

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-2

STATEWIDE FRESHWATER FISHERIES MONITORING AND MANAGEMENT PROGRAM

2011 Survey Report

Lewisville Reservoir

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TABLE OF CONTENTS

Survey and management summary	2
Introduction.....	3
Reservoir description.....	3
Management history.....	3
Methods.....	4
Results and discussion.....	4
Fisheries management plan.....	6
Literature cited.....	8
Figures and tables.....	9-30
Water level (figure 1).....	9
Reservoir characteristics (table 1).....	9
Harvest regulations (table 2)	9
Stocking history (table 3).....	10
Habitat survey (table 4)	12
Percent directed effort (table 5).....	12
Gizzard shad (figure 2).....	13
Bluegill (figure 3)	14
Blue catfish (figures 4-5, table 6)	15
Channel catfish (figures 6-7)	17
White bass (figures 8-9, table 7)	19
Palmetto bass (figures 10-12, table 8)	21
Spotted bass (figure 13).....	24
Largemouth bass (figures 14-15, tables 9-10)	25
White crappie (figures 16-17, table 11)	28
Black crappie (figure 18)	30
Proposed sampling schedule (table 12).....	31
Appendix A	
Catch rates for all species from all gear types	32
Appendix B	
Map of 2011-2012 sampling locations	33
Appendix C	
Historical catch rates of target species by gear types	34
Appendix D	
Blue catfish age and growth	36

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lewisville Reservoir were surveyed in 2011 using electrofishing, and 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:** Lewisville Reservoir is a 29,592-acre impoundment constructed on the Elm Fork of the Trinity River by the U.S. Army Corps of Engineers in 1954 to provide flood control, municipal and industrial water, and recreation. The lower end of Lewisville Reservoir is surrounded by urban development and is 25 miles northwest of Dallas, Texas in Denton County. The upper end of the reservoir is experiencing rapid development as well. 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 natural shoreline, rocky shoreline, and standing timber.
- **Creel summary:** A spring quarter creel was conducted from March 2012 through May 2012. White bass were the most targeted species (65.1%) followed by largemouth bass (15.8%). Anglers spent an estimated \$622,524 for the spring quarter at Lewisville Reservoir.
- **Management history:** Important sport fishes include largemouth bass, white crappie, white bass, palmetto bass, and blue and channel catfish. All species are managed with statewide regulations with the exception of blue catfish, which are managed by a 30- to 45-inch slot length limit. The daily bag limit for blue and channel catfish remains 25 in the aggregate with only one blue catfish over 45 inches. Palmetto bass are requested annually at a rate of 5 fish per acre. A ShareLunker largemouth bass was caught at Lewisville in November of 2005. ShareLunker largemouth bass were stocked in the spring of 2006. Florida largemouth bass were stocked in 2006 and 2007.
- **Fish Community**
 - **Prey species:** Gizzard and threadfin shad are in abundant in the reservoir. Bluegill and longear sunfish are also available as prey.
 - **Catfishes:** The blue catfish population continues to be good and the relative abundance of channel catfish increased since previous surveys. No flathead catfish were sampled during annual gill netting.
 - **Temperate basses:** White bass catch rates decreased slightly from the previous survey. Palmetto bass catch rates increased over the previous survey. Eight year classes of palmetto bass were collected in 2012.
 - **Black basses:** Relative abundance of spotted bass population decreased from previous surveys. The largemouth bass population decreased in abundance from the previous survey, likely due to low water level. Catch of largemouth over 14 inches was much higher than previous surveys.
 - **Crappie:** The white crappie population increased over the previous survey. Condition of white crappie was good. Black crappie relative abundance increased since the previous survey with almost entirely stock-size fish collected.
- **Management Strategies:** Request palmetto bass fingerlings at a rate of 5/acre annually. Assist USACE and LAERF with habitat mitigation project regarding habitat loss in winter of 2006. Gill netting will be conducted every two years to monitor palmetto bass. Electrofishing and trap netting surveys will be conducted in 2015-2016, when the next report will be written.

INTRODUCTION

This document is a summary of fisheries data collected from Lewisville 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

Lewisville Reservoir, Denton County, is a 29,592-acre impoundment constructed by the U.S. Army Corps of Engineers (USACE) in 1954 on Elm Fork of the Trinity River. It was built to provide flood control, water for municipal and industrial purposes, and recreation. Other principal tributaries are Hickory Creek and Little Elm Creek. In 1989 the conservation pool level of the reservoir was raised from 514 ft. mean-sea-level (msl) to 522 ft. msl. Lewisville Reservoir has a drainage area of approximately 968 square miles. Rainfall in the watershed averages 33.5 inches per year. Angler and boat access is adequate. There is one handicap accessible facility.

Management History

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

1. Maintain palmetto bass population. Collect information regarding angling pressure on palmetto bass fishery.

Actions: Continued requesting palmetto bass annually at 5 fish per acre. Thus far, gill netting catch rates have remained high despite a reduced stocking rate.

2. Conduct annual creel survey on Lewisville Reservoir from June 2011 through May 2012.

Actions: A Spring quarter creel survey was conducted March 2012 through May 2012.

3. Habitat consisting of 123 acres of standing timber was illegally cut down by a land developer during an extended drought in 2006. The USACE formed a team to assess habitat loss while the developer was mandated by a court ruling to pay restitution.

Actions: We attended meetings discussing what type of habitat improvements to make and approximate locations. To date, several areas in Hickory Creek near the site of the cutting have been planted with emergent vegetation. Contracts are currently being worked out for the setting of posts (to replace roosting sites for birds), rock pile placement, and submersed vegetation planting in cages.

Harvest regulation history: Sport fish populations in Lewisville Reservoir are managed with statewide regulations with the exception of the slot length limit on blue catfish (Table 2).

Stocking history: Striped bass were stocked annually from 1991 until 1999. Stockings were discontinued because of low catch rates and several summer fish kills of striped bass occurred, however palmetto bass have been stocked annually since 1999, excluding 2001 due to golden alga outbreak at production hatcheries. ShareLunker largemouth bass were stocked in the spring of 2006. Florida largemouth bass were stocked in 2006 and 2007. The last stocking of Lewisville Reservoir occurred in 2010 consisting of palmetto bass fry (Table 3).

Vegetation/habitat history: In January 2006, approximately 123 acres of stumps and standing timber in the Hickory Creek arm of the reservoir were illegally cut by a land developer during an extended drought which had water levels 7-8 feet below conservation pool. A team organized by the USACE was formed to assess the damage as well as develop a mitigation plan for fish and wildlife. The habitat restoration plan is ongoing and will incorporate rock piles, brush piles, and vegetation planted in cages by Lewisville Aquatic Ecosystem Research Facility staff and volunteers. Lewisville Reservoir aquatic vegetation, while sparse, is currently comprised mainly of sporadic stands of native shoreline emergent species. Natural shoreline, rocky shoreline, and standing timber make up the majority of the habitat currently (Table 4). Emergent plant species were planted in 2010 and 2011 in the area affected by the clear cutting. More work is scheduled for the summer of 2012.

Water transfer: Lewisville Reservoir is a major municipal drinking water supply for many cities in North Texas. The Upper Trinity Regional Water District also uses water from Lewisville Reservoir. There is a 1.7 megawatt hydroelectric power generation unit owned by Garland Power and Light utilizing water released through the dam. There are no known water transfers entering the reservoir besides water released from Ray Roberts Reservoir directly above Lewisville on the Elm Fork of the Trinity River.

METHODS

Fishes were collected by electrofishing (2.0 hours at 24 5-min stations), trap netting (15 net nights at 15 stations), and gill netting (15 net nights at 15 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 and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

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. A category 1 age and growth analysis was conducted on palmetto bass in spring 2012 (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Ages were determined using otoliths. Source for water level data was the United States Geological Survey website.

RESULTS AND DISCUSSION

Habitat: Water level at the time of the electrofishing survey was approximately 7 feet below conservation pool. Fish habitat at the time of the survey was primarily natural shoreline followed by rocky shoreline. (Table 4). A native aquatic plant habitat restoration project was initiated on Lewisville Reservoir in 1998 in cooperation with LAERF. Partial work on the project began, but drought conditions resulted in no vegetation being planted in 1998. In 1999 the drought continued as water levels declined to 14 feet below conservation pool. Limited plantings have occurred since with little success.

Creel: A spring quarter creel survey was conducted from March 1, 2012 through May 31, 2012. The most sought after species was white bass followed by largemouth bass (Table 5). Anglers spent an estimated \$622,524 for the spring quarter at Lewisville Reservoir.

Prey species: The electrofishing catch rate of threadfin of 341.5/hr (Appendix A) was above the district average of 220.6/hr. The gizzard shad electrofishing catch rate of 350.5/hr (Figure 2) was also above the district average of 260.8/hr. It was similar to the 2007 survey of 364.5/hr. Index of vulnerability for gizzard shad was high, indicating that 91% of gizzard shad captured in 2011 were available to existing predators. The electrofishing catch rate of bluegill was 143.0/hr (Figure 3) which was down from 314.0/hr in 2007.

The bluegill population does not contain large numbers of quality sized fish (>6 inches), however, PSD values have increased from 6 in 2003 to 15 in 2011. The longear sunfish catch rate observed in 2011 (81.0/hr) was above the district average of 73.2/hr (Appendix A).

Catfishes: The gill netting catch rate of blue catfish in 2012 of 7.1/nn was the highest catch rate ever recorded (Figure 4) which was well above the district average of 2.5/nn. Size structure of the blue catfish population was good as indicated by a PSD value of 41 and a PSD-p value of 5 observed in 2012. The blue catfish population at Lewisville is currently included in an experimental slot-length limit of 30-45 inches with one fish over 45 inches allowed per day (Appendix D). Blue catfish were caught by anglers at a rate of 1.1 per hour and were harvest oriented as 0% legal-size fish were released (Table 6). The gill netting catch rate of channel catfish was 2.3 /nn in 2012 which was higher than the two previous samples (1.5/nn in 2008, 1.7/nn in 2010; Figure 6). The 2012 catch rate was below the district average (5.7/nn) and size structure declined as indicated by a PSD value of 5. Total harvest of channel catfish in the spring quarter of 2012 was 25,220 (Figure 7). Lewisville, like other district reservoirs, has exhibited an inverse relationship between blue catfish and channel catfish relative abundances.

Temperate basses: The gill netting catch rates of white bass have historically been above the district average of 7.7/nn. The 2010 and 2012 surveys were no exception with catch rates of 13.3/nn and 10.4/nn observed, respectively (Figure 8). Size structure of the 2012 survey was dominated by quality size fish as indicated by the PSD value of 87. White bass were caught by anglers at 2.5 fish per hour (Table 7) with a harvest rate of 0.5 per hour. Harvest of white bass for the spring quarter was estimated at 45,548 fish (Figure 9). The gill netting catch rate of palmetto bass was 4.5/nn (Figure 10) which was higher than the district average of 3.2/nn. Palmetto bass were caught by anglers at a rate of 0.6 per hour (Table 8). Of particular interest, eight age classes of palmetto bass were collected in 2012. In Lewisville, palmetto bass reach 18 inches between age 2 and 3 (Figure 12).

Black basses: The electrofishing catch rate of spotted bass in 2011 of 21.0/hr was lower than the catch rates observed in 2003 and 2007 (Figure 13), and lower than the district average of 27.1/hr. Mean relative weights were good for spotted bass over 11 inches. The electrofishing catch rate of largemouth bass has varied along with the water levels at Lewisville from 76.5/hr in 2003 up to 111.5/hr in 2007 (mainly due to strong year class in a full reservoir), and back down to 73.0/hr in 2011 (Figure 14). The size structure of the population has improved as indicated by a PSD value of 44 and a CPUE-14 of 11.0/hr. Mean relative weights were below optimal for fish below 14 inches but good for fish over 14 inches. Lewisville is a popular venue for bass tournaments. All largemouth bass observed in the creel were tournament-held fish (Figure 15). The 2011 Florida largemouth bass allele percentage was 39.0% (Table 11).

Crappies: The trap netting catch rate of white crappie was 21.9/nn in 2011, which is above the district average of 17.0/nn and higher than the previous survey (Figure 16). The size structure of the population was dominated by quality-size fish as indicated by a PSD value of 98. Anglers caught white crappie at a rate of 2.0 per hour and were harvest-oriented as 0% of legal fish were released (Table 11). The black crappie trap netting catch rate was 5.7/nn in 2011, which is much higher than the previous surveys (Figure 18). The size structure of the black crappie population shifted since the 2007 survey to include more adults as indicated by a PSD of 51.

Fisheries management plan for Lewisville Reservoir, Texas

Prepared – July 2012

ISSUE 1: A quality fishery for palmetto bass has persisted in Lewisville Reservoir since annual stockings resumed in 1999. The fishery supports several guides targeting palmetto bass and creel survey data suggests anglers catch many fish. Maintenance of the population relies on annual stockings.

MANAGEMENT STRATEGIES

1. Request annual stockings of fingerling palmetto bass at a rate of 5 fish per surface acre. As hatchery production varies, consideration will be given to alternating requests of fingerlings and fry.
2. Conduct gill netting surveys every other year to monitor palmetto bass population.

ISSUE 2: Approximately 123 acres of standing timber was illegally cut down by a land developer during an extended drought in the winter of 2006 that exposed much of the upper end of the Hickory Creek arm of Lewisville Reservoir. The USACE formed a team to assess the habitat loss to fish and wildlife. The developer was ordered by a federal judge to pay restitution. A committee was formed to put together a mitigation plan.

MANAGEMENT STRATEGIES

1. Continue to work with USACE and LAERF, providing relevant information on where the habitat restoration will be of the greatest value.
2. Monitor habitat restoration efforts through habitat surveys every four years.

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. Educate the public about invasive species through the use of media and the internet
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

ISSUE 4: Given it's proximity to known established populations of zebra mussels and the level of recreation occurring, Lewisville is at high risk of an infestation. In the spring of 2012, a dead zebra mussel shell was found on the shore of Lewisville Reservoir. To date, there have been no live zebra mussels found at the reservoir.

MANAGEMENT STRATEGIES

1. Continue distributing informational materials to marinas and boat service facilities around the reservoir.
2. Continue to monitor for the establishment of zebra mussel on settlement samplers installed at all

marinas monthly.

ISSUE 5: Lewisville Reservoir has the potential to produce trophy largemouth bass. In 2005, a Toyota ShareLunker was caught at the fishing barge. The genetic sampled collected in 2011 revealed no pure Florida largemouth bass were collected.

MANAGEMENT STRATEGIES

1. Request stockings of Florida largemouth bass in 2013 and 2014.
2. Monitor Florida largemouth bass genetic influence by analyzing fin clips in 2015 prior to the next management report being written.

SAMPLING SCHEDULE JUSTIFICATION

General monitoring of sport fish species with electrofishing and trap netting every 4 years, gill netting will be conducted every 2 years, and the next management report will be written in 2016. A habitat and vegetation survey will be conducted in 2015 to monitor the habitat restoration work.

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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

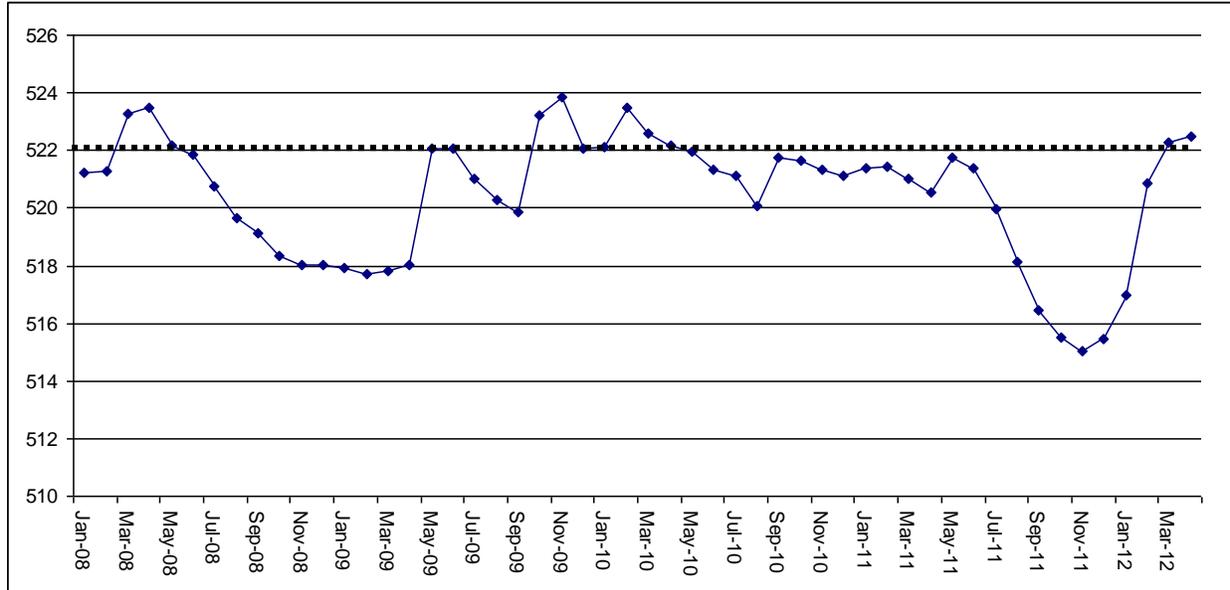


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Lewisville Reservoir, Texas from January 2008-April 2012. Dashed line indicates conservation pool (522 feet above MSL) Data were obtained from the USGS.

Table 1. Characteristics of Lewisville Reservoir, Texas.

Characteristic	Description
Year Constructed	1954
Controlling authority	US Army Corps of Engineers
Counties	Denton
Reservoir type	Mainstream Trinity River (Elm Fork)
Conductivity	278 umhos/cm

Table 2. Harvest regulations for Lewisville Reservoir, Texas.

Species	Bag Limit	Length Limit (inches)
Catfish: channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 minimum (channel) 30-45 slot (blue: only 1 over 45)
Catfish, flathead	5	18 minimum
Bass, white	25	10 minimum
Bass, palmetto	5	18 minimum
Bass: spotted	5 In any combination	none
Bass: largemouth		14 minimum
Crappie: white and black crappie, their hybrids and subspecies	25 (in any combination)	10 minimum

Table 3. Stocking history of Lewisville, 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)
Bluegill	1975	250	UNK	UNK
	Total	250		
Channel catfish	1966	170,000	AFGL	7.9
	1967	30,000	AFGL	7.9
	1968	23,870	AFGL	7.9
	1969	204,200	AFGL	7.9
	1970	25,000	AFGL	7.9
	1971	21,000	AFGL	7.9
	1972	117,800	AFGL	7.9
	1981	76,844	AFGL	7.9
	1993	250	FRY	0.3
	Total	668,964		
Florida largemouth bass	1978	141,588	FGL	2.1
	1978	18,156	FRY	1.0
	1990	743,646	FRY	0.7
	1993	739,751	FGL	1.2
	1998	741,380	FGL	1.4
	2006	507,625	FGL	1.7
	2007	501,720	FGL	1.6
	Total	3,393,866		
Largemouth bass	1966	1,400,500	FRY	0.7
	1967	402,200	FRY	0.7
	1968	640,990	FRY	0.7
	1968	11,385	UNK	UNK
	1969	578,275	FRY	0.7
	1970	35,450	UNK	UNK
	1971	340,000	FRY	0.7
	1975	82	UNK	UNK
	Total	3,408,882		
Palmetto bass (striped X white bass hybrid)	1974	97,570	UNK	UNK
	1976	68,310	UNK	UNK
	1979	232,300	UNK	UNK
	1981	230,740	UNK	UNK
	1983	236,039	UNK	UNK
	1986	18,576	FGL	2.0
	1986	264,239	FRY	1.0
	1999	222,892	FGL	1.3

Species	Year	Number	Life Stage	Mean TL (in)
	2000	221,969	FGL	1.5
	2002	221,983	FGL	1.7
	2003	147,923	FGL	1.4
	2004	295,986	FGL	1.7
	2005	148,670	FGL	1.6
	2006	150,399	FGL	1.5
	2006	1,090,919	FRY	0.2
	2007	149,032	FGL	1.4
	2008	149,121	FGL	1.6
	2009	90,600	FGL	1.4
	2010	2,278,868	FRY	0.3
	Total	6,316,136		
ShareLunker largemouth bass	2006	3,585	FGL	2.3
	Total	3,585		
Striped bass	1989	120,537	FGL	1.5
	1990	123,827	FGL	1.5
	1991	294,247	FGL	1.3
	1992	133,786	FRY	0.8
	1993	168,107	FGL	1.1
	1994	589,269	FGL	1.1
	1994	3,018,000	FRY	0.8
	1995	272,024	FGL	1.3
	1996	4,617	FGL	1.3
	1997	297,111	FGL	1.2
	1998	151,071	FGL	1.3
	Total	5,172,596		
Threadfin shad	1984	3,200	AFGL	3.0
	Total	3,200		
Walleye	1972	405,000	FRY	0.2
	1973	207,800	FRY	0.2
	1974	475,000	FRY	0.2
	Total	1,087,800		

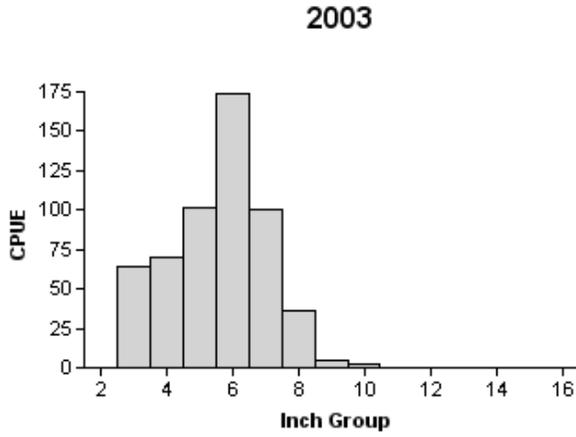
Table 4. Survey of littoral zone and physical habitat types, Lewisville Reservoir, Texas, 2011. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of open water habitat found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Natural shoreline	205.6	85.4		
Rocky shoreline	30.0	12.5		
Natural shoreline + piers/docks	2.4	1.0		
Gravel shoreline	2.2	0.9		
Rock bluff	0.2	0.1		
Bulkhead	0.2	0.1		
Boat docks/marinas			172.9	0.6
Standing timber			6621.0	22.4

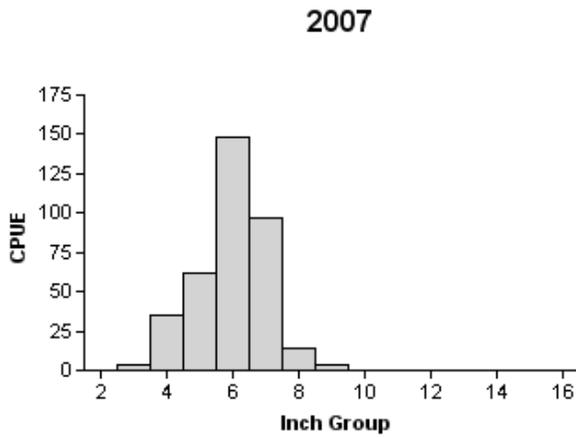
Table 5. Percent directed angler effort by species, for Lewisville Reservoir, Texas, from March 2012 through May 2012.

Species	Percent Directed Effort
Blue catfish	1.1
Catfish species	1.1
White bass	65.1
Palmetto bass	2.8
Temperate basses	2.1
White crappie	3.3
Crappie species	3.1
Largemouth bass	15.8
Anything	5.6

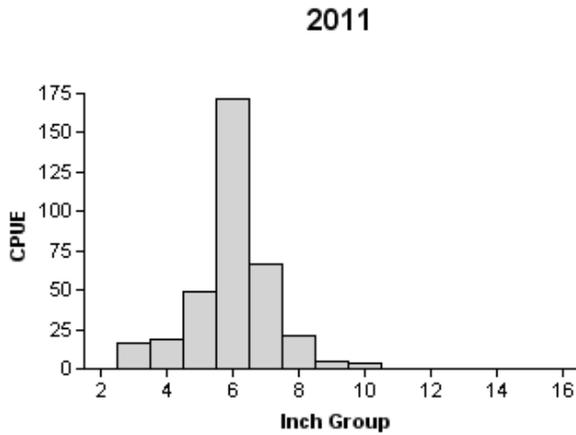
Gizzard Shad



Effort = 2.0
 Total CPUE = 552.5 (21; 1105)
 Stock CPUE = 143.0 (18; 286)
 IOV = 92 (2.3)



Effort = 2.0
 Total CPUE = 364.5 (16; 729)
 Stock CPUE = 115.0 (15; 230)
 IOV = 95 (1.7)



Effort = 2.0
 Total CPUE = 350.5 (18; 701)
 Stock CPUE = 96.5 (19; 193)
 IOV = 91 (2.8)

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, Lewisville Reservoir, Texas, 2003, 2007, and 2011.

Bluegill

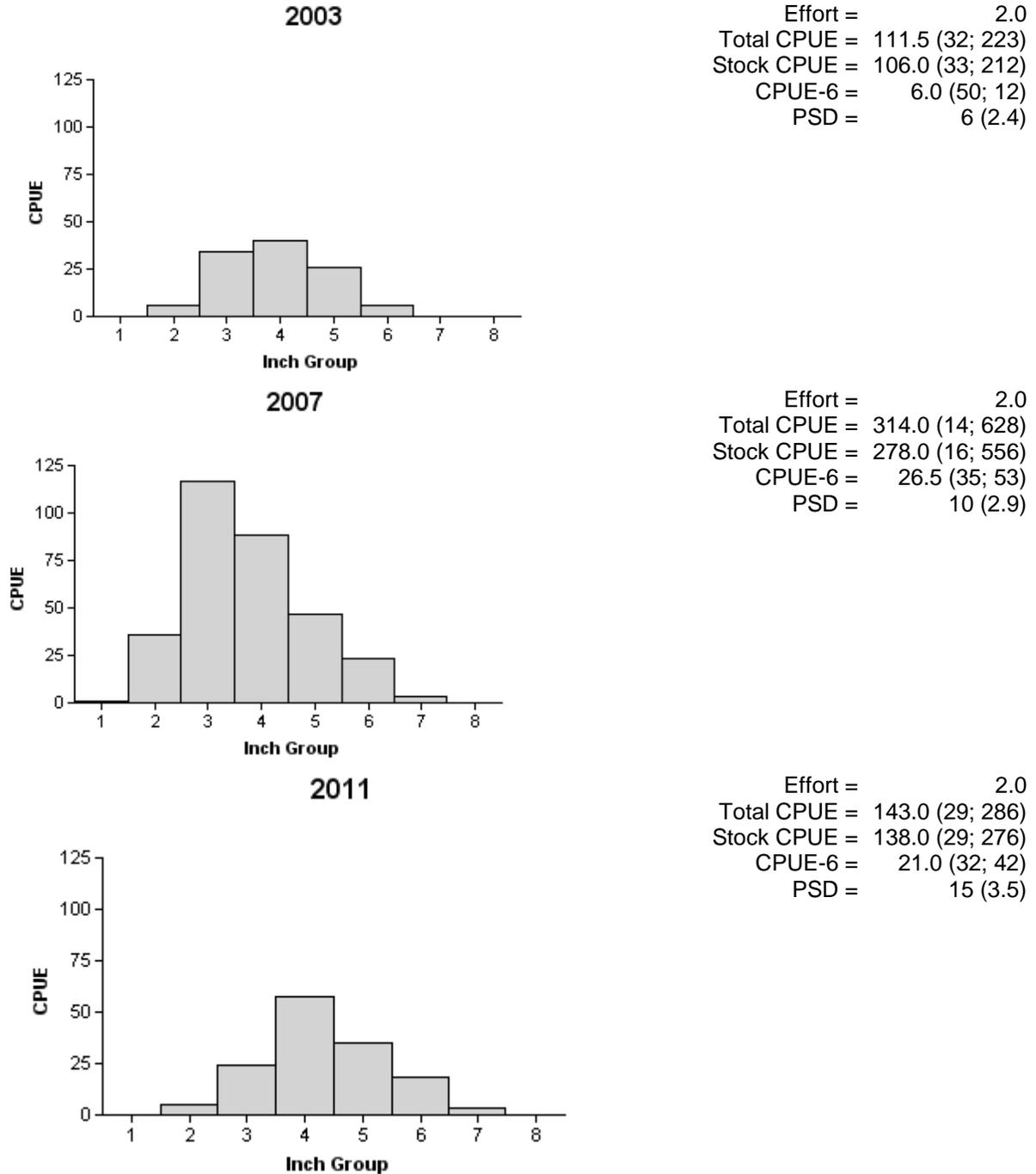


Figure 3. Number of bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2003, 2007, and 2011.

Blue Catfish

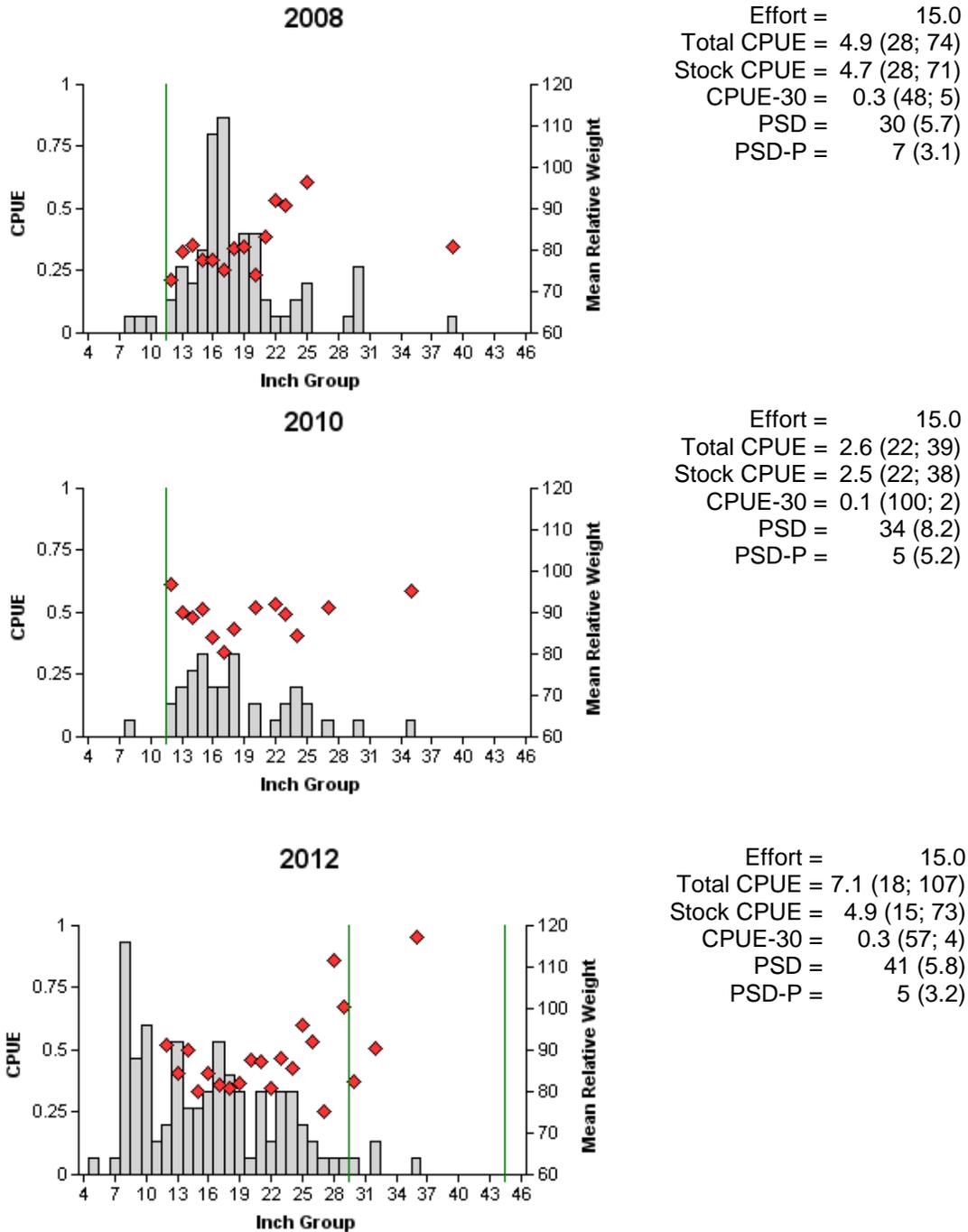


Figure 4. Number of blue catfish caught per net night (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2008, 2010, and 2012. Vertical line represents length limit at time of sampling.

Table 6. Creel survey statistics for blue catfish at Lewisville Reservoir from March 2012 through May 2012, where total catch per hour is for anglers targeting blue catfish and total harvest is the estimated number of blue catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Quarter
	Spring 2012
Percent directed effort	1.1
Directed effort (h)	1528.6 (63.4)
Directed effort/acre	0.1
Total catch per hour	1.1 (85.5)
Total harvest	2286 (154.6)
Harvest/acre	0.08
Percent legal released	0

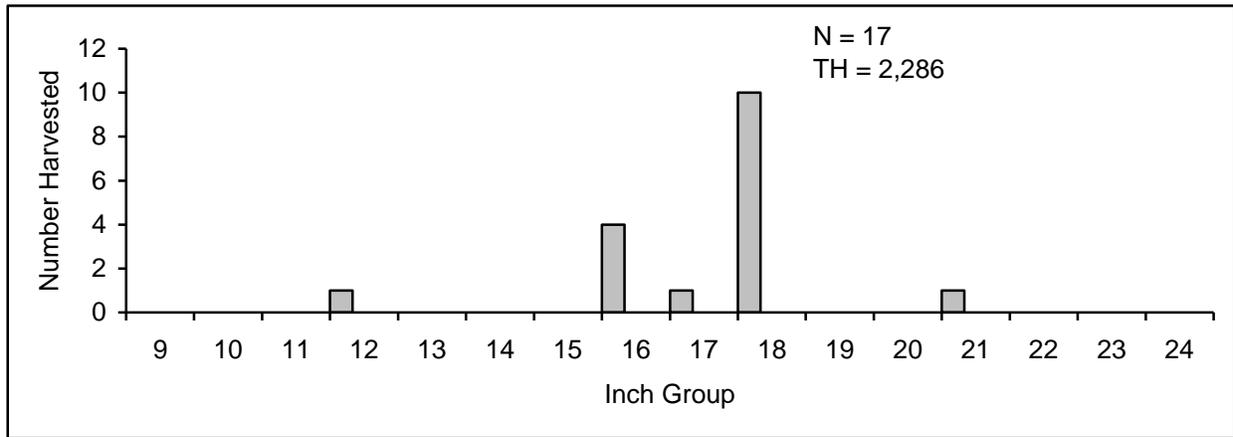


Figure 5. Length frequency of harvested blue catfish observed during creel surveys at Lewisville Reservoir from March 2012 through May 2012 all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Slot length limit is 30-45 inches.

Channel Catfish

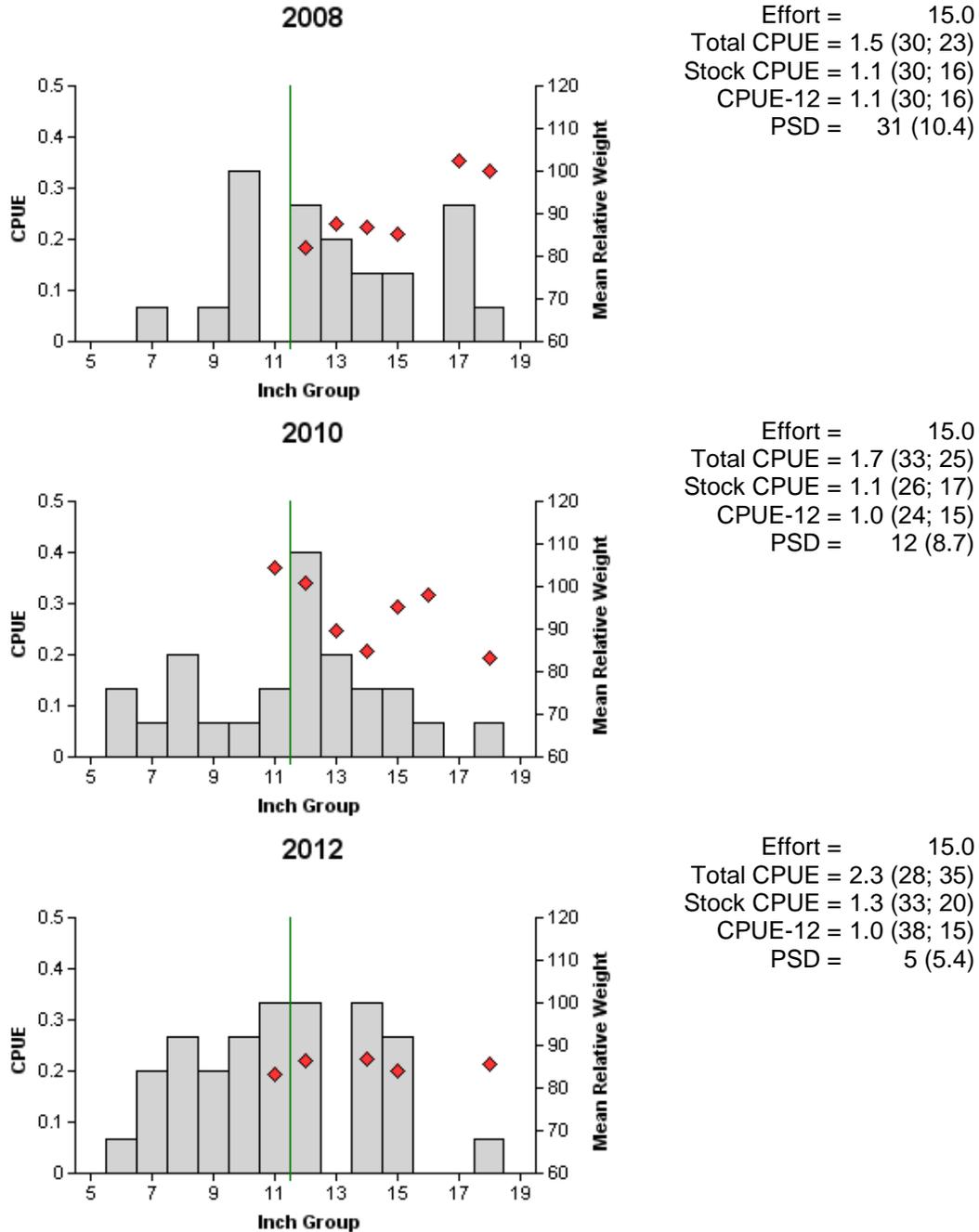


Figure 6. Number of channel catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2008, 2010, and 2012. Vertical line represents length limit at time of sampling.

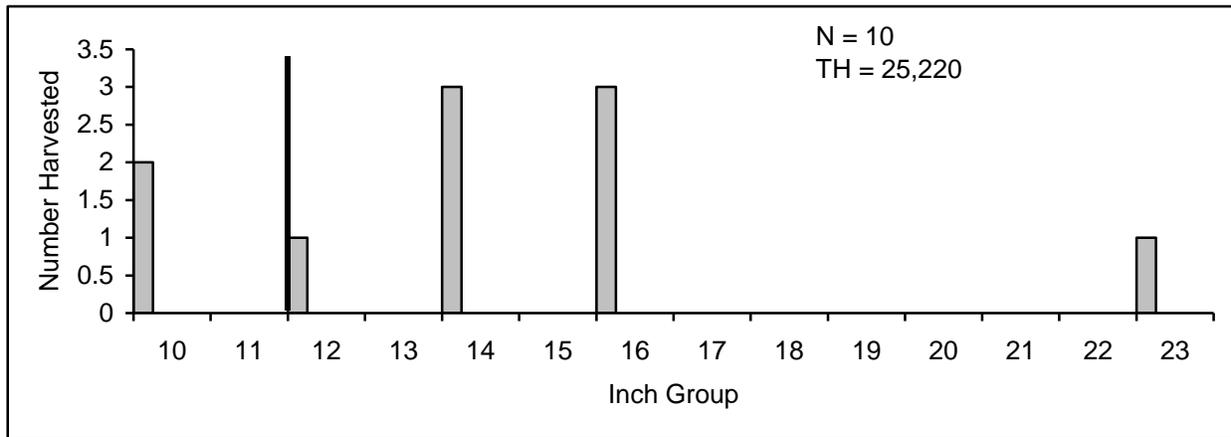


Figure 7. Length frequency of harvested channel catfish observed during creel surveys at Lewisville Reservoir from March 2012 through May 2012 all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit.

White Bass

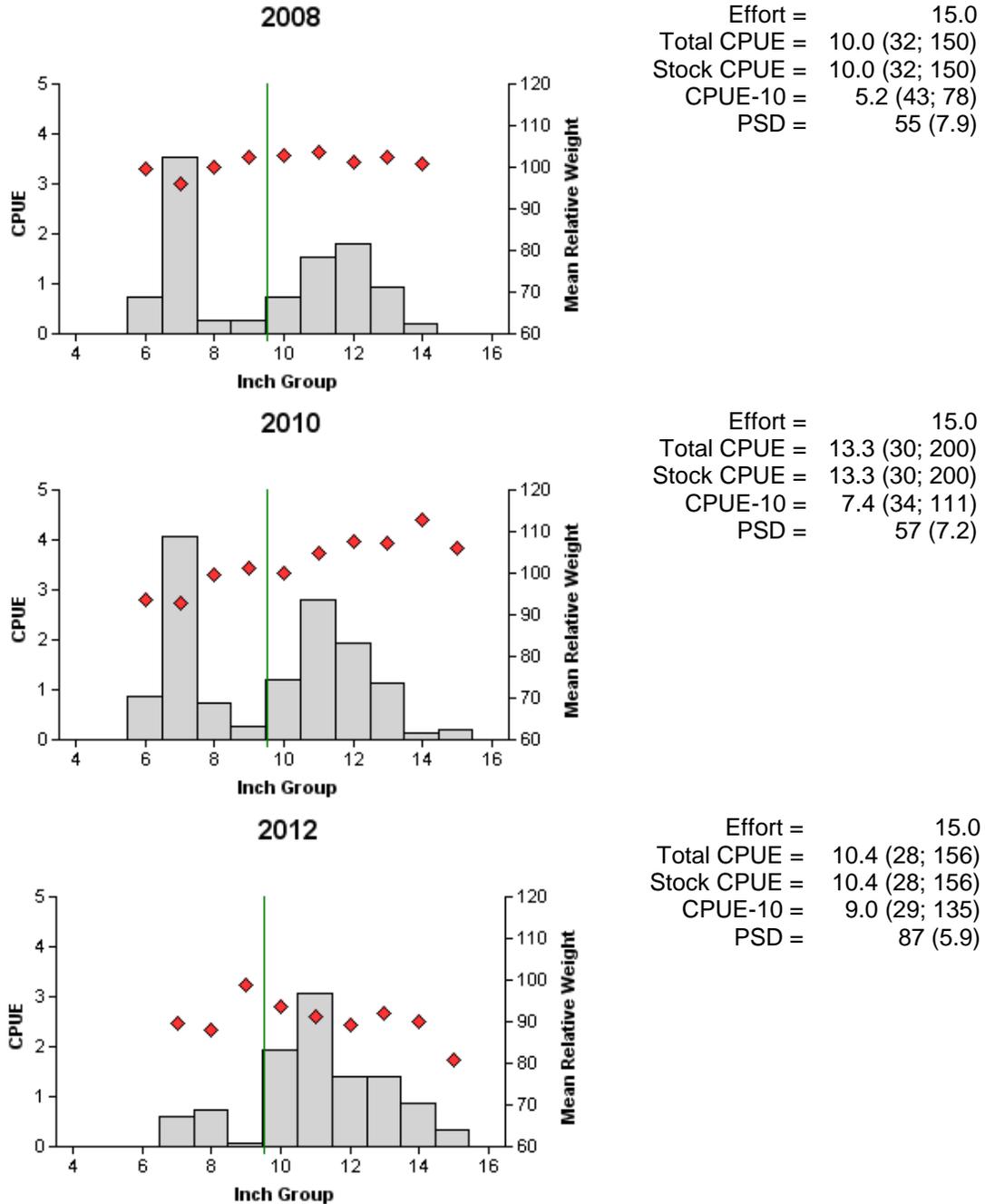


Figure 8. Number of white bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2008, 2010, and 2012. Vertical line represents length limit at time of sampling.

Table 7. Creel survey statistics for white bass at Lewisville Reservoir from March 2012 through May 2012, where total catch per hour is for anglers targeting white bass and total harvest is the estimated number of white bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Quarter
	Spring 2012
Percent directed effort	65.1
Directed effort (h)	91739.2 (18.0)
Directed effort/acre	3.1
Total catch per hour	2.5 (45.7)
Total harvest	45,548 (35.6)
Harvest/acre	1.5
Percent legal released	0.1 (968.8)

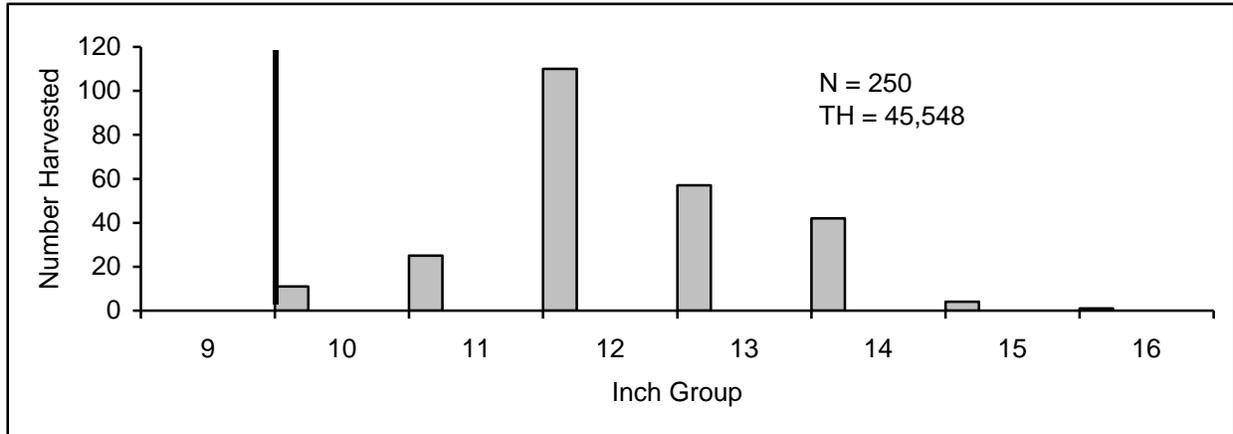


Figure 9. Length frequency of harvested white bass observed during creel surveys at Lewisville Reservoir from March 2012 through May 2012, all anglers combined. N is the number of harvested white bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit.

Palmetto Bass

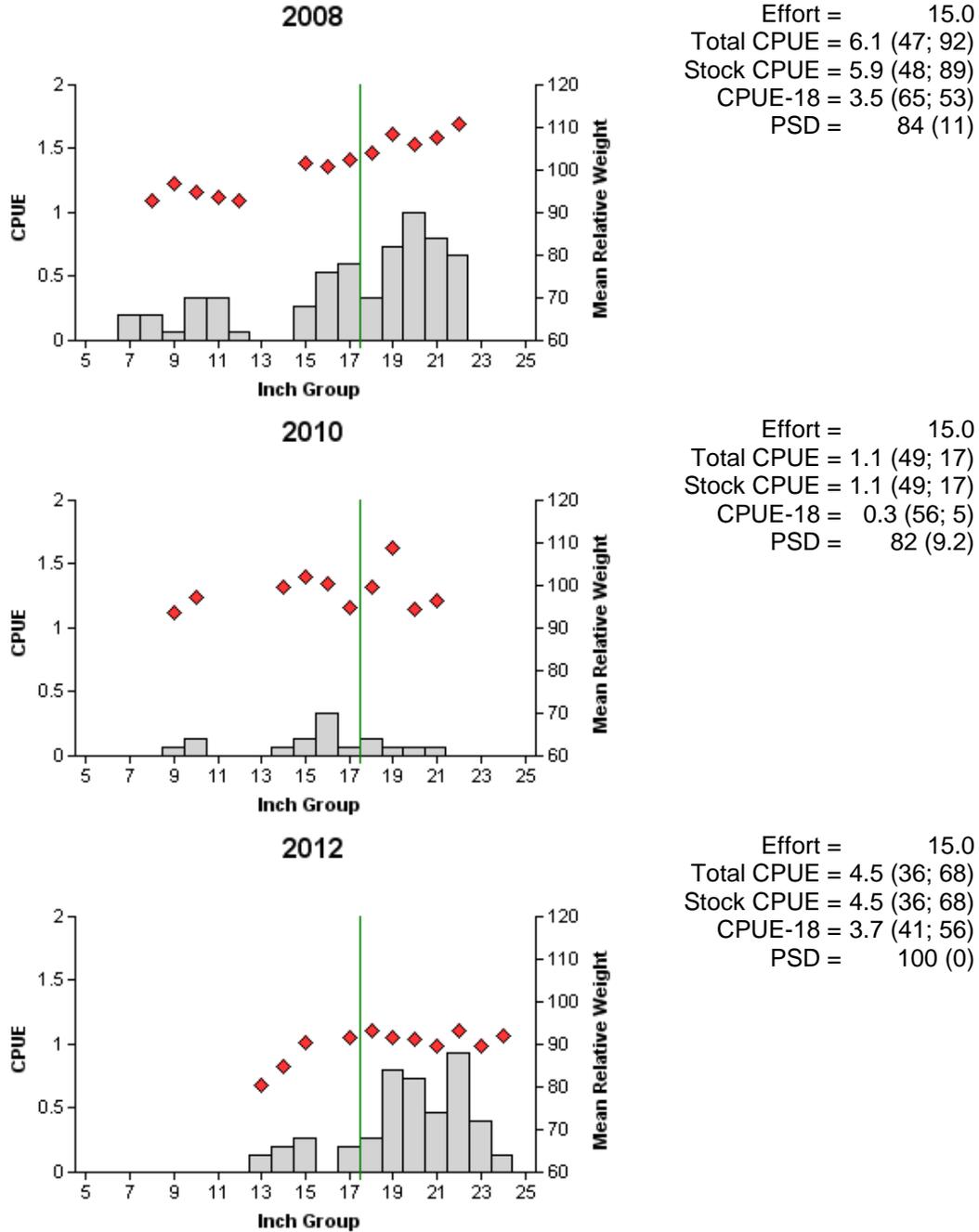


Figure 10. Number of palmetto bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2008, 2010, and 2012. Vertical line represents length limit at time of sampling.

Table 8. Creel survey statistics for palmetto bass at Lewisville Reservoir from March 2012 through May 2012 , where total catch per hour is for anglers targeting palmetto bass and total harvest is the estimated number of palmetto bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Quarter
	Spring 2012
Percent directed effort	1.1
Directed effort (h)	4001.5 (42.8)
Directed effort/acre	0.1
Total catch per hour	0.6 (41.2)
Total harvest	1748 (121.7)
Harvest/acre	0.06
Percent legal released	0.3 (100)

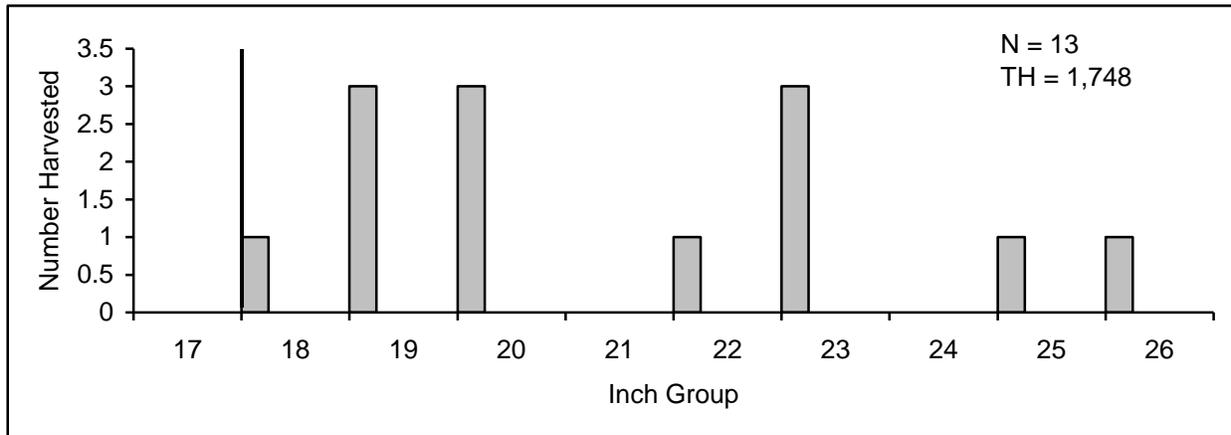


Figure 11. Length frequency of harvested palmetto bass observed during creel surveys at Lewisville Reservoir from March 2012 through May 2012, all anglers combined. N is the number of harvested palmetto bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit.

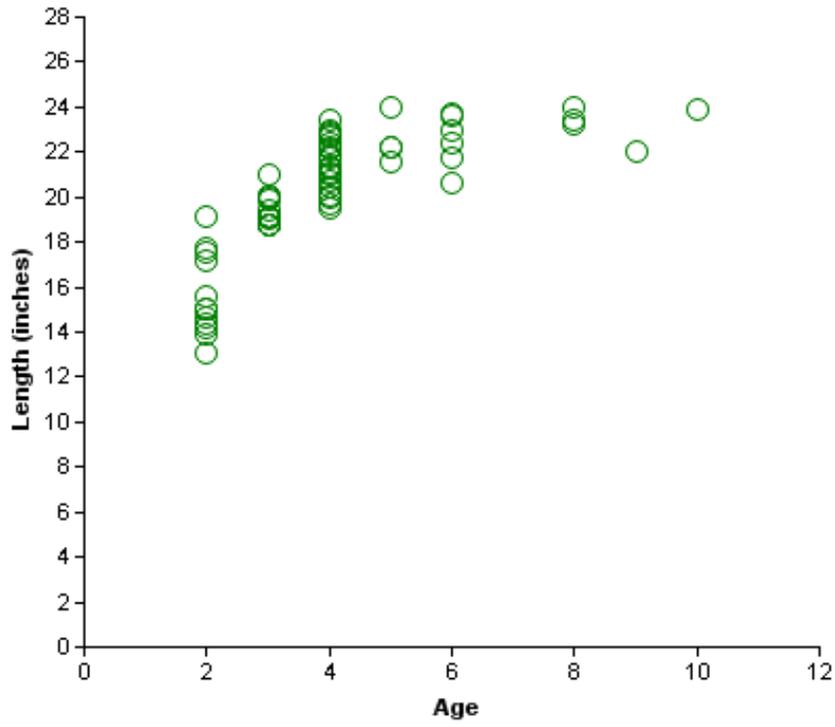


Figure 12. Length at age for palmetto bass (sexes combined) collected from gill netting at Lewisville Reservoir, Texas, for spring 2012 (N=63).

Spotted Bass

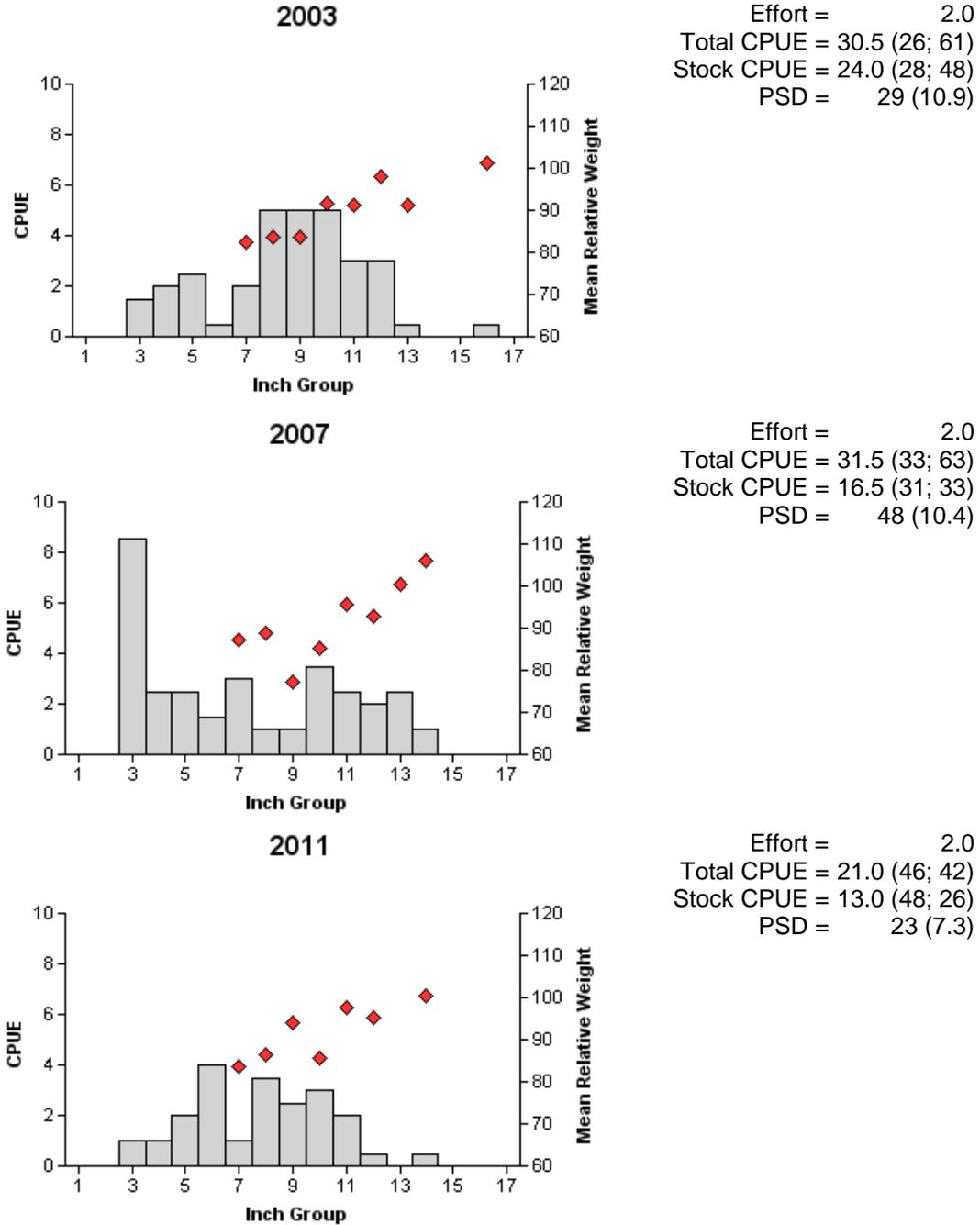


Figure 13. Number of spotted bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2003, 2007, and 2011.

Largemouth Bass

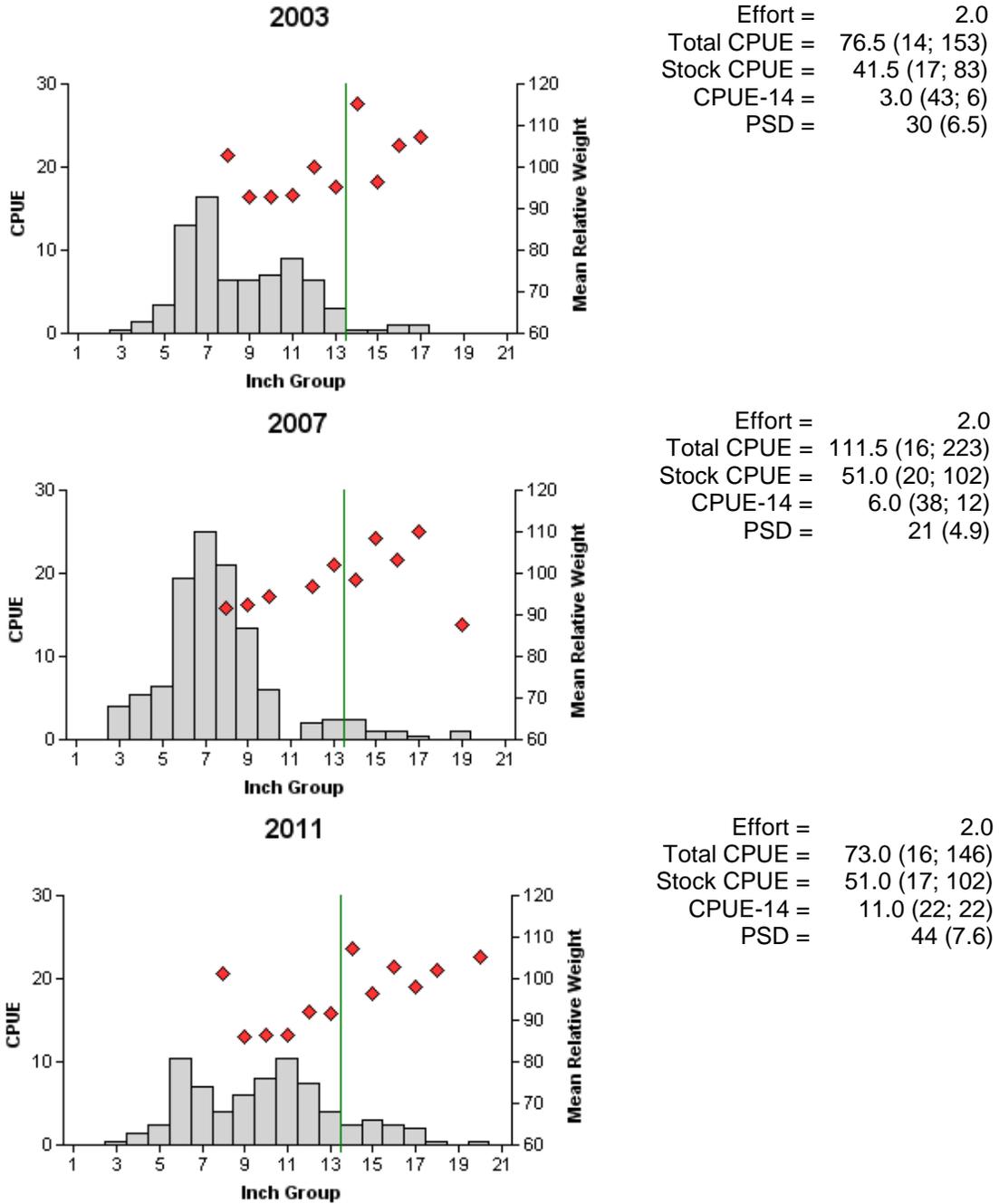


Figure 14. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2003, 2007, and 2011. Vertical lines represent length limit at time of sampling.

Table 9. Creel survey statistics for largemouth bass at Lewisville Reservoir from March 2012 through May 2012, where total catch per hour is for anglers targeting largemouth bass and total harvest is the estimated number of largemouth bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Quarter
	Spring 2012
Percent directed effort	15.8
Directed effort (h)	22207.4 (26.9)
Directed effort/acre	0.8
Total catch per hour	0.4 (38.1)
Total harvest	2420 (83.0)
Harvest/acre	0.08
Percent legal released	0.07 (49.6)

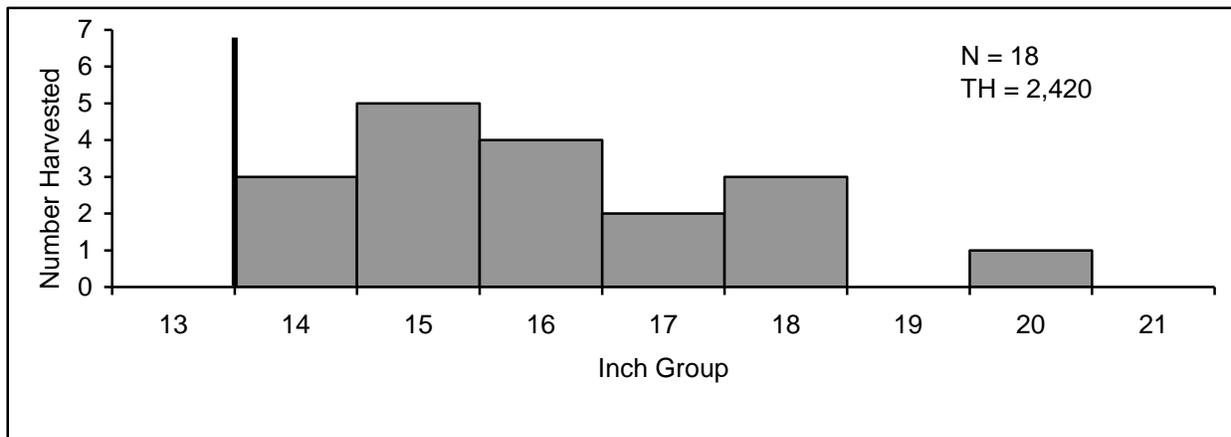


Figure 15. Length frequency of harvested largemouth bass observed during creel surveys Lewisville Reservoir from March 2012 through May 2012, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit at time of sampling. All largemouth bass observed were tournament-held fish.

Table 10. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lewisville Reservoir, Texas, 2011. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB.

Year	Sample size	% FLMB alleles	%NLMB alleles	F genotypes	N genotypes	F1
2011	30	39	61	0	3	1

White Crappie

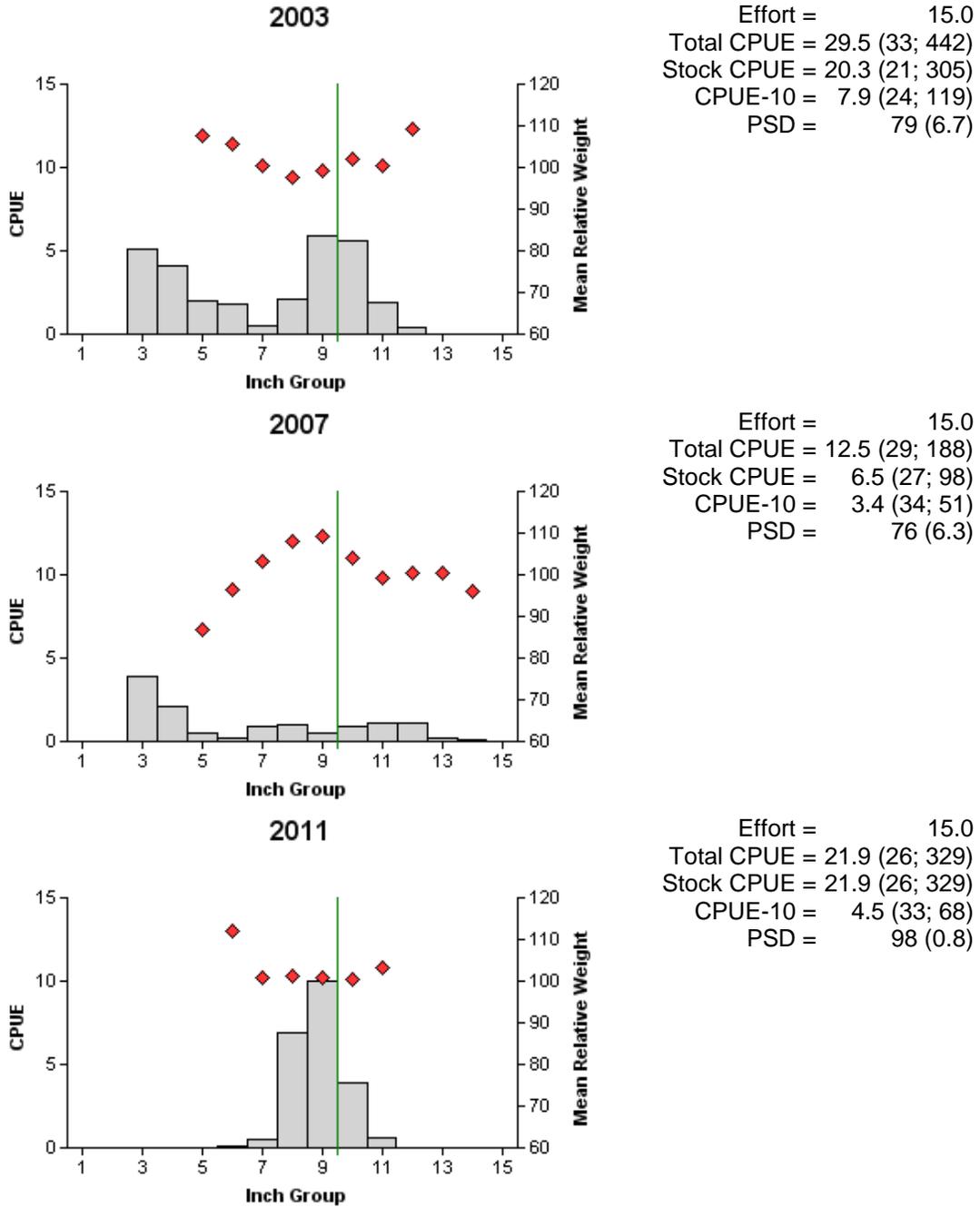


Figure 16. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lewisville Reservoir, Texas, 2003, 2007, and 2011. Vertical line represents length limit at time of sampling.

Table 11. Creel survey statistics for white crappie at Lewisville Reservoir from March 2012 through May 2012, where total catch per hour is for anglers targeting white crappie and total harvest is the estimated number of white crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Quarter
	Spring 2012
Percent directed effort	3.3
Directed effort (h)	4636.9 (40.6)
Directed effort/acre	0.2
Total catch per hour	2.0 (27.6)
Total harvest	6050 (65.1)
Harvest/acre	0.2
Percent legal released	0

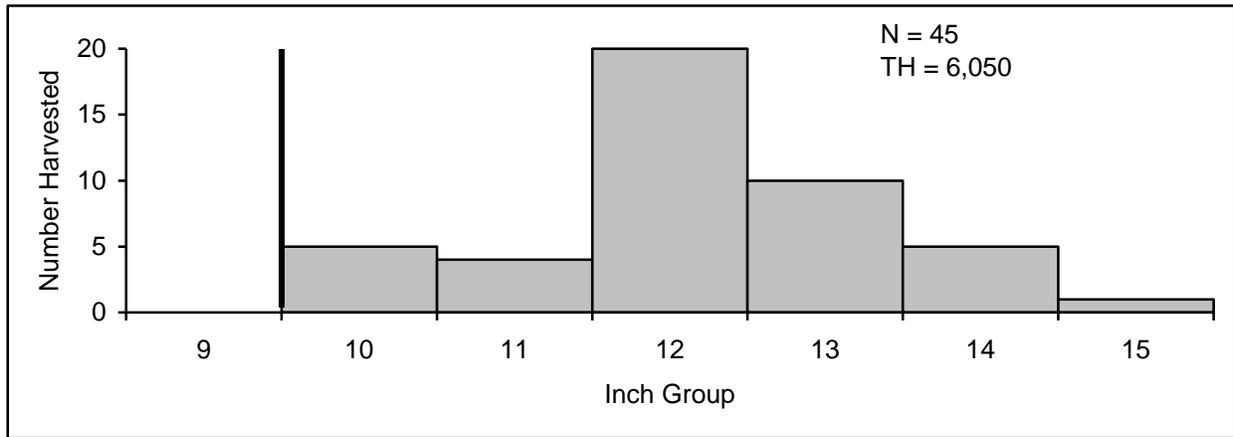


Figure 17. Length frequency of harvested white crappie observed during creel surveys at Lewisville Reservoir from March 2012 through May 2012, all anglers combined. N is the number of harvested white crappie observed during creel surveys, and TH is the total estimated harvest for the creel period. Vertical line represents minimum length limit.

Black Crappie

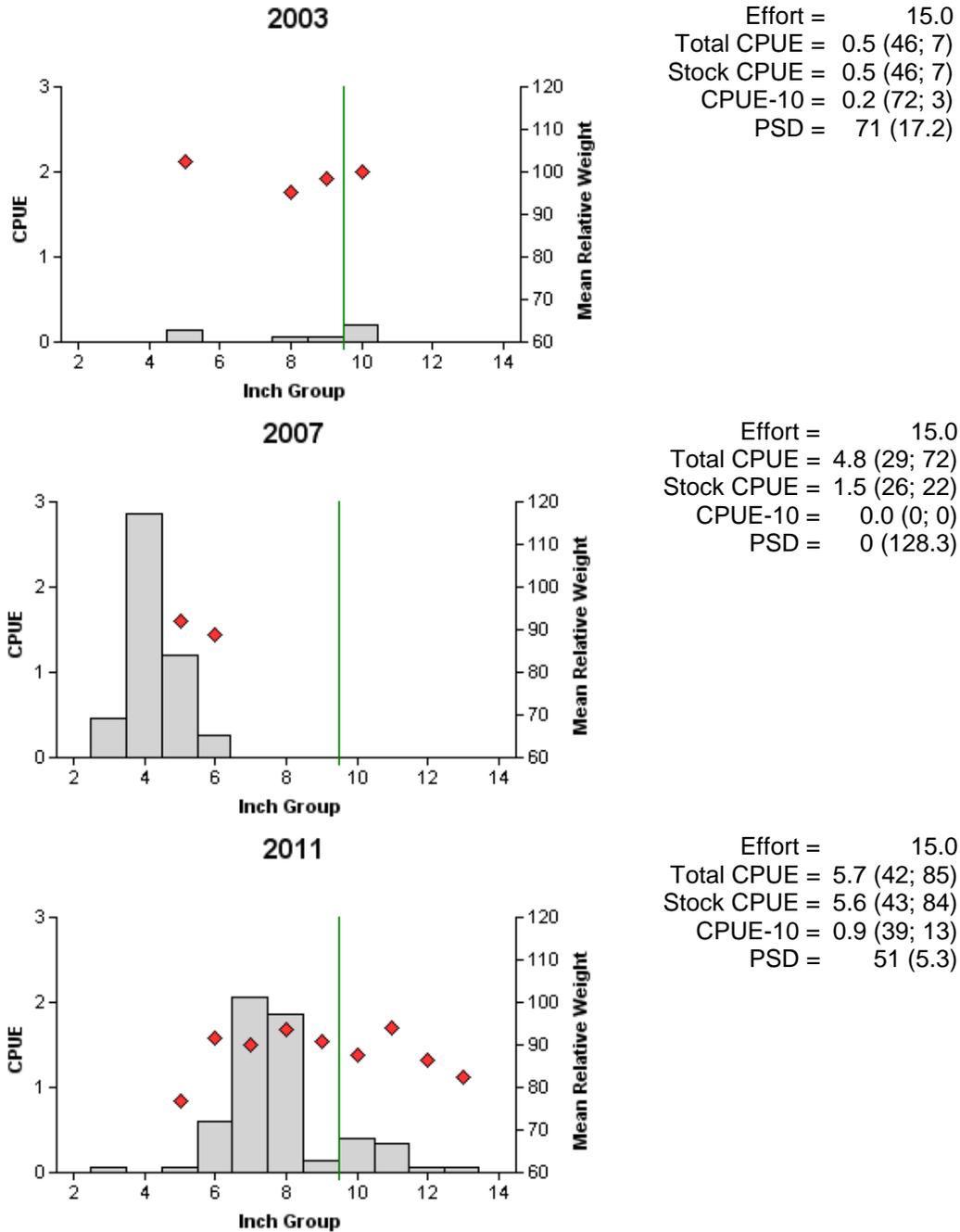


Figure 18. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lewisville Reservoir, Texas, 2003, 2007, and 2011. Vertical line represents length limit at time of sampling.

Table 12. Proposed sampling schedule for Lewisville 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.

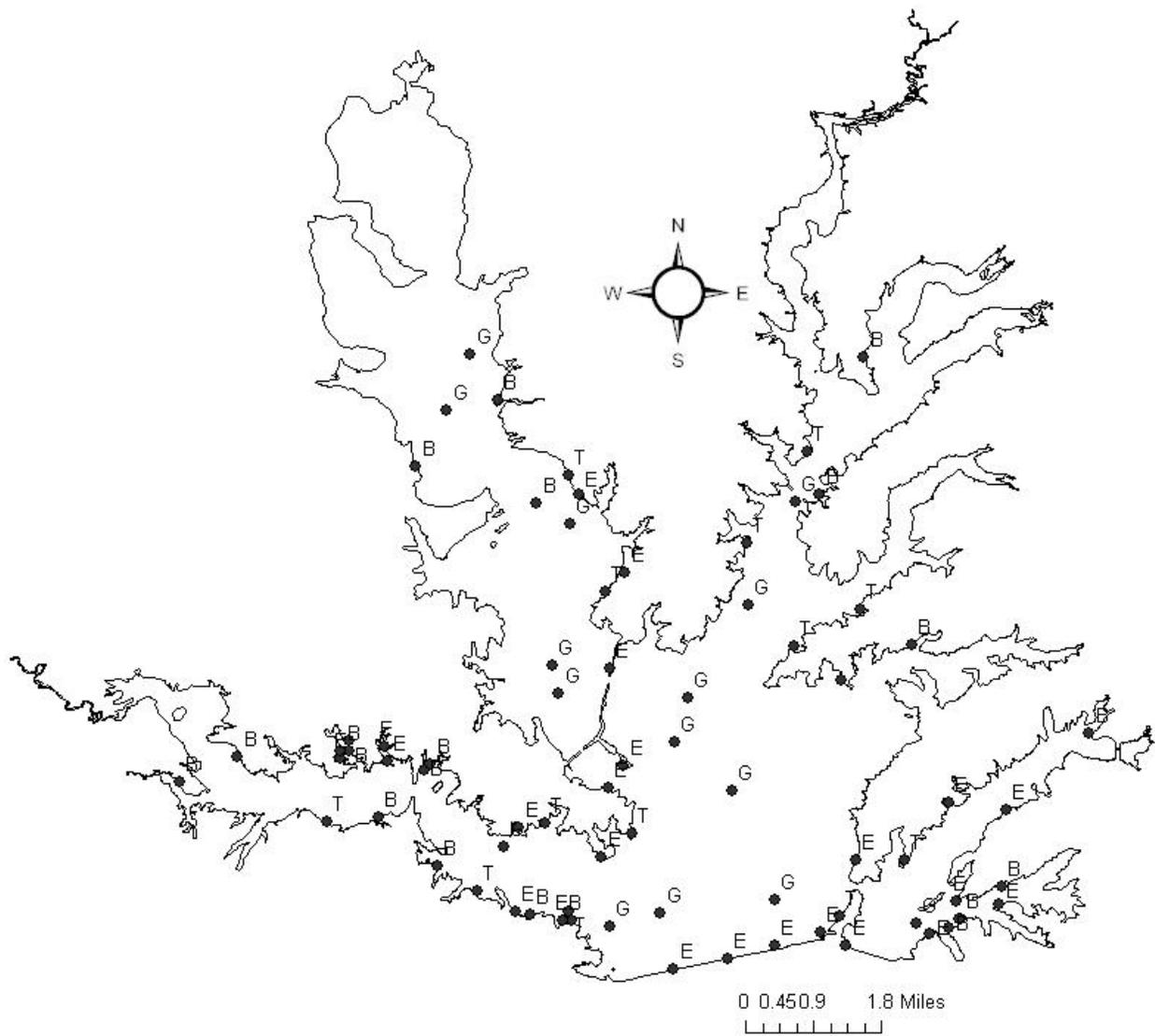
Survey Year	Electrofisher	Trap Net	Gill Net	Creel Survey	Vegetation Survey	Access Survey	Report
Fall 2012-Spring 2013							
Fall 2013-Spring 2014			A				
Fall 2014-Spring 2015							
Fall 2015-Spring 2016	S	S	S		S	S	S

APPENDIX A

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

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Longnose gar	2	0.1				
Gizzard shad	357	23.8			701	350.5
Threadfin shad	2	0.1			683	341.5
Common carp	1	0.1				
River carp sucker	1	0.1				
Smallmouth buffalo	114	7.6				
Blue catfish	107	7.1				
Channel catfish	35	2.3				
White bass	156	10.4				
Palmetto bass	68	4.5				
Bluegill					286	143.0
Longear sunfish					162	81.0
Redear sunfish					2	1.0
Spotted bass					42	21.0
Largemouth bass					146	73.0
White crappie	11	0.7	329	21.9		
Black crappie	1	0.1	85	5.7		
Freshwater drum	11	0.7				

APPENDIX B



Location of sampling sites, Lewisville 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 at time of electrofishing and trap netting was approximately 7 feet below conservation pool and at the time of gill netting was about one foot low.

APPENDIX C

Historical catch rates of targeted species by gear type for Lewisville Reservoir, Texas, for specified years.

Gear	Species	Year											
		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Gill Netting (fish/net night)	Blue catfish	0.0	0.1	0.0	0.3	0.1	0.1	0.1	0.5	0.7	1.3	1.4	3.5
	Channel catfish	5.0	7.0	5.0	6.0	6.2	3.0	3.3	2.3	2.7	2.1	1.9	3.0
	White bass	17.0	6.0	8.0	31.0	14.1	13.0	18.5	19.8	12.3	16.6	7.1	20.0
	Palmetto bass	2.0	4.0	1.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Striped bass	0.0	0.0	0.0	1.0	1.3	1.0	0.5	1.1	4.3	2.0	0.1	0.6
Electrofishing (fish/hour)	Gizzard shad	475.0	343.0	385.0	486.0	241.0	430.0	1125.0	619.0	144.5	526.0	210.5	202.5
	Threadfin shad	799.0	450.0	370.0	544.0	435.0	53.0	230.0	94.0	123.5	60.0	305.5	273.0
	Bluegill	248.0	82.0	160.0	202.0	163.0	73.0	65.0	69.0	50.5	6.0	138.0	119.5
	Longear sunfish	203.0	126.0	91.0	94.0	136.0	0.0	39.0	40.5	25.5	4.0	40.0	35.0
	Redear sunfish	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0
	Spotted bass	25.0	19.0	9.0	16.0	24.0	37.0	37.0	23.5	19.0	8.0	5.0	15.5
	Largemouth bass	130.0	92.0	151.0	126.0	141.0	105.0	94.0	99.0	94.0	39.0	117.0	89.5
Trap Netting (fish/net night)	White crappie	25.0	13.0	15.0	26.0	5.3	9.9	10.6	4.4	19.1	2.4	12.9	12.1
	Black crappie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

Appendix C, continued.

Gear	Species	Year										
		1999	2001	2002	2003	2004	2006	2007	2008	2010	2011	2012
Gill Netting (fish/net night)	Blue catfish	2.9		5.1		4.9	5.2		4.9	2.6		7.1
	Channel catfish	0.7		1.7		1.9	4.7		1.5	1.7		2.3
	White bass	24.7		3.7		5.3	4.9		10.0	13.3		10.4
	Palmetto bass	0.0		0.3		0.7	5.4		6.1	1.1		4.5
	Striped bass	0.9		0.0		0.0	0.0		0.0	0.0		0.0
Electrofishing (fish/hour)	Gizzard shad	346.0			552.5			364.5				350.5
	Threadfin shad	235.0			245.0			475.0				341.5
	Bluegill	42.0			111.5			314.0				143.0
	Longear sunfish	38.0			90.5			140.0				81.0
	Redear sunfish	0.0			0.0			13.0				1.0
	Spotted bass	21.0			30.5			31.5				21.0
	Largemouth bass	40.0			76.5			111.5				73.0
Trap Netting (fish/net night)	White crappie	4.7	40.5		29.5			12.5				21.9
	Black crappie	0.0	0.0		0.5			4.8				5.7

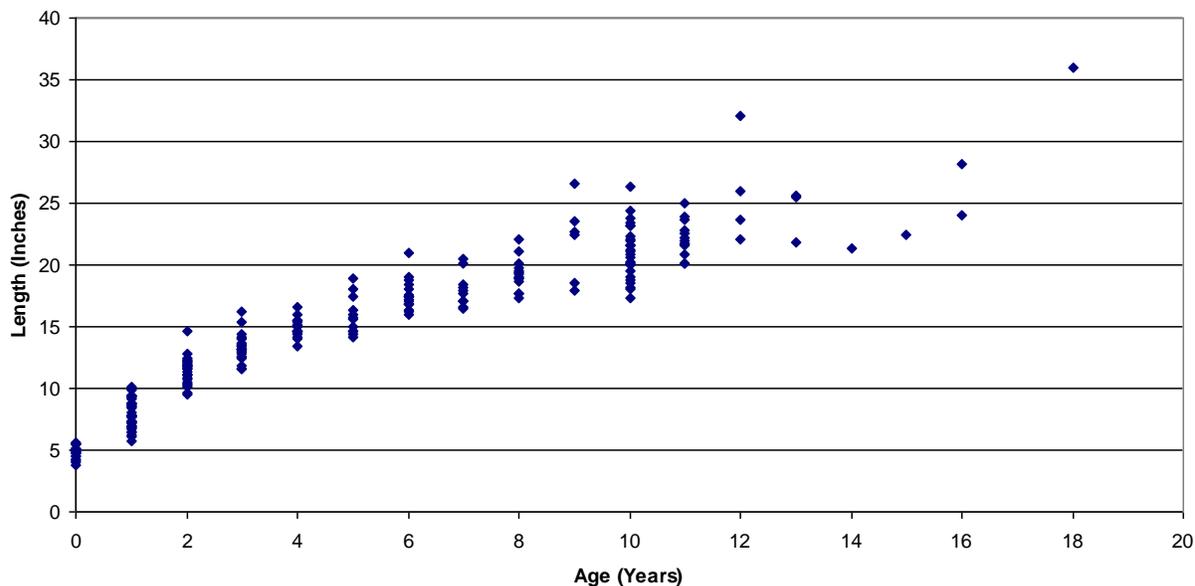
APPENDIX D

Blue catfish research project:

In 2009, an evaluation of a 30- to 45-inch slot length limit on blue catfish began on three Texas reservoirs: Lewisville, Richland-Chambers, and Waco. The regulation is part of a new catfish management plan currently being drafted, and will be an important tool to explore the potential for improving the size distribution of blue catfish in Texas waters. Catfish guiding and tournaments are on the increase, indicating a lot of interest in large catfish.

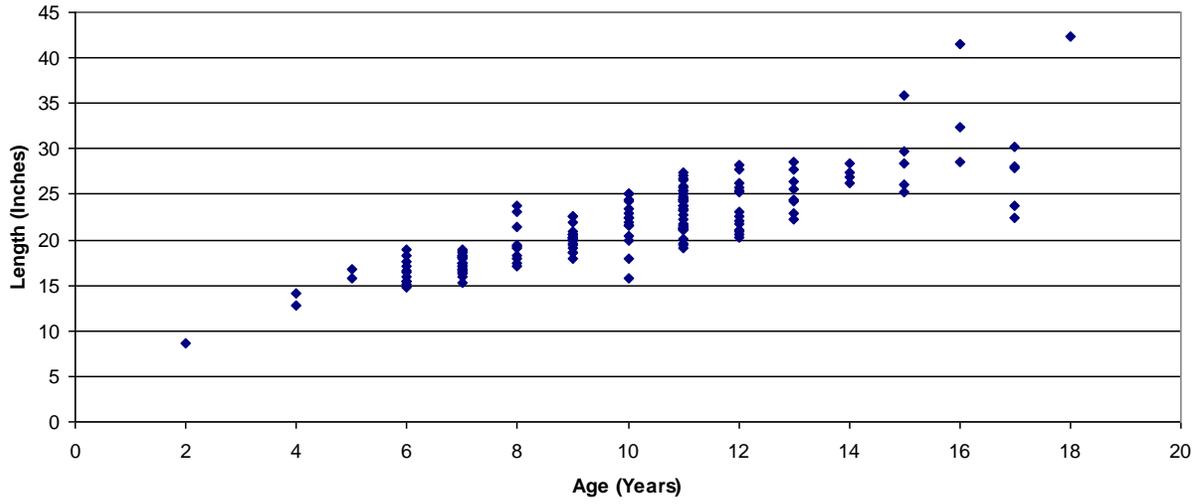
The study includes 5 objectives: 1) quantify winter jugline effort for blue catfish before and after the regulation is enacted, 2) measure jugline attitude and opinions, as well as economic impact, before and after the regulation is enacted, 3) measure pole-and-line angler attitude and opinions, as well as economic impact, after the regulation is enacted, 4) measure size structure of jugline harvest and size structure of the total blue catfish population before and after the regulation is enacted, and 5) determine if large blue catfish contaminants are above action levels.

A large-scale age and growth analysis was conducted in accordance with the project. In 2009, we conducted an electrofishing sample during daylight hours until 1000 blue catfish were collected. Every fish was measured and otoliths were obtained from five fish per cm. Additionally, blue catfish were collected from juglining and gill netting surveys conducted during the winter of 2009-2010. Five fish per cm were also aged from these samples. Below are the results of the age and growth analyses.

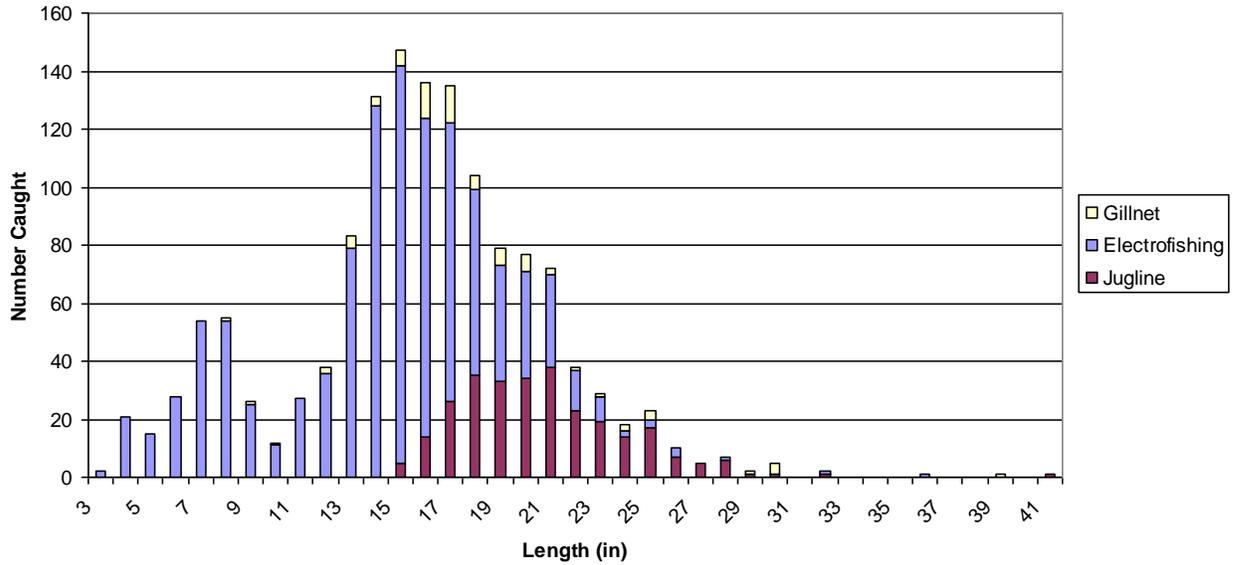


Age at length of blue catfish collected by daytime electrofishing in summer of 2009 at Lewisville Reservoir (N=236).

Appendix D, continued.



Age at length of blue catfish collected by juglining and gill netting in winter of 2009-2010 at Lewisville Reservoir (N=155).



A comparison of the size-structure of blue catfish caught by gillnet, low-pulse electrofishing, and jugline from Lewisville Reservoir in 2009-2010. Gillnetting N=74 (yellow), low-pulse electrofishing N=1030 (blue), and jugline N=280 (purple).