PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Kemp Reservoir

Prepared by:

Mark Howell and Robert Mauk
Inland Fisheries Division
District 2-E, Wichita Falls, Texas

Robert L. Cook
Executive Director

Phil Durocher
Director, Inland Fisheries

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Kemp Reservoir were surveyed in 2004 using trap nets, in 2005 using electrofishing and in 2006 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Kemp Reservoir is a 15,104-acre impoundment located on Wichita River in the Red River Basin approximately 50 miles west of Wichita Falls. It has a primarily rocky shoreline with some submerged aquatic and flooded terrestrial habitat. The reservoir was within 5 feet of conservation pool (1,147.1) from January of 2005 through January 2006. Kemp water quality is somewhat saline and highly conductive. It has had annual golden alga blooms since 2002 that have had a severe adverse affect on fish populations.

- **Management history:** Historically important sport fish include striped bass, white bass, largemouth bass, white crappie, and catfish. The 2001 management plan recommended stocking striped bass annually at the rate of 5 to 10 per acre depending on prey availability. Striped bass were stocked in 2002 at a rate of 7.7 fish/acre, in 2004 at 2.5 fish/acre and in 2005 at 9.9 fish/acre. In 2005, Florida largemouth bass fingerlings were stocked at the rate of 12.9 per acre and channel catfish at the rate of 19.1 per acre in response to golden alga mortality in previous years. Kemp has always been managed with statewide regulations.

- **Fish Community**
  - **Prey species:** The gizzard shad survey catch rate was slightly below average for the reservoir and the index of vulnerability (IOV) was very high indicating adequate forage for game fish. The CPUE for bluegill and other sunfishes was relatively low.

  - **Catfishes:** Blue catfish were well represented in the gill net survey of 2004, but were not sampled in the 2005 or 2006 surveys. However, anglers were observed harvesting blue catfish later in those years. The channel catfish population continued to show low abundance after the golden alga related mortalities that have occurred since 2002. Flathead catfish were last sampled during the May 2004 gill net survey.

  - **Temperate basses:** White bass and striped bass were present, but few white bass were sampled in 2006 and none were sampled in 2005. However, the fall 2004 trap net sample had high numbers of young white bass indicating excellent reproduction during that year. In 2006, only the 2005 year class of striped bass was sampled.

  - **Black bass:** Historically, spotted bass were the most abundant bass species, but they've rarely been documented since golden alga blooms began in 2002. In 2005, largemouth bass had the highest electrofishing catch rate recorded for the reservoir, but all of the fish sampled were less than 11 inches. Florida bass influence was high as expected since the reservoir was stocked during spring 2005. However, pure Florida largemouth bass did not make up 100% of the genetic sample which indicated there are still resident largemouth bass that have survived the alga blooms and are reproducing.

  - **White crappie:** Only 2 fish were sampled during the 2004 survey. While never showing high relative abundance during past trap net surveys, the 2004 catch was extremely low indicating the population has been negatively impacted by golden alga.

- **Management Strategies:** Discontinue stocking of striped bass until annual golden alga blooms cease. Consider management stocking of white crappie if annual golden alga blooms cease by collecting from other lakes and transporting to Kemp. Conduct general monitoring with trap nets, gill nets, and electrofishing surveys in 2009-2010.

INTRODUCTION

This document is a summary of fisheries data collected from Kemp Reservoir in 2004-2006. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data is presented with the 2004-2006 data for comparison.

Reservoir Description

Kemp Reservoir is a 15,104-acre impoundment constructed in 1923 on the Wichita River. It is located in Baylor County approximately 50 miles west of Wichita Falls and is operated and controlled by the City of Wichita Falls and Wichita County Irrigation District No. 2. Primary uses include irrigation, flood control, future municipal water supply and recreation. Mean depth was 17 ft., shoreline development index was 10.6, and conductivity was 5,470 umhos/cm. Habitat at time of sampling consisted of flooded terrestrial vegetation, rocks, boat docks, and submerged vegetation. Water level has been high and stable since 2005 while in 2002 the water level was about 10 feet below conservation pool (Figure 1). Boat access consisted of seven public boat ramps. The Waggoner Ranch based in Vernon, TX controls land access to the reservoir and charges a five dollar per vehicle entrance fee. Bank fishing is available at the public access points including the boat ramps. Other descriptive characteristics for Kemp Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Mauk and Howell 2002) included:

1. Maintain the current fishery for striped bass by stocking fingerlings annually at the rate of 5-10 per acre depending on prey availability.
   Action: Striped bass fingerlings were stocked in 2002 (7.7 per acre), 2004 (2.5 per acre) and 2005 (9.9/acre).
2. Largemouth bass recruitment rates remain low and spotted bass recruitment rates remain relatively high.
   Action: Toxic golden alga fish kills since 2002 appear to have virtually eliminated spotted bass from the reservoir. Florida largemouth bass were stocked during 2005 (12.9 per acre).
3. A toxic golden alga induced fish kill occurred during the late winter of 2002. The Resource Protection Division estimated over 136,000 fish of various species killed at that time. Catfish were the most common type of game fish lost.
   Action: Conducted supplemental gill net sampling in the winter of 2003, 2004 and 2005 to reassess stocks of catfish and striped bass.
   Action: Supplemented blue catfish population by stocking 112,857 fingerlings in 2002.
   Action: Stocked striped bass fingerlings in 2002 (116,311), 2004 (37,796) and 2005 (149,771).
   Action: Stocked channel catfish in 2005 (288,664 channel catfish).

Harvest regulation history: Sport fish species in Kemp Reservoir are currently managed, and have always been managed with statewide regulations (Table 2).

Stocking history: In recent years, the reservoir was supplementally stocked with blue and channel catfish, striped bass and Florida largemouth bass in an attempt to reestablish population abundances since the 2002 golden alga fish kill. From 1979 to 1999, striped bass were stocked almost every year.

The complete stocking history is in Table 3.

Vegetation/habitat history: Kemp Reservoir has no significant vegetation/habitat management history.

METHODS

Fishes were collected by electrofishing (2 hours at 24 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 stations). Catch per unit effort 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). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2002).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from 5 to 10 fish per inch group. Source for water level data was the United States Geological Survey.

RESULTS AND DISCUSSION

Habitat: A physical habitat survey conducted August 9, 2005 indicated that the littoral zone habitat consisted primarily of rocky shoreline, flooded terrestrial vegetation, and native submerged vegetation (Table 4). The previous physical habitat survey was conducted in 2001 (Mauk and Howell 2002). Very little or no manmade changes to the physical habitat had occurred during the four year period. However, there was a significant increase in submergent aquatic plants compared to the 2001 survey.

Prey species: Electrofishing catch rates of bluegill and gizzard shad were 3.0/h and 154.5/h, respectively. Index of vulnerability for gizzard shad was high, indicating that 99% of gizzard shad were available to existing predators; this was higher than IOV estimates in previous years. Total CPUE of gizzard shad was slightly lower in 2005 compared to the 1998 and 2001 surveys (Figure 2). Total CPUE of bluegill in 2005 was similar to the 2001 survey, but much lower than the 1998 survey (Figure 3).

Blue catfish: Blue catfish were not sampled in the 2005 and 2006 gill net surveys (Figure 4). Historically they have been the most abundant catfish species sampled during gill net surveys. Good numbers (1.7/nn) were sampled during the 2004 survey (Figure 4). The timing of the gill net surveys has been problematic since Kemp has had golden alga blooms occurring or influencing the sampling periods since 2002.

Channel catfish: No channel catfish were sampled in 2006 and only one was sampled in 2004 and 2005 (Figure 5). There has been a constant downward trend for channel catfish every year since 2001.

White bass: The gill net catch rate for white bass was 0.2/nn in 2006, which was down from 1.5/nn in 2005 and 15.2/nn in 2004 (Figure 6). White bass at times respond to the winter golden alga blooms by producing large year classes in the spring. Being highly prolific spawners, they can produce large, fast growing year classes that quickly repopulate the reservoir as evidenced by a catch rate of 99.4/nn from the 2004 trap net survey.

Striped bass: The gill net catch rate of striped bass was 0.3/nn in 2006 compared to 0.5/nn in 2005 (Figure 8). Both years the sample appeared to consist entirely of age-1 fish. Before the golden alga bloom occurred in 2002, the CPUE was 5.7/nn with most fish near the minimum size limit of 18 inches (Figure 8). No striped bass were sampled in 2003 and 2004 after the golden alga bloom in 2002.

Spotted bass: Spotted bass were not sampled during the 2005 electrofishing survey. Historically, spotted bass were the most abundant black bass species in the reservoir. Like other golden alga influenced reservoirs in the district, spotted bass seem to be highly susceptible to golden alga toxins and have been rarely found after significant golden alga fish kill events.

Largemouth bass: The electrofishing CPUE of largemouth bass was 25.0/h in 2005 (Figure 9), an increase from previous surveys in 1998 (18.5/h) and 2001 (15.0/h). All the bass sampled were $\leq$10 inches and were all from the 2005 year class. Body condition in 2005 was excellent (relative weight over 110) for stock size bass ($\geq$ 8 inches) and was improved compared previous surveys (Figure 8). Florida largemouth bass influence was high as Florida allele influence was 88% and the percentage of pure Florida largemouth bass in the sample was 76% (Table 5). This indicates that the 2005 Florida largemouth bass stocking had a strong influence on the genetics of the population, but that the reservoir still has some resident northern largemouth bass that survived the golden alga and are contributing to the population through natural reproduction.

White crappie: The trap net catch rate of white crappie was only 0.1/nn in 2004, much lower than the previous surveys of 2001 (5.7/nn) and 1998 (4.6/nn) and were only sampled in the upper end of the reservoir (Figure 10). The crappie population has been adversely affected by the reoccurring golden alga blooms and fish kills.

Fisheries management plan for Kemp Reservoir, Texas

Prepared – July 2006

ISSUE 1: Golden alga has severely impacted the reservoir from at least January through May each of the last 5 years. This has acted to greatly displace fish and cause population losses, especially affecting striped bass, spotted bass, largemouth bass, and crappie.

MANAGEMENT STRATEGIES

1. Reduce the stocking frequency of striped bass until annual golden alga blooms cease. This species had shown poor survival of stocked fingerlings during the last 4 years.

2. Supplementally stock blue catfish, channel catfish and largemouth bass when they are available as surplus from the state hatchery program.

3. Continue to provide the public with information on golden alga affects and management actions as conditions warrant.

SAMPLING SCHEDULE JUSTIFICATION:

Until there are years free of golden alga bloom induced fish kills, no additional sampling will be conducted. Sport fish species have been negatively impacted to the point that until the populations have a chance to recover, sampling will provide little new information. At this time, angler effort and interest has been greatly reduced because of the annually recurring golden alga blooms. Standard sampling will be conducted in 2009-2010 to quantify species populations. If annual golden alga blooms end additional sampling will be considered to monitor fish population recovery.

LITERATURE CITED

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

Mauk, R., and M. Howell. 2002. Statewide freshwater fisheries monitoring and management program survey report for Kemp Reservoir, 2001. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

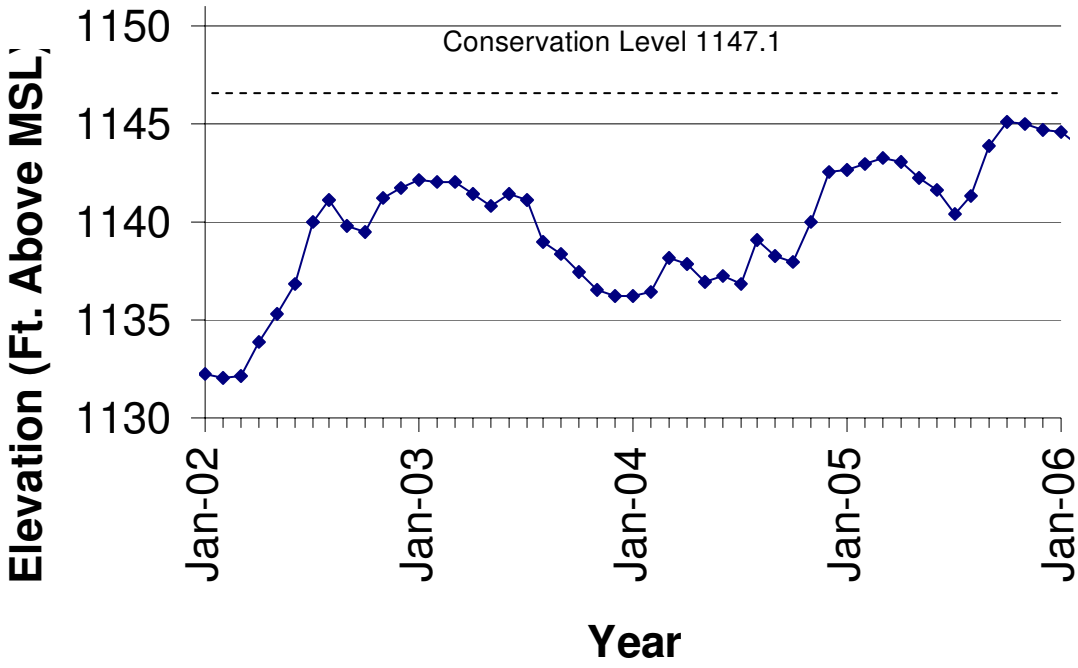


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Kemp Reservoir, Texas.

Table 1. Characteristics of Kemp Reservoir, Texas.

Characteristic	Description
Year Constructed	1923
Controlling authorities	City of Wichita Falls and Wichita County WID No. 2
County	Baylor
Reservoir type	Mainstem
Shoreline Development Index (SDI)	10.6
Conductivity	5,470 umhos/cm

Table 2. Harvest regulations for Kemp Reservoir.

Species	Bag Limit	Length Limit (inches)
Catfish: Channel and Blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum
Catfish, Flathead	5	18 minimum
Bass, White	25	10 minimum
Bass, Striped	5	18 minimum
Bass: Largemouth	5	14 minimum
Bass: Spotted	5	No Limit
Crappie: White	25	10 minimum

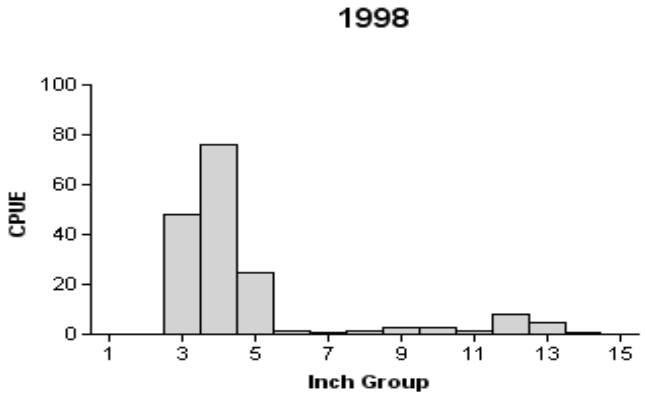
Table 3. Stocking history of Kemp Reservoir, Texas. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Year	Number	Size
	Threadfin shad	
1999	725	ADL
	Blue catfish	
1989	165,496	FGL
1990	168,011	FGL
1991	143,977	FGL
2002	112,857	FGL
Species Total	590,341	
	Channel catfish	
1967	17,500	FGL
1969	6,000	FGL
1970	12,000	FGL
1971	300	ADL
1972	210,000	FGL
2005	288,664	FGL
Species Total	534,464	
	Striped bass	
1979	81,961	FGL
1981	211,102	FGL
1983	164,859	FGL
1987	28,000	FGL
1988	167,386	FGL
1989	130,355	FGL
1992	80,857	FGL
1993	168,024	FGL
1994	4,000,000	FRY
1994	42,193	FGL
1995	82,796	FGL
1995	3,608	FRY
1997	33,323	FGL
1998	728	AFGL
1998	82,700	FGL
1999	98,087	FGL
2002	116,311	FGL
2004	37,796	FGL
2005	149,771	FGL
Species Total	5,679,857	
	Largemouth bass	
1967	7,500	FGL
1970	100,000	FGL
1971	35,000	FGL
Species Total	142,500	
	Florida largemouth bass	
1977	174,200	FGL
1990	415,356	FGL
1999	414,186	FGL
2005	194,384	FGL
Species Total	1,198,126	
	Black crappie	
2003	2,700	FGL

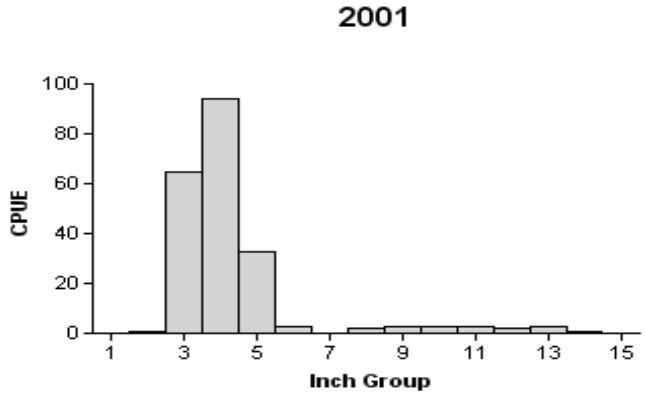
Table 4. Survey of littoral zone and physical habitat types, Kemp Reservoir, Texas, 2005. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Rocky shore	46.9	61.4		
Riprap	0.6	0.8		
Flooded live terrestrial	28.9	37.8		
Native submerged vegetation	11.9		550	3.6
Native emerged vegetation	>0.1		0.1	>0.1

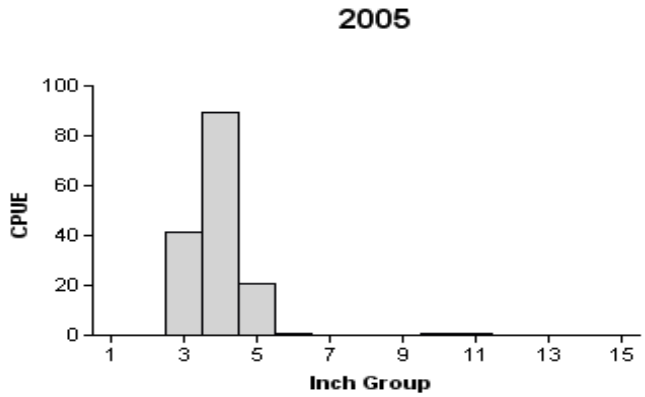
Gizzard Shad



Effort = 2.0
Total CPUE = 173.0 (18; 346)
IOV = 87.3 (0.1)



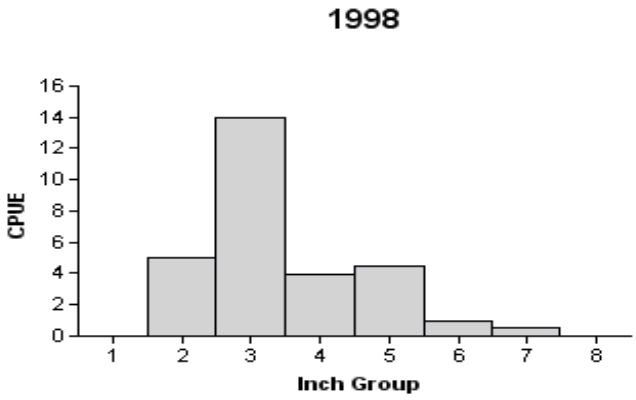
Effort = 2.0
Total CPUE = 211.0 (32; 422)
IOV = 92.2 (0.0)



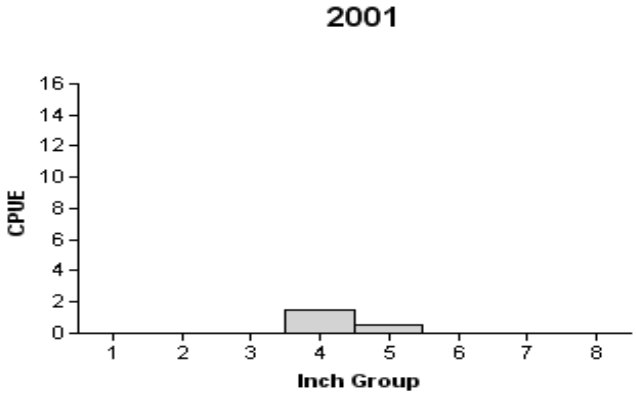
Effort = 2.0
Total CPUE = 154.5 (22; 309)
IOV = 98.7 (0.0)

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, Kemp Reservoir, Texas, 1998, 2001, and 2005.

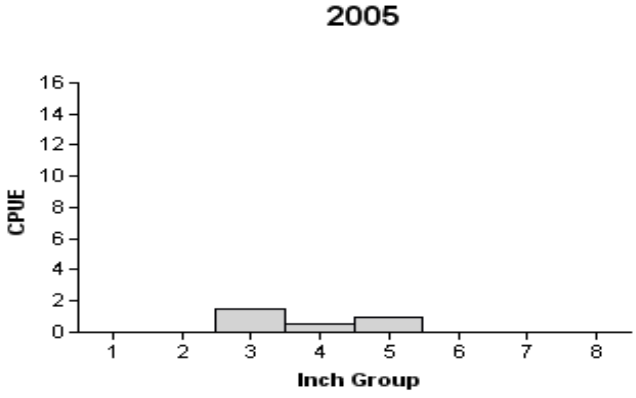
Bluegill



Effort = 2.0
Total CPUE = 29.0 (18; 58)
PSD = 6.0 (0.0)



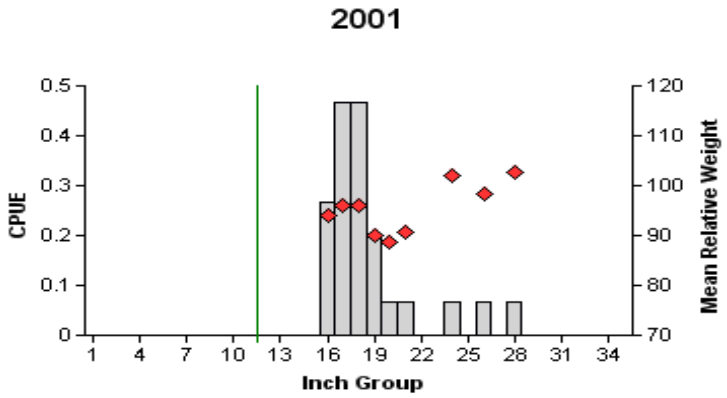
Effort = 2.0
Total CPUE = 2.0 (25; 4)
PSD = 0.0 (0.8)



Effort = 2.0
Total CPUE = 3.0 (17; 6)
PSD = 0.0 (0.5)

Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Kemp Reservoir, Texas, 1998, 2001, and 2005.

Blue Catfish



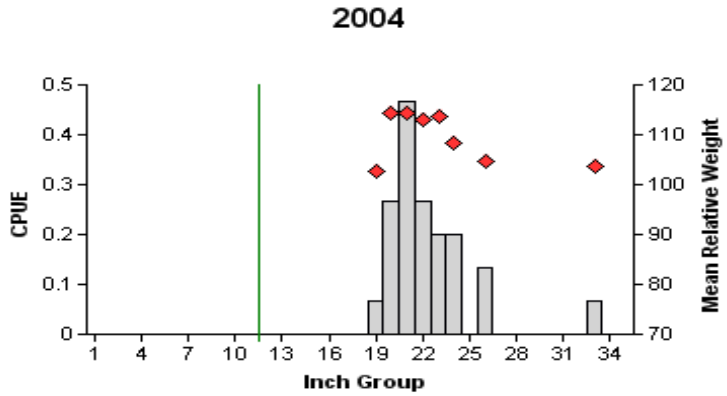
Effort =	15.0
Total CPUE =	1.7 (23; 26)
Stock CPUE =	1.7 (23; 26)
PSD =	19.0 (0.1)
RSD-P =	0.0 (0)

Effort =	15.0
Total CPUE =	1.9 (28; 29)
Stock CPUE =	1.9 (28; 29)
PSD =	45.0 (0.2)
RSD-P =	3.0 (0.0)

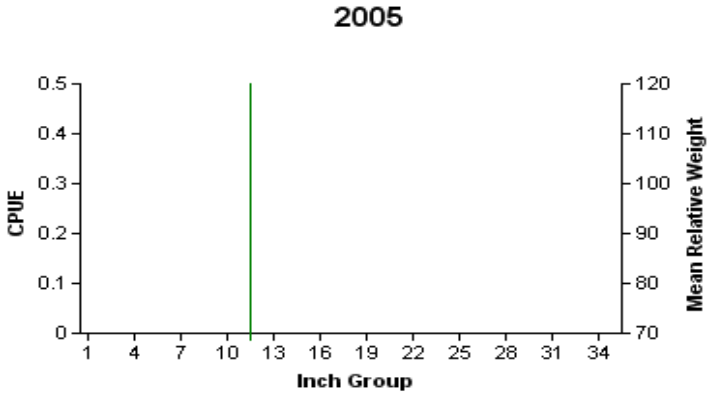
Effort =	15.0
Total CPUE =	0.3 (25; 4)
Stock CPUE =	0.3 (25; 4)
PSD =	75.0 (0.2)
RSD-P =	0.0 (0)

Figure 4. Number of blue 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 netting surveys, Kemp Reservoir, Texas, 2001, 2002, and 2003. Line indicates minimum size limit at time of sampling.

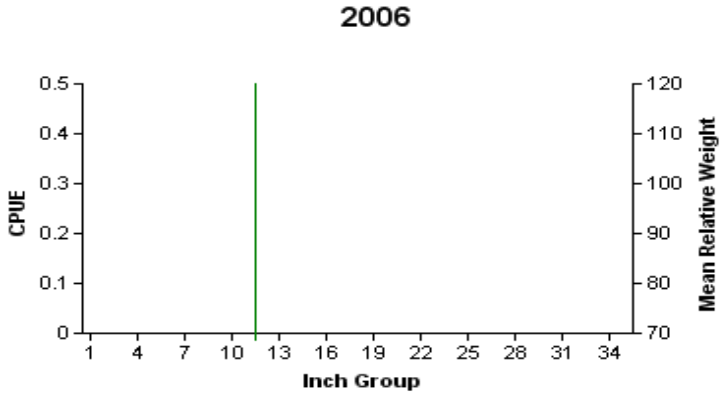
Blue Catfish



Effort =	15.0
Total CPUE =	1.7 (30; 25)
Stock CPUE =	1.7 (30; 25)
PSD =	96.0 (0.1)
RSD-P =	4.0 (0.0)



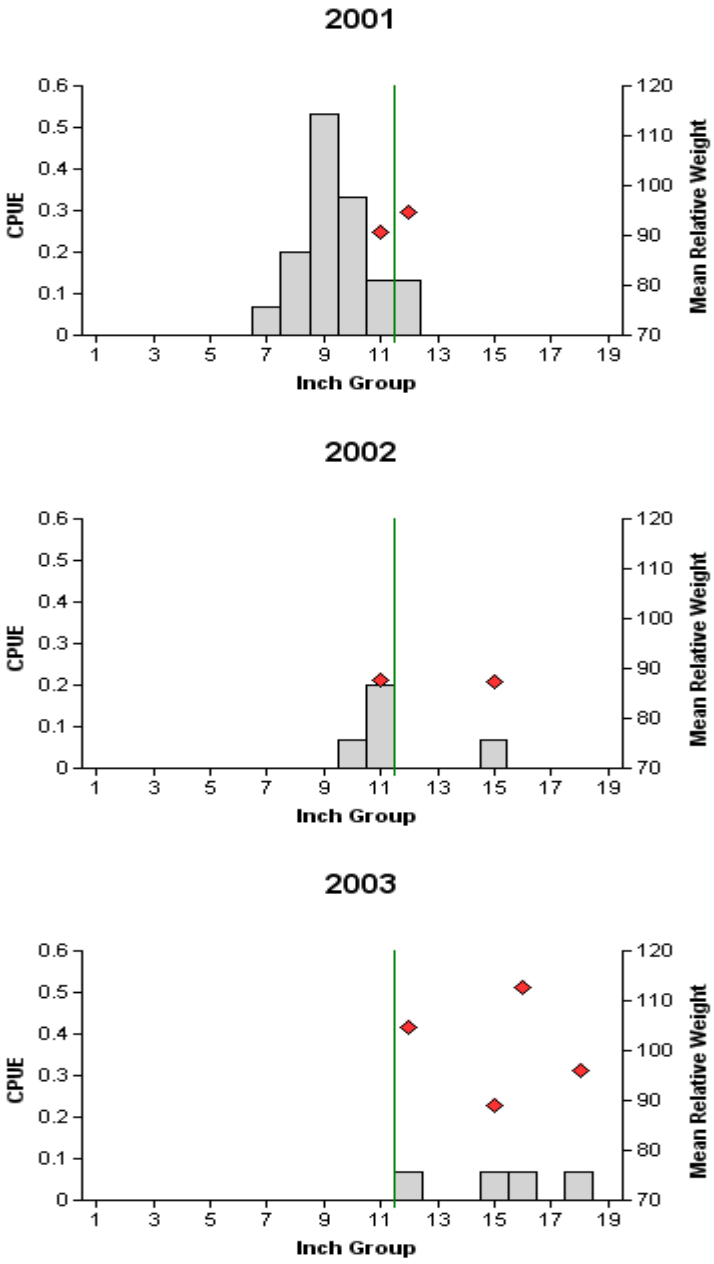
Effort =	30.0
Total CPUE =	0.0 (0; 0)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0)
RSD-P =	0.0 (0)



Effort =	15.0
Total CPUE =	0.0 (0; 0)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0)
RSD-P =	0.0 (0)

Figure 4 (continued). Number of blue 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 netting surveys, Kemp Reservoir, Texas, 2004, 2005, and 2006. Line indicates minimum size limit at time of sampling.

Channel Catfish



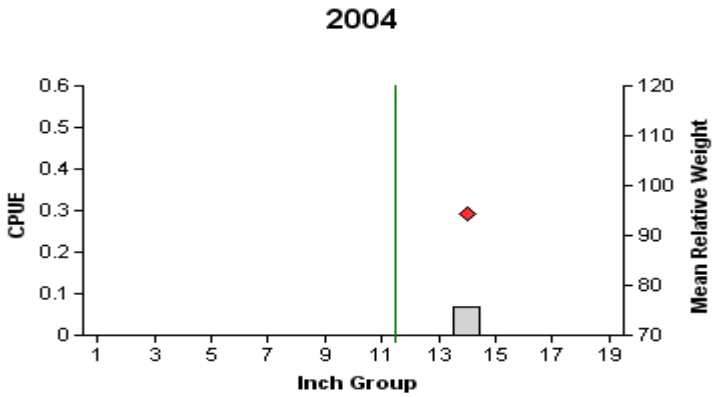
Effort =	15.0
Total CPUE =	1.4 (30; 21)
Stock CPUE =	0.3 (76; 4)
PSD =	0.0 (2.3)
RSD-P =	0.0 (0)

Effort =	15.0
Total CPUE =	0.3 (20; 5)
Stock CPUE =	0.3 (41; 4)
PSD =	0.0 (0.8)
RSD-P =	0.0 (0)

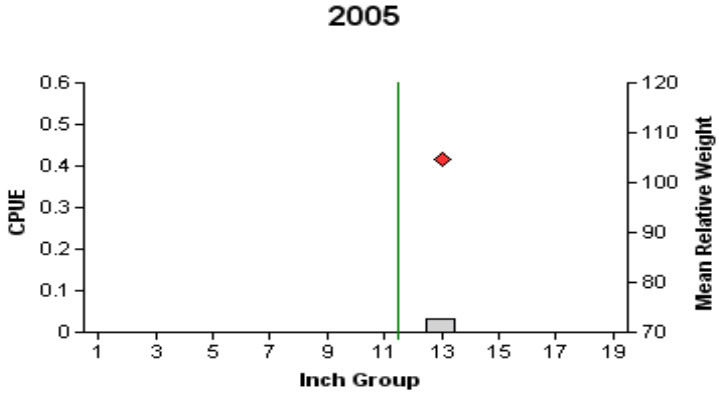
Effort =	15.0
Total CPUE =	0.3 (0; 4)
Stock CPUE =	0.3 (0; 4)
PSD =	50.0 (0.3)
RSD-P =	0.0 (0)

Figure 5. 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 netting surveys, Kemp Reservoir, Texas, 2001, 2002, and 2003. Line indicates minimum size limit at time of sampling.

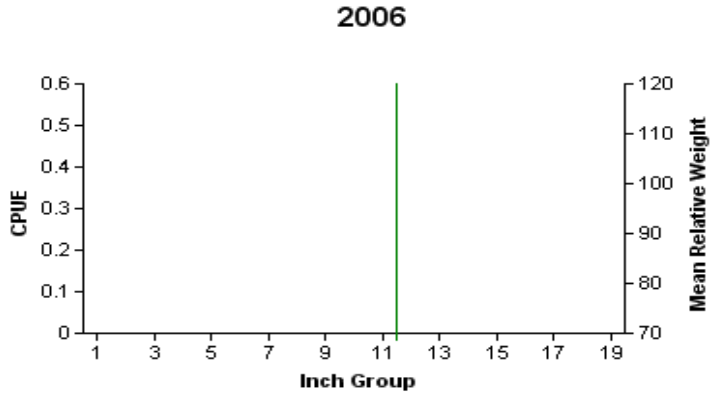
Channel Catfish



Effort =	15.0
Total CPUE =	0.1 (-99; 1)
Stock CPUE =	0.1 (-99; 1)
PSD =	0.0 (1.0)
RSD-P =	0.0 (0)



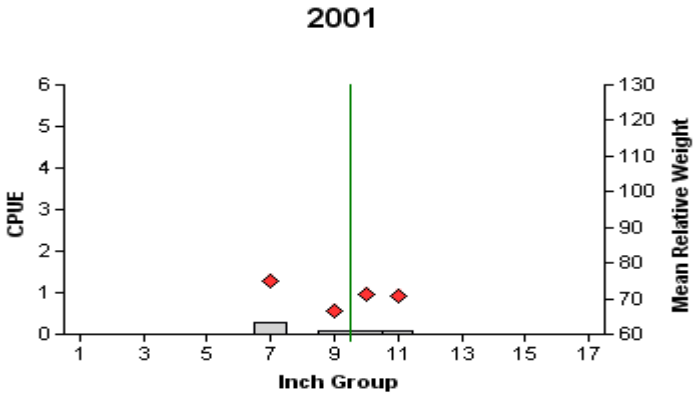
Effort =	30.0
Total CPUE =	0.0 (-99; 1)
Stock CPUE =	0.0 (-99; 1)
PSD =	0.0 (1.0)
RSD-P =	0.0 (0)



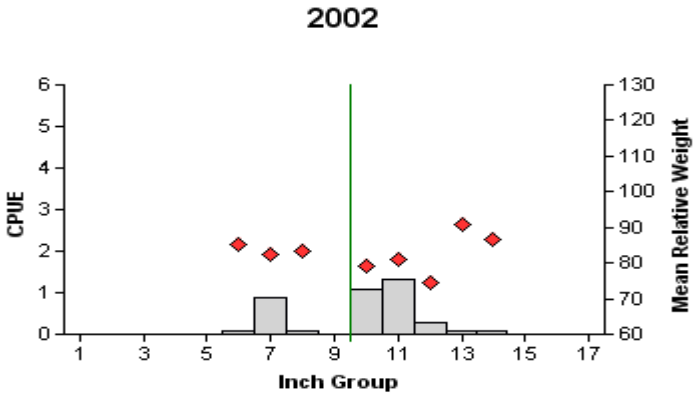
Effort =	15.0
Total CPUE =	0.0 (0; 0)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0)
RSD-P =	0.0 (0)

Figure 5 (continued). 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 netting surveys, Kemp Reservoir, Texas, 2004, 2005, and 2006. Line indicates minimum size limit at time of sampling.

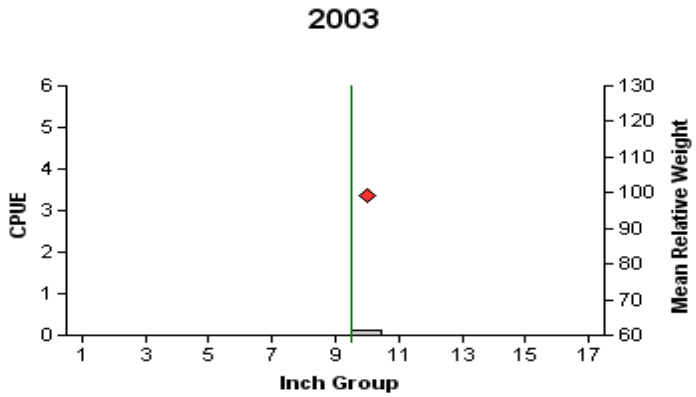
White Bass



Effort =	15.0
Total CPUE =	0.5 (29; 7)
Stock CPUE =	0.5 (29; 7)
PSD =	43.0 (0.3)
RSD-P =	0.0 (0)



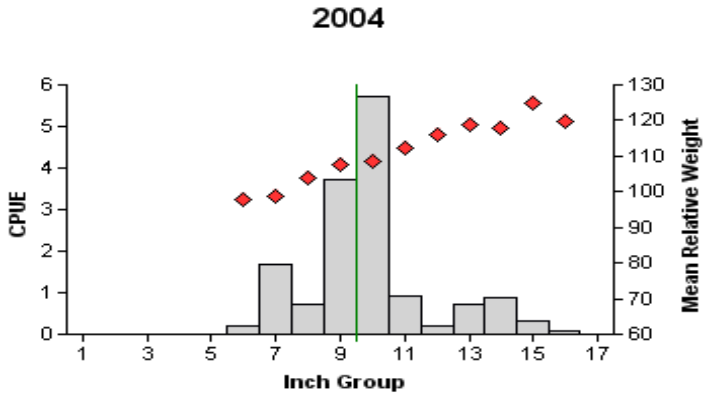
Effort =	15.0
Total CPUE =	3.8 (22; 57)
Stock CPUE =	3.8 (22; 57)
PSD =	74.0 (0.1)
RSD-P =	11.0 (0.1)



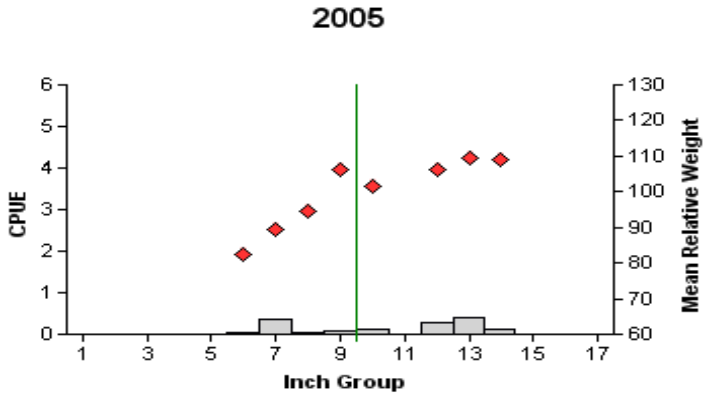
Effort =	15.0
Total CPUE =	0.1 (0; 2)
Stock CPUE =	0.1 (0; 2)
PSD =	100.0 (0)
RSD-P =	0.0 (0)

Figure 6. 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 netting surveys, Kemp Reservoir, Texas, 2001, 2002, and 2003. Line indicates minimum size limit at time of sampling.

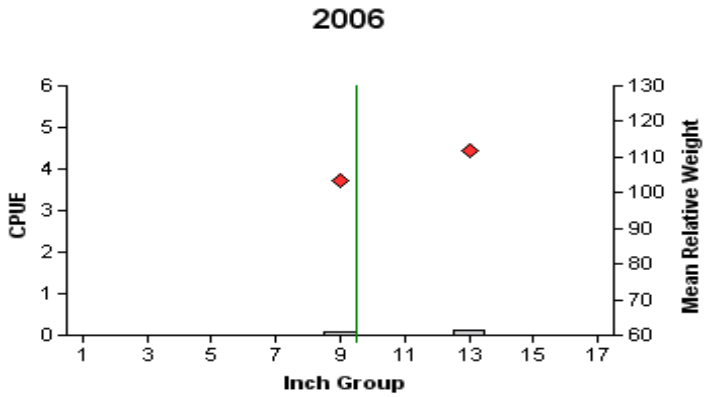
White Bass



Effort =	15.0
Total CPUE =	15.2 (27; 228)
Stock CPUE =	15.2 (27; 228)
PSD =	83.0 (0.0)
RSD-P =	14.0 (0.1)



Effort =	30.0
Total CPUE =	1.5 (-99; 44)
Stock CPUE =	1.5 (-99; 44)
PSD =	70.0 (0.0)
RSD-P =	57.0 (0)



Effort =	15.0
Total CPUE =	0.2 (33; 3)
Stock CPUE =	0.2 (33; 3)
PSD =	100.0 (0)
RSD-P =	67.0 (0.2)

Figure 6 (continued). 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 netting surveys, Kemp Reservoir, Texas, 2004, 2005, and 2006. Line indicates minimum size limit at time of sampling.

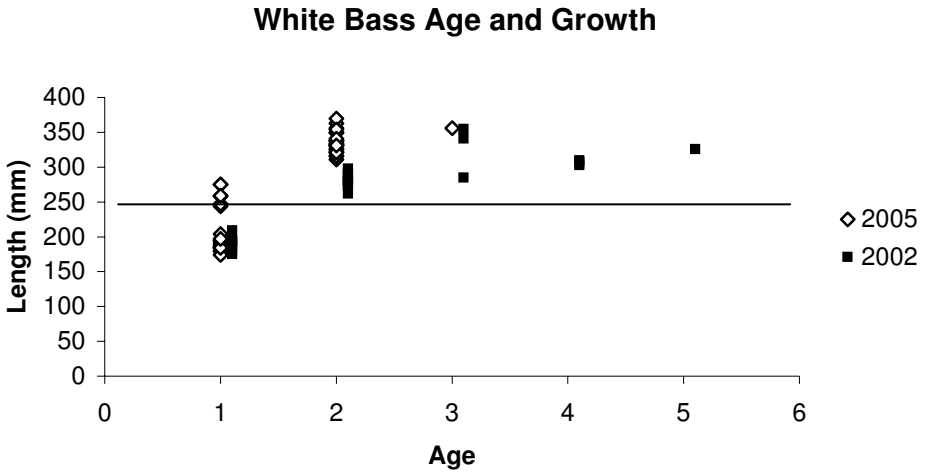
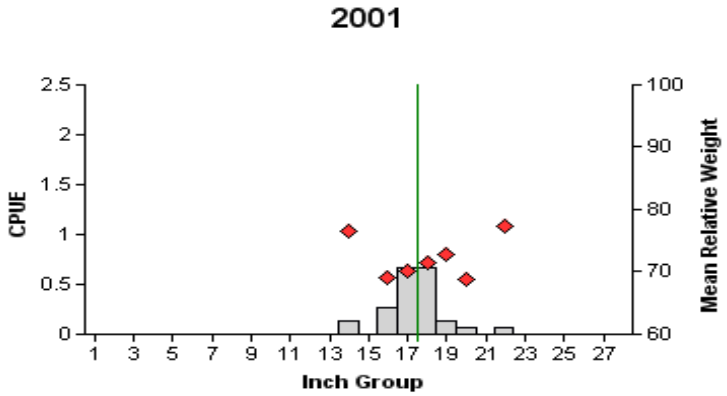
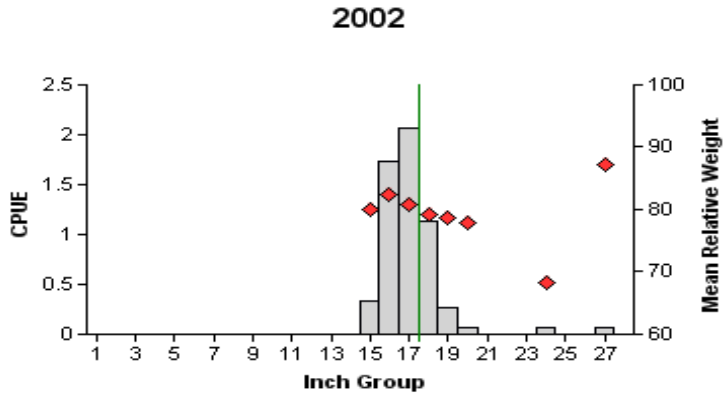


Figure 7. Length at age for white bass collected from gill nets at Kemp Reservoir, Texas, Spring 2002 and 2005. Horizontal line represents the minimum length limit.

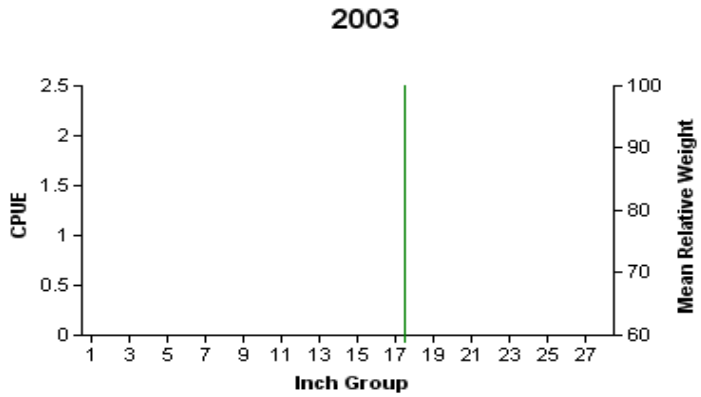
Striped Bass



Effort =	15.0
Total CPUE =	2.0 (24; 30)
Stock CPUE =	2.0 (24; 30)
PSD =	7.0 (0.0)
RSD-P =	0.0 (0)



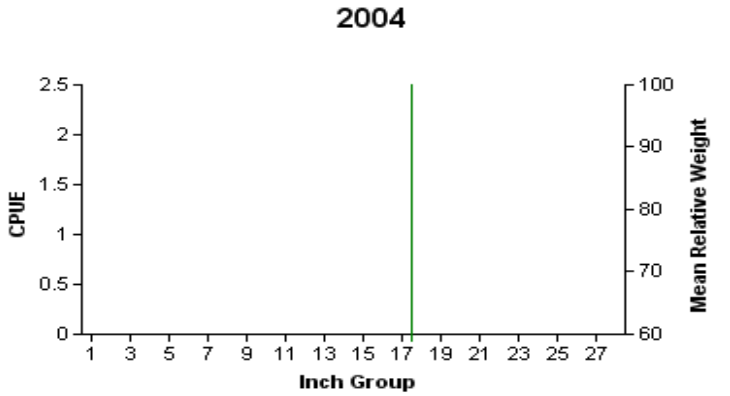
Effort =	15.0
Total CPUE =	5.7 (31; 86)
Stock CPUE =	5.7 (31; 86)
PSD =	3.0 (0.0)
RSD-P =	0.0 (0)



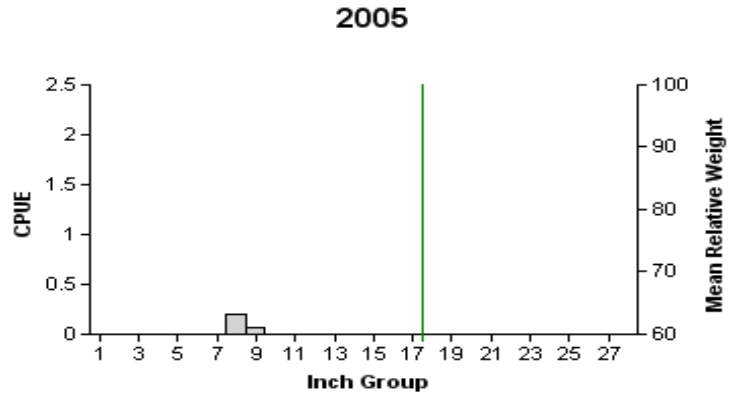
Effort =	15.0
Total CPUE =	0.0 (0; 0)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0.0)
RSD-P =	0.0 (0)

Figure 8. Number of striped 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 netting surveys, Kemp Reservoir, Texas, 2001, 2002, and 2003. Line indicates minimum size limit at time of sampling.

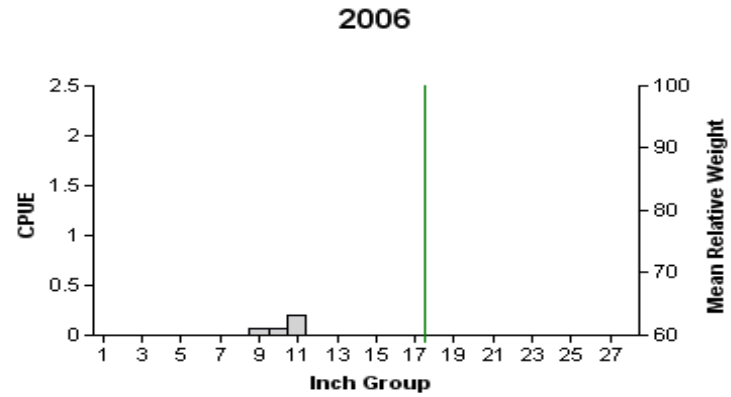
Striped Bass



Effort =	15.0
Total CPUE =	0.0 (0; 0)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0.0)
RSD-P =	0.0 (0)



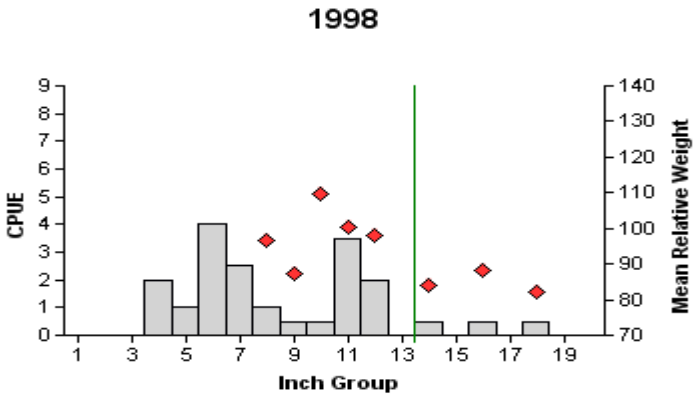
Effort =	30.0
Total CPUE =	0.3 (-99; 8)
Stock CPUE =	0.0 (0; 0)
RSD-P =	0.0 (0)



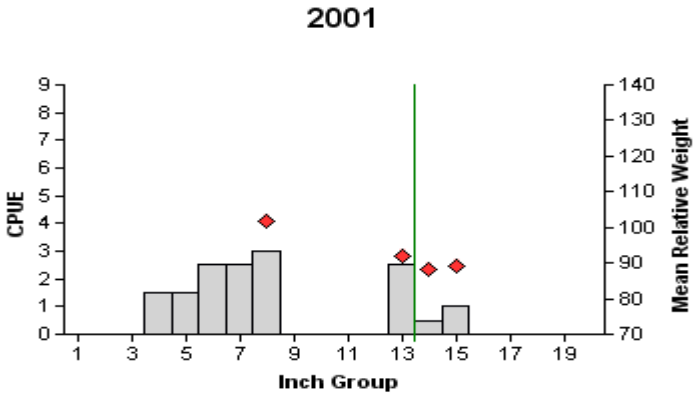
Effort =	15.0
Total CPUE =	0.3 (0; 5)
Stock CPUE =	0.0 (0; 0)
RSD-P =	0.0 (0)

Figure 8 (continued). Number of striped 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 netting surveys, Kemp Reservoir, Texas, 2004, 2005, and 2006. Line indicates minimum size limit at time of sampling.

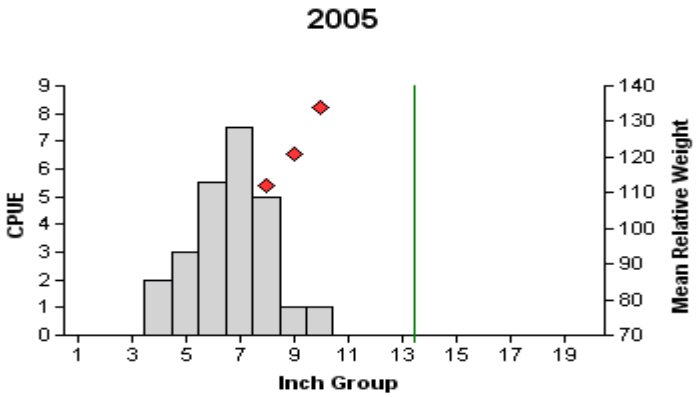
Largemouth Bass



Effort =	2.0
Total CPUE =	18.5 (24; 37)
Stock CPUE =	9.0 (33; 18)
PSD =	39.0 (0.1)
RSD-P =	11.0 (0.1)



Effort =	2.0
Total CPUE =	15.0 (22; 30)
Stock CPUE =	7.0 (24; 14)
PSD =	57.0 (0.1)
RSD-P =	14.0 (0.1)



Effort =	2.0
Total CPUE =	25.0 (18; 50)
Stock CPUE =	7.0 (31; 14)
PSD =	0.0 (1.2)
RSD-P =	0.0 (0)

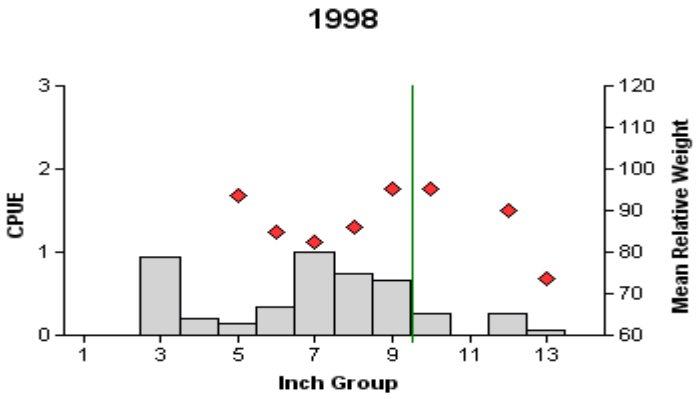
Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Kemp Reservoir, Texas, 1998, 2001, and 2005. Line indicates minimum size limit at time of sampling.

Largemouth Bass

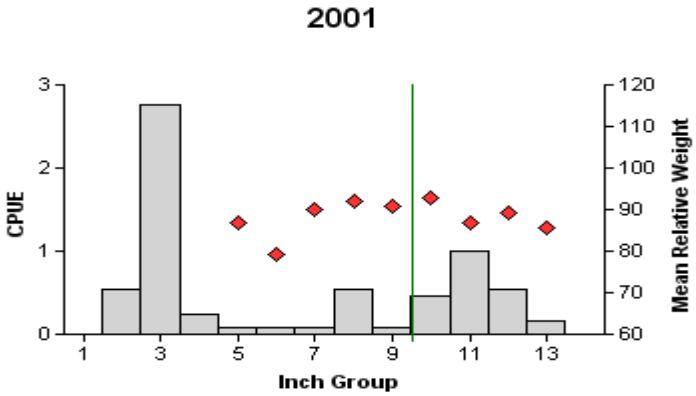
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Kemp Reservoir, Texas, 1998, 2001, and 2005. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB.

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% pure FLMB
1998	21	0	1	4	16	14.3	0.0
2001	23	0	5	6	12	18.5	0.0
2005	41	31	0	9	1	87.7	76.0

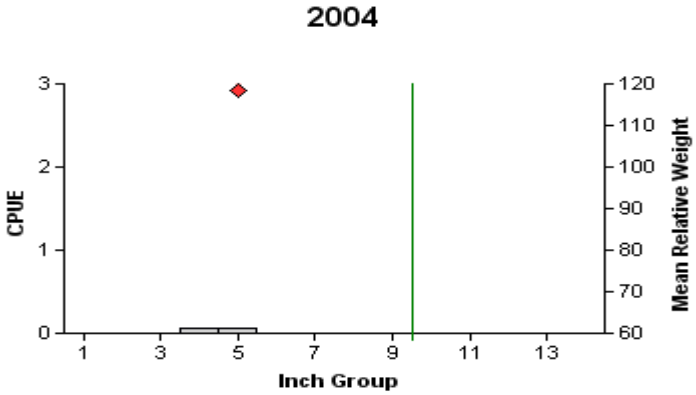
White Crappie



Effort =	15.0
Total CPUE =	4.6 (24; 69)
Stock CPUE =	3.5 (27; 52)
PSD =	58.0 (0.1)
RSD-P =	17.0 (0.1)



Effort =	13.0
Total CPUE =	6.5 (42; 85)
Stock CPUE =	3.0 (43; 39)
PSD =	92.0 (0.0)
RSD-P =	72.0 (0.1)



Effort =	15.0
Total CPUE =	0.1 (-99; 2)
Stock CPUE =	0.1 (-99; 1)
PSD =	0.0 (2.0)
RSD-P =	0.0 (0)

Figure 10. Number of white crappie 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 fall trap netting surveys, Kemp Reservoir, Texas, 1998, 2001, and 2004. Line indicates minimum size limit at time of sampling.

Table 6. Proposed sampling schedule for Kemp Reservoir, Texas. Gill net surveys are conducted in the spring, while electrofishing and trap net surveys are conducted in the fall. S denotes standard survey.

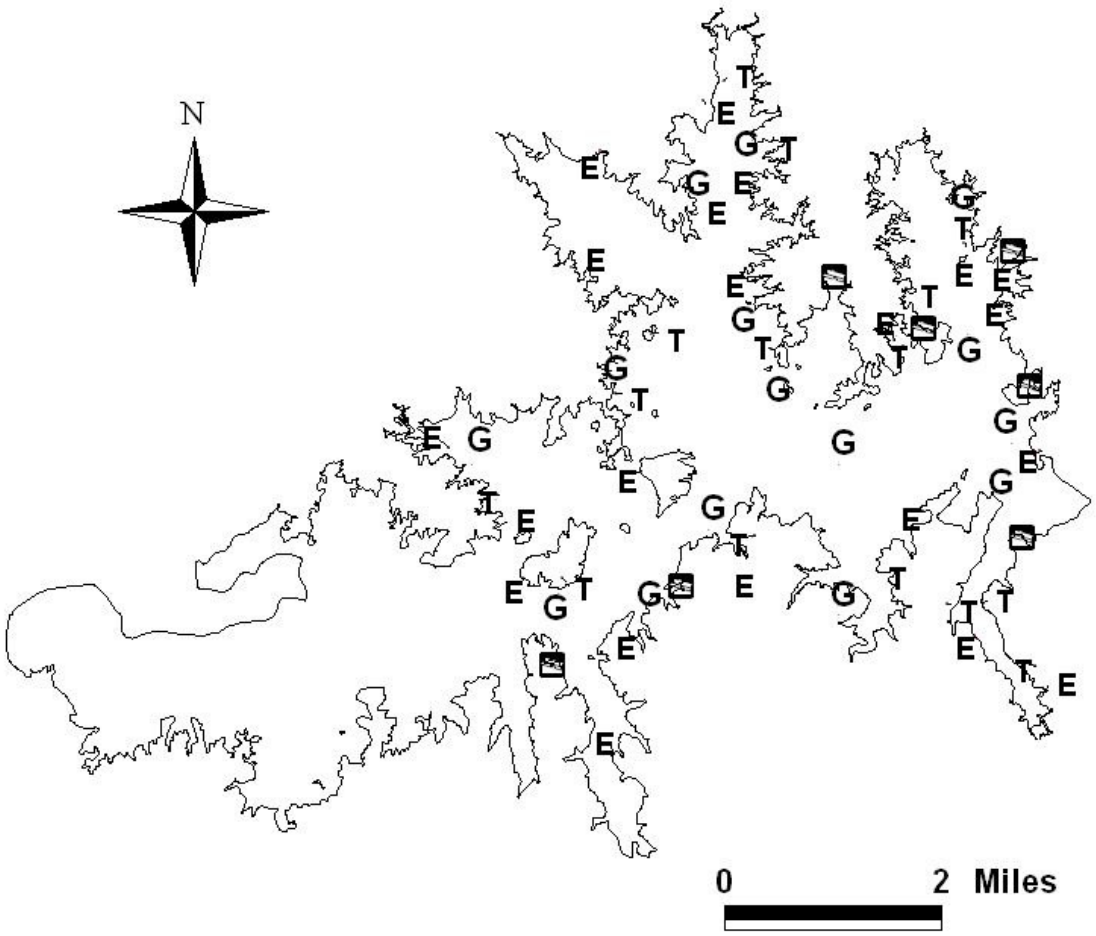
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2006-Spring 2007					
Fall 2007-Spring 2008					
Fall 2008-Spring 2009					
Fall 2009-Spring 2010	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from gill nets (2006), trap nets (2004) and electrofishing (2005) from Kemp Reservoir, Texas.

	Gill Nets		Trap Nets		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard shad			7	0.5	309	154.5
Common carp	4	0.3	29	1.9		
River carpsucker			5	0.3		
Smallmouth buffalo			1	0.1		
Black bullhead			1	0.1		
Channel catfish			1	0.1		
White bass	3	0.2	1,491	99.4		
Striped bass	5	0.3				
Green sunfish			10	0.7	16	8.0
Bluegill			7	0.5	6	3.0
Longear sunfish			29	1.9	7	3.5
Largemouth bass					50	25.0
White crappie			2	0.1		

APPENDIX B



Location of sampling sites, Kemp Reservoir, Texas, 2004-2006. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. ⏢ represents public boat ramps.