PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2016 Fisheries Management Survey Report

Coleman Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Coleman Reservoir were surveyed in 2016 using electrofishing and trap netting and in 2017 using gill netting. Historical data are presented with the 2016-2017 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Coleman Reservoir is an 1,811-acre impoundment constructed in 1966 on Jim Ned Creek in the Colorado River Basin. The reservoir is used for municipal water supply, flood control, and recreation. The reservoir is controlled by the City of Coleman and has a history of water level fluctuations. Coleman was full in 2007 but dropped to a record low water level in April 2015. Water level rose after rains in May and July 2015 and filled to conservation pool after substantial rains in April and May 2016. Fish habitat primarily consisted of flooded terrestrial vegetation, standing timber, water star-grass, and inundated black willow. As of summer 2016, all boat ramps were useable. Bank-fishing access was limited to the boat ramp areas and near Press Morris Park.

- **Management History:** Important sport fish include Largemouth Bass, Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass), and White Crappie. Sport fishes are currently regulated by statewide harvest regulations. Threadfin Shad were introduced in 1984 and 1985. Channel Catfish were introduced in 1966. In order to maintain a Hybrid Striped Bass fishery, fish have regularly been stocked beginning in 1976. Florida Largemouth Bass were introduced in 1991 and were last stocked in 2012. Largemouth Bass continue to be monitored for size structure, body condition, and Florida Largemouth Bass influence. Inform the public of the threat and impact of invasive species, specifically zebra mussels and salt cedar.

- **Fish Community**
  - **Prey species:** Electrofishing catch of prey species consisted primarily of Gizzard Shad, Threadfin Shad, and Bluegill. Most Gizzard Shad were large and were not available as prey to sport fish. Bluegill were of sizes that were available to most sport fish. However, some larger Bluegill were available for a sunfish fishery. Other fish species were also available as prey.

  - **Catfishes:** Channel Catfish and Flathead Catfish were present in the gill netting surveys in low numbers. Channel Catfish were the most abundant catfish species observed. Most of the Channel Catfish were of harvestable size.

  - **Hybrid Striped Bass:** Hybrid Striped Bass (predominantly Palmetto Bass) were relatively abundant, and nearly all fish sampled were harvestable size. All fish sampled were either eight or ten years old.

  - **Largemouth Bass:** Largemouth Bass were relatively abundant in electrofishing surveys, and the quantity of legal-sized fish sampled was fair. Body condition for most inch groups were adequate, which suggested that prey availability was not an issue.

  - **White Crappie:** In 2016, White Crappie numbers in trap netting surveys improved from previous years. Some legal-sized White Crappie were available to anglers. Body condition for most inch classes was good.

Management Strategies: Electrofishing, trap netting, and gill netting surveys will be conducted in 2020-2021 for catch rates, size structure, and body condition. An additional gill netting survey will be conducted in 2019. Access and habitat surveys will be conducted in summer 2020. Stock Hybrid Striped Bass biennially to maintain the fishery. Continue to inform the public of the threat and impact of invasive species.

INTRODUCTION

This document is a summary of fisheries data collected from Coleman Reservoir in 2016-2017. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2016-2017 data for comparison.

Reservoir Description

Coleman Reservoir is an 1,811-acre impoundment constructed in 1966 on Jim Ned Creek in the Colorado River Basin. The reservoir is used for municipal water supply, flood control, and recreation. The reservoir is controlled by the City of Coleman and has a history of extreme water level fluctuations and drought. Coleman Reservoir was full in 2007 but dropped to a record low water level by April 2015 (Figure 1). The reservoir filled to conservation pool (CP) after substantial rains in 2015 and 2016. Other descriptive characteristics for Coleman Reservoir are in Table 1.

Angler Access

Coleman Reservoir's boat access consisted of three boat ramps: two public ramps at Press Morris Park and one private ramp at Quail Creek RV Park. Press Morris Park's North Ramp was unusable because of low water level from November 2008 until June 2015. As of 2015, all ramps were useable. Additional boat ramp characteristics are in Table 2. Bank access was limited to boat ramp areas and Press Morris Park.

Management History

Previous management strategies and actions: Management strategies and actions from previous survey report (Dennis and Dumont 2013) included:

1. Provide the City of Coleman with information about the Boating Access Grant and partnership program to extend the boat ramps at the city park.
   Action: Extension was not feasible at either Press Morris Park ramp due to lack of access to deep water. No meeting with the City of Coleman was scheduled to discuss ramp extension.
2. Educate the public about the threats of invasive species.
   Action: Press releases were distributed to local and statewide media. Signage was posted at Coleman Reservoir boat ramps to notify users of the potential threats of invasive species.

Harvest regulation history: From 1985 to 1992, Largemouth Bass were managed with a 14-inch minimum length limit (MLL). A 16-inch MLL was implemented in 1992 to improve the population size structure. In 1999, the regulation was reverted to the statewide 14-inch MLL because the 16-inch MLL failed to produce satisfactory results. All other species have been managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: Threadfin Shad were stocked in 1984 and 1985. Channel Catfish were stocked in the 60's and early 2000's. Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass) have been stocked frequently at Coleman Reservoir. Palmetto Bass were stocked from 1976 to 2009 and Sunshine Bass fry have been stocked from 2014 until 2017. Florida Largemouth Bass were first stocked in 1991 and were most recently stocked in 2012. The complete stocking history is displayed in Table 4.

Vegetation/habitat management history: Twenty-two aquatic plant species were planted in Coleman Reservoir in 1998 as part of a statewide habitat initiative. From 1998-2007, qualitative vegetation assessments were conducted annually by staff from the United States Army Corps of Engineers Lewisville Aquatic Ecosystem Research Facility. No introduced aquatic plants, aside from those documented to be naturally occurring, were found in vegetation surveys after the reservoir filled in 2002.

Water transfer: No interbasin water transfers exist.

METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Coleman Reservoir (TPWD unpublished). Primary components of the OBS plan are listed in (Table 5). All survey sites were randomly selected unless otherwise stated, and all surveys were conducted according to the Fisheries Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 hour at 12, 5-minute stations in 2014 and 2016). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. In 2016, a total of 13 fish 13.0-14.9 inches were sampled with electrofishing to determine age at legal length. Biologist-selected sites were also used to collect Largemouth Bass for age and growth. In 2014, a total of 22 Largemouth Bass between 13.0-14.9 inches were sampled for evaluating age and growth. Otoliths were collected and used to estimate age of the fish.

Trap Netting – White Crappie were collected by using trap nets (10 net nights at 10 stations). Catch per unit effort for trap netting was recorded as the number of fish caught per net night (fish/nn). Otoliths were collected from 14 White Crappie 9.0-10.9 inches to determine age at legal-length.

Gill netting – Channel Catfish, Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass), and Flathead Catfish were sampled by gill netting (10 net nights at 10 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Lengths were measured for each species; weights were only taken for Hybrid Striped Bass. Otoliths were collected from all Hybrid Striped Bass for evaluating age and growth.

Genetics – Genetic analysis of Largemouth Bass was conducted in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2016 and by electrophoresis for previous years.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD) terminology modified by Guy et al. 2007], and body 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 statistics.

Habitat – A habitat survey was conducted during summer 2016 using the random point method (TPWD Inland Fisheries Division, unpublished manual revised 2015). A total of 200 points were randomly selected throughout the reservoir, and presence/absence was determined for habitat types identified at or below the waterline at all points. One point was discarded from the analysis because it could not be sampled. Percent occurrence (% = [# stations present / total stations sampled] X 100) and associated Wilson 95% confidence intervals (AusVet 2017) were calculated for each habitat feature type. No structural habitat survey was conducted in 2016-2017 since structural features have not changed since the 2012 sampling period.

Water level – Source for water level data was the United States Geological Survey (USGS 2017).

RESULTS AND DISCUSSION

Habitat: In 2016, water level at the time of the habitat survey was 0.9-feet below CP. Water star-grass was the most prevalent of the vegetation found in the survey. In 2016, other vegetation such as black

willow, common buttonbush, salt cedar, *Chara* sp., torpedo grass, water willow, lotus, cattail, pondweed, and ash trees were surveyed. Flooded terrestrial, standing timber, and fallen trees were also present (Table 6). The number of aquatic vegetation species was greater in 2016 compared to the previous survey conducted in 2012. Dennis and Dumont (2013) noted that the only aquatic vegetative species present were water star-grass, *Chara* sp., and brittle naiad. The percent occurrence of water star-grass and *Chara* sp. were similar in 2016 and 2012. Prior to 2016, no salt cedar had been surveyed at Coleman Reservoir. Of the structural habitat features found in the survey, small boulders were surveyed the most followed by cobble, docks, bedrock, bulkhead, fence, and large boulders (Table 6).

Prey species: The prey base primarily consisted of Gizzard Shad, Threadfin Shad, and Bluegill. Catch rate of Gizzard Shad in 2016 had decreased to 184.0/h (RSE=24) from 239.0/h (RSE=40) in 2014 and 194.0/h (RSE=37) in 2012. In 2016, IOV was lower (8; SE=9) than reported in 2014 and 2012 (75; SE=6 and 78; SE=9, respectively; Figure 2), indicating that most Gizzard Shad were not of suitable prey size for sport fish. Threadfin Shad catch rate increased from 70.0/h (RSE=45) in 2012 and 0.0/h (RSE=0) in 2014 to 118.0/h (RSE=54) in 2016. Bluegill CPUE fluctuated from 120.0/h (RSE=43) in 2012 to 241.0/h (RSE=36) in 2014 then to 150.0/h (RSE=28) in 2016. Size structure of Bluegill consisted primarily of fish < 7 inches, and most were of adequate prey size for sport fish (Figure 3).

Catfishes: Channel Catfish catch rates in gill netting surveys remained consistently low from 2009-2017 and ranged from 2.0/nn-2.2/nn. The catch rates of legal-sized fish were also similar from 2009-2017 and ranged from 1.8/nn-2.0/nn. Nearly all fish collected during the 2009-2017 surveys were of harvestable size. Flathead Catfish were present in gill netting surveys. Catch rates were low in 2009 (0.8/nn; RSE=47), 2013 (1.4/nn; RSE=48), and 2017 (0.2/nn; RSE=67).

Hybrid Striped Bass: Hybrid Striped Bass catch rates in gill net surveys declined from 14.4/nn (RSE=51) in 2009 to 3.4/nn (RSE=38) in 2013, then increased to 9.7/nn (RSE=26) in 2017 (Figure 4). Catch rates of Hybrid Striped Bass ≥ 18 inches improved from 2.4/nn (RSE=60) in 2009 and 2.2/nn (RSE=36) in 2013 to 9.5/nn (RSE=26) in 2017. Body condition improved since the 2009 survey. In 2017, mean relative weights appeared good to excellent and ranged from 98-129 compared to poor values from 70-83 in the 2009 survey. All fish sampled for age and growth were Palmetto Bass and were either 8 years old (N=5; i.e., stocked in 2009) or 10 years old (N=91; i.e., stocked in 2007). No Hybrid Striped Bass aged in 2017 were Sunshine Bass from the 2014-2016 fry stockings. In 2017, the Category III age sample objective was not met and the poor size distribution with no fish >16 inches represented in the sample did not warrant additional sampling effort. Since Sunshine Bass stocked from 2014-2016 were not sampled, age at legal length for these fish could not be determined.

Largemouth Bass: Electrofishing catch rate for Largemouth Bass was 107.0/h (RSE=16) in 2016, 155.0/h (RSE=20) in 2014, and 82.0/h (RSE=21) in 2012 (Figure 5). Catch rates of stock-sized Largemouth Bass (≥ 8 inches) increased from 53.0/h (RSE=30) in 2012 to 77.0/h (RSE=26) in 2014 and 80.0/h (RSE=20) in 2016. Catch rates of Largemouth Bass ≥ 14 inches decreased from 21.0/h (RSE=24) in 2012 to 19.0/h (RSE=29) in 2014 to 5.0/h (RSE=36) in 2016. Values for PSD declined from 72 (SE=7) in 2012 to 38 (SE=5) in 2016, which indicated that the population size structure shifted from larger fish to smaller individuals over the survey period. Body condition was optimal to excellent and ranged from 95 to 124. Eleven specimens were collected during regular electrofishing, and two were collected at biologist-selected sites. Largemouth Bass grew to legal size within 1.0 year in 2016 (N=13; range = 1 year; SE=0). In 2014, age and growth analysis of Largemouth Bass indicated that they achieved length of 14 inches in 2.0 years (range = 1-7 years; SE=1). The percent Florida Largemouth Bass alleles were similar in 2014 (48.6%) and 2016 (50.8%; Table 8). In 2016, one pure Florida Largemouth Bass and one pure Northern Largemouth Bass were represented in the sample, and all other fish collected were intergrades.

White Crappie: White Crappie catch rates in trap net surveys were variable. Catch rates increased from 2012 (2.0/nn; RSE=100) to 2016 (6.2/nn; RSE=53). Catch of stock-sized White Crappie (≥ 6 inches) decreased from 2008 (15.7/nn; RSE=29) to 2012 (0.0/nn; RSE=0) but increased in 2016 (5.9/nn; RSE=57). A similar trend was observed in legal-sized White Crappie. White Crappie CPUE-10 decreased from 3.3/nn (RSE=38) in 2008 to 0.0/nn (RSE=0) in 2012, then increased to 2.7/nn (RSE=64) in 2016 (Figure 6). In 2008, PSD for White Crappie decreased from 45 (SE=10) to 0 in 2012 (SE=0), but

increased to 95 (SE=2) in 2016. In the 2016 survey, White Crappie of legal-size were available to anglers. Body condition was optimal and ranged from 93-107. White Crappie grew to harvestable size within 1.0 (SE=0) year in 2016 (N=13, range = 1 year).

Fisheries management plan for Coleman Reservoir, Texas

Prepared – July 2017

ISSUE 1: Hybrid Striped Bass have provided a fishery at Coleman Reservoir. Regular stockings are required to maintain the fishery.

MANAGEMENT STRATEGIES

1. Stock Palmetto Bass fingerlings biennially and reduce the rate to 5/acre.
2. Continue to monitor Hybrid Striped Bass by gill netting in 2019 and 2021 to determine trends in catch rates, size structure, body condition, and growth.
3. Collect fin clips of all Hybrid Striped Bass during gill net surveys to assess relative recruitment of Sunshine Bass and growth to legal size.

ISSUE 2: Salt cedar (*Tamarix* sp.) has become established at Coleman Reservoir. Coverage of salt cedar is not known.

MANAGEMENT STRATEGIES

1. Map coverage of salt cedar in Coleman Reservoir.
2. Discuss salt cedar establishment and potential control strategies with the City of Coleman and Texas Parks and Wildlife Department invasive species experts.

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 were 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 City of Coleman to maintain appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, and other informative materials 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 constituents.
5. Map existing and future interbasin water transfers to facilitate potential invasive species responses.

Objective-based Sampling Plan and Schedule for Coleman Reservoir

Sport fish, prey fish, and other important fishes: Sport fishes present in Coleman Reservoir are Channel Catfish, Flathead Catfish, Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass), Largemouth Bass, and White Crappie. Important prey species include Gizzard Shad, Threadfin Shad, and Bluegill. Proposed sampling is in Table 9.

Survey objectives, fisheries metrics, and sampling objectives

Prey Species: Gizzard Shad, Threadfin Shad, and Bluegill are the primary prey species in Coleman Reservoir. The next electrofishing survey will be conducted in fall 2020 for 1.0 hour at 12, 5-minute random stations. Catch rate target precision will be RSE ≤ 25% for all three species. A sample of 50 Gizzard Shad will be collected for monitoring trends of size structure (length frequency) and index of vulnerability to assess prey availability and prey size suitability for sport fish. Size structure (PSD) will be determined for Bluegill by collecting ≥ 50 stock-sized (≥3 inch) fish. No additional effort will be conducted if objectives for prey species are not met during designated electrofishing sampling. Largemouth Bass body condition can provide information on prey vulnerability to predation and prey catch rates.

Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass): Hybrid Striped Bass have been managed with the statewide 18-inch minimum length-limit (MLL) and 5-fish daily bag limit. Frequent stockings have been necessary to provide and maintain the fishery. Palmetto Bass have been stocked frequently since 1976. Stocking efforts for Palmetto Bass have been successful and they have been relatively abundant in the reservoir. Catch rates of all fish ≥18 inches were good. Body condition of most fish sampled was good to excellent. A gill net survey will be conducted in spring 2019 and 2021 to collect data on catch rates and size structure. Gill nets will be deployed at 10 random stations at depths ≤ 30 feet to collect relative abundance data, and target precision will be a RSE ≤ 30% for CPUE-Total and CPUE-18. A target of 50 fish will be collected to assess size structure. Length and weight will be taken on all fish. Growth to legal length for Hybrid Striped Bass may have been influenced by water level fluctuations and prolonged drought. Hybrid Striped Bass reached legal length between 2 and 3 years in high water level years. However, in low water years, fish did not reach 18 inches until between 4 and 5 years. A Category II age sample will be collected from 13 fish at 17.0-18.9 inches to assess age at legal length. Fin clips will be taken on all Hybrid Striped Bass to determine if Sunshine Bass fry stockings were successful. If these objectives are not achieved, up to 10 additional random stations may be sampled if deemed feasible.

Channel Catfish: Channel Catfish are present in the reservoir and have been managed with the 12-inch minimum length limit (MLL) and 25-fish (in combination with Blue Catfish) daily bag limit. Channel Catfish have low catch rates in gill net surveys. Catch in gill net surveys was 2.0/nn (RSE=16) in 2009, 2.0/nn (RSE=39) in 2013, and 2.2/nn (RSE=32) in 2017. Baited, tandem hoop nets were used to sample Channel Catfish in May 2013 at 3 stations, but none were collected. General monitoring for Channel Catfish relative abundance (CPUE-Total) will be conducted in conjunction with gill net sampling for Hybrid Striped Bass. No specific sampling goals will be set for Channel Catfish.

Flathead Catfish: Flathead Catfish are present in the reservoir and have been managed with the statewide 18-inch MML and 5-fish daily bag limit. From 2005-2017, catch of Flathead Catfish in gill net surveys was low. Flathead Catfish will be monitored for presence/absence in 2021 in conjunction with sampling for Hybrid Striped Bass.

Largemouth Bass: Largemouth Bass have been managed with the statewide 14-inch MLL and 5-fish daily bag limit. Largemouth Bass are relatively abundant in Coleman Reservoir and are likely an important fishery for anglers. The reservoir has been a popular destination for bass fishing tournaments. Catch of Largemouth Bass decreased in 2016, but relative abundance remained adequate (107.0/h; RSE=16). Catch rates of stock-size fish (≥8 inches) are good and have increased to 80.0/h (RSE=20). Catch rates of fish ≥ 14 inches were fair and declined in 2016 (5.0/h; RSE=36). To monitor Largemouth Bass and their prey, a night-time electrofishing survey will be conducted during fall 2020 to monitor trends in relative abundance (CPUE-Total, CPUE-Stock, and CPUE-14), size structure, and body condition. Electrofishing will be conducted for 1.0 hour at 12, 5-minute stations. A target precision will be RSE ≤ 25% for estimates

of CPUE-Total, CPUE-Stock, and CPUE-14 during sampling. A target of 50 fish ≥ stock-size will be collected to assess size structure, and ≥ 5 fish per inch group ≥ stock-size will be measured for length and weight to assess body condition. A Category II age sample will be collected from 13 fish at 13.0-14.0 inches to assess age at legal length. If precision, size structure, or body condition objectives are not achieved, up to one hour of additional sampling (12, 5-minute stations) may be added. If age and growth sample objective is not achieved, non-random stations will be used.

White Crappie: White Crappie are present and have been managed under the statewide 10-inch MLL and 25-fish daily bag limit. White Crappie catch rate was lower compared to other district reservoirs and increased in 2016 (6.2/nn; RSE=53); CPUE-Stock (5.9/nn; RSE=57) also increased. Trap net surveys every four years have been adequate to detect large-scale changes in the fishery and to inform the fisheries biologist on the status of the fishery and distributing the information to constituents. Trap nets will be deployed at 10 random stations in fall 2020 to obtain estimates of CPUE-Total and CPUE-Stock at a target precision of RSE ≤ 25. A target of 50 White Crappie ≥ stock-size will be collected to monitor trends in size structure, and 5 fish ≥ stock-size per inch group will be measured and weighed to assess body condition. Five additional random stations may be added if data objectives are not met and if extra sampling is deemed feasible.

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Water Level Data

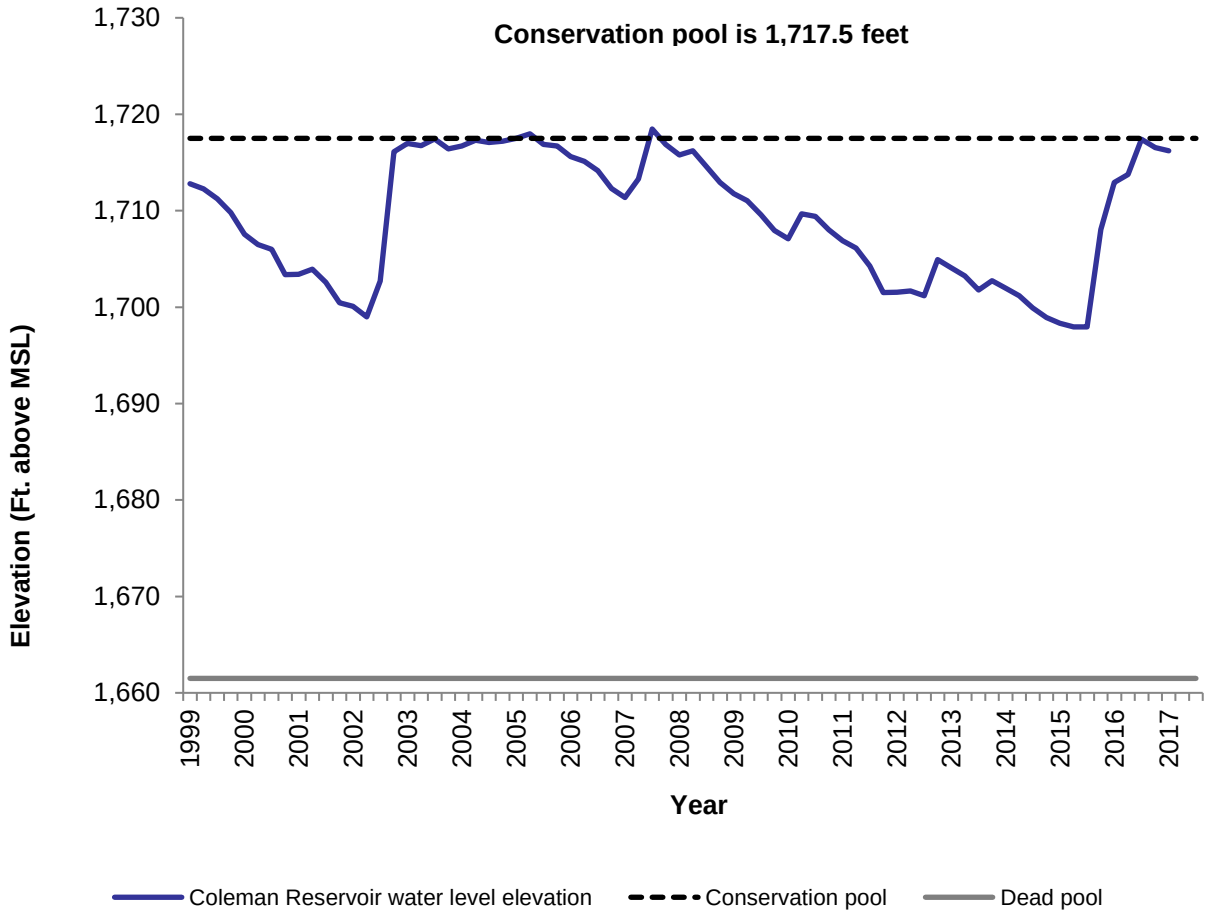


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Coleman Reservoir, Texas, shown in blue. Conservation pool is 1,717.5 feet above mean sea level, shown in black dashes. Dead pool is approximately 1,661.5 feet above mean sea level, shown in gray.

Table 1. Characteristics of Coleman Reservoir, Texas.

Characteristic	Description
Year constructed	1966
Conservation pool	1,717.5 feet above mean sea level
Dead pool	1,661.5 feet above mean sea level
Controlling authority	City of Coleman, Texas
County	Coleman
Reservoir type	Tributary
River basin	Colorado River Basin
Shoreline Development Index	4.05
USGS 8-Digit HUC Watershed	12090108 (Jim Ned)
Conductivity	412-686 µS/cm

Table 2. Boat ramp characteristics for Coleman Reservoir, Texas, March, 2017. Reservoir elevation at time of survey was 1,717.4 feet above mean sea level.

Boat Ramp	Latitude Longitude (dd)	Public	Parking Capacity (N)	Elevation at end of Boat Ramp (ft)	Condition
Press Morris Park, North	32.03853 -99.46322	Y	15	1,709.5	Good; Accessible
Press Morris Park, South	32.03775 -99.46311	Y	8	1,707.5	Good; Accessible
Quail Creek RV Park	32.03622 -99.47069	Y	5	1,705.5	Good; Accessible

Table 3. Harvest regulations for Coleman Reservoir, Texas.

Species	Bag Limit	Length Limit
Catfish: Channel and Blue, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Hybrid Striped (i.e., Palmetto Bass and Sunshine Bass)	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Coleman Reservoir, Texas. Size categories were: UNK = unknown; FRY = < 1 inch; FGL = (fingerling) 1-3 inches; AFGL = (advanced fingerling) 3-5 inches.

Species	Year	Number	Size
Threadfin Shad	1984	1,950	FGL
	1985	1,200	FGL
	Total	3,150	
Channel Catfish	1966	84,000	AFGL
	1967	350	UNK
	2002	1,081	AFGL
	2003	33,584	AFGL
	Total	119,015	
Palmetto Bass	1976	21,280	UNK
	1977	16,656	UNK
	1979	13,950	UNK
	1981	10,575	UNK
	1983	9,999	UNK
	1986	35,180	FRY
	1987	40,050	FGL
	1988	300,000	FRY
	1989	250,000	FRY
	1991	32,030	FGL
	1992	24,400	FGL
	1994	24,786	FGL
	1995	14,950	FGL
	1996	10,096	FGL
	1997	10,235	FGL
	1998	10,087	FGL
	2004	9,998	FGL
	2007	523,122	FRY
	2007	10,119	FGL
	2009	10,220	FGL
	Total	1,377,733	
Sunshine Bass	2014	124,952	FRY
	2015	118,918	FRY
	2016	108,379	FRY
	2017	142,500	FRY
	Total	494,749	
Largemouth Bass	1966	246,000	UNK
	1967	8,000	UNK
	1970	100,000	UNK
	Total	354,000	
Kemp's Largemouth Bass	1985	102,528	FRY
Florida Largemouth Bass	1991	100,465	FGL
	2001	201,471	FGL
	2012	104,477	FGL
	Total	406,413	

Table 4 (continued). Stocking history of Coleman Reservoir, Texas. Size categories were: UNK = unknown; FRY = < 1 inch; FGL = (fingerling) 1-3 inches; AFGL = (advanced fingerling).

Species	Year	Number	Size
Black Crappie	1966	2,000	UNK
Green Sunfish X Redear Sunfish	1966	10,000	UNK
	1979	400	UNK
	Total	10,400	

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

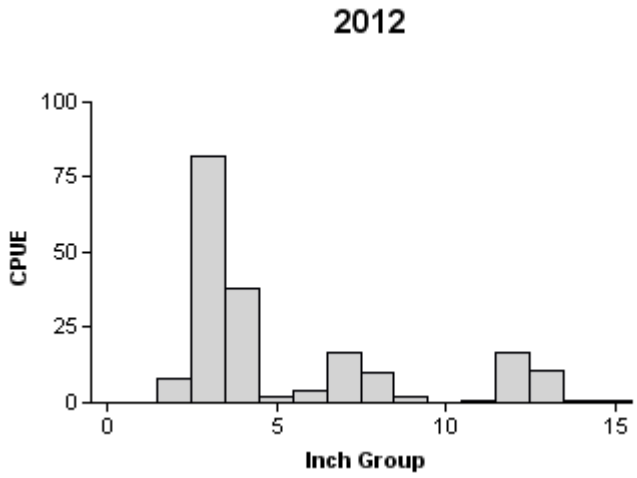
Gear/Target Species	Survey Objective	Metrics	Sampling Objective
Electrofishing			
Gizzard Shad [a]	Determine Trends in Relative Abundance	CPUE-Total	RSE ≤ 25
	Size Structure	Length frequency	N ≥ 50
	Prey Availability	IOV	N ≥ 50
Threadfin Shad [a]	Determine Trends in Relative Abundance	CPUE-Total	RSE ≤ 25
Bluegill [a]	Determine Trends in Relative Abundance	CPUE-Total	RSE ≤ 25
	Size Structure	PSD, Length frequency	N ≥ 50 stock
Largemouth Bass	Determine Trends in Relative Abundance	CPUE-Total; Stock-CPUE; CPUE-14	RSE ≤ 25
	Size Structure	PSD, Length frequency	N ≥ 50 stock
	Age and Growth	Age at 14 inches TL	N = 13, 13.0-14.9 inches
	Body Condition	W_r	5 fish/inch group
	Genetics	% FLMB	N = 30, any age
Gill netting			
Hybrid Striped Bass (i.e., Palmetto Bass and Sunshine Bass)	Assess Success of Fry Stockings and Determine Trends in Relative Abundance	CPUE-Total; CPUE-18	RSE ≤ 30
	Size Structure	Length frequency	N ≥ 50
	Age and Growth	Year class strength (Category III age sample) and age at 18 inches TL	N ≥ 200
Trap netting			
White Crappie	Determine Trends in Relative Abundance	CPUE-Total; Stock-CPUE	RSE ≤ 25
	Size Structure	PSD, Length frequency	N ≥ 50 stock
	Body Condition	W_r	5 fish/inch group
	Age and Growth	Age at 10 inches TL	N = 13, 9.0-10.9 inches

[a] No additional effort will be expended to achieve prey species survey objectives if sampling objectives not reached from designated electrofishing survey sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

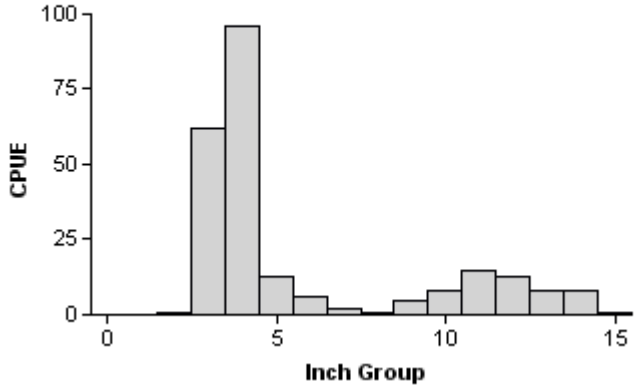
Table 6. Comparison of the percent occurrence and associated 95% confidence limits (CL) for habitat sampled at random throughout the reservoir (N=199) in Coleman Reservoir, Texas, 2016. Size categories were: pebbles 0.01-2.5 inches, cobble 2.5-10.0 inches, small boulders 10.0-24.0 inches, and large boulders ≥ 24.0 inches. Water level at time of survey was approximately at conservation pool in 2016.

Habitat Type	Percent Occurrence	Lower CL	Upper CL
Non-descriptive/featureless	34.7	28.4	41.5
Vegetative/species habitat type			
Flooded terrestrial vegetation	45.2	38.5	52.2
Standing timber	29.1	23.3	35.8
Water star-grass	17.6	12.9	23.5
Black willow	16.6	12.1	22.4
Fallen timber	9.0	5.8	13.8
Common buttonbush	7.0	4.25	11.5
Salt cedar	4.5	2.4	8.4
Chara sp.	3.5	1.7	7.1
Torpedo grass	2.5	1.1	5.8
Water willow	2.0	0.8	5.1
Lotus	2.0	0.8	5.1
Cattail	0.5	0	2.8
Pondweed	0.5	0	2.8
Ash tree	0.5	0	2.8
Structural habitat type			
Small boulders	7.5	4.6	12.1
Cobble	4.0	2.1	7.7
Boat dock	2.5	1.1	5.8
Bedrock	2.0	0.8	5.1
Bulkhead	1.0	0.3	3.6
Fence	0.5	0	2.8
Large boulders	0.5	0	2.8

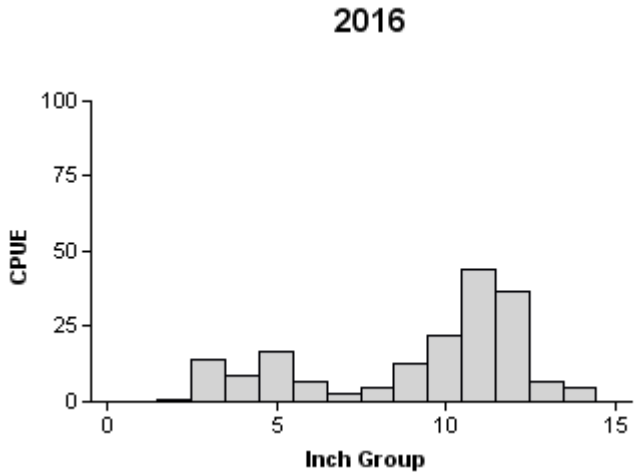
Gizzard Shad



Effort = 1.0
Total CPUE = 194.0 (37; 194)
IOV = 78 (9)



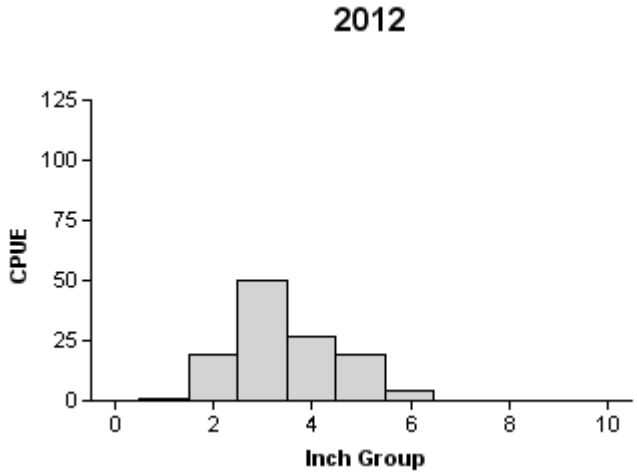
Effort = 1.0
Total CPUE = 239.0 (40; 239)
IOV = 75 (6)



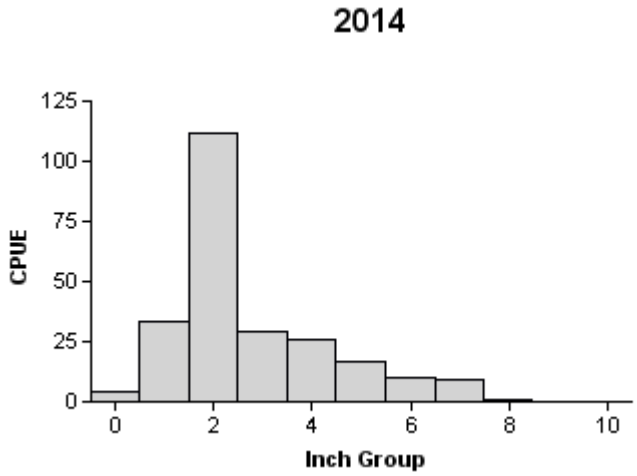
Effort = 1.0
Total CPUE = 184.0 (24; 184)
IOV = 28 (9)

Figure 2. Comparison of the 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, Coleman Reservoir, Texas, 2012, 2014, and 2016.

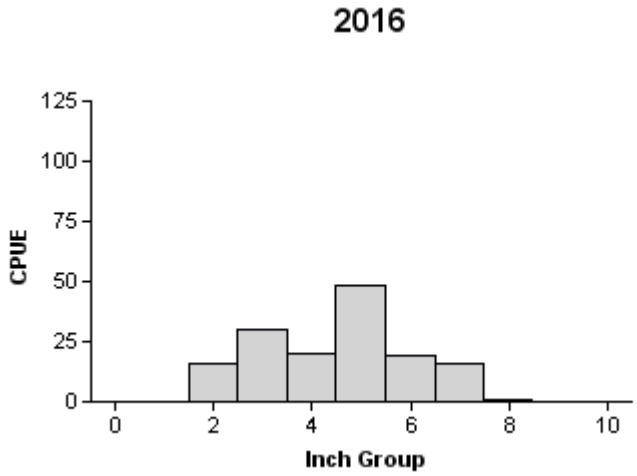
Bluegill



Effort = 1.0
Total CPUE = 120.0 (43; 120)
PSD = 4 (2)



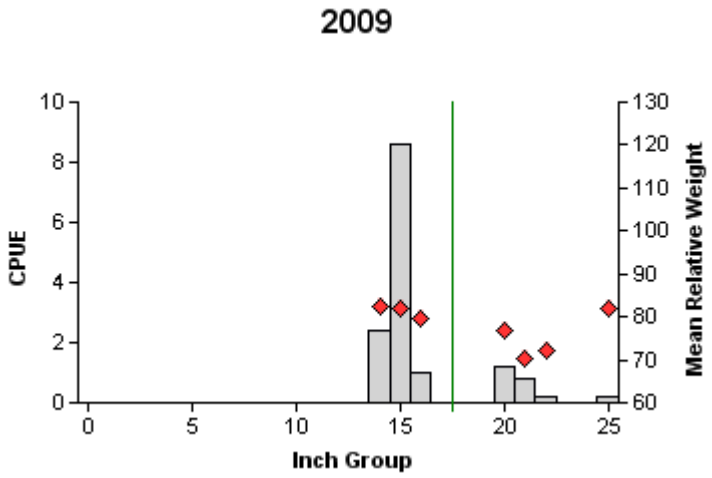
Effort = 1.0
Total CPUE = 241.0 (36; 241)
PSD = 22 (7)



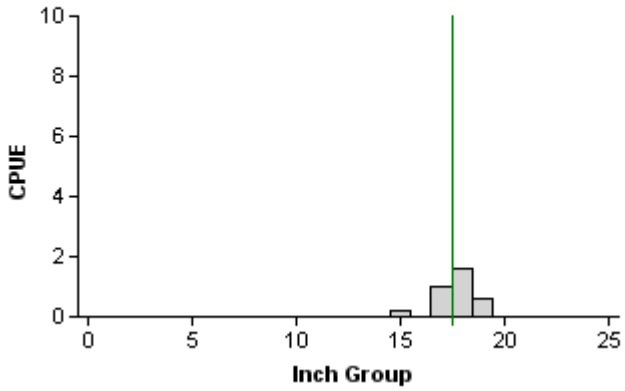
Effort = 1.0
Total CPUE = 150.0 (28; 150)
PSD = 27 (8)

Figure 3. Comparison of the number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleman Reservoir, Texas, 2012, 2014, and 2016.

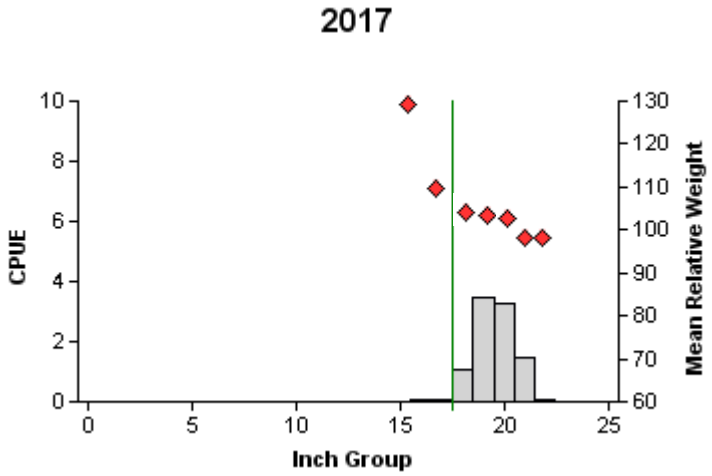
Hybrid Striped Bass



Effort = 5.0
Total CPUE = 14.4 (51; 72)
CPUE-18 = 2.4 (60; 12)
PSD = 24 (17)



Effort = 5.0
Total CPUE = 3.4 (38; 17)
CPUE-18 = 2.2 (36; 11)
PSD = 94 (6)



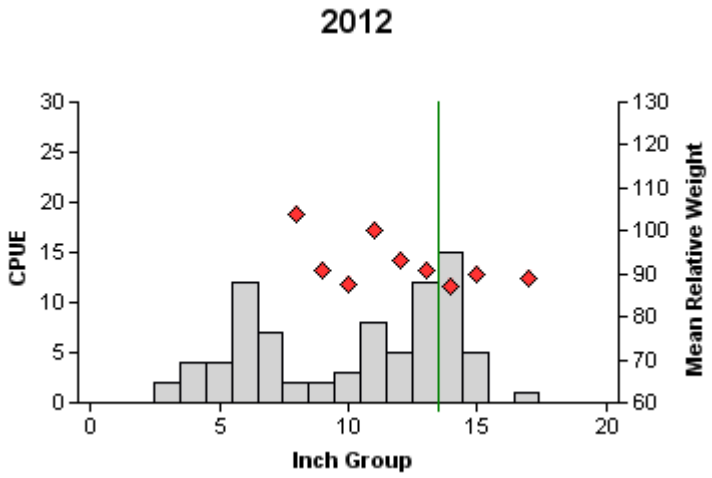
Effort = 10.0
Total CPUE = 9.7 (26; 97)
CPUE-18 = 9.5 (26; 95)
PSD = 100 (0)

Figure 4. Comparison of the number of Hybrid Striped Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE) for spring gill net surveys, Coleman Reservoir, Texas, 2009, 2013, and 2017. The vertical line denotes the 18-inch minimum length limit.

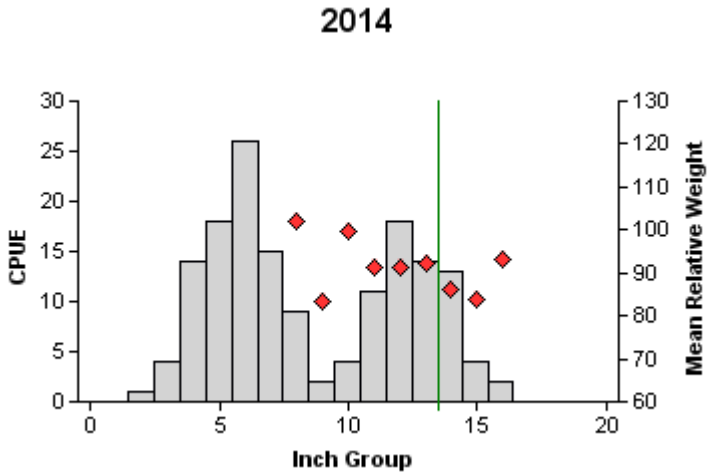
Table 7. Average length at capture for Palmetto Bass (sexes combined) ages 1 – 13 collected in gill net surveys, Coleman Reservoir, Texas, 1992 through 2017. Lengths are followed by the relative standard error and sample size in parenthesis (RSE; N).

Sample Year	Length-at-age (inches)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1992	8.5 (0; 1)	9.2 (3; 8)	16.2 (12; 3)	17.1 (3; 13)	23.0 (0; 1)								
1994		15.4 (2; 9)	18.0 (1; 25)		19.8 (2; 10)	25.7 (6; 2)							
1997		14.7 (3; 4)	18.9 (2; 6)		20.4 (1; 14)	20.7 (2; 2)							
2001			17.3 (1; 20)	17.8 (3; 4)	18.6 (2; 8)	18.8 (2; 8)	20.2 (0; 3)		20.0 (0; 2)	19.9 (0; 1)			
2005	12.8 (5; 3)						21.1 (2; 7)	21.0 (1; 5)	21.7 (3; 5)	20.0 (1; 2)	21.9 (9; 2)		
2009		15.4 (1; 24)			19.8 (5; 6)							21.3 (0; 1)	23.5 (6; 2)
2017								19.9 (2, 5)		20.0 (1; 91)			

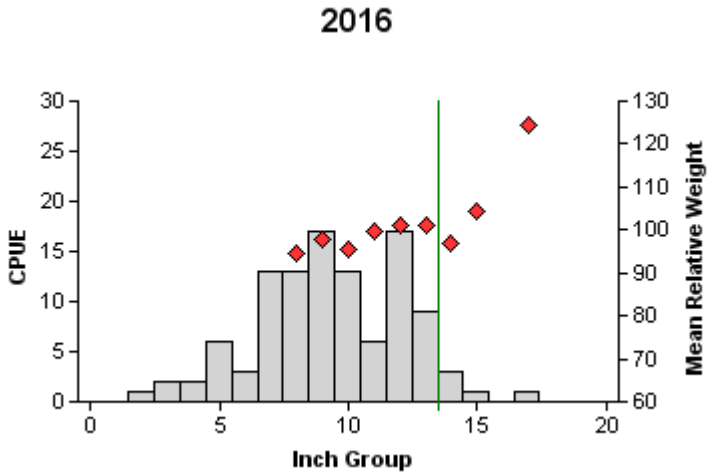
Largemouth Bass



Effort =	1.0
Total CPUE =	82.0 (21; 82)
Stock CPUE =	53.0 (30; 53)
CPUE-14 =	21.0 (24; 21)
PSD =	72 (7)



Effort =	1.0
Total CPUE =	155.0 (20; 155)
Stock CPUE =	77.0 (26; 77)
CPUE-14 =	19.0 (29; 19)
PSD =	66 (5)



Effort =	1.0
Total CPUE =	107.0 (16; 107)
Stock CPUE =	80.0 (20; 80)
CPUE-14 =	5.0 (36; 5)
PSD =	38 (5)

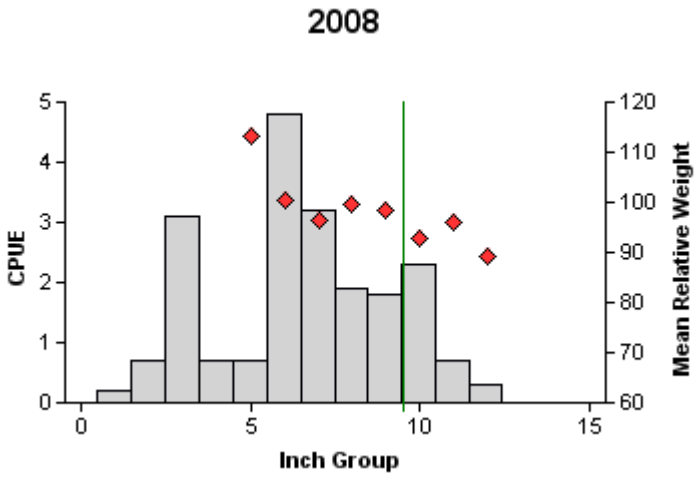
Figure 5. Comparison of the number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Coleman Reservoir, Texas, 2012, 2014, and 2016. The vertical line denotes the 14-inch minimum length limit.

Largemouth Bass

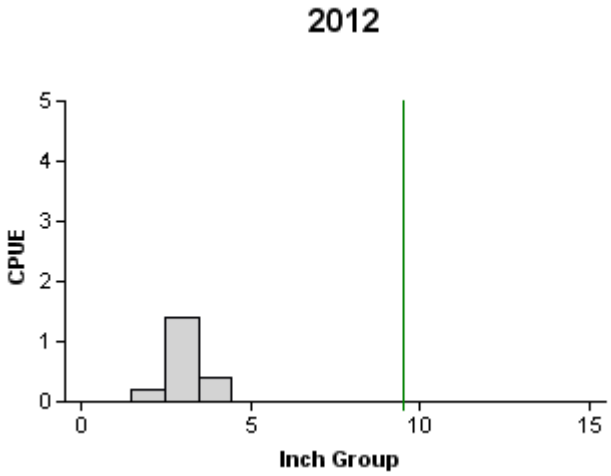
Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Coleman Reservoir, Texas, 1987-2016. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and by micro-satellite DNA analysis since 2005.

		Number of Fish				
Year	Sample size	FLMB	Intergrade	NLMB	% FLMB Alleles	% FLMB
1987	41	0	4	37	3.0	0.0
1991	30	0	17	13	17.5	0.0
1994	21	8	12	1	71.5	38.1
1997	30	1	21	8	31.7	3.3
2000	30	2	26	2	48.3	6.7
2002	41	4	31	6	48.7	9.8
2004	34	5	23	6	46.2	14.7
2006	30	0	30	0	48.4	0.0
2012	30	1	29	0	59.2	3.3
2014	30	0	30	0	48.6	0.0
2016	30	1	28	1	50.8	3.3

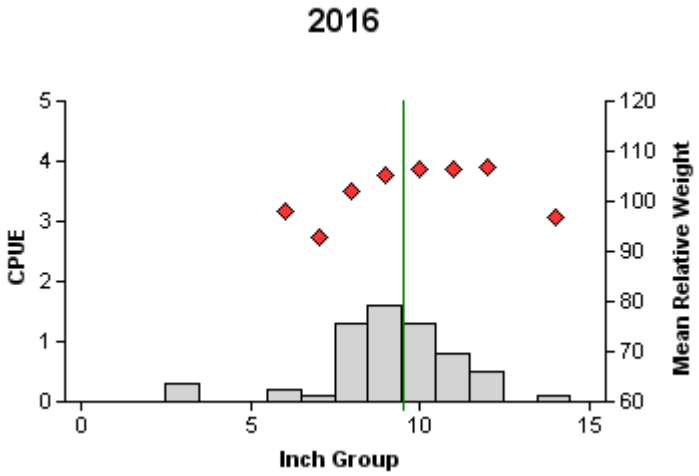
White Crappie



Effort =	10.0
Total CPUE =	20.4 (27; 204)
Stock CPUE =	15.7 (29; 157)
CPUE-10 =	3.3 (38; 33)
PSD =	45 (10)



Effort =	5.0
Total CPUE =	2.0 (100; 10)
Stock CPUE =	0.0 (0; 0)
CPUE-10 =	0.0 (0, 0)
PSD =	0 (0)



Effort =	10.0
Total CPUE =	6.2 (53; 62)
Stock CPUE =	5.9 (57; 59)
CPUE-10 =	2.7 (64; 27)
PSD =	95 (2)

Figure 6. Comparison of the number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Coleman Reservoir, Texas, 2008, 2012, and 2016. No mean relative weights were determined in 2012. The vertical line denotes the 10-inch minimum length limit.

Table 9. Proposed sampling schedule for Coleman Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, and electrofishing and trap netting surveys are conducted in the fall. Surveys and reporting to be completed are denoted by S for standard survey and A for additional survey.

Survey Year	Electrofish	Trap Net	Gill Net	Habitat/ Vegetation	Access	Report
2017-2018						
2018-2019			A			
2019-2020						
2020-2021	S	S	S	S	S	S

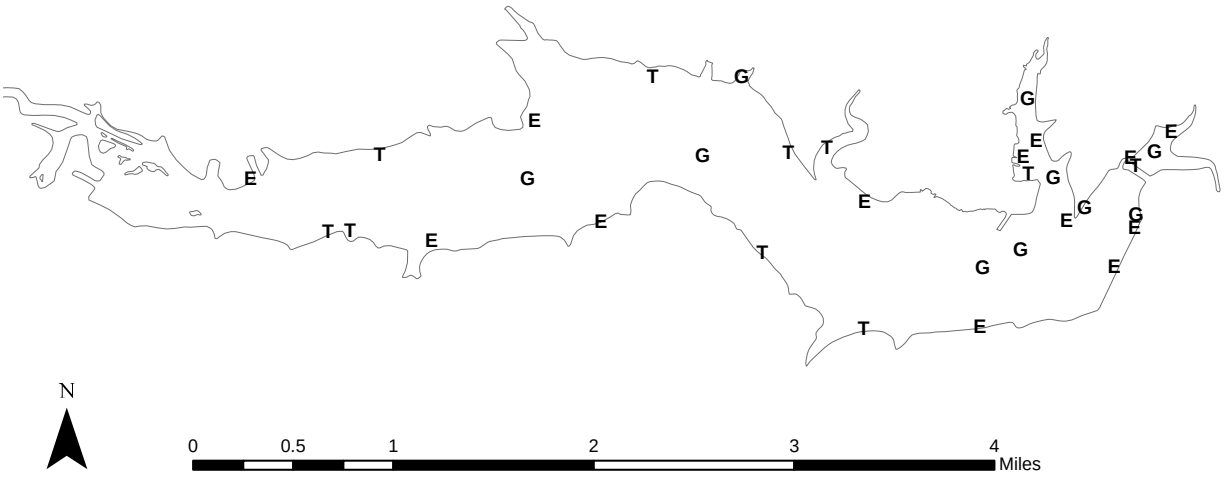
APPENDIX A

Number (N) and catch rate (CPUE) and associated relative standard error (RSE) of all species collected from standard gear types from Coleman Reservoir, Texas, 2016-2017. Sampling effort was 1.0 hour for electrofishing, 10 net nights for gill netting, and 10 net nights for trap netting.

Species	Electrofishing		Gill Netting		Trap Netting	
	N	CPUE (RSE)	N	CPUE (RSE)	N	CPUE (RSE)
Gizzard Shad	184	184.0 (24)				
Threadfin Shad	118	118.0 (54)				
Channel Catfish	1	1.0 (100)	22	2.2 (32)		
Flathead Catfish	2	2.0 (67)	2	0.2 (67)	1	0.1 (100)
Green Sunfish	13	13.0 (70)				
Warmouth	6	6.0 (58)				
Orangespotted Sunfish	1	1.0 (100)				
Bluegill	150	150.0 (28)			323	32.3 (34)
Longear Sunfish	4	4.0 (56)			20	2.0 (66)
Redear Sunfish	8	8.0 (50)			6	0.6 (83)
Largemouth Bass	107	107.0 (16)				
White Crappie	6	6.0 (58)			62	6.2 (53)
Logperch	8	8.0 (50)				
Freshwater Drum[1]	1	1.0 (100)				
Hybrid Sunfish	1	1.0 (100)				
Hybrid Striped Bass			97	9.7 (26)		

[1]Fish sampled ≤ 6 inches TL.

APPENDIX B



Location of sampling sites, Coleman Reservoir, Texas, 2016-2017. Electrofishing (E), gill netting (G), and trap netting (T) stations are displayed. Reservoir outline at conservation pool is displayed by a gray line. Throughout the sampling period, the reservoir was approximately at conservation pool at time of sampling.