PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Pat Mayse Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Pat Mayse Reservoir were surveyed in 2008 using electrofishing and trap netting, and in 2009 using gill netting. Aquatic vegetation and habitat surveys were conducted on Pat Mayse Reservoir during July 2008. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Pat Mayse Reservoir is a 5,940-acre impoundment located in Lamar County, Texas, on Sanders Creek, a tributary of the Red River. It was constructed by the U. S. Army Corps of Engineers in 1967 for flood control, and as a municipal and industrial water supply. The major habitat components observed were native emergent vegetation, native floating macrophytes, and standing timber. Total vegetation coverage was less than 2% of reservoir surface area. Hydrilla coverage was estimated at <0.1 acre, less than previous estimates in summer 2004 (6.1 acres) and summer 2000 (30.2 acres) (Storey and Jubar 2005).

- **Management history:** Largemouth bass, white bass and channel catfish are the most important sport fishes present. The fisheries management plan from the 2004 survey report recommended monitoring the largemouth bass population through electrofishing, monitoring the genetic influence of Florida largemouth bass using fin-tissue samples from age-0 fish collected during fall electrofishing and continuing to monitor the reservoir's hydrilla infestation.

- **Fish community**
  - **Prey species:** Abundant clupeid (threadfin and gizzard shad) and sunfish populations provided adequate prey for largemouth bass, white bass, palmetto bass, and channel catfish. The majority of gizzard shad, bluegill and redear sunfish collected in 2008 were available as prey for adult predators.

  - **Catfishes:** The channel catfish population shows evidence of natural recruitment, but the majority of fish collected during spring 2009 gill netting were of legal size and all size classes exhibited favorable relative weights.

  - **Temperate basses:** The white bass population has been slow to recover from a large fish kill in summer 2005 and the palmetto bass population continues to decline since this population is no longer maintained by stocking.

  - **Black basses:** The largemouth bass population showed evidence of good natural recruitment following two years of stable water levels, resulting in improved survival. Body condition was typically favorable, indicating adequate prey availability.

  - **Crappies:** Both white and black crappies were present in the reservoir, but catch rates were low.

- **Management strategies:** Continue with standard fisheries monitoring in 2012-2013 and conduct additional electrofishing survey in 2010 to monitor the largemouth bass population. Monitor the City of Paris' plans to sell water from Pat Mayse Reservoir, its impact on the reservoir's water elevation and its affect on recreational users and fish populations.

INTRODUCTION

This document is a summary of fisheries data collected from Pat Mayse Reservoir from June 2008 through May 2009. 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 2008 and 2009 data for comparison.

Reservoir Description

Pat Mayse Reservoir is a 5,940-acre impoundment located in Lamar County, Texas, on Sanders Creek in the Red River basin. The reservoir is located approximately 13 miles north-northwest of Paris, Texas, and is operated and controlled by the U. S. Army Corps of Engineers. Primary water uses included flood control, municipal and industrial water supply, and recreation. Habitat at time of sampling consisted of natural shoreline, standing timber, native floating and native emergent macrophytes. Total aquatic vegetation coverage was less than 2% of reservoir area. Boat access consisted of eight public boat ramps located in parks around the lake. Bank fishing access was limited to areas near public boat ramps in each of the parks. Other descriptive characteristics for Pat Mayse Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Storey and Jubar 2005) included:

1. Monitor the largemouth bass population, assess population genetics, and continue to manage the fishery under statewide regulations.
   Action: Pat Mayse Reservoir was sampled using electrofishing in fall 2008, and genetic analysis of age-0 LMB was conducted. Low reservoir water elevations in fall 2006 precluded electrofishing sampling and genetic assessment.

2. Increase public awareness of Pat Mayse Reservoir's fisheries resources and fisheries regulations through distribution of information through news releases and regulation posters.
   Action: In spring 2007 and 2008, District staff attended Uncle Jesse Big Mouth Big Bass Classic tournament, presented information on area fisheries resources and were available to answer questions from the general public. In 2007, District staff participated in two radio call-in programs at Paris radio station KSST.

3. Continue to monitor hydrilla infestation at Pat Mayse Reservoir and recommend treatment plan to U.S. Army Corps of Engineers if necessary.
   Action: Low reservoir water elevations caused by drought conditions in 2006 reduced coverage of hydrilla, which made treatment unnecessary.

4. Encourage U.S. Army Corps of Engineers to improve existing angler access facilities to accommodate bank anglers and physically-challenged anglers if the opportunity arose.
   Action: Although this was identified as an area of need in the previous management plan, there were no complaints received and upon re-evaluation it was not considered a high priority issue.

Harvest regulation history: Sport fishes in Pat Mayse Reservoir are managed with statewide regulations (Table 2).

Stocking history: Florida largemouth bass (FLMB) were initially introduced in 1981 and stocked in 1983, 1991, 1994, 2003, and 2004. Channel catfish were introduced in 1967, and have developed into a self-sustaining fishery. Palmetto bass were stocked periodically from 1973 to 1986 and annually from 1991 to 2000. Stocking of palmetto bass was discontinued in 2001 due to low directed fishing pressure. The

complete stocking history is in Table 3.

Vegetation/habitat history: Pat Mayse Reservoir has historically contained a margin of native emergent vegetation, areas of native floating macrophytes, and limited amounts of native submerged vegetation. Structural habitat in the reservoir was limited to areas of standing timber. No boat docks or bulkheads were present.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18, 5-min stations), and trap netting (10 net nights at 10 stations) in fall 2008 and gill netting in spring 2008 (10 net nights at 10 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 trap nets and gill 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 (Texas Parks and Wildlife Department (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 2008).

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 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from samples of white bass (15 fish from 9.8-11.2 inches in length), palmetto bass (16 fish from 21.6-25.4 inches in length), and largemouth bass (15 fish from 13.0-15.8 inches in length). Largemouth bass and white bass specimens were selected plus or minus one inch surrounding the minimum length limit for each species. Age-0 largemouth bass were collected by electrofishing in fall 2008 and subjected to genetic analysis using DNA microsatellite analysis in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2008.

RESULTS AND DISCUSSION

Vegetation/habitat: The reservoir water elevation has remained within two feet of conservation pool for the past two years (Figure 1). Stable conditions have proven beneficial for reproduction and survival of the reservoir's centrarchid populations. The major habitat components observed during summer 2009 were native emergent vegetation, native floating macrophytes, and standing timber (Table 4). Total vegetation coverage was less than 2% of reservoir surface area. Hydrilla coverage (<0.1 acres) was lower than previous estimates in summer 2004 (6.1 acres) and summer 2000 (30.2 acres) (Storey and Jubar 2005), probably a result of drought conditions which abated in 2007.

Prey species: Electrofishing catch rate of gizzard shad during fall 2008 (128.0 fish/h) was similar to 2004 (126.7/h), but lower than 2000 (252.0/h) (Figure 2). Size structure shifted to smaller-sized individuals (IOV = 69), improving their availability as prey for most sport fish. The prey base is enhanced by the presence of threadfin shad. Bluegill fall 2008 catch rate (383.0/h) was higher than the two previous surveys (2004, 202.0/h; 2000, 153.3/h) and the mode decreased from 4 to 3 inches (Figure 3). Redear sunfish catch rate in 2008 (109.3/h) was also higher than in previous surveys (2004, 56.7/h; 2000, 45.3/h) (Figure 4). Prey fish populations appear adequate for predators such as largemouth bass, palmetto bass, white bass, and channel catfish as evidenced by relative weights of 90 or more for most size classes.

Channel catfish: Pat Mayse Reservoir continues to support a quality channel catfish population. Gill netting catch rate in spring 2009 (7.2/nn) was similar to 2007 (8.3/nn) and higher than 2005 (3.1/nn) (Figure 5). There is evidence of natural recruitment into the fishery but the majority of fish collected were of legal size. Relative weights were good and fish up to 26 inches in length were collected.

Temperate basses: The gill net catch rate of white bass in 2009 (3.3/nn) was higher than 2007 (1.6/nn) but lower than 2005 (10.5/nn) (Figure 6). Most of the fish collected (76%) were larger than the 10-inch minimum length limit. Pat Mayse Reservoir is subjected to periodic fish kills involving white bass (Storey and Jubar 2005, Storey and Myers 2001), but investigations have identified no causative agent. The most recent kill occurred in summer 2005, and the fishery has been slow to recover. All (N=15) white bass in the age sample were age 1 and mean length was 10.3 inches.

The remnant population of palmetto bass continues to decline since stockings discontinued in 2000. The 2009 gill-net catch rate (1.6/nn) was the lowest in the review period and fish lengths ranged from 21 to 25 inches (Figure 7). Palmetto bass ranged in age from 9 (mean length 23.7 inches; N=14) to 11 (mean length 22.6 inches; N=1) years.

Black basses: Electrofishing catch rate of largemouth bass during fall 2008 (71.3/h) was higher than 2004 (33.0/h), but lower than 2000 (93.3/h) (Figure 8). Stable water levels for the last two years have led to improved survival and recruitment, and the population was dominated by fish smaller than the minimum length limit. Average age at 14 inches (13.0 to 15.8 inches) was 1.9 years (N=15; range=1–6 years). A fall 2008 sample of age-0 largemouth bass contained 30.0% FLMB alleles; 10% of the sample were northern largemouth bass (NLMB) and the other 90% of fish were second or higher generation intergrades between FLMB and NLMB. A low-density spotted bass population exists in Pat Mayse Reservoir, which is periodically targeted by anglers, but no spotted bass were collected by electrofishing in 2008.

Crappies: Although both white crappie and black crappie are present in Pat Mayse Reservoir, historically white crappie have been the dominant species. However in 2008, trap net catches of white crappie were low (Figure 9) and black crappie were collected at a higher rate (1.1/nn) (Appendix A). Sample sizes were too low to enable collection of age samples. Crappie sample sizes were too low to make definitive inferences about these populations.

Fisheries management plan for Pat Mayse Reservoir, Texas

Prepared – July 2009

ISSUE 1: Pat Mayse Reservoir was stocked with Florida largemouth bass in 2003 and 2004. The population is characterized by good recruitment following two years of stable water levels, but few fish larger than the minimum length limit were encountered. The largemouth bass fishery in Pat Mayse Reservoir is popular and is a venue for numerous fishing tournaments.

MANAGEMENT STRATEGIES

1. Monitor largemouth bass abundance, condition, and population size structure, by conducting fall electrofishing surveys every other year beginning in 2010.
2. Continue to monitor Florida largemouth bass allele frequency through collection of fin samples from age-0 largemouth bass every four years.
3. Request stockings of Florida largemouth bass at 50 fish/acre in 2010 and 2011 in order to increase the influence of FLMB alleles and pure FLMB in the population.
4. Continue to promote the reservoir's largemouth bass fishery through communication with anglers and bass club members.

ISSUE 2 The invasive aquatic plant hydrilla has been present in Pat Mayse Reservoir for a number of years, but has not created access problems for recreational users. Coverage declined in recent years, likely a result of drought conditions, which ended in 2007.

MANAGEMENT STRATEGIES

1. Continue monitoring of hydrilla infestation at Pat Mayse Reservoir every four years. Expansion rates are typically low in this reservoir, and the plant is not considered an immediate threat.
2. In the event this plant becomes problematic, work with US Army Corps of Engineers to develop an integrated pest management plan.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional bass-only electrofishing in 2010, and mandatory monitoring in 2012-2013 (Table 6). Gill net surveys will be conducted every four years to monitor channel catfish and white bass recruitment, condition, and relative abundance.

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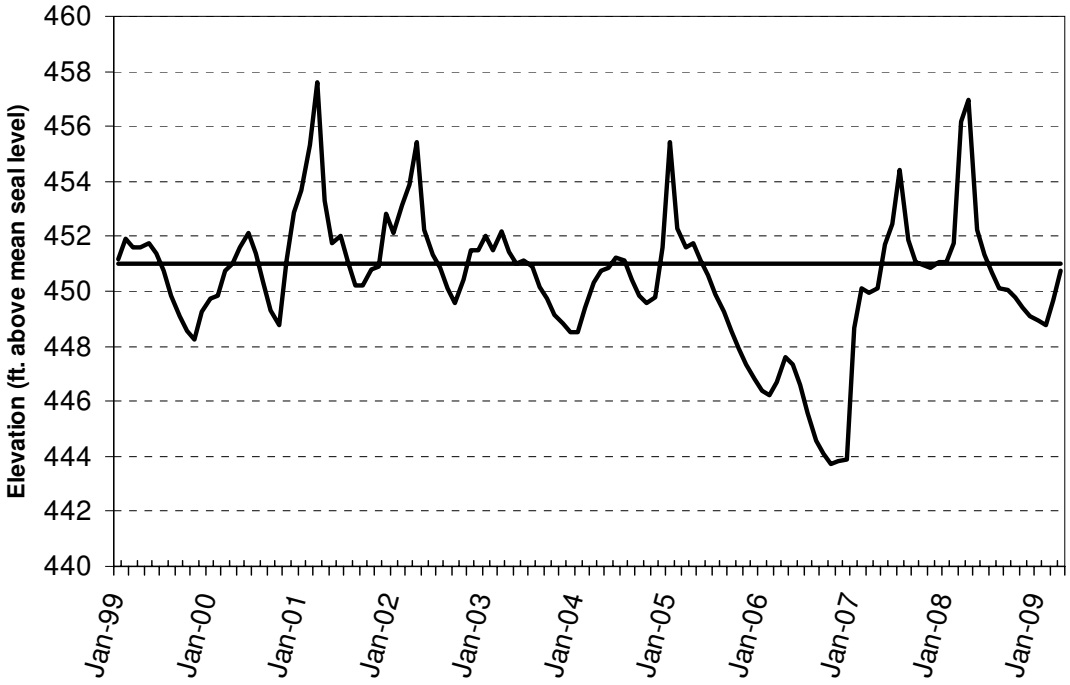


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Pat Mayse Reservoir, Texas, January 1999 through April 2009. Bold horizontal line indicates conservation pool elevation; 451 ft. msl.

Table 1. Characteristics of Pat Mayse Reservoir, Texas.

Characteristic	Description
Year constructed	1967
Controlling authority	U.S. Army Corps of Engineers
Surface area	5,865 acres
County	Lamar
Reservoir type	Mainstream
Mean depth	12.5 ft.
Maximum depth	55.0 ft.
Shoreline development index (SDI)	6.18
Conductivity	135 µmho / cm
Secchi disc range	4 – 6 ft.

Table 2. Harvest regulations for Pat Mayse Reservoir.

Species	Bag limit	Minimum-Maximum length (inches)
Bass, Largemouth	5 (*in any combination with spotted bass*)	14 – No Limit
Bass, Spotted	5 (*in any combination with largemouth bass*)	No Limit – No Limit
Bass, White	25	10 - No Limit
Bass, Palmetto	5	18 - No Limit
Catfish, Channel	25	12 - No Limit
Catfish, Flathead	5	18 - No Limit
Crappie, Black and White, their hybrids and subspecies	25 (*in any combination*)	10 - No Limit

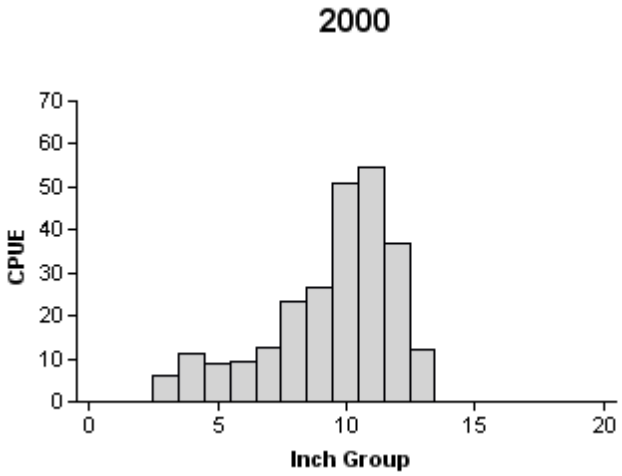
Table 3. Stocking history of Pat Mayse Reservoir, Texas. Size categories are: FGL = 1-3 inches; and ADL = adults.

Species	Year	Number	Size
Threadfin shad	1986	1,000	ADL
	Total	1,000	
Channel catfish	1967	162,400	FGL
	Total	162,400	
Palmetto bass	1973	46,303	FGL
	1974	60,000	FGL
	1975	59,773	FGL
	1976	60,000	FGL
	1979	30,000	FGL
	1982	63,000	FGL
	1986	89,495	FGL
	1992	58,000	FGL
	1993	49,284	FGL
	1994	89,758	FGL
	1995	121,525	FGL
	1996	42,801	FGL
	1997	42,175	FGL
	1998	42,200	FGL
	1999	21,084	FGL
	2000	42,027	FGL
	Total	1,012,425	
Largemouth bass	1967	505,000	FGL
	1968	901,000	FGL
	Total	1,406,000	
Florida largemouth bass	1981	7,980	FGL
	1983	289,375	FGL
	1991	289,390	FGL
	1994	301,790	FGL
	2003	298,658	FGL
	2004	147,910	FGL
	Total	1,335,103	

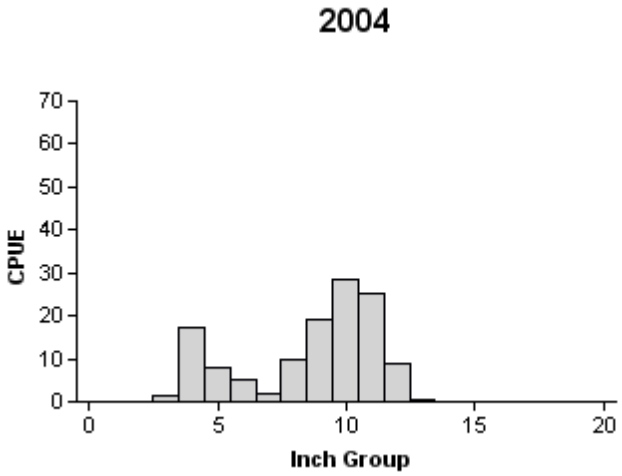
Table 4. Survey of littoral zone and physical habitat types, Pat Mayse Reservoir, Texas, July 2008. A linear shoreline distance (miles) was recorded for each habitat type found. The sum of shoreline distances exceeds the lake perimeter because of overlap of habitat types.

Shoreline habitat type / Aquatic vegetation species	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Natural shoreline	56.6	97.1		
Flooded terrestrial	3.7	6.3		
Rock shore	1.7	2.9		
Standing timber	14.8	25.3		
Native emergent (giant cutgrass, giant bullrush)	44.9	76.9	135.8	2.3
Native floating (American lotus)	16.2	27.7	104.0	1.8
Native submerged (coontail, muskgrass)			0.3	<0.1
Hydrilla			<0.1	<0.1
Total			12.7	1.9

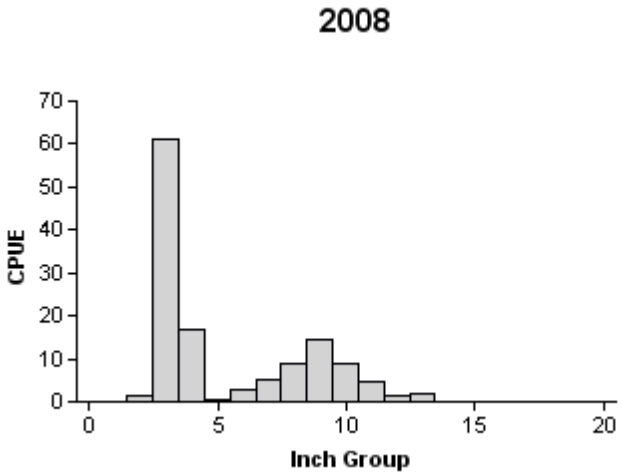
Gizzard shad



Effort = 1.5
Total CPUE = 252.0 (13; 378)
IOV = 19 (3)



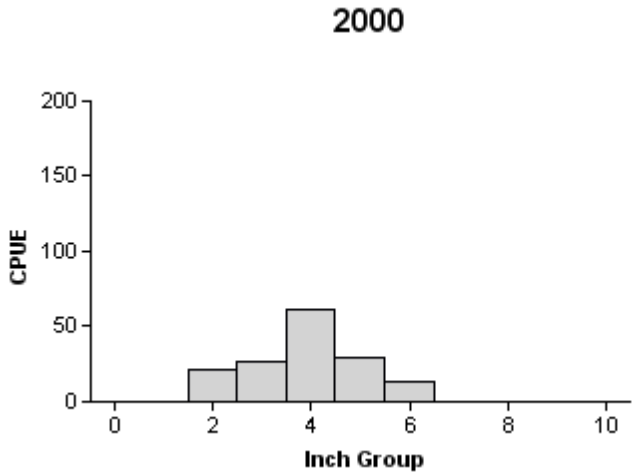
Effort = 1.5
Total CPUE = 126.7 (17; 190)
IOV = 27 (4.8)



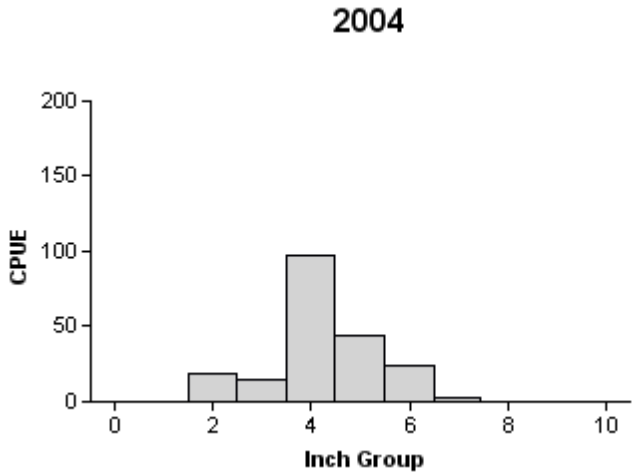
Effort = 1.5
Total CPUE = 128.0 (27; 192)
IOV = 69 (8.2)

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 Mayse Reservoir, Texas, 2000, 2004 and 2008.

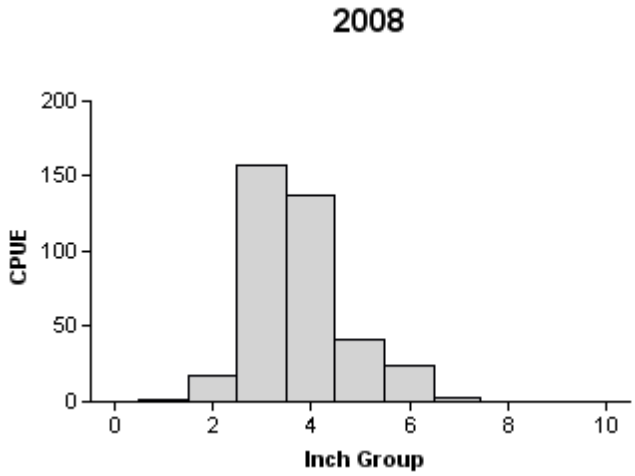
Bluegill



Effort = 1.5
Total CPUE = 153.3 (21; 230)
Stock CPUE = 131.3 (21; 197)
PSD = 11 (3.1)



Effort = 1.5
Total CPUE = 202.0 (26; 303)
Stock CPUE = 182.7 (26; 274)
PSD = 15 (3.8)



Effort = 1.5
Total CPUE = 383.3 (14; 575)
Stock CPUE = 363.3 (14; 545)
PSD = 8 (1.8)

Figure 3. 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, Pat Mayse Reservoir, Texas, 2000, 2004, and 2008.

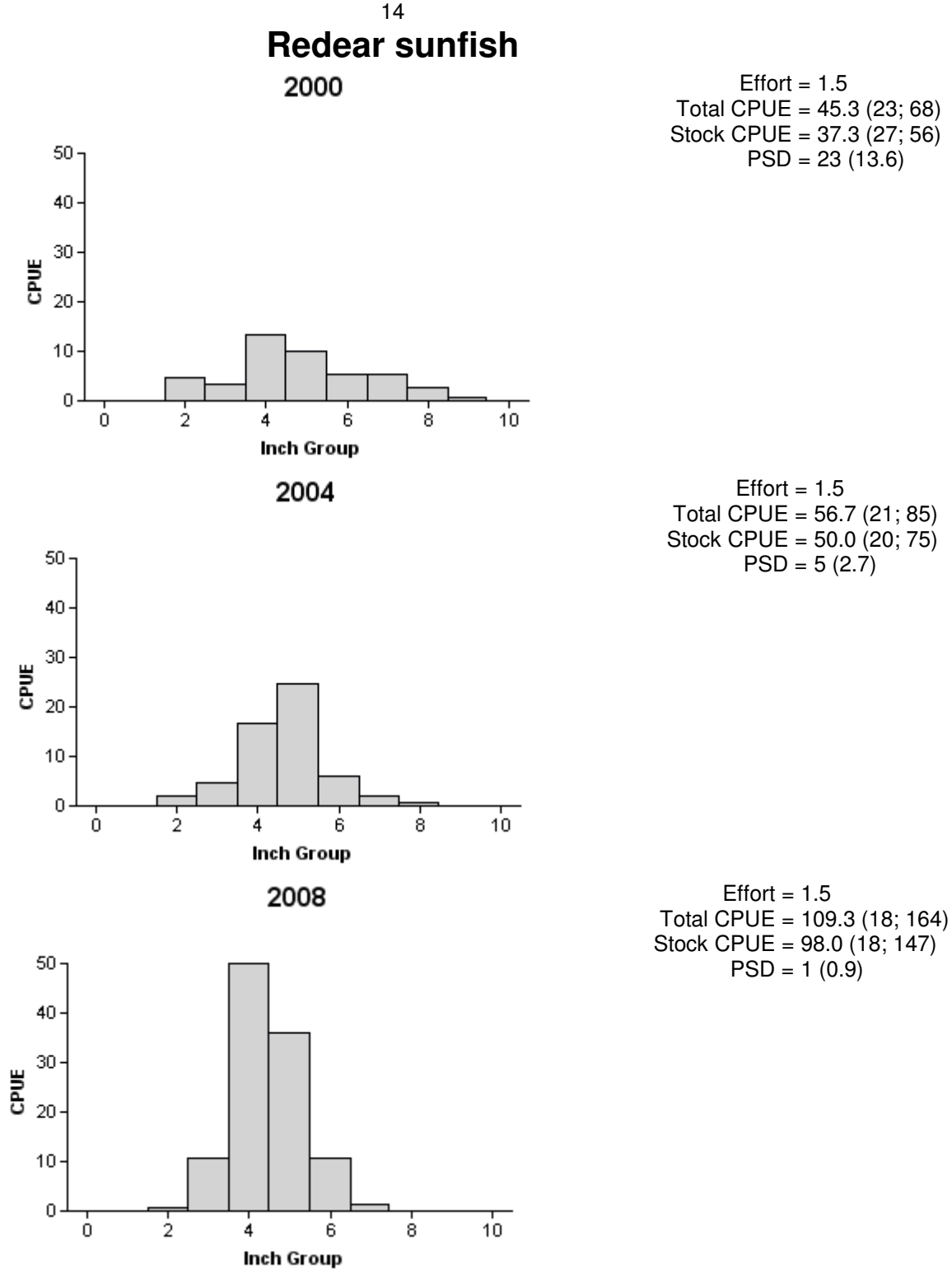


Figure 4. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Pat Mayse Reservoir, Texas, 2000, 2004, and 2008.

Channel catfish

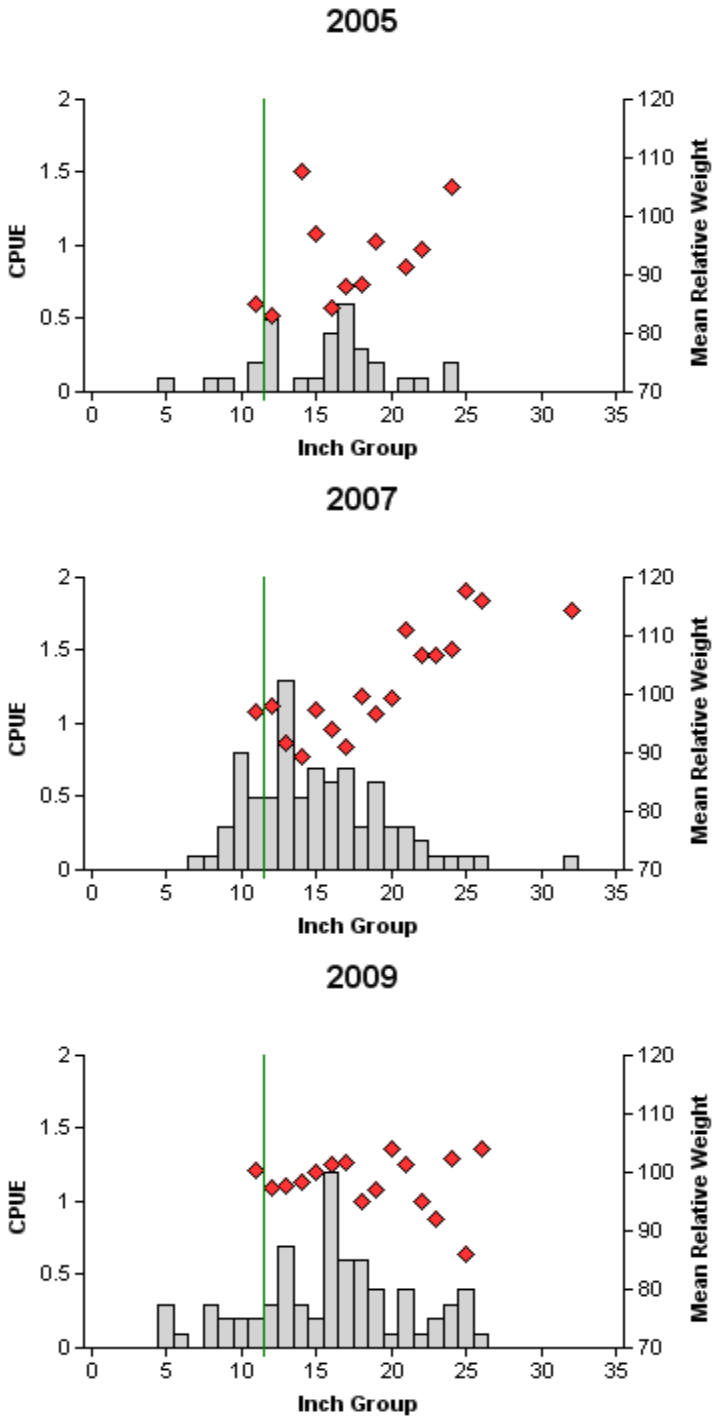
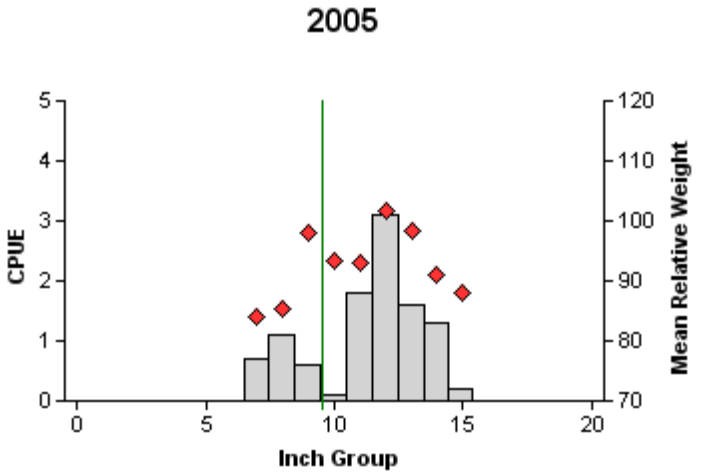
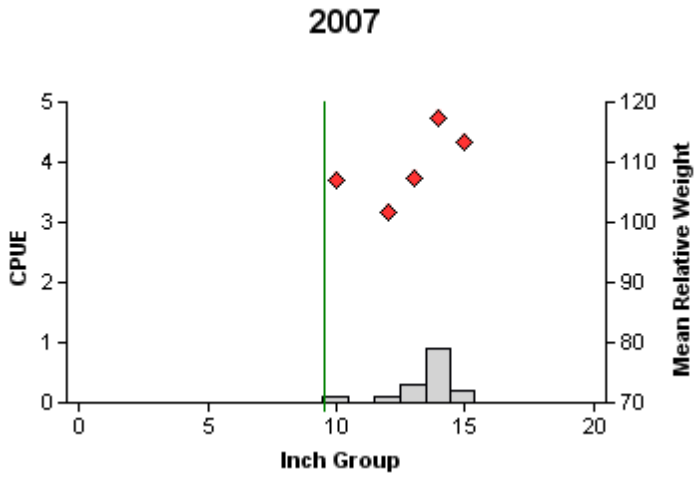


Figure 5. Number of channel catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Pat Mayse Reservoir, Texas, 2005, 2007, and 2009.

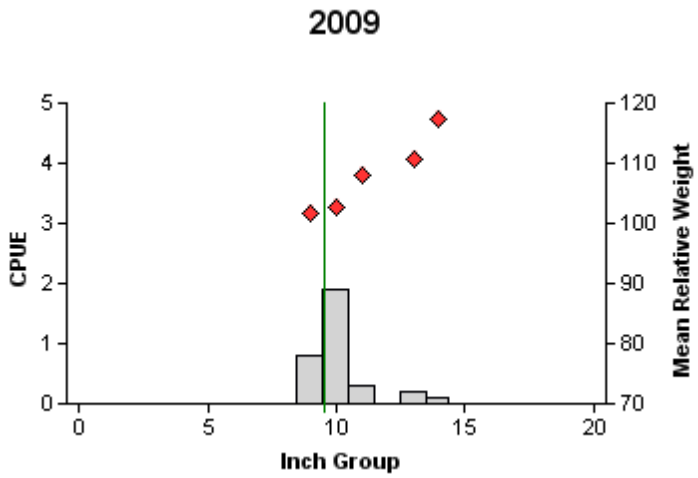
White bass



Effort = 10
Total CPUE = 10.5 (24; 105)
Stock CPUE = 10.5 (24; 105)
PSD = 83 (9.1)
RSD-P = 59 (13.3)



Effort = 10
Total CPUE = 1.6 (87; 16)
Stock CPUE = 1.6 (87; 16)
PSD = 100 (0.0)
RSD-P = 94 (1.3)



Effort = 10
Total CPUE = 3.3 (23; 33)
Stock CPUE = 3.3 (23; 33)
PSD = 100 (0)
RSD-P = 9 (6.5)

Figure 6. Number of white bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Pat Mayse Reservoir, Texas, 2005, 2007, and 2009.

Palmetto bass

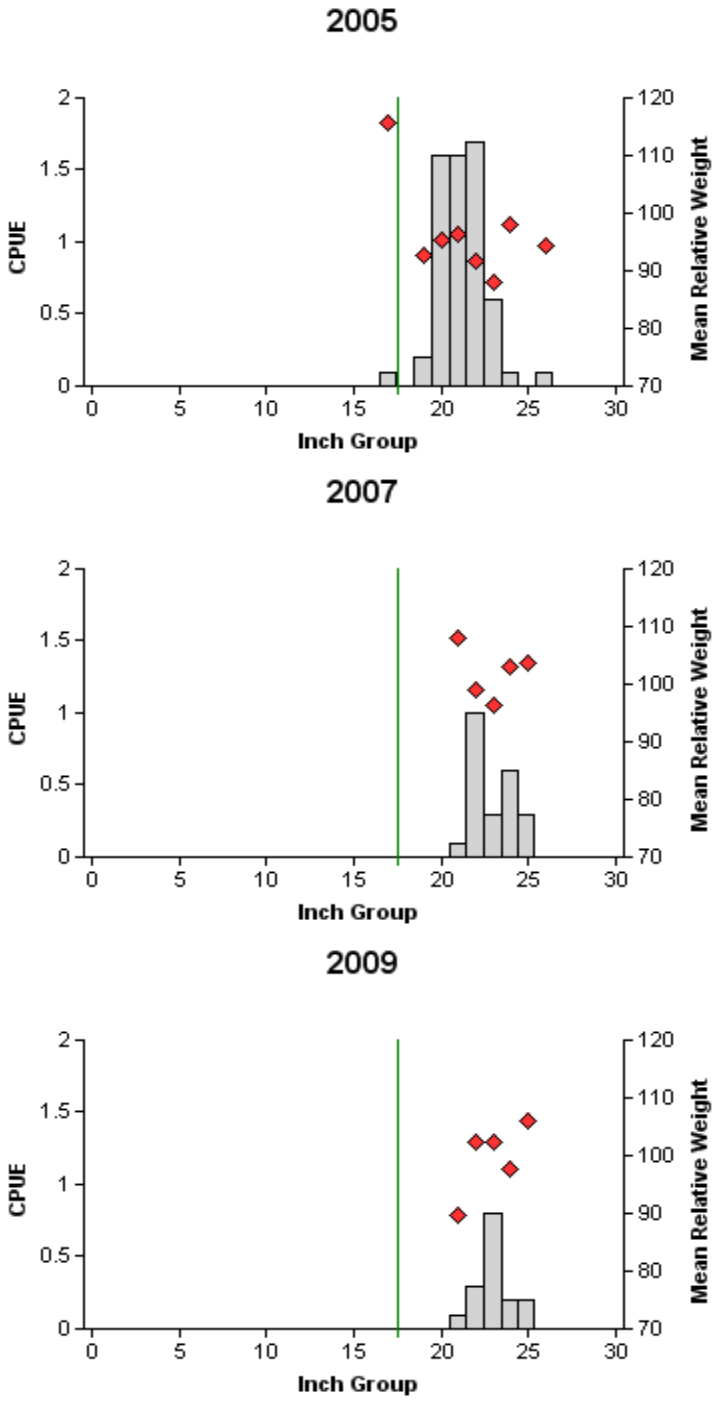


Figure 7. Number of palmetto bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Pat Mayse Reservoir, Texas, 2005, 2007, and 2009.

Largemouth bass

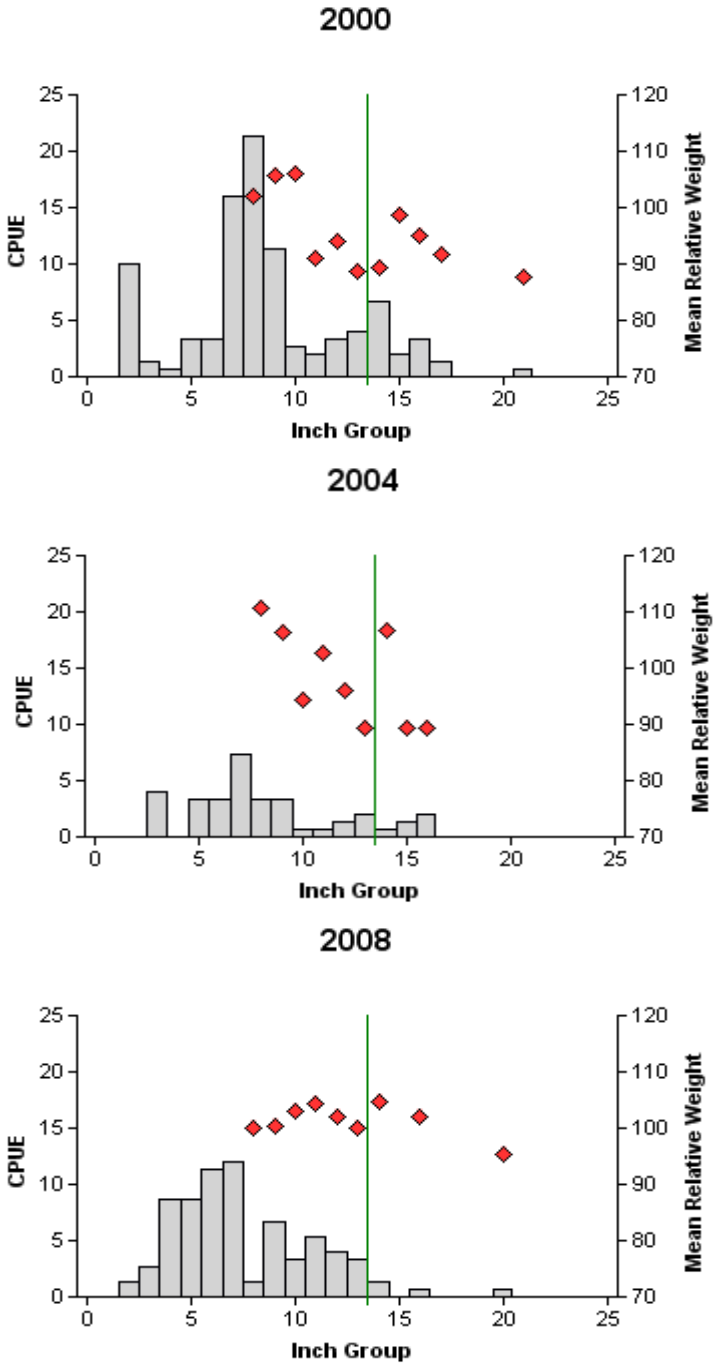


Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Pat Mayse Reservoir, Texas, 2000, 2004, and 2008. Vertical lines indicate minimum length limit at time of survey.

Table 5. Results of genetic analysis of Age-0 largemouth bass collected by fall electrofishing, Pat Mayse Reservoir, Texas, 1989 through 2008. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation intergrade between an FLMB and an NLMB, Fx = second or higher generation intergrade between an FLMB and an NLMB. Since 2006 analyses have been conducted using DNA microsatellite analysis. Prior to that time starch gel electrophoresis was employed.

Year	Sample size	Genotype					% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	Combined intergrades	NLMB		
1991	30	3	6	13	19	8	34.7	10.0
1992	35	0	9	11	20	15	25.0	0.0
1993	35	0	3	16	19	16	17.1	0.0
1994	35	4	11	3	14	16	24.6	11.4
1997	35	1	11	16	27	10	33.6	2.6
2000	23	1	6	13	19	3	45.5	4.6
2004	38	0	7	27	34	4	38.5	0.0
2008	30	0	0	27	27	3	30.0	0.0

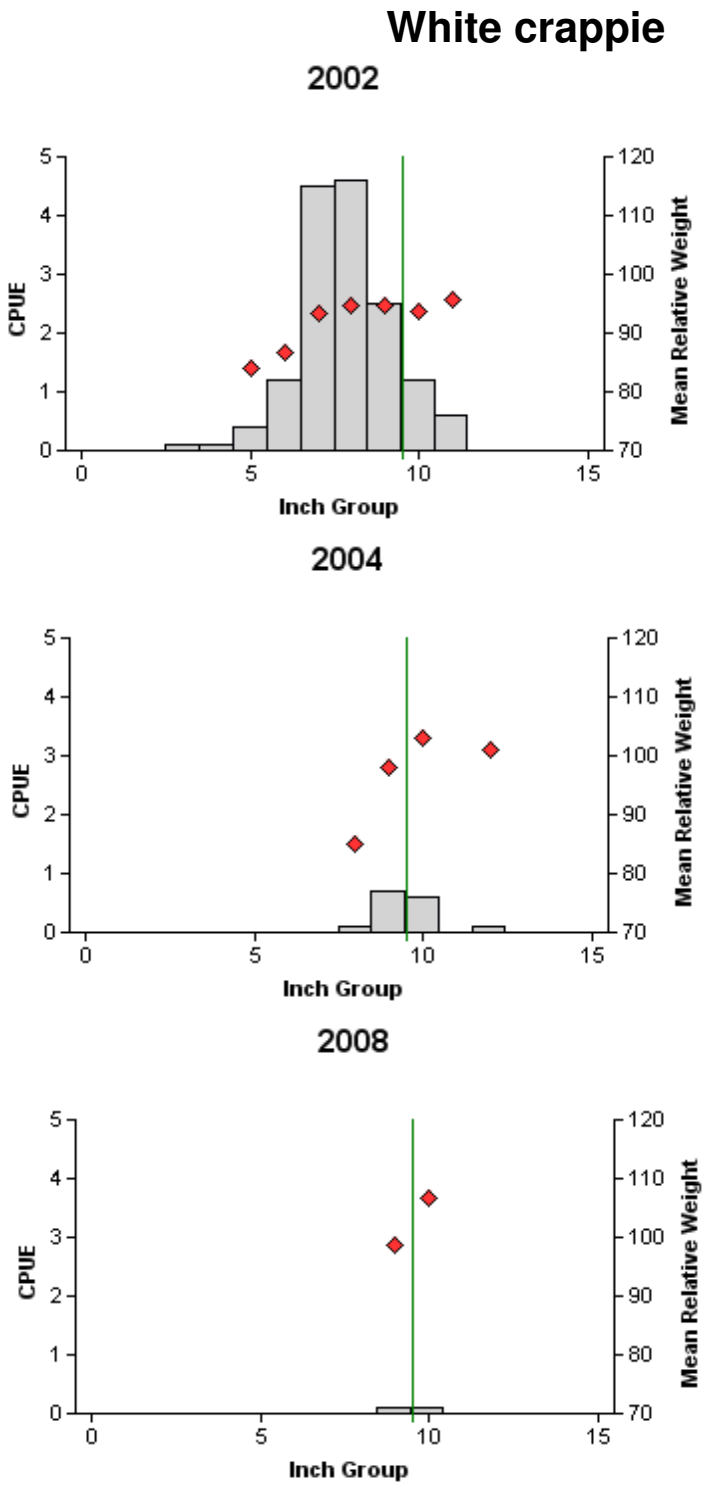


Figure 9. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Pat Mayse Reservoir, Texas, 2002, 2004, and 2008. Vertical lines indicate minimum length limit at time of survey.

Table 6. Proposed sampling schedule for Pat Mayse Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing is conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

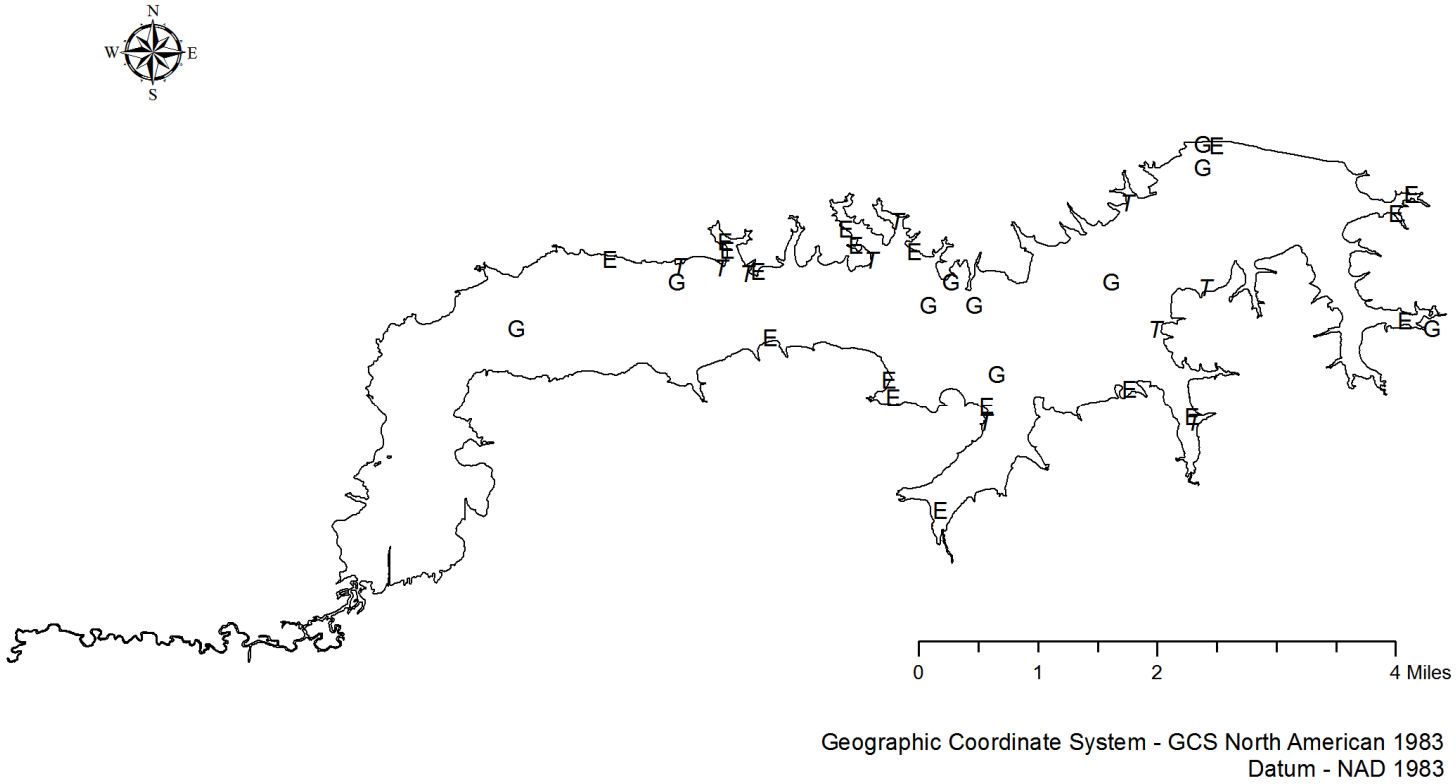
Survey Year	Electrofishing	Trap net	Gill net	Vegetation/ Habitat	Report
Summer 2009-Spring 2010					
Summer 2010-Spring 2011	A				
Summer 2011-Spring 2012					
Summer 2012-Spring 2013	S	A	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected by fall electrofishing, fall trap netting, and spring gill netting from Pat Mayse Reservoir, Texas, 2008-2009.

Species	Fall electrofishing		Fall trapnetting		Spring gillnetting	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	192	128.0				
Threadfin shad	52	34.7				
Channel catfish					72	7.20
White bass					33	3.30
Palmetto bass					16	1.60
Warmouth	7	4.7				
Bluegill	575	383.3				
Longear sunfish	68	45.3				
Redear sunfish	164	109.3				
Largemouth bass	107	71.3				
White crappie			2	0.2		
Black crappie			11	1.1		

APPENDIX B



Location of electrofishing (E), trap netting (T), and gill net (G) sites, Pat Mayse Reservoir, Texas, 2008-2009