

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-33

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2007-08 Survey Report

**Palo Pinto Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Palo Pinto Reservoir were surveyed with trap nets and electrofishing in 2007 and with gill nets in 2008. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Palo Pinto Reservoir is a 2,399-acre impoundment located in Palo Pinto County on Palo Pinto Creek in the Brazos River Basin approximately 79 miles southwest of Fort Worth. It was constructed in 1964 to provide municipal water for Mineral Wells, Texas and cooling water for the Brazos Electric power plant. It has a primarily rocky shoreline with boat docks. At the time of the 2007 habitat survey, the reservoir was 0.5 feet below spillway elevation and a large amount of flooded terrestrial vegetation was documented. Boat access is adequate at the three improved public boat ramp sites. Periodic turbidity, fluctuating water levels and a rocky shoreline inhibit the growth of aquatic vegetation.
- **Management history:** Important sport fish include channel catfish, white bass, palmetto bass, largemouth bass, and white crappie. Palo Pinto has always been managed using statewide regulations.
- **Fish Community**
  - **Prey species:** Gizzard shad catch rate was near the historical average for the reservoir indicating adequate forage for game fish. The catch per unit effort (CPUE) for bluegill was much higher than previous surveys.
  - **Catfish:** Blue catfish were first stocked in 2007 and were not sampled during the 2008 gill net survey which was expected since they likely had not recruited to the sampling gear. The gill net survey for the channel catfish resulted in a catch rate identical to the 2006 survey and the historical average. All channel catfish sampled were of legal size and were in good body condition. Flathead catfish exist in the reservoir, but none were sampled in 2008.
  - **White bass:** White bass CPUE was near the historical average, but was down from 2006 when the highest catch rate ever was measured. There was noticeable improvement in the body condition of the white bass sampled compared to the past.
  - **Palmetto bass:** Two palmetto bass were sampled in 2008 compared to 2006 when twenty palmetto bass were surveyed although the 2008 fish were bigger than any caught in 2006. Palmetto bass were first stocked during 2002 and have been stocked every other year at the stocking rate of five per acre.
  - **Largemouth bass:** Largemouth bass CPUE was near the historical average for the reservoir. Bass body condition was considered good and had improved over the last two electrofishing surveys. A large number of young-of-the year bass were sampled which bodes well for the future. The number of legal size bass sampled has increased since the last survey. Florida largemouth bass alleles for the 2007 year class were low.
  - **White crappie:** The 2007 CPUE was higher than the previous two surveys in 1999 and 2003. The majority of the crappie sampled were young-of the-year indicating natural reproduction continues to be good.
- **Management Strategies:** Stock Florida largemouth bass at a rate of 50/acre in 2008 to increase Florida allele percentage in the bass population. Stock blue catfish at a rate of 50/acre in 2008 to complete the species introduction to the reservoir. Begin stocking palmetto bass every year at five per acre.

## INTRODUCTION

This document is a summary of fisheries data collected from Palo Pinto reservoir in 2007 and 2008. The purpose 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 important sport fish and prey species. Historical data is presented for comparison.

### *Reservoir Description*

Palo Pinto Reservoir is a 2,399-acre impoundment constructed in 1964 on Palo Pinto Creek in the Brazos River watershed. It is in Palo Pinto County approximately 79 miles southwest of Fort Worth. Primary uses are municipal water supply for Mineral Wells, Texas and cooling water for the Brazos Electric power plant. Mean depth is 17 feet and conductivity was 217  $\mu\text{mhos/cm}$  when measured in July 2007. Primary aquatic habitats in 2007 included flooded terrestrial vegetation, rocks and boat docks. Periodic turbidity, fluctuating water levels and a rocky shoreline inhibits the abundance of aquatic vegetation. Bank fishing is available at the public access points including the boat ramps. Other descriptive characteristics are in Table 1.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Howell and Mauk 2004) included:

1. The channel catfish population was stable, but catch rates were low. There was little evidence that the 1997 and 2000 supplemental stocking helped to increase relative abundance. Blue catfish were not present and could potentially provide an additional sport fish at a reservoir with low catfish abundance.  
**Action:** Requested blue catfish fingerlings at the rate of 50 per acre. Initial stocking occurred in 2007. Enhanced evaluation of catfish populations by increasing gill net surveys to every other year and doubled effort to 10 gill net nights per survey.
2. Palmetto bass could provide another important game fish for anglers. White bass reproduction is sporadic, so periodic stocking of palmetto bass would help provide another pelagic predator. The warm-water effluent from the power plant should attract palmetto bass and provide improved winter angling.  
**Action:** Continued stocking palmetto bass at the rate of five per acre in 2004 and 2006. Monitored the success of stocking by surveying every two years with double the gill net survey effort, and maintained supplemental stocking requests on an every other year basis. The developing palmetto bass fishery was mentioned in a 2006 news release.

**Harvest regulation history:** Sport fish in Palo Pinto reservoir have always been managed using statewide regulations (Table 2).

**Stocking history:** Blue catfish were first stocked in 2007. Palmetto bass were introduced in 2002 and have been stocked every other year. The complete stocking history is in Table 3.

**Vegetation/habitat history:** Palo Pinto has no significant vegetation or habitat management history. Noxious vegetation has not been a problem at the reservoir.

## METHODS

Fish were collected by electrofishing (1.0 hours at 12 five-minute stations), gill netting (10 net nights at 10 stations), and trap netting (five net nights at five stations). Catch per unit effort for electrofishing was

recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill and trap nets, as the number of fish 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 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], 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 =  $100 \times \text{SE of the estimate/estimate}$ ) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from 5 to 10 fish per inch group. Source for water level data was the United States Geological Survey.

## RESULTS AND DISCUSSION

**Habitat:** A physical habitat survey conducted August 7, 2007 indicated that the littoral zone habitat consisted primarily of rocky shoreline and flooded terrestrial vegetation (Table 4). The previous physical habitat survey was conducted in 2003 (Howell and Mauk 2004). Very few manmade changes to the physical habitat had occurred during the four year period.

**Prey species:** Electrofishing catch rates of bluegill and gizzard shad were 186.0/h and 119.0/h, respectively. Index of vulnerability for gizzard shad was high, indicating that 100.0% of gizzard shad were available to predators; this was a slightly higher IOV estimate than in previous years. Total CPUE of gizzard shad was lower in 2007 compared to 2003, but was near the historical reservoir average (Figure 2). Total CPUE of bluegill in 2007 was higher than the 1999 and 2003 surveys (Figure 3). Threadfin shad were also present at the relatively low abundance of 10.0/h.

**Blue catfish:** Blue catfish were introduced during 2007 but were not sampled during the 2008 gill net survey. Blue catfish likely had not recruited to the gear as of 2008.

**Channel catfish:** The 2008 gill net catch rate was 1.1/nn, identical to the 2006 catch rate and the historical average (Figure 4). All sampled fish were of legal size and had Wr at or above 100.

**White bass:** The gill net catch rate for white bass was 2.0/nn in 2008, which was down from 4.3/nn in 2006, but similar to 2.2/nn in 2004 (Figure 5) and the historical average of 2.1/nn. There was a great improvement in body condition as evidenced by Wr's above 100 for all white bass inch groups sampled greater than 8 inches compared to 2004 and 2006 when no inch groups had Wr's above 100.

**Palmetto bass:** Palmetto bass were first introduced in 2002 and have been stocked every other year at a reduced rate of about 5/acre. In 2008, the gill net catch rate was 0.2/nn, down from 2006 when the rate was 2.0/nn but up from 2004 when the rate was 0.1/nn (Figure 6). Like the white bass, palmetto bass were in excellent condition with Wr's over 100 compared to the past when Wr's were 90 and below.

**Largemouth bass:** The electrofishing CPUE of largemouth bass was 77.0/h in 2007, a decrease from 2003 (93.0/h) and an increase from 1999 (70.0/h) (Figure 7). Body condition for these fish was excellent with relative weight near 100 for stock size ( $\geq 8$  inches) and greater. The genetic analysis of the 2007 age-class found a low (13.6) percentage of Florida alleles in the population (Table 5).

**Crappie:** The trap net catch rate of white crappie was 24.2/nn in 2007, higher than previous surveys in 1999 (15.5/nn) and 2003 (13.0/nn); (Figure 8). The catch rate of stock size crappie was lower than the two previous surveys with the high CPUE rate attributed to the large number of young-of-the-year fish sampled. Natural reproduction was good and relative weights for stock size crappie were near 90. Black crappie were present in low abundance at 0.2/nn.

**Fisheries management plan for Palo Pinto Reservoir, Texas**

Prepared – July 2008

**ISSUE 1:** The largemouth bass population had a low percentage (13.6) of Florida alleles present in the 2007 year-class.

**MANAGEMENT STRATEGY**

1. Stock Florida largemouth bass fingerlings at the rate of 50/acre to increase Florida alleles in 2008.

**ISSUE 2:** Blue catfish were first introduced into Palo Pinto in 2007 as part of an approved management plan. No blue catfish were captured during the 2008 gill net survey, but they were probably not recruited to the sampling gear yet. Normal stocking procedures generally allow for two years of introductions to establish a new species in a water body.

**MANAGEMENT STRATEGY**

1. Stock blue catfish at a rate of 50/acre during 2008 to complete introductory stocking.

**ISSUE 3:** Palmetto bass have been stocked on an every other year basis at a reduced rate of 5/acre. The resulting palmetto bass abundance as determined by gill net surveys is low.

**MANAGEMENT STRATEGY**

1. Begin stocking palmetto bass every year at the rate of five per acre.
2. Continue gill net surveys on an every other year basis to monitor palmetto bass.
3. Collect age and growth data on palmetto bass for baseline data of this new fishery.

**SAMPLING SCHEDULE JUSTIFICATION:**

Gill netting for blue catfish and palmetto bass will be conducted on an every other year basis using 10 gill net nights of effort to more closely monitor the status of their developing populations. Standard surveys with trap nets and electrofishing will be conducted every four years to monitor other sport fish species.

## 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, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- 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.
- Howell, M., and R. Mauk. 2004. Statewide freshwater fisheries monitoring and management program survey report for Palo Pinto Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-29-R, Austin.

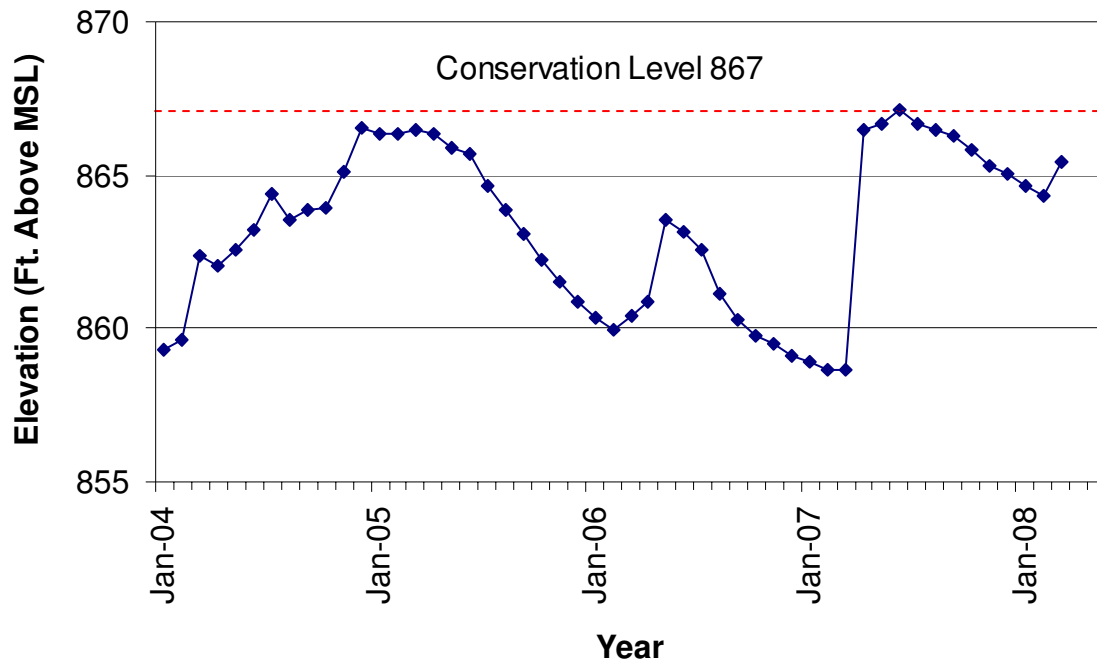


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Palo Pinto Reservoir, Texas.

Table 1. Characteristics of Palo Pinto Reservoir, Texas.

Characteristic	Description
Year Constructed	1964
Controlling authority	City of Mineral Wells
County	Palo Pinto
Reservoir type	Tributary
Shoreline Development Index (SDI)	
Conductivity	217 $\mu$ mhos/cm

Table 2. Harvest regulations for Palo Pinto 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, Palmetto	5	18 minimum
Bass, Largemouth	5	14 minimum
Crappie, White	25	10 minimum



Table 3. Stocking history of Palo Pinto, 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.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Life Stage</b>	<b>Mean TL (in)</b>
Black crappie x White crappie	1993	125,480	FRY	0.9
	1994	134,000	FRY	0.9
	1995	26,774	FGL	1.0
	Total	286,254		
Blue catfish	2007	120,555	FGL	2.5
	Total	120,555		
Channel catfish	1986	79,831	AFGL	5.0
	1997	13,325	AFGL	7.8
	2000	27,016	FGL	2.8
	Total	120,172		
Florida Largemouth bass	1975	53,000	FRY	1.0
	1982	53,823	FGL	2.0
	1983	64,960	FGL	2.0
	1983	116,984	FRY	1.0
	1985	119,150	FRY	1.0
	1997	133,648	FGL	1.2
	Total	541,565		
Largemouth bass	1970	100,000	FGL	UNK
	1982	17,681	FGL	UNK
	Total	117,681		
Palmetto Bass (striped X white bass hybrid)	2002	13,342	FGL	2.1
	2004	12,107	FGL	1.4
	2006	12,084	FGL	1.6
	Total	37,533		

Table 4. Survey of littoral zone and physical habitat types, Palo Pinto Reservoir, Texas, August 7, 2007.

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. Reservoir elevation at time of survey 866.5 msl (spillway elevation is 867.0 msl).

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Boulder	5.7	22.6		
Bulkhead	0.4	2.0		
Concrete	0.5	2.0		
Eroded bank	0.2	0.1		
Featureless/nondescript	0.1	<0.1		
Flooded terrestrial	11.8	46.8		
Overhanging brush	3.0	11.9		
Rocky bluff	0.2	0.1		
Rocky shore	3.3	13.1		
Total shoreline length	25.2			
<hr/>				
Habitat adjacent to shoreline				
Standing timber			223.3	9.3
Boat docks			16.2	<0.1
Native submerged vegetation			3.7	<0.1
Native emerged vegetation			0.4	<0.1

## Gizzard Shad

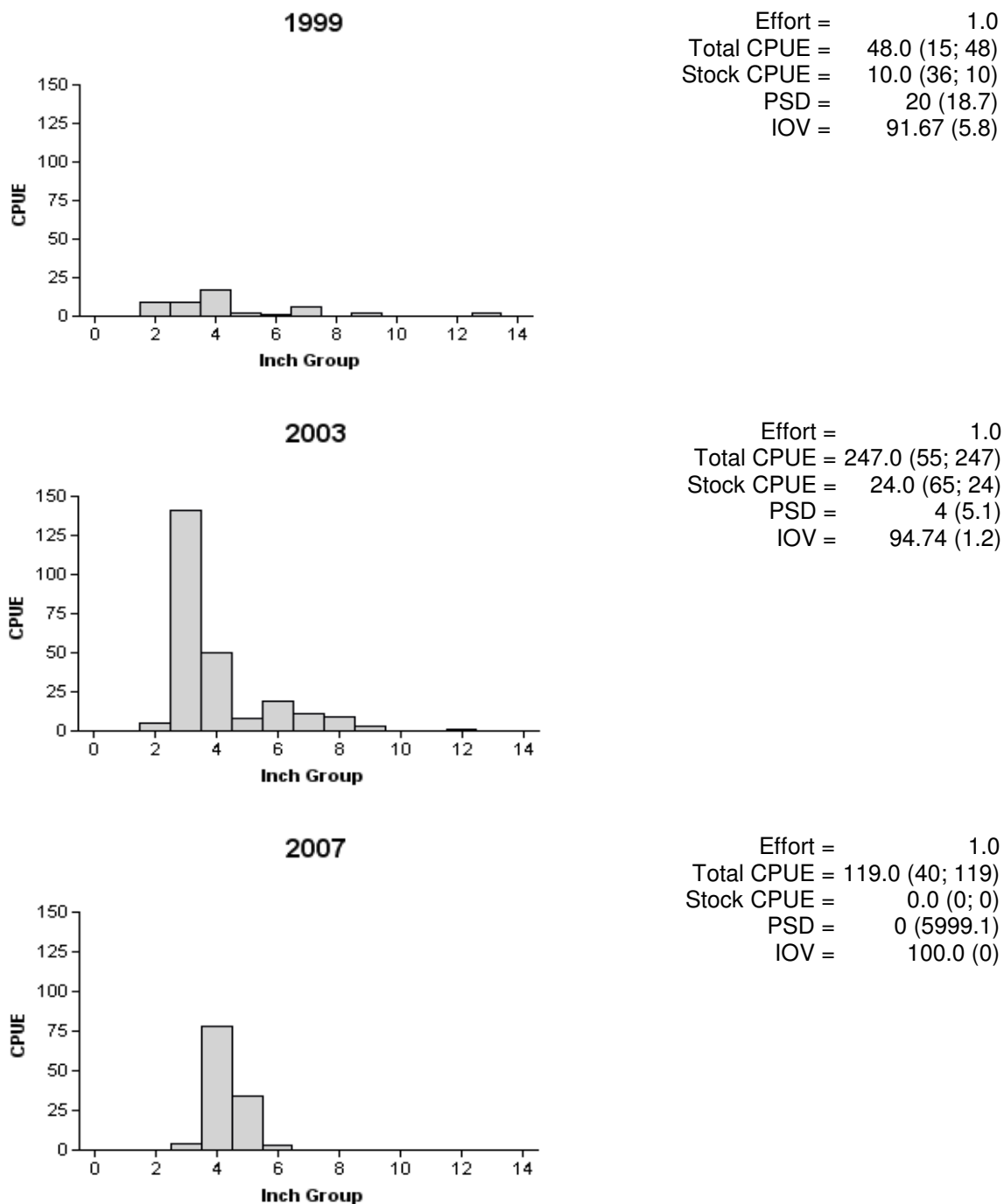
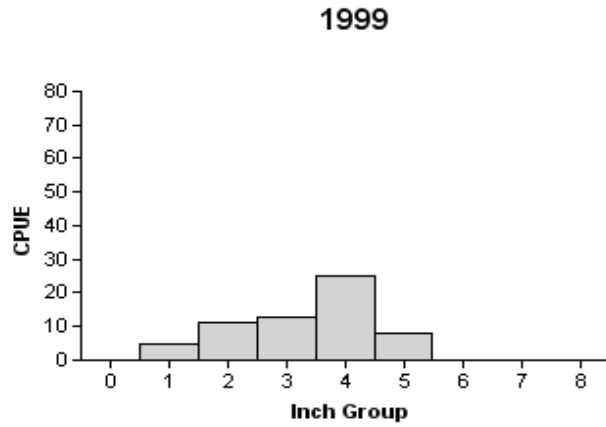
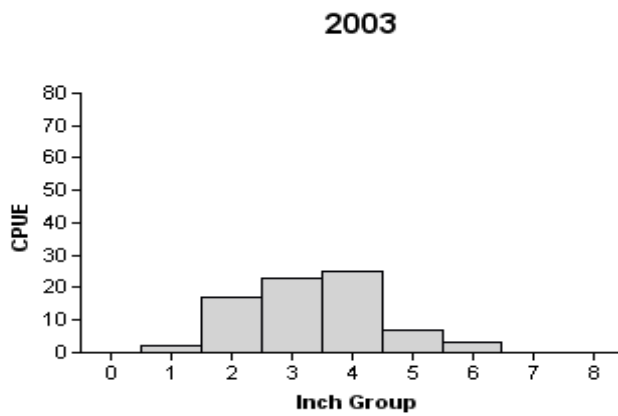


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 1999, 2003, and 2007.

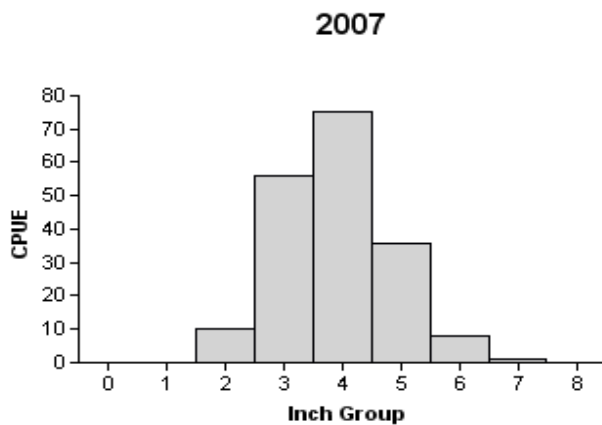
## Bluegill



Effort = 1.0  
 Total CPUE = 62.0 (25; 62)  
 Stock CPUE = 46.0 (22; 46)  
 PSD = 0 (52.9)  
 RSD-P = 0 (0)



Effort = 1.0  
 Total CPUE = 77.0 (27; 77)  
 Stock CPUE = 58.0 (29; 58)  
 PSD = 5 (3.6)  
 RSD-P = 0 (0)

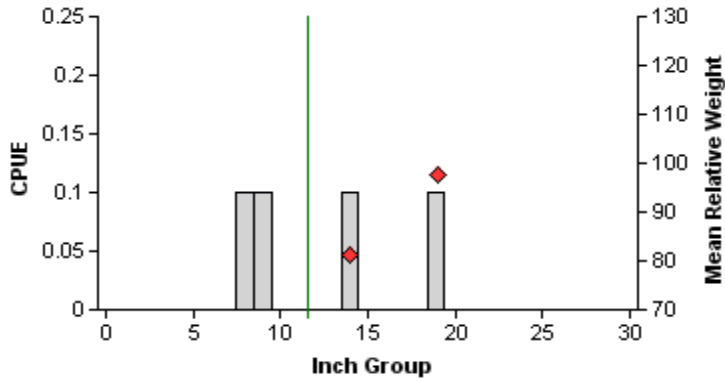


Effort = 1.0  
 Total CPUE = 186.0 (15; 186)  
 Stock CPUE = 176.0 (15; 176)  
 PSD = 5 (1.5)  
 RSD-P = 0 (0)

Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 1999, 2003, and 2007.

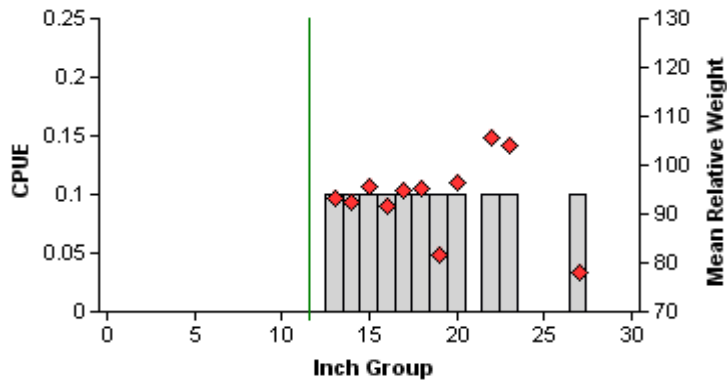
## Channel Catfish

2004



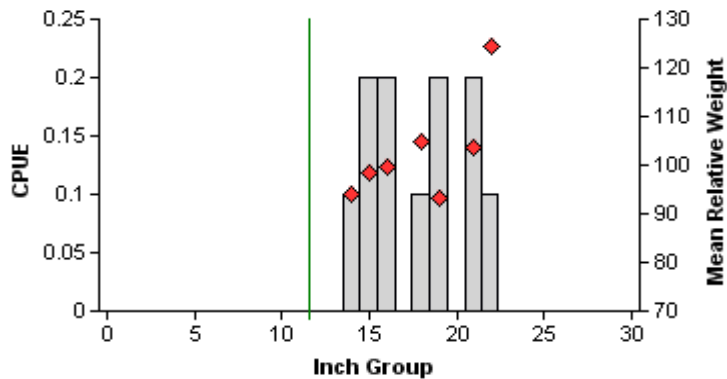
Effort = 10.0  
 Total CPUE = 0.4 (55; 4)  
 Stock CPUE = 0.2 (67; 2)  
 PSD = 50 (37.3)  
 RSD-P = 0 (0)

2006



Effort = 10.0  
 Total CPUE = 1.1 (39; 11)  
 Stock CPUE = 1.1 (39; 11)  
 PSD = 73 (12.6)  
 RSD-P = 9 (6.9)

2008

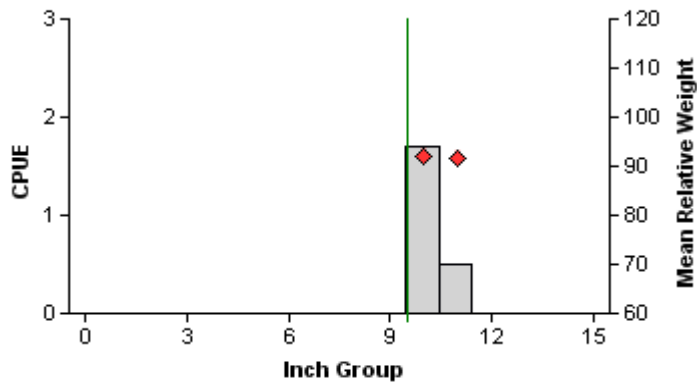


Effort = 10.0  
 Total CPUE = 1.1 (34; 11)  
 Stock CPUE = 1.1 (34; 11)  
 PSD = 73 (20)  
 RSD-P = 0 (0)

Figure 4. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2002, 2006, and 2008. Line indicates minimum size limit at time of sampling.

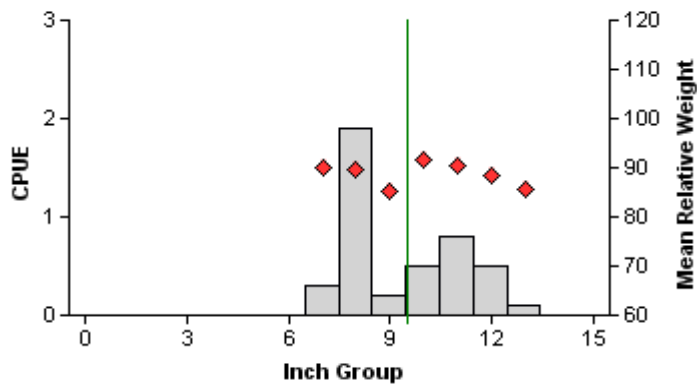
## White Bass

2004



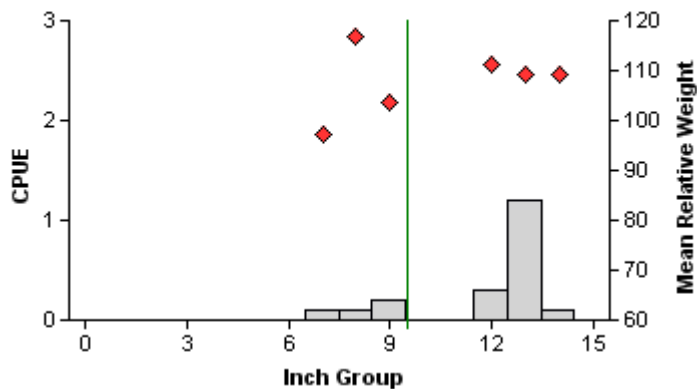
Effort = 10.0  
 Total CPUE = 2.2 (44; 22)  
 Stock CPUE = 2.2 (44; 22)  
 PSD = 100 (0)  
 RSD-P = 0 (0)

2006



Effort = 10.0  
 Total CPUE = 4.3 (31; 43)  
 Stock CPUE = 4.3 (31; 43)  
 PSD = 49 (7.4)  
 RSD-P = 14 (4.5)

2008

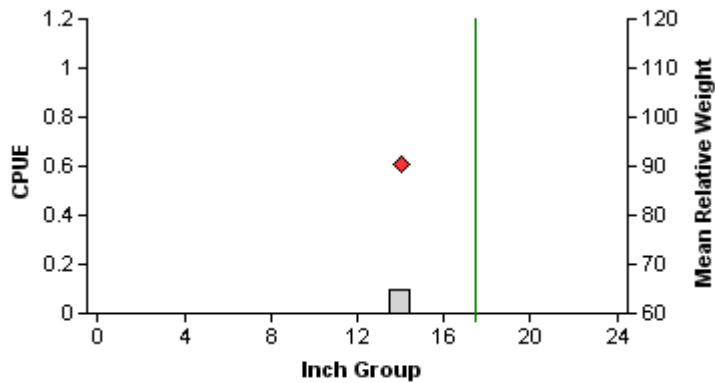


Effort = 10.0  
 Total CPUE = 2.0 (46; 20)  
 Stock CPUE = 2.0 (46; 20)  
 PSD = 90 (3.2)  
 RSD-P = 80 (7.2)

Figure 5. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2002, 2006 and 2008. Line indicates minimum size limit at time of sampling.

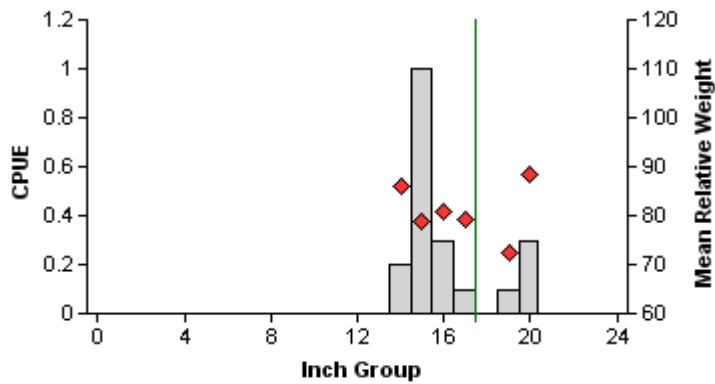
## Palmetto Bass

2004



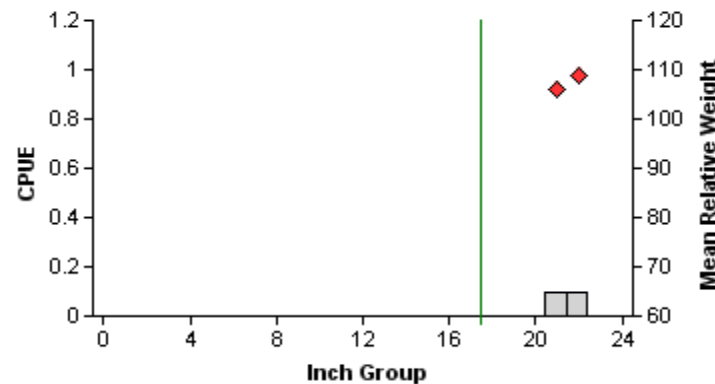
Effort = 10.0  
 Total CPUE = 0.1 (100; 1)  
 Stock CPUE = 0.1 (100; 1)  
 PSD = 100 (0)  
 RSD-P = 0 (0)

2006



Effort = 10.0  
 Total CPUE = 2.0 (48; 20)  
 Stock CPUE = 2.0 (48; 20)  
 PSD = 100 (0.0)  
 RSD-P = 90 (6.8)

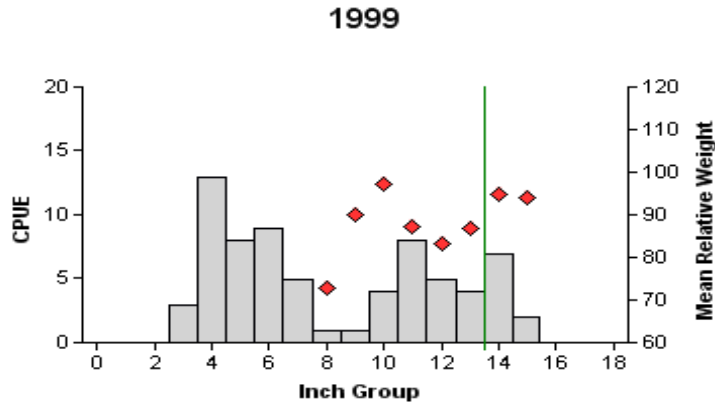
2008



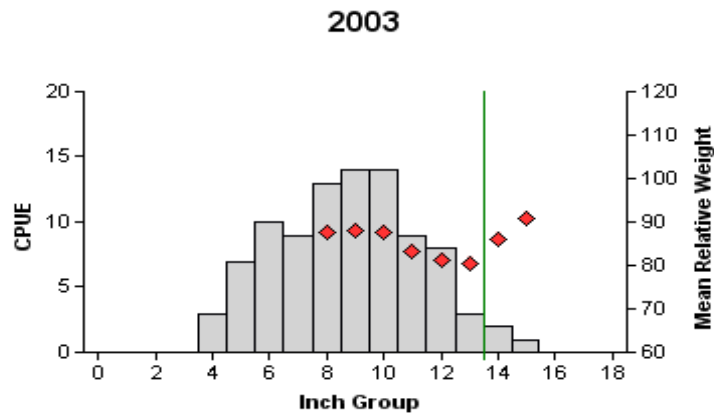
Effort = 10.0  
 Total CPUE = 0.2 (67; 2)  
 Stock CPUE = 0.2 (67; 2)  
 PSD = 100 (0)  
 RSD-P = 100 (0)

Figure 6. Number of palmetto bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2004, 2006 and 2008. Line indicates minimum size limit at time of sampling.

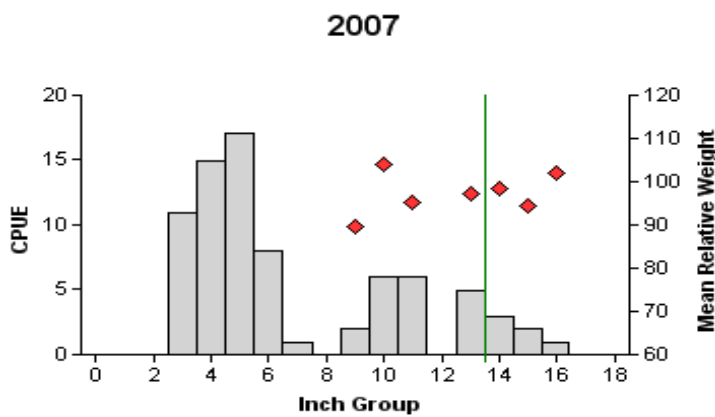
## Largemouth Bass



Effort = 1.0  
 Total CPUE = 70.0 (27; 70)  
 Stock CPUE = 32.0 (27; 32)  
 PSD = 56 (6.1)  
 RSD-P = 6 (3.8)



Effort = 1.0  
 Total CPUE = 93.0 (32; 93)  
 Stock CPUE = 64.0 (35; 64)  
 PSD = 22 (4.7)  
 RSD-P = 2 (1.7)



Effort = 1.0  
 Total CPUE = 77.0 (19; 77)  
 Stock CPUE = 25.0 (29; 25)  
 PSD = 44 (10.2)  
 RSD-P = 12 (6.1)

Figure 7. 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, Palo Pinto Reservoir, Texas, 1999, 2003, and 2007. Line indicates minimum size limit at time of sampling.

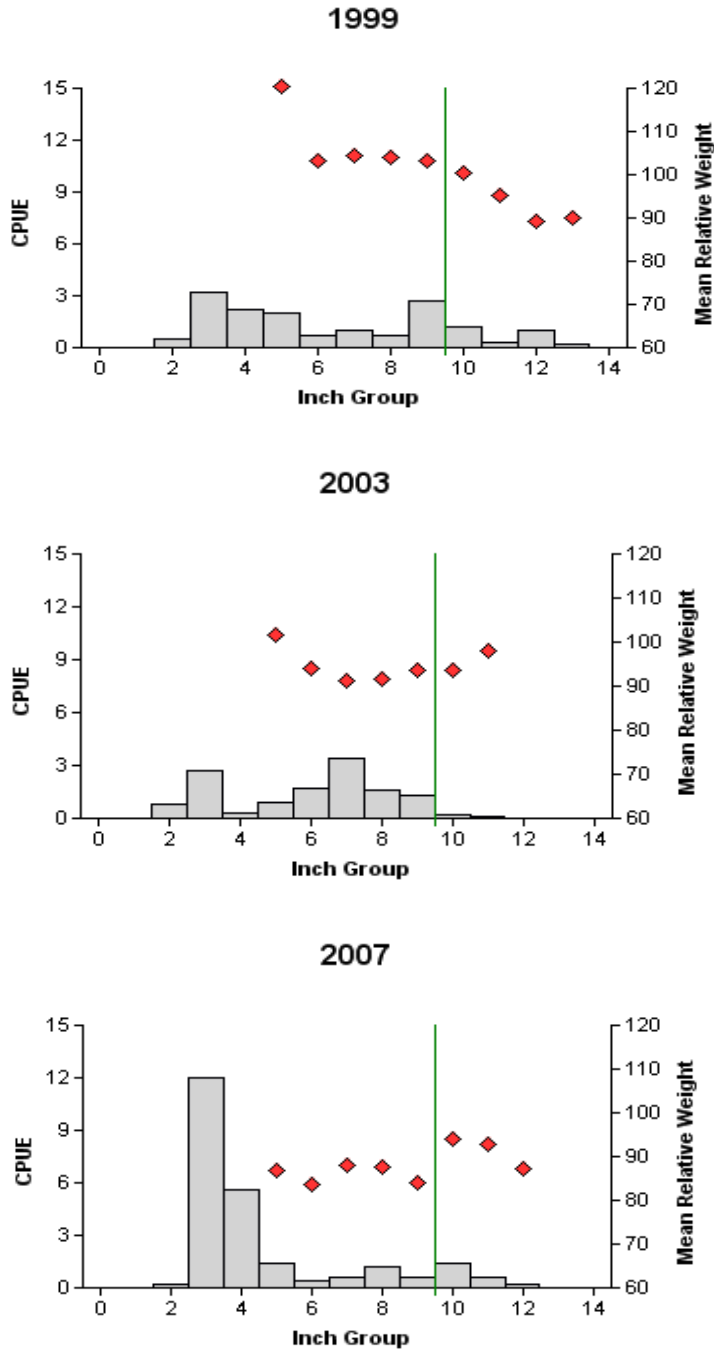


## Largemouth Bass

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Palo Pinto Reservoir, Texas, 1996, 1999, 2003 and 2007. 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 or Fx	NLMB		
1996	30	1	19	10	29.2	3.3
1999	30	3	13	14	29.2	10.0
2003	31	3	21	7	39.5	9.8
2007	30	0	13	17	13.6	0.0

## White Crappie



Effort = 6.0  
 Total CPUE = 15.5 (30; 93)  
 Stock CPUE = 9.7 (26; 58)  
 PSD = 62 (8.3)  
 RSD-P = 28 (3.6)

Effort = 10.0  
 Total CPUE = 13.0 (18; 130)  
 Stock CPUE = 9.2 (23; 92)  
 PSD = 35 (4.7)  
 RSD-P = 3 (1.4)

Effort = 5.0  
 Total CPUE = 24.2 (59; 121)  
 Stock CPUE = 6.4 (42; 32)  
 PSD = 62 (9.7)  
 RSD-P = 34 (5.7)

Figure 8. 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, Palo Pinto Reservoir, Texas, 1999, 2003, and 2007. Line indicates minimum size limit at time of sampling.

Table 6. Proposed sampling schedule for Palo Pinto Reservoir, Texas. Gill net surveys are conducted in the spring, while electrofishing and trap net surveys are conducted in the fall. S denotes standard survey and A denotes additional survey.

Survey Year	Electrofishing	Trap Net	Gill Net	Creel	Report
Fall 2008-Spring 2009					
Fall 2009-Spring 2010			A		
Fall 2010-Spring 2011					
Fall 2011-Spring 2012	S	S	S		S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all species collected from all gear types from Palo Pinto Reservoir, Texas, 2007-2008.

Species	Gill Nets		Trap Nets		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Spotted gar	2	0.2				
Longnose gar	84	8.4				
Shortnose gar	2	0.2				
Gizzard shad	62	6.2			119	119.0
Threadfin shad					10	10.0
Common carp	1	0.1	1	0.2		
River carpsucker	1	0.1				
Smallmouth buffalo	111	11.1				
Channel catfish	11	1.1				
White bass	20	2.0				
Palmetto bass	2	0.2				
Green sunfish					14	14.0
Warmouth					5	5.0
Bluegill			27	5.4	186	186.0
Longear sunfish			1	0.2	55	55.0
Other hybrid sunfish					1	1.0
Largemouth bass	3	0.3			77	77.0
White crappie	29	2.9	121	24.2		
Black crappie			1	0.2		
Freshwater drum	10	1.0				

