

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-29

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT
PROGRAM

2004 Survey Report

Medina Reservoir

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EXECUTIVE SUMMARY

Medina Reservoir was surveyed from June 2004 to May 2005 using electrofishing, trap nets, gill nets, creel, a littoral zone habitat survey, an aquatic vegetation survey, and an angler access and facilities survey. 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) was constructed in 1913 and is located on the Medina River in Medina County, Texas. It was built primarily for irrigation water supply. The water level increased about 25 feet in 2000 to near conservation pool elevation and remained within 5 feet of that level until May 2005. Angler access is adequate with one public boat ramp and four private ramps open to the public. Bank angling access is fair and available adjacent to 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 very little aquatic vegetation with native emergent species occurring along only 1.5 miles of the shoreline.
- **Prey species:** Electrofishing catch rate of gizzard shad in 2004 (56.7 fish/hour) was similar to in 2000 (49.3 fish/hour) and greater than in 1997 (32.0 fish/hour). Gizzard shad population size structure was similar in 1997, 2000, and 2004, with most fish being too large (≥ 8 inches) to be suitable prey for predators. In 2004, electrofishing catch rate of threadfin shad (113.3 fish/hour) was about double that of gizzard shad (56.7 fish/hour). Because of smaller size and greater relative abundance, threadfin shad likely contribute more to the forage base than do gizzard shad. Electrofishing catch rate of bluegill was greater in 2004 (143.3 fish/hour) than in 2000 (63.3 fish/hour), but lower than in 1997 (318.7 fish/hour). Electrofishing catch rate of redbreast sunfish was greater in 2004 (317.3 fish/hour) than in 2000 (138.0 fish/hour) and 1997 (195.3 fish/hour). Bluegill, redbreast sunfish, and green sunfish, because of their small size and abundant populations are important prey for predator species in the reservoir.
- **Catfishes:** Gillnet catch rate of blue catfish was lower in 2005 (0.7 fish/NN) than in 2000 and 2001 (1.9 and 2.4 fish/NN, respectively), whereas catch rate of channel catfish was similar in 2000, 2001, and 2005 (1.0-1.4 fish/NN). The majority of blue and channel catfish captured in gillnets were longer than the 12-inch minimum length. According to 2003-2004 creel surveys, catfish angling effort accounted for 19% of the total angling effort in the reservoir. Of the total estimated angler catch of catfish (1,663), about half (879 fish) were harvested with channel catfish accounting for the majority of the total catfish catch and harvest. Average rate of angler catch and harvest of catfish in the reservoir was < 0.15 fish/angler-hour.

- **Temperate basses:** Gillnet catch rate of white bass in 2005 (1.0 fish/NN) was slightly less than in 2001 (1.9 fish/NN) and slightly greater than in 2000 (0.5 fish/NN). White bass population size structure was similar in 2000, 2001, and 2005, with most of the fish being ≥ 12 inches long. Gillnet catch rate of palmetto bass in 2005 (1.2 fish/NN) was similar to in 2001 (1.6 fish/NN) and much lower than in 2000 (8.6 fish/NN). Thus, according to gill net sampling, palmetto bass stockings in 2002 and 2004 were not as successful as stockings conducted prior to 2000. Palmetto bass population size structure was similar in 2000, 2001, and 2005, with about half of the sampled fish being longer than 18-inch minimum size limit. Average age of 17-19 inch palmetto bass was 3.8 years (N = 9) in 2005. 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. An estimated 949 white bass and 1,944 palmetto bass were caught by anglers at an average rate of 0.318 fish/angler hour and 1,106 fish/angler-hour, respectively. Angler-harvest of white bass and palmetto bass was estimated to be 399 and 816 fish, respectively.
- **Black basses:** Electrofishing catch rate of largemouth bass in 2004 (60.0 fish/hour) was similar to 2000 (59.3 fish/hour), but lower than in 1997 (122.0 fish/hour). Largemouth bass population size structure was similar in 1997, 2000, and 2004, with preferred size fish (≥ 15 inches) accounting for a very small proportion of stock size fish (RSD-P = 2). Average age of 13-15 inch largemouth bass was 2.9 years (N = 10). Florida largemouth bass allele frequency in 2004 (63.3%), as determined from electrophoretic analyses of age-0 individuals, was similar to 2000 (66.7%) and greater than in 1997 (44.2%). According to 2003-2004 creel surveys, angling effort directed towards black basses (18,959 angler-hours) accounted for 52% of the total angling effort in the reservoir. Largemouth bass catch and harvest was estimated to be 19,642 fish and 1,361 fish, respectively. Although the reservoir's largemouth bass population is primarily composed of sub-14 inch fish, average angling success was considered good at 0.536 fish/angler-hour. An estimated 16 and 214 smallmouth and guadalupe bass, respectively, were caught from the reservoir.
- **Crappie:** Both white and black crappies are present in the reservoir; however white crappie dominate. Black crappie were not captured during 2004 trap-net sampling. Trap-net catch rate of white crappie in 2004 (0.50 fish/NN) was lower than in 2000 (4.7 fish/NN) and similar to 1997 (0.6 fish/NN). According to 2003-2004 creel surveys, angling effort directed towards crappies accounted for 6% of the total angling effort expended at the reservoir. Catch and harvest of white crappie was estimated to be 1,033 and 229 fish, respectively. No black crappie were observed harvested by anglers interviewed during creel surveys.
- **Management strategies:** All species should continue to be managed under current harvest regulations. Biennial electrofishing, gill-netting, and trap-netting will be conducted to monitor primary sport and prey species and evaluate the success of palmetto bass and largemouth bass stockings. Every fourth year age-0 largemouth bass will be collected and analyzed to assess the genetic composition of the population. To increase public awareness of angling opportunities, a press release regarding palmetto bass stockings will be prepared and signs depicting fish harvest regulations will be posted at boat ramps.

INTRODUCTION

This document is a summary of fisheries data collected from Medina Reservoir from June 2004 to May 2005. The purpose of this document is to provide information and make management recommendations to protect and improve the sport fishery. Although information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Management strategies are included to address existing problems or opportunities. Historical data is presented with the 2004-2005 data for comparison.

STATUS OF MANAGEMENT ACTIONS PREVIOUSLY LISTED (Zerr 2001)

1. Palmetto bass have become a popular sport fish in Medina Reservoir and stocking is required to maintain abundance. Proposed action was to continue population monitoring and to annually stock fingerling palmetto bass.

Action: Gillnet sampling was conducted in 2001 and 2005 to monitor the population. Creel surveys were conducted in 2003-2004 to quantify the palmetto bass fishery. Palmetto bass fingerlings were stocked in 2002 and 2004.

Current fish harvest regulations for Medina Reservoir, Texas, 2004-2005.

Species	Bag Limit	Minimum Length (inches)
Largemouth bass	5	14
Palmetto bass	5	18
White bass	25	10
Blue and channel catfish	25 (in any combination)	12
Flathead catfish	5	18
Black and white crappie	25 (in any combination)	10

METHODS

- Fishes were collected by electrofishing (1.5 hour total at 18, 5-minute stations) and by trap-netting (1 net-night each at 10 stations) in fall 2004, 2000, and 1997. Fishes were collected by gill-netting (1-net night each at 10 stations) in spring 2005, 2001, and 2000. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing, and for gill netting and trap netting as the number of fish caught in one net set overnight (NN). Sample station selection method for all gear types was random.
- Sampling statistics (CPUE for various length categories) and proportional stock density (PSD), relative stock density (RSD), and relative weight were calculated for target fishes according to Anderson and Neumann (1996). The gizzard shad index of vulnerability (IOV) was calculated according to DiCenzo et al. 1996.
- Largemouth bass electrophoresis samples were collected according to Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Mean age of palmetto bass at legal-harvestable size (18 inches) and largemouth bass at legal-harvestable size (14 inches) was estimated using otoliths according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Creel surveys were conducted from 12/1/2003 to 11/30/2004 according to Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004) to estimate angler effort, catch, and harvest for primary sport fish species. A roving, random-stratified, uniform probability creel sampling design was used and five weekend days and four week days were sampled per quarter (3-month period).
- Littoral zone/physical habitat, vegetation, angler access, and facility surveys were conducted in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).

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. Stimpert. 1996. Relationship between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Zerr B. 2001. Statewide freshwater fisheries monitoring and management program survey report for Medina Reservoir, 2000. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Physical and historical data for Medina Reservoir, Texas, 2004-2005.

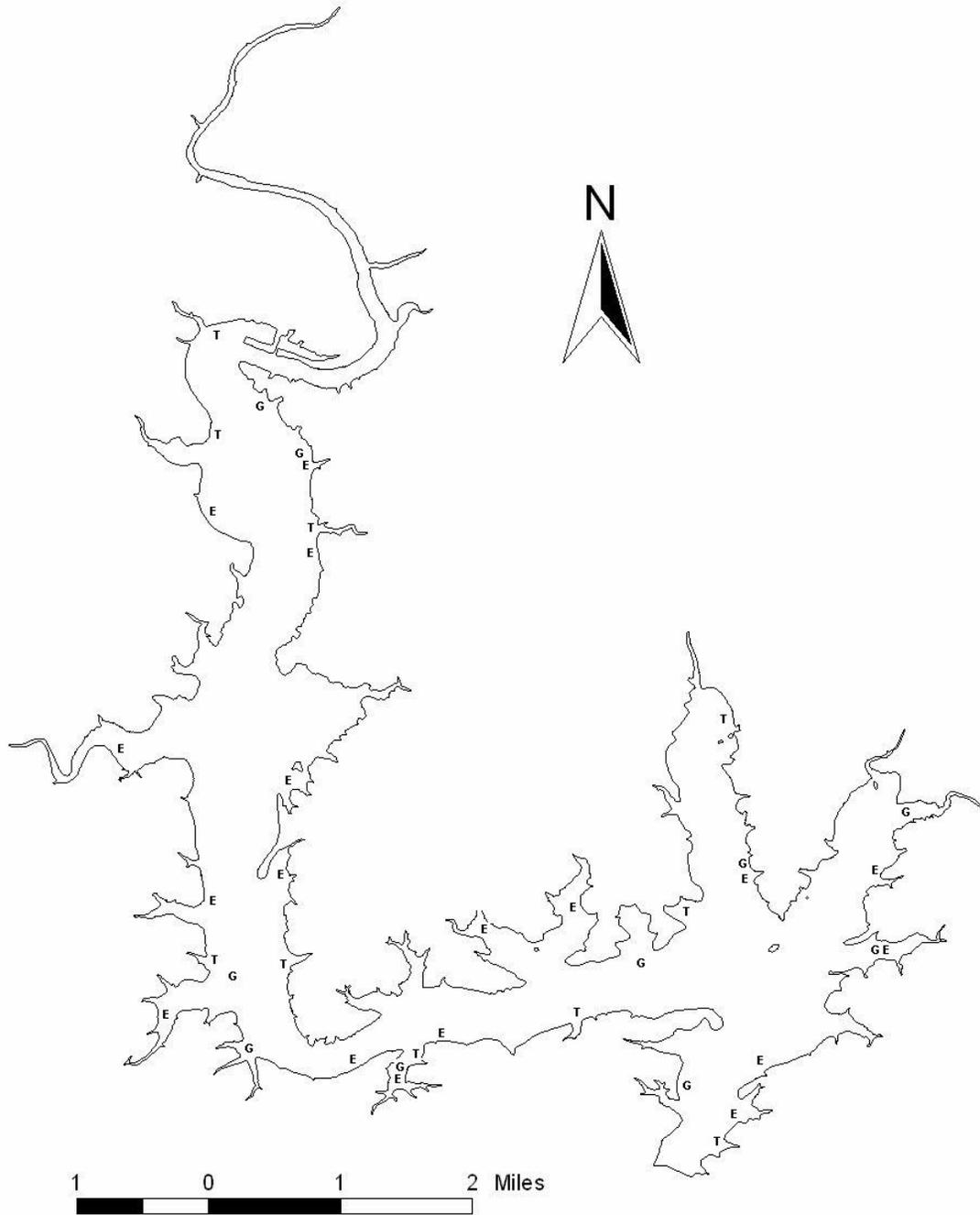
Inland Fisheries water body code	0489
IF District	1D
Surface area	5,410 acres
Conservation pool elevation	1064.19 feet above mean sea level
Shoreline length	110 miles
Controlling authority	Bexar Medina Atacosa Counties Water Improvement District No. 1
Water uses	Irrigation and recreation
Counties	Medina
Latitude	29.540500
Longitude	-98.933884
Nearest major metropolitan area and distance	San Antonio-40 miles
Reservoir description	Main stream
River system	Medina
Mean depth	46 feet
Maximum depth	152 feet
Shoreline development ratio	10.5
Watershed area	634 mi ²
Secchi disc range	>6 feet
Conductivity	835 umhos/cm
Constructed	1913
Boat access	Adequate –1 public and 4 private ramps
Bank access	Fair (at access points only)
Handicap access	Inadequate-none

Results of habitat and aquatic vegetation surveys conducted at Medina Reservoir, Texas, in May, 2005. Linear shoreline distance (miles) was estimated for each habitat type and divided by total shoreline distance (110 miles) to obtain percent of shoreline occupied by habitat type. Habitat types may overlap so their sum does not equal total shoreline distance. Lake elevation was 0.05 feet above conservation pool elevation (1064.19 ft above mean sea level) at time of survey. Native emergent aquatic vegetation species observed were water willow, sawgrass, water primrose, and yellow water lily.

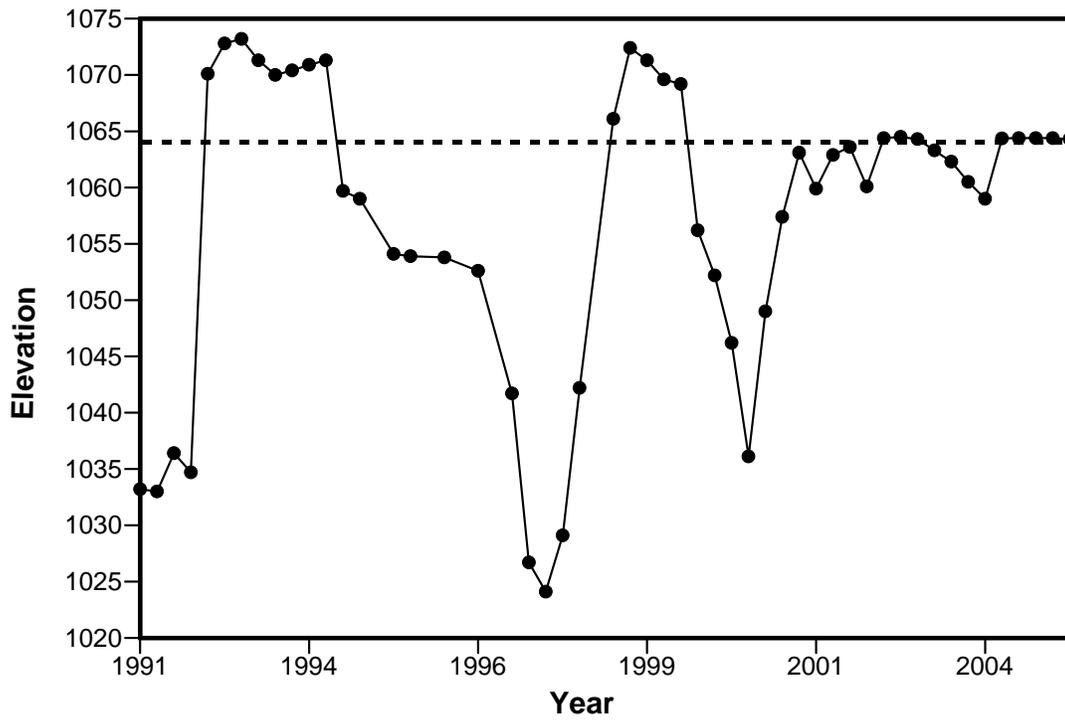
Habitat type	Shoreline distance	Percent
Rock bluff	52.7	47.9
Rocky or gravel shoreline	29.6	26.9
Boat docks	26.5	24.1
Featureless	26.1	23.7
Dead trees (floating logs or fallen trees)	6.6	6.0
Native emergent aquatic vegetation	1.5	1.4
Flooded terrestrial vegetation	1.2	1.1
Concrete	0.8	0.6

Stocking history for Medina Reservoir (5,410 acres). Size categories are FGL for fingerling, ADL for adult, FR for fry, and NA for not available.

Species	Year	Number	Size	Species	Year	Number	Size
Blue catfish	1974	186,750	NA	Florida largemouth bass	1976	5,000	FGL
	1975	3,000	NA		1977	59,950	FR
	Species total	189,750			1978	99,901	FGL
			2003		276,179	FGL	
			Species total		436,530		
Channel catfish	1967	2,750	NA	Palmetto bass	1977	60,400	NA
	Species total	2,750			1979	59,968	NA
Warmouth	1967	47,000	NA		1983	55,450	NA
	Species total	47,000			1994	61,300	FGL
Walleye	1973	640,000	NA		1995	92,700	FGL
	1974	134,750	NA		1996	85,900	FGL
	Species total	653,750			1997	83,971	FGL
Smallmouth bass	1977	60,850	NA		1998	56,304	FGL
	1979	51,725	NA		1999	41,897	FGL
	1987	22,630	FGL		2000	5,550	FGL
	1988	78	ADL	2002	42,146	FGL	
	1988	106,594	FR	2004	42,281	FGL	
	Species total	241,877		2005	81,150	FGL	
			Species total	687,867			
Largemouth bass	1967	7,500	NA				
	1971	70,000	NA				
	Species total	77,500					

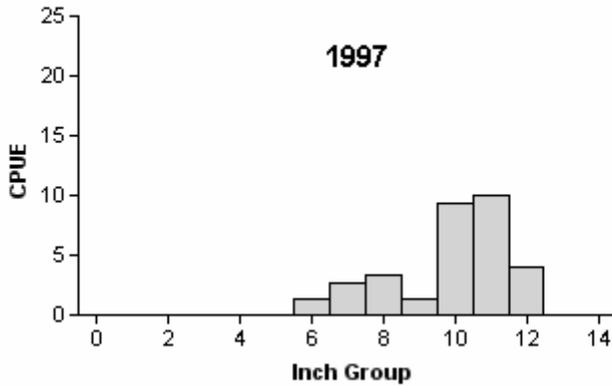


Location of electrofishing (E), gill netting (G), and trap netting (T) sample sites in Medina Reservoir, 2004-2005.

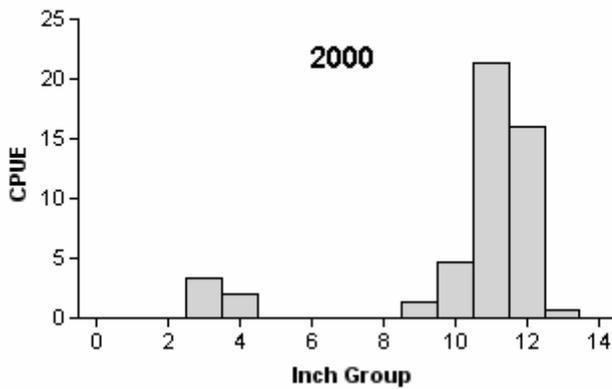


Medina Reservoir mean quarterly water level (feet above sea level) from fall 1991 to summer 2005. Dashed line represents conservation pool elevation of 1064.19 feet above sea level.

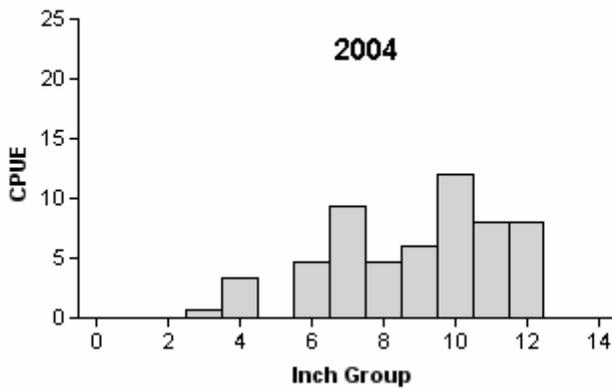
Gizzard Shad



Effort = 1.5
 N = 48
 Total CPUE = 32.0
 Stock CPUE = 30.7
 PSD = 46
 IOV = 13



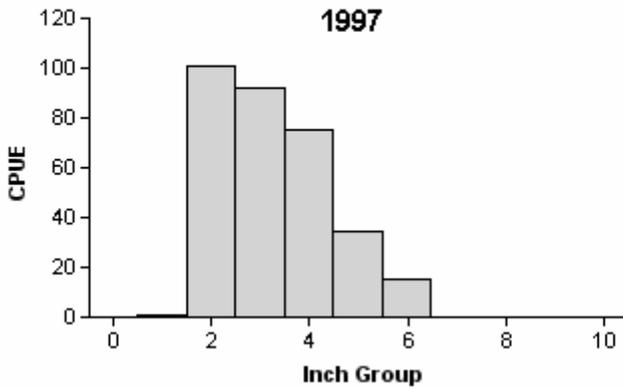
Effort = 1.5
 N = 74
 Total CPUE = 49.3
 Stock CPUE = 44.0
 PSD = 86
 IOV = 11



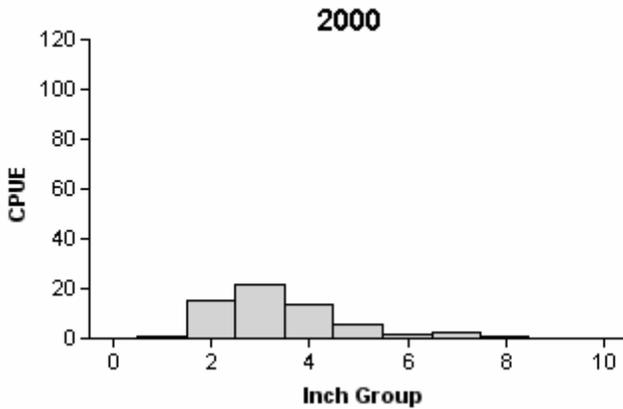
Effort = 1.5
 N = 85
 Total CPUE = 56.7
 Stock CPUE = 48
 PSD = 33
 IOV = 32

Comparison of the number of gizzard shad caught per hour (CPUE) and population indices from fall electrofishing sampling in Medina Reservoir, Texas.

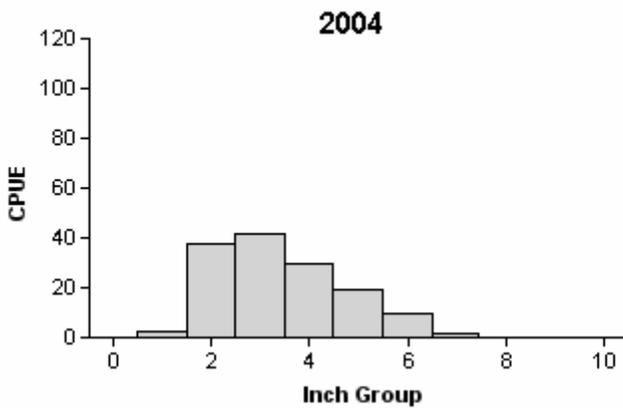
Bluegill



Effort = 1.5
 N = 478
 Total CPUE = 318.7
 Stock CPUE = 217.3
 PSD = 7



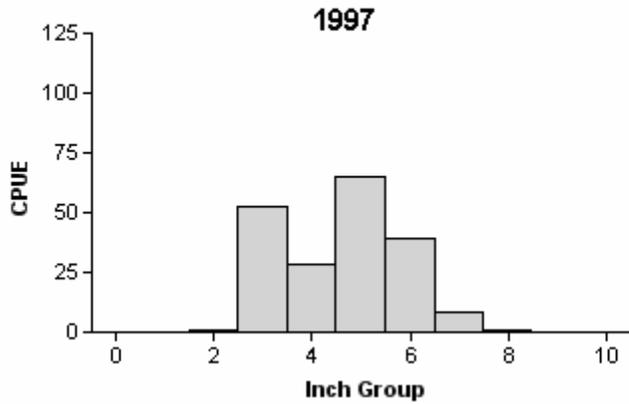
Effort = 1.5
 N = 95
 Total CPUE = 63.3
 Stock CPUE = 47.3
 PSD = 11



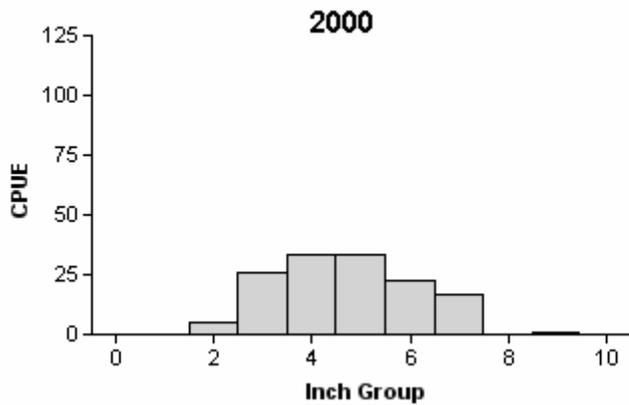
Effort = 1.5
 N = 215
 Total CPUE = 143.3
 Stock CPUE = 103.3
 PSD = 12

Comparison of the number of bluegill caught per hour (CPUE) and population indices from fall electrofishing sampling in Medina Reservoir, Texas.

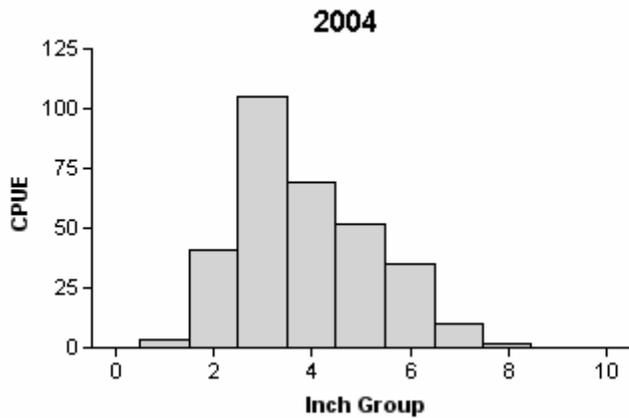
Redbreast sunfish



Effort = 1.5
 N = 293
 Total CPUE = 195.3
 Stock CPUE = 194.7
 PSD = 25



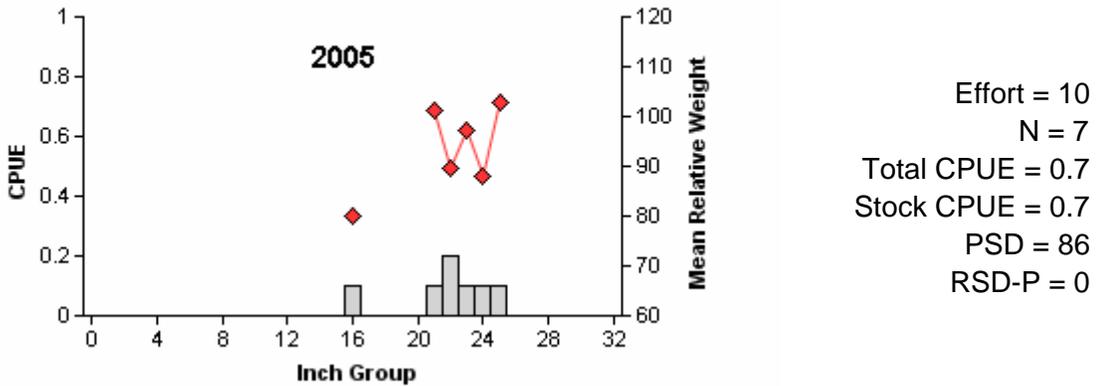
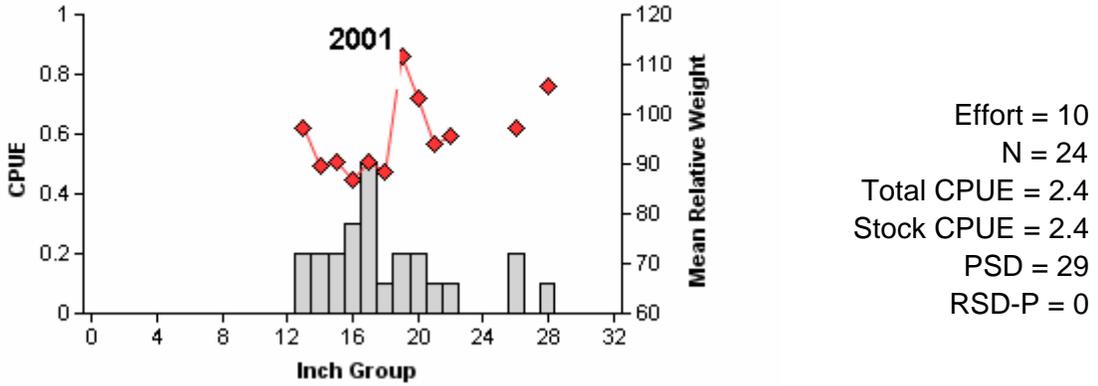
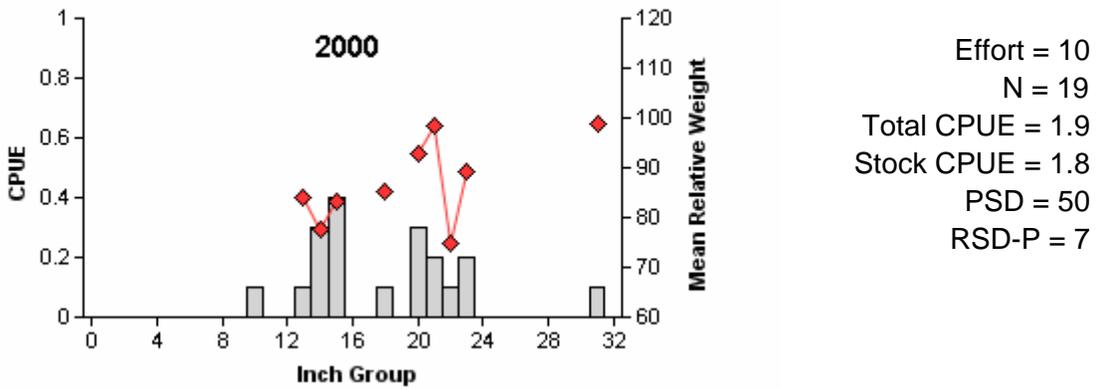
Effort = 1.5
 N = 207
 Total CPUE = 138.0
 Stock CPUE = 132.7
 PSD = 30



Effort = 1.5
 N = 476
 Total CPUE = 317.3
 Stock CPUE = 273.3
 PSD = 17

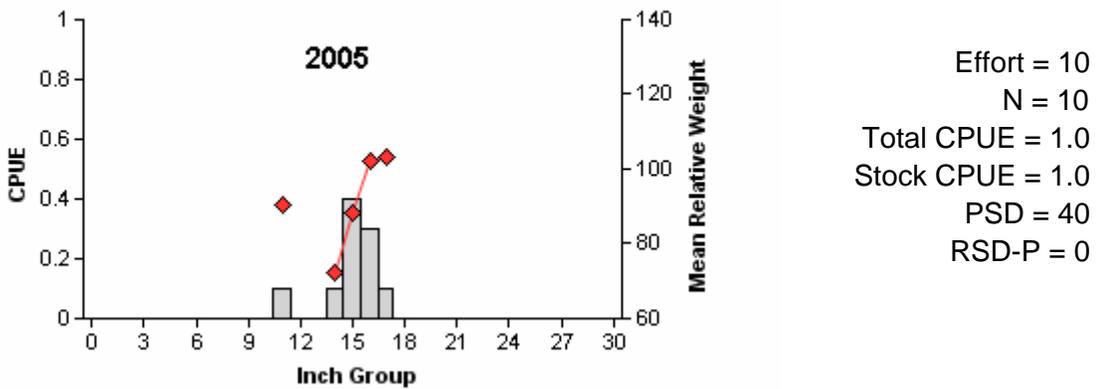
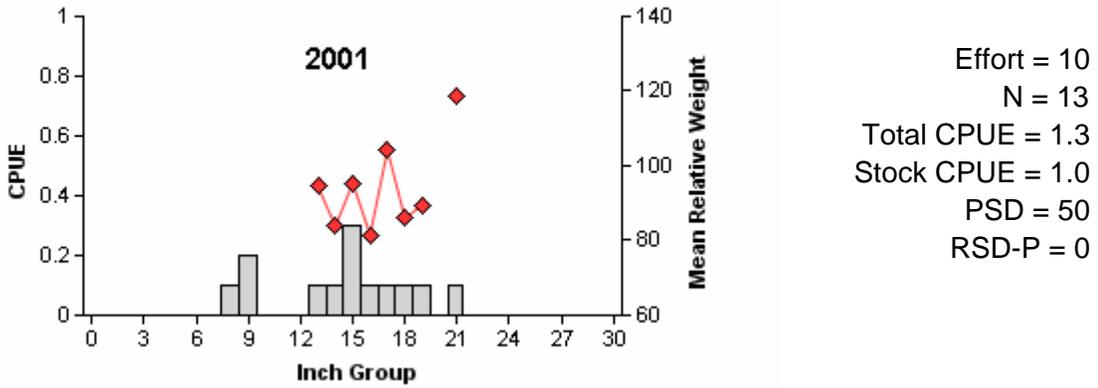
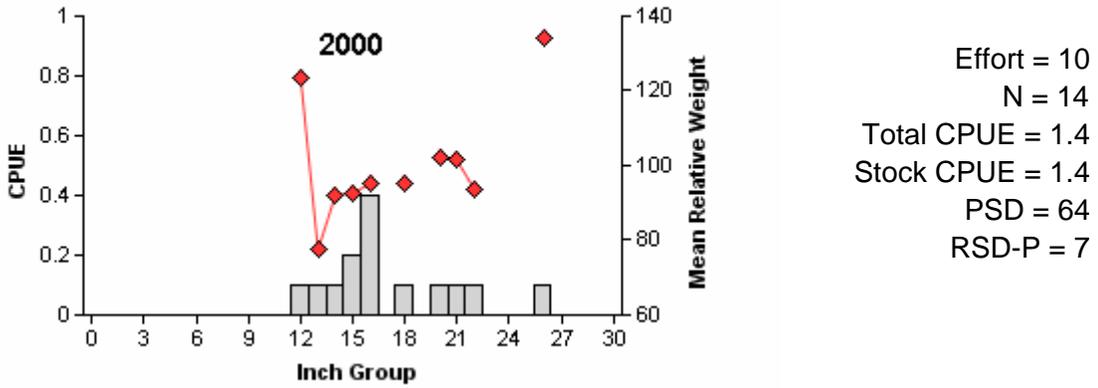
Comparison of the number of redbreast sunfish caught per hour (CPUE) and population indices from fall electrofishing sampling in Medina Reservoir, Texas.

Blue catfish



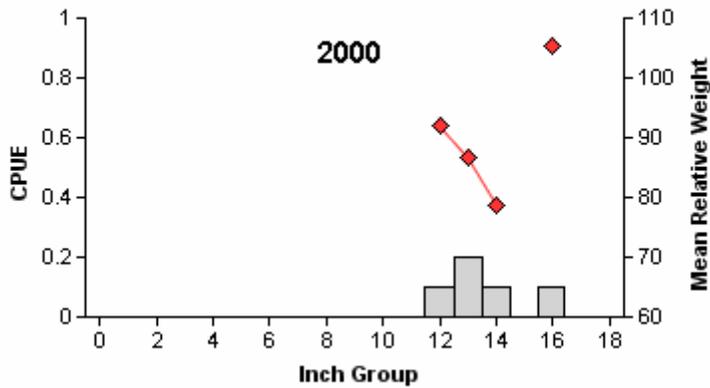
Comparison of the number of channel catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices from spring gill net sampling in Medina Reservoir, Texas.

Channel catfish

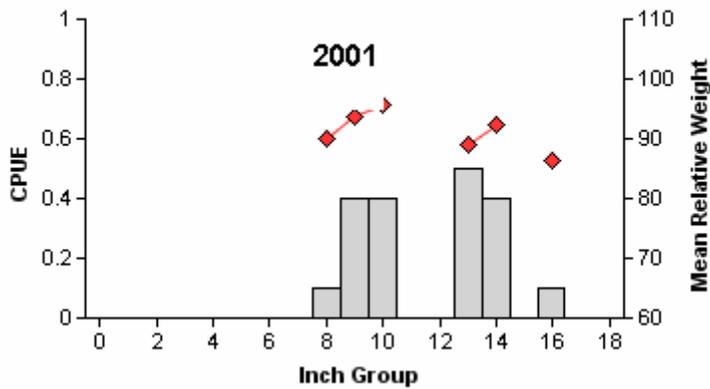


Comparison of the number of channel catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices from spring gill net sampling in Medina Reservoir, Texas.

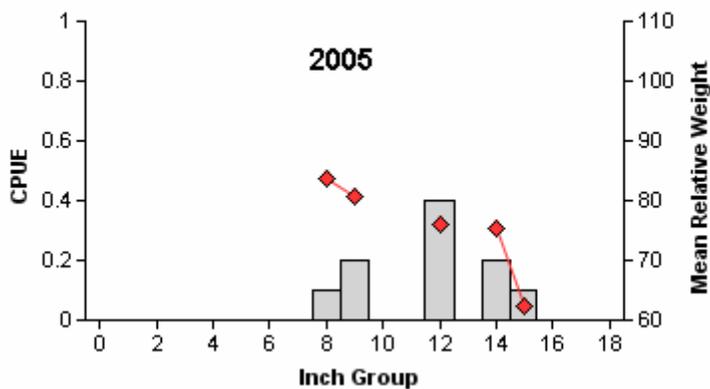
White bass



Effort = 10
 N = 5
 Total CPUE = 0.5
 Stock CPUE = 0.5
 PSD = 100
 RSD-P = 100



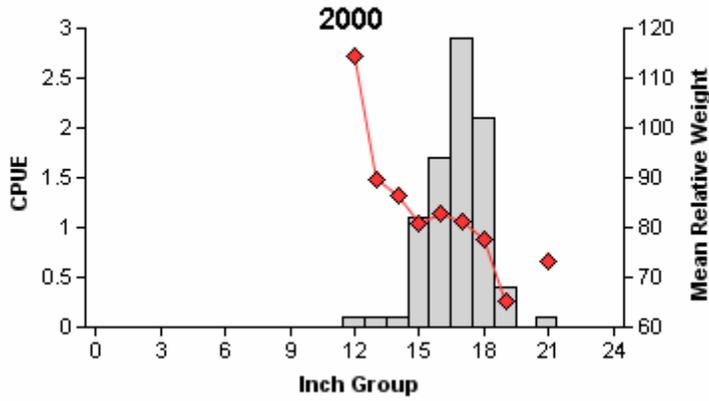
Effort = 10
 N = 19
 Total CPUE = 1.9
 Stock CPUE = 1.9
 PSD = 95
 RSD-P = 53



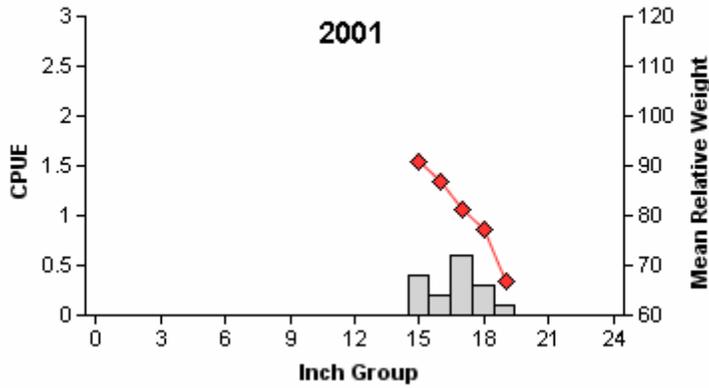
Effort = 10
 N = 10
 Total CPUE = 1.0
 Stock CPUE = 1.0
 PSD = 90
 RSD-P = 70

Comparison of the number of white bass caught per net night (CPUE), mean relative weight (diamonds), and population indices from spring gill net sampling in Medina Reservoir, Texas.

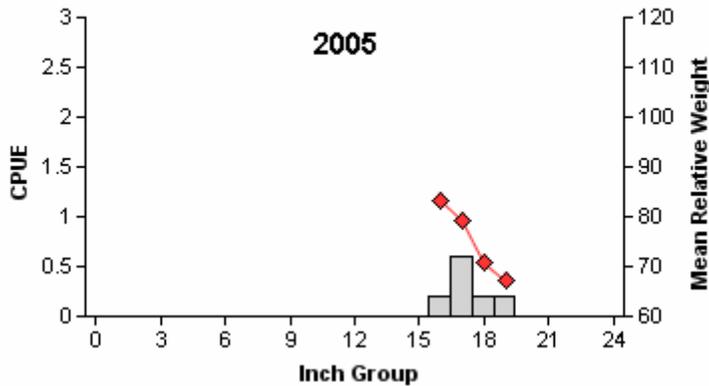
Palmetto bass



Effort = 10
 N = 86
 Total CPUE = 8.6
 Stock CPUE = 8.6
 PSD = 100
 RSD-P = 97



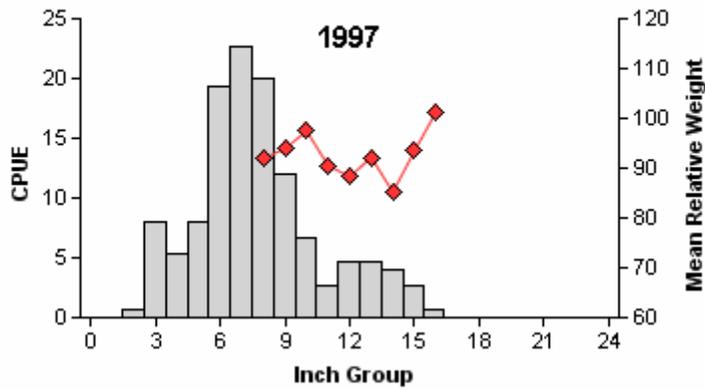
Effort = 10
 N = 16
 Total CPUE = 1.6
 Stock CPUE = 1.6
 PSD = 100
 RSD-P = 100



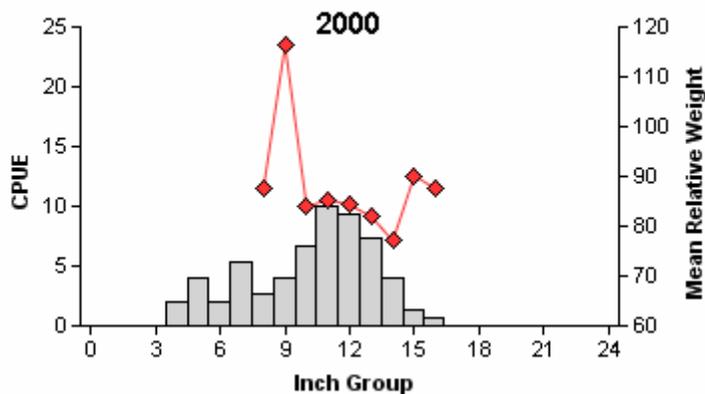
Effort = 10
 N = 12
 Total CPUE = 1.2
 Stock CPUE = 1.2
 PSD = 100
 RSD-P = 100

Comparison of the number of palmetto bass caught per net night (CPUE), mean relative weight (diamonds), and population indices from spring gill net sampling in Medina Reservoir, Texas.

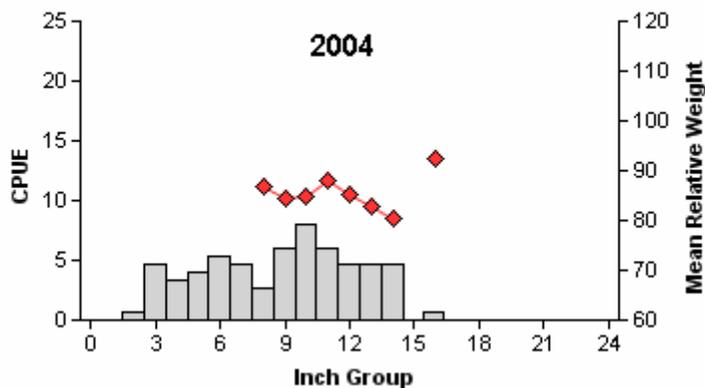
Largemouth bass



Effort = 1.5
 N = 183
 Total CPUE = 122.0
 Stock CPUE = 58.0
 PSD = 29
 RSD-P = 15
 % FLMB alleles = 44.2
 % FLMB genotype = 0.0



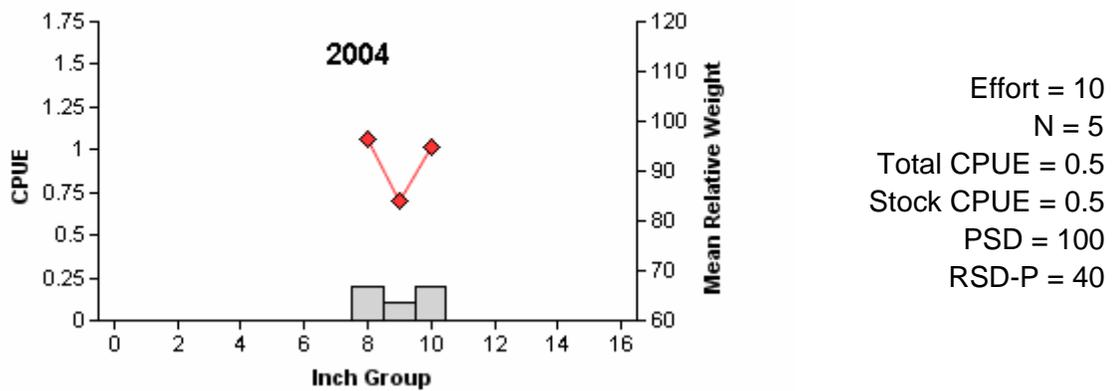
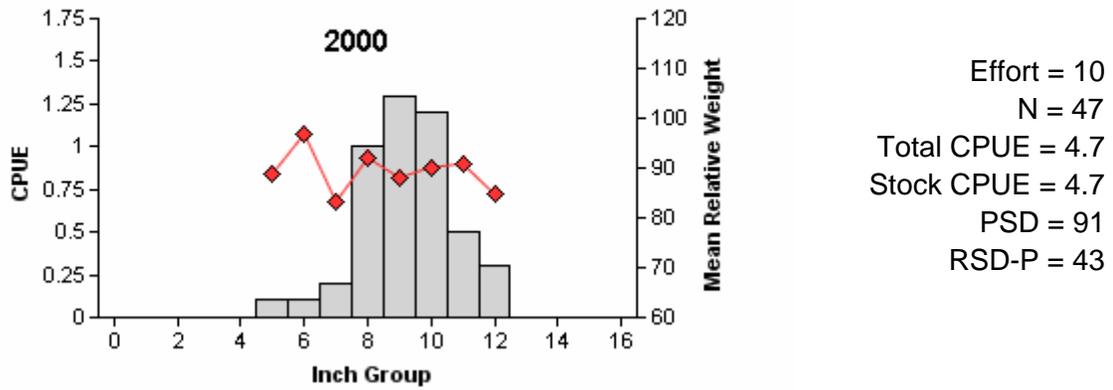
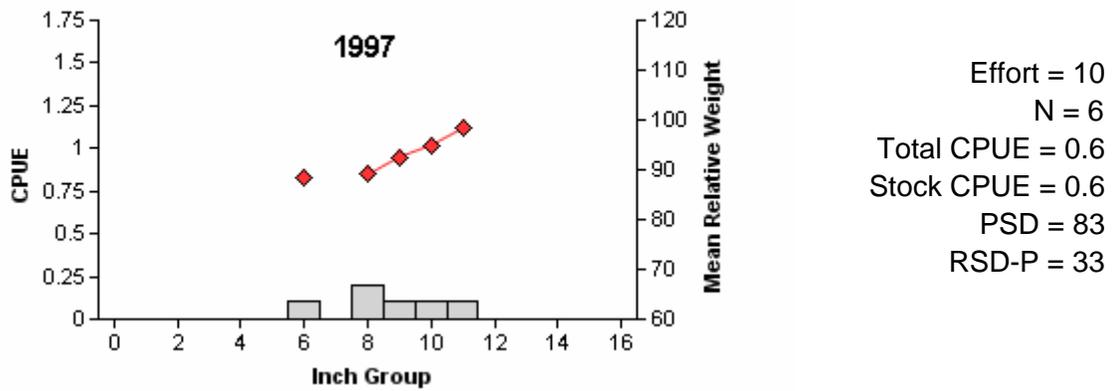
Effort = 15
 N = 89
 Total CPUE = 59.3
 Stock CPUE = 46.0
 PSD = 49
 RSD-P = 4
 % FLMB alleles = 66.7
 % FLMB genotype = 20.8



Effort = 15
 N = 90
 Total CPUE = 60.0
 Stock CPUE = 37.3
 PSD = 39
 RSD-P = 2
 % FLMB alleles = 63.3
 % FLMB genotype = 26.7

Comparison of the number of largemouth bass caught per hour (CPUE), mean relative weight (diamonds), population indices, and Florida largemouth bass (FLMB) genetic introgression measures from fall electrofishing sampling in Medina Reservoir, Texas.

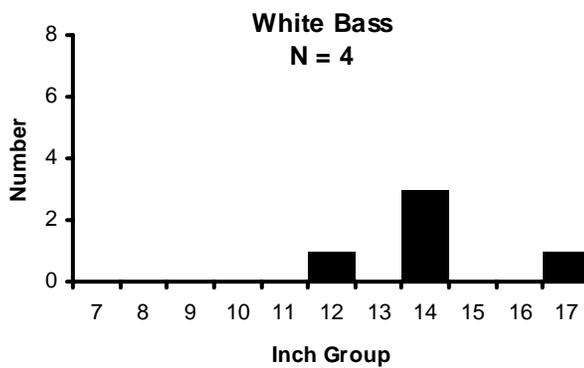
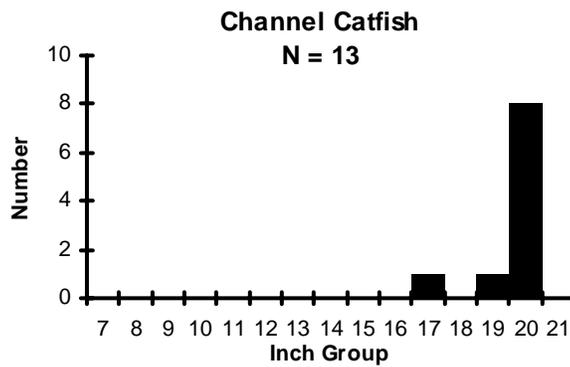
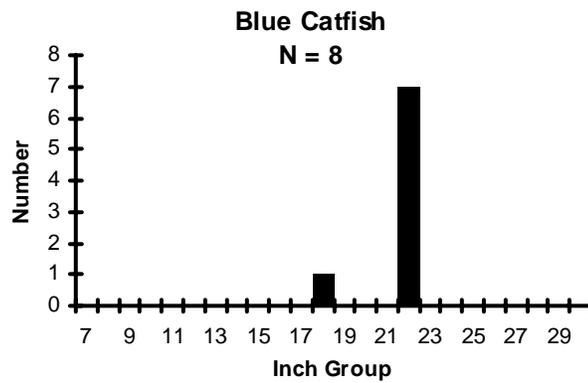
White crappie



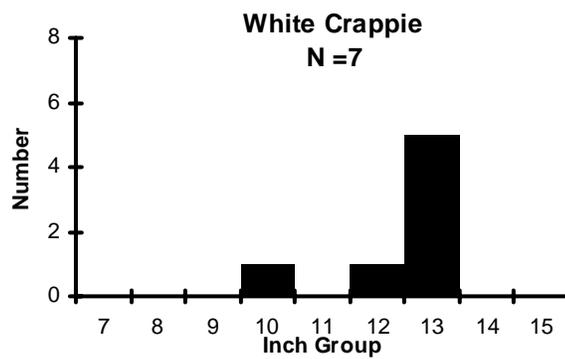
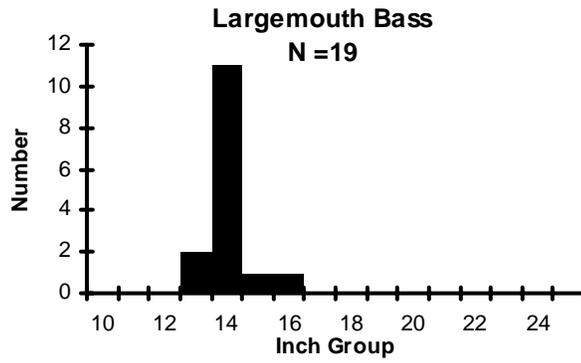
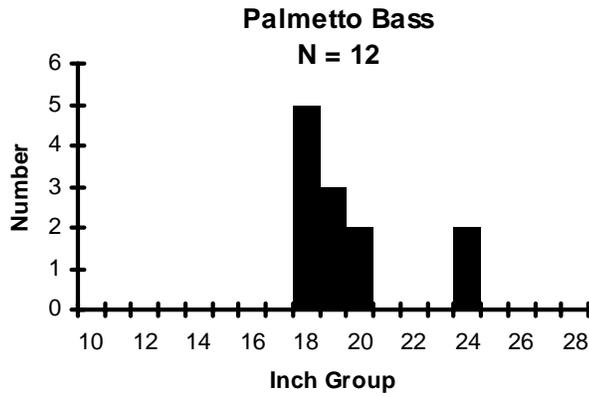
Comparison of the number of white crappie caught per net-night (CPUE), mean relative weight (diamonds), and population indices from fall trap-net sampling in Medina Reservoir, Texas.

Medina Reservoir (5,410 acres) creel survey estimates for the period from 12/1/2003 to 11/30/2004. Species represents individual species or species group targeted by anglers. Directed-effort is in angler-hours and harvest and catch is in number of fish. HPUE and CPUE represent mean number of fish caught and harvested, respectively, per angler-hour. Species group HPUE and CPUE averages are weighted by directed effort.

Species	Directed effort	Harvest	Catch	HPUE	CPUE
All catfish	5,646			0.074	0.145
Blue catfish		279	325		
Channel catfish	1,403	461	1,199	0.023	0.150
Flathead catfish		139	139		
Catfishes total	7,049	879	1,663		
Catfishes average				0.064	0.146
All temperate basses	2,064			0.161	0.161
White bass	3,661	399	949	0.001	0.318
Palmetto bass	2,094	816	1,944	0.219	1.106
Temperate basses total	7,819	1,215	2,893		
Temperate basses average				0.102	0.488
All sunfishes	319			0	0.388
Bluegill		0	1,034		
Unidentified sunfish spp.		0	270		
Sunfishes total	319	0	1,304		
Sunfishes average				0	0.388
All black basses	3,541			0.030	0.536
Largemouth bass	15,418	1,361	19,642	0.036	0.566
Smallmouth bass		0	16		
Guadalupe bass		0	214		
Black basses total	18,959	1361	19,872		
Black basses average				0.035	0.560
Crappies	1,717			0.107	0.149
White crappie	643	229	1,033	0	0
Crappies total	2,360	229	1,033		
Crappies average				0.107	0.149



Length frequency distributions of blue catfish, channel catfish, and white bass harvested by Medina Reservoir anglers during the period 12/1/2003-11/30/2004.



Length frequency distributions of palmetto bass, largemouth bass, and white crappie harvested by Medina Reservoir anglers for the period 12/1/2003-11/30/2004.

**Fisheries Management Plan
Medina Reservoir, Texas**

Prepared June 2005

ISSUE 1 Largemouth bass population. Medina Reservoir has the potential to produce trophy largemouth bass evidenced by a 13.5 pound fish caught in 1943. The reservoir was stocked last in 1996 with Florida largemouth bass fingerlings at 51 fish/acre. In 2004, the percent contribution of pure Florida bass to the population was 26.7%, which is above the targeted level of 20%.

MANAGEMENT STRATEGIES

1. Continue to monitor the largemouth bass population by conducting electrofishing surveys every two years. The next scheduled survey will be in 2006.
2. Continue to monitor Florida largemouth bass allele frequency through electrophoretic analysis of liver samples taken from age-0 largemouth bass during routine fish population assessments made every fourth year.

ISSUE 2 Palmetto bass population. Palmetto bass have become a popular sport fish in Medina Reservoir. According to 2003-2004 creel surveys, angling effort for temperate basses accounts for 21% of the total angling effort in the reservoir. Of the total angling effort directed towards temperate basses, 27% is specifically directed towards palmetto bass. Stocking is required to maintain the palmetto bass portion of the temperate bass fishery.

MANAGEMENT STRATEGIES

1. Continue to monitor the palmetto bass population by conducting gill-netting surveys every two years. The next scheduled survey will be in 2006.
2. Propose to stock of fingerling palmetto bass (5 fish/acre) annually from 2006 to 2008.

ISSUE 3 Angler awareness. Medina Reservoir is a popular destination of recreational boaters from the San Antonio area. Many of these users may be unaware of the angling opportunities the reservoir provides.

MANAGEMENT STRATEGIES

1. Prepare at least one press release regarding angling opportunities in the reservoir and post signs at the five publicly accessible boat ramps to increase angler awareness of the fish harvest regulations and palmetto bass stockings.

APPENDIX 1

Catch rates, by gear type, of all species collected from Medina Reservoir, 2004-2005. Sampling effort totals were 1.5 hours of electrofishing during fall, and 10 net-nights for trap-net and gill-net sampling during winter and spring, respectively.

Species	Electrofishing (number/hour)	Trap net (number/net-night)	Gill net (number/net-night)
Longnose gar			3.30
Gizzard shad	56.67		
Threadfin shad	103.33		
Common carp			1.30
Gray redhorse			0.60
Blue catfish			0.70
Channel catfish			1.00
Flathead catfish			0.80
White bass			1.00
Palmetto bass			1.20
Redbreast sunfish	317.33		
Green sunfish	54.00		
Warmouth	6.67		
Bluegill	143.33		
Longear sunfish	29.33		
Redear sunfish	7.33		
Largemouth bass	60.00		
White crappie		0.30	
Rio grande cichlid	9.33		

APPENDIX 2

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. Fish resulting from a cross between pure Florida largemouth bass (FLMB) and pure northern largemouth bass (NLMB) are F1 and those resulting from all other crosses are FX.

Year	Sample size	Number of fish by genotype				% FLMB alleles	% FLMB genotype
		FLMB	F1	FX	NLMB		
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

APPENDIX 3

Water body records, all tackle category, for Medina Reservoir as of May 20, 2005.

Species	Weight (lbs)	Length (inches)	Date certified	Gear
Largemouth bass	13.5	28.75	1/16/1943	Rod and reel
Smallmouth bass	6.13	22.0	6/10/1993	Rod and reel
Bluegill	0.76	8.75	3/31/2005	Rod and reel
Common carp	5.1	22.25	7/6/1997	Bow and arrow
Channel catfish	0.69	13.75	3/28/2005	Rod and reel
White crappie	0.82	10.25	3/25/2004	Rod and reel
American eel	4.0	41.0	2/22/1986	Rod and reel
Longnose gar	8.6	45.75	7/6/1997	Bow and arrow
Green sunfish	0.62	10	3/25/2004	Rod and reel
Redbreast sunfish	0.19	7.25	3/28/2005	Rod and reel
Redear sunfish	0.38	9.0	3/28/2005	Rod and reel

APPENDIX 4

Angler access facilities, Medina Reservoir, May 2005

Facility type	Location name	GPS coordinates	Fee charged	No. of lanes	Challenged access	Bank fishing	Comments
Boat ramp	Bandera County Ramp	N 29° 33.814' W 98° 57.002'	Y	2	N	Y	Limited parking
Boat ramp	Pop's Place	N 29° 38.298' W 98° 58.069'	Y	2	N	Y	
Boat ramp	The Dock	N 29° 37.928' W 98° 58.013'	Y	2	N	Y	
Boat ramp	Joe's Place	N 29° 32.977' W 98° 55.758'	Y	3	N	Y	
Boat ramp	Red Cove	N 29° 32.757' W 98° 55.669'	Y	2	N	Y	

APPENDIX 5

Proposed survey schedule for Medina Reservoir, Texas, from 2005 to 2009. Regularly scheduled surveys are denoted by S and additional surveys are denoted by A.

Survey year	Electrofishing	Trap netting	Gill netting	Creel	Report
2005-2006					
2006-2007	A	A	A		
2007-2008					
2008-2009	S	S	S		S