

PERFORMANCE REPORT

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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

**Houston County Lake**

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## EXECUTIVE SUMMARY

Houston County Lake 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:** Houston County Lake is a 1,523 acre reservoir located on Little Elkhart Creek in the Trinity River basin near Crockett, Houston County, Texas. The reservoir lies within the Piney Woods Vegetational Area. Soil types are Freestone-Kenny and Kaufman-Trinity Associations. The Houston County Water District (controlling agency) constructed Houston County Lake in 1966 to provide water for municipal and industrial purposes. Houston County Lake has a drainage area of approximately 44 square miles and a shoreline length of 25 miles. Rainfall in the watershed averages 33 inches per year. Flooded timber and residential development surround the lakeshore.
- **Prey species:** Dominant prey fishes in Houston County Lake are threadfin shad, gizzard shad, bluegill, and redear sunfish. Other prey species include warmouth, longear sunfish, bullhead minnow, pugnose minnow, and blacktail shiner.

Electrofishing catch rate of threadfin shad in 2004 was 150.0 fish/hour, similar to the previous two survey years (174.0 fish/hour in 1999 and 148.0 fish/hour in 2000). The fall 2004 electrofishing catch rate of gizzard shad (40 fish/hour) is similar to the previous two samples; however, there were fewer fish in the 2 to 5 inch category. Relative abundance of sub-stock sized gizzard shad was lower than it was in 2000 suggesting fewer gizzard shad available as forage.

Bluegill continue to be the dominant sunfish species in Houston County Lake; however, the electrofishing catch rate in the 2004 sample (538.0 fish/hour) was about half that in 2002 (1,105.0 fish/hour). A large decrease in the number of sub-stock sized bluegill accounts for the drop in overall CPUE.

The electrofishing catch rate of redear sunfish decreased from 361.0 fish/hour in 2002 to 237.0 fish/hour in 2004. PSD dropped from 25 in 2002 to 11 in 2004, and RSD-P dropped to zero in 2004 from 2 in 2002. Redear sunfish reach 4 inches in their second growing season and 7 inches in the third growing season.

The 2002 spring creel survey indicates a low directed effort for sunfishes (0.5 hours/acre). Angler catch and harvest rates of sunfishes (species combined) were very high (15.3 and 2.2 fish/angler-hour, respectively). Sunfish to 9 inches were observed in the creel survey.

- **Catfishes:** Gill net catch rates of channel catfish have always been low at Houston County Lake. No anglers reported seeking catfish during the March-May 2002 creel survey.
- **White bass:** Only two white bass were captured in the 2005 sample. No anglers targeting white bass were noted in the March-May 2002 creel survey.
- **Black bass:** The electrofishing catch rate of largemouth bass in the fall of 2004 (82.0 fish/hour) was up from the 2003 sample (43.0 fish/hour) and similar to the 2002 sample (88.0 fish/hour). The PSD of bass decreased from 56 in 2003 to 29 in 2004 due to an increase in the sample relative abundance of bass 8 to 12 inches from a strong year class in 2003.

The lake was stocked with Florida largemouth bass in 2003 and 2004, and the genetic influence of Florida largemouth bass in the lake is still quite strong. Electrophoretic examination indicated that Florida largemouth bass alleles represented 67.4% of the total alleles in the sample (N=47), and 23.4% of the individuals in the sample were pure Florida genotype.

The largemouth bass fishery is the most popular fishery at Houston County Lake. During the March-May 2002 creel survey, anglers reported spending 4.7 hours/acre seeking largemouth bass, representing > 50% of the total effort. The angler catch rate of largemouth bass was 0.2 fish/angler-hour.

- **Crappie:** White and black crappie have not been well represented in trap net samples on Houston County Lake. Five white crappie and one black crappie were captured in fall 2000. Only six white crappie were captured in 2004 and no black crappie. However, results of the 2002 creel indicate a popular fishery for crappie. During the March-May 2002 creel survey, anglers reported spending 3.2 hours/acre seeking crappie (38% of total effort). The angler catch rate was 2.5 fish/angler-hour, and harvest was 1.5 fish/angler-hour with fish between 10 and 14 inches being harvested.
- **Management strategies:** The largemouth bass fishery in Houston County Lake is providing marginal sport fishing opportunities. The number of slot-sized largemouth bass was lower in the 2004 sample than it was in the 2002 and 2003 samples with no fish above 15 inches captured. We will continue monitoring the bass population annually. No regulation changes are recommended at this time.

The crappie population in Houston County Lake appears to be small and widely scattered. However, information obtained in the spring 2002 creel survey indicates a significant crappie fishery. TPWD will conduct a spring creel survey in 2006 to monitor the crappie population.

## INTRODUCTION

This document is a summary of fisheries data collected from Houston County Lake 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 are presented with the 2004-2005 data for comparison.

### Fish harvest regulations at Houston County Lake in 2004-2005.

Species	Bag Limit	Minimum length (inches)
Bass, largemouth	5 in aggregate with 1 largemouth bass $\geq$ 21	14–21-inch slot length limit
Bass, spotted	5 in aggregate	No Limit
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 from randomly selected stations by electrofishing (1 hour at 12, 5-minute stations) and trap netting (5 net nights at 5 stations) in the fall and gill netting (5 net nights at 5 stations) in the spring. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing and for gill nets and trap nets as the number of fish caught in one net set overnight. Largemouth bass electrophoresis samples were collected in accordance with Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Sampling statistics (CPUE for various length categories) and structural indices [Proportional Stock Density (PSD) and Relative Stock Density (RSD)], and Relative Weight (Wr) were calculated for target fishes, when appropriate, according to

Anderson and Neumann (1996).

- A roving creel survey ( 9 days/spring quarter) was conducted in 2002 to assess angler use, catch, and harvest. Interviews were conducted using roving counts while anglers were fishing. Analyses were conducted in accordance with the Texas Parks and Wildlife Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Littoral zone/physical habitat, aquatic vegetation, and angler access and facility surveys were conducted according to 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.
- TPWD, Inland Fisheries Division. 2004. Texas Inland Fishery Assessment Procedures. Unpublished manual. Austin, Texas.

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

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Inland Fisheries water body code:	0369
IF District:	3E - Bryan
Controlling authority:	Houston County WC&ID No. 1
Area:	1,523 acres
Counties:	Houston (location of dam)
Latitude:	31° 21'
Longitude:	95° 29'
Nearest major metropolitan area and distance:	Houston MSA - 125 miles
Reservoir description:	Off channel
River system:	Trinity
Shoreline length:	25 miles
Mean depth (ft):	12.0
Maximum depth (ft):	40.0
Shoreline development ratio:	4.57
Watershed drainage area (mi <sup>2</sup> ):	44
Secchi disc range (ft):	> 6
Conductivity (µmhos/cm):	120
Constructed:	1966
Access:	
Boat Public:	Adequate
Boat Private	Adequate
Bank	Fair
ADA Access:	None

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Survey History of Houston County Lake, Texas, 1970-2005.

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Method	Year
Gill net	1970-1975, 1982, 1984, 1988, 1990, 1993, 1996, 1999, 2001, 2005
Electrofishing	1971, 1975, 1982, 1984-1986, 1988, 1990, 1991, 1993, 1996, 1999, 2000, 2002, 2003, 2004
Trap net	1971, 1986, 1988, 1990, 1993, 1996, 1999, 2000, 2004
Cove rotenone	1975, 1982
Creel survey	1985, 2002
Seining	1970, 1973, 1974, 1975
Habitat	1996, 1999, 2000, 2004

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Habitat survey of littoral zone and physical habitat types, Houston County Lake, Texas, September 2004. Linear shoreline distance (miles) was recorded for each habitat type found. Estimated acreages are reported for non-native vegetation.

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Habitat type	Shoreline distance (miles)	Surface Area (acres)	Percent of Total
Native (emergent)	9.6		37.7
Non Native (floating) Water hyacinth	5.1		20.1
Boat dock/native emergents	1.2		4.8
Bulkhead/boat dock	9.5		37.5
Standing timber		816.0	53.6
Water hyacinth		1.5	0.1
Hydrilla		trace	

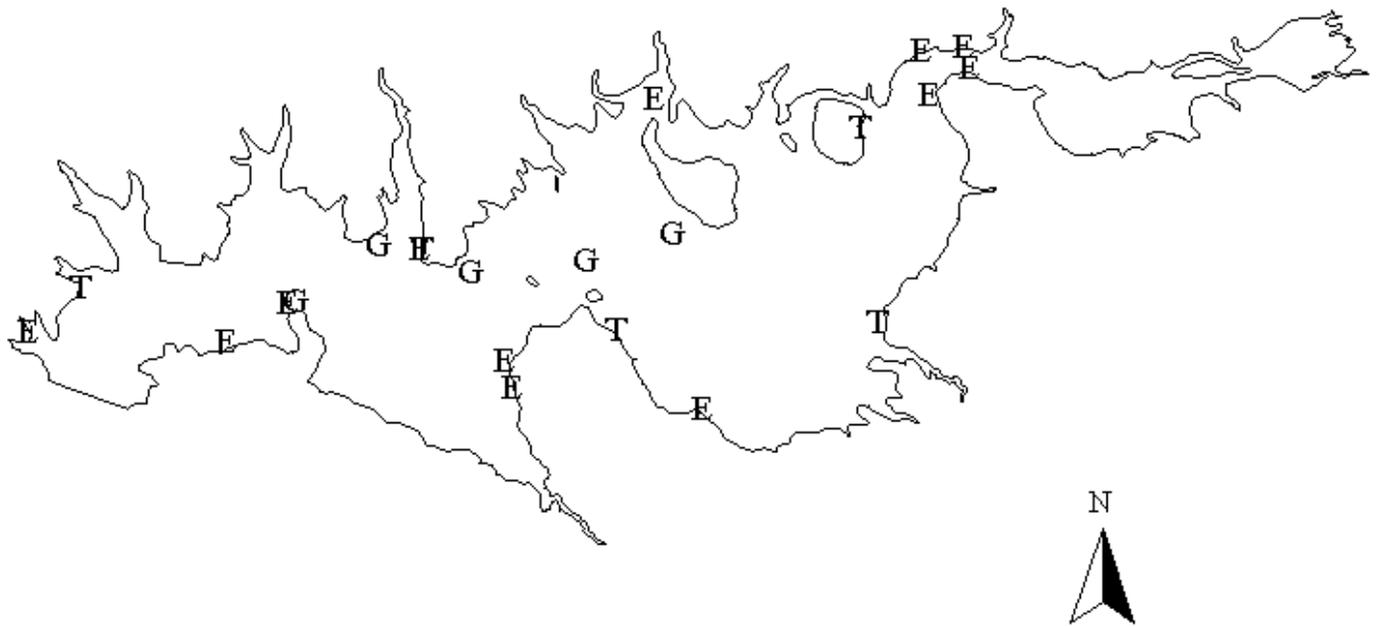
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 Stocking history of Houston County Lake, Texas.
 

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Species	Year	Number
Northern pike	1972	<u>200</u>
	Total	200
Channel catfish	1967	5,000
	1973	26,221
	1986	<u>75,112</u>
	Total	106,333
Striped bass	1972	<u>5,760</u>
	Total	5,760
Palmetto bass	1979	<u>14,500</u>
	Total	14,500
Green x redear	1967	2,000
	1971	<u>8,000</u>
	Total	10,000
Kemp's largemouth bass	1985	34,735
	1986	<u>62,630</u>
	Total	97,365
Florida largemouth bass	1974	72,000
	1976	75,000
	1977	75,000
	2003	131,707
	2004	<u>136,645</u>
	Total	490,352
Black crappie	1967	<u>2,000</u>
	Total	2,000

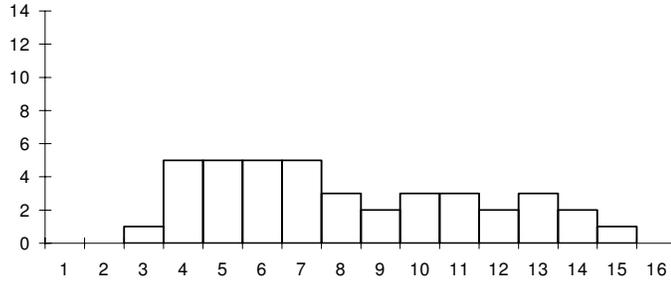
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**E** Electrofishing  
**T** Trap netting  
**G** Gill netting

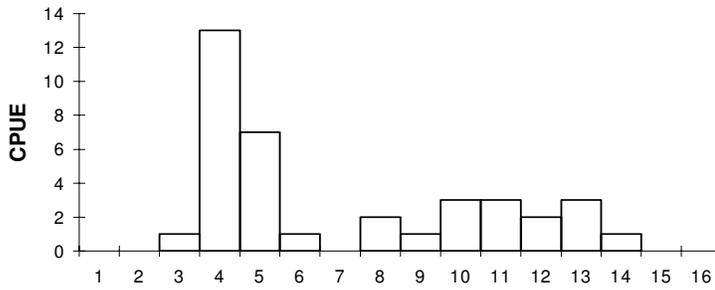
Location of fish sampling stations, Houston County Lake, Texas, 2004-2005.

**Gizzard shad  
2000**



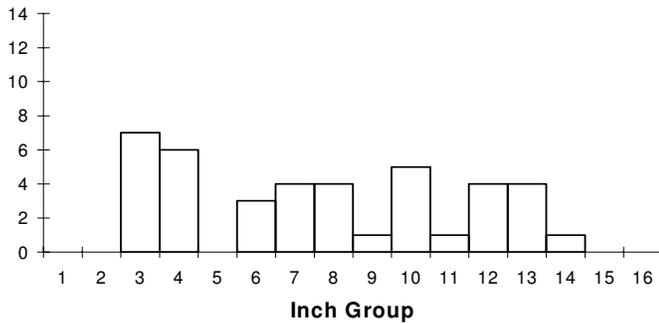
Effort = 1.0  
 Total CPUE = 40.0  
 Stock CPUE = 24.0  
 PSD = 46

**2002**



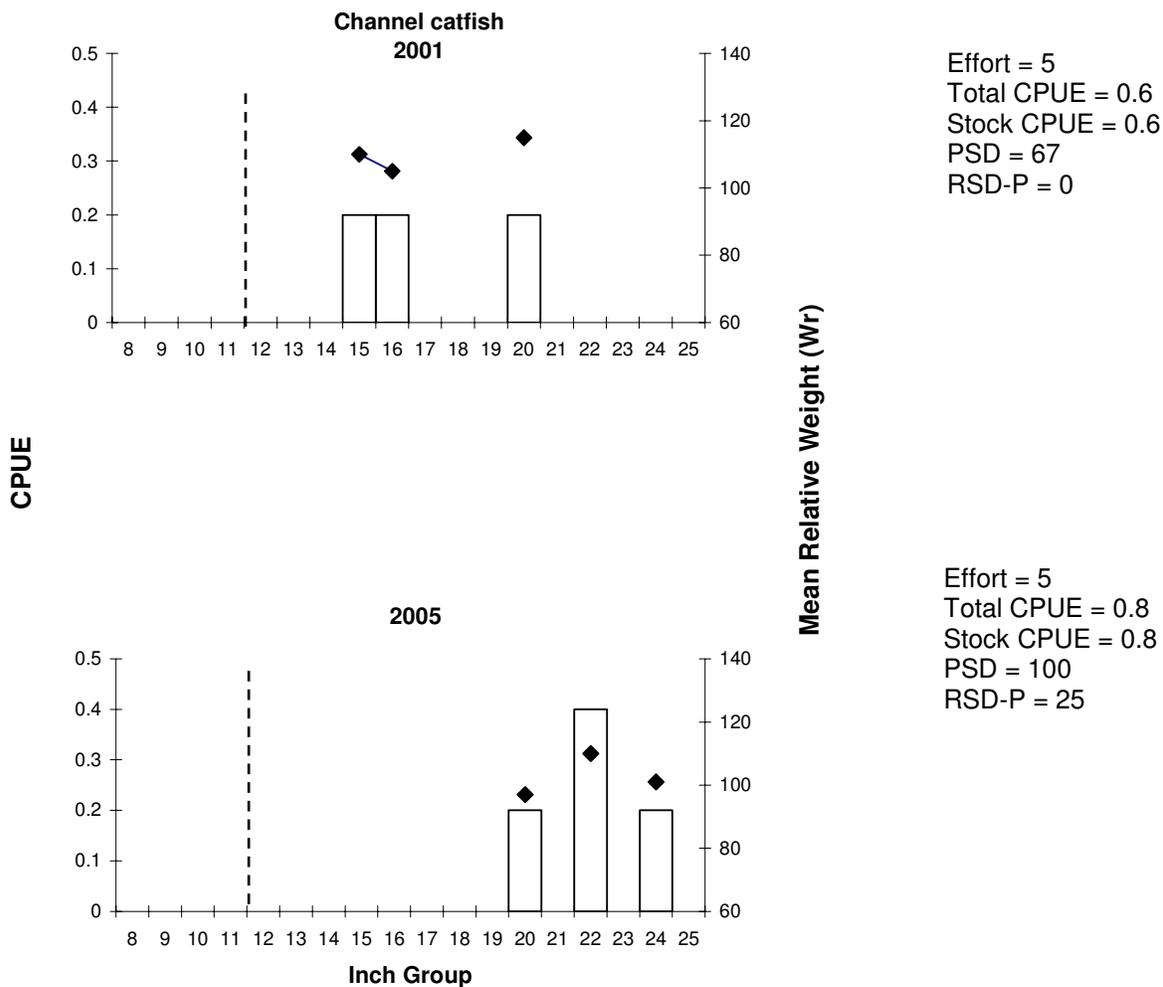
Effort = 1.0  
 Total CPUE = 37.0  
 Stock CPUE = 15.0  
 PSD = 60

**2004**

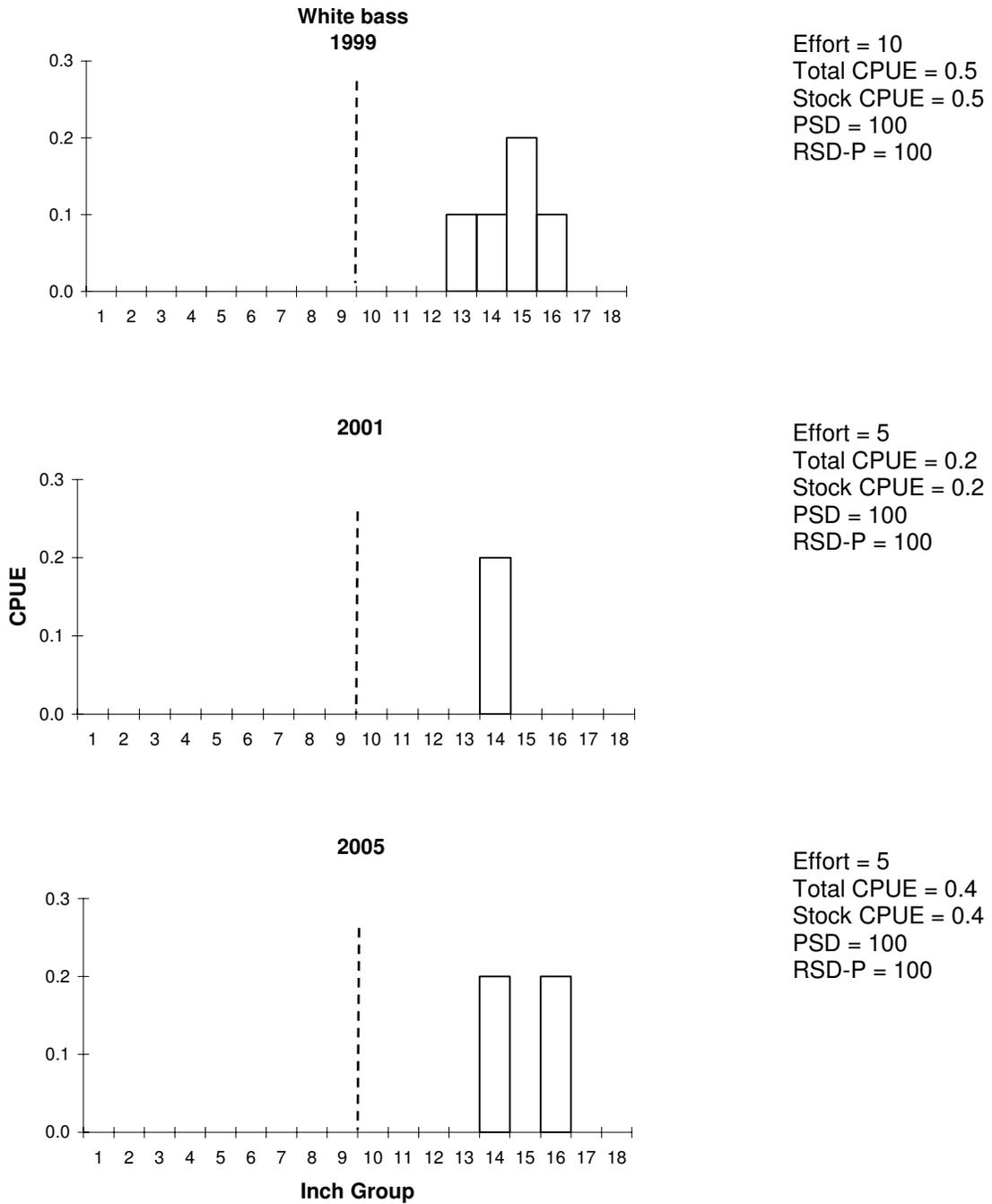


Effort = 1.0  
 Total CPUE = 40.0  
 Stock CPUE = 24.0  
 PSD = 42

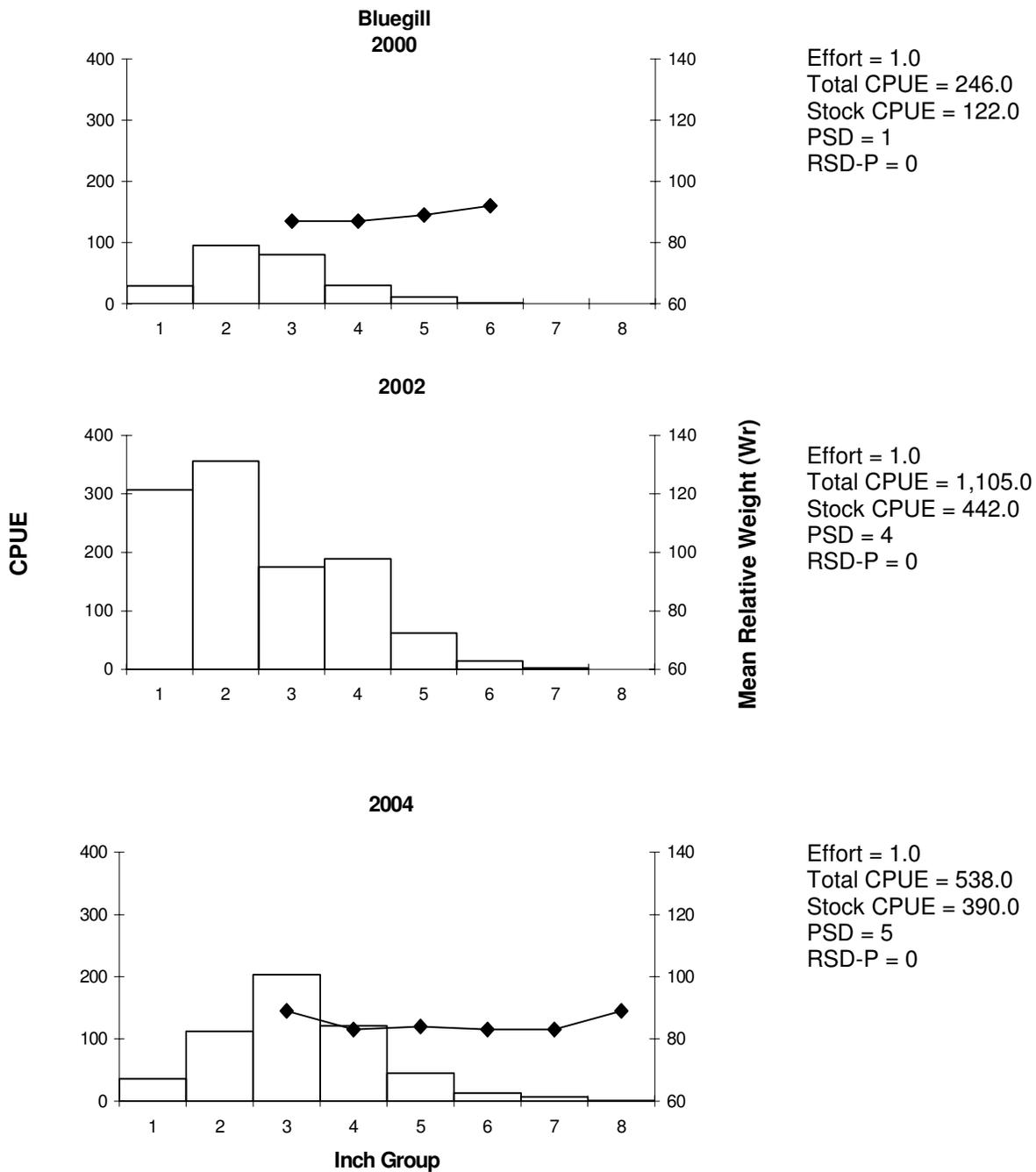
Number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Houston County Lake, Texas.



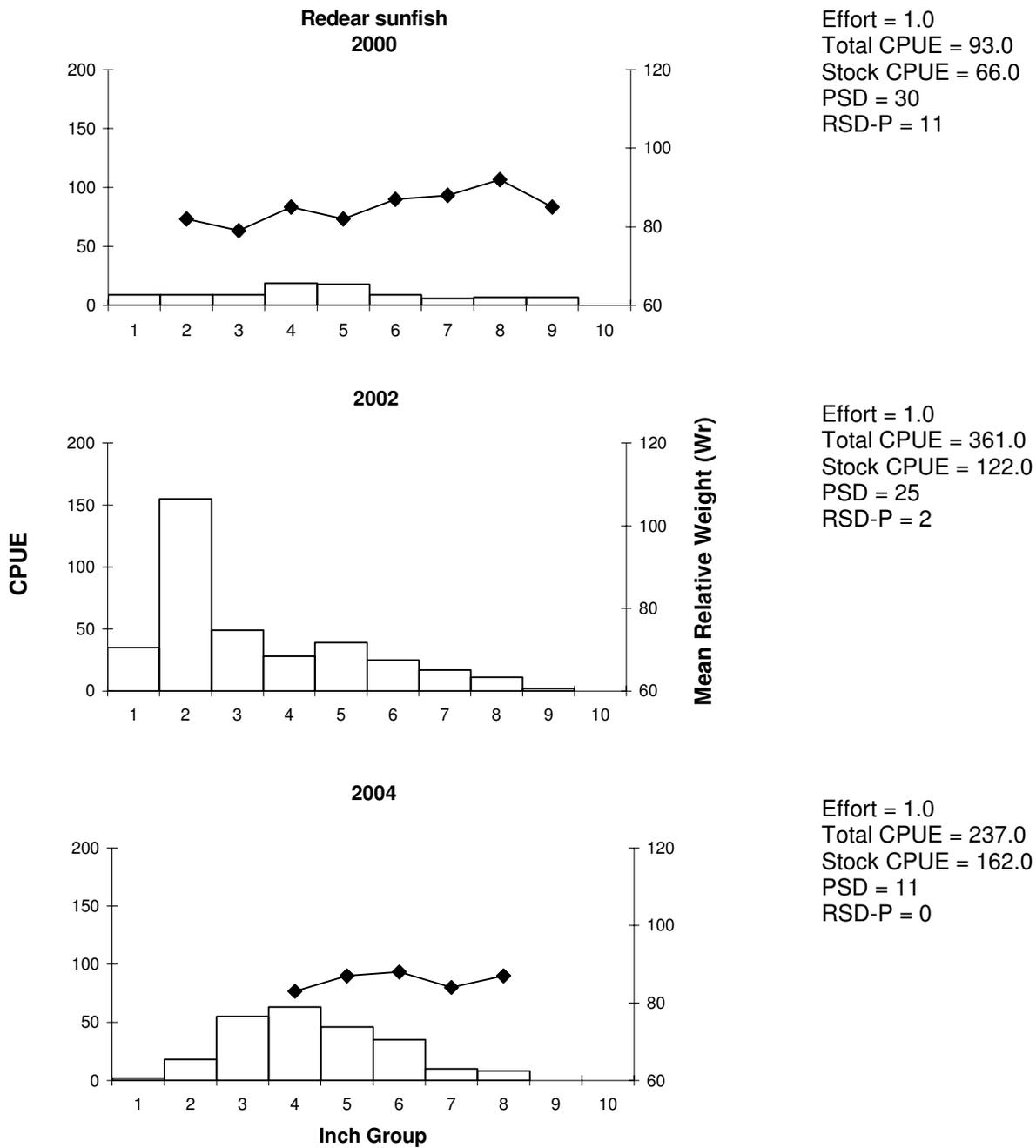
Number of channel catfish caught per net night (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for spring gill net surveys, Houston County Lake, Texas. Vertical dashed lines denote minimum legal length. No channel catfish were captured in 1999.



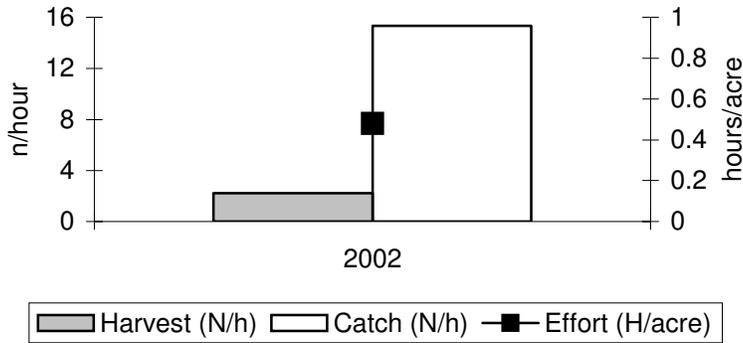
Number of white bass caught per net night (CPUE, bars) and population indices for spring gill net surveys, Houston County Lake, Texas. Vertical dashed lines denote minimum legal length.



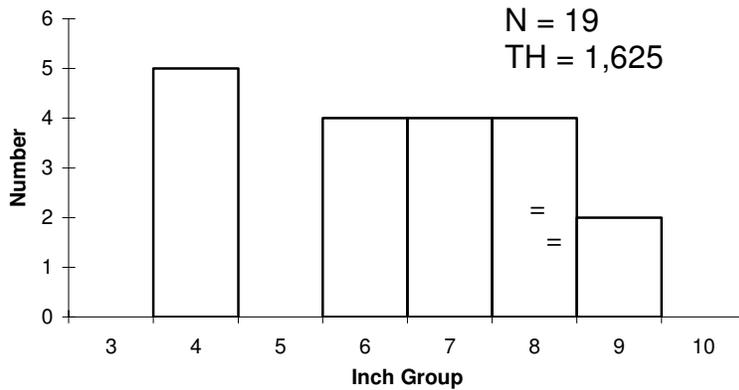
Number of bluegill caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Houston County Lake, Texas. Relative Weight was not evaluated in 2002.



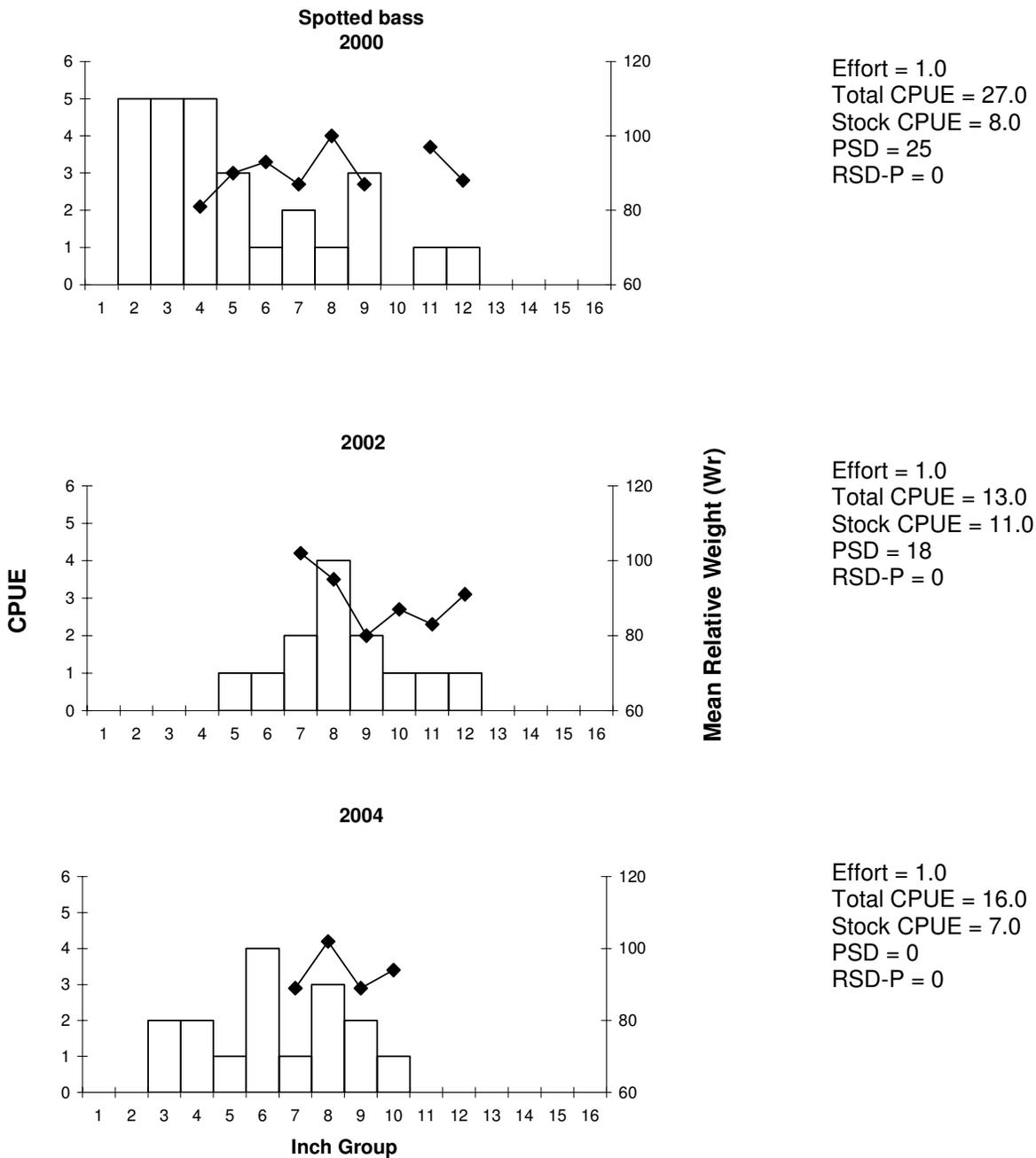
Number of redear sunfish caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Houston County Lake, Texas. Relative Weight was not evaluated in 2002.



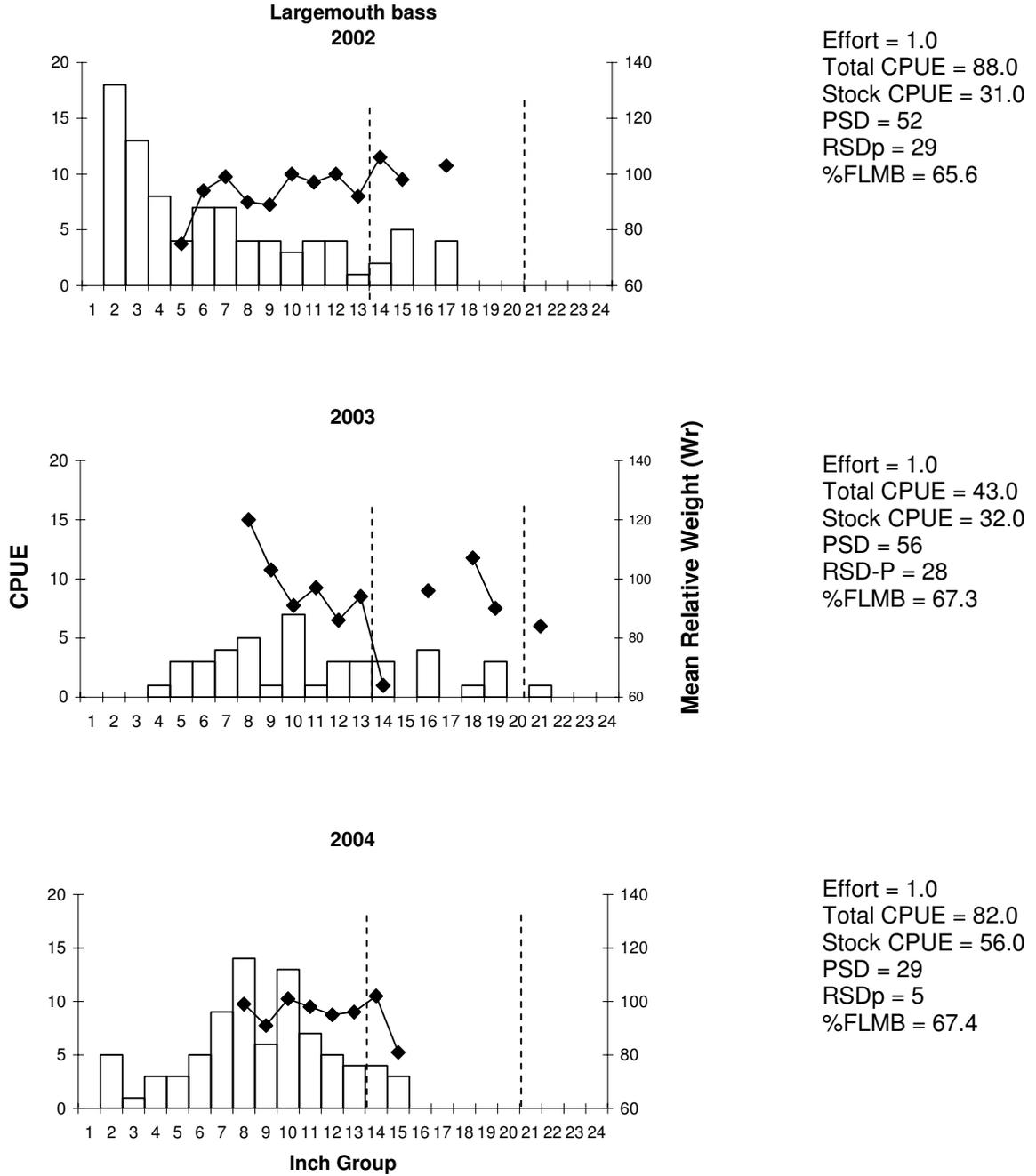
Quarterly creel statistics for rod and reel anglers seeking any sunfish species at Houston County Lake, Texas, March 1, 2002 through May 31, 2002.



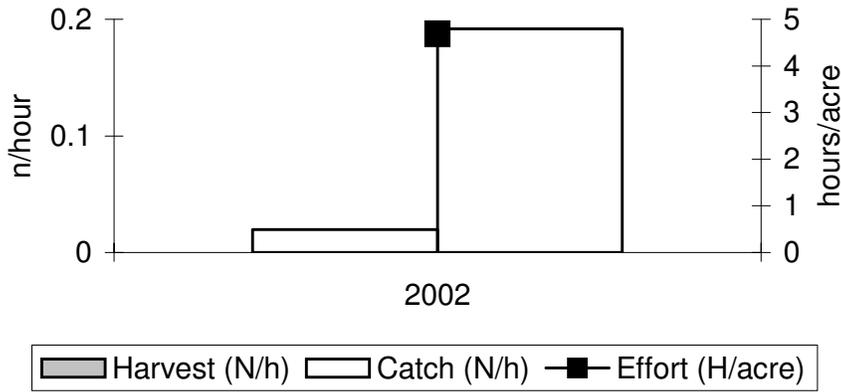
Length frequency of harvested sunfish observed during creel surveys at Houston County Lake, Texas, March through May 2002. N = number of fish observed during creel surveys. TH – total quarterly harvest estimate.



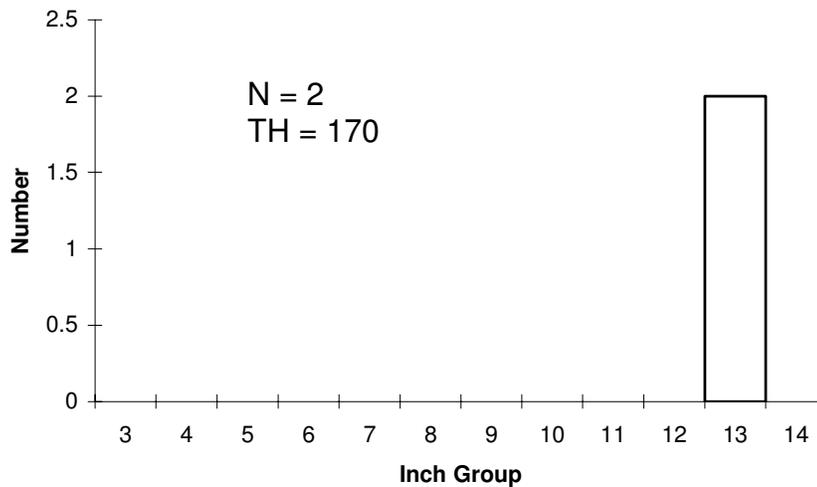
Number of spotted bass caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Houston County Lake, Texas.



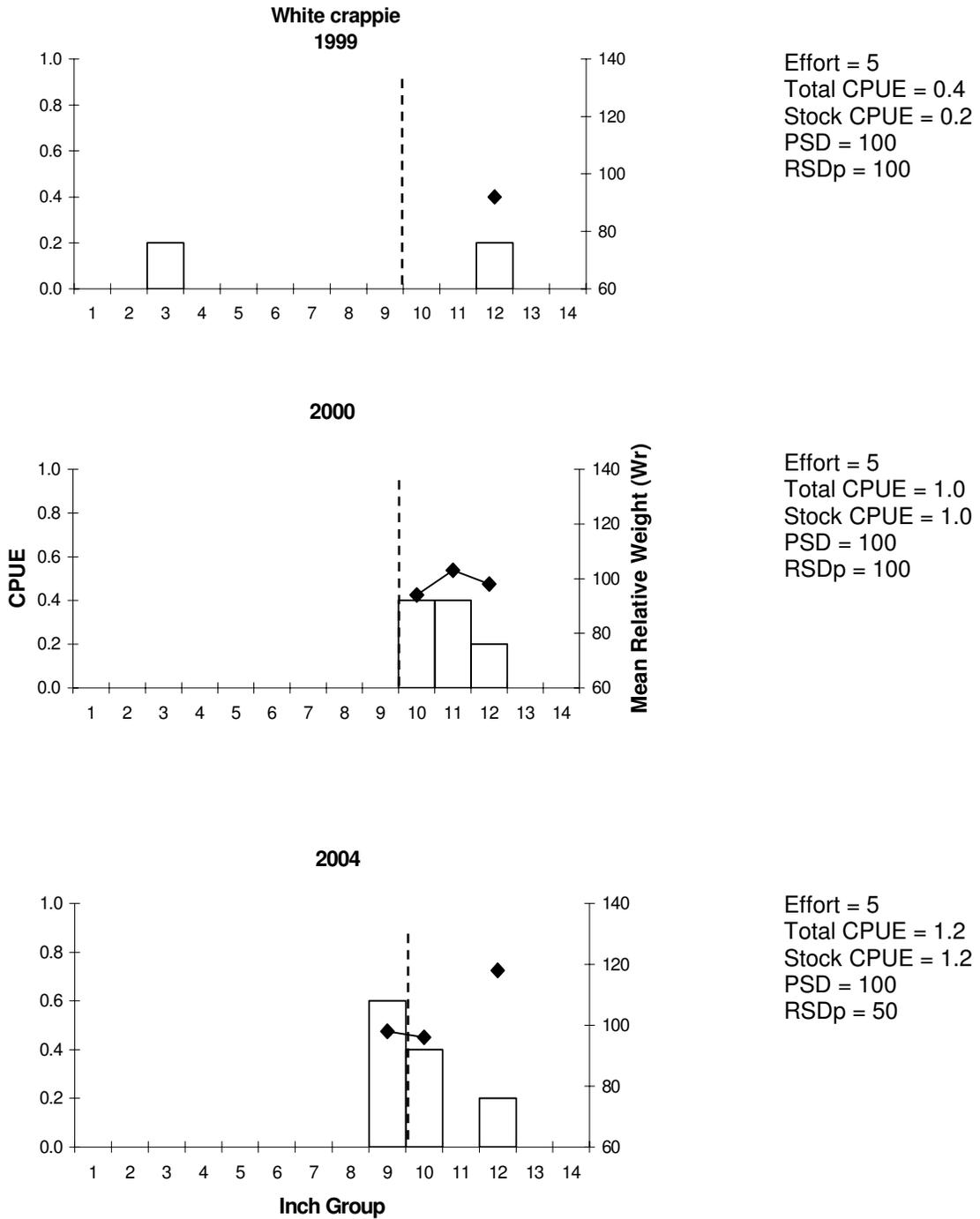
Number of largemouth bass caught per hour (CPUE, bars), mean Relative Weight (Wr, diamonds), and population indices for fall electrofishing surveys, Houston County Lake, Texas. Vertical dashed lines denote the slot length limit.



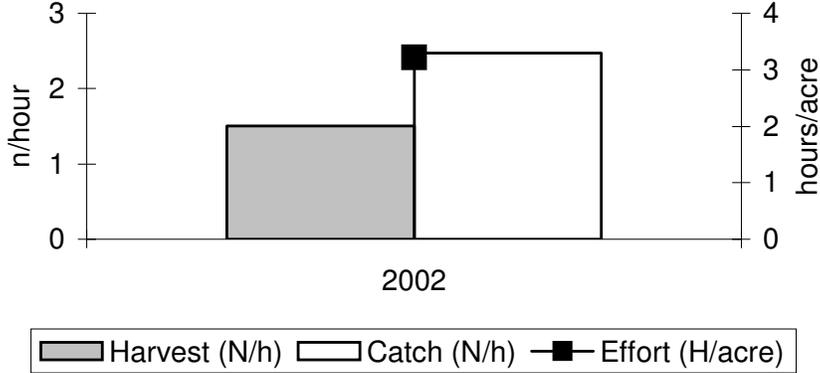
Quarterly creel statistics for rod and reel anglers seeking largemouth bass on Houston County Lake, Texas, March through May 2002.



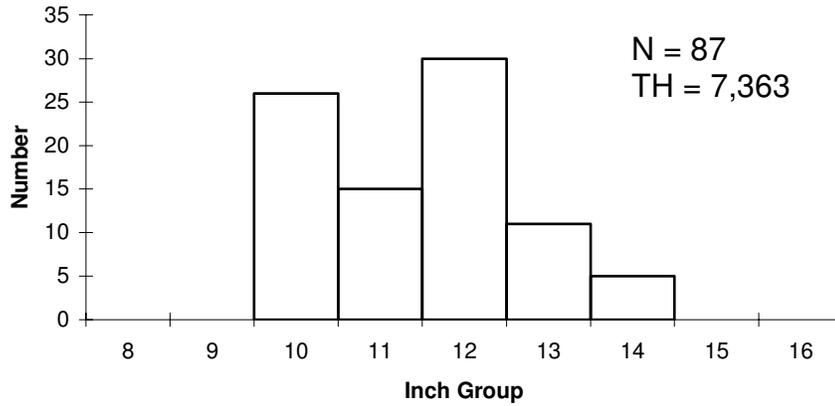
Length frequency of harvested largemouth bass observed during creel surveys at Houston County Lake, Texas, March through May 2002. The slot length lime is 14 to 21 inches. N- number fish observed during the creel surveys. TH – total quarterly harvest estimate.



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



Quarterly creel statistics for rod and reel anglers seeking any crappie species on Houston County Lake, Texas, March through May 2002.



Length frequency of harvested black and white crappie (species combined) observed during creel surveys at Houston County Lake, Texas, March through May 2002. The minimum length limit is 10 inches. N – number of fish observed during creel surveys. TH – total quarterly estimated harvest.

**Fisheries Management Plan  
Houston County Lake, Texas**

Prepared – July 31, 2005.

**ISSUE 1** Houston County Lake has been under a slot length limit for largemouth bass since 1985. A 15-21 inch slot length limit was in effect from September 1985 until September 1988 when the regulation changed to a 14-21 inch slot limit. There is currently no minimum length limit on spotted bass. Recruitment is somewhat low in this lake, but the bass fishery has provided good opportunities for catch and release angling as well as limited harvest of spotted bass and largemouth bass outside the protected slot. The numbers of largemouth bass in the slot decreased in the 2004 sample. No bass over 15 inches were observed. Houston County Lake has a history of producing trophy largemouth bass under the current regulation.

**MANAGEMENT STRATEGIES**

1. Beginning in 2006, monitor largemouth bass using biennial spring electrofishing surveys to monitor relative abundance of slot-sized bass in the population. Conduct fall electrofishing surveys every four years.
2. Conduct a roving creel survey in the spring of 2006 to monitor angler effort, catch, and harvest.
3. Stock additional Florida largemouth bass when criteria are met.
4. In 2008, consider changing the regulation to statewide 14-inch minimum if no changes in relative abundance of slot-size bass are seen.

**ISSUE 2** Though trap net catches have been low, the 2002 creel survey indicates a high level of directed angling effort and high angler catch and harvest of crappie in Houston County Lake.

**MANAGEMENT STRATEGIES**

1. Conduct trap net surveys every 4 years.

**ISSUE 3** The quality of littoral habitat vital to spawning and recruitment success of largemouth bass and other sport fishes has slowly degraded through the loss of native aquatic macrophytes, resulting in decreased recruitment of sport fish populations. Beginning in 1999, in cooperation with the Houston County

Bass Club and U.S. Army Corps of Engineers, Texas Parks & Wildlife Inland Fisheries began a project to re-establish native aquatic macrophytes in Houston County Lake.

#### MANAGEMENT STRATEGIES

1. Continue monitoring the test plots at Houston County Lake to determine which species of plants are most likely to establish successfully.
2. Continue working with cooperators to expand the project as needed.

**ISSUE 4** Houston County Lake has a particularly good population of redear sunfish offering an excellent opportunity for fly rod and light tackle anglers, yet many anglers remain unaware of this opportunity. Information on this and other aspects of this fishery need to be disseminated more efficiently and frequently.

#### MANAGEMENT STRATEGIES

1. Construct angler information boards for use at major access points. Boards will be used to display information regarding Houston County Lake fisheries and management strategies as well as rules and regulations and information pertaining to the Angler Recognition Program.
2. Signs at access points need to be replaced.
3. Produce a Houston County Lake brochure highlighting all of the reservoir's fishing opportunities.
4. Produce more news releases to be disseminated to local media outlets.

**Appendix 1**

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

Species	Gill netting (5 net nights)		Trap netting (5 net nights)		Electrofishing (1 hour)	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					40	40.0
Threadfin shad					150	150.0
Bullhead minnow					2	2.0
Pugnose minnow					1	1.0
Blacktail shiner					4	4.0
Channel catfish	4	0.8				
White bass	2	0.4				
Warmouth					3	3.0
Bluegill					538	538.0
Longear sunfish					13	13.0
Redear sunfish					237	237.0
Spotted sunfish					1	1.0
Spotted bass					16	16.0
Largemouth bass					82	82.0
White crappie			6	1.2		
Black crappie			0	0.0		

**Appendix 2**

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Houston County Lake, Texas, 1990, 1993, 1996, 1999, 2000, 2002, 2003, 2004.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		Florida	F1	Fx	Northern		
1990	25	7	5	13	0	77	28
1993	20	9	3	6	2	72	45
1996	30	15	3	10	2	80	50
1999	40	19	3	16	2	76	48
2000	12	5	1	6	0	81	42
2002	50	6	11	25	1	66	14
2003	13	2	2	9	0	67	15
2004	47	11	16	20	0	67	23

**Appendix 3**

Angler access facilities, Houston County Lake, Texas, 2004.

Name	GPS Coordinates	Fee Charged	Number of lanes	Accommodations for challenged	Bank fishing
Dam	31° 24' 19" 95° 36' 09"	N	2	N	Y
Crockett Family Resort	31° 24' 38" 95° 34' 43"	Y	2	N	Y
County Boat Ramp	31° 24' 49" 95° 33' 38"	N	1	N	Y