

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

White River Reservoir

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TABLE OF CONTENTS

Survey and Management Summary	2
Introduction	3
Reservoir Description.....	3
Management History.....	3
Methods	4
Results and Discussion.....	4
Fisheries Management Plan	6
Literature Cited	6
Figures and Tables	7-21
Water level (Figure 1).....	7
Reservoir characteristics (Table 1)	7
Harvest regulations (Table 2)	8
Stocking history (Table 3).....	9
Habitat survey (Table 4)	10
Gizzard shad (Figure 2).....	11
Bluegill (Figure 3)	12
Blue catfish (Figure 4)	13
Channel catfish (Figure 5)	14
Flathead catfish (Figure 6)	15
White bass (Figure 7).....	16
Largemouth bass (Figure 8).....	17
White crappie (Figures 9 and 10)	18
Walleye (Figure 11)	20
Proposed sampling schedule (Table 5).....	21
Appendix A	
Catch rates for all species from all gear types.....	22
Appendix B	
Map of 2006-2007 sampling locations	23

SURVEY AND MANAGEMENT SUMMARY

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

- **Reservoir Description:** White River Reservoir is a 2,020-acre (pool was approximately 591 acres at sampling) impoundment on White River, a tributary of the Salt Fork of the Brazos River. White River reservoir is located approximately 55 miles east of Lubbock in Crosby County, Texas and is owned and operated by the White River Municipal Water District for municipal water supply. Water levels have declined since 2000. The reservoir has three boat ramps. All are currently above the water line. One temporary launch site is in place. There are no handicap specific facilities.
- **Management History:** Important sport fish include walleye, white bass, largemouth bass, white crappie, and catfish. White crappie were overabundant in the system and had poor growth. Walleye stocking has been attempted to mitigate the overabundance of crappie. Florida largemouth bass were stocked in 1982, 2000 and 2003 in order to maintain a trophy largemouth bass fishery.
- **Fish Community**
 - **Prey species:** The electrofishing catch rate for gizzard shad was very high with good availability as prey to most sport fish. The electrofishing catch rate for bluegills was good but few quality-length fish were collected in 2006.
 - **Catfishes:** Blue catfish and channel catfish were abundant in the reservoir and provided a quality fishery. Flathead catfish were present in the reservoir in very low numbers.
 - **White bass:** White bass were present in low numbers. Size structure was good.
 - **Largemouth bass:** Largemouth bass were abundant in the reservoir and provide a quality fishery.
 - **White crappie:** White crappie were over abundant in the system. Size structures was poor with only two legal-size fish sampled in 2007.
 - **Walleye:** Walleye were present in the reservoir and provided a quality fishery. Natural reproduction in the reservoir has been limited and is likely due to above optimal water temperatures during winter cooling period.
- **Management Strategies:** Continue stocking program for walleye and Florida largemouth bass. Conduct electrofishing survey in 2008, gill net survey in 2009, and general monitoring with electrofishing, trap nets, and gill nets surveys in 2010-2011. Conduct habitat and aquatic vegetation surveys in 2010.

INTRODUCTION

This document is a summary of fisheries data collected from White River 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 is presented with the current data for comparison.

Reservoir Description

White River Reservoir is a 2,020 acre impoundment (pool at sampling was approximately 591 acres). The reservoir is approximately 55 miles east of Lubbock, in Crosby County, Texas. The reservoir is owned and operated by the White River Municipal Water District for municipal water supply. The dam was completed and the reservoir began filling in 1963. The reservoir has experienced record low water levels since 2000 (Figure 1). The reservoir has three boat ramps which are currently above the water line, however, a temporary launch site is in place. There are no handicap specific facilities. Most of the shoreline is accessible to anglers fishing from the bank. Other descriptive characteristics for White River Reservoir are presented in Table 1.

Management History

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

1. Maintain walleye fishery through supplemental stockings.
Action: Walleye fry were stocked in 2005 and 2007 at a rate of 2,000 fry/acre to help maintain the fishery.
2. Maintain trophy largemouth bass fishery through supplemental stockings of Florida largemouth bass.
Action: No supplemental stockings of Florida largemouth bass have been requested due to continued low water levels.

Harvest regulation history: Sport fishes in White River Reservoir are currently managed with statewide regulations (Table 2). From 1993 to 2001, smallmouth bass were managed with an 18-inch minimum length limit and 3-fish daily bag limit in an effort to increase relative abundance and size structure of the population. In 2001, harvest regulations for smallmouth bass were changed to the statewide 14-inch minimum length limit and 5-fish bag as no discernable change in the population was observed. Regulations on harvest of walleye changed from 16-inch minimum and 5 fish bag, to 5 fish bag with no more than 2 walleye under 16-inch on September 1, 1999.

Stocking history: White River Reservoir has been stocked with multiple species since impoundment in 1963. The complete stocking history is in Table 3.

Vegetation/habitat history: Habitat is typified by natural shoreline (eroded bank, clay, silt, or sand) with scattered areas of gravel (rock <4 in) and rocky shoreline (rock >4 in). Vegetation in the reservoir consisted of native emergent, flooded dead trees and stumps, and small isolated areas of flooded terrestrial vegetation and exotic submerged aquatic vegetation. Habitat and vegetation surveys were conducted in 2006 (Table 4).

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 electrofishing and gill net survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2002). Trap net survey sites were non-random biologist selected sites in 2007.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [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 ($RSE = 100 \times SE \text{ of the estimate/estimate}$) was calculated for all CPUE statistics. Ages were determined using otoliths from 60 randomly selected white crappie. Source for water level data was the United States Geological Survey (USGS) website.

RESULTS AND DISCUSSION

Habitat: Habitat is typified by natural shoreline (eroded bank, clay, silt, or sand) with scattered areas of gravel (rock <4 in) and rocky shoreline (rock >4 in). Vegetation in the reservoir consisted of native emergent, flooded dead trees and stumps, and small isolated areas of flooded terrestrial vegetation and exotic submerged aquatic vegetation. Habitat and vegetation surveys were conducted in 2006 (Table 4).

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 455.0/h and 107.0/h, respectively. IOV for gizzard shad was very good, indicating that 89% of gizzard shad were available to existing predators (Figure 2). The number of small gizzard shad (< 6 in) has been increasing since 2002 (Figure 2). Total CPUE of bluegill has increased since 2002 with few quality-size (≥ 6 in) fish (Figure 3).

Blue catfish: The gill net catch rate of blue catfish was 8.4/nn in 2007 which was higher than catch rates in 2003 (3.2/nn) and 2005 (5.0/nn). The blue catfish population appears to be increasing and has more quality (≥ 20 in) fish available to anglers (Figure 4).

Channel catfish: The gill net catch rate of channel catfish was 10.0/nn in 2007. This catch rate was similar to the catch rate in 2003 (10.6/nn) but much higher than 2005 (3.4/nn). The channel catfish population had good size distribution with the majority of fish sampled being available to legal harvest (Figure 5).

Flathead catfish: The gill net catch rate of flathead catfish was 0.4/nn in 2007. This catch rate was the same as the catch rate in 2003 and 2005 (Figure 6).

White bass: The gill net catch rate of white bass was 0.8/nn in 2007 (Figure 7). This catch rate was similar to the catch rate in 2003 (0.4/nn) but much lower than 2005 (2.2/nn).

Largemouth bass: The electrofishing catch rate of largemouth bass was 63.0/h in 2006, and has increased from 32.0/h in 2002 and 28.0/h in 2004. The increase in CPUE in 2006 was due to an increase in sub-stock (< 8 in) size fish. CPUE-14 and RSD-14 remained similar throughout the sample years (Figure 8).

White crappie: The trap net catch rate of white crappie was 388.0/nn in 2007. The CPUE-10 was 0.4 indicating very poor size structure with only two fish in the sample being available for legal harvest (Figure 9). Growth rates were very poor (Figure 10).

Walleye: The gill net catch rate of walleye was low at 2.0/nn in 2007. This catch rate was similar to the catch rate in 2003(2.2/nn) but increased from that of 2005 (0.8/nn; Figure 11).

Fisheries management plan for White River Reservoir, Texas

Prepared – July 2007.

ISSUE 1: The walleye fishery was developed in White River Reservoir through a stocking program beginning in the early 1970s. Natural recruitment in the reservoir is limited and the fishery needs to be maintained by supplemental stockings. The reservoir has also developed an overabundant white crappie population with poor size structure and growth. Recent age and growth data for white crappie indicated growth has slowed from a mean length of 13 inches at age 5 in 1999 (Hutt 2003) to mean length of 7 inches at age 5 in 2006.

MANAGEMENT STRATEGY

1. Walleye fry stockings should be increased to an annual rate of 3,000 fry/acre to maintain walleye fishery and increase predation on small crappie.
2. Investigate other methods of controlling the overabundant white crappie population with catfish species.

ISSUE 2: The largemouth bass fishery in White River Reservoir has suffered from poor recruitment for several years due to declining water levels. The poor recruitment may be mitigated by stocking Florida largemouth bass fingerlings when water levels rise.

MANAGEMENT STRATEGY

1. Florida largemouth bass fingerlings should be stocked at a rate of 100/acre when water levels increase.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes electrofishing in fall 2008, gill netting in spring 2009, and a complete survey except creel in 2010/2011 (Table 5). Gill net surveys are required to monitor the catfish and walleye populations. Electrofishing is required to monitor largemouth bass recruitment and size structure and prey availability.

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.
- Hutt, C. 2003. Statewide freshwater fisheries monitoring and management program survey report for White River Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

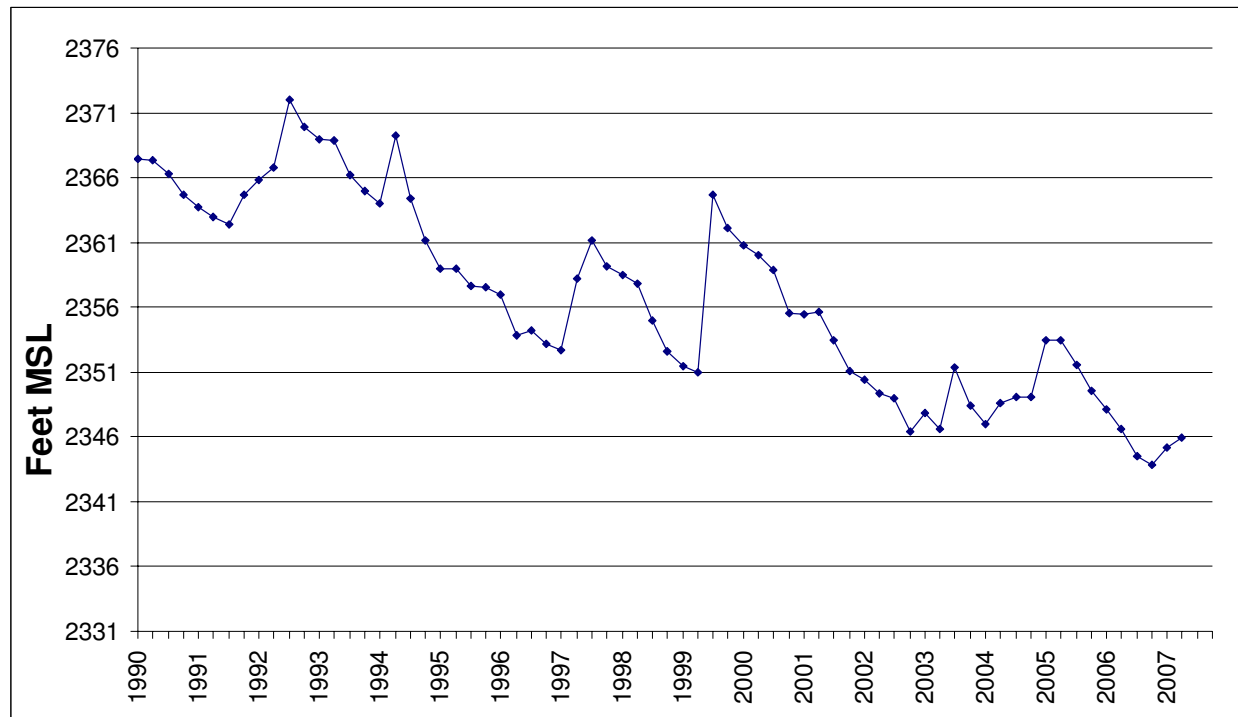


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for White River Reservoir, Texas. Conservation elevation is at 2369 MSL.

Table 1. Characteristics of White River Reservoir, Texas.

Characteristic		Description
Year Constructed	1963	
Controlling authority	White River Municipal Water District	
Counties	Crosby	
Reservoir type	Mainstream	
Shoreline Development Index (SDI)	4.87	
Conductivity	1569 umhos/cm	

Table 2. Harvest regulations for White River 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, smallmouth	5	14 - No Limit
Bass: largemouth	5	14 - No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit
Walleye	5	Only 2 fish allowed under 16 inches

Table 3. Stocking history of White River Reservoir, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, ADL = adults, and UNK = unknown.

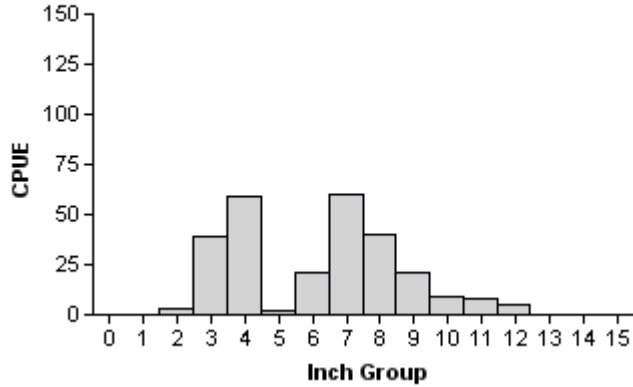
Year	Number	Size	Year	Number	Size
<u>Blue catfish</u>			<u>Largemouth bass</u>		
1970	5,000	UNK	1964	100,000	UNK
1975	<u>9,300</u>	UNK	1972	15,000	UNK
Total	14,300		Total	115,000	UNK
<u>Channel catfish</u>			<u>Florida largemouth bass</u>		
1967	30,000	AFGL	1982	105,000	FGL
1970	9,000	AFGL	2000	200,000	FGL
1972	21,000	AFGL	2003	<u>19,105</u>	FGL
1973	25,000	AFGL	Total	324,636	
1974	<u>10,000</u>	AFGL			
Total	95,000				
<u>Flathead catfish</u>			<u>Walleye</u>		
1971	1,500	UNK	1975	500,000	FRY
1972	1,500	UNK	1976	500,000	FRY
1973	<u>1,500</u>	UNK	1979	2,456,250	FRY
Total	4,500		1980	5,478,500	FRY
<u>Green sunfish X Redear sunfish</u>			1983	5,800,004	FRY
1969	3,000	UNK	1988	1,515,488	FRY
1970	7,500	UNK	1989	3,989,200	FRY
1971	7,500	UNK	1990	3,762,064	FRY
1972	<u>1,000</u>	UNK	1991	5,000,000	FRY
	19,000		1994	4,100,000	FRY
<u>Smallmouth bass</u>			2000	58,000	FGL
1979	15,654	UNK	2005	2,385,745	FRY
1980	5,212	UNK	2007	<u>2,145,000</u>	FRY
1981	<u>50,300</u>	UNK	Total	37,690,251	
Total	71,166				
			<u>Yellow perch</u>		
			1994	200,000	UNK
			1996	116,700	UNK
			1997	<u>3,745</u>	UNK
			Total	320,645	
			<u>Red Drum</u>		
			1975	14,415	UNK

Table 4. Survey of littoral zone and physical habitat types, White River Reservoir, Texas, 2006. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area where the habitat type or aquatic vegetation type were present was determined.

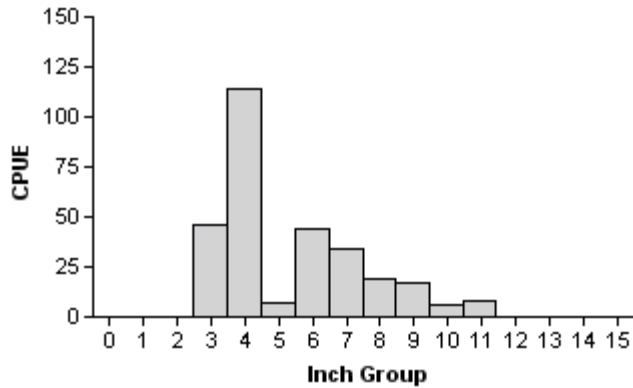
Habitat	Type	Shoreline Distance		Acres
		Miles	Percent	
Shoreline	Natural shoreline	34.37	88	
	Gravel	0.28	1	
	Rocky shoreline	4.38	11	
Adjacent to Shoreline	Dead trees and stumps		2.3	17.38
	Flooded terrestrial vegetation		0.09	0.69
	Native emergent		9.5	72.34
	Exotic vegetation		0.04	0.31
Vegetation	Boat docks and piers		0.03	0.23
	Common cattail		9.0	71.76
	Eurasian water milfoil		0.04	0.31
	Willow		0.08	0.59

Gizzard Shad**2002**

Effort = 1.0
 Total CPUE = 267.0 (20; 267)
 IOV = 69 (7.2)

**2004**

Effort = 1.0
 Total CPUE = 295.0 (19; 295)
 IOV = 83 (3.3)

**2006**

Effort = 1.0
 Total CPUE = 455.0 (14; 455)
 IOV = 89 (3.1)

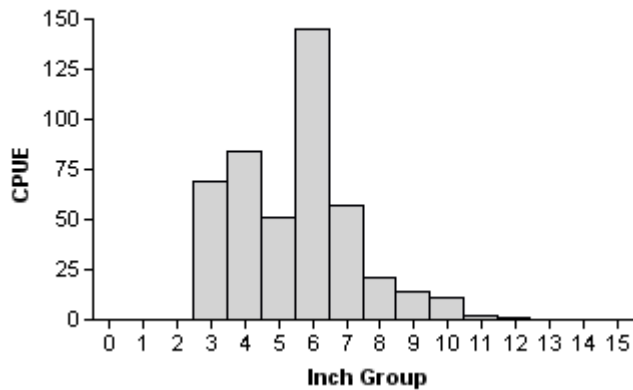
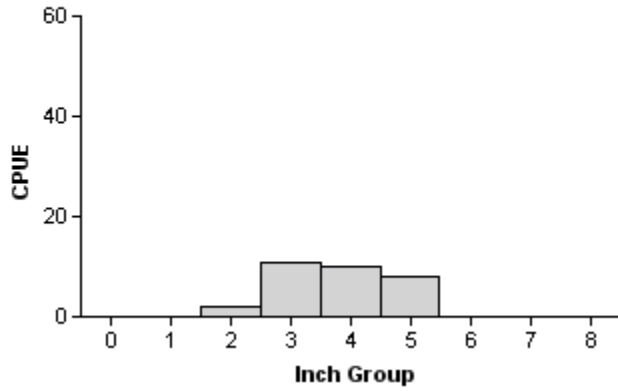


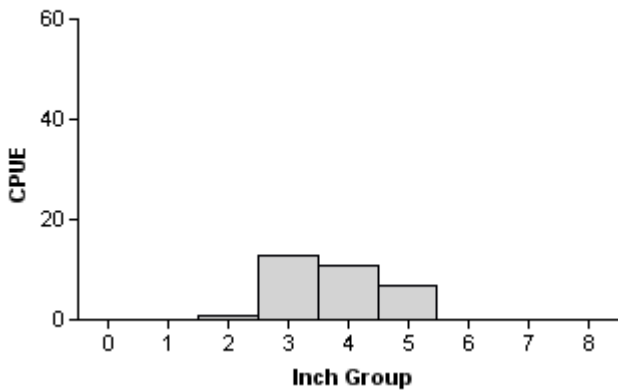
Figure 2. Number of gizzard shad caught per hour (CPUE, bars) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2002, 2004, and 2006. RSE is used for CPUE Values and SE is used for IOV Values.

Bluegill**2002**

Effort = 1.0
 Total CPUE = 31.0 (30; 31)

**2004**

Effort = 1.0
 Total CPUE = 32.0 (23; 32)

**2006**

Effort = 1.0
 Total CPUE = 107.0 (20; 107)

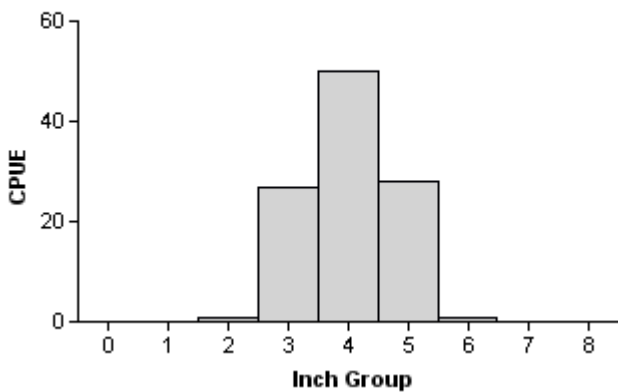
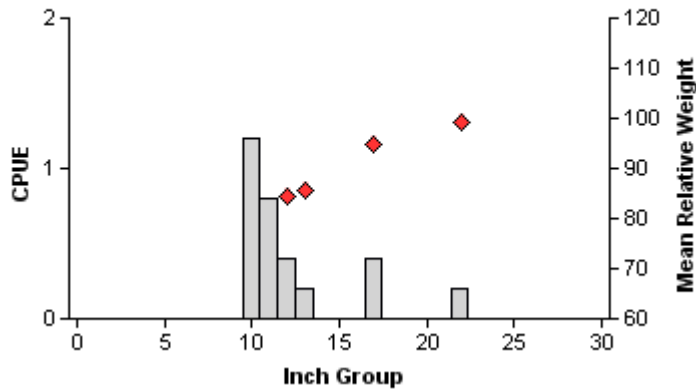


Figure 3. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2002, 2004, and 2006.

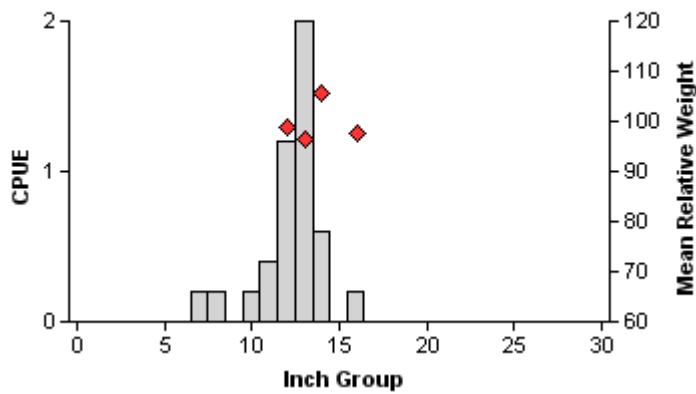
Blue Catfish

2003



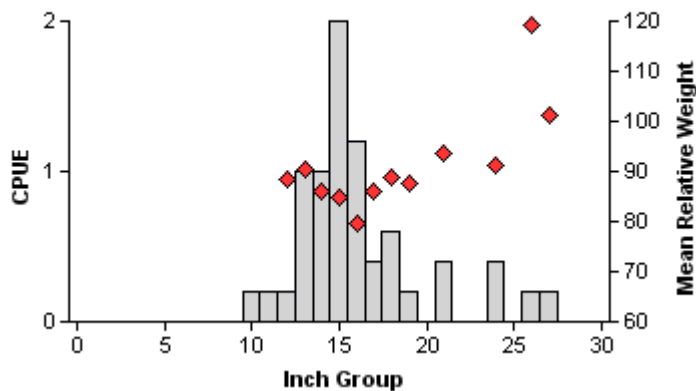
Effort = 5.0
 Total CPUE = 3.2 (30; 16)
 Stock CPUE = 1.2 (61; 6)
 PSD = 17 (20.2)

2005



Effort = 5.0
 Total CPUE = 5.0 (24; 25)
 Stock CPUE = 4.0 (24; 20)
 PSD = 0 (69.6)

2007

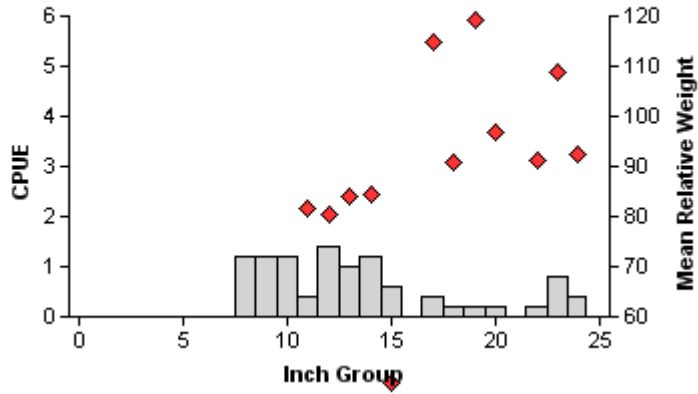


Effort = 5.0
 Total CPUE = 8.4 (32; 42)
 Stock CPUE = 8.0 (33; 40)
 PSD = 18 (7.9)

Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean relative weight(diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2003, 2005, and 2007. RSE is used for CPUE Values and SE is used for PSD Values.

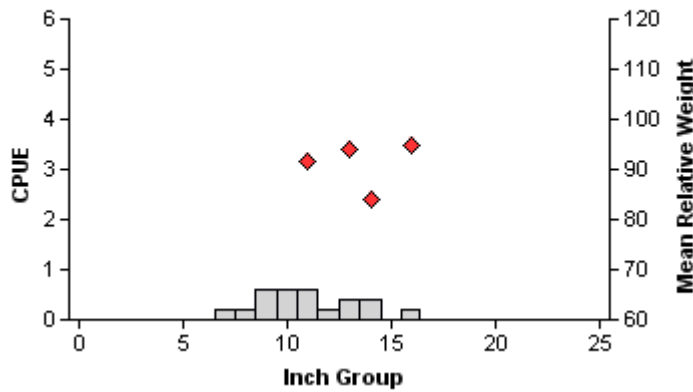
Channel Catfish

2003



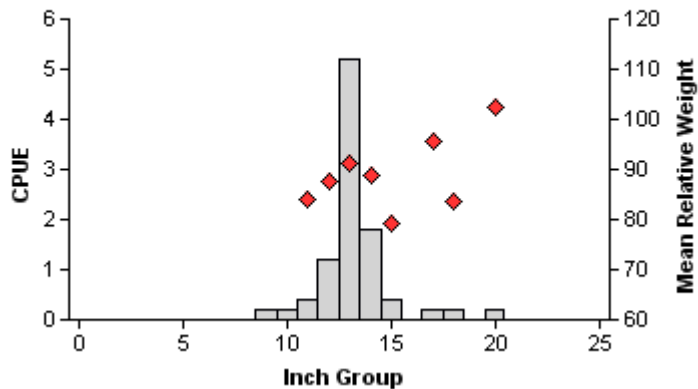
Effort = 5.0
 Total CPUE = 10.6 (12; 53)
 Stock CPUE = 7.0 (9; 35)
 PSD = 34 (9.9)

2005



Effort = 5.0
 Total CPUE = 3.4 (36; 17)
 Stock CPUE = 1.8 (27; 9)
 PSD = 11 (9.6)

2007

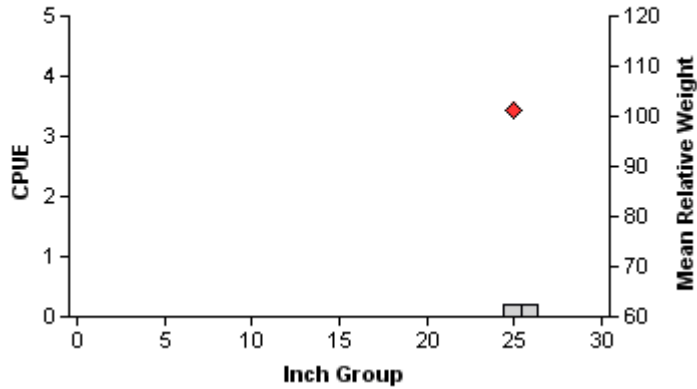


Effort = 5.0
 Total CPUE = 10.0 (14; 50)
 Stock CPUE = 9.6 (13; 48)
 PSD = 6 (1.9)

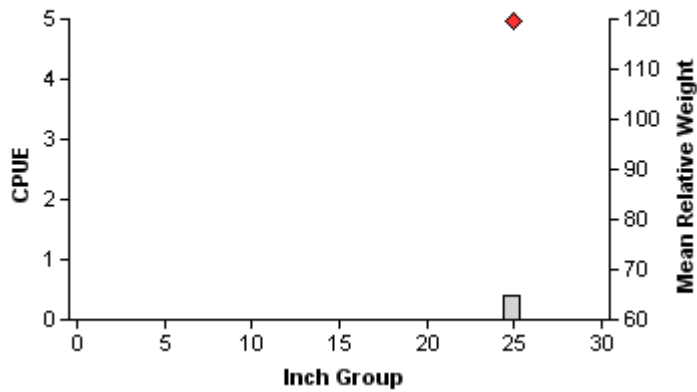
Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean relative weight(diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2003, 2005, and 2007. RSE is used for CPUE Values and SE is used for PSD Values.

Flathead**2003**

Effort = 5.0
 Total CPUE = 0.4 (61; 2)
 0.4 (61; 2)

**2005**

Effort = 5.0
 Total CPUE = 0.4 (61; 2)
 0.4 (61; 2)

**2007**

Effort = 5.0
 Total CPUE = 0.4 (61; 2)
 0.2 (100; 1)

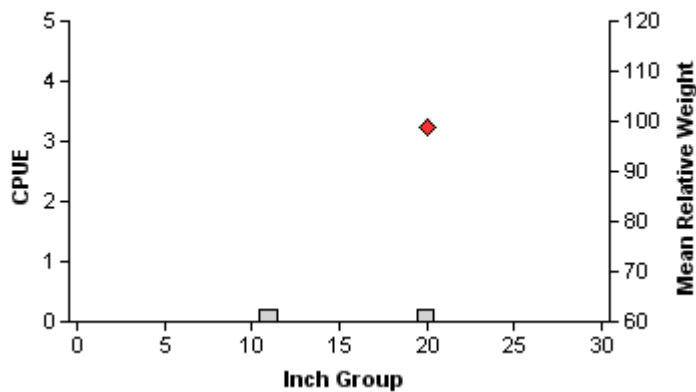
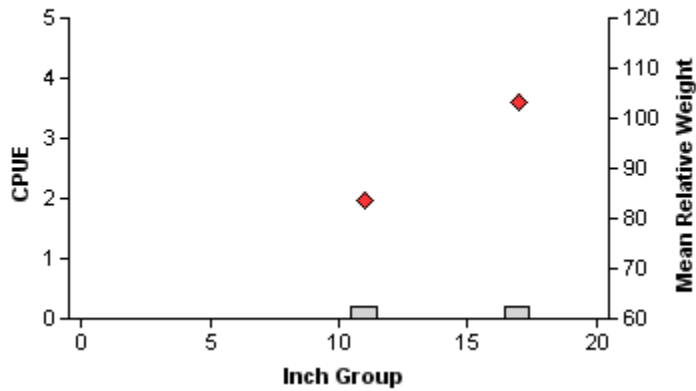


Figure 6. Number of flathead catfish per net night (CPUE, bars), mean relative weight(diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2003, 2005, and 2007. RSE is used for CPUE Values.

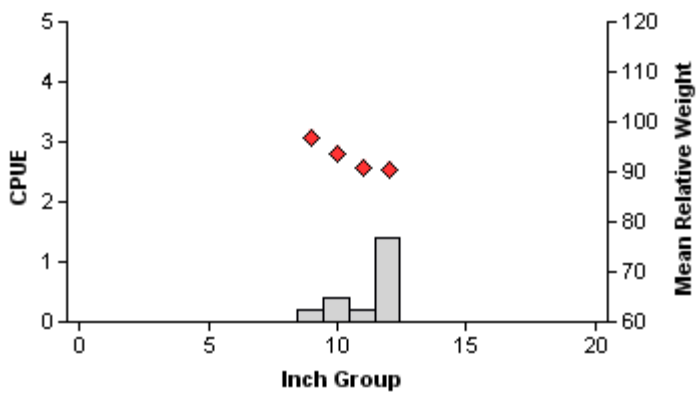
White Bass

2003



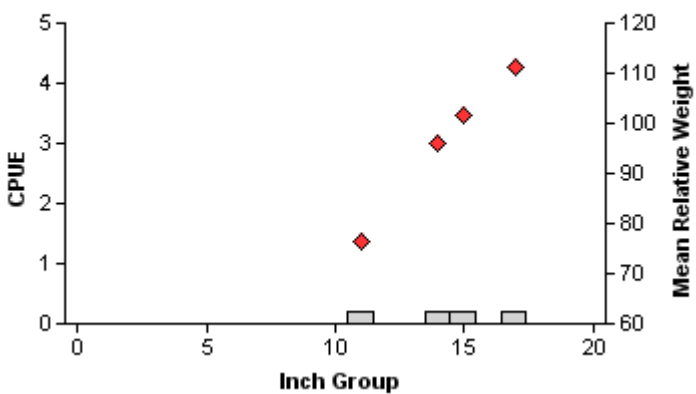
Effort = 5.0
 Total CPUE = 0.4 (61; 2)
 Stock CPUE = 0.4 (61; 2)
 PSD = 100 (0)
 RSD-10 = 100 (0)

2005



Effort = 5.0
 Total CPUE = 2.2 (36; 11)
 Stock CPUE = 2.2 (36; 11)
 PSD = 100 (0.0)
 RSD-10 = 91 (6.4)

2007

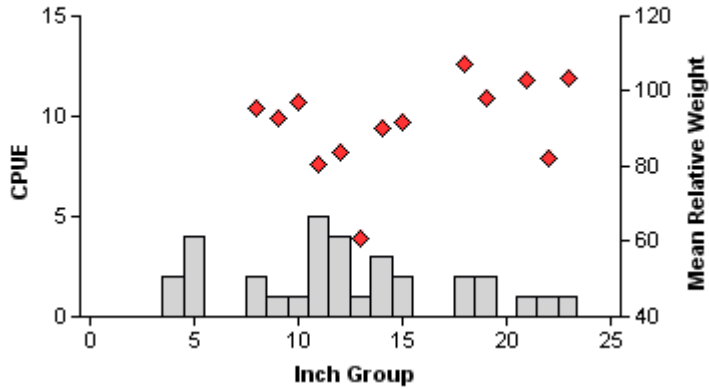


Effort = 5.0
 Total CPUE = 0.8 (61; 4)
 Stock CPUE = 0.8 (61; 4)
 PSD = 100 (0)
 RSD-10 = 100 (0)

Figure 7. Number of white bass caught per net night (CPUE, bars), mean relative weight(diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2003, 2005, and 2007. RSE is used for CPUE Values and SE is used for RSD/PSD Values.

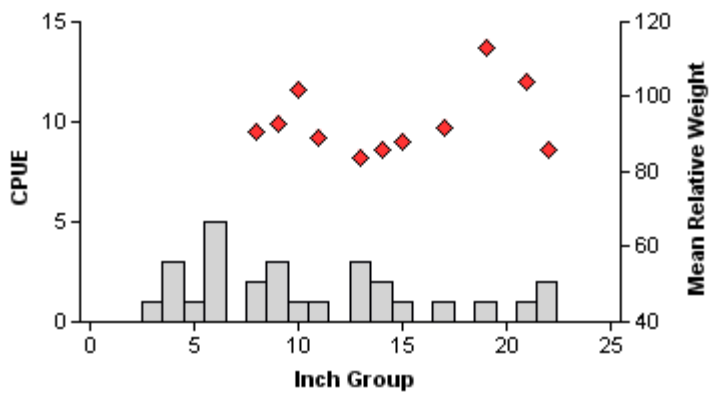
Largemouth Bass

2002



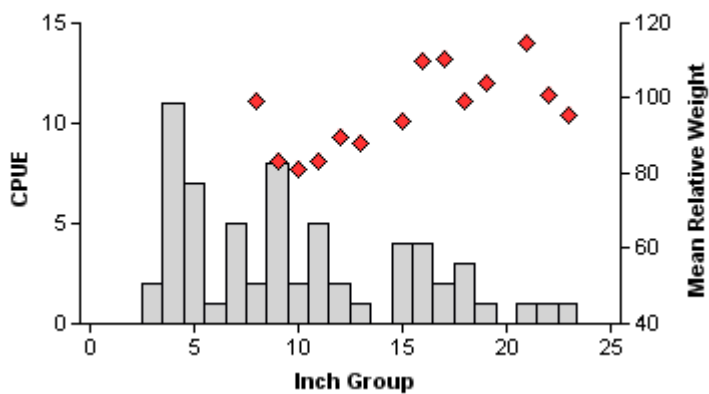
Effort = 1.0
 Total CPUE = 32.0 (19; 32)
 Stock CPUE = 26.0 (24; 26)
 CPUE-14 = 12.0 (39; 12)
 PSD = 65 (10.4)
 RSD-14 = 46 (10.9)

2004



Effort = 1.0
 Total CPUE = 28.0 (31; 28)
 Stock CPUE = 18.0 (33; 18)
 CPUE-14 = 8.0 (50; 8)
 PSD = 61 (13.5)
 RSD-14 = 44 (16.3)

2006



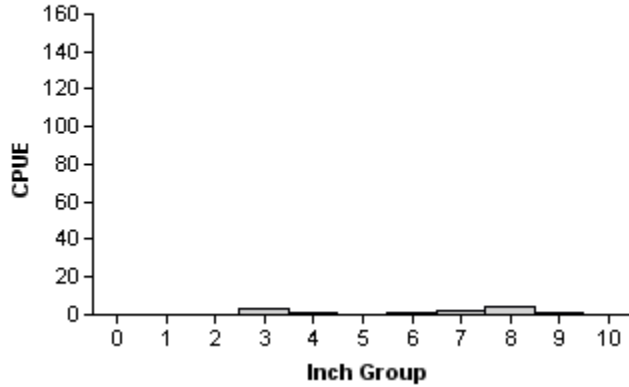
Effort = 1.0
 Total CPUE = 63.0 (29; 63)
 Stock CPUE = 37.0 (28; 37)
 CPUE-14 = 17.0 (27; 17)
 PSD = 54 (5.6)
 RSD-14 = 46 (5.3)

Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, White River Reservoir, Texas, 2002, 2004, and 2006. RSE is used for CPUE Values and SE is used for RSD/PSD values

White Crappie

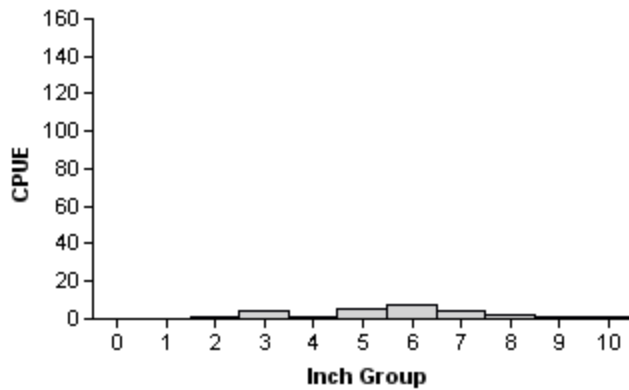
1999

Effort = 8.0
Total CPUE = 12.6 (16; 101)
CPUE-10 = 0.5 (53; 4)



2002

Effort = 5.0
Total CPUE = 28.4 (8; 142)
CPUE-10 = 1.6 (15; 8)



2007

Effort = 5.0
Total CPUE = 388.0 (27; 1,940)
CPUE-10 = 0.4 (61; 2)

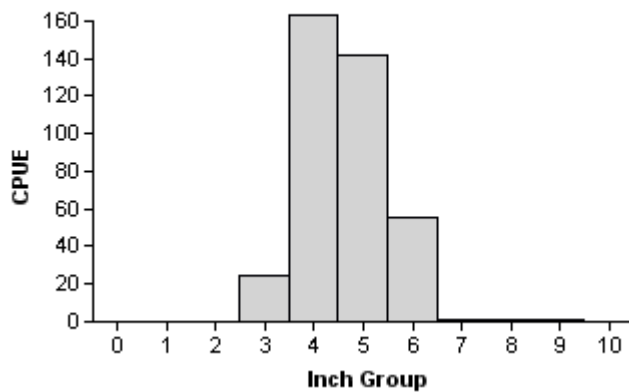


Figure 9. Number of white crappie caught per net night (CPUE, bars) and population indices (RSE and N are in parentheses) for fall trap net surveys, White River Reservoir, Texas, 1999, 2002, and 2007. RSE is used for CPUE Values.

White Crappie

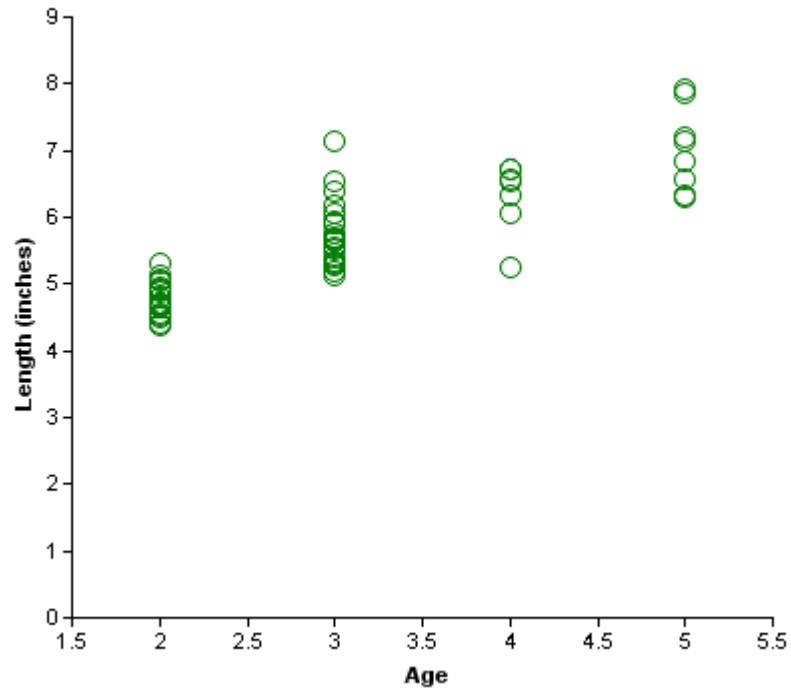


Figure 10. Length at age for 60 white crappie collected from trap nets at White River Reservoir, Texas, in January 2007.

20 Walleye

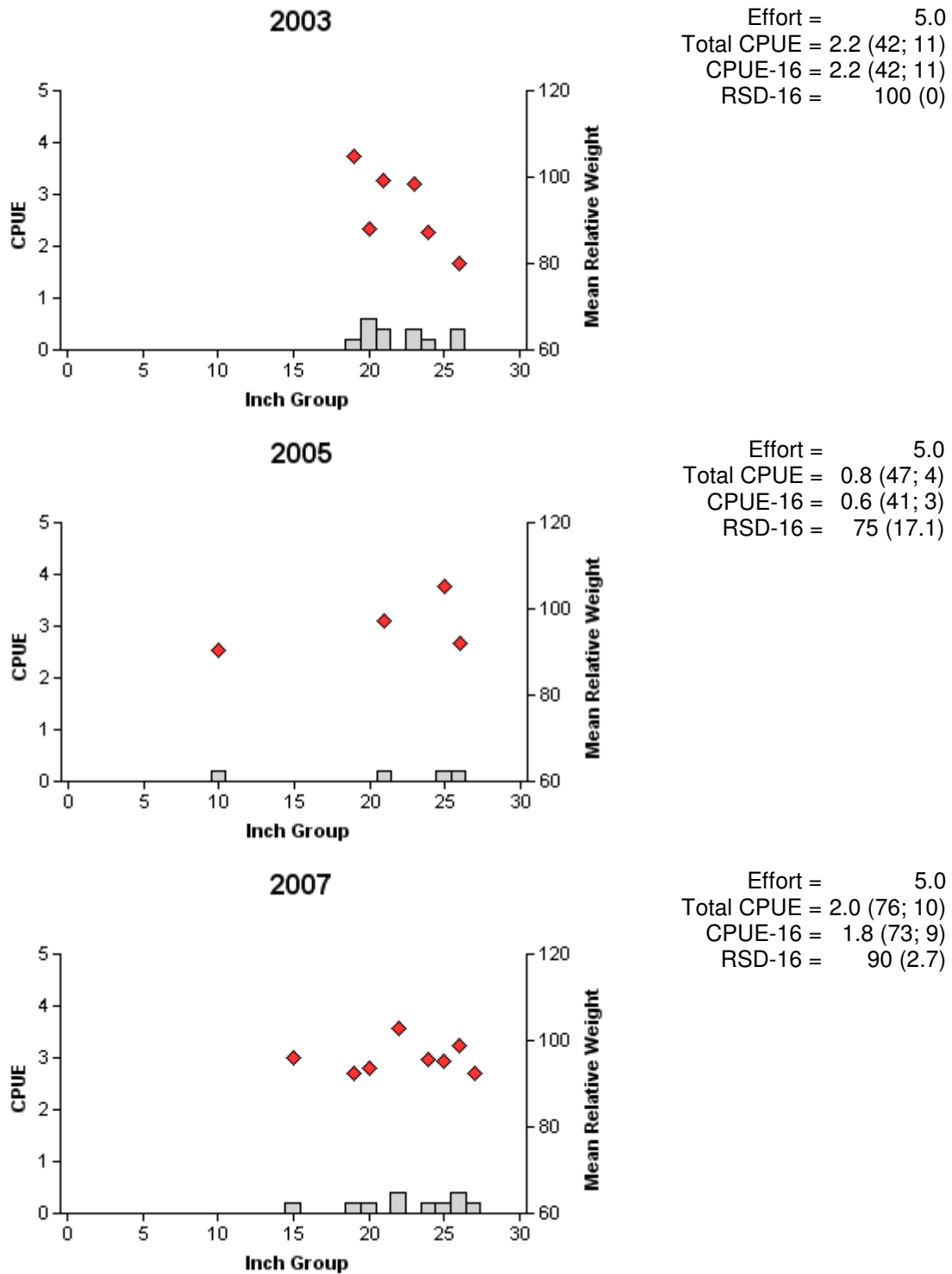


Figure 11. Number of walleye caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, White River Reservoir, Texas, 2003, 2005, and 2007. RSE is used for CPUE Values and SE is used for RSD/PSD Values.

Table 5. Proposed sampling schedule for White River Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. S denotes standard survey and A denotes additional survey.

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

APPENDIX A

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

Species	Gill Nets		Trap Nets		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	226	45.2	1	0.2	455	455.0
Common carp	19	3.8			120	120.0
River carpsucker	28	5.6				
Blue catfish	42	8.4				
Channel catfish	50	10.0			3	3.0
Flathead catfish	2	0.4			3	3.0
White bass	4	0.8			10	10.0
Green sunfish					3	3.0
Bluegill	7	1.4	36	7.2	107	107.0
Longear sunfish			1	0.2	61	61.0
Largemouth bass	4	0.8			63	63.0
White crappie	36	7.2	1,940	388.0	149	149.0
Walleye	10	2.0			1	1.0
Freshwater drum			1,075	215.0	55	55.0

23
APPENDIX B



Location of sampling sites, White River Reservoir, Texas. Indicated electrofishing and trap net stations are for 2006 and gill net stations are for 2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Lake levels are represented by shaded lake outlines: light gray = conservation pool, dark gray = current water level, white line = water level at time of sampling.