PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Joe Pool Reservoir

Prepared by:

Raphael Brock and Thomas Hungerford
Inland Fisheries Division
District 2-D, Fort Worth, Texas

Carter Smith
Executive Director

Gary Saul
Director, Inland Fisheries

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Joe Pool Reservoir were surveyed in 2006, 2007, 2008, and 2009 using electrofishing, in 2009 using 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:** Joe Pool Reservoir, a 7,470-acre reservoir located on Mountain Creek (a tributary of the Trinity River), was constructed in 1986 by the U.S. Army Corps of Engineers for flood control, water supply, recreation, and fish and wildlife enhancement. It was opened to public fishing in August 1989. It is located in Tarrant, Ellis, and Dallas Counties four miles south of Grand Prairie, Texas. Habitat is composed mainly of rocky habitat, shoreline emergent vegetation, and flooded timber.

- **Management history:** Important sport fish include white bass, largemouth bass, white crappie, and channel catfish. Largemouth bass have been intensively managed through harvest regulations and opened with an 18 inch minimum length limit. This was changed to a 14-to 21- inch slot length limit in Fall 1992

- Hydrilla, (*Hydrilla verticillata*) was first discovered in Joe Pool Reservoir in 1994. Coverage was less than 1 acre until it expanded to approximately 116 acres in 2003 and fluctuated between 100 and 120 acres from 2004-2006; however hydrilla began to decrease in 2007 and had decreased to less than one acre in 2008. In 2009 no hydrilla was found. Although hydrilla is an exotic species and can be problematic, the increased coverage increased largemouth population abundance and appeared to increase growth rates. The decline in the hydrilla abundance could have a negative impact on the largemouth bass population.

- **Fish Community**
  - **Prey species:** Gizzard and threadfin shad were present in the reservoir. However, catch rates of these species remain well below averages of other district reservoirs.
  - **Catfishes:** Larger blue catfish were captured by gill netting than in the previous sample but at a low rate. The catch rate of channel catfish remained near the reservoir average. Flathead catfish are present but none were captured this past survey year.
  - **White bass:** White bass were caught at a high rate by gill netting but not as high as the previous sample.
  - **Largemouth bass:** The largemouth bass population abundance decreased. Averaged body condition continued to be below average. A new largemouth bass lake record was certified in 2008 (14.45 lbs). This fish qualified for the ShareLunker program but was not submitted.
  - **White crappie:** The white crappie population continued to exhibit fluctuations in abundance with trap net catch rates similar to previous years.

- **Management Strategies:**

  A creel survey to determine angler attitudes and opinions of harvest regulations will be conducted in 2013-2014. Additional electrofishing surveys will be conducted in 2010, 2011, and in 2012, and general monitoring with trap nets, gill nets, and electrofishing in 2013-2014. Annual aquatic vegetation surveys will be conducted to monitor hydrilla coverage.

INTRODUCTION

This document is a summary of fisheries data collected from Joe Pool Reservoir from fall 2006-spring 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 are presented with the 2006-2009 data for comparison.

Reservoir Description

Joe Pool Reservoir is a 7,470-acre impoundment constructed in 1986 on Mountain Creek (a tributary of the Trinity River) by the U.S. Army Corps of Engineers for flood control, water supply, recreation, and fish and wildlife enhancement. It is located in Tarrant, Ellis and Dallas Counties four miles south of Grand Prairie, Texas. The watershed was primarily agricultural but is being developed for residential purposes. Land use on the northeast side of the reservoir is maintained by Cedar Hill State Park. Joe Pool Reservoir is an oligotrophic reservoir and is ranked highest among major reservoirs in Texas as having limited chlorophyll a production and low total phosphorus levels (Texas Commission on Environmental Quality 2005). This has probably had an impact in the limited forage available for sport fish populations and is probably the main obstacle to improving largemouth bass growth rates, body conditions, and size structure. Angler and boat access is adequate. Most of the fishing facilities are accessible to the handicapped. At the time of sampling the fishery habitat was composed mainly of rocky habitat, shoreline emergent vegetation, and flooded timber. Other descriptive characteristics for Joe Pool Reservoir are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2006) included:

1. An intensive age and growth analysis will be conducted to monitor any improvement in growth and to model different length limits using the Fishery Analysis and Simulation Tools (FAST) (Slipke and Maceina, 2000) to aid in the determination of the most appropriate regulation.

   Action: A category 4 age and growth analysis was conducted in fall 2006 (TPWD, Inland Fisheries Division, unpublished manual revised 2005). Growth statistics were calculated and population modeled using different rates of mortality. The results of this are reported in Appendix D. Since the analysis, the aquatic vegetation abundance has decreased and could have a larger impact on the population than the current harvest regulation.

2. Joe Pool Reservoir had over 100 acres of hydrilla in 2006. Hydrilla can cause negative impacts to fish populations and boating access. However, coverage on Joe Pool Reservoir is only 1.7% and is only a minimal problem for boating access.

   Action: Annual summer vegetation surveys were conducted from 2006-2009 to monitor hydrilla abundance.

Harvest regulation history: Sport fish populations in Joe Pool Reservoir were managed with statewide regulations with the exception of largemouth bass (Table 2). From 1989 to 1991, largemouth bass were managed with an 18-inch minimum length limit. A 14- to 21-inch slot length limit was implemented in 1992 to improve growth rates, fish condition, and the population size structure.

Stocking history: Joe Pool Reservoir was stocked in 2005 and 2006 with Florida largemouth bass. The stockings were conducted to increase the Florida largemouth bass genetic influence. The complete stocking history is in Table 3.

Vegetation/habitat history: Joe Pool Reservoir aquatic vegetation is currently composed of sporadic stands of American pondweed (*Potamogeton nodosus*) and shoreline emergent stands of water willow (*Justicia Americana*), and common reed (*Phragmites australis*) . Hydrilla, (*Hydrilla verticillata*), was first observed in Joe Pool Reservoir in 1994. At that time it composed less than 0.10 acres. No hydrilla was observed in vegetation surveys conducted in 1995, 1996, 1997, 1999 and 2000. Small stands (less than 1 acre in size) of hydrilla were observed in 1998 and again in 2001 near the Lynn Creek Park boat ramps. In 2002, hydrilla was evident at numerous locations around the reservoir with a total coverage estimated to be 13 acres. In 2003 hydrilla expanded to an estimated 116 acres. In 2004, 2005, and 2006 hydrilla coverage fluctuated between 120 and 106 acres. Large dense stands of hydrilla were primarily along the shores of Cedar Hill State Park and Lynn Creek Park. The boat ramps and swimming beaches were treated at both parks in summer of 2004 with aquatic herbicide. In summer of 2005, the City of Grand Prairie again conducted herbicide treatments to their swimming areas and boat ramps and also conducted a first time herbicide treatment at Britton Park. Hydrilla abundance decreased in 2007 to 7.5 acres. In 2008 less than an acre was reported. No hydrilla was found during the vegetation survey conducted in 2009.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations), gill netting (10 net nights at 10 stations), and trap netting (10 net nights at 10 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/hr) 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 2008).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distributions (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) 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. A category 4 age and growth analysis was conducted on largemouth bass in fall 2006 (TPWD, Inland Fisheries Division, unpublished manual revised 2008). Ages were determined using otoliths. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of rocky habitat, shoreline emergent vegetation, and flooded timber (Table 4).

Prey species: From 2006 to 2009 electrofishing catch rates of gizzard shad averaged 87.0/hr and ranged from 54.7/hr in 2009 to 122.7/hr in 2008 (Figure 2). Index of vulnerability for gizzard shad was poor with values averaging 45 from 2006-2009 (Figure 2). This average was similar to IOV estimates in previous years. The electrofishing catch rates of threadfin shad varied from a low in 2008 of 77.3/hr to a high of 276.0/hr in 2006. The average threadfin catch rate from 2006-2009 was 191.1/hr. This is below the district average of 262.0/hr. However this average catch rate is higher when compared to the previous 4-year sample period (2002-2005, 76.0/hr). Electrofishing catch rates of bluegill were variable from 2006 - 2009 and averaged 204.9/hr. Catch rates ranged from 78.0/hr in 2008 to 385.3/hr in 2007 (Figure 3). The bluegill population does not contain large numbers of quality-size fish (>6 inches) or preferred sized fish (>8 inches) as evident by a PSD value of 7. Not surprisingly the decline in catch rates of bluegill coincides with the decline in the abundance of aquatic vegetation. Longear sunfish catch rates were variable from 2006-2009 averaging 24.8.0/hr and ranging from 4.7/hr in 2006 to 54.0/hr in 2007 (Figure 4). This average is similar to the previous sample period (2002-2005, 32.0/hr).

Catfishes: Blue catfish were first captured by gill netting in 2006. . The gill netting catch rate of blue catfish in 2010 was 0.3/nn with larger fish captured when compared to the previous sample. The gill net catch rate of channel catfish was 1.4/nn in 2010 which was lower than previous samples (2.5/nn in 2002, 3.0/nn in 2006; Figure 6). This catch rate is well below the district average of 5.6/nn and the size structure decreased when compared to previous sample.

White bass: White bass were first collected by gill netting in Joe Pool in 1994. The gill netting catch rates of white bass have historically been well below the district average of 7.9/nn. The catch rate in 2010 was 5.1/nn which is a decrease from the previous sample (2006, 10.0/nn; Figure 7). Size structure of the population was above average as indicated by the PSD value of 98.

Largemouth bass: The total electrofishing catch rates of largemouth bass were variable from 2006-2009 ranging from 81.3/hr in 2009 to 121.3/hr in 2007 (Figure 8). The catch rate of largemouth bass ≥ 14 inches in length remained high from 2006-2008 (11.8/hr average) but decreased to only 4/hr in 2009. Size structure of the population remained stable from 2006-2009 with PSD values averaging 30. However a decrease in population structure was observed in 2009. Body conditions in 2009 were below optimal (relative weights under 91) for most size classes of fish (Figure 8). These decreases coincide with the decrease in aquatic vegetation (Figure 9). On average largemouth bass reached 14 inches in length (the lower slot limit) by age three (Figure 10; Table 5). Florida largemouth bass influence was 52% which was higher than previous sample in 2004. This is a result of the FLMB stockings in 2006-2007. However, the FLMB genotype was 0 (Table 6).

White crappie: The trap net catch rate of white crappie was 5.1/nn in 2009, which was almost the same as the catch rate observed in 2005 (5.2/nn) but much lower that in 2002 (17.9/nn; Figure 11). The size structure of the population remained stable as PSD values were similar to the previous samples.

Fisheries management plan for Joe Pool Reservoir, Texas

Prepared – July 2010.

ISSUE 1: The last creel survey conducted on Joe Pool was in the spring of 2000. Creel statistics need to be updated to determine effectiveness of the 14- to 21-inch slot length limit. Information on angler opinions of the slot length limit also needs to be collected.

MANAGEMENT STRATEGY

1. A year long creel survey will be conducted on Joe Pool in 2013-2014 to obtain creel statistics and angler opinion information.

ISSUE 2: Joe Pool Reservoir had over 100 acres of hydrilla in 2006. High coverage of hydrilla can cause negative impacts to fish populations and boating access.

MANAGEMENT STRATEGY

1. Monitor coverage of hydrilla by conducting annual aquatic vegetation surveys. Recommend herbicide treatments if hydrilla coverage causes access problems.

ISSUE 3: The largemouth bass population in Joe Pool Reservoir improved with the increase in hydrilla. Introducing native submersed vegetation may improve the largemouth bass population.

MANAGEMENT STRATEGY

1. Contact controlling authority to determine if native vegetation plantings can be conducted in Joe Pool Reservoir. If permission is granted, plant native submersed vegetation in suitable sites and monitor its growth.

ISSUE 4: 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

Electrofishing surveys will be conducted annually to monitor the largemouth bass population. General monitoring of other sport fish species with gill netting and trap netting will be conducted in 2013-2014. Vegetation surveys will be conducted annually to monitor hydrilla coverage. A year long creel survey will be conducted in 2013-2014 to obtain creel statistics and angler opinion information.

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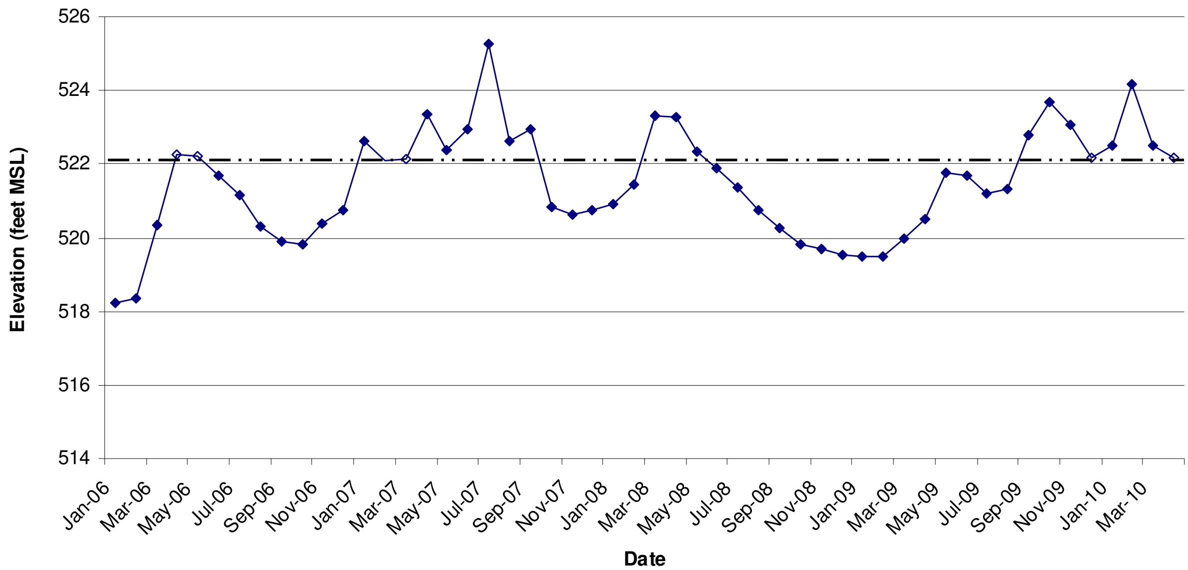


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Joe Pool Reservoir, Texas from Sept 2005-April 2010. Conservation pool is 522 feet above MSL and represented by the dashed line.

Table 1. Characteristics of Joe Pool Reservoir, Texas.

Characteristic	Description
Year Constructed	1986
Year Opened to public	1989
Controlling authority	United States Army Corps of Engineers
Counties	Tarrant, Dallas, Ellis
Reservoir type	Tributary Trinity River
Conductivity	405 umhos/cm

Table 2. Harvest regulations for Joe Pool 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: largemouth	5 (only 1 > 21 inches)	14 – 21 slot
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

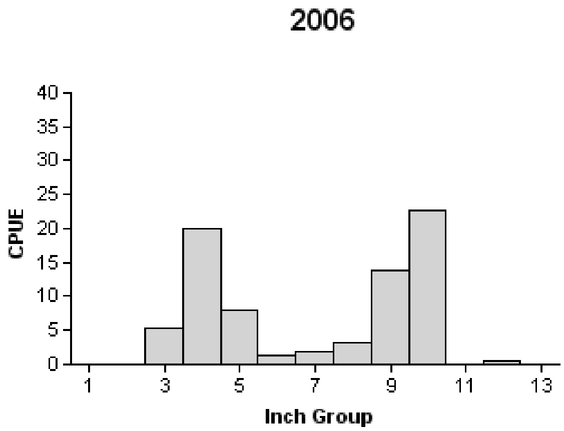
Table 3. Stocking history of Joe Pool, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species 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)
Channel catfish	1986	750,000	FRY	0.8
	Total	750,000		
Coppernose bluegill	1981	19,950	UNK	UNK
	1985	125,000	AFGL	2.0
	1986	5,290	AFGL	2.0
	Total	150,240		
Florida Largemouth bass	1981	2,970	FRY	0.7
	1984	2,700	FRY	1.0
	1986	665,810	FRY	1.0
	1987	203,315	FRY	1.0
	2001	182,049	FGL	1.5
	2005	317,036	FGL	1.6
	2006	325,681	FGL	1.6
	Total	1,699,561		
Threadfin shad	1981	1,080	AFGL	2.9
	Total	1,080		

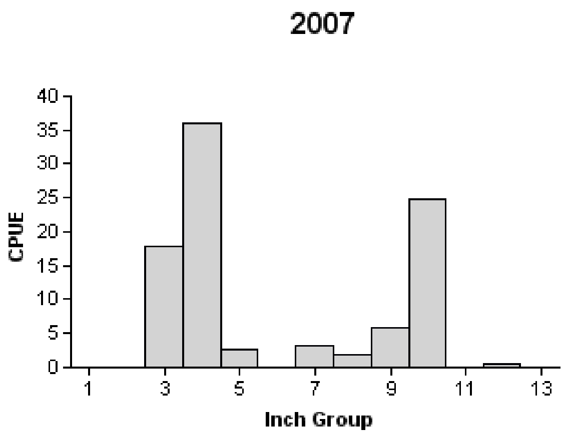
Table 4. Survey of littoral zone and physical habitat types, Joe Pool Reservoir, Texas, 2009. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulk head	2.4	3.9		
Gravel	0.5	0.8		
Native emergent	0.5	0.8		
Native emergent + gravel	5.9	9.5		
Native emergent + natural	41.7	66.8		
Native emergent + rocky shoreline	2.3	3.7		
Native submersed	0.2	0.3		
Natural	7.0	11.3		
Riprap	1.4	2.2		
Rocky shoreline	0.4	0.7		
Hydrilla			0	0
Boat docks + piers			19.2	0.3
Standing timber			1281.7	19.8

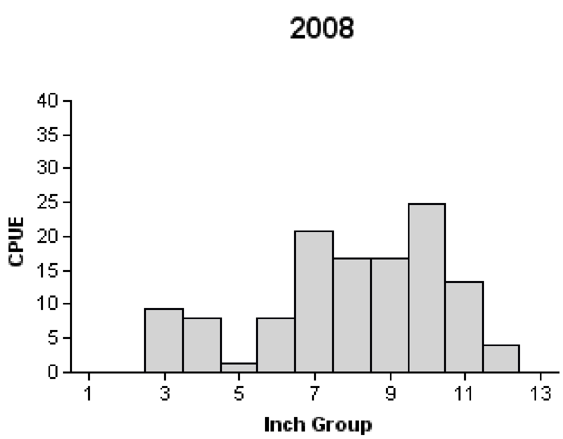
Gizzard Shad



Effort = 1.5
Total CPUE = 77.3 (31; 116)
Stock CPUE = 42.7 (25; 64)
IOV = 47.41 (17.9)



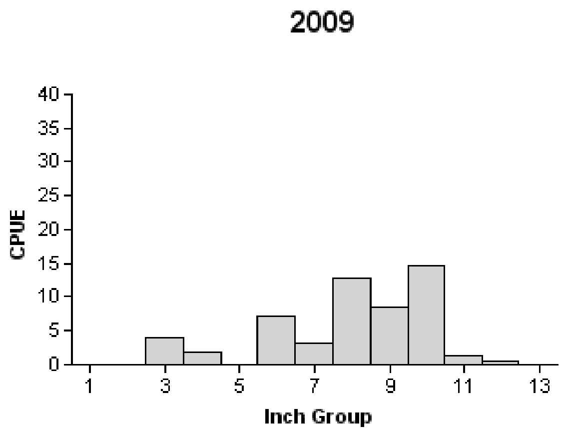
Effort = 1.5
Total CPUE = 93.3 (21; 140)
Stock CPUE = 36.7 (32; 55)
IOV = 64.29 (10.7)



Effort = 1.5
Total CPUE = 122.7 (23; 184)
Stock CPUE = 96.0 (23; 144)
IOV = 38.59 (8.3)

Figure 2. 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, Joe Pool Reservoir, Texas, 2006, 2007, 2008, and 2009.

Gizzard Shad

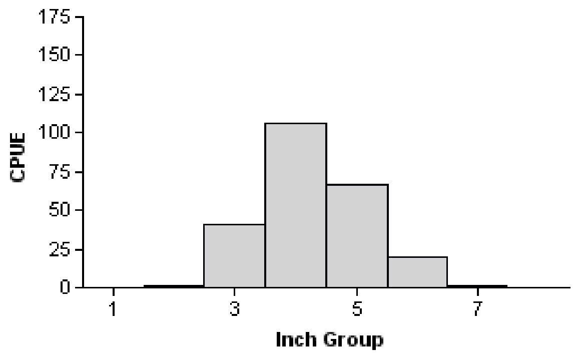


Effort = 1.5
Total CPUE = 54.7 (27; 82)
Stock CPUE = 41.3 (30; 62)
IOV = 30.49 (6)

Figure 2 continued.

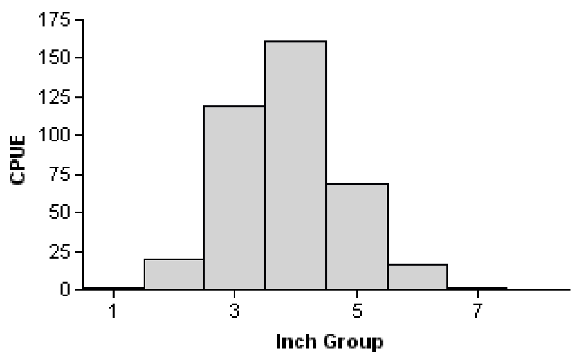
Bluegill

2006



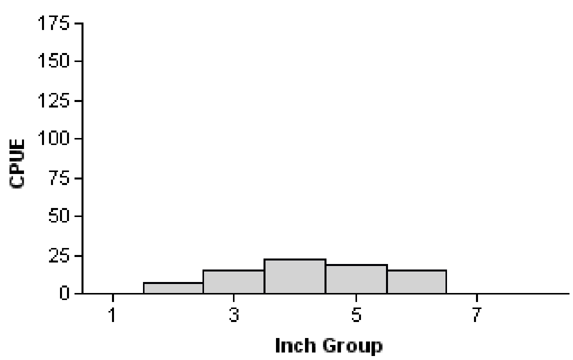
Effort = 1.5
Total CPUE = 235.3 (19; 353)
Stock CPUE = 234.7 (19; 352)
CPUE-6 = 21.3 (29; 32)
PSD = 9 (2)

2007



Effort = 1.5
Total CPUE = 385.3 (18; 578)
Stock CPUE = 365.3 (18; 548)
CPUE-6 = 16.7 (25; 25)
PSD = 5 (1.1)

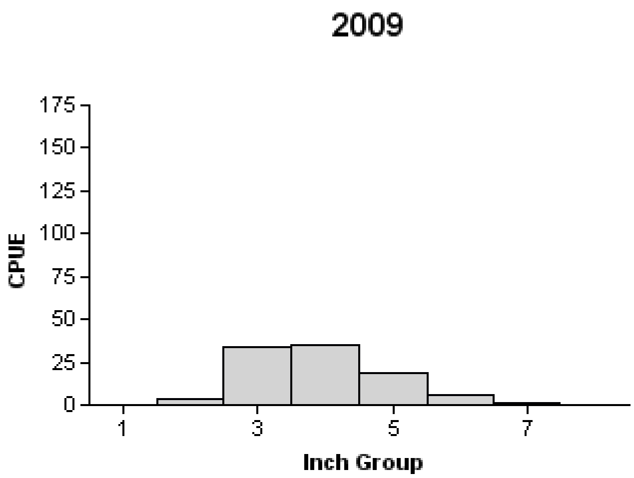
2008



Effort = 1.5
Total CPUE = 78.0 (14; 117)
Stock CPUE = 71.3 (14; 107)
CPUE-6 = 15.3 (25; 23)
PSD = 21 (5)

Figure 3. 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, Joe Pool Reservoir, Texas, 2006, 2007, 2008, and 2009.

Bluegill



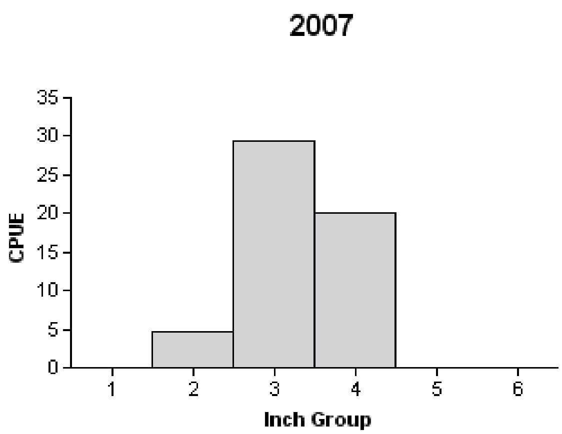
Effort =	1.5
Total CPUE =	98.0 (28; 147)
Stock CPUE =	94.7 (27; 142)
CPUE-6 =	6.7 (39; 10)
PSD =	7 (2.4)

Figure 3 continued.

Longear Sunfish

Effort = 1.5
Total CPUE = 4.7 (52; 7)

Effort = 1.5
Total CPUE = 54.0 (26; 81)



Effort = 1.5
Total CPUE = 6.0 (49; 9)

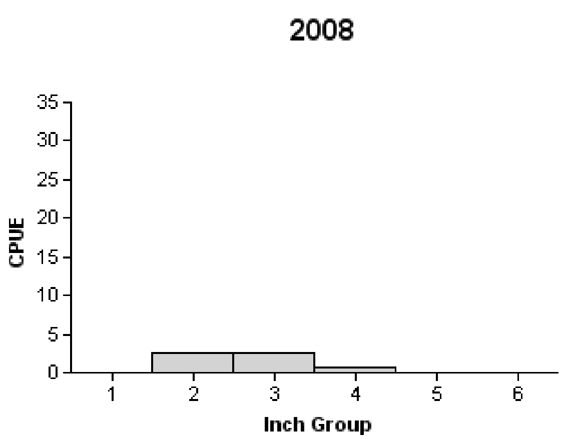


Figure 4. Number of longear sunfish caught per hour (CPUE;bars) (RSE and N for CPUE) for fall electrofishing surveys, Joe Pool Reservoir, Texas, 2006, 2007, 2008, and 2009.

Longear Sunfish

Effort = 1.5
Total CPUE = 34.7 (31; 52)

Figure 4 continued.

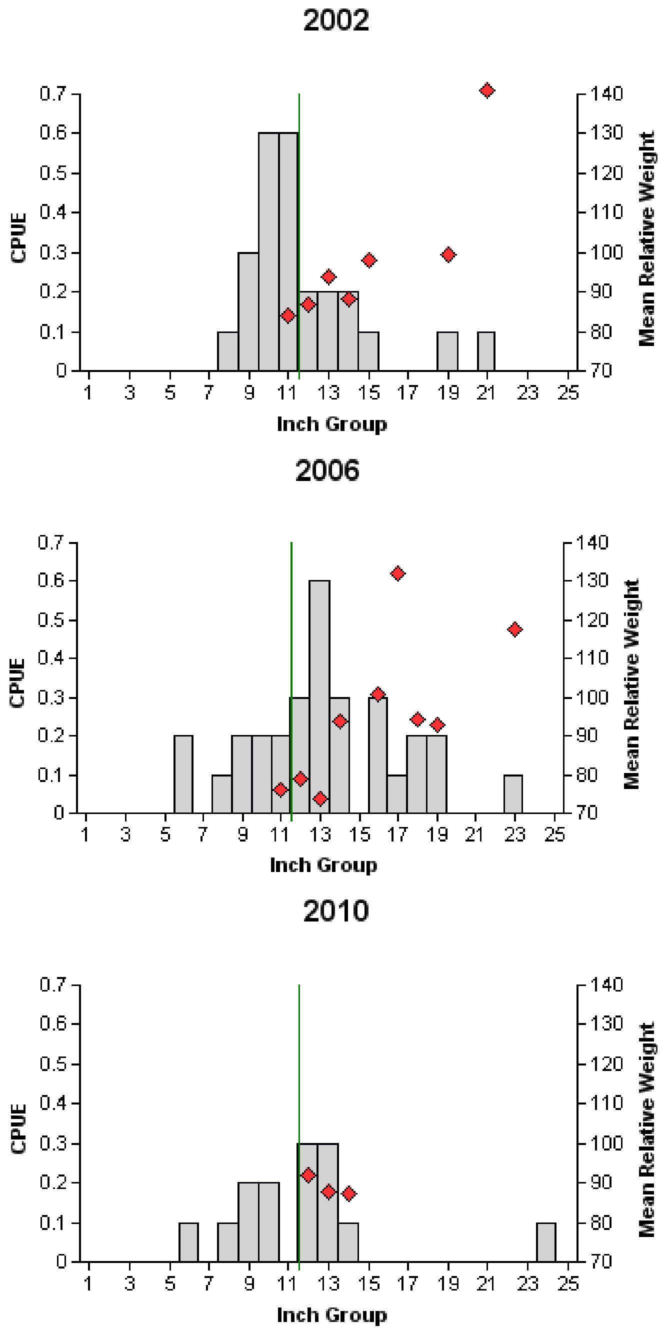
Blue Catfish

Effort = 10.0
Total CPUE = 0.4 (76; 4)
Stock CPUE = 0.0 (0; 0)
PSD = 0 (-1)

Effort = 10.0
Total CPUE = 0.3 (71; 3)
Stock CPUE = 0.3 (71; 3)
PSD = 67 (16.7)

Figure 5. 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 net surveys, Joe Pool Reservoir, Texas, 2006 and 2010. Vertical line represents length limit at time of sampling.

Channel Catfish



2002

Effort = 10.0
Total CPUE = 2.5 (35; 25)
Stock CPUE = 1.5 (48; 15)
PSD = 13 (12.4)
PSD-12 = 60 (17)

2006

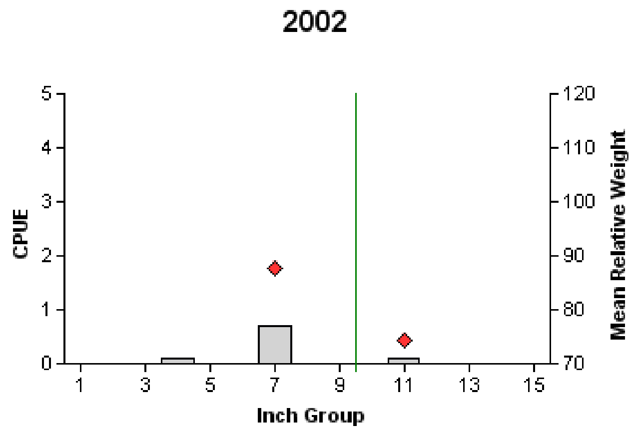
Effort = 10.0
Total CPUE = 3.0 (22; 30)
Stock CPUE = 2.3 (19; 23)
PSD = 39 (15)
PSD-12 = 91 (5.9)

2010

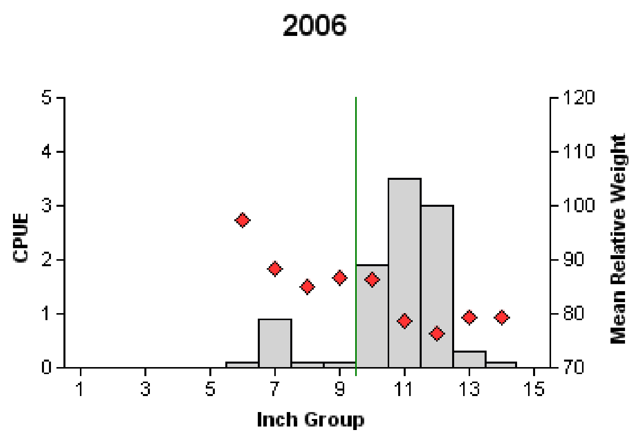
Effort = 10.0
Total CPUE = 1.4 (34; 14)
Stock CPUE = 0.8 (31; 8)
PSD = 12 (12.7)
PSD-12 = 100 (0)

Figure 6. 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 net surveys, Joe Pool Reservoir, Texas, 2002, 2006, and 2010. Vertical line represents length limit at time of sampling.

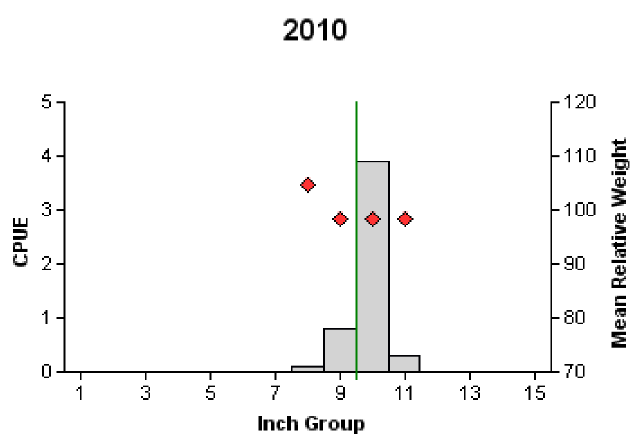
White Bass



Effort = 10.0
Total CPUE = 0.9 (67; 9)
Stock CPUE = 0.8 (76; 8)
CPUE-10 = 0.1 (100; 1)
PSD = 12 (13.8)
PSD-10 = 12 (13.8)



Effort = 10.0
Total CPUE = 10.0 (51; 100)
Stock CPUE = 10.0 (51; 100)
CPUE-10 = 8.8 (51; 88)
PSD = 89 (1.6)
PSD-10 = 88 (2)

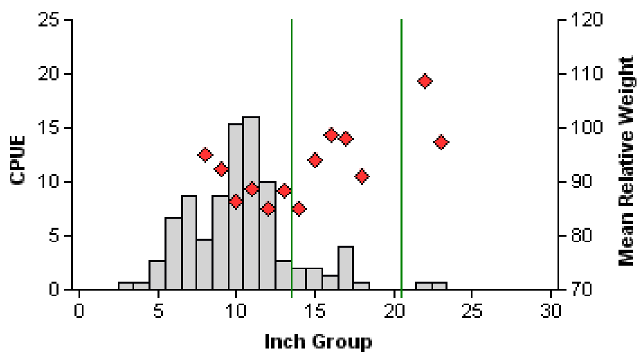


Effort = 10.0
Total CPUE = 5.1 (39; 51)
Stock CPUE = 5.1 (39; 51)
CPUE-10 = 4.2 (38; 42)
PSD = 98 (2.2)
PSD-10 = 82 (3)

Figure 7. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Joe Pool Reservoir, Texas, 2002, 2006, and 2010. Vertical line represents length limit at time of sampling.

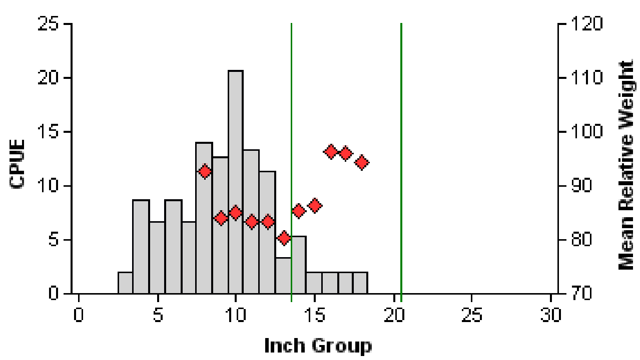
Largemouth Bass

2006



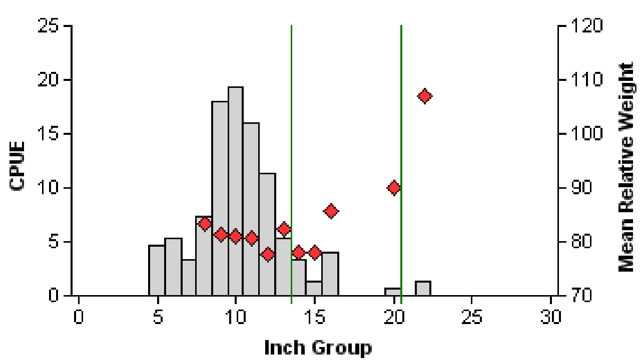
Effort = 1.5
Total CPUE = 88.0 (12; 132)
Stock CPUE = 68.7 (15; 103)
CPUE-14 = 11.3 (25; 17)
PSD = 35 (5.2)
PSD-P = 14 (3.2)

2007



Effort = 1.5
Total CPUE = 121.3 (14; 182)
Stock CPUE = 88.7 (17; 133)
CPUE-14 = 13.3 (28; 20)
PSD = 32 (5.6)
PSD-P = 9 (3.3)

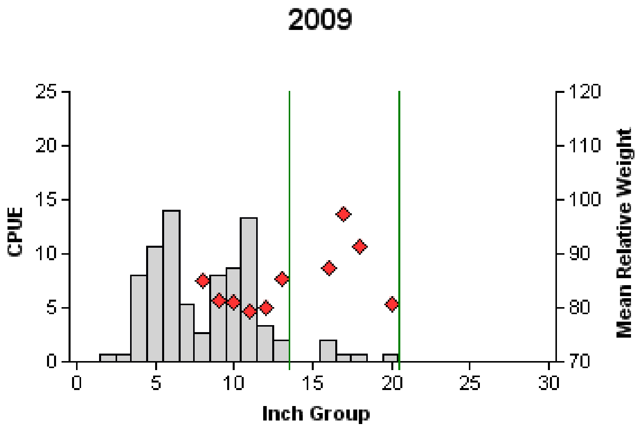
2008



Effort = 1.5
Total CPUE = 101.3 (17; 152)
Stock CPUE = 88.0 (18; 132)
CPUE-14 = 10.7 (31; 16)
PSD = 31 (4)
PSD-P = 8 (2.6)

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, Joe Pool Reservoir, Texas, 2006, 2007, 2008 and 2009. Vertical lines represent length limit at time of sampling.

Largemouth Bass



Effort =	1.5
Total CPUE =	81.3 (15; 122)
Stock CPUE =	42.0 (19; 63)
CPUE-14 =	4.0 (42; 6)
PSD =	22 (6.6)
PSD-P =	10 (4.2)

Figure 8 continued.

Figure 9. Total number of largemouth bass caught per hour (squares), total number of largemouth bass ≥ 14-inches caught per hour (diamonds) from fall electrofishing surveys, Joe Pool Reservoir, Texas. Vertical lines represent lake opening, implementation of 14- to 21–inch slot length limit, hydrilla discovery, hydrilla expansion, and hydrilla decline.

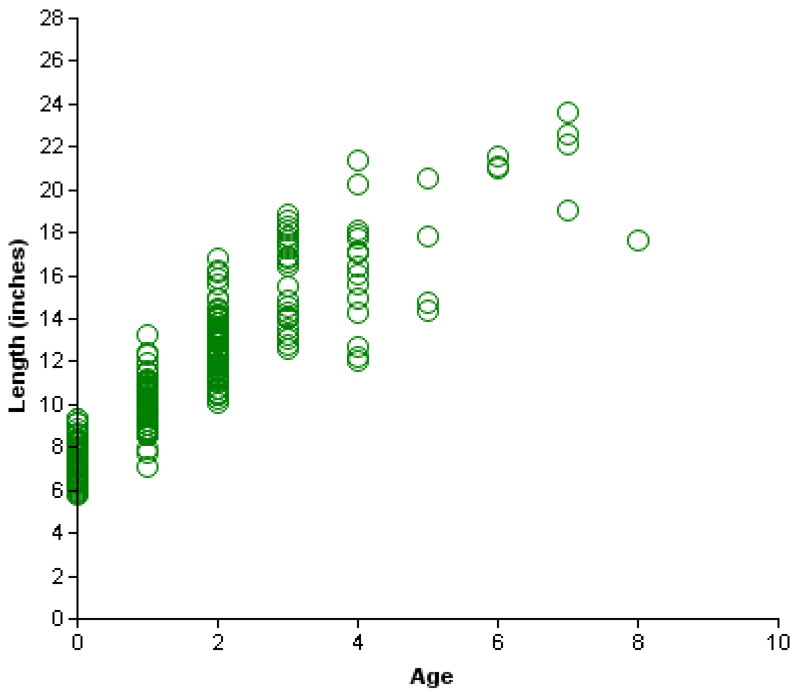
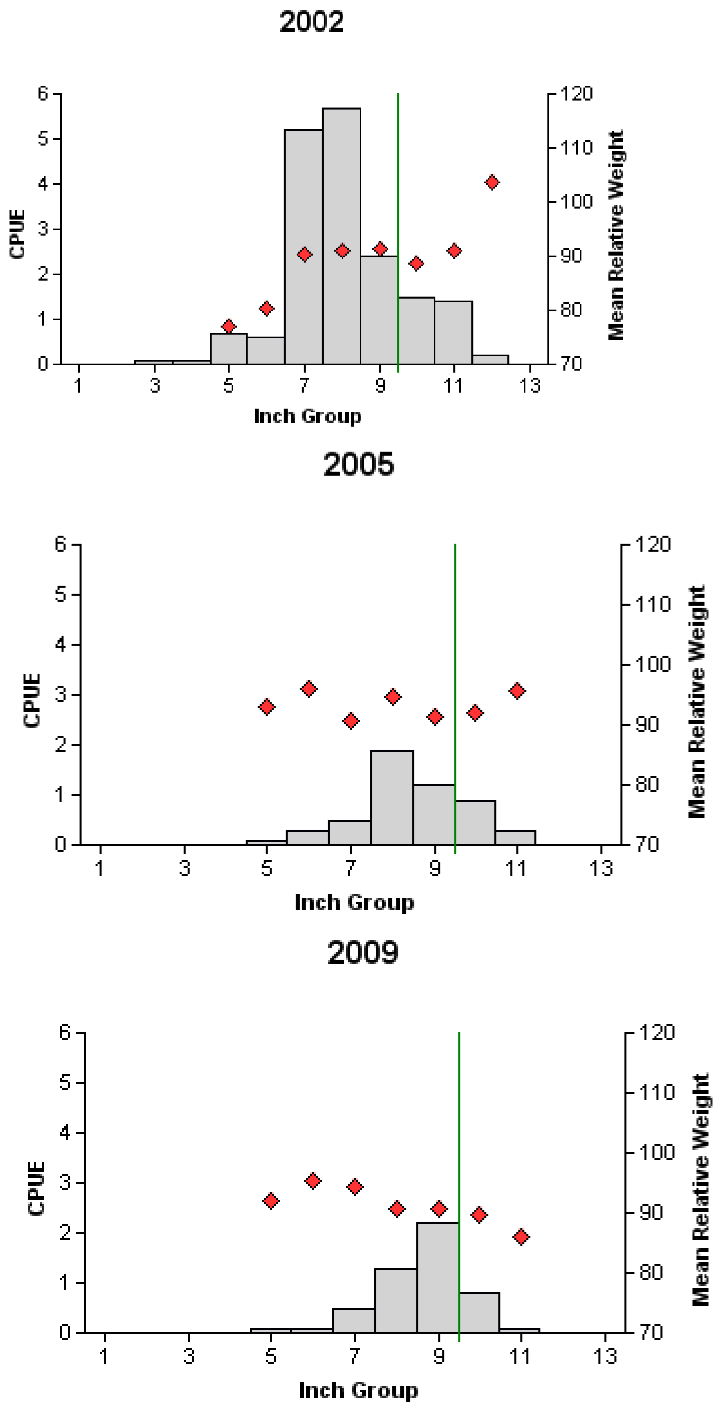


Figure 10. Length at age for largemouth bass (sexes combined) collected from electrofishing at Joe Pool Reservoir, Texas, for fall 2006 (N=257).

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Joe Pool Reservoir, Texas, 2009. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB.

Year	Sample size	% FLMB alleles	%NLMB allelles	Fgenotypes	Ngenotypes	F1
2009	30	52	48	0	7	3

White Crappie



2002

Effort = 10.0
Total CPUE = 17.9 (56; 179)
Stock CPUE = 17.7 (56; 177)
CPUE-10 = 3.1 (52; 31)
PSD = 63 (2.5)
PSD-10 = 18 (1.8)

2005

Effort = 10.0
Total CPUE = 5.2 (34; 52)
Stock CPUE = 5.2 (34; 52)
CPUE-10 = 1.2 (52; 12)
PSD = 83 (5.9)
PSD-10 = 23 (6.7)

2009

Effort = 10.0
Total CPUE = 5.1 (24; 51)
Stock CPUE = 5.1 (24; 51)
CPUE-10 = 0.9 (35; 9)
PSD = 86 (7.3)
PSD-10 = 18 (5.5)

Figure 11. 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 net surveys, Joe Pool Reservoir, Texas, 2002, 2005, and 2009. Vertical line represents length limit at time of sampling.

Table 6. Proposed sampling schedule for Joe Pool Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

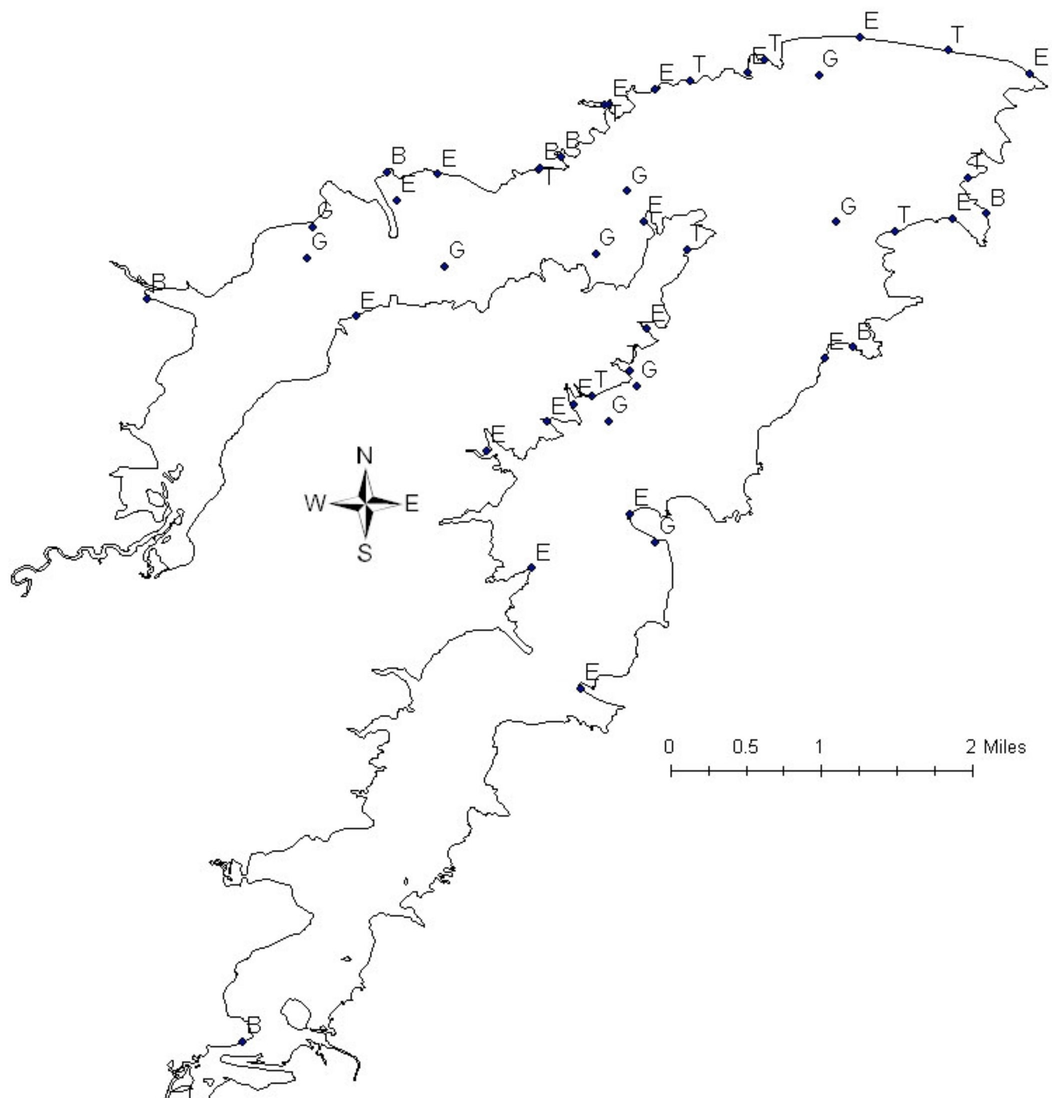
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2010-Spring 2011	A				
Fall 2011-Spring 2012	A				
Fall 2012-Spring 2013	A				
Fall 2013-Spring 2014	S	S	S	A	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Joe Pool Reservoir, Texas, 2009-2010.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					82	54.7
Threadfin shad					134	201.3
Common carp	3	0.3				
Smallmouth buffalo	3	0.3				
Blue catfish	3	0.3				
Channel catfish	14	1.4				
White bass	51	5.1				
Bluegill					147	98.0
Longear sunfish					52	34.7
Largemouth bass	2	0.2			122	81.3
White crappie			51	5.1		

APPENDIX B



Location of sampling sites, Joe Pool Reservoir, Texas, 2009-2010. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B. Water level was near full pool at time of sampling.

Appendix C

Historical catch rates of targeted species by gear type for Joe Pool Reservoir, Texas.

		Year													
Gear	Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	2000	2001	2002
Gill Netting	Blue catfish		0		0				0			0			0
(fish/net night)	Channel catfish		3		1				2.1			3.1			2.5
	White bass		0		0				2.1			0.8			0.9
Electrofishing	Gizzard shad		110		187		153	71	120	112		110.7	132.7	90	152
(fish/hour)	Threadfin shad		36		12		13	0	22	26		11.3	84	45.3	149.3
	Bluegill		115		208		151		64	106		73	34.7	106	65.3
	Longear sunfish		50		101				36	44		45	26	61	28.7
	Largemouth bass	92	120.7	144	151.3	144.4	143.5	106.5	113.3	119	133.3	91.3	104	90	78
Trap Netting (fish/net night)	White crappie		15		7	7.3	4.9		1.5			2.3		18.5	17.9

Appendix C Continued.

Gear	Species	Year 2003	2004	2005	2006	2007	2008	2009	2010
Gill Netting (fish/net night)	Blue catfish				0.4				0.3
	Channel catfish				3				1.4
	White bass				10				5.1
Electrofishing (fish/hour)	Gizzard shad	76	58.7	106	77.3	93.3	122.7	54.7	
	Threadfin shad	56	21.3	77.3	274.7	126	276	201.3	
	Bluegill	94	346.7	228	235.3	385.3	78	98	
	Longear sunfish	32.7	33.3	14	4.7	54	6	34.7	
	Largemouth bass	55.3	82.7	141.3	88	121.3	101.8	81.3	
Trap Netting (fish/net night)	White crappie			5.2				5.1	

APPENDIX D

Results from FAST modeling

Introduction

When managing a largemouth bass population in a reservoir, growth, exploitation, total mortality, and maximum size are all important population statistics. These statistics were calculated from data collected during electrofishing surveys conducted in fall 2006 using Fishery Analysis and Simulation Tools (FAST) (Slipke and Maceina, 2000).

Methods

Largemouth bass otoliths were collected using a stratified random approach in which ten fish per centimeter group were selected for otolith extraction. The remaining fish were assigned ages using an age-length key. Collection and processing of otoliths was conducted according to the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (unpublished, revised manual 2008).

Total annual mortality, theoretical maximum age, L-infinity (theoretical maximum length), were calculated using FAST. Unweighted catch-curve regression was used to examine annual mortality, and theoretical maximum age. The Von Bertalanffy growth function was used to determine L-infinity. Only data from age1 through age 4 were used to calculate total annual mortality and theoretical maximum age because of possible gear bias for older fish described in the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (unpublished, revised manual 2008). Theoretical maximum length was calculated using length data from all ages. Fish were not segregated by sex during the analysis. Exploitation rate was crudely estimated from creel data collected in spring 2000. Exploitation was estimated by dividing the total number of fish harvested by the total number of fish caught. Although this is not the real exploitation rate, it provides a starting point for modeling. Yield was calculated using the Beverton-Holt equilibrium yield equation as described by Ricker.

Results and Discussion

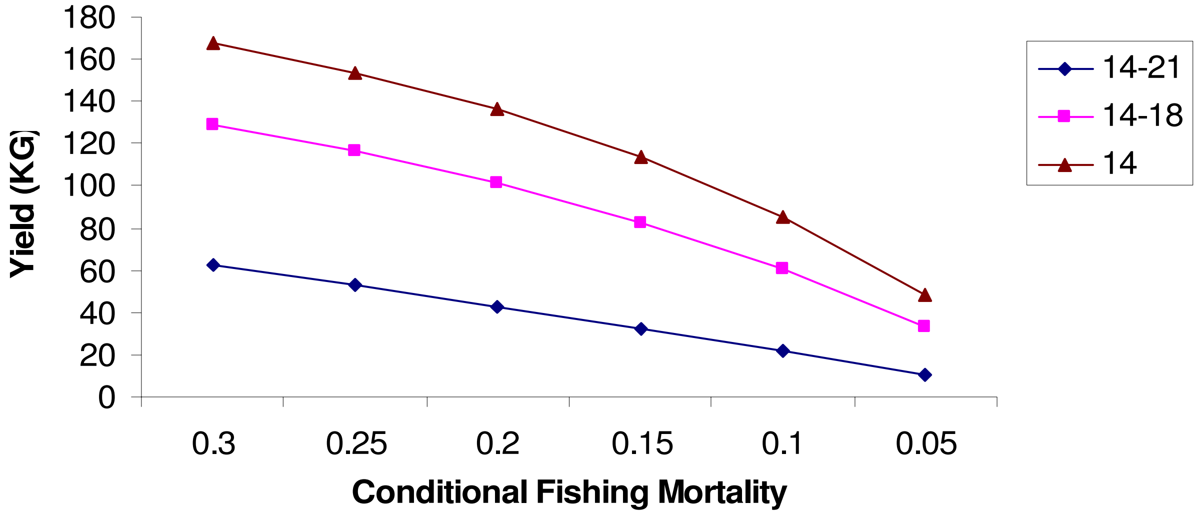
The results are shown in the accompanying table and figure. Results of the growth analysis were suspect with the L-infinity being 22.1 inches and the maximum age being only 8.4 years. Modeling of different length limits could not be conducted with the maximum age estimate because the model predicted that it would take 9.8 years for a fish to reach the 21- inch upper slot limit. Reasons for this abnormality of the model could be caused by the increase of aquatic vegetation which could have caused increased growth rates of some year classes when compared to others. This increase in vegetation abundance would likely violate some of the FAST model assumptions such as consistent recruitment and mortality over time.

To model different length limits, I assigned a maximum age of 10 to run the model successfully. Different rates of conditional natural mortality (ranging from .045-0.25) and conditional fishing mortalities (ranging from 0.3-0.05) were processed for three different types of regulations. These regulations were a 14- to 21-inch slot, a 14- to 18-inch slot, and a 14-inch minimum length limit. The FAST model produced yield estimates for each different length limit. Yield estimates across each different conditional natural mortality were averaged and presented with the corresponding conditional fishing mortality.

It appears from yield estimates that the 14- to 21- inch slot limit has very low yield estimates when compared to the other regulations modeled. This is mainly because not very many fish are growing to that size based on the available growth data. The 14- inch minimum regulation was predicted to have the largest yield. This is not unexpected because more fish would be available for anglers. Although lower, the 14-to 18- inch slot had somewhat similar yield estimates as the 14- inch minimum.

Population parameters of Largemouth bass in Joe Pool Reservoir, 2006. Estimates were obtained using the FAST Modeling Program.

N aged	Total Mortality	Maximum size (L-infinity in inches)	Maximum age (years)
225	49.0%	22.1”	8.4



Average total yield estimates for 14-to 21-inch slot (diamonds), 14-to 18-inch slot (squares), and 14-inch minimum (triangles) length limits modeled under varying conditional natural mortalities and conditional fishing mortalities. Conditional natural mortalities ranged from 0.45-0.25. Estimates were obtained using the FAST modeling program with data collected from 2006 fall electrofishing.