

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-30-R-33

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2007 Survey Report

Cooper Reservoir

Prepared by:

Aaron K. Jubar and Kevin W. Storey
Inland Fisheries Division
District 3B, Tyler, Texas



Carter P. Smith
Executive Director

Phil Durocher
Director, Inland Fisheries

July 31, 2008

TABLE OF CONTENTS

Survey and management summary	2
Introduction.....	3
Reservoir description.....	3
Management history.....	3
Methods.....	4
Results and discussion.....	5
Fisheries management plan.....	6
Literature cited.....	8
Figures and tables.....	9-22
Water level and rainfall (Figure 1)	9
Reservoir characteristics (Table 1)	9
Harvest regulations (Table 2).....	10
Stocking history (Table 3).....	11
Habitat and vegetation surveys (Table 4).....	12
Gizzard shad (Figure 2).....	13
Bluegill (Figure 3)	14
Blue catfish (Figure 4)	15
Channel catfish (Figure 5)	16
White bass (Figure 6).....	17
Palmetto bass (Figure 7)	18
Largemouth bass (Figure 8; Table 5).....	19
White crappie (Figure 9).....	21
Proposed sampling schedule (Table 6).....	22
Appendix A	
Catch rates for all species from all gear types	23
Appendix B	
Map of 2007-2008 sampling locations	24

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Cooper Reservoir were surveyed using electrofishing and trap netting in 2007, and gill netting in 2008. A littoral-zone habitat survey and an aquatic vegetation survey were conducted in summer 2007. This report summarizes the results of the surveys and contains a management plan for the reservoir.

- **Reservoir description:** Cooper Reservoir is located in Delta and Hopkins Counties, Texas on the Middle and South Forks of the Sulphur River. It was constructed by the U. S. Army Corps of Engineers for water supply and flood control. Reservoir elevation in the past four years has experienced extreme fluctuations, declining to 17.5 feet below conservation pool elevation in December 2006. Elevations returned to conservation pool in 2007, flooding terrestrial vegetation and providing additional habitat for many fish species.
- **Management history:** Important sport fishes at Cooper Reservoir include palmetto bass, white bass, blue catfish, channel catfish, and largemouth bass. Palmetto bass are stocked annually at a rate of 10/acre.
- **Fish community**
 - **Prey species:** Cooper Reservoir contained populations of both gizzard shad and bluegill of appropriate size to provide prey for sport fish. Electrofishing surveys resulted in few threadfin shad, and other species of sunfishes were rarely encountered.
 - **Catfishes:** Cooper Reservoir continued to sustain quality fisheries of blue and channel catfish. Sub-stock sized fish of both species were collected, indicating successful reproduction. Harvestable-size blue catfish occurred in high numbers and exhibited good body condition.
 - **Temperate basses:** Ample open water habitat and a sufficient prey base allow Cooper Reservoir to support populations of white bass and palmetto bass. Cooper Reservoir has received annual stockings of palmetto bass since 2002.
 - **Black basses:** Largemouth bass abundance has historically been limited. Unseasonably low lake elevations prohibited electrofishing sampling in fall 2005. When the reservoir elevation returned to conservation pool in 2007, numerous juvenile largemouth bass, but no adult fish, were collected in electrofishing.
 - **Crappie:** White and black crappie were present in the reservoir. Although not overly abundant, many of the white crappie sampled were of harvestable size. Only one black crappie was sampled in 2007.
- **Management strategies:** Annual stockings of palmetto bass should continue at a rate of 10/acre to maintain the fishery. Recommend stocking FLMB at 25/acre as a result of significant increase in habitat resulting from increased water level and subsequent development of aquatic habitat. General monitoring with trap netting, gill netting and electrofishing surveys will be repeated in 2011-2012. Conduct an aquatic vegetation survey in 2008 to monitor hydrilla in the vicinity of boat ramps.

INTRODUCTION

This document is a summary of fisheries data collected from Cooper Reservoir from June 2007 to May 2008. 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 2007 and 2008 data for comparison.

Reservoir Description

Cooper Reservoir is an impoundment of the Sulphur River in Delta and Hopkins Counties, Texas. The reservoir was constructed by the U. S. Army Corps of Engineers in 1991 for water supply and flood control. At conservation pool (440.0 feet above mean sea level), Cooper Reservoir is 19,280 surface acres, has a shoreline length of 125 miles, and a mean depth of 15 feet. Water level fluctuations averaged 7.4 feet annually for the period 2001-2007. However, water levels reached an historic low in 2006 (422.5 feet) (Figure 1). The reservoir was eutrophic with a Carlson's Trophic State Index (TSI) chl-*a* of 53.12 µg/L (Texas Commission on Environmental Quality 2005). The primary habitat component at time of sampling consisted of flooded terrestrial vegetation, smartweed, and hydrilla. Littoral habitat was limited prior to 2007 due to extremely low water levels. Heavy spring rains in 2007 have inundated terrestrial vegetation, providing spawning habitat for largemouth bass and sunfishes as well as cover for juvenile fish. Other descriptive characteristics for Cooper Reservoir are in Table 1.

Management History

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

1. Enhancement of the largemouth bass population and fishery.
Action: To evaluate the 18-inch minimum length limit for largemouth bass on Cooper Reservoir, biennial electrofishing surveys were planned. Due to extreme low water conditions in 2005, the biennial survey was postponed. Lake levels reached record lows in 2006, delaying the survey further. When the survey was finally conducted in 2007, no largemouth bass over 8 inches were collected. Unfortunately, electrofishing catch rates at Cooper Reservoir have historically been low making evaluation of the largemouth bass population and length limit difficult.
2. Enhancement of largemouth bass population genetics.
Action: In order to assess the Florida largemouth bass allele frequency, 30 age-0 fish were collected during the fall 2007 electrofishing survey. Genetic analysis of the age-0 fish sample showed an FLMB allele frequency of 62%. Heavy rainfall in 2007 and 2008 led to the inundation of terrestrial vegetation and the establishment of large areas of aquatic vegetation.
3. Enhancement of palmetto bass fishery.
Action: The presence of small palmetto bass in 2006 and 2008 gill netting confirms the success of success of recent stockings. Relative abundance of adult fish is good, leading to a productive fishery.
4. Habitat enhancement.
Action: In 1998, TPWD staff in cooperation with USACE Lewisville Aquatic Ecosystem Research Facility (LAERF) personnel initiated annual native aquatic vegetation restoration experiments in seven Texas reservoirs, including Cooper Reservoir. The extended low water event from 2003 to 2006 severely limited the success of this project, as nearly all vegetation enclosures were dry for approximately four years.
5. Increase angler awareness of the fisheries resources at Cooper Reservoir
Action: District staff provided information on the fisheries resources available in Cooper Reservoir to outdoor writers and general anglers who have contacted the District office.

6. Improve angler access

Action: Facilities for bank anglers are reasonably good, and the Doctor's Creek unit of Cooper Lake State Park has an excellent loading dock that is handicap-accessible. Extended periods of low-water conditions on Cooper Reservoir limited boating access to the lake for much of the time from 2004 through 2006. If low-water conditions persist in future years, the controlling authority will be encouraged to extend the paved boat ramp to improve angler access during times of lower water levels.

Harvest regulation history: Sport fishes in Cooper Reservoir are currently managed with TPWD statewide regulations with the exception of largemouth bass (Table 2). The minimum length limit for largemouth bass has been 18 inches with a five fish daily bag limit from the time the lake was opened to fishing.

Stocking history: Cooper Reservoir has received annual stockings of palmetto bass (since 1998), with the exception of 2000 and 2001 when golden algal blooms limited hatchery production (Table 3). Florida largemouth bass were most recently stocked in 2003. The complete stocking history is listed in Table 3.

Vegetation/habitat history: Historically, habitat in Cooper Reservoir was comprised of featureless shoreline and flooded timber. Aquatic vegetation coverage consisted of native emergent and native floating vegetation in small quantities. A habitat enhancement project was initiated on Cooper Reservoir in 1999, but low water conditions in 2003 to 2004 limited the productivity of habitat enclosures.

METHODS

Fishes were collected by electrofishing (2.0 hours at 24, 5-min stations), and trap netting (15 net nights at 15 stations) in 2007, and gill netting (15 net nights at 15 stations) in 2008. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill nets and trap nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected. Aquatic vegetation and littoral habitat surveys were performed in summer 2007 and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Stock Density (PSD), Relative Stock Density (RSD)], and relative weight (Wr) were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE and SE was calculated for structural indices and IOV.

Ages were determined from otoliths of white crappie collected in trap netting, and white bass and palmetto bass collected in gill netting. A sample of 30 age-0 largemouth bass were collected by electrofishing in fall 2007 and subjected to genetic analysis using DNA microsatellite analysis in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2005).

Water elevation and rainfall data were obtained from the U. S. Army Corps of Engineers website at <http://www.swf-wc.usace.army.mil/cgi-bin/rcshtml.pl>.

RESULTS AND DISCUSSION

Habitat: Reservoir elevation has remained close to conservation pool throughout the past year (Figure 1). Littoral zone habitat consisted primarily of natural shoreline, standing timber, flooded terrestrial, and native emergent vegetation (Table 4). A 2003 habitat survey indicated primary habitat components of featureless shoreline, overhanging brush, standing timber, and native emergent vegetation (Storey and Myers 2004). In 2007, extensive areas of smartweed were present. The previous vegetation survey in 2003 showed very little aquatic vegetation (30.2 acres; 0.2% of lake surface area).

Prey species: Primary prey species included gizzard shad, threadfin shad, and bluegill. Gizzard shad, in particular, provided abundant prey. Gizzard shad catch rates in 2007 (429.5/h) were much higher than previous surveys in 2003 (93.5/h) and 1999 (298.0/h) (Figure 2). Index of vulnerability (IOV) values were similar across surveys, ranging from 75.5 to 90.1 indicating high prey availability of gizzard shad. Cooper Reservoir also contains bluegill of appropriate size to provide prey for sport fishes. Bluegill catch rate in 2007 (40.0/h) was higher than in 1999 (7.0/h) but similar to 2003 (36.5/h) (Figure 3).

Catfishes: The gill net catch rate of blue catfish was 8.0/nn in 2008, similar to 2004 and 2006 (9.1 and 10.2/nn, respectively). Blue catfish recruitment has remained stable, with numerous sub-stock (<12 inches) individuals sampled (Figure 4). Fish were in good condition as mean relative weight of most inch groups ranged from 85 to 120. Channel catfish were also present in the reservoir; however, they were less abundant than blue catfish. Catch rate of channel catfish in 2008 (1.1/nn) was lower than in previous years (2006 – 2.7/nn; 2004 – 4.1/nn). Some channel catfish were of harvestable size, but few reached quality length (≥ 16 inches; Figure 5).

White bass: The gill net catch rate of white bass in 2008 was 8.1/nn (Figure 6). Catch rate was higher in 2008 compared to 2006 (1.7/nn), and similar to 2004 (10.4/nn). Most white bass were of harvestable size (≥ 10 inches) and in excellent body condition as relative weights exceeded 90. Growth of white bass in Cooper Reservoir was good with an average age at 10 inches (9.3 to 11.9 inches) of 1.1 years (N = 13; range 1 – 2 years).

Palmetto bass: The gill net catch rate of palmetto bass was lower in 2008 (5.1/nn) than in 2004 and 2006 (18.7 and 11.9/nn; respectively) (Figure 7). The majority of fish collected in 2008 were of harvestable size (≥ 18 inches). Body condition of all size groups was good with relative weights exceeding 95 indicating abundant prey fish availability. Average age at 18 inches (17.0 to 19.8 inches) was 3.7 years (N = 13; range 2 – 5 years).

Largemouth bass: Electrofishing catch rates of largemouth bass in Cooper Reservoir have historically been low and 2007 data is no exception to that trend (15.0/h) (Figure 8). According to local anglers, largemouth bass in this reservoir rarely associated with shoreline areas similar to those sampled using electrofishing which may help explain low catch rates. Size structure fluctuated since 2001 (PSD range 0 – 56) with only one stock-sized fish collected in 2007. The presence of age-0 largemouth bass in 2007 indicated successful reproduction by adult fish, even though none were observed. Historic age and growth data from spring 2003 indicated largemouth bass grew to 18 inches (length range 16.4 – 20.5 inches) on average in 5.5 years (age range 3 – 9 years). In fall 2007, the FLMB allele frequency was 62.1% and pure FLMB and NLMB both comprised 10% of the sample (Table 5). Florida largemouth bass were most recently stocked in 2003.

Crappies: Populations of both white and black crappie were present in the reservoir, with white crappie predominating. The trap net catch rate of white crappie was 10.4/nn in 2007 (Figure 9), lower than in 2003 (17.3/nn) and 2001 (67.5/nn). Body condition of white crappie was typically good, with fish having relative weights above 90. Average age at 10 inches (9.3 to 12.8 inches) was 1.5 years (N = 15; range 1 – 2 years). Only one black crappie was caught in trap nets during 2007.

Fisheries management plan for Cooper Reservoir, Texas

Prepared – July 2008

ISSUE 1: Palmetto bass have been a part of the fishery since the late 1990s. This species supports a high quality sport fishery in Cooper Reservoir.

MANAGEMENT STRATEGIES

1. Continue palmetto bass stocking at a rate of 10 fish /acre to maintain the fishery
2. Conduct spring gill net surveys every four years to monitor the palmetto bass population

ISSUE 2: Largemouth bass have historically been an important fishery in Cooper Reservoir. This reservoir has produced four entries in the ShareLunker Program since 1997, with the most recent caught in spring 2000. Record low water levels during 2006 severely limited largemouth bass habitat. Reservoir water levels returned to conservation pool in 2007 following heavy spring rains and remained high through spring 2008. A large area of littoral habitat was created during this time period. Florida largemouth bass were last stocked in Cooper Reservoir in 2003.

MANAGEMENT STRATEGIES

1. Recommend stocking FLMB fingerlings in 2009 and 2010 at a rate of 25 fish/acre
2. Conduct standard electrofishing survey in 2011
3. Collect age and growth sample in fall 2011 (or in spring 2012 if necessary)
4. Assess genetics of sample of age-0 largemouth bass in 2011

ISSUE 3: Hydrilla has been documented in Cooper Reservoir in the past but it has never created access problems for anglers. This plant is unlikely to create problems as a result of the reservoir's turbidity, but it would be prudent to monitor its distribution, especially in the vicinity of public boat ramps. The invasive aquatic fern, giant salvinia, has become established in some northeast Texas lakes. This invasive species poses a severe threat to all freshwater resources, and is often spread between reservoirs via boat trailers.

MANAGEMENT STRATEGIES

1. Monitor the abundance and distribution of hydrilla through an annual survey.
2. Because of the popular waterfowl hunting in the remote areas of Cooper Reservoir, and because of its close proximity to reservoirs containing giant salvinia, district staff must be vigilant in the face of this invasive threat.
3. Posters and informational materials educating the public about giant salvinia should be placed at all public boat ramps.
4. State park staff, area game wardens, and other resource user groups should be educated in how to identify giant salvinia.

ISSUE 4: Increased awareness of Cooper Reservoir's fisheries resources would provide additional fishing opportunities to anglers. Dissemination of information describing the sport fish harvest regulations on Cooper Reservoir would serve as a helpful public service.

MANAGEMENT STRATEGIES

1. Prepare regulation posters detailing fisheries regulations in effect at Cooper Reservoir and post this information in both state park units and at all boat ramps.
2. Promote fisheries resources of Cooper Reservoir through news releases whenever opportunities arise.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes electrofishing to monitor the largemouth bass population and determine the genetic influence of Florida bass alleles. Gill net surveys will be conducted every four years to monitor catfish, white bass, and palmetto bass populations. Trap nets will be used every four years to monitor crappie populations. Comprehensive vegetation and habitat surveys will be conducted every four years, and annual surveys of the lake's hydrilla population will be conducted as necessary.

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. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Storey, K., and R. Myers. 2004. Statewide freshwater fisheries monitoring and management program survey report for Cooper Reservoir, 2003. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-29, Austin.
- Texas Commission on Environmental Quality. 2005. Trophic Classification of Texas Reservoirs: 2004 Water Quality Inventory and 303(d) List. 15pp.

Monthly Water Level and Rainfall

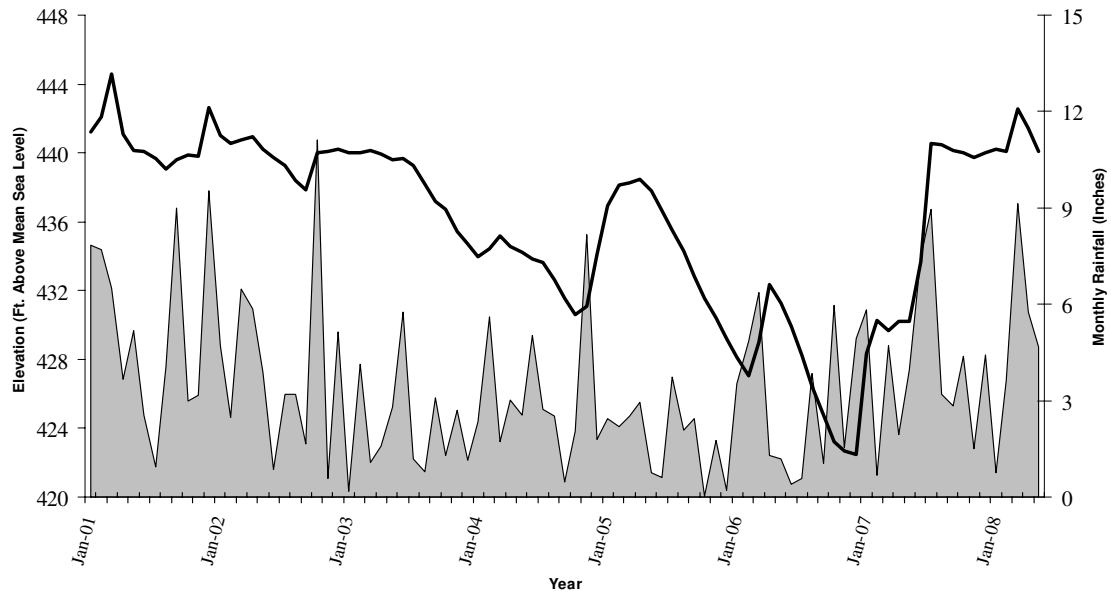


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) and monthly rainfall (inches) recorded for Cooper Reservoir from January 2001 to May 2008. Conservation pool elevation for Cooper Reservoir is 440.0 ft msl.

Table 1. Characteristics of Cooper Reservoir.

Characteristic	Description
Year constructed	1991
Controlling authority	U. S. Army Corps of Engineers
Counties	Delta and Hopkins
Reservoir type	Mainstream
Shoreline development index (SDI)	6.42
Conductivity	150 umhos/cm

Table 2. Harvest regulations for Cooper Reservoir, Texas.

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

Table 3. Stocking history of Cooper Reservoir, Texas. Size categories are: FGL = 1-3 inches, and ADL = adults.

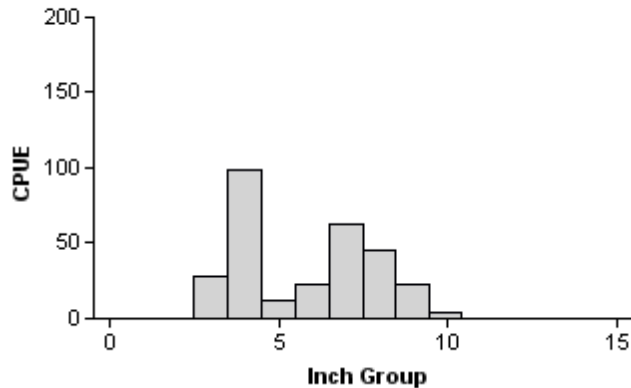
Species	Year	Number	Size
Blue catfish	1991	3,500	FGL
	1992	482,075	FGL
	Total	485,575	
Channel catfish	1991	12,500	FGL
	Total	12,500	
Bluegill	1991	41,600	FGL
	Total	41,600	
Palmetto bass	1996	193,665	FGL
	1998	146,573	FGL
	1999	97,749	FGL
	2002	96,410	FGL
	2003	95,100	FGL
	2004	167,717	FGL
	2005	190,388	FGL
	2006	142,178	FGL
	2007	188,931	FGL
	2008	195,560	FGL
	Total	1,514,271	
Florida largemouth bass	1991	5,142	FGL
	1991	151	ADL
	1992	1,929,012	FGL
	1992	192	ADL
	1993	681,829	FGL
	1993	30	ADL
	1997	482,879	FGL
	1998	482,084	FGL
	1999	484,695	FGL
	2000	9,132	FGL
	2002	489,878	FGL
	2003	477,289	FGL
	Total	5,042,313	

Table 4. Survey of littoral zone and physical habitat types, Cooper Reservoir, Texas, September 2007. A linear shoreline distance (miles) was recorded for each habitat type found. The sum of shoreline distances exceeds the lake perimeter because of overlap of habitat types. Surface area (acres) and percent of reservoir surface area were determined for each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	0.3	0.4		
Natural shoreline	55.5	93.1		
Rip rap	3.9	6.5		
Standing timber	38.2	64.1		
Flooded terrestrial	41.0	68.7	205.1	1.2
Native emergent	56.2	94.2	3,457.5	20.4
Hydrilla	0.9	1.6	16.2	0.1

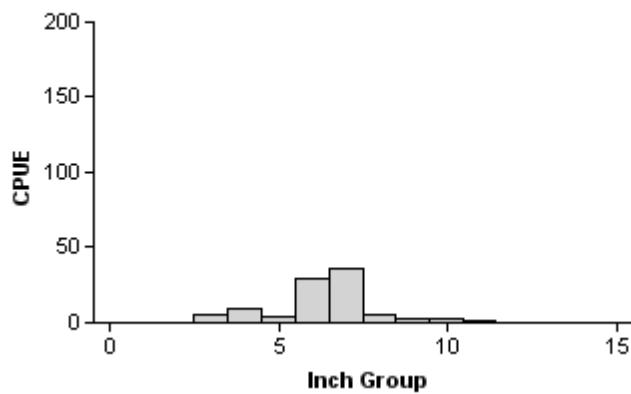
Gizzard shad

1999



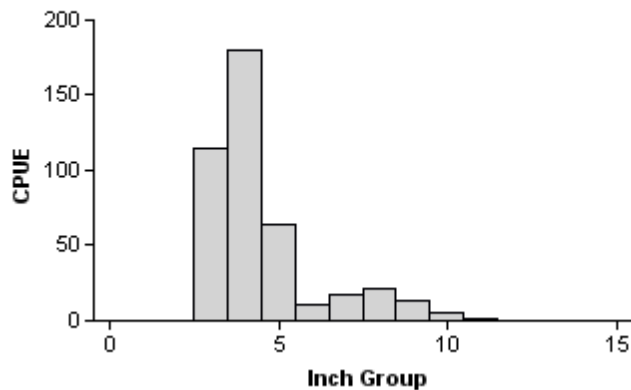
Effort = 1.0
 Total CPUE = 298.0 (28; 298)
 Stock CPUE = 136.0 (40; 136)
 PSD = 0 (89.9)
 IOV = 75.5 (5)

2003



Effort = 2.0
 Total CPUE = 93.5 (25; 187)
 Stock CPUE = 46.5 (33; 93)
 PSD = 2 (2.3)
 IOV = 88.24 (3.9)

2007

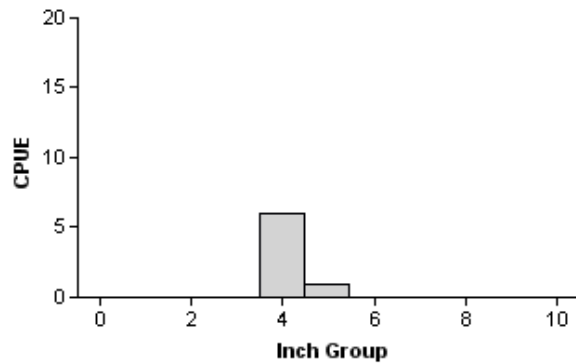


Effort = 2.0
 Total CPUE = 429.5 (9; 859)
 Stock CPUE = 60.0 (22; 120)
 PSD = 2 (1.3)
 IOV = 90.1 (2.6)

Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure and IOV are in parentheses) for fall electrofishing surveys, Cooper Reservoir, Texas, 1999, 2003, and 2007.

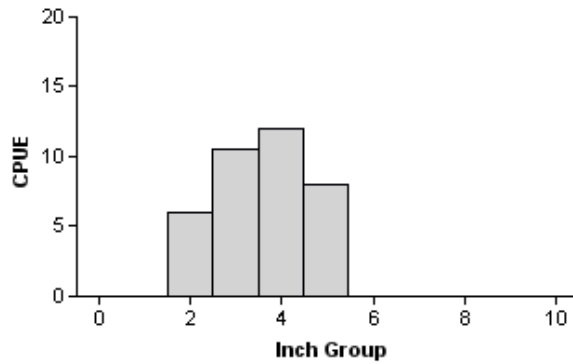
Bluegill

1999



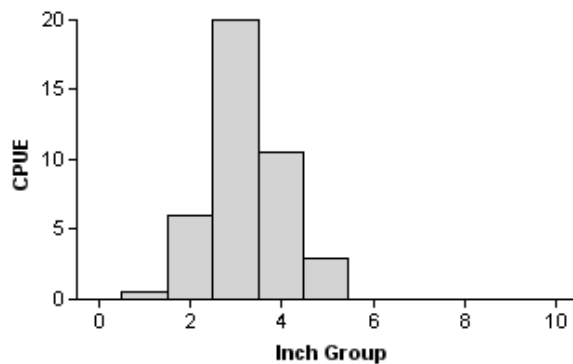
Effort = 1.0
 Total CPUE = 7.0 (49; 7)
 Stock CPUE = 7.0 (49; 7)
 PSD = 0 (57.8)

2003



Effort = 2.0
 Total CPUE = 36.5 (45; 73)
 Stock CPUE = 30.5 (46; 61)
 PSD = 0 (59.3)

2007

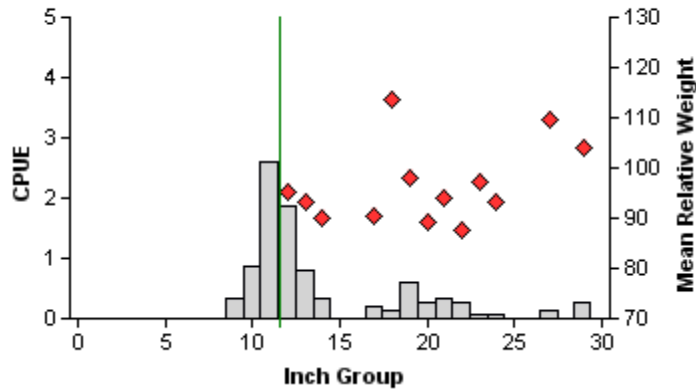


Effort = 2.0
 Total CPUE = 40.0 (23; 80)
 Stock CPUE = 33.5 (22; 67)
 PSD = 0 (37.2)

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, Cooper Reservoir, Texas, 1999, 2003, and 2007.

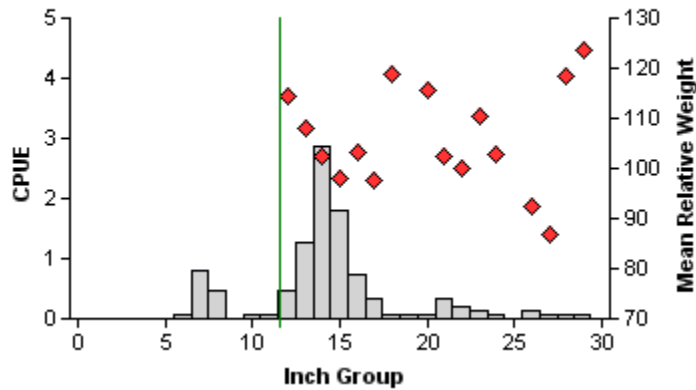
Blue catfish

2004



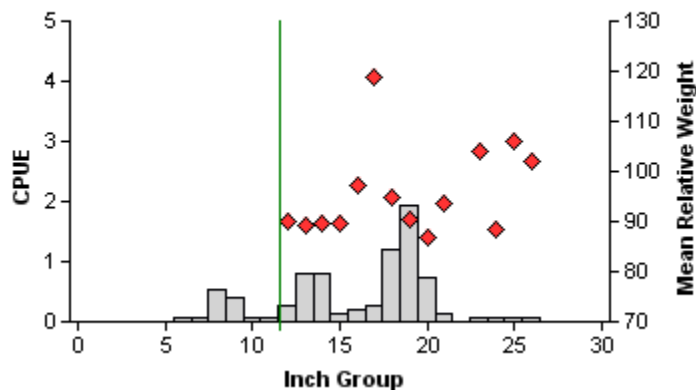
Effort = 15.0
Total CPUE = 9.1 (24; 137)
Stock CPUE = 5.3 (26; 80)
PSD = 26 (7.9)

2006



Effort = 15.0
Total CPUE = 10.2 (25; 153)
Stock CPUE = 8.7 (24; 131)
PSD = 13 (3.3)

2008

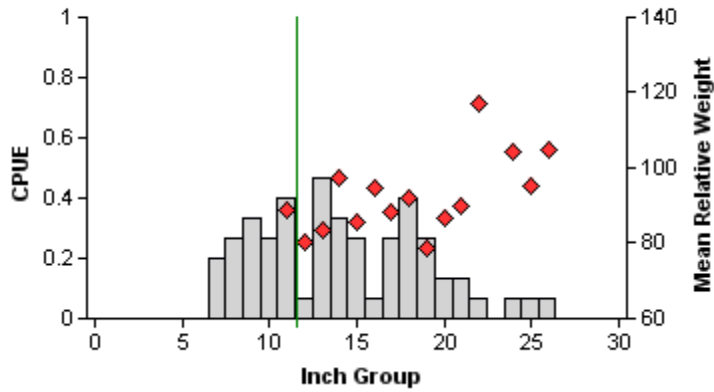


Effort = 15.0
Total CPUE = 8.0 (26; 120)
Stock CPUE = 6.8 (24; 102)
PSD = 18 (3.3)

Figure 4. Number of blue catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Cooper Reservoir, Texas, 2004, 2006, and 2008. Vertical lines represent minimum length limit at time of survey.

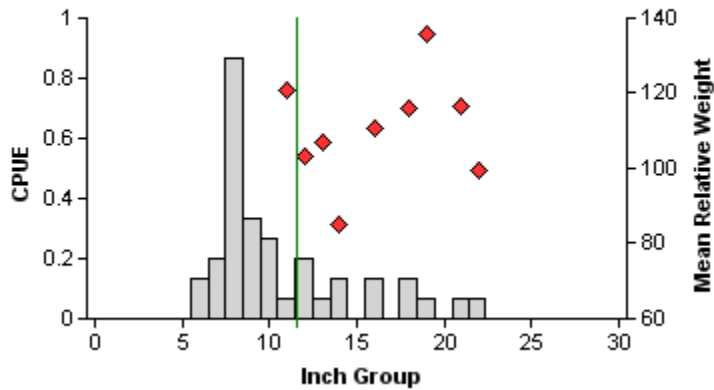
Channel catfish

2004



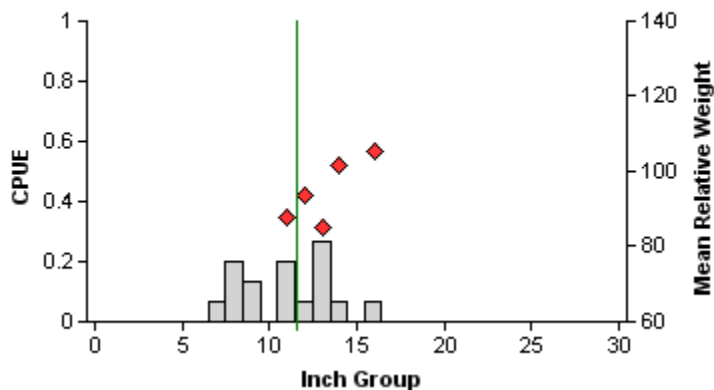
Effort = 15.0
Total CPUE = 4.1 (25; 62)
Stock CPUE = 3.1 (28; 46)
PSD = 50 (6.6)

2006



Effort = 15.0
Total CPUE = 2.7 (24; 41)
Stock CPUE = 0.9 (40; 14)
PSD = 50 (22.8)

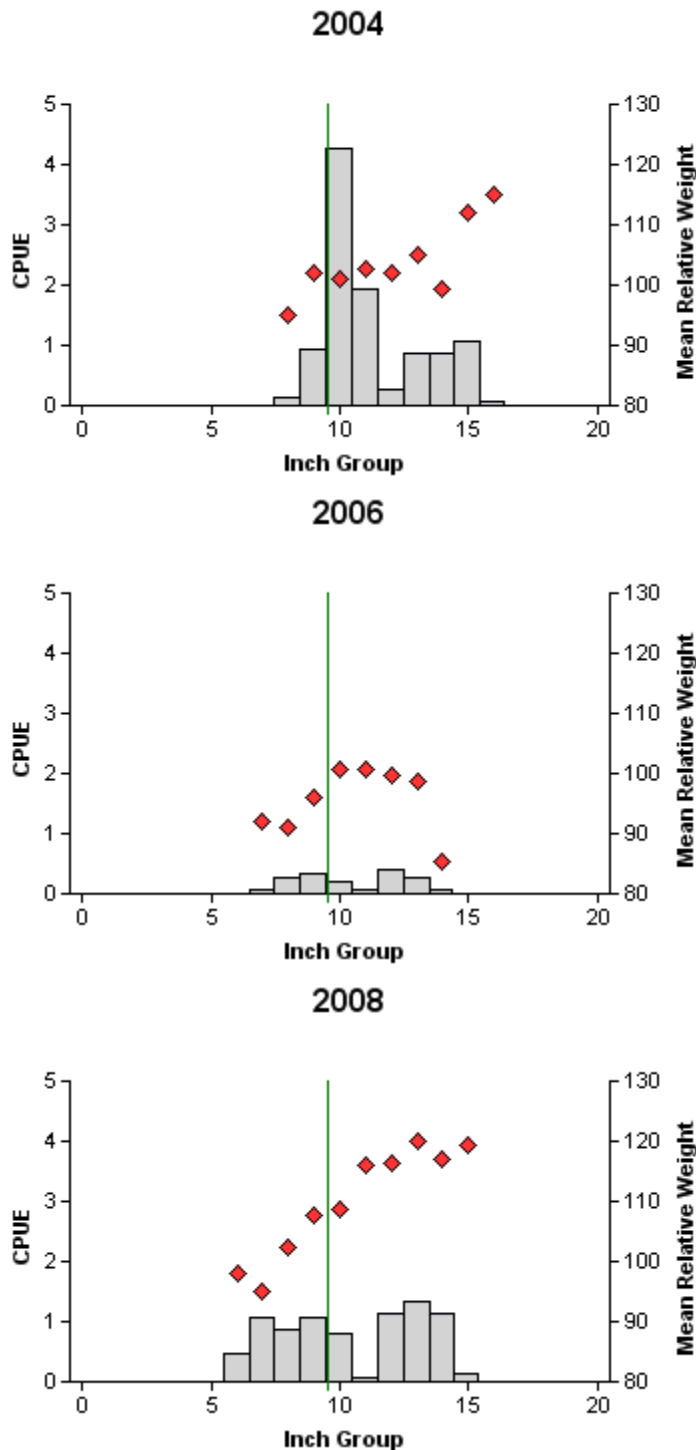
2008



Effort = 15.0
Total CPUE = 1.1 (30; 16)
Stock CPUE = 0.7 (35; 10)
PSD = 10 (10.3)

Figure 5. Number of channel catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Cooper Reservoir, Texas, 2004, 2006, and 2008. Vertical lines represent minimum length limit at time of survey.

White bass



Effort = 15.0
 Total CPUE = 10.4 (27; 156)
 Stock CPUE = 10.4 (27; 156)
 PSD = 99 (1.2)

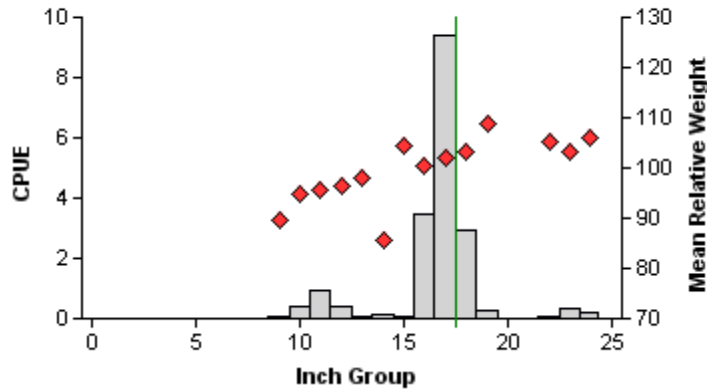
Effort = 15.0
 Total CPUE = 1.7 (46; 25)
 Stock CPUE = 1.7 (46; 25)
 PSD = 80 (6.5)

Effort = 15.0
 Total CPUE = 8.1 (25; 121)
 Stock CPUE = 8.1 (25; 121)
 PSD = 70 (6.7)

Figure 6. Number of white bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Cooper Reservoir, Texas, 2004, 2006, and 2008. Vertical lines represent minimum length limit at time of survey.

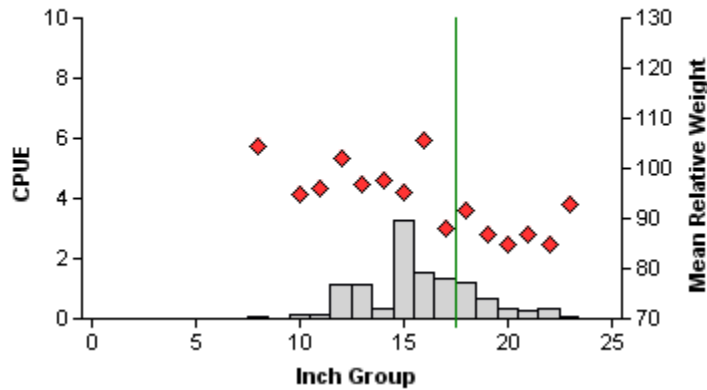
Palmetto bass

2004



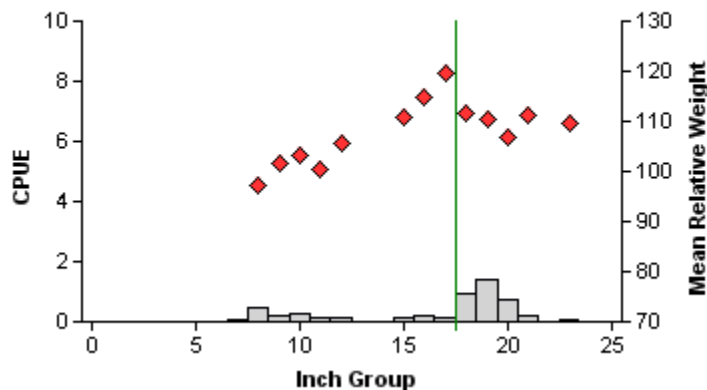
Effort = 15.0
Total CPUE = 18.7 (27; 281)
Stock CPUE = 18.7 (27; 281)
PSD = 93 (3)

2006



Effort = 15.0
Total CPUE = 11.9 (39; 179)
Stock CPUE = 11.9 (39; 179)
PSD = 97 (1.0)

2008

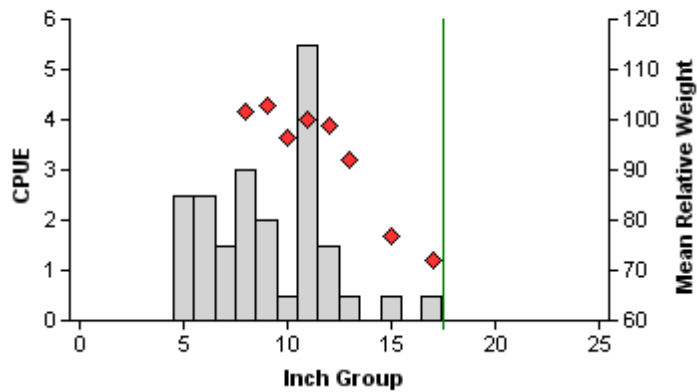


Effort = 15.0
Total CPUE = 5.1 (43; 76)
Stock CPUE = 5.0 (43; 75)
PSD = 79 (11.7)

Figure 7. Number of palmetto bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Cooper Reservoir, Texas, 2004, 2006 and 2008. Vertical lines represent minimum length limit at time of survey.

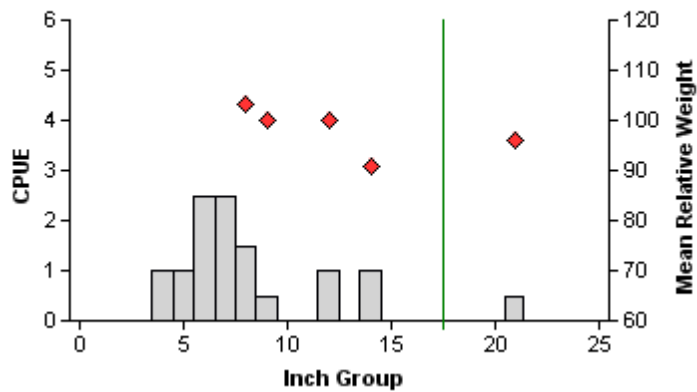
Largemouth bass

2001



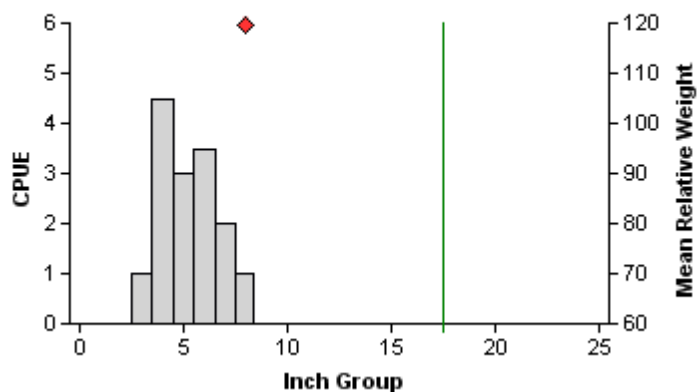
Effort = 2.0
 Total CPUE = 20.5 (28; 41)
 Stock CPUE = 14.0 (28; 28)
 PSD = 21 (8)
 RSD-P = 7 (4.6)

2003



Effort = 2.0
 Total CPUE = 11.5 (34; 23)
 Stock CPUE = 4.5 (45; 9)
 PSD = 56 (17.6)
 RSD-P = 11 (10.1)

2007



Effort = 2.0
 Total CPUE = 15.0 (50; 30)
 Stock CPUE = 1.0 (69; 2)
 PSD = 0 (807.6)
 RSD-P = 0 (0)

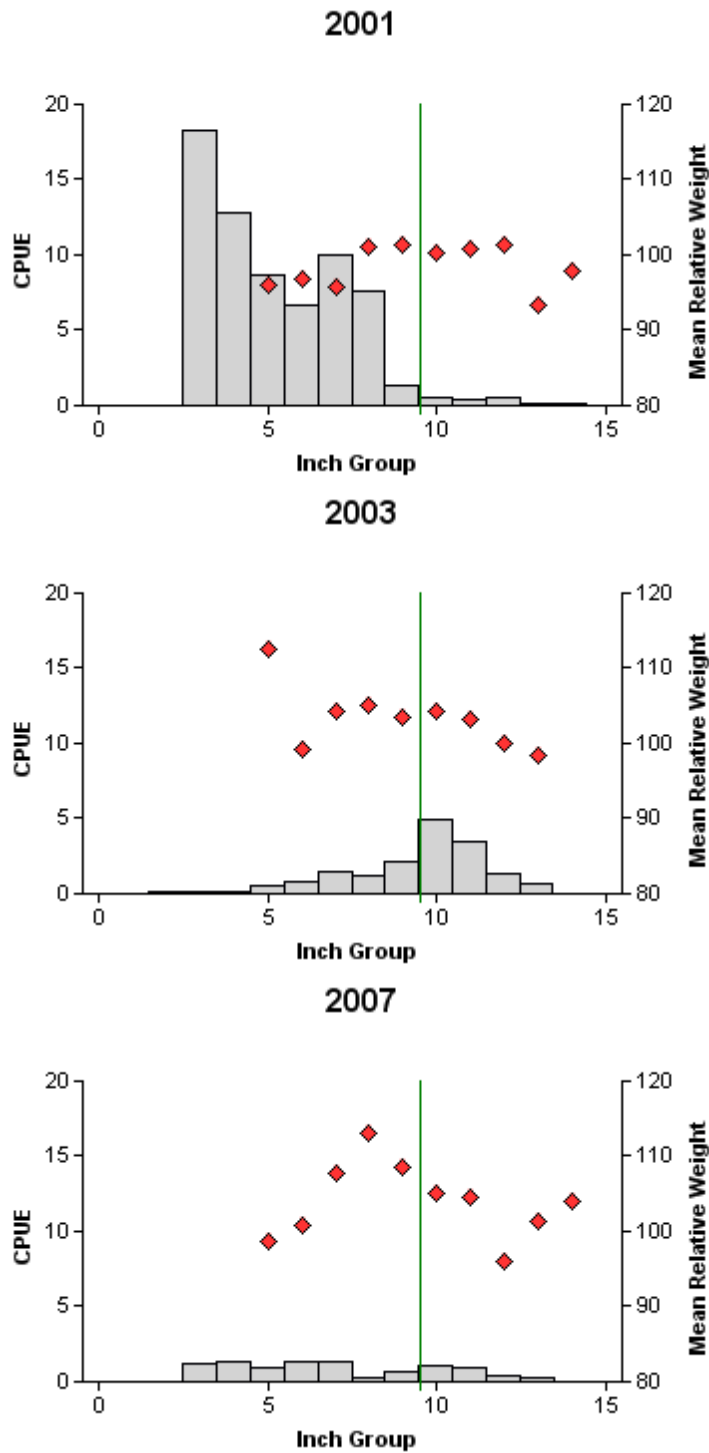
Figure 8. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Cooper Reservoir, Texas, 2001, 2003, and 2007. Vertical lines represent minimum length limit at time of survey. The 2001 sampling was for largemouth bass only.

Table 5. Results of genetic analysis of age-0 largemouth bass collected by fall electrofishing, Cooper Reservoir, Texas, 1992 through 2007. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation integrate between an FLMB and an NLMB, Fx = second or higher generation integrate between an FLMB and an NLMB. Since 2005 analyses have been conducted using DNA microsatellite analysis but prior to that time starch gel electrophoresis was employed.

Year	Sample size	Genotype				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
1992	35	14	2	1	18	42.9	40.0
1993	15	4	1	0	10	30.0	26.7
1994	32	3	6	4	19	25.8	9.4
1995	20	2	1	3	14	20.0	10.0
2000	30	4	7	11	8	40.8	13.3
2003	34	5	6	14	9	39.7	14.7
2007	30	3	^a	^a	3	62.1	10.0

^aAnalysis no longer separates F1 from Fx hybrids

White crappie



Effort = 15.0
 Total CPUE = 67.5 (21; 1013)
 Stock CPUE = 36.4 (22; 546)
 PSD = 30 (3.6)

Effort = 15.0
 Total CPUE = 17.3 (28; 259)
 Stock CPUE = 16.7 (29; 251)
 PSD = 83 (2.8)

Effort = 15.0
 Total CPUE = 10.4 (29; 156)
 Stock CPUE = 7.7 (36; 116)
 PSD = 53 (6.2)

Figure 9. Number of white crappie 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 trap net surveys, Cooper Reservoir, Texas, 2001, 2003, and 2007. Vertical lines represent minimum length limit at time of survey.

Table 6. Proposed sampling schedule for Cooper Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys denoted by S and additional surveys denoted by A.

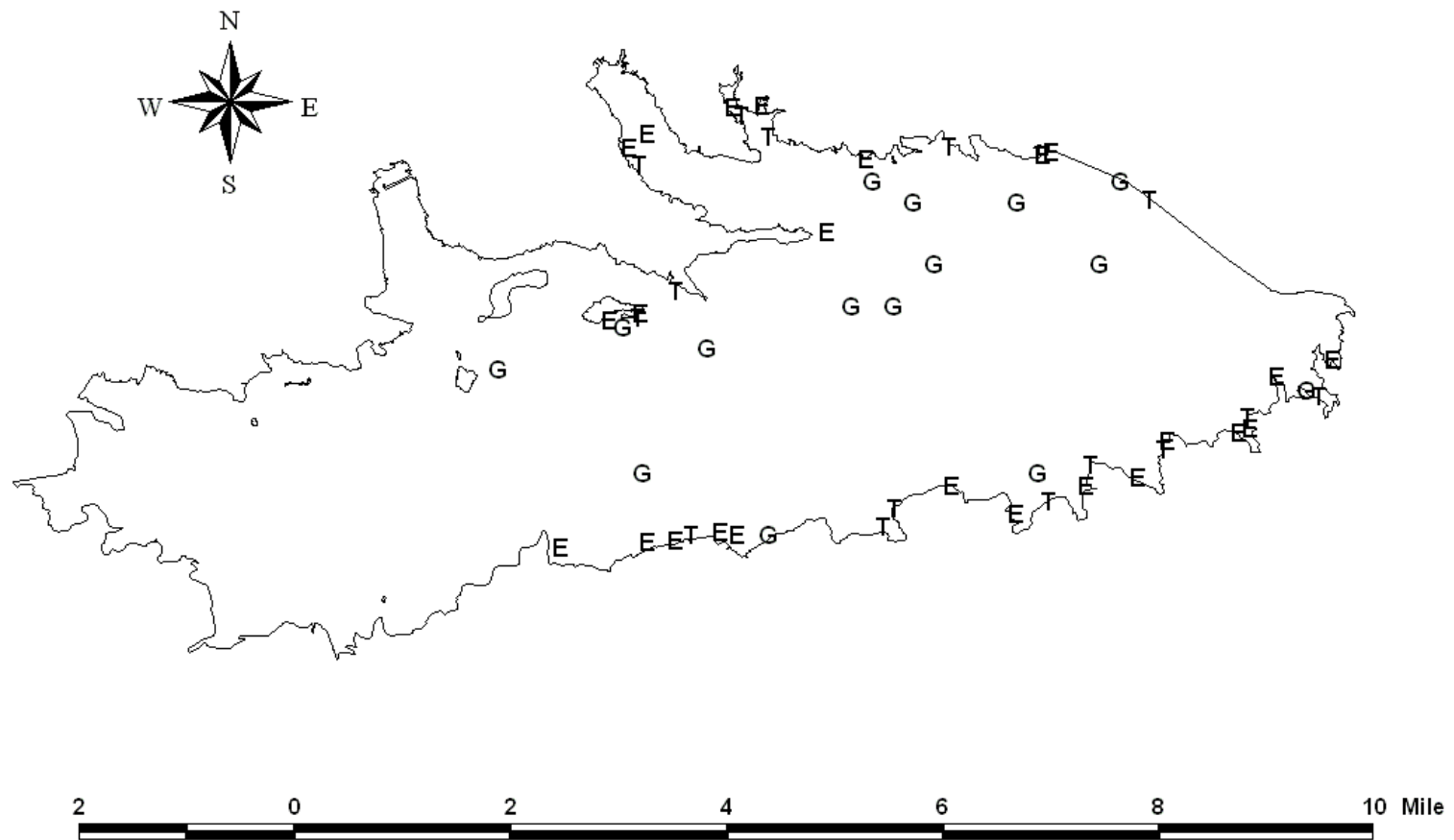
Survey Year	Electrofishing	Trap Net	Gill Net	Vegetation survey	Habitat survey	Report
2008-2009				A		
2009-2010				A		
2010-2011				A		
2011-2012	S	S	S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from gill netting, trap netting, and electrofishing, Cooper Reservoir, Texas, 2007-2008.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					859	429.5
Threadfin shad					1	0.5
Blue catfish	120	8.0				
Channel catfish	16	1.1				
Flathead catfish	2	0.1				
White bass	121	8.1				
Palmetto bass	76	5.1				
Bluegill					80	40.0
Longear sunfish					29	14.5
Warmouth					5	2.5
Largemouth bass					30	15.0
White crappie			156	10.4		
Black crappie			1	0.1		

APPENDIX B



Location of fall electrofishing (E), fall trap netting (T), and spring gill netting sites (G), Cooper Reservoir, Texas, 2007-2008.