

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

**Eagle Mountain Reservoir**

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## Executive Summary

Eagle Mountain Reservoir was surveyed in 2004 using electrofishing and trap netting, and in 2005 using gill netting. A creel survey consisting of 18 days was conducted during the spring quarter of 2002 to assess angler tendencies. 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 in 1954 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 owns a tract of land that was proposed to be developed into a state park on the reservoir, although no development has occurred to date. There is only one handicap fishing pier on the reservoir. Fishery habitat consisted primarily of boat docks and bulkhead.
- **Prey species:** The electrofishing catch rate for gizzard shad was 437.3/hour is higher than the district average of 270.0/hour. The index of vulnerability (IOV; i.e., percentage of individual gizzard shad less than 8 inches total length thought to be vulnerable to largemouth bass predation) for 2004 was 80.8 which indicates a high percentage of gizzard is available for predators (DiCenzo et. al 1996).

The 2004 threadfin shad electrofishing catch rate was 528.7/hour which is much higher than the district average of 204.0/hour.

Bluegill and longear sunfish are the two principal sunfishes in Eagle Mountain and their electrofishing catch rates for 2004 were 264.0/hour and 143.3/hour, respectively. The district averages for bluegill and longear sunfish are 160.0/hour and 87.0/hour, respectively.

- **Catfishes:** The gill netting catch rate for blue catfish for

2005 was 7.9/net night which is much higher than the 2001 gill netting catch rate of 0.9/net night. The district average for blue catfish is 1.9/net night. Twenty five percent of the sample consisted of individuals greater than 20 inches. The population expansion is likely due to excellent reproduction and recruitment.

The gill netting catch rate for channel catfish in 2005 (6.5/net night) was higher than the 2001 gill netting catch rate of 2.3/net night and was higher than the district average of 5.6/net night. Nearly half of all channel catfish sampled (43%) were above the legal length limit. Directed angling effort during the spring quarter of 2002 for channel catfish was 9.0% and angler catch rate was 0.3 fish per hour.

- **White bass:** The white bass gill netting catch rate for 2005 (6.1/net night) was higher than the gill netting catch rate in 2001 of 3.7/net night. The district average for white bass is 8.0/net night. The majority (77%) of fish sampled were below the minimum length limit of 10 inches. Directed effort of anglers surveyed between March 1 and May 31, 2002 for white bass was 17.7%. Approximately 0.56 hours/acre were spent on Eagle Mountain during that period, with an average catch rate of 1.4 fish/hour, and harvest rate of 0.4/hour.
- **Black basses:** Smallmouth bass were stocked in Eagle Mountain in 1999. Although smallmouth bass have never been collected in subsequent fall electrofishing surveys, a 4.15-pound smallmouth was caught by an angler in 2003.

The 2004 electrofishing catch rate for spotted bass of 21.3/hour was lower than the district average of 25.0/hour.

The sample was dominated by smaller fish with only one over 12 inches. Anglers were not specifically seeking spotted bass during the spring quarter creel survey in 2002.

The largemouth bass electrofishing catch rate for 2004 was 116.0/hour which was nearly double the 2000 electrofishing catch rate of 64.9/hour. The 2004 catch rate is lower than the district average of 126.0/hour. Largemouth bass in Eagle Mountain reach legal size (14 inches) at age 2+. Florida largemouth bass alleles in Eagle Mountain have dropped from 45% in 2000 to 29% in 2004. This decrease likely reflects the stocking of 232,424 fingerling Florida bass in 2000. The RSD-12 of 49 indicates nearly half of

fish over stock size (8 inches) were over 12 inches. Directed effort for largemouth bass during the spring 2002 creel survey was 55.6% and the catch rate was 0.7 fish/hour. Several bass tournaments were included in the survey.

- **Crappie:** Black crappie are present in Eagle Mountain in low abundance (2.2/net night).

The trap netting catch rate for white crappie in 2004 was 3.7/net night which was similar to the 1998 (3.4/net night) and 2000 (3.2/net night), but much lower than the district average of 16.4/net night. The RSD-12 indicates the sample was dominated by small fish. Anglers surveyed during the spring 2002 creel survey directed only 1.8% of the effort towards white crappie at Eagle Mountain. White crappie were harvested at a rate of 0.3 fish per hour.

#### ▪ **Management Strategies**

Based on current information, existing harvest regulations should be maintained on Eagle Mountain Reservoir.

Access to Eagle Mountain Reservoir is limited due to the large amount of privately owned land surrounding the reservoir. The reservoir lacks good boat ramps. One management strategy will include possible improvement of existing ramps or construction of new ones.

Because the reservoir has adequate habitat and forage, requests for the stocking of smallmouth bass will continue. A 4.15 pound smallmouth was caught in the fall of 2003 establishing a new waterbody record.

## Introduction

This document is a summary of the fisheries data collected from Eagle Mountain Reservoir in 2002 -2005. 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. Management strategies are included to address existing problems or opportunities. Historical data are presented with the current data for comparison.

Harvest regulations for Eagle Mountain Reservoir, 2004-2005.

Species	Bag Limit	Minimum-Maximum Length
Bass, largemouth and smallmouth	5 <sup>a</sup>	14-No Limit
Bass, spotted	5 <sup>a</sup>	No limit <sup>b</sup>
Bass, white	25	10-No Limit
Catfish, flathead	5	18-No Limit
Catfish, blue and channel	25	12-No Limit
Crappie	25	10-No Limit

<sup>a</sup>Largemouth, spotted, and smallmouth bass daily bag limit is 5 fish in any combination.

<sup>b</sup>Changed from 12 inches to no limit on September 1, 2001.

## Methods

- Fishes were collected by electrofishing (1.5 hours at 18 stations), gill netting (10 net nights at 10 stations) and trap netting (10 net nights at 10 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour, and for gill netting and trap netting as the number of fish caught in one net set overnight. Access, habitat, and largemouth bass electrophoresis samples were collected according to Texas Parks and Wildlife Department (TPWD) Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2003).

- Sampling statistics (CPUE for various length categories) and structural indices (Proportional Stock Density [PSD] and Relative Stock Density [RSD]) were calculated for target fishes according to Anderson and Neumann (1996). Standard weight equations used to calculate relative weight were from Anderson and Neumann (1996) and Mouneke and Pope (1999) for data collected after 1996.
- Ages were determined using otoliths for largemouth bass. All largemouth bass above stock length (8 inches) sampled were aged. TPWD procedures were amended to establish tiers of priority for age determination (TPWD, Inland Fisheries Division, unpublished manual revised 2003).
- A littoral zone/physical habitat survey was conducted in accordance with TPWD Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2003).
- A creel survey consisting of 18 days was conducted from March 1, 2002 to May 31, 2002. Eight weekdays and ten weekend days were surveyed. Creel survey information was collected as described in the TPWD Inland Fisheries Assessment Manual (TPWD, Inland Fisheries Division, unpublished manual revised 2003).

#### 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.
- Muoneke, M. I., and K. L. Pope. 1999. Development and evaluation of standard weight ( $W_s$ ) equation for blue catfish. North American Journal of Fisheries Management 19:878-879.

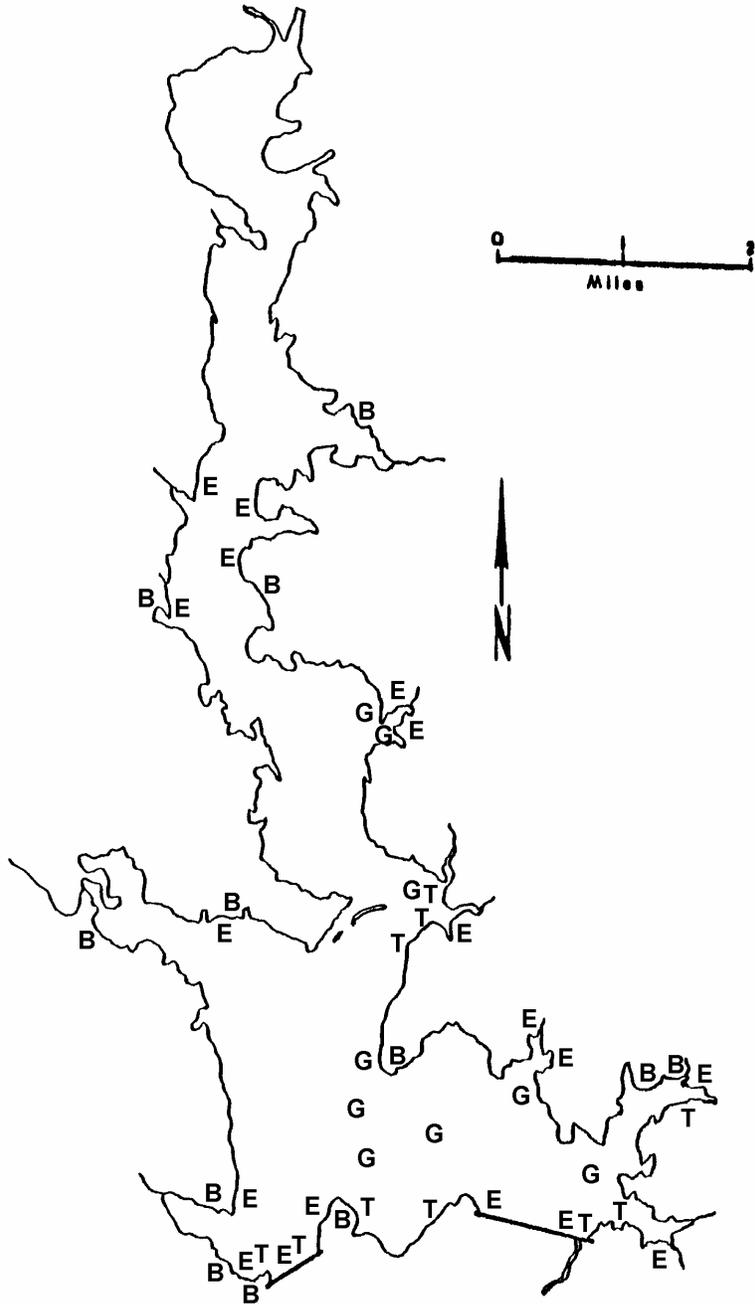


Survey of littoral zone and physical habitat types, Eagle Mountain Reservoir, Texas, Summer 2004. A linear shoreline distance (miles) was recorded for each habitat type found.

Habitat		Miles	Acres
Waters edge	Boat docks, piers	45	
	Bulkhead	44	
	Rock bluff	14	
	Dead trees	10	
	Nondescript	20	
	Boulder	10	
	Eroded bank	19	
	Rip rap	13	
	Overhanging brush	18	
	Gravel	7	
	Vegetation	Native emergent	4
Near shore	Boat docks, piers	31	
	Dead trees	12	
Open water	Dead trees		38
Total reservoir shoreline length		200	

Stocking history of Eagle Mountain Reservoir, Texas. Sizes of fish are indicated as AD - adult, FG - fingerling, and FRY - fry.

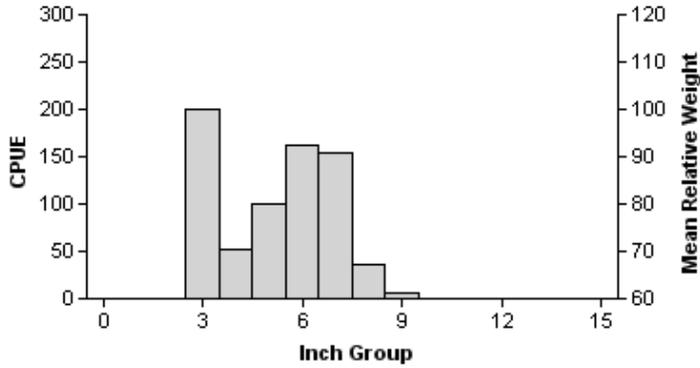
Species	Year	Number	Size
Threadfin shad	1984	<u>2,985</u>	AD
	Species total	2,985	
Channel catfish	1969	48,000	FG
	1970	60,000	FG
	1971	10,964	FG
	1972	9,000	FG
	1973	200	FG
	1979	<u>10,095</u>	FG
	Species total	138,259	
Largemouth bass	1969	300,000	FG
	1971	100,000	FG
	1978	<u>275</u>	AD
	Species total	400,275	
Florida largemouth bass	1988	333,148	FG
	1993	373,642	FG
	1994	148,628	FG
	2000	<u>232,424</u>	FG
	Species total	1,087,842	
Smallmouth bass	1978	84,000	FG
	1979	34,460	FG
	1980	1,200	FG
	1999	<u>122,192</u>	FG
	Species total	318,365	
Walleye	1973	1,400,000	FRY
	1974	3,100,090	FRY
	1975	<u>2,150,090</u>	FRY
	Species total	6,650,180	
White crappie	1969	<u>20,000</u>	FG
	Species total	20,000	
Blue catfish	1991	<u>92,147</u>	FG
	Species total	92,147	



Location of sampling sites, Eagle Mountain Reservoir, Texas, 2004-2005. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.

**Gizzard Shad**

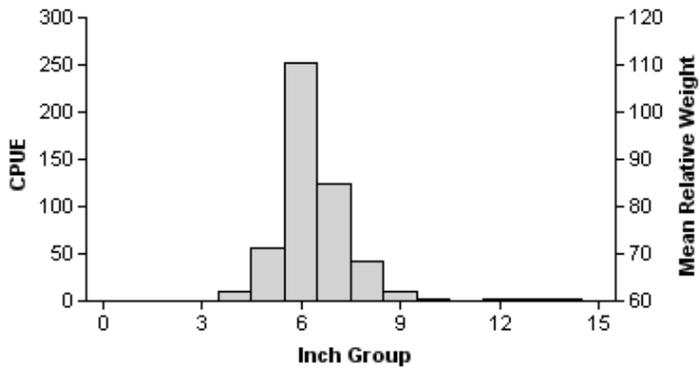
2000



PSD = 1  
IOV = 93.9  
CPUE Total = 711.3

Effort = 1.5  
CPUE Stock = 197.3  
N = 1067

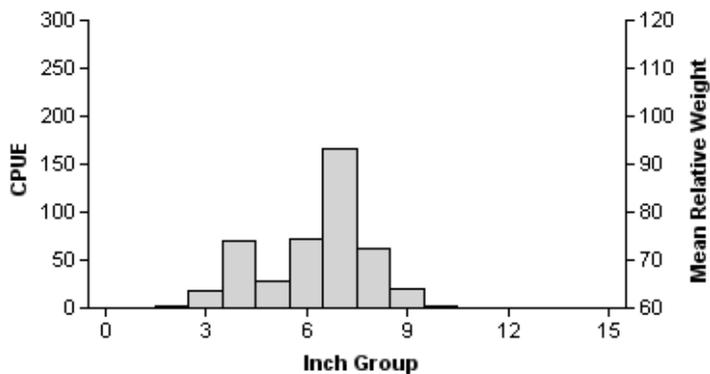
2002



PSD = 3  
IOV = 88.4  
CPUE Total = 500.5

Effort = 1.4  
CPUE Stock = 182.1  
N = 709

2004



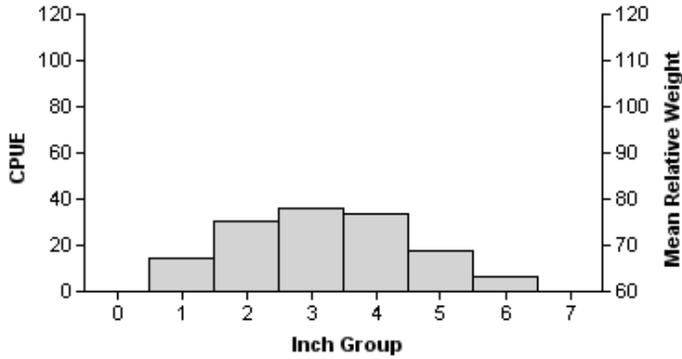
PSD = 0  
IOV = 80.8  
CPUE Total = 437.3

Effort = 1.5  
CPUE Stock = 250.7  
N = 656

Comparison of the number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Eagle Mountain Reservoir, Texas.

**Bluegill**

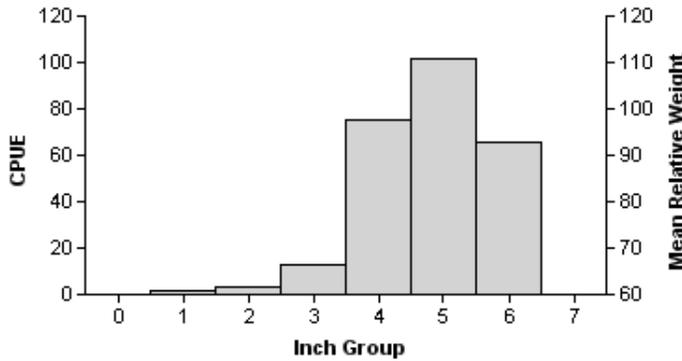
2000



PSD = 7  
RSD-8 = 0  
CPUE Total = 140.0

Effort = 1.5  
CPUE Stock = 94.7  
N = 210

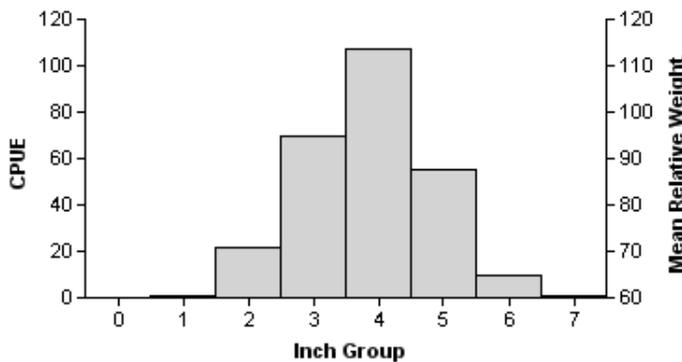
2002



PSD = 26  
RSD-8 = 0  
CPUE Total = 259.1

Effort = 1.4  
CPUE Stock = 254.8  
N = 367

2004



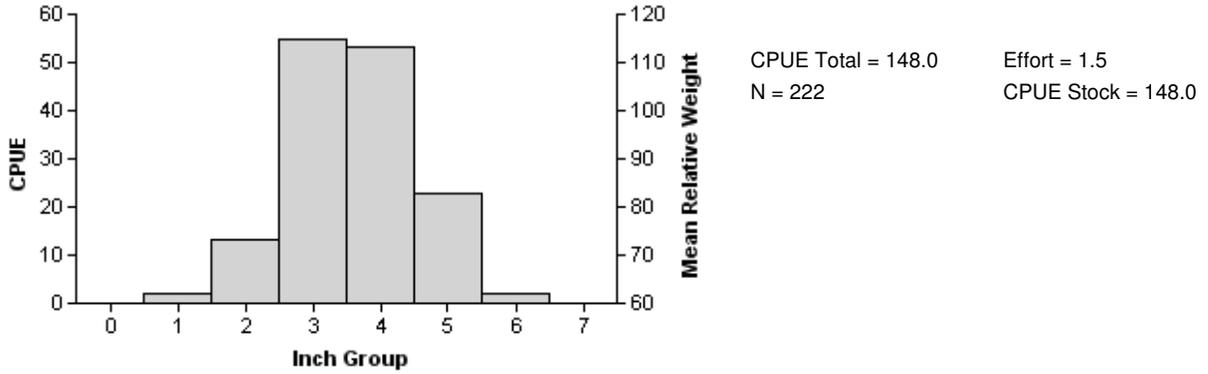
PSD = 4  
RSD-8 = 0  
CPUE Total = 264.0

Effort = 1.5  
CPUE Stock = 242.0  
N = 396

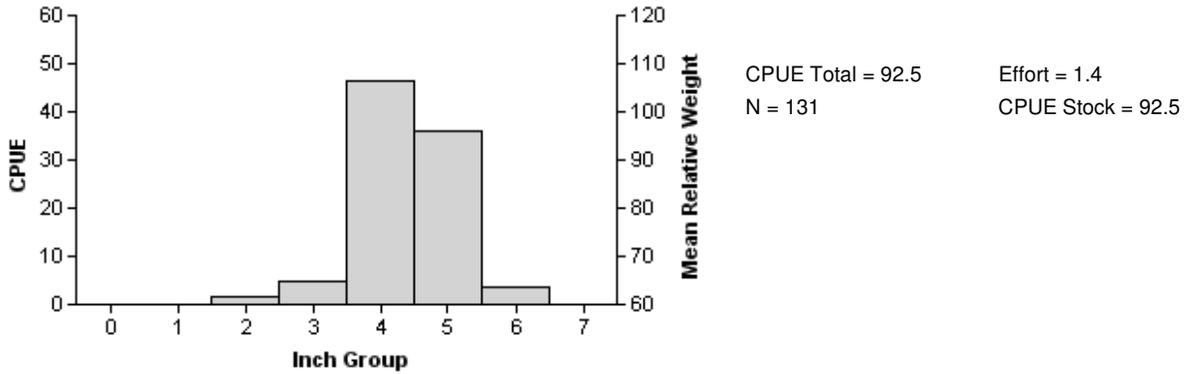
Comparison of the number of bluegill caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Eagle Mountain Reservoir, Texas.

**Longear Sunfish**

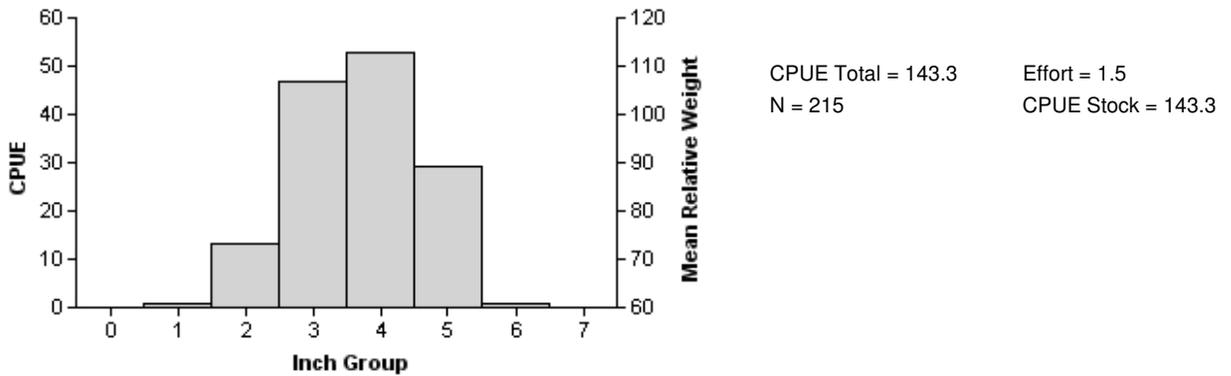
2000



2002



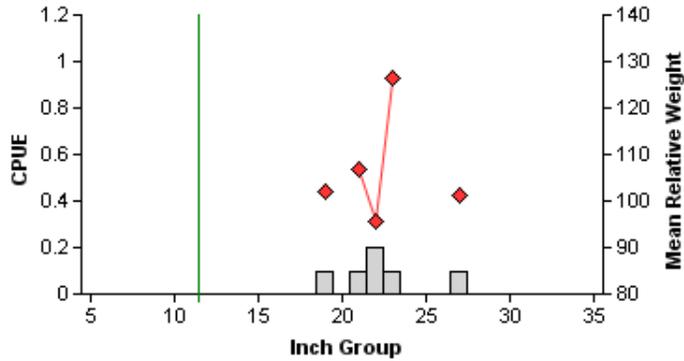
2004



Comparison of the number of longear sunfish caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Eagle Mountain Reservoir, Texas.

**Blue Catfish**

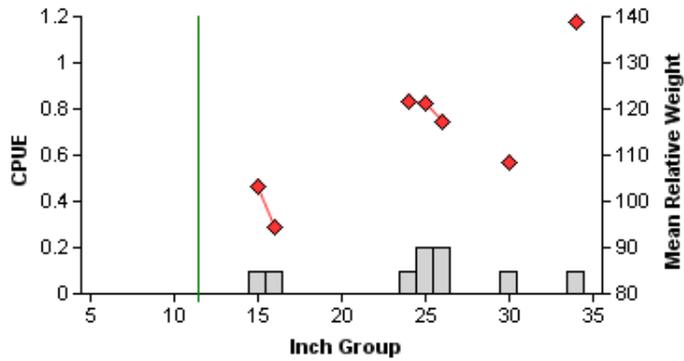
1998



PSD = 83  
RSD-30 = 0  
CPUE Total = 0.6

Effort = 10.0  
CPUE Stock = 0.6  
N = 6

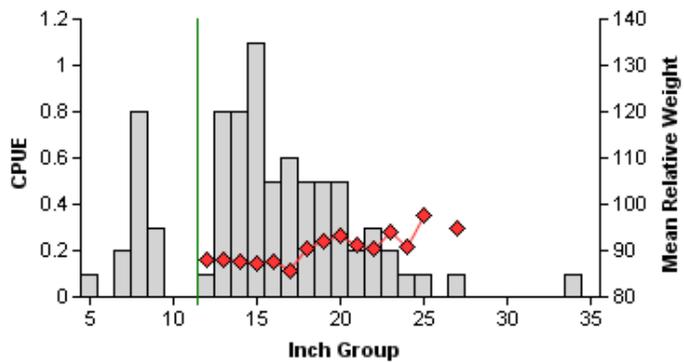
2001



PSD = 78  
RSD-30 = 22  
CPUE Total = 0.9

Effort = 10.0  
CPUE Stock = 0.9  
N = 9

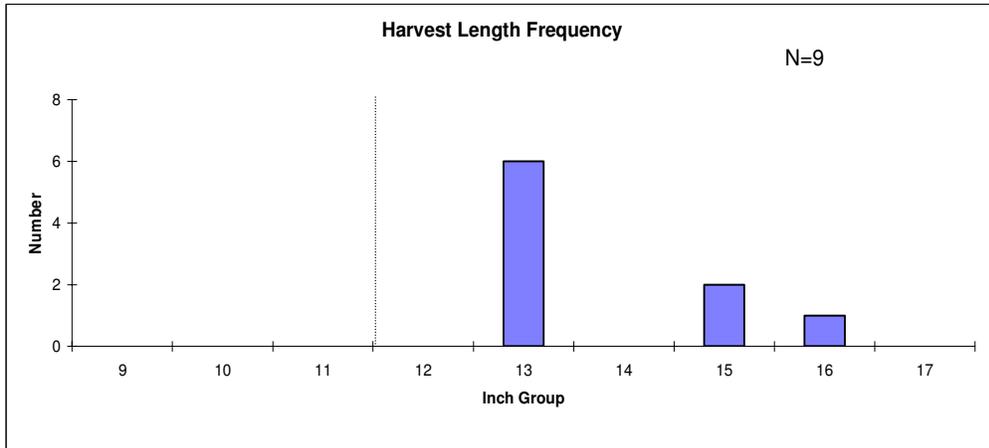
2005



PSD = 25  
RSD-30 = 2  
CPUE Total = 7.9

Effort = 10.0  
CPUE Stock = 6.5  
N = 79

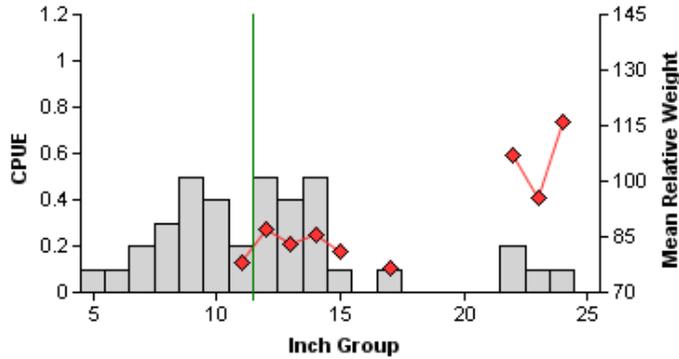
Comparison of the number of blue catfish caught per net night (CPUE, bars), mean relative weights (lines) and population indices for spring gill netting surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.



Length frequency of blue catfish observed during creel surveys at Eagle Mountain Reservoir, Texas. March 2002 - May 2002. Dashed line represents length limit at time of survey.

**Channel Catfish**

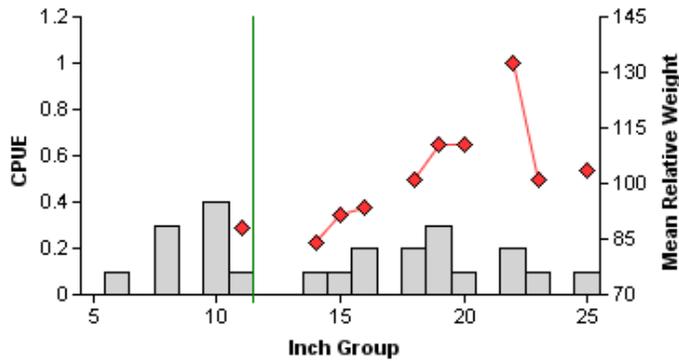
1998



PSD = 23  
RSD-24 = 5  
CPUE Total = 3.8

Effort = 10.0  
CPUE Stock = 2.2  
N = 38

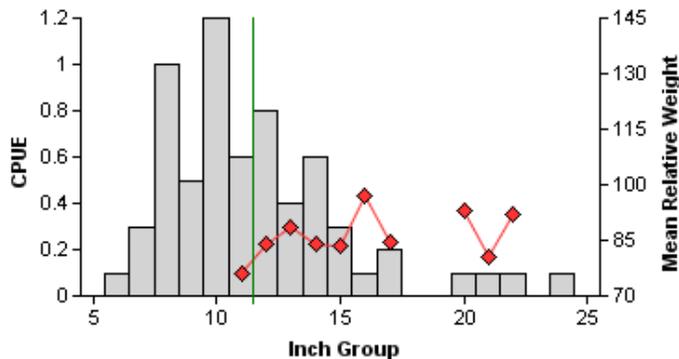
2001



PSD = 80  
RSD-24 = 7  
CPUE Total = 2.3

Effort = 10.0  
CPUE Stock = 1.5  
N = 23

2005



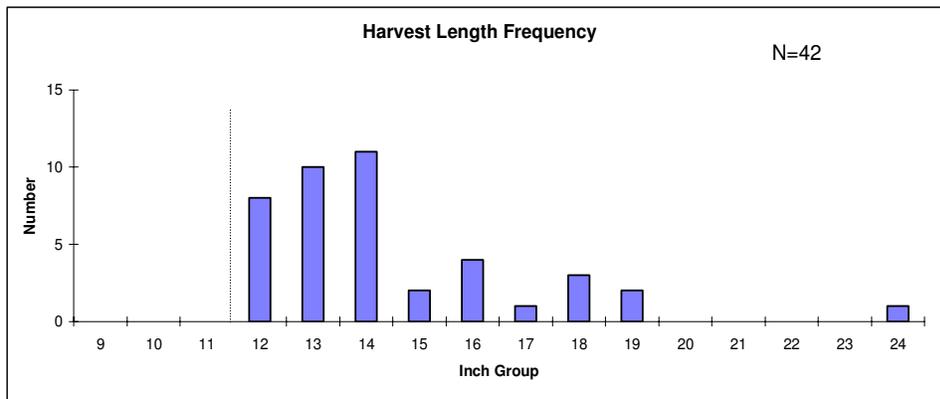
PSD = 21  
RSD-24 = 3  
CPUE Total = 6.5

Effort = 10.0  
CPUE Stock = 3.4  
N = 65

Comparison of the number of channel catfish caught per net night (CPUE, bars), mean relative weights (lines) and population indices for spring gill netting surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.

Creel survey statistics for anglers seeking channel catfish at Eagle Mountain Reservoir March 2002 - May 2002.

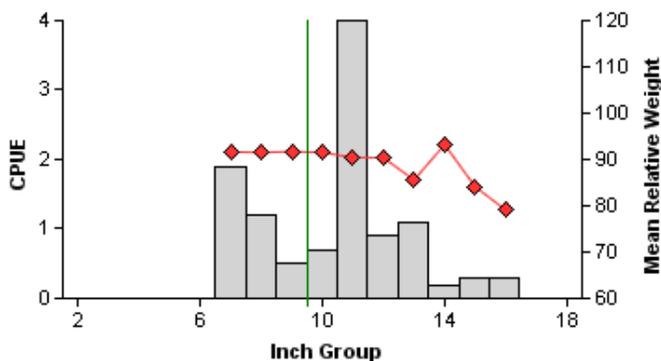
% Directed Effort	Effort (Hours/Acre)	Catch Rate (Number/Hour)	Harvest (Number/Hour)
8.99	0.29	0.29	0.19



Length frequency of channel catfish observed during creel surveys at Eagle Mountain Reservoir, Texas. March 2002 - May 2002. Dashed line represents length limit at time of survey.

**White Bass**

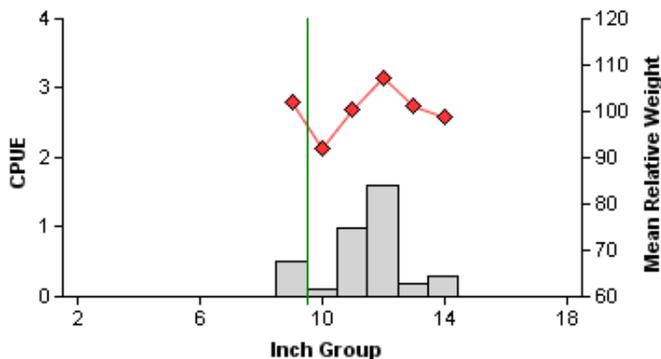
1998



PSD = 72  
RSD-12 = 25  
CPUE Total = 11.1

Effort = 10.0  
CPUE Stock = 11.1  
N = 111

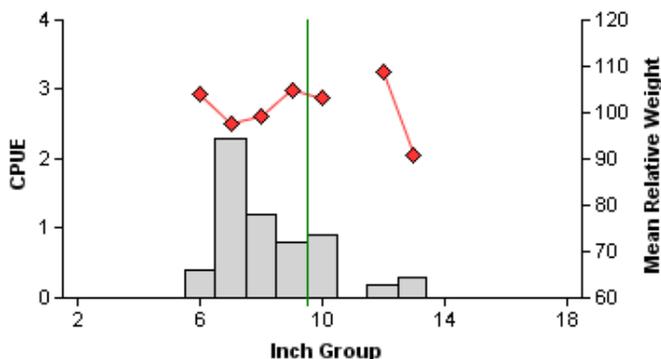
2001



PSD = 100  
RSD-12 = 57  
CPUE Total = 3.7

Effort = 10.0  
CPUE Stock = 3.7  
N = 37

2005



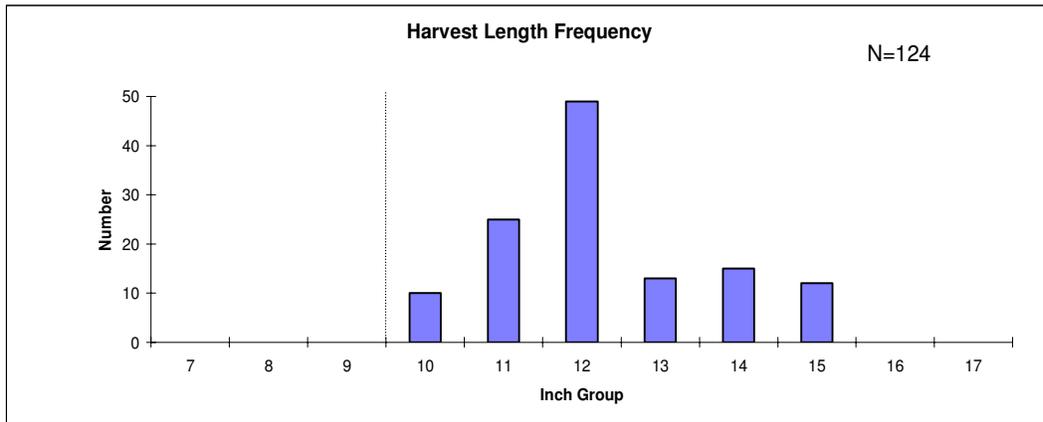
PSD = 36  
RSD-12 = 8  
CPUE Total = 6.1

Effort = 10.0  
CPUE Stock = 6.1  
N = 61

Comparison of the number of white bass caught per net night (CPUE, bars), mean relative weights (lines) and population indices for spring gill netting surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.

Creel survey statistics for anglers seeking white bass at Eagle Mountain Reservoir March 2002 - May 2002.

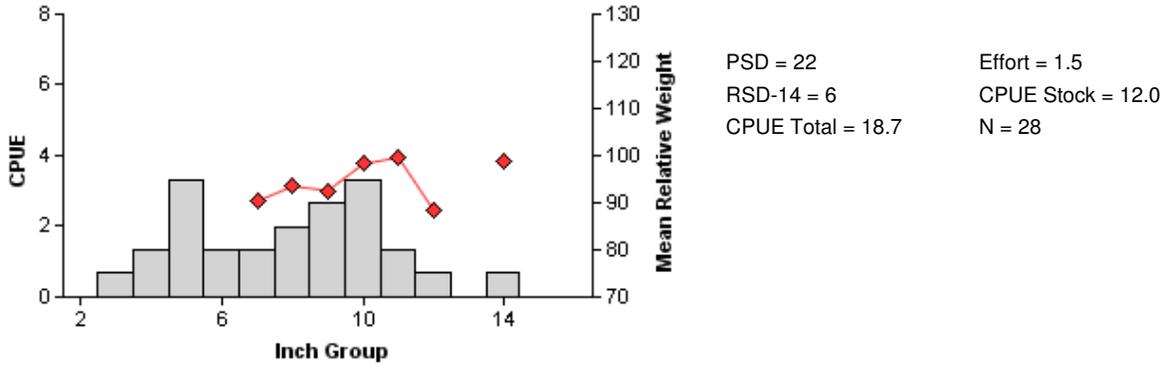
% Directed Effort	Effort (Hours/Acre)	Catch Rate (Number/Hour)	Harvest (Number/Hour)
17.73	0.56	1.42	0.40



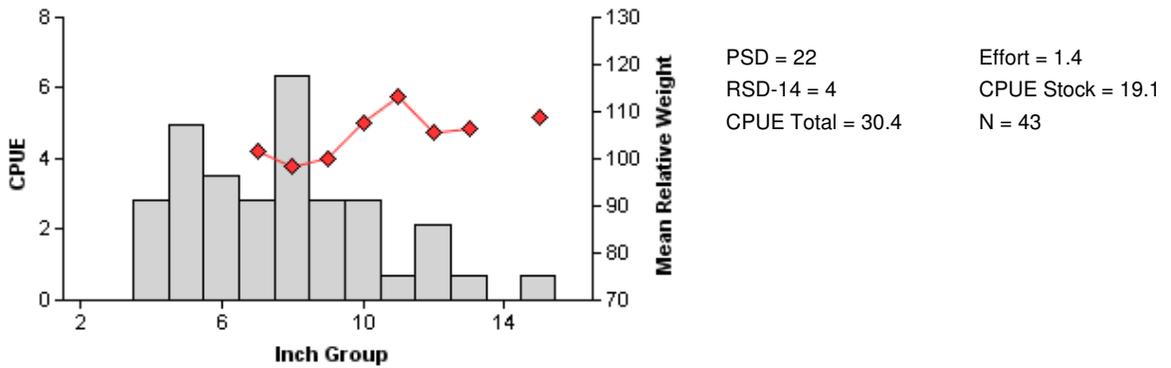
Length frequency of white bass observed during creel surveys at Eagle Mountain Reservoir, Texas. March 2002 - May 2002. Dashed line represents length limit at time of survey.

**Spotted Bass**

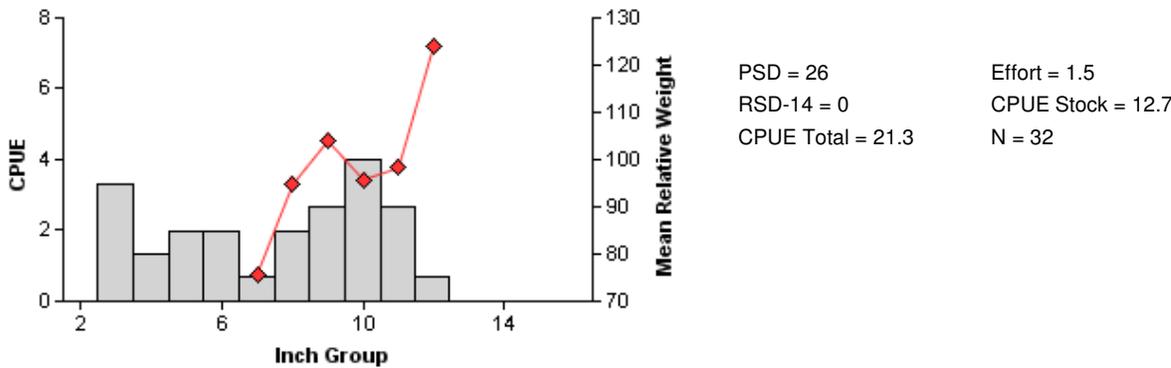
2000



2002



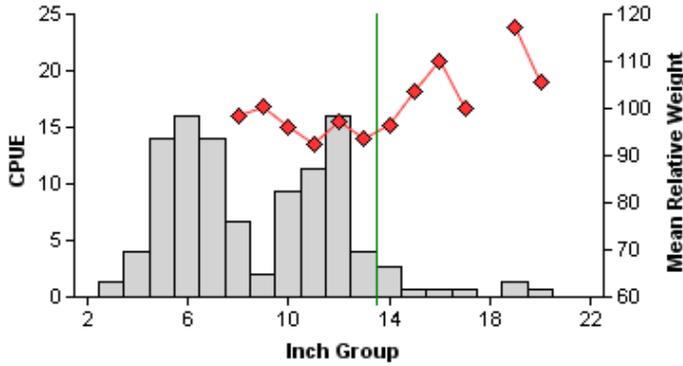
2004



Comparison of the number of spotted bass caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Eagle Mountain Reservoir, Texas.

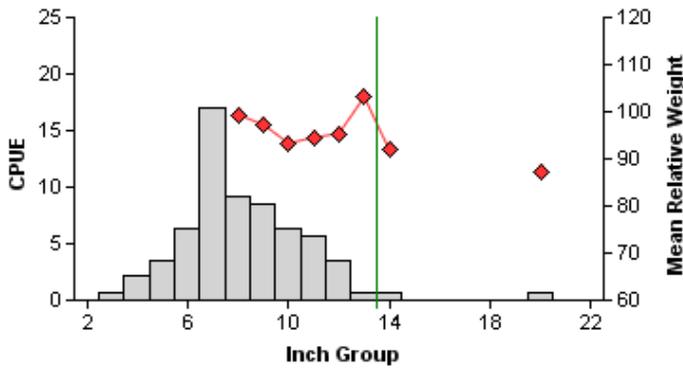
**Largemouth Bass**

2000



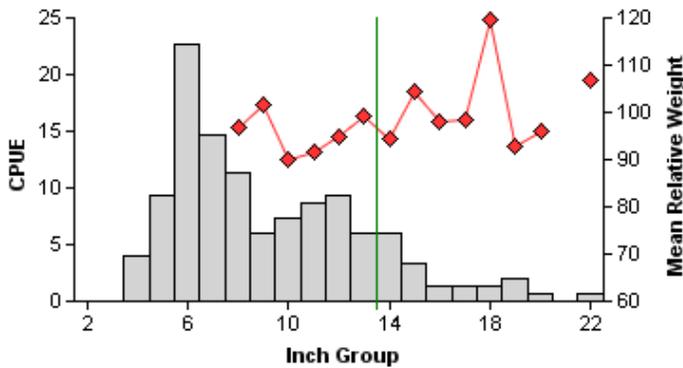
PSD = 48	Effort = 1.5
RSD-15 = 7	CPUE Stock = 56.0
CPUE Total = 105.3	N = 158
% FLMB Alleles = 20.0	% FLMB = 0.0

2002



PSD = 16	Effort = 1.4
RSD-15 = 2	CPUE Stock = 35.3
CPUE Total = 64.9	N = 92
% FLMB Alleles = 45.0	% FLMB = 23.3

2004

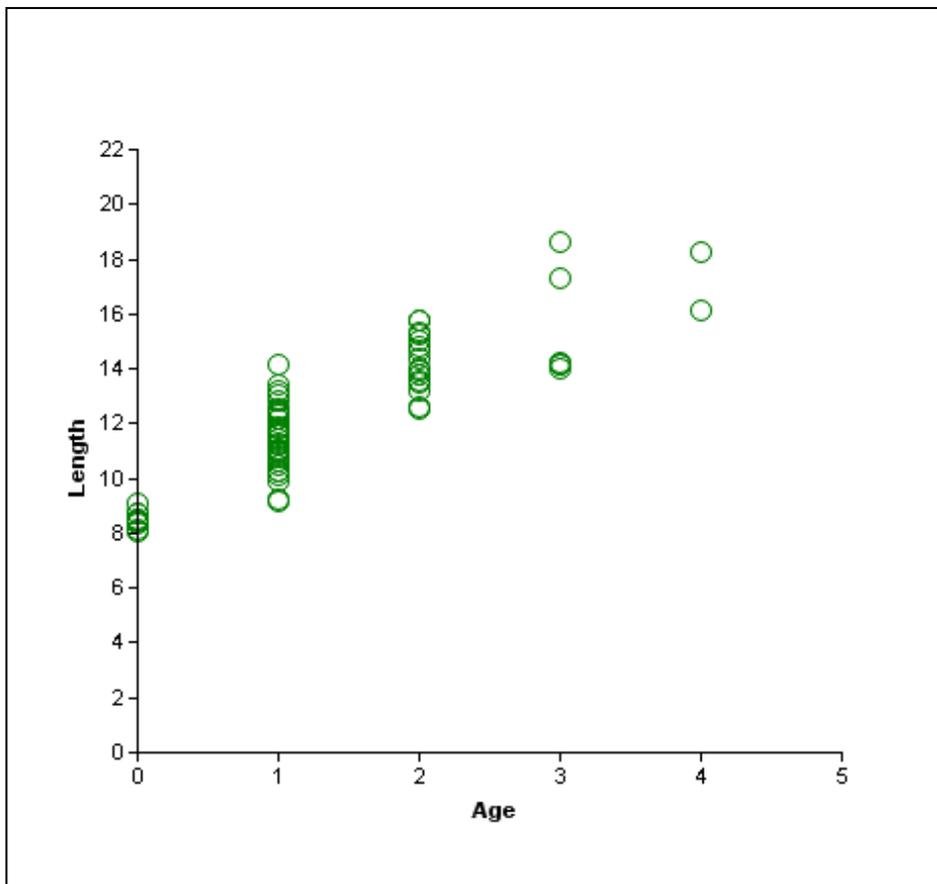


PSD = 49	Effort = 1.5
RSD-15 = 16	CPUE Stock = 65.3
CPUE Total = 116.0	N = 174
% FLMB Alleles = 29.2	% FLMB = 3.3

Comparison of the number of largemouth bass caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.

Mean length (inches) at age of capture for largemouth bass (sexes combined) collected during the 2004 fall electrofishing survey from Eagle Mountain Reservoir, Texas.

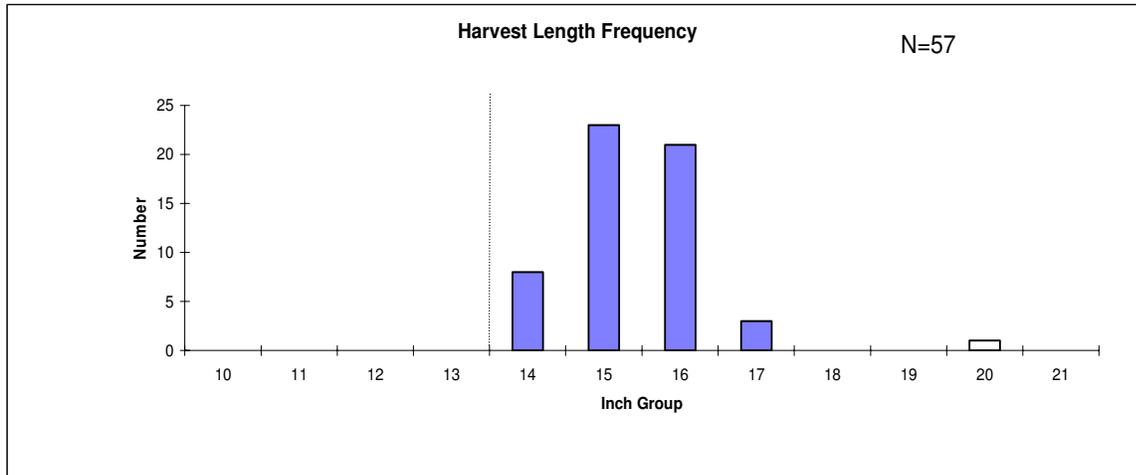
Age	Total Length	N
0	8.5	10
1	11.5	35
2	14.2	17
3	15.4	6
4	17.2	2



Length (inches) at age of capture for largemouth bass (sexes combined) caught during fall electrofishing sample, 2004, Eagle Mountain Reservoir, Texas. Ages were determined using otoliths.

Creel survey statistics for anglers seeking largemouth bass at Eagle Mountain Reservoir March 2002 - May 2002.

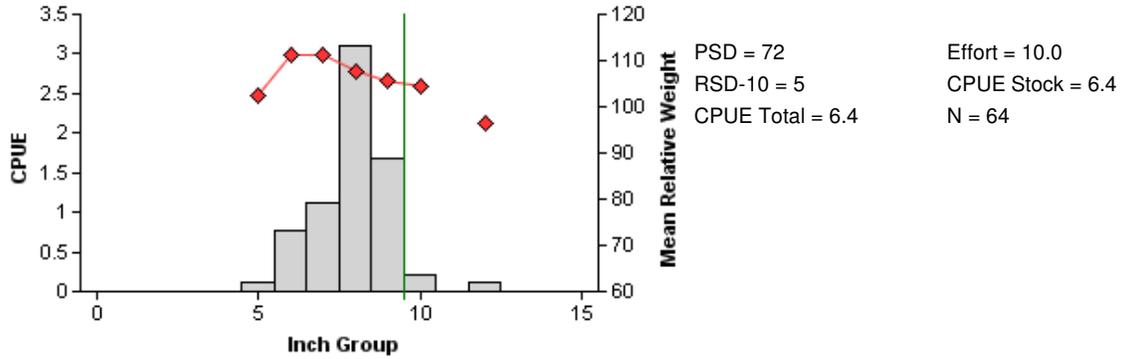
% Directed Effort	Effort (Hours/Acre)	Catch Rate (Number/Hour)	Harvest (Number/Hour)
55.57	1.77	0.72	0.09



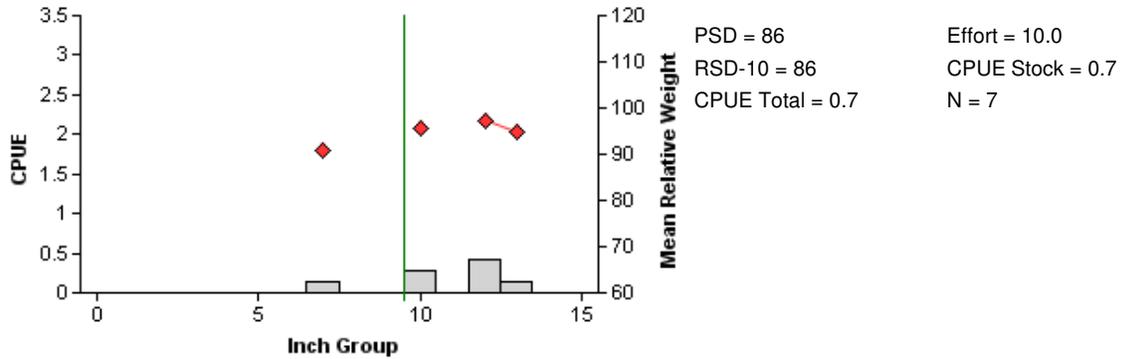
Length frequency of largemouth bass observed during creel surveys at Eagle Mountain Reservoir, Texas. March 2002 - May 2002. Dashed line represents length limit at time of survey.

**Black Crappie**

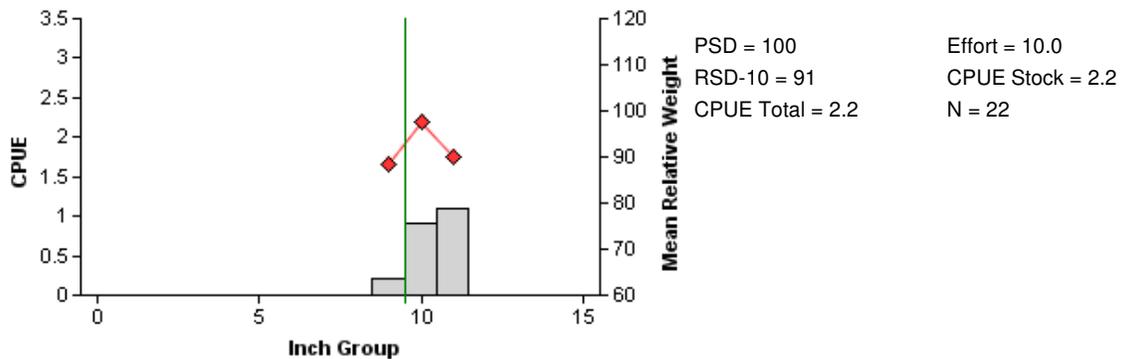
1998



2000



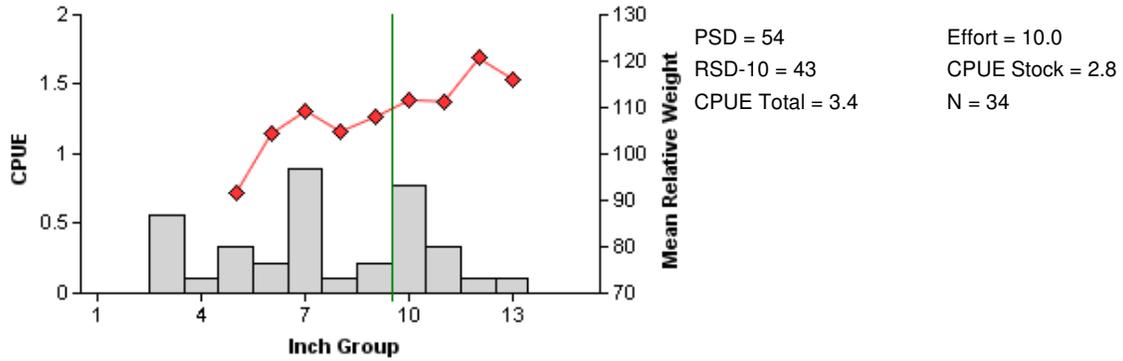
2004



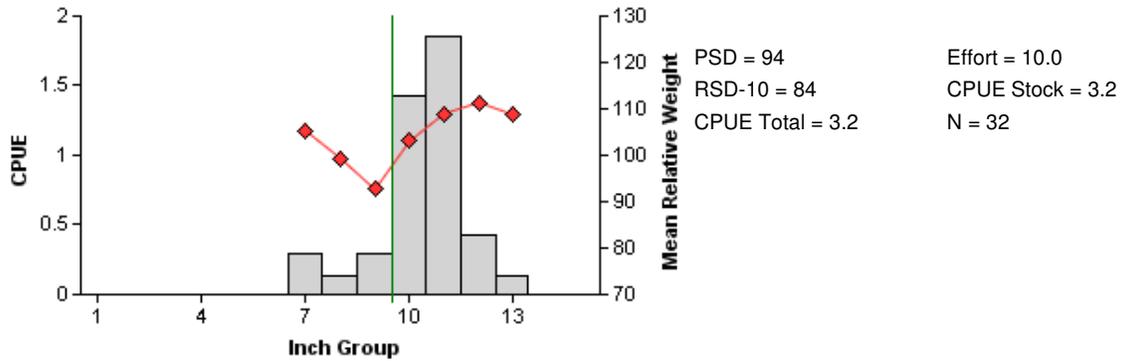
Comparison of the number of black crappie caught per net (CPUE, bars) and population indices for fall trap netting surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.

**White Crappie**

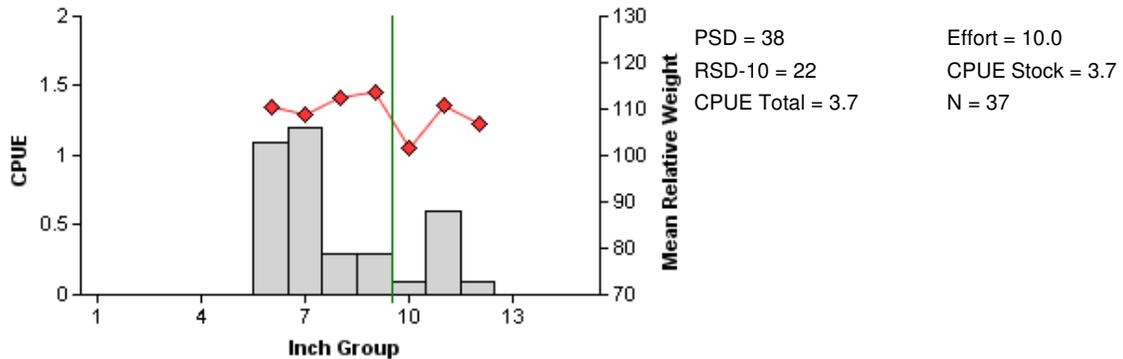
1998



2000



2004



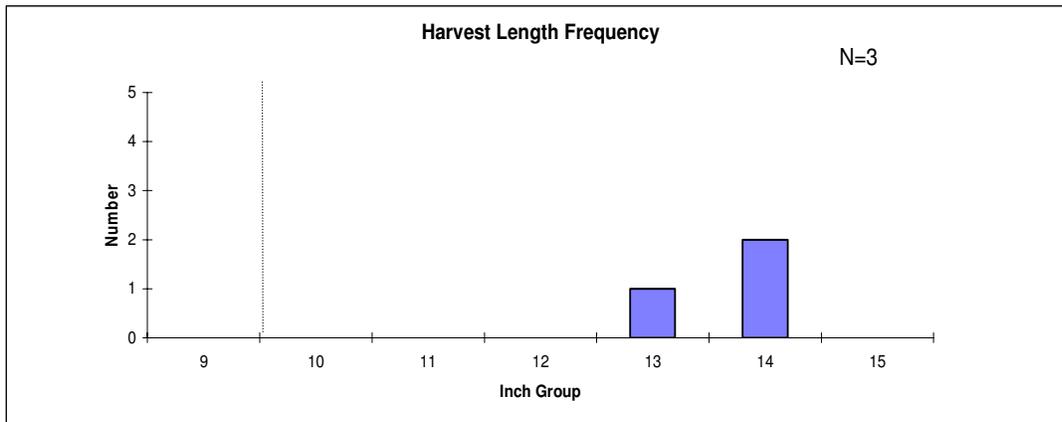
Comparison of the number of white crappie caught per net (CPUE, bars) and population indices for fall trap netting surveys, Eagle Mountain Reservoir, Texas. Solid lines indicate minimum length limit at time of sampling.

Creel survey statistics for anglers seeking white crappie at Eagle Mountain Reservoir March 2002 - May 2002.

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% Directed Effort	Effort (Hours/Acre)	Catch Rate (Number/Hour)	Harvest (Number/Hour)
1.77	0.06	0.45	0.02

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Length frequency of white crappie observed during creel surveys at Eagle Mountain Reservoir, Texas. March 2002 - May 2002. Dashed line represents length limit at time of survey.

**Fisheries Management Plan  
Eagle Mountain Reservoir, Texas**

Prepared - July 2005

**Issue 1** Access to Eagle Mountain is limited due to the amount of shoreline that is privately controlled. Tarrant Regional Water District, the controlling authority, has property which is not open to the public. There is only one public park on the reservoir which is operated by the City of Azle.

Management Strategies

1. Contact the controlling authority and the City of Azle recommending an increase in public bank fishing access and handicap facilities.
2. Encourage authorities to participate in the TPWD boat ramp and community grant program for assistance in improving access.
3. Inquire into TPWD land for potential development for increased bank access and construction of a new boat ramp.

**Issue 2** Eagle Mountain Reservoir has adequate habitat and forage to support a smallmouth bass population. These fish were stocked in 1999 and had some success. A new waterbody record smallmouth weighing 4.15 pounds was caught in the fall of 2003.

Management Strategy

1. Continue requesting smallmouth bass for stocking and evaluate success of the stockings.

## Appendix A

Number (N) of fish caught per unit effort (CPUE) by gill netting, trap netting, and electrofishing from Eagle Mountain Reservoir, Texas, during 2004–2005 sampling season. Sampling effort was 10 net nights for gill netting and trap netting and 1.5 hours for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	280	28.0			656	437.3
Threadfin shad	2	0.2			793	528.7
Common carp	2	0.2				
River carpsucker	2	0.2				
Smallmouth buffalo	34	3.4				
Blue catfish	79	7.9				
Channel catfish	65	6.5				
Flathead catfish	2	0.2				
White bass	61	6.1				
Bluegill					396	264.0
Longear sunfish	3	0.3			215	143.3
Redear sunfish					2	1.3
Spotted bass					32	21.3
Largemouth bass					174	116.0
White crappie	1	0.1	37	3.7		
Black crappie			22	2.2		
Freshwater drum	7	0.7				

## Appendix B

Summary of electrophoretic analysis of 30 young-of-the-year largemouth bass collected during electrofishing at Eagle Mountain Reservoir, Texas, fall 2004.

	Number	Percentage of Sample
F <sub>L</sub> (Florida largemouth bass)	1	3.3
F <sub>1</sub> hybrid	6	20.0
F <sub>x</sub> hybrid	15	50.0
Northern largemouth bass	8	26.7
Total Number (N)	30	
% Florida largemouth alleles		29.2

## Appendix C

The percentage of directed effort (angler hours) and catch rate (number/angling hour), for the spring survey quarter for Eagle Mountain Reservoir 2002.

Analysis variable	Largemouth bass	Crappie	White bass	Channel catfish
% Spring Quarter Effort	55.6	1.8	17.7	9.0
Spring Quarter Catch Rate	0.7	0.3	1.4	0.3

## Appendix D

Mean monthly reservoir elevation for Eagle Mountain Reservoir, Texas, January 2001–May 2005.

