

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

**Purtis Creek State Park Lake**

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## EXECUTIVE SUMMARY

Purtis Creek State Park Lake was surveyed during the period June 2004 to May 2005 using electrofishing, trap nets, gill nets, littoral zone habitat and vegetation surveys, 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:** Purtis Creek State Park Lake is a 349-acre reservoir on Purtis Creek, a tributary of the Trinity River. The impoundment was constructed by the Texas Parks and Wildlife Department in 1985 for recreational and soil conservation purposes. Boat and bank access are both good. There are two handicap accessible fishing piers. Hydrilla has continued to require periodic herbicide treatment to provide access to the fishing piers, boat ramp, and swimming beach. Purtis Creek State Park funded the treatment of 13 acres of hydrilla with SONAR SRP in April 2005, which was applied by the TPWD Inland Fisheries Aquatic Habitat Enhancement crew. Problems associated with this hydrilla infestation will likely continue. Hydrilla should be treated with SONAR, as necessary, to allow continued access for lake users. Native vegetation now covers 116 surface acres (33%).
- **Prey species:** Sunfish have traditionally been the predominant prey available to largemouth bass in Purtis Creek State Park Lake. However, electrofishing catch rates of bluegill and redear sunfish have recently declined. Bluegill catch rates have declined from 311 fish/hour in 2001 to 35 fish/hour in 2004. No redear sunfish were collected in 2004, but the 2003 fall electrofishing survey produced 208 fish/hour. The abundance of submersed aquatic vegetation has made electrofishing difficult in some areas of the lake and this may be negatively affecting sunfish catches. Also, redear sunfish may reside in deeper water in areas making them less vulnerable to electrofishing. Gizzard shad provide supplemental prey, but the majority of individuals were too large to be utilized by predators. The electrofishing catch rate of gizzard shad has declined from 119 fish/hour in 2002 to 28 fish/hour in 2004. However, threadfin shad catch rates have increased from 10 fish/hour in 2003 to 235 fish/hour in 2004, which were all of a size available to predators.
- **Catfishes:** Gill net sampling on Purtis Creek State Park Lake typically yields very low catches of catfish. Only one blue catfish and no channel catfish were collected during the 2005 gill net survey. Natural recruitment of catfish has always been limited in Purtis Creek, presumably as a result of heavy predation by largemouth bass. Therefore, stockings of advanced size channel or blue catfish ( $\geq 12$  inches) may be needed to sustain recreational angling opportunity for catfish in this reservoir.

- **White bass:** White bass were collected in gill nets for the first time in 2005. Only 16 fish were collected (3.2 fish/net night). A sub-sample of 10 fish collected for age-and-growth analysis indicated that 2 year classes (age 1 and age 2) were present in the reservoir. It is not known how this species was introduced to the waterbody. However, due to the lack of suitable spawning habitat, population density should remain low.
- **Sunfishes:** The special 7-inch minimum length limit harvest restriction on sunfishes was discontinued September 2002 as recommended by Ott et al. (2001). Electrofishing catch rates of all sunfish species have been variable since 2000; however, large sunfish (>6 inches) are available to anglers.
- **Black bass:** Annual electrofishing surveys at Purtils Creek State Park Lake continue to indicate the presence of a high-quality and relatively stable largemouth bass population. Since 2000, spring electrofishing catch rates of stock-size fish ( $\geq 8$  inches) has ranged from 79 to 110 fish/hour and fall catch rates have ranged from 78 to 139 fish/hour. Mean relative weight ( $W_r$ ) in each inch class has generally been  $>90$  during fall sampling. However, some individual fish have been in extremely poor condition presumably as a result of hooking injuries. The mean age of a sample of 13 fish, between 13.6 and 15.4 inches TL, was 3.8 years (range = 2 to 7). Size structure of the population indicated a large proportion of the fish above quality length (PSD = 74, RSD-14 = 68).
- **Crappie:** The quality of the white crappie population in Purtils Creek has declined since the 2000 trap net survey. Total catch (11.2 fish/net night) was similar to 2000 surveys; however, catch of stock-length fish ( $\geq 5$  inches) and legal-size fish declined in 2004. However, a successful 2004 year class should recruit to the fishery by fall 2005. Growth of white crappie was good. Age and growth analysis of 23 fish approximately 10 inches in length indicated that all were age 1. Condition of white crappie was excellent with most inch groups having a mean  $W_r >100$ .

- **Management Strategies**

The largemouth bass population at Purdis Creek State Park Lake is managed with a catch-and-release only regulation to maintain high angling catch rates. Population trends should be monitored with annual spring and fall electrofishing. With this highly restrictive harvest regulation, Florida largemouth bass genetics will provide the best opportunity for production of trophy-size fish. Therefore, largemouth bass genetics should be monitored every other year to determine the necessity of future stocking of Florida largemouth bass. White bass have recently been discovered in this reservoir. Lack of suitable spawning habitat should limit their abundance; however, gill netting and age and growth analyses should be utilized to monitor their status in the reservoir. Due to the lack of catfish recruitment, the stocking of advanced size fingerlings (>12 inches) may be required to maintain this fishery. Because this is a state park facility, Purdis Creek State Park Lake will be considered a high priority for stocking, assuming these size fish are available in our hatchery system. Efforts should be made to seek additional sources of fish or outside funding partners in this effort. The hydrilla infestation at Purdis Creek State Park Lake has required continued control in access areas. The abundance of hydrilla should continue to be monitored during scheduled annual vegetation surveys.

## INTRODUCTION

This document is a summary of fisheries data collected from Purtis Creek State Park Lake in 2004 and 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 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.

Fish harvest regulations at Purtis Creek State Park Lake in 2004-2005.

Species	Bag limit	Minimum length (inches)
Bass, largemouth	Catch and release only: Fish $\geq$ 21 inches in length can be weighed at lake-side weigh station	-
Bass, white	25	10
Catfish, blue and channel	5 (in combination)	None
Catfish, flathead	5	18
Crappie, black and white	25 (in combination)	10

## METHODS

- Fishes were collected by electrofishing in fall and spring (1 hour at 12, 5-minute stations), trap netting in fall (one net-night each at 5 stations), and gill netting in spring (one net-night each 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. 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], relative stock density [RSD], and relative weight [Wr]) were calculated for target fishes, when appropriate, according to Anderson and Neumann (1996).

- Ages were determined for largemouth bass, white bass, and white crappie using otoliths. Individual ages were determined for a sub-sample of fish within one inch above and below 14 inches for largemouth bass and 10 inches for crappie. Category 2, Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Aquatic vegetation and angler access and facility surveys were conducted in accordance with the Texas Parks and Wildlife Department Inland 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.
- Ott, R. A., Jr., T. J. Bister, and J. W. Schlechte. 2001. Assessment of a 178-mm minimum length limit on bluegill at Purvis Creek State Park Lake, Texas. Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies 55:334-345.

## Physical and historical data for Purtis Creek State Park Lake, Texas, 2004-2005.

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Inland Fisheries water body code:	0593	
IF District:	3-C, Tyler	
Controlling authority:	Texas Parks and Wildlife	
Area:	349 acres	
Counties:	Henderson (dam), and Van Zandt	
Latitude:	32° 21'	
Longitude:	95° 58'	
Nearest major metropolitan area and distance:	Tyler – 40 miles	
Reservoir description:	State Park	
River system:	Trinity	
Shoreline length (mi):	7.0	
Mean depth:	10.7	
Maximum depth (ft):	30.0	
Shoreline development ratio:	2.7	
Watershed drainage area (mi <sup>2</sup> ):	10.0	
Secchi disc range (ft):	4-6	
Conductivity (µmhos/cm):	120	
Constructed:	1985	
Access:	Boat public:	Good – 1 ramp
	Bank:	Good
	Handicap:	Excellent – 2 piers ADA approved

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## Survey History:

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Method	Year
Gill net	1987-1993, 1995, 1996, 1997, 2001, 2005
Electrofishing	1986-2005
Trap net	1987-1997, 2000, 2004
Creel survey	1987-1997
Habitat survey	1996, 1997, 2000
Vegetation survey	1989, 1991-1997, 2000, 2004

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Summary of aquatic vegetation survey, Purtil Creek State Park Lake, Texas, 9/14/2004. Total surface area = 349 acres.

Vegetation type	Species	Acreage	Percent of total
Native emergent	American lotus	94	27
	Cattail	3	<1
Native submersed	Pondweed	2	<1
	Coontail	17	5
Non-native/invasive	Hydrilla	22	6

## Stocking history of Purtis Creek State Park Lake, Texas.

Species	Year	Number	Size
Threadfin shad	1985	1,840	Adult
	1994	500	Adult
	Total	<u>2,340</u>	
Blue catfish	2000	8,906	Fingerling
	2003	8,746	Fingerling
	Total	<u>17,652</u>	
Channel catfish	1985	54,140	Fingerling
	1986	10,080	Fingerling
	1987	4,400	Fingerling
	1989	11,230	Adult
	1990	177,503	Fingerling
	1991	8,875	Fingerling
	1992	14,650	Fingerling
	1993	17,882	Fingerling
	1994	8,876	Fingerling
	1995	8,170	Fingerling
		2,703	Adult
	1996	8,850	Adult
	1998	8,973	Fingerling
	1999	8,870	Fingerling
	2001	8,875	Fingerling
2002	8,875	Fingerling	
Total	<u>362,952</u>		
Bluegill	1994	2,500	Fingerling
	Total	<u>2,500</u>	
Bluegill X green sunfish hybrid	1997	700	Fingerling
	Total	<u>700</u>	
Coppernose bluegill	1984	67,679	Fingerling
	1987	7,300	Fingerling
	Total	<u>74,979</u>	
Redear sunfish	1985	86,792	Fingerling
	Total	<u>86,792</u>	

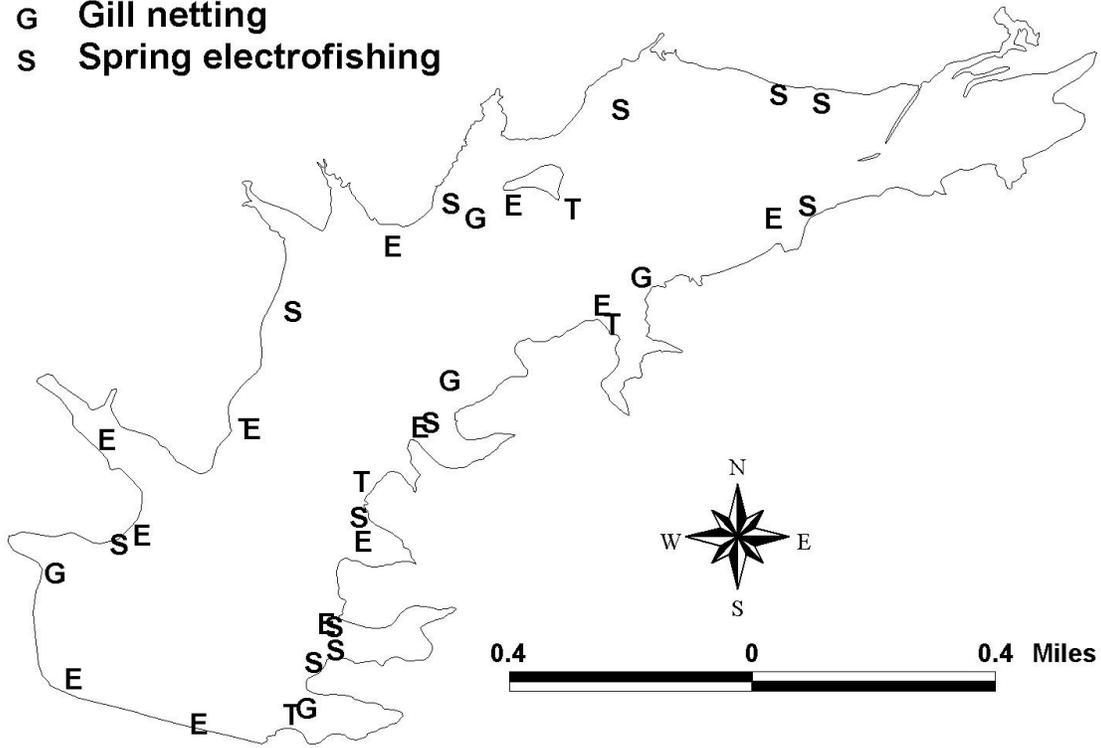
## Stocking history, continued.

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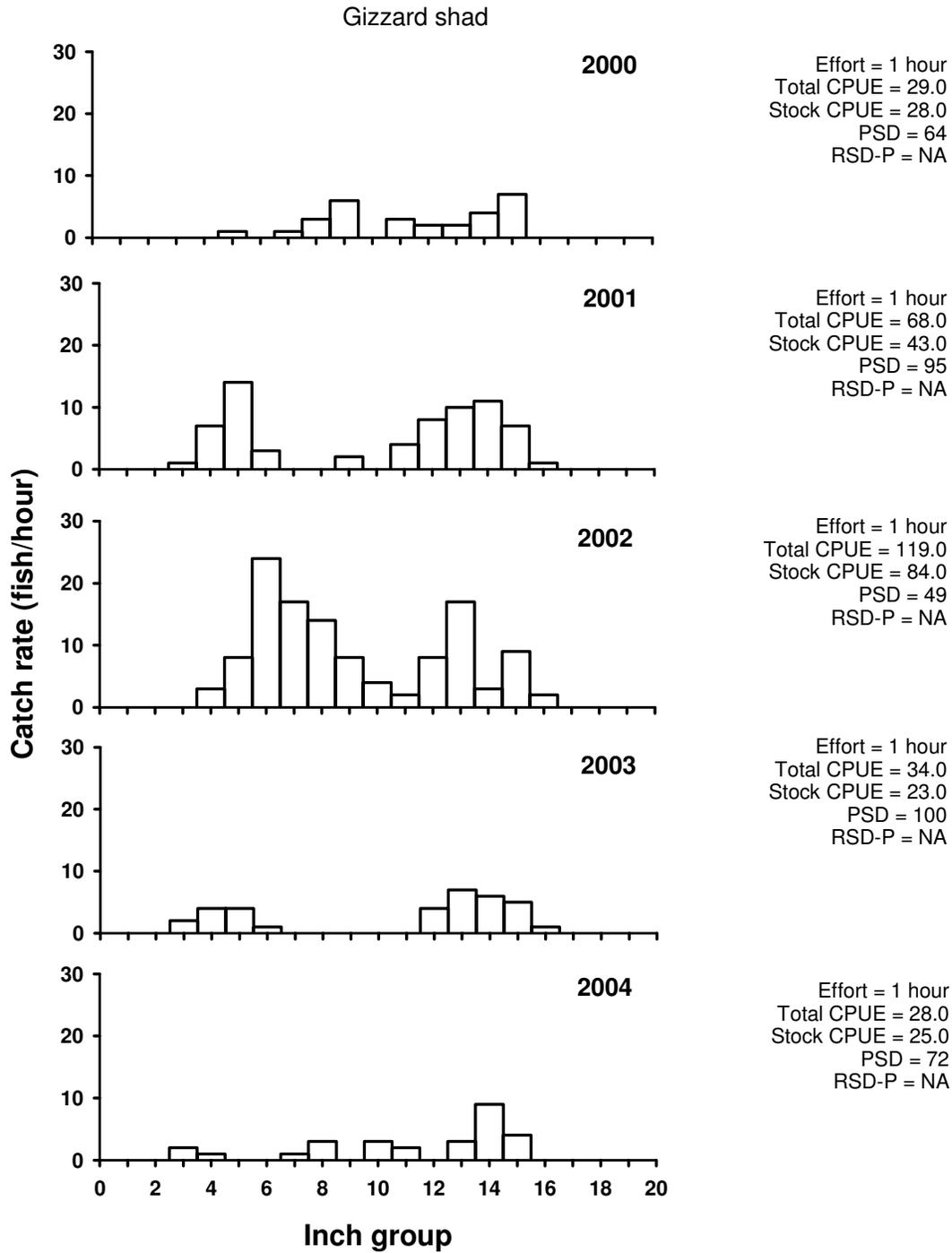
Largemouth bass	1995		19,959	Fingerling
	1996		17,987	Fingerling
		Total	<u>37,946</u>	
Florida largemouth bass	1985		31,440	Fingerling
			248	Adult
		Total	<u>31,688</u>	

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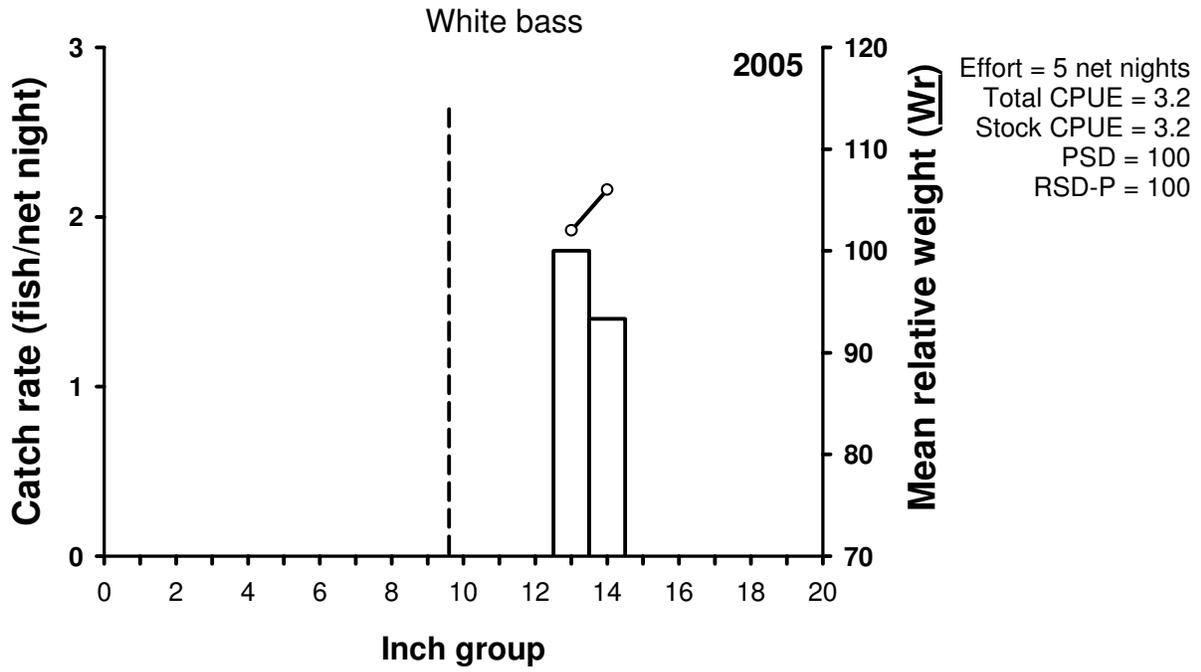
- E** Fall electrofishing
- T** Trap netting
- G** Gill netting
- S** Spring electrofishing



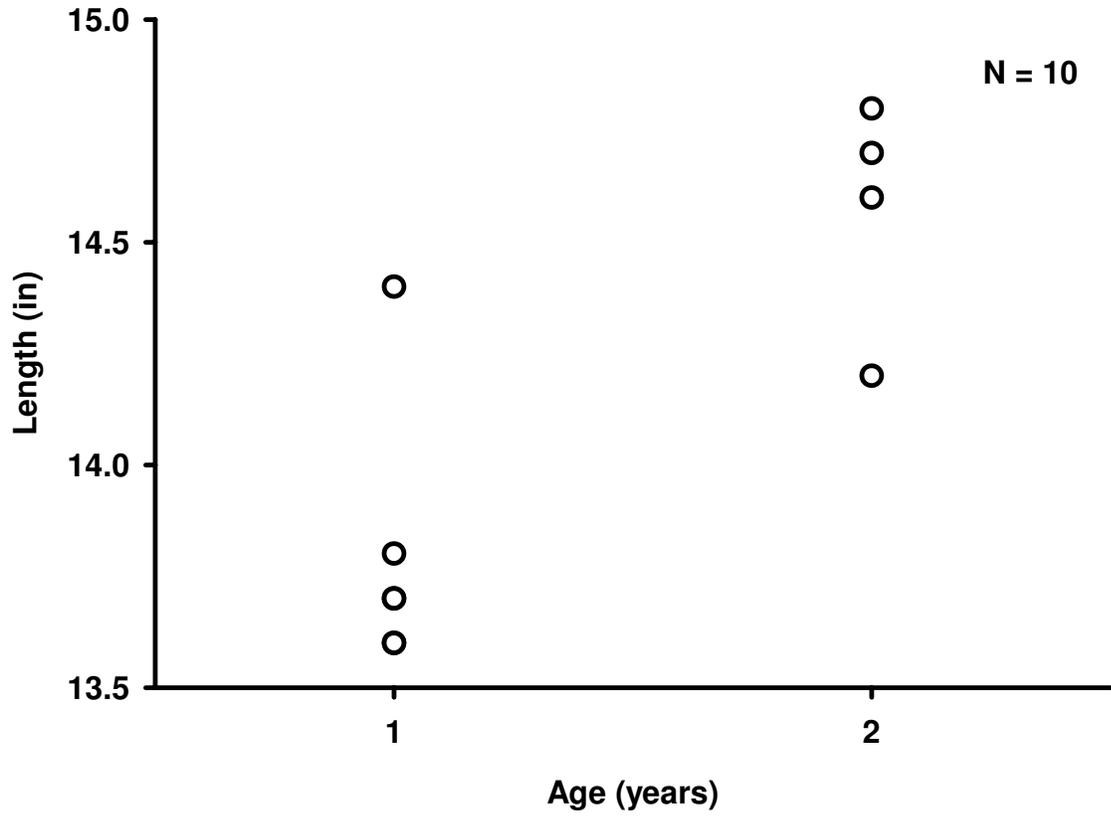
Location of fish community sampling stations for Puritis Creek State Park Lake, Texas, 2004-2005. Legend indicates sampling gears.



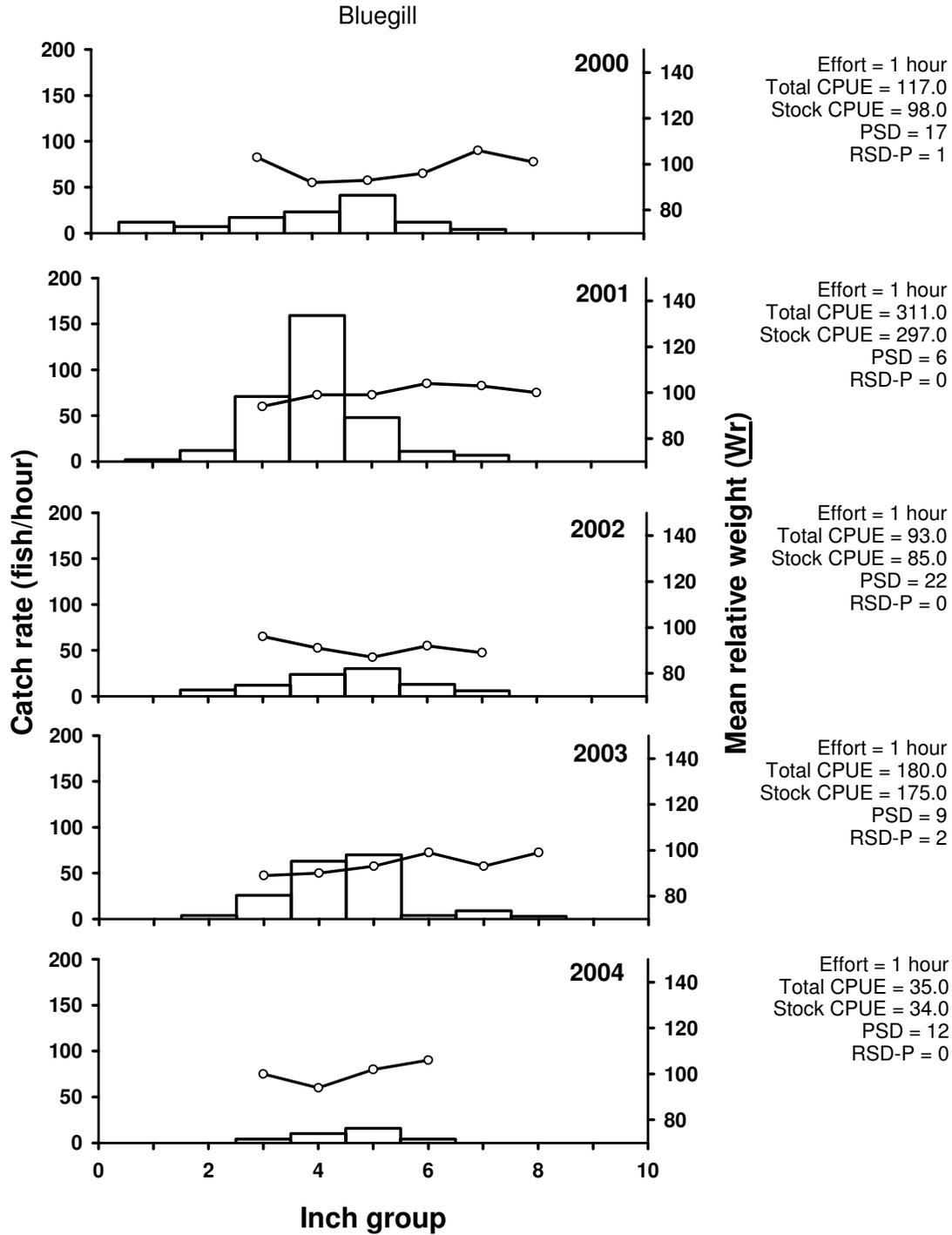
The number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Puritus Creek State Park Lake, Texas.



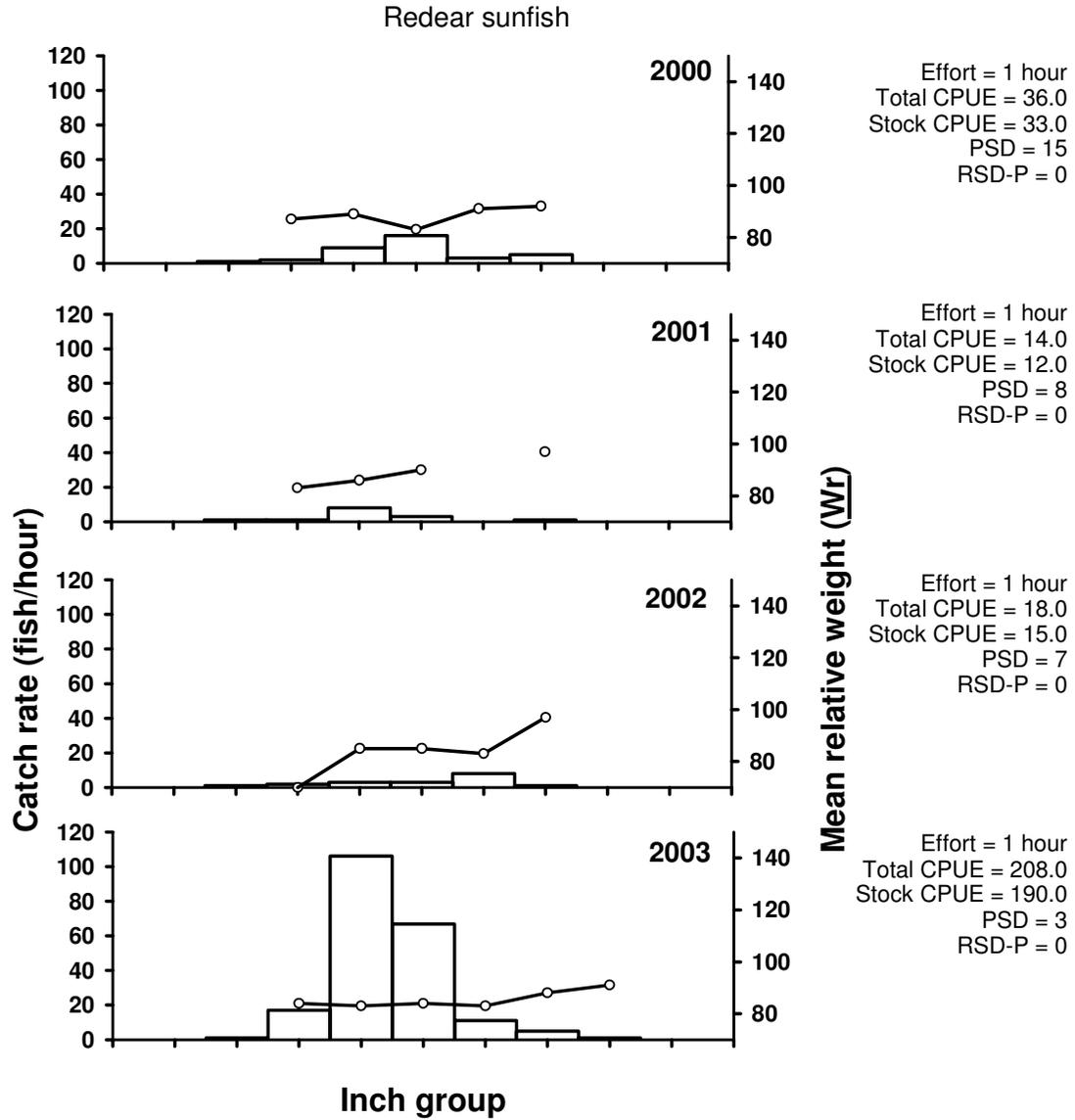
The number of white bass caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill netting surveys, Purtils Creek State Park Lake, Texas. Vertical line indicates minimum length limit.



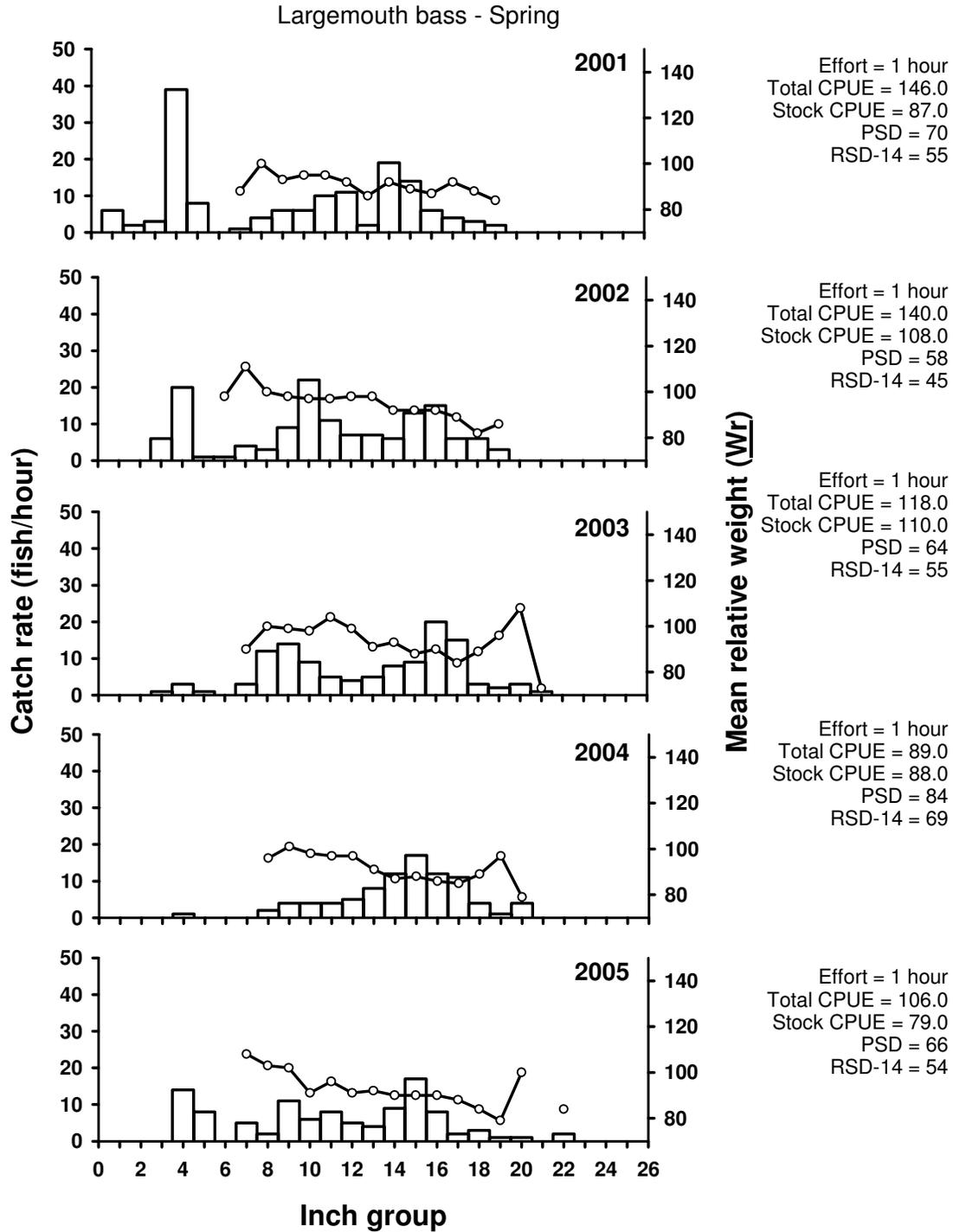
Length-at-age (inches) at time of capture for white bass, collected by gill netting, Purvis Creek State Park Lake, Texas, March 2005.



The number of bluegill caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Puritus Creek State Park Lake, Texas.

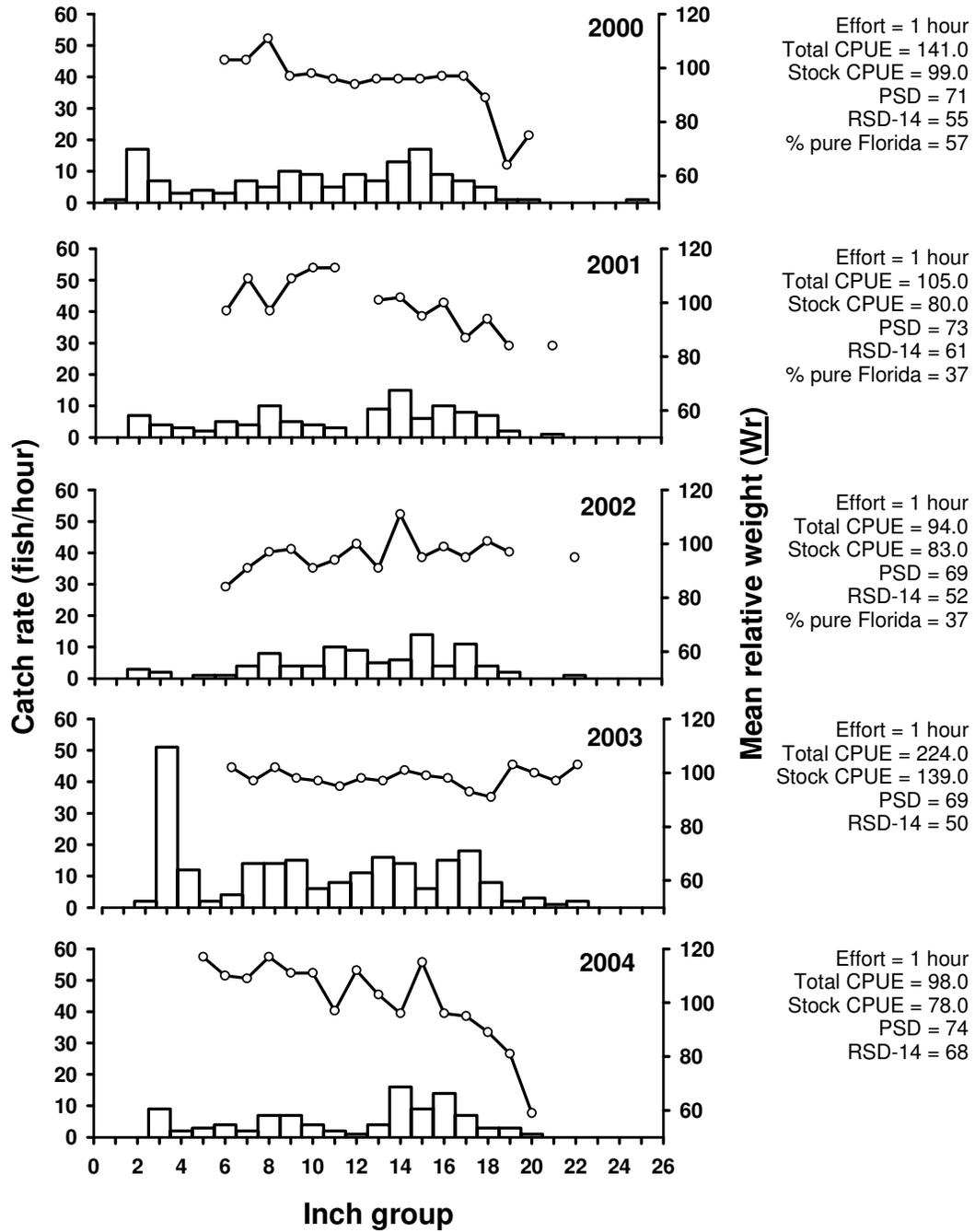


The number of redeer sunfish caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Puritis Creek State Park Lake, Texas. None were collected in 2004.

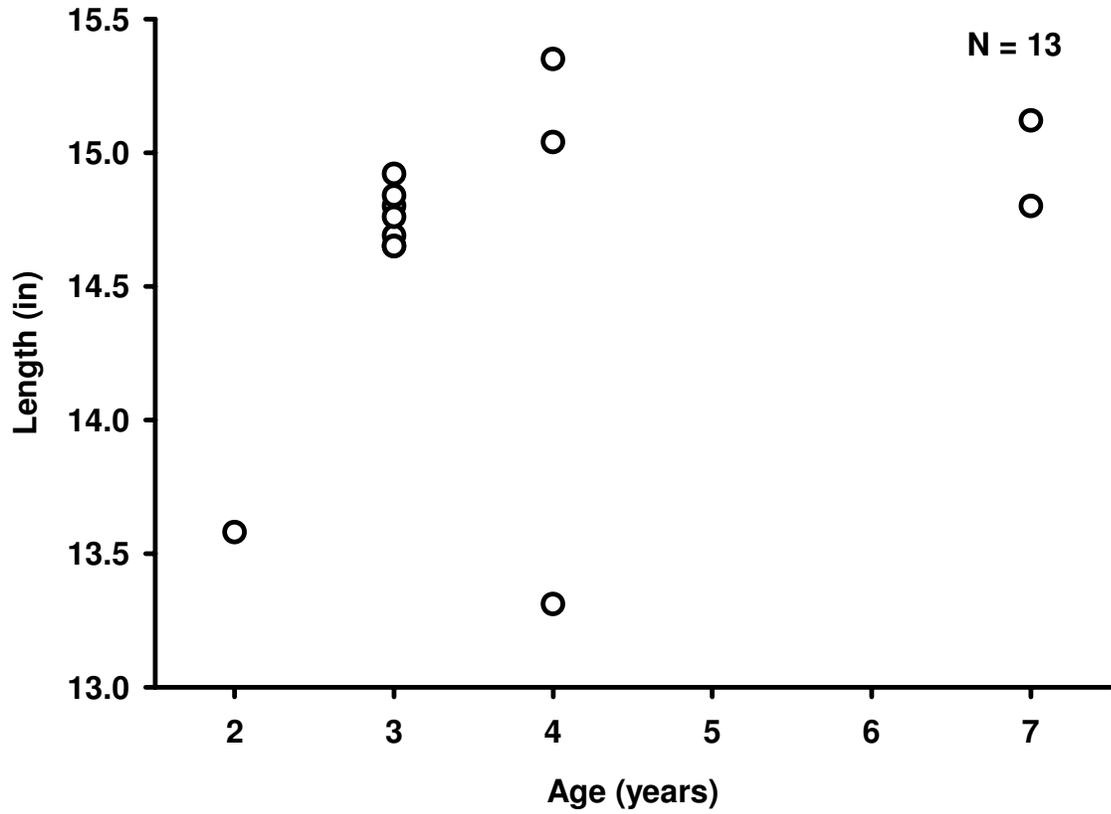


The number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for spring electrofishing surveys, Purtil Creek State Park Lake, Texas.

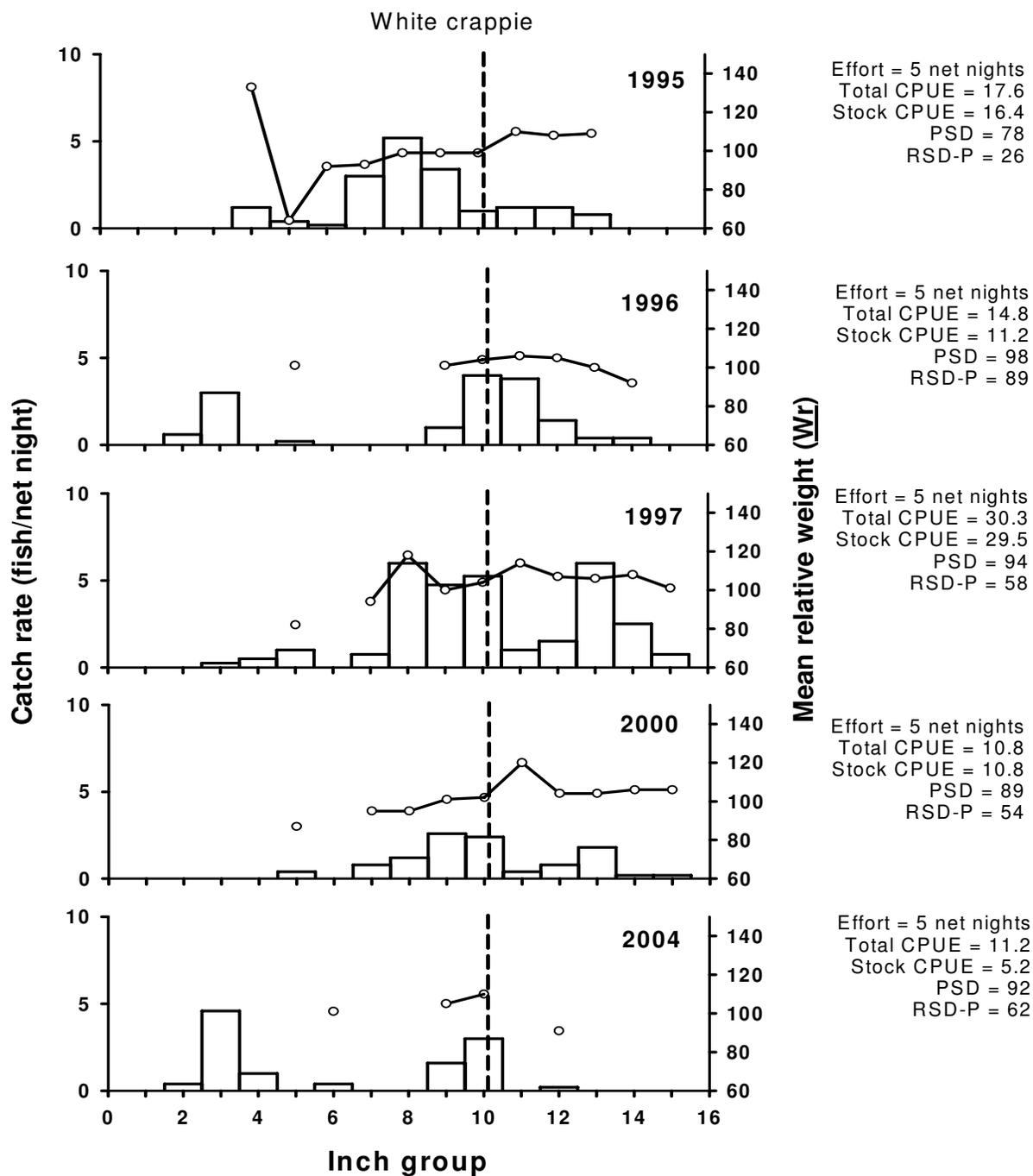
Largemouth bass - Fall



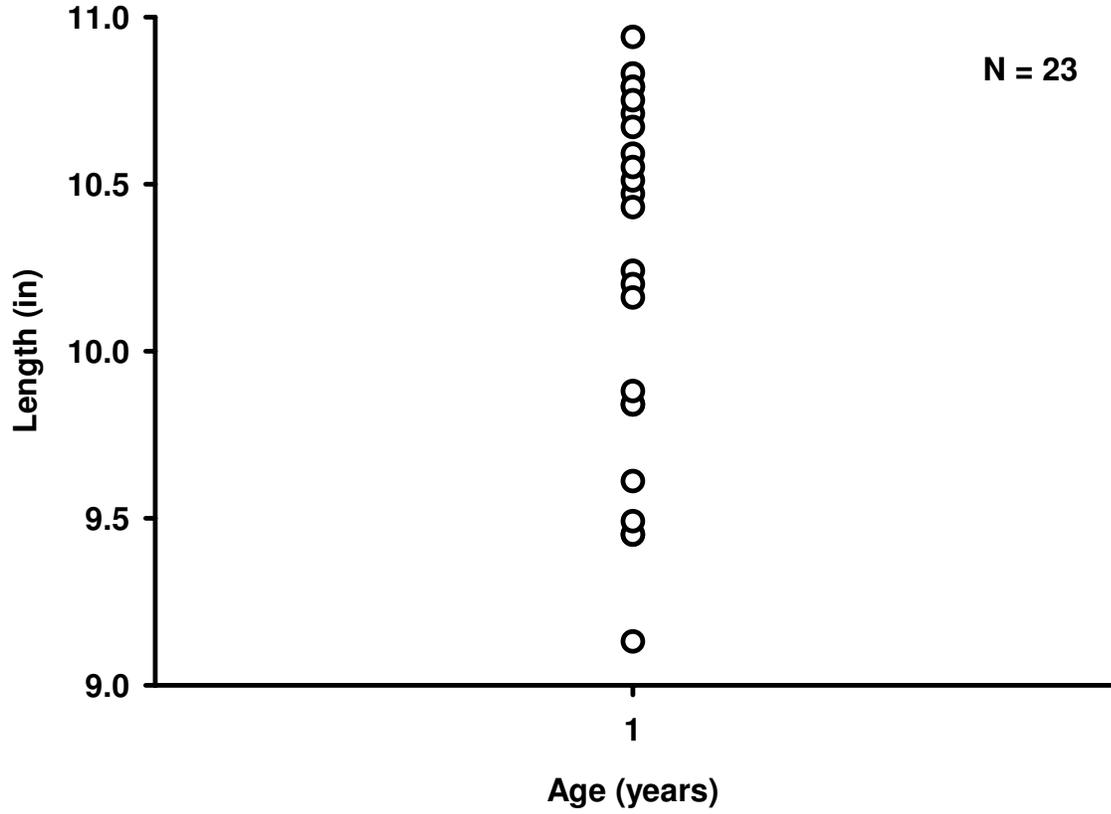
The number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Puritus Creek State Park Lake, Texas.



Length-at-age (inches) at time of capture for largemouth bass within 1 inch above and below 14 inches (sexes combined); sub sample category 2, collected by fall electrofishing, Purvis Creek State Park Lake, Texas, October 2004.



The number of white crappie caught per net night (CPUE, bars), mean relative weight (lines), and population indices for fall trap netting surveys, Puritus Creek State Park Lake, Texas. Vertical dashed lines indicate minimum length limit.



Length-at-age (inches) at time of capture for white crappie within 1 inch above and below 10 inches (sexes combined); sub sample category 2, collected by fall trap netting, Purtils Creek State Park Lake, Texas, October 2004.

## Fisheries Management Plan Purtis Creek State Park Lake

Prepared July 2005

**ISSUE 1** The Florida bass component of the Purtis Creek State Park Lake largemouth bass population was last assessed in 2002 (2001 cohort). The percentage of pure Florida largemouth bass and Florida bass alleles has remained relatively stable since 1998. With a highly restrictive (catch and release only) harvest regulation, Florida largemouth bass genetics will provide the best opportunity for production of trophy-size fish. Therefore, largemouth bass genetics should be monitored every other year to determine the necessity of future stocking of Florida largemouth bass.

### *MANAGEMENT STRATEGIES*

1. Continue monitoring of largemouth bass allele frequencies through optional fall electrophoretic sampling every other year.

**ISSUE 2** Largemouth bass in Purtis Creek State Park Lake have been managed with a special regulation since it was opened to public fishing in 1988 allowing catch-and-release only except that any fish 21 inches or greater caught may be retained in a livewell, weighed at a lake-side weigh station, and then immediately released or donated to the ShareLunker program. This regulation was implemented to maintain high angler catch rates of largemouth bass. During spring 2005, Purtis Creek State Park Lake was included in a long-term evaluation of the effectiveness of stocking offspring of TPWD Budweiser ShareLunker brood fish, termed Operation World Record.

### *MANAGEMENT STRATEGIES*

1. Maintain the current regulation and continue annual monitoring of largemouth relative abundance, size distribution, condition, and growth through annual spring and fall electrofishing.
2. 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.

3. Sample age-4 fish every 2 years beginning in spring 2009 through 2017.
4. Compare mean weight of age-4 largemouth bass among ShareLunker offspring, non-Lunker hatchery fish (FLMB fingerlings) and resident fish.

**ISSUE 3** White bass were collected in gill nets at Purtis Creek for the first time in 2005. Previous annual electrofishing surveys as well as anecdotal information from state park staff indicated that this species was introduced to the reservoir in 2003. Because this reservoir lacks suitable habitat for white bass spawning, reproduction and overall population density should remain low.

*MANAGEMENT STRATEGIES*

1. Continue to monitor the white bass population in Purtis Creek during spring 2009 gill netting.
2. Continue to conduct age and growth analyses to determine the spawning success of fish in this population.

**ISSUE 4** There is little evidence of natural catfish recruitment at Purtis Creek State Park Lake. To support the existing fishery, the population should be supplemented with advanced size (> 12 inch) fingerlings on a regular basis. Since this lake is a state park facility, it should be considered a high priority for stocking.

*MANAGEMENT STRATEGIES*

1. Seek outside sources of these fish and/or funding partners to support the catfish fishery at Purtis Creek State Park Lake.
2. When available, stock channel catfish advanced fingerlings at 25/acre/year.

**ISSUE 5** Boat and bank access are both good. There are two handicap accessible fishing piers as well as a courtesy pier at the single boat ramp. However, Purtis Creek State Park Lake will likely face continued problems with hydrilla infestation. Hydrilla near the boat ramp, fishing piers, and swimming area has been treated with the aquatic herbicide SONAR<sup>®</sup> in past years to improve access.

*MANAGEMENT STRATEGIES*

1. Angler access and facilities should be reevaluated during annual electrofishing sampling.
2. Control hydrilla, as necessary, to ensure good public access. Maintain good communication with park staff to identify and treat problem areas. Coordinate with park staff to ensure that funding is available for treatments.
3. Evaluate the distribution of hydrilla with annual vegetation surveys.

## Appendix 1

Number and catch rate (CPUE) of species collected by all gear types from Purtil Creek State Park Lake, Texas, 2004 and 2005.

Species	Gill netting (5 net nights)		Trap netting (5 net nights)		Fall electrofishing (1 hour)		Spring electrofishing (1 hour)	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					28	28.0		
Threadfin shad					235	235.0		
Blue catfish	1	0.2						
White bass	16	3.2						
Redbreast sunfish					1	1.0		
Bluegill					35	35.0		
Largemouth bass					98	98.0		106.0
White crappie			56	11.2				

## Appendix 2

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Purtils Creek State Park Lake, Texas, 1990, 1991, 1994 - 1997, 1998, 2000, 2001, and 2002.

Year	Sample size	Genotype				Northern	% Florida largemouth bass alleles	% pure Florida largemouth bass
		Florida	F1	FX				
1990	19	0	3	10	6	58.8	0	
1991	29	12	5	9	3	79.3	41.4	
1994	30	12	3	14	1	75.0	40.0	
1995	30	5	15	8	2	60.0	16.7	
1996	30	9	11	9	1	67.5	30.0	
1997	29	5	8	14	3	55.0	16.7	
1998	30	10	7	13	0	75.8	33.3	
2000	30	27	2	11	0	88.1	56.7	
2001	21	7	2	10	2	65.5	33.3	
2002 <sup>1</sup>	17	6	2	8	1	75.0	35.3	

<sup>1</sup> Sample based on age-1 cohort.

## Appendix 3

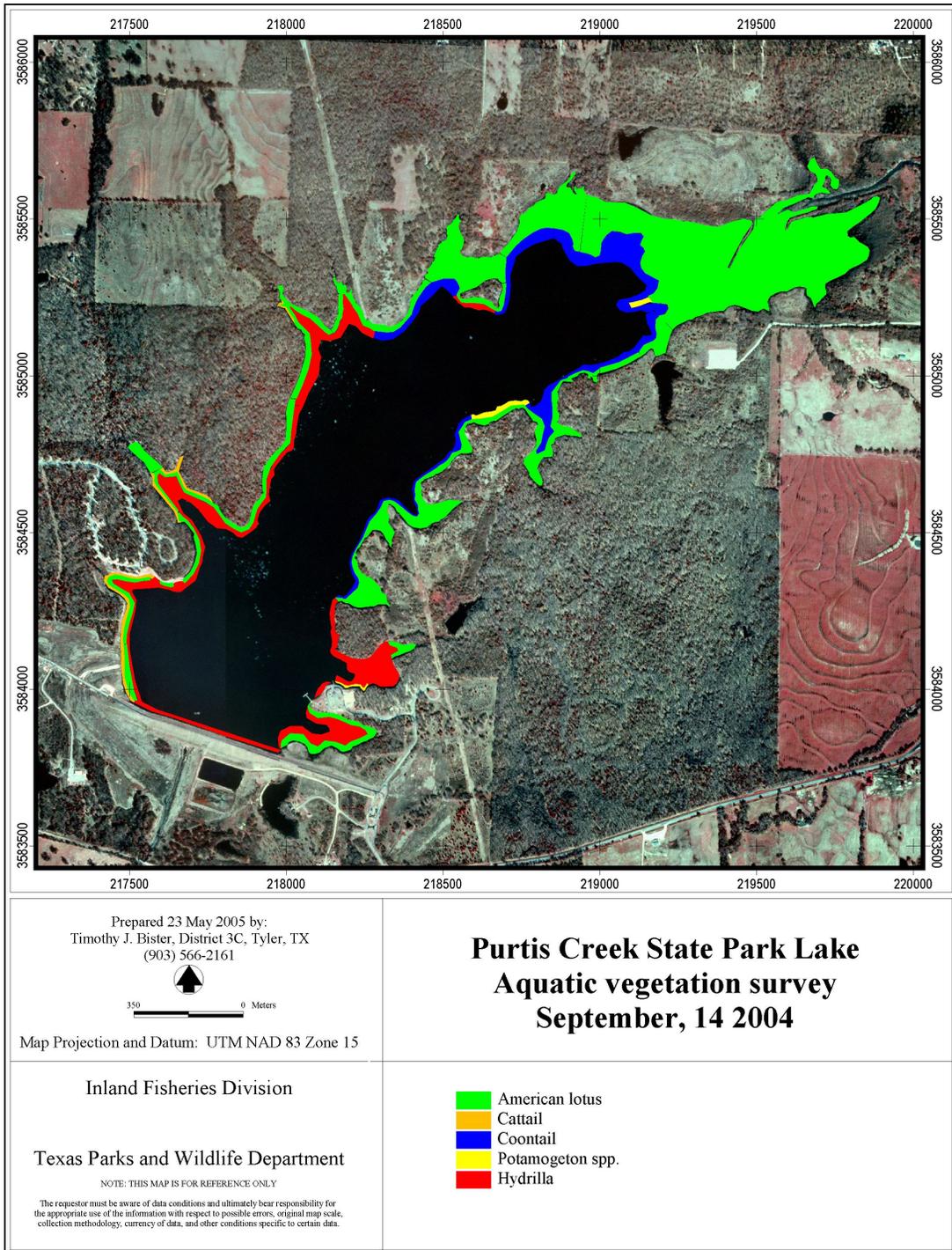
Angler access and facilities, Purtis Creek State Park Lake, Texas, September 2004.

Name	GPS coordinates	Fee charged	# of lanes	Accommodations for challenged	Bank fishing	Comments
Boat ramp	N 32 21' 27.4" W 95 59' 42.3"	Y <sup>1</sup>	2	Y	Y	
Fishing pier #1	N 32 21' 26.2" W 95 59' 45.5"	N <sup>2</sup>	NA	Y	NA	
Fishing pier #2	N 32 21' 36.7" W 96 00' 01.3"	N <sup>2</sup>	NA	Y	NA	

<sup>1</sup> A \$5.00 fee is required to put any object in the lake (i.e., boat, tube, float, etc.).

<sup>2</sup> A fee is required gain access to the state park and includes use of the fishing piers.

Appendix 4\*\*



\*\* Please note that the figure above is a color image and must be printed in color to view aerial coverage of aquatic plants described in the figure's legend.