PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Lavon Reservoir

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July 31, 2015

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lavon Reservoir were surveyed in 2014 using electrofishing and trap netting 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:** Lavon Reservoir is a 21,400-acre impoundment located on the East Fork Trinity River approximately 8 miles east of McKinney. Since July 2011 water level has fluctuated 13 feet above and below conservation elevation (492 feet above mean sea level). However, water level began dropping July 2012 and continued dropping until January 2015. Lavon Reservoir has moderate productivity. Habitat features consisted mainly of riprap along the dam and railroad bridges, dead trees and stumps, and rocky shoreline. Standing dead timber was an important habitat feature.

- **Management history:** Important sport fishes include White Bass, Largemouth Bass, White and Black Crappie, and Blue and Channel Catfish. The management plan from the 2011 survey report included requesting the TPWD Webmaster include a statement about the improving sport fishery, especially Blue and Channel Catfish, and Largemouth Bass. We cooperated with USACOE in posting signage warning lake visitors of the potential of zebra mussel infestation. Advised, educated, and provided signage and invasive species literature to marina owners. Utilizing media outlets and speaking engagements, we provided our constituents and user groups this same information. Monitored existing inter-basin water transfers. Monitored Portland samplers deployed in the reservoir for zebra mussel colonization.

- **Fish community**

  - **Prey species:** Threadfin Shad continued to be present, but showed a decline in abundance. While showing a large decline in numbers, the electrofishing catch of Gizzard Shad was still high and most (95%) were available as prey to most sportfishes. The electrofishing catch of prey-size Bluegill declined in numbers, but was still above the district average.

  - **Catfishes:** Gill net catch of Blue Catfish declined, but 100% of the population was legal size and in good condition. Recruitment was low, but they continue to out-number Channel Catfish in abundance. Gill net catch of Channel Catfish declined. No Flathead Catfish were collected.

  - **White Bass:** Gill net catch of White Bass increased and no Striped Bass were collected.

  - **Largemouth Bass:** The electrofishing catch of Largemouth Bass declined, but recruitment was good and relative weights were fair for legal-size fish. Over one-half of the Largemouth Bass sample population was legally harvestable.

  - **Crappies:** The trap netting catch of White Crappie increased, body condition and recruitment was good, and over one-half of the sample population was legal size and larger. The trap netting catch of Black Crappie was at an all-time high and the fish were in good condition. We predict a bright future for Black Crappie.

- **Management strategies:** Conduct general monitoring with electrofisher, trap nets, and gill nets in 2018-2019. Publicize improvements to sport fishes in the reservoir to anglers. Inform the Lavon Reservoir U.S. Army Corps of Engineers personnel about new exotic species threats to Texas waters, and work with them to display appropriate signage, educate constituents, and understand appropriate enforcement actions. Continue to monitor immigration of invasive species into Lavon Reservoir.

INTRODUCTION

This document is a summary of fisheries data collected from Lavon Reservoir in 2014-2015. Sampling of fishes was done by electrofishing and trap netting in 2014 and in 2015 by gill netting. 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

Lavon Reservoir is a 21,400-acre impoundment constructed in 1953 on the East Fork Trinity River. It is located in Collin County approximately 8 miles east of McKinney and is operated and controlled by the U.S. Army Corps of Engineers (USACOE). The original dam impounded 11,080 acres of water. In 1974 the dam was raised 12 feet and increased the surface area of the reservoir to 21,400 acres. Primary project purposes are municipal and industrial water supply, flood control, and recreation. To augment municipal and industrial water, Lavon Reservoir receives inter-basin transfers from Cooper and Tawakoni Reservoirs and the East Fork Raw Water Supply Project near Seagoville, TX. The inter-basin transfer of Texoma Reservoir water via Sister Grove Creek has been converted to a direct pipeline transfer from Texoma Reservoir to the North Texas Municipal Water District water treatment facility at Wylie, TX. Lavon Reservoir also receives outfall from a regional sewage treatment facility. Lavon Reservoir was mesotrophic with a mean TSI chl-*a* of 39.30 (Texas Commission on Environmental Quality 2011). Habitat at time of sampling consisted of dead trees, rocks and boulders, riprap, but mostly rocky interspersed with bare soil shoreline. There were isolated patches of native submerged and emergent vegetation. Native aquatic plants present were pondweed, water willow, and buttonbush. Water level has been low and unstable since July 2011 (Figure 1). With the exception of July 2011, most of the reservoir was 8 to 12 feet below conservation throughout this study period Other descriptive characteristics for Lavon Reservoir are in Table 1.

Angler Access

Lavon Reservoir has 16 public boat ramps (Table 2). During the period July 2011 through spring 2015 access via these boat ramps was limited to the period January 2012 to July 2013. Early in this period access was denied because of low water and late in this period access was denied because of high water. Boat ramp characteristics appear in detail in Table 2. Bank fishing access has been compromised due to large expanses of exposed flats and shallow inshore water. Despite this there are still potential sites available at USACOE recreation areas and to a lesser extent from public roads. Shoreline access to Lavon Reservoir is unlimited unless posted because it is U.S. Army Corps of Engineers property; hence, public.

Management History

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

1. Recommended incorporating improvements in the sport fishery on the TPWD web site.
   Action: Sport fish survey data were forwarded to the TPWD webmaster in Austin.
2. Recommended cooperating with reservoir controlling authority and marinas to inform and educate the public about invasive species.
   Action: Posted appropriate signage at reservoir access points, informed marina owners regarding invasive species, provided printed material, used media and internet, tracked any and all inter basin transfers, and monitored Portland samplers in the reservoir.

Harvest regulation history: Sportfishes in Lavon Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Lavon Reservoir was last stocked in 2007 and 2008 with Striped Bass at 13/acre. The complete stocking history is in Table 4.

Vegetation/habitat history: Historically, Lavon Reservoir (Hysmith and Moczygemba 1980) supported diverse aquatic vegetation, and consisted of narrow leaved cattail, black willow, smartweed, water willow, knotgrass, duckweed, and water primrose native pondweed, buttonbush, and water willow. There was no aquatic vegetation to sample in 2014, however, in 2010 aquatic vegetation consisted of pondweed, buttonbush, and water willow (Hysmith and Moczygemba 2011).

Water Transfer: Lavon Reservoir is primarily used for municipal water supply, recreation, and to a lesser extent, flood control. Water is pumped into Lavon Reservoir from Cooper Reservoir, Tawakoni Reservoir, and the East Fork Raw Water Supply Project Seagoville, TX. Until 2009, water was pumped from Texoma Reservoir to Sister Grove Creek, a tributary of Lavon Reservoir. Water is pumped out of Lavon Reservoir by North Texas Municipal Water District.

METHODS

Fishes were collected by electrofishing (2 hours at 24 5-min stations), gill netting (15 net nights at 15 stations), and trap netting (15 net nights at 15 stations). 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 caught per net night (fish/nn). Survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

A structural habitat survey was conducted in 2014. Vegetation surveys were conducted in 2002, 2006, 2010, and 2014. Aquatic vegetation was not present in 2006 and 2014. Habitat was assessed using a modified digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Sampling statistics (CPUE for various length categories) and structural indices [Proportional Size Distribution (PSD)] as defined by Guy et al. (2007) and condition indices [relative weight (Wr)] 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. Ages for Channel Catfish, Largemouth Bass, and White and Black Crappie were determined using Category 2 protocol according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). The manual specifies Largemouth Bass, but we adapted the protocol to include Channel Catfish and White and Black Crappie. Source for water level data was the United States Geological Survey (USGS 2015).

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.

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of rocky shoreline and dead timber with some native aquatic vegetation (Tables 5 and 6).

Prey species: Electrofishing CPUE of Gizzard Shad and Bluegill were 405.5/h and 88.5/h, respectively (Figures 2 and 3). Catches of both species were lower than for 2010. While not as good as 2011, the current IOV of 95 indicated an abundance of prey-size Gizzard Shad. Over half the sample population of Bluegill was $\leq$ 4 inches, ideal prey-size. Longear Sunfish were almost as abundant as Bluegill (Appendix A) and because of their small average size, provided excellent prey. The electrofishing CPUE for Threadfin Shad (14.0/h) was a record low (Appendix A).

Catfishes: The gill net CPUE of Blue Catfish was 2.5/nn in 2015, well below estimates of relative abundance in 2007 (Figure 4). The multiyear relative abundance has averaged 10.7/nn since 1996 (Appendix C). Relative weight ranged from 80 to 115, increasing with size; a trend repeated from 2011 (Figure 4). The trophy component (≥ 30 inches) of the population remained strong, repeating results of 2011 (Figure 4). All of the Blue Catfish sample population was ≥12 inches.

The gill net CPUE of Channel Catfish was 3.5/nn in 2015, second highest on record (Figure 5 and Appendix C). Recruitment of sub-stock fish was good and body condition was fair with relative weights ranging from 80 to almost 90. Channel Catfish grew to 12 inches in 5 years (N = 11; range = 5 to 6 years). Sixty-three percent of the sample population was ≥ 12 inches.

White Bass: The gill net CPUE of White Bass was 6.0/nn in 2015 (Figure 6), second highest CPUE for this reservoir (Appendix C). Relative weight of White Bass ranged from 95 to 105. Eighty-eight percent of the sample population was ≥ 10 inches.

Largemouth Bass: The electrofishing CPUE of Largemouth Bass was 35.0/h in 2015 (Figure 7), well below the all-time high CPUE in 2010 (Figure 7, Appendix C). There was excellent recruitment of sub-stock fish. A high average relative weight of 90 indicated a majority of the Largemouth Bass were in good condition, especially sub-stock fish which showed average relative weight ranging between 100 and 120 (Figure 7). Growth was excellent with fish reaching legal size in 2 years (N = 13; range 2 to 3 years). Fifty-four percent of the sample population was ≥ 14 inches. Genetic analysis of Largemouth Bass collected by electrofishing indicated Florida Largemouth Bass allele's at 39.0% which is a decrease from 42.0% in 2006 (Table 7).

Crappies: The trap net CPUE of White Crappie was 34.8/nn in 2015 (Figure 8), more than double the reservoir average (Appendix C). There was excellent recruitment of sub-stock fish. A high average relative weight of 100 % indicated a majority of the White Crappie were in good condition. Twenty-eight percent of the sample population was ≥ 10 inches and they reached legal size in 1 year (N = 13; range = 1 to 2 years).

Trap netting CPUE of Black Crappie was 3.4/nn (Figure 9). They were first collected in 2006 when one specimen was caught in a trap net during standard sampling (Hysmith and Moczygemba 2007). Thirteen individuals were collected during routine trap net sampling in 2010. There was excellent recruitment of sub-stock fish. High relative weight (>90) indicated a majority of the Black Crappie were in good condition. Thirty-seven percent of the sample population was ≥ 10 inches and they reached legal size in 2 years (N=13; range = 2 to 3 years).

Fisheries management plan for Lavon Reservoir, Texas

Prepared – July 2015.

ISSUE 1: The sport fishery in Lavon Reservoir, especially blue and Channel Catfish, and Largemouth Bass has continued to improve.

MANAGEMENT STRATEGY

1. Incorporate these improvements on the TPWD web site.

ISSUE 2: 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. Zebra mussels have been found in Sister Grove Creek, a tributary to Lavon Reservoir and water conduit for water transfer from Texoma Reservoir, where zebra mussels have established. Portland samplers have been deployed in Lavon Reservoir and Sister Grove Creek.

MANAGEMENT STRATEIES

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.
6. Monitor Portland samplers deployed in Lavon Reservoir.

SAMPLING SCHEDULE JUSTIFICATION:

Conduct general monitoring surveys in 2018 – 2019 with a creel survey, electrofishing, trap netting, and gill netting. Access and habitat surveys will also be conducted.

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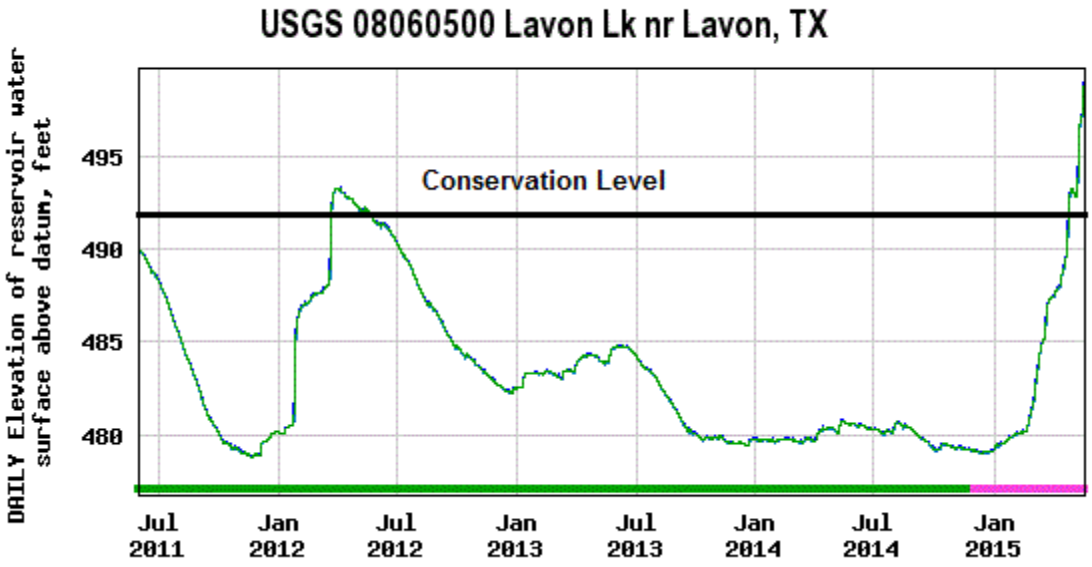

Figure 1. Monthly average water level elevations in feet above mean sea level (MSL) recorded for Lavon Reservoir (U.S. Geological Survey. 2015. USGS real time water data for USGS 08060500 Lavon Lake near Lavon, Texas. http://waterdata.usgs.gov/nwis), Texas, June 2011-May 2015.

Table 1. Characteristics of Lavon Reservoir, Texas.

Characteristic	Description
Year constructed	1953
Controlling authority	U.S. Army Corps of Engineers
Counties	Collin
Reservoir type	Mainstream
Shoreline development index	5.9
Conductivity	286 µmhos/cm

Table 2. Boat ramp characteristics for Lavon Reservoir, Texas, August, 2014. Reservoir elevation at time of survey was 479.09 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Twin Groves	33.16593 -96.44157	Y	40	490[a]	Out of water. Extension is not feasible
Caddo Park	33.16247 -96.41896	Y	30	490[a]	Out of water. Extension is not feasible
Elm Creek	33.14009 -96.42500	Y	30	485[a]	Out of water. Extension is not feasible
Lakeland Park	33.10315 -96.44589	Y	60	478[a]	Out of water. Extension is not feasible
Tickey Creek	33.09562 -96.47443	Y	60	478[a]	Out of water. Extension is not feasible
Pebble Beach	33.08451 -96.45275	Y	45	481[a]	Out of water. Extension is not feasible
Little Ridge	33.06624 -96.45500	Y	60	478	Fair. Extension is feasible.
Mallard Park	33.04860 -96.42698	Y	30	478	Fair. Extension is feasible.
Lavonia Park	33.04178 -96.44335	Y	60	478	Fair. Extension is feasible.
Clear Lake	33.05900 -96.48810	Y	45	478	Fair. Extension is feasible.
Bratonia Park	33.11063 -96.52019	Y	20	490[a]	Out of water. Extension is not feasible
Highland Park	33.10782 -96.54063	Y	30	490[a]	Out of water. Extension is not feasible
Brockdale Park	33.07344 -96.54531	Y	30	484[a]	Out of water. Extension is not feasible
Collin Park	33.05104 -96.53057	Y	85	478	Fair. Extension is feasible.
East Fork Park	33.03705 -96.51466	Y	105	478	Fair. Extension is feasible.
Avalon Park	33.04276 -96.49807	Y	60	474	Excellent. No access issues.

[a] Elevations were determined using GPS and may be approximate due to GPS error. Varying lake levels and large amounts of siltation on ramps have prevented more accurate onsite measurements from being taken since original survey date.

Table 3. Harvest regulations for Lavon 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, Striped	5	18-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 Lavon Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. 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)
Blue catfish	1989	214,259	FGL	2.6
	1997	214,106	FGL	2.0
	1998	214,588	FGL	2.2
	Total	642,953		
Channel catfish	1954	20,000	AFGL	7.9
	1971	26,700	AFGL	7.9
	Total	46,700		
Florida Largemouth bass	1988	67,226	FGL	2.0
	1988	361,652	FRY	1.0
	1997	250,800	FGL	1.2
	2004	539,664	FGL	1.5
	2005	535,577	FGL	1.5
	Total	1,754,919		
Largemouth bass	1954	1,027,000	FRY	0.7
	1968	177,100	UNK	UNK
	Total	1,204,100		
Mixed Largemouth Bass	1988	98,860		1.0
	Total	98,860		
Palmetto Bass (Striped X White Bass hybrid)	1976	39,200	FGL	UNK
	Total	39,200		
Striped bass	1989	213,826	FGL	1.4
	1994	428,402	FGL	1.3
	2004	19,241	FGL	1.9
	2005	107,008	FGL	1.6
	2006	216,086	FGL	1.8
	2007	339,114	FGL	1.5
	2008	216,090	FGL	1.6
	Total	1,539,767		
Threadfin shad	1980	8,250	AFGL	2.9
	1984	2,000	AFGL	3.0
	Total	10,250		

Table 4 continued.

Species	Year	Number	Life Stage	Mean TL (in)
Walleye	1976	86,000	FRY	0.2
	Total	86,000		
White bass	1957	330	ADL	UNK
	Total	330		

Table 5. Survey of structural habitat types, Lavon Reservoir, Texas, 2014. Shoreline habitat type units are in miles and standing timber and piers, boat docks, and marinas in acres.

Habitat type	Estimate	% of total
Bulkhead	0.1 miles	0.1
Piers, boat docks, marinas	100 acres	0.5
Natural	41.2 miles	34.0
Rocky	79.7 miles	65.9
Standing timber	10,700 acres	50.0

Table 6. Survey of aquatic vegetation, Lavon Reservoir, Texas, 2002 – 2014. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2002	2006	2010	2014
Native submersed		0.0	10 (<0.1)	0.0
Native emergent	44 (0.2)	0.0	44 (0.2)	0.0

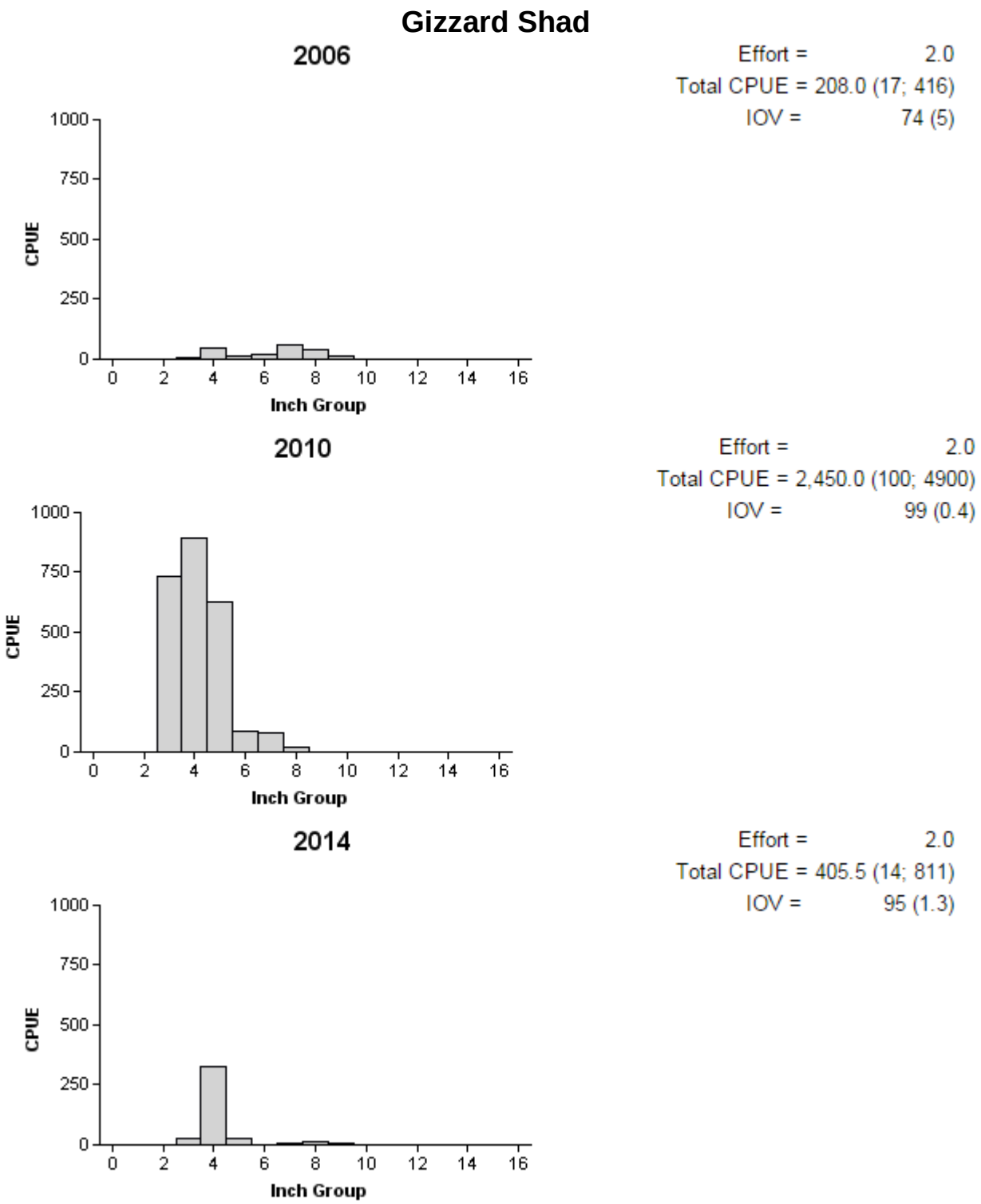

Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lavon Reservoir, Texas, 2006, 2010, and 2014.

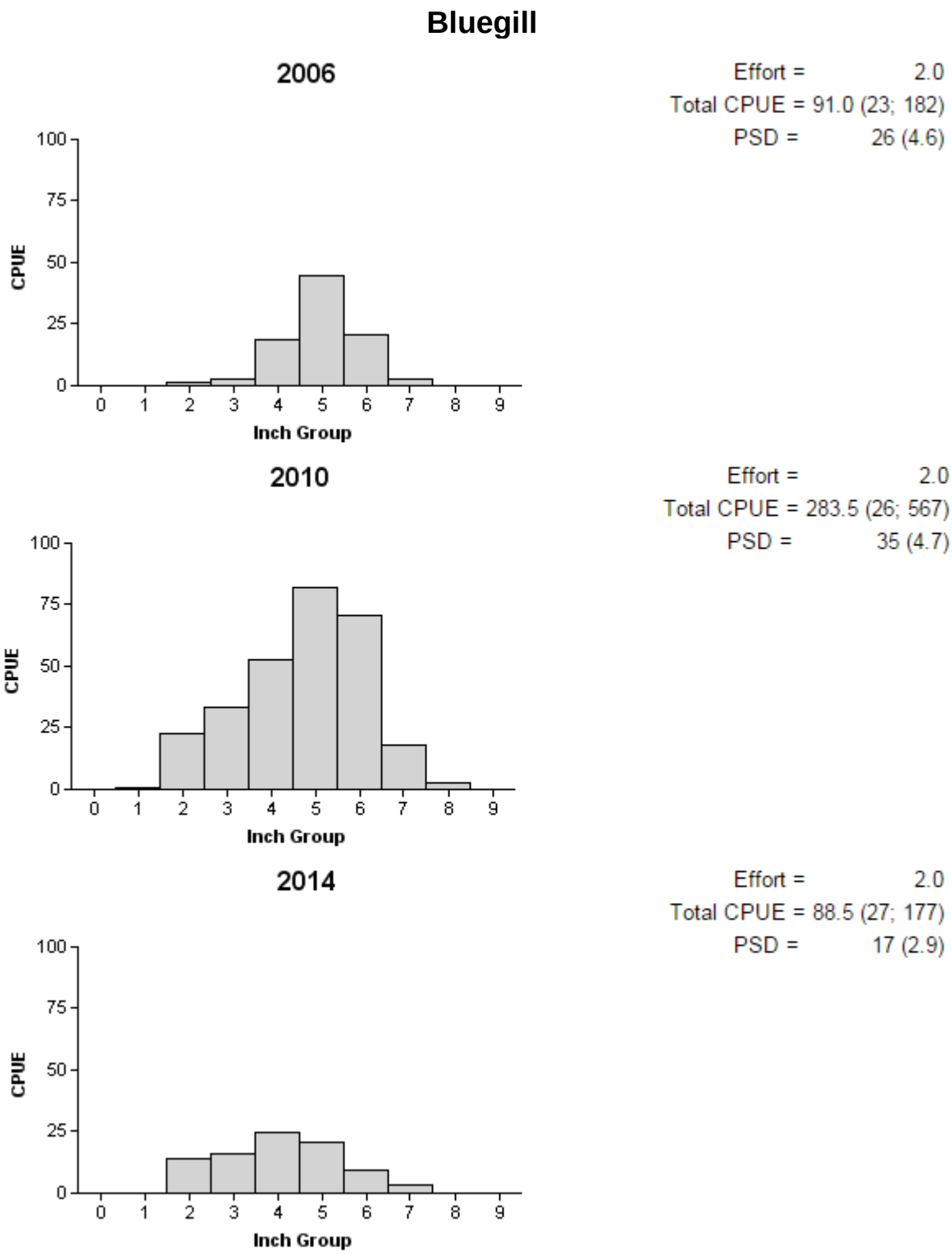

Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lavon Reservoir, Texas, 2006, 2010, and 2014.

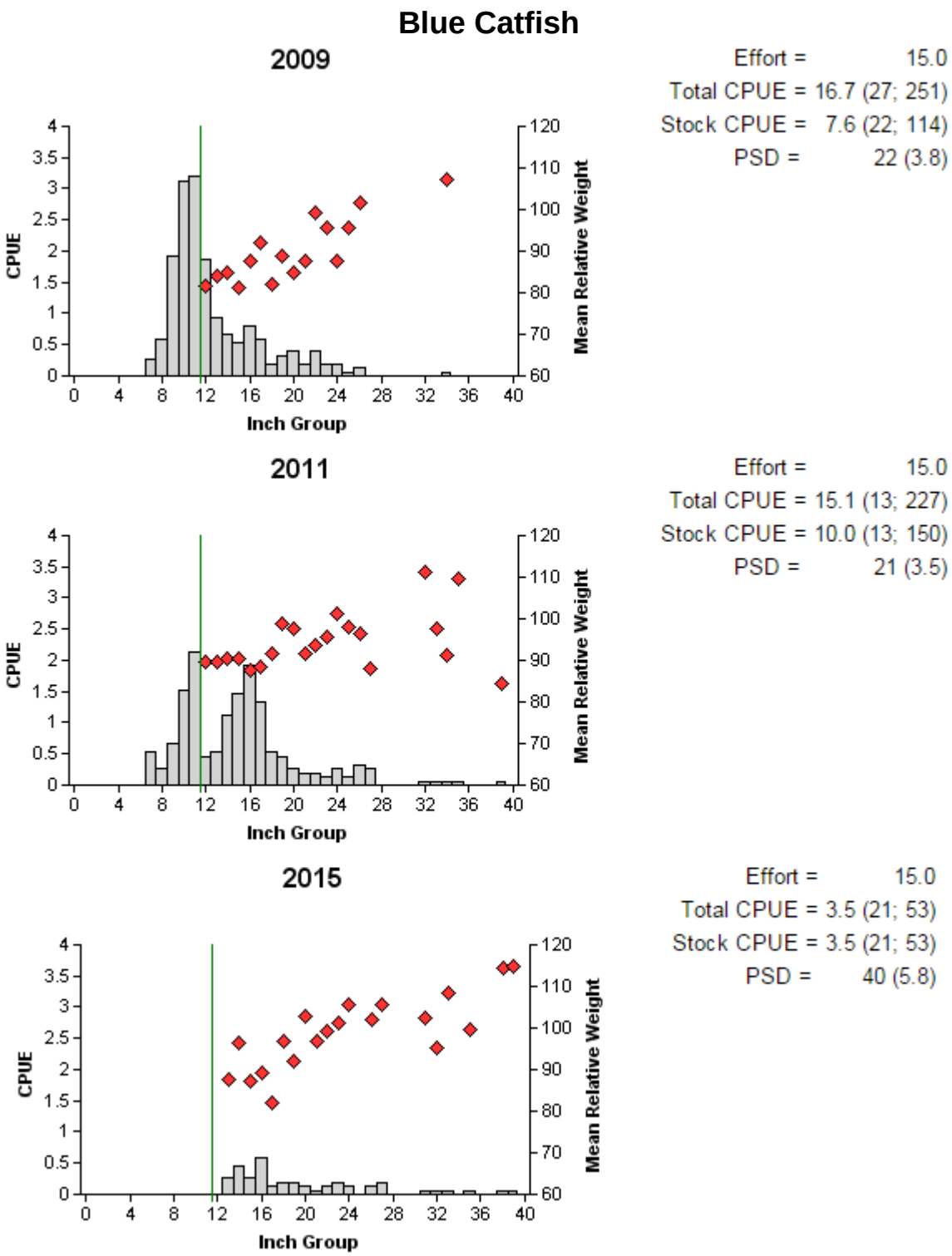

Figure 4. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lavon Reservoir, Texas, 2009, 2011, and 2015. Vertical lines represent length limit at time of collection.

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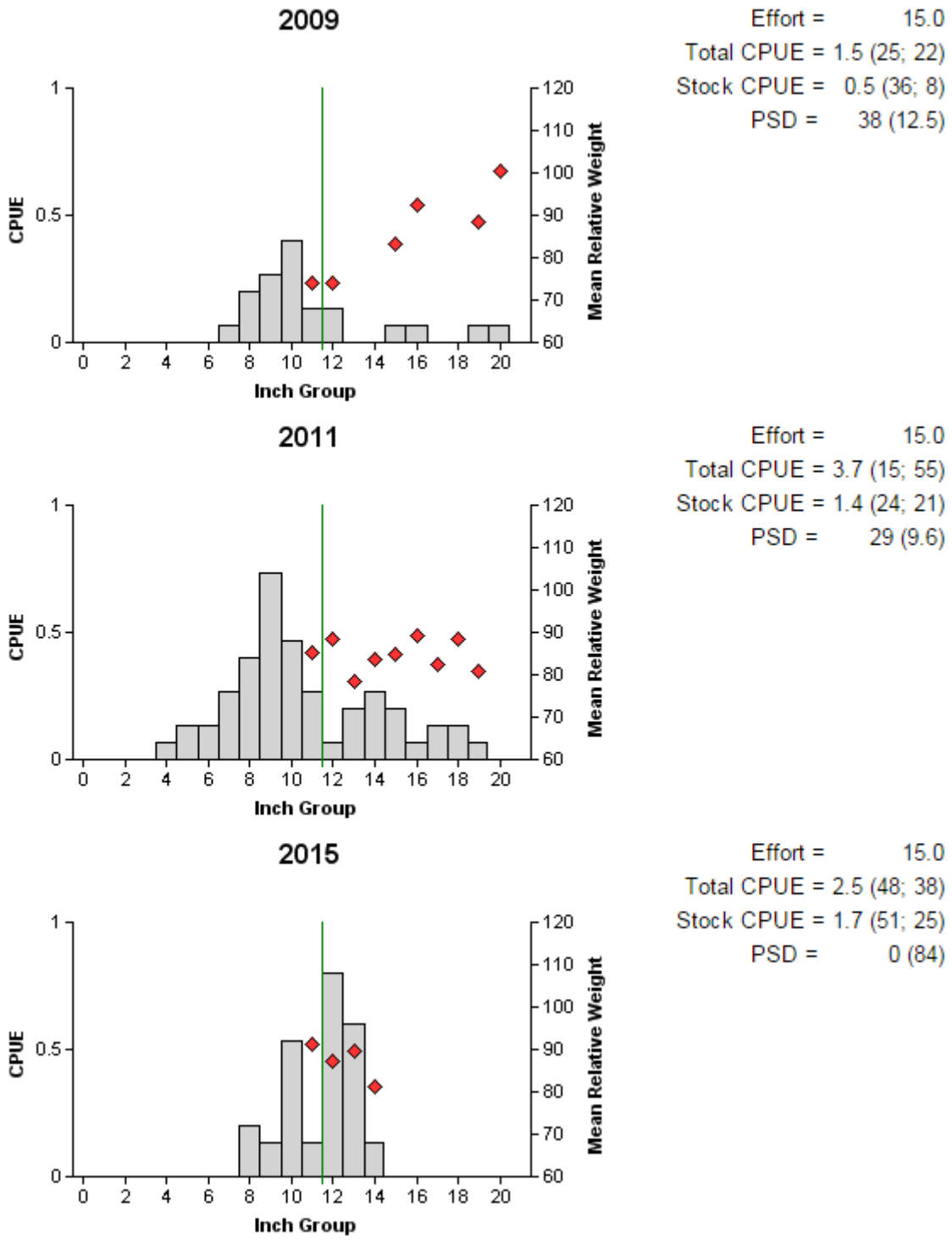


Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lavon Reservoir, Texas, 2009, 2011, and 2015. Vertical lines represent length limit at time of collection.

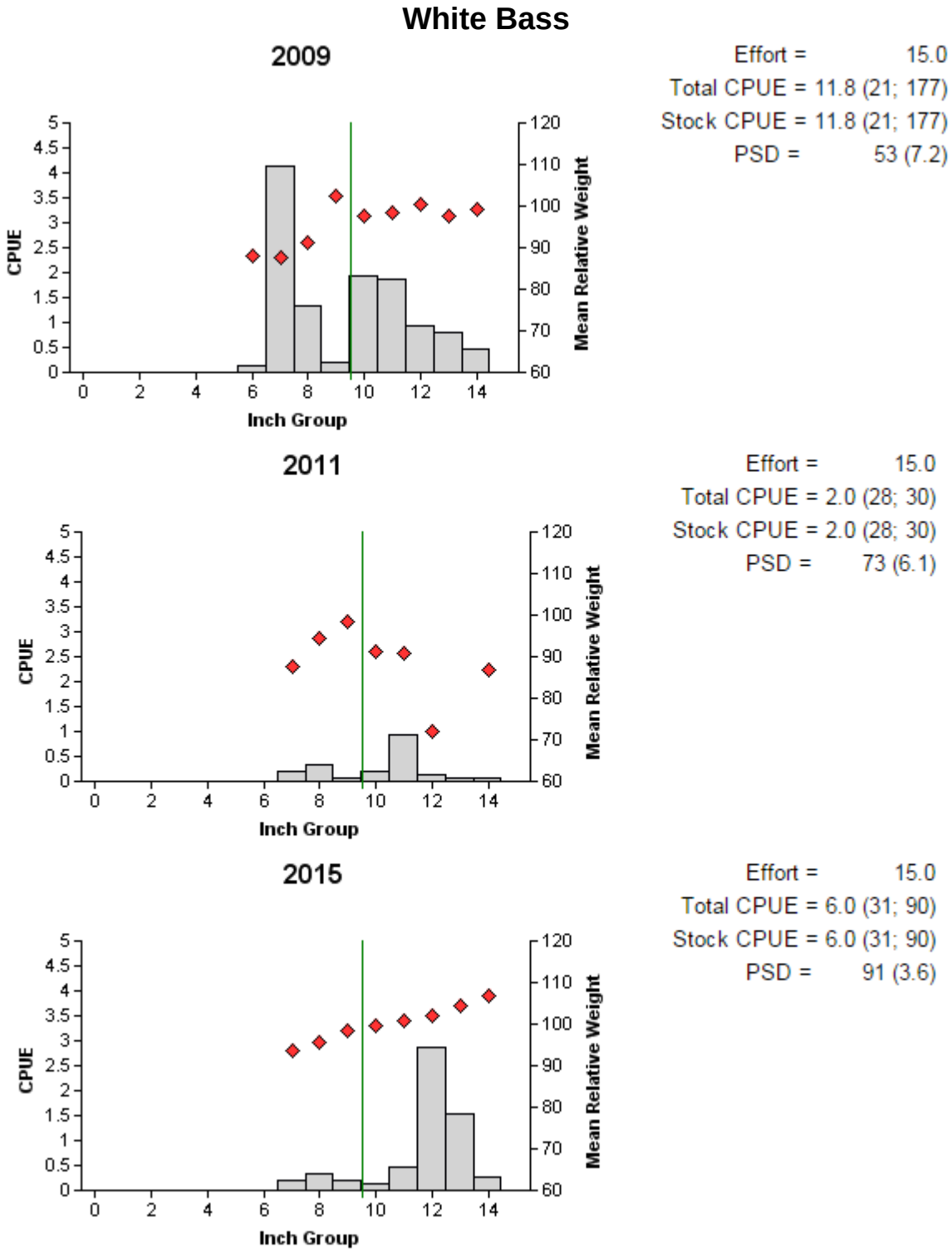


Figure 6. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lavon Reservoir, Texas, 2009, 2011, and 2015. Vertical lines represent length limit at time of collection.

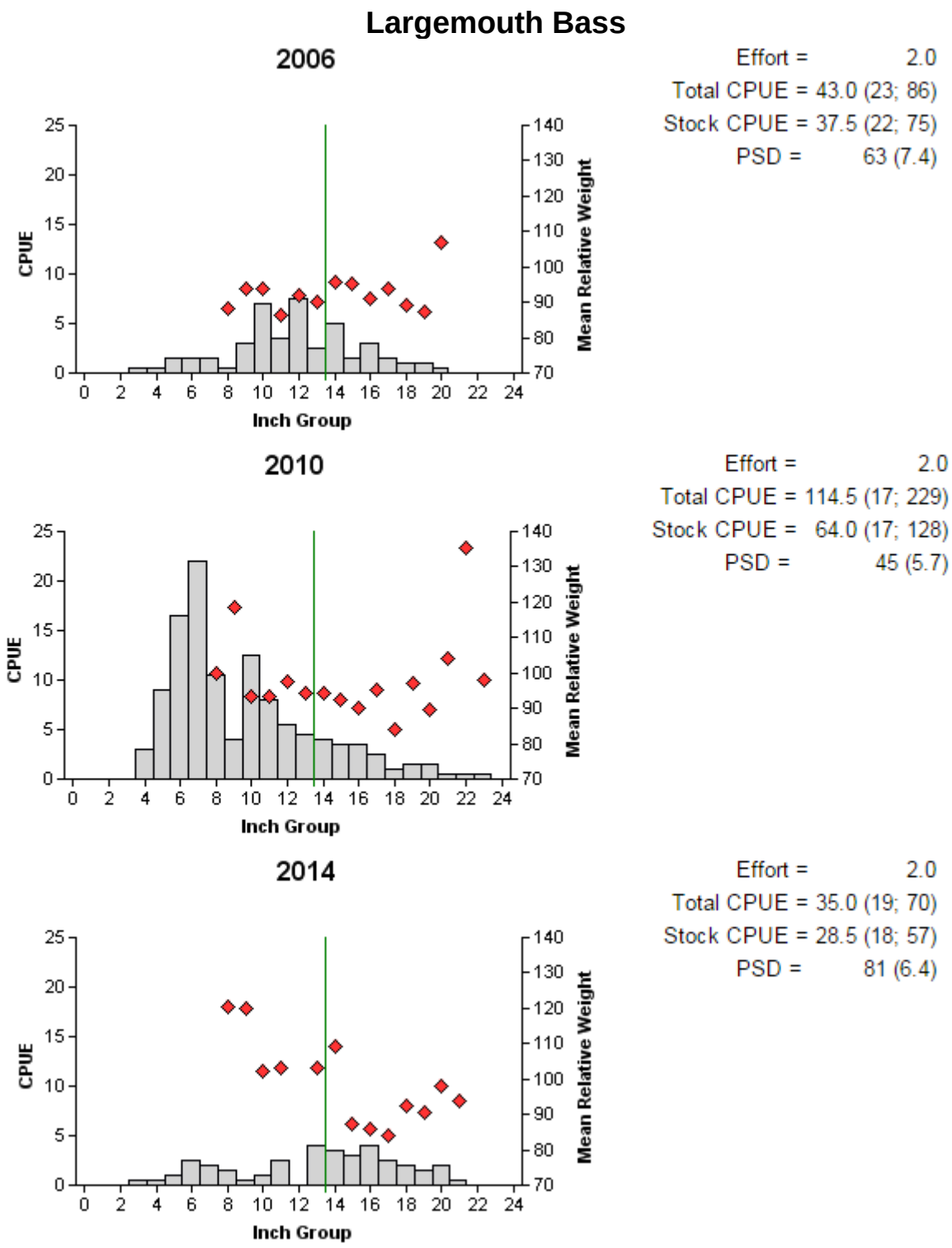


Figure 7. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lavon Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of collection.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lavon Reservoir, Texas, 1990, 1996, 1999, 2002, 2006, and 2014. 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.

		Number of fish				
Year	Sample size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB
1990	36	1	6	29	6.9	2.8
1996	40	1	37	2	52.6	2.5
1999	33	1	17	15	23.5	3.0
2002	24	0	7	17	10.4	0.0
2006	30	1	24	5	42.0	3.3
2014	30	2	23	5	39.0	6.7

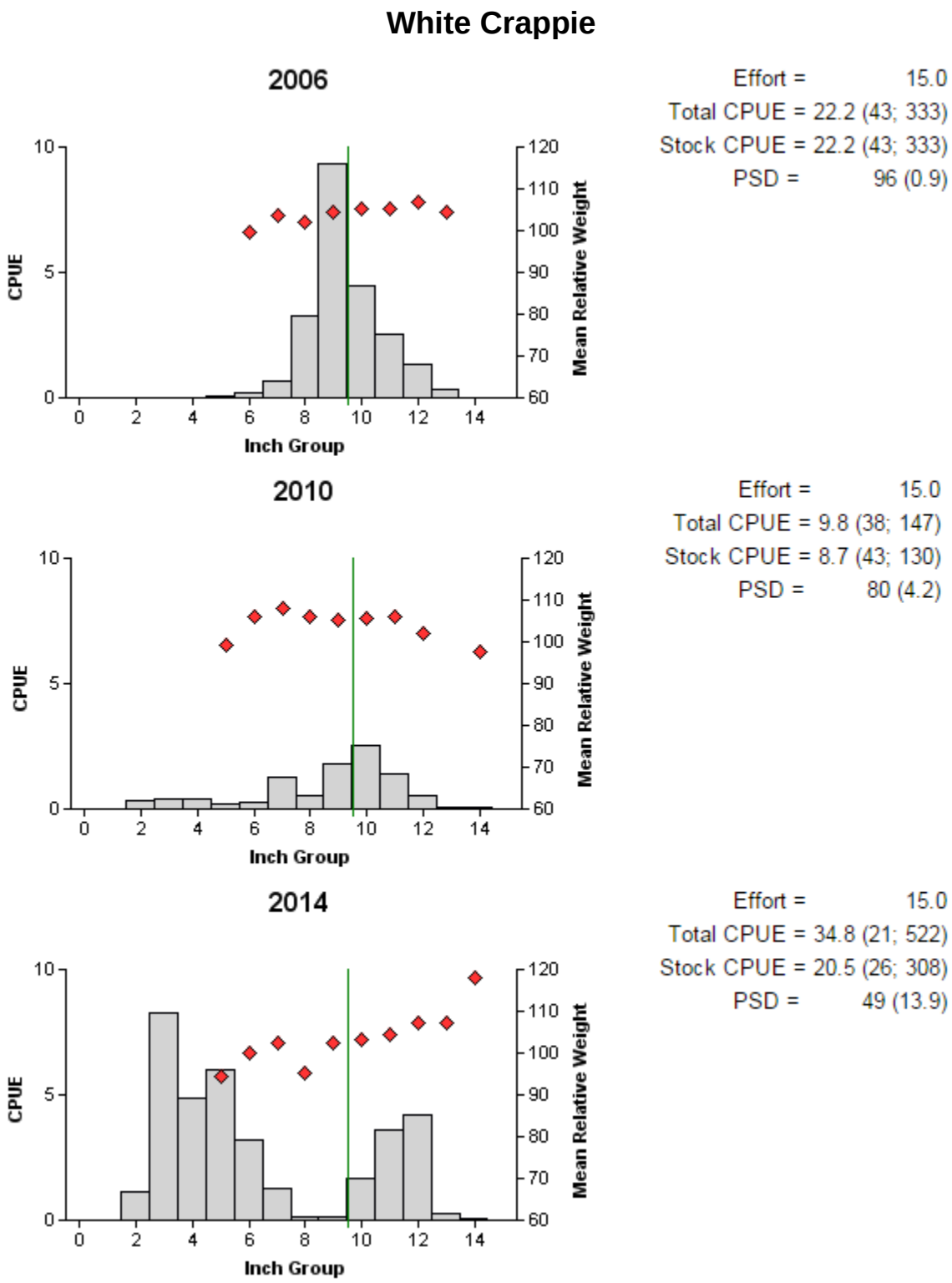


Figure 8. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Lavon Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit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

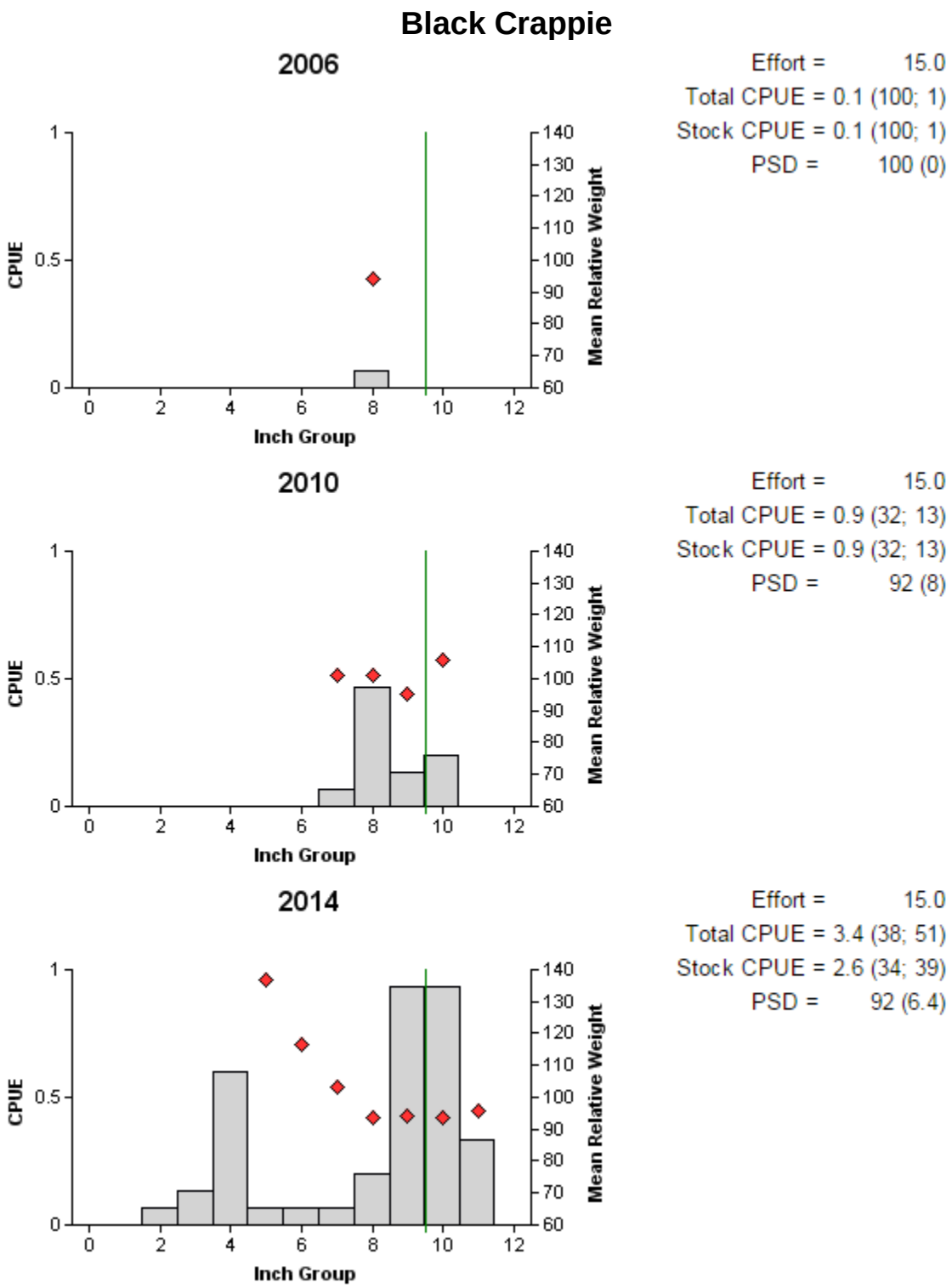


Figure 9. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Lavon Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of collection.

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

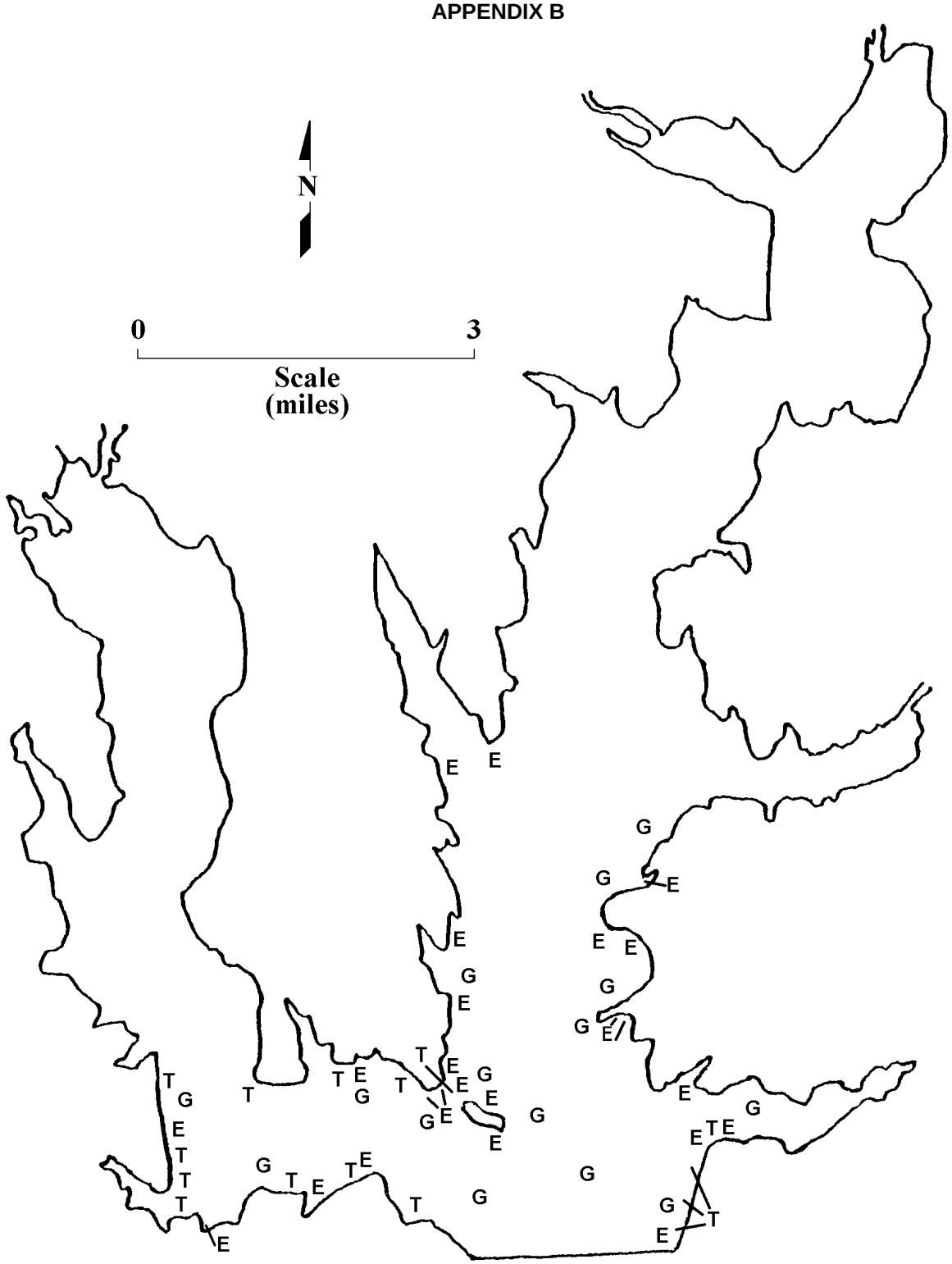
Survey year	Electrofish Fall(Spring)	Trap net	Gill net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2015-2016								
2016-2017								
2017-2018								
2018-2019	S	S	S		S	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lavon Reservoir, Texas, 2014-2015. Sampling effort was 15 net nights for gill netting, 15 net nights for trap netting, and 2 hours for electrofishing.

	Gill Netting		Trap Netting		Electrofishing	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					811	405.5
Threadfin Shad					28	14.0
Blue Catfish	53	3.5				
Channel Catfish	38	2.5				
White Bass	90	6.0				
Green Sunfish					8	4.0
Warmouth					9	4.5
Orangespotted Sunfish					32	16.0
Bluegill					177	88.5
Longear Sunfish					171	85.5
Largemouth Bass					70	35.0
White Crappie			522	34.8		
Black Crappie			51	3.4		

APPENDIX B



Location of sampling sites, Lavon Reservoir, Texas, 2014-2015. Electrofishing, trap netting, and gill netting stations are indicated by E, T, and G, respectively. Water level was 12.5 feet below conservation for electrofishing, 12.9 feet below during trap netting, and 7.1 feet below during gill netting.

APPENDIX C

Historical catch rates of targeted species by gear type for Lavon Reservoir, Texas, 1996, 1999, 2002, 2006, 2009, 2010, and 2014.

		Year							
Gear	Species	1996[a]	1999	2002[b]	2006[b]	2009	2010[b]	2014[b]	**Avg.**
Gill Netting	Blue catfish	1.1	8.3	14.8	16.7	15.5	15.1	3.5	**10.7**
(fish/net night)	Channel catfish	1.9	2.5	0.9	1.5	1.3	3.7	2.5	**2.0**
	Flathead catfish	0.0	0.0	0.0	0.1	0.0	0.1		**0.0**
	White bass	3.8	3.8	2.5	0.1	11.8	2.0	6.0	**4.3**
	Striped bass	1.3	1.5	0.1	0.1	0.1	0.2		**0.5**
Electrofishing	Gizzard shad	202.5	215.5	209.5	208.0		2450.0	405.5	**527.3**
(fish/hour)	Threadfin shad	120.5	330.0	58.5	832.0		170.5	14.0	**217.9**
	Green sunfish	1.5	4.0	0.0	0.0		6.5	4.0	**2.3**
	Warmouth	0.5	3.0	2.5	8.0		14.5	4.5	**4.7**
	Orangespotted sunfish	0.0	0.0	2.5	0.0		1.0	16.0	**2.3**
	Bluegill	33.0	40.5	79.0	91.0		283.5	88.5	**87.9**
	Longear sunfish	4.0	88.0	66.5	65.5		244.5	85.5	**79.1**
	Redear sunfish	0.0	0.0	0.0	1.0		3.0	0.0	**0.6**
	Largemouth bass	9.0	66.0	18.5	43.0		114.5	35.0	**40.9**
Trap Netting	White Crappie	3.5	17.8	17.5	22.2		9.8	34.8	**15.1**
(fish/net night)	Black Crappie	0.0	0.0	0.0	0.1		0.9	3.4	**0.6**

[a] Trap netting was conducted in January 1997.

[b] Gill netting was conducted in the spring of the following year.