PERFORMANCE REPORT

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FEDERAL AID PROJECT F-30-R-32

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2006 Survey Report

Lake Tawakoni

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Tawakoni were surveyed in 2006 using electrofishing and trap nets and in 2007 using gill nets, a littoral zone habitat survey, and an aquatic vegetation survey. This report summarizes the results of the surveys and contains a management plan for the reservoir.

- **Reservoir description:** Lake Tawakoni is located in Van Zandt, Rains, and Hunt Counties, Texas on South Fork and Cowleech Fork of the Sabine River, and Caddo Creek. It was constructed by the Sabine River Authority to provide water for municipal and industrial uses and for recreational purposes. Lake elevation in the past 4 years has experienced extreme fluctuations, declining to 12.4 feet below conservation pool elevation in December 2006. Persistent low-water conditions have limited the growth of aquatic vegetation. Consequently, the primary habitat component at the time of the survey was featureless shoreline.

- **Management history:** Important sport fishes at Lake Tawakoni include striped bass, palmetto bass, white bass, blue catfish, channel catfish, and largemouth bass. Striped bass and palmetto bass are stocked annually at a rate of 5/acre.

- **Fish community**
  - **Prey species:** Lake Tawakoni contained populations of both gizzard shad and threadfin shad of appropriate size to provide prey for sport fish. Electrofishing surveys resulted in few bluegills, and other species of sunfishes were rarely encountered.

  - **Catfishes:** Lake Tawakoni continued to produce abundant blue and channel catfish of harvestable size. Both species exhibit abundant small fish, good growth, and contribute to the quality of this fishery.

  - **Temperate basses:** Ample open water habitat and a sufficient prey base allow Lake Tawakoni to support populations of white bass, striped bass, palmetto bass and sunshine bass. Lake Tawakoni is the only reservoir in the state that receives annual stockings of both striped bass and palmetto bass.

  - **Black basses:** Largemouth bass populations have been historically stable; however, because of low lake elevation during fall 2006 suitable shallow-water habitat for electrofishing was limited resulting in low catch rates of largemouth bass.

  - **Crappie:** White and black crappie were present in the reservoir. Although not overly abundant, many of the white and black crappies sampled were legal size fish.

- **Management strategies:** Temperate basses are a popular sport fishery and a vital component of Lake Tawakoni's local economy. Annual stockings of both striped bass and palmetto bass should continue at a rate of 5 fish /acre. Begin conducting trailer ramp counts in preparation for an angler access creel survey to collect information on catch and harvest rates and fishing effort on sport fishes. Conduct an electrofishing survey in fall 2008, and gill net and electrofishing surveys in spring 2009. General monitoring with trap nets, gill nets and electrofishing surveys will be repeated in 2010-2011. Conduct an aquatic vegetation survey in 2008.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Tawakoni in 2006-2007. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2006-2007 data for comparison.

Reservoir Description

Lake Tawakoni is an impoundment of the Sabine River in Van Zandt, Rains, and Hunt Counties, Texas. The reservoir was constructed by the Sabine River Authority (SRA) in 1960 as water supply for municipal, industrial and recreational uses. At conservation pool (437.5 feet above mean sea level), Lake Tawakoni is 36,700 surface acres, has a shoreline length of 200 miles, and a mean depth of 12 feet. Water level fluctuations averaged 5.0 feet annually for the period 2000-2006. However, water levels reached an historic low in 2006 (425.1 feet) (Figure 1). The reservoir was mesotrophic with a mean trophic state index chl-*a* of 56.61 µg/L (Texas Commission on Environmental Quality 2005). The primary habitat component at time of sampling consisted of featureless shoreline. Aquatic vegetation was absent due to extremely low lake levels during 2006. Heavy spring rains in 2007 have inundated terrestrial vegetation, providing spawning habitat for largemouth bass and sunfishes as well as cover for juvenile fish. Most of the land around the reservoir is used for timber production, agriculture, and residential development. Other descriptive characteristics for Lake Tawakoni are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Storey and Myers 2003) included:

1. Continue annual stocking of striped bass.
   Action: In 2003, TPWD staff desired an alternative location to collect striped bass brood fish for hatchery production of striped bass and palmetto bass. The Lake Tawakoni tailrace appeared to be a suitable candidate. Recommendations were made to discontinue palmetto bass stocking and stock striped bass at a rate of 10 fish /acre. Shortly after the recommendations were made, strong angler concerns convinced TPWD staff to cancel the plan and continue stocking of both striped bass and palmetto bass at a rate of 5 fish/acre.
2. Monitor genetic composition of largemouth bass population.
   Action: To be eligible for stocking of Florida largemouth bass, the Lake Tawakoni bass population must have less than 20% FLMB alleles in a sub-sample of age-0 fish. District staff planned to collect tissue samples from age-0 largemouth bass during fall electrofishing surveys in 2006. Poor electrofishing catch rates made it impossible to collect a sample for genetic analysis so no information is available.
3. Improve access facilities for bank fishermen.
   Action: District staff discussed the proposal by the controlling authority (Sabine River Authority) to construct a fishing pier in West Tawakoni on property owned by the city. The project was never completed.
4. Increase awareness of Lake Tawakoni fisheries resources.
   Action: Management strategies from 2002 included: 1) preparation of regulation posters detailing fisheries regulations in effect at Lake Tawakoni and post this information at boat ramps and local businesses, and 2) Production of news releases promoting the fisheries resources of Lake Tawakoni for distribution to local media outlets. Staff prepared fisheries regulation posters and provided them to Wildlife Division staff for inclusion in

information displays that were erected at public boat ramps; and telephone interviews were provided to outdoor reporters on Lake Tawakoni's quality fisheries for catfish and temperate basses. District staff have also provided information to Fishing Hot Spots to assist with their development of a new lake map that will benefit anglers.

Harvest regulation history: Sport fishes in Lake Tawakoni are currently managed with TPWD statewide regulations (Table 2).

Stocking history: Lake Tawakoni has received annual stockings of striped bass (since 1991), with the exception of 2001 when golden algal blooms limited hatchery production (Table 3). Palmetto bass have been stocked in 10 of the last 13 years. In 2004 after receiving a stocking permit from TPWD, the Lake Tawakoni Sportsman's Association (LTSA) purchased 139,000 sunshine bass (striped bass ♂ x white bass ♀ hybrids) that were boat stocked by TPWD district staff. In 2007 the LTSA also applied for a permit to stock 55,000 additional sunshine bass. Florida largemouth bass were most recently stocked in 1999. The complete stocking history is listed in Table 3.

Vegetation/habitat history: Historically, aquatic vegetation coverage at Lake Tawakoni consisted of native emergent vegetation and limited submerged species. The dominant species were American lotus and American water willow. No aquatic vegetation was observed in 2006 due to low water levels. In 2004 a waterhyacinth infestation which originated in Ash Cove was reported to District staff. A vegetation survey was conducted in December of that year to assess the extent of its coverage. Waterhyacinth plants observed were primarily small floating colonies and coverage was estimated at 1.5 acres. Declining water levels limited the spread of this noxious aquatic plant. SRA staff treated plants in Ash Cove that were isolated by declining water levels. District staff will continue to monitor this threat as shorelines are inundated and the conditions become favorable for the germination of any seeds that are buried in the sediment.

METHODS

Fishes were collected by electrofishing (2.0 hours at 24 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 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 and trap nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected. Aquatic vegetation and littoral habitat surveys were performed 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 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 and SE was calculated for structural indices and IOV. Ages were determined from otoliths of largemouth bass collected in electrofishing and white bass collected in gill netting. Water elevation data were obtained from the Sabine River Authority (SRA) website at http://www.sra.dst.tx.us/basin/lake_tawakoni_monthly.asp.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted exclusively of featureless shoreline exposed by a drop of some 9 feet below conservation pool elevation as a result of drought (Figure 1). A 2002 habitat survey indicated primary habitat components of featureless shoreline, overhanging brush, dead trees, and native emergent vegetation (Storey and Myers 2003). In 2006, no aquatic vegetation was observed. The previous vegetation survey in 2002 showed very little aquatic vegetation (189 acres; 0.5% of lake surface area). No habitat or vegetation data were presented in this report due to low lake elevations observed at the time these surveys were conducted.

Prey species: Primary prey species included gizzard shad, threadfin shad, and bluegill. Gizzard and threadfin shad provided abundant prey. Gizzard shad catch rates in 1998 (264.0/h), 2002 (209.5/h), and 2006 (243.0/h) were similar (Figure 2). Index of vulnerability (IOV) values were similar, ranging from 79 to 94 indicating high prey availability of gizzard shad. Total CPUE of threadfin shad was 104.0/h (Appendix A). Lake Tawakoni contains populations of both gizzard shad and threadfin shad which were of appropriate size to provide prey for sport fishes. Bluegill catch rate in 2006 (10.0/h) was considerably lower than in 1998 and 2002 (79.0 and 107.5 /h respectively). Low lake level during the time of electrofishing limited suitable shoreline sampling sites and resulted in reduced catches of sunfishes.

Catfishes: The gill net catch rate of blue catfish was 13.6/nn in 2007. Since 2003, blue catfish recruitment has remained high, with numerous sub-stock (<12 inches) individuals sampled (Figure 5). Fish were in good condition as most inch groups had relative weights ranging from 85 - 110. Channel catfish are also present in the reservoir; however, they are less abundant than blue catfish. Catch rate of channel catfish in 2007 (4.3/nn) was lower than in previous years (2003 – 8.6/nn; 2005 – 8.1/nn). Most channel catfish were of harvestable size, but very few reached quality length (≥16 inches; Figure 6).

White bass: The gill net catch rate of white bass was 4.0/nn in 2007 (Figure 7). Although catch rates were lower in 2007 compared to 2003 and 2005 (6.9/nn and 9.6/nn, respectively), the population structure remained similar with most fish of harvestable size (≥10 inches) and in good body condition (Wr ranging from 85 – 105). Growth of white bass in Lake Tawakoni was excellent. Average age at 11 inches (10.4 to 12.5 inches) was 1.2 years (N = 14; range 1 – 2 years). Average age at 14 inches (13.4 to 15.6 inches) was 3.5 years (N = 15; range 2 – 5 years).

Striped bass: Striped bass gill net catch rate was lower in 2007 (0.5/nn) compared to surveys conducted in 2003 (2.3/nn) and 2005 (1.1/nn; Figure 9). Whereas all striped bass sampled in 2005 were ≥20 inches, smaller fish were observed in 2007, indicating the success of stockings in 2005-2006. Striped bass in Lake Tawakoni were generally in good body condition (Wr ranging from 87 – 100).

Hybrid striped bass: The gill net catch rate of hybrid striped bass (palmetto bass and sunshine bass) was lower in 2007 (1.1/nn) than in 2005 (3.1/nn) but higher than in the 2003 survey (0.1/nn; Figure 10). Most fish were of harvestable size (≥18 inches) and exhibited mean Wrs between 85 and 105, indicating palmetto bass had an adequate supply of forage fish.

Largemouth bass: Electrofishing catch rates of largemouth bass have steadily declined from 2002 (49.0/h) to 2006 (4.0/h; Figure 11). Low water levels and limited littoral habitat reduced catches in the fall survey in 2006. Size structure has improved since 2002 (PSD range 48 – 88; Figure 11) and is inversely correlated with catch rates, indicating possible recruitment problems. Low water levels in recent years may have reduced largemouth bass spawning habitat and decreased reproductive success. No age-0 largemouth bass were collected in fall 2006. The most recent genetic analysis data were collected in fall 2002, at which time FLMB alleles were 21.7% and there were no pure FLMB in the sample (Table 4). Florida largemouth bass have not been stocked since 1999.

Crappies: The trap net catch rate of white crappie was 2.2/nn in 2006, lower than in 2002 (4.3/nn) and 1998 (3.9/nn). Body condition of white crappie was typically good, with most fish having relative weights between 95 and 115. Similar to white crappie, black crappie catch rate in 2006 was lower (0.7/nn) than 2002 (1.8/nn) and considerably lower than 1998 (8.8/nn).

Fisheries management plan for Lake Tawakoni, Texas

Prepared – July 2007

ISSUE 1: Conduct an angler access creel survey on Lake Tawakoni to quantify fishing effort and catch rate of sportfishes.

MANAGEMENT STRATEGY

1. Identify all public and private boat ramps on Lake Tawakoni. Beginning in June 2007, these ramps will be visited twice monthly and boat trailers will be counted. The number of boat trailers will be used to determine probabilities for angler use of each ramp. Since differences exist in seasonal fishing patterns trailer counts will be conducted for a period of one year.
2. Once trailer counts are complete, an angler access creel is scheduled to begin in June 2008.

ISSUE 2: Striped and palmetto bass have been a part of the fishery since the late 1970s. These fishes represent an important and unique sport fishery in Lake Tawakoni.

MANAGEMENT STRATEGY

1. Continue stocking striped bass and palmetto bass each at a rate of 5 fish /acre.
2. Use data from creel survey (see Issue 1 above) to determine the catch, harvest and fishing pressure of Lake Tawakoni's temperate basses to strengthen the justification for continued annual stockings of striped bass and palmetto bass.

ISSUE 3: Electrofishing catch rates of largemouth bass have been on the decline since 1998. Low water levels and reduced habitat are most likely the cause. District staff have had difficulty collecting fish to conduct genetic analysis of the age-0 cohort.

MANAGEMENT STRATEGIES

1. Conduct spring electrofishing surveys when water levels are high, and terrestrial vegetation has been flooded. Such areas are likely to concentrate largemouth bass until water levels drop later in the year.
2. Continue biennial fall electrofishing surveys with emphasis on collecting age-0 largemouth bass for genetic analysis.
3. If Florida alleles fall below 20%, recommend additional stockings of Florida largemouth bass to enhance the population.

ISSUE 4: Access facilities for bank anglers at Lake Tawakoni are limited and should be improved. A variety of local businesses and Lake Tawakoni State Park provide access facilities for a fee, but free access is restricted to the areas around public boat ramps.

MANAGEMENT STRATEGIES

1. Encourage the Sabine River Authority (SRA) to consider construction of public fishing piers
2. Explore TPWD funding options available to controlling authority to help defray costs of pier construction.

ISSUE 5: Increased awareness of Lake Tawakoni fisheries resources is needed. Dissemination of information describing the sport fish harvest regulations in effect on Lake Tawakoni is also needed.

MANAGEMENT STRATEGIES

1. Prepare regulation posters detailing fisheries regulations in effect at Lake Tawakoni and post this

information at public and private boat ramps, in the state park and in local businesses.

2. Produce news releases promoting the fisheries resources of Lake Tawakoni for distribution to local media outlets.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes biennial electrofishing to monitor the largemouth bass population (fall) and determine the genetic influence of Florida bass alleles (spring when appropriate) (Table 5). A creel survey will be conducted to quantify effort, catch and harvest rates of sport fishes. Gill net surveys will be conducted every two years to adequately monitor the catfish, white bass, striped bass, and palmetto bass populations. Trap nets will be used every four years to monitor the white and black crappies. Annual vegetation surveys will be conducted annually to monitor the status of waterhyacinth in Lake Tawakoni.

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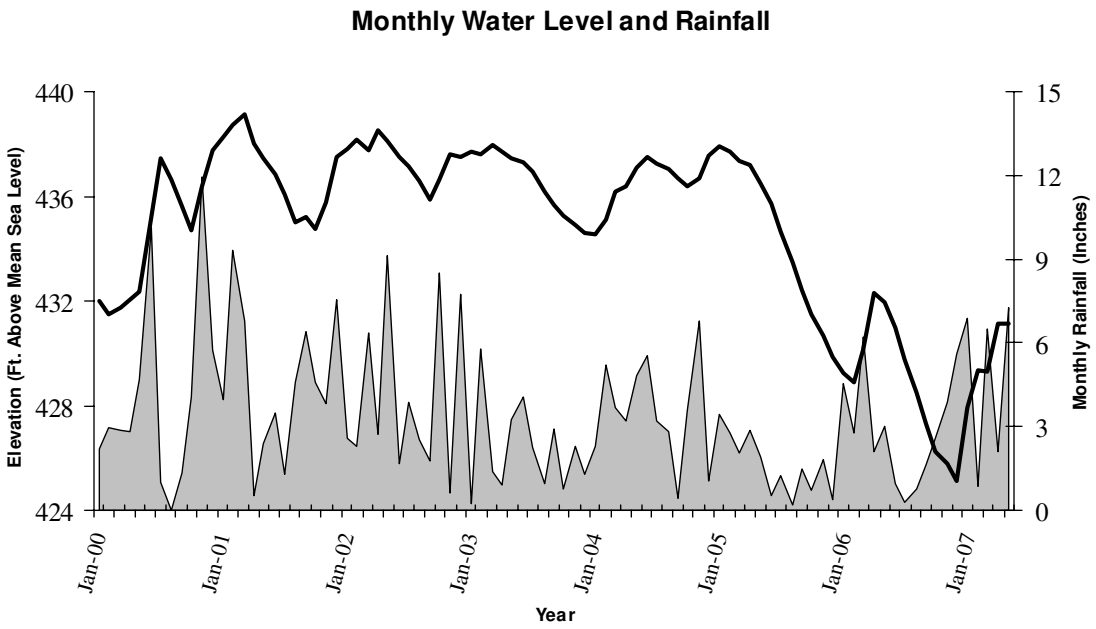


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) and monthly rainfall (inches) recorded for Lake Tawakoni from January 2000 – May 2007. Conservation pool elevation for Lake Tawakoni is 437.5 ft msl.

Table 1. Characteristics of Lake Tawakoni.

Characteristic	Description
Year constructed	1960
Controlling authority	Sabine River Authority
Counties	Van Zandt & Rains (location of dam), Hunt
Reservoir type	Mainstream
Shoreline development index (SDI)	7.45
Conductivity	175 umhos/cm

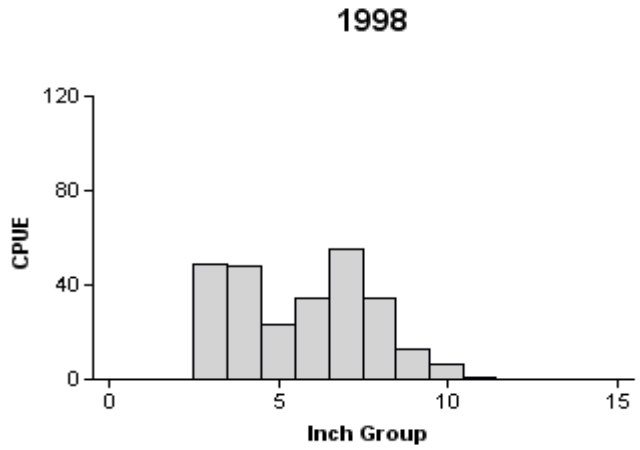
Table 2. Harvest regulations for Lake Tawakoni, Texas.

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

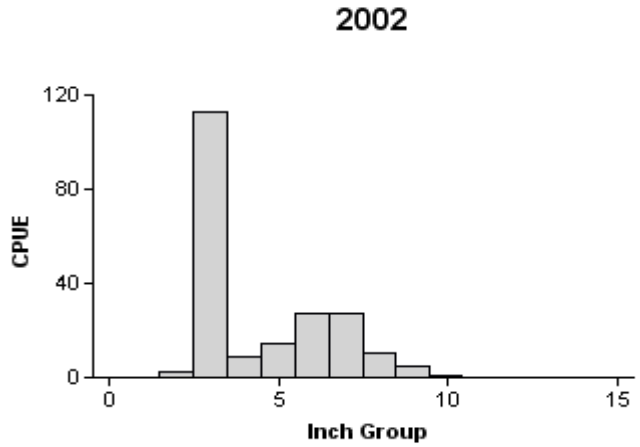
Table 3. Stocking history of Lake Tawakoni. Size Categories are: FRY =<1 inch; FGL = 1-3 inches; AFGL = 8 inches, and ADL = adults.

Year	Number	Size
	Blue catfish	
1989	366,675	FGL
Total	366,675	
	Striped bass	
1979	755,800	
1982	195,694	
1991	352,558	FGL
1992	203,462	FGL
1993	184,300	FGL
1994	722,640	FGL
1995	382,333	FGL
1996	183,700	FGL
1997	257,080	FGL
1998	135,256	FGL
1999	262,678	FGL
2000	189,410	FGL
2002	288,856	FGL
2003	369,005	FGL
2004	78,739	FGL
2005	100,211	FGL
2006	156,865	FGL
2007	916,724	FRY
2007	320,819	FGL
Total	6,056,130	
	Palmetto bass	
1975	100,466	FGL
1979	181,500	FGL
1980	110,400	FGL
1983	179,302	FGL
1995	218,946	FGL
1996	166,295	FGL
1997	119,000	FGL
1998	267,842	FGL
1999	128,619	FGL
2002	92,910	FGL
2004	189,319	FGL
2005	189,557	FGL
2006	188,206	FGL
2007	172,704	FGL
Total	2,305,066	
	Sunshine bass	
2004	139,000	FGL
2007	60,900	FGL
Total	199,900	
	Florida largemouth bass	
1984	507,714	FGL
1992	469,904	FGL
1993	917,785	FGL
1998	367,500	FGL
1999	364,995	FGL
Total	2,627,898	
	Green x Redear sunfish	
1973	5,300	FGL
Total	5,300	
	Walleye	
1979	450,000	FGL
Total	450,000	

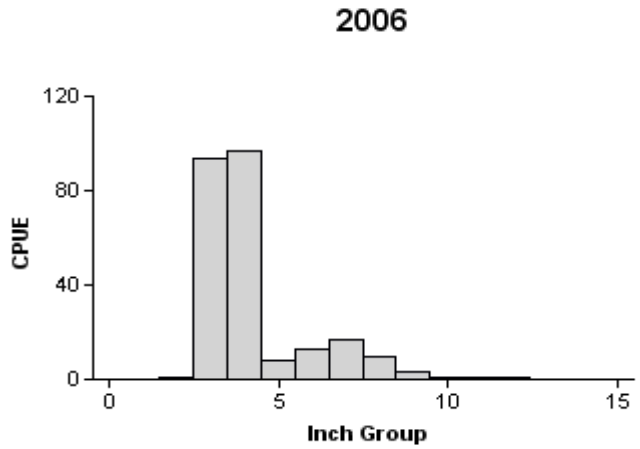
Gizzard shad



Effort = 2.0
Total CPUE = 264.0 (27; 528)
Stock CPUE = 109.5 (27; 219)
PSD = 0 (0.5)
IOV = 79 (6.7)



Effort = 2.0
Total CPUE = 209.5 (36; 419)
Stock CPUE = 43.5 (20; 87)
PSD = 0 (201.5)
IOV = 92 (3.7)



Effort = 2.0
Total CPUE = 243.0 (23; 486)
Stock CPUE = 31.5 (34; 63)
PSD = 3 (2.1)
IOV = 94 (2.3)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure and IOV are in parentheses) for fall electrofishing surveys, Lake Tawakoni, Texas, 1998, 2002, and 2006.

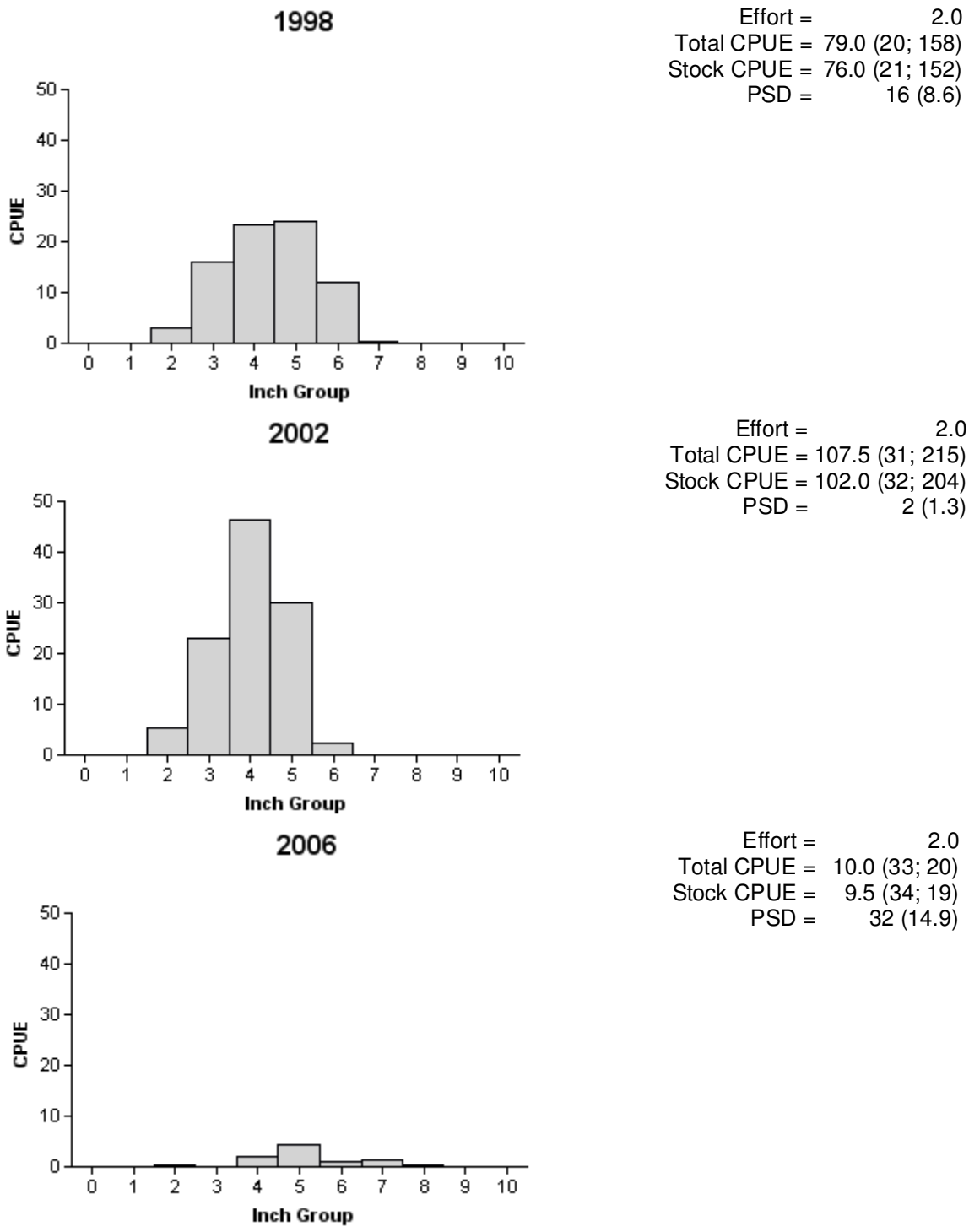


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Tawakoni, Texas, 1998, 2002, and 2006.

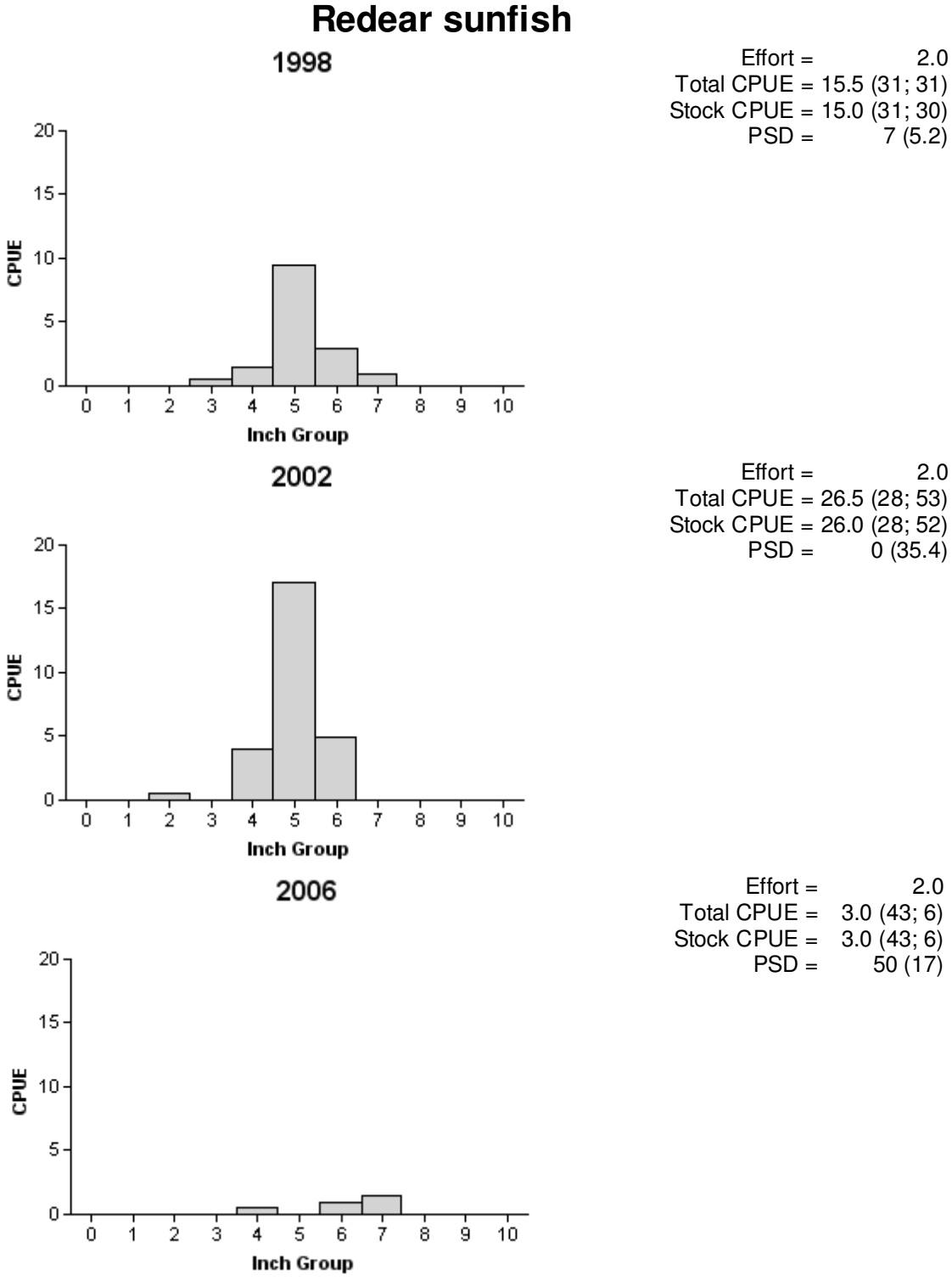


Figure 4. Number of redear sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Tawakoni, Texas, 1998, 2002, and 2006.

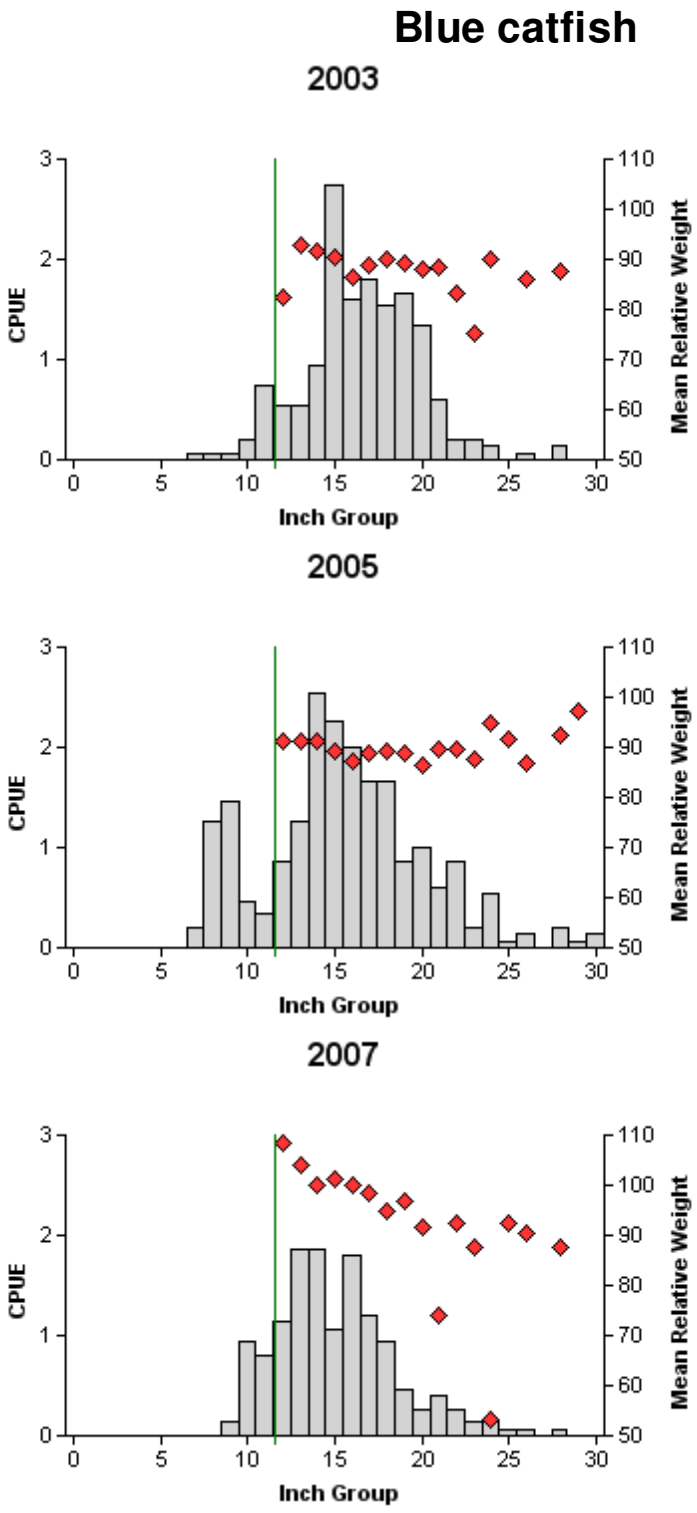


Figure 5. Number of blue catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2003, 2005, and 2007. Vertical lines represent minimum length limit at time of survey.

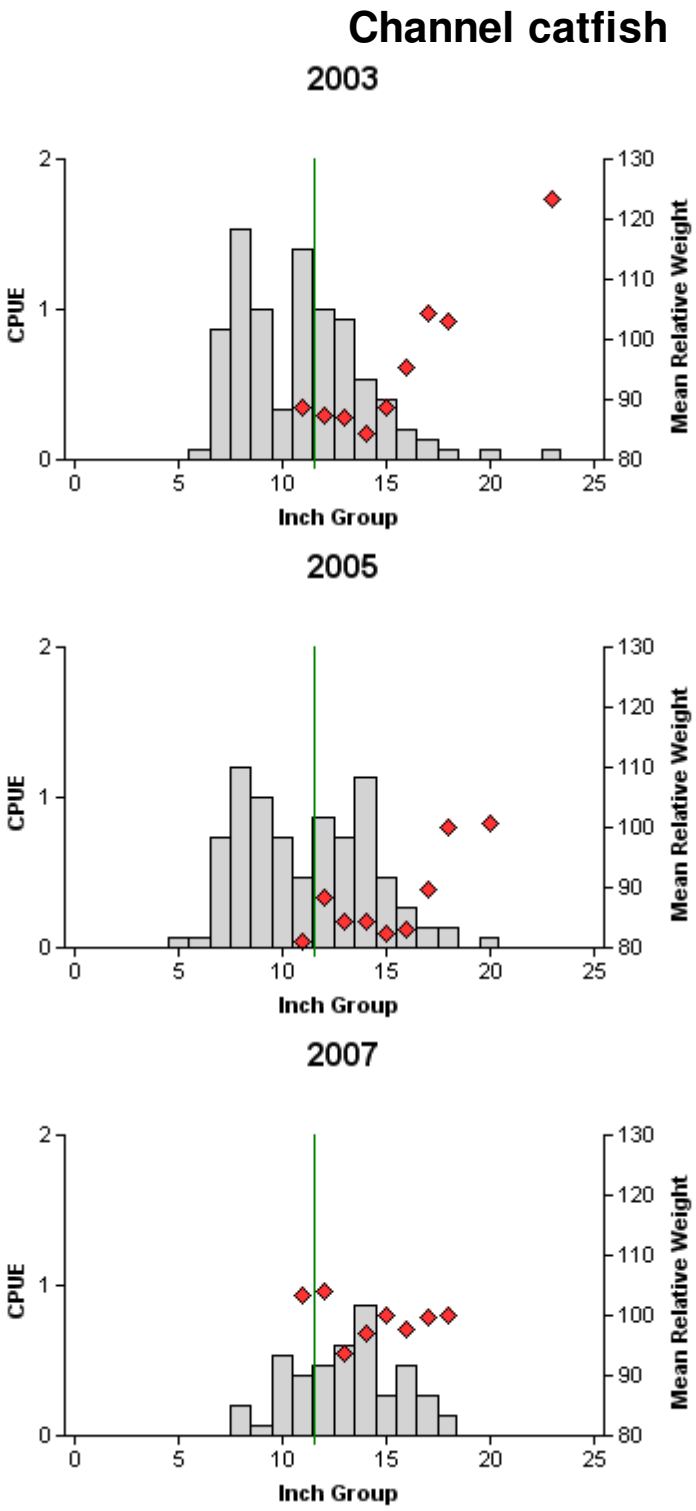


Figure 6. Number of channel catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2003, 2005, and 2007. Vertical lines represent minimum length limit at time of survey.

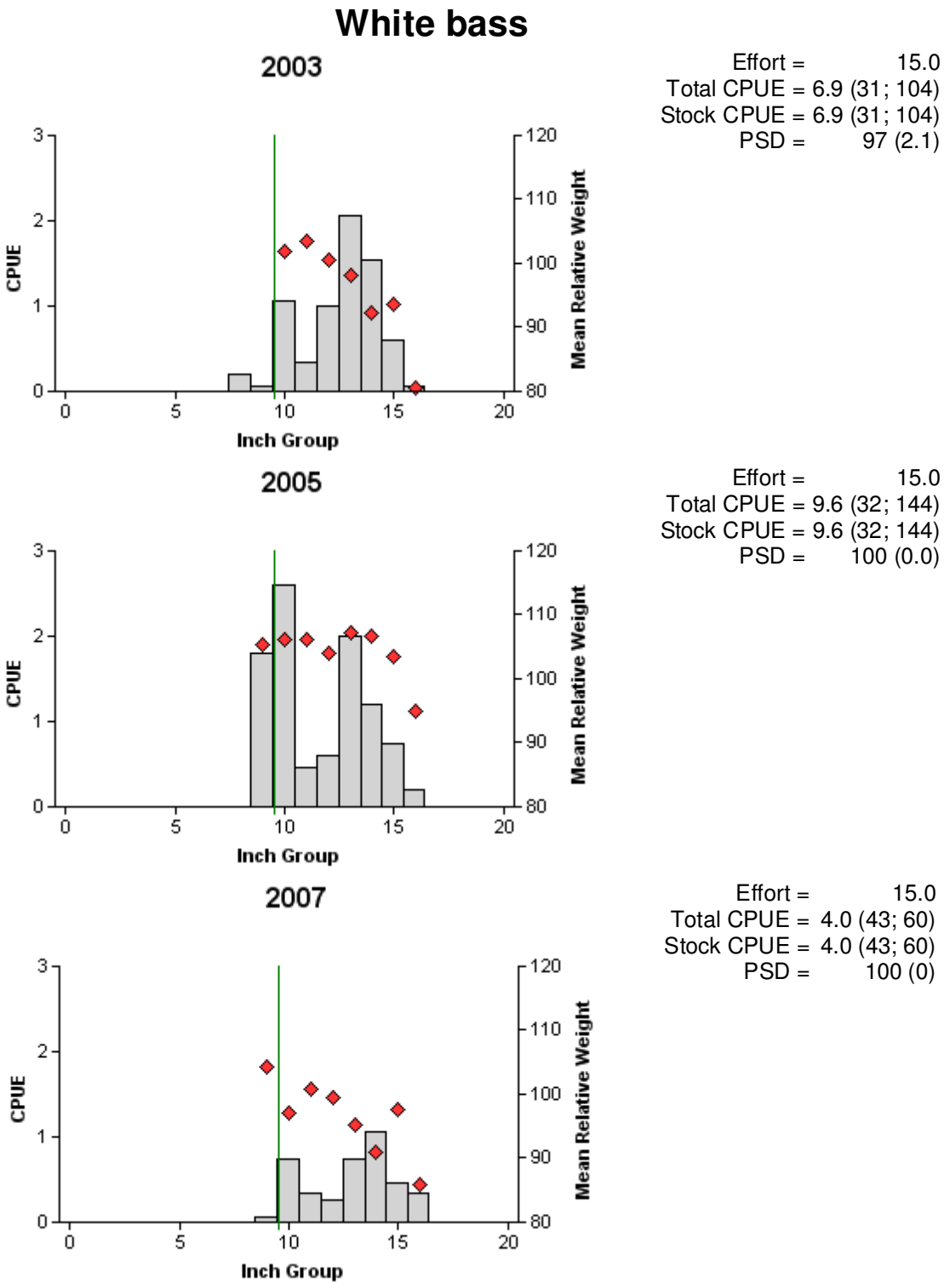


Figure 7. Number of white bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2003, 2005, and 2007. Vertical lines represent minimum length limit at time of survey.

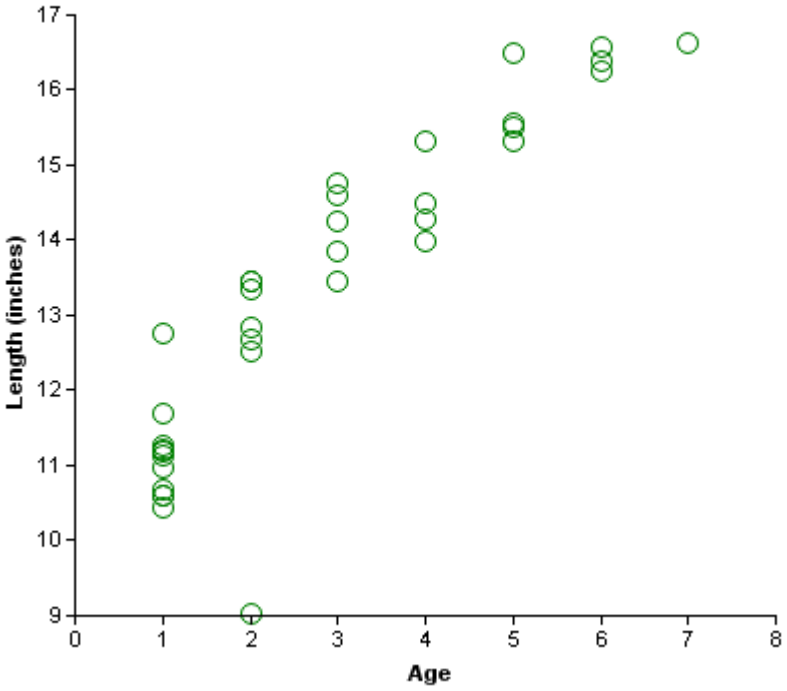


Figure 8. Length at age for white bass collected from gill netting at Lake Tawakoni, Texas, May 2007. Average length of age 1 fish - 11.1 inches.

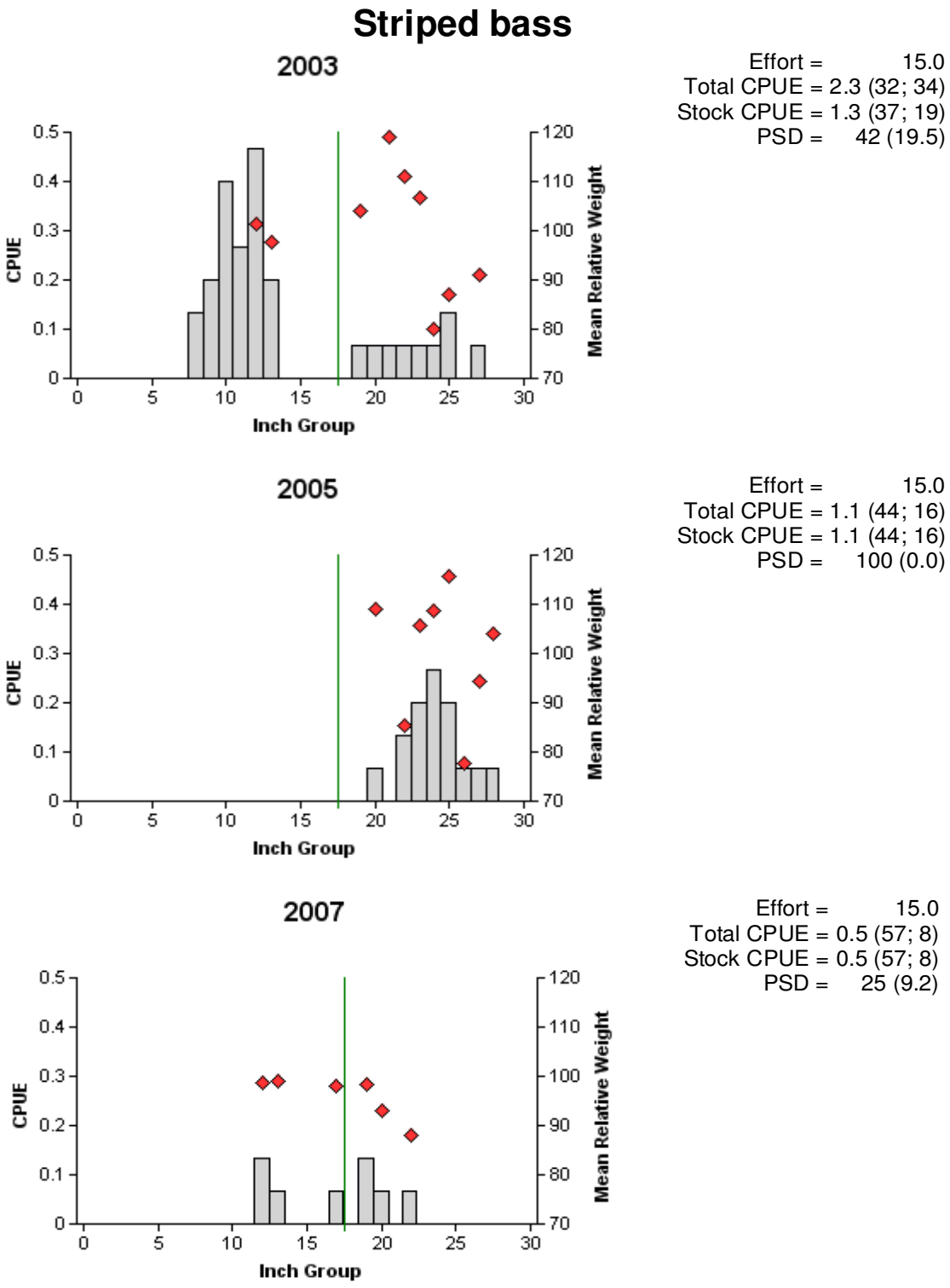


Figure 9. Number of striped bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2003, 2005 and 2007. Vertical lines represent minimum length limit at time of survey.

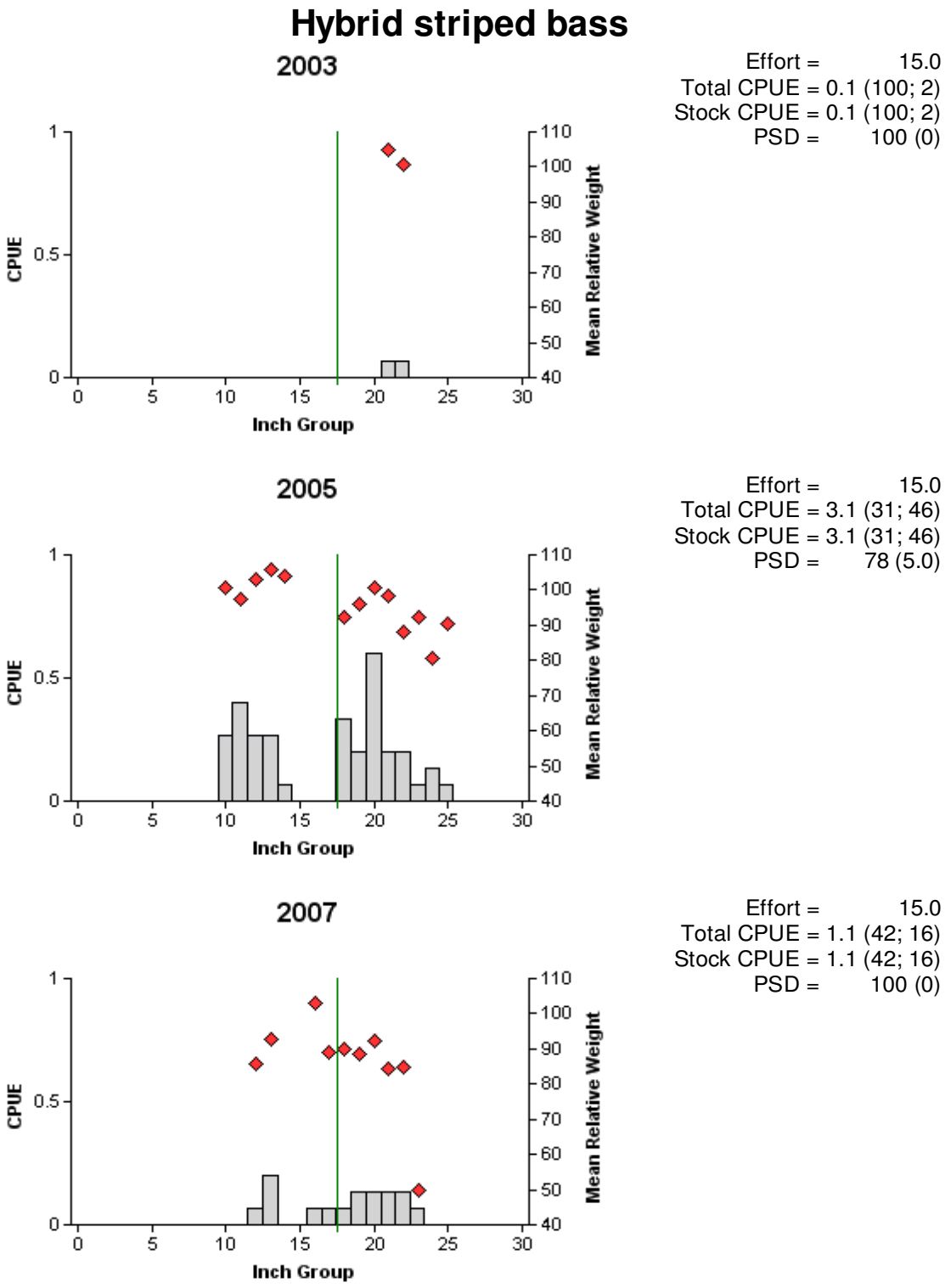


Figure 10. Number of hybrid striped bass (palmetto bass and sunshine bass) caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Tawakoni, Texas, 2003, 2005 and 2007. Vertical lines represent minimum length limit at time of survey.

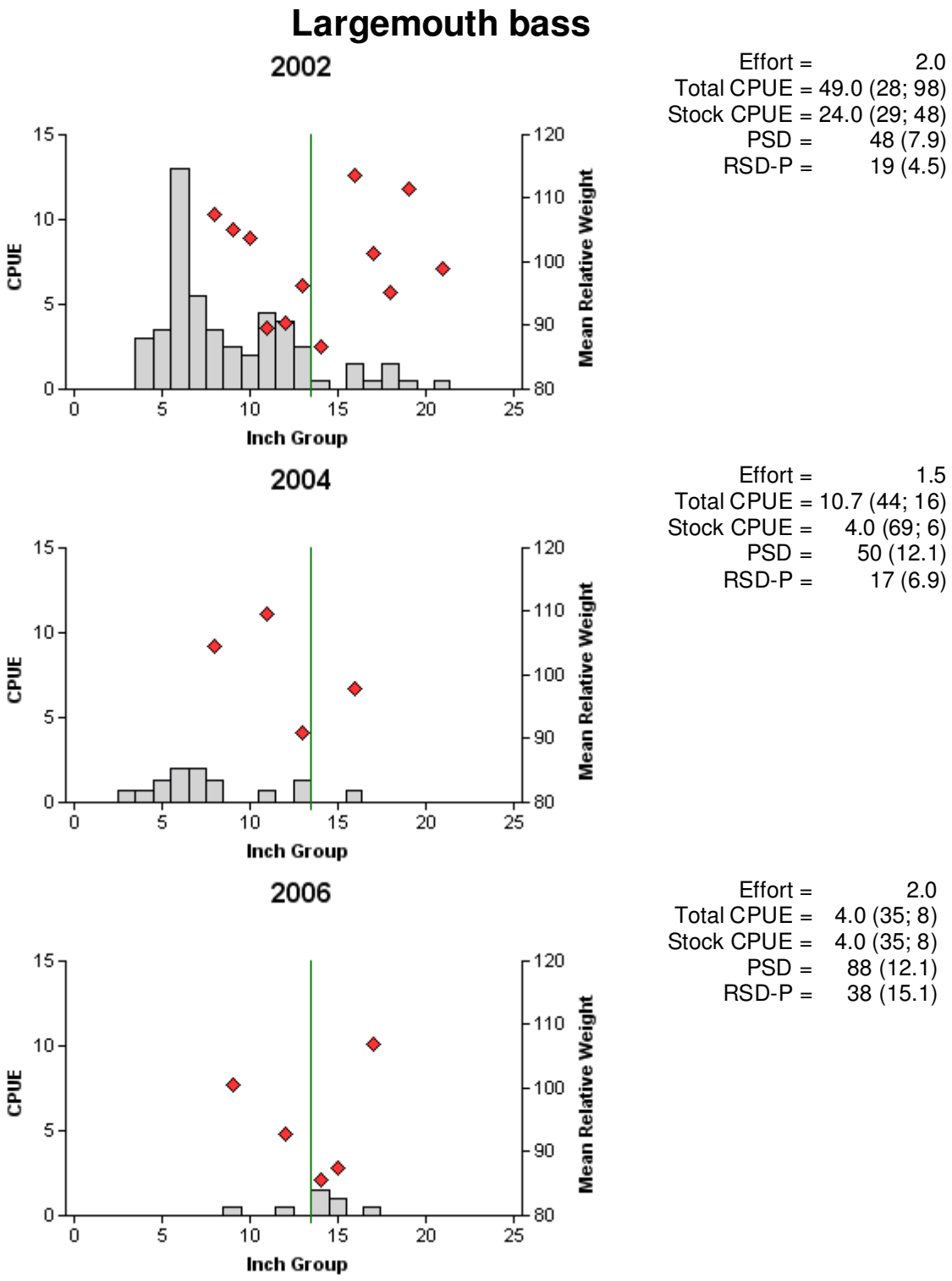


Figure 11. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Tawakoni, Texas, 2002, 2004, and 2006. Vertical lines represent minimum length limit at time of survey.

Table 4. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Tawakoni, Texas, 1987 - 2006. 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.

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% pure FLMB
1987	16	0	1	3	12	7.8	0.0
1991	25	0	0	2	23	2.0	0.0
1992	35	4	0	4	27	12.9	11.4
1993	35	5	1	1	28	23.6	14.3
1994	32	0	4	8	20	12.5	0.0
1995	35	1	3	0	31	7.1	2.9
1998	35	0	5	8	22	12.1	0.0
2000	18	4	4	6	4	50.0	22.2
2002	50	0	9	19	22	21.7	0.0
2006	0[a]	-	-	-	-	-	-

[a] No age-0 fish were collected in 2006, due to extremely low water conditions.

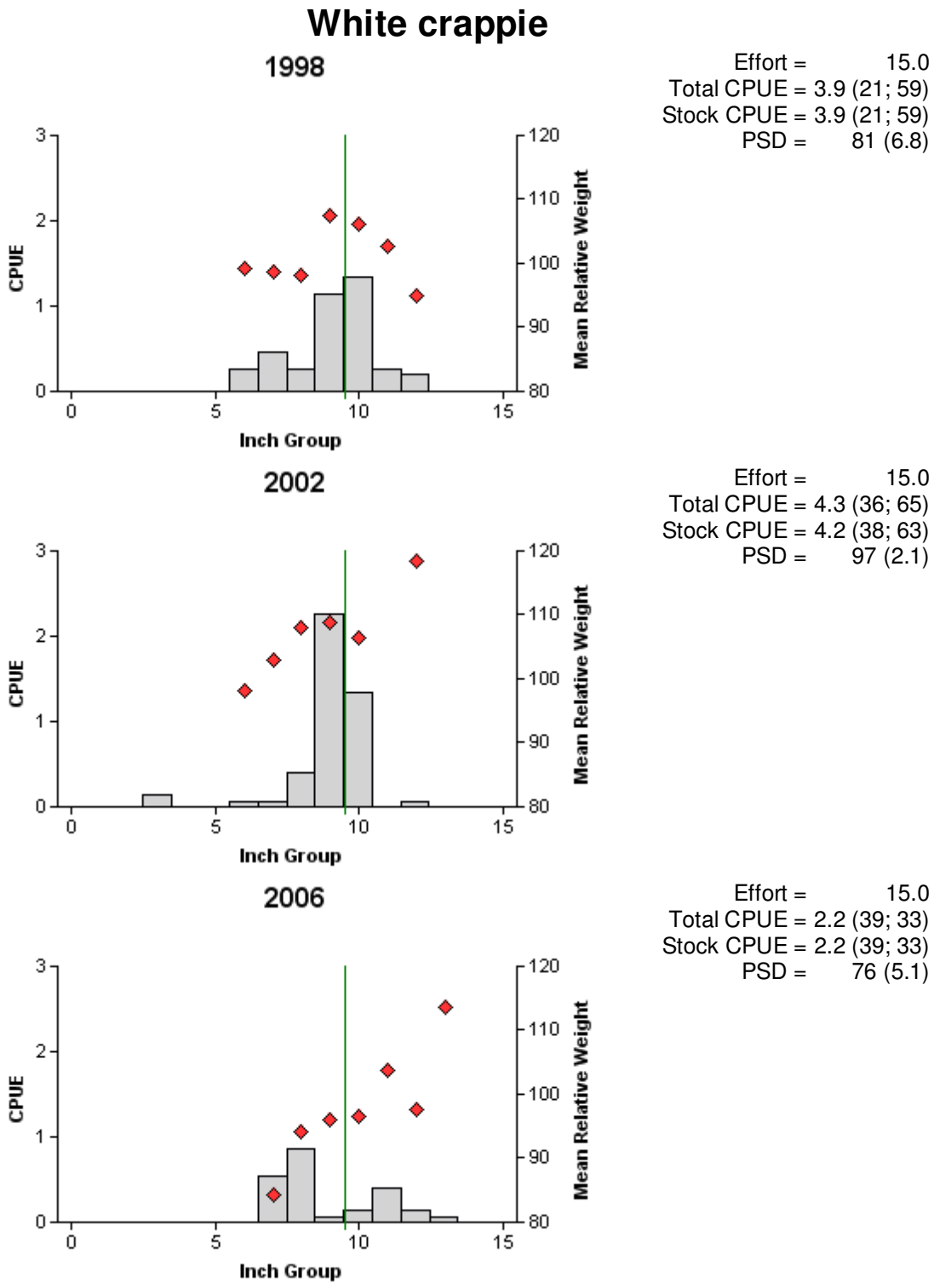


Figure 12. Number of white crappie caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Tawakoni, Texas, 1998, 2002, and 2006. Vertical lines represent minimum length limit at time of survey.

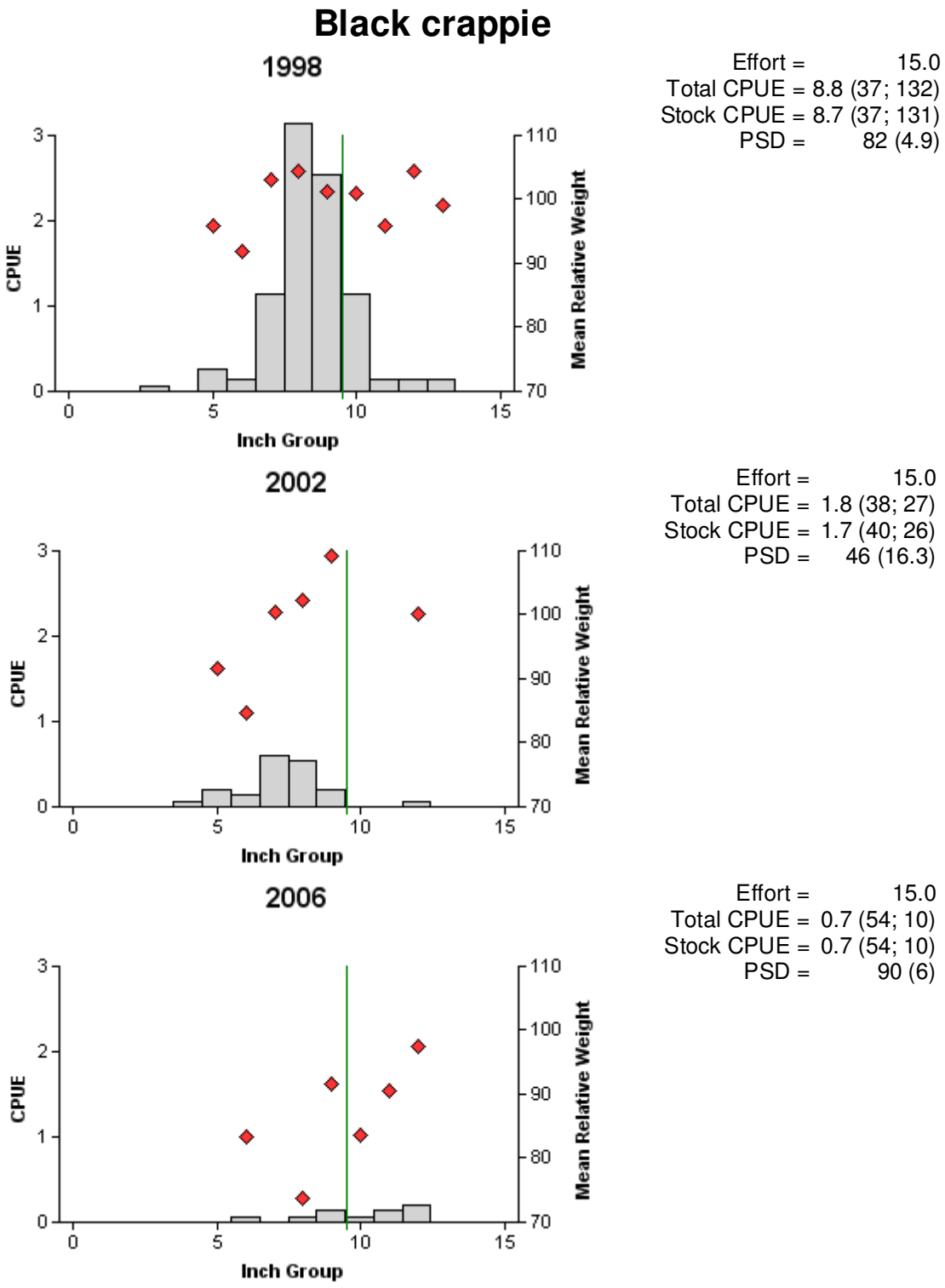


Figure 13. Number of black crappie caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap surveys, Lake Tawakoni, Texas, 1998, 2002, and 2006. Vertical lines represent minimum length limit at time of survey.

Table 5. Proposed sampling schedule for Lake Tawakoni, Texas. Gill netting surveys are conducted in the winter and electrofishing surveys are conducted in the fall and spring. Standard survey denoted by S and additional survey denoted by A.

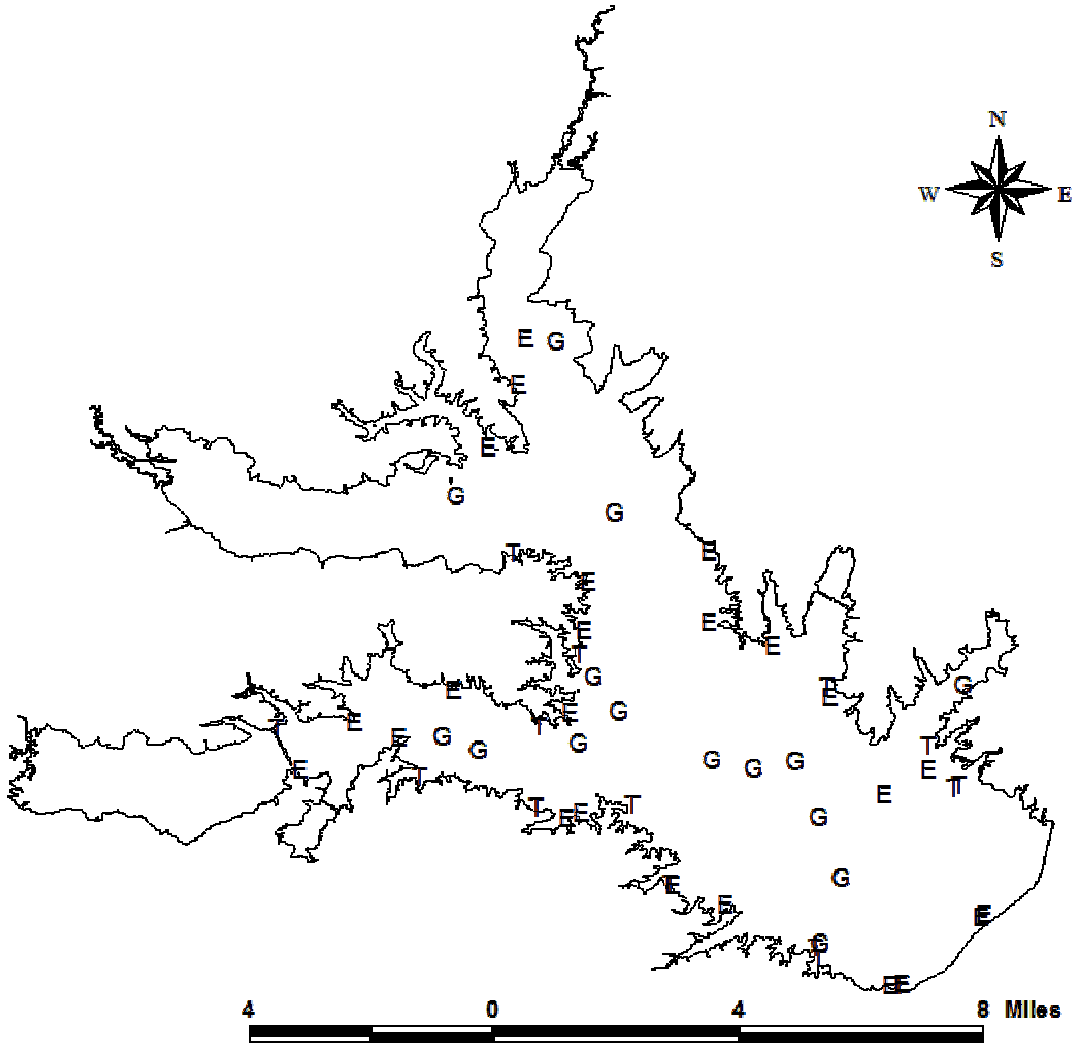
Survey Year	Electrofishing	Trap Net	Gill Net	Vegetation survey	Habitat survey	Creel survey	Report
2007-2008	A			A		A	
2008-2009	A		A	A		A	
2009-2010	A			A			
2010-2011	S	S	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from gill netting, trap netting, and electrofishing, Lake Tawakoni, Texas, 2006-2007.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					486	243.0
Threadfin shad					208	104.0
Blue catfish	204	13.6				
Channel catfish	64	4.3				
White bass	60	4.0				
Striped bass	8	0.5				
Hybrid striped bass	16	1.1				
Bluegill					20	10.0
Longear sunfish					2	1.0
Redear sunfish					6	3.0
Largemouth bass					8	4.0
White crappie			33	2.2		
Black crappie			10	0.7		

APPENDIX B



Location of fall electrofishing (E), fall trap netting (T), and spring gill netting sites (G), Lake Tawakoni, Texas, 2006-2007. Water level was 6.4 – 11.8 feet below conservation pool elevation at time of sampling.