PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

Lyndon B. Johnson Reservoir

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Executive Summary

Lyndon B. Johnson Reservoir was surveyed in 2004 using trap nets and boat electrofisher, and in 2005 using gill nets. Structural habitat, aquatic vegetation, and angler access surveys were conducted in 2004. This report summarizes the results of these surveys and contains a fisheries management plan for the reservoir based on those findings.

- **Reservoir Description:** Lyndon B. Johnson Reservoir is a 6,449-acre impoundment of the Colorado and Llano Rivers in Burnet and Llano counties. It was constructed in 1951 by the Lower Colorado River Authority (LCRA) for purposes of hydro-electric and steam-electric power, flood control, and water conservation. Lyndon B. Johnson Reservoir has a drainage area of approximately 36,290 square miles and a shoreline length of about 200 miles. Residential and commercial properties border most of the shoreline area.

- **Angler access:** Seventeen boat ramps provided excellent public boat access. Boat ramps were available in most areas of the reservoir. Most boat ramps offered courtesy docks, but none offered public fishing piers. The majority of the shoreline was privately owned, resulting in poor bank access.

- **Aquatic vegetation/habitat:** Lyndon B. Johnson Reservoir supported a diverse mix of aquatic vegetation species (page 9), but these species covered less than 5% of the reservoir surface acreage. Historically, submerged aquatic vegetation (milfoil, pondweed, and coontail) was common and sometimes problematic until the late 1960s when rooted vegetation disappeared (Butler 1983) and never fully recovered (Tibbs and Magnelia 1998). Near undisturbed shoreline areas waterwillow can be abundant, but shoreline development (in the form of bulkhead banks) has increased in recent years (1997 = 46 % of shoreline; 1999 = 55 % of shoreline; 2004 = 60% of shoreline). Evidence in the scientific literature shows a negative correlation between emergent and floating-leaf vegetation and the percentage of lakeshore development (Radomski and Goeman 2001). Increased conversion of vegetated shoreline to bulkhead habitat can lead to poor littoral fish assemblages (Trial et al. 2001).

  A cooperative native aquatic vegetation restoration project was initiated in 1999 by personnel from the Texas Parks and Wildlife Department (TPWD), the LCRA, the U.S. Army Corps of Engineers (USACOE) aquatic research laboratory in Lewisville, and the Lake LBJ Habitat Committee (made up of interested public). The objective of the project was to improve aquatic habitat which might result in increased standing stocks of cover seeking fishes (largemouth bass and sunfish) and higher angler catch rates of these fish. A variety of aquatic plant species (Bonds and Magnelia 2000) were planted inside multiple types of protective cages (to prevent herbivory on newly established plants) at several locations within the reservoir in summer of 2000. Expansion of submerged aquatic plants was insignificant. Limited success was achieved by uprooting existing shoreline emergents (e.g., waterwillow, and spatterdock) and replanting in areas lacking aquatic vegetation.

Eurasian watermilfoil expanded from only a trace presence in 2000 to occupy over 80 acres (1.3% surface acreage) in 2004. This plant was mainly relegated to the upper end of the reservoir below the confluence of the Llano and Colorado Rivers. In addition, 2 to 3 acres of hydrilla were discovered scattered over approximately 45 acres subsequent to the aquatic vegetation survey in 2004. These four patches of hydrilla were treated in April 2005 with Nautique (main lake areas) and Sonar (inside cove) herbicides in an attempt to prevent expansion of this exotic plant (Appendix E).

Water hyacinth, an exotic floating aquatic plant, was discovered growing in several isolated patches in the upper end of the reservoir in 2003. This plant offered no significant benefit as fisheries habitat, and had the potential for rapid expansion. These plants were both chemically (i.e., glyphosate herbicide) and mechanically (i.e., by hand) removed from the reservoir in 2004. These plants were still absent by Spring 2005.

- **Prey species:** Gizzard shad electrofishing catch-per-unit-effort (CPUE) in 2004 was 134.5/hour, which was similar to the average CPUE from the previous three surveys (1997 – 2000 mean = 138.7/hour). However, annual variability in production of young shad has occurred, evidenced by the wide range of index of vulnerability (IOV) values (range = 7 – 82). Threadfin shad were present in the reservoir in low densities and comprised a small quantity of the electrofishing catch (1997 = 4.0/hour; 1999 = 6.0/hour; 2000 = 2.0/hour; 2004 = 19.5/hour).

  Redbreast sunfish CPUE (63.5/hour) and size structure were fairly consistent with previous surveys (1997 – 2000 mean = 66.9/hour; Range = 32.0 – 117.3/hour). Redbreast sunfish were sampled up to 8 inches in length, providing a limited fishery.

  Bluegill electrofishing CPUE (218.5/hour) was moderate in 2004 and similar to previous surveys (1999 = 190.0/hour; 2000 = 154.0/hour). Bluegill PSD increased to 22 in 2004, compared to a range of 12 – 14 for years 1997 through 2000. Electrofishing catch rate of bluegill 7 inches and longer (2004 = 10.0/hour) has steadily increased across recent surveys (1997 = 0/hour; 1999 = 1.3/hour; 2000 = 3.3/hour). These data suggest that the size distribution of bluegill has shifted toward larger fish.

  Other sunfish species collected in 2004 were green sunfish (21.0/hour), redear sunfish (20.0/hour), longear sunfish (18.0/hour), and warmouth (6.0/hour). Other prey fishes collected were bullhead minnow (29.5/hour), inland silverside (12.0/hour), blacktail shiner (7.5/hour), blue tilapia (2.5/hour), and Rio Grande cichlid (1.0/hour).

- **Catfishes:** The gill netting catch rate for channel catfish in 2005 (3.5/net night) was the lowest reported since 1991 (3.4/net night). However, these rates were only slightly below the average for other surveys conducted within this time period (average CPUE 1994 – 2001 = 5.0/net night; $N_{surveys} = 6$; Range = 4.7 – 5.3/net night). Size structure was consistently dominated by fish measuring 9 to 18 inches, but larger fish (21 – 24 inches) were routinely

collected. Most relative weights ranged from 80 to 110, and typically increased with fish size. This pattern was similar among recent samples.

One blue catfish measuring 24 inches was collected in the 2005 gill net survey (0.1/net night). Blue catfish were never stocked in this reservoir, but most likely immigrated from upstream reservoirs where stockings occurred. Blue catfish were collected in each of the past four gill net surveys, but never in large numbers (< 0.6/net night).

Flathead catfish were collected in the 2005 gill netting survey (1.6/net night). Historical catch rates were consistent and all less than 1.4/net night.

- **White bass:** This reservoir supported a low density white bass population. The 2005 gill net catch rate (1.6/net night) was slightly lower than the average for the previous five surveys (2.6/net night), but within the range (1.0 – 5.7/net night) of prior sampling variability. White bass 8 to 16 inches were represented in the sample, and most relative weights were between 80 and 90.

  The experimental 12-inch length limit on white bass implemented in 1995 was returned to the statewide 10-inch length limit in 2003. The experimental length limit failed to meet the objectives of increasing white bass abundance and stabilizing fluctuations in year-class production.

- **Black basses:** Largemouth bass electrofishing catch rates for all sizes (81.0/hour) and for stock size (8 inches) and larger (67.5/hour) were slightly higher than average values for the previous four surveys (1997 – 2002 mean $CPUE_{total}$ = 65.7/hour; $CPUE_{stock}$ = 45.2/hour). Size structure has been consistently good, with legal-sized fish between 14 and 24 inches routinely collected. Relative weight values have varied, and generally increased with size. Average Wr values were consistent for years 1999 through 2004, and ranged from 85.4 (2002; N = 56; SD = 10.9) to 87.6 (2004; N = 136; SD = 9.2). Growth was moderate. Mean lengths at ages 1 (10.9 inches; N = 65; SD = 1.0), 2 (13.2 inches; N = 32; SD = 1.4), and 3 (15.5 inches; N = 18; SD = 1.8) were similar to prior years (Appendix D). The average age of largemouth bass at 14 inches was 2.3 years (N = 20; range = 1 – 4).

  Florida largemouth bass fingerlings were stocked in 1976, 2001, and 2002. The two most recent stockings were conducted to take advantage of newly planted aquatic vegetation and its potential for increasing stocked fingerling survival. Despite these stockings, Florida largemouth bass genetic influence did not increase from 2000 (Florida alleles = 63%; Florida genotype = 19%) to 2004 (Florida alleles = 50%; Florida genotype = 19%). Relatively high natural recruitment of existing largemouth bass and the insignificant change in aquatic vegetation coverage likely explain why stocked fingerlings did not significantly alter population genetic composition.

  Guadalupe bass were collected in moderate numbers in 2004 (22.0/hour), but all individuals

measured less than 12 inches. Previous surveys have collected Guadalupe bass as large as 14 inches, but individuals longer than 12 inches were uncommon.

- **White crappie:** The 2004 trap net catch rate for white crappie was the lowest recorded for this reservoir (0.8/net night). The average catch rate for years 1989 through 2000 (N = 5 surveys) was 2.5/net night, and ranged between 1.0/net night (1994) and 4.5/net night (2000). Relative weight values for white crappie were typically between 90 and 100. Sample sizes of white crappie were generally too small to adequately describe growth.

- **Management Strategies**
  Based on current information, the reservoir should continue to be managed with existing regulations. Florida largemouth bass fingerling stockings in 2001 and 2002 failed to increase the genetic contribution of the Florida subspecies in a 2004 age-0 sample compared to a similar sample collected in 2000. Population characteristics of the largemouth bass population have been consistent across recent surveys. However, the introduction of hydrilla and the expansion of Eurasian watermilfoil have the potential to alter the population dynamics of bass and their prey. Electrofishing surveys should be conducted in 2006 and 2008 to monitor population characteristics of the largemouth bass, sunfishes, and shad species.

  Survival and expansion of introduced native aquatic plants has mostly been disappointing, except for translocated emergent plants. Additional plantings of submerged species such as waterstargrass, American pondweed, and *Vallisneria sp*. should discontinue. Future efforts should be made to maintain protective cages surrounding surviving aquatic plants and translocating existing waterwillow and spatterdock to locations devoid of habitat.

  Hydrilla, water hyacinth, and Eurasian watermilfoil have the potential to rapidly spread beyond coverage observed in 2004. Aquatic vegetation surveys should be conducted annually until exotic aquatic plant growth has stabilized.

Introduction

This document is a summary of fisheries data collected from Lyndon B. Johnson Reservoir from July 2004 to June 2005. Historical data are also provided for comparative purposes. The purpose of the document is to provide fisheries information and make fisheries 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.

Harvest regulations for Lyndon B. Johnson Reservoir in 2004.

Species	Bag Limit	Length Limit (inches)
Largemouth bass	5	14
Guadalupe bass	5	none
Flathead catfish	5	18
Blue and channel catfish	25	12
White bass	25	10
White crappie	25	10

Methods

- Fishes were collected by electrofishing (2.0 hours at 24 stations), gill netting (15 net nights at 15 stations), and trap netting (30 net nights at 30 stations). Sampling locations for all gear types presented in this report were selected randomly. 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 netting as the number of fish caught in one net set overnight. Largemouth bass electrophoresis testing and access and aquatic vegetation surveys were conducted according to the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).
- Sampling statistics (CPUE for various length categories), structural indices (Proportional Stock Density [PSD], Relative Stock Density [RSD]), and relative weight indices were calculated for target fishes according to Anderson and Neumann (1996).
- Otoliths were used to determine ages for largemouth bass, white bass, and white crappie. No age data were collected for Guadalupe bass, sunfish, and catfish species.
- IOV was computed for the gizzard shad electrofishing sample according to DiCenzo et al. (1996). This index computes the percentage of shad measuring < 8 inches in the sample (i.e., those sizes that are vulnerable to predation by most sizes of predator fish).
- Reservoir surface acreage was determined using data provided by the Texas Water Development Board. Surface acreage differs from previous Lyndon B. Johnson Reservoir reports, when acreage was determined using United States Geological Survey quadrangle maps.

Literature Cited

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DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

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Tibbs, J. E., and S. J. Magnelia. 1998. Statewide freshwater fisheries monitoring and management program. Survey report for Lyndon B. Johnson Reservoir, 1997. Texas Parks and Wildlife Department, Federal Aid Project F-30-R-21.

Trial, P. F., F. P. Gelwick, and M. A. Webb. 2001. Effects of shoreline urbanization on littoral fish assemblages. Journal of Lake and Reservoir Management 17(2):127-138.

Physical and historical data for Lyndon B. Johnson Reservoir, Texas

Inland Fisheries water body code: 0466 IF District: 2C – San Marcos

Controlling authority: Lower Colorado River Authority (LCRA)

Acres: 6,449

Water Uses: Flood control, water supply, hydroelectric and steamelectric power

Counties: Burnet and Llano Location: 10 miles west of Marble Falls

Latitude: 30° 20' Longitude: 98° 32'

Nearest major metropolitan area and distance: Austin – 60 miles

Reservoir description: Mainstream River system: Colorado

Mean depth (ft): 22.0 Maximum depth (ft): 90.0

Shoreline development index: 17.9

Secchi disc range (ft): 2-6 Conductivity (umhos/cm): 475

Constructed: 1951

Survey History:

Method	Year
Gill net	1975, 1976, 1982, 1987, 1989, 1991, 1994, 1997 – 2001, 2005
Electrofisher	1982, 1987, 1989, 1991, 1993, 1994, 1997, 1999, 2000, 2002, 2004
Trap net	1986, 1987, 1989, 1991, 1994, 1997, 2000, 2004
Angler access	1995, 2004
Structural habitat	1994, 1997, 1999, 2001, 2004
Aquatic vegetation	1989, 1991, 1994, 1997, 2000, 2004

Habitat survey of littoral zone and physical habitat types, Lyndon B. Johnson Reservoir, Texas, August, 2004. A linear shoreline distance (miles) was recorded for each habitat type found. Water elevation was at full conservation pool (825 feet msl) at time of survey.

Habitat Type	Shoreline Miles	% of Shoreline Mileage
Boat dock/bulkhead	85.9	60.3
Non-descript shoreline	31.0	21.7
Non-navigable	13.1	9.2
Native emergent	8.4	5.9
Riprap	3.1	2.2
Other	0.6	0.4
Dam	0.4	0.3
Total	142.5	100.0

Aquatic vegetation species composition and coverage, Lyndon B. Johnson Reservoir, Texas, July, 2004. Water elevation was at full conservation pool (825 feet msl) at time of survey.

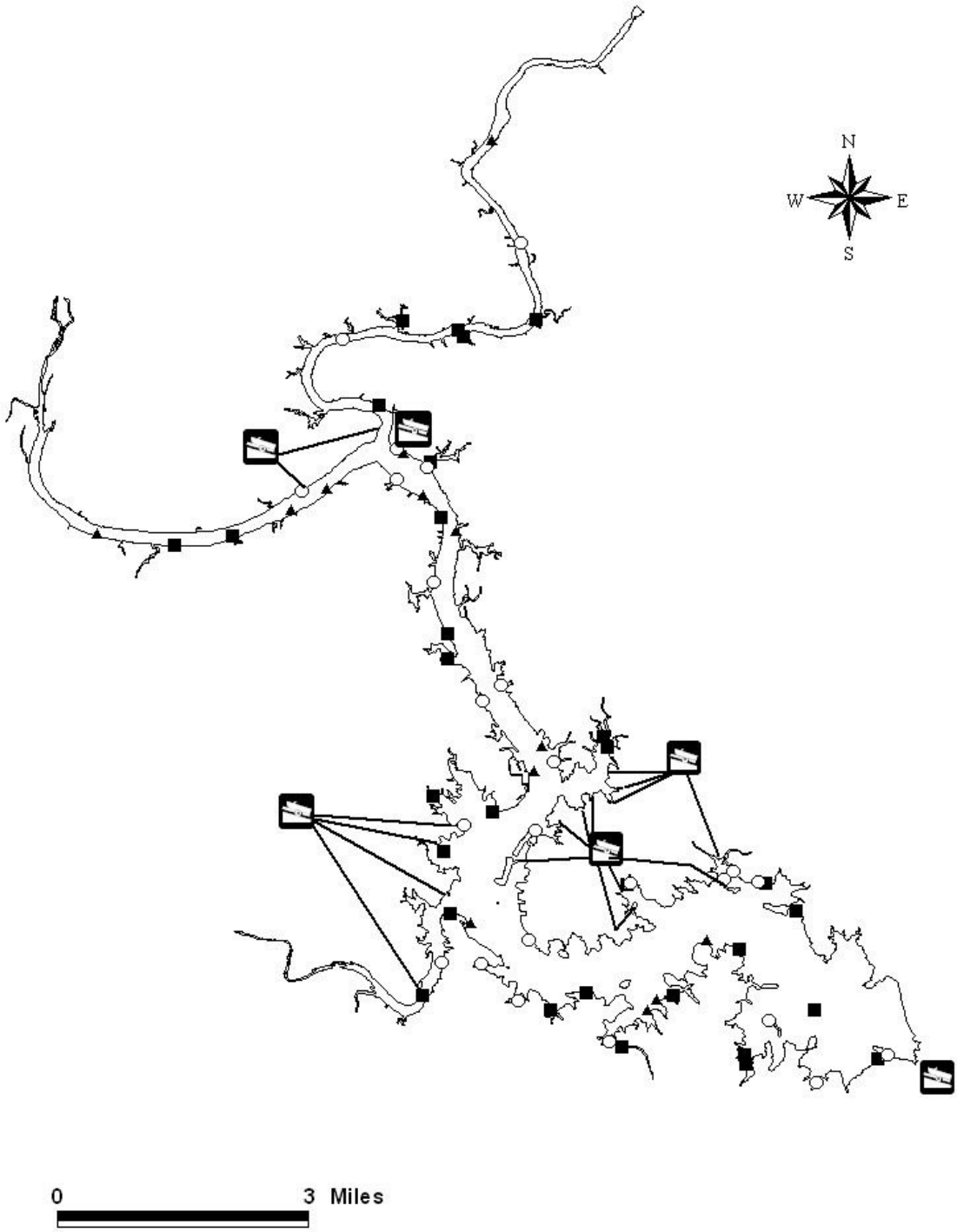
Common name	Scientific name	Acres	% Coverage	Public Access Inhibited?
Bulrush	*Scirpus spp.*	12.4	< 1	No
Eelgrass	*Vallisneria americana*	0.1	< 1	No
Eurasian water-milfoil	*Myriophyllum spicatum*	83.0	1.3	No
Pickerelweed	*Pontederia cordata*	0.1	< 1	No
Pondweed	*Potomogeton* spp.	0.1	< 1	No
Spatterdock	*Nuphar luteum*	6.4	< 1	No
Water-hyacinth	*Eichhornia crassipes*	0.5	< 1	No
White water-lily	*Nymphaea odorata*	< 0.1	< 1	No
Water-willow	*Dianthera americana*	1.8	< 1	No
Total		104.4	1.6	No

Stocking history of Lyndon B. Johnson Reservoir, Texas.

Species	Year	Number	Size
Channel catfish	1969	112,457	Fingerling
	1971	263,925	Fingerling
	1972	32,400	Fingerling
	1984	7,682	Adult
	1989	5,346	Adult
	1991	10,900	Fingerling
	1994	580	Fingerling
	Species total	433,290	
Flathead catfish	1971	52	Adult
	Species total	52	
Florida largemouth bass	1976	64,600	Fingerling
	2001	228,300	Fingerling
	2002	420,790	Fingerling
	Species total	713,690	
Green X redear sunfish	1972	15,000	Fingerling
	Species total	15,000	
Largemouth bass	1971	308,126	Fingerling
	Species total	308,126	
Palmetto (hybrid striped) bass	1977	71,000	Fingerling
	1980	64,000	Fingerling
	Species total	135,000	
Smallmouth bass	1976	25,000	Fingerling
	1984	59,400	Fingerling
	1985	59,500	Fingerling
	1986	747	Fingerling
	Species total	144,647	
Striped bass	1983	59,881	Fingerling
	Species total	59,881	

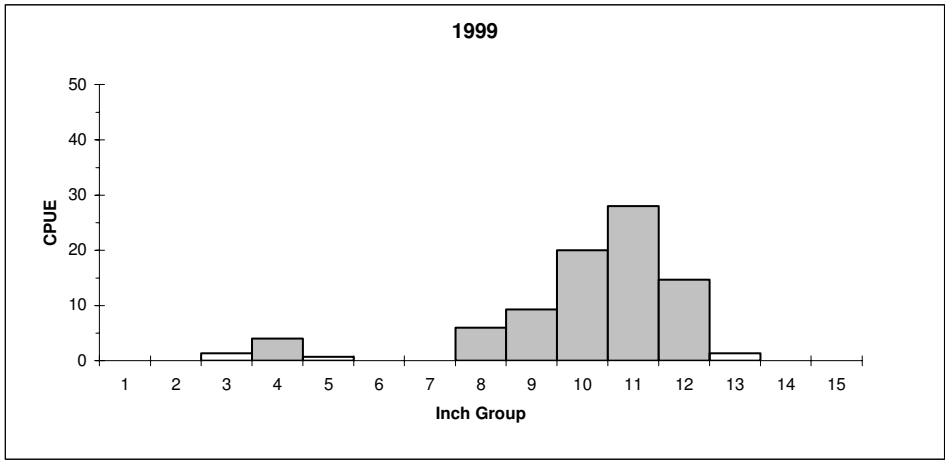
Stocking history of Lyndon B. Johnson Reservoir, Texas, continued.

Species	Year	Number	Size
Walleye	1973	5,600,000	Fry
	1974	1,600,000	Fry
	Species total	7,200,000	

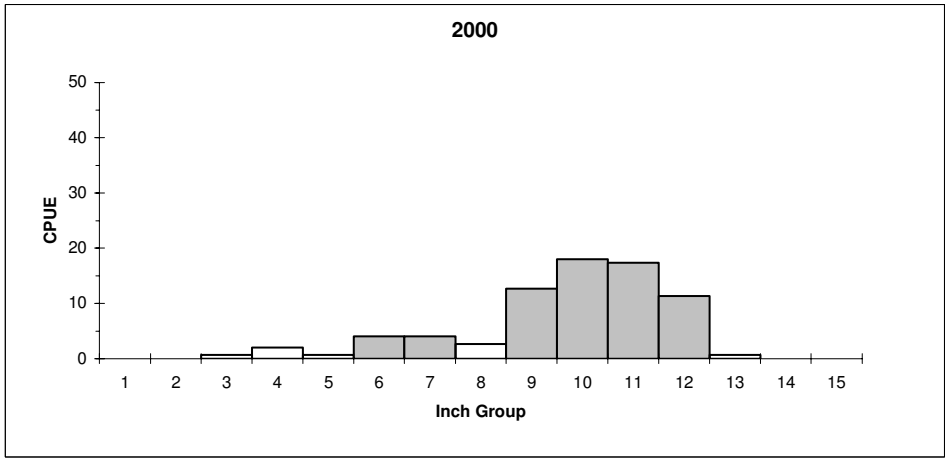


Location of sampling sites, Lyndon B. Johnson Reservoir, Texas, 2004 – 2005. Trap netting, gill netting, and electrofishing stations are indicated by squares, triangles, and open circles, respectively. Boat ramps are represented by boat ramp symbols.

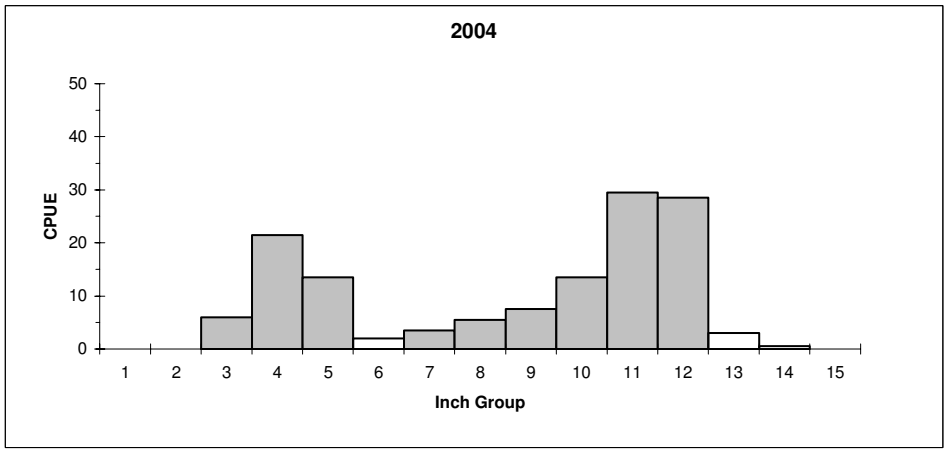
Gizzard Shad



Effort =	1.5
Total CPUE =	85.3
Stock CPUE =	79.3
PSD =	55
IOV =	7



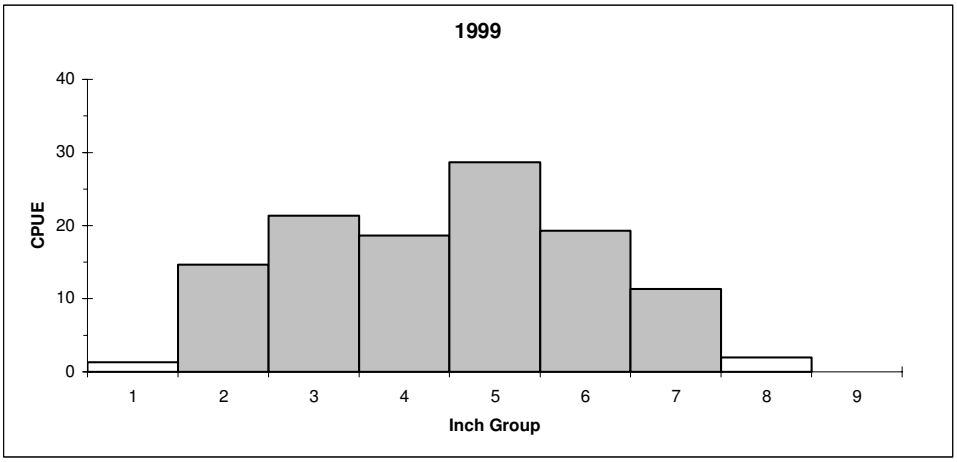
Effort =	1.5
Total CPUE =	74.0
Stock CPUE =	63.0
PSD =	44
IOV =	23



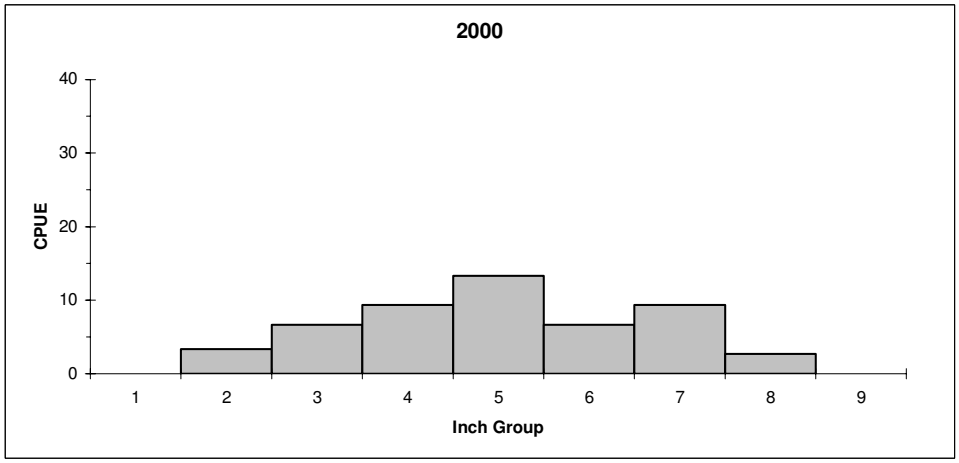
Effort =	2.0
Total CPUE =	134.5
Stock CPUE =	91.5
PSD =	67
IOV =	35

Comparison of the number of gizzard shad caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1999, 2000, and 2004.

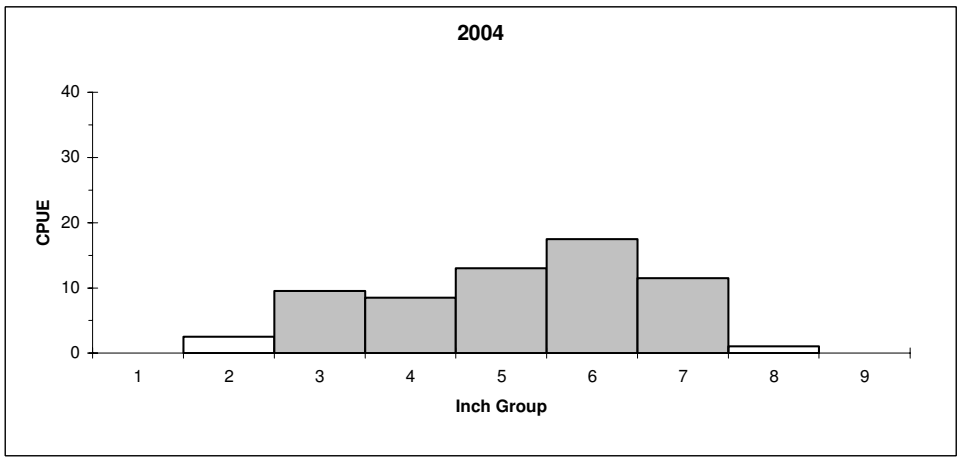
Redbreast Sunfish



Effort =	1.5
Total CPUE =	117.3
Stock CPUE =	80.0
CPUE ≥7 =	13.3



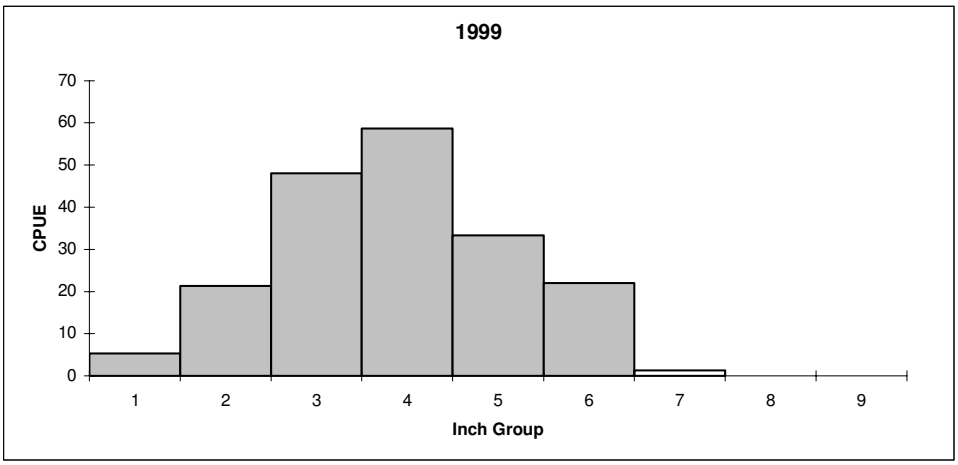
Effort =	1.5
Total CPUE =	51.3
Stock CPUE =	41.3
CPUE ≥7 =	12.0



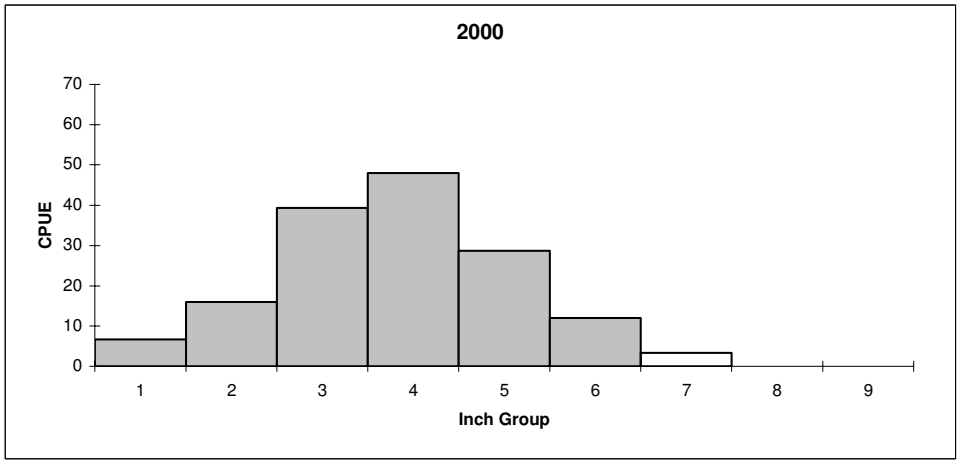
Effort =	2.0
Total CPUE =	63.5
Stock CPUE =	61.0
CPUE ≥7 =	12.5

Comparison of the number of redbreast sunfish caught per hour (CPUE, bars), and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1999, 2000, and 2004.

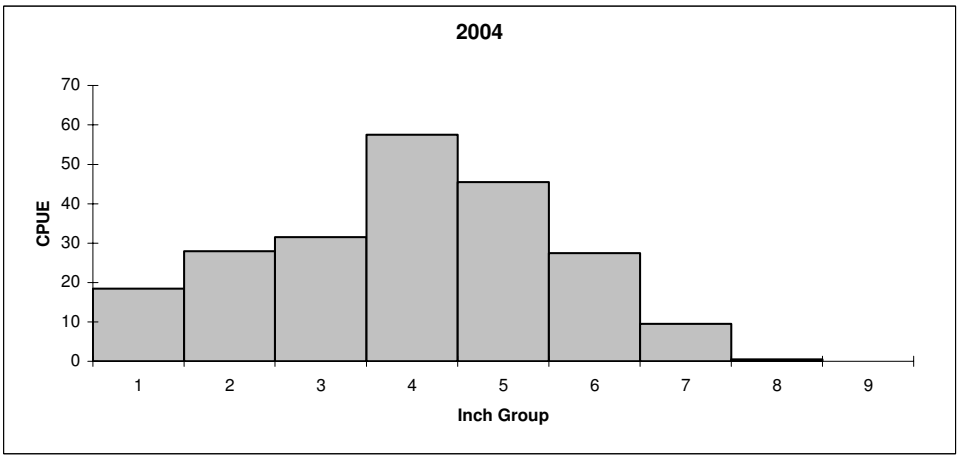
Bluegill



Effort =	1.5
Total CPUE =	190.0
Stock CPUE =	163.3
PSD =	14
RSD-8 =	0



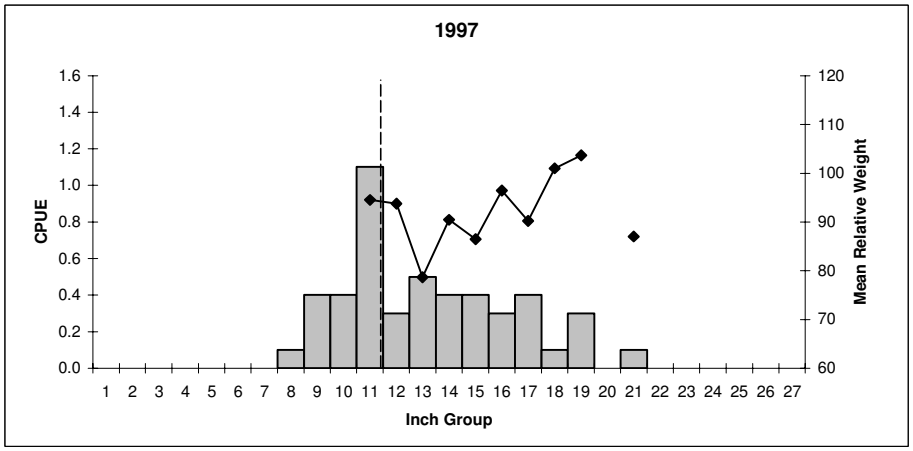
Effort =	1.5
Total CPUE =	154.0
Stock CPUE =	131.3
PSD =	12
RSD-8 =	0



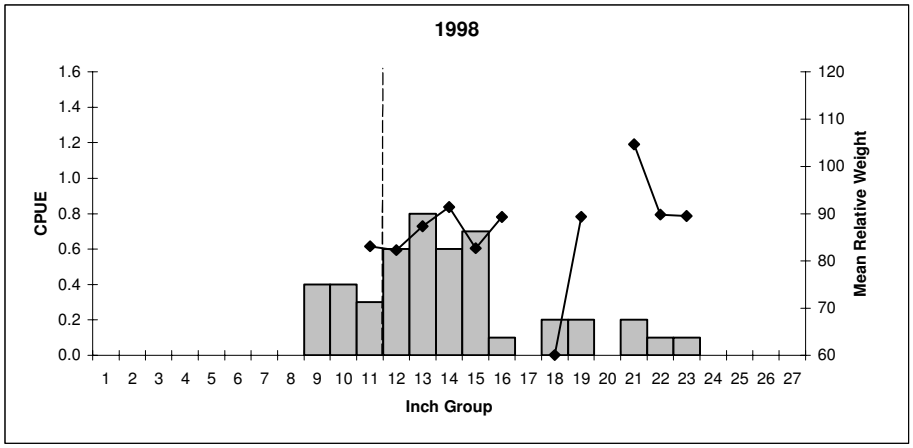
Effort =	2.0
Total CPUE =	218.5
Stock CPUE =	172.0
PSD =	22
RSD-8 =	< 1

Comparison of the number of bluegill caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1999, 2000, and 2004.

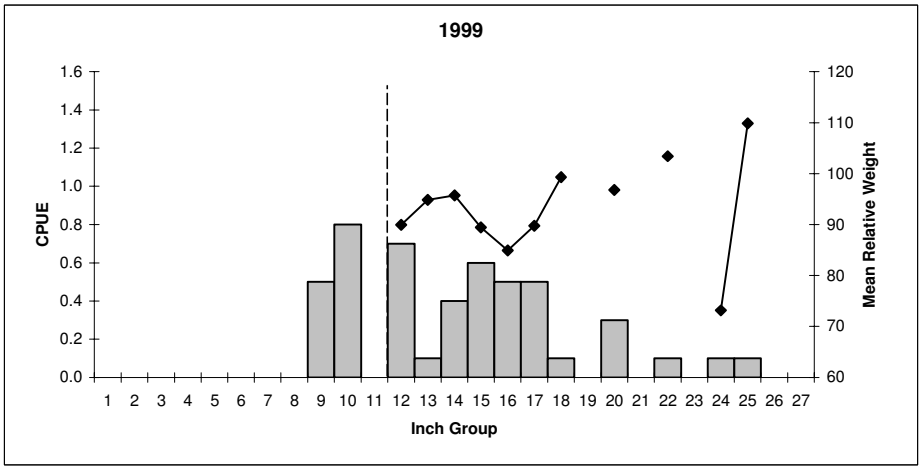
Channel Catfish



Effort =	10
Total CPUE =	4.8
Stock CPUE =	3.9
PSD =	31
RSD-P =	0



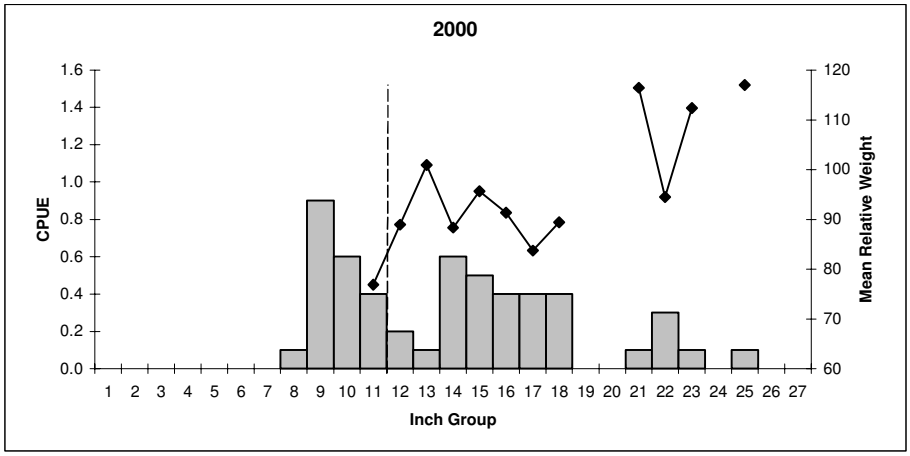
Effort =	10
Total CPUE =	4.7
Stock CPUE =	3.9
PSD =	23
RSD-P =	0



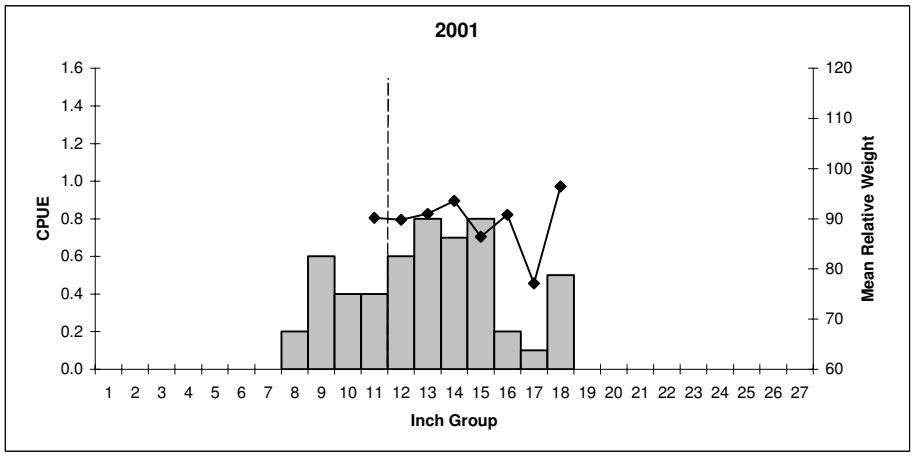
Effort =	10
Total CPUE =	4.8
Stock CPUE =	3.5
PSD =	49
RSD-P =	6

Comparison of the number of channel catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 1997, 1998, and 1999. The vertical dashed line represents the minimum length limit.

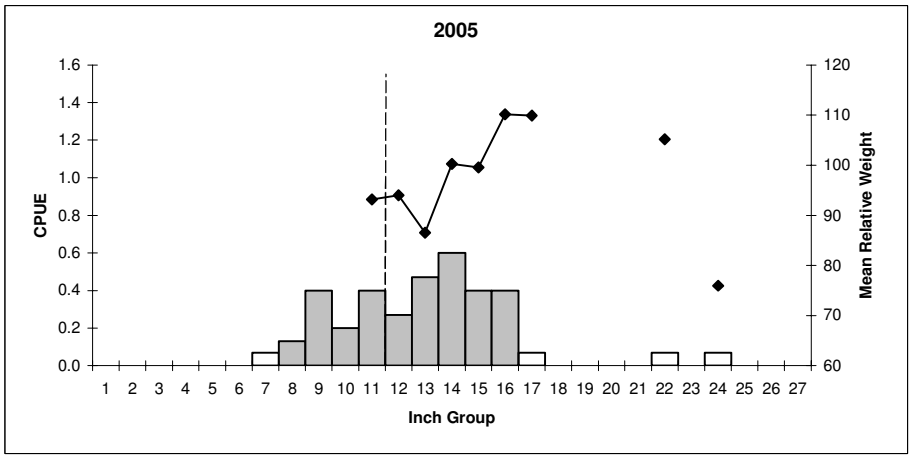
Channel Catfish



Effort =	10
Total CPUE =	5.2
Stock CPUE =	3.6
PSD =	50
RSD-P =	3



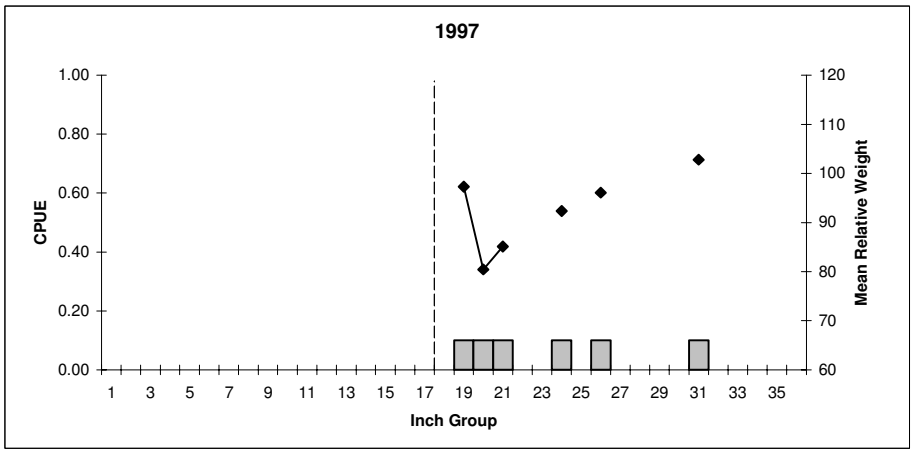
Effort =	10
Total CPUE =	5.3
Stock CPUE =	4.1
PSD =	20
RSD-P =	0



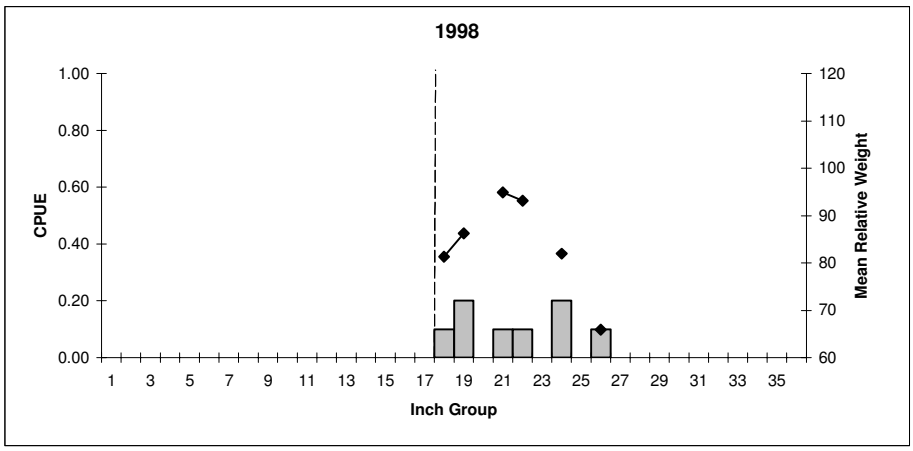
Effort =	15
Total CPUE =	3.5
Stock CPUE =	2.7
PSD =	22
RSD-P =	2

Comparison of the number of channel catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 2000, 2001, and 2005. The vertical dashed line represents the minimum length limit.

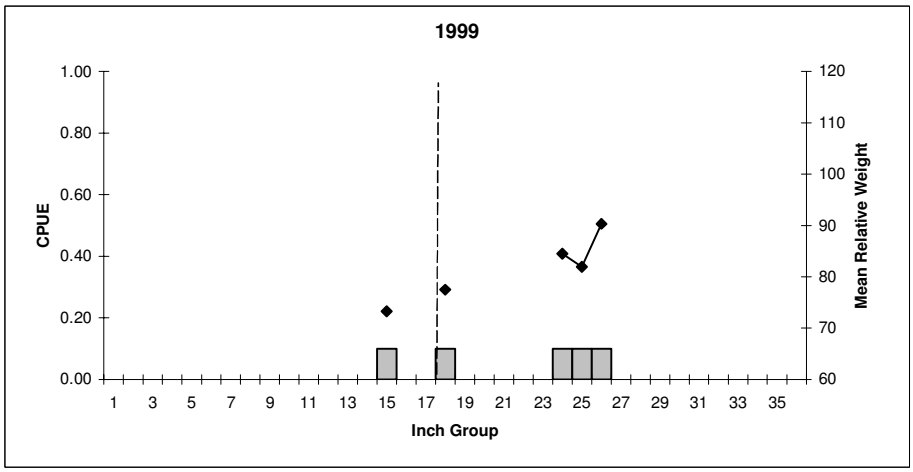
Flathead Catfish



Effort =	10
Total CPUE =	0.6
Stock CPUE =	0.6
PSD =	83
RSD-18 =	100



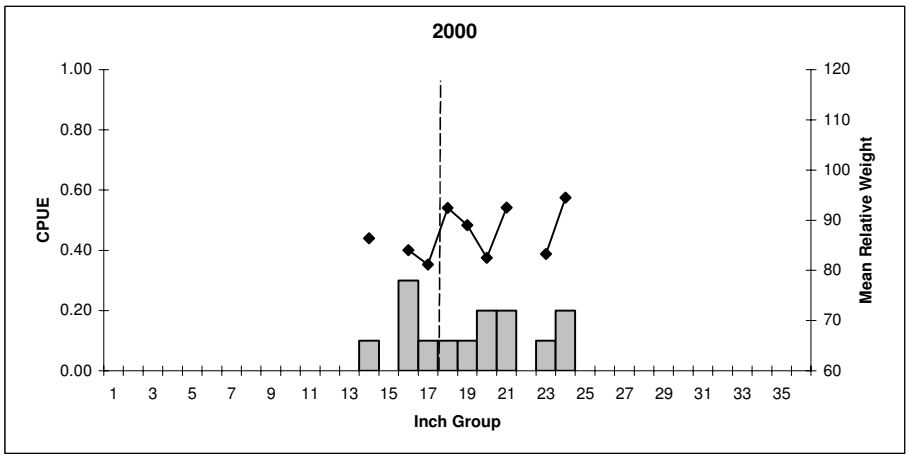
Effort =	10
Total CPUE =	0.8
Stock CPUE =	0.8
PSD =	63
RSD-18 =	100



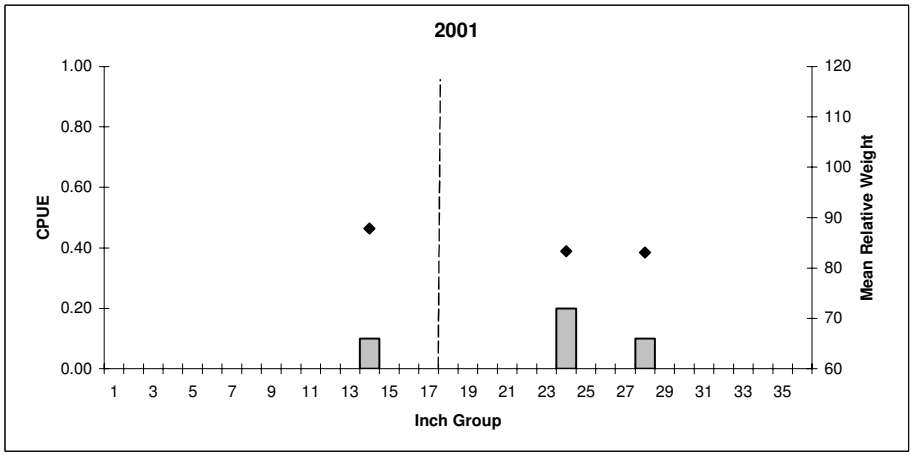
Effort =	10
Total CPUE =	0.5
Stock CPUE =	0.5
PSD =	60
RSD-18 =	80

Comparison of the number of flathead catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 1997, 1998, and 1999. Vertical dashed lines represent minimum length limit.

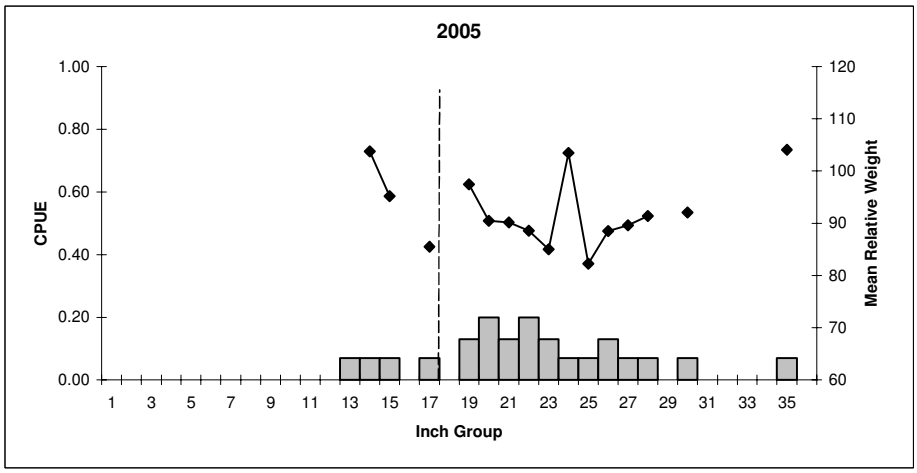
Flathead catfish



Effort =	10
Total CPUE =	1.4
Stock CPUE =	1.4
PSD =	50
RSD-18 =	64



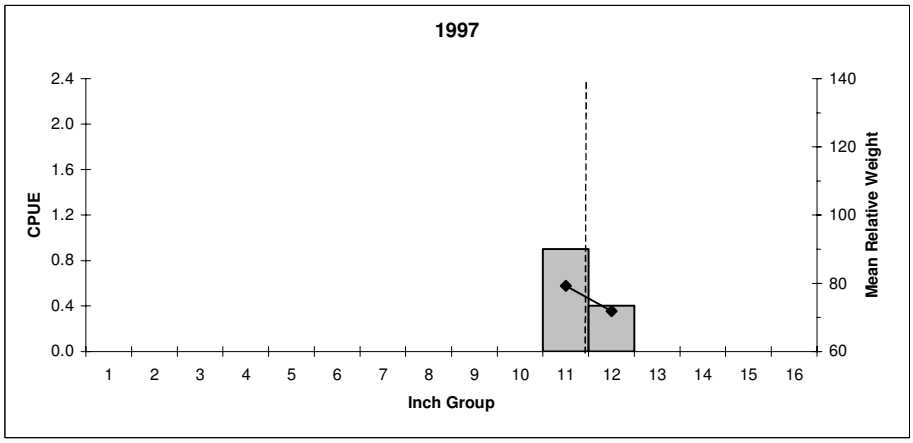
Effort =	10
Total CPUE =	0.4
Stock CPUE =	0.4
PSD =	75
RSD-18 =	75



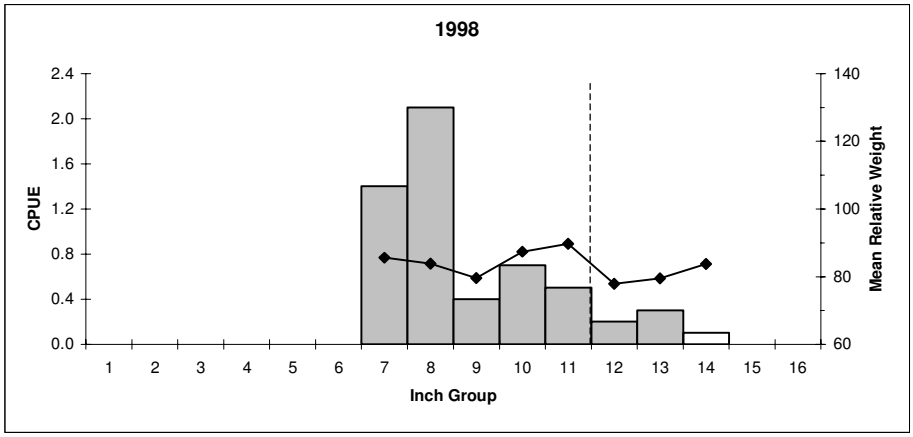
Effort =	15
Total CPUE =	1.6
Stock CPUE =	1.5
PSD =	78
RSD-18 =	82

Comparison of the number of flathead catfish caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 2000, 2001, and 2005. Vertical dashed lines represent minimum length limit.

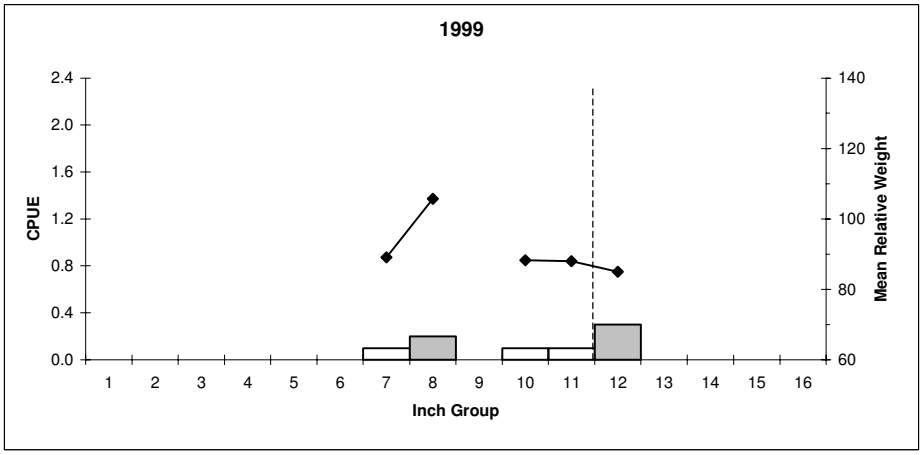
White Bass



Effort =	10
Total CPUE =	1.4
Stock CPUE =	1.4
PSD =	100
RSD-12 =	31



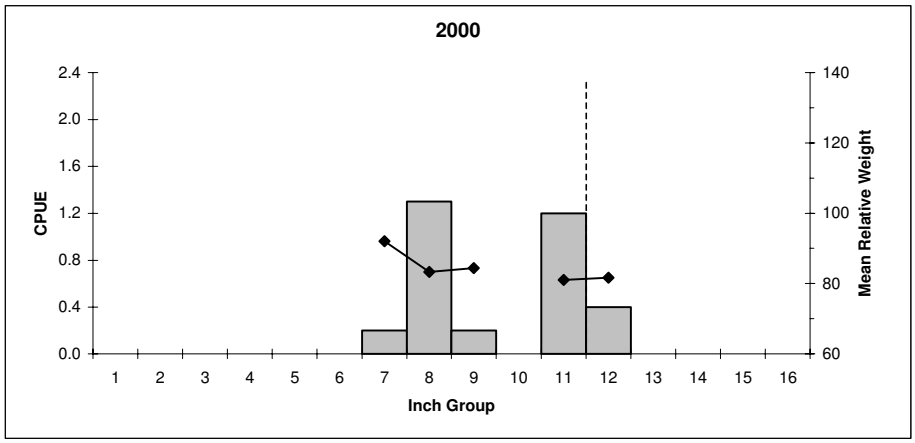
Effort =	10
Total CPUE =	5.7
Stock CPUE =	5.7
PSD =	39
RSD-12 =	11



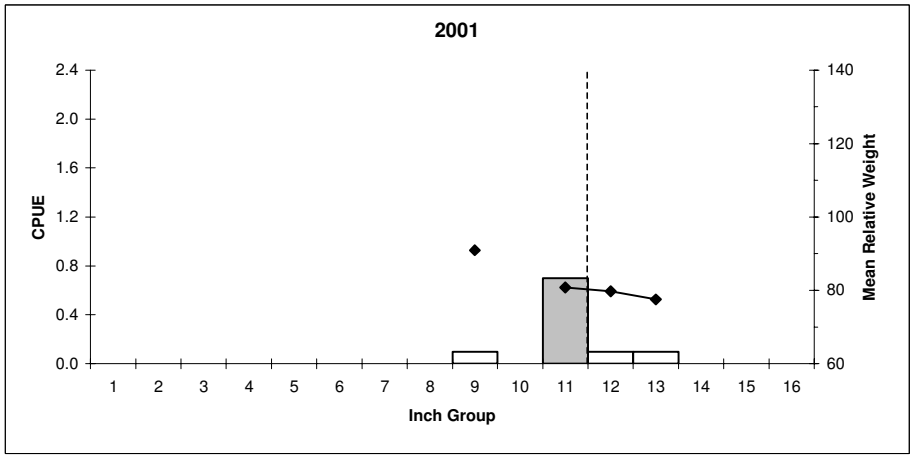
Effort =	10
Total CPUE =	1.8
Stock CPUE =	1.8
PSD =	83
RSD-12 =	17

Comparison of the number of white bass caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 1997, 1998, and 1999. Vertical dashed lines represent the minimum length limit.

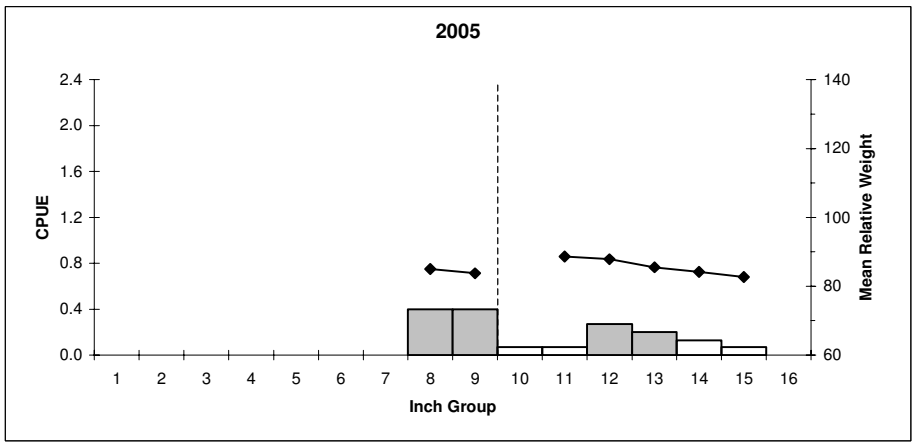
White Bass



Effort =	10
Total CPUE =	3.3
Stock CPUE =	3.3
PSD =	55
RSD-12 =	12



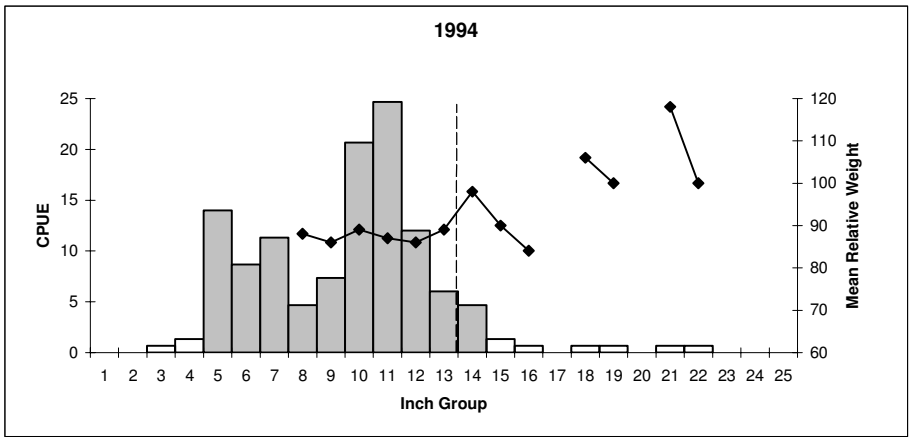
Effort =	10
Total CPUE =	1.0
Stock CPUE =	1.0
PSD =	100
RSD-12 =	20



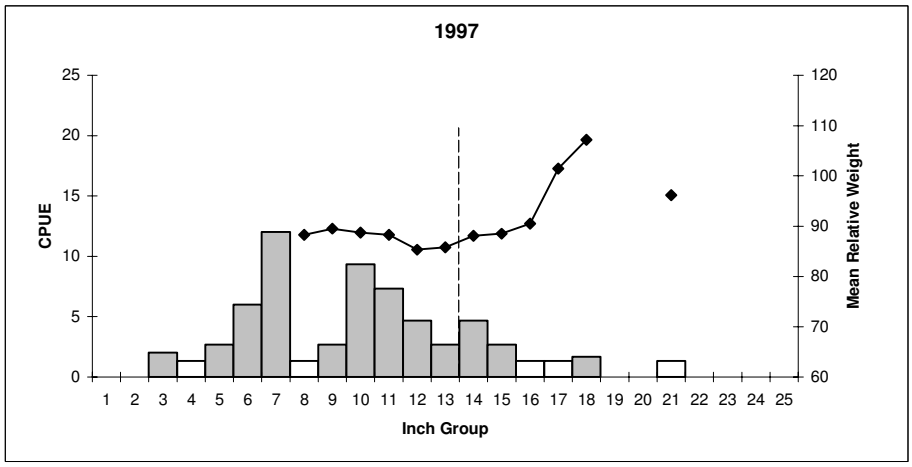
Effort =	15
Total CPUE =	1.6
Stock CPUE =	1.6
PSD =	75
RSD-12 =	42

Comparison of the number of white bass caught per net night (CPUE, bars), mean relative weight (lines), and population indices for spring gill net collections, Lyndon B. Johnson Reservoir, Texas, 2000, 2001, and 2005. Vertical dashed line represents the minimum length limit.

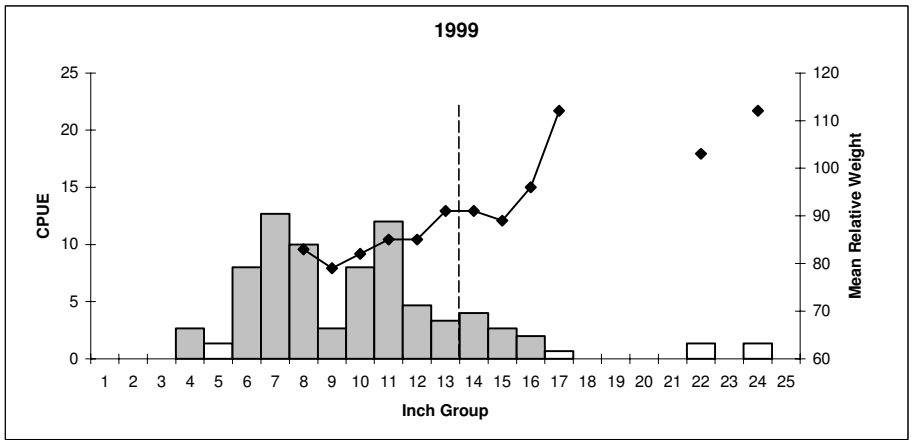
Largemouth Bass



Effort =	1.5
Total CPUE =	120.7
Stock CPUE =	84.7
PSD =	32
RSD-14 =	11
% FLMBA =	47
% FLMB =	17



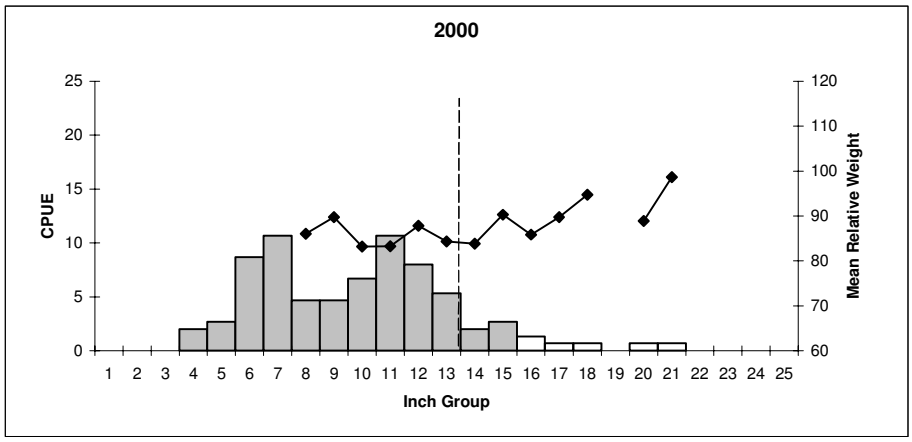
Effort =	1.5
Total CPUE =	64.7
Stock CPUE =	40.7
PSD =	48
RSD-14 =	30
% FLMBA =	45
% FLMB =	20



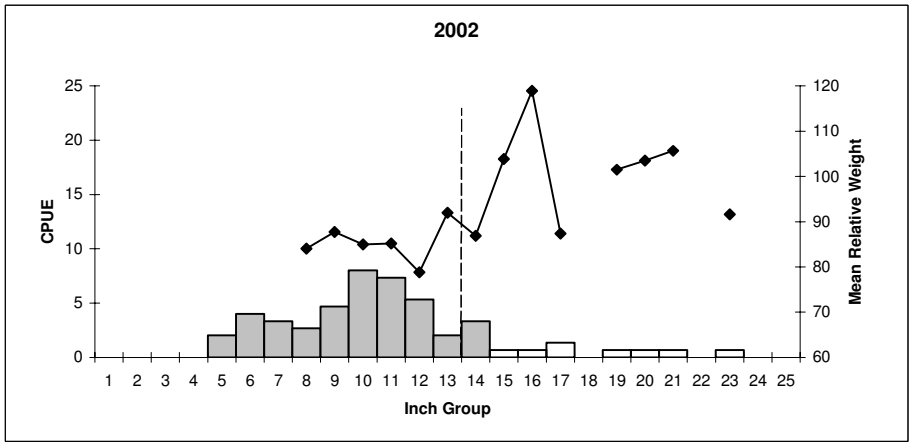
Effort =	1.5
Total CPUE =	77.3
Stock CPUE =	52.7
PSD =	38
RSD-14 =	23
% FLMBA =	50
% FLMB =	7

Comparison of the number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1994, 1997, and 1999. Vertical dashed line represents the minimum length limit. When assessed, the percentage of of Florida largemouth bass alleles (%FLMBA) and pure Florida bass (%FLMB) are given.

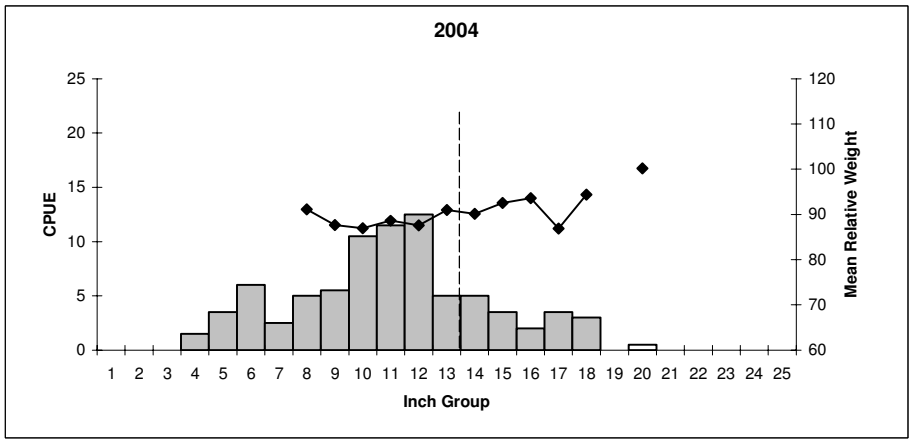
Largemouth Bass



Effort =	1.5
Total CPUE =	72.7
Stock CPUE =	48.7
PSD =	45
RSD-14 =	18
% FLMBA =	63
% FLMB =	19



Effort =	1.5
Total CPUE =	48.0
Stock CPUE =	38.7
PSD =	41
RSD-14 =	22
% FLMBA =	NA
% FLMB =	NA



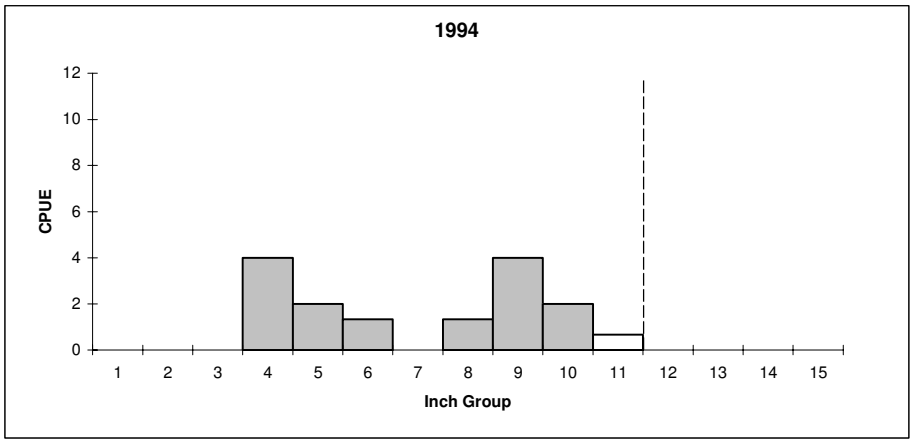
Effort =	2.0
Total CPUE =	81.0
Stock CPUE =	67.5
PSD =	52.0
RSD-14 =	26.0
% FLMBA =	50
% FLMB =	19

Comparison of the number of largemouth bass caught per hour (CPUE, bars), mean relative weight (lines), and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 2000, 2002 and 2004. Vertical dashed line represents the minimum length limit. When assessed, the percentage of of Florida largemouth bass alleles (%FLMBA) and pure Florida bass (%FLMB) are given.

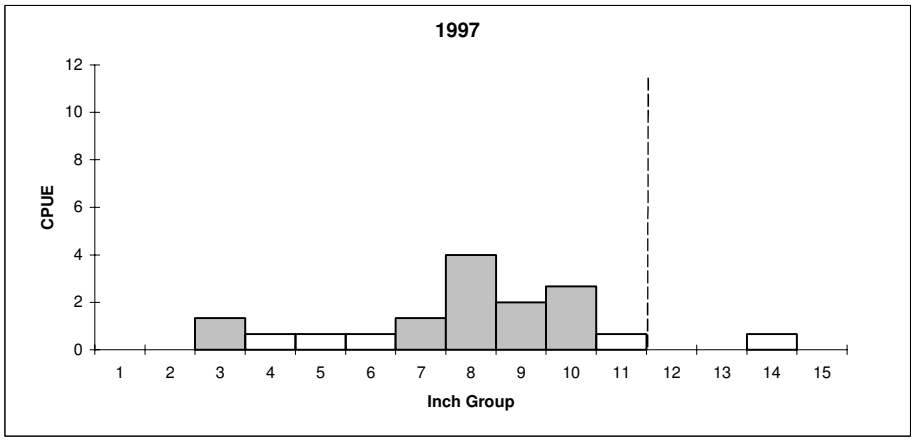
Average length at capture for largemouth bass (sexes combined) at successive ages collected in electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1994, 1997, 2000, and 2004. Numbers within parenthesis represent sample sizes.

	Length (inches) at capture for age						
Sampling date	1	2	3	4	5	6	7
11/14/1994	10.6 (19)	14.0 (11)	15.6 (5)		16.1 (2)	21.3 (1)	
12/09/1997	10.6 (13)	13.5 (11)	14.8 (10)	14.0 (1)		16.7 (2)	
11/29/2000	10.6 (19)	14.0 (14)	15.6 (3)				
12/01/2004	10.9 (65)	13.2 (32)	15.5 (18)	17.3 (9)	18.2 (1)	18.0 (2)	

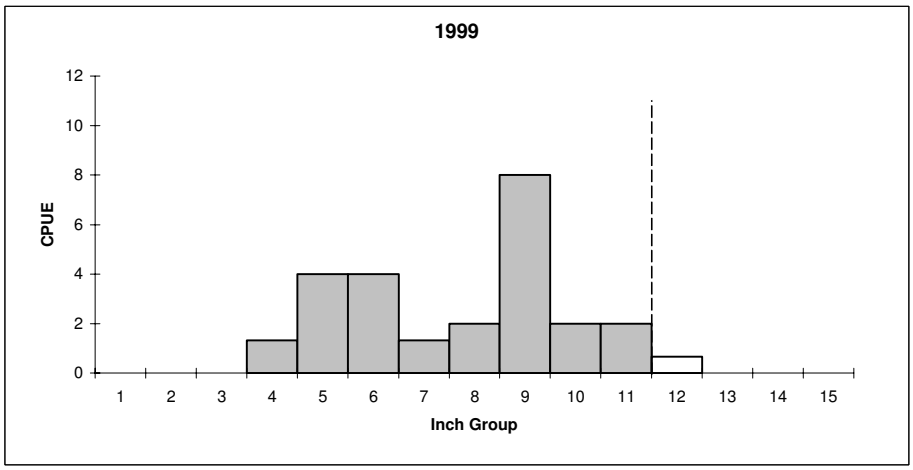
Guadalupe Bass



Effort =	1.5
Total CPUE =	15.3
Stock CPUE =	8.0
PSD =	8
RSD-12 =	0



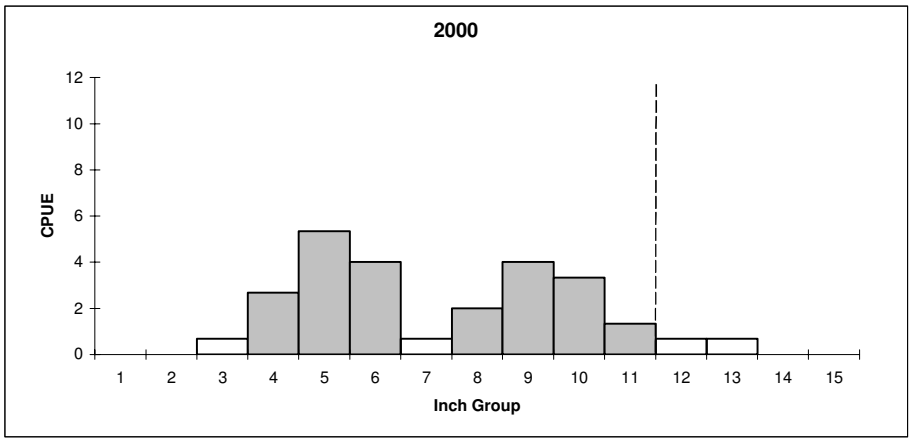
Effort =	1.5
Total CPUE =	14.7
Stock CPUE =	11.3
PSD =	11
RSD-12 =	7



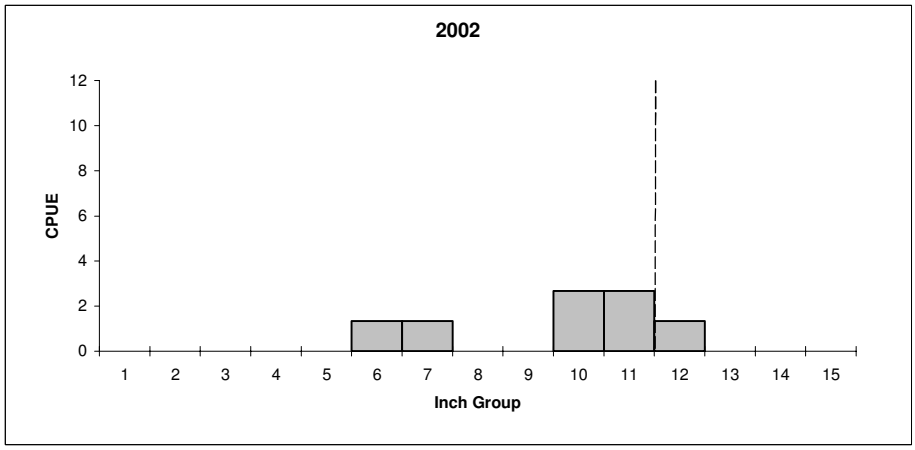
Effort =	1.5
Total CPUE =	25.3
Stock CPUE =	16.0
PSD =	17
RSD-12 =	1

Comparison of the number of Guadalupe bass caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 1994, 1997 and 1999. Vertical dashed line represents the minimum length limit.

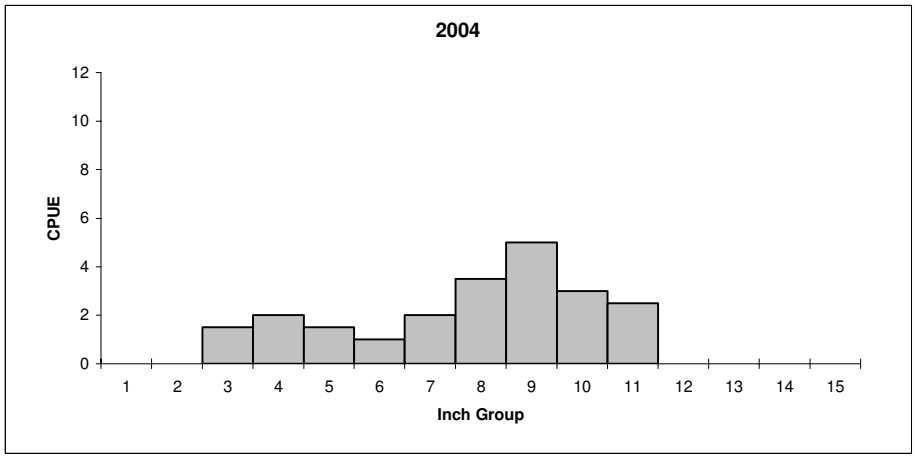
Guadalupe Bass



Effort =	1.5
Total CPUE =	25.3
Stock CPUE =	12.7
PSD =	21
RSD-12 =	11



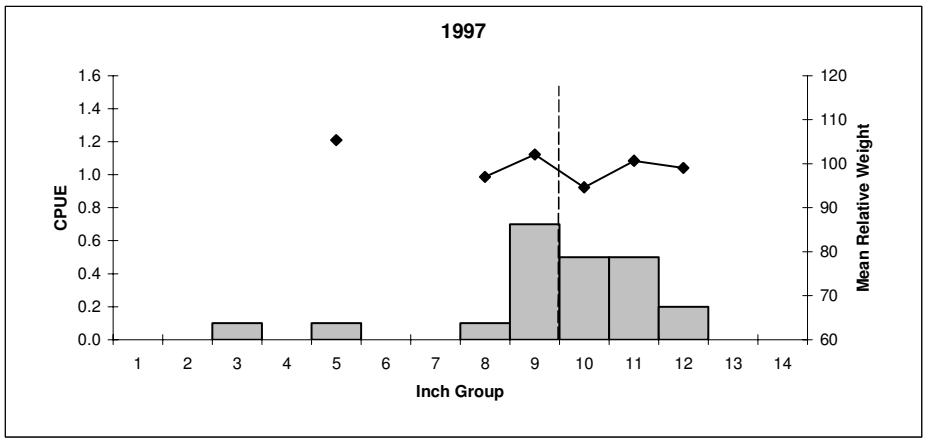
Effort =	1.5
Total CPUE =	9.3
Stock CPUE =	8.0
PSD =	50
RSD-12 =	17



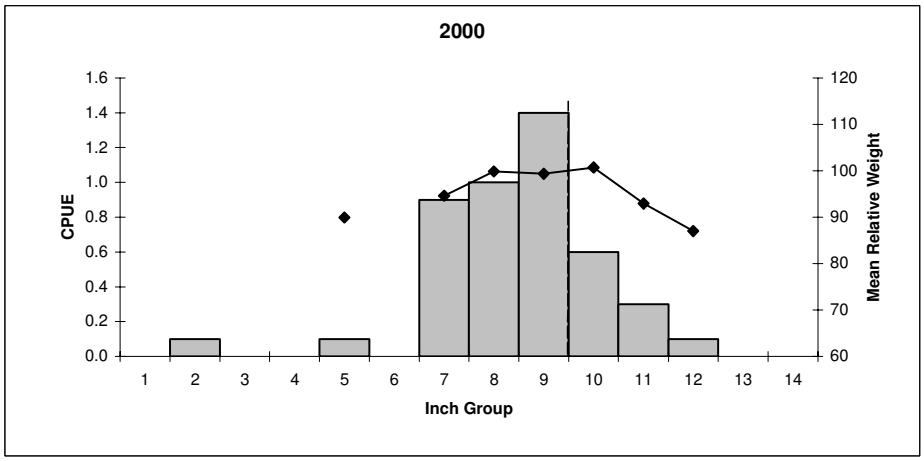
Effort =	2.0
Total CPUE =	22.0
Stock CPUE =	17.0
PSD =	32.0
RSD-12 =	15.0

Comparison of the number of Guadalupe bass caught per hour (CPUE, bars) and population indices for fall electrofishing surveys, Lyndon B. Johnson Reservoir, Texas, 2000, 2002 and 2004. Vertical dashed line represents the minimum length limit.

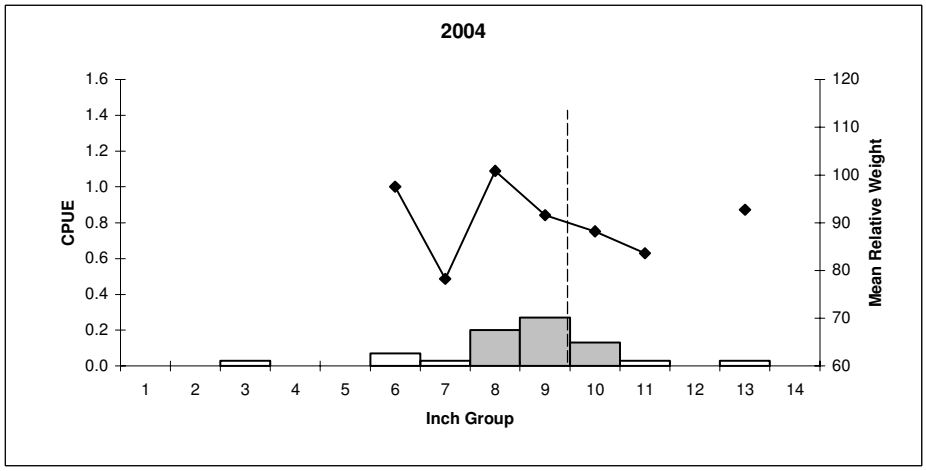
White Crappie



Effort =	10
Total CPUE =	2.3
Stock CPUE =	2.2
PSD =	95
RSD-10 =	57



Effort =	10
Total CPUE =	4.5
Stock CPUE =	4.4
PSD =	77
RSD-10 =	23



Effort =	30
Total CPUE =	0.8
Stock CPUE =	0.8
PSD =	87
RSD-10 =	26

Comparison of the number of white crappie caught per net night (CPUE, bars), mean relative weight (lines), and population indices for trap net collections, Lyndon B. Johnson Reservoir, Texas, 1997, 2000, and 2004. Vertical dashed line represents the minimum length limit.

Fisheries Management Plan
Lyndon B. Johnson Reservoir, Texas

Prepared – July 2005.

Issue 1 Stockings of Florida largemouth fingerlings in 2001 and 2002 failed to increase the genetic influence of this subspecies in 2004.

Management Strategy

1. Conduct an optional electrofishing survey in 2006 and collect an age-0 largemouth bass sample for electrophoresis analysis.

Issue 2 Establishment of introduced native aquatic vegetation has been challenging. Survival and spread of the majority of submerged plants was poor. Protective cages suffered structural degradation over time and need routine maintenance for continued effectiveness. Growth of Eurasian watermilfoil and filamentous algae limited growth and survival of enclosed native plants. Uprooting existing waterwillow and spatterdock and replanting in areas devoid of habitat offered the most promising results.

Management Strategies

1. Discontinue future plantings of pondweed, eelgrass, waterstargrass, white water lily, and pickerelweed.

2. Continue to maintain cages that protect surviving native aquatic plants.

3. Continue translocating waterwillow and spatterdock to littoral areas lacking aquatic habitat.

Issue 3 The exotic aquatic plants hydrilla, water hyacinth, and Eurasian watermilfoil all have the potential to spread rapidly. However, hydrilla and water hyacinth have the greatest potential to grow to problematic levels and limit access.

Management Strategies

1. Conduct aquatic vegetation surveys each summer.

2. Work with the reservoir controlling authority (i.e., LCRA) on developing control options for exotic aquatic plants.

Issue 4 Urbanization and shoreline development continue to impact littoral aquatic habitat.

Management Strategy

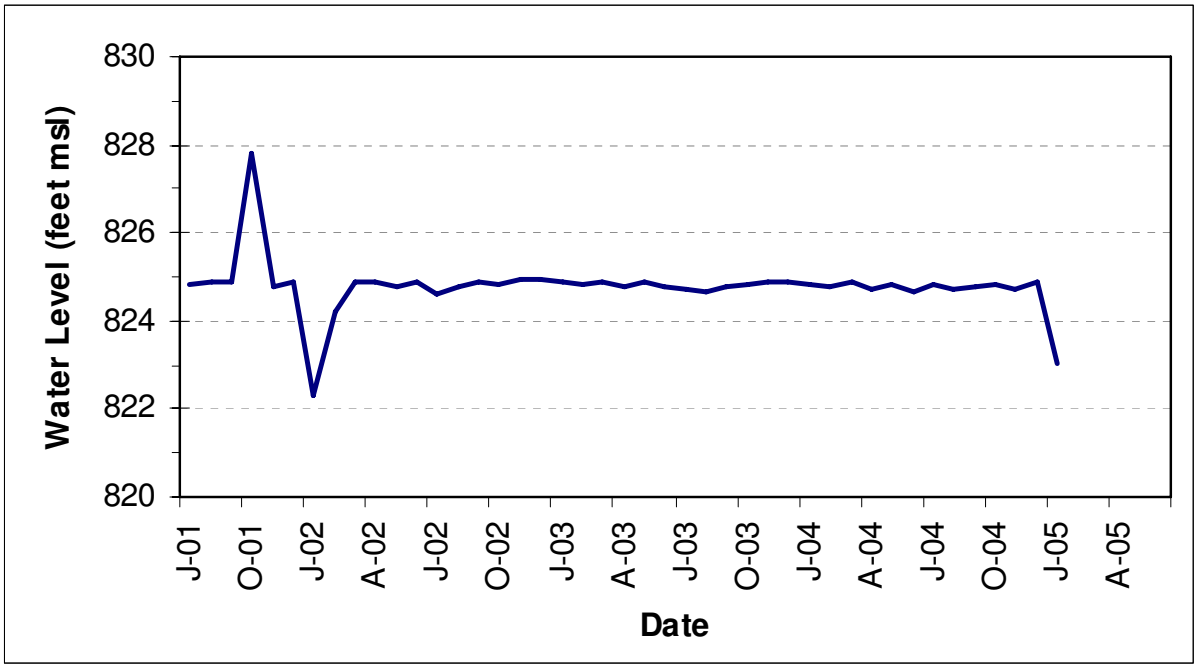
1. Continue working with the LCRA to promote mitigation for habitat loss due to shoreline development.

Appendix A:

Number (N) and catch rate (CPUE) of species collected from all gear types from Lyndon B. Johnson Reservoir, Texas, 2004 and 2005.

	Gill Netting		Trap Netting		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					269	134.5
Threadfin shad					39	19.5
Bullhead minnow					59	29.5
Inland Silverside					24	12.0
Blacktail shiner					15	7.5
Blue catfish	1	0.1				
Channel catfish	53	3.5				
Flathead catfish	24	1.6				
White bass	24	1.6				
Redbreast sunfish					127	63.5
Green sunfish					42	21.0
Warmouth					12	6.0
Bluegill					437	218.5
Longear sunfish					36	18.0
Redear sunfish					40	20.0
Largemouth bass					162	81.0
Guadalupe bass					44	22.0
White crappie			24	0.8		
Rio Grande cichlid					2	1.0
Blue tilapia					5	2.5

Appendix B:



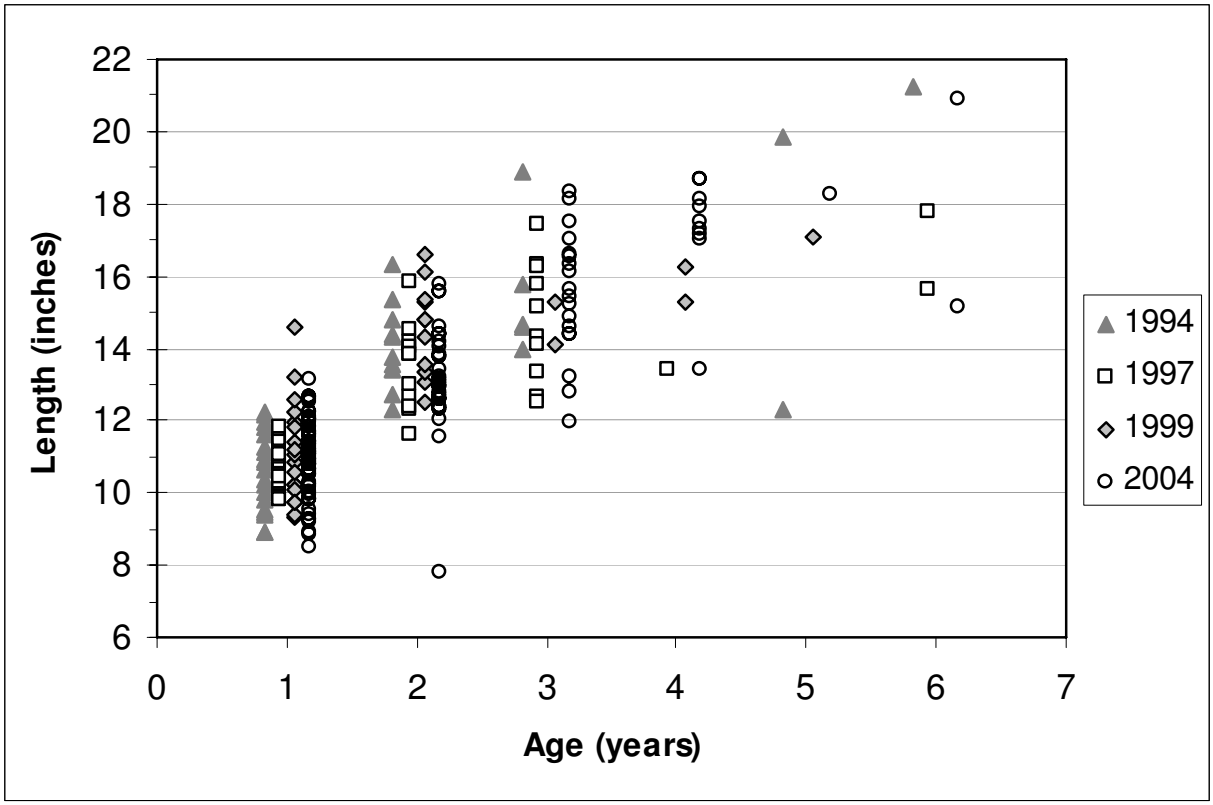
Mean monthly water level (feet msl) for Lyndon B. Johnson Reservoir, July 2001 through February 2005.

Appendix C:

Record fish caught by rod-and-reel from Lyndon B. Johnson Reservoir, Texas, as of June 2005.

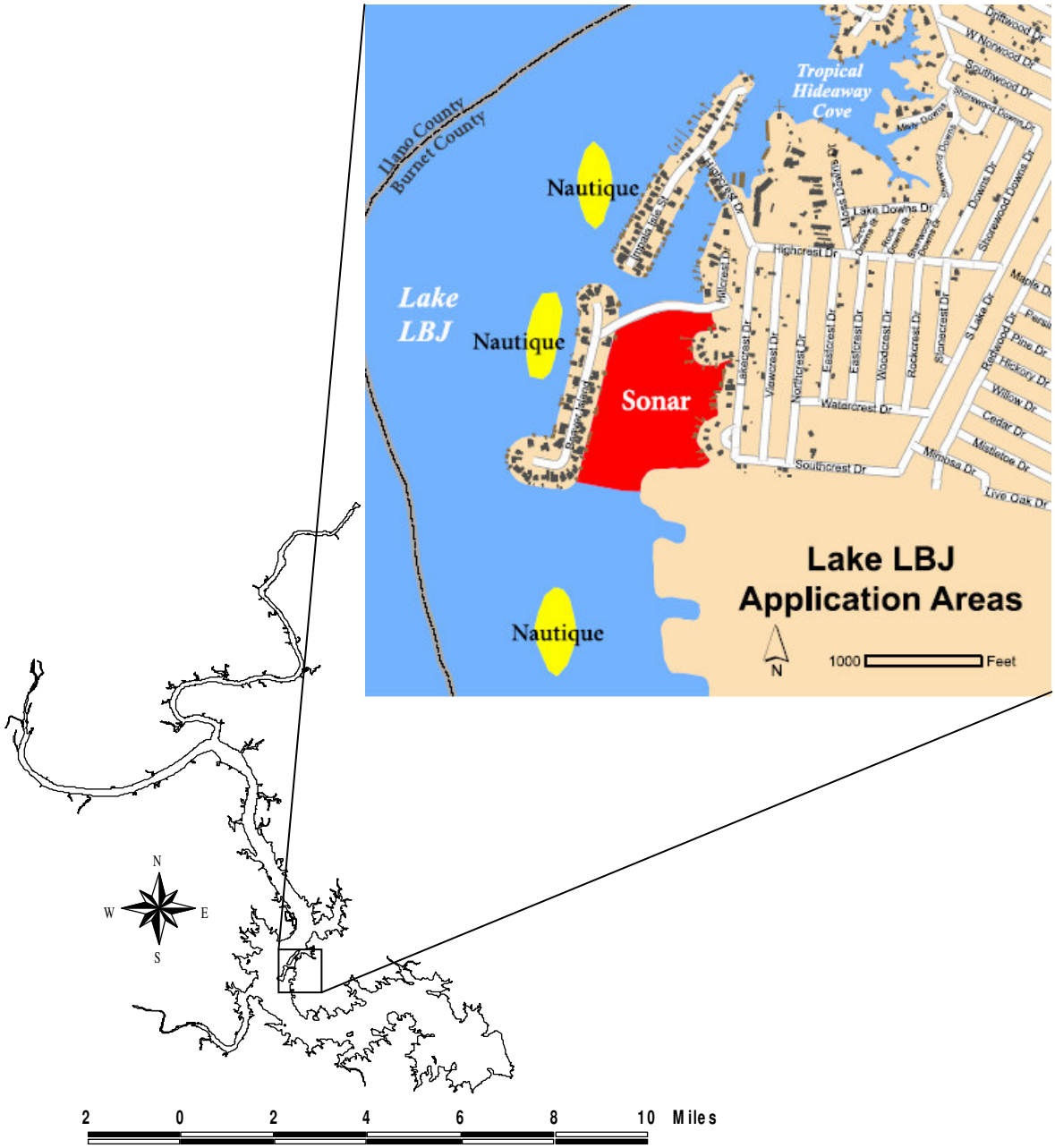
Species	Weight (lbs.)	Total Length (in.)	Date Caught	Angler's Name
Bluegill	1.1	10.5	06/16/2003	D. Schwierjohn
Blue catfish	30.5	37.8	4/10/2004	K. Lane
Common carp	13.8	30.3	07/30/2003	C. Parker
Flathead catfish	38.1	43.0	03/23/1998	J. Brooks
Freshwater drum	5.1	23.0	08/31/2000	A. Navin
Largemouth bass	12.6	27.0	03/26/1989	C. Sohne
Longnose gar	15.7	49.8	05/02/2004	K. Lane
Palmetto (hybrid striped) bass	18.5	32.0	02/04/1991	S. Walker
Red-bellied Pacu	1.8	14.5	06/15/2004	H. Thornblom
Redbreast sunfish	0.6	9.8	11/16/1992	H. Adams
Smallmouth bass	6.5	17.0	03/02/1985	D. Edgar
Striped bass	38.1	42.0	04/13/1991	D. Hunziker
White bass	2.0	15.5	11/27/2004	J. LeCates
White crappie	2.0	15.8	03/29/2003	B. Parker

Appendix D:



Length at age for largemouth bass collected from Lyndon B. Johnson Reservoir in fall electrofishing surveys for years 1994, 1997, 1999, and 2004.

Appendix E:



Location of herbicide treatments for hydrilla in Lyndon B. Johnson Reservoir, Texas, spring 2005. Herbicides used were Nautique and Sonar.