PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009-10 Survey Report

Kemp Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Kemp Reservoir were surveyed in 2009 using electrofishing and trap nets and in 2010 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 the 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 elevation has fluctuated greatly the last 4 years from 3 feet above conservation pool (1,144.0) to 9 feet below. Kemp water quality is somewhat saline and highly conductive. It has had annual golden alga blooms since 2002 that have had an adverse effect on the fish populations.

- **Management history:** Historically important sport fish include striped bass, white bass, largemouth bass, white crappie, and catfish. Golden alga fish kills began in 2002 and have continued annually since. In response, striped bass were stocked in 2002, 2004, and 2005 with no apparent recruitment to the fishery. Excess fry from state hatcheries were stocked in 2009. In 2005, Florida largemouth bass fingerlings were stocked but not a single largemouth bass was sampled in 2009. Channel catfish were stocked in 2005 and 2009. Blue catfish were stocked in 2002. Kemp has always been managed with statewide regulations.

- **Fish Community**
  - **Prey species:** The gizzard shad survey catch rate was the highest ever documented and the index of vulnerability (IOV) was quite high indicating adequate forage for game fish. The CPUE for bluegill and other sunfishes was relatively low as it has been for all electrofishing surveys conducted since golden alga was documented in 2002.

  - **Catfishes:** Blue catfish have not been collected since the 2004 gill net survey. Only one channel catfish has been observed in gill nets since 2004. However, several channel catfish were caught during the 2009 trap net survey and two stockings have occurred since 2005. Flathead catfish were last observed during the May 2004 gill net survey.

  - **Temperate basses:** No white bass and striped bass were caught during the 2010 gill net survey although white bass were caught in trap nets in 2009. White bass have historically done well at the reservoir, despite the annual golden alga problems. Striped bass have not faired as well.

  - **Black bass:** Historically, spotted bass were the most abundant bass species, but their presence has not been documented since golden alga blooms began in 2002. In 2009, no largemouth bass were sampled during the electrofishing survey. Largemouth bass were stocked in May 2005 and the survey in October 2005 documented the highest electrofishing catch rate recorded for the reservoir with many young of the year present. Anglers reported catching several sublegal bass during 2008.

  - **White crappie:** Only two fish were collected during the 2009 survey. While never showing high relative abundance during past trap net surveys, the 2009 catch rate was extremely low and matched the 2004 catch rate indicating the population has been negatively impacted by golden alga. During the last two surveys, all crappie collected came from the upper reservoir.

- **Management Strategies:** Supplementally stock only if surplus fish are available from state hatcheries or if golden alga fish kills cease. Conduct an additional Fall gill netting survey in 2010 since Spring surveys coincide with golden alga blooms. Conduct general monitoring with trap nets, gill nets and electrofishing surveys in 2013-2014.

INTRODUCTION

This document is a summary of fisheries data collected from Kemp Reservoir in 2009-2010. 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 2009-2010 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, municipal water supply and recreation. Kemp has a watershed area of 2,086 mi^2. Sedimentation is a problem with 23.2% of the storage capacity and 1,183 acres of surface area being lost from 1971 to 2006 (Austin et al. 2006). In addition, when the reservoir is down 3 feet from conservation pool, 2,451 surface acres are cut off from the rest of the reservoir (Austin et al. 2006). Mean reservoir depth was 16 feet, shoreline development index was 7.3, and conductivity was 5,307 μmhos/cm. Habitat at time of sampling consisted of aquatic submerged vegetation, rocks, and boat docks. Water level has fluctuated since 2006 from above conservation pool to 9 feet below conservation pool (Figure 1). Boat access consisted of seven public boat ramps. The Waggoner Ranch based in Vernon, TX controls shoreline access to the reservoir and charges a $15 per person for a three day pass. Bank fishing is available at the public access points including the boat ramps. Golden alga *Prymnesium parvum* has caused annual fish kills since 2002 and has severely impacted the sport fishery. 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 (Howell and Mauk 2006) included:

1. Golden alga had severely impacted the reservoir from at least January through May every year since 2002. This had acted to greatly displace fish and cause population losses, especially affecting striped bass, spotted bass, largemouth bass, and crappie.
   Action: Only stocked when fry/fingerling striped bass, channel catfish, and largemouth bass were available as surplus from the state hatchery program. Continued to provide the public with information on golden alga affects and management actions as conditions warranted.

Harvest regulation history: Sport fish species in Kemp Reservoir have always been managed using statewide regulations (Table 2).

Stocking history: In the years since golden alga was identified in 2002, Kemp has been stocked with blue and channel catfish, striped bass and Florida largemouth bass in attempts to rebuild population abundances. 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. Chara *Chara spp.* and sago pondweed *Potamageton pectinatus* were identified in 3-6 feet of water in the lower half of the reservoir covering 52.3 acres in July 2009 (Table 4).

Water Transfer: Kemp Reservoir, in the Red River basin, is used primarily for irrigation by the Wichita County Water Irrigation District. However, beginning in 2009 the city of Wichita Falls began receiving 10% of their municipal water supply from Kemp. To use the naturally salty water, a large reverse osmosis

water treatment plant was placed into full operation. The briny, reject water from this plant is then pumped via pipeline directly into the Wichita River. TPWD currently has a monitoring project to assess the impacts of this operation. Another major use of Kemp is for cooling water at a coal-fired power plant located near Oklaunion, Texas and operated by West Texas Utilities. The sale of this water provides an additional revenue source for the city of Wichita Falls.

METHODS

Fish 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 2009).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights (W_r)] 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. Source for water elevation data was the United States Geological Survey.

RESULTS AND DISCUSSION

Habitat: A physical habitat survey conducted July 1, 2009 indicated that the littoral zone habitat consisted primarily of rocky shoreline (Table 4). The previous physical habitat survey was conducted in 2005 (Howell and Mauk 2006). Very little or no manmade changes to the physical habitat had occurred during the four year period. However, there was a significant decrease in submergent aquatic plants compared to the 2005 survey.

Prey species: Electrofishing catch rates of bluegill and gizzard shad were 1.5/h and 674.0/h, respectively. Index of vulnerability for gizzard shad was high, indicating that all gizzard shad were available to existing predators. Total CPUE of gizzard shad was higher than all previous surveys (Figure 2). Total CPUE of bluegill in 2009 was similar to the two previous surveys (Figure 3), but lower than pre-golden alga catch rates.

Blue catfish: No blue catfish were collected in the 2005, 2006, or 2010 gill net surveys (Figure 4) although historically they have been the most abundant catfish species sampled. Good numbers (1.7/nn) were collected 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 entire winter and spring sampling periods since 2002.

Channel catfish: No channel catfish were observed in the 2006 or 2010 surveys and only one was collected in 2004 and 2005 (Figure 5). There has been a constant downward trend for channel catfish in every survey since 2001. Two channel catfish stockings have occurred since 2005 totaling 394,751 fish. Trap nets caught 105 fish in 2009 which shows they are there but not vulnerable to spring gill netting when the fish seek refuge from the golden alga blooms.

White bass: The gill net catch rate for white bass was 0.2/nn in 2006, but no white bass were observed in 2010 (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. Like channel catfish, 43 white bass were caught in the 2009 trap net survey proving their

presence in the reservoir but can't be sampled effectively with spring gill netting.

Striped bass: No striped bass were collected in 2010 gill net survey (Figure 8). 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. Fingerling stockings occurred in 2004 and 2005 and they survived the winter but apparently succumbed to the golden alga bloom the following year. 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 observed in 2003 and 2004 after the golden alga bloom in 2002.

Spotted bass: No spotted bass were observed during the 2009 electrofishing survey. Historically, spotted bass were the most abundant black bass species in the reservoir but have not been documented since 2001. Like other golden alga influenced reservoirs in the district, spotted bass seem to be highly susceptible to golden alga toxins and are rarely found after significant golden alga fish kill events.

Largemouth bass: The electrofishing CPUE of largemouth bass was 0.0/h in 2009 (Figure 9), a decrease from previous surveys in 2005 (25.0/h) and 2001 (15.0/h). The 2005 survey was conducted after a Florida largemouth stocking and all bass sampled were $\leq$10 inches and were all from the 2005 year class. Anglers during 2008 reported catching sublegal (<14 inches) largemouth bass at the reservoir but the current electrofishing survey did not find any. However, it is believed that a few largemouth bass still exist in the reservoir.

White crappie: The trap net catch rate of white crappie was only 0.1/nn in 2009, which matches the CPUE from 2004 but is much lower than the previous pre-golden alga surveys of 2001 (5.7/nn) and 1998 (4.6/nn) (Figure 10). Like the previous survey and many of our gill net surveys, the fish were collected in the upper end of the reservoir. The crappie population has been adversely affected by the reoccurring golden alga blooms and associated fish kills.

Fisheries management plan for Kemp Reservoir, Texas

Prepared – July 2010

ISSUE 1: Golden alga has severely impacted the reservoir from roughly January through May each of the last 8 years. This has acted to greatly displace fish and cause population losses. This has especially affected the blue catfish, striped bass, spotted bass, largemouth bass and white crappie populations.

MANAGEMENT STRATEGIES

1. Stock blue catfish, channel catfish, striped bass, and largemouth bass only when they are available as surplus from the state hatchery program.

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

ISSUE 2: Seven standardized random gill net surveys have been completed between the months of January through May since the initial golden alga bloom of 2002. Blooms have occurred annually and our standard surveys have proven ineffective in gathering population data on target species. Conversely, fall trap nets have captured both channel catfish and white bass.

MANAGEMENT STRATEGY

1. Conduct a 15 net night gill net survey in the fall of 2010.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

Until there are years free of golden alga bloom induced fish kills, no additional standardized sampling will be conducted. Sport fish species have been negatively impacted to the point that until the populations have a chance to recover, standard sampling will likely provide little new information. At this time, angler effort and interest has been greatly reduced because of the annual golden alga

blooms and current high entrance fees. An additional non-standard fall gill net survey will occur in 2010 when the reservoir is not influenced by golden alga blooms to collect data on target species that is impossible to collect with standard spring gill netting. Standard sampling will be conducted in 2013-2014 to quantify species populations. If annual golden alga blooms end, additional sampling will be considered to monitor fish population recovery.

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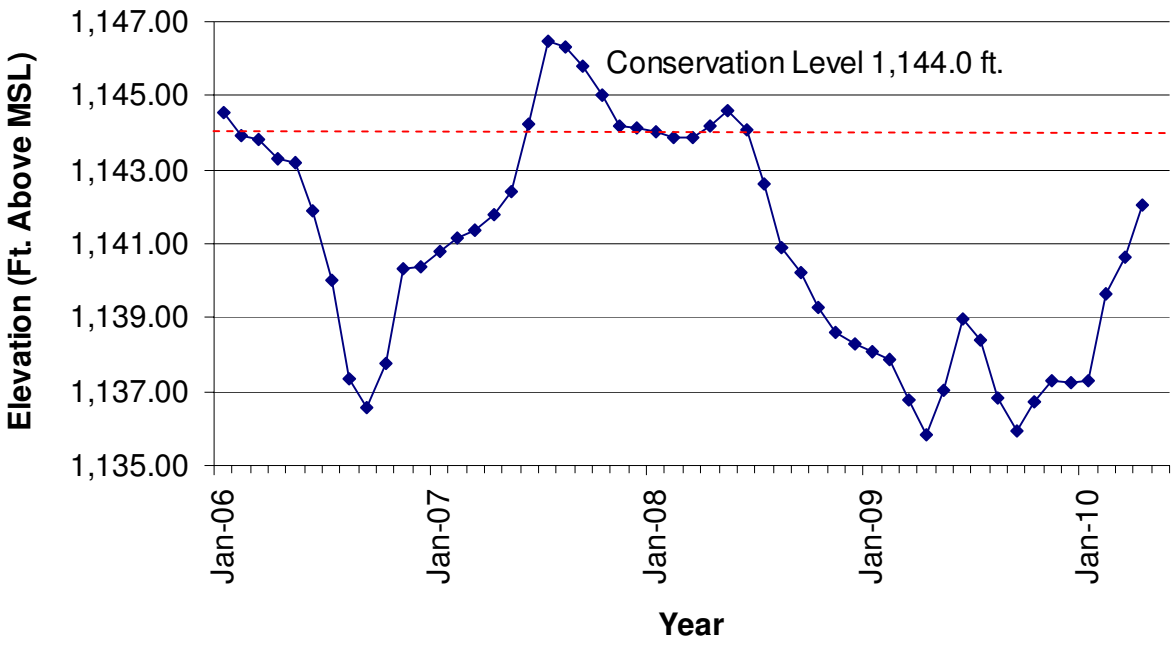


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Kemp Reservoir, Texas.

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)	7.3
Conductivity	5,307 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	(in any combination)	No Limit
Crappie: White	25	10 minimum

Table 3. Stocking history of Kemp (Baylor County), Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	1989	165,496	FGL	2.5
	1990	168,011	FGL	2.0
	1991	143,977	FGL	2.6
	2002	112,857	FGL	2.0
	Total	590,341		
Channel catfish	1967	17,500	AFGL	7.9
	1969	6,000	AFGL	7.9
	1970	12,000	AFGL	7.9
	1971	300	UNK	UNK
	1972	210,000	AFGL	7.9
	2005	297,239	FGL	3.1
	2009	97,512	FGL	4.0
	Total	640,551		
Florida largemouth bass	1977	174,200	FRY	0.9
	1990	415,356	FRY	0.7
	1999	414,186	FGL	1.5
	2005	194,404	FGL	1.5
	Total	1,198,146		
Largemouth bass	1967	7,500	UNK	UNK
	1970	100,000	UNK	UNK
	1971	35,000	UNK	UNK
	Total	142,500		
Red drum	1954	58	UNK	UNK
	1955	16	UNK	UNK
	1956	1,304	UNK	UNK
	1957	4	UNK	UNK
	1981	204,837	UNK	UNK
	Total	206,219		
Striped bass	1979	81,961	UNK	UNK
	1981	211,102	UNK	UNK
	1983	164,859	UNK	UNK
	1987	28,000	FGL	2.0
	1988	167,386	FRY	1.0
	1989	130,355	FGL	1.2

	1992	20,800	FGL	1.3
	1992	60,057	FRY	0.9
	1993	126,674	FGL	1.1
	1994	83,543	FGL	1.1
	1994	4,000,000	FRY	0.8
	1995	82,796	FGL	1.1
	1995	3,000,000	FRY	0.8
	1997	33,323	FGL	1.1
	1998	728	AFGL	5.9
	1998	82,700	FGL	1.3
	1999	98,087	FGL	1.4
	2002	116,311	FGL	1.5
	2004	37,796	FGL	1.7
	2005	149,771	FGL	1.6
	2009	186,119	FRY	0.3
	Total	8,862,368		
Threadfin shad	1999	725	ADL	3.5
	Total	725		

Table 4. Survey of littoral zone and physical habitat types, Kemp Reservoir, Texas, 2009. 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 offshore habitat type identified.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Gravel	2.6	2.7		
Natural	3.3	3.4		
Rocky shore	92.1	94.0		
Total shoreline length	98.0			
Habitat adjacent to shoreline				
Boat docks			9.0	<0.1
Flooded terrestrial			6.5	<0.1
Native submergent vegetation			52.3	<0.1
Standing timber			24.9	<0.1

Gizzard Shad

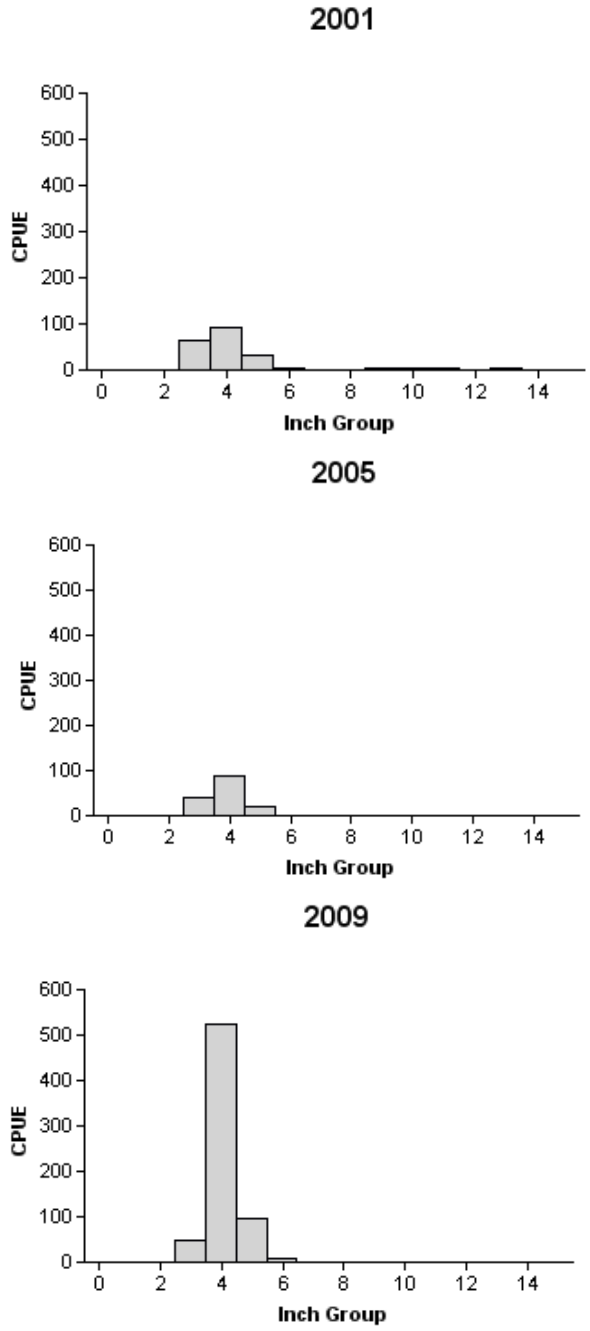
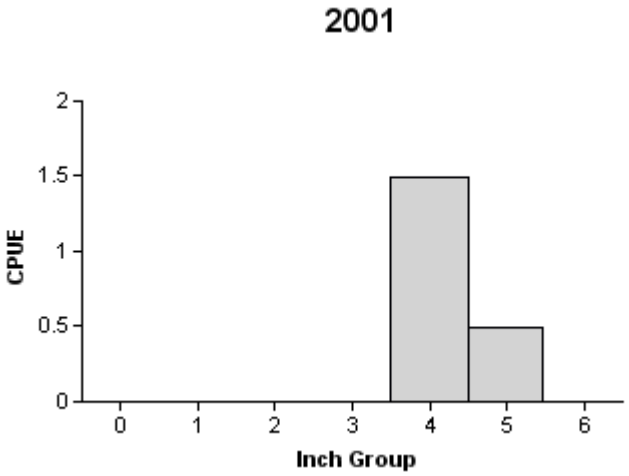
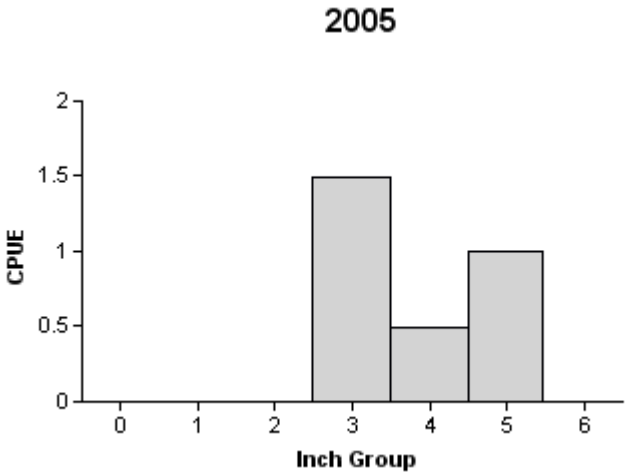


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Kemp Reservoir, Texas, 2001, 2005, and 2009.

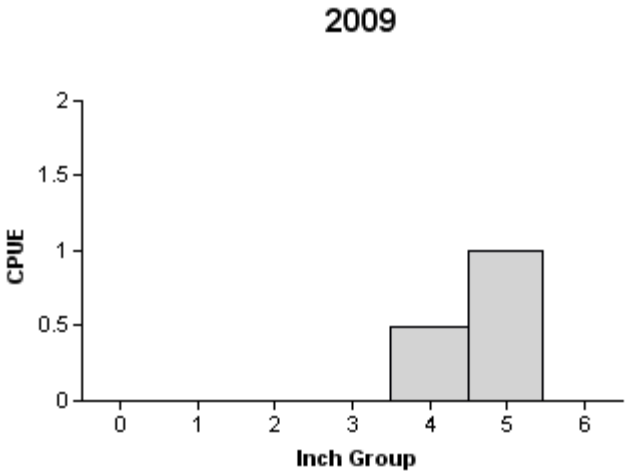
Bluegill



Effort = 2.0
Total CPUE = 2.0 (59; 4)
Stock CPUE = 2.0 (59; 4)
PSD = 0 (62.6)
PSD-P = 0 (0)



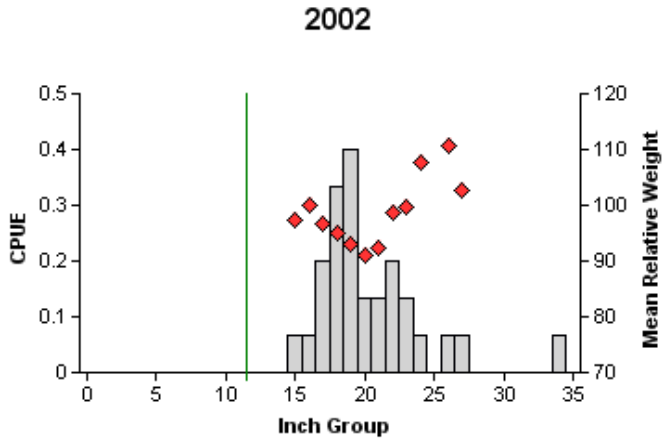
Effort = 2.0
Total CPUE = 3.0 (43; 6)
Stock CPUE = 3.0 (43; 6)
PSD = 0 (48.2)
PSD-P = 0 (0)



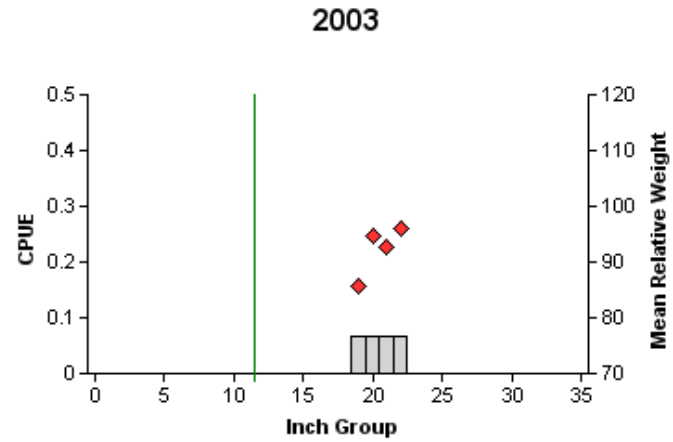
Effort = 2.0
Total CPUE = 1.5 (73; 3)
Stock CPUE = 1.5 (73; 3)
PSD = 0 (76.1)
PSD-P = 0 (0)

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, 2001, 2005 and 2009.

Blue Catfish



Effort = 15.0
Total CPUE = 1.9 (35; 29)
Stock CPUE = 1.9 (35; 29)
PSD = 45 (16.1)
PSD-P = 3 (3.4)



Effort = 15.0
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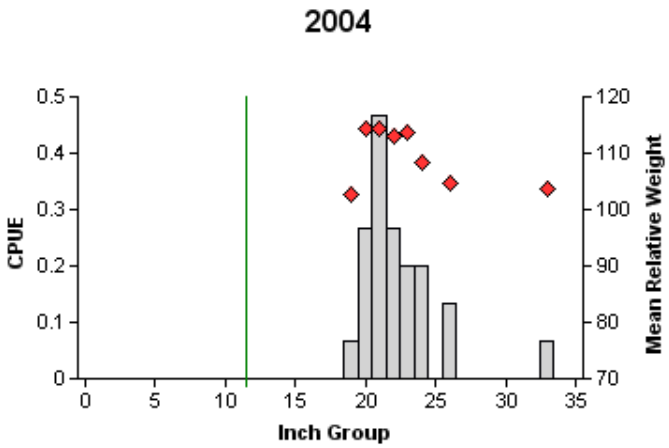
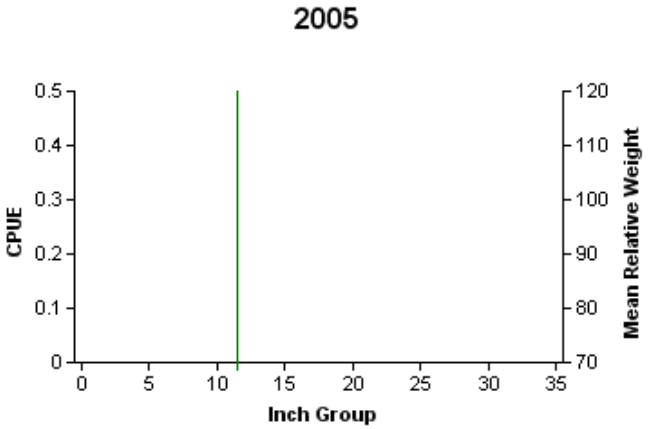
Stock CPUE = 0.3 (57; 4)
PSD = 75 (15.9)
PSD-P = 0 (0)



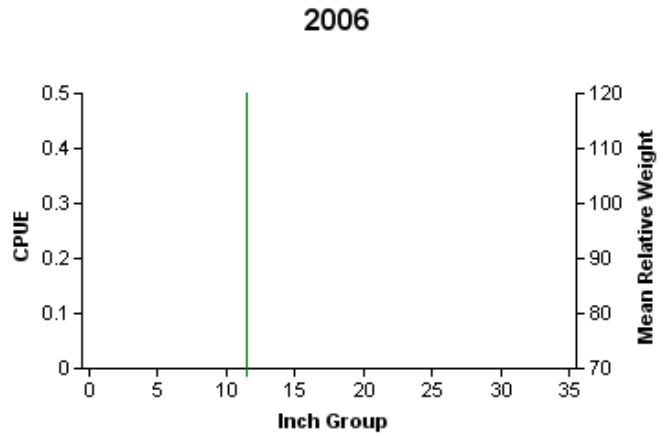
Effort = 15.0
Total CPUE = 1.7 (52; 25)
Stock CPUE = 1.7 (52; 25)
PSD = 96 (4.6)
PSD-P = 4 (3.6)

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, 2002, 2003 and 2004. Line indicates minimum size limit at time of sampling.

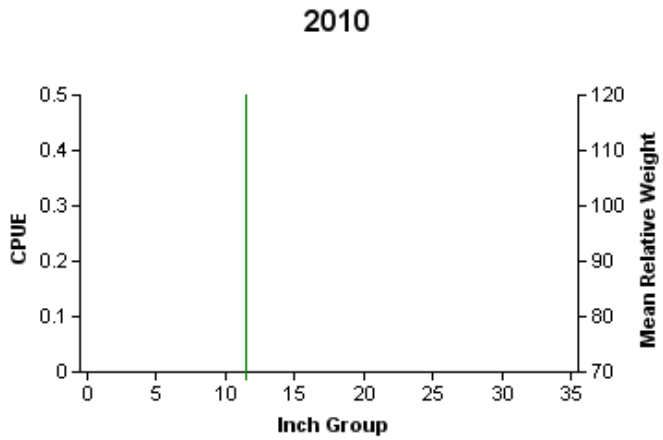
Blue Catfish



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



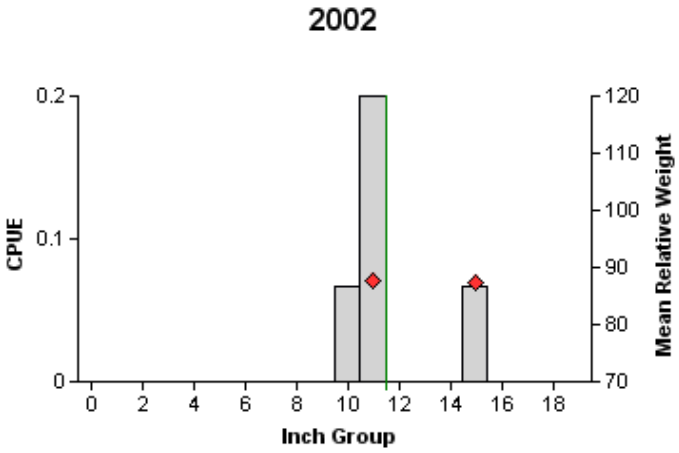
Effort = 15.0
Total CPUE = 0.0 (0; 0)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)



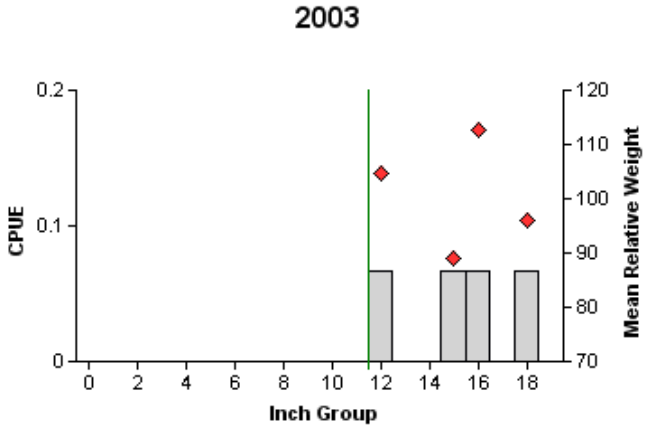
Effort = 15.0
Total CPUE = 0.0 (0; 0)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)

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, 2005, 2006 and 2010. Line indicates minimum size limit at time of sampling.

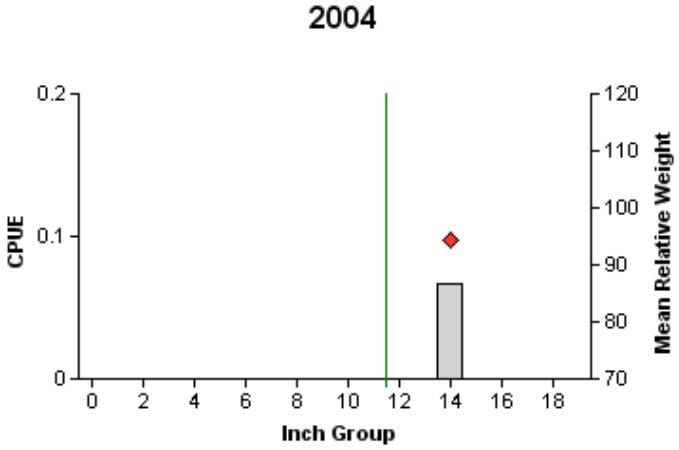
Channel Catfish



Effort = 15.0
Total CPUE = 0.3 (48; 5)
Stock CPUE = 0.3 (100; 4)
PSD = 0 (68.5)
PSD-P = 0 (0)



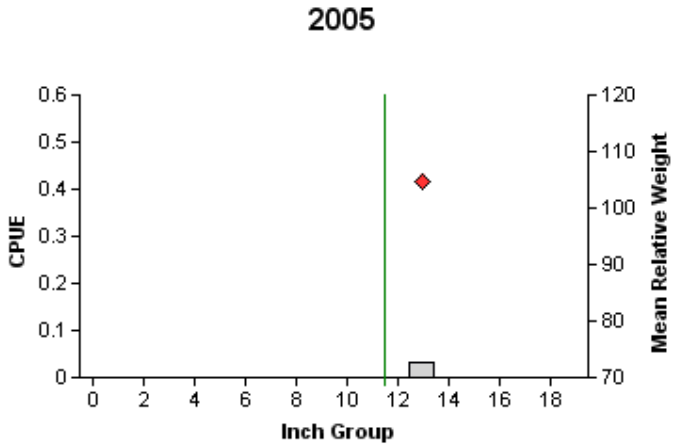
Effort = 15.0
Total CPUE = 0.3 (44; 4)
Stock CPUE = 0.3 (44; 4)
PSD = 50 (25.9)
PSD-P = 0 (0)



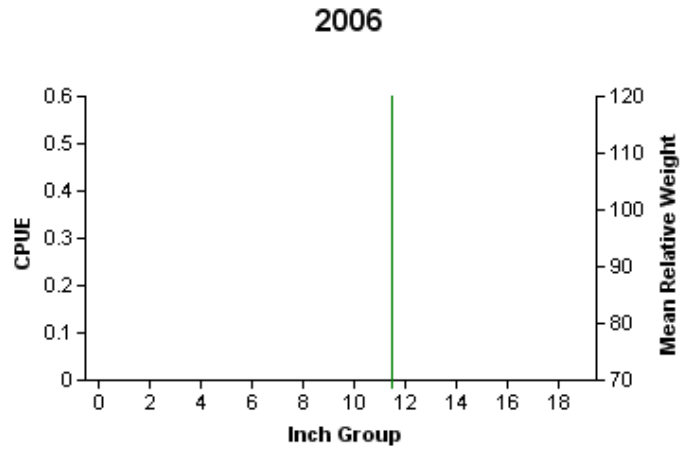
Effort = 15.0
Total CPUE = 0.1 (100; 1)
Stock CPUE = 0.1 (100; 1)
PSD = 0 (103.5)
PSD-P = 0 (0)

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, 2002, 2003 and 2004. Line indicates minimum size limit at time of sampling.

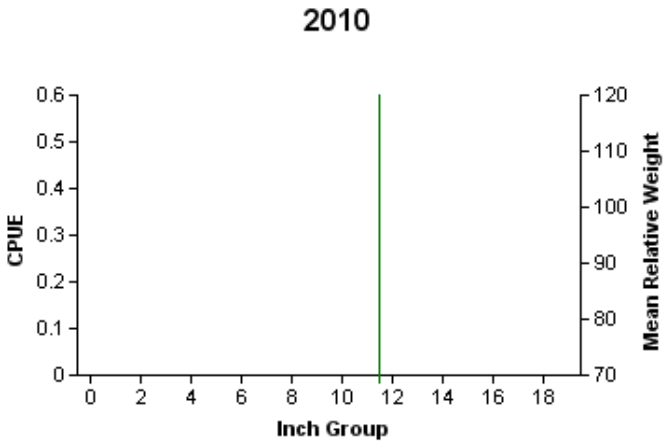
Channel Catfish



Effort = 30.0
Total CPUE = 0.0 (100; 1)
Stock CPUE = 0.0 (100; 1)
PSD = 0 (101.7)
PSD-P = 0 (0)



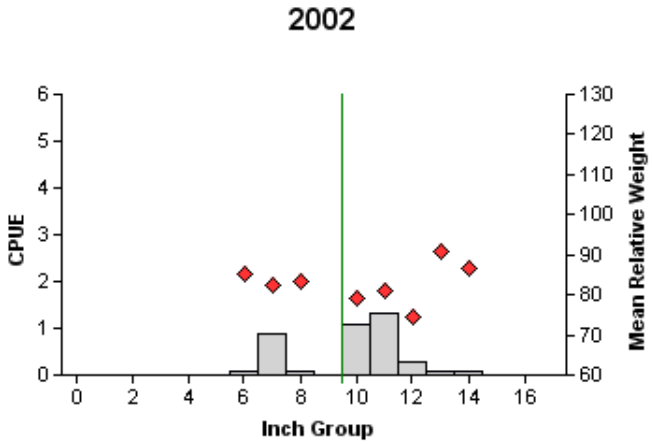
Effort = 15.0
Total CPUE = 0.0 (0; 0)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)



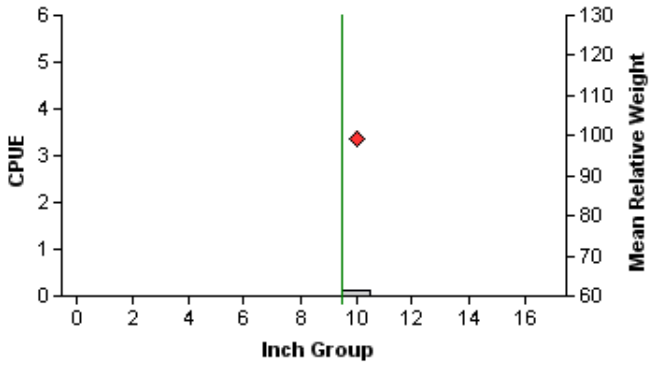
Effort = 15.0
Total CPUE = 0.0 (0; 0)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)

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, 2005, 2006 and 2010. Line indicates minimum size limit at time of sampling.

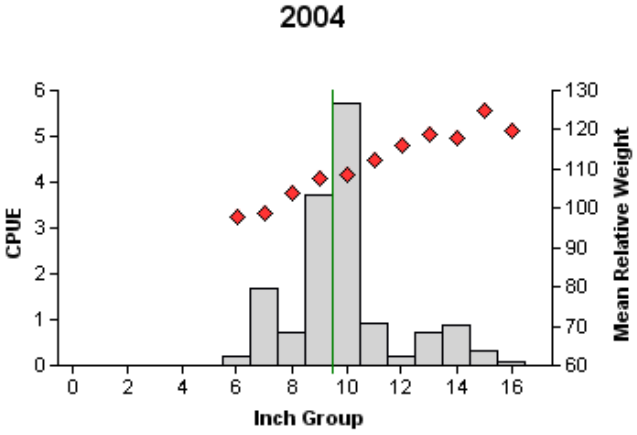
White Bass



Effort = 15.0
Total CPUE = 3.8 (24; 57)
Stock CPUE = 3.8 (53; 57)
PSD = 74 (8)
PSD-P = 0 (0)



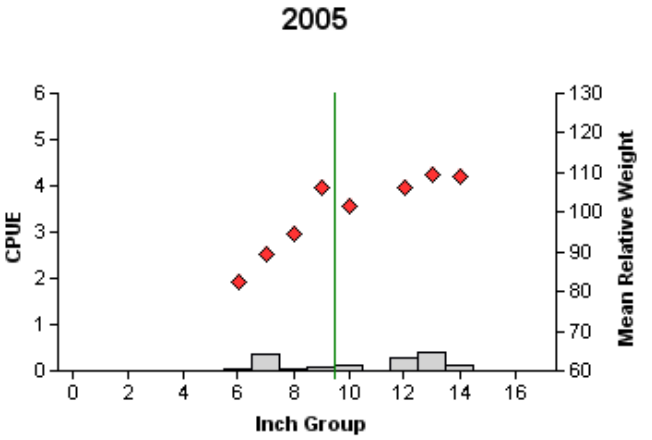
Effort = 15.0
Total CPUE = 0.1 (68; 2)
Stock CPUE = 0.1 (100; 2)
PSD = 100 (0)
PSD-P = 0 (0)



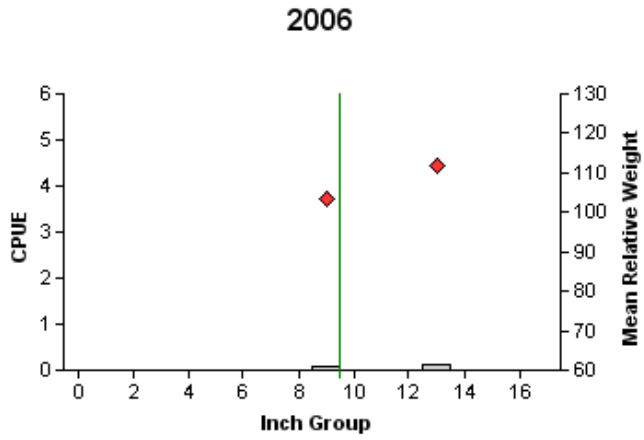
Effort = 15.0
Total CPUE = 15.2 (28; 228)
Stock CPUE = 15.2 (60; 228)
PSD = 83 (3.2)
PSD-P = 0 (0)

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, 2002, 2003 and 2004. Line indicates minimum size limit at time of sampling.

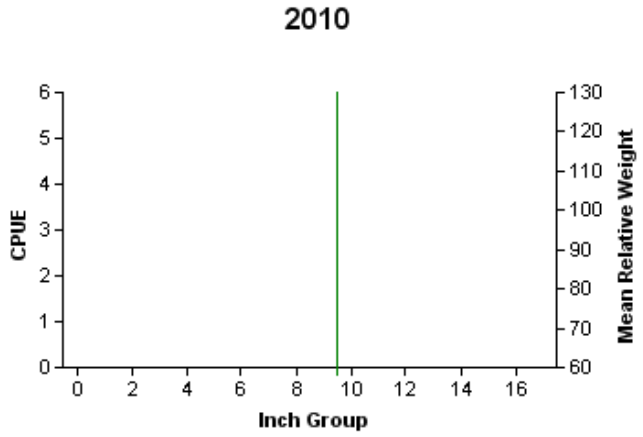
White Bass



Effort = 30.0
Total CPUE = 1.5 (100; 44)
Stock CPUE = 1.5 (100; 44)
PSD = 70 (0.5)
PSD-P = 0 (0)



Effort = 15.0
Total CPUE = 0.2 (72; 3)
Stock CPUE = 0.2 (68; 3)
PSD = 100 (0)
PSD-P = 0 (0)



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

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, 2005, 2006 and 2010. Line indicates minimum size limit at time of sampling.

Striped Bass

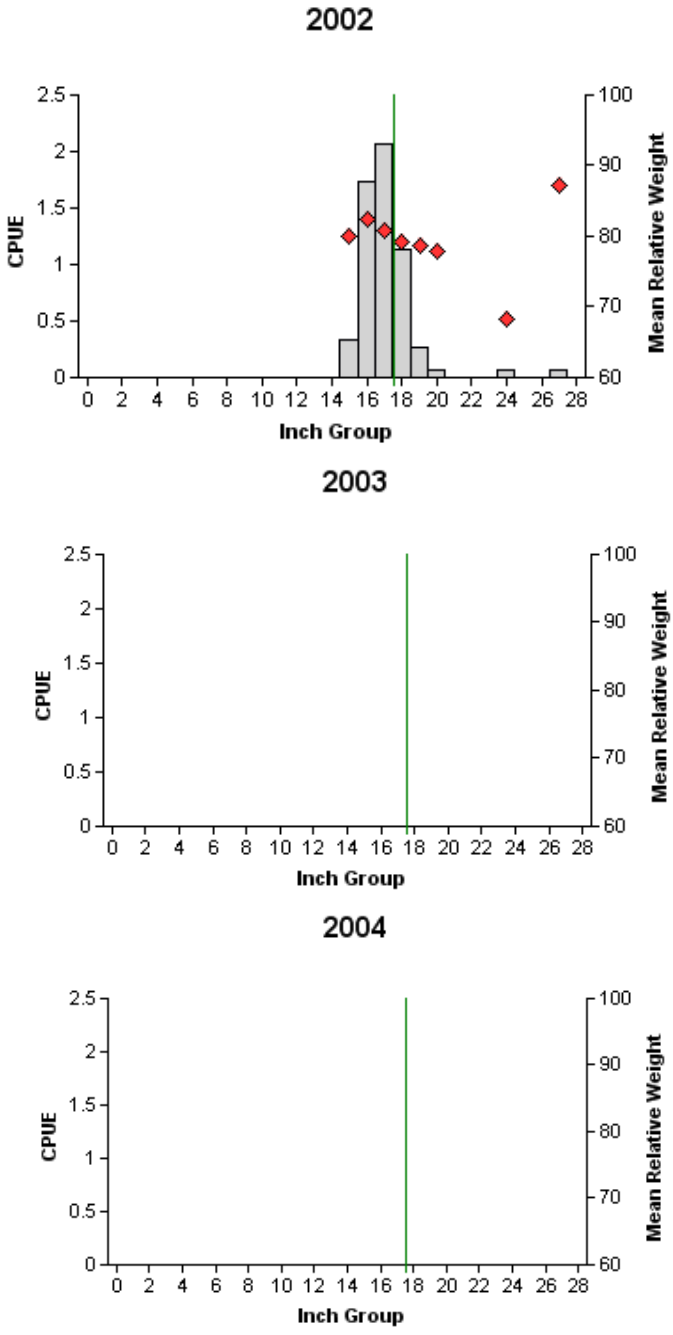
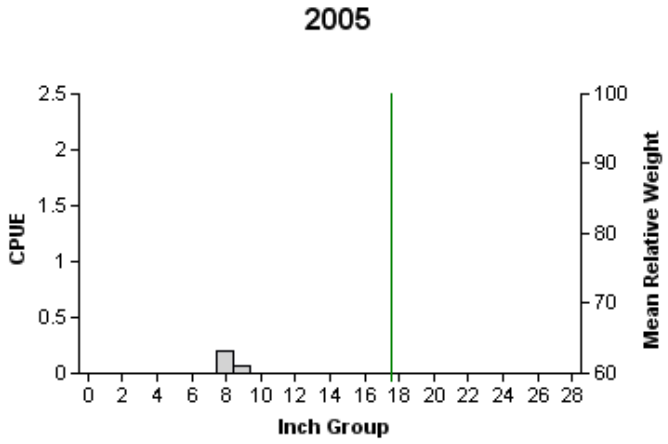
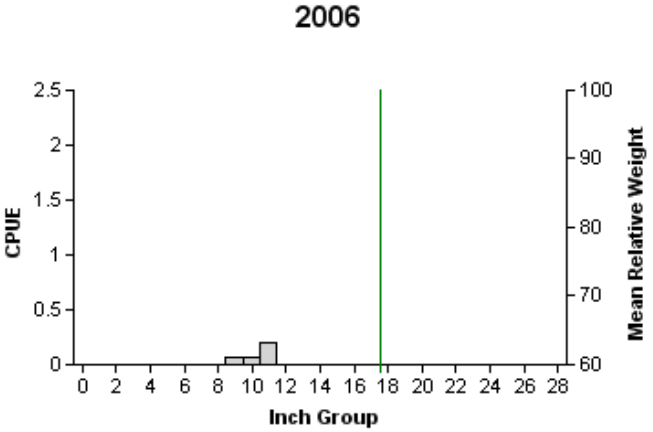


Figure 7. Number of striped bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Kemp Reservoir, Texas, 2002, 2003 and 2004. Line indicates minimum size limit at time of sampling.

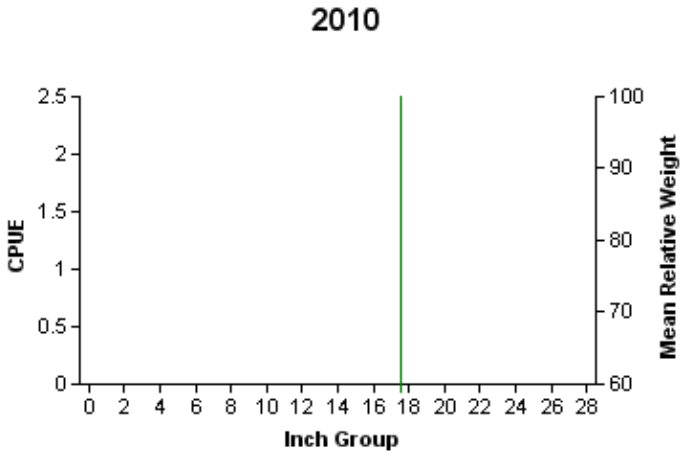
Striped Bass



Effort = 30.0
Total CPUE = 0.3 (100; 8)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)



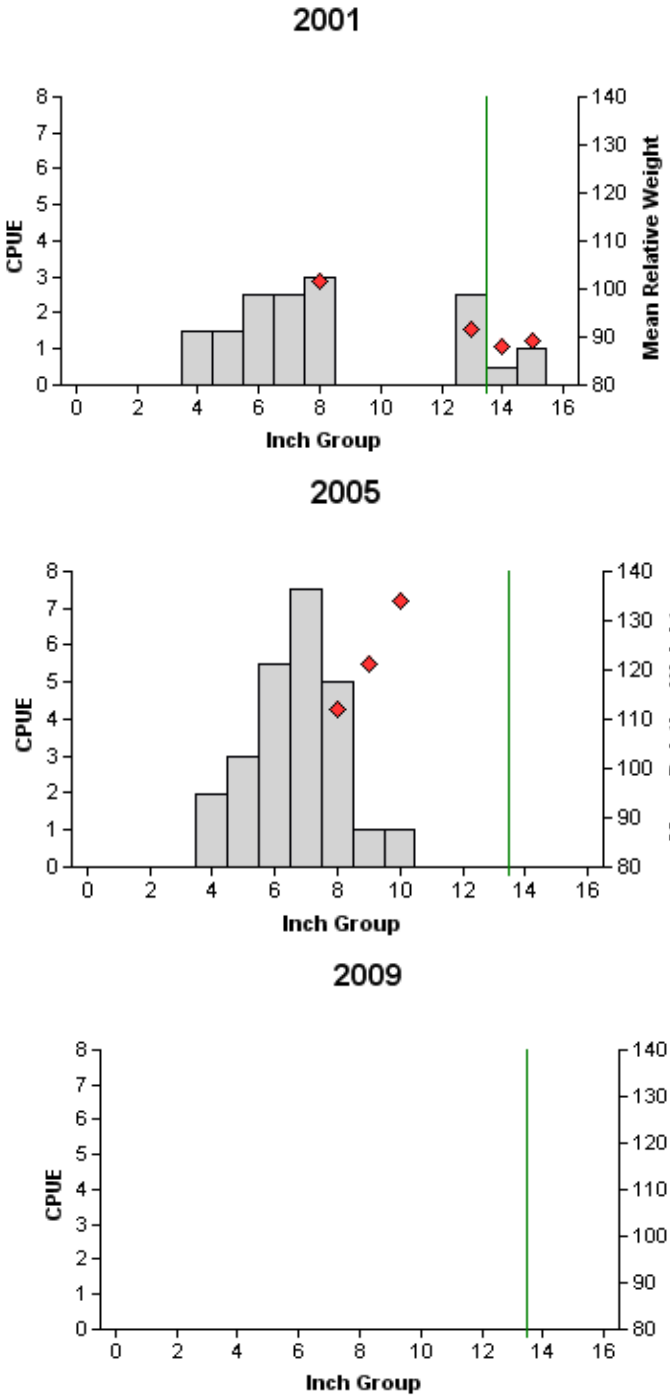
Effort = 15.0
Total CPUE = 0.3 (38; 5)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)
PSD-P = 0 (0)



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

Figure 7 9continued). 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, 2005, 2006 and 2010. Line indicates minimum size limit at time of sampling.

Largemouth Bass



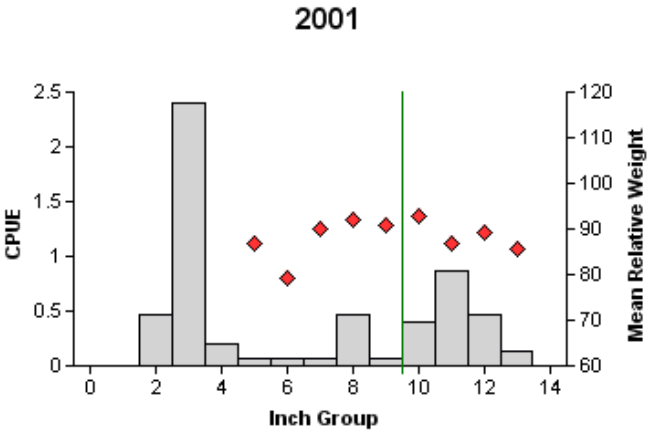
Effort = 2.0
Total CPUE = 15.0 (31; 30)
Stock CPUE = 7.0 (28; 14)
PSD = 57 (12.3)

Effort = 2.0
Total CPUE = 25.0 (26; 50)
Stock CPUE = 7.0 (27; 14)
PSD = 0 (119.9)

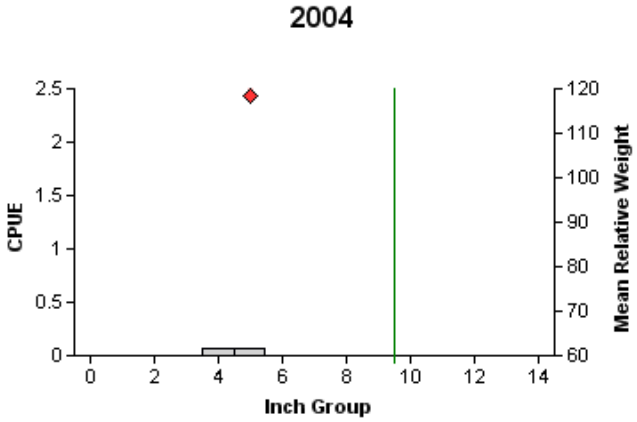
Effort = 2.0
Total CPUE = 0.0 (0; 0)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (0)

Figure 8. 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, 2001, 2005 and 2009. Line indicates minimum size limit at time of sampling.

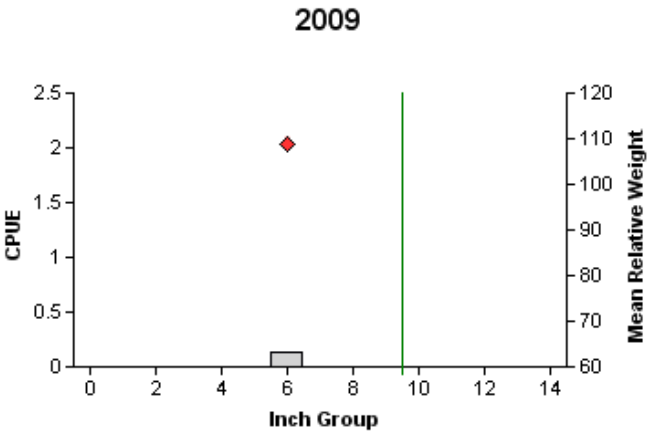
White Crappie



Effort = 15.0
Total CPUE = 5.7 (46; 85)
Stock CPUE = 2.6 (46; 39)
PSD = 92 (2.6)
PSD-P = 72 (5.9)



Effort = 15.0
Total CPUE = 0.1 (100; 2)
Stock CPUE = 0.1 (100; 1)
PSD = 0 (207.0)
PSD-P = 0 (0)



Effort = 15.0
Total CPUE = 0.1 (100; 2)
Stock CPUE = 0.1 (100; 2)
PSD = 0 (103.5)
PSD-P = 0 (0)

Figure 9. 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, 2001, 2004 and 2009. 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 and A denotes an additional survey.

Survey Year	Electrofish	Trap Net	Gill Net	Creel	Report
Fall 2010-Spring 2011			A[a]		
Fall 2011-Spring 2012					
Fall 2012-Spring 2013					
Fall 2013-Spring 2014	S	S	S		S

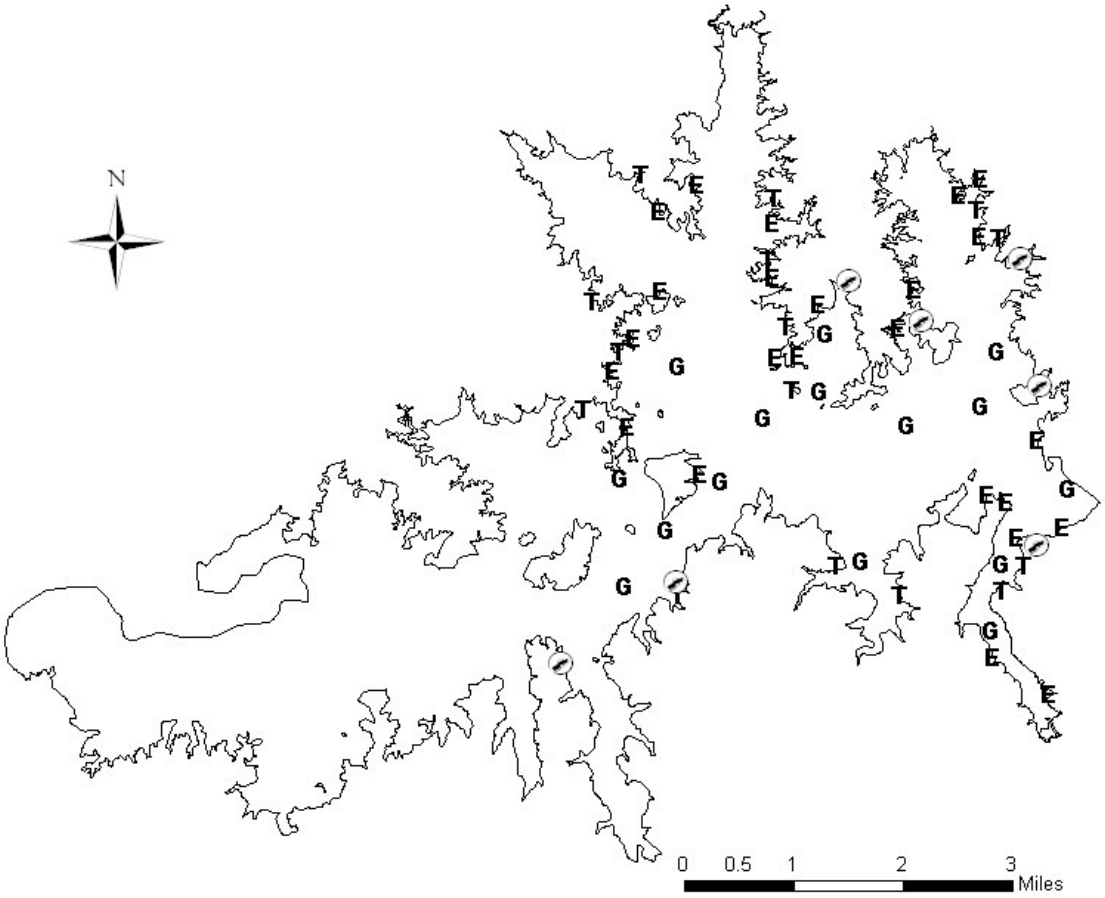
[a] Additional gill net survey will be conducted in the Fall of 2010, prior to typical golden alga blooms.

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from gill nets (2010), trap nets (2009) and electrofishing (2009) from Kemp Reservoir, Texas.

	Gill Nets		Trap Nets		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard shad			47	3.1	1,348	674.0
Common carp	5	0.3	614	40.9		
River carpsucker			151	10.1		
Black bullhead			118	7.9		
Channel catfish			105	7.0		
White bass			43	2.9		
Green sunfish			13	0.9	3	1.5
Bluegill			9	0.6	3	1.5
Longear sunfish					3	1.5
White crappie			2	0.1		

APPENDIX B



Location of sampling sites, Kemp Reservoir, Texas, 2009-2010. Trap net, gill net and electrofishing stations are indicated by T, G and E respectively.