

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

**Lake Quitman**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Quitman were surveyed in 2005 using electrofishing and trap nets, and in 2006 using gill nets. Aquatic vegetation and habitat surveys were conducted on Lake Quitman during September 2005. 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 featureless banks, boat docks, inundated timber, emergent aquatic vegetation, and the invasive floating plant, waterhyacinth.
- **Management history:** Important sport fish include largemouth bass, white crappie, black crappie, and channel catfish. The management plan from the 2001 survey report recommended stocking Florida largemouth bass fingerlings at 100 fish/acre if the percentage of Florida largemouth bass alleles in fall 2005 sampling was below 20%. Florida largemouth bass were introduced in 1980 and stocked again in 1999 and 2000. Recent efforts to control waterhyacinth 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 very high, with the majority of gizzard shad being available as prey to most sport fish. Electrofishing catch of bluegills was moderate, but few bluegills were over 6-inches long. Threadfin shad provided additional forage for sport fish in the reservoir.
  - **Catfishes:** The majority of channel catfish collected during gill netting were of harvestable size, resulting in the possibility of a productive fishery that may be underutilized. Flathead catfish were present in the reservoir, but are rare in population samples.
  - **Largemouth bass:** Largemouth bass were relatively abundant. Size structure was good. Largemouth bass tended to be of average body condition, indicating that prey populations were adequate.
  - **Crappies:** Both white and black crappies were present in the reservoir, with white crappie being more abundant. Both crappie species showed good size and body condition. Most white crappie reached legal size within two years.

**Management strategies:** Stock Florida largemouth bass to increase the percentage of Florida alleles in the largemouth bass population. Conduct additional electrofishing survey in 2007 and standard monitoring with trap nets, gill nets, and electrofishing surveys in 2009-2010. Conduct aquatic vegetation surveys in 2006-2009 to monitor distribution and coverage of waterhyacinth.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Quitman in 2005-2006. 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 2005-2006 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 of featureless banks with limited cover in the form of boat docks, inundated timber, and emergent aquatic vegetation. Waterhyacinth, a noxious aquatic plant, was first discovered in a few, small (5 acres) areas in September 2001 in the western third of the reservoir. Since 2001, waterhyacinth control activities have included manual removal and herbicide applications by TPWD staff. Recent observations show waterhyacinth persisted in small areas, but is limited to the western third of 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 (Myers and Storey 2002) included:

1. Enhancement of largemouth bass fishery.  
**Action:** Electrofishing surveys were conducted in 2003 and 2005 to monitor the largemouth bass population. Additional stockings of Florida largemouth bass (FLMB) were recommended if FLMB allele frequency fell below 20% during the fall 2005 electrofishing survey. The last FLMB stocking occurred during spring 2000.
2. Waterhyacinth control.  
**Action:** Aquatic vegetation surveys were conducted in summer 2002 through 2005 to monitor coverage of waterhyacinth as this invasive plant had persisted in small areas in the western third of the reservoir. Control efforts from 2002 through 2005 consisted of manual removal and aquatic herbicide applications.
3. Increase awareness of Lake Quitman fisheries resources.  
**Action:** Lake Quitman has the potential for excellent bass, catfish, and crappie fishing. However, the reservoir's close proximity to Lake Fork Reservoir causes it to be overlooked by many anglers. When opportunities arose, continuing efforts were made to promote the fisheries resources and inform anglers of current fishing regulations on Lake Quitman.

**Harvest regulation history:** Sportfishes in Lake Quitman are currently managed with statewide regulations (Table 2).

**Stocking history:** Lake Quitman has not been stocked since 2000. FLMB were initially introduced in 1980 (311 adults) and stocked again in 1999 and 2000. Channel catfish were introduced in 1982, flathead catfish and green x redear sunfish hybrids (both in 1971), and striped bass in 1972; of these species, channel and flathead catfish were still present in the reservoir. The complete stocking history is in Table 3.

**Vegetation/habitat history:** Lake Quitman contained no submerged vegetation and very little native emergent vegetation (2.3 acres). Historically, shoreline habitat has been dominated by featureless shore (1998 = 84.4%; 2001 = 81.4%) mixed with boat docks and native emergent vegetation. In September 2001, native emergent vegetation covered much of the lakeshore (79% of shoreline) but covered very little surface area (4.5 acres; Myers and Storey 2002). The invasive floating plant, waterhyacinth, was first documented in September 2001 (5.0 acres), and has persisted in limited areas (July 2002 = 0.5 acres; June 2003 = 0.2 acres; July 2004 = 0.3 acres; May 2005 = 1.9 acres) despite manual removal and spraying with aquatic herbicides. Lake residents and local interest groups have been informed of the waterhyacinth problem and have conducted manual removals of the nuisance vegetation.

## 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 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and 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). Relative standard error ( $RSE = 100 \times SE$  of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined for largemouth using otoliths from six specimens with lengths ranging from one inch below to one inch above the legal length limit (average length of fish in sample = 14.5 inches). Ages were determined for five white crappie from each length class from 9 to 14 inches.

## RESULTS AND DISCUSSION

**Vegetation/habitat:** Shoreline habitat during fall 2005 was composed primarily of featureless bank, native emergent vegetation, and boat docks (28, 23, and 21% respectively; Table 4). Waterhyacinth has persisted in limited areas and remains isolated in the western reaches of the lake (September 2005 = 0.31 acres). Low lake levels due to the 2005 drought may have helped limit the spread of this invasive plant. Regular monitoring of waterhyacinth is warranted, particularly as water levels rise.

**Prey species:** Electrofishing catch rates of bluegill and gizzard shad were 109.0/h and 296.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was high, indicating that 84% of gizzard shad were available to existing predators (Figure 1). Total CPUE of gizzard shad was

considerably lower in 2005 (296.0/h) compared to the 2001 (488.0/h) survey (Figure 1), however, CPUE was still extremely high. Total CPUE of bluegill in 2005 (109.0/h) was lower than total CPUE in 2001 (185.0/h), and size structure continued to be dominated by small individuals (Figure 2). The sunfish population in Lake Quitman is dominated by bluegill, as electrofishing catch rate of redear sunfish was extremely low (10.0/h; Figure 3).

**Channel catfish:** The gill net catch rate of channel catfish was 5.0/nn in 2006. The channel catfish population showed an increase in relative abundance in 2006 compared to 2002 survey, in which only one channel catfish was sampled (Figure 4). The 2006 gill net survey indicated the occurrence of natural channel catfish reproduction due to the presence of sub-stock fish. Additionally, many channel catfish were of harvestable size, indicating a potentially productive fishery.

**Largemouth bass:** The electrofishing catch rate of stock-length largemouth bass was 67/h in 2005, lower than the 84/h in 2003 (Figure 5). Growth of largemouth bass in Lake Quitman was good; average age of a legal length (14 inches) fish was two years (N = 6; range = 13.6 – 15.5 inches). Body condition in 2005 was average (relative weight ranged from 87 to 105) for nearly all size classes of fish and was similar to body condition in previous surveys (Figure 5). FLMB influence has remained relatively constant as Florida alleles have ranged from 19.5 to 29.0% and Florida genotype has ranged from 0 to 3.4% (Table 5).

**Crappies:** The trap net catch rate of white crappie was 30.8/nn in 2005, much higher than in 2001 (12.2/nn) and 1998 (15.4/nn). The PSD was 99 and was similar to the PSD in 2001 but higher than the PSD in 1998 (Figure 6). Mean relative weight was over 88 for all size classes in 2005 and was similar to values observed in 2001 and generally higher than those observed in 1998 (Figure 6). Some white crappie reached 10 inches in total length (legal size) by the time they were two years of age (Figure 7). Trap net catch rate of black crappie was low (1.8/nn) in 2005, but remained consistent with CPUE from the previous survey in 2001 (Figure 8). Fish sampled were in good body condition (relative weight ranged from 90 to 100).

## Fisheries management plan for Lake Quitman, Texas

Prepared – July 2006

**ISSUE 1:** Largemouth bass in Lake Quitman exhibit good 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 was donated to the Sharelunker Program (#141). Genetic analysis of age-0 fish collected in fall 2005 indicates a FLMB allele frequency of 29%, but with no pure FLMB. Lake Quitman was last stocked with FLMB in 1999 and 2000 at an approximate rate of 100/acre. We believe that additional stockings of FLMB will enhance the bass fishery.

### MANAGEMENT STRATEGY

1. Stock FLMB (100/acre) in 2007 and 2008.
2. Conduct additional electrofishing survey during fall 2007 to monitor largemouth bass population.
3. Conduct electrophoresis on age-0 fish sampled during fall 2009 electrofishing to determine FLMB component.

**ISSUE 2:** Waterhyacinth, a noxious aquatic plant, was first documented in Lake Quitman in September 2001. Since then, we have closely monitored its distribution and abundance with frequent vegetation surveys. When possible, efforts were made to remove manually plant colonies. Additional control of large stands of waterhyacinth was done with herbicide applications. Because of the risk waterhyacinth poses to the reservoir ecosystem, we believe it is imperative to continue close monitoring of the invasive plant and implement control activities when necessary.

### MANAGEMENT STRATEGY

1. Continue monitoring waterhyacinth biannually.
2. Implement control (manual removal or herbicide application) when possible.

**ISSUE 3:** 2005 and 2006 sampling results show the potential for an excellent crappie and channel catfish fishery at Lake Quitman. Close proximity to Lake Fork Reservoir and other Wood County lakes, however, may limit fishery exposure

### MANAGEMENT STRATEGIES

1. Prepare regulation posters detailing the fisheries regulations at Lake Quitman and post this information at boat ramps.
2. When opportunities arise, promote the fisheries resources of Lake Quitman through local media and other outlets.

### SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes biannual vegetation sampling, additional electrofishing in 2007, and mandatory monitoring in 2009-2010 (Table 6). The additional electrofishing survey in 2007 is necessary to maintain consistent data for trend information on the largemouth bass population. Gill net surveys are only necessary every four years to monitor channel catfish recruitment and abundance.

## 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.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- 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 in Sport Fish Restoration, Performance Report, Project F-30-R-27, Job A, 24 pages.

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. 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

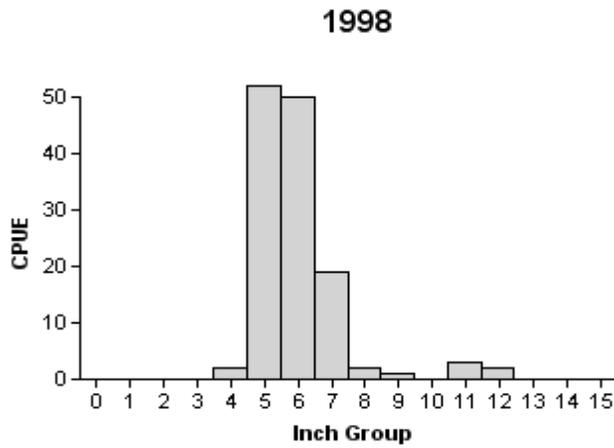
Table 3. Stocking history of Lake Quitman, Texas. Size categories are: FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

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
	Total	164,021	

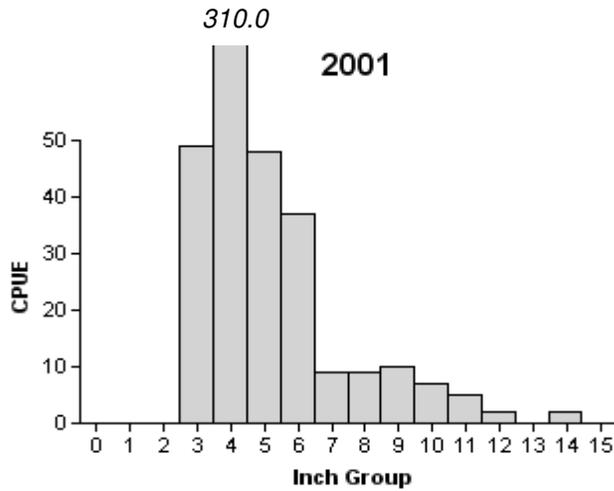
Table 4. Survey of littoral zone and physical habitat types, Lake Quitman, Texas, 2005. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Boat dock	2.85	21.0		
Bulkhead	0.32	2.4		
Concrete	0.24	1.8		
Rip-rap	0.12	0.9		
Standing timber	1.68	12.4		
Featureless	3.84	28.3		
Native emergent	3.16	23.3	2.3	0.28
Overhanging brush	1.27	9.4		
Sandy beach	0.46	3.4		
Waterhyacinth	0.43	3.2	0.31	0.04

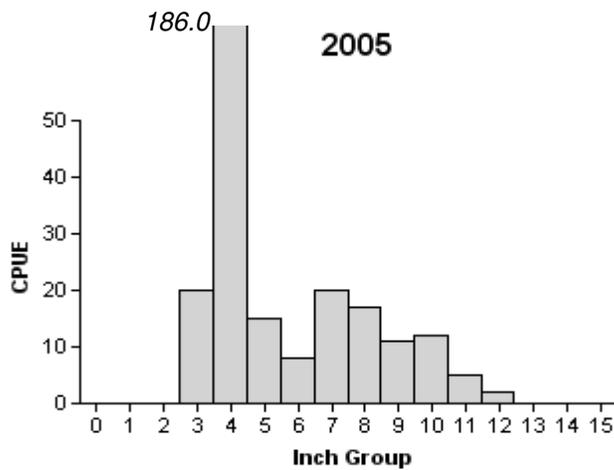
## Gizzard Shad



Effort = 1.0  
 Total CPUE = 131.0 (30; 131)  
 IOV = 93.89 (0.03)



Effort = 1.0  
 Total CPUE = 488.0 (21; 488)  
 IOV = 92.83 (0.02)



Effort = 1.0  
 Total CPUE = 296.0 (26; 296)  
 IOV = 84.12 (0.05)

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, 1998, 2001, and 2005.

# Bluegill

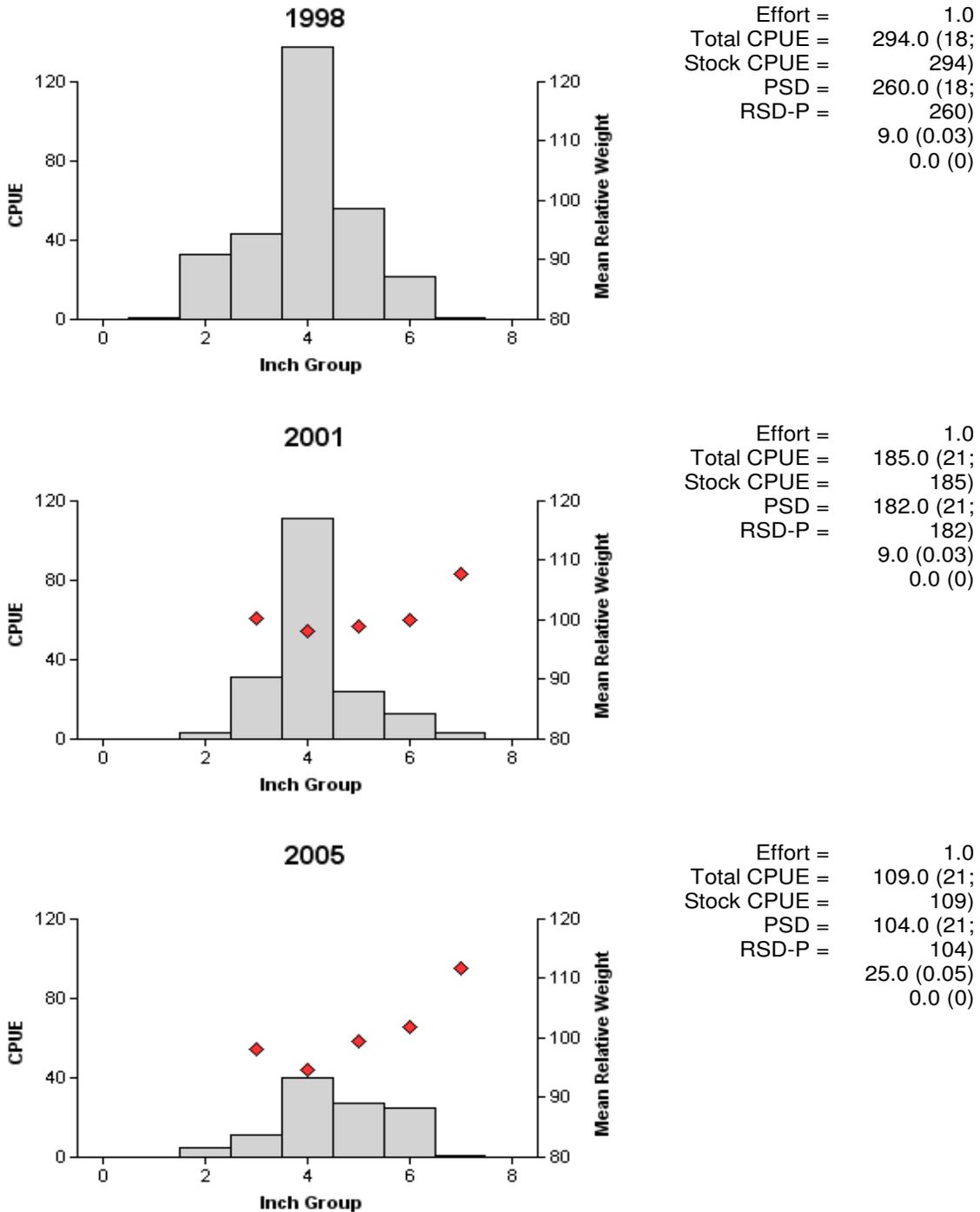


Figure 2. Number of bluegill caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 1998, 2001, and 2005. Weight data not collected in 1998.

## Redear Sunfish

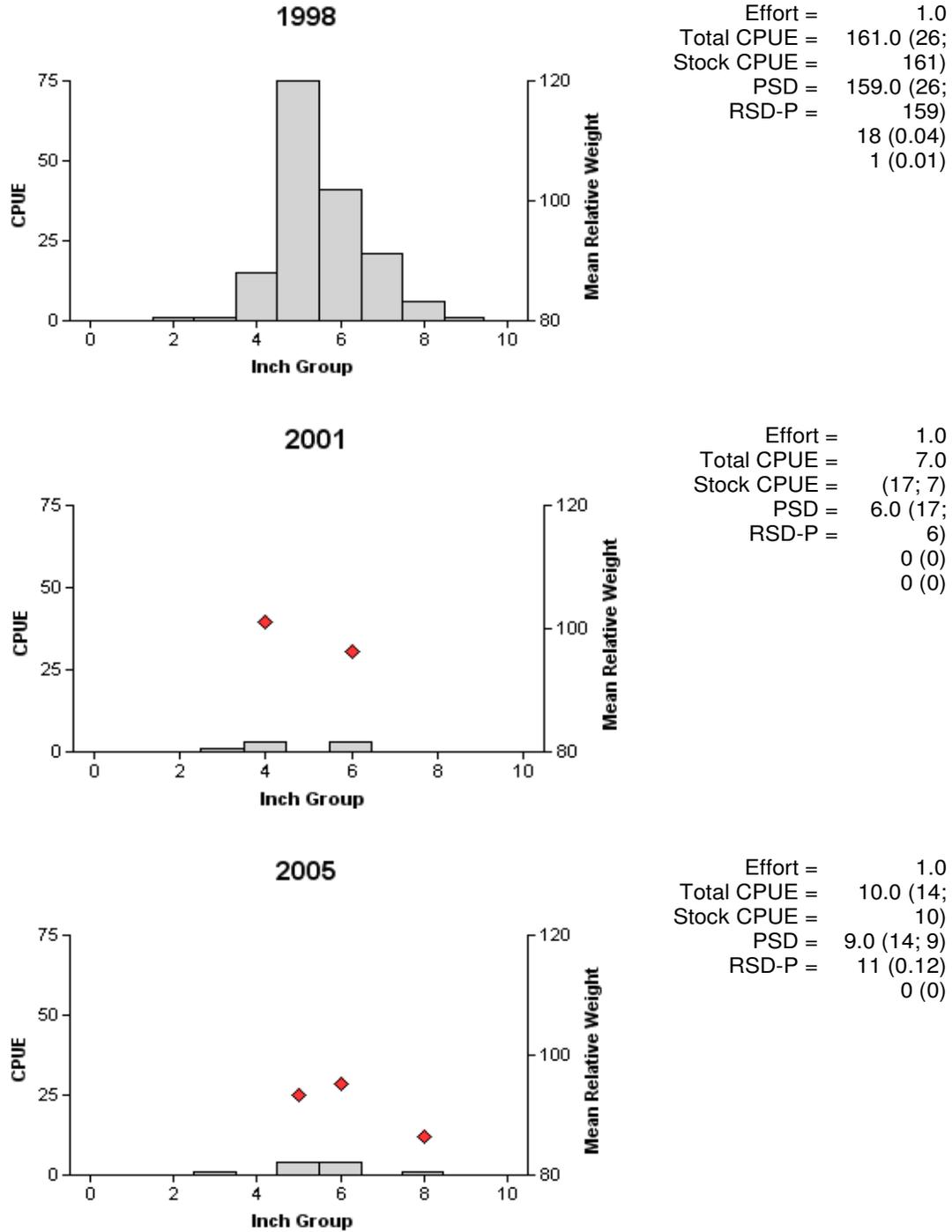
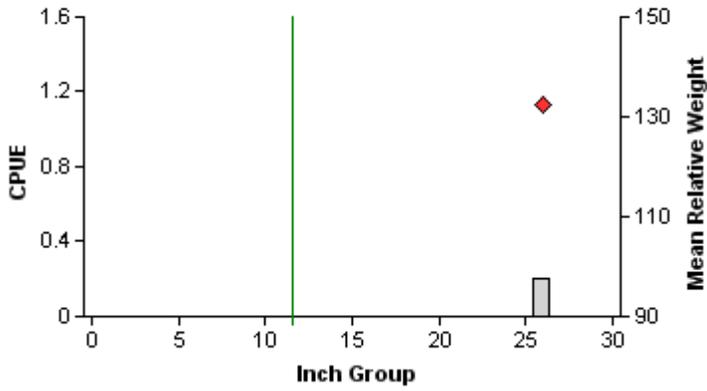


Figure 3. Number of redear sunfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 1998, 2001, and 2005. Weight data not collected in 1998.

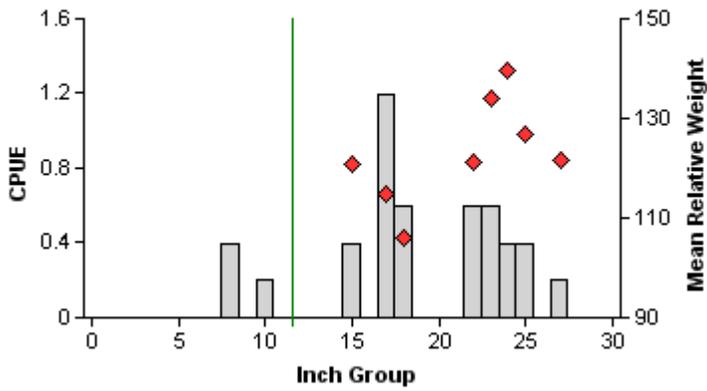
## Channel catfish

2002



Effort = 5.0  
 Total CPUE = 0.2 (100; 1)  
 Stock CPUE = 0.2 (100; 1)  
 PSD = 100.0 (0)  
 RSD-P = 100.0 (0)

2006



Effort = 5.0  
 Total CPUE = 5.0 (23; 25)  
 Stock CPUE = 4.4 (28; 22)  
 PSD = 91.0 (0.07)  
 RSD-P = 23.0 (0.06)

Figure 4. 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 and 2006. Vertical lines indicate minimum length limit at time of survey. No channel catfish were sampled in spring 1998.

## Largemouth bass

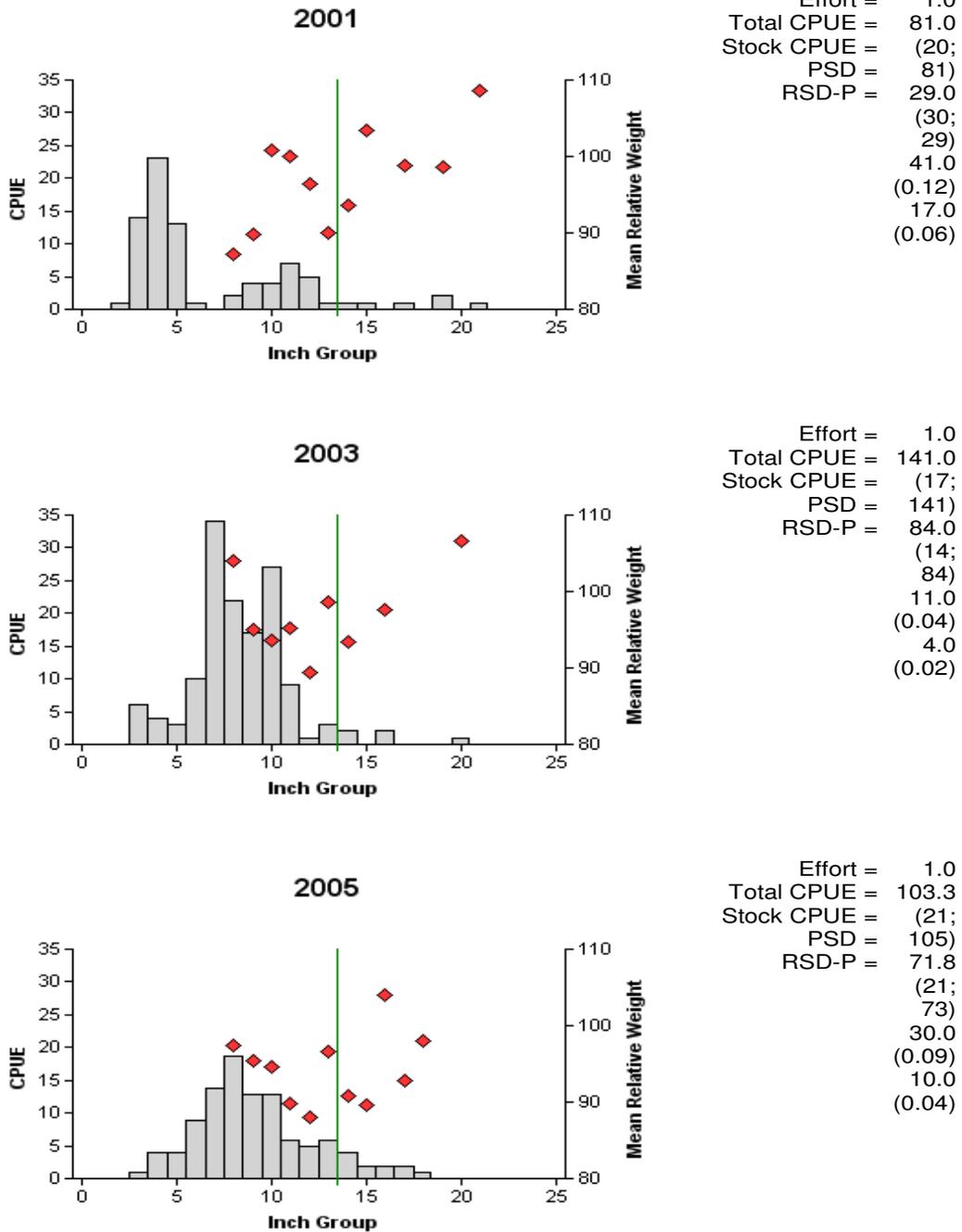


Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Quitman, Texas, 2001, 2003, and 2005. Vertical lines indicate minimum length limit at time of survey. The 2003 survey was a largemouth bass only electrofishing survey.

## Largemouth bass

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Quitman, Texas, 1992, 1995, 1998, 2001 and 2004. 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		
1992	29	0	4	14	11	25.8	0.0
1995	35	1	4	13	14	22.8	2.9
1998	30	0	4	20	6	21.7	0.0
2001	29	1	6	7	15	19.5	3.4
2005	30	0	0	7	23	29.0	0.0

## White crappie

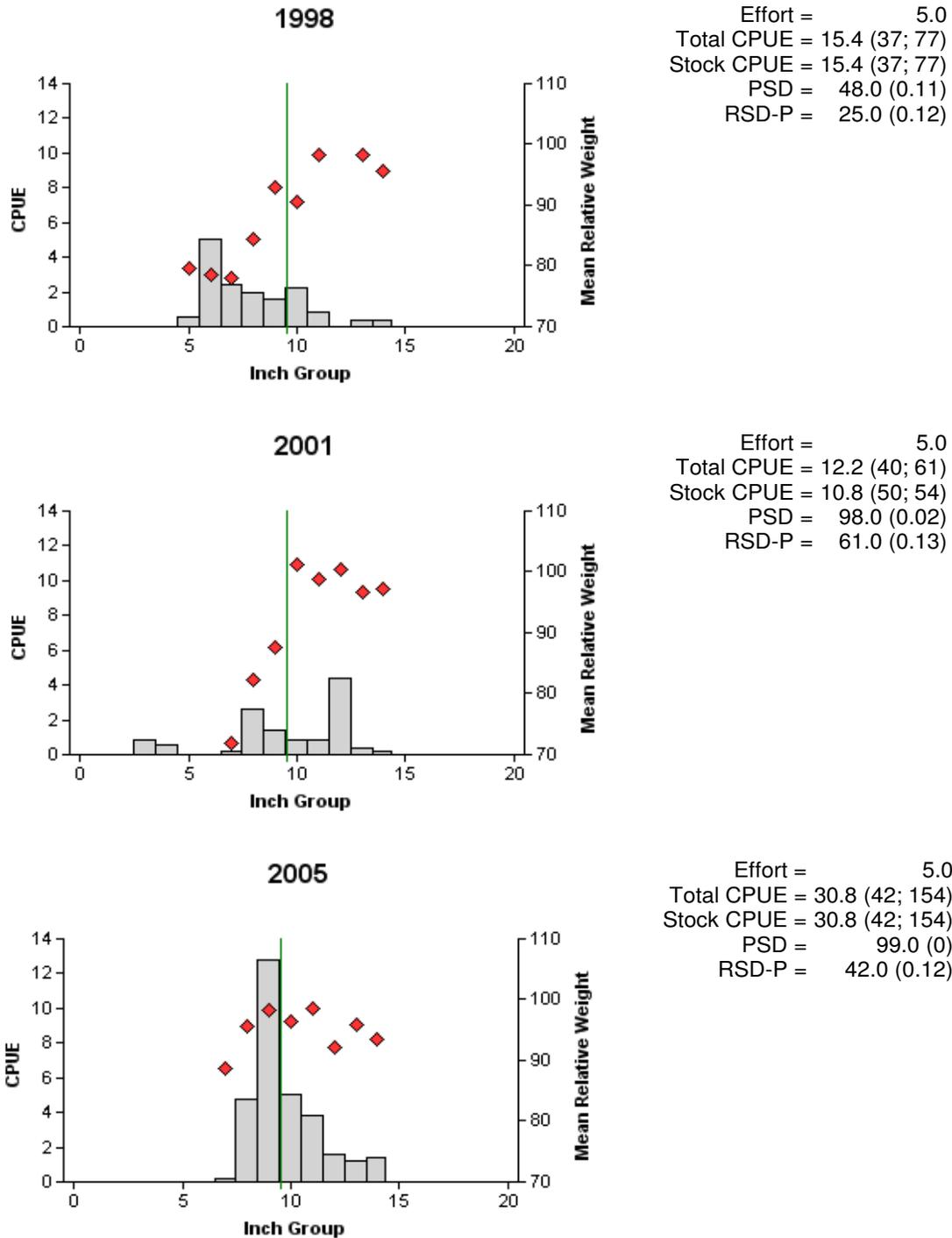


Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Quitman, Texas, 1998, 2001, and 2005. Vertical lines indicate minimum length limit at time of survey.

## White crappie

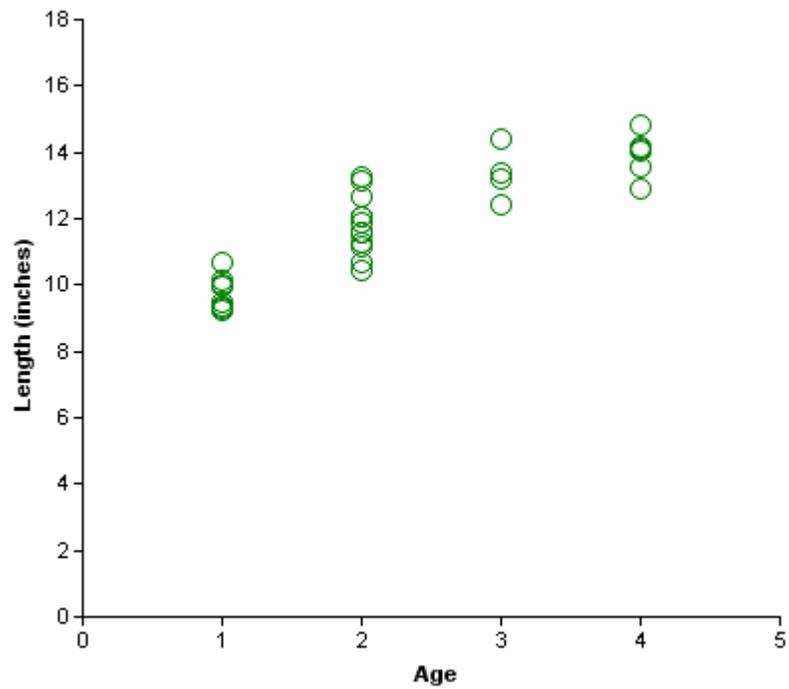


Figure 7. Length-at-age for white crappie collected from trap nets at Lake Quitman, Texas, November 2005.

## Black crappie

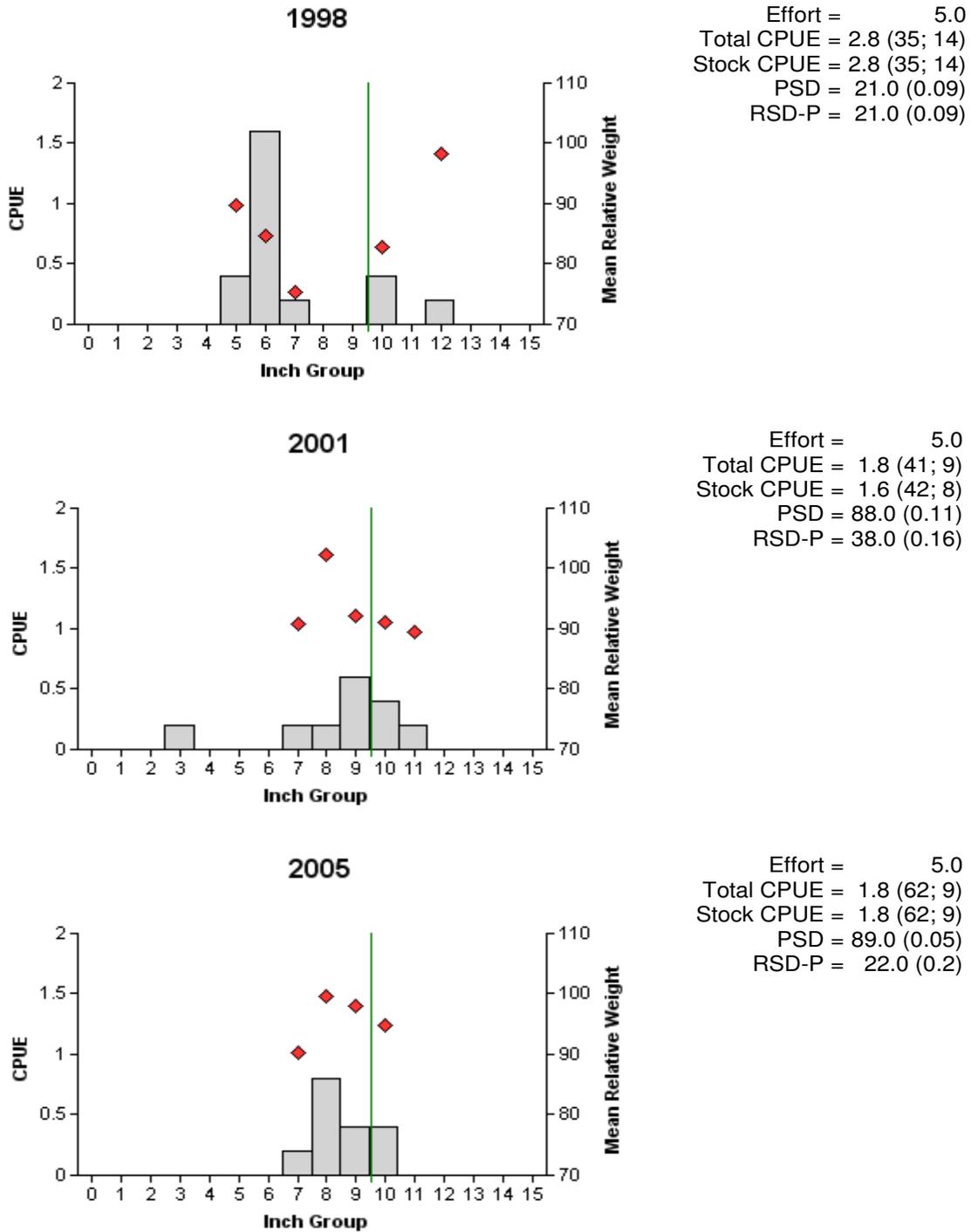


Figure 8. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Quitman, Texas, 1998, 2001, and 2005. Vertical lines indicate minimum length limit at time of survey.

Table 6. 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.

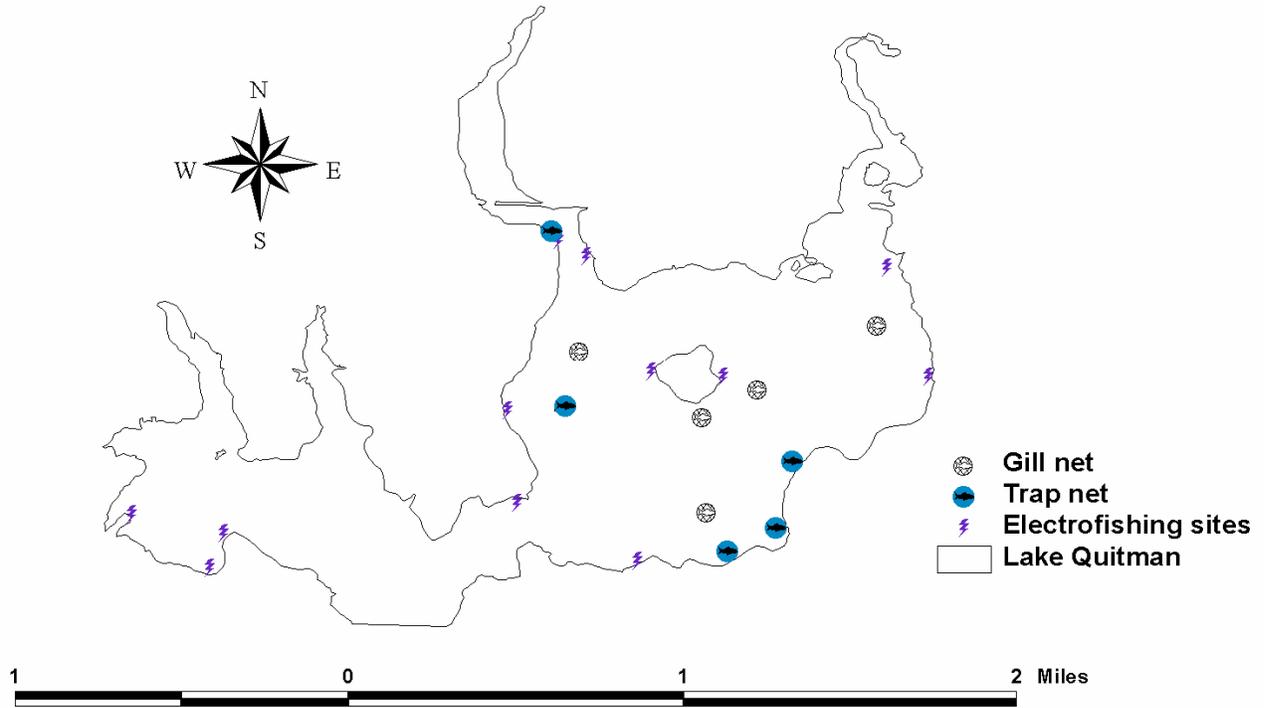
Survey Year	Electrofishing	Trap netting	Gill netting	Vegetation	Report
Fall 2006-Spring 2007				A	
Fall 2007-Spring 2008	A			A	
Fall 2008-Spring 2009				A	
Fall 2009-Spring 2010	S	S	S	S	S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Quitman, Texas, 2005-2006.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					296.0	296.0
Threadfin shad					73.0	73.0
Channel catfish	25	5.0				
Flathead catfish	1	0.2				
Warmouth					2.0	2.0
Bluegill					109.0	109.0
Longear sunfish					85.0	85.0
Redear sunfish					10.0	10.0
Largemouth bass					99.0	99.0
White crappie			154	30.8		
Black crappie			9	1.8		

APPENDIX B



Location of gill net, trap net, and electrofishing sites, Lake Quitman, Texas, 2005-2006.