

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Arlington Reservoir

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SURVEY AND MANAGEMENT SUMMARY

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

Reservoir Description: Arlington Reservoir is a 1,939-acre impoundment constructed on Village Creek (a tributary of West Fork Trinity River) by the City of Arlington in 1957 to provide flood control, water for municipal and industrial purposes, and recreation. Arlington Reservoir is surrounded by urban development and is almost directly in the center of the Dallas-Ft. Worth metroplex. It is approximately 3.8 miles long, 1.6 miles wide (widest point), and has a 20-mile shoreline at 550 feet mean-sea-level. In addition to run-off from the 143 square-mile watershed, an average of 30,426 acre-feet of water, purchased annually from the Tarrant Regional Water District, is pumped from Cedar Creek Reservoir. Exelon operates a natural gas power plant on the reservoir, discharging hot water on the west side of the reservoir. Angler and boat access was adequate. There are three handicap specific facilities, three boat ramps, and several banks accessible to anglers. Fishery habitat is primarily nondescript.

- **Management history:** Important sport fish include largemouth bass, white crappie, white bass, and channel catfish. All species have been managed with statewide regulations.
- **Fish Community**
 - **Prey species:** Gizzard and threadfin shad are in great abundance in the reservoir. Bluegill are also very abundant as prey and there are some larger fish (≥ 6 inches) available for anglers. Longear sunfish are moderately abundant as well.
 - **Catfishes:** Arlington continues to be the best channel catfish reservoir in the district. The catch rate of channel catfish nearly doubled from the past sample. Flathead catfish are present as well.
 - **White bass:** White bass catch rates decreased greatly from the past sample, especially lacking are the smaller fish.
 - **Largemouth bass:** The largemouth bass population has fluctuated greatly in abundance over the past three surveys. Condition factors are good with mean relative weights above 90.
 - **White crappie:** The white crappie population continued to be high in abundance with quality fish available for anglers. Relative weights for crappie were approximately 100 or higher.
- **Management Strategies:** General monitoring with trap nets, gill nets, and electrofishing surveys will be conducted in 2010-2011. Work with Exelon and the city of Arlington to improve fishery habitat with mandated mitigation from power plant impingement. Consider stocking FLMB in 2008 to take advantage of increased from rise in water level.

INTRODUCTION

This document is a summary of fisheries data collected from Arlington Reservoir in 2006-2007. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2006-2007 data for comparison.

Reservoir Description

Arlington Reservoir is a 1,939-acre impoundment constructed on Village Creek (a tributary of West Fork Trinity River) by the City of Arlington in 1957 to provide flood control, water for municipal and industrial purposes, and recreation. Arlington Reservoir is surrounded by urban development and is almost directly in the center of the Dallas-Ft. Worth metroplex. It is approximately 3.8 miles long, 1.6 miles wide (widest point), and has a 20-mile shoreline at 550 feet mean-sea-level. In addition to run-off from the 143 square-mile watershed, an average of 30,426 acre-feet of water, purchased annually from the Tarrant Regional Water District, is pumped from Cedar Creek Reservoir. Angler and boat access is adequate. There are three handicap specific facilities, three boat ramps, and several banks accessible to anglers. Fishery habitat is primarily nondescript. Other descriptive characteristics for Arlington Reservoir are in Table 1.

Management History

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

1. Angler utilization of the put-grow-and-take palmetto bass fishery was poor, as indicated by results of a year-long creel survey. Directed fishing effort by anglers seeking palmetto bass was estimated at 1.1% of the total angling effort and no palmetto bass were reported during creel survey interviews.

Action: Arlington Reservoir was dropped from the palmetto bass stocking list in 2004.

2. Initiation of a voluntary program whereby anglers catching largemouth bass weighing seven pounds or greater could report them to the Arlington city office.

Action: Advertised the program through outdoor writers and other media outlets in the Dallas-Fort Worth metroplex. Signs detailing the program were also placed at the boat ramps with phone numbers for more information. Little data was collected. Shortly after the program began, there was a staffing change at the office resulting in reduced hours of operation. The drought forced the closure of all boat ramps for an extended period of time.

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

Stocking history: The last stocking of Arlington Reservoir occurred in 2003. The stocking consisted of 19,390 palmetto bass. The complete stocking history is in Table 3.

Vegetation/habitat history: Arlington Reservoir aquatic vegetation is usually composed of sporadic stands of native shoreline emergent species, however at the time of last sampling, the reservoir was approximately 8 feet low and no vegetation was observed.

METHODS

Fishes were collected by electrofishing (1.0 hours 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/hr) 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. Ages for largemouth bass were determined using otoliths from all fish collected over stock size (N=64). Source for water level data was the United States Geological Survey website, maintained in cooperation with the City of Arlington.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of nondescript (Table 4). The second most dominant habitat type was rock and gravel banks. Historically, Arlington Reservoir has sporadic stands of waterwillow, however, with the recent drought, none was observed during the 2006 habitat survey.

Prey species: The electrofishing catch rate of threadfin was more than double the district average of 229.0/hr in 2006 (528.0/hr). The gizzard shad electrofishing catch rate in 2006 of 303.0/hr was above the district average of 266.0/hr and higher than the catch rate observed in 2004 (208.0/hr) and 2005 (264.0/hr) (Figure 2). Index of vulnerability for gizzard shad was high, indicating that 73.9% of gizzard shad captured in 2006 were available to existing predators; this was an improvement on IOV estimates in previous years. The electrofishing catch rate of bluegill in 2006 of 353.0/hr was higher than the previous two surveys in 2004 and 2005 and higher than the district average of 167.0/hr (Figure 3). The bluegill population contains good numbers of quality sized fish (>6 inches) as evident in PSD values. The longear sunfish catch rate observed in 2006 (94.0/hr) was similar to rates observed in 2004 and 2005 and above the district average of 88.0/hr (Figure 4).

Channel catfish: The gill net catch rate of channel catfish was 15.0 /nn in 2007 which was nearly double the catch rate in 2003 (8.6/nn) and slightly lower than 2001 (17.4/nn; Figure 5). Although the 2007 catch rate was well above the district average 5.7/nn, size structure remained adequate as indicated by a PSD value of 39. Arlington continues to be the best channel catfish reservoir in the district.

White bass: The gill netting catch rates of white bass in Arlington have fluctuated widely among the past three samples. The 2007 gill net catch rate of 5.2/nn was much lower than the 2003 sample of 19.0/nn (Figure 6) but near the 2001 sample (4.8/nn). Size structure of the population was above average as indicated by the PSD value of 100. Recent drought has likely reduced spawning success. The smallest fish sampled was 9 inches.

Largemouth bass: The total electrofishing catch rate fell in 2006 with a catch rate of 94.0/hr (Figure 7). This is much lower than the catch rate observed in 2005 (147.0/hr) and lower than the district average of 126.0/hr. The size structure of the population continues to be average as indicated by a PSD value 42. Growth of largemouth bass in Arlington Reservoir remains near the district average (Figure 8). Body condition in 2006 was fair for most size classes of fish. Florida largemouth bass influence was high as Florida alleles were 53.0% in 2006 and Florida genotype was 7.0% (Table 5).

White crappie: The trap net catch rate of white crappie was 19.0/nh in 2006, which is the highest catch rate observed to date (Figure 9). The body condition of white crappie was excellent with most size classes well above 100. The size structure of the population is good as indicated by a PSD value of 70.

Fisheries management plan for Arlington Reservoir, Texas

Prepared – July 2007.

ISSUE 1: The Texas Commission on Environmental Quality recently requested all power plant facilities to account for impingement of fish. A consulting firm was contracted and estimated impingement for Arlington Reservoir. Exelon will be required to mitigate for all loss of fish due to power plant operations.

MANAGEMENT STRATEGY

1. Work with Exelon and the city of Arlington in developing mitigation projects designed to improve fishery habitat in Arlington Reservoir.

SAMPLING SCHEDULE JUSTIFICATION

General monitoring of other sport fish species with gill netting, electrofisher, and trap netting will be conducted in every 4 years.

LITERATURE CITED

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- Hungerford, T and R. Brock. 2003. Statewide freshwater fisheries monitoring and management program survey report for Arlington Reservoir, 2002. 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.

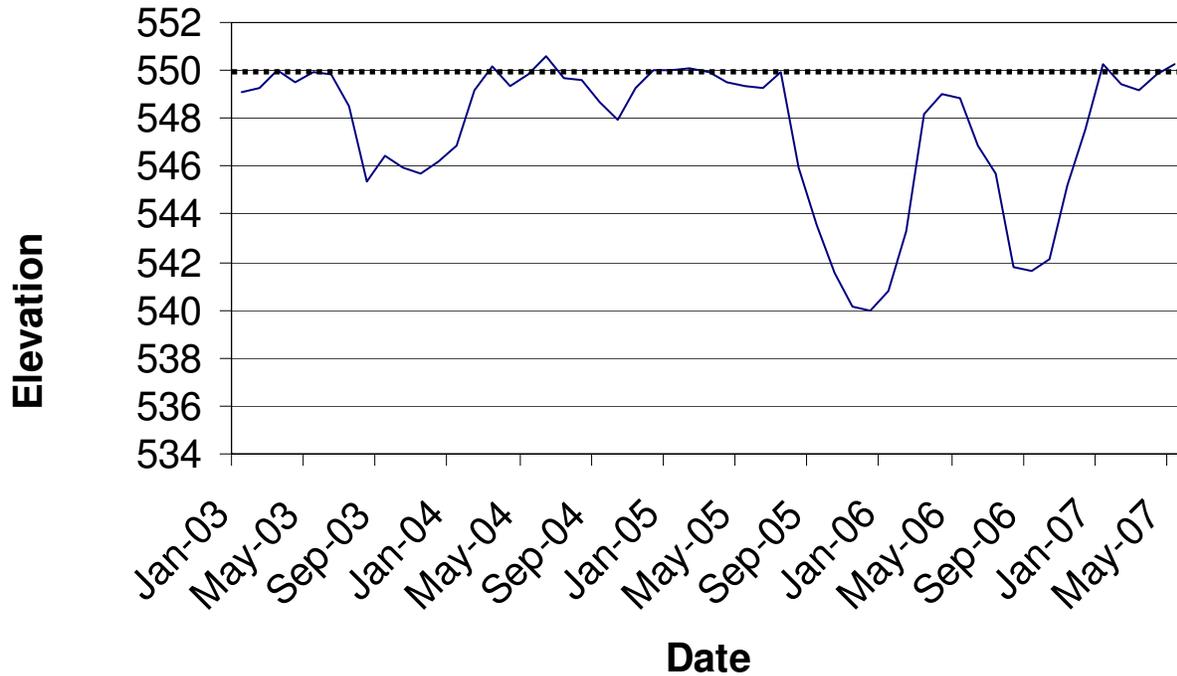


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Arlington Reservoir, Texas from January 2001-May 2007. Conservation pool is 550 feet above MSL and is indicated by the dashed line. Data provided by United States Geological Survey in cooperation with the city of Arlington.

Table 1. Characteristics of Arlington Reservoir, Texas.

Characteristic	Description
Year Constructed	1957
Controlling authority	City of Arlington
Counties	Tarrant
Reservoir type	Tributary of Trinity River
Conductivity	252 umhos/cm

Table 2. Harvest regulations for Arlington 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 Arlington 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)
Channel catfish	1970	13,450	AFGL	7.9
	1972	5,026	AFGL	7.9
	1997	1,000	ADL	16.1
	1998	1,500	ADL	13.1
	Total	20,976		
Florida largemouth bass	1978	9,900	FGL	2.0
	1992	114,078	FGL	1.2
	1997	115,321	FGL	1.2
	2002	115,750	FGL	1.6
	Total	355,049		
Largemouth bass	1967	10,000	UNK	UNK
	1971	75,000	UNK	UNK
	Total	85,000		
Palmetto bass (striped X white bass hybrid)	1978	11,947	UNK	UNK
	1980	22,500	UNK	UNK
	1982	21,000	UNK	UNK
	1984	46,605	FGL	2.0
	1985	45,000	FGL	2.0
	1986	44,000	FRY	1.0
	1987	45,450	FRY	1.0
	1988	51,300	FRY	1.0
	1989	49,700	FGL	1.6
	1991	41,200	FRY	1.0
	1992	21,800	FGL	1.3
	1994	34,506	FGL	1.3
	1995	38,400	FGL	1.2
	1996	35,800	FGL	1.4
	1997	30,000	FGL	1.8
	1998	35,218	FGL	1.1
	1999	11,526	FGL	1.5
	2002	11,379	FGL	1.5
2003	19,390	FGL	1.5	
Total	616,721			
Walleye	1975	50,000	FRY	0.2
	1976	500,000	FRY	0.2
	Total	550,000		

Table 4. Survey of littoral zone and physical habitat types, Arlington Reservoir, Texas, 2006. 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
Rock and gravel	2.9	15.0		
Concrete	0.3	1.5		
Rip rap	2.0	10.3		
Bulkhead	0.3	1.5		
Standing timber	0.7	3.6	7.0	0.4
Boat docks, piers	1.2	6.2		
Nondescript	12.0	61.9		

Gizzard Shad

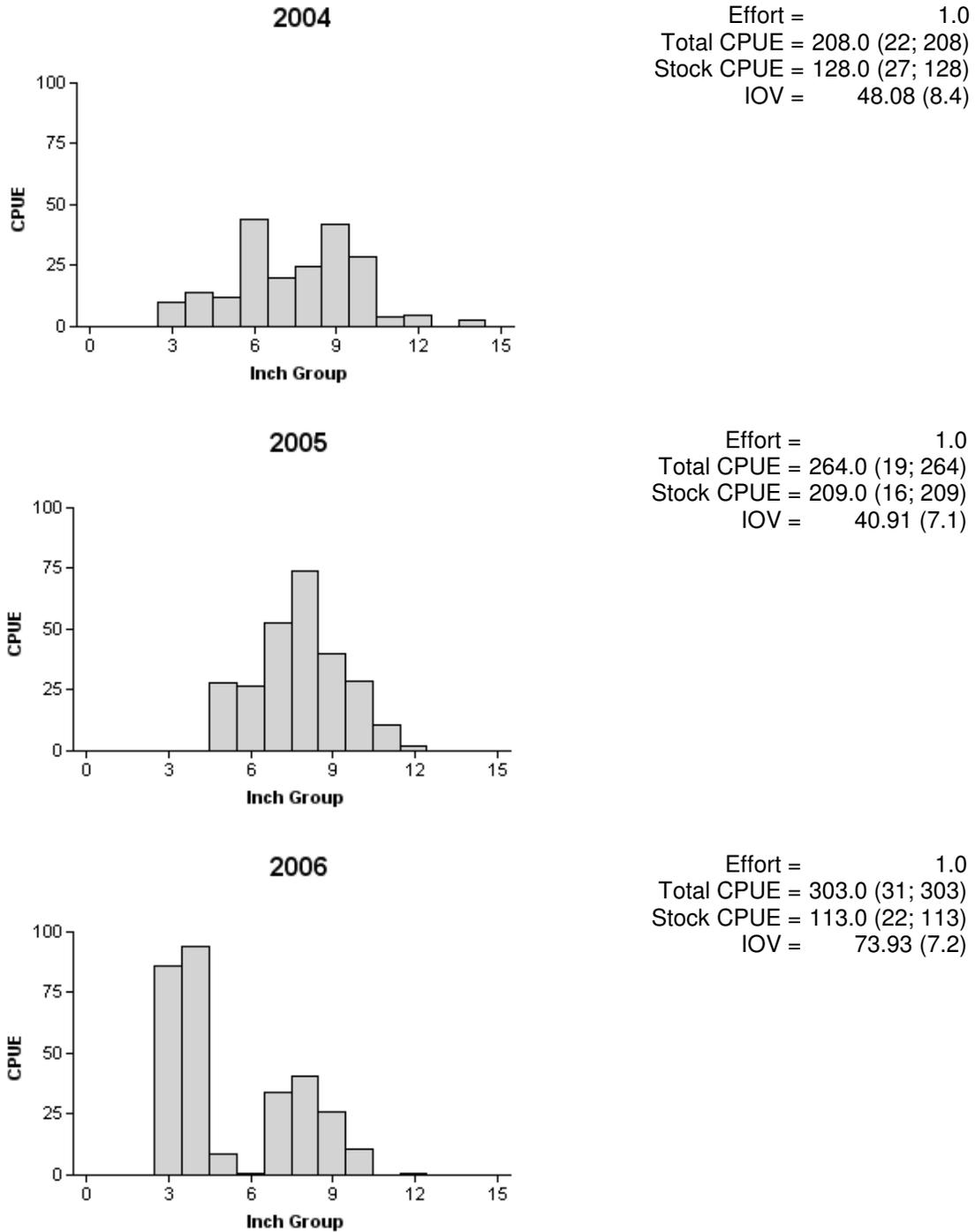


Figure 2. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Arlington Reservoir, Texas, 2004-2006.

Bluegill

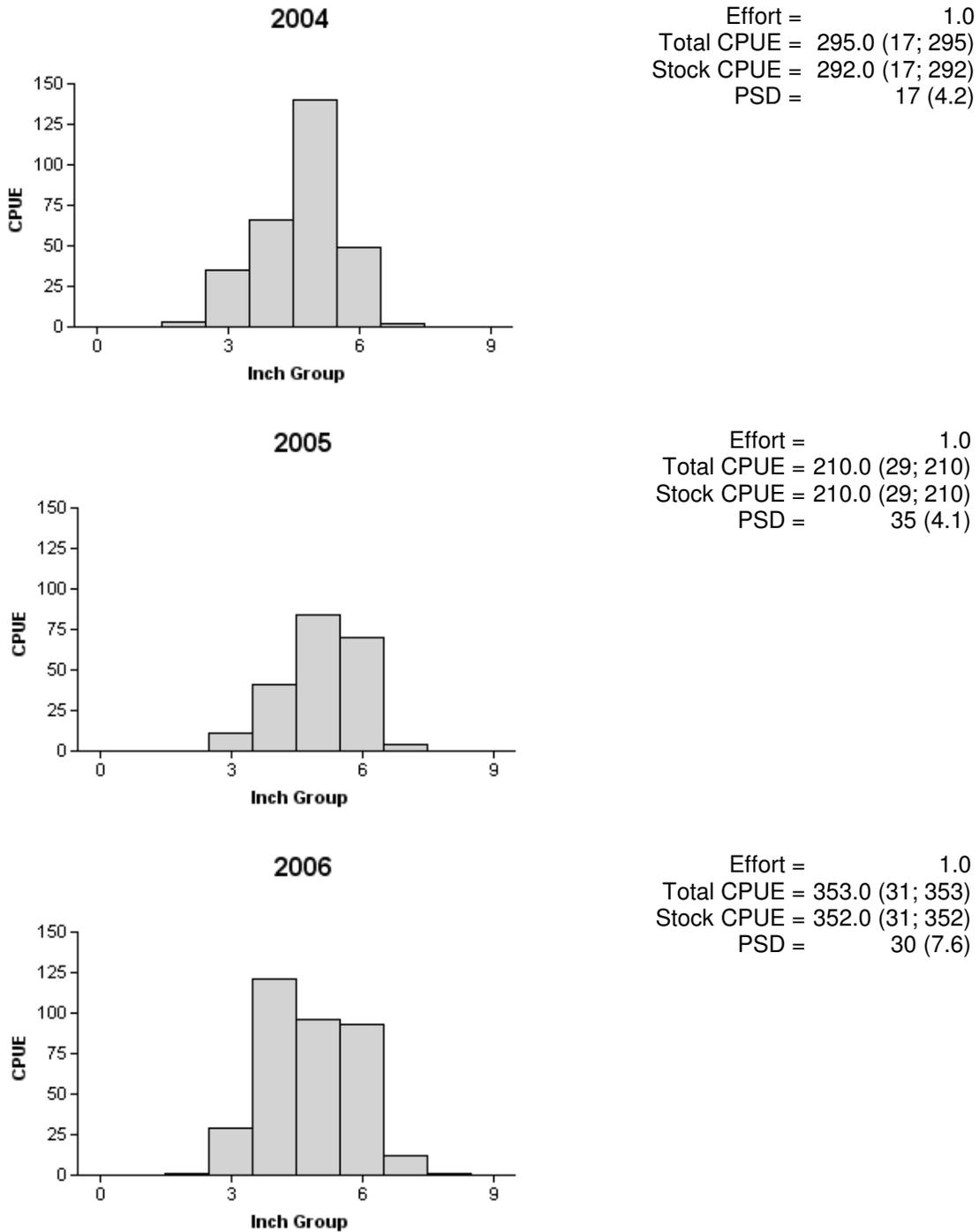
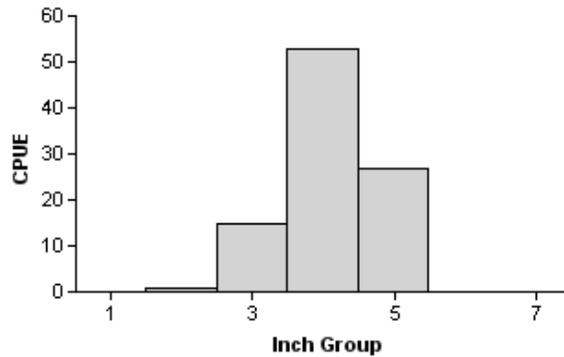


Figure 3. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Arlington Reservoir, Texas, 2004-2006.

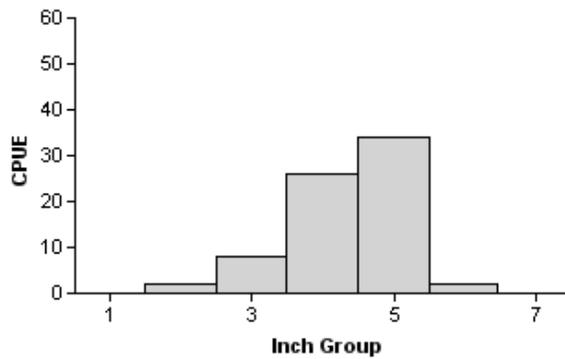
Longear Sunfish

2004



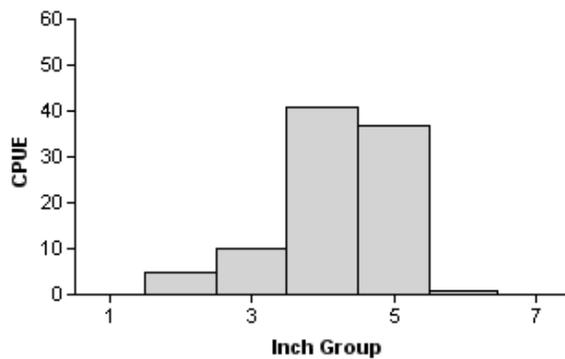
Effort = 1.0
 Total CPUE = 96.0 (30; 96)
 Stock CPUE = 96.0 (30; 96)

2005



Effort = 1.0
 Total CPUE = 72.0 (35; 72)
 Stock CPUE = 72.0 (35; 72)

2006

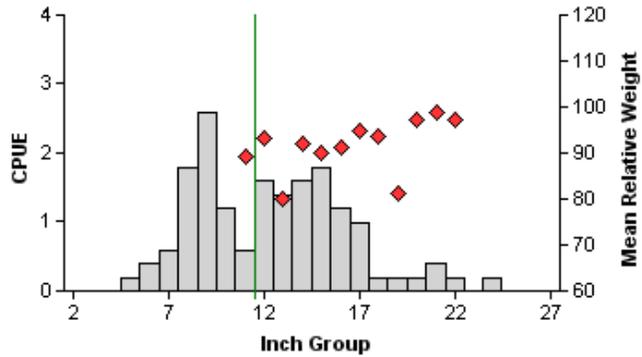


Effort = 1.0
 Total CPUE = 94.0 (34; 94)
 Stock CPUE = 94.0 (34; 94)

Figure 4. Number of longear 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, Arlington Reservoir, Texas, 2004-2006.

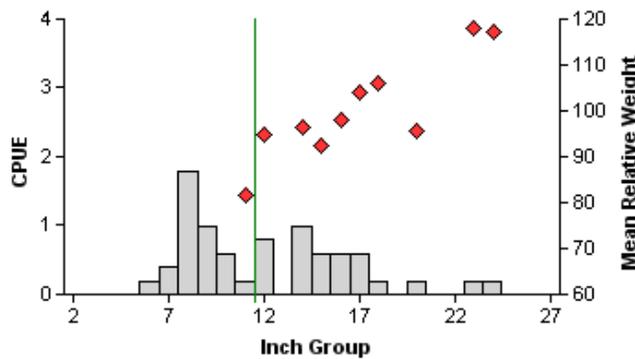
Channel Catfish

2001



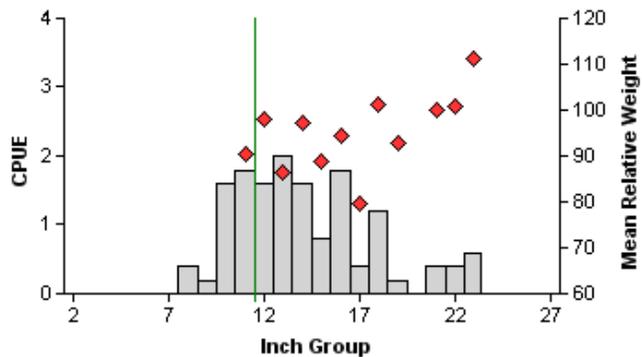
Effort = 5.0
 Total CPUE = 17.4 (28; 87)
 Stock CPUE = 10.6 (30; 53)
 PSD = 34 (3.7)
 RSD-12 = 94 (5)

2003



Effort = 5.0
 Total CPUE = 8.6 (38; 43)
 Stock CPUE = 4.6 (33; 23)
 PSD = 43 (11.0)
 RSD-12 = 96 (4.7)

2007



Effort = 5.0
 Total CPUE = 15.0 (29; 75)
 Stock CPUE = 12.8 (29; 64)
 PSD = 39 (1.8)
 RSD-12 = 86 (3.7)

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 net surveys, Arlington Reservoir, Texas, 2001, 2003, and 2007. Vertical line represents length limit at time of sampling.

White Bass

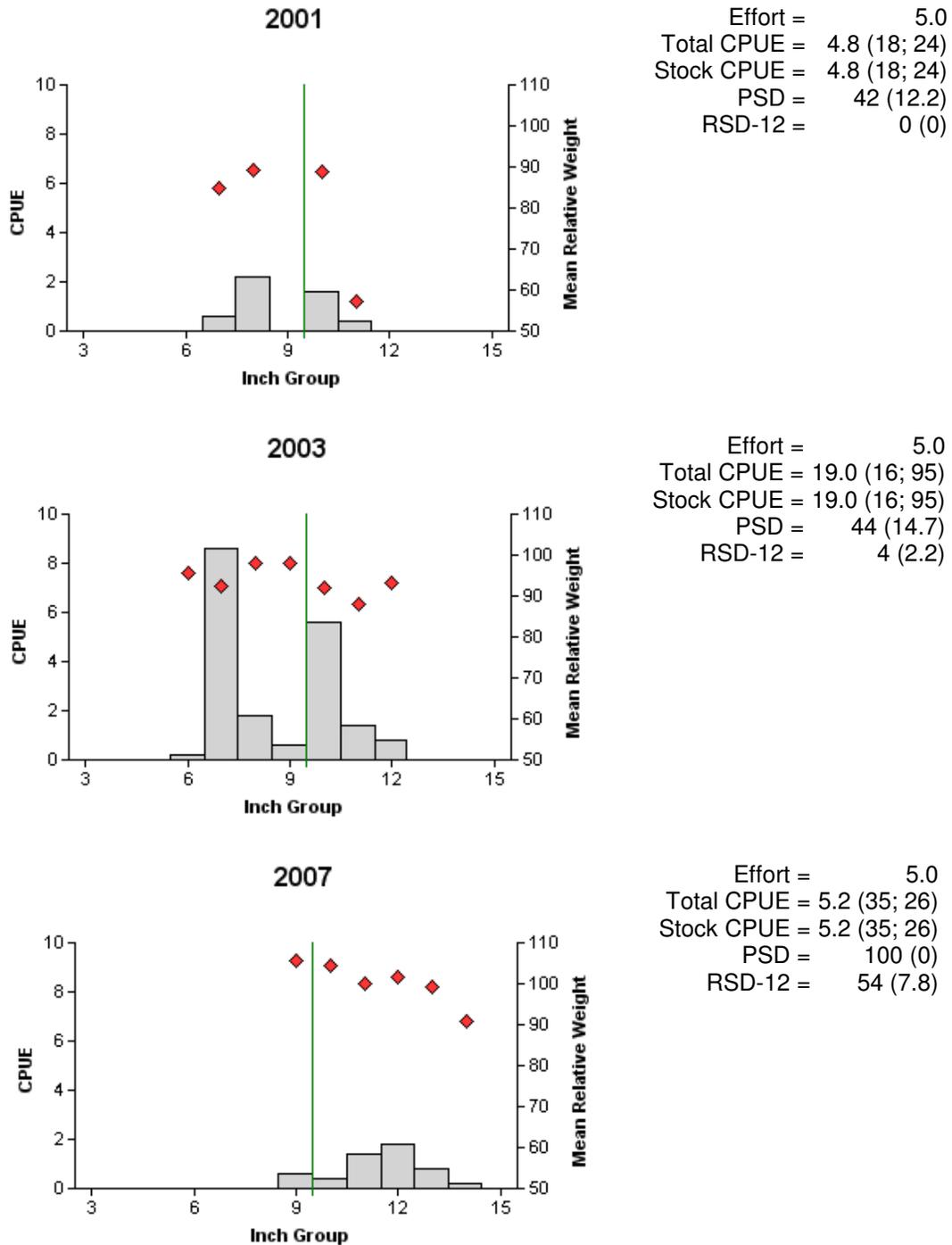


Figure 6. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Arlington Reservoir, Texas, 2001, 2003, and 2007. Vertical line represents length limit at time of sampling.

Largemouth Bass

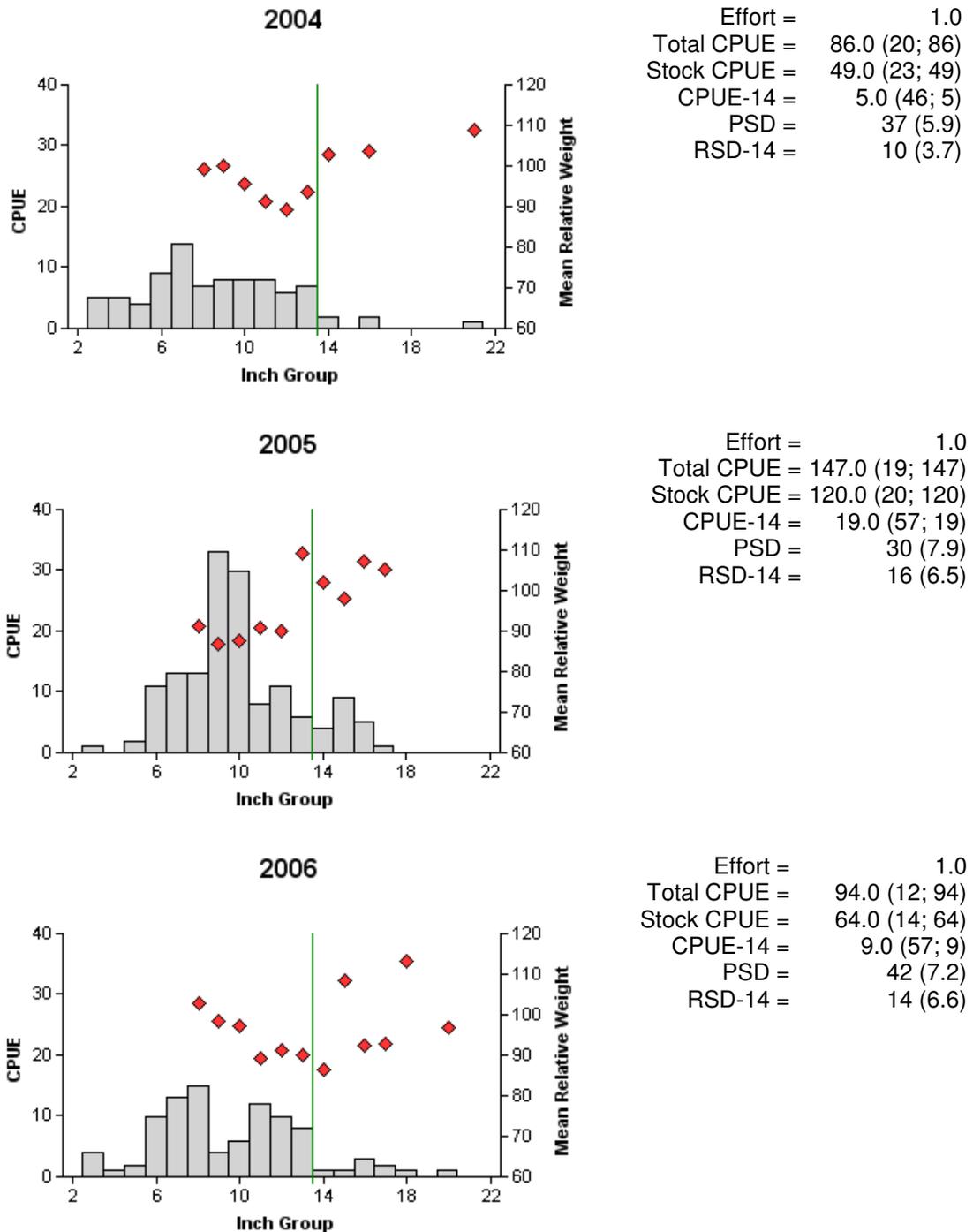


Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Arlington Reservoir, Texas, 2004-2006. Vertical lines represent length limit at time of sampling.

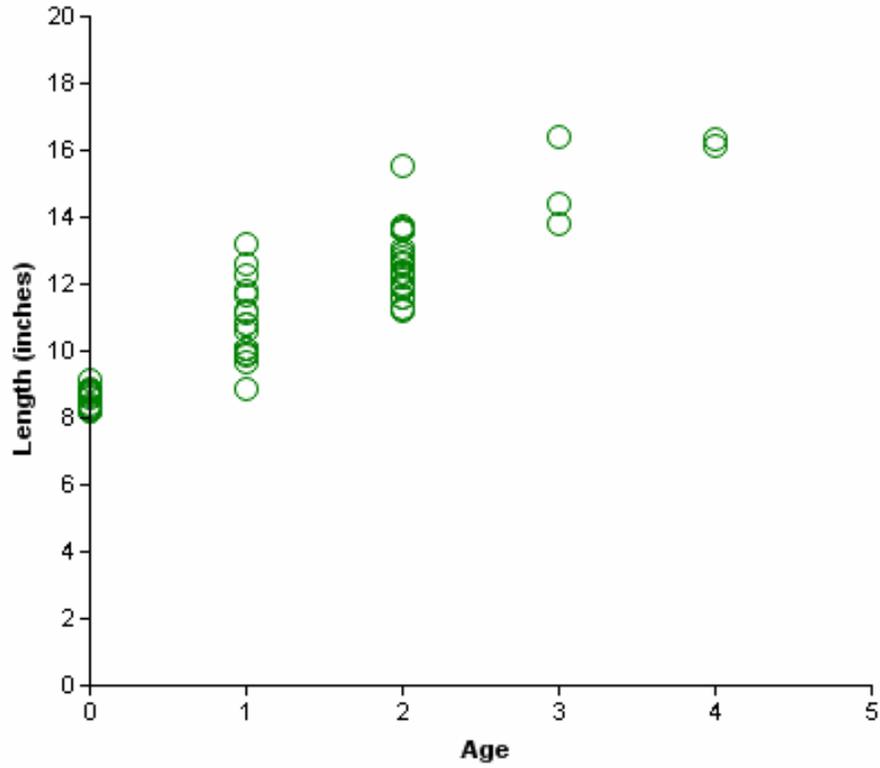


Figure 8. Length at age for largemouth bass (sexes combined) collected from electrofishing at Arlington Reservoir, Texas, for fall 2006 (N=64).

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Arlington Reservoir, Texas, 2002 and 2006. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, Fx = second or higher generation hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype			% FLMB alleles
		% FLMB	% NLMB	% Fx	
2002	28	4	7	57	71.6
2006	40	7	7	86	53.0

White Crappie

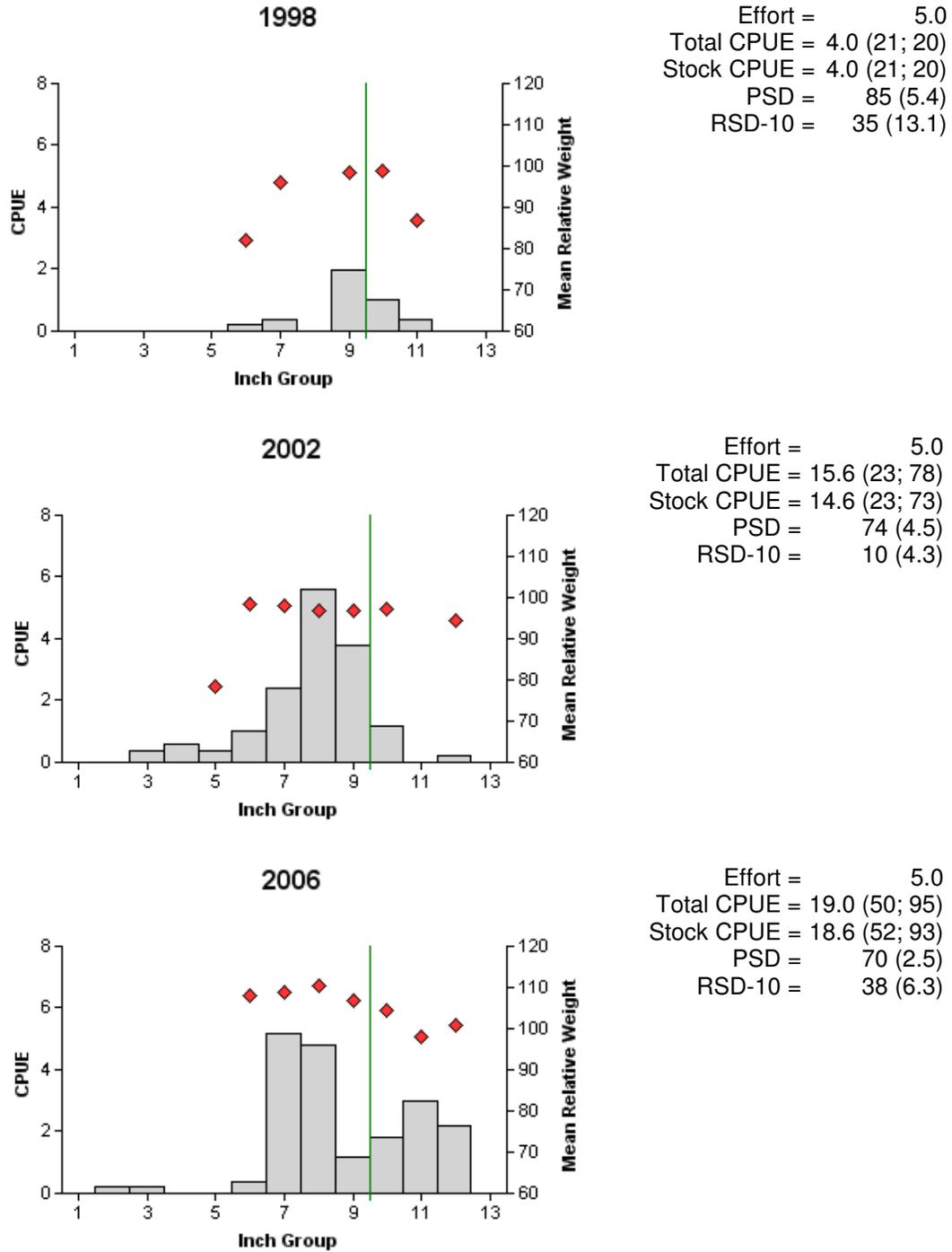


Figure 9. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Arlington Reservoir, Texas, 1998, 2002, and 2006. Vertical line represents length limit at time of sampling.

Table 6. Proposed sampling schedule for Arlington 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.

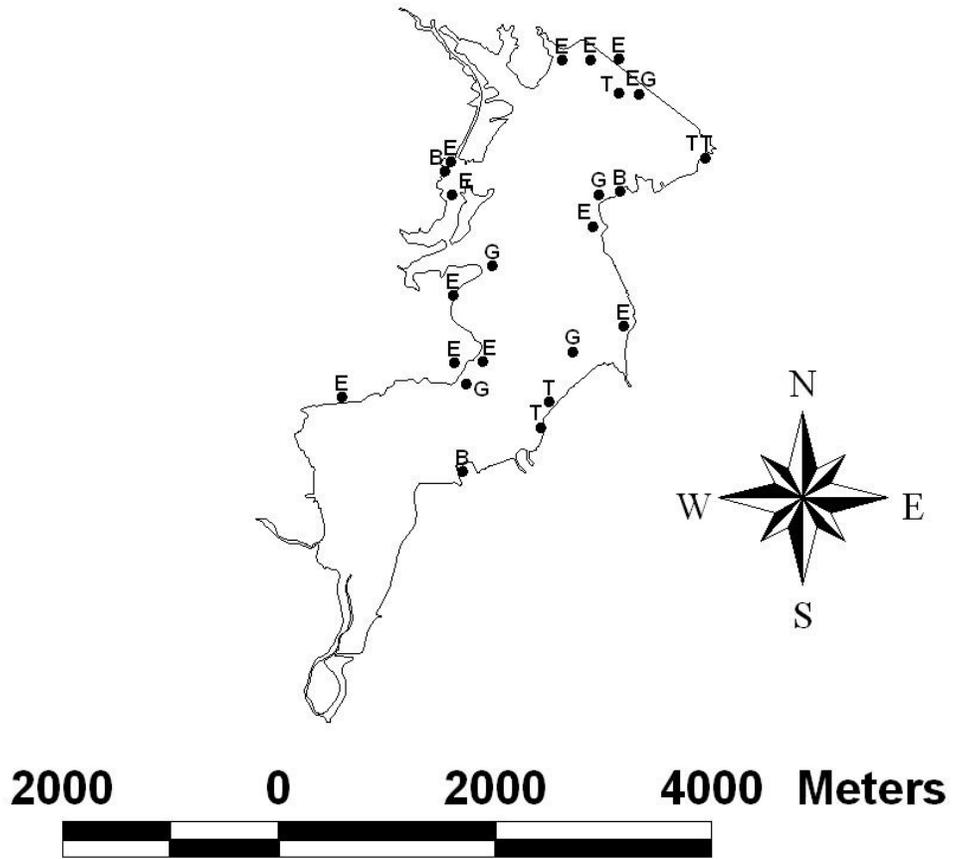
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2007-Spring 2008					
Fall 2008-Spring 2009					
Fall 2009-Spring 2010					
Fall 2010-Spring 2011	S	S	S		S

APPENDIX A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	202	40.4			303	303.0
Threadfin shad					528	528.0
Channel catfish	45	15.0				
Flathead catfish	1	0.2				
White bass	26	5.2				
Bluegill	4	0.8			353	353.0
Longear sunfish					94	94.0
Largemouth bass					94	94.0
White crappie			95	19.0		

APPENDIX B



Location of sampling sites, Arlington Reservoir, Texas, 2006-2007. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.