

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2016 Fisheries Management Survey Report

**Lake Somerville**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Somerville were surveyed in 2016 using electrofishing and in 2017 using gill netting. Anglers were surveyed from March 2014 through February 2015 with a creel survey. 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 Somerville is an 11,456-acre flood-control reservoir constructed by the U.S. Army Corps of Engineers on Yegua Creek in Burleson, Lee, and Washington Counties, Texas. Principle tributaries are Middle Yegua, West Yegua, and Nails Creeks. Lake Somerville has a drainage area of approximately 1,006 square miles and a shoreline length of 104 miles.
- **Management History:** Important sport fishes include White Bass, Palmetto Bass, Largemouth Bass, White Crappie, Black Crappie, Channel Catfish, and Blue Catfish. Annual stockings of Palmetto Bass were conducted until 2015 when Lake Somerville was removed from the Palmetto Bass stocking program. Due to the receipt of 85 emails, 11 phone calls, and one hand written letter from concerned Hybrid Striped Bass anglers in July and August of 2016, Somerville was stocked with Palmetto Bass and Sunshine Bass in 2017. Hydrilla and water hyacinth have been introduced and treated in the lake.
- **Fish Community**
  - **Prey species:** Threadfin Shad and Gizzard Shad were the predominant prey species in Lake Somerville and most were available as prey. Bluegill and Longear Sunfish were the most common sunfish prey. Other less important prey species included Golden Shiner, Inland Silverside, Brook Silverside, Warmouth, Redear Sunfish and Bigscale Logperch.
  - **Catfishes:** Channel Catfish were the dominant catfish species, offering good angling opportunities. Blue Catfish, although less numerous, also support a fishery. According to the most recent creel survey, catfishes (along with temperate basses) were the second-most targeted species group at Lake Somerville.
  - **Temperate basses:** White Bass and Palmetto Bass were both present in Lake Somerville. Palmetto Bass were stocked annually when available with the exception of 2015 and 2016. According to the most recent creel survey, Temperate Basses were also the second-most targeted species group (along with catfishes) at Lake Somerville, with White Bass comprising 13.1% of total angling effort and Palmetto Bass making up 8.9%.
  - **Largemouth Bass:** Largemouth Bass were abundant with a good size distribution available to anglers. The 2014-2015 creel survey indicated that Largemouth Bass were the most popular species among anglers at Lake Somerville.
  - **Crappies:** Both White Crappie and Black Crappie are present in the reservoir with legal-size fish up to 14 inches long harvested by anglers.

**Management Strategies:** Request annual stockings of Palmetto Bass and Sunshine Bass. Enhance big fish potential of Largemouth Bass with annual stocking of Florida Largemouth Bass and encouraging local anglers to participate in angler recognition programs. Aquatic Invasive Species vegetation surveys will be conducted annually to identify potential angler access issues.

## INTRODUCTION

This document is a summary of fisheries data collected from Lake Somerville from June 2016 through May 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 Somerville is an 11,456-acre flood-control reservoir constructed by the U.S. Army Corps of Engineers (USACE) on Yegua Creek in Burleson, Lee, and Washington Counties, Texas. Principle tributaries are Middle Yegua, West Yegua, and Nails Creeks. Lake Somerville has a drainage area of approximately 1,006 square miles, a shoreline length of about 104 miles, and a Shoreline Development Index of 5.7. The reservoir has a mean depth of 11 feet and a maximum depth of 38 feet. Average rainfall in the watershed is 39 inches per year. Conservation elevation is 238 feet above mean sea level (MSL) (Figure 1). The reservoir lies within the Post Oak Savannah Land Resource Area with soils consisting of Falba-Burlewash, Kaufman-Gowen, and Tabor-Axtell associations (sandy loam-clay). Land uses around the reservoir are primarily agricultural and recreational. Other descriptive characteristics for Lake Somerville are recorded in Table 1.

### *Angler Access*

Lake Somerville has nine public boat ramps and three private boat ramps. All public access ramps except Lakeside Marina & Overlook Park and the Birch Creek Unit of Lake Somerville State Park were available to anglers by the summer of 2017. Several had been closed in previous years due to flooding (Figure 1) or flooding damage. Additional boat ramp characteristics are listed in Table 2. Shoreline access is available at the Nails Creek and Birch Creek Units of Lake Somerville State Park, Welch Park, Overlook Park, and Lake Somerville Marina.

### *Management History*

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

1. Continue annual monitoring of temperate basses in Lake Somerville. Palmetto bass would be stocked at a rate of 10/acre annually. If significant angler effort for and catch of Palmetto Bass is not documented, stocking requests will be discontinued in 2015.  
**Action:** Temperate bass species were sampled with gill nets in spring of 2013, 2015, and 2017. Because of lack of documentation of angler effort and catch of Palmetto Bass, stockings were discontinued in 2015. However, due to receiving 85 emails, 11 phone calls, and 1 hand written letter in July and August of 2016, stockings were reinstated in 2017.
2. Monitor Crappie by an access point creel survey from 2014-2015 and by trap nets in 2016.  
**Action:** Crappie were monitored with a creel survey from March 2014 through February 2015, but sampling was discontinued in 2016 due to high catch variability. Crappies were monitored for presence/absence by electrofishing in the fall of 2016.
3. Continue to perform outreach to anglers and encourage anglers to participate in the Angler Recognition and Sharelunker programs. Send news releases to local media outlets highlighting the stockings of Sharelunker offspring. Continue to monitor Largemouth Bass by standard electrofishing survey.  
**Action:** Largemouth Bass were monitored using an access point creel survey in 2014-2015 and a standard electrofishing survey in 2016. Florida Largemouth Bass were last stocked in 2009 (ShareLunker offspring) and in 2010.

4. Continue annual monitoring for hydrilla and water hyacinth in Lake Somerville.

**Action:** Annual Aquatic Invasive Species (AIS) vegetation surveys are conducted to monitor for invasive species. No treatments have been necessary since the last report and water hyacinth is no longer present in the reservoir.

**Harvest regulation history:** Currently, there are no exceptions to statewide fishing regulations at Lake Somerville. Table 3 summarizes the harvest regulations for the reservoir.

**Stocking history:** From 1975 through 2014, Lake Somerville has been stocked annually with Palmetto Bass when fish were available. Lake Somerville was temporarily removed from the stocking requests in 2015 and 2016. Lake Somerville was stocked with Florida Largemouth Bass in 2008, 2009 (ShareLunker offspring), and 2010. The complete stocking history is recorded in Table 4.

**Vegetation/habitat management history:** Water hyacinth has not been seen since it was initially discovered in 2008 and subsequently physically removed and the remainder treated with herbicide.

**Water transfer:** Lake Somerville is operated by the USACE for water supply, flood control, and recreation. Water released from Lake Somerville is transferred via Yegua Creek to the Brazos River to supply agricultural, industrial, and municipal customers downstream. 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 Lake Somerville. 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, crappie, Gizzard Shad, and Threadfin Shad were collected by electrofishing (2 hours at 24, 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).

*Gill netting* – Channel Catfish, Blue Catfish, White Bass, and Palmetto Bass were collected by gill netting (15 net nights at 15 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for White Bass were determined using otoliths from 13 randomly-selected fish (range 9.0 to 10.9 inches).

*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). Palmetto Bass PSD was calculated according to Dumont and Neely (2011). 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.

*Creel survey* – A roving creel survey was conducted from March 2014 through February 2015. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

*Habitat* – A structural habitat survey and complete vegetation survey were conducted in 2016. AIS vegetation surveys were conducted in 2013-2015 to monitor. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

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

## RESULTS AND DISCUSSION

**Habitat:** Littoral habitat consisted primarily of non-vegetated shoreline due to water levels being well over conservation pool (up to 22 feet over) for the majority of the last two years (Figure 1). Non-vegetated as well as rocky shoreline can be found throughout the perimeter of the reservoir. Riprap occurs along the dam and along jetties within the state parks. Other structural habitat consisted of approximately 246 acres of flooded dead vegetation and timber (Table 6). Vegetative habitat historically consisted of non-native hydrilla and giant cane but has been temporarily repressed due to recent persistent flooding (Table 7). The native plant community was dominated by floating-leaved vegetation in 2012; however, none was observed in 2016. Water hyacinth was not detected during the most recent vegetation survey.

**Creel:** Directed fishing effort by anglers was highest for Largemouth Bass (31%), followed by anglers fishing for temperate basses (22%) and catfishes (22%) (Table 8). Anglers fished for 96,435 hours and spent approximately \$719,909 towards fishing-related expenditures (Table 9). During the creel period, most anglers traveled less than 75 miles to fish at Lake Somerville, although some anglers reported traveling up to 200 miles (Appendix C).

**Prey species:** Shads were the dominant prey fish in Lake Somerville. Gizzard Shad exhibited an electrofishing catch rate of 219.5/h in 2016, which was less than the 1,111.5/h Homer and Webb (2013) reported in 2012 (Figure 2). Most Gizzard Shad were available as prey (IOV = 95). Threadfin Shad catch increased from a rate of 513.5/h in 2012 (Homer and Webb 2013) to a rate of 583.5/h in 2016 (Appendix A). Additional forage was provided by Bluegill with an electrofishing catch rate of 259.5/h (Figure 3). Other less-important prey species included Golden Shiner, Inland Silverside, Brook Silverside, Warmouth, Longear Sunfish, Redear Sunfish, and Bigscale Logperch.

**Catfishes:** Lake Somerville supports a quality Channel Catfish fishery. The gill net catch rates have been variable in the last three surveys, with catch rates of 10.3/nn in 2017, 17.5/nn in 2015, and 10.6/nn in 2013 (Figure 4). Size distribution data from the 2017 gill net survey indicated most Channel Catfish were of legal length, with fish collected up to 27 inches in length. Blue Catfish were caught at 0.3/nn in the spring 2017 gill net survey, which was less than the 0.7/nn in 2015 and 0.9/nn in 2013 (Figure 6). Blue Catfish up to 24 inches total length were collected in 2017.

Catfishes were the second-most targeted species group at Lake Somerville, comprising 21.9% of the angling effort (21,163 h) during the 2014-2015 creel survey. Catch rate for anglers reported targeting catfishes was 2.00/h for Channel Catfish (Table 10) and an estimated 36,434 were harvested. Length frequency of the 196 Channel Catfish measured in the creel ranged 14-19 inches total length (Table 10; Figure 5). Angler catch rate of Blue Catfish (0.01/h) (Table 10) was lower than Channel Catfish but the fish were larger (16-28 inches total length) (Figure 7).

**White Bass:** White Bass were caught in the spring 2017 gill net survey at 12.7/nn, which was higher than the 1.3/nn reported in 2015 or the 2.1/nn in 2013 (Figure 8). The primary spawning area for White Bass in Lake Somerville is Yegua Creek, which experiences inconsistent flows in the spring, limiting White Bass reproduction in some years. Drought conditions from 2009 to early 2012 likely impeded access to preferred spawning habitat, but excessive rainfall during 2015 and 2016 likely provided ample spawning opportunities. Thirty one percent of estimated catch was released as undersized fish. Average age of White Bass at 10 inches (9.0 to 10.9 inches) was 2.15 (N=13; range = 1-3 years).

During the 2014-2015 creel survey, anglers spent 12,644 h targeting White Bass specifically (Table 12), which represented 13.1% of total angling effort. Further, 67,647 White Bass were reported harvested; the 611 observed harvested fish ranged from 10-15 inches (Figure 10). Four percent of the legal length White Bass were released.

**Palmetto Bass:** Gill net CPUE of Palmetto Bass in the spring surveys has historically been low (0.3/nn in 2017, 1.8/nn in 2015, and 1.9/nn in 2013) (Figure 11). Low catch rates are likely due to inconsistent stocking (Table 4).

During the 2014-2015 creel survey, 8.9% of the total directed fishing effort by anglers was specifically directed to Palmetto Bass (Table 13). Limited harvest (220 specimens) was recorded (Figure 12) and no live-release of legal length fish was documented. However, 97.9% of estimated catch was released as undersized fish.

**Largemouth Bass:** The electrofishing catch rate of Largemouth Bass in 2016 (117.5/h) was higher than those reported in 2012 (65.5/h) and 2008 (78.0/h) (Figure 13). Although size distribution was dominated by small (<10 inches) fish and PSD (36) was below the target range of 40-70, Largemouth Bass up to 21 inches total length were observed in the sample. Due to the series of droughts from 2009 until 2012 and the ensuing low reservoir water levels, fish reproduction and recruitment was lower in 2012 than the surrounding report years. Unfavorable sampling conditions were experienced during that time as well. The prolonged drought period was shortly followed by back to back heavy rainfall years in 2015 and 2016, providing flooded terrestrial vegetation for cover likely improving reproduction and recruitment.

Growth of Largemouth Bass in Lake Somerville was fast; average age at 14 inches (13.0 to 14.9 inches) was 1.30 (N=20; range = 1-2 years).

Largemouth Bass were the most targeted species in the 2014/2015 creel survey. During the creel period, anglers spent 29,970 h targeting Largemouth Bass (Table 14) and catch rate was estimated to be 0.19/h. Total estimated harvest was low (330 fish) with an estimated 68% of the legal-length fish caught were released. Unlike previous surveys, no tournament anglers were interviewed.

**Crappies:** White Crappie and Black Crappie were present in Lake Somerville but were not sampled by trap netting during 2016. In 2004, 2008, and 2012 trap net catch rates for White Crappie were only 1.6/nn, 1.1/nn, and 1.1/nn, respectively (Homer and Webb 2013). One Black Crappie was captured in 2004, none in 2008, and 13 in 2012. Due to low trap net catch rates since 2000, crappies were sampled for presence/absence by electrofishing in 2016 (Appendix A).

Historically, crappies were the most targeted species group at Lake Somerville (Henson and Webb 2005). Data from the 2014-2015 creel survey indicated that a lower percentage of anglers targeted crappies than in previous creel surveys; however, actual effort was similar. Anglers spent 0.69 hours/acre targeting crappies, which was higher than the 0.54 h/acre reported in 2012 (Table 15). In 2014/2015, angler catch rate was 2.94/h for White Crappie and 3.68/h for Black Crappie. An estimated 9,010 White Crappie and 13,637 Black Crappie were harvested during the same period (Table 15).



## Fisheries management plan for Lake Somerville, Texas

Prepared – July 2017.

**ISSUE 1:** Although Palmetto Bass pressure and catch is relatively low in creel surveys, direct angler feedback indicates an avid group of Palmetto Bass anglers that desire continued Palmetto Bass stockings.

### MANAGEMENT STRATEGY

1. Request Palmetto Bass and/or Sunshine Bass annually.
2. Continue to solicit angler feedback through social media to document Palmetto Bass fishing pressure and catches at Lake Somerville.

**ISSUE 2:** Largemouth Bass support one of the most popular fisheries at Lake Somerville and trophy potential has been documented by the production of a Sharelunker in 2009.

### MANAGEMENT STRATEGIES

1. Request annual stockings of Florida Largemouth Bass to improve the opportunities for continued trophy Largemouth Bass catches at Lake Somerville.
2. Continue outreach to anglers in the Lake Somerville area, encouraging participation in all TPWD angler recognition programs including ShareLunker.

**ISSUE 4:** Expansion of exotic aquatic plants could potentially lead to angler access issues at Lake Somerville.

### MANAGEMENT STRATEGIES

1. Continue annual monitoring of hydrilla and giant cane at Lake Somerville.
2. If access issues are identified, keep the USACE informed and assist with treatment recommendations and facilitate herbicide treatments if necessary.

**ISSUE 4:** 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 for Lake Somerville

2017 - 2021

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

Sport fishes in Lake Somerville include Blue Catfish, Channel Catfish, White Bass, Palmetto Bass, Largemouth Bass, Black Crappie, and White Crappie. Important forage species include Gizzard Shad, Threadfin Shad, and Bluegill.

### Low-density fisheries

All sport species at Lake Somerville contribute to the overall fishery and justify sampling effort.

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

**Crappie:** Historically, crappies were the most targeted species group at Lake Somerville (Henson and Webb 2005). Data from the 2014-2015 creel survey indicated crappies were still a reasonably popular species group, comprising 8.2% of directed angling effort. Even though percentage of directed effort was lower, anglers spent 0.69 hours/acre targeting crappies, which was similar to the 0.54 h/acre reported in 2009/2010. Angler catch rate of crappies was 6.62/h in 2014/2015, compared to 5.43/h in 2009-2010. An estimated 9,010 White Crappie and 13,637 Black Crappie were harvested during the same period. White Crappie and Black Crappie were present in Lake Somerville surveys, but trap net catch rates since 2000 have been low for both species. In 2004, 2008, and 2012 trap net catch rates for White Crappie were only 1.6/nn, 1.1/nn, and 1.1/nn, respectively. One Black Crappie was captured in 2004, none in 2008, and 13 in 2012. Historically, crappie have been sampled every four years with 15 single-cod, shoreline set trap nets in late fall, with catch rates ranging from 0.1 – 2.3 (2000 – 2012). CPUE as well as the confidence intervals surrounding estimates of abundance and PSD fluctuated considerably. Based on bootstrap analysis of historical data, it would take > 24 trap nets to attain acceptable precision (RSE ≤ 25, N > 50) at least 80% of the time. Crappie will be monitored for presence/absence (**this is the survey objective**) every four years with fall during electrofishing and a spring quarter creel survey (**this is the sample objective**).

**Hybrid Striped Bass:** Palmetto Bass have been stocked in Lake Somerville (when available) since 1975. Most recently Palmetto Bass were stocked in 2011, 2013, 2014, and 2017; Sunshine Bass were also stocked in 2017. Gill net CPUE of Palmetto Bass in the spring surveys were 1.9/nn in 2013, 1.8/nn in 2015, and 0.3/nn in 2017. The majority of Palmetto Bass collected in each survey were available for harvest, with fish between 18 and 27 inches in length. Recent catch rates were much lower than those in 2005 (13.7/nn), but similar to those in 2004 (2.3/nn). The relative abundance of legal-length fish in 2017 (CPUE<sub>18</sub> = 0.3) has decreased slightly since 2013 (CPUE<sub>18</sub> = 1.6). During the 2009-2010 creel survey, 8.9% of the total directed fishing effort by anglers was directed to Palmetto Bass. Only two fish were reported in the 2014/2015 creel; however, numerous emails have been received from anglers targeting Palmetto Bass at Lake Somerville and requesting continued stockings. Palmetto Bass will be monitored for presence/absence (**this is the survey objective**) every four years with spring gill netting and a spring quarter creel survey during 2018 (**this is the sampling objective**) per sampling objectives described for Channel Catfish.

**White Bass:** White Bass were caught in the spring 2017 gill net survey at 12.7/nn, which was higher than the 1.3/nn observed in 2015. During the 2014/2015 creel survey, anglers reported that they spent 12,644 h targeting White Bass. Further, 67,647 White Bass were reported harvested; the 660 observed harvested fish ranged from 10-15 inches. Continuation of population trend data on relative abundance, size structure, body condition, growth, and angler harvest and effort every four years with gill net

sampling and a spring quarter creel survey will allow for the detection of any large-scale fluctuations in the White Bass population that may warrant further investigation (**this is the survey objective**). Bootstrap analysis of historical data predicts 15 randomly set gill nets will collect an adequate sample to accurately calculate CPUE ( $RSE \leq 25$ ) plus PSD and  $W_r$  ( $N > 50$  stock size individuals) with  $> 80\%$  confidence (**this is the sample objective**). If at least 13 specimens are collected between 9.0-10.9 inches in length, they will be used to estimate mean age at legal length (**this is the secondary sample objective**). If targets are not met, no additional gill nets will be set.

**Blue Catfish:** Blue Catfish were caught at 0.3/nn in the spring 2017 gill net survey, which was similar to the 0.7/nn in 2015. Catfishes were the second-most targeted species group at Lake Somerville. During the 2014/2015 creel survey, anglers reported targeting catfishes for 21,163 h, with catch rate at 2.01/h. An estimated 114 Blue Catfish were harvested during the 2014/2015 creel survey; the five observed harvested fish were 16-28 inches total length. Bootstrap analysis of this data predicts it would require  $\geq 45$  randomly set gill nets to reach desired population estimates. Therefore, presence/absence of Blue Catfish will be monitored per sampling objectives used for Channel Catfish.

**Channel Catfish:** Lake Somerville supports a quality Channel Catfish fishery. The gill net catch rates have been variable in the last three surveys, with catch rates of 10.3/nn in 2017, 17.5/nn in 2015, and 10.6/nn in 2013. Catfishes were the second-most targeted species group at Lake Somerville. During the 2014/2015 creel survey, anglers reported targeting catfishes for 21,163 h, with catch rate at 2.01/h. An estimated 36,434 Channel Catfish were harvested during the 2014/2015 creel period; 201 fish were observed as harvested ranging from 12-18 inches total length. Continuation of population trend data on relative abundance, size structure, body condition, and angling effort and catch and harvest of Channel Catfish every four years with gill net sampling and a spring quarter creel survey will allow for the detection of any large-scale fluctuations in the Channel Catfish population that may warrant further investigation (**this is the survey objective**). Bootstrap analysis of historical data predicts 15 randomly set gill nets will collect an adequate sample to accurately calculate CPUE ( $RSE \leq 25$ ) plus PSD and  $W_r$  ( $N > 50$  stock size individuals) with  $> 80\%$  confidence (**this is the sample objective**). No additional gill nets will be set.

**Largemouth Bass:** The electrofishing catch rate in 2016 (117.5/h) was higher than those reported in 2012 (65.5/h) and 2008 (78.0/h). Size distribution was dominated by small ( $< 10$  inches) fish. Largemouth Bass were the most targeted species in the 2014/2015 creel survey. During the creel period, anglers spent 29,970 h targeting Largemouth Bass. Unlike previous surveys, no tournament anglers were interviewed. Angler catch-per-hour was estimated to be 0.19/h. An estimated total of 330 Largemouth Bass were harvested by anglers during the survey. Continued monitoring of population trend data on relative abundance, size structure, body condition, growth, and angling effort and catch and harvest of Largemouth Bass every four years with fall electrofishing and a spring quarter creel survey will allow for the detection of any large-scale fluctuations in the Largemouth Bass population that may warrant further investigation (**this is the survey objective**). Bootstrap analysis of this data suggests reliable population metrics (CPUE;  $RSE \leq 25$ , PSD and  $W_r$ ;  $N > 50$  stock size individuals) can be obtained with 24 randomly selected 5-minute electrofishing stations (**this is the sample objective**). Additional biologist-selected sites will be sampled for Largemouth Bass only in an attempt to collect 13 specimens 13.0-14.9 inches in length to estimate mean age at legal length (**this is the secondary sample objective**).

**Gizzard Shad, Threadfin Shad, and Bluegill:** Gizzard Shad, Threadfin Shad, and Bluegill were the dominant prey fish in Lake Somerville. Sampling Gizzard Shad, Threadfin Shad, and Bluegill at the same intensity as is proposed for Largemouth Bass will provide will allow for the detection of any large-scale fluctuations in the prey population abundance or size structure that may warrant further attention (**this is the survey objective**). Relative weight estimates for Largemouth Bass will be used for supplemental qualitative assessment of prey suitability.

Fishery

**Creel Survey:** An access point angler creel survey will be conducted March 1, 2018 – May 31, 2019 to estimate directed angling effort, catch, harvest, and expenditures for all game fish species. This is a general monitoring creel survey that intends to capture information about all species sought by anglers, economic expenditures, travel distances for anglers, and angling pressure on Lake Somerville fisheries.

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## Water Level

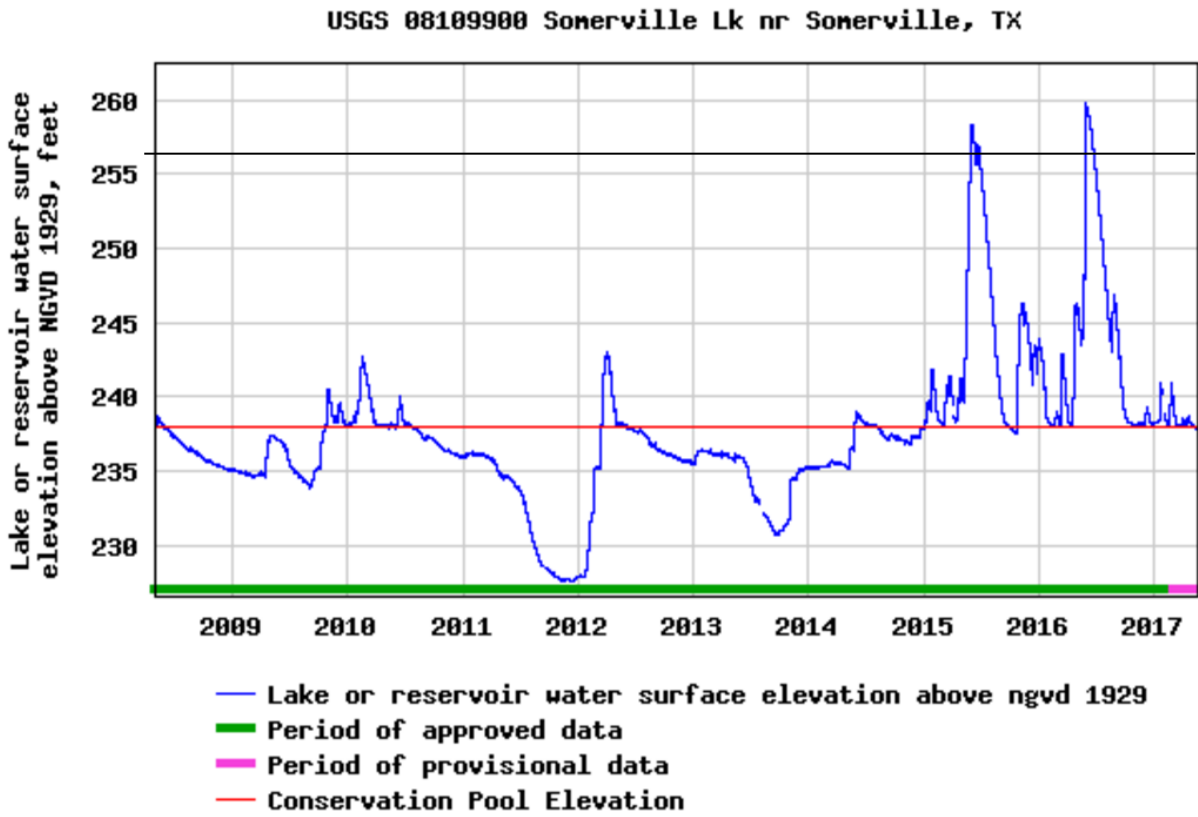


Figure 1. Yearly water level elevations in feet above mean sea level (MSL) recorded for Lake Somerville, Texas.

Table 1. Characteristics of Lake Somerville, Texas.

Characteristic	Description
Year constructed	1967
Controlling authority	U.S. Army Corps of Engineers
County	Washington, Lee, and Burleson
Reservoir type	Tributary
Shoreline Development Index (SDI)	5.2
Shoreline Length	104 miles
Conductivity	290-330 $\mu\text{S}/\text{cm}$

Table 2. Boat ramp characteristics for Lake Somerville, Texas, August 2016. Reservoir elevation at time of survey was 238 feet (MSL).

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Lakeside Marina & Overlook Park	30.29519 -96.66404	Y	25	233	Closed for repairs from flooding
Apache Hills	30.34719 -96.57730	Y	32	235	Open, no access issues
Birch Creek Forest	30.31962 -96.62030	Y	15	234	Open, no access issues
Birch Creek Unit, Lake Somerville State Park	30.30943 -96.61884	Y	80	228	Closed for repairs from flooding
Nails Creek Unit, Lake Somerville State Park	30.29531 -96.66401	Y	27	230	Open, no access issues
Big Creek Park	30.32343 -96.57185	N	8	232	Closed for repairs from flooding
Yegua Creek Park A	30.30737 -96.54563	Y	50	226	Open, no access issues
Yegua Creek Park B	30.30611 -96.53626	Y	20	230	Open, no access issues
Welch Park	30.33857 -96.55160	N	25	231	Open, no access issues
Pecan Lake	30.29036 -96.60568	Y	10	235	Open, unimproved ramp
Lake Somerville Marina & Campground	30.30954 -96.51765	N	50	230	Open, no access issues
Rocky Creek Park A	30.29963 -96.57211	Y	35	226	Open, no access issues
Rocky Creek Park B	30.30597 -96.56443	Y	30	226	Open, no access issues

Table 3. Harvest regulations for Lake Somerville, 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, Palmetto	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum



Table 4. Stocking history of Lake Somerville, Texas. FRY = Fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Blue Catfish	1967	23,000	UNK
	Total	23,000	
Channel Catfish	1967	73,850	UNK
	1968	302,000	UNK
	1973	29,500	UNK
	Total	405,350	
Palmetto Bass	1975	50,000	UNK
	1977	72,649	UNK
	1979	128,000	UNK
	1981	67,416	UNK
	1983	76,912	UNK
	1984	250,576	FGL
	1985	144,271	FGL
	1986	170,600	FGL
	1987	184,600	FGL
	1988	232,497	FGL
	1989	232,497	FGL
	1991	116,651	FGL
	1992	178,626	FGL
	1993	92,723	FGL
	1994	170,800	FGL
	1995	324,800	FGL
	1996	173,638	FGL
	1997	50,215	FGL
	1998	177,621	FGL
	1999	85,436	FGL
	2000	29,800	FGL
	2002	22,020	FGL
	2004	115,312	FGL
	2005	100,175	FGL
	2006	58,085	FGL
2007	58,375	FGL	
2008	110,079	FGL	
2009	80,406	FGL	
2011	80,676	FGL	
2013	107,963	FGL	
2014	50,284	FGL	
2017	69,157	FGL	
Total		3,862,860	
Sunshine Bass	2017	60,545	FGL
	Total	60,545	

Table 4. Stocking history continued.			
Species	Year	Number	Size
Black Crappie	1967	4,000	UNK
	Total	4,000	
White Crappie	1967	4,000	UNK
	Total	4,000	
Sharelunker Largemouth Bass	2009	2,990	FGL
	Total	2,990	
Florida Largemouth Bass	1990	287,680	FRY
	2000	287,680	FGL
	2001	259,707	FGL
	2008	296,657	FGL
	2010	304,656	FGL
	Total	1,436,342	
Walleye	1973	655,000	FRY
	1974	171,000	FRY
	1975	253,200	FRY
	Total	1,079,800	

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

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE – stock	RSE – Stock $\leq$ 25
	Size structure	PSD, length frequency	N $\geq$ 50 stock
	Age-and-growth	Age at 14 inches	N = 13, 13.0 – 14.9 inches
	Condition	$W_r$	10 fish/inch group (max)
	Genetics	% FLMB	N = 30, any age
Crappie	Presence/Absence	Presence/absence	
Bluegill <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq$ 25
	Size structure	PSD, length frequency	N $\geq$ 50
Gizzard Shad <sup>a</sup>	Abundance	CPUE – Total	RSE $\leq$ 25
	Size structure	PSD, length frequency	N $\geq$ 50
	Prey availability	IOV	N $\geq$ 50
<i>Gill Netting</i>			
Channel Catfish	Abundance	CPUE – stock	RSE – Stock $\leq$ 25
	Size structure	PSD, length frequency	N $\geq$ 50 stock
Blue Catfish	Presence/absence	Presence/absence	
Flathead Catfish	Presence/absence	Presence/absence	
White Bass	Abundance	CPUE – stock	RSE – Stock $\leq$ 25
	Size structure	PSD, length frequency	N $\geq$ 50 stock
	Age-and-growth	Age at 10 inches	N = 13, 9.0 – 10.9 inches
	Condition	$W_r$	10 fish/inch group (max)
Palmetto Bass	Presence/absence	Presence/absence	

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq$  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 structural habitat types, Lake Somerville, Texas, 2016. Shoreline habitat type units are in miles and standing timber is acres. Water level at time of survey was 244 (MSL).

Habitat type	Estimate	% of total
Bulkhead with boat docks	0.6 miles	0.7
Riprap	0.7 miles	0.8
Non-descript/Un-vegetated	81.6 miles	94.4
Rocky	3.5 miles	4.1
Dead timber/dead vegetation	246.2 acres	2.1

Table 7. Survey of aquatic vegetation, Lake Somerville, Texas, 2012-2016. Surface area (acres) is listed with percent of total reservoir surface area in parentheses. Water level at time of survey was 244 (MSL)

Vegetation	2012	2016
Native submersed	5.7 (0.05)	0.0 (0.0)
Native floating-leaved	28.2 (0.2)	0.0 (0.0)
Native emergent	19.3 (0.2)	0.0 (0.0)
Non-native		
Giant Cane (Tier III)*	26.8 (0.2)	0.0 (0.0)
Hydrilla (Tier II)*	34.2 (0.3)	0.0 (0.0)

\*Tier II is Maintenance, Tier III is Watch Status

Table 8. Percent directed angler effort by species for Lake Somerville, Texas, 2009-2010 and 2014-2015. Survey periods were from 1 June through May 31 for 2009-2010 and 1 March through 28 February for 2014-2015. The 2009/2010 creel survey was a roving survey and the 2014/2015 creel survey was an access point survey.

Species	2009/2010	2014/2015
Catfishes	18.3	21.9
White Bass	2.3	13.1
Palmetto Bass	4.0	8.9
Largemouth Bass (combined LMB and Black Basses)	45.2	31.1
Crappies	20.8	8.2
Panfishes	0.0	0.9
Anything	9.0	15.9

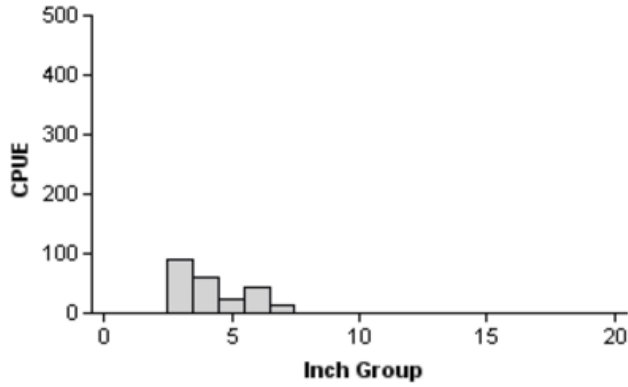
Table 9. Total fishing effort (h) for all species and total directed expenditures at Lake Somerville, Texas, 2009-2010 and 2014-2015. Survey periods were from 1 June through May 31 for 2009-2010 and 1 March through 28 February for 2014-2015. Relative standard error is in parentheses.

Creel statistic	2009/2010	2014/2015
Total fishing effort	31,798 (13)	96,435 (23)
Total directed expenditures	\$267,171 (31)	\$719,909 (41)

## Gizzard Shad

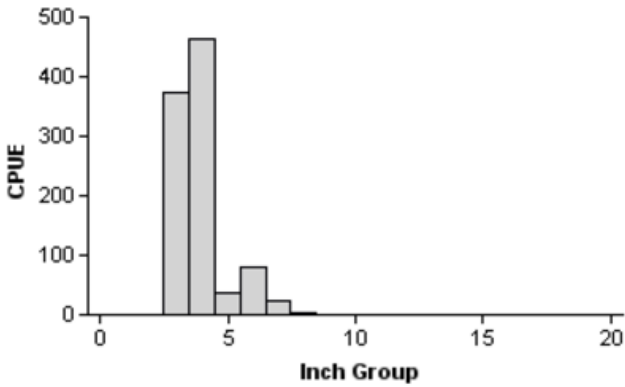
2008

Effort = 2.0  
 Total CPUE = 231.5 (20; 463)  
 IOV = 99 (1)



2012

Effort = 2.0  
 Total CPUE = 1,111.5 (21; 2223)  
 IOV = 88 (3)



2016

Effort = 2.0  
 Total CPUE = 219.5 (21; 439)  
 IOV = 95 (2)

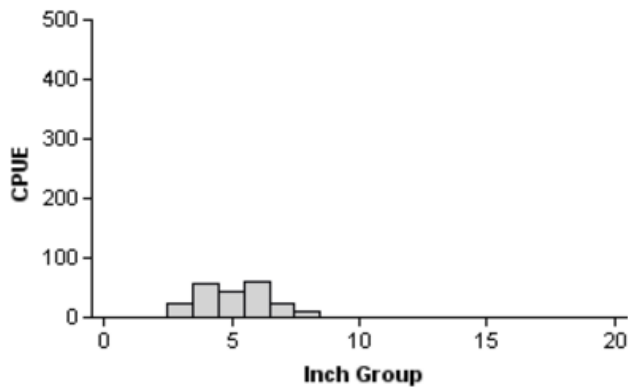


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Somerville, Texas, 2008, 2012, and 2016.

# Bluegill

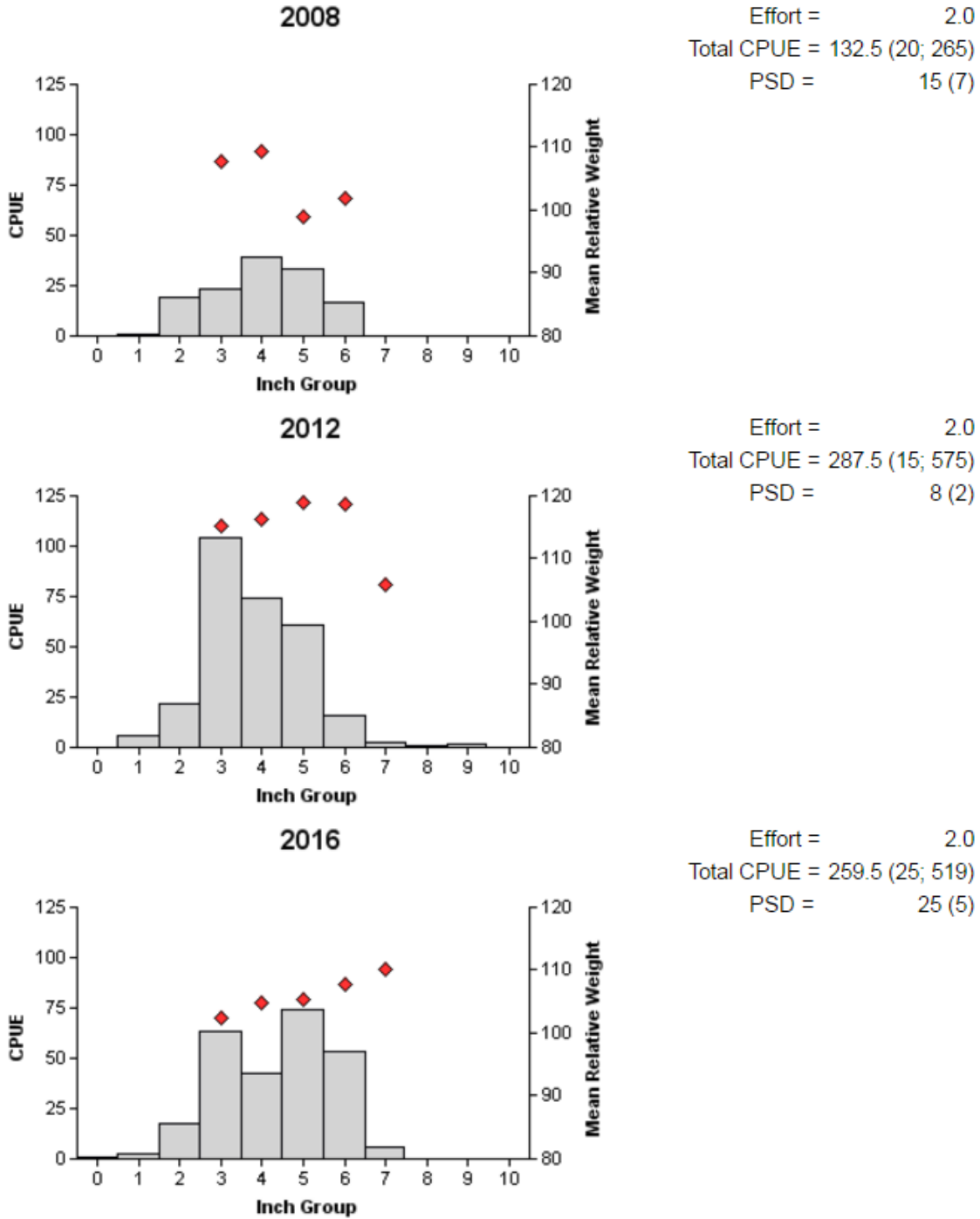


Figure 3. Number of Bluegill caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Somerville, Texas, 2008, 2012, and 2016.

## Channel Catfish

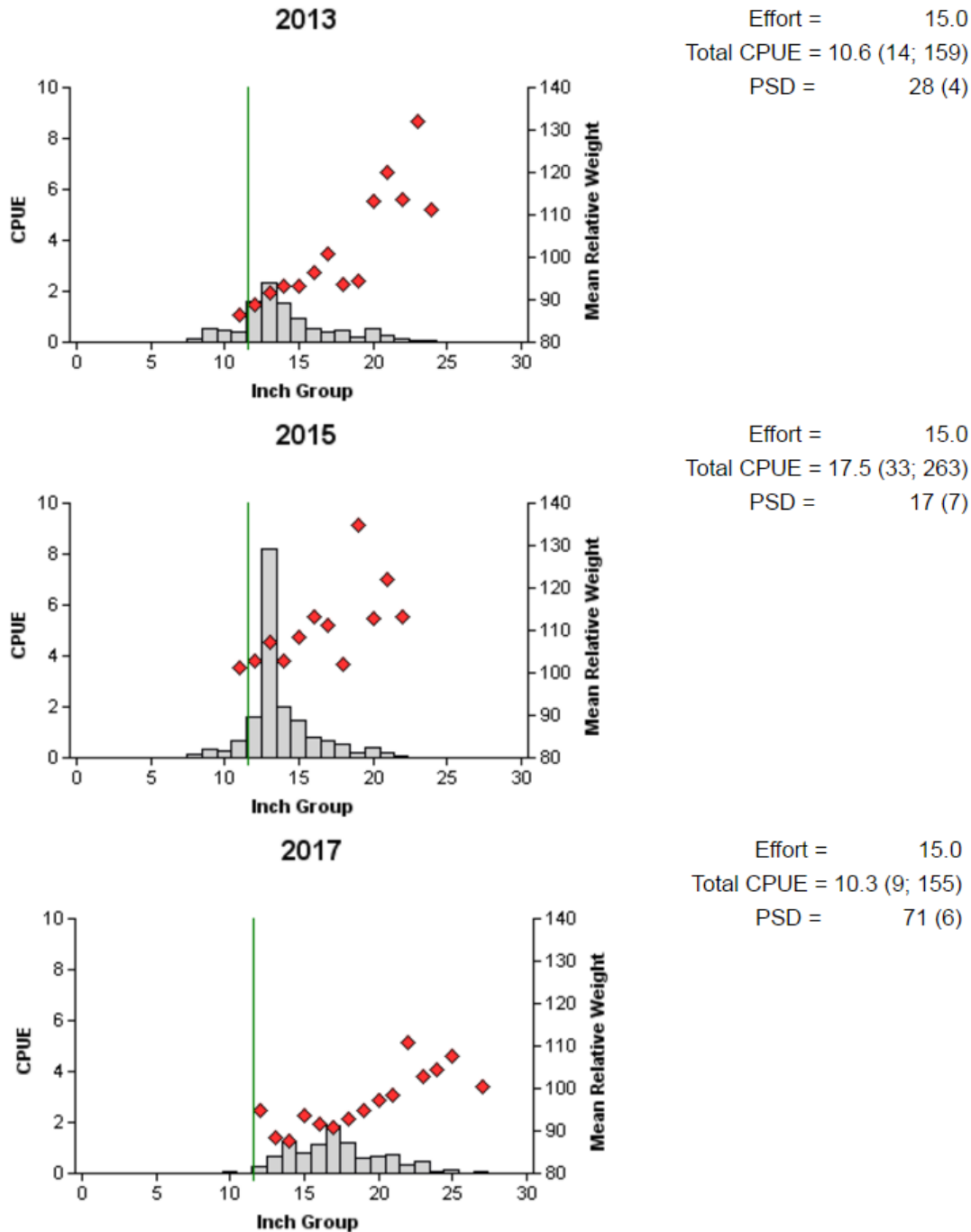


Figure 4. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Somerville, Texas, 2013, 2015, and 2017. Vertical line indicates the minimum length limit.



## Channel Catfish

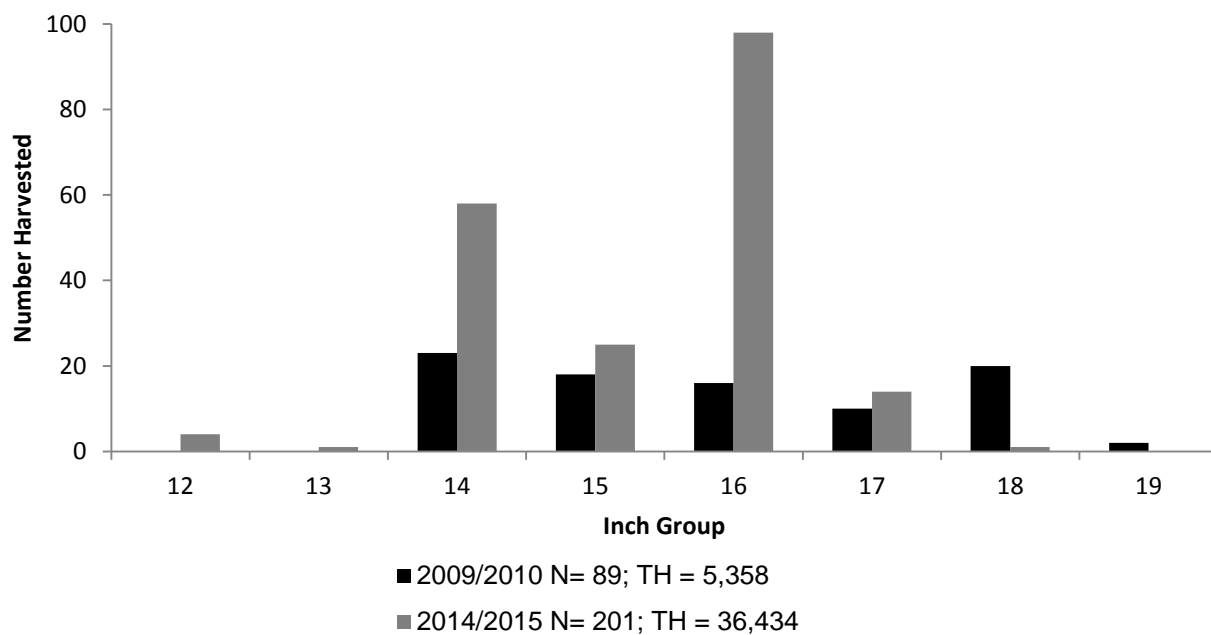


Figure 5. Length frequency of harvested Channel Catfish observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Blue Catfish

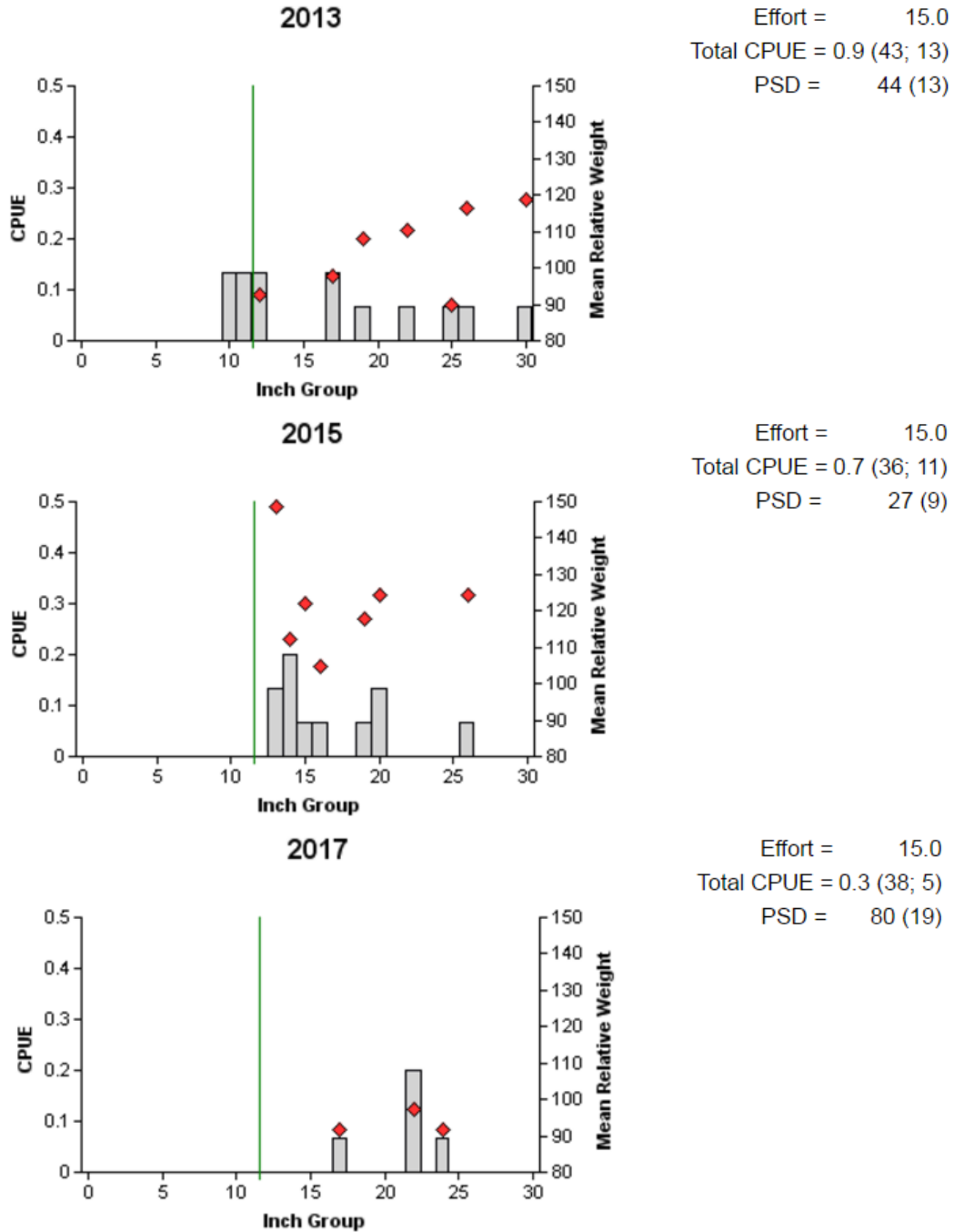


Figure 6. Number of Blue Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Somerville, Texas, 2013, 2015, and 2017. Vertical line indicates the minimum length limit.

## Blue Catfish

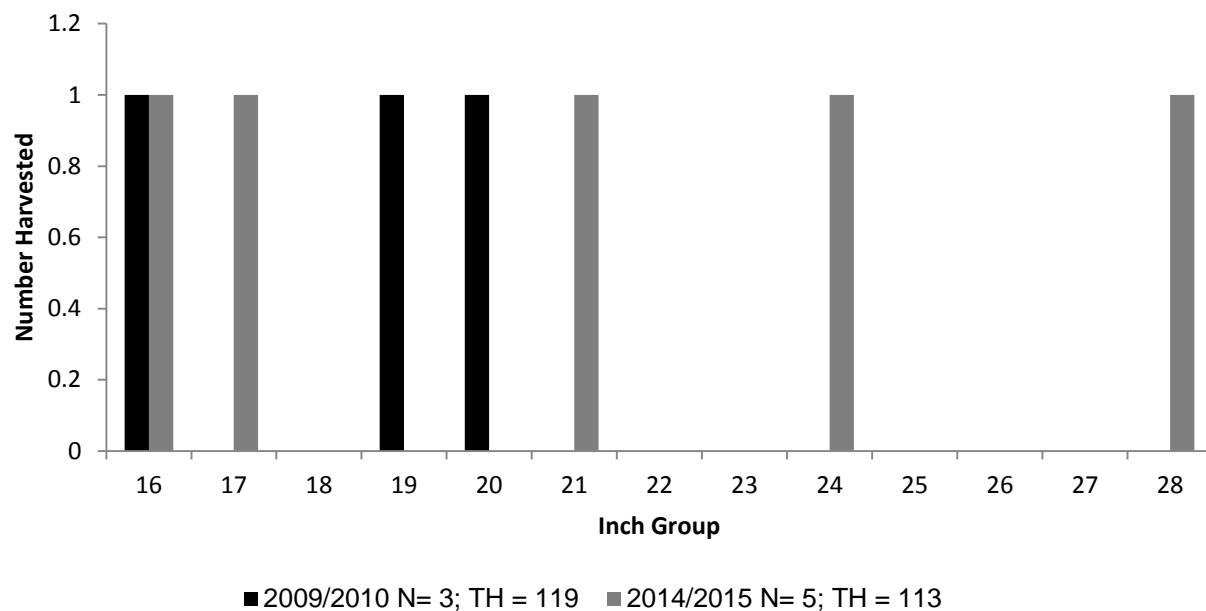


Figure 7. Length frequency of harvested Blue Catfish observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Catfishes

Table 10. Creel survey statistics for catfishes at Lake Somerville, Texas, from June 2009 through May 2010 and March 2014 through February 2015. Directed effort is combined effort for Channel Catfish and Blue Catfish. Total catch per hour by species is reported for anglers targeting catfish, and total harvest is the estimated number of Channel Catfish and Blue Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2009/2010	2014/2015
Surface area (acres)	11,456	11,456
Directed effort (h)	5,456.84 (24)	21,162.84 (47)
Directed effort/acre	0.48 (24)	1.85 (47)
Total catch per hour		
Channel Catfish	0.99 (33)	2.00 (25)
Blue Catfish	0.06 (196)	0.01 (107)
Total harvest		
Channel Catfish	5,358 (26)	36,434 (28)
Blue Catfish	297 (193)	114 (107)
Total harvest/acre		
Channel Catfish	2.15 (26)	3.18 (28)
Blue Catfish	0.03 (193)	0.01 (107)
Percent legal released		
Channel Catfish	2.3	1.1
Blue Catfish	0.0	0.0

## White Bass

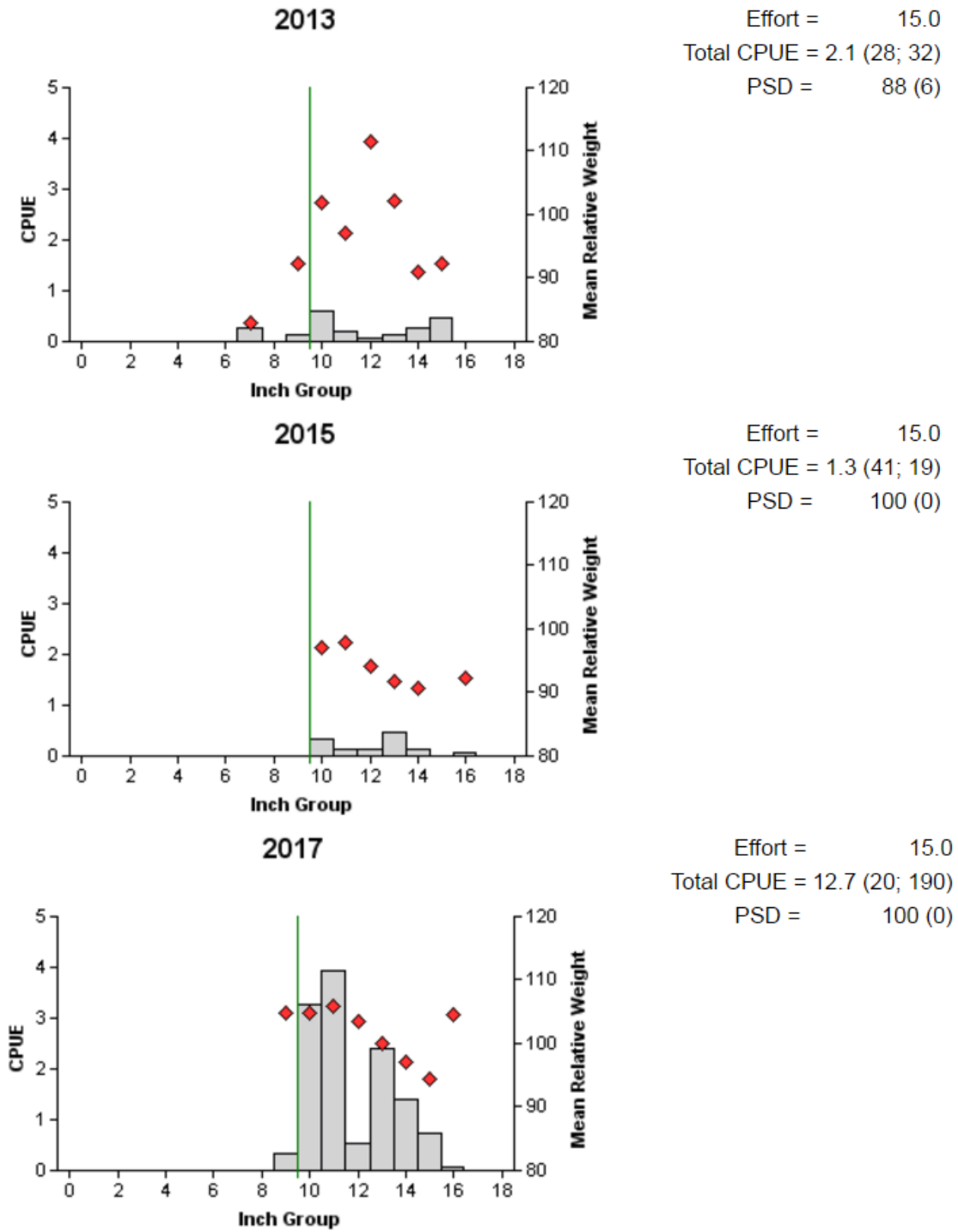


Figure 8. Number of White Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Somerville, Texas, 2013, 2015, and 2017. Vertical line indicates the minimum length limit.

## White Bass

Table 11. Creel survey statistics for White Bass at Lake Somerville, Texas, from June 2009 through May 2010 and March 2014 through February 2015. Total catch per hour is for anglers targeting White Bass, and total harvest is the estimated number of White Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2009/2010	2014/2015
Surface area (acres)	11,456	11,456
Directed effort – White Bass (h)	672.90 (71)	12,644 (38)
Directed effort/acre – White Bass	0.06 (71)	1.10 (38)
Total catch per hour	0.81 (167)	8.24 (32)
Total harvest	660 (168)	67,647 (44)
Harvest/acre	0.06 (168)	5.90 (44)
Percent legal released	0.0	4.3

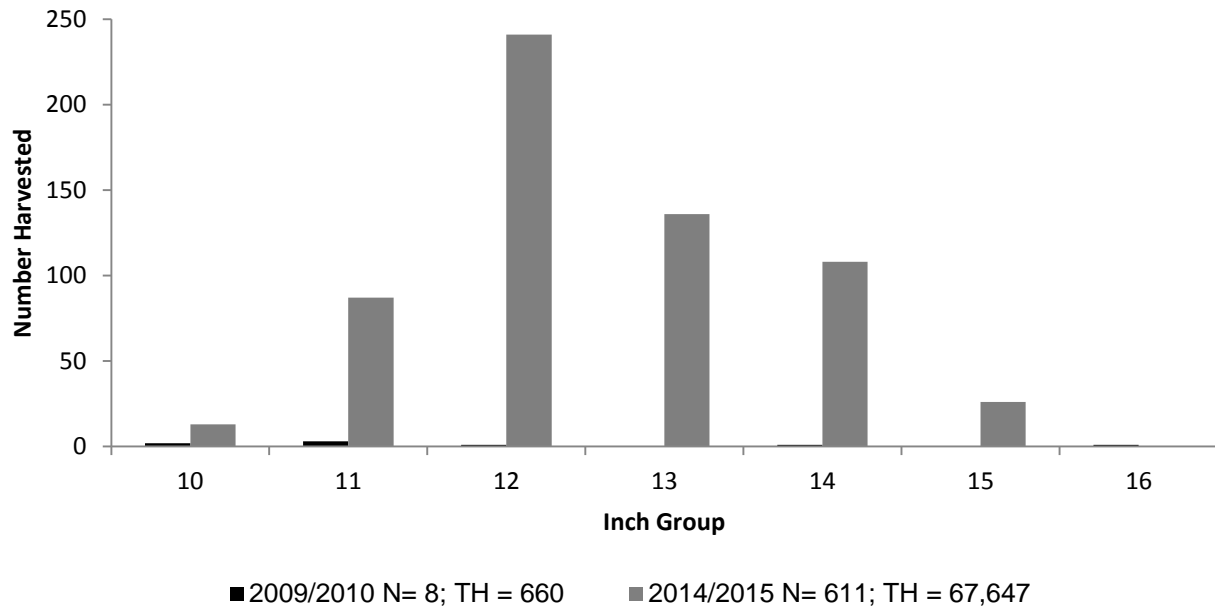


Figure 9. Length frequency of harvested White Bass observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Palmetto Bass

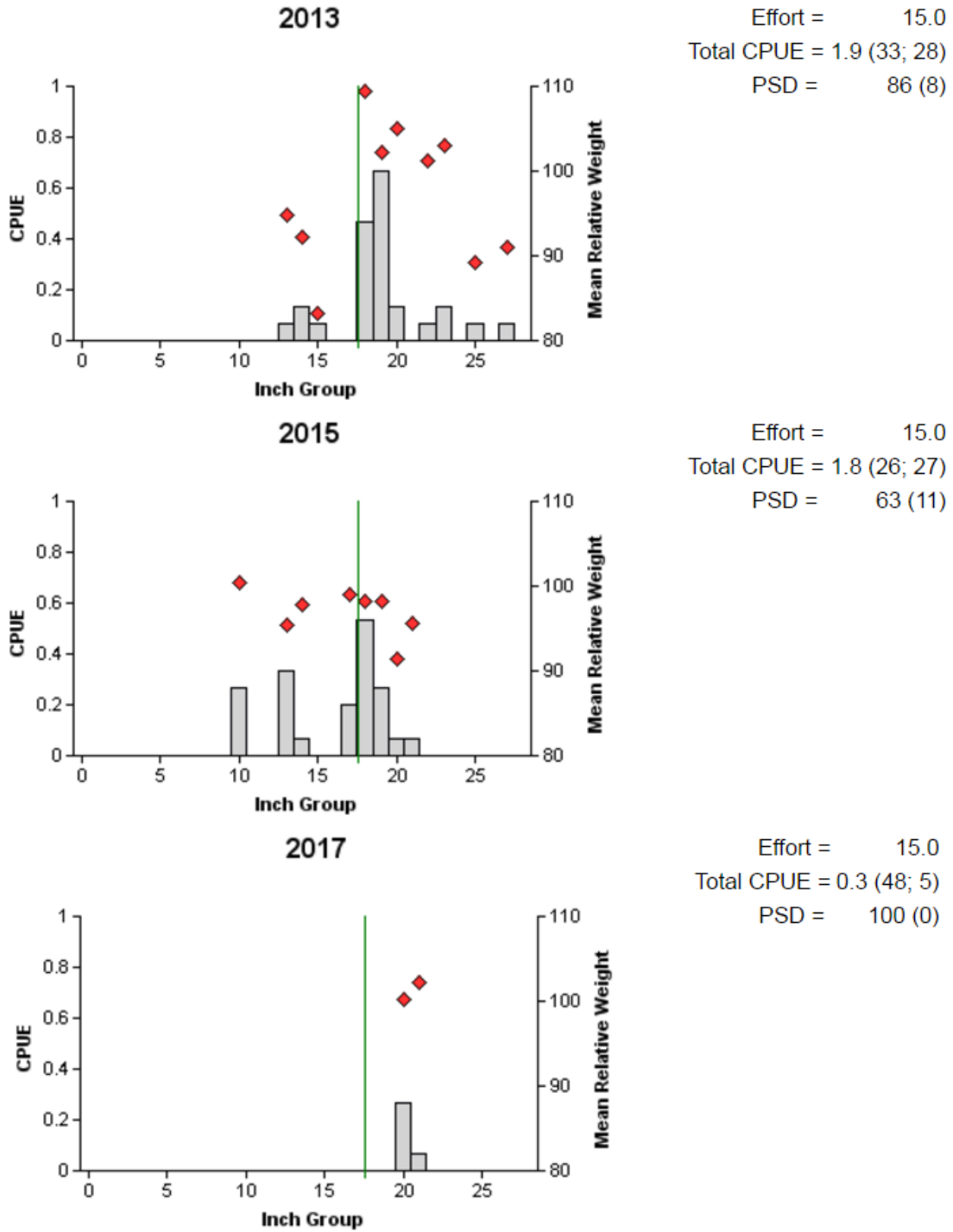


Figure 10. Number of Palmetto Bass caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N are in parentheses) for spring gill net surveys, Lake Somerville, Texas, 2013, 2015, and 2017. Vertical line indicates the minimum length limit.

## Palmetto Bass

Table 12. Creel survey statistics for Palmetto Bass at Lake Somerville, Texas, from June 2009 through May 2010 and March 2014 through February 2015. Total catch per hour is for anglers targeting Palmetto Bass, and total harvest is the estimated number of Palmetto Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year	
	2009/2010	2014/2015
Surface area (acres)	11,456	11,456
Directed effort (h)	143.37 (142)	8,598.60 (38)
Directed effort/acre	0.01 (142)	0.75 (38)
Total catch per hour	0 (0)	1.24 (84)
Total harvest	0 (0)	220 (750)
Harvest/acre	0 (0)	0.02 (750)
Percent legal released	0.0	0.0

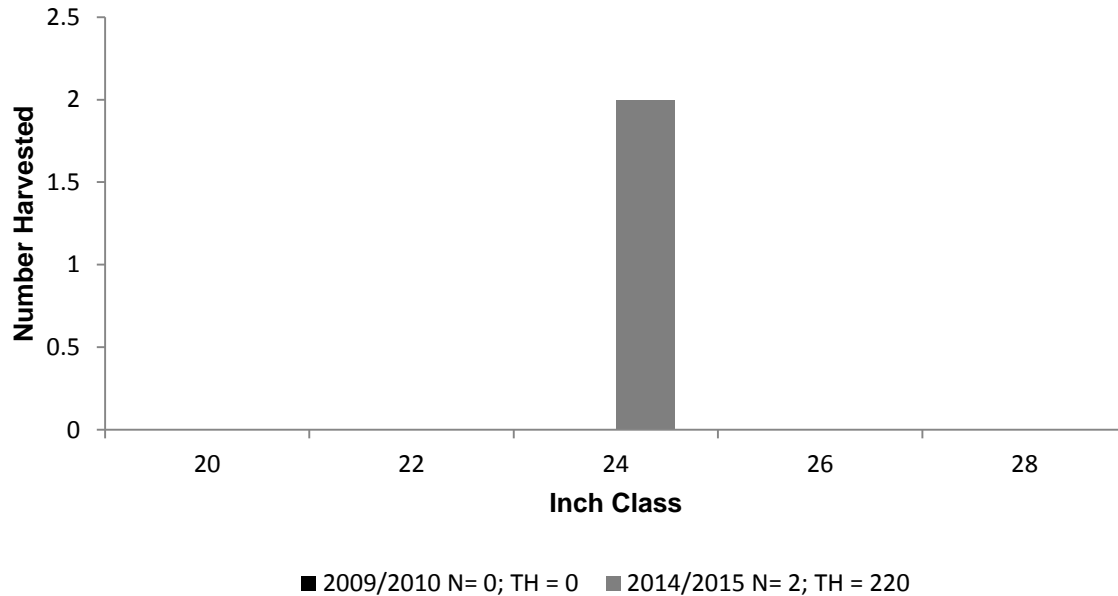


Figure 11. Length frequency of harvested Palmetto Bass observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested Palmetto Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.



## Largemouth Bass

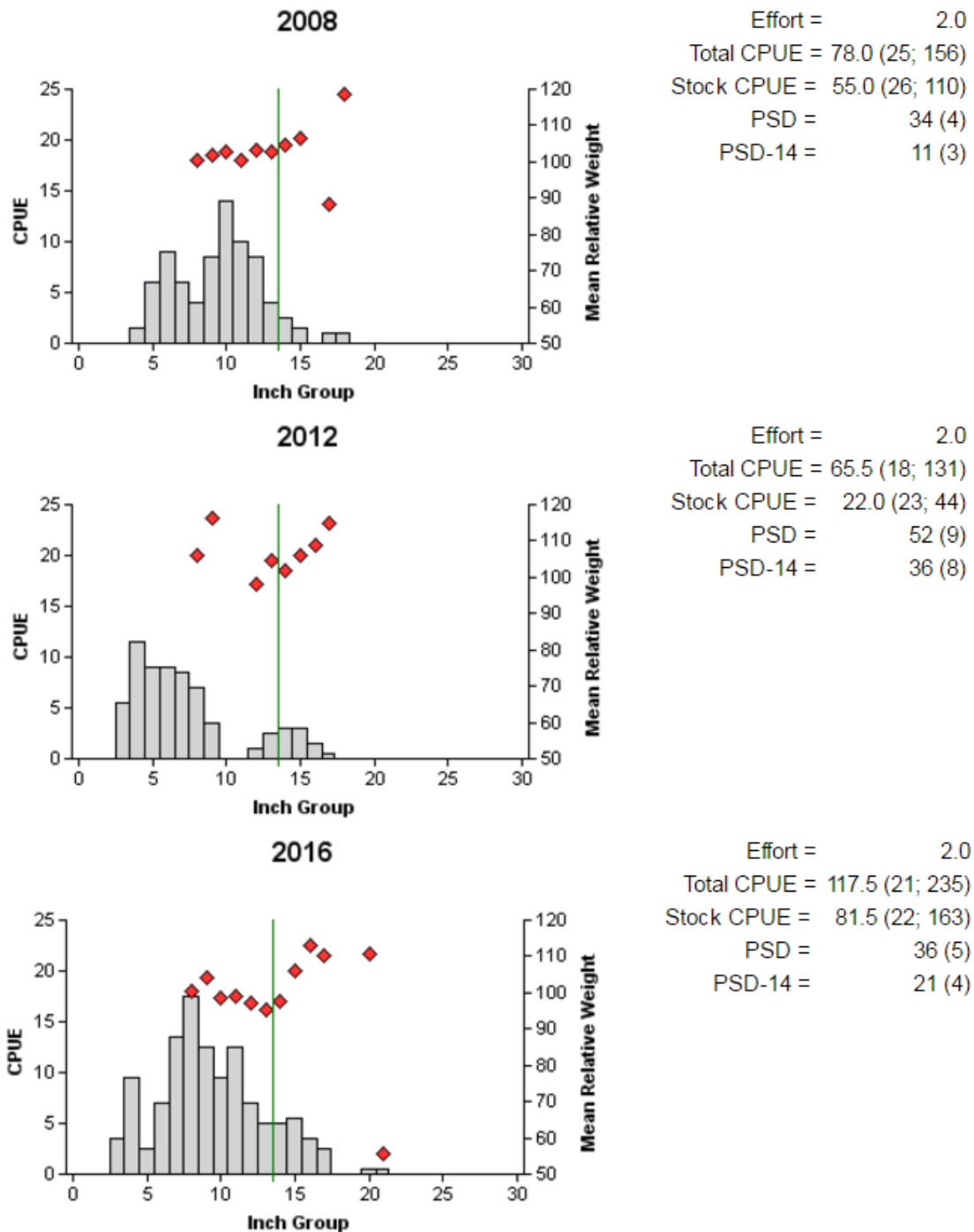


Figure 12. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Somerville, Texas, 2008, 2012, and 2016. Vertical line indicates the minimum length limit.

## Largemouth Bass

Table 13. Creel survey statistics for Largemouth Bass at Lake Somerville, Texas, from June 2009 through May 2010 and March 2014 through February 2015. Directed angling effort is for all anglers targeting Largemouth Bass. Catch rate is for all anglers targeting Largemouth Bass. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. The estimated number of fish released by weight category is for anglers targeting Largemouth Bass. Relative standard errors (RSE) are in parentheses.

Statistic	Year	
	2009/2010	2014/2015
Surface area (acres)	11,456	11,456
Directed angling effort (h)		
Tournament	2,986.97 (35)	0 (0)
Non-tournament	10,527.83 (22)	29,970.48 (33)
All black bass anglers combined	13,514.80 (25)	29,970.48 (33)
Angling effort/acre	1.18 (25)	2.62 (33)
Catch rate (number/h)	0.14 (97)	0.19 (73)
Harvest		
Non-tournament harvest	231 (202)	330 (671)
Harvest/acre	0.02 (202)	0.03 (671)
Tournament weigh-in and release	180.10 (82)	0 (0)
Release by weight		
<4.0 lbs	N/A	5,356 (91.2)
4.0-6.9 lbs		0 (0)
7.0-9.9 lbs		0 (0)
≥10.0 lbs		0 (0)
Percent legal released (non-tournament)	26.1	68.0

## Largemouth Bass

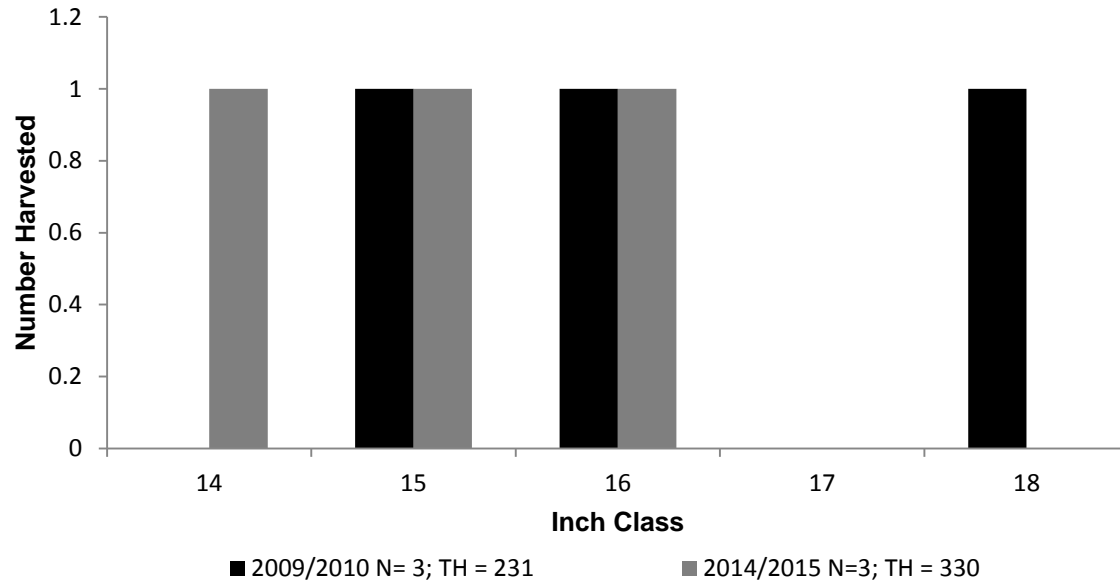


Figure 13. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the estimated non-tournament harvest for the creel

## White Crappie

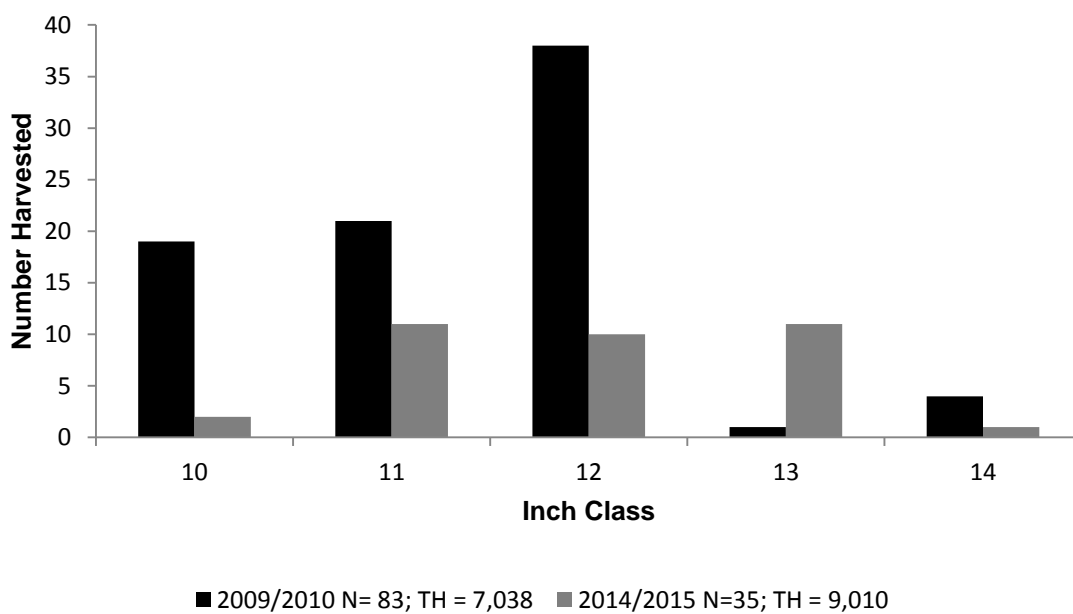
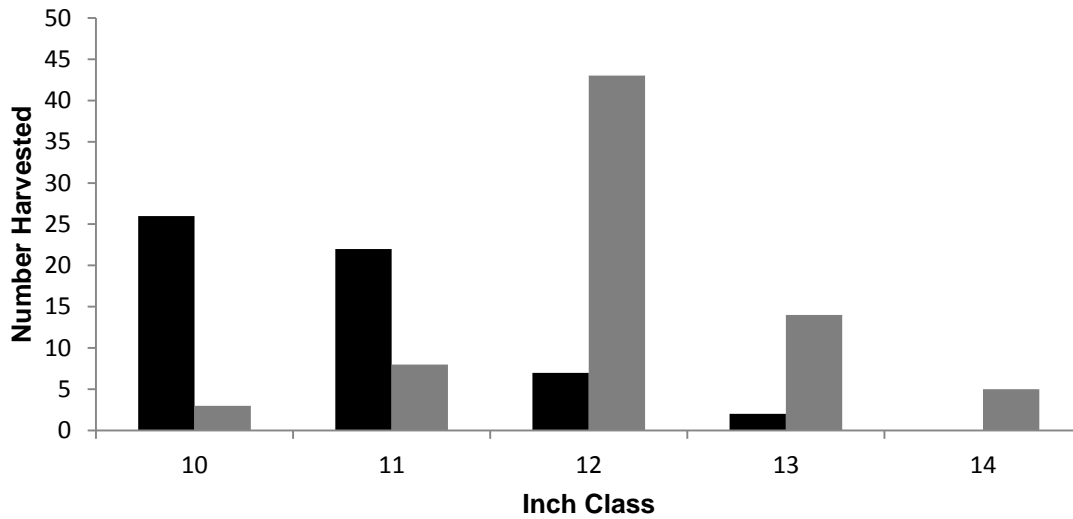


Figure 14. Length frequency of harvested White Crappie observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested White Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Black Crappie



■ 2009/2010 N= 57; TH = 3,555 ■ 2014/2015 N=73; TH = 13,673

Figure 15. Length frequency of harvested Black Crappie observed during creel surveys at Lake Somerville, Texas, June 2009 through May 2010 and March 2014 through February 2015, all anglers combined. N is the number of harvested Black Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

## Crappies

Table 14. Creel survey statistics for crappies at Lake Somerville, Texas, from June 2009 through May 2010 and March 2014 through February 2015. Total catch per hour by species is reported for anglers targeting crappies, and total harvest is the estimated number of White Crappie and Black Crappie harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel Survey Statistic	Year	
	2009/2010	2014/2015
Surface area (acres)	11,456	11,456
Directed effort (h)	6,224.24 (24)	7,928.81 (38)
Directed effort/acre	0.54 (24)	0.69 (38)
Total catch per hour		
White Crappie	1.12 (49)	2.94 (33)
Black Crappie	1.05 (27)	3.68 (32)
Total harvest		
White Crappie	7,038 (78)	9,010 (58)
Black Crappie	3,555 (47)	13,637 (65)
Harvest/acre		
White Crappie	0.61 (78)	0.79 (58)
Black Crappie	0.31 (47)	1.19 (65)
Percent legal released		
White Crappie	0.0	3.3
Black Crappie	0.0	0.0

Table 15. Proposed sampling schedule for Lake Somerville, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

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

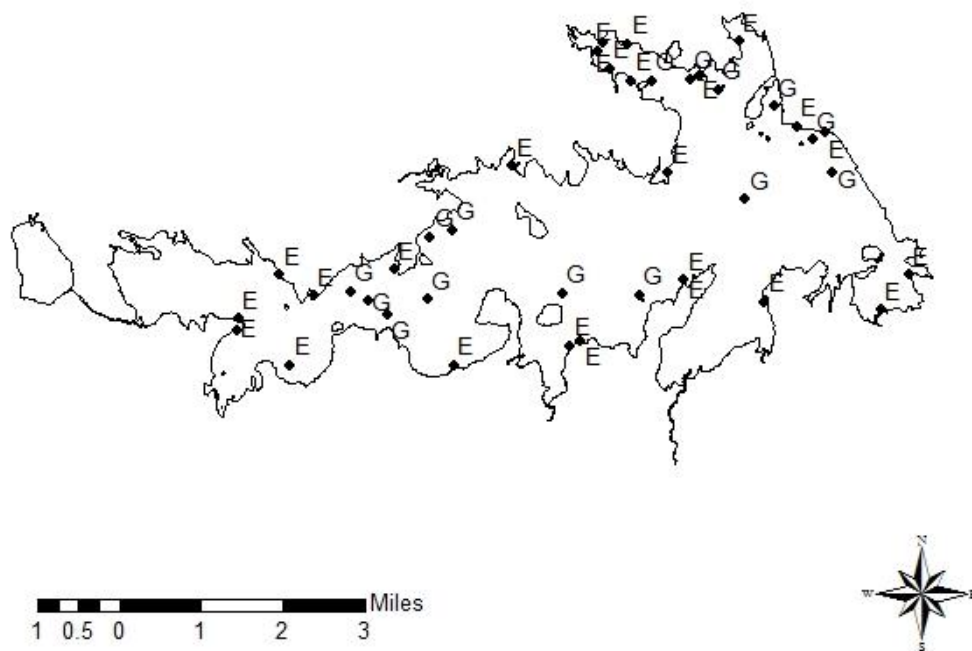
## APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Somerville, Texas, 2016-2017. Sampling effort was 15 net nights for gill netting and 2 hours for electrofishing.

Species	Gill Netting		Electrofishing	
	N	CPUE	N	CPUE
Spotted Gar	31	2.07		
Longnose Gar	2	0.13		
Alligator Gar	9	0.60		
Gizzard Shad	247	16.47	439	219.50
Threadfin Shad			1,167	583.50
Common Carp	8	0.53		
Golden Shiner	1	0.07		
Inland Silverside			74	37.00
Brook Silverside			1	0.50
River Carpsucker	4	0.27		
Smallmouth Buffalo	239	15.93		
Blue Catfish	5	0.33		
Channel Catfish	155	10.33		
White Bass	190	12.67		
Palmetto Bass	5	0.33		
Warmouth			11	5.50
Bluegill	32	2.13	519	259.50
Longear Sunfish	1	0.07	47	23.50
Redear Sunfish			17	8.50
Largemouth Bass	14	0.93	235	117.50
White Crappie	25	1.67	4	2.00
Black Crappie	26	1.73	4	2.00
Bigscale Logperch			2	1.00
Freshwater Drum	16	1.07		

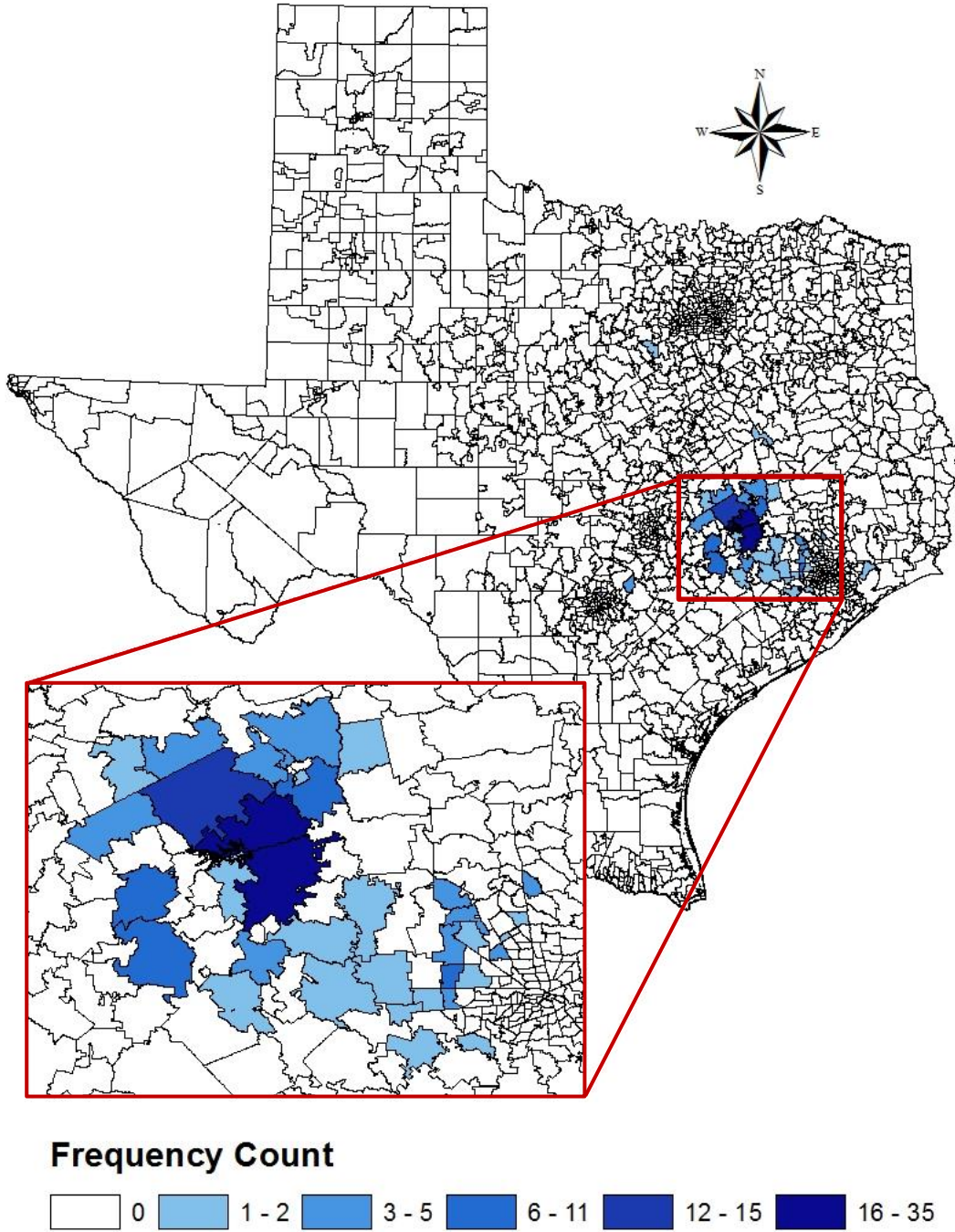


## APPENDIX B



Location of sampling sites, Lake Somerville, Texas, 2016-2017. Gill net and electrofishing stations are indicated by G and E, respectively. Water level was at full pool at time of sampling.

APPENDIX C



Location, by ZIP code, and frequency of anglers that were interviewed at Lake Somerville, Texas, during the March 2014 through February 2015 creel survey.