

PERFORMANCE REPORT

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TEXAS

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

**Marine Creek Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Marine Creek Reservoir were surveyed in 2014 using electrofishing and trap netting and in 2015 using gill netting. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Marine Creek is a 250-acre reservoir located on Marine Creek (a tributary of the Trinity River). The reservoir was constructed in 1958 by the Tarrant Regional Water District primarily for flood control and limited recreational activities. It is located in Tarrant County in northwest Fort Worth, Texas. Habitat is composed mainly of native emergent aquatic vegetation in the forms of water willow, cattails, and bulrush and rocky shoreline.
- **Management history:** Important sport fish include Largemouth Bass, White Crappie, and Channel Catfish. Largemouth Bass were managed under the statewide 14-inch minimum length limit until September 1, 2006 when the minimum length limit was changed to 18 inches. Marine Creek was a study site for the first phase of the Operation World Record research project. In 2014, tagged ShareLunker Largemouth Bass and Florida Largemouth Bass were stocked as part of phase two of the project.

- **Fish Community**

- **Prey species:** Gizzard and Threadfin Shad are present in the reservoir. However, catch rates of these species remain low. The primary forage base was sunfishes. The total catch rate of Bluegill was the lower than previous surveys, while the catch rate of Longear Sunfish has fluctuated over the last three years. Redear Sunfish abundance increased in the reservoir.
- **Catfishes:** Channel Catfish are present in the reservoir. Catch rates were low despite several stockings since 2004. Flathead Catfish were present. Blue catfish are not present in Marine Creek.
- **White Bass:** Past gill netting surveys documented a small population of White Bass present in Marine Creek. In 2014, White Bass catch was the highest on record since sampling began in 2002. Two distinct modes likely indicate two or more year classes.
- **Black basses:** Spotted Bass abundance has declined in the reservoir. The electrofishing catch rate of Largemouth Bass has varied over the past three years but always exceeded 100 fish/hour. The catch rate of fish > 14 inches in length has remained low.
- **White Crappie:** The White Crappie population continued to exhibit fluctuations in abundance with trap net catch rates lower than in previous years.

**Management Strategies:** Continue habitat improvement through native vegetation planting. Check all Largemouth Bass collected via electrofishing for tags and record data on all tagged Largemouth Bass. Clip fins on tagged Largemouth Bass for DNA confirmation. Work with TRWD on renovation of IH-820 Access Rd boat ramp and "no-wake" buoy installation.

## INTRODUCTION

This document is a summary of fisheries data collected from Marine Creek Reservoir 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 species of 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*

Marine Creek Reservoir is a 250-acre impoundment constructed in 1958 on Marine Creek (a tributary of the Trinity River), by the Tarrant Regional Water District (TRWD) for flood control and limited recreational activities. Water level remains fairly constant (within 2 feet) even during times of prolonged drought. It is located in Tarrant County approximately 7 miles northwest of downtown Fort Worth, Texas. The watershed is small and mostly residential development with some agricultural land remaining. Angler and boat access are adequate. Most of the fishing facilities are accessible to the handicapped. At the time of sampling the fishery habitat was emergent aquatic vegetation in the forms of water willow, cattails, and bulrush along with rocky shoreline. Marine Creek is a constant water-level reservoir and surveys were conducted within 2 feet of full pool. Because no water level data exist at Marine Creek, we were not able to compile a water level figure. Other descriptive characteristics for Marine Creek Reservoir are in Table 1. In the spring of 2007, approximately 30 trees were bundled and sunk in three locations throughout the reservoir to provide habitat. The trees were donated Christmas trees and quickly deteriorated. In summer of 2013 and 2014, white water lily, arrowhead, and pickerel weed have been planted at various locations along the shoreline.

### *Angler Access*

Marine Creek Reservoir has one public boat ramp and no private boat ramps. One public ramp, Ten Mile Bride Road closed in 2012 due to the construction of a new trail. A renovation of the remaining ramp off the IH-820 Access Road is planned in the next few years as part of the reservoir's master plan. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the public boat ramp area and various spots along the paved trail around the reservoir.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Hungerford and Brock 2011) included:

1. Work with the TRWD to improve boat ramp conditions and install regulation signage at the reservoir.  
**Action:** TRWD is currently in the process of printing and installing regulation signs at the reservoir.
2. Due to prior stocking of ShareLunker Largemouth Bass as part of Operation World Record, all bass sampled via electrofishing were to be checked for presence of coded-wire tags during data collection. In addition, Marine Creek is also part of the second phase of Operation World Record with tagged Florida Largemouth Bass as well as tagged ShareLunker Largemouth Bass stocked in 2014.  
**Action:** All Largemouth Bass sampled were checked for presence of coded-wire tags using a tag detector. A preliminary sample was conducted in spring 2015 to assess over-winter survival of tagged fish from the second phase of Operation World Record. Fin clips were also taken from individuals that appeared to possess coded-wire tags.
3. Communicated with TRWD regarding posting of signs educating the public about the spread

of aquatic nuisance species. Emphasized the importance of cleaning, draining, and drying vessels when leaving all reservoirs to reduce risk of spreading zebra mussels.

**Action:** Signs were distributed to TRWD for display at public access points. We made a speaking point when talking to the public the importance of cleaning, draining, and drying vessels prior to launching at other reservoirs.

**Harvest regulation history:** Sport fish populations in Marine Creek Reservoir were managed with statewide regulations with the exception of an 18-inch minimum length limit on Largemouth Bass (Table 3).

**Stocking history:** Marine Creek was stocked in 2006, 2008, and 2014 with ShareLunker Largemouth Bass. Channel Catfish were stocked in 2004, 2009, 2014, and 2015. The complete stocking history is in Table 4.

**Vegetation/habitat history:** Hydrilla and American lotus were historically found, but have not been observed in many years. White water lily, pickerel weed, and arrowhead have been planted in Marine Creek in 2013 and 2014. Results have been promising.

**Water Transfer:** Marine Creek Reservoir is primarily used for flood control and recreation. There are no pumping structures on the reservoir.

## METHODS

Fishes were collected by electrofishing (0.67 hours at 8 5-min stations), gill netting (3 net nights at 3 stations), and trap netting (3 net nights at 3 stations). Since Marine Creek Reservoir is only 250 acres in size, effort was reduced from standard levels. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/hr) of actual electrofishing and, for gill and trap nets, as the number of fish per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights ( $W_i$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV.

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 from 2005 through 2012 and by electrophoresis for previous years.

Water level data are not available for this reservoir.

## RESULTS AND DISCUSSION

**Habitat:** Littoral zone habitat was last surveyed in 2010 and consisted primarily of native emergent aquatic vegetation in the form of water willow, cattail, and bulrush and rocky shoreline (Hungerford and Brock 2011).

**Creel:** The last creel survey at Marine Creek was conducted in 2006-2007 (Hungerford and Brock 2011).

**Prey species:** The Threadfin Shad catch rates varied from a high in 2008 of 112.5/hr to a low of 4.5/hr in 2014 (Appendix C). The electrofishing catch rate of Gizzard Shad has remained under 100.0/hr since sampling began in 2002 (Figure 1; Appendix C). Index of vulnerability for Gizzard Shad was poor, indicating that only 5% of Gizzard Shad captured in 2014 were available to existing predators; this was lower than IOV estimates in the previous surveys (Figure 1). The primary forage base in Marine Creek is sunfishes. Electrofishing catch rates of Bluegill was lower in 2014 (303.0/hr) than the record 532.5/hr in 2010 (Figure 2). The Bluegill population does not contain large numbers of quality sized fish (>6 inches) or preferred sized fish (>8 inches) as evident in PSD values. Longear Sunfish catch rates have varied from a low of 11.0/hr in 2002 to a high of 201.0/hr in 2005 (Appendix C). However, in 2014 the catch rate of Longear Sunfish was 57.0/hr. Redear Sunfish relative abundance increased (34.5/hr) in 2014, up from just 9.0/hr in 2010 (Figure 3).

**Channel Catfish:** The gill net catch rate of Channel Catfish was 2.7/nn in 2015 (Figure 4). This catch rate is an increase from 2010 (1.3/nn). Channel Catfish were stocked in 2009, 2014, and 2015 (Table 4). The 2014 and 2015 stockings were the result of a special event put on by TRWD. Mean relative weight of Channel Catfish was around 90 for all size classes sampled in 2015.

**White Bass:** White Bass abundance in Marine Creek was the highest seen in recent surveys (Appendix C). The gill netting catch rate of White Bass in 2014 (11.0/nn) was much higher than 2007 (4.7/nn) and 2011 (1.3; Figure 5). Size structure indicates two distinct modes in the population. Despite being in an extended period of drought, with little run-off into Marine Creek Reservoir, the White Bass population appeared to improve. Body condition was around 90 for all sizes of fish (Figure 5).

**Black basses:** The electrofishing catch rate of Spotted Bass in 2010 was 15.0/hr (Figure 6). Spotted Bass were more abundant from 2002 through 2007, but have declined in recent samples (Appendix C). The electrofishing catch rate of Largemouth Bass was 129.0/hr in 2014 (Figure 7), but has varied from a low of 94.0/hr in 2003 to a high of 202.5 in 2005 (Appendix C). Size structure of the population has steadily improved from 2008 as PSD values increased from 23 in 2008, 44 in 2010, and 48 in 2014. Body conditions have declined recently (relative weight between 80 and mid-90s) for nearly all size classes of fish (Figure 7). Florida Largemouth Bass influence was low in 2004 and Florida genotype was 0, but in 2014, Florida genotype was 7.4% (Table 5). Florida Largemouth Bass have been stocked in 2006, 2008, and 2014 (Table 4).

**White Crappie:** The trap net catch rate of White Crappie was 1.7/nn in 2014, which was much lower when compared to 2010 (8.7/nn; Figure 8). The PSD in 2014 was 80 which was slightly higher than the previous sample in 2010 (71).

## Fisheries management plan for Marine Creek Reservoir, Texas

Prepared – July 2015

**ISSUE 1:** Marine Creek is used only for flood control and recreation. As such, minimal water level fluctuations occur and only as drought conditions persist. The resulting stable water level is beneficial to aquatic vegetation. Plantings of white water lily, pickerel weed, and arrowhead have proved successful in 2013 and 2014.

### MANAGEMENT STRATEGIES

1. Request appropriate native emergent species of vegetation for planting at Marine Creek in 2015 and 2016.
2. Monitor establishment of plantings annually.

**ISSUE 2:** Marine Creek was stocked in 2006, 2008 (phase 1), and 2014 (phase 2) with coded-wire tagged ShareLunker Largemouth Bass and in 2014 (phase 2) with coded-wire tagged Florida Largemouth Bass as part of the Operation World Record project. The primary objectives of the first phase were accomplished in 2010, although tagged fish still remain in the reservoir. Phase two will be evaluated in 2018.

### MANAGEMENT STRATEGIES

1. All Largemouth Bass collected during sampling will be checked for tags and data will be recorded accordingly.
2. Fin clips will be collected from tagged fish for DNA confirmation of coded-wire tagged Largemouth Bass.
3. Conduct 4-year growth evaluation of phase 2 of the project in spring of 2018.

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

### MANAGEMENT STRATEGIES

1. Cooperate with the Tarrant Regional Water District (TRWD) to maintain appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

**ISSUE 4:** Tarrant Regional Water District is planning a major renovation to the remaining boat ramp located off the IH-820 Access Road. Currently, the ramp is a single lane with an unimproved parking area. Additionally, Marine Creek Reservoir was designated as a “no-wake” lake recently. A sign detailing this change is posted near the boat ramp, however, it is often overlooked.

#### MANAGEMENT STRATEGIES

1. Communicate with TRWD regarding the TPWD Boating Access Grant Project. The grants allow 75% matching grant funds provided by Sport Fish Restoration Act.
2. Advise TRWD with amenities at the renovated boat ramp as warranted.
3. Suggest TRWD installs a floating buoy advising boaters of the “no-wake” restriction.

#### SAMPLING SCHEDULE JUSTIFICATION

The proposed sampling schedule includes additional electrofishing in 2016 and mandatory monitoring in 2018/2019 (Table 6). The additional electrofishing survey in 2016 is necessary to maintain consistent data for trend information on this heavily used Largemouth Bass fishery. Also, a spring electrofishing survey related to 4-year growth of tagged Florida Largemouth Bass and ShareLunker Largemouth Bass will be conducted in 2018. Gill net and trap net surveys are only necessary every four years at this point to ensure presence or absence of Channel Catfish, White Bass, and White Crappie.

## LITERATURE CITED

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between Reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16: 888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional Size Distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7):348.
- Hungerford, T and R. Brock. 2011. Statewide freshwater fisheries monitoring and management program survey report for Marine Creek Reservoir, 2010. Texas Parks and Wildlife Department, Federal Aid Report F-221-M, Austin.

Table 1. Characteristics of Marine Creek Reservoir, Texas.

Characteristic	Description
Year Constructed	1958
Controlling authority	Tarrant Regional Water District
Count	Tarrant
Reservoir type	Tributary of Trinity River
Conductivity	315 umhos/cm

Table 2. Boat ramp characteristics for Marine Creek Reservoir, Texas, Fall 2014. There is no staff gauge for monitoring water levels and little fluctuation occurs.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
IH-820 Access Rd Ramp	-97.39061 32.82603	Y	30	N/A	Ramp is in good shape, but parking lot is rough.

Table 3. Harvest regulations for Marine Creek Reservoir, 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, Largemouth	5 <sup>a</sup>	18-inch minimum
Bass, Spotted	5 <sup>a</sup>	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>a</sup> Daily bag for Largemouth Bass and Spotted Bass = 5 fish in any combination.

Table 4. Stocking history of Marine Creek Reservoir, Texas. Size categories are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), and adults (ADL). For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Channel Catfish	2004	11,608	AFGL	8.8
	2009	18,758	AFGL	9.5
	2014	183	AFGL	10.6
	2015	185	ADL	11.1
	Total	30,734		
Florida Largemouth Bass	1977	11,880	AFGL	5.0
	1977	12,000	FRY	1.0
	1978	15,200	FGL	3.0
	2014	12,797	FGL	2.4
	Total	51,877		
ShareLunker Largemouth Bass	2006	6,290	AFGL	6.7
	2008	6,254	AFGL	6.3
	2014	12,599	FGL	2.3
	Total	25,143		

## Gizzard Shad

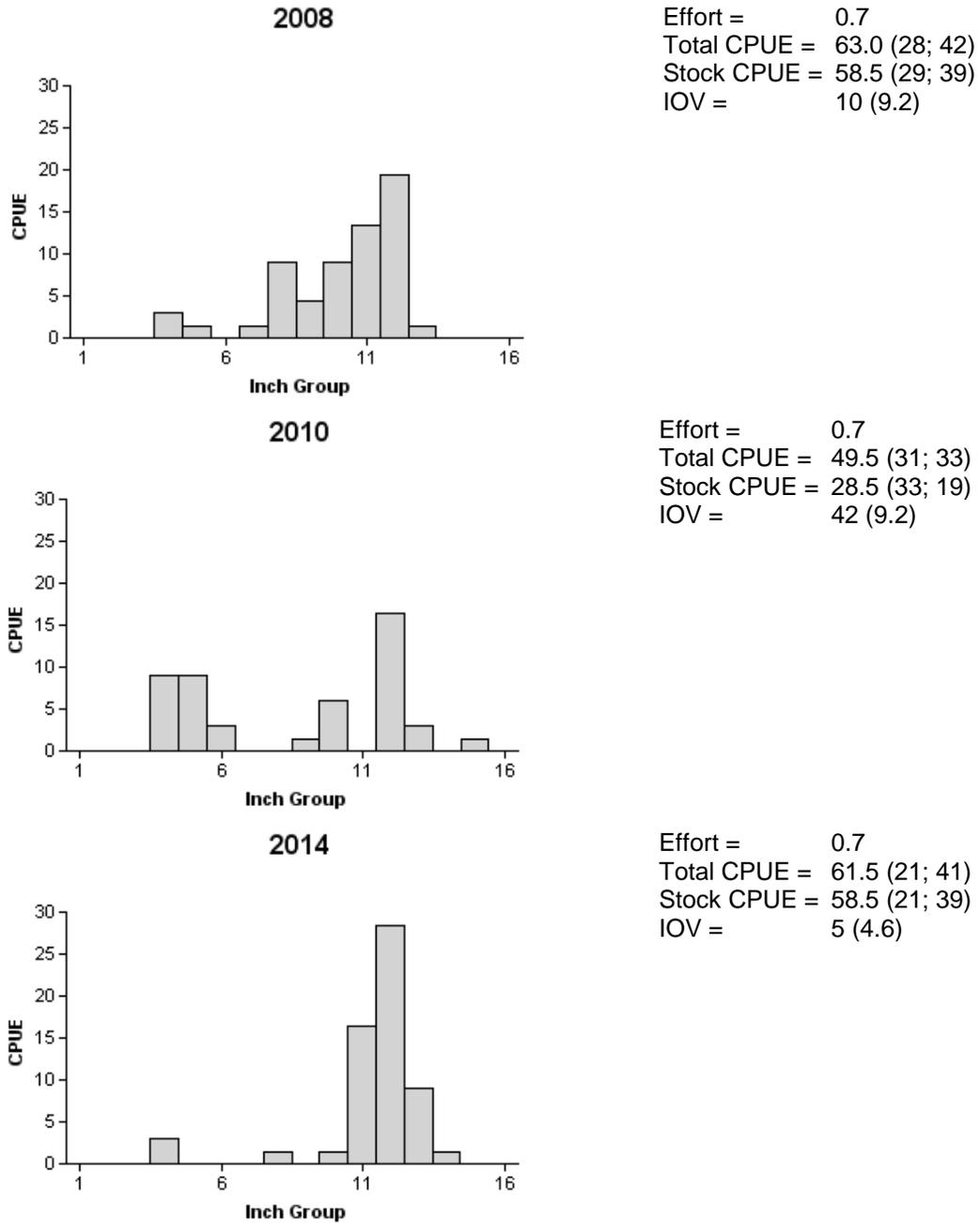


Figure 1. Number of Gizzard Shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Marine Creek Reservoir, Texas, 2008, 2010, and 2014.

# Bluegill

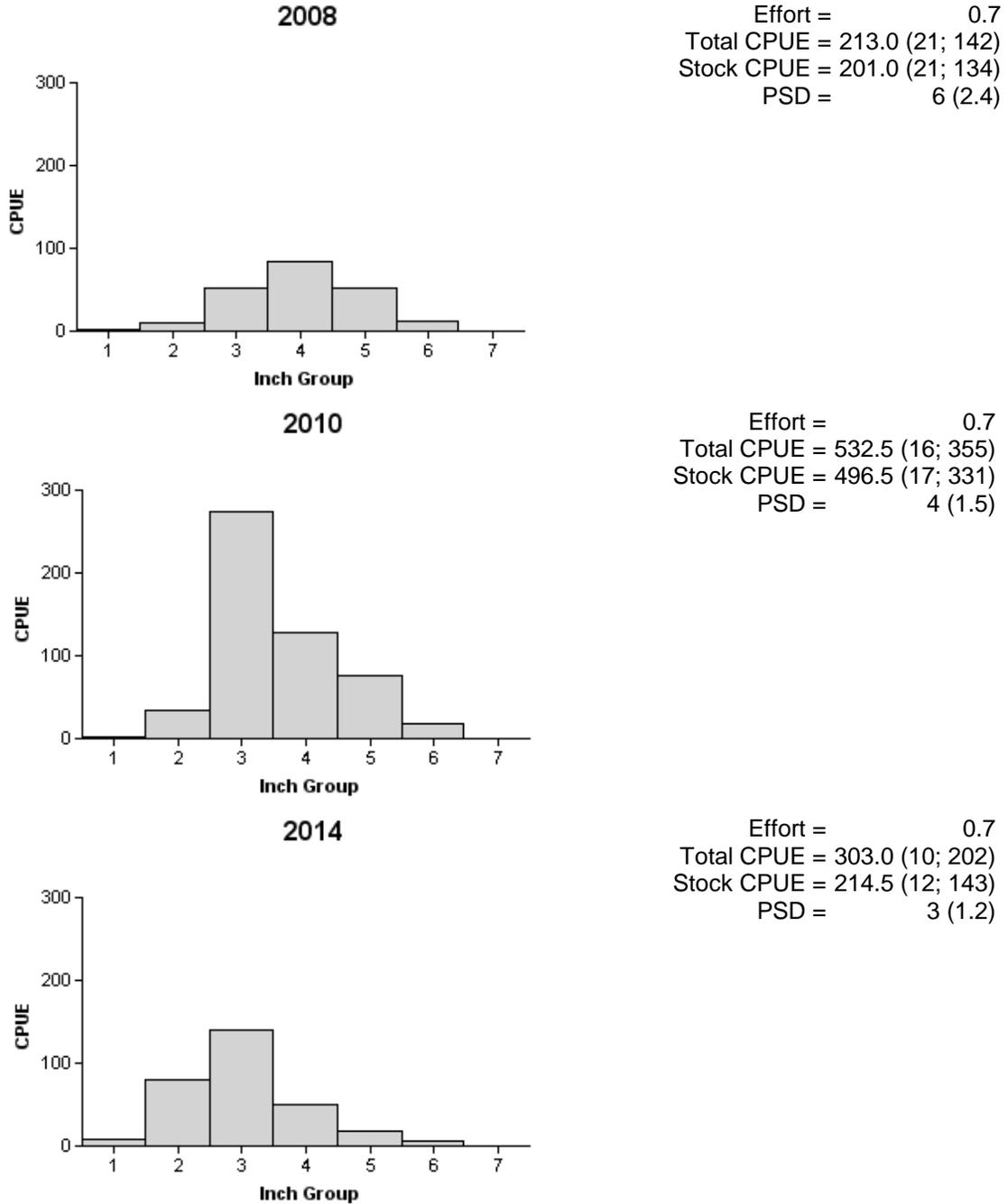


Figure 2. Number of Bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Marine Creek Reservoir, Texas, 2008, 2010, and 2014.

## Redear Sunfish

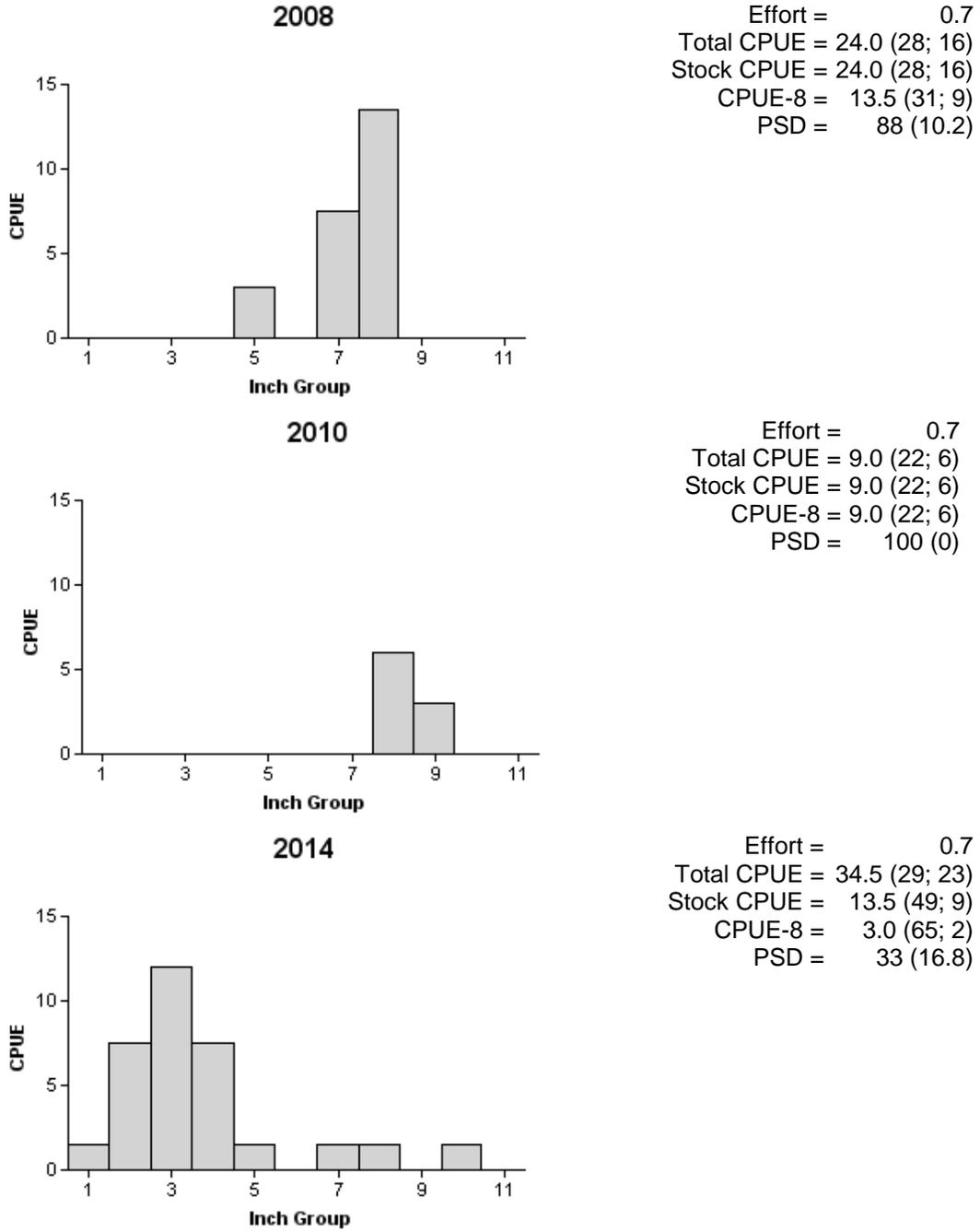


Figure 3. Number of Redear Sunfish caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Marine Creek Reservoir, Texas, 2008, 2010, and 2014.

## Channel Catfish

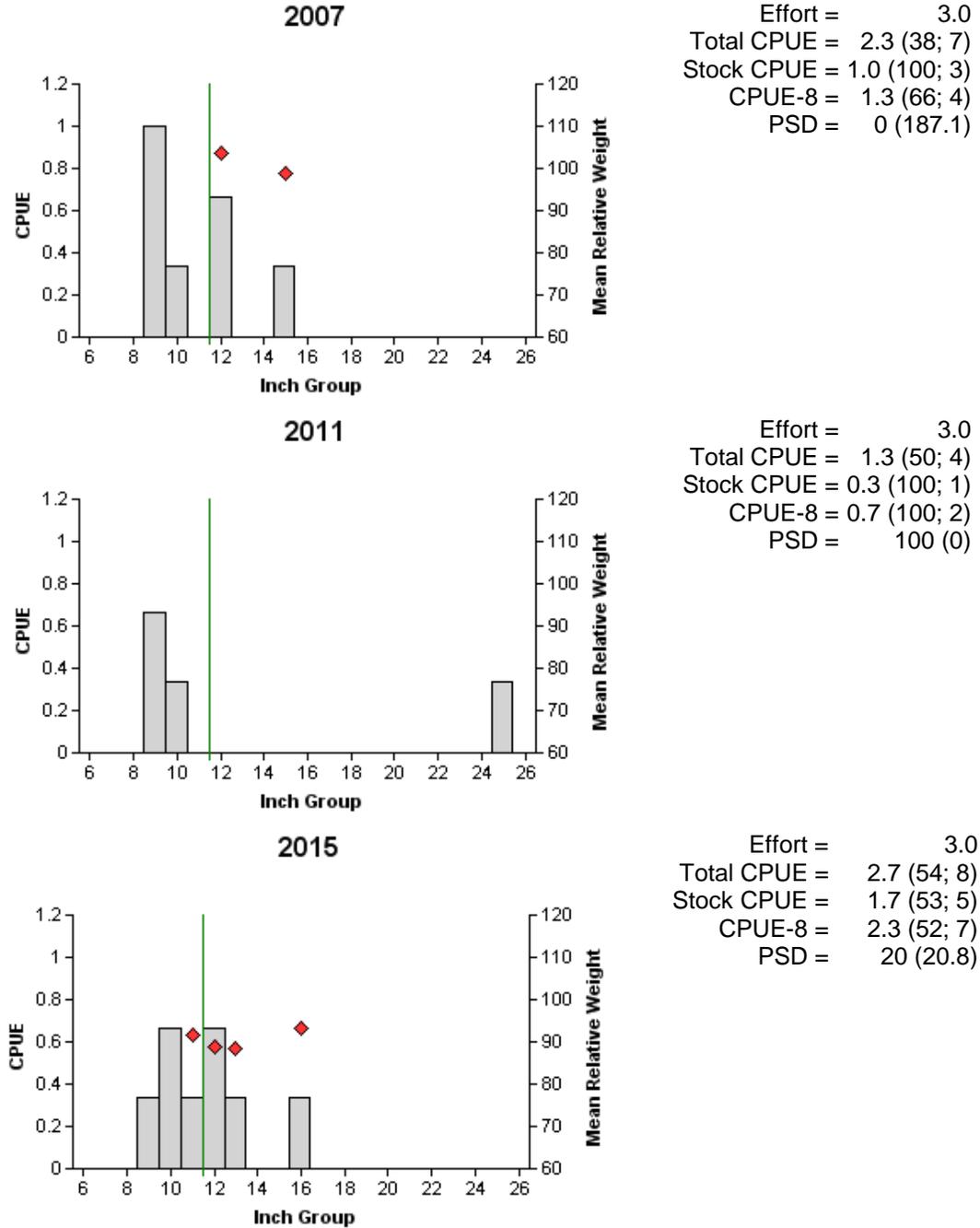


Figure 4. Number of Channel Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net survey, Marine Creek Reservoir, Texas, 2007, 2011, and 2015. Vertical line represents length limit at time of sampling.

# White Bass

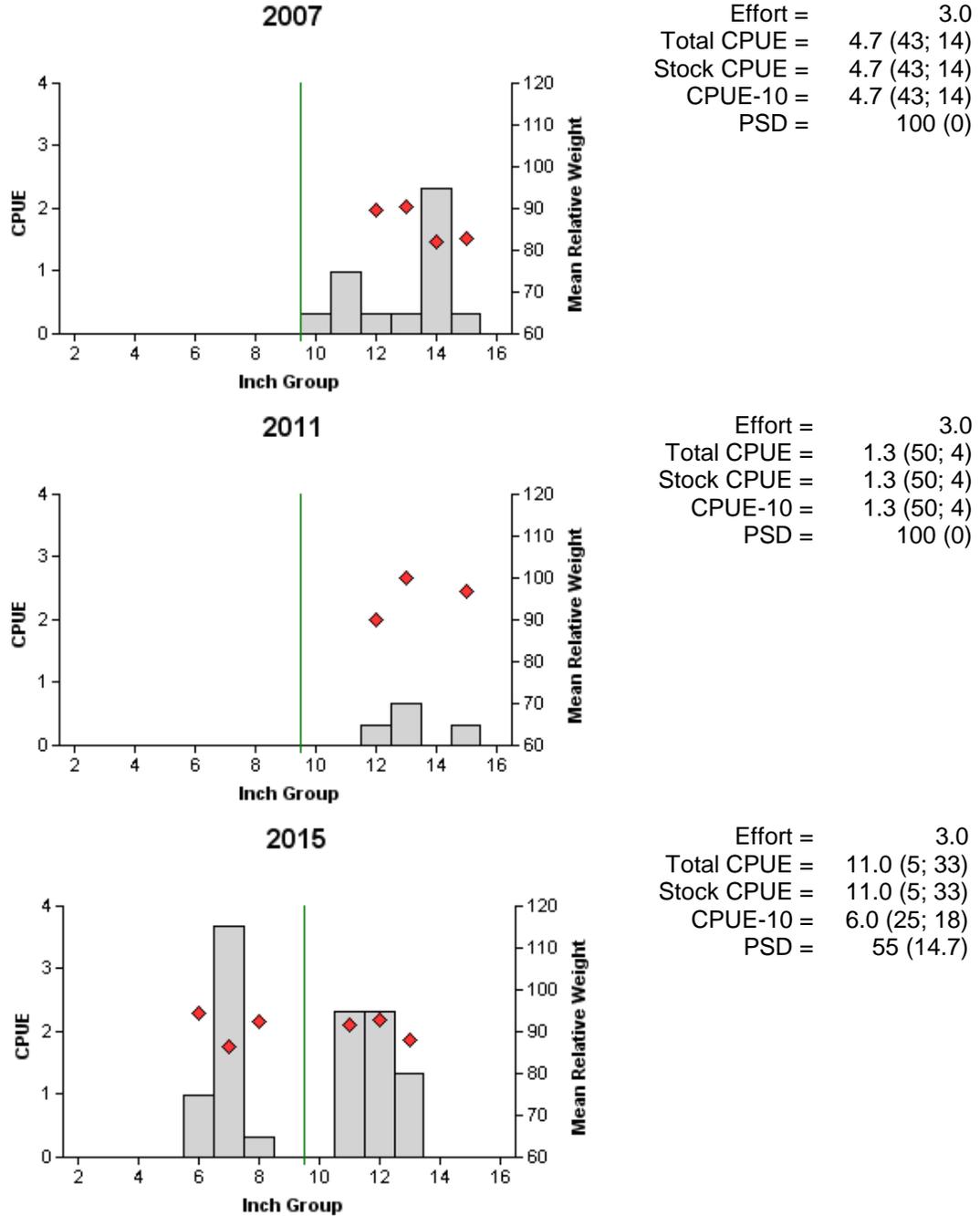


Figure 5. Number of White Bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Marine Creek Reservoir, Texas, 2007, 2011, and 2015. Vertical line represents length limit at time of sampling.

## Spotted Bass

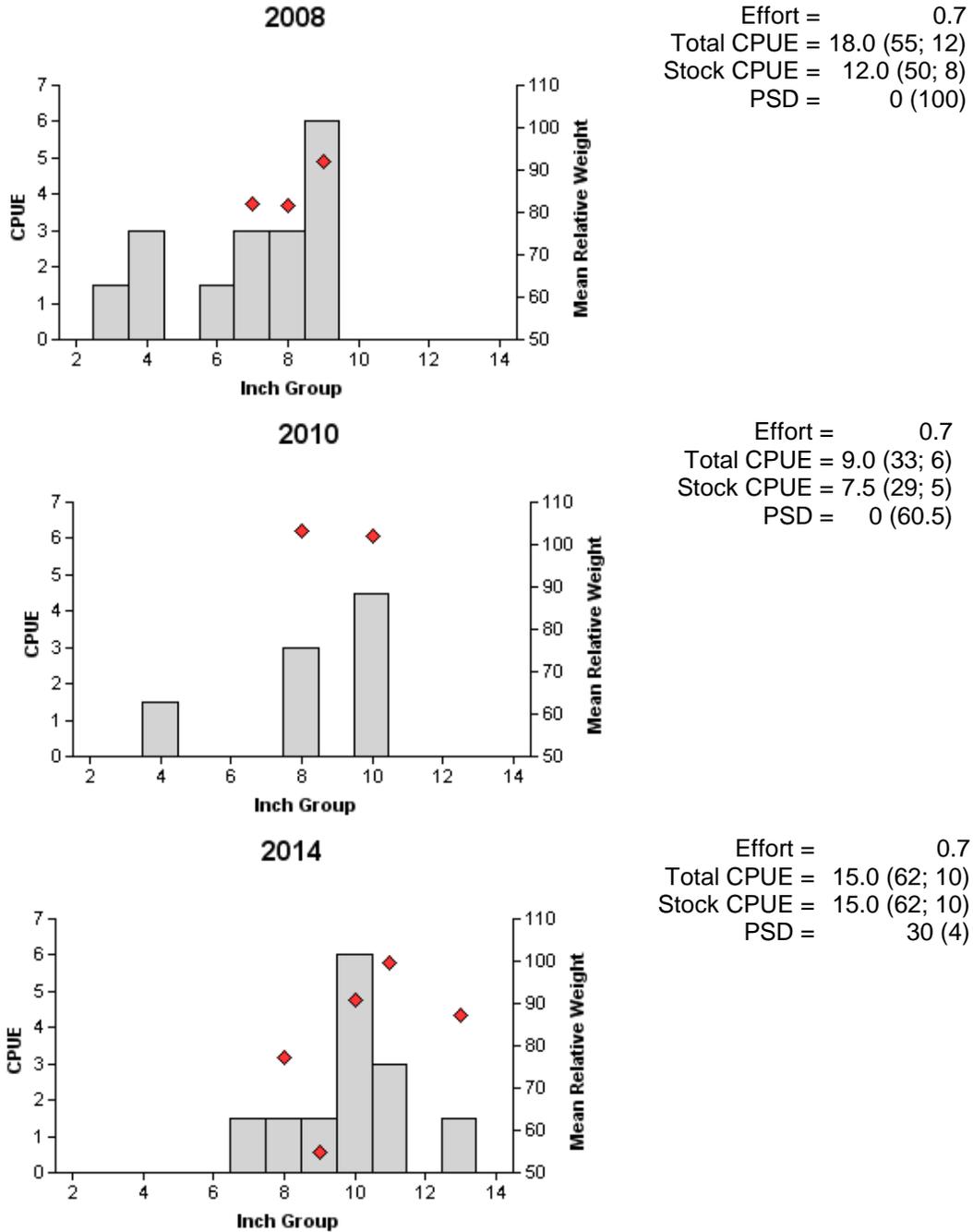


Figure 6. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Marine Creek Reservoir, Texas, 2008, 2010, and 2014.

## Largemouth Bass

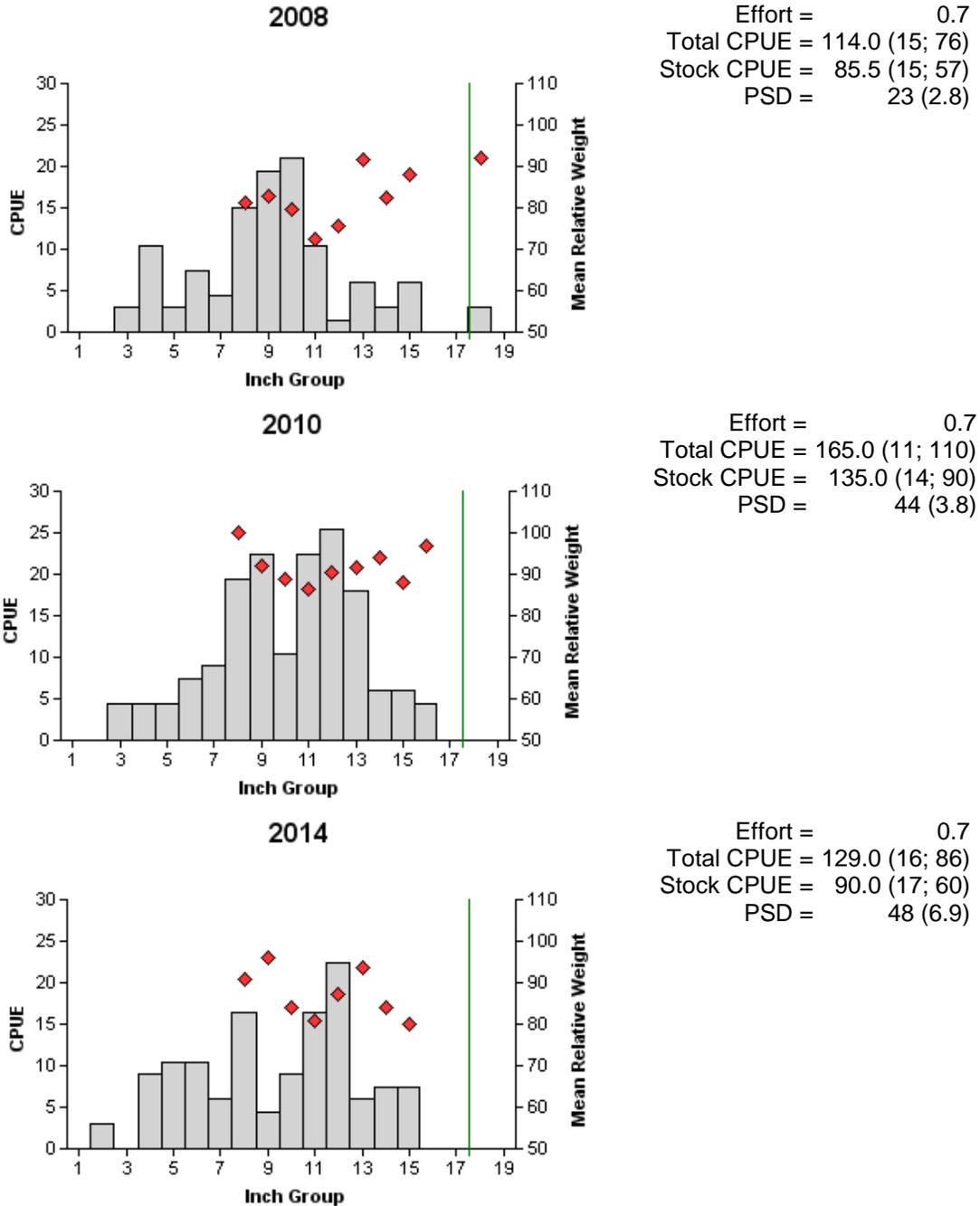


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Marine Creek Reservoir, Texas, 2008, 2010, and 2014. Vertical lines represent minimum length limit at time of sampling.

Table 5. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Marine Creek Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Genotype			% FLMB alleles	% pure FLMB
		FLMB	Intergrade	NLMB		
2004	18	0	14	4	25.0	0.0
2014	27	2	25	0	50.0	7.4

# White Crappie

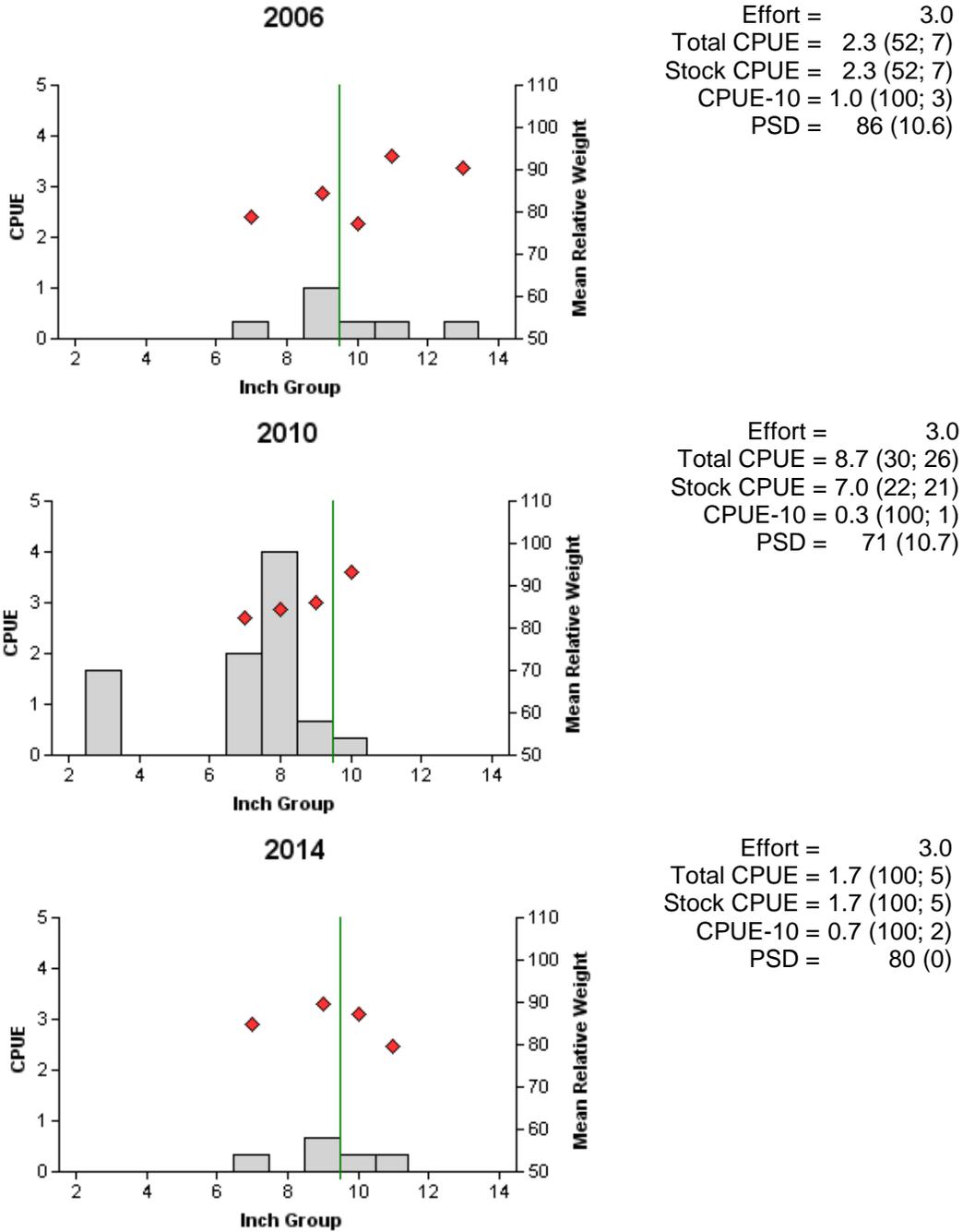


Figure 8. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Marine Creek Reservoir, Texas, 2006, 2010, and 2014. Vertical line represents length limit at time of sampling.

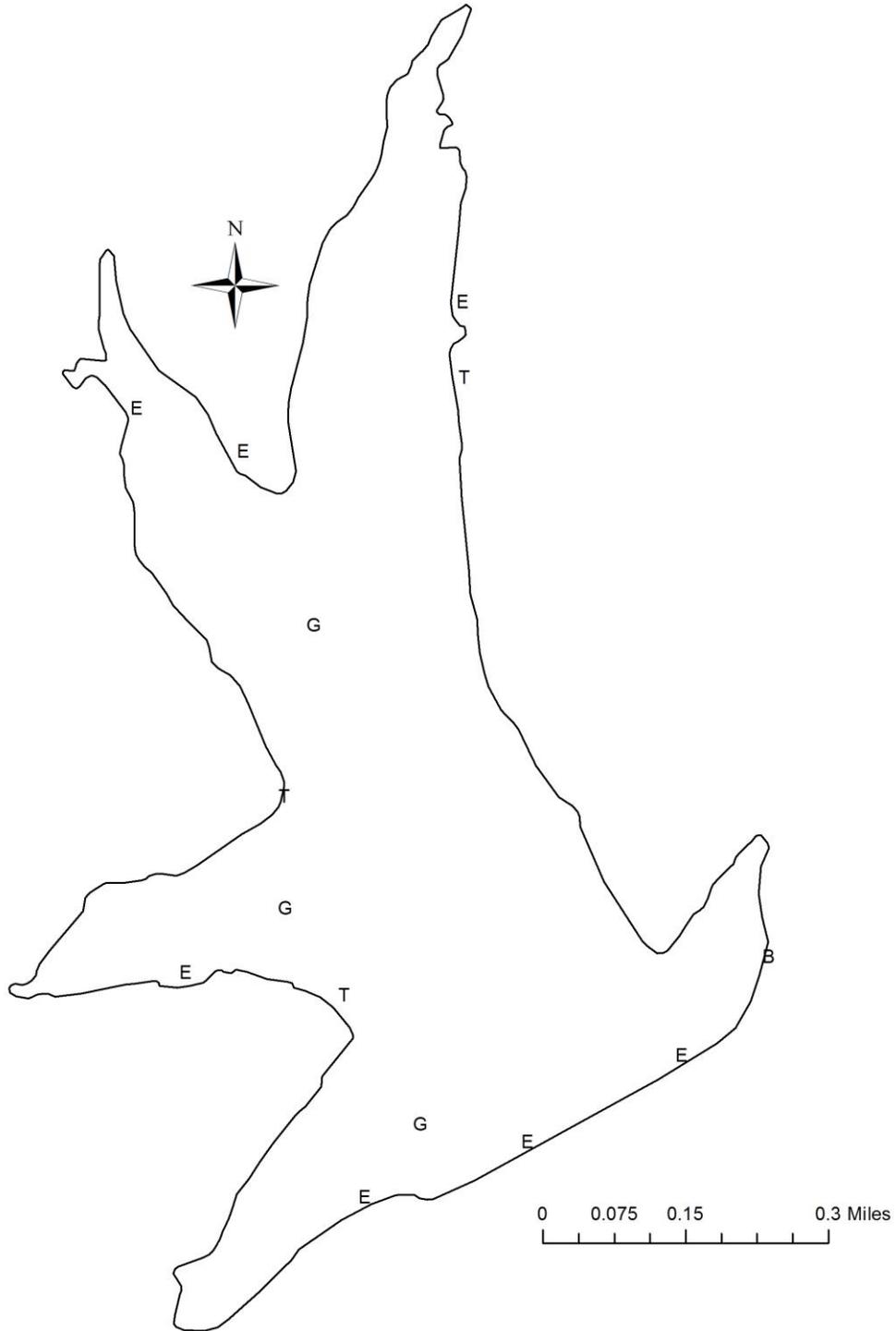


## APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all standard surveys from Marine Creek Reservoir, Texas, 2014-2015.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	27	9.0			41	61.5
Threadfin Shad					3	4.5
Common Carp	1	0.3				
Channel Catfish	8	2.7				
Flathead Catfish	1	0.3				
White Bass	33	11.0				
Bluegill	1	0.3			202	303.0
Longear Sunfish					38	57.0
Redear Sunfish	1	0.3			23	34.5
Spotted Bass					10	15.0
Largemouth Bass	3	1.0			86	129.0
White Crappie	19	6.3	5	1.7		

APPENDIX B



Location of sampling sites, Marine Creek Reservoir, Texas, 2014-2015. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramp is indicated with a B. Water level was near full at the time of all surveys.

## APPENDIX C

Historical catch rates of targeted species by gear type for Marine Creek Reservoir, Texas. Reservoir averages are in bold.

Gear	Species	Year											Avg.
		2002	2003	2004	2005	2006	2007	2008	2010	2011	2014	2015	
Gill Netting (fish/net night)	Channel Catfish		0.0				2.3			1.3		2.7	<b>1.6</b>
	White Bass		9.0				4.7			1.3		11.0	<b>6.5</b>
Electrofishing (fish/hour)	Gizzard Shad	38.0	27.0	40.5	30.0	37.5	87.0	63.0	49.5		61.5		<b>48.2</b>
	Threadfin Shad	99.0	15.0	40.5	31.5	60.0	27.0	112.5	21.0		4.5		<b>45.7</b>
	Bluegill	417.0	307.5	184.5	208.5	286.5	210.0	213.0	532.5		303.0		<b>295.8</b>
	Longear Sunfish	11.0	42.0	87.0	201.0	133.5	153.0	48.0	127.5		57.0		<b>95.6</b>
	Redear Sunfish	168.0	115.5	66.0	121.5	63.0	55.5	24.0	9.0		34.5		<b>73.0</b>
	Largemouth Bass	192.0	94.0	129.0	202.5	148.5	165.0	114.0	165.0		129.0		<b>148.8</b>
	Spotted Bass	15.0	31.5	16.5	45.0	40.5	57.0	18.0	9.0		15.0		<b>27.5</b>
Trap Netting (fish/net night)	White Crappie	15.4				2.3			8.7		1.7		<b>7.0</b>