

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Survey Report

Grapevine Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Grapevine Reservoir were surveyed in 2013 and 2015 using electrofishing, in 2015 using trap nets, and in 2016 using gill nets. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers in 1952 to provide flood control, municipal and industrial water, and recreation. Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) and has an average depth of 28.2 feet and a maximum depth of 65.0 feet. Angler and boat access is adequate. There is one handicap specific facility on the reservoir. At the time of sampling the fishery habitat was primarily rocky and gravel shoreline.
- **Management History:** Important sport fishes include Largemouth Bass, Smallmouth Bass Spotted Bass, White Crappie, White Bass, and Blue and Channel Catfish. The Largemouth Bass population has been managed with a 14 to 18-inch slot-length limit since 1994. All other species have been managed with statewide regulations.
- **Fish Community**
 - **Prey species:** Gizzard Shad were in great abundance in the reservoir. Threadfin Shad were also available in high abundance for predators. Bluegills and Longear Sunfish were also very abundant as prey but few fish over 6 inches are available for anglers.
 - **Catfishes:** The Blue Catfish were abundant and the population continues to improve. The Channel Catfish catch rate was well below average.
 - **White Bass:** White Bass catch rates were below the average of other district reservoirs, but fish could have been upstream spawning at time of sampling.
 - **Black basses:** The Smallmouth Bass population continues to develop and evidence of reproduction was discovered. Largemouth and Spotted Bass populations are in high abundance and quality fish are available for anglers.
 - **Crappie:** The White Crappie catch rates decreased from last sample and continued to be average in abundance when compared to other district reservoirs.

Management Strategies: Summer low frequency electrofishing, fall electrofishing, trap netting, and gillnetting surveys will be conducted in 2019-2020. Additional summer low frequency will be conducted in summer of 2017 to monitor Blue Catfish population. An additional fall electrofishing survey will be conducted in fall of 2017 to monitor black bass populations. A year- long creel survey will be conducted from June 2019-May 2020 to obtain updated information on angler effort and catch statistics.

INTRODUCTION

This document is a summary of fisheries data collected from Grapevine 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

Grapevine Reservoir is a 6,684-acre impoundment constructed on Denton Creek, a tributary of the Trinity River by the U.S. Army Corps of Engineers in 1952 to provide flood control, municipal and industrial water, and recreation (Table 1). Grapevine Reservoir is surrounded by urban development and is 20 miles northwest of Dallas, Texas in Tarrant County. The reservoir contains 188,550 acre-feet of water at conservation elevation (535 ft. above mean sea level) has an average depth of 25.5 feet and a maximum depth of 65.0 feet. Angler and boat access is good. At the time of sampling the fishery habitat was natural and rocky shoreline.

Angler Access

Grapevine Reservoir has 15 public boat ramps and 2 private boat ramps. There is one high water ramp located at Katie's Woods Park. However access was very limited during high water conditions during the summer and winter of 2015-2016. Additional boat ramp characteristics are in Table 2. Shoreline access is good within numerous parks located around the reservoir. Many of the parks which were once managed by the USCOE are now being leased by surrounding Cities.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Brock and Hungerford 2012) included:

1. Conduct category 4 age and growth survey on Largemouth Bass in 2015 to obtain a good estimate of growth rates. Conduct age and growth survey on Smallmouth Bass to document reproduction.
Action: A Category 4 age and growth survey was conducted on Largemouth Bass in 2015. A total of 150 Largemouth bass were aged. Age and growth survey was not conducted on Smallmouth Bass because of low population density.
2. Conduct annual creel survey from June 2015 – May 2016 to obtain angler catch statistics.
Action: Creel was not conducted because of limited access of reservoir during flooding in summer and winter of 2015.
3. Request Smallmouth Bass for stocking. Conduct spring exploratory electrofishing sampling to investigate any possible Smallmouth Bass spawning activity.
Action: Smallmouth Bass were stocked in 2013 and 2014. They were not stocked in 2012, 2015 or 2016. Spring exploratory sampling was conducted but no spawning activity was documented. However during fall 2015 sampling, two young-of-the-year fish were observed despite no stocking in 2015.
4. Invasive organisms such as Giant Salvinia (*Salvinia molesta*) and zebra mussels (*Dreissena polymorpha*) have been spreading around aquatic environments in Texas.
Action: The controlling authority, USCOE is very aware of the zebra mussel threat and

conducts sampling for early detection of zebra mussel infestation. Signs were erected at public ramps. Stencils were applied to boat ramps with cleaning procedures and water draining law.

Harvest regulation history: Sport fish populations in Grapevine Reservoir have been managed with statewide regulations with the exception of Largemouth Bass which are managed with a 14 to 18-inch slot-length limit (Table 3). Results of a creel survey revealed 70% of anglers believed the slot-length limit was benefiting the Largemouth Bass population (Brock and Hungerford 2004).

Stocking history: Grapevine Reservoir has been stocked annually with Smallmouth Bass from 2008-2011, 2013 and 2014. The complete stocking history is in Table 4.

Vegetation/habitat history: The last habitat survey was conducted in 2011. Grapevine Reservoir habitat is composed mainly of natural and rocky shorelines. Grapevine Reservoir was part of the TPWD Habitat Improvement Initiative; however, because of water level fluctuations success has been limited.

Water transfer: Grapevine Reservoir is the main water supply for the City of Grapevine. 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 Grapevine (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 - Black basses, Sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1.5 hours at 18, 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. Ages for Largemouth Bass were determined using otoliths.

Trap netting - Crappie were collected using trap nets (10 net nights at 10 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn).

Gill netting - Blue and Channel Catfish and White Bass 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).

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 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: The most recent habitat survey conducted was in 2011 (Table 6). At the time of sampling the fishery habitat was natural and rocky shoreline.

Prey species: Gizzard Shad electrofishing total CPUE was 616.7/h in 2015 (Figure 2). Index of vulnerability was high, indicating that 97% of Gizzard Shad were available to existing predators. The total CPUE of Threadfin Shad was 494.7/h in 2015 (Appendix C). Bluegill electrofishing total CPUE was 241.3/h in 2015 (Figure 3). The Longear Sunfish total CPUE was 56.7/h in 2015. Forage species continued to be in great abundance in the Reservoir.

Catfishes: Gill netting total CPUE of Blue Catfish in 2016 (5.9/nn) was the highest on record (Figure 4). Body condition for most size classes was below optimal. Size structure of the Blue Catfish population was dominated by smaller individuals as indicated by a PSD value of 22 (Figure 4). The OBS sampling objectives for Blue Catfish were not met (Table 5). It was determined that extra gillnetting was not warranted because RSE values were determined to be adequate enough to determine population status. The gill net catch rate of Channel Catfish was 1.2/nn in 2016 which was higher than rate observed in 2012 sample and much lower than rate observed in 2008 (5.0/nn; Figure 5).

White Bass: The 2016 gill netting total CPUE of White Bass (0.8/nn) was similar to previous sample but less than in 2008 (Figure 6). This could be the result of rises in water levels that affected sampling efficiency or because the fish were in the tributaries for spawning when sampling occurred.

Black basses: The electrofishing total CPUE of Smallmouth Bass was 16.7/h and 6.7/h in 2013 and 2015, respectively (Figure 7). The 2013 CPUE was highest on record. Fish over 14 inches were collected (4.7/h in 2013; 2.0/h in 2015). Body condition for most size classes were above 80. For the first time in possible reproduction was documented in 2015 (Figure 7).

The total electrofishing CPUE of Spotted Bass was 31.3/h in 2013 and 52.7/h in 2015 (Figure 8). The catch of fish over 12 inches was 3.3/h in 2013; 8.0 in 2015 (Figure 8). Size structure of the Spotted Bass population remained good as PSD values averaged 44 from 2013 and 2015. Spotted Bass ≥ 14 inches greater were collected (Figure 8).

The total electrofishing CPUE of Largemouth Bass in 2013 and 2015 was 146.0/h and 234.7, respectively (Figure 9). The CPUE of fish ≥ 14 inches was 26.0/h in 2013 and 10.7/h in 2015. The size structure of the population was dominated by smaller size fish in 2015 (Figure 9). This is attributable to formation of a strong year class in 2015 due the substantial increase in water level year and resultant habitat improvement. Body condition was good with values of 90 or higher for most size classes of fish. Genetic analysis revealed low FLMB genetic introgression into the population (Table 7). Growth rates of Largemouth Bass were very high with fish reaching 14 inches in less than 2 years (Table 8).

White Crappie: The total trap netting CPUE of White Crappie was 4.9/nn in 2015, which was less than CPUE in 2011 (10.0/nn; Figure 10). The catch rate of fish > 10 inches in 2015 (1.1/nn) was similar to previous sample (0.9/nn in 2011) (Figure 10).

Fisheries management plan for Grapevine Reservoir, Texas

Prepared - July 2016.

ISSUE 1: Smallmouth Bass have been stocked during most years from 2008-2016. A population is developing. However, stockings will need to be continued to keep building the population.

MANAGEMENT STRATEGIES

1. Request Smallmouth Bass for stocking in 2017-2019.
2. Monitor reproduction through additional fall electrofishing in 2017.

ISSUE 2: The last creel survey was conducted in 2003-2004. Updated angling effort and harvest statistics need to be obtained.

MANAGEMENT STRATEGY

1. Conduct an annual creel in 2019-2020 to monitor catch and harvest statistics of major sport fishes.

ISSUE 3: The FLMB genetics of the Largemouth Bass population has decreased during the last two sampling surveys.

MANAGEMENT STRATEGIES

1. Request FLMB for stocking in 2017 and 2018 at 1000/km of shoreline.
2. Conduct genetic sampling in fall 2019 to evaluate stockings.

ISSUE 4: Largemouth Bass are the most sought after species in the reservoir. The population has been managed with a 14 to 18-inch slot-length limit since 1994. Anglers are satisfied with regulation. Additional sampling is needed to monitor population.

MANAGEMENT STRATEGY

1. Conduct additional fall electrofishing in 2017 to monitor Largemouth Bass population.

ISSUE 5: The Blue Catfish population is increasing in quality. However standard gillnet surveys may not be the most efficient method to obtain adequate sampling statistics.

MANAGEMENT STRATEGY

1. Conduct additional low frequency electrofishing surveys in summer of 2017 and 2019 to determine if adequate sampling statistics can be obtained.

ISSUE 6: 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 maintain 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

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

Low Density fisheries:

Spotted Bass: Although a quality population of Spotted Bass are present in Grapevine there is no directed effort for the species. Catch information on Spotted Bass will be collected during sampling for Largemouth Bass and forage species.

Smallmouth Bass: Smallmouth Bass are present in Grapevine, but the population is at a low density. Catch information on Smallmouth Bass will be collected during sampling for Largemouth Bass and forage species.

Channel Catfish: Although Channel Catfish are present in Grapevine and the population is low density based on historic catch rates. Catch information on Channel Catfish will be collected during sampling for Blue Catfish.

Survey objectives, fisheries metrics, and sampling objectives

Creel Survey: A 36 day annual creel survey will be conducted from June 2019 – May 2020. Creel will be conducted and data collected to monitor trends and changes in catch and harvest statistics of sportfish populations.

Largemouth Bass: According to the most recent creel survey conducted on Grapevine Reservoir (2003-2004), 43% of anglers target Largemouth Bass and they are the most popular sport fish in Grapevine Reservoir. The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Largemouth Bass have been managed with a 14-18 in slot length limit regulation since 1994. Fall nighttime electrofishing will be conducted in 2017 and 2019. This should allow for determination of any large-scale changes in the Largemouth Bass population. A minimum of 18 randomly selected 5-min electrofishing sites will be sampled in 2017 and 2019. Based on past catch rates, this should be adequate to obtain an RSE of CPUE-S ≤ 25 (the anticipated effort to meet both sampling objectives is 18 stations with 80% confidence). If the RSE objective is not met, additional electrofishing sampling will only continue if 50 stocked sized fish or larger are not captured in the 18

sample sites. A category 2 age and growth survey will also be conducted in 2019 on Largemouth Bass to determine length at age of capture at 14 inches.

Blue Catfish: Catfishes are the second most sought after sport fish in Grapevine Reservoir (24 % of total angling effort). It is currently not known what percentage of anglers are targeting Blue Catfish and what percentage are targeting Channel Catfish. However based on observations of angler effort trends on other district reservoirs, more of the effort is probably directed toward Blue Catfish. The popularity and reputation for quality Catfish fishing at this reservoir warrant sampling time and effort. A total of 10 gillnet surveys will be conducted in spring of 2020 to determine CPUE of both species. Based on past catch rates, this should be adequate to obtain an RSE of CPUE-S ≤ 25 (the anticipated effort to meet both sampling objectives is 10 stations with 80% confidence) for Blue Catfish. If RSE objectives are not met no additional gillnetting nights will be conducted. Low frequency electrofishing will be conducted in 2017 and 2019 to obtain population statistics of Blue Catfish population and to determine if this is a more efficient method of sampling.

Bluegill, Longear Sunfish, Threadfin and Gizzard Shad: Bluegill, Longear Sunfish, Threadfin, and Gizzard Shad are the primary forage in Grapevine 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 Bluegill, Longear Sunfish, Threadfin and Gizzard Shad relative abundance. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of Bluegill and Gizzard Shad for size structure estimation (PSD and IOV; 50 fish minimum at 18 stations with 80% confidence)

White Crappie: Previous creel survey data indicate White Crappie angling comprised only 10% of total angling effort. A 10 single-cod shoreline trap netting survey will be conducted in fall of 2019. This should provide basic population trend data information. No sampling objectives will be set for White Crappie.

White Bass: Previous creel survey data indicated 17% of anglers targeted White Bass. Data on White Bass will be collected when the gillnet survey for Blue Catfish is conducted in the spring of 2020. This should give an idea of the population status when compared to past surveys. Although angler effort is high for the species no sampling objectives will be set for White Bass because of the variability in year class strength of the population.

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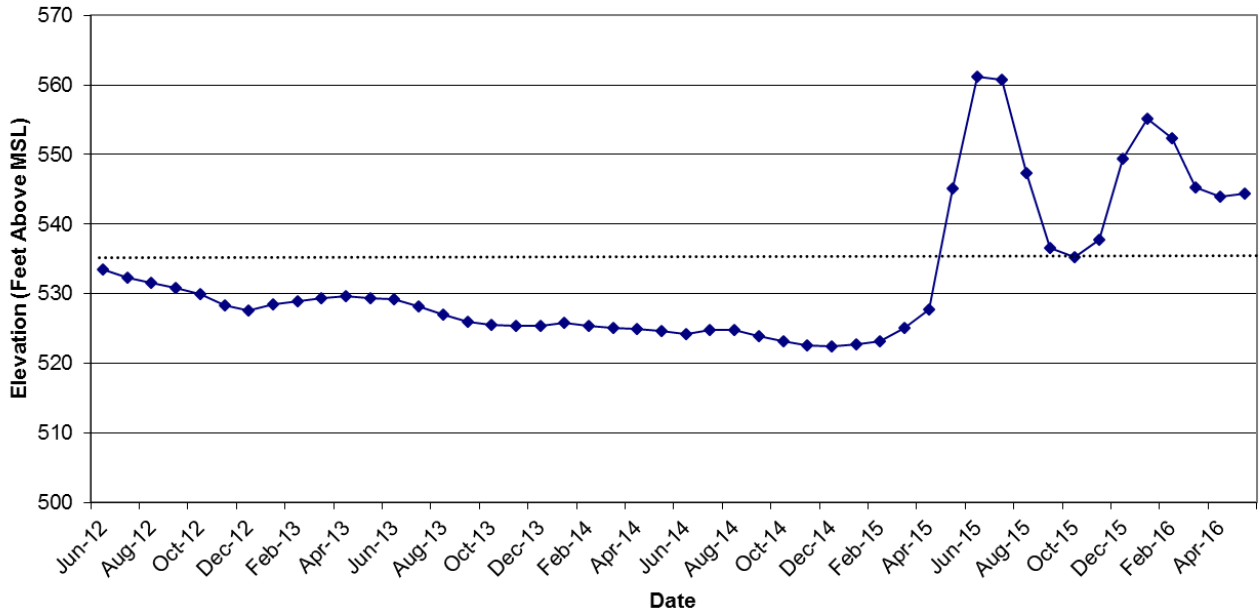


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Grapevine Reservoir, Texas from June 2012-May 2016. Dashed line represents conservation pool (535 feet above MSL).

Table 1. Characteristics of Grapevine Reservoir, Texas.

Characteristic	Description
Year Constructed	1952
Controlling authority	United States Corps of Engineers
Counties	Tarrant and Denton
Reservoir type	Tributary
Conductivity	375 umhos/cm

Table 2. Boat ramp characteristics for Grapevine Reservoir, Texas, August, 2015. Reservoir elevation at time of survey was 12.4 feet above conservation pool.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Trophy Club Park	32.0292 -99.1798	Y	10	NA	Small boat only
Meadowmere Park 1	32.98167 -97.11190	Y	28	528.5	Excellent, no access issues
Meadowmere Park 2	32.9789 -99.1139	Y	24	NA	Excellent, no access issues
Lakeview 1	32.9807 -97.0968	Y	15	NA	Excellent, no access issues
Lakeview 2	32.9771 -97.0964	Y	15	528.2	Excellent, no access issues
Oak Grove Park McPherson Slough	32.9669 -97.0943	Y	25	NA	Excellent, no access issues
Oak Grove Park Dove Loop Ramp	32.9700 -97.0903	Y	65	NA	Excellent, no access issues
Oak Grove Park Trawick Ramp	32.9697 -97.0808	Y	42	NA	Excellent, no access issues
Oak Grove Park Sand Bass Point Ramp	32.9641 -97.0726	Y	30	528.0	Excellent, no access issues

Table 2 continued.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Katie's Woods Ramp	32.9597 -97.0667	Y	47	NA	Excellent, no access issues
Katie's Woods High Water Ramp	32.9588 -97.0674	Y	NA	NA	Excellent, no access issues
Silver Lake Marina	32.9559 -97.0585	Y	NA	NA	Fair, no access issues, limited parking
Murrell Park 1	32.9931 -97.0847	Y	16	526.9	Fair, no access issues
Murrell Park 2	32.9961 -97.0919	Y	22	528.9	Good, no access issues
Twine Coves Park	32.0028 -97.1047	Y	15	NA	Excellent, no access issues

Table 3. Harvest regulations for Grapevine Reservoir, Texas.

Species	Bag limit	Length limit (inches)
Catfish: Channel, Blue, their hybrids and subspecies	25	12 minimum
Catfish: Flathead	5	18 minimum
Bass, White	25	10 minimum
Bass: Spotted	5 ^a	none
Bass: Smallmouth	5 ^a	14 minimum
Bass: Largemouth	5 ^a	14-18 slot
Crappie: White and Black, their hybrid and subspecies	25	10 minimum

^a Daily bag for Largemouth Bass, Smallmouth Bass, and Spotted Bass = 5 fish in any combination.

Table 4. Stocking history of Grapevine, 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)
Channel Catfish	1969	25,000	AFGL	7.9
	1970	50,000	AFGL	7.9
	1971	50,000	AFGL	7.9
	1972	<u>87,000</u>	AFGL	7.9
	Total	212,000		
Florida Largemouth Bass	1990	218,848	FGL	1.1
	1990	147,286	FRY	0.8
	1996	363,499	FGL	1.6
	2001	195,900	FGL	1.5
	2007	<u>335,768</u>	FGL	1.7
	Total	1,261,301		
Largemouth Bass	1967	320,000	FRY	0.7
	1968	50,000	UNK	UNK
	1969	450,000	FRY	0.7
	1971	<u>400,000</u>	FRY	0.7
	Total	1,220,000		
Mixed Largemouth Bass	1988	<u>364,004</u>		1.0
	Total	364,004		
Palmetto Bass (striped X White Bass hybrid)	1978	36,400	UNK	UNK
	1979	74,390	UNK	UNK
	1982	<u>87,000</u>	UNK	UNK
	Total	197,790		
Smallmouth Bass	1999	183,186	FGL	1.4
	2008	27,977	AFGL	4.8
	2009	103,586	FGL	1.4
	2010	112,208	FGL	1.3

Table 4. Stocking history continued.

Species	Year	Number	Life Stage	Mean TL (in)
	2011	104,650	FGL	1.4
	2013	67,212	FGL	2.0
	2014	<u>99,098</u>	FGL	1.4
	Total	697,917		
Threadfin Shad	1984	<u>800</u>	AFGL	3.0
	Total	800		
Walleye	1975	144,600	FRY	0.2
	1976	<u>2,500,000</u>	FRY	0.2
	Total	2,644,600		

Table 5. Objective-based sampling plan components for Grapevine Reservoir, Texas 2015 – 2016.

Gear/target species	Survey objective	Metrics	Sampling objective	
<i>Electrofishing</i>	Largemouth Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
		Size structure	PSD, length frequency	N ≥ 50 stock
		Condition	W_r	10 fish/inch group (max)
		Genetics	% FLMB	N = 30, any age
	Bluegill	Abundance	CPUE – Total	None
		Size structure	PSD, length frequency	N ≥ 50
	Longear Sunfish	Abundance	CPUE – Total	None
	Gizzard Shad	Abundance	CPUE – Total	None
		Size structure	PSD, length frequency	N ≥ 50
		Prey availability	IOV	N ≥ 50

Table 5. OBS plan components continued.

Gear/target species	Survey objective	Metrics	Sampling objective	
<i>Electrofishing</i>	Threadfin Shad	Abundance	CPUE	None
<i>Gill netting</i>	Channel Catfish	Abundance	CPUE – stock	None
		Size structure	Length frequency	None
	Blue Catfish	Abundance	CPUE – stock	RSE-Stock \leq 25
		Size structure	Length frequency	N \geq 50 stock
	White Bass	Abundance	CPUE – stock	None
		Size structure	Length frequency	None
<i>Trap netting</i>	Crappie	Abundance	CPUE – stock	None
		Size structure	PSD, length frequency	None

Table 6. Survey of littoral zone and physical habitat types, Grapevine 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 each type of habitat found.

Shoreline habitat type	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Natural shoreline	40.8	55.8		
Rocky shoreline	18.1	24.7		
Rocky shoreline + natural	5.9	8.1		
Rock bluff	5.4	7.4		
Gravel	2.6	3.6		
Natural shoreline + piers/docks	0.3	0.4		
Standing timber			456.0	6.8
Boat docks			48.1	0.7

Gizzard Shad

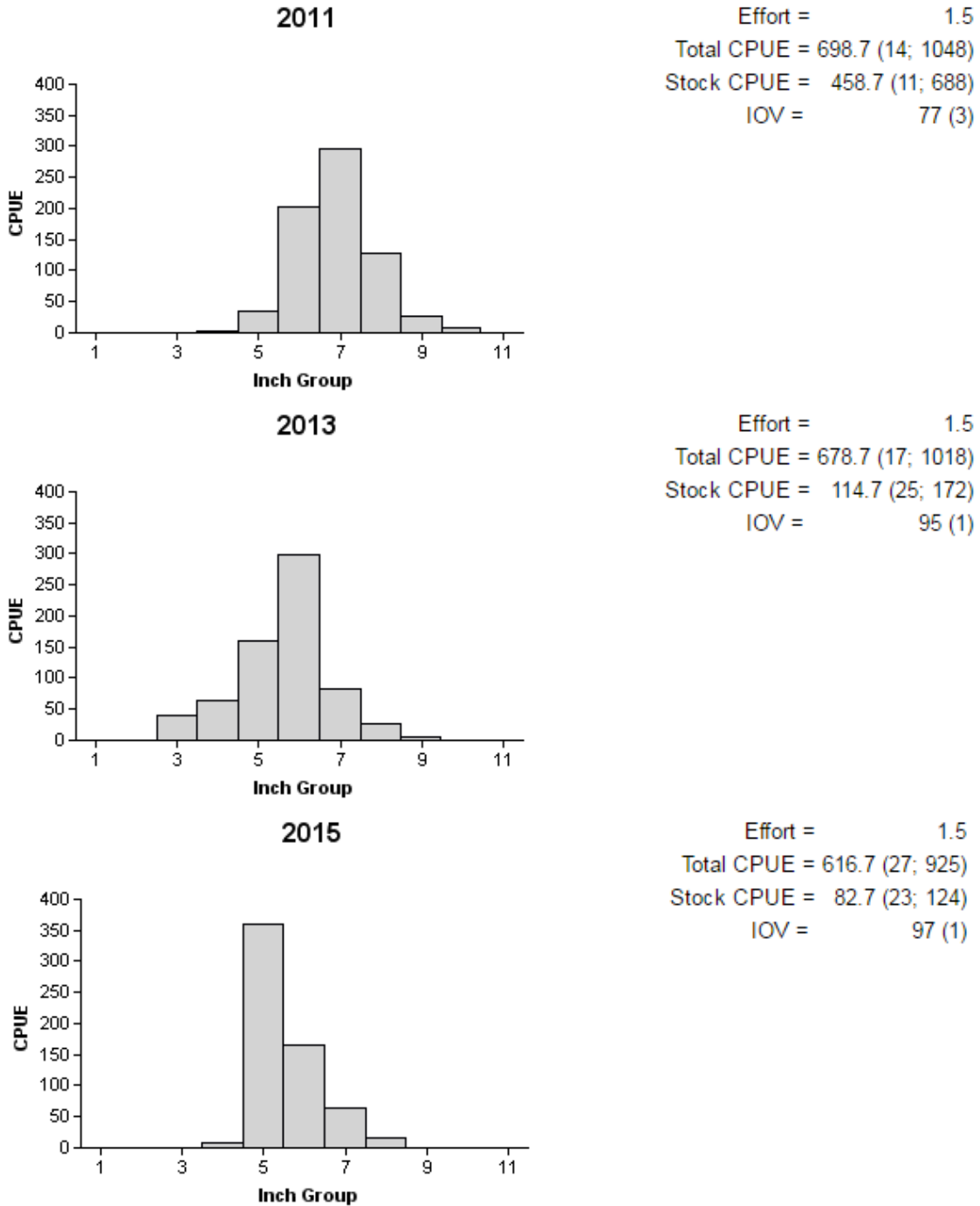


Figure 2. Number of Gizzard Shad caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2011, 2013, and 2015.

Bluegill

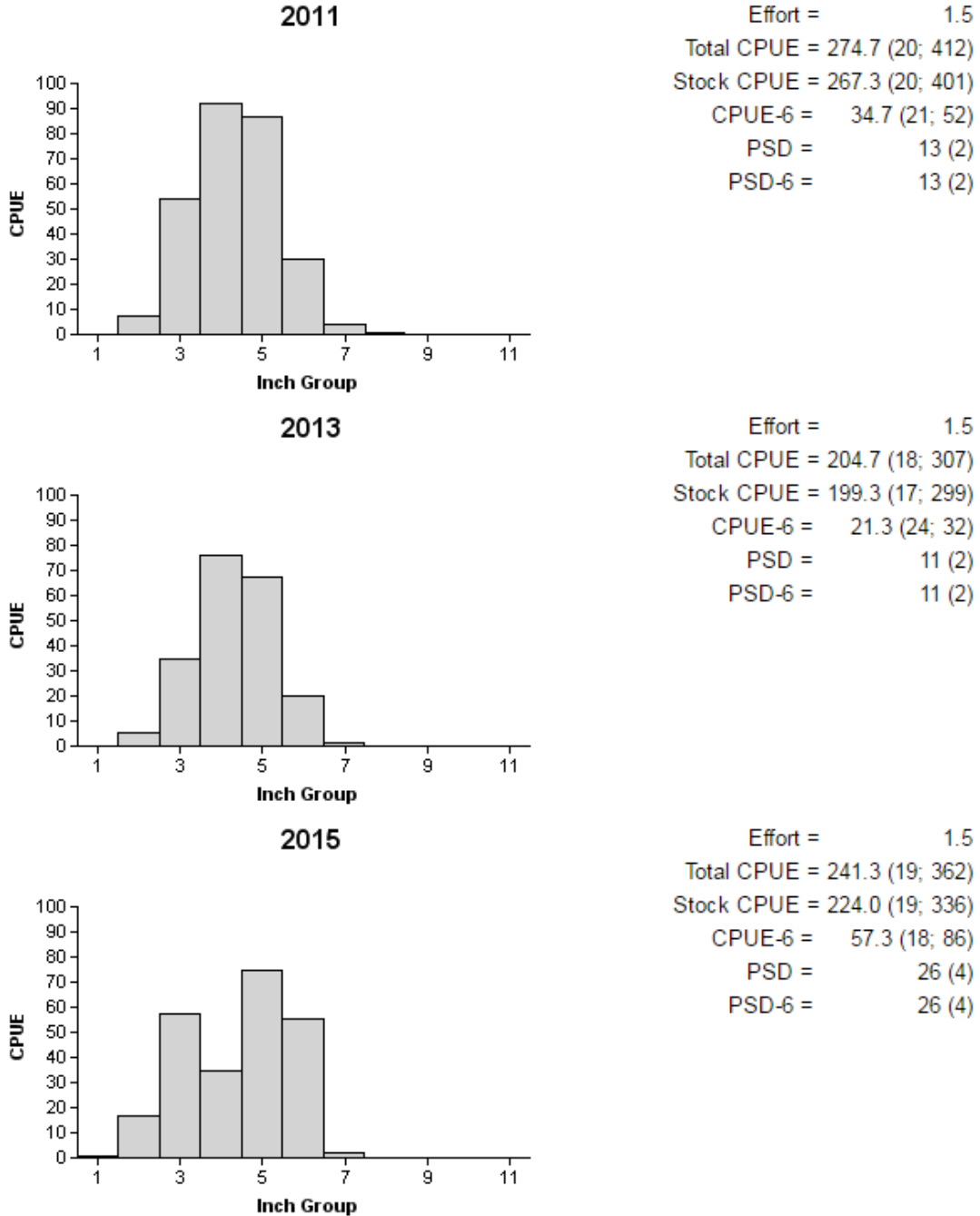


Figure 3. Number of Bluegill caught per hour (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2011, 2013, and 2015.

Blue Catfish

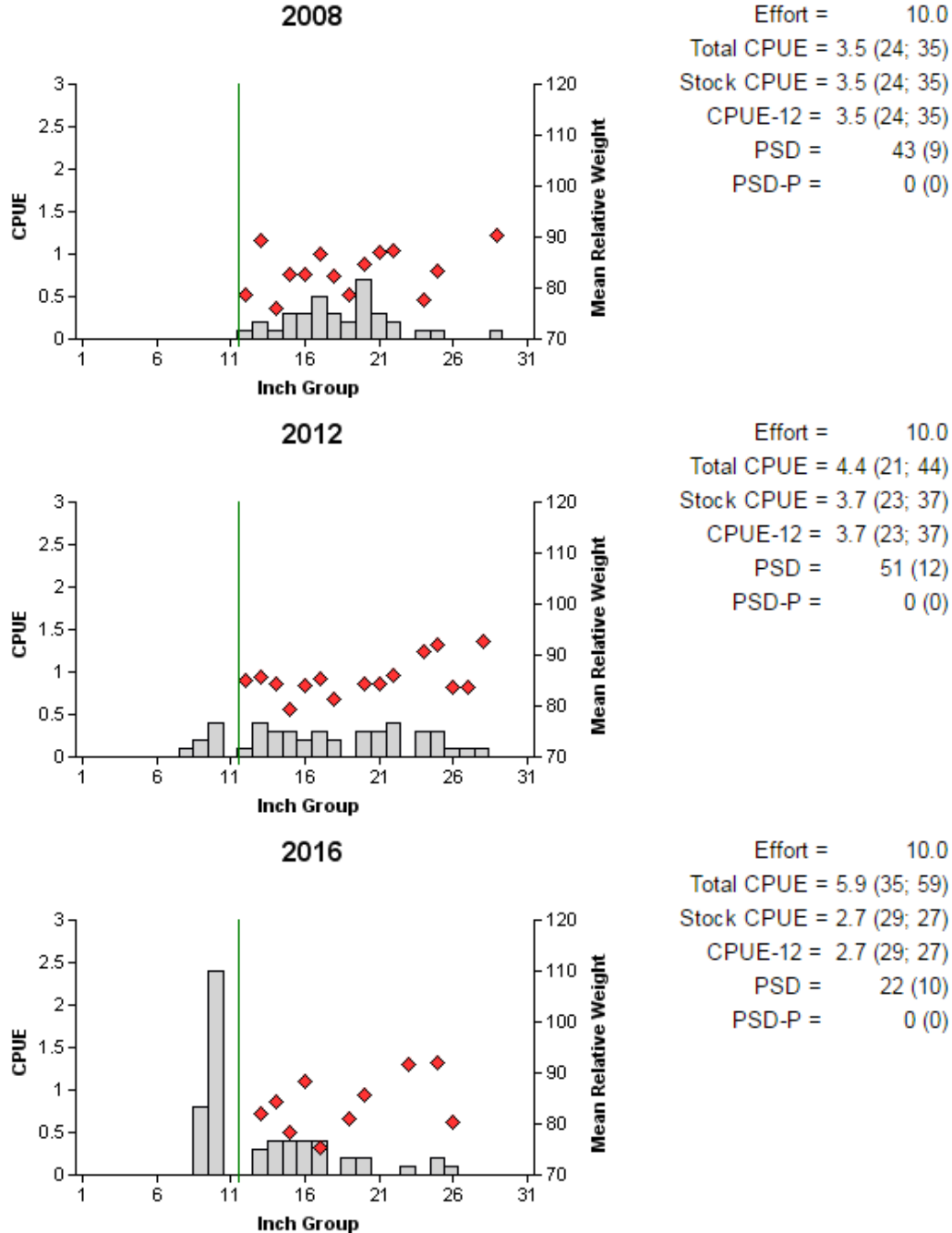


Figure 4. Number of Blue Catfish caught per net night (CPUE; bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2008, 2012, and 2016. Vertical line represents length limit at time of sampling.

Channel Catfish

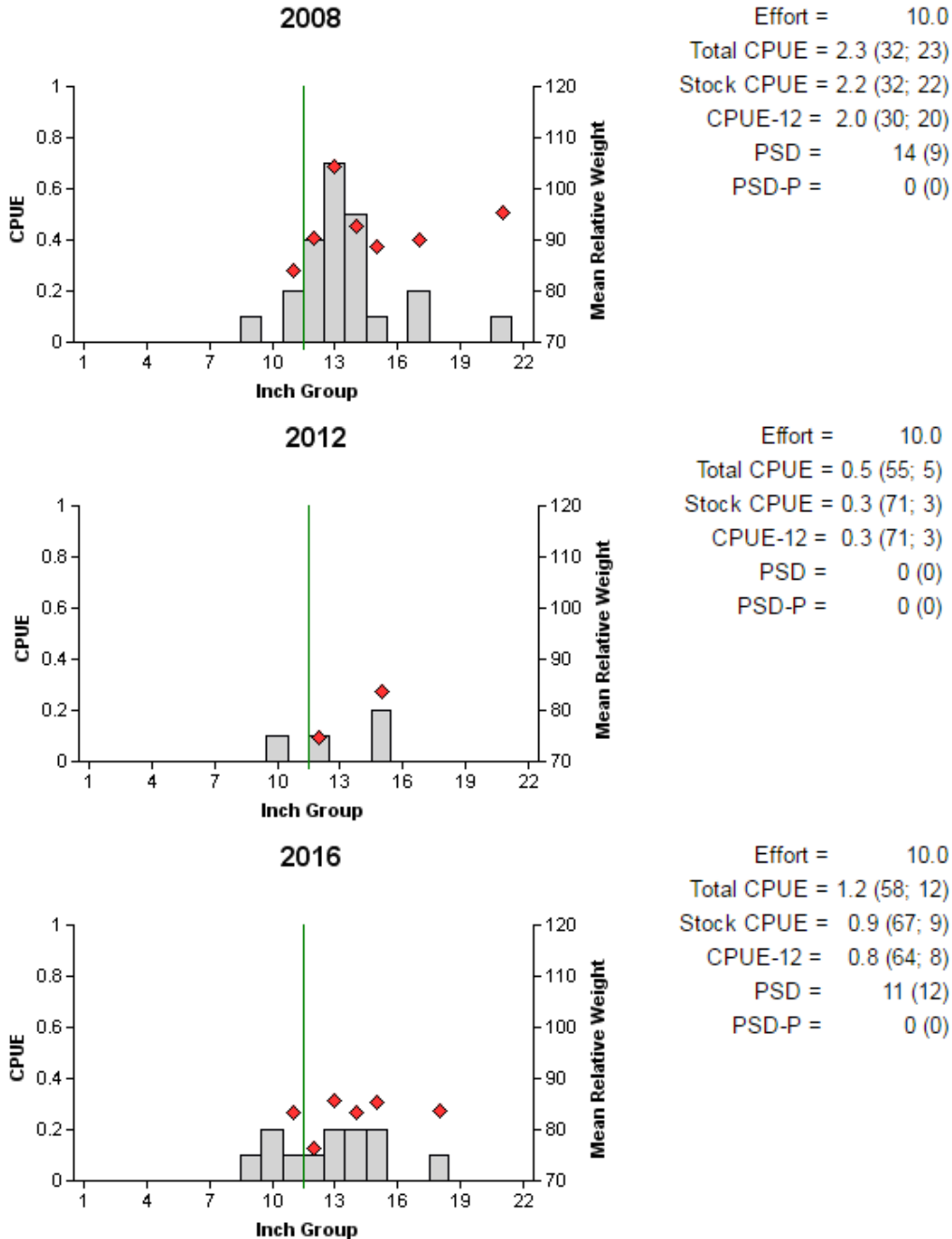


Figure 5. Number of Channel Catfish caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2008, 2012, and 2016. Vertical line represents length limit at time of sampling.

White Bass

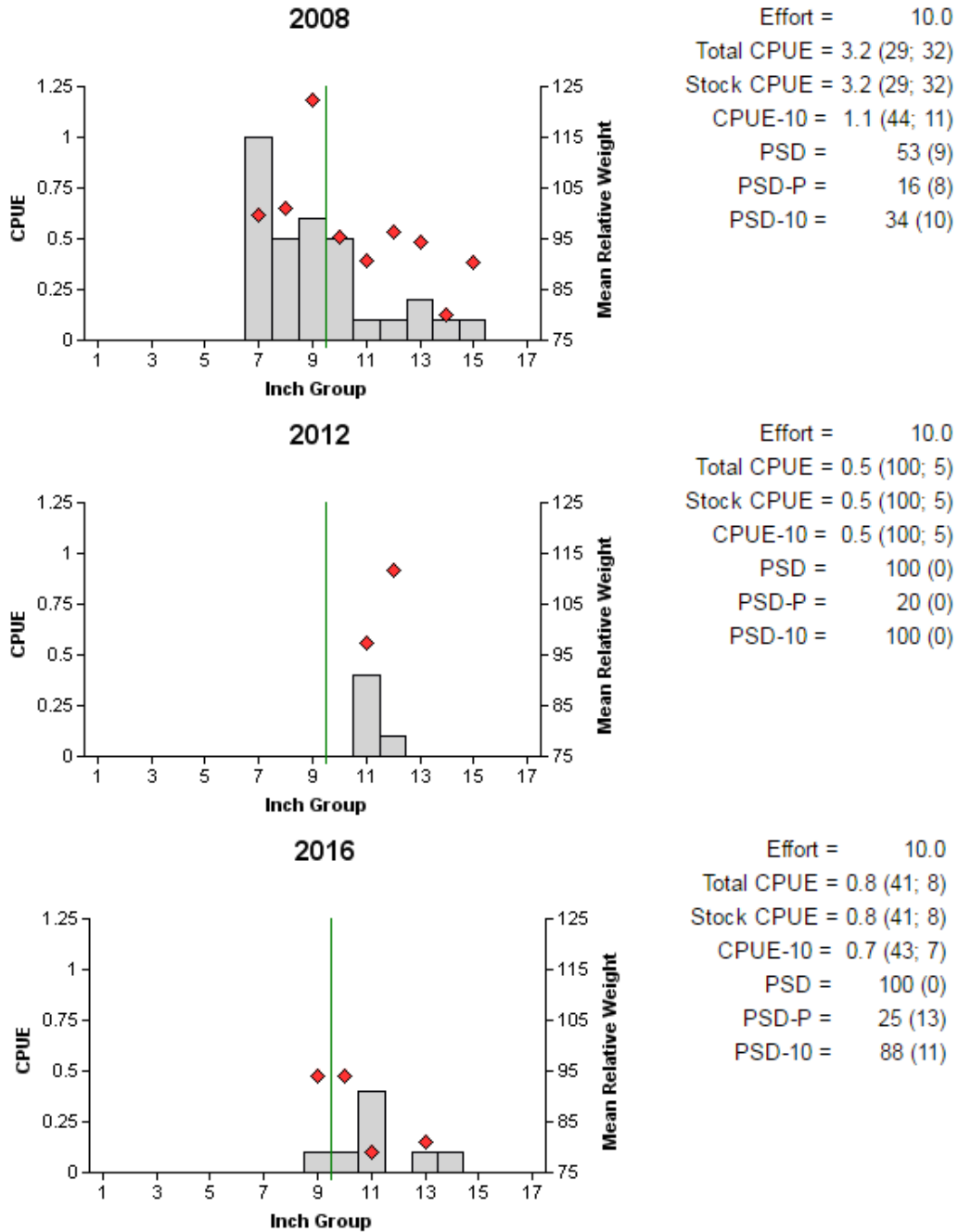


Figure 6. Number of White Bass caught per net night (CPUE; bars), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Grapevine Reservoir, Texas, 2008, 2012, and 2016. Vertical line represents length limit at time of sampling.

Smallmouth Bass

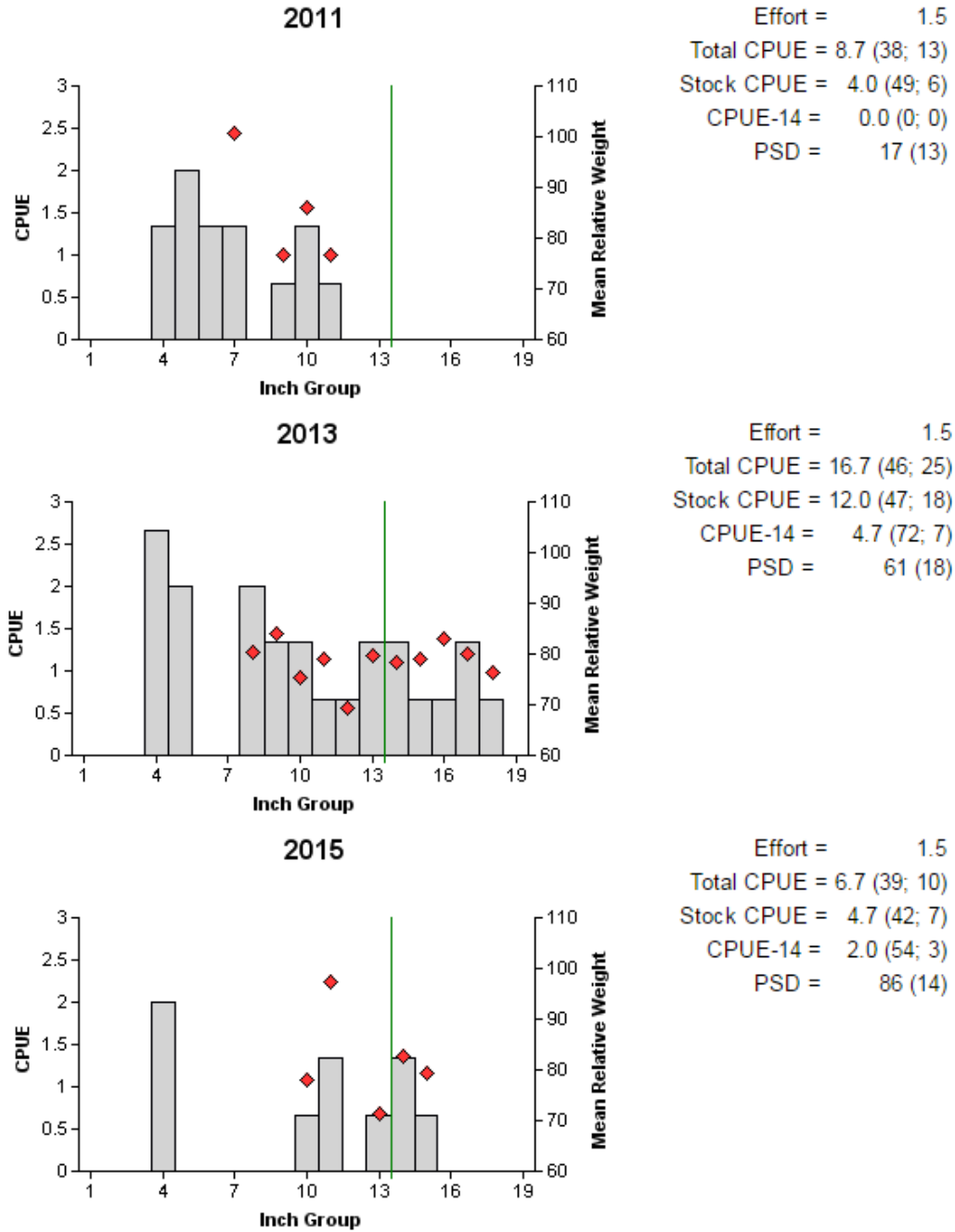


Figure 7. Number of Smallmouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2011, 2013, and 2015.

Spotted Bass

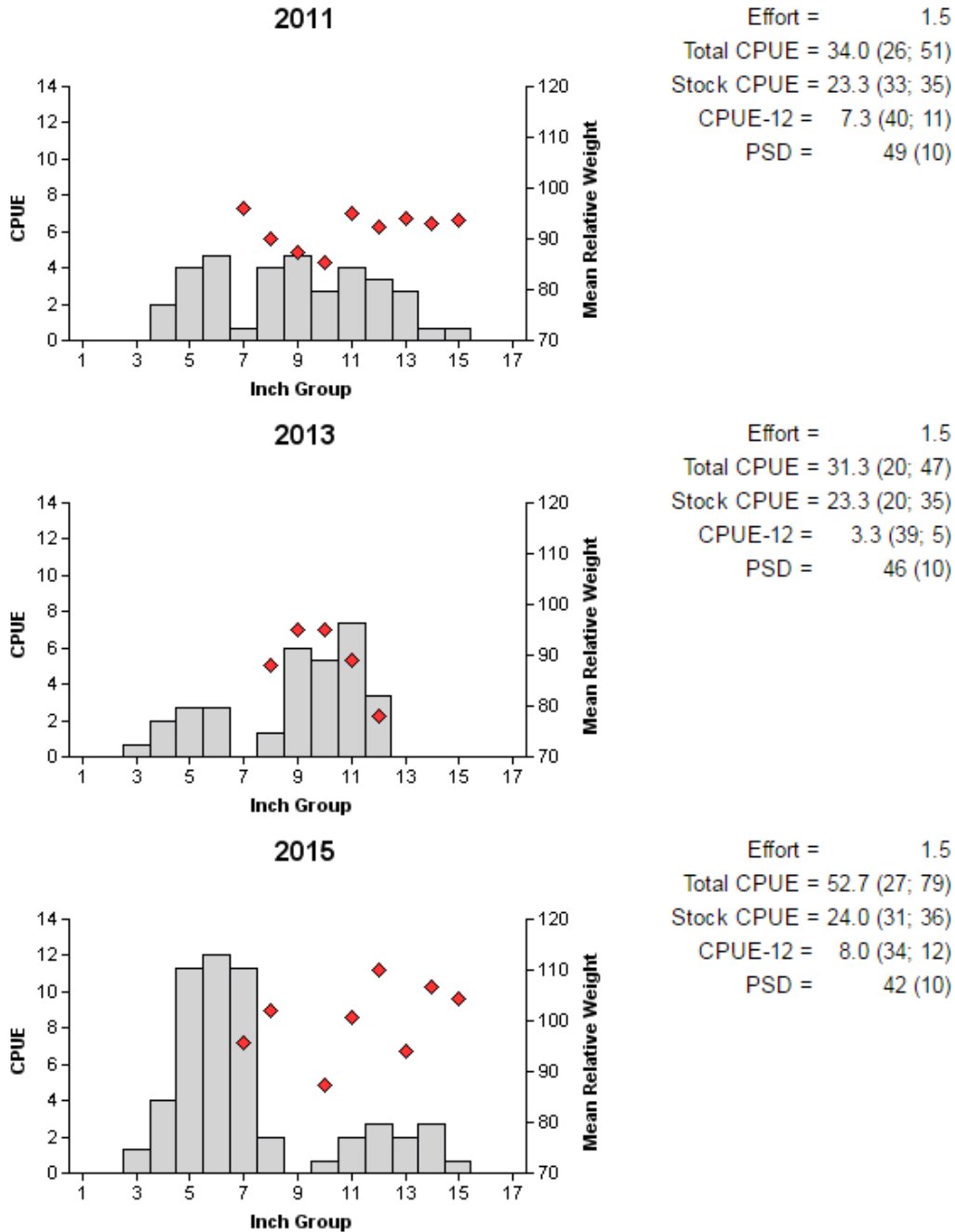


Figure 8. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2011, 2013, and 2015.

Largemouth Bass

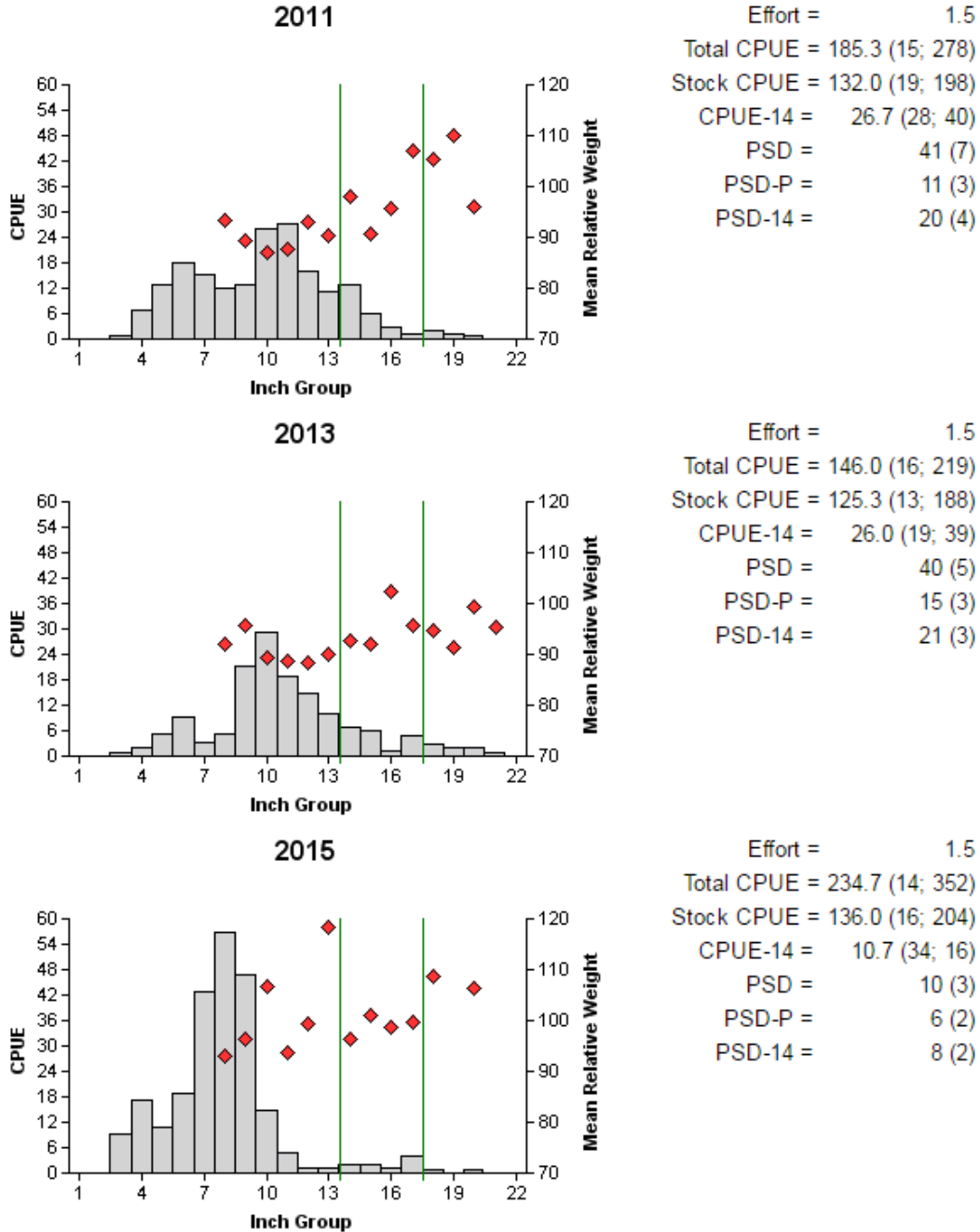


Figure 9. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Grapevine Reservoir, Texas, 2011, 2013, and 2015. Vertical lines represent length limit at time of sampling.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Grapevine Reservoir, Texas. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass.

Year	Sample size	Number of fish				% FLMB alleles	% pure FLMB
		FLMB	F1	Fx	NLMB		
2011	30	0	1	NA	1	37	0
2015	29	0	0	21	8	29	0

Table 8. Average length at capture for Largemouth Bass (sexes combined) ages 0 – 4 collected by electrofishing, Grapevine Reservoir, fall 2015 (N=150). Lengths are followed by the sample size. Note that the age-0 data may not be representative of the actual size distribution because of gear bias against smaller fish.

Age	Growth	
	Total Length	Number of fish
0	8.4	122
1	12.2	13
2	15.4	4
3	16.5	6
4	17.6	5

White Crappie

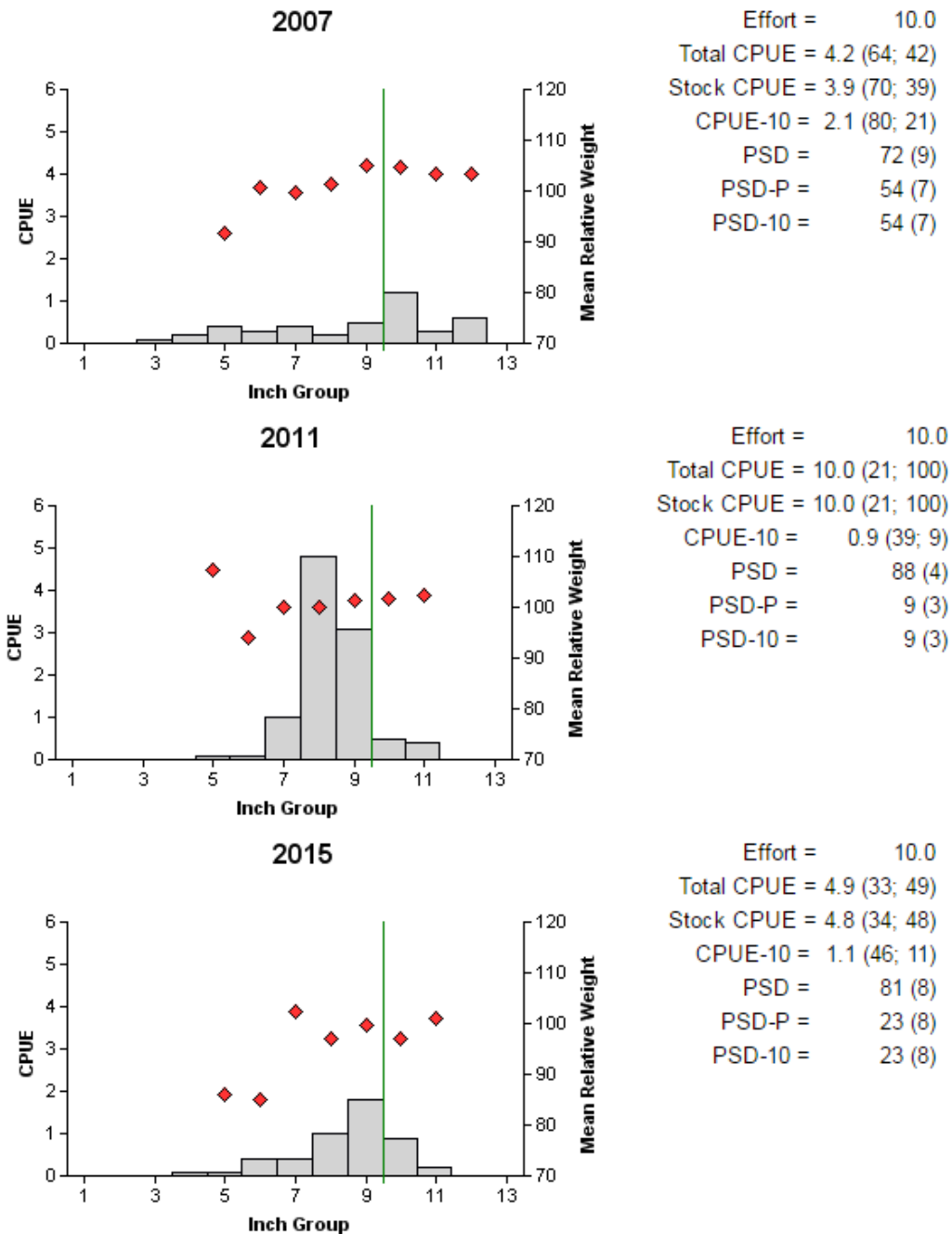


Figure 10. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Grapevine Reservoir, Texas, 2007, 2011, and 2015. Vertical line represents length limit at time of sampling.

Table 13. Proposed sampling schedule for Grapevine Reservoir, Texas. Low frequency electrofishing surveys will be conducted in the summer while electrofishing and trap netting surveys are conducted in the fall. Gill netting is conducted in the spring. Standard surveys are denoted by S and additional surveys denoted by A.

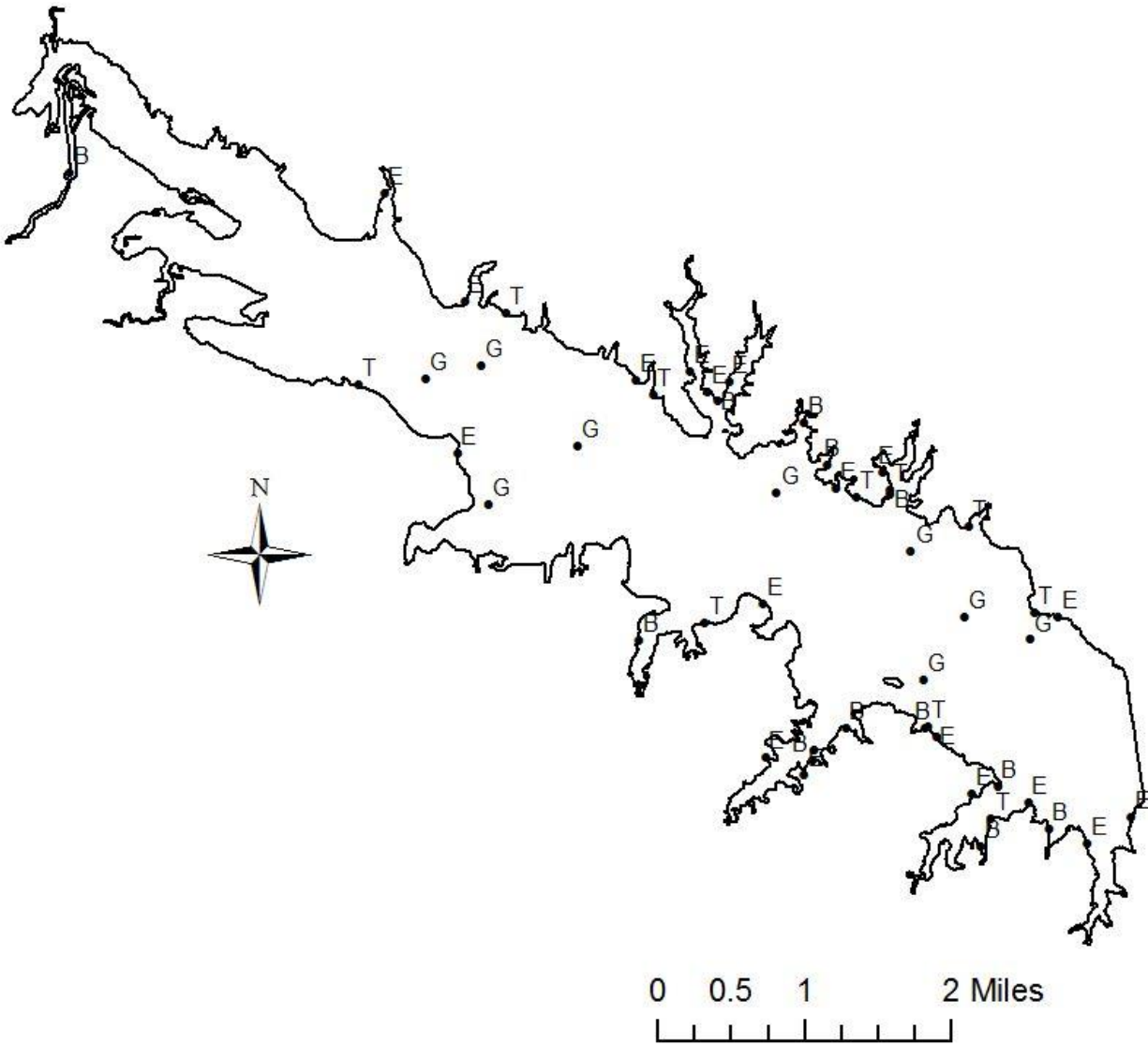
Survey year	Electrofishing Fall(Spring)	Low Frequency Electrofishing	Trapnet	Gillnet	Habitat			Creel survey	Report
					Structural	Vegetation	Access		
2016-2017									
2017-2018	A	A							
2018-2019									
2019-2020	S	A	S	S			S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all species collected from all gear types from Grapevine Reservoir, Texas, 2015-2016.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	29	2.9			925	616.7
Threadfin Shad					742	494.7
River Carpsucker	4	0.4				
Common Carp	8	0.8				
Smallmouth Buffalo	5	5.0				
Blue Catfish	59	5.9				
Channel Catfish	12	1.2				
White Bass	8	0.8				
Bluegill					362	241.3
Longear Sunfish	2	0.2			85	56.7
Redear Sunfish					5	3.3
Smallmouth Bass					10	6.7
Spotted Bass					79	52.7
Largemouth Bass	1	0.1			352	234.7
White Crappie	7	0.7	49	4.9		
Freshwater Drum	30	3.00				

APPENDIX B



Location of sampling sites, Grapevine 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. Water level was 1.2 feet above conservation pool during electrofishing and 2.8 feet above conservation pool during trap netting surveys and 10.0 feet above conservation pool during gill netting surveys.

APPENDIX C

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

Gear	Species	Year														
		1996	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gill Netting (fish/net night)	Blue Catfish	0.5	0.8					3.9				3.5				4.4
	Channel Catfish	4.7	4.5					5.0				2.3				0.5
	White Bass	5.8	4.4					2.3				3.2				0.5
Electrofishing (fish/hour)	Gizzard Shad	141.0	283.0	310.7	620.0	287.3	328.7	373.3	409.3	211.3	398.7	442.7	294.0	566.7	698.7	
	Threadfin Shad	59.0	337.0	348.7	128.0	161.3	154.7	184.7	123.3	138.0	84.0	134.7	192.0	360.7	386.7	
	Bluegill	11.0	82.0	74.0	340.7	217.3	146.7	140.0	204.7	18.0	255.3	393.3	466.7	263.3	274.7	
	Longear Sunfish	10.0	58.0	60.67	151.3	60.7	71.3	90.7	136	36.3	42.0	79.3	153.3	186.0	214.0	
	Redear Sunfish	3.0	1.0	1.3	4.9	0.7	2.7	2.0	2.2	0.0	3.3	8.0	9.3	6.7	2.7	
	Smallmouth Bass		3.0											2.7	11.3	8.7
	Spotted Bass	13.0	41.0	16.7	28.0	23.3	34.0	40.0			22.7	26.0	29.3	31.3	25.3	34.0
	Largemouth Bass	95.0	109.0	88.7	208.0	78.0	125.3	110.0	126.7	51.3	294.0	196.7	204.0	191.3	185.3	
Trap Netting (fish/net night)	White Crappie	2.6	2.5				24.4				4.2				10.0	

Appendix C continued.

Gear	Species	Year			
		2013	2015	2016	Ave
Gill Netting (fish/net night)	Blue Catfish			5.9	3.2
	Channel Catfish			1.2	3.0
	White Bass			0.8	2.8
Electrofishing (fish/hour)	Gizzard Shad	678.7	616.7		416.3
	Threadfin Shad	578	494.7		241.6
	Bluegill	204.7	241.3		208.4
	Longear Sunfish	93.3	56.7		93.7
	Redear Sunfish	0.7	3.3		3.2
	Smallmouth Bass	16.7	6.7		8.2
	Spotted Bass	31.3	52.7		29.9
	Largemouth Bass	146.0	234.7		152.8
Trap Netting (fish/net night)	White Crappie		4.9		8.1