

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

White Rock Reservoir

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TABLE OF CONTENTS

Survey and Management Summary.....	1
Introduction.....	2
Reservoir Description.....	2
Angler Access.....	2
Management History.....	2
Methods.....	3
Results and Discussion.....	3-4
Fisheries Management Plan.....	5-7
Literature Cited.....	8
Figures and Tables.....	9-19
Reservoir Characteristics (Table 1).....	9
Boat Ramp Characteristics (Table 2).....	9
Harvest Regulations (Table 3).....	9
Stocking History (Table 4).....	10
Objective Based Sampling Plan for 2015-2016 (Table 5).....	11
Structural Habitat Survey (Table 6).....	12
Gizzard Shad (Figure 1).....	13
Bluegill (Figure 2).....	14
Channel Catfish (Figure 3).....	15
Largemouth Bass (Figure 4; Table 7).....	16
White Crappie (Figure 5).....	18
Proposed Sampling Schedule (Table 8).....	19
Appendix A	
Catch Rates for all Species from all Gear Types.....	20
Appendix B	
Map of 2015-2016 Sampling Locations.....	21
Appendix C	
Historical Catch Statistics 1996-2016.....	22

SURVEY AND MANAGEMENT SUMMARY

Fish populations in White Rock Reservoir were surveyed in 2015 using electrofishing and trap netting and in 2016 using gill netting. Historical data are presented with the 2015-2016 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:** White Rock Reservoir is a 1,088-acre impoundment located on White Rock Creek, a tributary of the Elm Fork of the Trinity River. It was constructed in 1910 by the City of Dallas as a municipal water supply, but presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to five feet. Angler and boat access is adequate. Outboard motors on White Rock Reservoir are restricted to no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. Fishery habitat consisted of primarily native emergent vegetation.
- **Management History:** Important sport fishes include Largemouth Bass, White Crappie, and Channel Catfish. All fish species are managed under statewide length and bag limits. White Rock Reservoir is an urban fishery with the majority of fishing pressure being bank angling (Brock and Hungerford 2011).
- **Fish Community**
 - **Prey species:** Gizzard and Threadfin Shad are abundant in the reservoir. Electrofishing catch rates of these species were high. The total catch rate of Bluegill decreased since sampling in 2011, while the catch rate of Longear Sunfish increased slightly.
 - **Catfishes:** Channel Catfish were present in the reservoir. Catch rates were higher than previously reported with the majority of fish >15 inches in length.
 - **White Bass:** No White Bass were collected in the reservoir during 2016. Spring gill netting surveys conducted in 2012 indicated a small population of White Bass present in White Rock Reservoir.
 - **Largemouth Bass:** The electrofishing catch rates of Largemouth Bass were comparable to those of fall 2011. Catch rates varied in abundance and fish > 14 inches in length increased from previous samples.
 - **White Crappie:** The White Crappie catch rates were lower than the previous sample in 2013. The population varied in abundance with trap net catch rates but fish were still in good condition based on relative weight (W_r).
- **Management Strategies:** General monitoring with electrofishing and trap netting will be conducted in 2019. Hoop net surveys will be conducted in 2018. If hoop netting is successful, additional hoop net surveys will be conducted in 2020 to collect population catch statistics of Channel Catfish. Continue to work with the City of Dallas Parks and Recreation Department to install artificial habitat structures to improve fish habitat near fishing piers.

INTRODUCTION

This document is a summary of fisheries data collected from White Rock Reservoir in 2015-2016. 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 2015-2016 data for comparison.

Reservoir Description

White Rock Reservoir is a 1,088-acre impoundment located on White Rock Creek, a tributary of the Elm Fork of the Trinity River. It was constructed in 1910 by the City of Dallas as a municipal water supply; presently it is used only for recreation and flood control. The upper portion of the reservoir was dredged in 1998 and 1999 increasing the average depth of that area to five feet. At the time of sampling the fishery habitat was primarily native emergent vegetation. Since White Rock Reservoir is no longer used for municipal water, a water level gauge is unavailable. The reservoir remains near conservation pool. Other descriptive characteristics for White Rock Reservoir are in Table 1.

Angler Access

White Rock Reservoir has four public boat ramps and no private boat ramps. The boat ramps are open year round and do not require a fee. Several fishing piers are available around the perimeter of the lake. Outboard motors on White Rock Reservoir can be no more than 10.5 HP. However, boats with larger motors can utilize the reservoir using their trolling motors. There are two handicap specific facilities on the reservoir. Additional boat ramp characteristics are in Table 2.

Management History

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

1. Work with City of Dallas Parks and Recreation Department to establish artificial habitat near the fishing piers.
Actions: Obtained funding from the conservation license plate fund and constructed artificial habitat structures in partnership with the Fort Worth Fly Fishing Club.
2. Contact Dallas Parks and Recreation personnel and request signage informing fishermen about regulations and the boat motor horsepower restriction.
Actions: Template signs were forwarded to City personnel but they were not erected.
3. Invasive species like zebra mussels (*Dreissena polymorpha*) and Giant Salvinia (*Salvinia molesta*) continue to be a threat to aquatic habitats and organisms in Texas. Adversely, this can also affect the state ecologically, environmentally, and economically.
Actions: Educated the public about invasives through the use of media, the internet and talking points.

Harvest regulation history: Sport fish populations in White Rock Reservoir have always been managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: The complete stocking history is in Table 4.

Vegetation/habitat management history: The last habitat survey was conducted in 2011. White Rock Reservoir is primarily comprised of shoreline emergent species including cattails, bulrushes, and water willow.

Water transfer: No interbasin transfers are known to exist.

METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for White Rock Reservoir (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Electrofishing - Largemouth Bass, Sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (45 min at 9, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Trap netting - Crappie were collected using trap nets (5 net nights at 5 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn).

Gill netting - Channel Catfish were collected by gill netting (5 net nights at 5 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

Genetics - Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2012 and by electrophoresis for previous years.

Statistics - 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 ($RSE = 100 \times SE \text{ of the estimate/estimate}$) was calculated for all CPUE and creel statistics.

RESULTS AND DISCUSSION

Habitat: A habitat survey was last conducted in 2011 (Brock and Hungerford 2011; Table 6). At the time of sampling the fishery habitat was predominantly shoreline emergent vegetation.

Prey species: In 2015, electrofishing CPUEs of Gizzard Shad and Threadfin Shad were 673.3/h and 284.0/h respectively (Appendix A). Index of vulnerability (IOV) for Gizzard Shad in White Rock Reservoir remained very high. This IOV indicates 99% of Gizzard Shad are available as prey items (Figure 1). Electrofishing CPUE of Bluegill was 485.3/h which was lower than in 2011. Size structure of Bluegill was varied with a good population of quality sized fish >6 inches (Figure 2). Electrofishing CPUE of Longear Sunfish was 154.6/h which was greater than in 2011.

Catfishes: Although stocked in 2007, no Blue Catfish have been collected from the reservoir (Appendix C). The gill net CPUE of Channel Catfish was 5.4/nn in 2016 which was greater than in 2012 (Figure 3). Size structure of the population was shifted towards larger fish as indicated by a PSD of 92 in 2016.

White Bass: No White Bass were collected during the 2016 gill net survey. The population of White Bass has been historically low (Appendix C).

Largemouth Bass: Electrofishing CPUE of Largemouth Bass was 185.3/h in 2015 which was similar in 2011 (Figure 4). Likewise, CPUE of Largemouth Bass ≥ 14 inches was slightly higher than it was in 2011 with a rate of 17.0/h observed in 2016. Body condition has remained excellent (relative weight above 100) for all size classes of fish. The size structure of the population continues to remain good as reflected in a PSD value of 35 observed in 2016. Florida Largemouth Bass (FLMB) introgression was lower than previously reported (Brock and Hungerford, 2011) with percent Florida alleles at 25% and percent Florida genotype remaining at 0 in 2015 (Table 7).

White Crappie: The total trap netting CPUE of White Crappie was 63.0/nn in 2015, lower than 2013 (91.5/nn) but marginally higher than 2011 (58.2/nn; Figure 5). The catch rate of fish ≥ 10 inches was 10.4/nn. The PSD in 2015 was 51 indicating a good size structure. The body condition of White Crappie is good, especially considering the high relative abundance. White Rock Reservoir continues to be one of the best Crappie lakes in the Dallas/Fort Worth area.

Fisheries management plan for White Rock Reservoir, Texas

Prepared – July 2016.

ISSUE 1: White Rock is located in a highly urbanized area, and has several fishing piers, boat ramps, and bank access points. However, the reservoir is not being heavily utilized by anglers.

MANAGEMENT STRATEGY

1. Encourage recreational angling opportunities using social media and TPWD website. Contact City of Dallas to promote fishing on White Rock Reservoir on City website and host fishing events.

ISSUE 2: White Rock Lake has several public fishing piers, but these areas are lacking fisheries habitat/cover that attracts fish.

MANAGEMENT STRATEGY

1. Develop a memorandum of understanding and continue to work with the Dallas Water Authority to place artificial habitat structures around these piers and away from high boat traffic areas.

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

Objective-Based Sampling Plan and Schedule

Important sport fishes in White Rock Reservoir include Largemouth Bass, Channel Catfish, and White Crappie. Known important forage species include Bluegill, Longear Sunfish, Threadfin and Gizzard Shad.

Low-density fisheries:

White Bass: White Bass are present in White Rock Reservoir but their abundance is very low and receives no directed fishing effort. Catch information on White Bass will be collected during sampling for other species.

Blue Catfish: Blue Catfish are present in White Rock Reservoir but their abundance is very low. Catch information on Blue Catfish will be collected during sampling for other species.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: According to the most recent creel survey conducted on White Rock Reservoir (2005-2006), 24% of anglers target Largemouth Bass and they are the third most popular sport fish in White Rock Reservoir. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Largemouth Bass have always been managed with a 14-inch minimum length limit (MLL). Fall nighttime electrofishing will be conducted in 2019. This should allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2019. Based on past catch rates, this should be adequate to obtain an RSE of $CPUE-S \leq 25$ (the anticipated effort to meet both sampling objectives is 12 stations with 80% confidence). If the RSE objective is not met with 9 stations, additional electrofishing sampling will be conducted to achieve this RSE objective. However, no more than 12 stations will be sampled. This will allow for valid size structure estimation (PSD; 50 fish minimum at 12 stations with 80% confidence)

Channel Catfish: Channel Catfish are tied with White Crappie for the most sought after sport fish in White Rock Reservoir (28% of total angling effort). The popularity and reputation for quality catfish fishing at this reservoir warrant sampling time and effort. In spring of 2018, 6 tandem-set hoop net samples will be conducted to determine if hoop netting is a viable option to collect CPUE and size structure data on Channel Catfish. If hoop netting is successful, sampling will be conducted in spring of 2020 to collect enough Channel Catfish for valid size structure estimation (PSD; 50 stocked-length fish minimum at 6 stations with 80% confidence). This reduces the catch of non-targeted species that typically comes with gillnetting.

Bluegill, Longear Sunfish, Threadfin and Gizzard Shad: Bluegill, Threadfin and Gizzard Shad are the primary forage in White Rock Reservoir. Like Largemouth Bass, trend data on CPUE and size structure have been collected with fall nighttime electrofishing. Sampling, as with Largemouth Bass above, will allow for monitoring of large-scale changes in these species relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of these species for size structure estimation (PSD and IOV; 50 fish minimum at 12 stations with 80% confidence) and achieve an $RSE \leq 25$ for total CPUE.

White Crappie: Previous creel survey data indicate White Crappie angling comprised 28% of total angling effort, tying it with Channel Catfish as the most sought after fish in the reservoir. It is one of the best Crappie reservoirs in the Dallas/Fort Worth metroplex. A 5 station single-cod shoreline trap netting survey will be conducted in fall of 2019. This sampling effort will result in sufficient numbers of White Crappie for size structure estimation (PSD; 50 fish minimum at 5 stations with 80% confidence). Because of the high number of Crappie caught in past surveys, RSE of CPUE-S ≤ 25 will not be an objective. However, the 5 net surveys should also give us an idea of the population status when compared to past surveys.

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- 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.

Table 1. Characteristics of White Rock Reservoir, Texas.

Characteristic	Description
Year Constructed	1910
Controlling authority	City of Dallas
County	Dallas
Reservoir type	Tributary of Trinity River
Conductivity	360 umhos/cm

Table 2. Boat ramp characteristics for White Rock Reservoir, Texas, June, 2015. Elevation at the end of the boat ramp is not applicable (N/A) due to the fact that White Rock is a stable water level reservoir.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Fisher Road ramp	32.83298 -96.72947	Y	30	N/A	Good, no access issues
Big Thicket ramp	32.84983 -96.71816	Y	30	N/A	Good, no access issues
Fliter Building ramp	32.82371 -96.73019	Y	30	N/A	Good, no access issues
White Rock ramp	32.84613 -96.71749	Y	30	N/A	Good, no access issues

Table 3. Harvest regulations for White Rock Reservoir.

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	14-inch minimum
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of White Rock Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	1988	15	ADL	15.8
	2007	107,354	FGL	2.6
	Total	107,369		
Channel Catfish	1979	1,315	AFGL	7.9
	1979	935	UNK	UNK
	1980	17,431	AFGL	7.9
	1981	22,380	AFGL	7.9
	1986	1,883	AFGL	11.0
	2000	293,146	FGL	3.0
	2004	10,551	AFGL	7.8
	2008	163	ADL	20
Total	347,804			
Florida Largemouth Bass	1978	1,150	AFGL	4.0
	1982	10,000	FGL	2.0
	1992	112,030	FGL	1.1
	1996	112,468	FGL	1.5
	Total	235,648		
Largemouth Bass	1968	300,000	UNK	UNK
	1995	10	ADL	18.9
	2001	13	ADL	16.5
	Total	300,023		
Palmetto Bass (Striped X White Bass hybrid)	1975	20,000	UNK	UNK
	1977	9,900	UNK	UNK
	Total	29,900		
Red Drum	1976	2,200	UNK	UNK
	Total	2,200		
Walleye	1978	4,500,000	FRY	0.2
	1979	3,360,000	FRY	0.2
	Total	7,860,000		

Table 5. Objective-based sampling plan components for White Rock Reservoir, Texas 2015-2016.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock \leq 25
	Size structure	PSD, length frequency	$N \geq$ 50 stock
	Condition	W_r	10 fish/inch group (max)
	Genetics	% FLMB	$N =$ 30, any age
Bluegill ^a	Abundance	CPUE – Total	RSE \leq 25
	Size structure	PSD, length frequency	$N \geq$ 50
Gizzard Shad ^a	Abundance	CPUE – Total	RSE \leq 25
	Size structure	PSD, length frequency	$N \geq$ 50
	Prey availability	IOV	$N \geq$ 50
<i>Trap netting</i>			
Crappie	Abundance	CPUE – Total	RSE \leq 25
	Size structure	PSD, length frequency	$N =$ 50
<i>Tandem hoop netting</i>			
Channel Catfish	Abundance	CPUE– stock	RSE-Stock \leq 25
	Size structure		$N \geq$ 50 stock

^a No additional effort will be expended to achieve an RSE \leq 25 for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of littoral zone and physical habitat types, White Rock Reservoir, Texas, 2011. A linear shoreline distance (miles) was recorded for each habitat type found. Surface area (acres) and percent of reservoir surface area was determined for boat docks and each type of aquatic vegetation found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Boat docks			6.8	0.6
Native emergent + rocky shoreline	8.3	93		
Bulkhead	0.6	7		

Gizzard Shad

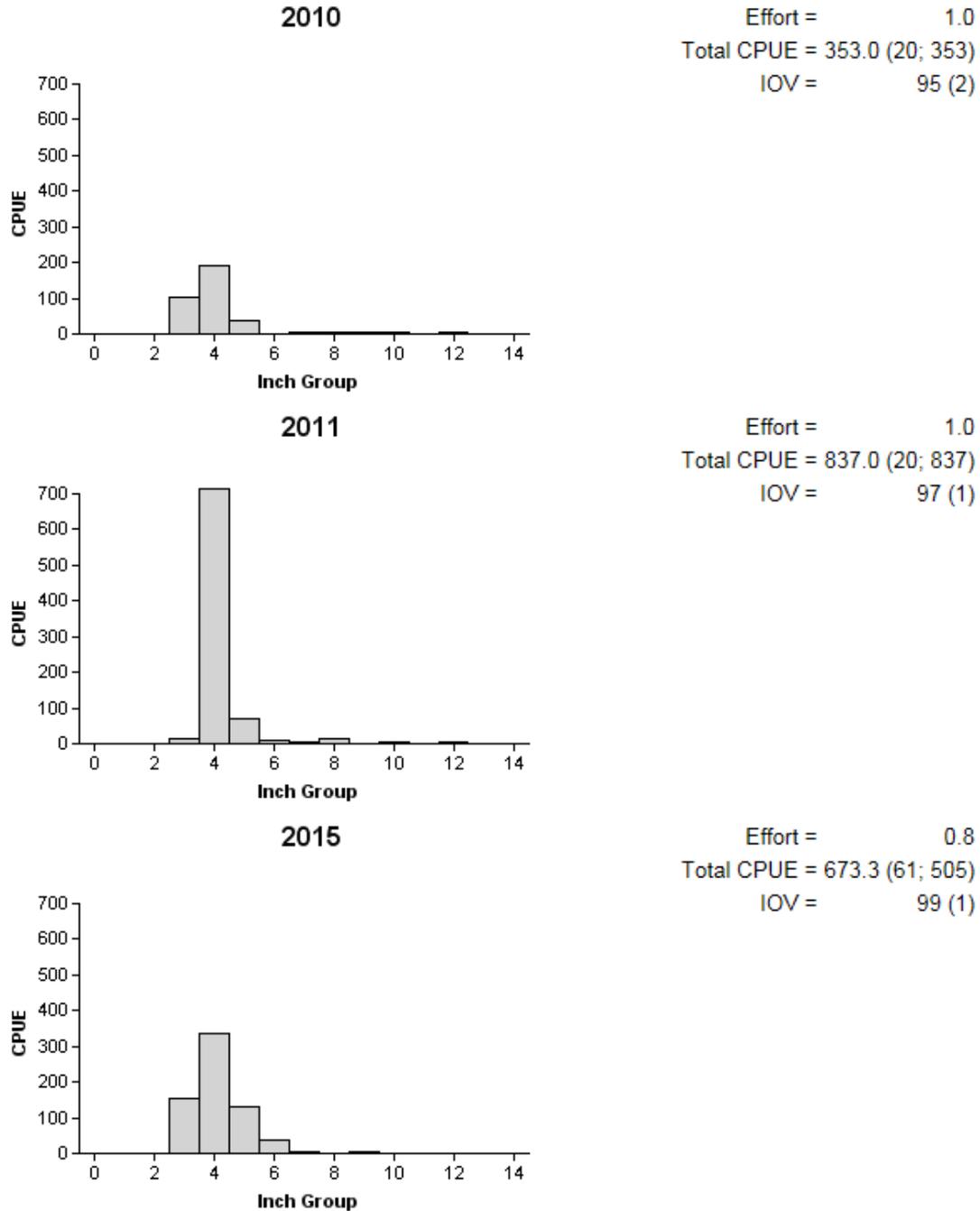


Figure 1. Number of Gizzard Shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2010, 2011, and 2015.

Bluegill

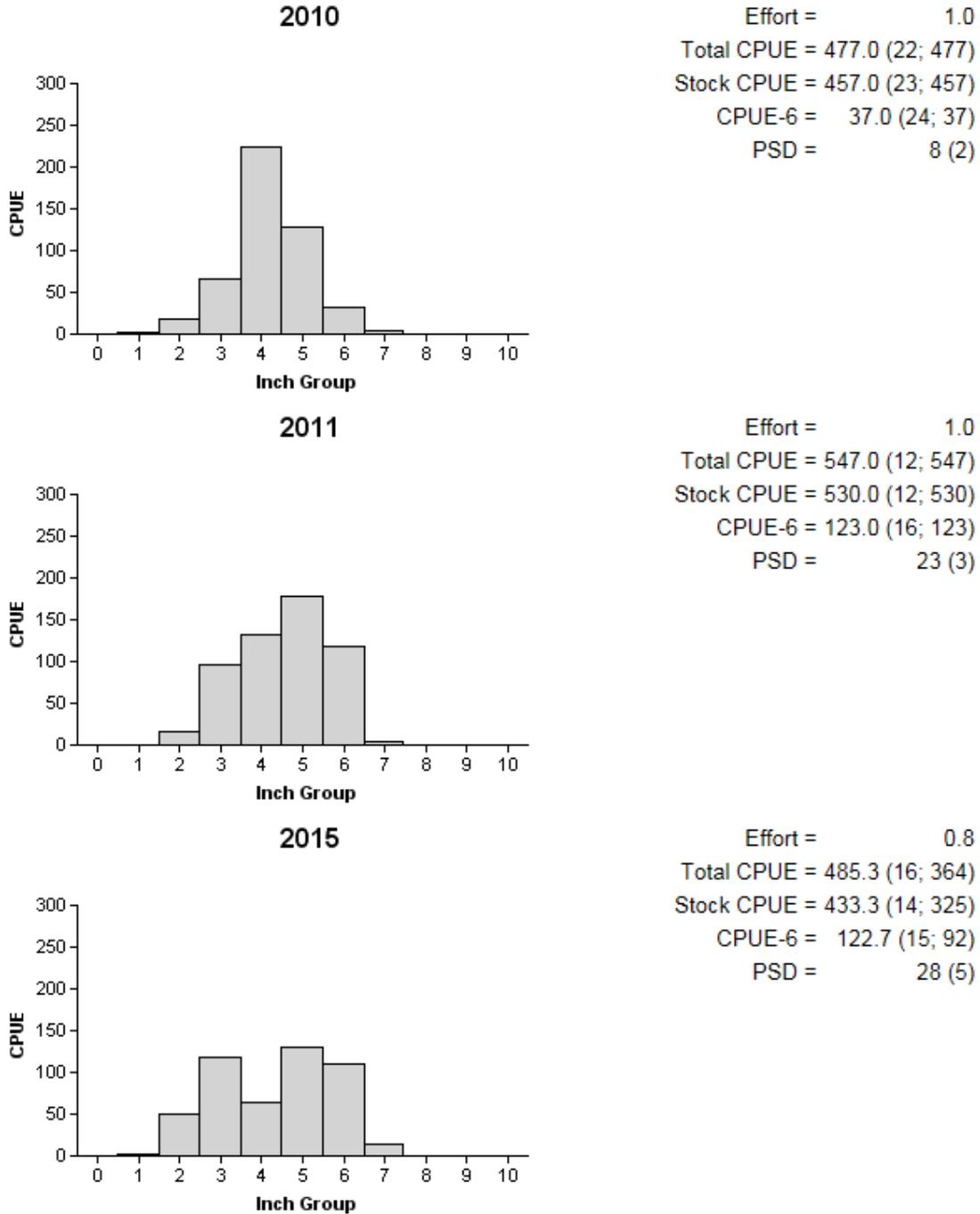


Figure 2. Number of Bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2010, 2011, and 2015.

Channel Catfish

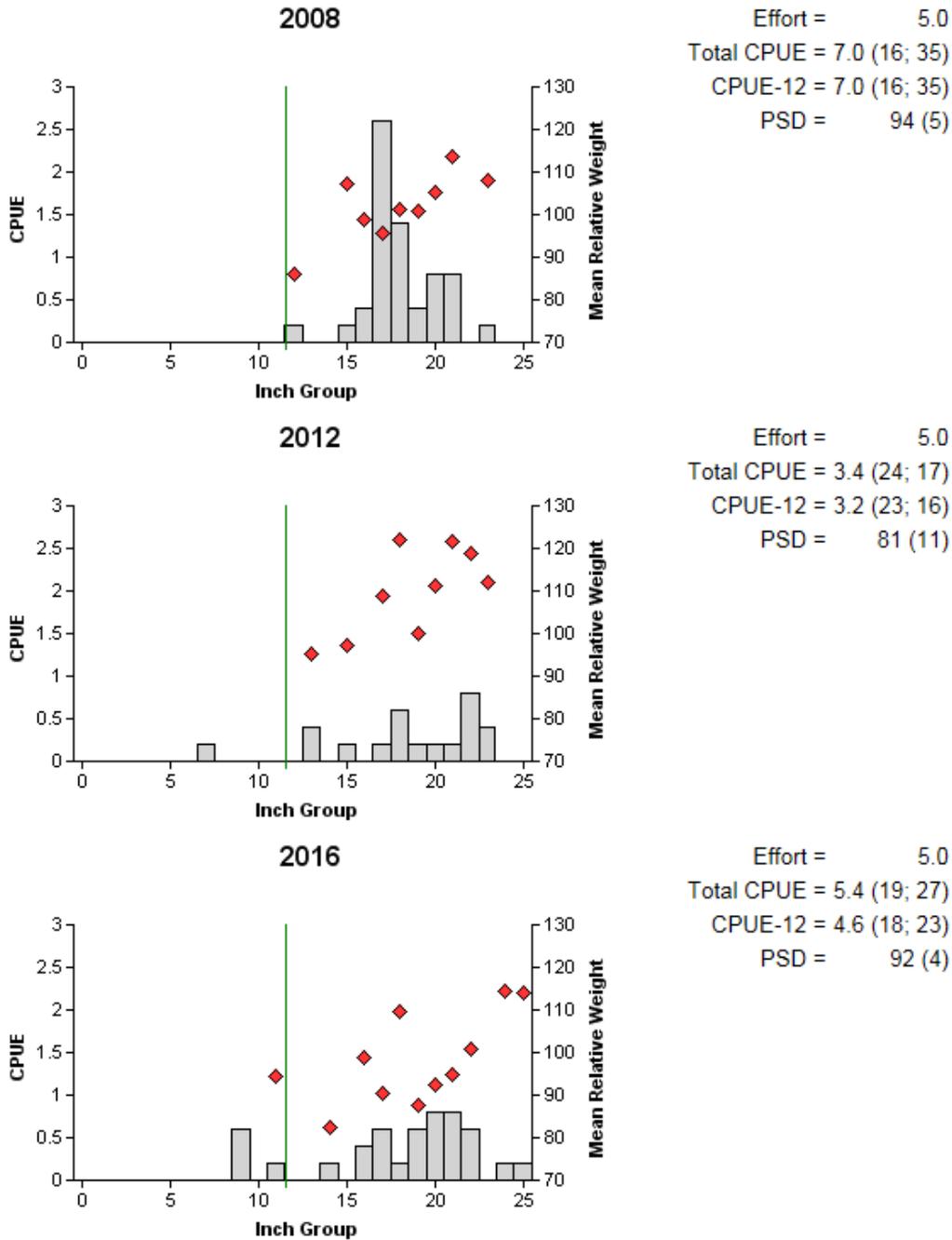


Figure 3. Number of Channel Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill netting survey, White Rock Reservoir, Texas, 2008, 2012 and 2016. Vertical line represents length limit at time of sampling.

Largemouth Bass

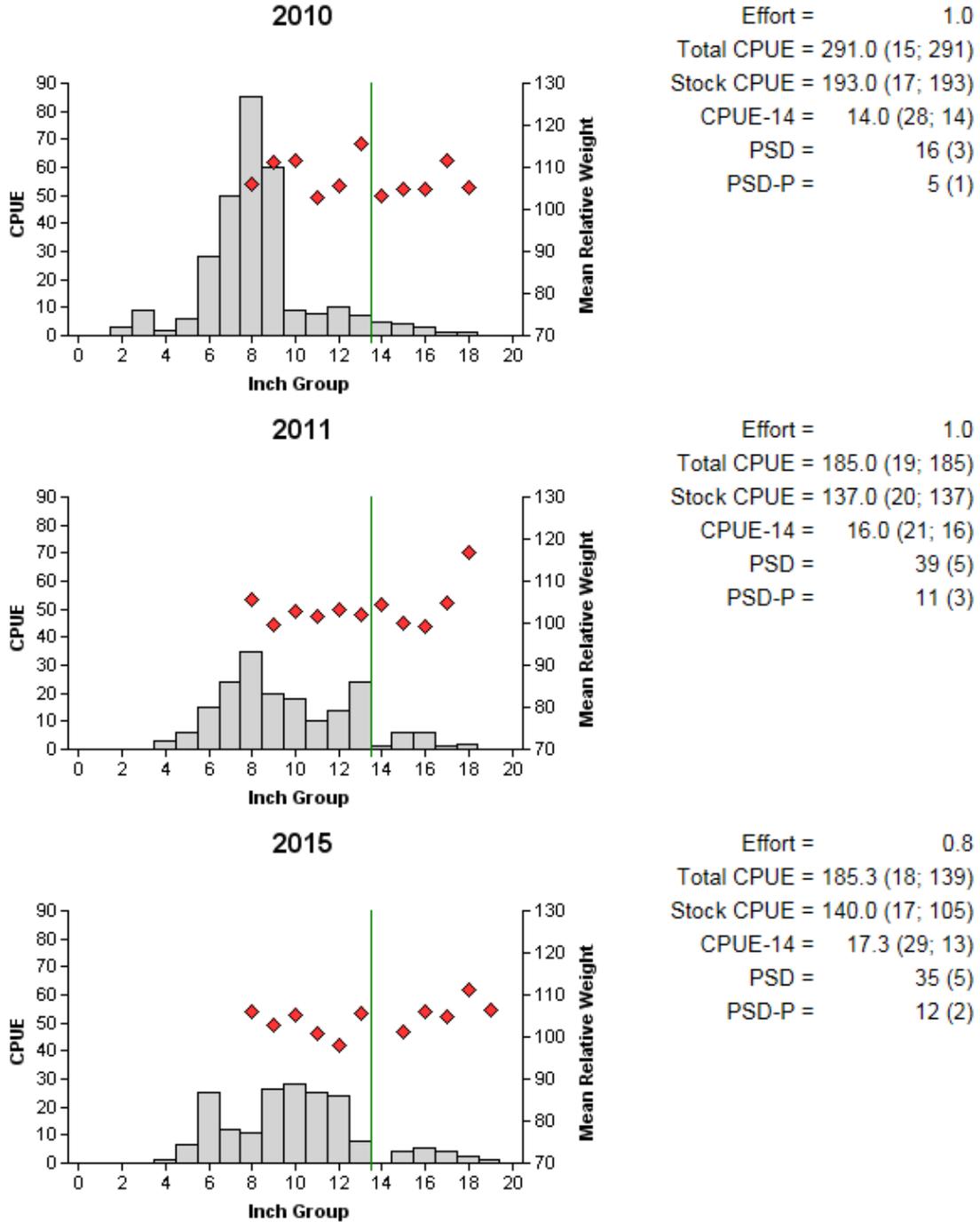


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, White Rock Reservoir, Texas, 2010, 2011, and 2015. Vertical lines represent minimum length limit at time of sampling.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, White Rock Reservoir, Texas, 2011, and 2015. 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	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
2011	30	0	20	10	34.0	0
2015	30	0	26	4	25.0	0

White Crappie

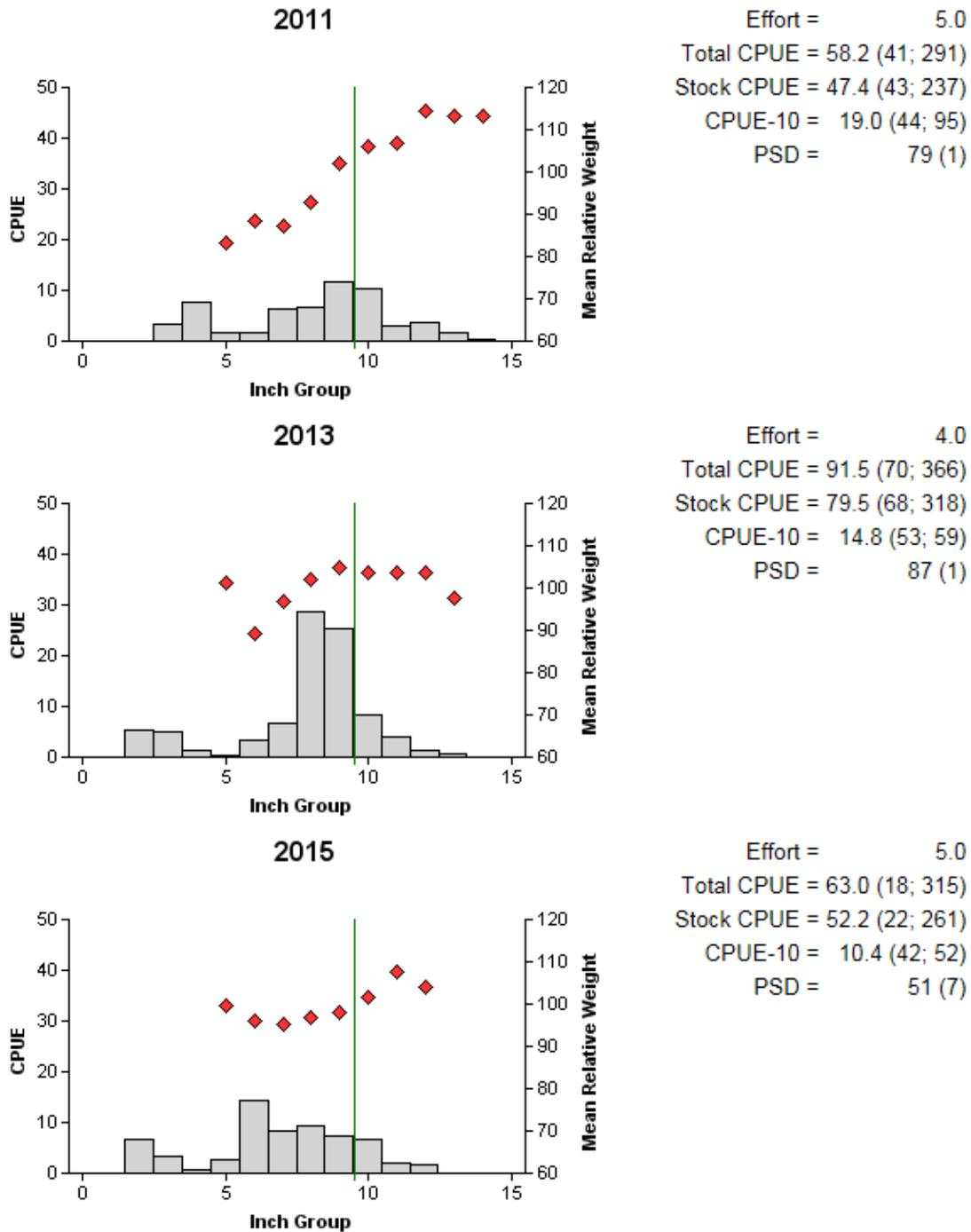


Figure 5. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, White Rock Reservoir, Texas, 2011, 2013 and 2015. Vertical line represents length limit at time of sampling.

Table 8. Proposed sampling schedule for White Rock Reservoir, Texas. Hoop netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard surveys are denoted by S and additional surveys denoted by A.

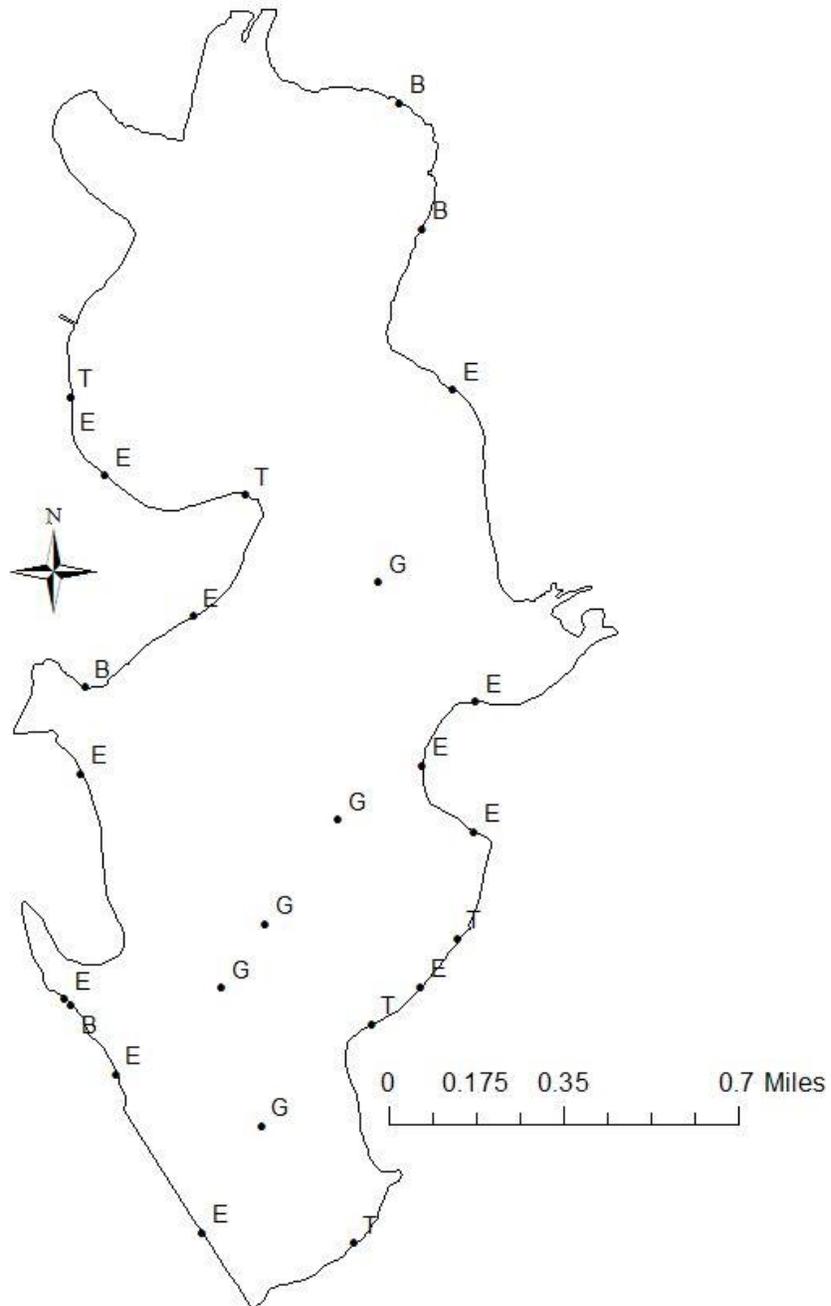
Survey year	Electrofishing Fall(Spring)	Trap net	Hoop net	Habitat			Creel survey	Report
				Structural	Vegetation	Access		
2016-2017								
2017-2018			A					
2018-2019								
2019-2020	S	S	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from White Rock Reservoir, Texas, 2015-2016. Sampling effort was 5 net nights for gill netting, 5 net nights for trap netting and 0.75 hours for electrofishing.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	138	27.6			505	673.3
Threadfin Shad					213	284.0
Common Carp	1	0.2				
Smallmouth Buffalo	100	20.0				
Spotted Sucker	1	0.2				
Channel Catfish	27	5.4				
Yellow Bass	79	15.8				
Bluegill					364	485.3
Longear Sunfish					116	154.6
Largemouth Bass					139	185.3
White Crappie	3	0.6	315	63.0		

APPENDIX B



Location of sampling sites, White Rock Reservoir, Texas, 2015-2016. Trap net, gill net, and electrofishing stations are indicated by T, G, and E, respectively. Boat ramps are indicated with a B.

APPENDIX C

Historical catch rates for targeted species by gear type for White Rock Reservoir, Texas.

Gear	Species	Year																
		1996	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2015	2016
Gill Netting (fish/net night)	Channel Catfish	0.8	2.0					3.2				7.0				3.4		5.4
	White Bass	0.6	1.4					0.4				0.6				0.4		0
Electrofishing (fish/hour)	Gizzard Shad	47.0	362.0		324.0	149.0	100.0	90.0	213.0	415.0	274.0	152.0	957.0	353.0	837.0			673.3
	Threadfin Shad	57.0	177.0		0.0	9.0	47.0	255.0	402.0	348.0	30.0	125.0	369.0	29.0	54.0			284.0
	Bluegill	129.0	61.0		190.0	78.0	210.0	108.0	300.0	296.0	423.0	622.0	431.0	477.0	547.0			485.3
	Longear Sunfish	33.0	14.0		102.0	46.0	141.0	54.0	158.0	88.0	124.0	163.0	112.0	180.0	134.0			154.6
	Largemouth Bass	318.0	302.0		100.0	90.0	100.0	50.0	212.0	177.0	154.0	217.0	206.0	291.0	185.0			185.3
Trap Netting (fish/net night)	White Crappie	6.6	13.4				176.0				69.8				58.2		63.0	