

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-2

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

Pinkston Reservoir

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July 31, 2012

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Pinkston Reservoir were surveyed in 2012 using spring electrofishing and gill netting. Anglers were surveyed March through May 2012 with a creel survey. Vegetation and access surveys were also conducted in 2011. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Pinkston Reservoir is an impoundment of Sandy Creek, a tributary of the Attoyac Bayou in the Neches River Basin. The City of Center is the controlling authority. Primary uses are water supply and recreation. This reservoir has a surface area of 447 acres at conservation pool (300 feet msl), a shoreline length of 4 miles, and an average depth of 20 feet. Water level fluctuations average 5 feet annually. Boat access is available with two boat ramps present, but they are in need of repair. Bank access is adequate.
- **Management history:** Important sport fish include largemouth bass and white and black crappie. The 14- to 18-inch slot-length limit for largemouth bass (implemented in 1991) was changed to a 14- to 21-inch slot-length limit in 2001. Historically, largemouth bass recruitment into the slot length limit has been good, with fish reaching 14 inches in length by age three. Hydrilla has been problematic over the years, and coverage has exceeded 50% of the reservoir surface area. In 1997, triploid grass carp were stocked at a rate of 7 fish/vegetated acre (2,100 fish total) in an attempt to reduce hydrilla coverage to 30%. Hydrilla coverage declined to 30% coverage during the summer of 2007 but increased to 45% coverage in 2011. Giant salvinia was discovered in the reservoir in 2006. A rapid eradication response was successful and no giant salvinia has been observed since 2006.
- **Fish community**
 - **Prey species:** A fall electrofishing survey (the method for assessing prey abundance) could not be conducted due to low water and prohibitive hydrilla coverage. However, threadfin and gizzard shad, bluegill, and redear sunfish were observed during the spring 2012 electrofishing survey and were available as prey for predators.
 - **Catfishes:** Although channel catfish were stocked in 1987, no channel catfish have been collected from monitoring surveys since 1989. Reproduction and growth of channel catfish has likely been limited by hydrilla growth that has created conditions favorable for increased catfish predation by largemouth bass.
 - **Largemouth bass:** Largemouth bass were abundant. Size structure has remained consistent from past surveys with a high abundance of fish within the slot-length limit. Largemouth bass had good growth rates, reaching 14 inches in less than three years. The current largemouth bass water body record is 16.90 lbs (February 1986).
 - **Crappies:** White crappie and black crappie were present in the reservoir. No directed angling effort was observed for crappie during the 2008 and 2012 creel surveys.
- **Management strategies:** Continue to manage largemouth bass with 14- to 21-inch slot-length limit. Continue to monitor trends of hydrilla coverage through annual aquatic vegetation surveys (2012-2015). Conduct additional biennial spring electrofishing surveys in 2014 and 2016 and a spring quarter (March-May) creel survey in 2016. Conduct standard monitoring with gill netting and fall electrofishing in 2015.

INTRODUCTION

This document is a summary of fisheries data collected from Pinkston Reservoir in 2011-2012. 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 are presented with the 2011-2012 data for comparison.

Reservoir Description

Pinkston Reservoir is a 447-acre impoundment constructed in 1976 on Sandy Creek (Table 1). It is located in Shelby County approximately 10 miles west of Center and is operated and controlled by the City of Center. Primary water uses include municipal water supply and recreation. Secchi disc readings average 5 feet. Habitat at time of sampling consisted of concrete, standing timber, boat docks, and aquatic vegetation (primarily hydrilla). The majority of the land surrounding the reservoir is used for agriculture, timber production, and residential development.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ashe and Driscoll 2007) included:

1. Conduct annual vegetation surveys to monitor hydrilla coverage and the potential reintroduction of giant salvinia. If hydrilla coverage prompts public complaints, consult with the City of Center and the angling public to develop a management plan.
Action: Aquatic vegetation surveys were conducted annually from 2008 to 2011. In the summer of 2011, hydrilla coverage was 45% (historical high = 50% coverage). Currently, hydrilla is not impeding municipal water use by the City of Center or initiating complaints from anglers. Since 2006, no giant salvinia has been found in the reservoir.
2. Encourage the City of Center to improve access and parking.
Action: Recommendations were provided to the City of Center (i.e., road surface repairs and accommodations for the physically challenged). In addition, possible grant opportunities through the Sport Fish Restoration Program were explored but the city lacked matching funds.
3. Monitor success of the 14- to 21-inch slot-length limit for largemouth bass.
Action: Spring electrofishing surveys were conducted in 2010 and 2012. Largemouth bass growth was examined in 2011, and fish reached 14 inches by age 3. In 2012, a spring angler creel survey was conducted to monitor angler catch and harvest.

Harvest regulation history: Sport fishes in Pinkston Reservoir are currently managed with statewide regulations with the exception of largemouth bass (Table 2). From 1991 to 2001, largemouth bass were managed with a 14- to 18-inch slot-length limit. A 14- to 21-inch slot-length limit was implemented in 2001 to increase the abundance of large fish.

Stocking history: Sharelunker largemouth bass fingerlings were stocked in 2006 and 2008 as part of Operation World Record (Table 3). Triploid grass carp were stocked in 1997. Florida largemouth bass were stocked in 1976. Threadfin shad were successfully introduced in 1979.

Vegetation/habitat history: Hydrilla has been problematic over the years, and coverage has exceeded 50% of the reservoir surface area. In 1997, triploid grass carp were stocked at a rate of 7 fish/vegetated acre (2,100 fish total) in an attempt to reduce hydrilla coverage to 30%. Hydrilla coverage declined to 30% coverage during the summer of 2007, but since 2008, coverage has ranged from 40% to 48% (Table 4). In 2006, giant salvinia was found and staff quickly eradicated it with herbicide treatments and manual removal.

Historically, native vegetation has comprised $\leq 6\%$ coverage.

Water transfer: Pinkston Reservoir is primarily used for municipal water supply and recreation. There are no plans for inter-basin transfer of water.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) during March 2012 (largemouth bass only) and by gill netting in February 2012 (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 gill 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).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Relative standard error (RSE = $100 \times \text{SE of the estimate/estimate}$) was calculated for all CPUE statistics and for creel statistics and SE was calculated for structural indices. Average age of 14-inch (13.5 – 14.5 inches) largemouth bass was determined from otoliths (N=17) collected in the fall of 2011.

An access creel survey (9 days) was conducted from March through May 2012 to assess angler use and catch in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Total angler catch of largemouth bass ≥ 4 , 7, and 10 pounds was also estimated. Anglers were asked if released fish were within weight categories.

RESULTS AND DISCUSSION

Habitat: A habitat survey conducted in 2007 indicated that the littoral zone included primarily dead timber, concrete, and native emergent vegetation (Ashe and Driscoll 2007). Historically, hydrilla has comprised nearly all of the vegetative coverage (2007-2011 range = 29.7 – 47.8%) (Table 4). Due to low water levels, hydrilla was the only aquatic plant present in 2011.

Creel: Results of the 2008 and 2012 spring quarter creel surveys were similar. Most ($> 85\%$) of the directed effort was for largemouth bass (Table 5), and fishing effort was relatively high (15.5 to 16.9 h/acre; Table 7).

Prey species: No new information was collected on prey species during 2011 due to low water level and prohibitive hydrilla coverage. Ashe and Driscoll (2007) reported gizzard shad, threadfin shad, and bluegill as the primary prey species (Figures 1 and 2). Electrofishing catch rates in 2007 were 28.0/h, 75.0/h, and 450.0/h for these species, respectively. During the 2012 creel survey, there was no angler effort directed for sunfish (Table 5).

Channel catfish: In 1987, a channel catfish stocking exceeding 300 fish/acre had only short-term success, as none have been collected since 1989. There was no observed directed angler effort for catfish during the spring 2008 or 2012 creel surveys (Table 5). Since 2008, hydrilla coverage has been $\geq 40\%$ (Table 4) and may be reducing catfish growth and abundance. Also, trophic dynamics of the reservoir are likely unfavorable for catfish, possibly leading to reductions in preferred food items (i.e., benthic invertebrates) for channel catfish. Similar relationships between hydrilla coverage and channel catfish catch rates have been observed at Nacogdoches Reservoir (Driscoll and Parks 2001) and Martin Creek Reservoir (Ashe and

Driscoll 2006).

Largemouth bass: Largemouth bass accounted for nearly all of the total angling effort observed in the spring 2012 creel (97.2%; Table 5). Directed effort was high (16.9 h/acre) and similar to 2008 (15.5 h/acre; Table 7). Angler catch rates in 2008 and 2012 were similar (0.5 and 0.7/h, respectively; Table 7). In 2012, 97.8% of harvestable fish were released and only 59 fish were estimated as harvested. There were no largemouth bass > 7.0 pounds observed during either creel survey year. In 2012, the catch of preferred largemouth bass increased with 1,156 fish 4.0 – 6.9 pounds caught, accounting for 14.9% of the total catch of 7,760 fish. The majority of anglers interviewed during the 2012 spring creel (51%) reported that they always practice catch and release, which was an increase compared to 2008 (32%) (Appendix C). In addition, 75% of anglers indicated they would always release fish > 21 inches in 2012, compared to only 40% in 2008.

Fall electrofishing was cancelled in 2011 due to low water level and hydrilla coverage that would have reduced survey efficiency. Fall surveys in 2002, 2003, and 2007 indicated an abundant population with good size structure (CPUE range = 146 – 218/h; PSD range = 41 – 64) (Figure 3). Although the spring electrofishing catch rate in 2012 (182/h) was lower than in 2008 (306/h) and 2010 (254/h), all three surveys indicated relatively stable population structure and high recruitment into the slot-length limit (PSD-14 range = 58 – 70) (Figure 4).

Growth of largemouth bass was good; average age at 14 inches (13.5 to 14.5 inches) was 2.5 years (N = 17; range=1-5 years). Florida largemouth bass influence has remained relatively constant as allele frequency has ranged from 73.2 to 77.6% (Table 8).

Crappies: Historically, trap net catch rates of crappies (both white and black) have been low ($\leq 0.6/\text{nn}$). Trap net surveys were discontinued in 2003. The gill net survey indicated that white and black crappie were present in the reservoir (Appendix A), with black crappie being the predominate species (5.6/nn). No observed directed angler effort was observed during the spring 2008 and 2012 creel surveys and few fish were estimated as harvested (Table 9 and Figure 6).

Fisheries management plan for Pinkston Reservoir, Texas

Prepared – July 2012

ISSUE 1: Hydrilla coverage in Pinkston Reservoir exceeded 50% in 1996 and 1997 and impeded municipal use and angler access. Although hydrilla covered 44% of the reservoir in 2011, coverage did not affect municipal use or prompt public complaints.

MANAGEMENT STRATEGY

1. Continue to monitor aquatic vegetation annually (2012-2015). If hydrilla expands beyond an acceptable coverage (levels prompting public or controlling authority complaint) within the next 4 years, meet with city officials and angling public to develop an integrated aquatic vegetation management plan.

ISSUE 2: Giant salvinia was found in Pinkston Reservoir in 2006. Aggressive treatment and removal measures resulted in eradication. Giant salvinia may be reintroduced into Pinkston Reservoir.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to maintain appropriate signage at both access points.
2. Educate the public about invasive species through the use of media and the internet.
3. Discuss invasive species when presenting to constituent and user groups.

ISSUE 3: Access roads and parking lots at both boat ramps are unpaved and in poor condition.

MANAGEMENT STRATEGY

1. Continue to recommend improvements at the access points to the City of Center.

ISSUE 4: Data indicate the 14- to 21-inch slot-length limit for largemouth bass is producing desirable results. Density of 14- to 21-inch fish is relatively high and growth rates are good. Recruitment of largemouth bass into the protective slot length limit is high and stable.

MANAGEMENT STRATEGY

1. Continue to monitor largemouth bass population size structure and growth to assess the success of the implemented slot length limit by spring electrofishing (2014 and 2016) and fall electrofishing (2015). Conduct an angler creel survey (2016) to assess catch and angler trends in regards to the 14- to 21-inch slot-length limit.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional aquatic vegetation surveys (2012-2014), spring electrofishing surveys (2014 and 2016), and a spring (March-May) creel in 2016. Standard monitoring with fall electrofishing and gill nets will be conducted in 2015-2016 (Table 10). Additional aquatic vegetation surveys are required to monitor hydrilla coverage and potential reintroduction of giant salvinia. Additional spring electrofishing and creel surveys are conducted to evaluate the largemouth bass slot length limit regulation.

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Table 1. Characteristics of Pinkston Reservoir, Texas.

Characteristic	Description
Year constructed	1976
Controlling authority	City of Center
County	Shelby
Reservoir type	Secondary stream
Shoreline Development Index (SDI)	5.05
Mean depth	20 feet
Size	447 acres
Secchi disc	5 feet
Conductivity	85 umhos/cm

Table 2. Harvest regulations for Pinkston Reservoir, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies ^a	25 (in any combination)	12 - No Limit
Catfish, flathead ^a	5	18 - No Limit
Bass: white	25	10 – No Limit
Bass: largemouth ^b	5	14 – 21
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

^aUse of trotlines is prohibited.

^bNo more than one largemouth bass \geq 21 inches may be retained.

Table 3. Stocking history of Pinkston Reservoir, Texas. Life stages are fry (FRY), advanced fingerlings (AFGL), and unknown (UNK). 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)
Channel catfish	1976	40,000	AFGL	7.9
	1987	165,040	AFGL	4.2
	Total	205,040		
Flathead catfish	1977	2,000		UNK
	Total	2,000		
Florida largemouth bass	1976	85,000	FRY	1.0
	Total	85,000		
Northern pike	1976	24,000		UNK
	Total	24,000		
ShareLunker largemouth bass	2006	11,150	AFGL	6.7
	2008	10,967	AFGL	6.3
	Total	22,117		
Triploid grass carp	1997	2,100	AFGL	UNK
	Total	2,100		
Threadfin shad	1979	1,500	AFGL	2.9
	Total	1,500		

Table 4. Survey of aquatic vegetation, Pinkston Reservoir, Texas, 2007-2011. Acreage of each species and percent of total surface area coverage (in parentheses) are presented.

Species	2007	2008	2009	2010	2011
Lizard's tail	6 (1.3)	1 (<1)	1 (<1)	1 (<1)	0 (0)
Spikerush	1 (<1)	1 (<1)	1 (<1)	2 (<1)	0 (0)
American lotus	1 (<1)	0 (0)	0 (0)	0 (0)	0 (0)
Arrowhead	0 (0)	1 (<1)	1 (<1)	1 (<1)	0 (0)
Hydrilla	133 (29.7)	179 (40.0)	214 (47.8)	183 (40.9)	201 (44.0)

Table 5. Percent directed angler effort by species for Pinkston Reservoir, Texas, March – May 2008 and 2012.

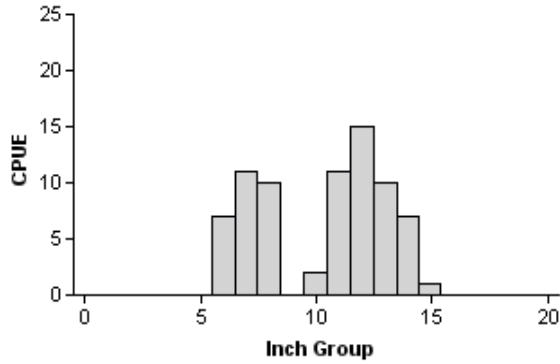
Species	2008	2012
Sunfishes	1.6	
Largemouth bass	86.7	97.2
Anything	11.7	2.8

Table 6. Total fishing effort (h) for all species and total directed expenditures at Pinkston Reservoir, Texas, March - May 2008 and 2012.

Creel Statistic	2008	2012
Total fishing effort	8,002.0 hours	7,752.0 hours
Total directed expenditures	\$34,749	\$33,295

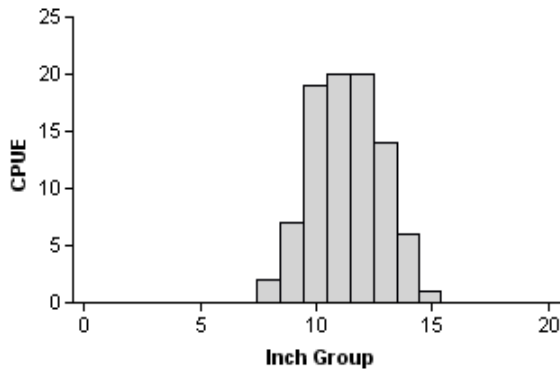
Gizzard Shad

2002



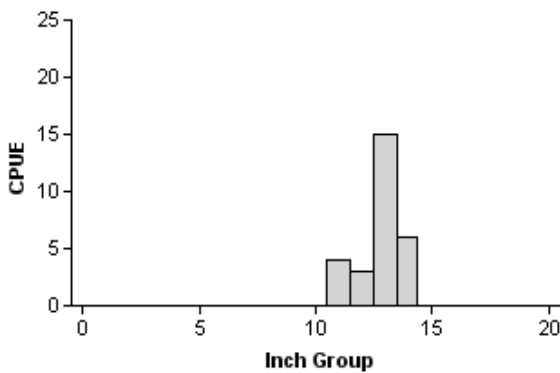
Effort = 1.0
 Total CPUE = 74.0 (29; 74)
 Stock CPUE = 67.0 (26; 67)
 PSD = 66 (6.9)
 IOV = 24.32 (6.3)

2003



Effort = 1.0
 Total CPUE = 89.0 (19; 89)
 Stock CPUE = 89.0 (19; 89)
 PSD = 69 (4.5)
 IOV = 0.0 (0.0)

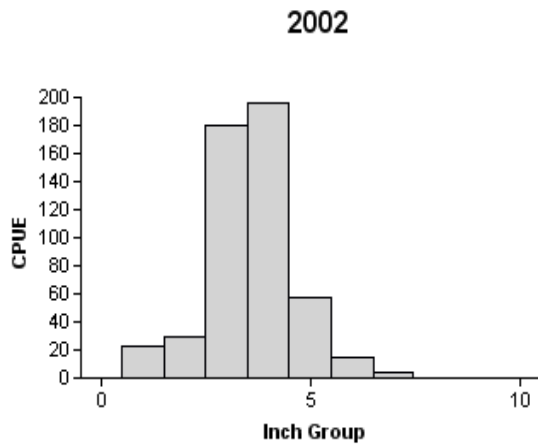
2007



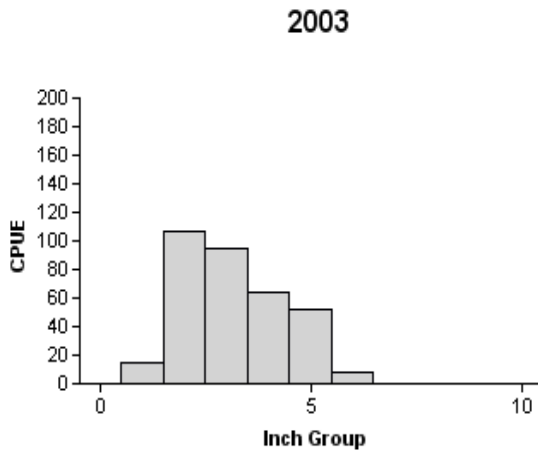
Effort = 1.0
 Total CPUE = 28.0 (25; 28)
 Stock CPUE = 28.0 (25; 28)
 PSD = 100 (0)
 IOV = 0.0 (0)

Figure 1. 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, Pinkston Reservoir, Texas, 2002, 2003, and 2007.

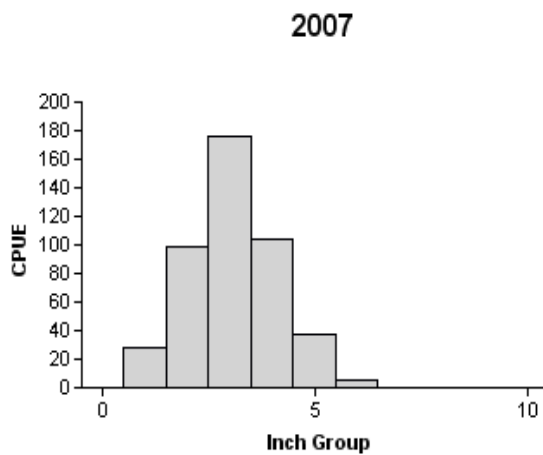
Bluegill



Effort = 1.0
 Total CPUE = 505.0 (19; 505)
 Stock CPUE = 453.0 (19; 453)
 PSD = 4 (1.8)



Effort = 1.0
 Total CPUE = 341.0 (20; 341)
 Stock CPUE = 219.0 (20; 219)
 PSD = 4 (0.7)



Effort = 1.0
 Total CPUE = 450.0 (16; 450)
 Stock CPUE = 323.0 (17; 323)
 PSD = 2 (0.7)

Figure 2. 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, Pinkston Reservoir, Texas, 2002, 2003, and 2007.

Largemouth Bass

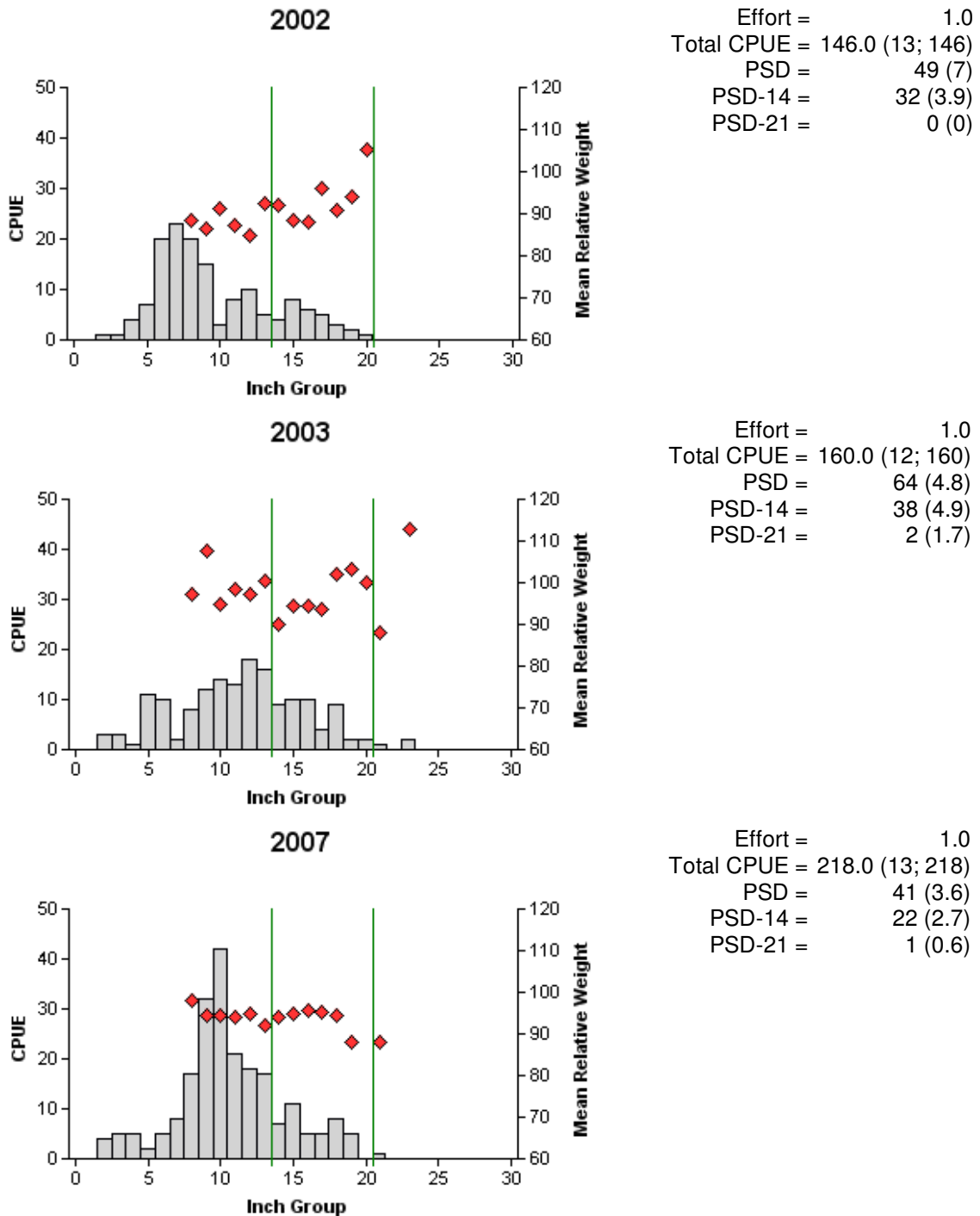


Figure 3. Number of largemouth bass caught per hour (CPUE, bars), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Pinkston Reservoir, Texas, 2002, 2003, and 2007. Vertical lines represent the slot length limit.

Largemouth Bass

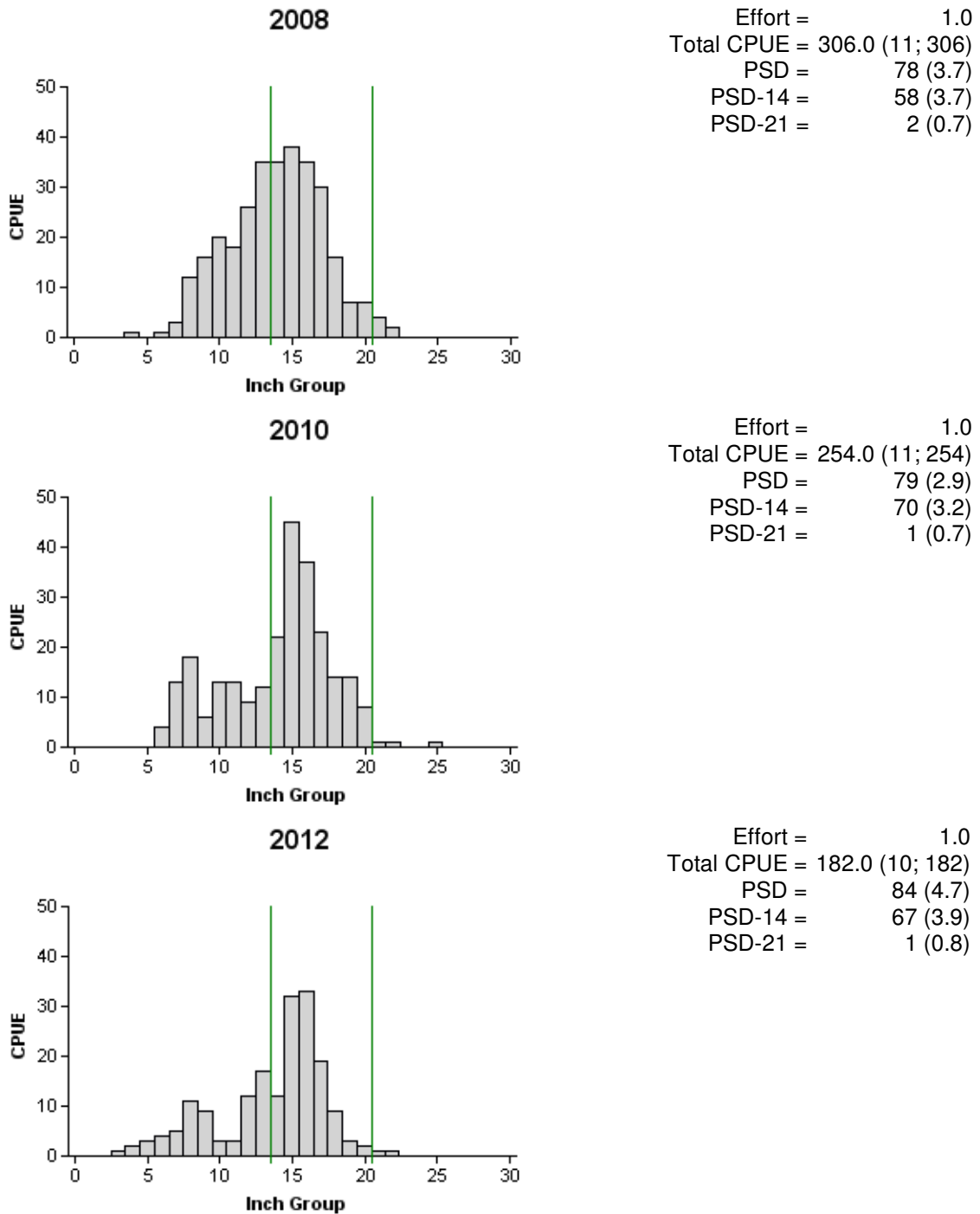


Figure 4. Number of largemouth bass caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring electrofishing surveys, Pinkston Reservoir, Texas, 2008, 2010, and 2012. Vertical lines represent the slot length limit.

Table 7. Creel survey statistics for largemouth bass at Pinkston Reservoir from March - May 2008 and 2012, 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. For estimated catch of 4, 7, and 10-pound fish, the percentages of total catch are provided.

Creel Survey Statistic	Year	
	March-May 2008	March-May 2012
Directed effort (h)	6,935.8 (22)	7,536.1 (19)
Directed effort/acre	15.5 (22)	16.9 (19)
Total catch per hour	0.5 (18)	0.7 (30)
Total catch	3,292	7,760 (42)
≥ 4 pound fish	161 - 4.9%	1,156 - 14.9%
≥ 7 pound fish	0	0
≥ 10 pound fish	0	0
Total harvest	310 (85)	59 (72)
Harvest/acre	0.7 (85)	0.1 (72)
Percent legal released	76.1	97.8

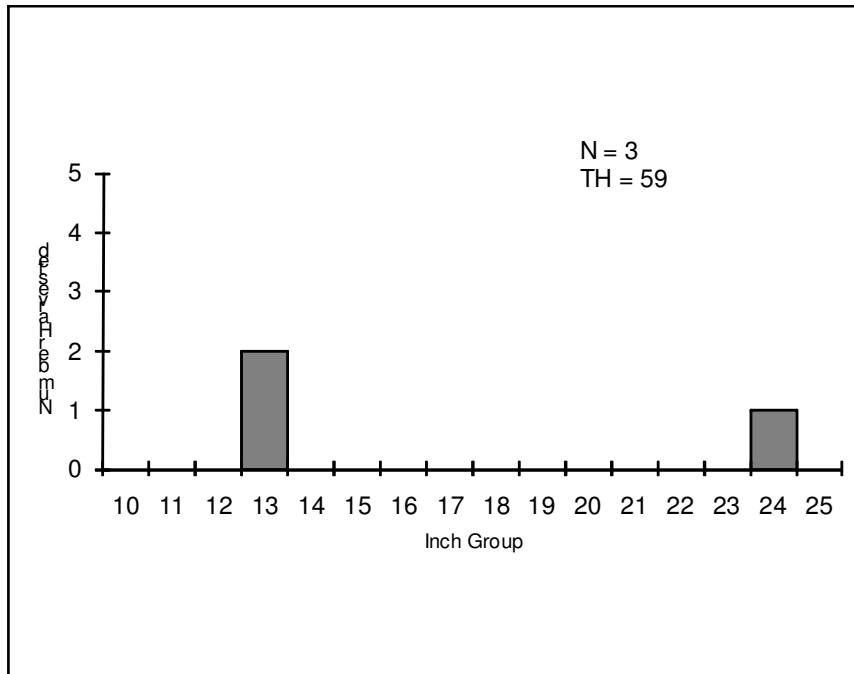


Figure 5. Length frequency of harvested largemouth bass observed during creel surveys at Pinkston Reservoir, Texas, March - May 2012, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 8. Results of genetic analysis of largemouth bass collected by fall electrofishing, Pinkston Reservoir, Texas, 2003, 2007, and 2011. 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.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
2003	28	10	3	15	0	73.2	35.7
2007	24	3			0	77.6	12.5
2011	28	1	0	27	0	75.0	4.0

Crappies

Table 9. Creel survey statistics for crappies at Pinkston Reservoir from March - May 2008 and 2012, where total harvest is the estimated number of crappies harvested by all anglers. No directed effort for crappies was observed. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	March-May 2008	March-May 2012
Directed effort (h)		
Directed effort/acre		
Total catch per hour		
Total harvest	89 (128)	23 (111)
Harvest/acre	0.2 (82)	0.1 (111)
Percent legal released	0.0	0.0

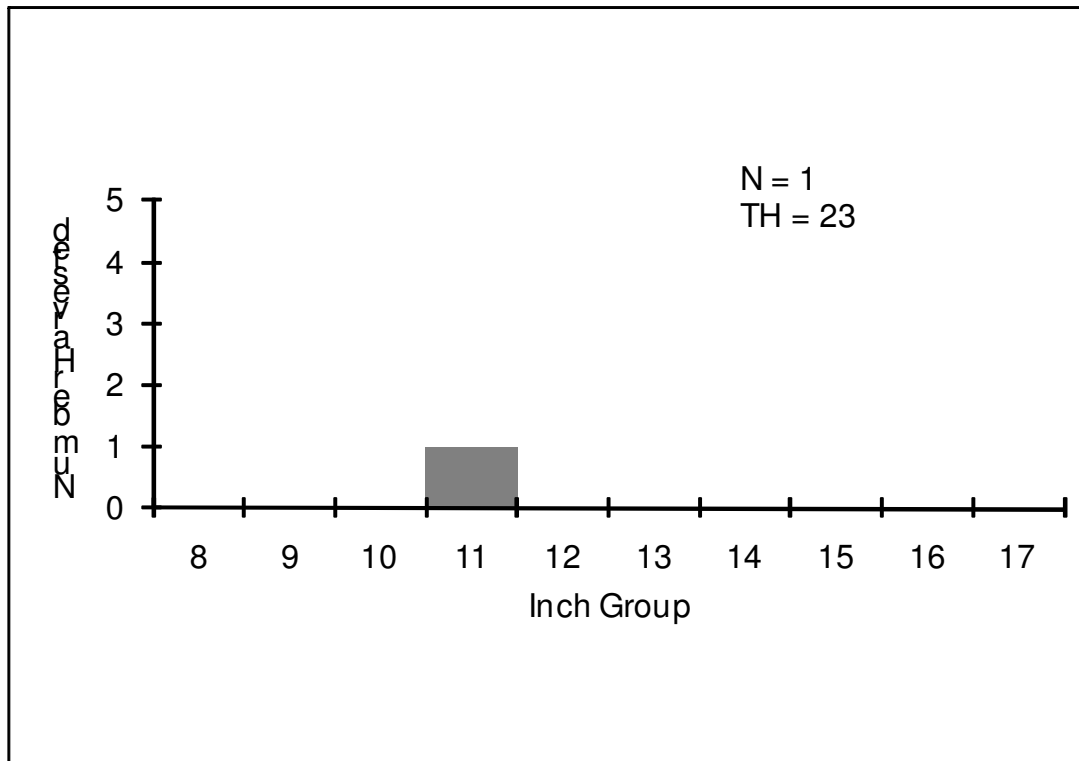


Figure 6. Length frequency of harvested black crappie observed during creel surveys at Pinkston Reservoir, Texas, March - May 2012, all anglers combined. N is the number of harvested black crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 10. Proposed sampling schedule for Pinkston 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 survey denoted by A.

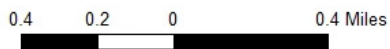
Survey Year	Electrofisher	Gill Net	Creel	Access	Vegetation	Report
June 2012-May 2013					A	
June 2013-May 2014	A				A	
June 2014-May 2015					A	
June 2015-May 2016	S / A	S	A	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Pinkston Reservoir, Texas, 2012.

Species	Gill Netting		Spring Electrofishing	
	N	CPUE	N	CPUE
Gizzard shad	66	13.2		
Spotted sucker	7	1.4		
Brown bullhead	1	0.2		
White bass	1	0.2		
Bluegill	1	0.2		
Largemouth bass	15	3.0	182	182.0
White crappie	1	0.2		
Black crappie	28	5.6		

APPENDIX B



Location of sampling sites, Pinkston Reservoir, Texas, 2012. Gill net and spring electrofishing stations are indicated by G and S, respectively.

APPENDIX C

Which one of the following best describes your harvest practices for largemouth bass at Lake Pinkston under the current regulation (14 to 21 inch slot limit, 1 fish bag per day over 21 inches)?

1. I always practice catch and release regardless of the size of the bass I catch.
2. I practice catch and release for fish that are larger than 21 inches but **sometimes** keep bass I catch that are less than 14 inches.
3. I practice catch and release for fish that are larger than 21 inches but **always** keep bass I catch that are less than 14 inches.
4. I practice catch and release for bass that are less than 14 inches but **sometimes** harvest a bass that is larger than 21 inches.
5. I practice catch and release for bass that are less than 14 inches but **always** harvest a bass that is larger than 21 inches.
6. I **sometimes** harvest bass on either side of the slot limit (less than 14 inches or 1 bass larger than 21 inches).
7. I **always** harvest bass that are outside the slot limit (less than 14 inches or 1 bass larger than 21 inches).

Results of additional creel questions used to identify potential harvest practices of anglers at Pinkston Reservoir. Values are the percent of anglers that responded with each answer.

Creel Question	2008	2012
1	32	51
2	8	24
3	0	0
4	20	3
5	4	3
6	20	14
7	16	5