

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

**Lake Winnsboro**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Winnsboro were surveyed in 2006 using electrofishing and trap nets, and in 2007 using gill nets. Aquatic vegetation and habitat surveys were conducted on Lake Winnsboro during August 2006. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Winnsboro is a 1,100-acre impoundment located in Wood County, Texas, on Big Sandy Creek, a tributary of the Sabine River. It was constructed by Wood County for flood control and recreation. Habitat consists primarily of featureless banks and shallow areas are usually dominated by native emergent aquatic vegetation.
- **Management history:** Important sport fish include largemouth bass, white crappie, black crappie, and channel catfish. The management plan from the 2002 survey report recommended monitoring the Florida largemouth bass allele frequency using liver samples from age-0 largemouth bass collected during fall electrofishing. Florida largemouth bass were stocked most recently in 1998 and 1999.
- **Fish community**
  - **Prey species:** Predominant prey species in the reservoir include gizzard shad, threadfin shad, bluegill, and redear sunfish. 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. Redear sunfish are also present in the reservoir in high abundance, with many individuals  $\geq 6$ -inches. Threadfin shad provided additional forage for sport fish in the reservoir.
  - **Catfishes:** All channel catfish collected during gill netting were of harvestable size, indicating a productive fishery that may be underutilized. No blue or flathead catfish were sampled in the reservoir during the spring 2007 survey.
  - **Largemouth bass:** Few largemouth bass were caught during electrofishing, most likely due to unusually low water conditions. Despite the low catch rates, size structure of the population was good. Largemouth bass tended to be in good body condition, indicating prey populations were adequate.
  - **Crappies:** Black crappie was the only species sampled during the survey. They were more abundant than previous surveys and showed good size distribution and excellent body condition. Black crappie reached legal size between two and three years of age.

**Management strategies:** Continue to monitor the largemouth bass population using biennial samples to evaluate the effect of stockings of Florida largemouth bass fingerlings conducted in 1998 and 1999. Conduct an additional trap net survey in fall 2008 to monitor the black and white crappie populations. Continue with standard monitoring using trap nets, gill nets, and

electrofishing surveys in 2010-2011.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Winnsboro in 2006-2007. 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 2006-2007 data for comparison.

### *Reservoir Description*

Lake Winnsboro is a 1,100-acre impoundment constructed in 1962 on Big Sandy Creek, a tributary of the Sabine River. It is located in Wood County approximately 35 miles north of Tyler, Texas, and is operated and controlled by Wood County. Primary water uses included flood control and recreation. Habitat at time of sampling consisted of featureless banks with limited cover provided by flooded timber. Boat docks and emergent vegetation were not useable habitat for fish due to extremely low water conditions. Boat access consisted of three public boat ramps. Bank fishing access was present at all public boat ramps and along bridges in the upper end of the reservoir. Other descriptive characteristics for Lake Winnsboro are in Table 1.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Storey and Myers 2003) included:

1. Enhancement of largemouth bass fishery.

**Action:** Electrofishing surveys were conducted in 2004 and 2006 to monitor the largemouth bass population.

2. Increase awareness of Lake Winnsboro fisheries resources.

**Action:** Lake Winnsboro 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 Winnsboro.

**Harvest regulation history:** Sport fishes in Lake Winnsboro are currently managed with statewide regulations (Table 2).

**Stocking history:** Lake Winnsboro has not been stocked since 1999. Florida largemouth bass (FLMB) were initially introduced in 1974 (55,100 fingerlings) and stocked again in 1998 and 1999. Blue catfish were introduced in 1977, and stocked twice more, but the population did not persist as no blue catfish have been sampled during the past two decades. Channel catfish were introduced in 1982 and flathead catfish in 1977; of these species, channel catfish were still present in the reservoir. The complete stocking history is in Table 3.

**Vegetation/habitat history:** In 2002, native emergent vegetation covered much of the lakeshore but accounted for very little surface area (13.8 acres; Storey and Myers 2003).

## 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 caught 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). Aquatic vegetation and littoral habitat surveys were performed according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005). Shoreline distances and areas of vegetation were estimated using ArcView GIS software.

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 black crappie using otoliths from 15 specimens with lengths ranging from 9 to 11 inches (average length of fish in sample = 10.5 inches). A sample of 13 age-0 largemouth bass were collected by electrofishing in fall 2006 and subjected to genetic analysis using DNA microsatellite analysis in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

## RESULTS AND DISCUSSION

**Vegetation/habitat:** Shoreline habitat during fall 2006 was composed primarily of featureless shoreline, featureless shoreline with standing timber, and boat docks (62.5%, 28.9% and 7.1% respectively; Table 4). Low lake levels due to a statewide drought limited the amount of shoreline habitat available to fish.

**Prey species:** Electrofishing catch rates of bluegill, redear sunfish and gizzard shad were 158.0/h, 172.0/h, and 184.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was moderate, indicating that 44% of gizzard shad were available to existing predators (Figure 1). Total CPUE of gizzard shad was similar to 2002 (194.0/h) but much higher than the 1999 survey (47.0/h) survey (Figure 1). Total CPUE of bluegill in 2006 (158.0/h) was lower than total CPUE in 2002 (438.0/h), but similar to the 1999 survey (138.0/h), with a high relative abundance of small individuals (Figure 2). Redear sunfish comprise a large component of the sunfish population in Lake Winnsboro, as the electrofishing catch rate in 2006 was slightly higher than bluegill CPUE (172.0/h). Historically, Lake Winnsboro had a popular redear sunfish fishery. Many of the redear sunfish sampled in 2006 were large enough ( $\geq 6$  inches) to sustain a fishery for this species (Figure 3).

**Channel catfish:** The gill net catch rate of channel catfish in 2007 was 3.6/nn, virtually unchanged from the 2003 survey (3.8/nn), and with similar size distribution (Figure 4). The 2007 and 2003 surveys resulted in few fish less than stock length ( $> 11$  inches), indicating possible limitations in recruitment. However, many channel catfish were of harvestable size (12 inches) and in good

body condition, indicating a productive fishery.

**Largemouth bass:** The electrofishing catch rate of stock length (>8 inches) largemouth bass was 31/h in 2006, lower than the 93/h in 2004 and 117/h in 2002 (Figure 5). Electrofishing catch rates were extremely low in 2006 because of unusually low water levels that resulted in poor habitat conditions. Largemouth bass in Lake Winnsboro grow to legal length (14 inches) between three and four years of age. Body condition in 2006 was good ( $W_r$  ranged from 88 to 105) for nearly all size classes of fish and was similar to body condition in previous surveys (Figure 5). An insufficient number of largemouth bass were collected for age and growth analysis. Additionally, the low sample size of age-0 fish collected during fall electrofishing made it impossible to make an accurate genetic assessment of the influence of FLMB in the bass population (Table 5).

**Crappies:** No white crappie were sampled in 2006. The trap net catch rate of black crappie was 10.2/nn in 2006, higher than in 2002 (7.0/nn) and 1999 (5.2/nn). The PSD was 90 and similar to the level observed in 2002 but lower than in 1999 (Figure 7). Mean  $W_r$  was 110 for all size classes in 2006, which was similar to those observed in 1999, but higher than those observed in 2002. Growth of black crappie in Lake Winnsboro was good. Average age at 10 inches (9.2 to 11.9 inches) was 1.5 years ( $N = 13$ ; range = 1 – 2 years).

## **Fisheries management plan for Lake Winnsboro, Texas**

Prepared – July 2007

**ISSUE 1:** Enhance the largemouth bass fishery. Lake Winnsboro has shown the potential to produce trophy largemouth bass as evidenced by the size of the current lake record, 10.75 pounds (3/2004). Florida largemouth bass were stocked in 1998 and 1999. District staff will continue monitoring the largemouth bass population to determine the impact of the FLMB stockings and to evaluate the need for future stockings when appropriate.

### **MANAGEMENT STRATEGY**

1. Conduct additional electrofishing survey during fall 2008 to monitor largemouth bass population.
2. Conduct genetic analysis on 30 age-0 fish sampled during fall 2008 electrofishing to determine FLMB component of the population.
3. If genetic analysis results indicate <20% FLMB alleles in the population, request stocking of FLMB for 2009 and 2010 at 100/acre).

**ISSUE 2:** Fall trap net surveys in 2006 did not collect any white crappie. In 2002, white crappie represented a large proportion of the crappie collected. The fact that no white crappies were sampled in 2006 was most likely due to random sampling and relatively few nets (only 5 net nights); however, additional surveys should be conducted to verify the continued presence of white crappie in the reservoir.

### **MANAGEMENT STRATEGY**

1. Conduct a standard trap net survey during the fall of 2010 to verify the presence of white crappie in Lake Winnsboro.

**ISSUE 3:** Sampling results from 2006 and 2007 show the potential for an excellent black crappie and channel catfish fishery at Lake Winnsboro. 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 Winnsboro and post this information at boat ramps and local businesses.
2. Promote the fisheries resources of Lake Winnsboro through local media and other outlets.

### **SAMPLING SCHEDULE JUSTIFICATION:**

The proposed sampling schedule includes additional electrofishing and trap netting in 2008, and mandatory monitoring in 2010-2011 (Table 6). The additional electrofishing survey in 2008 is necessary to maintain consistent data for trend information on the largemouth bass population. The additional trap net survey in 2008 will be used to monitor the white and black crappie populations. Gill net surveys are only necessary every four years to monitor channel catfish recruitment, condition, and relative 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.
- Storey, K., and R. Myers. 2003. Statewide freshwater fisheries monitoring and management program survey report for Lake Winnsboro, 2002. Texas Parks and Wildlife Department, Federal Aid in Sport Fish Restoration, Performance Report, Project F-30-R-28, Job A, 24 pages.

Table 1. Characteristics of Lake Winnsboro, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
Surface area	1,100 acres
Counties	Wood
Reservoir type	Tributary
Mean depth	11.0 ft.
Maximum depth	23.0 ft.
Shoreline development index (SDI)	N/A
Conductivity	110 $\mu\text{mho} / \text{cm}$
Secchi disc range	2 – 4 ft.
Watershed area	27 $\text{mi}^2$

Table 2. Harvest regulations for Lake Winnsboro.

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
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No limit

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

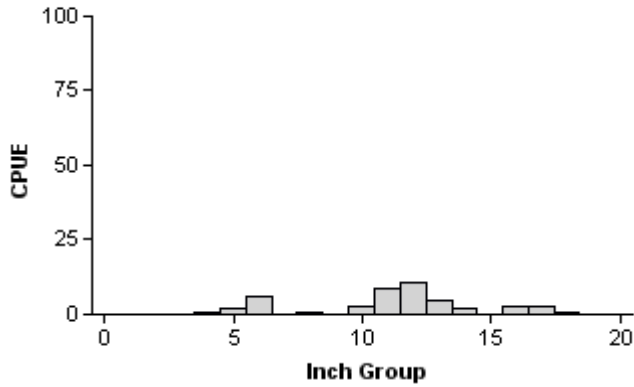
Species	Year	Number	Size
Blue catfish	1977	11,000	FGL
	1979	10,990	
	1981	16,000	
	Total	37,990	
Channel catfish	1982	300	AFGL
	1992	11,028	
	Total	11,328	
Flathead catfish	1977	700	
	Total	700	
Florida largemouth bass	1974	55,100	FGL
	1998	110,423	FGL
	1999	118,218	FGL
	Total	283,741	

Table 4. Survey of littoral zone and physical habitat types, Lake Winnsboro, Texas, 2006. A linear shoreline distance (miles) was recorded for each habitat type found. No aquatic vegetation was observed in survey because of low lake elevation.

Shoreline habitat type	Shoreline Distance	
	Miles	Percent of total
Boat dock / Featureless	1.23	7.1
Concrete	0.27	1.5
Standing timber / Featureless	5.01	28.9
Featureless	10.85	62.5

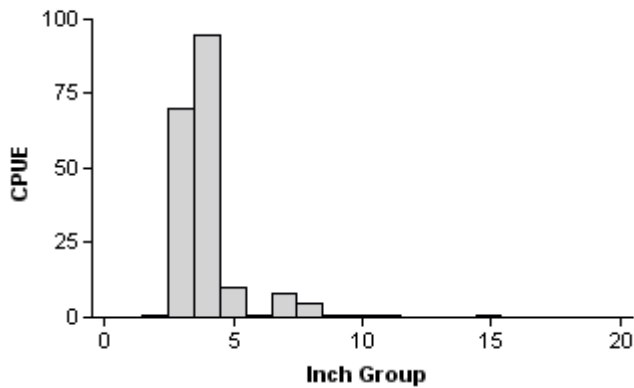
## Gizzard shad

1999



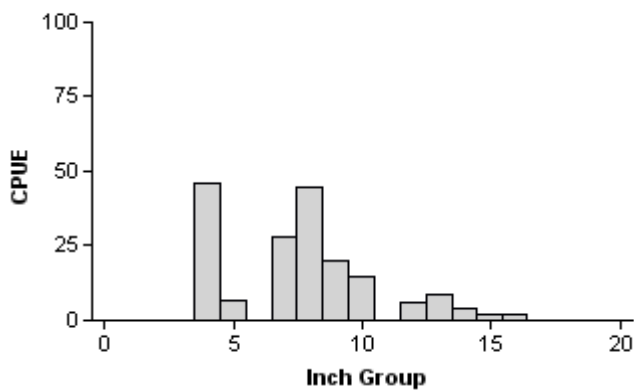
Effort = 1.0  
 Total CPUE = 47.0 (30; 47)  
 Stock CPUE = 38.0 (26; 38)  
 PSD = 89 (2.8)  
 IOV = 19 (8.6)

2002



Effort = 1.0  
 Total CPUE = 194.0 (32; 194)  
 Stock CPUE = 17.0 (34; 17)  
 PSD = 12 (7.1)  
 IOV = 95 (3.0)

2006



Effort = 1.0  
 Total CPUE = 184.0 (22; 184)  
 Stock CPUE = 131.0 (22; 131)  
 PSD = 18 (4.6)  
 IOV = 44 (7.6)

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 Winnsboro, Texas, 1999, 2002, and 2006.

## Bluegill

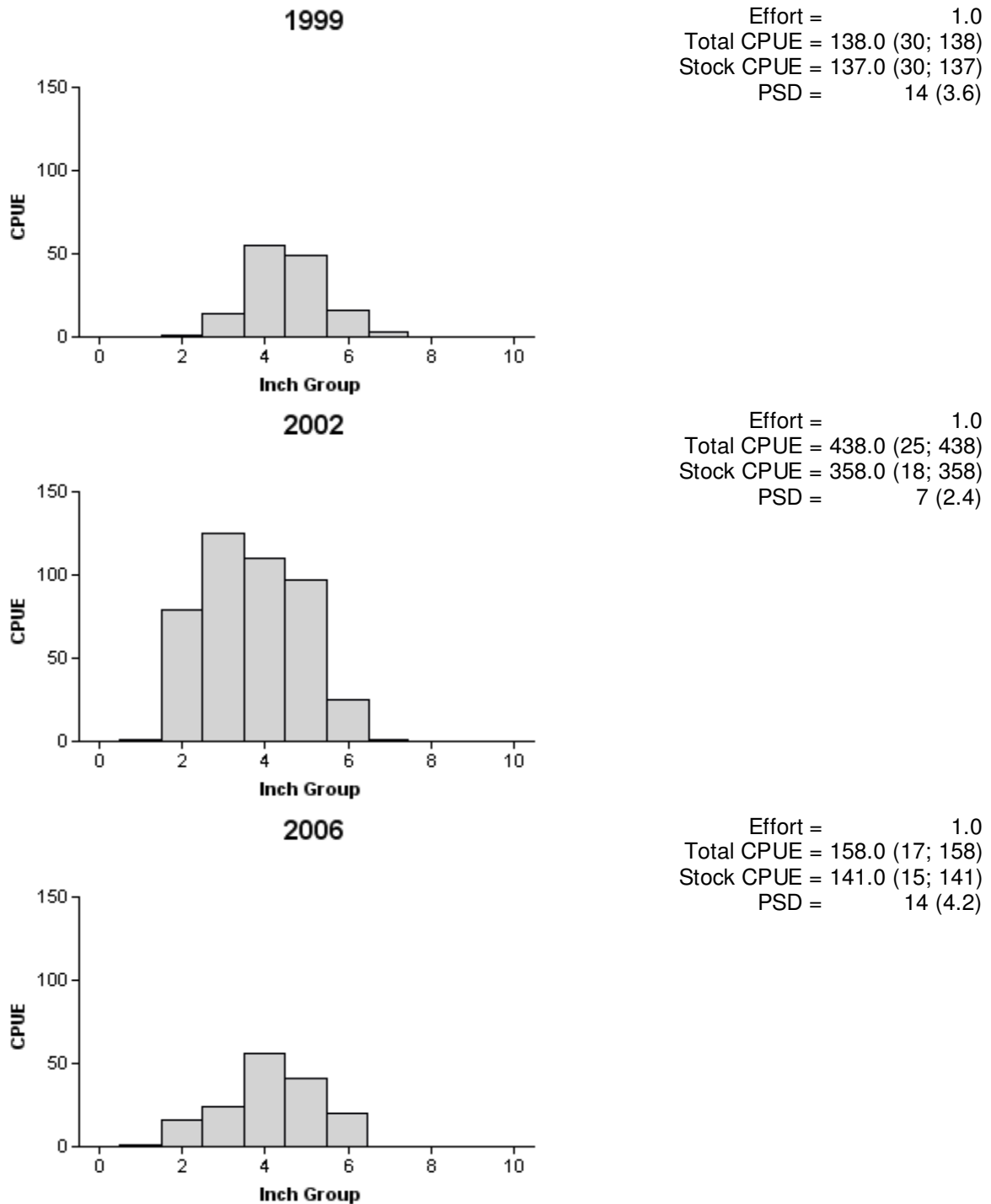


Figure 2. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 1999, 2002, and 2006.

## Redear sunfish

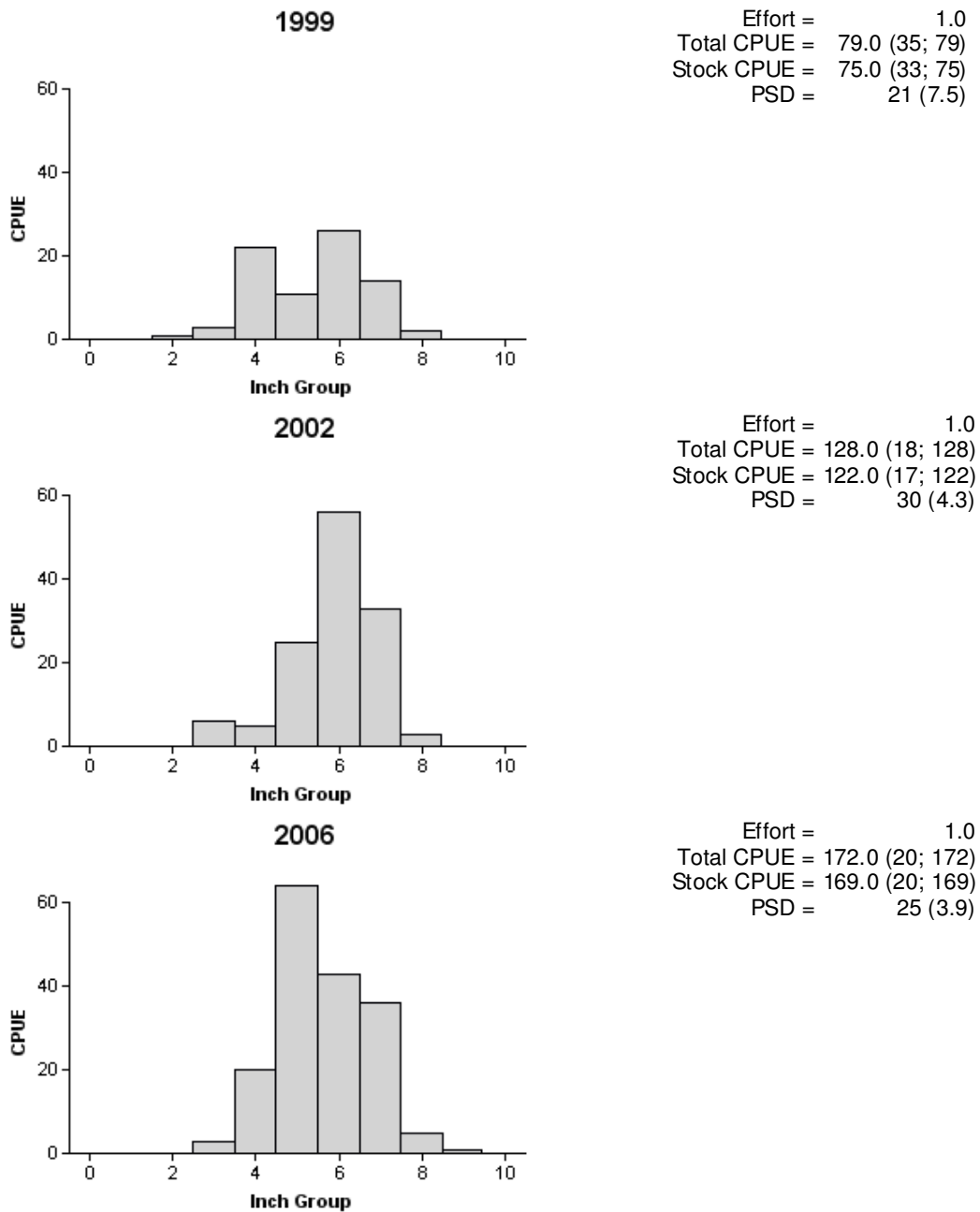
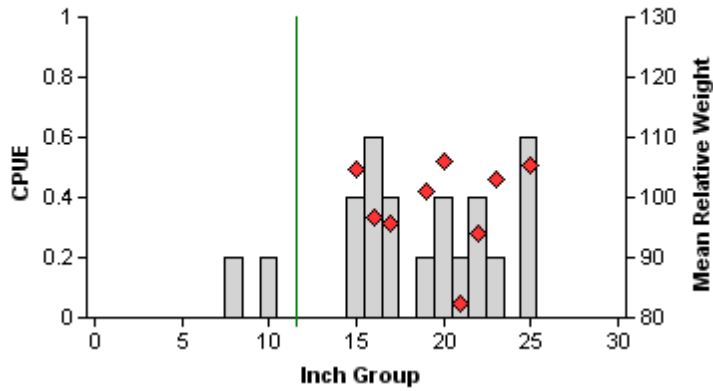


Figure 3. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 1999, 2002, and 2006.

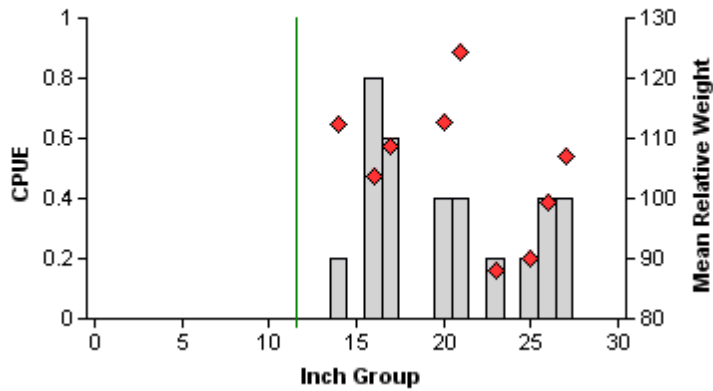
## Channel catfish

2003



Effort = 5.0  
 Total CPUE = 3.8 (15; 19)  
 Stock CPUE = 3.4 (22; 17)  
 PSD = 88 (7.5)

2007



Effort = 5.0  
 Total CPUE = 3.6 (26; 18)  
 Stock CPUE = 3.6 (26; 18)  
 PSD = 94 (4.2)

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 Winnsboro, Texas, 2002 and 2006. Vertical lines indicate minimum length limit at time of survey. No channel catfish were captured in the spring 1999 survey.

## Largemouth bass

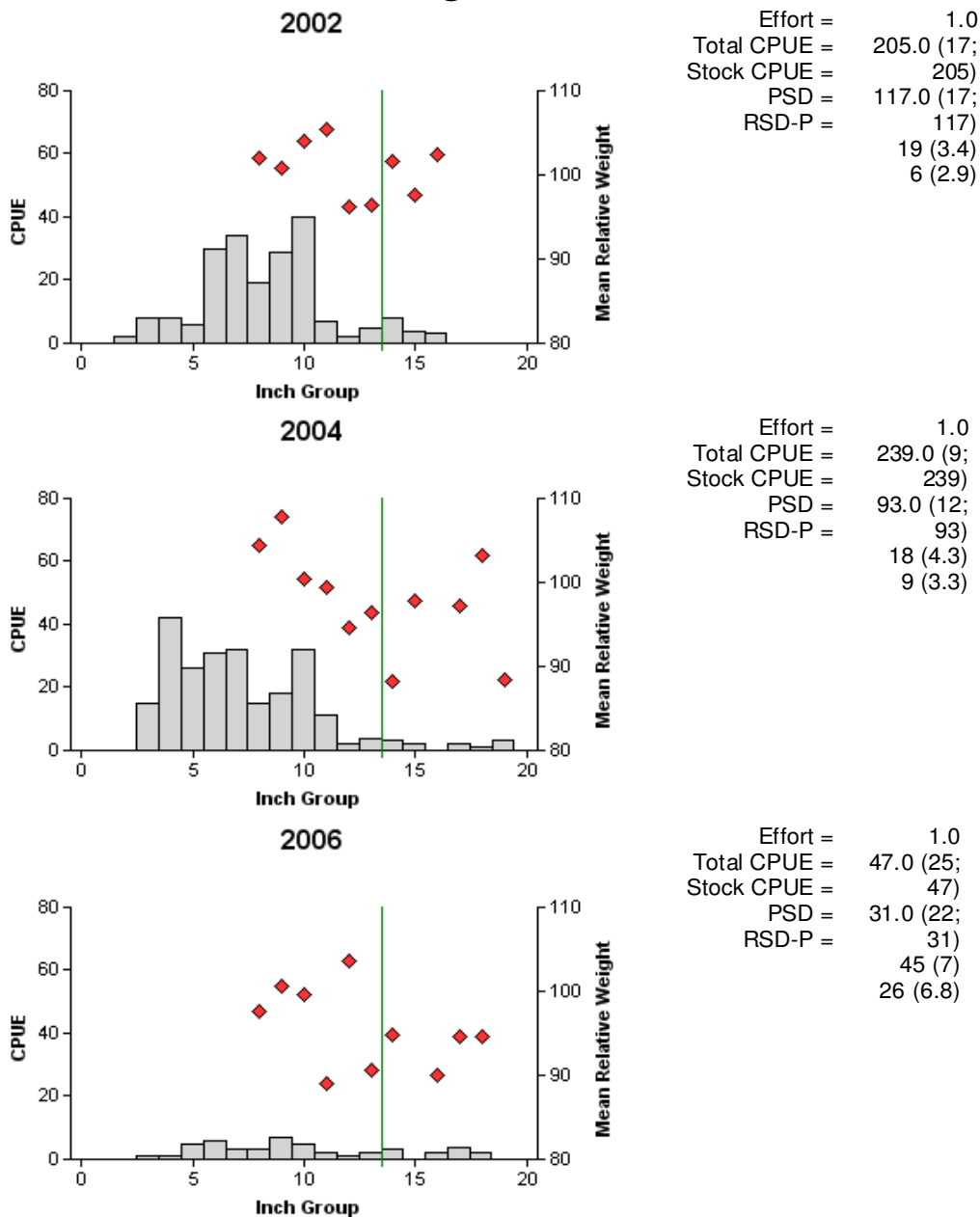


Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2002, 2004, and 2006. The 2004 survey was bass-only. Vertical lines indicate minimum length limit at time of survey.



Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Winnsboro, Texas, 1989, 1993, 1996, 1999, 2002, and 2006. 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	Combined hybrids	NLMB		
1989	30	1	5	15	20	9	34.2	3.3
1993	35	0	8	18	26	9	30.0	0.0
1996	35	2	8	19	27	6	42.1	5.7
1999	30	0	5	14	19	11	21.7	0.0
2002	27	1	4	9	13	13	24.6	3.7
2006	13	0	<sup>a</sup>	<sup>a</sup>	11	2	30.0	0.0

<sup>a</sup>Analysis no longer separates F1 from Fx hybrids

## White crappie

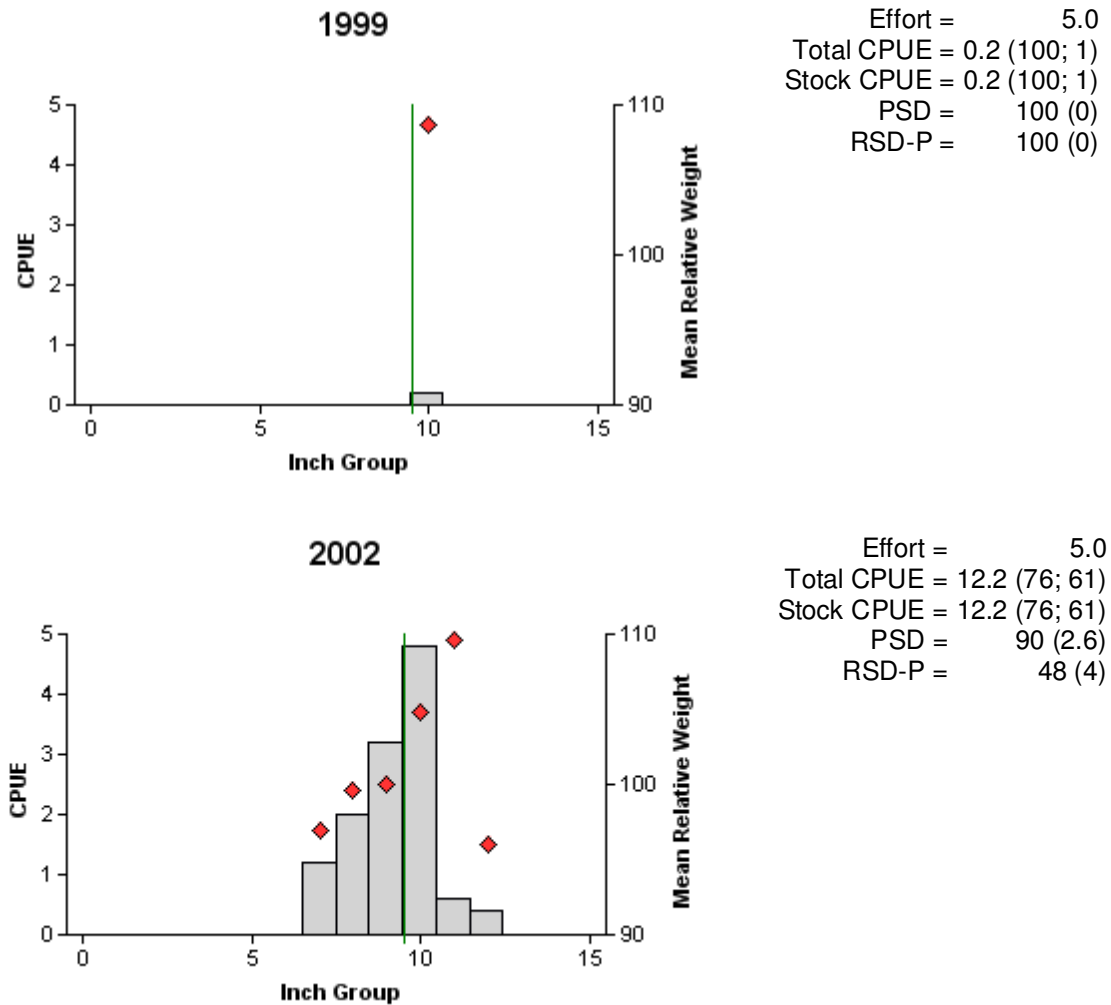


Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 1999 and 2002. No white crappie were collected in 2006. Vertical lines indicate minimum length limit at time of survey.

## Black crappie

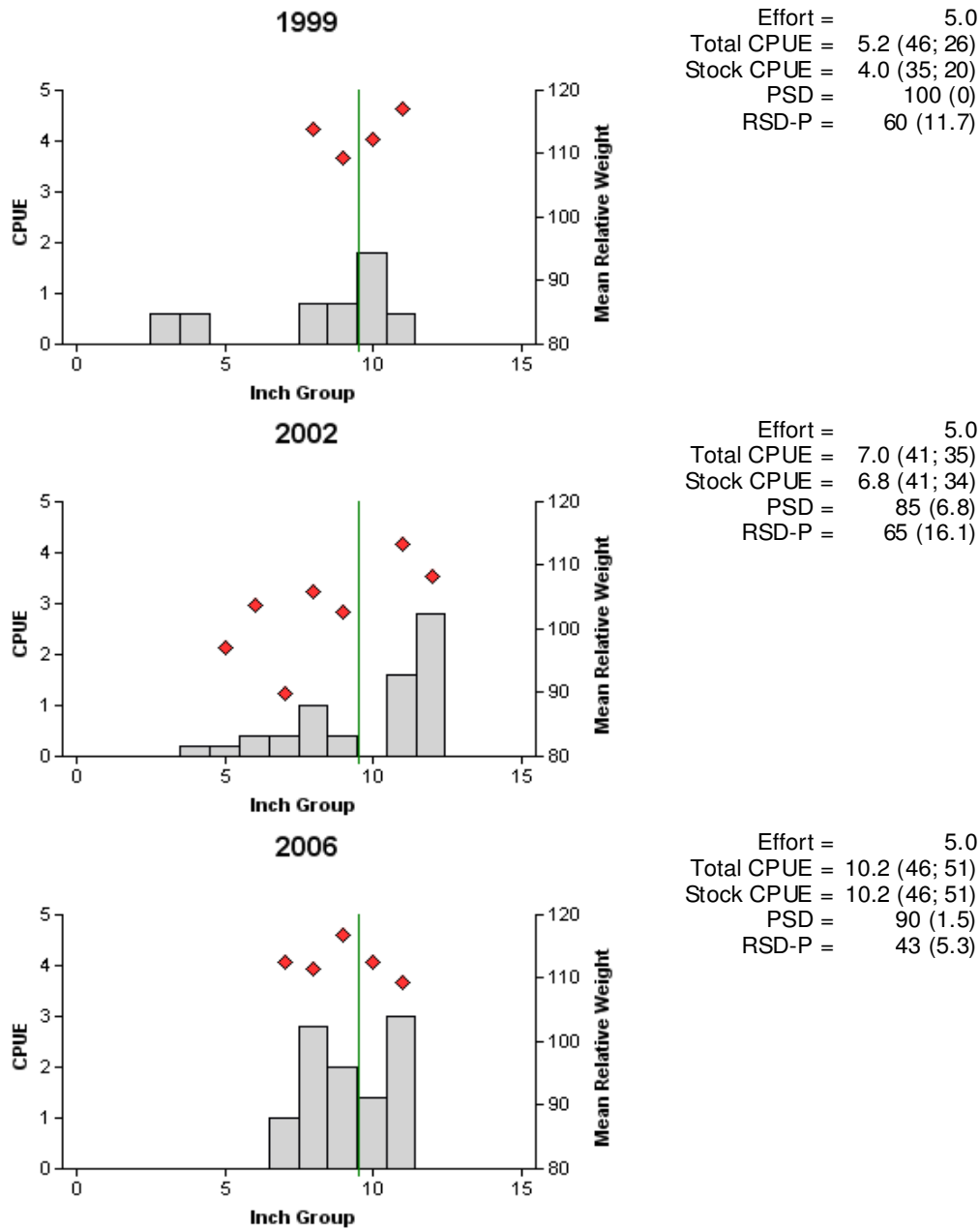


Figure 7. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 1999, 2002, and 2006. Vertical lines indicate minimum length limit at time of survey.

Table 6. Proposed sampling schedule for Lake Winnsboro, 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	Electrofisher	Trap net	Gill net	Vegetation/ Habitat	Report
Summer 2008-Spring 2009	A	A			
Summer 2010-Spring 2011	S	S	S	S	S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Winnsboro, Texas, 2006-2007.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					184	184.0
Threadfin shad					414	414.0
Channel catfish	18	3.6				
Bluegill					158	158.0
Longear sunfish					57	57.0
Redear sunfish					172	172.0
Largemouth bass					47	47.0
Black crappie			51	10.2		

## APPENDIX B



Location of gill net (G), trap net (T), and electrofishing sites (E), Lake Winnsboro, Texas, 2006-2007.