

PERFORMANCE REPORT

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STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Mineral Wells Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Mineral Wells Reservoir were surveyed in 2006 using an electrofisher and trap nets and in 2007 using gill nets. Habitat was surveyed in 2002. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Mineral Wells Reservoir, a 440-acre impoundment located on Rock Creek in Parker County, was constructed in 1920 by the U.S. Army and is situated at the east edge of Mineral Wells. During 2003 and 2004, water level remained above or nearly within one foot of conservation elevation (863 feet above mean sea level). Most recently, water level was below conservation elevation (Figure 1). Mineral Wells Reservoir has moderate primary productivity. Habitat features consisted mainly of rocky shoreline and native emergent vegetation, especially along the shoreline. There was some standing timber.
- **Management history:** Important sport fish include channel catfish, largemouth bass, and white crappie. The management plan from the 2002 survey report included updating the web page for Mineral Wells Reservoir on the TPWD web site. Additionally, we stocked advanced fingerling channel catfish and adult Florida largemouth bass in 2005.
- **Fish community**
 - **Prey species:** Electrofishing catch rate of gizzard shad was high with good numbers seven inches and smaller. Electrofishing catch rate of bluegills was the highest since 1998 and consisted mostly of four-inch and smaller fish. Both species provided excellent prey.
 - **Channel catfish:** Gill net catch rate of channel catfish was low and has continued to decline since 1998.
 - **Largemouth bass:** The electrofishing catch rate of largemouth bass continues to increase, growth rates were slow, and the fish were fairly healthy. Electrophoretic samples produced no pure Florida bass, but the sample had 35.0% Florida largemouth bass alleles.
 - **White crappie:** Trap net catch rate of white crappie was low and the fish were in fair to good condition. Growth was slow, requiring over three years to reach legal size.
- **Management strategies:** Stock advanced fingerling channel catfish to augment natural recruitment and enhance recreational angling opportunities. Encourage park staff to conduct a creel survey to identify angling trends.

INTRODUCTION

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

Reservoir Description

Mineral Wells Reservoir is a 440-acre impoundment constructed in 1920 on Rock Creek in Parker County. It was constructed by the U.S. Army and is located at the east edge of Mineral Wells. Historically, it was used as a water supply and recreation for the Fort Wolters Army Base. Currently, it is located within the boundaries of Lake Mineral Wells State Park and is used for recreation. Chl-a measurements were not available for Mineral Wells Reservoir, however average Secchi disk transparency was 65 cm for 2006 and suggested mesotrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2002). Mesotrophic conditions are further supported by a heavily vegetated watershed that deposits organic debris on the ground resulting in allochthonous enrichment (Findenegg 1966; Sorokin 1966). Habitat at time of sampling consisted of native emergent vegetation (water willow), rocks and boulders, and dead trees and stumps. During the first one-half of a four-year period beginning May 2003, water level remained above or nearly within one foot of conservation elevation (863 feet above mean sea level). Until recently, water level was below conservation elevation (Figure 1). There is one public boat ramp and boarding pier and five fishing piers. Bank fishing was readily available. Other descriptive characteristics for Mineral Wells Reservoir are in Table 1.

Management History

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

1. Promote recreational angling for blue and channel catfish in community fishing lakes (CFL).
Action: On September 1, 2004, a new regulation removed the minimum length for blue and channel catfish; the bag limit remained at 5.
2. Update the Mineral Wells Reservoir web page as required.
Action: Recommendations were made as appropriate.

Harvest regulation history: With the exception of channel and blue catfish, sport fishes in Mineral Wells Reservoir are currently managed with statewide regulations (Table 2). Channel and blue catfish are managed under CFL rules which include no minimum length limit and a 5 fish daily bag limit.

Stocking history: Mineral Wells Reservoir was last stocked in 2005 with channel catfish and Florida largemouth bass. Channel catfish fingerlings were stocked annually from 1991 through 1996. Florida largemouth bass fingerlings were stocked periodically from 1986 through 1997.

Vegetation/habitat history: Mineral Wells Reservoir supported native emergent aquatic vegetation (Table 4). Historically and currently, water willow was abundant along most of the shoreline. The persistence of water willow along the shoreline probably contributes to the success of largemouth bass recruitment in this reservoir (Aggus and Elliott 1975).

METHODS

Fishes were collected by electrofishing (1 hour at 12 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish caught per net night (fish/nn). All survey sites were randomly selected and all surveys were

conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_r)] 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 ($RSE = 100 \times SE \text{ of the estimate/estimate}$) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using Category 2 protocol with otoliths from 13 each of largemouth bass and white crappie according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005). The manual specifies for largemouth bass only, but we adapted crappie to the protocol for identifying the number of fish to sample. Source for water level data was U.S. Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of native emergent vegetation and rocks and boulders (Table 4).

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 172.0/h and 346.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was good, indicating that 63% of gizzard shad were available to existing predators; this was higher than IOV estimates in previous years (Figure 2). Total CPUE of gizzard shad was higher in 2006 compared to surveys in 1998 and 2002 (Figure 2). Threadfin shad CPUE of 59.0/h was an increase over 42.0/h observed in 2002, but catch rates as high as 112.0/h have been observed (Appendix C). Total CPUE of bluegill (346.0/h) has varied historically from 42.0/h to 395.0/h (Figure 3 and Appendix C). The size structure in 2006 was dominated by individuals in the 3-inch class. The prey base for Mineral Wells Reservoir in 2006 was in very good shape.

Channel catfish: The gill net catch rate of channel catfish was 3.6/nn in 2007. The catch rate has been decreasing since the 1998 record catch rate of 28.6/nn (Figure 4). Channel catfish (mostly advanced fingerlings) were stocked from 1991 to 1996 (Table 3). Stocking was discontinued until 2005, when there was a small stocking of advanced fingerlings. Relative weights were good, indicating a vigorous population (Figure 4). With a PSD of zero, there were no quality fish in the sample population.

Largemouth bass: The electrofishing catch rate of stock-length largemouth bass was 111.0/h in 2006, higher than the 46.0/h in 2002, but lower than the 146.0/h in 1998 (Figure 5). However, total CPUE (162.0/h) was the second highest on record (Appendix C). Size structure was acceptable with a PSD of 24.0, but no bass over 18 inches were collected and only 6% of the population was ≥ 14 inches. Growth of largemouth bass in Mineral Wells Reservoir was slow. On average, largemouth bass did not reach the legal length of 14 inches within a four-year period ($N = 11$; range = 2 – 4 years). Body condition in 2006 was variable by inch group (relative weight = 85 – 98) and was similar to body condition in previous surveys (Figure 5). Between 1986 and 2005, Florida largemouth bass were stocked five times to include 1,421 adults in 2005 (Table 3). Florida largemouth bass alleles have remained high (> 30%) since 2002, while the Florida genotype dropped from 8.3% to 0.0% since 2002 (Table 5).

White crappie: The trap net catch rate of white crappie was 10.4/nn in 2006 (Figure 6), lower than 2002 (16.8/nn), but higher than 1998 (4.3/nn). The PSD was 80.0, but only 10% of the sample population was legal length (≥ 10 inches). The sample population was dominated by 9-inch crappie. In 2002 7- and 8-inch crappie were the dominant sizes; legal-size crappie made up 8% of the sample population. Relative weights were above 90 for all inch groups except 10-inch. This was an improvement over the 2002 survey, when relative weights of the smaller crappie were in the mid-80's. Growth was slow as only one fish of the 13-crappie sample grew to 10 inches in 2 years; the rest did reach legal size in 3 years ($N=13$, range=2-3 years).

Fisheries management plan for Mineral Wells Reservoir, Texas

Prepared – July 2007.

ISSUE 1: The channel catfish fishery cannot maintain a viable fishery without stocking advanced channel catfish fingerlings. After the cessation of stocking in 1996, the fishery has decreased. Stocked fish survived, grew, and contributed to the fishery into 1998, but availability of channel catfish has decreased since 1998, two years after cessation of stocking.

MANAGEMENT STRATEGIES

1. Stock advanced fingerling channel catfish (12.5/acre) annually beginning in 2008.
2. Assess the channel catfish population in the spring of 2011 with general survey gill netting.

ISSUE 2: Angler harvest information is unknown for this state park reservoir. These data would be helpful in identifying angler trends and expectations.

MANAGEMENT STRATEGY

1. Encourage park staff to conduct a creel survey to identify angling trends.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule consists of mandatory monitoring in 2010-2011 (Table 6).

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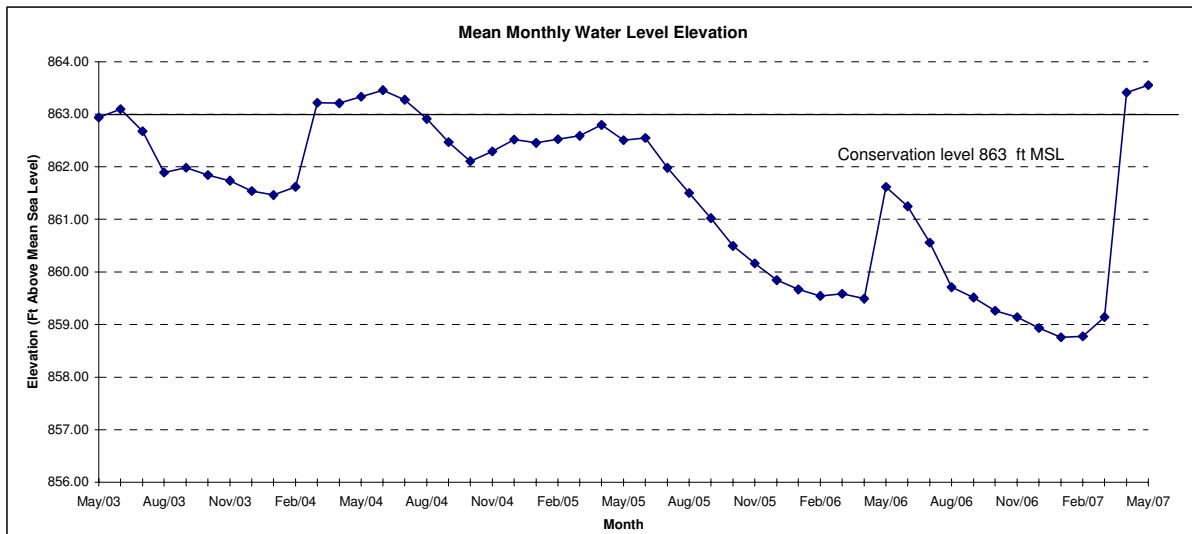


Figure 1. Monthly average water level elevations in feet above mean sea level (MSL) recorded for Mineral Wells Reservoir, Texas, May 2003-May, 2007.

Table 1. Characteristics of Mineral Wells Reservoir, Texas.

Characteristic	Description
Year constructed	1920
Controlling authority	Palo Pinto Co Municipal Water District No. 1
Counties	Parker
Reservoir type	Offstream
Shoreline development index	1.9
Conductivity	316 μ mhos/cm

Table 2. Harvest regulations for Mineral Wells Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	5	No Limit
Catfish, Flathead	5	18 minimum
Bass: spotted	5	No Limit
Bass: largemouth	5	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25	10 minimum

Table 3. Stocking history of Mineral Wells, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

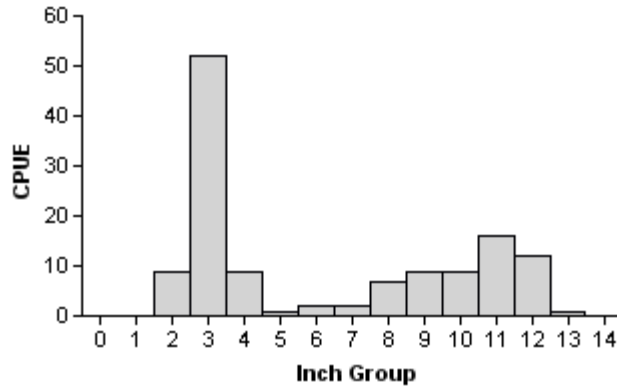
Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	1988	12	ADL	15.8
	Total	12		
Channel catfish	1971	15,000	AFGL	7.9
	1972	100,000	AFGL	7.9
	1987	32,800	FGL	3.0
	1989	18,786	AFGL	4.7
	1991	9,985	AFGL	5.2
	1992	9,948	AFGL	5.1
	1993	16,580	AFGL	8.8
	1993	11,040	FRY	0.4
	1994	35,638	AFGL	6.7
	1995	17,064	AFGL	7.2
	1996	16,575	AFGL	6.8
	2005	11,210	AFGL	10.0
	Total	294,626		
Florida Largemouth bass	1986	32,794	FRY	1.0
	1987	5,065	FGL	3.0
	1990	66,443	FRY	1.0
	1997	66,300	FGL	1.7
	2005	1,421	ADL	8.4
	Total	172,023		
Largemouth bass	1967	60,000	FGL	1.5
	1972	80,000	FGL	1.5
	Total	140,000		
Rainbow trout	1984	11,243	ADL	9.3
	1985	17,943	ADL	9.3
	Total	29,186		
Threadfin shad	1984	800	AFGL	3.0
	1985	3,400	AFGL	3.0
	Total	4,200		

Table 4. Survey of littoral zone and physical habitat types, Mineral Wells Reservoir, Texas, 2002. 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
Bulkhead	0.2	2.9		
Rocky shore	2.5	35.7		
Boulders	0.9	12.9		
Flooded dead terrestrial	0.8	11.4		
Boat docks	0.1	1.4		
Native emergent vegetation	2.5	35.7	8.1	1.3

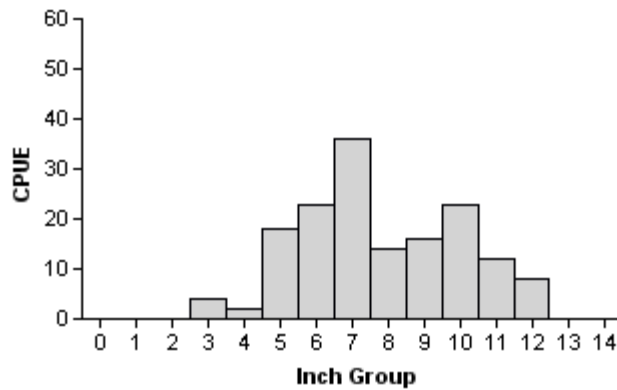
Gizzard Shad

1998



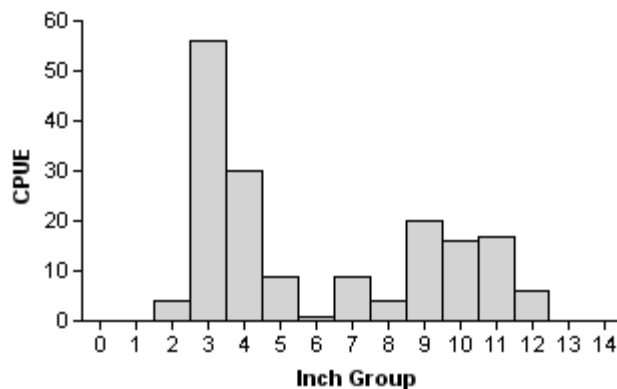
Effort = 1.0
 Total CPUE = 129.0 (40; 129)
 PSD = 52 (9.2)
 IOV = 58 (11.8)

2002



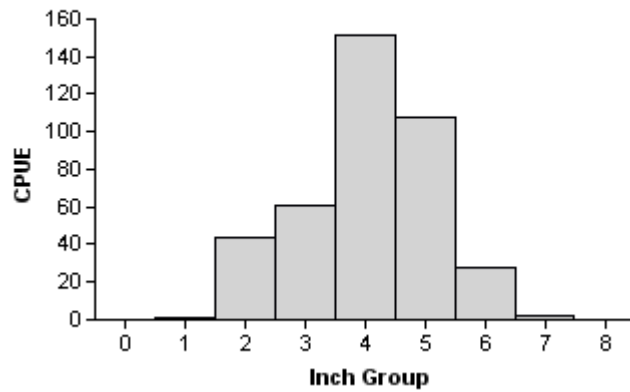
Effort = 1.0
 Total CPUE = 156.0 (14; 156)
 PSD = 18 (5.0)
 IOV = 53 (7.3)

2006

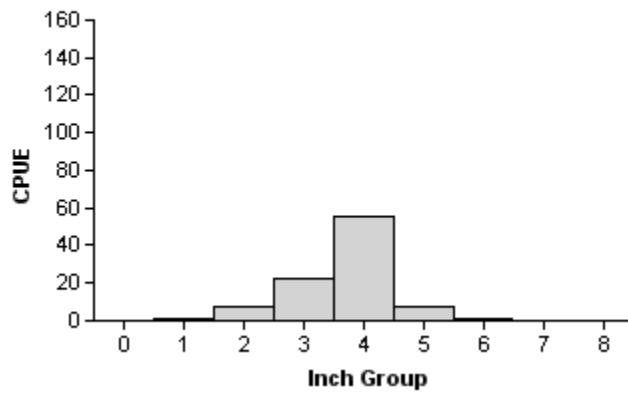


Effort = 1.0
 Total CPUE = 172.0 (35; 172)
 PSD = 32 (5.1)
 IOV = 63 (11.5)

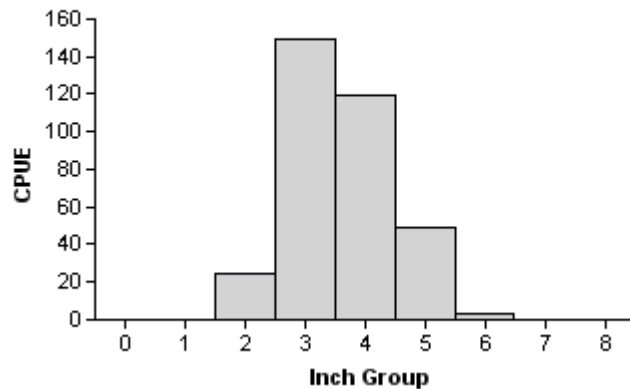
Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas 1998, 2002, and 2006.

Bluegill**1998**

Effort = 1.0
 Total CPUE = 395.0 (19; 395)
 PSD = 9 (1.5)

2002

Effort = 1.0
 Total CPUE = 95.0 (15; 95)
 PSD = 1 (1.1)

2006

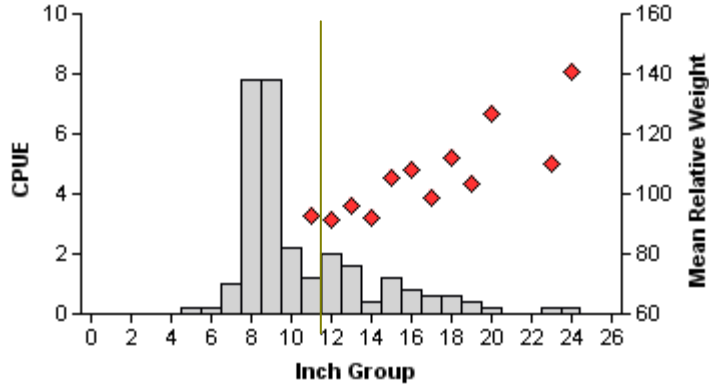
Effort = 1.0
 Total CPUE = 346.0 (17; 346)
 PSD = 1 (0.6)

Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 1998, 2002, and 2006.

Channel Catfish

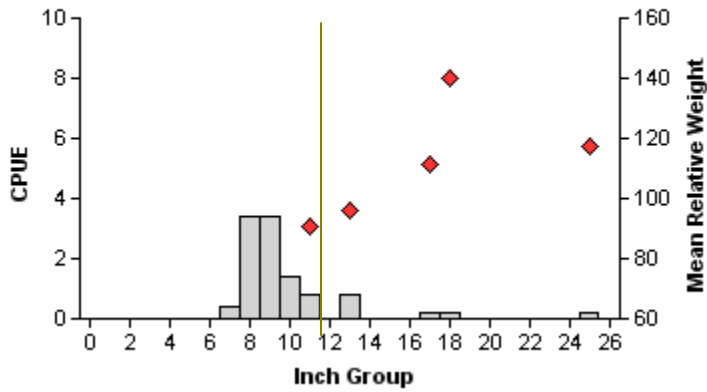
1998

Effort = 5.0
Total CPUE = 28.6 (20; 143)
PSD = 32 (6.8)



2003

Effort = 5.0
Total CPUE = 10.8 (32; 54)
PSD = 27 (9.2)



2007

Effort = 5.0
Total CPUE = 3.6 (48; 18)
PSD = 0 (113.2)

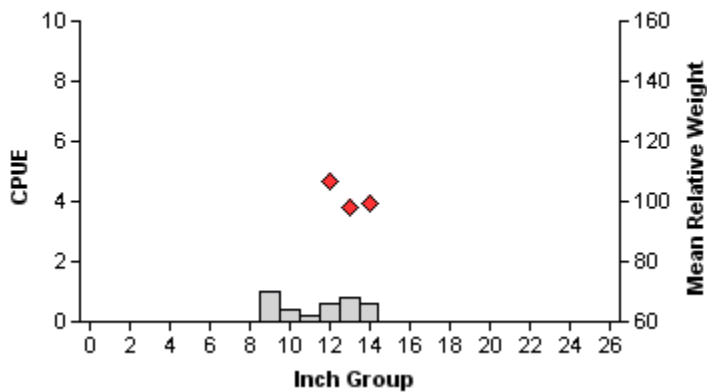
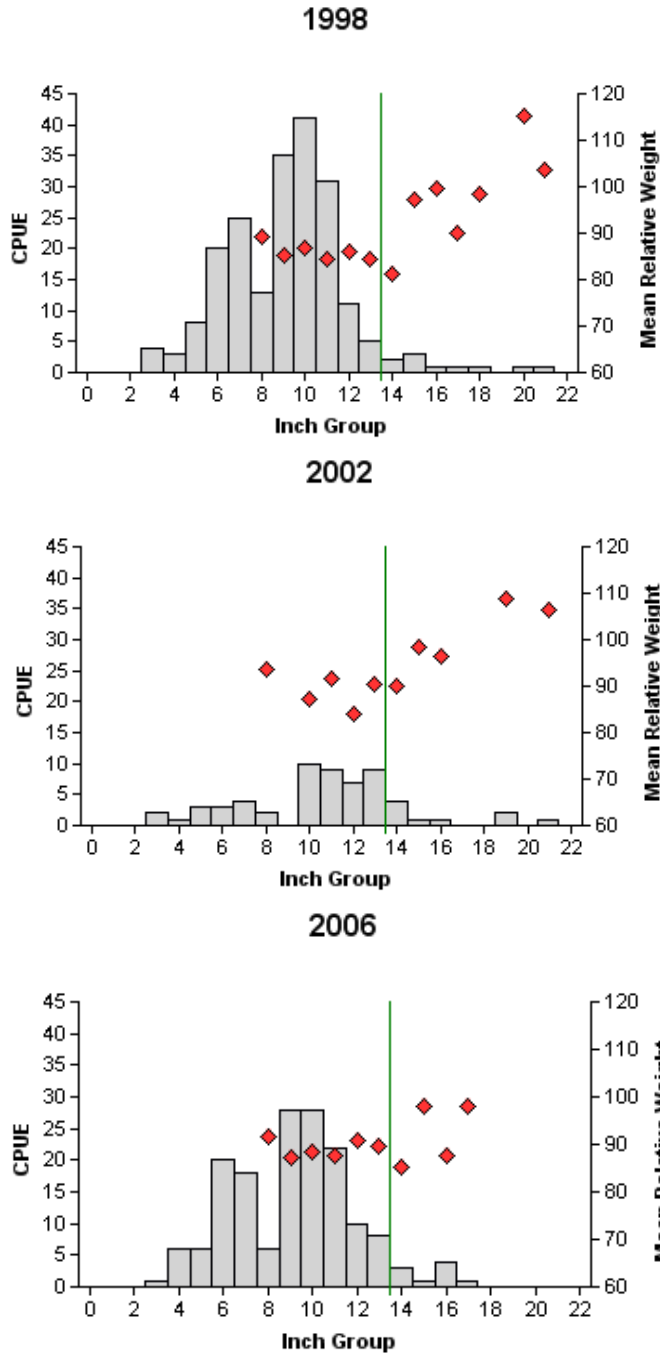


Figure 4. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Mineral Wells Reservoir, Texas, 1998, 2003, and 2007. Vertical lines represent length limit at time of collection.

Largemouth Bass



Effort = 1.0
 Total CPUE = 206.0 (16; 206)
 Stock CPUE = 146.0 (20; 146)
 PSD = 18 (3.4)

Effort = 1.0
 Total CPUE = 59.0 (23; 59)
 Stock CPUE = 46.0 (24; 46)
 PSD = 54 (6.0)

Effort = 1.0
 Total CPUE = 162.0 (19; 162)
 Stock CPUE = 111.0 (20; 111)
 PSD = 24 (5.8)

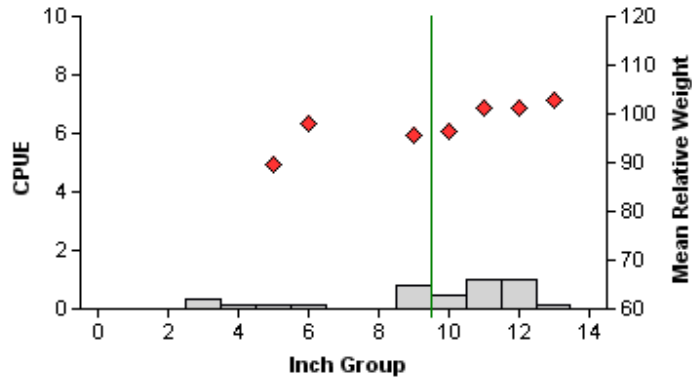
Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 1998, 2002, 2006. Vertical lines represent length limit at time of collection.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Mineral Wells Reservoir, Texas, 1988, 1998, 2002, and 2006. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, Hybrids = cross between a FLMB and a NLMB.

Year	Sample size	Genotype			% FLMB alleles	% pure FLMB
		FLMB	Hybrids	NLMB		
1988	28	0.0	1.2	26.8	2.1	0.0
1998	40	2.0	19.0	19.0	26.9	5.0
2002	24	2.0	15.0	7.0	35.4	8.3
2006	30	0.0	27.0	3.0	35.0	0.0

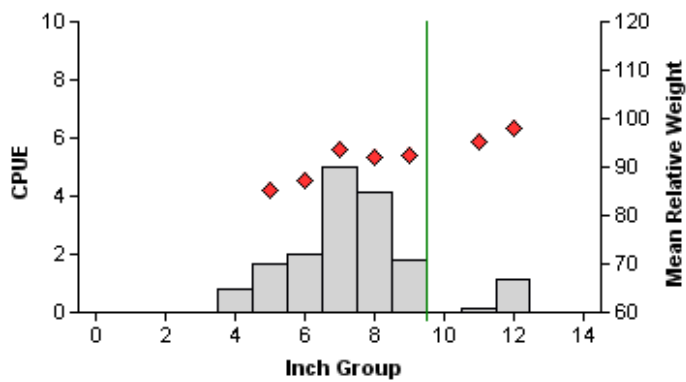
White Crappie

1998



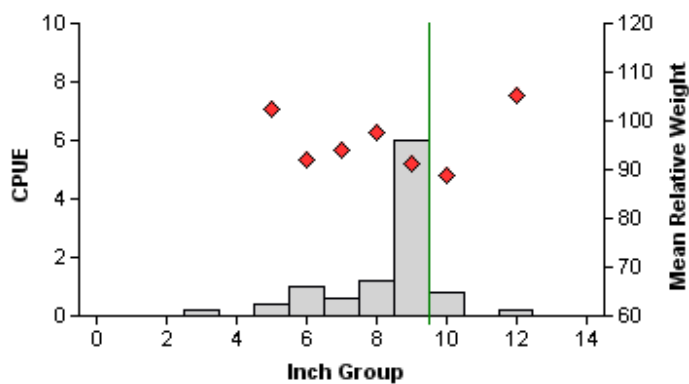
Effort = 6.0
Total CPUE = 4.3 (31; 26)
PSD = 91 (9.7)

2002



Effort = 6.0
Total CPUE = 16.8 (54; 101)
PSD = 46 (15.4)

2006



Effort = 5.0
Total CPUE = 10.4 (45; 52)
PSD = 80 (6.3)

Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Mineral Wells Reservoir, Texas, 1998, 2002, and 2006. Vertical lines represent length limit at time of collection.

Table 6. Proposed sampling schedule for Mineral Wells Reservoir, Texas. Electrofishing and trap netting surveys are conducted in the fall, while gill netting surveys are conducted during the following spring. Standard survey denoted by S.

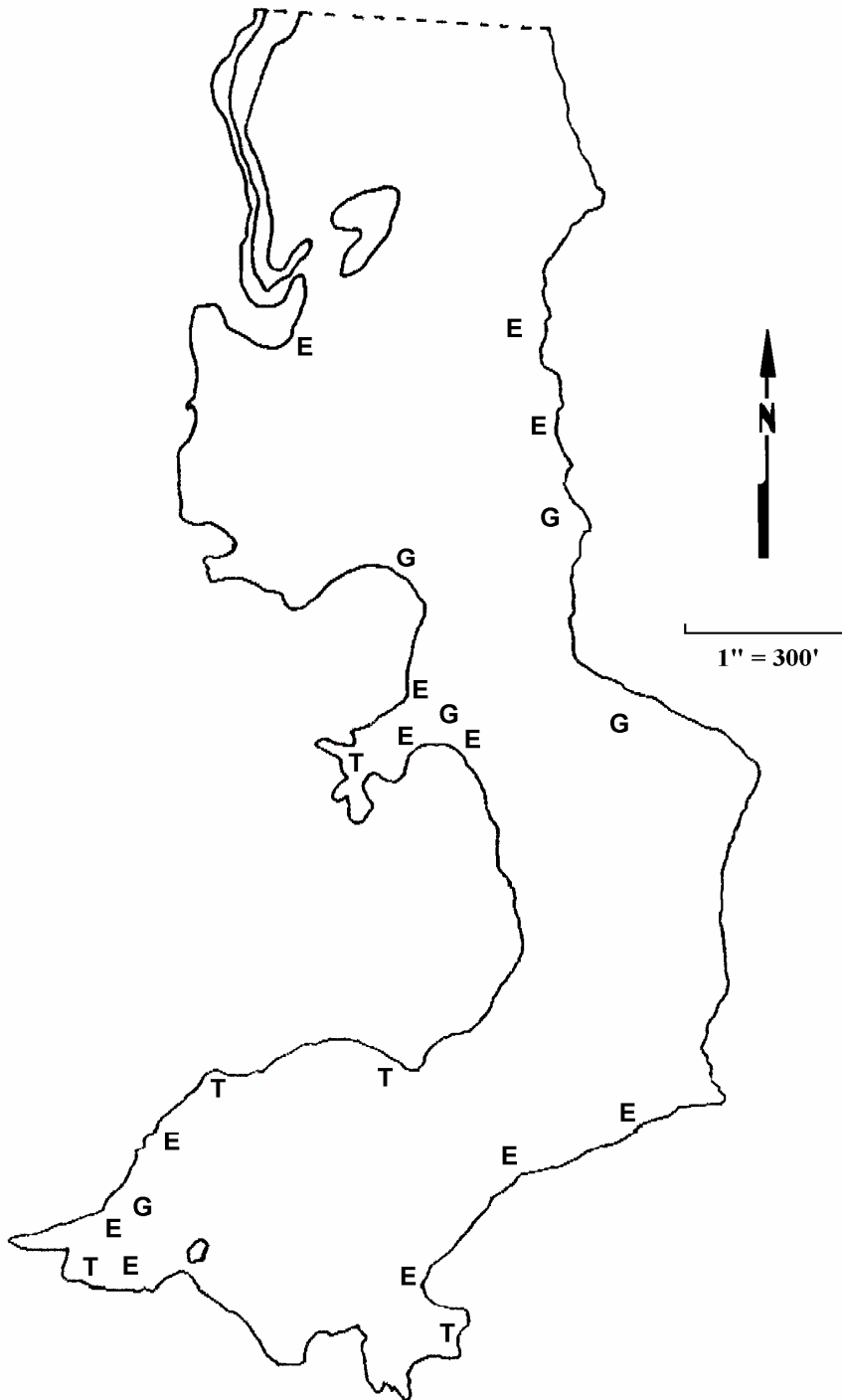
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2007-Spring 2008					
Fall 2008-Spring 2009				A	
Fall 2009-Spring 2010				A	
Fall 2010-Spring 2011	S	S	S		S

Appendix A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					172	172.0
Threadfin shad					59	59.0
Channel catfish	18	3.6				
Flathead catfish	1	0.2				
Green sunfish					26	26.0
Warmouth					14	14.0
Bluegill					346	346.0
Longear sunfish					137	137.0
Redear sunfish					31	31.0
Spotted bass					2	2.0
Largemouth bass					162	162.0
White crappie			52	10.4		

APPENDIX B



Location of sampling sites, Mineral Wells Reservoir, Texas, 2006-2007. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively. Water level was 4 feet below conservation for electrofishing, 3 feet below conservation for trap netting, and at conservation level during gill netting.

APPENDIX C

Catch rates (CPUE) of targeted species by gear type for Mineral Wells Reservoir, Texas, 1992, 1995, 1998, 2002, 2003, 2006, and 2007.

Gear	Species	Year						
		1992 _a	1995 _a	1998 _b	2002 _b	2003 _b	2006 _b	2007 _b
Gill Net	Channel catfish	3.8	8.8	28.6		10.8		3.6
	Flathead catfish	0.2	0.6	0.8		0.0		0.2
Electrofisher	Gizzard shad	214.0	93.0	129.0	156.0		172.0	
	Threadfin shad	15.0	112.0	88.0	42.0		59.0	
	Green sunfish	0.0	12.0	42.0	17.0		26.0	
	Warmouth	3.0	8.0	32.0	31.0		14.0	
	Orangespotted sunfish	0.0	0.0	3.0	1.0		0.0	
	Bluegill	42.0	360.0	395.0	95.0		346.0	
	Longear sunfish	6.0	38.0	62.0	42.0		137.0	
	Redear sunfish	2.0	28.0	23.0	12.0		31.0	
	Spotted bass	2.0	0.0	6.0	9.0		2.0	
	Largemouth bass	69.0	146.0	206.0	59.0		162.0	
Trap Net	White crappie	28.1	34.5	4.3	16.8		10.4	

_a All sampling stations for all gear were subjectively selected.

_b All sampling stations for all gear were randomly selected.