

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2011 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 2011 and with gill nets in 2012. 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 2011 habitat survey, the reservoir was 3.7 feet below spillway elevation and rocky shoreline and standing timber was the dominant habitat features. Boat access was 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 blue and channel catfish, white and palmetto bass, largemouth bass, and crappie. Palo Pinto has always been managed using statewide regulations.
- **Fish Community**
  - **Prey species:** Gizzard shad catch rate was above the historical average for the reservoir and almost all were of a size range utilized by predators. The catch per unit effort (CPUE) for bluegill was the highest ever recorded for the reservoir. Threadfin shad were abundant and redear sunfish are becoming established. Prey does not appear to be a problem at the reservoir.
  - **Catfish:** Blue catfish were first stocked in 2007. They were not sampled during the 2008 gill net survey because they were probably not vulnerable to the gill net mesh size. During the 2010 and 2012 surveys, the catch rate was good and all fish sampled in 2012 were above the 12 inch minimum length limit. The gill net survey for the channel catfish resulted in a catch rate that has been in decline since 2008. This phenomenon of CPUE decline is seen in most of the district reservoirs where blue catfish have become established. Flathead catfish exist in the reservoir, but were not sampled in 2012.
  - **White bass:** White bass CPUE was the lowest ever recorded but was probably affected by the extremely high water elevations the month preceding the survey and at the time of the survey. The reservoir was above spillway elevation and many fish either went up the creek or some might have left the reservoir by going over the spillway.
  - **Palmetto bass:** One palmetto bass was sampled in 2012 compared to 2010 when four were surveyed. High water during the 2012 survey period and only one stocking since 2008 could account for the low CPUE. Like white bass, the palmetto bass possibly escaped the reservoir and were therefore not vulnerable to our nets.
  - **Largemouth bass:** Largemouth bass CPUE was the highest ever recorded. Body condition was considered below average. Many bass were just below the minimum legal size limit and good numbers of legal sized bass were surveyed so the future is bright for this population.
  - **Crappie:** The 2011 white crappie CPUE was above the historical average. A majority of the crappie were in the 6-8 inch range which bodes well for the future. Body condition was considered good. Black crappie are present but in low abundance.
- **Management Strategies:** Request annual stocking of palmetto bass at five per acre. Gill net every two years to monitor palmetto bass and blue catfish. Perform year long creel survey to determine reservoir angling pressure, catch, and harvest. Collect age and growth data for largemouth bass.

## INTRODUCTION

This document is a summary of fisheries data collected from Palo Pinto reservoir in 2011 and 2012. 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 447  $\mu\text{mhos/cm}$  in August 2011. Primary aquatic habitats in 2011 included rocky shoreline, standing timber, 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 (Mauk and Howell 2008) included:

1. The largemouth bass population had a low percentage (13.6) of Florida alleles present in the 2007 year-class.  
**Action:** Stocked Florida largemouth bass fingerlings at the rate of 50/acre in 2008 to increase Florida alleles.
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.  
**Action:** Stocked blue catfish at a rate of 50/acre during 2008 to complete introductory stocking.
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.  
**Action:** Requested palmetto bass stocking every year at the rate of five per acre.  
  
**Action:** Continued gill net surveys on an every other year basis to monitor palmetto bass.  
  
**Action:** Planned on collecting age and growth data on palmetto bass for baseline data of this new fishery but small sample size made it impossible for meaningful age and growth estimates.

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

**Stocking history:** Blue catfish were introduced in 2007 with a second stocking in 2008. Palmetto bass were introduced in 2002 and had been stocked every other year until 2008. Only a 2011 stocking has occurred since. 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.

**Water transfer:** There are no intra or inter basin transfers from Palo Pinto. Mineral Wells uses water released through the dam as a municipal water source, pumping the water from the creek about 16 miles downstream of 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 (7 net nights at 7 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 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 weights ( $W_r$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). 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. Source for water level data was the United States Geological Survey.

## RESULTS AND DISCUSSION

**Habitat:** A physical habitat survey conducted August 8, 2011 indicated that the littoral zone habitat consisted primarily of rocky and natural shoreline (Table 4). The previous physical habitat survey was conducted in 2007 (Mauk and Howell 2008). Very few manmade changes to the physical habitat had occurred during the four year period.

**Prey species:** Electrofishing catch rates of gizzard shad and bluegill were 190.0/h and 260.0/h, respectively. Index of vulnerability for gizzard shad was high, indicating that 96% of gizzard shad were available to predators and nearly identical to the IOV estimates in 2007 (100%) and 2003 (95%). Total CPUE of gizzard shad was higher than in 2007 (119.0/h) and the historical average (151.0/h) but lower than 2003 (247/h; Fig. 2). Total CPUE of bluegill in 2011 was higher than the previous surveys and was the highest CPUE documented for the reservoir (Fig. 3). Threadfin shad were also present at the relative abundance of 140.0/h (Appendix A), an increase over the previous survey in 2007 (10.0/h). Redear sunfish were sampled at a rate of 17.0/h. This is an increase over the two previous surveys when only one was sampled in 2003 (Fig. 4).

**Blue catfish:** Blue catfish were first introduced during 2007 with a second stocking occurring in 2008. They were not sampled during the 2008 gill net survey since the 2008 stocking had not yet occurred and the 2007 fish had not recruited to the gear. The 2010 gill net survey had a catch rate of 1.5/nn with most catfish below the 12-inch minimum length limit (Fig. 5). The 2012 survey had a similar catch rate of 1.8/nn with all fish above the minimum length limit. Body condition as measured by  $W_r$  was between 80-90 for most inch classes.

**Channel catfish:** The 2012 gill net survey catch rate was 0.2/nn, slightly lower than the 2010 catch rate of 0.4/nn and 2008 catch rate of 1.1/nn. No legal length channel catfish were sampled in 2012 (Fig. 6).

**White bass:** The gill net catch rate for white bass was 0.2/nn in 2012, which was down from 1.2/nn and 2.0/nn for 2010 and 2008, respectively (Fig. 7) and the historical average of 2.0/nn. At the time of the survey, the reservoir elevation was over the spillway and had been for nearly a month. White bass were possibly up the creek for their spawning run and some possibly went over the spillway into the creek below the reservoir.

**Palmetto bass:** Palmetto bass were first introduced in 2002 and had been stocked every other year up to 2008 at a reduced rate of about 5/acre. The next stocking occurred in 2011 at a rate of 7.6/acre, an increase over the 2008 management plan which called for annual stockings of 5/acre. In 2012, the gill net catch rate was 0.1/nn, down from 2010 and 2008 when the rate was 0.4/nn and 0.2/nn respectively (Fig. 8). Like white bass, the palmetto bass possibly could have left the reservoir in response to reservoir

elevation being over the spillway.

**Largemouth bass:** The electrofishing catch rate of largemouth bass was 126.0/h in 2011, an increase from 2007 (77.0/h) and 2003 (93.0/h; Fig. 9). This was the highest catch rate for the reservoir. Body condition for these fish was considered sub-optimal with most inch groups having Wr's in the 80's. The 2011 genetic analysis of the bass population found 35.0% Florida alleles in the population and both, pure northern and Florida largemouth bass were present (Table 5).

**Crappie:** The trap net catch rate of white crappie was 21.4/nn in 2011, slightly lower than the previous survey in 2007 (24.2/nn) but slightly above the historical average (18.5/nn); (Fig. 10). The catch rate of stock size crappie was much higher than the two previous surveys which should result in an increase in legal sized crappie the next couple of years. Relative weights for legal-sized crappie were near 100. Black crappie were present in low abundance at 0.6/nn (Appendix A) which is a threefold increase over the previous three survey periods. It is unknown whether these are pure black crappie or a remnant of the hybrid black and white crappie that were stocked in 1993-95.

## Fisheries management plan for Palo Pinto Reservoir, Texas

Prepared – July 2012

**Issue 1:** No angling statistics have ever been collected for this reservoir. Angling effort, catch, harvest, and targeted species are unknown.

### MANAGEMENT STRATEGY

1. Perform year-long creel survey beginning in June of 2012.

**Issue 2:** Palmetto bass and blue catfish are relatively recent introductions into the reservoir and their populations are in the process of becoming established. Palmetto bass require stocking to maintain the population and are currently being requested every year at a rate of five per acre. How well these populations are doing and if they become established needs to be monitored.

### MANAGEMENT STRATEGIES

1. Continue gill net surveys on an every other year basis to monitor palmetto bass and blue catfish.
2. Continue requesting palmetto bass stockings annually at a rate of five per acre.

**Issue 3:** No recent age and growth data exists for the largemouth bass population, last being completed in 2003.

### MANAGEMENT STRATEGY

1. Perform an age and growth study of the largemouth bass population in conjunction with an additional electrofishing survey conducted in 2013.

**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 and literature so that they can in turn educate others.
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:

Gill netting for blue catfish and palmetto bass will be conducted on an every other year basis using seven net nights of effort to monitor the status of their developing populations. An additional

electrofishing survey will be conducted in 2013 to monitor the largemouth bass population and to collect age and growth data. Prey populations will also be monitored during this survey. Standard surveys with trap nets will be conducted every four years to monitor the crappie population. A year-long creel survey will be completed during 2012-13 since no angler information has ever been collected for this reservoir.



## 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.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32:348.
- Mauk, R., and M. Howell. 2008. Statewide freshwater fisheries monitoring and management program survey report for Palo Pinto Reservoir, 2007. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-33, Austin.

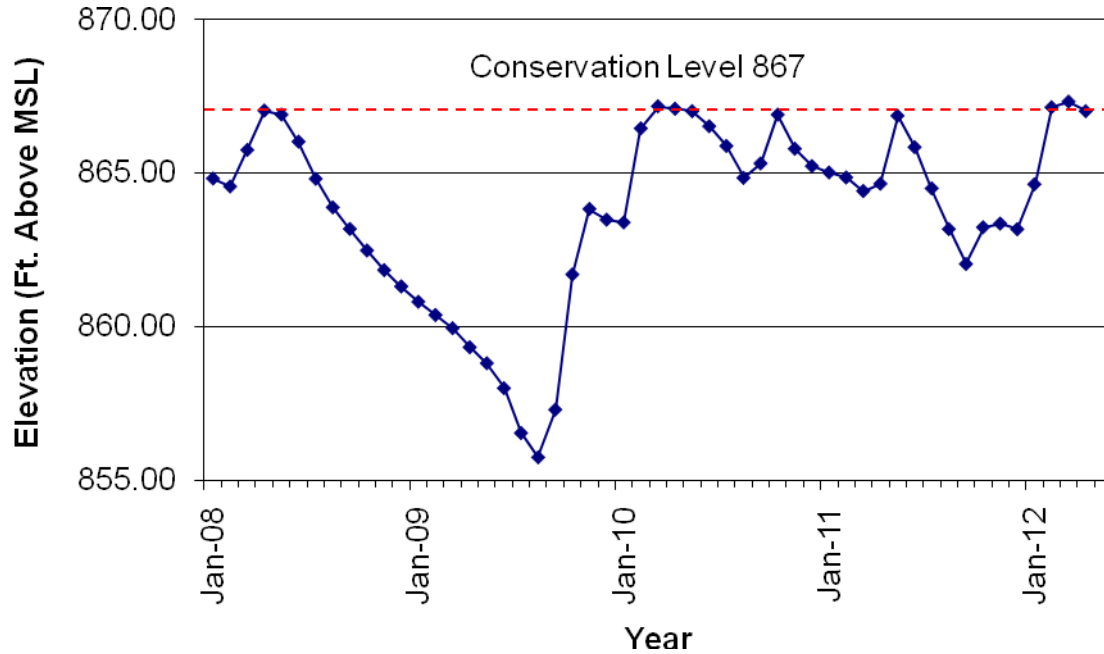


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Palo Pinto Reservoir, Texas. Reservoir elevation data obtained from the USGS website.

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)	2.62
Conductivity	447 $\mu$ 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 Reservoir, 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
	2008	120,666	FGL	2.1
	Total	241,221		
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
	2008	120,900	FGL	1.5
	Total	662,465		
Largemouth bass	1970	100,000	UNK	UNK
	1982	17,681	UNK	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
	2008	12,469	FGL	1.3
	2011	18,169	FGL	1.3
	Total	68,171		

Table 4. Survey of littoral zone and physical habitat types, Palo Pinto Reservoir, Texas, August 8, 2011. 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 863.3 msl (spillway elevation is 867.0 msl).

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	0.2	0.9		
Natural Shoreline	6.5	27.9		
Natural Shoreline with boat docks	2.4	10.3		
Rocky shoreline	6.5	27.9		
Rocky shoreline with boat docks	7.7	33.0		
Total shoreline length	23.3			
<hr/>				
Habitat adjacent to shoreline				
Standing timber			223.3	11.6
Boat docks			16.2	0.8
Flooded terrestrial vegetation			64.6	3.4

## Gizzard Shad

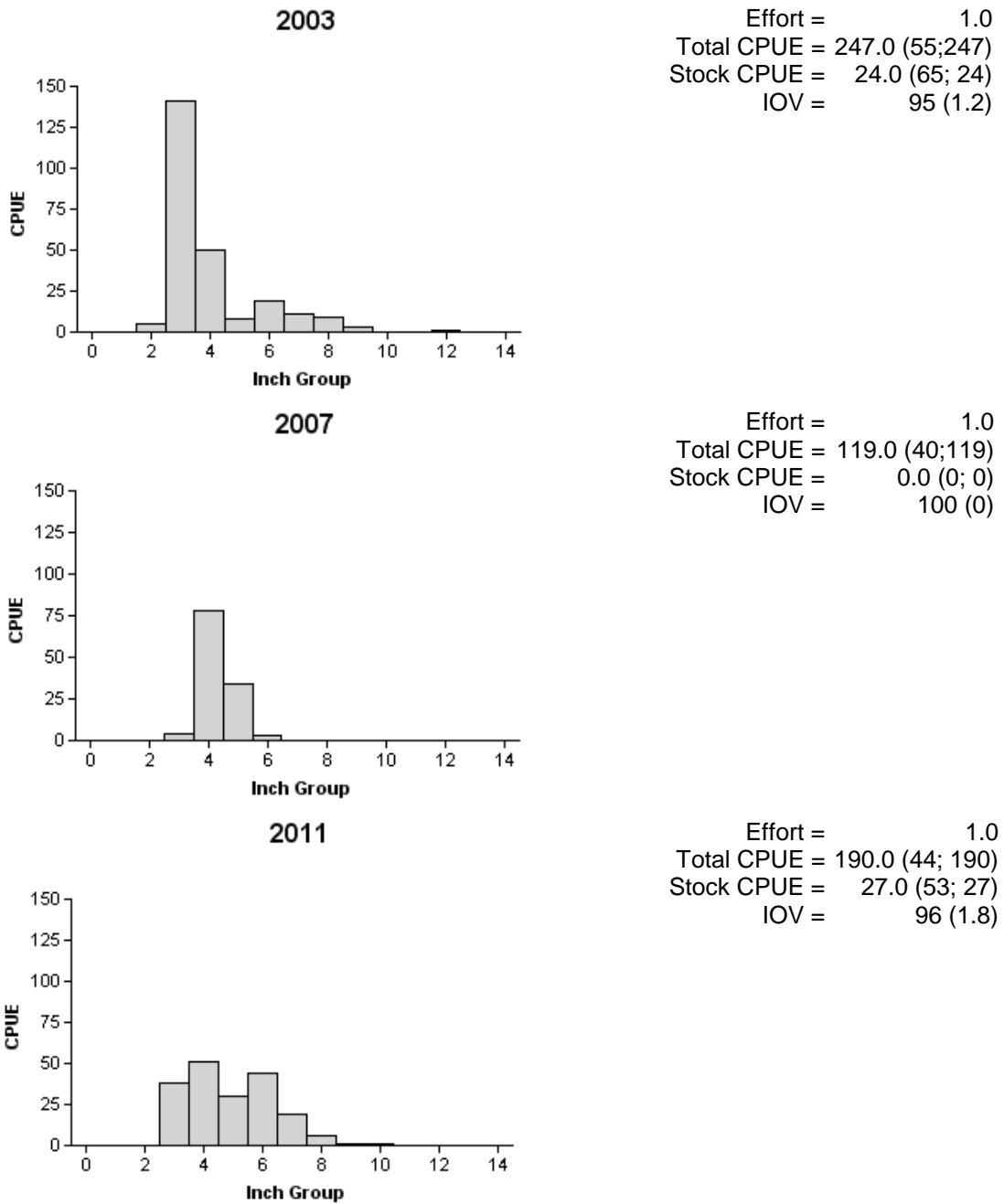


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 2003, 2007, and 2011.

# Bluegill

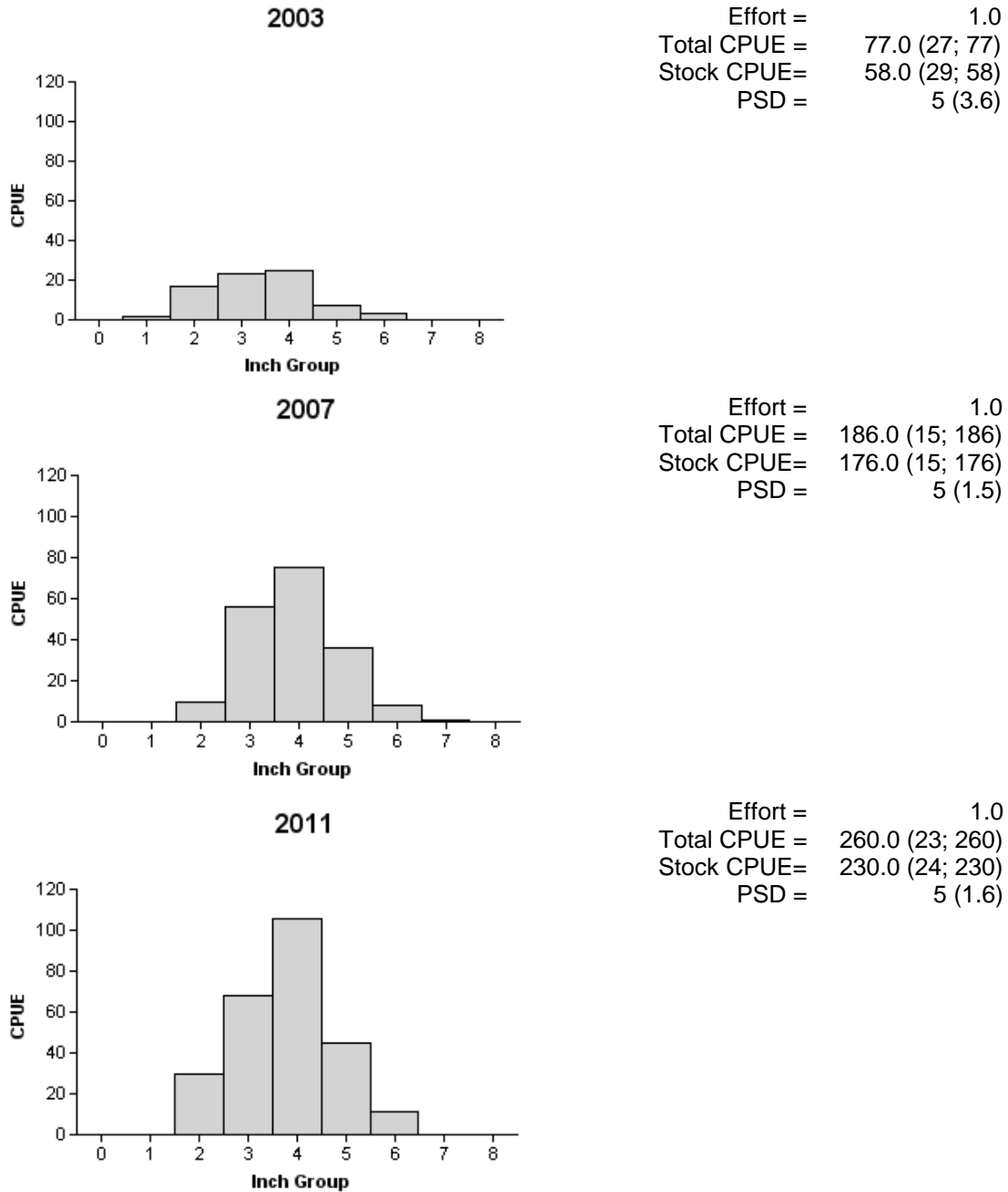


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 2003, 2007, and 2011.

## Redear Sunfish

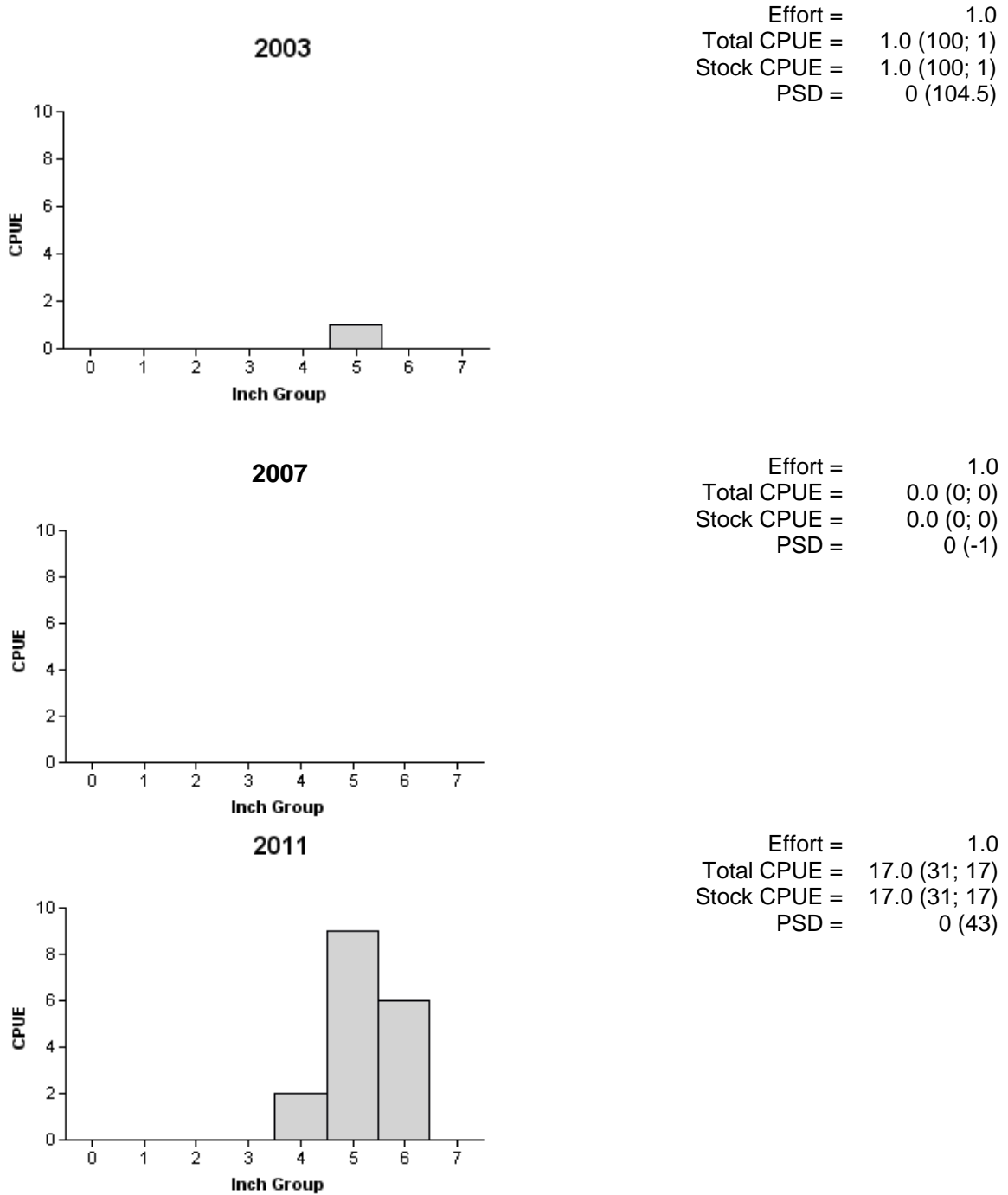


Figure 4. Number of redear sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 2003, 2007, and 2011.

## Blue Catfish

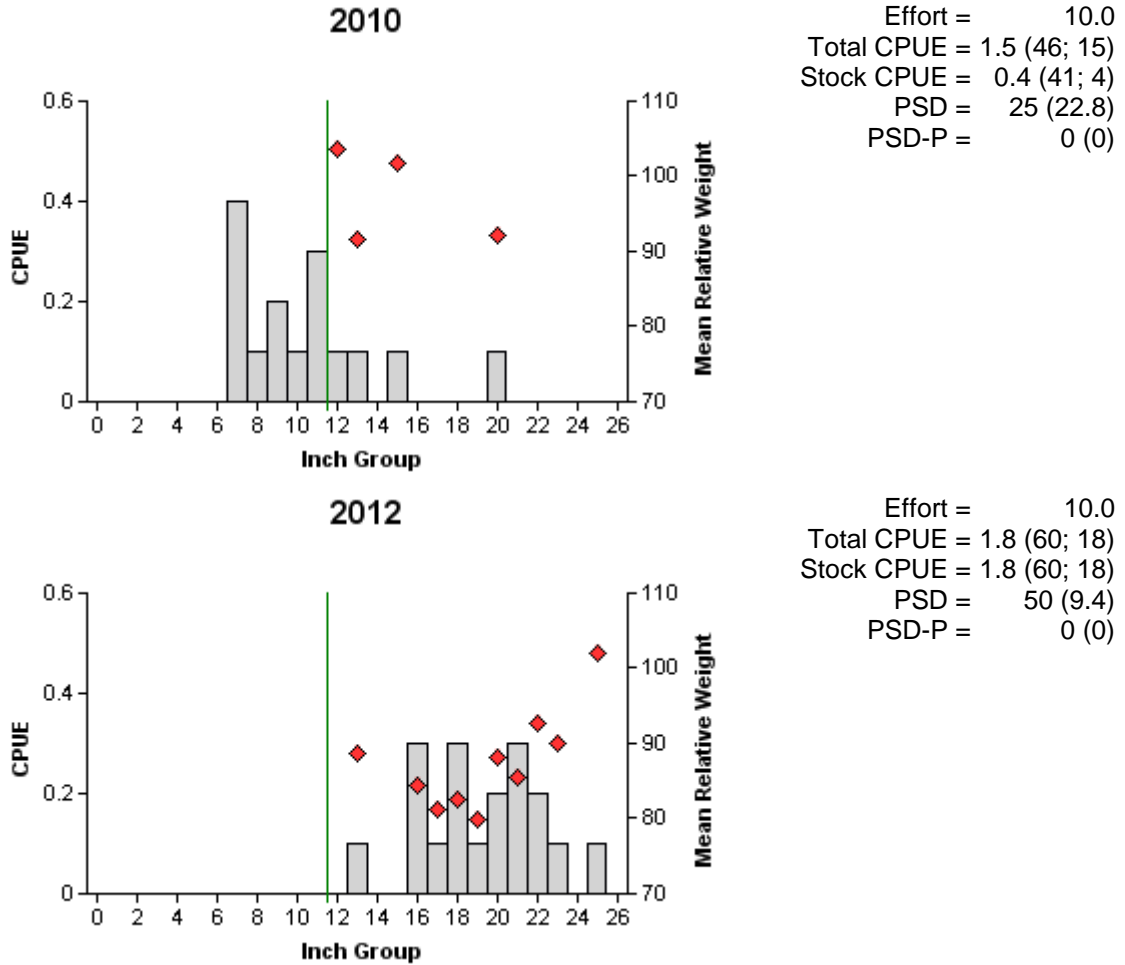


Figure 5. Number of blue catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2010 and 2012. Line indicates minimum length limit at time of sampling.



## Channel Catfish

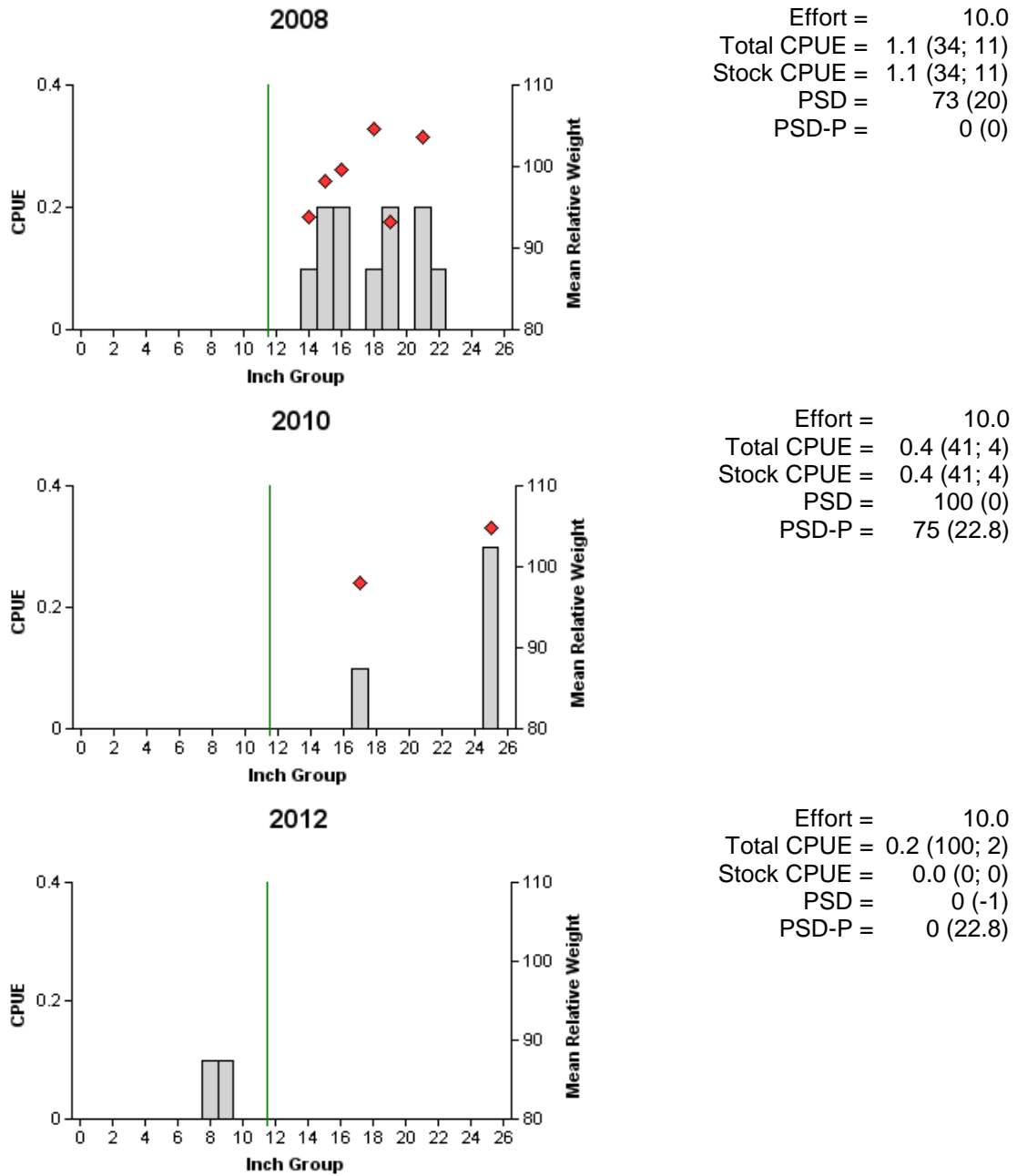


Figure 6. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2008, 2010, and 2012. Line indicates minimum length limit at time of sampling.

## White Bass

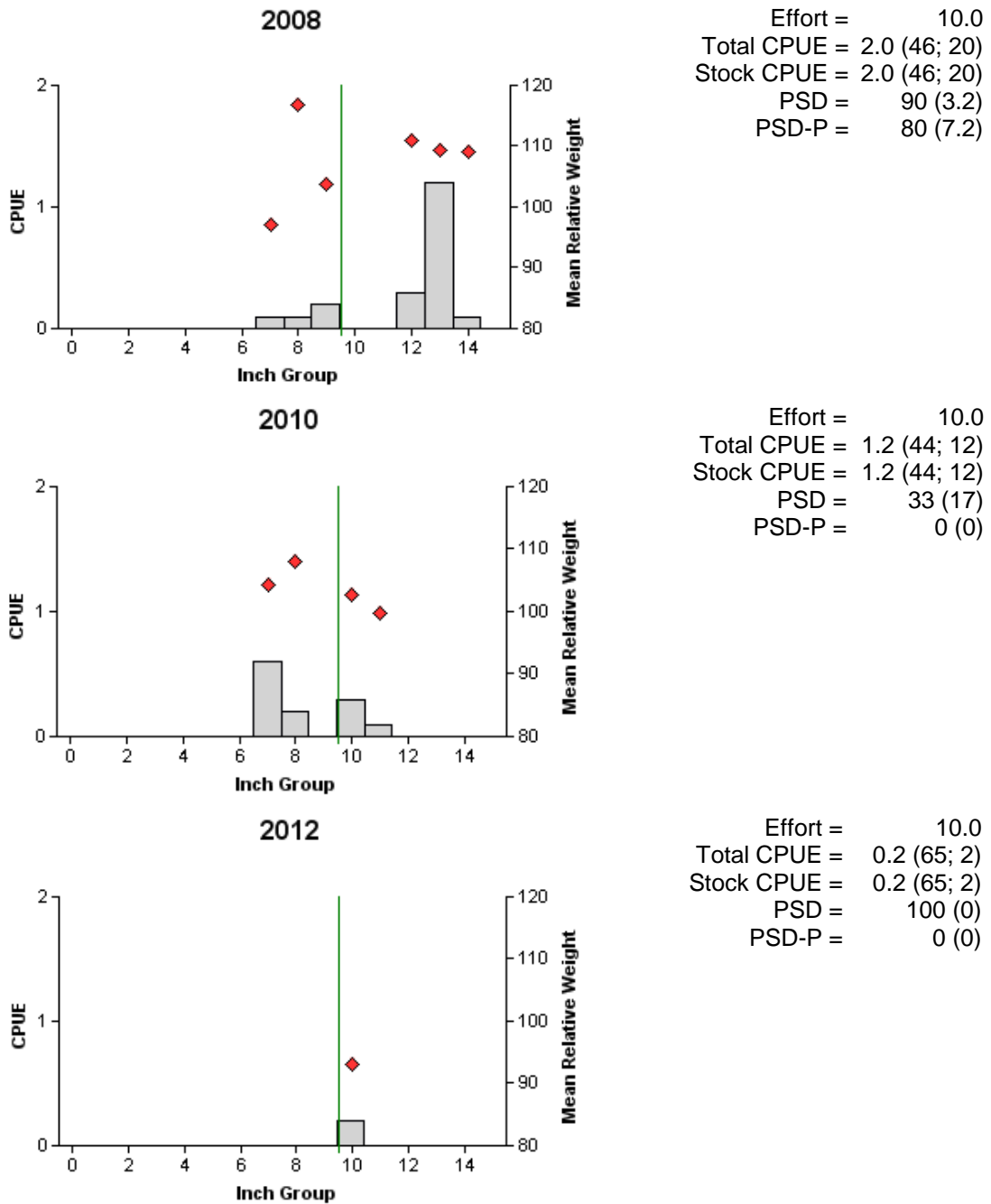


Figure 7. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2008, 2010 and 2012. Line indicates minimum length limit at time of sampling.

## Palmetto Bass

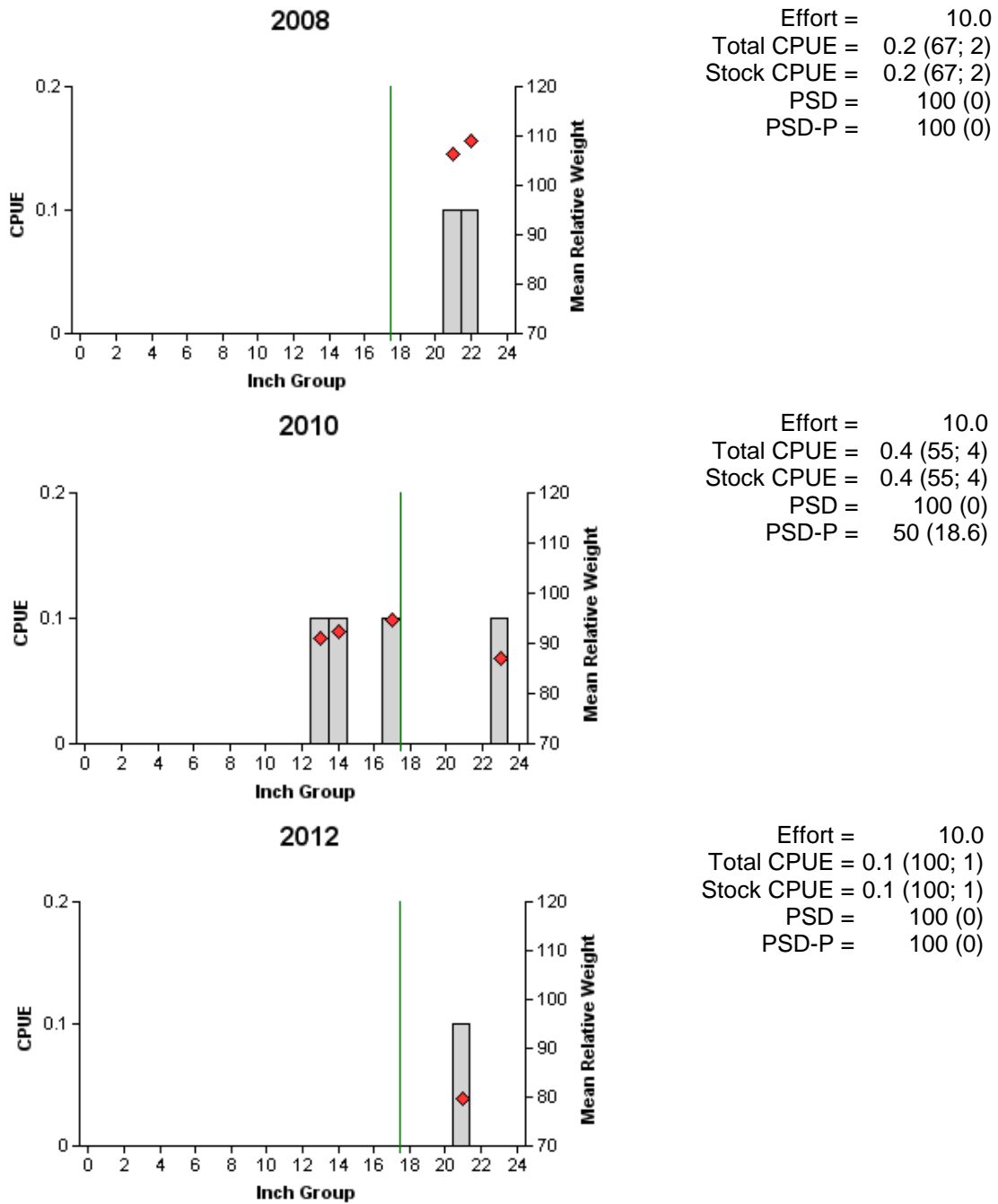


Figure 8. Number of palmetto bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting surveys, Palo Pinto Reservoir, Texas, 2008, 2010 and 2012. Line indicates minimum length limit at time of sampling.

## Largemouth Bass

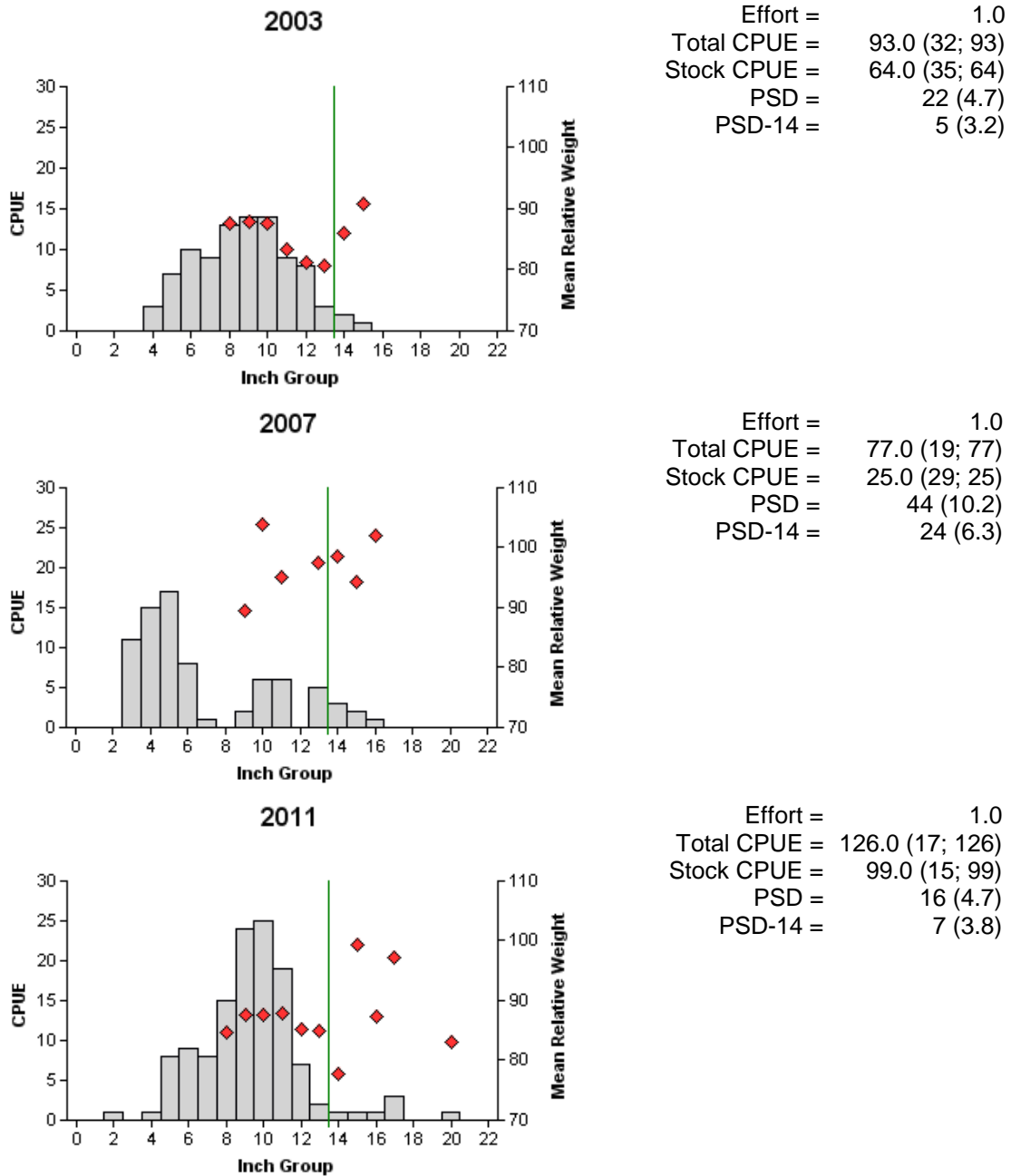


Figure 9. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Palo Pinto Reservoir, Texas, 2003, 2007, and 2011. Line indicates minimum length 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, 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 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
2011	30	1	25	4	35.0	3.0

# White Crappie

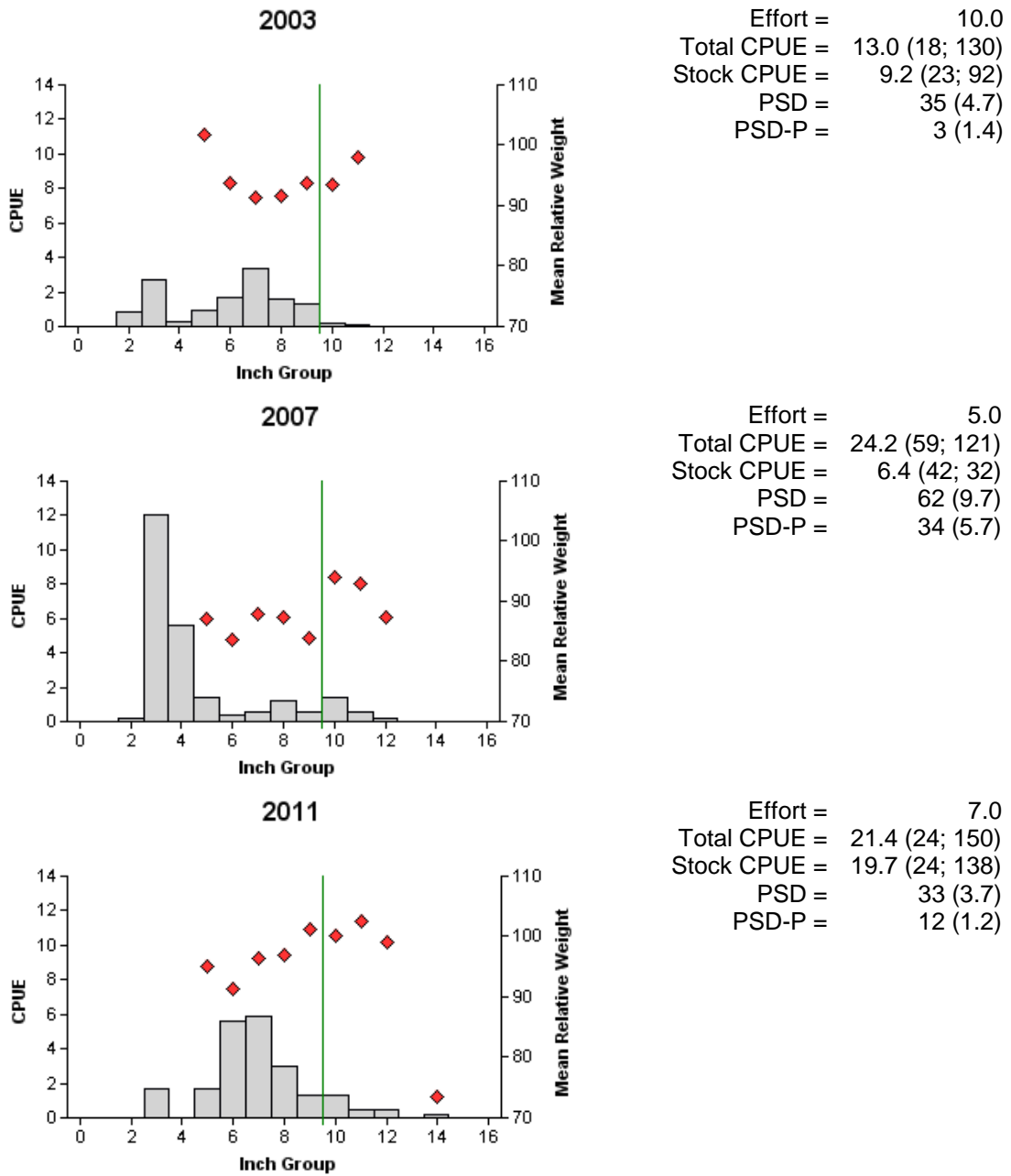


Figure 10. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Palo Pinto Reservoir, Texas, 2003, 2007, and 2011. Line indicates minimum length 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	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2012-Spring 2013				A			
Fall 2013-Spring 2014	A		A				
Fall 2014-Spring 2015							
Fall 2015-Spring 2016	S	S	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, 2011-2012.

Species	Gill Nets		Trap Nets		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	24	2.4			190	190.0
Threadfin shad					140	140.0
Common carp	1	0.1				
River carpsucker	1	0.1				
Smallmouth buffalo	8	0.8				
Blue catfish	18	1.8				
Channel catfish	2	0.2	2	0.3		
White bass	2	0.2	1	0.1		
Palmetto bass	1	0.1				
Green sunfish					21	21.0
Warmouth					6	6.0
Bluegill			67	9.6	260	260.0
Longear sunfish			8	1.1	72	72.0
Redear sunfish			1	0.1	17	17.0
Largemouth bass					126	126.0
White crappie	15	1.5	150	21.4		
Black crappie	2	0.2	4	0.6		
Freshwater drum	11	1.1				



