PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Buffalo Creek Reservoir

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July 31, 2011

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Buffalo Creek Reservoir were surveyed in 2010 using trap nets and electrofishing and in 2011 using gill nets. A nine month creel survey was conducted from June – Nov 2009 and March-May 2010. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Buffalo Creek Reservoir is a 1,577-acre impoundment located on the North Fork of Buffalo Creek in the Red River Basin approximately 20 miles west of Wichita Falls. It has a primarily rocky shoreline with flooded terrestrial habitat. Aquatic vegetation has recently become established. Buffalo Creek water can be turbid at times.

- **Management history:** Important sport fish include largemouth bass, white crappie, and catfish. Northern largemouth bass were stocked in 2005 and 2006. Florida largemouth bass were stocked in 2008 and channel catfish were stocked in 2005. The stockings were in response to extended periods of low water in previous years that adversely impacted fish populations. Buffalo Creek has always been managed with statewide regulations.

- **Fish Community**
  - **Prey species:** The gizzard shad catch rate was below the historical average and consisted of a large portion (43%) of individuals that were too large for largemouth bass to consume. Total catch rate (CPUE) for bluegill was near the historical average.

  - **Catfishes:** Blue catfish CPUE doubled over the two previous surveys, though most were below the 12-inch minimum length limit. Channel catfish CPUE had greatly increased, but like the blue catfish CPUE consisted mainly of sub-legal fish. Flathead catfish were present in low density.

  - **Largemouth bass:** Largemouth bass had the second highest electrofishing catch rate ever recorded for the reservoir, with many bass sampled over the minimum length limit. Body condition was average.

  - **White crappie:** The catch rate decreased from the 2006 trap net survey, but was higher than the reservoir's historical catch rate. However, the 2006 sample consisted mostly of smaller crappie six inches or less in length. The size structure improved in 2010, with larger specimens ≥14 inches in length observed in the survey. During the creel survey, crappie up to 16 inches were measured. Crappie growth was above the regional average.

- **Management Strategies:** Conduct general monitoring with trap netting, gill netting, and electrofishing surveys in 2014-2015. Continue habitat improvement along the dam by annually placing brush piles and half-felling trees beside the dam.

INTRODUCTION

This document is a summary of the fisheries data collected from Buffalo Creek Reservoir in 2010-2011. The purpose is to provide fisheries information and make possible 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 is presented with the 2010-2011 data for comparison.

Reservoir Description

Buffalo Creek Reservoir is a 1,577-acre impoundment constructed in 1964 on the North Fork of Buffalo Creek. It is located in Wichita County, approximately 20 miles west of Wichita Falls and is operated and controlled by the City of Iowa Park. The primary use is for recreation. Mean depth is 10 feet when the reservoir is at conservation pool, but it has often been well below that during the fisheries surveys. Conductivity was measured at 588 μmhos/cm in April 2011. Habitat at time of sampling consisted of rocky shoreline and flooded terrestrial vegetation. The water level had been low since 2003, ranging from the current 8 feet low to 23 feet below conservation pool (Figure 1). Boat access consisted of a single, public two-lane concrete ramp which is unusable when the reservoir was more than 14 feet low. Bank fishing was readily available around the periphery of the reservoir. Other descriptive characteristics for Buffalo Creek Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report issues (Mauk and Howell 2007) included:

1. Low water elevations prior to 2006 had greatly impacted angling effort including use of the boat ramp which was out of the water. By 2007, the reservoir elevation had risen enough that the boat ramp was again usable and most fish populations had increased in abundance and size, but anglers were unaware of the improved conditions.

   Action: During 2007, publicized that the boat ramp was once again usable and that the fish populations were in good shape via news releases in the Wichita Falls Time Record News and in the Iowa Park Leader newspapers.

2. Florida largemouth bass genetic influence was low caused by years of drought and municipal demand. The reservoir is no longer a municipal water source and the reservoir elevation had increased.

   Action: Stocked Florida largemouth bass at a rate of 100/acre in 2008.

3. Physical habitat and fish structure were limited during periods of low water.

   Action: After reservoir elevation rose, hundreds of acres of terrestrial vegetation were flooded, providing abundant habitat. During late 2009 and early 2011, district staff created brush piles along the dam consisting of mesquite trees, cleared from the dam and donated cinder blocks. This project focused on enhancing littoral habitat, concentrating white crappie and improving angler catch rates.

Harvest regulation history: Sport fish species in Buffalo Creek Reservoir are currently managed and have always been managed using statewide harvest regulations (Table 2).

Stocking history: In recent years, the reservoir received supplemental stockings of channel catfish, northern and Florida largemouth bass in response to increased water elevation from previous years. Florida largemouth bass were last stocked in 2008. The complete stocking history is in Table 3.

Vegetation/habitat history: Buffalo Creek has no significant aquatic vegetation management history. It has had habitat enhancement work completed in the past using mesquite trees growing on the dam that were cut and sunk as fish attractors. The resulting brush piles were popular with anglers. The work ceased a few years when the reservoir nearly dried up in 2004. This enhancement work started up again in late 2009 in response to increased reservoir elevations.

Water transfer: Buffalo Creek Reservoir is primarily used for recreation. It was originally used as a municipal water supply for the city of Iowa Park. There is a functional water pumping station on the reservoir, which can transfer water to other locations; but it is seldom operated, only enough to keep the pumps in operational condition. When the pumps are operated, water is primarily pumped to Gordon Lake, a community fishing lake in Iowa Park. Water could also be pumped to Iowa Park Lake.

METHODS

Fishes were collected by electrofishing (one hour at 12 five-minute stations), gill netting (10 net nights at 10 stations), and trap netting (10 net nights at 10 stations). A creel survey was conducted June – Nov 2009 and March – May 2010 quarters. Catch per unit effort 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 per net night (fish/nn). All survey sites were randomly selected. Habitat, vegetation, and access surveys were completed in 2010. All surveys were conducted according to TPWD Inland Fisheries 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_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability 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. Source for water level data was the United States Geological Survey.

RESULTS AND DISCUSSION

Habitat: Very little or no manmade changes to the physical habitat occurred during the eight-year period since the last habitat survey was completed (Mauk and Howell 2003). A physical habitat survey was not conducted in 2006 because extremely low water elevations would not allow boat launching. During the 2010 habitat survey, the elevation Increased and abundant flooded terrestrial vegetation such as salt cedar and mesquite were observed, mainly towards the upper portion of the reservoir covering about 33% of the surface acreage (Table 4). Native emergent and submergent aquatic vegetation were surveyed at the reservoir. While covering a small proportion of the reservoirs surface acreage at the time of the survey, it has since expanded creating important fisheries habitat.

Creel Survey: A nine-month creel survey was conducted from June – November 2009 and March – May 2010. During the creel survey, the unpaved roads around the lake were deeply rutted from vehicle passage after rainfall events. Deteriorated road conditions impeded anglers from accessing the reservoir, especially those with boats. In response, the City of Iowa Park personnel graded the roads and began to restrict road access during and after rain events until the roads were dry. During the survey, five of the twenty-seven creel survey days coincided when the gates were closed and these scheduled surveys were not then conducted.

The creel survey revealed that total direct expenditures were $99,230 (Table 6). White crappie were the most sought after species (46.2%) with largemouth bass second (21.7%; Table 5). White crappie made up the majority of the harvest (90.3%) and catch (66.8%; Table 5). Harvested crappie ranged from 11 to 16 inches (N=196) with most between 12 and 14 inches (Fig. 12).

Prey species: Electrofishing catch rates of gizzard shad and bluegill were 383.0/h (Fig. 2) and 93.0/h (Fig. 3), respectively. Index of vulnerability for gizzard shad was well below previous surveys, indicating that 57% of gizzard shad were available to existing predators (Fig. 2). Total CPUE of gizzard shad was well below the 2006 survey (1,188.0/hr) and below the historical average (557.3/hr). Total CPUE of bluegill in 2010 (93.0/h) was much higher than the 2006 survey (22.0/hr) and near the historical average of 99.5/hr. (Figure 3), a likely result of increased habitat after the rise in water level.

Blue catfish: The 2011 blue catfish gill net CPUE (9.4/nn) doubled from the two previous surveys of 2003 (4.6/nn) and 2007 (4.7/nn; Fig. 4). The size range was 8 to 23 inches with the majority (6.0/nn) being less than 12 inches long (Fig. 4). Body condition (Wr) was above 90 for almost all fish above stock size.

Channel catfish: The channel catfish gill net CPUE (11.1/nn) in 2011 increased dramatically since the 2007 survey (6.1/nn) and the 2003 survey (0.6/nn; Figure 6). This is a possible reflection of the 2005 advanced fingerling stocking effort. Like the blue catfish, sub-legal channel catfish made up a large portion (9.3/nn) of the CPUE. Relative weights were highly variable for stock sized fish ranging from 78 to 104. Gill net sampled channel catfish ranged in size from 7 to 23 inches in length and in the creel survey from 12 to 21 inches.

Flathead catfish: Flathead catfish were present with two being caught in the gill nets during the survey (Fig. 8). This is down from previous surveys but, historically, their abundance has been consistently low in this reservoir.

Largemouth bass: The electrofishing CPUE of largemouth bass was 49.0/h in 2010 (Figure 10), a decrease from the previous survey in 2006 (65.0/h), but was the second highest CPUE and above the historical average (39.8/hr) for the reservoir. PSD-14 was 42 indicating just less than half of the stock-size population was ≥14 inches. Bass up to 20 inches were harvested during the creel survey, and all the largemouth bass observed harvested were in excess of the 14-inch length limit. Body condition in 2010 was considered adequate ranging from 89 to 107.

White crappie: The trap net catch rate of white crappie was 131.9/nn in 2010, lower than the previous record catch rate from 2006 (222.6/nn; Fig. 11), but above the historical average of 107.3/nn. The 2006 sample was made up entirely of sub-legal crappie ($\leq$10 inches). The high 2006 catch rate may be attributed to excellent reproduction resulting from an increase in reservoir elevation level and expanded habitat. The reservoir experienced chronically low water elevations since 1999, resulting in the reservoir nearly going dry in 2004. A large elevation rise in 2007 likely contributed to the 2010 catch distribution that included legal-sized (>10 inches) crappie and an improved size structure with individuals up to 14 inches. During the creel survey crappie up to 16 inches were measured and there were an abundance of 12- 14 inch crappie observed as harvested (Figure 11). Growth of the crappie is well above the regional average (Table 10) and Wr of legal crappie ranged from 91-102 (Fig. 11).

Issue 1: After rainfall events, the City of Iowa Park closes the Burnet Ranch Road and the Harmony Road access gates to prevent vehicle damage to the dirt roads. These are the only access points to the reservoir for anglers.

MANAGEMENT STRATEGIES

1. Work with the city of Iowa Park to continue road access improvements to include possible participation in the state boat ramp program. A matching grant from this program could potentially be used for access road paving and a paved parking area. This would likely increase use in a significant way.

Issue 2: During periods of reservoir elevations above 1,040 feet above mean sea level, we have annually placed brush piles and half felled trees in the water along the dam. This effort has been well received by the angling public.

MANAGEMENT STRATEGY

1. When water levels allow, continue placing fish attracting structure on an annual basis to enhance littoral habitat. The cover provided should help concentrate white crappie and enhance angler catch rates. The most suitable and available materials are a combination of donated cinder blocks and mesquite trees cleared from the dam.

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 the controlling authority to post appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

There are no special concerns at this point regarding the fishery. Standard sampling will be conducted in 2014-2015 to monitor the fish populations (Table 12).

LITERATURE CITED

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32:348.

Howell, M. and R. Mauk. 2007. Statewide freshwater fisheries monitoring and management program survey report for Buffalo Creek Reservoir, 2006. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Mauk, R., and M. Howell. 2003. Statewide freshwater fisheries monitoring and management program survey report for Buffalo Creek Reservoir, 2002. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Prentice, J. A. 1987. Length-weight relationships and average growth rates of fishes in Texas. Inland Fisheries Data Series No. 6. Texas Parks and Wildlife Department, Inland Fisheries Division. Austin.

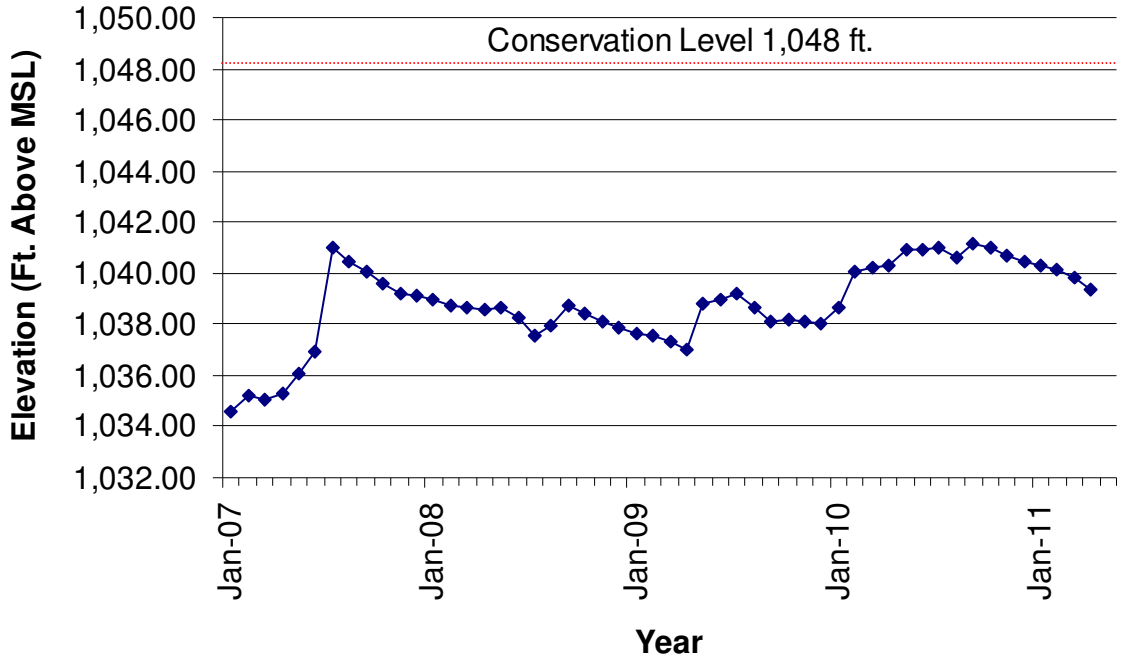


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Buffalo Creek Reservoir, Texas.

Table 1. Characteristics of Buffalo Creek Reservoir, Texas.

Characteristic	Description
Year Constructed	1964
Controlling authority	City of Iowa Park
County	Wichita
Reservoir type	Tributary
Shoreline Development Index (SDI)	3.7
Conductivity	588 μmhos/cm

Table 2. Harvest regulations for Buffalo Creek Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: Channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Flathead catfish	5	18 minimum
Largemouth bass	5	14 minimum
White crappie	25	10 minimum

Table 3. Stocking history of Buffalo Creek, Texas. Life stages are fingerlings (FGL), advanced fingerlings (AFGL). 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) if known is given (UNK=unknown). For years when there were multiple stocking events for a particular species, the mean TL is an average for all stocking events combined.

Species	**Year**	**Number**	**Life Stage**	**Mean TL (in)**
Blue catfish	1969	25,000	FGL	UNK
Channel catfish	2005	24,059	AFGL	9.9
	Total	24,059		
Florida largemouth bass	1993	139,987	FGL	1.2
	1999	141,148	FGL	1.4
	2008	165,989	FGL	1.7
	Total	447,124		
Northern largemouth bass	2005	38,460	FGL	1.6
	2006	48,070	FGL	1.9
	Total	86,530		

Table 4. Survey results of littoral zone and physical habitat types for Buffalo Creek on August 17 & 19, 2010 (1,040.6 feet msl). 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 and offshore flooded terrestrial.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Rocky shore	0.8	9.0		
Flooded dead terrestrial	7.8	91.0	514.0	32.6
Vegetation				
Native emerged vegetation			0.2	<0.1
Native submerged vegetation			1.0	<0.1

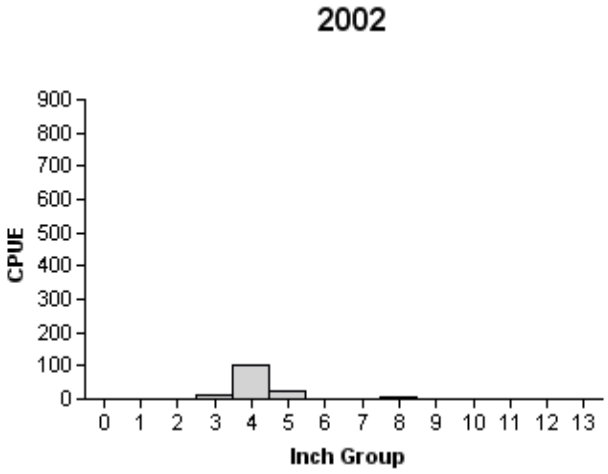
Table 5. Percent directed angler effort by species, percent harvest and catch for all anglers for Buffalo Creek Reservoir, Texas, from June-November 2009 and March-May 2010.

Species	Percent directed effort	Percent harvest all anglers	Percent catch all anglers
Carp	0.2		2.0
Blue catfish	1.7	1.3	0.7
Channel catfish	1.9	2.9	2.8
Flathead catfish			0.2
Catfish spp.	10.2		
Panfish spp.			1.5
Largemouth bass	21.7	5.4	26.0
White crappie	46.2	90.3	66.8
Anything	18.1		

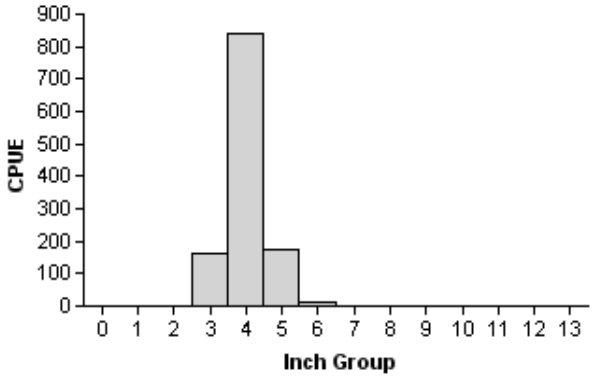
Table 6. Total fishing effort (h) for all species and total directed expenditures at Buffalo Creek from June-November 2009 and March-May 2010.

Creel Statistic	Year
	June –November 2009 and March-May 2010
Total fishing effort (h)	23,993
Total directed expenditures	$99,230

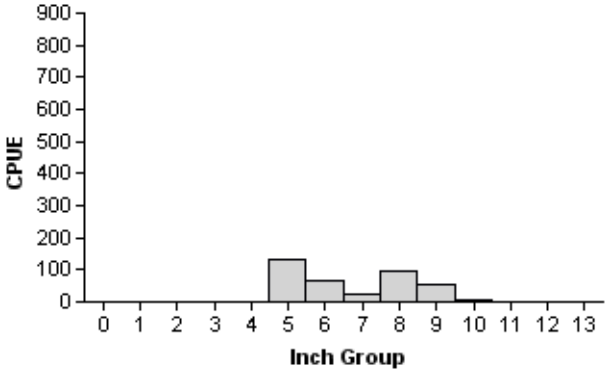
Gizzard Shad



Effort = 1.0
Total CPUE = 146.0 (26; 146)
Stock CPUE = 10.0 (51; 10)
IOV = 94 (3.1)



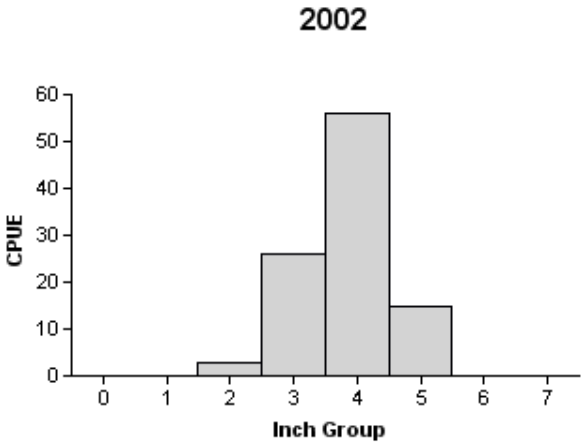
Effort = 1.0
Total CPUE = 1,188.0 (20; 1188)
Stock CPUE = 2.0 (67; 2)
IOV = 100 (0.1)



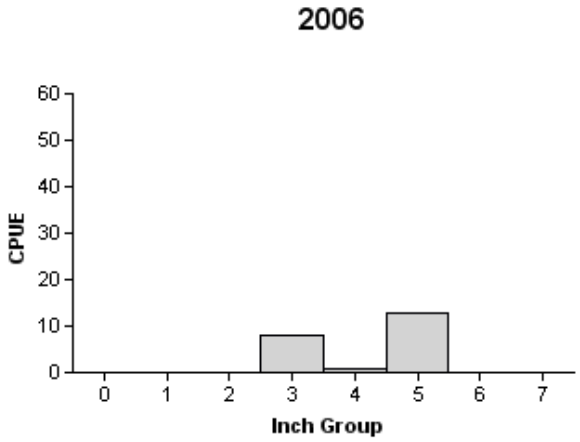
Effort = 1.0
Total CPUE = 383.0 (19; 383)
Stock CPUE = 186.0 (21; 186)
IOV = 57 (11)

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

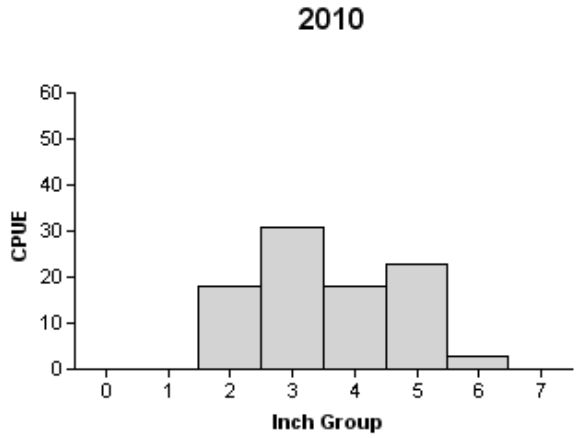
Bluegill



Effort = 1.0
Total CPUE = 100.0 (45; 100)
Stock CPUE = 97.0 (100; 97)
PSD = 0 (56.2)



Effort = 1.0
Total CPUE = 22.0 (37; 22)
Stock CPUE = 22.0 (100; 22)
PSD = 0 (47.5)



Effort = 1.0
Total CPUE = 93.0 (31; 93)
Stock CPUE = 75.0 (100; 75)
PSD = 4 (1.5)

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, Buffalo Creek Reservoir, Texas, 2002, 2006, and 2010.

Blue Catfish

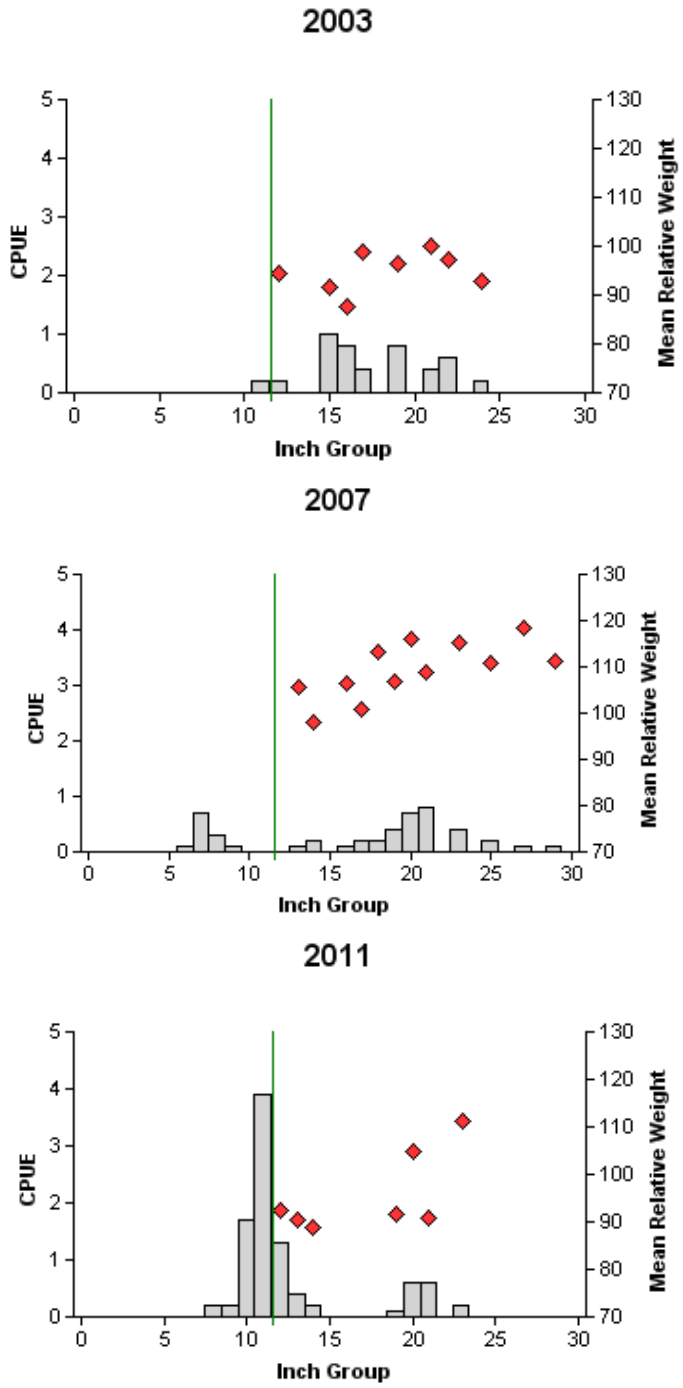


Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Buffalo Creek Reservoir, Texas, 2003, 2007, and 2011. Line indicates minimum length limit at time of sampling.

Blue Catfish

Table 7. Creel survey statistics for blue catfish at Buffalo Creek Reservoir from June through November 2009 and March through May 2010, where total catch per hour is for anglers targeting blue catfish and total harvest is the estimated number of blue catfish harvested by all anglers.

Creel Survey Statistic	Year
	June – November 2009 and March – May 2010
Directed effort (h)	412.1
Directed effort/acre	0.3
Total catch per hour	0.4
Total harvest	169.1
Harvest/acre	0.1

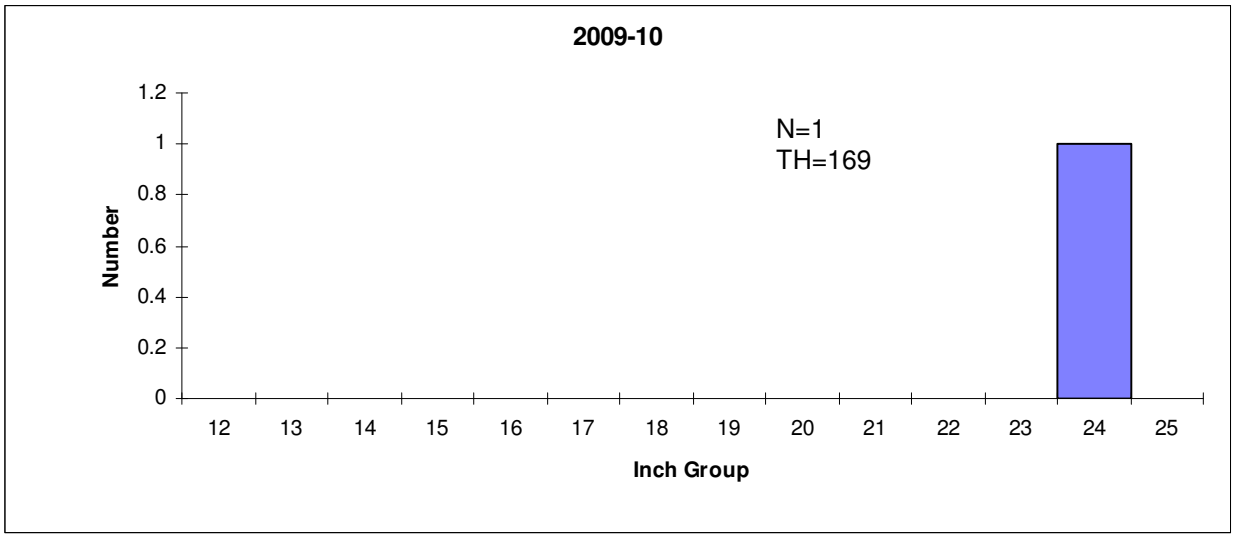
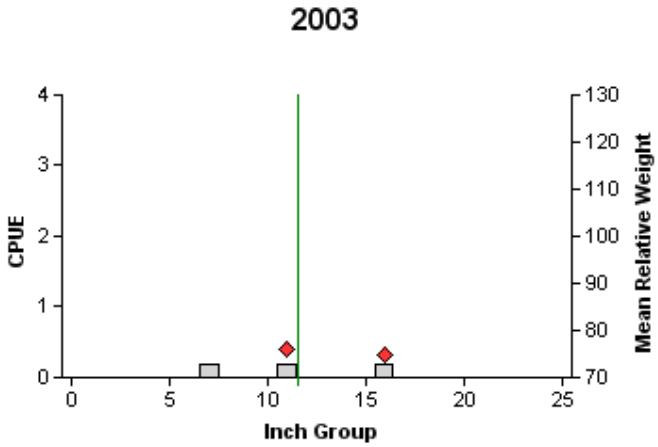
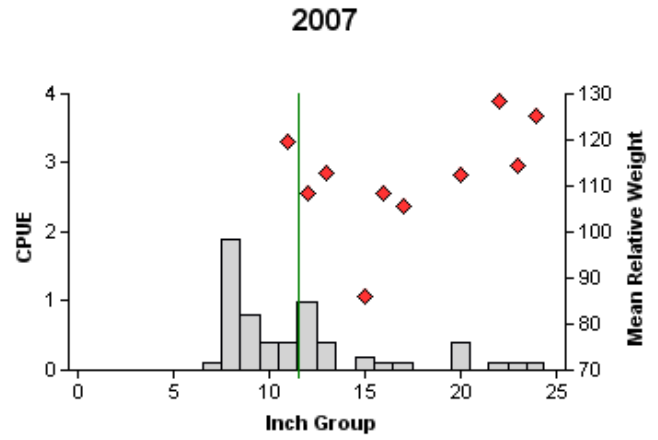


Figure 5. Length frequency of harvested blue catfish observed during creel surveys at Buffalo Creek June – November 2009 and March – May 2010, all anglers combined. N is the number of harvested blue catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Twelve-inch length limit at time of sampling.

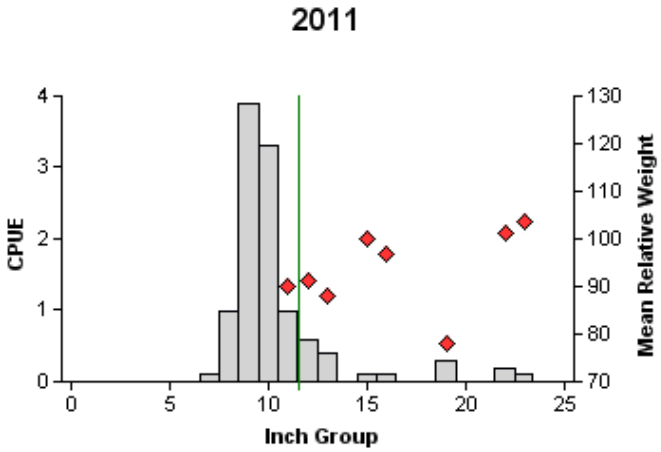
Channel Catfish



Effort = 5.0
Total CPUE = 0.6 (67; 3)
Stock CPUE = 0.4 (100; 2)
PSD = 50 (39.5)
PSD-P = 0 (0)



Effort = 10.0
Total CPUE = 6.1 (18; 61)
Stock CPUE = 2.9 (19; 29)
PSD = 31 (9.9)
PSD-P = 0 (0)



Effort = 10.0
Total CPUE = 11.1 (32; 111)
Stock CPUE = 2.8 (28; 28)
PSD = 25 (9.1)
PSD-P = 0 (0)

Figure 6. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Buffalo Creek Reservoir, Texas, 2003, 2007, and 2011. Line indicates minimum length limit at time of sampling.

Channel Catfish

Table 8. Creel survey statistics for channel catfish at Buffalo Creek Reservoir from June through November 2009 and March through May 2010, where total catch per hour is for anglers targeting channel catfish and total harvest is the estimated number of channel catfish harvested by all anglers.

Creel Survey Statistic	Year
	June – November 2009 and March – May 2010
Directed effort (h)	466.9
Directed effort/acre	0.3
Total catch per hour	0.2
Total harvest	371.6
Harvest/acre	0.2

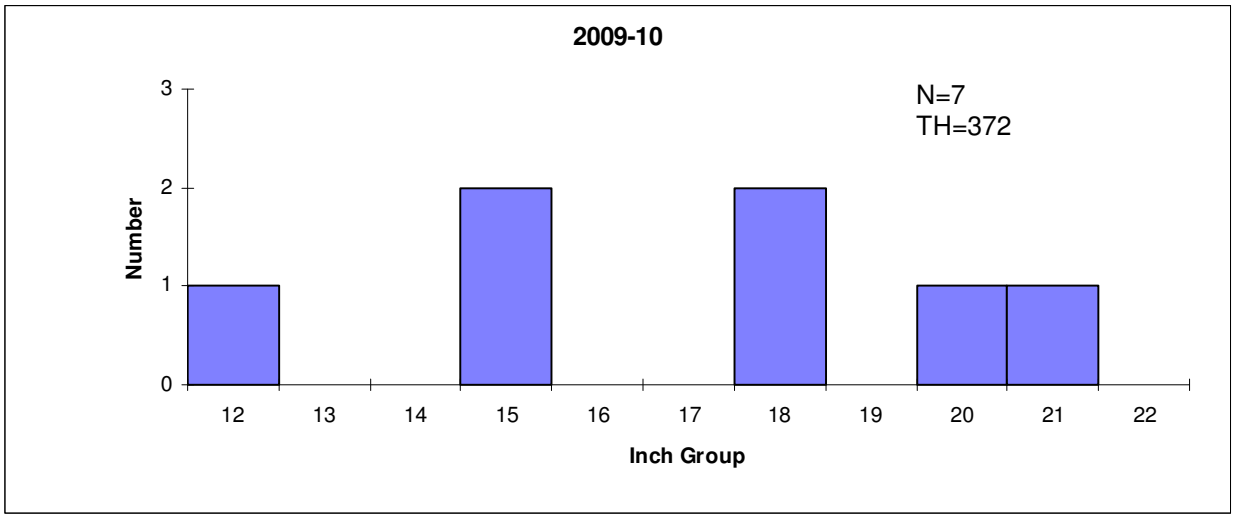
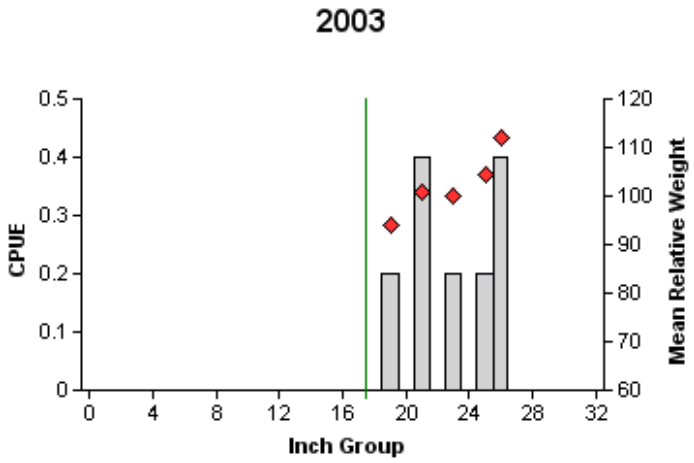
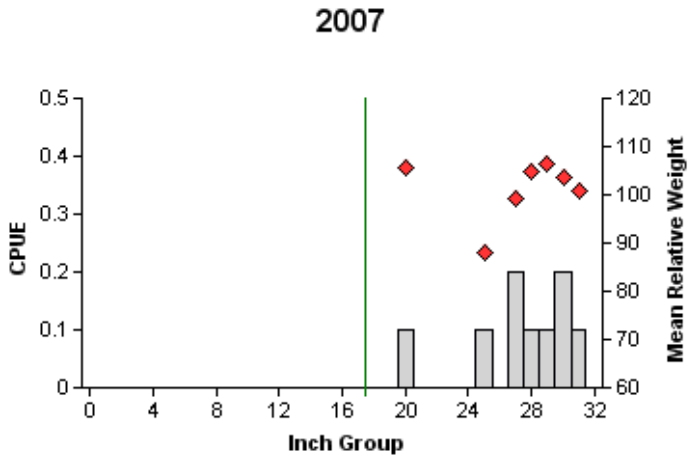


Figure 7. Length frequency of harvested channel catfish observed during creel surveys at Buffalo Creek June – November 2009 and March – May 2010, all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Twelve-inch length limit at time of sampling.

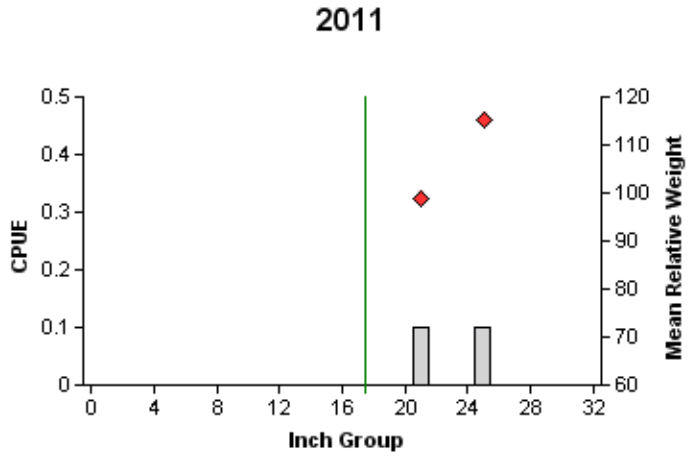
Flathead Catfish



Effort = 5.0
Total CPUE = 1.4 (43; 7)
Stock CPUE = 1.4 (43; 7)
PSD = 86 (14)
PSD-P = 0 (0)



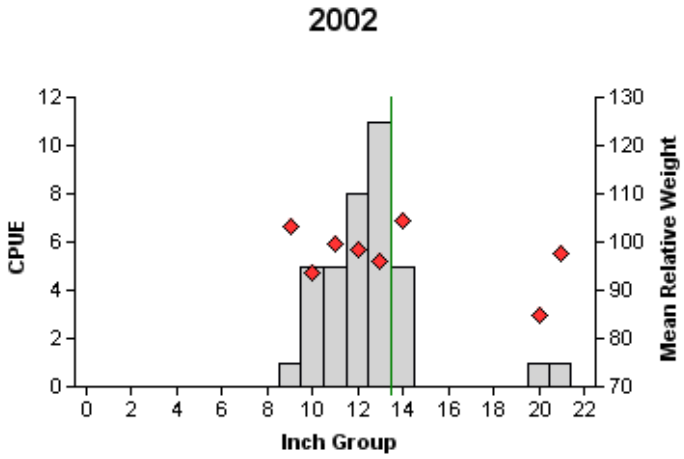
Effort = 10.0
Total CPUE = 0.9 (54; 9)
Stock CPUE = 0.9 (54; 9)
PSD = 100 (0)
PSD-P = 56 (18.8)



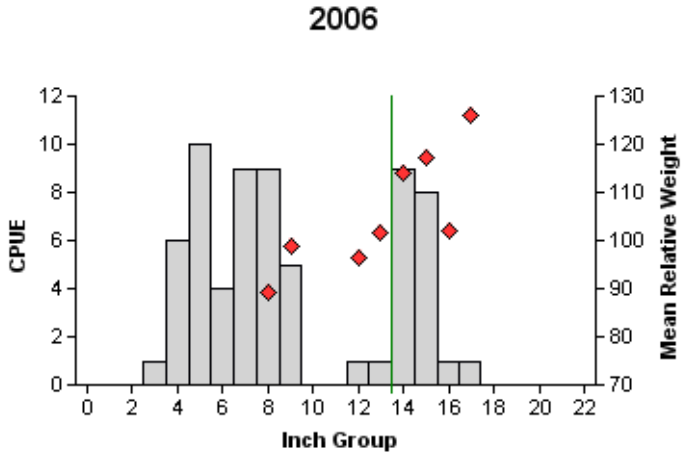
Effort = 10.0
Total CPUE = 0.2 (67; 2)
Stock CPUE = 0.2 (67; 2)
PSD = 100 (0)
PSD-P = 0 (0)

Figure 8. Number of flathead 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 netting surveys, Buffalo Creek Reservoir, Texas, 2003, 2007, and 2011. Line indicates minimum length limit at time of sampling.

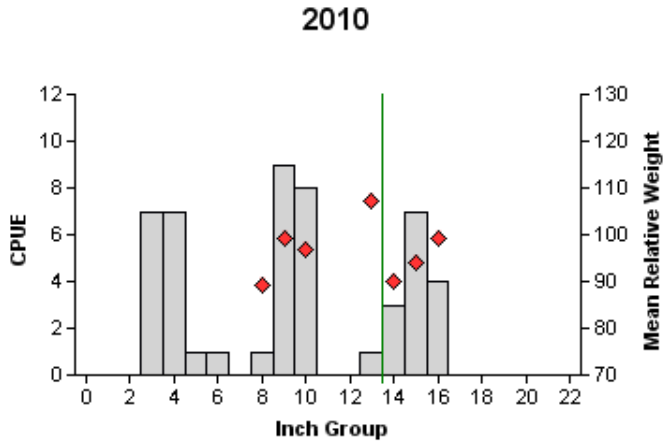
Largemouth Bass



Effort = 1.0
Total CPUE = 37.0 (36; 37)
Stock CPUE = 37.0 (36; 37)
PSD = 70 (5.2)
PSD-14 = 19 (4.7)



Effort = 1.0
Total CPUE = 65.0 (24; 65)
Stock CPUE = 35.0 (22; 35)
PSD = 60 (8)
PSD-14 = 54 (8.1)



Effort = 1.0
Total CPUE = 49.0 (28; 49)
Stock CPUE = 33.0 (26; 33)
PSD = 45 (10.9)
PSD-14 = 42 (8.7)

Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Buffalo Creek Reservoir, Texas, 2002, 2006, and 2010. Line indicates minimum length limit at time of sampling.

Largemouth Bass

Table 9. Creel survey statistics for largemouth bass at Buffalo Creek Reservoir from June through November 2009 and March through May 2010, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers.

Creel Survey Statistic	Year
	June – November 2009 and March – May 2010
Directed effort (h)	5,217.4
Directed effort/acre	3.3
Total catch per hour	1.0
Total harvest	692.7
Harvest/acre	0.4

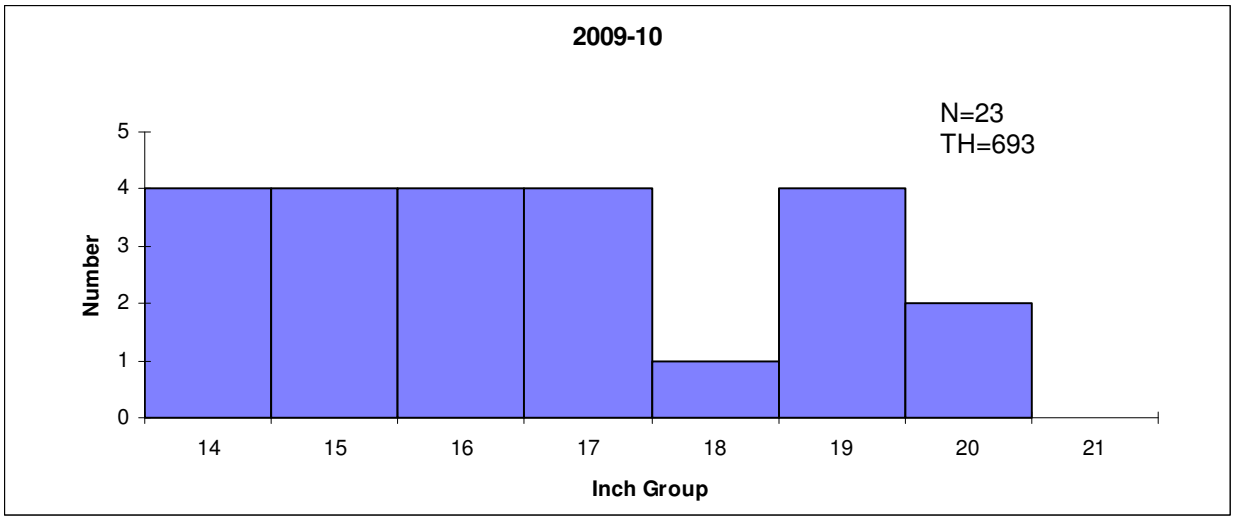
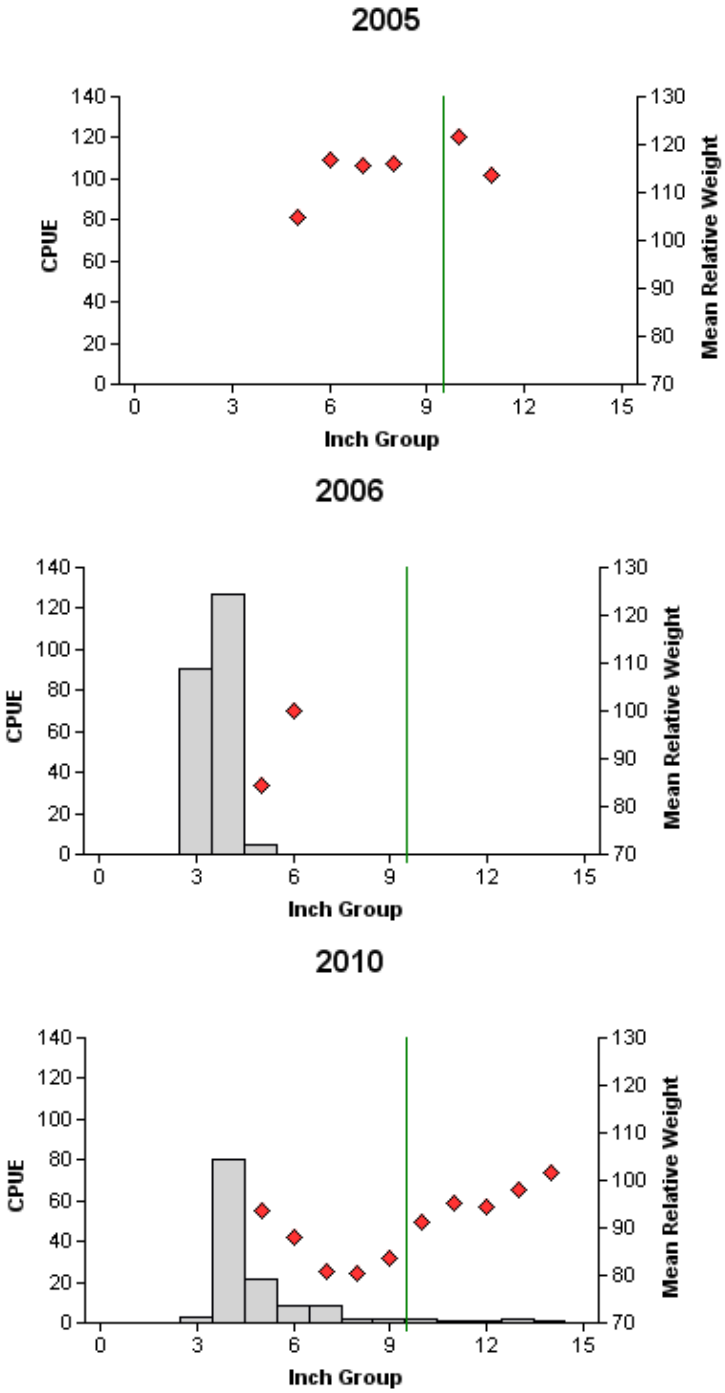


Figure 10. Length frequency of harvested largemouth bass observed during creel surveys at Buffalo Creek June – November 2009 and March – May 2010, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Fourteen-inch length limit at time of sampling.

White Crappie



Effort =	8.0
Total CPUE =	0.9 (34; 7)
Stock CPUE =	0.9 (34; 7)
PSD =	57 (20.9)
PSD-P =	29 (20.3)

Effort =	10.0
Total CPUE =	222.6 (42; 2226)
Stock CPUE =	4.8 (24; 48)
PSD =	0 (2468.7)
PSD-P =	0 (0)

Effort =	10.0
Total CPUE =	131.9 (27; 1319)
Stock CPUE =	48.6 (18; 486)
PSD =	20 (4.7)
PSD-P =	12 (2.9)

Figure 11. 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, Buffalo Creek Reservoir, Texas, 2005, 2006, and 2010. Line indicates minimum length limit at time of sampling.

Table 10. Mean length at age of capture for white crappie (sexes combined) collected with trap nets, Buffalo Creek Reservoir, Texas, September 1992, November 1995, 1998, 2002, and October 2010. Sample sizes are in parentheses. Ages determined using otoliths.

	Length (inches) at age of capture			
Year	1	2	3	4
1992	7.1(10)	10.8(20)		13.9(2)
1995	6.8(15)	10.4(17)	12.2(5)	
1998	8.8(19)	11.8(7)	12.1(7)	
2002	8.6(36)	12.3(3)		12.7(1)
2010	5.7(20)	9.1(76)	13.6(24)	11.9(1)
Averages[a]	5.7	7.0	8.2	9.2

[a]Ecological region 7 averages from Prentice (1987); lengths derived for November 1.

White Crappie

Table 11. Creel survey statistics for white crappie at Buffalo Creek Reservoir from June through November 2009 and March through May 2010, where total catch per hour is for anglers targeting white crappie and total harvest is the estimated number of white crappie harvested by all anglers.

Creel Survey Statistic	Year
	June – November 2009 and March – May 2010
Directed effort (h)	10,969.2
Directed effort/acre	7.0
Total catch per hour	1.6
Total harvest	11,479.8
Harvest/acre	7.3

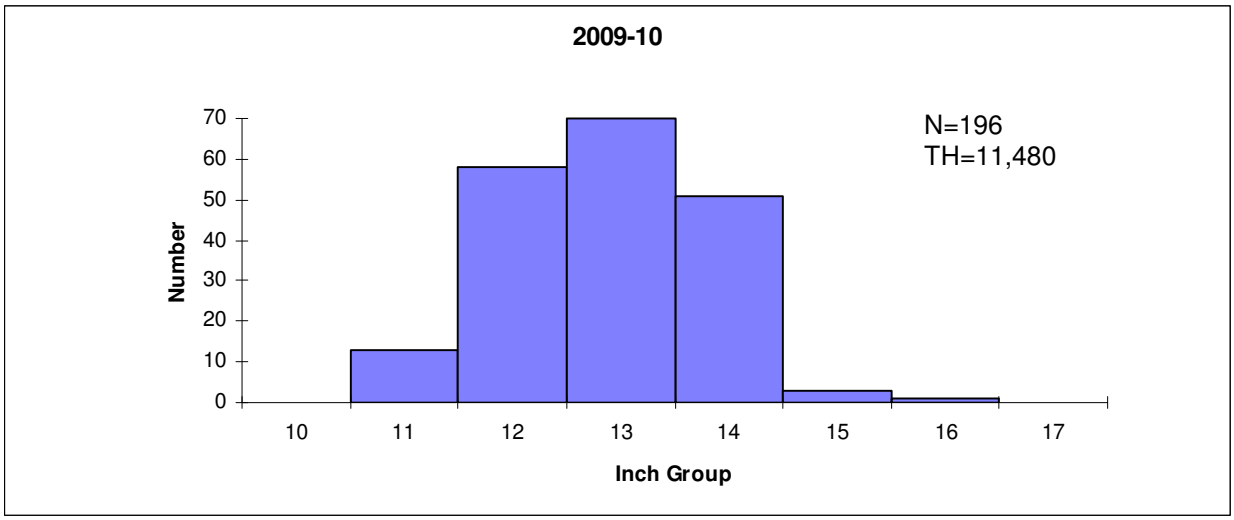


Figure 12. Length frequency of harvested white crappie observed during creel surveys at Buffalo Creek June – November 2009 and March – May 2010, all anglers combined. N is the number of harvested white crappie observed during creel surveys, and TH is the total estimated harvest for the creel period. Ten-inch length limit at time of sampling.

Table 12. Proposed sampling schedule for Buffalo Creek Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

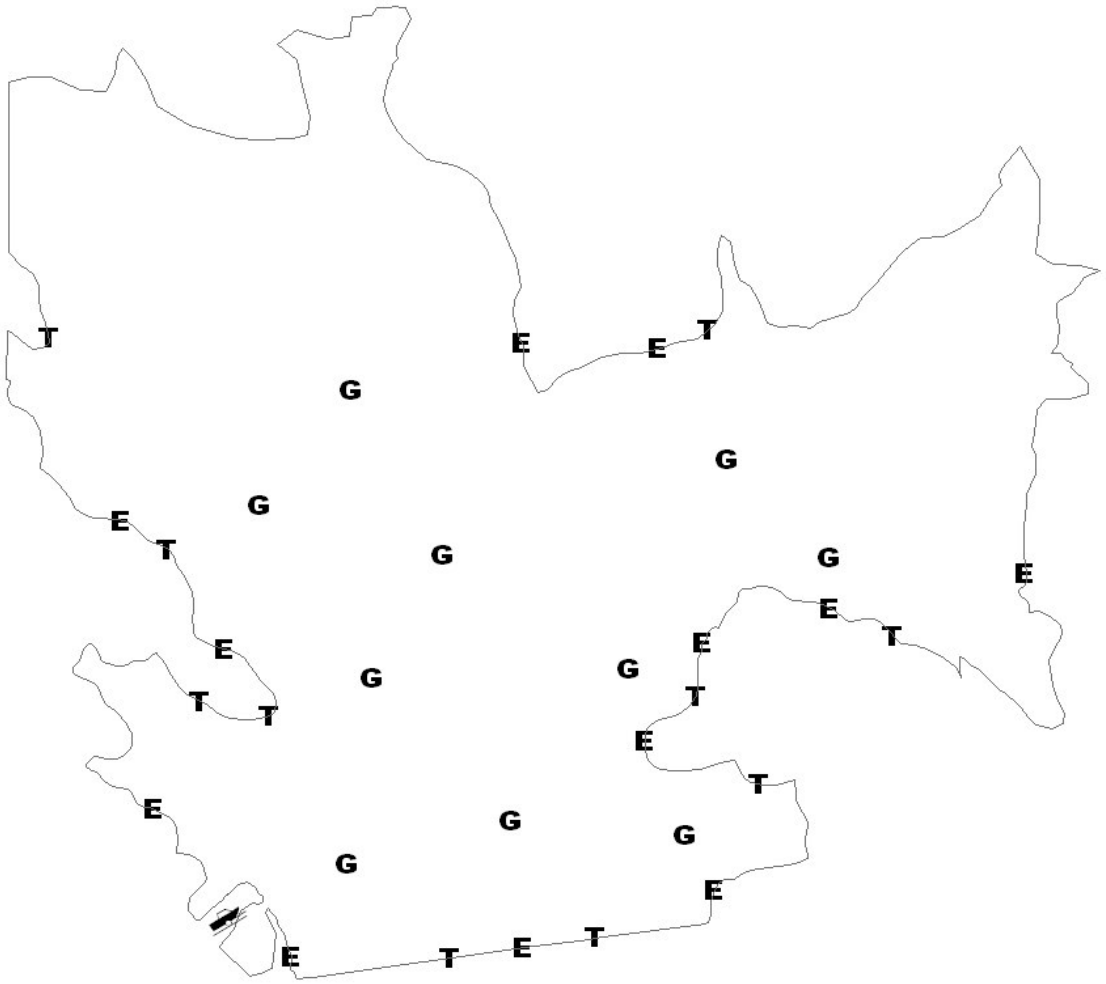
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2011-Spring 2012							
Fall 2012-Spring 2013							
Fall 2013-Spring 2014							
Fall 2014-Spring 2015	S	S	S		S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from gill nets (2011), trap nets (2010) and electrofishing (2010) from Buffalo Creek Reservoir, Texas.

	Gill Nets		Trap Nets		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	476	47.6	42	4.2	383	383.0
Common carp	50	5.0	3	0.3		
River carpsucker	1	0.1				
Smallmouth buffalo	44	4.4	1	0.1		
Blue catfish	94	9.4	1	0.1		
Channel catfish	111	11.1	10	1.0		
Flathead catfish	2	0.2				
Green sunfish					3	3.0
Orangespotted sunfish			5	0.5	3	3.0
Bluegill	5	0.5	189	18.9	93	93.0
Longear sunfish			1	0.1	4	4.0
Largemouth bass	9	9.0	1	0.1	49	49.0
White crappie	109	10.9	1,319	131.9		

APPENDIX B



Location of sampling sites, Buffalo Creek Reservoir, Texas, 2010-2011. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.