

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-30-R-35

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2009 Survey Report

Stillhouse Hollow Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Stillhouse Hollow Reservoir were surveyed in 2009 with a boat electrofisher and in 2010 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Stillhouse Hollow Reservoir is a 6,430 acre reservoir located in Bell County, Texas. The impoundment was created in 1968 and is operated by the United States Army Corps of Engineers. Primary water uses include municipal water supply and recreation. Water levels fluctuate about 5 feet annually; however elevations were near conservation pool (i.e., 622) during sampling periods. Habitat features mainly consisted of natural shorelines.
- **Management history:** Sport fishes in Stillhouse Hollow Reservoir have always been managed with statewide regulations. Important sport fish include largemouth and smallmouth bass. The management plan from the 2002 survey report included annual evaluations of hydrilla coverage, and annual comparisons of smallmouth bass catch rates between standardized and non-standardized stations. Standard electrofishing surveys were conducted in 2002 and 2003; however district priorities changed in 2004 and these annual surveys were dropped from the four year rotation. A tier IV age and growth sample was conducted on largemouth bass in 2005 as a result of the district reprioritization. Annual electrofishing of subjectively chosen stations began in 2002, but after only one survey, it was found that the numbers of smallmouth bass collected were insufficient for analysis, and these surveys were dropped. Hydrilla coverage is still surveyed on an annual basis.
- **Fish Community**
 - **Prey species:** The prey base is currently very weak, with numbers and catch rates of all species below historical averages.
 - **Catfishes:** Channel catfish were collected in good numbers for the first time since 1998. All fish collected were of legal size. Flathead catfish are in the reservoir in low numbers.
 - **White bass:** A low density white bass population still exists in the reservoir. Catch rates and condition indices were near average, and individuals up to 15 inches were observed.
 - **Black basses:** The smallmouth bass catch rate was poor, with only a single individual collected. Hopefully, the 2009 stocking of over 10,000 advanced fingerlings and nearly 70,000 fingerlings will rejuvenate this important fishery. The largemouth bass catch rate was good, and the population showed consistent recruitment and individuals to 19 inches in length.
 - **White crappie:** White crappie are still present in the reservoir.
- **Management Strategies:** Perform annual aquatic vegetation surveys for hydrilla, and implement native vegetation plantings with the help of interested constituent and user groups to improve fishery habitat. Continue annual stocking requests of 25/acre for smallmouth bass and perform a bass-only electrofishing survey in fall 2011 to monitor the black bass population in general and to determine the recruitment effects from recent smallmouth bass stockings. Inform controlling authorities about new exotic species threats to Texas waters, and work with those authorities to display appropriate signage, educate constituents, and understand appropriate enforcement action(s).

INTRODUCTION

This document is a summary of fisheries data collected from Stillhouse Hollow Reservoir in 2009-2010. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data is presented with the 2009-2010 data for comparison.

Reservoir Description

- Stillhouse Hollow Reservoir is a 6,430 acre reservoir located in Bell County, Texas. The impoundment was created in 1968 and is operated by the United States Army Corps of Engineers. Primary water uses include municipal water supply and recreation. The reservoir has a shoreline length of 58 miles, a mean depth of 37.0 feet, and a maximum depth of 107.0 feet. Water levels fluctuate about 5 feet annually; however elevations were near conservation pool during sampling. The reservoir is classified as oligotrophic based on chlorophyll a (1.6 mg/cubic meter) and total phosphorous (15.7 mg/cubic meter) readings. Fish habitat at the time of sampling consisted mainly of rocky shorelines, flooded timber, dead trees and stumps. Native aquatic plants were sparse. Hydrilla coverage used to be significant however it is currently minimal. Boat and bank access to the reservoir are good, however handicap facilities remain poor.

Management History

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

1. Monitor hydrilla coverage annually and share information with controlling authority and other interested parties.
Action: Hydrilla coverage has been surveyed annually. The 2006 survey found hydrilla at its highest coverage to date (i.e., 19%). An extended period of high, turbid water elevation during summer 2007 wiped out most stands of hydrilla. The current coverage is estimated at around 3%. Survey data are shared with the United States Army Corps of Engineers and interested constituents.
2. Continue requesting smallmouth bass stockings annually.
Action: Smallmouth bass have been requested annually for Stillhouse Hollow. Stillhouse Hollow was stocked with 69,866 fingerlings and 10,175 advanced fingerlings during 2009.

Harvest regulation history: Sportfishes in Stillhouse Hollow Reservoir have always been managed with statewide regulations (Table 2).

Stocking history: Largemouth bass were first introduced in 1968. Florida largemouth bass were then stocked in 1993 and 1994 (Table 3). Smallmouth bass were introduced in 1974 and stocked through 1977. The program was revitalized in 1992 and smallmouth were stocked through 2000. The loss of hatchery brood fish curtailed stockings from 2001 through 2008 even though stocking requests were maintained. Last year approximately 80,000 fingerling smallmouth bass were stocked. Efforts continue to return to full production for this species. Walleye and palmetto bass fisheries were attempted during the 70s and early 80s, however those efforts were abandoned.

Vegetation/habitat history: Stillhouse Hollow Reservoir has never supported much native vegetation, as

most of the reservoir is deep and rocky. However, hydrilla was discovered in 1995 and has been monitored annually ever since. The peak hydrilla coverage (i.e., 19%) occurred in 2006, however the reservoir experienced high elevations of turbid water due to heavy rains in summer 2007, causing most of the hydrilla to die; only limited patches of hydrilla were observed during the summer 2009 survey. The current coverage is estimated at around 3%. The use of advanced GIS/GPS technology has resulted in more accurate coverage estimates since 2005. Several campaigns have been initiated around the state to introduce or reintroduce native aquatic vegetation into public reservoirs; Stillhouse Hollow is one of many reservoirs which have been considered.

Water Transfer: Stillhouse Hollow Reservoir is primarily used for municipal water supply, recreation, and to a lesser extent, flood control. There are currently three permanent pumping stations on the reservoir which transfer water to other sites. The first is operated by the Brazos River Authority (BRA) and transfers untreated water to Lake Georgetown to be used for municipal water supply. The other two are operated by the town of Kempner and Central Texas Water Supply, both of which pump treated water to their destinations for use as municipal water. There is one additional proposal to install a pumping station on Belton Reservoir, and pump untreated water directly to Stillhouse Hollow, thereby increasing the water transfer capabilities of Stillhouse Hollow; this proposal has not yet been approved.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations) and gill netting (10 net nights at 10 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/hr) of actual electrofishing and, for gill 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 Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (unpublished, revised manual 2009).

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_i)] 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 ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics and SE was calculated for structural indices and IOV. Fish aging became optional in 2004, and no new age and growth data were collected from the 2009/2010 survey. The most recent age and growth information for Stillhouse Hollow Reservoir can be found in Tibbs and Baird (2006). Source for water level data was the United States Geological Survey (USGS) website and United States Army Corps of Engineers (USACOE).

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of rocky shoreline, natural bluff, standing timber, dead trees and stumps, and limited amounts of rock riprap. A physical habitat survey was conducted this year (Table 4).

Creel: No creels were conducted during this survey period.

Prey species: The prey base is currently very weak, with numbers and catch rates of all species below historical averages. Prey species and catch rates included: bluegill (91/hr), longear sunfish (24/hr), green sunfish (14/hr), gizzard shad (7/hr), redear sunfish (3/hr), threadfin shad (1/hr), and warmouth (1/hr) (Figures 2, 3, and 4; Appendices A and B). The decrease in prey abundance can likely be attributed to the near total loss of hydrilla during summer 2007. Index of vulnerability (IOV) was poor with only 50% of the gizzard shad population available as prey for predators (DiCenzo et al. 1996).

Catfishes: Channel catfish were stocked once in 1968 with 322,800 advanced fingerlings. The species has only been collected in good numbers on occasion, and the channel catfish sample collected in 2010 was the best from recent records. Although the population structure appeared out of balance (PSD=76; PSD-12=100), sub-legal sized catfishes are often under-represented by gill netting, and this phenomenon has been observed in other Texas reservoirs (Buckmeier and Schlechte 2009). Individuals up to 24-inches were collected and relative weights (W_r), an index of condition or plumpness, averaged between 80 and 100 (Figure 5; Appendices A and B). No age and growth work was done on channel catfish during this survey period; additional information on this species can be found in Tibbs and Baird (2002).

White bass: A low density white bass population exists in Stillhouse Hollow Reservoir. The white bass catch rate of 1.3/nn was down slightly from the 2006 survey (2.6/nn) and the historical average (2.0/nn). The population structure was balanced with a PSD of 38 and PSD-12 of 38. Condition indices averaged between 80 and 90 with few exceptions, and individuals up to 15-inches were observed (Figure 6; Appendices A and B). No age and growth work was done on white bass during this survey period; additional information on this species can be found in Tibbs and Baird (2002).

Black basses: The smallmouth bass catch rate was poor as only one individual was collected. The 2009 catch rate of 0.7/hr was down considerably from 2005 (4.0/hr); historical catch rates average 5/hr. Condition for the single fish was excellent (Figure 7; Appendices A and B). Nothing further can be said about the current smallmouth bass population due to poor catch rates. Hopefully, the 2009 stocking of over 10,000 advanced fingerlings and nearly 70,000 fingerlings will rejuvenate this fishery. Smallmouth bass will continue to be requested at a rate of 25/acre annually. No age and growth work was done on largemouth bass during this survey period; additional information on this species can be found in Tibbs and Baird (2002).

The largemouth bass catch rate (100/hr) was above the historical average (80/hr) and similar to the 2005 survey (107/hr). The current population size structure looks fair (PSD=55; PSD-14= 9), yet few legal fish are recruiting and only one fish was collected over 18-inches. Condition indices, in general, were lower than previous surveys. Largemouth bass genetics were not analyzed this survey period since no stockings are planned for the immediate future. However, Florida largemouth bass influence has remained excellent (Figure 8; Table 5; Appendices A and B). No age and growth work was done on largemouth bass during this survey period however a large tier IV age and growth sample was analyzed on this species in 2005; additional information can be found in Tibbs and Baird (2002 and 2006).

White crappie: Trap netting became an optional gear in 2009, and since recent crappie surveys have failed to collect useful sample sizes, trap netting was not conducted during this survey period. White crappie have always been present in the reservoir in low numbers.

Fisheries management plan for Stillhouse Hollow Reservoir, Texas

Prepared – July 2010

ISSUE 1: Although hydrilla coverage decreased significantly after the high waters in 2007, it is still present in the reservoir. The 2009 survey estimated coverage at around 3%.

MANAGEMENT STRATEGY

1. Monitor hydrilla coverage annually and share information with the controlling authority and other interested parties.

ISSUE 2: The smallmouth bass catch rate from the 2009 electrofishing survey was 0.7/hr, one of the lowest on record. Smallmouth were stocked with over 10,000 advanced fingerlings and nearly 70,000 fingerlings in 2009, yet may not have fully recruited to the gear by the time of the survey. Natural reproduction has been documented in the reservoir, but appears insufficient to maintain a quality fishery.

MANAGEMENT STRATEGIES

1. Continue requesting smallmouth bass stockings annually.
2. Perform a bass-only electrofishing survey during spring 2012 to determine potential recruitment from recent smallmouth bass stockings.

ISSUE 3: Stillhouse Hollow Reservoir has never supported much native vegetation; however, hydrilla has been prevalent since its discovery in 1995. High water levels from heavy rains during summer 2007 caused most of the hydrilla to die; only limited patches of hydrilla were observed during the summer 2009 survey. Several campaigns have been initiated around the state to introduce or reintroduce native aquatic vegetation into public reservoirs to improve fishery habitat and water quality; Stillhouse Hollow is one of many reservoirs which have been considered in the past.

MANAGEMENT STRATEGIES

1. Form a partnership with the U.S. Army Corps of Engineers and interested constituent/user groups to introduce native vegetation into the lake.
2. Request appropriate species of native vegetation from the new Texas Freshwater Fisheries Center (TFFC) aquatic plant nursery; utilize partners to plant vegetation when available.
3. Monitor the spread/growth of native vegetation plantings on an annual basis pending observations; review the program at the next report writing and make recommendations.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes bass-only electrofishing in spring 2012. General monitoring with electrofishing and gill netting is slated for 2013 and 2014 (Table 6). The spring 2011 survey is necessary to evaluate the 2009 smallmouth bass stockings and monitor black bass populations in general. The 2013 and 2014 surveys are regularly scheduled surveys.

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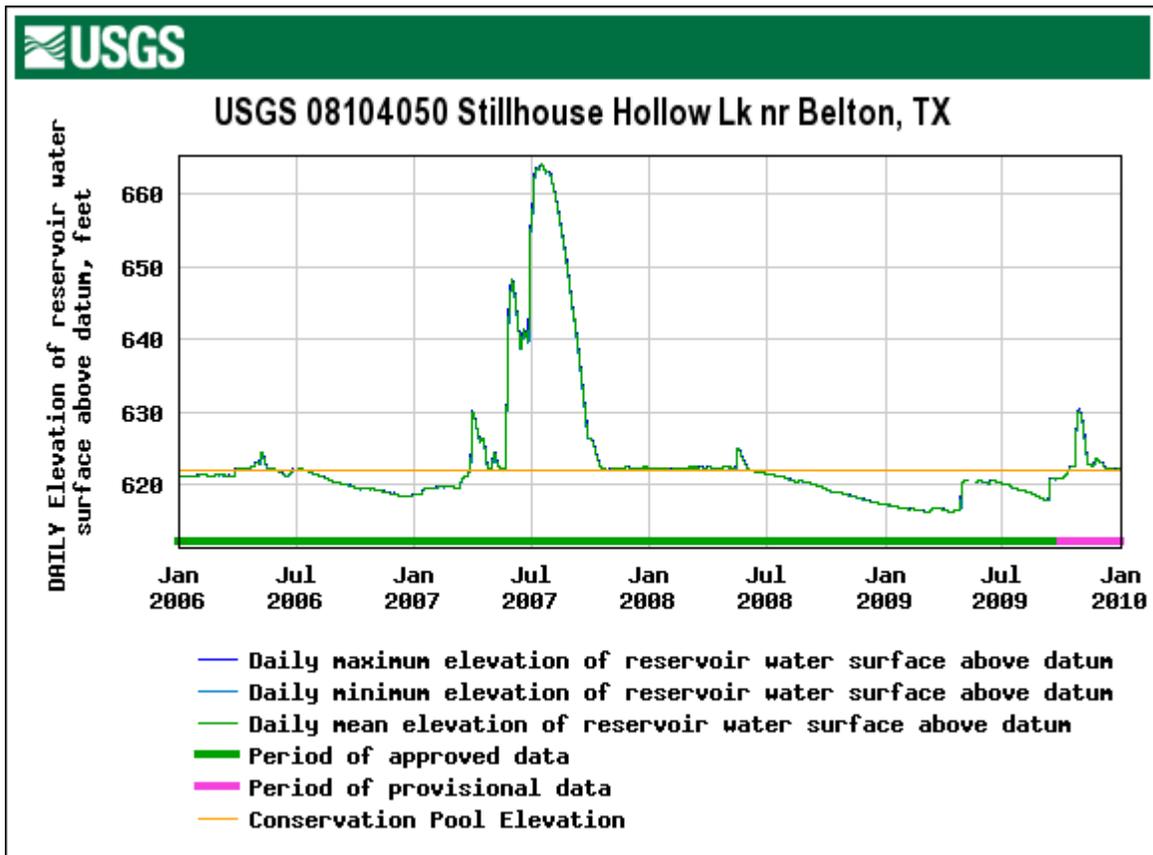


Figure 1. Daily mean water levels for Stillhouse Hollow Reservoir from January 1, 2006 through January 1, 2010. Conservation pool level is 622 feet above mean sea level.

Table 1. Characteristics of Stillhouse Hollow Reservoir, Texas.

Characteristic	Description
Year Constructed	1968
Controlling authority	United States Army Corps of Engineers
Counties	Bell
Reservoir type	Mainstem
Shoreline Development Index (SDI)	5.2
Conductivity	490 umhos/cm

Table 2. Harvest regulations for Stillhouse Hollow Reservoir, Texas.

Species	Bag Limit	Length limit (inches)
Catfish: channel and blue	25 (any combination)	12" minimum
Catfish, flathead	5	18" minimum
Bass, white	25	10" minimum
Bass: largemouth, smallmouth	5 (any combination)	14" minimum
Bass: spotted	5 (any combination)	No minimum
Crappie: white and black	25 (any combination)	10" minimum

Table 3. Stocking history of Stillhouse Hollow, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Channel catfish	1968	322,800	AFGL	7.9
	Total	322,800		
Flathead catfish	1968	2,000		UNK
	Total	2,000		
Florida largemouth bass	1993	322,026	FGL	1.2
	1994	321,167	FGL	1.2
	Total	643,193		
Largemouth bass	1968	735,000	FRY	0.7
	Total	735,000		
Palmetto bass (striped X white bass hybrid)	1978	39,225	UNK	UNK
	1982	54,527	UNK	UNK
	Total	93,752		
Smallmouth bass	1974	129,000	UNK	UNK
	1975	65,000	UNK	UNK
	1976	125,000	UNK	UNK
	1977	100,000	UNK	UNK
	1986	471	ADL	10.7
	1992	58	ADL	10.7
	1992	35,249	FGL	1.3
	1993	141,055	FGL	1.3
	1994	161,043	FGL	1.2
	1997	160,766	FGL	1.0
	1999	97,048	FGL	1.4
	2000	159,026	FGL	1.5
	2009	10,175	AFGL	5.5
	2009	69,866	FGL	1.4
	Total	1,253,757		
Walleye	1974	150,000	FRY	0.2
	1975	126,240	FRY	0.2
	1976	100,000	FRY	0.2
	Total	376,240		

Table 4. Survey of littoral zone and physical habitat types, Stillhouse Hollow Reservoir, Texas, 2010.

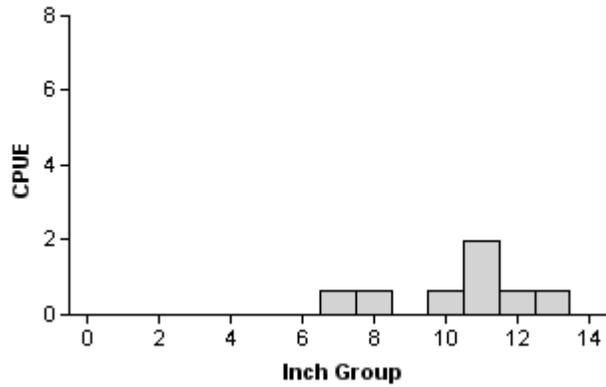
Linear shoreline distance (miles) and percent of linear shoreline distance was recorded for each habitat type. Percent of total shoreline distance is blank for boat docks/piers because they were dually coded with adjacent habitat. Emergent aquatic vegetation was non-existent.

Shoreline habitat type	Shoreline Distance	
	Miles	Percent of total
Bulk heading	0.11	0.17
Gravel shoreline (rocks < 4")	6.51	10.36
Rocky shoreline (rocks > 4")	24.34	38.76
Rock bluff	1.85	2.94
Natural shoreline	30.00	47.78
Boat docks/Piers	0.01	

Gizzard shad

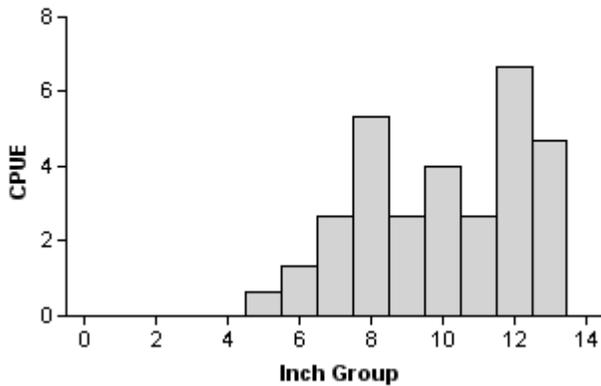
2003

Effort = 1.5
 Total CPUE = 5.3 (37; 8)
 Stock CPUE = 5.3 (37; 8)
 IOV = 12.5 (10.7)



2005

Effort = 1.5
 Total CPUE = 30.7 (41; 46)
 Stock CPUE = 28.7 (42; 43)
 IOV = 15.22 (7.1)



2009

Effort = 1.5
 Total CPUE = 6.7 (36; 10)
 Stock CPUE = 3.3 (49; 5)
 IOV = 50.0 (21.8)

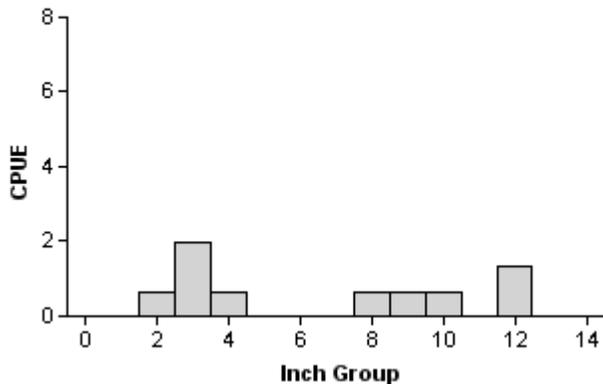


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2003, 2005, and 2009.

Bluegill

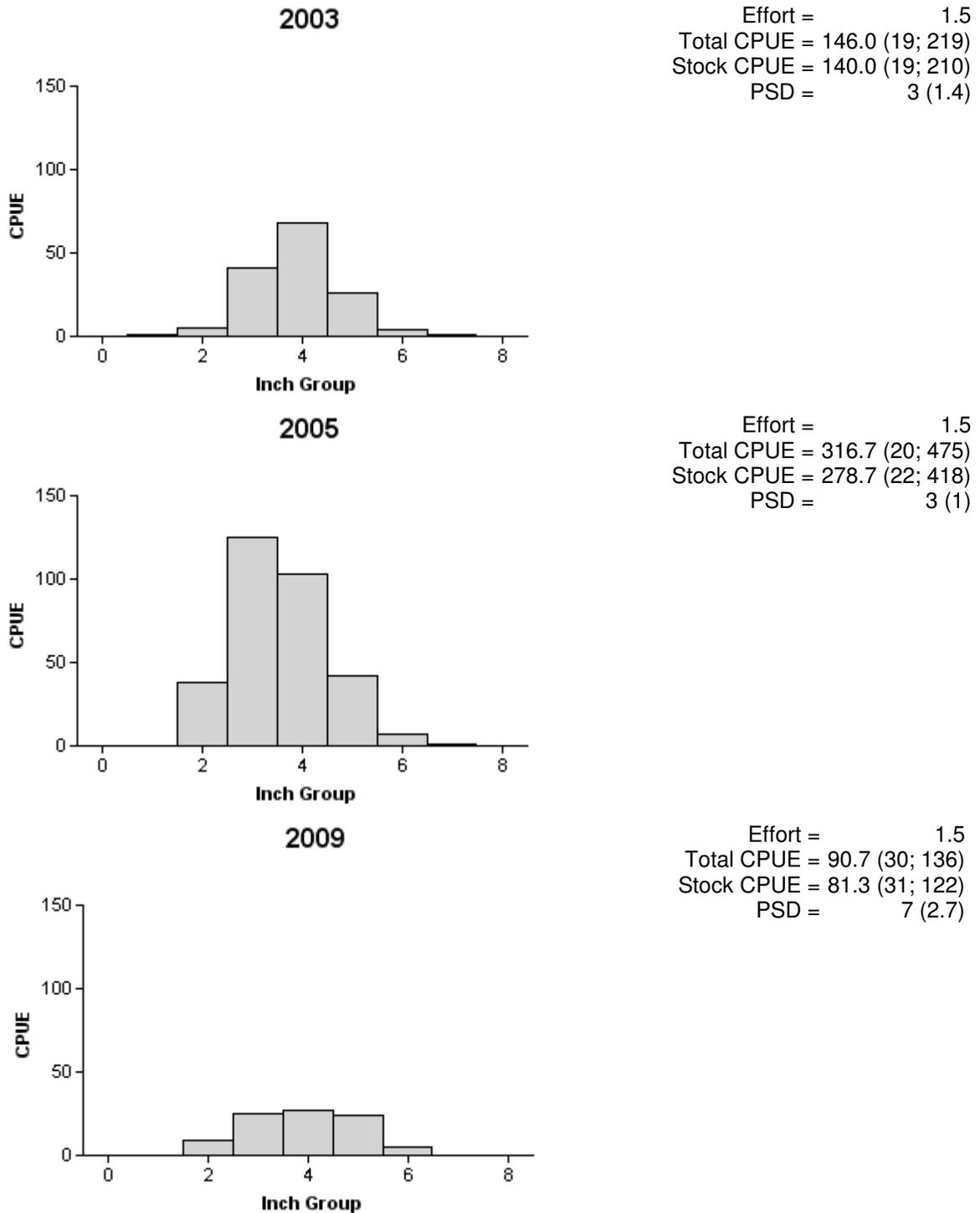


Figure 3. Number of bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2003, 2005, and 2009.

Longear sunfish

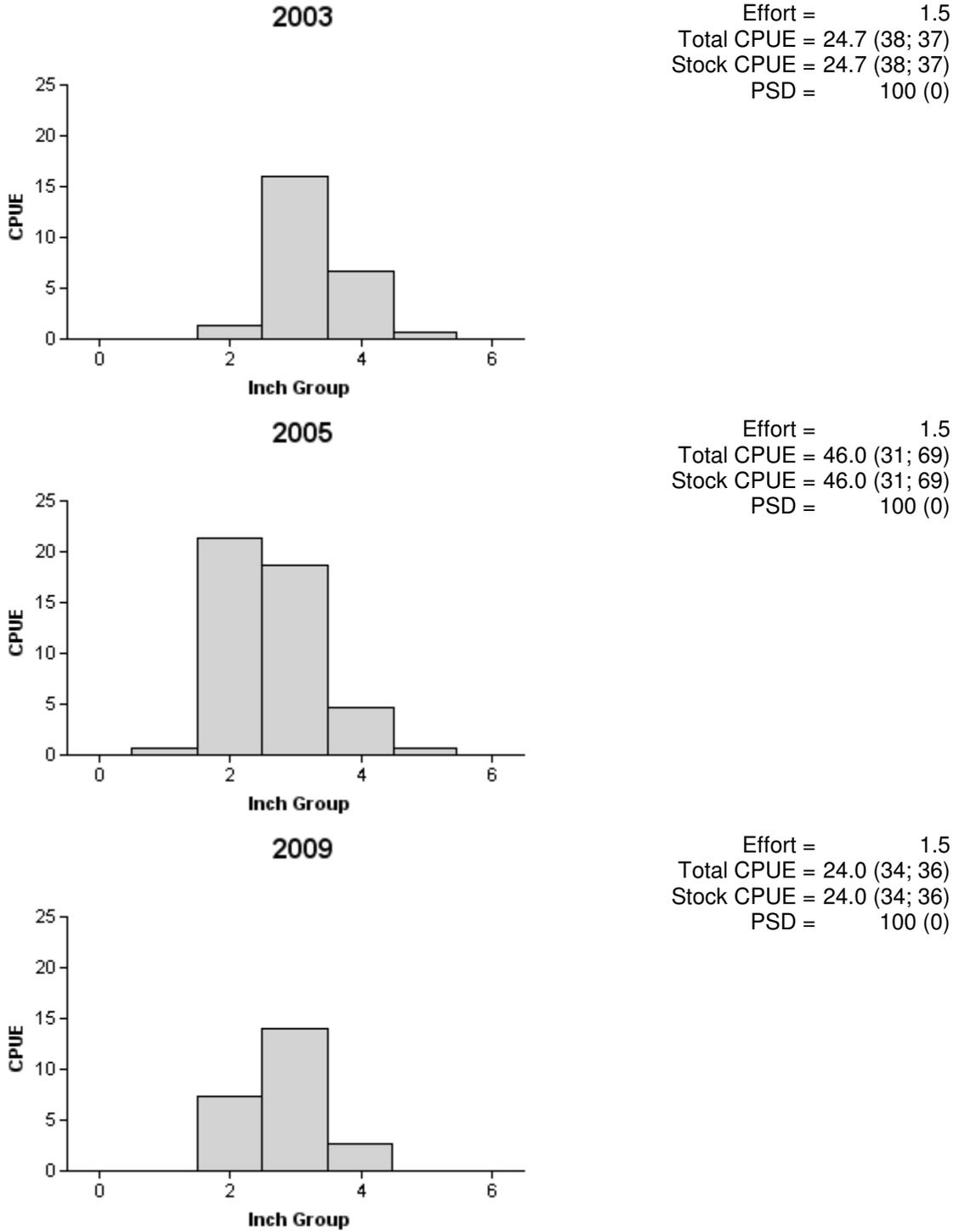


Figure 4. Number of longear sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2003, 2005, and 2009.

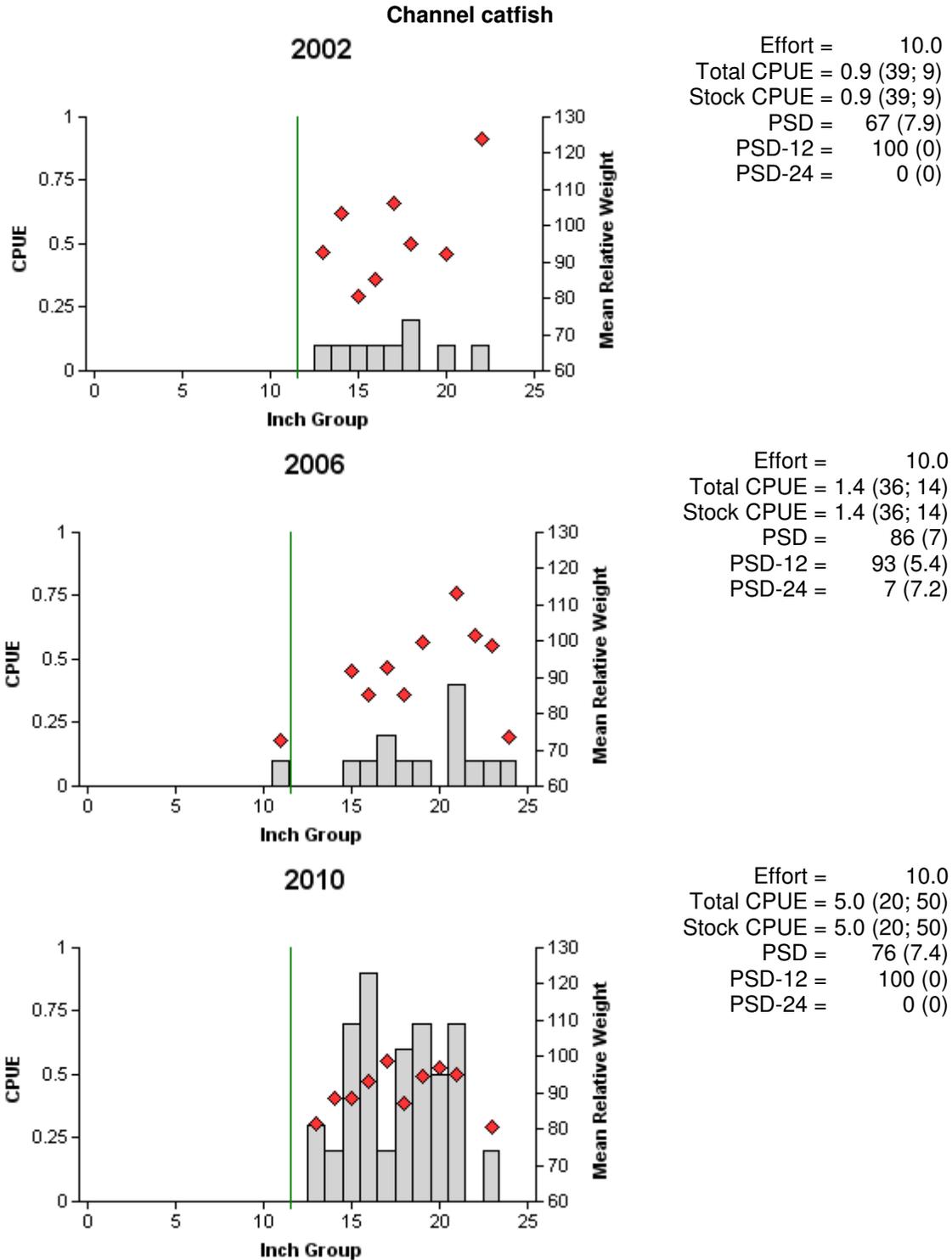


Figure 5. Number of channel catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Stillhouse Hollow Reservoir, Texas, 2002, 2006, and 2010.

White bass

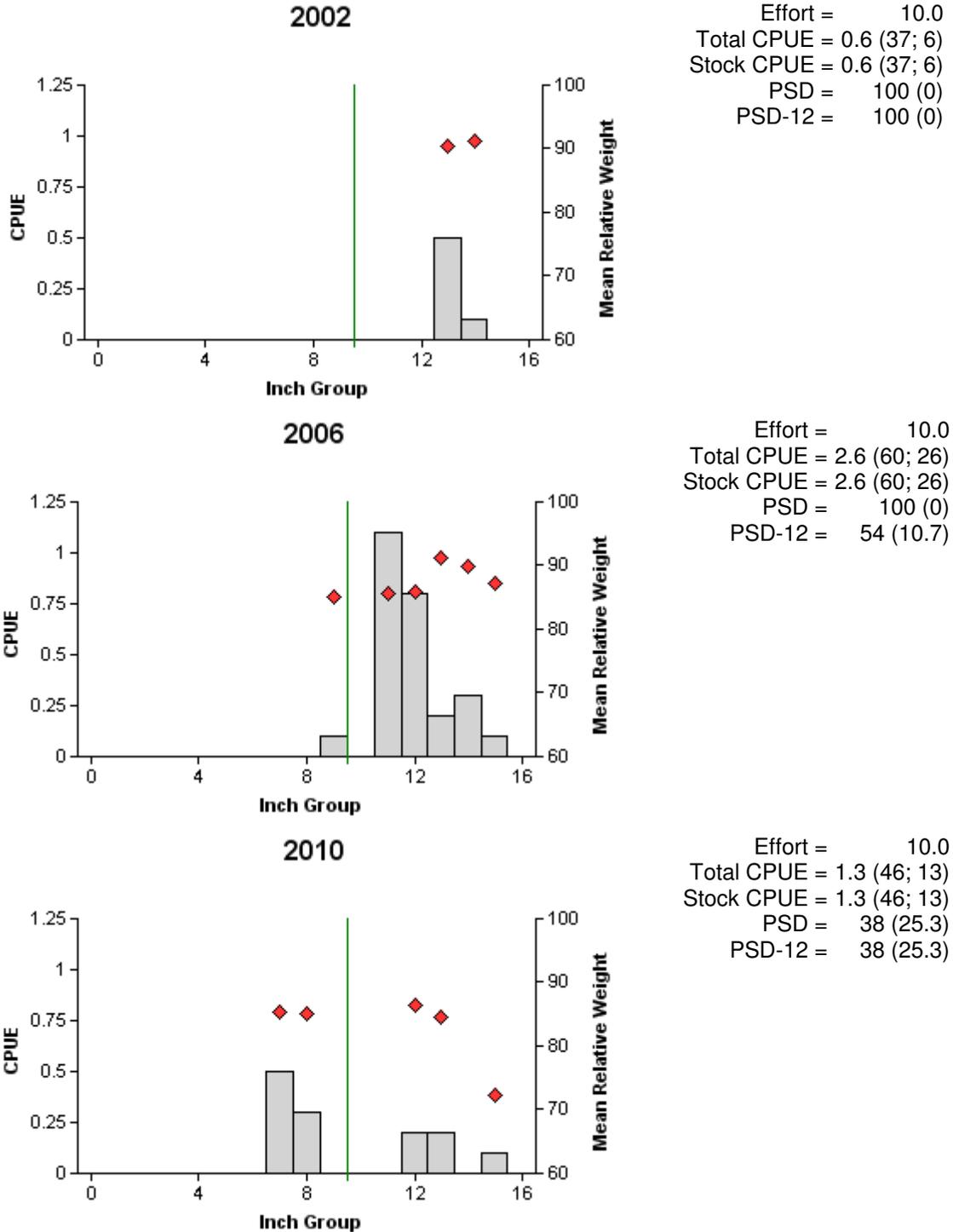


Figure 6. Number of white bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Stillhouse Hollow Reservoir, Texas, 2002, 2006, and 2010.

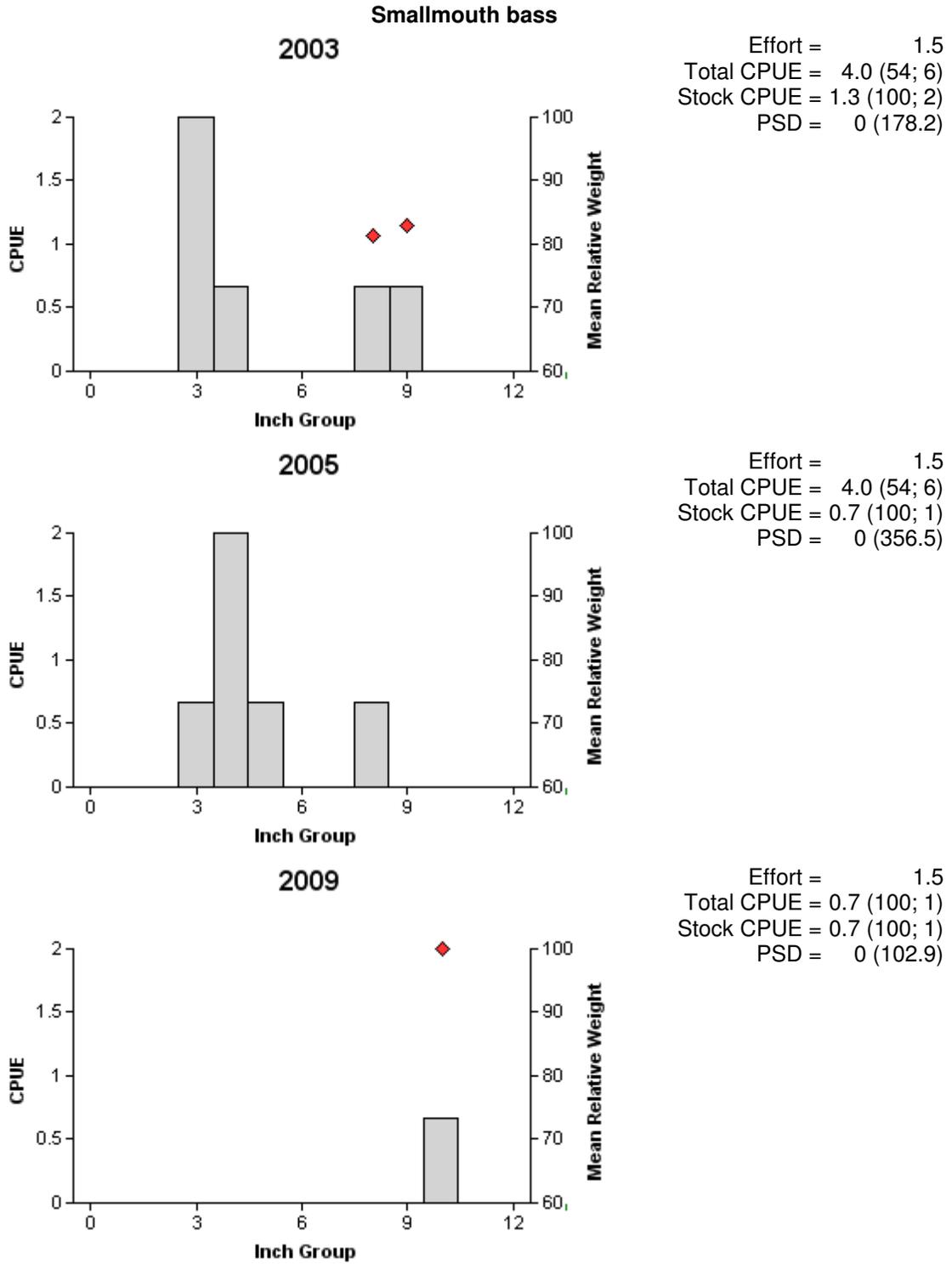


Figure 7. Number of smallmouth bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2003, 2005, and 2009.

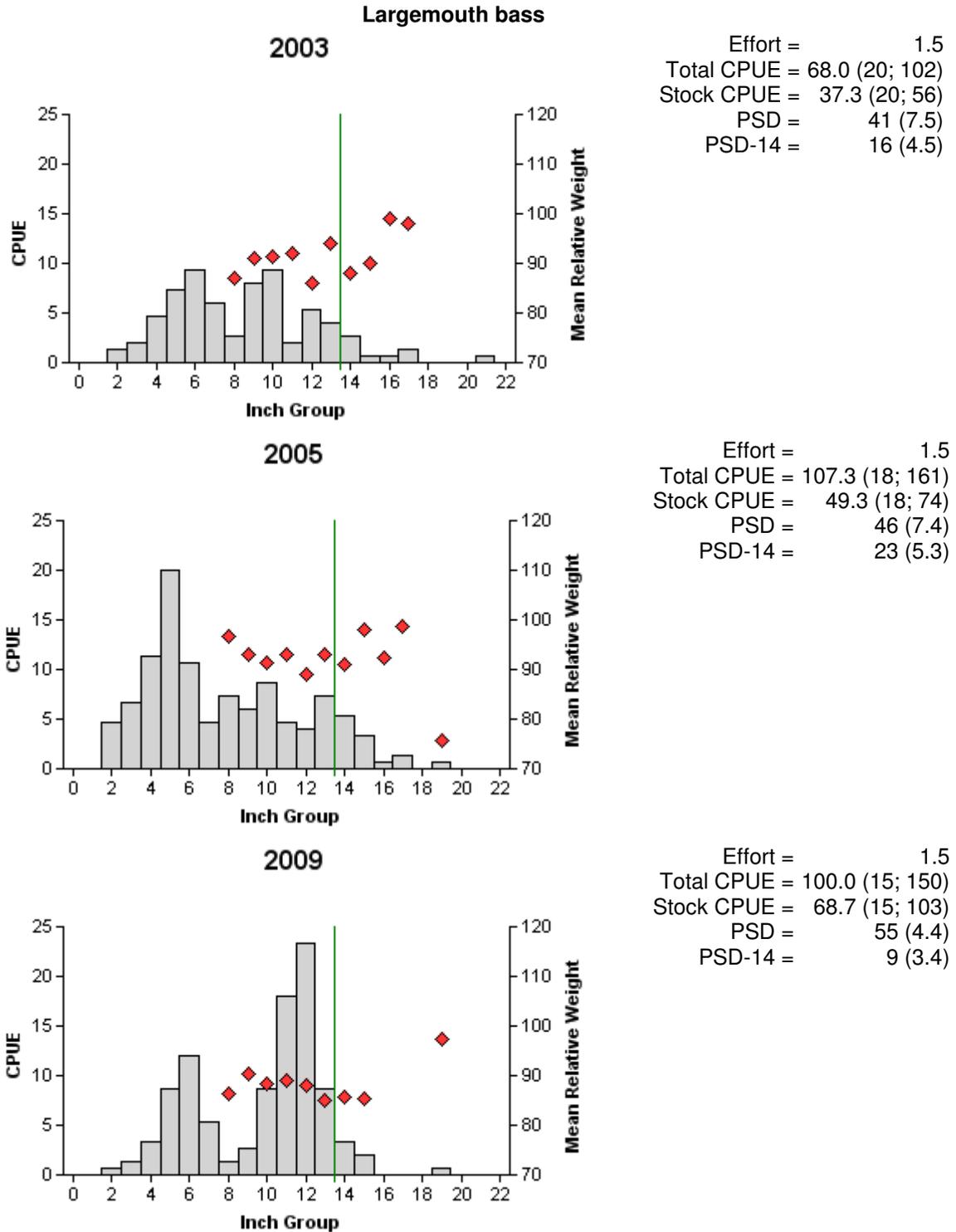


Figure 8. Number of largemouth bass caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas, 2003, 2005, and 2009.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Stillhouse Hollow Reservoir, Texas during 2003 and 2005. 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	Fx	NLMB		
2003	30	4	7	18	1	62.5	13.3
2005	30	2	1	27	0	59.8	7.0

Table 6. Proposed sampling schedule for Stillhouse Hollow Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Winter trap netting became optional in 2009. Standard survey denoted by S and additional survey denoted by A.

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

Appendix A

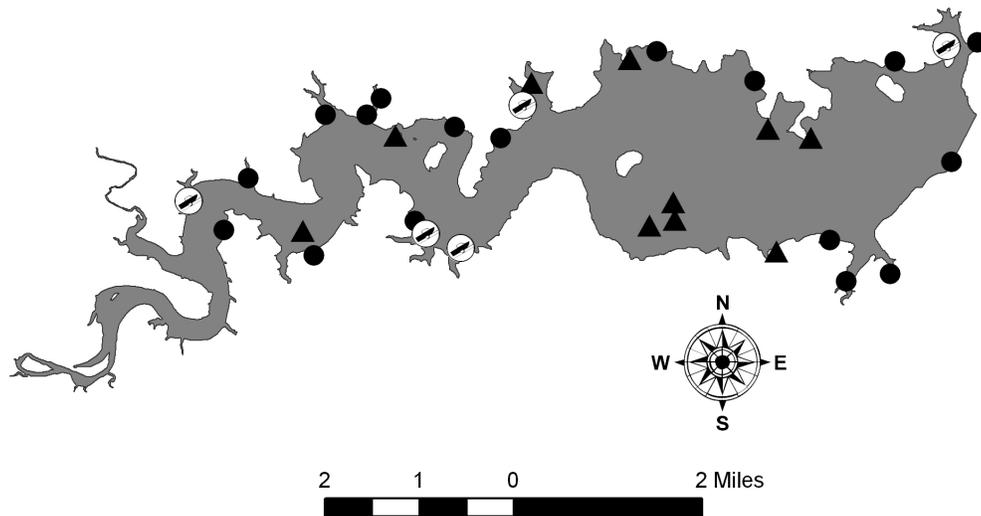
Number (N) and catch rate (CPUE) of all target species collected from all gear types from Stillhouse Hollow Reservoir, Texas, 2009-2010.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard shad			10	6.67
Threadfin shad			1	0.67
Channel catfish	50	5.00		
Flathead catfish	2	0.20		
White bass	13	1.30		
Green sunfish			140	14.00
Warmouth			1	0.67
Bluegill			136	90.67
Longear sunfish			36	24.00
Redear sunfish			4	2.67
Smallmouth bass			1	0.67
Largemouth bass			150	100.00

Appendix B

Historical catch rates (CPUE) of targeted species by gear type for Stillhouse Hollow Reservoir, Texas, 1998 to present. All stations were randomly selected and all electrofishing stations were shocked with a 5.0 Smith-Root GPP (Gas Powered Pulsator). Species Averages are in bold.

Gear	Species	1998	2001	2002	2003	2005	2006	2009	2010	Avg.
<u>Electrofisher</u>										
	Largemouth bass	102	41	64	68	107		100		80
	Smallmouth bass	20		1	4	4		1		5
	Spotted bass	1	1			1				1
	Gizzard shad	40	20		5	31		7		21
	Threadfin shad	7				5		1		3
	Bluegill sunfish	257	149		146	317		91		192
	Redear sunfish	39	25		32	39		3		28
	Longear sunfish	30	44		25	46		24		34
	Green sunfish	17	27		26	150		14		47
	Warmouth	1			1	7		1		2
<u>Gillnets</u>										
	Channel catfish	4.5		0.9			1.4		5	3
	White bass	1.7		0.6			2.6		1.3	2
	Flathead catfish	0.5		0.2			0.7		0.2	0.4
<u>Trap nets</u>										
	White crappie	3.2	0.6			2.8				2.2

Appendix C

Location of sampling sites, Stillhouse Hollow Reservoir, Texas, 2009-2010. Gill net and electrofishing stations are indicated by triangles and circles respectively. Water level was at full pool at time of sampling.