

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-34

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2008 Survey Report

Ray Hubbard Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Ray Hubbard Reservoir were surveyed in 2005, 2006, 2007, and 2008 using electrofishing, 2007 and 2009 using gill netting, and 2008 using trap netting. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Ray Hubbard Reservoir is a 22,745-acre impoundment constructed on the East Fork of the Trinity River by the City of Dallas in 1968 to provide water for municipal, industrial, and recreational purposes. Ray Hubbard Reservoir is located one-mile east of Rockwall and lies within Dallas, Collin, Rockwall and Kaufman counties. The reservoir is surrounded by urban development and is part of the Dallas-Ft. Worth metroplex. The reservoir has a 1,074 square-mile watershed that lies in the Blackland Prairies ecological region and is primarily used for agricultural and residential development. The reservoir is 13 miles long and 3 miles wide (widest point). It contains 490,000 acre feet of water at conservation elevation (435.5 ft-msl), and has a maximum depth of 40 feet. Angler and boat access is adequate. At the time of sampling the fishery habitat was primarily dead trees, emergent vegetation, and eroded banks. Hydrilla (*Hydrilla verticillata*) is present and provides fish habitat and currently has no detrimental effects on access or the fish populations. A creel survey was last conducted on Ray Hubbard Reservoir from June 1, 2004 to May 31, 2005.
- **Management history:** Important sport fish include largemouth bass, white crappie, white bass, palmetto bass, blue and channel catfish. All species are managed with statewide regulations. Palmetto bass are stocked annually at a rate of 5 -15 fish per acre and provide a popular fishery. The reservoir has a population of large blue catfish and has produced ShareLunker largemouth bass. Florida largemouth bass were stocked in 2006 and 2007.
- **Fish Community**
 - **Prey species:** Threadfin shad were in great abundance. Gizzard shad are also present but not as abundant as in other district reservoirs. The number of smaller sized gizzard shad available to predator species continues to be low. Bluegill and longear sunfish are also very abundant as prey. Some bluegill over 6 inches are available for anglers.
 - **Catfishes:** The blue catfish population continues to be good with large individuals available for anglers. The relative abundance of channel catfish declined since previous surveys. No flathead catfish were sampled during annual gill netting but are present.
 - **Temperate basses:** White bass catch rates nearly doubled from the previous two surveys. Palmetto bass catch rate decreased over the previous survey. Striped bass were also caught but at a low rate.
 - **Largemouth bass:** The largemouth bass population has remained good over the past several years with good size structure. The Florida largemouth bass influence is high.
 - **Crappie:** The white crappie population declined greatly compared to previous surveys.
- **Management Strategies:** Stock palmetto bass at a rate of 5/acre annually. Continue to contact controlling authority regarding installation of courtesy docks at boat ramp and to mitigate the installation of bulk heads for erosion control. General monitoring with gill netting will be conducted every two years. Electrofishing surveys will continue to be conducted annually. Trap netting surveys will be conducted in 2009 to re examine the population after a below average catch in 2008 and also in 2012 as part of standard sampling.

INTRODUCTION

This document is a summary of fisheries data collected from Ray Hubbard Reservoir in 2008-2009. 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 2008-2009 data for comparison.

Reservoir Description

- Ray Hubbard Reservoir, is a 22,745-acre impoundment constructed on the East Fork of the Trinity River by the City of Dallas in 1968 to provide water for municipal, industrial, and recreational purposes. Ray Hubbard Reservoir is located one-mile east of Rockwall and lies within Dallas, Collin, Rockwall and Kaufman counties. The reservoir is surrounded by urban development and is part of the Dallas-Ft. Worth metroplex. The reservoir has a 1,074 square-mile watershed that lies in the Blackland Prairies ecological region and is primarily used for agricultural and residential development. The reservoir is 13 miles long and 3 miles wide (widest point). It contains 490,000 acre feet of water at conservation elevation (435.5 ft-msl), and has a maximum depth of 40 feet. Angler and boat access is adequate. At the time of sampling the fishery habitat was primarily standing timber, native emergent vegetation, and rocky habitat in the form of riprap. Hydrilla (*Hydrilla verticillata*) is present in the reservoir and provides fish habitat and currently has not caused problems with access, fish populations, or landowners around the reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2004) included:

Maintain palmetto bass population.

Actions: Continued requesting palmetto bass annually at 10 fish per acre. The stocking rate of palmetto bass has since been reduced to 5 fish per acre in an effort to reduce number of fish requested.

Ray Hubbard has a quality blue catfish population which is under utilized.

Actions: Ray Hubbard was sampled with gillnets in 2007 and 2009 to monitor blue catfish population. Several news releases were distributed to media outlets to inform anglers of the blue catfish population in Ray Hubbard Reservoir.

Ray Hubbard Reservoir has a history of producing trophy sized largemouth bass. Recent electrofishing surveys have revealed below average catch rates.

Actions: Ray Hubbard was sampled with electrofishing annually since last report to monitor largemouth bass population. Florida largemouth bass were stocked in 2006 and 2007 to increase trophy potential.

Public boat ramps do not have courtesy docks, which causes boat launching and boat loading problems.

Actions: A courtesy dock was constructed at one of the public boat ramps by the City of Rockwall. The City of Dallas also is in the process of constructing a courtesy dock at one of their parks. However, more are needed at higher use ramps. The City of Garland, which controls the other public ramps, still has not made plans to construct courtesy docks.

docks.

Harvest regulation history: Sport fish populations in Ray Hubbard Reservoir have been managed with statewide regulations (Table 2).

Stocking history: The most recent stocking of Ray Hubbard Reservoir occurred in 2008 and consisted of 114,846 palmetto bass. The complete stocking history is in Table 3.

Vegetation/habitat history: Ray Hubbard Reservoir aquatic vegetation is currently comprised mainly of native shoreline emergent species and limited floating leaf species along with sporadic stands of hydrilla (Table 4). A large stand of hydrilla is located in the upper East Fork arm of the reservoir. Although present, hydrilla doesn't currently hamper access or cause problems with property owners. Rocky habitat in the form of riprap is also abundant along the numerous highway crossings, along the dam, near the power plant intake and discharge area, and near marinas.

METHODS

Fishes were collected by electrofishing (2.0 hours at 24 5-min stations), trap netting (15 net nights at 15 stations), and gill 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/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 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 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Age and growth analysis for largemouth bass and palmetto bass was conducted with ages being determined using otoliths from fish collected over stock size (TPWD, Inland Fisheries Division, unpublished manual revised 2008). A level 1 and 2 age and growth survey was conducted on palmetto and largemouth bass respectively. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of native shoreline emergent species and limited floating leaf species, and sporadic stands of hydrilla (Table 4). A large stand of hydrilla is located in the upper East Fork arm of the reservoir. Although present, hydrilla doesn't currently hamper access or cause problems with property owners. Riprap habitat is also abundant along the numerous highway crossings, along the dam, near the power plant intake and discharge area, and near marinas.

Prey species: The total electrofishing catch rate of threadfin averaged 708.8/hr from 2005–2008. Catch rates varied from a high of 1,195.0/hr in 2008 to a low of 251.0/hr in 2006. This average catch rate is well above the district average of 249.6/hr. Gizzard shad catch rates averaged 179.1/hr from 2005–2008, and varied from a high of 273.5/hr in 2008 to a low of 98.0/hr in 2005 (Figure 2). This average catch rate is well below the district average of 267.9/hr. Index of vulnerability (IOV) continues to be low. IOV values averaged only 48.7 from 2005 - 2008. Although this value is low and is a cause of concern, historical IOV values have also been low and have averaged only 63.8 from 1987–2008 (Figure 3). The catch rate of bluegill averaged 204.1/hr from 2005–2008 (Figure 4). This average is higher than the district average of 186.6/hr. The catch rate of bluegill 6 inches and longer averaged 53.8/hr from 2005–2008 indicating the population has the potential to provide angling opportunities. The longear catch rate averaged 134.4/hr from 2005–2008 which is above the district average of 95.4/hr (Figure 5).

Catfishes: The 2009 total gill netting catch rate of blue catfish was 8.1/nn which was an increase from the rate observed in 2007 (2.3/nn) (Figure 6). The average of these years (5.2/nn) was well above the district average of 2.3/nn. Size structure of the blue catfish population is very good as indicated by PSD values of 19 and 45, and RSD-p values of 10 and 11 observed in 2007 and 2009 respectively. Body conditions of the blue catfish sampled were above 85 for most length groups. The total gill netting catch rate of channel catfish was 2.1/nn in 2009 which was lower than the previous sample (5.0/nn) in 2007 (Figure 7). This catch rate is also lower than the district average of 5.7/nn. Size structure of the population was below average as indicated by PSD and RSD-p values of 10 and 5 respectively. However body condition of the channel catfish sampled were above 90 for most length groups.

Temperate basses: The 2009 total gill netting catch rate of white bass was 9.5/nn which was above the district average of 8.0/nn. This catch rate was also higher than the 2007 catch rate of 3.9/nn (Figure 8). Size structure of the population was good as indicated by the PSD value of 91. For the first time in recent history striped bass were collected in gill netting samples at 0.3/nn. These fish are probably from the stockings in Lavon Reservoir which is directly above Ray Hubbard and there abundance is expected to increase in the future. The gill netting catch rate of palmetto bass was 1.3/nn which was much lower than the district average of 3.4/nn (Figure 9). This catch rate is the lower than the previous catch rate observed in 2007 (3.3/nn). The population structure is good as indicated by PSD and RSD-p values of 63 and 58 respectively. In Ray Hubbard, palmetto bass reach 18 inches between age 2 and 3 (Figures 10 and 11).

Largemouth bass: The total electrofishing catch rate of largemouth bass averaged 119.4/hr from 2005-2008 and varied from a high of 139.5/hr in 2007 to a low of 106.5/hr in 2008 (Figure 12). This average is slightly below the district average of 131.8/hr. Size structure of the largemouth bass population was good as indicated by an average PSD value of 36 and an RSD-14 value of 16 observed from 2005-2008. Growth of largemouth bass in Ray Hubbard Reservoir was good. Average age at 14 inches (13.0 to 14.4 inches) was between 2 and 3 years (N = 13); range = 1 – 2 years (Figure 13). Body conditions in 2008 were at or near optimal for most size classes of fish. Florida largemouth bass allele percentage was 43% (Table 5).

Crappies: The total trap netting catch rate of white crappie was 1.4/nn in 2008, which is well below the district average of 16.9/nn and much lower than previous surveys (Figure 14). The size structure of the population is good as indicated by a PSD value of 60 and RSD-p of 33. The black crappie catch rate was 1.3/nn in 2008, which is higher than the 2004 survey (0.9/nn; Figure 15). The size structure of the black crappie population is good as indicated by a PSD of 75.

Fisheries management plan for Ray Hubbard Reservoir, Texas

Prepared – July 2009.

ISSUE 1: A quality fishery for palmetto bass has persisted in Ray Hubbard Reservoir since the stocking program began. The fishery supports several guides targeting palmetto bass. Maintenance of the population relies on annual stockings.

MANAGEMENT STRATEGY

1. Request annual stockings of palmetto bass at a rate of 10 – 15 fish per surface acre.

ISSUE 2: Although some progress has been made, courtesy docks are still needed at high use ramps to assist anglers with launching and loading of boats.

MANAGEMENT STRATEGY

1. Contact the City of Dallas and Garland to continue pressing for the installation of courtesy docks at high use boat ramps.

ISSUE 3: The largemouth bass population has a history of producing trophy sized fish. There is evidence of good catches occurring during tournaments. Genetic analysis revealed a high FLMB allele frequency but no FLMB genotypes.

MANAGEMENT STRATEGIES

1. Request the stocking of FLMB in 2010 and 2011 at a rate of 25/acre to boost FLMB genotype.
2. In 2012, conduct genetic analysis of largemouth bass samples to determine stocking success.

ISSUE 4: The crappie catch rate in 2008 was well below historic catch rates.

MANAGEMENT STRATEGY

1. Conduct trap netting in fall of 2009 to monitor catch rate of crappie.

ISSUE 5: The exotic species zebra mussel (*Dreissena polymorpha*) has been found in Texoma Reservoir. Water from Texoma Reservoir is pumped into Lavon Reservoir for water supply purposes. Lavon Reservoir is directly upstream from Ray Hubbard Reservoir and infestation of zebra mussel is possible.

MANAGEMENT STRATEGY

1. Notify the City of Dallas about the zebra mussel threat.
2. Setup sampling equipment to determine if zebra mussels are in Ray Hubbard Reservoir.

SAMPLING SCHEDULE JUSTIFICATION

General monitoring of sport fish species will be conducted with annual electrofishing and gill netting every 2 years. Trap netting will be conducted in 2009 to monitor the low catch rate of crappie observed in 2008 and in 2012 for general monitoring.

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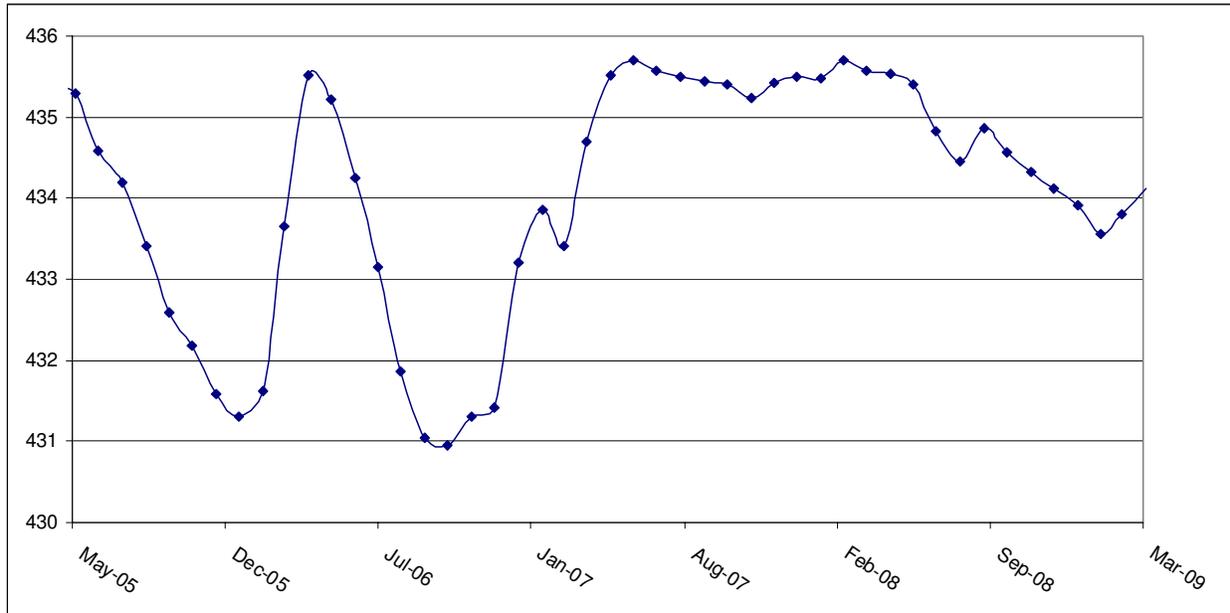


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Ray Hubbard Reservoir, Texas from May 2005-April 2009. Conservation pool is 435.5 feet above MSL.

Table 1. Characteristics of Ray Hubbard Reservoir, Texas.

Characteristic	Description
Year Constructed	1968
Controlling authority	City of Dallas
Counties	Collin, Dallas; Rockwall; Kaufman
Reservoir type	Mainstream Trinity River
Conductivity	353 umhos/cm

Table 2. Harvest regulations for Ray Hubbard Reservoir, Texas.

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, striped	5	18 minimum
Bass, largemouth	5	14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

Table 3. Stocking history of Ray Hubbard 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.

Species	Year	Number	Life Stage	Mean TL (in)
Blue catfish	1990	109,170	FGL	2.0
	1993	399,950	FGL	2.2
	Total	509,130		
Channel catfish	1971	96,830	AFGL	7.9
	Total	96,830		
Florida Largemouth bass	1988	64,870	FRY	1.0
	1991	568,890	FGL	1.4
	1996	549,320	FGL	1.4
	2001	501,360	FGL	1.6
	2003	5,000	FGL	1.5
	2006	542,230	FGL	1.7
	2007	543,440	FGL	1.7
Total	2,775,130			
Largemouth bass	1968	1,471,600	FRY	0.7
	1970	2,003,000	FRY	0.7
	1970	201,000	UNK	UNK
	Total	3,675,600		
Mixed largemouth bass	1988	502,890		0.9
	Total	502,890		
Palmetto Bass (striped X white bass hybrid)	1976	149,610	UNK	UNK
	1979	114,000	UNK	UNK
	1980	101,800	UNK	UNK
	1982	232,700	UNK	UNK
	1985	271,950	FGL	2.0
	1987	455,010	FRY	1.0
	1988	1,200	AFGL	4.0
	1988	454,640	FRY	1.0
	1989	460,940	FGL	1.3
	1991	235,990	FGL	1.4
	1992	325,180	FGL	1.4
	1993	171,850	FGL	1.6
	1993	940,000	FRY	0.4
	1994	170,020	FGL	1.7
	1994	171,630	FRY	0.9
	1995	346,140	FGL	1.2
1996	250,700	FGL	1.6	

Species	Year	Number	Life Stage	Mean TL (in)
	1999	56,940	FGL	1.3
	2002	172,330	FGL	1.3
	2003	162,990	FGL	1.5
	2004	100,430	FGL	1.3
	2005	216,810	FGL	1.5
	2005	1,501,900	FRY	0.3
	2007	152,630	FGL	1.5
	2008	114,840	FGL	1.6
	Total	7,332,320		
Striped bass	1979	111,220	UNK	UNK
	1981	113,480	UNK	UNK
	1983	115,860	UNK	UNK
	1984	338,680	FGL	2.0
	1986	50,800	FGL	2.0
	1986	174,400	FRY	1.0
	1996	11,590	FGL	1.7
	Total	916,050		
Walleye	1976	230,000	FRY	0.2
	1981	19,230	FRY	0.2
	Total	249,230		

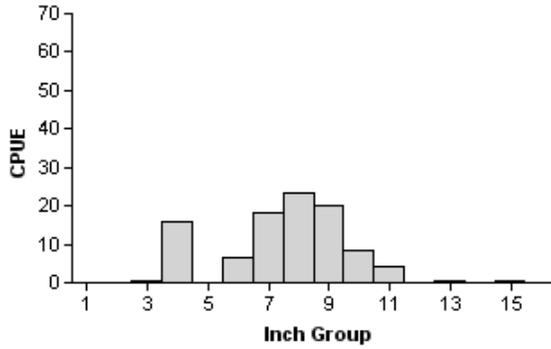
Table 4. Survey of littoral zone and physical habitat types, Ray Hubbard Reservoir, Texas, 2008. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Boat dock	0.3	0.3		
Bulkhead	13.4	13.4		
Bulkhead + boat dock	4.3	4.3		
Bulkhead + native emergent	0.2	0.2		
Exotic not prohibited	0.1	0.1		
Gravel + natural	0.4	0.4		
Native emergent	1.4	1.4		
Native emergent + boat dock	0.8	0.8		
Native emergent + exotic not prohibited	0.2	0.2		
Native emergent + native floating + native submersed	2.8	2.8		
Native emergent + native submersed	0.8	0.8		
Native emergent + natural	53.6	53.6		
Native emergent + native submersed	0.9	0.9		
Native submersed	0.1	0.1		
Native submersed + natural	0.1	0.1		
Natural	5.0	5		
Natural + exotic not prohibited	0.3	0.3		
Rocky shoreline	19.9	19.9		
Rocky shoreline + boat dock	0.3	0.3		
Rocky shoreline + gravel + natural	0.2	0.2		
Rocky shoreline + native emergent	2.0	2		
Rocky shoreline + native emergent + natural	0.1	0.1		
Rocky shoreline + native submersed	0.3	0.3		
Rocky shoreline + natural	0.5	0.5		
Exotic prohibited (hydrilla)			857	4
Standing Timber			3,365	16
Boat Dock + marina			108	0.5

Gizzard Shad

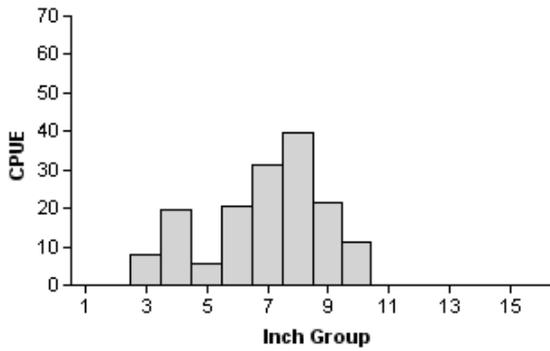
2005

Effort : 2.0
 Total CPUE : 98.0 (18; 196)
 Stock CPUE : 75.0 (20; 150)
 IOV : 41.84 (8)



2006

Effort : 2.0
 Total CPUE : 157.0 (20; 314)
 Stock CPUE : 103.5 (26; 207)
 IOV : 54.14 (8.4)



2007

Effort : 2.0
 Total CPUE : 188.0 (15; 376)
 Stock CPUE : 140.0 (17; 280)
 IOV : 43.35 (7.4)

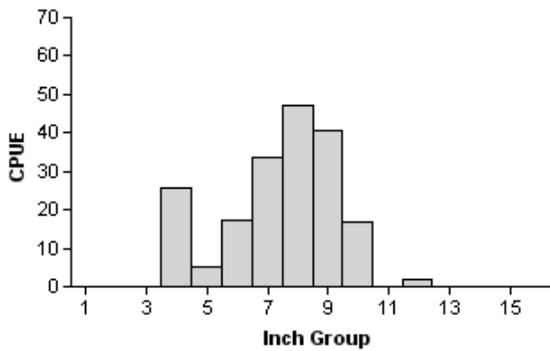


Figure 2. Number of gizzard shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Ray Hubbard Reservoir, Texas, 2005, 2006, 2007, and 2008.

Gizzard Shad

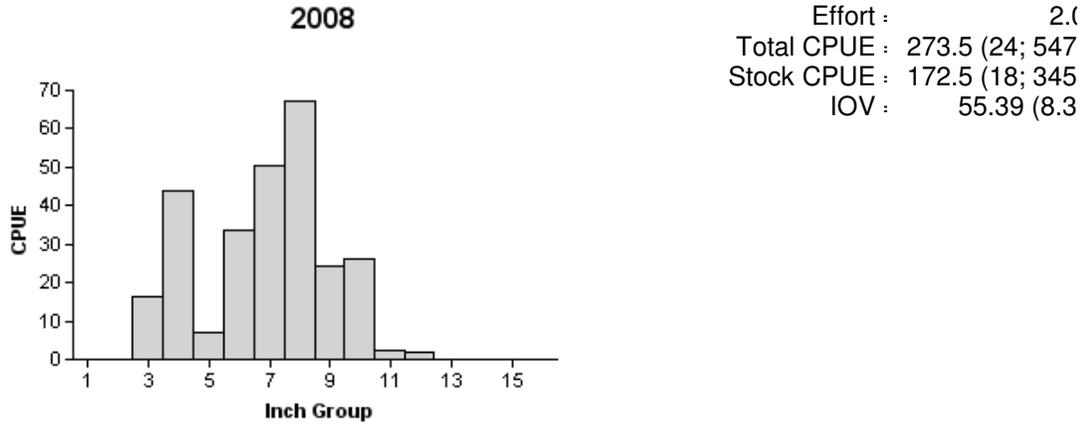


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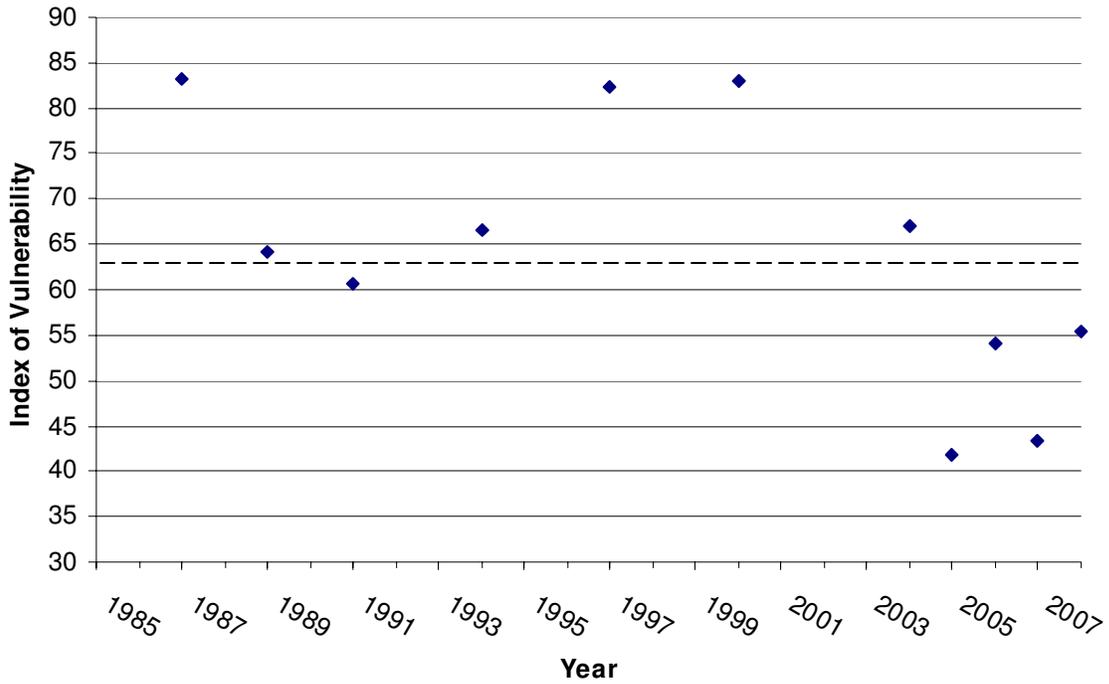


Figure 3. Index of Vulnerability (IOV) for gizzard shad caught during fall electrofishing samples at Ray Hubbard Reservoir from 1987-2008. Dashed line represents reservoir average (63.8).

Bluegill

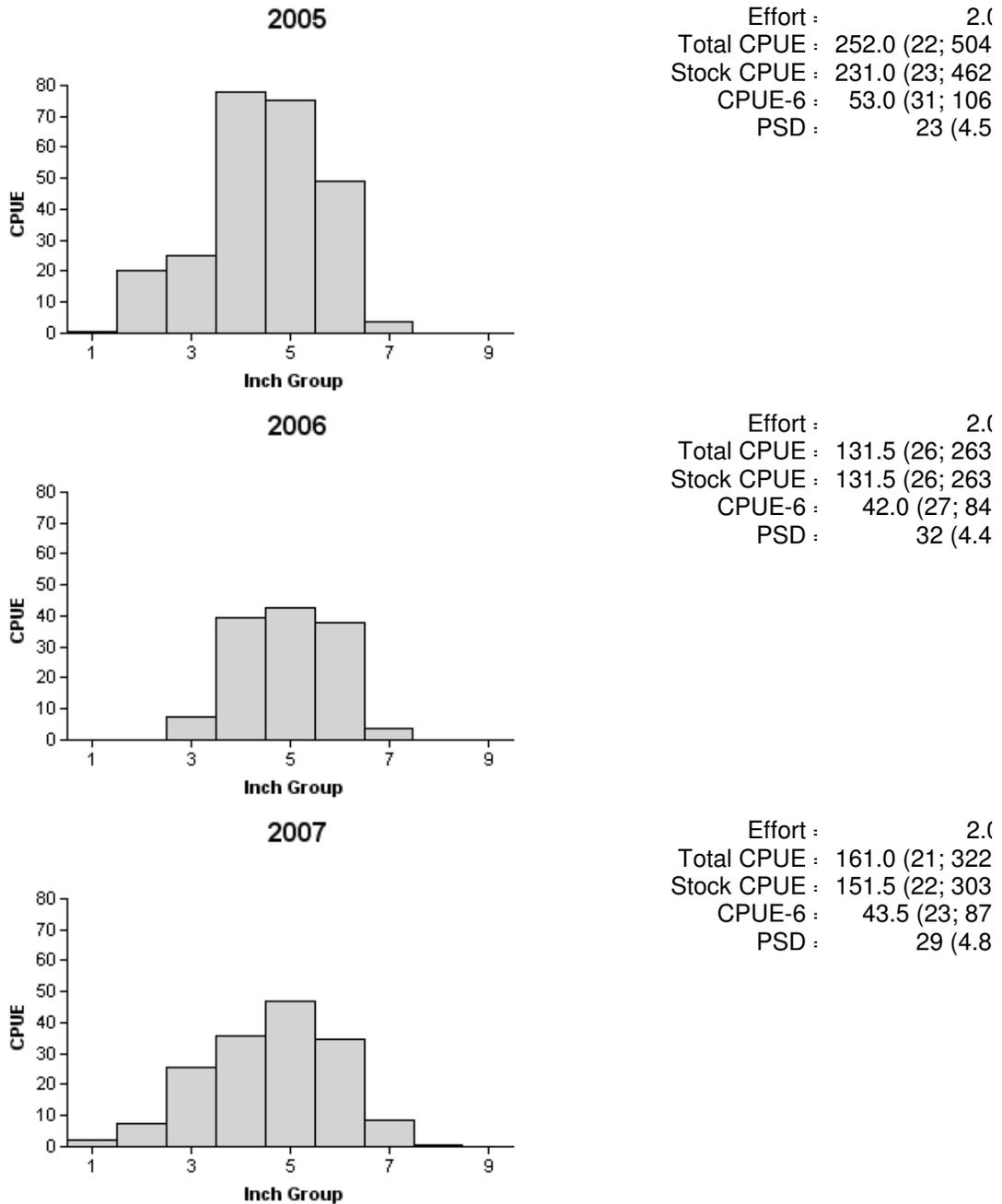
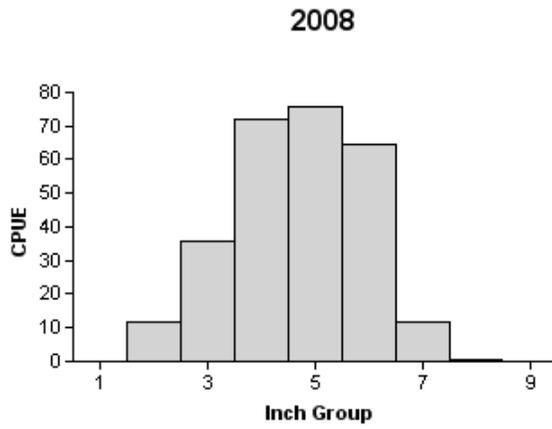


Figure 4. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Ray Hubbard Reservoir, Texas, 2005, 2006, 2007, and 2008.

Bluegill



Effort : 2.0
Total CPUE : 272.0 (25; 544)
Stock CPUE : 260.0 (24; 520)
CPUE-6 : 76.5 (27; 153)
PSD : 29 (3.4)

Figure 4 continued.

Longear Sunfish

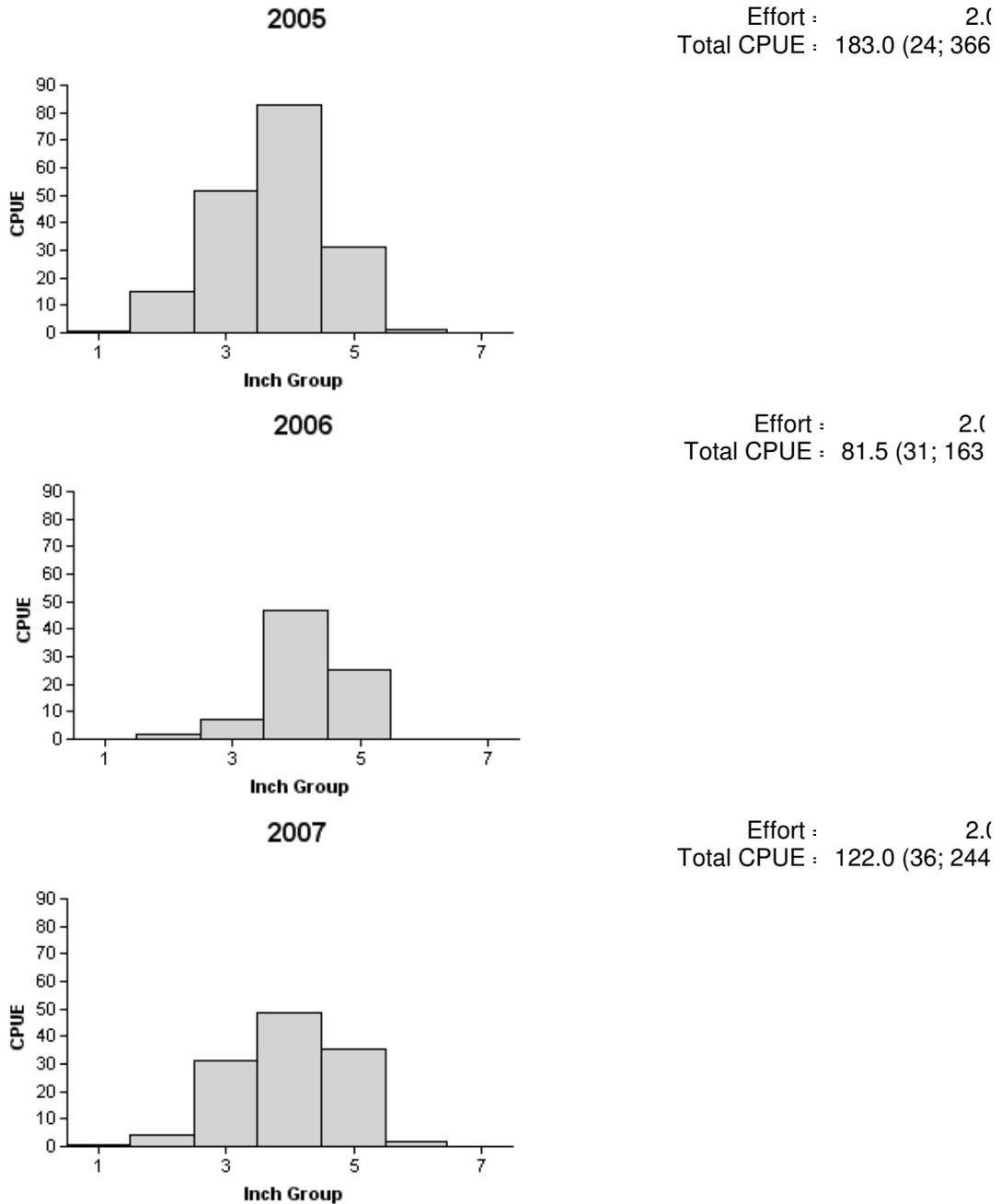


Figure 5. Number of longear sunfish caught per hour (CPUE; RSE and N for CPUE) for fall electrofishing surveys, Ray Hubbard Reservoir, Texas, 2005, 2006, 2007, and 2008.

Longear Sunfish

2008

Effort : 2.0
Total CPUE : 151.0 (24; 302)

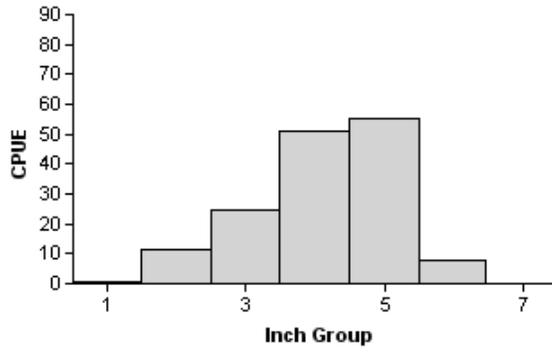


Figure 5 continued.

Blue Catfish

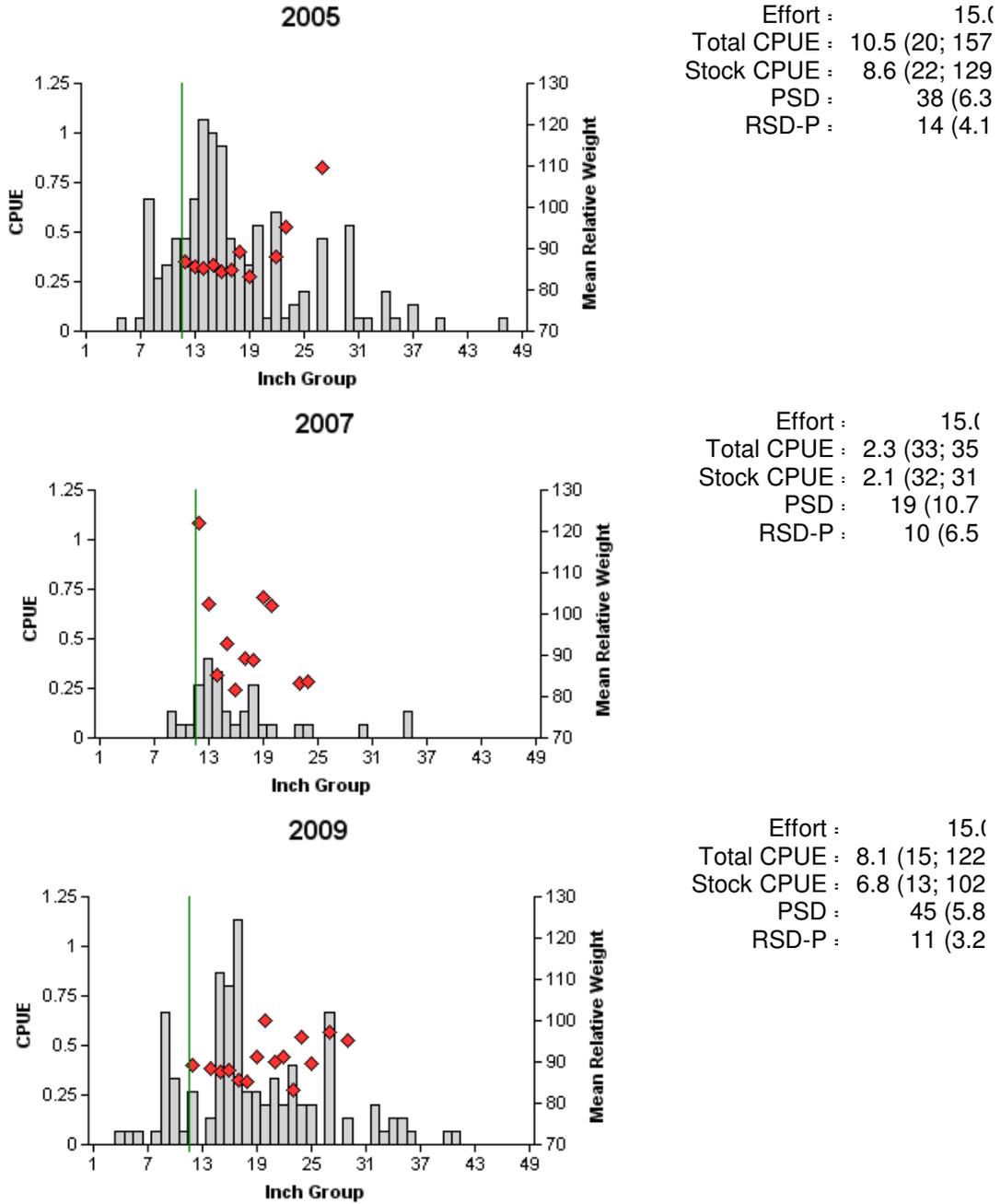
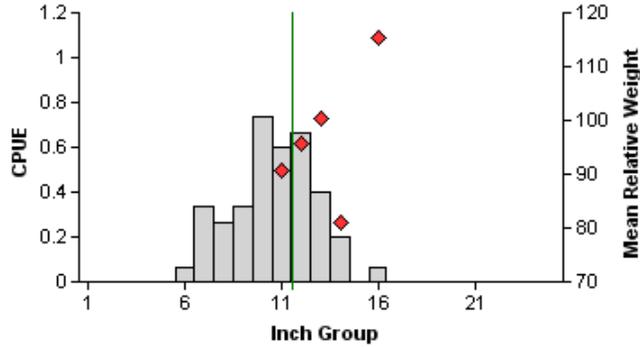


Figure 6. Number of blue catfish caught per net night (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Ray Hubbard Reservoir, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of sampling.

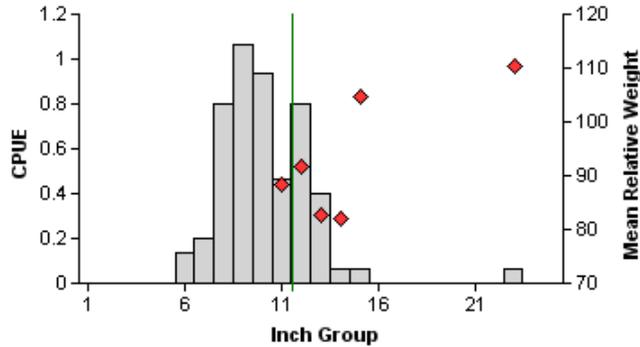
Channel Catfish

2005



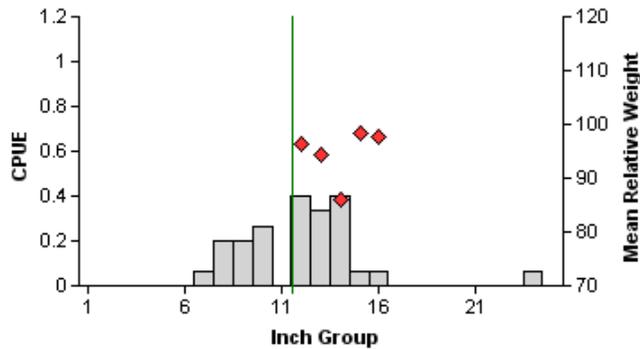
Effort : 15.0
 Total CPUE : 3.7 (21; 55)
 Stock CPUE : 1.9 (29; 29)
 PSD : 3 (3.3)
 RSD-P : 0 (0)

2007



Effort : 15.0
 Total CPUE : 5.0 (15; 75)
 Stock CPUE : 1.9 (37; 28)
 PSD : 4 (3.8)
 RSD-P : 0 (0)

2009



Effort : 15.0
 Total CPUE : 2.1 (23; 31)
 Stock CPUE : 1.3 (20; 20)
 PSD : 10 (6.2)
 RSD-P : 5 (4.6)

Figure 7. 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, Ray Hubbard Reservoir, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of sampling.

White Bass

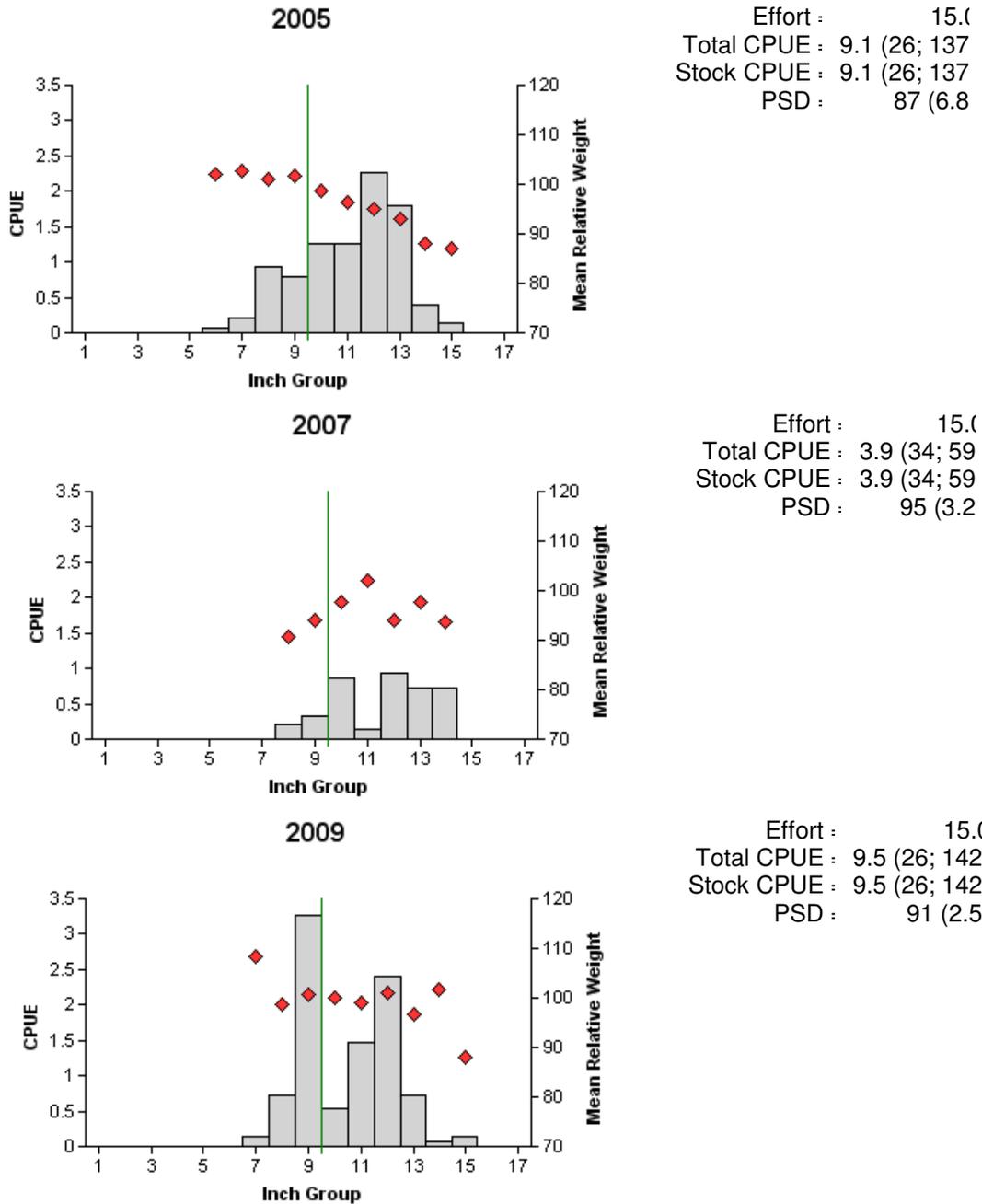


Figure 8. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Ray Hubbard Reservoir, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of sampling.

Palmetto Bass

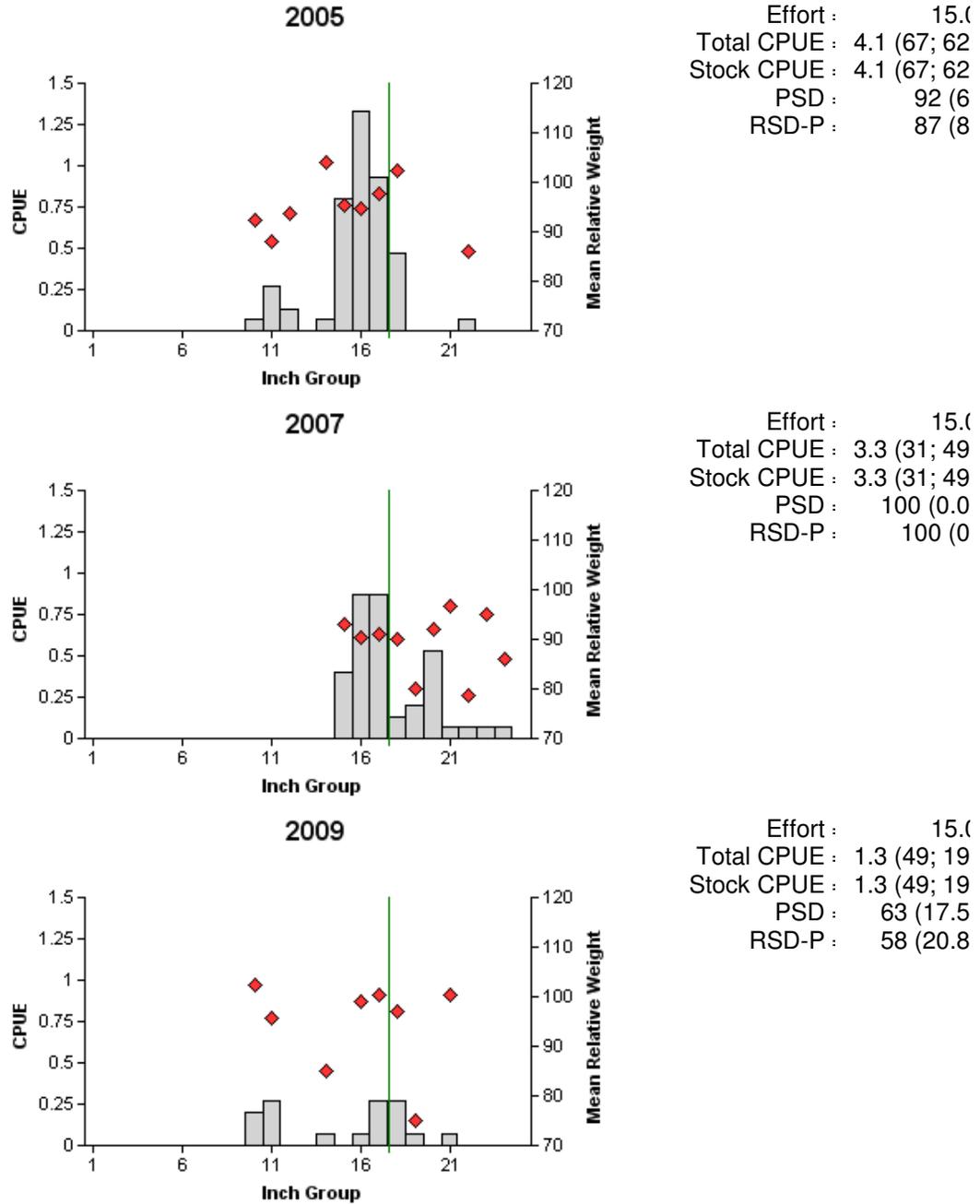


Figure 9. Number of palmetto bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Ray Hubbard Reservoir, Texas, 2005, 2007, and 2009. Vertical line represents length limit at time of sampling.

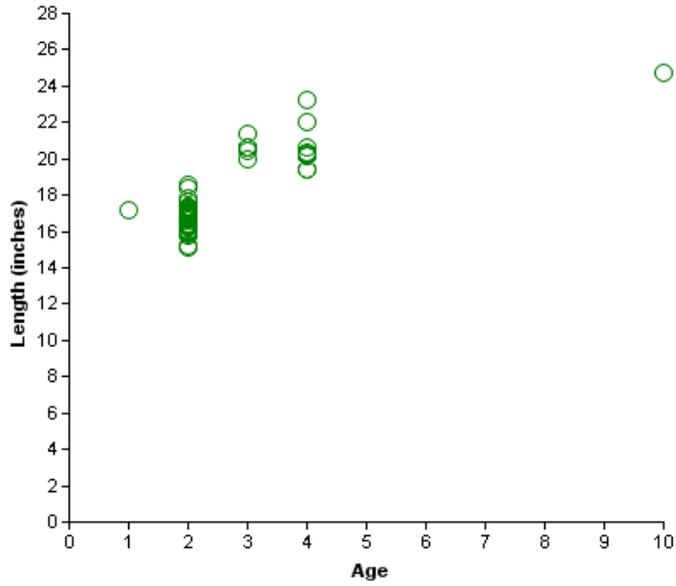


Figure 10. Length at age for palmetto bass (sexes combined) collected from gill netting at Ray Hubbard Reservoir, Texas, for spring 2007 (N=49).

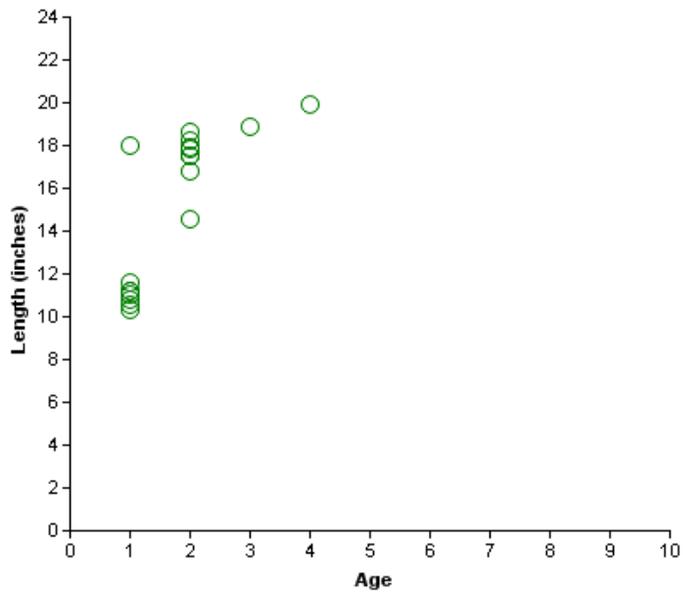


Figure 11. Length at age for palmetto bass (sexes combined) collected from gill netting at Ray Hubbard Reservoir, Texas, for spring 2009 (N=18).

Largemouth Bass

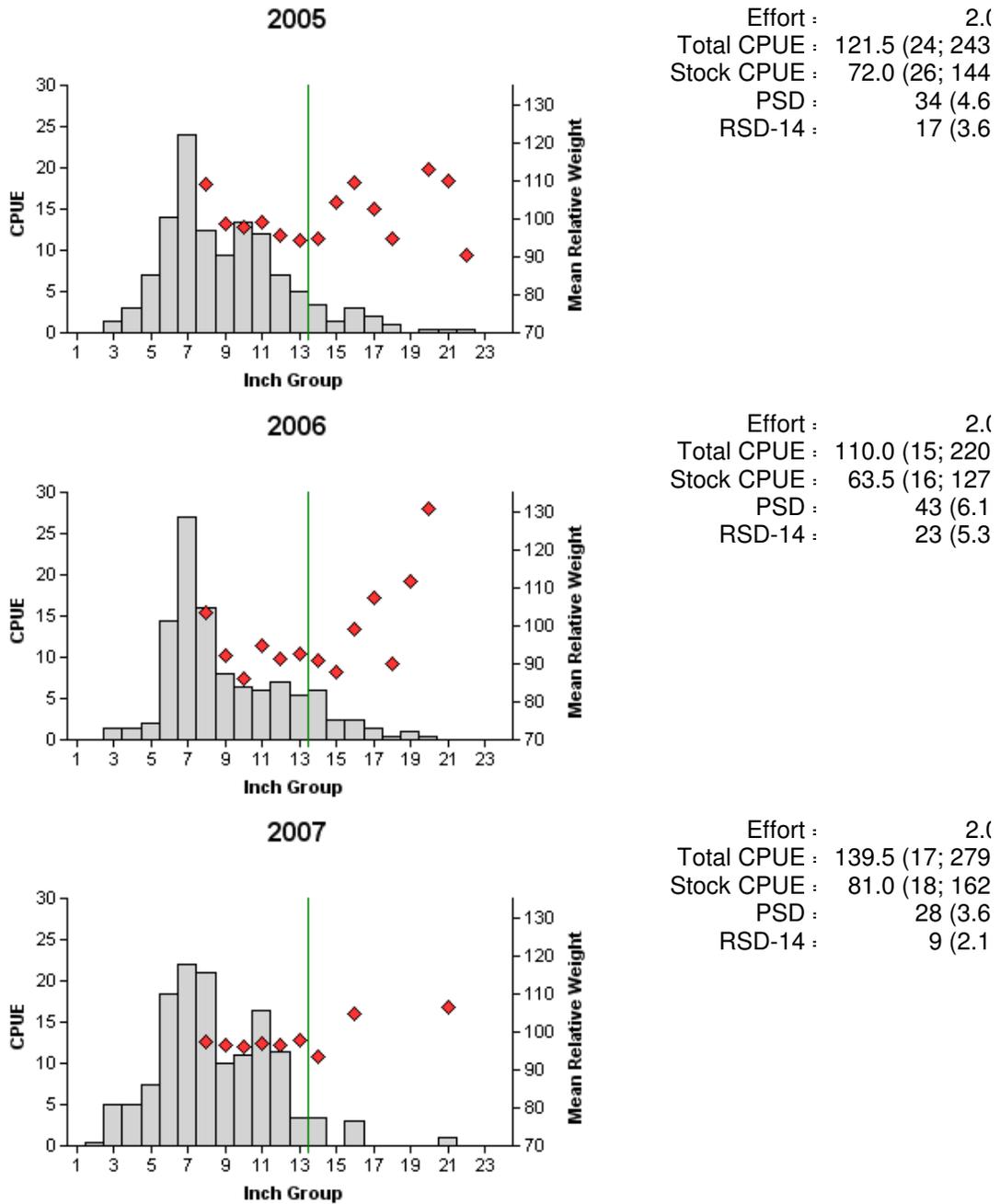


Figure 12. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Ray Hubbard Reservoir, Texas, 2005, 2006, 2007, and 2008. Vertical lines represent length limit at time of sampling.

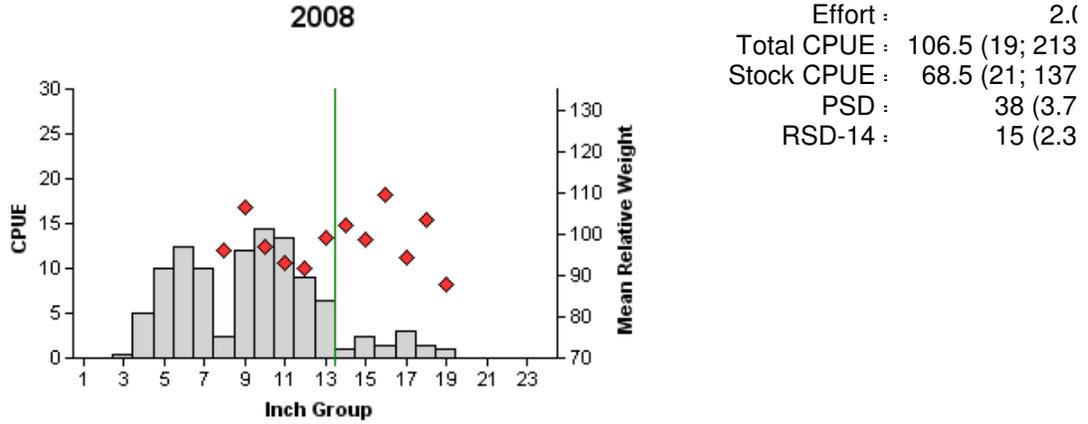


Figure 12 continued.

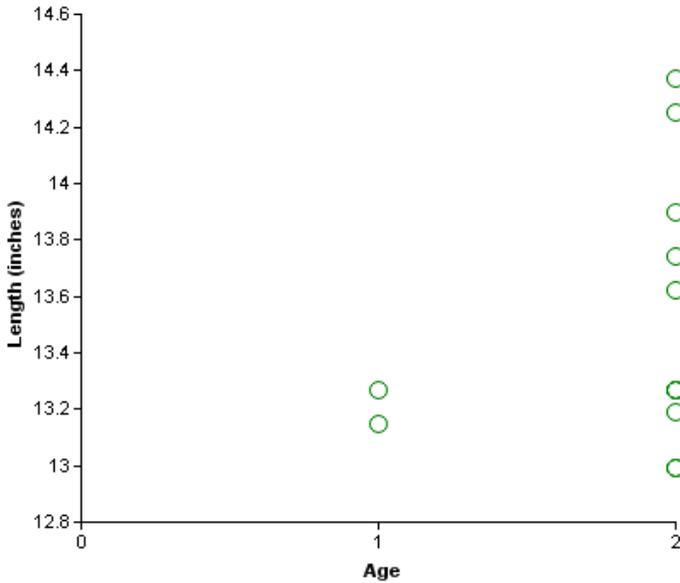


Figure 13. Age at length for largemouth bass (sexes combined) collected from electrofishing at Ray Hubbard Reservoir, Texas, for fall 2008 (N=13).

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Ray Hubbard Reservoir, Texas, 2008. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB.

Year	Sample size	% FLMB alleles	%NLMB alleles	Fgenotypes	Ngenotypes	F1
2008	29	43	57	0	0	0

White Crappie

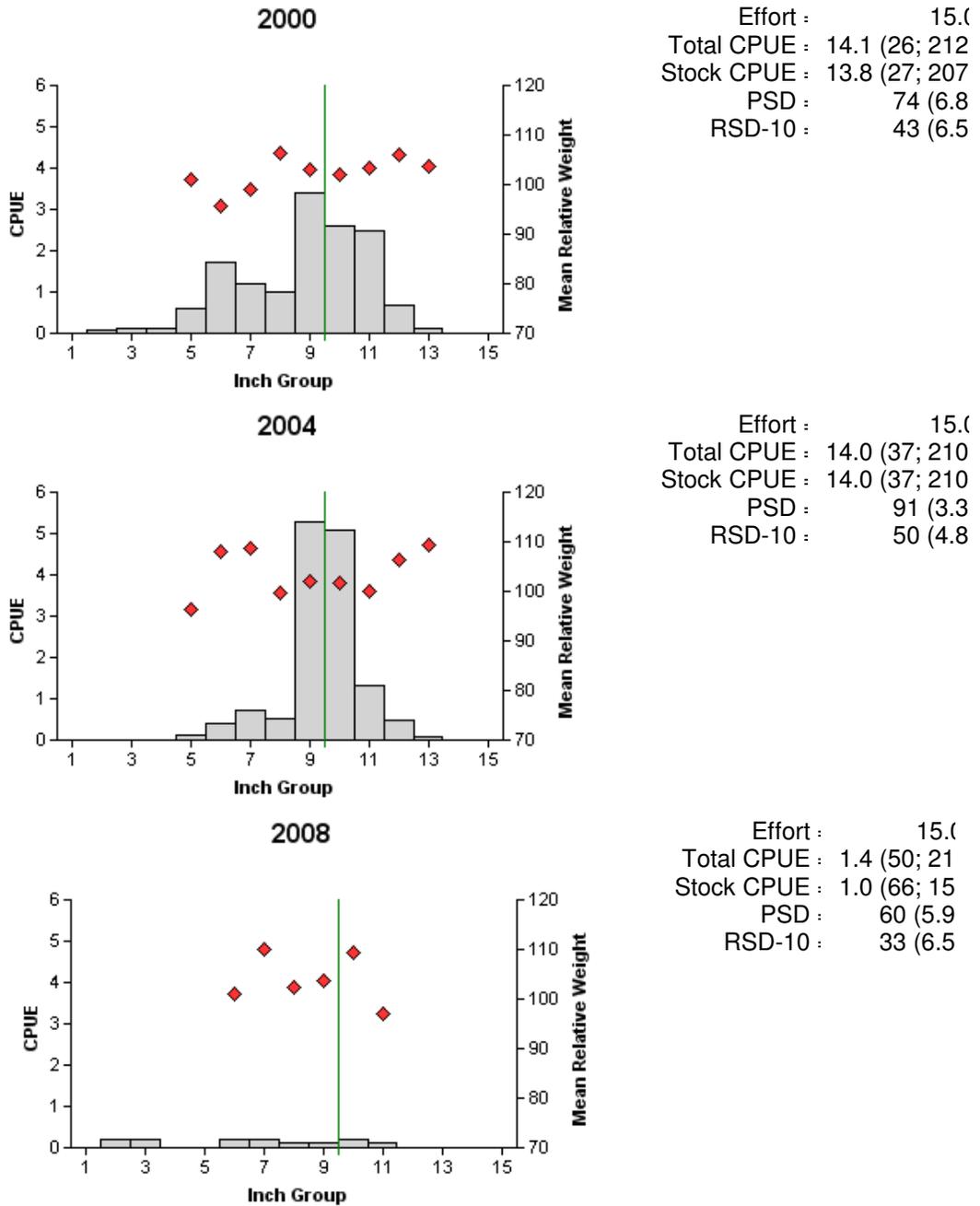


Figure 14. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Ray Hubbard Reservoir, Texas, 2000, 2004, and 2008. Vertical line represents length limit at time of sampling.

Black Crappie

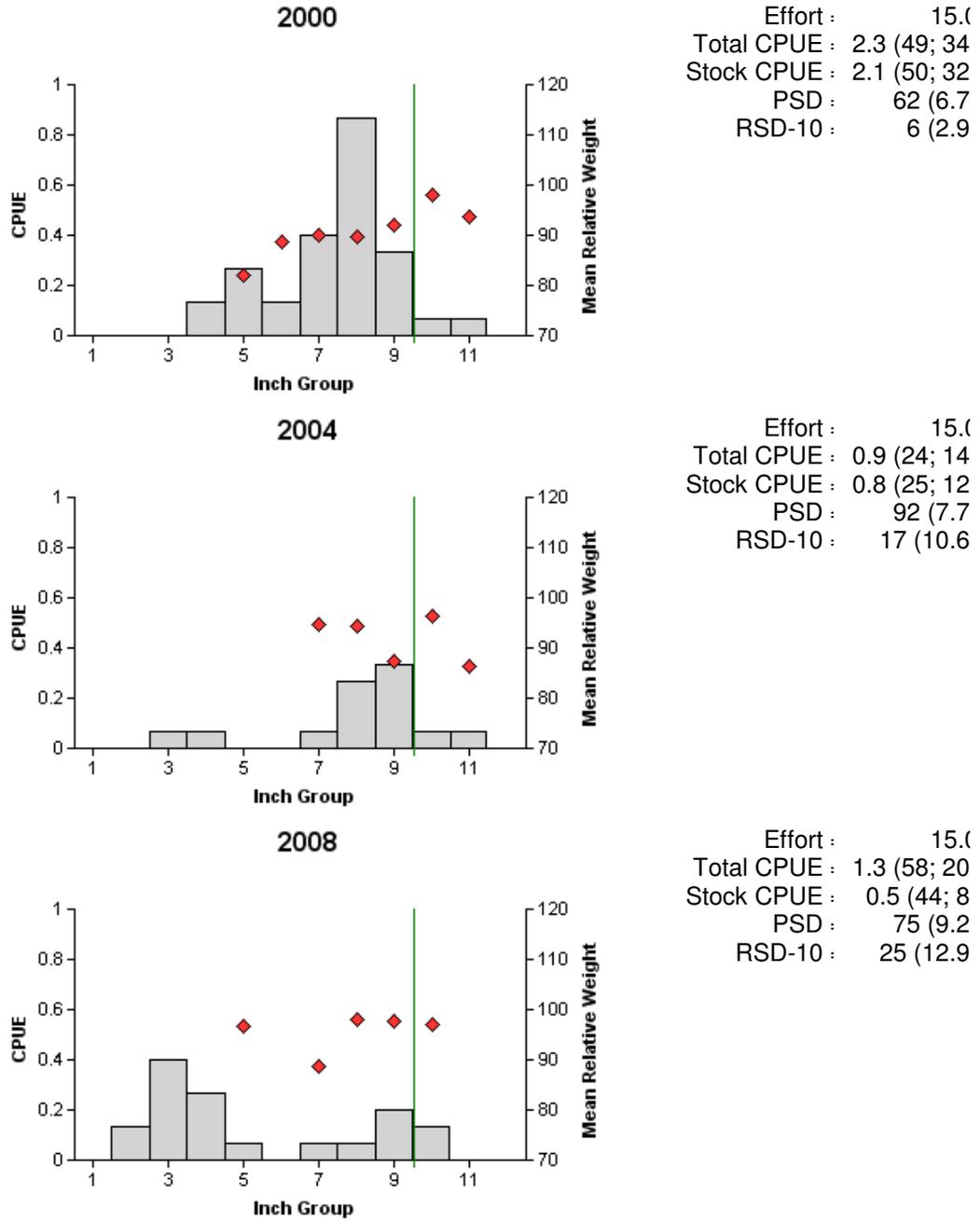


Figure 15. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Ray Hubbard Reservoir, Texas, 2000, 2004, and 2008. Vertical line represents length limit at time of sampling.

Table 6. Proposed sampling schedule for Ray Hubbard 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.

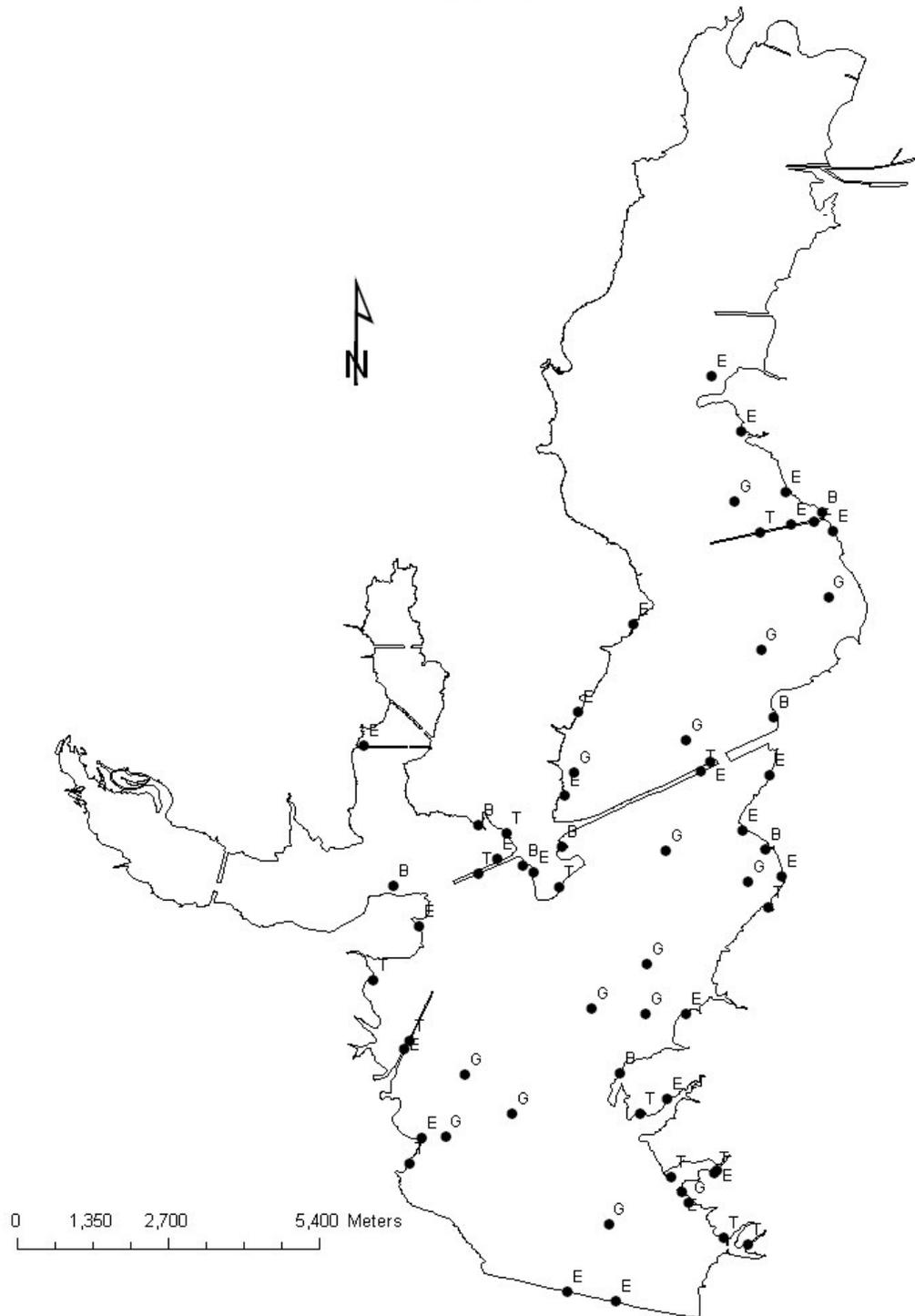
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2009-Spring 2010	A	A			
Fall 2010-Spring 2011	A		A		
Fall 2011-Spring 2012	A				
Fall 2012-Spring 2013	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Ray Hubbard Reservoir, Texas, 2008-2009.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad	296	19.7			547	273.5
Threadfin shad					2,390	1,195.0
Common carp	3	0.2				
Smallmouth buffalo	41	2.7				
Blue catfish	122	8.1				
Channel catfish	31	2.1				
White bass	142	9.5				
Yellow bass	320	21.3				
Striped bass	5	0.3				
Palmetto bass	19	1.3				
Bluegill					544	272.0
Longear sunfish					302	151.0
Redear sunfish					22	11.0
Largemouth bass					213	106.5
White crappie			21	1.4		
Black crappie	2	0.1	20	1.3		
Freshwater drum	17	1.1				

APPENDIX B



Location of sampling sites, Ray Hubbard Reservoir, Texas, 2008-2009. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.