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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2016 Fisheries Management Survey Report

New Ballinger Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in New Ballinger Reservoir were surveyed in 2016 using electrofishing and trap netting and in 2017 using gill netting. Historical data are presented with the 2016-2017 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:** New Ballinger Reservoir is a 591-acre impoundment located on Valley Creek in the Colorado River basin in Runnels County, Texas. It was constructed in 1984 for municipal water supply and recreation. The reservoir has a history of extreme water level fluctuations. It nearly dried up and refilled twice in the past 9 years. Water levels increased significantly in spring 2016 and the reservoir returned to full pool. Boat and shoreline access are good, and habitat is predominantly flooded saltcedar. Watershed land use is primarily ranching.

- **Management History:** Important sport fish included Largemouth Bass, White Crappie, White Bass, Channel Catfish, and Blue Catfish. Following construction in 1984, the reservoir was initially stocked with Threadfin Shad, Coppernose Bluegill, Redbreast Sunfish, Blue Catfish, Channel Catfish, Palmetto Bass, Smallmouth Bass, Florida Largemouth Bass, and Walleye. Periods of drying and refilling were followed up with stockings of Largemouth Bass, Bluegill, White Crappie, Channel Catfish, Walleye, and Gizzard Shad. Sport fish harvest has been managed according to statewide regulations.

- **Fish Community**
  - **Prey species:** Electrofishing catch of Gizzard Shad was good and most were suitably-sized as prey. Bluegills were present, but at low abundance.

  - **Catfishes:** Channel Catfish abundance was low and similar to past surveys.

  - **White Bass:** White Bass were present in the reservoir, but at low abundance.

  - **Largemouth Bass:** Largemouth Bass abundance remained low and the population was comprised of small fish (<9 inches). Population abundance and size structure are expected to improve in the near future due to the substantial increase in water level in 2016 and associated positive impact to fisheries habitat.

  - **White Crappie:** White Crappie were present, however few legal- size fish were collected. Good recruitment was evident with many fish from 3 to5 inches.

Management Strategies: Continue to monitor the fish community response to the water level increase using electrofishing and trap netting in fall 2018 and 2020, and tandem hoop netting in spring 2019 and 2021.

INTRODUCTION

This document is a summary of fisheries data collected from New Ballinger Reservoir in 2016-2017. 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 2016-2017 data for comparison.

Reservoir Description

New Ballinger Reservoir is a 591-acre impoundment located on Valley Creek in the Colorado River basin approximately 5 miles west of Ballinger in Runnels County, Texas. It was constructed in 1984 for municipal water supply and recreation. The reservoir water level dropped dramatically in 2004, 2011, and 2015. The boat ramp was closed to the public during those times. Heavy rainfall in 2004, 2012, and 2016 caused the springs in Valley Creek watershed to begin flowing again, returning the reservoir to near conservation elevation (Figure 1). Habitat is predominantly flooded saltcedar with some rock bluff and standing timber. Watershed land use is primarily ranching. Other descriptive characteristics for New Ballinger Reservoir are shown in Table 1.

Angler Access

New Ballinger Reservoir has one public access point at the Ballinger Municipal City Park and campground maintained by the City of Ballinger. Shoreline access is good at the park, and one concrete boat ramp is available when water level is suitable (Table 2).

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Scott 2013) included:

1. Continue rebuilding the fisheries with stockings of Largemouth Bass, Bluegill, Channel Catfish, Gizzard Shad, and White Crappie.
   Action: Surplus Channel Catfish were stocked in 2016 and Florida Largemouth Bass fingerlings (FLMB) were stocked in 2017.
2. Assess the effectiveness of the stockings with an additional electrofishing survey in fall 2015 and hoop netting in 2016.
   Action: Fisheries were assessed with fall electrofishing in 2016 and hoop netting in 2017.
3. When the fishery has recovered, inform public of such.
   Action: Two separate articles were published in local papers regarding the recovery of fisheries resources in New Ballinger Reservoir.
4. Cooperate with controlling authorities to post signage, educate the public about invasive species, and track existing and future inter-basin water transfers to facilitate potential invasive species responses.
   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 New Ballinger Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: In the summer of 2004 the reservoir was nearly dry, but by 2005 water level had reached conservation pool. Adult Gizzard Shad, Largemouth Bass, White Crappie, Largemouth Bass, Channel Catfish and Walleye were stocked in 2005 to rebuild the populations. After severe low water in 2011, the reservoir refilled in October 2012, and Bluegill, FLMB, and Channel Catfish were stocked in 2013. New Ballinger was again very low in 2015, but filled in spring 2016 and was stocked with Channel Catfish in 2016 and FLMB in 2017. The complete stocking history is shown in Table 3.

Vegetation/habitat management history: New Ballinger Reservoir has no vegetation/habitat management history.

Water transfer: No interbasin water transfers are known to occur.

METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for New Ballinger Reservoir (TPWD Unpublished). Primary components of the OBS plan are listed in Table 5. All survey sites (Appendix B) 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, and Gizzard Shad were collected by electrofishing (1 hour at 12, 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 from 13 randomly-selected fish (range 13.0 to 14.9 inches).

Trap netting – Crappie spp. 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 – Channel Catfish, Flathead Catfish, and White Bass 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).

Tandem hoop nets – Channel Catfish were collected using 8 tandem hoop-net series at 8 stations. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series).

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 statistics.

Habitat – A vegetation survey was conducted in 2016. Google Earth aerial imagery was utilized to map coverage of inundated terrestrial vegetation. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Water level – Source for water level data was from the City of New Ballinger (personal communication; Water Treatment Plant Superintendent).

RESULTS AND DISCUSSION

Habitat: Fish habitat in New Ballinger Reservoir has been influenced by the substantial water level fluctuations which has allowed for significant terrestrial growth on the exposed lake bed and subsequent reduction of native aquatic vegetation. Although some submerged and emergent vegetation were observed in past surveys (Farooqi and Scott 2008), no aquatic vegetation was observed during the 2016 survey. Flooded terrestrial vegetation occupied 360 acres (61%) of the reservoir. This represented a significant increase from 2008 when flooded terrestrial was found occurring in 23% of the reservoir.

Prey species: Electrofishing CPUE of Bluegill and Gizzard Shad were 20.0/h and 382.0/h, respectively. Index of vulnerability (IOV) for Gizzard Shad was excellent, indicating that 99% of Gizzard Shad were available to existing predators (Figure 2). Most Gizzard Shad ranged from 3-5 inches and this strong year-class was likely a response to the increase in water level the previous spring. Bluegill abundance was low in 2016 and was similar to the 2010 survey, but lower than the 2008 survey (Figure 3). The Bluegill population has been negatively impacted by the low water conditions, but should rebound contingent upon the reservoir maintaining sufficient water levels. Other sunfish species collected included Warmouth, Green Sunfish, and Longear Sunfish (Appendix A).

Channel Catfish: The gill net CPUE of Channel Catfish was 0.6/nn in 2017 which was similar to in 2009 and 2007 when catch rates were 0.6 and 1.4/nn. Channel Catfish CPUE from hoop netting was 2.6/series with fish ranging from 6-13 inches. The majority of Channel Catfish were 6-8 inches and are likely from the 2016 stocking. Only three legal size Channel Catfish were collected during gill netting and hoop netting combined.

White Bass: White Bass were present in the reservoir, but at low abundance. Only two White Bass were collected, but both were legal size. Historically, New Ballinger Reservoir has supported a low-density population with individuals up to 16 inches in length.

Largemouth Bass: In 2016, Largemouth Bass CPUE was low (26.0/h) which was expected for a population that is in the process of recovering from extreme low water conditions. Largemouth Bass from 4 to 9 inches were collected indicating enough reproducing adults survived the low water conditions to create a viable year-class in 2016. Relative weights for Largemouth Bass were excellent at W_r near 120. Given the excellent prey base, abundant flooded habitat and supplemental stocking of Florida Largemouth Bass in 2017, the Largemouth Bass population should continue to expand in New Ballinger Reservoir.

White Crappie: Trap net CPUE of stock size crappie was 3.5/nn in 2016, which was lower than previous surveys, however the lower abundance of larger crappie is likely due to the extreme low water levels experienced in 2015. Recruitment was strong with high catch rates of 3-5 inch crappie. Population size structure was slightly imbalanced, but should improve as the current year class grows up to legal size. Relative weights were excellent with most inch groups near a W_r of 110. These high relative weights were likely due to a combination of low density of stock size crappie and the high quality shad population. Contingent upon the reservoir holding water, the crappie population in New Ballinger is in good position to improve significantly over the next few years with good recruitment and an abundant forage base.

Fisheries management plan for New Ballinger Reservoir, Texas

Prepared – July 2017.

ISSUE 1: Sportfish populations are beginning to recover following extreme low-water conditions. Survey data shows that Largemouth Bass and crappie populations successfully spawned in spring 2016 after the increase in water levels, but population density remains low. Additionally, Channel Catfish were stocked in 2016 and 2017 to help rebuild the population. Sampling is necessary to monitor improvements in the bass, crappie, and catfish populations.

MANAGEMENT STRATEGY

1. Conduct electrofishing and trap net surveys in fall 2018 and 2020 to monitor Largemouth Bass and White Crappie population improvement.
2. Request stockings of Largemouth Bass in 2018.
3. Collect Largemouth Bass genetics sample in 2020.
4. Conduct tandem-hoop netting in 2019 and 2021 to monitor the Channel Catfish population.

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

New Ballinger Reservoir FY 2017 - 2020

Sport fish, forage fish, and other important fishes

Important sport fish include Largemouth Bass, Channel Catfish, and White Crappie. Important forage fish include Gizzard Shad and Bluegill.

Low-density fisheries

Flathead Catfish: Flathead Catfish are present in the reservoir, but catch rates have been very low. Sampling this population is unnecessary during 2018-2021.

White Bass: White Bass are present in the reservoir, but abundance has been highly variable likely due to inconsistent recruitment and fluctuating water levels. From 1995 to 2017 catch rates have ranged from 0.0/nn to 10.2/nn. Collecting enough White Bass to assess the population is unlikely. Sampling this population is unnecessary during 2018-2021.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass are a primary sport fish in New Ballinger Reservoir and are managed with the statewide 14-in MLL regulation. Continued collection of trend data with night electrofishing in the fall every 2 years will allow for determination of any large-scale changes in the largemouth bass population. A minimum of 12 randomly selected 5-min electrofishing sites will be sampled in fall 2018 and 2020. Past sampling data from 1998-2010 indicates that these objectives could be met 50% of the time with 18-24 stations. Twelve random stations will be determined for electrofishing. In addition to the original 12 stations, another 6 random stations will be determined in the event extra sampling is necessary. A maximum of 18 stations will be sampled. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected in 2018 and 2020 to determine mean age at 14 inches to monitor large-scale changes in growth. Relative weight of Largemouth Bass ≥ 8 inches will be determined from their length/weight data. A genetic sample of 30 fish will be collected during electrofishing in 2020.

White Crappie: Historically, White Crappie were abundant in New Ballinger Reservoir and provided excellent angling opportunities. White Crappie have been sampled periodically since 1998 with 5 single-cod, shoreline-set, trap nets in late fall, with CPUE ranging from 13.7-25.6/nn. However, RSE has ranged from 27 to 47 during this timeframe. A minimum of 10 randomly selected trap netting sites will be sampled in fall 2018 and 2020. In addition to the original 10 random stations, another 5 random stations will be determined in the event extra sampling is necessary. A maximum of 15 stations will be sampled. Otoliths from 13 fish between 9.0 and 10.9 inches will be collected in 2018 and 2020 to determine mean age at 10 inches to monitor large-scale changes in growth. Relative weight of White Crappie ≥ 5 inches (total length) will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

Channel Catfish: Channel Catfish are present in the reservoir, but gill net catch rates have been very low. From 1995 to 2017 total CPUE ranged from nil to 2.6/nn. We will sample Channel Catfish with baited hoop nets. The estimated number of sets to achieve an RSE for CPUE-S ≤ 25 is 10 using the

recommended 2-night soak duration. Sampling will occur in June 2021. A target of 100 stock size fish should provide an adequate PSD estimate per the tandem hoop net procedures (within 10% of PSD with 80% confidence, 75-140 fish are recommended). Ten additional random stations will be selected in the event extra sampling is necessary. A maximum of 20 tandem hoop net sets will be sampled. If we fail to achieve desired sampling objectives for Channel Catfish using new baited hoop net procedures, we will drop Channel Catfish from future surveys and list as a low-density species.

Sunfish and Gizzard Shad: Sunfish and Gizzard Shad both are important forage fish in New Ballinger Reservoir. From 2005 to 2016 CPUEs of Bluegill ranged from 11.0 fish/h to 356.0 fish/h and Gizzard Shad have ranged from 76.6 fish/h to 382.0 fish/h. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in bluegill and gizzard shad relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass should result in sufficient numbers of bluegill size structure estimation (PSD; 50 fish minimum with 80% confidence) and relative abundance estimates (RSE < 25 of CPUE-Total). At the sampling effort needed to achieve sampling objectives for Largemouth Bass, the expected RSE for CPUE-T is < 20. If the target for Bluegill sampling is not attained, no additional effort will be expended to achieve an RSE$\leq$25 for CPUE of Bluegill.

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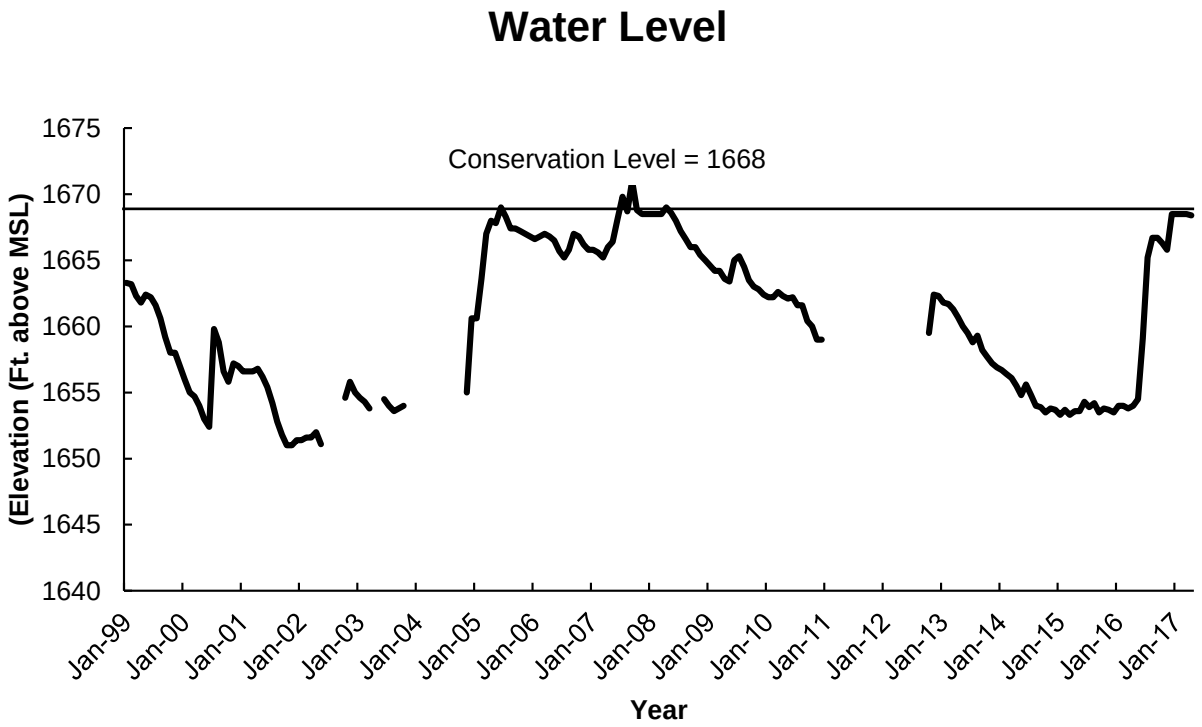


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for New Ballinger Reservoir, Texas. Water level data was unavailable for some years due to very low water levels.

Table 1. Characteristics of New Ballinger Reservoir, Texas.

Characteristic	Description
Year constructed	1984
Controlling authority	City of Ballinger
County	Runnels
Reservoir type	Tributary
Shoreline Development Index (SDI)	3.01
Conductivity	770 µmhos/cm

Table 2. Boat ramp characteristics for New Ballinger Reservoir, Texas, March, 2017. Reservoir elevation at time of survey was 1668 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Ballinger Municipal Lake Park	31.74021 -100.0357	Y	30	1660	Good, no issues extension not feasible

Table 3. Harvest regulations for New Ballinger Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of New Ballinger Reservoir, Texas. FGL = fingerling; FRY = fry; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Gizzard Shad	2005	196	ADL
Threadfin Shad	1985	1,200	UNK
Blue Catfish	1984	1,000	FGL
	1985	12,022	FGL
	1986	12,005	FGL
	1995	57,500	FGL
	Total	82,527	
Channel Catfish	1986	30,012	FGL
	1987	31,030	FGL
	1995	58,894	FGL
	2005	30,766	FGL
	2013	50,356	FGL
	2016	45,210	FGL
	2017	27,602	FGL
	Total	273,870	
Palmetto Bass	1985	57,389	FRY
Redbreast Sunfish	1985	8,262	FGL
Bluegill	2005	386	ADL
	2013	15,720	FGL
	Total		
Coppernose Bluegill	1985	60,000	UNK
Smallmouth Bass	1985	13,000	FGL
	1986	12,800	FGL
	1987	12,225	FGL
	Total	38,025	
Largemouth Bass	2005	68	ADL
White Crappie	2005	327	ADL
Florida Largemouth Bass	1985	12,000	FGL
	1986	13,605	FGL
	1997	57,507	FGL
	2005	31,161	FGL
	2013	54,503	FGL
	2017	54,342	FGL
	Total	223,118	

Table 4. Stocking history continued.

Species	Year	Number	Size
Walleye	1985	1,550,000	FRY
	1993	1,300,000	FRY
	1995	1,000,000	FRY
	1996	138,486	FGL
	2005	15,745	FGL
	2006	15,206	FGL
	2007	705	FGL
	Total	4,020,142	

Table 5. Objective-based sampling plan components for New Ballinger Reservoir, Texas 2016 – 2017.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	W_r	10 fish/inch group
Bluegill [a]	Abundance	CPUE – Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad [a]	Abundance	CPUE – Total	RSE ≤ 25
	Size structure	length frequency	N ≥ 50
	Prey availability	IOV	N ≥ 50
Trap netting			
White Crappie	Size structure	PSD, length frequency	N = 50
	Condition	W_r	10 fish/inch group
Gill Netting			
Channel Catfish	Abundance	CPUE– stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Condition	W_r	10 fish/inch group
Tandem hoop netting			
Channel Catfish	Abundance	CPUE– stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 100 stock
	Condition	W_r	10 fish/inch group

[a] No additional effort will be expended to achieve an RSE ≤ 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.

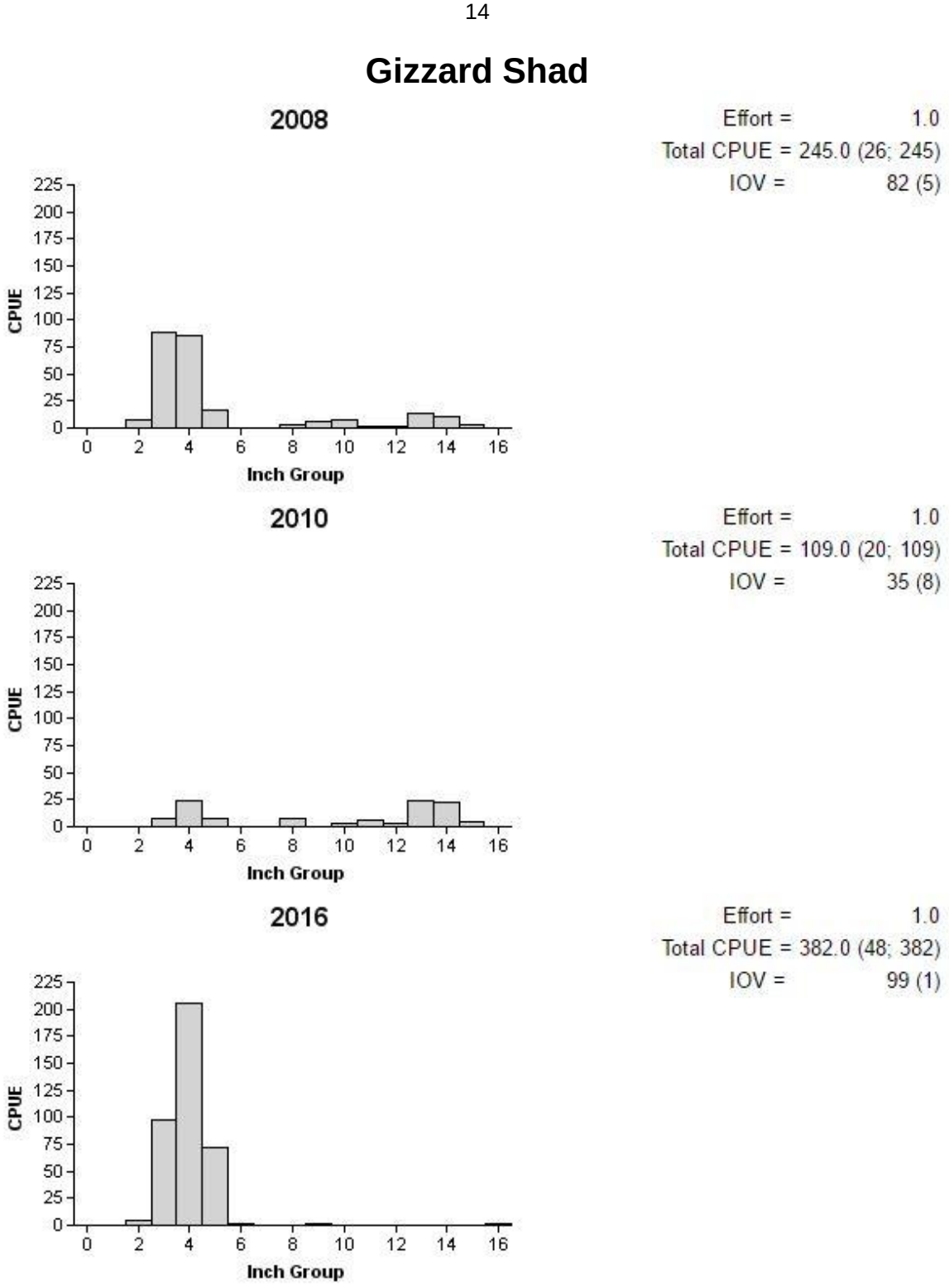


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, New Ballinger Reservoir, Texas, 2008, 2010, and 2016.

Bluegill

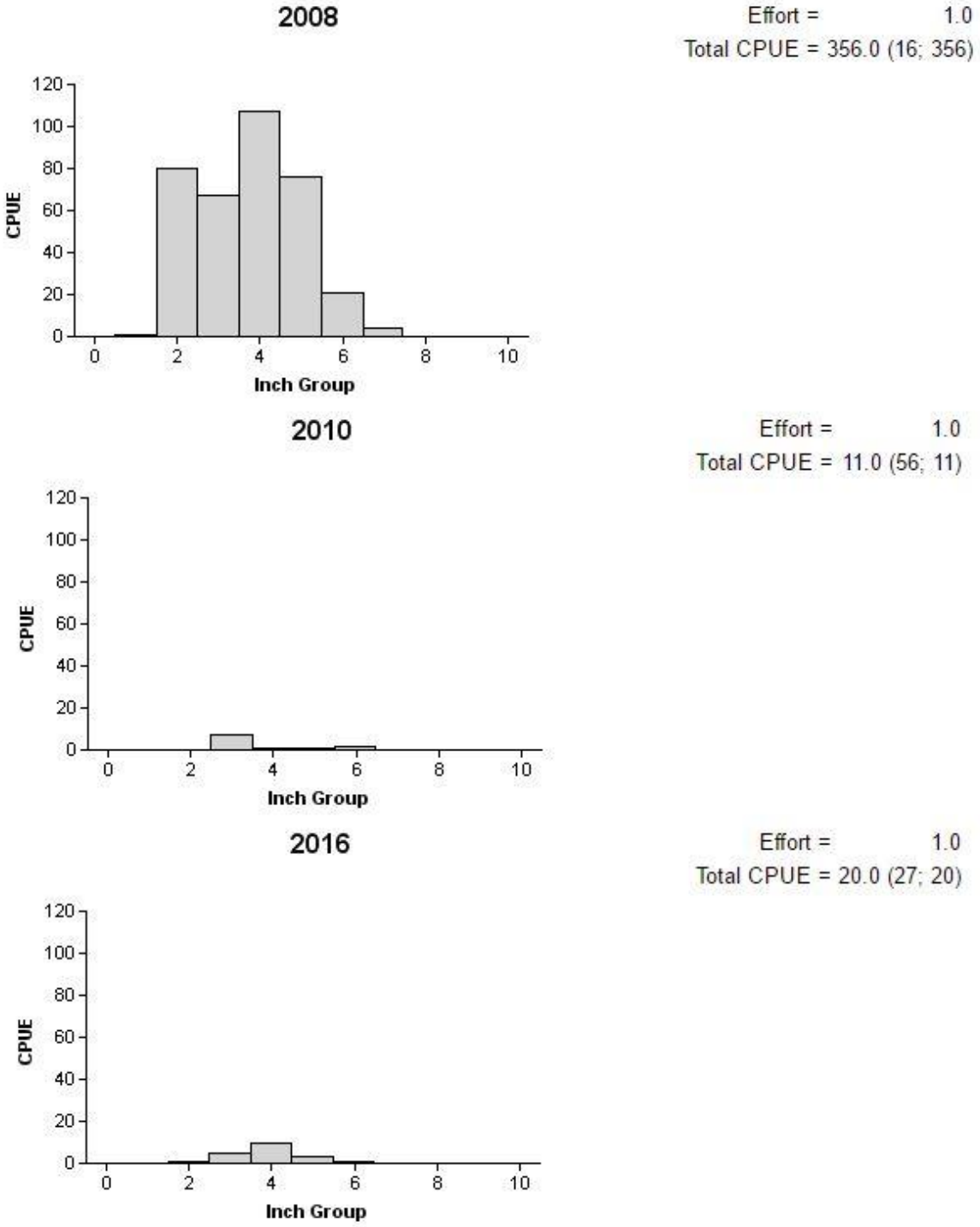


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, New Ballinger Reservoir, Texas, 2008, 2010, and 2016.

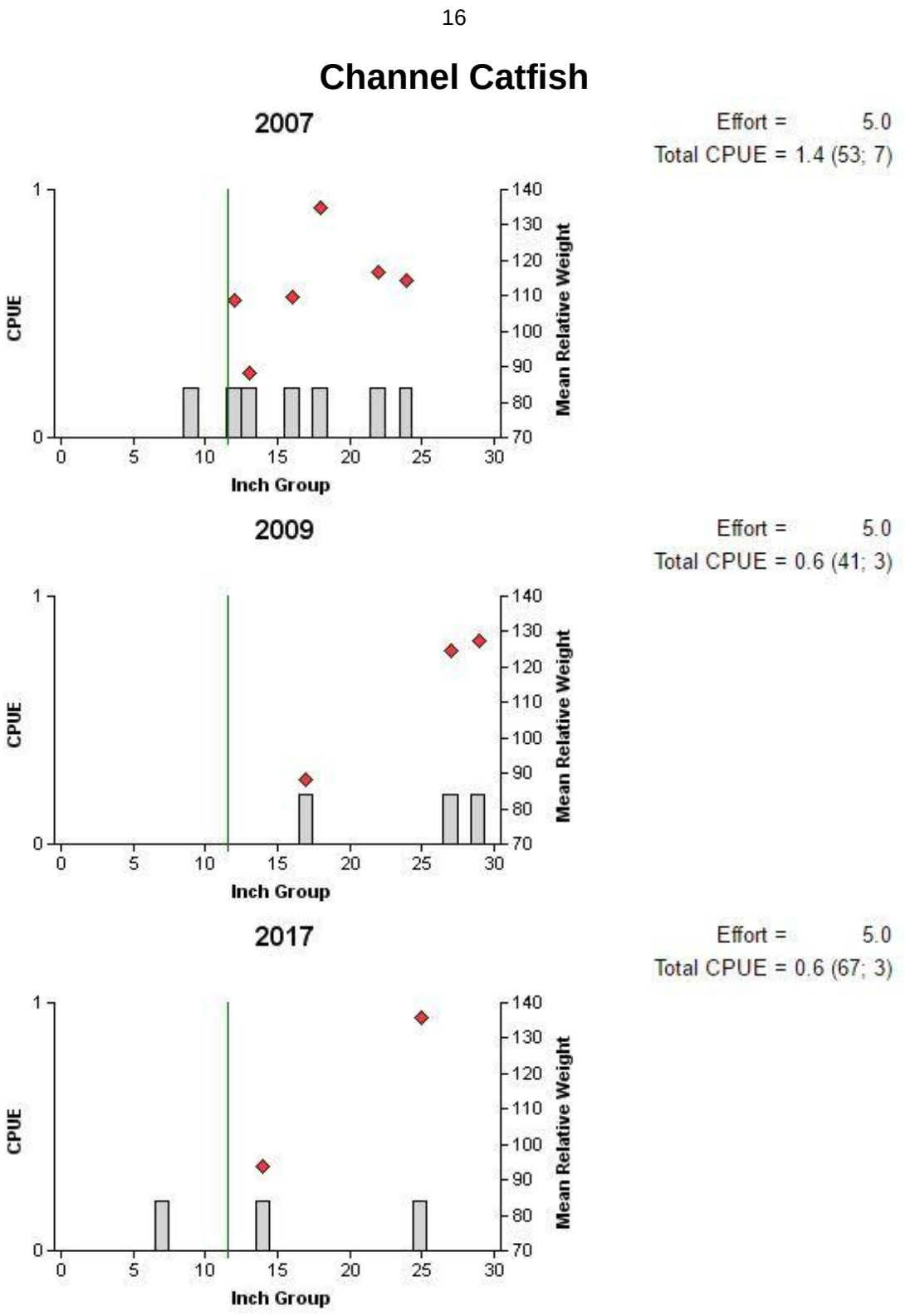


Figure 4. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, New Ballinger Reservoir, Texas, 2007, 2009, and 2017. Vertical line indicates minimum length limit.

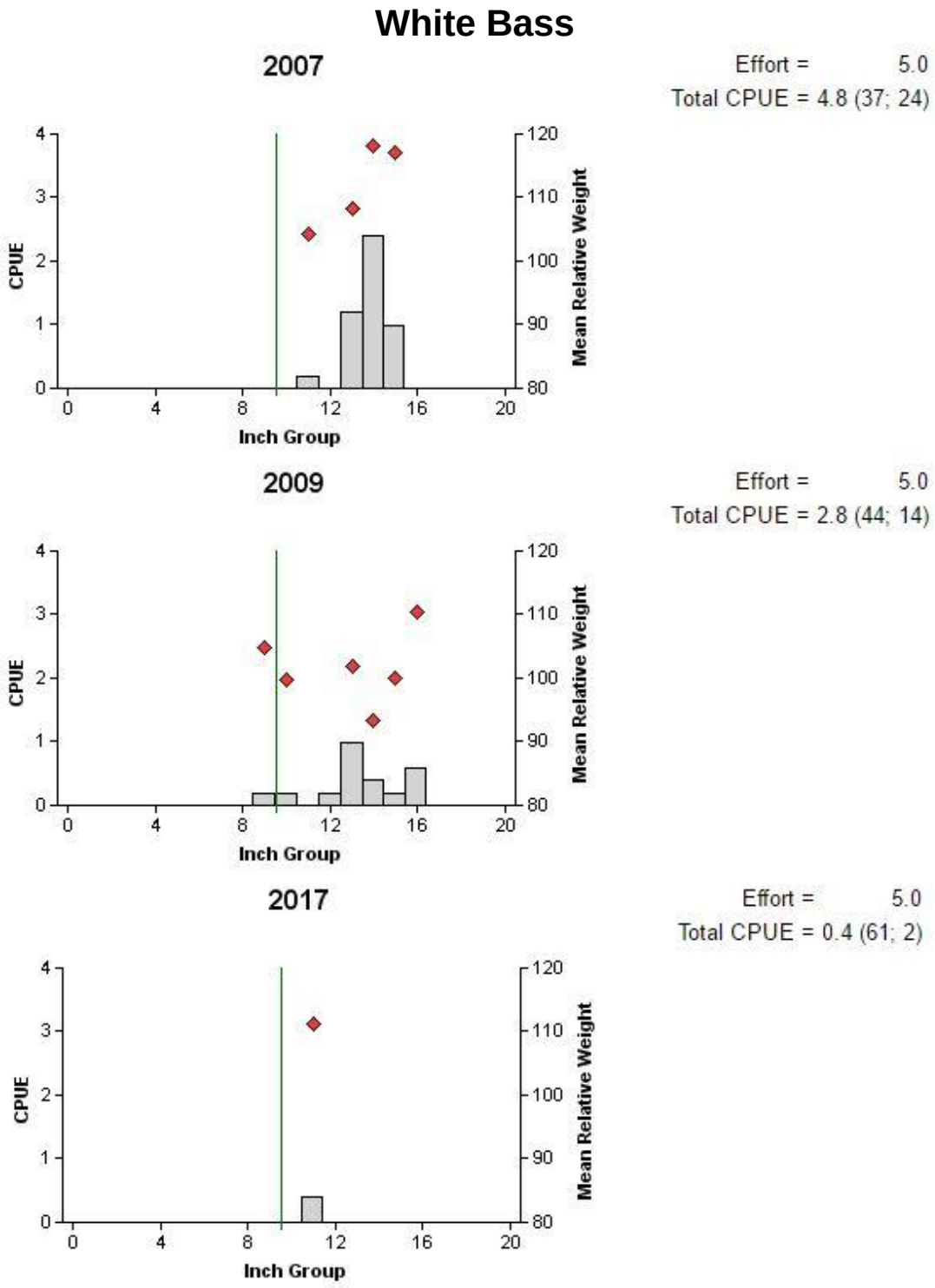


Figure 5. Number of White Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, New Ballinger Reservoir, Texas, 2007, 2009, and 2017. Vertical line indicates minimum length limit.

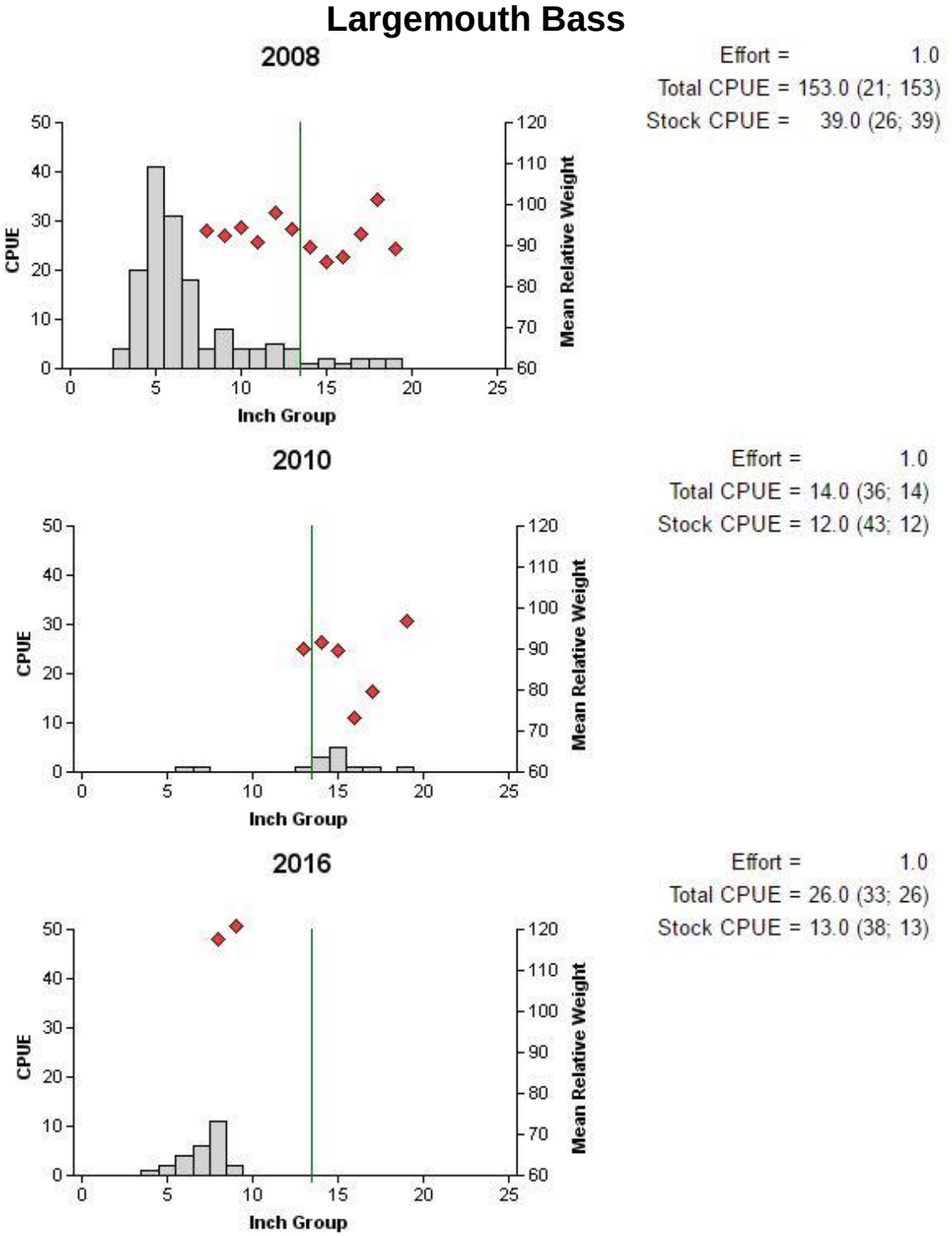


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, New Ballinger Reservoir, Texas, 2008, 2010, and 2016. Vertical line indicates minimum length limit.

White Crappie

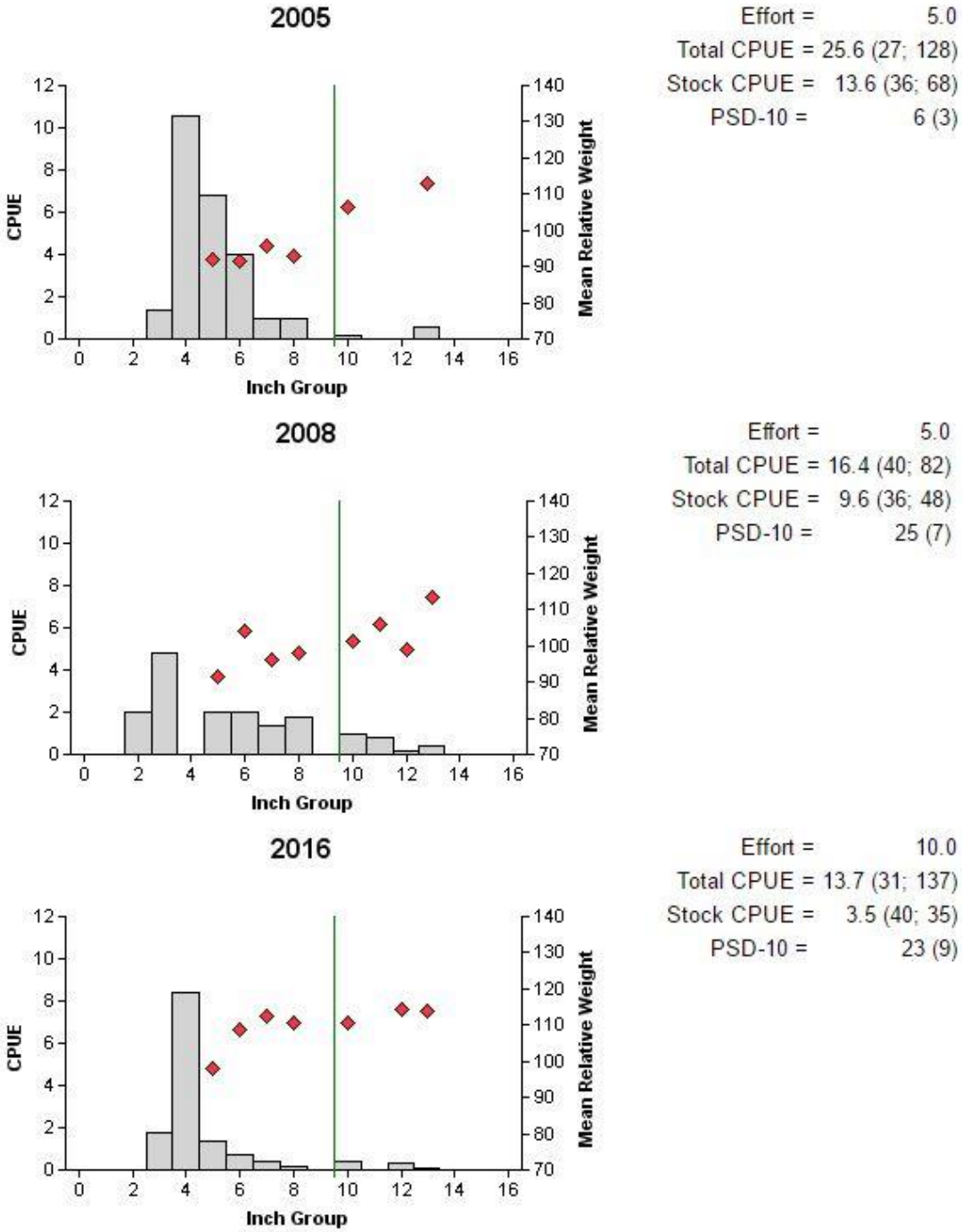


Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, New Ballinger Reservoir, Texas, 2005, 2008, and 2016. Vertical line indicates minimum length limit.

Table 6. Proposed sampling schedule for New Ballinger 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.

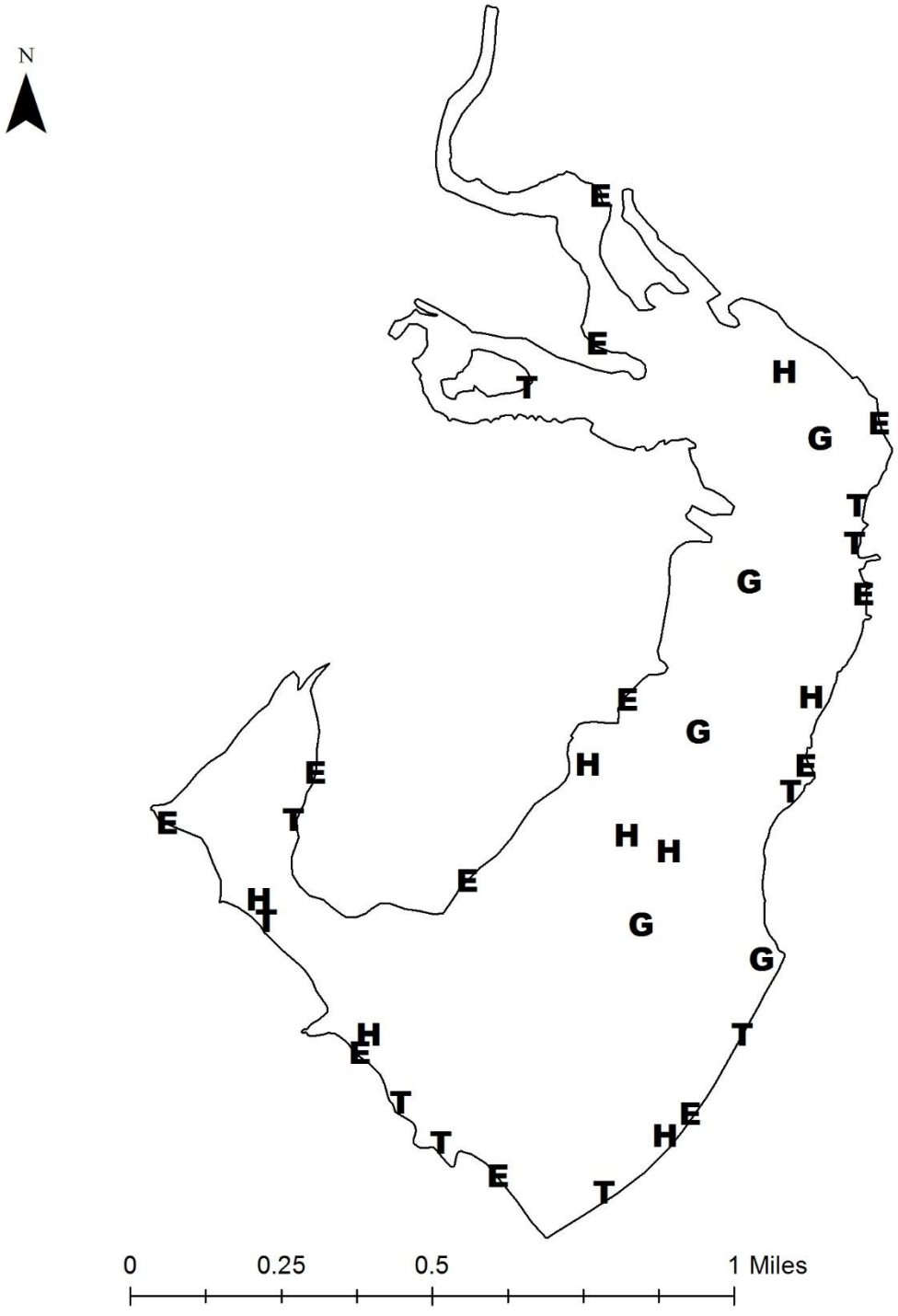
Survey year	Electrofish Fall(Spring)	Trap net	Hoop net	Habitat		Access	Creel survey	Report
				Structural	Vegetation			
2017-2018								
2018-2019	A	A						
2019-2020								
2020-2021	S	S	A		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from New Ballinger Reservoir, Texas, 2016-2017. Sampling effort was 5 net nights for gill netting, 10 net nights for trap netting, 1 hour for electrofishing, and 8 net series for hoop netting.

Species	Gill Netting		Trap Netting		Electrofishing		Hoop Netting	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					382	382.0		
Channel Catfish	3	0.6					21	2.6
Flathead Catfish	2	0.4						
White Bass	2	0.4						
Green Sunfish					10	10.0		
Warmouth					5	5.0		
Bluegill					20	20.0		
Longear Sunfish					25	25.0		
Largemouth Bass					26	26.0		
White Crappie	1	0.2	137	13.7				

APPENDIX B



Location of sampling sites, New Ballinger Reservoir, Texas, 2016-2017. Trap net, gill net, tandem hoop net, and electrofishing stations are indicated by T, G, H, and E, respectively. Water level was near full pool at time of sampling.