

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-1

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Lake O' the Pines

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake O' the Pines were surveyed in 2010 using electrofishing and trap netting and in 2011 using gill netting. Anglers were surveyed from June 2010 through May 2011 with a creel survey. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake O' the Pines is a 16,269-acre reservoir on Big Cypress Creek, which was constructed in 1956 by the U. S. Army Corps of Engineers (USACE) for flood control, municipal and industrial water supply, and public recreation. Habitat features consisted of inundated timber, brush, creek channels, and riprap. Water level has been relatively stable over the last year, allowing the growth of some aquatic vegetation throughout the reservoir.
- **Management history:** Important sport fish include largemouth bass, channel catfish, white bass, sunfish, and crappie. Palmetto bass stocking was discontinued due to low angler utilization. All fish species are currently managed under statewide harvest regulations except for crappie. From 1 December until the last day in February, anglers are required to keep the first 25 crappie they catch each day regardless of size to minimize excess mortality due to fish being caught in deep water.
- **Fish community**
 - **Prey species:** Threadfin shad were present in the reservoir. Electrofishing catch of gizzard shad has decreased since previous surveys and 63% of fish collected during the 2010 electrofishing survey were available as prey to sport fish. Bluegill catch has increased over the last three surveys, and many of these fish were available as prey to sport fish. Redbreast sunfish and redear sunfish serve as an additional prey source for predators and also grow to sizes desirable to anglers.
 - **Catfishes:** The channel catfish population had many fish above legal size and provided good angling opportunities. Gill net catch rates of channel catfish in 2011 have increased compared to previous surveys. Flathead catfish were also present in the reservoir. Catfish were the third most sought after fish by anglers.
 - **White bass:** Gill net catch rates of white bass in 2011 were higher than 2007 but lower than 2003. Few anglers targeted white bass during the 2010/2011 creel survey.
 - **Black basses:** Largemouth bass electrofishing catch rates were much higher than previous surveys. Growth rates were moderate. The average age of a 14-inch fish was 2.7 years. Largemouth bass as long as 24 inches were collected and body condition was good. Spotted bass were present and provide additional angling opportunities. Black basses were the most sought species group by anglers during the 2010/2011 creel survey.
 - **Crappie:** Even though crappie catch rates in trap nets were poor, a popular fishery existed. Directed angling effort toward crappie was 34% of the total hours spent fishing on the reservoir. This was second only to black basses.
- **Management strategies:** Conduct a supplemental electrofishing survey in fall 2012. Conduct general monitoring with electrofishing in 2014 and gill netting in 2015. Conduct annual surveys of invasive aquatic vegetation. Provide technical guidance to the controlling authority if the need arises to actively manage invasive aquatic plants. Stock Florida largemouth bass annually to maintain the quality of the fishery.

INTRODUCTION

This document is a summary of fisheries data collected from Lake O' the Pines from June 2010 through May 2011. 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 fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2010-2011 data for comparison.

Reservoir Description

Lake O' the Pines is a 16,269-acre reservoir located in Marion, Morris, Upshur, and Camp Counties on Big Cypress Creek. It was constructed in 1956 by the U. S. Army Corps of Engineers (USACE) for flood control, municipal and industrial water supply, and public recreation. Shoreline length is 144 miles with a shoreline development index of 7.5. Normal annual water level fluctuation is 2-3 feet, however the reservoir experienced a drought in 2006 and abnormally high water the end of 2009 (Figure 1). Bank fishing and boating access was available at numerous USACE parks and private marinas. Other descriptive characteristics for Lake O' the Pines are in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Bister and Brice 2007) included:

1. Monitor hydrilla and provide technical guidance to the controlling authority to develop management strategies if coverage becomes problematic.
Action: The hydrilla infestation has been monitored annually. Hydrilla has not caused access problems for anglers/boaters.
2. Monitor genetic composition of the largemouth bass population during the fall 2010 electrofishing survey and stock Florida largemouth bass if electrophoresis results indicate <20% Florida largemouth bass alleles.
Action: The 2010 electrofishing survey was conducted as scheduled to monitor the largemouth bass and prey fish populations, but no genetic analysis was conducted because Florida largemouth bass fingerlings were stocked during the same year.
3. Keep anglers and other public aware of harvest regulations, fishing methods, and other fisheries-related topics.
Action: During the survey period, public was informed of giant salvinia infestations and eradication efforts at two boat ramps on the reservoir, ShareLunker contributions and new largemouth bass lake records, and the discovery of bighead carp in the spillway below the reservoir.
4. Conduct roving angler creel survey from June 2010 through May 2011 to assess angling effort, catch and harvest.
Action: Creel survey was conducted as scheduled.

Harvest regulation history: Sport fishes in Lake O' the Pines are currently managed with statewide regulations, except for the winter crappie fishery (Table 2). A special regulation for white bass and palmetto bass (10-inch minimum length limit, daily aggregate bag limit of 25 fish of which only 5 may be 18 inches or greater) was removed after palmetto bass stocking was discontinued. Largemouth bass have been managed with a 14-inch minimum length limit and 5-fish daily bag since 1986. Other black bass were included under this regulation in 1988. The minimum length limit on spotted bass was removed in 2000, but the daily bag for black bass in any combination remains at 5 fish/day. The 12-inch minimum length limit and 25 fish daily bag for channel catfish and blue catfish (in any combination) has

been in effect since 1994. The minimum length limit for flathead catfish was reduced from 24 inches to 18 inches in 1994. There is a 5-fish daily bag limit on flathead catfish. In 1991, a special winter season regulation for crappie was implemented, which states that for black and white crappie caught from 1 December through the last day of February, there is no minimum length limit, the daily bag limit is 25 fish in any combination, and all crappie caught must be retained.

Stocking history: Channel catfish stockings in the late 1960s and 1970 established a self-sustaining population. Blue catfish were stocked in 1971 and 1994 but a self-sustaining population was not established. Florida largemouth bass were most recently stocked in 2009 and 2010. Palmetto bass (hybrid striped bass) were stocked from 1977 to 2000 to create and sustain the fishery. The stocking was discontinued due to low angler utilization. The complete stocking history is in Table 3.

Vegetation/habitat history: Hydrilla coverage was greater than 3,000 acres in 1999 and declined to 700 acres in 2002. By 2006, hydrilla coverage had increased to 3,500 acres. American lotus, Illinois pondweed, buttonbush, and *Chara sp.* have occurred at measurable levels during past surveys. Higher water levels during recent years have allowed for the growth of more plants throughout the reservoir.

Water Transfer: Lake O' the Pines provides water for eight cities and towns, numerous rural water districts, and several steel manufacturers and electricity generators. Current authorized inter-basin transfers include the City of Longview and Brandy Branch Reservoir (American Electric Power), which are both in the Sabine River watershed.

METHODS

Fishes were collected by electrofishing (2 hours at 24, 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 stations). An aquatic vegetation and structural habitat survey was conducted in September 2010. A roving angler creel survey consisting of 35 survey days (4 weekdays [only 3 weekday surveys were conducted during the spring quarter], 5 weekend days per quarter, from 1 June 2010 through 31 May 2011) was conducted to estimate angler catch, harvest rates, and angling effort. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for gill and trap netting, as the number of fish per net night (fish/nn). All survey sites were randomly selected and electrofishing, trap netting, gill netting, angler access, and angler creel surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and for creel statistics and SE was calculated for structural indices and IOV. Average age-at-length was determined using otoliths for largemouth bass 13.1 to 14.7 inches in 2008 (N = 13) and 13.2 to 14.6 inches in 2010 (N = 14). Source for water level data was the USACE website.

RESULTS AND DISCUSSION

Habitat: The majority of the reservoir perimeter was natural shoreline (Table 4). Hydrilla was the most dominant submersed aquatic plant. In 2010, there was an estimated 2,369 acres of hydrilla (Table 4). This was a reduction of approximately 1,000 acres since the last survey report when the reservoir level was 4.5 feet below normal pool elevation (Bister and Brice 2007). Alligatorweed (55 acres) and water hyacinth (41 acres) were also present during the 2010 survey (Table 4). Native submersed (429 acres), emergent (97 acres), and floating leaved vegetation (196 acres) were also present during the 2010 survey (Table 4). During this survey period, giant salvinia was discovered at two boat ramps on the reservoir. Containment and eradication efforts were made immediately following the discovery of giant salvinia at these locations and no plants have been found in the reservoir since then.

Creel: The angler creel survey conducted from June 2010 through May 2011 indicated directed fishing effort by anglers was highest for black bass (47%), followed by anglers fishing for crappie (34%) and catfish (17%) (Table 5). Total fishing effort for all species at Lake O' the Pines was 267,245 h, and anglers spent an estimated \$1,604,036 on direct expenditures (Table 6).

Prey species: Threadfin shad were present in the 2010 electrofishing survey (Appendix A). Electrofishing catch rate of gizzard shad was 85.5/h in 2010, which was a decline from 2008 (174.5/h) and 2006 (321.0/h) (Figure 2). Index of vulnerability (IOV) for gizzard shad was good, indicating that 63% of gizzard shad were available to predators; this was higher than IOV estimates in 2008, but similar to 2006 (Figure 2). Bluegill electrofishing catch rate has increased from 288.5/h in 2006 to 490.0/h in 2008 and 674/h in 2010 (Figure 4). The catch rate of redear sunfish in 2010 was 211.5/h, which was similar to 2008 (200.0/h) and higher than 2006 (131.0/h) (Figure 5). In addition to their function as a prey fish, redbreast sunfish, bluegill, and redear sunfish were present at larger sizes and available to anglers (Figures 3-5). Directed sunfish angling effort and harvest were low (Table 7, Figure 6).

Catfish: The gill net catch rate of channel catfish was 25.0/nn in 2011, which was higher than catch rates in 2007 and 2003 (Figure 7). Many fish were collected that were greater than the 12-inch minimum length limit. Historically, growth of channel catfish has been fast with fish reaching legal size in 2 or 3 growing seasons (Ryan and Brice 2003). Body condition was good with mean W_r for most inch groups >95 (Figure 7). Flathead catfish were also collected during the 2011 gill net survey (Figure 8) and provide an additional angling opportunity. Catfish were the third most sought species group during the 2010/2011 angler creel survey (Table 5). Angling catch rate of catfish was >3 fish/h and anglers only released 12% of legal-sized fish that were caught, indicating a highly consumptive fishery (Table 8). Harvested channel catfish ranged from 12 to 24 inches in length (Figure 9).

White bass: Despite a popular spring fishery in Big Cypress Creek above Lake O' the Pines during the white bass spawning run, only 0.4% of directed angling effort occurred for white bass during the 2010/2011 creel survey (Table 5). Only one harvested white bass was observed during the creel period (Figure 11). The gill net catch rate of white bass in 2011 (3.7/nn) was higher than 2007 (2.3/nn) but lower than 2003 (7.3/nn). Body condition was excellent in 2011 with mean W_r for all inch groups >95 (Figure 10).

Black bass: The electrofishing catch rate of largemouth bass (Figure 13) was 329.5/h in 2010, which was much higher than 2008 (137.5/h) and 2006 (173.5/h). Much of this difference was attributed to high recruitment in 2010, which was likely related to high water levels early in the year when there was abundant inundated cover for nursery areas. Growth of largemouth bass was moderate in 2010. The average age at 14 inches (13.2-14.6 inches) was 2.7 years ($N = 13$; range = 2-4 years). This was slower than growth observed during the 2008 survey, in which the average age at 14 inches (13.1-14.7 inches) was 1.4 years ($N = 13$; range = 1-2 years). Body condition in 2010 was good (W_r above 95) for most size classes of fish (Figure 13). The relative abundance of spotted bass was lower in 2010 (39.0/h) compared to 2008 (55.0/h) but higher than 2006 (20.5/h) (Figure 12). This species provides an additional

opportunity for anglers.

Black basses were the most popular species group among anglers. Directed effort toward black basses accounted for 47.3% of the total angling effort at the reservoir during the 2010/2011 creel survey period (Table 5). Angling catch rate of black basses was approximately 1 fish/h (Table 10), which was almost twice that of estimated black bass catch rates during a 2009/2010 creel survey at neighboring Caddo Lake (Bister and Brice 2010). Even though some traditional harvest was observed, 76% of largemouth bass observed in live wells during the creel survey were retained by anglers during live-release tournaments (Figure 14).

Crappie: Even though trap nets have not shown an abundant crappie population (Figures 15 and 16), this species group was very popular with anglers. Directed effort toward crappie accounted for 34% of angling effort during the 2010/2011 creel survey period, which was second only to black basses (Table 5). Anglers caught almost 2 fish/h and harvested an estimated 119,942 crappie (Table 11). Anglers only released 1% of legal-sized crappie that were caught during the year-long survey (Table 11). Harvested fish ranged from 7 to 16 inches in length (Figure 17). This includes fish harvested during the winter quarter when anglers are required to keep the first 25 crappie they catch each day regardless of size.

Fisheries management plan for Lake O' the Pines, Texas

Prepared – July 2011

ISSUE 1: Lake O' the Pines has experienced infestations of invasive aquatic plants. During this survey period, giant salvinia was discovered at two boat ramps on the reservoir. Containment and eradication efforts were made immediately following the discovery of giant salvinia at these locations and no plants have been found in the reservoir since then. However, monitoring should be conducted to identify future giant salvinia infestations. Hydrilla, water hyacinth, and alligatorweed also occur in the reservoir, and even though coverage can be abundant in certain areas, they have not caused any access-related problems to anglers or boaters at this time. However, access restrictions due to these invasive plants should be monitored.

MANAGEMENT STRATEGY

1. Maintain communication with the USACE regarding invasive aquatic plant infestations and develop an invasive aquatic plant management plan.
2. Conduct an annual survey of invasive aquatic plants in the reservoir.

ISSUE 2: Lake O' the Pines has an excellent largemouth bass fishery and has demonstrated the ability to produce trophy fish. During the 2009/2010 Toyota ShareLunker season, a 13.2-lb. and a 15.13-lb largemouth bass (the current lake record) were contributed to the program. In order to maintain the trophy potential of the largemouth bass fishery, supplemental stocking of Florida largemouth bass (FLMB) should be conducted. In addition, supplemental electrofishing surveys should be conducted to monitor the largemouth bass population, FLMB genetic influence, and prey fish populations.

MANAGEMENT STRATEGIES

1. Conduct electrofishing survey in fall 2012 to monitor largemouth bass and prey species populations and assess FLMB genetic influence.
2. Conduct electrofishing survey in fall 2014 to monitor largemouth bass and prey species.
3. Request FLMB stocking annually at a rate of 25 fish/acre.

ISSUE 3: Anglers and stakeholders need to be informed about fisheries management activities, fishing opportunities, and other issues on Lake O' the Pines.

MANAGEMENT STRATEGIES

1. Continue to provide news releases to the print and broadcast media.
2. Continue to provide fisheries presentations to public regarding issues/angling opportunities at Lake O' the Pines.

ISSUE 4: Bighead carp were discovered in the spillway below Lake O' the Pines during fall 2010. Additional bighead carp were removed from the spillway during a dewatering operation in spring 2011. Currently, the dam at Lake O' the Pines is a barrier to the upstream movement of bighead carp. Anglers should be aware of the presence of this invasive species so they will not transport them to other waters.

MANAGEMENT STRATEGIES

1. Create signage to post at the Lake O' the Pines spillway to alert anglers to the presence of bighead carp and the environmental threat they pose to surrounding waters.

ISSUE 5: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels 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 and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling 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 and literature so that they can educate their customers.
3. Educate the public about invasive species through the use of appropriate media.
4. Discuss invasive species when presenting to constituent and user groups.
5. Document existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes annual invasive aquatic vegetation monitoring, a supplemental electrofishing survey in 2012, and required angler access, electrofishing, and gill netting surveys in 2014/2015 (Table 12). A winter creel survey will be conducted in 2014/2015 to collect crappie for age-and-growth analysis. Annual invasive aquatic vegetation surveys are necessary to identify new infestations and provide coverage estimates of existing infestations to the controlling authority. Supplemental electrofishing in 2012 will be conducted to monitor the largemouth bass and prey fish populations. Genetic analysis of largemouth bass in fall 2012 will be used to monitor the Florida largemouth bass genetics in the population.

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Monthly Water Level

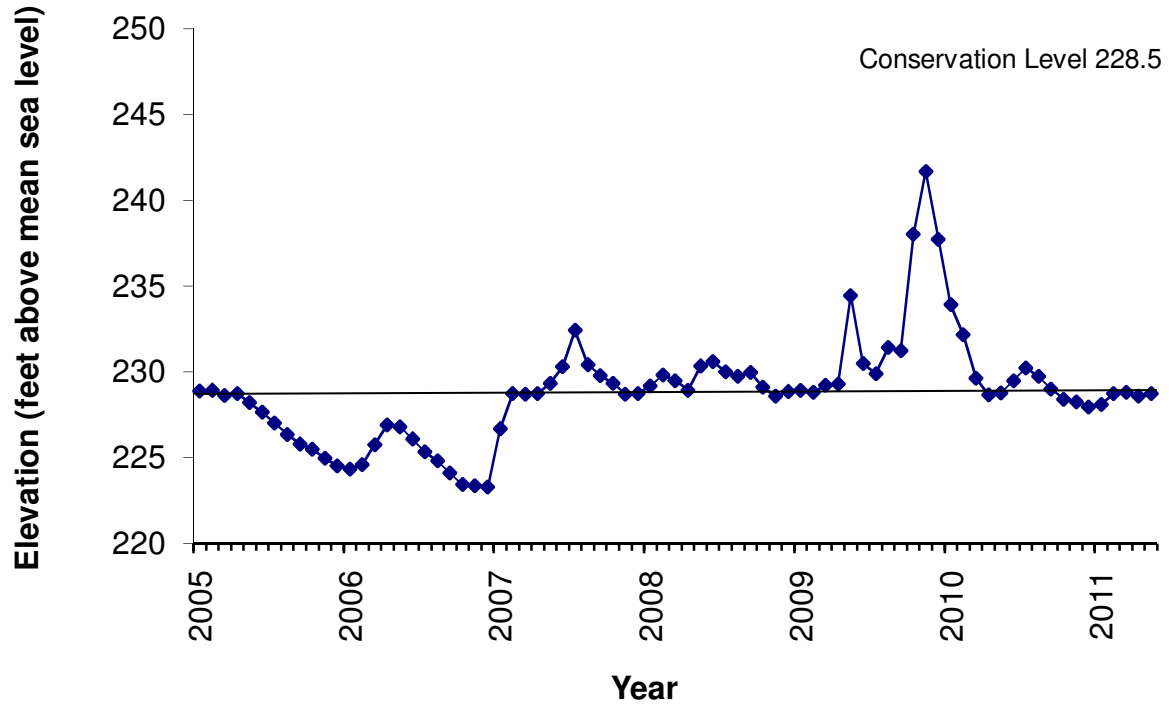


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Lake O' the Pines, Texas. The horizontal line denotes conservation pool elevation.

Table 1. Characteristics of Lake O' the Pines, Texas.

Characteristic	Description
Year constructed	1956
Controlling authority	U. S. Army Corps of Engineers
Counties	Marion, Morris, Upshur, and Camp
Reservoir type	Mainstream
Shoreline development index (SDI)	7.5
Conductivity	178 umhos/cm

Table 2. Harvest regulations for Lake O' the Pines, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish, channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No Limit
Catfish, flathead	5	18 - No Limit
Bass, white	25	10 - No Limit
Bass, palmetto	5	18 - No Limit
Bass, largemouth	5 ^a	14 – No Limit
Bass, spotted	5 ^a	No Limit - No Limit
Crappie, white and black crappie, their hybrids and subspecies	25 (in any combination)	10 ^b - No Limit

^a Daily bag for largemouth bass and spotted bass = 5 in any combination.

^b For black and white crappie caught from 1 December through the last day of February, there is no minimum length limit, daily bag = 25 in any combination, and all crappie caught must be retained.

Table 3. Stocking history of Lake O' the Pines, Texas. Size categories are FRY =<1 inch, FGL = 1-3 inches, AFGL = 8 inches, and UNK = unknown.

Species	Year	Number	Size
Blue catfish	1971	19,654	UNK
	1994	307,248	FGL
	Total	326,902	
Channel catfish	1968	206,000	AFGL
	1969	27,000	AFGL
	1970	317,763	AFGL
	Total	550,763	
Florida largemouth bass	1982	500	AFGL
	1982	59,838	FGL
	1983	306,332	FGL
	1992	468,146	FGL
	1993	458,002	FGL
	1998	467,500	FGL
	2000	447,154	FGL
	2009	408,658	FGL
	2010	407,949	FGL
	Total	3,024,079	
ShareLunker largemouth bass	2010	2,017	FGL
	Total	2,017	
Paddlefish	1992	15,401	UNK
	1998	9,646	UNK
	Total	25,047	
Palmetto bass	1977	157,505	UNK
	1979	180,000	UNK
	1981	177,815	UNK
	1994	191,338	FGL
	1995	280,754	FGL
	1996	140,612	FRY
	1997	50,658	FGL
	1998	191,837	FGL
	1999	62,182	FGL
	2000	44,931	FGL
	Total	1,477,632	
Smallmouth bass	1980	285,000	UNK
	1982	30,000	UNK
	Total	315,000	

Table 4. Survey of littoral zone and physical habitat types, Lake O' the Pines, Texas, 2010. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for each type of aquatic vegetation found. Water level was 0.5 feet above full pool at the time of the survey.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	2.0	1.4		
Natural shoreline	124.8	86.7		
Natural shoreline & boat docks	1.7	1.2		
Rocky shoreline	14.1	9.8		
Rock bluff	1.0	0.7		
Gravel shoreline	0.3	0.2		
Native submerged vegetation			429.2	2.6
Native emergent vegetation			97.4	0.6
Native floating-leaved			195.9	1.2
Non-native				
Alligatorweed			55.2	0.3
Hydrilla			2,368.8	14.6
Water hyacinth			40.5	0.2

Table 5. Percent directed angler effort by species for Lake O' the Pines, Texas, 2010/2011.

Species/Group	2010/2011
Black bass	47.3
Crappie	34.0
Catfish	16.5
Sunfish	1.2
Anything	0.6
White bass	0.4

Table 6. Total fishing effort (h) for all species and total directed expenditures at Lake O' the Pines, Texas, 2010/2011.

Creel statistic	2010/2011
Total fishing effort (h)	267,245
Total directed expenditures	\$1,604,036

Gizzard Shad

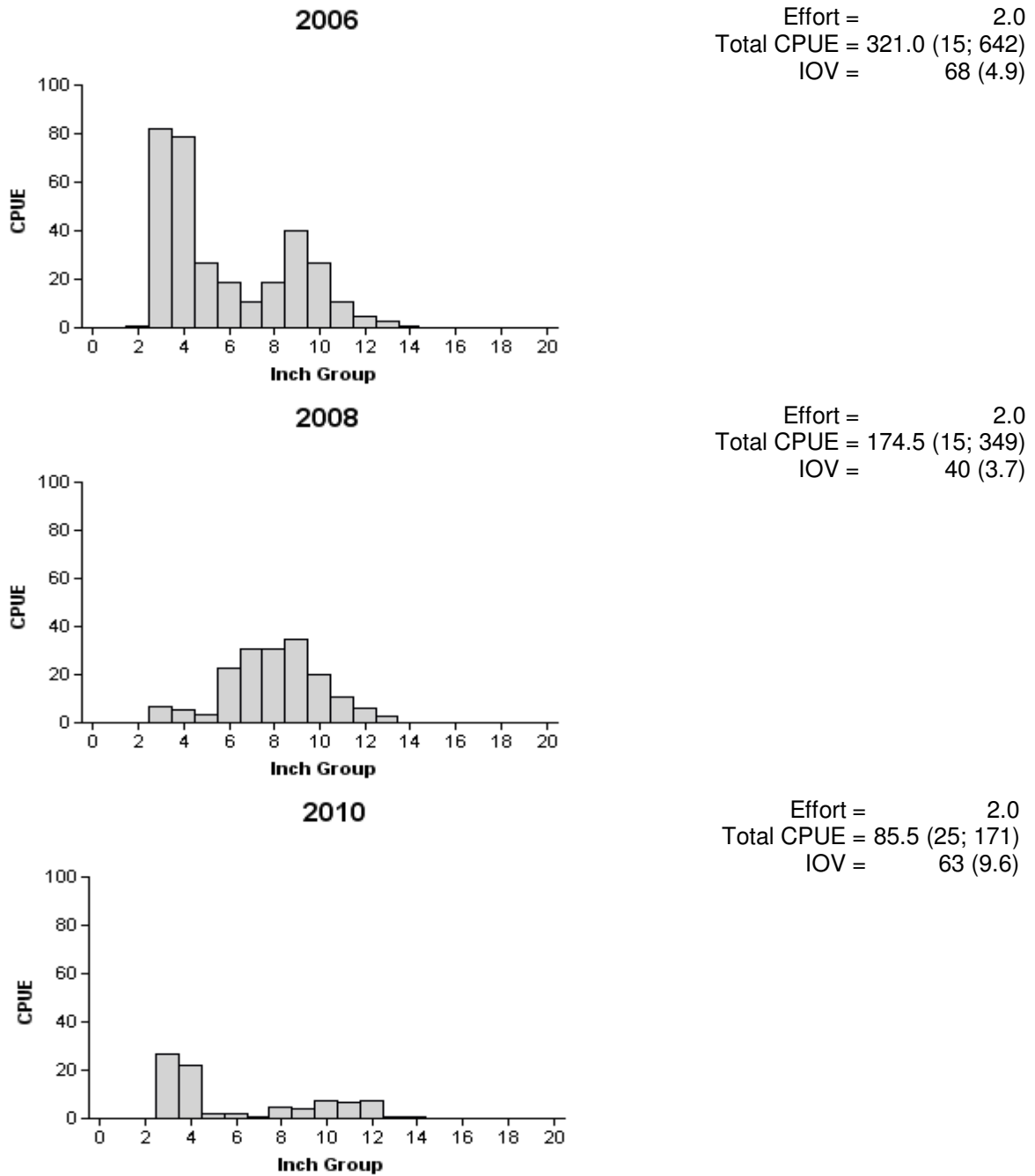


Figure 2. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2006, 2008, and 2010.

Redbreast Sunfish

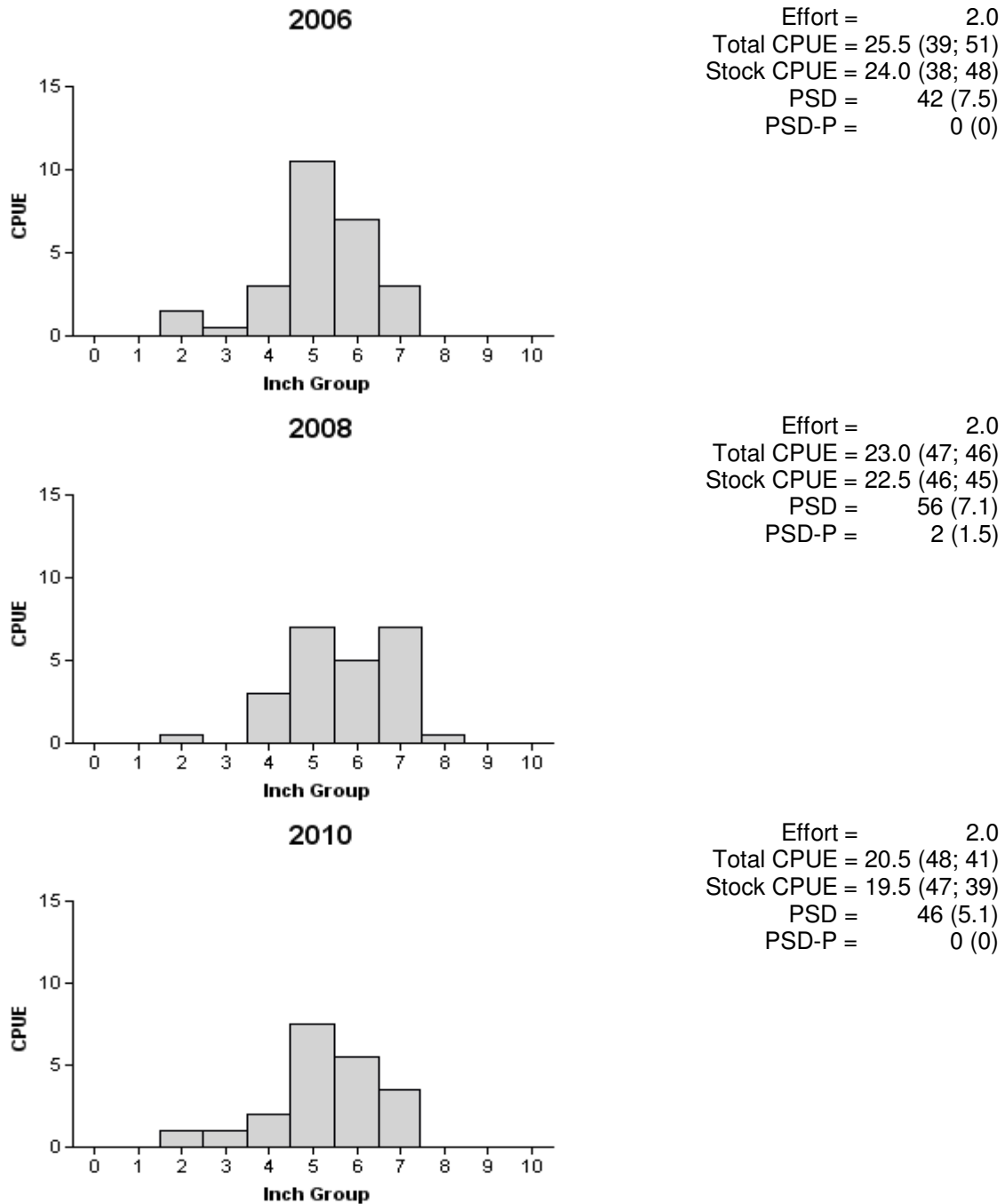
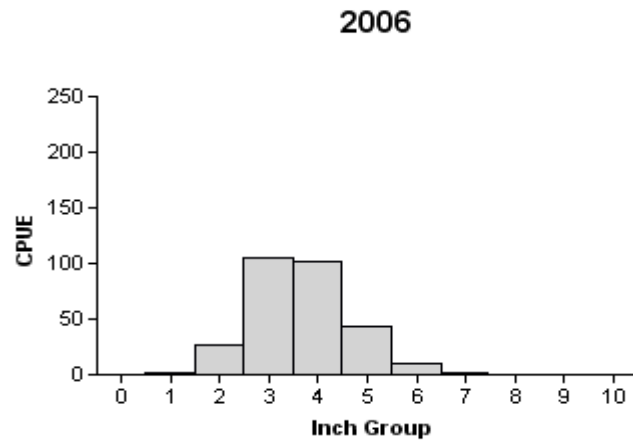


Figure 3. Number of redbreast sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2006, 2008, and 2010.

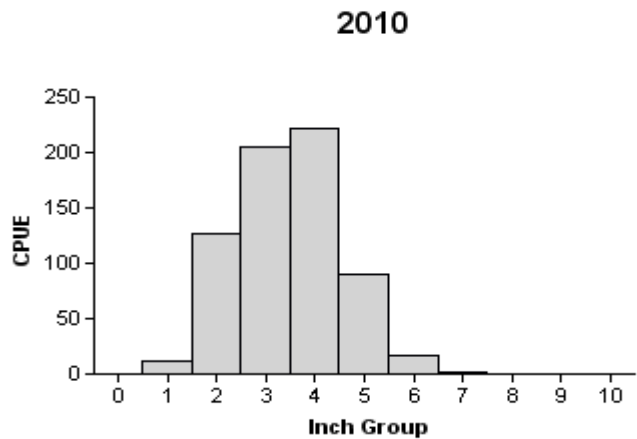
Bluegill



Effort = 2.0
 Total CPUE = 288.5 (23; 577)
 Stock CPUE = 260.5 (24; 521)
 PSD = 4 (1.1)
 PSD-P = 0 (0)



Effort = 2.0
 Total CPUE = 490.0 (18; 980)
 Stock CPUE = 437.5 (19; 875)
 PSD = 4 (0.9)
 PSD-P = 0 (0)



Effort = 2.0
 Total CPUE = 674.0 (14; 1348)
 Stock CPUE = 536.0 (15; 1072)
 PSD = 4 (0.7)
 PSD-P = 0 (0.1)

Figure 4. 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, Lake O' the Pines, Texas, 2006, 2008, and 2010.

Redear Sunfish

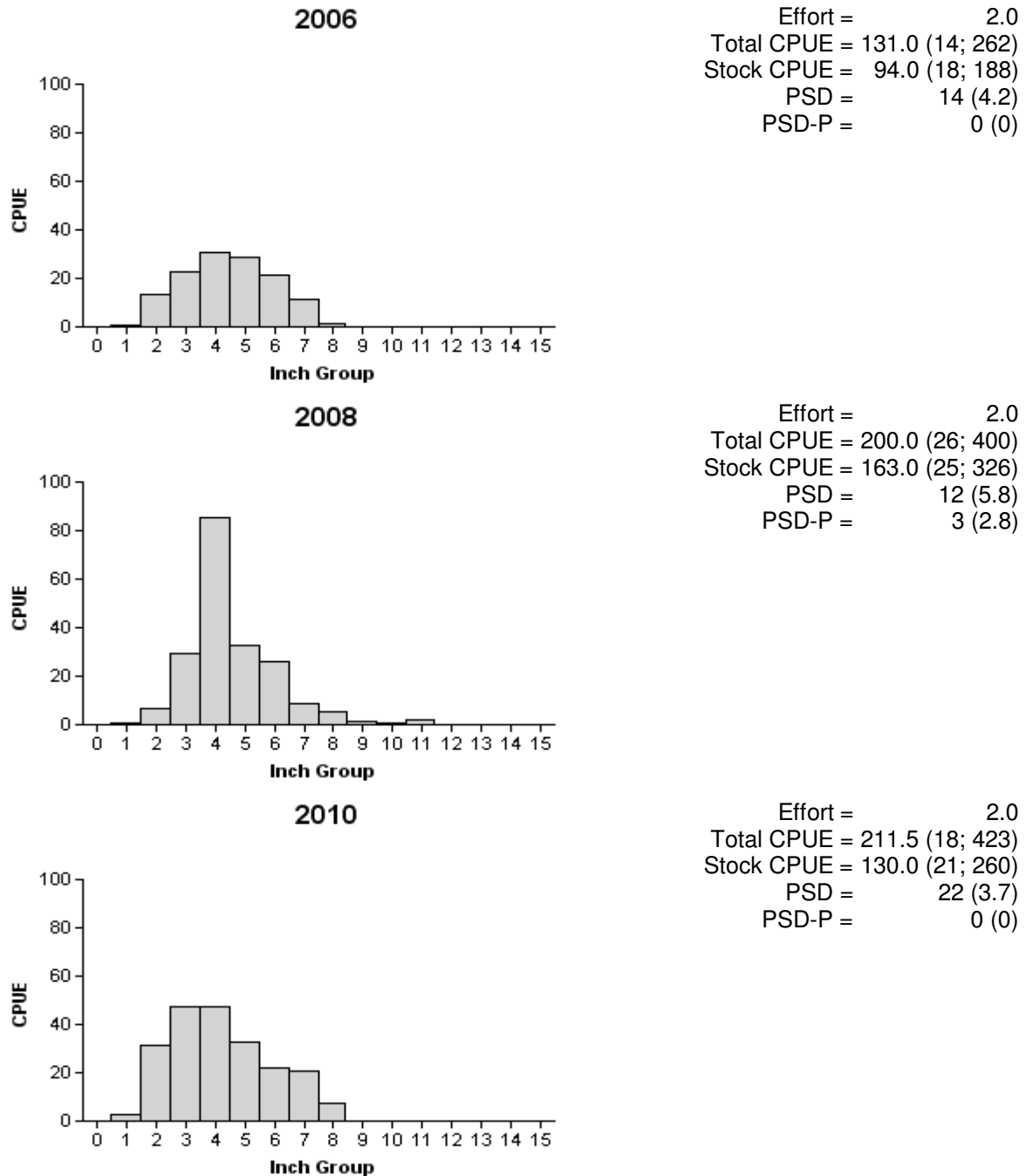


Figure 5. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2006, 2008, and 2010.

Sunfishes

Table 7. Creel survey statistics for sunfishes at Lake O' the Pines, Texas from June 2010 through May 2011 where total catch per hour is for anglers targeting sunfish and total harvest is the estimated number of all sunfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2010/2011
Directed effort (h)	3,117 (59)
Directed effort/acre	0.19 (59)
Total catch per hour	7.02 (18)
Total harvest	2,680 (232)
Sunfish (unidentified)	379 (210)
Bluegill	1,273 (195)
Redear sunfish	1,028 (286)
Harvest/acre (Total)	0.16 (232)
Percent legal released	90

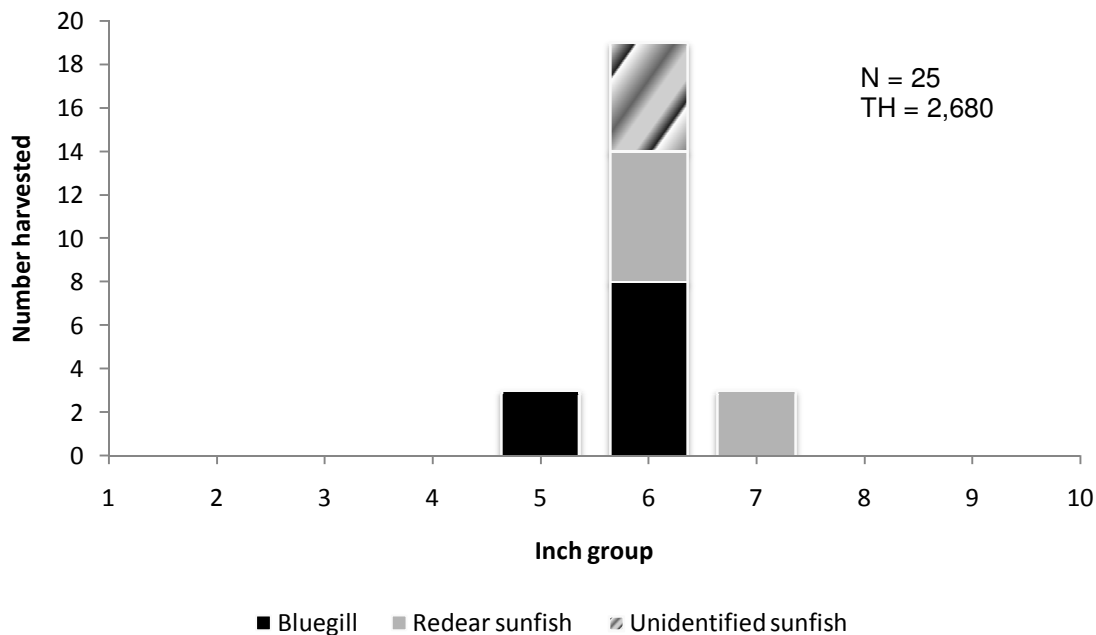


Figure 6. Length frequency of harvested sunfish (bluegill, redear sunfish, and unidentified sunfish) observed during creel surveys at Lake O' the Pines, Texas June 2010 through May 2011, all anglers combined. N is the number of harvested sunfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Channel Catfish

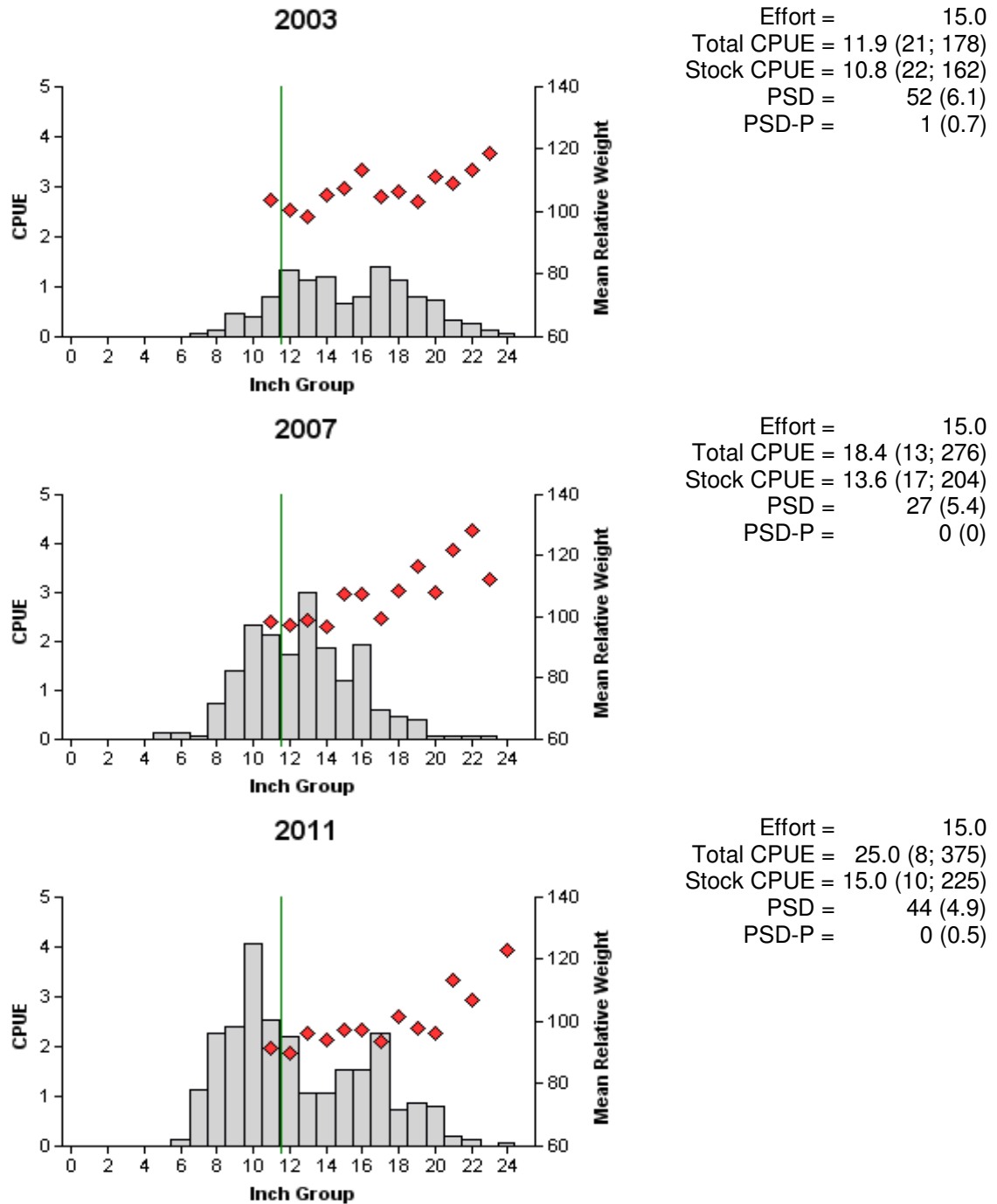


Figure 7. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake O' the Pines, Texas, 2003, 2007, and 2011. Vertical line indicates minimum length limit.

Flathead Catfish

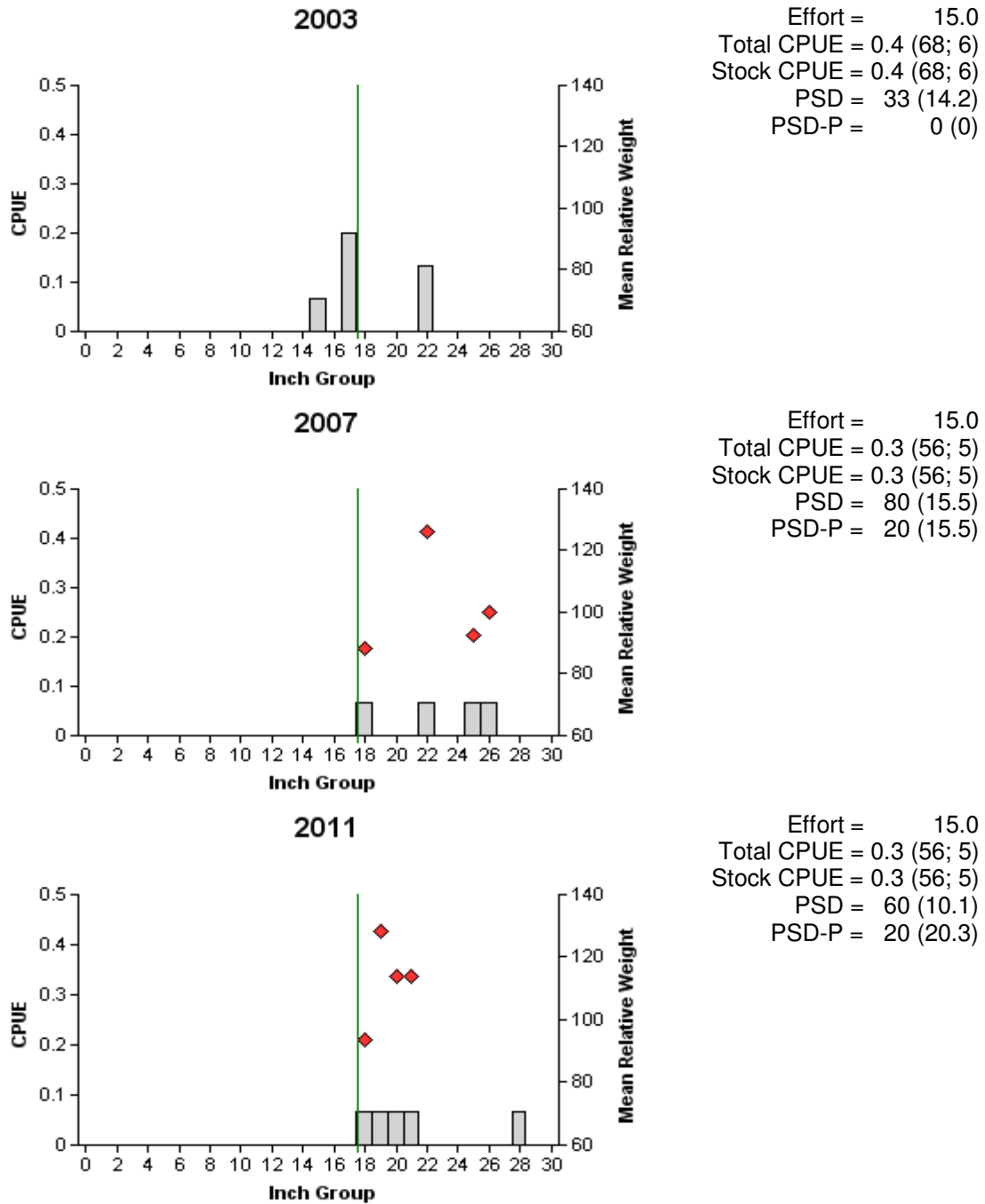


Figure 8. Number of flathead catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake O' the Pines, Texas, 2003, 2007, and 2011. Vertical line indicates minimum length limit.

Catfish

Table 8. Creel survey statistics for catfish at Lake O' the Pines, Texas from June 2010 through May 2011, where total catch per hour is for anglers targeting catfish and total harvest is the estimated number of channel catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2010/2011
Directed effort (h)	44,010 (22)
Directed effort/acre	2.71 (22)
Total catch per hour	3.17 (38)
Total harvest	52,571 (51)
Harvest/acre	3.21 (51)
Percent legal released	12

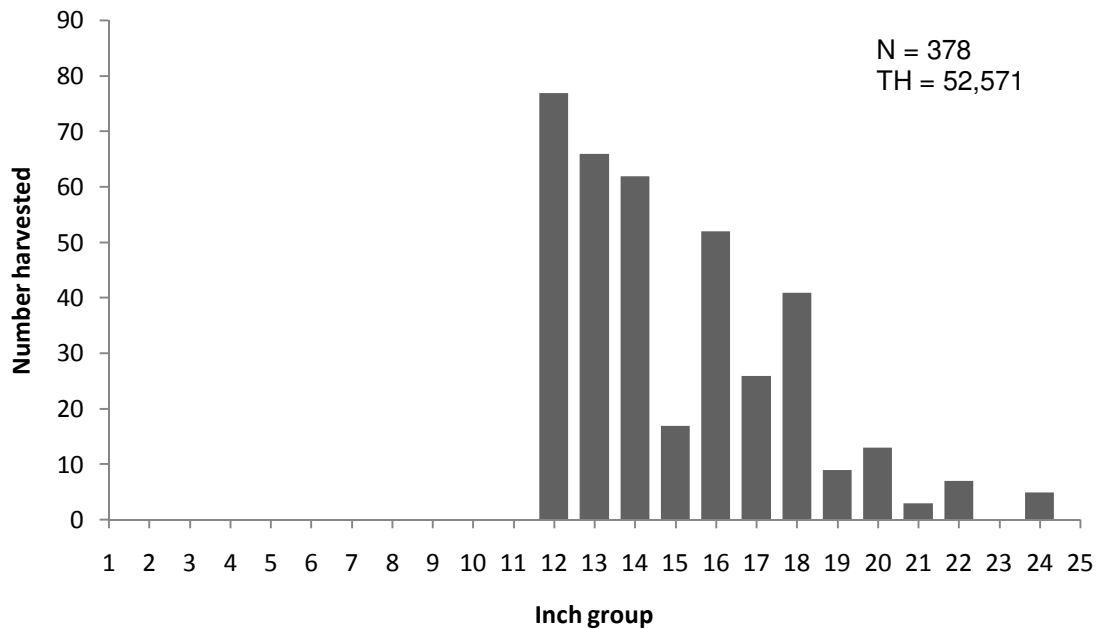


Figure 9. Length frequency of harvested channel catfish observed during creel surveys at Lake O' the Pines, Texas from June 2010 through May 2011, all anglers combined. N is the number of harvested channel catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

White Bass

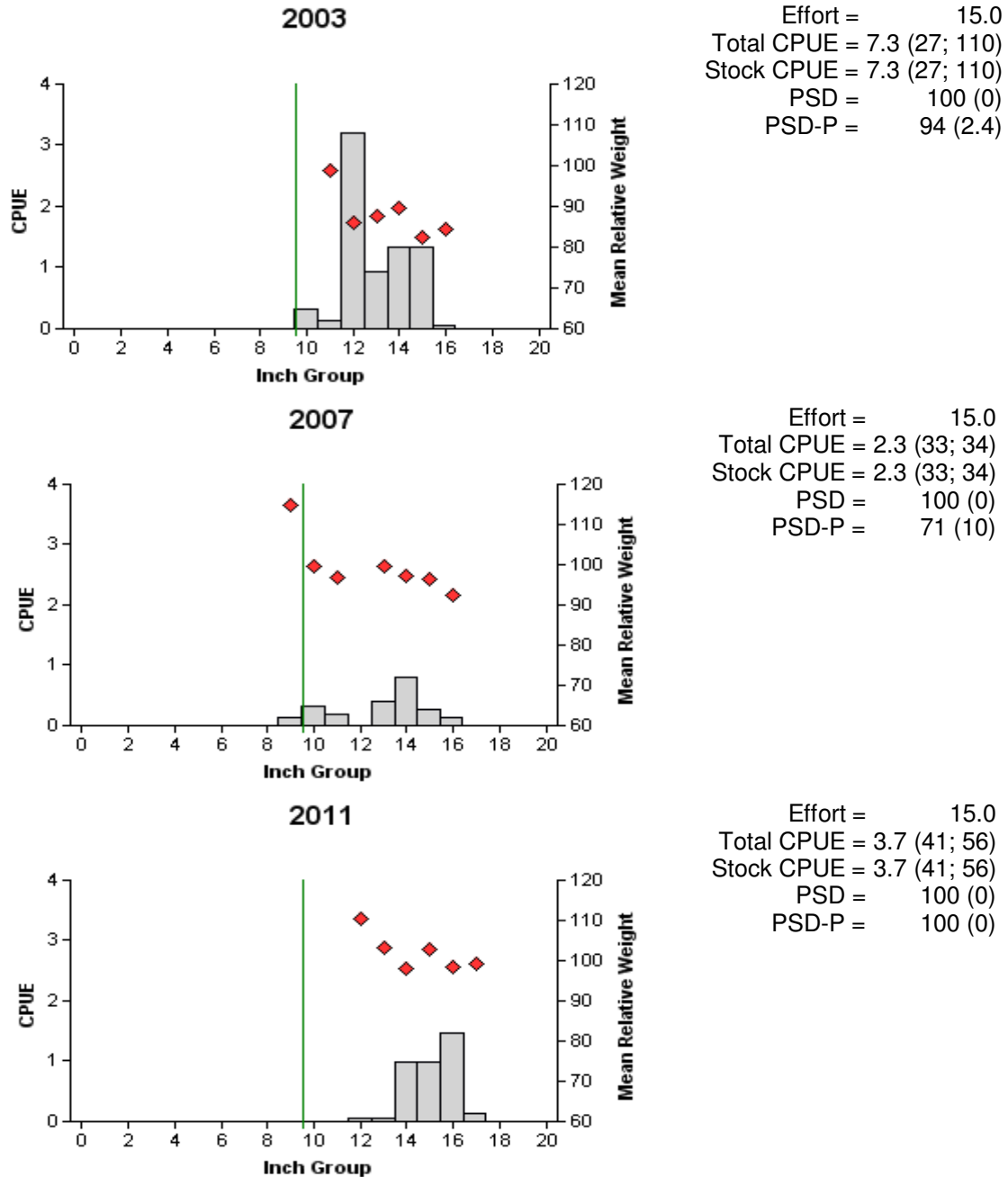


Figure 10. Number of white bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake O' the Pines, Texas, 2003, 2007, and 2011. Vertical line indicates minimum length limit.

White bass

Table 9. Creel survey statistics for white bass at Lake O' the Pines, Texas from June 2010 through May 2011, 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	Year
	2010/2011
Directed effort (h)	961 (92)
Directed effort/acre	0.06 (92)
Total catch per hour	1.33 (^a)
Total harvest	139 (1,103)
Harvest/acre (Total)	0.01 (1,103)
Percent legal released	73

^a Unable to calculate RSE due to low sample size.

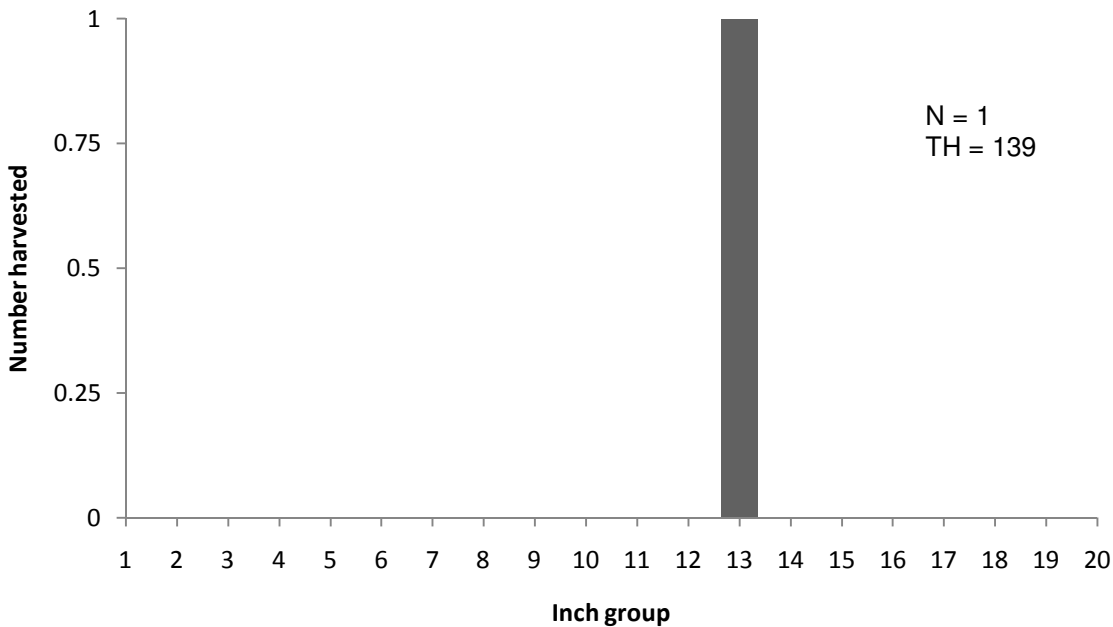
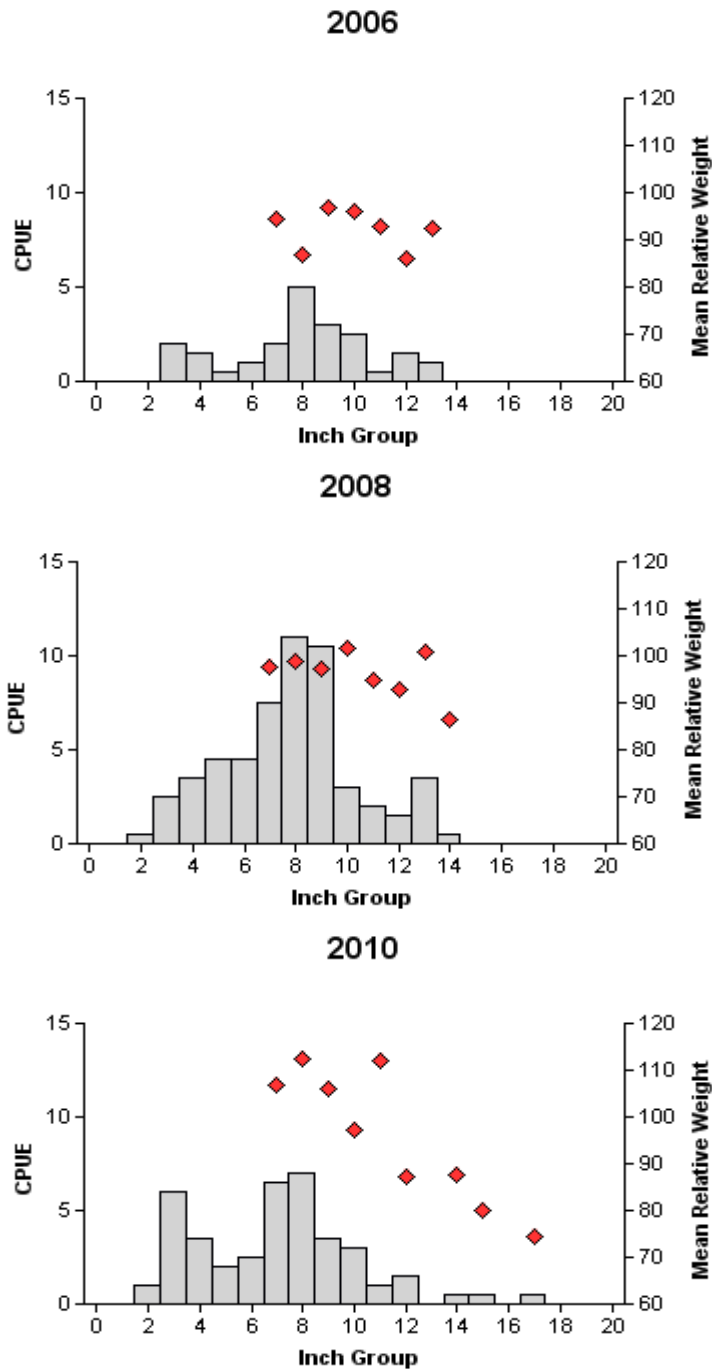


Figure 11. Length frequency of harvested white bass observed during creel surveys at Lake O' the Pines, Texas from June 2010 through May 2011, all anglers combined. N is the number of harvested white bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Spotted Bass



Effort = 2.0
 Total CPUE = 20.5 (23; 41)
 Stock CPUE = 15.5 (22; 31)
 PSD = 19 (5.3)
 PSD-P = 0 (0)

Effort = 2.0
 Total CPUE = 55.0 (29; 110)
 Stock CPUE = 39.5 (31; 79)
 PSD = 19 (3.7)
 PSD-P = 1 (1.1)

Effort = 2.0
 Total CPUE = 39.0 (28; 78)
 Stock CPUE = 24.0 (31; 48)
 PSD = 17 (4.1)
 PSD-P = 6 (2.7)

Figure 12. 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, Lake O' the Pines, Texas, 2006, 2008, and 2010.

Largemouth Bass

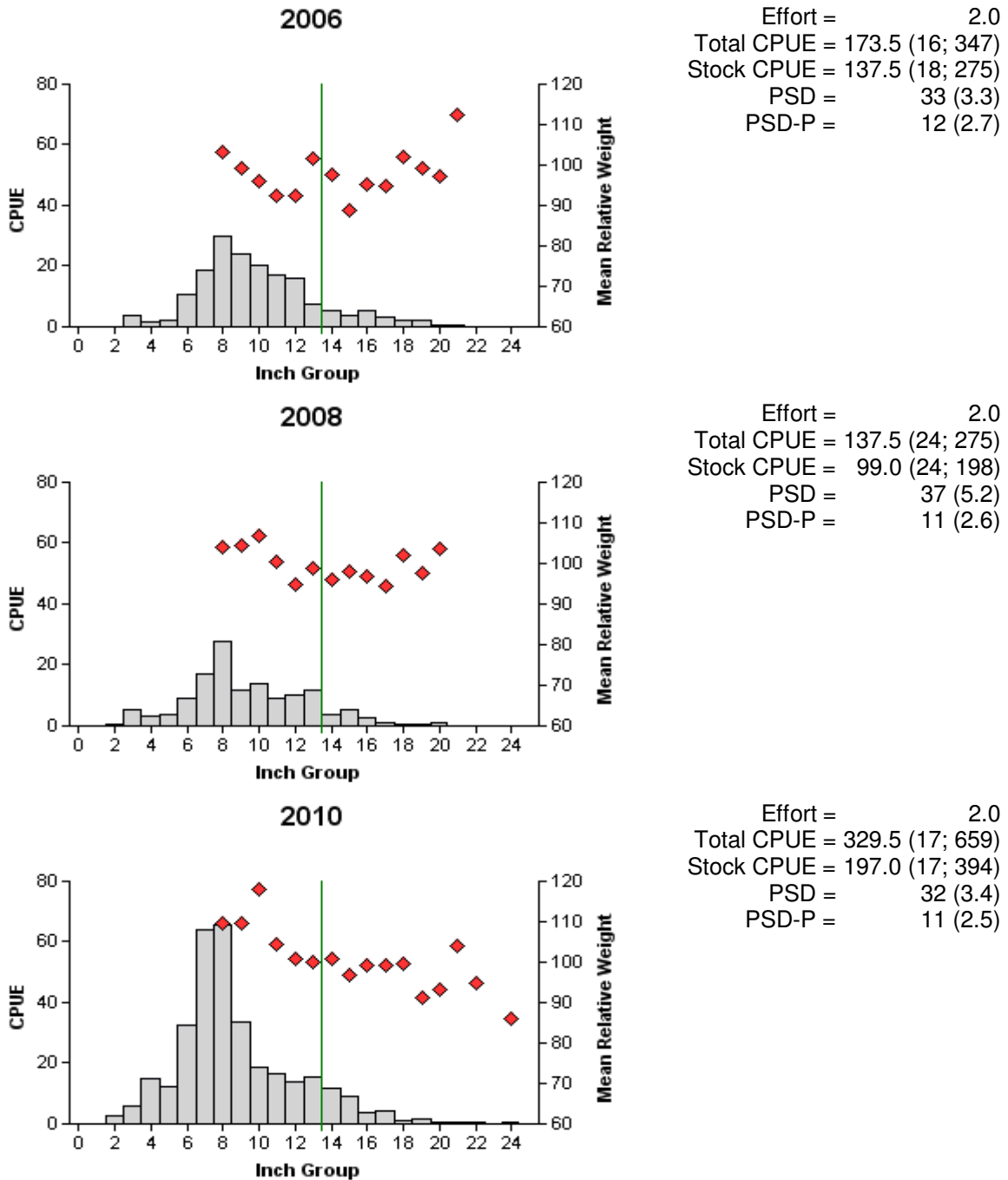


Figure 13. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake O' the Pines, Texas, 2006, 2008, and 2010. Vertical line indicates minimum length limit.

Black Bass

Table 10. Creel survey statistics for black bass at Lake O' the Pines, Texas from June 2010 through May 2011, where total catch per hour is for anglers targeting black bass and total harvest is the estimated number of black bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2010/2011
Directed effort (h)	126,520 (23)
Directed effort/acre	7.78 (23)
Total catch per hour	1.01 (23)
Total harvest (all black bass)	24,714 (54)
Spotted bass	203 (764)
Largemouth bass	24,512 (48)
Harvest/acre (Total)	1.52 (54)
Percent legal released	56 ^a

^a Only calculated for largemouth bass.

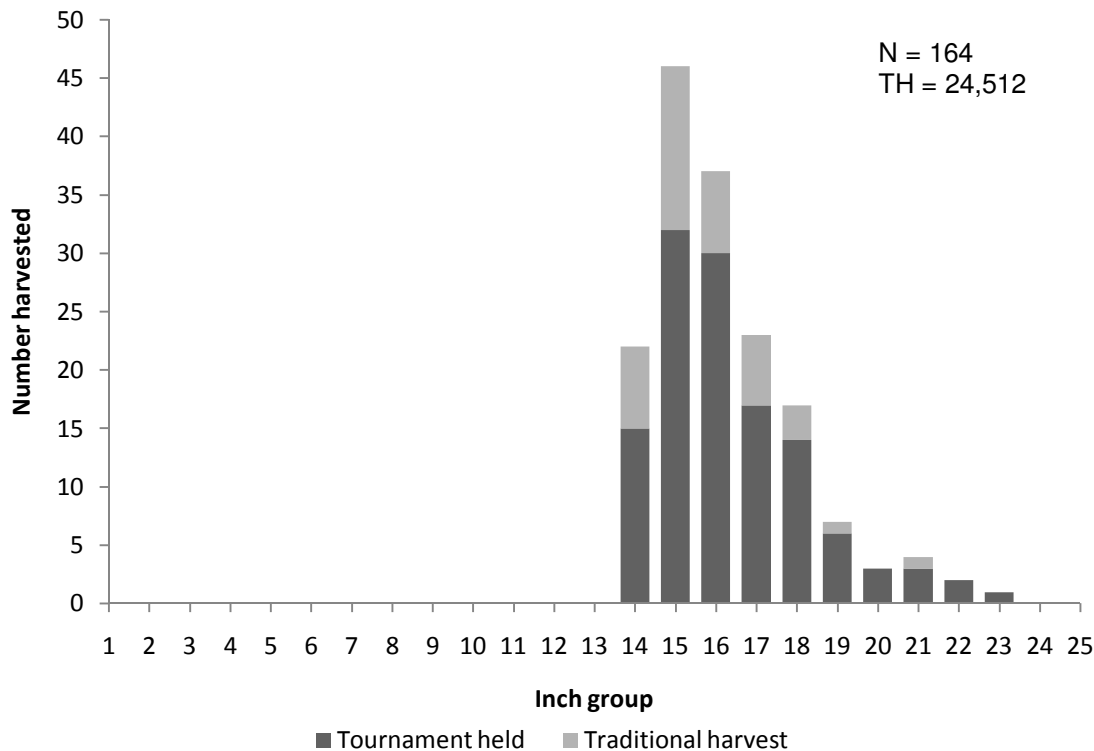


Figure 14. Length frequency of harvested (tournament and traditional) largemouth bass observed during creel surveys at Lake O' the Pines, Texas from June 2010 through May 2011, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest of largemouth bass for the creel period.

White Crappie

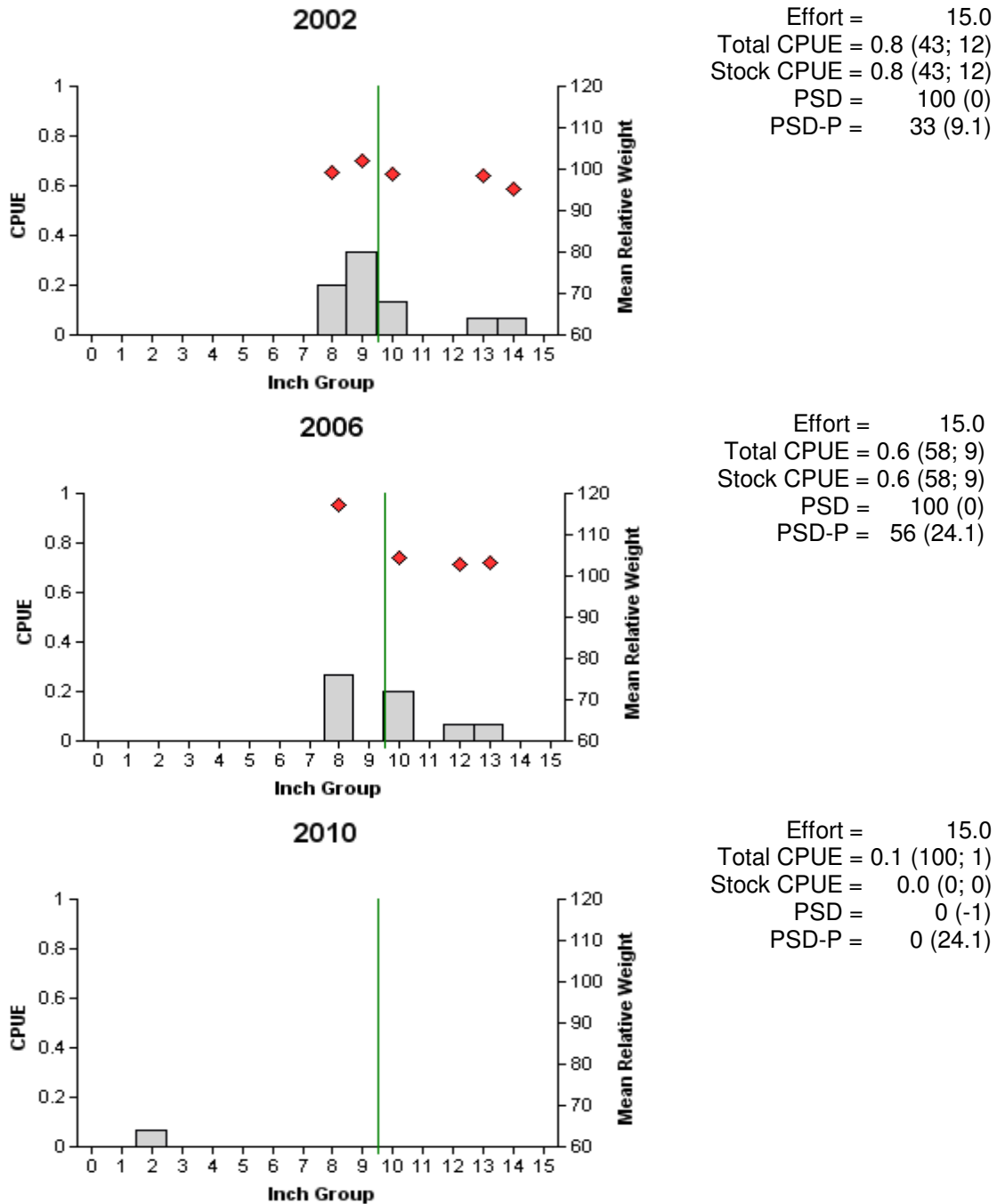


Figure 15. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake O' the Pines, Texas, 2002, 2006, and 2010. Vertical line indicates minimum length limit.

Black Crappie

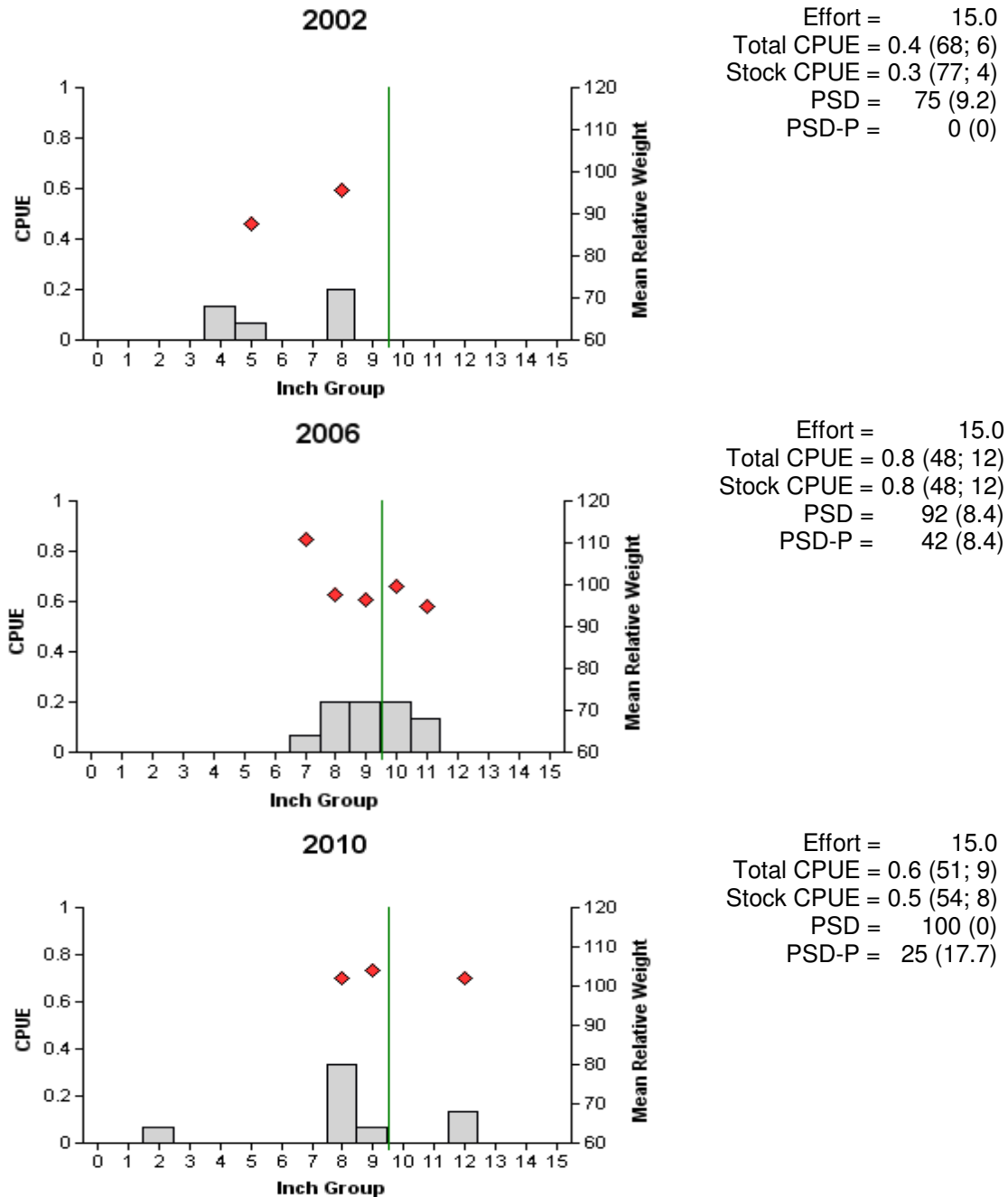


Figure 16. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure) for fall trap net surveys, Lake O' the Pines, Texas, 2002, 2006, and 2010. Vertical line indicates minimum length limit.

Crappie

Table 11. Creel survey statistics for black and white crappie at Lake O' the Pines, Texas from June 2010 through May 2011, where total catch per hour is for anglers targeting crappie and total harvest is the estimated number of crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year
	2010/2011
Directed effort (h)	90,888 (40)
Directed effort/acre	5.59 (40)
Total catch per hour	1.93 (18)
Total harvest	119,942 (60)
Crappie (unidentified)	31,951 (71)
White crappie	17,981 (56)
Black crappie	70,010 (56)
Harvest/acre	7.37 (60)
Percent legal released	1

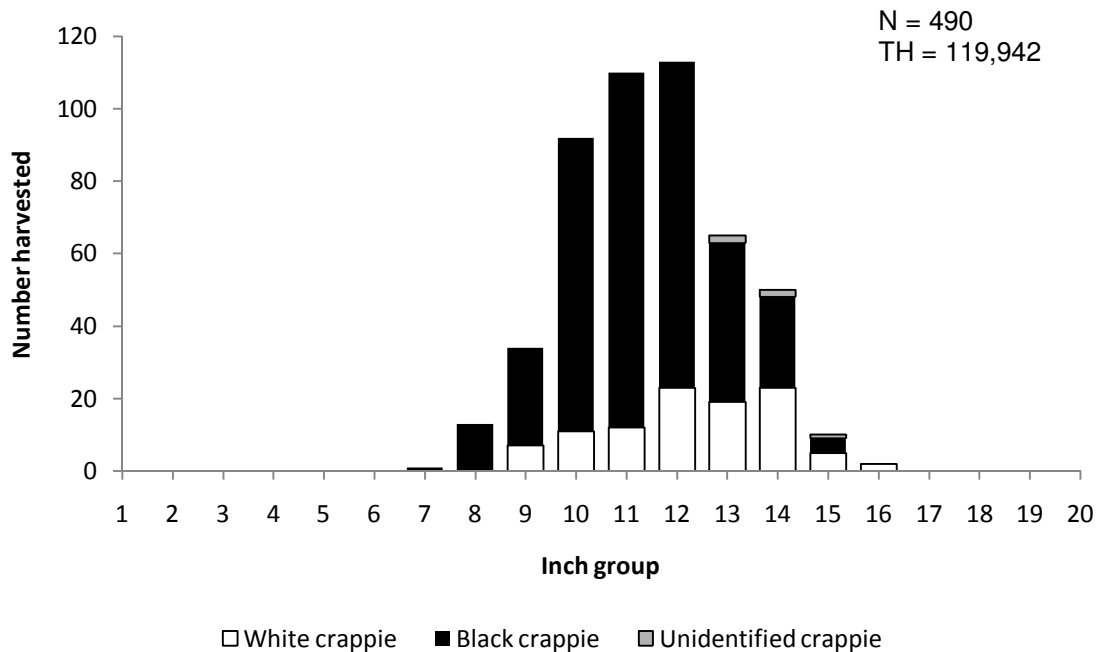


Figure 17. Length frequency of harvested crappie observed during creel surveys at Lake O' the Pines, Texas, June 2010 through May 2011, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 12. Proposed sampling schedule for Lake O' the Pines, Texas. Gill netting surveys are conducted in the spring, electrofishing is conducted in the fall, and vegetation/habitat surveys are conducted in the summer. Standard survey denoted by S and additional survey denoted by A.

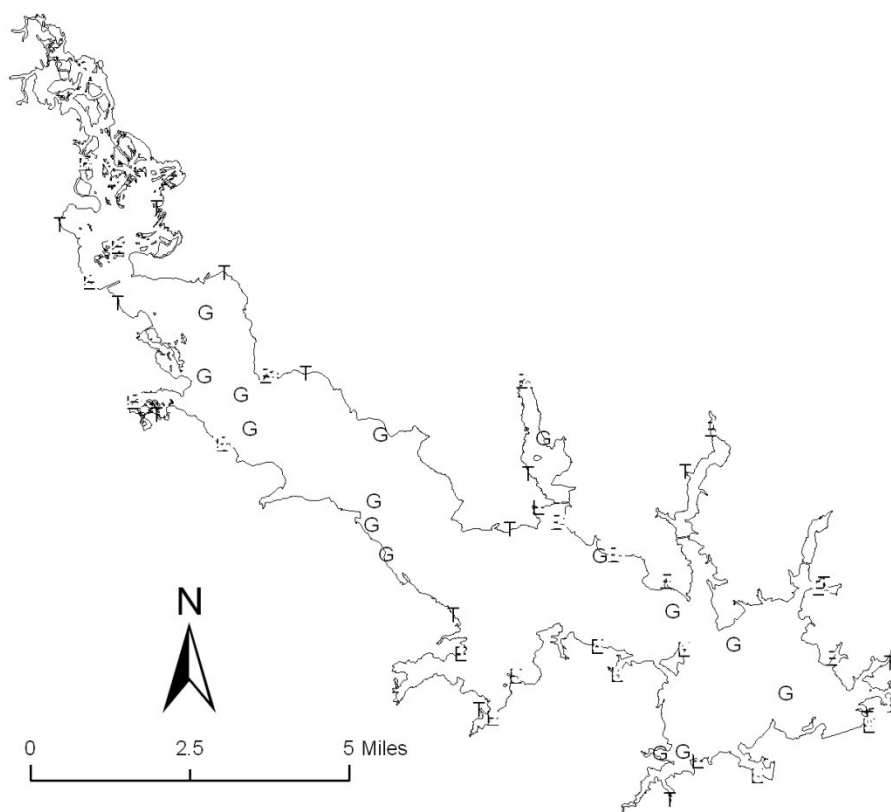
Survey Year	Vegetation	Electrofisher	Access	Gill Net	Creel	Report
June 2011- May 2012	A					
June 2012- May 2013	A	A				
June 2013- May 2014	A					
June 2014- May 2015	S	S	S	S	A ^a	S

^a Winter creel survey to collect crappie for age-and-growth analysis.

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake O' the Pines, Texas, 2010-2011.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					171	85.5
Threadfin shad					793	396.5
Channel catfish	375	25.0				
Flathead catfish	5	0.3				
White bass	56	3.7				
Redbreast sunfish					41	20.5
Warmouth					23	11.5
Orangespotted sunfish					1	0.5
Bluegill					1,348	674.0
Longear sunfish					162	81.0
Redear sunfish					423	211.5
Redspotted sunfish					14	7.0
Bantam sunfish					5	2.5
Spotted bass					78	39.0
Largemouth bass					659	329.5
White crappie			1	0.1		
Black crappie			9	0.6		

APPENDIX B

Location of sampling sites, Lake O' the Pines, Texas, 2010-2011. Trap netting, gill netting, and electrofishing stations are indicated by T, G, and E, respectively. Water level approximately at full pool at time of sampling.