

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

Lake Sheldon

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EXECUTIVE SUMMARY

Lake Sheldon 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 Sheldon is a 1,200 acre reservoir on Culpepper Bayou in Harris County, Texas, lying within the Sheldon Wildlife Management Area. The lake has a drainage area of 4.0 square miles, a shoreline length of 13.1 miles, and a shoreline development ratio of 2.7. The reservoir has a mean depth of 3 feet and a maximum depth of 20 feet. Rainfall in the watershed averages 42.6 inches per year. Lake Sheldon lies within the Gulf Coast Plains Land Resource Area with Lake Charles/Benard Association (clay) soil types. Land uses around Lake Sheldon are primarily agricultural and recreational.
- **Prey species:** Gizzard and threadfin shad were absent in the 2005 electrofishing sample. Electrofishing sampling efficiency was much reduced due to low water and extensive vegetation cover and may account for the lack of shad species collected. The catch rate of bluegills was 42.0 fish/hour, higher than it was in 2000 (7.0 fish/hour) but still much lower than it was in 1997 (189.0 fish/hour) (Henson and Webb 1997, Henson and Webb 2000).

Since 1989 redear sunfish have rarely occurred in electrofishing samples from Lake Sheldon. In 2004, the electrofishing CPUE for redear sunfish was 84.0 fish/hour with fish up to 7 inches in the sample.

- **Catfishes:** The gill net catch of blue catfish in 2005 (1.4/net-night) was much lower than it was in previous surveys. Blue catfish were well represented in the 2001 catch at 10.4 fish/net night and ranged from 6 to 31 inches in length. Gill net CPUE of channel catfish was 2.4 fish/net-night in 2005 with all individuals \geq 17 inches in length. Seventeen channel catfish were captured in 2001 (3.4/net night) ranging in length from 10 to 19 inches.

No age and growth analysis was conducted on catfish this year. Blue and channel catfish normally surpass 12 inches in their second growing season and reach 15 inches by age 2 or 3 (Henson and Webb 1997).

- **Largemouth bass:** The electrofishing CPUE of largemouth bass greatly increased in 2004 to 249.0 fish/hour from 2.0 fish/hour in 2000. The increase was primarily due to a large number of age-0 bass in the sample. Largemouth bass catches have been typically low on Lake Sheldon. One reason for low catches of bass is the difficulty in sampling this reservoir because of thick vegetation. Though numbers

from past surveys have been low, catches tend to be evenly distributed across a wide range of lengths. Bass captured in 2004 ranged from 3 to 16 inches total length. Largemouth bass reach the state-wide minimum length limit of 14 inches in their third growing season (Henson and Webb 2000).

- **Crappie:** The trap net catch rate of white crappie in 2004 was 0.4 fish/net night, down drastically from 20.4/net night in 2000. The catch in 2000 was very well distributed across all sizes classes from 2 to 14 inches, indicating population expansion over the past several years. No black crappie were captured in our 2004 sample. White crappie attain legal harvestable size (10 inches) by about age 3 (Henson and Webb 2000).
- **Management strategies:** Lake Sheldon is a very important asset to Texas Parks and Wildlife and to the people of Houston. To make the most of this resource the Inland Fisheries Division is working closely with State Parks and Infrastructure Divisions to improve the reservoir in conjunction with the development of the Lake Sheldon Education Center. Priority projects are underway to improve access to Lake Sheldon by control of over-abundant vegetation, construction of a new boat ramp, and dredging of boat lanes in shallow areas. Fish stockings are also conducted to enhance largemouth bass and channel catfish angling opportunities. As these efforts continue, angling opportunities at Lake Sheldon will be published through various media outlets, lakeside signs, and brochures.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Sheldon in 2004-2005. 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. Management strategies are included to address existing problems or opportunities. Historical data is presented with the 2004-2005 data for comparison.

Fish harvest regulations for Lake Sheldon in 2004-2005.

Species	Bag Limit	Minimum Length (inches)
Bass, largemouth	5	14
Bass, white	25	10
Catfish, flathead	5	18
Catfish, channel and blue	25 (in any combination)	12
Crappie, white and black	25 (in any combination)	10

METHODS

- Fishes were collected by electrofishing in fall 2004 (0.33 hour at 4, 5-minute stations), trap nets in fall 2004 (5 net nights at 5 stations), and gill nets in spring 2005 (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 trap and gill nets as the number of fish caught in one net set overnight. Sample station selection for all gear types was changed from fixed to random in 1996. All fish population surveys were conducted in accordance with Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004), except that in 2004-2005, stations were subjectively selected due to excessive vegetation.
- Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD) and Relative Stock Density (RSD)], and Relative Weight (Wr) indices were calculated for target fishes according to Anderson and Neumann (1996).
- Age and growth data was not collected this data year.

- A littoral zone physical habitat survey and vegetation survey 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.
- Henson, J. C. and M. A. Webb. 1997. Statewide freshwater fisheries monitoring and management program. Survey report for Lake Sheldon, 1997. Federal Aid in Sport Fish Restoration. Project F-30-R. Texas Parks & Wildlife Department, Inland Fisheries Division. Austin, Texas.
- Henson, J. C. and M. A. Webb. 2000. Statewide freshwater fisheries monitoring and management program. Survey report for Lake Sheldon, 2000. Federal Aid in Sport Fish Restoration. Project F-30-R-26. Texas Parks & Wildlife Department, Inland Fisheries Division. Austin, Texas.
- TPWD, Inland Fisheries Division. 2004. Texas Inland Fishery Assessment Procedures. Unpublished manual. Austin, Texas.

 Physical and historical data for Lake Sheldon, Texas, 2004-2005.

Inland Fisheries water body code:	0667
IF District:	3-E, Bryan
Controlling authority:	Texas Parks & Wildlife Department
Area:	1,200
Counties:	Harris
Latitude:	29° 10'
Longitude:	95° 52'
Nearest major metropolitan area and distance:	Houston MSA, 0 miles
Reservoir description:	Park Lake
River system:	San Jacinto
Shoreline length (mi):	13.1
Mean depth:	3.0
Maximum depth (ft):	20.0
Shoreline development ratio:	2.7
Watershed drainage area (mi ²):	4.0
Secchi disc range (ft):	<1
Conductivity (µmhos/cm):	80
Constructed:	1958
Access:	
Boat public:	Inadequate – 2 areas
Bank:	Inadequate – 1 area
ADA Access:	None

 Survey History of Houston County Lake, Texas, 1975-2005.

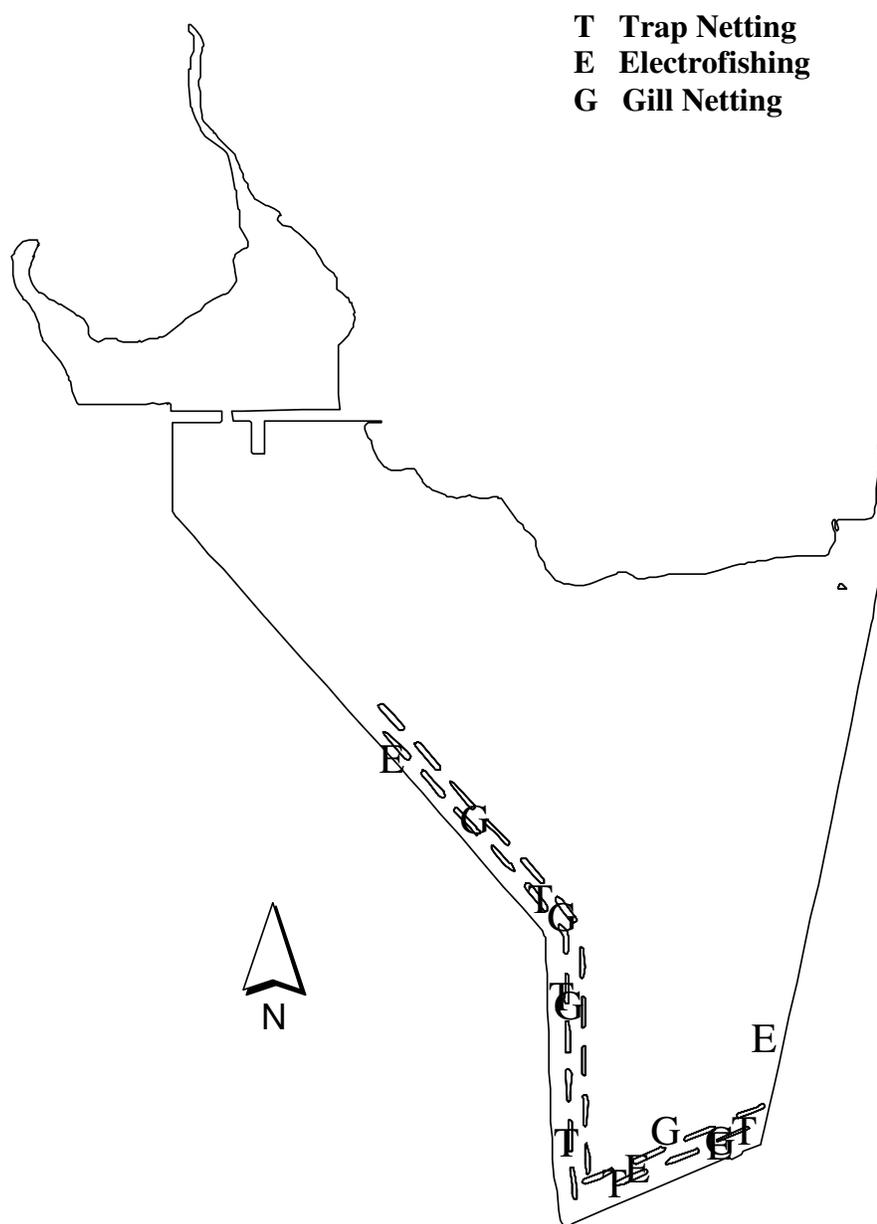
Method	Year
Gill net	1975, 1978, 1989, 1992, 1994, 1997, 2001, 2005
Electrofishing	1986, 1989, 1994, 1997, 2000, 2004
Trap net	1989, 1994, 1997, 2000, 2004
Vegetation survey	2004
Habitat survey	1994, 1997, 2000, 2004

Habitat survey of littoral zone and physical habitat types, Lake Sheldon, Texas, September 2004. Linear shoreline distance (miles) was recorded for each habitat type found.

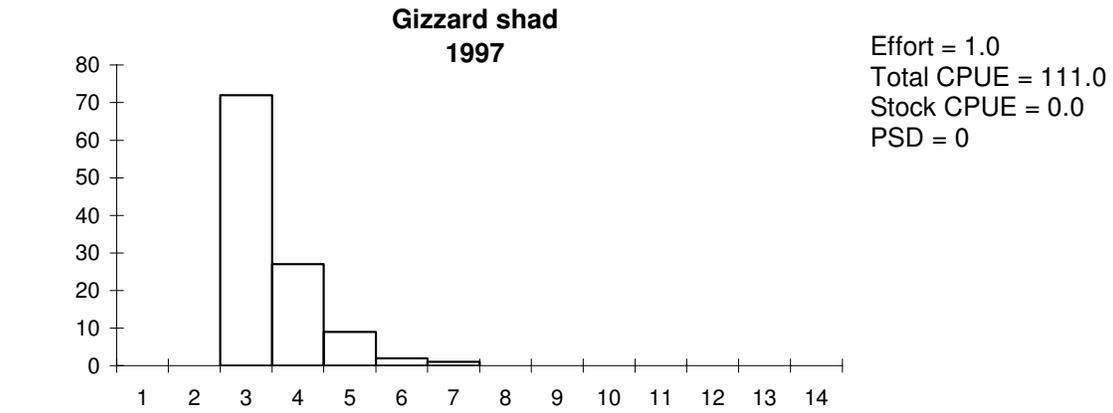
Habitat type	Shoreline distances (miles)	Surface area (acres)	Percent of total
Native emergent	5.15		39.2
Overhanging brush	5.32		40.5
Native emergent/hydrilla	0.40		3.0
Native emergent/native submergent	1.31		9.9
Native floating/native emergent	0.27		2.1
Native Emergent		349.2	29.1
Native Submergent		119.1	10.0
<u>Non natives</u>			
Alligatorweed		8.0	0.6
Hydrilla		817.1	68.1
Giant salvinia (scattered)		120.0	10.0
Mixed non-natives		77.4	6.5
Mixed natives and non-natives		23.1	1.9
Native submergent/native emergent/hydrilla	0.69		5.3

Stocking history of Lake Sheldon, Texas.

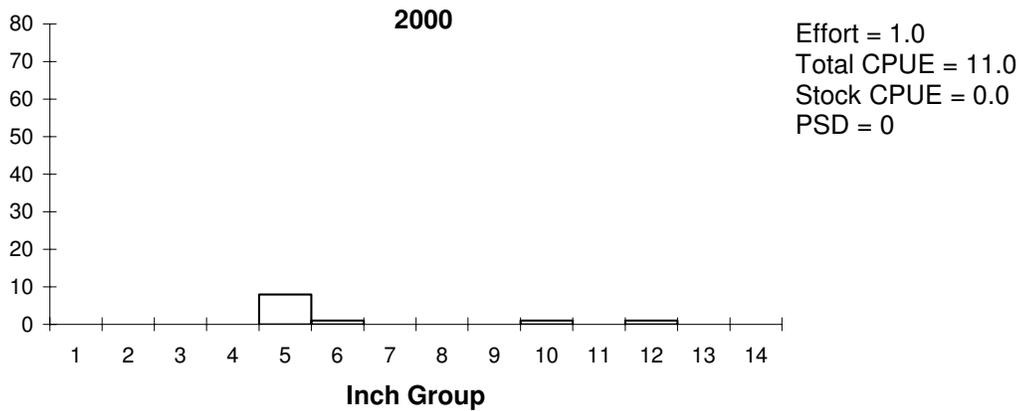
Species	Year	Number
Blue catfish	1972	4,800
	1978	46,360
	1983	<u>89</u>
	Total	51,249
Channel catfish	1972	12,500
	1976	34,640
	1978	90,654
	1984	78,432
	1990	12,261
	2004	<u>1,986</u>
	Total	230,473
Flathead catfish	1972	1,015
	1983	<u>25</u>
	Total	1,040
Warmouth	1972	41,600
Redear sunfish	1983	107,800
Largemouth bass	1972	73,000
	1983	<u>15,569</u>
	Total	88,569
Black crappie	1972	51,000
Florida largemouth bass	1978	120,000
	Total	<u>52,344</u> 172,344
Green X redbreast	1972	80,000
	1976	24,365
	1978	<u>70,300</u>
	Total	174,665
Red drum	1976	246



Location of fish community sampling stations, Lake Sheldon, Texas, 2004-2005.

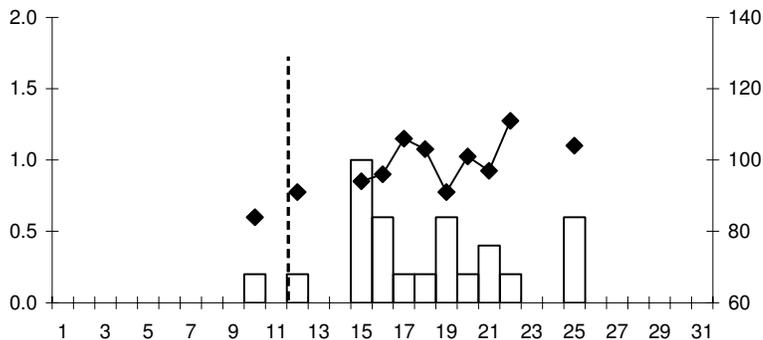


CPUE



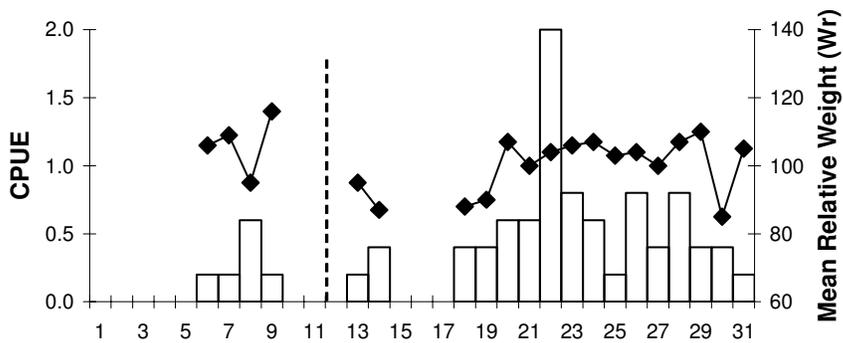
Number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Sheldon, Texas. No gizzard shad were captured in the fall 2004 survey.

**Blue catfish
1997**



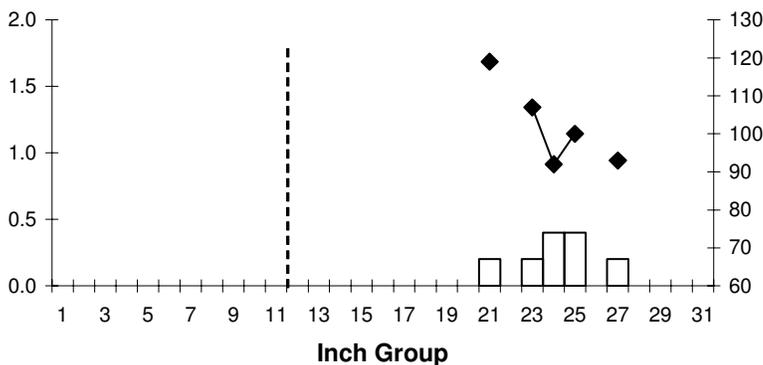
Effort = 5
 Total CPUE = 4.4
 Stock CPUE = 4.2
 PSD = 33
 RSD-P = 0

2001



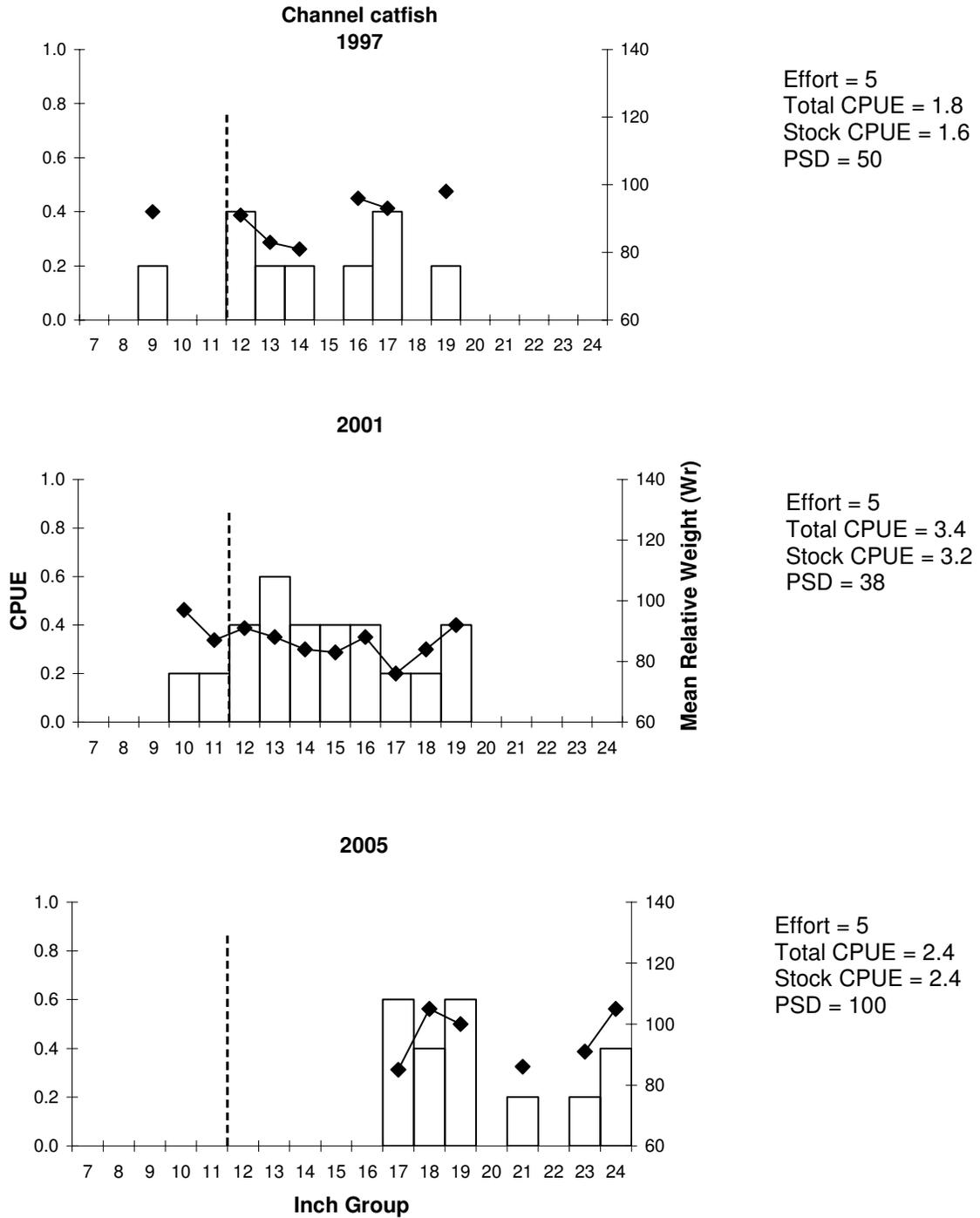
Effort = 5
 Total CPUE = 10.4
 Stock CPUE = 8.6
 PSD = 88
 RSD-P = 7

2005

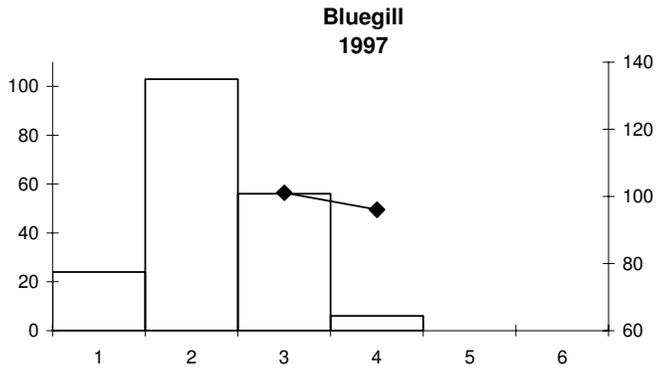


Effort = 5
 Total CPUE = 1.4
 Stock CPUE = 1.4
 PSD = 100
 RSD-P = 0

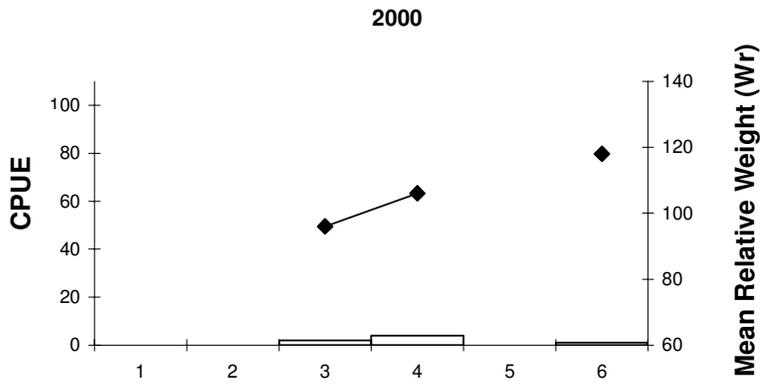
Number of blue catfish caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for spring gill net surveys, Lake Sheldon, Texas. Vertical dashed lines denote minimum legal length.



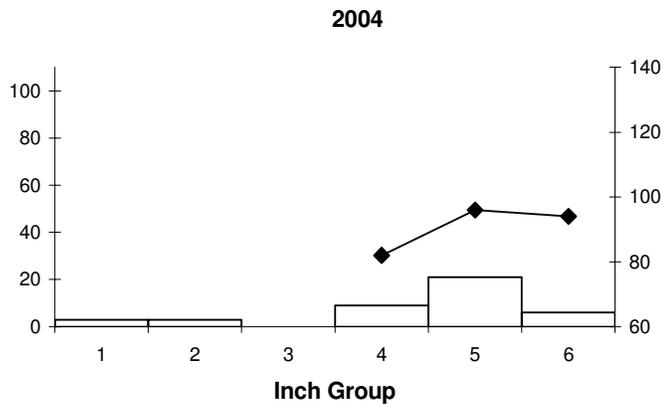
Number of channel catfish caught per net night (CPUE, bars), mean Relative Weight (W_r , diamonds), and population indices for spring gill net surveys, Lake Sheldon, Texas. Vertical dashed lines denote minimum legal length.



Effort = 1.5
 Total CPUE = 189.0
 Stock CPUE = 62.0
 PSD = 0

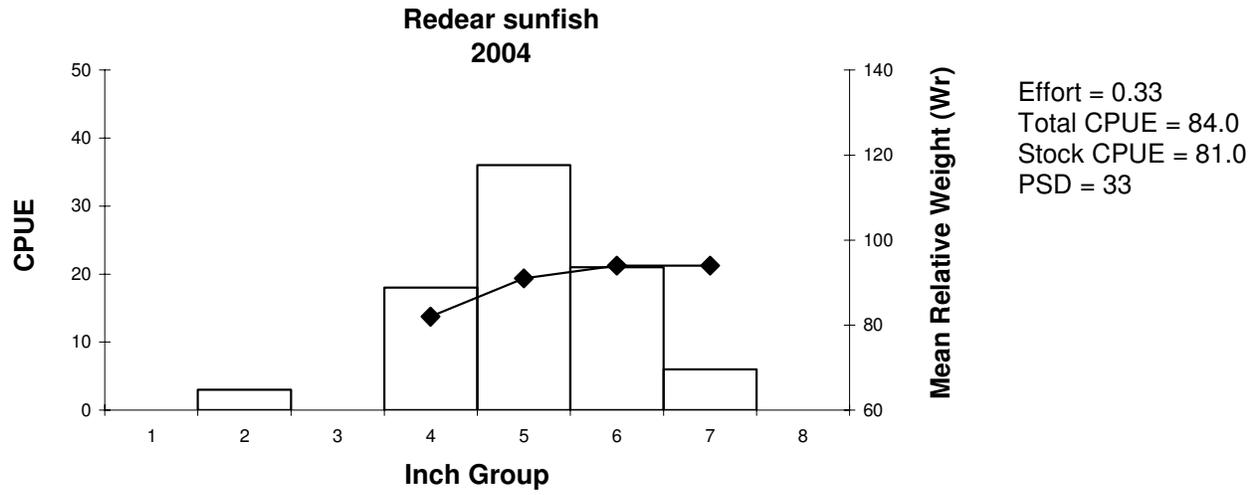


Effort = 1
 Total CPUE = 7.0
 Stock CPUE = 7.0
 PSD = 14

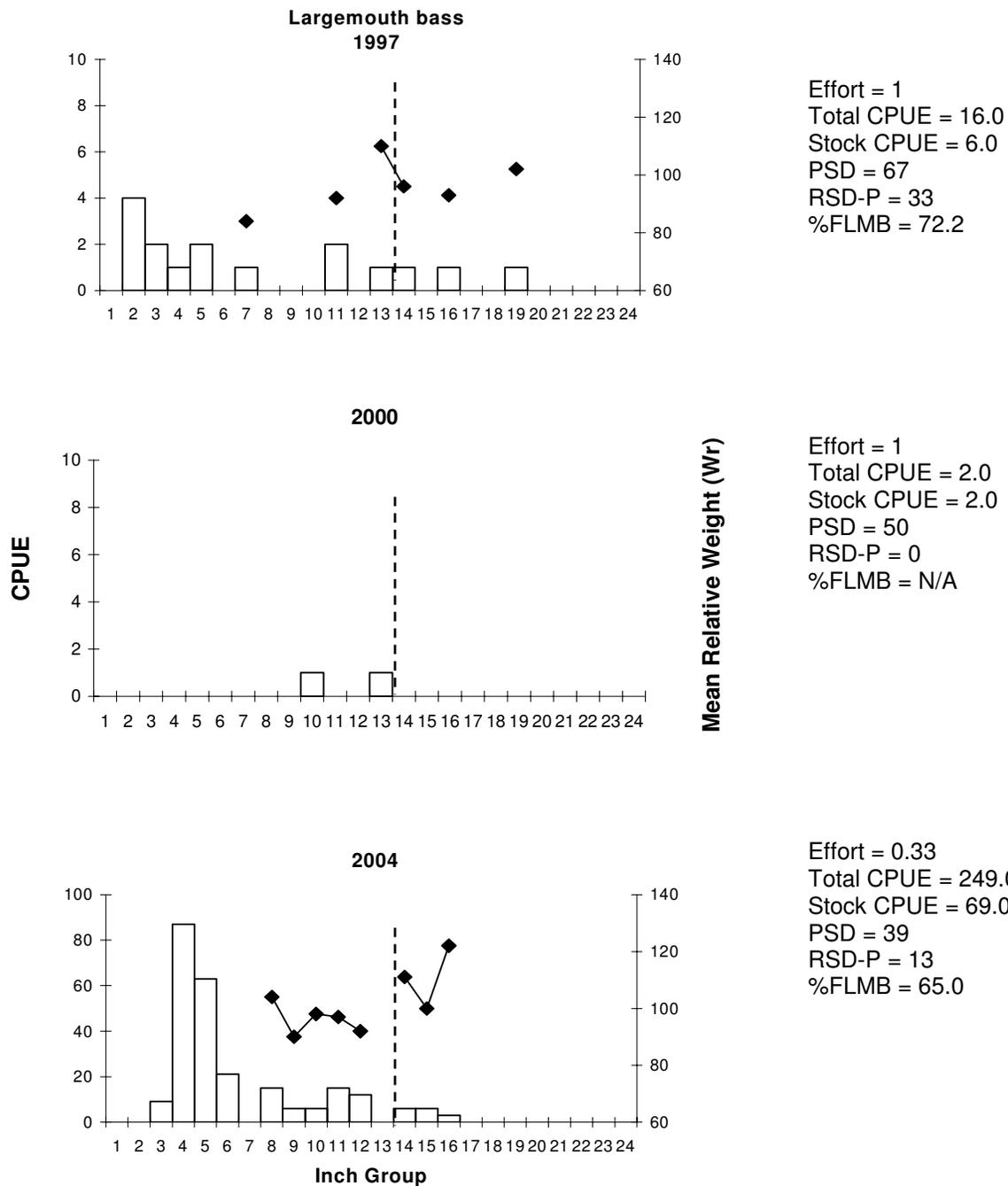


Effort = 0.33
 Total CPUE = 42.0
 Stock CPUE = 36.0
 PSD = 17

Number of bluegill caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Lake Sheldon, Texas.

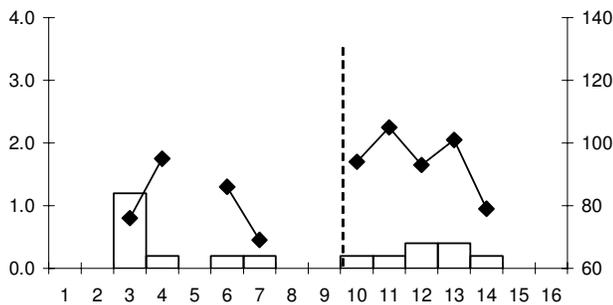


Number of redear sunfish caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Lake Sheldon, Texas.



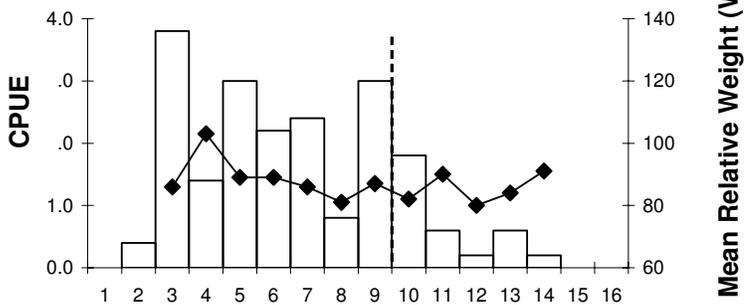
Number largemouth bass caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Lake Sheldon, Texas. Relative Weight was not evaluated in 2000. No age-0 bass were captured in 2000 for FLMB genetics analysis. Vertical dashed lines denote minimum legal length.

**White crappie
1997**



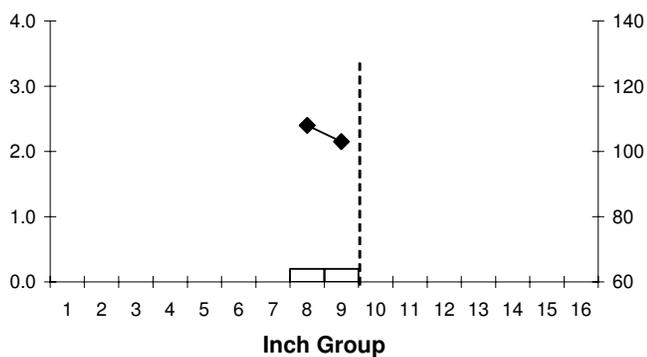
Effort = 5
 Total CPUE = 3.2
 Stock CPUE = 1.8
 PSD = 78
 RSD-P = 78

2000



Effort = 5
 Total CPUE = 20.4
 Stock CPUE = 14.8
 PSD = 49
 RSD-P = 23

2004



Effort = 5
 Total CPUE = 0.4
 Stock CPUE = 0.4
 PSD = 100
 RSD-P = 0

Number of white crappie caught per net night (CPUE, bars), mean Relative Weight (lines), and population indices for fall trap net surveys, Lake Sheldon, Texas. Vertical dashed lines denote minimum legal length.

**Fisheries Management Plan
Lake Sheldon, Texas**

Prepared – July 31, 2005.

ISSUE 1 Produce a trophy largemouth bass fishery at Lake Sheldon.

MANAGEMENT STRATEGIES

Current/Immediate Actions

1. Sample largemouth bass population at least biennially to determine status and management needs.
2. Stock Lake Sheldon with Florida largemouth bass to optimize Florida bass genetics in the population.

Short Term Actions with Limited Funding

3. Place a certified scale at the State Park Office to allow for greater participation in the Angler Recognition awards program.
4. Stock Lake Sheldon with advanced-sized Operation World Record Florida largemouth bass.
5. In the year following the stocking of Operation World Record Florida largemouth bass, change current length limit to a 16-inch minimum for two years followed by a subsequent change to a 14 to 24 inch slot-length limit to allow for protection and growth of genetically superior largemouth bass.

ISSUE 2 Angler access at Lake Sheldon is very limited because of dense coverage of submerged and emergent aquatic vegetation. Increase angler access to Lake Sheldon.

MANAGEMENT STRATEGIES

Current/Immediate Action

1. Continue treatment of giant salvinia with herbicide
2. Release salvinia weevils as a bio-control for salvinia infestation.

3. Remove closed season and horsepower restriction for boat users.

Short Term Action with Limited Funding

4. Treat hydrilla with herbicide to open shoreline access and boat lanes near boat ramps.
5. Release hydrilla flies to help reduce hydrilla growth.
6. Treat water hyacinth with herbicide to increase boat access in open water.
7. Stock water hyacinth weevils to help reduce water hyacinth growth.
8. Treat Asian marsh weed with herbicide to increase boat access in open water.

Long Term Action Requiring Significant Funding

9. Add lighting at all access points and fishing piers.
10. Repair or replace all fishing piers.
11. Repair or replace footbridges leading to fishing piers off Pineland Road.
12. Construct a boat ramp at the parking area off Garrett Road.
13. Investigate grants and partnerships for funding and developing a dredging program (canals and boat lanes) designed to increase bank and boat access.
14. Stock triploid grass carp to reduce overall coverage of aquatic vegetation.
15. Use aerial herbicide treatments to open large areas of open water currently covered with emergent and floating vegetation.

ISSUE 3 Increase harvest opportunities for Lake Sheldon anglers.

MANAGEMENT STRATEGIES

Current/Immediate Action

1. Stock advanced-sized channel catfish.

Short Term Action with Limited Funding

2. Design, install, and operate experimental tamperproof fish feeding stations on two of the existing fishing piers and evaluate use and success.

Long Term Action Requiring Significant Funding

3. Develop rearing ponds to grow out 12-inch or longer channel catfish for stocking into Lake Sheldon.
4. Contingent on use and success of experimental fish feeding stations, install and operate similar stations on all existing and renovated piers.

ISSUE 4 Increase awareness of Lake Sheldon's fisheries.

MANAGEMENT STRATEGIES

Current/Immediate Action

1. Submit news releases to the Houston Chronicle highlighting fishing opportunities and management efforts.
2. Create Lake Sheldon brochure highlighting fishing opportunities.

Short Term Action with Limited Funding

3. Work with State Parks Interpretive Specialists to develop displays at all fishing piers and boat ramps highlighting Lake Sheldon's fisheries and ecology.
4. Work with Media Service to produce a video on the fishing opportunities and ecology of Lake Sheldon.

Appendix 1.

Number (N) and catch per unit effort (CPUE) of species collected from fall electrofishing (December 2004) and trap netting (December 2004) and winter gill netting (January 2005) from Lake Sheldon, Texas. Electrofishing CPUE is the number of fish per hour, while trap netting and gill netting CPUE are the number of fish per net night.

Species	Gill netting (5 net nights)		Trap netting (5 net nights)		Electrofishing (0.33 hours)	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					0	0.0
Threadfin shad					0	0.0
Blue catfish	7	1.4				
Channel catfish	12	2.4				
Bluegill					14	42.0
Redear sunfish					28	84.0
Largemouth bass					82	249.0
White crappie			2	0.4		

Appendix 2.

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Lake Sheldon, Texas, 1994, 1997, and 2004. Beginning in 2004, samples were taken from a single cohort.

Year	Sample Size	Genotype				% Florida largemouth bass alleles	% Pure Florida largemouth bass
		Florida	F1	FX	Northern		
1994	9	2	2	4	1	55.6	22.2
1997	9	2	2	5	0	72.2	22.2
2004	50	8	11	31	0	65.0	16.0

Appendix 3.

Angler access facilities, Lake Sheldon, 2004. Locations include one boat ramp.

Boat ramp	GPS coordinates	Fee charged?	# of lanes	Parking capacity	Accommodations for challenged?	Bank fishing?
Public ramp at dam	29° 51' 04" 95° 10' 27"	N	2	15	N	Y