

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Stamford Reservoir

Prepared by:

Spencer Dumont and Mukhtar Farooqi
Inland Fisheries Division
District 1-B, Abilene, Texas



Robert L. Cook
Executive Director

Phil Durocher
Director, Inland Fisheries

July 31, 2007

TABLE OF CONTENTS

Survey and management summary	1
Introduction.....	2
Reservoir description.....	2
Management history.....	2
Methods.....	3
Results and discussion.....	3
Fisheries management plan.....	5
Literature cited.....	6
Figures and tables.....	7-19
Water level (Figure 1).....	7
Reservoir characteristics (Table 1)	7
Harvest regulations (Table 2).....	8
Stocking history (Table 3).....	9
Gizzard shad (Figure 2).....	10
Bluegill (Figure 3)	11
Blue catfish (Figure 4)	12
Channel catfish (Figure 5).....	13
White bass (Figure 6).....	14
Largemouth bass (Figure 7; Table 4).....	15
White crappie (Figure 8)	17
Proposed sampling schedule (Table 5).....	18
Appendix A	
Catch rates of all target species from all gear types	19
Appendix B	
Map of 2006-2007 sampling locations	20

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Stamford Reservoir were surveyed in 2006 using electrofishing and trap nets and in 2007 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Stamford Reservoir is a 5,200-acre impoundment located on Paint Creek in the Brazos River Basin approximately 10 miles southeast of Haskell. Water level has been within 5 feet of full pool since July 2002. From 1993 to 2000 the reservoir had low and dropping water levels. Stamford Reservoir had high productivity. Habitat features consisted of rocks, abundant flooded brush and trees, bulrush, and scattered submerged vegetation. There were two public boat ramps and limited bank-fishing access.
- **Management History:** Florida largemouth bass were introduced in the late 1970s. Stockings of blue catfish, palmetto bass, and walleye also occurred during the 1970s. Blue catfish were also stocked in 1991. Florida largemouth bass and channel catfish were stocked in the early 2000s in response to increased water levels.
- **Fish Community**
 - **Prey species:** Gizzard shad abundance was high, and bluegill abundance has steadily increased since 1998. Overall, there was satisfactory prey for existing predators.
 - **Catfishes:** Blue and channel catfish were present in the reservoir at low abundance. Their recovery from extended drought conditions has yet to be documented. Flathead catfish were present in the reservoir.
 - **Temperate basses:** The white bass population had many fish in the 14- to 17-inch size range available to anglers.
 - **Largemouth bass:** Largemouth bass have recovered from prolonged drought effects. Overall, this largemouth bass population was exceptional.
 - **White crappie:** White crappie were in excellent shape, both in terms of numbers of fish and size distribution, as plenty of legal-sized crappie were available to anglers.
- **Management Strategies:** Increase awareness of white bass population through articles in local papers.

2
INTRODUCTION

This document is a summary of fisheries data collected from Stamford Reservoir 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

Stamford Reservoir is a 5,200-acre impoundment constructed in 1953 on Paint Creek, a tributary of the Clear Fork of the Brazos River. It is located in Haskell County approximately 10 miles southeast of Haskell and is operated and controlled by the city of Stamford. The reservoir provided municipal and industrial water supply for the city of Stamford and is used for flood control and recreation. Land use around the reservoir was residential and agriculture. A steam electric generating plant was located on the reservoir, but it has been shut down for several years.

Habitat at time of fall sampling was primarily dead flooded terrestrial vegetation, rocks, bulrush and scattered submerged vegetation. Water level, at time of sampling, was 3 to 5 feet below the spillway. Water level steadily dropped from 1993 to 2000 and reached a low of nearly 16 feet below conservation level before water level increased to near conservation level in 2002 (Figure 1). Since 2002 water level has remained within 5 feet of conservation level, and the reservoir filled in 2006 (Figure 1).

Stamford Reservoir was eutrophic based on Carlson's Trophic State Index for Chlorophyll-a (TSI Chl-a) with a mean TSI chl-a of 47.50 and a trend that indicated an increase in algal content (Texas Commission on Environmental Quality 2005). Boat access was good and consisted of two public boat ramps. Bank-fishing access was restricted to the area around the boat ramps and a pay-for-fishing dock. Other descriptive characteristics for Stamford Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Van Zee and Munger 2003) included:

1. Stock channel catfish fingerlings, after substantial water level increases, to supplement poor channel catfish reproduction and recruitment.
Action: 149,712 fingerling channel catfish were stocked in 2003.
2. Largemouth bass abundance, prior to 2002, was extremely low and Florida largemouth bass influence has historically been nearly absent. Therefore, stocking Florida largemouth bass after substantial increases in water level when population abundance was very low would have the most impact on increasing Florida influence.
Action: Florida largemouth bass were stocked in 2001 and 2002. Florida largemouth bass alleles increased from 0% in 1992 to 39% in 2006.

Harvest regulation history: Sportfishes in Stamford Reservoir have always been managed with statewide regulations (Table 2).

Stocking history: Florida largemouth bass were introduced in 1977, and the most recent stocking was in 2002. Palmetto bass were stocked in the late 1970s and early 1980s. Walleye were stocked in the 1970s. Blue catfish were introduced in 1974 and a supplemental stocking occurred in 1991. Channel catfish were stocked in 2003. A complete stocking history can be found in Table 3.

Vegetation/habitat history: Stamford Reservoir has no significant vegetation/habitat management history.

METHODS

Fishes were collected by electrofishing (2 hours at 24 5-min stations), gill netting (five net nights at five stations), and trap netting (16 net nights at 16 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). Microsatellite DNA analysis was used in 2006 and electrophoresis was used prior to 2006 to determine largemouth bass genetics. 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 condition indices [relative weight (W_t)] were calculated for some 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 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages of largemouth bass were determined using otoliths. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 1998 (Van Zee 1999).

Prey species: Electrofishing catch rate of gizzard shad and bluegill was 827.5/h and 149.5/h, respectively. Gizzard shad IOV has increased from 88% in 1998 to 98% in 2006 (Figure 2). Total CPUE of gizzard shad steadily increased since 1998, and a sub-stock CPUE of over 700 gizzard shad per hour indicated that gizzard shad abundance was substantial (Figure 2). Electrofishing catch rate of bluegill has steadily increased since from 18.0/h in 1998 to 149.5/h in 2006 (Figure 3). Size structure of bluegill was typical of the district; the population was dominated by small individuals with a low PSD (Figure 3).

Blue catfish: The gill net catch rate of blue catfish was 1.8/nn in 2007, and there was a declining trend in CPUE from 1998 to 2007 (Figure 4). The apparent decline in relative abundance may be lingering effects related to the long drought period. A sign of recovery was the gill net catch of several smaller blue catfish (< 10 inches long) in the 2007 gill-net survey. Fish of this size were not collected in 1998 or 2002. It is possible that, with several years of high and stable water levels, the blue catfish population will rebound.

Channel catfish: The gill net catch rate of channel catfish was 1.6/nn in 2007. Gill net catch of channel catfish has ranged from 0.6/nn to 1.6/nn since 1998 (Figure 5), indicating that the population consistently has low relative abundance. Channel catfish were stocked in 2003 to supplement reproduction in a declining population during drought years from 1993-2001.

White bass: The gill net catch rate of white bass was 8.4/nn in 2007, compared to 2.4/nn in 1998 and 16.0/nn in 2002. Size structure of white bass was excellent in 2002 and 2007; modal length in 2002 and 2007 was 15 inches and 14 inches, respectively (Figure 6).

Largemouth bass: The electrofishing catch rate of stock-length largemouth bass (≥ 8.0 inches) was 44.0/h in 2006, considerably higher than the catch rate in 1998 and 2001 (Figure 7). By 2001, after eight years of low and dropping water levels, largemouth bass abundance and size structure was extremely poor. The reservoir nearly filled in 2002 and has since been at or near full capacity. Florida largemouth bass stockings in 2002, coupled with excellent natural reproduction, have greatly improved the largemouth bass population. Reproduction in 2006 was excellent as evidenced from the CPUE of sub-stock fish (Figure 7). Size structure was excellent; PSD was 61 and RSD-14 was 42 in 2006 (Figure 7). Growth of largemouth bass in Stamford Reservoir was excellent; average age at 14 inches (13.0 to 14.9 inches) was 2.1 years (N = 14). Florida alleles were 39% in 2006 and 34% in 2002. Historically, Florida alleles were

less than 10% (Table 4). In 2006 none of the samples were Florida genotypes, but 13% of the samples (N=30) had Florida alleles that were 0.75 or higher. Corresponding to the increase in Florida alleles was a large decrease in northern largemouth bass genotypes (Table 4). Mean W_r was similar among inch classes and centered around 100, indicating good forage availability for the existing largemouth bass population (Figure 7).

White crappie: Trap net catch rate of white crappie was 41.2/nn in 2006. Catch rates have steadily increased since 1998 (Figure 8). The relatively high catch rate in 2001 (32.2/nn) consisted almost entirely of fish less than 5 inches in length (Figure 8). The length frequency distribution of fish in 2006 showed a balanced population with fish ranging from 3 inches to 13 inches long (Figure 8). The PSD was 39, and 28% of stock-sized fish were legal size. Condition of white crappie generally improved with fish size as W_r was below 90 for 5-7-inch fish and ranged from the mid 90s to over 110 for 8-inch and larger fish (Figure 8). Growth was good in 2006; mean age of 9.0-10.9-inch white crappie was 1.9 years (N=54). Apparently, the white crappie population has rebounded from the extended drought that severely impacted the reservoir during most of the 1990s through 2001.

Fisheries management plan for Stamford Reservoir, Texas

Prepared – July 2007.

ISSUE 1: The white bass population consisted of some very large fish and could be the source of an excellent fishery. However, we believe that little fishing effort is directed for this species.

MANAGEMENT STRATEGY

1. Publish press releases on white bass fishing opportunities in local papers.

SAMPLING SCHEDULE JUSTIFICATION:

Additional electrofishing and trap net sampling in 2008, although not necessary, would allow us to write updated press releases on fishing opportunities at Stamford Reservoir. Further trend data on the recovery of the crappie and largemouth bass populations would also be beneficial for the long-term management of the reservoir. Catfish populations, at least in this area of the state, grow slower and, with gear selectivity, it takes longer to document their recovery. Therefore, a four-year rotation on gill nets should be adequate to monitor their progress.

6
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, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Van Zee, B. 1999. Statewide freshwater fisheries monitoring and management program survey report for Stamford Reservoir, 1998. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Van Zee, B. and C. Munger. 2003. Statewide freshwater fisheries monitoring and management program survey report for Stamford Reservoir, 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Texas Commission on Environmental Quality. 2005. Trophic classification of Texas reservoirs; 2004 water quality inventory and 303(d) list (May 13, 2005). 15 pp.

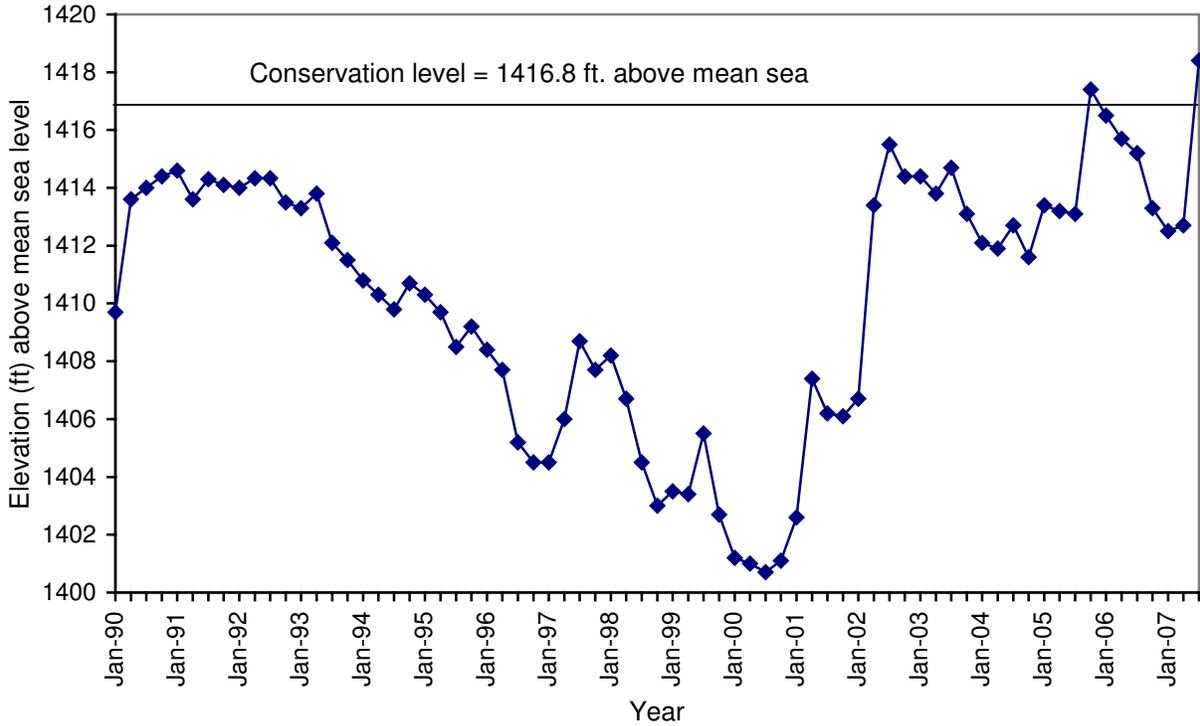


Figure 1. Quarterly water level elevations in feet above mean sea level for Stamford Reservoir, Texas. Conservation level is 1416.8 feet above mean sea level.

Table 1. Characteristics of Stamford Reservoir, Texas.

Characteristic	Description
Year constructed	1953
Controlling authority	City of Stamford
County	Haskell
Reservoir type	Main stream, Brazos River Basin
Shoreline Development Index	7.20
Conductivity	679 umhos/cm

Table 2. Harvest regulations for Stamford Reservoir, Texas

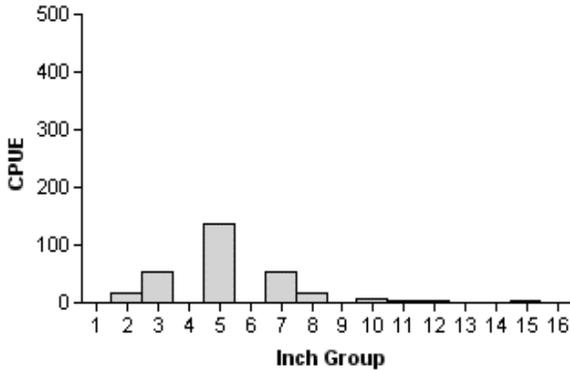
Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass, largemouth	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies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

Table 3. Stocking history of Stamford Reservoir, Texas. Size categories are: FGL = 1-3 inches.

Species	Year	Number	Size
Blue catfish	1974	25,300	FGL
	1977	41,250	FGL
	1991	52,000	FGL
	Total	118,550	
Channel catfish	1971	2,250	FGL
	1973	13,000	FGL
	1974	1,500	FGL
	2003	149,712	FGL
	Total	166,462	
Florida largemouth bass	1977	60,720	FGL
	1978	116,200	FGL
	1985	83,435	FGL
	1986	71,500	FGL
	1996	260,933	FGL
	1998	262,295	FGL
	2001	100,735	FGL
	2002	263,514	FGL
Total	1,219,332		
Palmetto bass (striped X white bass hybrid)	1977	23,500	FGL
	1979	46,900	FGL
	1982	46,016	FGL
	Total	116,416	
Walleye	1976	1,000,000	FRY
	1977	1,227,000	FRY
	1978	1,150,000	FRY
	Total	3,377,000	

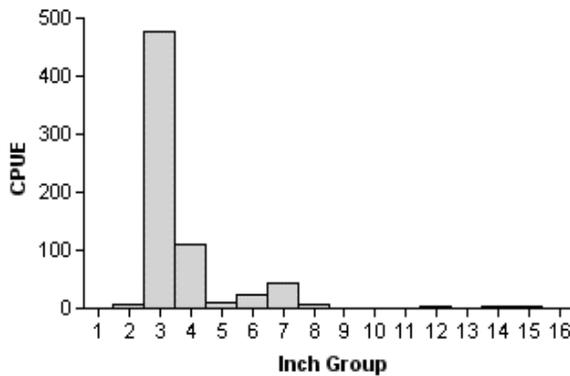
Gizzard Shad

1998



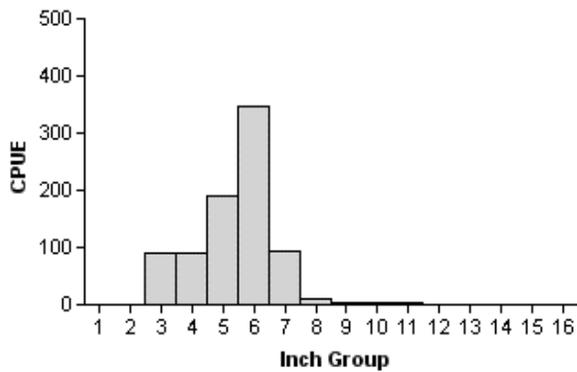
Effort = 1.0
 Total CPUE = 297.0 (23; 297)
 Stock CPUE = 90.0 (23; 90)
 PSD = 11 (4)
 IOV = 88 (2)

2001



Effort = 1.0
 Total CPUE = 689.0 (21; 689)
 Stock CPUE = 63.0 (27; 63)
 PSD = 16 (8)
 IOV = 97 (1)

2006



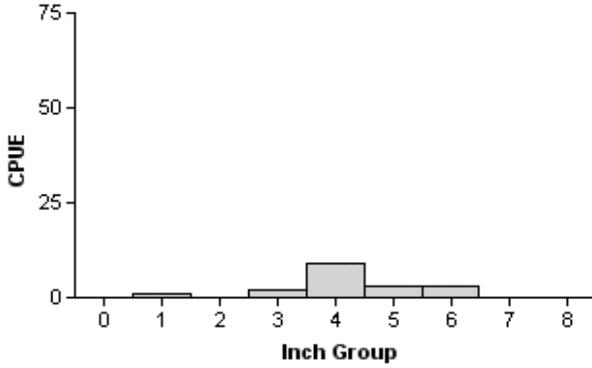
Effort = 2.0
 Total CPUE = 827.5 (12; 1655)
 Stock CPUE = 111.0 (19; 222)
 PSD = 3 (1)
 IOV = 98 (1)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for PSD and IOV are in parentheses) for fall electrofishing surveys, Stamford Reservoir, Texas, 1998, 2001, and 2006.

Bluegill

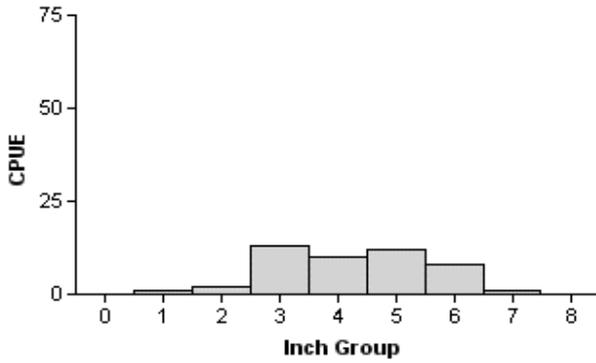
1998

Effort = 1.0
 Total CPUE = 18.0 (41; 18)
 PSD = 18 (11)



2001

Effort = 1.0
 Total CPUE = 47.0 (60; 47)
 PSD = 20 (8)



2006

Effort = 2.0
 Total CPUE = 149.5 (16; 299)
 PSD = 5 (2)

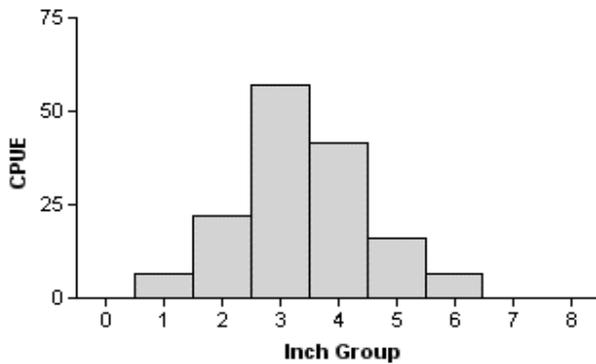


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stamford Reservoir, Texas, 1998, 2001, and 2006.

Blue Catfish

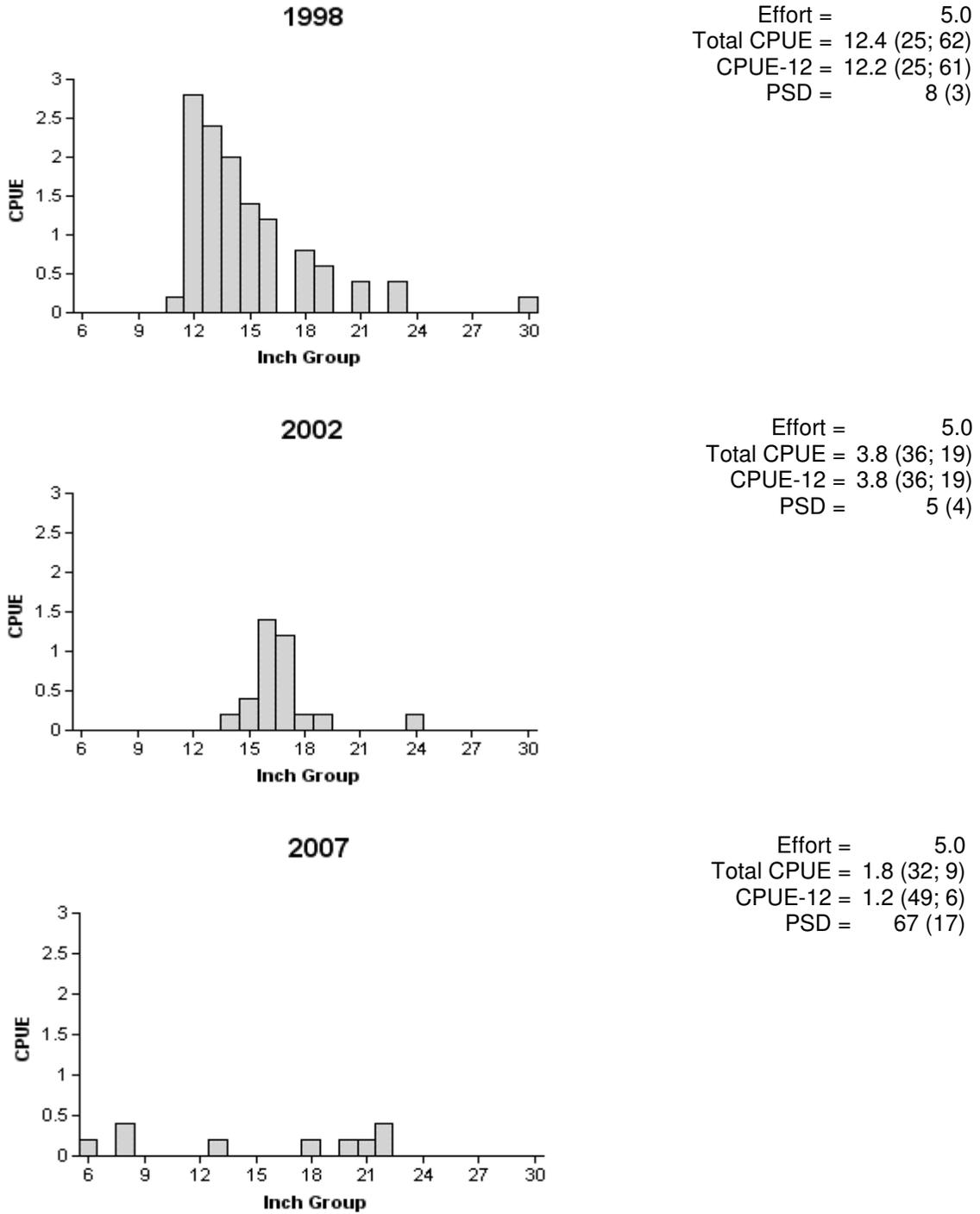
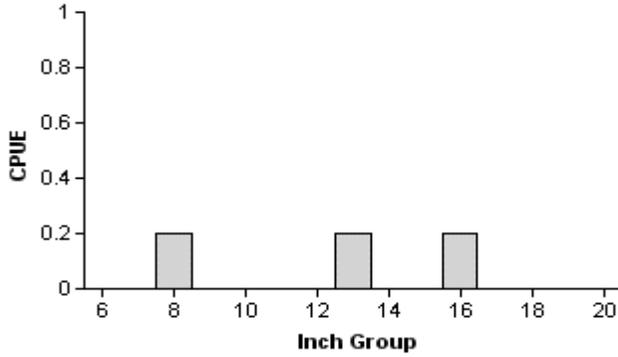


Figure 4. Number of blue catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Stamford Reservoir, Texas, 1998, 2002, and 2007.

Channel Catfish

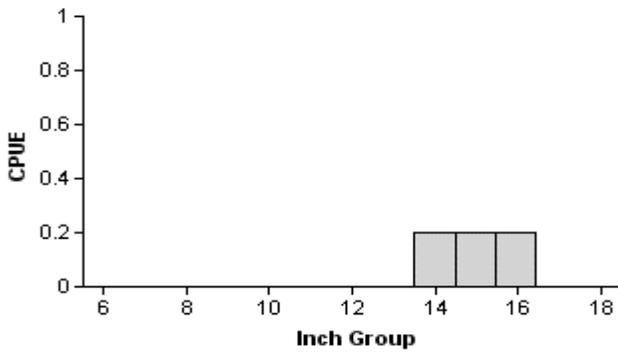
1998

Effort = 5.0
 Total CPUE = 0.6 (67; 3)
 CPUE-12 = 0.4 (100; 2)
 PSD = 50 (0)



2002

Effort = 5.0
 Total CPUE = 0.6 (41; 3)
 CPUE-12 = 0.6 (41; 3)
 PSD = 33 (30)



2007

Effort = 5.0
 Total CPUE = 1.6 (38; 8)
 CPUE-12 = 1.2 (49; 6)
 PSD = 50 (35)

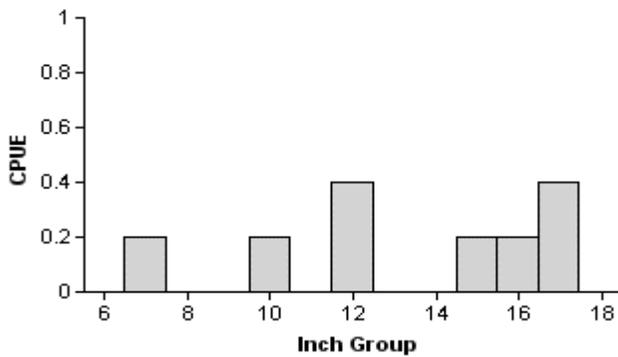
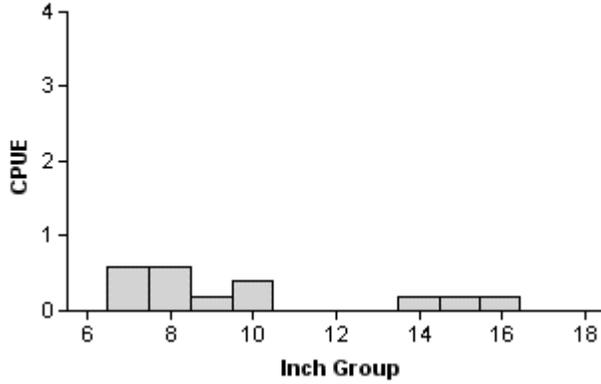


Figure 5. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Stamford Reservoir, Texas, 1998, 2002, and 2007.

White Bass

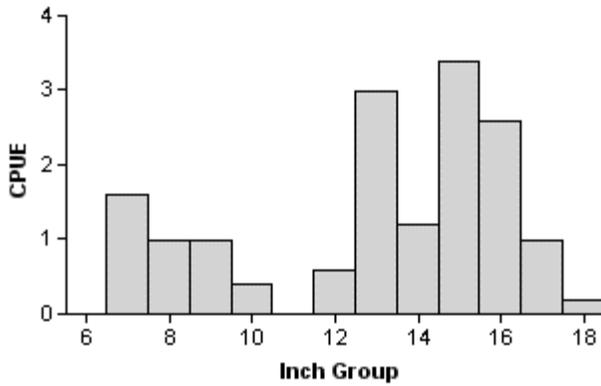
1998

Effort = 5.0
 Total CPUE = 2.4 (34; 12)
 CPUE-10 = 1.0 (55; 5)



2002

Effort = 5.0
 Total CPUE = 16.0 (27; 80)
 CPUE-10 = 12.4 (34; 62)



2007

Effort = 5.0
 Total CPUE = 8.4 (36; 42)
 CPUE-10 = 7.8 (36; 39)

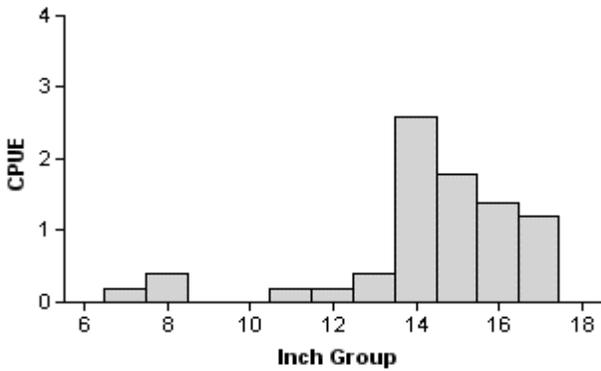
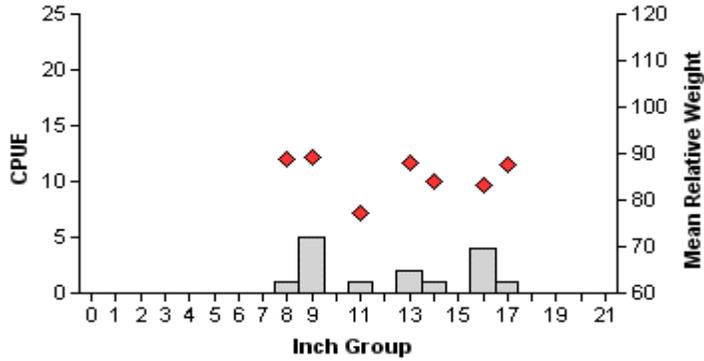


Figure 6. Number of white bass caught per net night (CPUE) and population indices (RSE and N for CPUE are in parentheses) for spring gill net surveys, Stamford Reservoir, Texas, 1998, 2002, and 2007.

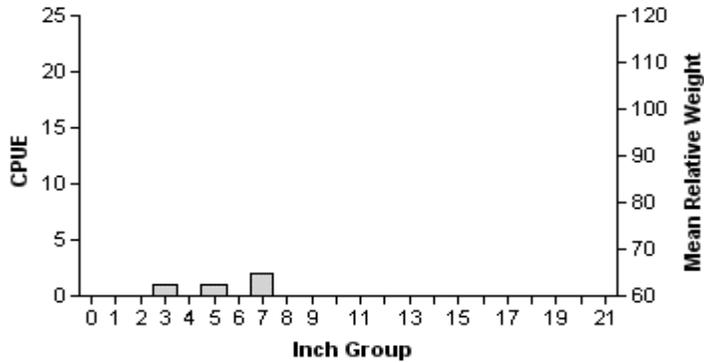
Largemouth Bass

1998



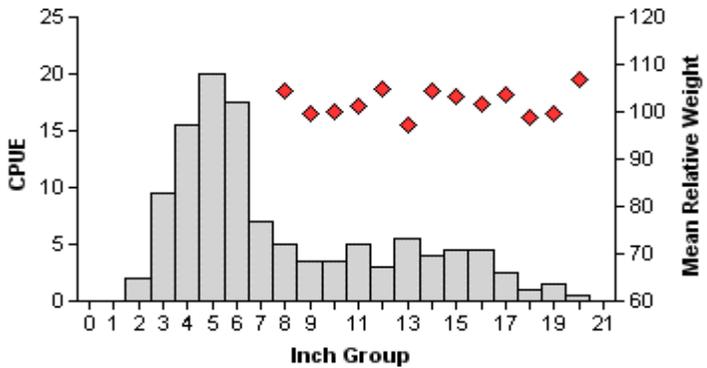
Effort = 1.0
 Total CPUE = 15.0 (47; 15)
 Stock CPUE = 15.0 (47; 15)
 CPUE-14 = 6.0 (39; 6)
 PSD = 53 (8)
 RSD-P = 33 (19)
 RSD-14 = 40 (15)

2001



Effort = 1.0
 Total CPUE = 4.0 (56; 4)
 Stock CPUE = 0.0 (0; 0)
 CPUE-14 = 0.0 (0; 0)
 PSD = 0 (0)
 RSD-P = 0 (0)
 RSD-14 = 0 (0)

2006



Effort = 2.0
 Total CPUE = 115.5 (15; 231)
 Stock CPUE = 44.0 (16; 88)
 CPUE-14 = 18.5 (21; 37)
 PSD = 61 (8)
 RSD-P = 33 (7)
 RSD-14 = 42 (6)

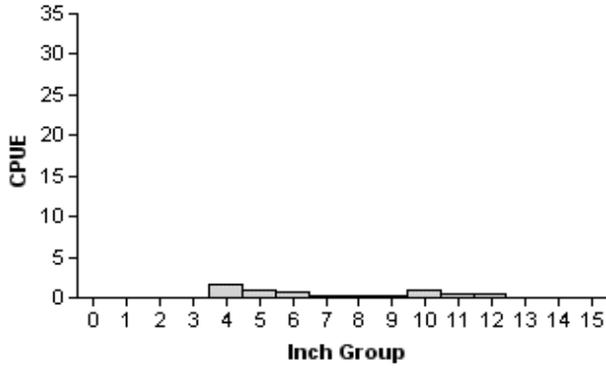
Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stamford Reservoir, Texas, 1998, 2001, and 2006.

Table 4. Results of genetic analysis of largemouth bass collected by fall electrofishing, Stamford Reservoir, Texas, 1991, 1992, 2002, and 2006. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass. Microsatellite DNA analysis was used in 2006, and electrophoresis was used in 1991, 1992, and 2002 to determine largemouth bass genetics.

Year	Sample size	Genotype			% FLMB alleles	% FLMB genotype
		FLMB	Intergrades	NLMB		
1991	30	0	7	23	5.8	0.0
1992	19	0	0	19	0.0	0.0
2002	35	5	16	14	34.0	14.3
2006	30	0	24	6	39.0	0.0

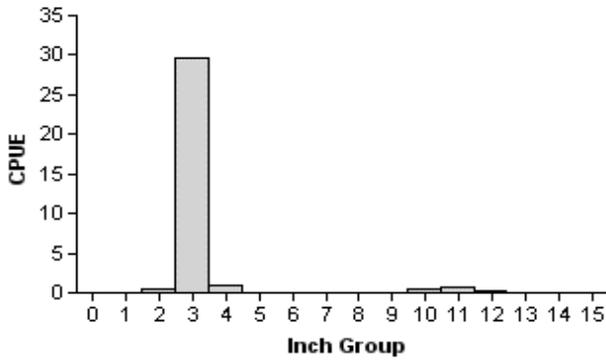
White Crappie

1998



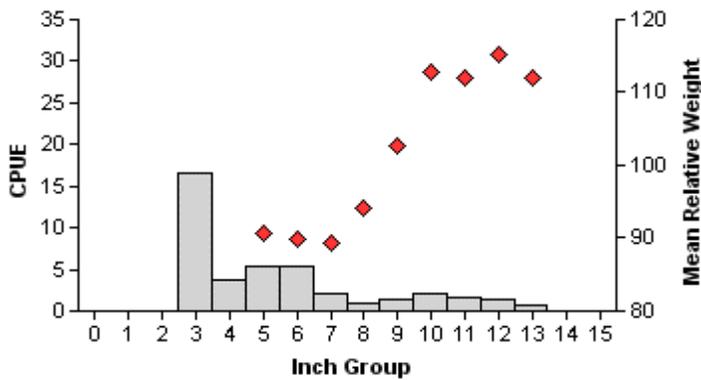
Effort =	4.0
Total CPUE =	6.3 (36; 25)
Stock CPUE =	4.5 (35; 18)
CPUE-10 =	2.0 (68; 8)
PSD =	56 (10)
RSD-10 =	44 (15)

2001



Effort =	5.0
Total CPUE =	32.2 (41; 161)
Stock CPUE =	1.2 (49; 6)
CPUE-10 =	1.2 (49; 6)
PSD =	100 (0)
RSD-10 =	100 (0)

2006



Effort =	16.0
Total CPUE =	41.2 (24; 659)
Stock CPUE =	21.0 (29; 336)
CPUE-10 =	5.9 (31; 95)
PSD =	39 (5)
RSD-10 =	28 (6)

Figure 8. 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, Stamford Reservoir, Texas, 1998, 2001, and 2006.

Table 5. Proposed sampling schedule for Stamford Reservoir, 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.

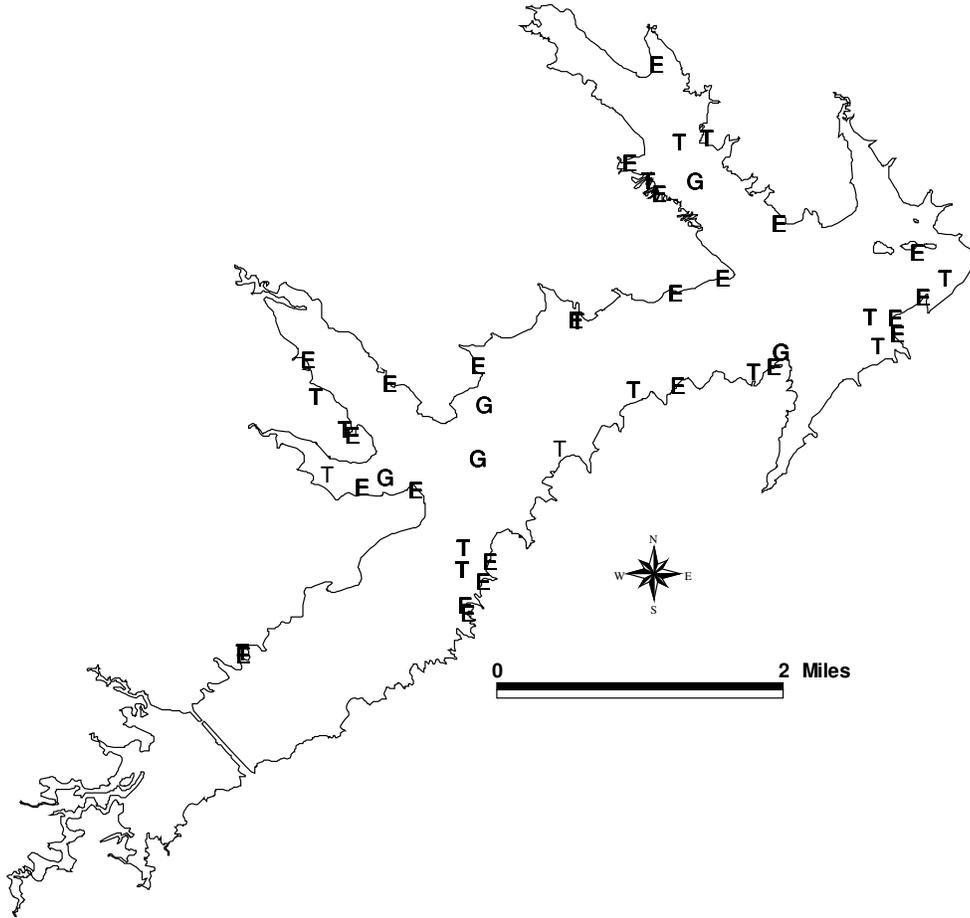
Survey Year	Electrofisher	Trap Net	Gill Net	Report
Fall 2007-Spring 2008				
Fall 2008-Spring 2009	A	A		
Fall 2009-Spring 2010				
Fall 2010-Spring 2011	S	S	S	S

APPENDIX A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					1655	827.5
Blue catfish	9	1.8				
Channel catfish	8	1.6				
Flathead catfish	1	0.2				
White bass	42	8.4				
Green sunfish					14	7.0
Warmouth					10	5.0
Bluegill					299	149.5
Longear sunfish					29	14.5
Largemouth bass					231	115.5
White crappie			659	41.2		

APPENDIX B



Location of sampling sites, Stamford Reservoir, Texas, 2006-2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was near full pool at time of sampling.