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

2008 Survey Report

Medina Reservoir

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July 31, 2009

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Medina Reservoir were surveyed in 2008 using electrofishing and in 2009 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:** Medina Reservoir (5,410 acres), constructed in 1913, is located on the Medina River in Medina and Bandera counties, Texas. It was built primarily for irrigation water supply. Angler access is adequate with one public boat ramp and four private ramps open to the public. Bank angling access is fair and available at the boat ramps. The reservoir is deep, having an average depth of 46 feet, and infertile with a secchi depth that exceeds 6 feet. Most of the shoreline (75%) is characterized as rock bluff or rocks and gravel. Boat docks occur along 24% of the shoreline. The reservoir contained no aquatic vegetation in 2008.

- **Management History:** Important sport fish include largemouth bass, palmetto and white basses, and blue and channel catfishes. Harvest of these species is managed according to standard state-wide regulations.

- **Fish Community:**
  - **Prey species:** Gizzard shad abundance was slightly decreased in 2008 compared to previous years and few were of a suitable size as prey for predators. Bluegill abundance has increased dramatically over previous years with the majority suitably-sized as forage for predators.

  - **Catfishes:** Blue catfish abundance increased, but size structure declined in 2009 compared to previous years. The population is comprised mainly of fish ≤16 inches. Channel catfish abundance and size structure in 2009 was similar compared to previous years. The population remains comprised mostly of fish >12 inches.

  - **Temperate basses:** Abundance of white and palmetto basses was greater in 2007 than 2009. Population size structures declined in 2009 for both species.

  - **Largemouth bass:** Largemouth bass abundance was greater in 2008 than in previous years but population size structure declined; few fish >14 inches were present in the population.

- **Management Strategies:**
  Based on survey results all species should continue to be managed under current harvest regulations. Monitor fish populations with standard sampling conducted in 2012-2013, with the exception of gillnet sampling which will occur every other spring (2011 and 2013). Maintain the palmetto bass fishery by stocking every other year.

INTRODUCTION

This document is a summary of fisheries data collected from Medina Reservoir in 2008-2009. 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 is presented with the current data for comparison.

Reservoir Description

Medina Reservoir (5,410 acres), constructed in 1913, is located on the Medina River in Medina and Bandera counties, Texas. It was built primarily for irrigation water supply. Angler access is adequate with one public boat ramp and four private ramps open to the public. Bank angling access is fair and available at the boat ramps. The reservoir is deep, having an average depth of 46 feet, and relatively infertile with a secchi depth that exceeds 6 feet. Most of the shoreline (75%) is characterized as rock bluff or rocks and gravel. Boat docks occur along 24% of the shoreline. The reservoir contains no aquatic vegetation in 2008. Other descriptive characteristics for Medina Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Myers and Dennis 2004) included:

1. Maintain or increase trophy largemouth bass potential.
   Action: Florida largemouth bass stocked in 2005.
2. Maintain palmetto bass fishery by stocking.
   Action: Palmetto bass were stocked in 2005, 2007, and 2008.
3. Increase angler awareness of Medina Reservoir Fishery.
   Action: A press release about the TPWD Waterbody Records Program and Medina Reservoir was written and sent to local print media.

Harvest regulation history: Harvest of sport fishes in Medina Reservoir has been managed according to standard state-wide harvest regulations (Table 2).

Stocking history: Palmetto bass and Florida largemouth were stocked periodically since the late 1970s. Fingerling channel catfish were stocked in 2007, but this was not a requested stocking and a result of over-production at TPWD hatcheries. The detailed stocking history is in Table 3.

Vegetation/habitat history: Native submersed vegetation species occurs sporadically during times of relatively stable water levels in Medina Reservoir. In 2005, 1.4% of the shoreline had native emergent vegetation (Myers and Dennis 2004).

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations) and gill netting (10 net nights at 10 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 nets, as the number of fish per net night (fish/nn). Electrofishing and gill netting survey sites were randomly selected (Appendix A). A vegetation survey was conducted in 2008. Trapnet sampling for crappie was not conducted because of the sparse crappie population and the ineffectiveness of this gear to capture crappie at this reservoir. Age of select size white (9-11") and palmetto (17-19") bass was determined using otoliths for estimation of average age at minimum length limit. All surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (Wr)] 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.

RESULTS AND DISCUSSION

Habitat: Shoreline structural habitat remain relatively unchanged since the survey in 2005, thus a structural habitat survey was not conducted during this study period. In 2008, no aquatic vegetation was found in the reservoir, likely due to widely fluctuating water level (Figure 1).

Prey species: Gizzard shad CPUE (Figure 2) was slightly lower in 2008 (39.3 fish/h) than in 2000 (49.3 fish/h) and 2004 (56.7 fish/h). Gizzard shad IOV was 10 in 2008, similar to 2000 (10) and lower than 2004 (32). These numbers suggest shad are generally neither abundant nor small enough to provide a good forage base for predators. Few threadfin shad were collected in 2008. Bluegill CPUE (Figure 3) increased from 2000 to 2004 to 2008 (63.3, 143.3, and 280.7 fish/h, respectively. Bluegill PSD was lower in 2008 (6) than 2000 (11) and 2004 (12), indicating bluegill have consistently been of suitable size to be prey for predators. The CPUE for all sunfishes combined was 572.7 fish/h (Appendix A) and sunfish continue to be the dominant forage in this reservoir.

Catfishes: Blue catfish CPUE was 1.8 fish/nn in 2009 (Figure 4. This was similar to 1.6 fish/nn in 2007 and greater than 0.7 fish/nn in 2005. Blue catfish PSD decreased from 86 in 2005 to 42 in 2009, suggesting a proportional decrease in quality size fish. Mean relative weights (Wr) of blue catfish were highly variable across all three sample years. Excess channel catfish fingerlings (185,271 fish) produced by hatcheries were stocked in 2007. However, channel catfish CPUE (Figure 5) was fairly stable across the past three samples (1.0 fish/nn in 2005, 1.4 fish/nn in 2007, and 0.8 fish/nn in 2008). Channel catfish PSD ranged from 40 in 2005 to 27 in 2007 to 33 in 2009. The 2009 population sample was composed entirely of individuals <18 inches which was similar to samples taken in previous years. Channel catfish Wrs were between 80 and 100 for all size groups in 2009. One flathead catfish was collected in 2009.

Temperate basses: White bass CPUE (Figure 6) was 2.0 fish/nn, which was down from 3.5 fish/nn in 2007, but greater than 1.0 fish/nn in 2005. White bass PSD remained at 80 or above for all three sample years. The majority of the fish collected in all three sample years were $\geq$ 10 inches. The Wrs for the white bass collected in 2009 were between 80 and 100. Average age of white bass ranging 9-11 inches in total length was 1.5 years in 2007. Palmetto bass CPUE (Figure 7) in 2009 was 5.4 fish/nn, compared to 9.0 fish/nn in 2007 and 1.2 fish/nn in 2005. Palmetto bass PSDs were high ($\geq$90) for all three sample years, indicating the population is comprised of larger fish. The mean relative weights ranged from 60 to 90 and were lower for larger palmetto bass for all three years, which is typical for this species in this reservoir (Zerr, 2001; Myers and Dennis, 2004). Average age of 17-19 inch palmetto bass was 3.8 years (N = 9 fish) in 2005 (Myers and Dennis, 2004) and 2.8 years (N = 15 fish) in 2007, suggesting more

rapid growth in recent years.

Largemouth bass: Largemouth bass CPUE (Figure 8) was greater in 2008 (113.3 fish/h) than in 2004 (60.0 fish/h) and 2000 (59.3 fish/h). Largemouth bass PSD was lower in 2008 (26) than in previous years indicating the increase in CPUE was from bass <12 inches in length. Additionally, relatively few largemouth bass >14 inches were collected. Largemouth bass average Wr ranged from 75 to 89 in 2008. Average age of 13-15 inch largemouth bass (N = 10 fish) was 2.9 years in 2004 (Myers and Dennis, 2004). Electrophoretic analysis of age-0 fish collected in 2004 indicated a 63.3% frequency of Florida largemouth bass alleles with 26.7% of the sample having the Florida largemouth bass genotype (Table 4).

Fisheries management plan for Medina Reservoir, Texas

Prepared – July 2009.

ISSUE 1: Palmetto bass are a popular game fish in this reservoir. According to 2003-2004 creel surveys, angling effort directed towards temperate basses (7,819 angler-hours) accounted for 21% of the total angling effort expended at the reservoir with an estimated 949 white bass and 1,944 palmetto bass caught by anglers at an average rate of 0.318 fish/angler hour and 1.106 fish/angler-hour, respectively (Myers and Dennis, 2004). Although palmetto bass growth rate has improved in recent years, some individuals continue to exhibit poor body condition (Wr <75).

MANAGEMENT STRATEGY

1. Stock palmetto bass at the rate of 5 fish/acre every other year (2010 and 2012) to maintain the fishery.
2. In addition to gillnet sampling required in spring 2013, conduct additional gillnet sampling in spring 2011 to assess palmetto bass growth and body condition.

SAMPLING SCHEDULE JUSTIFICATION:

Conduct electrofishing and gill net surveys in 2012-2013 to monitor the populations of sport and forage fishes, and additional gillnet sampling in spring 2011 to provide more data to address concerns about palmetto bass described above (Table 5).

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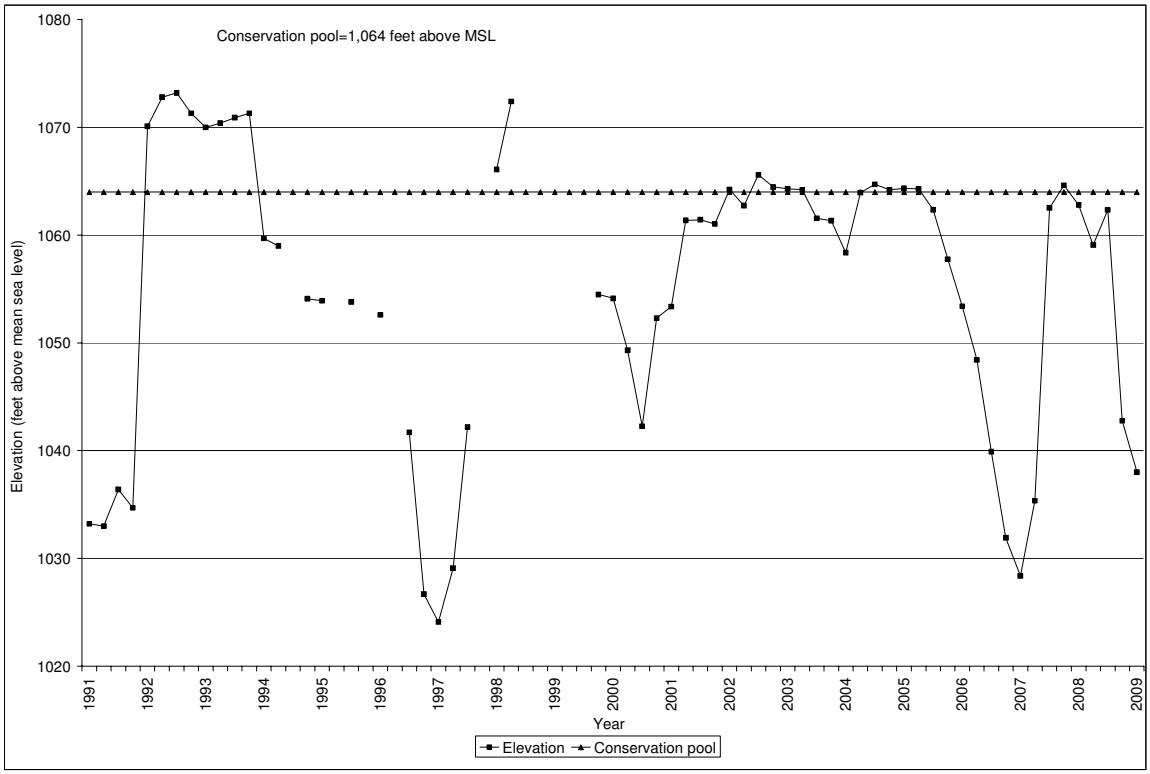


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Medina Reservoir, Texas.

Table 1. Characteristics of Medina Reservoir, Texas.

Inland Fisheries water body code	0489
IF District	1D
Surface area	5,410 acres
Conservation pool elevation	1064.19 ft. msl
Shoreline length (miles)	110 miles
Controlling authority	Bexar Medina Atascosa Counties Water Improvement District No. 1
Water uses	Irrigation and recreation
Counties	Bandera, Medina
Latitude	29.540500
Longitude	-98.933884
Nearest major metropolitan area and distance	San Antonio-40 miles
Reservoir description	Main stream
River system	San Antonio
Mean depth (ft)	46
Maximum depth (ft)	152
Shoreline development ratio	10.5
Watershed area (mi^2)	634
Secchi disc range (ft)	>6
Conductivity (umhos/cm)	388
Constructed	1913
Boat access	Adequate –1 public and 4 private fee ramps
Bank access	Fair (at access points only)
Handicap access	Inadequate-none

Table 2. Harvest regulations for Medina Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12” minimum
Catfish, flathead	5	18” minimum
Bass, white	25	10” minimum
Bass, palmetto	5	18” minimum
Bass, largemouth	5	14” minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10” minimum

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

Species	Year	Number	Size
Blue catfish	1974	186,750	NR
	1975	3,000	
	Total	189,750	
Channel catfish	1967	2,750	NR
	2007	185,271	FGL
	Total	188,021	
Warmouth	1967	47,000	NR
	Total	47,000	NR
Walleye	1973	640,000	NR
	1974	134,750	NR
	Total	653,750	
Smallmouth bass	1977	60,850	NR
	1979	51,725	NR
	1987	22,630	FGL
	1988	78	ADL
	1988	106,594	FR
	Total	241,877	
Largemouth bass	1967	7,500	NR
	1971	70,000	NR
	Total	77,500	
Florida largemouth bass	1976	5,000	FGL
	1977	59,950	FR
	1978	99,901	FGL
	2003	276,179	FGL
	2005	271,158	FGL
	Total	712,188	
Palmetto bass	1977	60,400	NR
	1979	59,968	NR
	1983	55,450	NR
	1994	61,300	FGL
	1995	92,700	FGL
	1996	85,900	FGL
	1997	83,971	FGL
	1998	56,304	FGL
	1999	41,897	FGL
	2000	5,550	FGL
	2002	42,146	FGL
	2004	42,281	FGL
	2005	81,265	FGL
	2007	23,859	FGL
	2008	54,586	FGL
	Total	847,577	

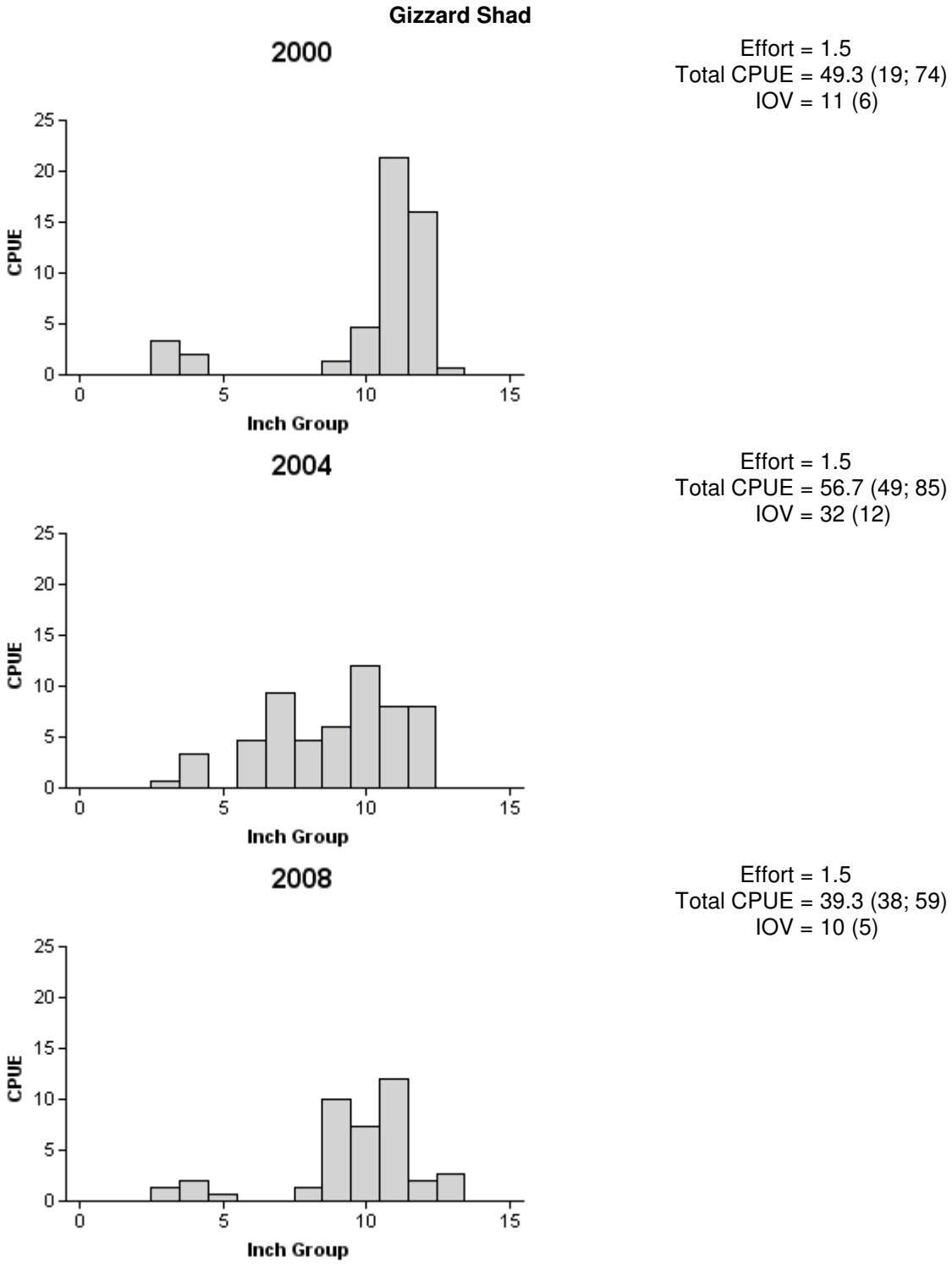


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Medina Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for IOV values.

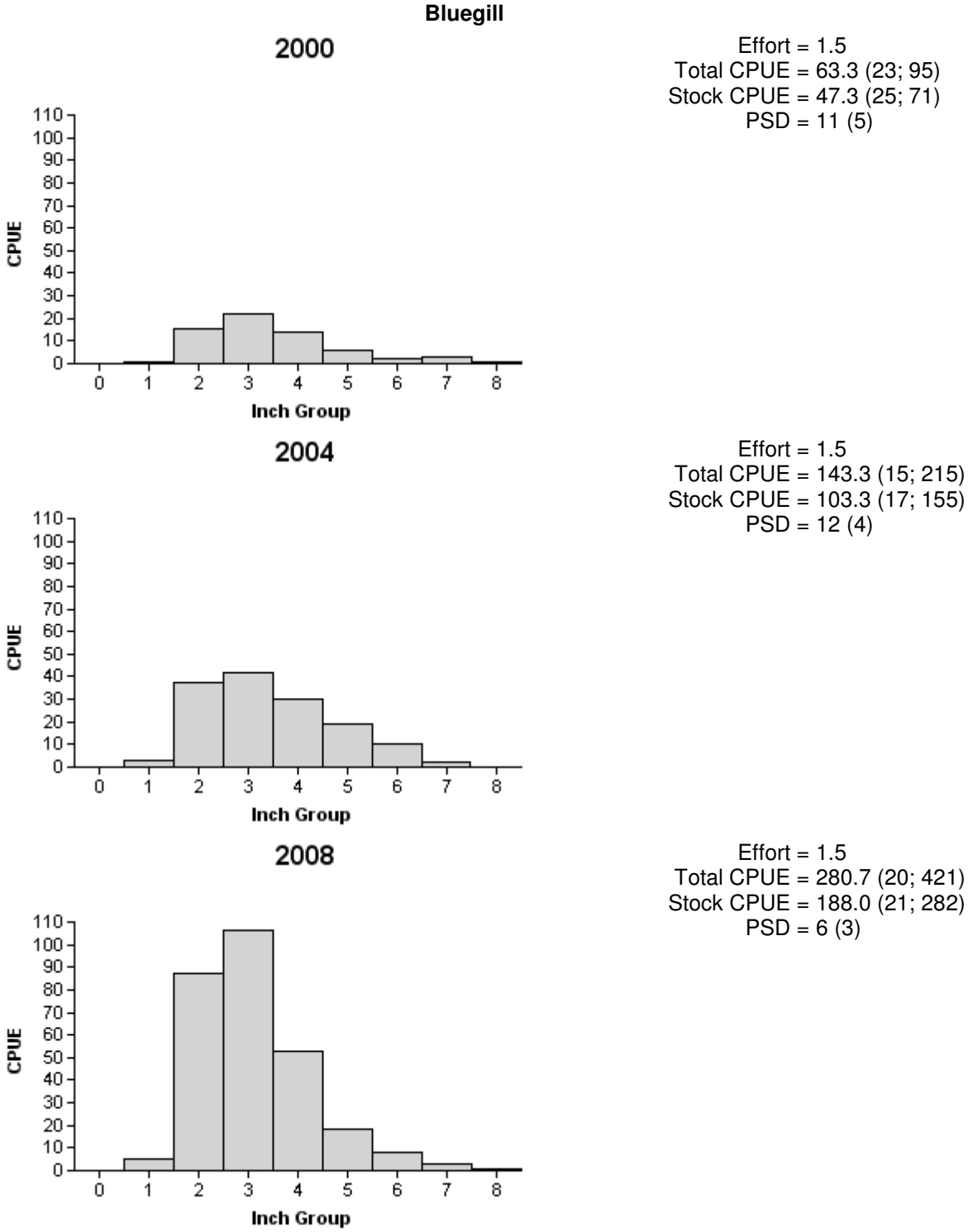


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Medina Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for PSD values.

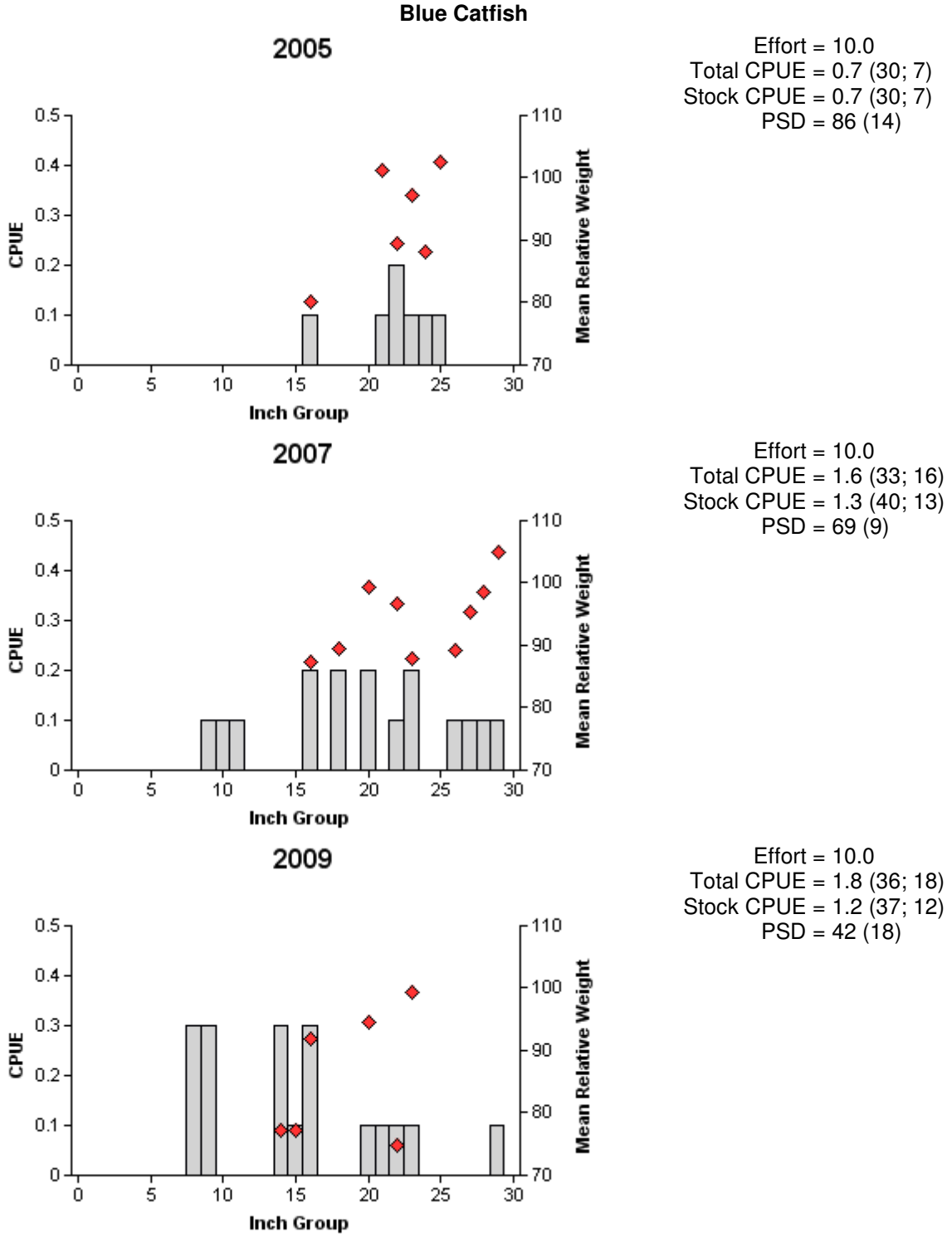


Figure 4. Number of blue catfish caught per net night (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Medina Reservoir, Texas, 2005, 2007, and 2009. RSE is used for CPUE values and SE is used for PSD values.

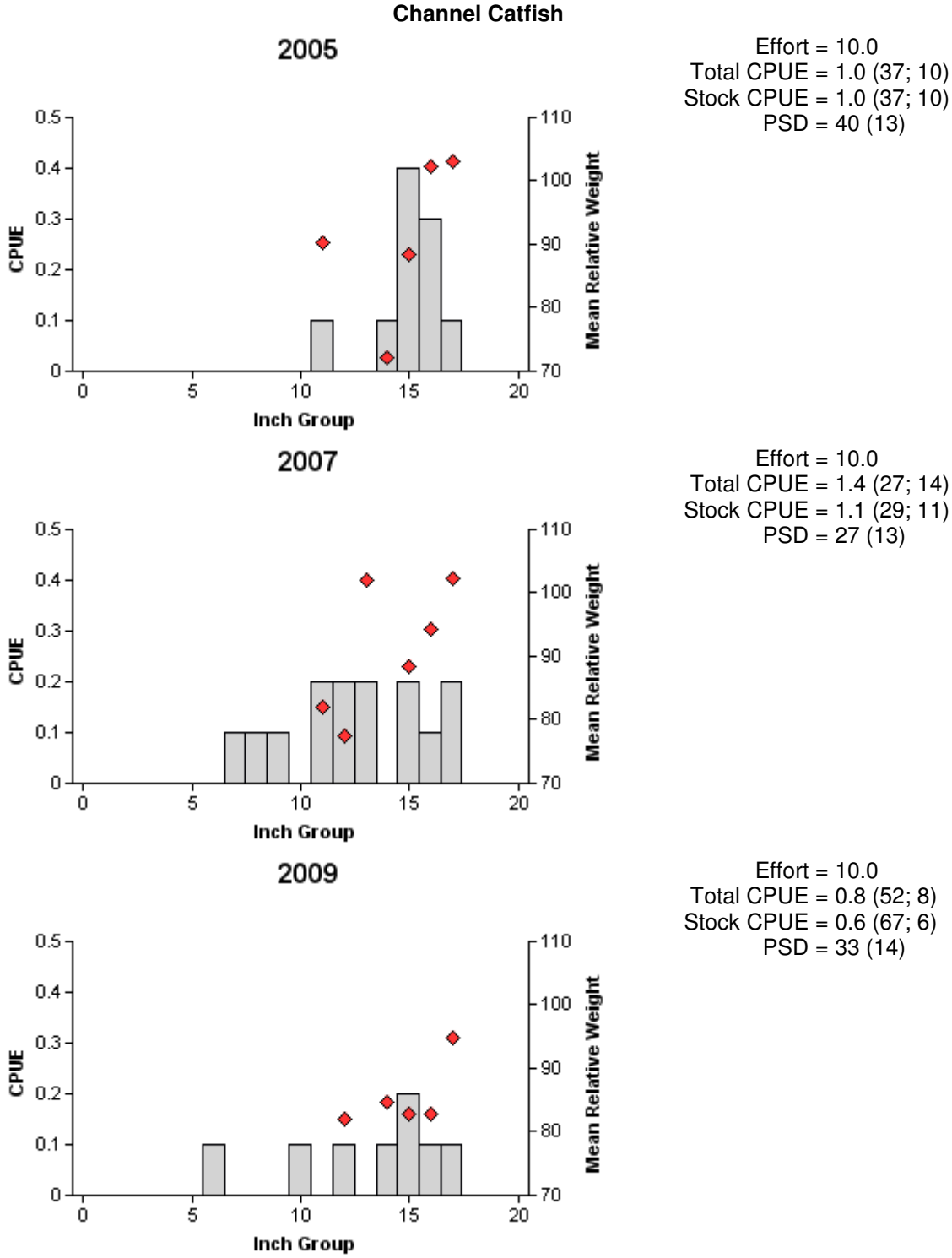


Figure 5. Number of channel catfish caught per net night (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Medina Reservoir, Texas, 2005, 2007, and 2009. RSE is used for CPUE values and SE is used for PSD values.

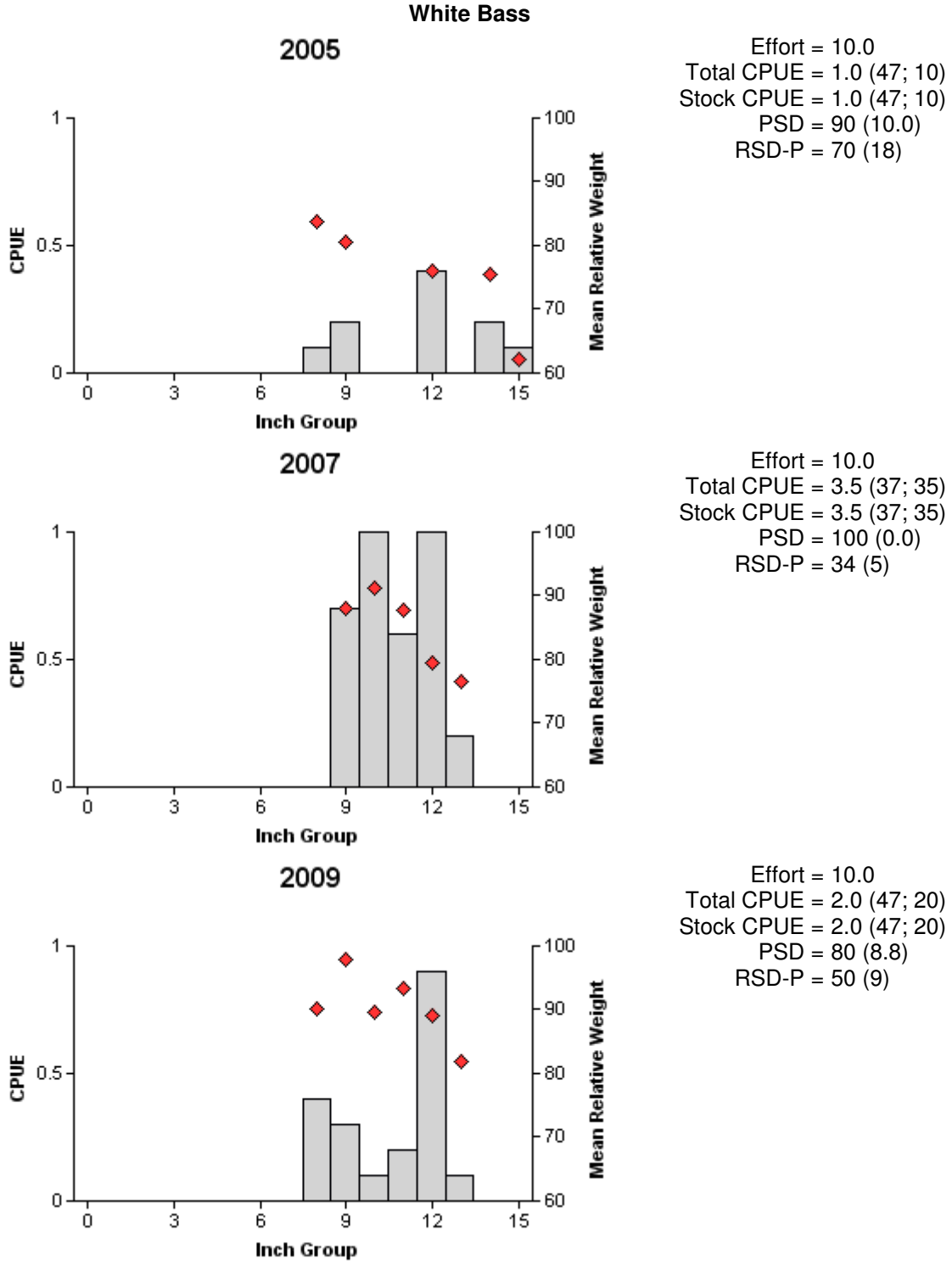
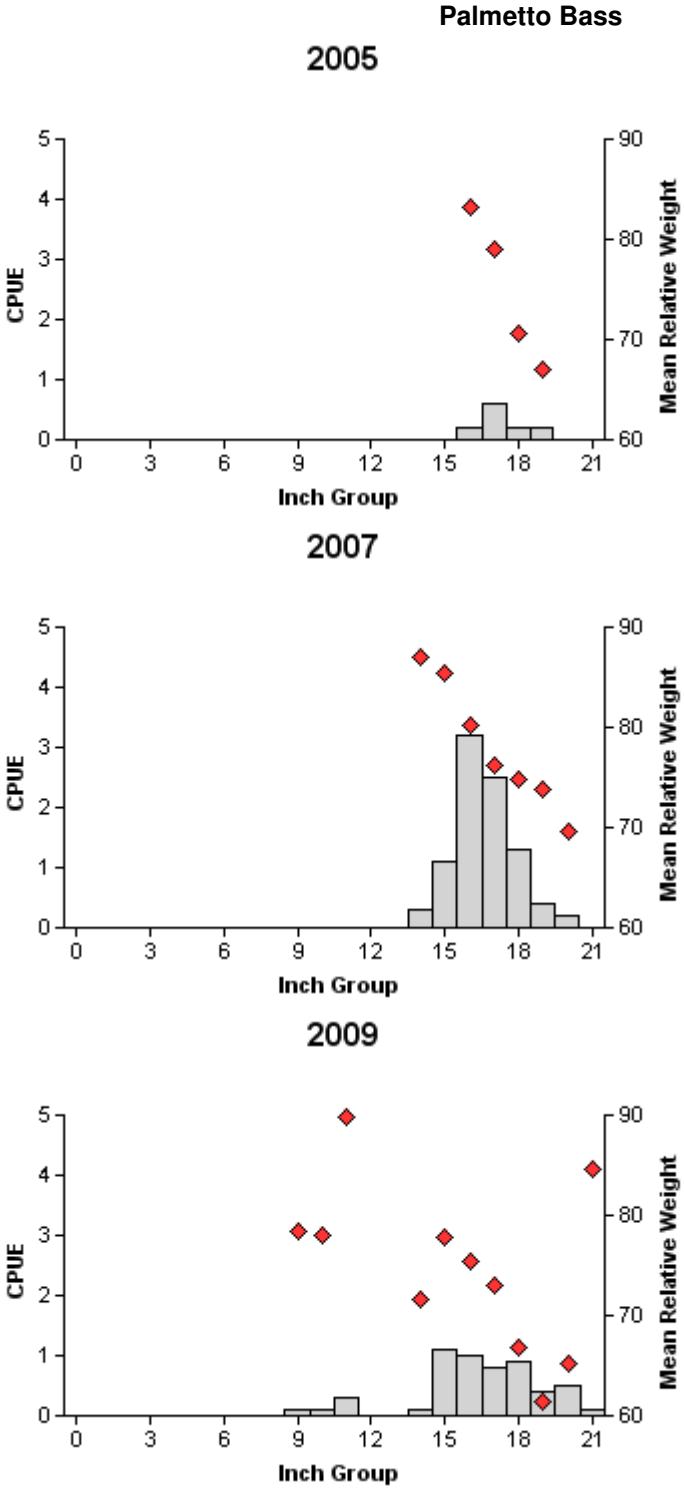


Figure 6. Number of white bass caught per net night (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Medina Reservoir, Texas, 2005, 2007, and 2009. RSE is used for CPUE values and SE is used for RSD/PSD values.

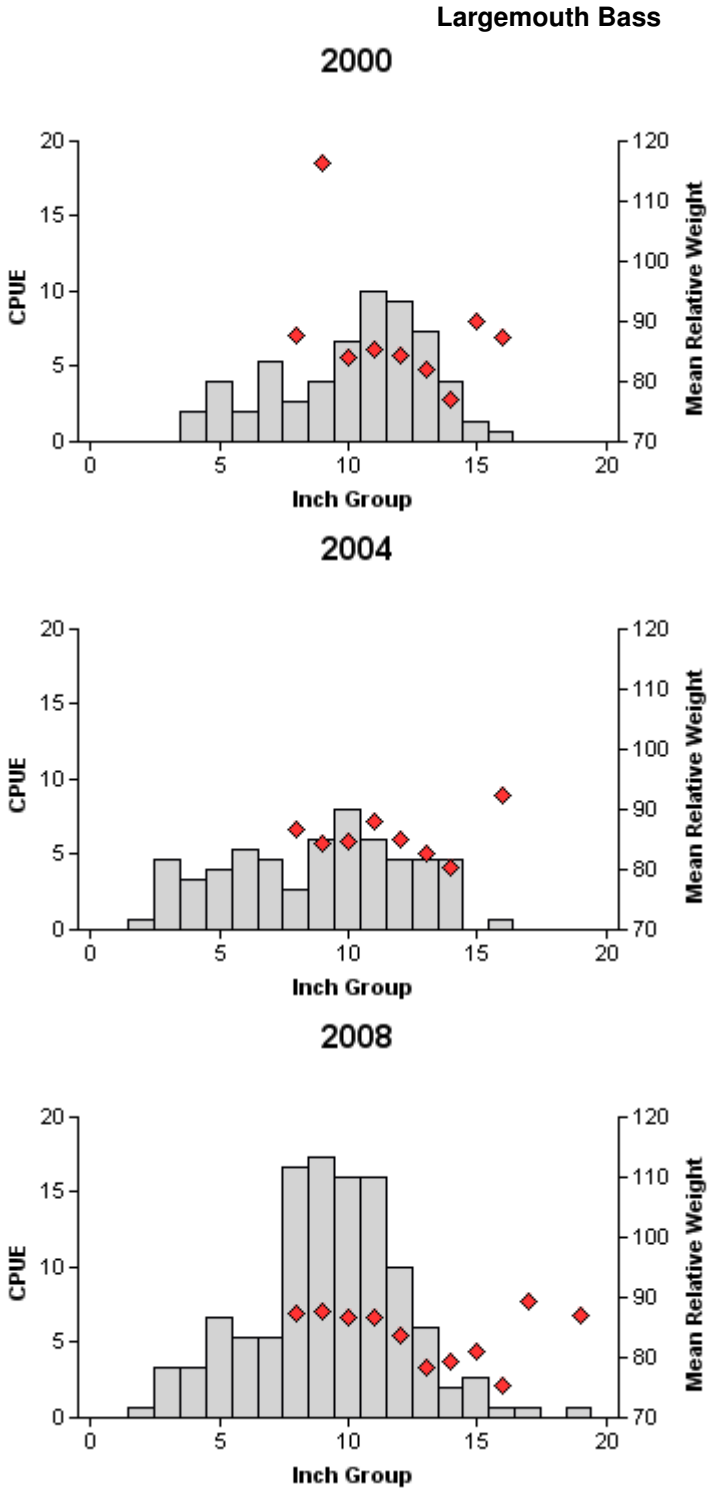


Effort = 10.0
Total CPUE = 1.2 (43; 12)
Stock CPUE = 1.2 (43; 12)
PSD = 100
RSD-P = 100

Effort = 10.0
Total CPUE = 9.0 (27; 90)
Stock CPUE = 9 (27; 90)
PSD = 100
RSD-P = 97 (2)

Effort = 10.0
Total CPUE = 5.4 (49; 54)
Stock CPUE = 5.4 (49; 54)
PSD = 91 (3)
RSD-P = 89 (3)

Figure 7. Number of palmetto bass caught per net night (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Medina Reservoir, Texas, 2005, 2007, and 2009. RSE is used for CPUE values and SE is used for RSD/PSD values.



Effort = 1.5
Total CPUE = 59.3 (17; 89)
Stock CPUE = 46.0 (22; 69)
PSD = 49 (9)
RSD-P = 4 (2)

Effort = 1.5
Total CPUE = 60.0 (16; 90)
Stock CPUE = 37.3 926; 56)
PSD = 39 (9)
RSD-P = 2 (2)

Effort = 1.5
Total CPUE = 113.3 (18; 170)
Stock CPUE = 88.7 (22;113)
PSD = 26 (7)
RSD-P = 5 (2)

Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N are in parentheses) for fall electrofishing surveys, Medina Reservoir, Texas, 2000, 2004, and 2008. RSE is used for CPUE values and SE is used for RSD/PSD values.

Table 4. Results of electrophoretic analysis of age-0 largemouth bass collected by electrofishing during fall from Medina Reservoir, Texas, in selected years from 1990 to 2004. F1 fish are those resulting from a cross between pure Florida largemouth bass (FLMB) and pure northern largemouth bass (NLMB), and FX fish are those resulting from all other crosses

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		Florida	F1	FX	Northern		
1990	43	4	14	20	5	50.0	9.3
1994	30	5	2	23	0	63.3	16.7
1997	30	0	6	20	4	44.2	0.0
2000	24	5	4	15	0	66.7	20.8
2004	30	8	2	18	2	63.3	26.7

Table 5. Proposed sampling schedule for Medina 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.

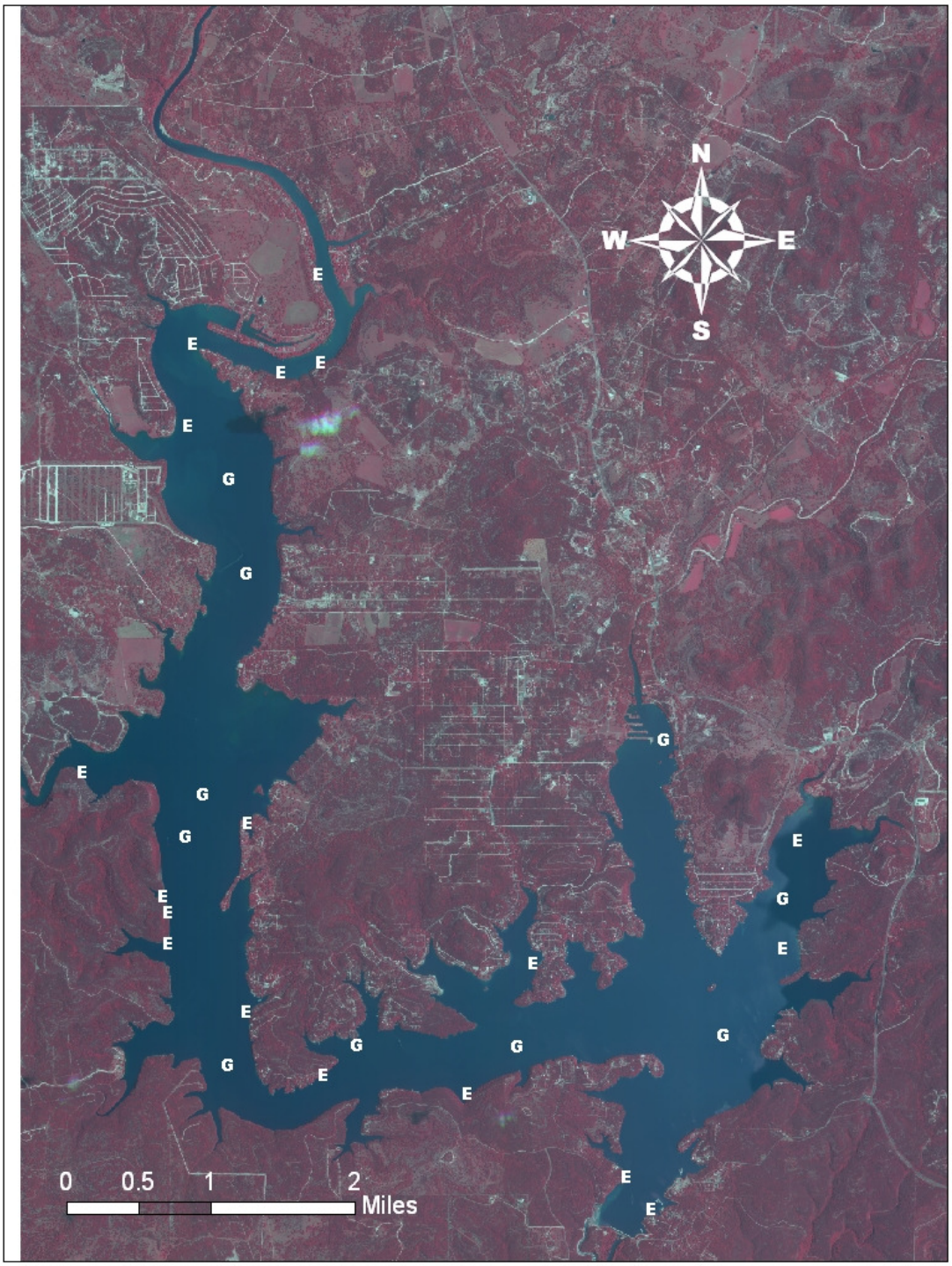
Survey Year	Electrofishing	Trap Net	Gill Net	Creel Survey	Report
Fall 2009-Spring 2010					
Fall 2010-Spring 2011			A		
Fall 2011-Spring 2012					
Fall 2012-Spring 2013	S		S		S

Appendix A

Catch rate (CPUE) of all target species collected from all gear types from Medina Reservoir, Texas, 2008-2009. Effort was 1.5 hours for electrofishing and 10 net-nights for gill netting.

Species	Electrofishing	Gill netting
Longnose gar		1.3
Gizzard shad	39.3	16.6
Threadfin shad	2.7	
Common carp		0.8
Bullhead minnow	1.3	
River carpsucker		0.3
Grey redhorse	1.3	
Blue catfish		1.8
Channel catfish		0.8
Flathead catfish		0.1
White bass		2.0
Palmetto bass		5.4
Redbreast sunfish	154.7	
Green sunfish	41.3	
Warmouth	1.3	
Bluegill	280.7	0.1
Longear sunfish	62.7	
Redear sunfish	32.0	
Largemouth bass	113.3	0.6
Guadalupe bass	1.3	
White crappie		1.6
Black crappie	1.3	0.1
Rio Grande cichlid	4.0	

Appendix B



Location of sampling sites, Medina Reservoir, Texas, 2008-2009. Gill net and electrofishing stations are indicated by G and E, respectively.