PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-31

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2005 Survey Report

Stillhouse Hollow Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Stillhouse Hollow Reservoir was surveyed in the fall of 2005 using a boat electrofisher, winter of 2005 with trap nets, and spring of 2006 with gill nets. This report summarizes survey results 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 for flood control, water supply, and recreation. Water levels fluctuate about 5 feet annually, however retention time varies greatly (long-term average = 500 days). Fish habitat at the time of sampling consisted mainly of aquatic vegetation (i.e., hydrilla), rocky shorelines and dead trees and stumps
- **Management history:** Important sport fish include largemouth bass and, to some extent, smallmouth bass. The management plan from the 2002 survey report included annual evaluation of hydrilla coverage in the reservoir. All species are being managed under statewide regulations. Florida largemouth bass were stocked for the first time in 1993 and again in 1994. Smallmouth bass were introduced in 1974 and stocked through 1977. The program was revitalized in 1992 and smallmouth were stocked through 2000. Loss of hatchery broodfish to golden alga curtailed subsequent stocking, although efforts are underway to return to full production and annual stocking requests have been maintained.

- **Fish community**
  - **Prey species:** Electrofishing catch of gizzard shad was low, and few gizzard shad were available as prey to most sport fish. Electrofishing catch of bluegills was good, with most available as prey.

  - **Catfishes:** The channel catfish population is reasonably good, with a fair number of larger fish available to anglers. No flathead or blue catfish were collected in the most recent survey.

  - **Temperate bass:** White bass were caught in good numbers in the most recent survey. Most fish in the population are of legal size.

  - **Black bass:** Largemouth bass were relatively abundant. Size structure was good. Largemouth bass had adequate growth rates, and were in good condition. The presence of large hydrilla beds in the lake has apparently resulted in increased angler usage. Stillhouse Reservoir is a popular reservoir in internet discussion forums and a popular destination for tournaments, both large and small.

  - **White crappie:** The white crappie population can provide quality fishing during some years. The latest survey showed a good population of legal-sized fish.

- **Management strategies:** Conduct exotic aquatic vegetation surveys in 2006-2010. Request smallmouth bass stocking annually to improve recruitment. Conduct standard sampling again in 2009/2010.

INTRODUCTION

This document is a summary of fisheries data collected from Stillhouse Hollow Reservoir in 2005-2006. 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 2005-2006 data for comparison.

Reservoir description:

Stillhouse Hollow Reservoir is a 6,430-acre reservoir located in Bell County, Texas (Table 1). The impoundment was constructed in 1968 and is operated by the United States Army Corps of Engineers for flood control, water supply, and recreation. Stillhouse Hollow 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 (Figure 1), however retention time varies greatly (long-term average = 500 days). 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 aquatic vegetation (i.e., hydrilla), rocky shorelines, and dead trees and stumps. Boat and bank access to the reservoir are good, however handicap facilities are poor.

Management history

Previous management strategies and actions: Management strategies and actions from the previous survey report (Tibbs and Baird 2002) included:

1. Survey exotic vegetation annually.
   Action: Hydrilla coverage was surveyed annually. Data were shared with the controlling authority in 2005.

2. Electrofish annually to obtain additional standardized information.
   Action: The reservoir was electrofished in Fall, 2002, 2003, and 2005. District priorities were re-evaluated in 2004 when the 4-year plan for 2004-2007 was developed. At that time it was decided that the majority of additional sampling effort during any one year would be directed toward a single reservoir to answer question(s) that would require more effort than could normally be allocated. Therefore additional electrofishing was eliminated in 2004. However, an additional 3.25 hours of electrofishing was conducted in 2005 to examine growth and day vs. night gear bias.

3. Electrofish subjectively chosen sites to obtain additional smallmouth bass information.
   Action: The dam was electrofished for a total of 15 minutes in 2002 in an attempt to obtain additional smallmouth bass for age and growth analysis. Although the catch rate increased to 12/hr for this site, numbers were still insufficient for analysis. Therefore, subjectively chosen sites were dropped from future surveys.

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

Stocking history: The last stocking for Stillhouse Hollow Reservoir was in 2000 (smallmouth bass). The complete stocking history is in Table 3.

Vegetation/habitat history: Stillhouse Hollow Reservoir has never supported much native vegetation, as a large majority of the reservoir is deep and rocky. However, hydrilla was discovered in 1995 and has

been monitored annually ever since. Recent implementation of GIS and improved GPS technology has yielded much more accurate coverage estimates starting in 2005. Vegetation estimates prior to this date are questionable.

METHODS

Fishes were collected by night electrofishing (1.5 hours at 18 5-min stations). Additional information was collected by day electrofishing (1.5 hours at 18 5-min stations) (1.75 hours at 7 15-minute stations). Fishes were also collected by gill netting (10 net nights at 10 stations), and trap 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/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 2002).

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 for creel statistics and SE was calculated for structural indices and IOV. Ages for largemouth bass were determined using randomly selected otoliths from a 400 fish sample with a maximum of 10 fish per centimeter group. Source for water level data was the Brazos River Authority.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 1998 (Tibbs and Baird, 2002). Littoral zone habitat consisted primarily of boulders, rocks, gravel, and stumps. Hydrilla covered 887 acres, or 13.8 percent of the reservoir in 2005, providing a significant amount of habitat.

Creel: No creel was conducted during the survey period due to financial constraints.

Prey species: Electrofishing catch rates of bluegill and gizzard shad were 317/h and 31/h, respectively. Index of vulnerability (IOV) for gizzard shad was poor, indicating that only 15% of gizzard shad were available to existing predators; this was similar to IOV estimates in previous years (Figure 2). Total CPUE of gizzard shad in 2005 was similar to previous surveys (Figure 2). Total CPUE of bluegill in 2005 was higher than previous surveys, and size structure continued to be dominated by small individuals (Figure 3). Redear were caught in modest numbers (Figure 4) with a few fish exceeding 8 inches in length.

Channel catfish: The gill net catch rate of channel catfish was 1.4/nn in 2006. The channel catfish population continued to have low relative abundance and was dominated by legal-sized fish (Figure 5).

White bass: The gill net catch rate of white bass was 2.6/nn in 2006 which was higher than previous years. The population is dominated by legal-sized fish (Figure 6).

Smallmouth bass: The electrofishing catch rate of smallmouth bass was 4.0/hr in 2005, similar to 2003, and higher than 2002 (Figure 7). Size structure since cessation of stocking has remained similar, with no fish collected over 9” in length.

Largemouth bass: The electrofishing catch rate of stock-length largemouth bass was 107/h in 2005, higher than the previous four surveys (Figure 8). Stock CPUE also increased to 49.3, higher than the previous four surveys. A PSD of 46 indicated a balanced population. Relative weights generally ranged between 90 and 100, indicating good condition. Growth of largemouth bass in Stillhouse Hollow Reservoir was fair, with mean length at Age 3 (14.3”) exceeding the minimum length limit. Increased electrofishing

effort in 2005 yielded a maximum length of approximately 22” and a maximum age of 9 years. Florida largemouth bass influence as measured by Florida alleles in the population was 59.8%, which was similar to previous years (Table 5). The percentage of pure Florida bass was 7%, lower than previous years. Caution should be used comparing these data to previous years, as the laboratory methodology for determining allelic frequencies changed in 2005.

White crappie: The trap net catch rate of white crappie was 2.8/nn in 2005 (Figure 9), higher than in 2001 (0.6/nn) and similar to 1997 (3.2/nn). While Stillhouse Hollow isn’t known for good crappie fishing, over 50% of collected crappie exceeded the minimum length limit.

Fisheries management plan for Stillhouse Hollow Reservoir, Texas

Prepared – July 2006.

ISSUE 1: Hydrilla coverage on the reservoir is 13.8% and may be increasing.

MANAGEMENT STRATEGY

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

ISSUE 2: Although natural reproduction has been documented for the smallmouth bass population, it appears insufficient to maintain a quality fishery.

MANAGEMENT STRATEGY

1. Continue requesting smallmouth bass stockings annually.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule only includes mandatory monitoring in 2009/2010 (Table 6). Additional sampling is not warranted at this time.

LITERATURE CITED

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

DiCenzo, V. J., M. J. Maceina, and M. R. Stimert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.

Tibbs, J. and M. Baird. 2002. Statewide freshwater fisheries monitoring and management program survey report for Stillhouse Hollow Reservoir, 2001. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Tibbs, J. and M. Baird. 2004. Statewide freshwater fisheries monitoring and management program survey report for Limestone Reservoir, 2004. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

Texas Parks and Wildlife Department, Inland Fisheries Division, 2002. Fishery Assessment Procedures, unpublished manual revised 2002.

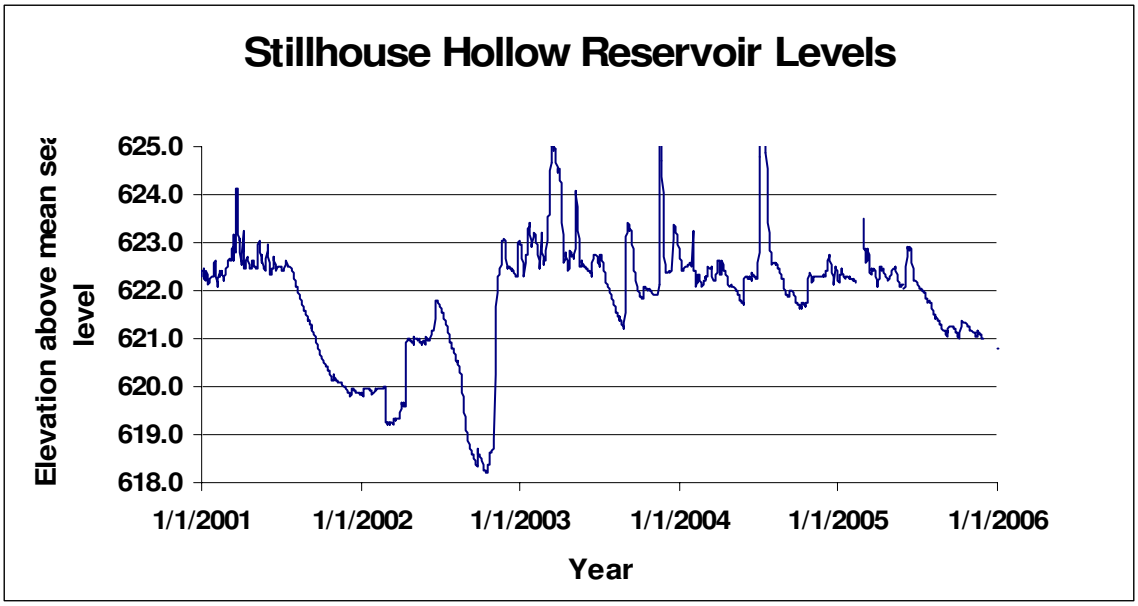


Figure 1. Daily mean water level elevations in feet above mean sea level (MSL) recorded for Stillhouse Hollow Reservoir, Texas.

Table 1. Characteristics of Stillhouse Hollow Reservoir, Texas.

Characteristic	Description
Year Constructed	1968
Controlling authority	United States Army Corps of Engineers
County	Bell
Reservoir type	Mainstem
Shoreline Development Index (SDI)	5.20
Conductivity	490 umhos/cm

Table 2. Harvest regulations for Stillhouse Hollow Reservoir.

Species	Bag Limit	Length limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12” minimum
Catfish, Flathead	5	18” minimum
Bass, White	25	10” minimum
Bass, smallmouth	5	14” minimum
Bass: largemouth	5	14” minimum
Bass: spotted, Guadalupe	5 (in any combination)	No minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10” minimum

Table 3. Stocking history of Stillhouse Hollow Reservoir, Texas. Size Categories are: FGL = 1-3 inches; and ADL = adults.

Species	Year	Number stocked	Size
Channel catfish	1968	322,800	
Flathead catfish	1968	2,000	
Hybrid striped bass	1978	39,225	
	1982	54,527	
	Species total:	93,752	
Smallmouth bass	1974	129,000	
	1975	65,000	
	1976	125,000	
	1977	100,000	
	1986	471	ADL
	1992	58	ADL
	1992	35,249	FGL
	1993	141,055	FGL
	1994	161,043	FGL
	1997	160,766	FGL
	1999	97,048	FGL
	2000	159,026	FGL
	Species total:	1,173,716	
Florida largemouth bass	1993	322,026	FGL
	1994	321,167	FGL
	Species total:	643,193	
Largemouth bass	1968	735,000	
Walleye	1974	150,000	
	1975	126,240	
	1976	100,000	
	Species total:	376,240	

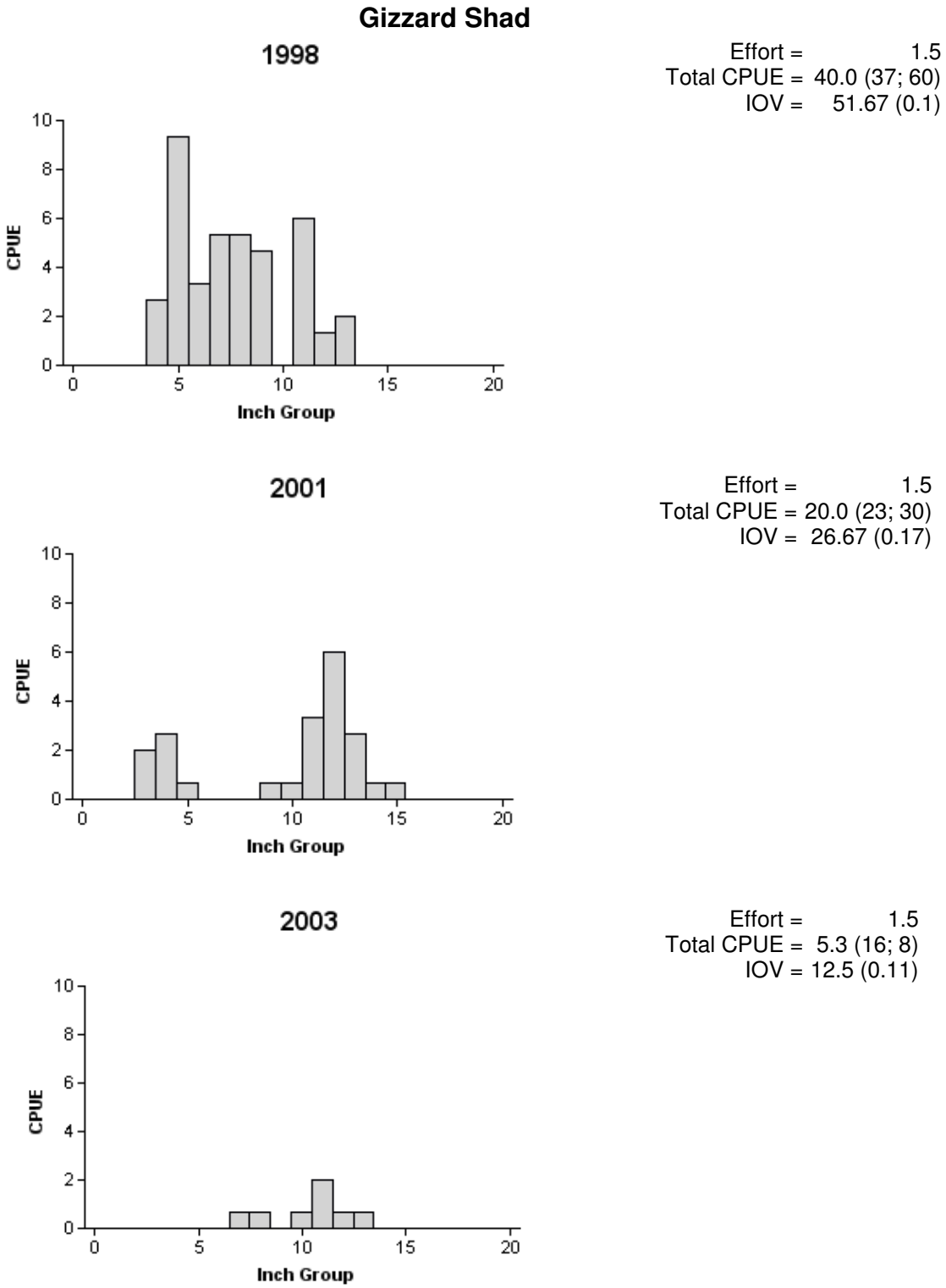


Figure 2: Number of gizzard shad caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas.

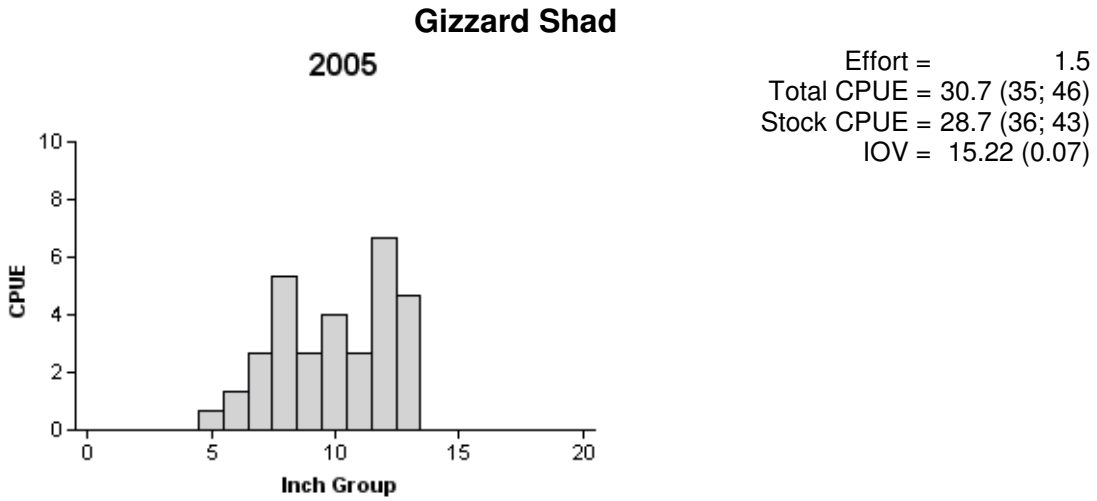
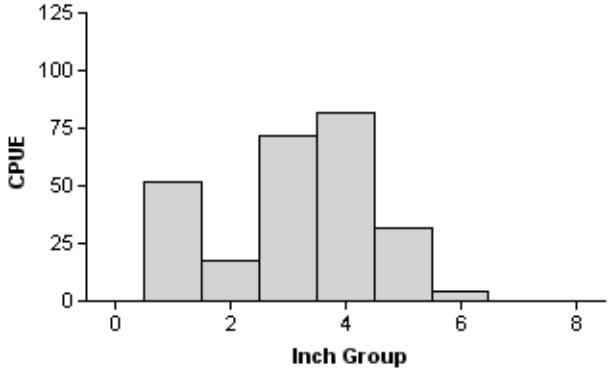


Figure 2 continued. Number of gizzard shad caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas.

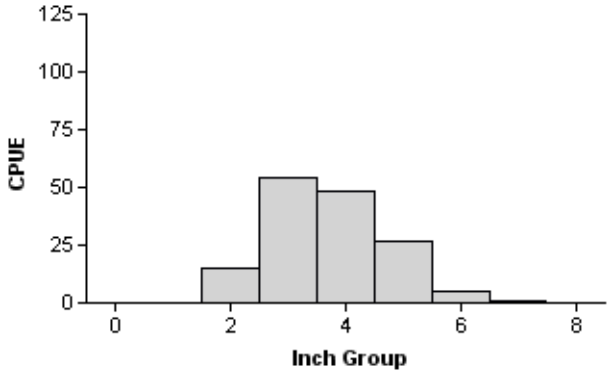
Bluegill

1998



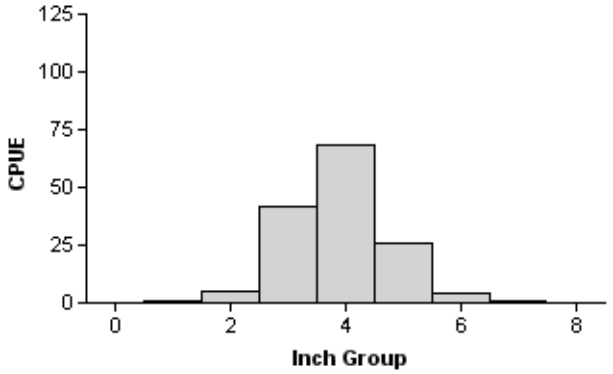
Effort = 1.5
Total CPUE = 256.7 (29; 385)
Stock CPUE = 188.0 (33; 282)
PSD = 2.0 (0.01)

2001



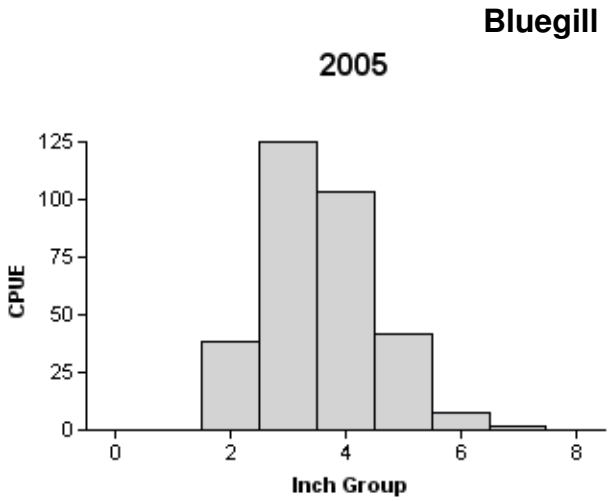
Effort = 1.5
Total CPUE = 149.3 (20; 224)
Stock CPUE = 134.7 (20; 202)
PSD = 4.0 (0.02)

2003



Effort = 1.5
Total CPUE = 146.0 (17; 219)
Stock CPUE = 140.0 (17; 210)
PSD = 3.0 (0.01)

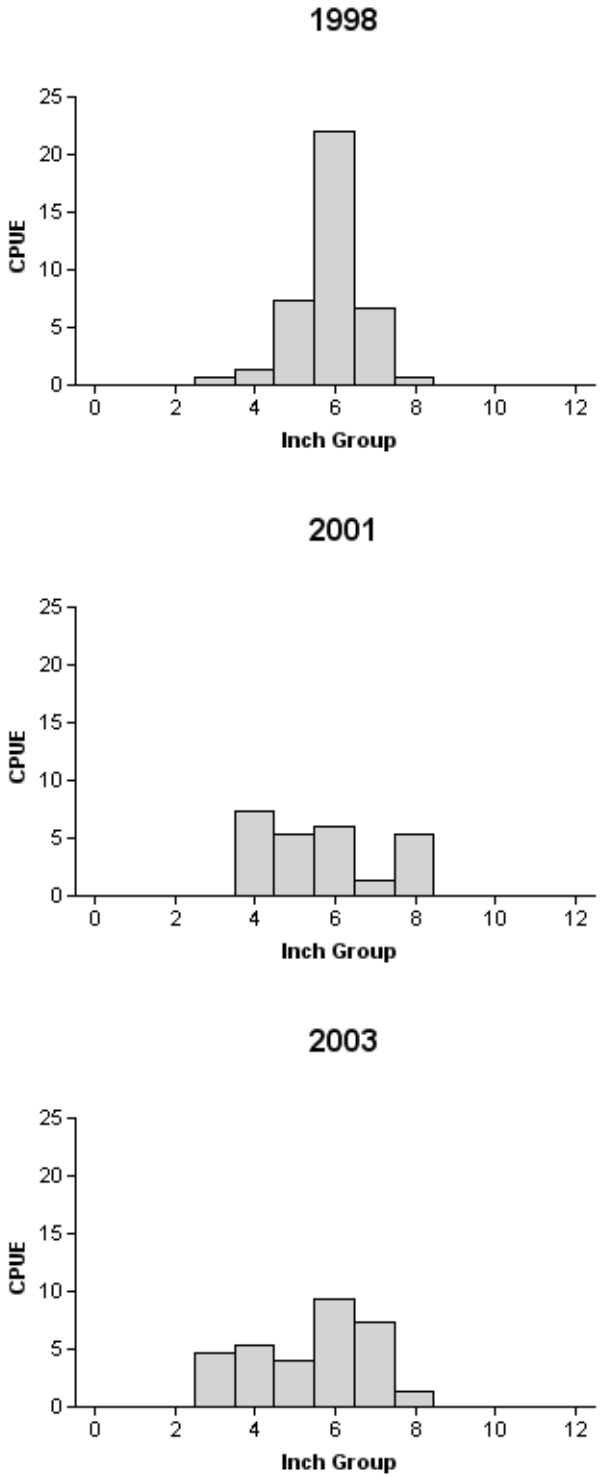
Figure 3: Number of bluegill caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas.



Effort = 1.5
Total CPUE = 316.7 (20; 475)
Stock CPUE = 278.7 (22; 418)
PSD = 3.0 (0.01)

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

Redear Sunfish



1998

Effort = 1.5
Total CPUE = 38.7 (56; 58)
Stock CPUE = 38.0 (55; 57)
PSD = 19.0 (0.14)
RSD-P = 0.0 (0)

2001

Effort = 1.5
Total CPUE = 25.3 (12; 38)
Stock CPUE = 25.3 (12; 38)
PSD = 26.0 (0.07)
RSD-P = 0.0 (0)

2003

Effort = 1.5
Total CPUE = 32.0 (15; 48)
Stock CPUE = 27.3 (15; 41)
PSD = 32.0 (0.07)
RSD-P = 0.0 (0)

Figure 4: Number of redear caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas.

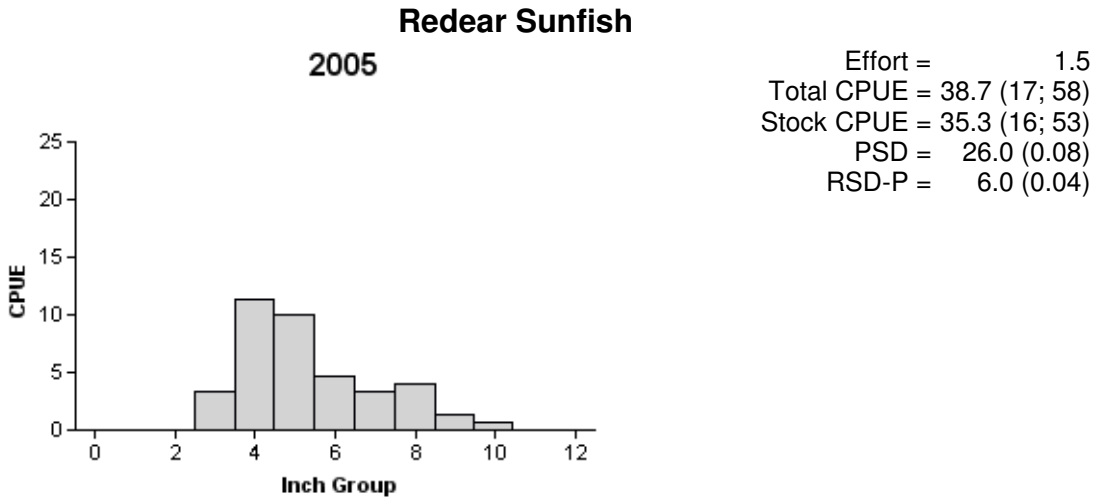


Figure 4 continued. Number of redear caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas.

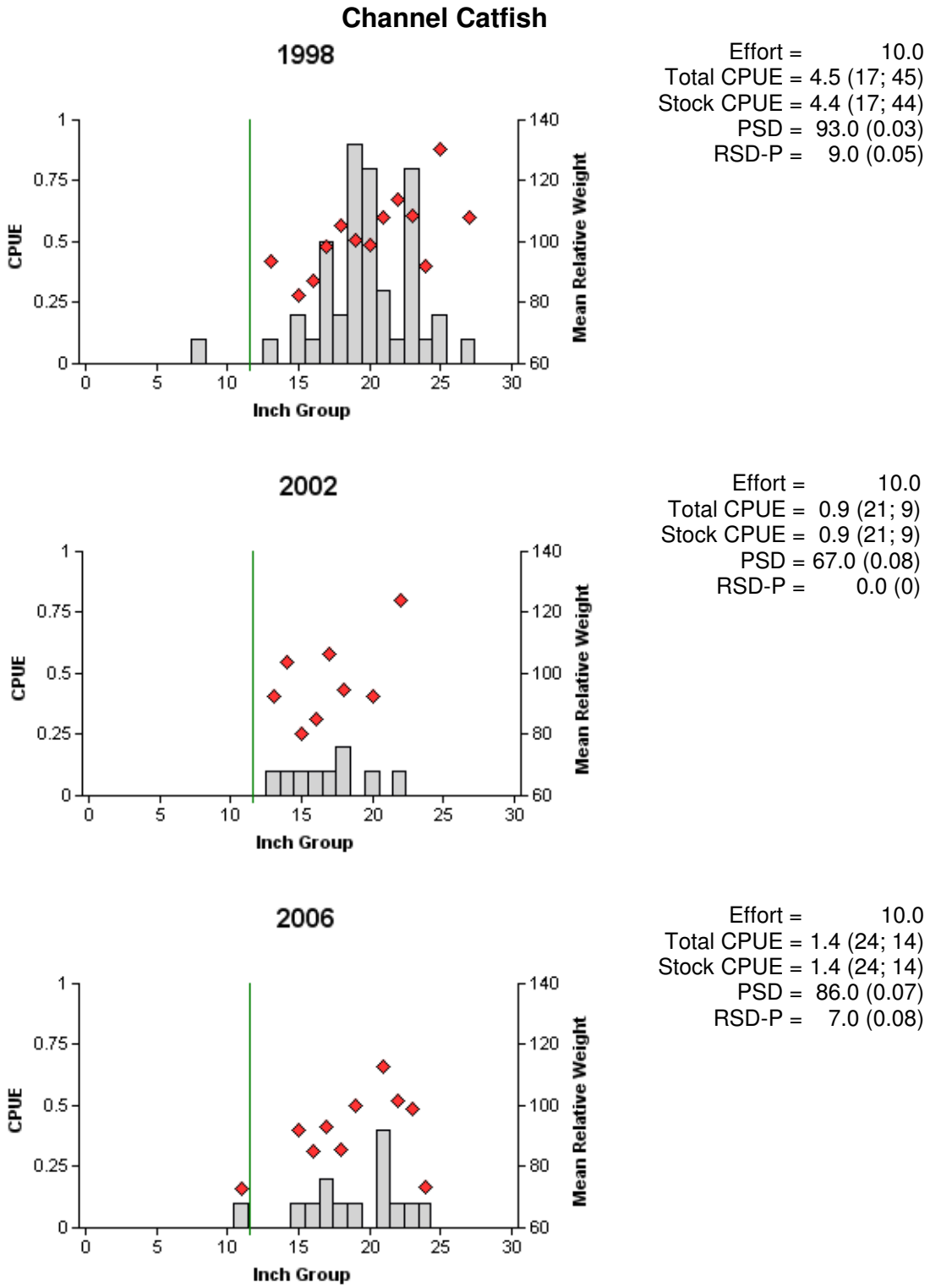
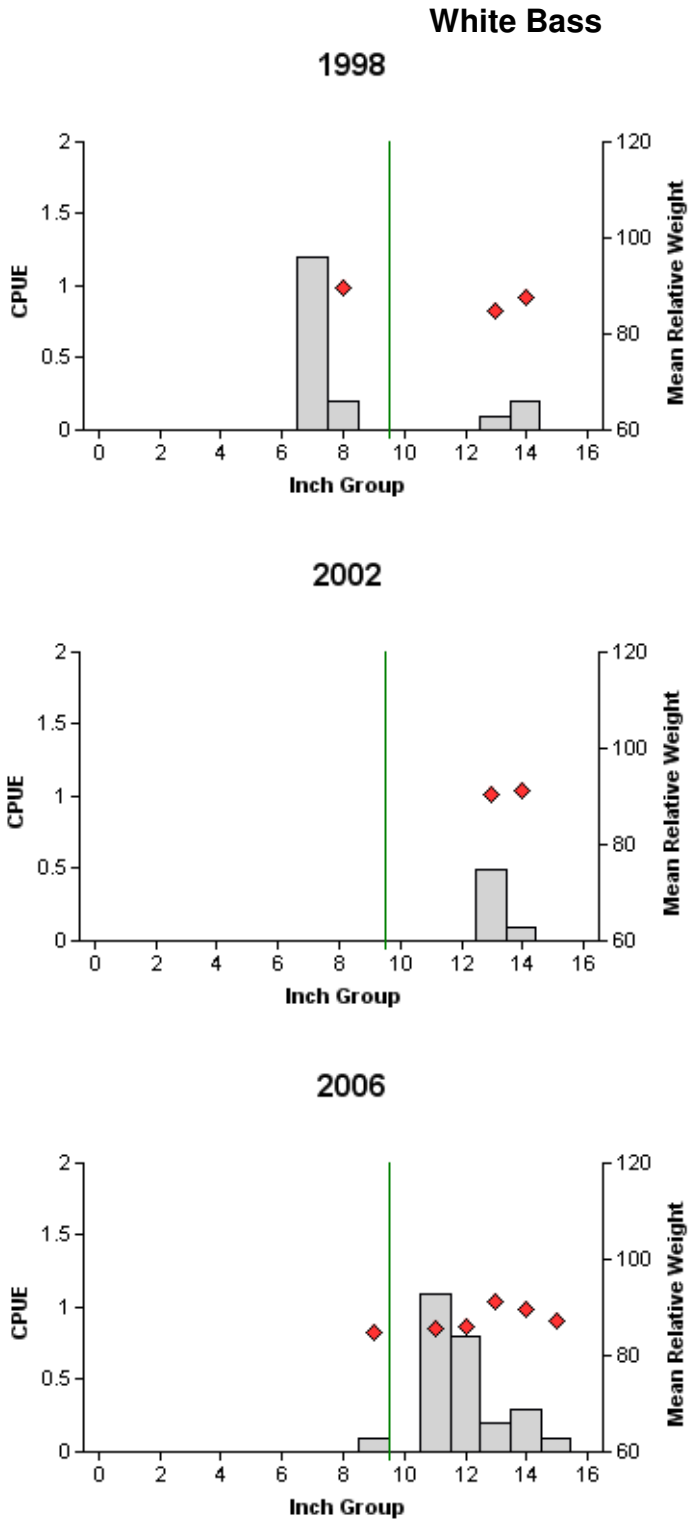
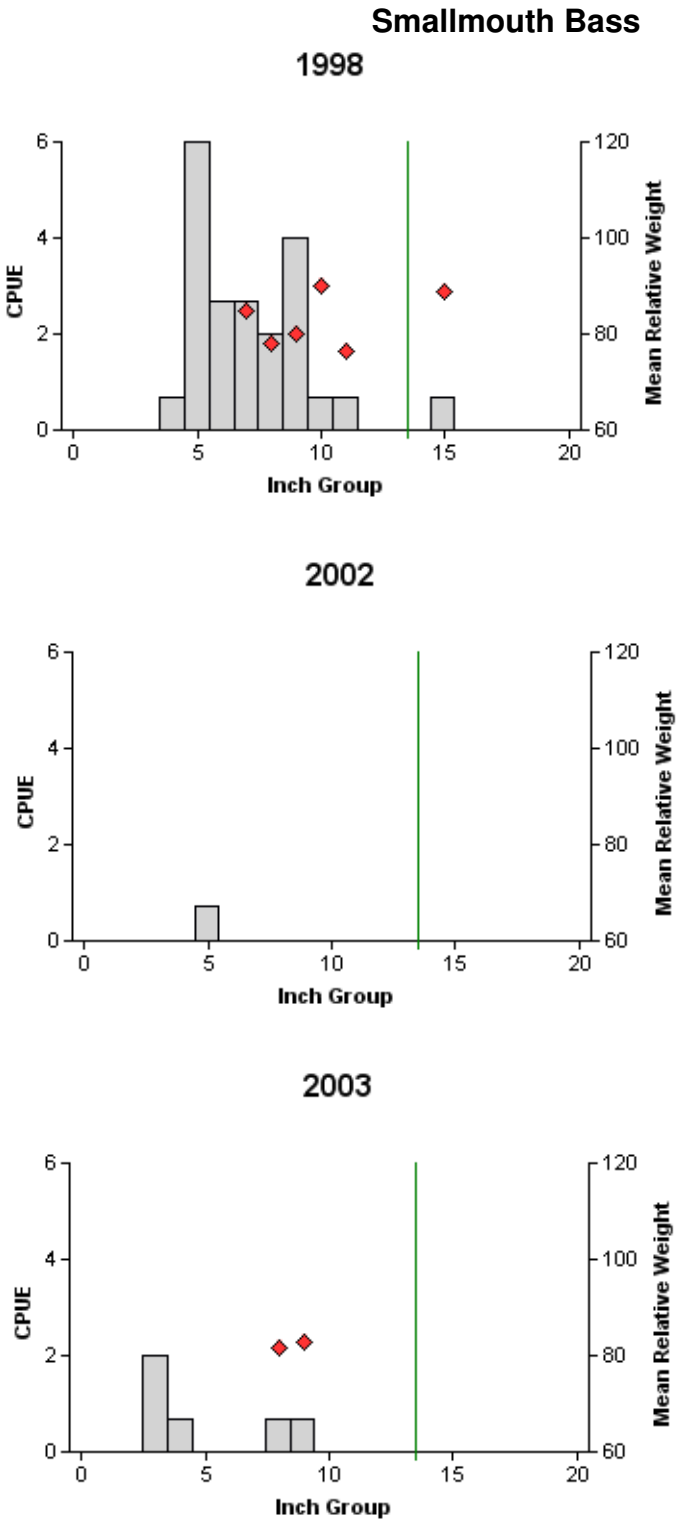


Figure 5: Number of channel catfish caught per net (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for spring gill net surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.



	1998	2002	2006
Effort =	10.0	10.0	10.0
Total CPUE =	1.7 (29; 17)	0.6 (17; 6)	2.6 (55; 26)
Stock CPUE =	1.7 (29; 17)	0.6 (17; 6)	2.6 (55; 26)
PSD =	18.0 (0.03)	100.0 (0.00)	100.0 (0)
RSD-P =	18.0 (0.03)	100.0 (0)	54.0 (0.11)
RSD-M =	0.0 (0)	0.0 (0)	4.0 (0.04)

Figure 6: Number of white bass caught per net (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for spring gill net surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

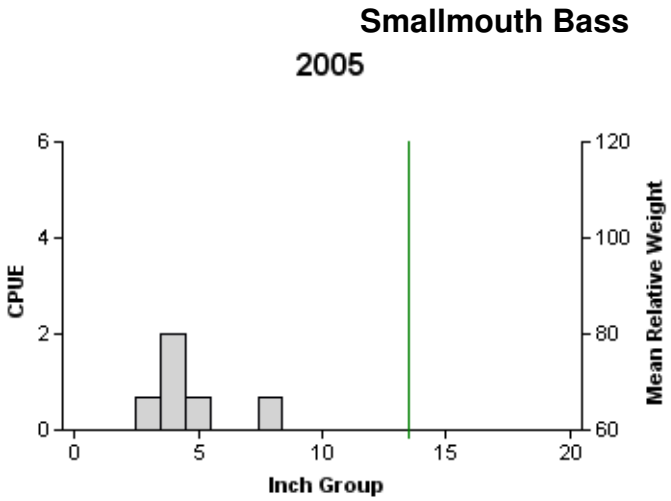


Effort =	1.5
Total CPUE =	20.0 (51; 30)
Stock CPUE =	10.7 (63; 16)
PSD =	12.0 (0.05)
RSD-P =	6.0 (0.03)

Effort =	1.4
Total CPUE =	0.7 (-99; 1)
Stock CPUE =	0.0 (0; 0)
PSD =	0.0 (0.99)
RSD-P =	0.0 (0)

Effort =	1.5
Total CPUE =	4.0 (0; 6)
Stock CPUE =	1.3 (100; 2)
PSD =	0.0 (2.12)
RSD-P =	0.0 (0)

Figure 7: Number of smallmouth bass caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

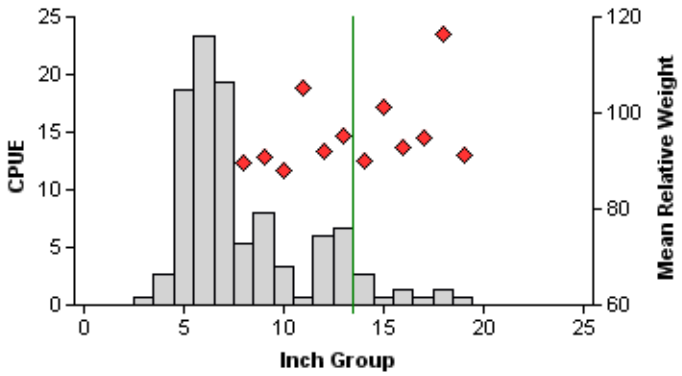


Effort = 1.5
Total CPUE = 4.0 (33; 6)
Stock CPUE = 0.7 (100; 1)
PSD = 0.0 (4)
RSD-P = 0.0 (0)

Figure 7 continued. Number of smallmouth bass caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

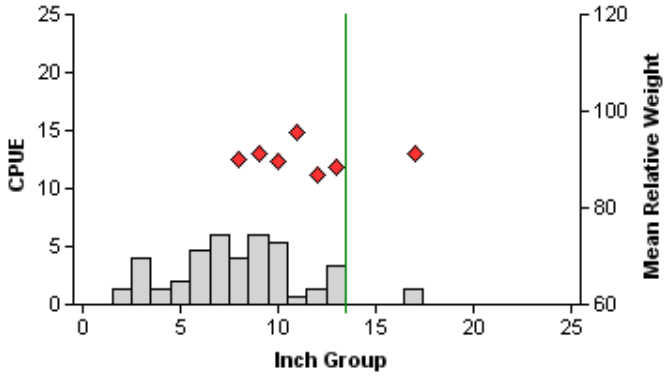
Largemouth Bass

1998



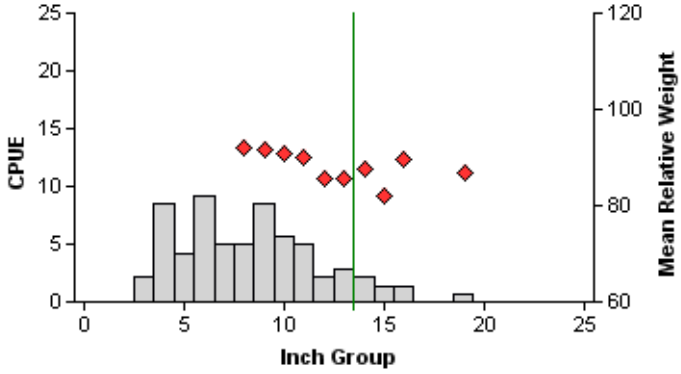
Effort =	1.5
Total CPUE =	102.0 (30; 153)
Stock CPUE =	37.3 (20; 56)
PSD =	54.0 (0.11)
RSD-P =	12.0 (0.03)
RSD-M =	0.0 (0)

2001



Effort =	1.5
Total CPUE =	41.3 (24; 62)
Stock CPUE =	22.0 (34; 33)
PSD =	27.0 (0.04)
RSD-P =	6.0 (0.03)
RSD-M =	0.0 (0)

2002

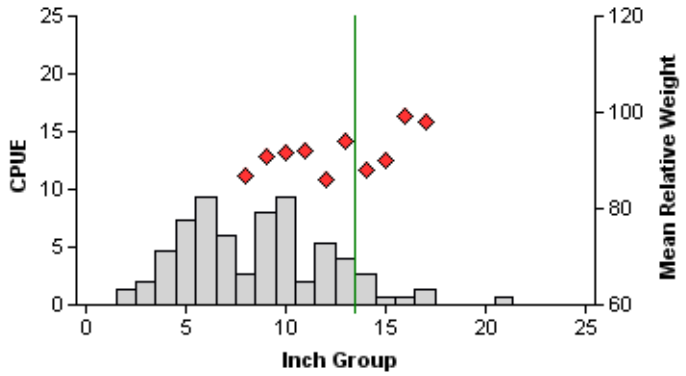


Effort =	1.4
Total CPUE =	63.5 (13; 90)
Stock CPUE =	34.6 (13; 49)
PSD =	31.0 (0.07)
RSD-P =	10.0 (0.04)
RSD-M =	0.0 (0)

Figure 8: Number of largemouth bass caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

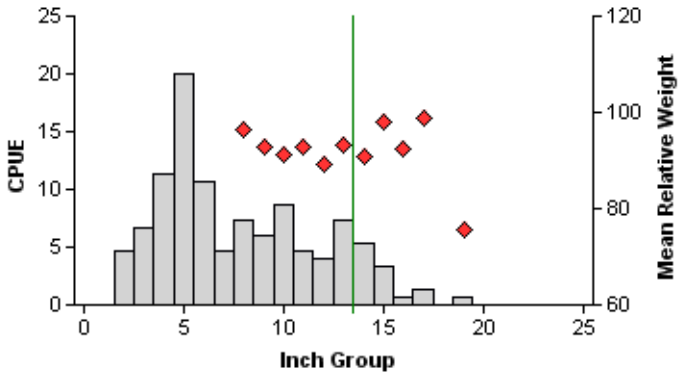
Largemouth Bass

2003



Effort =	1.5
Total CPUE =	68.0 (20; 102)
Stock CPUE =	37.3 (20; 56)
PSD =	41.0 (0.07)
RSD-P =	9.0 (0.03)
RSD-M =	2.0 (0.01)

2005



Effort =	1.5
Total CPUE =	107.3 (18; 161)
Stock CPUE =	49.3 (18; 74)
PSD =	46.0 (0.07)
RSD-P =	12.0 (0.04)
RSD-M =	0.0 (0)

Figure 8 continued. Number of largemouth bass caught per hour (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall electrofishing surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

Table 4. Results of genetic analysis of largemouth bass collected by fall electrofishing, Stillhouse Hollow Reservoir, Texas, 1998 through 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.

		Genotype					
Year	Sample size	FLMB	F1	Fx	NLMB	% FLMB alleles	% pure FLMB
1998	29	5	7	12	5	44.8	17.2
2001	30	9	2	17	1	69.5	31.0
2002	30	4	12	13	1	55.8	13.3
2003	30	4	7	18	1	62.5	13.3
2005	30	2	1	27	0	59.8	7.0

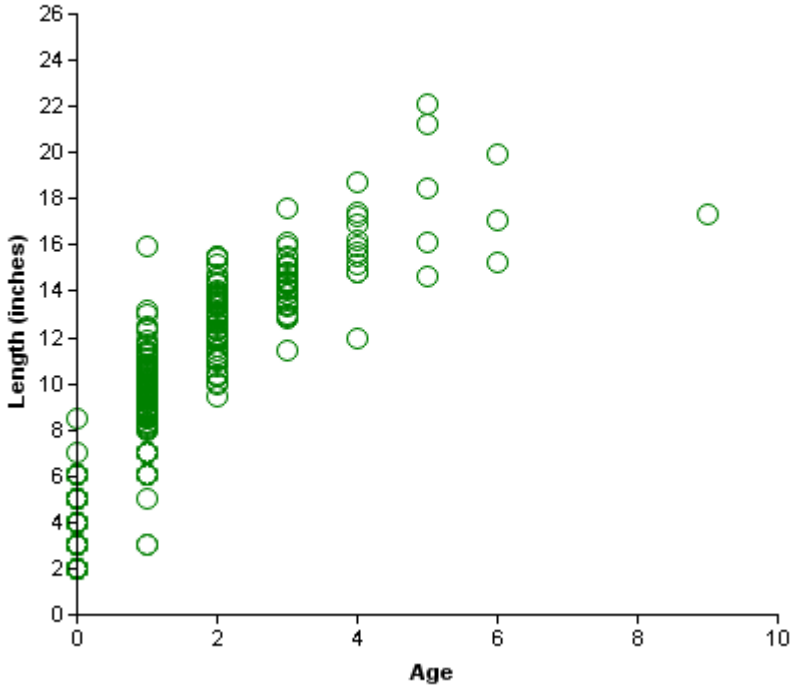


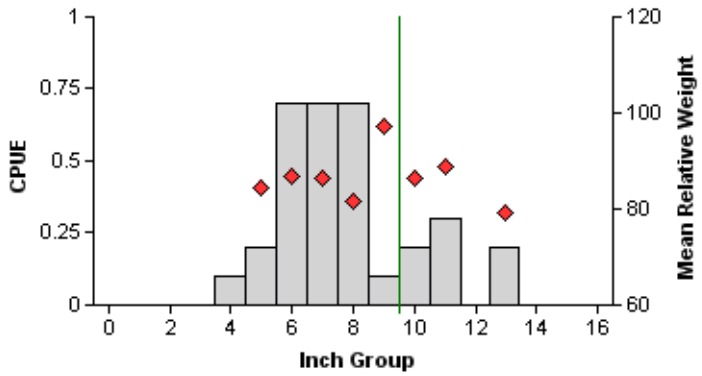
Figure 9: Length at age (N = 321) for largemouth bass collected by electrofishing at Stillhouse Hollow Reservoir, Texas, October, 2005. Note that the age-0 data may not be representative of the actual size distribution because of gear bias against smaller fish.

Table 5: Average length at capture for largemouth bass (sexes combined) ages 1 – 9 collected in electrofishing surveys, Stillhouse Hollow Reservoir, fall, 2005. Lengths are followed by the sample size. Note that the age-0 data may not be representative of the actual size distribution because of gear bias against smaller fish.

	Growth	
Age	Total Length	Number of fish
0	3.92	105
1	9.01	108
2	12.67	57
3	14.28	30
4	15.88	12
5	18.50	5
6	17.44	3
9	17.36	1

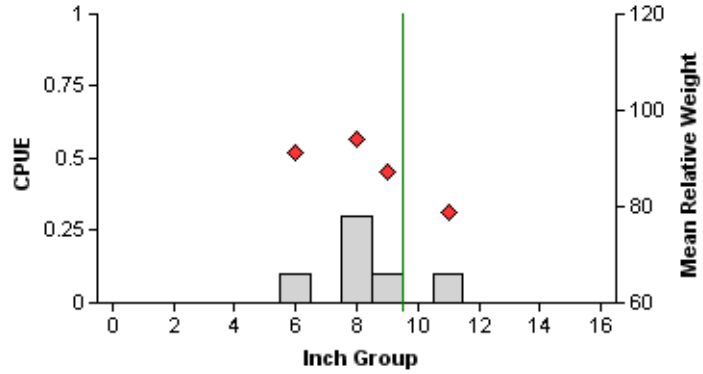
White Crappie

1998



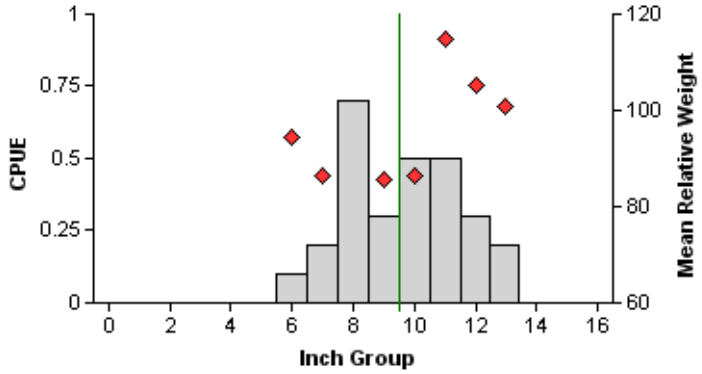
Effort = 10.0
Total CPUE = 3.2 (44; 32)
PSD = 48.0 (0.1)
RSD-P = 23.0 (0.05)
RSD-M = 6.0 (0.07)

2001



Effort = 10.0
Total CPUE = 0.6 (29; 6)
PSD = 83.0 (0.13)
RSD-P = 17.0 (0.17)
RSD-M = 0.0 (0)

2005



Effort = 10.0
Total CPUE = 2.8 (44; 28)
PSD = 89.0 (0.04)
RSD-P = 54.0 (0.07)
RSD-M = 18.0 (0.06)

Figure 10: Number of white crappie caught per net (CPUE) (RSE and N in parentheses), and population indices (SE in parentheses) for fall trap net surveys, Stillhouse Hollow Reservoir, Texas. The vertical line represents the minimum length limit at the time of the survey.

Table 6. Proposed sampling schedule for Stillhouse Hollow Reservoir, 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.

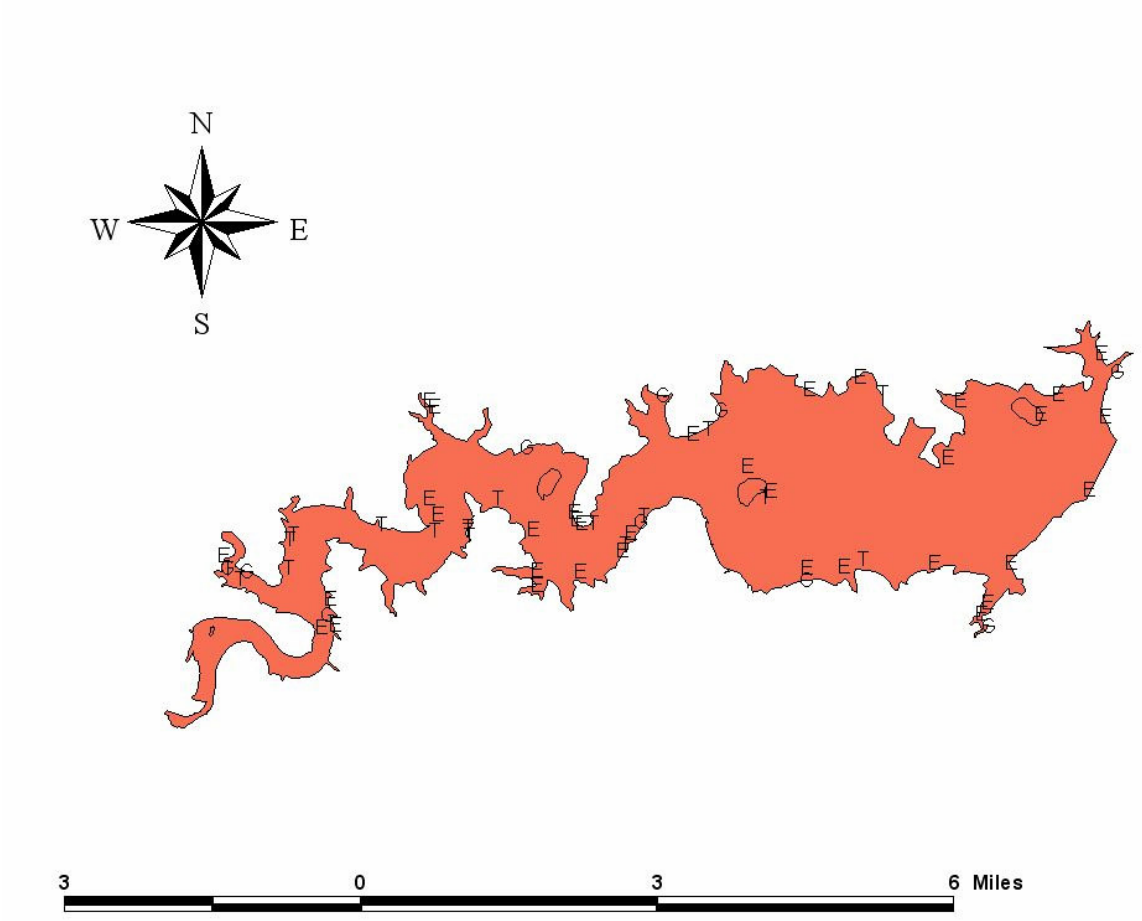
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Report
Fall 2006-Spring 2007					
Fall 2007-Spring 2008					
Fall 2008-Spring 2009					
Fall 2009-Spring 2010	S	S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Stillhouse Hollow Reservoir, Texas, 2005-2006.

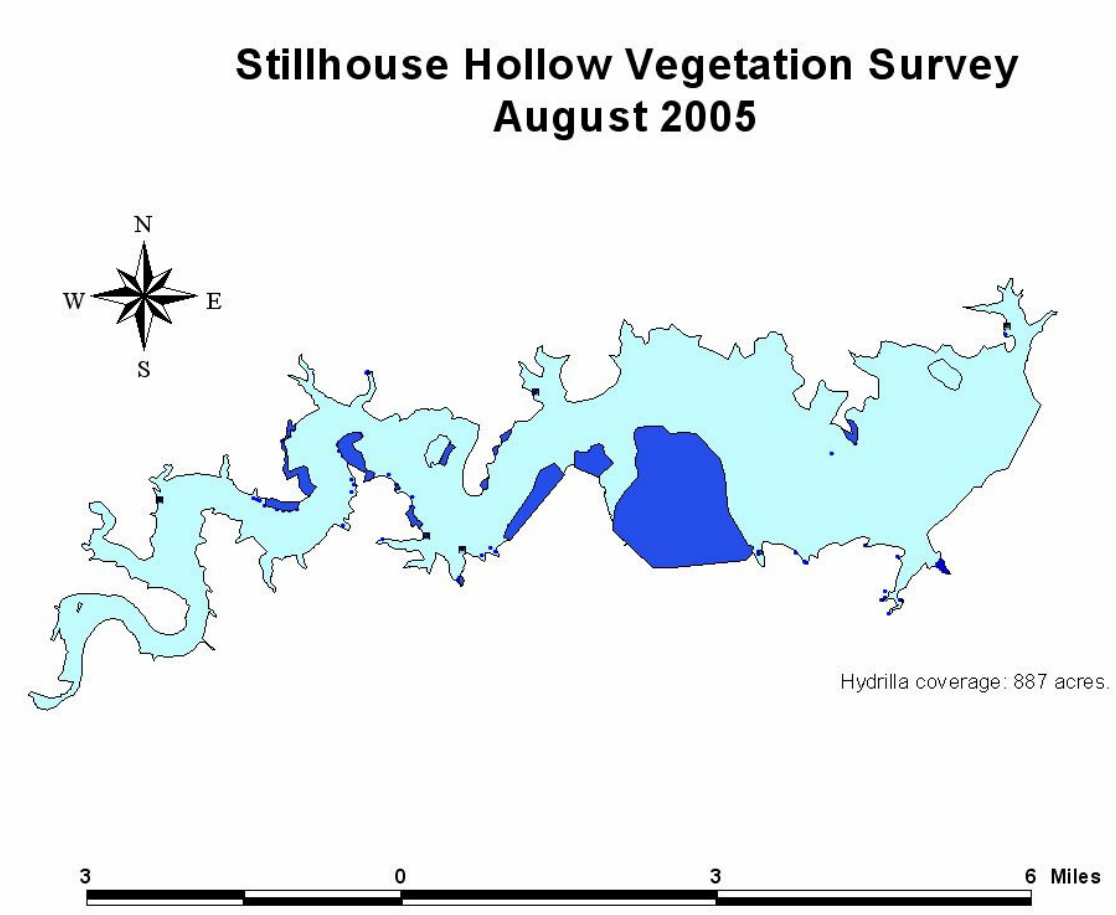
Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					46	30.7
Threadfin shad					0	0
Channel catfish	14	1.4				
Flathead catfish	7	0.7				
White bass	26	2.6				
Redbreast sunfish					0	0
Green sunfish					225	150.0
Warmouth					10	6.7
Orange spotted sunfish					0	0
Bluegill					475	316.7
Longear sunfish					69	46.0
Redear sunfish					58	38.7
Spotted Bass					1	0.7
Smallmouth Bass					6	4.0
Largemouth bass					161	107
White crappie			28	2.8		

APPENDIX B



Location of sampling sites, Stillhouse Hollow Reservoir, Texas, 2004-2005. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Water level was near full pool at time of sampling.

APPENDIX C



Location of hydrilla in Stillhouse Hollow Reservoir, August 2005.

APPENDIX D

Results from FAST modeling

Introduction

Recruitment, growth, exploitation, total mortality, and maximum size are all important population statistics to have when managing a reservoir. We calculated these statistics from largemouth bass data collected during management surveys using Fishery Analysis and Simulation Tools (FAST) (Slipke and Maceina, 2000).

Methods

Largemouth bass otoliths were collected using a stratified random approach in which ten fish per centimeter group were selected for otoliths extraction. The remaining largemouth bass were assigned ages using a length-age key. Collection and processing of otoliths was conducted according to the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (unpublished, revised manual 2003).

Total annual mortality, theoretical maximum age, L-infinity (theoretical maximum length), and residuals (year class strength) were calculated using FAST. Unweighted catch-curve regression was used to examine annual mortality, theoretical maximum age, and year class strength. The Von Bertalanffy growth function was used to determine L-infinity. Only data from age-0 through age-3 were used for largemouth bass, because of possible gear bias for older fish described in the Texas Parks and Wildlife Department Inland Fisheries Assessment Procedures (unpublished, revised manual 2003). Fish were not segregated by sex during the analysis.

Results and Discussion

The results are shown in Figure 9 and Table 5. The largemouth bass population exhibits moderate total mortality and a shorter than desired maximum length of 17.5”, a maximum age of 9.4 years, and relatively consistent recruitment. Exploitation was considered to be low, based on recent creel data from other reservoirs in Texas.

It is clear that with low exploitation, additional harvest restrictions will do little to restructure any of these populations at the current time. Most of the mortality observed is likely natural mortality. However, if angling pressure were to increase in the future, it is possible that exploitation might become a factor, necessitating additional harvest restrictions.

The largemouth bass population is interesting, especially when compared to the recently evaluated Limestone reservoir data (Tibbs and Baird, 2005). Both exhibit consistent recruitment and acceptable genetics, indicating no reason to consider stocking in the near term. The theoretical maximum length for Stillhouse Hollow was 17.5” with a maximum age of 9.4 years, compared with 18.1” and 7.8 years respectively for Limestone Reservoir. It should be noted here that the current largemouth bass lake record for Stillhouse Hollow was established January 2006 with a 27”, 11.73 lb fish, which is quite similar to the Limestone record set in December of 2004 (25.5” and 11.75 lbs). This indicates that both reservoirs are capable of producing trophy largemouth bass. Our modeling efforts did not take into account differences in growth between male and female bass. Had we modeled only female bass, which are most likely to become trophies, our theoretical maximum length would have increased.

Population parameters of largemouth bass, Stillhouse Hollow Reservoir, 2005. Estimates were obtained using the Fast Modeling Program.

Species	N aged	Total Mortality	Exploitation rate	Maximum size (L-infinity)	Maximum age	Residuals
Largemouth bass	405	42.7%	Unknown, but likely very low	17.5”	9.4	-.104 to 0.123

Appendix E

Results from night vs. day electrofishing

Introduction

The current standardized electrofishing procedures require that sampling be conducted at night no earlier than 30 minutes after sunset (unpublished, revised manual 2003). The reasons traditionally cited for this include increased fish activity in shallow water at night, decreased avoidance of the electrofishing boat, and the ability to sample larger fish. We tested whether these assumptions affected catch rates of largemouth bass in Stillhouse Hollow Reservoir during the fall, 2005 electrofishing season.

Methods

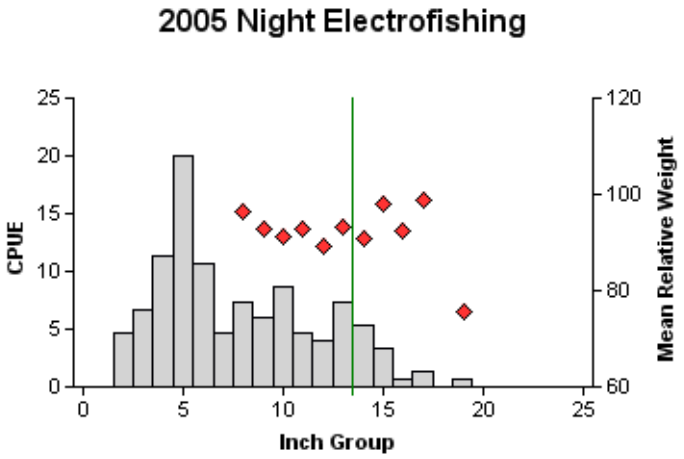
A total of 36 five-minute stations were randomly selected throughout the lake for day and night electrofishing, 18 for each treatment. On 10/11/05, 9 stations for each treatment were electrofished. On 10/13/05, 9 stations for each treatment were electrofished. During night electrofishing, all target species were collected. During day electrofishing, only largemouth bass were collected. Water clarity ranged from 70 to 120 cm, as measured by a secchi disk.

Results and Discussion

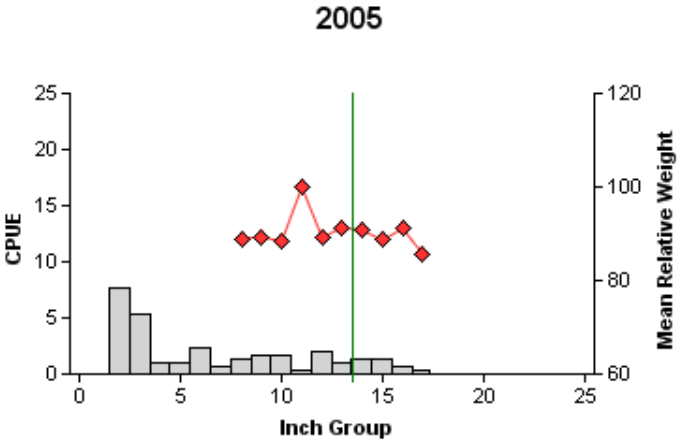
The results are shown in the accompanying graphs. The first graph is the standard night electrofishing with the associated population indices. The second graph is the accompanying day electrofishing.

The two graphs look very different. Catch rates during the day are about half compared to night electrofishing, indicating that electrofishing samples collected during the day would not be comparable to those collected at night. However, the maximum size of bass collected for each of the two samples is similar and the overall shape of the length distribution is similar. This indicates that length-at-age information collected during daytime electrofishing is just as representative as that which was collected during nighttime electrofishing.

We believe that strong consideration should be given to modifying the current electrofishing procedures to allow for day electrofishing in reservoirs with reduced water clarity or in reservoirs where a similar comparison to this has been completed with satisfactory results. Compelling reasons for this change include increased safety, as well as greater ease of fish collection for age and growth analysis. If such a change were implemented, CPUE data for Stillhouse Hollow reservoir should be collected at night, but additional length-at-age information could be collected during the day.



Effort =	1.5
Total CPUE =	107.3
Stock CPUE =	49.3
PSD =	46



Effort =	1.5
Total CPUE =	59.3
Stock CPUE =	23.3
PSD =	57

Night vs. day electrofishing during 2005 on Stillhouse Hollow Reservoir, Texas.