

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

Houston County Lake

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July 31, 2009

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Houston County Lake were surveyed in 2008 using electrofishing and trap netting and in 2009 using gill netting. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Houston County Lake is a 1,523 acre reservoir located on Little Elkhart Creek in the Trinity River basin near Crockett, Texas. The reservoir lies within the Piney Woods Vegetational Area. Soil types are Freestone-Kenny and Kaufman-Trinity Associations. The Houston County Water Conservation and Improvement District 1 (controlling agency) constructed Houston County Lake in 1966 to provide water for municipal and industrial purposes.
- **Management history:** With the exception of largemouth bass, all sport fishes are managed under current statewide regulations. Largemouth bass harvest has been restricted with a 14- to 21-inch slot-length limit and a 5-fish daily bag limit, of which one fish over 21 inches is allowed per angler per day.
- **Fish Community**
 - **Prey species:** Dominant prey fishes in Houston County Lake were threadfin shad, gizzard shad, bluegill, and redear sunfish. Other prey species include warmouth, longear sunfish, bullhead minnow, pugnose minnow, and blacktail shiner. A significant sunfish fishery exists at Houston County Lake with anglers spending an estimated 2,148 hours seeking sunfish during March through May of 2006.
 - **Catfishes:** Gill net catch rates of channel catfish have always been low at Houston County Lake. Flathead catfish were also present. No anglers reported seeking catfish during the March through May 2006 creel survey.
 - **White bass:** White bass were present at Houston County Lake, but gill net samples indicated low numbers. Anglers were not observed targeting white bass during a creel survey conducted in spring 2006.
 - **Largemouth bass:** Largemouth bass were the most popular sport fish with anglers at Houston County Lake. During the March through May 2006 creel survey, anglers were estimated to have spent over 10,000 hours seeking largemouth bass, representing 73% of the intended total effort. Electrofishing catch rates were typically in the range of 80 to 90/h. The lake has a history of producing trophy-size bass. The water body record bass is 15.2 pounds caught in 1988.
 - **Crappie:** Crappie have never been well represented in trap net samples from Houston County Lake; however, creel data indicated a significant fishery. During the March through May 2006 creel survey, an estimated 1,534 hours were spent by anglers seeking crappie (11% of total effort). The angler catch rate was 2.7/h, with anglers harvesting an estimated 2,900 crappie between 9 and 12 inches.
- **Management Strategies:** The largemouth bass population is monitored every two years while other species are monitored every four years. Requests are made to stock Florida largemouth bass fingerlings when justified. Hydrilla has returned to problematic levels and will be monitored annually. Currently, TPWD Inland Fisheries is communicating with the Houston County Agricultural Extension office and the Water Conservation and Improvement District to devise a cooperative plan for control of hydrilla.

INTRODUCTION

This document is a summary of fisheries data collected from Houston County Lake from June 2008 through May 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

Houston County Lake is a 1,523 acre reservoir located on Little Elkhart Creek in the Trinity River basin near Crockett, Houston County, Texas. The reservoir lies within the Piney Woods Vegetational Area. Soil types are Freestone-Kenny and Kaufman-Trinity Associations. The Houston County Water Conservation and Improvement District #1 (controlling agency) constructed Houston County Lake in 1966 to provide water for municipal and industrial purposes. Houston County Lake has a drainage area of approximately 49 square miles and a shoreline length of 25 miles. Conservation pool elevation is 260 feet above mean sea level and annual fluctuations in water level are less one foot. Rainfall in the watershed averages 33 inches per year. Forest and residential development surround the lakeshore (Table 1).

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Henson and Webb 2005) included:

1. The largemouth bass fishery is under a slot length limit; however few slot-size fish are seen in electrofishing samples. Houston County has a history of producing trophy-size bass.
Action: In 2008, 134,373 fingerling Florida largemouth bass were stocked into suitable littoral habitat. In 2006, a spring (March-May) creel survey was conducted to assess angler preferences, directed effort, and catch. A spring electrofishing survey planned for 2006 was not conducted due to time constraints.
2. Trap net catches of crappie are low, but creel surveys indicate a substantial fishery for crappie.
Action: Conducted a spring creel survey in 2006 to assess angling preference, directed effort, catch, and harvest. Evaluated crappie population from gill net catches in spring 2009.
3. Littoral habitat has been degraded through the loss of aquatic macrophytes. Test plots of several native species were planted in 1999.
Action: Vegetation has been surveyed every year including the test plots. Plants are still present but little expansion has been observed.
4. Disseminate information on Houston County fisheries more efficiently and frequently.
Action: A Lake Houston information sheet has been developed with news releases published specifically highlighting sunfish angling opportunities.

Harvest regulation history: Largemouth bass harvest was limited to fish outside a 14- to 21-inch slot length limit with only one fish over 21 inches allowed per angler per day. All other sport fish harvest was managed under statewide regulations. Table 2 summarizes harvest regulations for the reservoir.

Stocking history: Florida largemouth bass fingerlings have been stocked seven times since 1974, with two stockings of Kemp's largemouth bass. Palmetto bass and northern pike were also stocked but. The complete stocking history for Houston County Lake is in Table 3.

Vegetation/habitat history: Houston County Lake has a mixed aquatic plant community of both native and non-native species (Table 4). Hydrilla has been problematic in the past and presently has returned to levels that pose an impediment to access and angling.

Structural shoreline habitat consists primarily of non-descript mud and sand shoreline with bulkheads, boat docks, and native emergent vegetation. American lotus and water hyacinth occur in shallow coves and standing timber covers over half the surface area of the lake.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 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 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). An access point creel survey was conducted from March through May 2006 (5 weekend days and 4 weekdays). Anglers were counted and interviewed as they completed their trips. All fish retained by anglers were measured and counted with the anglers consent. Creel data analysis was performed in the Inland Fisheries Creel Data program.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and condition indices [relative weight (W_t)] 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 for creel statistics and SE was calculated for structural indices and IOV. Source for water level data was the United States Geological Survey (USGS) website.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of non-descript shoreline with hydrilla and American lotus dominating the shoreline plant community. Hydrilla is beginning to limit access in some areas to shoreline residents. Boat access is not affected. Boat docks and bulkheads lined about 40% of the shoreline along with native emergent vegetation (Table 4).

Creel: In the spring of 2006, a creel survey was conducted at Houston County Lake to evaluate angling preferences, catch, and harvest. Total angling effort increased slightly in 2006 from that reported in 2002, but direct expenditures more than doubled in the same period from just over \$65,000 in 2002 to over \$114,000 in 2006 (Table 6).

Largemouth bass were the most popular sport fish species with anglers spending an estimated 10,500 hours seeking bass, representing 73% of total intended angling effort. This was an increase of approximately 30% from the 2002 estimate of just over 7,000 hours or 50% of total intended effort (Henson and Webb 2005). Intended angler catch was 0.4/h and harvest was negligible.

Past trap net surveys have yielded no significant catches of crappie (Henson and Webb 2005); however, 2006 creel survey results indicated a significant crappie fishery does exist (Table 5) though the estimates in 2006 were down since 2002. Anglers seeking crappie in spring 2002 represented 37% of the total intended effort and harvested an estimated 7,400 crappie; however, in 2006 those numbers were down to 11% and just over 2,900, respectively (Table 10). No effort for catfish or white bass was noted during the creel period.

The 2006 creel survey indicated that angler effort for pan fishes (*Lepomis sp.*) has increased to over 2,000 hours, or 15% of total intended effort from 2002 when angler reportedly spent only 730 hours seeking pan fishes, or 5% of total intended effort. Anglers harvested an estimated 7,097 bluegill during that period from March through May 2006 (Table 7).

Prey species: Dominant prey fishes in Houston County Lake were threadfin shad, bluegill, and redear sunfish. Other prey species included gizzard shad, warmouth, longear sunfish, blacktail shiner, golden

shiner, and lake chubsucker.

The electrofishing catch rate of threadfin shad was 895.0/h (Appendix A); much higher than the 150.0/h captured in the 2004 survey, and the highest since 1990 (Henson and Webb 2000). Gizzard shad CPUE was 22.0/h, which was lower than in 2004 (40.0/h) (Figure 2). Gizzard shad have never contributed significantly to the forage base at Houston County Lake.

Bluegill were the most abundant sunfish prey in Houston County Lake. In 2008, bluegill were captured at a rate of 620.0/h, which was higher than in 2004 (538.0/h), but almost half the CPUE observed in 2002 (1,105.0/h) (Figure 3). Bluegill relative abundance has greatly increased over the past 10 years. The size structure of the samples indicates high recruitment and good numbers of harvestable-size fish.

Redear sunfish were very common in Houston County Lake and have been popular with anglers. Though the electrofishing CPUE in 2008 (104.0/h) dropped from 2004 (237.0/h), the size structure still indicated a recruiting population with abundant numbers of 6- to 8-inch fish available to anglers.

Catfishes: Both channel catfish and flathead catfish occur in Houston County Lake, but in very low numbers (Figure 5 and Appendix A). The gill net CPUE for channel catfish in 2009 was only 1.6/nn (Figure 5). Of the channel catfish collected during the 2009 gill netting, most were above the 12-inch minimum length limit. No intended angler effort for catfishes was recorded in the 2002 (Henson and Webb 2005) or the 2006 creel surveys.

White bass: White bass were scarce in Houston County Lake. Only one individual was captured in gill nets in 2009 (Appendix A). No intended angler effort was recorded in 2002 (Henson and Webb 2005) or 2006.

Largemouth bass: Largemouth bass were the most popular sport fish among anglers at Houston County Lake. Anglers spent an estimated 10,535 hours (73% of total intended effort) seeking largemouth bass during the period from March through May of 2006. Very few bass were harvested by anglers. The harvest rate (all anglers) of largemouth bass was 0.08/acre in 2006 and 0.11/acre in 2002. Ninety-four percent of the legal largemouth bass caught were released (Table 8). Electrofishing CPUE of largemouth bass has increase over the past four years from 82.0/h in 2004 to 117.0/h in 2008. The relative abundance of bass in the protected 14- to 21 inch slot has increased (Figure 7).

Spotted bass: Spotted bass were not common in Houston County Lake, and were not targeted by anglers (Henson and Webb 2005). Electrofishing CPUE in 2008 was 17.0/h and has changed very little over the years. Spotted bass of desirable sizes have not been captured in electrofishing surveys (Figure 6).

Crappie: Both white and black crappie species were present in Houston County Lake in about equal proportions (Figure 9 and Figure 10). Trap nets have never been effective at capturing crappie at Houston County Lake; however, gill nets were more efficient catching crappie in the spring of 2009. The gill net CPUE for white and black crappie was 2.4/nn and 2.8/nn, respectively (Figures 9 and 10). Most of the fish in the sample were above the 10-inch minimum length limit. The creel survey in 2006 indicated a significant fishery for crappie. Anglers spent 1,534 hours seeking crappie (species combined) and harvested an estimated 2,839 black crappie and 118 white crappie during that same period (Table 10). It is interesting to note that during creel period from March through May 2002, no black crappie were harvested and over 7,000 white crappie were harvested.

Fisheries management plan for Houston County Lake, Texas

Prepared – July 2009.

ISSUE 1: Hydrilla is impeding access at Houston County Lake. Some areas around residential piers and boat docks are not accessible.

MANAGEMENT STRATEGY

1. Continue to survey all exotic vegetation annually.
2. Work with the controlling authority and reservoir recreationists to develop an integrated pest management plan for hydrilla control with lake user input.

ISSUE 2: The largemouth bass fishery at Houston County Reservoir is very popular. Directed effort for bass accounts for 73% of total intended angling effort. The lake has a history of producing trophy-sized largemouth bass.

MANAGEMENT STRATEGY

1. Continue to survey the largemouth bass population every two years with fall electrofishing. Collect age-0 largemouth bass in 2010 to assess Florida genetics.
2. Continue to inform bass clubs and other interested groups of survey results.
3. Request a stocking of Florida largemouth bass in 2010.

SAMPLING SCHEDULE JUSTIFICATION:

Fall electrofishing will be conducted every two years for largemouth bass. Gill netting will be conducted every four years. A spring creel survey will be conducted in spring 2010. Vegetation surveys for exotic and native species will be conducted annually.

LITERATURE CITED

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- 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.
- Henson, J. C., and M. A. Webb. 2005. Statewide freshwater fisheries monitoring and management program survey report for Houston County Lake, 2004. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-30, Austin

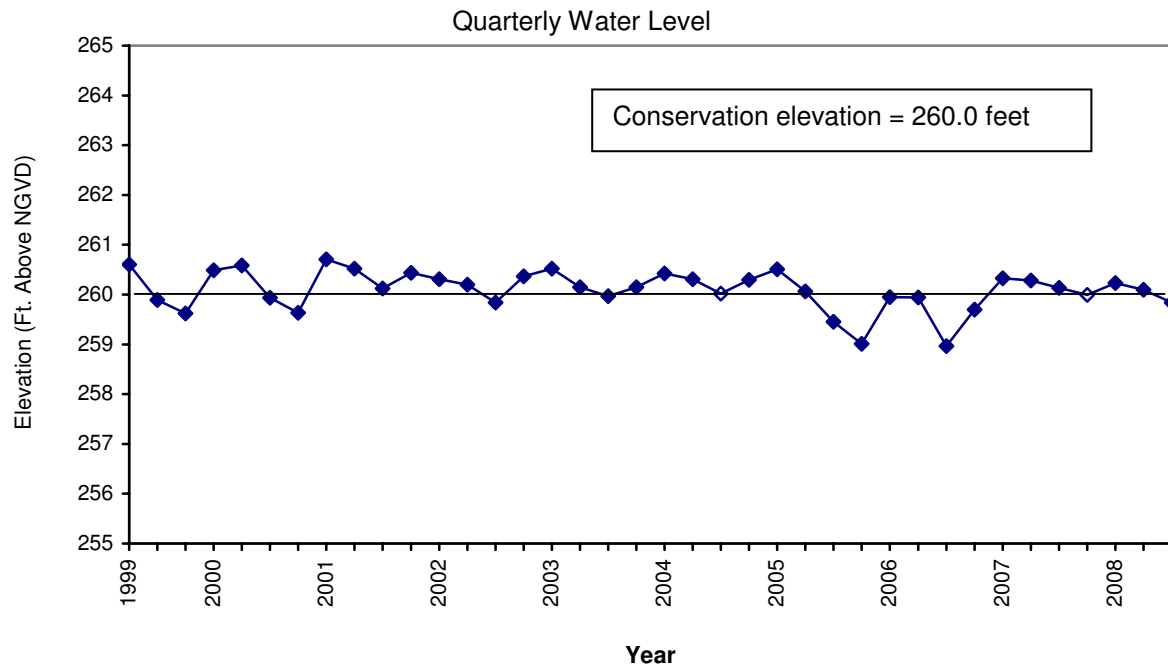


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Houston County Lake, Texas from June 1999 to September 2008.

Table 1. Characteristics of Houston County Lake, Texas.

Characteristic	Description
Year Constructed	1966
Controlling authority	Houston County Water Conservation and Improvement District #1
Counties	Houston
Reservoir type	Tributary – Little Elkhart Creek
Shoreline Development Index (SDI)	4.6
Conductivity	120 umhos/cm

Table 2. Harvest regulations for Houston County Lake.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass: largemouth	5 with only 1 bass over 21 inches	14 – 21
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No Limit

Table 3. Stocking history of Houston County Lake, Texas. Size Categories are FRY =<1 inch, FGL = 1-3 inches, and AFGL = 6-8 inches.

Species	Year	Number	Size
Northern pike	1972	200	UNK
		Total 200	
Channel catfish	1967	5,000	AFGL
	1973	26,221	AFGL
	1986	75,112	AFGL
	Total	106,333	
Palmetto bass	1979	14,500	UNK
		Total 14,500	
Green X redbreast	1967	2,000	UNK
	1971	8,000	UNK
	Total	10,000	
Kemp's largemouth bass	1985	34,735	UNK
	1986	62,630	UNK
	Total	97,365	
Florida largemouth bass	1974	56,000	FGL
	1974	18,000	FRY
	1976	75,000	FGL
	1977	75,000	FGL
	2003	131,645	FGL
	2004	136,645	FGL
	2008	134,373	FGL
	Total	626,663	
Black crappie	1967	2,000	UNK
		Total 4,000	

Table 4. Survey of littoral zone and physical habitat types, Houston County Lake, 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 Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
<u>Structural habitat</u>				
Non-descript/native emergent/dead trees	14	56		
Bulkhead/boat dock	11	44		
Standing timber			816.0	53.6
<u>Native vegetation</u>				
Native emergent			126.7	8.3
Native submergent			8.5	<1.0
Native floating			<1.0	<1.0
<u>Non-native vegetation</u>				
Hydrilla			18.4	1.2
Water hyacinth			14.9	1.0

Table 5. Percent directed angler effort by species for Houston County Lake, Texas, March through May 2002 and 2006.

Species	Year	
	2002	2006
Sunfishes	5.4	14.9
Largemouth bass	53.3	73.0
Crappie	36.8	10.6
Anything	4.5	1.4

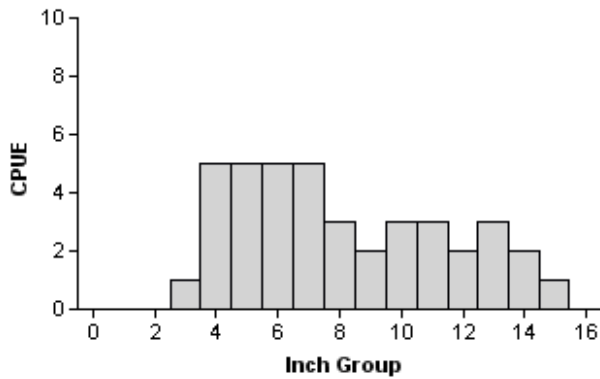
Table 6. Total fishing effort (h) for all species and total directed expenditures at Houston County Lake, Texas, March-May 2002 and 2006.

Creel Statistic	Year	
	2002	2006
Total fishing effort (hrs)	13,380	14,422
Total directed expenditures	\$65,690	\$114,857

Gizzard Shad

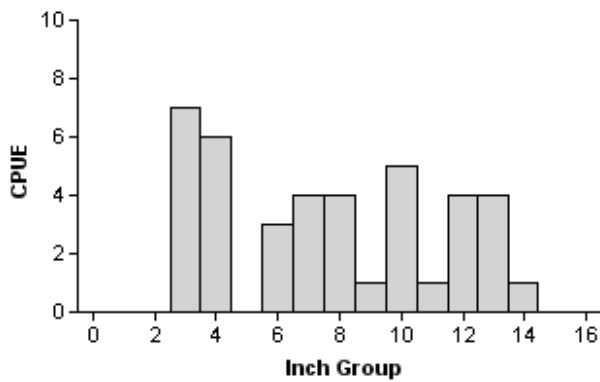
2000

Effort = 1.0
Total CPUE = 40.0 (23; 40)
IOV = 52.5 (10.9)



2004

Effort = 1.0
Total CPUE = 40.0 (25; 40)
IOV = 47.62 (13.3)



2008

Effort = 1.0
Total CPUE = 22.0 (36; 22)
IOV = 18.18 (12)

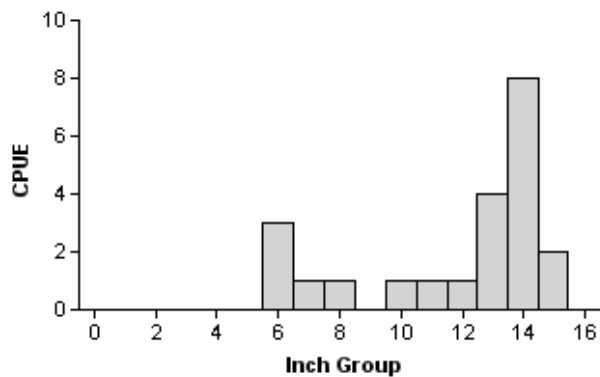
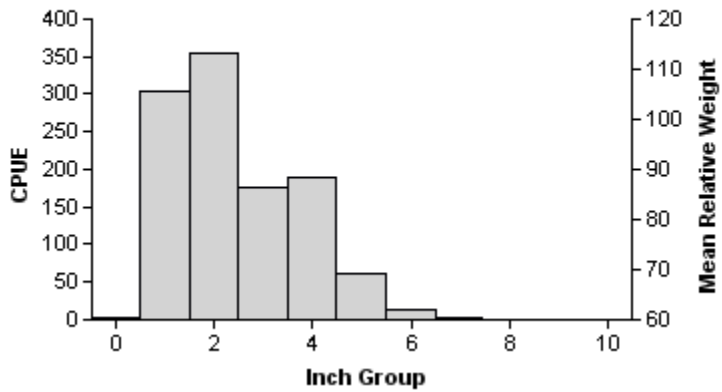


Figure 2. Number of gizzard shad caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Houston County Lake, Texas, 2000, 2004, and 2008.

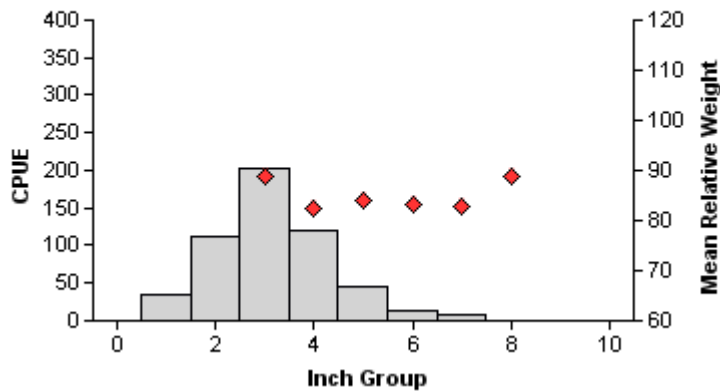
Bluegill

2002



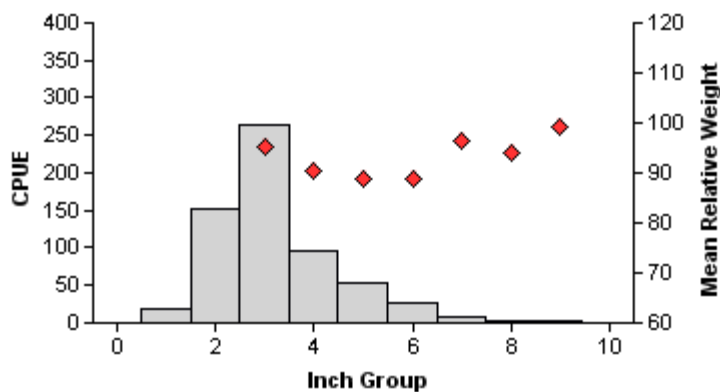
Effort = 1.0
 Total CPUE = 1,105.0 (14; 1105)
 Stock CPUE = 442.0 (12; 442)
 PSD = 4 (1.1)

2004



Effort = 1.0
 Total CPUE = 538.0 (22; 538)
 Stock CPUE = 390.0 (20; 390)
 PSD = 5 (0.8)

2008



Effort = 1.0
 Total CPUE = 620.0 (18; 620)
 Stock CPUE = 450.0 (15; 450)
 PSD = 9 (1.8)

Figure 3. Number of bluegill 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, Houston County Lake, Texas, 2002, 2004, and 2008.

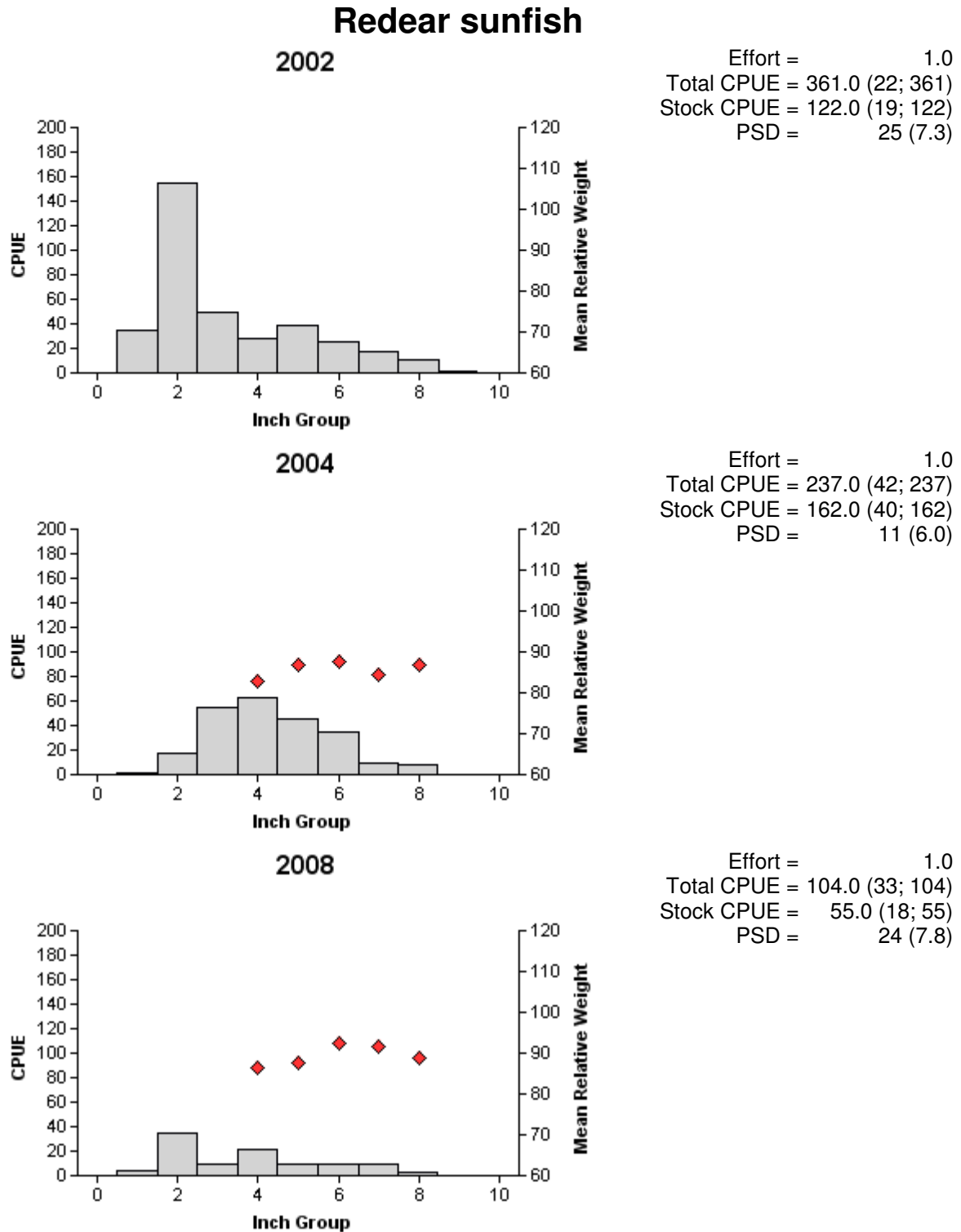


Figure 4. Number of redear sunfish caught per hour (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Houston County Lake, Texas, 2002, 2004, and 2008.

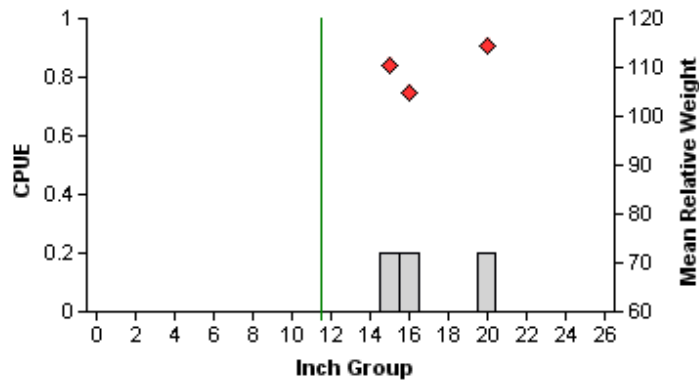
Sunfishes

Table 7. Creel survey statistics for sunfishes (*Lepomis sp.*) Houston County Lake from March through May 2002 and 2006, where effort and total catch per hour is for anglers targeting pan fishes (species combined) and total harvest is the estimated number of bluegill harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	2002	2006
Directed effort (h)	729 (60)	2,148 (62)
Directed effort/acre	0.48 (60)	1.41 (62)
Total catch per hour	22.5 (0.9)	2.86 (81)
Total harvest	761 (176)	7,097 (92)
Harvest/acre	0.50 (176)	4.66 (92)

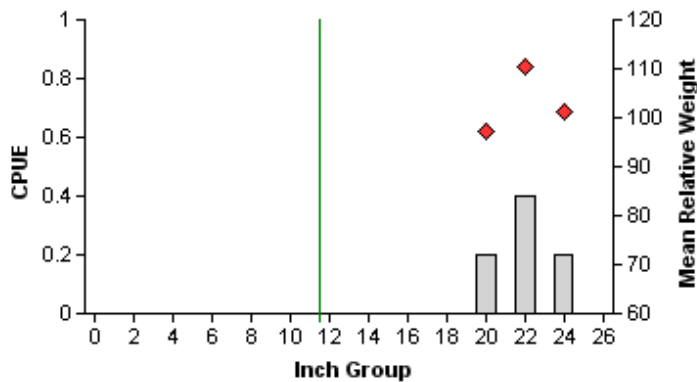
Channel Catfish

2001



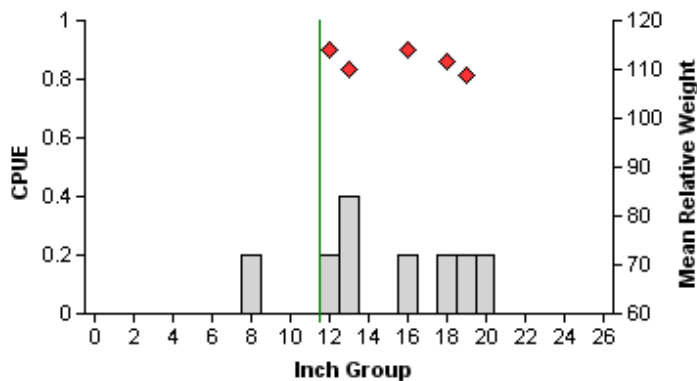
Effort = 5.0
 Total CPUE = 0.6 (41; 3)
 Stock CPUE = 0.6 (41; 3)
 PSD = 67 (30.4)
 RSD-12 = 100 (0)

2005



Effort = 5.0
 Total CPUE = 0.8 (47; 4)
 Stock CPUE = 0.8 (47; 4)
 PSD = 100 (0.0)
 RSD-12 = 100 (0)

2009

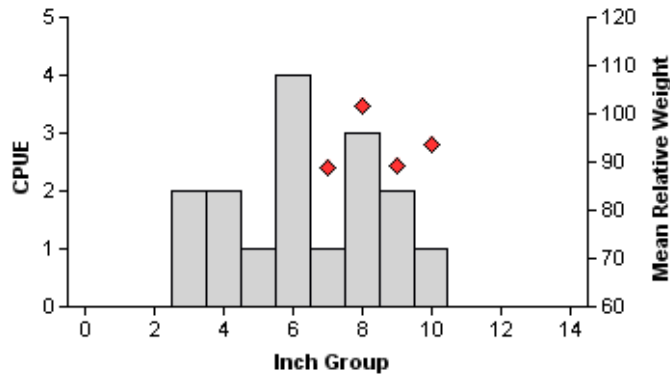


Effort = 5.0
 Total CPUE = 1.6 (25; 8)
 Stock CPUE = 1.4 (29; 7)
 PSD = 57 (28.1)
 RSD-12 = 100 (0)

Figure 5. 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, Houston County Lake, Texas, 2001, 2005, and 2009. Vertical lines indicate minimum length limit at time of survey.

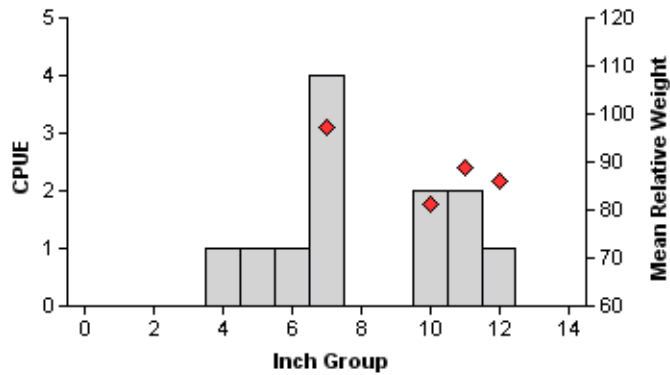
Spotted Bass

2004



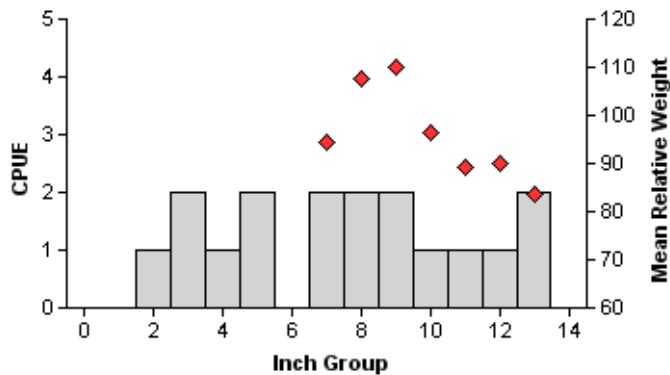
Effort = 1.0
 Total CPUE = 16.0 (49; 16)
 Stock CPUE = 7.0 (45; 7)
 PSD = 0 (131.8)

2007



Effort = 1.0
 Total CPUE = 12.0 (35; 12)
 Stock CPUE = 9.0 (37; 9)
 PSD = 33 (14.5)

2008

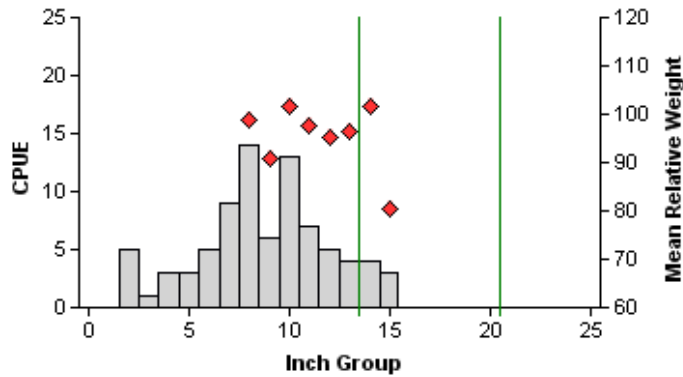


Effort = 1.0
 Total CPUE = 17.0 (24; 17)
 Stock CPUE = 11.0 (28; 11)
 PSD = 36 (15.6)

Figure 6. Number of spotted 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, Houston County Lake, Texas, 2004, 2007, and 2008.

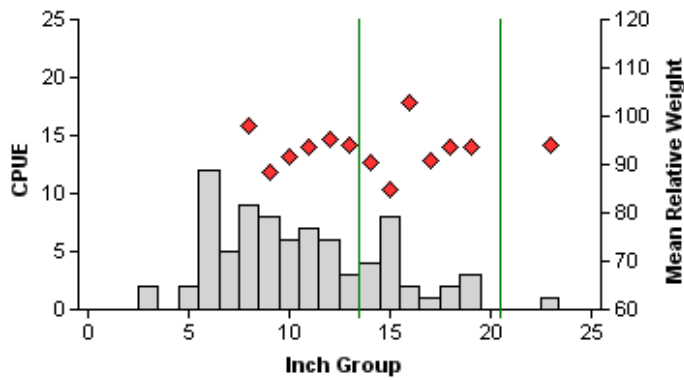
Largemouth Bass

2004



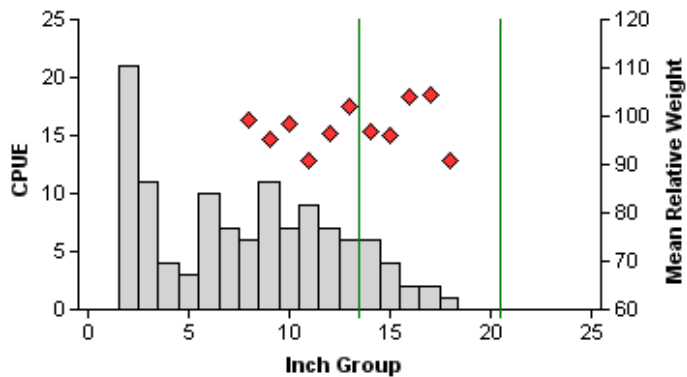
Effort = 1.0
 Total CPUE = 82.0 (24; 82)
 Stock CPUE = 56.0 (28; 56)
 PSD = 29 (6.4)

2007



Effort = 1.0
 Total CPUE = 81.0 (13; 81)
 Stock CPUE = 60.0 (11; 60)
 PSD = 50 (4.4)

2008



Effort = 1.0
 Total CPUE = 117.0 (14; 117)
 Stock CPUE = 61.0 (19; 61)
 PSD = 46 (5.5)

Figure 7. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Houston County Lake, Texas, 2004, 2007, and 2008. Vertical lines indicate slot length limit at time of survey.

Largemouth Bass

Table 8. Creel survey statistics for largemouth bass at Houston County Lake from March through May 2002 and 2006 where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	2002	2006
Directed effort (h)	7,148 (32)	10,535 (35)
Directed effort/acre	4.69 (32)	6.92 (35)
Total catch per hour	0.33 (45)	0.40 (33)
Total harvest	169 (375)	118 (114)
Harvest/acre	0.11 (375)	0.08 (114)
Percent legal released	60	94

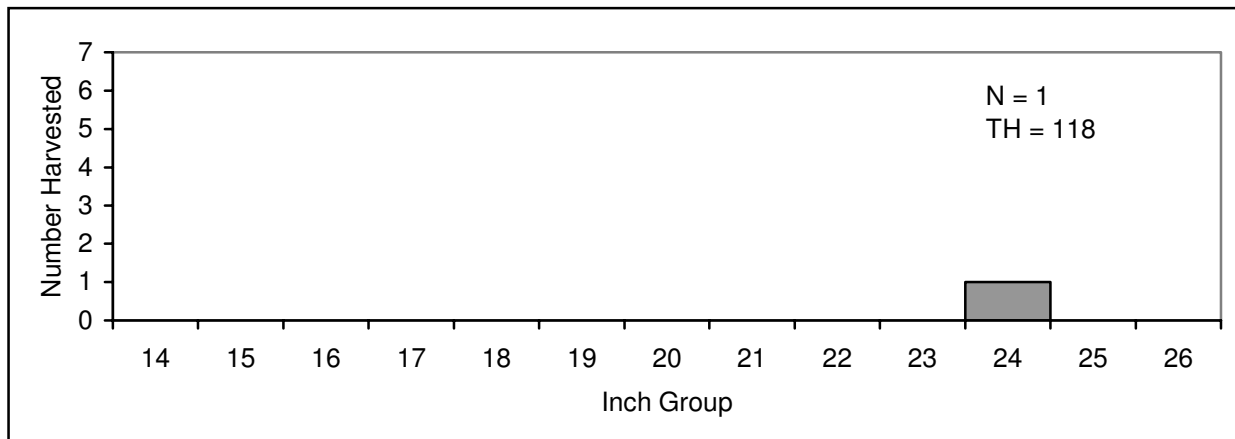


Figure 8. Length frequency of harvested largemouth bass observed during creel surveys at Houston County Lake, Texas, March through May 2006 all anglers combined. N is the number of harvested largemouth bass observed during creel surveys and TH is the total estimated harvest for the creel period.

Table 9. Results of genetic analysis of largemouth bass collected by fall electrofishing, Houston County Lake, Texas, 1990 through 2004. 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		
1990	25	7	5	13	0	77	28
1993	20	9	3	6	2	72	45
1996	30	15	3	10	2	80	50
1999	40	19	3	16	2	76	48
2000	12	5	1	6	0	81	42
2002	50	6	11	25	1	66	14
2003	13	2	2	9	0	67	15
2004	47	11	16	20	0	67	23

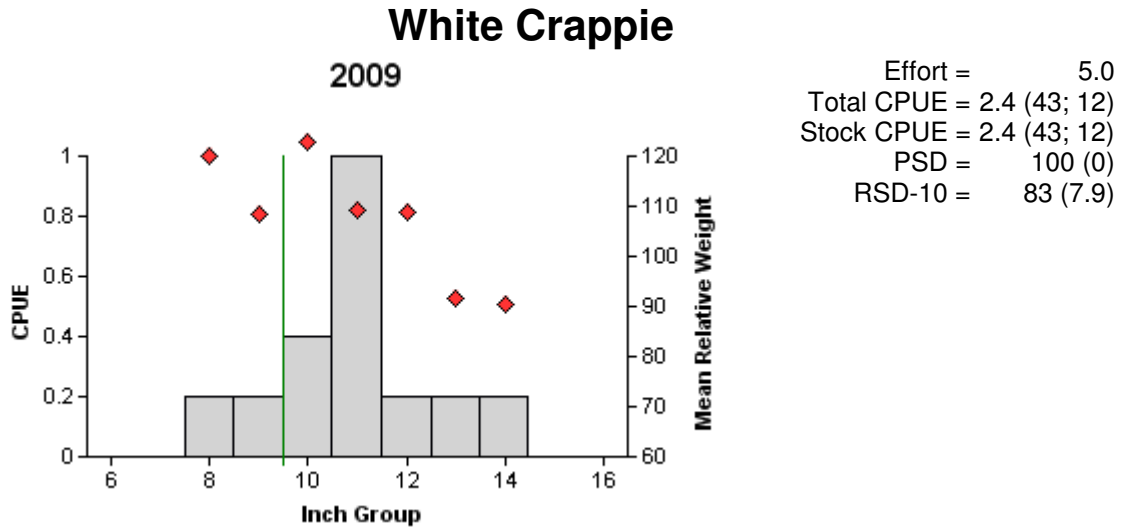


Figure 9. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for gill net survey, Houston County Lake, Texas, 2009. Vertical line indicates minimum length limit at time of survey.

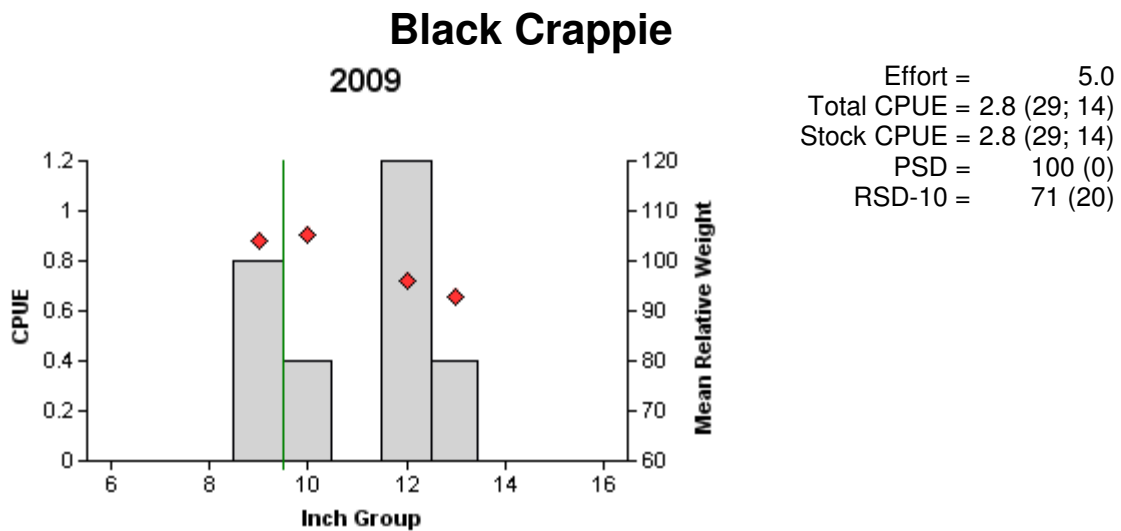


Figure 10. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for gill net survey, Houston County Lake, Texas, 2009. Vertical line indicates minimum length limit at time of survey.

Crappie

Table 10. Creel survey statistics for crappie at Houston County Lake from March through May 2002 and 2006 where effort and total catch per hour is for anglers targeting crappie (species combined) and total harvest is the estimated number of black and white crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	2002	2006
Directed effort (h)	4,900 (35)	1,534 (72)
Directed effort/acre	3.22 (35)	1.01 (72)
Total catch per hour	3.54 (34)	2.73 (77)
Total harvest		
Black crappie	0	2,839 (94)
White crappie	7,363 (40)	118 (419)
Harvest/acre		
Black crappie	0.00	1.86 (94)
White crappie	4.83 (40)	0.08 (419)
Percent legal released	3.8	2.9

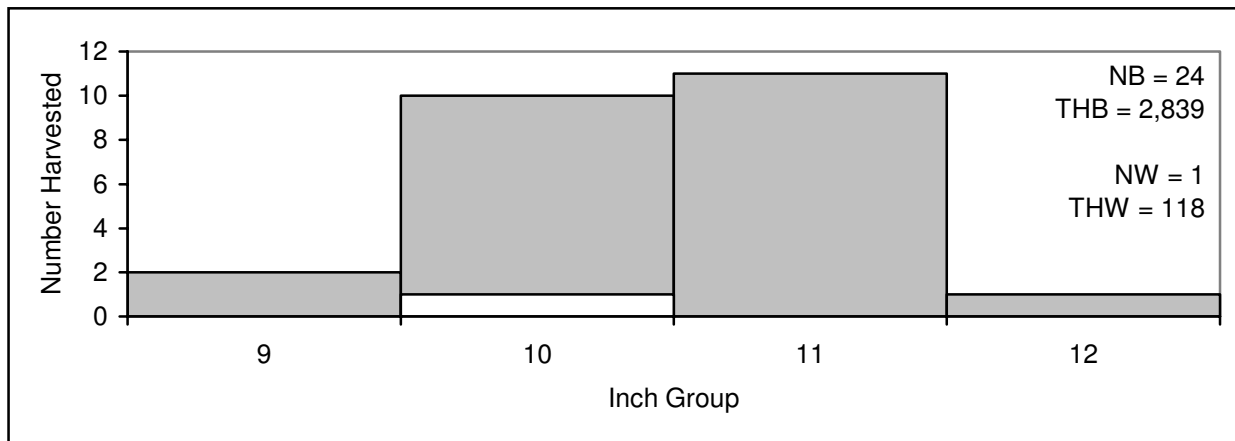


Figure 11. Length frequency of harvested black crappie (gray bars) and white crappie (white bars) observed during creel survey at Houston County Lake, Texas, March through May 2006, all anglers combined. NB and NW are the number of harvested black and white crappie observed during creel surveys, respectively, and THB and THW are the total estimated harvest of black and white crappie, respectively, for the creel period.

Table 11. Proposed sampling schedule for Houston County Lake, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

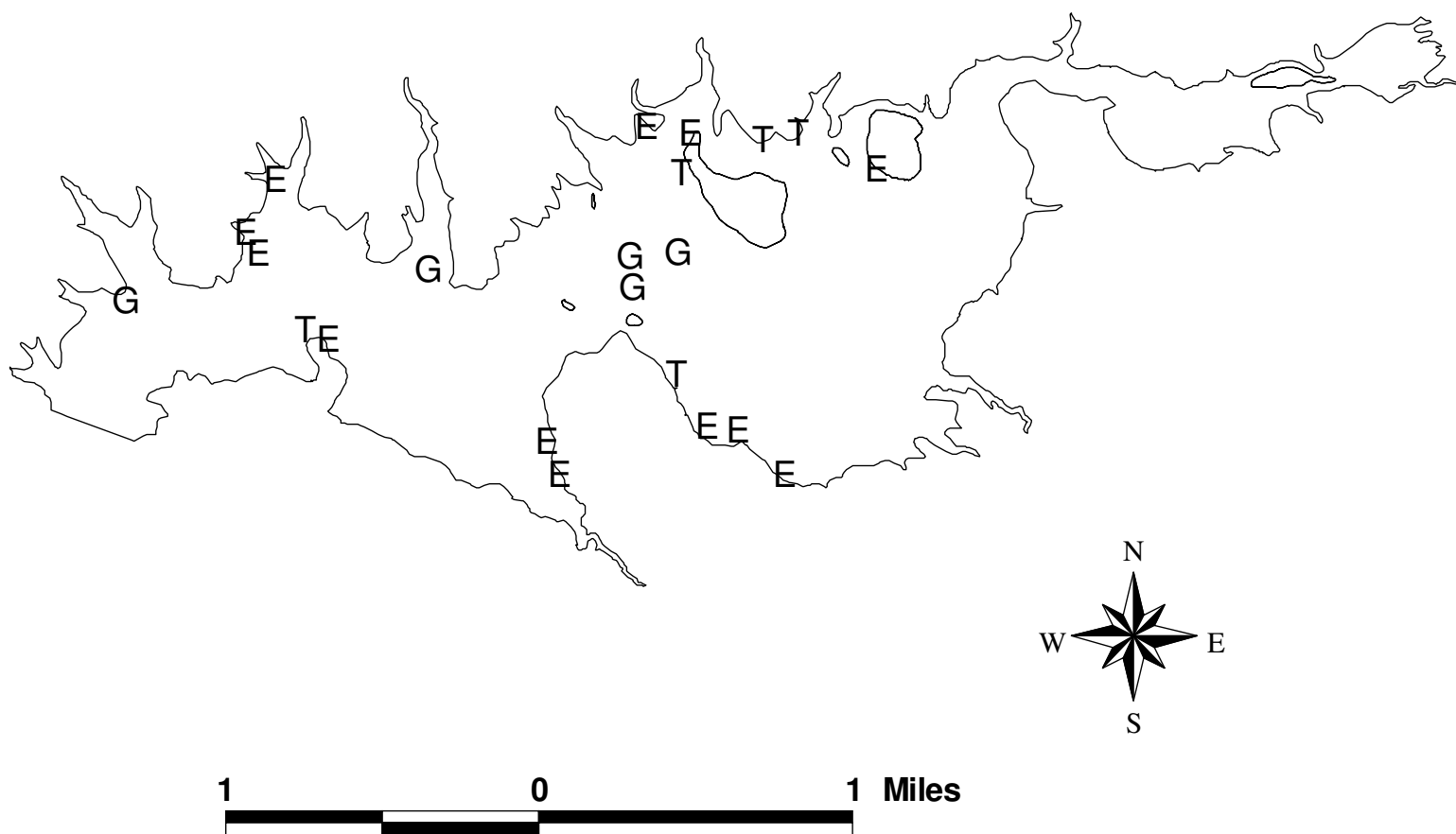
Survey Year	Electrofisher	Trap Net	Gill Net	Vegetation	Creel	Report
Fall 2009-Spring 2010				A	S	
Fall 2010-Spring 2011	A			A		
Fall 2011-Spring 2012				A		
Fall 2012-Spring 2013	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Houston County Lake, Texas, 2008-2009.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					22	22.0
Threadfin shad					895	895.0
Golden shiner					16	16.0
Blacktail shiner					2	2.0
Lake chubsucker					6	12.0
Yellow bullhead catfish	1	0.2				
Channel catfish	8	1.6				
Flathead catfish	1	0.2				
White bass	1	0.2				
Warmouth					10	10.0
Bluegill					622	622.0
Longear sunfish					34	34.0
Redear sunfish					104	104.0
Spotted bass					17	17.0
Largemouth bass					117	117.0
White crappie	12	2.4	2	0.4		
Black crappie	14	2.8				

APPENDIX B



Location of sampling sites, Houston County Lake, Texas, 2008-2009. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively.