

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-6

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

**E.V. Spence Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in E. V. Spence Reservoir were surveyed with electrofishing in 2015 and with gill netting in 2016. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** E. V. Spence Reservoir is a 14,950-acre reservoir located on the Colorado River near Robert Lee, Coke County, Texas. It has a history of prolonged water level declines and has never filled to conservation pool. Golden alga *Prymnesium parvum* blooms caused substantial fish kills in the winters of 2001, 2002, and 2003 that effectively eliminated the fish community. Subsequently, toxic conditions have been recorded on an annual basis.
- **Management History:** The management of this reservoir has been impacted by chronic toxic golden alga blooms since 2001 and low water level. Florida-strain Largemouth Bass, Striped Bass, Bluegill and Channel Catfish were stocked in multiple years following major fish kills due to toxic golden alga blooms. These stockings failed to produce a viable fishery. No stocking has been conducted since 2008.
- **Fish Community**
  - **Prey species:** Gizzard Shad and Bluegill were present in the reservoir.
  - **Channel Catfish:** The Channel Catfish population had adequate numbers of harvestable size fish, but few fish over 20 inches.
  - **White Bass:** White Bass have historically been present at low densities, but none were observed during the most recent surveys.
  - **Largemouth Bass:** Largemouth Bass were present in the reservoir, but most were below the minimum length limit.
  - **White Crappie:** White Crappie have historically been present in the reservoir, but none were observed during the most recent surveys.
- **Management Strategies:** Continue to manage under statewide harvest regulations. Continue to monitor for gold alga during winter months. Conduct additional electrofishing surveys in 2017 and gill net surveys in 2018. Conduct general required monitoring with electrofishing in 2019 and with gill netting in 2020.

## INTRODUCTION

This document is a summary of fisheries data collected from E.V. Spence 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 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*

E. V. Spence Reservoir is a 14,950-acre impoundment constructed in 1969 on the Colorado River. It is located in Coke County near the town of Robert Lee and is approximately 45 miles north of San Angelo. It has a history of prolonged low water level and has never filled to conservation pool. The reservoir is operated and controlled by the Colorado River Municipal Water District (CRMWD). Primary water uses included water supply and recreation. Land use around the reservoir is primarily pastureland. In the winters of 2001, 2002, 2003 golden alga *Prymnesium parvum* blooms caused major fish kills in the reservoir that essentially eliminated the fish community. Subsequently, toxic conditions have been recorded on an annual basis and have prevented the re-establishment of sport fish and prey communities. Water level has been consistently low and was 87.5 ft. below conservation pool in September 2012 before rebounding somewhat with significant rainfall (Figure 1). During spring 2016 the reservoir was at about 10% capacity with a surface area of approximately 3,367 acres. Other descriptive characteristics for E. V. Spence Reservoir are shown in Table 1.

### *Angler Access*

E.V. Spence Reservoir has five public boat ramps. All ramps except Paint Creek were unusable due to low water conditions and Rough Creek ramp has been closed indefinitely. Day pass fee is required at all ramps and anglers can launch boats from the bank. Additional boat ramp characteristics are in Table 2.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Farooqi and Scott 2012) included:

1. Monitor golden alga in E.V. Spence during peak months and monitor water quality and quantity for suitable conditions to begin restocking the reservoir.  
**Action:** Continued to monitor golden alga levels. Water levels and quality has improved enough to stock sport fish including Blue Catfish, Channel Catfish, Largemouth Bass, and Black Crappie.
2. Work with controlling authorities to post signage, educate the public about invasive species issues through the media and presentations.  
**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 fish in E. V. Spence Reservoir are currently managed with statewide regulations (Table 3).

**Stocking history:** Striped Bass were stocked nearly every year from 1969 to 2007. Florida Largemouth Bass were stocked frequently since 2000. No stockings occurred from 2009 to 2012 due to low water and toxic golden alga blooms. The complete stocking history is shown in Table 4.

**Vegetation/habitat management history:** E. V. Spence Reservoir has no significant vegetation/habitat management history.

**Water transfer:** The CRMWD uses this reservoir as one of its three major sources of surface water. The District provides raw water (non-potable) to rural users and municipal and industrial (oil/gas) customers. Municipal customers include the cities of Big Spring, Snyder, Stanton, Midland, and Odessa. The City of Robert Lee also uses this reservoir for their raw water source. The City of San Angelo also has infrastructure at this reservoir capable of pumping water for their municipal needs. Their facility has not been used since the early 2000's. There are no inter-basin transfers. Historically, transfers occurred between E. V. Spence, Colorado City Reservoir, and Moss Creek City Reservoir.

## METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for E.V. Spence Reservoir (TPWD unpublished). Primary components of the OBS plan are listed in Table 5. In 2015/2016 electrofishing and gill net survey sites were non-random, biologist-selected stations. Additionally, electrofishing in 2015 was conducted during daylight hours.

*Electrofishing* – Largemouth Bass, Sunfishes, and Gizzard Shad were collected by electrofishing (1 hour at 6, 10-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

*Gill netting* – Channel Catfish were collected by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

*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 ( $W_t$ )] 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.

*Water level* – Source for water level data was the United States Geological Survey (USGS 2016).

## RESULTS AND DISCUSSION

**Habitat:** A habitat survey was last conducted in 2007 (Farooqi and Scott 2008). The littoral zone habitat consisted primarily of flooded terrestrial vegetation (62.4%) and rocky shoreline (20.9%). No significant aquatic vegetation was present. As of June 2016, the reservoir was at 10% capacity and 3,367 acres.

**Prey species:** Electrofishing catch rates for Gizzard Shad were 151.3/h in 2015. Index of vulnerability (IOV) for Gizzard Shad was adequate with 67% of Gizzard Shad available to existing predators, however this was lower than past surveys (Figure 2). Bluegill were present in 2015, but only 2 individuals were collected (Appendix A).

**Channel Catfish:** The gill net catch rate of Channel Catfish was 5.3/nn in 2016 which was higher than previous surveys. The Channel Catfish population size structure was balanced with a PSD of 45, however few large fish (>20 inches) were present in the sample (Figure 3). Relative weights were exceptional, likely indicating a low density population that is taking advantage of increased water levels and available forage.

**White Bass:** No White bass were collected during sampling in 2015/2016. Historically, White Bass have been present in low abundance (Farooqi and Scott 2008).

**Largemouth Bass:** Largemouth Bass were present in the reservoir with CPUE of stock size fish at 38.1/h (Figure 4), however the fish collected only ranged from 4-15 inches in total length. Because of previous fish kills due to golden alga, only the two most recent year-classes of bass were present which explains the absence of large fish and poor size structure (Figure 4). Relative weights for fish from 8-15 inches were very high ( $W_t$  range from 120 to 130) likely indicating a low density population with little competition for prey resources.

**White Crappie:** No White Crappie were collected during sampling in 2015/2016. Historically, White Crappie have been present, but trap net catch rates have been low (Farooqi and Scott 2008).

## Fisheries management plan for E. V. Spence Reservoir, Texas

Prepared – July 2016.

**ISSUE 1:** E. V. Spence Reservoir has had toxic golden alga blooms on a regular basis since 2001 resulting in numerous fish kills. However, no toxic blooms have occurred the past 2 years and water levels have increased since the record low in 2012. The quality and quantity of water has improved enough to begin rebuilding the fishery with stockings. Despite the improvements, golden alga requires monitoring.

### MANAGEMENT STRATEGY

1. Request stockings of Florida Largemouth Bass and Bluegill to help rebuild the fishery.
2. Conduct management stockings of Crappie and White Bass to re-establish those fish populations that existed prior to low water levels in 2012.
3. Conduct electrofishing surveys in fall 2017 and 2019 to monitor the Largemouth Bass and prey populations.
4. Conduct gill netting in spring 2018 and 2020 to monitor the Crappie, Catfish, and White Bass populations and to assess the effectiveness of management stockings.
5. Continue to collect at minimum two water samples for golden algae testing between November 1 and March 31.

**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.

### 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.

## Objective-Based Sampling Plan and Schedule

### FY 2017 – FY2020

#### Sport fish, forage fish, and other important fishes

Sport fishes in E.V. Spence include Channel Catfish, White Crappie, White Bass, and Largemouth Bass. Known important forage species include Gizzard Shad and Sunfish species.

#### Low-density fisheries

All species are low-density fisheries at this time, but require monitoring as the populations recover from low water conditions and golden alga kills. As populations improve, survey objectives will be re-evaluated in 2019.

#### Survey objectives, fisheries metrics, and sampling objectives

**Largemouth Bass:** Monitoring the Largemouth Bass population is necessary due to its ongoing recovery from low water levels and golden algae kills. There is potential for a quality fishery to return. Based on examination of past data, it is unlikely enough stock size fish will be caught for size structure analysis, given reasonable amount of effort. To achieve a sample of 50 stock-size fish and an RSE below 25 for CPUE-S would require, at minimum, 48 stations during most years. This level of effort is not feasible. Our survey objective for Largemouth Bass is to monitor for largescale changes in total abundance and condition. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in 2017 and 2019 (Table 6), but sampling will continue at random sites until the RSE of CPUE-Total is  $\leq 25$  (the anticipated effort to meet the sampling objective is 12-18 stations with 95% confidence). Twelve random stations will be determined. Exclusive of the original 12 random stations, 6 additional random stations will be pre-determined in the event some extra sampling is necessary. A maximum of 18 stations will be sampled.

**Channel Catfish:** Monitoring the Channel Catfish population is necessary due to its ongoing recovery from low water levels and golden alga kills. There is potential for a quality fishery to return. Catch rates were above average in 2016 and more than 50 stock-size fish were collected. Based on the 2016 data, we could expect to collect at least 50 stock-size fish with 80% confidence in 15 net nights. However, it is unlikely an RSE below 25 could be achieved, given a reasonable amount of effort. Our goal is to collect enough Channel Catfish to characterize size structure, condition, and growth rates. Our sampling objective for gill netting in spring 2018 and 2020 (Table 6) is to collect a minimum 50 stock-size Channel Catfish for size structure analysis. Ten random stations will be determined. Exclusive of the original 10 random stations, 10 additional random stations will be pre-determined in the event extra sampling is necessary. A maximum of 20 gill net stations will be sampled. Otoliths from 13 fish between 11.0 and 12.9 inches will be collected to determine mean age at 12 inches.

**White Crappie:** White Crappie have historically been present in E.V. Spence and management stockings have been conducted to re-establish the population. Our objective is to determine presence/absence. Sampling effort based on sampling objectives for Channel Catfish will be sufficient to determine the presence/absence of White Crappie.



**White Bass:** White Bass have historically been present in E.V. Spence and management stockings have been conducted to re-establish the population. Our objective is to determine presence/absence. Sampling effort based on sampling objectives for Channel Catfish will be sufficient to determine the presence/absence of White Bass.

**Gizzard Shad and Bluegill:** Gizzard Shad are the primary forage fish in E.V. Spence Reservoir. Bluegill are also present at low density. Sampling effort based on sampling objectives for Largemouth Bass will be sufficient to determine IOV and CPUE-T of Gizzard Shad and CPUE-T of Bluegill. No additional sampling effort will be expended to achieve an RSE25 for CPUE-T for Gizzard Shad or Bluegill.

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## Water Level

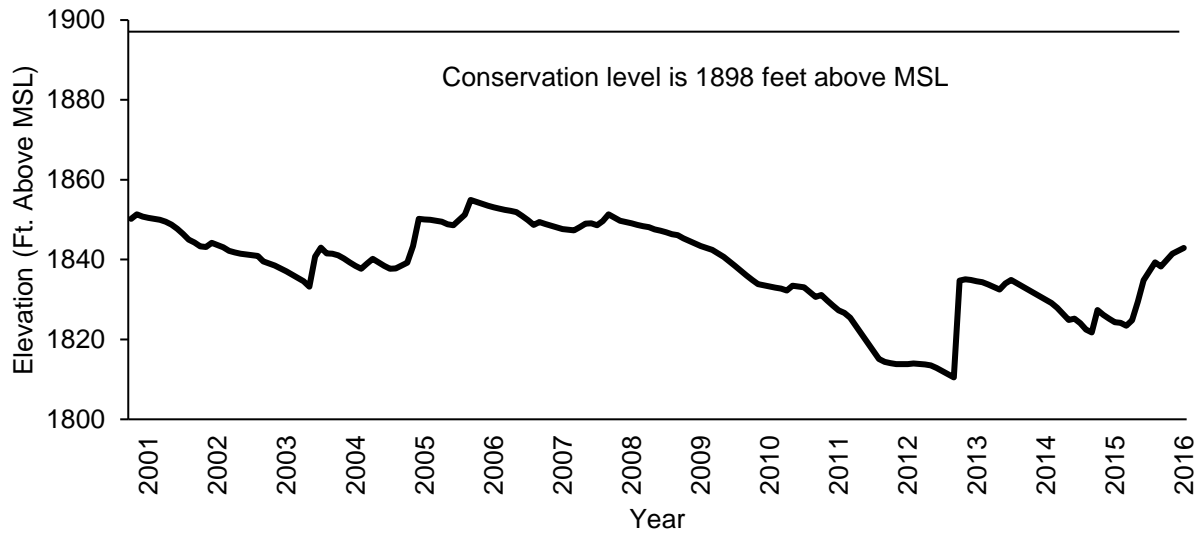


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for E.V. Spence Reservoir, Texas.

Table 1. Characteristics of E.V. Spence Reservoir, Texas.

Characteristic	Description
Year constructed	1969
Controlling authority	Colorado River Municipal Water District
County	Coke
Reservoir type	Main-stem
Shoreline Development Index (SDI)	8.00
Watershed Area	15,278 square miles
Conductivity	$\geq 2,300 \mu\text{S/cm}$

Table 2. Boat ramp characteristics for E.V. Spence Reservoir, Texas, June, 2016. Reservoir elevation at time of survey was 1843 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Wildcat Recreation Area, Ramp #1	31.88601 -100.5323	Y	20	1852	Out of water. Extension is not feasible
Wildcat Recreation Area, Ramp #2	31.88883 -100.5311	Y	20	1848	Out of water. Extension is not feasible
Wildcat Recreation Area, Ramp #3	31.89137 -100.5338	Y	20	1838	Good condition. Ramp gated and closed.
Paint Creek	31.91149 -100.5822	Y	20	1840	Good condition.
Rough Creek	31.97720 -100.5878	Y	20	1866	Out of Water, Extension is not feasible
South End of Dam	31.89123 -100.5171	Y	20	NA	Bank Access Only
North End of Dam	31.90928 -100.5249	Y	20	NA	Bank Access Only

Table 3. Harvest regulations for E.V. Spence, 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	14-inch minimum
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of E.V. Spence Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Threadfin Shad	1980	4,000	UNK
	1981	3,000	UNK
	1982	1,200	UNK
	1984	5,700	UNK
	Total	13,900	
Blue Catfish	1971	4,325	UNK
	1973	13,000	UNK
	1979	120,359	UNK
	1980	42,228	UNK
	1981	49,996	UNK
	1988	15	ADL
	1992	60,810	FGL
	2002	2,715	FGL
	2004	125,000	FGL
	Total	418,448	
Channel Catfish	1968	138,000	UNK
	1969	87,650	UNK
	1970	16,000	UNK
	1971	34,200	UNK
	1972	10,000	UNK
	2003	132,861	FGL
	2004	85,471	FGL
	2005	187,342	FGL
	2006	233,974	FGL
	2007	183,235	FGL
	2008	162,061	FGL
	2013	108,139	FGL
	Total	1,378,933	
Flathead Catfish	1969	26	UNK
	1971	1,825	UNK
	1973	4,000	UNK
	Total	5,851	
White Bass	1982	100	UNK

Table 4. Stocking History Continued

Species	Year	Number	Size
Striped Bass	1969	34,500	FGL
	1970	3,000	FGL
	1971	47,328	FGL
	1972	51,835	FGL
	1973	69,834	FGL
	1974	51,075	FGL
	1975	82,068	UNK
	1976	34,975	UNK
	1977	29,698	UNK
	1979	30,525	UNK
	1981	84,182	UNK
	1982	50,000	UNK
	1984	119,500	FGL
	1986	105,384	FGL
	1988	2,000,000	FRY
	1988	150,274	FGL
	1990	152,136	FGL
	1991	68,644	FGL
	1992	62,700	FGL
	1993	107,545	FGL
	1993	62,950	FRY
	1994	17,500	FGL
	1995	71,346	FGL
	1996	10,403	FRY
	1996	24,794	FGL
	1997	25,229	FGL
	1998	25,223	FGL
	2000	15,010	FGL
	2004	27,041	FGL
2005	37,243	FGL	
2007	35,774	FGL	
Total		3,670,216	
Palmetto Bass	1975	51,748	UNK
Bluegill	2002	301,201	FGL
	2005	374,684	FGL
	2006	239,789	FGL
	2007	180,800	FGL
	2008	176,660	FGL
Total		1,273,134	
Smallmouth Bass	1980	500	UNK
	1981	146,817	UNK
	1982	144,837	UNK
	1985	258	ADL
	Total		292,412

Table 4. Stocking History Continued

Species	Year	Number	Size
Largemouth Bass	1968	10,990	UNK
	1969	786,000	UNK
	1970	26,000	UNK
	1971	46,946	UNK
	1972	4,500	UNK
	1973	1,650	UNK
	2005	100,885	FGL
	Total	979,971	
Florida Largemouth Bass	1980	37,900	FGL
	1981	86,000	FGL
	1996	349,276	FGL
	2000	200,031	FGL
	2003	148,516	FGL
	2004	124,706	FGL
	2005	188,526	FGL
	2007	181,428	FGL
	2008	164,710	FGL
	2013	109,965	FGL
	2016	102,549	FGL
	Total	1,693,607	
	White Crappie	2005	146
Green X Redear Sunfish	1971	70,000	UNK
	1972	2,700	UNK
	Total	72,700	

Table 5. Objective-based sampling plan components for E.V. Spence Reservoir, Texas 2015 – 2016. Sampling stations were biologist selected and electrofishing was conducted during daylight hours.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	Presence/Absence	Practical Effort
	Condition	<i>Wr</i>	10 fish/inch group (max)
Bluegill	Abundance	Presence/Absence	Practical Effort
Gizzard Shad	Abundance	Presence/Absence	Practical Effort
<i>Gill netting</i>			
Crappie	Abundance	Presence/Absence	Practical Effort
	Condition	<i>Wr</i>	10 fish/inch group (max)
Channel Catfish	Abundance	Presence/Absence	Practical Effort
	Condition	<i>Wr</i>	10 fish/inch group (max)
Blue Catfish	Abundance	Presence/Absence	Practical Effort
	Condition	<i>Wr</i>	10 fish/inch group (max)
White Bass	Abundance	Presence/Absence	Practical Effort
	Condition	<i>Wr</i>	10 fish/inch group (max)



## Gizzard Shad

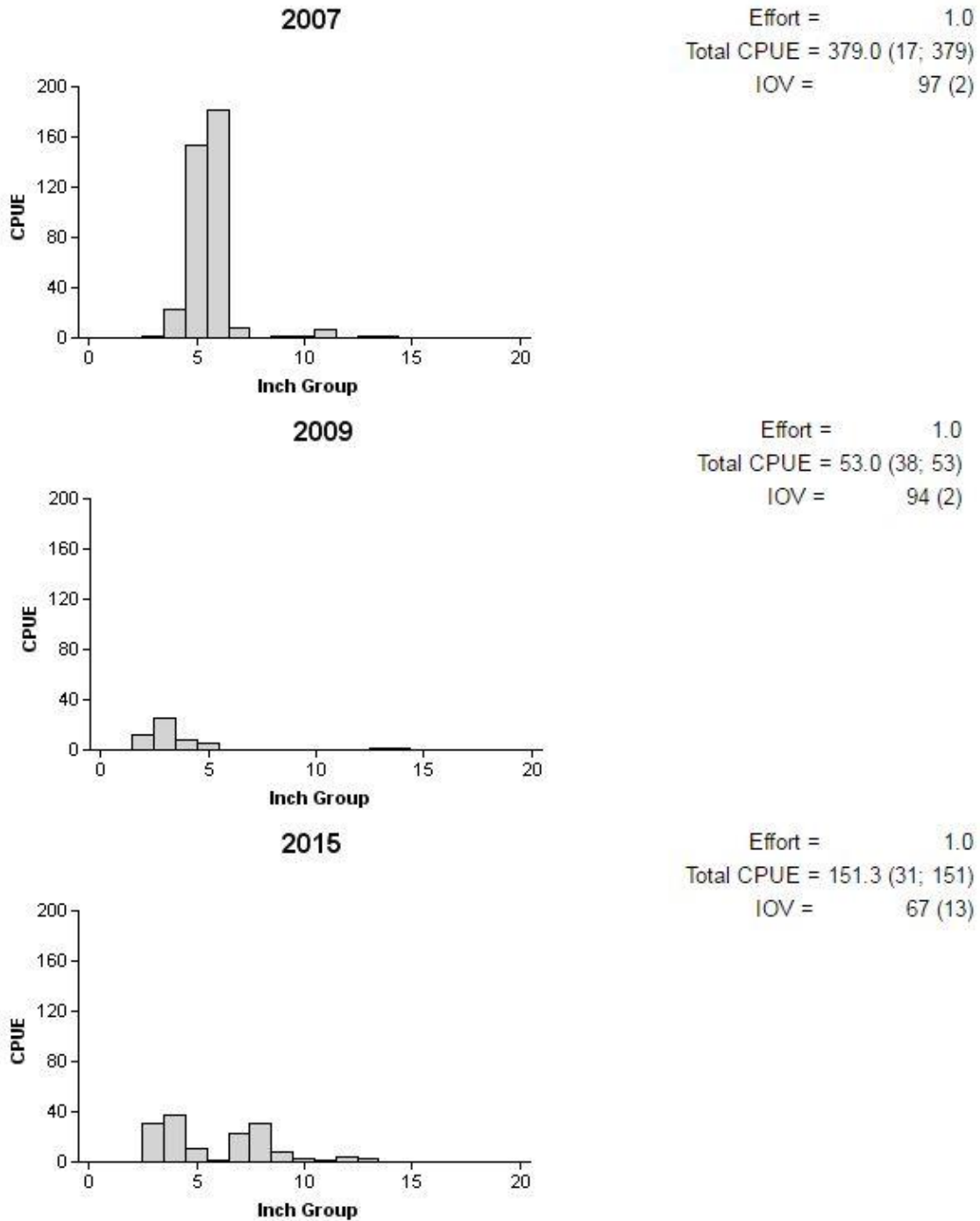


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, E.V. Spence Reservoir, Texas, 2007, 2009, and 2015. Electrofishing in 2015 was conducted during daylight hours.

## Channel Catfish

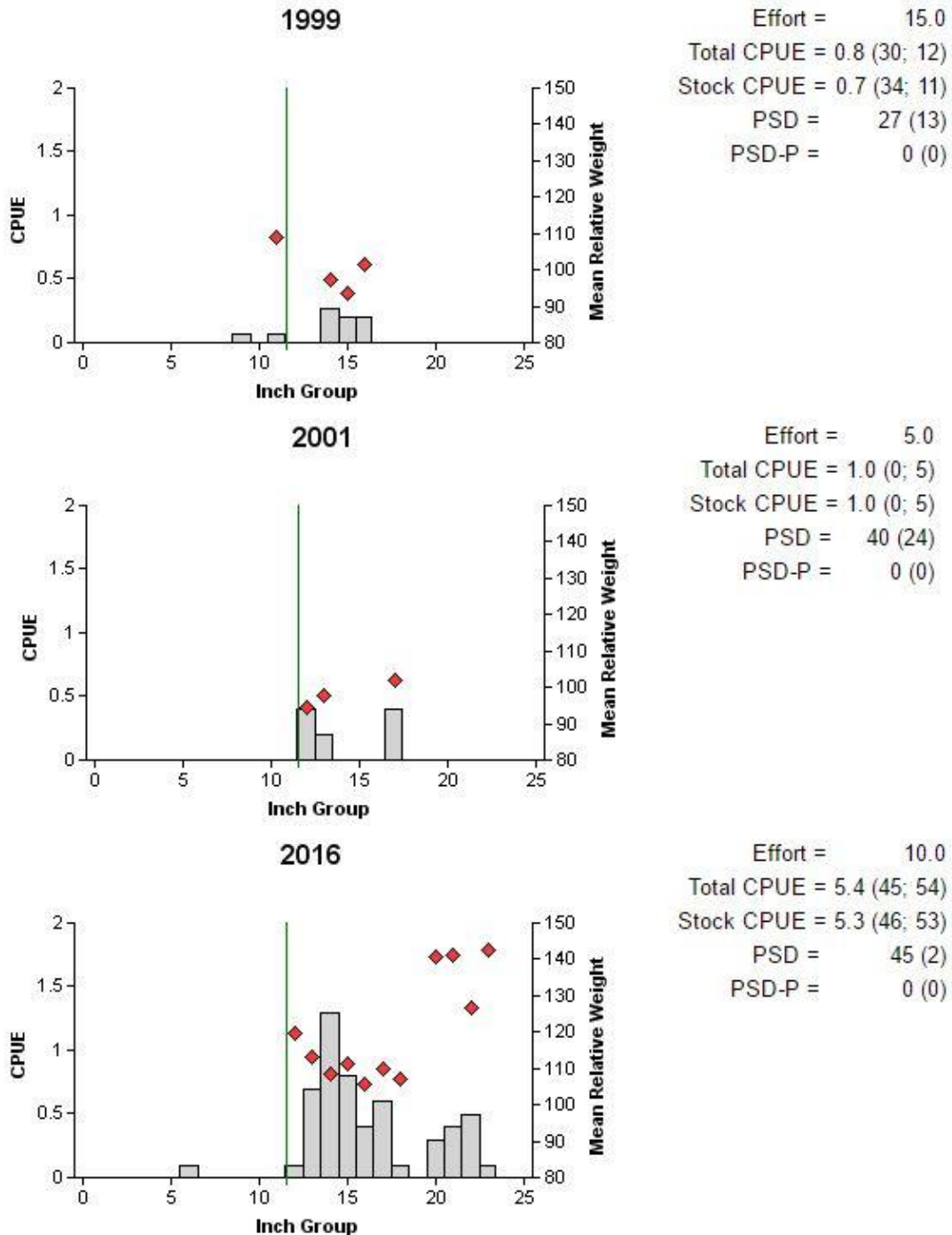


Figure 3. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, E.V. Spence Reservoir, Texas, 1999, 2001, and 2016. Vertical line indicates minimum length limit.

## Largemouth Bass

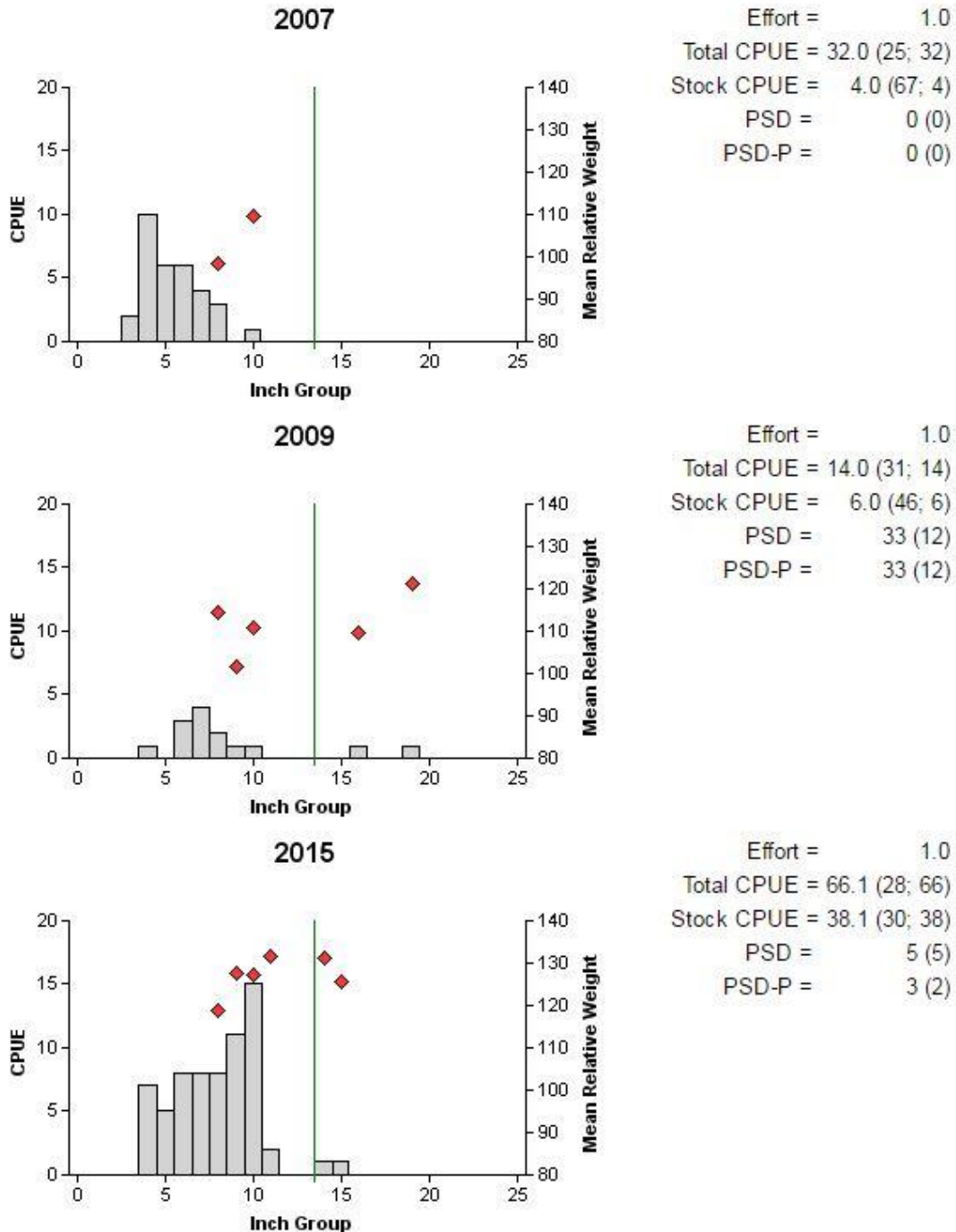


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, E.V. Spence Reservoir, Texas, 2007, 2009, and 2015. Vertical line indicates minimum length limit. Electrofishing in 2015 was conducted during daylight hours.

Table 6. Proposed sampling schedule for E.V. Spence 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 and additional survey denoted by A.

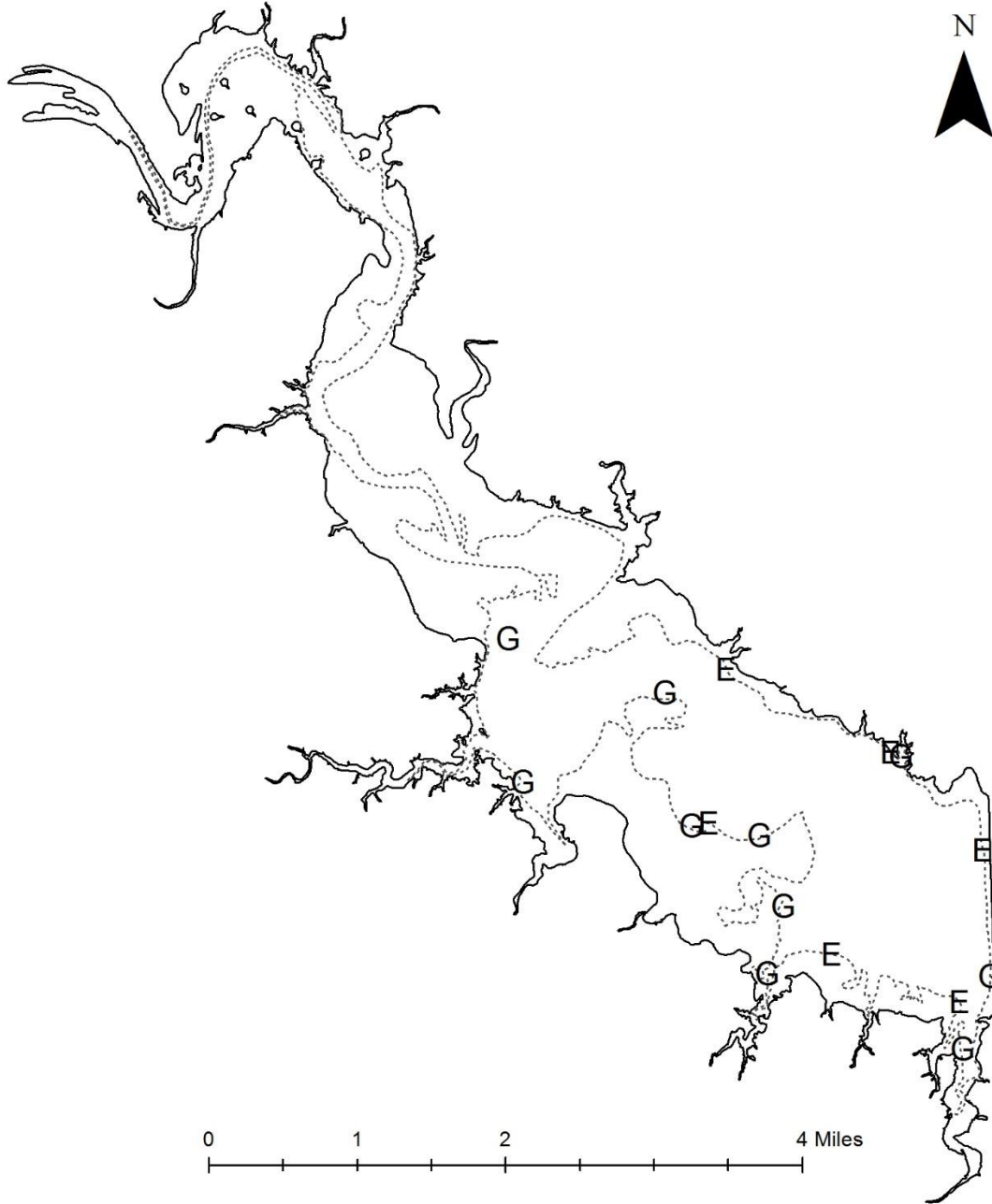
Survey year	Electrofishing Fall(Spring)	Trap net	Gill net	Habitat			Creel survey	Report
				Structural	Vegetation	Access		
2016-2017								
2017-2018	A		A					
2018-2019								
2019-2020	S		S	S	S	S		S

**APPENDIX A**

Number (N) and catch rate (CPUE) of all target species collected from all gear types from E.V. Spence Reservoir, Texas, 2015-2016. Sampling effort was 10 net nights for gill netting and 1 hour for electrofishing.

Species	Electrofishing		Gill Netting	
	N	CPUE	N	CPUE
Gizzard Shad	151	151.3	150	15.0
Common Carp	1	1.0	119	11.9
River Carpsucker			56	5.6
Blue Catfish			1	0.1
Black Bullhead			32	3.2
Channel Catfish	1	1.0	54	5.4
Green Sunfish			18	1.8
Bluegill	2	2.0	2	0.2
Largemouth Bass	66	66.1	25	2.5

APPENDIX B



Location of sampling sites, E.V. Spence, Texas, 2015-2016. Gill net and electrofishing stations are indicated by G and E, respectively. Water level was 56ft below conservation pool at time of sampling. Dashed line indicates approximate shoreline at time of sampling.