PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Falcon Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Falcon Reservoir were surveyed in 2007 and 2009 using electrofishing and trap nets and in 2006 and 2010 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Falcon Reservoir (83,654 acres when full) borders Mexico and was constructed in 1954 on the Rio Grande River. The reservoir experiences extreme water level fluctuations due to variable rainfall and water releases for downstream agricultural irrigation. Water level declined to a record 54 feet low in 2002 and steadily increased to 2.3 feet above conservation pool elevation in 2009. As a result of the water level increase, flooded terrestrial vegetation is currently the predominant structural habitat for fish.

- **Management History:** Fish harvest is regulated by Texas Parks and Wildlife Department (TPWD) according to the standard statewide restrictions and is unregulated by Mexico. A substantial commercial gill net fishery exists on the Mexico-side of the reservoir with blue tilapia, catfishes, and rough fish species comprising most of the catch. Striped bass, palmetto bass, and smallmouth bass were historically stocked to provide additional angling opportunities, but stockings were discontinued because of low fish survival or low angler utilization. White bass and white crappie stockings were conducted in the 2000s in an attempt to restore these two populations which historically supported popular fisheries but were decimated during the 1990s due to an extended period of low water level and commercial netting. Largemouth bass, blue catfish, and bluegill were stocked from 2003-2005 to offset population impacts caused by the previous low water level. In 2009, Florida-strain largemouth bass (FLMB) were stocked to increase the percentage of pure Florida bass in the reservoir, and thus trophy potential.

- **Fish Community**
  - **Prey species:** Shad species, sunfish species, and blue tilapia are the principal forage fishes in the reservoir. Fish population survey data suggest that prey abundance and size are not limiting predator fish abundance and growth.

  - **Catfishes**: Blue catfish relative abundance doubled since 2004 and the population contains fish >30 inches in total length (TL). Channel catfish relative abundance remained similar since 2004 and the population is dominated by sub-legal size fish (<12 inches TL).

  - **Temperate basses:** No white and striped bass were collected during population surveys conducted from 2006 to 2010 suggesting the white bass population remains depleted and previously stocked striped bass no longer exist in the reservoir.

  - **Largemouth bass:** Population survey data indicate increased relative abundance and excellent population size structure, with fish attaining legal harvestable size (≥14 inches) during their second growing season. The reservoir currently supports an exceptional largemouth bass fishery.

  - **White crappie:** Relative abundance increased tremendously in 2009 and growth was excellent, with 2009 year-class fish averaging 9.6 inches in December 2010.

- **Management Strategies:** Improve genetic introgression of FLMB, promote the white crappie fishery, closely monitor the white crappie and largemouth bass populations, quantify the white crappie and largemouth bass fisheries, and provide educational assistance to minimize largemouth bass tournament mortality.

INTRODUCTION

This document is a summary of fisheries data collected from Falcon Reservoir from 2006 to 2010. 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 for comparison.

Reservoir Description

Falcon Reservoir is a Texas-Mexico border impoundment constructed on the Rio Grande River. At conservation pool elevation, the reservoir encompasses 83,654 acres, with 38,360 acres located within Texas jurisdiction. The reservoir was completed in 1954 and was built for water conservation, flood control, hydroelectric energy, and recreation. Ownership of water is shared between Mexico (41%) and the U.S. (59%) and flows are managed by the International Boundary and Water Commission and Texas Commission on Environmental Quality according to terms in the 1944 Water Treaty established between the two countries. The reservoir experiences dramatic water level fluctuations due to variable rainfall and downstream agricultural irrigation needs (Figure 1). Water level declined to a record low of 54 feet below conservation pool in 2002 due largely to a drought that began in 1992. During the extended low water period, terrestrial vegetation became established on the exposed reservoir bottom. Beginning in 2003, heavy rainfalls caused the water level to rise to within 10 feet of conservation pool elevation in 2004. Additional heavy rainfalls within the watershed filled the reservoir to 2.3 feet above conservation pool elevation in late 2009. As a result, flooded terrestrial vegetation, some of which is 20 years old, is the predominant structural habitat for fish. There are two public boat ramps (Zapata County Park and Falcon Lake State Park) and several private boat launches associated with motels and RV parks adjacent to the reservoir. Shoreline angling access is limited to areas around the boat ramps. Zapata County received grants and funding to construct a county park adjacent to their boat ramp, renovate the boat ramp, and expand boat trailer parking with construction scheduled to begin in 2008. However, a noxious exotic terrestrial plant species was found which reportedly delayed construction which is now scheduled to begin in 2010. Other descriptive characteristics for the Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Myers and Dennis 2006) included:

1. Promote the high quality largemouth bass fishery.
   Action: Information was provided to outdoor writers which facilitated numerous newspaper, web-based, and magazine articles describing the high quality largemouth bass fishery.
2. Monitor white bass and white crappie populations to determine impacts from illegal gill netting activities.
   Action: Illegal Mexican gill nets confiscated by TPWD Law Enforcement and Inland Fisheries contained no white bass and very few white crappie and other sport fishes.

Harvest regulation history: Fish harvest is currently regulated by TPWD according to the standard statewide restrictions (Table 2) and is unregulated by Mexico. In 1985, a 14-inch minimum length limit (MLL) and a 5-fish daily bag limit for largemouth bass were implemented at the reservoir which differed from the statewide regulations in effect at that time. In 1986, the statewide harvest regulations for largemouth bass were changed to the same as was in effect at Falcon Reservoir. A substantial commercial gill net fishery exists on the Mexico-side of the reservoir with blue tilapia, catfish, and rough fish species comprising most of the catch. Considerable illegal netting occurs on the Texas-side of the reservoir.

Stocking history: Walleye (1975-1977), palmetto bass (1984 and 1987), striped bass (1976-2002), smallmouth bass (1984), white crappie (2003), white bass (2003-2009), bluegill (2003), blue catfish (2003) and largemouth bass (1975-2010) have been stocked into the reservoir. Stockings of walleye, smallmouth bass, palmetto bass, and striped bass were conducted to provide additional angling opportunities, but these were discontinued either because they were ineffective or low angler utilization. White bass and white crappie stockings were conducted in an attempt to restore these two populations which historically supported popular fisheries, but were decimated during the 1990s due an extended period of low water level and commercial netting impacts. Bluegill, blue catfish, and largemouth bass stockings in 2003-2005 occurred coincident with the dramatic water level increase to improve populations depressed as a result of the previous extended period of low water. In 2010, FLMB were stocked to increase the percentage of pure Florida bass in the reservoir, and thus trophy potential. The complete stocking history is in Table 3.

Vegetation/habitat history: Fisheries habitat in the reservoir has historically consisted of flooded terrestrial vegetation, the quantity of which was dependent on magnitude and duration of previous water level fluctuations. In 2007, water hyacinth was observed beginning in the Beacon Lodge cove and extending upstream. Since 2008, no water hyacinth has been found in the reservoir which was likely due to the reservoir's widely fluctuating water level. Aquatic vegetation (marine naiad, 1 acre) was last reportedly found in the reservoir in 1980 (Wray 1981).

METHODS

Fishes were collected by electrofishing (2 hours at 24 5-minute stations), trap netting (12-20 net-nights) and gill netting (15 net-nights). Electrofishing surveys were conducted at randomly selected sites during daytime (due to safety concerns) in spring 2007 and 2009 and in fall 2009. Trap net surveys were conducted in winter 2007 and 2009 with sampling sites biologist-selected. Gill net surveys were conducted in spring 2006 and 2010 at randomly selected sites. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. For gill nets and trap nets, CPUE was reported as the number of fish per net night (fish/nn). Except as described above, all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). Refer to Appendix A for a reservoir map and location of 2009-2010 sampling stations.

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 (IOV) was calculated for gizzard shad according to 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. In 2009, ages of 13 largemouth bass ranging from 13.0 to 14.9 inches in length was determined using otoliths to calculate mean age at 14 inches length. Age was determined for 77 randomly collected white crappie using otoliths to identify year classes and estimate mean total length at age.

Genetic analysis of 30 largemouth bass collected in 2009 and vegetation and shoreline structural habitat surveys were conducted following the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). All fish and habitat surveys were conducted on the Texas-side of the reservoir only.

RESULTS AND DISCUSSION

Habitat: In 2009, fisheries habitat primarily consisted of flooded terrestrial vegetation (huisache, mesquite, and acacia). Flooded terrestrial vegetation occurred across 68.4% of the bottom on the Texas side (Table 4) and occupied 98.4% of the Texas shoreline (Table 5). Aquatic vegetation was not found in the reservoir from 2006 to 2010, except for water hyacinths in 2007. During the 2006-2010 study period, water level was lowest in May 2007 (35.2 feet below conservation pool elevation) and highest in January 2009 at 2.3 feet above conservation pool elevation.

Prey species: Electrofishing CPUE of gizzard shad (Figure 2) was higher in 2009 (25.0 fish/h) than in 2005 (5.5 fish/h) and similar to 2003 (23.0 fish/h). Gizzard shad IOV has steadily decreased from 91 in 2003 to 36 in 2005 to 0 in 2009, indicating the reservoir contains minimal gizzard shad of optimum forage size. However, electrofishing CPUE of threadfin shad was 52.5 fish/h in 2009 suggesting that shad spp. remain an important component of the overall forage fish community (Appendix B). Electrofishing CPUE of bluegill (Figure 3) remained low in 2009 (0.5 fish/h) which was similar to in 2003 (0.5 fish/h) and lower than 2005 (5.0 fish/h). Blue tilapia and crayfish are also important prey species in the reservoir. However, relative abundance of blue tilapia could not be determined because of low susceptibility of this species to sampling gears. Increased abundance and rapid growth of predator species (largemouth bass and white crappie) and average relative weights exceeding 90 for all but one size class of largemouth bass (see below) suggest that reduced abundance of small gizzard shad and bluegill is not limiting predator populations.

Blue catfish: Gillnet CPUE of blue catfish in 2010 (8.7 fish/nn) was nearly twice as high as in 2006 (4.6 fish/nn) and 2004 (4.1 fish/nn). Size structure of the population was slightly improved in 2010 compared to previous years. Although PSD varied among years, in 2010 most fish were greater than the MLL, and PSD-P (6) was greater than in previous years (Figure 4). Average relative weight values ranged between 90 and 100.

Channel catfish: Gillnet CPUE of channel catfish in 2010 (2.9 fish/nn) was similar to 2006 (3.0 fish/nn) and double that of 2004 (1.4 fish/nn). Population size structure declined somewhat with modal peak of the length frequency distribution at 10 inches in 2010 compared to 12-14 inches in previous years and PSD decreased to 0 (Figure 5). Insufficient weight data was collected which prevented computation of legitimate relative weight values in 2010. However, relative weight values in previous years generally exceeded 100.

Temperate basses: No white bass have been collected in gill nets since 1995 or reported caught by anglers. The extended low water period coincident with intense commercial netting effectively decimated the white bass population in the mid to late 1990s. A few adult white bass (N = 139 total fish) were stocked in 2003 and 2004, and 1.16 million fry were stocked 2009, but these stockings have had no detectable effect. Likely no striped bass remain in the reservoir with the last stocking occurring in 2002.

Largemouth bass: Electrofishing CPUE of largemouth bass steadily increased from 20.0 fish/h in 2003 to 39.0 fish/h in 2005 to 48.0 fish/h in 2009 according to fall sampling (Figure 6). Alternatively for spring sampling, electrofishing CPUE decreased from 71.5 fish/h in 2007 to 33.5 fish/h in 2009 (Figure 7). The dynamic water level and habitat conditions at this reservoir reduce the effectiveness of electrofishing for monitoring temporal trends in fish abundance. Spring and fall surveys both indicated that population size structure has improved, with PSD-P values of 60 and 66 in 2009. For most size classes, average relative weight values exceeded 90. Growth of largemouth bass was rapid as the average age of 13.0-14.9 inch fish was 1.23 years. Genetic introgression of FLMB into the population declined since the early 2000s, with percent FLMB alleles estimated at 52 in 2009 (Table 6). In 2009, FLMB were stocked to increase the level of genetic introgression in the population, particularly the percentage of pure Florida bass. During the 2006-2010 study period, five fish $\geq$13 lbs. caught from Falcon were submitted to the "ShareLunker" program. To increase awareness and angler participation in the program and improve care for submitted fish, a certified "ShareLunker" receiving station was established at a local tackle shop. The reservoir provides an exceptional largemouth bass fishery. Record tournament catches for multiple tournament organizations occurred during the study period.

White crappie: The population of white crappie has increased tremendously. In 2005 and 2007, only one fish was caught each year, but in 2009 there were 81 crappie caught in 12 nets (Figure 8). Of the 77 collected fish that were aged, 63 (83%) were determined to have been born in 2009. Fish from this 2009 year class averaged 9.6 inches in length at time of collection. The remaining 14 fish were born in 2008 and averaged 12.5 inches in length.

Fisheries Management Plan for Falcon Reservoir, Texas

Prepared – July 2010.

ISSUE 1: The white crappie population recently rebounded, however few anglers are aware of this high quality fishery.

MANAGEMENT STRATEGY

1. Formulate and distribute a statewide press release describing this high quality white crappie angling opportunity and encourage outdoor writers to prepare related articles in fishing magazines.
2. Conduct additional trap net sampling in 2011-2012 to monitor the white crappie population.

ISSUE 2: Introgression of FLMB into the population appears to be declining and no 100% pure FLMB were found in the sample taken in 2009.

MANAGEMENT STRATEGY

1. Stock 250,000 FLMB fingerlings annually from 2011 to 2014.
2. Conduct additional electrofishing sampling in spring 2011 and 2013 and fall 2011 to monitor the largemouth bass population and collect fish for genetic analysis.

ISSUE 3: The white bass population has not rebounded. However, over 1.1 million white bass fry were stocked in 2009.

MANAGEMENT STRATEGY

1. Conduct additional gill net sampling in spring 2012 to evaluate the 2009 stocking and monitor for a white bass population.

ISSUE 4: In recent years, the reservoir has become a more popular destination for largemouth bass tournament anglers. At some tournament events, mortality of released fish has been reported to be excessive.

MANAGEMENT STRATEGY

1. Provide educational assistance to tournament anglers and organizers on how to minimize tournament mortality.

ISSUE 5: Angling effort by largemouth bass anglers has increased in recent years and angling effort by white crappie anglers is also expected to increase.

MANAGEMENT STRATEGY

1. Quantify largemouth bass angling effort and catch, the fraction of the largemouth bass fishery attributable to tournament angling, and white crappie angling effort and harvest by conducting creel survey sampling from January through June 2011. The most recent creel survey was conducted in 2007.

SAMPLING SCHEDULE JUSTIFICATION (Table 7)**:**

Additional electrofishing, trap net and gill net sampling is necessary to monitor important sportfish populations and evaluate fish stockings. The 6-month creel survey will be conducted to quantify the sport fishery, particularly for largemouth bass and white crappie.

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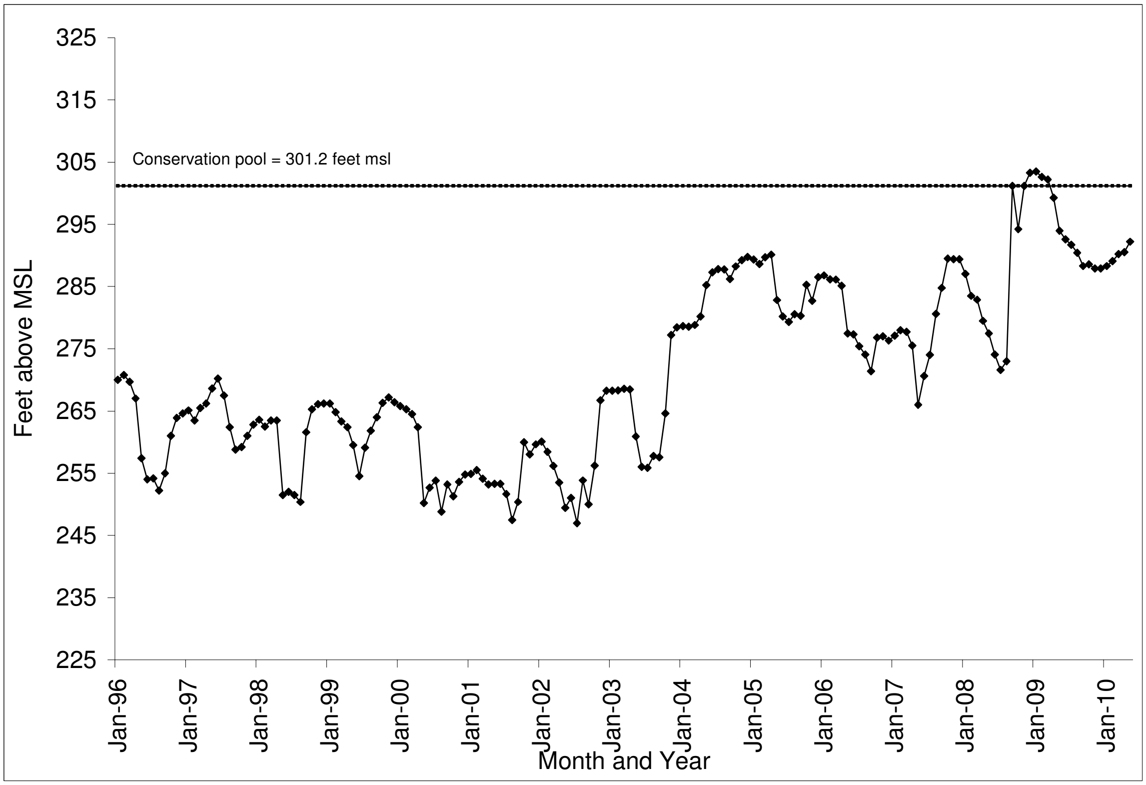


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Falcon Reservoir, Texas. Conservation pool is 301.2 ft MSL

Table 1. Characteristics of Falcon Reservoir, Texas.

Characteristic	Description
Year constructed	1954
Controlling authority	International Boundary and Water Commission
Counties	Zapata and Starr
Reservoir type	Mainstream
Shoreline Development Index (SDI)	10.64
Conductivity	1,525 umhos/cm

Table 2. Harvest regulations for Falcon Reservoir.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass, striped	5	18 - No Limit
Bass, largemouth	5	14 – No Limit
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

Table 3. Stocking history of Falcon Reservoir, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, ADL = adults, and NR = size not recorded.

Species	Year	Number	Size
Walleye	1975	447,184	NR
	1976	4,830,000	NR
	1977	1,706,700	NR
	Total	6,983,884	
Smallmouth bass	1984	20,265	FGL
Striped bass	1976	149,804	NR
	1977	725,692	NR
	1978	186,287	NR
	1979	174,638	NR
	1983	386,503	NR
	1988	617,902	FGL
	1989	4,786,960	FRY
	1994	685,542	FGL
	1995	782,685	FGL
	1997	78,837	FGL
	1998	78,645	FGL
	1999	390,919	FGL
	2000	769,406	FGL
	2002	108,027	FGL
	Total	9,921,847	
White bass	2003	29	ADL
	2004	110	ADL
	2007	9,048	FRY
	2008	125,187	FRY
	2009	1,162,094	FRY
	Total	1,296,468	
Palmetto bass	1984	222,174	FGL
	1987	665,000	FRY
	Total	887,174	
White crappie	2003	1,500	ADL
Bluegill	2003	215,718	FGL
Blue catfish	2003	28,043	FGL
Mixed largemouth bass	1989	219,316	NR
Florida largemouth bass	1975	750,000	FGL
	1976	2,250	FGL
	1978	451,049	FGL
	1979	131,455	FGL
	1981	67,000	FGL
	1984	18,375	FGL
	1985	102,000	FGL
	1989	117	ADL
	1997	501,783	FGL
	2001	131,021	FGL

Table 3 continued. Stocking history of Falcon Reservoir, Texas. Size Categories are: FRY $\leq$1 inch; FGL = 1-3 inches, ADL = adults, and NR = size not recorded.

Species	Year	Number	Size
Florida largemouth bass	2003	313,739	FGL
	2004	185	ADL
	2004	664,165	FGL
	2005	11,995	FGL
	2010	238,244	FGL
	Total	3,383,378	
Largemouth bass	1984	6,000	ADL
	2004	174,241	FGL
	Total	180,241	
ShareLunker largemouth bass	2008	2,842	FGL

Table 4. Results of a vegetation survey conducted at Falcon Reservoir, Texas, in August, 2009. Surface area coverage (acres) was estimated for each vegetation type for the Texas side of the reservoir from the dam to the Beacon Lodge cove using 253 randomly selected sample points.

Vegetation type	Coverage	Percent	Lower 95% CL	Upper 95% CL
Flooded terrestrial vegetation	20,612	68.4	62.3	74.1
Open water	8,709	28.9	23.4	34.9
Standing timber and stumps	723	2.4	0.9	5.1

Table 5. Results of a structural habitat survey conducted at Falcon Reservoir, Texas, in August, 2009. Linear distance (miles) was estimated for each habitat type for the Texas side of the reservoir from the dam to the Beacon Lodge cove using 382 randomly selected sample points.

Habitat type	Linear distance	Percent	Lower 95% CL	Upper 95% CL
Natural shoreline	147.2	75.1	70.5	79.4
Rocky shoreline	21.6	11.0	8.0	14.6
Flooded terrestrial vegetation	192.9	98.4	96.6	99.4
Gravel	27.2	13.9	10.6	17.8

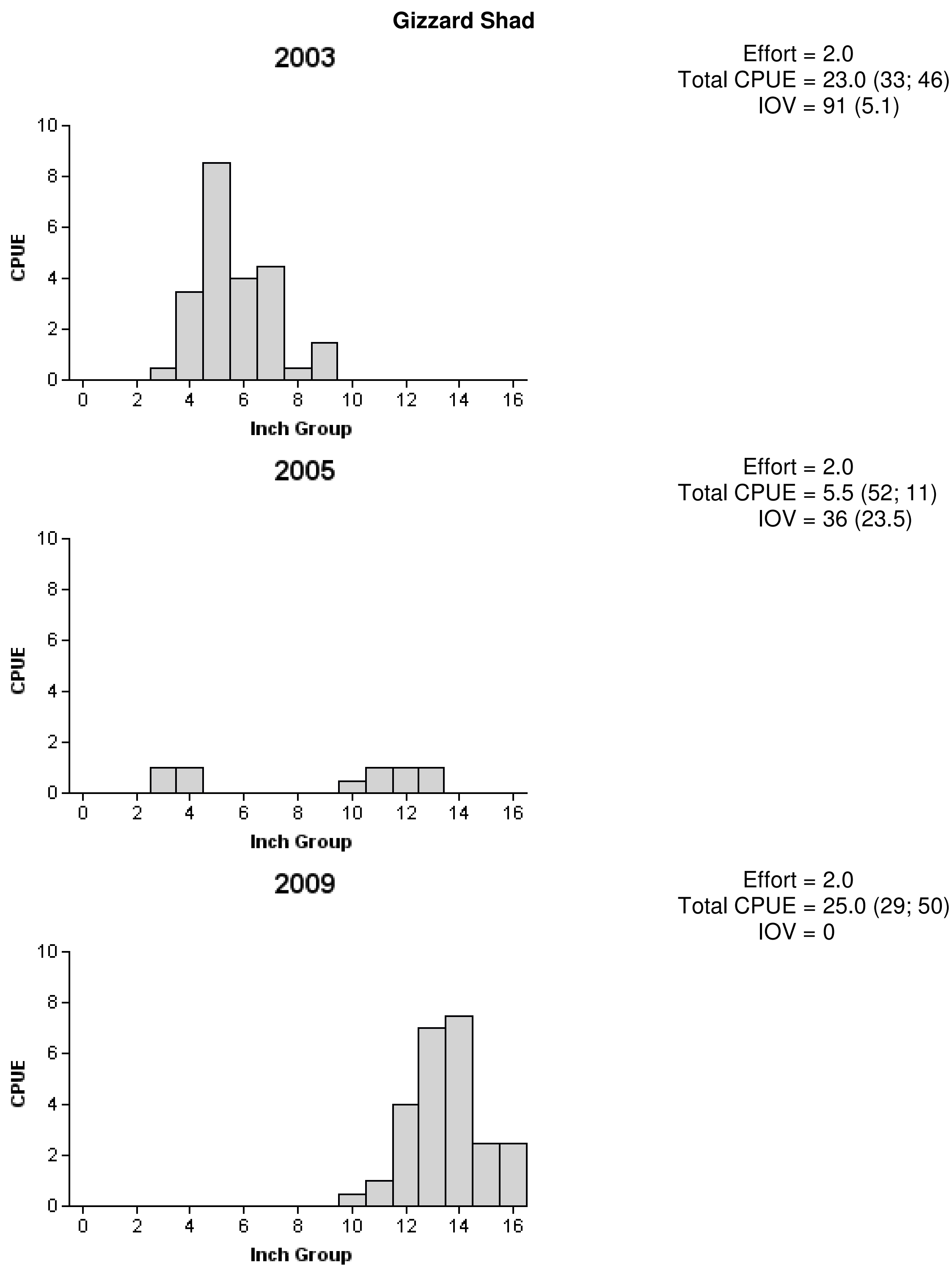
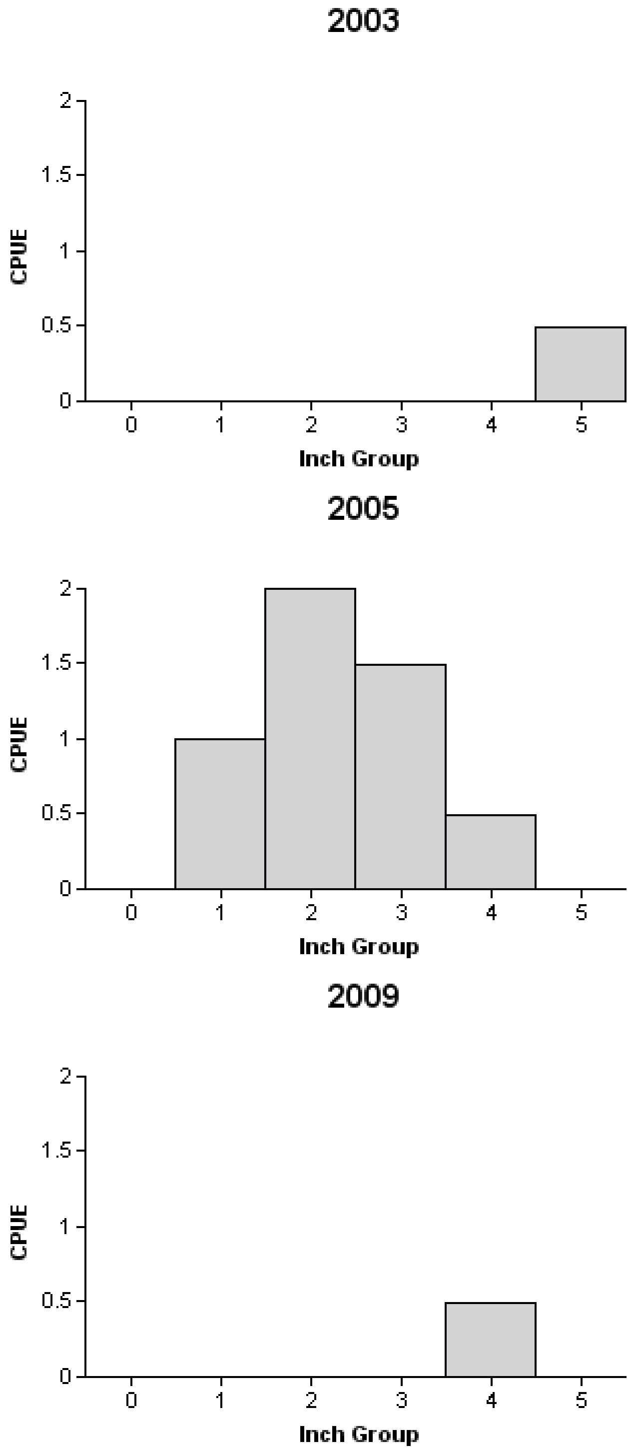


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Falcon Reservoir, Texas, 2003, 2005, and 2009. Also, SE is provided for IOV values.

Bluegill

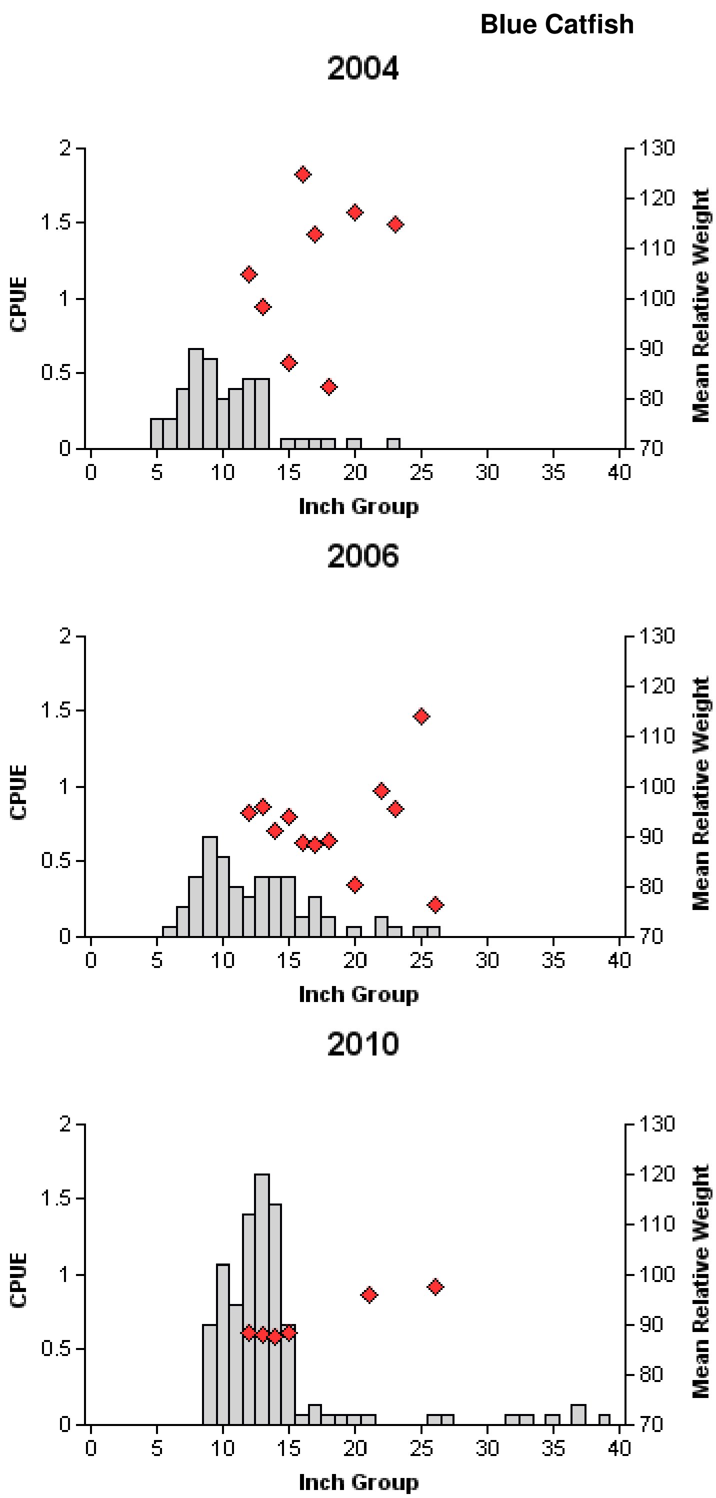


2003:
Effort = 2.0
Total CPUE = 0.5 (100; 1)
Stock CPUE = 0.5 (100; 1)

2005:
Effort = 2.0
Total CPUE = 5.0 (48; 10)
Stock CPUE = 2.0 (59; 4)

2009:
Effort = 2.0
Total CPUE = 0.5 (100; 1)
Stock CPUE = 0.5 (100; 1)

Figure 3. Number of bluegill caught per hour (CPUE; RSE and N are in parentheses) for fall electrofishing surveys, Falcon Reservoir, Texas, 2003, 2005, and 2009.



2004

Effort = 15.0
Total CPUE = 4.1 (26:62)
Stock CPUE = 1.3 (34; 20)
PSD = 10 (8)
PSD-P = 0 (0)

2006

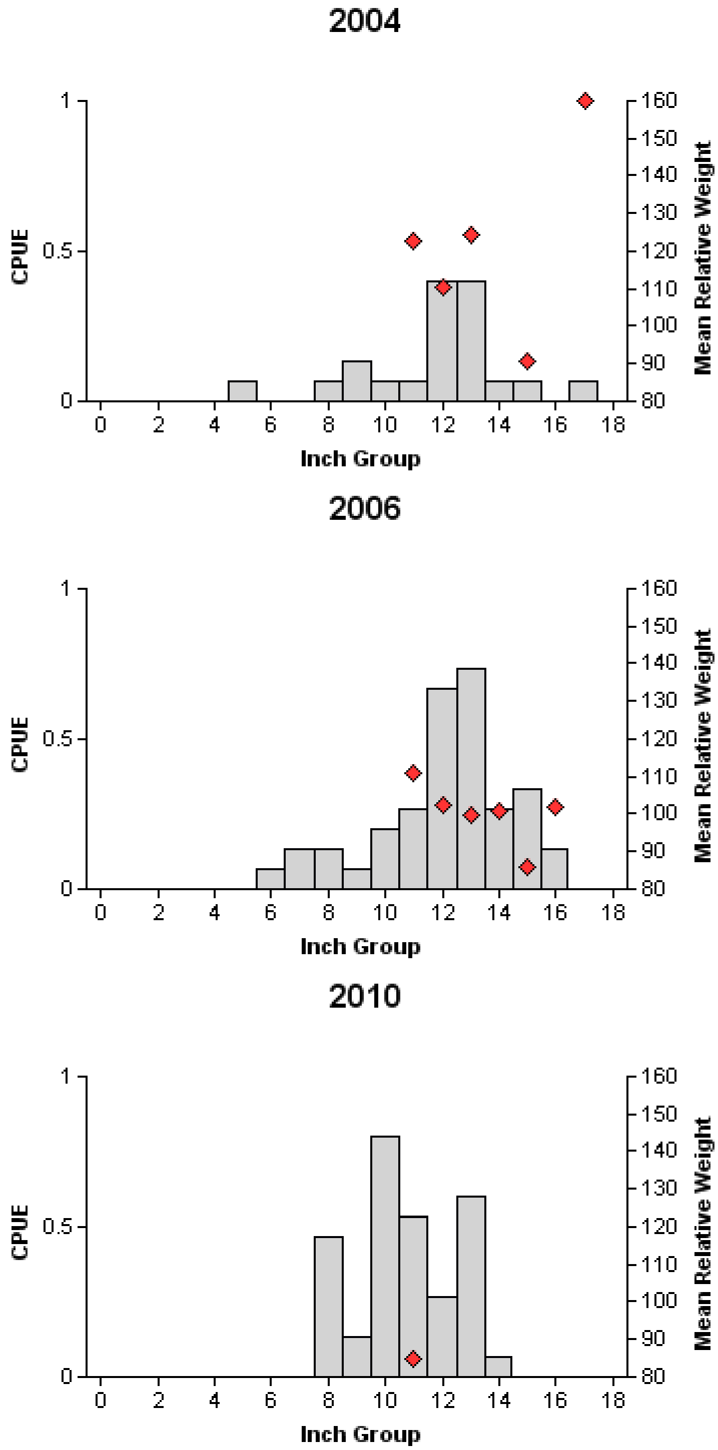
Effort = 15.0
Total CPUE = 4.6 (27;69)
Stock CPUE = 2.4 (20;36)
PSD = 17 (9)
PSD-P = 0 (0)

2010

Effort = 15.0
Total CPUE = 8.7 (18; 131)
Stock CPUE = 6.2 (16; 93)
PSD = 11 (3)
PSD-P = 6 (3)

Figure 4. Number of blue catfish caught per net night (CPUE) and population indices (RSE and N are in parentheses) for spring gill net surveys, Falcon Reservoir, Texas, 2004, 2006, and 2010. Diamonds represent average relative weight values, and SE (in parentheses) is provided for PSD values.

Channel Catfish



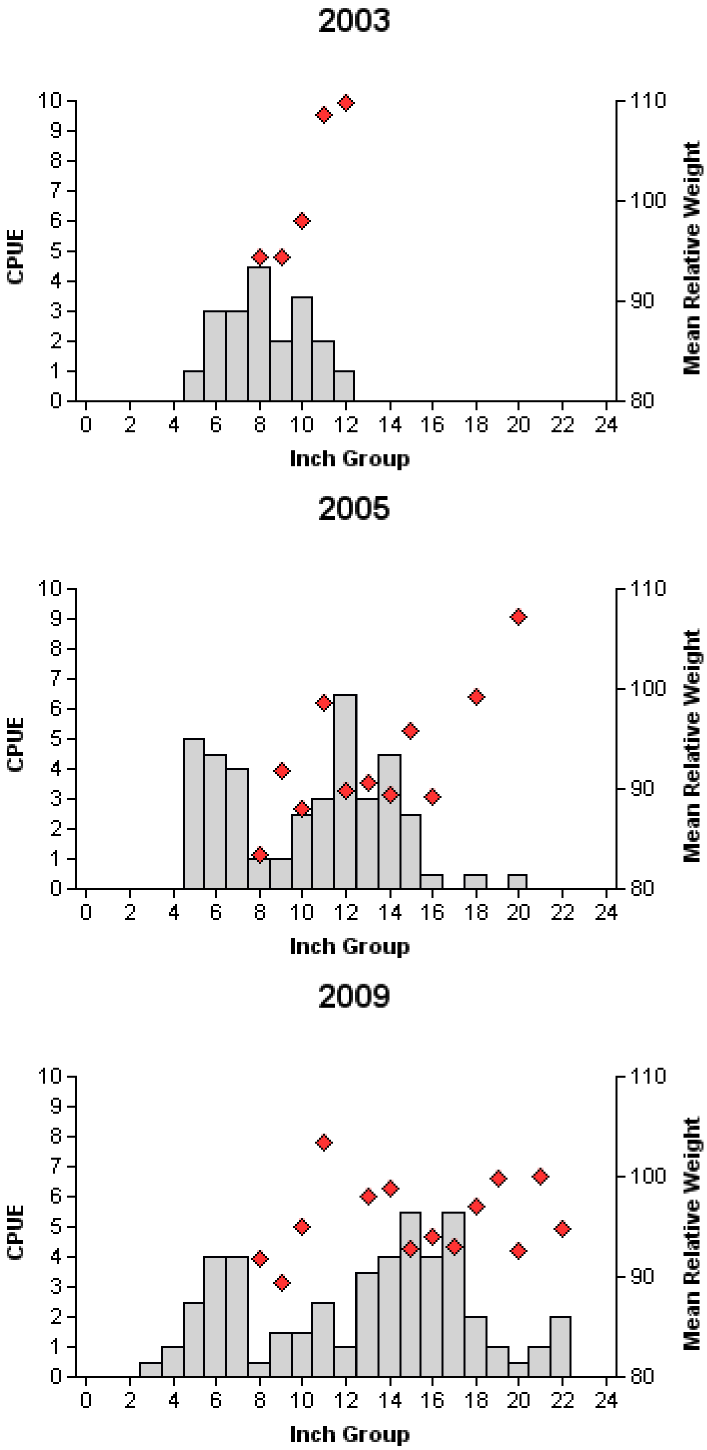
Effort = 15.0
Total CPUE = 1.4 (29; 21)
Stock CPUE = 1.1 (37; 16)
PSD = 6 (6)

Effort = 15.0
Total CPUE = 3.0 (26; 45)
Stock CPUE = 2.4 (27; 36)
PSD = 6 (4)

Effort = 15.0
Total CPUE = 2.9 (29; 43)
Stock CPUE = 1.5 (38; 22)
PSD = 0 (77)

Figure 5. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N are in parentheses) for spring gill net surveys, Falcon Reservoir, Texas, 2004, 2006, and 2010. Diamonds represent average relative weight values, and SE (in parentheses) is provided for PSD values.

Largemouth Bass (Fall Electrofishing)



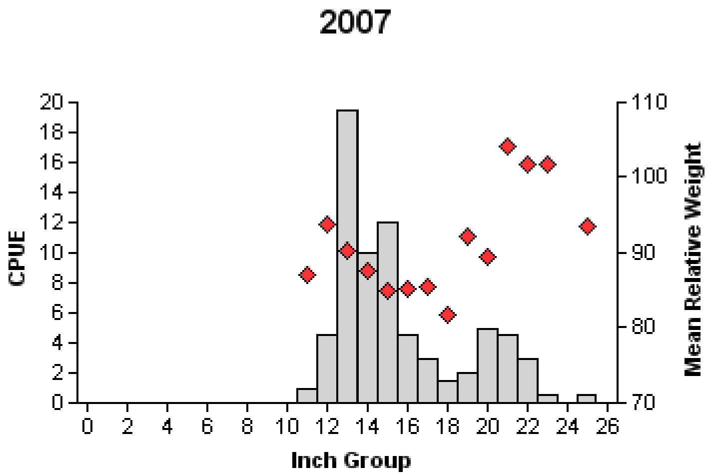
Effort = 2.0
Total CPUE = 20.0 (24; 40)
Stock CPUE = 13.0 (25; 26)
PSD = 8 (5)
PSD-P = 0 (0)

Effort = 2.0
Total CPUE = 39.0 (19; 78)
Stock CPUE = 25.5 (18; 51)
PSD = 71 (6)
PSD-P = 16 (5)

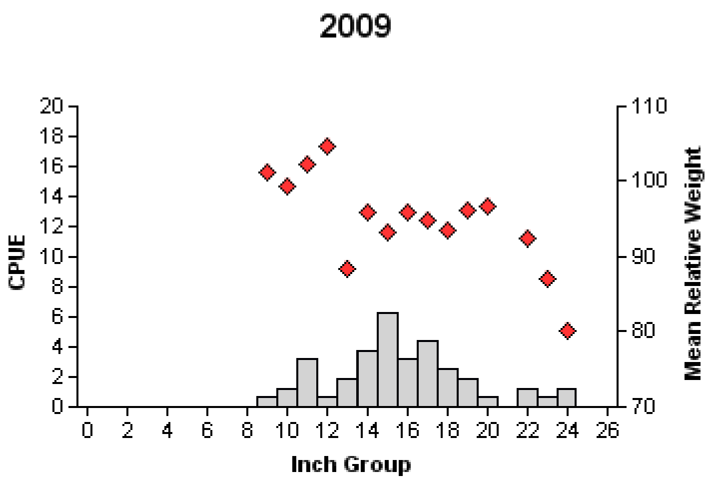
Effort = 2.0
Total CPUE = 48.0 (17; 96)
Stock CPUE = 36 (18; 72)
PSD = 83 (6)
PSD-P = 60 (6)

Figure 6. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Falcon Reservoir, Texas, 2003, 2005, and 2009. Diamonds represent average relative weight values, and SE (in parentheses) is provided for PSD values.

Largemouth Bass (Spring Bass-only Electrofishing)



Effort = 2.0
Total CPUE = 71.5 (19; 143)
Stock CPUE = 71.5 (19; 143)
PSD = 99 (1)
PSD-P = 51 (6)



Effort = 2.0
Total CPUE = 33.5 (19; 53)
Stock CPUE = 33.5 (19; 53)
PSD = 85 (7)
PSD-P = 66 (7)

Figure 7. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N are in parentheses) for spring electrofishing surveys, Falcon Reservoir, Texas, 2007, and 2009. Diamonds represent average relative weight values, and SE (in parentheses) is provided for PSD values.

Table 6. Results of genetic analysis of largemouth bass collected by fall electrofishing, Falcon Reservoir, Texas, 2000, 2001, 2005, and 2009. Genetic analysis procedures changed from electrophoresis to micro satellite DNA in 2006. Thus, the 2009 % pure FLMB estimate should not be compared to previous estimates

Year	Sample size	% FLMB Alleles	% pure FLMB
2000	34	81	41
2001	32	84	42
2005	33	68	12
2009	30	52	0

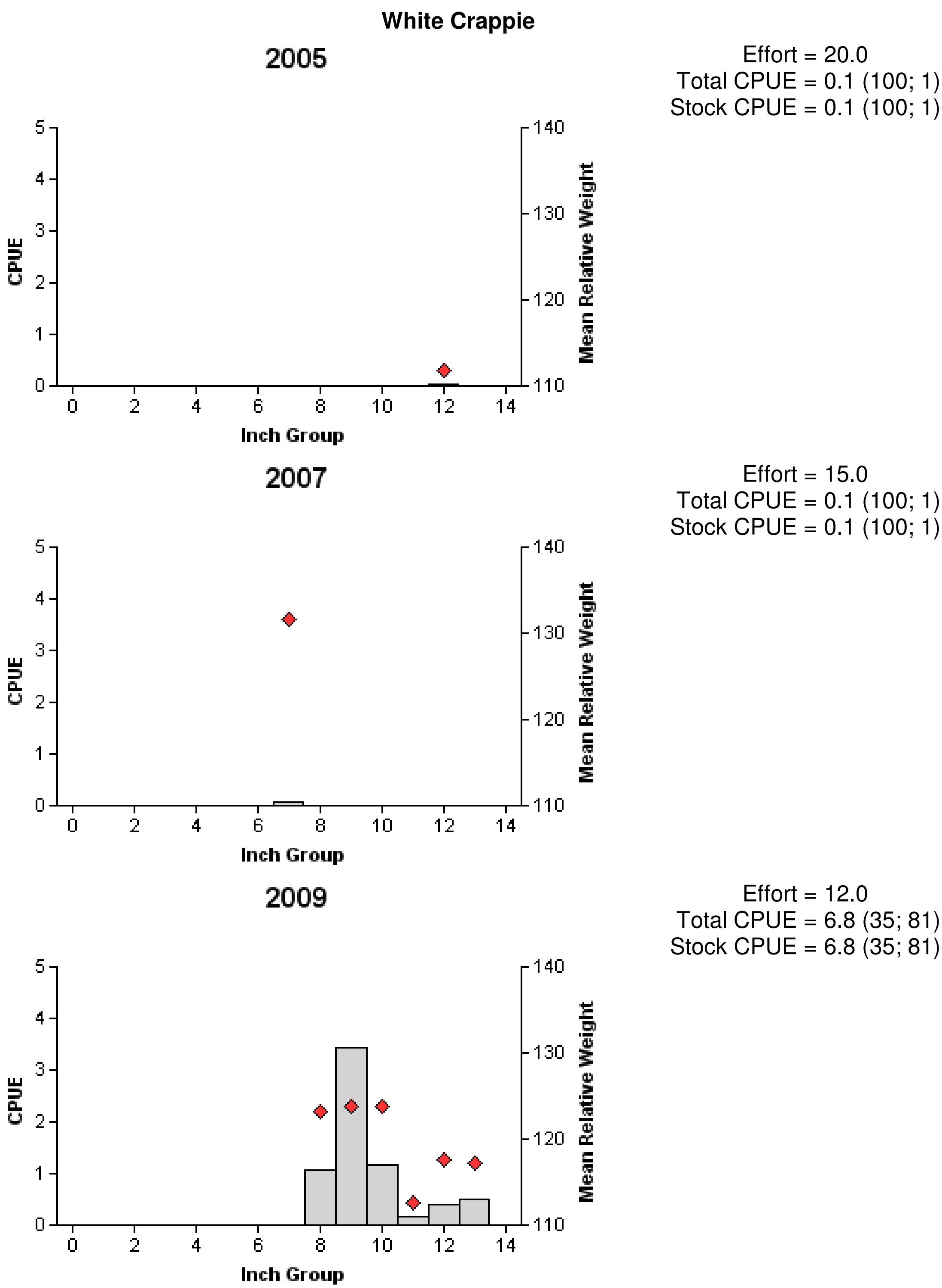
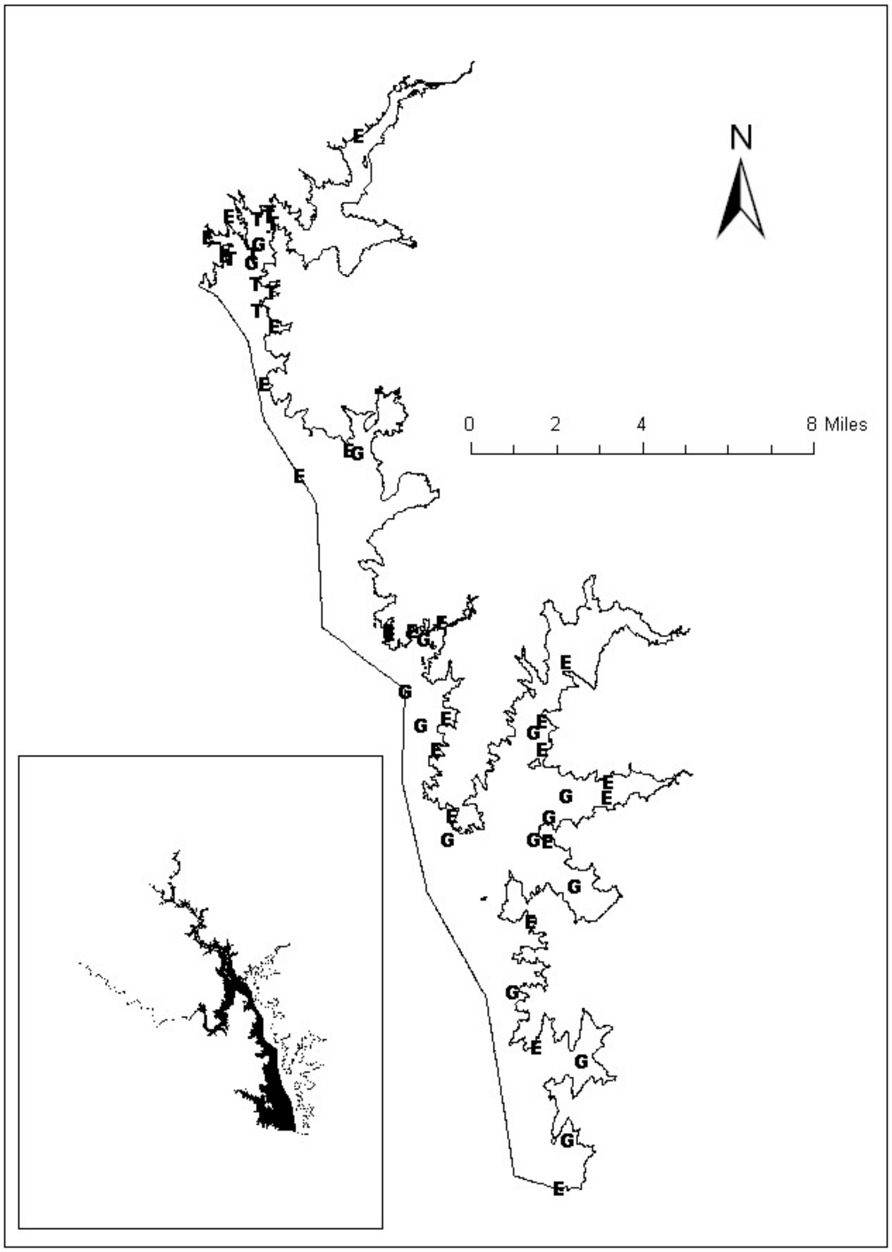


Figure 8. Number of white crappie caught per hour (CPUE; RSE and N are in parentheses) for fall trap net surveys, Falcon Reservoir, Texas, 2005, 2007, and 2009. Diamonds represent mean relative weight values.

Table 7. Proposed sampling schedule for Falcon Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofishing	Trap Net	Gill Net	Creel Survey	Report
Fall 2010-Spring 2011	A (spring)			A (6 mo.)	
Fall 2011-Spring 2012	A (fall)	A	A		A
Fall 2012-Spring 2013	A (spring)				
Fall 2013-Spring 2014	S (fall)	S	S		S

Appendix A



Location of sampling sites, Falcon Reservoir, Texas, 2009-2010. Gill net (G), trap net (T), and electrofishing (E) stations are indicated.

Appendix B

Catch rate (CPUE) of all target species collected from all gear types from Falcon Reservoir, Texas, 2009-2010. Effort was 2.0 hours for electrofishing, 12.0 net nights for trap netting, and 15.0 net-nights for gill netting.

Species	Electrofishing	Trap netting	Gill netting
Spotted gar			0.07
Longnose gar			0.13
Gizzard shad	25.00		20.13
Threadfin shad	52.50		
Common carp			0.13
Blue catfish			8.73
Channel catfish			2.87
Flathead catfish			0.07
Mexican tetra		0.08	
Redbreast sunfish	19.00	0.08	
Warmouth		0.08	0.13
Bluegill	0.50	21.58	0.2
Redear sunfish		7.42	0.33
Largemouth bass	48.00		2.47
White crappie		6.75	0.33
Freshwater drum			1.40
Blue tilapia		0.25	