

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

**Lake Holbrook**

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## TABLE OF CONTENTS

Summary .....	3
Introduction .....	5
Methods.....	5
Literature cited .....	6
Physical and historical data survey.....	7
Physical habitat survey .....	8
Vegetation survey.....	8
Stocking history.....	9
Location of sampling sites.....	10
Species Information	
Gizzard shad.....	11
Channel catfish.....	12
Bluegill.....	13
Redear sunfish.....	14
Largemouth bass .....	15
White crappie .....	16
Black crappie.....	17
Fisheries Management Plan.....	18
APPENDIX 1	
Catch rates (CPUE) of all species .....	20
APPENDIX 2	
Results of electrophoretic analysis of young-of-the-year largemouth bass .....	21
APPENDIX 3	
Water body records, all tackle category, for Lake Holbrook .....	22
APPENDIX 4	
Historic information on mean length-at-age of capture (inches) of game fishes.....	23
APPENDIX 5	
Public angler access facilities .....	24

## SUMMARY

Lake Holbrook was surveyed during the period June 2004 to May 2005 using electrofishing, trap netting, gill netting, 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:** Lake Holbrook is located in Wood County, Texas on Lankford Creek, a tributary of the Sabine River. It was constructed by Wood County for flood control and recreation. The reservoir contains few aquatic plants. Boat docks and standing timber comprise the majority of the structural habitat along the shoreline. Since the last management report was prepared in 2000, the controlling authority has improved angler access by making significant repairs to both public boat ramps.
- **Prey species:** Gizzard shad catch rate in 2004 (57.0 fish/hour) was similar to 1998 (54.0 fish/hour) but lower than 2000 (100.0 fish/hour). In 2004, the majority of gizzard shad collected were 10 inches or larger; the population mode was 11 inches, an unavailable prey size for most adult largemouth bass. This population is supplemented by an abundant threadfin shad population (electrofishing catch rate: 121.0 fish/hour). Threadfin shad were established following a stocking of adult fish by TPWD personnel in May 2004. Prior to fall 2004, threadfin shad had not been collected in population sampling since 1998. Bluegill catch rate was lower in 2004 (95.0 fish/hour) than in 1998 (211.0 fish/hour) or 2000 (465.0 fish/hour). The size range of the population has remained consistent with a mode of 3 or 4 inches. Catch rate of redear sunfish (12.0 fish/hour) was similarly lower than in 1998 (30.0 fish/hour) or 2000 (80.0 fish/hour). Prey fish populations appear adequate for adult largemouth bass as evidenced by relative weights in excess of 90.
- **Catfishes:** Channel catfish catch rate in spring 2005 (3.2 fish/net night) was higher than in previous years (1998; 0.2 fish/net night, 2001 12.0 fish/net night). Fish up to 23 inches were collected, and there was evidence of limited recruitment. Channel catfish relative weights were generally above 90, indicating adequate prey populations. Although blue catfish were stocked in 1982, none were collected in 2005. Current and past sampling results indicate a limited catfish fishery exists in Lake Holbrook.
- **Black bass:** Largemouth bass catch rate in 2004 (57.0 fish/hour) was similar to 2002 (58.0 fish/hour) but lower than in 2000 (80.0 fish/hour). The size structure of the largemouth bass population was similar across years with few fish above the minimum length limit (14 inches). Florida largemouth bass were last stocked in 2000. In fall 2004, 12.5% of a sample of age-0 largemouth bass were pure Florida largemouth bass (FLMB). The percentage of FLMB alleles in this sample (51.6%) was higher than in previous samples. The significance of these results must be tempered by considering the small sample size.
- **Crappie:** Catch rate of white crappie in 2004 (1.9 fish/net night) was lower than 2000 (2.6 fish/net night) and higher than 1998 (0.2 fish/net night). The majority of fish collected were above the 10-inch minimum length limit. The mean age of white crappie at 10.5 inches (n=15) was 1.0 years. In spring 2003, the Lake Holbrook Homeowner's Association purchased 10,800 advanced fingerling black-stripe black crappie to supplement the lake's population. The choice of the black-stripe color variant of black crappie makes evaluation of the effectiveness of stocking easier. The catch rate of black crappie was higher in 2004 (0.5 fish/net night) than in previous years although it was lower than white crappie. Additional fish were collected in trap netting in January 2005 and through angling in

December 2004 and January 2005. In the age and growth sample, 34 fish from the 2003 age class were collected and 10 of these fish (29%) were black-striped. It was discovered after stocking that the black-stripe color variant occurs naturally in the Lake Holbrook population; 14% (1 in 7) of the 2002 age class were found to possess this trait. The overall contribution of the 2003 stocking of black-stripe crappie to the Lake Holbrook population may therefore be lower. The effective increase in abundance of the 2003 year class as a result of the 2003 stocking was estimated at 15%. The mean age of black crappie (collected in fall 2004) at 10.06 inches (n=12) was 1.25 years.

- **Management strategies:** Lake Holbrook has demonstrated the potential to produce trophy largemouth bass; the current lake record of 11.6 pounds was established in 2000. The influence of FLMB should be monitored and additional stockings of fingerlings at 100 fish/acre should be conducted beginning in spring 2006. The threadfin shad population will continue to be monitored and additional stockings will be conducted if necessary. Additional stockings of black-stripe crappie may also be considered. Harvest of all sport fishes should continue to be restricted according to the statewide harvest regulations.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Holbrook 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 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 Lake Holbrook.

Species	Daily Bag Limit	Minimum-Maximum Length Limit (inches)
Bass, Largemouth	5	14 – No Limit
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 hours at 12 stations), fall trap netting (40 net nights at 40 stations), and spring gill netting (5 net nights at 5 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).
- Ages were determined for selected fishes using the following structures: otoliths for white crappie and black crappie.
- 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 Texas Parks and Wildlife Department Inland Fisheries Assessment 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, 2<sup>nd</sup> 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.



Habitat survey of littoral zone and physical habitat types, Lake Holbrook, Texas, September 2004. Linear shoreline distance was estimated for each habitat type and divided by total shoreline distance (12 miles) to obtain percent of shoreline occupied by habitat type. Habitat components may overlap so their sum does not estimate total shoreline distance. Lake elevation (367.0 ft msl) at conservation pool elevation at time of survey.

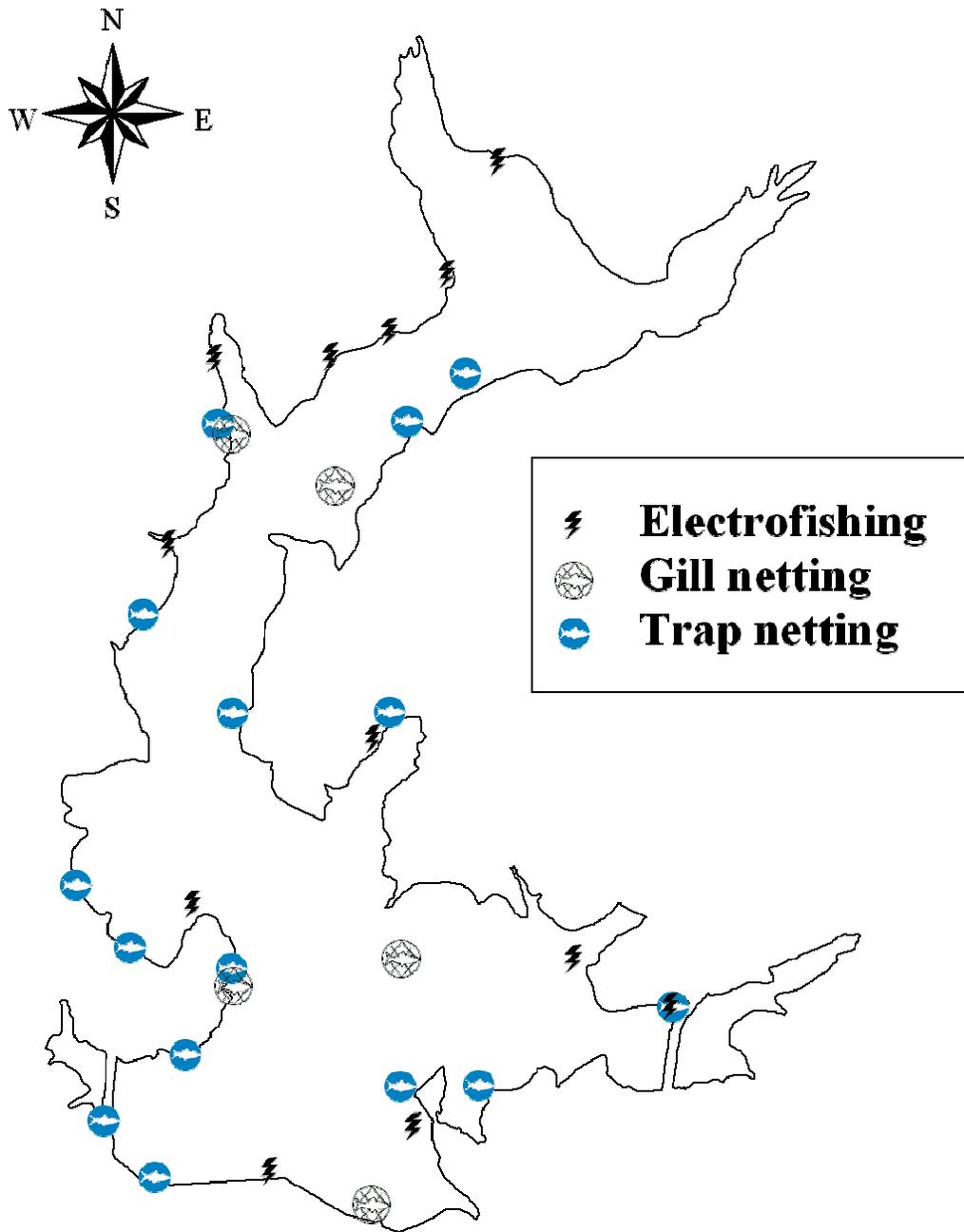
Shoreline habitat component	Shoreline distance (miles)	Percentage of lake perimeter
Boat dock	4.73	39.4
Bulkhead	0.56	4.7
Concrete	0.52	4.3
Dead trees	5.88	49.0
Featureless	6.83	56.9
Native emergent	5.09	42.4
Native floating	0.12	1.0
Native submerged	0.16	1.3
Overhanging brush	1.61	13.4
Rip rap	0.26	2.2

Results of aquatic vegetation survey conducted at Lake Holbrook, Texas, in September 2004. Surface area coverage (acres) was estimated by vegetation type and divided by total reservoir area (1,050 acres) to obtain percent of reservoir area occupied by vegetation type.

Vegetation type	Acres	Percent lake surface area
American lotus	0.33	0.03
Native emergent (cattail, maidencane, spikerush)	9.98	0.95
Native submerged (chara, nitella)	0.63	0.06
Total	10.94	1.03

Stocking history for Lake Holbrook, Texas. Size categories are ADL for adult, FGL for fingerling, and FGL+ for advanced fingerling.

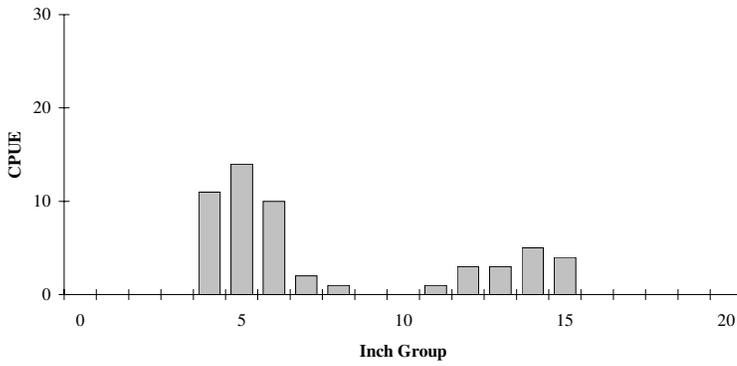
Species	Year	Number	Size
Threadfin shad	2004	5,500	ADL
	Species Total	5,500	
Blue catfish	1982	54,154	FGL
	Species Total	54,154	
Channel catfish	1992	10,526	FGL+
	Species Total	10,526	
Florida largemouth bass	1978	1,085	FGL+
	1980	39,845	FGL
	1983	52,902	FGL
	1999	106,197	FGL
	2000	105,080	FGL
	2005	211	ADL
	Species Total	305,320	
Black crappie	2003	10,800	FGL+
	Species Total	10,800	



Location of fish population sampling sites, Lake Holbrook, Texas, 2004 - 2005.

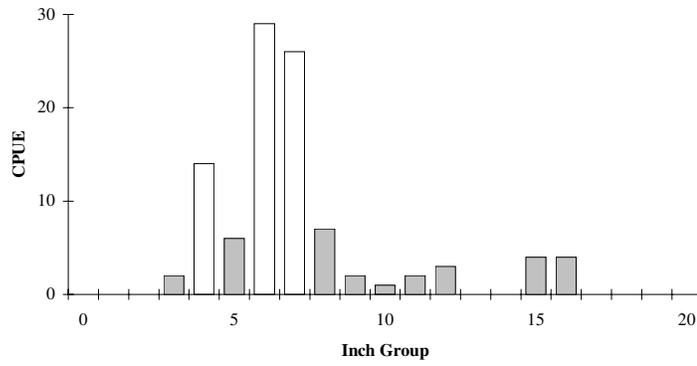
**Gizzard Shad**

**1998**



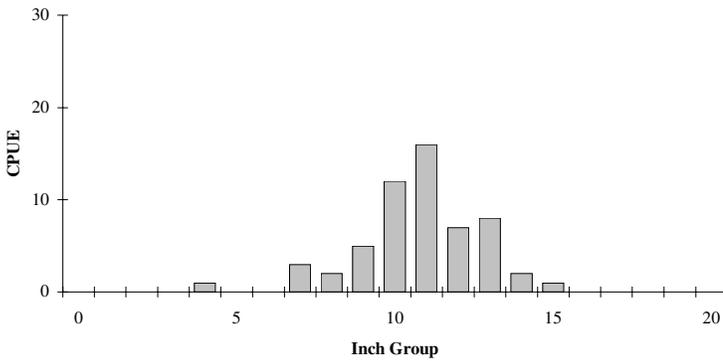
Effort = 1.0 hours  
 Total CPUE = 54.0  
 Stock CPUE = 19.0  
 PSD = 84

**2000**



Effort = 1.0 hours  
 Total CPUE = 100.0  
 Stock CPUE = 49.0  
 PSD = 27

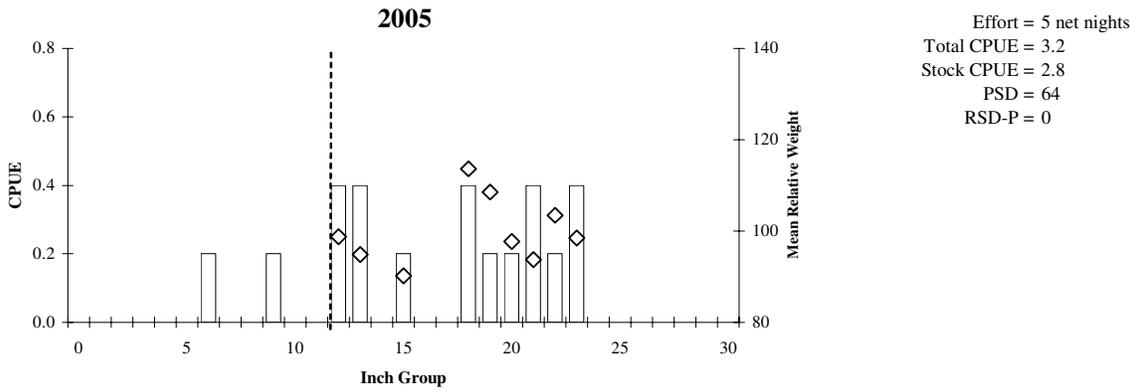
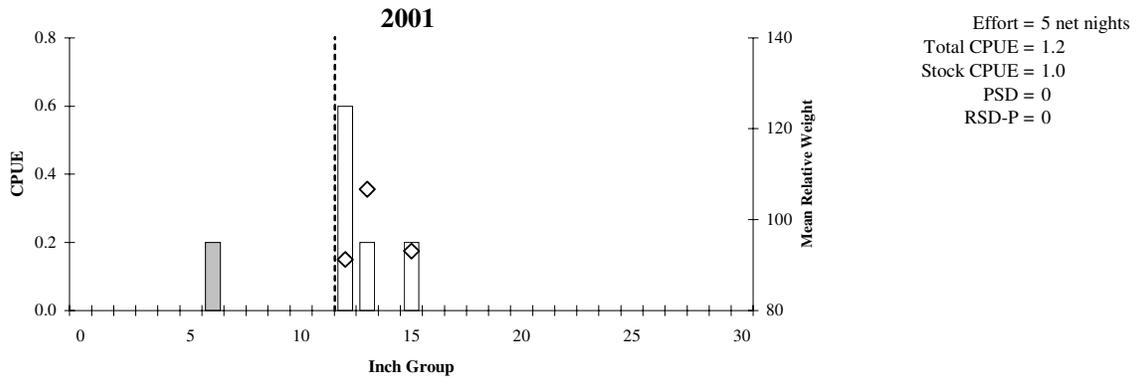
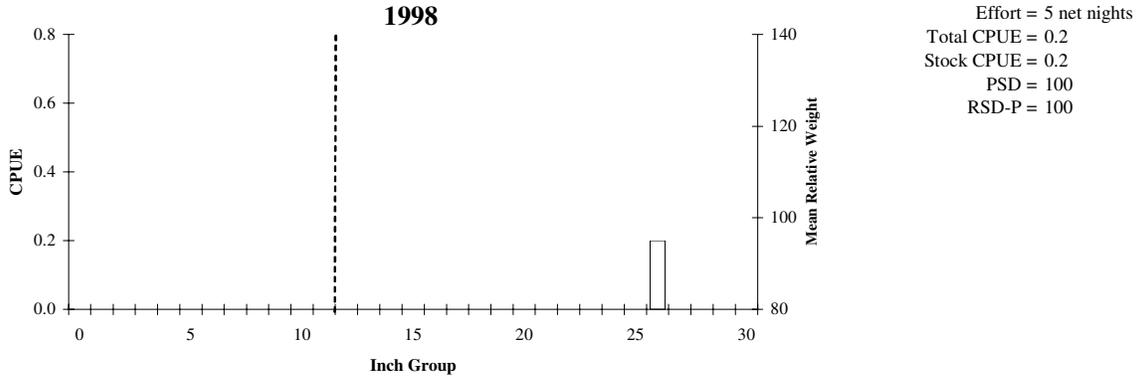
**2004**



Effort = 1.0 hours  
 Total CPUE = 57.0  
 Stock CPUE = 56.0  
 PSD = 61

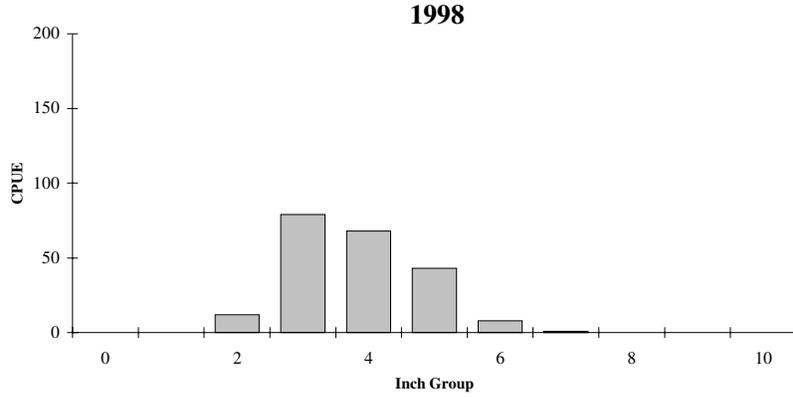
The number of gizzard shad caught per hour (CPUE; bars), and population indices from fall electrofishing sampling at Lake Holbrook, Texas.

**Channel Catfish**

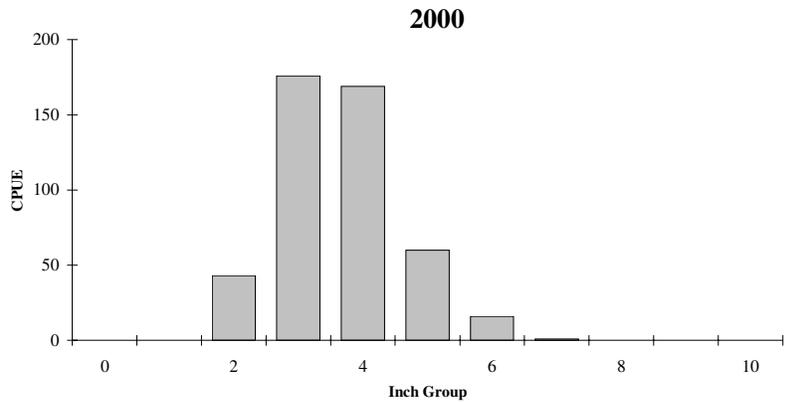


The number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices from spring gill netting sampling at Lake Holbrook, Texas. Dashed lines indicate minimum length limit at time of survey.

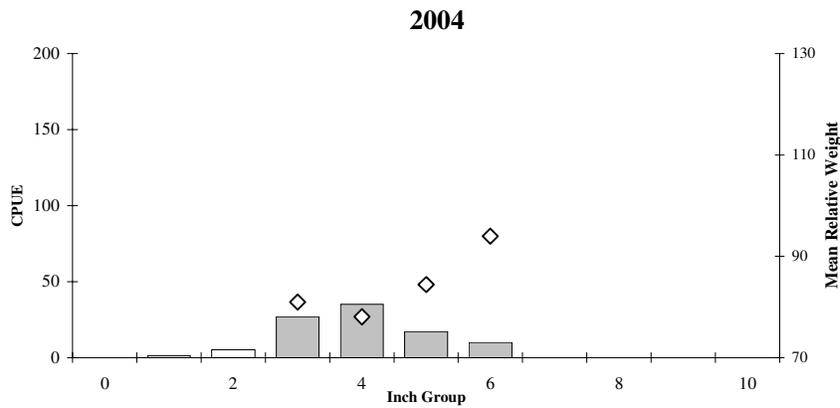
**Bluegill**



Effort = 1.0 hours  
 Total CPUE = 211.0  
 Stock CPUE = 199.0  
 PSD = 5  
 RSD-P = 0



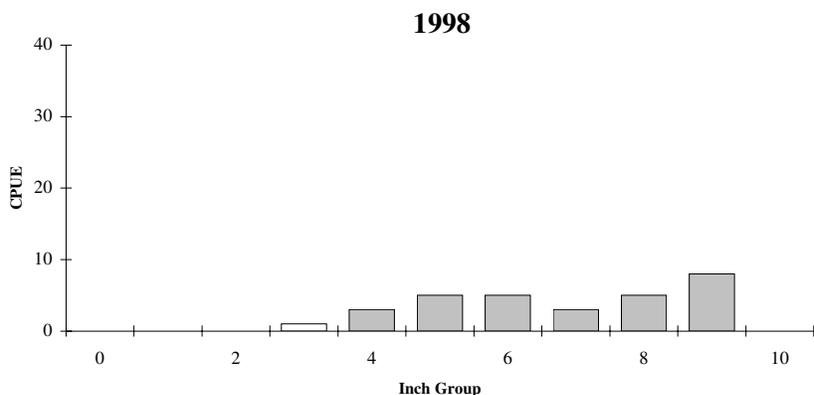
Effort = 1.0 hours  
 Total CPUE = 465.0  
 Stock CPUE = 422.0  
 PSD = 4  
 RSD-P = 0



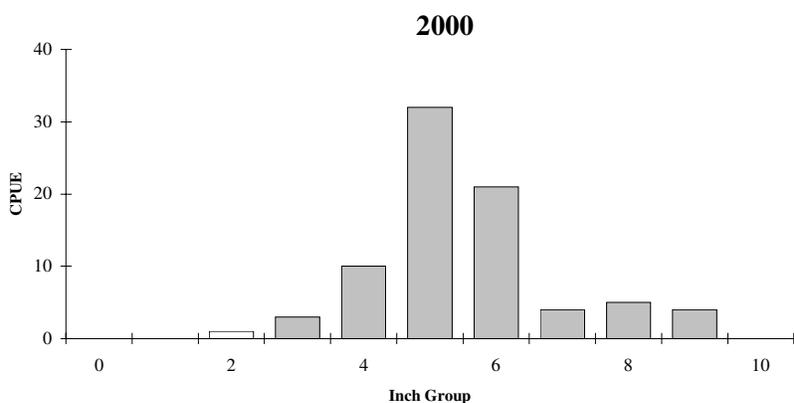
Effort = 1.0 hours  
 Total CPUE = 95.0  
 Stock CPUE = 89.0  
 PSD = 11  
 RSD-P = 0

The number of bluegill caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Lake Holbrook, Texas. No weight data were collected in 1998 or 2000.

### Redear Sunfish



Effort = 1.0 hours  
 Total CPUE = 30.0  
 Stock CPUE = 29.0  
 PSD = 55  
 RSD-P = 28



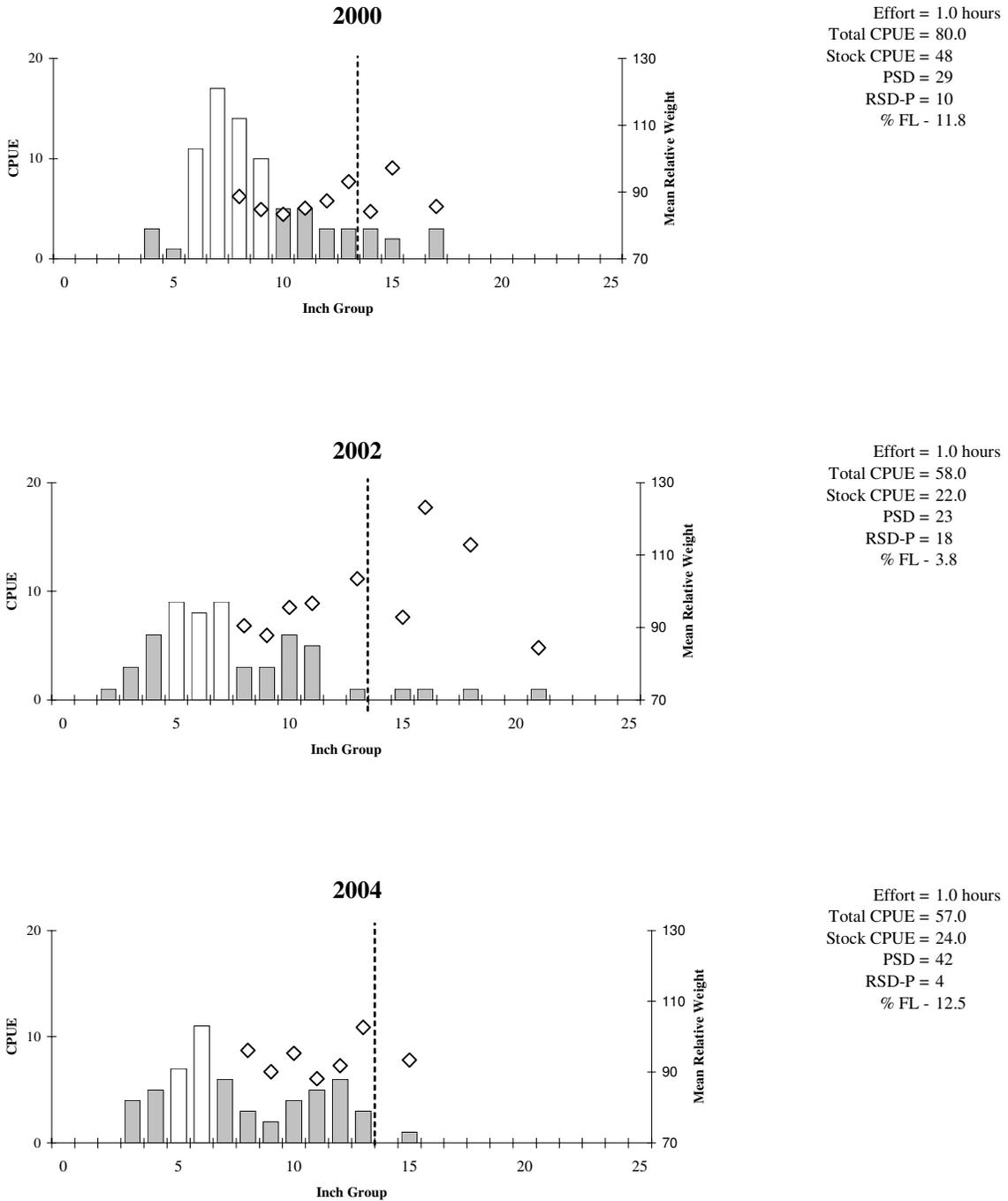
Effort = 1.0 hours  
 Total CPUE = 80.0  
 Stock CPUE = 76.0  
 PSD = 17  
 RSD-P = 5



Effort = 1.0 hours  
 Total CPUE = 12.0  
 Stock CPUE = 12.0  
 PSD = 42  
 RSD-P = 0

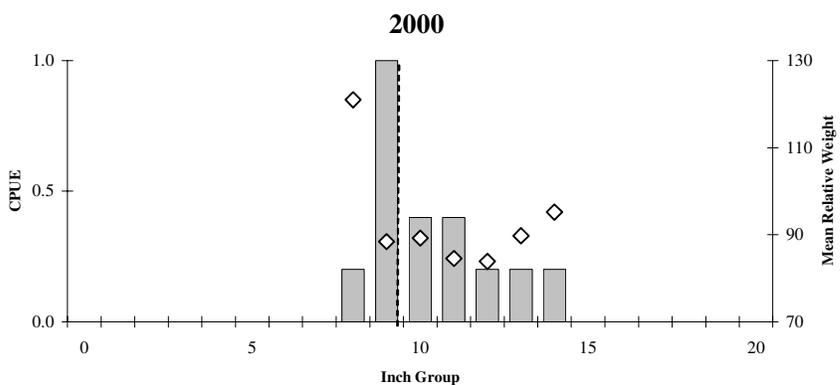
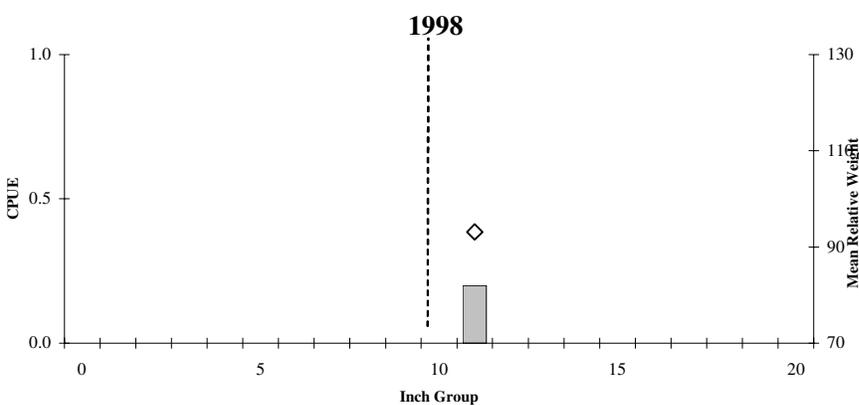
The number of redear sunfish caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Lake Holbrook, Texas. No weight data were collected in 1998 or 2000.

**Largemouth Bass**



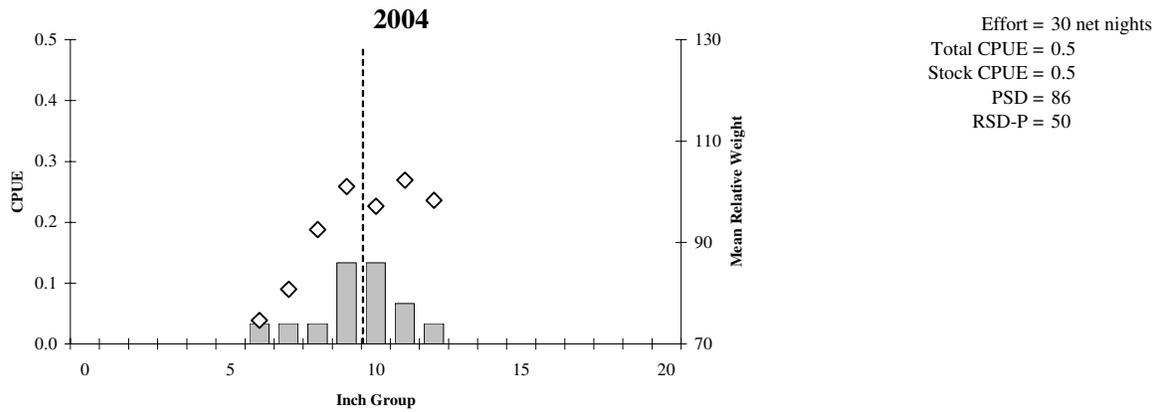
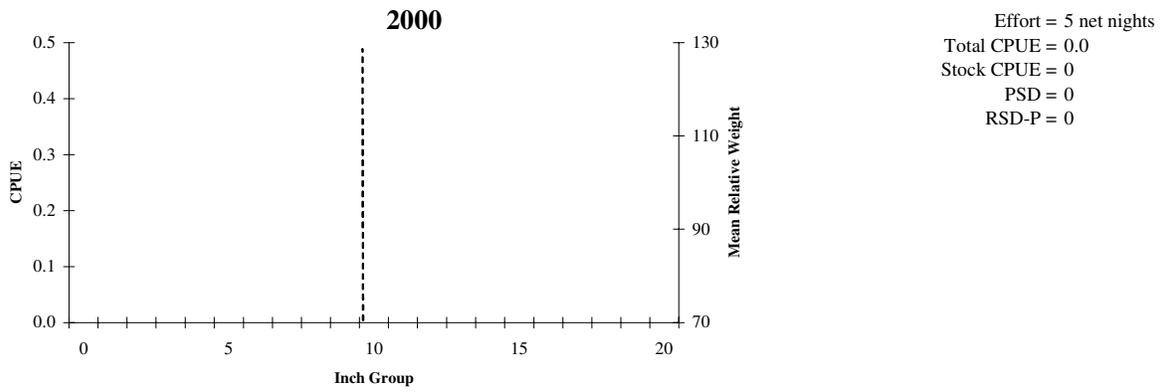
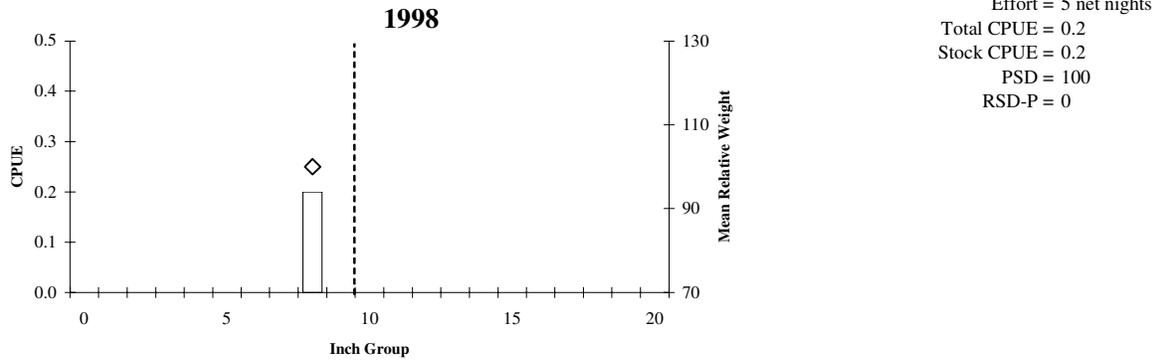
The number of largemouth bass caught per hour (CPUE; bars), mean relative weight (diamonds), and population indices from fall electrofishing sampling at Lake Holbrook, Texas. Dashed lines indicate minimum lengths limit at time of survey. % FL = percent of pure Florida largemouth bass present in sub-sample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

## White Crappie



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

### Black Crappie



The number of black crappie caught per net night (bars), mean relative weight (diamonds), and population indices from fall trap netting sampling at Lake Holbrook, Texas. Dashed lines indicate minimum length limit at time of survey.

## **Fisheries Management Plan Lake Holbrook, Texas**

Prepared - July 2005

**ISSUE 1** Although the Lake Holbrook record for largemouth bass is 11.6 pounds, a fish weighing 13.75 pounds was confirmed caught in 1995. As such, Lake Holbrook has the potential to produce trophy-size largemouth bass. The lake was stocked in 1999 and 2000 with FLMB fingerlings at 100 fish/acre. In 2004, 12.5% of the age-0 fish sampled were pure FLMB, which is below the target of 20% required for stocking populations with trophy potential.

### MANAGEMENT STRATEGIES

1. Recommend stocking FLMB fingerlings at 100/acre in spring 2006 and 2007.
2. Continue to monitor the largemouth bass population by conducting fall electrofishing surveys and collecting age and growth samples in fall 2006 and 2008.
3. Monitor the influence of FLMB stockings by collecting at least 60 age-0 largemouth bass for electrophoretic analysis in fall 2006 and 2008.
4. Continue to manage the largemouth bass fishery under the current statewide 14-inch minimum length limit, 5-fish daily bag limit.

**ISSUE 2** Lake Holbrook contains few aquatic plants or other forms of structural habitat. This situation has the potential to reduce survival and subsequent recruitment of littoral sport fishes. Re-establishment of native aquatic plant communities could enhance the lake's fisheries.

### MANAGEMENT STRATEGIES

1. A statewide habitat initiative to investigate the establishment of native aquatic plant communities is currently being evaluated. When management recommendations on establishment techniques are finalized, Lake Holbrook should be considered a candidate for implementation of a habitat enhancement project.

**ISSUE 3** Maintenance and improvement of angler access facilities are important in promoting angling and maximizing utilization of the fisheries resources at Lake Holbrook 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.

2. Increase angler awareness of the developing catfish fishery at Lake Holbrook by disseminated information to the controlling authority and local media outlets.

**APPENDIX 1**

Catch rates (CPUE) of all species collected from all gear types from Lake Holbrook, Texas, 2004 - 2005.

Species	Electrofishing 1 hour	Trap Net 30 net nights	Gill Net 5 net nights
Gizzard shad	57		
Threadfin shad	121		
Channel catfish			3.20
Warmouth	4		
Bluegill	95		
Longear sunfish	35		
Redear sunfish	12		
Largemouth bass	57		
White crappie		1.93	
Black crappie		0.47	

**APPENDIX 2**

Results of electrophoretic analysis of young-of-the-year largemouth bass collected by fall electrofishing from Lake Holbrook, Texas.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		Florida	F1	Fx	Northern		
1986	30	0	10	10	10	25.8	33.3
1992	35	3	9	17	6	45	8.6
1995	35	2	9	10	12	31.1	5.7
1998	36	1	10	19	6	36.8	16.7
2000	17	2	3	5	7	27.9	11.8
2002	28	1	8	13	6	40.4	3.6
2004	16	2	3	9	2	51.6	12.5

**APPENDIX 3**

Water body records, all tackle category, for Lake Holbrook as of 5/5/2005.

Species	Weight (lbs)	Length (inches)	Date certified	Gear
Bass, Hybrid yellow	1.65	14.75	5/21/00	Rod & Reel
Bass, Largemouth	11.60	27	2/15/00	Rod & Reel
Bass, Yellow	0.24	8	05/05/04	Fly Rod
Bluegill	0.37	8	05/26/02	Fly Rod
Crappie, Black	2.19	15.50	2/25/95	Rod & Reel
Crappie, White	2.20	15.50	4/29/90	Rod & Reel
Sunfish, Green	0.27	7	06/03/03	Fly Rod
Sunfish, Longear	0.13	5.30	08/13/02	Fly Rod
Sunfish, Redear	0.44	8.50	05/05/04	Fly Rod

## APPENDIX 4

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

Largemouth bass collected in fall electrofishing surveys September 1992 and 1995, and October 1989, 1998, and 2000 compared with averages for the Sabine/ Sulphur/ Cypress/ Neches River system (Prentice 1987) for October 15.

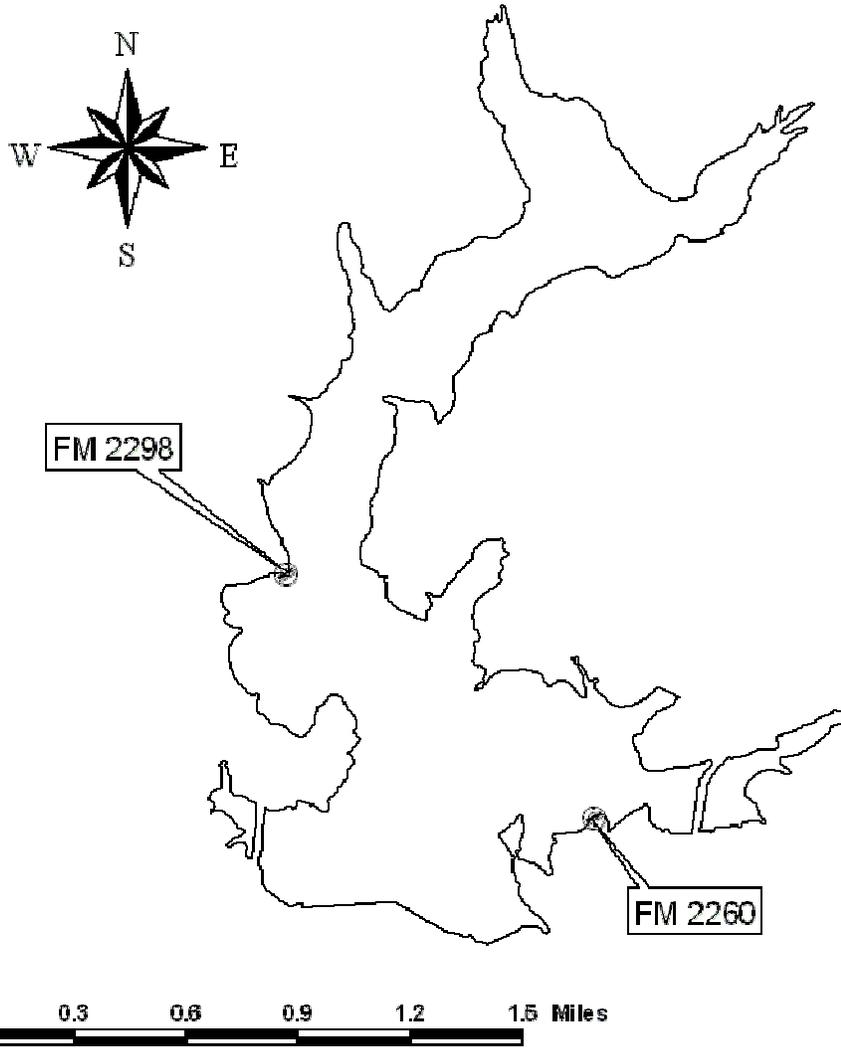
Year	Age class							
	0	1	2	3	4	5	6	7
2000	7.7 (21)	11.3 (13)	13.7 (2)	15.1 (8)				17.8 (1)
1998	8.5 (10)	11.3 (20)	13.2 (5)	17.7 (2)				
1995	7.5 (14)	11.7 (21)	14.4 (17)	16.5 (3)	17.2 (2)			
1992	7.5 (15)	11.0 (20)	14.2 (12)	16.6 (6)	16.2 (3)	18.6 (1)	21.7 (1)	
1989	7.2 (16)	10.0 (28)	13.2 (3)	16.1 (1)	16.1 (1)		19.5 (1)	
Sabine/ Sulphur/ Cypress/ Neches River system	5.3	10.3	13.3	15.2	16.2	16.9	17.3	17.5

White crappie collected in fall trap netting surveys, November 2000 compared with averages for the Sabine/ Sulphur/ Cypress/ Neches River system (Prentice 1987) for November 15. Sample sizes are shown in parentheses.

Year	Age class							
	0	1	2	3	4	5	6	7
2000		9.7 (9)	12.8 (4)					
Sabine/ Sulphur/ Cypress/ Neches River system	4.4	6.5	8.5	10.3	11.9	13.4	14.7	16.0

**APPENDIX 5**

Public angler access facilities, Lake Holbrook, 5/2005



Facility type	Location name	GPS Coordinates	Fee charged	No. of lanes	Challenged access	Bank Fishing	Comments
Boat ramp	FM 2260	N 32° 41.421' W 95° 32.665'	No	1	No	Yes	
Boat ramp	FM 2298	N 32° 41.976' W 95° 33.366'	No	1	No	Yes	