

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

**Lake Jacksonville**

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## EXECUTIVE SUMMARY

Lake Jacksonville 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 Jacksonville is a 1,208-acre reservoir on Gum Creek (a tributary of the Neches River), Texas, built to provide water for municipal and industrial purposes. Boat and bank angler access is adequate. Handicap-specific facilities are present in the parking lot and restrooms near the main boat ramp. Water is clear and very low in productivity (mean  $\text{mg}/\text{m}^3$  chlorophyll *a* = 1.41). Fertilization of 300 acres was initiated in 1993 to increase primary productivity, but was discontinued in 1995 after hydrilla was discovered. An integrated vegetation management plan was initiated in 1997 in an attempt to control hydrilla and diversify the native plant community. The plan had three phases: phase 1 included herbicide control of the hydrilla; phase 2 called for construction of a fish barrier at the outflow and limited stocking (200 fish) of triploid grass carp; phase 3 included introduction of native aquatic plants to diversify the plant community. In spring 1999 the City of Jacksonville removed the fish barrier in the belief that it caused flooding of low-lying properties; thereby preventing any additional grass carp stocking. Annual hydrilla control has continued with herbicide and physical removal. However, hydrilla has continued to expand in coverage.
- **Prey species:** Sunfishes (redbreast, bluegill, and redear) were the dominant prey species at Lake Jacksonville in fall 2004. Total catch rate of all sunfish species combined (625 fish/hour) was somewhat below that in 2002 (873 fish/hour) but is similar to 1998 and 2000 (682 and 617, respectively). The majority of sunfishes collected were  $\leq 4$  inches in length and were available as prey. Sunfish are not highly sought-after by anglers. Electrofishing catch rate of gizzard shad (4 fish/hour) was low but similar to previous years; however, most were too large ( $\geq 12$  inches) to provide benefit as prey. Threadfin shad were also collected but are low in abundance (8 fish/hour).
- **Catfishes:** Lake Jacksonville supports a low-density channel catfish population with poor natural recruitment. No channel catfish were collected in gill nets in 2004 and historical catch rates were low (1.2 fish/net night in 2002 and 0.2 fish/net night in 1999). Survival of young catfish in Lake Jacksonville is likely limited, in part, due to predation by largemouth bass, clear water, and absence of spawning sites. Both fingerling and adult channel catfish were last stocked in Lake Jacksonville in 1994. Without additional stockings of advanced size (9-12 inch) channel catfish it is unlikely that this species will provide a viable fishery.

- **Black basses:** Lake Jacksonville has shown potential to produce trophy-sized fish (15.12 lbs, 1986) and is a popular lake for local tournament angling interests. Florida strain largemouth bass were stocked in Lake Jacksonville from 1975-1979 and again in 1999 and 2000. The initial stocking was successful in establishing and maintaining Florida bass genes in this population and was likely responsible for the existing lake record. Subsequent stockings have maintained a relatively high (> 50%) Florida bass allele frequency. Allele frequency was estimated at 56% in 2004 and the percentage of pure Florida strain largemouth bass in a sub-sample of age-0 largemouth bass collected in fall 2004 was 12%. The electrofishing catch rate in 2003 (79 fish/hour) was similar to previous years. Proportional stock density (PSD) was 46; within the target range of 40-70. Relative stock density (RSD-14) was higher than that recorded since 1995 and may be related to changes in legal harvestable length from 14 inches to 18 inches in September 2000. Mean relative weight (Wr) was  $\geq 90$  for most inch classes (>12 inches) and was indicative of adequate prey availability. Individual ages of a sub-sample of fish from 13.1 to 15.9 inches in length ranged from 2 to 4 with a mean age of 3.2 years.
- **Crappie:** No crappie (white or black) were collected in gill nets in spring 2005. Lake Jacksonville has historically had low crappie recruitment but good growth (Ott and Bister, 2001). Stocking of nearly 300,000 crappie fingerlings (black and white) in 1988 failed to increase catch rate in subsequent trap netting. It is likely that crappie recruitment is adversely affected by largemouth bass predation in the clear water present in Lake Jacksonville.
- **Management strategies:** Based on current information, Lake Jacksonville fishing regulations should be maintained at their current status. Because of the importance of the largemouth bass fishery at Lake Jacksonville, biennial electrofishing and electrophoretic sampling should continue with the next sampling scheduled for fall 2006. Annual assessment of hydrilla coverage should be continued with a yearly vegetation survey. To allow for a greater range of control techniques the City of Jacksonville should be encouraged to rebuild the fish barrier at the outflow to allow stocking of additional grass carp as was recommended in the integrated management plan. To promote the fishery and clarify harvest regulations angler information projects should be continued utilizing news releases, regulation posters, public presentations, and the TPWD web site.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Jacksonville 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 species of fish 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 current data for comparison.

Fish harvest regulations at Lake Jacksonville in 2003 –2004.

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

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## METHODS

- Fishes were collected by electrofishing in fall 2004 (1.0 hour at 12, 5-minute stations), trap netting in fall 2004 (5 net nights at 5 stations), and by gill netting 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 gill and trap 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).
- Sampling statistics (CPUE for various length categories) and structural indices (proportional stock density, [PSD]; relative stock density, [RSD], and relative weight, [W<sub>r</sub>]) were calculated for target fishes, according to Anderson and Neumann (1996).

- Ages were determined for largemouth bass using otoliths. Individual ages were determined for a sub-sample of fish within one inch above and below 14 inches in length; category 2. Inland Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Littoral zone/physical habitat, vegetation, and angler access and facility surveys were conducted in accordance with 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. and T. J. Bister. 2001. Statewide freshwater fisheries monitoring and management program survey report for: Lake Jacksonville, 2000. Texas Parks and Wildlife Department, Federal Aid in Sport Fish Restoration, Grant F-30-R, Performance Report. 32 pp.

## Physical and historical data for Lake Jacksonville, Texas, 2004.

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Inland Fisheries water body code:	0389
IF District:	3-C, Tyler
Controlling authority:	City of Jacksonville
Area:	1,208
Counties:	Cherokee (location of dam), Cherokee
Latitude:	31° 54'
Longitude:	95° 17'
Nearest major metropolitan area and distance:	Tyler – 25 miles
Reservoir description:	City lake
River system:	Neches
Shoreline length (mi):	21.7
Mean depth:	23.2
Maximum depth (ft):	62.0
Shoreline development ratio:	4.9
Watershed drainage area (mi <sup>2</sup> ):	34
Secchi disc range (ft):	4-6
Conductivity (µmhos/cm):	80
Constructed:	1958
Access:	Boat public: Adequate – 3 ramps
	Bank: Adequate – 3 areas
	Handicap: A.D.A. accessible parking and restroom facilities are available at the main boat ramp.

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## Survey History

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Method	Year
Gill net	1974, 1980, 1990, 1992, 1995, 1998, 2001, 2005
Electrofishing	1975-78, 1980, 1985-88, 1990, 1992-95, 1998, 2000, 2002, 2004
Trap net	1980, 1985-88, 1990, 1992, 1995, 1998, 2000, 2004
Cove rotenone	1980
Habitat survey	1995, 1998, 1999, 2000
Vegetation survey	1995, 1998, 2000-2004

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Summary of aquatic vegetation survey, Lake Jacksonville, Texas, August 2004. Estimates based on reservoir area of 1,208 acres.

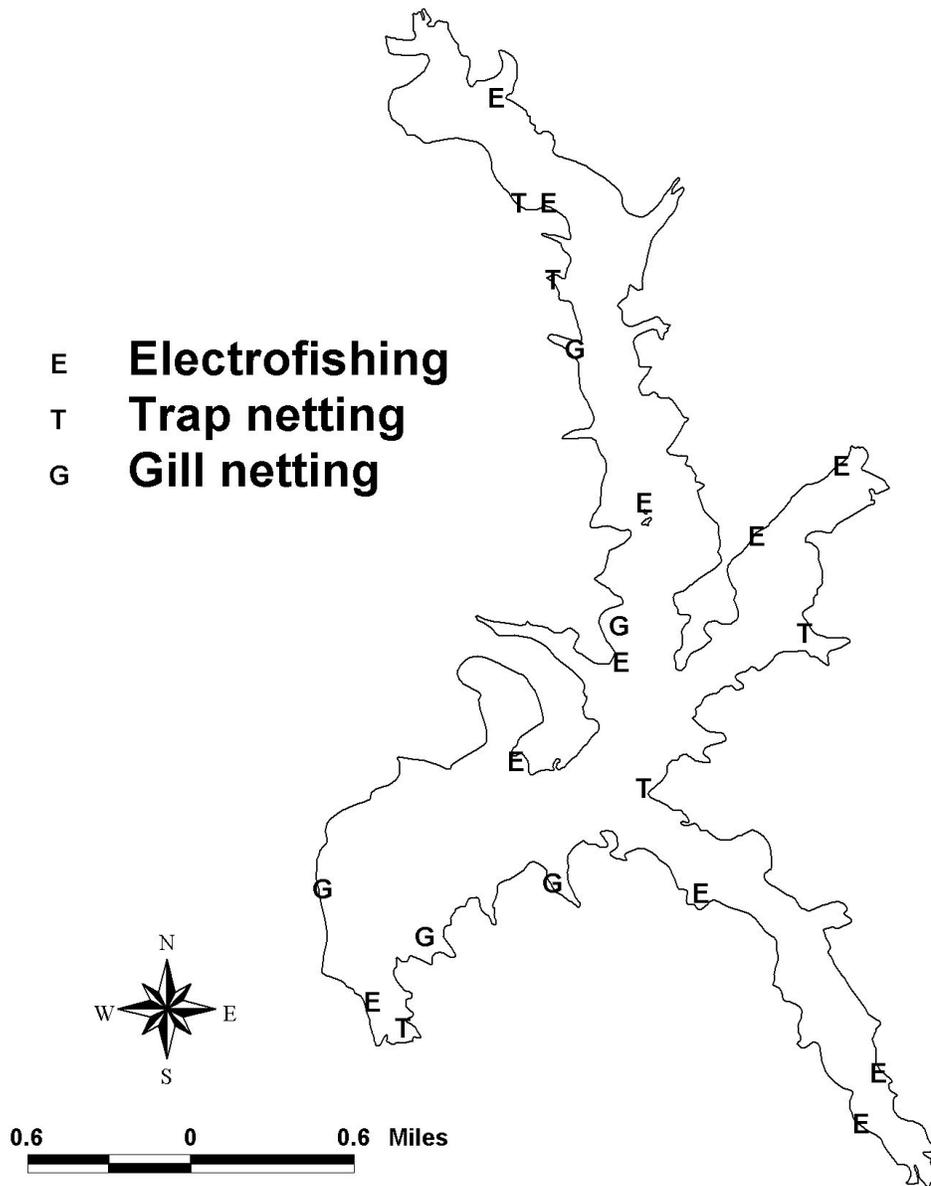
Vegetation type	Acres	Percentage total
Non-Native Invasive submersed (hydrilla)	124.0	10.3
Non-Native Invasive emergent (alligatorweed, giant cane)	1.3	0.1
Native floating-leaved (American lotus, white water-lily, spatterdock, & water-shield)	9.0	0.7
Native emergent (arrowhead, bulltongue, giant cutgrass, lizard's tail, pickerelweed, squarestem spikerush, water primrose, & waterwillow)	36.7	3.0
Native submersed (coontail & pondweed)	13.6	1.1
Total acres vegetated	184.5	15.3

## Stocking history of Lake Jacksonville, Texas.

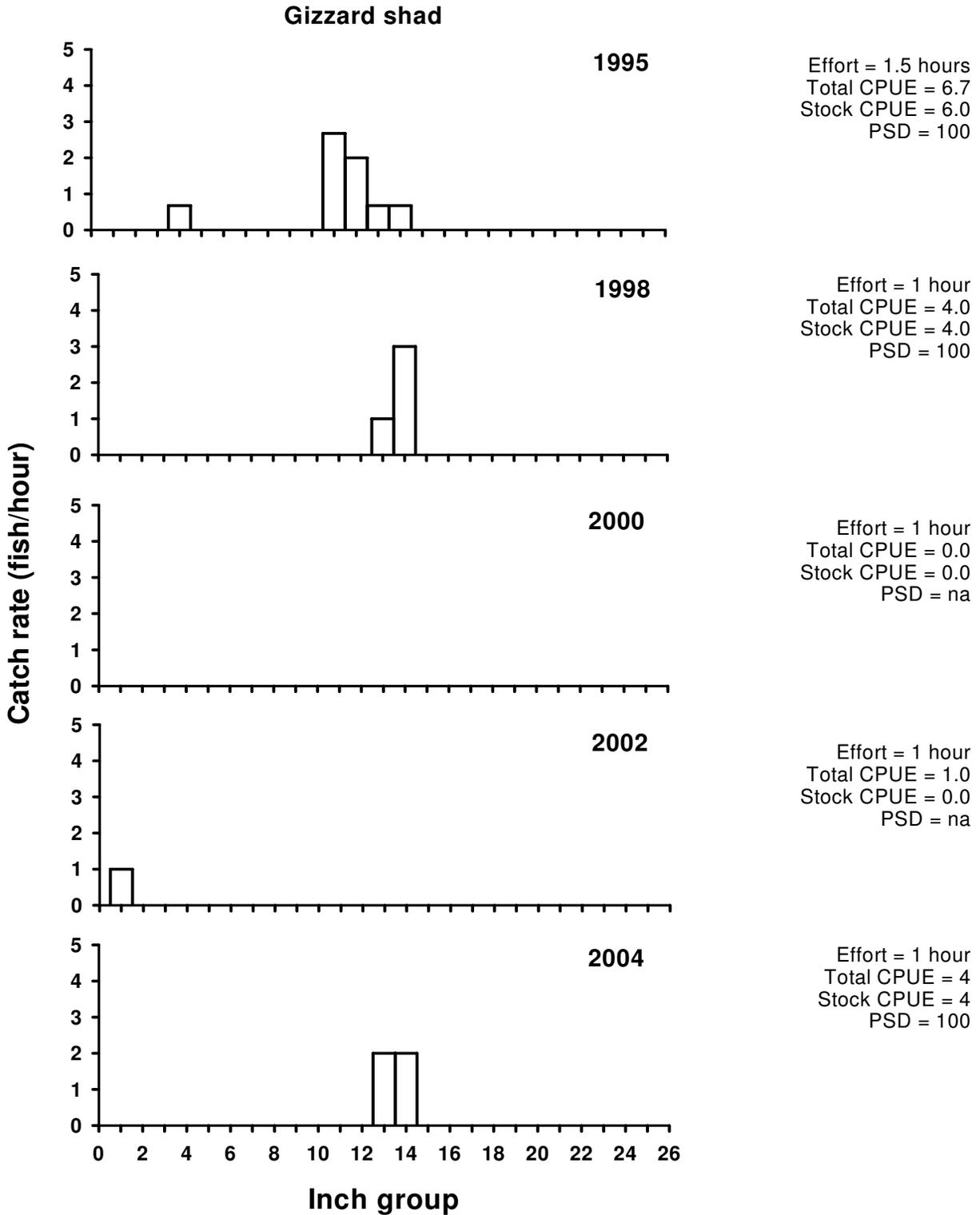
Species	Year		Number	Size
Threadfin shad	1987		2,500	Fingerling
		Total	<u>2,500</u>	
Blue catfish	1975		2,000	Fingerling
	1987		6,149	
	Total		<u>8,149</u>	
Channel catfish	1967		2,000	Adult Fingerling Fry Adult Fingerling
	1968		2,500	
	1969		2,500	
	1970		2,000	
	1971		2,000	
	1973		2,000	
	1974		2,000	
	1978		17,500	
	1979		4,000	
	1980		2,000	
	1981		2,000	
	1982		4,000	
	1983		4,000	
	1986		4,011	
	1994		295	
Total		<u>60,993</u>	271,404	
Palmetto bass	1974		15,000	
	1979		14,000	
	1981		16,349	
	1983		15,584	
	Total		<u>59,933</u>	
Largemouth bass	1973		4,000	
	1974		24,000	
	Total		<u>28,000</u>	

## Stocking history continued...

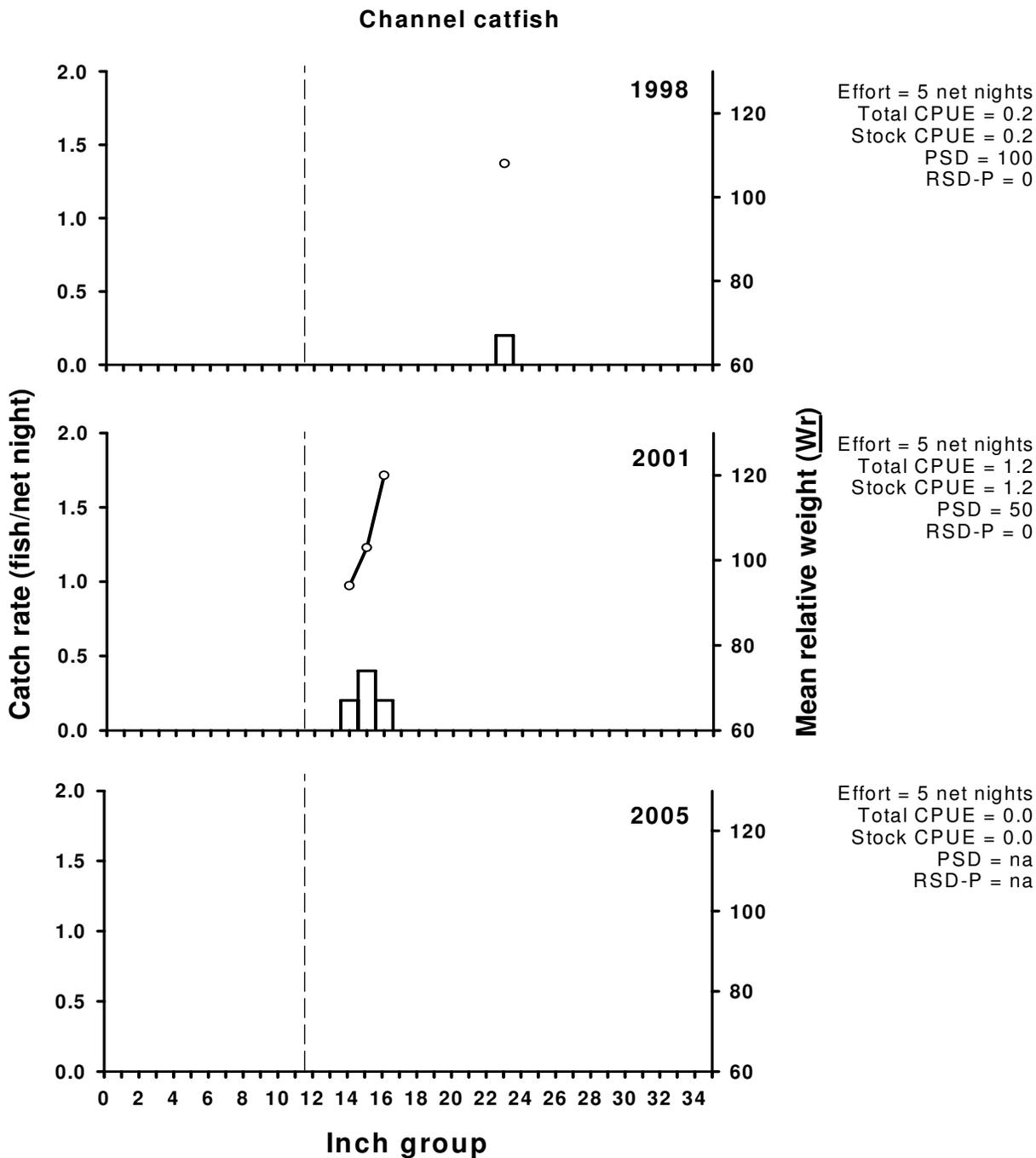
Species	Year	Number	Size
Florida largemouth bass	1975	67,000	Fingerling
	1976	138,000	Fingerling
	1977	132,200	Fingerling
	1978	138,053	Fingerling
	1979	4,000	Fingerling
	1999	135,300	Fingerling
	2000	135,222	Fingerling
	Total	<u>749,775</u>	
White crappie	1988	180,143	Fingerling
	Total	<u>180,143</u>	
Black crappie	1968	1,500	Fingerling
	1969	2,000	Fingerling
	1970	2,000	Fingerling
	1988	118,946	Fingerling
	1990	69,638	Fry
	1992	85,312	Fry
Total	<u>279,396</u>		
Grass carp	1997	100	Adult
	1998	100	Adult
	Total	<u>200</u>	



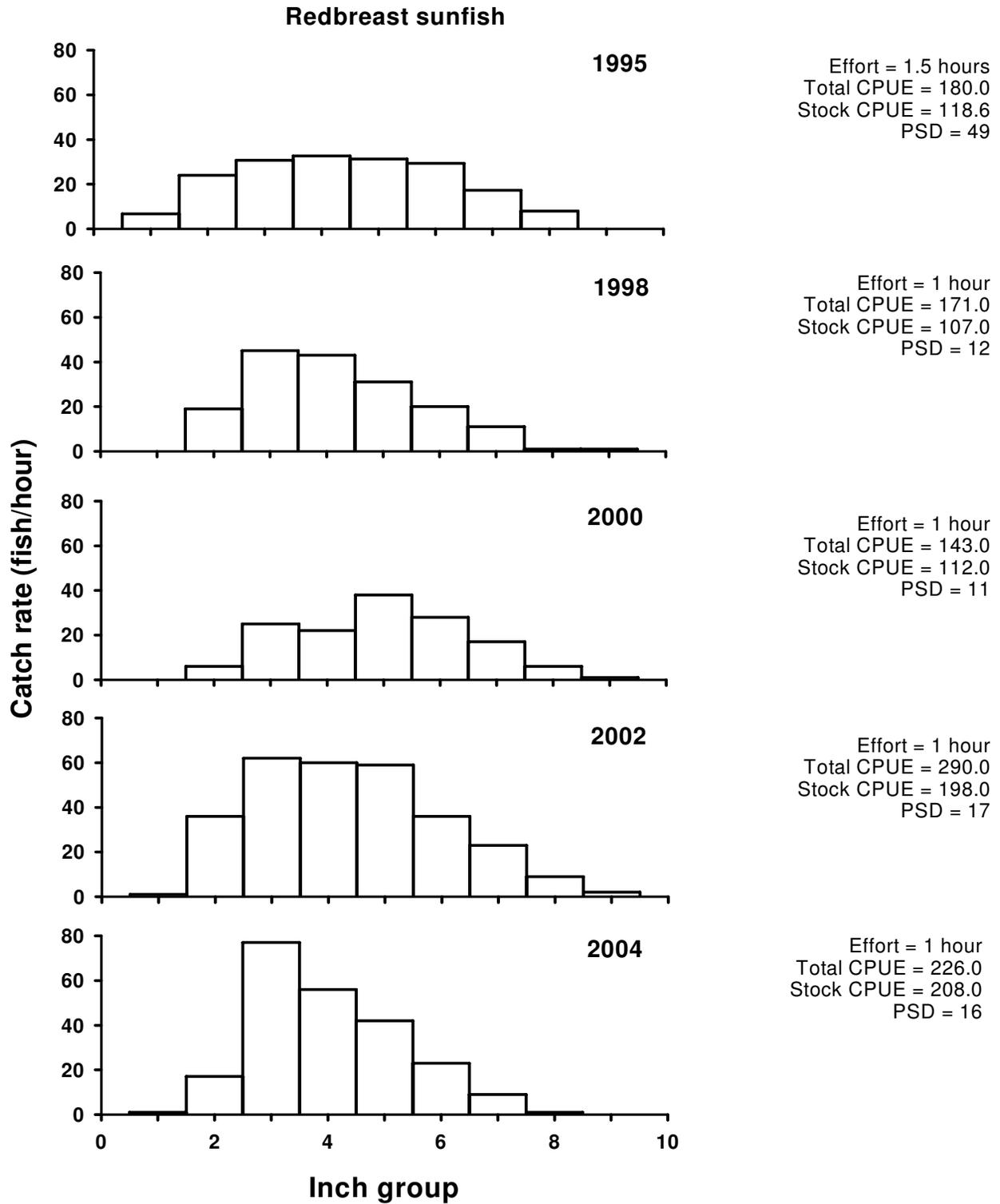
Locations of fish community sampling stations, Lake Jacksonville, Texas, 2004-2005.



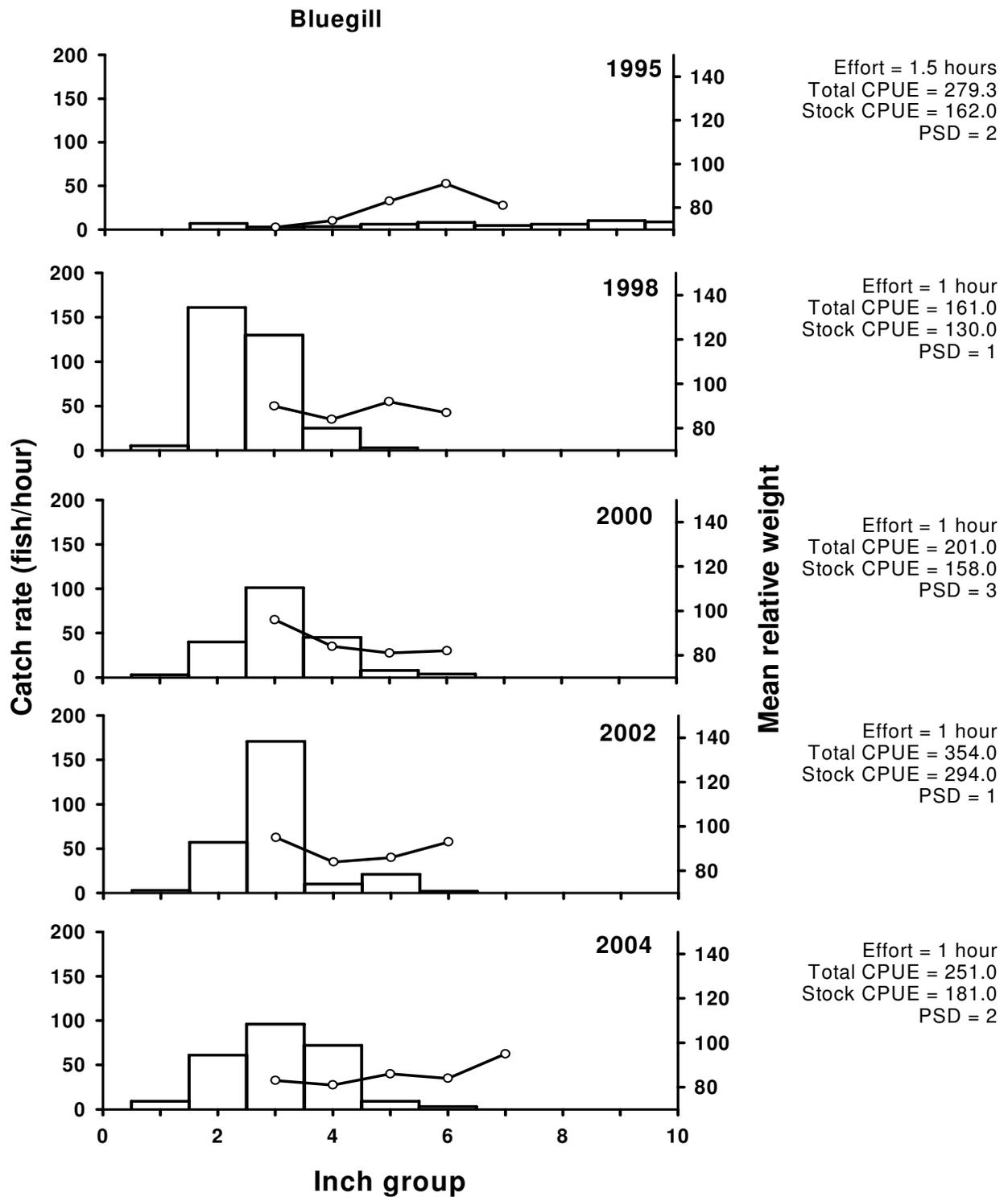
The number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Jacksonville, Texas. Beginning in 1996, all sampling stations were randomly selected.



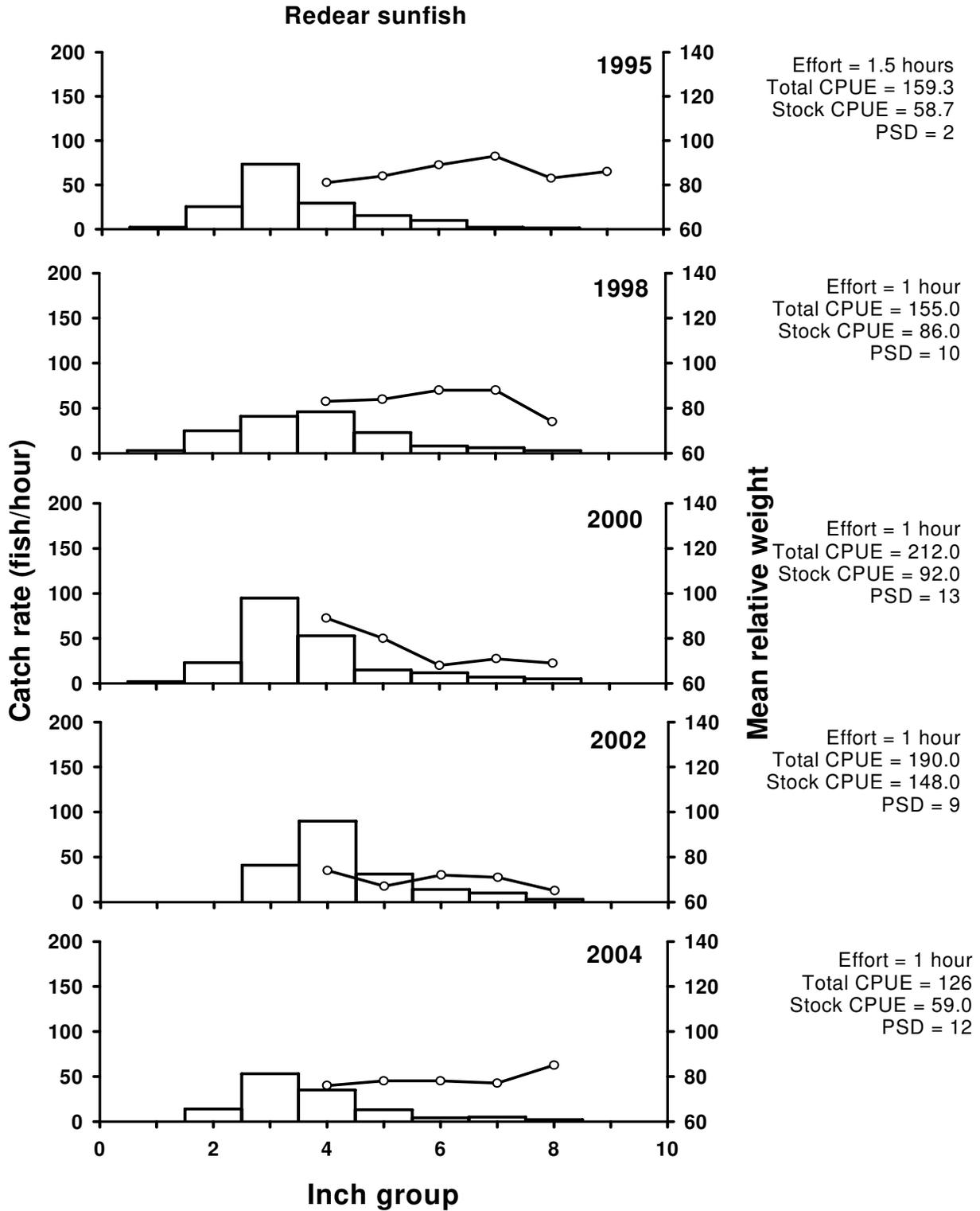
The number of channel catfish caught per net night (CPUE, bars), mean relative weight ( $W_r$ , lines) and population indices for spring gill netting surveys, Lake Jacksonville, Texas. Dashed lines indicate minimum length limit at the time of survey.



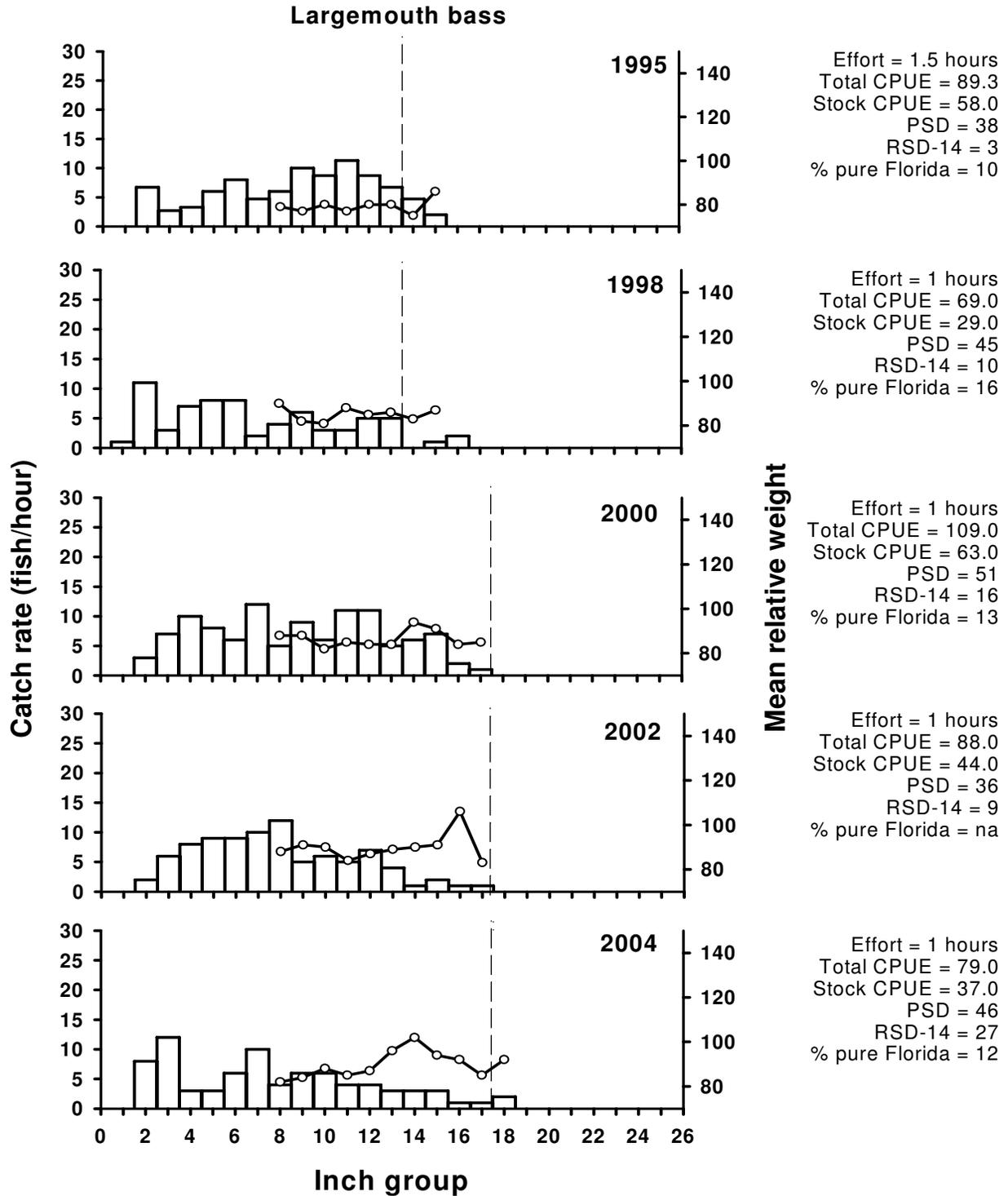
The number of redbreast sunfish caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lake Jacksonville, Texas. Beginning in 1996, all sampling stations were randomly selected.



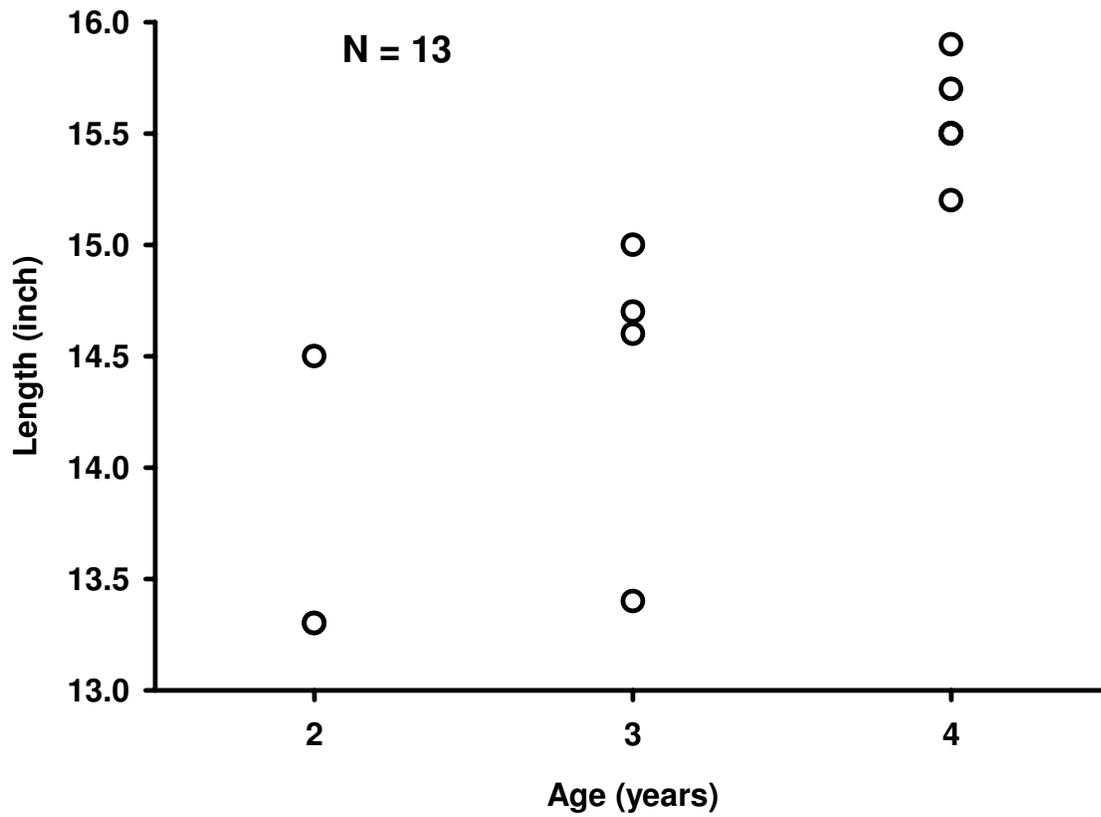
The number of bluegill caught per net night (CPUE, bars), mean relative weight ( $W_r$ , lines) and population indices for fall electrofishing surveys, Lake Jacksonville, Texas. Beginning in 1996, all sampling stations were randomly selected.



The number of redeer sunfish caught per net night (CPUE, bars), mean relative weight (Wr, lines) and population indices for fall electrofishing surveys, Lake Jacksonville, Texas. Beginning in 1996, all sampling stations were randomly selected.

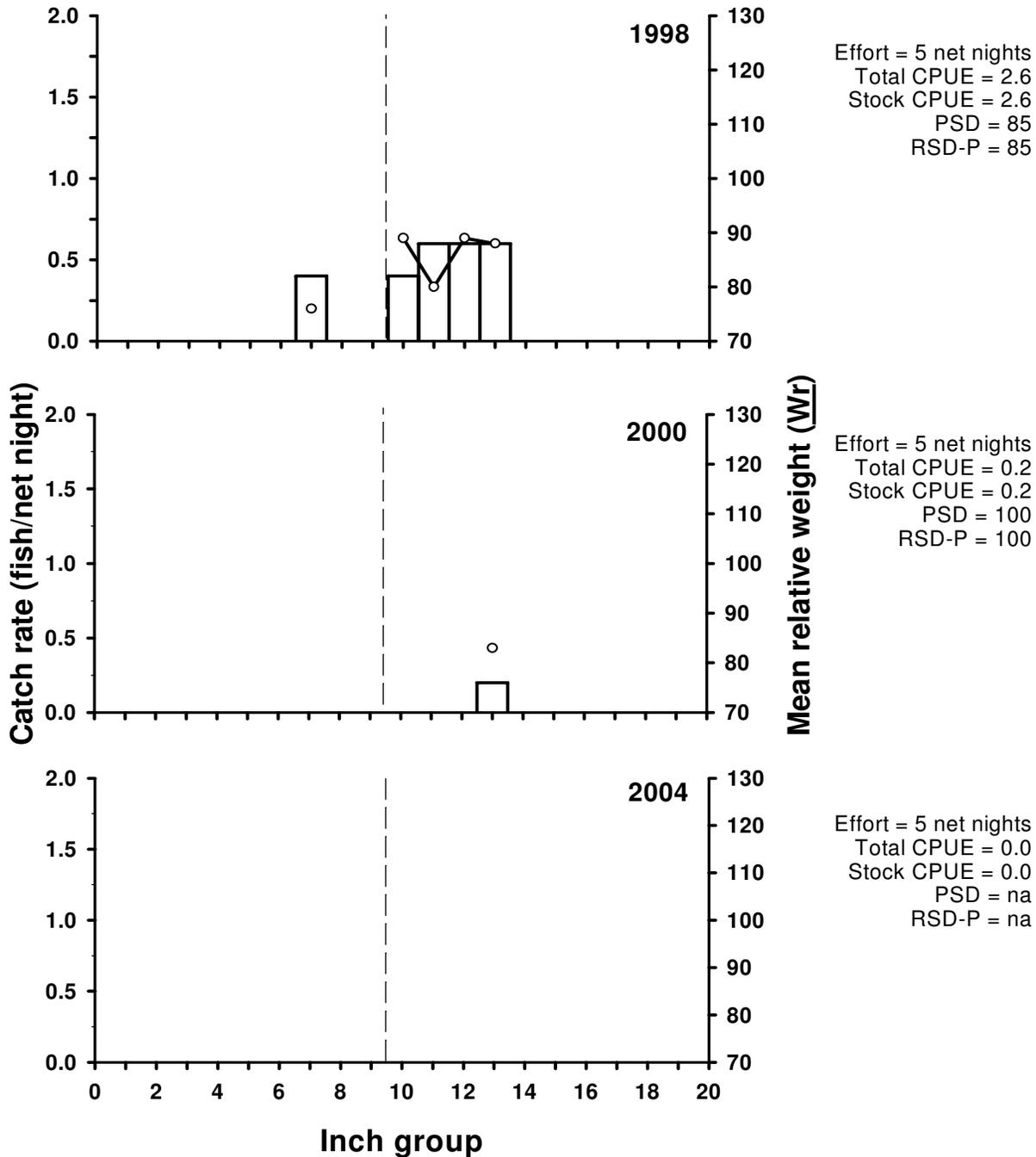


The number of largemouth bass caught per hour (CPUE, bars), mean relative weight ( $W_r$ , lines) and population indices for fall electrofishing surveys, Lake Jacksonville, Texas. Dashed lines indicate minimum length limit at the time of survey. Beginning in 1996, all sampling stations were randomly selected.



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, Lake Jacksonville, Texas, October 2004.

**White crappie**



The number of white crappie caught per net night (CPUE, bars), mean relative weight ( $\overline{Wr}$ , lines) and population indices for fall trap netting surveys, Lake Jacksonville, Texas. Dashed lines indicate minimum length limit at the time of survey.

# Fisheries Management Plan

## Lake Jacksonville

Prepared July 2005

**ISSUE 1** Lake Jacksonville has traditionally provided a high quality largemouth bass fishery and this fishery is very important to anglers in the area. This lake has demonstrated trophy bass potential (a 15.12 lb fish was caught in 1986); it was last stocked with Florida Largemouth bass in 1999 and 2000 and is scheduled for stocking in 2005 and 2006.

### *MANAGEMENT STRATEGIES*

1. Continue electrofishing on a biennial basis to monitor and evaluate the population.
2. Conduct electrophoretic analysis of age-0 largemouth bass during fall 2008 to assess the success of the 2005 and 2006 stockings. Consider restocking of Florida strain largemouth bass if the percentage of pure Florida strain largemouth bass falls below the target level (20%).

**ISSUE 2** Hydrilla has increased in area from the 20 surface acres found in 1995 to over 125 acres in the August 2004 survey. Currently, native submersed vegetation (primarily coontail and pondweed) occupies only 14 surface acres.

### *MANAGEMENT STRATEGIES*

1. Monitor changes in the aquatic plant community through annual surveys. Recommend construction of a replacement fish barrier to allow the possibility of additional grass carp stocking, as was proposed under the integrated management plan.
2. Continue assisting the City of Jacksonville in obtaining USACOE matching funds (if available) to offset costs for herbicide treatments. Continue assisting the City in obtaining discounted herbicide and or experimental products to control hydrilla.
3. Assist the City of Jacksonville in obtaining hydrilla flies as an additional control measure for hydrilla and as part of the integrated management plan

**ISSUE 3** Recruitment of channel catfish continues to be poor. Clear water and largemouth bass predation make survival of small (< 12 inch) channel catfish fingerlings unlikely. Production capability of TPWD hatcheries limits availability of advance sized ( $\geq$ 12 inch) channel catfish.

*MANAGEMENT STRATEGIES*

1. Consult with the City of Jacksonville about obtaining advance sized channel catfish from a private vendor.
2. Assist assisting the City of Jacksonville in seeking sponsorship to offset the cost of a stocking program.
3. Evaluate the efficacy of any resulting stocking program during routine gill netting in spring 2009.

**ISSUE 4** Lake Jacksonville offers good recreational angling opportunity and could benefit from additional promotion. Also, area anglers would benefit from occasional reminders about current fishing regulations on this water body.

*MANAGEMENT STRATEGIES*

1. Include Lake Jacksonville in news releases that promote angling opportunities in the East Texas area. Give presentations about the lake and fisheries to interested groups and area residents as requested.
2. Provide lake-specific regulation posters to angling-oriented businesses serving the Lake Jacksonville area.
3. Maintain regulation signs previously mounted at public and private boat ramps on Lake Jacksonville.

## Appendix 1

Number (N) and catch rate (CPUE; gill net and trap net = fish/net-night, electrofishing = fish/hour) of target and important prey species collected by gear type from Lake Jacksonville, Texas, 1 June 2004 - 31 May 2005.

Species	Gill net		Trap net		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					4	4.0
Threadfin shad					8	8.0
White bass	8	1.6				
Channel catfish	0	0				
Flathead catfish	1	0.2				
Redbreast sunfish					226	226.0
Green sunfish					2	2.0
Warmouth					19	19.0
Bluegill					251	251.0
Longear sunfish					3	3.0
Redear sunfish					126	126.0
Spotted sunfish					10	10.0
Spotted bass					8	8.0
Largemouth bass					79	79.0
White crappie			0	0		
Black crappie			0	0		

## Appendix 2

Results of electrophoretic analysis of young-of-year largemouth bass collected by electrofishing from Lake Jacksonville, Texas, 1995, 1998, 2000, 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		
1995	30	3	7	16	3	50	10
1998	25	4	6	13	1	58	16
2000	30	4	8	16	2	57	13
2004	30	3	7	14	2	56	12

### Appendix 3

Angler access facilities, Lake Jacksonville, Texas, August 2004. Locations include three boat ramps.

Name	GPS coordinates	Fee charged	# of lanes	Accommodations for challenged	Bank fishing	Comments
FM 747 Ramp	N 31'56.863 W 95'17.236	N	1	N	Y	
Marina	N 31'54.054 W 95'18.547	N	2	N	Y	
Dam	N 31'55.256 W 95'17.425	N	2	N	Y	