

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

**Eagle Mountain Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Eagle Mountain Reservoir were surveyed in 2008 using electrofishing and trap nets and in 2009 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:** Eagle Mountain Reservoir is an 8,504-acre impoundment constructed on the West Fork Trinity River by the Tarrant Regional Water District (TRWD) in 1932 for municipal and industrial purposes. The reservoir is located in northwest Fort Worth. A TXU Energy steam electric generating plant uses reservoir water for cooling. Operations at the electric plant have decreased in recent years. The reservoir is approximately 10 miles long and 3.5 miles wide (widest point), drains 1,970 square miles of watershed and has 200 miles of shoreline. Conservation pool elevation is 649 feet mean-sea-level and storage capacity is 19,460 acre-feet. Angler and boat access is fairly limited. The Texas Parks and Wildlife Department sold a tract of land that was proposed to be developed into a state park on the reservoir to the TRWD in 2008. TRWD has developed some hiking and biking trails but no angler access was incorporated. There is one handicap fishing pier on the reservoir. Fishery habitat consisted primarily of natural banks, rocky shorelines, and boat docks.
- **Management history:** Important sport fish include largemouth bass, crappies, white bass, and blue and channel catfish. All species are managed with statewide regulations. The reservoir has a population of large blue catfish. Florida largemouth bass were stocked in 2006 and 2007.
- **Fish Community**
  - **Prey species:** Gizzard and threadfin shad are in great abundance in the reservoir. Bluegill and longear sunfish are also abundant as prey. Some bluegill over 6 inches are available for anglers.
  - **Catfishes:** The blue catfish population continues to increase and produces some large individuals. The relative abundance of channel catfish has also increased over the past three surveys. The size structure of channel catfish is excellent. Although present, no flathead catfish were sampled during 2009 gill netting.
  - **White bass:** White bass catch rates increased greatly from the previous two surveys.
  - **Black basses:** The spotted bass population has increased since the last survey and the size structure continues to improve. The largemouth bass population has increased in abundance from the previous surveys, likely due to a major water level increase coupled with two stockings of Florida largemouth bass. Size distribution is skewed towards smaller fish.
  - **Crappies:** The white crappie population declined greatly over previous surveys. Black crappie relative abundance has remained low.
- **Management Strategies:** General monitoring with gill netting and trap netting will be conducted in 2012-2013, when the next report will be written. Electrofishing surveys will be conducted every year.

## INTRODUCTION

This document is a summary of fisheries data collected from Eagle Mountain Reservoir in 2008-2009. 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 fish was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2008-2009 data for comparison.

### *Reservoir Description*

Eagle Mountain Reservoir is an 8,504-acre impoundment constructed on the West Fork Trinity River by the Tarrant Regional Water District (TRWD) in 1932 for municipal and industrial purposes. The reservoir is located in northwest Fort Worth. A TXU Energy steam electric generating plant uses reservoir water for cooling. Operations at the electric plant have decreased in recent years. The reservoir is approximately 10 miles long and 3.5 miles wide (widest point), drains 1,970 square miles of watershed and has 200 miles of shoreline. Conservation pool elevation is 649 feet mean-sea-level and storage capacity is 19,460 acre-feet. Angler and boat access is fairly limited. The Texas Parks and Wildlife Department sold a tract of land that was proposed to be developed into a state park on the reservoir to the TRWD in 2008. TRWD has developed some hiking and biking trails but no angler access was incorporated in order to maintain the natural state of the area. TRWD plans to renovate the park at Twin Points during the fall of 2009. Plans include a two-lane boat ramp with parking for approximately 60 vehicles, a swimming beach, and RV camping. There is one handicap fishing pier on the reservoir. Fishery habitat consisted primarily of natural banks, rocky shorelines, and boat docks.

### *Management History*

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

Increase public access to the reservoir.

**Actions:** Contacted controlling authority regarding boat ramp construction on former TPWD property. TRWD did not have plans for a boat ramp in their development. Currently, a TRWD construction project is in the permitting stages at the Twin Points access point to include a two-lane boat ramp with parking for approximately 60 vehicles with trailers. There are also plans for short-term RV camping.

Eagle Mountain has adequate habitat and forage to support smallmouth bass. Continue requesting smallmouth bass stocking.

**Actions:** Smallmouth bass were requested, but none have been stocked since 1999. The existing waterbody record of 4.15 pounds was eclipsed by a 5.36 pound smallmouth weighed in a tournament in June of 2007 so a few fish remain from the previous stocking. Due to their limited availability, district staff decided to concentrate all smallmouth bass stocking efforts at Grapevine Reservoir.

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

**Stocking history:** The last stocking of Eagle Mountain Reservoir occurred in 2007 and consisted of

Florida largemouth bass. The complete stocking history is in Table 3.

**Vegetation/habitat history:** Eagle Mountain has limited aquatic vegetation and consists primarily of native emergent species such as lotus and cattail.

## METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations), trap netting (10 net nights at 10 stations), and gill netting (10 net nights at 10 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). In 2002, only 17 stations were sampled with electrofishing as the generator malfunctioned prior to completing the survey. All survey sites were randomly selected and all surveys were conducted 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 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 =  $100 \times \text{SE}$  of the estimate. Source for water level data was the United States Geological Survey website in conjunction with the Tarrant Regional Water District. The period of October 2008 through April 2009 is provisional.

## RESULTS AND DISCUSSION

**Habitat:** Littoral zone habitat consisted primarily of natural banks, rocky shorelines, and boat docks with small stands of native shoreline emergent species of aquatic vegetation (Table 4).

**Prey species:** The electrofishing catch rate of threadfin shad of 633.3/hr was more than double the district average of 249.6/hr. The gizzard shad electrofishing catch rate of 506.0/hr (Figure 2) was well above the district average of 267.9/hr. It was higher than the 2004 survey of 437.3/hr. Index of vulnerability for gizzard shad was good, indicating that 81% of gizzard shad captured in 2008 were available to existing predators. The electrofishing catch rate of bluegill was 267.3/hr (Figure 3). The bluegill population does not contain large numbers of quality sized fish (>6 inches), however, PSD values have increased from 4 in 2004 to 22 in 2008. The longear sunfish catch rate observed in 2008 (219.3/hr) was much higher than rates observed in 2002 and 2004 and above the district average of 95.4/hr (Figure 4).

**Catfishes:** The gill netting catch rate of blue catfish in 2009 of 10.3/nn was well above the district average of 2.3/nn and similar to the catch rate observed in 2005 (7.9/nn; Figure 5). Size structure of the blue catfish population was good as indicated by a PSD value of 34 and a CPUE-30 of 0.5/nn observed in 2009.

The gill netting catch rate of channel catfish was 9.3 /nn in 2009 which was higher than the previous samples (2.3/nn in 2001, 6.5/nn in 2005; Figure 6). The 2009 catch rate was above the district average 5.7/nn and size structure increased slightly as indicated by a PSD value of 38. Unlike other district reservoirs, Eagle Mountain has exhibited a positive correlation between blue catfish and channel catfish increased abundances.

**White bass:** The gill netting catch rates of white bass have historically been quite variable. The 2009 gill netting survey produced a catch rate of 25.0/nn (Figure 7) which is well above the district average of 8.0/nn. Size structure of the population was dominated by larger fish as indicated by a PSD value of 98 and 60% percent of the sample was over 12 inches. Mean relative weights remained optimal for nearly all inch groups.

**Black basses:** The total electrofishing catch rate of spotted bass in 2008 of 31.3/hr was higher than the catch rate observed in 2004 and slightly lower than the district average of 32.8/hr (Figure 8). Size structure of the spotted bass population was fair as indicated by a PSD value of 34. Spotted bass were generally in good condition with mean relative weights between 95 and 110.

The total electrofishing catch rate of largemouth bass has steadily increased since 2002 (64.9/hr) with a catch rate of 142.0/hr in 2008 (Figure 9). This is higher than the catch rate observed in 2004 (116.0/hr) and higher than the district average of 131.8/hr. The size structure of the population continues to be below average as indicated by a PSD value of 25, dominated by juvenile fish possibly from a stocking of Florida largemouth bass followed by a major increase in water levels lasting throughout the summer in 2007. Mean relative weights in 2008 varied from near 90 for fish up to 15 inches and above 100 for fish over 15 inches. The 2004 Florida allele percentage was 29.2% (Hungerford and Brock 2004).

**Crappies:** The trap netting catch rate of white crappie was 0.9/nn in 2008, which is well below to the district average of 16.9/nn and lower than previous surveys (Figure 10). The size structure of the population is solely comprised of adults as indicated by a PSD value of 100.

The black crappie trap netting catch rate was 1.6/nn in 2008, which is lower than the 2004 survey (2.2/nn; Figure 11).

### **Fisheries management plan for Eagle Mountain Reservoir, Texas**

Prepared – July 2009

**ISSUE 1:** Eagle Mountain Reservoir is a very popular tournament venue for bass tournament circuits operating in the Dallas/Fort Worth Metroplex. In 2008, a large circuit had their championship there with \$30,000 going to the winners. With the attention these tournaments draw on the bass population, more current data are justified.

#### MANAGEMENT STRATEGIES

1. Conduct annual fall electrofishing surveys to monitor largemouth and spotted bass relative abundance, size structure, and population indices.
2. Conduct annual spring bass-only electrofishing to compare to fall surveys.
3. Conduct a tier-3 age and growth sample in 2011.

**ISSUE 2:** Eagle Mountain Reservoir has excellent populations of both blue and channel catfish.

#### MANAGEMENT STRATEGY

1. Promote the catfish fisheries at Eagle Mountain through news releases and updated information regarding their quality on reservoir website.

#### **SAMPLING SCHEDULE JUSTIFICATION**

General monitoring of sport fish species with trap netting and gill netting will be conducted every 4 years, while fall electrofishing surveys will be conducted annually.

## 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, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.

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.

Hungerford, T. and R. Brock. 2004. Statewide freshwater fisheries monitoring and management program survey report for Eagle Mountain Reservoir, 2004. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

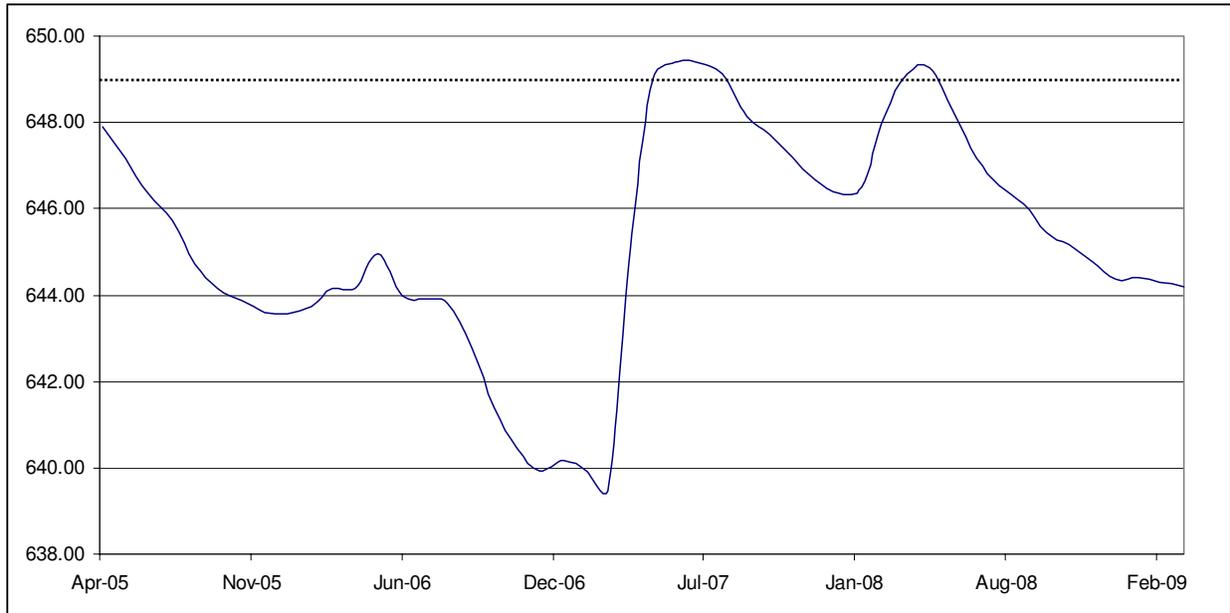


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Eagle Mountain Reservoir, Texas from May 2005-April 2009. Dashed line indicates conservation pool (649 feet above MSL).

Table 1. Characteristics of Eagle Mountain Reservoir, Texas.

Characteristic	Description
Year Constructed	1932
Controlling authority	Tarrant Regional Water District
Counties	Tarrant and Wise
Reservoir type	Mainstream Trinity River
Conductivity	352 umhos/cm

Table 2. Harvest regulations for Eagle Mountain Reservoir, Texas.

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: spotted	5 In any combination	none
Bass: largemouth and smallmouth		14 - minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - minimum

Table 3. Stocking history of Eagle Mountain, 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	1991	92,14	FGL	2.1
	Total	92,14		
Channel catfish	1969	48,00	AFGL	7.9
	1970	60,00	AFGL	7.9
	1971	10,96	AFGL	7.9
	1972	9,00	AFGL	7.9
	1973	20	UNK	UNK
	1979	10,09	AFGL	7.9
	Total	138,25		
Florida largemouth bass	1988	333,14	FRY	1.0
	1993	373,64	FGL	1.0
	1994	148,62	FGL	1.1
	2000	232,42	FGL	1.1
	2006	425,66	FGL	1.6
	2007	426,96	FGL	1.5
	Total	1,940,46		
Green sunfish x redear sunfish	1970	8,00		UNK
	Total	8,00		
Largemouth bass	1969	300,00	UNK	UNK
	1971	100,00	UNK	UNK
	1978	27	UNK	UNK
	Total	400,27		
Mixed largemouth bass	1988	127,09		1.0
	Total	127,09		
Smallmouth bass	1978	84,80	UNK	UNK
	1979	34,46	UNK	UNK
	1980	1,20	UNK	UNK
	1999	197,90	FGL	1.5
	Total	318,36		
Threadfin shad	1984	2,98	AFGL	3.0
	Total	2,98		
Walleye	1973	1,400,00	FRY	0.2
	1974	3,100,09	FRY	0.2

<b>Species</b>	<b>Year</b>	<b>Numbe</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
	1975	<u>2,150,09</u>	FRY	0.2
	Total	<u>6,650,18</u>		
White crappie	1969	<u>20,00</u>	UNK	UNK
	Total	<u>20,00</u>		

Table 4. Survey of littoral zone and physical habitat types, Eagle Mountain Reservoir, Texas, 2008. 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
Boat dock + native emergent + natural	0.1	0.1		
Boat dock + natural	12.2	15.0		
Boat dock + rock bluff	0.2	0.2		
Boat dock + rocky shoreline	17.3	22.0		
Bulkhead	0.3	0.4		
Bulkhead + boat dock	12.5	15.4		
Natural + native emergent	3.8	4.7		
Natural + native emergent + flooded terrestrial	0.7	0.9		
Natural + standing timber	4.7	6.8		
Rock bluff	0.1	0.1		
Standing timber			14.3	0.2
Nondescript	27.3	33.9		

## Gizzard Shad

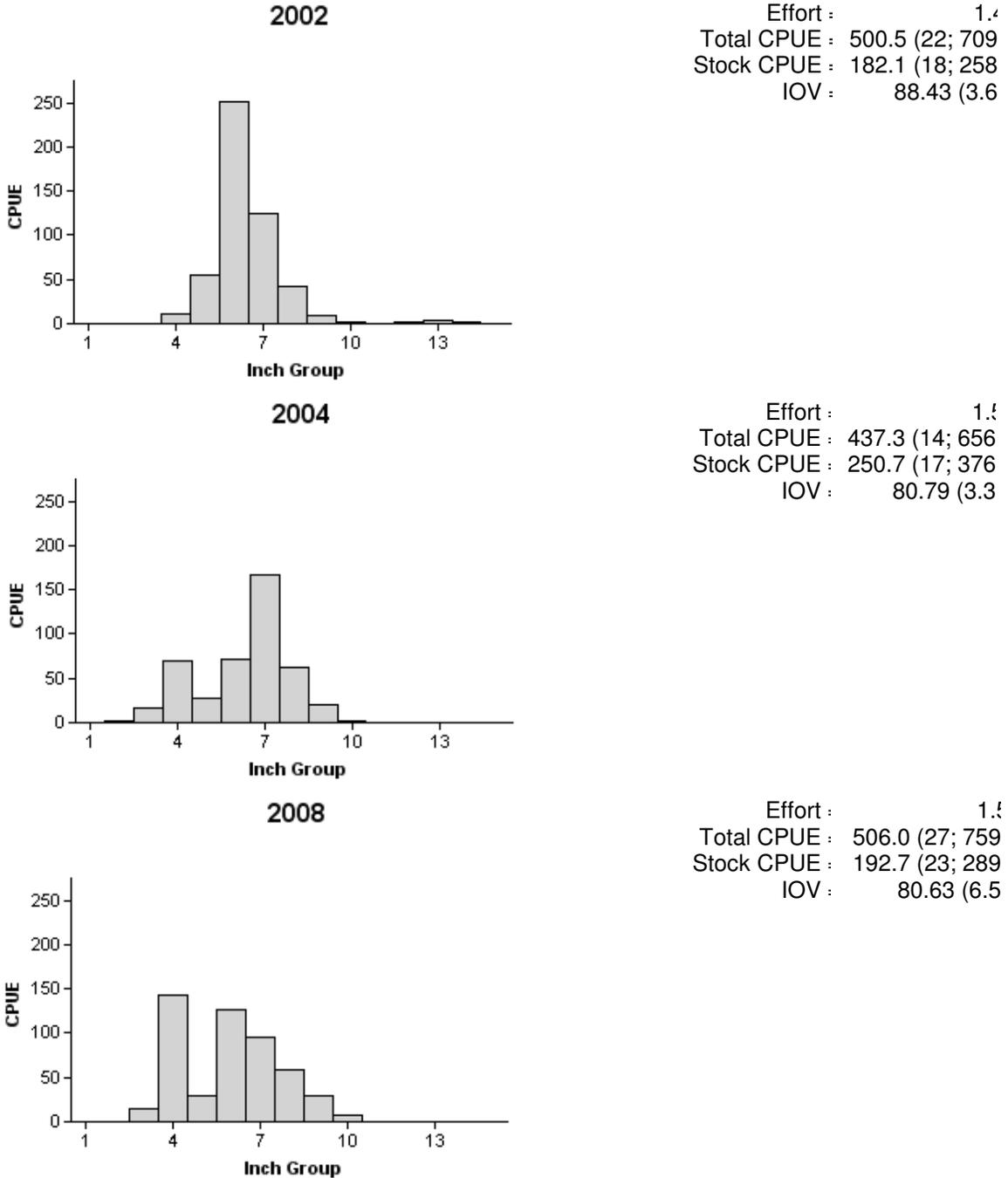
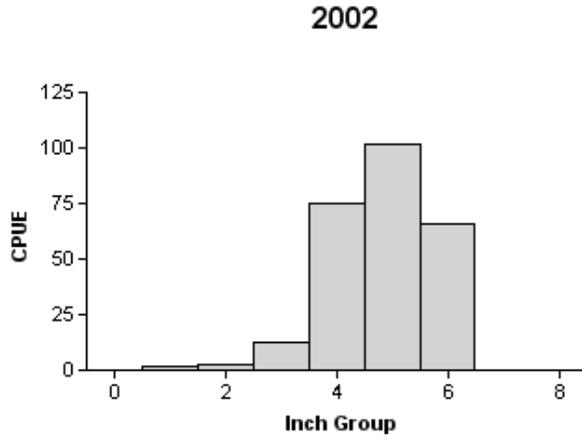
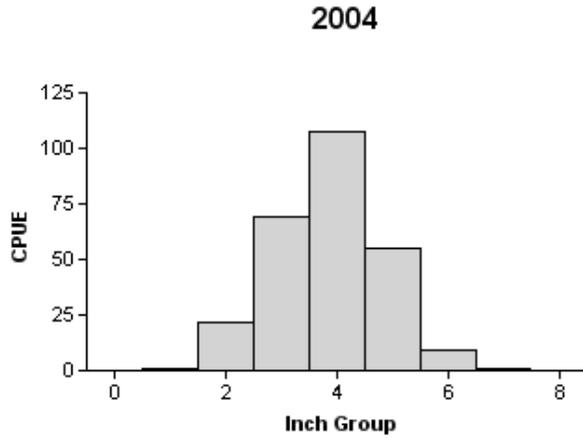


Figure 2. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Eagle Mountain Reservoir, Texas, 2002, 2004, and 2008.

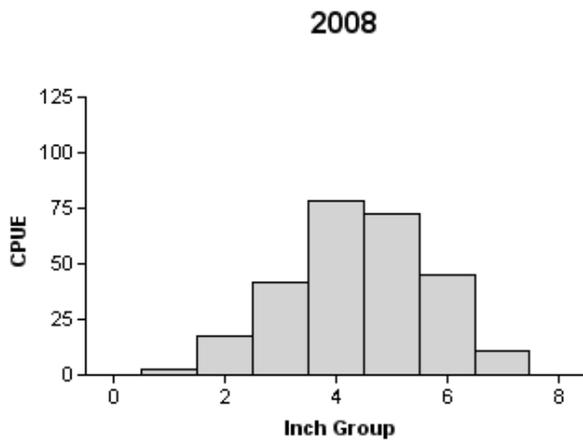
# Bluegill



Effort : 1.4  
 Total CPUE : 259.1 (26; 367)  
 Stock CPUE : 254.8 (27; 361)  
 PSD: 26(5)



Effort : 1.1  
 Total CPUE : 264.0 (17; 396)  
 Stock CPUE : 242.0 (17; 363)  
 PSD: 4(1.7)



Effort : 1.1  
 Total CPUE : 267.3 (21; 401)  
 Stock CPUE : 247.3 (22; 371)  
 PSD: 22(4.9)

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, Eagle Mountain Reservoir, Texas, 2002, 2004, and 2008.

## Longear Sunfish

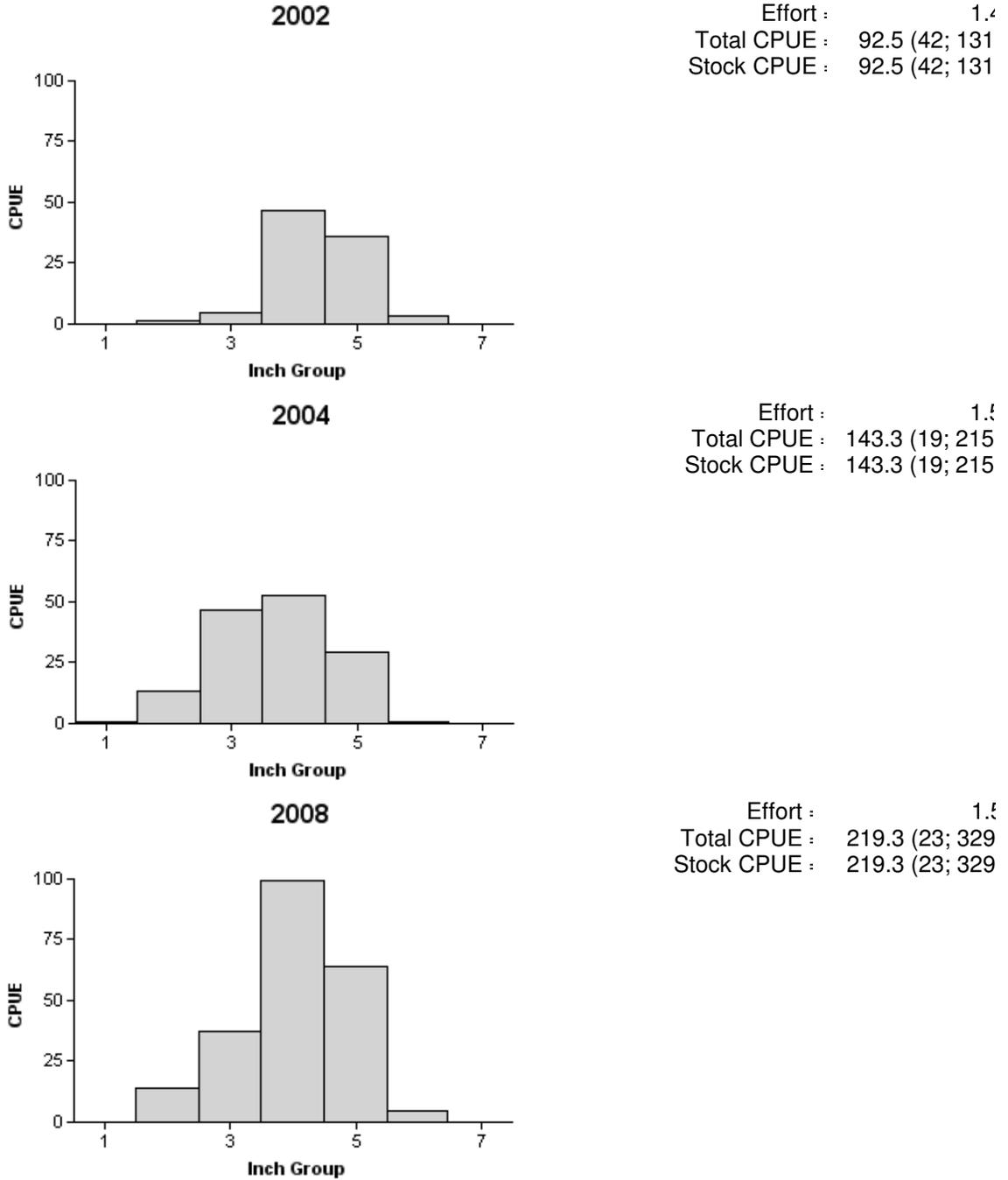


Figure 4. Number of longear sunfish caught per hour (CPUE; RSE and N for CPUE) for fall electrofishing surveys, Eagle Mountain Reservoir, Texas, 2002, 2004, and 2008.

# Blue Catfish

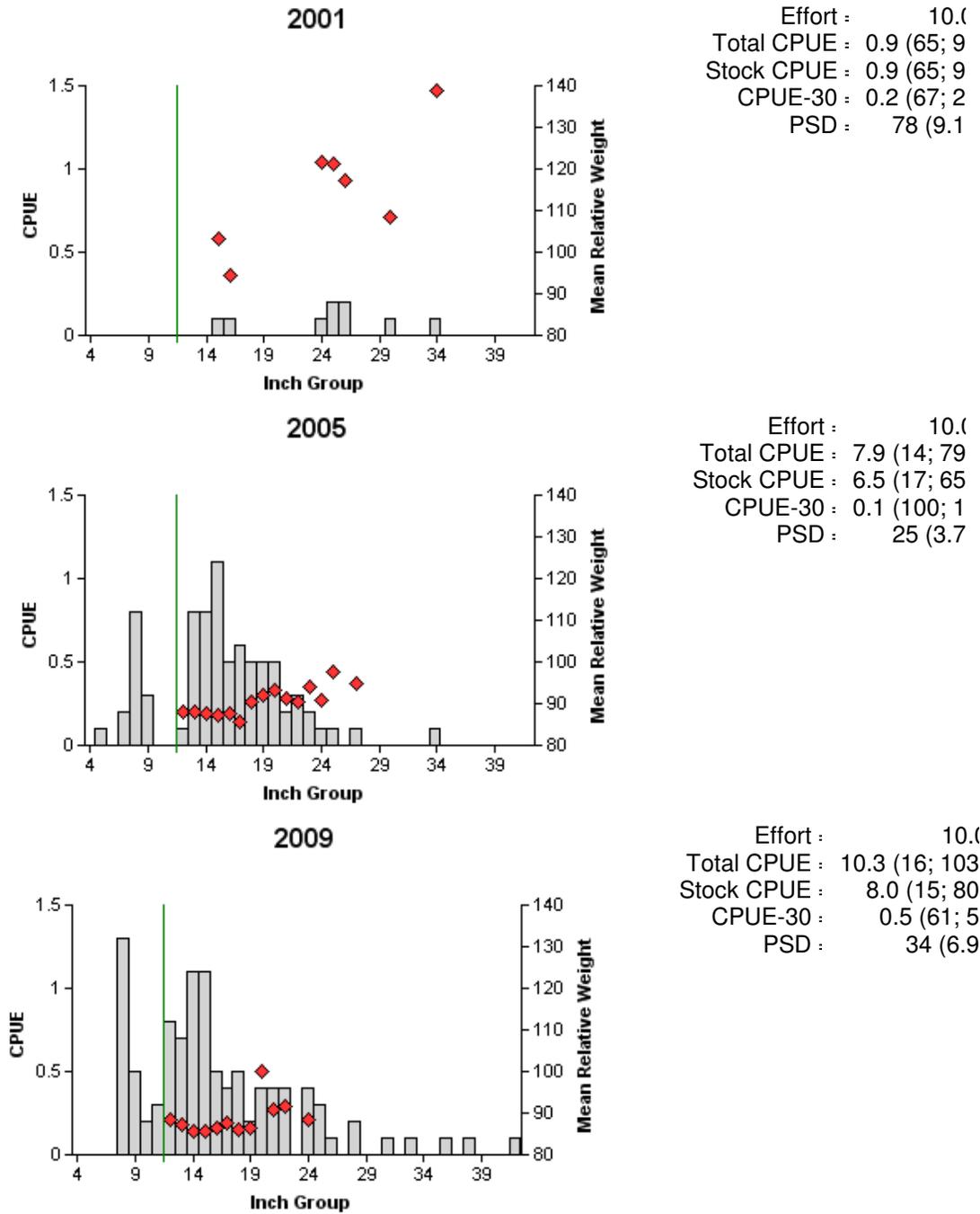


Figure 5. Number of blue catfish caught per net night (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Eagle Mountain Reservoir, Texas, 2001, 2005, and 2009. Vertical line represents length limit at time of sampling.

# Channel Catfish

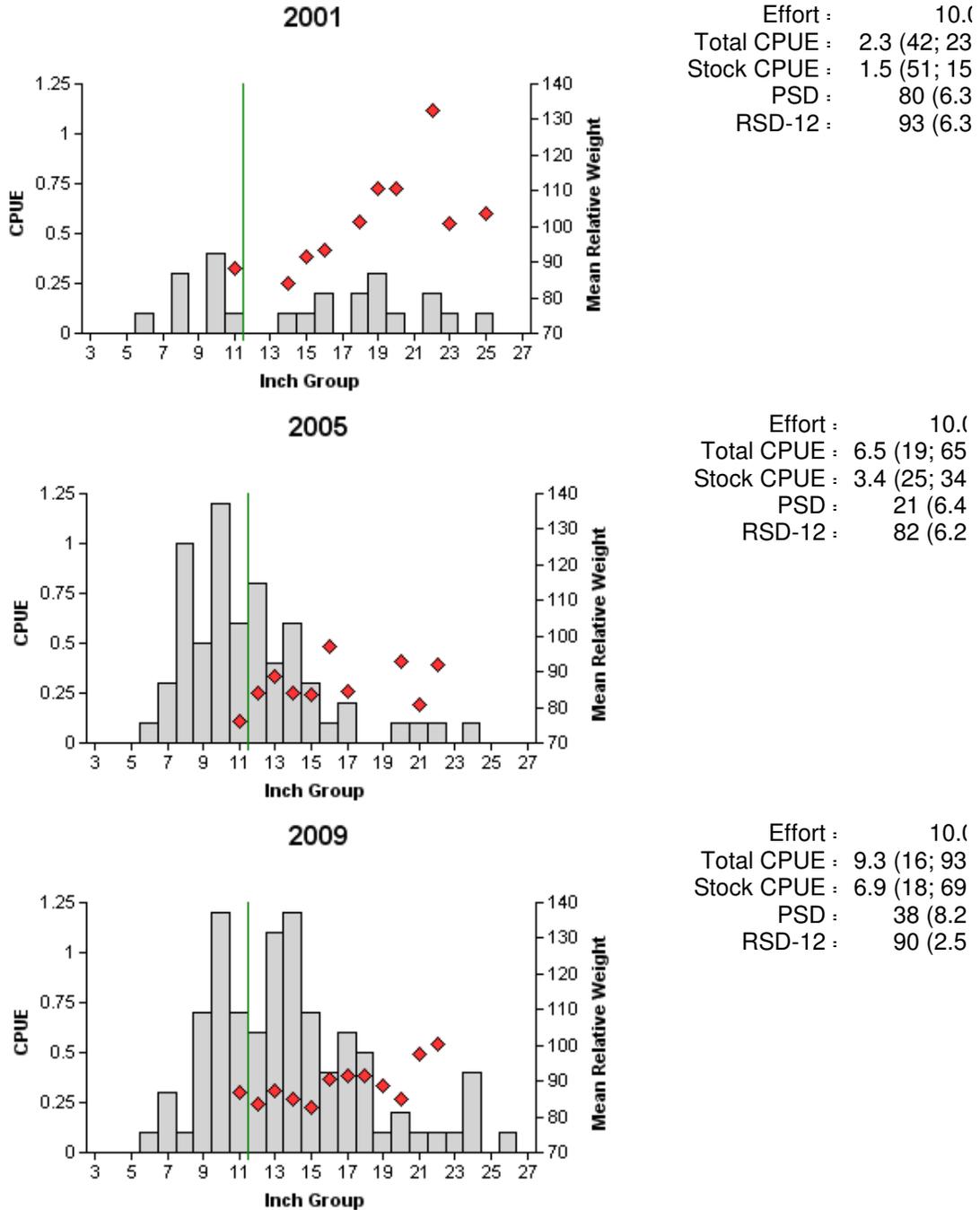


Figure 6. Number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Eagle Mountain Reservoir, Texas, 2001, 2005, and 2009. Vertical line represents length limit at time of sampling.

# White Bass

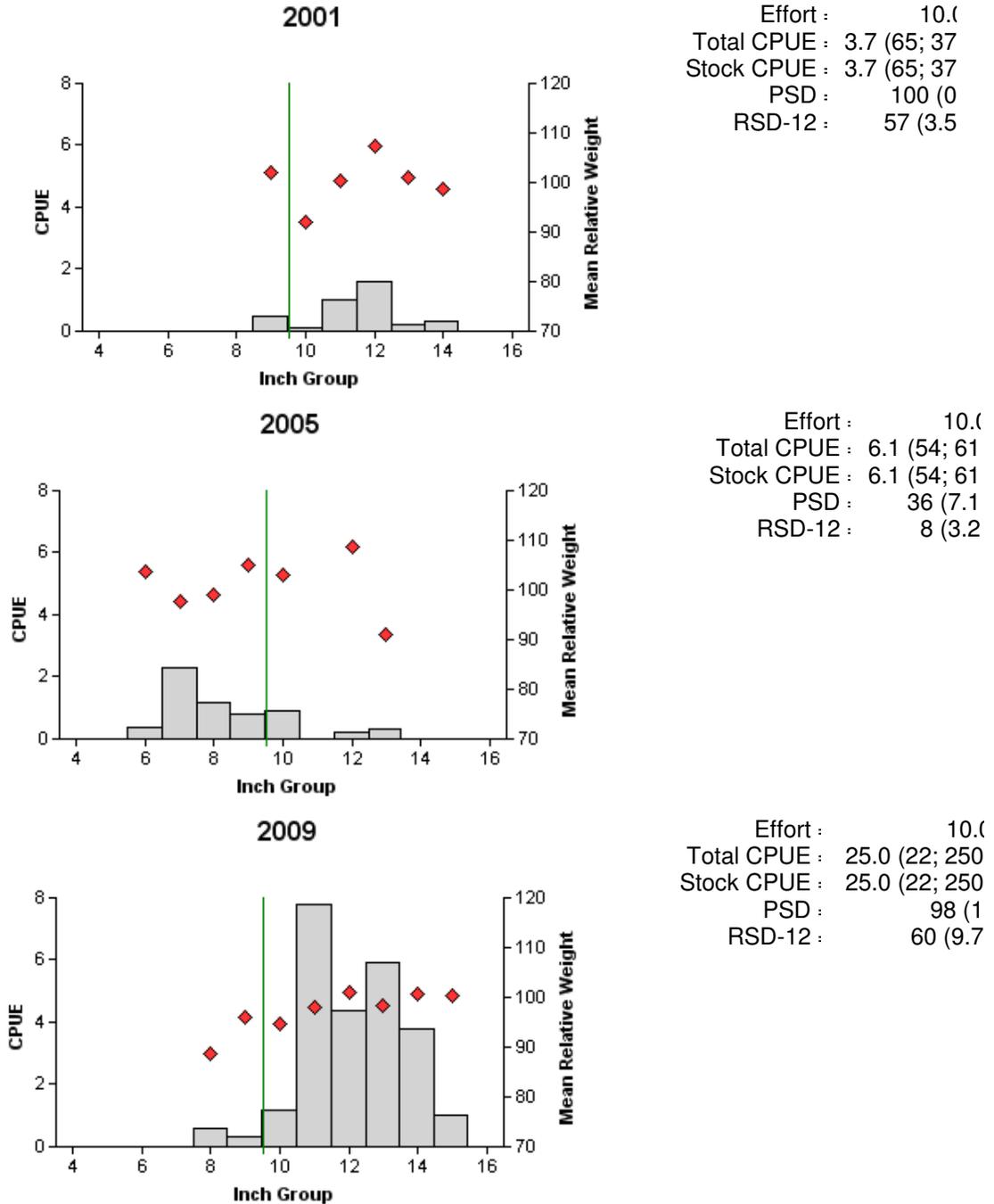


Figure 7. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Eagle Mountain Reservoir, Texas, 2001, 2005, and 2009. Vertical line represents length limit at time of sampling.

## Spotted Bass

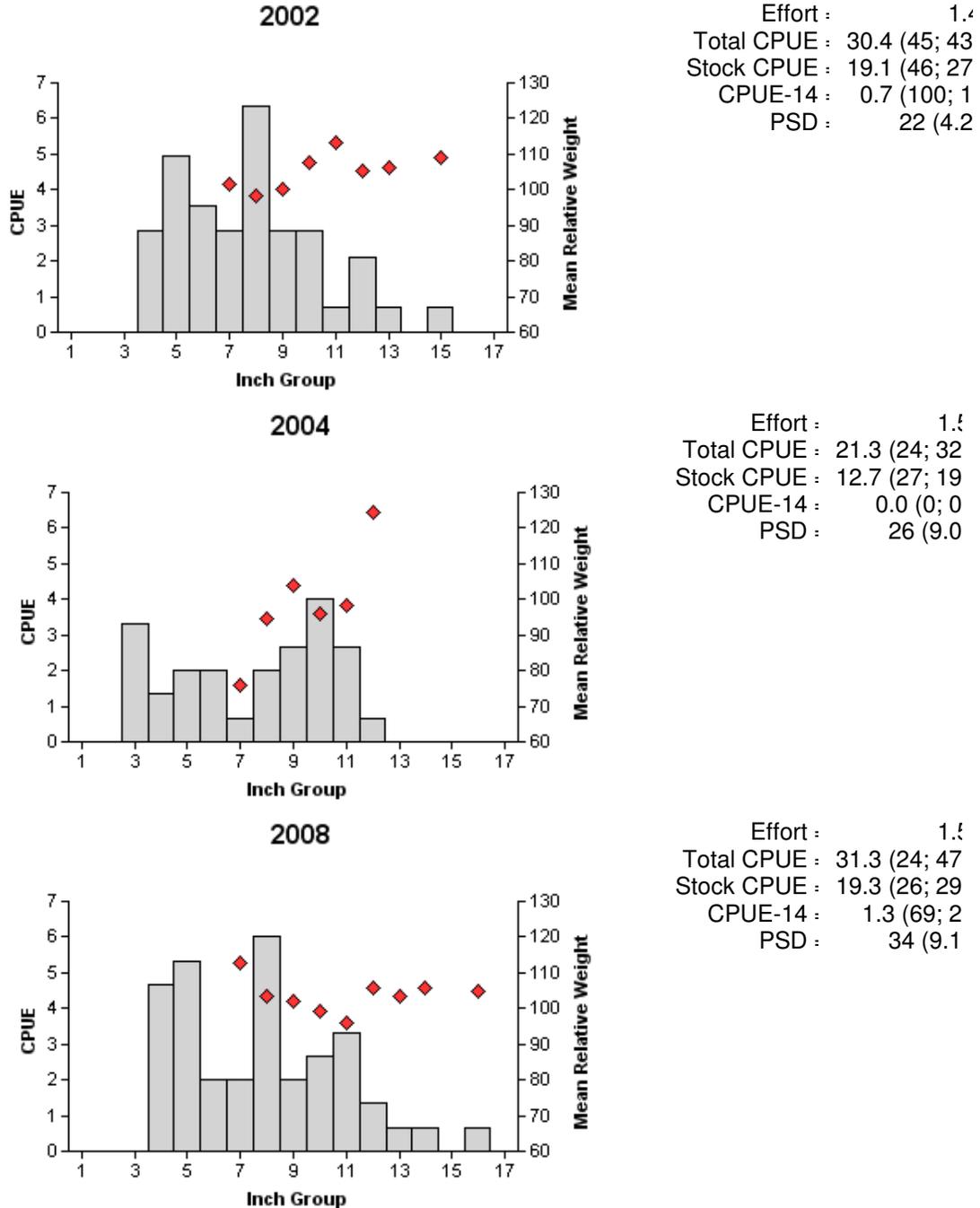


Figure 8. Number of spotted bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Eagle Mountain Reservoir, Texas, 2002, 2004, and 2008.

## Largemouth Bass

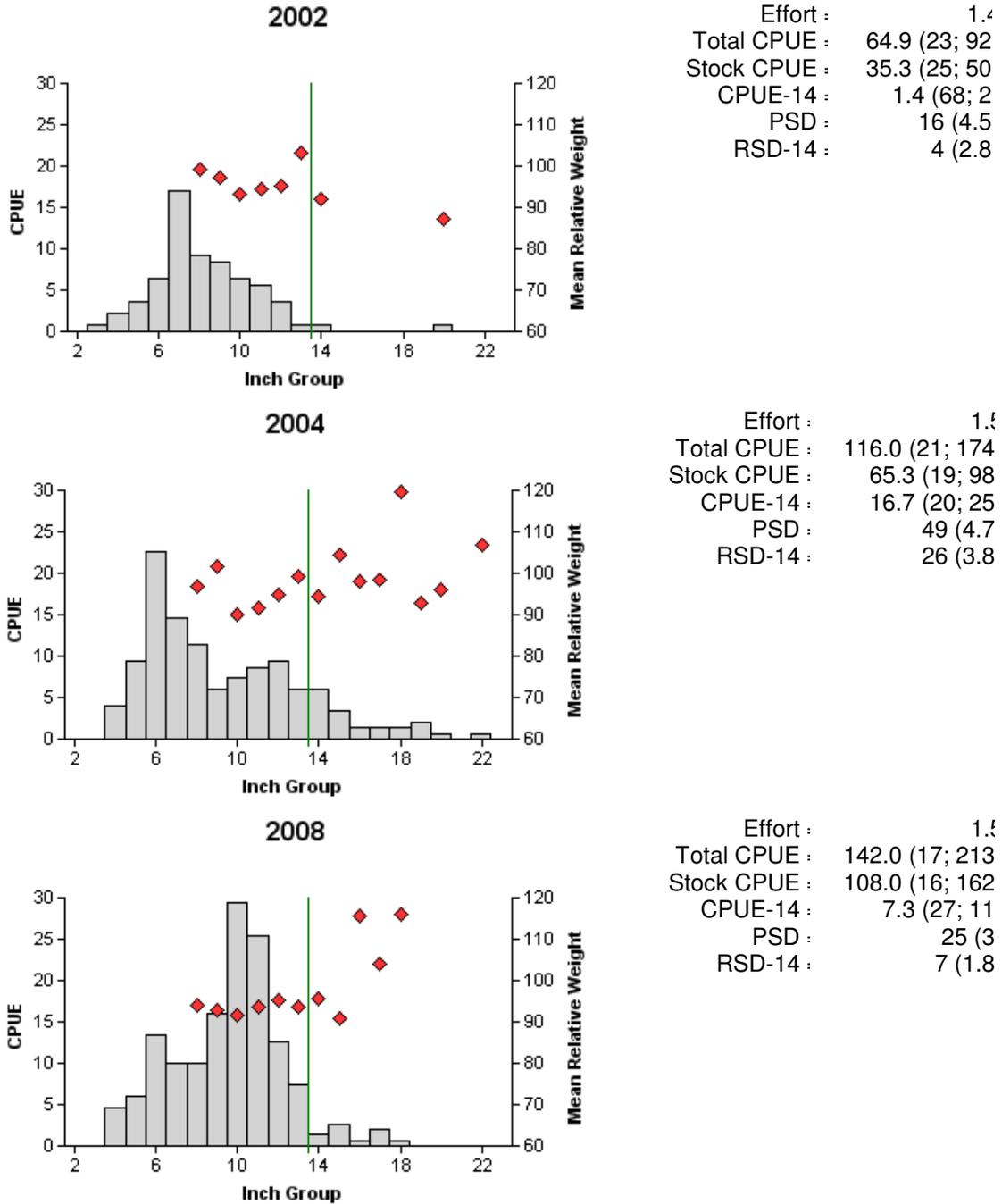


Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Eagle Mountain Reservoir, Texas, 2002, 2004, and 2008. Vertical lines represent length limit at time of sampling.

# White Crappie

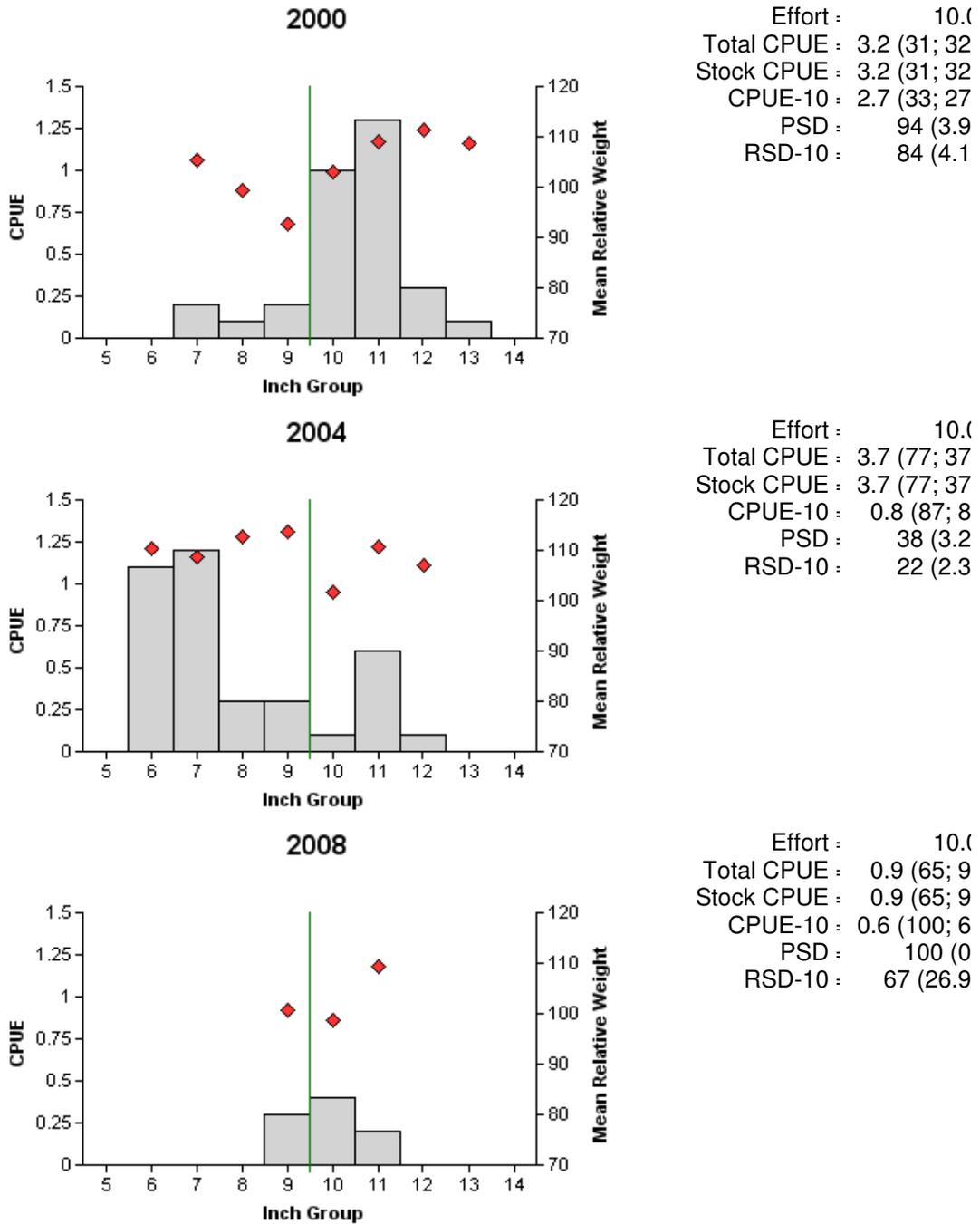


Figure 10. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Eagle Mountain Reservoir, Texas, 2000, 2004, and 2008. Vertical line represents length limit at time of sampling.

# Black Crappie

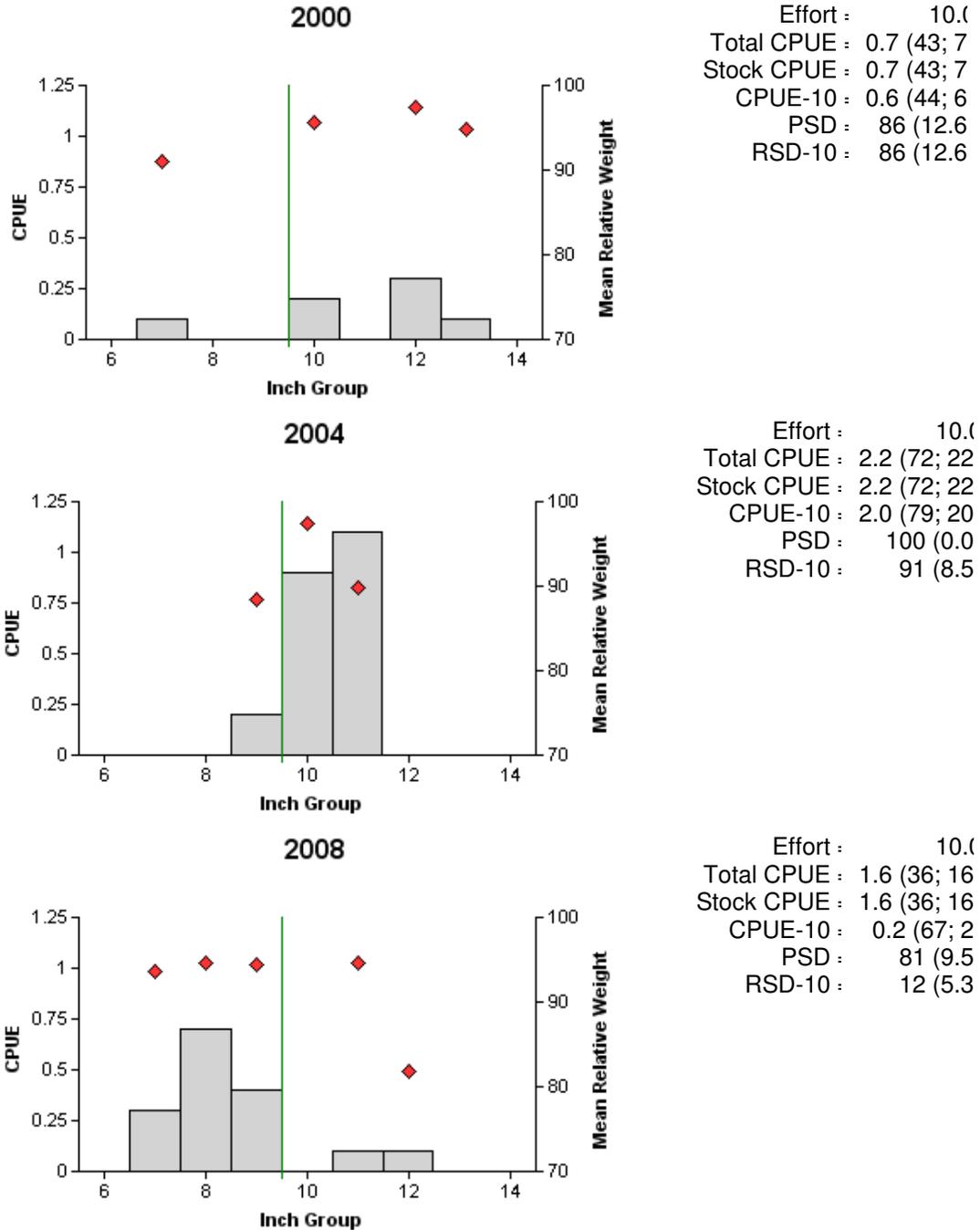


Figure 11. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Eagle Mountain Reservoir, Texas, 2000, 2004, and 2008. Vertical line represents length limit at time of sampling.

Table 5. Proposed sampling schedule for Eagle Mountain 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.

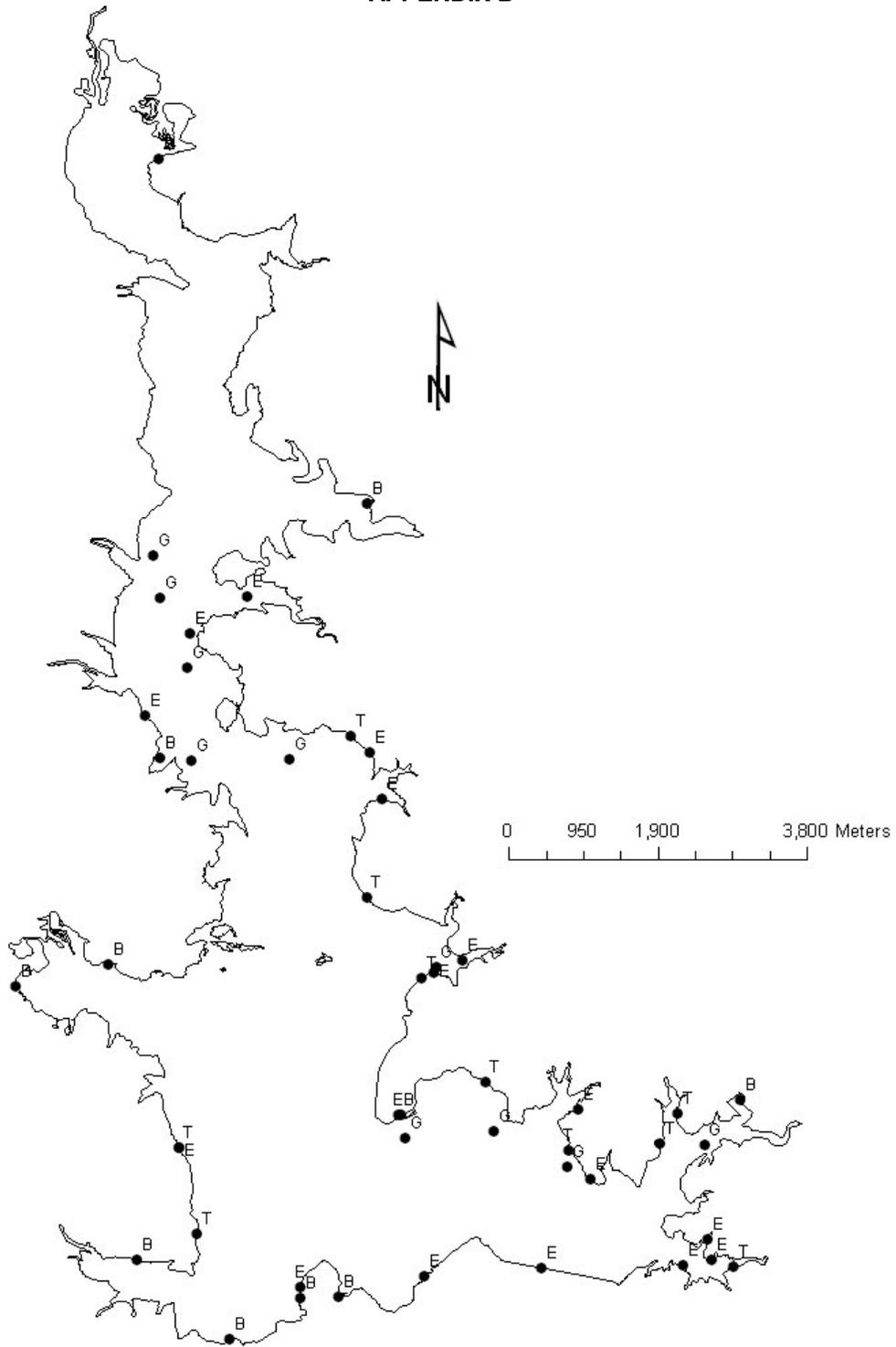
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2009-Spring 2010	A				
Fall 2010-Spring 2011	A				
Fall 2011-Spring 2012	A				
Fall 2012-Spring 2013	S	S	S		S

## APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Eagle Mountain Reservoir, Texas, 2008-2009.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar	1	0.1				
Longnose gar	8	0.8				
Gizzard shad	91	9.1			759	506.0
Threadfin shad					950	633.3
Common carp	4	0.4				
River carpsucker	5	0.5				
Smallmouth buffalo	84	8.4				
Blue catfish	103	10.3				
Channel catfish	93	9.3				
White bass	250	25.0				
Bluegill	3	0.3			401	267.3
Longear sunfish	3	0.3			329	219.3
Redear sunfish	1	0.1			42	28.0
Spotted bass					47	31.3
Largemouth bass	11	1.1			213	142.0
White crappie	1	0.1	9	0.9		
Black crappie	3	0.3	16	1.6		
Freshwater drum	13	1.3				

## APPENDIX B



Location of sampling sites, Eagle Mountain Reservoir, Texas, 2008-2009. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.