

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-29

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

**Meredith Reservoir**

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## EXECUTIVE SUMMARY

Meredith Reservoir was surveyed with electrofishing, trap nets, gill nets, and creel surveys from 2003 to 2005. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- Reservoir Description:** Meredith Reservoir is an impoundment on the Canadian River located 35 miles northeast of Amarillo, Texas. It was built in 1965 to provide municipal and industrial water. The reservoir was designed to impound a 16,000 acre reservoir, but the reservoir experiences substantial water level fluctuations and has recently experienced an extended drought. During this drought period, the reservoir has declined from approximately 11,500 acres in early 2000 to a record low of 5,784 acres in June 2004. Angler and boat access is adequate. Due to low water conditions, only 1 boat ramp was usable in summer 2004. Three ramps are now usable due to low water modifications. There is one handicap accessible fishing pier. Habitat in 1998 was primarily rock and gravel shoreline areas, with some flooded terrestrial vegetation, and 264 acres of native and non-native macrophytes (Munger 1999). There have been no significant man-made changes in habitat since 1998.
- Prey species:** The electrofishing catch rate of gizzard shad was 151.3/hour (h) in 2003 and 296.0/h in 2004, and continued to increase trend from a low of 35.5/h in 1998 (Munger 1999). The index of vulnerability (IOV) of gizzard shad (88%) was adequate for existing predators.

The electrofishing catch rate of bluegill declined since 1995. The catch rate in 2003 was 40.7/h and 31.3/h in 2004. The average catch rate from 1994 to 1996 was 154.5/h. The proportional stock density (PSD) in 2004 was 4 and the relative stock density (RSD-8) was 0. There has been no directed angling effort for bluegill in the creel survey since 2001 and only one 4-inch bluegill was documented in the 2003 creel survey.
- Channel Catfish:** The gill net catch rate of channel catfish was 1.9/net night (NN) in 2004 and 1.6/NN in 2005, similar to the 1999-2003 average catch rate of 1.6/NN. Length frequency distribution indicated recruitment into legal size ranges. Mean relative weight of the population is good at about 100. Directed fishing effort for channel catfish was 0.63 h/acre. Total catch rate was 0.07/h in 2003 and 0.25/h in 2004. The harvest rate was 0.01/h in 2003 and 0.16/h in 2004.
- Flathead Catfish:** The gill net catch rate of flathead catfish increased from 2.6/NN in 2002 and 1.4/NN in 2003 to 3.2/NN in 2004 and 3.4/NN in 2005, double the 1999-2003 average catch rate of 1.6/NN. Length frequency distribution information indicated there was recruitment. Relative weight of the sample has declined from around 105 from 1997 – 2003 to 92 in 2003 and 2004. The decline may be related to record low water levels during the past 2 years. During 2003 and 2004 creel surveys, there was no directed fishing effort toward flathead catfish. The catch and harvest rate of flathead catfish were both <0.01/h as only two fish were documented in the creel in 2004.
- White bass:** The gill net catch rate of white bass was 3.6/NN in 2003 and 12.9/NN in 2005. The 2005 catch rate was much higher than the 1999-2003 average of 5.0/NN. Recruitment to legal size was good as almost all fish caught were  $\geq 10$  inches. Average age of white bass 9.0-10.9 inches TL was 2.7 years (SE = 0.13, N = 12). Relative weight for the sample remained poor at about 90. Directed fishing effort remained low at 0.16 h/acre in 2003 and 0.28 h/acre in 2004. Prior to 2000, directed effort was above 0.40 h/acre and was as high as 1.33 h/acre. The catch rate of anglers seeking white bass was 0.60/h in 2003 and 0.49/h in 2004. Harvest rate was 0.41/h in 2003 and 0.38/h in 2004.
- Smallmouth bass:** The electrofishing catch rate of smallmouth bass was 14.0/h in 2003 and 9.3/h in 2004. These catch rates were the lowest in 10 years and are likely due to loss of habitat due to record low water levels during the past two years. Condition of smallmouth bass remains lower than desired with all sizes of fish in poor condition. Average condition has improved over the past two years though as the gizzard shad population has increased. Directed fishing effort was 0.06 h/acre in 2003 and 0.13 h/acre in 2004. The catch rate for anglers seeking smallmouth bass was very low at 0.00/h in 2003 and 0.20/h in 2004 with the harvest rate remaining the same at 0.00/h. All harvest of smallmouth bass was by anglers who were either seeking another species or were seeking no species in particular.

- **Largemouth bass:** The electrofishing catch rate of largemouth bass was 8.7/h in 2002 and 2003 and 7.3/h in 2004 and all are within typical sampling variation (range 5.0 – 36.9/h). The Young to Adult Ratio (YAR) was 2.99, which is within the optimal range of 1-10. Directed fishing effort was 0.05 h/acre in 2003 and 0.51 in 2004. The catch rate for anglers seeking largemouth bass was 0.24/h in 2004, and the harvest rate was 0.00/h. Only 2 fish were documented as harvested in the 2004 creel survey and none in the 2003 survey. All harvest of largemouth bass was by anglers who were either seeking another species or were seeking no species in particular.
- **Crappie:** The trap net catch rate of white crappie was 1.9/NN in 2002 and 5.8/NN in 2004; within the normal sampling variation (range 1.0 – 6.9/NN) for this gear and species. Condition of white crappie has remained poor with average relative weights in the mid to low 80's. Directed fishing effort was 0.34 h/acre in 2003 and 0.17 in 2004. Total catch rate by anglers seeking crappie declined from 0.21/h in 2003 to 0.13/h in 2004 and was far below the 1998 to 2002 average of 0.87/h. Harvest rates were 0.07/h in 2003 and 0.05/h in 2004. These rates were below the 1998 to 2002 average of 0.31/h.

The 2002 trap net catch rate for black crappie remained low at 0.1/net night with only 2 fish collected and no fish were collected in 2004. There was no angling pressure directed specifically at black crappie.

- **Walleye:** The catch rate of walleye in gill nets was 14.3/NN in 2004 and 11.9/NN in 2005. These catch rates are much lower than the 2002 catch rate of 24.2/NN and 37.0/NN in 2003. The 2004 and 2005 catch rates are about half the 2000-2003 average of 25.0/NN. The decline in catch rate may be due to record low water levels in 2004. Walleye were collected by electrofishing at a catch rate of 11.4/h in 2003 and 42.7/h in 2004. The 1998-2002 average electrofishing catch rate was 23.8/h. Electrofishing samples indicate good reproduction. The average age of walleye 15.0 to 16.9 inches TL in 2005 was 4.5 years (SE = 0.26, N = 20). Mean relative weight was 98 for samples collected in 2004 and 2005. Directed fishing effort was 0.50 h/acre in 2003 to 1.55 h/acre in 2004. The very low directed pressure in 2003 was likely due to wide publicity about falling water levels at Meredith Reservoir and the closing of most of the boat ramps. The catch rate for anglers seeking walleye was 0.60 fish/h in 2003 and 0.13 fish/h in 2004. The harvest rate was 0.10 fish/h in 2003 and 0.13 fish/h in 2004 and was within normal sampling variability. Seventy six percent of walleye observed as harvested in the creel in 2003 were less than 16 inches in length and 44% were less than 16 inches in 2004. Walleye as small as 5 inches were documented in the creel survey indicating anglers are willing to harvest small fish.
- **Management Strategies**  
Based on current information, all species in the reservoir should continue to be managed with existing regulations. The harvest regulation for walleye changed on September 1, 1999 from a 16-inch minimum length, 5-fish daily bag to a 5-fish daily bag with no more than 2 fish under 16 inches. The existing walleye regulation is being evaluated through continuation of standard gill net sampling through 2006. Evaluation of standard versus random sampling indicated standard stations are more effective at collecting all target species (Appendix D, Table 1 and Figure 1). Largemouth bass are recommended for stocking when the YAR is below the accepted range of 1-10 and water levels have increased enough to inundate adequate cover.

4  
INTRODUCTION

This document is a summary of fisheries data collected from Meredith Reservoir from fall 2003 to spring 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 is presented for comparison.

Status of Management Actions from 2002 (Munger 2003)

Issue 1      Stock F1 generation hybrid Florida largemouth bass when YAR is below 1. Evaluate sampling locations to ensure largemouth bass habitat is included and conduct supplemental sampling if habitat is not included.

Management Action

1. No supplemental stocking was required as the largemouth bass YAR was within the accepted range of 1-10.
2. Supplemental bass-only sampling was not conducted due to very low water levels.

Issue 2      Evaluate the smallmouth bass 12-15 inch slot length limit.

Management Action

1. Monitoring of the smallmouth bass population under current regulations has continued. Record low water levels have reduced sample size to where analysis cannot be conducted.

Issue 3      Evaluate the walleye harvest regulation of no minimum length limit and a 5 fish bag with no more than 2 fish under 16 inches. Evaluate the genetic impact of stocking Colorado walleye in 1998 and 2000.

Management Action

1. Monitoring of the walleye population under current harvest regulations has continued. Data collection will be completed in 2006.
2. Genetic samples from yearling walleye were collected in spring 2004 gill net samples. Detailed analysis could not be conducted due to lost pre-stocking data.
3. Angler opinion surveys concerning potential alternate regulations were not conducted in 2004 due to extreme low water conditions which resulted in very low angler contact opportunities.

Harvest regulations for Meredith Reservoir.

Species	Bag Limit	Minimum-Maximum Length (inches)
Bass, Largemouth	5	14 - No Limit
Bass, Smallmouth	3	12 - 15 Slot Length Limit
Bass, White	25	10 - No Limit
Catfish, Flathead	5	18 - No Limit
Catfish, Blue and Channel in aggregate	25	12 - No Limit
Crappie, Black and White in aggregate	25	10 - No Limit
Walleye	5	No more than 2 under 16 inches

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METHODS

- Fishes were collected by fall electrofishing (1.5 hours at 18 random 5-minute stations), spring gill nets (10 standard stations), and fall trap nets (20 random stations). Gill net effort was reduced due to very low water levels. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (N/h) of actual electrofishing. Gill and trap net CPUE was the number of fish caught in one net set overnight (N/NN). No significant man-made changes have occurred at the reservoir since 1998 (Munger 1999) so habitat surveys were not conducted.
- Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and relative weight indices were calculated for target fishes according to Anderson and Neumann (1996).
- Ages were determined for selected fish using otoliths.
- A 6-month creel survey (April – September; 20 days in 2003 with 10 days/quarter and 18 days in 2004 with 9 days/quarter) was conducted to quantify the fishery.
- All sampling was conducted according to Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- An index of vulnerability (IOV) was calculated for gizzard shad according to DiCenzo et al. (1996). The Young-Adult ratio was calculated according to Reynolds and Babb (1978).

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- 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, second 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.
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- Munger, C. R., and J. E. Kraai. 1997. Evaluation of a 407-mm minimum length limit and five fish bag limit for walleyes in Meredith Reservoir, Texas. *North American Journal of Fisheries Management* 17:438-445.
- Reynolds, J. B., and L. R. Babb. 1978. Structure and dynamics of largemouth bass populations. Pages 50-61 in G. D. Novinger and J. G. Dillard, editors. *New approaches to the management of small impoundments*. North Central Division of the American Fisheries Society Special Publication Number 5, Bethesda, Maryland.

Physical and historical data for Meredith Reservoir, Texas, 2004.

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Inland Fisheries water body code: 0494	IF District: IA - Canyon
Controlling authority: Canadian River Municipal Water Authority	Acres: 16,000
Water Uses: Water supply, recreation	2004 average acreage: 6,200
Counties: Hutchinson, Moore, Potter	Location: 35 miles NE of Amarillo
Latitude: 35° 40'	Longitude: 101° 35'
Nearest major metropolitan area and distance: Amarillo - 35 miles	
Reservoir description: Mainstream	River: Canadian
Mean depth (ft): 30	Maximum depth (ft): 127.0
Shoreline development index: 5.05	Watershed (mi <sup>2</sup> ): 6,018
Secchi disc range (ft): 2-8	Conductivity (µmhos/cm): 2,500
Constructed: 1965	
Access:	
Boat:	Adequate - 7 ramps (Only 1 ramp open in summer 2004 due to low water)
Bank:	Adequate - 9 areas
Handicap	Adequate - 4 handicap accessible piers (Only 1 open in 2004 due to low water)

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Stocking history of Meredith Reservoir, Texas. Size categories are: FRY = <1 inch; FGL = 1-3 inches; and ADL = adults (sexually mature fish).

Year	Number	Size	Year	Number	Size
<u>Rainbow trout</u>			<u>Largemouth bass</u>		
1973	50,000	ADL	1965	480,000	FGL
<u>Brown trout</u>			1966	432,000	FGL
1973	30,000	ADL	1973	61,000	FGL
<u>Blue catfish</u>			1973	27,000	ADL
1965	2,500	FGL	1983	553	ADL
1966	9,000	FGL	1994	286,400	FGL
1971	12,000	FGL	1995	586,663	FGL
1972	30,000	FGL	1997	177,000	FGL
1988	<u>160,500</u>	FRY	2000	<u>20,370</u>	FGL
Species Total	214,000		Species Total	2,070,986	
<u>Channel catfish</u>			<u>Florida largemouth bass</u>		
1965	421,500	FGL	1986	631	ADL
1966	360,000	FGL	1990	401,749	FGL
1970	9,680	FGL	1993	<u>100,000</u>	FGL
1971	12,000	FGL	Species Total	502,380	
1973	<u>107,690</u>	FGL	<u>F1 Florida X northern largemouth bass hybrids</u>		
Species Total	910,870		2001	32,000	FGL
<u>Flathead catfish</u>			<u>Kemp's largemouth bass</u>		
1966	15,000	FGL	1988	412,727	FGL
1966	18	ADL	1990	<u>189</u>	ADL
<u>White bass</u>			Species Total	412,916	
1965	15	ADL	<u>Mixed largemouth bass</u>		
<u>Smallmouth bass</u>			1989*	197	ADL
1974	11,100	FGL	1990*	<u>40</u>	ADL
1975	28,000	FGL	Species Total	237	
1976	66,000	FGL	<u>Crappie</u>		
1977	<u>322,700</u>	FGL	1994	308	ADL
Species Total	427,800		<u>White crappie</u>		
			1965	125,000	FRY
			1965	258	ADL
			1966	<u>50,000</u>	FGL
			Species Total	175,258	

Continued

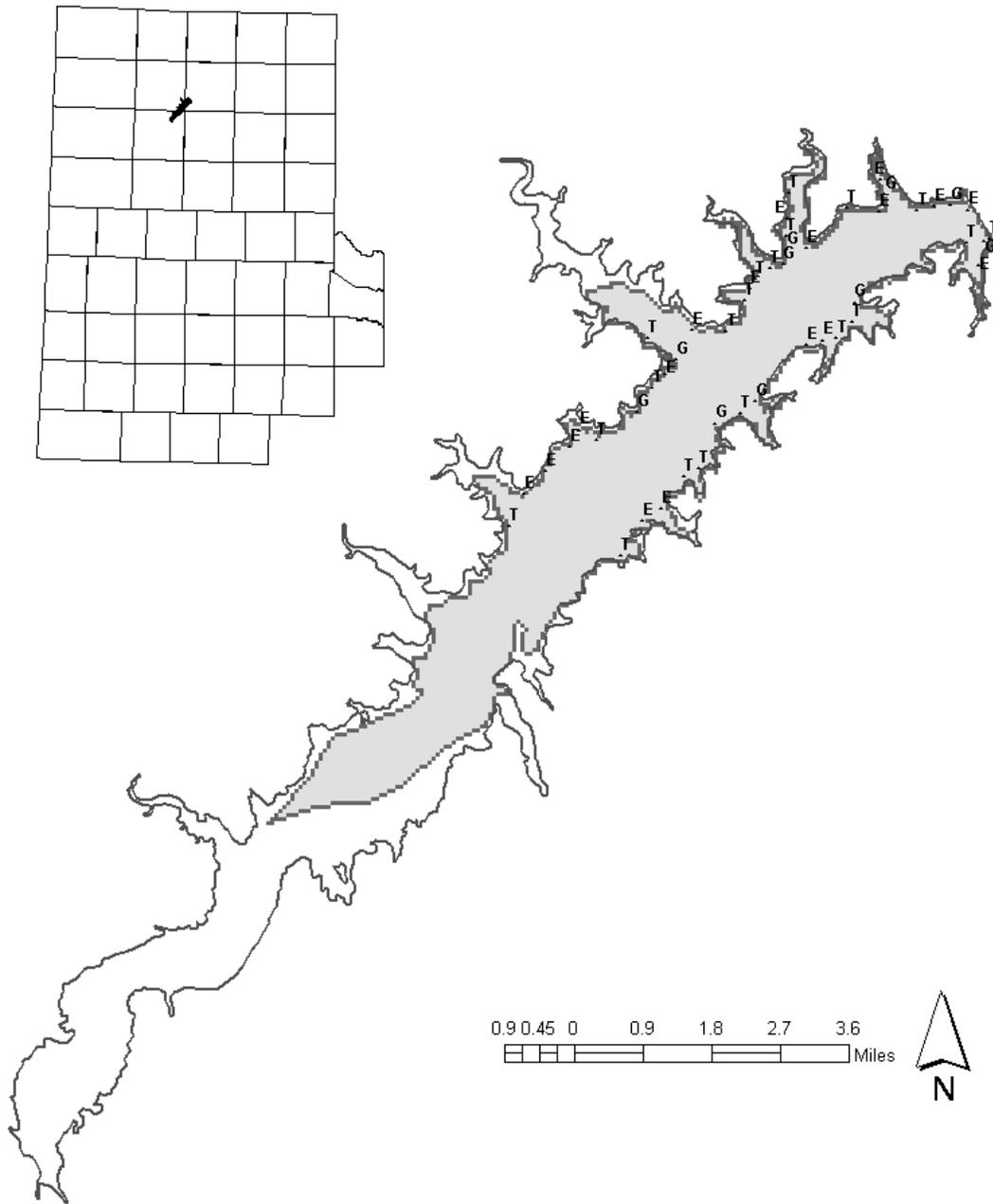
Stocking history of Meredith Reservoir, Texas  
continued.

	<u>Black crappie</u>			<u>Walleye</u>	
1966	150,000	FGL	1965	500,000	FRY
			1966	2,000,000	FRY
	<u>Yellow perch</u>		1969	750,000	FRY
1980	2,500	ADL	1998**	5,096,000	FRY
1981	2,500	ADL	2000**	<u>290,196</u>	FGL
1983	2,212	ADL	Species Total	8,636,196	
1984	400	ADL			
1992	165,116	FGL			
1995	<u>30,381</u>	FGL			
Species Total	203,109				

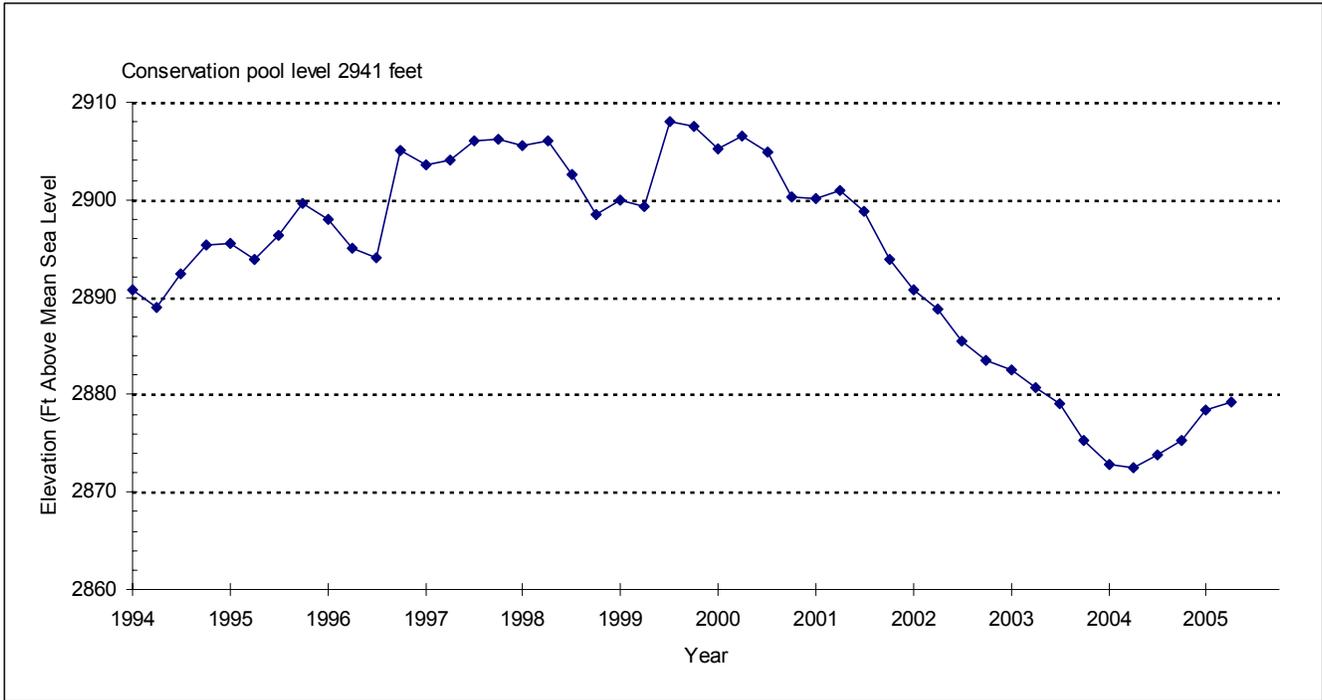
\*(retired brood fish 1.5 to 4.0 pounds)

\*\*Walleye obtained from Colorado.

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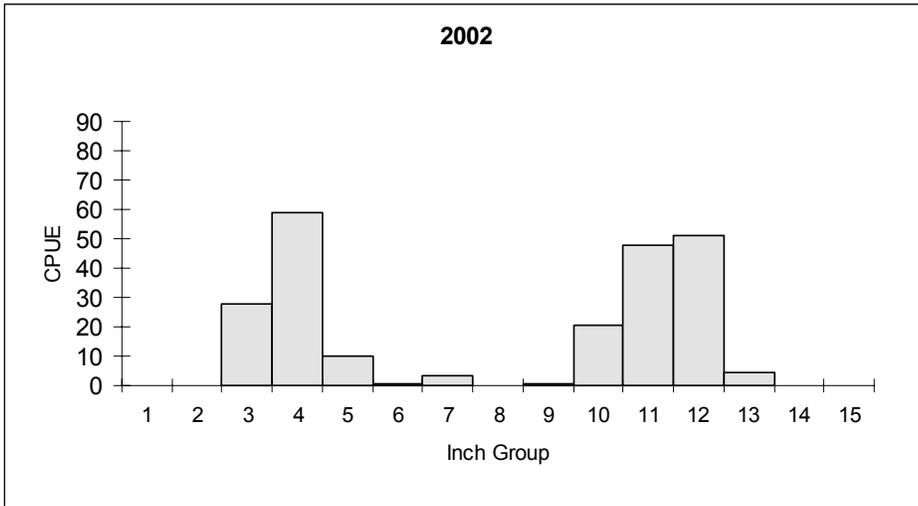
Location of sampling sites, Meredith Reservoir, Texas, 2004-05. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Gill net stations are standard locations each year. Shaded area indicates size during sampling.



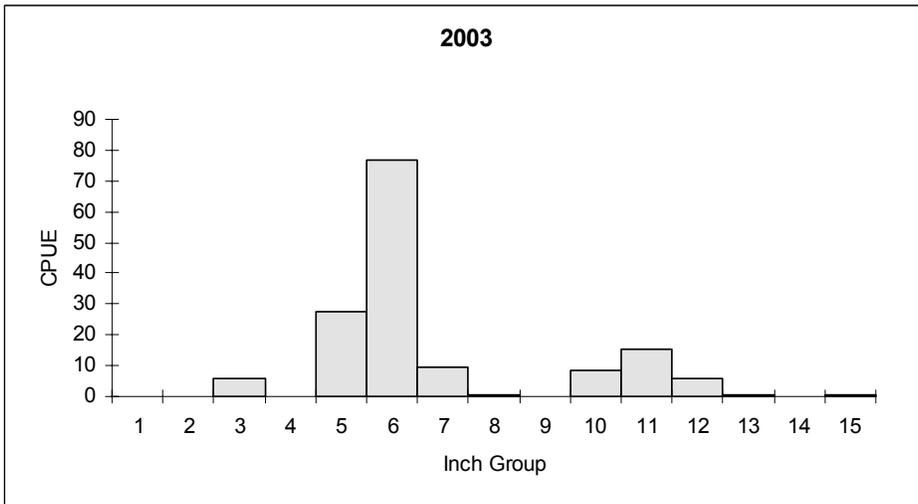
Quarterly water level elevations in feet above mean sea level (MSL) recorded for Meredith Reservoir, Texas. Conservation pool elevation is 2,941 feet MSL.



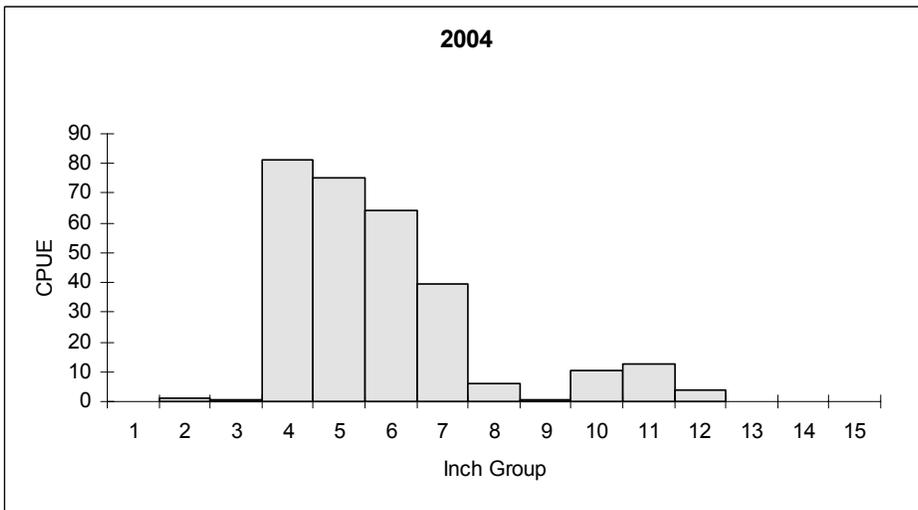
**Gizzard Shad**



Effort = 1.5  
 Total CPUE = 226.0  
 Stock CPUE = 128.7  
 PSD = 81  
 IOV = 44



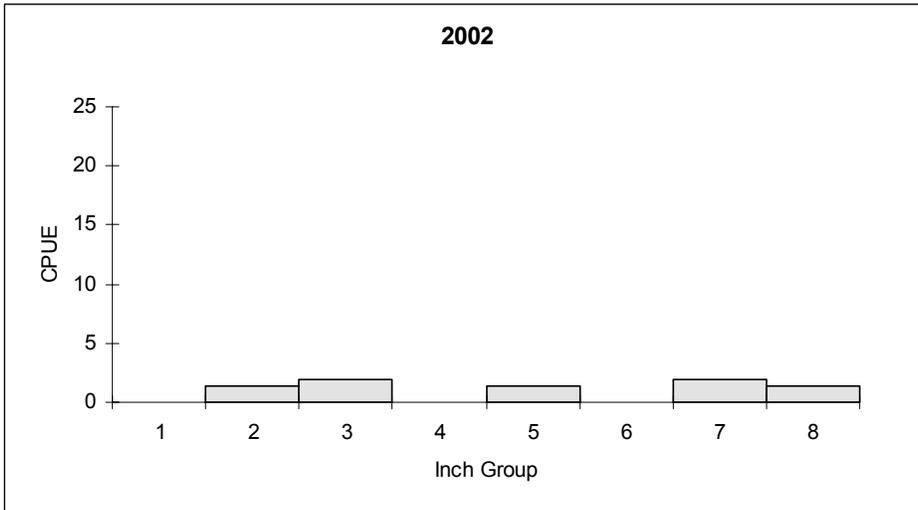
Effort = 1.5  
 Total CPUE = 151.3  
 Stock CPUE = 41.3  
 PSD = 55  
 IOV = 79



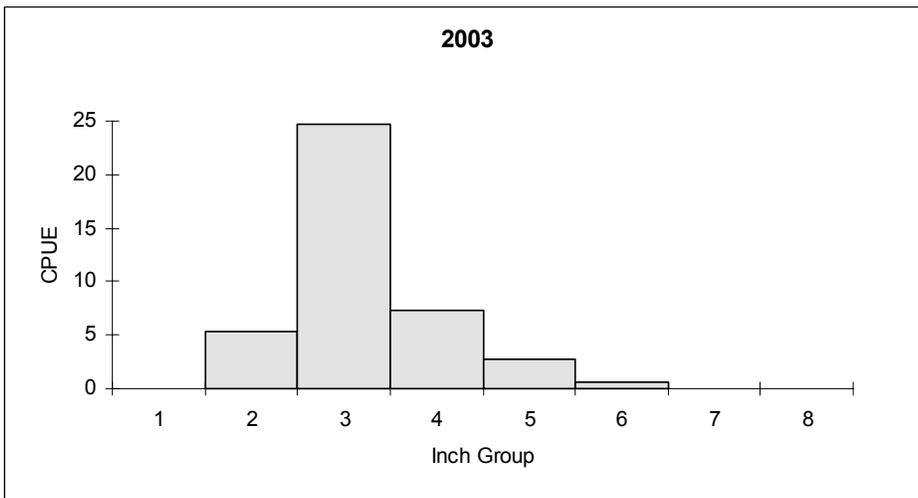
Effort = 1.5  
 Total CPUE = 296.0  
 Stock CPUE = 73.3  
 PSD = 23  
 IOV = 88

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

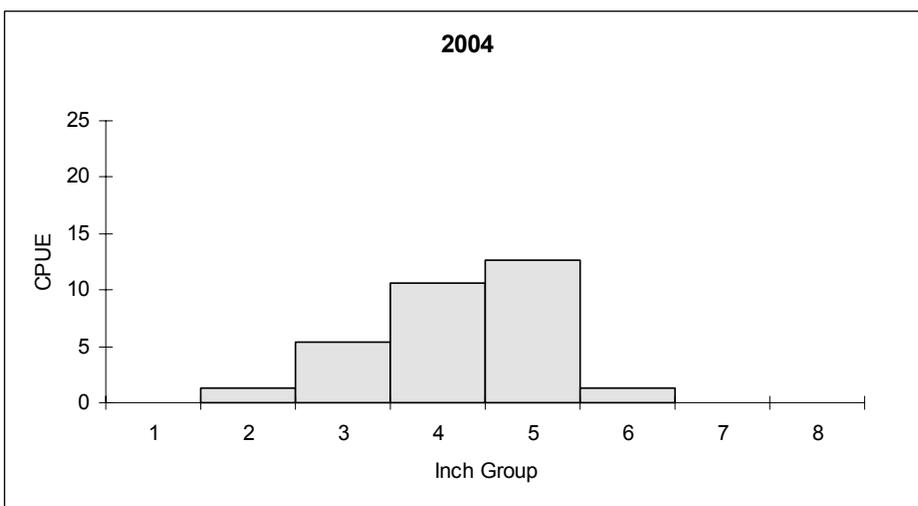
13  
**Bluegill**



Effort = 1.5  
 Total CPUE = 8.0  
 Stock CPUE = 6.7  
 PSD = 50  
 RSD-P = 20



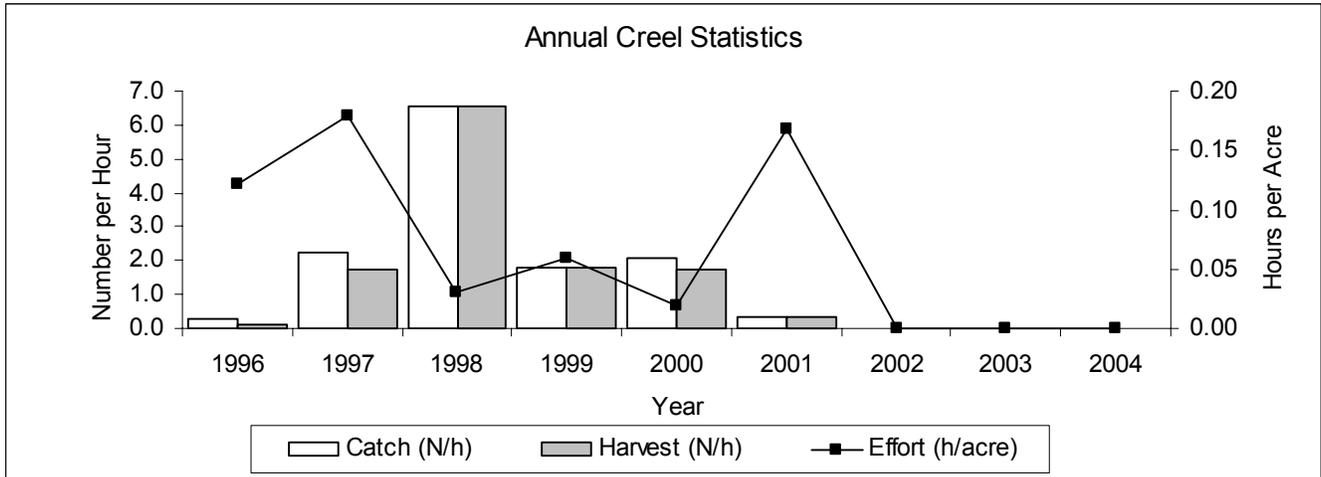
Effort = 1.5  
 Total CPUE = 40.7  
 Stock CPUE = 35.3  
 PSD = 2  
 RSD-P = 0



Effort = 1.5  
 Total CPUE = 31.3  
 Stock CPUE = 30.0  
 PSD = 4  
 RSD-P = 0

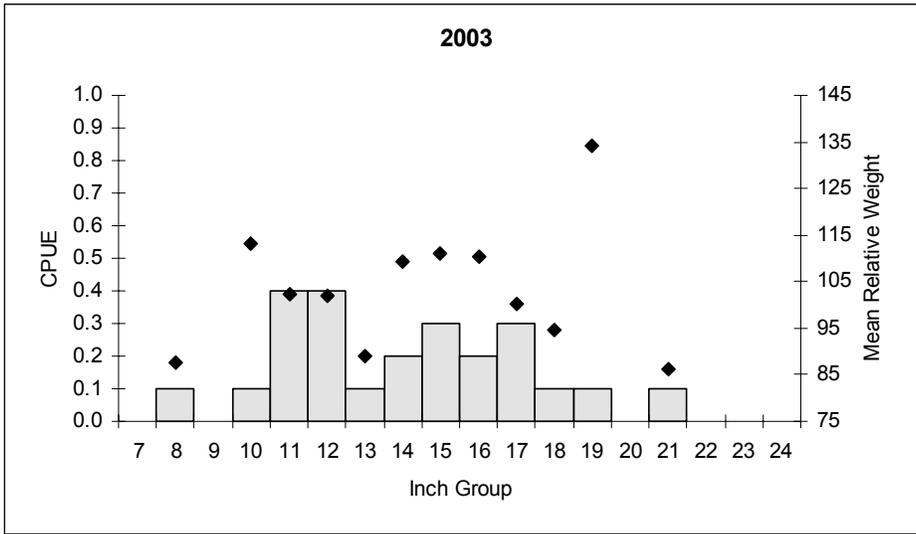
Comparison of the number of bluegill caught per hour (CPUE) and population indices for fall electrofishing surveys, Meredith Reservoir, Texas.

## Bluegill

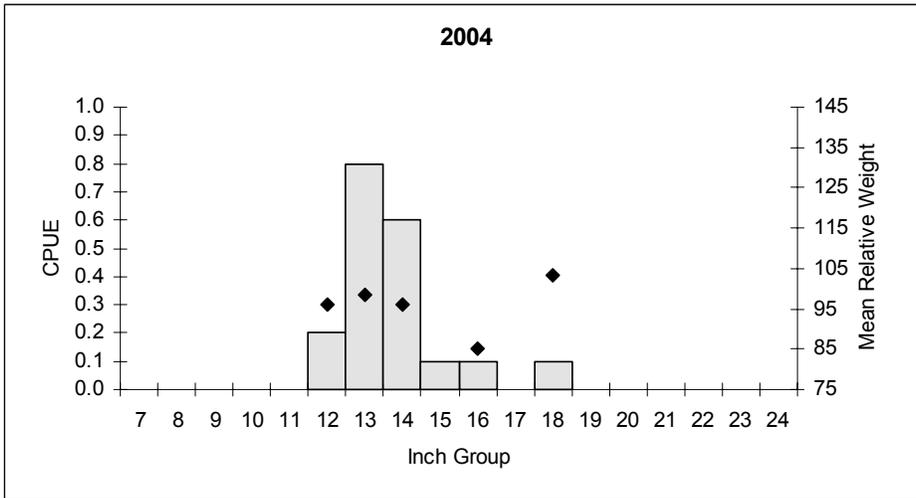


Annual creel statistics for anglers seeking bluegill at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000. No anglers have indicated they were seeking bluegill since 2001.

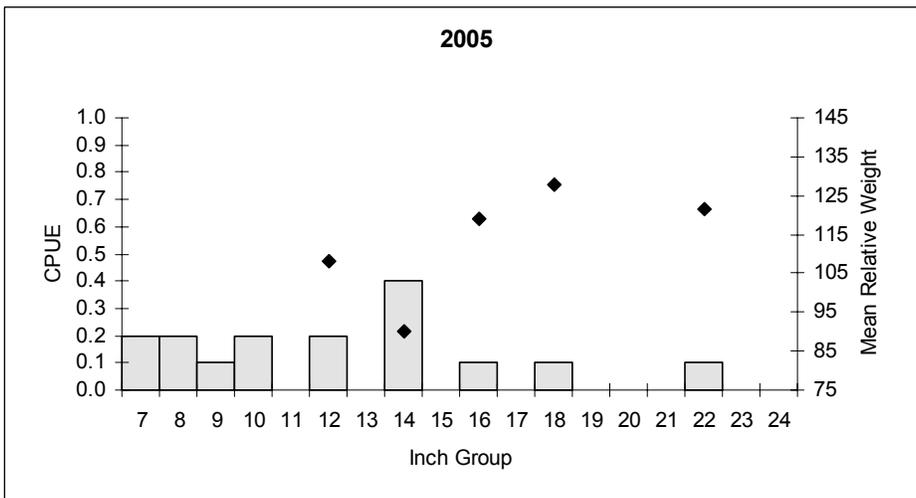
15  
**Channel Catfish**



Effort = 10  
 Total CPUE = 2.4  
 Stock CPUE = 2.2  
 PSD = 36  
 RSD-P = 0



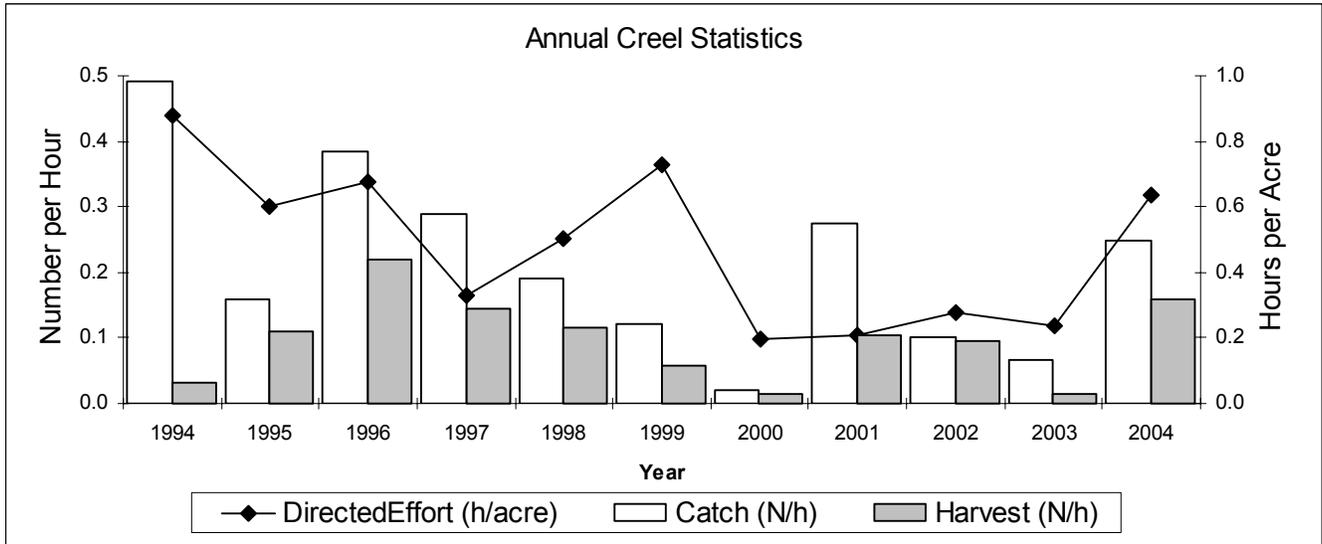
Effort = 10  
 Total CPUE = 1.9  
 Stock CPUE = 1.9  
 PSD = 11  
 RSD-P = 0



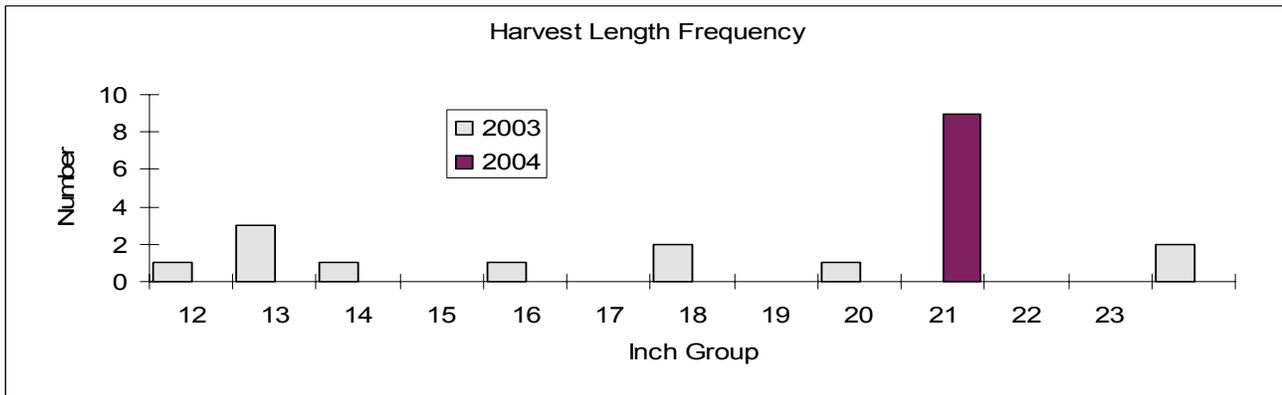
Effort = 10  
 Total CPUE = 1.6  
 Stock CPUE = 0.9  
 PSD = 33  
 RSD-P = 0

Comparison of the number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for spring gill net collections, Meredith Reservoir, Texas.

16  
**Channel Catfish**

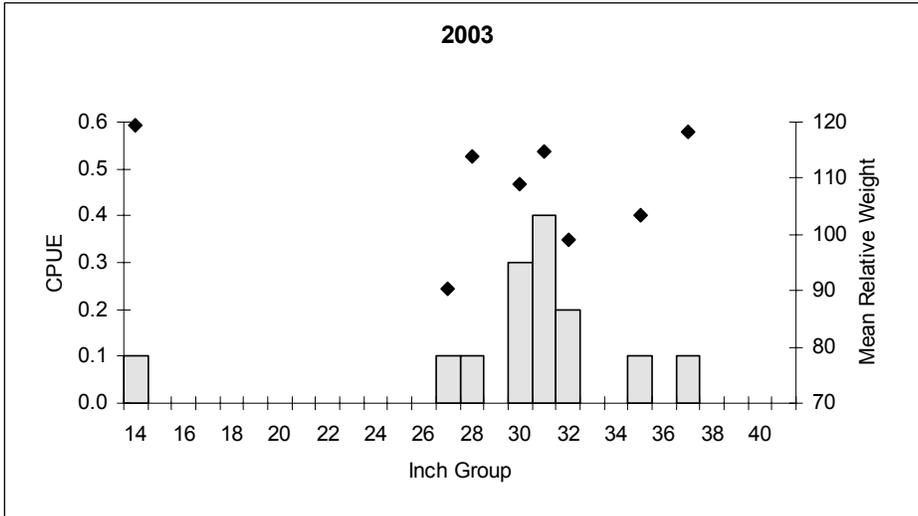


Annual creel statistics for anglers seeking channel catfish at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000.

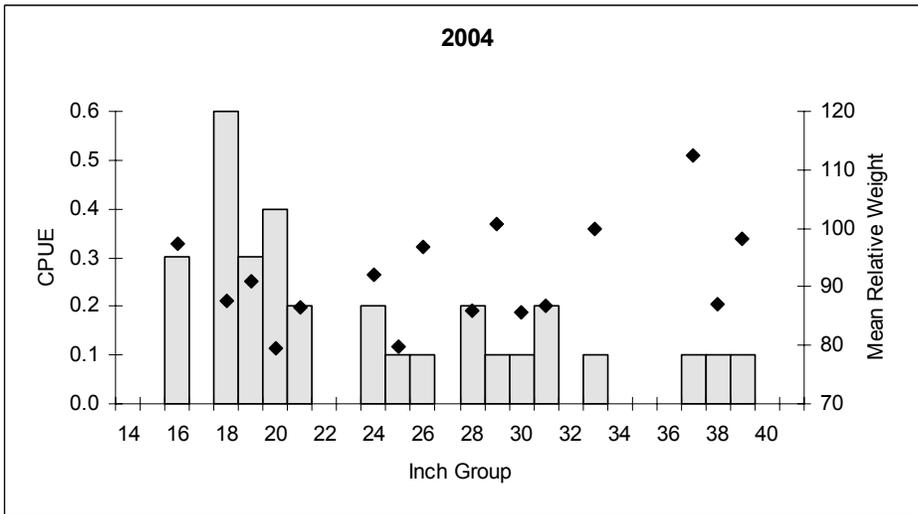


Length frequency of channel catfish observed during creel surveys at Meredith Reservoir, April through September 2003 and 2004, all anglers combined. The minimum length limit was 12 inches.

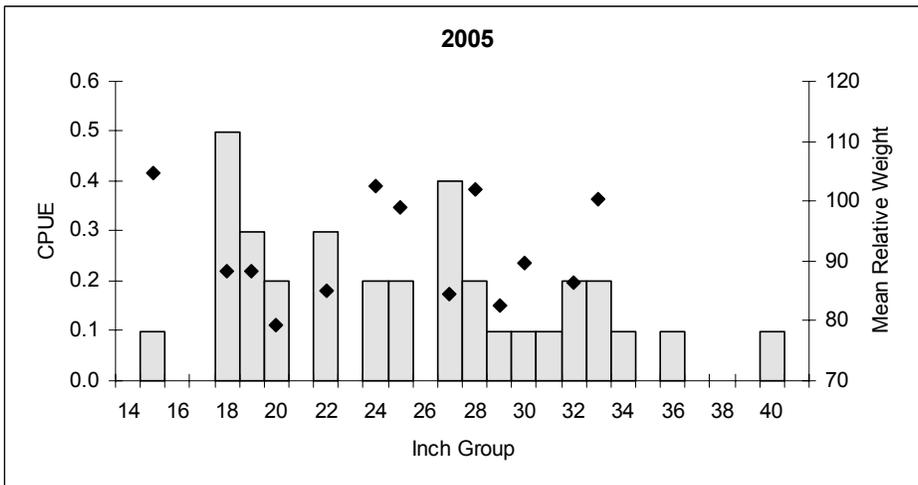
### Flathead Catfish



Effort = 10  
 Total CPUE = 1.4  
 Stock CPUE = 1.4  
 PSD = 93  
 RSD-P = 93



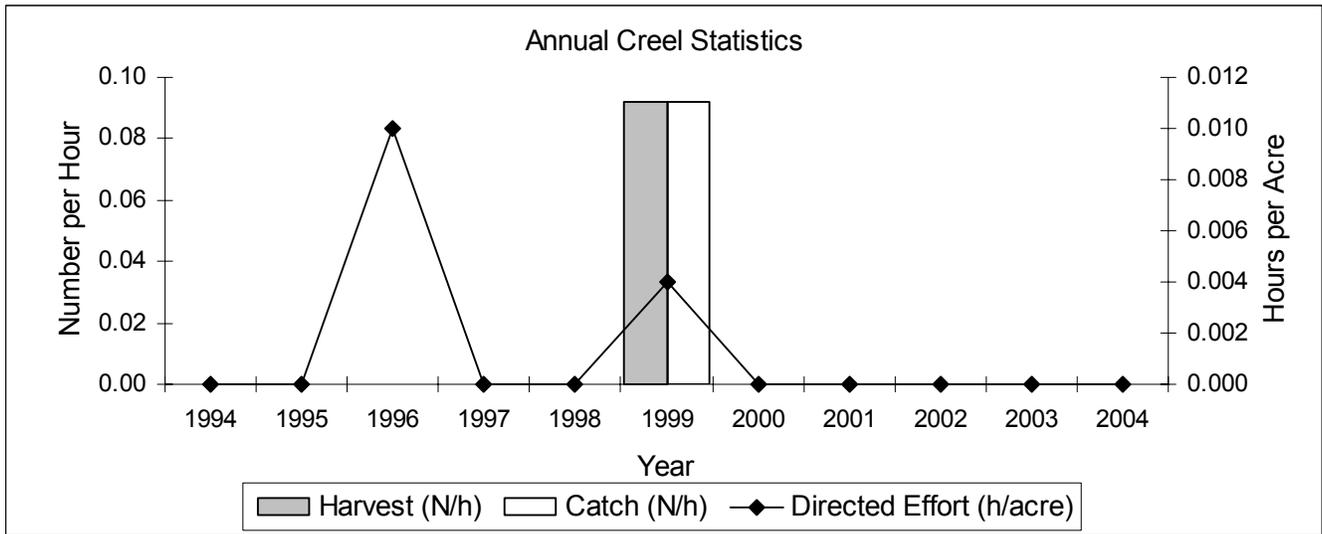
Effort = 10  
 Total CPUE = 3.2  
 Stock CPUE = 3.2  
 PSD = 100  
 RSD-P = 44



Effort = 10  
 Total CPUE = 3.4  
 Stock CPUE = 3.4  
 PSD = 97  
 RSD-P = 59

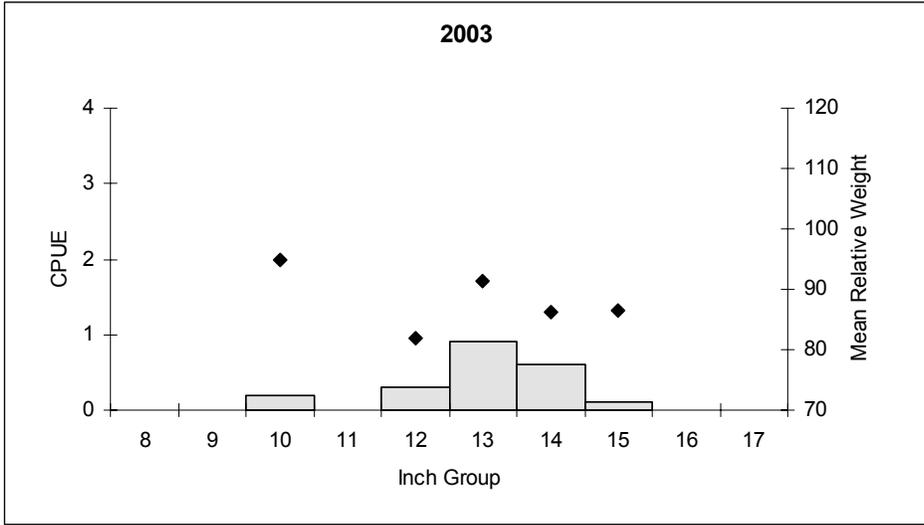
Comparison of the number of flathead catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for spring gill net collections, Meredith Reservoir, Texas.

### Flathead Catfish

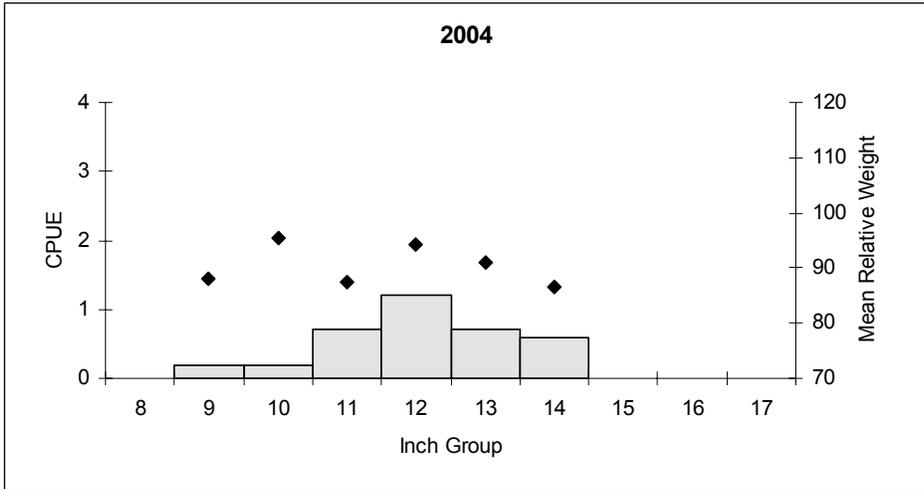


Annual creel statistics for anglers seeking flathead catfish at Meredith Reservoir, Texas. Creel periods were from January through December to 2001, then changed to April through September in 2002.

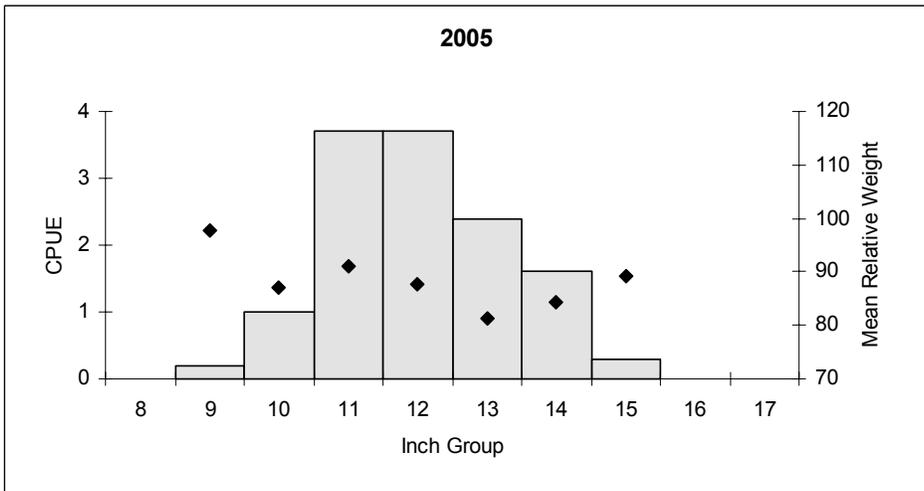
19  
**White Bass**



Effort = 10  
 Total CPUE = 2.1  
 Stock CPUE = 2.1  
 PSD = 100  
 RSD-P = 90



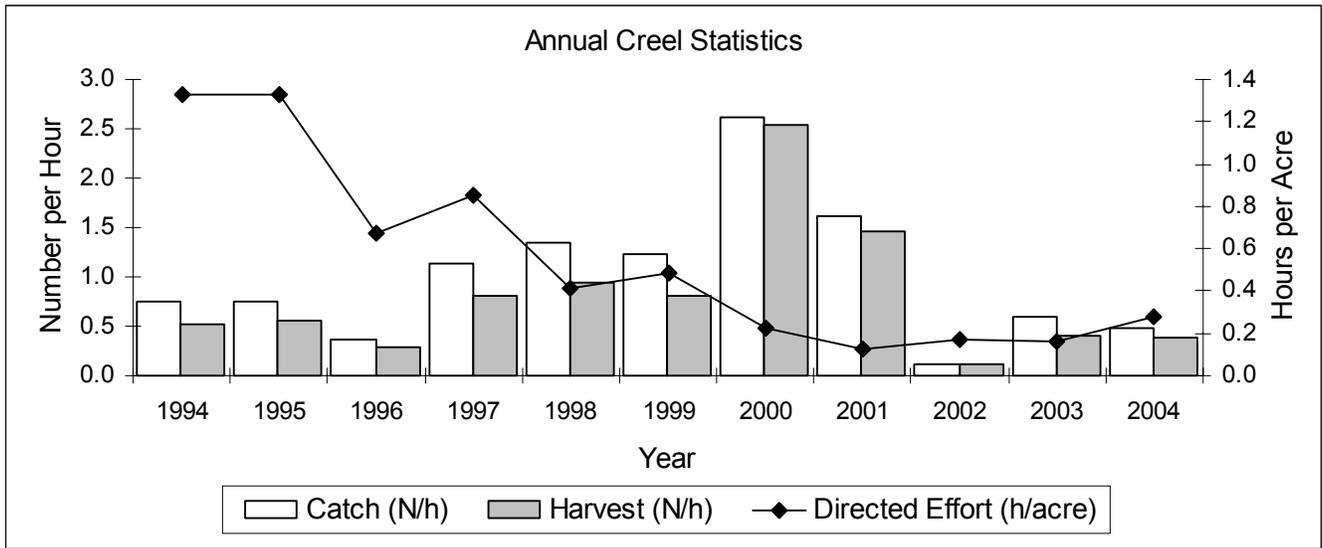
Effort = 10  
 Total CPUE = 3.6  
 Stock CPUE = 3.6  
 PSD = 100  
 RSD-P = 69



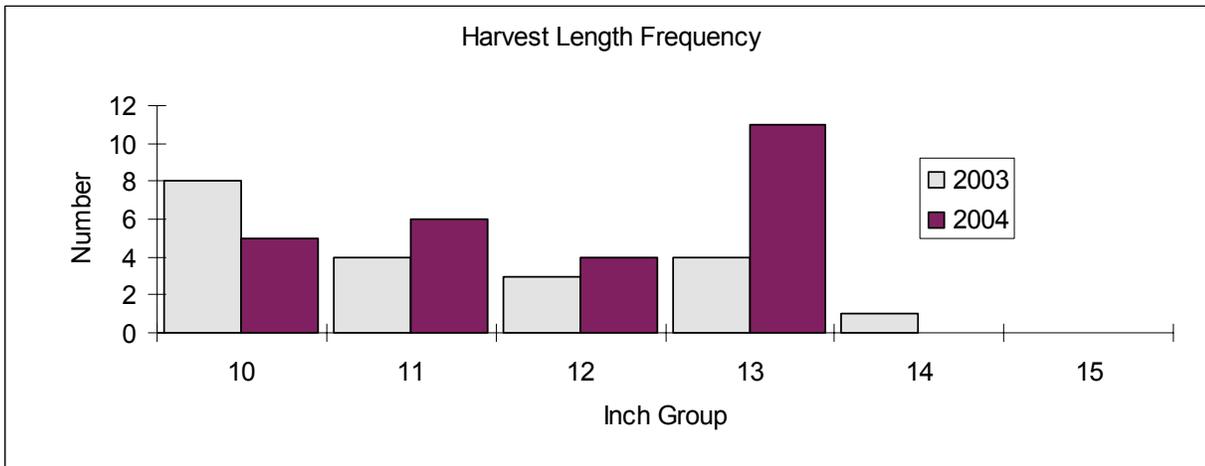
Effort = 10  
 Total CPUE = 12.9  
 Stock CPUE = 12.9  
 PSD = 100  
 RSD-P = 62

Comparison of the number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for spring gill net collections, Meredith Reservoir, Texas.

### White Bass

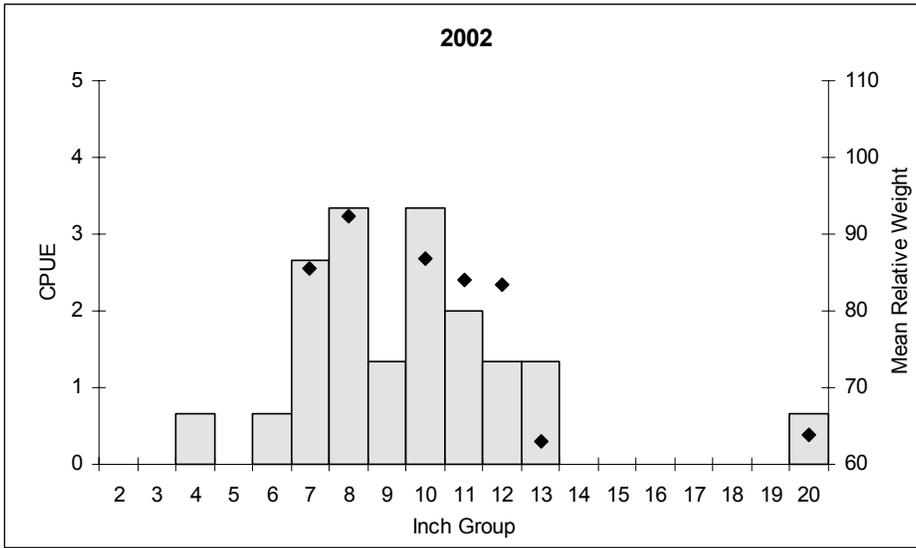


Annual creel statistics for anglers seeking white bass at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000.

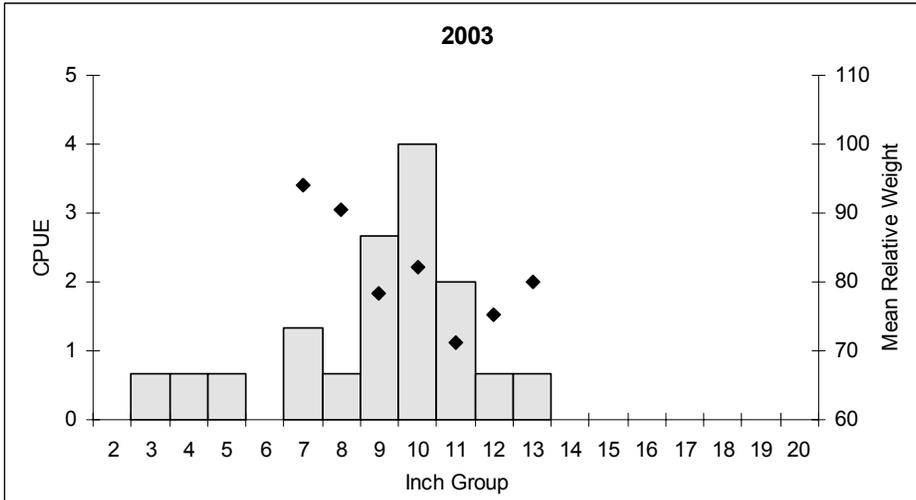


Length frequency of white bass observed during creel surveys at Meredith Reservoir, April through September 2003 and 2004, all anglers combined. The minimum length limit was 10 inches.

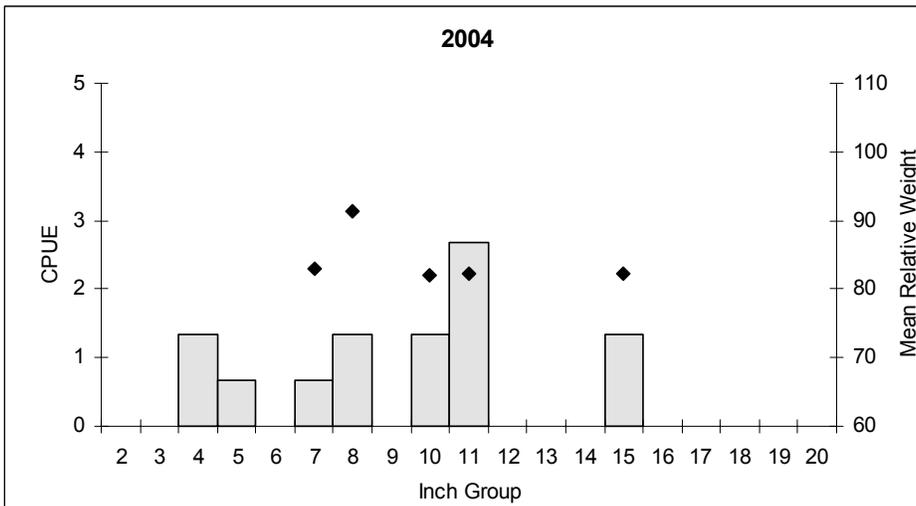
**Smallmouth Bass**



Effort = 1.5  
 Total CPUE = 17.3  
 Stock CPUE = 15.3  
 PSD = 33  
 RSD-P = 4



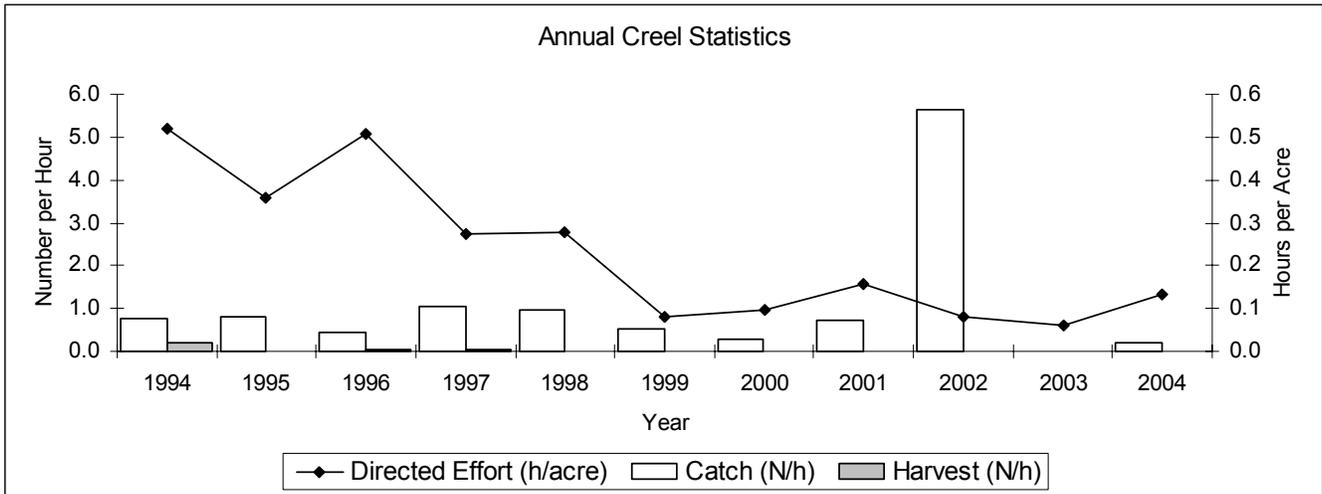
Effort = 1.5  
 Total CPUE = 14.0  
 Stock CPUE = 12.0  
 PSD = 28  
 RSD-P = 0



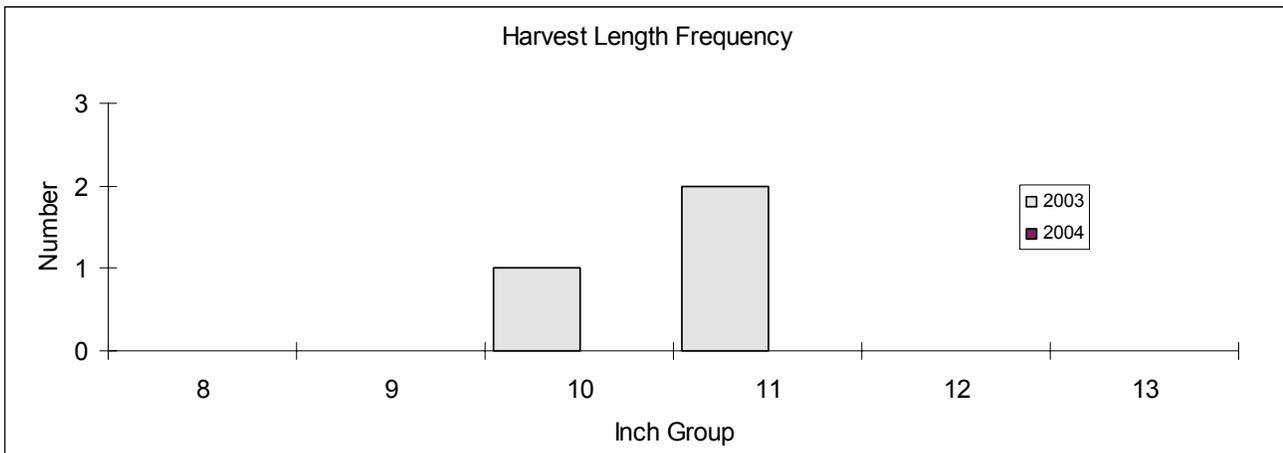
Effort = 1.5  
 Total CPUE = 9.3  
 Stock CPUE = 7.3  
 PSD = 55  
 RSD-P = 18

Comparison of the number of smallmouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices for fall electrofishing surveys, Meredith Reservoir, Texas.

### Smallmouth Bass

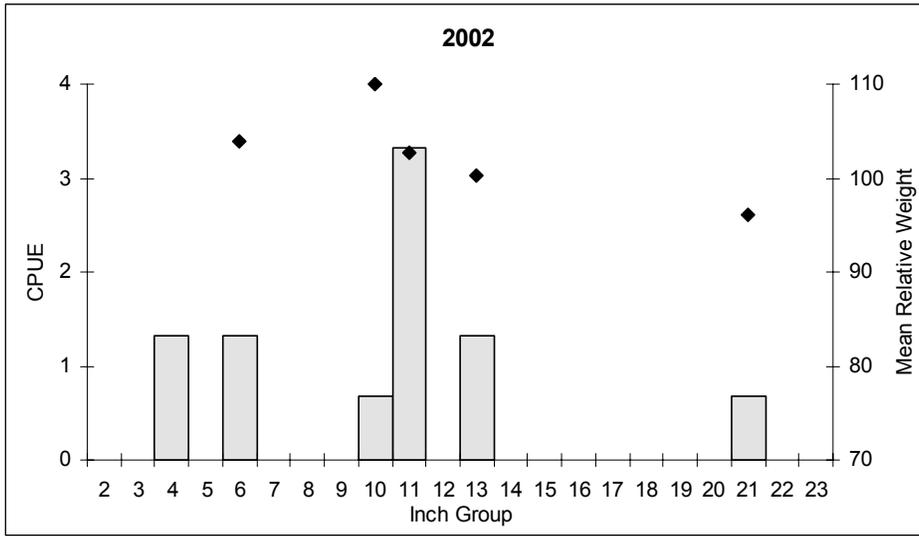


Annual creel statistics for anglers seeking smallmouth bass at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000.

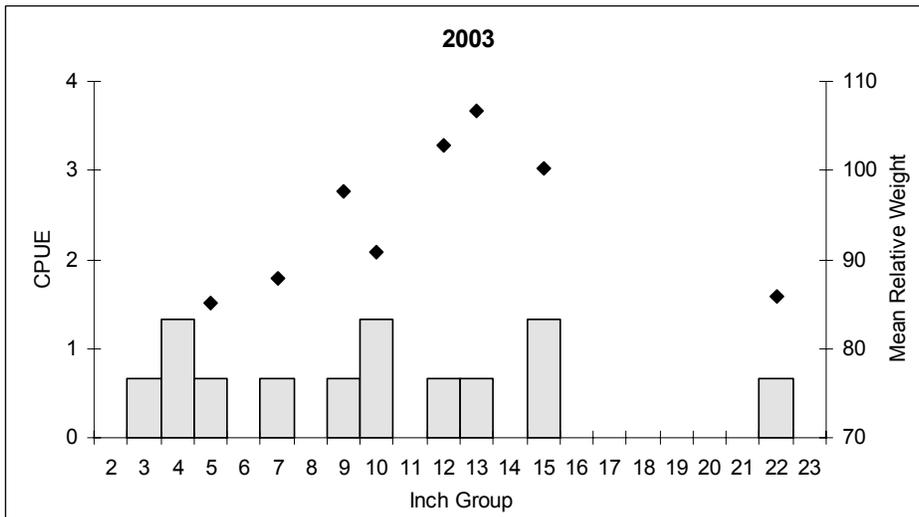


Length frequency of smallmouth bass observed during creel surveys at Meredith Reservoir, April through September 2003 and 2004, all anglers combined. A 12- inch to 15-inch slot length limit was in effect during the surveys.

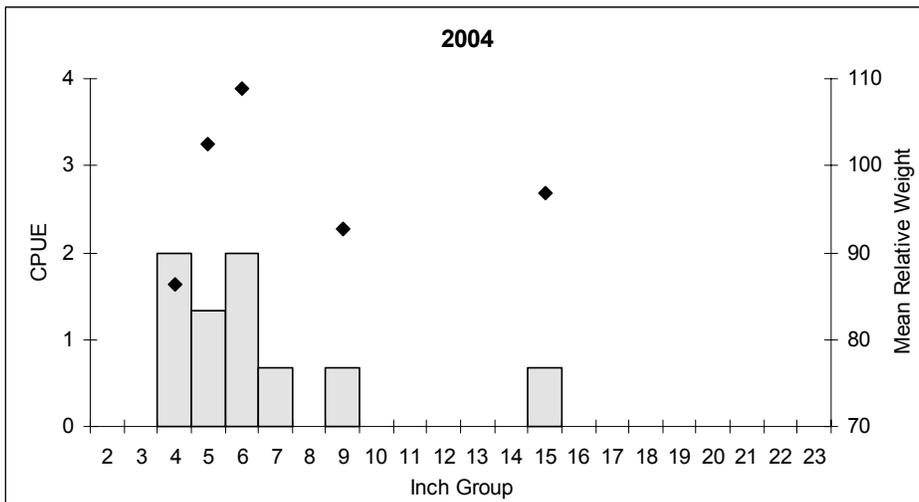
### Largemouth Bass



Effort = 1.5  
 Total CPUE = 8.7  
 Stock CPUE = 6.0  
 PSD = 33  
 RSD-P = 11  
 % FLMB Alleles = N/A  
 % FLMB Genotype = N/A  
 YAR = 0.67



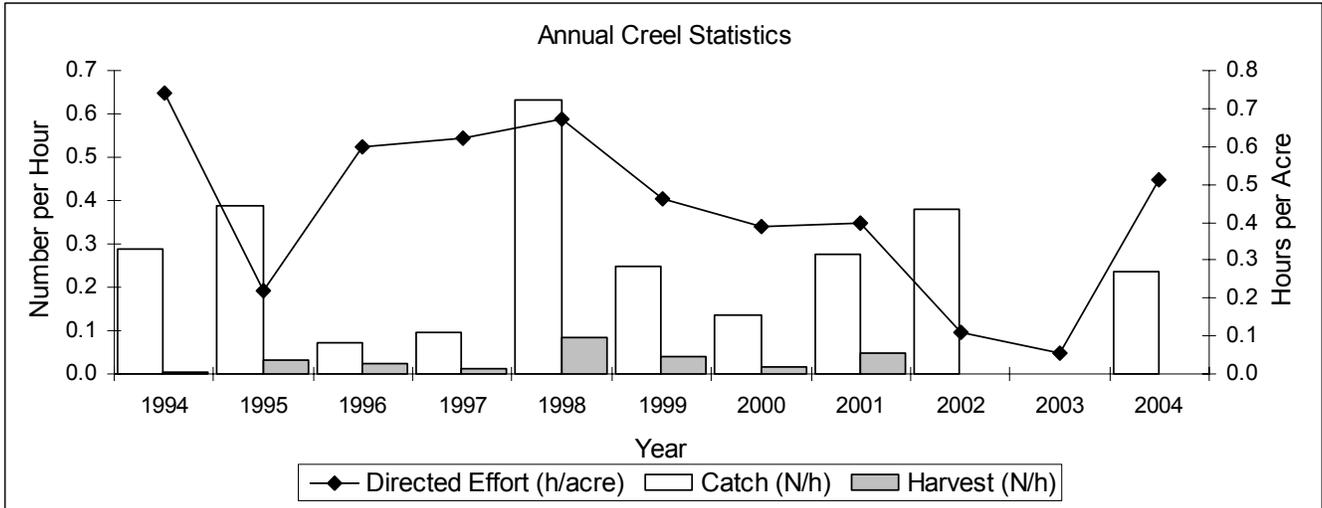
Effort = 1.5  
 Total CPUE = 8.7  
 Stock CPUE = 5.3  
 PSD = 63  
 RSD-P = 37  
 % FLMB Alleles = N/A  
 % FLMB Genotype = N/A  
 YAR = 0.60



Effort = 1.5  
 Total CPUE = 7.3  
 Stock CPUE = 1.3  
 PSD = 50  
 RSD-P = 50  
 % FLMB Alleles = N/A  
 % FLMB Genotype = N/A  
 YAR = 2.99

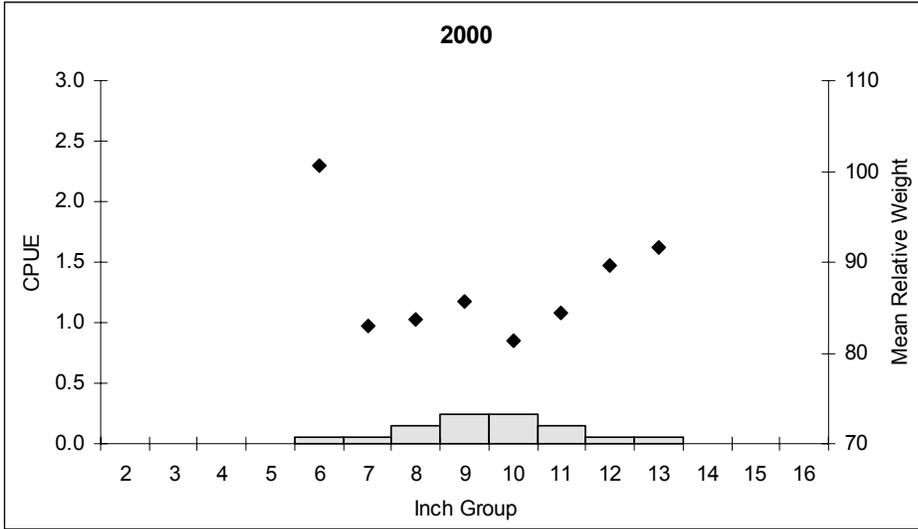
Comparison of the number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices for fall electrofishing surveys, Meredith Reservoir, Texas.

### Largemouth Bass

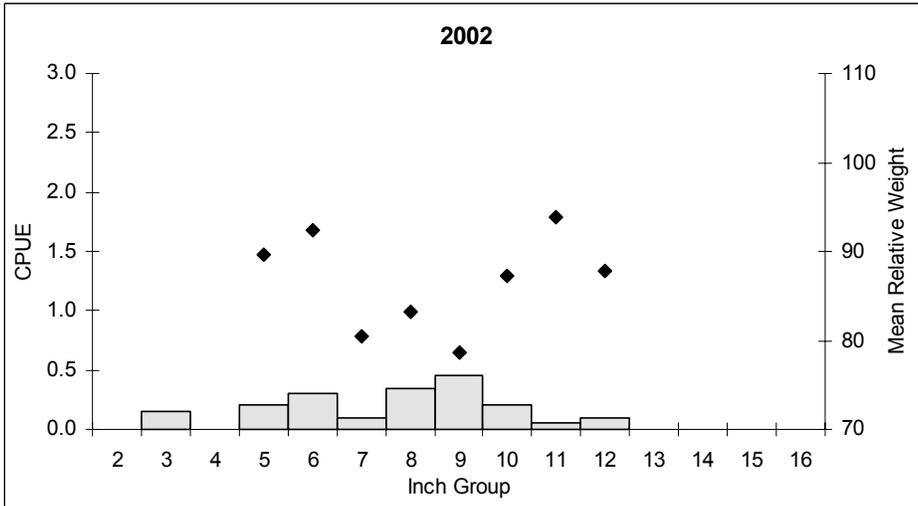


Annual creel statistics for anglers seeking largemouth bass at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000. Values for 2004 are for individuals seeking black bass.

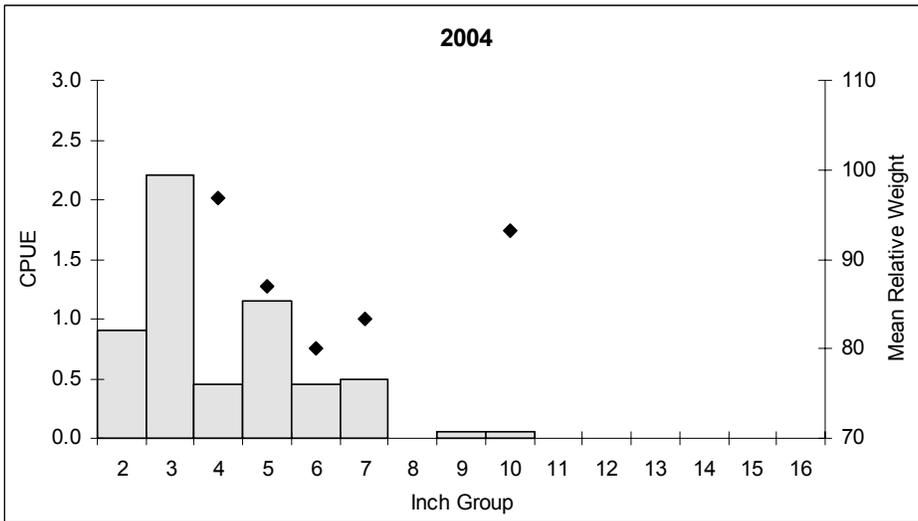
25  
**White Crappie**



Effort = 20  
 Total CPUE = 1.0  
 Stock CPUE = 1.0  
 PSD = 90  
 RSD-P = 50



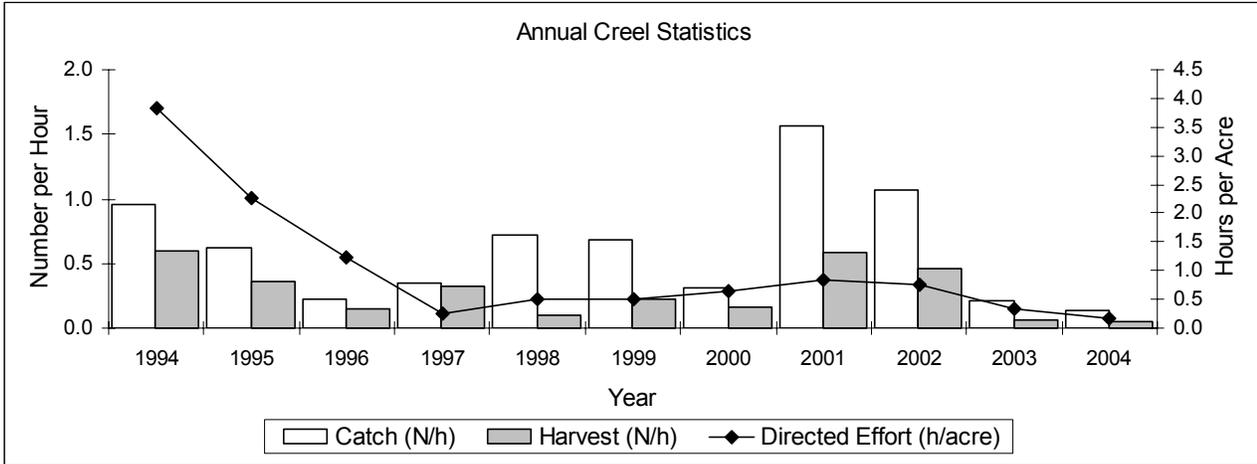
Effort = 20  
 Total CPUE = 1.9  
 Stock CPUE = 1.7  
 PSD = 66  
 RSD-P = 20



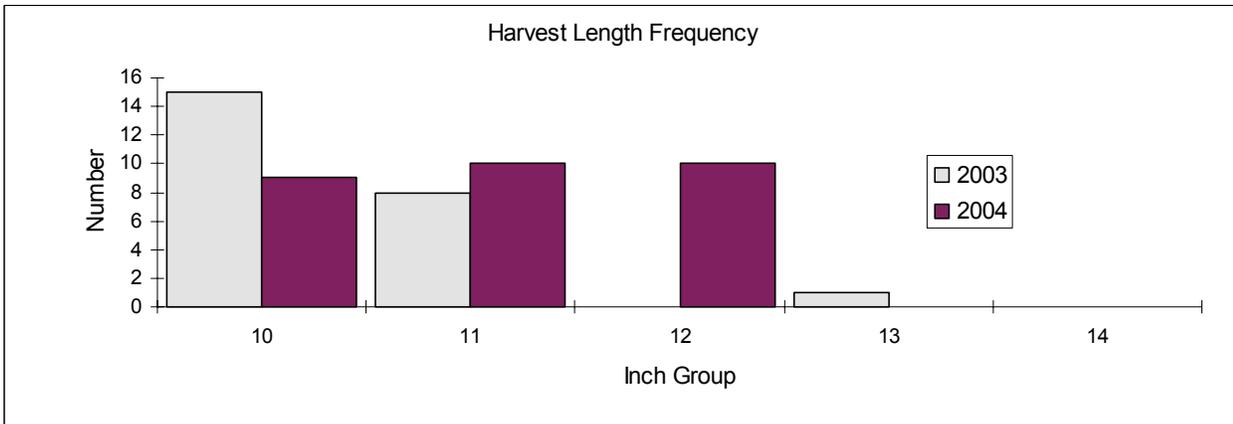
Effort = 20  
 Total CPUE = 5.8  
 Stock CPUE = 2.2  
 PSD = 4  
 RSD-P = 2

Comparison of the number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for fall trap net surveys, Meredith Reservoir, Texas.

26  
**White Crappie**



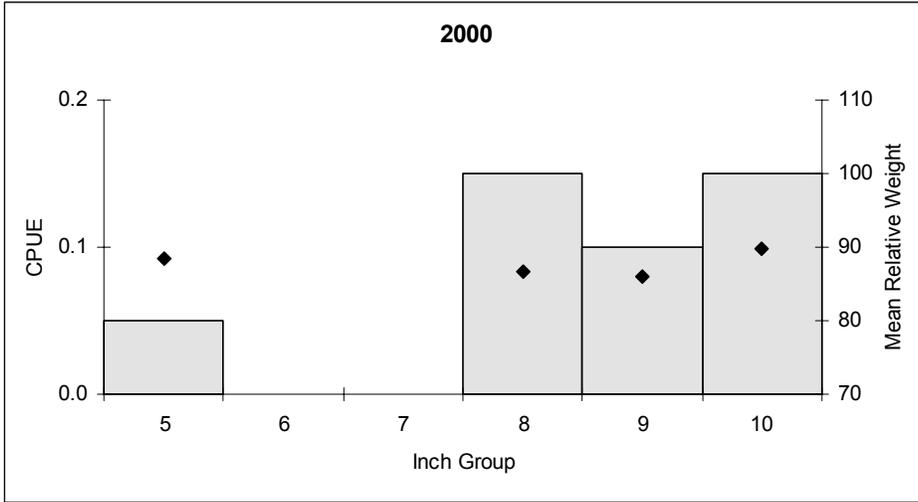
Annual creel statistics for anglers seeking crappie at Meredith Reservoir, Texas. Creel periods were from January through December to 1999, then changed to April through September in 2000.



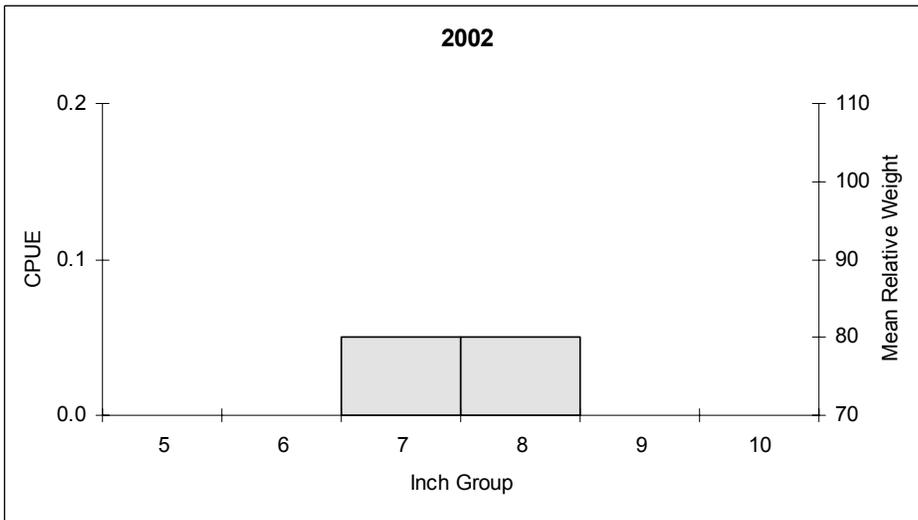
Length frequency of white crappie observed during creel surveys at Meredith Reservoir, April through September 2003 and 2004, all anglers combined. The minimum length limit was 10 inches.



**Black Crappie**



Effort = 20  
 Total CPUE = 0.4  
 Stock CPUE = 0.4  
 PSD = 89  
 RSD-P = 33



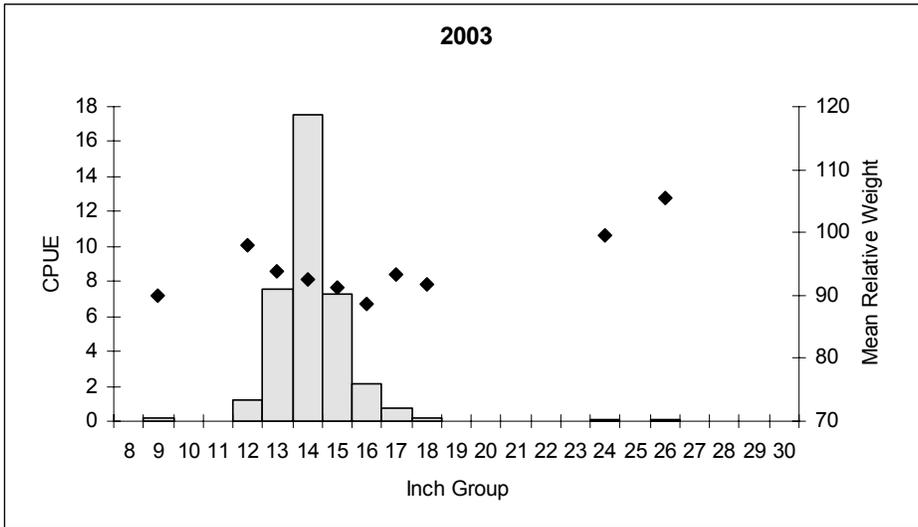
Effort = 20  
 Total CPUE = 0.1  
 Stock CPUE = 0.1  
 PSD = 50  
 RSD-P = 0

No black crappie collected in 2004

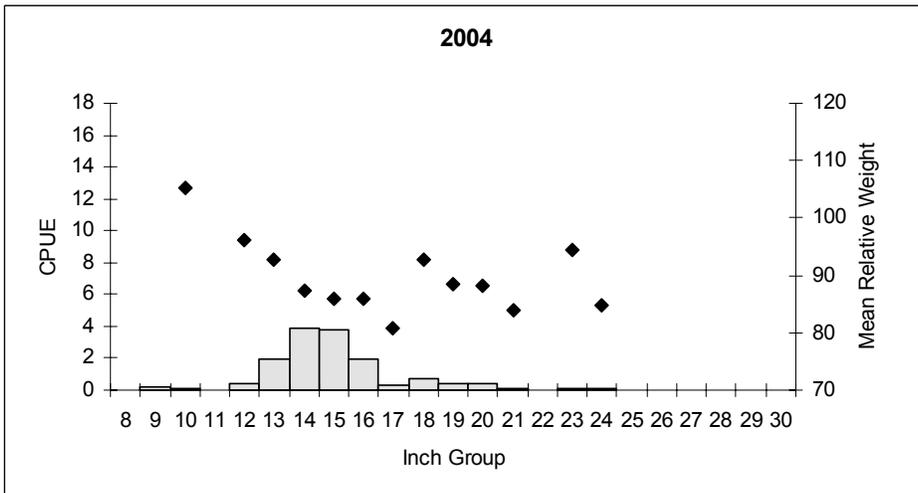
Effort = 20  
 Total CPUE = 0.0  
 Stock CPUE = 0.0  
 PSD = 0  
 RSD-P = 0

Comparison of the number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for fall trap net surveys, Meredith Reservoir, Texas.

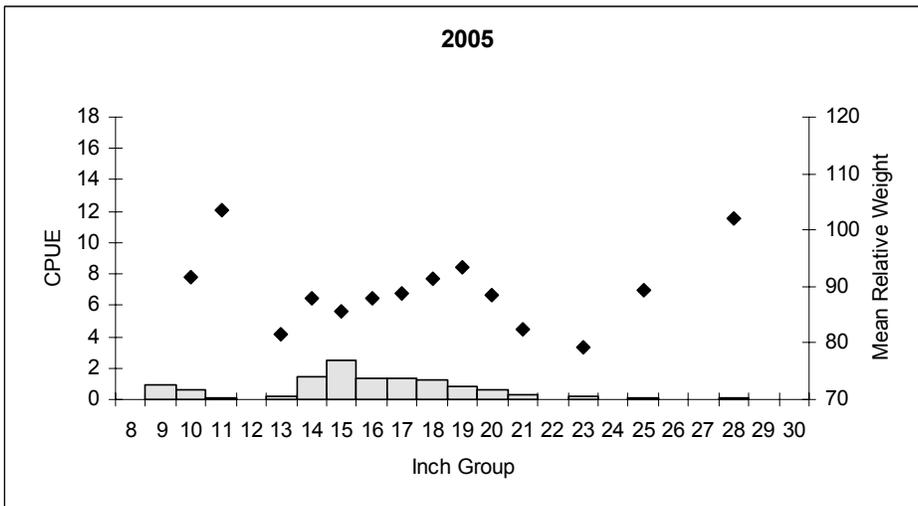
29  
Walleye



Effort = 10  
 Total CPUE = 37.0  
 Stock CPUE = 36.8  
 PSD = 28  
 RSD-16 = 8



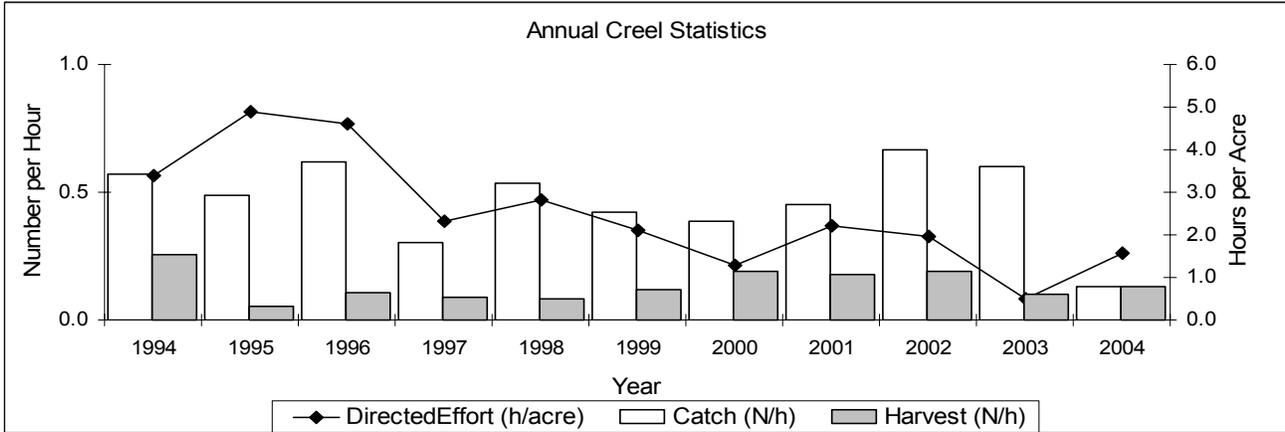
Effort = 10  
 Total CPUE = 14.3  
 Stock CPUE = 14.1  
 PSD = 55  
 RSD-16 = 28



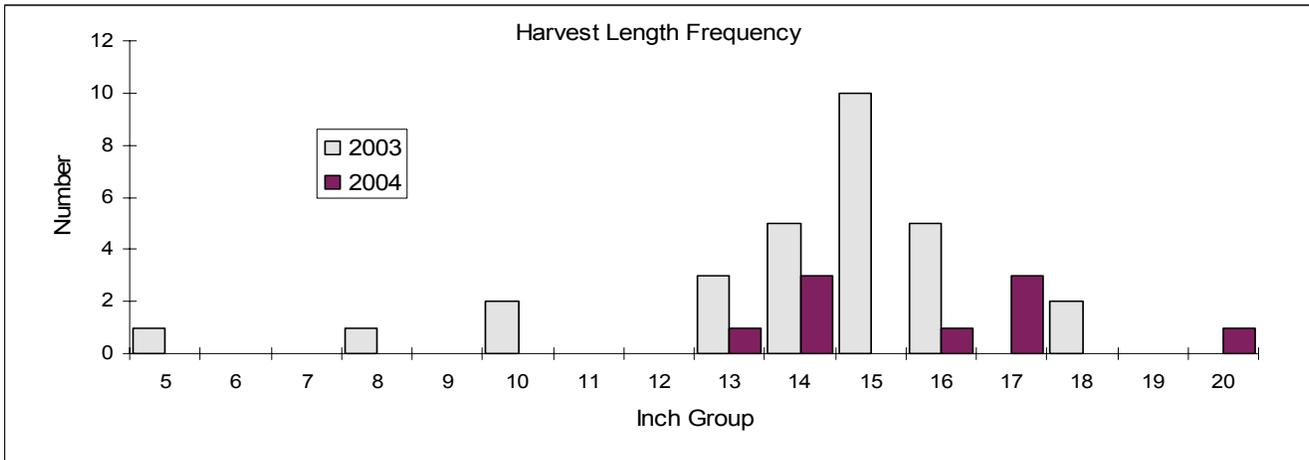
Effort = 10  
 Total CPUE = 11.9  
 Stock CPUE = 11.0  
 PSD = 78  
 RSD-16 = 55

Comparison of the number of walleye caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices for spring gill net collections, Meredith Reservoir, Texas.

30  
**Walleye**



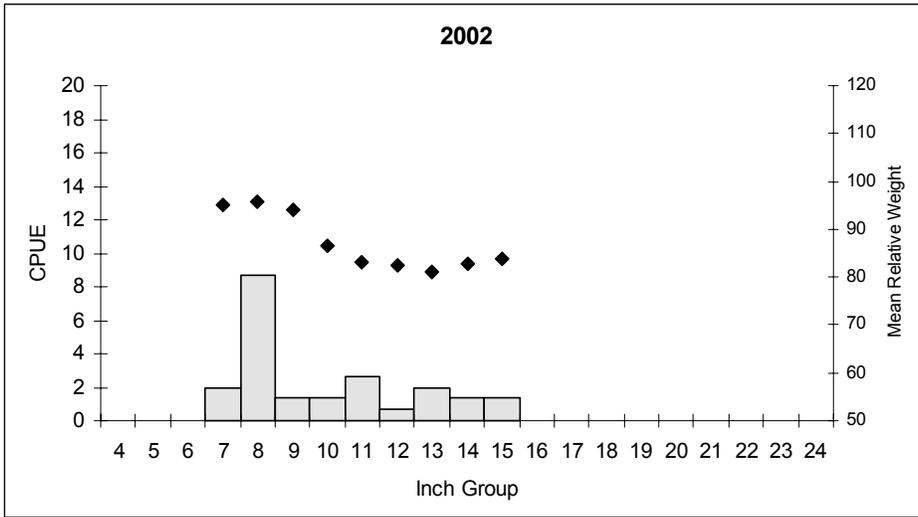
Annual creel statistics for anglers seeking walleye at Meredith Reservoir, Texas. Creel periods were from January through December to 1999 then changed to April through September in 2000.



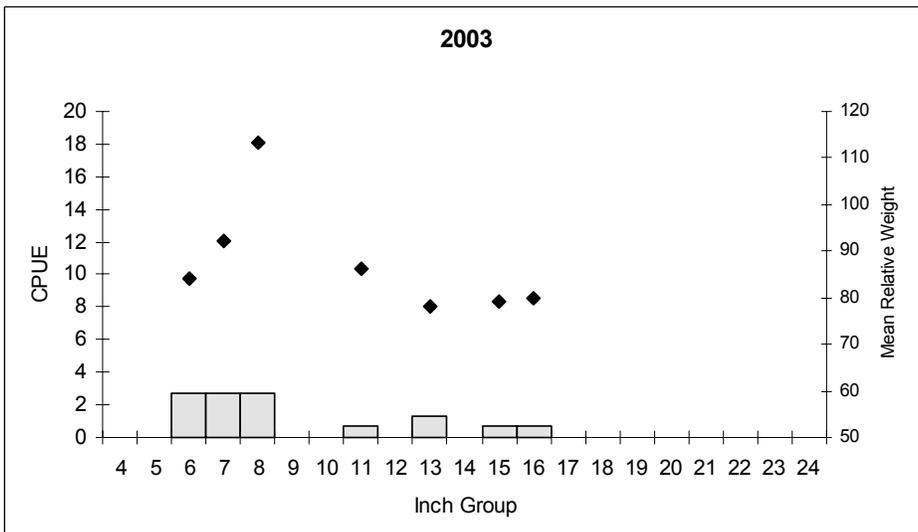
Length frequency of walleye observed during creel surveys at Meredith Reservoir, April through September 2002, all anglers combined. The harvest regulation is no minimum length limit, 5 fish daily bag with no more than 2 fish under 16 inches.



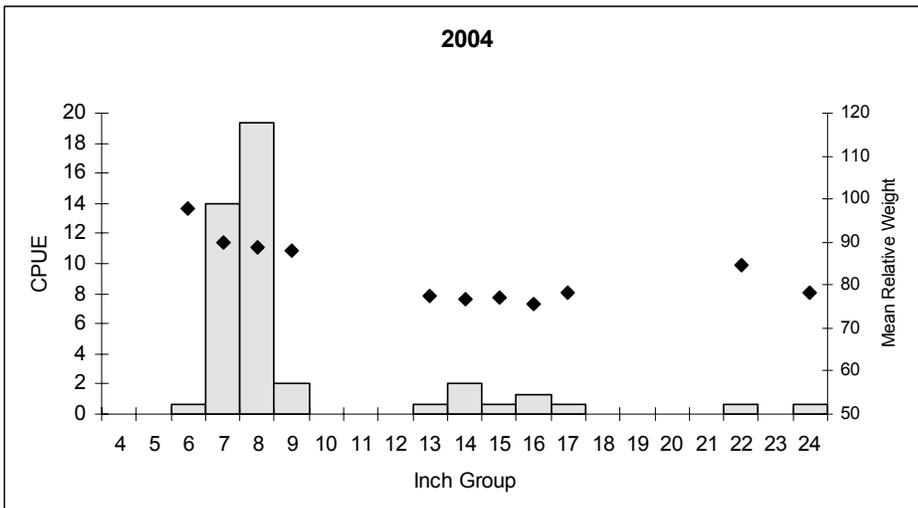
32  
Walleye



Effort = 1.5  
 Total CPUE = 21.3  
 Stock CPUE = 9.3  
 PSD = 14  
 RSD-P = 0



Effort = 1.5  
 Total CPUE = 11.3  
 Stock CPUE = 3.3  
 PSD = 40  
 RSD-P = 20



Effort = 1.5  
 Total CPUE = 42.7  
 Stock CPUE = 6.7  
 PSD = 60  
 RSD-P = 50

Comparison of the number of walleye caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices for fall electrofishing collections, Meredith Reservoir, Texas.

## Fisheries Management Plan Meredith Reservoir, Texas

Prepared - June 2005.

**ISSUE 1** Largemouth bass habitat is very patchy in the reservoir and is often located in small coves and the back of large coves. Extremely low water levels due to drought conditions have essentially eliminated most largemouth bass habitat. Survival of largemouth bass fingerlings is improved when they are stocked into suitable habitat. Largemouth bass should not be stocked until suitable habitat is inundated by rising water levels.

Since largemouth bass habitat is such a low proportion of the entire shoreline area, there is a high probability that random sample site selection will not include this habitat as evidenced by the 2002 to 2004 samples which had less than 14 fish. Supplemental sampling may be required to better assess the largemouth bass population.

### Management Strategies

1. Recommend stocking of northern largemouth bass or hybrid largemouth bass when the YAR is below the accepted range of 1-10, and water levels have increased sufficiently to inundate appropriate habitat.
2. Evaluate random sampling locations each year to determine if largemouth bass habitat will be sampled. If not, plan additional bass-only supplemental sampling within largemouth bass habitat to assess the largemouth bass population in Meredith Reservoir.

**ISSUE 2** The smallmouth bass population in Meredith Reservoir has been dominated by fish less than 12 inches in length. A 12 to 15-inch slot length limit was enacted at Meredith Reservoir in 1992. Assessment of the slot length limit has shown that anglers accept the regulation well and that fish under the slot length limit are being harvested. Population structure indices and condition indices have remained essentially unchanged. There has been no increase in numbers of fish over 15 inches and relative weight has remained low. The greatest improvement seen in the population since inception of the slot length limit has been in growth rates. In 1994, smallmouth bass took 5 to 6 years to reach 12 inches. By 1997, smallmouth bass were reaching 12 inches by age 3. Growth rates since 2000 have declined to where smallmouth bass were not reaching 12 inches until age 4. The decline in growth may be due to two consecutive years of poor gizzard shad recruitment and loss of habitat to drought conditions. Drought conditions have made smallmouth bass sampling very difficult and we have been unable to collect enough fish for an age and growth sample since 2002.

### Management Strategies

1. Complete evaluation of smallmouth bass harvest regulation.

**ISSUE 3**

In September, 1987, a minimum length limit of 16 inches was enacted for walleye resulting in increased densities of walleye in Meredith Reservoir (Munger and Kraai, 1997). The harvest regulation for walleye was changed on September 1, 1999 to no minimum length limit and a 5 fish bag with no more than 2 fish under 16 inches. This change was enacted to alleviate predatory pressure on gizzard shad without losing the positive impacts gained from the 16-inch minimum length limit. Since the regulation was implemented in 1999, the population has become dominated by 13-14 inch walleye. Growth rates declined during 2001 to 2003 when it took walleye 4 to 6 years to reach 16 inches. Growth rates have since returned to average for the reservoir with fish reaching 16 inches between ages 3 and 4.

Walleye obtained from Colorado sources were stocked in 1998 and 2000 in an attempt to alter the genetics of the population and increase the potential for trophy walleye. The allele frequency in the Colorado walleye was significantly different than the Meredith walleye. Subsequent sampling has indicated that the Colorado walleye stocking has had an impact on the genetics of the population. The extent of the impact cannot be determined due to the loss of the original genetic samples at the genetics lab.

Harvest of fish <16 inches was approximately 76% of the total harvest in 2003 and 44% 2004. The total harvest was estimated at only 1,408 fish in 2003 and 551 in 2004 (Appendix C, Tables 6 and 7). This low level of harvest is unlikely to have any impact on the population of fish <16 inches. A change in harvest regulation may be needed to restructure the walleye population and increase the number of fish over 20 inches.

Management Strategies

1. Continue monitoring the walleye population through standard gill net sampling and creel surveys to evaluate the effects of the 2 under 16 regulation.
2. Conduct angler opinion surveys during fall 2005 and spring 2006 concerning potential alternate regulations.

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**APPENDIX A**

Catch rate (number/h for electrofishing and number/net night for trap and gill net) of all species collected from all gear types from Meredith Reservoir, Texas, 2004-2005.

Species	Electrofishing	Trap Net	Gill Net
Gizzard shad	296.0	0.05	10.0
Common carp	10.7	0.15	3.6
River carpsucker		0.10	8.4
Blue catfish			0.2
Channel catfish	6.0		1.6
Flathead catfish	0.7		3.4
White bass	24.0	0.10	12.9
Green sunfish	4.0		
Bluegill	31.3	1.60	
Longear sunfish	5.3	0.05	
Smallmouth bass	9.3		0.1
Largemouth bass	7.3		
White crappie	4.7	5.75	0.2
Black crappie			0.1
Walleye	42.7		11.9

**APPENDIX B**

Proposed sampling schedule for Meredith Reservoir. Trap net and electrofishing surveys are conducted in the fall, gill net surveys in the spring, and the creel is 6 months from April through September. The letter S indicates standard sampling and the letter A indicates additional sampling or reporting.

Year	Electrofishing	Trap Net	Gill Net	Creel	Report
Fall 2005 – Spring 2006	S		S	S	
Fall 2006 – Spring 2007	S	S	S	S	A
Fall 2007 – Spring 2008	S		S	S	
Fall 2008 – Spring 2009	S	S	S	S	S

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APPENDIX C

Table 1. Estimates of fishing effort (hours) for all anglers targeting specific species or species groups. Estimates are for the period from April through September 2003 and 2004. Relative standard error for the hour estimate is indicated by RSE. Reservoir area at the time of sampling was 7,500 acres in 2003 and 5,618 acres in 2004.

Target species or species group	Percent total angling effort		Estimated hours of seeking effort		RSE for seeking effort	
	2003	2004	2003	2004	2003	2004
Anything	61.0	38.1	17,119.2	19,460.0	19	20
Walleye	13.4	17.1	3,764.5	8,727.6	32	31
Crappie		22.6		11,569.6		30
White crappie	9.1	1.8	2,558.1	931.5	41	63
Channel catfish	6.3	7.0	1,763.8	3,558.9	44	51
Black bass	1.3	5.6	356.6	2,867.8	88	52
White bass	4.4	3.1	1,222.8	1,564.5	49	67
Largemouth bass	1.4		404.4		81	
Catfish		3.4		1,716.9		59
Smallmouth bass	1.6	1.4	460.0	736.4	99	90
Common carp	1.5		427.8		87	

Table 2. Estimates of total value of the fishery by quarter and for the entire survey period April through September 2003 and 2004. Values indicated are US dollars. Relative standard error is indicated in parentheses.

Time Period	Total Fishery Value	
	2003	2004
April – June	45,114 (57)	90,920 (100)
July – September	37,914 (74)	154,690 (71)
April – September	83,028 (46)	245,610 (58)

Table 3. Catch rates (fish/hour) for all anglers targeting specific species or species groups for the entire period April through September 2003 and 2004. Catch rates indicated are total catch rate (CPUE) and catch rate for fish harvested (HPUE). Relative standard error (RSE) is indicated in parentheses. Dashes (--) indicate value could not be calculated and blank cells indicate no individual sought that species.

Target species or species group	CPUE		HPUE	
	2003	2004	2003	2004
Smallmouth bass	0.000 (---)	0.200 (---)	0.000 (---)	0.000 (---)
Common carp	0.750 (33)		0.750 (33)	
White crappie	0.214 (128)	0.134 (163)	0.068 (126)	0.051 (316)
Anything	0.673 (94)	0.287 (48)	0.142 (65)	0.146 (90)
Walleye	0.601 (68)	0.130 (125)	0.103 (55)	0.130 (125)
Largemouth bass	0.000 (---)		0.000 (---)	
Black basses	0.000 (---)	0.235 (73)	0.000 (---)	0.000 (---)
White bass	0.604 (110)	0.487 (113)	0.405 (123)	0.385 (138)
Channel catfish	0.066 (40)	0.249 (---)	0.014 (0.000)	0.160 (---)

Table 4. Release rates (fish/hour) for anglers targeting specific species from April through September 2003. Values are categorized relative to harvest regulations in effect at the time of sampling. For analysis purposes, the walleye regulation of no more than 2 fish under 16 inches was treated as a 16 inch minimum length limit. Relative standard error is indicated in parentheses. Dashes (--) indicate the value could not be calculated.

Species targeted	Below	Within	Above
Channel catfish	0.039 (68)		0.013 (106)
White bass	0.135 (123)		0.063 (0)
Smallmouth bass	0.000 (---)	0.000 (---)	0.000 (---)
Largemouth bass	0.000 (---)		0.000 (---)
White crappie	0.145 (131)		0.000 (---)
Walleye	0.398 (87)		0.100 (100)
Black basses	0.000 (---)	0.000 (---)	0.000 (---)
Anything	0.513 (117)	0.002 (198)	0.017 (113)

Table 5. Release rates (fish/hour) for anglers targeting specific species from April through September 2004. Values are categorized relative to harvest regulations in effect at the time of sampling. For analysis purposes, the walleye regulation of no more than 2 fish under 16 inches was treated as a 16 inch minimum length limit. Relative standard error is indicated in parentheses. Dashes (--) indicate the value could not be calculated.

Species targeted	Below	Within	Above
Channel catfish	0.089 (---)		0.000 (---)
White bass	0.103 (138)		0.000 (---)
Smallmouth bass	0.200 (---)	0.000 (---)	0.000 (---)
White crappie	0.000 (---)		0.000 (---)
Walleye	0.000 (---)		0.000 (---)
Black basses	0.235 (73)	0.000 (---)	0.000 (---)
Crappies	0.083 (243)		0.000 (---)
Anything	0.085 (55)	0.001 (193)	0.054 (120)

Table 6. Estimated number of fish caught, harvested, and released by species for all anglers for the survey period from April through September 2003. Released fish are categorized by length limit size groupings. Relative standard error is indicated by parentheses. Dashes (--) indicate the value could not be calculated.

Species	Caught	Harvested	Released	Released Below	Released Within	Released Above
Common carp	1,717 (131)	299 (97)	1,418 (158)			
Channel catfish	737 (216)	355 (96)	381 (408)	222 (475)		160 (235)
White bass	3,360 (144)	831 (67)	2,529 (190)	2,409 (192)		120 (109)
Bluegill	84 (190)	36 (176)	48 (305)			
Smallmouth bass	1,850 (135)	154 (136)	1,696 (147)	1,438 (162)	259 (91)	0 (---)
Largemouth bass	96 (184)	0 (---)	96 (184)	48 (166)		48 (227)
White crappie	14,481 (79)	1,058 (51)	13,424 (85)	13,424 (85)		0 (---)
Walleye	2,781 (64)	1,408 (52)	1,372 (117)	1,253 (121)		120 (104)

Table 7. Estimated number of fish caught, harvested, and released by species for all anglers for the survey period from April through September 2004. Released fish are categorized by length limit size groupings. Relative standard error is indicated by parentheses. Dashes (--) indicate the value could not be calculated.

Species	Caught	Harvested	Released	Released Below	Released Within	Released Above
Common carp	2,120 (237)	2,120 (237)	0 (---)			
Black bullhead	264 (243)	0 (---)	264 (243)			
Channel catfish	3,420 (89)	1,108 (165)	2,312 (105)	2,312 (102)		0 (---)
Flathead catfish	67 (325)	67 (325)	0 (---)	0 (---)		0 (---)
White bass	5,841 (85)	2,342 (160)	3,499 (94)	1694 (93)		1,805 (116)
Green sunfish	33 (655)	33 (655)	0 (---)			
Bluegill	197 (422)	0 (---)	197 (422)			
Smallmouth bass	3,933 (146)	0 (---)	3,933 (146)	2,659 (131)	637 (148)	637 (203)
Largemouth bass	5,098 (125)	102 (216)	4,996 (128)	4,996 (119)		0 (---)
White crappie	16,127 (71)	5440 (95)	10,687 (96)	10,687 (93)		0 (---)
Walleye	603 (118)	551 (125)	53 (338)	53 (283)		0 (---)

## APPENDIX D

## Standard Gill Net vs. Random Gill Net Comparison

Table 1. Comparison of sampling by random and standard gill net stations on Meredith Reservoir. Effort was determined by analyzing standard deviation of sampling on a spreadsheet developed by Warren Schlechte of Texas Parks and Wildlife Department. Number of nets was determined where probability of the desired sample was  $>0.9$ . Dashes indicate sampling effort greater than 30 nets. Current gill net sampling effort is 15 standard stations.

Species	Sampling effort required to reach the following			
	50 fish sample	100 fish sample	RSE 25 at 95%	RSE 15 at 95%
Random Channel catfish	25	---	10	25
Random White bass	15	25	25	---
Random Walleye	10	20	10	25
Standard Channel catfish	---	---	10	20
Standard White bass	15	25	5	10
Standard Walleye	5	10	5	10

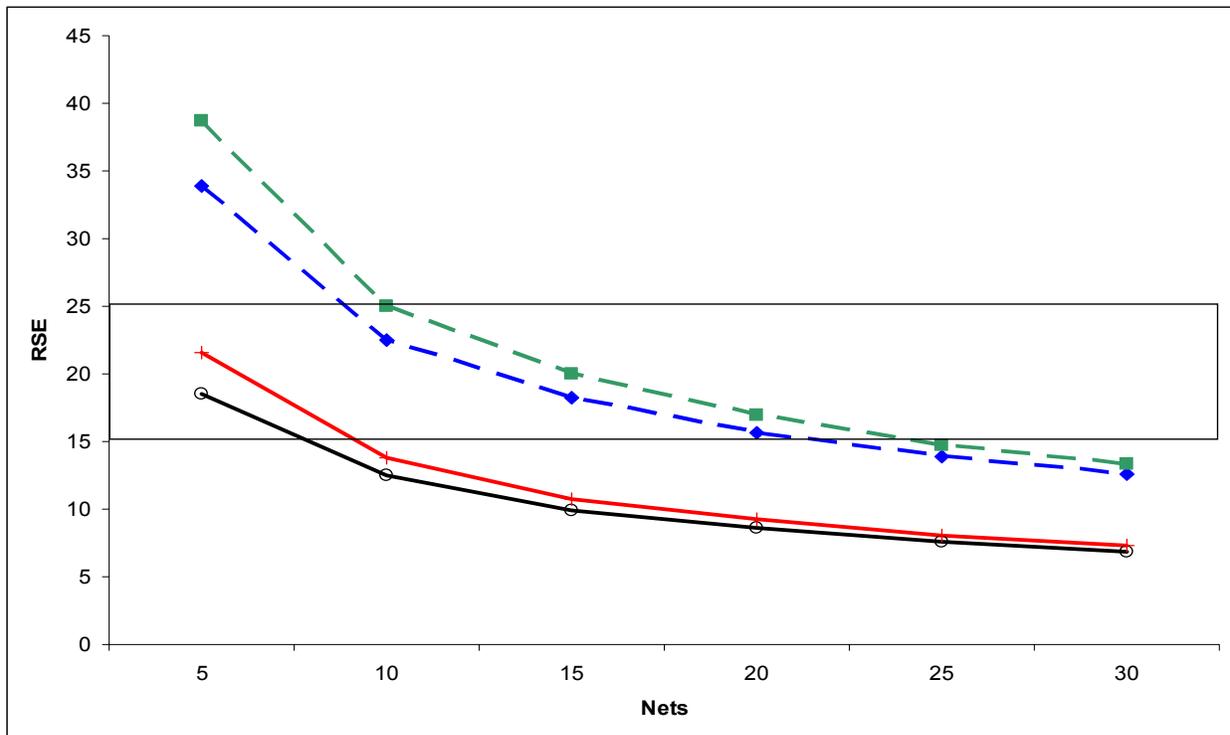


Figure 1. Comparison of relative standard error (RSE) for gill net collections of walleye in Meredith Reservoir by random and standard gill net stations. Nets is the predicted number of gill nets that would need to be set to reach the desired RSE at the 80<sup>th</sup> and 95<sup>th</sup> percentile. The boxed area indicates the transition from management-level sampling (RSE 25) to research-level sampling (RSE 15). The random 80<sup>th</sup> percentile RSE is indicated by the broken line with diamonds. The random 95<sup>th</sup> percentile RSE is indicated by the broken line with boxes. The standard sampling 80<sup>th</sup> percentile RSE is indicated by the solid line with open circles and the standard sampling 95<sup>th</sup> percentile RSE is indicated by the solid line with a plus sign.