PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Lone Star Lake

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lone Star Lake were surveyed in 2014 using electrofishing and in 2015 using gill netting. Historical data are presented with the 2014-2015 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:** Lone Star Lake is a 1,516-acre impoundment located on Ellison Creek in the Cypress River Basin in Morris County. Structural habitat is sparse, but is comprised of brush, riprap, creek channels, and boat docks. Hydrilla was discovered in the reservoir in 2006 and has slowly increased in recent surveys. A fish consumption advisory was issued due to PCB contamination in 2005.

- **Management History:** Important sport fish include Channel Catfish, White Bass, and Largemouth Bass. All sport fish have historically been managed with statewide harvest regulations. Florida Largemouth Bass have been stocked in this reservoir to improve the quality of the Largemouth Bass fishery. Palmetto Bass stocking was discontinued in 2005 due to the fish consumption advisory. Hydrilla was discovered in the reservoir in 2006 and herbicide treatments were conducted in 2006 and 2007. Environmental conditions caused a reduction in native vegetation in 2010, but vegetation coverage has returned to previous levels.

- **Fish Community**
  - **Prey species:** Threadfin Shad continued to be present in the reservoir. Electrofishing catch of Gizzard Shad was lower than previous surveys, and 37% of Gizzard Shad were small enough to be available as prey to sport fish. The electrofishing catch rate of sunfish was high, but very few sunfish were over 6-inches long.

  - **Channel Catfish:** The Channel Catfish population continued to have many fish over 12 inches. However, few fish over 20 inches have been observed in recent surveys.

  - **Temperate basses:** White Bass were present in the reservoir. White Bass abundance has fluctuated in recent surveys, likely due to poor spawning habitat and unpredictable recruitment. Palmetto Bass have not been stocked since 2005 and are likely no longer in the reservoir.

  - **Largemouth Bass:** Largemouth Bass were abundant with many fish over 14 inches available to anglers. Largemouth Bass had above average growth and condition indicating an excellent forage base. Many Largemouth Bass in the 2-3 inch range indicated an above average year-class had been produced.

  - **Crappie:** Crappie were not sampled in 2014-2015, however historically both Black and White Crappie have been present in Lone Star Lake.

- **Management Strategies:** Conduct an additional electrofishing survey in fall 2016, and general monitoring surveys with gill nets and electrofishing surveys in 2018-2019. Annual vegetation surveys will be conducted to monitor hydrilla and alligatorweed. Conduct angler creel survey during spring 2016 to assess angling effort and catch rates.

INTRODUCTION

This document is a summary of fisheries data collected from Lone Star Lake in 2014-2015. 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 2014-2015 data for comparison.

Reservoir Description

Lone Star Lake is a 1,516-acre impoundment constructed in 1943 on Ellison Creek in the Cypress River Basin. It is located in Morris County in the City of Lone Star. The controlling authority is U. S. Steel Tubular Products, Inc. Primary water uses are industrial water supply and public recreation. It has a watershed of approximately 37 square miles, a shoreline length of 14 miles, and a shoreline development index of 2.6. Annual water level fluctuation is typically around 1-3ft (Figure 1). Structural habitat is sparse, but is comprised of inundated timber, brush, riprap, creek channels, and boat docks. Aquatic plant abundance has decreased since the 2006 survey. Boat access consisted of two public boat ramps and one private boat ramp. Bank fishing access is limited. Other descriptive characteristics for Lone Star Lake are in Table 1. The Texas Department of State Health Services (TDSHS) issued a fish consumption advisory due to PCB contamination in 2005. Persons should not consume any species of fish from this reservoir (Ward et al. 2005).

Angler Access

Lone Star Lake has two public boat ramps and one private ramp. Lone Star City Park ramp is cracked and needs repair. Repairs are scheduled to begin in fall 2015. Shoreline access is limited to the public boat ramp areas. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Bister 2011) included:
1. Monitor hydrilla and alligatorweed coverage in the reservoir.
    Action: Provided technical guidance to the controlling authority regarding invasive aquatic plant management. Conducted annual hydrilla/alligatorweed surveys to monitor trends and estimate coverage of invasive aquatic plants.
2. Monitor the Largemouth Bass population to assess changes due to habitat fluctuations and Florida Largemouth Bass (FLMB) stockings.
    Action: Electrofishing surveys were conducted in 2012 and 2014 to assess the Largemouth Bass and prey species populations. Genetic samples were collected in 2012 and 2014.
3. Continue to maintain signage for the fish consumption advisory for PCBs.
    Action: Signage has been maintained at both ramps and questions regarding the advisory have been directed to the TDSHS.
4. Anglers and stakeholders may be interested in fisheries management activities, fishing opportunities, and other issues at Lone Star Lake.
    Action: Information regarding fisheries management work at Lone Star Lake was disseminated through personal interactions with anglers and through the district Facebook page.
5. Invasive species continue to threaten Texas waters.
    Action: Continued to work with controlling authorities to post signage and to educate the public on invasive species threats through media outlets.

Harvest regulation history: Sport fishes in Lone Star Lake are managed with statewide regulations (Table 3).

Stocking history: Palmetto Bass and FLMB have been the only species stocked in Lone Star Lake. After the TDSHS issued a consumption advisory because of PCB contamination to not eat any fish from this reservoir, Palmetto Bass stockings were discontinued in 2005. The complete stocking history is in Table 4.

Vegetation/habitat management history: Hydrilla was discovered in the reservoir in 2006 and herbicide treatments were conducted in 2006 and 2007. However, over the current survey period, hydrilla has not negatively impacted boat and angler access. Alligatorweed flea beetles were obtained from U. S. Army Corps of Engineers in Florida in spring 2014 and released in the upper end of the reservoir to provide biological control of plants.

Water transfer: No interbasin transfers are known to exist.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations) and gill netting (5 net nights at 5 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 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 2014).

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 fishes 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 and creel statistics. Average age-at-length was determined using otoliths for Largemouth Bass from 13.0 to 14.6 inches in 2012 (N = 17) and 13.0 to 14.7 inches in 2014 (N = 14). Average age-at-length was determined using otoliths for White Bass from 9.0 to 10.9 inches in 2012 (N = 13).

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Micro-satellite DNA analysis was used to determine genetic composition of individual fish.

Source for water level data was from U. S. Steel Tubular Products, Inc.

RESULTS AND DISCUSSION

Habitat: Native aquatic vegetation coverage was 24% (Table 6) of the lake area and was a significant increase from the 7% coverage surveyed in 2010 (Bister 2011). Primary native plants included coontail, Illinois pondweed, chara, American lotus, and white pond-lily. The majority of native vegetation in the lake was submersed vegetation located in the upper portion of the reservoir. Hydrilla coverage has increased to 33 acres while alligatorweed continues to persist in the upper portion of the reservoir and in the back of coves. Alligatorweed remained at low levels and totaled only 7 acres.

Prey species: Gizzard Shad, Threadfin Shad, and many species of sunfish were present, indicating good forage diversity. Gizzard Shad Index of Vulnerability (IOV) was moderate with 37% of fish being

available to predators, but abundance was poor (46.0/h) and slightly lower than in 2012 (97.0/h) and 2010 (77.0/h) (Figure 2). Redbreast Sunfish were abundant (225.0/h) and comprised a significant portion of the prey base in Lake Lone Star (Figure 3). Bluegill catch rate was 474.0/h which was lower than 2012 (788.0/h) and 2010 (819.0/h) (Figure 4). Longear Sunfish (233.0/h) and Redear Sunfish (130.0/h) (Figure 5) were also abundant. Bluegill comprised 44% of all sunfish collected, followed by Longear Sunfish (21%), Redbreast Sunfish, (21%), and Redear Sunfish (12%) (Appendix A).The sunfish population generally displayed a small size structure with few large (>8 inches) sunfish for anglers, but abundant smaller fish for predators.

Channel Catfish: The gill net catch rate of Channel Catfish was 8.8/nn in 2015, which was lower than 2011 (14.0/nn) and 2007 (11.0/nn) (Figure 6). Channel Catfish PSD was 30 and similar to previous surveys, and X% of the sample were legal size-fish available to anglers. However, few large fish (>20") have been observed in the three most recent surveys. Body condition was above average for Channel Catfish over 14 inches with mean Wr >100.

White Bass: The gill net catch rate of White Bass was 4.4/nn in 2015 which was higher than 2011 (0.6/nn), but much lower than 2007 (14.4/nn) (Figure 7). Most White Bass observed were 10-11 inches in length. Growth of White Bass was fast; mean age at 10 inches was 1 year (N = 13, range = all age-1 fish).

Largemouth Bass: The electrofishing catch rate of stock-length Largemouth Bass was 111.0/h in 2014, which was higher than the 75.0/h in 2012 and 100.0/h in 2010 (Figure 8). Size structure, as measured with PSD, indicated that 40-60% of adult fish were at least 12 inches long and approximately 20% of adults were at least 15 inches long.   PSD was 40 in 2014 and has remained in the balanced range (Anderson and Nuemann 1996) over the past three surveys (Figure 10). The size structure of preferred size bass has remained consistent over the past three surveys with approximately 20% of catchable size fish being over 15 inches long. In 2014, growth of Largemouth Bass was acceptable; mean age at 14 inches (13.0 to 14.7 inches) was 2.1 years (N = 14; range = 1 – 4 years) and was very similar to 2012 when Largemouth Bass mean age at 14 inches (12.9 to 14.6) was 2.2 years (N = 17; range = 1 – 4 years). Recruitment was excellent with many bass collected in the 2-3 inch range. Body condition was satisfactory with most inch groups with Wr >90 and was similar to past surveys. This indicates adequate prey availability for Largemouth Bass. In both 2012 and 2014, FLMB alleles were at 36%. No pure FLMB were observed in 2012 or 2014 (Table 6).

Crappie: Trap netting for crappie was discontinued after 2006 due to poor catch rates. Previous surveys have indicated both Black and White Crappie were present in the reservoir.

Fisheries management plan for Lone Star Lake, Texas

Prepared – July 2015.

ISSUE 1: The Largemouth Bass population consisted of quality-sized fish. Florida Largemouth Bass were stocked in Lone Star Lake in 2008 and 2009, however submersed habitat was reduced in 2010 due to environmental conditions. Submersed habitat has since returned to optimal levels and is providing good habitat. The reservoir has the ability to support a quality Largemouth Bass fishery. Past creel and electrofishing surveys (Bister and Brice 2007) have shown the presence of Largemouth Bass over 20 inches. The population should be monitored to assess changes related to habitat fluctuations and FLMB stocking efforts.

MANAGEMENT STRATEGY
1. Stock FLMB at 100 fish/acre in 2015 and continue stocking every other year contingent upon quality habitat persisting in the reservoir.
2. Conduct electrofishing surveys in 2016 and 2018 to monitor the Largemouth Bass and prey populations.
3. Conduct a spring creel survey in 2016 to monitor effort and catch rates for Largemouth Bass.

ISSUE 2: Hydrilla has expanded in Lone Star Lake from only a few acres from 2011-2013 to 33 acres in 2014. Hydrilla should be monitored to identify potential access problems in the future. Management of hydrilla may be necessary to minimize expansion throughout the reservoir. Alligatorweed is present and has been managed with alligatorweed flea beetles and should be monitored.

MANAGEMENT STRATEGIES
1. Conduct annual hydrilla/alligatorweed surveys to monitor trends and estimate coverage of invasive aquatic plants.
2. If necessary, provide technical guidance to the controlling authority regarding invasive aquatic plant management.
3. Release alligatorweed flea beetles when available.

ISSUE 3: The TDSHS issued a fish consumption advisory due to PCB contamination for all fishes in Lone Star Lake in 2005. The Texas Parks and Wildlife Department is required to post signs at access areas on waterbodies that have consumption advisories.

MANAGEMENT STRATEGIES
1. Continue to maintain consumption advisory signs at Lone Star Lake boat ramps.
2. Continue to refer public to TDSHS for more detailed information related to the advisory.
3. Continue to promote fisheries that are non-consumptive (i.e., Largemouth Bass).

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

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

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional electrofishing in 2016 and mandatory monitoring in 2018/2019 (Table 7). Additional vegetation surveys in 2015, 2016, and 2017 will be conducted to monitor hydrilla and alligatorweed coverage. Additional electrofishing survey in 2016 is necessary to maintain consistent data for trend information on the Largemouth Bass fishery. Gill net surveys are only necessary every four years to evaluate the Channel Catfish and White Bass populations. A spring quarter angler creel survey in 2016 will be conducted to estimate angling effort and catch rates for all game species.

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Guy, C. S., R. M. Neuman, 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.

Ward, J, M. Tennant, Z. Thomas, K. Wiles, and G. Heidman. 2005. Characterization of Potential Health Effects Associated with Consumption of Fish from Ellison Creek Reservoir Morris County, TX. Texas Department of State Health Services. http://www.dshs.state.tx.us/seafood/PDF2/Risk-Characterization/Ellison-CreekReservoirRC2005RevisedFebruary2007.pdf (Accessed June 2015).
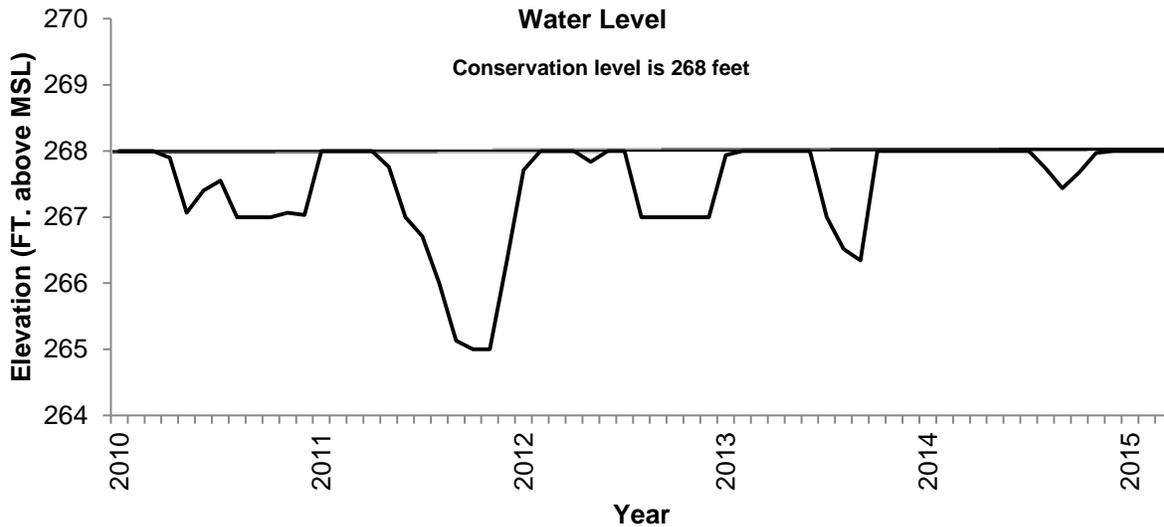
Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded Lone Star Lake, Texas.

Table 1. Characteristics of Lone Star Lake, Texas.

Characteristic	Description
Year constructed	1943
Controlling authority	U.S. Steel Tubular Products, Inc.
County	Morris
Reservoir type	Mainstream
Shoreline Development Index (SDI)	2.6
Conductivity	218 µS/cm

Table 2. Boat ramp characteristics for Lone Star Lake, Texas, June, 2015. Reservoir elevation at time of survey was 268 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Scenic View Marina	32.93600 -94.71750	N	10	264	Excellent, no access issues
Lone Star City Park	32.94678 -94.71485	Y	10	263	Needs repair, ramp is cracked
FM 997 County Ramp	32.96302 -94.72221	Y	10	263	Excellent, no access issues

Table 3. Harvest regulations for Lone Star Lake, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Palmetto	5	18-inch minimum
Bass, Largemouth	5[a]	14-inch Minimum
Bass: Spotted	5[a]	None
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a] Daily bag for Largemouth Bass and Spotted Bass = 5 fish in any combination.

Table 4. Stocking history of Lone Star Lake, Texas. FGL = fingerling; UNK = unknown.

Species	Year	Number	Size
Palmetto Bass	1983	16,500	UNK
	1997	15,253	FGL
	1999	7,636	FGL
	2002	15,264	FGL
	2004	14,300	FGL
	2005	14,328	FGL
	Total	83,281	
Florida Largemouth Bass	1990	153,238	FRY
	1995	75,013	FGL
	2008	151,608	FGL
	2009	152,108	FGL
	2015	155,063	FGL
	Total	687,030	

Table 5. Survey of structural habitat types, Lake Lone Star, Texas, 2010 (Bister 2011). Shoreline habitat type units are in miles.

Habitat type	Estimate	% of total
Bulkhead	2.6 miles	14.4
Natural	14.0 miles	61.9
Natural with boat docks	2.8 miles	15.5
Rocky	1.5 miles	5.5
Rocky with boat docks	0.5 miles	2.7

Table 6. Survey of aquatic vegetation, Lone Star Lake, Texas, 2011 – 2014. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.
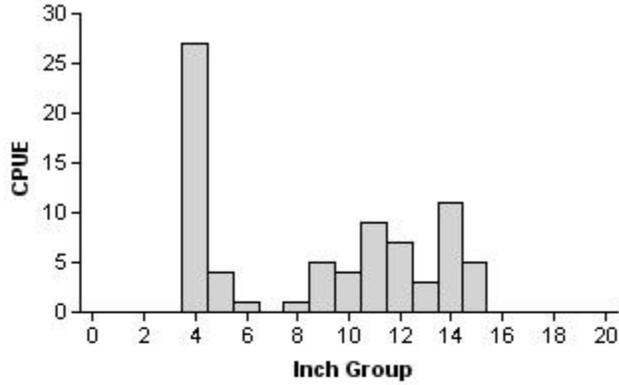
Vegetation	2011	2012	2013	2014
Native submersed				312.0 (20.6)
Native floating-leaved				18.0 (1.2)
Native emergent				40.0 (2.6)
Non-native				
Hydrilla (Tier II)*	Trace	Trace	4.0 (0.3)	33.0 (2.2)
Alligatorweed (Tier II)*	2.0 (0.1)	6.0 (0.4)	Trace	7.0 (0.5)

*Tier II is maintenance
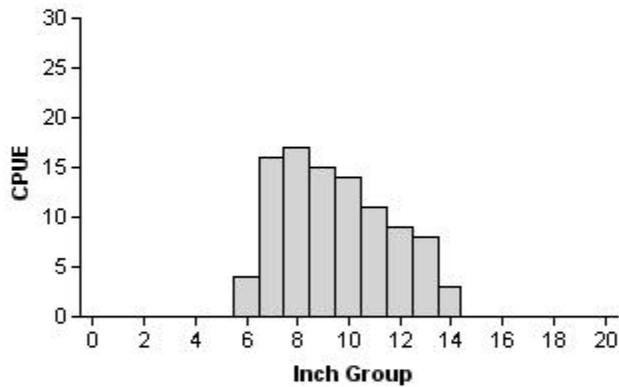
Gizzard Shad

2010

Effort = 1.0
Total CPUE = 77.0 (29; 77)
IOV = 42 (14.3)

2012

Effort = 1.0
Total CPUE = 97.0 (27; 97)
IOV = 21 (7.6)

2014

Effort = 1.0
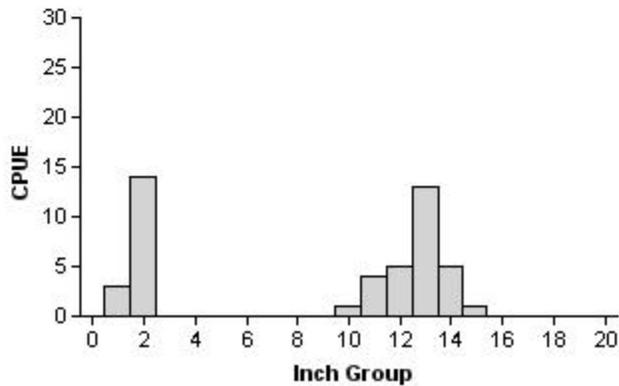Total CPUE = 46.0 (35; 46)
IOV = 37 (26.2)

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, Lone Star Lake, Texas, 2010, 2012, and 2014.

Redbreast Sunfish

2010

Effort = 1.0
Total CPUE = 275.0 (34; 275)
PSD = 10 (2.4)

2012

Effort = 1.0
Total CPUE = 391.0 (21; 391)
PSD = 45 (3.8)

2014

Effort = 1.0
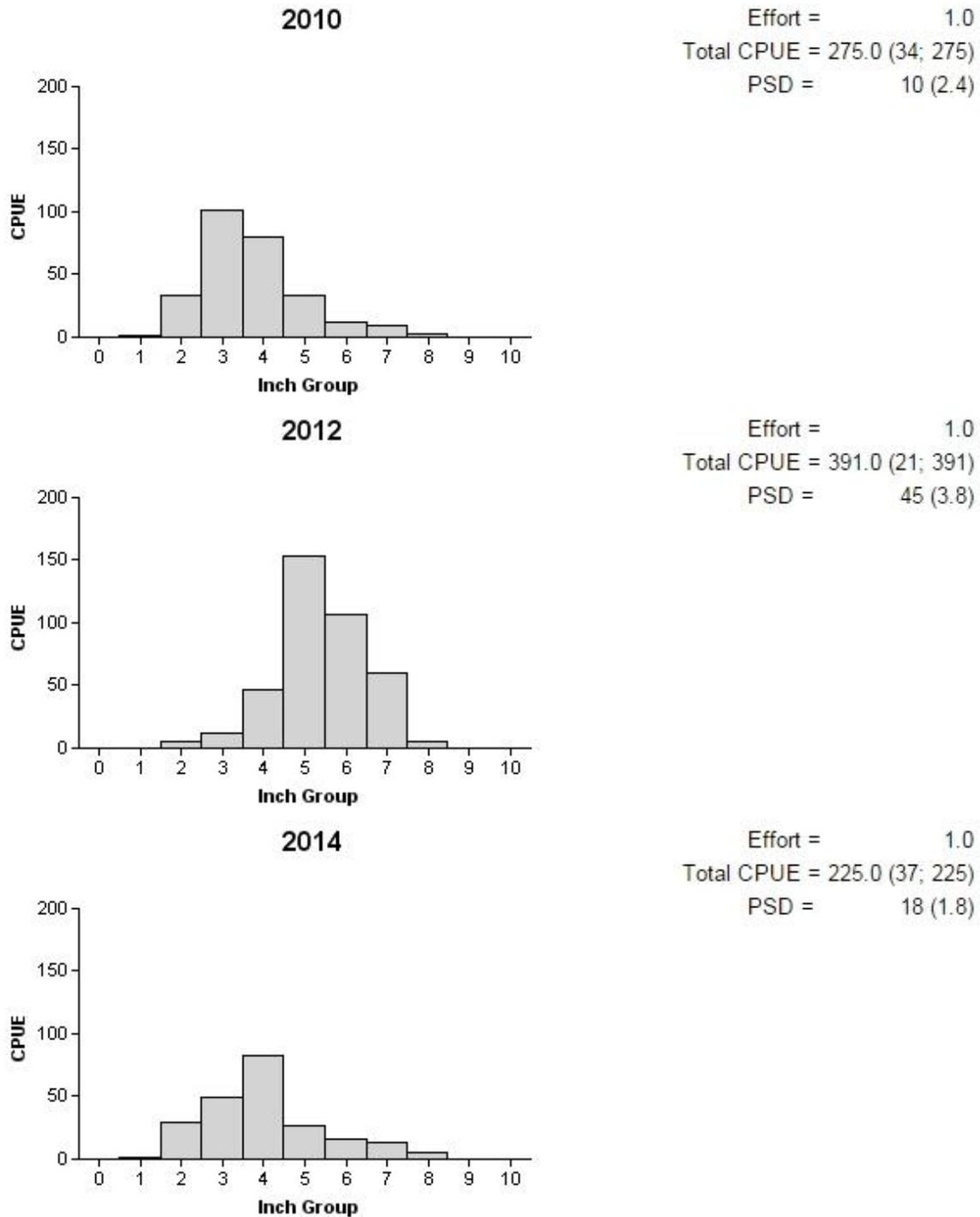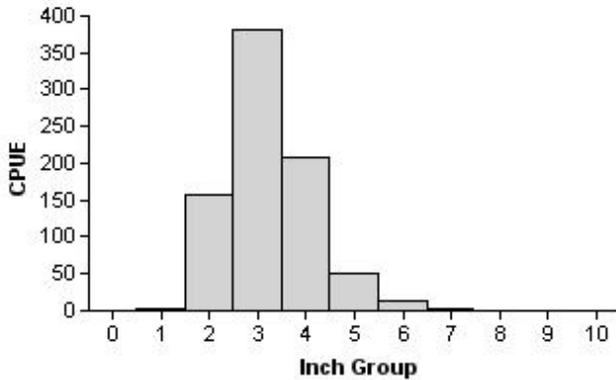Total CPUE = 225.0 (37; 225)
PSD = 18 (1.8)

Figure 3. Number of Redbreast 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, Lone Star Lake, Texas, 2010, 2012, and 2014

Bluegill

2010

Effort = 1.0
Total CPUE = 819.0 (11; 819)
PSD = 3 (1)

2012

Effort = 1.0
Total CPUE = 788.0 (10; 788)
PSD = 6 (1.8)

2014

Effort = 1.0
Total CPUE = 474.0 (17; 474)
PSD = 4 (1.1)

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, Lone Star Lake, Texas, 2010, 2012, and 2014.

Redear Sunfish

2010

Effort =   1.0
Total CPUE = 79.0 (23; 79)
PSD =   26 (6.3)

2012

Effort =   1.0
Total CPUE = 61.0 (23; 61)
PSD =   26 (6.5)

2014

Effort =   1.0
Total CPUE = 130.0 (25; 130)
PSD =   1 (1.3)

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, Lone Star Lake, Texas, 2010, 2012, and 2014.

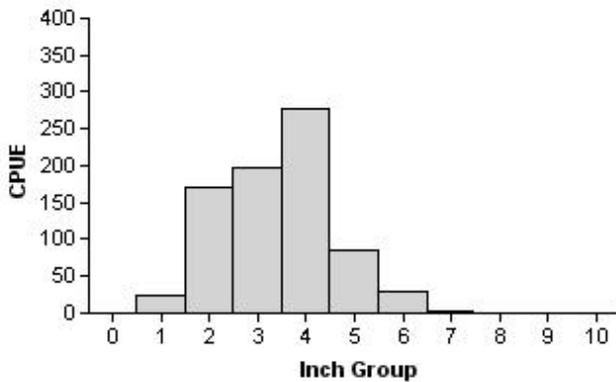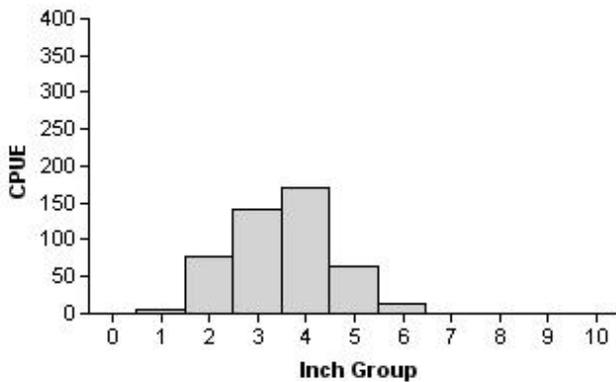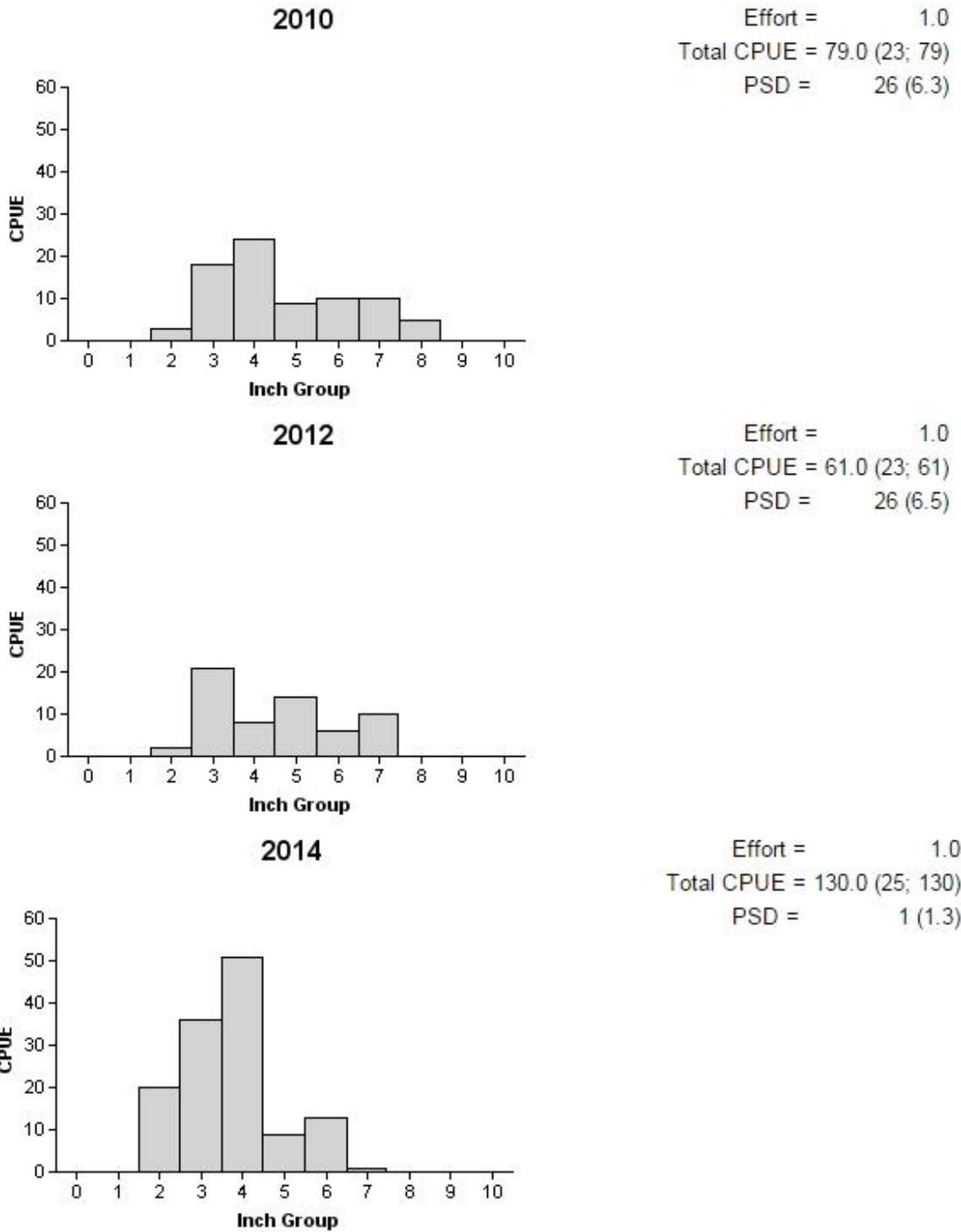# Channel Catfish

2007

Effort = 5.0
Total CPUE = 11.0 (40; 55)
Stock CPUE = 8.6 (44; 43)
PSD = 33 (12.6)
PSD-P = 0 (0)

2011

Effort = 5.0
Total CPUE = 14.0 (16; 70)
Stock CPUE = 13.0 (16; 65)
PSD = 37 (8.4)
PSD-P = 3 (1.6)

2015

Effort = 5.0
Total CPUE = 8.8 (57; 44)
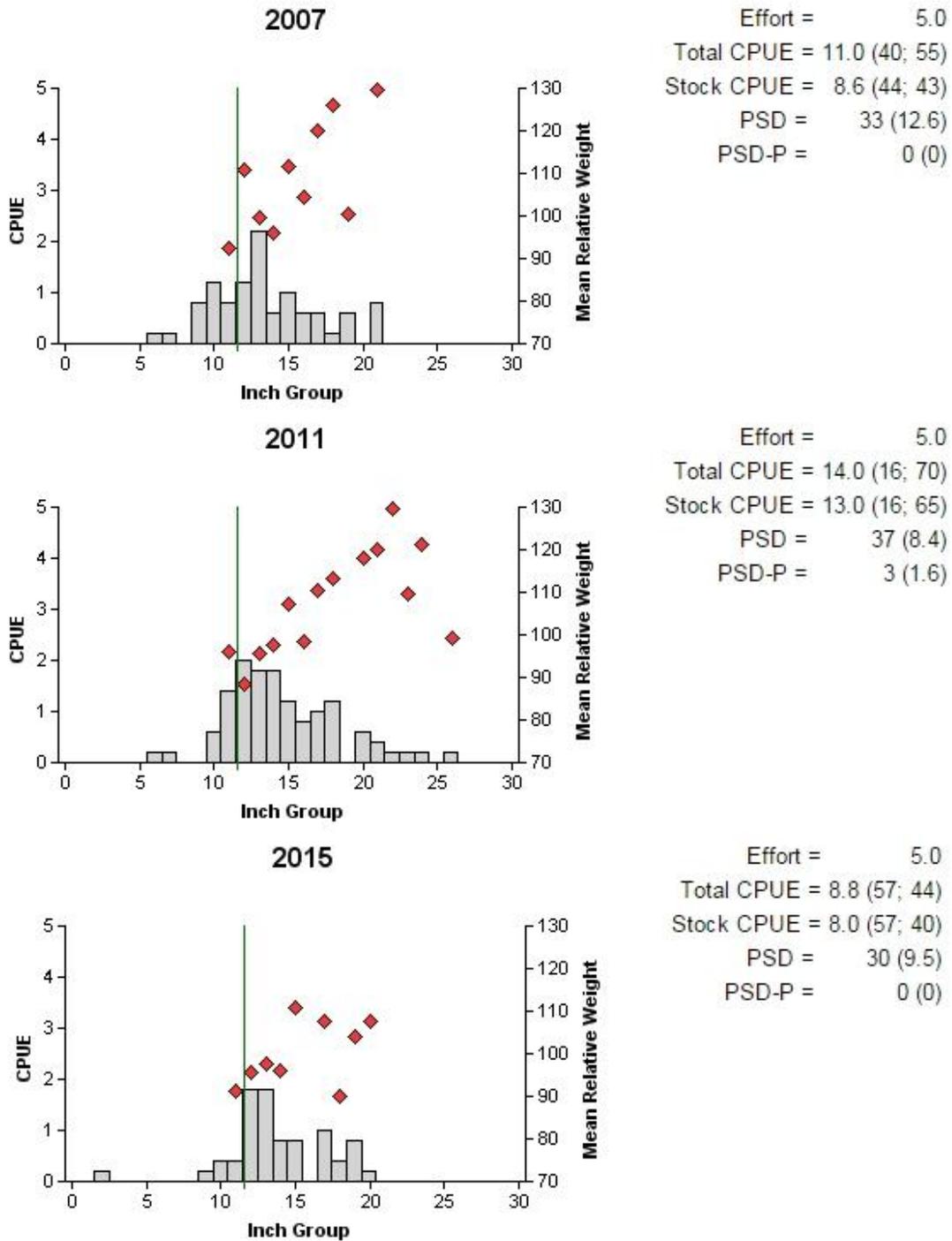Stock CPUE = 8.0 (57; 40)
PSD = 30 (9.5)
PSD-P = 0 (0)

Figure 6. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lone Star Lake, Texas, 2007, 2011, and 2015. Vertical line indicates minimum length limit at time of sampling.

White Bass

2007

Effort = 5.0
Total CPUE = 14.4 (68; 72)
Stock CPUE = 14.4 (68; 72)
PSD = 100 (0)
PSD-P = 100 (0)

2011

Effort = 5.0
Total CPUE = 0.6 (67; 3)
Stock CPUE = 0.6 (67; 3)
PSD = 100 (0)
PSD-P = 67 (35.1)

2015

Effort = 5.0
Total CPUE = 4.4 (52; 22)
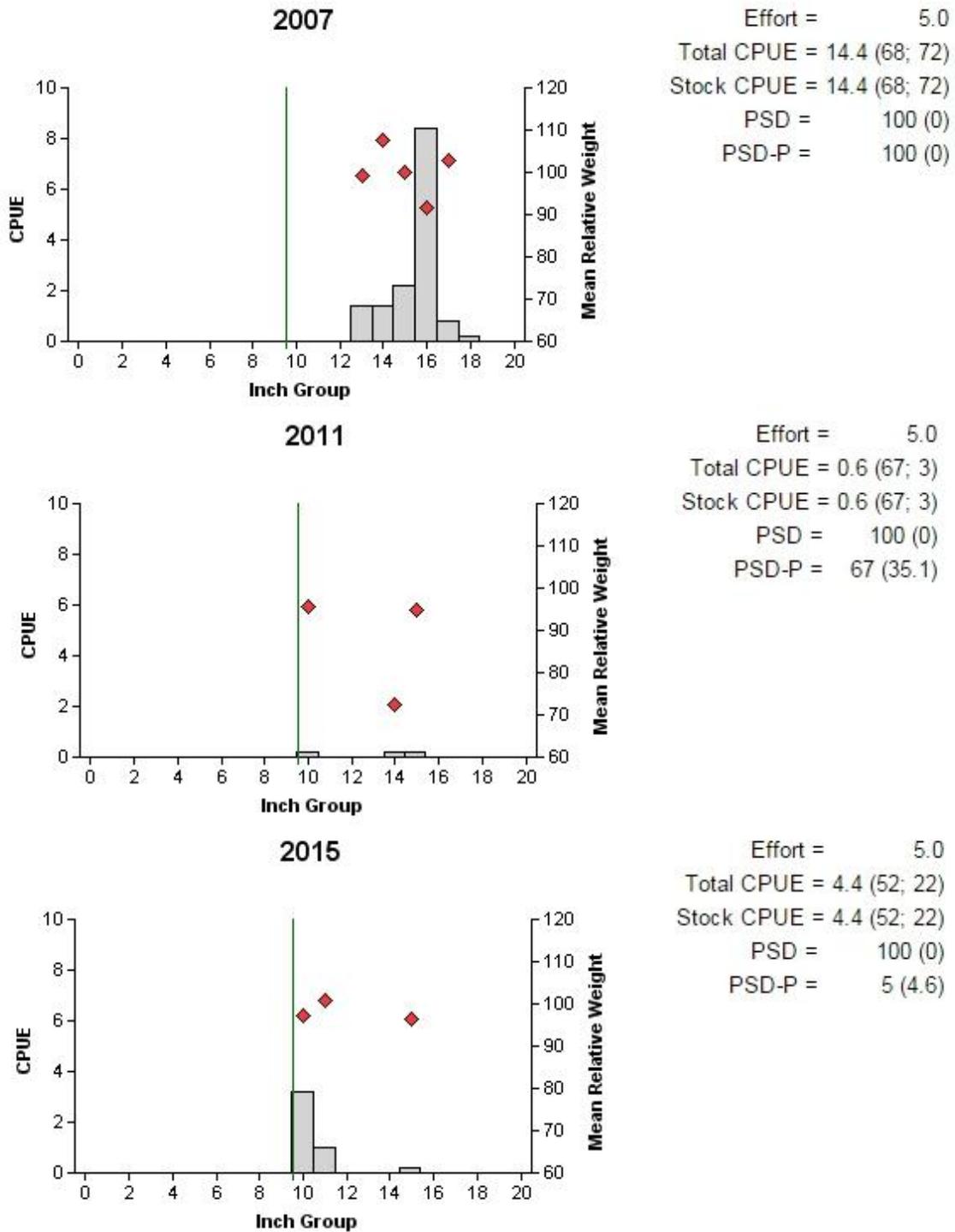Stock CPUE = 4.4 (52; 22)
PSD = 100 (0)
PSD-P = 5 (4.6)

Figure 7. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lone Star Lake, Texas, 2007, 2011, and 2015. Vertical line indicates minimum length limit at time of sampling.

Largemouth Bass

2010

Effort = 1.0
Total CPUE = 157.0 (20; 157)
Stock CPUE = 100.0 (23; 100)
PSD = 57 (5.3)
PSD-P = 19 (4)

2012

Effort = 1.0
Total CPUE = 127.0 (13; 127)
Stock CPUE = 75.0 (18; 75)
PSD = 59 (5)
PSD-P = 19 (4.9)

2014

Effort = 1.0
Total CPUE = 205.0 (12; 205)
Stock CPUE = 111.0 (15; 111)
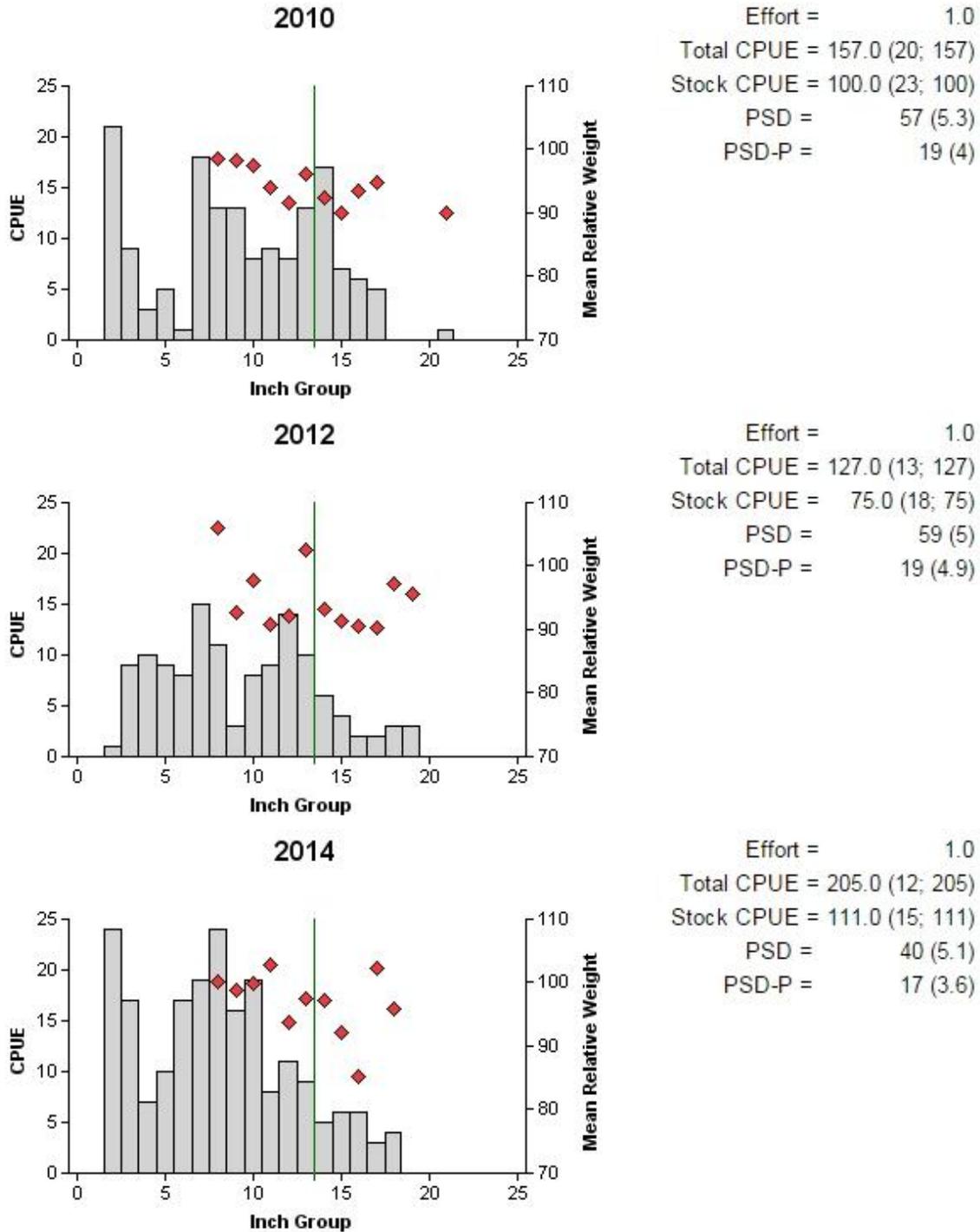PSD = 40 (5.1)
PSD-P = 17 (3.6)

Figure 8. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lone Star Lake, Texas, 2010, 2012, and 2014. Vertical line indicates minimum length limit at time of sampling.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lone Star Lake, Texas, 2012 and 2012. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined with micro-satellite DNA analysis.

| Year | Sample size | Number of fish | | | % FLMB alleles | % FLMB |
		FLMB	Intergrade	NLMB		
2006	35	0	35	0	40.1	0.0
2012	30	0	30	0	36.0	0.0
2014	30	0	28	2	36.0	0.0

Table 8. Proposed sampling schedule for Lone Star Lake, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

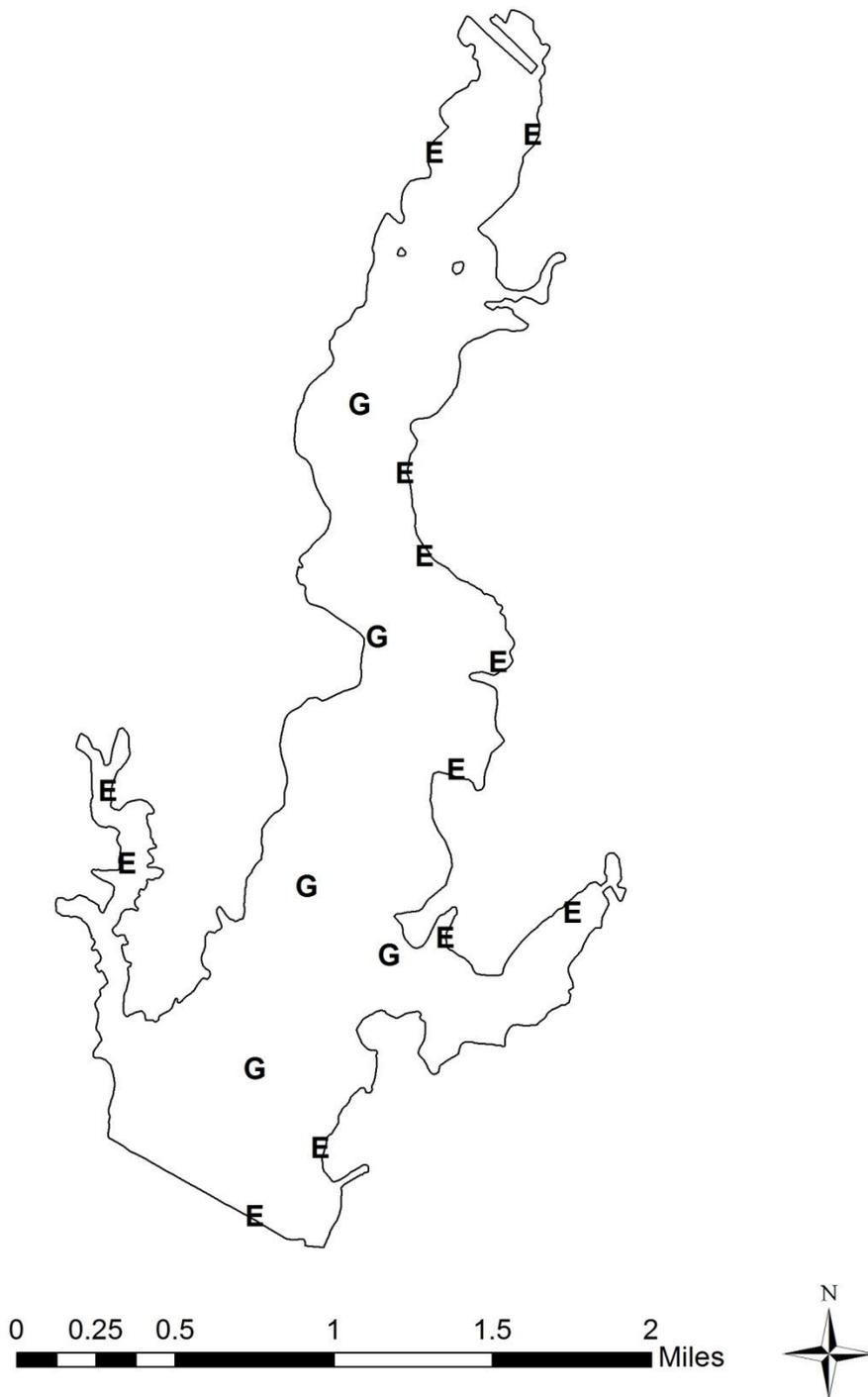| Survey year | Electrofish Fall(Spring) | Trap net | Gill net | Habitat | | Access | Creel survey | Report |
				Structural	Vegetation			
2015-2016					A		A*	
2016-2017	A				A			
2017-2018					A			
2018-2019	S		S		S	S		S

*Spring quarter creel survey

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lone Star Lake, Texas, 2014-2015. Sampling effort was 5 net nights for gill netting and 1 hour for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			46	46.0
Threadfin Shad			26	26.0
Channel Catfish	44	8.8		
White Bass	22	4.4		
Redbreast Sunfish			225	225.0
Warmouth			12	12.0
Orangespotted Sunfish			12	12.0
Bluegill			474	474.0
Longear Sunfish			233	233.0
Redear Sunfish			130	130.0
Redspotted Sunfish			10	10.0
Spotted Bass			10	10.0
Largemouth Bass			205	205.0

APPENDIX B

Location of sampling sites, Lone Star Lake, Texas, 2014-2015. Gill net and electrofishing stations are indicated by G and E, respectively. Water level was near full pool at time of sampling.