

Lewisville 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 Lewisville Reservoir were surveyed in 2019 using electrofishing and trap netting and in 2020 using gill netting. Anglers were surveyed from June 2018 through May 2019 with a creel survey. 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:** Lewisville Reservoir is a 29,592-acre impoundment constructed on the Elm Fork of the Trinity River by the U.S. Army Corps of Engineers in 1954 to provide flood control, municipal and industrial water, and recreation. Much of Lewisville Reservoir is surrounded by urban development and is 25 miles northwest of Dallas, Texas in Denton County. The upper end of the reservoir is experiencing rapid development as well. Zebra mussels were discovered in Lewisville in 2012. Angler and boat access is adequate. There is one handicap specific facility on the reservoir. At the time of sampling the fishery habitat was primarily natural shoreline, rocky shoreline, and standing timber.
- **Management History:** Important sport fishes include Largemouth Bass, White Crappie, White Bass, Hybrid Striped Bass, and Blue Catfish. All species are managed with statewide regulations with the exception of Blue Catfish, which are managed by a 30- to 45-inch slot length limit. The daily bag limit for Blue and Channel Catfish remains 25 in the aggregate with only one Blue Catfish over 45 inches. Hybrid Striped Bass fingerlings are requested annually at a rate of 15 fish per acre. Sunshine Bass fry were stocked in April of 2020.

Fish Community

- **Prey species:** Prey availability has never been an issue in Lewisville Reservoir. Gizzard and Threadfin Shad are abundant in the reservoir. Bluegill and Longear Sunfish are also available as prey.
- **Catfishes:** The Blue Catfish population continues to be good and the relative abundance of Channel Catfish remained similar to previous surveys. Angling effort for Catfishes represented about 8% of all effort in 2018/2019. Flathead Catfish were sampled during annual gill netting and the water body record is 98.0 lbs (1986).
- **Temperate basses:** White Bass catch rates increased from the previous surveys. Hybrid Striped Bass catch rates decreased from the previous two surveys following several fry-only stockings. Angling effort for Hybrid Striped Bass represented 6.9% of all effort. Five year classes of Hybrid Striped Bass were collected in 2018. Growth of Hybrid Striped Bass was average.
- **Black basses:** Relative abundance of Spotted Bass population remained similar to previous surveys. The Largemouth Bass population increased in total abundance due to a strong year class, but stock-sized catch was lower than the previous survey. Largemouth Bass anglers represented 53% of all angling effort in 2018/2019.
- **Crappie:** The White Crappie population remained relatively consistent compared to the previous 2 surveys. Condition of White Crappie was good. Approximately 11% of all angling effort was for Crappies in 2018/2019. Black Crappie relative abundance decreased since the previous survey.

Management Strategies: Request Hybrid Striped Bass fingerlings at a rate of 5/acre annually. Inform the public about the negative impacts of aquatic invasive species. Gill netting will be conducted every two years to monitor Hybrid Striped Bass. Electrofishing and trap netting surveys will be conducted in 2023/2024, when the next report will be written.

Introduction

This document is a summary of fisheries data collected from Lewisville 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 species of 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

Lewisville Reservoir, Denton County, is a 29,592-acre impoundment constructed by the U.S. Army Corps of Engineers (USACE) in 1954 on Elm Fork of the Trinity River. It was built to provide flood control, water for municipal and industrial purposes, and recreation. Other principal tributaries are Hickory Creek and Little Elm Creek. In 1989 the conservation pool level of the reservoir was raised from 514 ft. mean-sea-level (msl) to 522 ft. msl. At top of conservation pool elevation, 522 feet above mean sea level, the lake will store 598,902 acre feet water. The dam controls a drainage area of about 1,660 square miles of which 692 square miles are above Ray Roberts Reservoir. Rainfall in the watershed averages 33.5 inches per year. Zebra mussels were first found in Lewisville in 2012. Angler and boat access is adequate. There is one handicap accessible facility.

Angler Access

Lewisville Reservoir has seventeen public boat ramps and two private boat ramps. Recent renovations at Little Elm Park including a new 4-lane ramp with courtesy loading dock have been completed. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the public boat ramp areas and the fishing barge located at Lewisville City Park.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Hungerford and Brock 2016) included:

1. Maintain a quality Hybrid Striped Bass fishery through annual stocking.
Action: Palmetto Bass fingerlings were stocked in 2017, Palmetto Bass fry were stocked in 2016 and 2018, and Sunshine Bass fry were stocked in 2016 and 2020. Gill net surveys were conducted in 2018 and 2020.
2. Communicate with the USACE and TRWD regarding posting of signs educating the public about the spread of aquatic nuisance species. Contact marina operators and emphasize the importance of cleaning, draining, and drying vessels when leaving all reservoirs to reduce risk of spreading zebra mussels.
Action: Signs were distributed to USACE for distribution at public access points. We made a speaking point when talking to the public the importance of cleaning, draining, and drying vessels prior to launching at other reservoirs.

Harvest regulation history: Sport fish populations in Lewisville Reservoir are managed with statewide regulations with the exception of the slot length limit on Blue Catfish (Table 3).

Stocking history: Striped Bass were stocked annually from 1991 until 1999. Stockings were discontinued because of low catch rates and several summer fish kills of Striped Bass occurred, however Hybrid Striped Bass (primarily Palmetto Bass) have been stocked regularly since 1999, excluding 2001 due to golden alga outbreak at production hatcheries. Sunshine Bass fingerlings were stocked in 2016. ShareLunker Largemouth Bass were stocked in the spring of 2006. The last stocking of Lewisville Reservoir occurred in 2020 and consisted of Sunshine Bass fry (Table 4).

Vegetation/habitat management history: In January 2006, approximately 123 acres of stumps and standing timber in the Hickory Creek arm of the reservoir were illegally cut by a land developer during an

extended drought which had water levels 7-8 feet below conservation pool. A team organized by the USACE was formed to assess the damage as well as develop a mitigation plan for fish and wildlife. The habitat restoration plan is ongoing and will incorporate rock piles, brush piles, and vegetation planted in cages by Lewisville Aquatic Ecosystem Research Facility staff and volunteers. Lewisville Reservoir aquatic vegetation was comprised of sporadic stands of native shoreline emergent species. Natural shoreline, rocky shoreline, and standing timber make up the majority of the habitat currently (Table 6). Emergent plant species were planted in 2010 and 2011 in the area affected by the clear cutting but water level fluctuations have hindered establishment. A Friends of Reservoirs (FOR) grant in the amount of \$30,000 was awarded to the USACE via the Dallas Bass Hookers FOR chapter. Funding has been disbursed and plans for habitat enhancement include more native emergent plantings, riprap, and artificial structures such as Georgia cubes.

Water transfer: Lewisville Reservoir is infested with zebra mussels. Lewisville Reservoir is a major municipal drinking water supply for many cities in North Texas. The Upper Trinity Regional Water District also uses water from Lewisville Reservoir. There is a 1.7 megawatt hydroelectric power generation unit owned by Garland Power and Light utilizing water released through the dam. There are no known water transfers entering the reservoir besides tributaries and water released from Ray Roberts Reservoir directly above Lewisville on the Elm Fork of the Trinity River.

Zebra mussels: Since 2012, Lewisville Reservoir has been considered infested with zebra mussels.

Methods

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

Electrofishing – Black Basses, Sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (2.0 hours at 24, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Trap netting – Crappie were collected using trap nets (15 net nights at 15 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn).

Gill netting – Blue and Channel Catfish, White and Hybrid Striped Bass were collected by gill netting (15 net nights at 15 stations). CPUE for gill netting was recorded as the number of fish caught per net night (fish/nn). Ages for Hybrid Striped Bass were determined using otoliths.

Low-frequency electrofishing – Blue Catfish were collected by low-frequency electrofishing at 25 stations. The minimum duration of electrofishing at each station was 5 minutes. CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Micro-satellite DNA analysis was used to determine genetic composition of individual fish since 2005.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Palmetto Bass PSD was calculated according to Dumont and Neely (2011). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE and creel statistics.

Creel survey – A year-long, roving creel survey was conducted from 2018-2019. The creel period was June through May. Angler interviews were conducted on 5 weekend days and 4 weekdays per quarter to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Habitat – A structural habitat survey was last conducted in 2011. 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: In response to the destruction of 123 acres of submersed timber due to unauthorized cutting by a developer, LAERF placed poles to mitigate for roosting habitat of birds as well as fish. In the fall and summer of 2015, approximately 400 planting cages were installed in the Hickory Creek arm of Lewisville and plants were added in the summer/fall of 2016 once high water levels subsided. Unfortunately water level fluctuations have negatively affected their establishment.

Creel: Directed fishing effort by anglers was highest for Largemouth Bass (53.0%), followed by anglers fishing for Crappies (11.1%), anything (9.0%), Catfishes (7.7%), and Hybrid Striped Bass (6.9%; Table 6). Total fishing effort for all species was estimated at 133,725 hours and the estimated direct expenditures at Lewisville Reservoir was \$708,207 from 1 June 2018 through 31 May 2019 (Table 7).

Prey species: The 2019 electrofishing catch rates of Gizzard Shad and Bluegill were 481.5/h and 165.0/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was good, indicating that 89% of Gizzard Shad were available to existing predators; this was similar to IOV estimates in previous years (Figure 2). Total CPUE of Bluegill (165.0/h) in 2019 was higher than total CPUE from the two previous surveys (Figure 3). Total CPUE of Threadfin Shad was good (435.5/h) during the 2019 survey (Appendix A).

Catfishes: The gill net catch rate of Blue Catfish was 7.9/nn in 2020, which is higher than the previous two surveys (Figure 4). The total low-frequency electrofishing catch rates of Blue Catfish were 94.6/h and 87.4/h in 2017 and 2019, respectively (Figure 5). Total directed effort for Blue Catfish was estimated to be 3,613 angler hours with an angler catch rate of 0.75 fish/hour (Table 8). Total harvest of Blue Catfish was estimated to be 2,350 fish with fish up to 28 inches were harvested (Figure 6). Catfishes were the third most sought-after species by anglers with 7.7% of effort (Table 6).

The gill net catch rate of Channel Catfish was 2.7/nn in 2020. The Channel Catfish population remained in relatively low abundance as compared to the 2016 and 2018 surveys (Figure 7). Directed angling effort for Channel Catfish was estimated to be 1,951 hours with angler catch estimated to be 1.4 fish/hour (Table 9). Total harvest of Channel Catfish was estimated at 2,301 fish and all fish observed were \geq 13 inches (Figure 8). Two Flathead Catfish were collected in the 2020 gill net survey (Appendix A).

Temperate Basses: The gill net catch rate of White Bass (9.9/nn) in 2020, was higher than the two previous surveys (Figure 9). Two modes in the length frequency distribution suggest two consecutive year classes. Mean relative weights appeared to be optimal. Directed angling effort for White Bass was estimated to be 2,403 angler hours in 2018/2019 with anglers catching 1.7 fish per hour of effort (Table 9). Total harvest of White Bass was estimated to be 2,435 and fish observed ranged between 10 and 13 inches (Figure 10).

Because both Palmetto and Sunshine Bass have been stocked in Lewisville, Hybrid Striped Bass will be used when discussing them. While forty-six individuals (3.1/nn) were collected in the 2018 gill net survey, just four individuals were collected during the 2020 gill netting survey (Figure 11). The decline in catch rate may be attributable to just two fingerling stockings of Palmetto Bass since 2015. Palmetto and Sunshine Bass fry have been stocked three times since 2016, and fry-only stocking has resulted in reduced abundance in other DFW district reservoirs. Several factors may be responsible for the fry stockings failure, including poor survival of fry in bags and predation by other species. Fingerlings are requested annually, and will be moving forward as this tends to better maintain the fishery. Objectives from the sampling plan were not met and since we could collect just a few Hybrid Striped Bass, the effort required to obtain them was deemed unrealistic, especially given the emergence of the COVID-19 pandemic further limiting travel to and from the reservoir. The fish from the 2018 gill net survey were aged with 5 different year classes being represented (Figure 12). Directed fishing effort for Hybrid Striped Bass was estimated to be 5,885 h for 2018/2019 with anglers catching an estimated 1.3 per hour of directed effort (Table 10). Harvest of Hybrid Striped Bass was estimated to be 5,370 fish in 2018/2019 and fish between 18 and 25 inches were observed in the creel (Figure 13).

Black Basses: The electrofishing catch rate of Spotted Bass was 21.5/h in 2019, which was slightly higher than the two previous surveys (Figure 14). Spotted Bass continue to persist as a low-density fishery in the rocky areas of Lewisville Reservoir.

The stock-length electrofishing catch rate of Largemouth Bass of 66.5/h in 2019 was lower than the previous survey (Figure 15). Size structure in 2019 indicated a relatively strong year class with an abundance of 6-to-8-inch fish. Body condition in 2019 was variable, but generally good (mean relative weights between 90 and 110) for nearly all size classes of fish except those around the minimum length limit (Figure 15). Florida Largemouth Bass fingerlings were stocked in 2013, 2014, and 2019 (Table 4). As a result, genetics data were not collected in 2019 (Table 12). Directed fishing effort for Largemouth Bass was estimated to be 45,936 angler hours (Table 11); by far the most sought after species with 53% of all effort on the reservoir in 2018/2019 (Table 6). A little more than half of all angling effort for Largemouth Bass was spent by tournament anglers (24,125.1 h), 6 fish were observed in the creel

(Figure 16), and an estimated 2,182 fish were held to be released following tournament weigh-ins (Table 11). No harvest by non-tournament anglers was observed (Table 11).

Crappies: The trap net catch rate of Crappies was 23.5/nn in 2019, slightly lower than in 2015 (30.1/nn) and in 2011 (27.5/nn). White Crappie made up the majority of the 2019 survey with an increase in Black Crappie showing up as well (Figure 17). Catch per unit effort of Crappies over 10 inches (i.e., legal to harvest) was 12.2/nn in 2019 which was an increase over the previous two surveys (Figure 17). The PSD was 73 which was lower than both the 2011 and 2015 surveys, largely due to greater abundance of 5-7 inch fish. Mean relative weight was near 90 for all size classes of Black Crappie in 2019 and was near 100 for White Crappie in 2019 (Figure 17). Crappie were the second most sought-after species in 2018/2019 (Table 6). Total directed effort for Crappies was 9,564.5 angler hours (Table 13). Anglers seeking Crappies caught an estimated 3.8 fish per hour and total harvest of Black Crappie was 1,423 fish and total harvest of White Crappie was 11,677 fish (Figure 18).

Fisheries Management Plan for Lewisville Reservoir, Texas

Prepared – July 2020

ISSUE 1: Hybrid Striped Bass have been a part of the fishery at Lewisville Reservoir since the late 1970s. Annual stocking of Palmetto Bass and/or Sunshine Bass is required to sustain the population and maintain a fishery.

MANAGEMENT STRATEGIES

1. Stock Hybrid Striped Bass fingerlings annually at 15 fish/acre.
2. Monitor Hybrid Striped Bass stockings through gill netting every other year.

ISSUE 2: Declining water quality and aquatic habitat in America's reservoirs is an issue of great local significance and even greater national concern. The Reservoir Fisheries Habitat Partnership is an organization that works to protect and improve healthy aquatic habitat in reservoir systems for the benefit of fish and wildlife and the enhancement of quality of life for people and their communities. Friends of Reservoirs awarded a \$30,000 grant to provide the public with a sustainable watershed that can continue to adapt to urbanization and provide habitat for a variety of fish and wildlife species.

MANAGEMENT STRATEGY

1. Collaborate with the USACE to assist with implementation of fish habitat enhancement actions.

ISSUE 3: Largemouth Bass are the most sought-after species in Lewisville Reservoir and the fishery hosts numerous fishing tournaments.

MANAGEMENT STRATEGIES

1. Conduct additional bass-only fall electrofishing survey in 2021.
2. Conduct genetic analysis of 30 Largemouth Bass during the fall electrofishing survey in 2023.

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 USACE 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

Important sport fishes in Lewisville Reservoir include Largemouth Bass, Blue Catfish, White Bass, Hybrid Striped Bass and White Crappie. Known important forage species include Bluegill, Longear Sunfish, and Threadfin and Gizzard Shad.

Low density fisheries

Spotted Bass: Spotted Bass are present in Lewisville Reservoir in low density. Data from any Spotted Bass captured during standard electrofishing surveys for Largemouth Bass and forage species will be recorded but no survey metrics will be predetermined for them.

Channel Catfish: Channel Catfish are present in Lewisville Reservoir in low density. While some angling pressure exists, it's relatively low. Data from Channel Catfish will be recorded during surveys for Blue Catfish, White Bass, and Hybrid Striped Bass, but no objectives will be set.

Flathead Catfish: Flathead Catfish are present in Lewisville Reservoir; but, they are rarely captured in gill nets. Sampling this population is not a priority moving forward. Data from all Flathead Catfish collected by gill nets targeting Hybrid Striped Bass, White Bass and Blue Channel Catfish will be recorded.

Survey objectives, fisheries metrics, and sampling objectives

Blue Catfish: The popularity of catfish fishing (7.7% of directed angling effort in 2018/2019) at this reservoir warrant sampling time and effort. A gillnet survey consisting of 15 gillnet net nights at 15 randomly selected stations will be conducted in spring of 2022 and 2024 to determine CPUE and size structure of Blue Catfish. Based on past catch rates, this should be adequate to obtain an RSE of $CPUE-S \leq 25$ for Blue Catfish but not adequate to obtain confidence in size structure (PSD; 50 fish minimum at 10 stations with 80% confidence). If RSE objectives are not met no additional gillnetting will be conducted. No objective will be set for size structure information. Despite success with low-frequency electrofishing, no further LFE will be conducted there since gillnetting will be required for Hybrid Striped Bass monitoring.

Temperate Basses: Data on White Bass will be collected when the gillnet survey is conducted in the spring of 2022 and 2024 using 15 gillnet net nights at 15 randomly selected stations throughout Lewisville Reservoir. Sampling will be limited to general monitoring trend data (without precision or sample size requirements). Hybrid Striped Bass are a popular sport fish in Lewisville Reservoir (6.9% of all directed angling effort in 2018/2019). Hybrid Striped Bass data will be collected when the gillnet survey is conducted in the spring of 2022 and 2024. Target sample sizes to evaluate size structure, stocking success, and age and growth for Hybrid Striped Bass will be 35 stock-length fish. If 35 fish are not collected to provide adequate confidence in size structure (PSD; 30 fish minimum at 10 stations with 80% confidence), no additional gill netting (beyond the 15 nets) will be conducted. Additional fish will be collected via angling or with assistance from a fishing guide until the target number of fish are obtained (only to be used for age and growth data). If collection of 35 fish becomes difficult, sampling via angling will cease once a reasonable effort has been expended.

Largemouth Bass: Largemouth Bass are the most sought-after species at Lewisville Reservoir with 53% of all directed effort in the 2018/2019. Trend data on CPUE, size structure, and body condition have been collected frequently for over two decades with fall nighttime electrofishing. To continue monitoring of Largemouth Bass, fall nighttime electrofishing will be conducted. A minimum of 20 randomly selected 5-min electrofishing sites will be sampled in 2021 and 2023. Based on past catch rates, this should be adequate to obtain an RSE of $CPUE-S \leq 25$. If the RSE objective is not met, additional electrofishing

sampling will only continue if 35 stocked sized fish or larger are not captured in the 20 sample sites. A maximum of 24 sites will be sampled. Fin clips from 30 Largemouth Bass (of all sizes) will be collected in 2023 to assess Florida Largemouth Bass stockings.

Crappie: Trend data on Crappie CPUE, size structure, and body condition will be collected using 15 shoreline-set single-cod trap nets at 15 randomly selected locations in fall of 2023. This level of effort should be sufficient to collect 50 stock size fish for size structure estimation. Based on past surveys, it is likely an RSE of CPUE-S < 25 will be met with 15 net nights. If objectives are not met after 15 net nights, no additional nets will be set.

Bluegill, Longear Sunfish, and Threadfin and Gizzard Shad: Bluegill, Longear Sunfish, and Threadfin, and Gizzard Shad are the primary forage in Lewisville Reservoir. Like Largemouth Bass, trend data on CPUE and size structure have been collected with fall nighttime electrofishing. Sampling, as with Largemouth Bass above, will allow for monitoring of large-scale changes in Bluegill, Longear Sunfish, and Threadfin and Gizzard Shad relative abundance and size structure. Sampling effort based on achieving sampling objectives for Largemouth Bass will result in sufficient numbers of Bluegill, Longear Sunfish, Threadfin and Gizzard Shad for size structure estimation (PSD and IOV; 50 fish minimum at 20 stations with 80% confidence).

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Tables and Figures

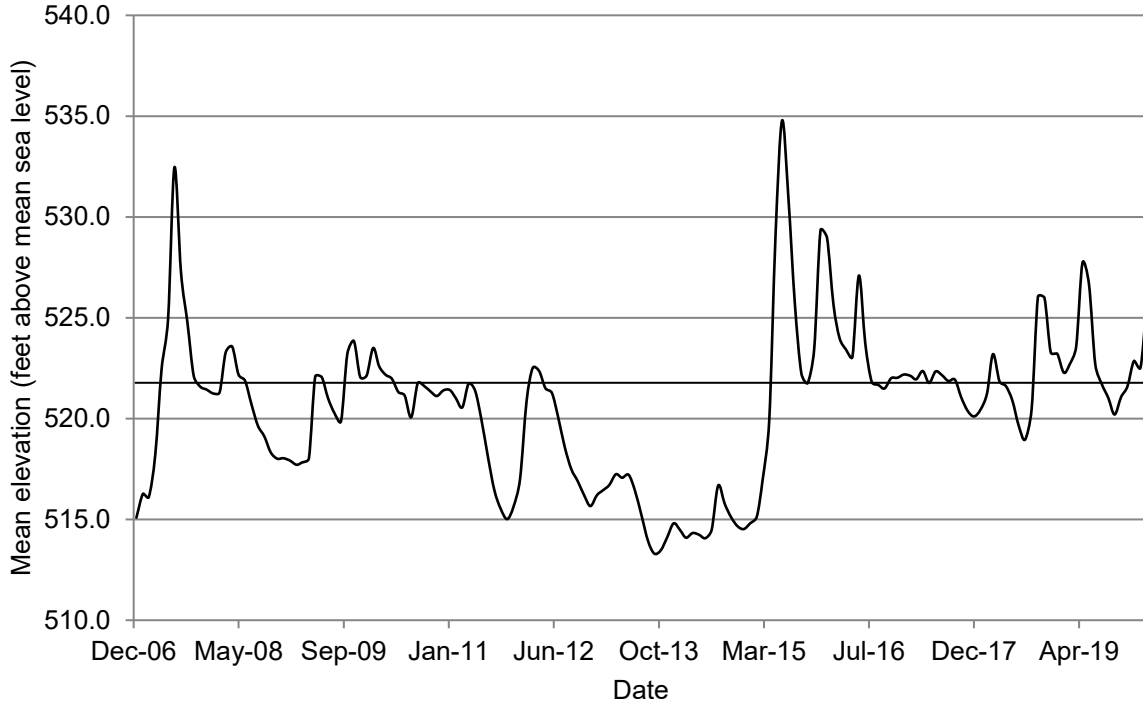


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Lewisville Reservoir, Texas. Conservation pool, represented by the solid line, is 522 ft. MSL.

Table 1. Characteristics of Lewisville Reservoir, Texas.

| Characteristic | Description |
|-----------------------|-------------------------------------|
| Year constructed | 1954 |
| Controlling authority | US Army Corps of Engineers |
| County | Denton |
| Reservoir type | Mainstream Trinity River (Elm Fork) |
| Conductivity | 266 $\mu\text{S}/\text{cm}$ |

Table 2. Boat ramp characteristics for Lewisville Reservoir, Texas, August, 2019. Reservoir elevation at time of survey was 522.5 feet above mean sea level. N/A indicates data not currently available.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|-----------------|-------------------------------|--------|----------------------------|--|--------------------------------|
| Crescent Oaks | 33.1767 -97.0116 | Y | 5 | 514.0 | Small boat only |
| Big Sandy | 33.1639 -97.0272 | Y | 24 | 515.2 | Excellent, no access issues |
| Willow Grove | 33.1234 -97.0140 | Y | 24 | N/A | Excellent, no access issues |
| Westlake Park | 33.1157 -97.0039 | Y | 68 | 515.0 | Excellent, no access issues |
| Pilot Knoll | 33.1031 -97.0728 | Y | 30 | 507.7 | Excellent, no access issues |
| Sycamore Bend | 33.1079 -97.0615 | Y | 26 | 509.8 | Excellent, no access issues |
| | 33.1090 -97.0415 | Y | 20 | 515.2 | Excellent, no access issues |
| Hickory Creek | 33.1091 -97.0401 | Y | 50 | 505.6 | Excellent, no access issues |
| | 33.1064 -97.0243 | Y | 28 | 508.1 | Excellent, no access issues |
| Arrowhead #1 | 33.1054 -97.0256 | Y | 31 | 504.2 | Good, no access issues |
| Copperas Branch | 33.0963 -97.0344 | Y | 50 | N/A | Excellent, no access issues |
| Tower Bay | 33.0870 -97.0231 | Y | 50 | 503.4 | Excellent, no access issues |
| Lake Park #1 | 33.0778 -97.0051 | Y | 50 | 503.5 | Excellent, no access issues |

Table 2 continued.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|-----------------|-------------------------------|--------|----------------------------|---------------------------------------|--------------------------------------|
| Lake Park #2 | 33.0765 -96.9989 | Y | 75 | 509.6 | Excellent, no access issues |
| Doe Branch | 33.1849 -96.9407 | Y | 20 | 519.2 | Fair, one lane ramp. Shallow area |
| Little Elm | 33.1571 -96.9495 | Y | 50 | 514.0 | Excellent Newly renovated. |
| Hidden Cove | 33.1295 -96.9316 | Y | 50 | 512.0 | Excellent, no access issues |
| Stewart's Creek | 33.0829 -96.9142 | Y | 50 | 506.5 | Good, no access issues |
| East Hill Park | 33.0752 -96.9245 | Y | 59 | 504.8 | Good, no access issues |

Table 3. Harvest regulations for Lewisville Reservoir, Texas.

| Species | Bag Limit | Length Limit (inches) |
|--|--|--|
| Catfish: Channel and Blue Catfish, their hybrids and subspecies | 25 (in any combination) | 12-minimum (Channel) 30-45 slot (Blue: only 1 > 45) |
| Catfish, Flathead | 5 | 18-minimum |
| Bass, White | 25 | 10-minimum |
| Bass, Palmetto | 5 | 18-minimum |
| Bass: Spotted | 5 ^a (in any combination) | none |
| Bass: Largemouth | | 14-minimum |
| Crappie: White and Black Crappie, their hybrids and subspecies | 25 (in any combination) | 10-minimum |

^a Daily bag for Largemouth Bass, Spotted Bass, and Guadalupe Bass = 5 fish in any combination.

Table 4. Stocking history for Lewisville, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

| Species | Year | Number | Life Stage | Mean TL (in) |
|-------------------------|------------------|------------------|------------|--------------|
| Bluegill | 1975 | <u>250</u> | UNK | 0.0 |
| | Total | <u>250</u> | | |
| Channel Catfish | 1966 | 170,000 | AFGL | 7.9 |
| | 1967 | 30,000 | AFGL | 7.9 |
| | 1968 | 23,870 | AFGL | 7.9 |
| | 1969 | 204,200 | AFGL | 7.9 |
| | 1970 | 25,000 | AFGL | 7.9 |
| | 1971 | 21,000 | AFGL | 7.9 |
| | 1972 | 117,800 | AFGL | 7.9 |
| | 1981 | 76,844 | AFGL | 7.9 |
| | 1993 | <u>250</u> | FRY | 0.3 |
| Total | <u>668,964</u> | | | |
| Florida Largemouth Bass | 1978 | 141,588 | FGL | 2.1 |
| | 1978 | 18,156 | FRY | 1.0 |
| | 1990 | 743,646 | FRY | 0.7 |
| | 1993 | 739,751 | FGL | 1.2 |
| | 1998 | 741,380 | FGL | 1.4 |
| | 2006 | 507,625 | FGL | 1.7 |
| | 2007 | 501,720 | FGL | 1.6 |
| | 2013 | 498,757 | FGL | 1.5 |
| | 2014 | 505,230 | FGL | 1.6 |
| | 2019 | <u>54,437</u> | FGL | 1.8 |
| Total | <u>4,452,290</u> | | | |
| Largemouth Bass | 1966 | 1,400,500 | FRY | 0.7 |
| | 1967 | 402,200 | FRY | 0.7 |
| | 1968 | 640,990 | FRY | 0.7 |
| | 1968 | 11,385 | UNK | 0.0 |
| | 1969 | 578,275 | FRY | 0.7 |
| | 1970 | 35,450 | UNK | 0.0 |
| | 1971 | 340,000 | FRY | 0.7 |
| | 1975 | <u>82</u> | UNK | 0.0 |
| | Total | <u>3,408,882</u> | | |

Table 4, continued.

| Species | Year | Number | Life Stage | Mean TL (in) |
|--|------------------|------------------|------------|--------------|
| Palmetto Bass (Striped X White Bass hybrid) | 1974 | 97,570 | UNK | 0.0 |
| | 1976 | 68,310 | UNK | 0.0 |
| | 1979 | 232,300 | UNK | 0.0 |
| | 1981 | 230,740 | UNK | 0.0 |
| | 1983 | 236,039 | UNK | 0.0 |
| | 1986 | 18,576 | FGL | 2.0 |
| | 1986 | 264,239 | FRY | 1.0 |
| | 1999 | 222,892 | FGL | 1.3 |
| | 2000 | 221,969 | FGL | 1.5 |
| | 2002 | 221,983 | FGL | 1.7 |
| | 2003 | 147,923 | FGL | 1.4 |
| | 2004 | 295,986 | FGL | 1.7 |
| | 2005 | 148,670 | FGL | 1.6 |
| | 2006 | 150,399 | FGL | 1.5 |
| | 2006 | 1,090,919 | FRY | 0.2 |
| | 2007 | 149,032 | FGL | 1.4 |
| | 2008 | 149,121 | FGL | 1.6 |
| | 2009 | 90,600 | FGL | 1.4 |
| | 2010 | 2,278,868 | FRY | 0.3 |
| | 2013 | 251,222 | FGL | 1.6 |
| | 2014 | 106,790 | FGL | 1.7 |
| | 2015 | 219,796 | FGL | 1.6 |
| | 2016 | 978,866 | FRY | 0.0 |
| 2017 | 143,378 | FGL | 1.9 | |
| 2018 | <u>1,510,000</u> | FRY | 0.2 | |
| | Total | <u>9,526,188</u> | | |
| ShareLunker Largemouth Bass | 2006 | <u>3,585</u> | FGL | 2.3 |
| | Total | <u>3,585</u> | | |
| Striped Bass | 1989 | 120,537 | FGL | 1.5 |
| | 1990 | 123,827 | FGL | 1.5 |
| | 1991 | 294,247 | FGL | 1.3 |
| | 1992 | 133,786 | FRY | 0.8 |
| | 1993 | 168,107 | FGL | 1.1 |
| | 1994 | 589,269 | FGL | 1.1 |
| | 1994 | 3,018,000 | FRY | 0.8 |
| | 1995 | 272,024 | FGL | 1.3 |

Table 4, continued.

| Species | Year | Number | Life Stage | Mean TL (in) |
|--|-------|------------------|------------|--------------|
| Striped Bass | 1996 | 4,617 | FGL | 1.3 |
| | 1997 | 297,111 | FGL | 1.2 |
| | 1998 | 151,071 | FGL | 1.3 |
| | Total | 5,172,596 | | |
| Sunshine Bass (white bass x striped bass hybrid) | 2016 | 450,000 | FRY | 0.2 |
| | 2020 | <u>1,008,020</u> | FRY | 0.2 |
| | Total | <u>1,458,020</u> | | |
| | | | | |
| Threadfin shad | 1984 | <u>3,200</u> | AFGL | 3.0 |
| | Total | <u>3,200</u> | | |
| Walleye | 1972 | 405,000 | FRY | 0.2 |
| | 1973 | 207,800 | FRY | 0.2 |
| | 1974 | <u>475,000</u> | FRY | 0.2 |
| | Total | 1,087,800 | | |

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

| Gear/target species | Survey objective | Metrics | Sampling objective |
|-------------------------------------|------------------|-----------------------|--------------------------|
| <i>Electrofishing</i> | | | |
| Largemouth Bass | Abundance | CPUE – stock | RSE-Stock ≤ 25 |
| | Size structure | PSD, length frequency | $N \geq 50$ stock |
| | Condition | W_r | 10 fish/inch group (max) |
| | Genetics | % FLMB | $N = 30$, any age |
| Bluegill ^a | Abundance | CPUE – Total | RSE ≤ 25 |
| | Size structure | PSD, length frequency | $N \geq 50$ |
| Gizzard Shad ^a | Abundance | CPUE – Total | RSE ≤ 25 |
| | Size structure | PSD, length frequency | $N \geq 50$ |
| <i>Trap netting</i> | | | |
| Crappie | Size structure | PSD, length frequency | $N = 50$ |
| <i>Gill netting</i> | | | |
| Blue Catfish | Abundance | CPUE | $N \geq 50$ |
| | Size structure | | $N \geq 50$ stock |
| Channel Catfish ^b | Abundance | CPUE– stock | RSE-Stock ≤ 25 |
| White Bass | Abundance | CPUE-stock | $N \geq 50$ |
| | Size structure | PSD, length frequency | $N \geq 50$ stock |
| Hybrid Striped Bass ^b | Abundance | CPUE-total | $N \geq 25$ |
| | Size structure | PSD, length frequency | $N \geq 25$ |
| | Age-and-growth | Length at age | All fish collected |
| <i>Low-frequency electrofishing</i> | | | |
| Blue Catfish | Abundance | CPUE | RSE-Stock ≤ 25 |
| | Size structure | PSD | $N \geq 50$ |

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

^b No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Channel Catfish if not reached from designated Palmetto Bass and Blue Catfish sampling effort.

Table 6. Percent directed angler effort by species for Lewisville Reservoir, Texas. Survey period was from 1 June 2018 through 31 May 2019.

| Species | Percent directed effort |
|---------------------|-------------------------|
| Blue Catfish | 4.2 |
| Channel Catfish | 2.2 |
| Catfishes | 7.7 |
| White Bass | 2.8 |
| Hybrid Striped Bass | 6.9 |
| Temperate Basses | 1.1 |
| Largemouth Bass | 53.0 |
| Anything | 9.0 |
| Crappies | 11.1 |
| Panfishes | 2.0 |

Table 7. Total fishing effort (h) for all species and total directed expenditures at Lewisville Reservoir, Texas. Survey period was from 1 June through 31 May. Relative standard error is in parentheses.

| Creel statistic | 2018/2019 |
|-----------------------------|------------------|
| Total fishing effort | 133,725 (17.1) |
| Total directed expenditures | \$708,207 (51.0) |

Gizzard Shad

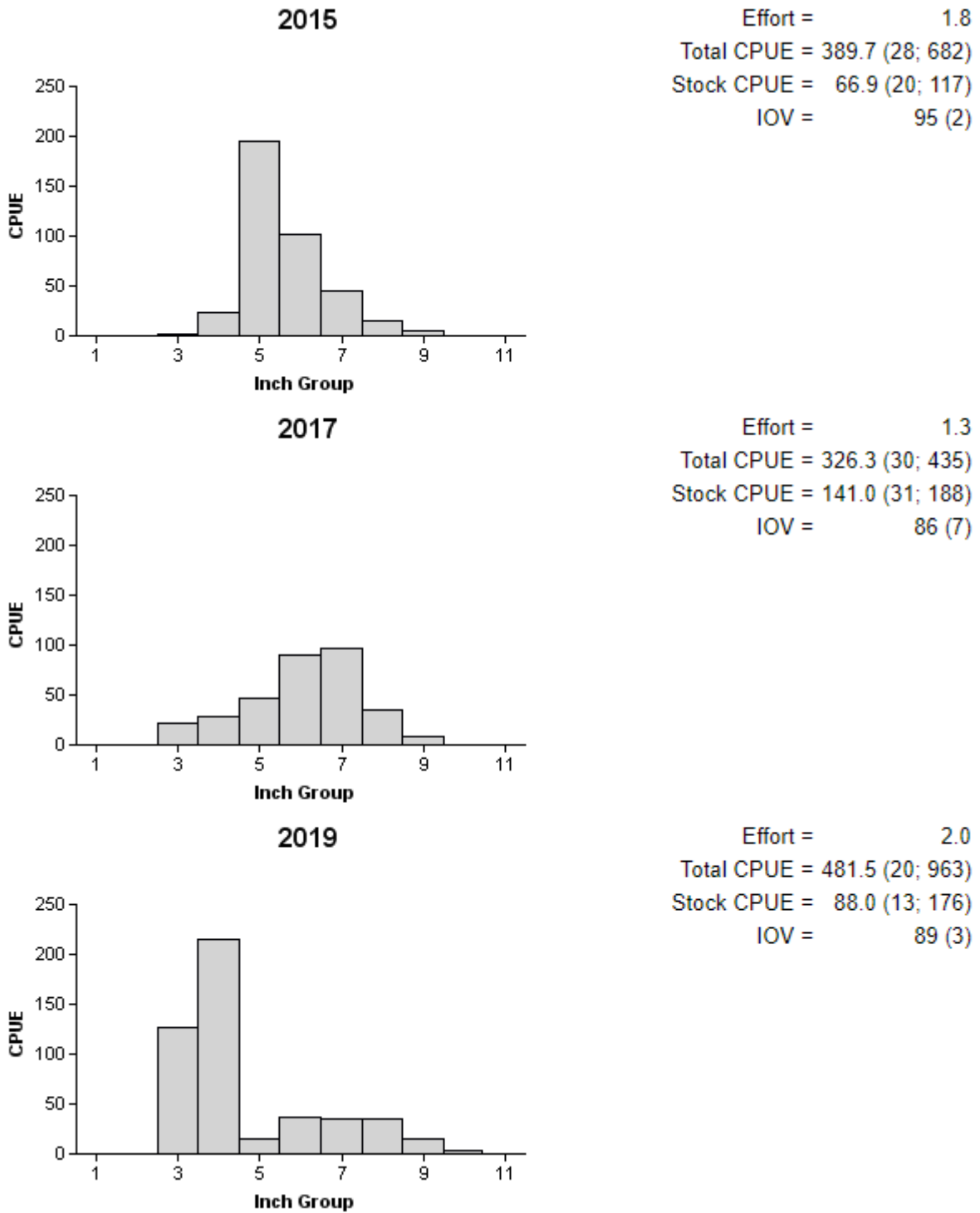


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2015, 2017, and 2019.

Bluegill

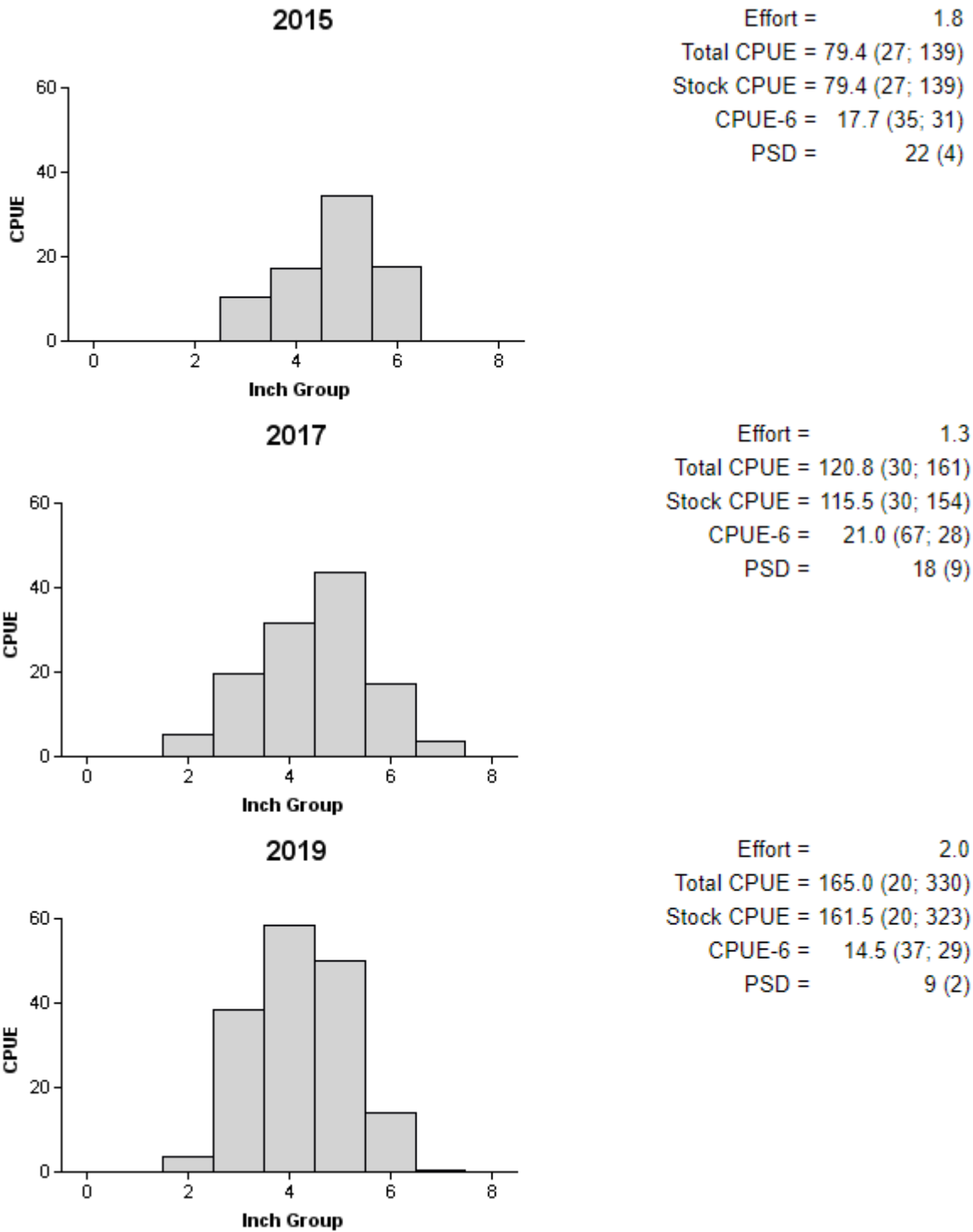


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2015, 2017, and 2019.

Blue Catfish

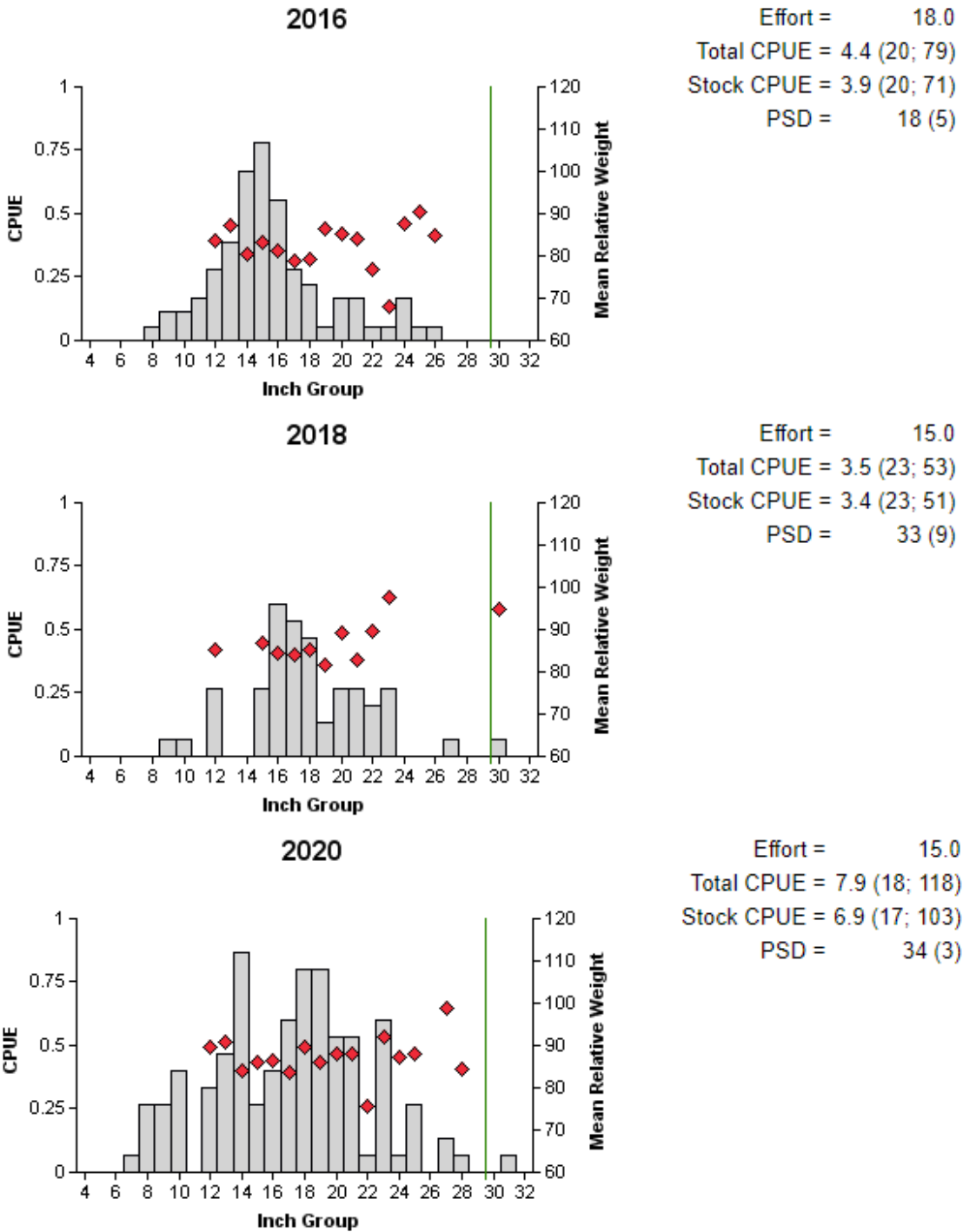


Figure 4. Number of Blue Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2016, 2018, and 2020. Solid vertical line indicates lower end of slot-length limit at time of sampling.

Blue Catfish

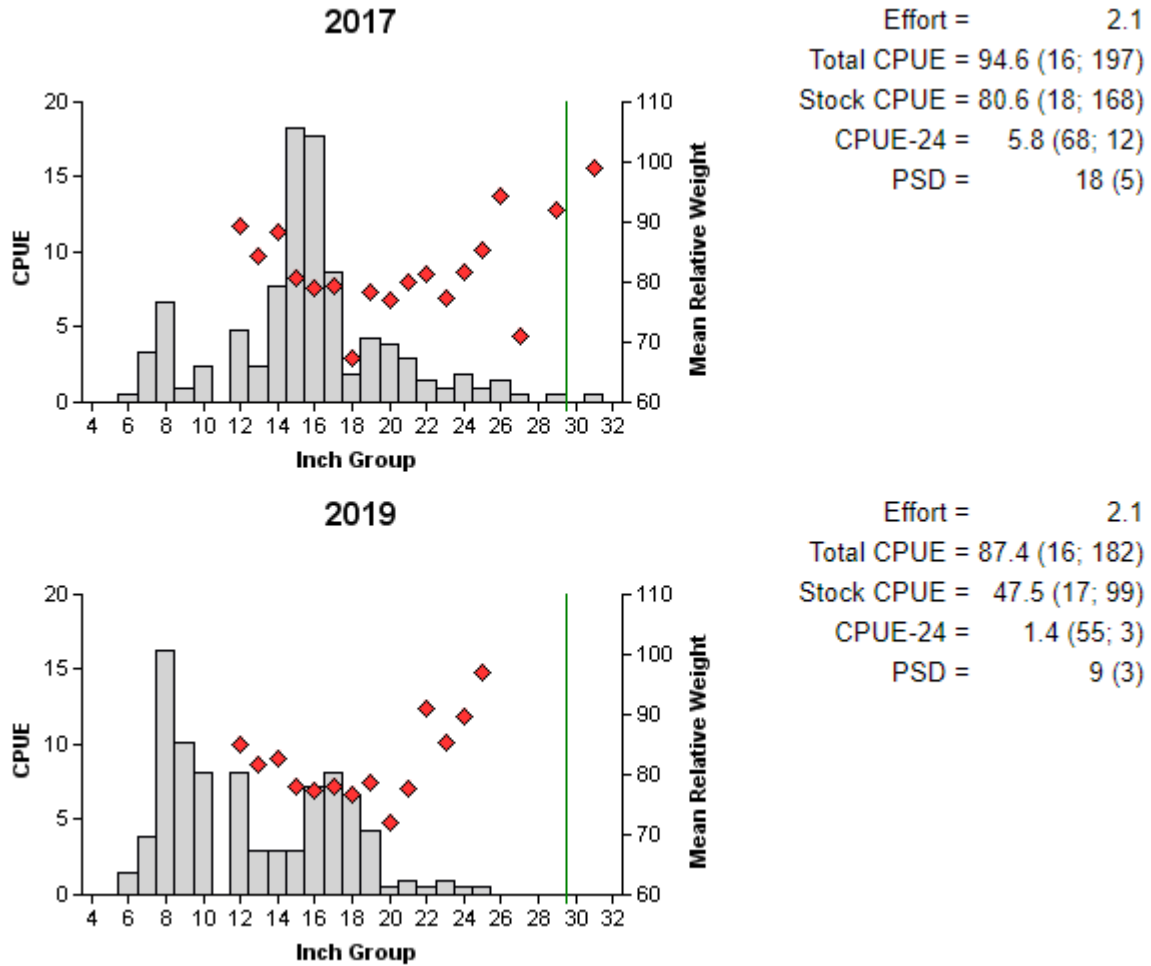


Figure 5. Number of Blue Catfish caught per hour (CPUE), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for summer low-pulse electrofishing surveys, Lewisville Reservoir, Texas, 2017 and 2019. Solid vertical line indicates lower end of slot-length limit at time of sampling.

Table 8. Creel survey statistics for Blue Catfish at Lewisville Reservoir, Texas, from June 2018 through May 2019. Total catch per hour is for anglers targeting Blue Catfish and total harvest is the estimated number of Blue Catfish harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Creel survey statistic | Year |
|------------------------|--------------|
| | 2018/2019 |
| Surface area (acres) | 29,592 |
| Directed effort (h) | 3,613 (38.4) |
| Directed effort/acre | 0.12 |
| Total catch per hour | 0.75 |
| Total harvest | 2,435 (13.8) |
| Harvest/acre | 0.08 (13.8) |
| Percent legal released | 52.5 |

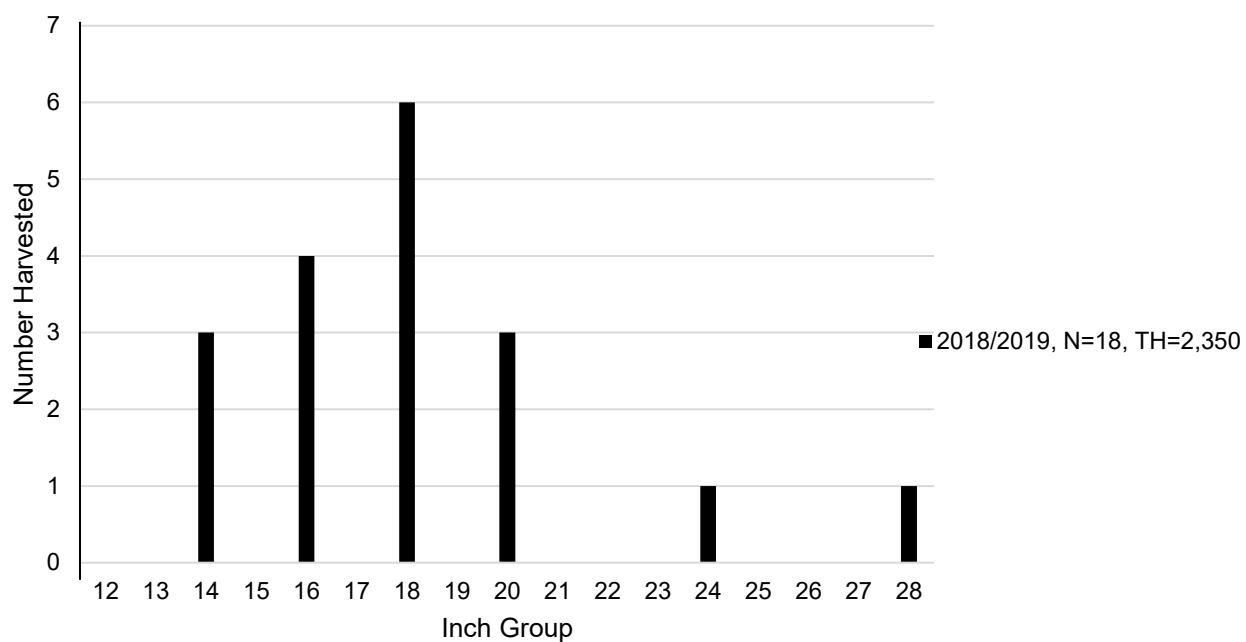


Figure 6. Length frequency of harvested Blue Catfish observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Channel Catfish

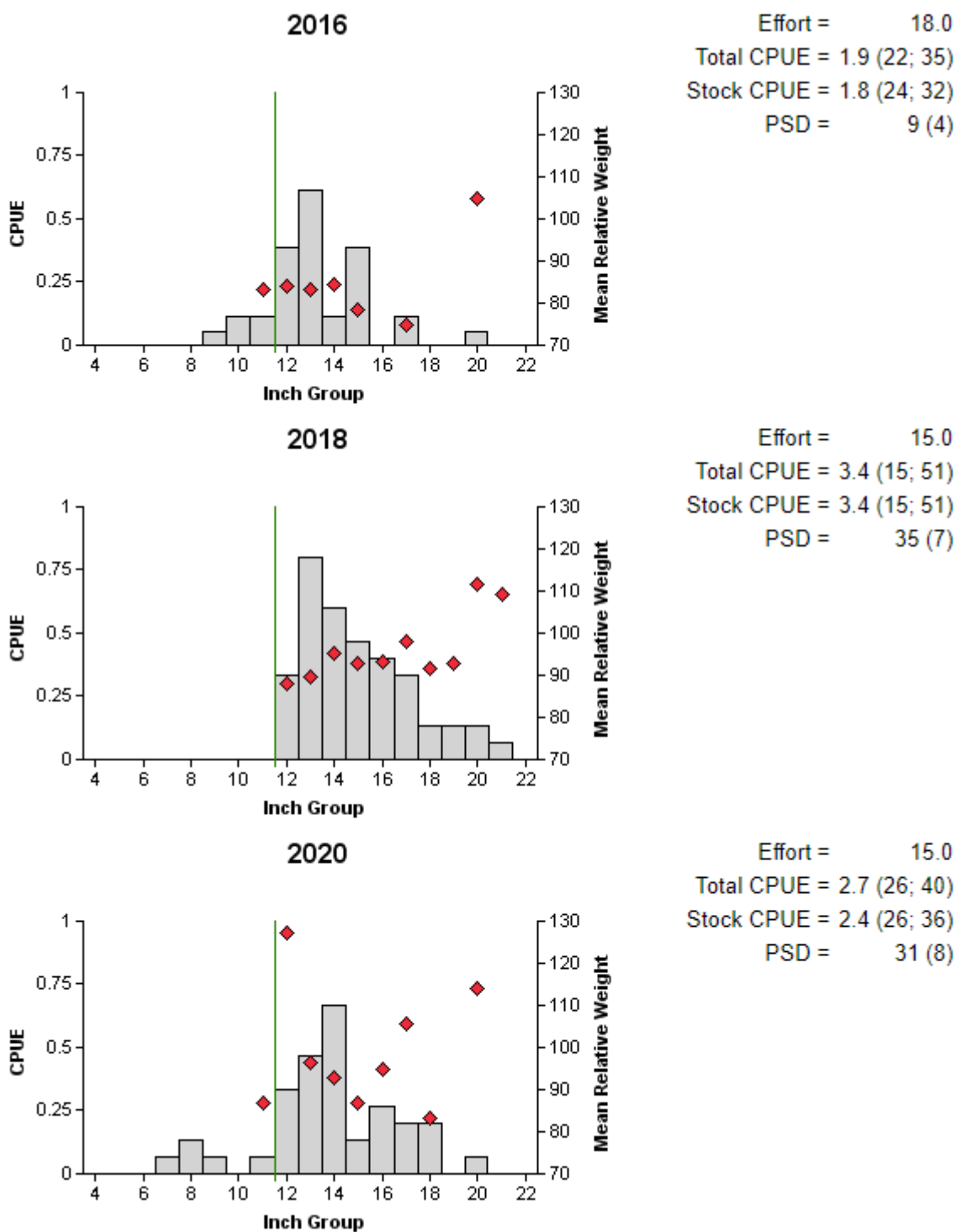


Figure 7. Number of Channel Catfish caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2016, 2018, and 2020. Solid vertical lines indicate minimum length limit at time of sampling.

Table 9. Creel survey statistics for Channel Catfish at Lewisville Reservoir, Texas, from June 2018 through May 2019. 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 | Year |
|------------------------|--------------|
| | 2018/2019 |
| Surface area (acres) | 29,592 |
| Directed effort (h) | 1,951 (52.9) |
| Directed effort/acre | 0.07 |
| Total catch per hour | 1.4 (106.8) |
| Total harvest | 2,301 (62.5) |
| Harvest/acre | 0.09 |
| Percent legal released | 20.6 |

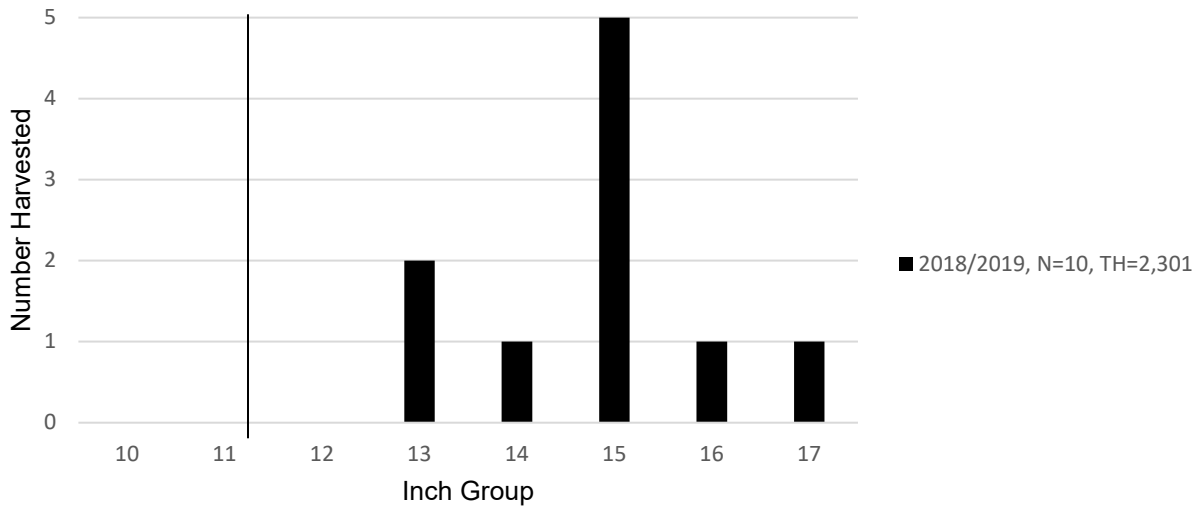


Figure 8. Length frequency of harvested Channel Catfish observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period. Solid vertical line indicates minimum length limit at time of sampling.

White Bass

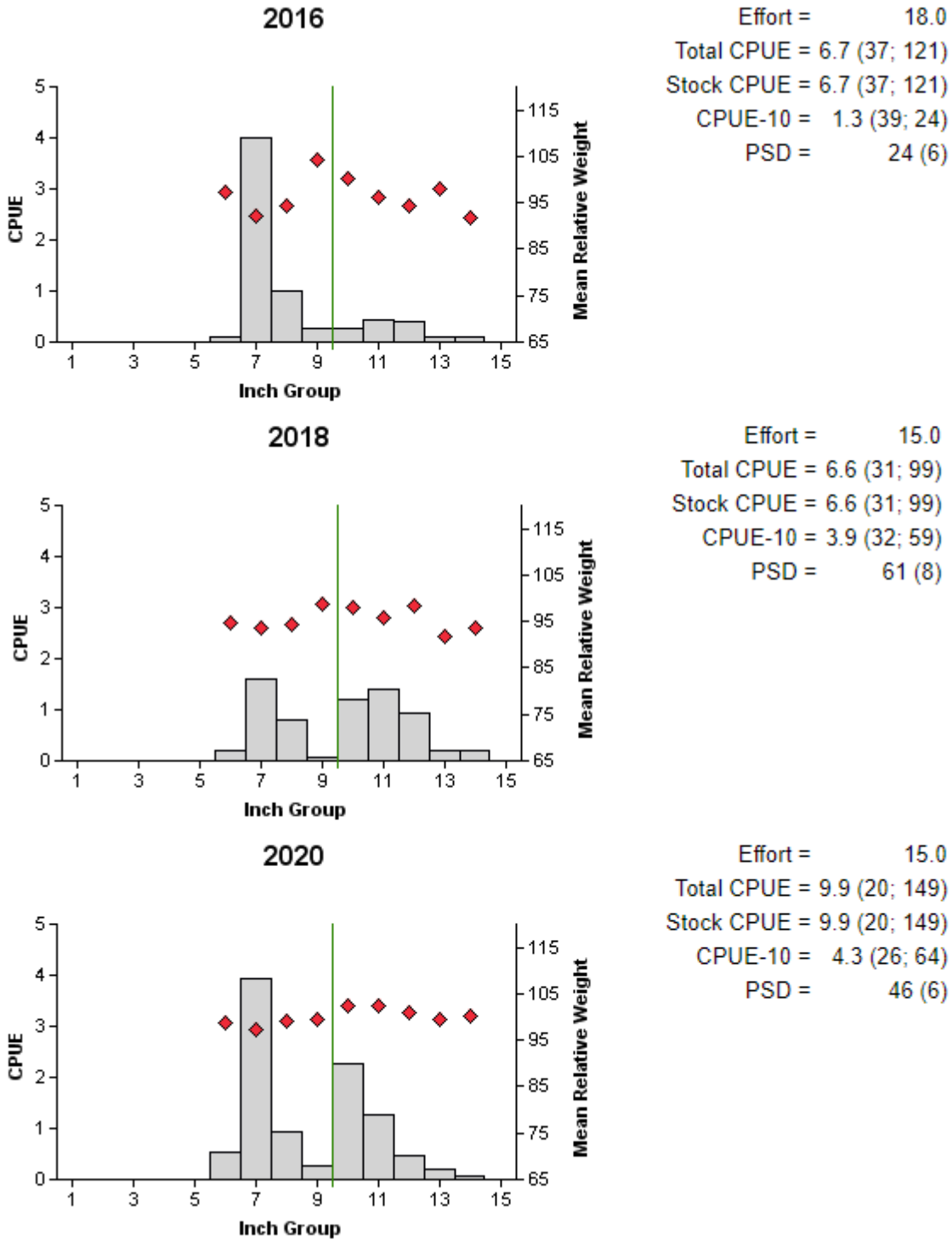


Figure 9. Number of White Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2016, 2018, and 2020. Solid vertical lines indicate minimum length limit at time of sampling.

Table 9. Creel survey statistics for White Bass at Lewisville Reservoir, Texas, from June 2018 through May 2019. Total catch per hour is for anglers targeting White Bass and total harvest is the estimated number of White Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Creel survey statistic | Year |
|------------------------|--------------|
| | 2018/2019 |
| Surface area (acres) | 29,592 |
| Directed effort (h) | 2,403 (39.4) |
| Directed effort/acre | 0.08 |
| Total catch per hour | 1.7 (128.9) |
| Total harvest | 2,435 (13.8) |
| Harvest/acre | 0.08 (13.8) |
| Percent legal released | 61.0 |

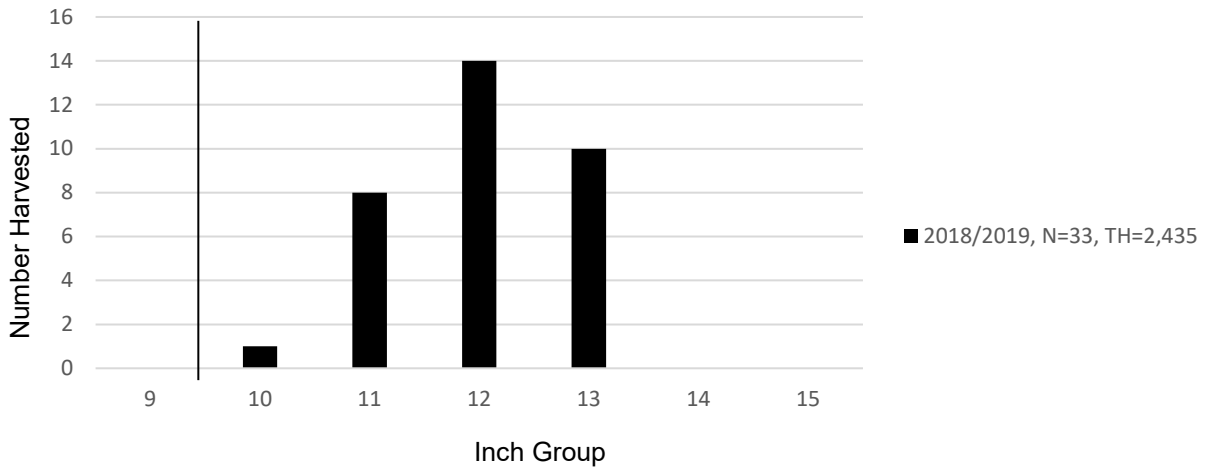


Figure 10. Length frequency of harvested White Bass observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Solid vertical line indicates minimum length limit at time of sampling.

Hybrid Striped Bass

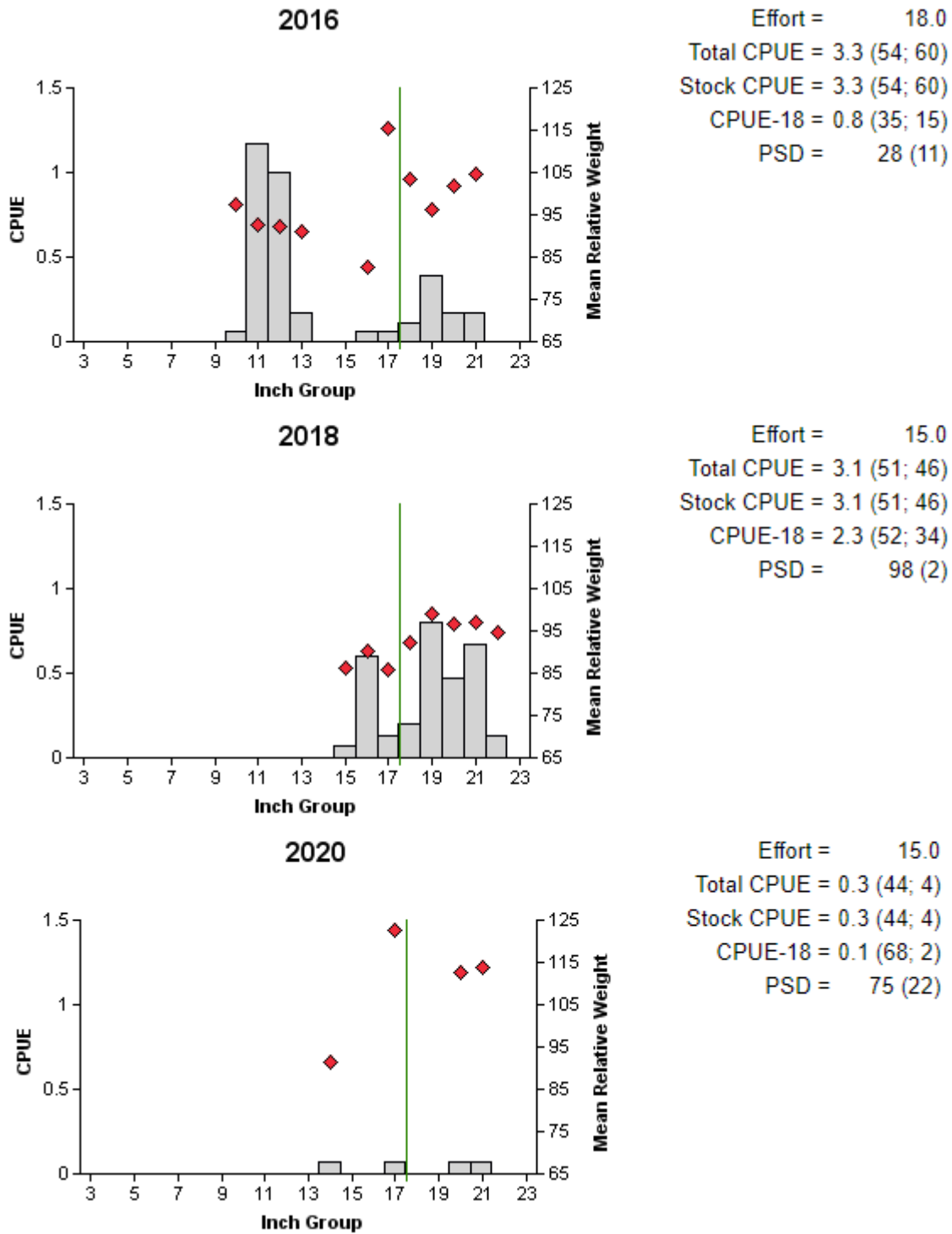


Figure 11. Number of Hybrid Striped Bass caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lewisville Reservoir, Texas, 2016, 2018, and 2020. Solid vertical lines indicate minimum length limit at time of sampling.

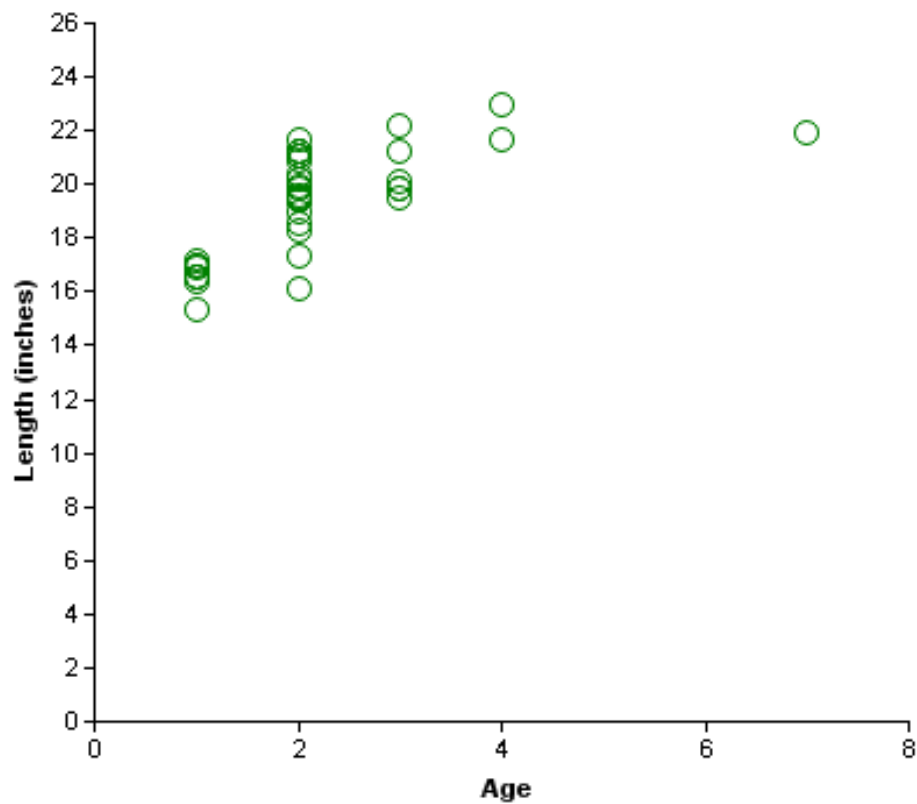


Figure 12. Length at age for Hybrid Striped Bass (sexes combined) collected from spring gill nets at Lewisville Reservoir, Texas, 2018 (N=41).

Table 10. Creel survey statistics for Hybrid Striped Bass at Lewisville Reservoir, Texas, June 2018 through May 2019. Total catch per hour is for anglers targeting Hybrid Striped Bass and total harvest is the estimated number of Hybrid Striped Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Creel survey statistic | Year |
|------------------------|-------------|
| | 2018/2019 |
| Surface area (acres) | 29,592 |
| Directed effort (h) | 5,885 (N/A) |
| Directed effort/acre | 0.2 |
| Total catch per hour | 1.3 (72.7) |
| Total harvest | 5,370 (N/A) |
| Harvest/acre | 0.2 |
| Percent legal released | 45.2 |

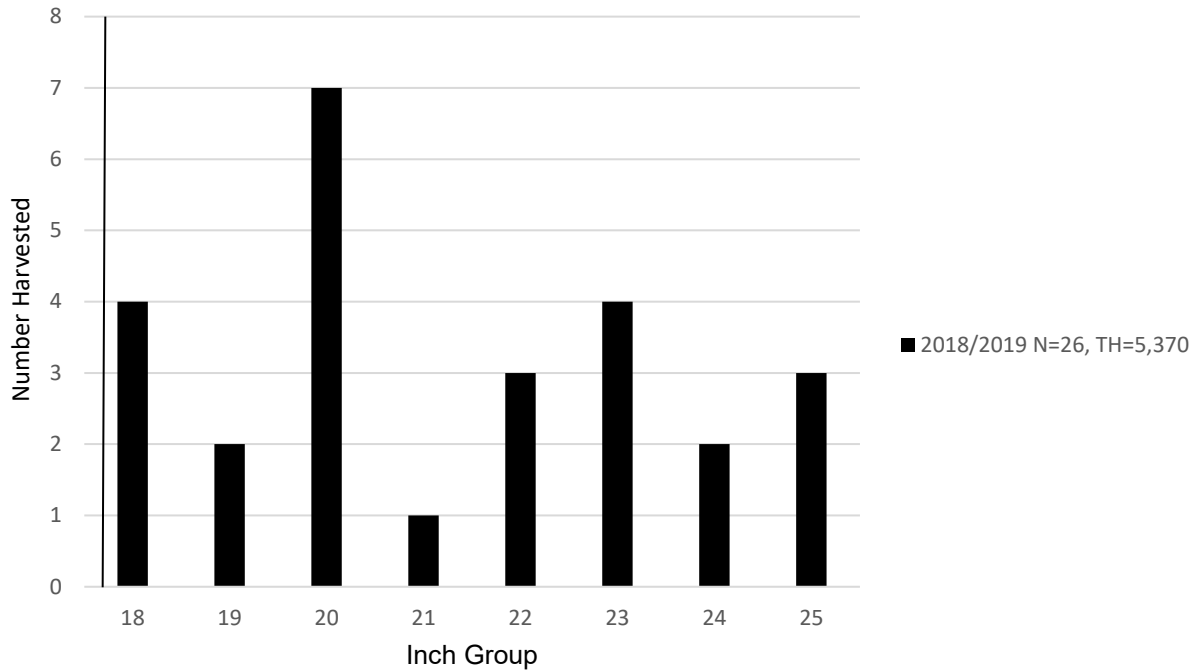


Figure 13. Length frequency of harvested Hybrid Striped Bass observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of harvested Hybrid Striped Bass observed during creel surveys, and TH is the total estimated harvest for the creel period. Solid line indicates minimum length limit at the time of the survey.

Spotted Bass

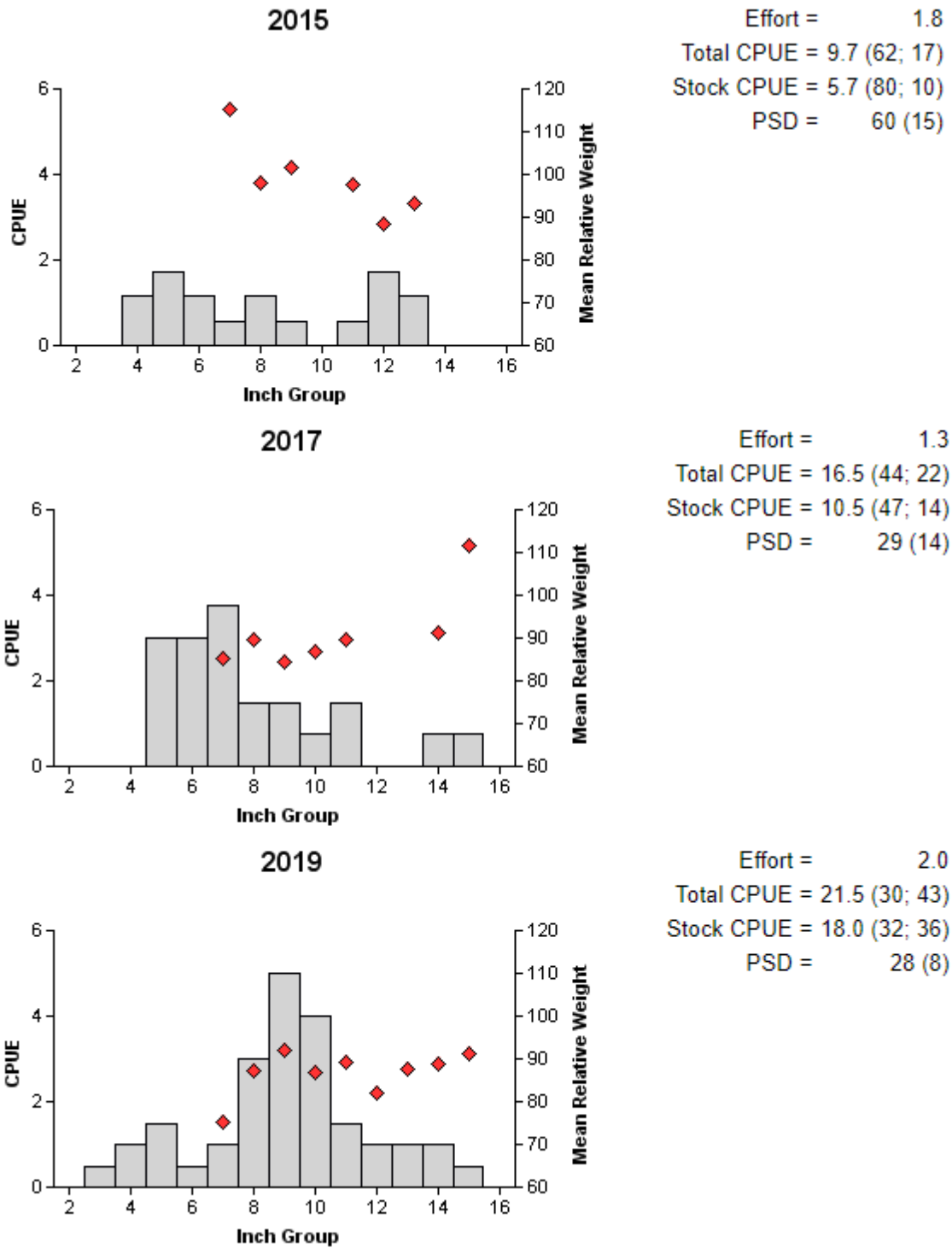


Figure 14. Number of Spotted Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2015, 2017, and 2019.

Largemouth Bass

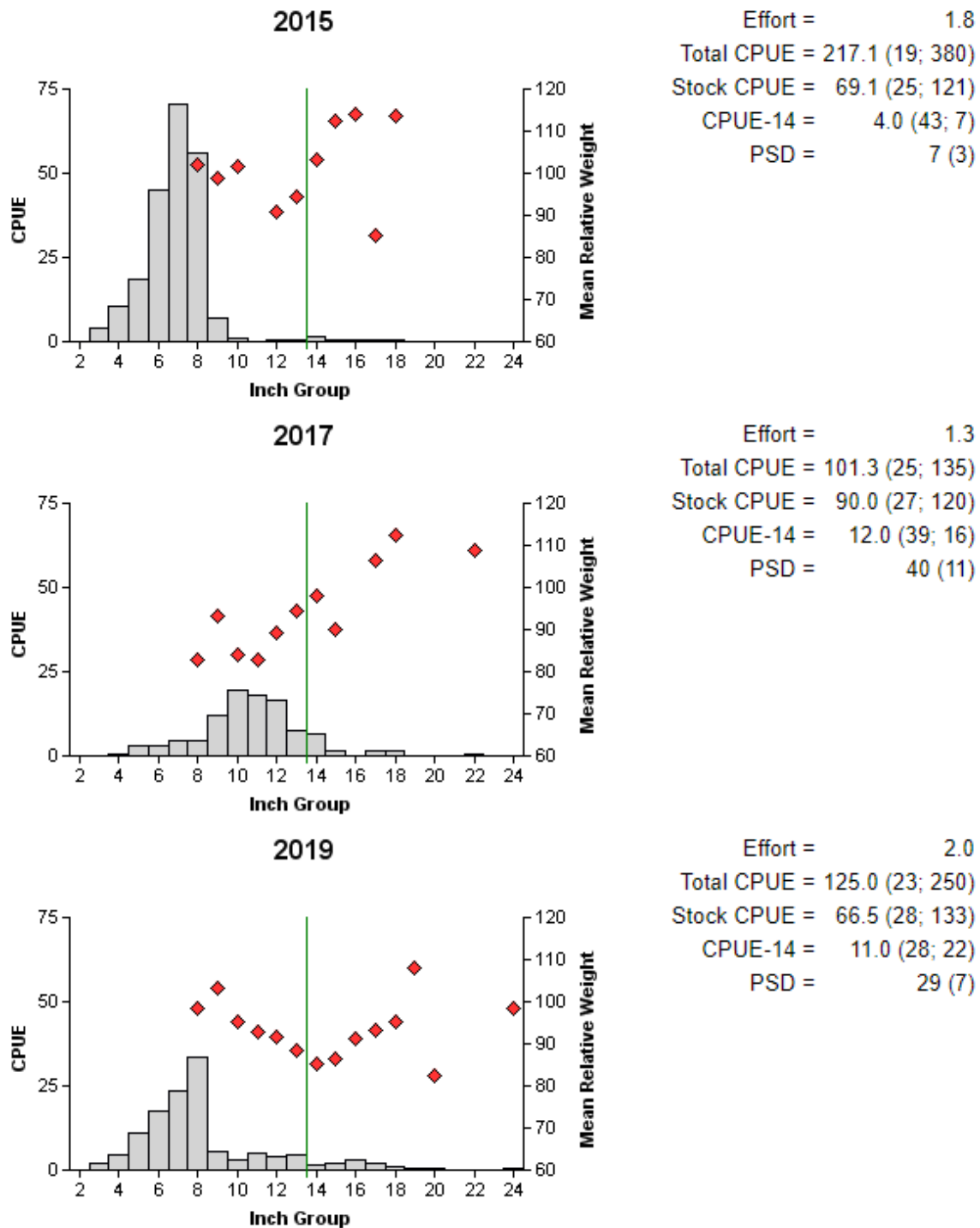


Figure 15. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lewisville Reservoir, Texas, 2015, 2017, and 2019. Solid vertical lines indicate minimum length limit at time of sampling.

Table 11. Creel survey statistics for Largemouth Bass at Lewisville Reservoir, Texas, from June 2018 through May 2019. 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 | 2018/2019 |
|---|-----------------|
| Surface area (acres) | 29,592 |
| Directed angling effort (h) | |
| Tournament | 24,125.1 (31.0) |
| Non-tournament | 21,811.0 (20.0) |
| All black bass anglers combined | 45,936.1 (24.2) |
| Angling effort/acre | 1.6 (24.2) |
| Catch rate (number/h) | 0.3 (25.0) |
| Harvest | |
| Non-tournament harvest | 0.0 |
| Harvest/acre | 0.0 |
| Tournament weigh-in and release | 2,182 (97.7) |
| Percent legal released (non-tournament) | 100.0 |

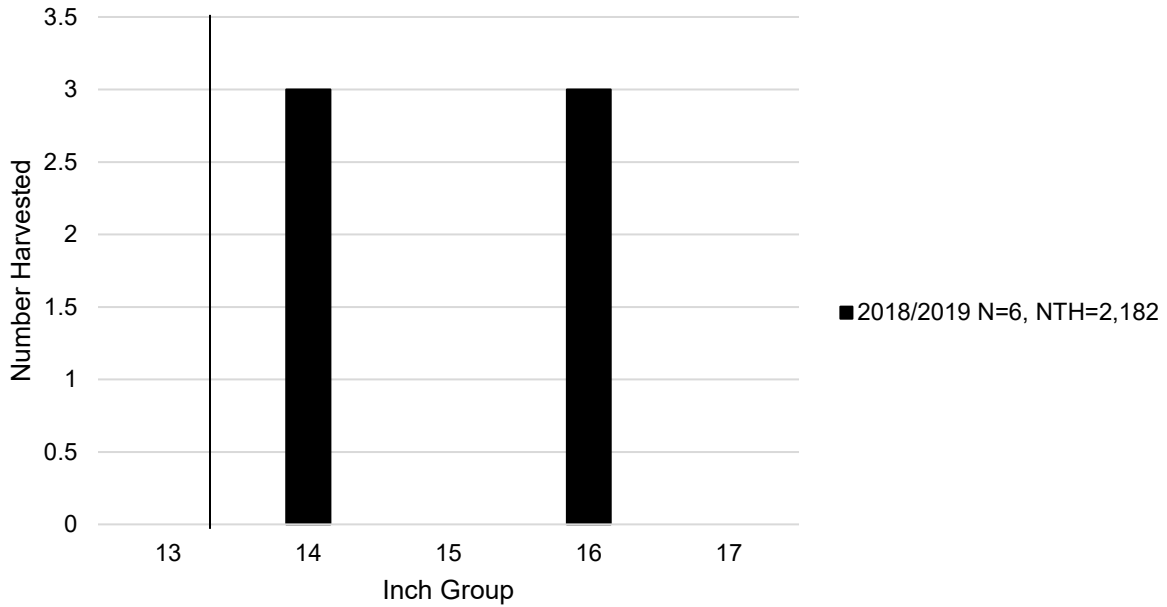
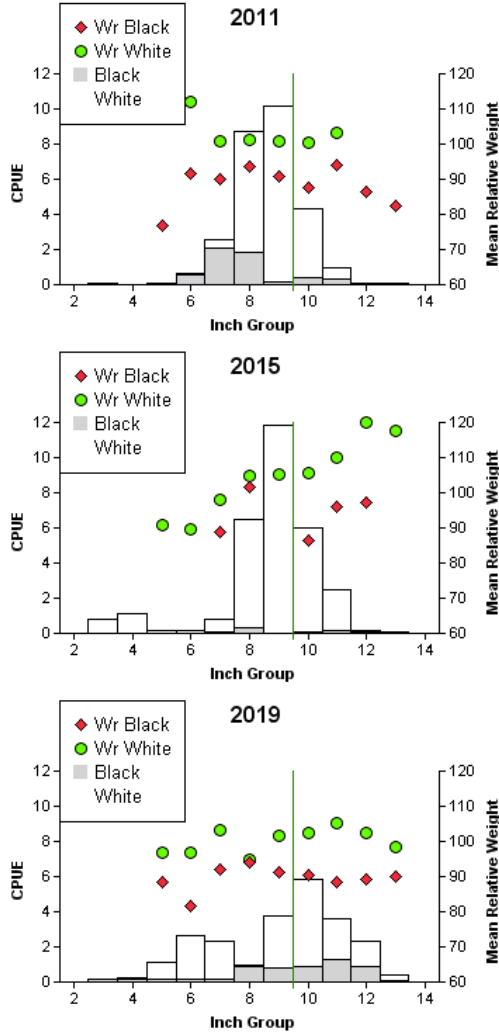


Figure 16. Length frequency of tournament held Largemouth Bass observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of held Largemouth Bass observed during creel surveys, and NTH is the estimated non-tournament harvest for 2018/2019 survey period. Solid line represents minimum length limit at the time of the surveys.

Table 12. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Lewisville Reservoir, Texas, 2011 and 2015. 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 with micro-satellite DNA analysis since 2005.

| Year | Sample size | Number of fish | | | | % FLMB alleles | % pure FLMB |
|------|-------------|----------------|----|----|------|----------------|-------------|
| | | FLMB | F1 | Fx | NLMB | | |
| 2011 | 30 | 0 | 1 | 26 | 3 | 61.0 | 0.0 |
| 2015 | 30 | 0 | 0 | 2 | 3 | 31.0 | 0.0 |

Crappies



| | |
|--------------|----------------|
| Effort = | 15.0 |
| Total CPUE = | 27.6 (25; 414) |
| Stock CPUE = | 27.5 (25; 413) |
| CPUE-10 = | 5.4 (29; 81) |
| PSD = | 88 (4) |

| | |
|--------------|----------------|
| Effort = | 15.0 |
| Total CPUE = | 30.1 (23; 451) |
| Stock CPUE = | 28.1 (26; 422) |
| CPUE-10 = | 8.7 (33; 130) |
| PSD = | 96 (1) |

| | |
|--------------|----------------|
| Effort = | 15.0 |
| Total CPUE = | 23.5 (25; 353) |
| Stock CPUE = | 23.1 (25; 347) |
| CPUE-10 = | 12.2 (22; 183) |
| PSD = | 73 (5) |

Figure 17. Number of 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, Lewisville Reservoir, Texas, 2011, 2015, and 2019. Vertical line indicates minimum length limit.

Table 13. Creel survey statistics for Crappies at Lewisville Reservoir, Texas, from June 2018 through May 2019. Total catch per hour is for anglers targeting Crappies and total harvest is the estimated number of each species harvested by all anglers. Relative standard errors (RSE) are in parentheses.

| Creel Survey Statistic | Year |
|------------------------|---|
| | 2018/2019 |
| Surface area (acres) | 29,592 |
| Directed effort (h) | 9,564.5 (23.5) |
| Directed effort/acre | 0.32 |
| Total catch per hour | 3.8 (37.7) |
| Total harvest | 11,6767 (12.8) ^a 1,423 (110.4) ^b |
| Harvest/acre | 0.39 ^a 0.04 ^b |
| Percent legal released | 34.3 ^a |

^aWhite Crappie

^bBlack Crappie

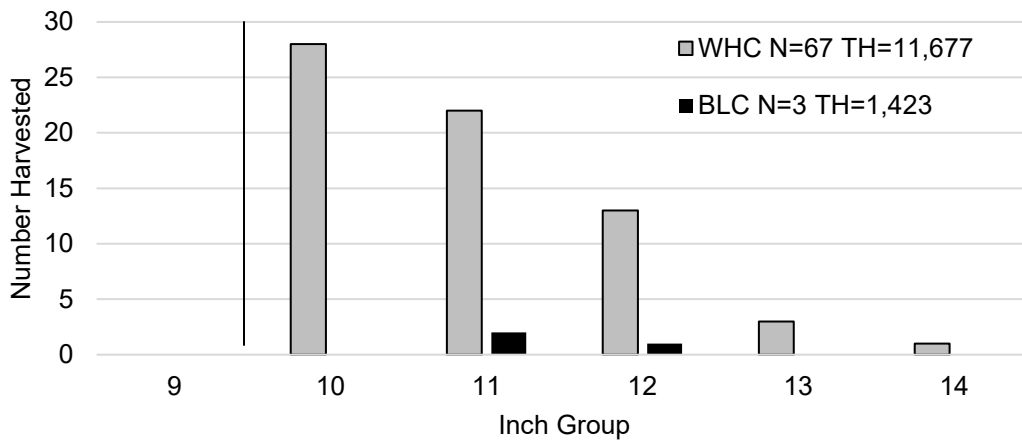


Figure 18. Length frequency of harvested Black Crappie (BLC, black bars) and White Crappie (WHC, gray bars) observed during creel surveys at Lewisville Reservoir, Texas, June 2018 through May 2019, all anglers combined. N is the number of harvested of each species observed during creel surveys, and TH is the total estimated harvest for the creel period. Solid line indicates minimum length limit at the time of the survey.

Proposed Sampling Schedule

Table 14. Proposed sampling schedule for Lewisville Reservoir, Texas. Survey period is June through May. 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 | | | |
|--------------------------------|-------------|----------------|-----------|-----------|
| | 2020-2021 | 2021-2022 | 2022-2023 | 2023-2024 |
| Angler Access | | | | S |
| Structural Habitat | | | | |
| Vegetation | | | | |
| Electrofishing – Fall | | A ¹ | | S |
| Electrofishing – Low frequency | | | | |
| Trap netting | | | | S |
| Gill netting | | A | | S |
| Creel survey | | | | |
| Report | | | | S |

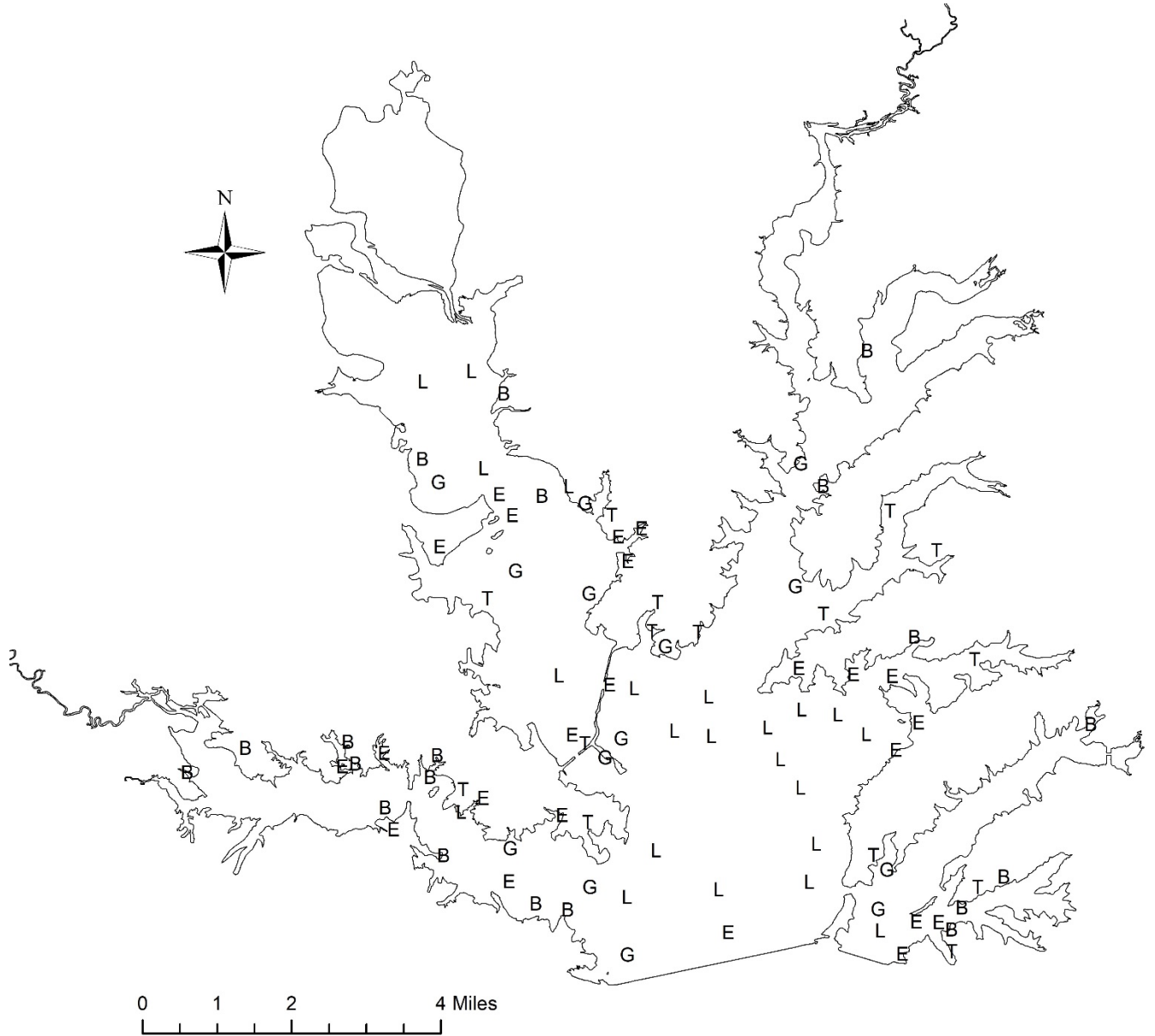
¹Bass-only.

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

Number (N) and catch rate (CPUE; RSE in parentheses) of all target species collected from all gear types from Lewisville Reservoir, Texas, 2019-2020. Sampling effort was 15 net nights for gill netting, 15 net nights for trap netting, and 2 hours for electrofishing.

| Species | Gill Netting | | Trap Netting | | Electrofishing | |
|------------------|--------------|----------|--------------|-----------|----------------|------------|
| | N | CPUE | N | CPUE | N | CPUE |
| Gizzard Shad | | | | | 963 | 481.5 (20) |
| Threadfin Shad | | | | | 871 | 435.5 (39) |
| Blue Catfish | 118 | 7.9 (18) | | | | |
| Channel Catfish | 40 | 2.7 (26) | | | | |
| Flathead Catfish | 2 | 0.1 (68) | | | | |
| White Bass | 149 | 9.9 (20) | | | | |
| Palmetto Bass | 4 | 0.3 (44) | | | | |
| Bluegill | | | | | 330 | 165.0 (20) |
| Longear Sunfish | | | | | 124 | 62.0 (22) |
| Redear Sunfish | | | | | 0 | 0.0 (N/A) |
| Spotted Bass | | | | | 43 | 21.5 (30) |
| Largemouth Bass | | | | | 250 | 125.0 (23) |
| White Crappie | | | 271 | 18.1 (29) | | |
| Black Crappie | | | 82 | 5.5 (30) | | |

APPENDIX B – Map of sampling locations



Location of sampling sites, Lewisville Reservoir, Texas, 2019-2020. Trap net, gill net, electrofishing, and low-frequency electrofishing stations are indicated by T, G, E, and L, respectively. Boat ramps are indicated with a B. Water level was near full pool at time of sampling.

Appendix C, continued.

| Gear | Species | Year | | | | | | | |
|----------------------------------|------------------------|------|------|-------|------|------|-------|------|-------|
| | | 2004 | 2006 | 2007 | 2008 | 2010 | 2011 | 2012 | 2013 |
| Gill Netting (fish/net night) | Blue Catfish | 4.9 | 5.2 | | 4.9 | 2.6 | | 7.1 | |
| | Channel Catfish | 1.9 | 4.7 | | 1.5 | 1.7 | | 2.3 | |
| | White Bass | 5.3 | 4.9 | | 10.0 | 13.3 | | 10.4 | |
| | Hybrid Striped Bass | 0.7 | 5.4 | | 6.1 | 1.1 | | 4.5 | |
| | Striped Bass | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | |
| Electrofishing (fish/hour) | Gizzard Shad | | | 364.5 | | | 350.5 | | 335.5 |
| | Threadfin Shad | | | 475.0 | | | 341.5 | | 451.5 |
| | Bluegill | | | 314.0 | | | 143.0 | | 81.5 |
| | Longear Sunfish | | | 140.0 | | | 81.0 | | 51.0 |
| | Redear Sunfish | | | 13.0 | | | 1.0 | | 0.0 |
| | Spotted Bass | | | 31.5 | | | 21.0 | | 19.0 |
| | Largemouth Bass | | | 111.5 | | | 73.0 | | 34.5 |
| Trap Netting (fish/net night) | White Crappie | | | 12.5 | | | | | |
| | Black Crappie | | | 4.8 | | | | | |

| Gear | Species | Year | | | | | | | |
|----------------------------------|------------------------|-------|-------|-------|-------|-------|-------|------|--|
| | | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Gill Netting (fish/net night) | Blue Catfish | 3.0 | | 4.8 | | 3.5 | | 7.9 | |
| | Channel Catfish | 3.5 | | 2.3 | | 3.4 | | 2.7 | |
| | White Bass | 12.2 | | 5.6 | | 6.6 | | 9.9 | |
| | Hybrid Striped Bass | 4.1 | | 3.3 | | 3.1 | | 0.3 | |
| | Striped Bass | 0.0 | | 0.0 | | 0.0 | | 0.0 | |
| Electrofishing (fish/hour) | Gizzard Shad | | 389.7 | | 326.3 | | 481.5 | | |
| | Threadfin Shad | | 150.3 | | 174.8 | | 435.5 | | |
| | Bluegill | | 79.4 | | 120.8 | | 165.0 | | |
| | Longear Sunfish | | 34.9 | | 36.0 | | 62.0 | | |
| | Redear Sunfish | | 0.0 | | 1.5 | | 0.0 | | |
| | Spotted Bass | | 9.7 | | 16.5 | | 21.5 | | |
| Largemouth Bass | | 217.1 | | 101.3 | | 125.0 | | | |
| Trap Netting (fish/net night) | White Crappie | | 29.3 | | | | 18.1 | | |
| | Black Crappie | | 0.7 | | | | 5.5 | | |



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