

PERFORMANCE REPORT

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STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Kurth Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish Populations in Kurth Reservoir were surveyed in 2006 using trap nets and in 2007 using gill nets and electrofishing. Anglers were surveyed from March through May 2007 with an access creel. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Kurth Reservoir is an impoundment on a small, unnamed tributary of the Angelina River in the Neches River Basin. Abitibi Consolidated is the controlling authority; primary uses of the reservoir are water supply for their paper mill and recreation. At conservation pool (197.5 ft. msl), Kurth Reservoir is 726 acres in size, has a shoreline length of 15 miles, and a mean depth of 15 feet. Boat and bank access is adequate, with one boat ramp present. Habitat in the lake consists primarily of flooded timber and aquatic vegetation (primarily hydrilla). Most of the land surrounding the reservoir is used for timber production.
- **Management history:** Important sport fish include largemouth bass, white and black crappie, and catfish. The fishery is managed under current statewide regulations. Hydrilla was first discovered at Kurth Reservoir in 1999, and coverage reached 34% in 2002. In 2002, a vegetation management plan was developed and 1,000 triploid grass carp were stocked at a rate of 5 fish/vegetated acre in an attempt to reduce hydrilla coverage to 10-15%. Since triploid grass carp were stocked, hydrilla coverage has remained at about 20%.
- **Fish community**
 - **Prey species:** A fall electrofishing survey (the method for assessing prey abundance) could not be conducted due to excessive vegetation coverage. However, threadfin and gizzard shad, bluegill, and redear sunfish were observed during the spring 2007 electrofishing survey and were available as prey for predators.
 - **Catfishes:** The gill net catch rate of both channel and blue catfish has declined steadily over past surveys. No catfish were caught in the 2007 gill net survey indicating poor recruitment. Kurth Reservoir supports only a limited catfish fishery.
 - **Temperate basses:** Palmetto bass were stocked annually from 1994-1998. Although an abundant population was established, angler interest in the fishery never developed and stocking was discontinued. As expected, gill net catch rates have declined over time.
 - **Largemouth bass:** Largemouth bass were relatively abundant in spring electrofishing surveys. Population size structure indicated good recruitment and an abundance of fish 10 - 18 inches in length. Largemouth bass were the most sought-after species at Kurth Reservoir.
 - **Crappie:** White and black crappie were present in the reservoir. Angler catch (1.3/hour) and total spring quarter (March-May 2007) harvest (1,189 fish) reflected an abundant crappie population.
- **Management strategies:** Continue to monitor hydrilla coverage via annual aquatic vegetation surveys. Conduct a spring electrofishing survey in 2009. In 2010-2011 a fall electrofishing, spring electrofishing, gill net, and access point survey will be conducted. Recommend Florida largemouth bass stockings in 2008-2009 if pure Florida largemouth bass genotypes in the population are < 20%.

INTRODUCTION

This document is a summary of fisheries data collected from Kurth Reservoir in 2006-2007. 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 2006-2007 data for comparison.

Reservoir Description

Kurth Reservoir is a 726-acre impoundment constructed in 1950 on a small, unnamed tributary of the Angelina River in the Neches River Basin (Table 1). It is located approximately 5 miles north of Lufkin and is operated and controlled by Abitibi Consolidated. Primary uses of the reservoir are water supply for the Abitibi paper mill and recreation. Secchi disc readings typically exceed six feet. Habitat at time of sampling consisted of overhanging brush, concrete, some standing timber, and emergent and submerged vegetation. Native aquatic plants present were spikerush, cattail, bulrush, pondweed, and American lotus. Hydrilla, a non-native, was first discovered in 1999 and water hyacinth has been present in trace amounts. Public access is limited to a single boat ramp. An information kiosk is located at the reservoir's only entrance.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Smith and Driscoll 2004) included:

1. Maintain frequent contact with Abitibi Consolidated as to potential changes to Kurth Reservoir access, ownership, or utilization. Encourage continuous public access.
Action: Contact with Abitibi Consolidated has been maintained. Abitibi Consolidated is currently negotiating to merge with Bowater Ltd., which is a Canadian-owned paper mill company. At this time there are no plans to restrict public access by either company.
2. Continue to manage the bass fishery with a 14-inch minimum length limit. Continue to monitor the frequency of Florida largemouth bass (FLMB) alleles in the population and recommend stocking if total 100% FLMB fall below 20%. Conduct a spring creel survey in 2007 to gather baseline information on angler effort, catch, harvest, and trip expenditures.
Action: No fishery regulation changes occurred on Kurth Reservoir. Genetic analysis of FLMB alleles was conducted in the spring of 2007 but results are not yet available. A spring creel survey was conducted in 2007.
3. Conduct annual vegetation surveys to monitor hydrilla coverage. If aquatic vegetation continued to pose problems for Abitibi Consolidated, then the vegetation management plan would be refined.
Action: Vegetation surveys have been conducted annually with hydrilla coverage remaining stable at 20-25% coverage since 2004. Abitibi Consolidated has not reported problems with the current hydrilla coverage.
4. Consult with Abitibi Consolidated to recommend parking improvements and construction of a ADA-accessible facility.
Action: Made recommendations to improve angler access.

Harvest regulation history: Sport fishes in Kurth Reservoir are currently managed with statewide regulations (Table 2).

Stocking history: Triploid grass carp (1,000) were stocked in 2002. Florida largemouth bass were stocked in 1977, 1994, 1998, 2001, and 2002. Palmetto bass were stocked annually from 1994 through 1998. The complete stocking history is in Table 3.

Vegetation/habitat history: Hydrilla was first discovered in Kurth Reservoir in 1999. In 2002 hydrilla coverage had expanded to cover 34% of the reservoir surface area. Triploid grass carp was stocked in an effort to reduce hydrilla coverage, and since that time coverage has remained at 20-25%. Native vegetation consisted of cattail, spikerush, American lotus, pondweed, and bulrush. Native vegetation was limited, comprising an estimated 40.5 surface acres (6%) (Table 4). Structural habitat consisted of overhanging brush and concrete.

METHODS

Fishes were collected by electrofishing (1 hour at 12 5-min stations) and gill netting (5 net nights at 5 stations). Trap net surveys were conducted using experimental tandem net procedures. Trap nets were set in groups consisting of one tandem net and one offshore net. Tandem trap nets were constructed of two standard trap nets with leaders completely overlapping and attached together along the float lines and weighted lines (throats of each net facing each other). Tandem and offshore trap nets were both set offshore and perpendicular to the shore. Trap net survey procedures were dictated by a special crappie sampling committee that was formed to improve crappie sampling procedures. Consequently, the results of the 2006 survey are not directly comparable to results of previous surveys done on Kurth Reservoir.

Catch per unit effort (CPUE) 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 the electrofishing and gill net surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005). A standard fall electrofishing survey was not conducted in 2006 because excessive growth of hydrilla. However, a spring electrofishing survey was conducted after hydrilla coverage had subsided in the reservoir.

A spring access creel (9 days) was conducted from March through May 2007 to assess angler use and catch in accordance to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of overhanging brush, emergent and submerged vegetation, and concrete (Table 4). Hydrilla was the dominant habitat type available for sport fishes in Kurth Reservoir.

Creel: An access point creel survey was conducted in the spring of 2007. Total estimated angling effort was 8,190.8 hours (11.3 hours/acre; Table 6). The largemouth bass fishery was most popular (82.6% of angling effort), followed by crappie and sunfish respectively (Table 5). Anglers harvested 80%, 38%, and 19% of all legal-sized crappie, sunfish, and largemouth bass, respectively.

Prey species: No new information was collected on prey species during 2007. Smith and Driscoll (2004) reported gizzard shad, threadfin shad, and bluegill as the primary prey species. Electrofishing catch rates in 2003 were 73.0/h, 48.0/h, and 289.0/h for these species, respectively.

Catfish: Blue, channel, and flathead catfish were present in Kurth Reservoir. Catfish abundance in Kurth Reservoir has historically been limited. Blue catfish were introduced in 1995 (Table 3). Few blue catfish

have been caught since their introduction with catch rates peaking at 3.8/n in 2001 and no fish observed in 2007. This blue catfish population does not appear to be self-sustaining; no fish less than stock size (12 inches) have been observed in surveys. Channel catfish gill net catch rates were low in 2004 (0.8/n) and no fish were captured in 2007. During the 2007 spring creel survey no directed effort or harvest of catfish was observed.

Palmetto bass: Palmetto bass were stocked annually from 1994 through 1998. An abundant population was observed in 2001 with catch rates of 9.2/n (Figure 2). However, angler interest in the fishery never developed and stocking was discontinued. As expected, abundance has declined over time with catch rates of 4.0/n in 2007. During the 2007 spring creel survey, no directed effort or harvest of palmetto bass was observed.

Largemouth bass: Fall electrofishing was cancelled in 2006 due to hydrilla coverage that would have hindered survey efficiency. Electrofishing surveys conducted in 2003 showed high catch rates (236.0/h), with excellent recruitment of young of the year (Smith and Driscoll 2004). Spring electrofishing surveys reflect increasing largemouth bass abundance and recruitment, as catch rates were 52.5/h, 88.0/h, and 104.0/h in 1999, 2004, and 2007, respectively (Figure 3). Good size structure indices (PSD=69 and RSD-14 =48) indicated the potential for a quality largemouth bass fishery. During the spring creel survey period, anglers spent an estimated 6,766.9 hours (9.3 h/ac) targeting largemouth bass. Total estimated catch was 3,992 fish; 2,380 were ≥ 14 inches (19% were harvested) (Table 8 and Figure 4).

Crappie: White and black crappie were present in the reservoir. Historically, trap net catch rates have been low (0.2/n). In 2006, experimental trap netting procedures were used (see methods above) to potentially increase crappie catch with only one black crappie was collected.

Creel data reflected a productive crappie fishery that was second only to the black bass fishery in terms of total fishing effort (7.6%). During spring of 2007, angler catch (1.3/h) and harvest (1.9/ac - 1,347 fish) was high (Table 9 and Figures 5 and 6).

Fisheries management plan for Kurth Reservoir, Texas

Prepared – June 2007.

ISSUE 1: Hydrilla in Kurth Reservoir was first documented by TPWD in 1999. In 2002, hydrilla coverage reached 34% of the reservoir surface area. Triploid grass carp were stocked at a rate of 5 fish / vegetated acre in 2002 to reduce hydrilla coverage. Since 2002, Abitibi Consolidated has ceased operations and not needed water from Kurth Reservoir. Hydrilla coverage observed in 2006 was 23% and has posed no problems for the controlling authority.

MANAGEMENT STRATEGY

1. Continue to monitor aquatic vegetation annually. If hydrilla coverage expands beyond acceptable coverage (40%) within the next 4 years, meet with Abitibi Consolidated officials and angling public to develop a vegetation management plan.

ISSUE 2: Giant salvinia, a non-native floating plant that can become problematic, has been in several nearby water bodies.

MANAGEMENT STRATEGY

1. Continue to remain vigilant to identify giant salvinia during annual aquatic vegetation surveys with plans to initiate an eradication or control response if plants are found. Place signs educating the public of giant salvinia identification and to remind the public to inspect boat trailers before launching a boat to minimize the risk of introducing aquatic vegetation from one water body to another.

ISSUE 3: In 2003, recommendations were provided to Abitibi Consolidated regarding improvements to the boat ramp (i.e. road surface repairs and accommodations for the challenged). However, due to uncertainty of Abitibi Consolidated's future as this reservoirs controlling authority, only limited improvements have been made to the boat ramp.

MANAGEMENT STRATEGY

1. Continue to recommend improvements at the access point.

ISSUE 4: Historically, the goal for FLMB stocking at Kurth Reservoir was to maintain total FLMB alleles $\geq 20\%$. Given the trends in largemouth bass abundance and size structure, and the documented catch of 13.2-pound (2005) and 12.7-pound bass (2007) via the kiosk at the reservoir entrance, the potential for producing trophy fish is good.

MANAGEMENT STRATEGY

1. Encourage local anglers to document catches of trophy-size bass by completing catch forms at the kiosk maintained by Abitibi Consolidated at the reservoir entrance.
2. Stock 100% pure FLMB at a rate of 100 fish/acre in 2008 and 2009 if the percent FLMB genotype in this population is $\leq 20\%$. Conduct genetic analysis every four years to monitor the percentage of the FLMB genotypes in this population.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes annual aquatic vegetation surveys and mandatory monitoring in 2010-2011 (Table 10). Annual aquatic vegetation surveys are required to monitor hydrilla coverage that has proven to be problematic. Additionally, a spring electrofishing survey will be conducted in 2009 and 2011 to more closely monitor the largemouth bass fishery. A spring creel survey (March-May) will be conducted in 2011 to monitor angler use of the reservoir. Largemouth bass growth and genetic analysis will be examined every four years.

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.
- Smith, J., and T. Driscoll. 2004. Statewide freshwater fisheries monitoring and management program survey report for Kurth Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-29, Austin.

Table 1. Characteristics of Kurth Reservoir, Texas .

Characteristic	Description
Year Constructed	1950
Controlling authority	Abitibi Consolidated
County	Angelina
Reservoir type	Secondary stream
Mean Depth	15 feet
Size	726 acres
Secchi Disc	> 6 feet
Conductivity	175 umhos/cm

Table 2. Harvest regulations for Kurth Reservoir.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass: palmetto	5	18 - No Limit
Bass: spotted	5 ^a	No Limit – No Limit
Bass: largemouth	5 ^a	14 – No Limit
Crappie: white and black, their hybrids and subspecies	25 (in any combination)	10 - No Limit

^a Bag limit for spotted and largemouth bass is 5 in the aggregate.

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

Species	Year	Number	Size
Black crappie	1969	2,000	UNK
Blue catfish	1995	60,041	FGL
	1996	41	ADL
	Total	60,082	
Florida largemouth bass	1977	32,000	
	1994	41,572	FRY
	1998	40,000	FGL
	2001	13,996	FGL
	2002	56,851	FGL
	Total	184,419	
Palmetto bass (striped X white bass hybrid)	1982	5,795	UNK
	1994	8,835	FGL
	1995	103,845	FRY
	1996	11,787	FGL
	1997	12,230	FGL
	1998	12,708	FGL
	Total	155,200	
Triploid grass carp	2002	1,000	AFGL

Table 4. Survey of littoral zone and physical habitat types, Kurth Reservoir, Texas, 2006. 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
Overhanging Brush	8.4	56.0		
Concrete	1.6	10.7		
Vegetated Shoreline	0.4	2.7		
Spikerush (native emergent)	2.6	17.3	8.7	1.2
American lotus (native emergent)	0.7	4.7	11.7	1.6
Cattail (native emergent)	2.1	14.0	7.6	1.0
Bulrush (native emergent)	0.2	1.3	0.7	< 1.0
Pondweed (native submerged)			11.8	1.6
Hydrilla (nonnative submerged)			170.0	23.4

Table 5. Percent directed angler effort by species for Kurth Reservoir, Texas, 2007.

Species	Year
	2007
Sunfish	2.64
Black Bass	82.62
Crappie	7.60
Anything	7.14

Table 6. Total fishing effort (h) for all species and total directed expenditures at Kurth Reservoir, Texas, 2007.

Creel Statistic	Year
	2007
Total fishing effort	8,190.8 hours
Total directed	\$25,608

Sunfish

Table 7. Creel survey statistics for sunfish (bluegill and redear sunfish) for Kurth Reservoir from March - May 2007, where total harvest is the estimated number of sunfish harvested by all anglers. Relative standard errors (RSE) are in parentheses. There was no directed angler effort for sunfish.

Creel Survey Statistic	Year
	March-May 2007
Directed effort (h)	-
Directed effort/acre	-
Total catch per hour	-
Total harvest	1,714.1 (96)
Harvest/acre	2.4 (96)
Percent legal released	61.9

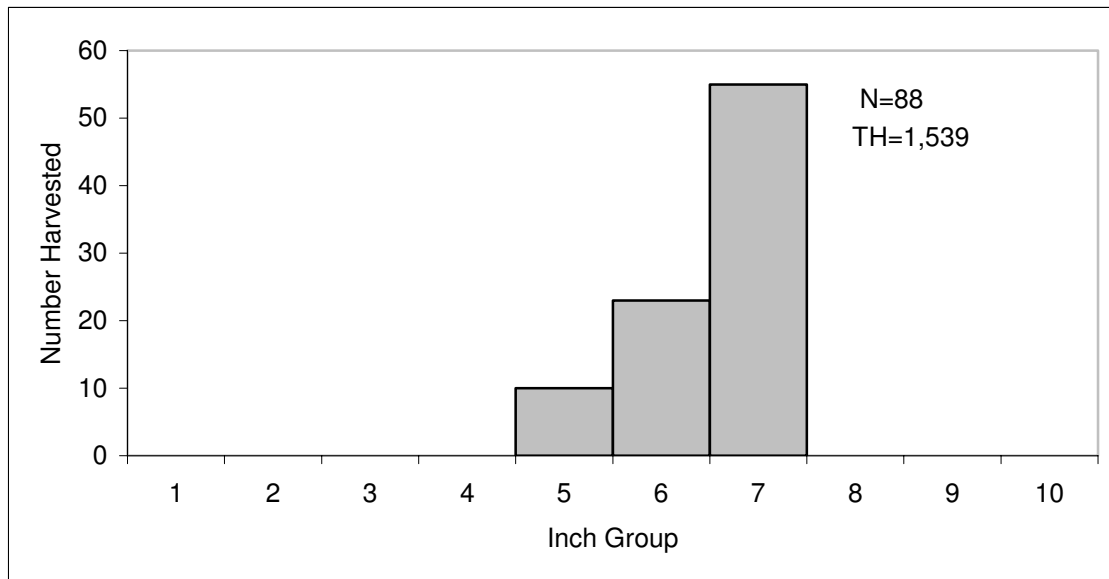
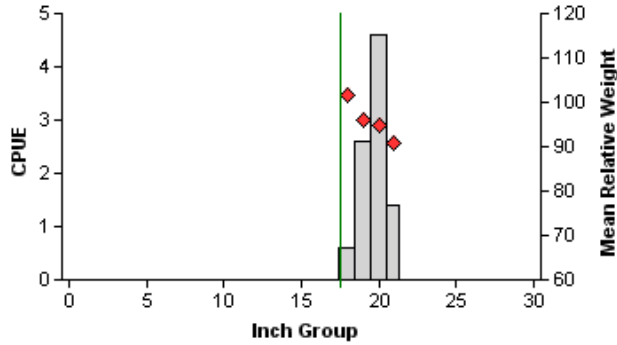


Figure 1. Length frequency of harvested bluegill observed during creel surveys at Kurth Reservoir, Texas, March - May 2007, all anglers combined. N is the number of harvested bluegill observed during creel surveys, and TH is the total estimated harvest for the creel period.

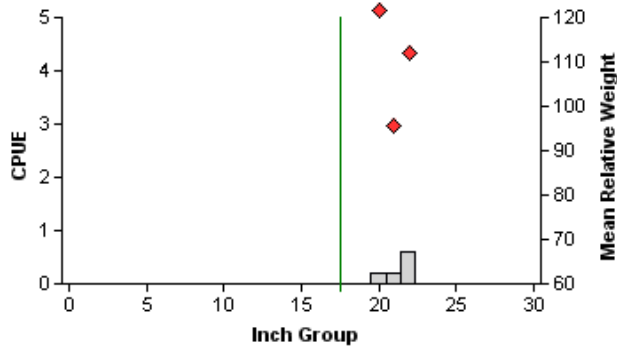
Palmetto bass

2001



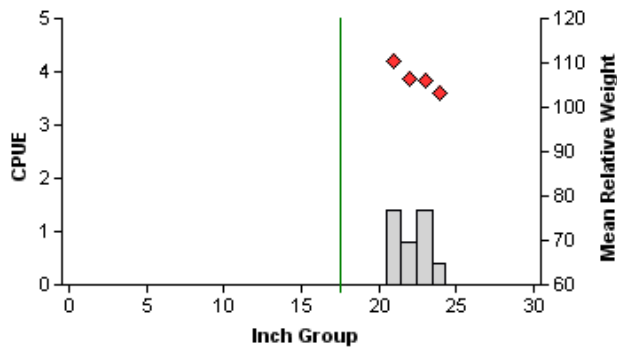
Effort = 5.0
 Total CPUE = 9.2 (50; 46)
 PSD = 100 (0)
 RSD-18 = 100 (0)

2004



Effort = 5.0
 Total CPUE = 1.0 (100; 5)
 PSD = 100 (0.0)
 RSD-18 = 100 (0)

2007

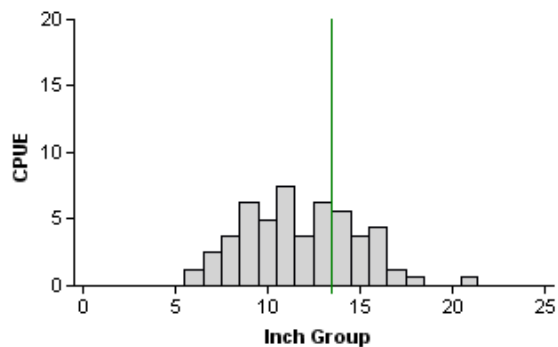


Effort = 5.0
 Total CPUE = 4.0 (76; 20)
 PSD = 100 (0)
 RSD-18 = 100 (0)

Figure 2. Number of palmetto bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Kurth Reservoir, Texas, 2001, 2004, and 2007. Vertical line indicates minimum length limit.

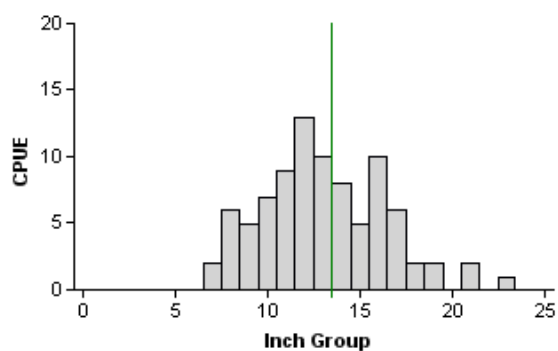
Largemouth Bass

1999



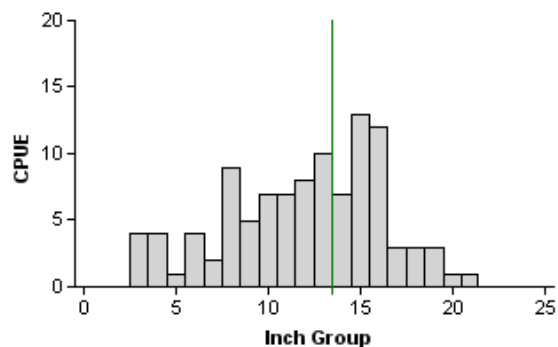
Effort = 1.6
 Total CPUE = 52.5 (26; 84)
 PSD = 54 (4.9)
 RSD-14 = 33 (5.4)

2004



Effort = 1.0
 Total CPUE = 88.0 (16; 88)
 PSD = 69 (6.9)
 RSD-14 = 42 (8.5)

2007



Effort = 1.0
 Total CPUE = 104.0 (14; 104)
 PSD = 69 (5)
 RSD-14 = 48 (5.4)

Figure 3. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring electrofishing surveys, Kurth Reservoir, Texas, 1999, 2004, and 2007. Vertical line indicates minimum length limit.

Largemouth Bass

Table 8. Creel survey statistics for largemouth bass for Kurth Reservoir from March - May 2007, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	March-May 2007
Directed effort (h)	6,766.90 (50)
Directed effort/acre	9.30 (50)
Total catch per hour	0.60 (15)
Total harvest	454.80 (67)
Harvest/acre	0.60 (67)
Percent legal released	80.9

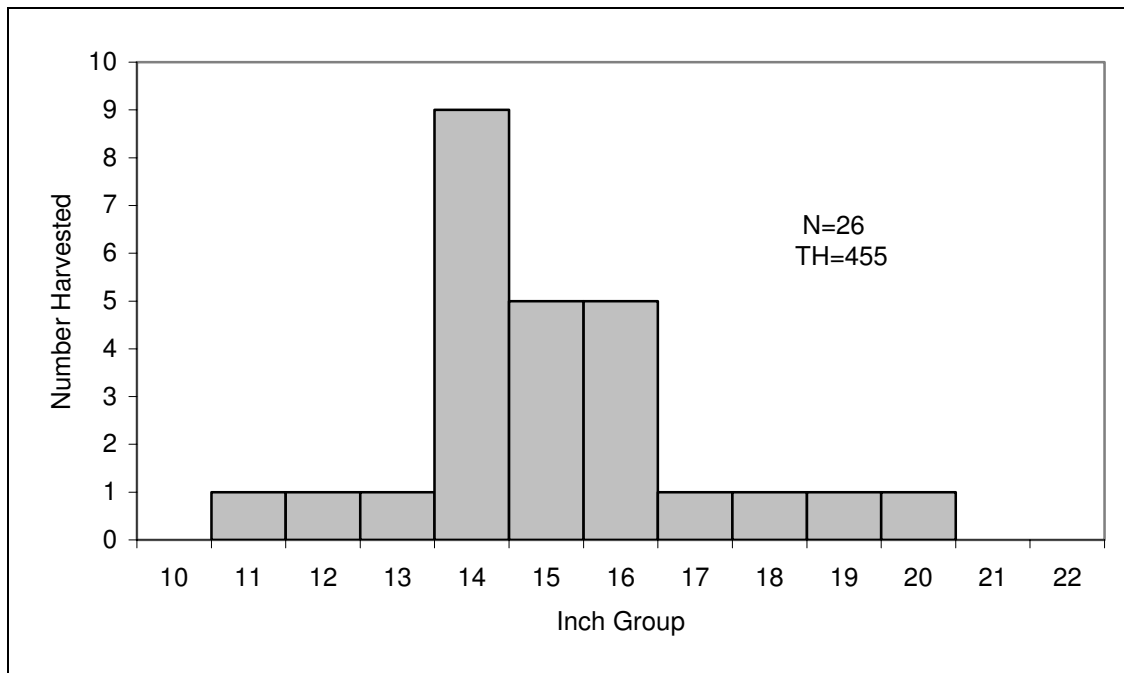


Figure 4. Length frequency of harvested largemouth bass observed during creel surveys at Kurth Reservoir, Texas, March - May 2007, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Crappie

Table 9. Creel survey statistics for crappie (black and white) for Kurth Reservoir from March - May 2007, where total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	March-May 2007
Directed effort (h)	622.60 (68)
Directed effort/acre	0.90 (68)
Total catch per hour	1.30 (59)
Total harvest	1,346.80 (82)
Harvest/acre	1.90 (82)
Percent legal released	20.4

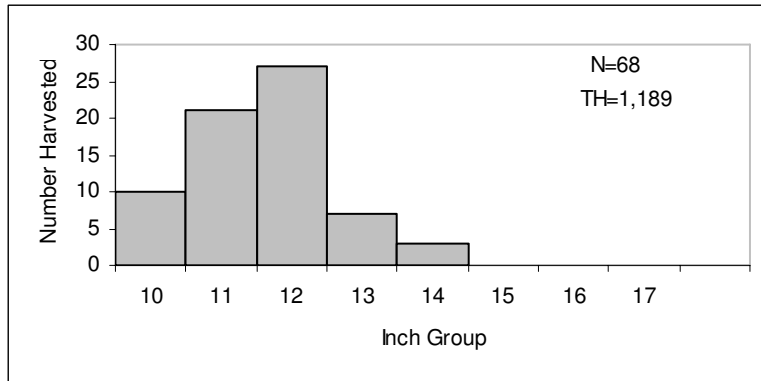


Figure 5. Length frequency of harvested black crappie observed during creel surveys at Kurth Reservoir, Texas, March - May 2007, all anglers combined. N is the number of harvested black crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

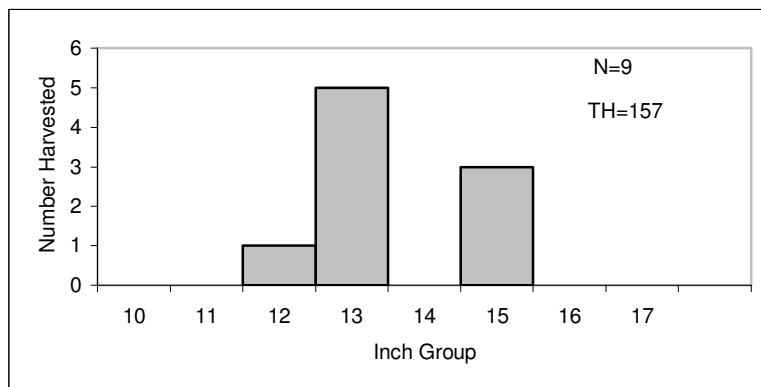


Figure 6. Length frequency of harvested white crappie observed during creel surveys at Kurth Reservoir, Texas, March - May 2007, all anglers combined. N is the number of harvested white crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 10. Proposed sampling schedule for Kurth Reservoir, Texas. Gill netting surveys are conducted in the spring, while standard electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional surveys denoted by A..

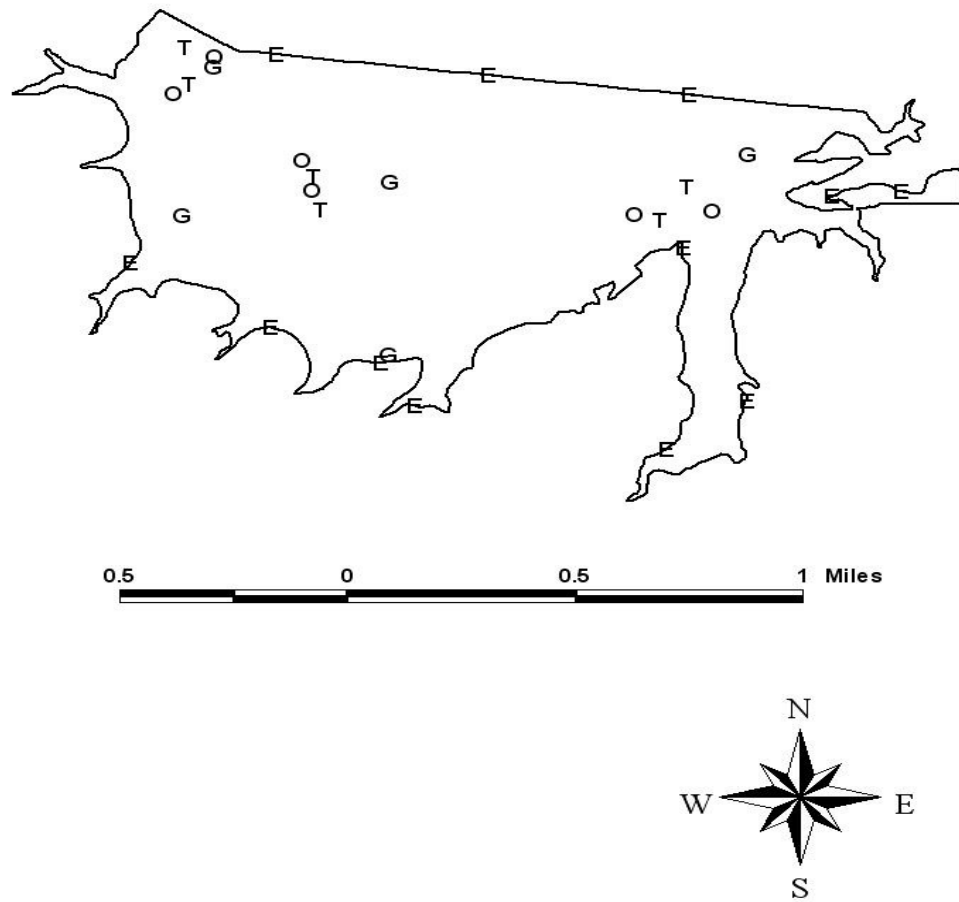
Survey Year	Electrofisher	Gill Net	Access Point Survey	Habitat / Vegetation Survey	Creel
Fall 2007-Spring 2008				A	
Fall 2008-Spring 2009	A			A	
Fall 2009-Spring 2010				A	
Fall 2010-Spring 2011	S	S	S	S	A

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Kurth Reservoir, Texas, 2006-2007.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
White bass	1	0.20				
Palmetto bass	21	4.20				
Largemouth bass	11	2.20			104	104.0
Black crappie	23	4.60	1	0.06		

APPENDIX B



Location of sampling sites, Kurth Reservoir, Texas, 2006-2007. Gill net, and spring electrofishing stations are indicated by G, and E, respectively. Offshore, and tandem trap net sites are represented by O, and T, respectively.