

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

Mill Creek Reservoir

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SUMMARY

Mill Creek Reservoir was surveyed from June 2004 to May 2005 using electrofishing, trap netting, gill netting, a littoral zone habitat, and an aquatic vegetation survey. This report summarizes survey results and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Mill Creek Reservoir is located in Van Zandt County, Texas on Mill Creek, a tributary of the Sabine River. It was constructed by the City of Canton in 1976 for municipal water supply. Nearly all of the shoreline was classified as featureless. Native submerged aquatic plants comprise the majority of the structural habitat at a level which is considered excessive. Hydrilla has recently become established and is present in 2% of the lake's surface area.
- **Prey species:** Gizzard shad catch rate while electrofishing was lower in 2004 (75.0 fish/hour) than in 1997 (181.0 fish/hour) and 2000 (336.0 fish/hour). All gizzard shad collected in 2004 electrofishing were 7 inches or longer. This decrease in gizzard shad abundance is likely associated with an increase in submerged aquatic macrophytes which absorb available nutrients making them unavailable to plankton which clupeids are dependent upon. Bluegill and redear sunfish abundances in 2004 were also reduced compared with previous years. This decrease is possibly an artifact of increased abundance of aquatic macrophytes which makes it difficult to sample littoral areas effectively. Prey species abundances appear adequate; however, relative weights of largemouth bass were reduced compared with previous years, which may be related to decreased prey accessibility.
- **Catfishes:** Although Mill Creek Reservoir has been stocked with blue catfish and channel catfish (1992 and 1993, respectively), few individuals are ever collected in gill nets. In spring 2005, 3 large blue catfish (36 to 50 inches) were collected. Sampling indicates that prior stockings have not resulted in the establishment of self-sustaining catfish populations.
- **Black bass:** Total electrofishing catch rate of largemouth bass was similar in 2004 (64.0 fish/hour) compared with 2000 (50.0 fish/hour) and 2002 (48.0 fish/hour). More than 50% of the fish collected in 2004 were below stock size (≥ 8 inches), a higher proportion than seen in the two previous surveys (25 – 36%). The percentage of stock size fish within the protected slot length limit (16%) was lower than in 2000 (38%) and 2002 (39%). Additional electrofishing sampling conducted in spring 2005 showed 46% of the sample was fish below stock size and a higher proportion of stock sized fish (49%) in the protected slot was also observed. The percentage of Florida largemouth bass (FLMB) alleles in samples collected between 1994 and 2004 has remained reasonably consistent (range 56 – 63%) The contribution of pure FLMB has ranged from 7.5 to 33.3%.
- **Crappie:** Few white (0.8/net night) or black crappie (4.6/net night) were collected during trap net sampling in 2004. Fall 2000 was an exception to the general rule, when catch rates of black crappie (109.8 fish/net night) and white crappie (31.0 fish/net night) were extremely high. At that time, nearly all of the crappies collected were adults and about half were greater than 10 inches in total length. The crappie populations of Mill Creek Reservoir are usually of low density.
- **Management Strategies:** Mill Creek Reservoir was included in a long-term evaluation, Operation World Record, of the effectiveness of stocking offspring of Texas Parks and Wildlife Department (TPWD) Budweiser ShareLunker broodfish because of the lake's small size and history of producing trophy largemouth bass. Angler harvest of all sport fishes should continue to be restricted according to the current regulations.

INTRODUCTION

This document is a summary of fisheries data collected from Mill Creek Reservoir during the period 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. While 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.

Harvest regulations for Mill Creek Reservoir.

Species	Daily Bag Limit	Minimum-Maximum Length Limit (inches)
Bass, Largemouth	5 (only 1 \geq 21")	14 – 21 Slot
Catfish, Blue and Channel	25 (in any combination)	12 - No Limit
Catfish, Flathead	5	18 - No Limit
Crappie, Black and White	25 (in any combination)	10 - No Limit

METHODS

- Fishes were collected by electrofishing in fall (1.0 hour at 12 stations), spring gill netting (5 net-nights at 5 stations), and fall trap netting (5 net nights at 5 stations). In addition, largemouth bass were collected by electrofishing in spring 2005 (1.0 hour at 4 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing, and for gill and trap nets as the number of fish caught in one net set overnight in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Sampling statistics (CPUE for various length categories), structural indices (Proportional Stock Density [PSD], Relative Stock Density [RSD]), and relative weights (W_r) were calculated for target fishes according to Anderson and Neumann (1996).
- Liver samples from young-of-year largemouth bass were collected for electrophoretic analysis in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- A littoral zone/physical habitat survey, vegetation survey, and angler access facility survey was 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, Second edition. American Fisheries Society, Bethesda, Maryland.
- 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, Fisheries Division. Austin, Texas.

Physical and historical data for Mill Creek Reservoir, Texas, 2004.

Inland Fisheries water body code	0503
IF District	3B
Surface area	364 acres
Conservation pool elevation	503.0 ft. msl.
Controlling authority	City of Canton
Water uses	Municipal water supply
Counties	Van Zandt
Latitude	32° 51'
Longitude	95° 32'
Nearest major metropolitan area and distance	Tyler - 34 miles
Reservoir description	Off-Stream type
River system	Sabine
Mean depth (ft)	10.0
Maximum depth (ft)	25.0
Shoreline development ratio	2.8
Watershed area (mi ²)	N/A
Secchi disc range (ft)	1-4 ft
Conductivity (umhos/cm)	75
Constructed	1976
Boat access	Fair - 1 public ramp
Bank access	Fair
Handicap access	Poor

Survey history:

Method	Year										
Gill net				1990	1994	1997		2001		2005	
Electrofishing	1976	1981	1986	1990	1994	1997	1998	2000	2002	2004	2005
Frame netting				1990	1994	1997		2000		2004	
Habitat survey								2000		2004	
Vegetation survey		1981		1990				2000		2004	

Summary of habitat survey conducted in September, 2004, at Mill Creek Reservoir, Texas. Linear shoreline distance was estimated for each habitat type and divided by total shoreline distance (7.2 miles) to obtain percent of shoreline occupied by habitat type. Habitat types may overlap so their sum does not estimate total shoreline distance. Lake elevation was at conservation pool elevation (494.0 ft msl) at time of survey.

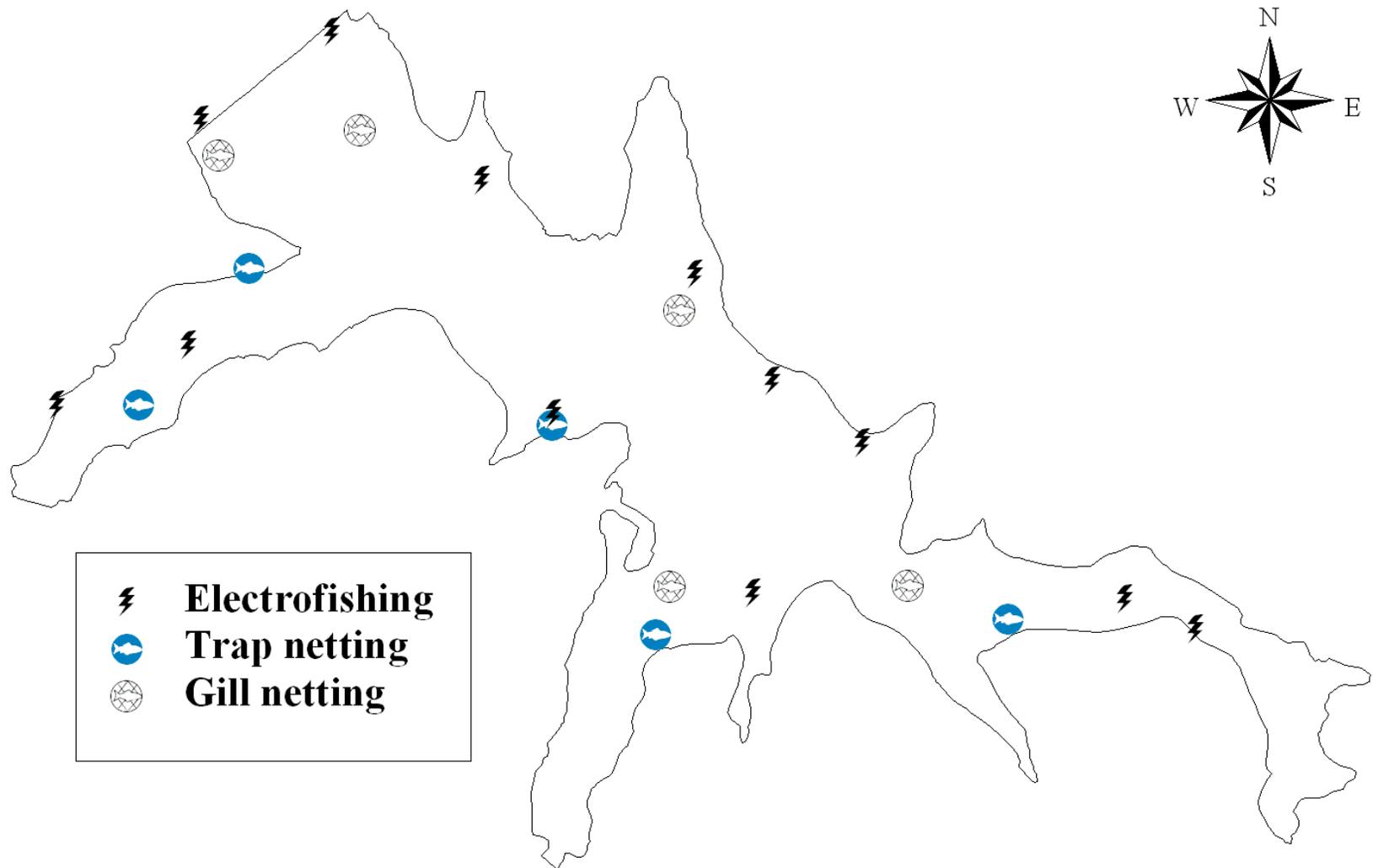
Habitat type	Percent
Featureless	46.3
Hydrilla	9.6
Native emergent (cattail, giant cane, smartweed, waterprimrose)	67.1
Native submerged (bushy pondweed, coontail, chara)	94.6
Overhanging brush	53.1

Results of aquatic vegetation survey conducted at Mill Creek Reservoir, Texas, in September 2004. Surface area coverage (acres) was estimated by vegetation type and divided by total reservoir area, to obtain percent of reservoir area occupied by vegetation type.

Vegetation type	Percent lake surface area
American lotus	0.36
Hydrilla	2.29
Native emergent (cattail, giant cane, smartweed, waterprimrose)	2.5
Native submerged (bushy pondweed, coontail, chara)	43.46
	Total
	48.61

Stocking history for Mill Creek Reservoir, Texas. Size categories are FGL for fingerling, FGL+ for advanced fingerling, and ADL for adults.

Species	Year	Number	Size
Threadfin shad	1982	4,000	ADL
	1983	1,000	ADL
	Total	5,000	
Northern pike x Muskellunge	1976	9,000	
	Total	9,000	
Blue catfish	1992	577	ADL
	Total	577	
Channel catfish	1978	15,500	
	1991	9,120	FGL
	1993	9,090	FGL
	Total	33,710	
Florida largemouth bass	1976	26,400	FGL
	1978	1,085	FGL+
	1980	39,845	FGL
	1983	52,902	FGL
	1998	168	ADL
	1998	36,603	FGL
	1999	36,000	FGL
Total	193,003		

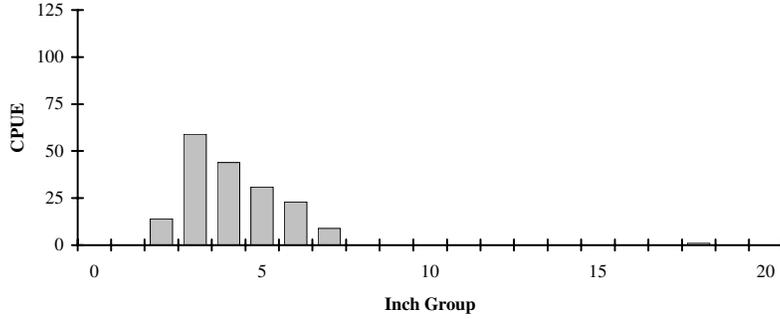


Location of fish population sampling sites, Mill Creek Reservoir, Texas, 2004.

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Gizzard Shad

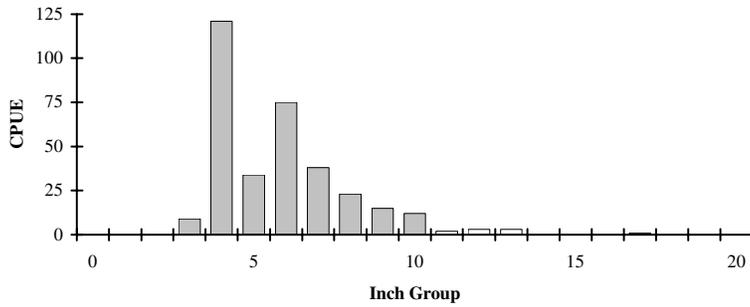
1997

Effort = 1.0 hours
Total CPUE = 181.0
Stock CPUE = 10.0
PSD = 10



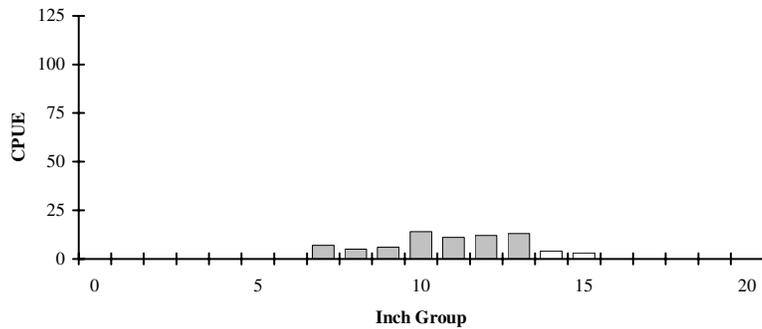
2000

Effort = 1.0 hours
Total CPUE = 336.0
Stock CPUE = 97.0
PSD = 9



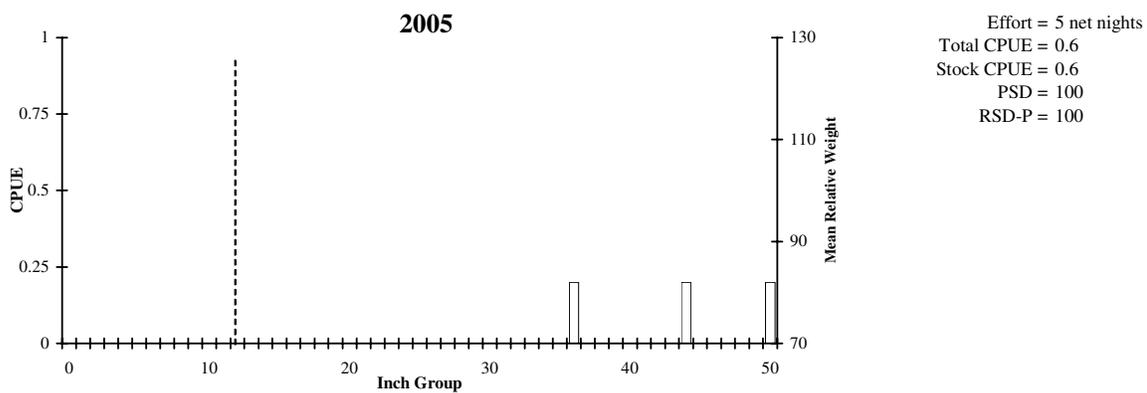
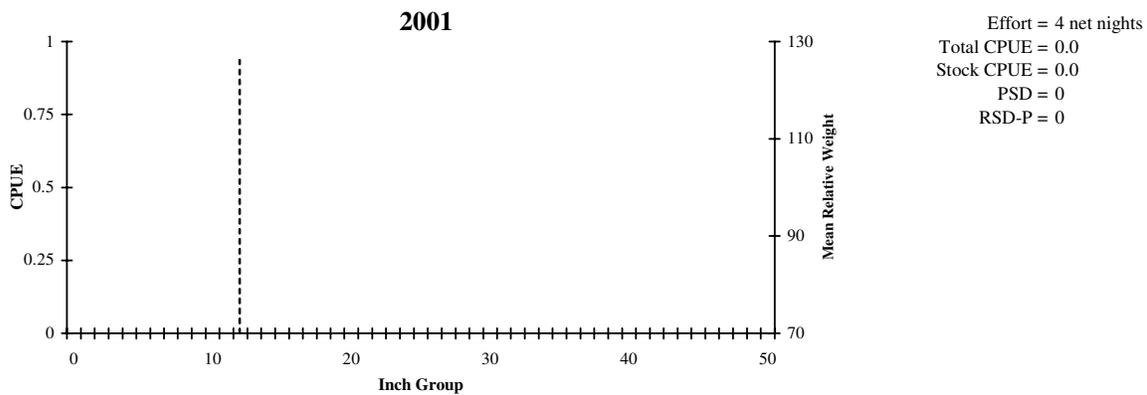
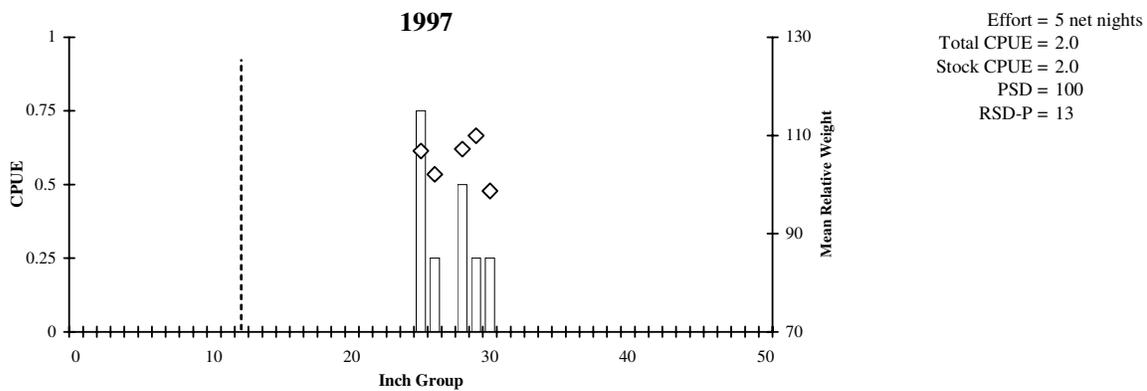
2004

Effort = 1.0 hours
Total CPUE = 75.0
Stock CPUE = 75.0
PSD = 57



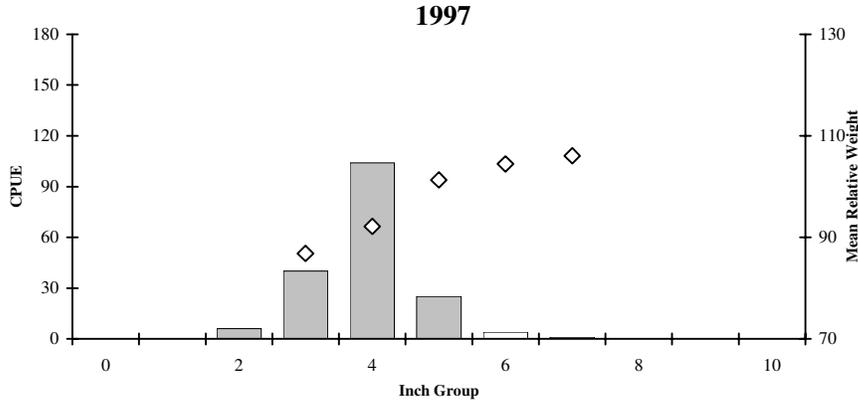
The number of gizzard shad caught per hour (CPUE; bars) and population indices from fall electrofishing sampling at Mill Creek Reservoir, Texas.

Blue catfish

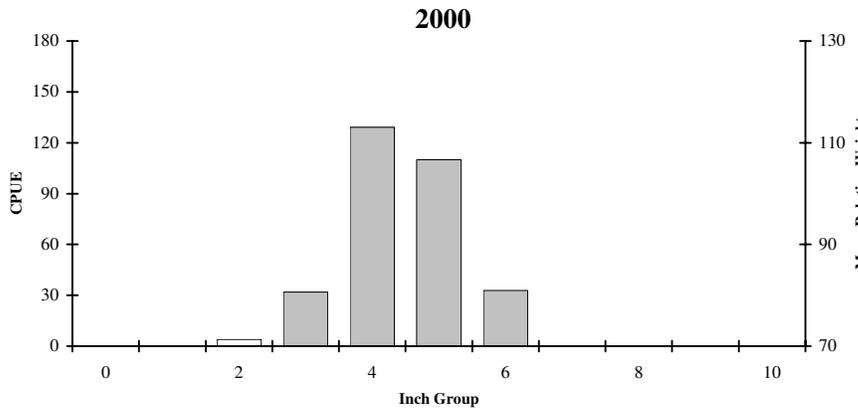


The number of blue catfish caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from spring gill netting sampling at Mill Creek Reservoir, Texas. Dashed lines indicate minimum length limit at time of survey.

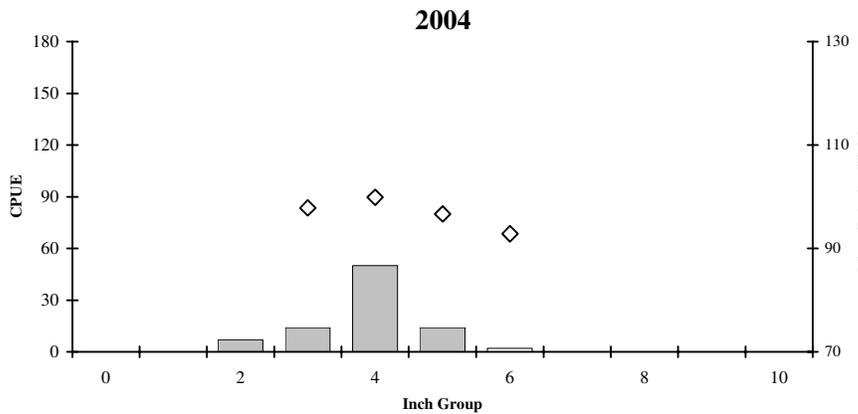
Bluegill



Effort = 1.0 hours
 Total CPUE = 180.0
 Stock CPUE = 174.0
 PSD = 3
 RSD-P = 0



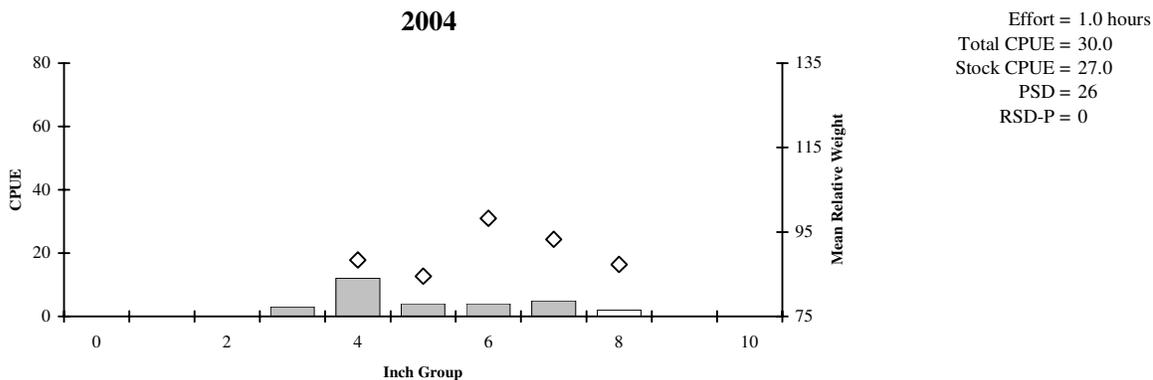
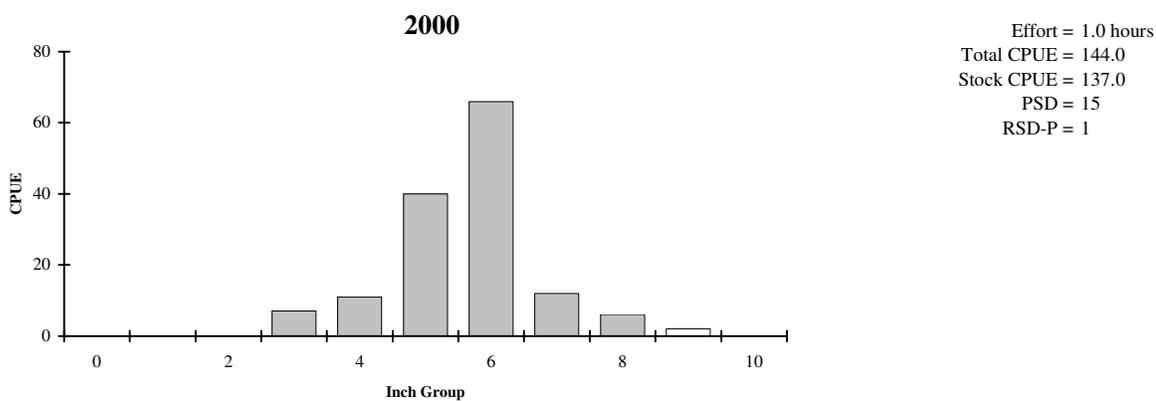
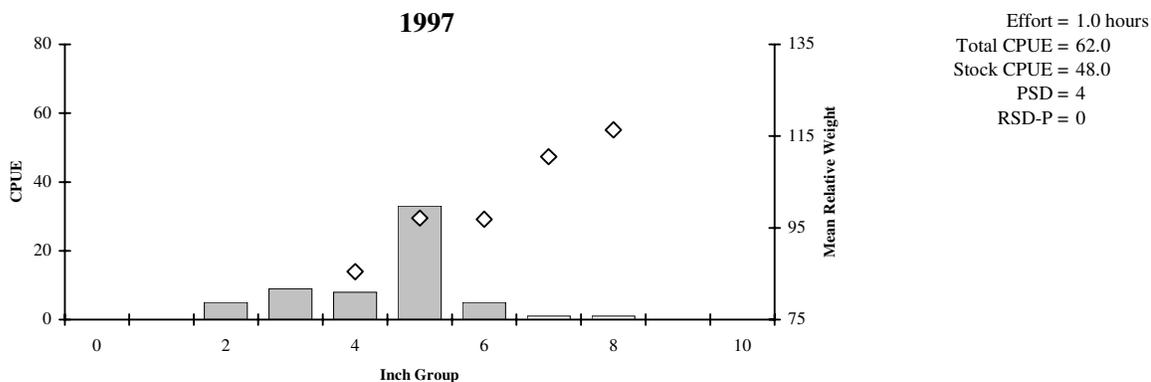
Effort = 1.0 hours
 Total CPUE = 308.0
 Stock CPUE = 304.0
 PSD = 11
 RSD-P = 0



Effort = 1.0 hours
 Total CPUE = 87.0
 Stock CPUE = 80.0
 PSD = 3
 RSD-P = 0

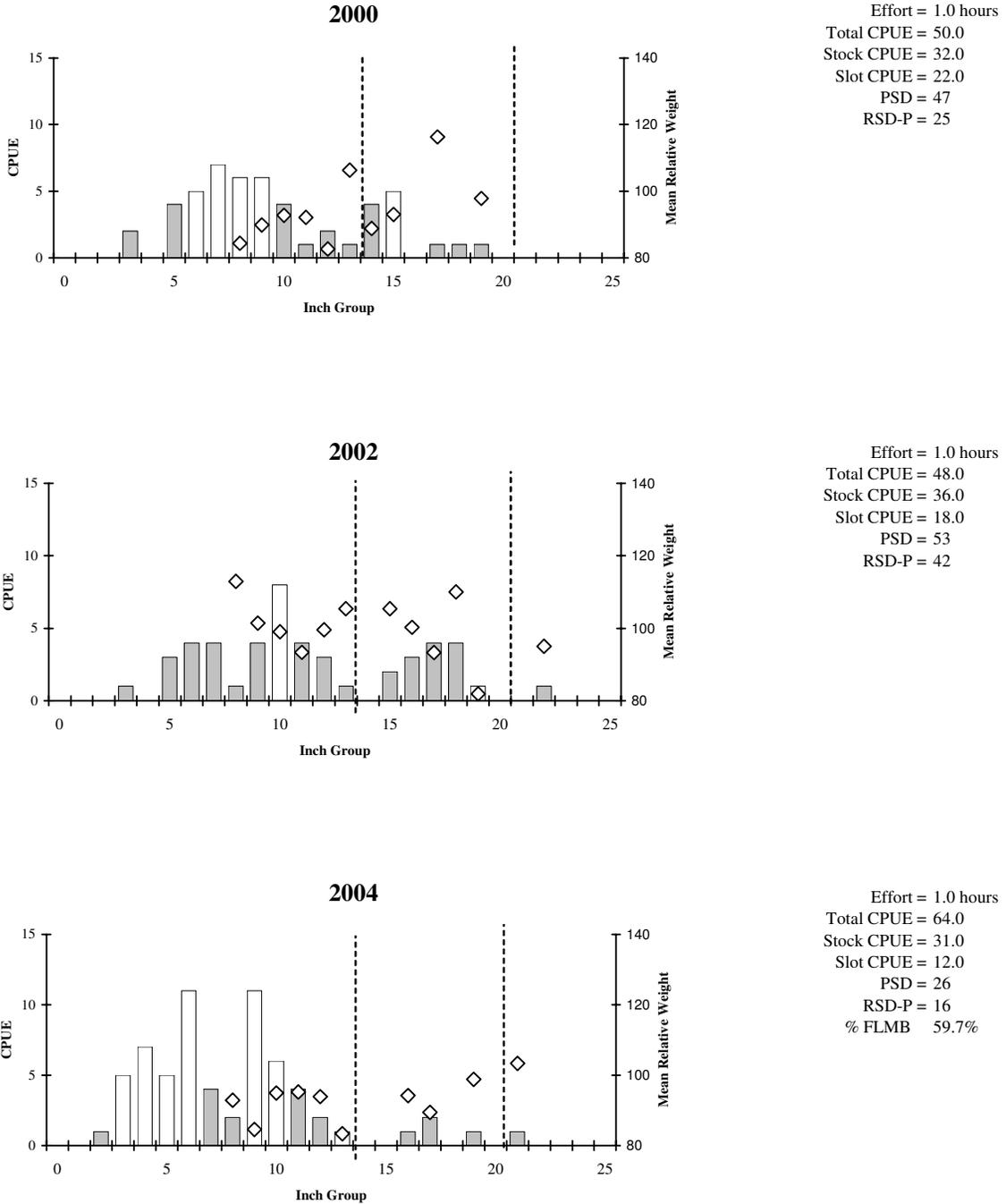
The number of bluegill caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Mill Creek Reservoir, Texas. No weight data were collected in 2000.

Redear Sunfish



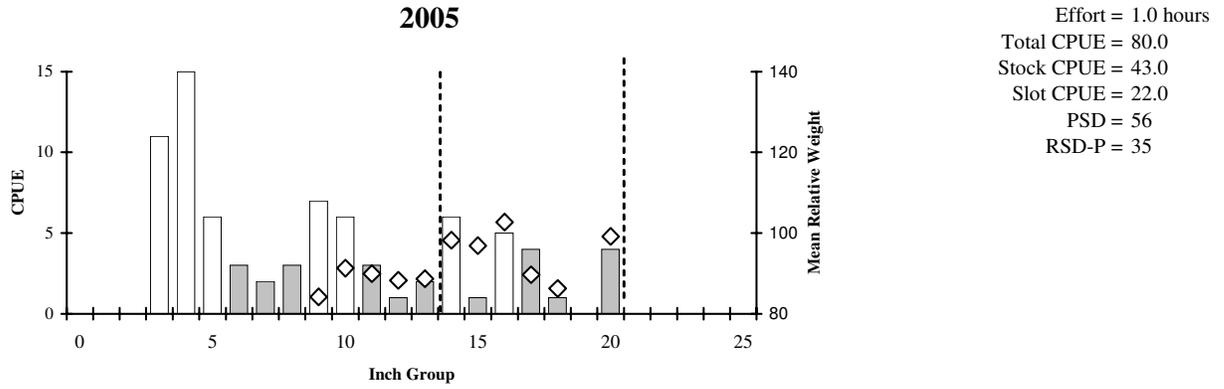
The number of redear sunfish caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Mill Creek Reservoir, Texas. No weight data were collected in 2000.

Largemouth Bass



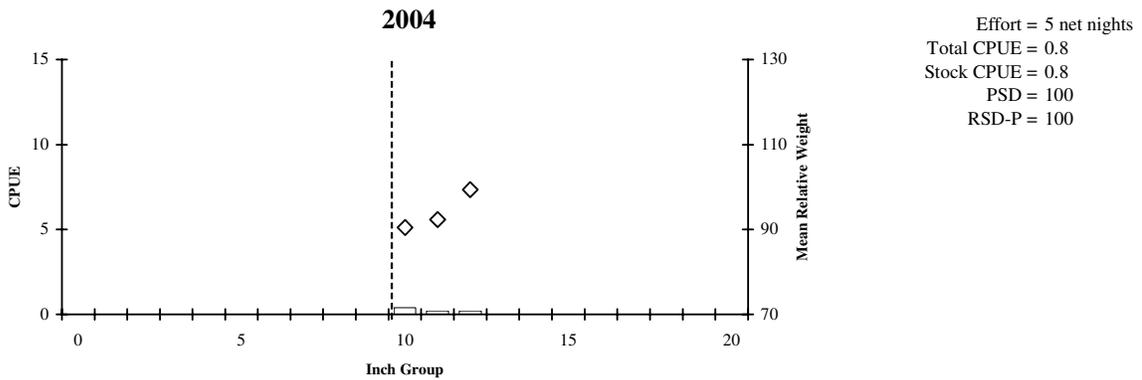
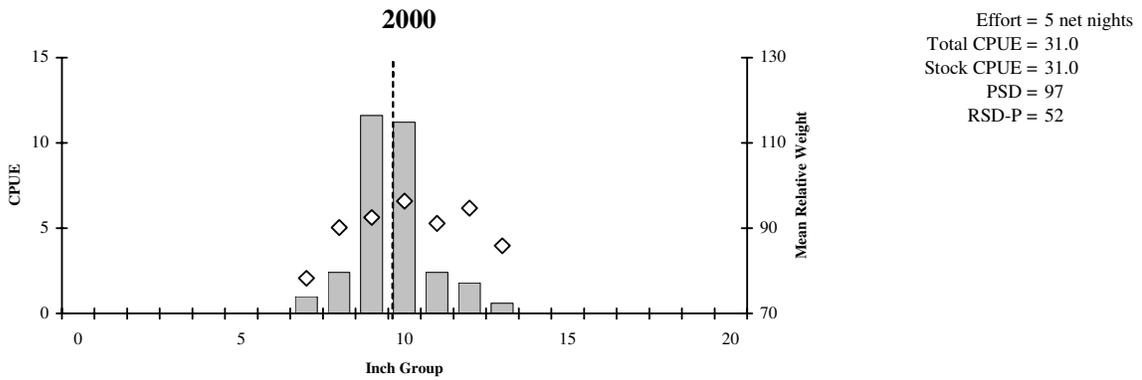
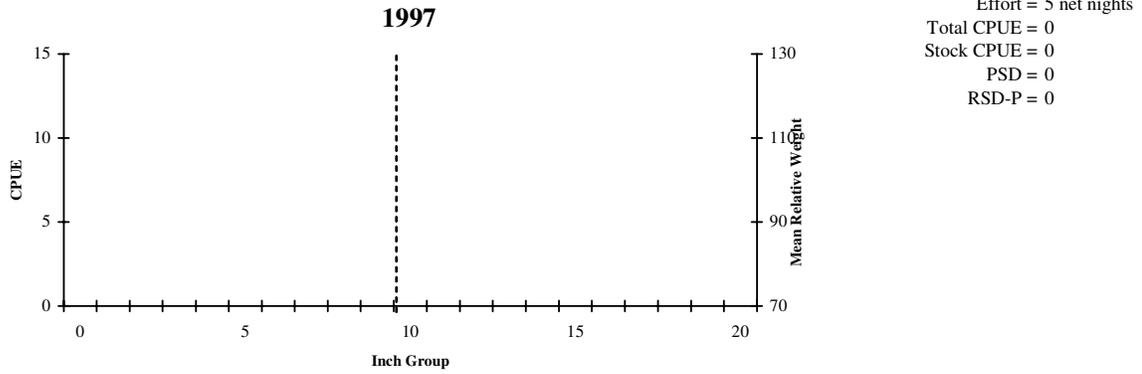
The number of largemouth bass caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Mill Creek Reservoir, Texas. Dashed lines indicate minimum length limit at time of survey. % FLMB = percent of Florida largemouth bass alleles present in sub-sample of Age-0 fish (see also Appendix 2).

Largemouth Bass



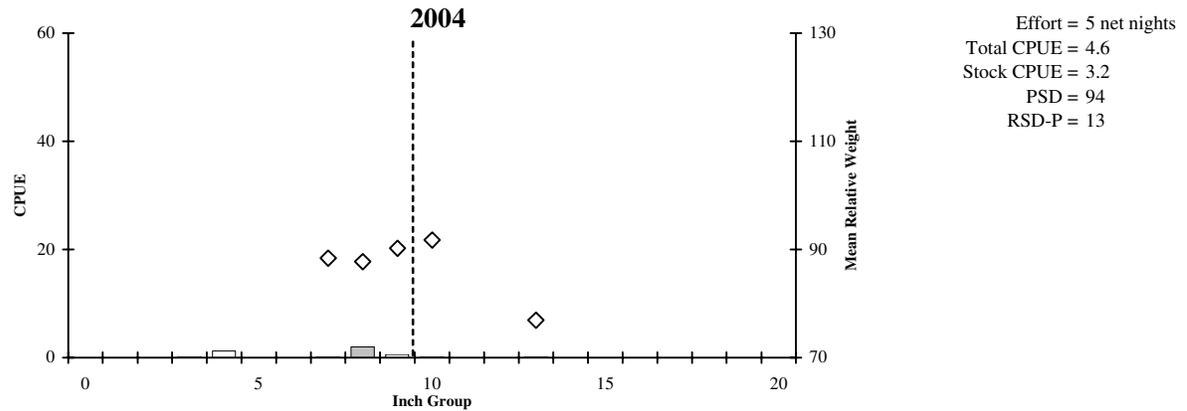
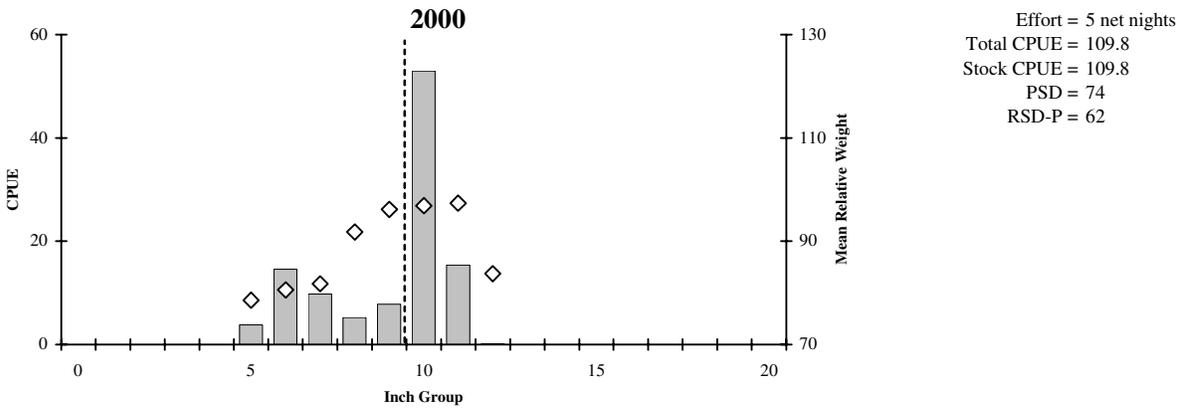
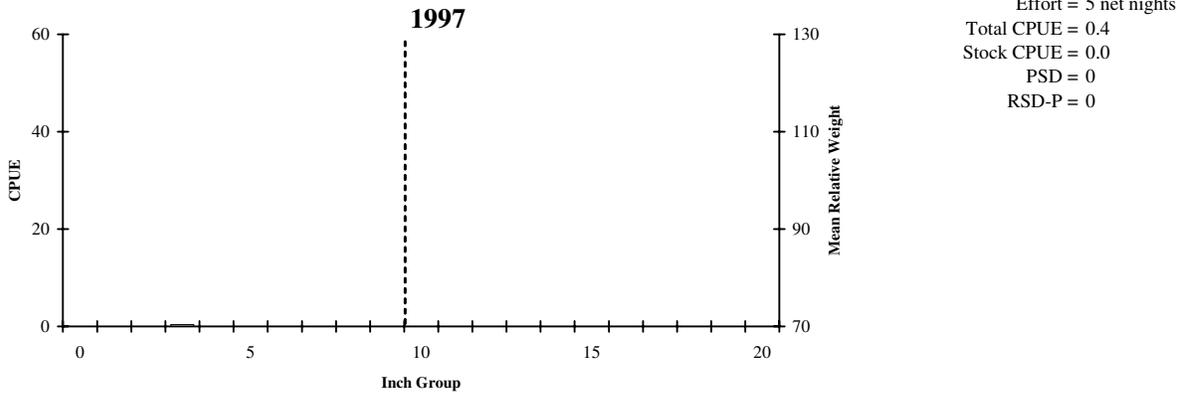
Largemouth bass length-frequency distributions (bars), mean relative weight (diamonds), and population indices from spring electrofishing sampling at Mill Creek Reservoir, Texas.

White Crappie



The number of white crappie caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall trap netting sampling at Mill Creek Reservoir, Texas. Dashed lines indicate minimum length limit at time of survey.

Black Crappie



The number of black crappie caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall trap netting sampling at Mill Creek Reservoir, Texas. Dashed lines indicate minimum length limit at time of survey.

Fisheries Management Plan Mill Creek Reservoir, Texas

Prepared - July 2005

ISSUE 1 Mill Creek Reservoir has a history of producing trophy largemouth bass. The largest recorded fish caught in this lake, a 16.77 pound fish caught in 1990, is the 10th largest fish ever caught in Texas. The lake has produced 6 fish over 13 pounds including 3 TPWD Budweiser ShareLunker entries. FLMB fingerlings were most recently stocked in 1998 and 1999 at a rate of 100 fish/acre. In 1998, 168 hatchery surplus brood stock were also stocked.

During spring 2005, Mill Creek Reservoir was included in a long-term evaluation of the effectiveness of stocking offspring of TPWD Budweiser ShareLunker broodfish, termed Operation World Record.

MANAGEMENT STRATEGIES

1. Stock 6-inch ShareLunker offspring at a rate of 25/acre and 6-inch FLMB fingerlings at a rate of 25/acre every 2 years beginning in fall 2005 through 2013. All fingerlings will be implanted with coded wire tags prior to stocking.
2. Sample age-4 fish every 2 years beginning in spring 2009 through 2017.
3. Compare mean weight of age-4 largemouth bass among ShareLunker offspring, non-Lunker hatchery fish (FLMB fingerlings) and resident fish.
4. Continue to monitor the largemouth bass population by conducting fall electrofishing surveys every 2 years.
5. Continue to manage the largemouth bass fishery under the current 14-21 inch slot length limit, 5-fish daily bag limit.

ISSUE 2 Native submersed aquatic plants (bushy pondweed, coontail, chara) have established themselves at excessive levels in Mill Creek Reservoir. This situation is further complicated by the establishment of Hydrilla. These plants have the potential to negatively impact the lake's fisheries and limit angler access.

MANAGEMENT STRATEGIES

1. Notify the City of Canton about the establishment of Hydrilla, and recommend selective herbicide treatment.
2. Continue to monitor aquatic vegetation on a 4 year cycle.

ISSUE 3 Access to Mill Creek Reservoir by boat anglers is limited to one ramp. The parking area at the ramp is small and needs to be re-surfaced. During periods of heavy fishing effort,

anglers are forced to park on the grass.

MANAGEMENT STRATEGIES

1. Approach the City of Canton about the feasibility of repaving or expanding the parking area.

ISSUE 4 Maintenance and improvement of angler access facilities are important in promoting angling and maximizing utilization of the fisheries resources at Mill Creek Reservoir by all types of anglers.

MANAGEMENT STRATEGIES

1. When opportunities are identified, encourage controlling authorities to improve existing angler access facilities to accommodate not only boat anglers, but also bank and physically challenged anglers.

APPENDIX 1

Catch rates (CPUE) of target species collected from all gear types from Mill Creek Reservoir, Texas 2004 - 2005.

Species	Electrofishing 1 hour	Trap Net 5 net nights	Gill Net 5 net nights
Threadfin shad	59.0		
Gizzard shad	75.0		
Blue catfish			0.6
Warmouth	11.0		
Bluegill	87.0		
Longear sunfish	2.0		
Redear sunfish	30.0		
Largemouth bass	64.0		
White crappie		0.8	
Black crappie		4.6	

APPENDIX 2

Results of electrophoretic analysis of young-of-the-year largemouth bass collected by fall electrofishing from Mill Creek Reservoir, Texas, 1994, 1997, and 2004.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		Florida	F1	Fx	Northern		
1994	35	5	10	18	2	62.9	14.3
1997	40	3	6	30	1	55.6	7.5
2004	18	6	4	6	2	59.7	33.3

APPENDIX 3

Water body records, all tackle category, for Mill Creek Reservoir as of 5/5/2005.

Species	Weight (lbs)	Length (inches)	Date certified	Gear
Bass, Largemouth	16.77	26.50	3/1/1990	Rod & Reel
Bluegill	0.30	7.50	06/01/02	Fly Rod
Sunfish, Longear	0.14	5.50	08/12/02	Fly Rod
Sunfish, Redear	0.36	7.75	08/12/02	Fly Rod
Warmouth	0.31	7.25	08/12/02	Fly Rod

APPENDIX 4

Historic information on mean length-at-age of capture (inches) of game fishes (sexes combined) from Mill Creek Reservoir, Texas. Sample sizes are shown in parentheses.

Largemouth bass collected in fall electrofishing surveys, October 1994, 1997 and 2000 compared with averages for the Sabine/ Sulphur/ Cypress/ Neches River System (Prentice 1987) for October 15.

Year	Age class							
	0	1	2	3	4	5	6	7
2000	6.8 (17)	9.8 (16)	15.0 (4)	14.4 (5)	15.6 (1)	18.9 (1)		17.8 (2)
1997	6.7 (7)	9.1 (15)	13.5 (12)	15.6 (3)	17.2 (1)			
1994	6.6 (7)	9.9 (23)	13.9 (14)	16.2 (3)	16.5 (2)	16.7 (2)		
Sabine/ Sulphur/ Cypress/ Neches/ River System	5.3	10.3	13.3	15.2	16.2	16.9	17.3	17.5

White crappie (sexes combined) collected in fall trap netting surveys, November 2000 compared with averages for the Sabine/ Sulphur/ Cypress/ Neches River System (Prentice 1987) for November 15.

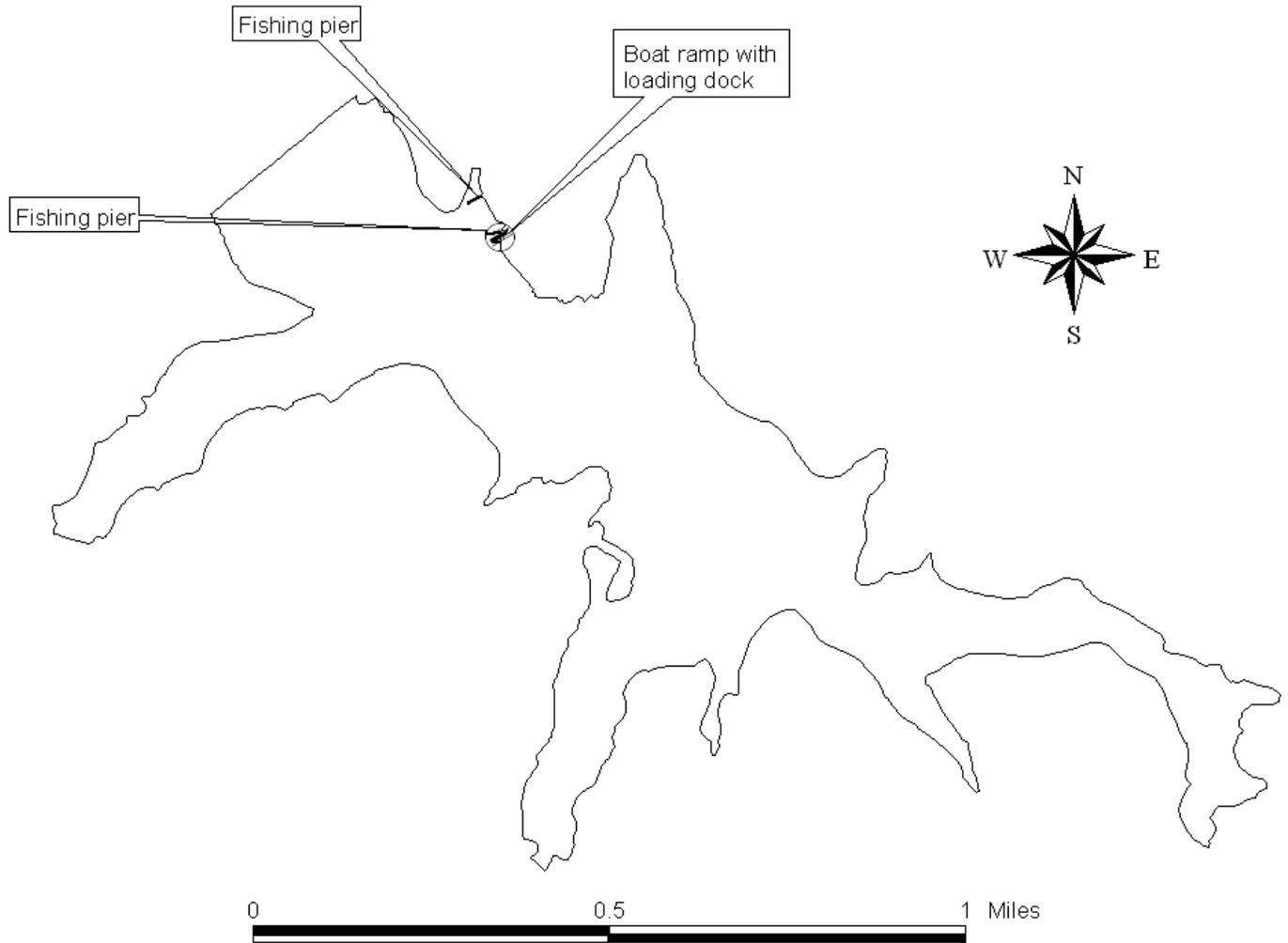
Year	Age class							
	0	1	2	3	4	5	6	7
2000		9.8 (23)	12.6 (8)	13.1 (2)				
Sabine/ Sulphur/ Cypress/ Neches/ River System	4.4	6.5	8.5	10.3	11.9	13.4	14.7	16.0

Black crappie (sexes combined) collected in fall trap netting surveys, November 2000 compared with averages for the Sabine/ Sulphur/ Cypress/ Neches River System (Prentice 1987) for November 15.

Year	Age class							
	0	1	2	3	4	5	6	7
2000		7.5 (22)	10.9 (4)	11.0 (9)				
Sabine/ Sulphur/ Cypress/ Neches/ River System	4.4	6.9	8.4	9.3	9.9	10.2	10.4	10.5

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APPENDIX 5

Public angler access facilities, Mill Creek Reservoir, 5/2005



Facility type	Location name	GPS Coordinates	Fee charged	No. of lanes	Challenged access	Bank Fishing	Comments
Boat ramp	Mill Creek ramp	N 32° 32.216' W 95° 51.002'	Yes	1	No	Yes	Ramp has loading dock and 2- 100' fishing piers in vicinity