As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Kickapoo Reservoir

Prepared by:

Tom Lang, District Management Supervisor
and
Robert Mauk, Assistant District Management Supervisor

Inland Fisheries Division
District 2-E, Wichita Falls, Texas

Carter Smith
Executive Director

Gary Saul
Director, Inland Fisheries

July 31, 2014

TABLE OF CONTENTS

SURVEY AND MANAGEMENT SUMMARY

Fish populations at Kickapoo Reservoir were surveyed in 2013 using trap netting and electrofishing. Historical data are presented with the 2013-2014 data for comparison. This report summarizes the results of the surveys and contains a management plan based on those findings.

- **Reservoir Description:** Kickapoo Reservoir is a 6,028-acre impoundment located on the Little Wichita River in the Red River Basin approximately 30 miles west of Wichita Falls. It has a primarily rocky shoreline. The reservoir elevation has been consistently dropping since 2011 to it's current elevation 14-feet below conservation pool (1,045 msl). Kickapoo water quality is considered good for municipal use, but tends to be turbid from surrounding clay soils.

- **Management History:** Important sport fish include catfishes, White Bass, Largemouth Bass and White Crappie. Past management plans recommended maintaining the genetic integrity of the existing pure northern strain Largemouth Bass population as a defined source for Texas Parks and Wildlife Department hatchery brood stock program. The reservoir is popular for its White Crappie fishery. Kickapoo has always been managed with statewide regulations.

- **Fish Community**
  - **Prey species:** Gizzard Shad catch rate was at an all-time high for the reservoir and provides an abundant prey base for game fish. The catch per unit effort (CPUE) for Bluegill was at an all-time low with none captured. Historically, Bluegill have been found in low abundance.

  - **Catfishes:** A 2014 gill netting survey was not completed as scheduled because extreme low reservoir elevations made launching a boat impossible. Blue Catfish historically have been abundant while Channel Catfish and Flathead Catfish have been present. In 2013 a new lake record Blue Catfish weighing 49.15-pound was caught.

  - **White Bass:** A 2014 gill netting survey was not completed as scheduled because extreme low reservoir elevations made launching a boat impossible. White Bass historically have been present in low abundance.

  - **Largemouth Bass:** Largemouth Bass, with the exception of one survey, have never been very abundant. In 2013, only four bass were sampled compared to six in 2009. The reservoir had recently been at extremely low elevation and adequate habitat for spawning and nursery areas was lacking. Genetic analysis in 2011 showed that only northern strain largemouth bass were present and that no Florida largemouth influence has been detected.

  - **White Crappie:** The 2013 trap net CPUE was the lowest ever recorded and well below the historical average for the reservoir. The legal sized White Crappie that were sampled exhibited good body condition.

- **Management Strategies:** Maintain the genetic integrity of the existing Largemouth Bass population as a pure northern strain population by not introducing any Florida strain Largemouth Bass. If reservoir elevation increases appreciably, consider requesting a supplemental stocking of northern Largemouth Bass. Continue conducting electrophoretic testing every four years when largemouth bass are collected.

INTRODUCTION

This document is a summary of fisheries data collected from Kickapoo Reservoir in 2013. The purpose is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fish were collected, this report deals primarily with important sport fish and prey species. Historical data are also presented for comparison.

Reservoir Description

Kickapoo Reservoir is a 6,028-acre impoundment constructed in 1945 on the Little Wichita River. It is located in Archer County approximately 30 miles west of Wichita Falls and is operated and controlled by the City of Wichita Falls. Primary uses include municipal water supply and recreation. Mean depth was 14.2 ft. with a maximum depth of 43.4 ft. (TWDB 2001). Texas Water Development Board (2001) stated that Kickapoo reservoir has a drainage of approximately 275 mi^2 a shoreline length of 62 miles, shoreline development index was 5.5, and the reservoir impounds 85,825 ac/ft of water when full. Conductivity was 558 µmhos/cm during the October, 2013 electrofishing survey. Habitat at time of sampling consisted of natural and rocky shoreline. Water level has fluctuated since 2010, reaching its lowest elevation in early 2014 when the reservoir water level was >14 feet below conservation pool (Figure 1). Boat access consisted of a single two-lane public boat ramp. Bank fishing is available at the public access points including the boat ramp. A popular fee fishing barge ($4.00 with a 2 rod limit) and camp also operates on the reservoir. Other descriptive characteristics for Kickapoo are in Table 1.

Angler Access

Kickapoo Reservoir has one public two-lane boat ramp and no private boat ramps. The public ramp was unavailable to anglers in 2013 because the end of the boat ramp was above the waterline. Extension of the ramp is not feasible. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the public boat ramp areas, spillway area, and the fishing barge.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Mauk and Howell 2010) included:

1. Maintain the genetic integrity of the existing Largemouth Bass population as a pure northern strain population and as a possible source for TPWD hatchery program brood stock.
   Action: Did not stock any Florida Largemouth Bass. Genetic integrity was confirmed by genetic analysis in 2011. Northern Largemouth Bass were stocked in 2013 to help population. Nineteen Largemouth Bass were collected for hatcheries in 2011.
2. Kickapoo had traditionally been viewed by anglers as a good crappie reservoir with other game fish species being underutilized. This reservoir also supported a good catfish population and improved Largemouth Bass size structure in 2010. Anglers needed to be made aware of the opportunities that existed at the reservoir.
   Action: Promoted the reservoir fisheries and the refurbished boat ramp through various media outlets.
3. With the spread of zebra mussels and other invasive species, we wanted to make the public and reservoir authorities aware of what to do to prevent their spread and what to do if they suddenly appear.
   Action: Spoke and gave material about invasive species to fishing barge operator. Published articles about invasives species in local newspaper.

Harvest regulation history: Sport fish species in Kickapoo Reservoir have always been managed using statewide regulations (Table 3).

Stocking history: There have not been any recent stockings except for northern strain Largemouth Bass in 2013. Management surveys have indicated adequate populations and reproduction of sport fish. The complete stocking history is in Table 4.

Vegetation/habitat management history: Kickapoo has no significant vegetation/habitat management history. Noxious vegetation has never been documented at the reservoir.

Water transfer: Kickapoo Reservoir, in the Red River basin, is used primarily by the city of Wichita Falls for municipal and industrial uses. Raw water travels to the city through a large underground pipeline that is gravity fed. Since water does not have to be mechanically pumped, it tends to be the favored surface water choice when the lake elevation is relatively high. Small amounts of untreated water are also used by waterfront property owners for irrigation purposes. The city also sells water from Kickapoo to the cities of Olney and Archer City to supplement their municipal water sources. For Olney, Kickapoo water is pumped to city lakes that include Cooper Reservoir and Olney City Lake. These two lakes are in the upper Brazos River basin which results in an inter-basin transfer of raw water.

METHODS

Fishes were collected by electrofishing (1.0 hours at 12, five-minute stations) and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for trap nets, as the number of fish caught 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 2011). However, the number of sampling sites were decreased to align with guidelines based on current reservoir surface acreage at time of sampling.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE.

Source for water level data was the United States Geological Survey (USGS 2014).

RESULTS AND DISCUSSION

Habitat: A physical habitat survey conducted August, 2013 indicated that the littoral zone habitat consisted primarily of natural or rocky shoreline (Table 5). The previous physical habitat survey was conducted in 2009 (Mauk and Howell 2010). Very few manmade changes to the physical habitat had occurred during the four year period. The reservoir elevation has fluctuated from near full to >14 feet below full during the last four years which has negatively influenced available habitat, the fish populations, access, and sampling.

Prey species: Electrofishing catch rates of Gizzard Shad and Bluegill were 644.0/h (Fig. 3) and 0.0/h (Fig 4), respectively. Index of vulnerability for Gizzard Shad was high, indicating that 100.0% of Gizzard Shad were available to predators. This was similar to IOV estimates in previous years. The total CPUE for Gizzard Shad of 664.0/h was the highest CPUE for this species at Kickapoo (Figure 3). While Bluegill has never been overly abundant at the reservoir (historical average of 27.1/h), a CPUE of 0.0/h is the first time none have been captured (Figure 4). The 2013 electrofishing survey was adversely affected by low reservoir conditions that did not allow near shore electrofishing combined with a general lack of suitable habitat at the sampling sites.

Blue Catfish: A 2014 gill netting survey was not completed as scheduled because extreme low reservoir elevations made launching a boat impossible. On 2/10/2013 a new lake record Blue Catfish weighing 49.15-pounds was caught.

Channel Catfish: A 2014 gill netting survey was not completed as scheduled because extreme low reservoir elevations made launching a boat impossible. No Channel Catfish were observed in the previous survey but have been documented in the past at low abundances.

White Bass: A 2014 gill netting survey was not completed as scheduled because extreme low reservoir elevations made launching a boat impossible. White Bass are present but typically in very low abundance.

Largemouth Bass: The electrofishing CPUE of Largemouth Bass was 4.0/h in 2013, a slight decrease from the past surveys (Figure 5) in 2009 (6.0/h) and 2005 (5.3/h). Largemouth Bass are rarely found in abundance in the reservoir except when conditions are optimal with the reservoir full and plenty of habitat available. The 2013 electrofishing survey was adversely affected by low reservoir conditions that did not allow near shore electrofishing combined with a general lack of suitable habitat at the sampling sites. Kickapoo is utilized as a northern strain Largemouth Bass procurement reservoir for the hatchery system. As such the genetics of the population are closely monitored and all bass sampled have been pure northern strain (Table 6).

White Crappie: The trap net catch rate of White Crappie was 4.8/nn in 2013, the lowest CPUE documented for the reservoir and well below the historical average of 41.6/nn (Figure 6). The 2013 trap netting survey was adversely affected by low reservoir conditions because of a general lack of suitable habitat at the sampling sites.

Fisheries management plan for Kickapoo Reservoir, Texas

Prepared – July 2014

ISSUE 1: Maintain and monitor the genetic integrity of the existing Largemouth Bass population as a pure northern strain population and a source for TPWD hatchery program brood stock. Locations with pure northern strains of Largemouth Bass are limited in Texas.

MANAGEMENT STRATEGIES

1. Do not stock any Florida Largemouth Bass at Kickapoo. It is the uppermost public impoundment in the watershed and should maintain the genetic integrity of its Largemouth Bass population.

2. Continue to monitor for Florida strain influence by conducting regular electrophoretic testing.

3. Consider requesting a supplemental stocking of northern Largemouth Bass if reservoir elevation increases appreciably.

ISSUE 2: Lake Kickapoo has traditionally been viewed by anglers as a good crappie reservoir with other game fish species being present. The reservoir can produce good populations of other game species depending on reservoir elevation and available habitat. Little fishing pressure exists on the reservoir except when good populations exist and are promoted. Future increases in water elevation should improve game fish populations over time.

MANAGEMENT STRATEGY

1. Promote the fisheries when appropriate through news releases and when talking to the public.

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:

Standard surveys will be conducted every 4 years to monitor species relative abundances and body conditions.

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.

Austin, B., D. Thomas, R. Burns, and M. Sansom. 2001. Volumetric survey of Lake Kickapoo. Texas Water Development Board, Austin.

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.

Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32:348.

Mauk, R., and M. Howell. 2010. Statewide freshwater fisheries monitoring and management program survey report for Kickapoo Reservoir, 2010. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

United States Geological Society (USGS). 2014. National water information system: Web interface. Available: http://waterdata.usgs.gov/tx/nwis (July 2014).

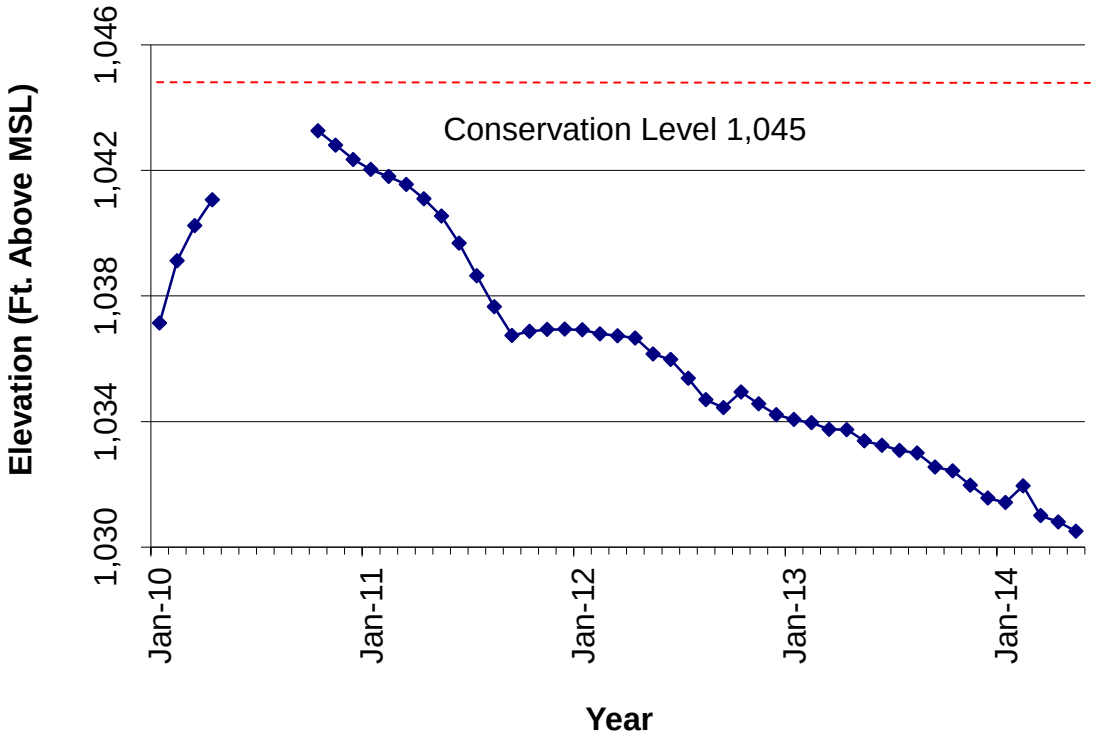


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Kickapoo Reservoir, Texas.

Figure 2. Map for Kickapoo Reservoir, Texas. Inside line indicates actual shoreline in spring 2014.

Table 1. Characteristics of Kickapoo Reservoir, Texas.

Characteristic	Description
Year Constructed	1945
Controlling authority	City of Wichita Falls
County	Archer
Reservoir type	Tributary
Shoreline Development Index (SDI)	5.5
Conductivity	436 µmhos/cm

Table 2. Boat ramp characteristics for Kickapoo Reservoir, Texas, August, 2013. Reservoir elevation at time of survey was 1,033.1 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Public Boat Ramp	33.66628 -98.78433	Y	15	1032	Out of water. Extension is not feasible

Table 3. Harvest regulations for Kickapoo Reservoir.

Species	Bag Limit	Length Limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie, White	25	10-inch minimum

Table 4. Stocking history of Kickapoo, 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	1986	18,475	FGL	3.0
	1990	63,162	FGL	2.0
	1991	62,039	FGL	2.1
	Total	143,676		
Channel Catfish	1969	10,000	AFGL	7.9
	1971	88,375	AFGL	7.9
	1972	50,000	AFGL	7.9
	1973	1,000	UNK	UNK
	Total	149,375		
Largemouth Bass	1970	100,000	UNK	UNK
	2013	99,088	FGL	1.8
	Total	199,088		

Table 5. Survey of structural habitat types, Kickapoo Reservoir, Texas, August, 2013. Shoreline habitat type units are in miles.

Habitat type	Estimate	% of total
Natural	25.1 miles	88.8
Rocky	3.2 miles	11.2

Gizzard Shad

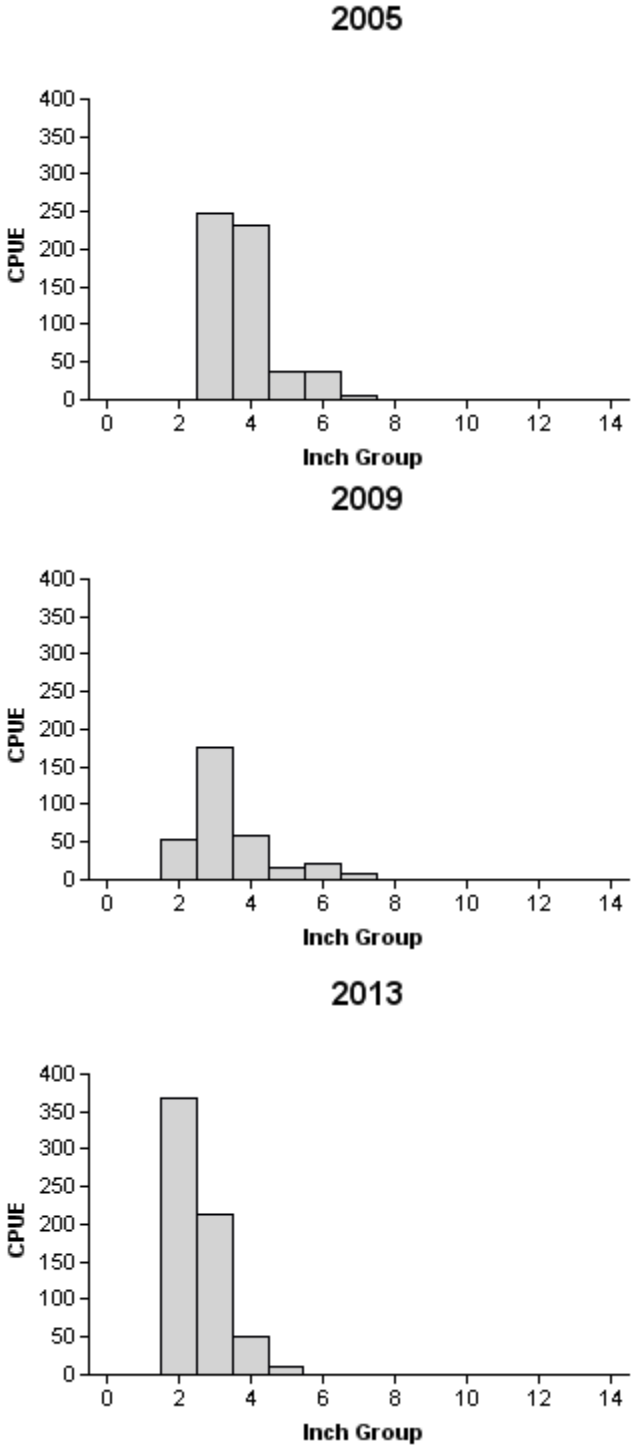


Figure 3. Number of Gizzard Shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Kickapoo Reservoir, Texas, 2005, 2009, and 2013.

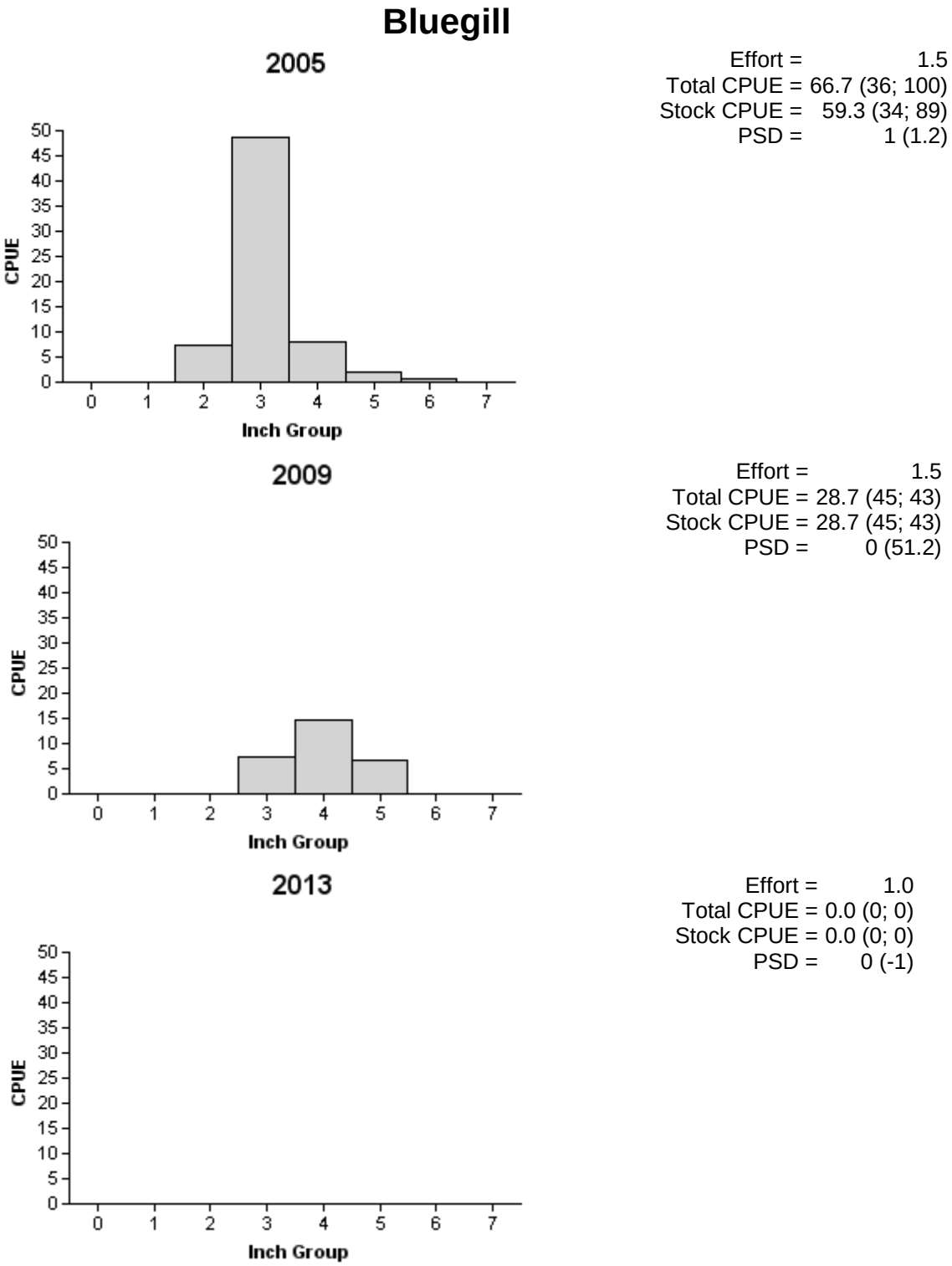
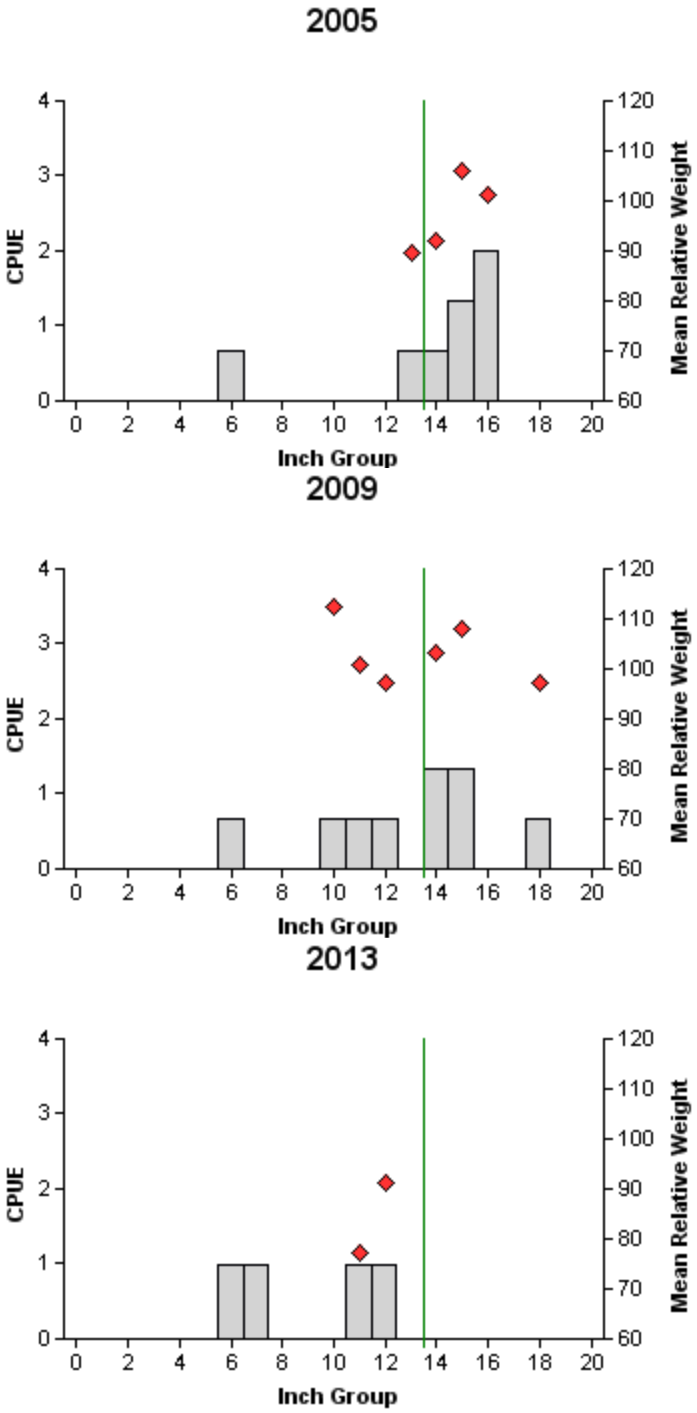


Figure 4. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Kickapoo Reservoir, Texas, 2005, 2009, and 2013.



2005
Effort = 1.5
Total CPUE = 5.3 (45; 8)
Stock CPUE = 4.7 (52; 7)
PSD = 100 (0)
PSD-14 = 86 (12.6)

2009
Effort = 1.5
Total CPUE = 6.0 (40; 9)
Stock CPUE = 5.3 (42; 8)
PSD = 75 (15.1)
PSD-14 = 62 (18.1)

2013
Effort = 1.0
Total CPUE = 4.0 (56; 4)
Stock CPUE = 2.0 (67; 2)
PSD = 50 (36.9)
PSD-14 = 0 (0)

Figure 5. 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, Kickapoo Reservoir, Texas, 2005, 2009, and 2013. Line indicates minimum size limit at time of sampling.

Largemouth Bass

Table 6. Results of genetic analysis of Largemouth Bass collected by electrofishing, Kickapoo Reservoir, Texas, 1997, 2001, 2004, 2008, 2009, and 2011. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

		Number of fish				
Year	Sample size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB
1997	15	0	0	15	0	0
2001	30	0	0	30	0	0
2005	1	0	0	1	0	0
2006	64	0	0	64	0	0
2009	2	0	0	2	0	0
2011	19	0	0	19	0	0

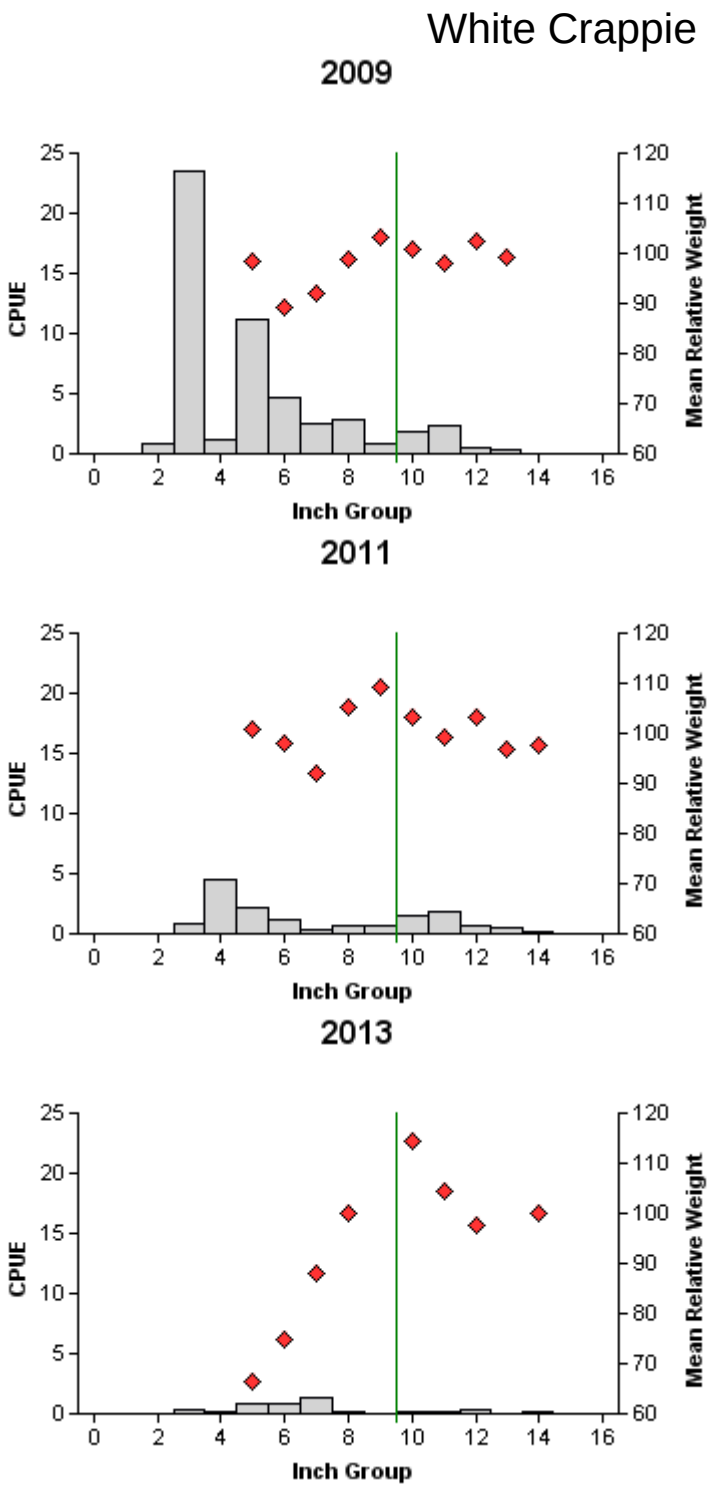


Figure 6. Number of White Crappie caught per net night (CPUE, bars),mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Kickapoo Reservoir, Texas, 2009, 2011, and 2013. Line indicates minimum size limit at time of sampling.

Table 7. Proposed sampling schedule for Kickapoo Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

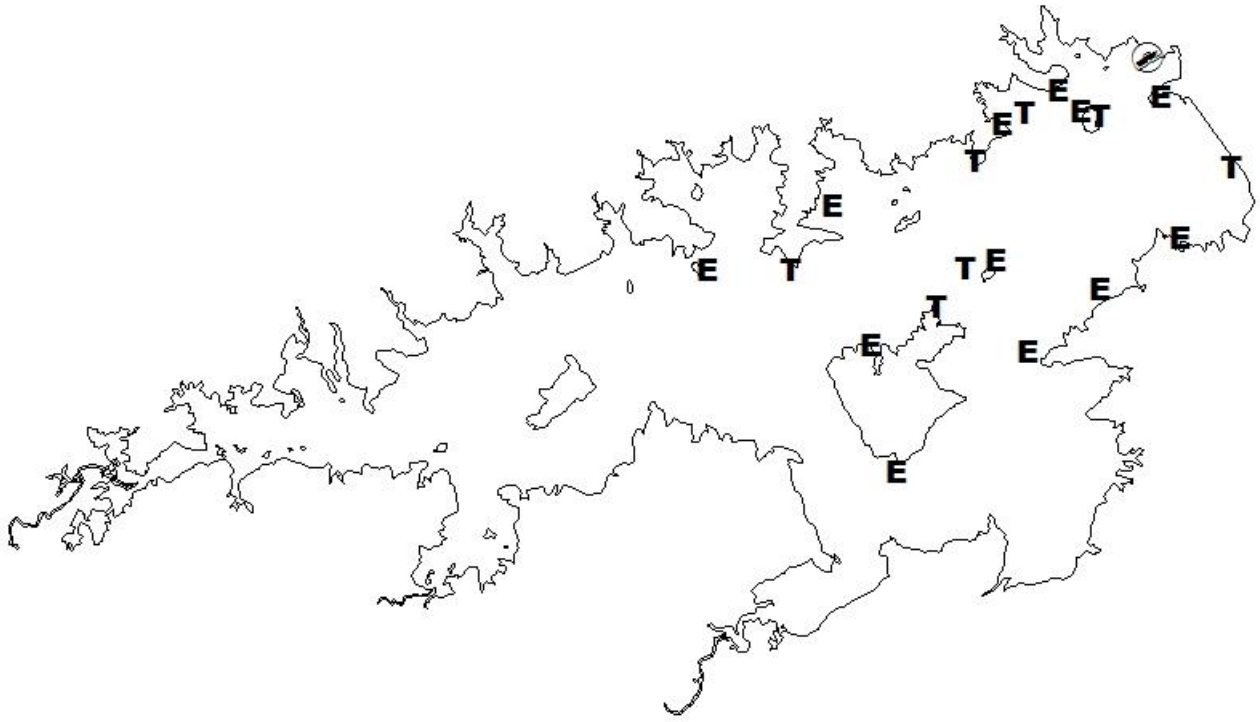
Survey year	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2014-2015								
2015-2016								
2016-2017								
2017-2018	S	S	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Kickapoo Reservoir, Texas, 2013-2014. Only targeted species were recorded for electrofishing. Sampling effort was 5 net nights for trap netting and 1 hour for electrofishing.

	Gill Netting		Trap Netting		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					644	644.0
Blue Catfish			3	0.6		
Channel Catfish			2	0.4		
Flathead Catfish			1	0.2		
Largemouth Bass					4	4.0
White Crappie			24	4.8		
Freshwater Drum			3	0.6		

APPENDIX B



Location of sampling sites, Kickapoo Reservoir, Texas, 2013-2014. Trap net and electrofishing stations are indicated by T and E, respectively. Boat ramp symbol signifies boat ramp.