

# Martin Creek Reservoir

## 2019 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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## Survey and Management Summary

Fish populations in Martin Creek Reservoir were surveyed in 2019 using electrofishing and in 2020 using gill nets and baited tandem hoop nets. Historical data are presented with the 2019-2020 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:** Martin Creek Reservoir is located on Martin Creek, a tributary of the Sabine River in Rusk County. Luminant Energy impounded the reservoir in 1974 to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres with a shoreline length of 62 miles and a mean depth of 16 feet. Water level fluctuations average 3 to 5 feet annually.

**Management History:** Previous management plans included working collaboratively with Martin Creek State Park and Luminant Energy to prevent additional introductions of giant salvinia. Annual aquatic vegetation surveys were conducted to ensure that a rapid response could occur if giant salvinia was reintroduced. State Park personnel have been vigilant in inspecting boat trailers. Several giant salvinia introductions have been identified and quickly eliminated. In 2017, an additional infestation of giant salvinia was discovered. After two years of herbicide treatments all salvinia plants have been eliminated. Triploid grass carp were stocked from 1996 through 1999 at a rate of 0.6/acre each year to reduce hydrilla that covered about a third of the reservoir. Native aquatic vegetation was introduced in 2012, and brushpiles were deployed in 2014. Artificial fish habitat structures were placed near the state park fishing pier in 2019 to enhance fishing success. Submersed aquatic vegetation coverage has increased in recent years.

### Fish Community

- **Prey species:** Threadfin and Gizzard Shad were present in the reservoir, but their abundance is low. Bluegill are the most abundant prey fish in the reservoir. Redbreast Sunfish were also abundant as a prey fish as well as for an additional angling opportunity.
- **Catfishes:** Blue Catfish, Channel Catfish, and Flathead Catfish were present during 2020 gill netting. The Blue Catfish population has been stable with fish collected as long as 41 inches. The number of Channel Catfish has increased over the last three gill netting surveys. Channel Catfish were the most abundant catfish species. During a 2019/2020 winter angler survey, 4% of hours fished were directed at catfishes.
- **White Bass:** White Bass were present in the reservoir in low abundance. They were not intentionally stocked but may have been introduced through water transferred from the Sabine River to maintain the reservoir water level for power plant operation. This population is not expected to provide a large component to the overall fishery due to limited spawning habitat.
- **Largemouth Bass:** Largemouth Bass numbers have steadily increased in recent electrofishing surveys. Growth of Largemouth Bass was fast, which was likely a result of warmer average water temperatures due to power plant cooling operations. Largemouth Bass received over 92% of directed angling effort during the 2019/2020 winter angler creel survey from tournament and non-tournament bass anglers. The anglers released 98% of all legal-sized fish that were caught.
- **Crappie:** Historical trap netting for White Crappie and Black Crappie has caught few fish. Therefore, netting surveys for crappie were discontinued in 2009. Few anglers interviewed fished for crappie during the 2019/2020 winter creel survey and they only accounted for 1% of the total angling effort.

**Management Strategies:** Conduct annual vegetation surveys to monitor for the presence and growth of giant salvinia, hydrilla, or other non-native invasive aquatic plants. Inform the public about the negative impacts of aquatic invasive species. Continue to work with Martin Creek Lake State Park staff to promote angling opportunities in the reservoir.

## Introduction

This document is a summary of fisheries data collected from Martin Creek Reservoir in 2019-2020. 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 2019-2020 data for comparison.

## Reservoir Description

Martin Creek Reservoir was impounded in 1974 on Martin Creek. It is located in Rusk County approximately 10 miles northeast of Henderson and is operated and controlled by Luminant Energy to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres in size and has a shoreline length of 62 miles and a mean depth of 16 feet. Water level fluctuations average three feet annually (Figure 1). The primary habitat type is standing timber. Most of the land around the reservoir is used for agriculture and oil and gas production. Other descriptive characteristics for Martin Creek Reservoir are presented in Table 1.

## Angler Access

Martin Creek Reservoir has a public boat ramp and one handicap-accessible fishing pier at Martin Creek State Park and a private ramp located on Luminant Energy property. An additional boat ramp is located within the state park to accommodate larger fishing tournaments. Additional boat ramp characteristics are listed in Table 2. Shoreline access is limited to Martin Creek State Park.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Bister and Wright 2016) included:

1. Monitor the reservoir for giant salvinia, hydrilla, and other invasive species. Coordinate with the controlling authority, Martin Creek Lake State Park, and TPWD Aquatic Habitat Enhancement (AHE) for any necessary prevention, education, or management activities.

**Action:** Annual aquatic vegetation surveys have been conducted to monitor the coverage and distribution of invasive species. The AHE team has conducted herbicide treatments of giant salvinia from 2017-2019. State park personnel have monitored boat trailers in the parking lot for potential new introductions of invasive aquatic plants.

2. Continue to investigate alternative sampling gears to monitor Channel Catfish and Blue Catfish populations.

**Action:** Low frequency electrofishing has been conducted for Blue Catfish and hoop netting for Channel Catfish.

**Harvest regulation history:** Sport fishes in Martin Creek Reservoir are currently managed with statewide regulations (Table 3).

**Stocking history:** No stockings occurred over the current survey period. Blue Catfish were stocked in 2003 (273,789 fingerlings) and 2007 (249,050 fingerlings). Approximately 3,000 triploid Grass Carp were stocked annually from 1996 through 1999. The complete stocking history is listed in Table 4.

**Vegetation/habitat management history:** The controlling authority stocked triploid Grass Carp in 1993 and again from 1996 through 1999 to reduce hydrilla. Hydrilla had become problematic in the reservoir at nearly 35% coverage prior to the triploid Grass Carp stockings. Grass Carp subsequently removed the majority of submersed plants in the reservoir. Giant salvinia was discovered in June 2009 and was eradicated until recent introductions in 2015 and 2016. Early detection of these introductions allowed rapid response with a combination of physical removal and herbicide treatment. A contractor treated 3 acres of giant salvinia in 2016 and 9 acres in 2017. In 2017 TPWD personnel discovered a giant salvinia infestation in a separate area of the reservoir. The primary source of plants came from a cove on the

other side of Farm to Market Road 2658 that was connected to the main reservoir via a culvert that runs under the road. Team members from TPWD AHE and Marshall Inland Fisheries District installed a floating boom to prevent further plants from entering the reservoir through the culvert. Repeated herbicide treatments were conducted on both sides of FM2658. The AHE team conducted herbicide treatments of giant salvinia in 2017 (10 acres), 2018 (11 acres), and 2019 (2.5 acres). Native aquatic vegetation (water willow, water stargrass, and Illinois pondweed) was introduced in 2012 with limited success. Brush piles were installed in 2014. Artificial fish habitat structures were also deployed around the fishing pier at Martin Creek State Park in 2019.

**Water transfer:** There is no interbasin transfer associated with the operation of Martin Creek Reservoir. Martin Creek Reservoir does have the ability to pump water from the Sabine River when needed, and water is released through the dam to maintain flow downstream and to manage pool elevation.

## Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Martin Creek Reservoir (Bister and Wright 2016). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (1 hour at 12, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 13 randomly selected fish (range 13.0 to 14.9 inches).

**Gill netting** – Blue Catfish, Channel Catfish, and White Bass were collected by gill netting (5 net nights at 5 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn).

**Low-frequency electrofishing** – Blue Catfish were collected by low-frequency electrofishing at 10 stations. The minimum duration of electrofishing at each station was 3 minutes. CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

**Tandem hoop nets** – Channel Catfish were collected using 10 tandem hoop-net series at 10 stations. Nets were baited with soap and deployed for 2-night soak durations. CPUE for tandem hoop netting was recorded as the number of fish caught per tandem hoop net series (fish/series).

**Statistics** – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight ( $W_r$ )] were calculated for target fishes according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

**Creel survey** – An access-point creel survey was scheduled from December 2019 through May 2020. The 2019/2020 winter creel survey was conducted as an access point survey opposed to a roving survey that was previously conducted. Therefore, current creel survey estimates during this latest survey are not directly comparable to prior surveys. The boat ramp at Martin Creek State Park is the primary public access on the reservoir and the majority of anglers should utilize this location for access to the reservoir. In addition to the winter creel survey in the last OBS Plan, we had decided to also continue the creel survey through the spring quarter (March through May). However, due to COVID-19-related closure of the state park, the spring quarter survey was not conducted. Angler interviews were conducted on 5 weekend days and 4 weekdays during the winter quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Habitat** – A structural habitat survey was last conducted in 2005 (Ashe and Driscoll 2006). Vegetation surveys were conducted in 2016–2019 to monitor hydrilla and giant salvinia and to assess native aquatic plant coverage in 2019. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

**Water level** – Source for water level data was the United States Geological Survey (USGS 2020).

## Results and Discussion

**Habitat:** A structural habitat survey was last conducted in 2005 (Ashe and Driscoll 2006). They reported 2,426 acres of standing timber within the reservoir and a majority of natural shoreline. During the 2019 aquatic vegetation survey, no giant salvinia was observed in the reservoir. Native vegetation covered approximately 10% of the reservoir's surface area (Table 6), most of which was floating-leaved species (primarily American lotus). The reservoir water level was 1.5 feet below conservation pool at the time of the survey, which resulted in many emergent species being out of the water. Hydrilla coverage was 42 acres in 2019 and has been stable in recent years (Table 6).

**Creel:** Directed fishing effort by anglers was highest for Largemouth Bass (92%), followed by anglers fishing for catfishes (4%) during the 2019/2020 winter creel survey period (Table 7). Total fishing effort for all species and direct expenditures at Martin Creek Reservoir was 13,868 h and \$105,793, respectively (Table 8). The majority of anglers surveyed (83%) travelled less than 50 miles to fish during the 2019/2020 creel survey period (Appendix C).

**Prey species:** Threadfin Shad were present in the 2019 electrofishing survey. The electrofishing catch rate of Gizzard Shad was higher in 2019 (41/h) than it was in 2017 (25/h), but lower than 2015 (78/h) (Figure 2). Index of vulnerability (IOV) for Gizzard Shad was moderate, indicating that 49% of Gizzard Shad were available to existing predators (Figure 2). Redbreast Sunfish were present as an additional prey source (Figure 3). Total CPUE of Bluegill in 2019 (462/h) was higher than 2017 (364/h), but lower than 2015 (667/h) (Figure 4). Collectively, sunfishes formed the reservoirs primary forage base.

**Catfishes:** The gill net catch rate of stock-length ( $\geq 12$  in) Blue Catfish was 8.3/nn in 2020, which was higher than 2016 (6.3/nn), but lower than 2014 (11.6/nn) (Figure 5). Gill netting in 2020 collected Blue Catfish from 10 to 41 inches in length, which was similar to previous surveys (Figure 5). Body condition of Blue Catfish indicated adequate prey availability with  $Wr$  values at or above 90 for most inch groups (Figure 5).

Low-frequency electrofishing for Blue Catfish collected some fish (34/h) during 2019 but failed to meet any sampling objectives (Figure 6). Given that gill netting remains a viable sampling gear for both Blue Catfish and Channel Catfish, low-frequency electrofishing and hoop netting will be discontinued at this reservoir.

The gill netting catch rate of stock-length Channel Catfish has increased over the past 3 surveys from 0.8/nn in 2014 to 10.7/nn in 2020 (Figure 7). Size structure of the Channel Catfish population showed a slight improvement from a PSD of 0 in 2014 to a PSD of 5 in 2019 (Figure 7). Channel Catfish body condition indicated adequate prey availability with  $Wr$  values  $>90$  for most inch groups (Figure 7).

The catch rate of stock-length Channel Catfish in baited tandem hoop nets was 10.5/series in 2020, which was lower than the survey in 2016 (13.6/series) (Figure 8). The lengths of fish collected in the 2020 survey ranged from 8 to 20 inches (Figure 8), which was similar to the size composition collected with gill nets. Relative weight values were also similar to fish collected during gill netting (Figure 8).

Directed angling effort for catfishes during the 2019/2020 winter creel survey was 616 h. Anglers caught an estimated 0.31 fish/h. Total catfish harvest was low and anglers harvested an estimated 30 Blue Catfish and 122 Channel Catfish (Table 9). The catfish harvest size composition ranged from 17 – 26 inches total length (Figures 9 and 10).

**White Bass:** White Bass were likely introduced to the reservoir during the past four years since the species was collected for the first time in 2020. Fish were not intentionally stocked but may have been

transferred into the reservoir from the Sabine River when water was used to maintain reservoir water levels. Their abundance was low (0.3/nh; Appendix A).

**Largemouth Bass:** The electrofishing catch rate of stock-length Largemouth Bass has increased steadily over the last three surveys from 102/h in 2015 to 201/h in 2019 (Figure 11). However, the size structure of the population has been consistent as seen in similar PSD values among recent surveys (Figure 11). Growth of Largemouth Bass was fast. The average age of 14-inch fish was 2.0 years in 2019 (N = 13; range = 1 to 3 years) and 1.7 years in 2017 (N = 13; range 1 to 3 years). Body condition was moderate with mean *Wr* values near 90 for most size classes (Figure 11).

Largemouth Bass received the most directed angling effort during the 2019/2020 winter access creel survey. Directed effort was 8,326 h for non-tournament anglers and 4,476 h for tournament anglers (Table 10). Total Largemouth Bass angling catch rate was 0.77/h (Table 10). Non-tournament anglers harvested an estimated 61 fish (Figure 12), while tournament anglers retained 488 fish for weigh-in and live release (Figure 13). Non-tournament anglers released 98% of legal-size Largemouth Bass caught. The total number of Largemouth Bass released included 10,260 that were <4 pounds and 256 that were between 4 and 6.9 pounds (Table 10).

**Crappie:** Black and White Crappie are present in Martin Creek Reservoir, but trap netting surveys have historically caught few fish. Efforts to increase the catch of crappie in 2009 was made using procedures for dual-cod trap nets, but only 1 White Crappie and 6 Black Crappie were caught during the survey. Trap net surveys were discontinued after 2009. Directed angling effort for crappie during the 2019/2020 winter creel survey was 126 h, and represented only 1% of the total directed effort during the survey period (Table 7). The few anglers encountered that were fishing for crappie did not catch any fish. Other anglers that caught crappie incidentally did not harvest the fish.

# Fisheries Management Plan for Martin Creek Reservoir, Texas

Prepared – July 2020

**ISSUE 1:** Giant salvinia was first discovered in Martin Creek Reservoir in June 2009. This initial infestation was contained and eliminated using herbicides. There have been several other instances in recent years in which giant salvinia has been found at the Martin Creek State Park boat ramp and on boat trailers. These smaller infestations have also been eliminated by mechanical removal and/or herbicide applications. A larger infestation was discovered in 2017 but has subsequently been eliminated using herbicide applications. The threat of future giant salvinia introductions remains high.

## MANAGEMENT STRATEGY

1. Continue to encourage state park personnel to inspect boat trailers and monitor the boat ramps for any invasive plant introductions.
2. Conduct annual surveys to monitor the reservoir for giant salvinia occurrence.
3. Be prepared for rapid response to reports of giant salvinia introduction (i.e., deploy floating containment booms, mechanically remove visible plants, and coordinate with TPWD Aquatic Habitat Enhancement to conduct herbicide treatment).
4. Maintain signage and boat ramp stencils related to invasive species.

**ISSUE 2:** Martin Creek Lake State Park is the primary access point for anglers to utilize the reservoir. Largemouth Bass and catfish fisheries are popular among anglers that visit the park. State park staff purchased a certified scale to be able to weigh fish for anglers that may catch record-sized fish.

## MANAGEMENT STRATEGIES

1. Continue to work with state park staff to promote fishing opportunities in the reservoir.
2. Inform anglers about the availability of the certified scale at the state park for weighing potential fish records.
3. Investigate opportunities for state park to bait the area around the fishing pier with range cubes or provide a fish feeder to attract fish for anglers.

**ISSUE 3:** Hydrilla and other submersed aquatic vegetation have reestablished in the reservoir following years of little to no submersed plant presence. The Largemouth Bass and sunfish populations have responded favorably to this increase in plant growth. However, hydrilla coverage has reached nuisance levels in the past and should be monitored.

## MANAGEMENT STRATEGIES

1. Conduct annual surveys to monitor hydrilla coverage.
2. Coordinate with TPWD Aquatic Habitat Enhancement to conduct herbicide treatment of hydrilla around the state park fishing pier, boat ramps, and swimming area as necessary.
3. Provide information and technical guidance to Luminant Energy related to hydrilla management.

**ISSUE 4:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like



fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

## MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

## Objective-Based Sampling Plan and Schedule (2020–2024)

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

Sport fishes in Martin Creek Reservoir include Blue Catfish, Channel Catfish, White Bass, Largemouth Bass, White Crappie, and Black Crappie. Known important forage species include Bluegill, Gizzard Shad, and Threadfin Shad. The proposed sampling schedule to meet the following OBS Plan can be found in Table 11.

### Low-density fisheries

**Crappie:** Black and White Crappie are present in Martin Creek Reservoir, but trap netting surveys have historically caught few fish. Efforts to increase the catch of crappie in 2009 were made using procedures for dual-cod trap nets, but only 1 White Crappie and 6 Black Crappie were caught during the survey. Trap net surveys were discontinued after 2009. There has been very little directed angling effort for crappie estimated during recent winter angler creel surveys (2009-2010 = 5.2%; 2013-2014 = 0.8%). Sampling this population is unnecessary in FYs 2020-2023.

**White Bass:** White Bass have only been present in the reservoir for the past few years. Currently, abundance is low and there was no directed angling effort during the 2019/2020 winter angler creel survey. This will likely continue to be a low-density fishery due to limited spawning habitat, but we will record White Bass data during routine gill netting surveys for catfishes to monitor any large-scale changes in the population.

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

**Largemouth bass:** Largemouth bass are the most popular sport fish in Martin Creek Reservoir. Directed angling effort exceeded 85% during recent winter creel surveys (2009-2010, 2013-2014, and 2019-2020). The popularity and reputation for quality Largemouth Bass fishing at this reservoir warrant sampling time and effort. Largemouth Bass are managed with the statewide 14-in MLL regulation. Trend data on CPUE, size structure, and body condition have been collected every 2 years since 2013 with fall nighttime electrofishing. Continued collection of trend data in this power plant cooling reservoir with night electrofishing in the fall every 2 years will allow for determination of any large-scale changes in the Largemouth Bass population that may spur further investigation. A minimum of 12 randomly selected 5-

min electrofishing sites will be sampled in 2021 and 2023, but sampling will continue at random sites until 50 stock-sized fish are collected and the RSE of CPUE-S is  $\leq 25$  (the anticipated effort to meet both sampling objectives is 12 stations with 80% confidence). The previous 3 surveys have achieved this objective with 12 electrofishing stations. In addition to the original 12 random stations, 3 additional random stations will be pre-determined in the event some extra sampling is necessary to achieve objectives. Otoliths from 13 fish between 13.0 and 14.9 inches will be collected in 2021 and 2023 to determine mean age at 14 inches to monitor large-scale changes in growth that may indicate the need for further investigation. Relative weight of Largemouth Bass  $\geq 8$  inches (total length) will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

**Catfish:** Blue Catfish and Channel Catfish are present in Martin Creek Reservoir. The use of alternative sampling gears to monitor the catfish populations in addition to traditional gill netting have been investigated in recent years. Even though hoop nets have been effective at catching Channel Catfish, low-frequency electrofishing has not been successful in sampling the Blue Catfish population. Therefore, gill netting remains the best sampling gear to collect population data for both species.

Gill netting will be continued every four years. The next survey will be conducted during spring 2023. Our sampling objective will be 100 stock-length Channel Catfish for length frequency and size structure (PSD), with a target RSE  $\leq 25$  for CPUE-S. Data will be also collected from Blue Catfish, but we will not pursue a sampling objective a specific number of stock-length fish. Relative weight will be calculated for each species based on length/weight data. We estimate that 10 net nights is needed to achieve 100 stock-length Channel Catfish. Our maximum sampling effort will be 10 net nights.

**Bluegill and shad:** Bluegill and other sunfish are the primary forage at Martin Creek Reservoir. Gizzard Shad and Threadfin Shad are present but not as abundant as Bluegill. Shad species will be surveyed for presence/absence during electrofishing surveys. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in Bluegill relative abundance and size composition. No additional effort will be expended beyond effort necessary to achieve Largemouth Bass objectives. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density. Relative weight of Largemouth Bass  $\geq 8$ " TL will be determined from their length/weight data (maximum of 10 fish weighed and measured per inch class).

## Literature Cited

- Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Ashe, D., and T. Driscoll. 2006. Statewide freshwater fisheries monitoring and management program survey report for Martin Creek Reservoir, 2005. Texas Parks and Wildlife Department, Federal Aid Project Report F-30-R-31, Austin.
- Bister, T. J., and L. D. Wright. 2016. Martin Creek Reservoir, 2015 fisheries management survey report. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and Gizzard Shad population characteristics in Alabama reservoirs. *North American Journal of Fisheries Management* 16:888-895.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. *Fisheries* 32(7): 348.
- United States Geological Society (USGS). 2020. National water information system: Web interface. Available: <http://waterdata.usgs.gov/tx/nwis> (April 2020).

## Tables and Figures

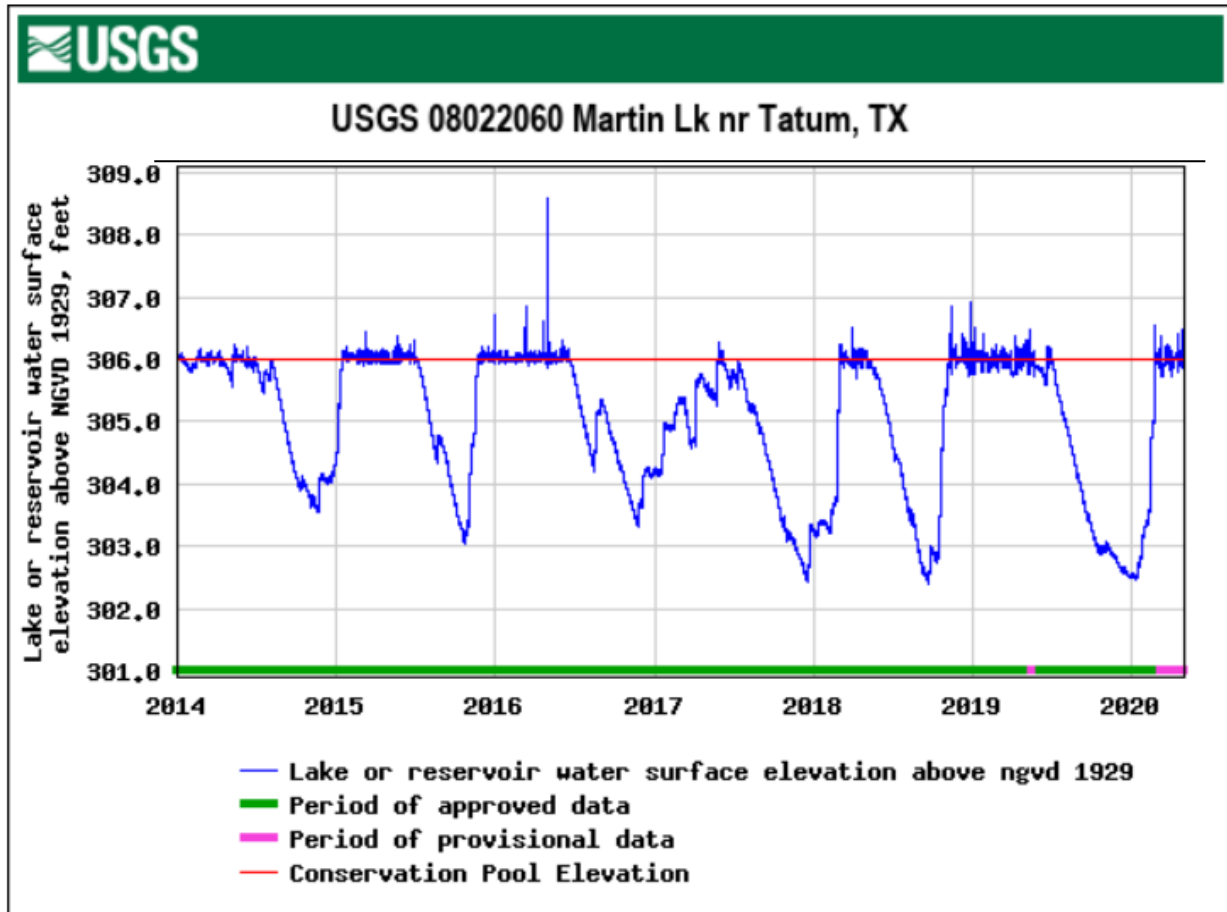


Figure 1. Water level elevations in feet above mean sea level (MSL) recorded for Martin Creek Reservoir, Texas. Conservation pool elevation is 306.0 feet MSL.

Table 1. Characteristics of Martin Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1974
Controlling authority	Luminant Energy
Counties	Rusk
Reservoir type	Tributary
Shoreline Development Index (SDI)	4.7
Conductivity	120 umhos/cm

Table 2. Boat ramp characteristics for Martin Creek Reservoir, Texas, August 2019. Reservoir elevation at time of survey was 304 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Martin Creek State Park	32.27379 -94.56583	Y	50	302	Excellent, no access issues
Martin Creek State Park auxiliary ramp	32.27534 -94.56308	Y	100	Unknown	Excellent, no access issues

Table 3. Harvest regulations for Martin Creek Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5 <sup>a</sup>	14-inch minimum
Bass: Spotted	5 <sup>a</sup>	None
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

<sup>a</sup> Daily bag for Largemouth Bass and Spotted Bass = 5 fish in any combination.

Table 4. Stocking history of Martin Creek Reservoir, Texas. FRY = fry; FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

<b>Species</b>	<b>Year</b>	<b>Number</b>	<b>Size</b>
Blue Catfish	1974	81,520	UNK
	1982	600	UNK
	1984	100,758	FGL
	1985	50,062	FGL
	2003	273,789	FGL
	2004	200	ADL
	2007	249,050	FGL
	Total	755,979	
Channel Catfish	1973	15	UNK
	1974	100,888	AFGL
	Total	100,903	
Florida Largemouth Bass	1974	365,000	FRY
	1984	559,970	FGL
	1990	251,357	FRY
	Total	1,176,327	
Palmetto Bass	1974	49,880	UNK
	1975	15,000	UNK
	1983	49,800	UNK
	1984	99,875	FGL
	Total	214,555	
Redbreast Sunfish	1983	346,853	UNK
	1984	404,236	UNK
	Total	751,089	
Triploid grass carp	1993	800	AFGL
	1996	2,899	AFGL
	1997	2,857	AFGL
	1998	3,000	AFGL
	1999	3,000	AFGL
	Total	12,556	
Walleye	1974	1,250,676	FRY
	Total	1,250,676	
White Crappie	1983	30,913	UNK
	1984	134,227	FGL
	1986	91,696	FRY
	Total	256,836	

Table 5. Objective-based sampling plan components for Martin Creek Reservoir, Texas 2019–2020.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock $\leq 25$
	Size structure	PSD, length frequency	$N \geq 50$ stock
	Age-and-growth	Age at 14 inches	$N = 13, 13.0 - 14.9$ inches
	Condition	$W_r$	10 fish/inch group (max)
Bluegill <sup>a</sup>	Abundance	CPUE–Total	
	Size structure	PSD, length frequency	
Gizzard Shad <sup>a</sup>	Presence/absence		
Threadfin Shad <sup>a</sup>	Presence/absence		
<i>Low-frequency electrofishing</i>			
Blue Catfish	Abundance	CPUE–stock	RSE-Stock $\leq 25$
	Size structure	Length frequency	$N \geq 200$
<i>Gill netting</i>			
Blue Catfish	Abundance	CPUE–stock	RSE-Stock $\leq 25$
	Size structure	PSD, length frequency	$N = 100$ stock (200 total)
Channel Catfish	Abundance	CPUE-stock	RSE-Stock $\leq 25$
	Size structure	PSD, length frequency	$N = 100$ stock
<i>Tandem hoop netting</i>			
Channel Catfish	Abundance	CPUE–stock	RSE-Stock $\leq 25$
	Size structure		$N \geq 100$ stock

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE of Bluegill and Gizzard Shad if not reached from designated Largemouth Bass sampling effort. Instead, Largemouth Bass body condition can provide information on forage abundance, vulnerability, or both relative to predator density.

Table 6. Survey of aquatic vegetation, Martin Creek Reservoir, Texas, 2016–2019. Non-native surveys were conducted annually, while native vegetation was only surveyed in 2019. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2016	2017	2018	2019
Native submersed				<1 <sup>(b)</sup>
Native floating-leaved				474 (9.5)
Native emergent				64 (1.3)
Non-native				
Giant salvinia (Tier I) <sup>a</sup>	0	<1 <sup>(b)</sup>	<1 <sup>(b)</sup>	0
Hydrilla (Tier III) <sup>a</sup>	22 (0.4)	54 (1.1)	37 (0.7)	42 (0.8)
Alligatorweed (Tier III) <sup>a</sup>	Present	<1 <sup>(b)</sup>	0	0

<sup>a</sup>Tier I is immediate response, Tier II is maintenance status, Tier III is watch status.

<sup>b</sup> Percentage calculation <0.1.



Table 7. Percent directed angler effort by species for Martin Creek Reservoir, Texas. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020.

Species	2009/2010	2013/2014	2019/2020
Largemouth Bass	85.5	90.3	92.3
Catfishes	5.9	8.9	4.4
Crappies	5.2	0.8	0.9
Anything	3.4	0.0	2.4

Table 8. Total fishing effort (h) for all species and total directed expenditures at Martin Creek Reservoir, Texas. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. Relative standard error is in parentheses.

Creel statistic	2009/2010	2013/2014	2019/2020
Total fishing effort	23,121 (37)	17,836 (40)	13,868 (37)
Total directed expenditures	\$140,045 (41)	\$148,823 (51)	\$105,793 (52)

## Gizzard Shad

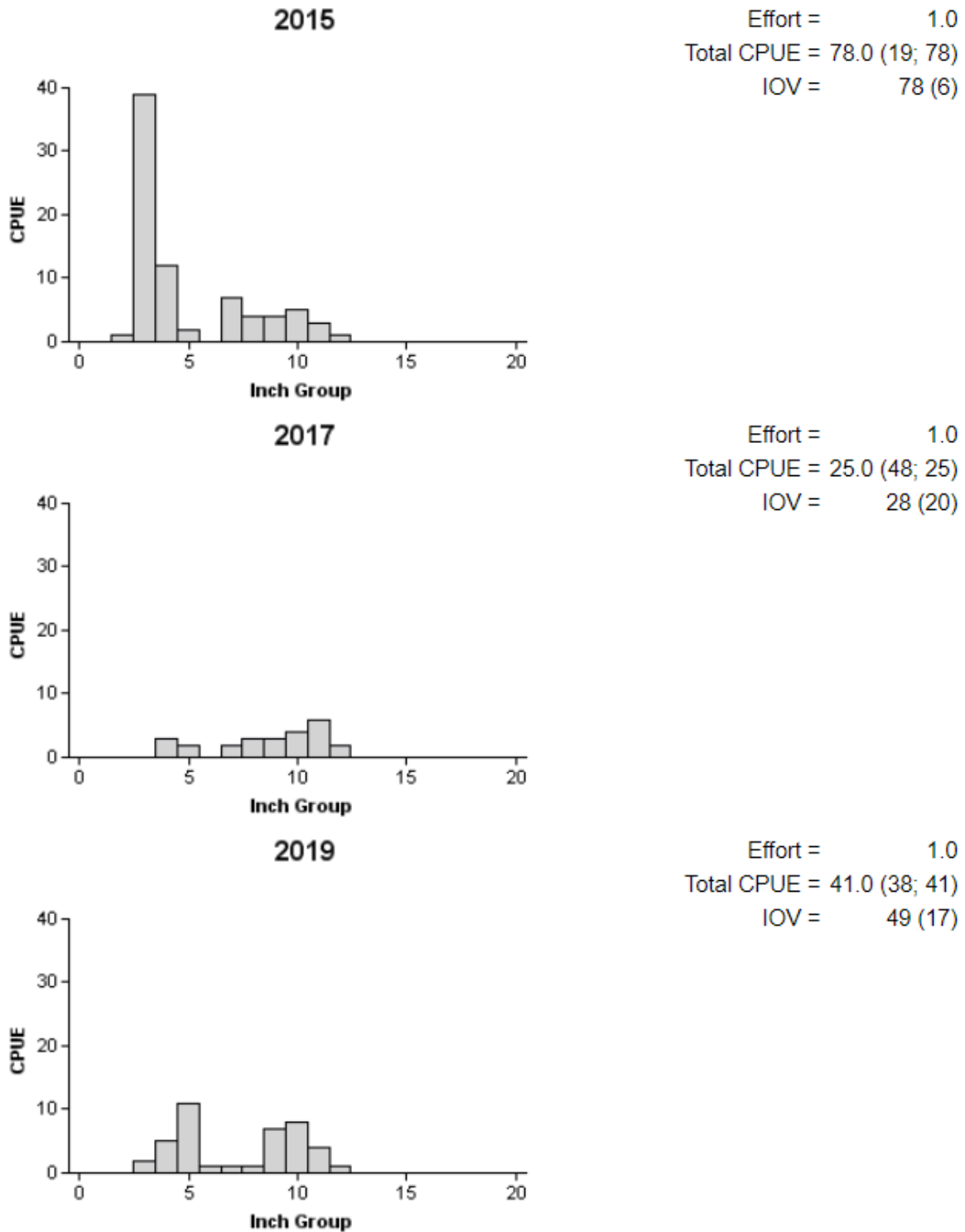


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2015, 2017, and 2019.

## Redbreast Sunfish

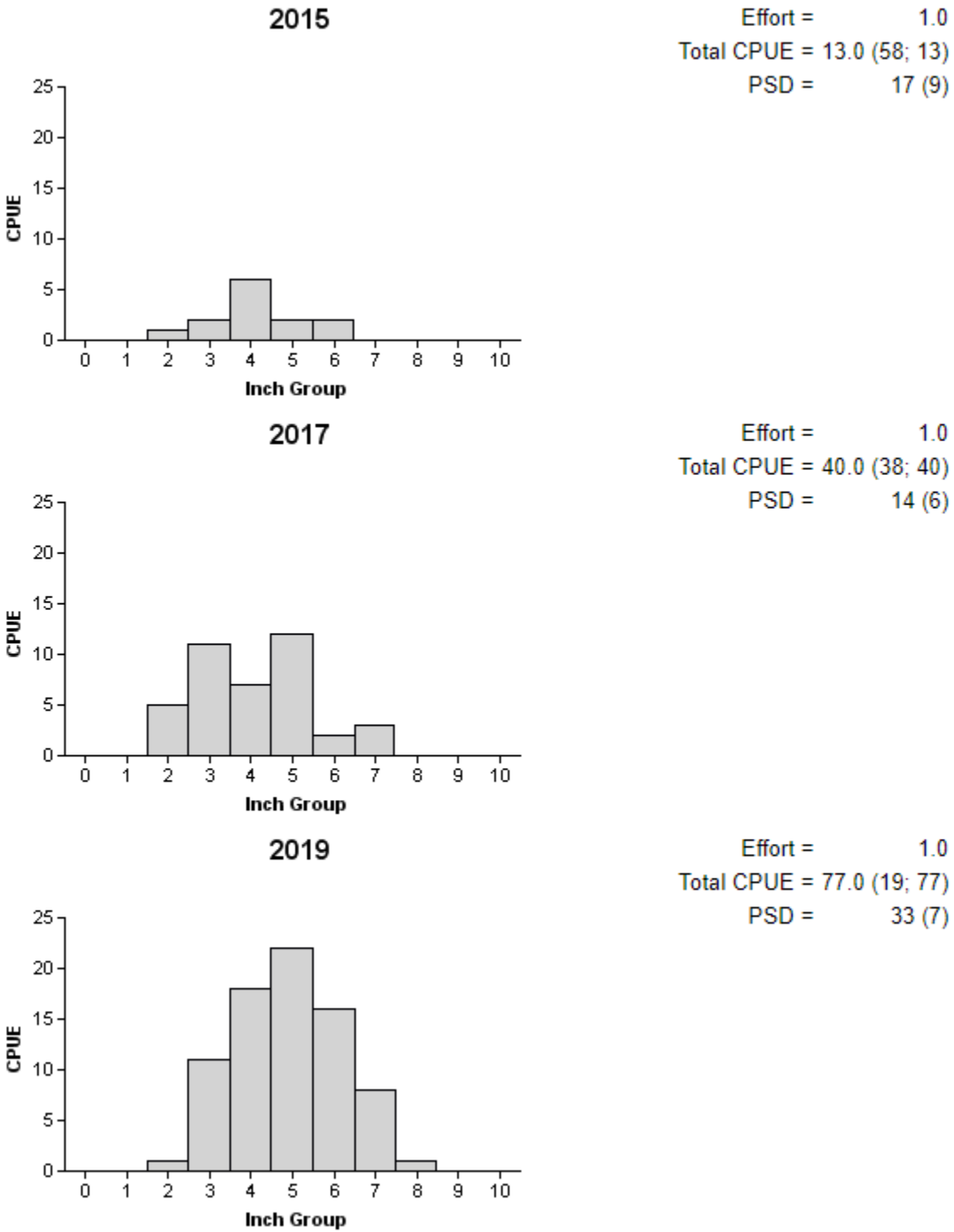


Figure 3. Number of Redbreast Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2015, 2017, and 2019.

## Bluegill

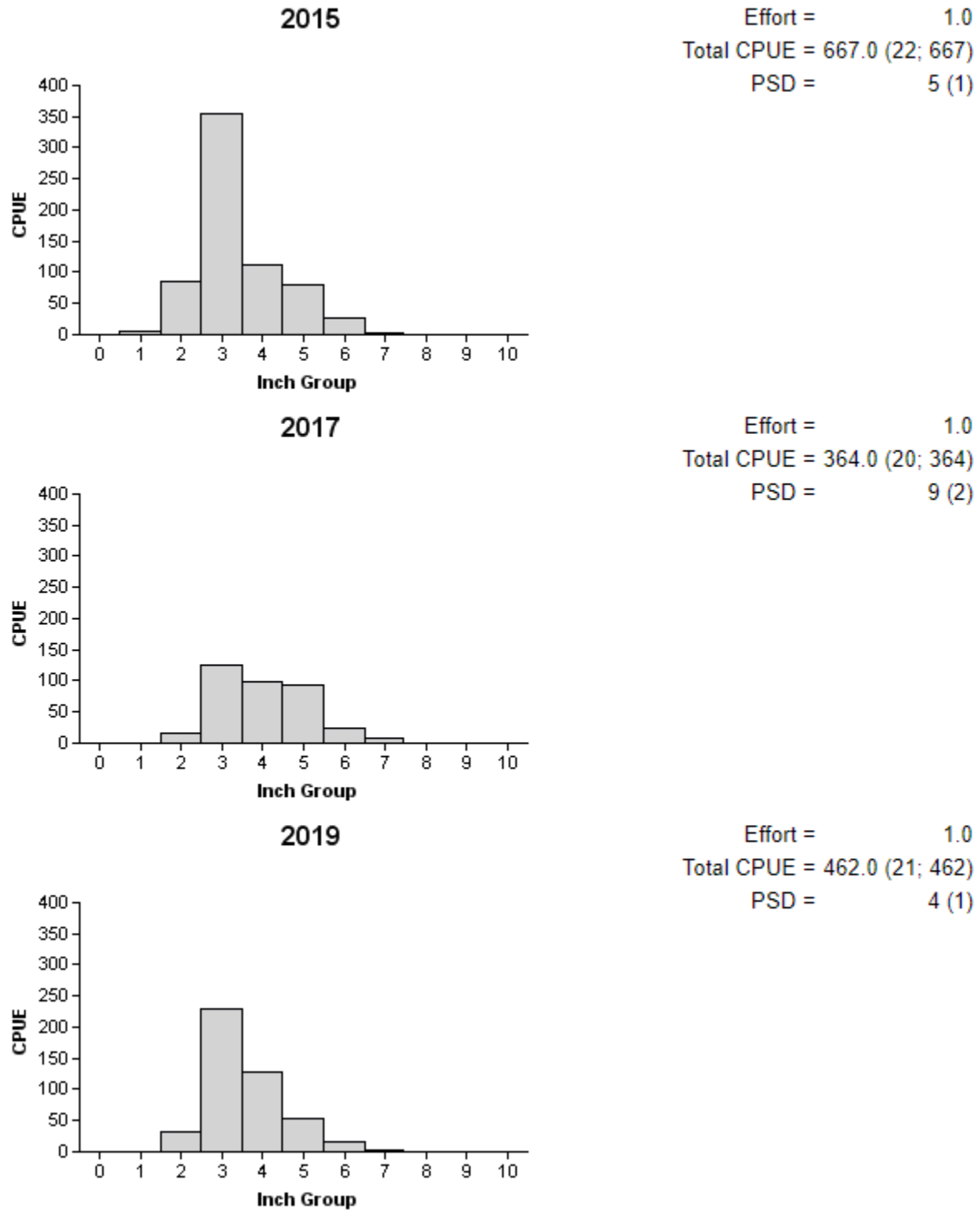


Figure 4. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2015, 2017, and 2019.

## Blue Catfish

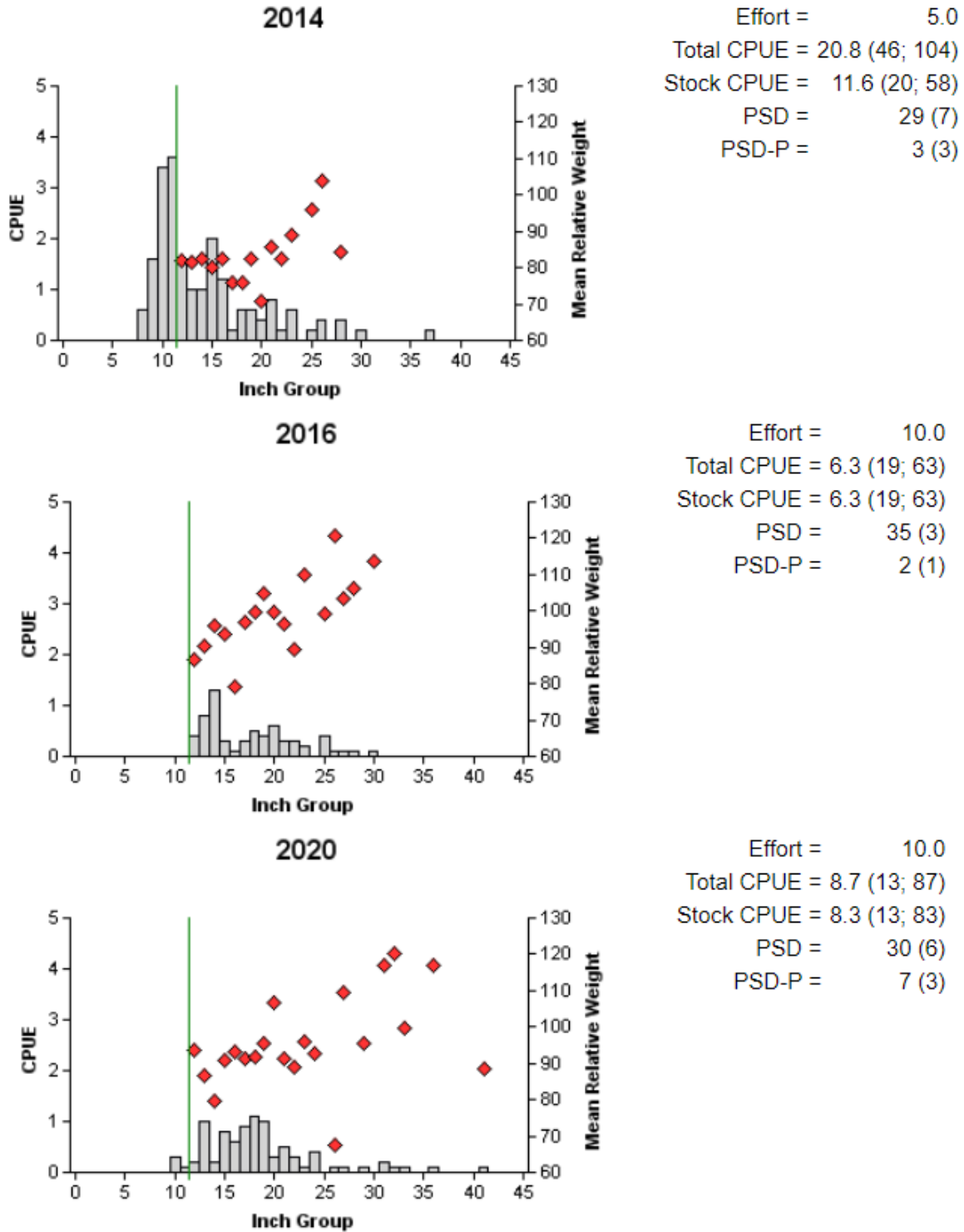


Figure 5. Number of Blue Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Martin Creek Reservoir, Texas, 2014, 2016, and 2020. Vertical line indicates minimum length limit.

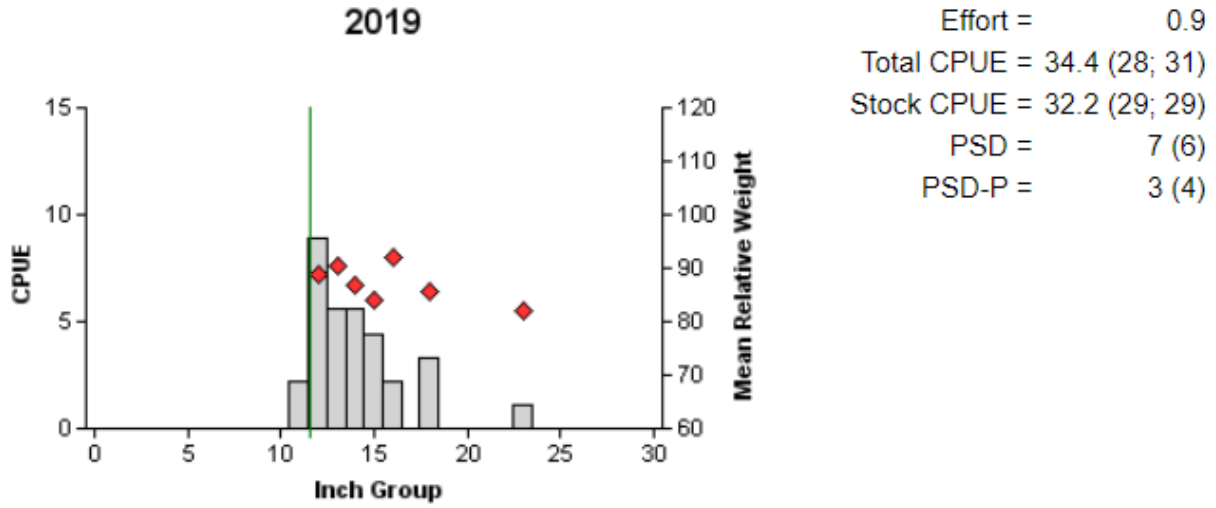


Figure 6. Number of Blue Catfish caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall low frequency electrofishing surveys, Martin Creek Reservoir, Texas, 2019. Vertical line indicates minimum length limit.

## Channel Catfish

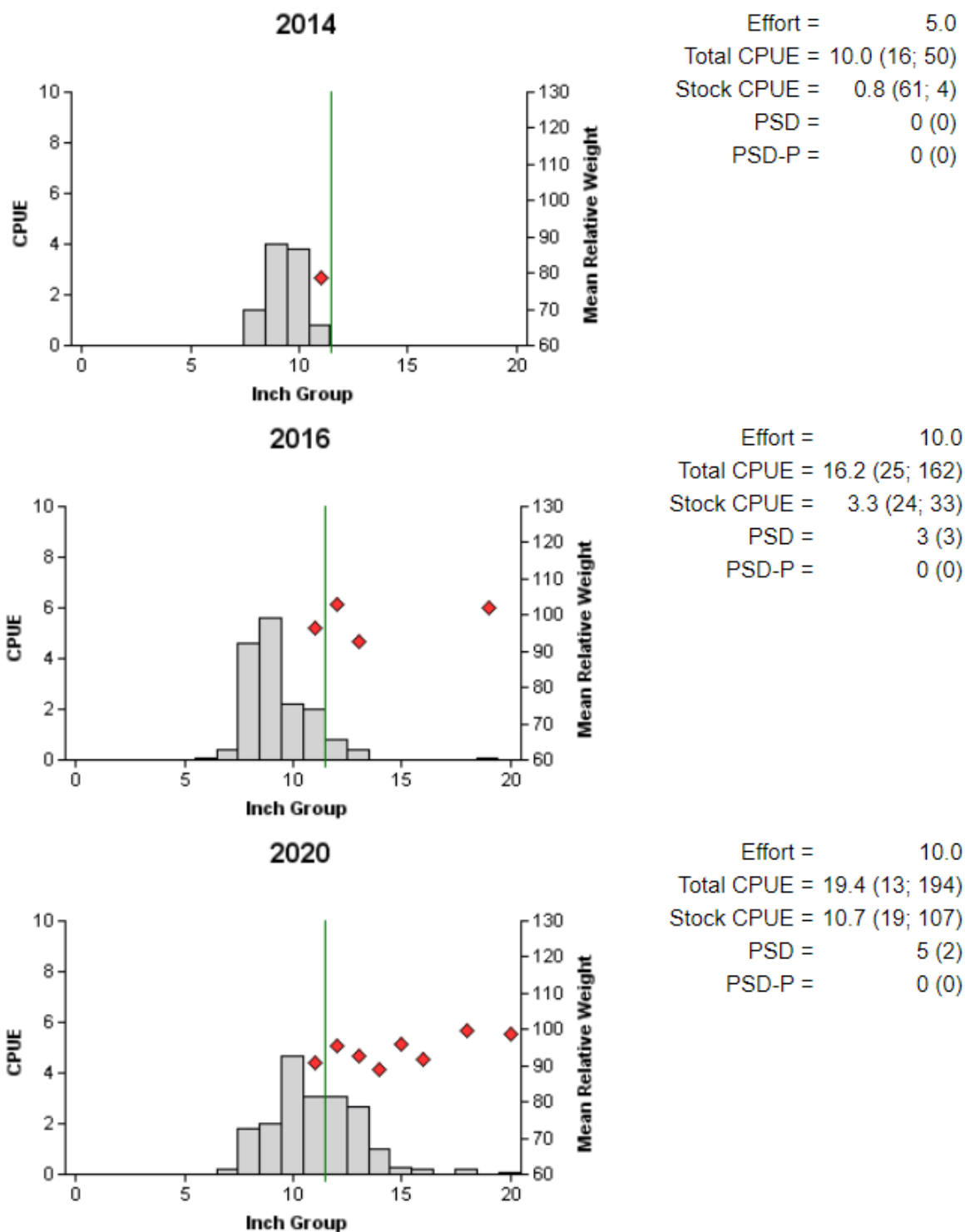


Figure 7. Number of Channel Catfish caught per net night (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure) for spring gill net surveys, Martin Creek Reservoir, Texas, 2014, 2016, and 2020. Vertical line indicates minimum length limit.

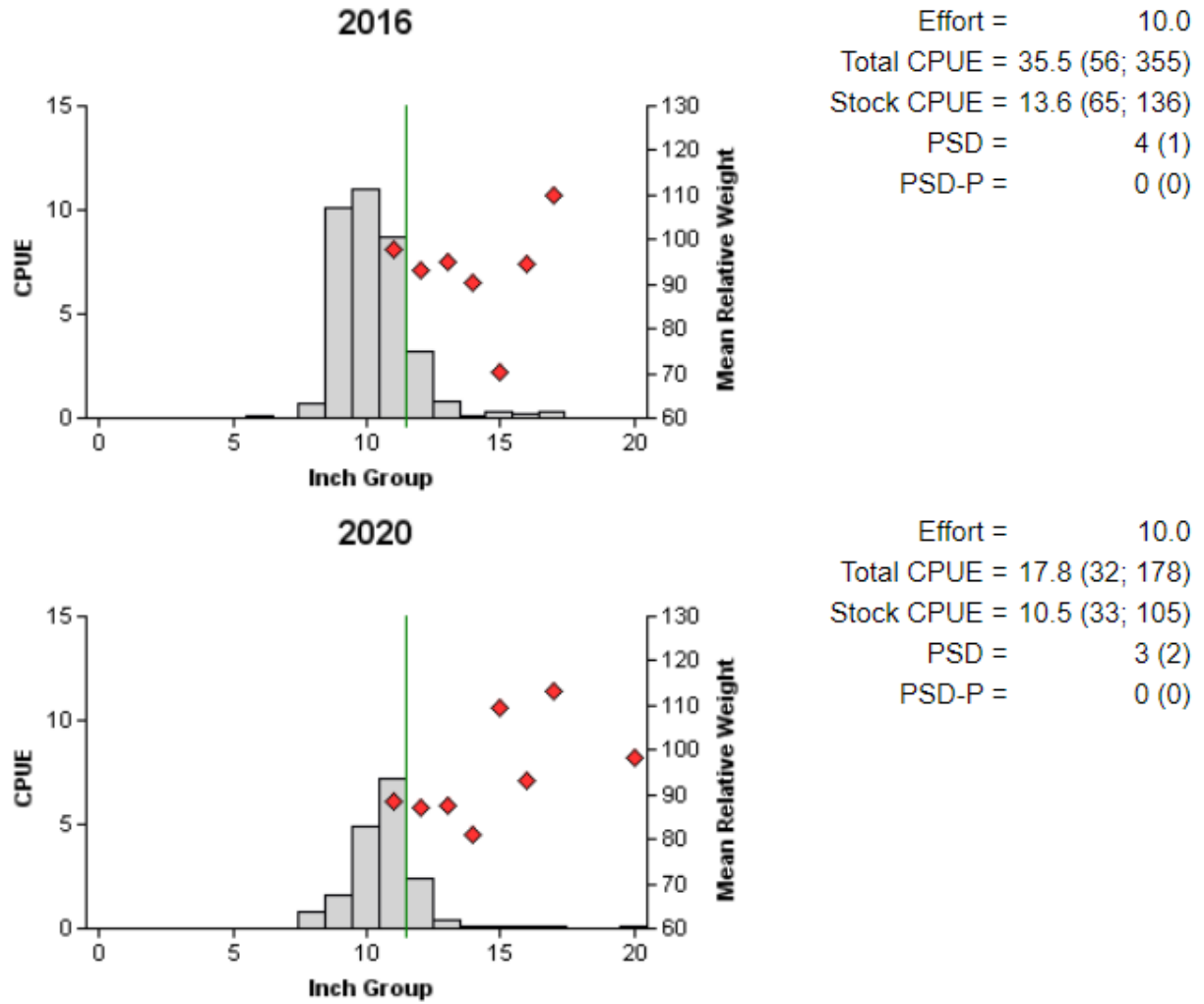


Figure 8. Number of Channel Catfish caught per series (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring hoop net surveys, Martin Creek Reservoir, Texas, 2016 and 2020. Vertical line indicates minimum length limit.



Table 9. Creel survey statistics for catfishes at Martin Creek Reservoir, Texas. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. Total catch per hour is for anglers targeting catfishes and total harvest is the estimated number of catfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year		
	2009/2010	2013/2014	2019/2020
Surface area (acres)	4,981	4,981	4,981
Directed effort (h)	1,365 (52)	1,585 (42)	616 (69)
Directed effort/acre	0.27 (52)	0.32 (42)	0.12 (69)
Total catch per hour	0.1 (110)	0.7 (46)	0.3 (48)
Total harvest	30 (491)	759 (100)	152 (178)
Blue Catfish	30 (491)	529 (89)	30 (403)
Channel Catfish	0	230 (123)	122 (123)
Harvest/acre	0.01 (491)	0.15 (100)	0.03 (178)
Percent legal released	0	13	43

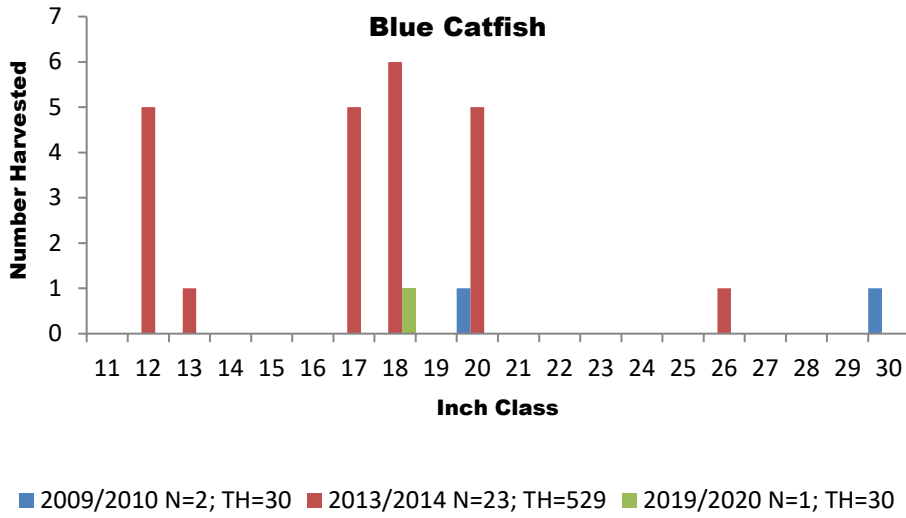


Figure 9. Length frequency of harvested Blue Catfish observed during creel surveys at Martin Creek Reservoir, Texas, all anglers combined. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

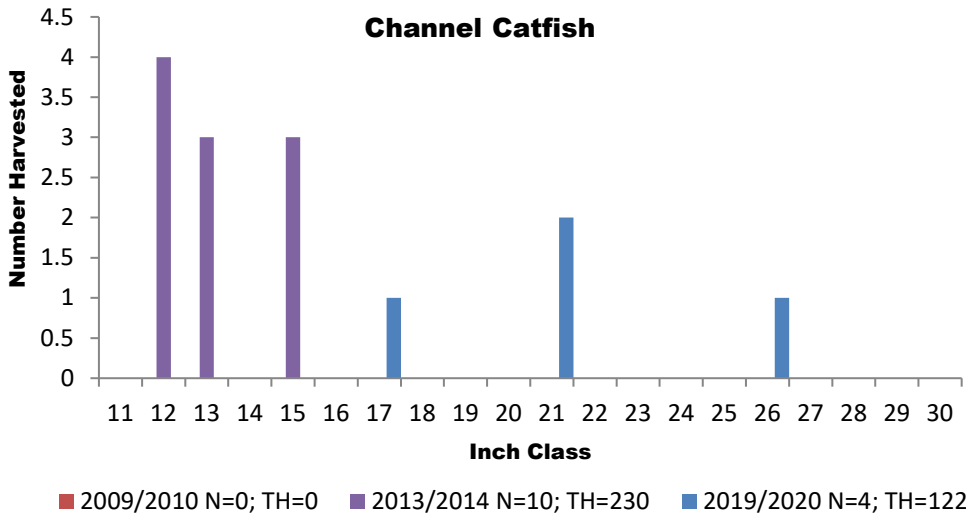


Figure 10. Length frequency of harvested Channel Catfish observed during creel surveys at Martin Creek Reservoir, Texas, all anglers combined. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. 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

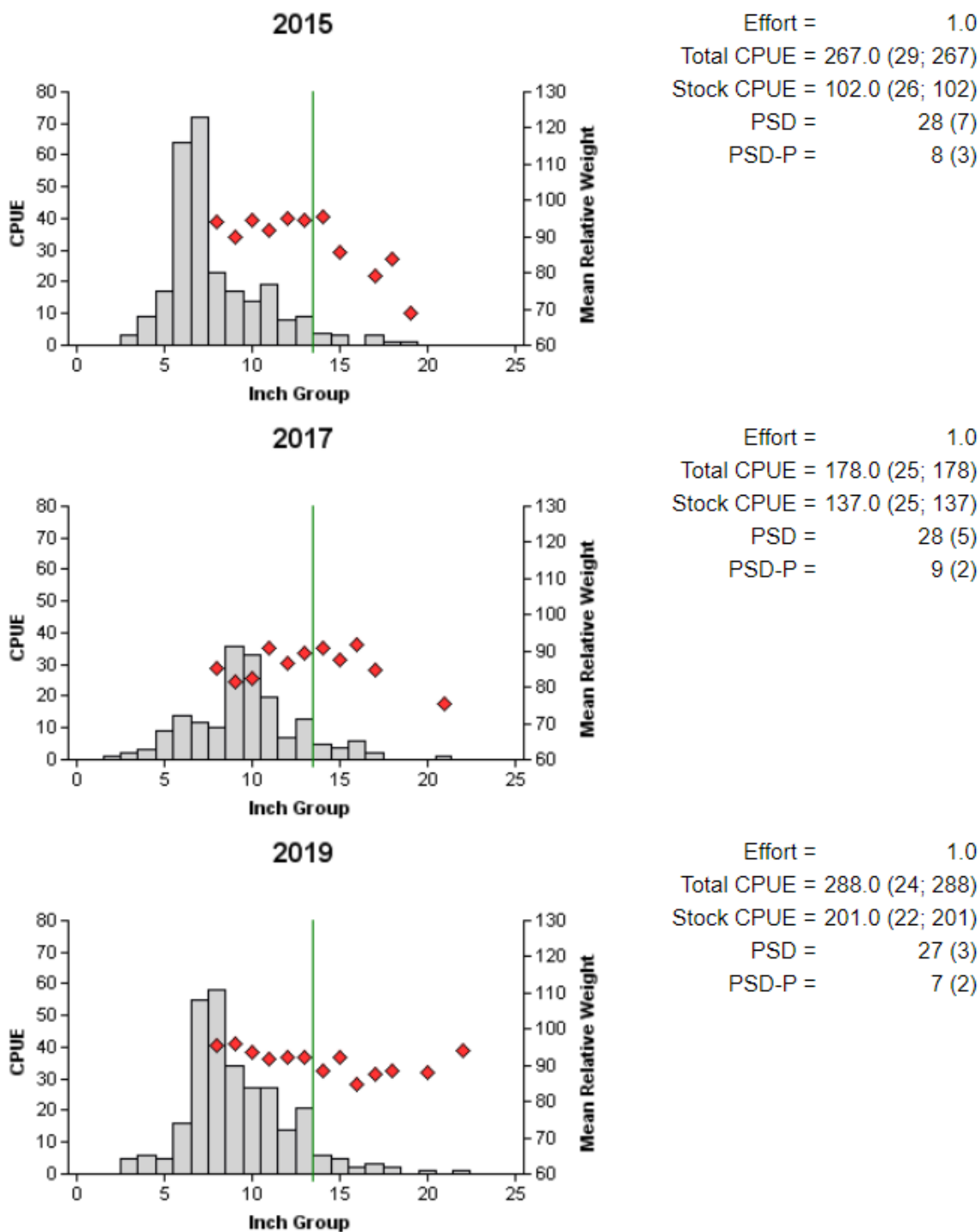


Figure 11. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2015, 2017, and 2019. Vertical line indicates minimum length limit.

Table 10. Creel survey statistics for Largemouth Bass at Martin Creek Reservoir, Texas. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. 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	2009/2010	2013/2014	2019/2020
Surface area (acres)	4,981	4,981	4,981
Directed angling effort (h)			
Tournament	9,402 (38)	6,440 (45)	4,476 (42)
Non-tournament	10,367 (35)	9,670 (43)	8,326 (39)
All black bass anglers combined	19,769 (35)	16,110 (42)	12,801 (38)
Angling effort/acre	4.0 (35)	3.2 (42)	2.6 (38)
Catch rate (number/h)	1.5 (11)	1.8 (17)	0.8 (13)
Harvest			
Non-tournament harvest	585 (46)	368 (83)	61 (76)
Harvest/acre	0.12 (44)	0.07 (83)	0.01 (76)
Tournament weigh-in and release	1,468 (48)	1,264 (80)	488 (62)
Release by weight			
< 4.0 lbs	30,826	33,471	10,260 (41)
≥ 4–6.9 lbs	240	471	256 (88)
≥ 7–9.9 lbs	37	0	0
≥ 10 lbs	0	0	0
Percent legal released (non-tournament)	84	90	98

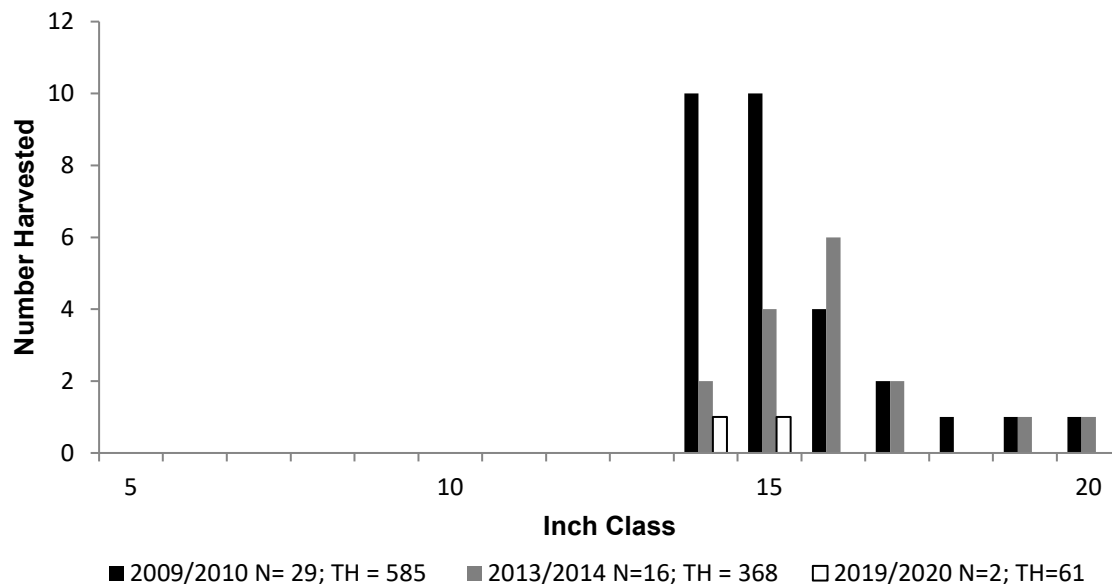


Figure 12. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Martin Creek Reservoir, Texas, all anglers combined. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. N is the number of harvested Largemouth Bass observed during creel surveys, and TH is the estimated non-tournament harvest for the creel.

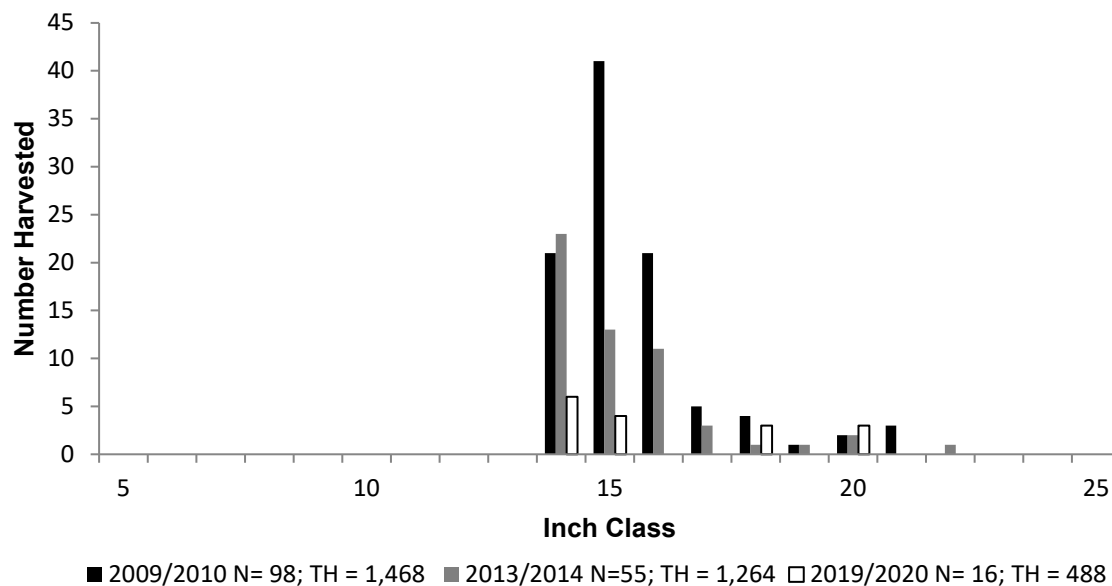


Figure 13. Length frequency of Largemouth Bass observed during creel surveys held for tournament weigh-in and live release at Martin Creek Reservoir, Texas. Survey periods were from December through February. Roving creel surveys were conducted in 2009/2010 and 2013/2014, while an access creel survey was conducted in 2019/2020. N is the number of tournament-held Largemouth Bass observed during creel surveys, and TH is the estimated number of fish weighed in by tournaments for the creel.

## Proposed Sampling Schedule

Table 11. Proposed sampling schedule for Martin Creek Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

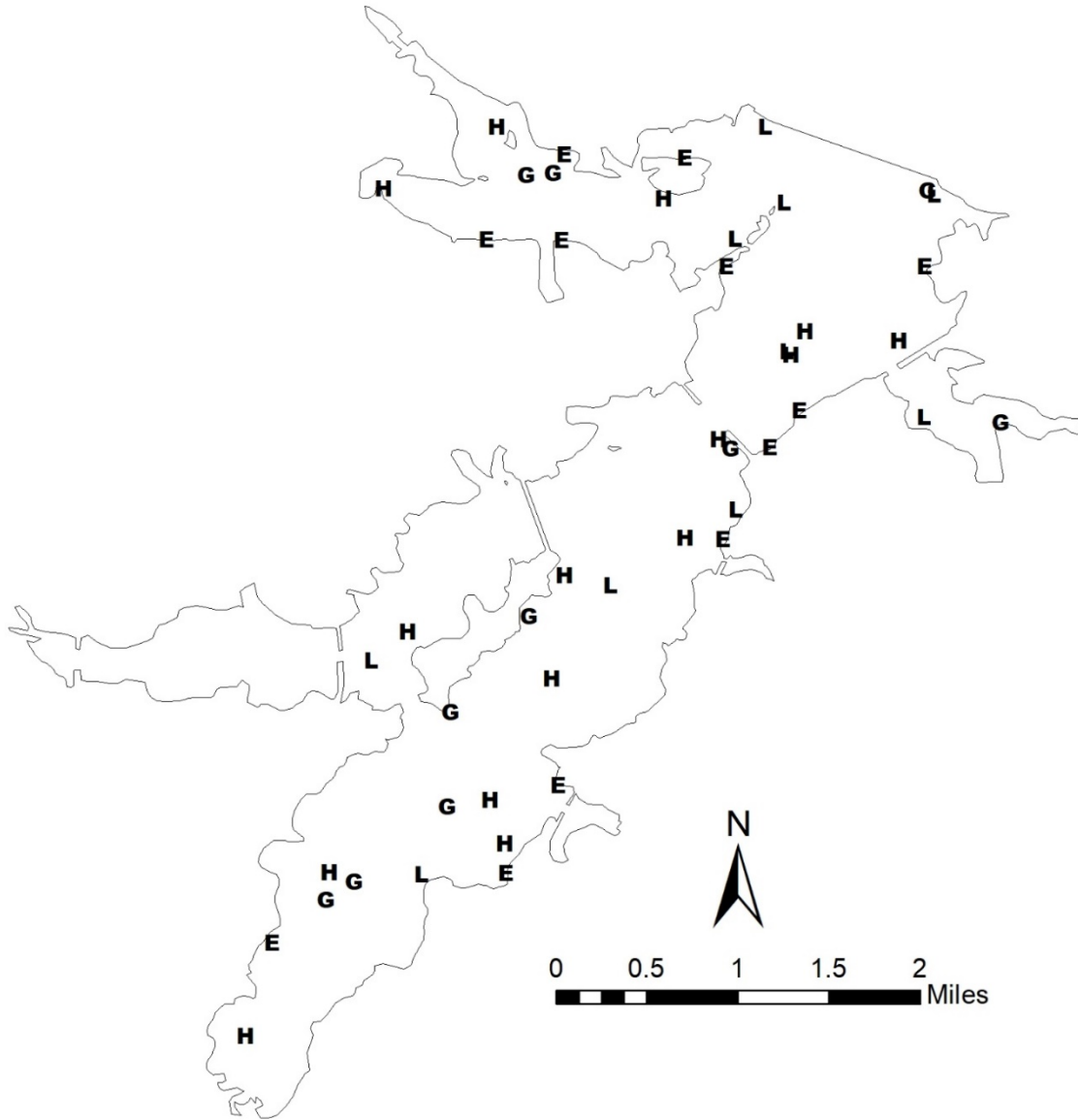
	Survey year			
	2020-2021	2021-2022	2022-2023	2023-2024
Angler Access				S
Structural Habitat				S
Vegetation	A	A	A	S
Electrofishing – Fall		A		S
Gill netting				S
Report				S

## APPENDIX A – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Martin Creek Reservoir, Texas, 2019-2020. Sampling effort was 10 net nights for gill netting, 10 net series for hoop netting, 0.9 hours for low frequency electrofishing, and 1 hour for electrofishing.

Species	Low-frequency Electrofishing		Electrofishing		Gill Netting		Hoop Netting	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad			41	41.0 (38)				
Threadfin Shad			10	10.0 (61)				
Blue Catfish	31	34.4 (28)			87	8.7 (13)		
Channel Catfish					194	19.4 (13)	178	17.8 (32)
Flathead Catfish					2	0.2 (67)		
White Bass					3	0.3 (71)		
Redbreast Sunfish			77	77.0 (19)				
Warmouth			4	4.0 (56)				
Bluegill			462	462.0 (21)				
Longear Sunfish			40	40.0 (28)				
Redear Sunfish			12	12.0 (52)				
Largemouth Bass			288	288.0 (24)				

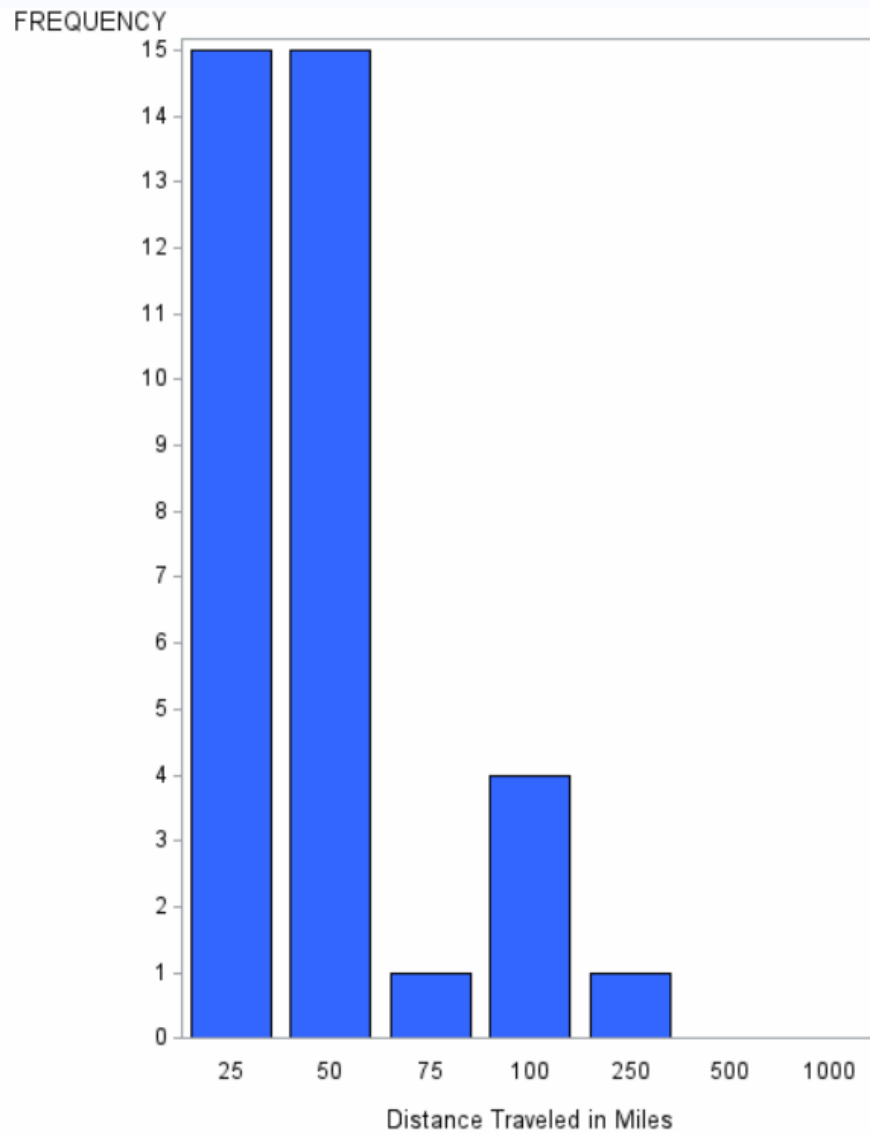
## APPENDIX B – Map of sampling locations



Location of sampling sites, Martin Creek Reservoir, Texas, 2019-2020. Hoop net, gill net, low frequency electrofishing and electrofishing stations are indicated by H, G, L, and E, respectively. Water level was 2 feet low during fall electrofishing surveys and near full pool at time during spring gill netting and hoop netting surveys.



## APPENDIX C – reporting of creel ZIP code data



Frequency of anglers that traveled various distances (miles) to Martin Creek Reservoir, Texas, as determined from the December 2019 through February 2020 creel survey.



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