

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

**Mineral Wells Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Mineral Wells Reservoir were surveyed in 2010 using an electrofisher and trap nets and in 2011 using gill nets. Habitat was surveyed in 2010. 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. After drought levels in 2009 when the lake was 4 feet low, water level remained near conservation elevation (863 feet above mean sea level) in 2010 and 2011. Most recently, water level was one foot below conservation elevation. 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 2006 survey report included an annual stocking of advanced fingerling channel catfish, which was accomplished from 2008-2010. Additionally, we have a cooperative (park and district staff) creel survey in the planning stage to determine angler harvest information.
- **Fish community**
  - **Prey species:** Electrofishing catch rate of gizzard shad was a little below average with adequate numbers seven inches and smaller. However, electrofishing catch rate of threadfin shad was the highest on record. Electrofishing catch rate of bluegill was the highest since 1998 and consisted mostly of four-inch and smaller fish. Longear sunfish had the highest electrofishing catch rates on record and provided predominantly four-inch and smaller fish as forage. The prey base for Mineral Wells Reservoir in 2010 was in very good shape.
  - **Channel catfish:** Gill net catch rate of channel catfish was high and showed great improvement since 2007. This was probably a result of resumption of the annual stocking of advanced fingerlings.
  - **Largemouth bass:** The electrofishing catch rate of largemouth bass decreased over the 2006 survey, but growth rates increased and body condition was much improved from previous surveys. The improved prey base probably contributed to these improvements.
  - **White crappie:** Trap net catch rate of white crappie was the highest since 1995. Most were 10-inches and longer. The fish were in excellent condition. Growth was still slow, requiring over three years to reach legal size.
- **Management strategies:** Stock advanced-size channel catfish fingerlings to augment natural recruitment and enhance recreational angling opportunities. Work to implement a cooperative creel survey between park personnel and district staff to identify angling trends and the utilization of the stocked advanced-size channel catfish fingerlings. Inform the Lake Mineral Wells State Park personnel about new exotic species threats to Texas waters, and work with them to display appropriate signage, educate constituents, and understand appropriate enforcement actions.

3  
INTRODUCTION

This document is a summary of fisheries data collected from Mineral Wells Reservoir in 2010-2011. 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 2010-2011 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 55 cm for 2010 and suggested eutrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2008). Eutrophic conditions are further supported by a heavily vegetated watershed that deposits organic debris on the ground resulting in allochthonous enrichment (Findenegg 1966; Sorokin 1966). Eutrophication is progressing as evidenced by mesotrophic conditions existing in 2006. Habitat at time of sampling consisted of native emergent vegetation (water willow), rocks and boulders, and dead trees and stumps. Water level remained above or nearly within one foot of conservation elevation (863 feet above mean sea level) from May 2007 to June 2008. The lake then declined to 4 feet below conservation level by summer 2009 before reaching conservation level by fall of 2009. Recently water level has been 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 Moczygamba 2007) included:

1. The channel catfish fishery cannot maintain a viable fishery without stocking advanced channel catfish fingerlings.  
**Action:** Annual stockings of advanced size fingerlings began in 2008.
2. Angler harvest information is unknown for this state park reservoir.  
**Action:** A cooperative creel survey between park and district staff to identify angling trends is being considered.

**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. Fishing is by pole and line only, with only two poles allowed per angler.

**Stocking history:** Mineral Wells Reservoir was last stocked in 2010 with channel catfish advanced fingerlings, which have been stocked annually since 2008 (Table 3). Florida largemouth bass adults were stocked in 2005.

**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).

**Water Transfer:** The City of Mineral Wells has water rights to Mineral Wells Reservoir and an operational pump in the lake. However, the City only exercises the water rights as a contingency during high drought

conditions or emergency water demands. The City has not exercised their right in recent history.

## 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 2009). Habitat and vegetation surveys were also conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights ( $W_t$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using Category 2 protocol with otoliths from channel catfish, largemouth bass and white crappie according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). The manual specifies for largemouth bass only, but we adapted channel catfish and white crappie to the protocol for identifying the target 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:** Total electrofishing catch rates of gizzard shad, bluegill, and longear sunfish were 135.0/h, 388.0/h, and 203.0/h, respectively. Index of vulnerability (IOV) for gizzard shad was fair, indicating that 45% of gizzard shad were available to existing predators; this was the lowest IOV estimate of the past three surveys (Figure 2). Total CPUE of gizzard shad was lower compared to surveys in 2002 and 2006 (Figure 2). However, this deficiency was offset by the threadfin shad CPUE of 1091.0/h, which was the highest on record (Appendix C). Total CPUE of bluegill has varied historically from 42.0/h to 395.0/h (Figure 3 and Appendix C). The size structure in 2010 was dominated by individuals in the 4-inch class. The total CPUE of longear sunfish has increased for the past three surveys to the highest on record (Appendix C). Their size structure was predominantly 3 and 4 inches. The prey base for Mineral Wells Reservoir in 2010 was in very good shape.

**Channel catfish:** The total gill net catch rate of channel catfish was 8.6/nn in 2011, which was double the 2007 catch rate (Figure 4), but below the average of 10.7/nn (Appendix C). Annual stocking of advanced fingerlings was resumed in 2008 (Table 3). Channel catfish reached 12 inches in three years (N = 5; all aged at 3 years). The stock CPUE went from 2.2/nn in 2007 to 6.4/nn in 2011, which may have been the result of the annual stockings. A healthy channel catfish population was indicated by good relative weights, especially the fish  $\geq$  14 inches (Figure 4). A PSD of 47 indicated a good proportion of quality fish in the sample population.

**Largemouth bass:** The electrofishing catch rate of stock-length largemouth bass was 61.0/h in 2010, lower than the 111.0/h in 2006, but higher than the 46.0/h in 2002 (Figure 5). However, total CPUE (93.0/h) was also lower than the average of 122.5/h for the six surveys since 1992 (Appendix C). Size structure increased from a PSD of 24 in 2006 to a PSD of 46 in 2010, but no bass over 19 inches were collected. Growth of largemouth bass in Mineral Wells Reservoir increased from the 2006 survey, possibly due to the improved prey base. On average, largemouth bass reached the legal length of 14 inches within a three-year period (N = 11; range = 2 – 4 years). Body condition in 2010 was close to 100

for most inch groups and was higher than body condition in previous surveys, another result of an improved prey base (Figure 5).

**White crappie:** The total trap net catch rate of white crappie was 27.8/nn in 2010 (Figure 6), highest since 1995 (34.5/nn), and higher than the average of 20.3/nn for the six surveys since 1992. The PSD was 93 and 49% of the sample population was legal length ( $\geq 10$  inches). The sample was dominated by 10-inch crappie with recruitment evident. Relative weights were improved over previous surveys with inch groups 7 – 11 approaching 100, another indicator of the improved prey base. However, growth was slow as most crappie did not reach legal size until 3 years (N=13, range=1- 3 years).

## Fisheries management plan for Mineral Wells Reservoir, Texas

Prepared – July 2011.

**ISSUE 1:** Angler harvest information is unknown for this state park reservoir. The utilization of advanced sized channel catfish stockings needs to be identified. These data would also be helpful in identifying angler trends and expectations.

### MANAGEMENT STRATEGY

1. Recommend a cooperative creel survey between park personnel and district staff to identify angling trends.

**ISSUE 2:** The channel catfish population cannot maintain a viable fishery without stocking advanced channel catfish fingerlings. Since the resumption of stocking, gill net catch rates have doubled.

### MANAGEMENT STRATEGIES

1. Continue stocking advanced fingerling channel catfish (12.5/acre) annually, if creel survey identifies utilization.
2. Assess the channel catfish population in the spring of 2015 with general survey gill netting.

**ISSUE 3:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

### MANAGEMENT STRATEGIES

1. Cooperate with Lake Mineral Wells State Park personnel to post appropriate signage at access points around the reservoir.
2. Contact and educate park personnel about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their park visitors.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

### SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule consists of mandatory monitoring in 2014-2015 (Table 5).

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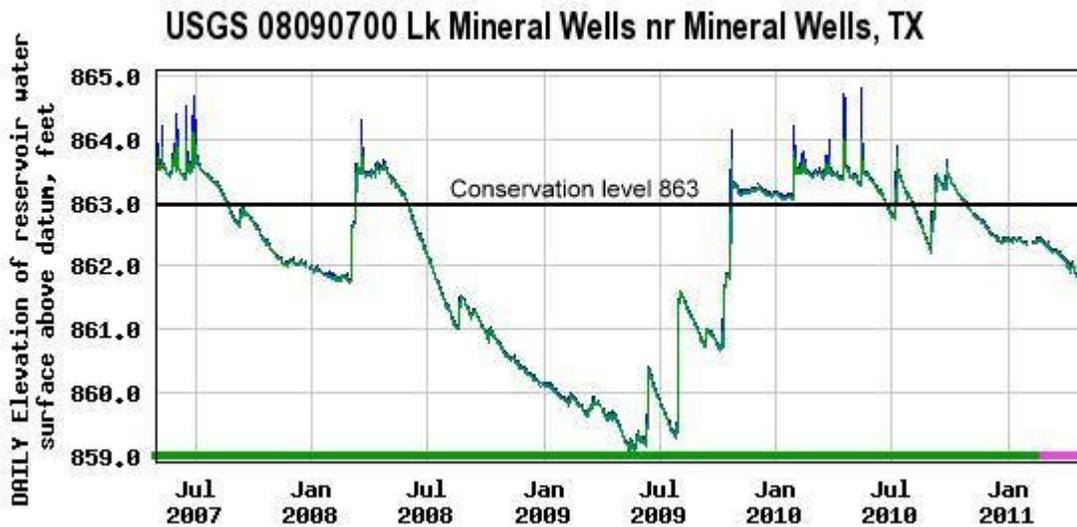


Figure 1. Monthly average water level elevations in feet above mean sea level (MSL) recorded for Mineral Wells Reservoir (U.S. Geological Survey. 2011. USGS real time water data for USGS 08090700 Lake Mineral Wells near Mineral Wells, Texas. <http://waterdata.usgs.gov/nwis>), Texas, May 2008-April, 2011.

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	266 $\mu$ 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	(black bass in any combination)	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25	10 minimum

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

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
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
	2008	11,095	AFGL	9.3
	2009	11,760	AFGL	9.0
	2010	11,163	AFGL	9.4
Total	328,644			
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	UNK	UNK
	1972	80,000	UNK	UNK
	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 shoreline habitat and littoral and pelagic habitat types, Mineral Wells Reservoir, Texas, 2010. A linear shoreline distance (miles) and percent of total was recorded for each shoreline habitat type found. Surface area (acres) and percent of total was determined for each type of littoral and pelagic habitat type found.

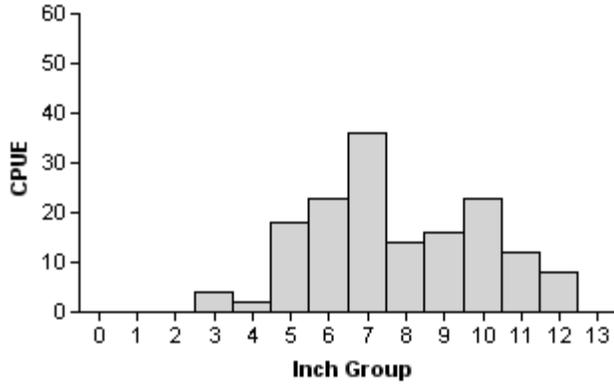
	Shoreline distance		Surface area	
	Miles	% of total	Coverage (acres)	% of total
Shoreline habitat type				
Bulkhead	0.2	2.9		
Rocky shoreline	5.8	82.8		
Natural shoreline	1	14.3		
Littoral and pelagic habitat type				
Native emergent <sup>a</sup>			8.1	1.8
Open water			431.9	98.2
Piers, boat docks, marinas			<0.1	<0.1

<sup>a</sup>Water-willow and Bulrush

# Gizzard Shad

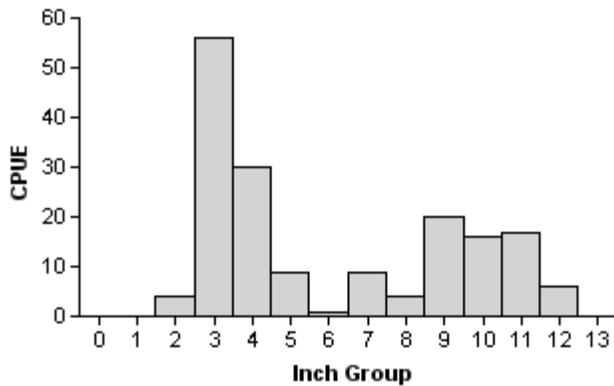
2002

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



2006

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



2010

Effort = 1.0  
 Total CPUE = 135.0 (27; 135)  
 IOV = 45 (3.1)

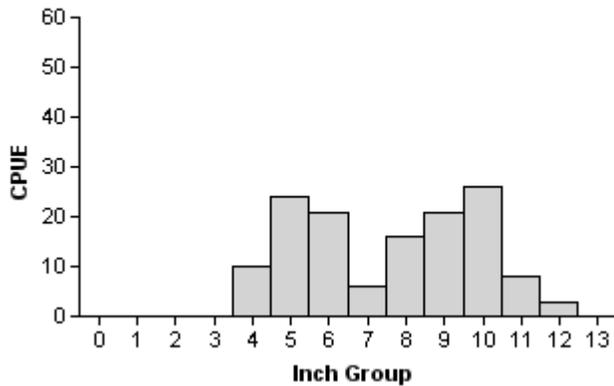
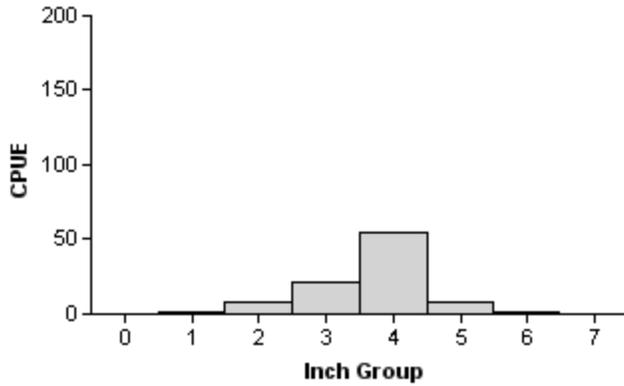


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 2002, 2006, 2010.

12  
Bluegill

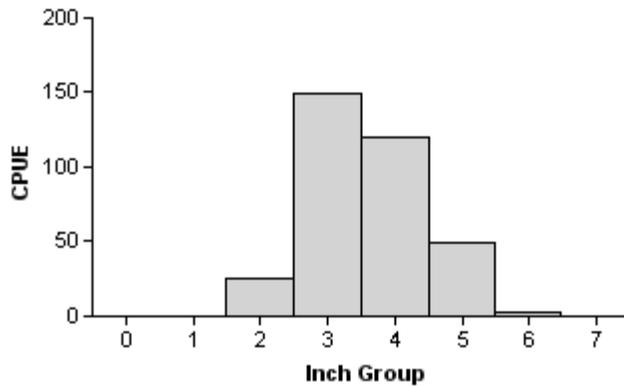
2002

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)



2010

Effort = 1.0  
Total CPUE = 388.0 (15; 388)  
PSD = 13 (2.6)

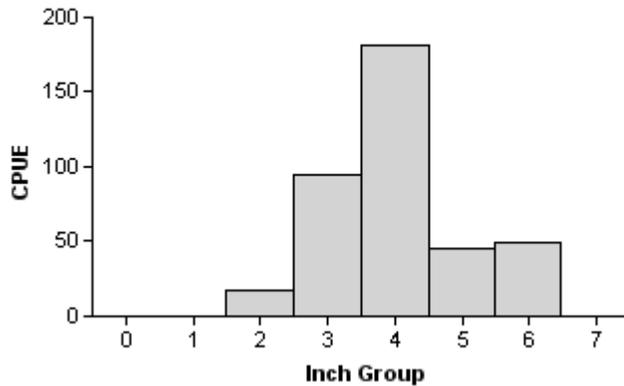
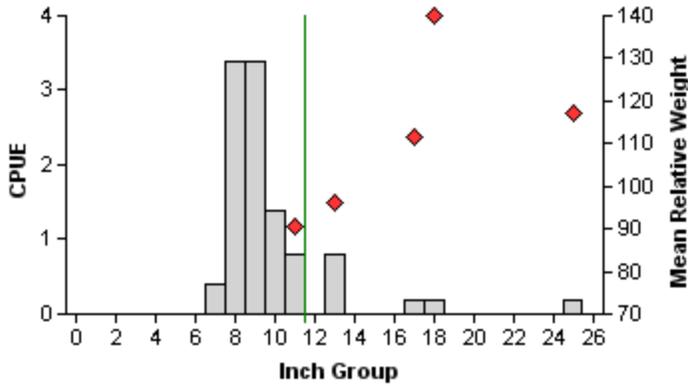


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 2002, 2006, and 2010.

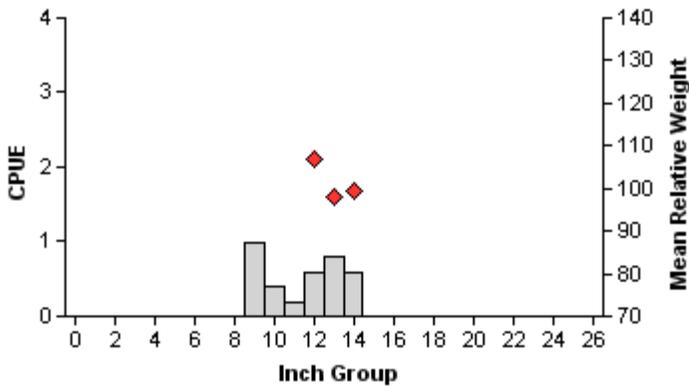
### Channel Catfish

2003



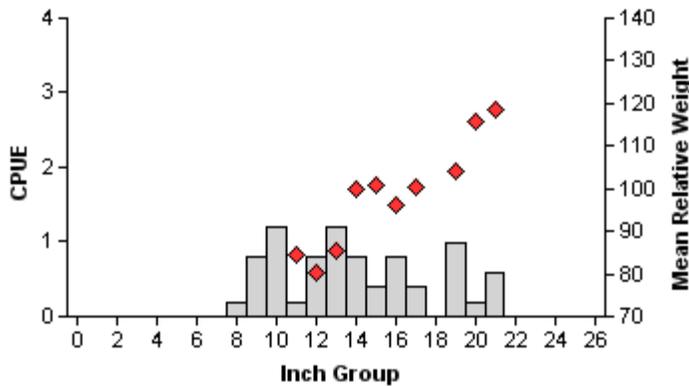
Effort = 5.0  
 Total CPUE = 10.8 (32; 54)  
 Stock CPUE = 2.2 (39; 11)  
 PSD = 27 (9.2)

2007



Effort = 5.0  
 Total CPUE = 3.6 (48; 18)  
 Stock CPUE = 2.2 (36; 11)  
 PSD = 0 (113.2)

2011

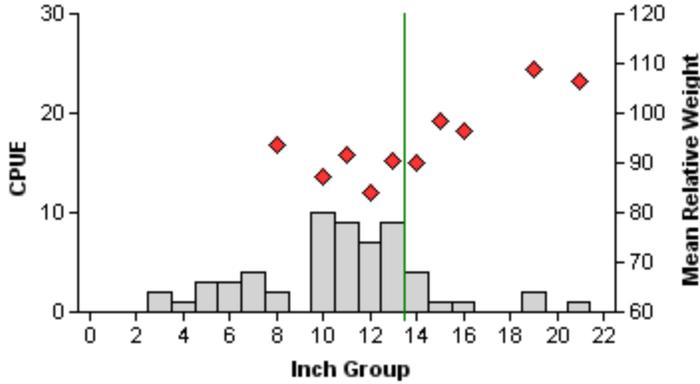


Effort = 5.0  
 Total CPUE = 8.6 (36; 43)  
 Stock CPUE = 6.4 (47; 32)  
 PSD = 47 (4.8)

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, 2003, 2007, and 2011. Vertical line represents length limit at time of collection.

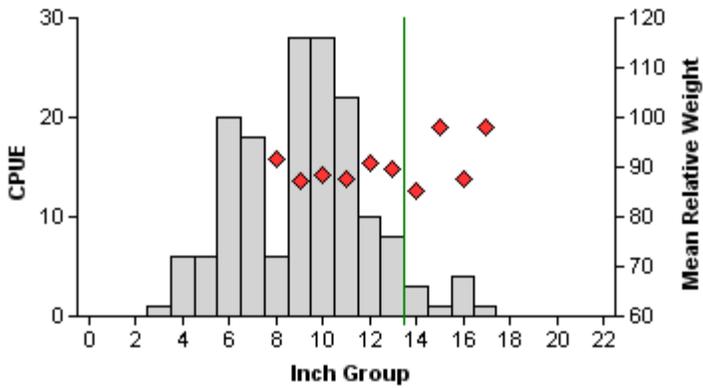
# Largemouth Bass

2002



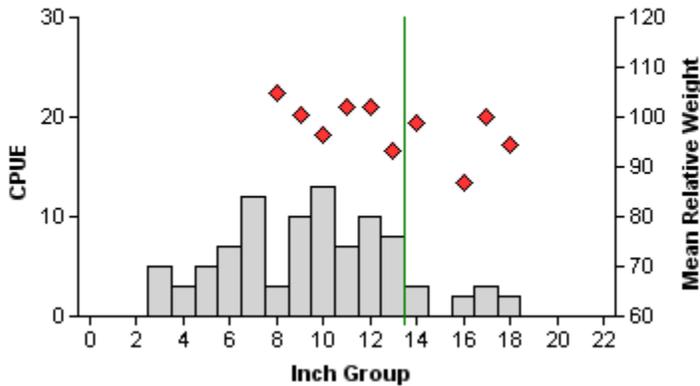
Effort = 1.0  
 Total CPUE = 59.0 (23; 59)  
 Stock CPUE = 46.0 (24; 46)  
 PSD = 54 (6)

2006



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

2010

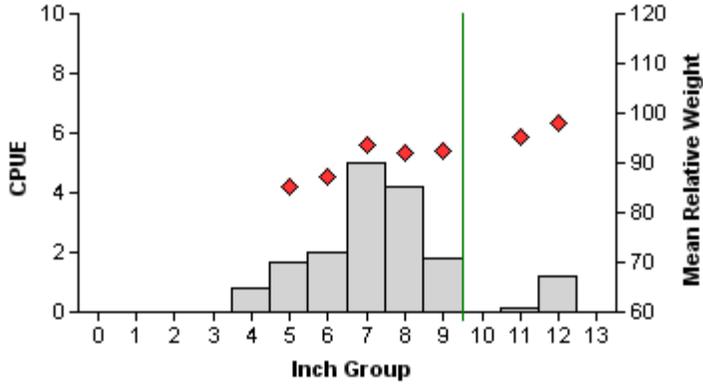


Effort = 1.0  
 Total CPUE = 93.0 (18; 93)  
 Stock CPUE = 61.0 (26; 61)  
 PSD = 46 (5.2)

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, 2002, 2006, and 2010. Vertical lines represent length limit at time of collection.

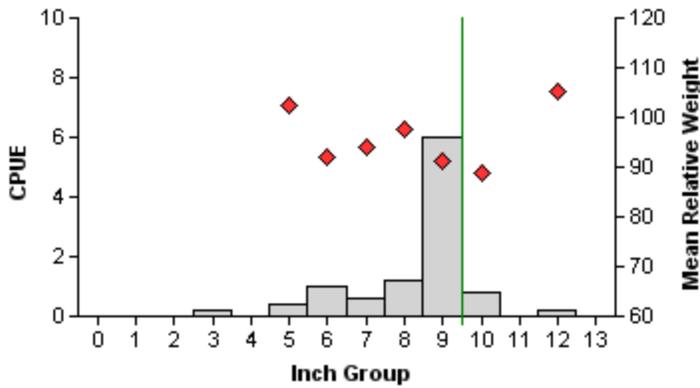
# White Crappie

2002



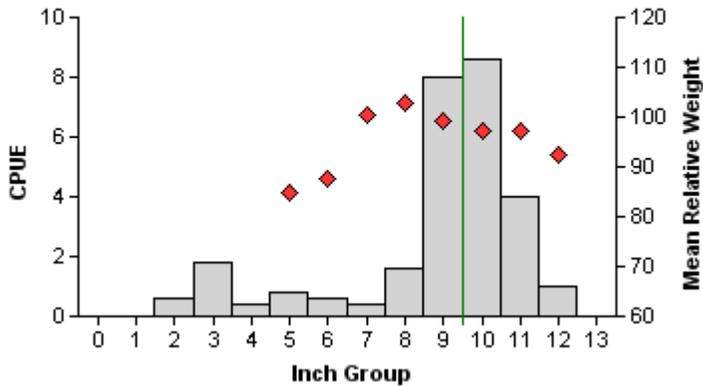
Effort = 6.0  
 Total CPUE = 16.8 (54; 101)  
 Stock CPUE = 16.0 (56; 96)  
 PSD = 46 (15.4)

2006



Effort = 5.0  
 Total CPUE = 10.4 (45; 52)  
 Stock CPUE = 10.2 (46; 51)  
 PSD = 80 (6.3)

2010



Effort = 5.0  
 Total CPUE = 27.8 (42; 139)  
 Stock CPUE = 25.0 (43; 125)  
 PSD = 93 (3.7)

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, 2002, 2006, and 2010. Vertical lines represent length limit at time of collection.

Table 5. 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. Additional survey denoted by A.

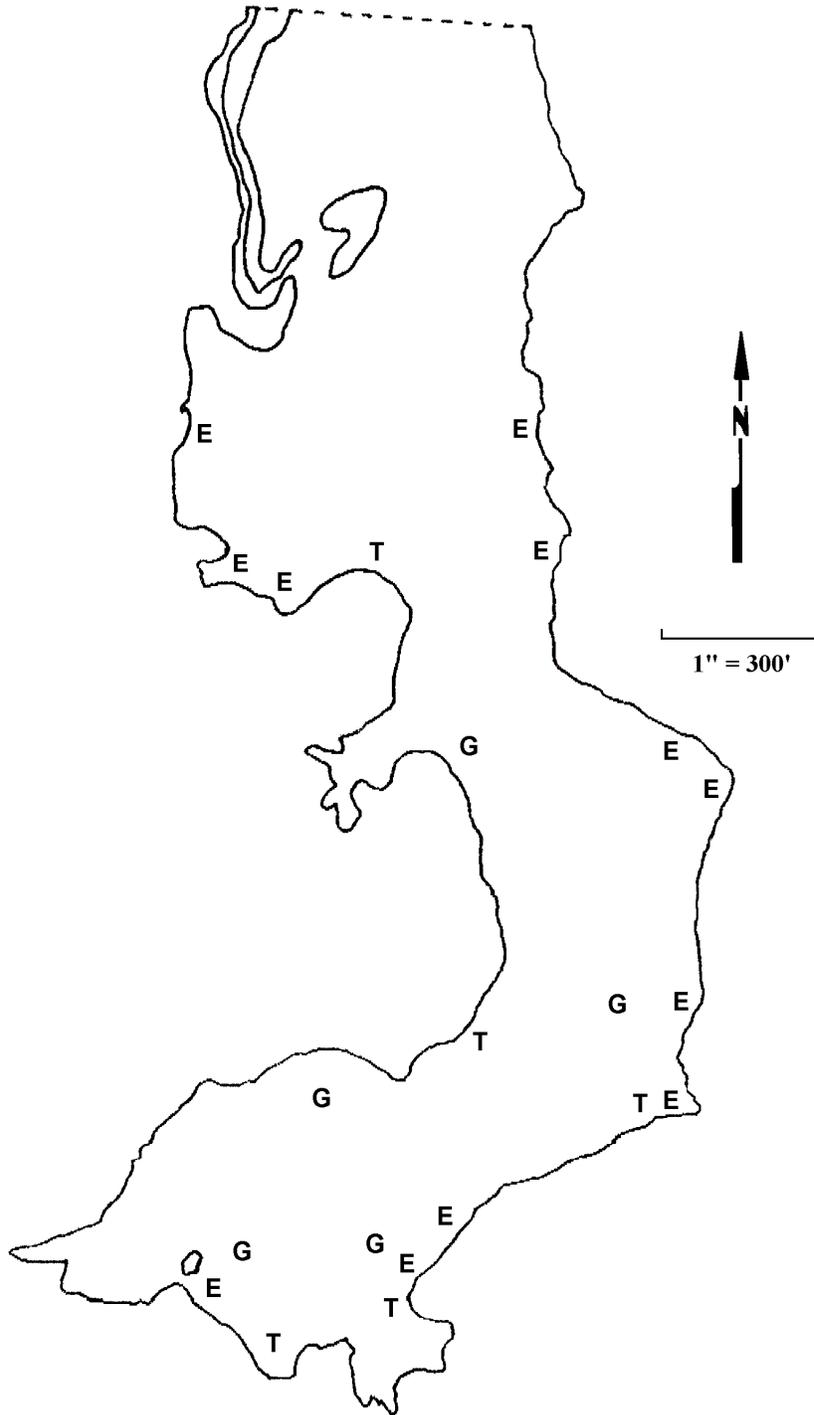
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2011- Spring 2012				A			
Fall 2012- Spring 2013							
Fall 2013- Spring 2014							
Fall 2014- Spring 2015	S	S	S		S	S	S

17  
**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Mineral Wells Reservoir, Texas, 2010-2011.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					135	135.0
Threadfin shad					1091	1091.0
Channel catfish	43	8.6				
Flathead catfish	1	0.2				
Green sunfish					8	8.0
Warmouth					8	8.0
Orangespotted sunfish					2	2.0
Bluegill					388	388.0
Longear sunfish					203	203.0
Redear sunfish					6	6.0
Largemouth bass					93	93.0
White crappie			139	27.8		

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APPENDIX B



Location of sampling sites, Mineral Wells Reservoir, Texas, 2010-2011. Electrofishing, trap netting, and gill netting stations are indicated by E, T, and G, respectively. Water level was 0.2 feet above conservation for electrofishing, 0.75 feet above conservation for trap netting, and one foot below conservation level during gill netting.

**APPENDIX C**

Historical catch rates of targeted species by gear type for Mineral Wells Reservoir, Texas, 1992, 1995, 1998, 2002, 2003, 2006, 2007, 2010, and 2011.

Gear	Species	Year									Avg.
		1992 <sub>a</sub>	1995 <sub>a</sub>	1998 <sub>b</sub>	2002 <sub>b</sub>	2003 <sub>b</sub>	2006 <sub>b</sub>	2007 <sub>b</sub>	2010 <sub>b</sub>	2011 <sub>b</sub>	
Gill Netting (fish/net night)	Channel catfish	3.8	8.8	28.6		10.8		3.6		8.6	<b>10.7</b>
	Flathead catfish	0.2	0.6	0.8		0.0		0.2		0.2	<b>0.3</b>
Electrofishing (fish/hour)	Gizzard shad	214.0	93.0	129.0	156.0		172.0		135.0		<b>149.8</b>
	Threadfin shad	15.0	112.0	88.0	42.0		59.0		1091.0		<b>234.5</b>
	Green sunfish	0.0	12.0	42.0	17.0		26.0		8.0		<b>17.5</b>
	Warmouth	3.0	8.0	32.0	31.0		14.0		8.0		<b>16.0</b>
	Orangespotted sunfish	0.0	0.0	3.0	1.0		0.0		2.0		<b>1.0</b>
	Bluegill	42.0	360.0	395.0	95.0		346.0		388.0		<b>271.0</b>
	Longear sunfish	6.0	38.0	62.0	42.0		137.0		203.0		<b>81.3</b>
	Redear sunfish	2.0	28.0	23.0	12.0		31.0		6.0		<b>17.0</b>
	Spotted bass	2.0	0.0	6.0	9.0		2.0		0.0		<b>3.2</b>
Largemouth bass	69.0	146.0	206.0	59.0		162.0		93.0		<b>122.5</b>	
Trap Netting (fish/net night)	White crappie	28.1	34.5	4.3	16.8		10.4		27.8		<b>20.3</b>

<sub>a</sub> All sampling stations for all gear were subjectively selected.

<sub>b</sub> All sampling stations for all gear were randomly selected.