

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

White Rock Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in White Rock Reservoir were surveyed in 2004, 2006, and 2007 using electrofishing, in 2007 using 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:** White Rock Reservoir, a 1,088-acre impoundment located on White Rock Creek (a tributary of the Elm Fork of the Trinity River), was constructed in 1910 by the City of Dallas as a municipal water supply; presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to 5 feet. Angler and boat access is adequate. Outboard motors on White Rock Reservoir can be no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. At the time of sampling the fishery habitat was primarily native emergent vegetation and cut bank.
- **Management history:** Important sport fish include largemouth bass, white crappie, and channel catfish. All fish species are managed under statewide length and bag limits. White Rock Reservoir is a truly urban fishery. This is evident by the results of an annual creel survey, conducted in 2005-2006, which indicated 96% of the angling effort on White Rock Reservoir comes from bank anglers and that 50% of the anglers were seeking "anything".
- **Fish Community**
 - **Prey species:** Gizzard and threadfin shad are present in the reservoir. Electrofishing catch rates of these species are above averages of other district reservoirs. The total catch rate of bluegill has increased over the past couple of years, while the catch rate of longear sunfish has fluctuated over the last three years.
 - **Catfishes:** Channel catfish are present in the reservoir. Catch rates were high compared to historic averages. No blue catfish were collected despite a 2007 stocking. Flathead catfish are present but none were captured this past survey year.
 - **White bass:** Past gill netting surveys have indicated a small population of white bass present in White Rock Reservoir. Spring gill netting surveys conducted in 2008 continue to confirm this fact with white bass being caught at a low rate.
 - **Largemouth bass:** The electrofishing catch rate of largemouth bass has varied in abundance but the rates were above the district average. The catch rate of fish > 14 inches in length was very high the past two samples. Growth rates are fast.
 - **White crappie:** The white crappie population is high in abundance and quality. The population exhibits fluctuations in abundance with trap net catch rates lower than in previous years but still much higher than the average of other district reservoirs.
- **Management Strategies:** Try to re-establish relationship with the White Rock Lake Foundation, Dallas Parks and Recreation Department to improve fishing access sites and signage. Conduct baseline fish tissue contaminant sampling to determine if further testing is warranted.

INTRODUCTION

This document is a summary of fisheries data collected from White Rock 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

White Rock Reservoir, a 1,088-acre impoundment located on White Rock Creek (a tributary of the Elm Fork of the Trinity River), was constructed in 1910 by the City of Dallas as a municipal water supply; presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to 5 feet. Angler and boat access is adequate. Outboard motors on White Rock Reservoir can be no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. At the time of sampling the fishery habitat was primarily native emergent vegetation and cut bank. Since White Rock Reservoir is no longer used for municipal water, a staff gauge is not available to monitor water level fluctuations.

Management History

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

1. Work with the White Rock Lake Foundation (WRLF) and Dallas Parks and Recreation to install and improve two existing piers.

Actions: Several meetings with WRLF were held along with Dallas Parks and Recreation personnel. A memorandum of understanding (MOU) was drafted by WRLF and sent to Texas Parks & Wildlife Department legal division for approval. TPWD legal division would not accept MOU because of wording regarding indemnification. No other drafts of the MOU were submitted.

2. Conduct an annual creel survey to assess angler catch and harvest.

Actions: A 36-day annual creel survey was conducted from June 2005 thru May 2006.

3. Add another sport species that can be angled from the bank to diversify fishery.

Actions: Blue catfish were stocked in spring 2007.

Harvest regulation history: Sport fish populations in White Rock Reservoir have been managed with statewide regulations (Table 2).

Stocking history: White Rock was stocked in 2007 with blue catfish to add another sport fish to the population which could be angled from the bank. The complete stocking history is in Table 3.

Vegetation/habitat history: White Rock Reservoir aquatic vegetation is primarily composed of shoreline emergent species including cattails, bulrushes, and water willow.

METHODS

Fishes were collected by electrofishing (1 hours at 12 5-min stations), trap netting (5 net nights at 5 stations), and gill 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/hr) of actual electrofishing and, for gill netting and trap netting, as the number of fish per net night (fish/nn). A roving creel survey was conducted consisting of 36 days between June 1, 2005 and May 31, 2006. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries

Division, unpublished manual revised 2006).

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. Ages for largemouth bass were determined using otoliths from all fish collected over stock size.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of gravel banks and native emergent aquatic vegetation in the form of water willow, cattail, and bulrush (Table 4).

Creel: From June 2005 to May 2006, the highest directed fishing effort was expended by anglers fishing for anything and comprised 50% of the angling effort, followed by anglers fishing for catfishes (21%), and largemouth bass (9%). Total fishing effort for all species at White Rock Reservoir was 45,790 h (42.1 h/acre), and anglers spent an estimated \$86,071 on direct expenditures.

Prey species: The total electrofishing catch rate of gizzard shad was 274.0/hr in 2007. Catch rates were highly variable from 2004-2007. Catch rates ranged from 90.0/hr in 2004 to 415.0/hr in 2006. However the average catch rate from 2004-2007 was 248.0/hr which was slightly below the district average of 270.6/hr (Figure 1). IOV for gizzard shad were also variable and ranged from 75 in 2006 to 93.4 in 2007. The threadfin shad catch rates were also highly variable and ranged from 30.0/hr in 2007 to 402.0/hr in 2005. The catch rate of bluegill was 423.0/hr in 2007. Catch rates of bluegill averaged 282.0/hr from 2004 -2007, and ranged from 108.0/hr in 2004 to 423.0/hr in 2007 (Figure 2). The bluegill population does not contain large numbers of quality sized fish (>6 inches) as evident in PSD values. The catch rate of longear sunfish was 124.0/hr in 2007. Longear sunfish catch rates have also been highly variable with an average catch rate of 106.0/hr which is above the district average of 90.3/hr. Catch rates ranged from 54.0/hr in 2004 to 158.0/hr in 2005 (Figure 3). Nine percent of total angling effort was expended toward sunfish species (Table 5). Even though larger sunfish are not abundant, angler harvest of sunfish was observed (Figure 4).

Catfishes: Although blue catfish were stocked in summer 2007, none were captured in 2008 gillnetting samples. The gill netting catch rate of channel catfish was 7.0/nn in 2008 (Figure 5). This catch rate was more than double the previous catch rate in 2004 and slightly higher than the district average (5.6/nn). Size structure of the population was very good as indicated by the PSD value of 94. These fish are probably the result of intensive stocking efforts of fingerling and advanced fingerling channel catfish in 2000 and 2004. Length frequency distribution also indicates little recruitment as evident in low catch rates of smaller sized fish. Twenty one percent of total angling effort was expended toward channel catfish. Directed effort for channel catfish was 8.8 hours/acre with a catch rate of 0.1 fish/hr (Table 5). Channel catfish were a harvest-oriented fish as 0 percent of the legal-sized fish were released. Some illegal harvest was observed (Figure 6).

White bass: The gill netting catch rate of white bass in 2008 (0.6/nn) was well below the district average of 7.7/nn (Figure 7). This is similar to past catch rates. Less than one percent of total angling effort was expended toward white bass with no fish being caught (Table 6).

Largemouth bass: The total electrofishing catch rate of largemouth bass was 154.0/hr in 2007. The catch rate averaged 148.3/hr from 2004-2007 which is above the district average of 127.9/hr. The catch rates ranged from 50.0/hr in 2004 to 212.0/hr in 2005 (Figure 9). Catch rates of largemouth \geq 14 inches increased from 2004-2007 with a high catch rate of 17.0/hr observed in 2007. Despite the high catch rates, body conditions have remained excellent (relative weight above 92) for all size classes of fish (Figure 10). The size structure of the population has also improved from 2004-2007 as reflected in a PSD

values observed in 2007. Growth of largemouth bass in White Rock Reservoir is fast with fish reaching 14 inches in almost 2 years (Figure 9). Florida largemouth bass influence was low as Florida alleles were 23% in 2007 and Florida genotype was 0 (Table 8). Nine percent of total angling effort was expended toward largemouth bass. Directed fishing effort and catch per hour for largemouth bass was estimated at 4,102 hrs and 0.03 fish/hr, respectively (Table 9). No harvest of largemouth bass was observed.

White crappie: The trap netting catch rate of white crappie was 69.8/nn in 2007 with a catch rate of crappie \geq 10 inches of 9.0/nn. The total catch rate is surprisingly lower than the catch rate observed in 2003 (176.0/nn) (Figure 14). However the catch rate in 2007 was much higher than the district average of 16.5/nn. The PSD in 2007 was 69 indicating excellent size structure. Seven percent of total angling effort was expended toward crappie. Directed fishing effort (hrs) and catch per hour for crappie was estimated at 3,125 hrs and 1.3 fish/hr, respectively (Table 10; Figure 11).

Fisheries management plan for White Rock Reservoir, Texas

Prepared – July 2008.

ISSUE 1: White Rock is located in a highly urbanized area which could lead to build up of contaminants in fish tissue.

MANAGEMENT STRATEGY

1. Work with TPWD contaminants personnel to analyze fish tissue for possible contamination.

ISSUE 2: Re-establish relationship with WLF to improve fishing at White Rock Reservoir.

MANAGEMENT STRATEGY

1. Contact WLF officials and propose brush pile installation around fishing piers to concentrate fish for anglers.

ISSUE 3: White Rock Lake has several boat ramps and bank access points which do not have signage regarding fishing regulations and the boat motor horsepower restriction.

MANAGEMENT STRATEGY

1. Contact Dallas Parks and Recreation personnel and request signage informing fishermen about regulations and the boat motor horsepower restriction.

SAMPLING SCHEDULE JUSTIFICATION

Annual electrofishing will be conducted to monitor largemouth bass and forage fish populations. General monitoring with trap netting, and gill netting will be conducted every 4 years.

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.
- Brock, R. and T. Hungerford 2004. Statewide freshwater fisheries monitoring and management program survey report for White Rock Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- DiCenzo, V.J., M.J. Maceina, and M.R. Stimpert. 1996. Relations between Reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16: 888-895.

Table 1. Characteristics of White Rock Reservoir, Texas.

Characteristic	Description
Year Constructed	1910
Controlling authority	City of Dallas
County	Dallas
Reservoir type	Tributary of Trinity River
Conductivity	360 umhos/cm

Table 2. Harvest regulations for White Rock Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, flathead	5	18 minimum
Bass, white	25	10 minimum
Bass: largemouth	5	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

Table 3. Stocking history of White Rock Reservoir, 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.

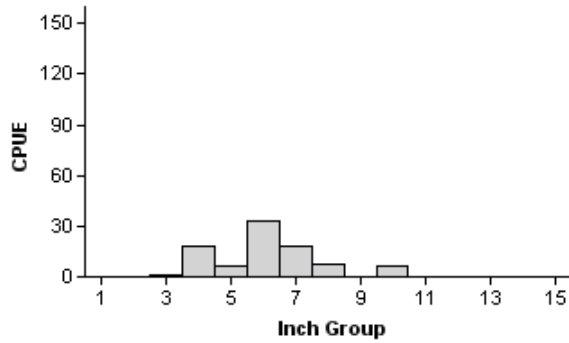
Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	1988	15	ADL	15.8
	2007	107,354	FGL	2.6
	Total	107,369		
Channel catfish	1979	1,315	AFGL	7.9
	1979	935	UNK	UNK
	1980	17,431	AFGL	7.9
	1981	22,380	AFGL	7.9
	1986	1,883	AFGL	11.0
	2000	293,146	FGL	3.0
	2004	10,551	AFGL	7.8
	2008	163	ADL	20
	Total	347,804		
Florida Largemouth bass	1978	1,150	AFGL	4.0
	1982	10,000	FGL	2.0
	1992	112,030	FGL	1.1
	1996	112,468	FGL	1.5
	Total	235,648		
Largemouth bass	1968	300,000	UNK	UNK
	1995	10	ADL	18.9
	2001	13	ADL	16.5
	Total	300,023		
Palmetto Bass (striped X white bass hybrid)	1975	20,000	UNK	UNK
	1977	9,900	UNK	UNK
	Total	29,900		
Red drum	1976	2,200	UNK	UNK
	Total	2,200		
Walleye	1978	4,500,000	FRY	0.2
	1979	3,360,000	FRY	0.2
	Total	7,860,000		

Table 4. Survey of littoral zone and physical habitat types, White Rock Reservoir, Texas, 2007. 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		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Gravel	5.9	34.1		
Eroded bank	1.1	6.3		
Overhanging brush	2.7	15.6		
Rip rap	0.8	4.6		
Native emergent	5.5	31.8		
Standing timber	0.4	2.3		
Nondescript	0.9	5.2		

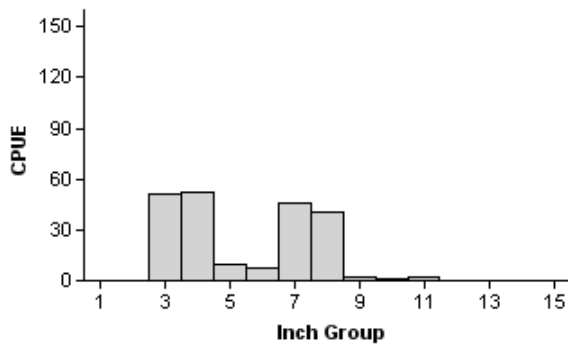
Gizzard Shad

2004



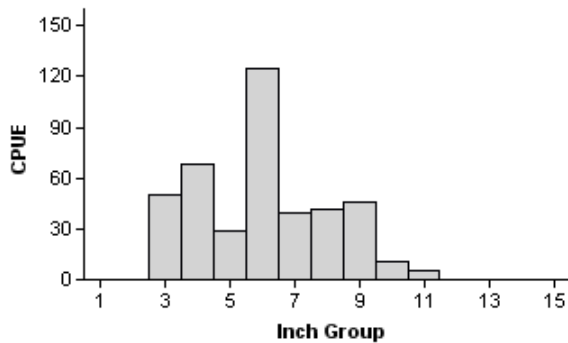
Effort = 1.0
 Total CPUE = 90.0 (25; 90)
 Stock CPUE = 32.0 (25; 32)
 IOV = 84.44 (6.8)

2005



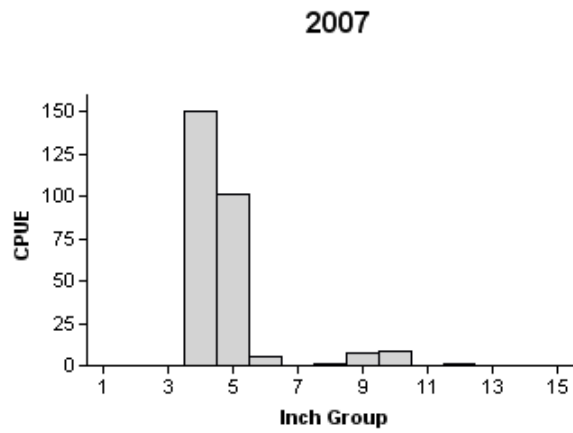
Effort = 1.0
 Total CPUE = 213.0 (19; 213)
 Stock CPUE = 92.0 (27; 92)
 IOV = 78.4 (5.5)

2006



Effort = 1.0
 Total CPUE = 415.0 (14; 415)
 Stock CPUE = 143.0 (13; 143)
 IOV = 74.94 (4.9)

Figure 1. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2004-2007.

Gizzard Shad

Effort = 1.0
Total CPUE = 274.0 (18; 274)
Stock CPUE = 18.0 (22; 18)
IOV = 93.43 (1)

Figure 1 continued.

Bluegill

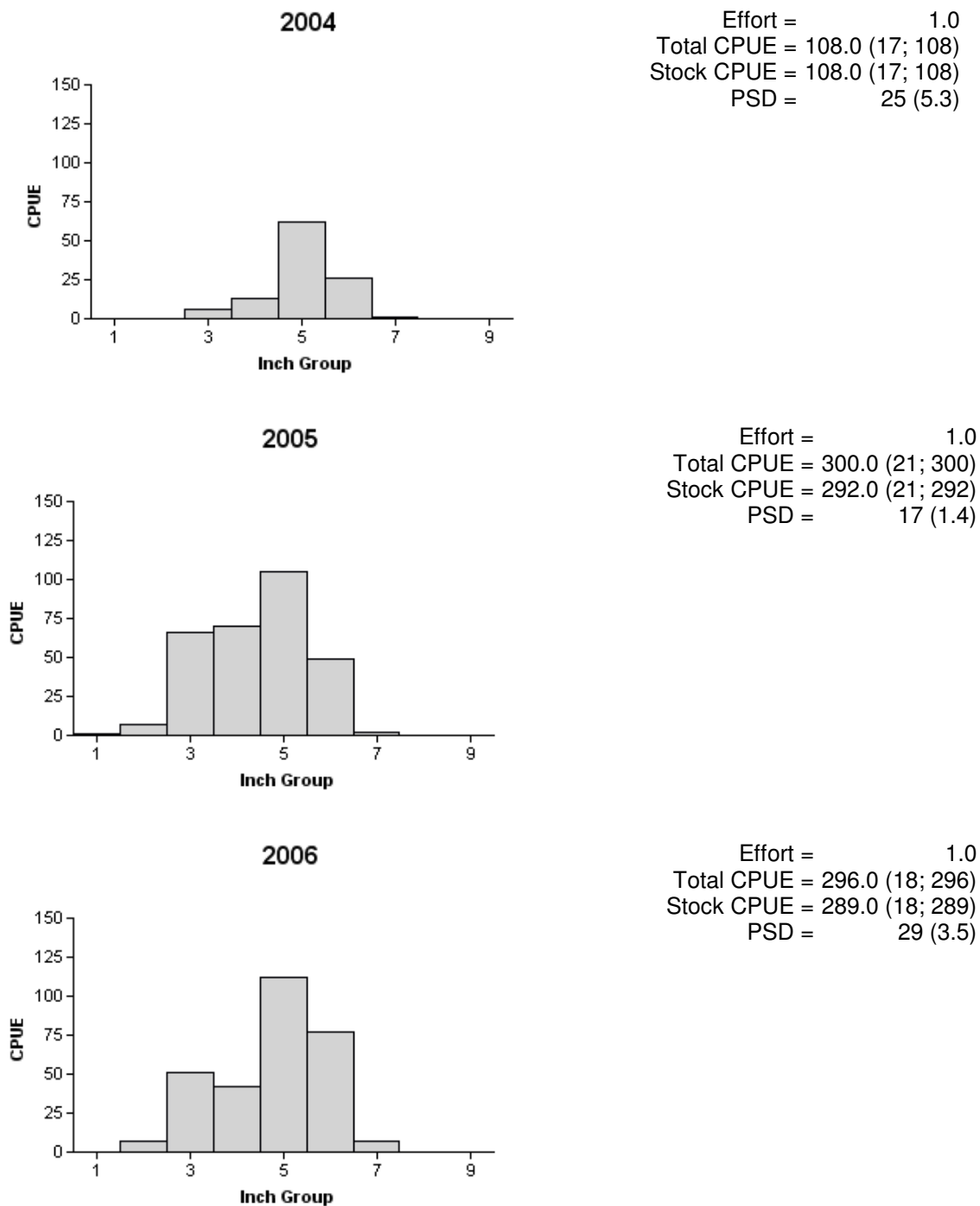


Figure 2. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2004-2007.

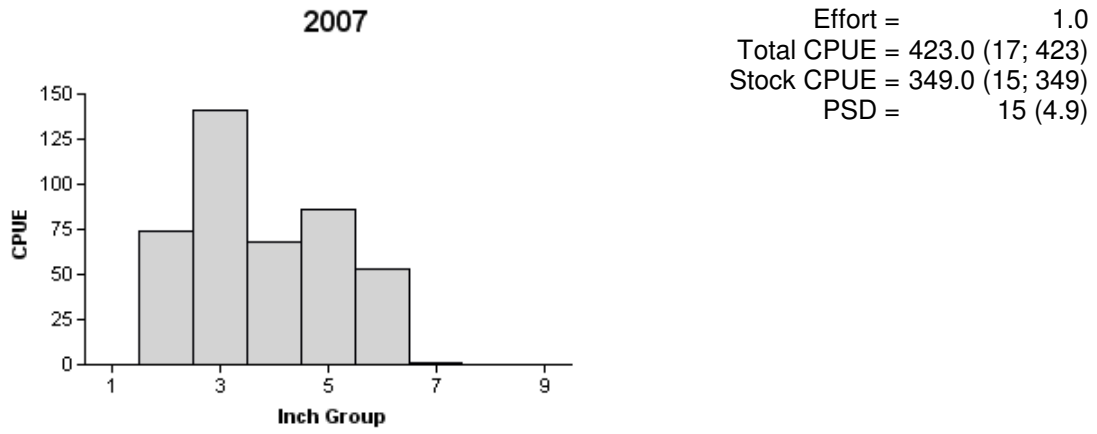
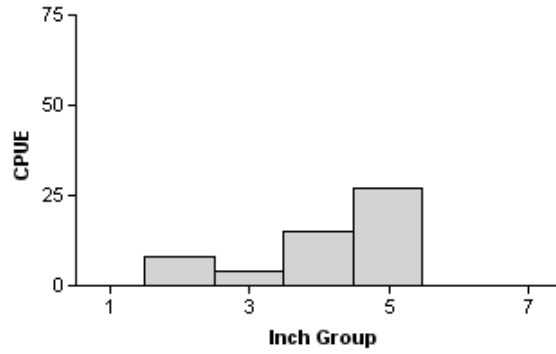
Bluegill

Figure 2 continued.

Longear Sunfish

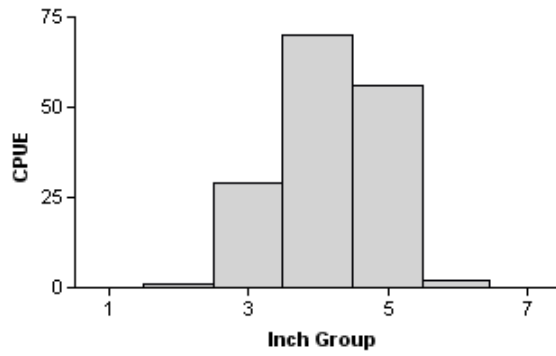
2004

Effort = 1.0
Total CPUE = 54.0 (25; 54)



2005

Effort = 1.0
Total CPUE = 158.0 (18; 158)



2006

Effort = 1.0
Total CPUE = 88.0 (28; 88)

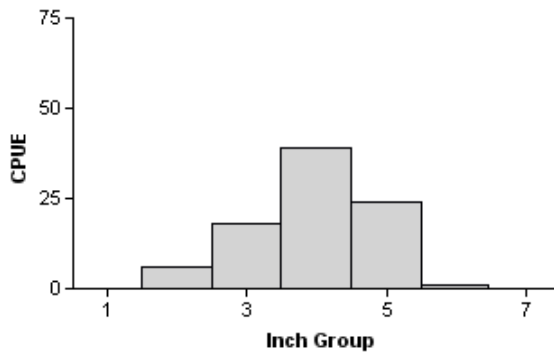


Figure 3. Number of longear sunfish caught per hour (CPUE; bars) (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2004-2007.

Longear Sunfish

2007

Effort = 1.0
Total CPUE = 124.0 (23; 124)

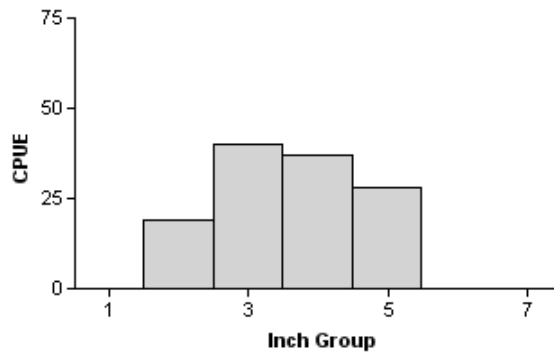


Figure 3 continued.

Table 5. Creel survey statistics for sunfishes from White Rock Reservoir from June 2005 through May 2006, where total catch per hour is for anglers targeting channel catfish and total harvest is the estimated number of channel catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2005/2006
Directed effort (h)	4,083.0 (33.5)
Directed effort/acre	3.8
Total catch per hour	1.9 (58.1)
Total harvest	4836 (43.9)
Harvest/acre	4.4
Percent legal released	1.2 (79.0)

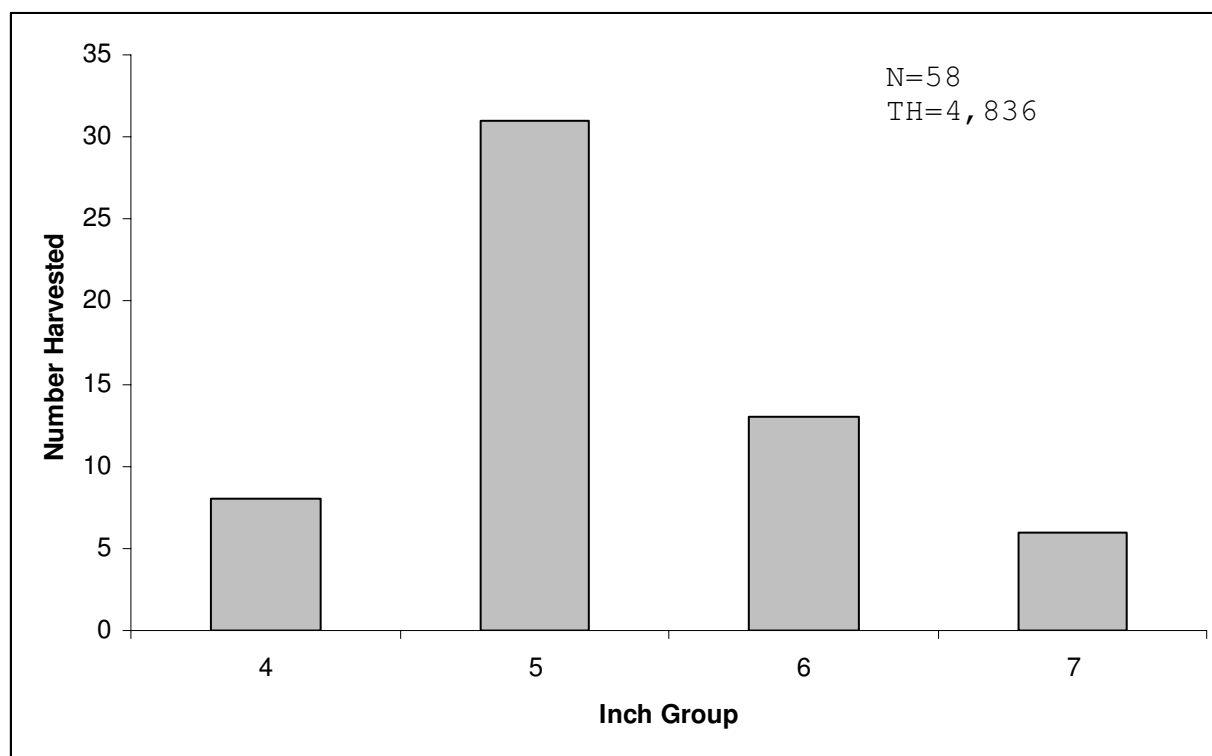


Figure 4. Length frequency of harvested sunfishes observed during creel surveys at White Rock Reservoir, Texas, June 2005 through May 2006, all anglers combined. N is the number of harvested sunfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Channel Catfish

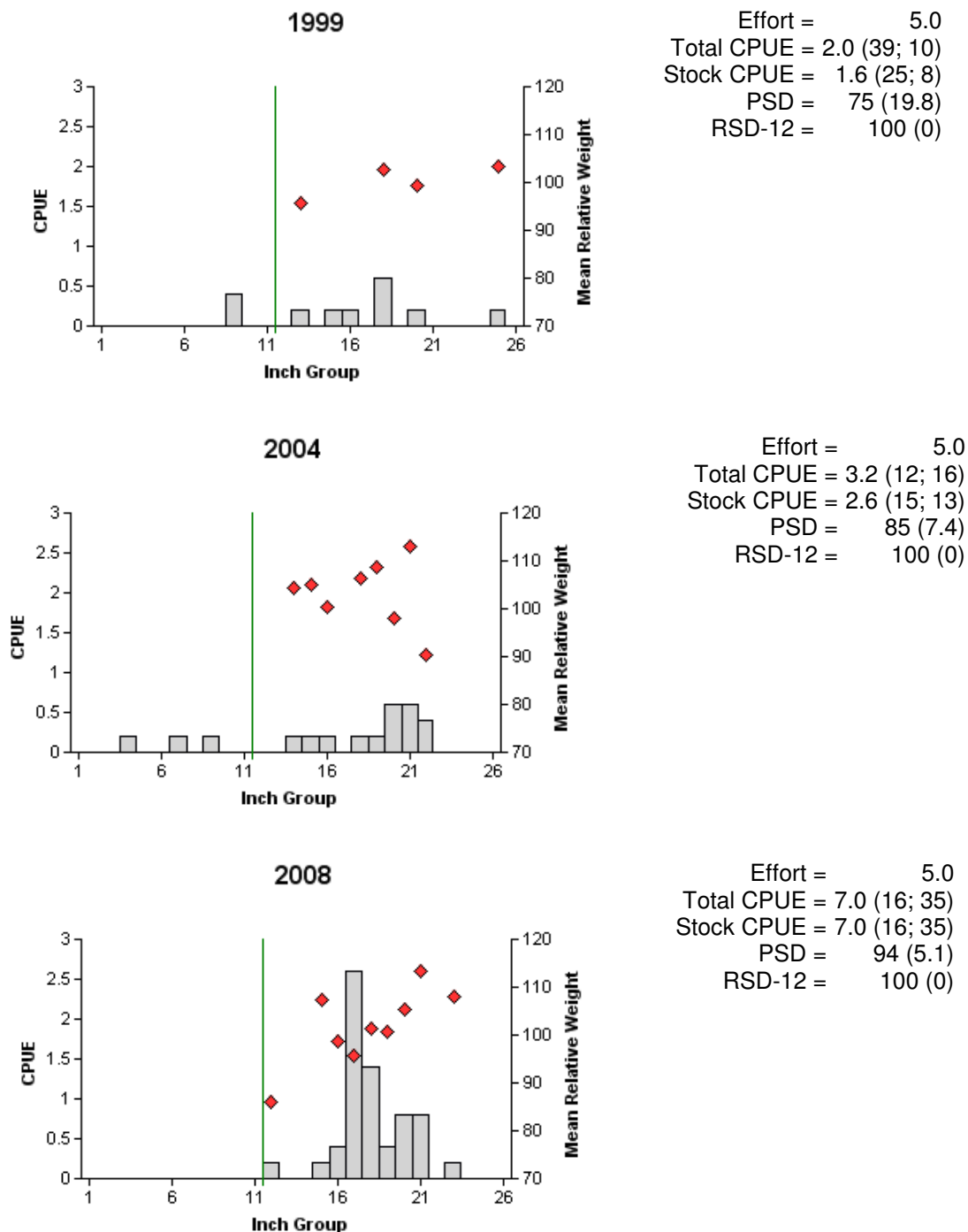


Figure 5. Number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting survey, White Rock Reservoir, Texas, 1999, 2003 and 2007. Vertical line represents length limit at time of sampling.

Table 6. Creel survey statistics for channel catfish at White Rock Reservoir from June 2005 through May 2006, where total catch per hour is for anglers targeting catfish and total harvest is the estimated number of harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2005/2006
Directed effort (h)	9,618.5 (28.6)
Directed effort/acre	8.8
Total catch per hour	0.1
Total harvest	3,300 (40.9)
Harvest/acre	3.0
Percent legal released	0.0

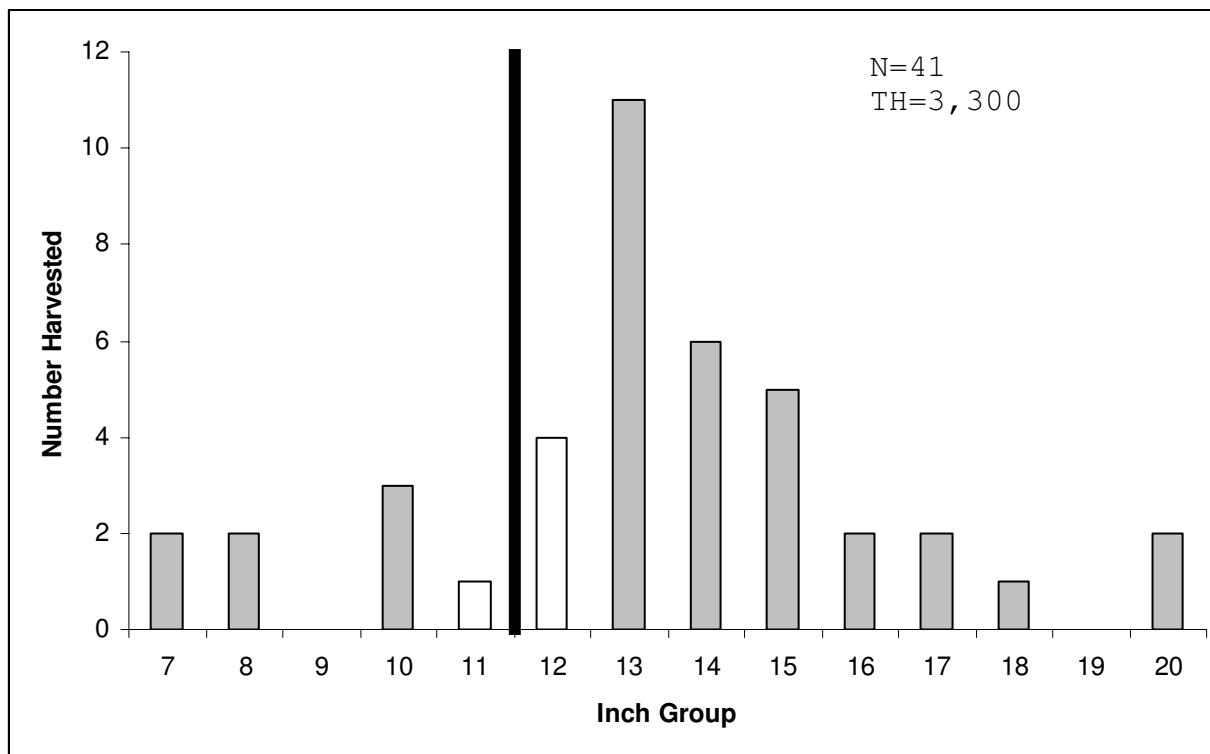


Figure 6. Length frequency of harvested channel catfish observed during creel surveys at White Rock Reservoir, Texas, June 2005 through May 2006, all anglers combined. N is the number of harvested catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit at time of sampling.

White Bass

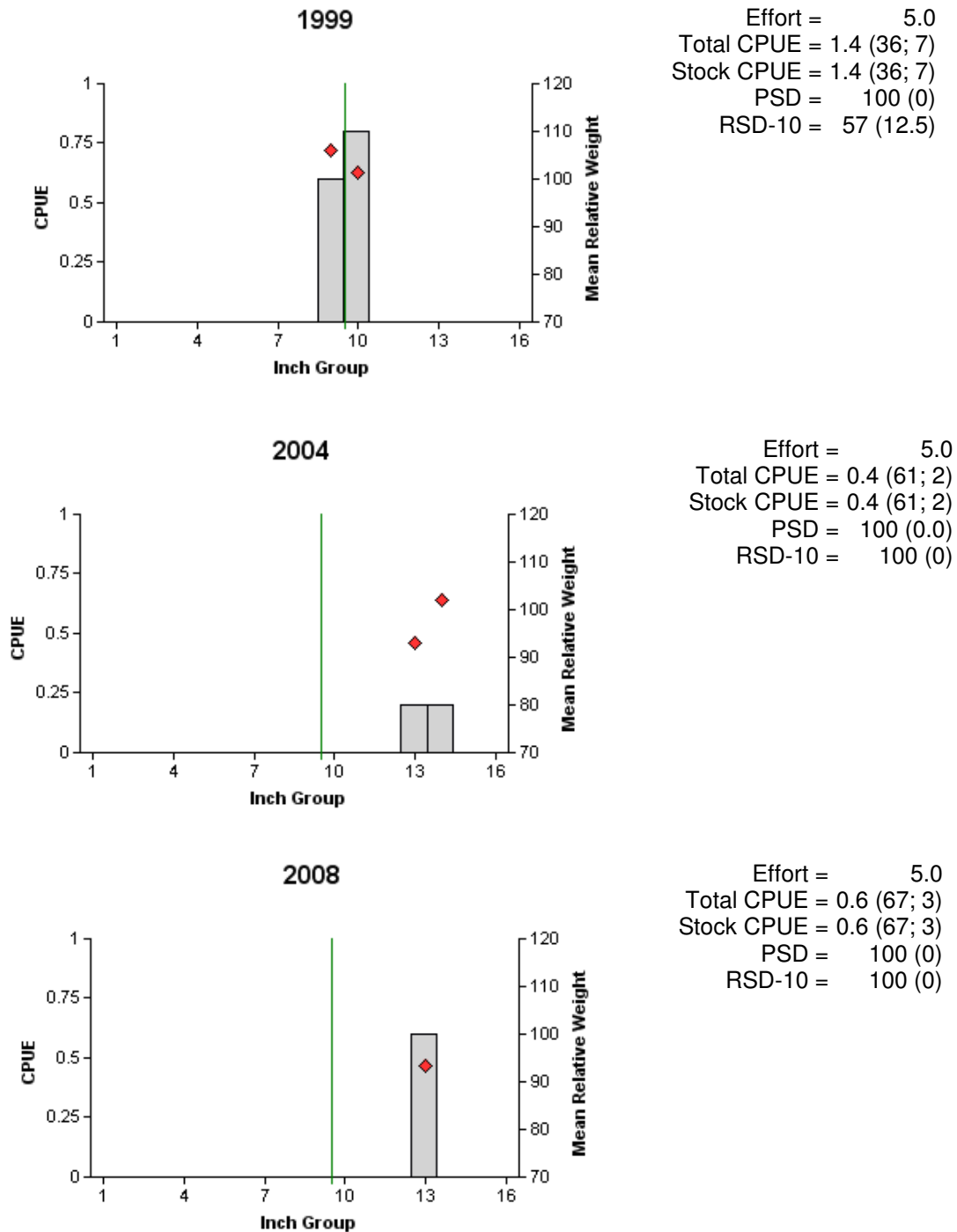


Figure 7. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill netting surveys, White Rock Reservoir, Texas, 999, 2003 and 2007. Vertical line represents length limit at time of sampling.

Table 7. Creel survey statistics for white bass at White Rock Reservoir from June 2005 through May 2006, where total catch per hour is for anglers targeting white bass and total harvest is the estimated number of white bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2005/2006
Directed effort (h)	163.13 (120.3)
Directed effort/acre	0.15
Total catch per hour	0.0
Total harvest	0
Harvest/acre	0
Percent legal released	NA

Largemouth Bass

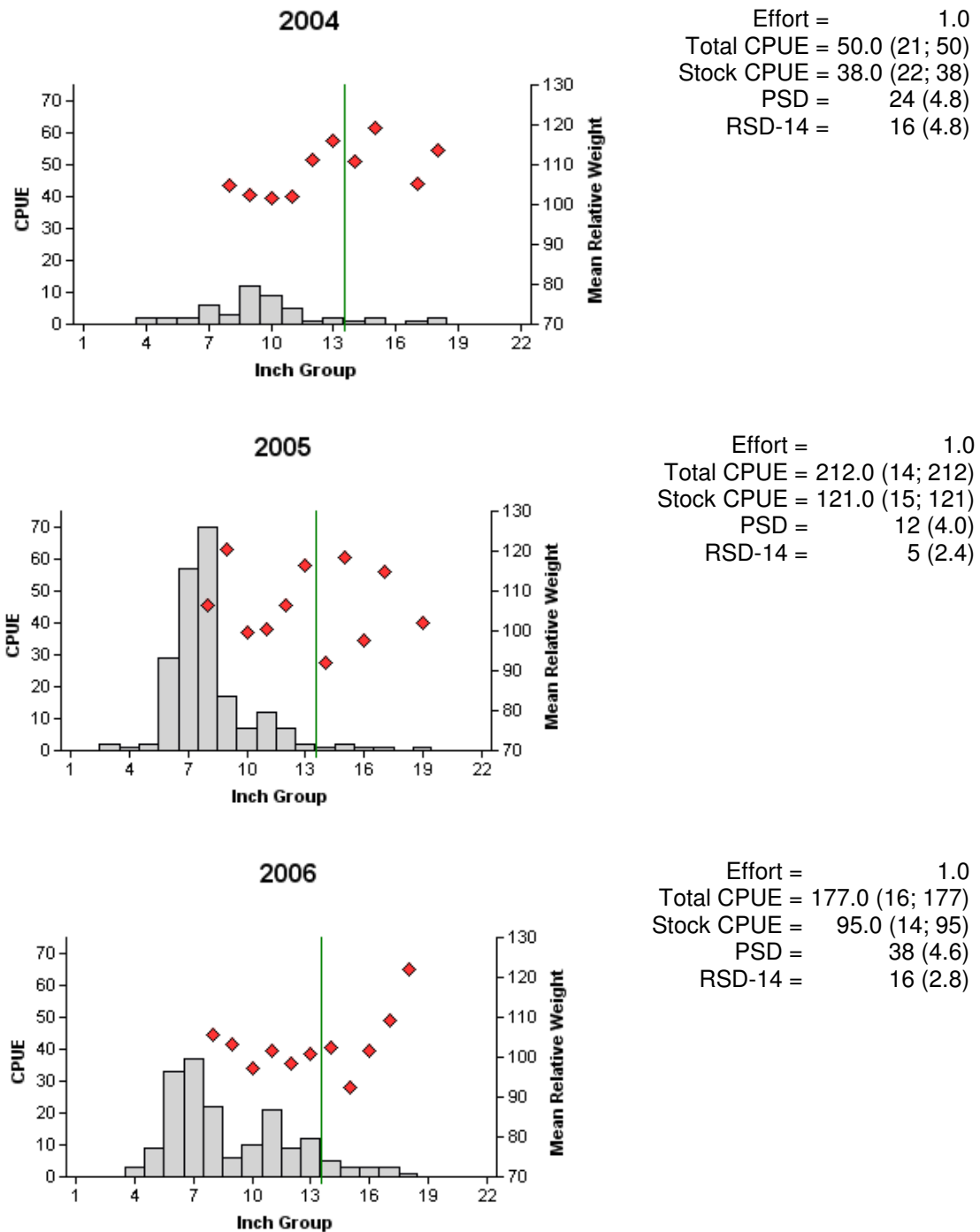


Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2004-2007. Vertical lines represent minimum length limit at time of sampling.

Largemouth Bass

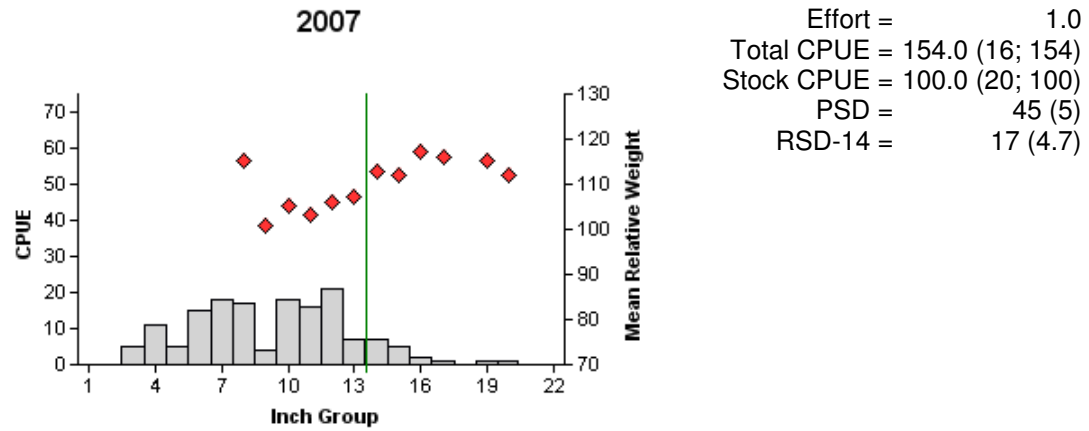


Figure 8 continued.

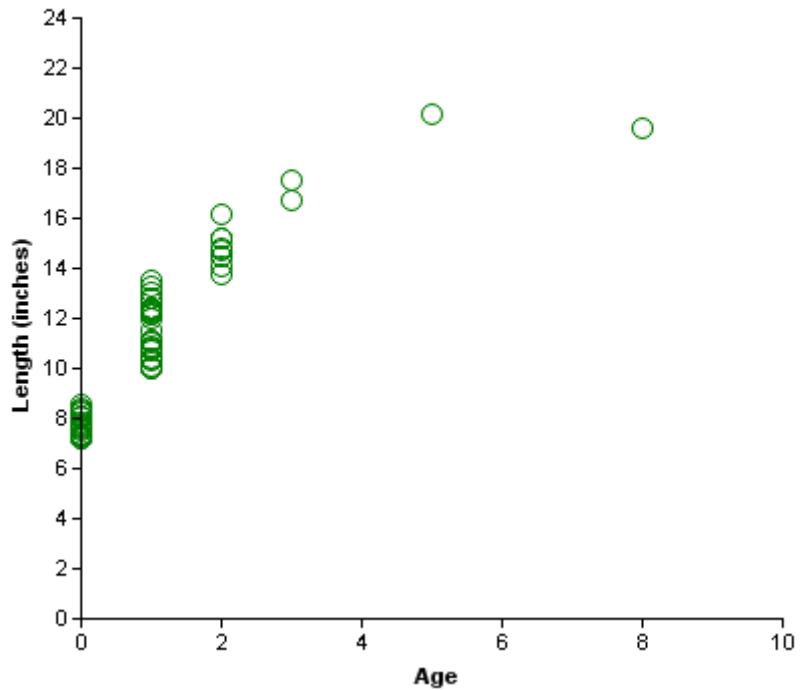


Figure 9. Length at age of largemouth bass (sexes combined) collected from White Rock Reservoir, Texas, fall 2007 (N=60).

Table 8. Results of genetic analysis of largemouth bass collected by fall electrofishing, White Rock Reservoir, Texas, 2007. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass.

Year	Sample size	Genotype		
		% FLMB	% NLMB	% FLMB alleles
2007	30	0	23.3	23.3

Table 9. Creel survey statistics for largemouth bass at White Rock Reservoir from June 2005 through May 2006, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2005/2006
Directed effort (h)	4,102.6 (24.4)
Directed effort/acre	3.8
Total catch per hour	0.03
Total harvest	0
Harvest/acre	0
Percent legal released	100

White Crappie

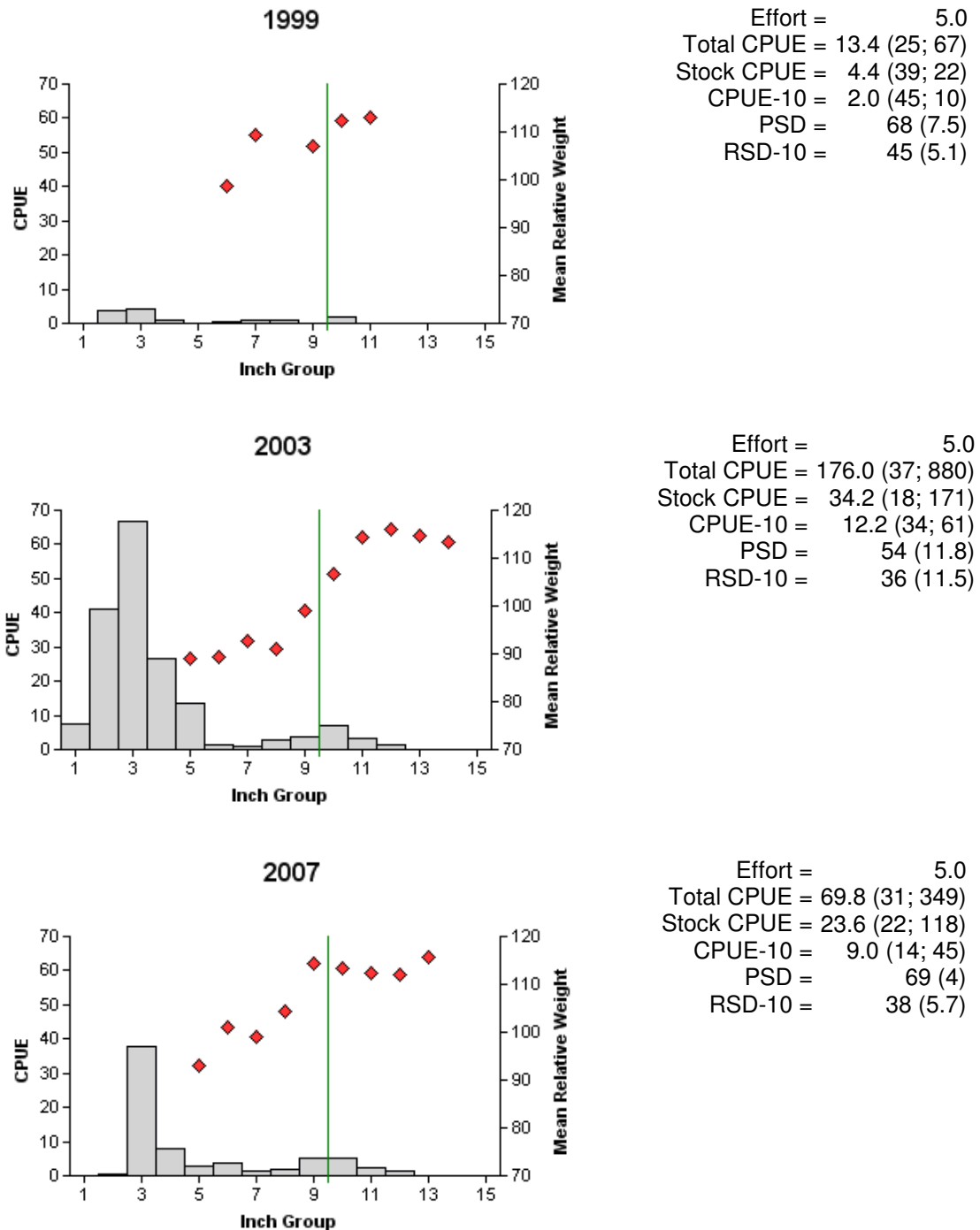


Figure 10. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, White Rock Reservoir, Texas, 1999, 2003 and 2007. Vertical line represents length limit at time of sampling

White Crappie

Table 10. Creel survey statistics for white crappie at White Rock Reservoir from June 2005 through May 2006, where total catch per hour is for anglers targeting white crappie and total harvest is the estimated number of white crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2005/2006
Directed effort (h)	3,124.8 (28.6)
Directed effort/acre	2.9
Total catch per hour	1.29 (79.8)
Total harvest	2,096 (62.1)
Harvest/acre	1.9
Percent legal released	0.0

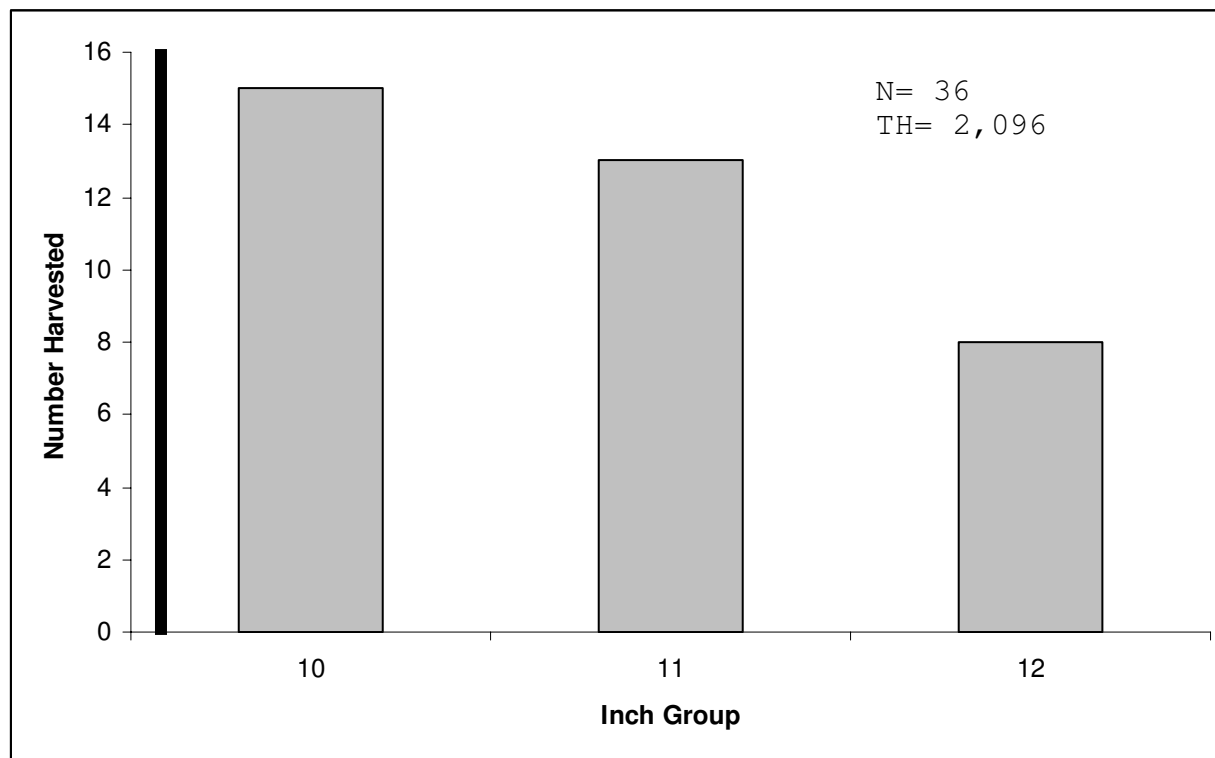


Figure 11. Length frequency of harvested white crappie observed during creel surveys at White Rock Reservoir, Texas, June 2005 through May 2006, all anglers combined. N is the number of harvested white crappie observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit at time of sampling.

Table 11. Proposed sampling schedule for White Rock Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

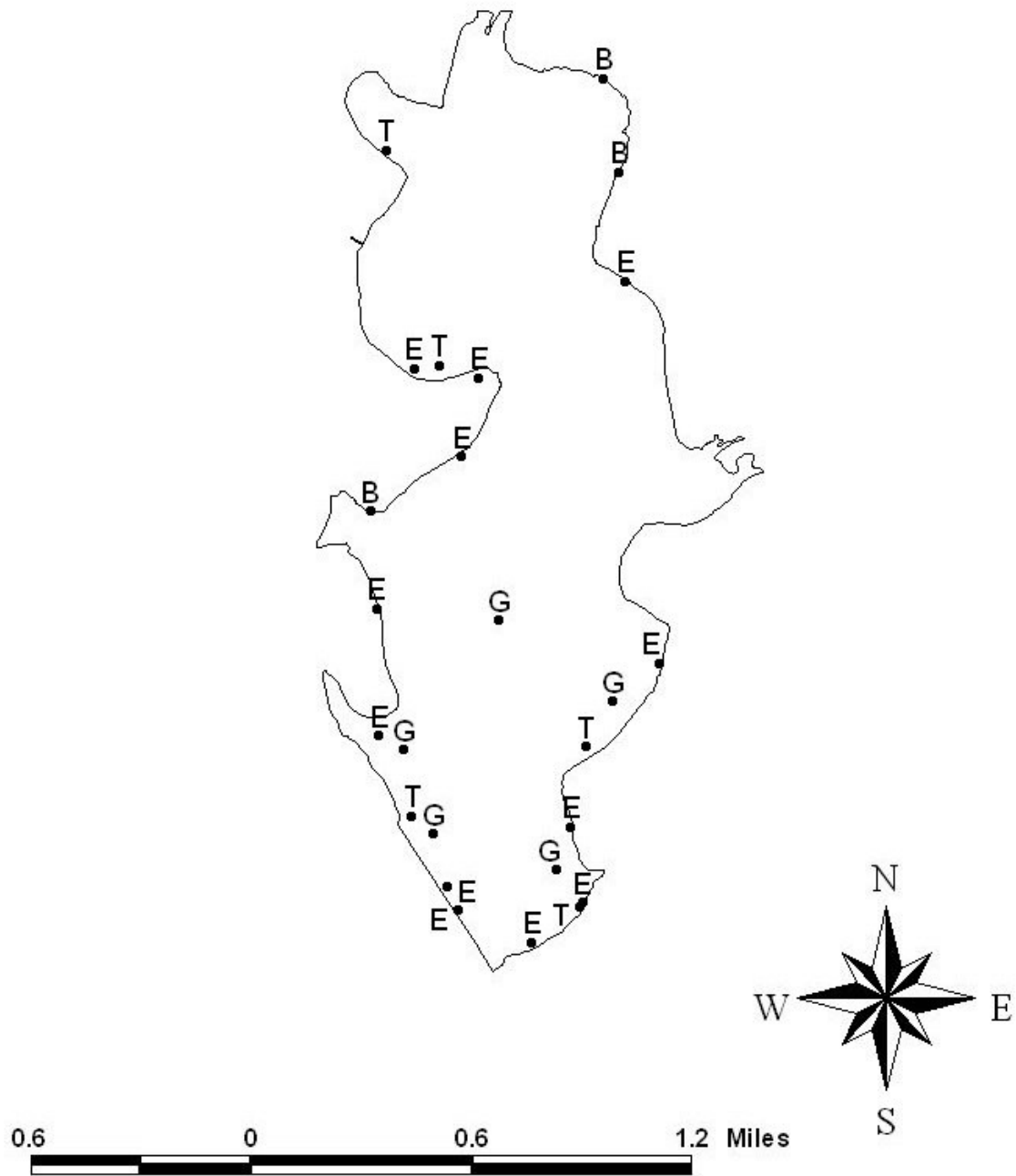
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2008-Spring 2009	A				
Fall 2009-Spring 2010	A				
Fall 2010-Spring 2011	A				
Fall 2012-Spring 2013	S	S	S		S

APPENDIX A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	130	26			274	274
Threadfin shad					30	30
Channel catfish	35	7.0				
White bass	3	0.6				
Bluegill	2	0.7			423	423
Longear sunfish					124	124
Largemouth bass					154	154
White crappie	16	3.2	349	69.8		

APPENDIX B



Location of sampling sites, White Rock Reservoir, Texas, 2007-2008. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.