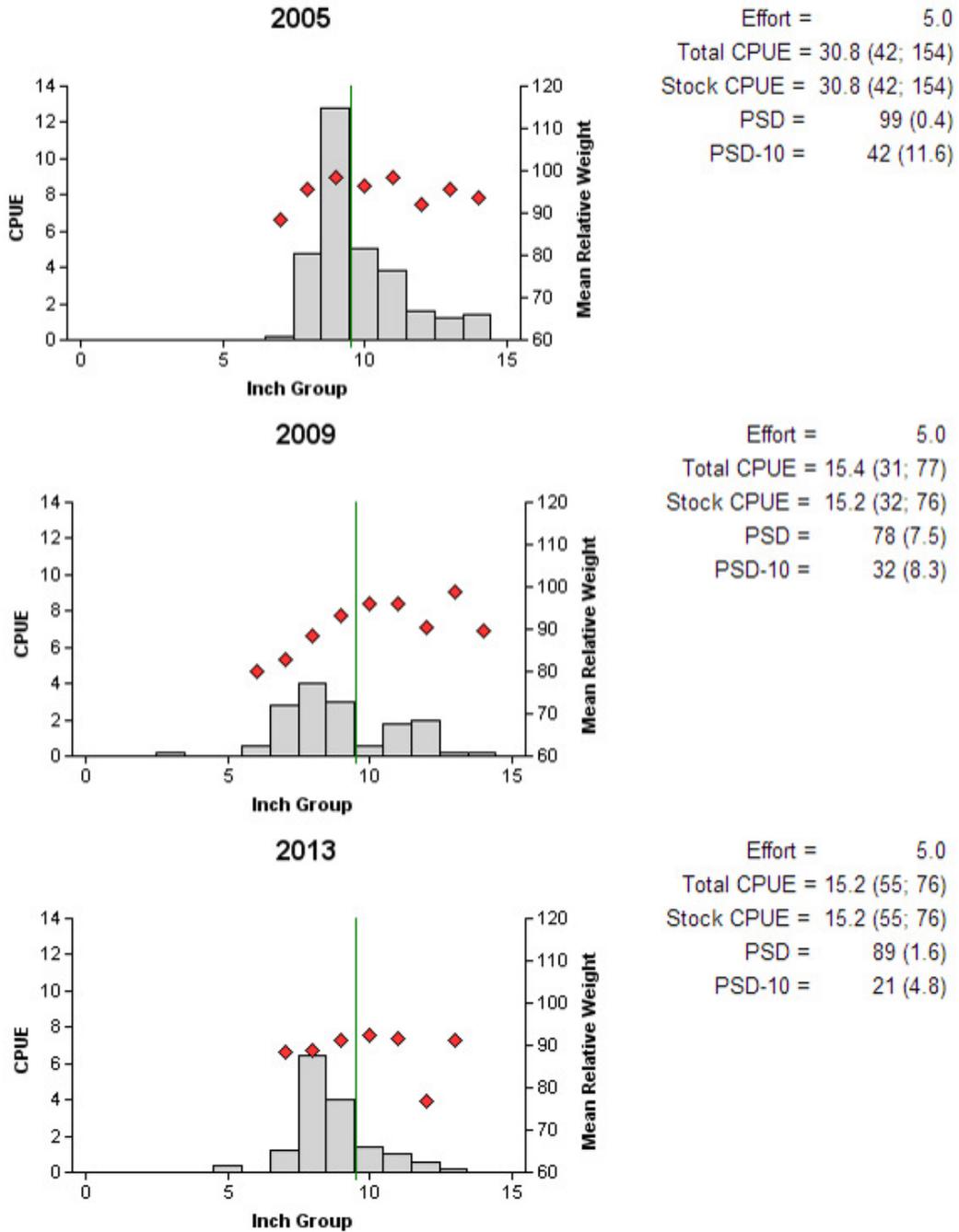


Figure 6. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Quitman, Texas, 2005, 2009, 2013. Vertical lines indicate minimum length limit at time of survey.

## Black Crappie

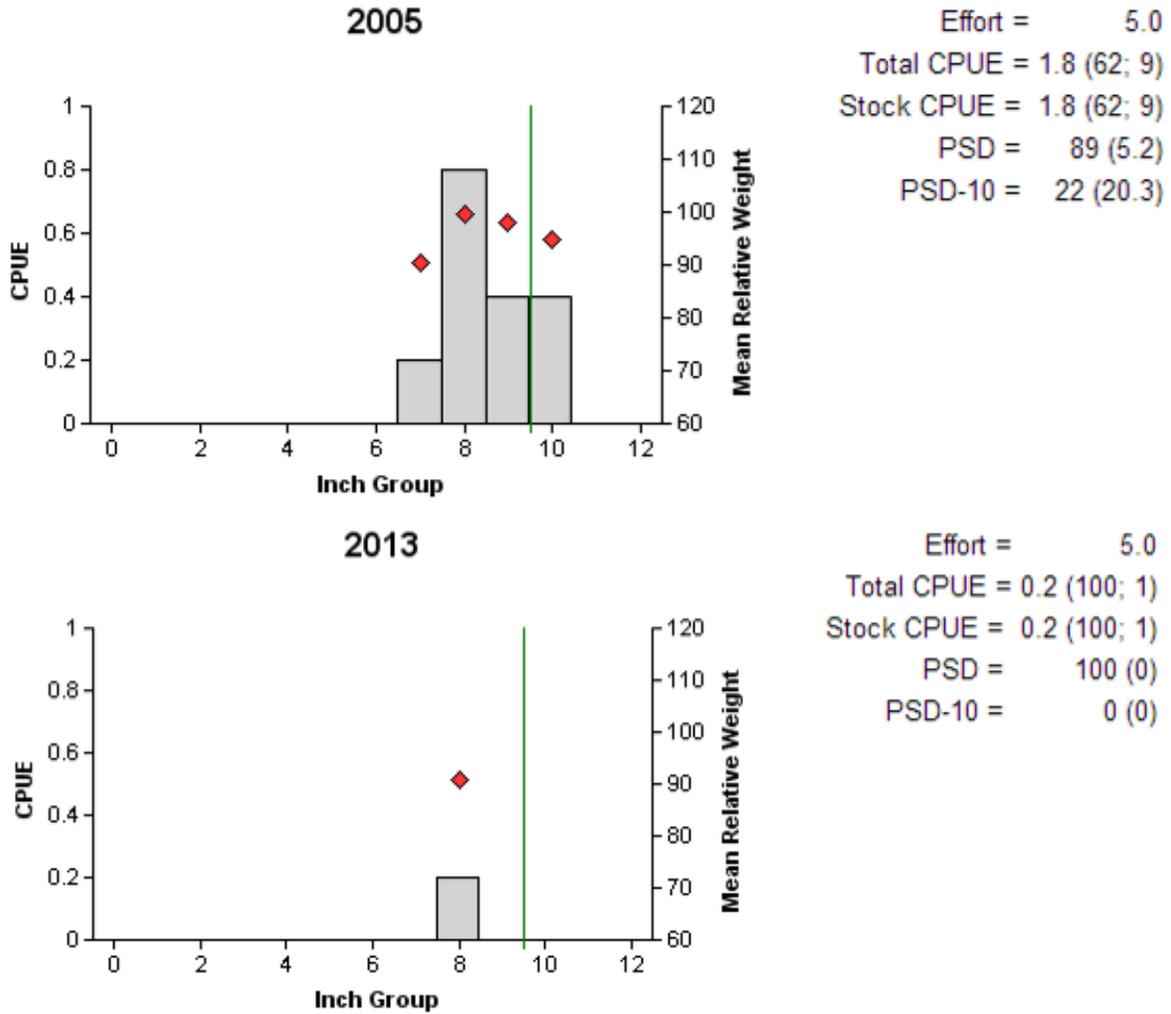


Figure 7. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Quitman, Texas, 2005 and 2013. Vertical lines indicate minimum length limit at time of survey.

Table 8. 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.

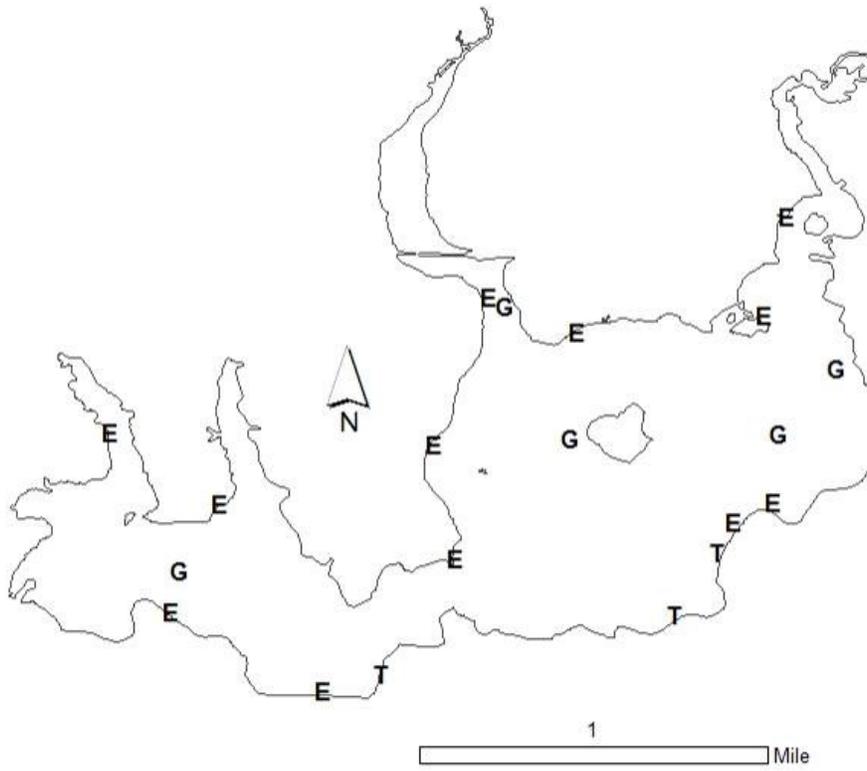
Survey Year	Electrofishing	Trap netting	Gill netting	Creel	Angler Access	Vegetation	Report
2014-2015						A	
2015-2016						A	
2016-2017						A	
2017-2018	S	A	S	Spring quarter	S	S	S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Quitman, Texas, 2013-2014. Sampling effort was 5 net nights for gill netting and trap netting, and 1 hour for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					202	202.0
Threadfin Shad					18	18.0
Channel Catfish	50	10.0				
Warmouth					1	1.0
Bluegill					111	111.0
Longear Sunfish					34	34.0
Spotted Bass					6	6.0
Largemouth Bass					48	48.0
White Crappie			76	15.2		
Black Crappie			1	0.2		

## APPENDIX B



Location of sampling sites at Lake Quitman Reservoir, Texas, 2013-2014. Electrofishing, gill net, and trap net stations are represented by E, G, and T, respectively.