PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-30

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2004 Survey Report

Lake Fork

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SUMMARY

Lake Fork was surveyed from June 2004 to May 2005 using electrofishing, an access point creel survey, and an aquatic vegetation survey. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Fork is located in Wood, Hopkins, and Rains counties, Texas on Lake Fork Creek, a tributary of the Sabine River. It was constructed by the Sabine River Authority to provide water for municipal, industrial, and recreational uses. Angler access is good with four public boat ramps and numerous private boat ramps and marinas. Limited bank access is available at public boat ramps, a day-use area operated by the controlling authority, and through a number of marinas. Littoral zone aquatic habitat is diverse with timber, native emergent plants, and native floating plants occurring along 50%, 46%, and 22% of the lake shoreline, respectively (Storey and Myers 2002). Bulkhead, concrete, and rip-rap are present along less than 6% of the shoreline, and boat docks in combination with other habitat types occupy 9% of the shoreline (Storey and Myers 2002). Total coverage of hydrilla (Hydrilla verticillata) accounted for 13.4% of the lake surface area, up from 6.6% in 2003. During the last year, lake elevation has remained within 1.5 feet of conservation pool elevation. Water hyacinth coverage has increased compared with the previous year and surveys and treatments should be continued on an annual basis.

- **Prey species:** Lake Fork contains abundant and diverse prey fish populations. The size structure of the gizzard shad population has remained consistent. Threadfin shad are present and serve as important prey due to their small size. The bluegill and redear sunfish populations are dominated by moderate sized individuals (4-5 inches). Prey fish populations in Lake Fork are adequate judged by the excellent body condition of largemouth bass.

- **Sunfish:** Sunfish (redear sunfish, bluegill, and longear sunfish) provide a limited recreational fishery. Angling effort directed at sunfish accounted for less than 0.5% of the total angling effort expended in 2004–2005. Angler catch (5.87/hour) and harvest (4.42/hour) rates were higher than in previous years.

- **Channel catfish:** Lake Fork provides an excellent quality channel catfish fishery. In 2004-2005, angling effort directed towards catfish (1.35 hours/acre) accounted for 4.7% of the total angling effort, a lower level than the previous year (1.47 hours/acre). In 2004-2005, angler catch rate (1.29/hour) was lower than in 2003-2004 (1.44/hour) but higher than in most other years (range: 0.05 – 1.44/hour). Harvest rate (0.84/hour) was greater than in previous years (range: 0.05 – 0.84/hour). Total catch of catfish amounted to 2.74/acre during 2004-2005 and 73% of these fish were harvested (2.01/acre). Compared to previous years there has been an overall reduction in the lengths of harvested fish as proportionally fewer quality ($\geq$16 inch – 38%) and preferred sized ($\geq$24 inches - <0.5%) individuals were caught. Other catfish species, including blue catfish, flathead catfish, and yellow bullhead are present, but they contribute little to the total fishery.

- **Temperate basses:** There is a limited fishery for yellow bass in Lake Fork accounting for less than 0.5% of total angling effort. Fish harvested by anglers in 2004-2005 ranged from 6 to 11 inches total length. A small population of white bass exists in Lake Fork and a single specimen was collected during 2004 gill net surveys. The lake record increased to 3.73 pounds in February 2005. A number of white bass x yellow bass hybrids are also caught each year. The current lake record white bass x yellow bass hybrid, weighing 4.01 lbs, was caught in March 2003. It is unlikely that the presence of white bass, or their hybrids, will have any kind of negative effect on Lake Fork's largemouth bass population since their numbers are low and prey fish populations remain abundant. These fish provide

alternative fisheries resources in this reservoir.

- **Black bass:** Electrofishing surveys conducted during the spring and fall show the presence of a stable, high-quality largemouth bass population. Statistical testing of catch rate data (analysis of variance) revealed no significant difference ($P < 0.05$) among years in electrofishing catch rate of largemouth bass during the past six years (Appendix 5). Population size structure also remained stable with PSD ranging from 31-46 during the past five years.

  Largemouth bass in Lake Fork exhibit rapid growth, and above-average condition. They grow to 16 inches during their fourth year. Mean relative weight of fish within the protected slot limit was above 90 in both spring and fall.

  Annual stockings of Florida strain largemouth bass (FLMB) have maintained the FLMB allele frequency above 30%. In 2004, FLMB allele frequency of age-0 fish was 54.0%, within the range observed since 1989 (32–58%, Appendix 2). Pure Florida bass accounted for 4% of the age-0 fish sampled in 2004. Approximately 500,000 FLMB fingerlings have been stocked annually since 2000 in Caney Creek, north of Highway 154 at an effective stocking rate of 100/acre. Genotype frequency of samples of age-1 fish from the stocked area was compared to that in the rest of the lake. Results in 2004 show no significant difference between the two areas (ChiSquare; $\underline{P} = 0.998$).

  Lake Fork continues to receive high directed angler effort for largemouth bass. In 2004-2005, largemouth bass angling effort accounted for 77.8% of the total effort. Angling effort in 2004-2005 (22.1 hours/acre) was at the second highest level for the last 5 years. During the spring creel quarter (March to May) anglers exerted 56.3% of the total annual fishing effort for largemouth bass. The fall quarter (September to November) recorded the second highest effort (22.2%), the summer quarter (June to August) third (15.1%) and the winter quarter (December to February) was lowest (6.3%).

  Angler catch rate (0.45/hour) and estimated number of largemouth bass caught (11.99/acre) during 2004-2005 were at the highest levels during the same time period. In the last four creel years, (2004-2005, 2003-2004, 2002-2003 and 2001-2002) the majority of released fish (71%, 67%, 55%, and 62%, respectively) were below the protected slot limit (16-24 inches). By contrast, during the last year 0.3% of the fish that were released were 24 inches or longer. In 2004-2005, largemouth bass harvest was comparatively high (0.98/hour) as a result of the inclusion of a large number live release tournament fish being transported from ramps to weigh-ins.

  Since March 2003, a total of 4,285 largemouth bass have been reported in the Lake Fork Trophy Bass Survey (Appendix 10) by anglers from 42 states. The top 5 states of reporting-angler origin were Texas (60.5%), Oklahoma (6.4%), Missouri (6.2%), Louisiana (5.3%), and Arkansas (4.6%). As expected, most trophy fish catches occurred during spring. By far, the vast majority of entries were 7 (38.9%) and 8 pound (30.0%) class fish. Anglers weighed 86% of their entries, and of these fish, 16.9% were 10 pounds or heavier. Anglers measured 50.8% of their entries, and 31.6% of these were 24 inches or longer. Fish in the 22 and 23 inch classes were most abundant of the measured entries, representing 27.4% and 26.9% of the total respectively.

Crappie: Lake Fork supports a quality crappie fishery that is monitored by an ongoing annual creel survey. Results indicated a declining trend in catch rates, and directed pressure, and changes in size composition and seasonality of harvest of Lake Fork's crappie population. Crappie were Lake Fork's second most popular species with annual directed angling effort (4.73 hours/acre) representing 16.6% of the total effort in 2004-2005, down from 20.9% in the previous year. Fishing effort varied little by

season. The highest level of effort was observed in the spring quarter (March to May) and it represented 28.8% of total annual effort. Fishing effort for crappie in the winter quarter (December to February) represented 22.7% of the total annual effort, the lowest seasonal level.

Although angler catch rate of crappie (black and white combined) appear to show a declining trend over the last five years, from 2.76/hour in 2000-2001 to 2.03/hour in 2004-2005, statistical testing of catch rate data (analysis of variance) showed no significant difference between years. The estimated number of crappie caught during this time period has declined, from 22.02/acre to 11.05/acre. Angler harvest rate of crappie in 2004-2005, 0.64/hour, was at its lowest level in the last five years. Total crappie harvested has declined from 7.51/acre in 2000-2001 to 4.22/acre in 2004-2005. The majority of harvested fish (75%) were black crappie. The most common size class of harvested crappie (black and white combined) was the 10-inch class which accounted for 33% of the total annual harvest. Angler compliance with the minimum length limit, in effect from March through November, was high with illegal harvest accounting for only 0.2% of all crappie harvested. In the winter quarter, when there is no minimum length limit, 49% of harvested crappies were less than 10 inches. A lower proportion of fish smaller than 10 inches was found during the winter quarters in the previous three years ; 2003-2004 - 41%, 2002-2003 - 37.5% and 2001-2002 - 40%. Harvest of fish <10 inches accounted for 27% of crappie harvested in 2004-2005, up from 19% in 2003-2004 and 7.5% in 2002-2003. The size distribution of crappie harvested for the last three years was similar, but the contribution of fish harvested during the winter quarter continues to increase. From 2000 through 2003 winter harvest amounted to 15-20% of the total year's harvest, but in 2003-2004 it rose to 44% and in 2004-2005 it was 55%.

- **Management strategies**

  Largemouth bass are vital to Lake Fork and the local economy (Hunt et al. 1996), so management strategies are geared to maintain and enhance this prestigious fishery. The harvest regulation for largemouth bass changed on September 1, 2000 to the current 16-24 inch slot length limit with a 5-fish daily bag limit of which only one fish can be ≥24 inches total length. Data from the Lake Fork Trophy Bass Survey indicates 32% of trophies reported since March 2003 were longer than 24 inches, an indication of the effectiveness of the slot-length limit regulation. Since 2001, Florida largemouth bass have been stocked annually in a 5,000-acre embayment of Caney Creek, north of the Highway 154 Bridge at an effective rate of 100 fish/acre to increase the frequency of FLMB in the largemouth bass population. Electrophoretic analysis of age-1 largemouth bass collected in fall 2003 and 2004 indicated no significant difference in genetic composition between stocked and un-stocked areas of the reservoir. In fall 2005, a sample of age-1 fish from stocked and un-stocked areas will be compared again for differences in genetic composition. Monitoring of water hyacinth distribution and coverage will continue and recommendations will be made for further treatment as needed.

INTRODUCTION

This document is a summary of data collected from Lake Fork during the period June 2003 to May 2004. The purpose of this document is to provide information and to present management recommendations designed to protect and improve the sport fishery. Although information on other fishes was collected, this report deals primarily with major sport species and important prey species. Management strategies are included to address existing problems or opportunities. Historical data is presented with the 2003-2004 data for comparison.

Harvest regulations for Lake Fork.

Species	Bag Limit	Minimum-Maximum Length
Bass, largemouth	5 (only 1 fish ≥24")	16 – 24" slot length limit
Catfish, blue and channel	25 (in any combination)	12 - none
Catfish, flathead	5	18 - none
Crappie, black and white[1]	25 (in any combination)	10 - none

[1] The minimum length limit is waived from December 1st to the last day of February each year. Anglers must harvest the first 25 crappie caught, regardless of size, with no catch-and-release or culling.

METHODS

- Fishes were collected by electrofishing at 24 5-minute stations in fall (October 2004) and spring (April 2005). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour of actual electrofishing. Largemouth bass electrophoresis samples were collected according to Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004). Chi-square analysis was used to test for difference in genetic composition between stocked and unstocked areas.

- Largemouth bass electrofishing catch rate data was evaluated to determine if abundance was significantly different across years. Catch at individual stations (5 minutes of sampling at each station was used to calculate mean catch rates (MCPE) for each year and season. Analysis of variance (ANOVA) was used to test for significant difference across years. If ANOVA revealed a significant difference ($P \leq 0.05$), the Tukey-Kramer multiple range test (controlled for an overall error rate) was used to separate significantly different means. Largemouth bass MCPE estimates by season and year, and significant differences are presented in Appendix 5.

- Sampling statistics (CPUE for various length categories), structural indices (proportional stock density (PSD), relative stock density (RSD)), and relative weights (Wr) were calculated for target fishes according to Anderson and Neumann (1996).

- Ages were determined for largemouth bass using otoliths.

- An access angler creel survey consisting of 72 survey days was conducted from June 2003 to May 2004 to estimate angler catch and harvest rates and angling effort in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2004).

- Analysis of variance (ANOVA) was used to test for significant difference across years of mean party catch rates for anglers seeking crappie (white and black combined). If ANOVA revealed a significant difference ($P \leq 0.05$), the Ryan-Einot-Gabriel-Welsch multiple range test was used to separate significantly different means.

- A vegetation survey to assess abundance and distribution of hydrilla and waterhyacinth was conducted in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2002). Shoreline distances and area of vegetation was estimated using ArcView GIS software. Lake area (26,856 acres) was calculated by digitizing the lake outline using the most recent digital orthophoto images published by the Texas Natural Resources Information System (TNRIS) (1995-1996).

- In March 2003, Texas Parks and Wildlife Department instituted the Lake Fork Trophy Bass Survey in conjunction with the Lake Fork Area Chamber of Commerce and the Lake Fork Sportsman's Association. This voluntary reporting survey is designed to document catches of largemouth bass 7 pounds and larger and catches of fish over 24 inches. Either actual weights and lengths or estimated values are acceptable. Anglers can record their catches at thirteen reporting stations around the lake and guides and their clients record their catches in guide logs. At the beginning of each month, district personnel collect logs and ledgers and analyze the data and provide data summaries.

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.

Hunt, K. M., S. M. Poarch, and R. Reichers. 1996. Trip characteristics, expenditures, and economic value of a trophy largemouth bass fishery, Lake Fork, Texas. Proceedings of the 50th Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 50:163-173.

Storey, K. W. and R.A. Myers. 2002. Statewide freshwater fisheries monitoring and management program, Lake Fork, Texas Parks and Wildlife Department, Federal Aid in Sport Fish Restoration, Performance Report, Project F-30-R-27, Job A, 41 pages.

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

Inland Fisheries water body code	0433
IF District	3B
Surface area	27,264 acres
Conservation pool elevation	403.0 ft. msl.
Controlling authority	Sabine River Authority
Water uses	Water supply, recreation
Counties	Wood (location of dam), Hopkins, Rains
Latitude	32° 49’
Longitude	95° 33’
Nearest major metropolitan area and distance	Tyler - 41 miles
Reservoir description	Mainstream
River system	Sabine
Mean depth (ft)	12.0
Maximum depth (ft)	70.0
Shoreline development ratio	13.51
Watershed area (mi^2)	490
Secchi disc range (ft)	4 – 6
Conductivity (umhos/cm)	135
Constructed	1980
Boat access	Good - 4 public ramps and many private ramps
Bank access	Fair – 1 day use area
Handicap access	Poor – 1 area

Survey history:

Method	Year
Gill net	1981 – 1999, 2002, 2004
Electrofishing	1981 - 2004
Frame netting	1985 – 1999, 2004
Habitat survey	1996, 1998, 1999, 2001, 2002
Vegetation survey	1996, 1998, 1999, 2000, 2001, 2002, 2004
Creel	1985 - 2004
Cove rotenone	1981 - 1990
Seine survey	1981 - 1984

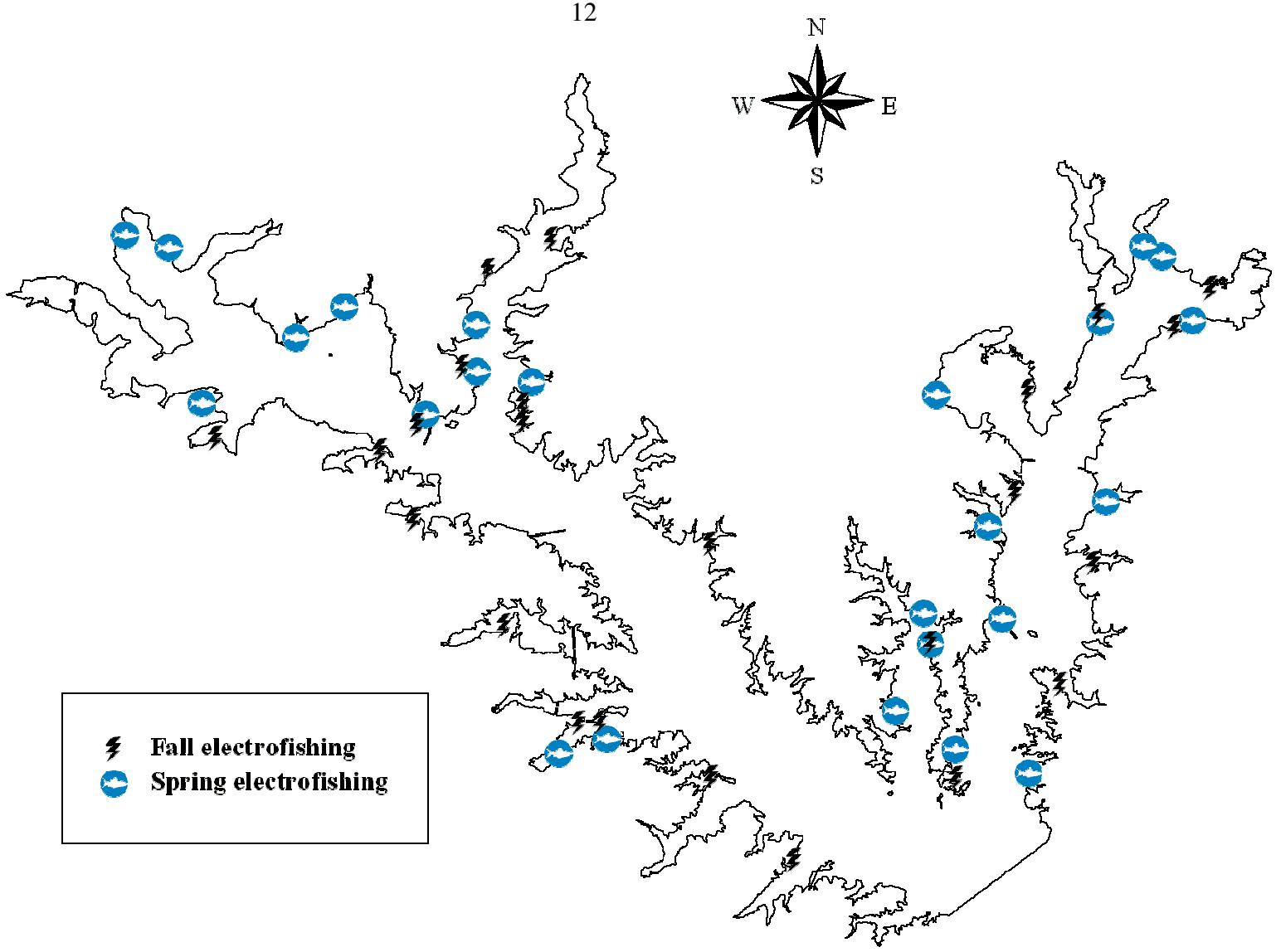
Water hyacinth and hydrilla surface area coverage (acres) at Lake Fork, Texas, estimated in September 1996, 1998, 1999, 2000, 2001, 2002, 2003, and 2004.

	Year							
Species	1996	1998	1999	2000	2001	2002	2003	2004
Water hyacinth	40	125	7	130	50	6	3.3	48.6
Hydrilla	3,900	4,750	3,027	N/A	198	873	1,773	3,701

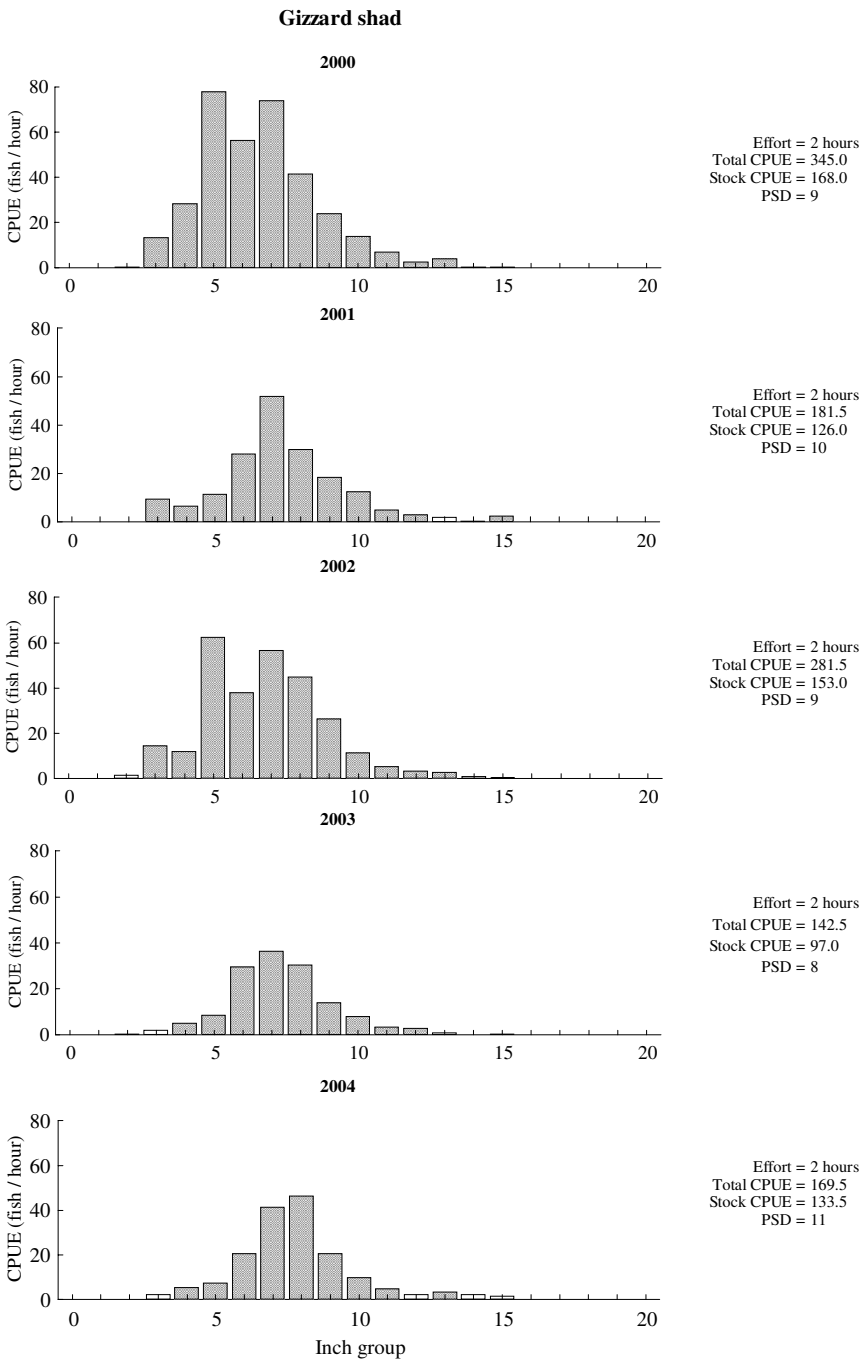
Stocking history for Lake Fork, Texas. Size categories are ADL for adult, FGL+ for advanced fingerling, FGL for fingerling and FRY for fry.

Species	Year	Number	Size
Blue catfish	1980	268,423	FGL
	1984	29,676	FGL
	1985	253,464	FGL
	Species Total	551,563	
Channel catfish	1977	37,787	FGL
	1978	80,130	FGL
	1980	137,545	FGL
	1984	102,103	FGL
	Species Total	357,565	
Flathead catfish	1979	4,800	FGL & ADL
	Species Total	4,800	
Redear sunfish	1981	36,000	FGL
	Species Total	36,000	
Coppernose bluegill	1981	633,911	FGL
	Species Total	633,911	
Spotted bass	1979	41	ADL
	Species Total	41	

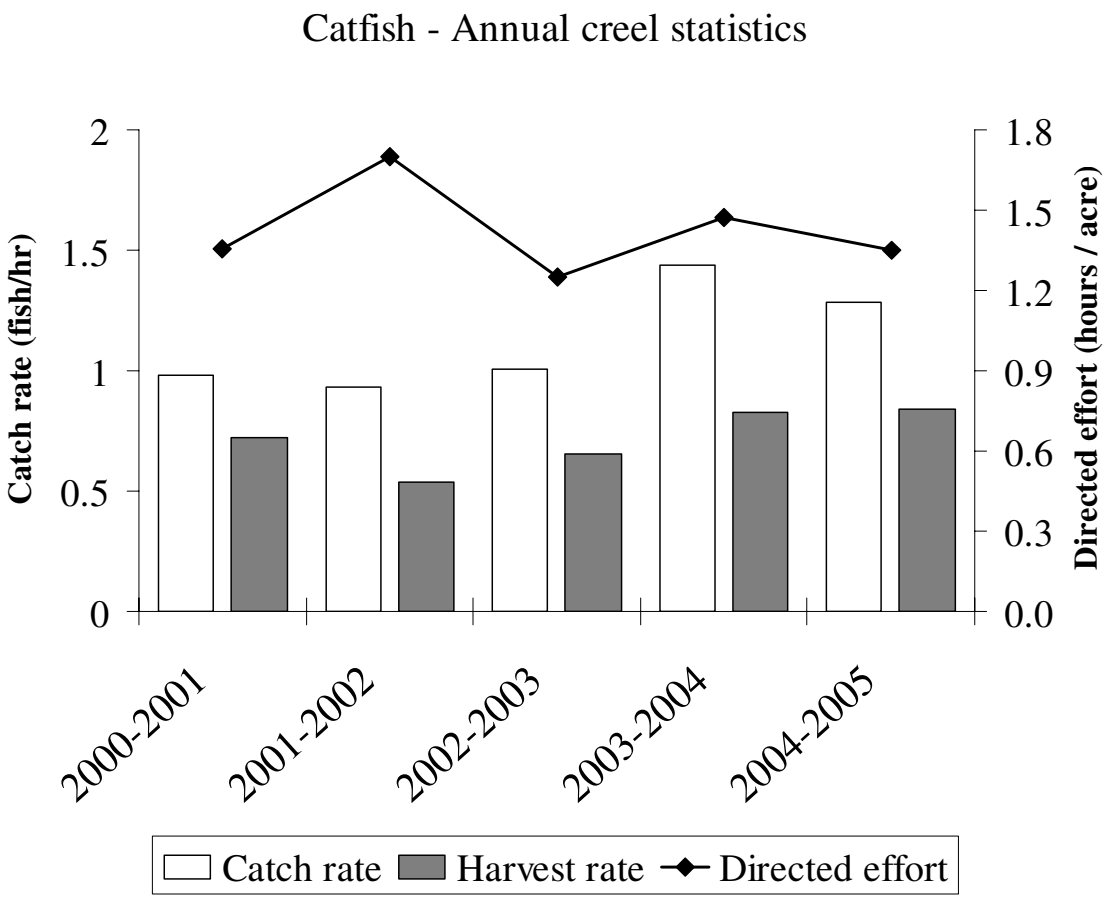
Species	Year	Number	Size
Florida largemouth bass	1978	103	ADL
	1979	740,815	FGL
	1979	561	ADL
	1980	330,800	FRY
	1980	300	ADL
	1982	49	ADL
	1987	250	FGL+
	1995	692,281	FGL
	1996	697,731	FGL
	1997	698,037	FGL
	1998	694,211	FGL
	1999	710,761	FGL
	2000	510,737	FGL
	2001	218,240	FGL
	2002	692,258	FGL
	2003	732,049	FGL
	2004	515,101	FGL
	2005	705,986	FGL
	Species Total	7,940,270	



Location of sample sites, Lake Fork, Texas, 2004 - 2005.

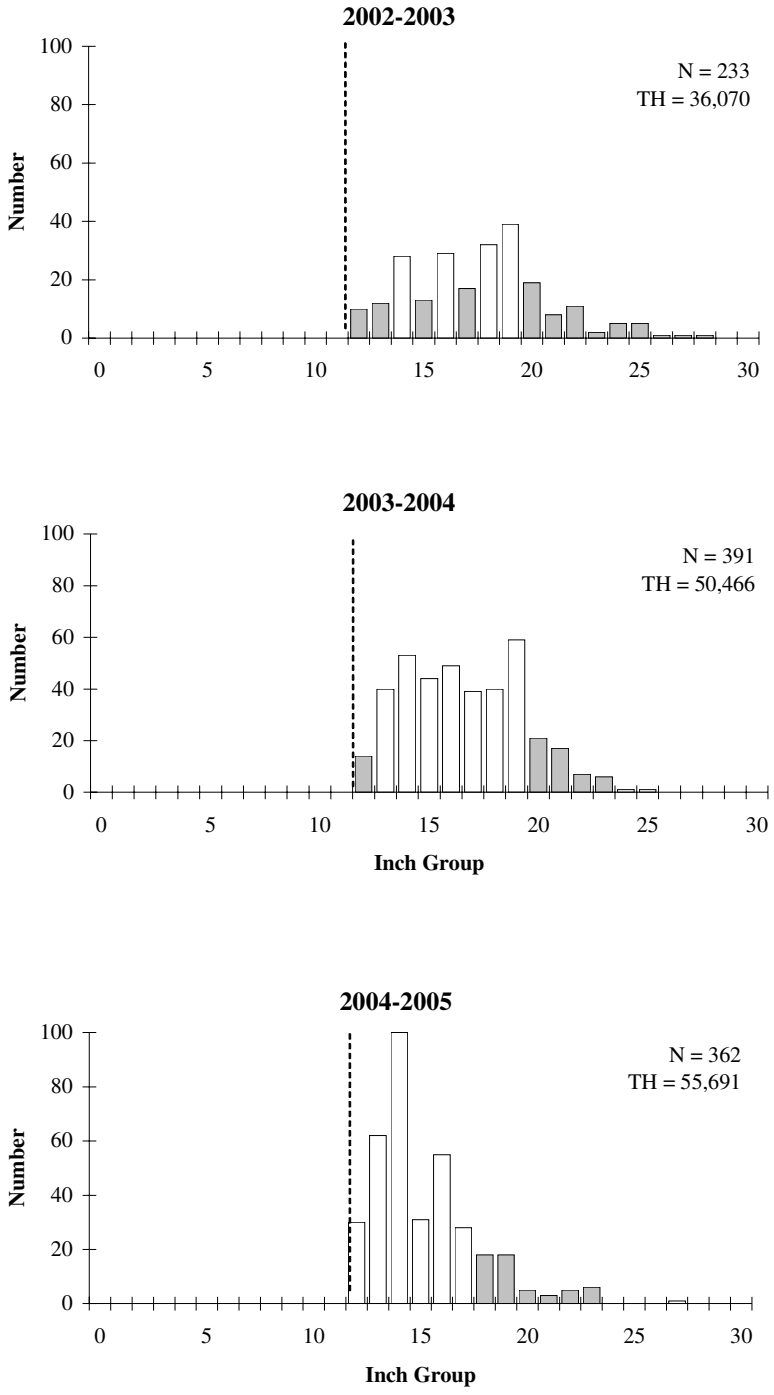


The number of gizzard shad caught per hour and population indices from electrofishing sampling at Lake Fork, fall 2000–2004.

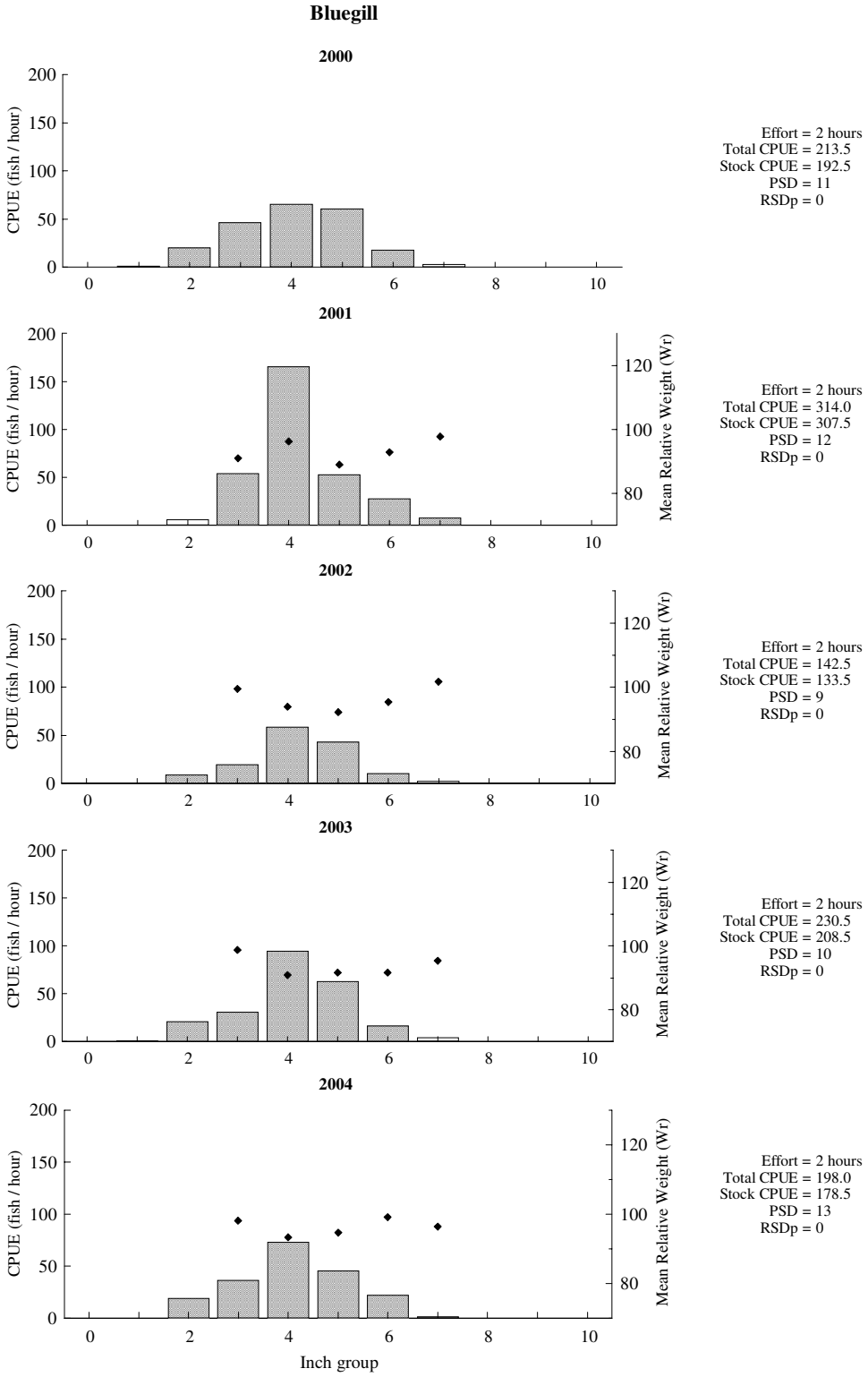


Angler catch rate (open bars), harvest rate (shaded bars) and directed effort (line) for anglers seeking catfish at Lake Fork, Texas. The creel surveys were conducted from June through May, 2000-2005.

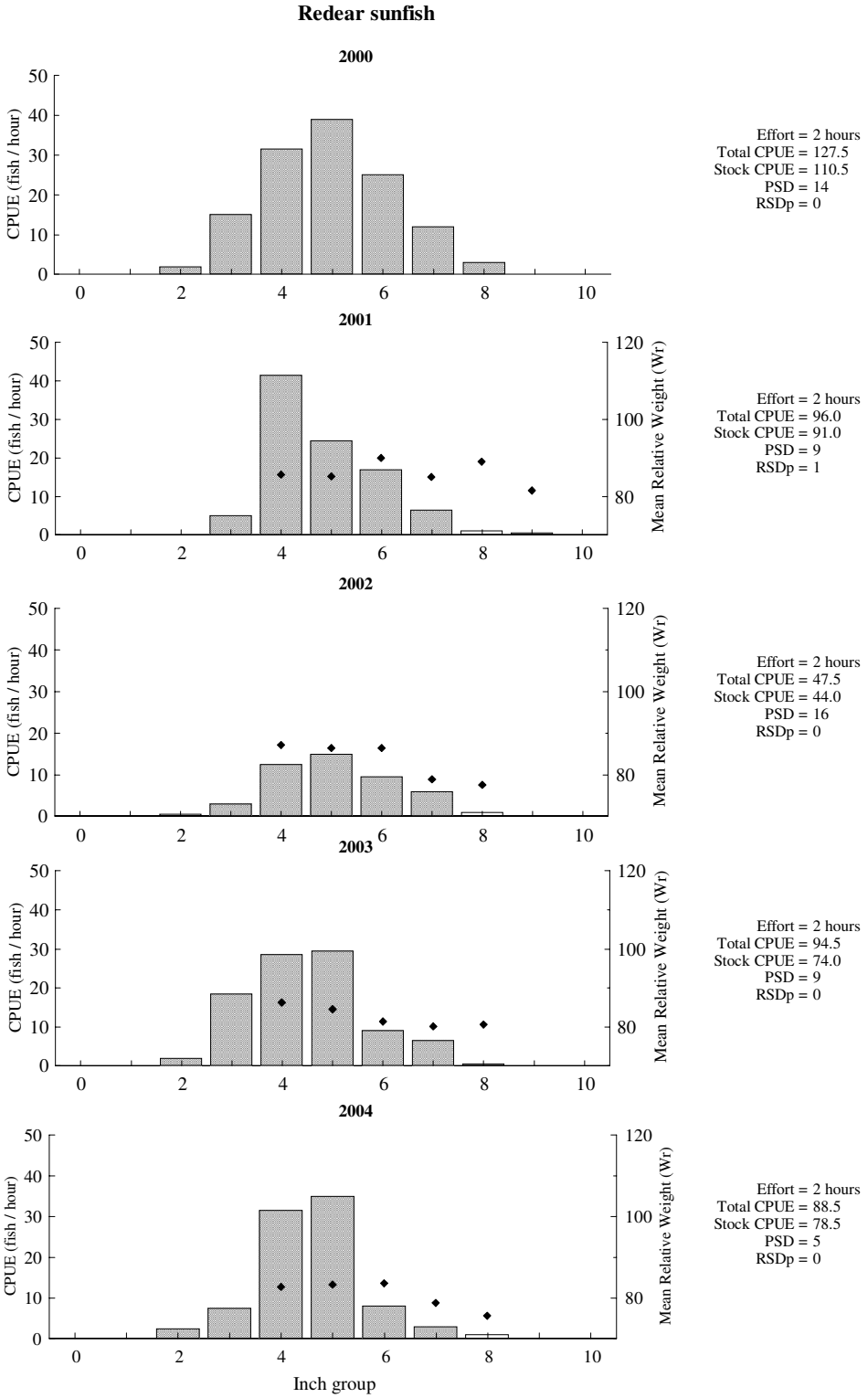
Channel catfish



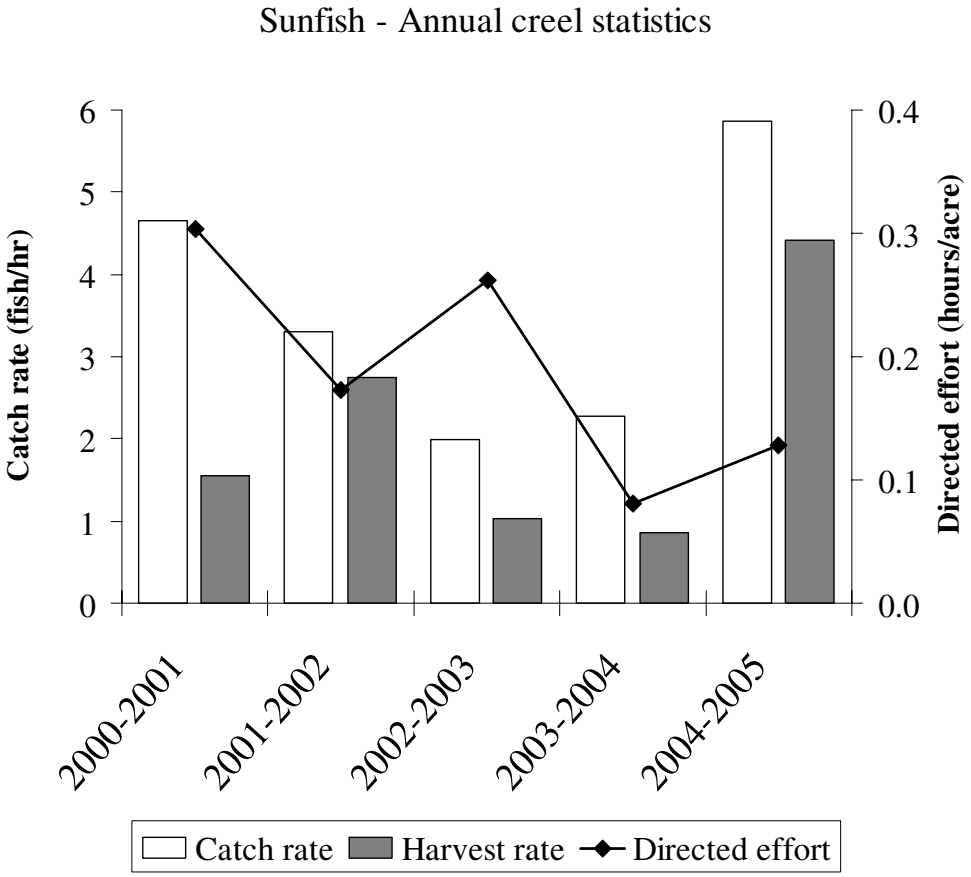
Length frequency distributions of channel catfish harvested during creel surveys at Lake Fork, Texas June 2002 through May 2005. Dashed lines indicate minimum length limit at time of survey. N = total number observed and TH = estimated total harvest.



The number of bluegill caught per hour (bars), mean relative weight (diamonds), and population indices from electrofishing sampling at Lake Fork, fall 2000–2004. No weight data were recorded in 2000.

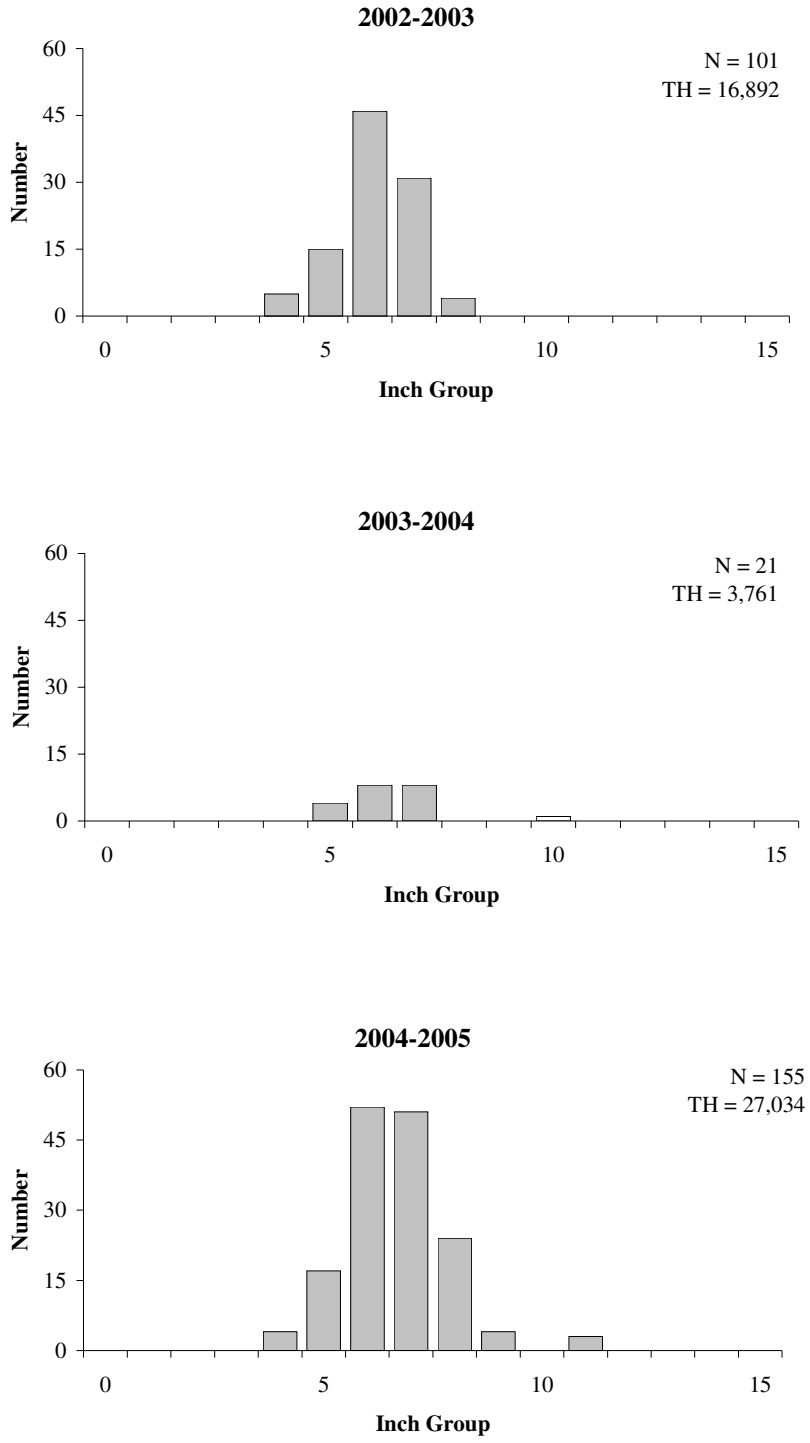


The number of redear sunfish caught per hour (bars), mean relative weight (diamonds), and population indices from electrofishing sampling at Lake Fork, fall 2000–2004. No weight data were recorded in 2000.

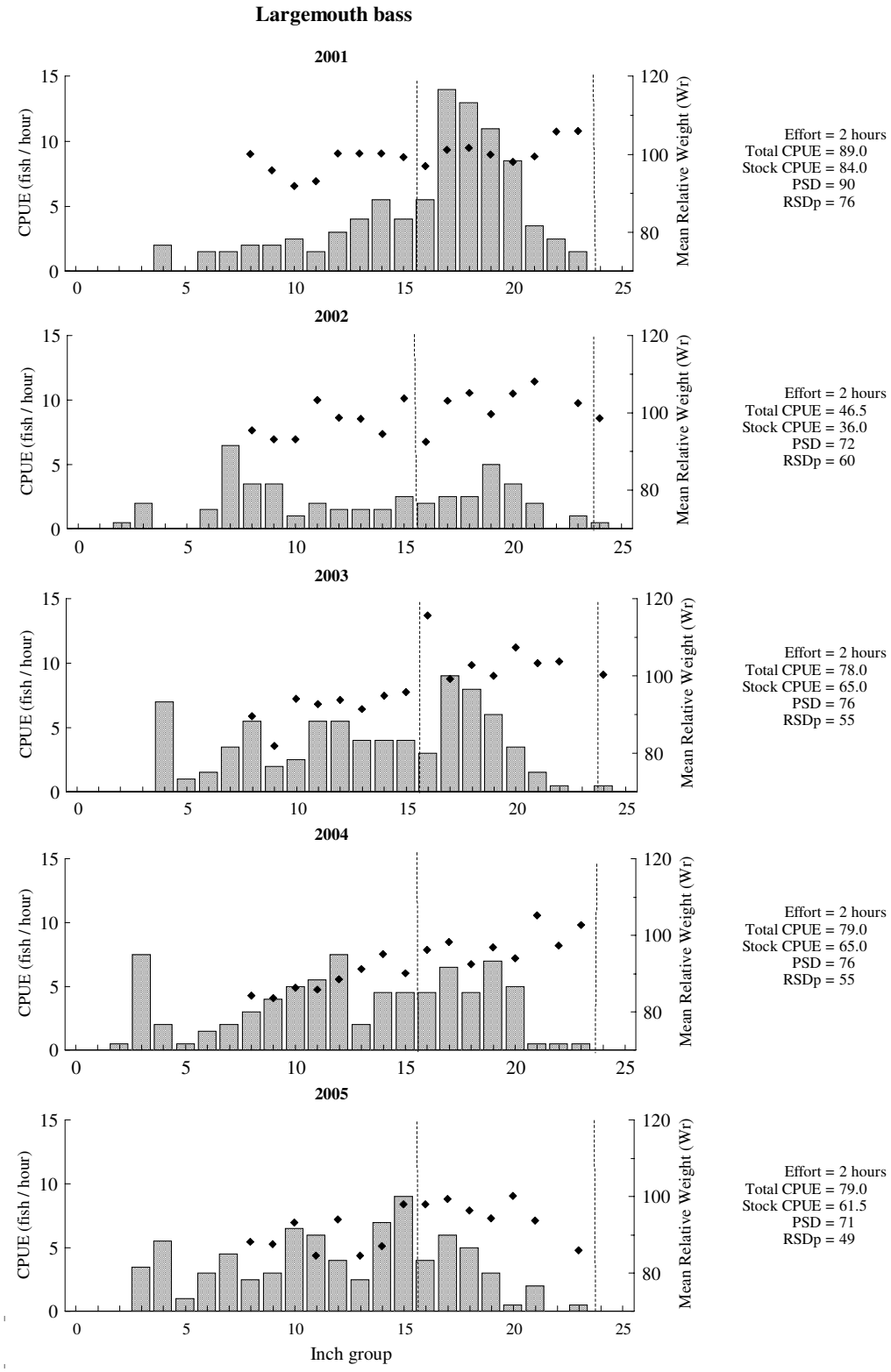


Angler catch rate (open bars), harvest rate (shaded bars) and directed effort (lines) for anglers seeking sunfish (species combined) at Lake Fork, Texas. The creel surveys were conducted from June through May, 2000-2005.

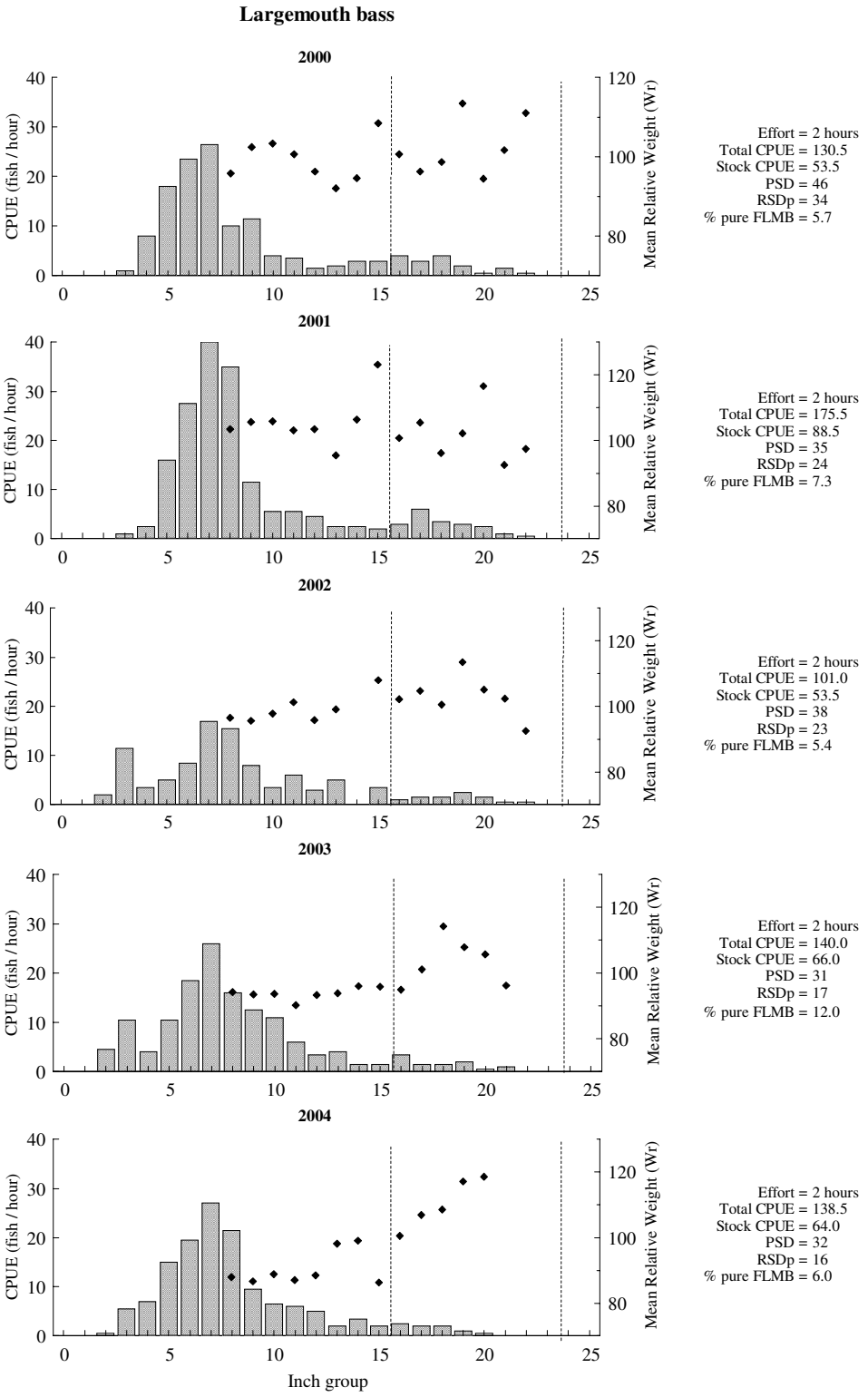
Combined Sunfish



Length frequency distributions of sunfish (combined bluegill, longear sunfish and redear sunfish) harvested during creel surveys at Lake Fork, Texas June 2002 through May 2005. N = total number observed and TH = estimated total harvest.



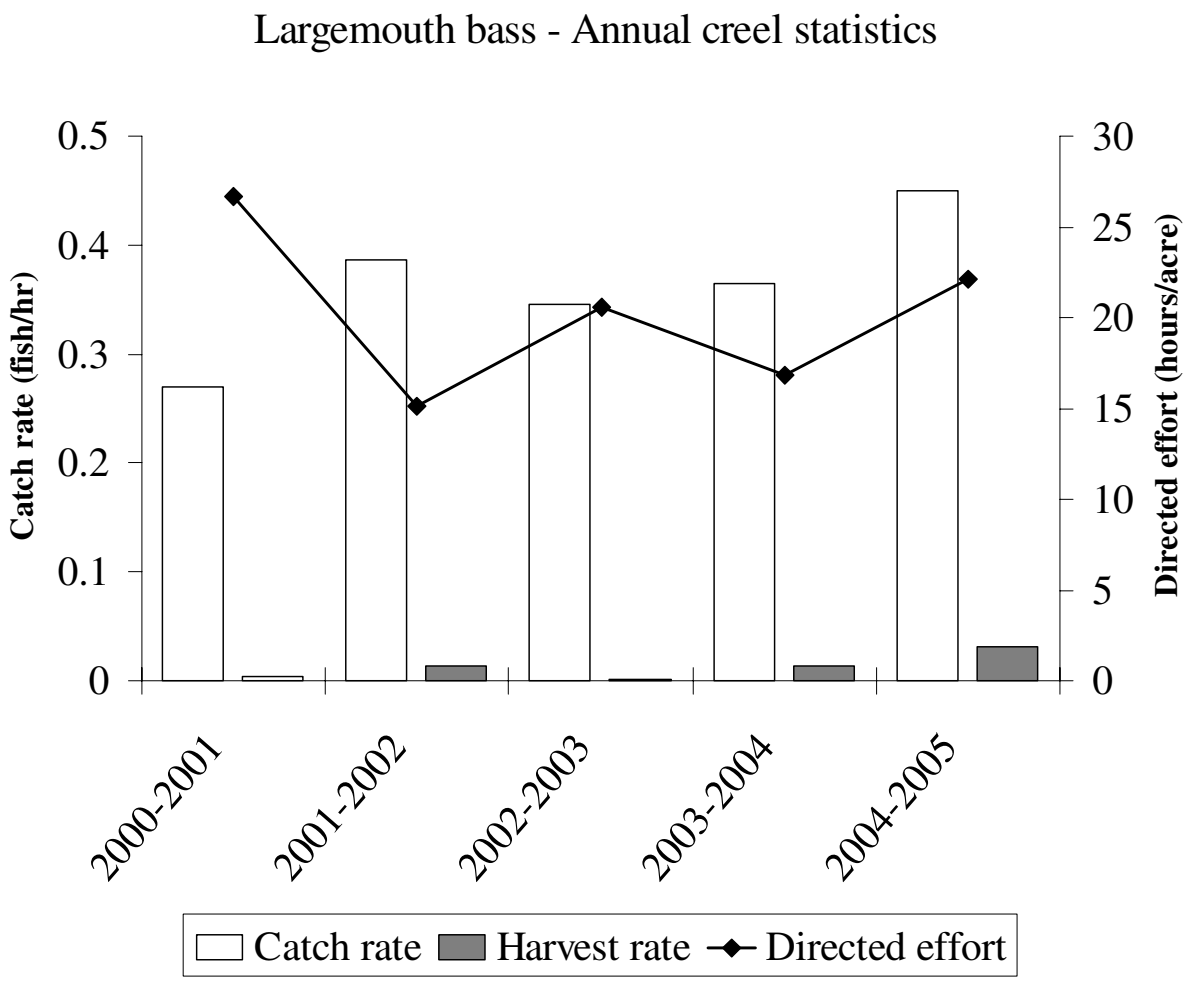
The number of largemouth bass caught per hour (bars), mean relative weight (diamonds), and population indices from electrofishing sampling at Lake Fork, spring 2001–2005. Dashed lines indicate minimum and maximum lengths of the slot length limit at time of survey.



The number of largemouth bass caught per hour (bars), mean relative weight (diamonds), and population indices from electrofishing sampling at Lake Fork, fall 2000–2004. Dashed lines indicate minimum and maximum lengths of the slot length limit at time of survey. Percentage of pure Florida bass in sample of age-0 fish presented as % pure FLMB.

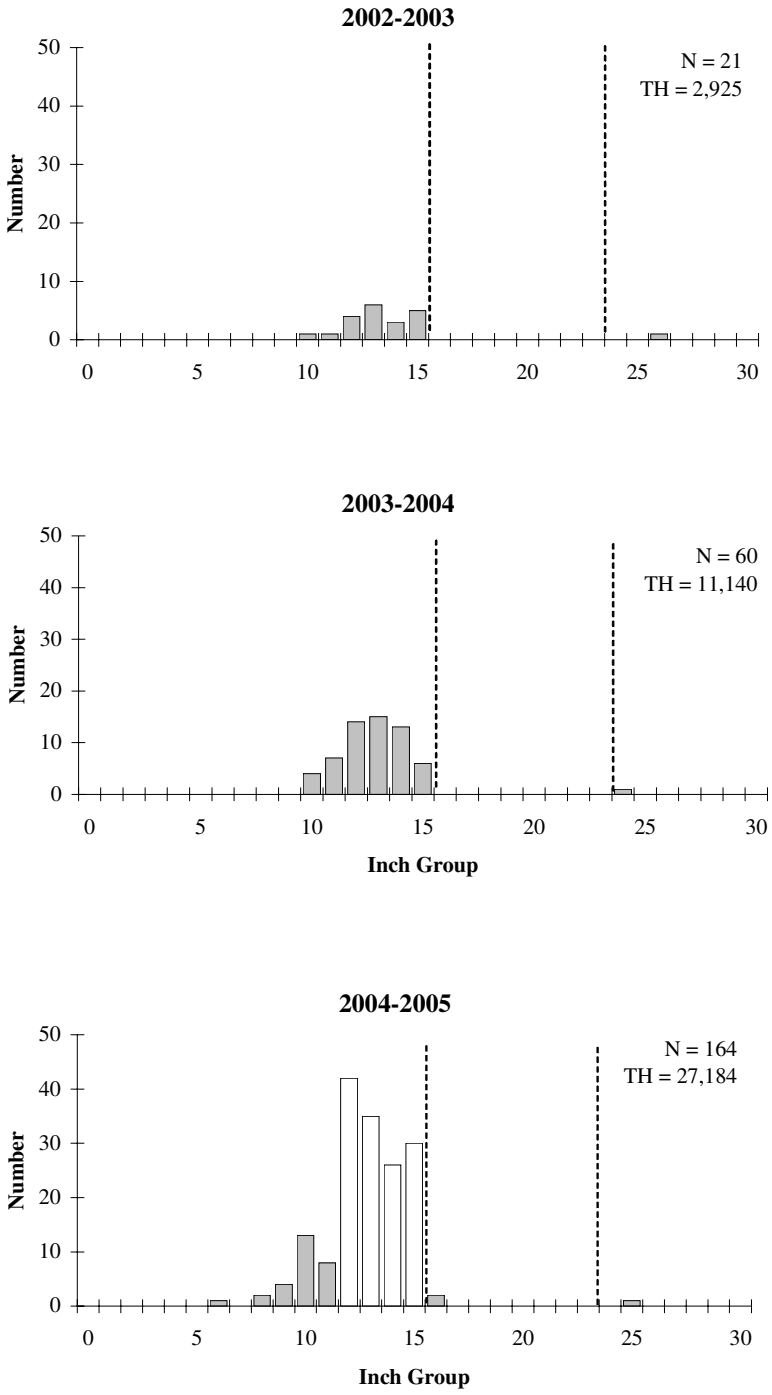
Mean length-at-age of capture (inches) of largemouth bass (sexes combined) collected in fall electrofishing, Lake Fork, Texas, October 2000 through 2004. Sample sizes are shown in parentheses.

	Age class														
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2004	6.5 *(29)*	11.7 *(25)*	15.5 *(16)*	16.7 *(8)*	16.9 *(1)*	17.0 *(2)*	18.9 *(2)*	17.6 *(1)*	19.8 *(1)*				17.7 *(1)*		
2003	6.5 *(21)*	11.4 *(22)*	15.2 *(15)*	18.5 *(3)*	17.5 *(4)*	18.1 *(2)*	18.8 *(5)*	20.1 *(1)*		19.3 *(2)*	19.2 *(3)*			19.9 *(2)*	
2002	6.7 *(29)*	11.7 *(23)*	15.9 *(4)*	16.2 *(2)*	16.2 *(2)*	13.3 *(1)*	19.1 *(3)*	18.6 *(3)*		20.1 *(4)*		20.5 *(2)*	20.0 *(1)*	18.8 *(1)*	
2001	7.7 *(23)*	12.1 *(19)*	15.2 *(19)*	16.5 *(13)*	17.5 *(13)*	18.7 *(4)*	19.5 *(5)*	19.6 *(4)*	18.7 *(5)*	18.9 *(4)*	19.2 *(3)*			20.4 *(1)*	22.3 *(1)*
2000	6.9 *(23)*	11.5 *(18)*	14.7 *(9)*	16.1 *(9)*		18.6 *(2)*	18.7 *(3)*		19.5 *(2)*	20.0 *(2)*					

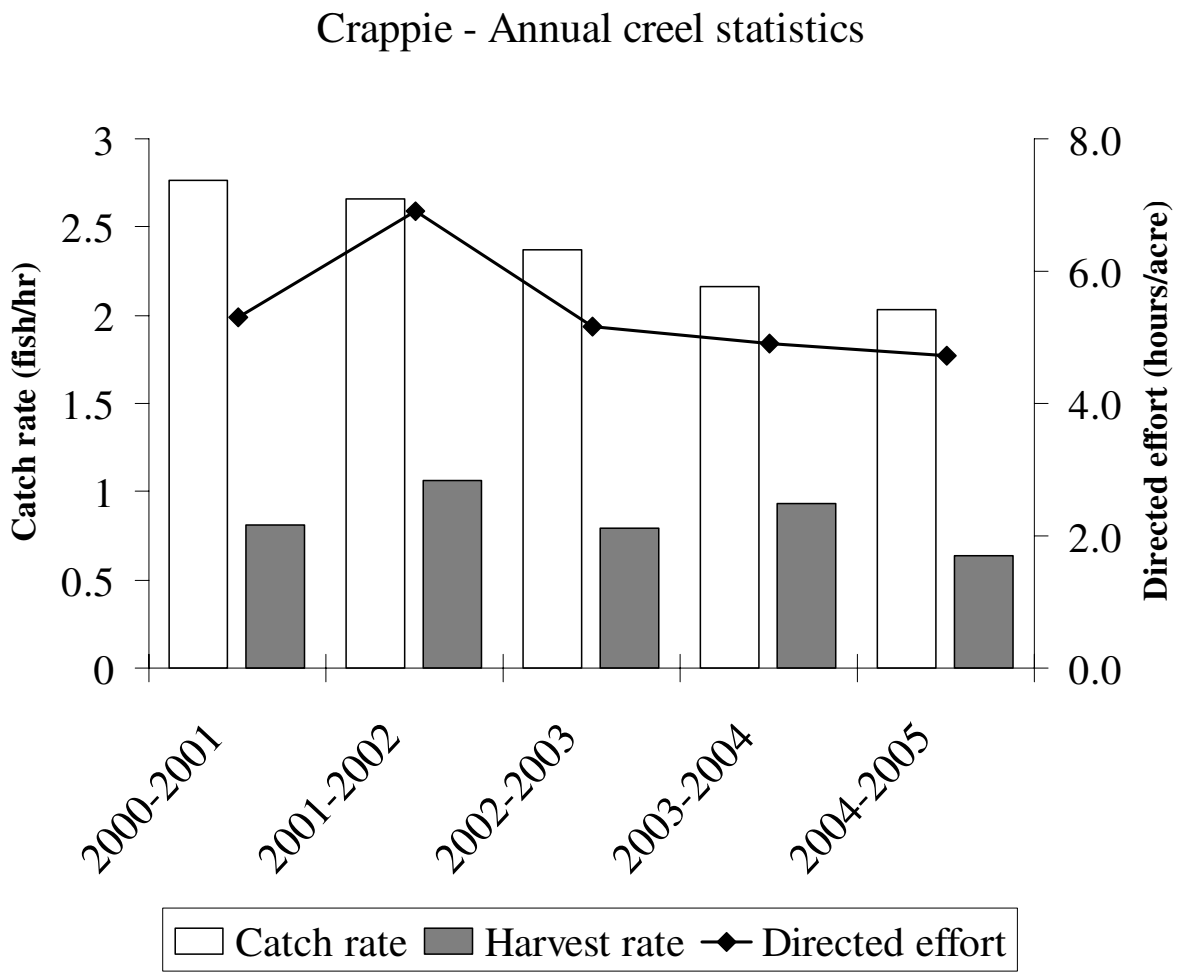


Angler catch rate (open bars), harvest rate (shaded bars) and directed effort (lines) for anglers seeking largemouth bass at Lake Fork, Texas. The creel surveys were conducted from June through May, 2000-2005.

Largemouth bass

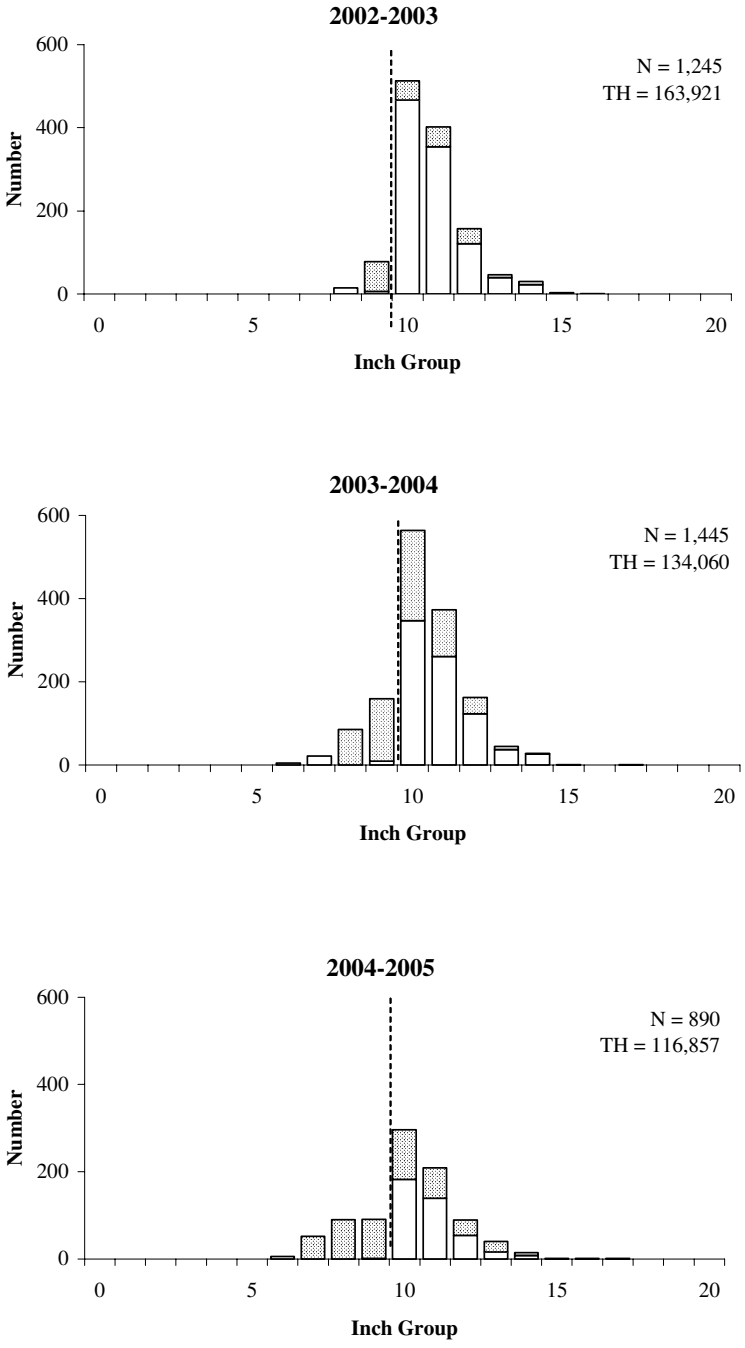


Length frequency distributions of largemouth bass measured during creel surveys at Lake Fork, Texas June 2002 through May 2005. Dashed lines indicate boundaries of 16 to 24 inch slot length limit. N = total number observed and TH = estimated total harvest.



Angler catch rate (open bars), harvest rate (shaded bars), and directed effort (lines) for anglers seeking crappie (white and black combined) at Lake Fork, Texas. The creel surveys were conducted from June through May, 2000-2005.

Crappie



Length frequency distributions of crappie (black and white combined) harvested during creel surveys at Lake Fork, Texas June 2002 through May 2005. Open bars represent crappie caught in summer, fall and spring quarters and shaded bars represent crappie caught in winter quarter (December to February). Dashed lines indicate minimum length limit (March – October). Minimum length limit is waived during winter (November to February). N = total number observed and TH = estimated total harvest.

Fisheries Management Plan
Lake Fork, Texas

Prepared - July 2005

ISSUE 1 **Florida bass stocking.** TPWD stocking criteria for lakes with a history of producing trophy largemouth bass allow stocking if the population contains less than 20% pure age-0, or age-1, Florida bass. While the percentage of FLMB alleles at Lake Fork have remained in the range of 30–60% for the last 15 years, the goal of 20% pure Florida largemouth bass has not been achieved.

MANAGEMENT STRATEGIES

1. Continue annual stocking of Florida largemouth bass.

2. Compare samples of age-1 largemouth bass from embayment stocked area (upstream of Highway 154 Bridge) and un-stocked areas for differences in genetic composition in fall 2005.

3. Monitor genetic composition of largemouth bass population (lake-wide) by assessing allele frequency of age-0 fish collected during fall electrofishing.

ISSUE 2 **Slot limit evaluation.** Lake Fork largemouth bass harvest has been managed using restrictive harvest regulations since the lake was opened. The current 16-24 inch slot length limit went into effect on September 1, 2000 and this regulation was designed to increase catches of trophy size fish.

MANAGEMENT STRATEGIES

1. Continue to monitor the largemouth bass population with biannual electrofishing surveys (spring and fall).

2. Continue to conduct three weekend and three weekday creel surveys per month to monitor the fishery.

3. Assess the effect of the 16 – 24” slot length limit regulation on largemouth bass size structure, growth, condition, angler catch and harvest.

4. Use Lake Fork Trophy Bass survey results to monitor angler catches of bass 24 inches and longer and help assess effects of this special regulation.

ISSUE 3 **Water hyacinth control** . Water hyacinth was first documented in Lake Fork in 1993. This plant is known to cause access and water quality problems and is very poor habitat for fish. By 1995, the coverage of this noxious aquatic plant had increased considerably. Low water level and extremely cold air temperatures during the winter of 1995-1996 helped to decrease its distribution at Lake Fork. Herbicide treatments using 2, 4-D were conducted by the TPWD Aquatic Habitat Enhancement staff (AHE) in 1996. In June

1998, water hyacinth was reported for the first time outside the Glade Creek area, and since that time it has spread throughout the Caney Creek arm of the reservoir. In October 1998, water hyacinth coverage was estimated at 125 acres. In 2000, coverage was similar (130 acres) but the plant had spread to Little Caney Creek and to sections of Lake Fork Creek. Although prolonged periods of low temperatures in winter 2000 dramatically reduced coverage in 2001, AHE staff treated 42 acres of water hyacinth in spring 2001. During a vegetation survey conducted in September 2004, the total area observed was 48.6 acres.

MANAGEMENT STRATEGIES

1. Recommend spraying of water hyacinth as needed by AHE staff using herbicide purchased by the Sabine River Authority (SRA).

2. Continue to monitor the distribution and coverage of water hyacinth annually at Lake Fork, and provide updates to interested parties.

ISSUE 4 **Trophy bass survey.** The reputation of Lake Fork's fishery is built on trophy largemouth bass, yet TPWD's electrofishing and creel survey sampling provide little data on these trophy-sized fish. In order to monitor this segment of the fishery and to more effectively evaluate the current 16 – 24 inch slot length limit, TPWD must employ alternative sampling methods to collect data on trophy largemouth bass. The Lake Fork Trophy Bass Survey, a cooperative project of TPWD, the Lake Fork Area Chamber of Commerce and the Lake Fork Sportsman's Association, was started in March 2003.

MANAGEMENT STRATEGIES

1. Continue the Lake Fork Trophy Bass Survey to obtain information on the catches of largemouth bass 7 pounds and larger as well as fish 24 inches and longer from Lake Fork. Data gathered through this program will be used to quantify the catches of trophy bass as well as to monitor the performance of the slot limit.

2. Provide monthly summaries of catches by weight class to participating marinas and local media. Produce news releases summarizing survey results and distribute information on a statewide basis.

3. Continue to work with Lake Fork Area Chamber of Commerce, the Lake Fork Sportsman's Association and area fishing guides to encourage them to participate in this survey. Provide marina ledgers to participants on a monthly basis.

4. Continue to promote this program through laminated posters displayed at public and private boat ramps and in area businesses.

ISSUE 5 **Increase angler awareness of the fisheries resources at Lake Fork.** There is a need to inform anglers of the significant fisheries potential that exists in Texas' premier largemouth bass trophy fishery and to provide information on the fisheries regulations that govern this and other fisheries resources in Lake Fork.

MANAGEMENT STRATEGIES

1. Continue to provide posters detailing fisheries regulations in effect at Lake Fork to local fishing-related businesses that serve the Lake Fork area, for display in stores and at boat ramps.

2. Continue to produce news releases promoting the fisheries resources of Lake Fork for distribution to local lake papers and other media outlets.

3. Continue to provide information packets on Lake Fork facilities to interested anglers by mail and e-mail.

ISSUE 6 **Angler access.** Maintenance and improvement of angler access facilities are important in promoting angling and maximizing utilization of the fisheries resources at Lake Fork by all types of anglers.

MANAGEMENT STRATEGIES

1. When opportunities are identified, encourage controlling authorities to improve existing angler access facilities to accommodate not only boat anglers, but also bank and physically challenged anglers.

APPENDIX 1

Catch rate summaries of target species from fall electrofishing 1996-2004

Electrofishing catch rate (number of fish/hour) by species and year

Species	1996	1997	1998	1999	2000	2001	2002	2003	2004
Gizzard shad	88.0	143.5	136.0	193.0	345.0	181.5	281.5	142.5	169.5
Threadfin shad	14.0	23.5	56.0	71.5	172.5	12.0	53.45	25.5	47.5
Warmouth	1.5	2.0	2.0	4.0	1.5	1.0	5.0	5.5	3.0
Bluegill	195.5	152.0	279.0	234.0	213.5	314.0	142.5	230.5	198.0
Longear sunfish	2.5	2.5	8.5	8.5	23.0	25.5	12.5	20.0	8.0
Redear sunfish	67.0	85.0	83.0	126.5	127.5	96.0	47.5	94.5	88.5
Spotted sunfish		3.0	2.0	10.5		3.5	1.5	1.0	0.5
Largemouth bass	234.0	238.5	334.0	149.0	130.5	175.5	101.0	140.0	138.5

APPENDIX 2

Results of electrophoretic analysis of largemouth bass collected by electrofishing from Lake Fork, Texas, fall 1989-2004.

Year	Age of fish	Sample size	Genotype				% FLMB alleles	% pure FLMB
			Florida	F1	Fx	Northern		
1989	0	30	2	8	13	7	31.7	6.7
1990	0	30	1	12	15	2	44.2	3.3
1991	0	30	4	5	15	4	51.8	13.3
1992	0	35	3	11	16	5	39.3	8.6
1993	0	35	2	7	18	8	33.6	5.7
1994	0	35	1	3	23	8	38.6	2.9
1995	0	35	0	8	17	10	31.4	0.0
1996	0	35	5	7	19	2	53.7	14.3
1997	0	50	4	12	27	6	40.3	8.0
1998	0	54	1	6	37	10	31.9	1.8
1999	0	35	2	14	10	9	34.3	5.7
2000	0	55	4	15	29	7	50.5	7.3
2001	0	56	3	6	28	19	31.9	5.4
2002	0	50	6	14	28	2	58.0	12.0
2003	0	50	3	33	10	4	41.0	6.0
2004	0	50	2	13	31	4	54.0	4.0
** 2003 (stocked embayment)	1	41	3	14	23	1	49.5	7.3
** 2003 (unstocked control area)	1	48	4	10	26	8	41.8	8.3
** 2004 (stocked embayment)	1	42	7	6	27	2	57.4	16.7
** 2004 (unstocked control area)	1	46	8	7	29	2	52.6	17.4

** - Embayment stocking study

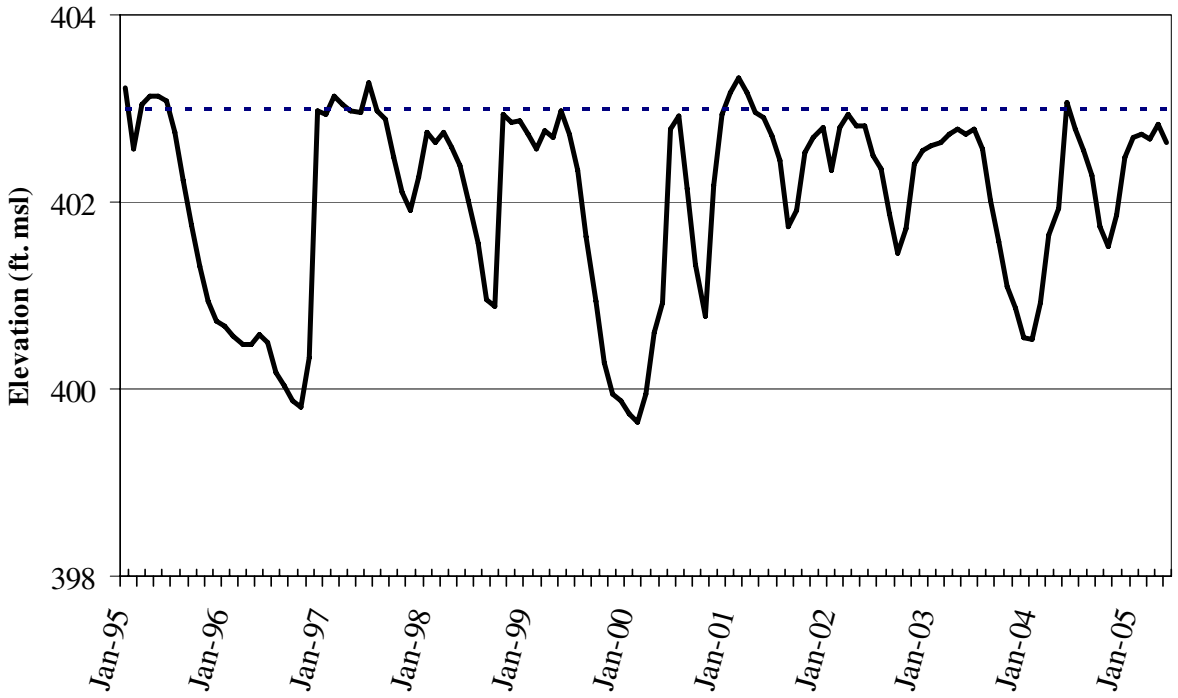
APPENDIX 3

Water body records, all tackle category, for Lake Fork as of 5/5/2005

Species	Weight (lbs)	Length (inches)	Date certified	Gear
Bass, Hybrid yellow	4.01	18.00	3/26/2003	Rod & reel
Bass, Largemouth	18.18	25.50	1/24/1992	Rod & reel
Bass, White	3.73	18.00	2/21/2005	Rod & reel
Bass, Yellow	1.37	12.25	11/19/1997	Rod & reel
Bluegill	1.61	11.50	7/9/1995	Rod & reel
Bowfin	17.65	36.50	2/21/1993	Rod & reel
Buffalo, Bigmouth	36.00	33.50	10/19/1997	Rod & reel
Buffalo, Smallmouth	51.50	36.25	12/4/1998	Rod & reel
Bullhead, Black	2.48	16.25	2/1/1995	Cane Pole
Bullhead, Yellow	3.20	16.25	3/22/1997	Rod & reel
Carp, Common	36.50	36.50	4/10/1999	Trotline
Catfish, Blue	89.00	49.25	3/1/2002	Trotline
Catfish, Channel	17.73	31.00	3/9/2003	Rod & reel
Catfish, Flathead	88.00	51.50	4/26/2004	Trotline
Crappie, Black	3.92	18.50	4/27/2003	Rod & reel
Crappie, White	3.19	17.00	2/5/1993	Rod & reel
Drum, Freshwater	14.01	27.50	6/24/1995	Rod & reel
Gar, Longnose	6.40	33.50	4/18/1993	Trotline
Gar, Spotted	10.31	39.00	4/19/2003	Bow & arrow
Sunfish, Hybrid	0.23	6.65	9/14/1999	Fly rod
Sunfish, Longear	0.48	7.50	6/1/1998	Rod & reel
Sunfish, Orangespotted	0.16	6.00	6/15/2004	Fly rod
Sunfish, Redear	1.27	12.75	6/2/1995	Rod & reel
Warmouth	0.84	9.5	5/16/2004	Rod & reel

APPENDIX 4

Mean monthly water level elevation (January 1995 through May 2005) and annual rainfall (1995 – 2004) at Lake Fork, Texas.



Mean monthly water level elevation (line) in feet above mean sea level (ft. msl) at Lake Fork, Texas, January 1995 through May 2005. Dashed line represents conservation pool elevation (403.0 ft. msl).

Total annual rainfall (inches) at Lake Fork, Texas, 1995 to 2004

APPENDIX 5

Mean catch-per-5-minutes electrofishing effort (MCPE) of 3 size categories of largemouth bass at Lake Fork during spring 1996-2005. Standard deviation (SD) and coefficient of variation (CV) are shown for each year.

Sub-stock fish (<8 inches)

Year	MCPE	Significantly different from year	SD	CV
1996	0	1997, 2003, 2004, 2005	0	0
1997	2.46	1996, 1998, 1999, 2000, 2001	3.51	143
1998	0.46	1997	0.72	157
1999	0.54	1997	0.72	133
2000	0.25	1997	0.53	213
2001	0.46	1997	0.78	170
2002	0.88		1.08	123
2003	1.08	1996	1.38	127
2004	1.17		1.55	133
2005	1.46	1996	2.17	149

Stock size fish ($\geq$ 8 inches)

Year	MCPE	Significantly different from year	SD	CV
1996	8.54	2000, 2002	5.66	66
1997	12.13	2000, 2002, 2003, 2004	7.50	62
1998	9.96	2000, 2002, 2004	5.99	60
1999	8.08	2000, 2002	5.30	66
2000	2.38	1996, 1997, 1998, 1999, 2001	1.97	83
2001	7.00	2000	5.16	74
2002	3.00	1996, 1997, 1998, 1999	2.75	92
2003	5.42	1997	4.24	78
2004	5.42	1997, 1998	5.33	98
2005	5.13	1997	3.60	70

Fish $\geq$ 14 inches

Year	MCPE	Significantly different from year	SD	CV
1996	6.96	2000, 2002, 2004	5.03	73
1997	9.71	2000, 2002, 2003, 2004, 2005	6.48	67
1998	7.21	2000, 2002, 2003, 2004, 2005	4.43	61
1999	4.96	2000, 2002	3.42	69
2000	1.88	1996, 1997, 1998, 1999, 2001	1.87	100
2001	5.75	2000, 2002	4.81	84
2002	1.92	1996, 1997, 1998, 1999, 2001	2.21	115
2003	3.33	1997, 1998	2.78	83
2004	3.17	1996, 1997, 1998	3.23	102
2005	3.08	1997, 1998	2.52	82

APPENDIX 5 continued

Mean catch-per-5-minutes electrofishing effort (MCPE) of 3 size categories of largemouth bass at Lake Fork during fall 1996-2002. Standard deviation (SD) and coefficient of variation are shown for each year.

Sub-stock fish (<8 inches)

Year	MCPE	Significantly different from year	SD	CV
1996	9.46		11.61	123
1997	10.83		16.01	148
1998	10.67	2002	12.00	113
1999	4.91		4.65	95
2000	6.41		7.45	116
2001	7.25		8.93	123
2002	3.96	1998	4.70	119
2003	6.17		5.88	95
2004	6.01		7.90	127

Stock size fish ($\geq$ 8 inches)

Year	MCPE	Significantly different from year	SD	CV
1996	10.04	2000, 2002, 2004	5.58	56
1997	9.04	2002	7.97	88
1998	17.17	1999, 2000, 2001, 2002, 2003, 2004	10.34	60
1999	7.50		5.01	67
2000	4.46	1996, 1998	3.54	79
2001	7.70		7.65	99
2002	4.46	1996, 1997, 1998	3.90	87
2003	5.50	1998	4.19	76
2004	5.33	1996, 1998	4.19	79

Fish $\geq$ 14 inches

Year	MCPE	Significantly different from year	SD	CV
1996	5.08	1997, 1999, 2000, 2001, 2002, 2003, 2004	2.96	58
1997	2.38	1996	2.65	112
1998	3.88	2002, 2003, 2004	3.72	96
1999	2.92	1996	2.92	100
2000	1.75	1996	1.85	106
2001	2.09	1996	1.73	83
2002	1.04	1996, 1998	1.04	100
2003	1.08	1996, 1998	1.18	109
2004	1.13	1996, 1998	1.36	121

APPENDIX 6
(Catfish spp.)

Annual estimates of angler catch rate (CPUE, fish/hour), harvest rate (HPUE, fish/hour), directed fishing effort (angler hours), catch (fish/acre) and harvest (fish/acre) for catfish at Lake Fork, Texas (27,680 acres), from creel sampling conducted from 1991 to 2004. Estimates are for the period from June thru May and relative standard error (RSE) for each is shown in parenthesis. A stratified uniform probability roving creel design was used prior to the 1999-2000 creel year and stratified non-uniform probability access point creel sampling was used in following creel years.

Creel year	CPUE	HPUE	Effort	Catch	Harvest
1991-1992	0.05 (121)	0.05 (121)	0.10 (544)	0.01 (1274)	0.00 (0)
1992-1993	1.27 (n/a)	1.27 (n/a)	0.02 (810)	0.03 (717)	0.03 (717)
1993-1994	0.14 (39)	0.11 (55)	0.82 (190)	0.18 (285)	0.17 (287)
1994-1995	0.71 (85)	0.71 (85)	0.21 (371)	0.08 (494)	0.08 (494)
1995-1996	1.04 (31)	0.83 (36)	0.53 (238)	0.53 (198)	0.40 (208)
1996-1997	0.23 (37)	0.13 (47)	0.33 (207)	0.07 (180)	0.04 (222)
1997-1998	0.76 (23)	0.41 (28)	0.44 (251)	0.30 (260)	0.14 (271)
1998-1999	1.33 (n/a)	0.50 (n/a)	0.03 (474)	0.04 (407)	0.02 (677)
1999-2000	0.67 (22)	0.33 (28)	0.61 (82)	0.34 (171)	0.20 (202)
2000-2001	0.98 (17)	0.72 (23)	1.35 (21)	2.44 (78)	2.42 (68)
2001-2002	0.94 (26)	0.53 (27)	1.70 (18)	3.68 (42)	1.14 (28)
2002-2003	1.01 (33)	0.65 (34)	1.25 (24)	1.90 (54)	1.30 (33)
2003-2004	1.44 (24)	0.82 (24)	1.47 (19)	2.87 (25)	1.82 (33)
2004-2005	1.29 (37)	0.84 (38)	1.35 (24)	2.74 (57)	2.01 (38)

APPENDIX 7
(Largemouth bass)

Annual estimates of angler catch rate (CPUE, fish/hour), harvest rate (HPUE, fish/hour), directed fishing effort (angler hours), catch (fish/acre) and harvest (fish/acre) for largemouth bass at Lake Fork, Texas (27,680 acres), from creel sampling conducted from 1990 to 2004. Estimates are for the period from June thru May and relative standard error (RSE) for each is shown in parenthesis. A stratified uniform probability roving creel design was used prior to the 1999-2000 creel year and stratified non-uniform probability access point creel sampling was used in following creel years.

Creel year	CPUE	HPUE	Effort	Catch	Harvest
1990-1991	0.34 (47)	0.02 (59)	29.18 (43)	11.11 (38)	0.45 (82)
1991-1992	0.33 (36)	0.02 (58)	24.57 (50)	9.57 (43)	0.53 (73)
1992-1993	0.35 (24)	0.01 (42)	39.35 (43)	16.03 (37)	0.48 (76)
1993-1994	0.36 (20)	0.01 (63)	28.07 (47)	10.92 (41)	0.32 (92)
1994-1995	0.44 (21)	0.02 (107)	24.54 (43)	12.36 (41)	0.31 (94)
1995-1996	0.38 (23)	0.01 (50)	30.61 (36)	11.80 (35)	0.27 (95)
1996-1997	0.34 (18)	<0.01 (67)	23.62 (27)	10.12 (29)	0.10 (131)
1997-1998	0.32 (22)	<0.01 (50)	22.61 (34)	7.84 (32)	0.04 (209)
1998-1999	0.39 (22)	0.01 (92)	20.95 (43)	8.45 (43)	0.19 (97)
1999-2000	0.27 (32)	<0.01 (100)	12.46 (44)	3.22 (41)	0.02 (263)
2000-2001	0.27 (9)	<0.01 (75)	26.68 (21)	11.63 (43)	0.21 (43)
2001-2002	0.39 (11)	0.01 (45)	15.10 (13)	6.72 (18)	0.19 (18)
2002-2003	0.34 (9)	<0.01 (97)	20.54 (14)	8.25 (18)	0.11 (49)
2003-2004	0.36 (9)	0.01 (60)	16.85 (12)	7.40 (15)	0.40 (38)
2004-2005	0.45 (8)	0.03 (24)	22.11 (17)	11.99 (21)	0.98 (12)

APPENDIX 8
(Crappie spp.)

Annual estimates of angler catch rate (CPUE, fish/hour), harvest rate (HPUE, fish/hour), directed fishing effort (angler hours), catch (fish/acre) and harvest (fish/acre) for crappie spp. at Lake Fork, Texas (27,680 acres), from creel sampling conducted from 1990 to 2004. Estimates are for the period from June thru May and relative standard error (RSE) for each is shown in parenthesis. A stratified uniform probability roving creel design was used prior to the 1999-2000 creel year and stratified non-uniform probability access point creel sampling was used in following creel years.

Creel year	CPUE	HPUE	Effort	Catch	Harvest
1990-1991	2.46 (10)	0.86 (11)	10.11 (69)	27.44 (66)	9.29 (67)
1991-1992	1.67 (15)	0.71 (28)	5.10 (89)	10.55 (86)	4.32 (82)
1992-1993	1.34 (15)	0.80 (13)	11.42 (73)	16.89 (78)	8.97 (72)
1993-1994	1.03 (18)	0.48 (22)	5.15 (95)	6.72 (94)	3.24 (97)
1994-1995	1.57 (14)	0.79 (14)	3.59 (100)	6.63 (99)	3.06 (98)
1995-1996	2.24 (23)	0.75 (20)	4.34 (98)	11.59 (96)	4.22 (98)
1996-1997	1.84 (16)	0.53 (14)	4.33 (84)	10.55 (82)	2.64 (86)
1997-1998	2.56 (15)	1.08 (14)	2.90 (100)	8.11 (92)	3.29 (95)
1998-1999	1.80 (13)	0.95 (18)	2.03 (117)	4.70 (116)	2.25 (121)
1999-2000	2.45 (23)	0.66 (16)	4.31 (33)	9.05 (72)	2.23 (76)
2000-2001	2.76 (17)	0.81 (18)	5.29 (24)	22.02 (50)	7.51 (55)
2001-2002	2.66 (15)	1.07 (14)	6.91 (13)	19.21 (21)	7.08 (24)
2002-2003	2.37 (20)	0.80 (21)	5.17 (13)	14.95 (22)	5.92 (28)
2003-2004	2.17 (16)	0.93 (18)	4.90 (13)	11.65 (21)	4.84 (26)
2004-2005	2.03 (19)	0.64 (21)	4.73 (18)	11.05 (29)	4.22 (41)

APPENDIX 9

Length frequency of harvested largemouth bass measured in angler creels from anglers seeking largemouth bass at Lake Fork, Texas, creel years 1991-2005. Creel periods extend from June to May. Slot limits (shaded area), daily bag limits and bag limit restrictions at the beginning of each creel year are shown.

Year	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Inch class															
5												1			
6					1							1			1
7											1	1			
8			1									6			2
9	2	4	2	1								1			4
10	13	8	8	3	6	3	1	1	3		2	9	1	4	13
11	15	6	14	2	7	3					8	3	1	7	8
12	30	33	14	7	26	4	2		8	1	2	13	4	14	42
13	16	33	32	14	23	20	6	2	6	1	1	7	6	15	35
14	4		2		2				11	1	2	15	3	13	26
15									15	1	3	17	5	6	30
16										1	1	1			2
17															
18															
19		1	1								1				
20	3	1	3	2	1	1	1	1							
21	12	6	12	12	4	11	3	4			1				
22	4	5	7	4	5	9	2	1	3						
23	3	2	5	5		4	2		3						
24	1	1	3	2					1					1	
25	1				1										1
26													1		
Total	104	100	104	52	76	55	17	9	50	5	22	75	21	60	164
Slot limit at start of year	14-21	14-21	14–21	14–21	14–21	14–21	14–21	14–21	14–21	16–22	16–23	16–24	16–24	16–24	16–24
Bag limit	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5
Bag limit restriction	None	None	None	None	1≥21”	1≥21”	1≥21”	1≥21”	1≥21”	1≥22”	1≥23”	1≥24”	1≥24”	1≥24”	1≥24”

APPENDIX 10

Distribution by angler-reported weight class of largemouth bass reported in the Lake Fork Trophy Bass Survey, March 2003 – May 2005. Numbers represent combined weighed and estimated entries.

Weight class (pounds)	7	8	9	10	11	12	13	14	15	16	Total
Mar-03	277	205	102	62	23	10	4	1		1	685
Apr-03	166	102	61	38	12	4	2	1			386
May-03	95	67	21	14	4	1	1				203
Jun-03	68	47	16	8	0	1	1				141
Jul-03	45	39	30	6	1	0	0				121
Aug-03	9	14	4	5	1	3	0				36
Sep-03	9	20	4	7	1	2	0				43
Oct-03	18	17	8	10	2	1	0				56
Nov-03	16	21	9	4	3	0	0				53
Dec-03	3	6	1	2	0	0	0				12
Jan-04	11	6	4	3	1	1	1				27
Feb-04	42	45	18	13	7	2	2				129
Mar-04	217	156	104	62	35	10	3				587
Apr-04	90	78	45	19	7	1	1				241
May-04	45	33	19	6	4	0	0				107
Jun-04	43	38	21	7	2						111
Jul-04	50	35	16	9	1	2					113
Aug-04	34	22	17	8	2	3			1		87
Sep-04	16	12	6	3							37
Oct-04	22	15	4	7	3	1	1		1		54
Nov-04	24	20	11	5							60
Dec-04	9	6	5	4		1	1				26
Jan-05	17	7	9	6		1					40
Feb-05	60	41	24	19	9	3	1				157
Mar-05	107	118	71	46	19	8	4				373
Apr-05	98	54	50	24	11	3					240
May-05	66	47	27	11	7	1		1			160
Total	1,657	1,271	707	408	155	59	22	3	2	1	**4,285**

APPENDIX 11

Distribution of water hyacinth in Lake Fork, September 2004. Total coverage was estimated to be 48.6 acres.