PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

Grapevine Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Grapevine Reservoir were surveyed in 2008-2011 using electrofishing, in 2011 using trap nets, and in 2012 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers in 1952 to provide flood control, municipal and industrial water, and recreation. Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) and has an average depth of 28.2 feet and a maximum depth of 65.0 feet. Angler and boat access is adequate. There is one handicap specific facility on the reservoir. At the time of sampling the fishery habitat was primarily rocky and gravel shorelines.

    - **Management History:** Important sport fish include largemouth bass, smallmouth bass spotted bass, white crappie, white bass, and blue and channel catfish. The largemouth bass population has been managed with a 14- to 18-inch slot-length limit since 1994. All other species have been managed with statewide regulations. Grapevine Reservoir was part of the TPWD Habitat Improvement Initiative; however, because of water level fluctuations there has been limited success.

    - **Fish Community**
        - **Prey species:** Gizzard shad were in great abundance in the reservoir. Threadfin shad were also available in large abundance for predators. Bluegills and longear sunfish were also very abundant as prey but few fish over 6 inches are available for anglers.

        - **Catfishes:** The blue catfish were abundant and the population continues to improve. The channel catfish population was average.

        - **White bass:** White bass catch rates were below the average of other district reservoirs.

        - **Black basses:** The smallmouth bass population appeared to be developing as a result of annual stockings. The largemouth bass and spotted bass populations had good abundance and size structure.

        - **Crappie:** The white crappie population improved from last sample but continued to be average in abundance when compared to other district reservoirs.

    - **Management Strategies:** Spring exploratory electrofishing will be conducted annually to monitor smallmouth bass spawning activity. A category 4 age and growth survey will be conducted in 2015 to better analyze age and growth statistics of largemouth bass population. A creel survey along with electrofishing, trap netting and gill netting surveys will be conducted in 2015-2016.

INTRODUCTION

This document is a summary of fisheries data collected from Grapevine Reservoir in 2011-2012. 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 2011-2012 data for comparison.

Reservoir Description

Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers in 1952 to provide flood control, municipal and industrial water, and recreation (Table 1). Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) and has an average depth of 25.5 feet and a maximum depth of 65.0 feet. Angler and boat access is adequate. There is one handicap specific facility on the reservoir. At the time of sampling the fishery habitat was natural and rocky shorelines.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2008) included:

1. Conduct category 2 age and growth sampling during report years to better document growth of fish to 14 inches. Continue annual electrofishing sampling to monitor largemouth bass population structure.
   Actions: Annual electrofishing surveys were conducted from 2008-2011. Category 2 age and growth sampling was not conducted because of plans to conduct a more intensive category 4 age and growth sample.
2. Request smallmouth bass for stocking. Conduct exploratory sampling to investigate any possible smallmouth bass spawning activity.
   Actions: Smallmouth bass were stocked annually from 2008-2011. Spring exploratory sampling was conducted. No spawning activity was documented.

Harvest regulation history: Sport fish populations in Grapevine Reservoir have been managed with statewide regulations with the exception of largemouth bass which are managed with a 14- to 18-inch slot-length limit (Table 2). Results of a creel survey revealed 70% of anglers believed the slot-length limit was benefiting the largemouth bass population (Brock and Hungerford 2003).

Stocking history: Grapevine Reservoir has been stocked annually with smallmouth bass from 2008-2011. The complete stocking history is in Table 3.

Vegetation/habitat history: Grapevine Reservoir habitat is composed mainly of natural and rocky shorelines. Grapevine Reservoir was part of the TPWD Habitat Improvement Initiative; however, because of water level fluctuations there has been limited success.

Water transfer: Grapevine Reservoir is the main water supply for the City of Grapevine. No water from other reservoirs is pumped into Grapevine reservoir.

METHODS

Fishes were collected by electrofishing (1.5 hours at 18 5-min stations), 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/hr) of actual electrofishing and, for gill and trap

nets, as the number of fish per net night (fish/nn). All survey sites were randomly selected. All surveys and genetic data collection procedures were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). No age and growth data was collected.

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distributions (PSD) as defined by Guy et al. (2007)], and condition indices [relative weight (Wr)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV.
Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Habitat in the reservoir was natural and rocky shoreline (table 4). Vegetation plantings conducted as part of the TPWD Habitat Improvement Initiative has had minimal impact.

Prey species: The gizzard shad electrofishing catch rate was 698.7/hr in 2011 (Figure 2). Gizzard shad catch rates ranged from 294.0/hr in 2009 to 698.7/hr in 2011 and averaged 500.5/hr which is well above the district average of 291.0/hr. Index of vulnerability (IOV) for gizzard shad was average, indicating that 77% of gizzard shad captured in 2011 were available to existing predators. The total electrofishing catch rate of threadfin shad was 386.7/hr in 2011. The average catch rate of threadfin from 2008-2011, 268.5/hr, was near the district average of 290.0/hr. Threadfin catch rates ranged from 135.0/hr in 2008 to 386.7/hr in 2011. The catch rate of bluegill was 274.7/hr in 2011. The bluegill catch rate averaged 374.5/hr from 2008-2011, and ranged from 274.7/hr in 2011 to 466.7/hr in 2009 (Figure 3). The bluegill population does not contain large numbers of quality sized fish (>6 inches) as evident in low PSD values. The longear sunfish total catch rate was 214.0/hr in 2011. Catch rates ranged from 79.3/hr in 2008 to 214.0/hr in 2011 and averaged 158.2/hr. This catch rate is above the district average of 100.4/hr.

Catfishes: The gill netting catch rate of blue catfish in 2012 of 4.4/nn was the highest on record and above the district average of 2.5/nn and higher than the catch rate observed in 2008 (3.5/nn; Figure 4). Size structure of the blue catfish population was good as indicated by a PSD value of 51. The gill net catch rate of channel catfish was 0.4/nn in 2012 which was much lower than observed in previous samples (2.3/nn in 2004, 5.0/nn in 2008; Figure 5).

White bass: The 2012 gill netting catch rate of white bass (0.5/nn) was much lower than previous samples and well below the district average of 7.7/nn (Figure 6). This could be the result of rises in water levels that affected sampling efficiency or because the fish were in the tributaries for spawning.

Black basses: The total electrofishing catch rate of smallmouth bass was 2.7/hr, 11.3/hr, and 8.7/hr in 2009, 2010, and 2011 respectively (Figure 7). However no fish over 12 inches have been captured. Thus far, spring exploratory sampling has not revealed evidence of larger individuals.

The total electrofishing catch rate of spotted bass was 34.0/hr in 2011 (Figure 8). The catch rate of spotted bass averaged 30.07/hr from 2008-2011 which was slightly above the district average of 27.1/hr. The catch rates had little variation and ranged from 25.33/hr in 2010 to 34.0/hr in 2011. Size structure of the spotted bass population remained good as PSD values averaged 42 for this time period and spotted bass 14 inches or greater were observed in samples.

The total electrofishing catch rate of largemouth bass in 2011 was 185.3/hr (Figure 9). Catch rates averaged 194.3/hr from 2008-2011 which is higher than the district average of 132.5/hr and higher than the average observed in the previous 4 year period. The total catch rates ranged from 185.3/hr in 2011 to 196.7/hr in 2008 (Figure 9). The catch rate of fish $\geq$ 14 inches averaged 26.1/hr from 2008-2011. The

size structure of the population is good as indicated by a PSD value of 41. Body condition from 2008-2011 was good with values of 90 or higher for most size classes of fish. Genetic analysis revealed adequate FLMB genetics present in the population.

White crappie: Trap netting catch rate of white crappie was 10.0/nn in 2011, which was well above the catch rate of the previous sample in 2007 (4.2) (Figure 10). The size structure of the population is very good as indicated by a PSD value of 88.

Fisheries management plan for Grapevine Reservoir, Texas

Prepared – July 2012.

ISSUE 1: Smallmouth bass have been stocked annually from 2008-2011. A population appears to be developing. Investigation into reproduction needs to be conducted. However stockings will need to be conducted to continue to build population.

MANAGEMENT STRATEGIES

1. Do not stock smallmouth in 2013 to assist in determining spawning activity.
2. Conduct annual exploratory sampling in the spring to investigate possible smallmouth bass spawning activity.
3. Request smallmouth bass for stocking in 2014 and 2015.

ISSUE 2: The largemouth bass population has been managed with a 14- to 18-inch slot-length limit since 1994. The regulation appears to be benefitting the population.

MANAGEMENT STRATEGY

1. Conduct an annual creel in 2015-2016 to monitor catch and harvest statistics of black bass anglers.
2. Conduct category 4 age and growth analysis on largemouth bass population to acquire statistically valid age and growth information.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

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

SAMPLING SCHEDULE JUSTIFICATION

General monitoring with electrofishing, trap netting, and gill netting will be conducted every 4 years. A creel survey will be conducted to monitor catch and harvest statistics of anglers and to determine any changes in angling trends in 2015-2016. Spring exploratory electrofishing will be conducted annually to investigate smallmouth spawning activity.

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Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.

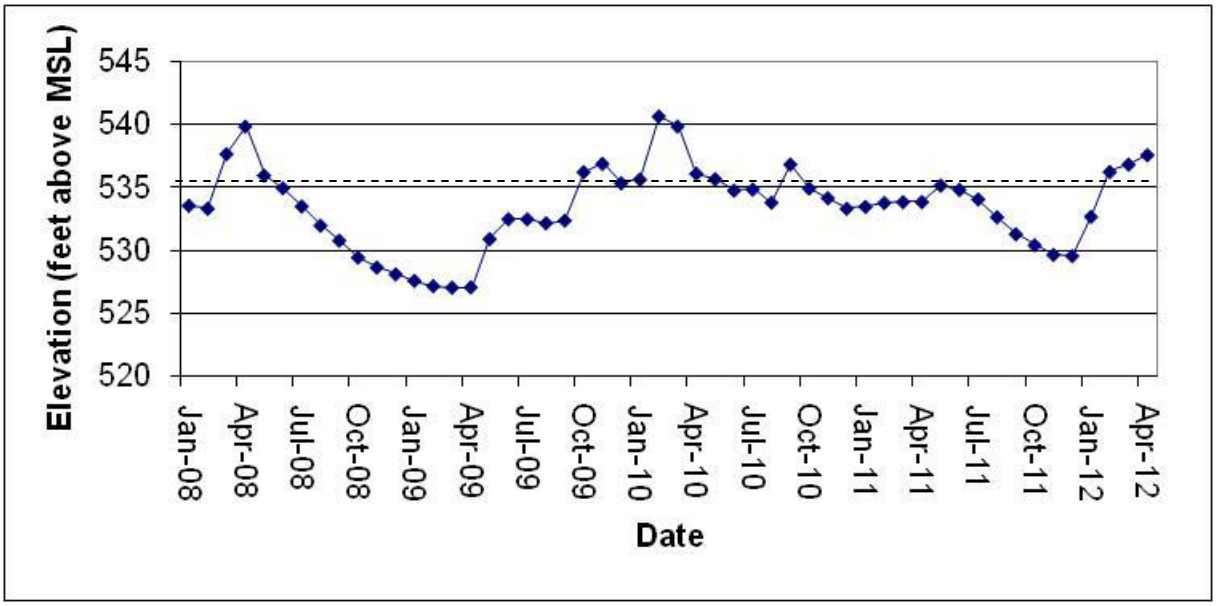


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Grapevine Reservoir, Texas from January 2008-April 2012. Dashed line represents conservation pool (535 feet above MSL).

Table 1. Characteristics of Grapevine Reservoir, Texas.

Characteristic	Description
Year Constructed	1952
Controlling authority	United States Corps of Engineers
Counties	Tarrant
Reservoir type	Tributary
Conductivity	375 umhos/cm

Table 2. Harvest regulations for Grapevine Reservoir, Texas.

Species	Bag limit	Length limit (inches)
Catfish: channel, blue, their hybrids and subspecies	25	12 minimum
Catfish: flathead	5	18 minimum
Bass, white	25	10 minimum
Bass: spotted		none
Bass: smallmouth	5	14 minimum
Bass: largemouth	In any combination	14-18 slot
Crappie: white and black, their hybrid and subspecies	25	10 minimum

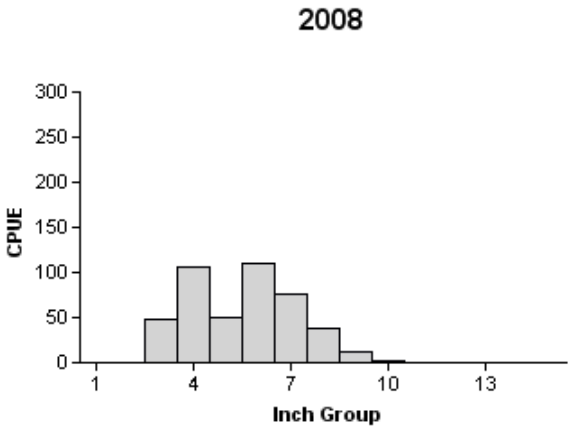
Table 3. Stocking history of Grapevine, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species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

Species	Year	Number	Life Stage	Mean TL (in)
Channel catfish	1969	25,000	AFGL	7.9
	1970	50,000	AFGL	7.9
	1971	50,000	AFGL	7.9
	1972	87,000	AFGL	7.9
	Total	212,000		
Florida Largemouth bass	1990	218,848	FGL	1.1
	1990	147,286	FRY	0.8
	1996	363,499	FGL	1.6
	2001	195,900	FGL	1.5
	2007	335,768	FGL	1.7
	Total	1,261,301		
Largemouth bass	1967	320,000	FRY	0.7
	1968	50,000	UNK	UNK
	1969	450,000	FRY	0.7
	1971	400,000	FRY	0.7
	Total	1,220,000		
Mixed largemouth bass	1988	364,004		1.0
	Total	364,004		
Palmetto Bass (striped X white bass hybrid)	1978	36,400	UNK	UNK
	1979	74,390	UNK	UNK
	1982	87,000	UNK	UNK
	Total	197,790		
Smallmouth bass	1999	183,186	FGL	1.4
	2008	27,977	AFGL	4.8
	2009	103,586	FGL	1.4
	2010	112,208	FGL	1.3
	2011	104,650	FGL	1.4
	Total	531,607		
Threadfin shad	1984	800	AFGL	3.0
	Total	800		
Walleye	1975	144,600	FRY	0.2
	1976	2,500,000	FRY	0.2
	Total	2,644,600		

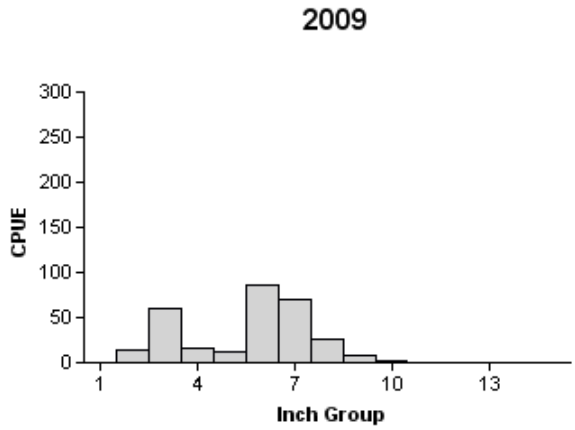
Table 4. Survey of littoral zone and physical habitat types, Grapevine Reservoir, Texas, 2011. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of habitat found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Natural shoreline	40.8	55.8		
Rocky shoreline	18.1	24.7		
Rocky shoreline + natural	5.9	8.1		
Rock bluff	5.4	7.4		
Gravel	2.6	3.6		
Natural shoreline + piers/docks	0.3	0.4		
Standing timber			456.0	6.8
Boat docks			48.1	0.7

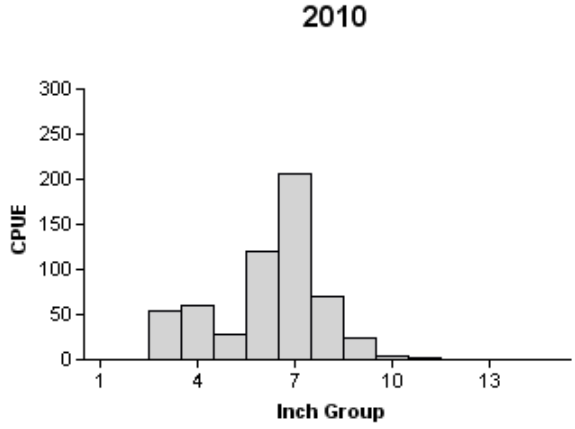
Gizzard Shad



Effort = 1.5
Total CPUE = 442.7 (40; 664)
Stock CPUE = 129.3 (19; 194)
IOV = 88 (5.6)



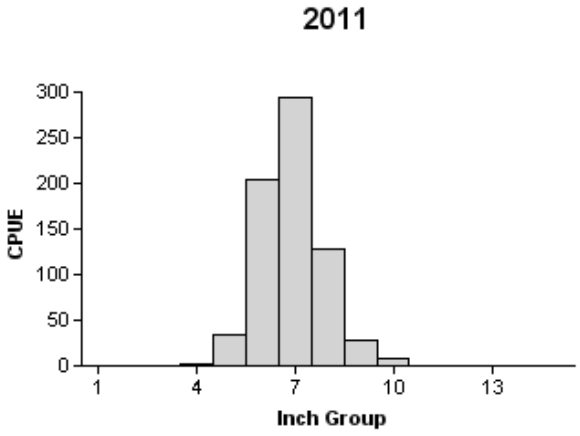
Effort = 1.5
Total CPUE = 294.0 (19; 441)
Stock CPUE = 104.7 (17; 157)
IOV = 88 (2.8)



Effort = 1.5
Total CPUE = 566.7 (20; 850)
Stock CPUE = 306.7 (15; 460)
IOV = 82 (4.7)

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, Grapevine Reservoir, Texas, 2008-2011.

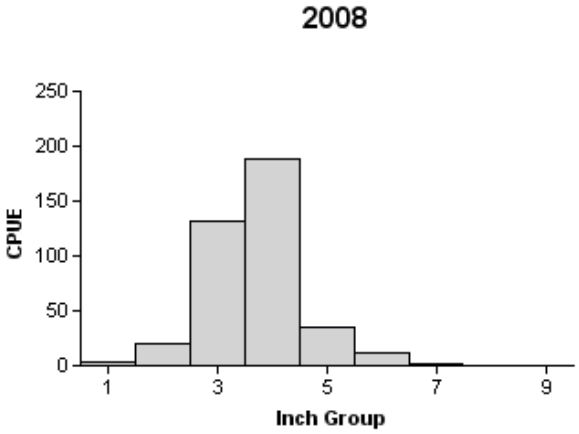
Gizzard Shad



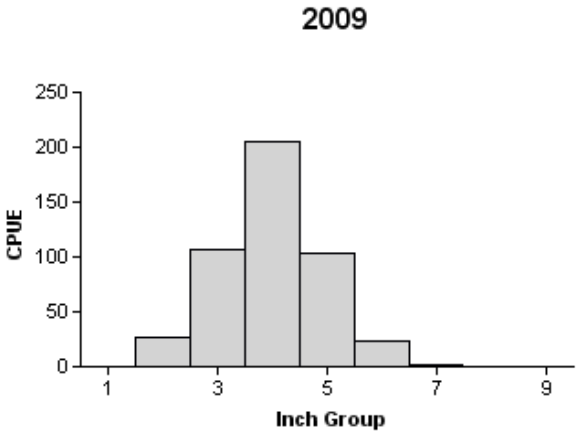
Effort =	1.5
Total CPUE =	698.7 (14; 1048)
Stock CPUE =	458.7 (11; 688)
IOV =	77 (3)

Figure 2 continued.

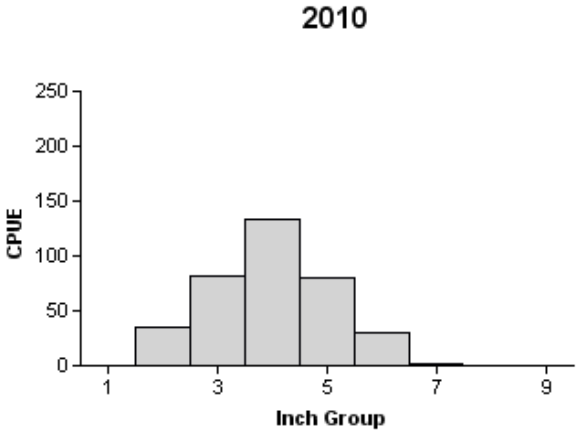
Bluegill



Effort = 1.5
Total CPUE = 393.3 (13; 590)
Stock CPUE = 368.7 (13; 553)
CPUE-6 = 14.0 (25; 21)
PSD = 4 (0.9)



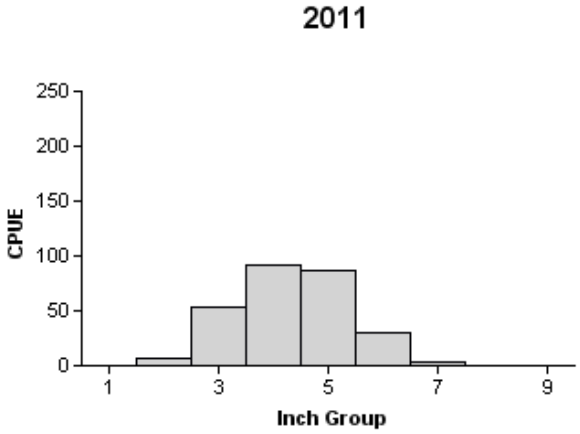
Effort = 1.5
Total CPUE = 466.7 (14; 700)
Stock CPUE = 439.3 (15; 659)
CPUE-6 = 24.0 (32; 36)
PSD = 5 (1.4)



Effort = 1.5
Total CPUE = 363.3 (15; 545)
Stock CPUE = 328.7 (15; 493)
CPUE-6 = 32.7 (21; 49)
PSD = 10 (1.9)

Figure 3. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2008-2011.

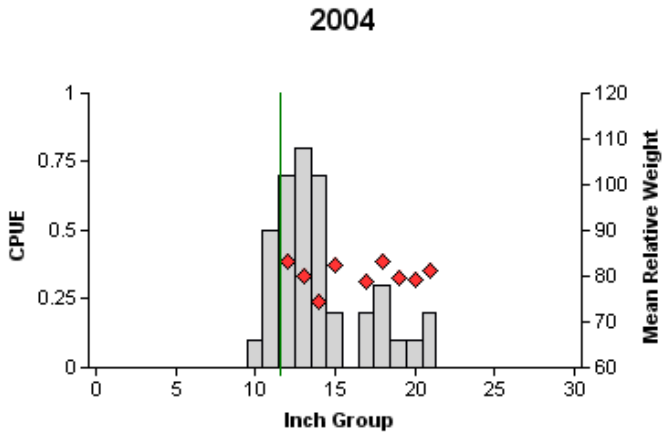
Bluegill



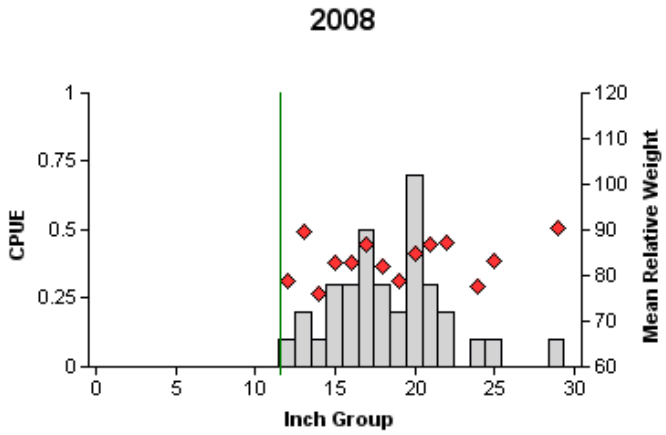
Effort =	1.5
Total CPUE =	274.7 (20; 412)
Stock CPUE =	267.3 (20; 401)
CPUE-6 =	34.7 (21; 52)
PSD =	13 (2)

Figure 3 continued.

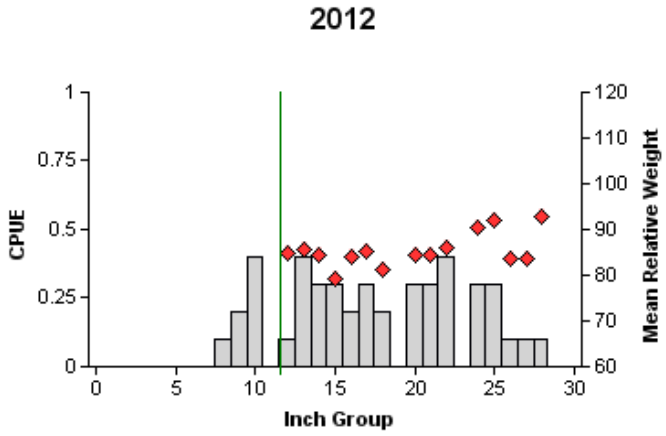
Blue Catfish



Effort = 10.0
Total CPUE = 3.9 (41; 39)
Stock CPUE = 3.3 (38; 33)
PSD = 9 (4.5)
PSD-P = 0 (0)



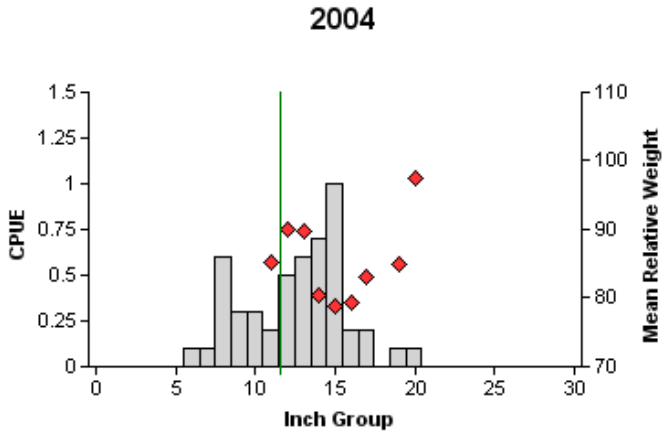
Effort = 10.0
Total CPUE = 3.5 (24; 35)
Stock CPUE = 3.5 (24; 35)
PSD = 43 (8.7)
PSD-P = 0 (0)



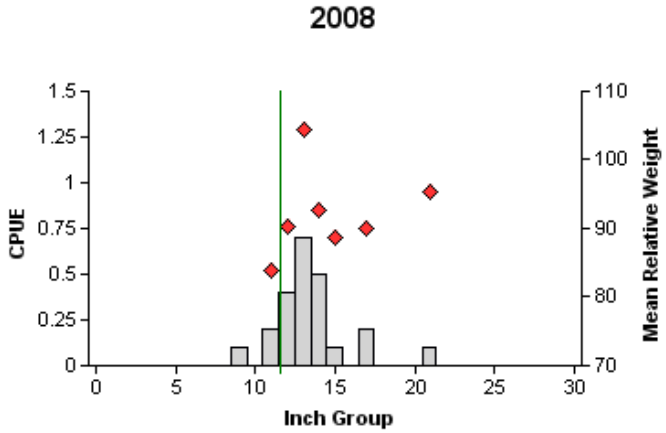
Effort = 10.0
Total CPUE = 4.4 (21; 44)
Stock CPUE = 3.7 (23; 37)
PSD = 51 (11.7)
PSD-P = 0 (0)

Figure 4. Number of blue catfish caught per net night (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2004, 2008, and 2012. Vertical line represents length limit at time of sampling.

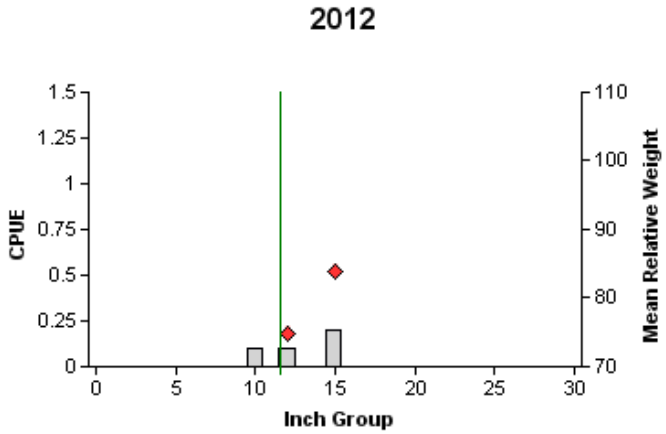
Channel Catfish



Effort = 10.0
Total CPUE = 5.0 (20; 50)
Stock CPUE = 3.6 (28; 36)
PSD = 17 (6.5)
PSD-12 = 94 (3.4)



Effort = 10.0
Total CPUE = 2.3 (32; 23)
Stock CPUE = 2.2 (32; 22)
PSD = 14 (8.9)
PSD-12 = 91 (3.7)



Effort = 10.0
Total CPUE = 0.4 (55; 4)
Stock CPUE = 0.3 (71; 3)
PSD = 0 (86.1)
PSD-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, Grapevine Reservoir, Texas, 2004, 2008, and 2012. Vertical line represents length limit at time of sampling.

White Bass

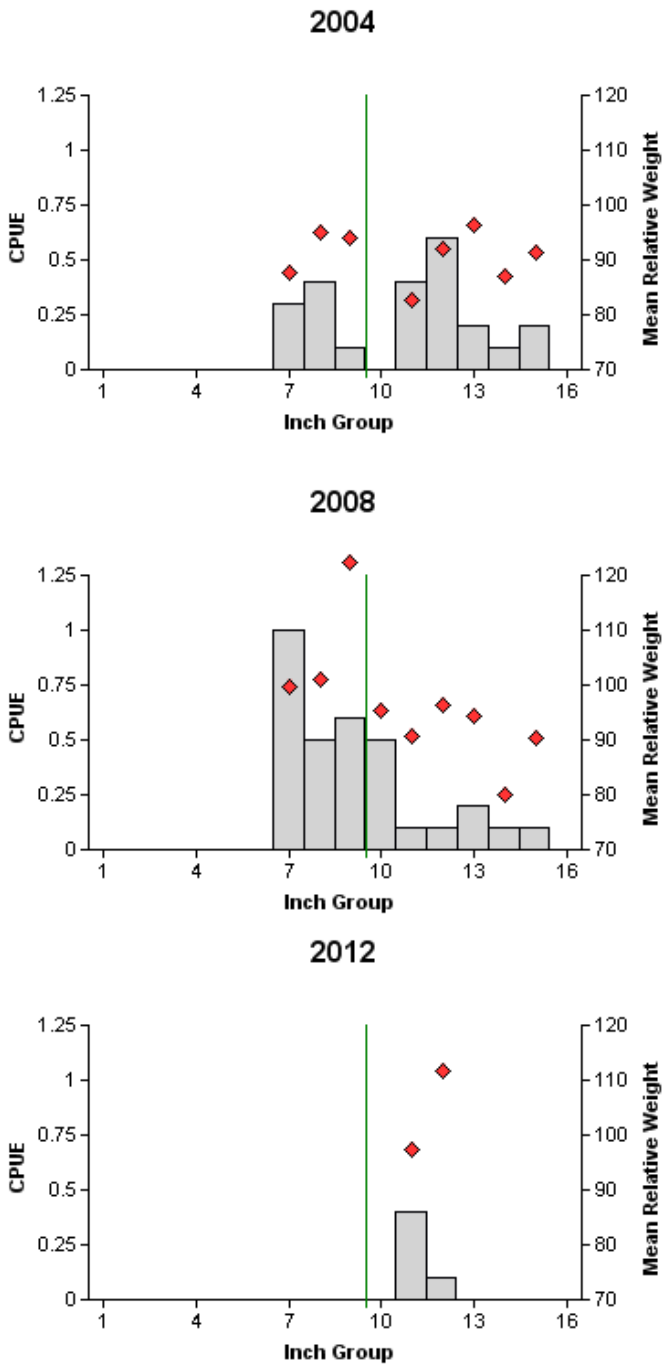
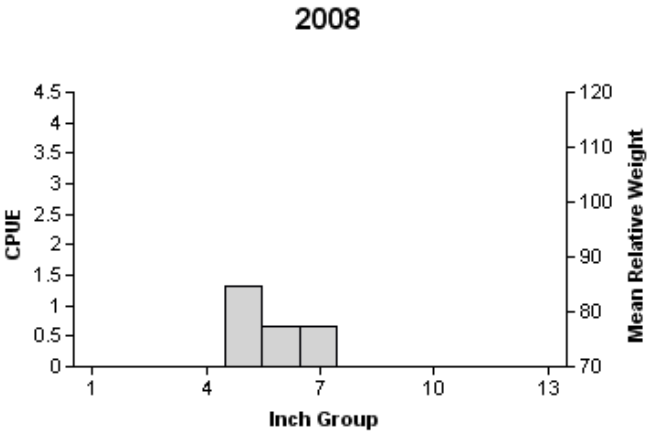
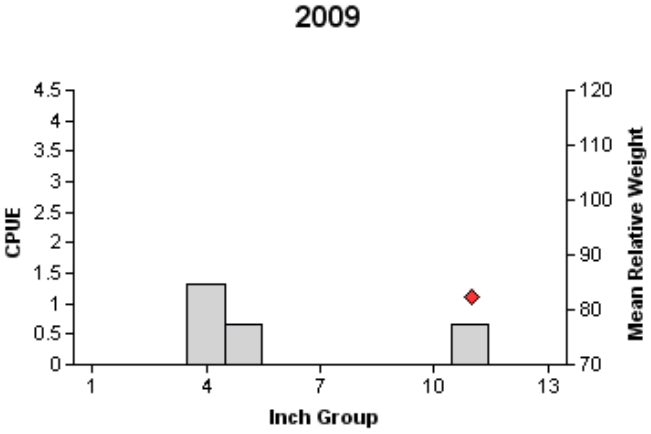


Figure 6. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2004, 2008, and 2012. Vertical line represents length limit at time of sampling.

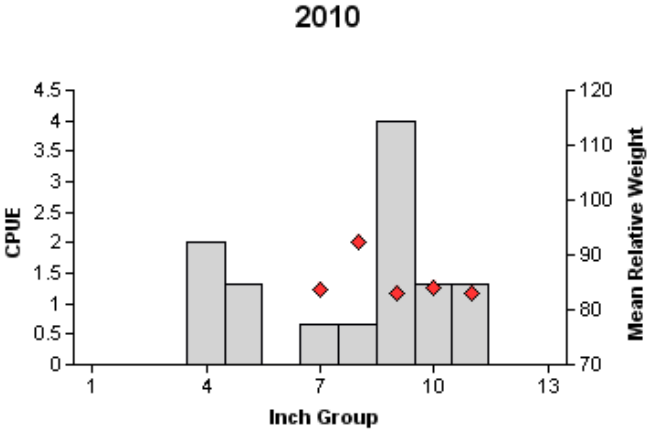
Smallmouth Bass



Effort = 1.5
Total CPUE = 2.7 (78; 4)
Stock CPUE = 0.7 (100; 1)
PSD = 0 (325.4)



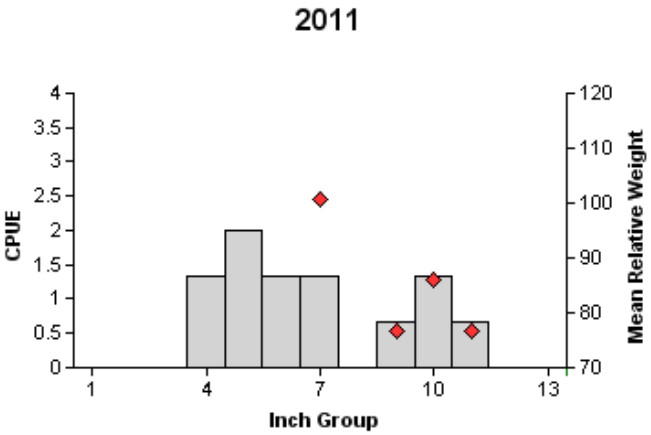
Effort = 1.5
Total CPUE = 2.7 (78; 4)
Stock CPUE = 0.7 (100; 1)
PSD = 100 (0)



Effort = 1.5
Total CPUE = 11.3 (46; 17)
Stock CPUE = 8.0 (61; 12)
PSD = 17 (13.1)

Figure 7. Number of smallmouth 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, Grapevine Reservoir, Texas, 2008-2011.

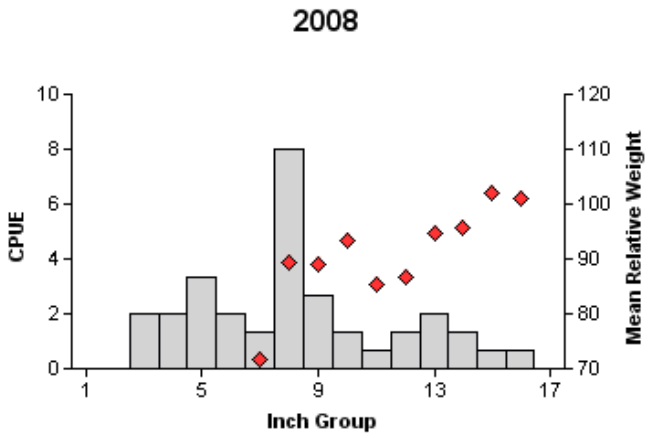
Smallmouth Bass



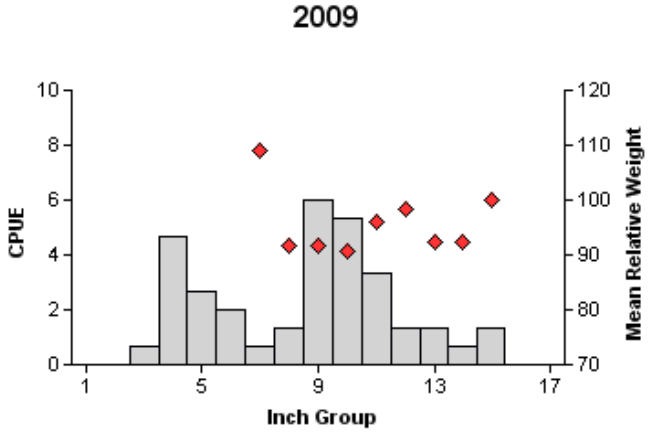
Effort = 1.5
Total CPUE = 8.7 (38; 13)
Stock CPUE = 4.0 (49; 6)
PSD = 17 (13.4)

Figure 7 continued.

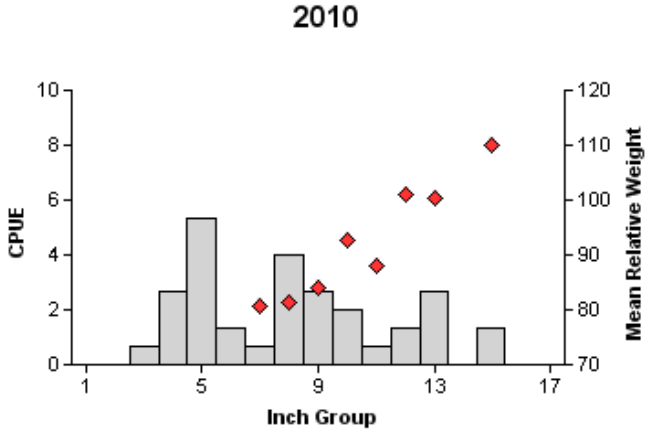
Spotted Bass



Effort = 1.5
Total CPUE = 29.3 (23; 44)
Stock CPUE = 20.0 (24; 30)
CPUE-12 = 6.0 (29; 9)
PSD = 33 (7)
PSD-P = 13 (5.2)



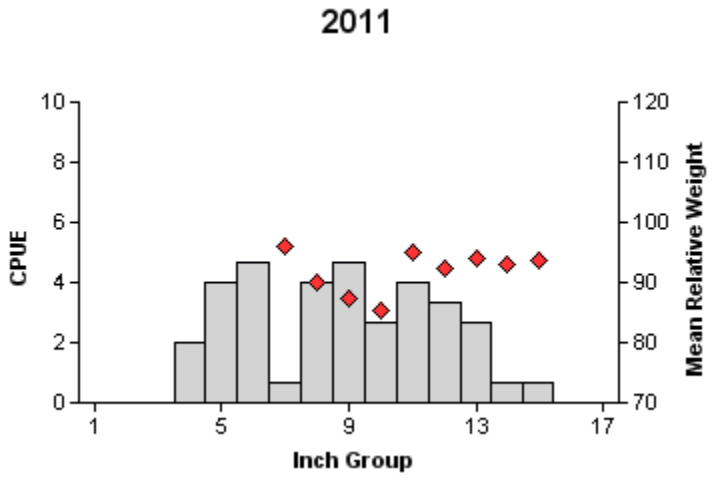
Effort = 1.5
Total CPUE = 31.3 (26; 47)
Stock CPUE = 21.3 (29; 32)
CPUE-12 = 4.7 (47; 7)
PSD = 38 (8.7)
PSD-P = 9 (6.4)



Effort = 1.5
Total CPUE = 25.3 (26; 38)
Stock CPUE = 15.3 (33; 23)
CPUE-12 = 5.3 (52; 8)
PSD = 39 (10.5)
PSD-P = 9 (7.1)

Figure 8. 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, Grapevine Reservoir, Texas, 2008-2011.

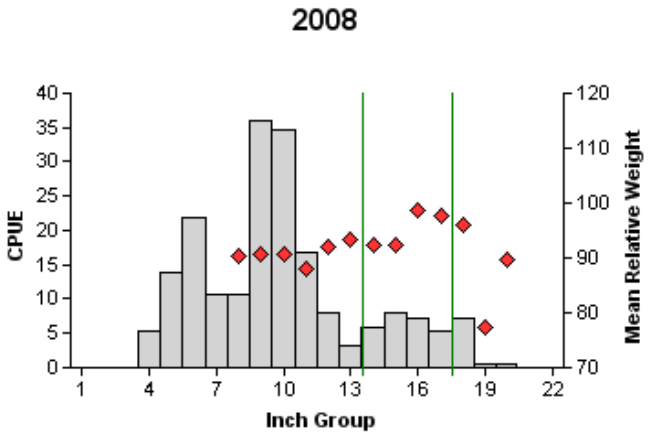
Spotted Bass



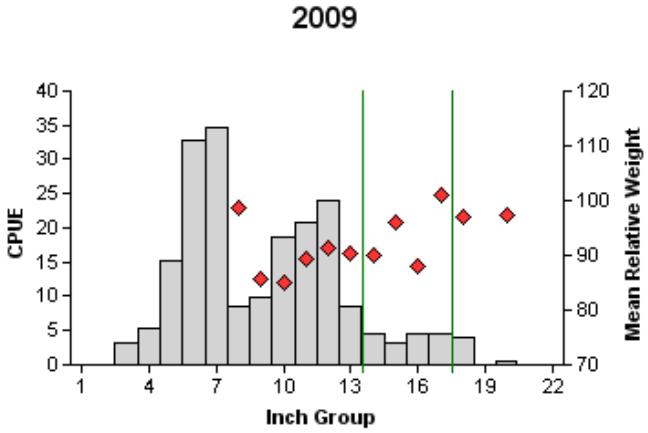
Effort =	1.5
Total CPUE =	34.0 (26; 51)
Stock CPUE =	23.3 (33; 35)
CPUE-12 =	7.3 (40; 11)
PSD =	49 (10.2)
PSD-P =	6 (2.6)

Figure 8 continued.

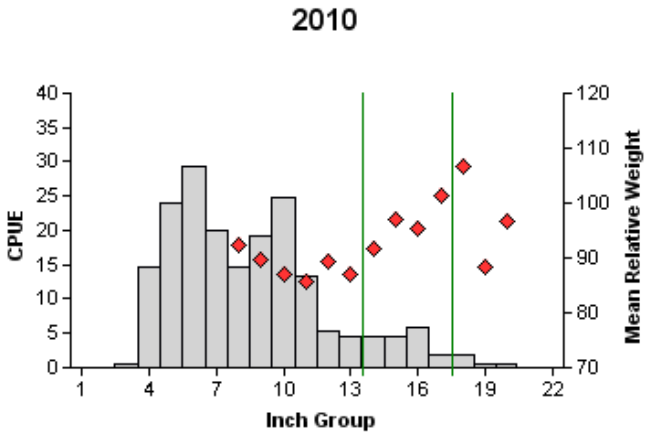
Largemouth Bass



Effort = 1.5
Total CPUE = 196.7 (14; 295)
Stock CPUE = 144.7 (14; 217)
CPUE-14 = 35.3 (15; 53)
PSD = 32 (4.1)
PSD-P = 20 (3.9)

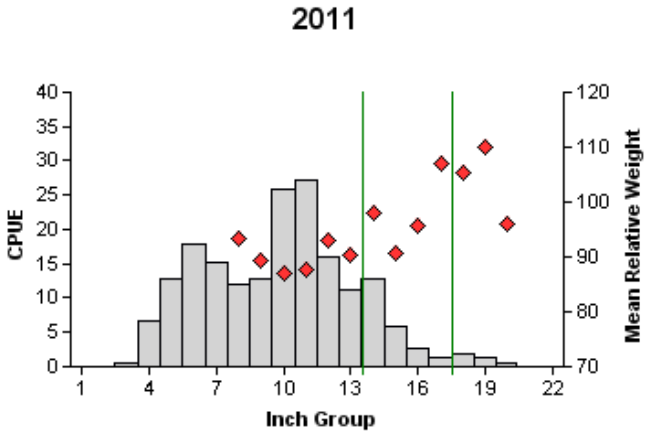


Effort = 1.5
Total CPUE = 204.0 (14; 306)
Stock CPUE = 112.7 (18; 169)
CPUE-14 = 22.0 (18; 33)
PSD = 49 (5.3)
PSD-P = 15 (3.2)



Effort = 1.5
Total CPUE = 191.3 (13; 287)
Stock CPUE = 102.7 (14; 154)
CPUE-14 = 20.7 (30; 31)
PSD = 30 (5.5)
PSD-P = 16 (3.8)

Figure 9. 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, Grapevine Reservoir, Texas, 2008-2011. Vertical lines represent length limit at time of sampling.



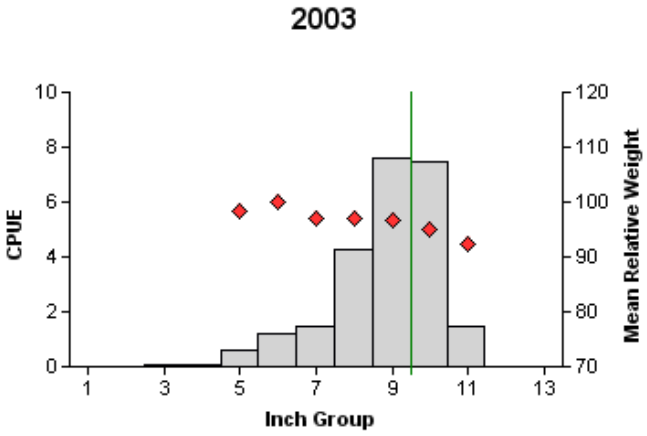
Effort = 1.5
Total CPUE = 185.3 (15; 278)
Stock CPUE = 132.0 (19; 198)
CPUE-14 = 26.7 (28; 40)
PSD = 41 (6.5)
PSD-P = 11 (2.6)

Figure 9 continued.

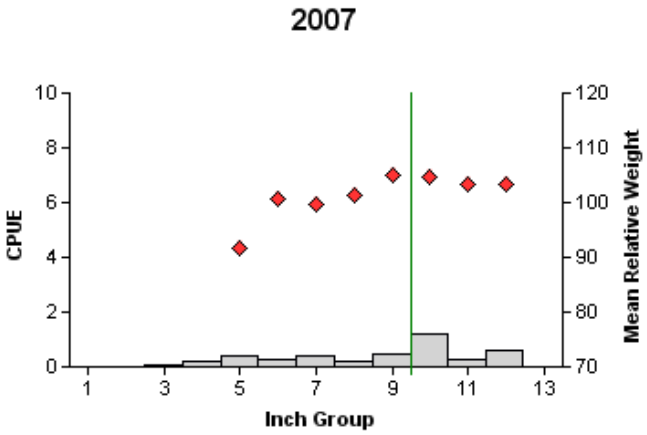
Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Grapevine Reservoir, Texas, 2011. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass.

Year	Sample size	% FLMB alleles	%NLMB alleles	F genotypes	N genotypes	F1
2011	30	37	63	0	1	1

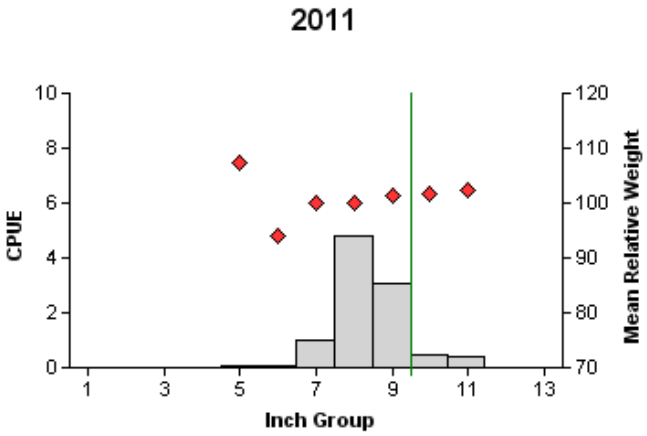
White Crappie



Effort =	10.0
Total CPUE =	24.4 (20; 244)
CPUE-10 =	9.0 (30; 90)
PSD =	86 (4.9)
PSD-P =	37 (5.4)



Effort =	10.0
Total CPUE =	4.2 (64; 42)
CPUE-10 =	2.1 (80; 21)
PSD =	72 (9.3)
PSD-P =	54 (6.6)



Effort =	10.0
Total CPUE =	10.0 (21; 100)
CPUE-10 =	0.9 (39; 9)
PSD =	88 (4.2)
PSD-P =	9 (3)

Figure 10. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Grapevine Reservoir, Texas, 2003, 2007, and 2011. Vertical line represents length limit at time of sampling.

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

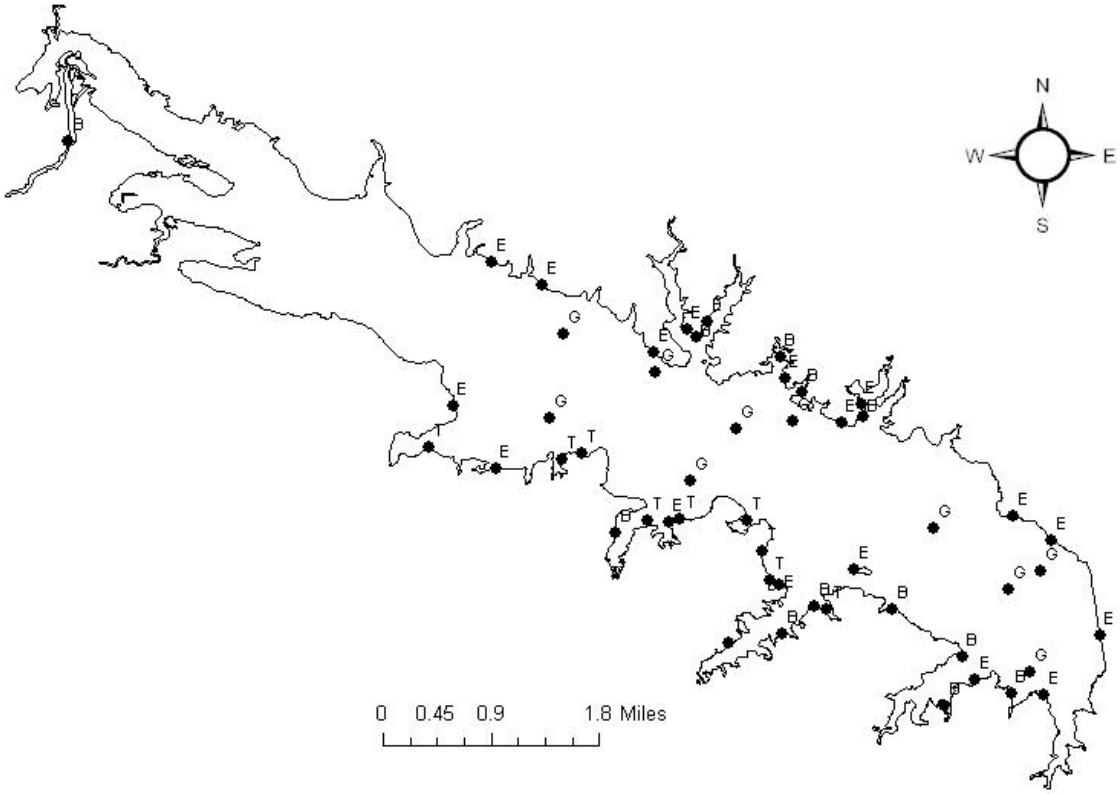
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2012-Spring 2013							
Fall 2013-Spring 2014							
Fall 2014-Spring 2015							
Fall 2015-Spring 2016	S	S	S	A		S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Grapevine Reservoir, Texas, 2011-2012.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Longnose gar	1	0.1				
Gizzard shad	46	4.6			1048	698.7
Threadfin shad					580	386.7
Smallmouth buffalo	18	1.8				
Blue catfish	44	4.4				
Channel catfish	5	0.4				
White bass	5	0.5				
Bluegill					412	274.7
Longear sunfish					321	214.0
Redear sunfish					4	2.7
Smallmouth bass					13	8.7
Spotted bass					51	34.0
Largemouth bass	2	0.2			275	185.3
White crappie	2	0.2	100	10.0		
Freshwater drum	12	1.2				

APPENDIX B



Location of sampling sites, Grapevine Reservoir, Texas, 2011-2012. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B. Water level was 4.7 feet below conservation pool during electrofishing and trap netting surveys and 5.3 feet above conservation pool during gill netting surveys.

APPENDIX C

Historical catch rates for targeted species by gear type for Grapevine Reservoir, Texas.

		Year														
Gear	Species	1996	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gill Netting	Blue catfish	0.5	0.8					3.9				3.5				4.4
(fish/net night)	Channel catfish	4.7	4.5					5.0				2.3				0.5
	White bass	5.8	4.4					2.3				3.2				0.5
Electrofishing	Gizzard shad	141.0	283.0	310.7	620.0	287.3	328.7	373.3	409.3	211.3	398.7	442.7	294.0	566.7	698.7	
(fish/hour)	Threadfin shad	59.0	337.0	348.7	128.0	161.3	154.7	184.7	123.3	138.0	84.0	134.7	192.0	360.7	386.7	
	Bluegill	11.0	82.0	74.0	340.7	217.3	146.7	140.0	204.7	18.0	255.3	393.3	466.7	263.3	274.7	
	Longear sunfish	10.0	58.0	60.67	151.3	60.7	71.3	90.7	136	36.3	42.0	79.3	153.3	186.0	214.0	
	Redear sunfish	3.0	1.0	1.3	4.9	0.7	2.7	2.0	2.2	0.0	3.3	8.0	9.3	6.7	2.7	
	Smallmouth bass		3.0										2.7	11.3	8.7	
	Spotted bass	13.0	41.0	16.7	28.0	23.3	34.0	40.0		22.7	26.0	29.3	31.3	25.3	34.0	
	Largemouth bass	95.0	109.0	88.7	208.0	78.0	125.3	110.0	126.7	51.3	294.0	196.7	204.0	191.3	185.3	
Trap Netting (fish/net night)	White crappie	2.6	2.5				24.4				4.2				10.0	