

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-33

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2007 Survey Report

Pat Cleburne Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Pat Cleburne Reservoir were surveyed in 2007 using electrofishing and trap nets and in 2008 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:** Pat Cleburne Reservoir is an 1,558-acre impoundment within the Brazos River Basin, Johnson County. Water levels were within one foot of conservation pool (733.6 above MSL) during the time of sampling. Shoreline fish habitat consisted of rocky shoreline, inundated stumps, and over hanging brush. Boat access (two ramps) on the reservoir is adequate, and there are currently no handicap-specific facilities.
- **Management history:** Important sport fish include largemouth bass, white crappie, and catfish. The management plan from the 2004 survey report included urging the city of Cleburne for necessary updates on the western-most boat ramp, and clearing the shoreline of trash and debris. No fishery strategies were included.
- **Fish Community**
 - **Prey species:** Threadfin shad were present in the reservoir. Electrofishing catch of gizzard shad was good and most were available as prey to sport fish. The electrofishing catch of bluegills was also excellent, however none over 6-inches were observed.
 - **Catfishes:** The gill net catch of blue and channel catfish was excellent in spring 2008, and body condition was average for both species. Size structure was dominated by legal-sized fish.
 - **White bass:** White bass were collected in good numbers in the spring 2008 gill net survey, and nearly 50% of the population was 12 inches in length or longer.
 - **Largemouth bass:** Largemouth bass were collected in good numbers and body condition generally improved with increasing size. However, the population is unbalanced due to the low numbers of legal-sized fish observed.
 - **White crappie:** Few white crappie were collected in fall 2007 trap nets, however body condition remained good.
- **Management Strategies:** Continue managing Pat Cleburne with statewide regulations. Conduct standard monitoring with electrofisher, trap nets, and gill nets in 2011 and 2012. Also, perform a new littoral habitat survey prior to the 2012 report.

INTRODUCTION

This document is a summary of fisheries data collected from Pat Cleburne Reservoir in 2007-2008. 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 2007-2008 data for comparison.

Reservoir Description

Pat Cleburne Reservoir is supplied by the Nolan River within the Brazos River Basin, Johnson County. The reservoir is used as a municipal water supply and for recreation. The 1,558-acre impoundment has a drainage area of 100 square miles, a storage capacity of 25,300 acre-feet, and a shoreline length of 9.0 miles. Mean and maximum depths are 16.5 and 64.0 feet respectively. Low water elevations occurred in late 2005 and 2006; otherwise levels have generally remained within three feet of conservation pool which is currently 733.6 feet above mean sea level (Figure 1). Shoreline fish habitat consists of rocky shoreline, inundated stumps, and over hanging brush. Bank and boat access (two ramps) on the reservoir is adequate, but there are currently no handicap-specific facilities. Other descriptive characteristics for Pat Cleburne Reservoir are in Table 1. Further information about Pat Cleburne Reservoir and its facilities can be obtained by visiting the Texas Parks and Wildlife Web site at <http://www.tpwd.state.tx.us/> and navigating within the fishing link.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Baird and Tibbs 2004) included:

1. Contact the City of Cleburne and urge them to clean-up boat ramp and west side of reservoir.
Action: Recommendations were made to the City of Cleburne, and actions were taken to clean-up the west side of the reservoir. Very little trash was observed during sampling in 2007 and 2008.

Harvest regulation history: Sportfishes in Pat Cleburne Reservoir are currently managed with statewide regulations.

Stocking history: Pat Cleburne Reservoir has not been stocked since 1998 when channel catfish were stocked at a rate of 25 fish per acre. To date, Florida largemouth bass, Northern largemouth bass, Flathead catfish, and Channel catfish have been stocked into the reservoir. The complete stocking history is in Table 3.

Vegetation/habitat history: Pat Cleburne is a small, shallow reservoir with a secchi range less than two feet. Water willow (*Justicia americana*) and Cattail (*Typha spp.*) are the dominant shoreline vegetation species. No noxious species of vegetation have been identified in the reservoir to date.

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 condition indices [relative weight (Wr)] 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 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. No age and growth was conducted in 2007 and 2008. Source for water level data was the United States Geological Survey (USGS) website and Brazos River Authority (BRA).

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of rocky shoreline, inundated stumps, over hanging brush, and emergent shoreline vegetation; however no habitat survey was conducted in 2007-2008 (Table 4). The last habitat survey was conducted by Sellers and Mitchell (1997).

Creel: No creel surveys were performed on Pat Cleburne Reservoir in the last four years.

Prey species: Electrofishing catch rates of threadfin and gizzard shad were 265.0/h and 299.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was good, indicating that 79% of gizzard shad were available to existing predators; this was higher than IOV estimates from 2003 (Figure 2). Total CPUE of gizzard shad in 2007 (299.0/h) was similar to that in 2003 (320.0/h) (Figure 2). Total CPUE of bluegill in 2007 (492.0/h) was lower than total CPUE from 2003 (913.0/h), and the size structure continues to be dominated by 4 to 5-inch individuals (Figure 3).

Catfish: The gill net catch rate of blue catfish nearly doubled from the 2004 survey and was 5.4/nn in 2008. Total lengths ranged from 14 to 26 inches and body condition was average (range 83 to 90, Figure 4). The channel catfish catch rate also doubled from 2004 (3.5/nn) to 2008 (7.6/nn). The population size structure showed recent evidence of recruitment, total lengths ranged from 7 to 20 inches, and body condition was again average (range 77 to 91, Figure 5). The PSD of 52 was average for the past three surveys and showed over 50% of the population was of quality length or longer.

White bass: The gill net catch rate of white bass was 9.0/nn – less than half the rate observed in 2004. Body condition was excellent for most individuals (range 86 to 108, Figure 6). Nearly 50% of the white bass in the population are 12 inches or longer (RSD-P = 47).

Largemouth bass: The 2007 electrofishing catch rate of largemouth bass (188.0/h) remained similar to the 2003 catch rate (178.0/h). Body condition was good to excellent (range 91 to 118, Figure 7), and generally increased with size. Population structure was lower than optimal according to Anderson and Neumann (1996) (i.e., PSD = 40–70) as the PSD was only 34. However this is much improved over the previous two surveys. Population structure showed consistent recruitment and nearly 6% of the largemouth bass population was in the preferred size class of 15 inches or longer. Florida largemouth bass influence in the population was determined to be 37%. No age and growth information was taken from the 2007 largemouth bass survey.

White crappie: The trap net catch rate of white crappie was 1.0/nn in 2007, lower than 2003 (3.0/nn) and 1999 (5.5/nn). The PSD was 75 and was slightly lower than the previous two surveys (Figure 8). Mean relative weight was over 90 for all size classes in 2007. Nearly 25% of the crappie population was the preferred size of 10 inches or longer.

Fisheries management plan for Pat Cleburne Reservoir, Texas

Prepared – July 2008.

ISSUE 1: The last habitat survey was conducted in 1997. Although few changes have taken place on the reservoir, this information needs to be updated.

MANAGEMENT STRATEGY

1. Conduct a vegetation/habitat survey in summer of 2011

ISSUE 2: Several species provide excellent angling opportunities in this relatively unknown reservoir.

MANAGEMENT STRATEGY

1. Issue one or more news releases informing the angling public about these opportunities.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard electrofishing and trap netting in fall 2011 and gill netting in spring 2012. (Table 5).

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.
- Baird, M. and J. Tibbs. 2003. Statewide freshwater fisheries monitoring and management program survey report for Pat Cleburne Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- 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.
- Sellers, K. and J. Mitchell. 1997. Statewide freshwater fisheries monitoring and management program survey report for Pat Cleburne Reservoir, 1997. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Pat Cleburne Mean Daily Water Level

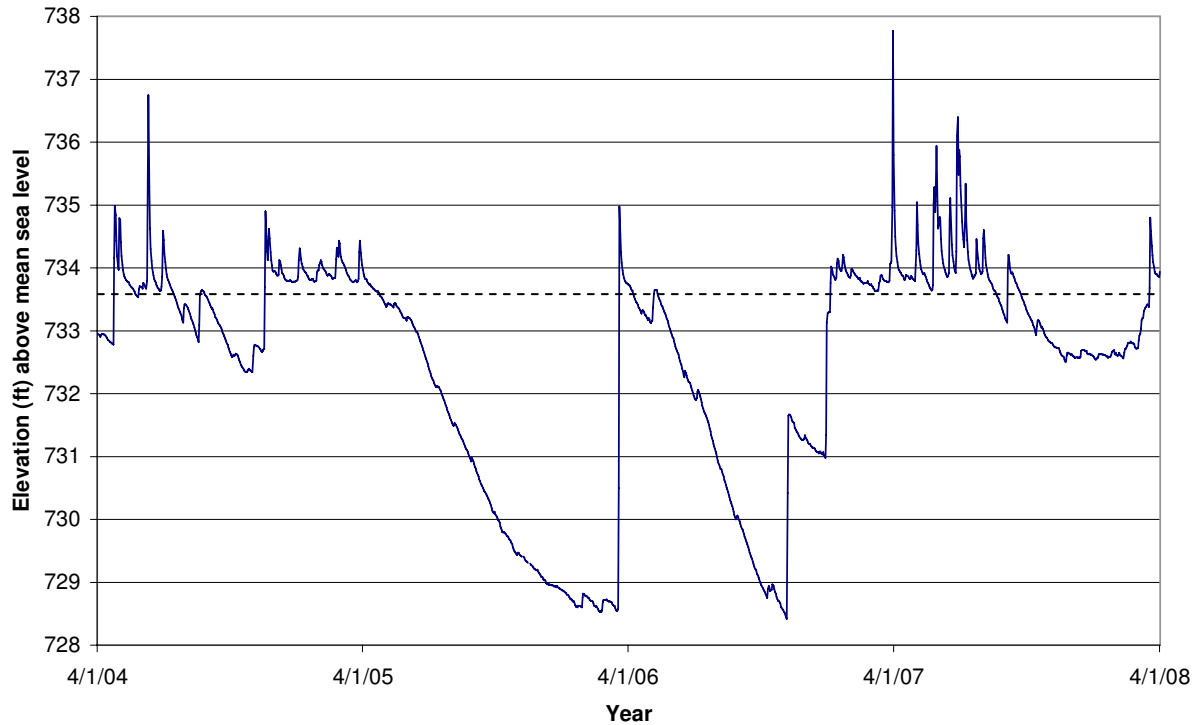


Figure 1. Daily mean water level elevations in feet above mean sea level (MSL) recorded for Pat Cleburne Reservoir, Texas.

Table 1. Characteristics of Pat Cleburne Reservoir, Texas.

Characteristic	Description
Year Constructed	1964
Controlling authority	City of Cleburne
County	Johnson
Reservoir type	Tributary
Shoreline Development Index (SDI)	1.6
Conductivity	320 umhos/cm

Table 2. Harvest regulations for Pat Cleburne Reservoir.

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 Pat Cleburne, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Channel catfish	1990	15,723	FGL	2.5
	1998	<u>39,182</u>	AFGL	8.6
	Total	54,905		
Flathead catfish	1982	<u>18</u>		UNK
	Total	18		
Florida Largemouth bass	1992	154,689	FGL	1.0
	1995	<u>155,332</u>	FGL	1.3
	Total	310,021		
Largemouth bass	1971	50,000	UNK	UNK
	1980	<u>235</u>	UNK	UNK
	Total	50,235		

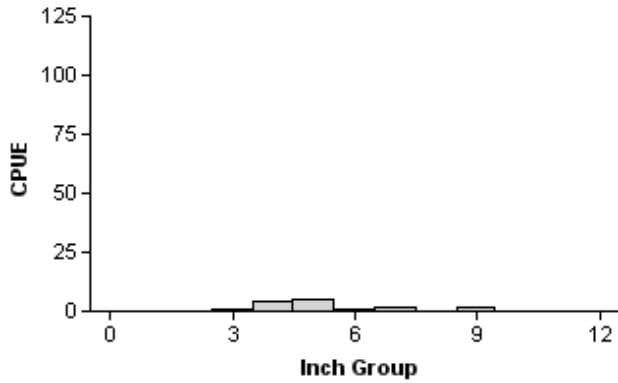
Table 4. Survey of littoral zone and physical habitat types, Pat Cleburne Reservoir, Texas, 1997. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline distance	
	Miles	Percent of total
Rocky shoreline	2.8	31.1
Dead trees, stumps	1.0	11.1
Featureless	2.7	30.0
Overhanging brush	2.0	22.2
Native vegetation	0.5	5.6

Gizzard Shad

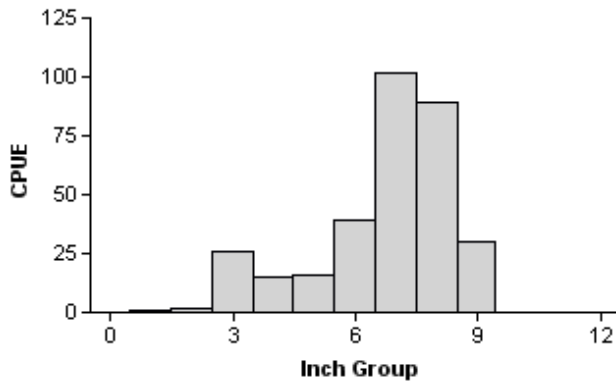
1999

Effort = 1.5
 Total CPUE = 14.0 (51; 21)
 Stock CPUE = 3.3 (49; 5)
 IOV = 90.48 (7.2)



2003

Effort = 1.0
 Total CPUE = 320.0 (30; 320)
 Stock CPUE = 221.0 (31; 221)
 IOV = 62.81 (3.5)



2007

Effort = 1.0
 Total CPUE = 299.0 (24; 299)
 Stock CPUE = 164.0 (25; 164)
 IOV = 79.26 (4)

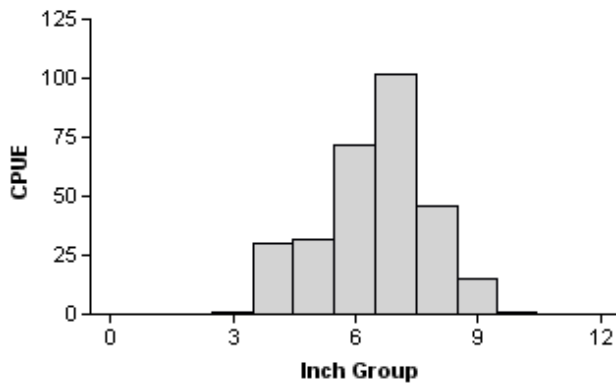
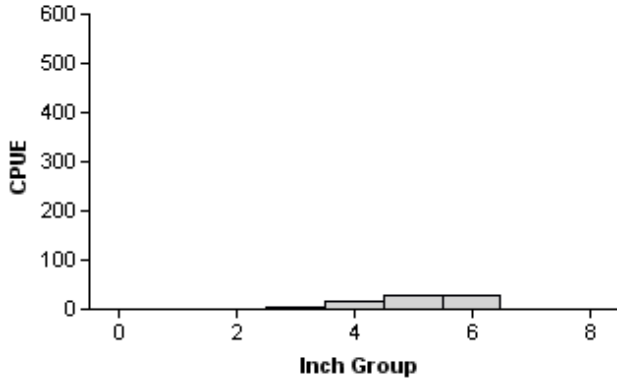


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Pat Cleburne Reservoir, Texas, 1999, 2003, and 2007.

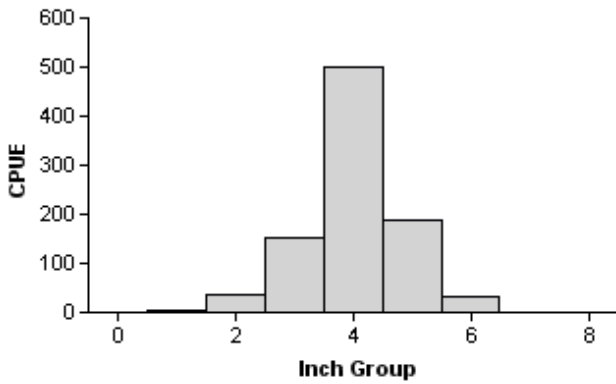
Bluegill

1999



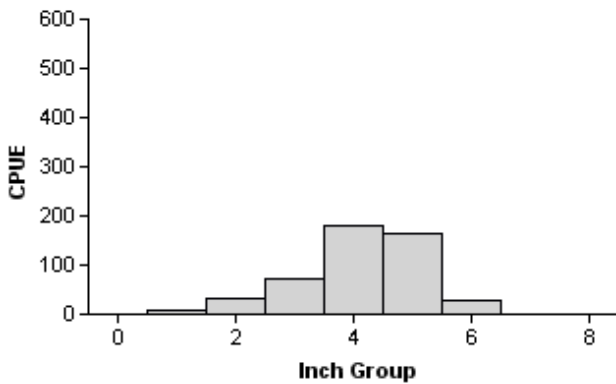
Effort = 1.5
 Total CPUE = 77.3 (18; 116)
 Stock CPUE = 76.0 (18; 114)
 PSD = 39 (6.3)
 RSD-P = 0 (0)

2003



Effort = 1.0
 Total CPUE = 913.0 (21; 913)
 Stock CPUE = 874.0 (23; 874)
 PSD = 4 (1.8)
 RSD-P = 0 (0)

2007

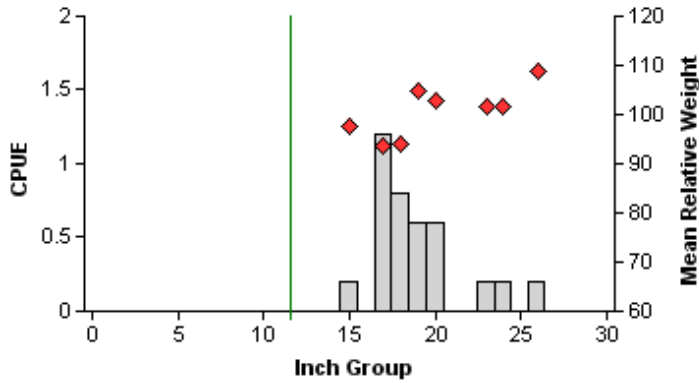


Effort = 1.0
 Total CPUE = 492.0 (28; 492)
 Stock CPUE = 449.0 (29; 449)
 PSD = 7 (2.7)
 RSD-P = 0 (0)

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, Pat Cleburne Reservoir, Texas, 1999, 2003, and 2007.

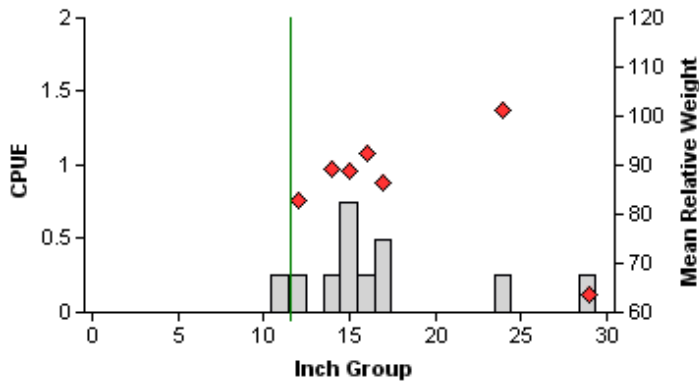
Blue Catfish

1999



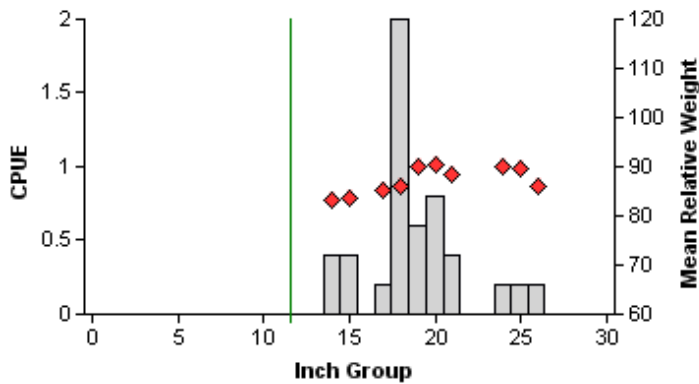
Effort = 5.0
 Total CPUE = 4.0 (58; 20)
 Stock CPUE = 4.0 (58; 20)
 PSD = 30 (5.4)
 RSD-P = 0 (0)

2004



Effort = 4.0
 Total CPUE = 2.8 (31; 11)
 Stock CPUE = 2.5 (26; 10)
 PSD = 20 (14.6)
 RSD-P = 0 (0)

2008

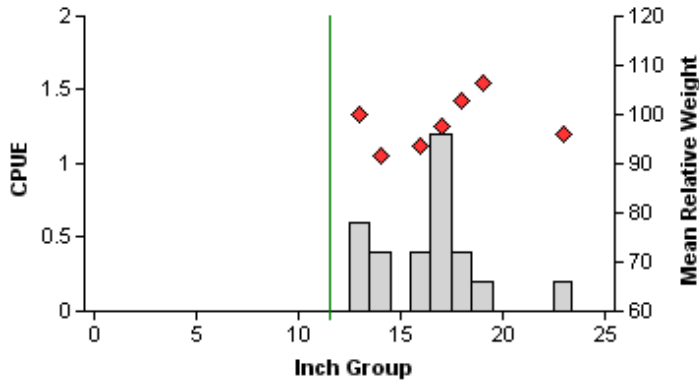


Effort = 5.0
 Total CPUE = 5.4 (24; 27)
 Stock CPUE = 5.4 (24; 27)
 PSD = 33 (10.8)
 RSD-P = 0 (0)

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, Pat Cleburne Reservoir, Texas, 1999, 2004, and 2008.

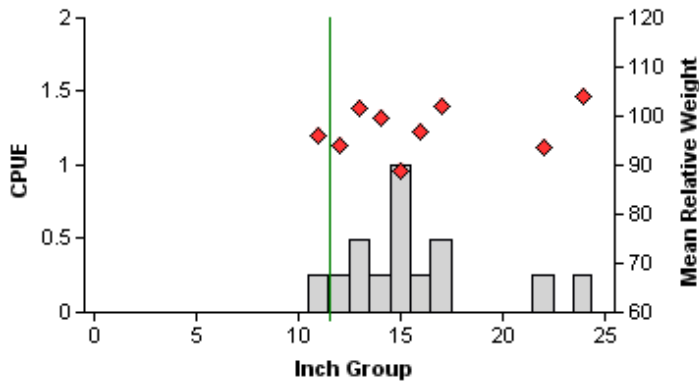
Channel Catfish

1999



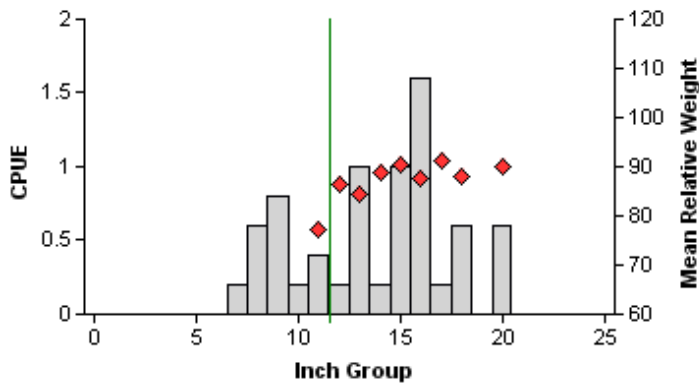
Effort = 5.0
 Total CPUE = 3.4 (36; 17)
 Stock CPUE = 3.4 (36; 17)
 PSD = 71 (16.6)
 RSD-P = 0 (0)

2004



Effort = 4.0
 Total CPUE = 3.5 (50; 14)
 Stock CPUE = 3.5 (50; 14)
 PSD = 36 (8.7)
 RSD-P = 7 (6.3)

2008



Effort = 5.0
 Total CPUE = 7.6 (15; 38)
 Stock CPUE = 5.8 (17; 29)
 PSD = 52 (11.8)
 RSD-P = 0 (0)

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, Pat Cleburne Reservoir, Texas, 1999, 2004, and 2008.

White Bass

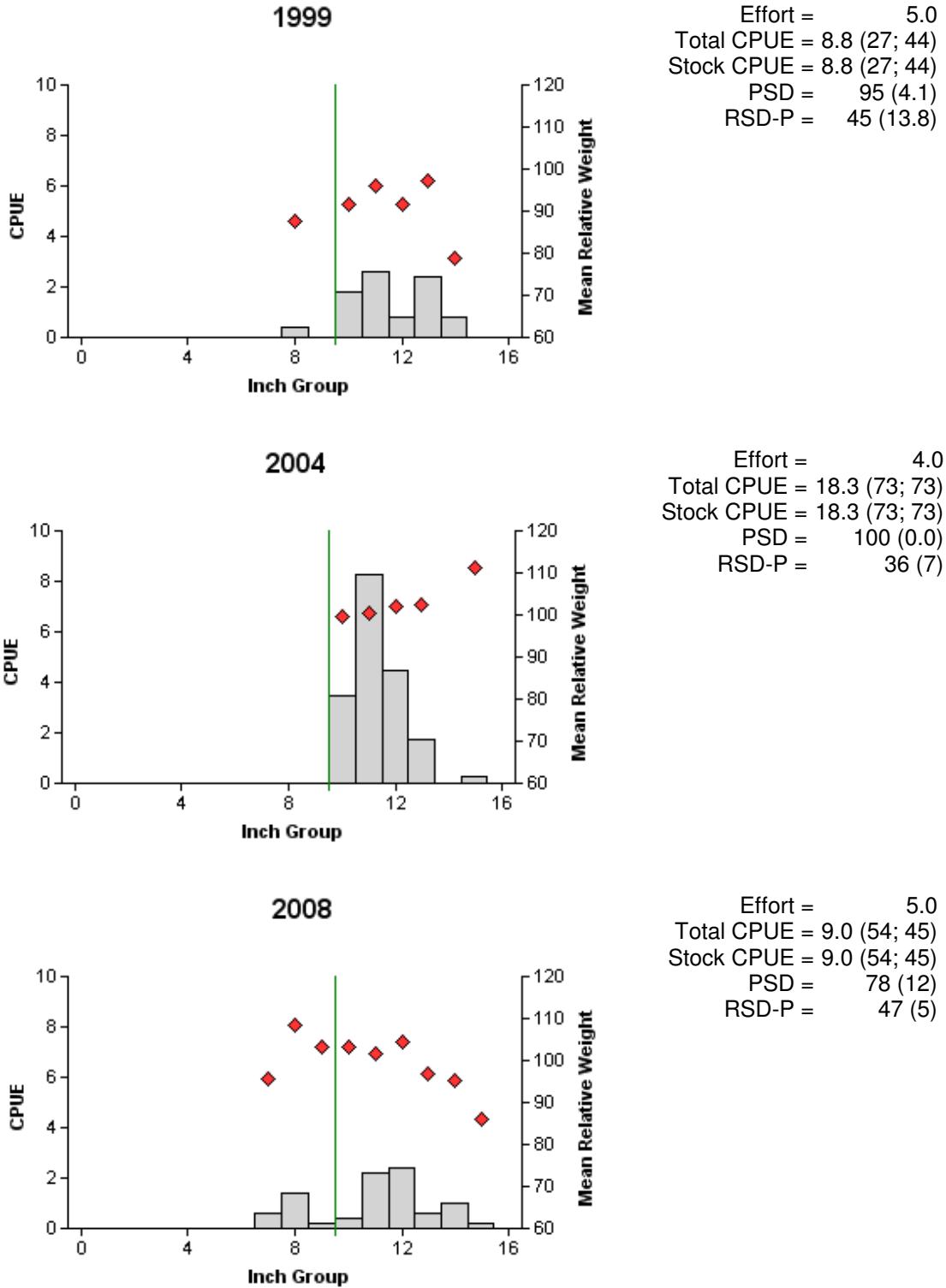
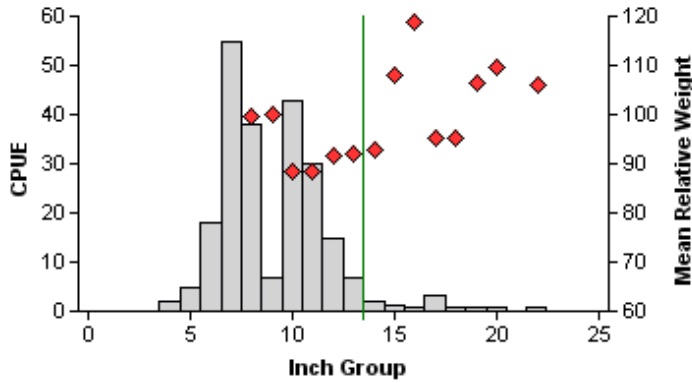


Figure 6. Number of white bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Pat Cleburne Reservoir, Texas, 1999, 2004, and 2008.

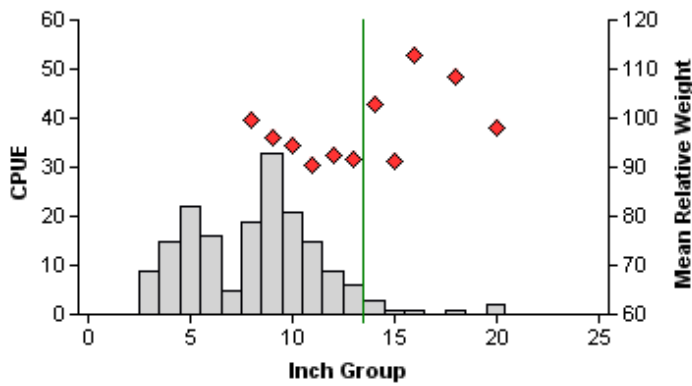
Largemouth Bass

1999



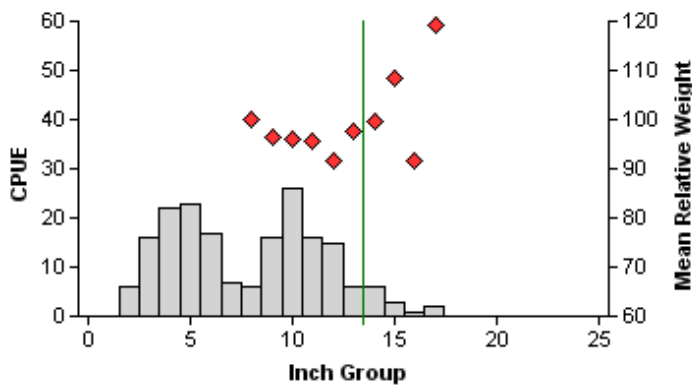
Effort = 1.5
 Total CPUE = 228.0 (7; 342)
 Stock CPUE = 148.7 (12; 223)
 PSD = 21 (2.7)
 RSD-P = 5 (1.7)

2003



Effort = 1.0
 Total CPUE = 178.0 (30; 178)
 Stock CPUE = 111.0 (30; 111)
 PSD = 21 (7.3)
 RSD-P = 5 (2.7)

2007

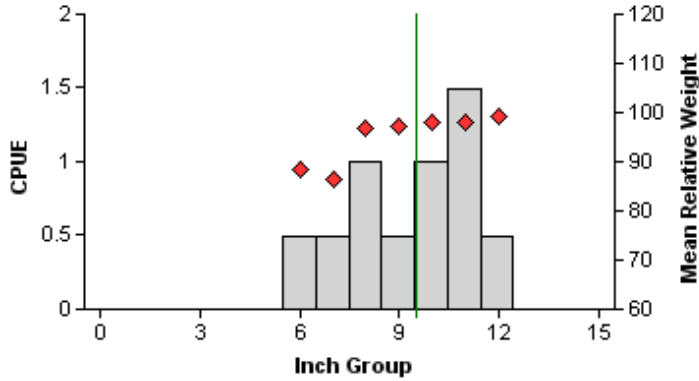


Effort = 1.0
 Total CPUE = 188.0 (25; 188)
 Stock CPUE = 97.0 (24; 97)
 PSD = 34 (5.3)
 RSD-P = 6 (3.1)

Figure 7. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Pat Cleburne Reservoir, Texas, 1999, 2003, and 2007.

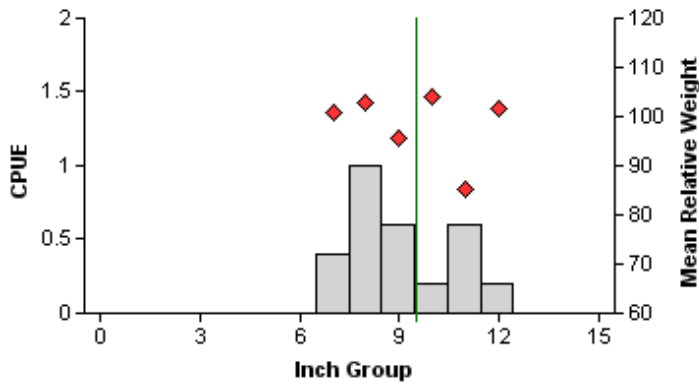
White Crappie

1999



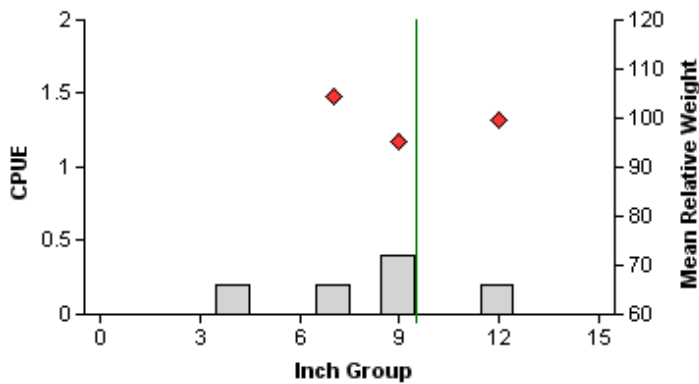
Effort = 2.0
 Total CPUE = 5.5 (27; 11)
 Stock CPUE = 5.5 (27; 11)
 PSD = 82 (4.9)
 RSD-P = 55 (21.4)

2003



Effort = 5.0
 Total CPUE = 3.0 (41; 15)
 Stock CPUE = 3.0 (41; 15)
 PSD = 87 (10.5)
 RSD-P = 33 (10.6)

2007



Effort = 5.0
 Total CPUE = 1.0 (100; 5)
 Stock CPUE = 0.8 (100; 4)
 PSD = 75 (0)
 RSD-P = 25 (0)

Figure 8. Number of white crappie caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Pat Cleburne Reservoir, Texas, 1999, 2003, and 2007.

Table 5. Proposed sampling schedule for Pat Cleburne 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.

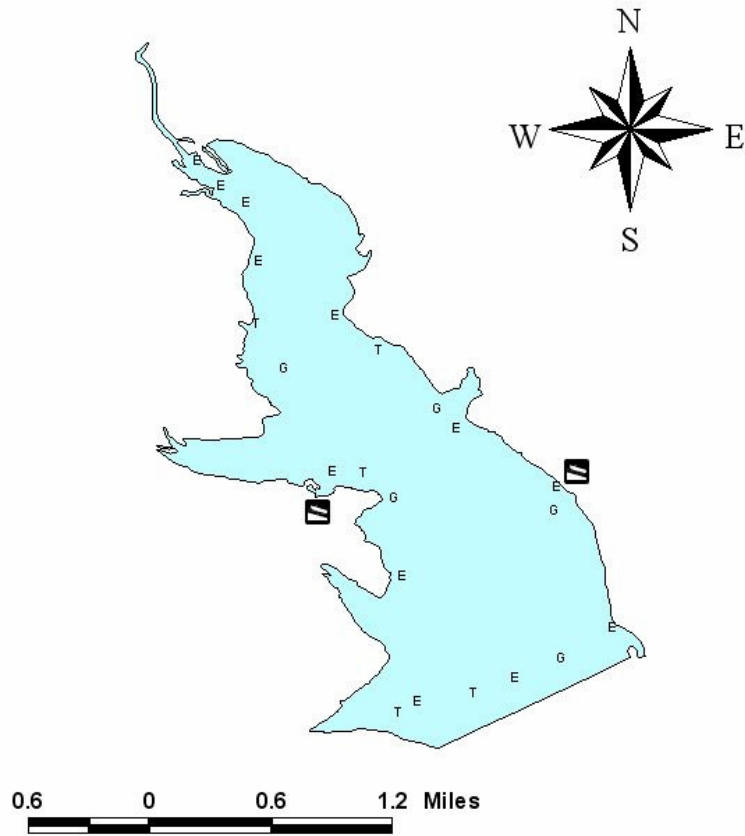
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2008-Spring 2009					
Fall 2009-Spring 2010					
Fall 2010-Spring 2011					
Fall 2011-Spring 2012	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Pat Cleburne Reservoir, Texas, 2007-2008.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					299	299.0
Threadfin shad					265	265.0
Blue catfish	27	5.4				
Channel catfish	38	7.6				
White bass	45	9.0				
Green sunfish					18	18.0
Warmouth					5	5.0
Bluegill					492	492.0
Longear sunfish					65	65.0
Redear sunfish					19	19.0
Largemouth bass					188	188.0
White crappie			5	1.0		

APPENDIX B



Location of sampling sites, Pat Cleburne Reservoir, Texas, 2007-2008. 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.