PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Lake Winnsboro

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July 31, 2015

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Winnsboro were surveyed in 2014 using electrofishing and trap netting and in 2015 using gill netting. Bass-only electrofishing was also conducted in 2012. An aquatic vegetation survey was conducted on Lake Winnsboro during August 2014. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Winnsboro is an 875 acre impoundment located in Wood County, Texas on Big Sandy Creek, a tributary of the Sabine River. It was constructed by Wood County for flood control and recreation. The majority of the lake's perimeter is natural shoreline, and the major aquatic habitat components are native emergent aquatic species and boat docks or piers. Less than 5% of the shoreline is modified with bulkhead or rocky shoreline.

- **Management history:** Important sport fish include Largemouth Bass, crappie, and Channel Catfish. Largemouth Bass population trend data has been collected through biennial electrofishing. Florida Largemouth Bass were stocked in 1998, 1999, and in 2015. Planting of the native emergent aquatic species American waterwillow was initiated in 2010 to increase availability of aquatic habitat in the reservoir.

- **Fish community**
  - **Prey species:** Gizzard and Threadfin Shad are present in Lake Winnsboro. Catch rates of Bluegill were high, and the population is dominated by small individuals (<4 inches).

  - **Channel Catfish:** The Channel Catfish population is of high quality, with many fish above the minimum-length limit. There is evidence of good natural recruitment, and relative weights are favorable. No Blue or Flathead Catfish were collected during the 2015 survey.

  - **Largemouth Bass:** The Largemouth Bass population has historically produced trophy-sized fish. The current population is dominated by small fish, with moderate abundance of fish stock-size or larger.

  - **Crappies:** Black and White Crappie are present in Lake Winnsboro. Black Crappie are the dominant species.

Management strategies: Continue to monitor the Largemouth Bass population using standard fall electrofishing and an additional spring electrofishing survey in 2016. Document angler-reported catches of trophy-sized fish through a spring creel survey in 2019 and through tournament results. Continue with standard monitoring of the Channel Catfish population using gill netting. Continue efforts to establish native vegetation to enhance aquatic habitat.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Winnsboro in 2014-2015. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2014-2015 data for comparison.

Reservoir Description

Lake Winnsboro is an 875 acre impoundment in Wood County constructed in 1962 on Big Sandy Creek, a tributary of the Sabine River. Primary water uses include flood control and recreation. Shoreline modification, consisting of bulkhead and rocky shoreline, accounts for <5% of lakeshore. Other descriptive characteristics for Lake Winnsboro are shown in Table 1.

Angler Access

Boat access consists of three public boat ramps. Bank fishing access was present near all public boat ramps, and along three bridges in the upper end of the reservoir. A fishing barge is also available for public access near the reservoir dam. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Storey 2011) included:

1. Enhancement of Largemouth Bass fishery.
   Action: Electrofishing surveys were conducted in 2012 and 2014 to monitor the Largemouth Bass population, and a genetics sample was obtained in fall 2014. Stocking of surplus Florida Largemouth Bass fry was conducted in 2015. Angler catches of trophy size Largemouth Bass were documented within a 2015 creel survey.
2. Diversify and enhance aquatic habitat.
   Action: Waterwillow has been planted at multiple sites in Lake Winnsboro since 2010, and has subsequently spread naturally throughout the reservoir. Efforts to introduce waterwillow to additional areas and expand coverage around the reservoir continue.
3. Increase awareness of Lake Winnsboro fisheries resources.
   Action: Lake Winnsboro has the potential for quality crappie and Channel Catfish fishing. Promotion of the available fisheries has occurred through word of mouth communication and through social media.

Harvest regulation history: Sport fishes in Lake Winnsboro are currently managed with statewide regulations (Table 3).

Stocking history: Lake Winnsboro was most recently stocked with Florida Largemouth Bass fry in 2015. Florida Largemouth Bass (FLMB) were introduced in 1974 (55,100 fingerlings) and stocked again in 1998 and 1999. Blue Catfish were introduced in 1977 and stocked twice more. Channel Catfish were introduced in 1982 and Flathead Catfish were introduced in 1977. The complete stocking history is shown in Table 4.

Vegetation/habitat management history: The shoreline of Lake Winnsboro has historically been dominated by natural shoreline with limited emergent vegetation (Storey 2011). Alligatorweed is also present around the shoreline of Lake Winnsboro and provides additional habitat for small fishes. Efforts to establish native waterwillow were successful and the plants have spread throughout the reservoir.

Water Transfer: There are no interbasin transfers of water from Lake Winnsboro.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (10 net nights at 10 stations), and trap netting (10 net nights at 10 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill netting and trap netting as the number of fish caught per net night (fish/nn). Surveys were conducted to achieve survey and sampling objectives in accordance with a 2014/2015 objective-based sampling (OBS) plan (Appendix D). All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

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

Aquatic vegetation and angler access surveys were performed according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Vegetation was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

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 (Wr)] 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. For Largemouth Bass, ages were determined using otoliths from 5 to 10 fish per inch group, and additional daytime electrofishing (3 h) was conducted in October 2014 to supplement the sample collected during nighttime electrofishing. For Channel Catfish and Black Crappie, ages were determined using fish from one-inch class below to one-inch class above the legal length limit. Additional crappie for aging were collected from angler-caught fish.

For Largemouth Bass, an age-length key was created using the otoliths from 106 fish collected by standard and supplemental electrofishing in October 2014. This age-length key was applied to the length frequency distribution from the standard fall electrofishing sample to produce a catch curve of the population. Data from age classes 0 and 1 were not fully vulnerable, or recruited, to the gear and were excluded from analysis. The number of fish in each age class from age-2 to age-7 were log-transformed and regressed using the method described by Robson and Chapman (1961). To compensate for age classes with no observations, one fish was added to each class since the natural log of zero cannot be computed. The slope of the regression was defined as the instantaneous rate of natural mortality (Z). Survival was calculated as $(S) = e^{-Z}$ and Total Annual Mortality equaled $(A) = 1\text{-}S$. A weighted regression technique was employed using Fishery Analysis and Simulation Tools (FAST) software (Slipke and Maceina 2000) in order to reduce the influence of rarer older fish and missing age class data when computing the slope of the regression.

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2014 and by electrophoresis for previous years.

Water level was visually estimated for Lake Winnsboro at time of aquatic vegetation survey because the reservoir does not maintain a gauging station.

RESULTS AND DISCUSSION

Habitat: A structural habitat survey was not conducted in 2014, and habitat has remained relatively unchanged from the previous survey conducted in 2010 (Storey 2011). Native emergent vegetation and piers/docks are the most common habitat features at Lake Winnsboro. Aquatic habitat in Lake Winnsboro is limited to emergent shoreline vegetation. Only eight acres of combined species coverage was observed during the vegetation survey, representing 1% of the lake's surface area (Table 5). District staff has maintained efforts to establish native aquatic vegetation in Lake Winnsboro in 2010 and subsequent years by planting waterwillow harvested from Lake Holbrook in the reservoir. Waterwillow has naturally expanded around the perimeter of the reservoir and was estimated to cover approximately 2.2 acres in summer 2014.

Creel: Directed angler effort was highest for Largemouth Bass, with 51% of total angler effort targeting this species. Live-release tournaments were responsible for 73% of the effort for Largemouth Bass (Table 6). Crappie were the second most sought after species at Lake Winnsboro, comprising 29% of total fishing effort, followed by Channel Catfish which accounted for 16% of angler effort during the spring creel survey. Total fishing effort at Lake Winnsboro from 1 March through 31 May 2015 was 15,686 h and directed expenditures were $98,944 (Table 7). Anglers traveled from throughout East Texas and from the Dallas/Ft. Worth area to fish Lake Winnsboro, many of whom traveled to participate in small bass tournaments (Appendix C).

Prey species: Total CPUE of Gizzard Shad in 2014 was similar (178.0/h) to previous years (194.0/h and 184.0/h in 2002 and 2006, respectively), but down from CPUE in 2010 (281.0/h). The population was dominated by fish less than 5-inches in length (Figure 1). Index of vulnerability (IOV) for Gizzard Shad was high, with 96% of Gizzard Shad available as prey to predators. The CPUE of Bluegill was high (1,411/h), up from 582.0/h in 2010 and 158.0/h in 2006. The Bluegill population was dominated by fish less than 4 inches in length (Figure 2). Sunfish accounted for just 3% of the total directed effort in the spring 2015 creel survey (Table 6). Anglers harvested an estimated 3.4 fish/acre during the three-month creel period (Table 8; Figure 3). Although Redear Sunfish are usually an important component of the sunfish community and historically supported a popular fishery in Lake Winnsboro, Redear were not collected in 2014 and CPUE in 2010 was much lower (3.0/h) than it was in previous years (2002, 128.0/h; 2006, 172.0/h). Longear Sunfish are also present in moderate abundance (CPUE = 111/h, 2014) and provide an additional forage fish.

Channel Catfish: Gill net surveys in the past have characterized the Channel Catfish population as one of low relative abundance. Historically, the majority of the fish collected were larger than the minimum length limit and few fish less than stock length (11 inches) were encountered, implying recruitment was limited. The gill net catch rate of Channel Catfish in 2011 (39.6/nn) was higher by a factor of ten than it was in 2007 (Figure 4). Catch rates in 2015 (10.2/nn) were lower than in 2011, but a majority of the fish (74%) were of legal size. A total of 82 stock-sized Channel Catfish with an RSE of 23 were collected in 2015 sampling which satisfied the sampling goals of the OBS plan. Relative weights of fish suggest Channel Catfish have an adequate prey base. Average age at 12-inches was 4.5 years (N = 15, range = 11.3 to 12.9 inches). This population currently provides an excellent fishery, and directed angler effort during a spring creel survey was 2,745 h. Channel Catfish were the third most targeted species at Lake Winnsboro in spring 2015 (Table 6). Catfish anglers caught an average of 1.22 fish/h and harvested an estimated 2.1 fish/acre of Channel Catfish during the spring creel survey (Table 9; Figure 5). Although Blue Catfish were stocked in the past, a fishery has never been established.

Largemouth Bass: Electrofishing catch rate of Largemouth Bass in 2014 (296/h) was high; although, only 17% of fish collected were stock size or larger. Forty-nine stock-size Largemouth Bass were collected in one-hour of electrofishing with an RSE of 20 which satisfied the goals for Largemouth Bass sampling in the OBS plan. Largemouth Bass CPUE in 2012 (153.0/h) and 2010 (150.0/h) were similar (Figure 6). Legal size bass represented just 4% of all fish collected in 2014 (CPUE=11.0/h), and only five of the 18 age-2 fish collected during standard sampling were of legal length. Body condition of Largemouth Bass for all size classes (relative weight >90) indicated abundance of prey was satisfactory. Growth of Largemouth Bass in Lake Winnsboro was satisfactory with fish growing to 10.9 inches in one year (age-1 mean length = 10.9 inches; N = 20, range = 7.5 to 13.0 in, RSE=2.8), and 13.9 inches in two years (age-2 mean length = 13.9 in; N = 33, range = 9.8 to 16.9 in, RSE=1.9) (Figure 7). Despite conducting additional daytime electrofishing for 3 hours, only one age-3 fish was collected. Fifty-one percent of directed angling effort at Lake Winnsboro was for Largemouth Bass during the spring creel survey (Table 6). Angler catch rate was 0.5/h (Table 10). Creel data suggests traditional non-tournament harvest of Largemouth Bass in spring was minimal, although a large number of fish were retained during live-release tournaments (Figure 8). One Largemouth Bass over 10 pounds was reportedly caught and released during the creel survey. Genetic assessment in fall 2014 revealed the entire sample was second or higher generation hybrids between FLMB and NLMB with an FLMB allele frequency of 32%. This value was within the range observed in previous surveys (22%-42%), (Table 11). Genetic composition of individual fish revealed that the majority (73%) of intergrades contained less than 33% Florida alleles, and few fish contained more than 50% Florida alleles (Figure 9).

Tournament effort represented 73% of the directed effort for Largemouth Bass. Live-release tournament angling effort was high (5,837h; 6.7h/acre) during the spring creel period suggesting tournament-related mortality may significantly affect the size structure of the Largemouth Bass fishery. An estimated 1,395 (1.6/acre) Largemouth Bass ≥14 inches were weighed-in from March through May 2015 (Table 10). Anecdotal information and creel data suggests that bass clubs from East Texas and the Dallas/Ft. Worth Metroplex frequently hold tournaments at this small reservoir (Appendix C). Multiple weekly, evening tournaments are also conducted at Lake Winnsboro. A 2007 mortality study at Amon G. Carter Reservoir, Texas, found tournament mortality significantly reduced the abundance of Largemouth Bass ≥14 inches in the 1,848-acre reservoir (Hysmith et al. 2014). Annual tournament angling effort at Amon G. Carter Reservoir was estimated to be 6.9h/acre. Allen et al. (2004) suggested that ratios of tournament weighed-in fish to non-tournament harvested fish above 3.0 warranted more detailed study because tournament-associated mortality of 20-30% could cause 5-12% declines in the abundance of quality-length and larger Largemouth Bass. Although just one Largemouth Bass was observed harvested by a non-tournament angler during the spring creel period, expanded creel estimates suggest the ratio of tournament weighed-in fish to non-tournament harvested fish at Lake Winnsboro was 17.9. Catch curve analysis of Largemouth Bass using a weighted regression of age classes 2 through 7 yielded an estimate of total annual mortality (A) of 42% (R^2 = 0.51). Allen et al. (2004) reviewed mortality estimates from previous studies for the time period 1953-2003 and calculated an average A of 57% which included an estimate of 37% for fish ≥age 3 at Sam Rayburn Reservoir (Driscoll 2003).

Crappies: The trap net catch rates of White and Black Crappie in 2014 were low with a combined CPUE of 3.3/nn (Figure 10 and Figure 11). Sampling objectives including precisely evaluating CPUE, size structure, and body condition for crappie, stated in the OBS sampling plan (Appendix D) were not met for either species or a combination of both species despite a doubling of standard sampling effort. Additional Black Crappie were collected from anglers to determine age at the minimum-length limit. Growth of Black Crappie in Lake Winnsboro was adequate; average age at 10 inches (mean length= 10.6 inches, range = 9.5 to 10.9 inches) was 2.0 years (N = 33; all fish were 2 years old). Crappie were the second most sought after species by Lake Winnsboro anglers after Largemouth Bass with 29% of anglers targeting crappie (Table 6). Angler catch rate for crappie was high (1.9/h) and anglers harvested an estimated 2.5 fish/acre during the spring quarter (Table 12; Figure 12).

Fisheries management plan for Lake Winnsboro, Texas

Prepared – July 2015

ISSUE 1: Lake Winnsboro has shown the potential to produce trophy Largemouth Bass as evidenced by the size of the current lake record, 10.75 pounds (3/2004), and a 10-pound fish caught during the 2015 spring creel survey. Fingerling Florida Largemouth Bass were last stocked in 1998 and 1999 and surplus FLMB fry were stocked in 2015. Percentage of Florida alleles in individual fish was low. A high level of tournament angling pressure was observed and total annual mortality estimates were high.

MANAGEMENT STRATEGIES

1. Conduct supplemental electrofishing in spring 2016 and standard electrofishing sampling in fall 2018 to monitor the Largemouth Bass population.
2. Document catches of large (≥7 pounds) Largemouth Bass by anglers at Lake Winnsboro.
3. Request stocking of FLMB fingerlings in 2016 and 2017 at 100/ac based on trophy potential.
4. Conduct genetic analysis of fish collected during fall 2018 electrofishing to determine the proportion of FLMB alleles in individual fish and document any impact of the fry stocking in 2015.
5. Evaluate angler satisfaction with the current Largemouth Bass fishery and regulations. Explore additional options to assess (tournament and non-tournament) angler opinions at Lake Winnsboro in addition to during a creel survey in 2019. Present alternative regulations that may increase the abundance of legal-length Largemouth Bass.

ISSUE 2: Aquatic vegetation is limited. Since 2010, waterwillow has been planted in sites throughout the reservoir.

MANAGEMENT STRATEGIES

1. Evaluate the growth of waterwillow at planting sites and document the spread to new areas during vegetation surveys.
2. Augment existing sites with supplemental plantings and establish colonies in new sites.
3. Introduce additional native submersed plant species.

ISSUE 3: 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

Sport fish, forage fish, and other important fishes

Sport fishes in Lake Winnsboro include Largemouth Bass, White Crappie, Black Crappie, and Channel Catfish. Largemouth Bass angling accounted for 7,972 h in spring 2015 and represented 51% of total angler effort. Crappie anglers accounted for 29% of total effort and catfish anglers contributed a further 16% of total angling effort during the spring creel survey. Important prey species groups include sunfish and shad.

Negligible fisheries

According to standard sampling, there are no negligible fisheries in Lake Winnsboro.

Survey objectives, fisheries metrics, and sampling objectives

A complete sampling schedule is in Table 13.

Largemouth Bass: Largemouth Bass are the most popular sport fish in Lake Winnsboro. The reservoir is a frequent destination for tournament anglers, and live-release tournaments in spring 2015 were responsible for 73% of the directed effort for Largemouth Bass. Bass weights over 7 pounds are periodically reported. Largemouth Bass are managed with the statewide 14-in MLL regulation. Trend data on CPUE, size structure, and body condition have been collected biennially since 2002 with fall nighttime electrofishing. The population is dominated by fish below quality length (<12 inches). PSD values have ranged from 9 to 51 since 2002, with the highest value being reported in 2014. A minimum of 12 randomly-selected 5-min electrofishing sites will be sampled in fall 2018 with a goal of collecting 50 stock-sized fish with a target CPUE-S RSE <25. Electrofishing sampling in 2014 met OBS plan objective for RSE-S of 20% and yielded a catch of 49 stock-size Largemouth Bass. Data from electrofishing surveys in 2008, 2010, and 2012, predicted the effort required to meet both sampling objectives to be within the range of 6–14 stations with 80% confidence. Five additional random stations will be predetermined in the event extra sampling is required on the first night of electrofishing. If either objective is not attained after one night of sampling and it seems feasible that the goals are attainable with an additional night of sampling, additional effort of 6-12 additional random stations will be considered. Supplemental information on catches of larger fish is required to justify stocking of Florida Largemouth Bass fingerlings. Contact has been made with the Winnsboro Bass Club in order to obtain catch information from weekly night tournaments conducted from spring through fall. Additional information on larger fish will be obtained through daytime electrofishing during spring. To document long-term changes in growth of Largemouth Bass, age estimation of a minimum of 13 fish between 13 and 14 inches in length will be collected in fall 2018 to calculate average age at minimum length limit. Age and growth analysis conducted in 2014 estimated the average length of 2-year old fish of 13.9 in.

Crappie: Lake Winnsboro contains populations of White and Black Crappie. Data from trap netting surveys in 2002, 2006, and 2010 of combined Black and White Crappie, predicted the effort required to meet sampling objectives of 50 stock-sized fish with a CPUE-S RSE <25 to be within the range of 5–28 stations with 80% confidence. Trap net sampling in fall 2014 involving effort of 10 nn yielded 12 White Crappie of stock size (RSE-S 43%) and 20 Black Crappie of stock size (RSE-S 55%) for a combined RSE-S of 38%, so OBS plan objectives (Appendix D) were not met. It is evident that a significantly more intense sampling effort would be required to meet OBS objectives and this level of effort is inefficient. To monitor long-term population and growth trends, effort and harvest data will be collected during the spring creel in 2019. We will also attempt to collect a sample of 13 fish (9 to 11 inches) of each species from crappie anglers to determine mean age at legal length (Category 2).

Channel Catfish: Gill net sampling in 2015 met OBS plan objectives and yielded a catch of 82 stock-size Channel Catfish with an RSE-S of 23%. To monitor for large-scale changes in relative abundance, size structure, and growth, the Channel Catfish population will be sampled with the required minimum effort of 10 net nights of gill netting in spring 2019. Data from gill netting surveys in 2003, 2007, and 2011, predicted the effort required to meet sampling objectives of 50 stock-sized fish with a CPUE-S RSE <25 to be within the range of 5–9 stations with 80% confidence. An age and growth sample with a minimum of 13 fish between 11 and 13 inches in length will be collected from spring gill netting to assess the time required for Channel Catfish to grow to MLL.

Prey fish: Sunfish and shad are the primary prey groups at Lake Winnsboro. Like Largemouth Bass, trend data on CPUE and size structure of Bluegill and Gizzard Shad have been collected biennially since 2002. Fall electrofishing in 2014 will be used to monitor large-scale changes in forage species' relative abundance and size structure. A minimum of 12 randomly-selected 5-minute electrofishing stations will be sampled in fall 2018 with a goad of collecting 100 fish of each species with a target RSE for CPUE-total of $\leq$25. No additional effort, beyond that required for Largemouth Bass, will be expended to meet these objectives. Forage relative abundance and availability will also be determined through relative weights of sport fish.

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Table 1. Characteristics of Lake Winnsboro, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
Counties	Wood
Reservoir type	Tributary
Shoreline development index (SDI)	4.25
Conductivity	110 µmho / cm

Table 2. Boat ramp characteristics for Lake Winnsboro, Texas, August 2014. Reservoir elevation at time of survey was 418 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
CR 4890 Ramp	32.88834 -95.34883	Y	30	412	Excellent, no access issues
CR 4864 Ramp	32.89387 -95.34967	Y	10	414	Aging, concrete in poor condition
CR 4847 Ramp	32.91369 -95.34731	Y	30	414	Excellent, no access issues

Table 3. Harvest regulations for Lake Winnsboro.

Species	Bag limit	Length limit
Catfish, Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12 - No limit
Catfish, Flathead	5	18 - No limit
Bass, Largemouth	5	14 - No limit
Crappie, White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10 - No limit

Table 4. Stocking history of Lake Winnsboro, Texas. Size categories: FGL = Fingerling, AFGL = advanced fingerling, and UNK = Unknown.

Species	Year	Number	Size
Blue Catfish	1977	11,000	
	1979	10,990	
	1981	16,000	FGL
	Total	37,990	
Channel Catfish	1982	300	
	1992	11,028	AFGL
	Total	11,328	
Flathead Catfish	1977	700	UNK
	Total	700	
Florida Largemouth Bass	1974	55,100	FGL
	1998	110,423	FGL
	1999	118,218	FGL
	2015	101,145	FRY
	Total	384,886	

Table 5. Survey of aquatic vegetation, Lake Winnsboro, Texas, 2014. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2014
Native emergent	2.6 (0.3)
(maidencane, American lotus, water-willow, giant cutgrass)	
Non-native	
Alligatorweed (Tier III)*	5.1 (0.6)

* Tier III is Watch Status

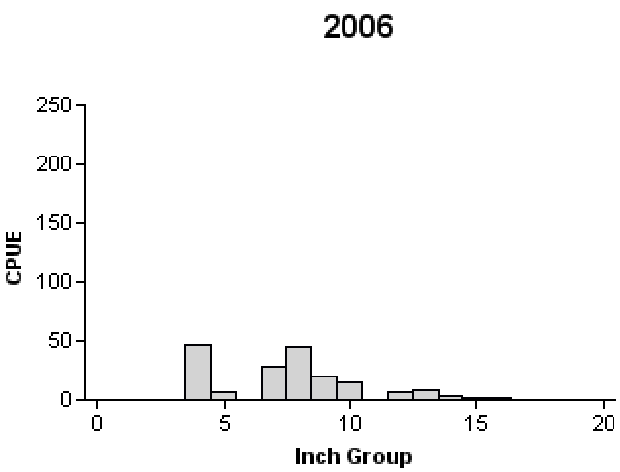
Table 6. Percent directed angler effort by species for Lake Winnsboro, Texas, spring 2015. Survey period was from 1 March through 31 May 2015. For Largemouth Bass, percent tournament effort is in parentheses.

Species	Spring 2015
Channel Catfish	16
Sunfishes	3
Largemouth Bass	51 (73)
Crappie	29
Anything	1

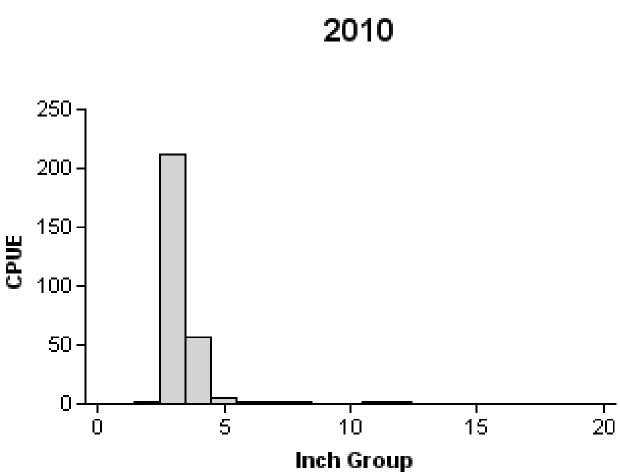
Table 7. Total fishing effort (h) for all species and total directed expenditures at Lake Winnsboro, Texas, spring 2015. Survey periods were from 1 March through 31 May 2015. Relative standard error is in parentheses.

Creel statistic	Spring 2015
Total fishing effort	15,686 (18)
Total directed expenditures	$98,944 (48)

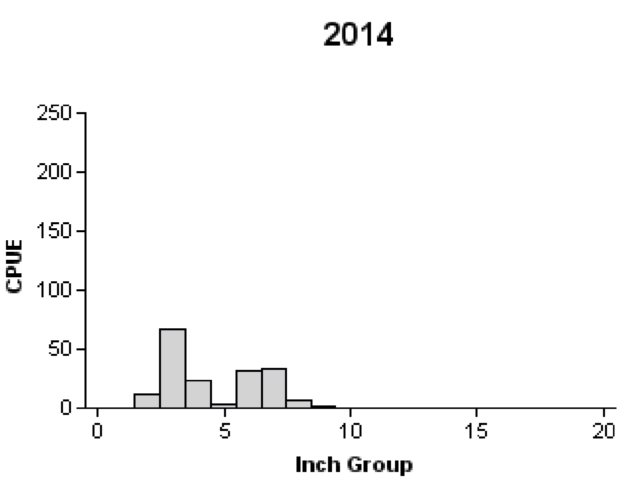
Gizzard Shad



Effort = 1.0
Total CPUE = 184.0 (22; 184)
Stock CPUE = 131.0 (22; 131)
PSD = 18 (4.6)
IOV = 44 (7.6)



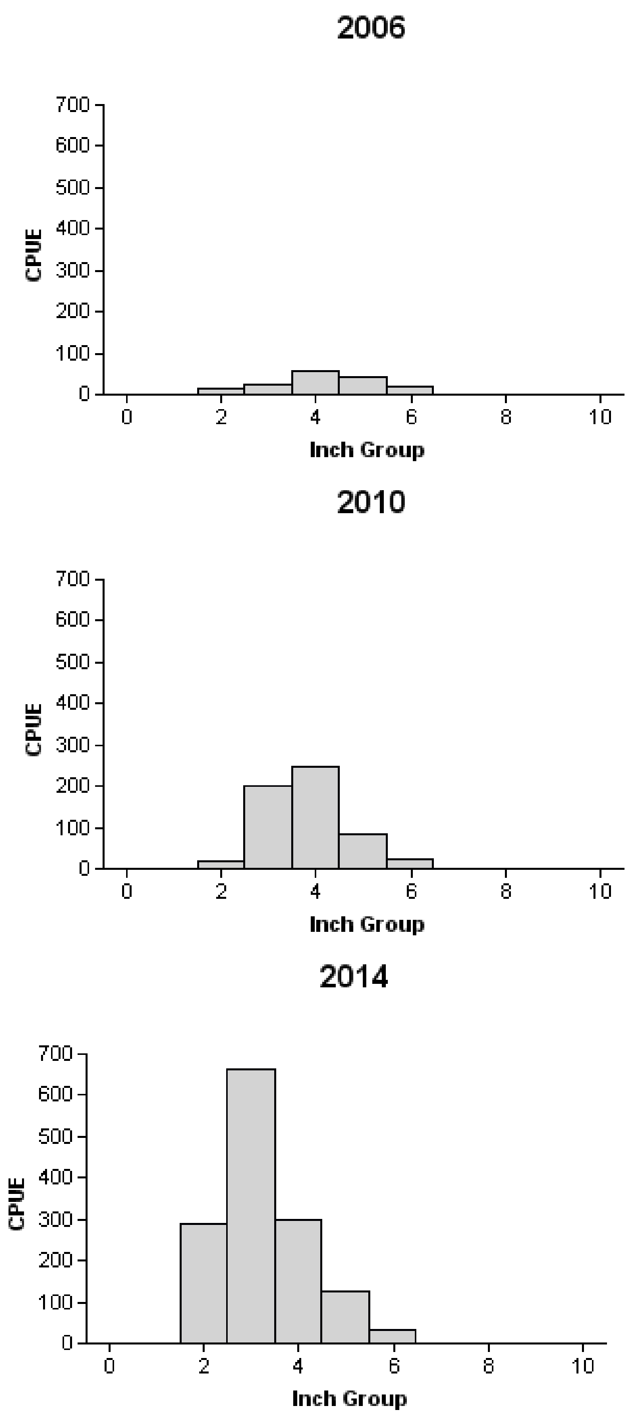
Effort = 1.0
Total CPUE = 281.0 (30; 281)
Stock CPUE = 6.0 (46; 6)
PSD = 50 (21.3)
IOV = 98 (0.9)



Effort = 1.0
Total CPUE = 178.0 (30; 178)
Stock CPUE = 41.0 (49; 41)
PSD = 0 (185.7)
IOV = 96 (1.4)

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 Winnsboro, Texas, 2006, 2010, and 2014.

Bluegill



2006

Effort = 1.0
Total CPUE = 158.0 (17; 158)
Stock CPUE = 141.0 (15; 141)
PSD = 14 (4.2)

2010

Effort = 1.0
Total CPUE = 582.0 (18; 582)
Stock CPUE = 563.0 (17; 563)
PSD = 4 (1)

2014

Effort = 1.0
Total CPUE = 1,411.0 (11; 1411)
Stock CPUE = 1,119.0 (12; 1119)
PSD = 3 (0.8)

Figure 2. Number of Bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2006, 2010, and 2014.

Bluegill

Table 8. Creel survey statistics for Bluegill at Lake Winnsboro, Texas, from March through May 2015. Total catch per hour is for anglers targeting Bluegill and total harvest is the estimated number of Bluegill harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Spring 2015
Surface area (acres)	875
Directed effort (h)	429 (72)
Directed effort/acre	0.5 (72)
Total catch per hour	5.8 (44)
Total harvest	2,966.2 (80)
Harvest/acre	3.4 (80)
Percent legal released	46

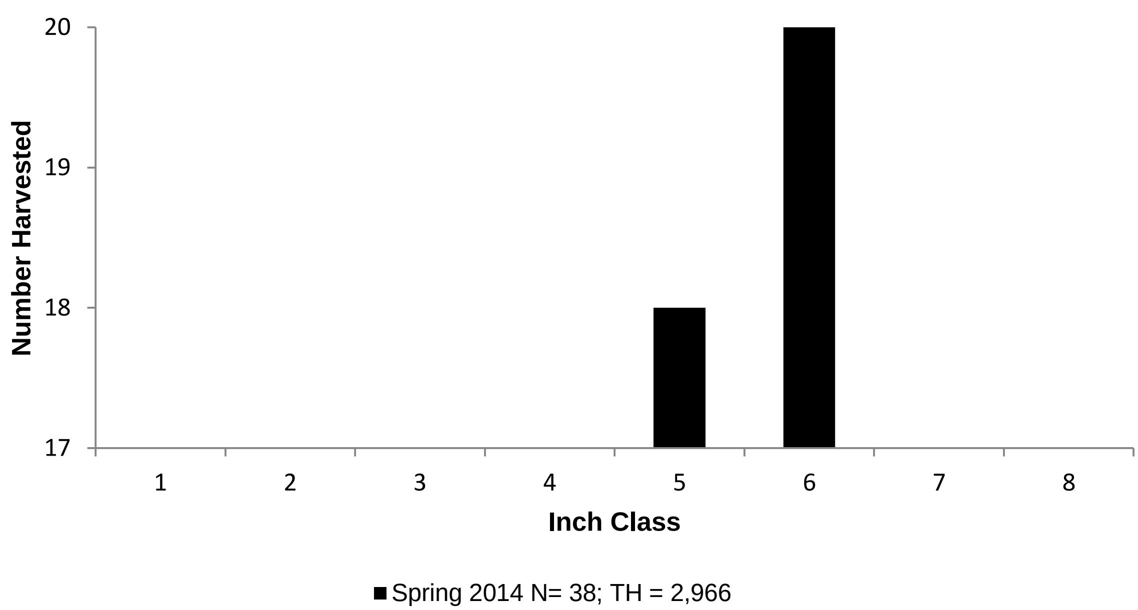
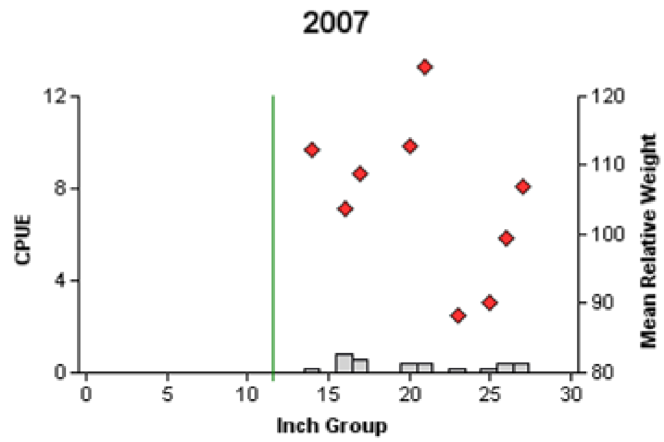
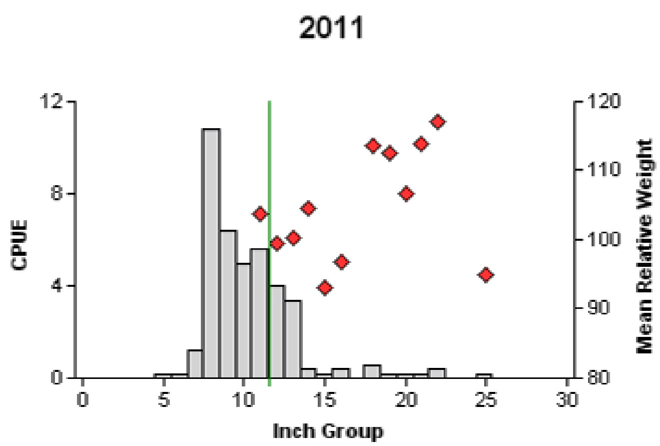


Figure 3. Length frequency of harvested Bluegill observed during creel survey at Lake Winnsboro, Texas, March through May 2015, all anglers combined. N is the number of harvested Bluegill observed during creel surveys, and TH is the total estimated harvest for the creel period.

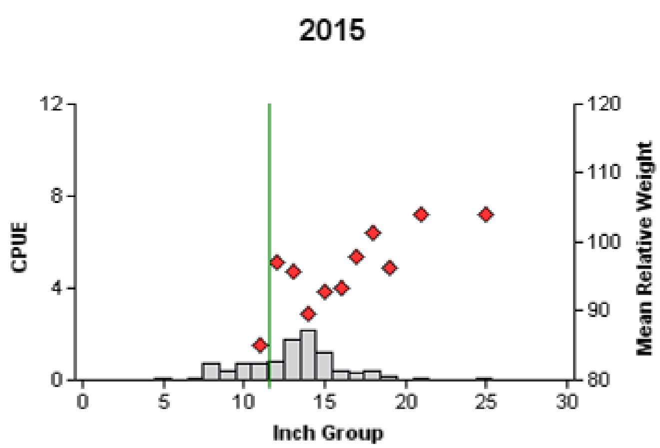
Channel Catfish



Effort = 5.0
Total CPUE = 3.6 (26; 18)
Stock CPUE = 3.6 (26; 18)
CPUE-12 = 3.6 (26; 18)
PSD = 94 (4.2)



Effort = 5.0
Total CPUE = 39.6 (18; 198)
Stock CPUE = 15.8 (15; 79)
CPUE-12 = 10.2 (26; 51)
PSD = 14 (6)



Effort = 10.0
Total CPUE = 10.2 (17; 102)
Stock CPUE = 8.2 (23; 82)
CPUE-12 = 7.5 (25; 75)
PSD = 18 (6.6)

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 gill net surveys, Lake Winnsboro, Texas, 2007, 2011, and 2015. Vertical lines indicate minimum length limit at time of survey.

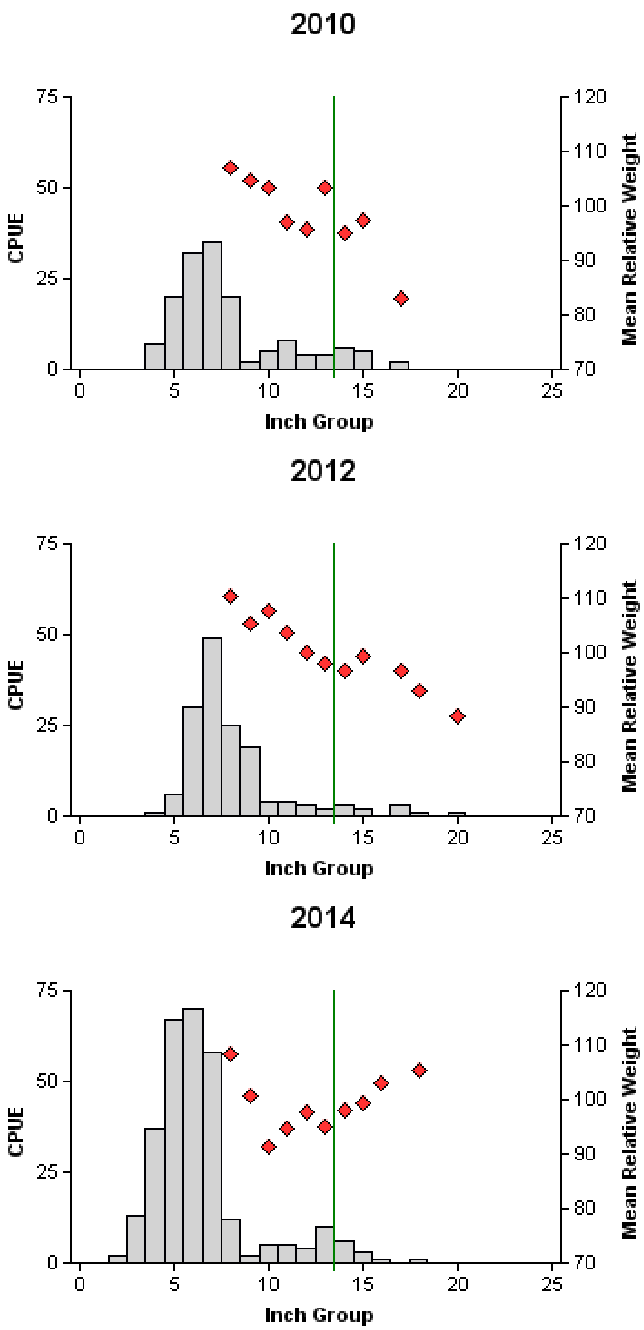
Channel Catfish

Table 9. Creel survey statistics for Channel Catfish at Lake Winnsboro, Texas, from March through May 2015. Total catch per hour is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Spring 2015
Surface area (acres)	875
Directed effort (h)	2,475 (33)
Directed effort/acre	2.8 (33)
Total catch per hour	1.2 (37)
Total harvest	1,873 (74)
Harvest/acre	2.1 (74)
Percent legal released	7.3

Figure 5. Length frequency of harvested Channel Catfish observed during creel survey at Lake Winnsboro, Texas, March through May 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.

Largemouth Bass



Effort = 1.0
Total CPUE = 150.0 (23; 150)
Stock CPUE = 56.0 (21; 56)
PSD = 38 (5.2)
PSD-14 = 23 (5.2)

Effort = 1.0
Total CPUE = 153.0 (16; 153)
Stock CPUE = 67.0 (19; 67)
PSD = 22 (5.5)
PSD-14 = 15 (5.2)

Effort = 1.0
Total CPUE = 296.0 (19; 296)
Stock CPUE = 49.0 (20; 49)
PSD = 51 (5.8)
PSD-14 = 22 (6.4)

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, Lake Winnsboro, Texas, 2010, 2012, and 2014. Vertical lines indicate minimum length limit at time of survey.

Largemouth Bass

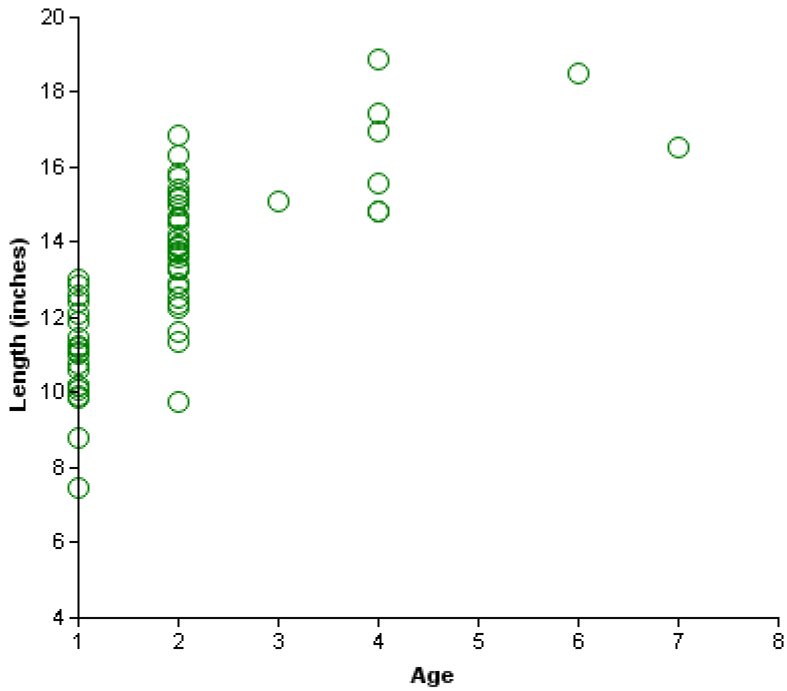


Figure 7. Length at age for Largemouth Bass collected from electrofishing at Lake Winnsboro, Texas, September and October 2014.

Largemouth Bass

Table 10. Creel survey statistics for Largemouth Bass at Lake Winnsboro, Texas, from March through May 2015. 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	Spring 2015
Directed angling effort (h)	
Tournament	5,837 (24)
Non-tournament	2,134 (32)
All black bass anglers combined	7,972 (23)
Angling effort/acre	9.1 (23)
Catch rate (number/h)	0.5 (16)
Harvest	
Non-tournament harvest	78 (767)
Harvest/acre	0.1 (767)
Tournament weigh-in and release	1,395 (33)
Release by weight	
<4.0 lbs	2,424 (36)
4.0-6.9 lbs	38 (86)
7.0-9.9 lbs	0 (0)
≥10.0 lbs	38 (86)
Percent legal released (non-tournament)	80

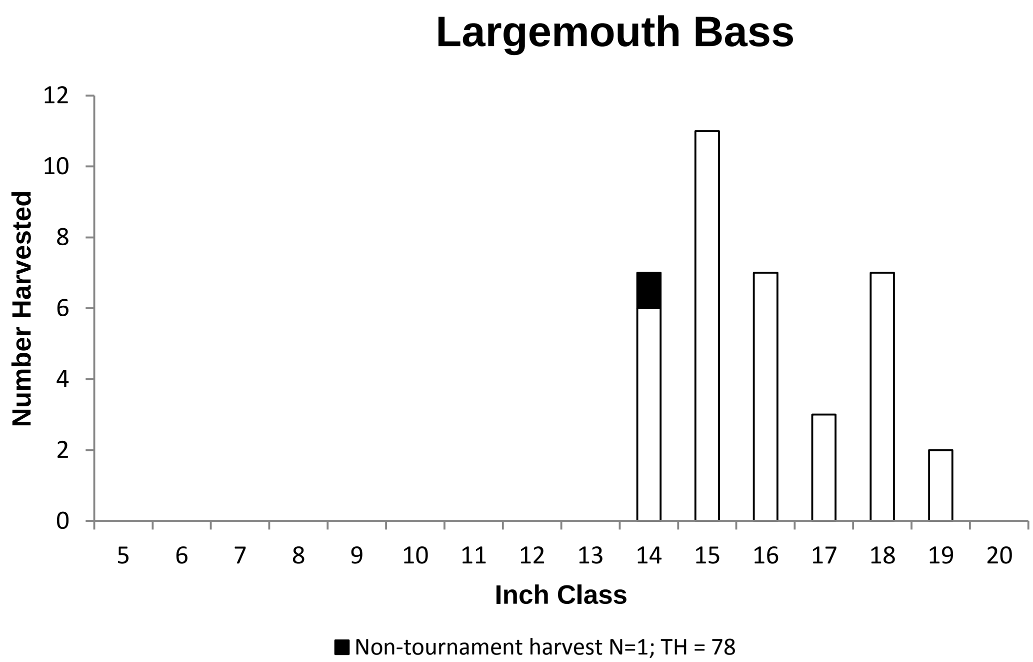


Figure 8. Length frequency of non-tournament and tournament-retained Largemouth Bass observed during creel surveys at Lake Winnsboro, Texas, March through May 2015, all anglers combined. N is the number of Largemouth Bass observed during creel surveys, TH is the estimated non-tournament harvest, and TR is estimated number of fish temporarily retained during tournaments for the creel period.

Table 11. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lake Winnsboro, Texas, 1989, 1993, 1996, 1999, 2002, 2006, 2008, 2010, and 2014. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between an FLMB and an NLMB. Since 2006, analyses have been conducted using DNA microsatellite analysis. Prior to that time starch gel electrophoresis was employed.

		Genotype						
Year	Sample size	FLMB	F1	Fx	Combined hybrids	NLMB	% FLMB alleles	% pure FLMB
1989	30	1	5	15	20	9	34.2	3.3
1993	35	0	8	18	26	9	30.0	0.0
1996	35	2	8	19	27	6	42.1	5.7
1999	30	0	5	14	19	11	21.7	0.0
2002	27	1	4	9	13	13	24.6	3.7
2006	13	0	[a]	[a]	11	2	30.0	0.0
2008	30	0	0	28	28	2	28.0	0.0
2010	29	0	0	28	28	1	24.0	0.0
2014	30	0	0	30	30	0	32.0	0.0

[a]Analysis did not separate F1 and Fx hybrids

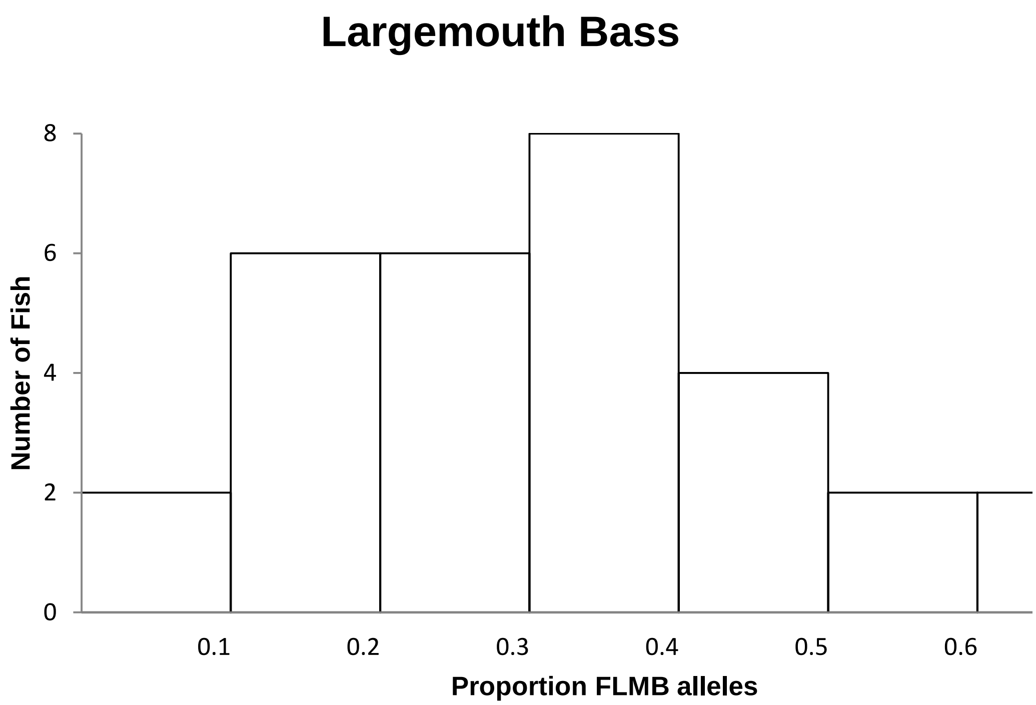
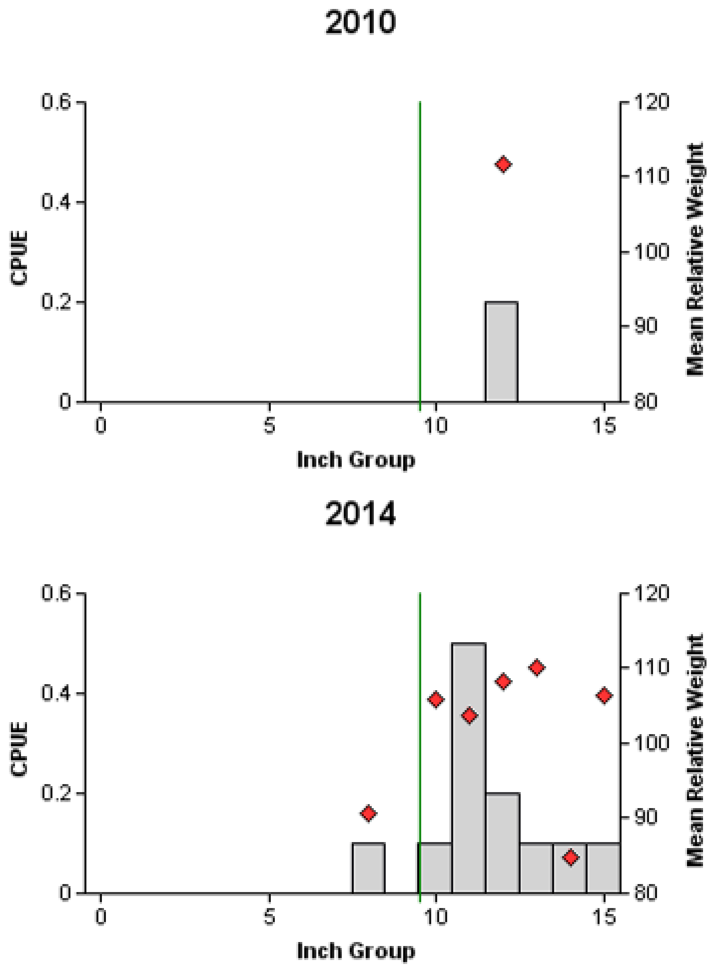


Figure 9. Proportion of FLMB alleles of individual Largemouth Bass (N = 30), Lake Winnsboro, Texas, October 2014. All fish were second or higher generation hybrids between FLMB and NLMB.

White Crappie



2010:

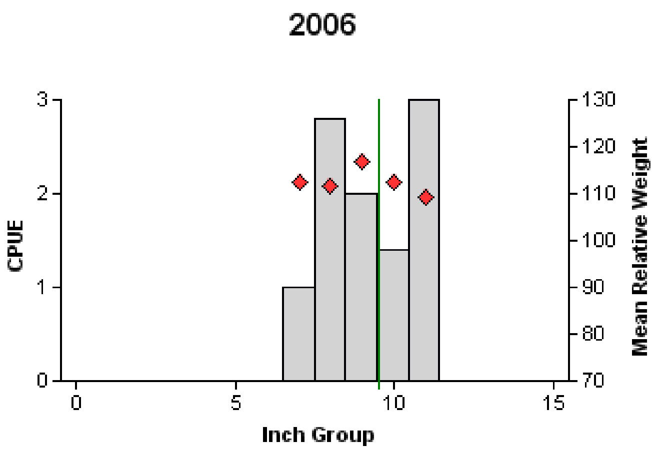
Effort = 5.0
Total CPUE = 0.2 (100; 1)
Stock CPUE = 0.2 (100; 1)
PSD = 100 (0)
PSD-P = 100 (0)

2014:

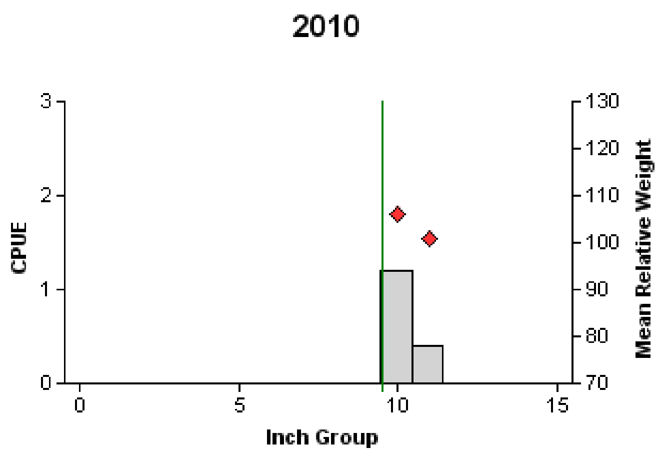
Effort = 10.0
Total CPUE = 1.2 (43; 12)
Stock CPUE = 1.2 (43; 12)
PSD = 100 (0)
PSD-P = 92 (6.8)

Figure 10. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 2010 and 2014. No White Crappie were collected in 2006. Vertical lines indicate minimum length limit at time of survey.

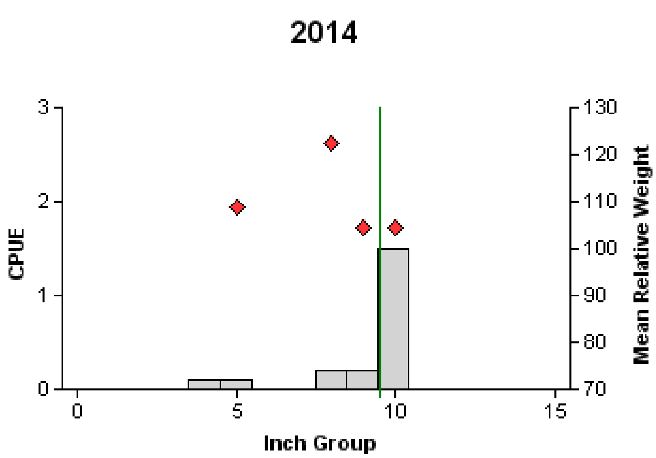
Black Crappie



Effort = 5.0
Total CPUE = 10.2 (46; 51)
Stock CPUE = 10.2 (46; 51)
PSD = 90 (1.5)
PSD-P = 43 (5.3)



Effort = 5.0
Total CPUE = 1.6 (38; 8)
Stock CPUE = 1.6 (38; 8)
PSD = 100 (0)
PSD-P = 100 (0)



Effort = 10.0
Total CPUE = 2.1 (56; 21)
Stock CPUE = 2.0 (55; 20)
PSD = 95 (3.6)
PSD-P = 75 (7.9)

Figure 11. Number of Black Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 2006, 2010, and 2014. Vertical lines indicate minimum length limit at time of survey.

Crappie

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

Creel Survey Statistic	Spring 2015
Directed effort (h)	4,605.7 (30)
Directed effort/acre	5.3 (30)
Total catch per hour	1.9 (43)
Total harvest	2,182.9 (71)
Harvest/acre	2.5 (71)
Percent legal released	0.1

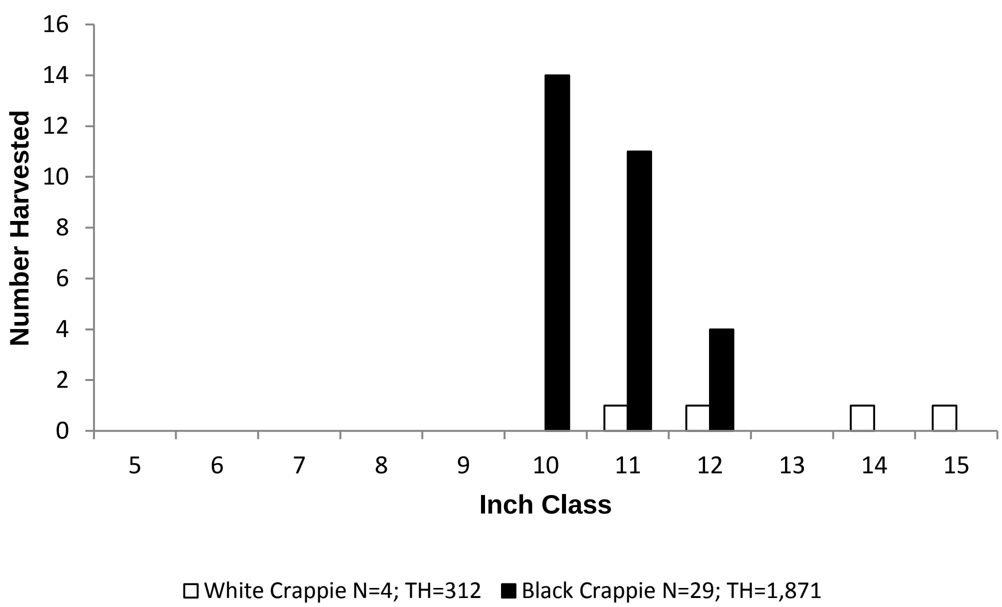


Figure 12. Length frequency of harvested White and Black Crappie observed during creel surveys at Lake Winnsboro, Texas, March through May 2015, all anglers combined. N is the number of harvested crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 13. Proposed sampling schedule for Lake Winnsboro, Texas. Gill netting surveys are conducted in the spring while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

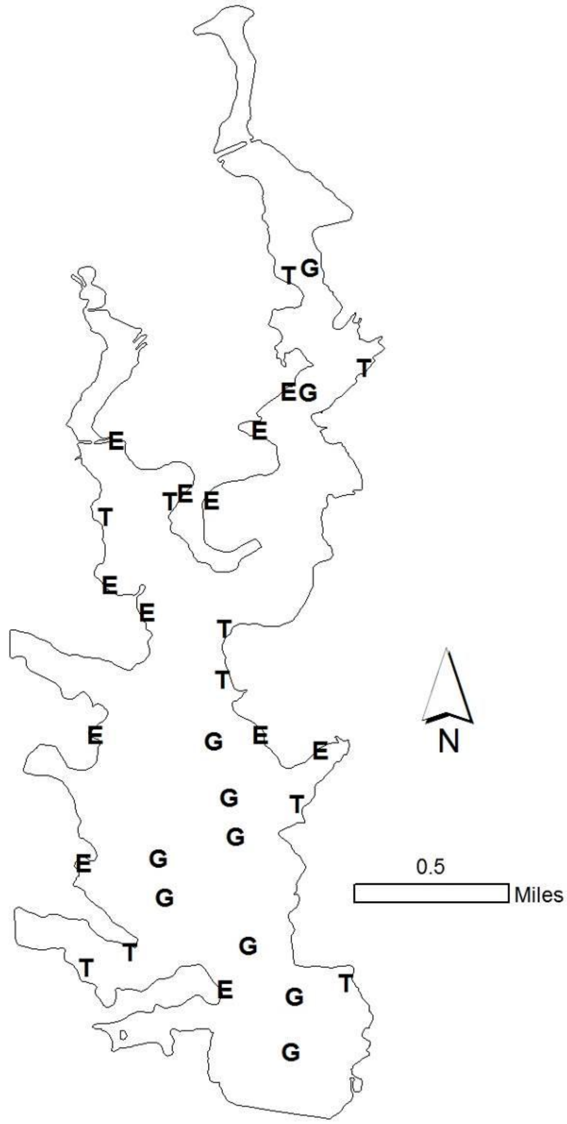
Survey Year	Electrofishing Fall (Spring)	Trap netting	Gill netting	Creel	Vegetation/ Habitat	Access	Report
Summer 2016-Spring 2017	(A)						
Summer 2018-Spring 2019	S	A	S	A	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Winnsboro, Texas, 2014-2015.

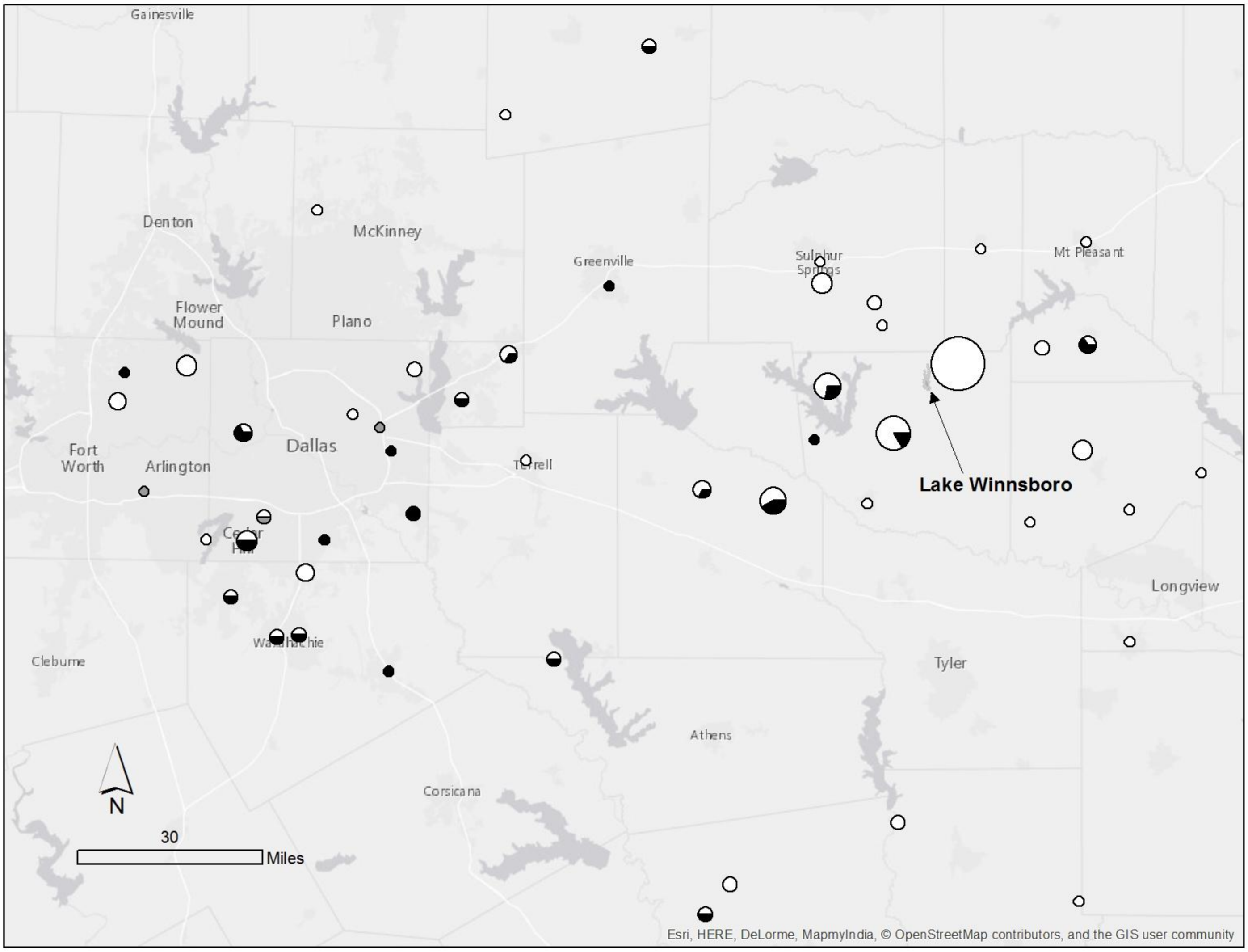
Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad					178	178.0
Threadfin Shad					61	61.0
Channel Catfish	102	10.2				
Warmouth					2	2.0
Bluegill					1,411	1,411.0
Longear Sunfish					111	111.0
Green Sunfish					1	1.0
Largemouth Bass					296	296.0
White Crappie			12	1.2		
Black Crappie			21	2.1		

APPENDIX B



Location of electrofishing (E), gill netting (G), and trap netting (T) sites Lake Winnsboro, Texas, 2014-2015.

Appendix C



Location, by ZIP code, and frequency of anglers that were interviewed at Lake Winnsboro, Texas, during a March through May 2015 creel survey. Size of circle indicates the relative number of anglers observed during the spring creel survey from each zip code centroid (N = 141; range = 1 to 29). White indicates proportion non-tournament anglers, gray indicates proportion of tournament-practice anglers, and black indicates proportion of tournament anglers from each zip code.

APPENDIX D

Sampling Plan for Winnsboro Reservoir

FY 2015

Sport fish, forage fish, and other important fishes

Sport fishes in Lake Winnsboro include Largemouth Bass, White Crappie, Black Crappie, and Channel Catfish. No creel information is currently available to determine directed effort for individual species. Important prey species groups include sunfish and shad.

Negligible fisheries

According to standard sampling, there are no negligible fisheries in Lake Winnsboro.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Anecdotal information suggests Largemouth Bass are the most popular sport fish in Lake Winnsboro. The reservoir is a frequent destination for tournament anglers, and big bass weights over 7 pounds are reported. Largemouth bass are managed with the statewide 14-in MLL regulation. Trend data on CPUE, size structure, and body condition have been collected biennially since 2002 with fall nighttime electrofishing. The population is dominated by fish below quality length (<12 inches). Observed PSD values have ranged from 9 to 38 since 2002. Standard nighttime electrofishing will be used every two years in fall to monitor large-scale changes in the Largemouth Bass population. A minimum of 12 randomly-selected 5-min electrofishing sites will be sampled in fall 2014 with a goal of collecting 50 stock-sized fish with a target RSE of CPUE-S <25. Data from electrofishing surveys in 2008, 2010, and 2012, predicted the effort required to meet both sampling objectives to be within the range of 6–14 stations with 80% confidence. Five additional random stations will be predetermined in the event extra sampling is required. If either objective is not attained after one night of sampling and it seems feasible that the goals are attainable with an additional night of sampling, extra effort of 6-12 additional random stations will be considered. Supplemental information on catches of larger fish is required to justify stocking of Florida Largemouth Bass fingerlings. Contact will be made with the Winnsboro Bass Club in order to obtain catch information from weekly night tournaments conducted from spring through fall. Additional information on larger fish could potentially be obtained through daytime electrofishing during spring. Age estimation is desired to evaluate growth rates of the Largemouth Bass population. A random sample with a target of 200 fish >150mm and <500mm, subsampled at 5 fish per 10 mm strata, for age estimation (Category 3) is desired to yield sufficient numbers of age 1-3 fish to estimate MLA and age structure for monitoring. In the event that targets of stock-sized fish (≥50) and sample precision (CPUE-S ≤25) are attained during night-time electrofishing but the age and growth sample is inadequate, additional sampling during daylight hours should be considered.

Crappie: Lake Winnsboro contains populations of White and Black Crappie. The Crappie Anglers of Texas (CAT) hosted a junior angler tournament at the reservoir in 2014, with a winning 5-fish bag of 6.81lbs, and big fish weights of 1.56 lbs. for White Crappie and 1.50 lbs. for Black Crappie. Single-cod, shoreline trap netting catch rates have been variable for both species. These data only allowed us to determine presence or absence of the population. Data from trap netting surveys in 2002, 2006, and 2010 of combined Black and White Crappie, predicted the effort required to meet sampling objectives of 50 stock-sized fish with a RSE of CPUE-S <25 to be within the range of 5–28 stations with 80% confidence. Estimates for individual species would necessarily be higher. Collect data to evaluate CPUE, size structure, body condition of Black and White crappie. Crappie will be collected using ten shoreline-set single-cod trap nets. Target sample sizes to evaluate size structure and CPUE will be 50 stock-length fish for Black and White crappie, and an RSE of CPUE-S ≤ 25. Weights will be collected for a minimum of ten fish per inch-class to determine relative weights for Black and White crappie. Information on the time required for fish to grow to the MLL is desired. A sample of 13-fish will be collected to determine mean length of Black and White crappie at legal length (Category 2). In the event that a 13-fish sample of 9-11 inch crappies cannot be obtained through trap net sampling, additional methods will be explored. In the event that a spring quarter creel survey can be coordinated in 2015, angler-supplied data will be collected to estimate catch rate and effort, and an attempt will be made to collect an age and growth sample with a minimum of 13 fish between 9 and 11 inches in length. An alternative method of collecting a sample is through rod and reel angling.

Channel Catfish: Trend data for Lake Winnsboro suggests the population previously suffered from limited recruitment, potentially from predation by Largemouth Bass. However, sampling in 2011 resulted a high CPUE of 39.6/nn, with a high proportion of sub-stock (≤11 inches) fish collected, indicating substantial recruitment. The channel catfish population will be sampled with the required minimum effort of 10 net nights of gill netting in spring 2015. Data from gill netting surveys in 2003, 2007, and 2011, predicted the effort required to meet sampling objectives of 50 stock-sized fish with a RSE of CPUE-S <25 to be within the range of 5–9 stations with 80% confidence. An age and growth sample with a minimum of 13 fish between 11 and 13 inches in length will be collected from spring gill netting to assess the time required for Channel Catfish to grow to the MLL.

Bluegill and Gizzard Shad: Sunfish and shad are the primary prey groups at Lake Winnsboro. Like Largemouth Bass, trend data on CPUE and size structure of Bluegill and Gizzard Shad have been collected biennially since 2002. Fall electrofishing in 2014 will be used to monitor large-scale changes in forage species, relative abundance, and size structure.

Appendix E

Age/length key developed for Largemouth Bass class collected during standard electrofishing in fall 2014.

Inch group / Age	0	1	2	3	4	5	6	7	Population sample
5	67.00								67
6	70.00								70
7	54.59	3.41							58
8	10.91	1.09							12
9	1.14	0.57	0.29						2
10		5.00							5
11		3.75	1.25						5
12		1.78	2.22						4
13		0.91	9.09						10
14			4.67		1.33				6
15			2.25	0.38	0.38				3
16			0.50		0.25			0.25	1
17									
18					0.5		0.5		1
Total fish / age group	203.64	16.51	20.27	0.38	2.46	0.00	0.50	0.25	244