PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2012 Fisheries Management Survey Report

Purtis Creek State Park Lake

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July 31, 2013

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Purtis Creek State Park Lake were surveyed in Fall 2012 using electrofishing and trap netting and in Spring 2013 using electrofishing and gill netting. Historical data are presented with the 2012-2013 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Purtis Creek State Park Lake is a 349-acre reservoir on Purtis Creek, a tributary of the Trinity River. The impoundment was constructed by the Texas Parks and Wildlife Department in 1985 for recreation and flood control purposes. Boat and bank access are both good and the park maintains two handicap-accessible fishing piers.

- **Management History:** Important sport fish include sunfishes, Largemouth Bass, Channel and Blue Catfish, and White Crappie. Hydrilla surveys have been conducted annually, and treatments with herbicide and triploid Grass Carp have been conducted in accordance with an integrated pest management plan. Electrofishing has been conducted in the fall and spring each year to monitor the Largemouth Bass population managed by a catch-and-release harvest regulation. Prior to September 1, 2008, anglers were allowed to retain one fish greater than 21 inches to be weighed at a lake-side weigh station and immediately released or donated to the TPWD ShareLunker program. This regulation was modified in 2008 so that only fish 24 inches and longer can be donated or released. Genetic analysis of Florida Largemouth Bass alleles was previously assessed in 2002 and has remained stable. The lake was included in the Operation World Record (OWR) program in 2005. Two stockings of OWR fish were conducted in 2006 and 2008.

- **Fish Community**
  - **Prey species:** Threadfin Shad were still abundant in the reservoir in 2012. Electrofishing catch rates of gizzard produced a high percentage of fish available as forage. Electrofishing catch rates of Bluegill, Redear Sunfish and Redbreast Sunfish ≤4 inches were also high, providing excellent prey availability for sport fishes.

  - **Catfishes**: A small number of large (>25 inches) Blue Catfish were collected during gill net surveys in 2013. Recruitment of catfishes in Purtis Creek State Park Lake has historically been low, and supplemental stocking of Channel Catfish advanced size fingerlings has been conducted to attempt to supplement this fishery. Gill net surveys in 2013 produced higher catch rates of Channel Catfish than previous years.

  - **Temperate basses:** No White Bass were collected prior to 2005. In 2009, White Bass were abundant in the reservoir as gill net catch rates increased to a historical high. However, 2013 gill net surveys produced only one White Bass

  - **Largemouth Bass:** Largemouth Bass remain a popular fishery at Purtis Creek State Park Lake, and a catch-and-release regulation is set to maintain high angler catch rates. Fall electrofishing catch rates remained consistent, although the number of large fish (>20 inches) collected during sampling efforts has declined slightly since 2006.

  - **Crappie:** White Crappie were abundant in the reservoir and provide an important fishery. Trap net catch rates for 2012 were excellent, doubling catches from 2004 and 2008 combined. Close to half (43%) of all crappie collected were over the 10 inch minimum length limit.

- **Management Strategies:** Conduct biennial fall (even years) and spring (odd years) electrofishing to further assess the Largemouth Bass population dynamics. Conduct an angler creel survey in 2015 to assess Largemouth Bass fishing pressure. Request surplus Channel Catfish fingerlings and broodfish when available to maintain the population. Conduct annual summer vegetation surveys. Conduct trap netting survey in 2016 and a gill netting survey in 2017.

INTRODUCTION

This document is a summary of fisheries data collected from Purtis Creek State Park Lake from June 2012 through May 2013. The purpose of this 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 2012-2013 data for comparison where appropriate.

Reservoir Description

Purtis Creek State Park Lake is a 349-acre reservoir on Purtis Creek, a tributary of the Trinity River. The impoundment was constructed by the Texas Parks and Wildlife Department in 1985 for recreation and flood control. Hydrilla *(Hydrilla verticillata)* has required periodic herbicide treatment to provide access to the fishing piers, boat ramp, and swimming beach. Purtis Creek State Park funded the stocking of 1,000 triploid Grass Carp *(Ctenopharyngodon idella)* in 2007, which, aided by flood-water inflows, effectively reduced hydrilla to trace amounts. Aquatic vegetation (both native and exotic) currently occupies less than 5 surface acres, primarily consisting of native emergent species. Other descriptive characteristics for Purtis Creek State Park Lake can be found in Table 1.

Angler Access

Purtis Creek State Park is approximately 18 miles northwest of Athens, Texas, on FM 316. The lake offers adequate boat and bank access. One public boat ramp can be located on the southeast corner of the lake, accessible through the main park entrance. Additional boat ramp characteristics are available in Table 2. Two handicap-accessible lighted fishing piers offer ample fishing opportunities for bank anglers.

Management History

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

1. Conduct annual fall electrofishing and spring bass-only electrofishing to monitor Largemouth Bass (*Micropterus salmoides*) relative abundance and size structure, plus assess prey population dynamics.
   Action: Annual electrofishing surveys have been conducted to provide long-term data on the Largemouth Bass population in Purtis Creek State Park Lake.
2. Address the current status of the Channel Catfish fishery on Purtis Creek State Park Lake through creel surveys and investigate outside sources of funding for stockings
   Action: Due to limitations in hatchery production, Channel Catfish *(Ictalurus punctatus)* stocking has been sporadic and primarily comprised of surplus production when available. Purtis Creek State Park Lake received 33,216 fingerlings between 2009 and 2010. No additional sources of funding were obtained to support additional Channel Catfish stocking. A voluntary creel survey to be distributed by park staff was developed to assess angler interest/utilization of the catfish fishery. However, due to State Park staffing issues, the survey was not completed.
3. Monitor changes in habitat during annual vegetation surveys; coordinate with Purtis Creek State Park staff to begin native plant establishment project.
   Action: Four enclosure cages containing native plant species were installed on Purtis Creek State Park Lake to limit Grass Carp access while colonies were established.
4. Promote potential White Bass fishery through means of the media and public presentations
   Action: No action taken due to high variability in White Bass population dynamics in the reservoir.

Harvest regulation history: Sport fishes in Purtis Creek State Park Lake are currently managed with statewide harvest regulations with the exception of a catch-and-release regulation for Largemouth Bass

and a 5-fish, no minimum length limit for Channel Catfish (Table 3). One Largemouth Bass greater than 24 inches can be temporarily retained in a live well and immediately weighed using personal scales, and then immediately released or donated to the ShareLunker program.

Stocking history: In 2005, Purtis Creek State Park Lake was included in a long-term evaluation of the effectiveness of stocking offspring of TPWD ShareLunker brood fish, termed Operation World Record. Approximately 24,180 advanced-size (6-inch) ShareLunker Largemouth Bass have been stocked since 2006. All ShareLunker progeny were tagged (coded stainless steel wire 0.25 mm in diameter and 1.1 mm long) prior to stocking. Prior to these stockings, Florida Largemouth Bass had not been stocked since 1985 due to a stable proportion of Florida Largemouth Bass alleles in the population. Channel Catfish have been stocked periodically since 1985 to maintain the population. One thousand triploid (i.e. sterile) Grass Carp were stocked in 2007. A complete stocking history is listed in Table 4.

Vegetation/habitat management history: Historically, hydrilla required annual treatments with aquatic herbicide by TPWD Inland Fisheries Aquatic Habitat Enhancement staff to maintain access to the reservoir. Hydrilla covered roughly 6% of the reservoir in 2004, and had expanded to cover 60% of the reservoir surface area by the fall of 2006. In 2007, strong currents from a flood event reduced hydrilla coverage to trace levels. One thousand triploid Grass Carp (stocked prior to flood event) have prevented the re-growth of hydrilla. Establishment of native plant species began in July 2012. Four enclosure cages were constructed around the native vegetation colonies to prevent Grass Carp grazing.

Water transfer: Purtis Creek State Park Lake is one of the few water bodies owned and operated by Texas Parks and Wildlife Department. The primary purpose for the lake is recreation, and to a lesser extent flood control. No water transfers are known to exist.

METHODS

Fish were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap 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/h) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). 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 Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target species according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics. Ages were determined using otoliths from White Bass (*Morone chrysops*), Largemouth Bass, and White Crappie (*Pomoxis annularis*) with lengths ranging from 12.8-15.9 inches for White Bass (N=20), 5.2-20.4 inches for Largemouth Bass (N=44), and 9.2-11.0 inches for White Crappie (N=16).

RESULTS AND DISCUSSION

Habitat: Annual vegetation surveys have been conducted since 2006. The most recent annual survey (summer 2012) revealed limited surface-acre coverage of all aquatic vegetation. Oneflower false fiddleleaf (*Hydrolea uniflorea*) occupied two surface acres, water primrose (*Ludwigia* spp.) occupied 1 surface acre; pondweed (*Potamogeton* spp.), water stargrass (*Heterantera dubia*), wild celery (*Vallisenaria*) and hydrilla all occupied trace amounts. A complete list of species present in Purtis Creek State Park Lake from 2008 - 2012 can be found in Table 5. Following the introduction of 1,000 triploid Grass Carp and flooding in 2007, aquatic vegetation has only persisted in trace amounts. Grass Carp densities should decline rapidly over the next five to ten years (Appendix B) due to natural mortality, allowing successful recolonization of native species.

Prey species: Sunfishes traditionally have been the predominant prey available to Largemouth Bass in Purtis Creek State Park Lake. Electrofishing catch rates of Bluegill (*Lepomis macrochirus)* have steadily increased from 2004 to 2012, from 35/h in 2004 (Ott and Bister 2005), to 465/h in 2008 (Bennett and Ott 2009), to 707/h in the most recent survey (Figure 2.). Redear Sunfish (*Lepomis microlophus)* catch rates have remained fairly stable since 2006 (Figure 3). Six- to nine-inch Redear Sunfish were present in the 2012 survey, representing the opportunity for a developing fishery. Mean relative weight (W_r) in each inch-class has traditionally been high (>95) for both Bluegill and Redear Sunfish. However, the most recent survey (2012) revealed lower condition of the largest (>8 inches) cohort of Redear Sunfish. Redbreast Sunfish (*Lepomis auritus*) were collected in high densities during fall electrofishing surveys (2010-2012), suggesting another important prey species exists in Purtis Creek State Park Lake (Figure 4). The electrofishing catch rates of Gizzard Shad (*Dorosoma cepedianum)* were highly variable in recent years, from over 750/h in 2010, 357/h in 2011, and 114/h in 2012 (Figure 1.) Variability among sampling years can be attributed to two driving factors: 1) As hydrilla and native plant species were lost during high floods in 2007, copious amounts of nutrients were dispersed throughout the lake. High nutrient contents allowed plankton colonies to flourish, in turn providing an extremely high forage base for shad species. As nutrient levels return to normal, so has the shad population. 2) Randomly selected electrofishing sites near the two lighted fishing piers produced extremely high catch rates, skewing the overall population estimate. The Gizzard Shad Index of Vulnerabilty (IOV) from 2010 – 2012 was 96%, 93% and 81%, respectively. These values indicate a large proportion of the Gizzard Shad population is available to predators. Threadfin Shad (*Dorosoma petenense)* were present in the annual surveys; however, catch rates are variable (Appendix A).

Catfishes: Purtis Creek State Park Lake has poor catfish recruitment, presumably due to an abundant Largemouth Bass population, and has required stocking with advanced-sized fingerlings to support this fishery. Gill net catch rate of Channel Catfish increased in 2013 (6.6/nn) from previous sample years: 0.6/nn in 2009 and 0.4/nn in 2001 (Figure 5). Channel Catfish <12 inches continue to be scarce, indicating poor recruitment of young fish. However, increasing numbers of large Channel Catfish in 2013 indicate adequate survival of stocked advanced fingerlings. Historic catch rates of Channel Catfish did not increase following stocking; however, aquatic vegetation was more established in past surveys. It is plausible that decimated aquatic macrophytes in recent years have enabled Channel Catfish populations to increase. Blue Catfish were stocked in 2000 and 2003; however, recruitment has not been observed. Extremely low catch rates have been observed over the last three sample years (i.e. 3 fish or less), but collected fish have been large (25 – 45 inches) (Figure 6).

White Bass: White Bass were first collected in gill nets in Purtis Creek State Park Lake in 2005. White Bass have not been stocked by TPWD so it is unknown how they were introduced in the reservoir. In 2009, gill net catch rate increased (4.6/nn) from 2005 (3.2/nn) (Bennett and Ott 2009). However, only one White Bass was caught in 2013 gill net surveys (Figure 7). These data indicate high variability within the White Bass population in Purtis Creek State Park Lake. Yearly variability can most likely be attributed to lack of suitable spawning habitat.

Largemouth Bass: Annual fall and spring electrofishing surveys continue to indicate high abundance of Largemouth Bass. Fall electrofishing catch rates of stock-size fish ($\geq$8 inches) has varied over the last three sampling seasons, with 54/h in 2010, 81/h in 2011 and 31/h in 2012 (Figure 8). These numbers are down from long term averages (97/h, 2005-2008) reported previously (Bennett and Ott 2009). Spring electrofishing catch rates of stock-size fish, 40/h (2011), 86/h (2012) and 93/h (2013) (Figure 9) are also down from long-term averages (168/h, 2007-2009). Mean relative weight (W_r) in each inch-class has generally been moderate (>85) during fall sampling (2010-2012). The size structure of fall 2012 samples were lower than previous years (PSD = 32, PSD-P = 16). Age and growth analysis conducted during fall 2012 electrofishing revealed average length at age 1 to be 9.40 inches (N = 19, range = 7.1 – 11.7 inches) (Figure 10). Florida Largemouth Bass genetic analysis has not been conducted on Purtis Creek State Park Lake since the last management report due to consistently high proportions of Florida largemouth alleles in the population (Bennett and Ott 2009).

Crappie: Trap net catch rates of White Crappie increased in 2012 (25.4/nn) from 2008 (2.0/nn) and 2004 (11.2/nn) (Figure 11). Forty-three percent of crappie sampled in 2012 exceeded the 10-inch minimum length limit. Average age of White Crappie at 10 inches was 1.8 years (N = 13; range 9.2 – 11.0 inches) (Figure 12). Similar to the 2013 Channel Catfish catch rates, the excellent catch rates of White Crappie in 2012 may be attributed to reduced aquatic macrophyte density.

Fisheries management plan for Purtis Creek State Park Lake, Texas

Prepared – July 2013

ISSUE 1: Largemouth Bass in Purtis Creek State Park Lake have been managed with a special catch-and-release regulation since it was opened to public fishing in 1988. This regulation was implemented to maintain high angler catch rates of Largemouth Bass**.** Recent trends in the data suggest declining condition (W_r) in the larger fish.

MANAGEMENT STRATEGIES

1. Implement a creel survey (winter and spring quarters) to assess angler effort directed towards Largemouth Bass.
2. Continue to monitor trends in structural indices (PSD-P) and condition indices (W_r) of Largemouth Bass through biennial electrofishing surveys.
3. Collect fin clips form 30 largemouth bass for microsatellite DNA analysis to determine the proportion of Florida Largemouth Bass alleles in the population.

ISSUE 2: There continues to be minimal evidence of natural Channel Catfish recruitment at Purtis Creek State Park Lake. Recent surveys indicate adequate survival and recruitment to larger sizes of advanced-fingerling stocked fish. Since this lake is a state park facility, it should be considered a high priority for stocking.

MANAGEMENT STARTEGIES

1. Continue to stock advanced fingerling Channel Catfish when surplus production is available to supplement the catfish fishery.
2. Seek outside sources of funding to install more brush piles or supplemental feed stations near the two fishing piers to congregate fish.
3. Monitor trends in the Channel Catfish population through standard gill net sampling every 4 years.

ISSUE 3: The White Bass and White Crappie populations appear to fluctuate yearly depending on environmental conditions.

MANAGEMENT STRATEGIES

1. Continue to monitor the White Bass population through gill net sampling every 4 years.
2. Continue to monitor the White Crappie population through trap net sampling every 4 years.
3. Promote these fisheries as ones experiencing occasional periods of high-quality.

ISSUE 4: Due to fluctuating water levels and the presence of triploid Grass Carp, aquatic vegetation in Purtis Creek State Park Lake consists primarily of trace amounts of emergent and floating-leaved species. Four nursery colonies of several native submersed species have been established within herbivore exclosure cages.

MANAGEMENT STRATEGIES

1. Continue annual vegetation survey to monitor recovery of native and or exotic plant species as Grass Carp mortality lessens herbivory.
2. Maintain existing exclosures to ensure continued production of native plant propagules.
3. Implement additional native aquatic plant enhancements where and when possible.
4. Solicit partnerships with constituent groups to assist with future exclosure cages and plantings.

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 (*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 state park staff about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes biennial fall and spring (bass-only) electrofishing, trap netting and angler access surveying in 2016, gill netting in 2017, and annual vegetation surveys (Table 6). A winter- and spring-quarter creel survey will be conducted from December 2014 through May 2015 (Table 6) to monitor angler effort, catch statistics, and economic expenditures. The additional bass-only electrofishing is necessary to closely monitor relative abundance and size structure of the Largemouth Bass population.

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Table 1. Characteristics of Purtis Creek State Park Lake, Texas.

Characteristic	Description
Year completed	1985
Controlling authority	Texas Parks and Wildlife Department
County	Henderson and Van Zandt
Reservoir type	State Park Lake
Shoreline Development Index (SDI)	3.4
Conductivity	212 umhos/cm

Table 2. Boat ramp characteristics for Purtis Creek State Park Lake, Texas, February, 2013. Reservoir elevation at time of survey was 410 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
State Park Ramp	32.35755 -95.99502	Y	21	404	Excellent, no access issues

Table 3. Harvest regulations for Purtis Creek State Park Lake, Texas.

Species	Bag limit	Length limit
Catfish: Channel, Blue and their hybrids and subspecies	5 (in any combination)	None
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	Fish ≥ 24 inches in length may be temporarily retained in a live well and immediately weighed using personal scales.	Catch and release only
Crappie: White, Black and their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Purtis Creek State Park Lake, Texas.
FGL = fingerling; AFGL = advanced fingerling; ADL = adults.

Name	Year	Number	Size
Threadfin Shad	1985	1,840	ADL
	1994	500	ADL
		2,340	
Blue Catfish	2000	8,906	FGL
	2003	8,746	FGL
		17,652	
Channel Catfish	1985	54,140	FGL
	1986	10,080	FGL
	1987	4,400	FGL
	1989	11,230	ADL
	1990	177,503	FGL
	1991	8,875	FGL
	1992	14,650	FGL
	1993	17,882	FGL
	1994	8,876	FGL
	1995	8,170	FGL
	1995	2,703	ADL
	1996	8,850	ADL
	1998	8,973	FGL
	1999	8,870	FGL
	2001	8,875	FGL
	2002	8,875	FGL
	2005	20,824	FGL
	2006	4,604	FGL
	2009	12,288	FGL
	2009	6,187	AFGL
	2010	14,741	FGL
		421,596	
Bluegill	1994	2,500	FGL
		2,500	
Bluegill x Green Sunfish	1997	700	FGL
		700	
Coppernose Bluegill	1987	7,300	FGL
		7,300	
Redear Sunfish	1985	86,792	FGL
		86,792	

Stocking history of Purtis Creek State Park Lake, Texas, continued.

Species	Year	Number	Size
Largemouth Bass	1995	19,959	FGL
	1996	17,987	FGL
		37,946	
Florida Largemouth Bass	1985	31,440	FGL
	1985	248	ADL
		31,688	
ShareLunker Largemouth Bass	2006	8,734	AFGL
	2008	8,807	AFGL
	2010	3,919	AFGL
	2012	2,720	AFGL
		24,180	
Grass Carp	2007	1,000	ADL
		1,000	

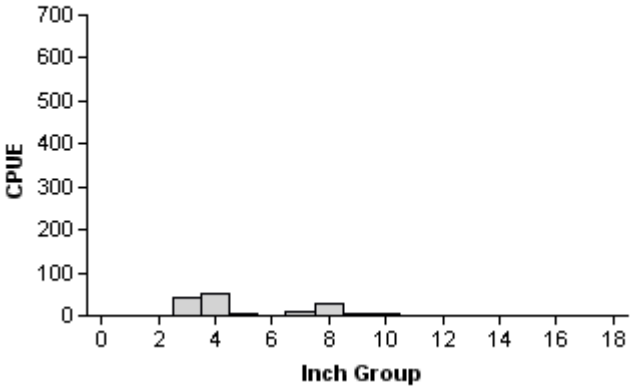
Table 5. Survey of aquatic vegetation, Purtis Creek State Park Lake, 2009 – 2012. Surface area (acres) is listed with percent of total reservoir surface area in parentheses

Vegetation	2009	2010	2011	2012
Native submersed				
Pondweed				<.01 (<.01)
Native floating-leaved				
Lotus	<1.0 (<.01)			
Native Emergent				
Bull tongue		<1.0 (<.01)		
Bulrush	3 (<.01)	3 (<.01)		
Cattail		<1.0 (<.01)		
Spike rush	3 (<.01)	3 (<.01)		
Oneflower false fiddleleaf				2.0 (<.01)
Water primrose		<1.0 (<.01)		1.0 (<.01)
Water stargrass				<.01 (<.01)
Wild celery				<.01 (<.01)
Non-native				
Alligator weed		<1.0 (<.01)		
Hydrilla	tr	tr		

Gizzard Shad

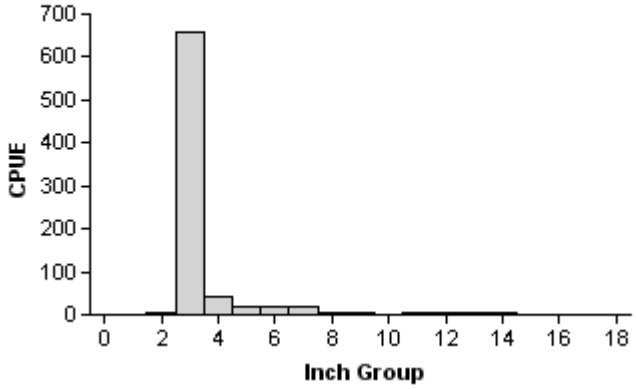
2009

Effort = 1.0
Total CPUE = 141.0 (33; 141)
IOV = 76 (3.9)



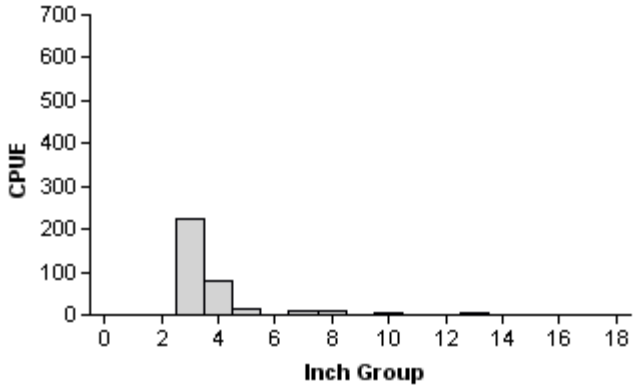
2010

Effort = 1.0
Total CPUE = 793.0 (22; 793)
IOV = 96 (1.4)



2011

Effort = 1.0
Total CPUE = 357.0 (16; 357)
IOV = 93 (2.9)



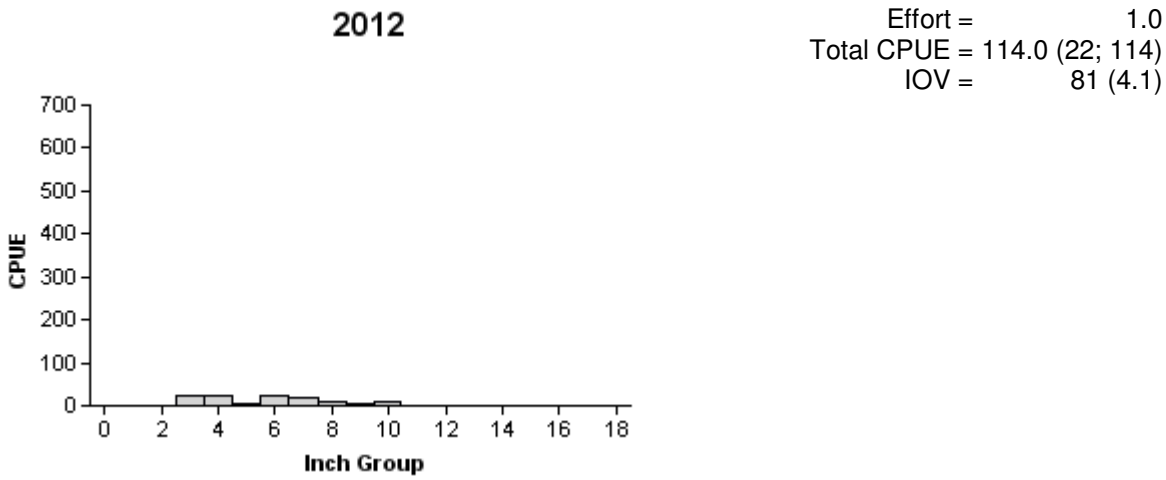
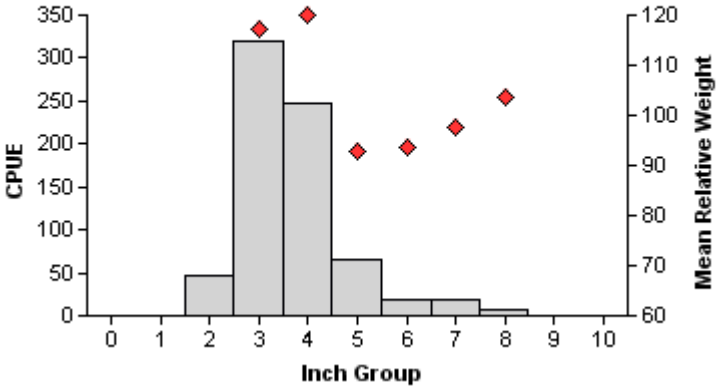


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys Purtis Creek State Park Lake, Texas, 2009, 2010, 2011, and 2012.

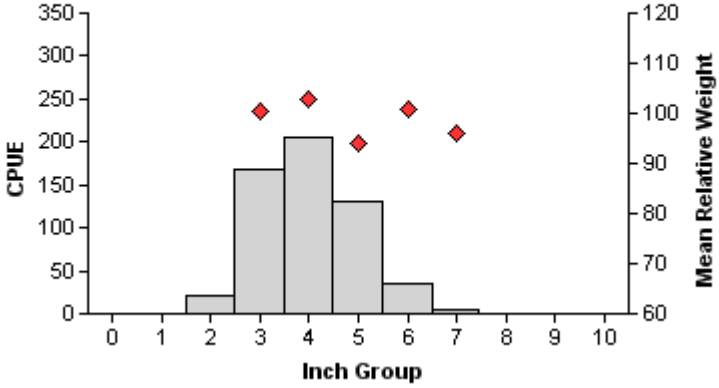
Bluegill

2009



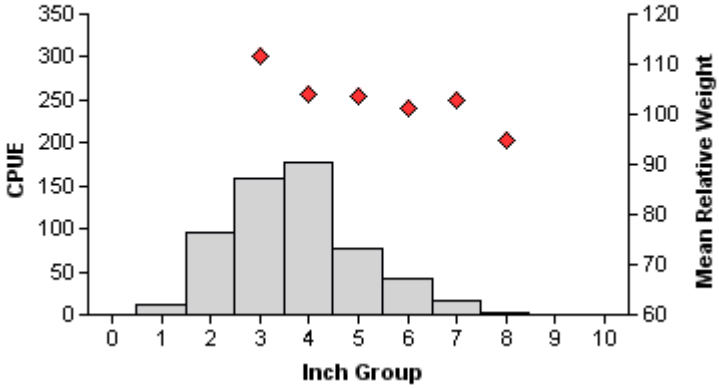
Effort = 1.0
Total CPUE = 721.0 (21; 721)
Stock CPUE 674.0 (20; 674)
= 6 (1.8)
PSD =

2010

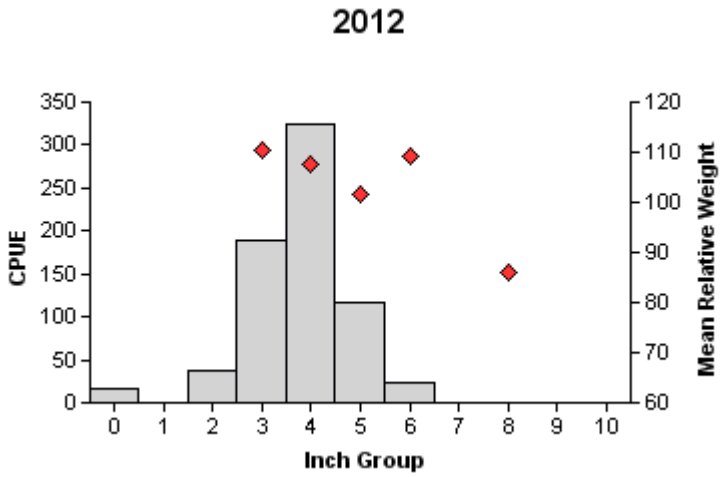


Effort = 1.0
Total CPUE = 566.0 (18; 566)
Stock CPUE = 544.0 (19; 544)
PSD = 7 (2)

2011



Effort = 1.0
Total CPUE = 584.0 (23; 584)
Stock CPUE = 476.0 (21; 476)
PSD = 13 (2.9)

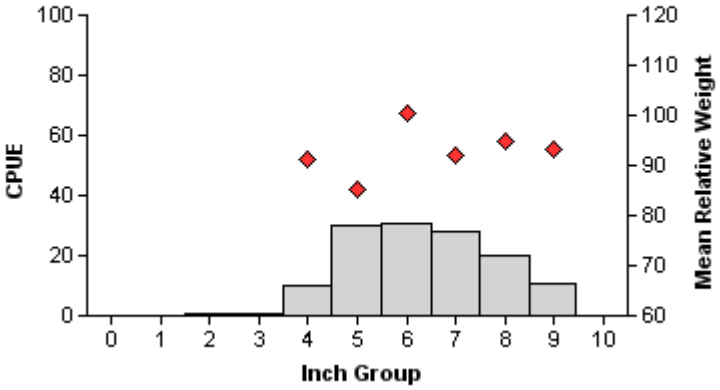


Effort = 1.0
Total CPUE = 707.0 (13; 707)
Stock CPUE = 652.0 (13; 652)
PSD = 4 (1.5)

Figure 2. Number of Bluegill caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys Purtis Creek State Park Lake, Texas, 2009, 2010, 2011, and 2012.

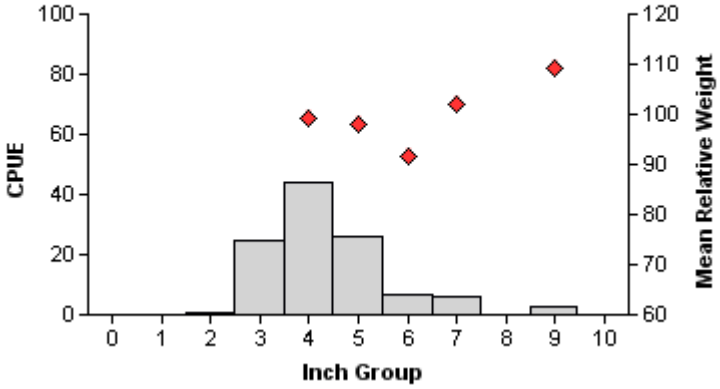
Redear Sunfish

2009



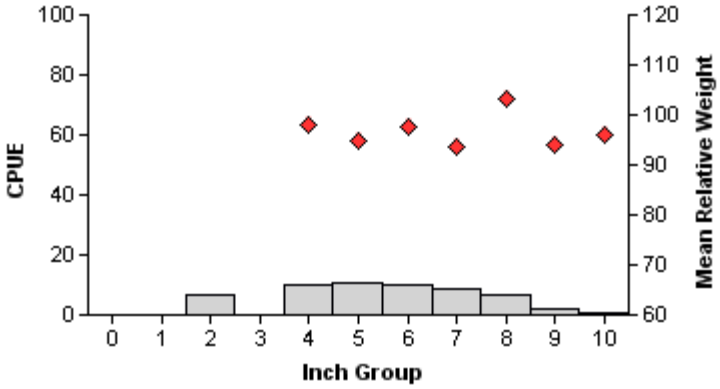
Effort = 1.0
Total CPUE = 132.0 (27; 132)
Stock CPUE= 130.0 (27; 130)
PSD = 45 (5.3)

2010

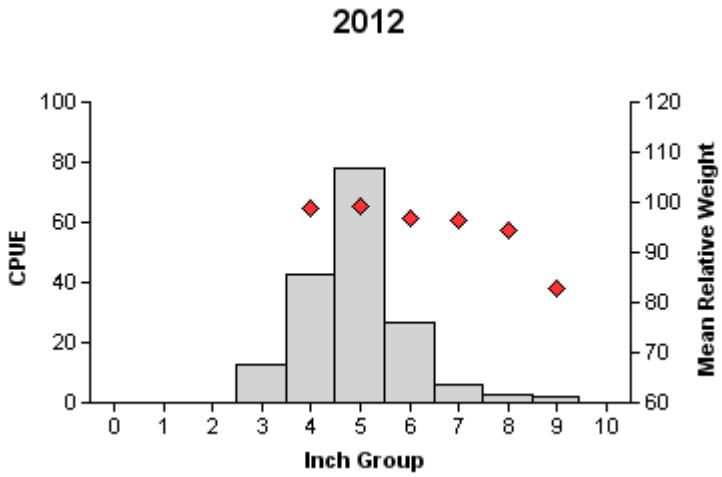


Effort = 1.0
Total CPUE = 112.0 (24; 112)
Stock CPUE = 86.0 (22; 86)
PSD = 10 (3.3)

2011



Effort = 1.0
Total CPUE = 57.0 (24; 57)
Stock CPUE = 50.0 (20; 50)
PSD = 38 (8.5)

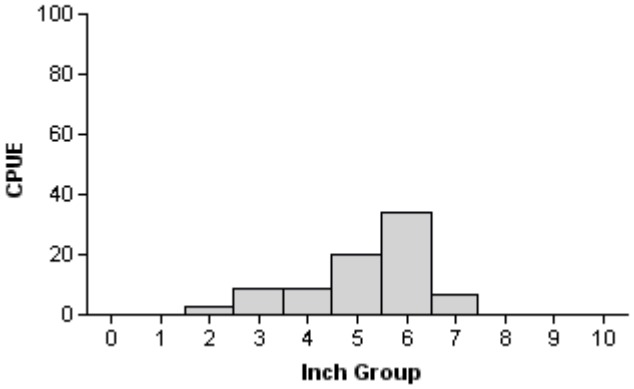


Effort = 1.0
Total CPUE = 172.0 (18; 172)
Stock CPUE = 159.0 (19; 159)
PSD = 7 (2.2)

Figure 3. Number of Redear Sunfish sunfish caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys, Purtis Creek State Park Lake, Texas, 2010, 2011, and 2012.

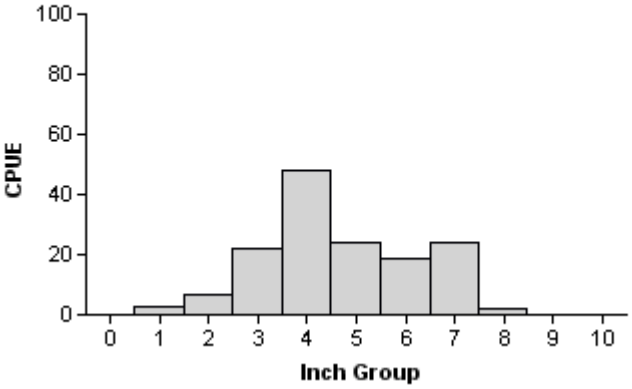
Redbreast Sunfish

2009



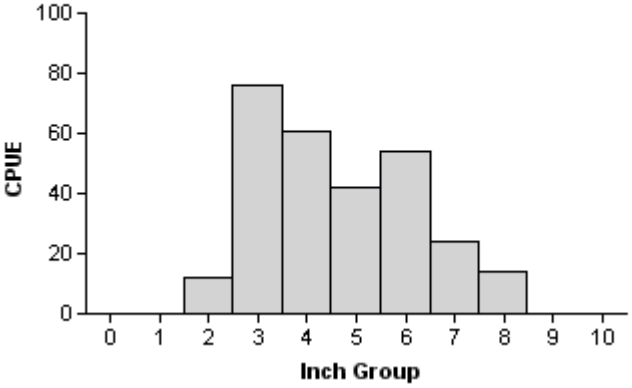
Effort = 1.0
Total CPUE = 82.0 (28; 82)
Stock CPUE= 79.0 (28; 79)
PSD = 52 (6.2)

2010

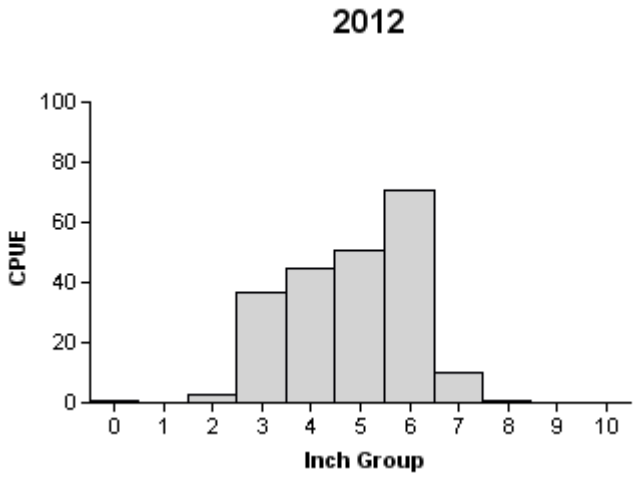


Effort = 1.0
Total CPUE = 149.0 (24; 149)
Stock CPUE = 139.0 (25; 139)
PSD = 32 (5.7)

2011



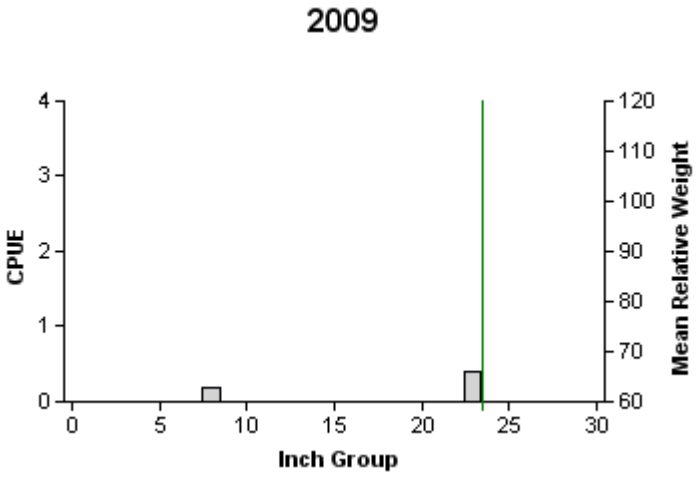
Effort = 1.0
Total CPUE = 283.0 (34; 283)
Stock CPUE = 271.0 (33; 271)
PSD = 34 (6)



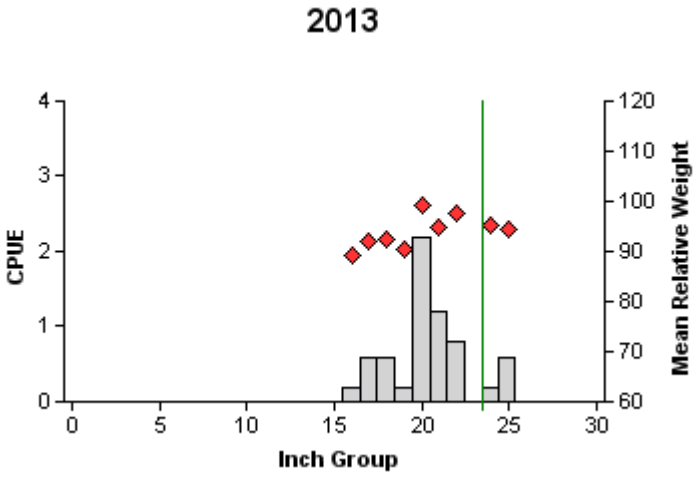
Effort = 1.0
Total CPUE = 219.0 (23; 219)
Stock CPUE = 215.0 (23; 215)
PSD = 38 (6.9)

Figure 4. Number of Redbreast Sunfish sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall electrofishing surveys, Purtis Creek State Park Lake, Texas, 2009, 2010, 2011, and 2012.

Channel Catfish



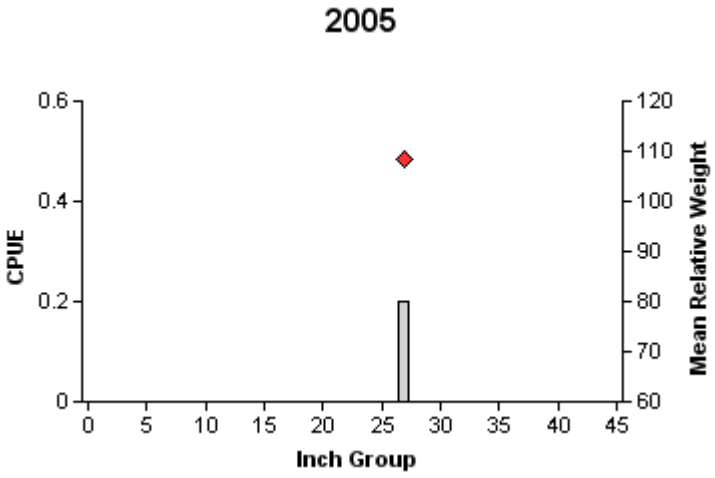
Effort = 5.0
Total CPUE = 0.6 (100; 3)
Stock CPUE= 0.4 (100; 2)
PSD = 100 (0)
PSD-P = 0 (0)



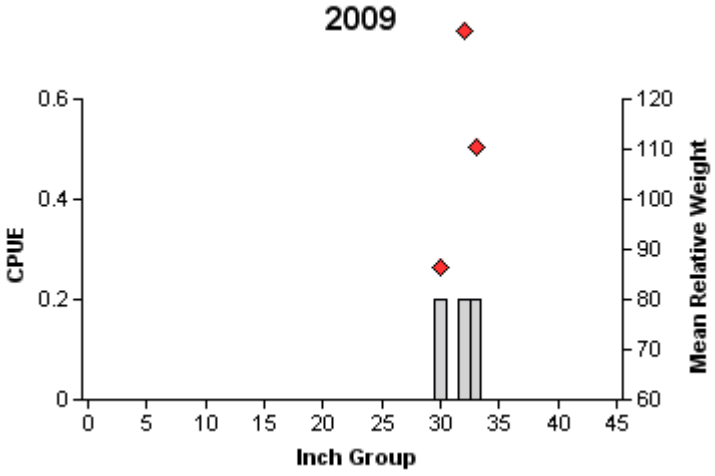
Effort = 5.0
Total CPUE = 6.6 (17; 33)
Stock CPUE= 6.6 (17; 33)
PSD = 100 (0)
PSD-P = 12 (9.9)

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 PSD are in parentheses) for spring gill net surveys, Purtis Creek State Park Lake, 2009 and 2013. No Channel Catfish were collected in spring 2005 gill netting. Vertical line represents PSD-P (24 inches)

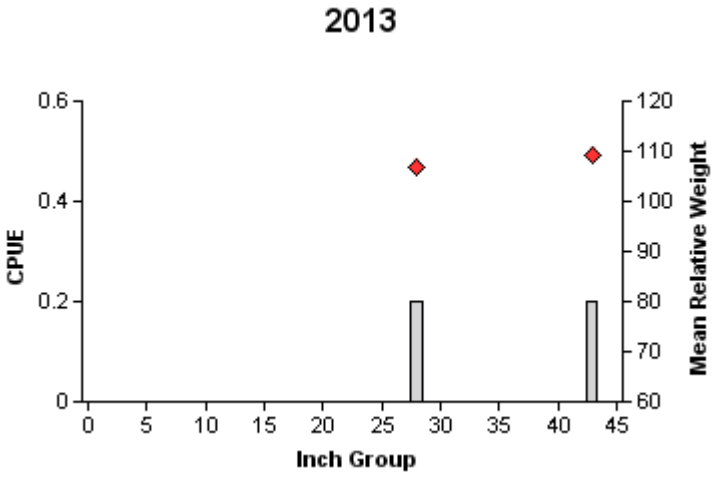
Blue Catfish



Effort = 5.0
Total CPUE = 0.2 (100; 1)
PSD = 100 (0)



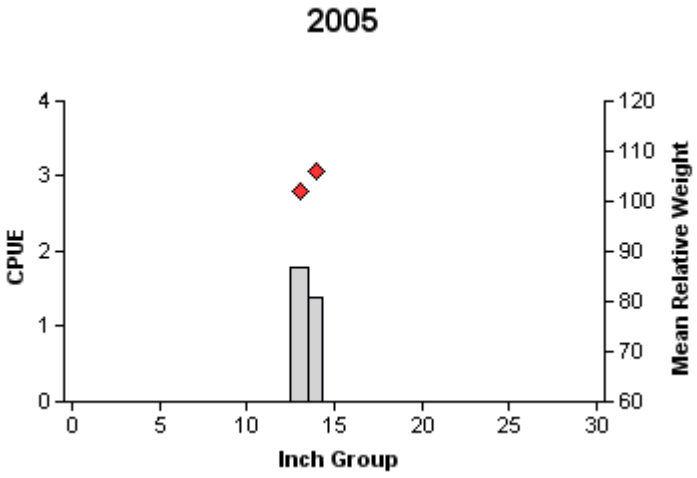
Effort = 5.0
Total CPUE = 0.6 (67; 3)
PSD = 100 (0)



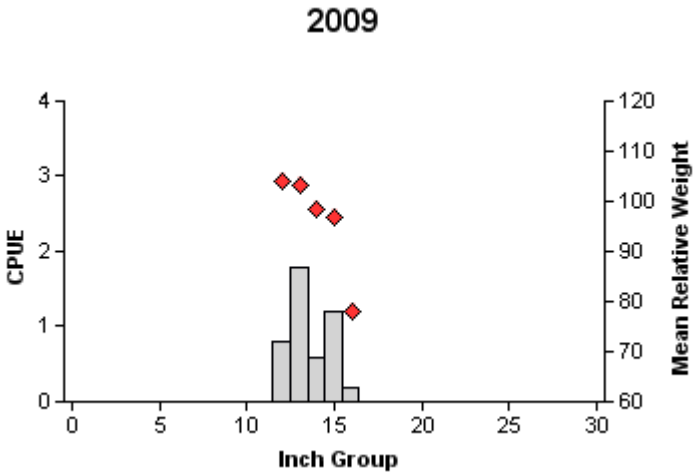
Effort = 5.0
Total CPUE = 0.4 (61; 2)
PSD = 100 (0)

Figure 6. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for spring gill net surveys, Purtis Creek State Park Lake, 2005, 2009 and 2013.

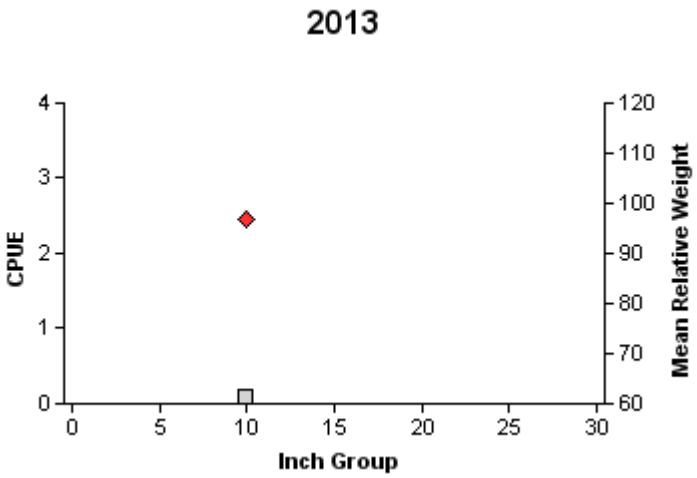
White Bass



Effort = 5.0
Total CPUE = 3.2 (45; 16)
PSD = 100 (0)



Effort = 5.0
Total CPUE = 4.6 (76; 23)
PSD = 100 (0)

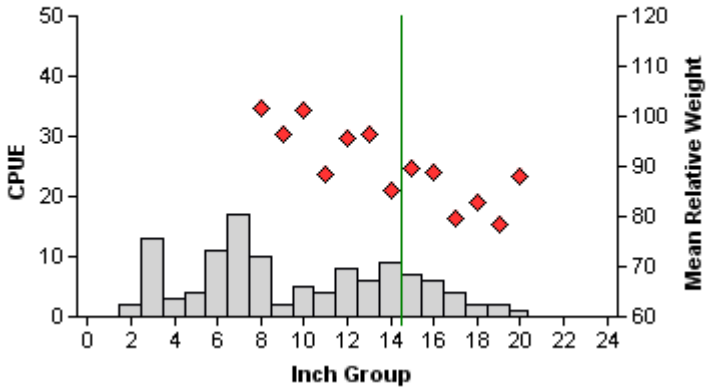


Effort = 5.0
Total CPUE = 0.2 (100; 1)
PSD = 100 (0)

Figure 7. 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 PSD are in parentheses) for spring gill net surveys, Purtis Creek State Park Lake, 2005, 2009 and 2013.

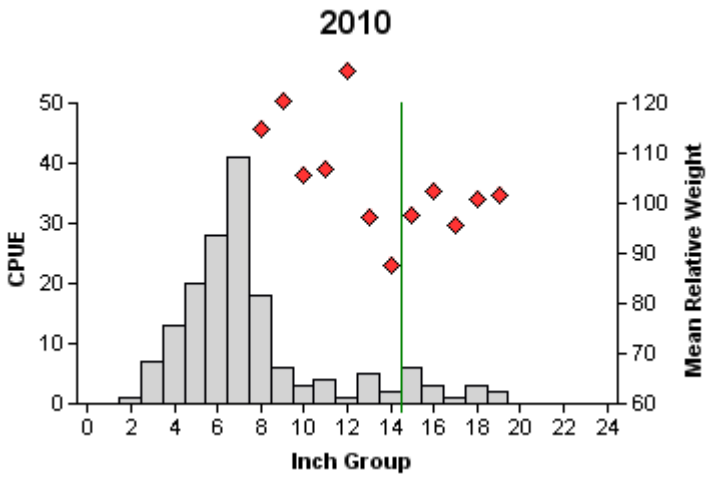
Largemouth Bass

2009



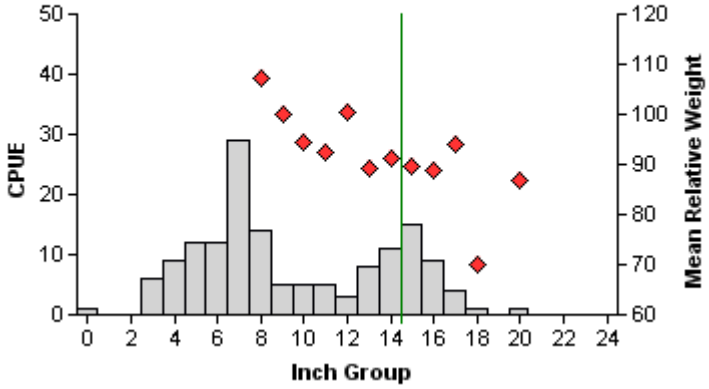
Effort = 1.0
Total CPUE = 116.0 (16; 116)
Stock CPUE = 66.0 (17; 66)
PSD = 68 (6.8)
PSD-P = 33 (8.2)

2010

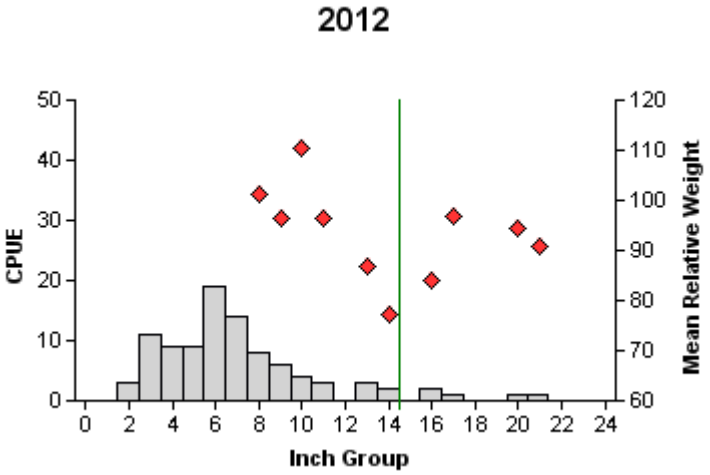


Effort = 1.0
Total CPUE = 164.0 (22; 164)
Stock CPUE= 54.0 (13; 54)
PSD = 43 (5.5)
PSD-P = 28 (7.4)

2011



Effort = 1.0
Total CPUE = 150.0 (20; 150)
Stock CPUE= 81.0 (31; 81)
PSD = 64 (12.2)
PSD-P = 37 (11.5)

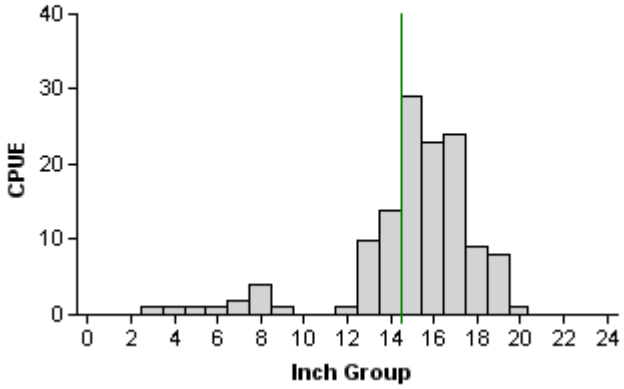


Effort = 1.0
Total CPUE = 96.0 (16; 96)
Stock CPUE= 31.0 (23; 31)
PSD = 32 (4.6)
PSD-P = 16 (6.2)

Figure 8. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE are in parentheses) for fall electrofishing surveys, Purtis Creek State Park Lake, Texas, 2009, 2010, 2011, and 2012. Vertical Line represents PSD-P (15 inches).

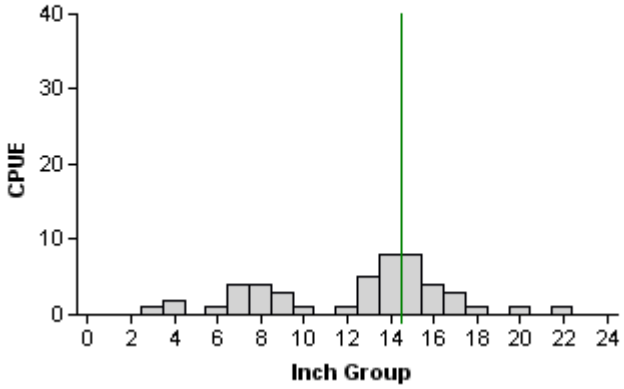
Largemouth Bass

2010



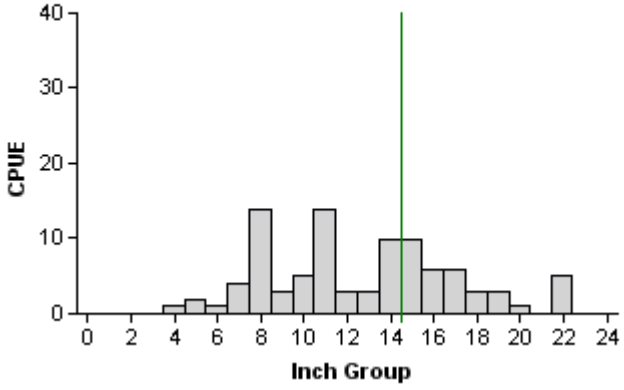
Effort = 1.0
Total CPUE = 130.0 (53; 130)
Stock CPUE= 124.0 (56; 124)
PSD = 96 (3.1)
PSD-P = 76 (4)

2011

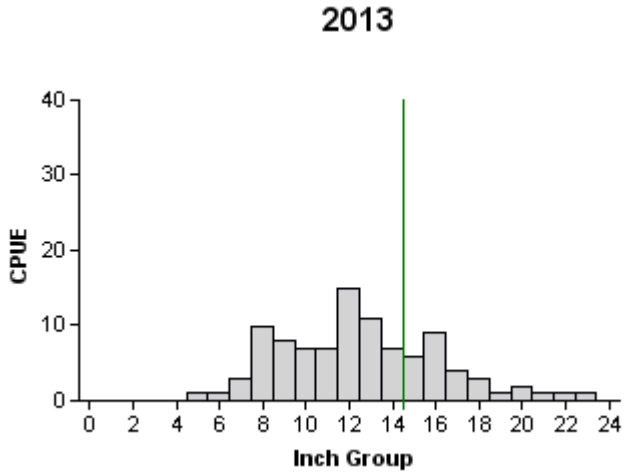


Effort = 1.0
Total CPUE = 48.0 (12; 48)
Stock CPUE= 40.0 (13; 40)
PSD = 80 (6.6)
PSD-P = 45 (6.2)

2012



Effort = 1.0
Total CPUE = 94.0 (16; 94)
Stock CPUE= 86.0 (14; 86)
PSD = 58 (7.5)
PSD-P = 40 (6.9)



Effort = 1.0
Total CPUE = 98.0 (18; 98)
Stock CPUE= 93.0 (18; 93)
PSD = 66 (6.2)
PSD-P = 30 (5.4)

Figure 9. Number of Largemouth Bass caught per hour (CPUE, bars), and population indices (RSE and N for CPUE and SE are in parentheses) for spring electrofishing surveys, Purtis Creek State Park Lake, Texas, 2010, 2011,2012 and 2013. Vertical line represents PSD-P (15 inches)

Largemouth Bass

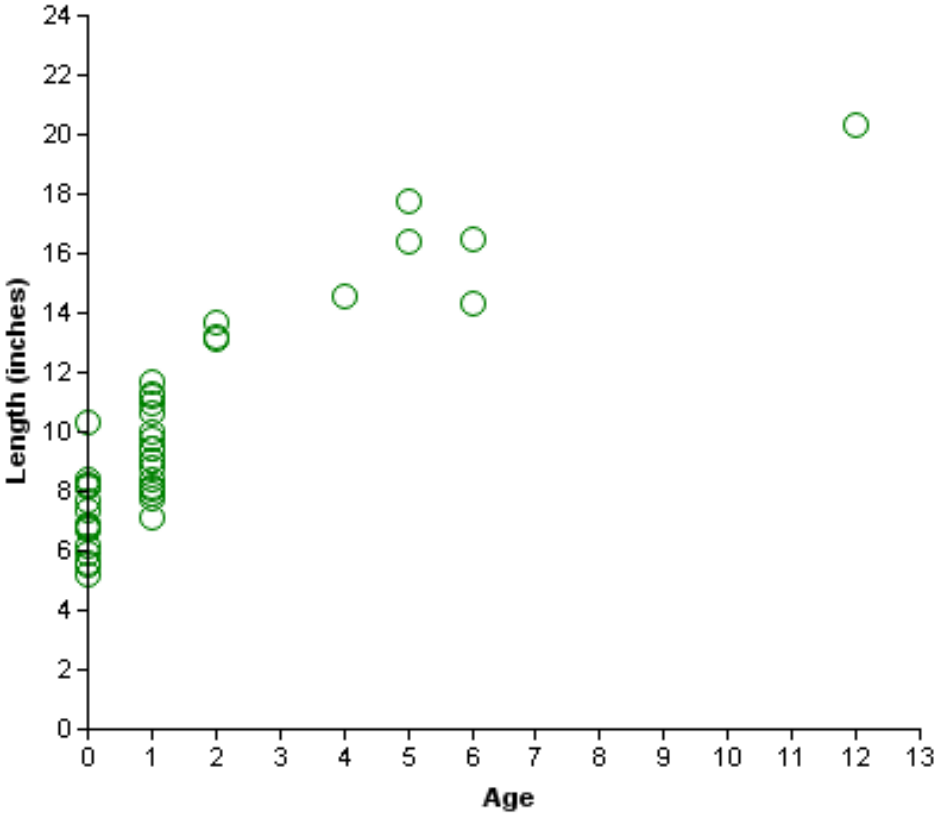
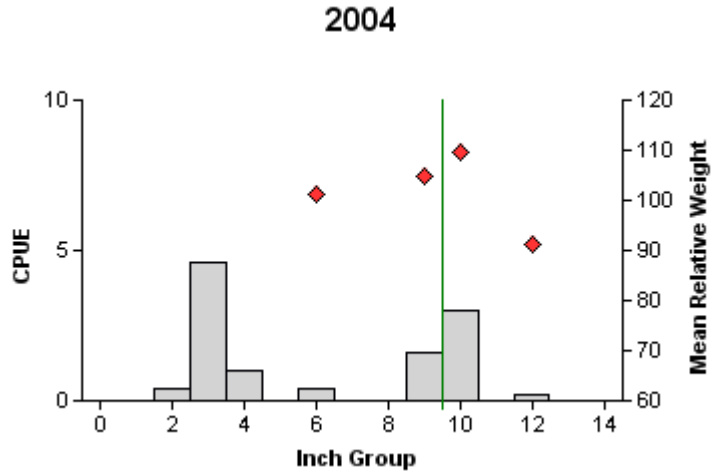
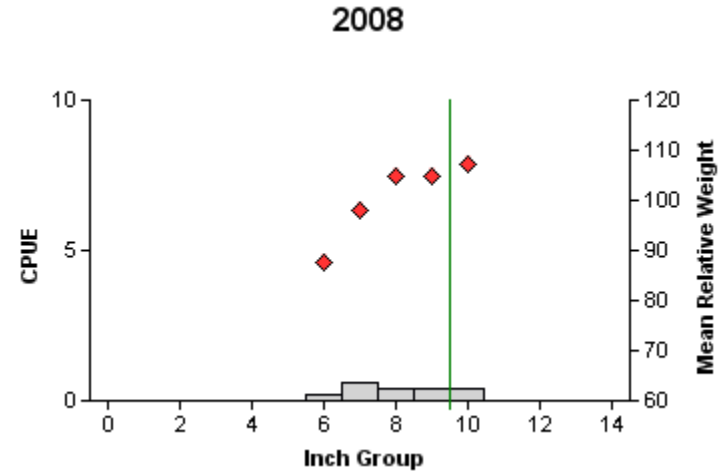


Figure 10. Length at age (inches) of Largemouth Bass (N=44) (sexes combined) collected in fall electrofishing, Purtis Creek State Park, Texas, October 2012.

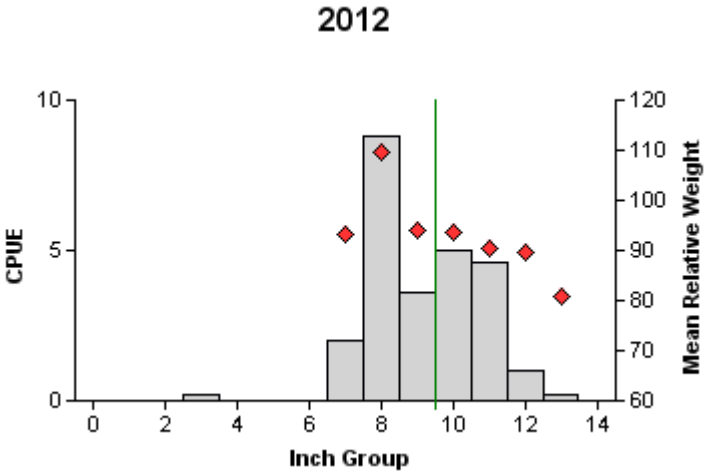
White Crappie



Effort = 5.0
Total CPUE = 11.2 (42; 56)
Stock CPUE= 5.2 (44; 26)
PSD = 92 (7.8)
PSD-10 = 62 (12.6)



Effort = 5.0
Total CPUE = 2.0 (42; 10)
Stock CPUE= 2.0 (42; 10)
PSD = 60 (21.9)
PSD-10 = 20 (16.4)



Effort = 5.0
Total CPUE = 25.4 (39; 127)
Stock CPUE= 25.2 (40; 126)
PSD = 92 (3.3)
PSD-10 = 43 (7)

Figure 11. Number of White Crappie caught per net night (CPUE, bars), and population indices (RSE and N for CPUE and SE for PSD are in parentheses) for fall trap net surveys, Purtis Creek State Park Lake, Texas, 2004, 2008, and 2012 . Vertical lines represent length limit (10 inches) at time of survey.

White Crappie

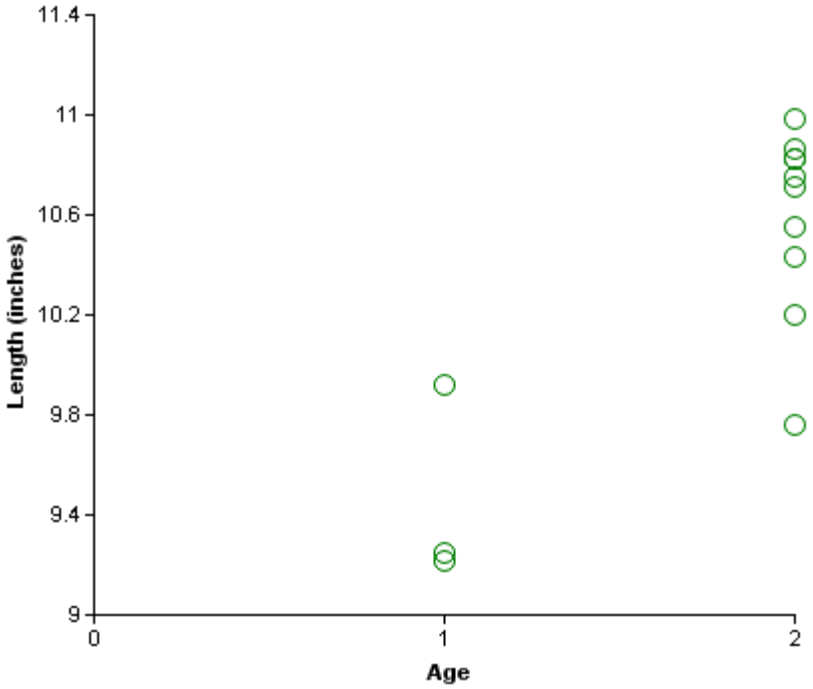


Figure 12. Length-at-age (inches) for White Crappie (N = 16) collected in trap nets, Purtis Creek State Park Lake, Texas, 2012.

Table 6. Proposed sampling schedule for Purtis Creek State Park Lake, Texas. Electrofishing is conducted in the fall and spring. Gill netting surveys are conducted in the spring, while trap netting surveys are conducted in the fall. Creel survey will run from December 2014 through May 2015 (i.e. winter and spring quarters). Standard survey denoted by S and additional survey denoted by A.

Survey year	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Vegetation	Structural			
2013-2014				A				
2014-2015	A (A)			A			A	
2015-2016				A				
2016-2017	S (A)	A	S	S		S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types, Purtis Creek State Park Lake, Texas, 2012-2013. Ef = fall electrofishing; Es = Spring bass-only electrofishing.

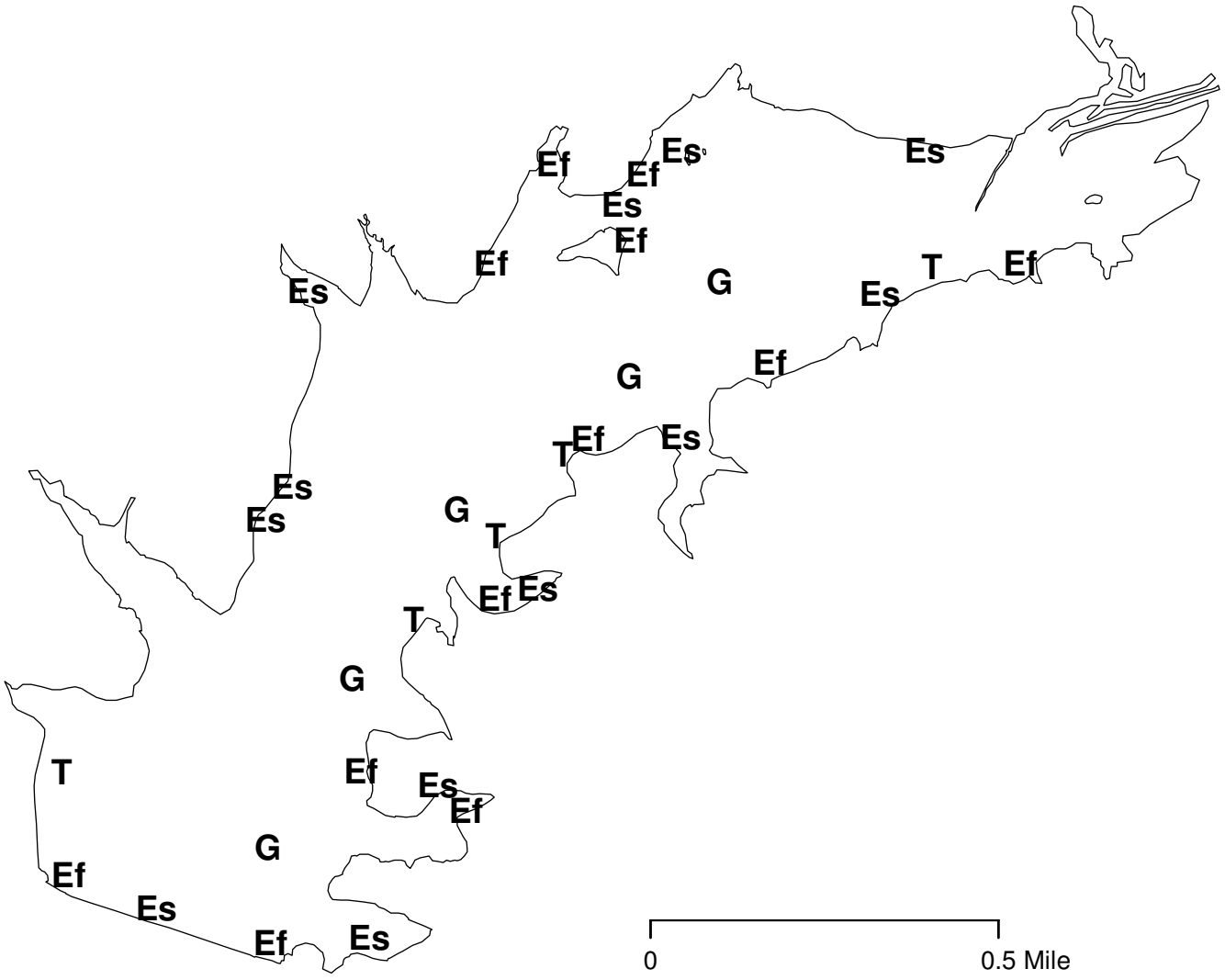
Species	Gill netting		Trap netting		Ef		Es	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					114	114.0		
Threadfin Shad					112	112.0		
Channel Catfish	33	6.6						
Blue Catfish	2	0.4						
White Bass	1	0.2						
Longear Sunfish					17	17.0		
Redbreast Sunfish					219	219.0		
Warmouth					11	11.0		
Bluegill					707	707.0		
Redear Sunfish					172	172.0		
Largemouth Bass					96	96.0	98	98.0
White Crappie			127	25.4				

APPENDIX B

Year	Stock	#/acre
2007	1000	2.90
2008	680	1.97
2009	462	1.34
2010	314	0.91
2011	214	0.62
2012	145	0.42
2013	99	0.29
2014	67	0.19
2015	46	0.13
2016	31	0.09
2017	21	0.06
2018	14	0.04
2019	10	0.03
2020	7	0.02
2021	5	0.01
2022	3	0.01
2023	2	0.01
2024	1	0.00
2025	1	0.00

Projected annual density of triploid Grass Carp remaining in Purtis Creek State Park Lake post 2007 stocking. Estimate based on an annual total mortality of 32%.

APPENDIX C



Location of sampling sites, Purtis Creek State Park Lake, Texas, 2012-2013. Trap net, gill net, and fall and spring electrofishing stations are indicated by T, G, Ef, and Es respectively.