

PERFORMANCE REPORT

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FEDERAL AID IN SPORT FISH RESTORATION ACT

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FEDERAL AID PROJECT F-221-M-6

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

Weatherford Reservoir

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July 31, 2016

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Weatherford Reservoir were surveyed in 2015 using electrofishing and trap netting and in 2016 using gill netting. Habitat was surveyed in 2015. Historical data are presented with the 2015-2016 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:** Weatherford Reservoir is a 1,158-acre impoundment on the Clear Fork Trinity River in Parker County. Water level was below conservation elevation (896 ft-msl) for most of the period between May 2012 and May 2015. Since the 2015 flood in May and June the water levels have remained near the conservation elevation. Extremely nutrient rich reservoir waters were probably enhanced by runoff from domestic habitation in the watershed. Habitat features consisted mainly of bulkhead and rocky and natural shoreline with numerous boat docks and piers.
- **Management History:** Important sport fishes included Channel Catfish, Largemouth Bass, and White Crappie. The management plan for the 2012 survey report included a recommendation to promote the Largemouth Bass fishery, encourage the City of Weatherford to renovate the one public ramp to make it usable during low water conditions, and educate controlling authority on invasive species dangers.
- **Fish Community**
 - **Prey species:** Abundant Gizzard and Threadfin Shad, as well as, plentiful sunfish species provided an excellent prey base.
 - **Channel Catfish:** The Channel Catfish population has remained stable throughout past surveys. Recruitment was evident and 97% of the sample population was legal size and larger. Fish were in good condition with catfish above 16 inches in excellent condition.
 - **White Bass:** Gill net catch rate of White Bass has steadily declined over the past four surveys from a high in 1996. This year few White Bass were collected.
 - **Largemouth Bass:** The Largemouth Bass sample indicated a record abundance made up of mostly 2015 young-of-the-year. The Largemouth Bass size structure has improved. Due to the abundant forage produced by the 2015 flood, Largemouth Bass were in great condition. Florida Largemouth Bass alleles in the Largemouth Bass population were still high.
 - **White Crappie:** The sample of White Crappie exhibited the highest recorded abundance. The overall body condition was great, especially crappie 11 inches and above. Growth was good and 32% of the sample population was 10 inches and larger.
- **Management Strategies:** Based on current information, Weatherford Reservoir should continue to be managed with existing fish harvest regulations. The improvements in the Largemouth Bass population should be communicated to constituents via TPWD social media and news releases. Educate the City of Weatherford about new exotic species threats to Texas waters, and work with them to display appropriate signage and educate constituents.

INTRODUCTION

This document is a summary of fisheries data collected from Weatherford Reservoir in 2015–2016. 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 2015–2016 data for comparison.

Reservoir Description

Weatherford Reservoir, a 1,158-acre impoundment on the Clear Fork Trinity River, is located northeast of Weatherford in Parker County. It was constructed in 1957 by the City of Weatherford for municipal and industrial uses. The reservoir also provides recreation for boaters and anglers. The reservoir drains approximately 109 square miles and has a shoreline six miles long. The average depth is 17 feet with a maximum depth of 39 feet. Water level remained as much as 9 feet below conservation level for most of May 2012 to May 2015 (Figure 1). The reservoir has remained near conservation elevation since flooding in 2015. With a TSI chl-*a* of 55.26, Weatherford Reservoir was eutrophic and borderline hypereutrophic (Texas Commission on Environmental Quality 2011). Habitat features consisted mainly of bulkhead and rocky and natural shoreline with numerous boat docks and piers. Other descriptive characteristics for Weatherford Reservoir are in Table 1.

Angler Access

Weatherford Reservoir has one public boat ramp with parking, boarding piers, and ample illumination. Much of the perimeter of Weatherford Reservoir is privately owned with occupied homes and boat docks; however, there is an interspersion of bank access. Shoreline access is available at the public park adjacent to the boat ramp area and a 0.3 mi stretch of shoreline (the Wall) on the east side of the reservoir. Further information about Weatherford Reservoir and its facilities can be obtained by visiting the Texas Parks & Wildlife Department (TPWD) website at www.tpwd.texas.gov and navigating within the fishing link. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Moczygemba and Hysmith 2012) included:

1. The improved sport fishery in Weatherford Reservoir, especially Largemouth Bass, needs publicizing.
Action: The sport fishery was promoted whenever possible.
2. The public ramp on Weatherford Reservoir is not safe to use during periods of low water levels.
Action: The City of Weatherford renovated the ramp which will allow launching in low water conditions.
3. Cooperate with the City of Weatherford personnel to post appropriate signage on invasive species, especially zebra mussels, at access points around the reservoir. Educate City of Weatherford personnel on other invasive species.
Action: Personnel with the City of Weatherford were educated on invasive species and signage has been installed at the public ramp. A zebra mussel sampler was installed in the reservoir.

Harvest regulation history: From September 1, 1993 to August 31, 1999, Weatherford Reservoir had a 14-18 inch slot limit on Largemouth Bass. Sport fishes are currently managed with statewide regulations (Table 3).

Stocking history: Weatherford Reservoir was last stocked with fingerling Florida Largemouth Bass in

1997 at 100/acre. The earliest stocking was with Channel Catfish fingerlings in 1961. Adult Threadfin Shad, Paradise Bass (Yellow Bass x Striped Bass), and Walleye have also been stocked. In 1990 1,101 adult triploid Grass Carp were stocked for control of abundant native aquatic vegetation. Stocking history since 1961 is detailed in Table 4.

Vegetation/habitat history: The 2011-2014 summer drought produced low water conditions at Weatherford Reservoir to the point where only rocky shoreline, bulkhead, gravel, and natural shoreline were the shoreline and littoral habitats (Table 5). Since 2003, aquatic vegetation (native floating and emergent) was not abundant nor problematic (Table 6).

Water Transfer: Weatherford Reservoir is primarily used for municipal water supply, recreation, and to a lesser extent, flood control. Water is pumped into Weatherford Reservoir from Benbrook Reservoir. A by-product of this transfer from Benbrook Reservoir has been the introduction of Yellow Bass, which were not present in 2012.

METHODS

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Weatherford Reservoir (TPWD, Inland Fisheries Division, unpublished manual revised 2015). Primary components of the OBS plan are listed in Table 7. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015).

Electrofishing – Largemouth Bass, Sunfishes, and Gizzard and Threadfin Shad were collected by electrofishing (1.4 hours at 17, 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 – White Crappie were collected using trap nets (5 net nights at 5 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn). Ages for White Crappie were determined using otoliths from 13 randomly-selected fish (range 9.0 to 10.9 inches).

Gill netting – 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).

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

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

Water level – Source for water level data was the United States Geological Survey (2016).

RESULTS AND DISCUSSION

Habitat: Littoral zone habitat consisted primarily of bulkhead, and natural and rocky shoreline with numerous boat docks and piers (Table 5). Native emergent vegetation provided good habitat and has expanded since July 2011 because of the prolonged drought, which allowed wetland plants to grow,

especially black willow. This vegetation was flooded when the reservoir levels increased in 2015 (Table 6).

Prey species: Electrofishing CPUE of Gizzard Shad and Bluegill were 254.8/h and 348.0/h, respectively (Figures 2 and 3). Index of vulnerability (IOV) for Gizzard Shad was high, indicating 88% of Gizzard Shad were available to existing predators; IOV estimates have historically been high (Figure 2). The CPUE of Bluegill remained high and 56% of the sample population was ≤ 4 inches (Figure 3). CPUE for Threadfin Shad was 238.0/h, which was below the average but higher than most years (Appendix C). Aided by the 2015 flooding of terrestrial vegetation, the three species provided a diversified and abundant forage base for Weatherford Reservoir.

Channel Catfish: Gill net CPUE of Channel Catfish was 6.8/nn, similar to 2012, but below the average of 8.4 (Figure 4 and Appendix C). The CPUE-Stock was 6.6/nn with a RSE of 28, which was slightly above the Objective Based Sampling goal of 25. We felt additional sampling was not warranted. Average relative weights of Channel Catfish from 12-16 inches were near 90, with Wr's of larger fish ranging from 103 to 115. This was an improvement from 2012 and was probably due to the abundant forage produced by 2015 floods. The sample population had a high PSD of 45, the highest of the last three surveys (Figure 4), and 97% of the sample population was legal size and larger.

White Bass: White Bass were first recorded in the reservoir in 1993 when a gill net CPUE of 9.2/nn was recorded. The CPUE peaked at 34.0/nn in 1996 and has been very sporadic since. Just three White Bass were collected in 2016 (Figure 5).

Largemouth Bass: Electrofishing CPUE for Largemouth Bass (236.1/h) was a record catch and well above the reservoir average (Figure 6, Appendix C). The CPUE-Stock of 36.0/h was similar to other years, even though it was 64.0/h in 2011. A PSD of 49 was similar to the past three surveys. With the exceptional 2015 spawn, the stock portion of the population and the PSD should improve over the next few years. Excellent average relative weights by inch-class varied from 96 to 130, due to a great improvement in the forage base due to the 2015 flood. Although no pure Florida Largemouth Bass were collected, Florida Largemouth Bass genetic influence has remained high with 47% of the alleles (Table 8).

White Crappie: Trap net catch rate of White Crappie (38.2/nn) was a catch of record (Figure 7 and Appendix C). Average relative weights of fish ≥ 11 inches were above 100, and 32% of the sample population was ≥ 10 inches. Growth was good with one-year-old White Crappie averaging 9.8 inches and two-year-olds averaging 10.6 inches (N = 13; range = 1 – 2 years).

Fisheries management plan for Weatherford Reservoir, Texas

Prepared – July 2016.

ISSUE 1: The improved sport fishery in Weatherford Reservoir, especially Largemouth Bass and White Crappie, is not well publicized.

MANAGEMENT STRATEGY

1. Promote these improvements through news releases and TPWD social media.

ISSUE 2: 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 City of Weatherford personnel to post appropriate signage at access points around the reservoir.
2. Contact and educate City of Weatherford personnel about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their reservoir visitors.
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.
6. Check sampler for presence of zebra mussels.

Objective-Based Sampling Plan and Schedule for Weatherford Reservoir
2017 – 2020

Sport fish, forage fish, and other important fishes: Sport fishes in Weatherford Reservoir include Channel Catfish, Largemouth Bass, and White Crappie. Known important forage species include Gizzard and Threadfin Shad and Bluegill.

Low-density fisheries:

White Bass: White Bass are considered a negligible fisheries because of low abundance and sporadic appearance. They are vulnerable to gill netting and may be sampled along with other open water species.

Survey objectives, fisheries metrics, and sampling objectives:

Channel Catfish: Continuation of trend data monitoring with gill netting every four years in the spring should allow for determination of any large-scale changes in the Channel Catfish population that may invite further investigation. Channel Catfish will be sampled until precision (RSE) of the CPUE-Stock estimate is ≤ 25 , using gill netting at five random sample stations in spring 2020. Body condition will be determined by weighing up to 10 catfish/inch group. Considering CPUE-Stock, RSE was 28 in 2016, additional samples may not be necessary to achieve sampling goals.

Largemouth Bass: Using general monitoring trend data collected at four-year intervals with fall nighttime electrofishing should allow for determination of any large-scale changes in the Largemouth Bass population that may invite further investigation. In fall 2019 Largemouth Bass will be sampled until precision (RSE) of CPUE-Stock estimate is ≤ 25 . To get a reliable size structure, 50 stock-size Largemouth Bass should be collected. A category-2 age analysis of 13 Largemouth Bass between 13.0 and 15.0 inches total length, randomly collected during electrofishing, will be conducted to determine age of minimum-length-limit fish. To determine percent Florida Largemouth Bass alleles, a genetics study will be conducted on 30 Largemouth Bass of any age, randomly collected during electrofishing. Although the age study was not completed, the other objectives were met in 2015 with an additional 5 electrofishing stations. Additional sampling stations may be necessary to achieve sampling goals.

White Crappie: Using general monitoring trend data collected at four-year intervals with fall trap netting, White Crappie will be sampled in 2019 until precision (RSE) of the CPUE-Stock estimate is ≤ 25 . To get a reliable size structure 50 stock-size White Crappie will be collected. A category-2 age analysis of 13 White Crappie between 9.0 and 11.0 inches total length, randomly collected during trap netting, will be conducted to determine age of minimum-length-limit fish. Body condition will be determined by weighing up to 10 crappie/inch group. The objectives were met with 5 trap net stations in 2015.

Gizzard and Threadfin Shad and Bluegill: Like Largemouth Bass, trend data on CPUE and size structure (CPUE-Stock) of Bluegill and Gizzard Shad have been collected at four-year intervals since 1986 with fall electrofishing. CPUE was also calculated for Threadfin Shad. Gizzard Shad and Bluegill will be sampled until precision (RSE) of the CPUE estimate is ≤ 25 . The presence of Threadfin Shad will be monitored during electrofishing. Sampling will continue in conjunction with Largemouth Bass sampling and/or until sufficient numbers for PSD and IOV (50 fish) have been collected. No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and Gizzard Shad or presence of Threadfin Shad. Instead, Largemouth Bass body condition (relative weight of Largemouth Bass ≥ 8) can provide information on forage abundance, vulnerability, or both, relative to predator density.

Sampling Schedule: Table 9 summarizes the proposed sampling schedule for Weatherford Reservoir from 2017 to 2020.

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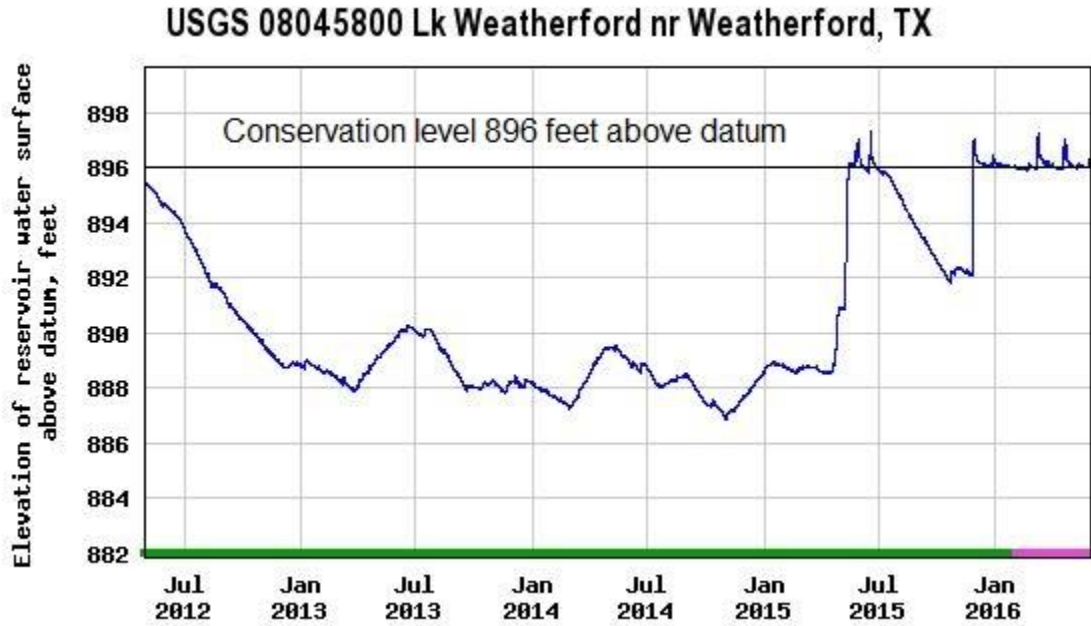


Figure 1. Water level elevations in feet above mean sea level (MSL) recorded for Weatherford Reservoir Texas, June 2012-May, 2016.

Table 1. Characteristics of Weatherford Reservoir, Texas.

| Characteristic | Description |
|-----------------------------|---------------------|
| Year constructed | 1957 |
| Controlling authority | City of Weatherford |
| County | Parker |
| Reservoir type | Mainstream |
| Shoreline development index | 1.3 |
| Conductivity | 572 μ mhos/cm |

Table 2. Boat ramp characteristics for Weatherford Reservoir, Texas, October, 2015. Reservoir elevation at time of survey was 892.2 feet above mean sea level.

| Boat ramp | Latitude Longitude (dd) | Public | Parking capacity (N) | Elevation at end of boat ramp (ft) | Condition |
|----------------------------|-------------------------------|--------|----------------------------|--|-----------------------|
| Lake Weatherford Marina | 32.77242 -97.68554 | N | 10 | 884.00 | Excellent, no issues. |

Table 3. Harvest regulations for Weatherford Reservoir, Texas.

| Species | Bag Limit | Length Limit |
|---|--------------------------------------|-----------------|
| Catfish: Channel and Blue, their hybrids and subspecies | 25 (in any combination) | 12-inch minimum |
| Catfish, Flathead | 5 | 18-inch minimum |
| Bass, White | 25 | 10-inch minimum |
| Bass, Spotted | 5 (black bass in any combination) | No Limit |
| Bass, Largemouth | | 14-inch minimum |
| Crappie: White and Black, their hybrids and subspecies | 25 (in any combination) | 10-inch minimum |

Table 4. Stocking history of Weatherford Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), 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) |
|--|-------|-----------|------------|--------------|
| Channel Catfish | 1961 | 18,850 | AFGL | 7.9 |
| | 1962 | 22,540 | AFGL | 7.9 |
| | 1964 | 31,025 | AFGL | 7.9 |
| | 1970 | 28,000 | AFGL | 7.9 |
| | Total | 100,415 | | |
| Florida Largemouth Bass | 1988 | 114,400 | FRY | 1.0 |
| | 1991 | 36,392 | FGL | 1.5 |
| | 1991 | 81,087 | FRY | 0.9 |
| | 1997 | 114,450 | FGL | 1.7 |
| | Total | 346,329 | | |
| Largemouth Bass | 1962 | 233,000 | UNK | UNK |
| | 1967 | 14,000 | UNK | UNK |
| | 1971 | 20,000 | UNK | UNK |
| | Total | 267,000 | | |
| Paradise Bass (Yellow Bass X Striped Bass) | 1977 | 14,997 | | UNK |
| | Total | 14,997 | | |
| Threadfin Shad | 1981 | 1,790 | AFGL | 2.9 |
| | 1984 | 1,000 | AFGL | 3.0 |
| | Total | 2,790 | | |
| Triploid Grass Carp | 1990 | 1,101 | | 14.4 |
| | Total | 1,101 | | |
| Walleye | 1982 | 755,550 | FRY | 0.2 |
| | 1983 | 1,730,000 | FRY | 0.2 |
| | 1984 | 2,500,000 | FRY | 0.2 |
| | Total | 4,985,550 | | |

Table 5. Survey of structural habitat types, Weatherford Reservoir, Texas, October, 2015. Shoreline habitat type units are in miles and piers and docks are in acres.

| Habitat type | Estimate | % of total |
|-----------------|-----------|------------|
| Bulkhead | 3.0 miles | 50.0 |
| Natural | 1.9 miles | 32.0 |
| Rocky | 1.1 miles | 18.0 |
| Piers and docks | 2.2 acres | 0.2 |

Table 6. Survey of aquatic vegetation, Weatherford Reservoir, Texas, 2003 – 2015. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

| Vegetation | 2003 | 2007 | 2011 | 2015 |
|------------------------|-----------|-----------|------|-----------|
| Native emergent | 0.6(<0.1) | 0.1(<0.1) | 0.0 | 76.3(6.6) |
| Native floating leaved | 0.2(<0.1) | | | 0.3(<0.1) |

Table 7. Objective-based sampling plan components for Weatherford Reservoir, Texas 2015-2016.

| 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 |
| | Condition | W_r | 10 fish/inch group (max) |
| | Genetics | % FLMB | N = 30, any age |
| Bluegill ^a | Abundance | CPUE – Total | RSE \leq 25 |
| | Size structure | PSD, length frequency | N \geq 50 |
| Gizzard Shad ^a | Abundance | CPUE – Total | RSE \leq 25 |
| | Size structure | length frequency | N \geq 50 |
| | Prey availability | IOV | N \geq 50 |
| Threadfin Shad ^a | Presence | CPUE – Total | N = 1 |
| <i>Trap netting</i> | | | |
| Crappie | Abundance | CPUE-stock | RSE-Stock \leq 25 |
| | Age & Growth | Length-at-Age | 13 fish \geq 9 & < 11 inches TL |
| | Condition | W_r | 10 fish/inch group (max) |
| <i>Gill netting</i> | | | |
| Channel Catfish | Abundance | CPUE– stock | RSE-Stock \leq 25 |
| | Condition | W_r | 10 fish/inch group (max) |

^a No additional effort was 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 provided information on forage abundance, vulnerability, or both relative to predator density.

Gizzard Shad

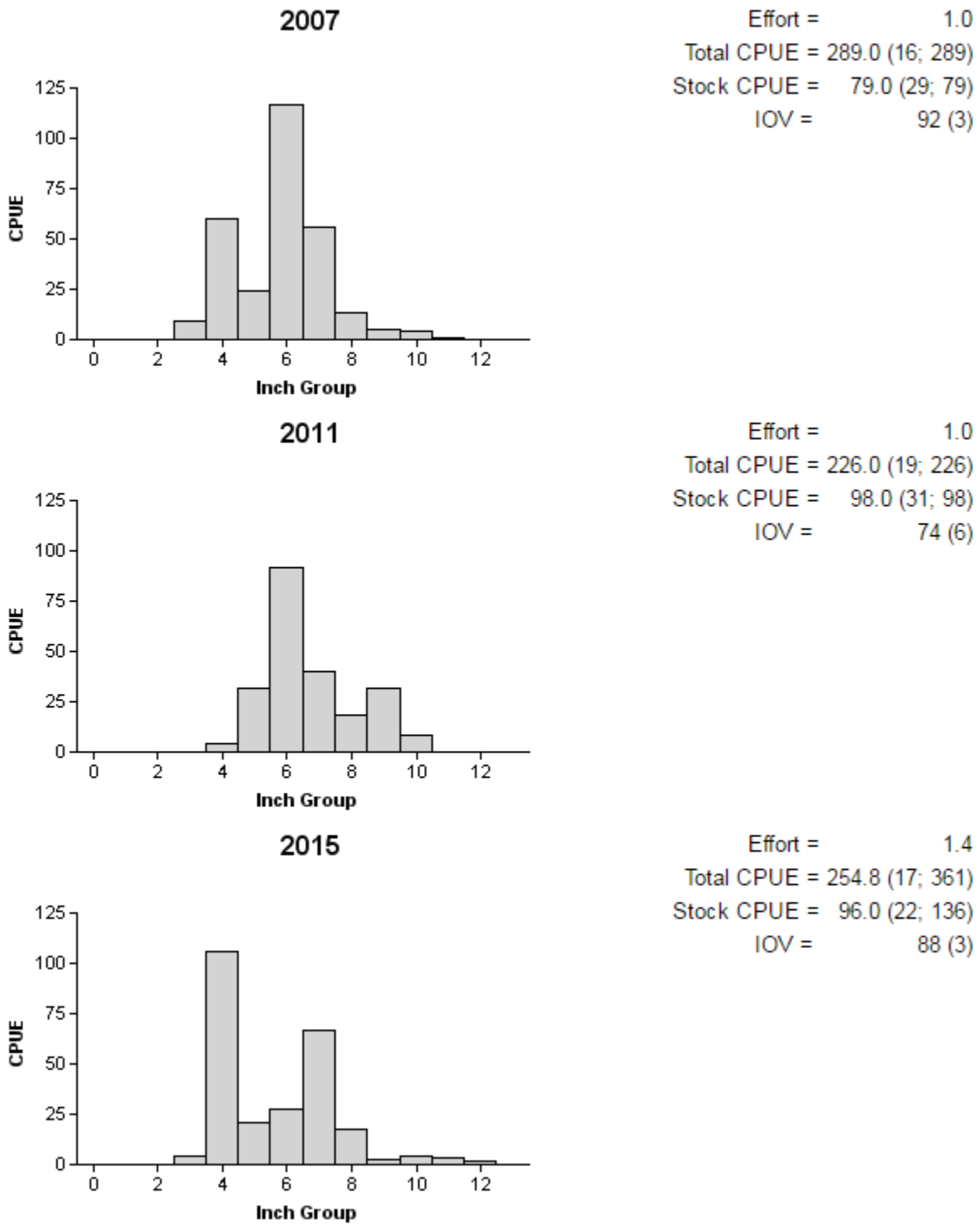


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Weatherford Reservoir, Texas, 2007, 2011, and 2015.

Bluegill

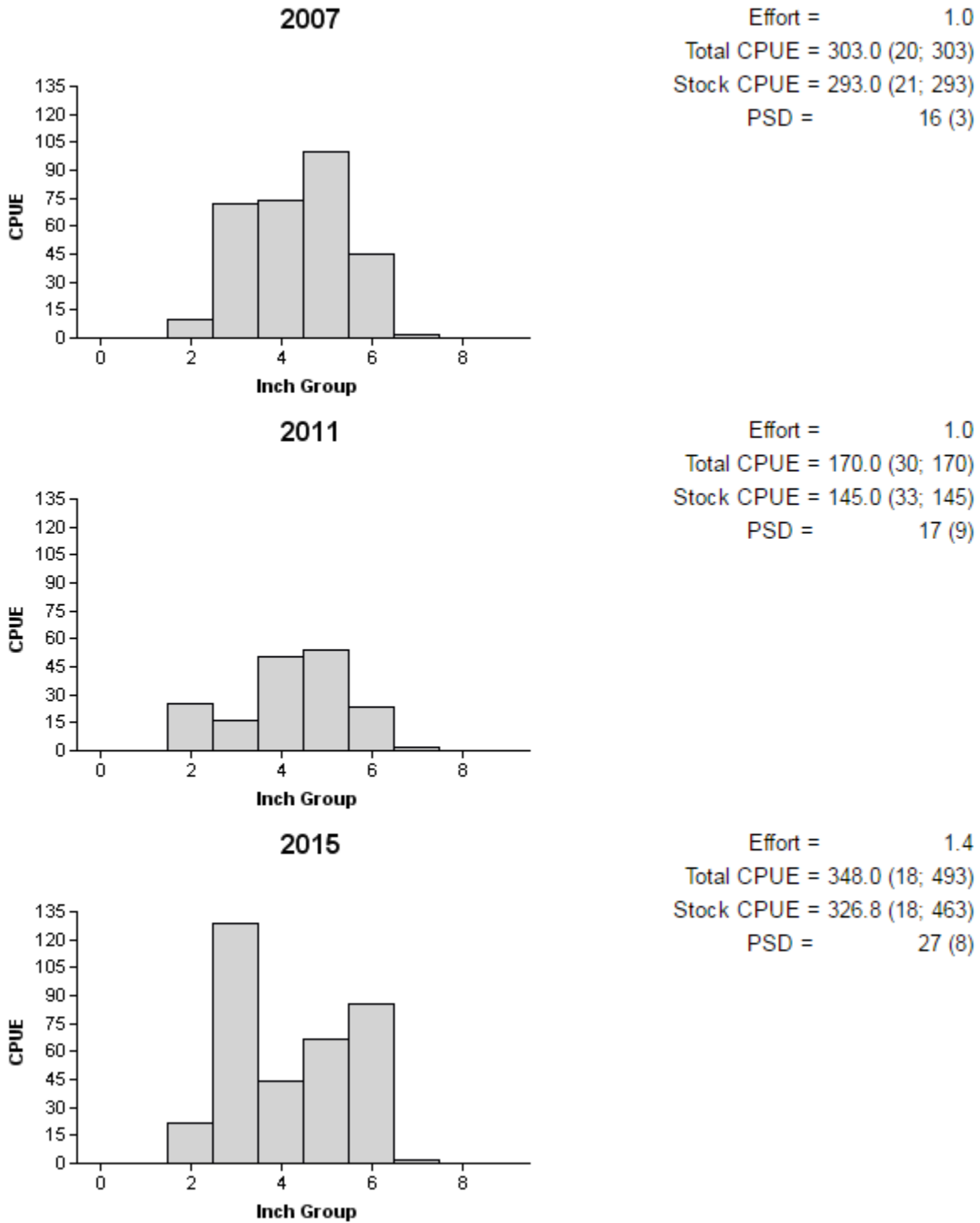


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Weatherford Reservoir, Texas, 2007, 2011, and 2015.

Channel Catfish

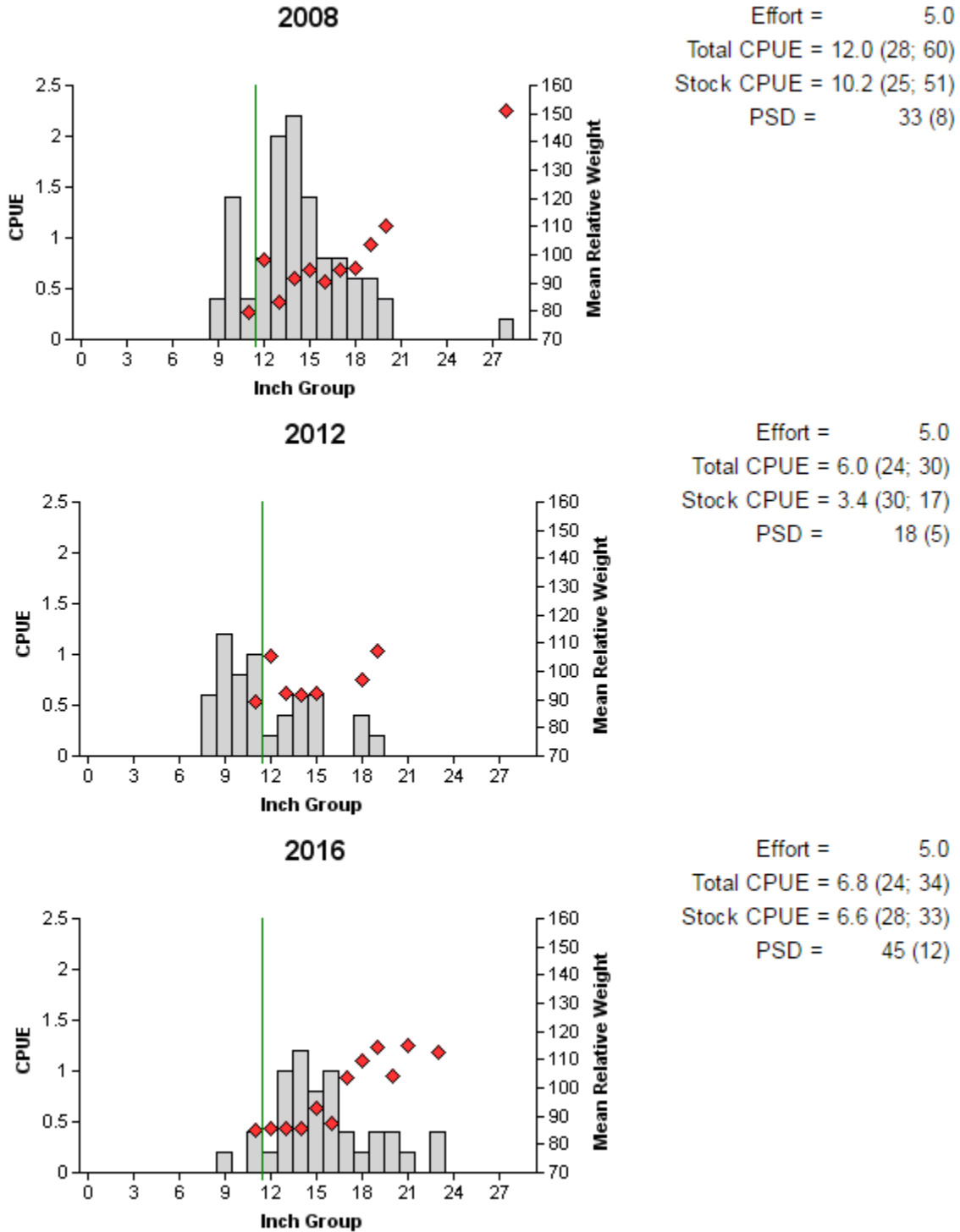


Figure 4. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Weatherford Reservoir, Texas, 2008, 2012, and 2016. Vertical lines represent length limit at time of collection.

White Bass

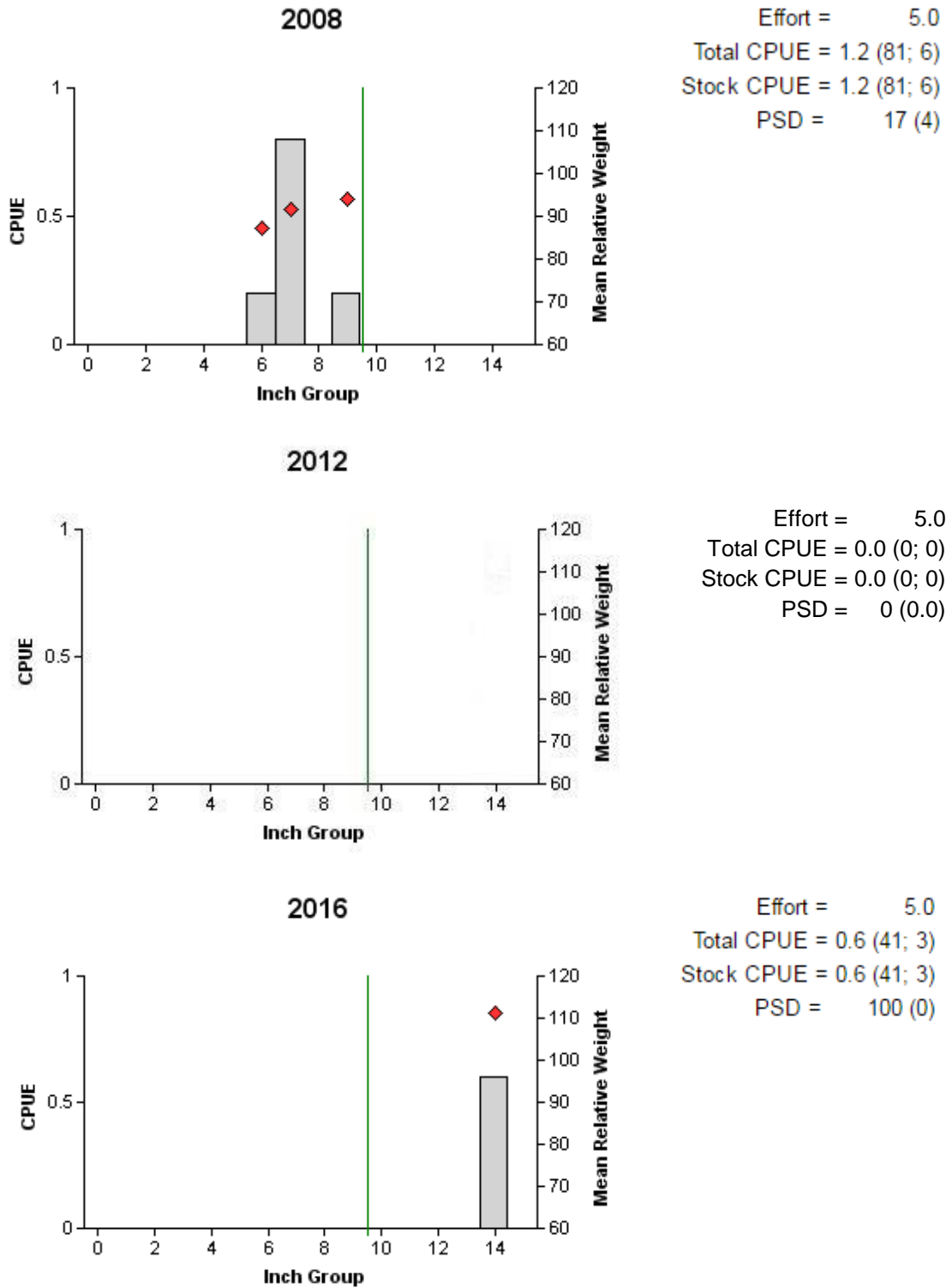


Figure 5. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Weatherford Reservoir, Texas, 2008, 2012, and 2016. Vertical lines represent length limit at time of collection.

Largemouth Bass

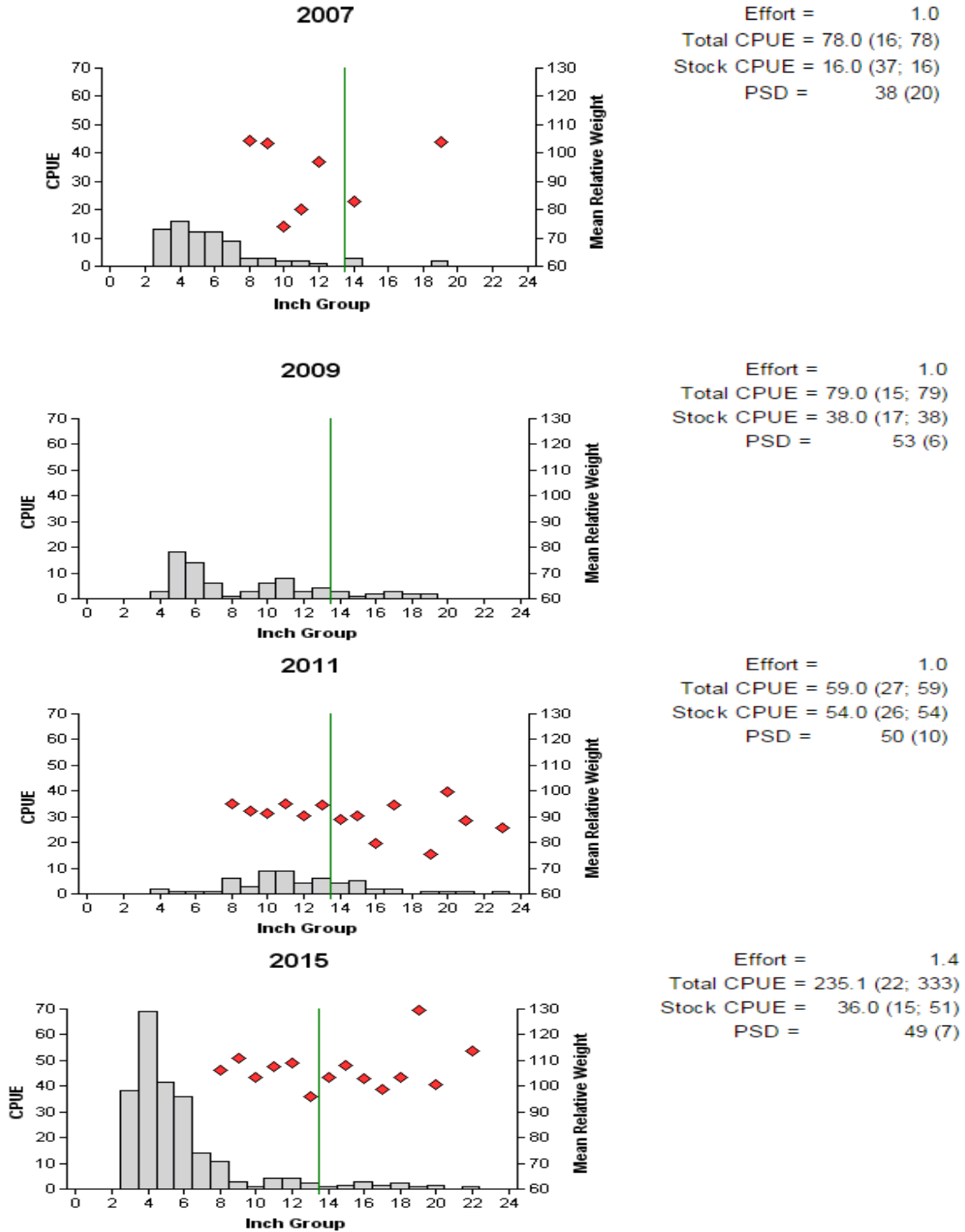


Figure 6. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (except 2009; diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Weatherford Reservoir, Texas, 2007, 2009, 2011, and 2015. Vertical lines represent length limit at time of collection.

Table 8. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Weatherford Reservoir, Texas, 1989, 1996, 1999, 2003, 2007, 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 | Intergrade | NLMB | | |
| 1989 | 31 | 0 | 3 | 28 | 2.4 | 0.0 |
| 1996 | 37 | 2 | 31 | 4 | 35.7 | 4.8 |
| 1999 | 40 | 3 | 27 | 10 | 41.9 | 7.5 |
| 2003 | 30 | 3 | 25 | 2 | 58.3 | 10.0 |
| 2007 | 30 | 0 | 29 | 1 | 45.5 | 0.0 |
| 2015 | 30 | 0 | 28 | 2 | 47.0 | 0.0 |

White Crappie

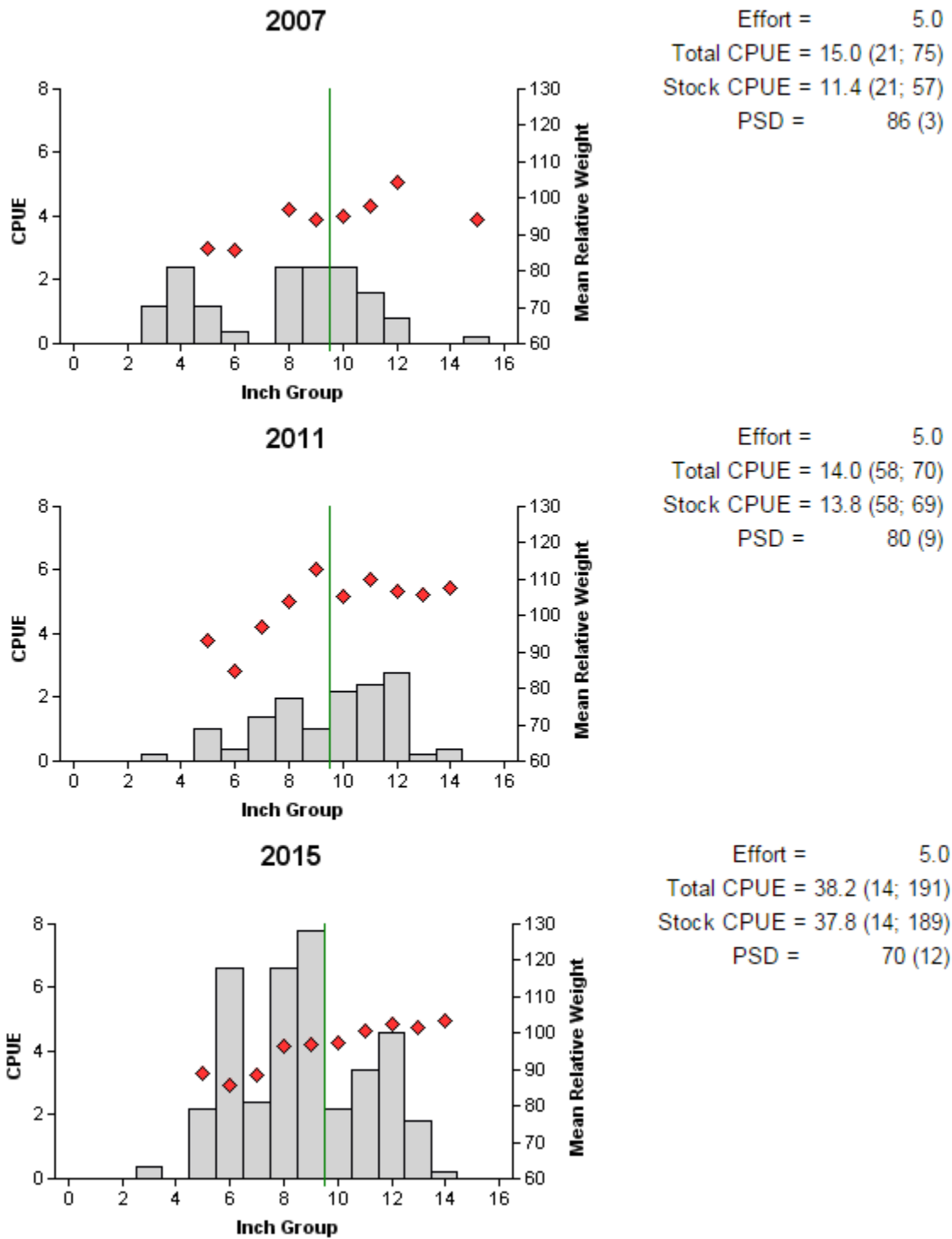


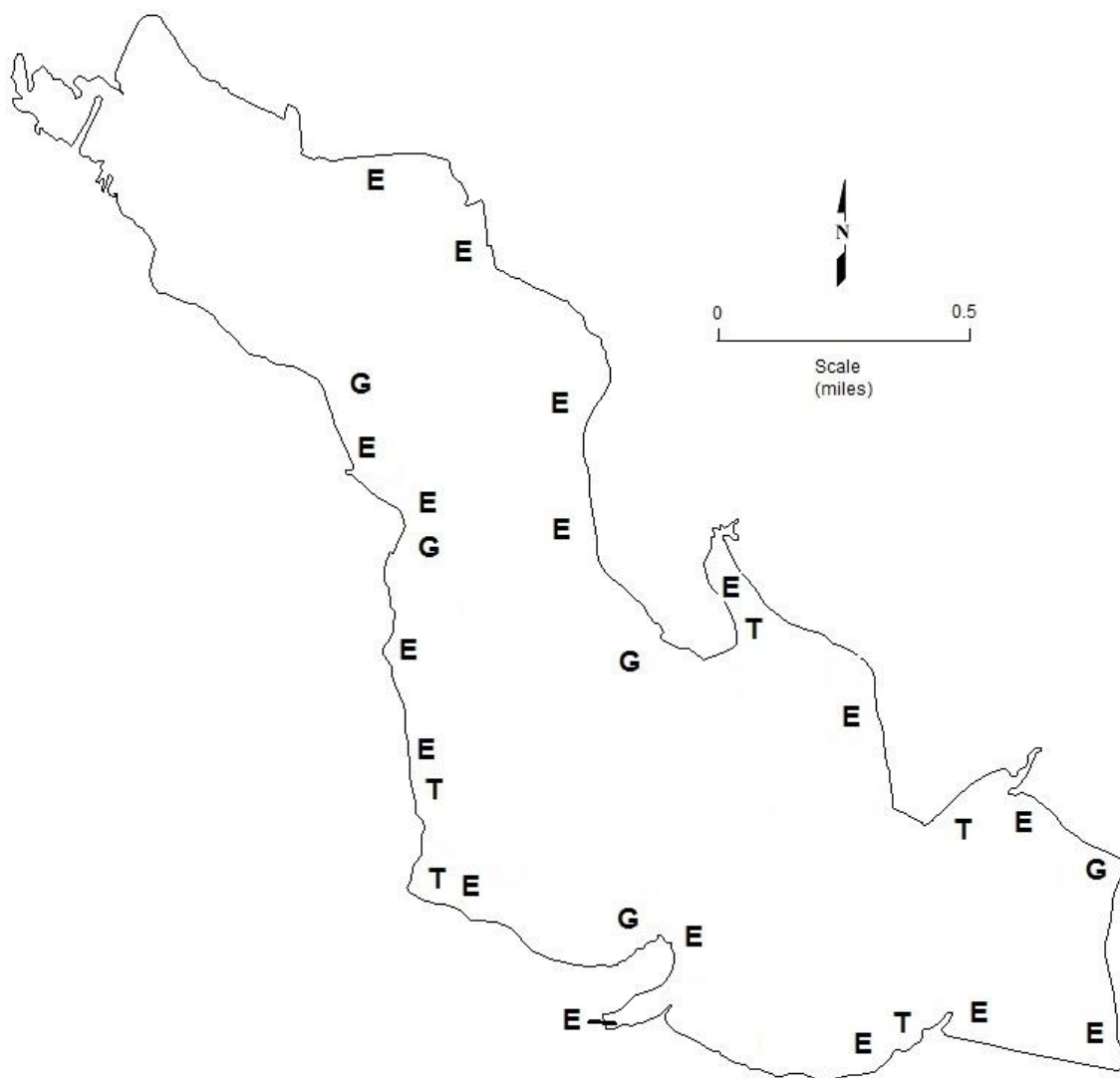
Figure 7. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Weatherford Reservoir, Texas, 2007, 2011, and 2015. Vertical lines represent length limit at time of collection.

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Weatherford Reservoir, Texas, 2015-2016.

| Species | Gill Netting | | Trap Netting | | Electrofishing | |
|-----------------------|--------------|------|--------------|------|----------------|-------|
| | N | CPUE | N | CPUE | N | CPUE |
| Gizzard Shad | | | | | 361 | 254.8 |
| Threadfin Shad | | | | | 327 | 230.8 |
| Channel Catfish | 34 | 6.8 | | | | |
| White Bass | 3 | 0.6 | | | | |
| Green Sunfish | | | | | 17 | 12.0 |
| Warmouth | | | | | 12 | 8.5 |
| Orangespotted Sunfish | | | | | 17 | 12.0 |
| Bluegill | | | | | 493 | 348.0 |
| Longear Sunfish | | | | | 207 | 146.1 |
| Redear Sunfish | | | | | 43 | 30.4 |
| Largemouth Bass | | | | | 333 | 235.1 |
| White Crappie | | | 191 | 38.2 | | |

APPENDIX B



Location of sampling sites, Weatherford Reservoir, Texas, 2015–2016. Trap netting, gill netting, and electrofishing, are indicated by T, G, and E, respectively. Water level was 4 feet below conservation for trap netting and electrofishing and at conservation level for gill netting.

APPENDIX C

Catch rates (CPUE) of targeted species by gear type for Weatherford Reservoir, Texas, 1986, 1989, 1993, 1996, 1999, 2003, 2007, 2011, and 2015.

| Gear | Species | Year | | | | | | | | | Avg |
|------------------------------|-----------------------|----------------------|-------------------|-------------------|-------------------|-------------------|----------------------|----------------------|----------------------|----------------------|----------------|
| | | 1986 ^{a, b} | 1989 ^c | 1993 ^c | 1996 ^d | 1999 ^e | 2003 ^{e, f} | 2007 ^{e, f} | 2011 ^{e, f} | 2015 ^{e, f} | |
| Gill Net (fish/net night) | Channel Catfish | | 13.4 | 5.0 | 10.8 | 7.4 | 5.8 | 12.0 | 6.0 | 6.8 | 8.4 |
| | Flathead Catfish | | 0.8 | 0.2 | 0.0 | 0.6 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 |
| | White Bass | | 0.0 | 9.2 | 34.0 | 2.6 | 0.4 | 1.2 | 0.0 | 0.6 | 6.0 |
| Electrofisher (fish/hour) | Gizzard Shad | 20.5 | 84.7 | 99.3 | 103.3 | 1,024.0 | 217.0 | 289.0 | 226.0 | 254.8 | 257.6 |
| | Threadfin Shad | 8,045.5 | 97.3 | 27.3 | 0.0 | 235.0 | 151.0 | 53.0 | 3993.0 | 230.8 | 1425.9 |
| | Green Sunfish | 22.0 | 19.3 | 11.3 | 24.7 | 11.0 | 12.0 | 5.0 | 1.0 | 12.0 | 13.3 |
| | Warmouth | 2.5 | 16.0 | 4.0 | 2.7 | 3.0 | 7.0 | 5.0 | 2.0 | 8.5 | 5.6 |
| | Orangespotted Sunfish | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 | 1.3 |
| | Bluegill | 177.5 | 640.0 | 132.0 | 430.0 | 255.0 | 314.0 | 303.0 | 170.0 | 348.0 | 307.7 |
| | Longear Sunfish | 104.0 | 63.3 | 84.0 | 193.3 | 65.0 | 310.0 | 112.0 | 43.0 | 146.1 | 124.5 |
| | Redear Sunfish | 22.0 | 72.7 | 24.7 | 17.3 | 12.0 | 4.0 | 4.0 | 6.0 | 30.4 | 21.5 |
| | Spotted Bass | 0.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.6 |
| Largemouth Bass | 36.5 | 112.7 | 107.3 | 159.3 | 158.0 | 91.0 | 78.0 | 59.0 | 235.1 | 115.2 | |
| Trap Net (fish/net night) | White Crappie | 24.4 | 2.2 | 22.8 | 1.5 | 6.4 | 11.0 | 15.0 | 14.0 | 38.2 | 15.1 |
| | Black Crappie | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | <0.1 |

^aElectrofishing in 1986 was conducted with a Coffelt VVP-15 (Variable Voltage Pulsator). Electrofishing in 1989, 1993, 1996, 1999, and 2003 was conducted with a Smith-Root 5.0 GPP (Gas Powered Pulsator). Electrofishing in 2007 was conducted with a Smith-Root 7.5 GPP (Gas Powered Pulsator).

^bElectrofishing and trap netting sampling sites were subjectively selected.

^cElectrofishing, gill netting, and trap netting sampling sites were subjectively selected

^dElectrofishing sampling sites were subjectively selected. Gill netting and trap netting sampling sites were randomly selected.

^eElectrofishing, gill netting, and trap netting sampling sites were randomly selected.

^fGill netting was conducted in the spring of the following year.