PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-2

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2016 Fisheries Management Survey Report

Lake Fairfield

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Fairfield were surveyed in 2016 using electrofishing and in 2017 using hoop 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:** Lake Fairfield is a 2,034-acre impoundment located on Big Brown Creek in the Trinity River Basin approximately 7 miles northeast of Fairfield, Texas. The reservoir serves as the source of cooling water for Big Brown power plant. Annual fish kills from 2008-2013 resulted in a decimated fish population. However, no fish kills have been documented from 2014-present and the reservoir appears to be rapidly rebounding. Boat access is adequate, and public bank access is moderate along the shoreline within Fairfield State Park. Littoral habitat consists primarily of cattails, common reed, lotus and hydrilla.

- **Management History:** Largemouth Bass are the primary sport fish within the reservoir. Red drum historically offered a unique opportunity to anglers, however, annual fish kills from 2008-2013 decimated the population and stocking of Red Drum has been temporarily halted. The management plan from the 2013 survey report primarily involved monitoring the reservoir to identify the continued occurrence of late-summer fish kills and continued monitoring of the Largemouth Bass and Red Drum populations in relation to fish kills. Biennial electrofishing was conducted in 2014 and 2016 to monitor the bass population however Red Drum sampling was discontinued due to low and dwindling population density.

- **Fish Community**
  - **Prey species:** Threadfin Shad were present in the reservoir. Electrofishing catch of Gizzard Shad was low, but most were available as prey to most sport fish. Electrofishing catch of Bluegills was very high and most were less than 4 inches long. Blue Tilapia were also abundant in the reservoir.

  - **Catfishes:** Channel Catfish were present. However, the most recent survey produced very few individuals. Hoop nets were used for the first time in this reservoir to survey the catfish population; it is unclear if the low catch rate is a product of the sampling gear or an accurate estimate of relative abundance.

  - **Largemouth Bass:** Largemouth Bass were abundant, which indicated the population has recovered from previous fish kills. Few legal-size fish were available to anglers, but a good population of sub-legal (<18 inches) fish were present. Largemouth Bass had fast growth (mean age at 14 inches long was 1.7 years).

Management Strategies: Inform the public about the negative impacts of aquatic invasive species. Monitor water quality (D.O) in late summer when fish kills were historically problematic. Educate park staff on identifying signs of fish kills and what conditions may cause late summer kills. If fish kill is documented, follow up with fish community assessment to determine the overall impact of fish kill within the reservoir.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Fairfield 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

Lake Fairfield is a 2,032-acre impoundment Big Brown Creek, Texas, a tributary of the Trinity River approximately 7 miles northeast of Fairfield, Texas. The lake was constructed by Texas Utilities (now owned and operated by Luminant) to provide cooling water for the nearby Big Brown lignite-fueled power plant. Primary water uses include the cooling water for Big-Brown and recreation. Habitat at time of sampling consisted of native emergent vegetation and non-native submersed vegetation. Native aquatic plants present were American lotus, cattails, giant cut grass and common reed. Hydrilla was also present in the reservoir. Water level has remained near conservation pool since 2014. Other descriptive characteristics for Lake Fairfield are found in Table 1.

Lake Fairfield experienced annual late-summer fish kills to varying degrees from 2008-2013. Rapid declines in dissolved oxygen (D.O.) levels are believed to be primarily responsible for the kills. Artificial heating of Lake Fairfield from the warm water discharge of Big Brown power plant caused higher than normal levels of evaporation from the lake. However, naturally occurring solids (i.e. calcium and salts) are left behind and remain in solution, producing highly concentrated nutrient levels over time. Prolonged periods of drought and make-up water pumped from the Trinity River increased the nutrient concentrations in Lake Fairfield further, resulting in extreme productivity and algal blooms in late summer. As length of day decreases in late summer, night-time bacterial respiration exceeds day time production by algal colonies causing overall drops in D.O. and eventually resulting in fish kills. Fortunately, the Lake Fairfield watershed has received significant rainfall annually since 2014 resulting in an influx of freshwater into the reservoir. As a result, the highly concentrated nutrient levels have diluted and flushed out of the reservoir resulting in more desirable nutrient levels, and no documented fish kills.

Angler Access

Two public boat ramps provide adequate boat access to Lake Fairfield. Additional boat ramp characteristics are in Table 2. Fairfield Lake State Park occupies the entire South East shoreline of the lake, offering ample bank fishing opportunities. A fishing pier adjacent to the swimming beach offers additional bank fishing opportunities.

Management History

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

1. Monitor annual late-summer fish kills and investigate methods to remediate the problem.
   Action: State park and Luminant staff were educated on the processes that were believed to be driving the late summer fish kills. This allowed them to better understand when fish kills were likely to occur and more closely monitor the reservoir. Fortunately, fish kills have not been documented since 2013, negating the need to investigate possible methods of remediating them.
2. If annual fish kills do not occur, monitor the Largemouth Bass population and Channel Catfish populations biennially.
   Action: Largemouth Bass were surveyed with fall electrofishing in 2014 and 2016. Channel Catfish were monitored with tandem hoop-netting in 2017.

3. If annual fish kills do not occur, consider restocking Red Drum into the reservoir.
   Action: While fish kills have not been documented since 2013, Red Drum stockings are still not being requested for Lake Fairfield. Low D.O. was still observed over a week long period in late August, 2016 suggesting conditions are still present for a fish kill to occur.

Harvest regulation history: Sport fish in Lake Fairfield are currently managed with statewide harvest regulations with exceptions for Largemouth Bass and Red Drum. Largemouth Bass at Lake Fairfield are currently managed with an 18-inch minimum-length limit, and Red Drum are managed with a 20-inch minimum length limit. Current regulations are found in Table 3.

Stocking history: Prior to the onset of annual fish kills, Red Drum had been stocked during most years since 1984. No Red Drum have been stocked in Lake Fairfield since 2011. Florida Largemouth Bass were stocked from 1975-1979. Multiple attempts to stock White Crappie and hybrid Black x White Crappie failed to establish a fishery. Palmetto Bass were annually stocked in Lake Fairfield between 1975 and 1999, and established a popular fishery. Due to limitations in total hatchery production, stocking of Palmetto Bass at Lake Fairfield was discontinued after 1999. Six hundred and fifty adult Largemouth Bass were stocked in 2010 along with Florida Largemouth Bass fingerlings, Bluegill fingerlings and Channel Catfish fingerlings stocked in 2011 to re-establish populations following several fish kills. Juvenile Alligator Gar (averaging 18-30 inches) were stocked in 2015. The complete stocking history is in Table 4.

Vegetation/habitat management history: American lotus had historically required herbicide treatment in the state park swimming area (Ott and Bister 2005), however treatments have not been necessary since the last survey report.

Water transfer: Lake Fairfield is used as a water cooling reservoir for Big Brown power plant (owned and operated by Luminant). During periods of drought, water is pumped into Lake Fairfield from the nearby Trinity River to provide adequate cooling water for Big Brown power plant. Due to high evaporation, little water is ever discharged from the reservoir. No inter-basin 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 Lake Fairfield (TPWD unpublished). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Electrofishing – Largemouth Bass, Sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (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).

Tandem hoop nets – Channel Catfish were collected using 5 tandem hoop-net series at 5 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 and creel statistics.

Habitat – A vegetation survey was conducted in 2016. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

RESULTS AND DISCUSSION

Habitat: Lake Fairfield has a good mix of littoral habitat, consisting primarily of native floating and emergent species along with non-native submersed species; in total the macrophyte community occupies approximately 11% of the reservoirs surface area (Table 6). During the 2016 survey, the primary native species were common reed (65 acres), American lotus (56 acres), cattail (41 acres) and giant cut grass (19 acres). Hydrilla had expanded from trace amounts in the 2012 survey to 44 acres in 2016. While hydrilla is non-native and can become problematic, there is currently not any issues with the percent of hydrilla coverage on Lake Fairfield. The last structural survey was conducted in 2000 (Ott and Bister 2001).

Prey species: Lake Fairfield has a diverse prey base. Gizzard Shad, Threadfin Shad, Bluegill, and Blue Tilapia are important prey species within the reservoir. The electrofishing catch rate for Gizzard Shad was poor in the 2016 survey (26/h); index of vulnerability (IOV) indicated 85% were available to prey (Figure 1.) Bluegill were abundant and the most dominant prey species in the 2016 survey. Total CPUE of Bluegill in 2016 (653/h) was higher than the previous two surveys; 94/h and 116/h in 2012 and 2014 respectively (Figure 2). The majority of the Bluegill were less than 4 inches, offering a great prey item to game fish. The increasing catch rate coincides with the lack of annual fish kills since 2014 and suggests a rebounding population. Tilapia are rarely captured with standard sampling gear, but are present within the reservoir and offer another excellent prey option to game fish.

Channel Catfish: Channel Catfish were historically surveyed with gill nets every two years to monitor population trends. However annual fish kills from 2008-2013 resulted in highly fluctuating catch rates (0.6/nn in 2011 vs 13.8/nn in 2013; Figure 3). Hoop nets were substituted for gill netting in the most recent survey to evaluate the Channel Catfish population while limiting by-catch mortality of other important gamefish. Unfortunately, the hoop net catch rate in the 2017 survey was poor; only two

individuals were collected (Figure 3). It is unclear if the hoop net survey results are representative of the population, or a result of the timing and location of the sampling gear. Future sampling will be required to determine the utility of hoop nets to sample Channel Catfish in Lake Fairfield.

Largemouth Bass: The electrofishing catch rate of Largemouth Bass was 145/h in 2016; higher than 2012 (92/h) but lower than the 2014 survey (213/h; Figure 4). However, size structure in 2016 (PSD=39) displayed improvement from the 2014 survey in which the majority of the fish were less than 10 inches (PSD=18). Similar to Bluegill, these trends were indicative of a newly expanding population following the annual fish kills from 2008-2013. Growth of Largemouth Bass collected in the 2016 survey was fast; average age at 14 inches (13.1 to 14.9 inches) was 1.7 years (N=13; range 1-2 years). Body condition was also good; relative weights were greater than 100 for most size classes. The extended growing season attributed to above average winter-time water temps, abundant prey base and newly expanding population suggest the Largemouth Bass population could continue to grow over the coming years, offering an excellent fishery to anglers. However, it is unclear if annual fish kills may occur again as total biomass begins to increase within the reservoir.

Red Drum: Red Drum were historically an important fishery to Lake Fairfield. Unfortunately, they have not been stocked since 2011, following subsequent late-summer fish kills. Anecdotal information from park staff suggests a few large individuals have remained within the lake, as catches are occasionally reported by anglers. A dead Red Drum was observed during the 2016 vegetation survey, further suggesting a few individuals have persisted. However, no directed sampling of Red Drum has occurred since 2013, and no individuals have been collected in sampling gear since 2010.

Fisheries management plan for Lake Fairfield, Texas

Prepared – July 2017.

ISSUE 1: Lake Fairfield experienced annual late-summer fish kills from 2008 – 2013, resulting in massive losses to the fishery both economically and recreationally. While no significant fish kills have been documented since 2013, the conditions (low D.O.) do still occur within certain areas of the reservoir in late summer.

MANAGEMENT STRATEGY

1. Continue to monitor D.O. in late summer with stationary data sounds.
2. Continue to educate park staff to identify any signs of fish kills occurring.
3. If a significant fish kill is documented, follow up with sufficient monitoring of the overall fish community to determine the impacts to both sport fish and the prey base within the reservoir.

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 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 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

Sport fishes in Lake Fairfield include Channel Catfish and Largemouth Bass. Important forage species are primarily Gizzard and Threadfin Shad, sunfishes and Tilapia.

Low-density fisheries

Red Drum had historically been a popular fishery on Lake Fairfield. However late-summer fish kills were documented annually from 2008-2013 resulting in a depleted Red Drum population. All stocking was halted on Fairfield following the annual fish kills, resulting in a very low density population of Red Drum. While sporadic reports of Red Drum catches still occur, the fishery itself is currently poor and not surveyed or reported on.

Survey objectives, fisheries metrics, and sampling objectives

Channel Catfish: Historically Channel Catfish have been monitored every four years with spring-time gill nets. While catch rates were good most years, the overall precision was typically high due to a non-

randomly distributed population. Furthermore, the recent introduction of young Alligator Gar into Lake Fairfield justifies considering other sampling techniques to limit by-catch mortality of gar. TPWD Assessment Procedures (2014) suggest that nine tandem hoop nets could provide an instantaneous estimate of CPUE with acceptable precisions (RSE $\leq$ 25)**.** The first attempted hoop net survey on Lake Fairfield was conducted in April, 2017; only 2 Channel Catfish were caught. However, the survey was conducted with only 5 hoop net series, and before optimal sampling conditions as described in the TPWD Assessment Procedures. Additional survey efforts will be required to determine the utility of hoop nets to sample Channel Catfish in Lake Fairfield. Therefore, exploratory sampling with hoop nets with a minimum of 9 baited tandem hoop nets in late spring 2020 to determine if Channel Catfish trend data (CPUE, PSD and Wr) can be collected with this gear. If Channel Catfish catch rate is again low with hoop net sampling, additional survey efforts with gill netting will be considered for the spring of 2021.

Largemouth Bass: The Largemouth Bass fishery was historically excellent on Lake Fairfield. However, similar to the Red Drum population, annual fish kills from 2008-2013 decimated the bass population. Fortunately no significant fish kills have been documented since 2013 and the population is rebounding. Electrofishing surveys, creel surveys and anecdotal tournament results indicate a rapidly expanding bass population. If Lake Fairfield continues to remain healthy (i.e. no fish kills), the bass population will be worth monitoring closely as it has the potential to explode with the combination of littoral habitat, excellent forage base and protracted growing season due to the warm water inflow from the power plant. Largemouth bass trend data on relative abundance, size structure, and body condition, (measured by CPUE, PSD, Wr) will be monitored with biennial fall electrofishing surveys to monitor the new and expanding population. In the fall of 2018 a minimum of 12 randomly selected 5-minute electrofishing stations will be sampled, with up to 6 additional stations, in order to achieve a precise estimate (RSE < 25) of CPUE-S and acceptable size-structure estimate (N≥ 50 stock-size fish).

Prey Species: Gizzard Shad and Threadfin Shad, sunfishes and Tilapia are the primary prey species in Fairfield. Traditionally, trend data on relative abundance and size structure (CPUE, IOV) on Gizzard Shad was monitored biennially with fall electrofishing. In accordance with the Largemouth Bass sample objectives, 12 randomly selected electrofishing sites will be sampled in the fall of 2018 and 2020 to monitor for large-scale changes to the prey base. No additional effort will be expended, regardless of survey precision or sample size; relative weight of Largemouth Bass will provide additional information on the prey base availability within Fairfield.

Angler Data: The Lake Fairfield fishery has been periodically monitored through angler creel surveys in order to monitor angling trends (species targeted, effort, catch and directed expenditures). Anecdotal information suggests the rebounding Largemouth Bass population has resulted in a popular winter and spring fishery. In 2020/2021 trend data on angling characteristics will be monitored with a winter quarter creel survey from December 2020 through February 2021 with 5 randomly selected weekend creel days and 4 randomly selected weekday creel days.

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Table 1. Characteristics of Lake Fairfield, Texas.

Characteristic	Description
Year constructed	1969
Controlling authority	Luminant
County	Freestone
Reservoir type	Cooling-water reservoir
Shoreline Development Index (SDI)	3.7
Conductivity	1200 µS/cm

Table 2. Boat ramp characteristics for Fairfield, Texas, August, 2012. Reservoir elevation at time of survey was 310 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
South Park Ramp	31.78141 -96.07068	Y	50	306	Excellent, no access issues
North Park Ramp	31.79417 -96.05902	Y	25	304	Excellent, no access issues

Table 3. Harvest regulations for Lake Fairfield, 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, Largemouth	5	18-inch minimum
Red Drum	3	20-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Lake Fairfield, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; JVL = juvenile.

Species	Year	Number	Size
Channel Catfish	1969	25,000	
	2011	21,156	FGL
	Total	46,156	
Bluegill	2011	107,815	FGL
Palmetto Bass	1975	25,000	
	1977	23,985	
	1979	24,500	
	1982	25,422	FGL
	1986	35,650	FRY
	1987	49,025	FGL
	1988	49,226	FGL
	1991	36,700	FRY
	1992	36,265	FGL
	1993	21,200	FGL
	1994	37,100	FGL
	1995	43,100	FGL
	1996	35,285	FGL
	1997	35,441	FGL
	1998	22,647	FGL
	1999	35,625	FGL
	Total	536,171	
Largemouth Bass	1970	250,000	FGL
	2010	650	ADL
	Total	250,650	
Florida Largemouth Bass	1975	123,100	FGL
	1976	122,500	FGL
	1977	130,000	FGL
	1979	129,145	FGL
	2011	109,073	FGL
	Total	613,815	
White Crappie	1985	87,601	FGL
	1986	29,450	FGL
	1987	353,439	FGL
	Total	470,490	
Black x White Crappie	1993	117,650	FGL
	1994	118,177	FGL
	1995	249,208	FGL
	Total	485,035	
Nile Perch	1983	1,310	
	Total	1,310	

Table 4. Stocking history continued.

Species	Year	Number	Size
Red Drum	1984	235,455	FGL
	1985	283,700	FGL
	1986	217,323	FGL
	1987	473,340	FGL
	1991	515,751	FGL
	1992	245,118	FGL
	1993	217,923	FGL
	1994	253,280	FGL
	1995	231,523	FGL
	1996	266,633	FGL
	1997	158,890	FGL
	1999	222,340	FGL
	2000	276,602	FGL
	2001	287,820	FGL
	2002	21,938	FGL
	2003	385,367	FGL
	2004	7,125	FGL
	2005	208,440	FGL
	2006	2,439	FGL
	2007	423,732	FGL
	2008	207,102	FGL
	2009	207,683	FGL
	2010	433,480	FGL
	2011	327,320	FGL
	Total	6,110,324	
Alligator Gar	2015	146	JVL

Table 5. Objective-based sampling plan components for Lake Fairfield, Texas 2016 – 2017.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Relative abundance	CPUE – stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
	Condition	W_r	10 fish/inch group (max)
Bluegill [a]	Relative abundance	CPUE – Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad [a]	Abundance	CPUE – Total	RSE ≤ 25
	Prey availability	IOV	N ≥ 50
Tandem hoop-netting			
Channel Catfish	Relative abundance	CPUE– stock	

[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.

Table 6. Survey of aquatic vegetation, Lake Fairfield, Texas, 2012 and 2016. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2012	2016
Native floating-leaved		
American lotus	195 (9.5)	56 (2.8)
Native emergent		
Cattail	4 (<1)	41 (2.0)
Common reed	16 (<1)	65 (3.2)
Giant cut grass		19 (<1)
Non-native		
Hydrilla (Tier III)*	Trace	44 (2.2)

*Tier III is Watch Status

Gizzard Shad

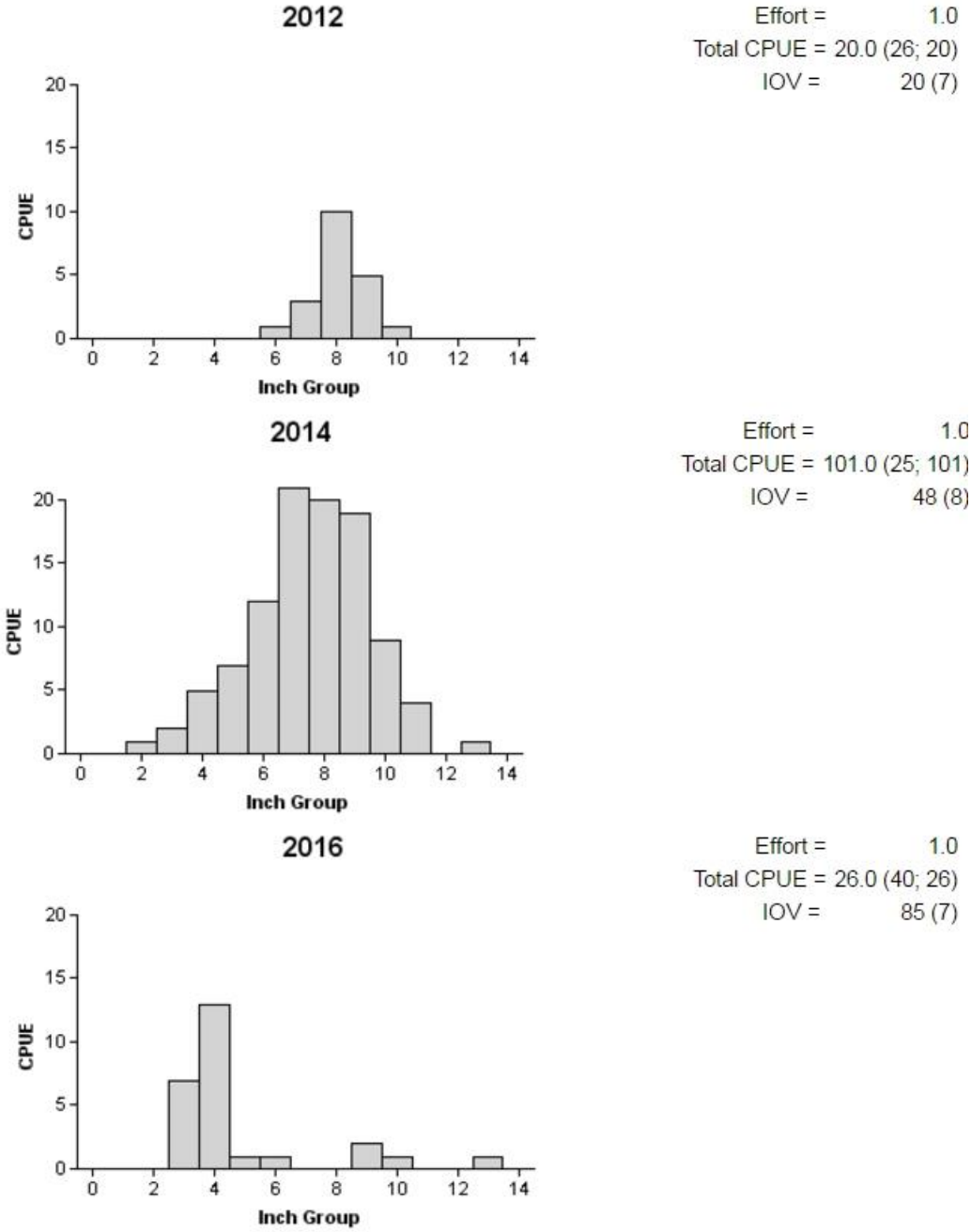


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2012, 2014, and 2016.

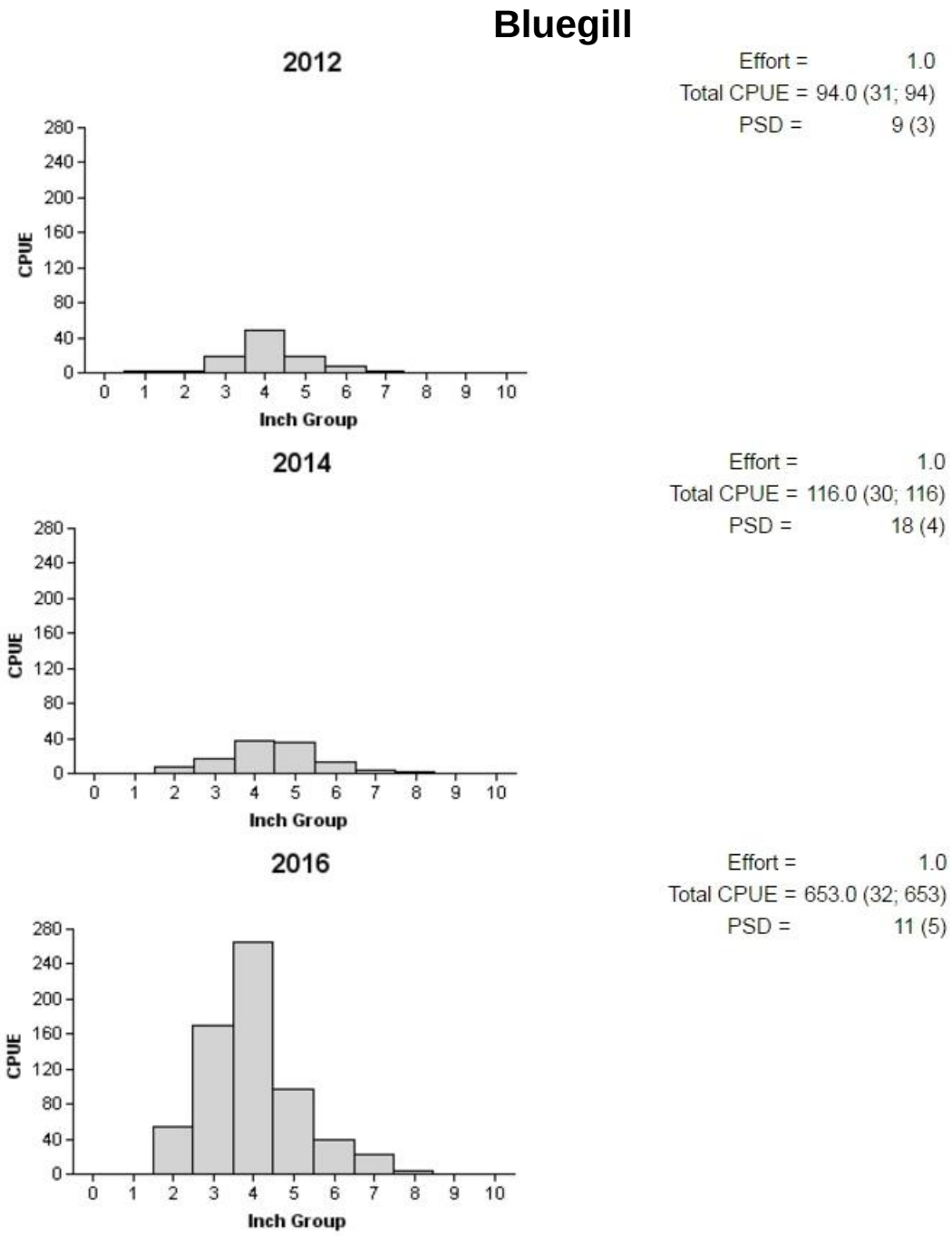


Figure 2. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2012, 2014, and 2016.

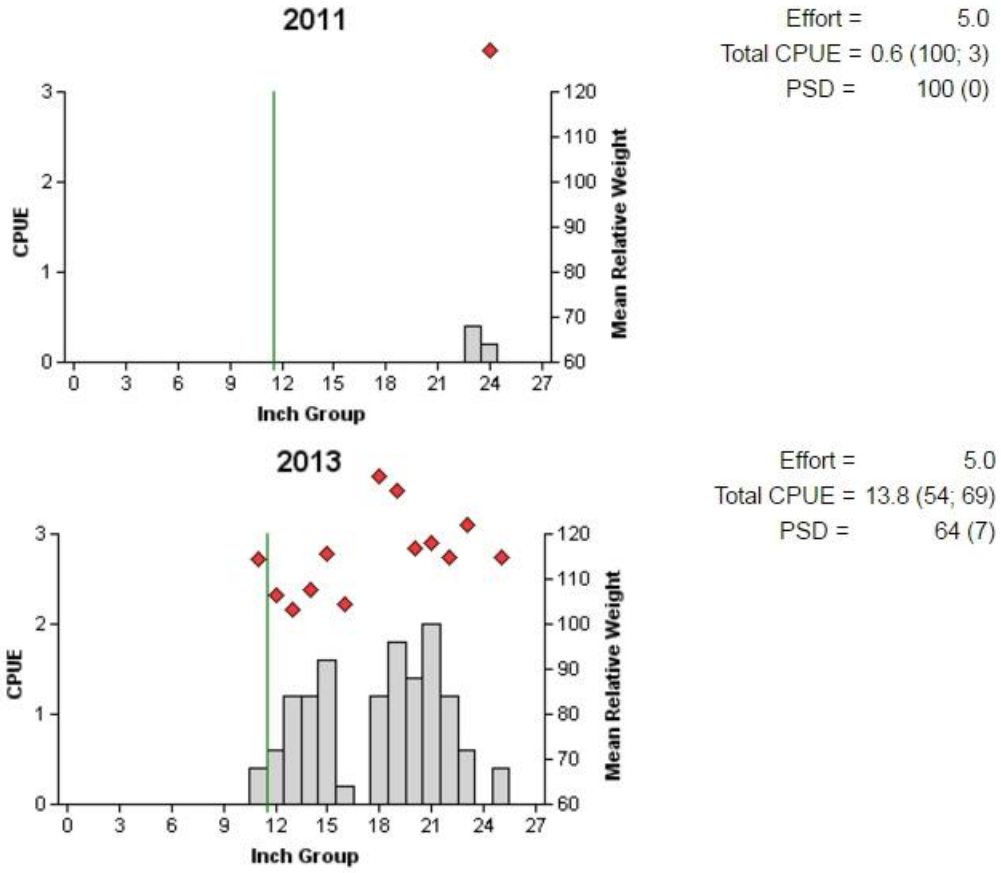


Figure 3. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Fairfield, Texas, 2011 and 2013. Vertical line represents minimum length limit.

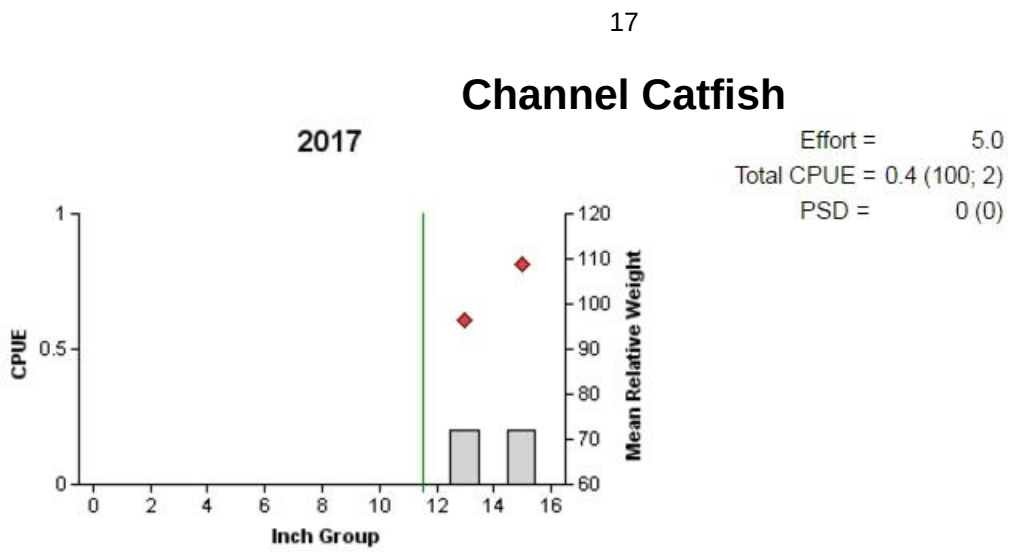


Figure 4. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop net survey, Lake Fairfield, Texas, 2017. Vertical line represents minimum length limit.

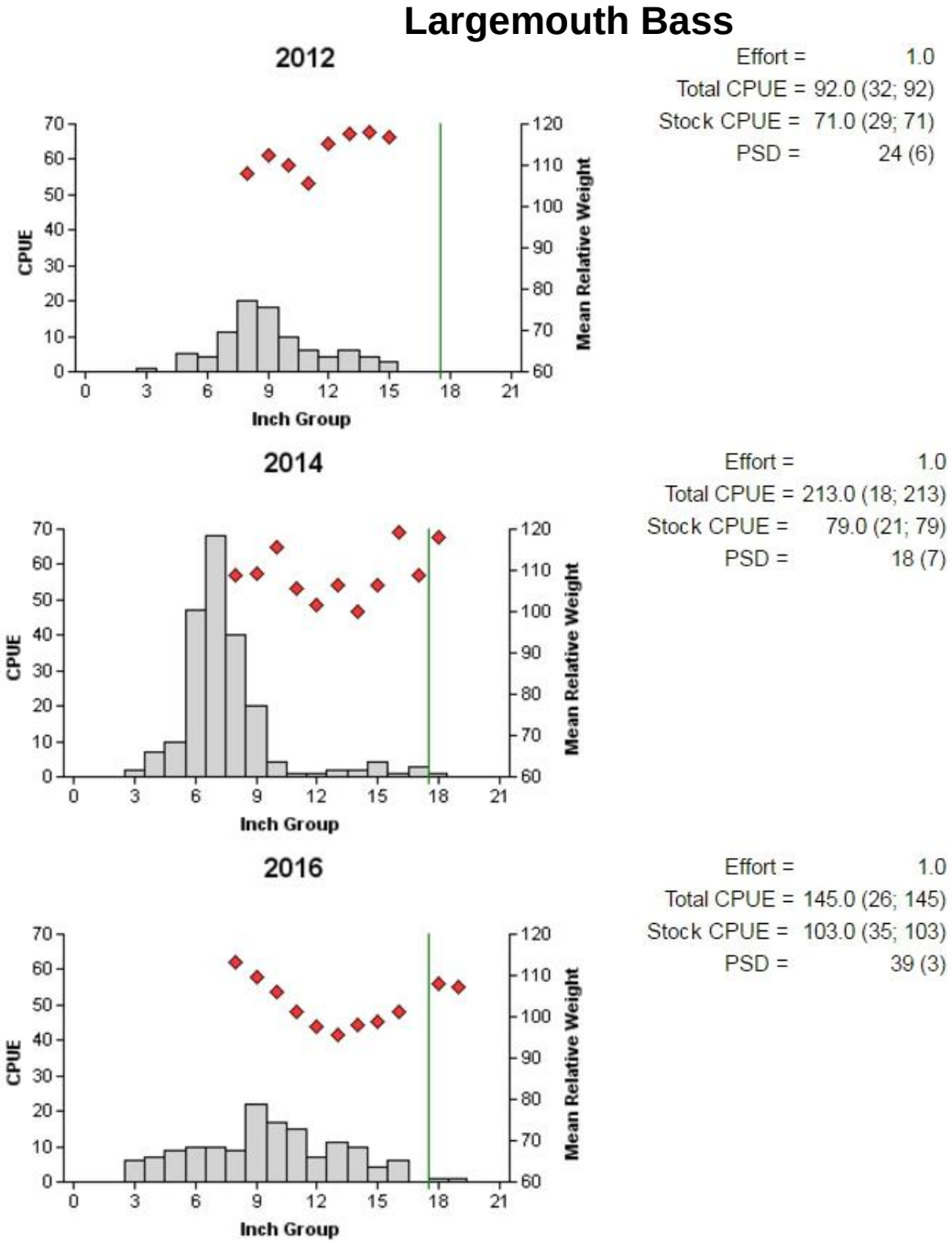


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Fairfield, Texas, 2012, 2014, and 2016. Vertical line represents minimum length limit.

Table 7. Proposed sampling schedule for Lake Fairfield, Texas. Survey period is June through May. Hoop-netting surveys are conducted in late spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey year	Electrofishing Fall	Hoop net	Vegetation	Access	Creel survey	Report
2017-2018						
2018-2019	A					
2019-2020						
2020-2021	S	S	S	S	A*	S

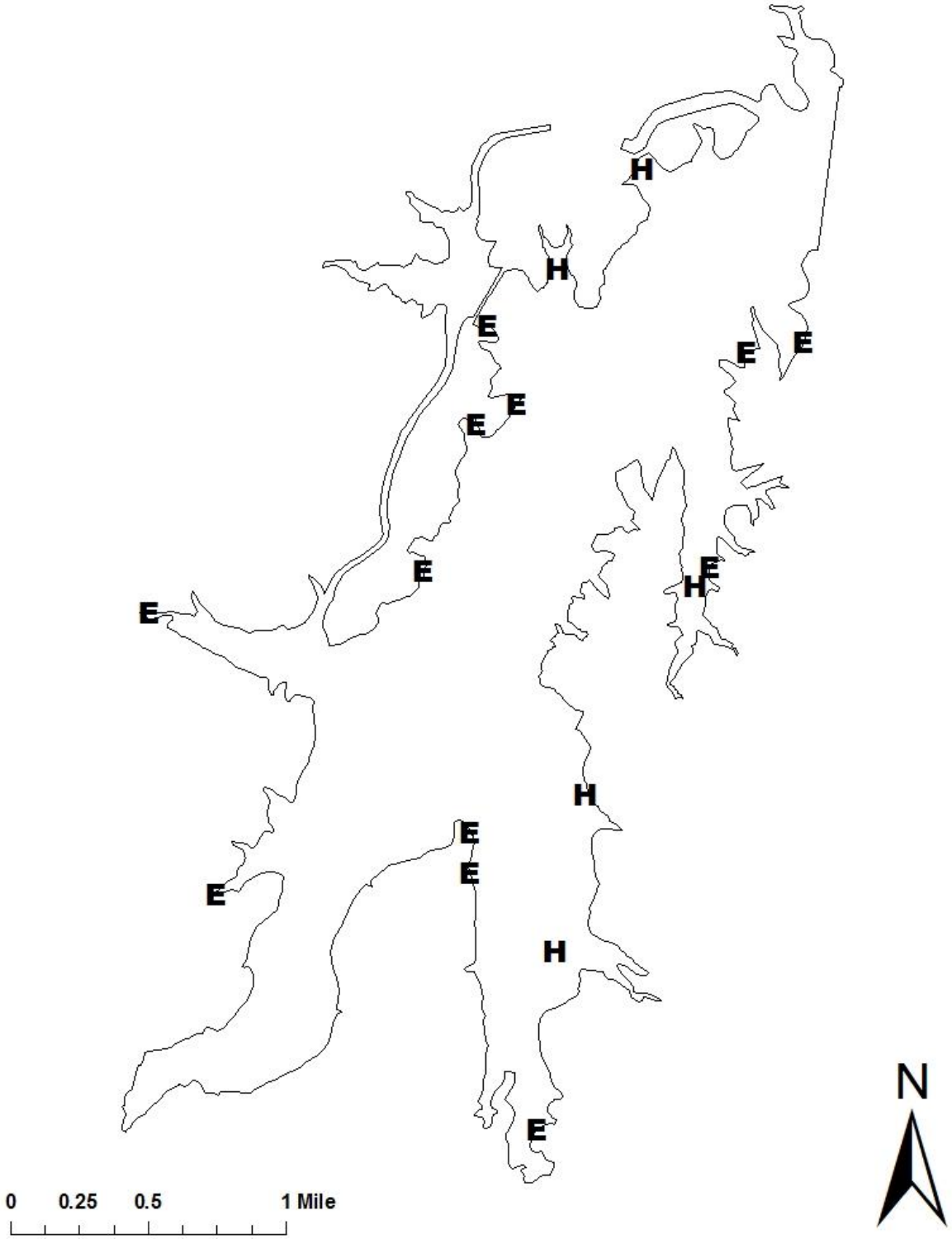
*Denotes Winter-only creel (December – February)

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Fairfield, Texas, 2016-2017. Sampling effort was 5 net series for hoop netting and 1 hour for electrofishing.

Species	Electrofishing		Hoop netting	
	N	CPUE	N	CPUE
Gizzard Shad	26	26.0		
Threadfin Shad	36	36.0		
Channel Catfish			2	0.4
Green Sunfish	5	5.0		
Bluegill	653	653.0		
Longear Sunfish	6	6.0		
Redear Sunfish	12	12.0		
Largemouth Bass	145	145.0		

APPENDIX B



Location of sampling sites, Lake Fairfield, Texas, 2016-2017. Hoop net and electrofishing stations are indicated by H and E, respectively. Water level was near full pool at time of sampling.