

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Lake Jacksonville

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SURVEY AND MANAGEMENT SUMMARY

The Lake Jacksonville fish community was surveyed from June 2008 through May 2009 using an electrofisher, gill nets, and trap nets. A vegetation survey was conducted in August 2008. A roving creel survey was conducted from December 2008 through May 2009 and collected angler use and harvest information. This report summarizes results of the surveys and contains a management plan 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 were present in the parking lot and restrooms near the main boat ramp. Water is clear and low in productivity. Land surrounding the reservoir is highly modified for residential development and approximately 40% of the shoreline has bulkhead at the land/water interface.
- **Management history:** Important sport fish include sunfishes, largemouth bass, channel catfish, white crappie and black crappie. Largemouth bass are managed with an 18-inch minimum-length limit; remaining species are managed under the statewide harvest regulations. Supplemental largemouth bass sampling was conducted in 2006 and stockings were conducted in 2006 and 2007. An integrated vegetation management plan was initiated in 1997 featuring triploid grass carp stocking, release of hydrilla flies, herbicide treatments, and native plant introduction. Vegetation surveys have been conducted twice a year (early spring and late summer). Herbicide treatments were continued annually but hydrilla continued to expand. In 2006 and 2007 a total of 3,890 triploid grass carp were stocked (10 fish/hydrilla acre). In July 2007 a major flood event removed most of the hydrilla and grass carp herbivory prevented reestablishment. By summer 2008 hydrilla was reduced to trace coverage and native vegetation was sparse.
- **Fish community:**
 - **Prey species:** Threadfin shad were present in the reservoir but the prey base continued to be dominated by sunfish species. Electrofishing catch rate of both threadfin and gizzard shad increased over previous surveys; however, most gizzard shad were too large to serve as prey. Catch rates of sunfishes ≤ 6 inches was high. Overall prey availability was adequate.
 - **Catfishes:** Channel catfish, although still present, were rare. Only one channel catfish was collected by standardized gill netting in spring 2009.
 - **White bass:** White bass were still present in Lake Jacksonville but abundance is low.
 - **Black basses:** Largemouth bass were the most sought-after species by anglers at Lake Jacksonville during the winter/spring creel survey and angler success was high. Relative abundance was similar to previous surveys but size structure has continued to improve since 2002. Spotted bass were present but contribute little to the fishery.
 - **Crappie:** Crappie was the second most sought after sport fish during the winter/spring creel surveys; however, no crappie were collected in trap nets in 2008.
 - **Management strategies:** Conduct additional electrofishing in fall 2010 to monitor largemouth bass and prey populations. Discuss the possibility of the City of Jacksonville purchasing advanced channel catfish fingerlings. Continue native vegetation restoration and discuss the possibility of removing protection for triploid grass carp. Solicit partners to construct and install bamboo fish attractors.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Jacksonville from June 2008 through May 2009. The purpose of this document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2008 and 2009 data for comparison where appropriate.

Reservoir Description

Lake Jacksonville is a 1,208-acre reservoir on Gum Creek, Texas, a tributary of the Neches River. The reservoir was built to provide water for municipal and industrial purposes. Lake Jacksonville is slightly eutrophic with a mean mg/m³ chlorophyll *a* = 4.58 (Texas Commission on Environmental Quality 2008). The littoral zone consists of a variety of physical habitat types (Table 4). The majority of the shoreline is a combination of bulkhead and boat docks (38%), eroded shoreline with boat docks (28%) or featureless (26%). Boat access is adequate, but bank access was limited to city park locations. Boats can be launched from three public ramps and a city owned marina provides fuel on the water. There are no handicap-specific facilities, but most are accessible. Other descriptive characteristics for Lake Jacksonville are found in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ott and Bister 2005) included:

1. Continue electrofishing on a biennial basis to monitor and evaluate the largemouth bass (*Micropterus salmoides*) population. Conduct electrophoretic analysis of age-0 largemouth bass during fall 2008 to assess the success of stocking recommended for 2005 and 2006.
Action: Florida largemouth bass (*M. s. Floridanus*) fingerlings were stocked in spring 2006 and 2007. Optional electrofishing was conducted in fall 2006 and genetic analysis of largemouth bass was conducted during routine electrofishing in fall 2008.
2. Monitor changes in the aquatic plant community through annual surveys. Recommend construction of a replacement fish barrier to allow the possibility of additional triploid grass carp (*Ctenopharyngodon idella*) stocking, as was proposed under the integrated hydrilla (*Hydrilla verticillata*) management plan. 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. Assist the City of Jacksonville in obtaining hydrilla flies (*Hydrellia pakistanae*) as an additional control measure for hydrilla and as part of the integrated management plan
Action: Aquatic plant community was assessed through exotic vegetation surveys conducted in the spring and late summer each year. An improved fish barrier was designed and installed at the outflow and grass carp were stocked at an effective rate of 10/hydrilla acre. City was able to obtain USACOE matching funds in 2005 and 2006, and district staff coordinated herbicide donations to supplement matching funds. District staff and USACOE released 750,000 hydrilla flies in 2006.
3. Consult with the City of Jacksonville about obtaining advance-sized channel catfish (*Ictalurus punctatus*) from a private vendor. Assist assisting the City of Jacksonville in seeking sponsorship to offset the cost of a stocking program. Evaluate the efficacy of any resulting stocking program during routine gill netting in spring 2009.
Action: Funding for channel catfish stocking was diverted to hydrilla control. Gill netting was conducted in spring 2009.
4. 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. Provide lake-specific regulation posters to angling-oriented businesses serving the Lake Jacksonville area. Maintain regulation signs previously mounted at public and private boat ramps on Lake Jacksonville.
Action: News releases and interviews regarding the fishery and habitat management plan

have been provided to local media. Presentations have been conducted to the Jacksonville City Council, and with angler and home owner groups. Regulation posters and posters informing the public about the habitat management plan have been provided.

Harvest regulation history: Sport fishes in Lake Jacksonville have been managed with statewide harvest regulations except for an 18-inch minimum-length limit for largemouth bass (Table 2) which was imposed in 2000. Regulations have not changed since the last survey (Ott and Bister 2005).

Stocking history: Triploid grass carp and Florida largemouth bass are the only species stocked since the last survey report. Triploid grass carp were stocked as part of an integrated vegetation management plan. Florida largemouth bass were initially stocked in 1975 and have been stocked periodically since then to enhance the trophy potential of the fishery. A complete stocking history is found in Table 3.

Vegetation/habitat history: Aquatic vegetation has historically been scarce on Lake Jacksonville. However, in fall 1995 approximately 20 acres of hydrilla was discovered and rapidly expanded. To control the hydrilla an integrated vegetation management plan was initiated in 1997. This plan featured low density triploid grass carp stocking, herbicide treatments, and native plant introduction. Following a flood in February 1999 the grass carp barrier was removed disallowing any additional grass carp stocking. Annual herbicide treatments were conducted but hydrilla continued to expand to over 300 acres with approximately 95 acres of native vegetation. In 2006 an improved fish barrier was constructed and in 2006 and 2007 a total of 3,890 triploid grass carp were stocked (10/hydrilla acre) and approximately 750,000 hydrilla flies were released. In July 2007 a major flood event removed most of the hydrilla and grass carp herbivory prevented reestablishment. By summer 2008 <1.0 acre of hydrilla and only approximately 30 acres of native vegetation were observed.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). A vegetation survey was conducted in August 2004 and was repeated at the beginning and end of the growing season 2005 through 2007. Roving creel surveys were conducted from December 2008 through May 2009. Surveys consisted of 9 creel days per quarter (4 weekdays and 5 weekend days); angler counts were instantaneous and were conducted at a random start time during the survey day. All survey dates were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (*Dorsoma cepedianum*), (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics and SE was calculated for structural indices and IOV. For largemouth bass, ages were determined using otoliths from 13 specimens with lengths ranging from 13.0 -14.8 inches. Water level data were obtained from the United States Geological Survey web site (USGS 2008).

RESULTS AND DISCUSSION

Habitat: Physical habitat types were similar to those found in previous surveys. Littoral habitat consisted mainly of bulkhead and boat docks, eroded shoreline with boat docks, and featureless. Hydrilla has been reduced to less than one acre and is present only where it is protected by the grass carp barrier at the outflow. Alligator weed (*Alternanthera philoxeroides*) was the only other prohibited species identified and occupied approximately two acres. Native emergent vegetation occupied approximately 30 acres of the reservoir (2.5% coverage) and is most abundant in the far upper end and at the upper ends of the Byrd Branch and Cat Creek arms. Dominant native emergent and floating – leaved species included: fragrant

water lily, (*Nymphaea odorata*), maidencane (*Panicum hemitomon*), common reed (*Phragmites australis*), giant cutgrass (*Zizaniopsis miliacea*), and yellow water lily (*Nuphar luteum*). Submersed native species included: coontail (*Ceratophyllum demersum*), pondweed (*potamogeton spp.*), and wild celery (*Vallisneria Americana*), (Table 4). Native plant enclosures have been reconstructed in Cat Creek and Byrd Branch and contain wild celery colonies.

Creel: Directed fishing effort by anglers was highest (68%) for largemouth bass during the winter 2008 through spring 2009 creel survey (Table 5). Crappie represented the second highest directed effort (14%). However, few crappie anglers were encountered during the creel period and relative standard error (RSE) is high for this estimate. Total fishing effort for all species at Lake Jacksonville was 9,656 hours from December 2008 through May 2009 and anglers spent an estimated \$36,990 on direct expenditures (Table 6). Adverse weather during spring 2009 likely reduced total effort and angler expenditures; three of the 9 creel days surveyed for the quarter resulted in zero effort.

Prey species: Both threadfin shad (*D. petenense*) and gizzard shad were present in Lake Jacksonville (Appendix A). The gizzard shad electrofishing catch rate (13/h) increased slightly from the 2004 (4/h); none were collected in 2006 (Figure 2). Furthermore, Index of Vulnerability (IOV) for gizzard shad was 15 indicating that most were too large for predators to consume. Threadfin shad electrofishing catch rate (111/h) was somewhat higher than in recent surveys (8/h, 2004; 0/h, 2006) and is likely related to habitat changes. Nutrients previously tied up in macrophyte biomass (hydrilla) were then available for phytoplankton production. However, overall abundance of shad was still low and the prey base continued to be dominated by sunfish species. The sunfish community included redbreast sunfish (*Lepomis auritus*), bluegill (*L. macrochirus*) and redear sunfish (*L. microlophus*) and all species were abundant. Combined catch rate for all sunfish species was 518/h, (Appendix 1). Fish collected were mostly ≤ 6 inches (Figures 3, 4, and 5) and functioned primarily as prey. Although 11% of the angler effort was directed at sunfish species during the December 2008 through May 2009 creel survey, no harvest was documented.

Catfish: Lake Jacksonville supports a low-density channel catfish population with poor natural recruitment. Poor recruitment is likely related to high water clarity (Secchi visibility >6 ft) and consequential predation by largemouth bass. Only one channel catfish was caught by gill net in 2009 (Figure 6) and that individual was large (23 inches) and mature. No evidence of recruitment was detected. This was similar to 2005 when no channel catfish were caught and 2001 when only 6 were caught. No directed angling effort for catfish was documented during the creel period.

White bass: Similar to previous surveys in 2001 and 2005 white bass (*Morone chrysops*) catch rate in gill nets continued to be low (Figure 7). Low abundance of white bass in Lake Jacksonville is likely a result of poor spawning habitat in the relatively small streams that feed the reservoir. It may also be related to the relatively low density of shad present as the relative weight (W_r) of the single specimen collected was only 80. No directed angling effort for white bass was documented during the creel period.

Black basses: Spotted bass were collected by electrofishing at a higher rate than past surveys (Figure 8) but all were small (an 11 inch specimen was the largest collected). It is unlikely that this species contributes appreciably to the fishery; no catch or harvest of spotted bass was documented during the creel period.

Electrofishing catch rate of largemouth bass in 2008 (80/h) was similar to 2002 (79/h) and 2006 (78/h), (Figure 9). Catch rate of stock-size (≥ 8 inches) largemouth bass was similar to 2006 but was nearly twice what was caught in 2004. Proportional stock density (PSD) has continued to improve from 37 (slightly below the 40-70 target range) in 2004 to 73 (slightly above the target range) in 2008. Relative weight (W_r) was ≥ 90 for fish ≥ 8 inches in length and showed marked improvement from 2006. The improvement in W_r is likely due to greater prey accessibility as a result of reduction in hydrilla. Average age for largemouth bass at 14 inches (13.0-14.8) was 2.6 years (N =13, range 2-4 years) and was similar to growth in other lakes of similar size in the area. The prevalence of Florida bass alleles in the population was similar to previous surveys despite the stockings in 2006 and 2007 (Table 8); but the percentage of pure Florida largemouth bass declined. However, in 2008 microsatellite DNA analysis was used to determine

largemouth bass genetic composition and results may not be directly comparable to historical data. The largemouth bass fishery at Lake Jacksonville is the most popular of any species with 68% of the directed angling effort in the December 2008 through May 2009 creel survey. Angler success was unusually high with an angler catch rate of 1.8 fish per hour (Table 7). Anglers released 55% of legal fish caught; however, fish held in live wells by tournament anglers comprised 50% of the harvested fish observed (Figure 10) so it is likely that eventual release was higher.

Crappie: No crappie were collected by trap net in fall 2008 and trap net catches (Appendix A) and catch rate in previous surveys were low (Ott & Bister, 2001; Ott & Bister, 2005). Fourteen percent (1,318 hours) of the estimated angler effort was directed toward crappie during the December 2008 through May 2009 creel survey and although reported angler success was high (7.9 fish/h), only one party interviewed targeting crappie actually caught any during the creel period and relative standard errors around catch and harvest estimates were high (Table 9).

Fisheries management plan for Lake Jacksonville, Texas

Prepared – July 2009

ISSUE 1: Lake Jacksonville has traditionally provided a high-quality largemouth bass fishery and it is important to local anglers. Changes in habitat have influenced angler perceptions of fishery status.

MANAGEMENT STRATEGY

1. Continue electrofishing surveys every other year beginning in 2010 to monitor largemouth bass and prey populations.
2. Continue conducting outreach presentations to area angling groups as requested.
3. Continue providing information to local news media concerning the status of the fishery.

ISSUE 2: The channel catfish population is of low density and continues to be hindered by recruitment problems. Periodic restocking with fish large enough to escape predation is necessary to produce a fishery.

MANAGEMENT STRATEGIES

1. Now that hydrilla is under control and city funding may be more available, revisit the idea of accessory stocking with \geq 10-inch fingerlings.
2. Solicit partners with angling and/or home-owner groups to finance stocking.

ISSUE 3: The Lake Jacksonville aquatic vegetation community consists primarily of emergent and floating-leaved species in the upper end of the reservoir. Nursery colonies of several native submersed species are still present in Byrd Branch and Cat Creek where exclosures protect them from grass carp herbivory. Several water-front property owners have shown interest in partnering with TPWD by allowing exclosures and plant introductions in front of their property.

MANAGEMENT STRATEGIES

1. Continue annual vegetation survey to monitor recovery of native and or exotic plant species as grass carp mortality lessens herbivory.
2. Maintain existing exclosures to ensure continued production of native plant propagules.
3. Continue soliciting partners among property owners and angler groups in native plant restoration.
4. Consult with the City of Jacksonville about additional habitat enhancement as stated in the Lake Jacksonville Aquatic Vegetation Management Plan.
5. Implement additional native aquatic plant enhancements where and when possible.
6. Solicit partnership with angling groups to construct and install artificial reefs.

ISSUE 4: Triploid grass carp stocked for hydrilla control have successfully reduced hydrilla below the level specified in the Lake Jacksonville Aquatic Vegetation Management Plan and are interfering with native vegetation recovery.

MANAGEMENT STRATEGIES

1. Under the terms of the integrated management plan discuss with the City the possibility of removing protection of grass carp and allowing angler harvest.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes an annual habitat survey, additional electrofishing in 2010, and mandatory monitoring in 2012-2013 (Table 10).

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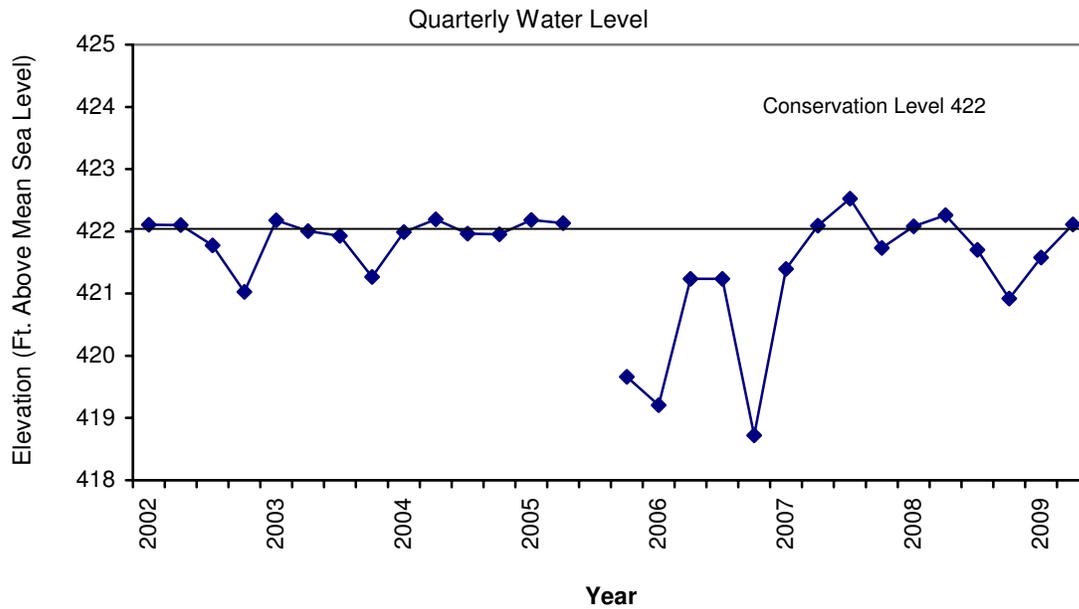


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Lake Jacksonville, Texas. Horizontal line represents conservation level.

Table 1. Characteristics of Lake Jacksonville, Texas.

Characteristic	Description
Year completed	1958
Controlling authority	City of Jacksonville
County	Cherokee
Reservoir type	City lake
Shoreline Development Index (SDI)	4.9
Conductivity	80 umhos/cm

Table 2. Harvest regulations for Lake Jacksonville, Texas.

Species	Bag Limit	Minimum-maximum length (inches)
Catfish: channel	25 (in any combination)	12–No limit
Catfish, flathead	5	18–No limit
Bass, white	25	10–No limit
Bass, largemouth and spotted	5 (in any combination)	18–No limit No minimum length for spotted bass
Crappie: white and black, their hybrids and subspecies	25 (in any combination)	10–No limit

Table 3. Stocking history of Lake Jacksonville, Texas. Size categories are: FRY <1 inch; FGL =1-3 inches; ADL = adult; UNK = unknown.

Species	Year	Number	Size
Threadfin shad	1987	<u>2,500</u>	ADL
		2,500	
Blue catfish	1975	2,000	UNK
	1987	<u>6,149</u>	FGL
		8,149	
Channel catfish	1967	2,000	UNK
	1968	2,500	UNK
	1969	2,500	UNK
	1970	2,000	UNK
	1971	2,000	UNK
	1973	2,000	UNK
	1974	2,000	UNK
	1978	17,500	UNK
	1979	4,000	UNK
	1980	2,000	UNK
	1981	2,000	UNK
	1982	4,000	ADL
	1983	4,000	FGL
	1986	4,011	FRY
	1994	<u>295</u>	ADL
			60,993
Palmetto bass	1974	15,000	UNK
	1979	14,000	UNK
	1981	16,349	UNK
	1983	<u>15,584</u>	UNK
		59,933	
Largemouth bass	1973	4,000	UNK
	1974	<u>24,000</u>	UNK
		28,000	
Florida largemouth bass	1975	67,000	FGL
	1976	137,500	FGL
	1977	47,200	FGL
	1977	85,000	FRY
	1978	138,053	FGL
	1979	4,000	FGL
	1999	135,300	FGL
	2000	135,222	FGL
	2006	86,081	FGL
	2007	<u>120,790</u>	FGL
		956,146	
White crappie	1988	<u>180,143</u>	FGL
		180,143	
Black crappie	1968	1,500	UNK
	1969	2,000	UNK

	1970	2,000	UNK
	1988	118,946	FGL
	1990	69,638	FRY
	1992	<u>85,312</u>	FRY
		279,396	
Grass carp (triploid)	1997	100	ADL
	1998	100	ADL
	2006	1,390	ADL
	2007	<u>2,500</u>	ADL
		4,090	

Table 4. Survey of littoral zone and physical habitat types, Lake Jacksonville, Texas. Abiotic¹ habitat survey was conducted in 2000 (Ott & Bister, 2001). Vegetation survey was conducted in 2008. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline distance		Surface area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead ¹	0.3	1.3		
Bulkhead and boat dock ¹	8.7	37.5		
Concrete ¹	0.1	<0.1		
Eroded shoreline ¹	1.1	4.7		
Eroded shoreline & boat docks ¹	6.6	28.4		
Featureless ¹	6.0	25.9		
Rip rap ¹	0.4	1.7		
Native submersed				
Coontail			tr	tr
Pondweed			0.8	<0.1
Wild celery			0.2	<0.1
Native emergent & floating-leaved				
Bladderwort			tr	tr
Cat-tail			tr	tr
Common reed			5.0	0.4
Fragrant water lily			10.8	0.9
Giant cut grass			3.2	0.3
Maidencane			5.1	0.4
Pickerelweed			tr	tr
Soft rush			2.0	0.2
Spikerush			tr	tr
Waterpod			tr	tr
Water primrose			tr	tr
Yellow water lily			3.1	0.3
Non native (prohibited)				
Alligator weed			2.0	0.2
Hydrilla			0.7	>0.1

¹ Abiotic habitat features.

Table 5. Percent directed angler effort by species for Lake Jacksonville, Texas, December, 2008 through May, 2009.

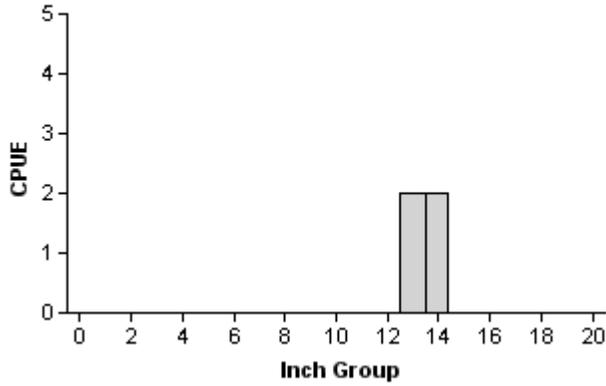
	Year
	Winter 2008 - Spring 2009
Black bass	68
Crappie spp.	14
Sunfish spp.	11
Anything	7

Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake Jacksonville, Texas, December, 2008 through May, 2009.

Creel Statistic	Year
	Winter 2008 - Spring 2009
Total fishing effort (hours)	9,656
Total directed expenditures	\$36,990

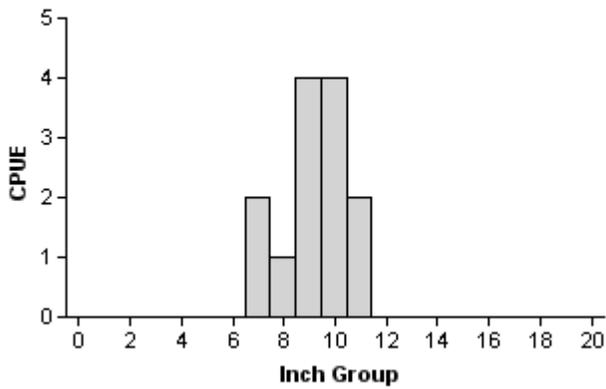
Gizzard shad

2004



Effort = 1.0
 Total CPUE = 4.0 (100; 4)
 Stock CPUE = 4.0 (100; 4)
 PSD = 100 (0)
 IOV = 0.0 (0)

2008



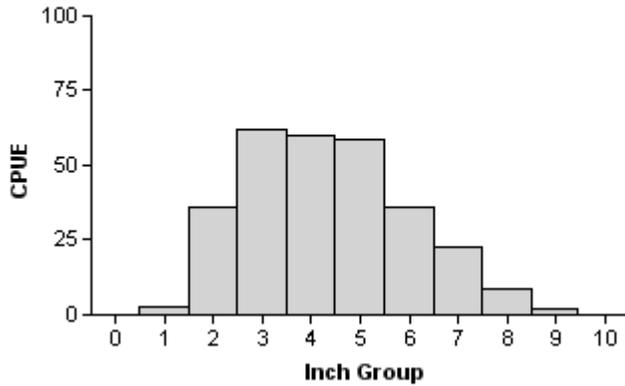
Effort = 1.0
 Total CPUE = 13.0 (33; 13)
 Stock CPUE = 13.0 (33; 13)
 PSD = 15 (12.2)
 IOV = 15.4 (9.8)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2004, and 2008. No gizzard shad were collected in 2006.

Redbreast sunfish

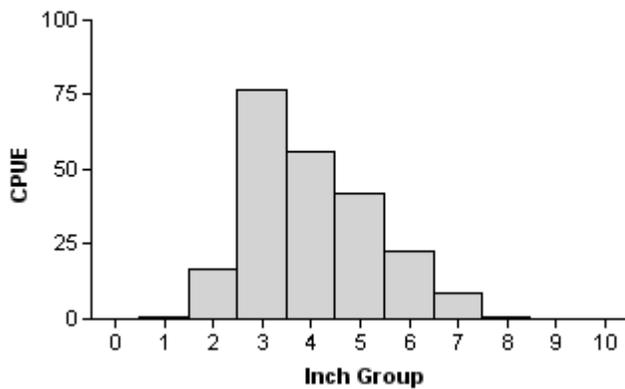
2002

Effort = 1.0
 Total CPUE = 290.0 (27; 290)
 Stock CPUE = 251.0 (21; 251)
 PSD = 28 (9.9)



2004

Effort = 1.0
 Total CPUE = 226.0 (40; 226)
 Stock CPUE = 208.0 (40; 208)
 PSD = 16 (5.3)



2008

Effort = 1.0
 Total CPUE = 230.0 (10; 230)
 Stock CPUE = 186.0 (12; 186)
 PSD = 21 (3)

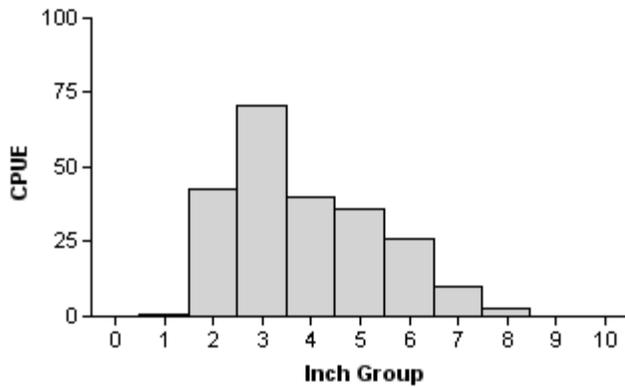


Figure 3. Number of redbreast sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2002, 2004, and 2008.

Bluegill

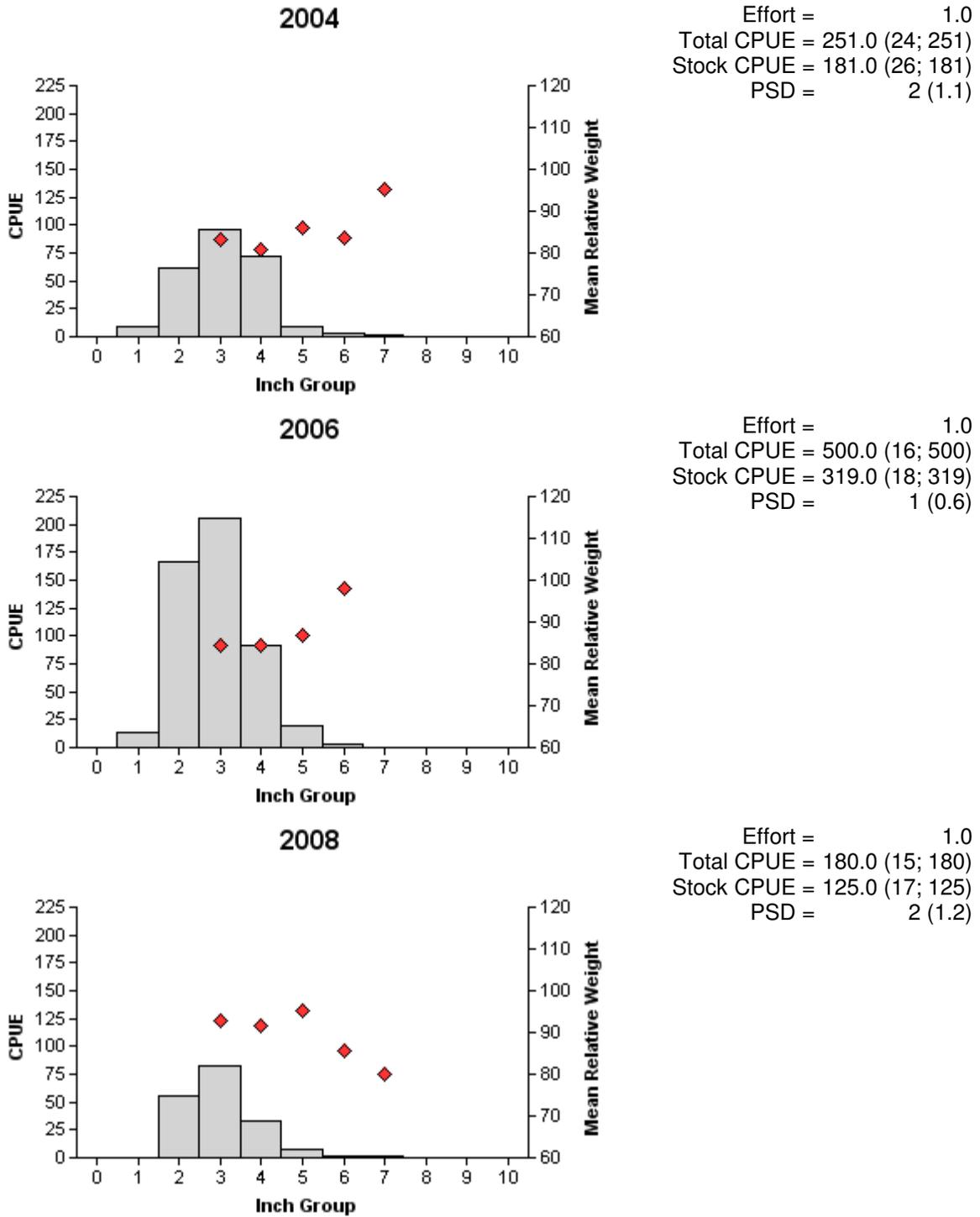
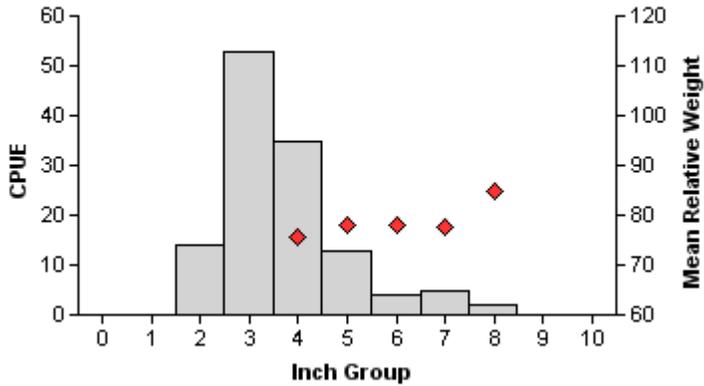


Figure 4. Number of bluegill caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2004, 2006, and 2008.

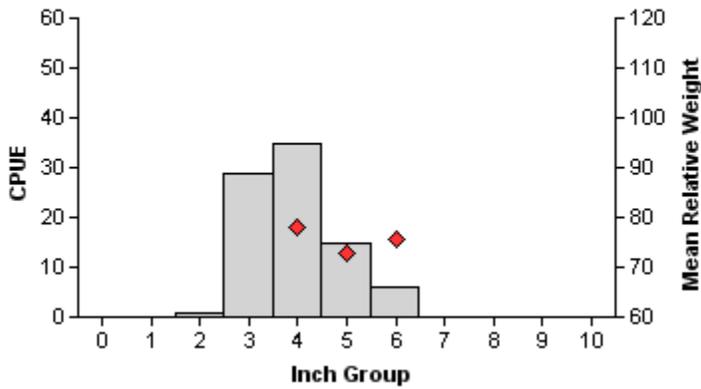
Redear sunfish

2004



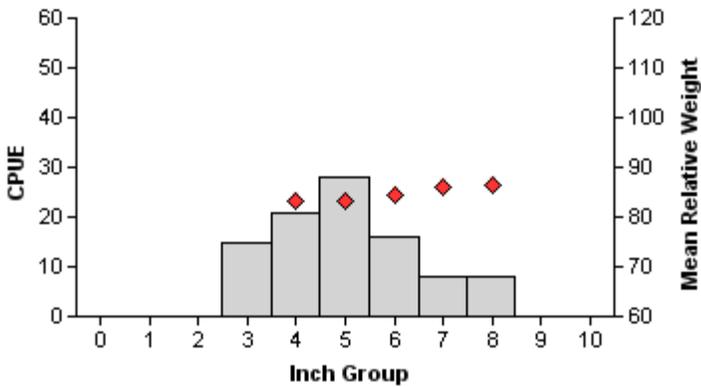
Effort = 1.0
 Total CPUE = 126.0 (24; 126)
 Stock CPUE = 59.0 (24; 59)
 PSD = 12 (2.6)

2006



Effort = 1.0
 Total CPUE = 86.0 (29; 86)
 Stock CPUE = 56.0 (30; 56)
 PSD = 0 (64.0)

2008



Effort = 1.0
 Total CPUE = 96.0 (18; 96)
 Stock CPUE = 81.0 (19; 81)
 PSD = 20 (7.8)

Figure 5. Number of redear sunfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2004, 2006, and 2008.

Channel catfish

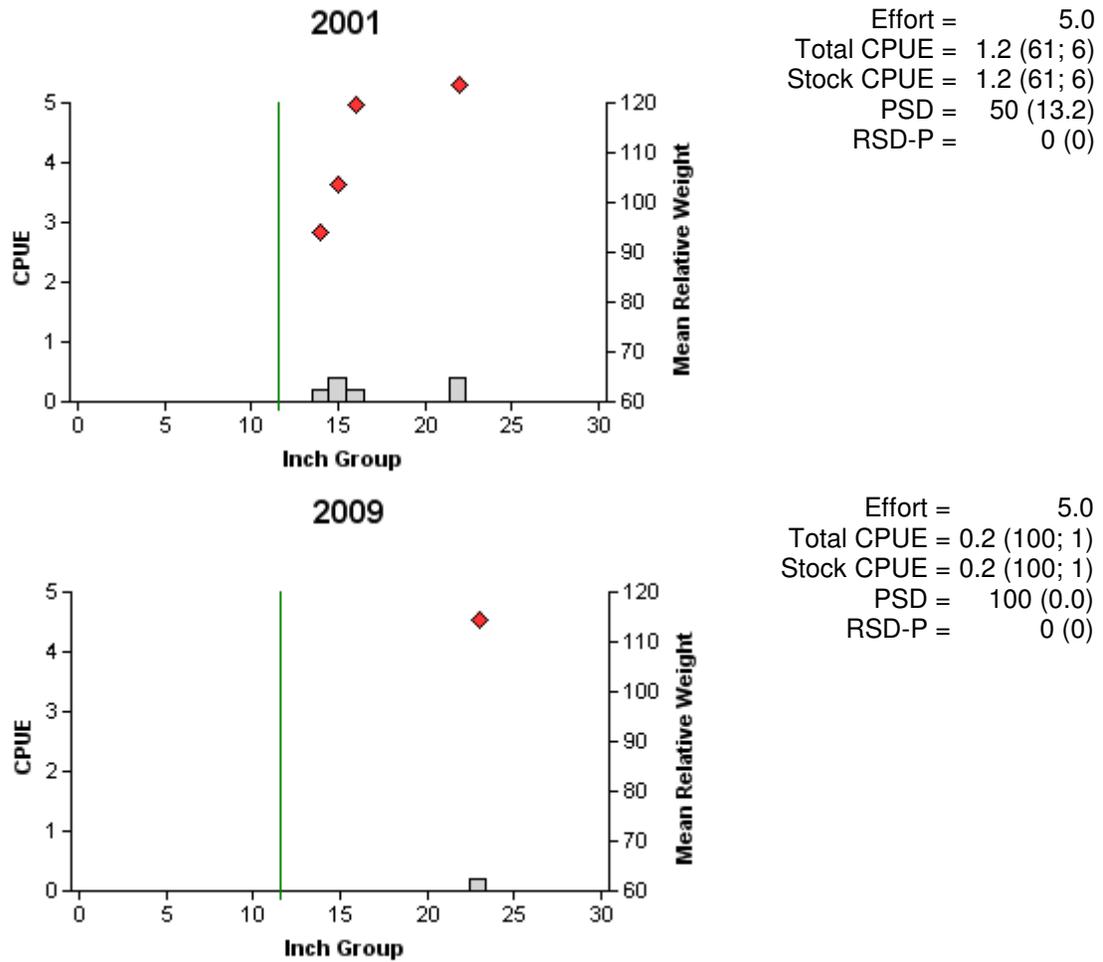


Figure 6. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Jacksonville Texas, 2001 and 2009. Vertical line represents length limit at time of survey. No channel catfish were collected in 2005.

White bass

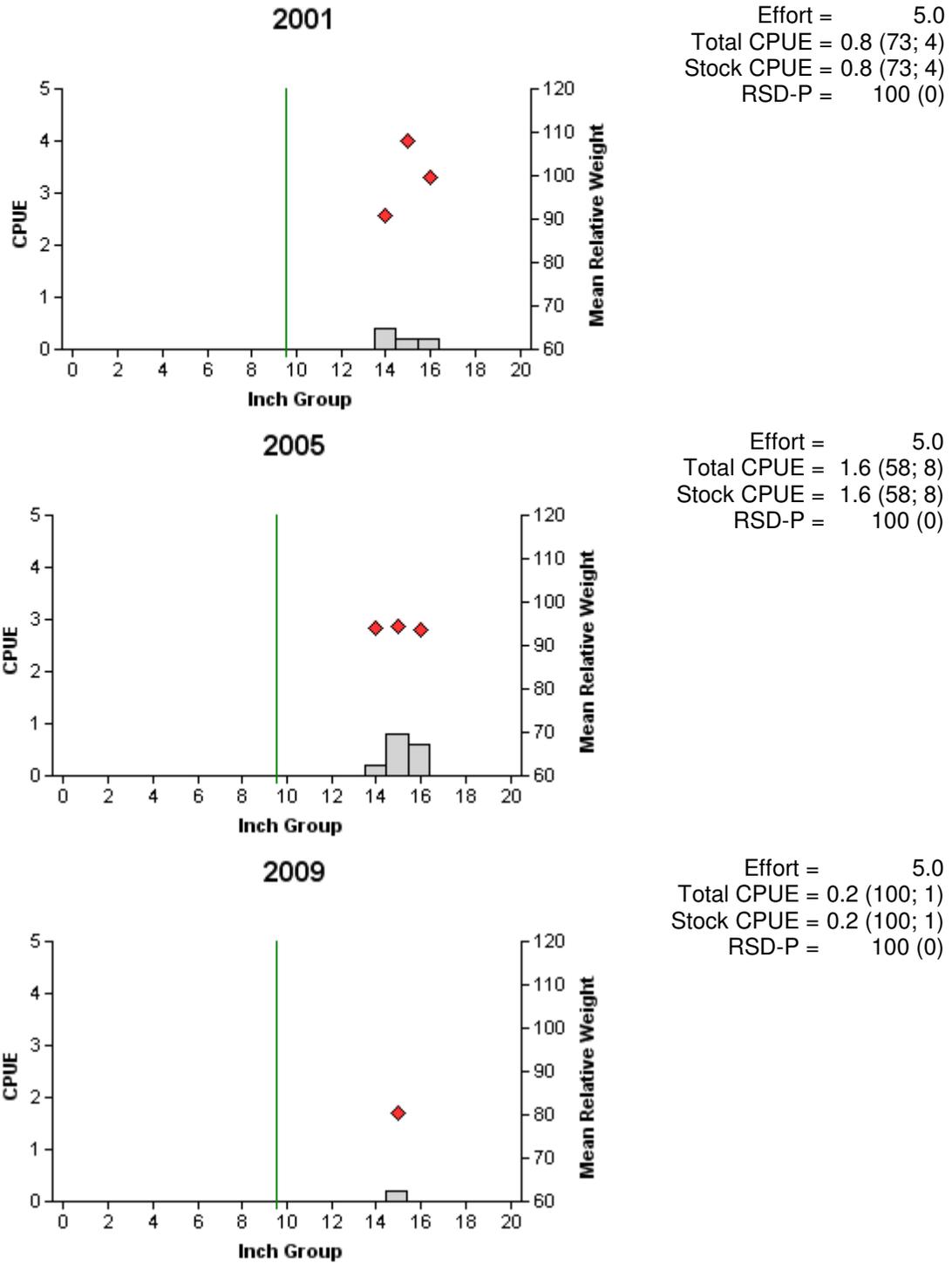
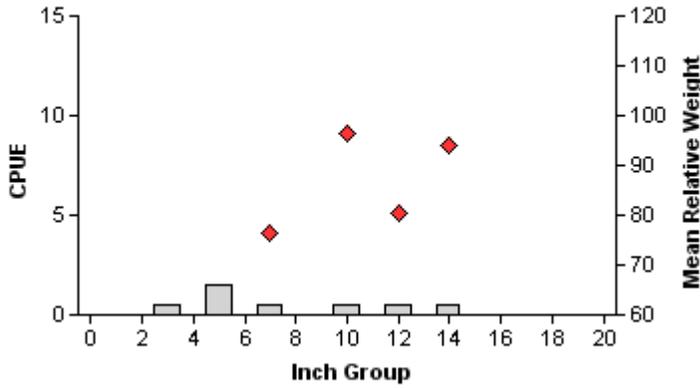


Figure 7. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Jacksonville, Texas, 2001, 2005, and 2009. Vertical line represents length limit at time of survey.

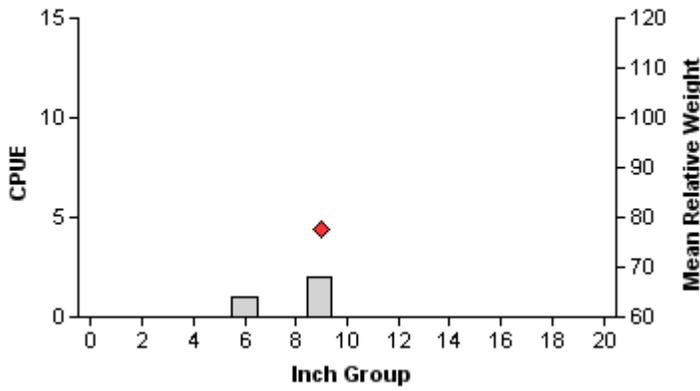
Spotted bass

2004



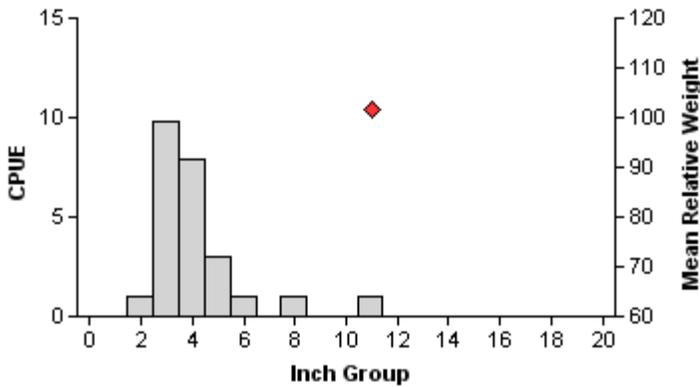
Effort = 2.0
 Total CPUE = 4.0 (51; 8)
 Stock CPUE = 2.0 (57; 4)
 PSD = 50 (18.4)
 RSD-P = 25 (15.9)

2006



Effort = 1.0
 Total CPUE = 3.0 (72; 3)
 Stock CPUE = 2.0 (100; 2)
 PSD = 0 (116.8)
 RSD-P = 0 (0)

2008



Effort = 1.0
 Total CPUE = 24.6 (35; 25)
 Stock CPUE = 2.0 (100; 2)
 PSD = 50 (0)
 RSD-P = 0 (0)

Figure 8. Number of spotted bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2004, 2006, and 2008.

Largemouth bass

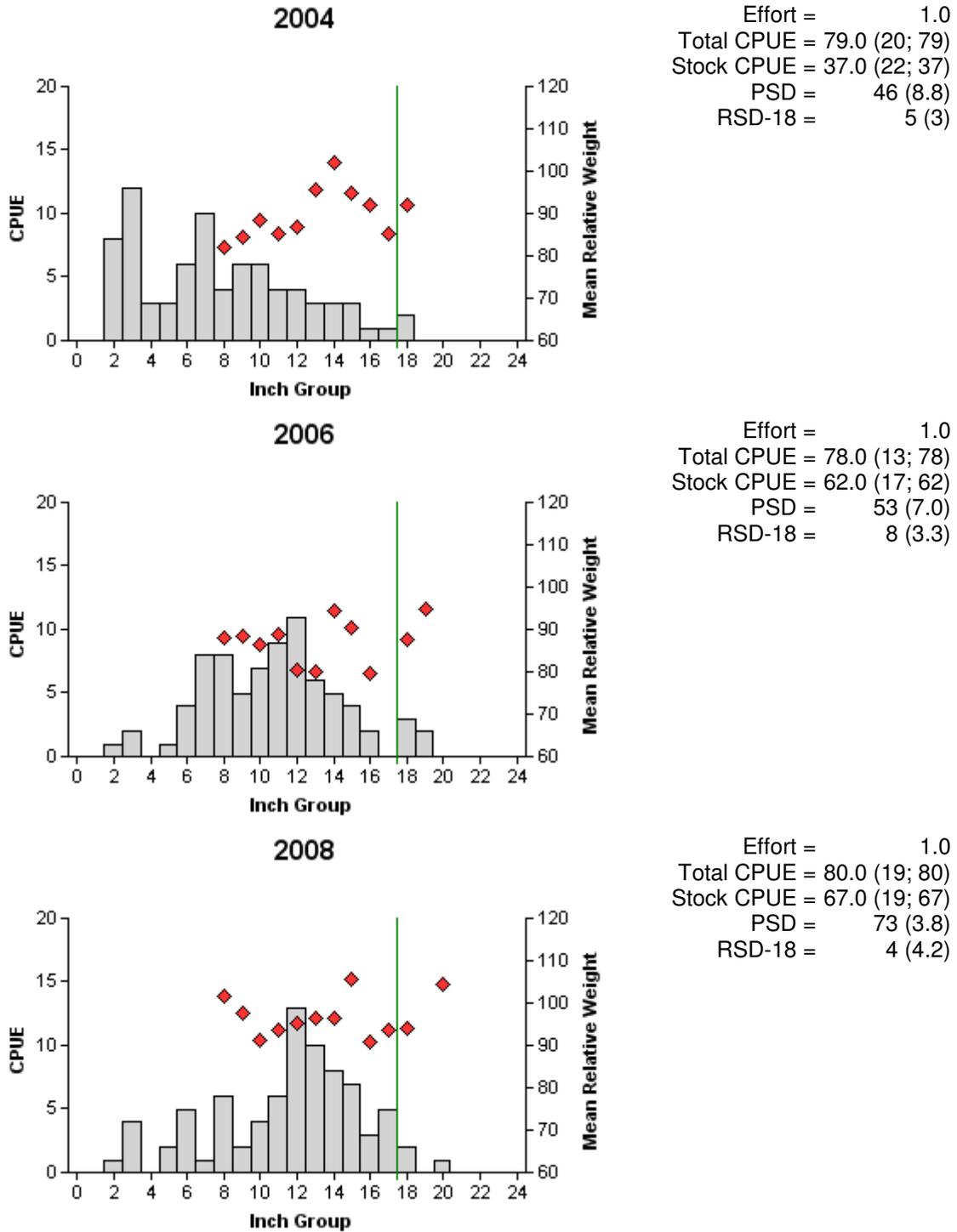


Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Lake Jacksonville, Texas, 2004, 2006, and 2008. Vertical line represents length limit at time of survey.

Largemouth bass

Table 7. Creel survey statistics for largemouth bass at Lake Jacksonville from December 2008 through May 2009, where total catch per hour is for anglers targeting all black bass species, and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Season	
	Winter 2008-Spring 2009	
Directed effort (h)	6,588	(29.3)
Directed effort/acre	5.4	(29.3)
Total catch per hour	1.8	(33.3)
Total harvest	408*	(73.5)
Harvest/acre	0.3	(73.5)
Percent legal released	55*	

* Includes fish held in live well for weigh in – eventual release rate is likely higher

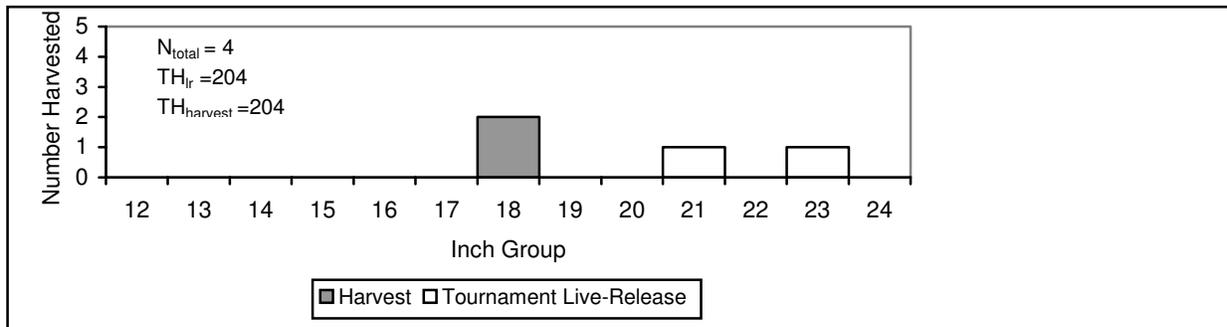


Figure 10. Length frequency of largemouth bass in possession by anglers during creel surveys at Lake Jacksonville, Texas, December, 2008 through May, 2009 all anglers combined. N_{total} is the actual number of largemouth bass observed in possession by anglers during the creel survey. TH_{lr} is the estimated number of largemouth bass temporarily held by tournament anglers intended for later release. $TH_{harvest}$ is the estimated number of largemouth bass in possession by anglers and intended for traditional harvest.

Largemouth bass

Table 8. Results of genetic analysis of largemouth bass collected by fall electrofishing at Lake Jacksonville, Texas, 1995, 1998, 2000, 2004, 2006, and 2008. In 2008 microsatellite DNA analysis was used to determine largemouth bass genetic composition and results may not directly comparable to historic data. FLMB=Florida largemouth bass, NLMB=Northern largemouth bass, F1=first generation hybrid between a FLMB and a NLMB, Fx=second or higher generation hybrid between a FLMB and a NLMB.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
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
2008	30	1	0	28	1	61	3

Black crappie

Table 9. Creel survey statistics for largemouth bass at Lake Jacksonville from December 2008 through May 2009, where total catch per hour is for anglers targeting any crappie species, and total harvest is the estimated number of black crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Season	
	Winter 2008-Spring 2009	
Directed effort (h)	1,318	(62.7)
Directed effort/acre	1.1	(62.7)
Total catch per hour	7.9	(0.00)
Total harvest	102	(157.2)
Harvest/acre	0.1	(157.2)
Percent legal released	0	

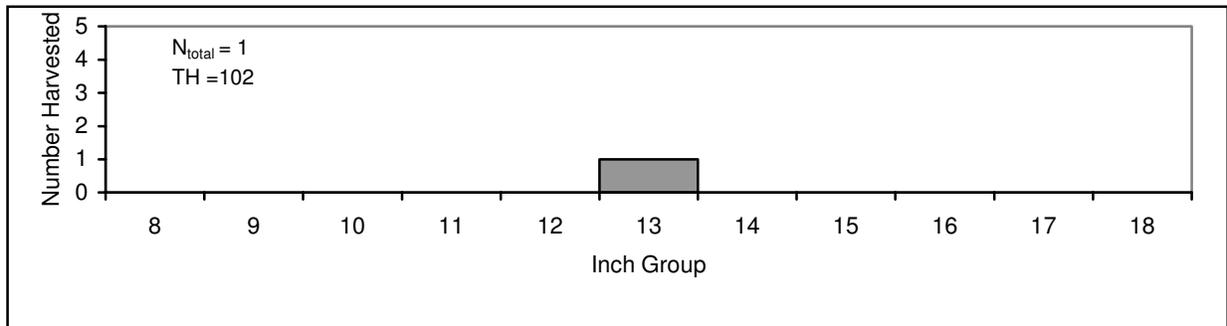


Figure 11. Length frequency of harvested white crappie and black crappie observed during creel surveys at Lake Jacksonville, Texas, December 2008 through May 2009, all anglers combined. N is the actual number of harvested black crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 10. Proposed sampling schedule for Lake Jacksonville, Texas. Gill netting is conducted in the spring and electrofishing is conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

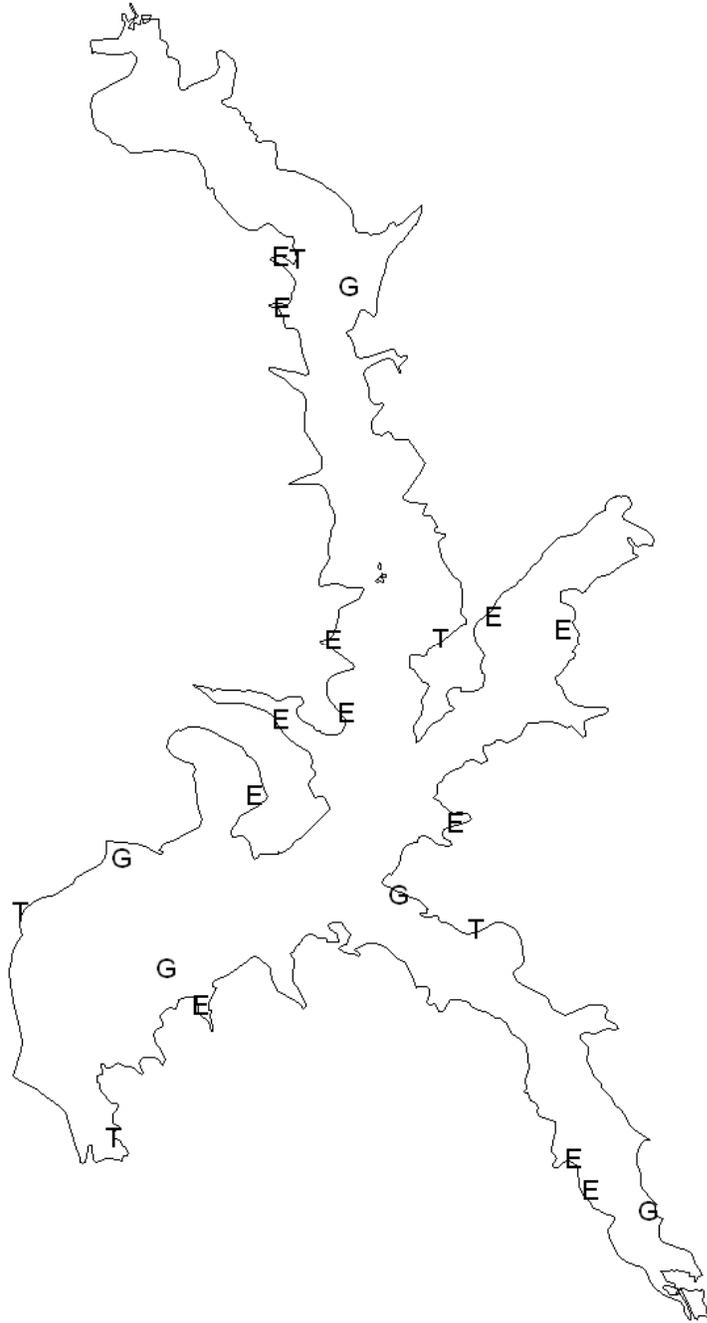
Survey Year	Electrofishing	Gill Net	Vegetation	Report
2009-2010			A	
2010-2011	A		A	
2011-2012			A	
2012-2013	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Jacksonville, Texas, 2008-2009.

Species	Gill netting		Trap netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					13	13.0
Threadfin shad					111	111.0
Channel catfish	1	0.2				
Flathead catfish	2	0.4				
White bass	1	0.2				
Redbreast sunfish					230	230.0
Warmouth					8	8.0
Bluegill					180	180
Redear sunfish					96	96.0
Spotted sunfish					4	4.0
Spotted bass					25	25.0
Largemouth bass					80	80.0

APPENDIX B



Location of sampling sites, Lake Jacksonville, Texas, June 2008 through May 2009. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.