PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Richland-Chambers Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Richland-Chambers Reservoir were surveyed in 2014 using electrofishing, trap netting, in 2015 using gill netting. An aquatic vegetation survey was conducted in August 2014. Anglers were surveyed from June through November 2014 and March through May 2015 with a creel survey. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Richland-Chambers Reservoir is a 41,356-acre reservoir (at full pool) on the Richland and Chambers Creek tributaries of the Trinity River. Boat access is adequate, but bank angler access is limited. At full pool boats can be launched from 9 boat ramps surrounding the lake, of which 5 are available without a fee. There are no handicap-specific facilities, but most are accessible. Aquatic vegetation was scarce due to high annual water level fluctuation. Anglers expended approximately 77,000 hours of fishing effort and spent an estimated $754,647 during the June 2014 through May 2015 creel survey.

- **Management History:** Important sport fish include White Bass and Palmetto Bass, Largemouth Bass, Blue Catfish and Channel Catfish, and White Crappie and Black Crappie. Supplemental stocking of Largemouth Bass (genetics unknown) was conducted in 2013. Requests for stocking of Palmetto Bass have been submitted annually and in most years stockings were accomplished. Supplemental gill netting was conducted in 2013 to monitor the popular temperate bass, and catfish, fisheries. An experimental 30-45 inch slot-size limit for Blue Catfish was established in 2010. A creel survey was conducted in 2014 and 2015.

- **Fish Community**
  - **Prey species:** Gizzard Shad and Threadfin Shad were the most abundant prey species and provided ample prey for sport fish**.** Several sunfish species were present but at low abundance.

  - **Catfishes:** Catfishes accounted for 13% of the directed angler effort during the most recent creel survey. Blue Catfish remain more abundant than Channel Catfish and represent 95% of the angler harvest. The experimental “trophy” blue catfish regulation implemented in 2009 is still under evaluation.

  - **Temperate basses:** Temperate basses continued to be the most sought-after species group and made up 36% of the directed fishing effort. Decline in angling and gill net catch rates of White Bass compared to previous surveys is likely due to low inflows due to drought. Increased stocking rate of Palmetto Bass in 2013 and 2014 appear to have improved abundance.

  - **Largemouth Bass:** Largemouth Bass was the second most sought-after species by anglers at Richland-Chambers Reservoir accounting for 25% of the directed fishing effort. Anglers fishing tournaments expended twice the effort of non-tournament anglers during the 2014-2015 creel survey. Few largemouth bass >14 inches were collected during the fall 2010 electrofishing survey.

  - **Crappie:** Crappie traditionally supports a popular fishery at Richland Chambers Reservoir. Although size distribution was good, assessment of population abundance was confounded by low water level in fall 2014.

- **Management strategies:** Stock Palmetto Bass at 10/acre annually. Monitor temperate basses and catfishes populations with biennial gill netting in 2017 and 2019 and creel survey in 2018-2019. Monitor Largemouth Bass population in 2018 with fall electrofishing. Complete evaluation of the experimental Blue Catfish regulation. Continue to monitor for exotic species presence and educate resource users. Provide written and verbal news information on fisheries management and opportunities to appropriate media outlets.

INTRODUCTION

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

Reservoir Description

Richland-Chambers Reservoir is a 41,356-acre reservoir (at full pool) on the Richland and Chambers Creek tributaries of the Trinity River. The reservoir was completed in 1987 to provide water for municipal and industrial purposes. Aquatic vegetation has traditionally been scarce (occupying <10% of the shoreline). In 2002, both hydrilla (*Hydrilla verticillata)* and native aquatic vegetation were present in the littoral area of the reservoir (Ott and Bister, 2003). Currently, hydrilla along with native submersed species occupies a trace of total reservoir surface area. Richland-Chambers Reservoir is in the mid-range of eutrophic reservoirs in Texas with a mean TSI chl-a of 51.26 (Texas Commission on Environmental Quality 2011). The littoral zone consists of a variety of physical habitat types (Bennett and Ott 2011). The majority of the shoreline is featureless (70%), while combinations consisting of bulkhead, eroded shoreline, and riprap make up the remainder. A substantial drought occurred in the watershed from 2012-2015 resulting in lower than normal water level (Figure 1).

Angler Access

At full pool boat access is adequate, but bank angler access is still limited. Boats can be launched from 9 boat ramps surrounding the lake, of which 5 require no fee (Table 2). There are no handicap-specific facilities, but most are accessible. Other descriptive characteristics for Richland-Chambers Reservoir are found in Table 1.

Management History

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

1. If substantial increases in available habitat are observed, request stocking of Florida strain Largemouth Bass *Micropterus salmoides Floridanus* fingerlings to improve trophy potential. Examine Largemouth Bass (M. s.) growth every four years. Collect Largemouth Bass and assess allele frequency in 2014.

   Action: Habitat availability was poor until spring 2015 when abundant rains flooded terrestrial vegetation that had grown in in the littoral zone during the extended drought. District stocking priorities were then shifted and Richland Chambers was assigned as priority one and 236,700 fingerlings were stocked. In addition a management stocking of 564 (unknown genetics) adult Largemouth Bass was conducted in 2013. Mean age-at legal-length was assessed from a sample of 13 Largemouth Bass collected in fall 2014. However, at that time no fingerling Florida Largemouth Bass stocking had occurred so no genetic assessment was conducted.

2. Continue to request annual stockings of Palmetto Bass *Morone chrysops x saxatilis* at 10/acre. Provide assistance to private parties interested in funding supplemental stockings of Palmetto or Sunshine Bass *M. saxatilis x chrysops.* Conduct additional gill netting in spring of 2013 to evaluate Palmetto Bass population characteristics. Conduct harvest assessment of palmetto bass during a creel survey conducted from June 2014-May 2015.

   Action: Richland-Chambers Reservoir has continued to receive the highest district

priority for annual Palmetto Bass stockings. District and hatchery staffs provided technical assistance to a private entity attempting to produce Palmetto Bass but production efforts have been unsuccessful and the effort was terminated. Additional gill netting was conducted in spring 2013 to monitor the pelagic fish community. An access-point angler creel survey was conducted from June through November 2014 and February through May 2015.

3. Continue to monitor the presence and coverage of exotic plant species in the reservoir through cursory inspections and a vegetation survey in 2014. Review treatment plans as submitted by property owners or the controlling authority and provide technical assistance.

   Action: A vegetation survey was conducted in 2014. Due to extremely low water levels the exotic species coverage did not justify treatment; no management actions have been required or recommended.

4. Continue promoting Richland-Chambers Reservoir in news releases and continue presentations to angling clubs promoting angling opportunities in the area.

   Action: Outdoor writers around the reservoir and state were provided with news releases and information about the fishery and additional stocking; lake-specific regulation posters were distributed to vendors of angling-oriented businesses in the Richland-Chambers Reservoir area.

5. Coordinate outreach efforts to advise anglers and businesses regarding the dangers of water borne exotic invasive species.

   Action: Controlling authority and TPWD Wildlife Management Area staff have been provided with information regarding the potential for zebra mussel *(Dreissena polymorpha)* infestation. An informal monitoring program has been established at the inflow from the Trinity River through the TPWD wetland. Clean-Drain-Dry posters have been distributed to major outdoor equipment retailers in the area.

Harvest regulation history: With the exception of Blue Catfish *Ictalurus furcatus*, sport fishes in Richland-Chambers Reservoir have been managed with statewide harvest regulations (Table 3). An experimental slot-length limit to protect trophy Blue Catfish went into effect in September 2009. Any size fish below 30 inches may be retained, all fish 30-45 inches in length must be released' only one fish over 45 inches is allowed as part of the 25-fish daily bag limit in combination with Channel Catfish *I. punctatus*.

Stocking history: Fingerling Palmetto Bass have been requested annually for Richland-Chambers Reservoir every year since 1996; due to limited availability no stocking occurred in 2000, 2001, 2007, or 2012. Palmetto Bass fingerling stocking was supplemented with approximately 2.1 million fry in 2010. Florida Largemouth Bass were first stocked in 1988, and have been periodically stocked to maintain the trophy potential of the reservoir. A management stocking of 564 adult largemouth bass (genetics unknown) was conducted in 2013. The complete stocking history is found in Table 4.

Vegetation/habitat management history: Richland-Chambers Reservoir has typically contained little aquatic vegetation. This is likely the result of wind action, turbidity, and high annual water level fluctuation. During the last three survey periods substantial aquatic vegetation was only present in 2010 (Table 5). A structural habitat survey was completed in 2010 (Bennett and Ott 2011). No other habitat enhancement projects have been conducted.

Water Transfer: Richland-Chambers Reservoir was built by the Tarrant Regional Water District (TRWD) for municipal water supply. TRWD is currently a water wholesaler to more than ten counties in Texas in the Dallas and Fort Worth (DFW) metropolitan complex. The City of Corsicana has a pipeline from the reservoir to Lake Halbert to supplement the city water system. Raw water is also transferred from the

reservoir through the current East Texas Pipeline and converges with water from Cedar Creek Reservoir near Waxahachie, Texas. Water from the pipeline is available along a grid system to multiple water treatment plants in the Dallas/Fort Worth area, including Waxahachie, Midlothian, and Fort Worth.

Raw water from Richland-Chambers Reservoir has the potential to be introduced directly or indirectly into reservoirs Bardwell, Benbrook, Halbert, Joe Pool, Mountain Creek, Arlington, Eagle Mountain, and Lake Worth; all with subsequent return into the Trinity River. The TRWD also maintains a pumping station on the Trinity River to filter raw river water through wetland cells before transmission through an additional pumping station into Richland Chambers; however, this is temporarily discontinued due to an upgrade to the pumps. The TRWD and the City of Dallas Water Utilities have partnered to construct an Integrated Pipeline (IPL) Project, which will create further connections between municipalities and reservoirs including Lake Palestine.

METHODS

Fishes were collected by electrofishing (2 hours at 24, 5-min stations), trap netting (15 net nights at 15 stations) and gill netting (15 net nights at 15 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for trap and gill nets, as the number of fish per net night (fish/nn). All routine survey sites were randomly selected gill netting and trap netting surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014); due to low water level electrofishing was conducted during daylight hours. Additional largemouth bass were collected for age-and-growth at a biologist selected station; however, these specimens were not included in estimates of CPUE.

An annual access-point creel survey was conducted from June through November 2014 and March through May 2015. 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 2014). Estimates of catch, harvest, and effort by area were based on actual mean surface area for the sample period.

A vegetation survey was conducted in 2014 using the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (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 *Dorosoma cepedianum* (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. Ages were determined for Largemouth Bass using otoliths collected from 13 specimens ranging in size from 12.8 to 14.7 inches in length and Palmetto Bass from 10 specimens ranging from 17.4 to 18.1 inches in length.

Source for water level data was the United States Geological Survey (USGS 2015).

RESULTS AND DISCUSSION

Habitat: A vegetation survey of the littoral zone was conducted in 2014. At the time of the survey, water level was approximately 8.5 feet below conservation pool (Figure 1) and most of the littoral zone was exposed. Native submersed species including Water stargrass (*Heteranthera dubia*), nitella (*Nitella spp*.), and pondweed (*Potamogeton spp*.) were present but only in trace amounts (Table 5). Distribution was limited to a deep hole that had been excavated in the harbor of one marina where water was still present. Hydrilla was present in trace amount in the same location. Emergent native species including Water-willow (*Justicia americana*), Water primrose (*Ludwigia spp*), American lotus (*Nelumbo lutea*), and Cattail (*Typha spp*.) were observed on exposed littoral substrate but were not quantified. Alligatorweed

(Alternanthera philoxeroides) was also observed on exposed littoral substrate but was not quantified. Bulkhead and riprap was reported to occupy about 25% of the shoreline habitat in 2010 (Bennett and Ott 2011), but most was exposed by low water level in 2014. Trees and stumps were still present in the upper ends of the Richland and Chambers Creek arms of the reservoir but much was exposed during the survey. Open water was abundant and was suitable for pelagic predators. Following the survey, spring rains in 2015 caused a rapid increase in reservoir elevation (Figure 1). Terrestrial vegetation such as Black willow *(Salix nigra)* and Winged elm *(Ulnus alata)* that had grown in the littoral zone during low water conditions were inundated providing excellent littoral habitat.

Creel: Similar to previous survey years, angling effort at Richland-Chambers Reservoir was primarily directed at temperate basses (36%) and Largemouth Bass (25%), (Table 6). Crappie *Pomoxis spp*. and catfish *Ictalurus spp.* accounted for slightly less of the directed effort (19% and 13%, respectively). Total fishing effort (76,999 hours) and total directed expenditures ($754,647) declined from previous survey years (Table 6). However, it is important to note that the creel survey in 2014-2015 did not include the winter quarter and that water level was low enough (Figure 1) to reduce access for the later part of 2014 and early 2015.

Prey species: Primary prey species included Gizzard Shad, Threadfin Shad *D. petenense*, and Bluegill *Lepomis macrochirus*. Combined catch rates of Gizzard and Threadfin shad were high (1,280/h) (Appendix A) and most Gizzard Shad were available as prey (IOV=89; Figure 3). Sunfish abundance was only 28.0/hour (Figure 5); likely due to daytime electrofishing and low water level (Figure 1). In addition to Bluegill, Longear Sunfish *L. megalotis* were collected. Although Bluegill up to 8 inches in length were collected by electrofishing (Figure 5), no directed angling effort toward sunfish was observed during the 2014-2015 creel period.

Catfishes: The percentage of total angler effort for catfishes (13%) was similar to 16% in 2010-2011 (Table 6) but the magnitude is substantially above past surveys (Table 7). Anglers harvested an estimated 22,718 catfishes (Blue and Channel Catfish combined) during the 2014-2015 survey (Table 8) but Blue Catfish continued to be the dominant species. Angler catch rate of catfishes (1.8/hour) was similar to 1.9/hour in 2006-2007 but substantially above 0.2/hour and 0.6 per hour (2004-2005 and 2010-2011, respectively). In both of the high catch rate surveys the winter quarter creel survey was not conducted (due to low water level); it is unknown if seasonal bias or water level influenced estimates of annual catch rate for those years. The majority of the Blue Catfish harvest was 12-20 inches in length (Figure 8). Although some sub slot-length Blue Catfish were harvested by anglers, none $\geq$ 45 inches were observed in the creel survey. Anecdotal information from angling guides and passive gear anglers indicate that some catch and release of fish within the protected 30-45 inch slot-size limit exists and photographs of fish $\geq$ 45 inches have been posted on social media. Channel Catfish made up only approximately 5% of the total catfish harvest and minimal illegal harvest of 10-inch Channel Catfish was observed during the creel survey (Figure 9); it is unknown if this was due to confusion about the experimental regulation for Blue Catfish or just simple misidentification of species. Gill net catch rate of Blue Catfish in 2015 (25.2/nn) was similar to previous surveys (31.7/nn in 2011 and 24.0/nn in 2013) (Figure 6). Relative body condition was acceptable (*Wr* >90) for all size classes and suggest adequate prey availability. Previous surveys documented relatively slow growth of Blue Catfish that may take a decade to reach quality size (>20 inches), and fifteen or more years to grow into the protected slot-size (Bennett and Ott 2011). Channel Catfish continued to be substantially less abundant than Blue Catfish, with gill net CPUE ranging from 1.3/nn in the current survey to 2.0/nn in the 2013 sample (Figure 7).

Temperate basses: Temperate basses *Morone spp*. continued to be the most sought-after species group at Richland-Chambers Reservoir; accounting for 36% of the total directed angling effort (Table 5). However, directed angling-effort, catch rate and harvest of temperate basses all declined compared to previous surveys (Table 9). Although some of the decrease in effort may have been due to low water level limiting access and 9 month rather than 12 month creel survey, it is still substantially lower than results from 2006-2007 when similar conditions existed. Although the size range of White Bass collected in gill nets is similar to surveys in 2011 and 2013, overall abundance appears to have declined (CPUE=5.0/nn in 2011, CPUE=1.7/nn in 2013, and CPUE=1.2/nn in 2015). Decline in relative abundance

is likely due to low inflows resulting from the extended drought (beginning in 2012) as exhibited by low reservoir elevations (Figure 1). Gill net catch rate of Palmetto Bass (2.0/nn) is still relatively low but the bi-modal size distribution of age 1 and age 2 (9-12 inch and 15-18 inch respectively) are indicative of increased stocking in 2013 and 2014 relative to previous years (Table 4). Palmetto Bass reach harvestable size by age 2; average age at 18 inches (17.4-18.1) was 2.0 years (N=10, range 2-2 years).

Largemouth Bass: Largemouth Bass continued to be the second most sought after species accounting for approximately 25% of the directed effort (Table 5). The majority of the species-directed effort (66%) was tournament-related. Angling catch rate for tournament and non-tournament anglers combined was similar to previous years at 0.5/h (Table 10). Estimated harvest was minimal; all tournament caught fish were assumed to be caught and released and 93% of the legal-length Largemouth Bass caught by non-tournament anglers were also released. Anglers reported most (94%) of the caught-and-released fish were < 4 lbs., 5% were 4.0-6.9 lbs., and 1% were 7.0-9.0 lbs.; there was no reported catch of fish > 10.0 lbs. Size distribution of tournament-caught Largemouth Bass was similar to that reported for previous surveys (Figure 16). Richland Chambers Reservoir has historically exhibited low nighttime electrofishing catch rates (Figure 14). Bennett and Ott (2011) related low catch rates to limited habitat availability and poor sampling conditions in the fall. In fall 2014 reservoir elevation was over 10 feet below conservation pool. For safety reasons sampling was conducted during daylight hours; therefore, data cannot be directly compared to previous surveys. However, fall 2014 sampling did document continued recruitment, and availability of legal-length specimens (Figure 15). Relative weight (Wr) for most size classes of Largemouth Bass (Figure 15) was good (>90%) and prey availability (particularly of Threadfin and Gizzard Shad) was high. Average age of Largemouth Bass at 14 inches (12.8-14.7) was 1.9 years (N=13, range 1-2 years).

Crappie: The percentage of directed effort for crappie *Pomoxis spp.* has continued to increase (19%) and represented the third most sought-after sport fish group at Richland-Chambers Reservoir in 2014-2015 (Table 5). Angling catch rate (1.5/h; species combined) and total harvest of crappie (approximately 18,000; species combined) was very consistent with the past two surveys (Table 11). Angler harvest of Black Crappie *P. nigromaculatus* was higher than White Crappie *P. annularis*; however, trap net catch rate showed the opposite relationship (Appendix A). Despite low catch rate, the size distribution of White Crappie collected in trap nets in 2014 was good (PSD=71) and relative weight was adequate (W_r > 90), (Figure 17). Water level over 9 feet below conservation pool forced trap net placement further from shore where reservoir topography is not conducive to the gear and likely did not adequately represent the population abundance of either species.

Fisheries management plan for Richland-Chambers Reservoir, Texas

Prepared – July 2015

ISSUE 1: Annual stockings of Palmetto Bass (combined with natural recruitment of White Bass) have developed an excellent fishery that is utilized by many anglers and accounts for the majority of the directed effort of this reservoir. Because the high demand for this species and consumptive nature of the fishery, annual stockings are required to maintain the quality of this fishery.

MANAGEMENT STRATEGIES

1. Continue to request annual stockings of Palmetto or Sunshine Bass (based on availability) at 10/acre.
2. Conduct additional gill netting in spring of 2017 to evaluate Palmetto Bass population characteristics and stocking success.
3. Conduct harvest assessment of Palmetto Bass during a creel survey conducted from June 2018-May 2019.

ISSUE 2: Florida Largemouth Bass fingerlings were stocked in 2015 to increase the trophy potential of the reservoir. Although some legal-length largemouth were observed during creel surveys, few fish >14 inches were observed during electrofishing surveys in 2014.

MANAGEMENT STRATEGIES

1. If current littoral habitat persists or if substantial increases in available habitat are observed, request stocking of FLMB (236,700 fingerlings) to maintain trophy Largemouth Bass potential.
2. Examine Largemouth Bass growth every four years.
3. Collect Largemouth Bass and assess allele frequency of Florida Largemouth Bass in 2018.

ISSUE 3: Hydrilla and Alligatorweed are present in low abundance in the reservoir and have the potential to become problematic in the future in high-traffic areas.

MANAGEMENT STRATEGIES

1. Continue to monitor the presence and coverage of exotic species in the reservoir through cursory inspections and a vegetation survey in 2018.
2. Review treatment plans as submitted by property owners or the controlling authority and provide technical assistance.

ISSUE 4: Richland-Chambers Reservoir offers substantial recreational angling opportunities and could benefit from additional promotion.

MANAGEMENT STRATEGIES

1. Continue promoting Richland-Chambers Reservoir in news releases and continue presentations to angling clubs promoting angling opportunities in the area.

ISSUE 5: A considerable catfish fishery exists. The rod-and-reel catfish fishery was similar in popularity to the crappie and Largemouth Bass fishery, and there is also a substantial passive-gear fishery for catfish. An experimental 30- to 45-inch slot-length limit for Blue Catfish was implemented in September, 2009 to improve the trophy potential of the fishery.

MANAGEMENT STRATEGIES

1. Conduct gill netting surveys every two years to monitor catfish populations.

2. Conduct experimental jug-lining in winter 2015-2016 to evaluate the experimental slot-length limit to increase size distribution of passive gear caught Blue Catfish.
3. Conduct harvest assessment of catfishes during a creel survey conducted from June 2018-May 2019.

ISSUE 6: 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*) Hydrilla 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. Maintain communication with Richland Chambers Wildlife Management Area staff regarding monitoring of zebra mussel samplers placed in wetland cells.
3. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc… so that they can in turn educate their customers.
4. Educate the public about invasive species through the use of media and the internet.
5. Make a speaking point about invasive species when presenting to constituent and user groups.
6. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes standard electrofishing every four years, and additional gill netting and trap netting every two years. Angler access and the vegetation community will be surveyed every four years. A creel survey will be conducted from June 2018 through May 2019 to monitor angler effort, catch, harvest, and economic value. Gill netting surveys will be conducted every two years to adequately monitor catfish populations and evaluate the experimental slot length limit for Blue Catfish as well as the success of Palmetto Bass stockings. Growth of Largemouth Bass and temperate basses will be examined every four years.

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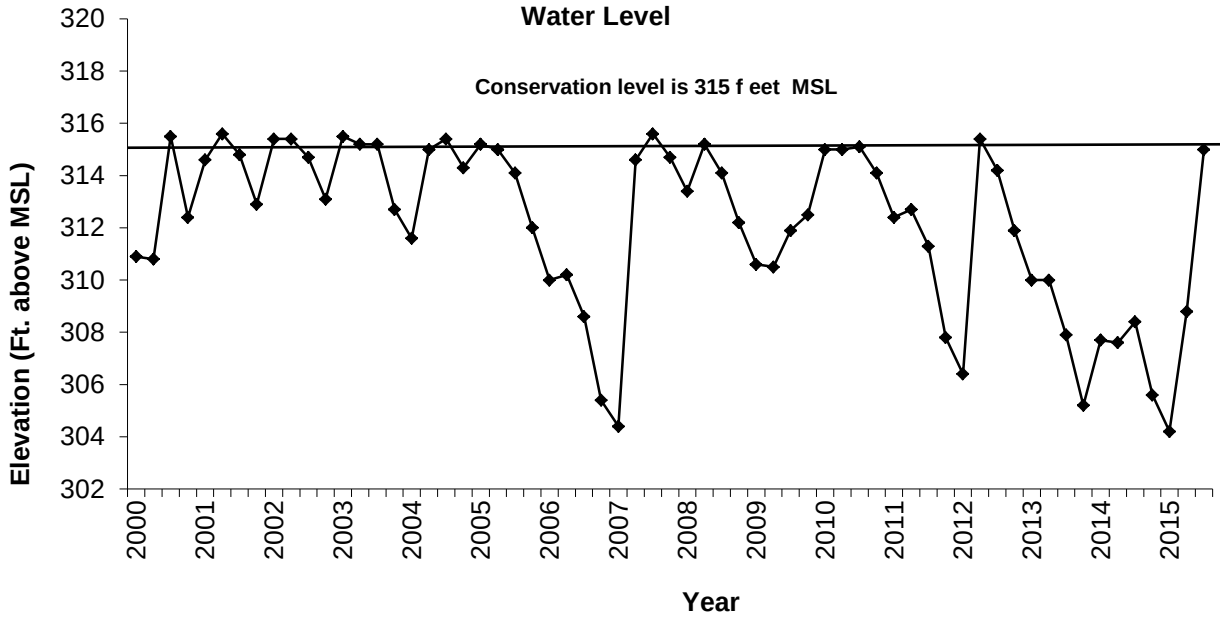


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Richland-Chambers Reservoir, Texas.

Table 1. Characteristics of Richland-Chambers Reservoir, Texas.

Characteristic	Description
Year constructed	1987
Controlling authority	Tarrant Regional Water District
Counties	Freestone (dam), Navarro
Reservoir type	Mainstream
Shoreline Development Index (SDI)	11.2
Conductivity	300 umhos/cm

Table 2. Boat ramp characteristics for Richland Chambers Reservoir, Texas, August, 2014. Reservoir elevation at time of survey was 306 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft.)	Condition
Cedar Creek	32.03087 -96.27554	Y	30	NA	Out of water.
Sunset Cove Marina	32.04856 -96.26393	Y/fee	10	NA	Out of water, marina closed
FM 2859	32.06318 -96.23896	Y	20	NA	Out of water.
Cheneyboro	32.94979 -96.34930	Y	10	NA	Out of water.
Crab Creek	31.96771 -96.31576	Y	10	NA	Out of water.
Oak Cove Marina	32.00437 -96.21558	Y/fee	200	304.5	Good access.
Harbor Inn Marina	31.99040 -96.21402	Y/fee	20	NA	Out of water.
Highway 309 Park	31.99105 -96.13688	Y	20	NA	Out of water.
Fisherman's Point	31.93896 -96.12474	Y/fee	40	303.0	Good access.
Reservoir Office	31.93766 96.11737	N	20	306	Restricted access

Table 3. Harvest regulations for Richland-Chambers Reservoir, Texas.

Species	Bag Limit	Minimum-Maximum Length (inches)
Catfish, Blue	25[a] (1 fish 45 inches or longer)	30 – 45 slot-length limit
Catfish, Channel	25[a]	12 - No Limit
Catfish, Flathead	5	18 - No Limit
Bass, White	25	10 – No Limit
Bass, Palmetto	5	18 – No Limit
Bass, Largemouth	5	14 – No Limit
Crappie, White and Black	25 (in any combination)	10 - No Limit

[a] The daily bag limit for Channel and Blue Catfish is 25 in any combination.

Table 4. Stocking History of Richland-Chambers Reservoir, Texas. Size categories are: FRY <1 inch; FGL = 1-3 inches; and Adult.

Species	Year	Number Stocked	Size
Catfish, Blue	1988	42,750	FGL
	1988	4,222	Adult
	Total	46,972	
Catfish, Channel	1988	193,202	FRY
Bass, Palmetto (White x Striped)	1996	100,861	FGL
	1997	117,576	FGL
	1998	227,618	FGL
	1999	225,598	FGL
	2002	112,070	FGL
	2003	103,300	FGL
	2004	205,895	FGL
	2005	413,686	FGL
	2006	150,753	FGL
	2008	415,646	FGL
	2009	249,657	FGL
	2010	64,036	FGL
	2010	2,072,137	FRY
	2011	100,602	FGL
	2013	304,917	FGL
	2014	387,327	FGL
	2015	422,287	FGL
	Total	5,673,966	
Bluegill, Coppernose	1988	659,598	FGL
	1989	1,042,071	FGL
	Total	1,701,669	

Continued next page…..

Table 4. continued

Species	Year	Number Stocked	Size
Bass, Florida Largemouth	1988	547,329	FGL
	1989	1,114,186	FRY
	1991	160,317	FRY
	1991	339,000	FGL
	1999	644	FGL
	2001	485,519	FGL
	2002	423,715	FGL
	2006	420,129	FGL
	2007	501,630	FGL
	2010	377,318	FGL
	2011	500,538	FGL
	2015	236,700	FGL
	Total	5,107,025	
Bass, ShareLunker	2008	9,739	FGL
Bass, Largemouth	2013	564	ADL

Table 5. Survey of aquatic vegetation, Richland Chambers Reservoir, Texas 2006, 2010, and, 2014. Surface area (acres) is listed with percent coverage in parenthesis.

Vegetation	2006	2010	2014
Native submersed	1 (0.01)	36 (0.10)	
Coontail	NA	<1 (<0.01)	
Muskgrass	NA	<1 (<0.01)	Tr.
Pondweed	NA	34 (0.08)	Tr.
Water stargrass	NA	2 (0.01)	Tr.
Native floating	0 (0.00)	0 (0.00)	0 (0.00)
Native emergent	0 (0.00)	17 (0.04)	0 (0.00)*
Non-native	1 (0.01)		
Alligatorweed (Tier III)	0 (0.00)	4 (0.01)	Tr.
Hydrilla (Tier III)	1 (0.01)	40 (0.10)	Tr.

* Emergent species were identified but not quantified because they were growing above water level.

Table 6. Percent directed angler effort by species for Richland-Chambers Reservoir, Texas, June 2004 through May 2005, June 2006 through November 2006 and March through May 2007, and June 2010 through May 2011, June 2014 through November 2014 and March through May 2015.

Species	Year			
	2004/2005	2006/2007*	2010/2011	2014/2015*
Catfishes	4	7	16	13
Temperate basses	32	45	39	36
Largemouth Bass	54	26	19	25
Crappie	6	8	16	19
Anything	4	14	10	7

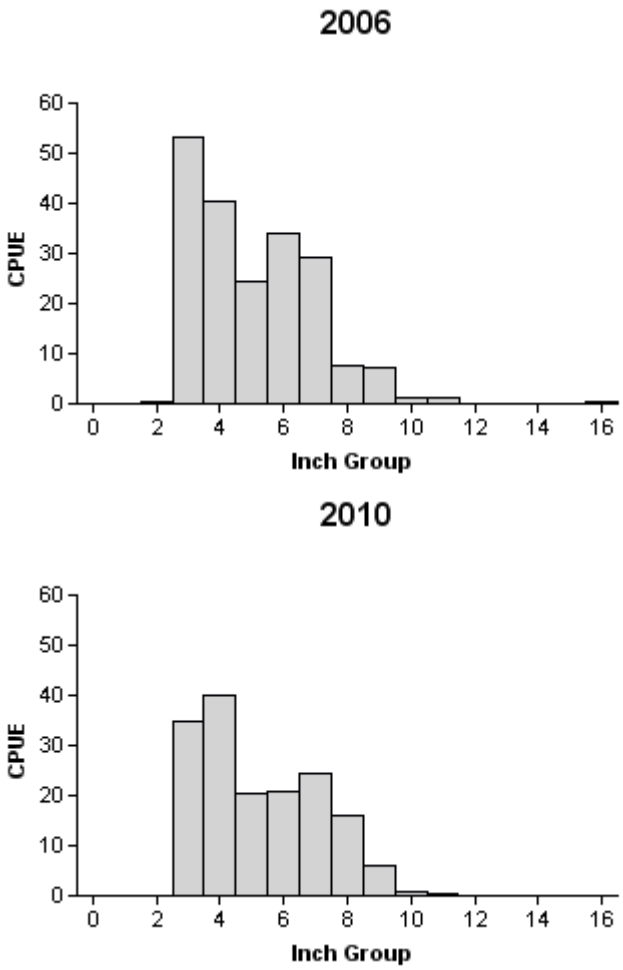
*Winter quarter was not included in the 2006-2007 or 2014-2015 creel surveys.

Table 7. Total fishing effort (h) for all species and total directed expenditures at Richland-Chambers Reservoir, Texas, June 2004 through May 2005, June 2006 through November 2006 and March through May 2007, June 2010 through May 2011, June 2014 through November 2014 and March through May 2015.

Creel Statistic	Year			
	2004/2005	2006/2007*	2010/2011	2014/2015*
Total fishing effort	152,252	97,870	87,679	76,999
Total directed expenditures	$1,517,049	$1,297,045	$1,021,728	$754,674

*Winter quarter was not included in the 2006-2007 or 2014-2015 creel surveys.

Gizzard Shad



Effort = 2.0
Total CPUE = 198.6 (19; 393)
Stock CPUE = 46.5 (23; 92)
IOV = 91.35 (2.5)

Effort = 2.0
Total CPUE = 164.5 (13; 329)
Stock CPUE = 48.0 (33; 96)
IOV = 85.71 (4.8)

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 nighttime fall electrofishing surveys, Richland-Chambers Reservoir, Texas, 2006 and 2010.

Gizzard Shad

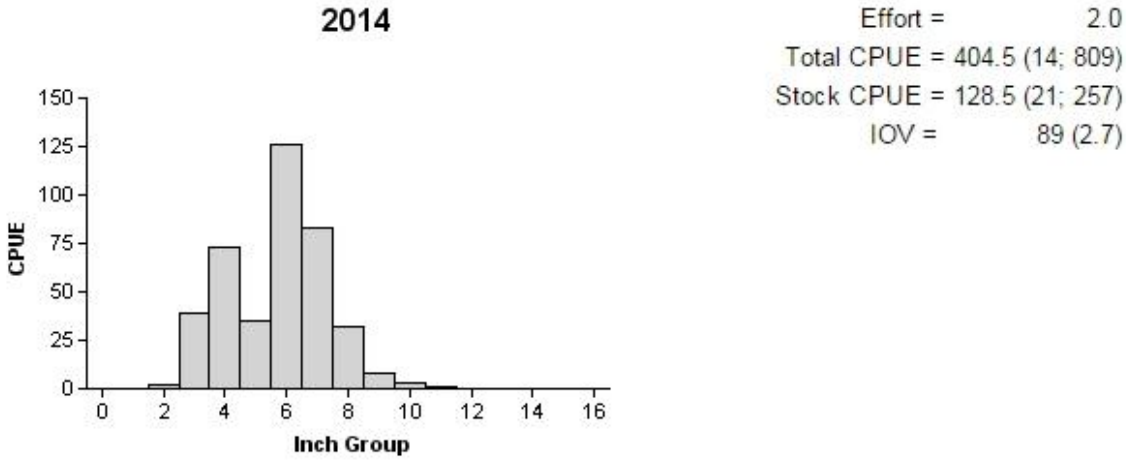
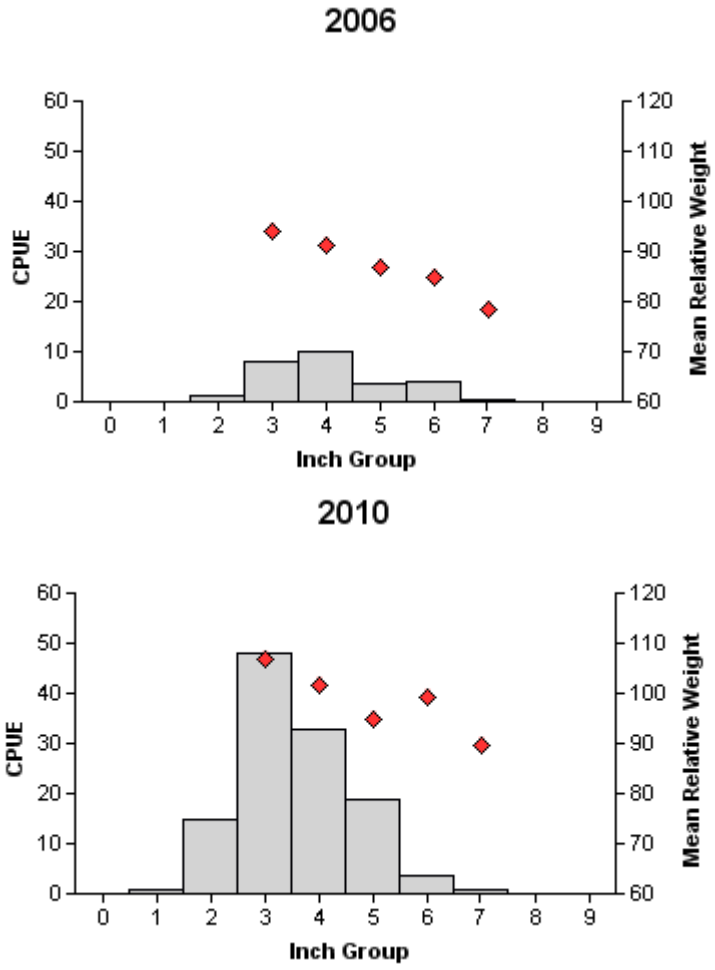


Figure 3. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for daytime fall electrofishing surveys, Richland-Chambers Reservoir, Texas, 2014.

Bluegill



Effort =	2.0
Total CPUE =	27.3 (44; 54)
Stock CPUE =	26.3 (45; 52)
PSD =	17 (4.9)

Effort =	2.0
Total CPUE =	120.5 (32; 241)
Stock CPUE =	104.5 (31; 209)
PSD =	4 (1.3)

Figure 4. Number of Bluegill 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 nighttime fall electrofishing surveys, Richland-Chambers Reservoir, Texas, 2006, and 2010.

Bluegill

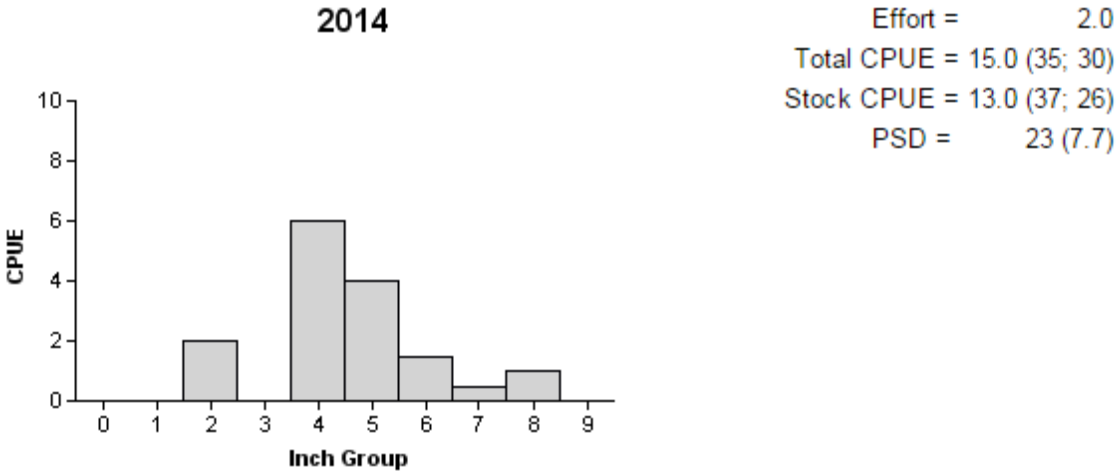


Figure 5. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for daytime fall electrofishing surveys, Richland Chambers Reservoir, Texas, 2014.

Blue Catfish

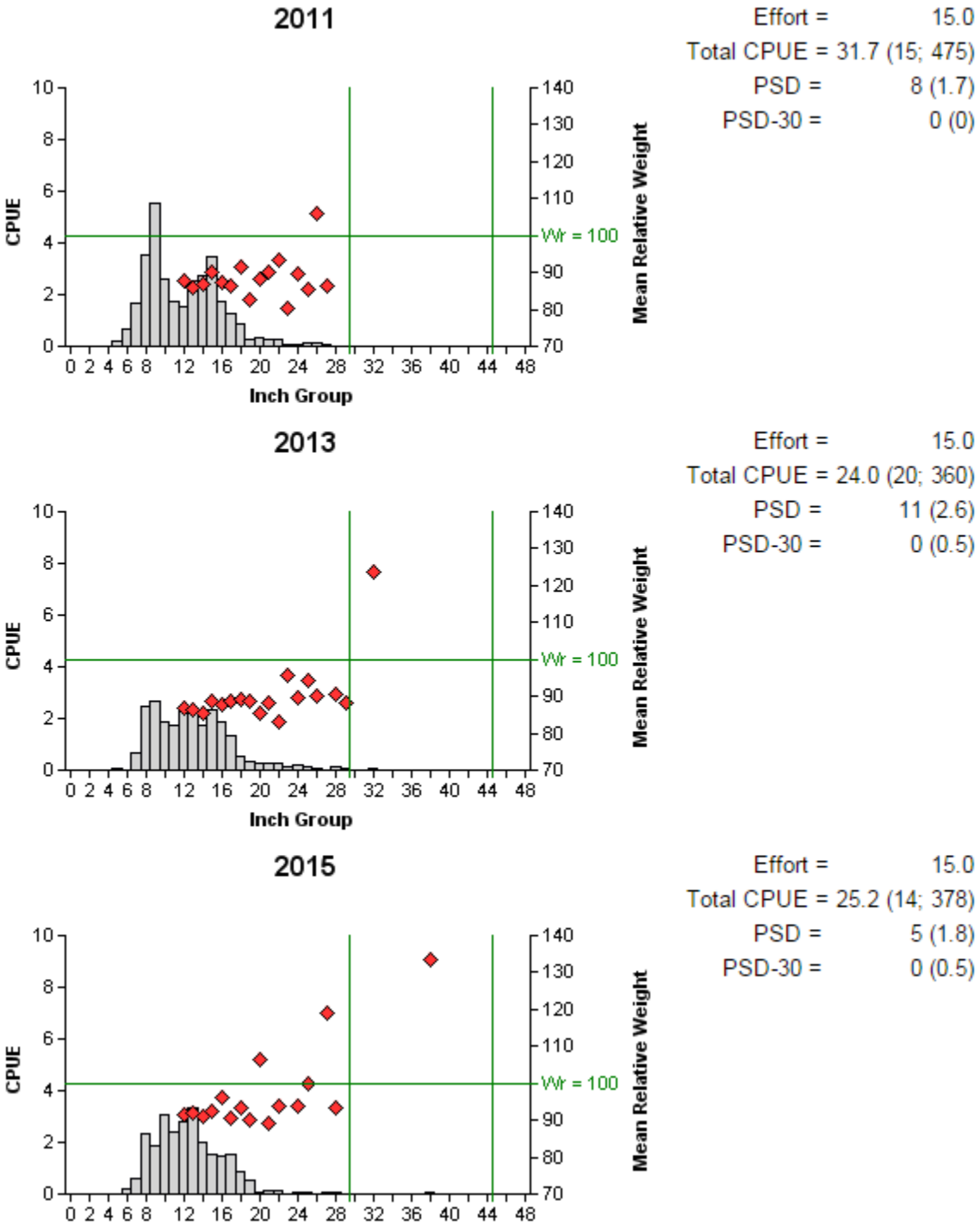


Figure 6. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure in parentheses) for spring gill net surveys, Richland-Chambers Reservoir, Texas, 2011, 2013, and 2015. Vertical lines indicate protected slot-length limit at time of survey and horizontal lines represent mean relative weight of 100.

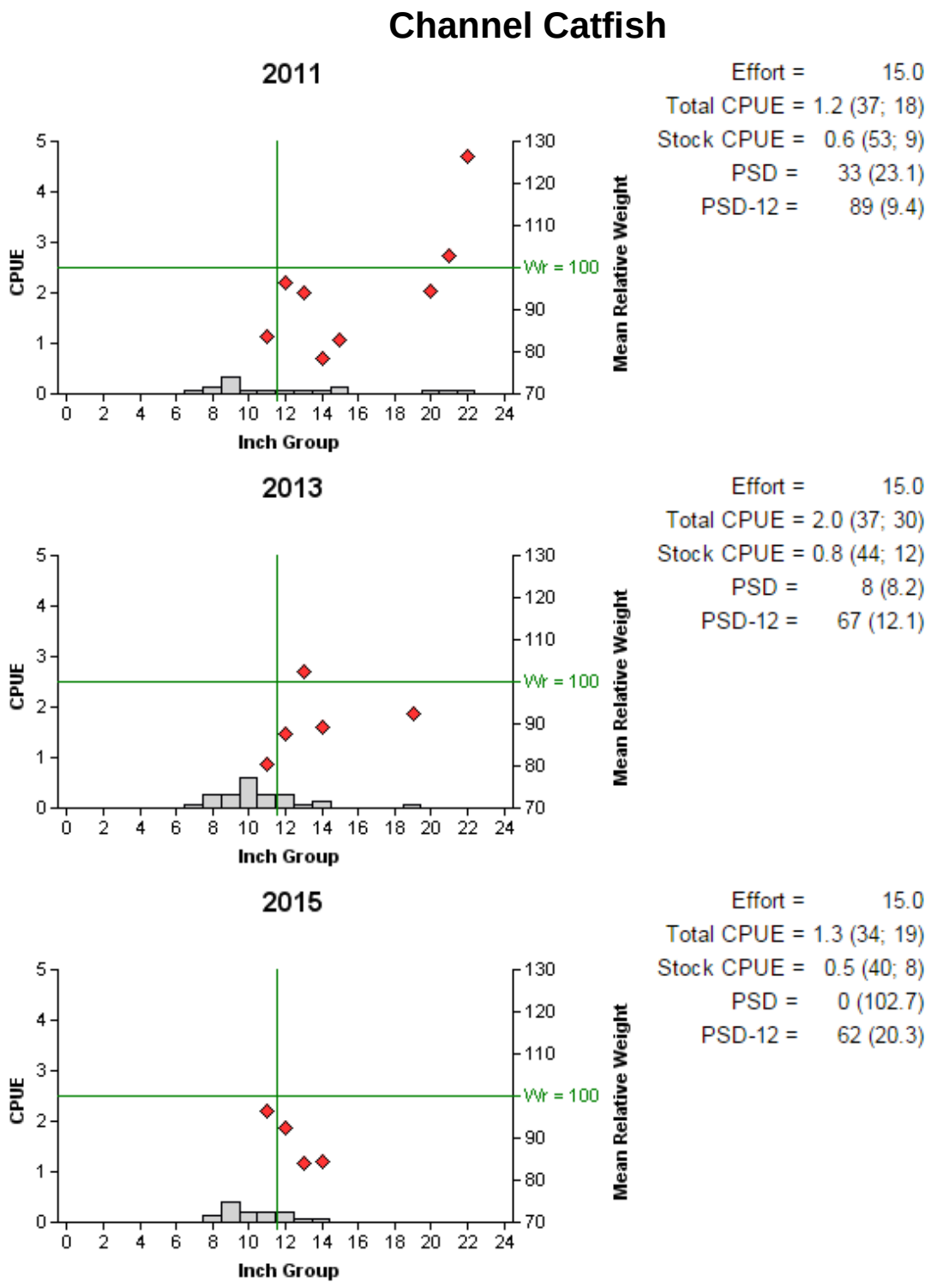


Figure 7. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Richland-Chambers Reservoir, Texas, 2011, 2013, and 2015. Vertical lines indicate minimum length limit at the time of survey and horizontal lines represent mean relative weight of 100.

Catfishes

Table 8. Creel survey statistics for catfishes at Richland Chambers Reservoir, Texas, from June 2004 through May 2005, June through November 2006 and March through May 2007, and June 2010 through May 2011 and June through November 2014 and March through May 2015. 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			
	2004-2005	2006-2007*	2010-2011	2014-2015*
Surface area (acres)	41,356	36,901	41,356	36,495
Directed effort (h)	6,626 (50)	5,780 (29)	7,036 (49)	10,215 (33)
Directed effort/acre	0.2 (50)	0.2 (29)	0.2 (49)	0.3 (33)
Total catch per hour	0.2 (46)	1.9 (46)	0.6 (19)	1.8 (22)
Total harvest	22,147 (73)	11,849 (69)	7,626 (91)	22,718 (62)
Blue Catfish	15,429 (58)	9,547 (48)	6,859 (61)	21,513 (56)
Channel Catfish	6,718 (106)	2,302 (155)	767 (359)	1,205 (169)
Harvest/acre	0.5 (73)	0.3 (69)	0.2 (91)	0.6 (62)
Blue Catfish	0.4 (58)	0.3 (48)	0.2 (61)	0.6 (62)
Channel Catfish	0.2 (106)	<0.1 (155)	0.02 (359)	<0.1 (169)
Percent legal released	0	<1	<1	8

* Winter quarter was not included in the 2006-2007 or 2014-2015 creel survey.

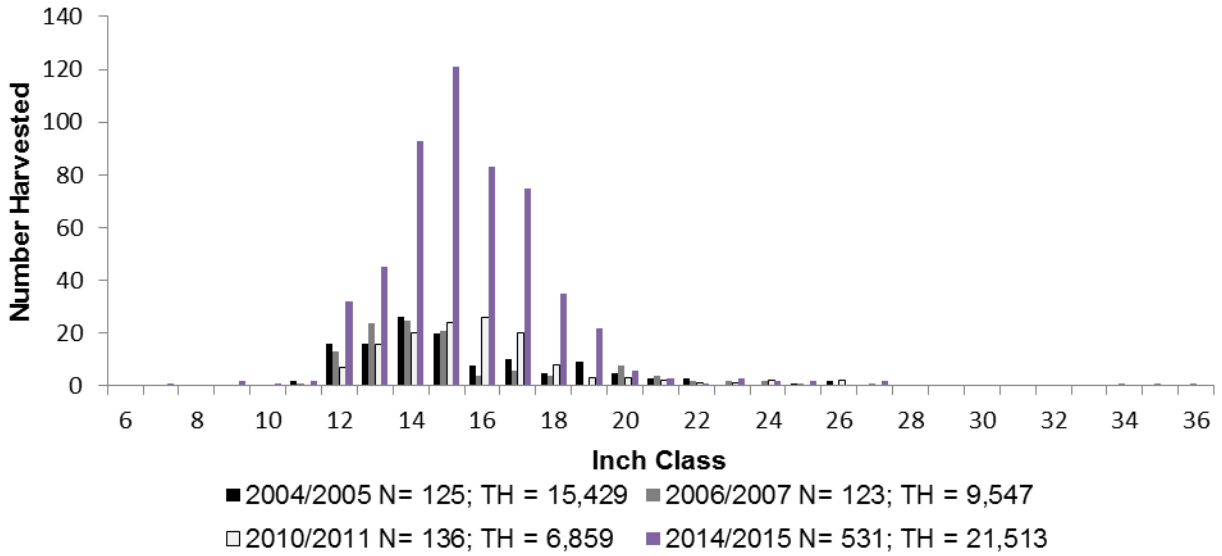


Figure 8. Length frequency of harvested Blue Catfish observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

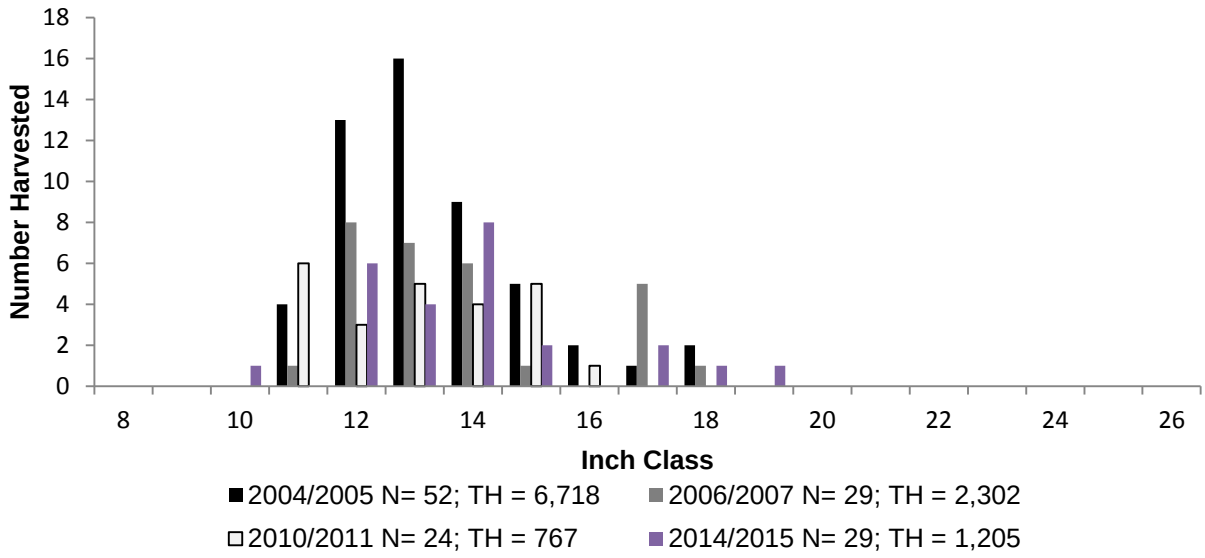


Figure 9. Length frequency of harvested Channel Catfish observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

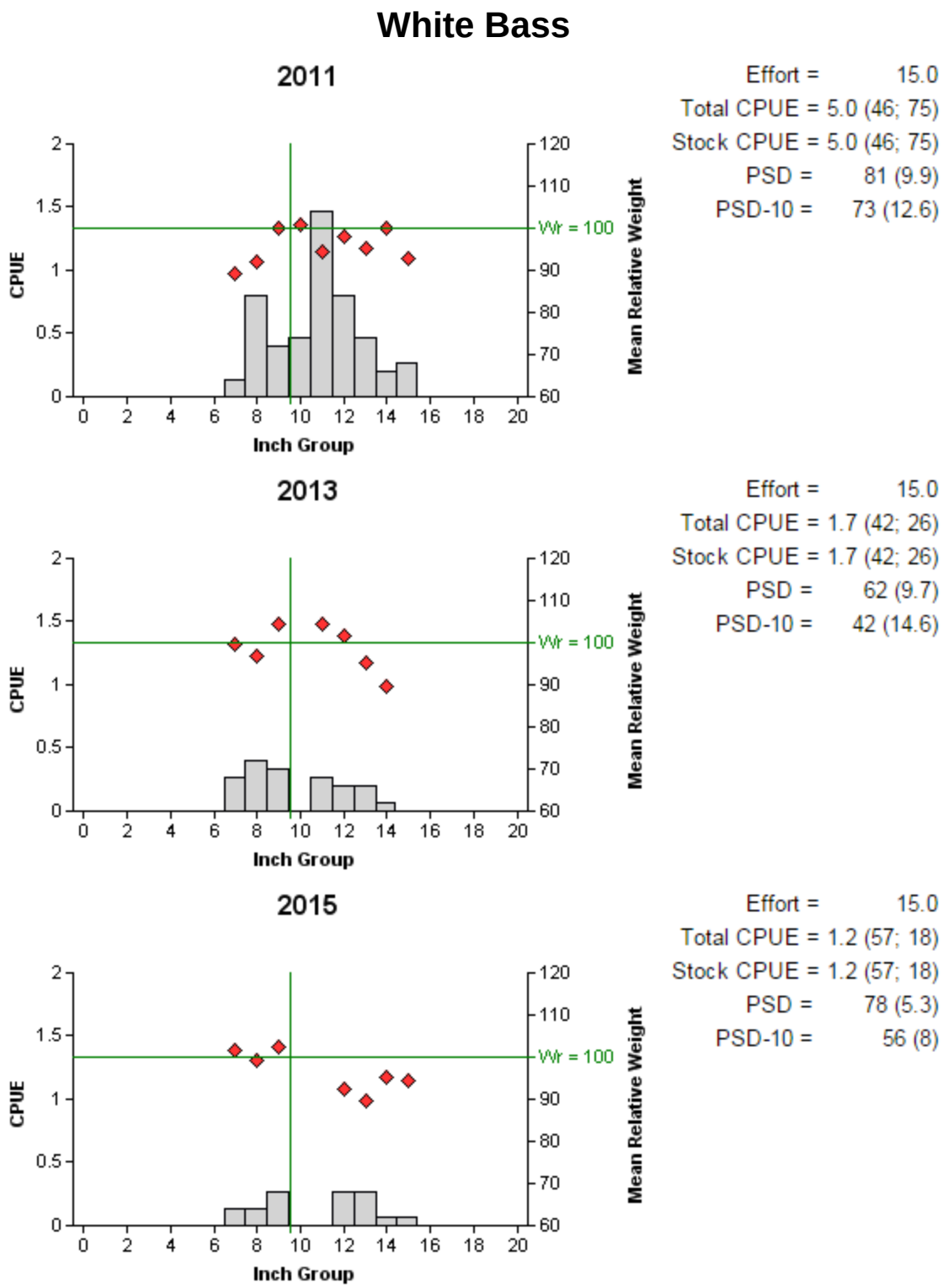


Figure 10. Number of White Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Richland-Chambers Reservoir, Texas, 2011, 2013, and 2015. Vertical lines indicate minimum length limit at the time of survey and horizontal lines represent mean relative weight of 100.

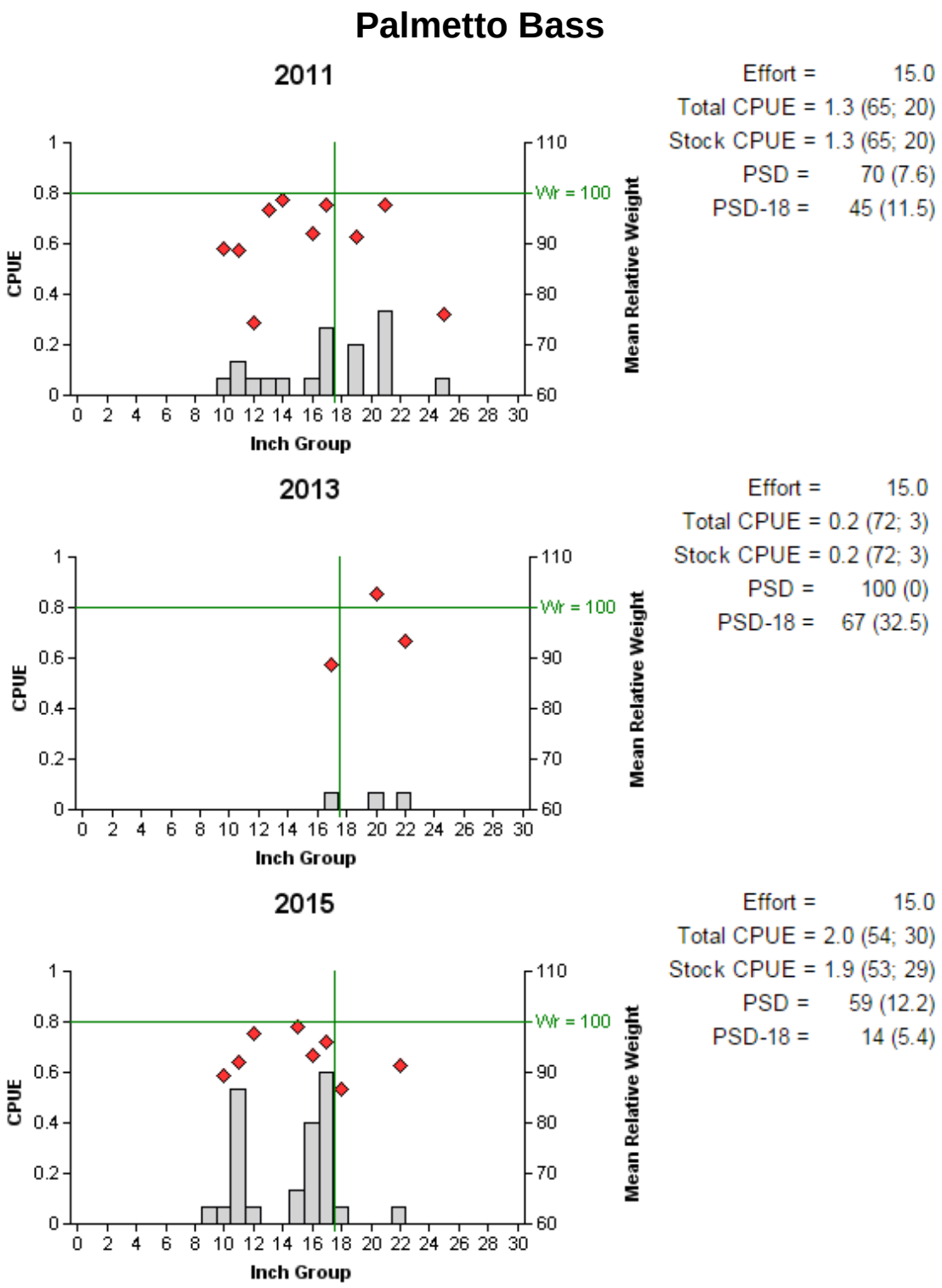


Figure 11. Number of Palmetto Bass caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Richland-Chambers Reservoir, Texas, 2011, 2013, and 2015. Vertical lines indicate minimum length limit at the time of survey and horizontal lines represent mean relative weight of 100.

Temperate basses

Table 9. Creel survey statistics for temperate basses at Richland Chambers Reservoir, Texas, from June 2004 through May 2005, June through November 2006 and March through May 2007, and June 2010 through May 2011 and June through November 2014 and March through May 2015. Total catch per hour is for anglers targeting catfishes and total harvest is the estimated number of temperate basses harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year			
	2004-2005	2006-2007*	2010-2011	2014-2015*
Surface area (acres)	41,356	36,901	41,356	36,495
Directed effort (h)	48,238 (29)	30,598 (17)	33,944 (22)	27,451 (25)
Directed effort/acre	1.2 (29)	0.8 (17)	0.8 (22)	0.8 (25)
Total catch per hour	3.4 (58)	6.4 (64)	3.8 (21)	2.6 (23)
Total harvest	143,379 (34)	102,381 (46)	77,380 (28)	38,562 (36)
White Bass	141,214 (31)	111,447 (23)	70,588 (24)	37,497 (32)
Palmetto Bass	2,165 (225)	8,934 (45)	6,792 (64)	1,065 (187)
Harvest/acre	3.5 (34)	3.0 (46)	1.9 (28)	1.1 (36)
White Bass	3.4 (31)	2.8 (23)	1.7 (24)	1.1 (32)
Palmetto Bass	<0.1 (225)	0.2 (45)	0.2 (64)	<0.1 (187)
Percent legal released				40
White Bass	1	9	21	N/A
Palmetto Bass	N/A	18	0	N/A

* Winter quarter was not included in the 2006-2007 or 2015-2015 creel survey.

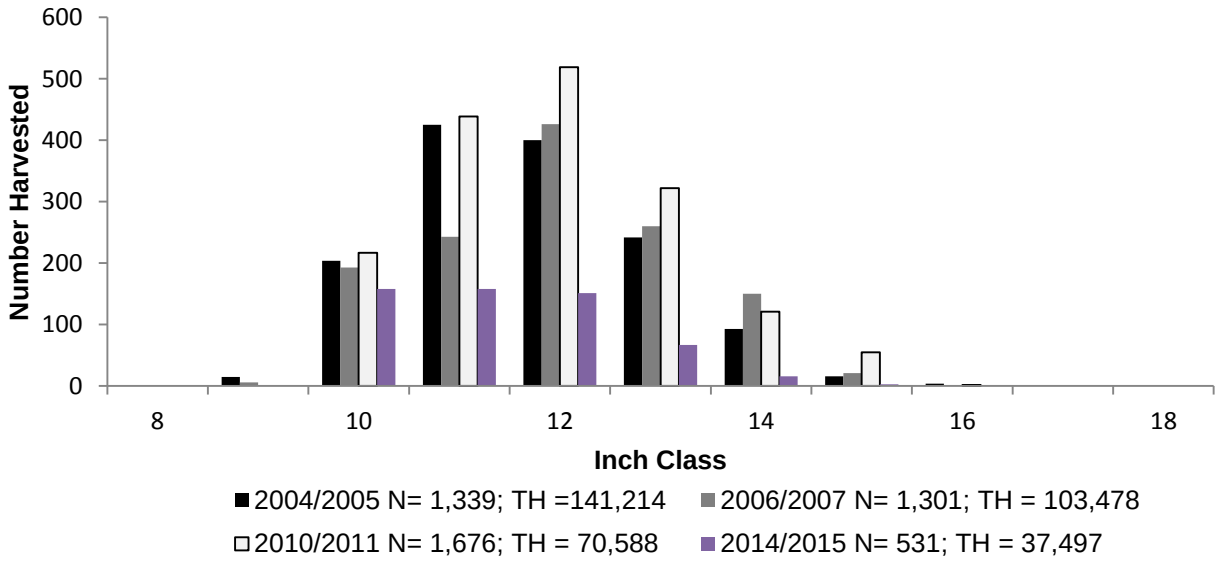


Figure 12. Length frequency of harvested White Bass observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested White Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

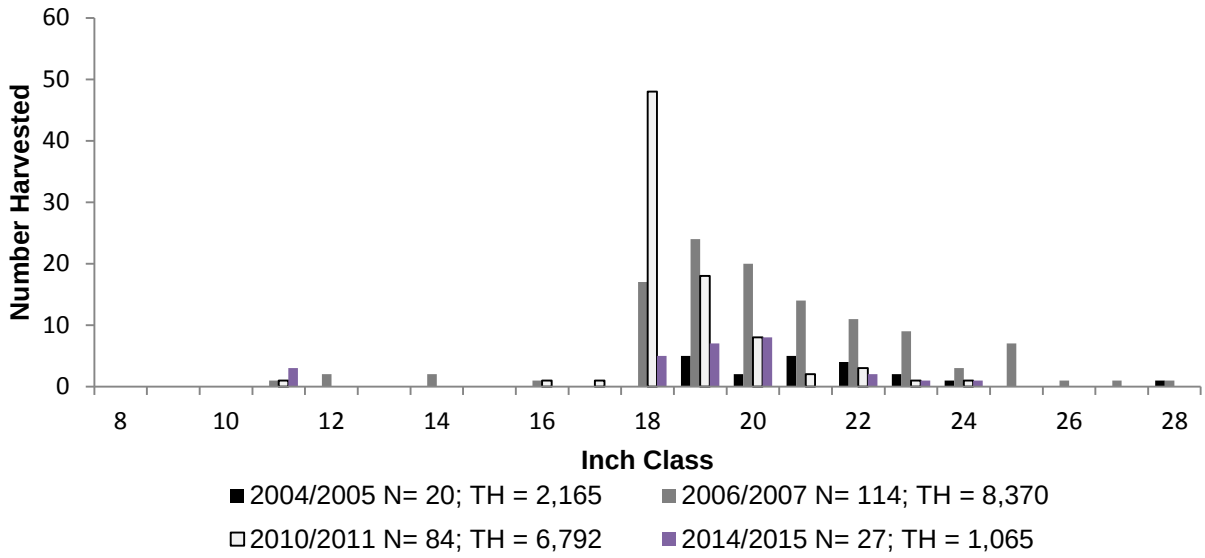


Figure 13. Length frequency of harvested Palmetto Bass observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested Palmetto Bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

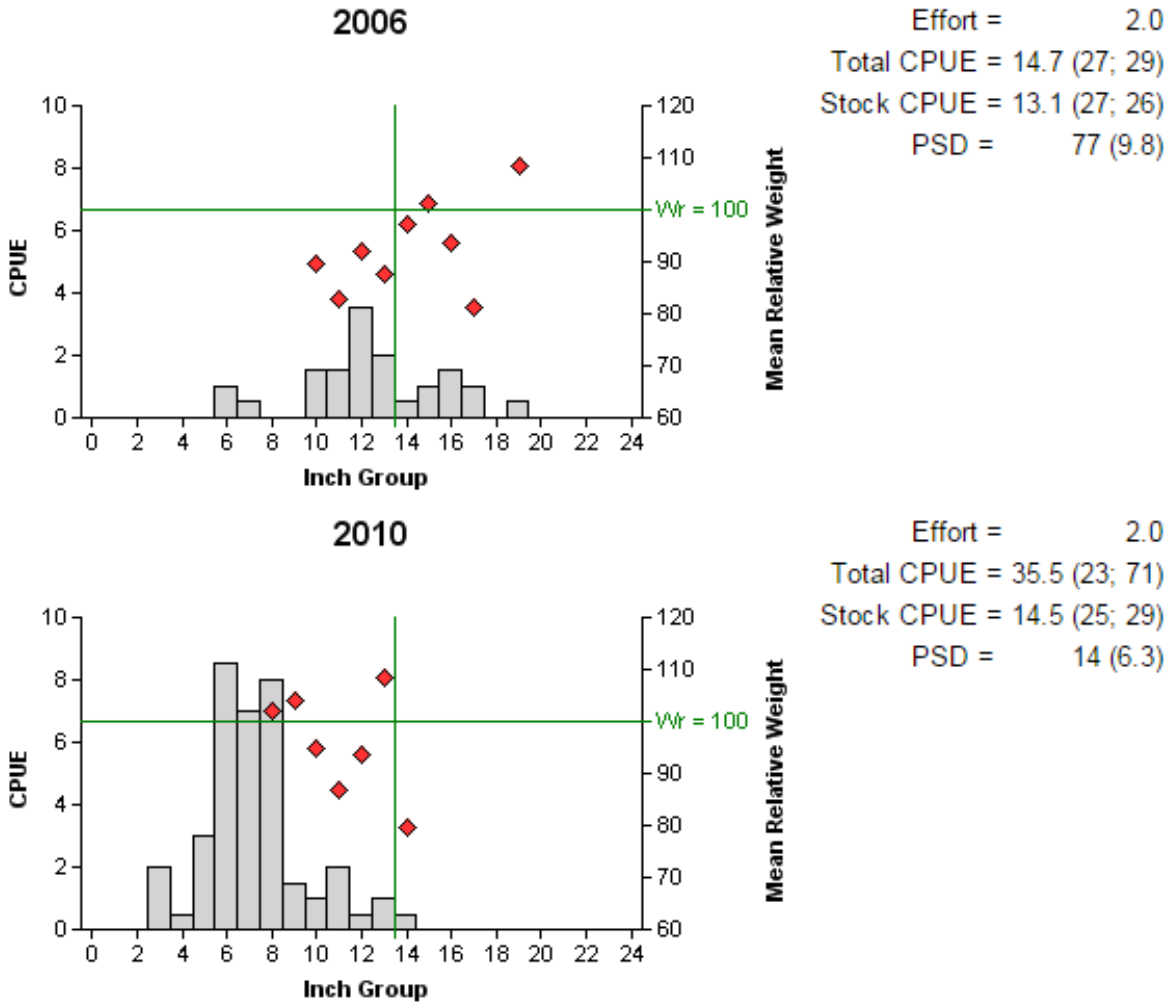


Figure 14. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for nighttime fall electrofishing surveys, Richland-Chambers Reservoir, Texas, 2006, and 2010. Vertical lines indicate minimum length limit at time of survey and horizontal lines represent mean relative weight of 100.

Largemouth Bass

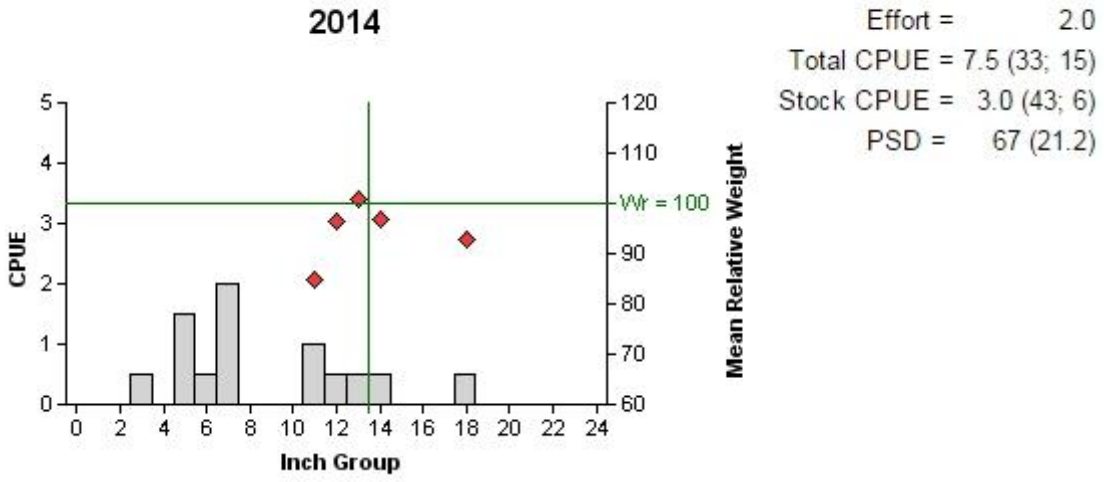


Figure 15. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for daytime fall electrofishing survey, Richland Chambers Reservoir, Texas, 2014. Vertical lines represent minimum length limit at time of survey and horizontal lines represent mean relative weight of 100.

Largemouth Bass

Table 10. Creel survey statistics for Largemouth Bass at Richland Chambers Reservoir, Texas, from June 2004 through May 2005, June through November 2006 and March through May 2007, and June 2010 through May 2011 and June through November 2014 and March through May 2015. Total catch per hour is for anglers targeting catfishes and total harvest is the estimated number of Largemouth Bass harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	Year			
	2004-2005	2006-2007*	2010-2011	2014-2015*
Surface area (acres)	41,356	36,901	41,356	36,495
Directed angling effort (h)				
Tournament	NA	14,748 (23)	7,706 (35)	12,807 (32)
Non-tournament	NA	8,019 (27)	9,261 (30)	6,566 (33)
All black bass anglers combined	82,455 (33)	27,308 (18)	16,967 (26)	19,373 (32)
Angling effort/acre	2.0 (33)	0.6 (19)	0.4 (26)	0.5 (32)
Catch rate (number/h)	0.5 (17)	0.3 (22)	0.5 (25)	0.5 (24)
Harvest	34,061 (48)			
Non-tournament harvest	NA	595	190	83 (<1)
Harvest/acre	0.82 (48)	0.01	<0.01	0.02 (1)
Tournament weigh-in and release	NA	2,819	1,916	889 (71)
Release by weight				
<4.0 lbs.	NA	NA	NA	7,959 (118)
4.0-6.9 lbs.	NA	NA	NA	447 (117)
7.0-9.9 lbs.	NA	NA	NA	54 (103)
≥10.0 lbs.	NA	NA	NA	0
Percent legal released (non-tournament)	14	45	21	93

*Winter quarter was not included in the 2006-2007 or 2014-2015 creel survey.

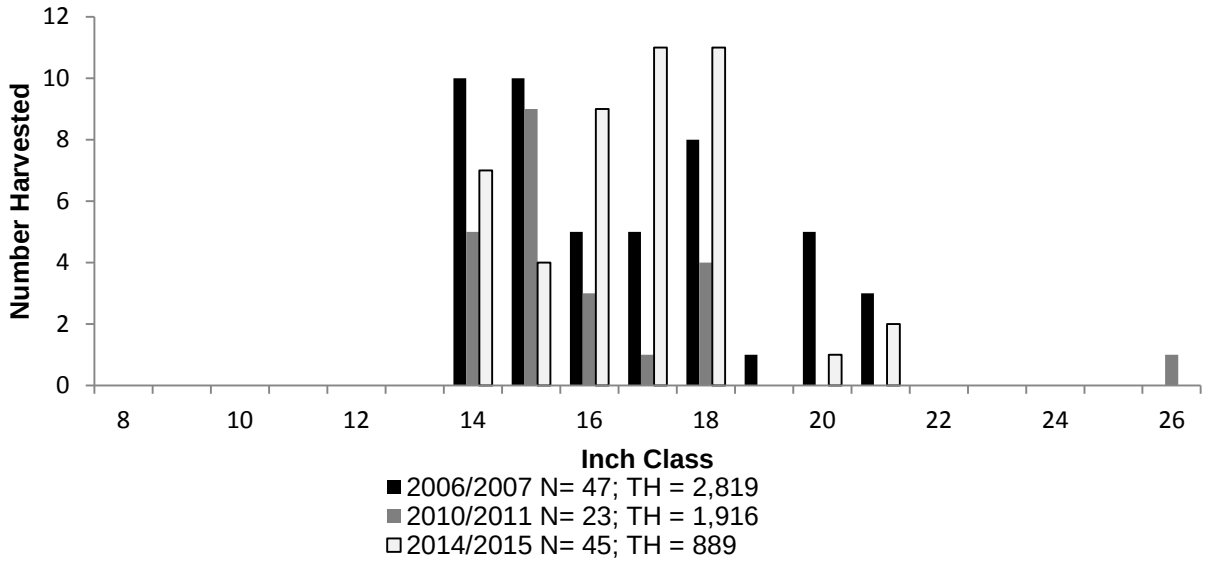


Figure 16. Length frequency of tournament retained and released Largemouth Bass observed during creel surveys at Richland Chambers Reservoir, Texas, June 2006 through May 2015, all anglers combined. N is the number of tournament retained and released Largemouth Bass observed during creel surveys, and TH is the estimated number of tournament retained and released Largemouth Bass for the creel period.

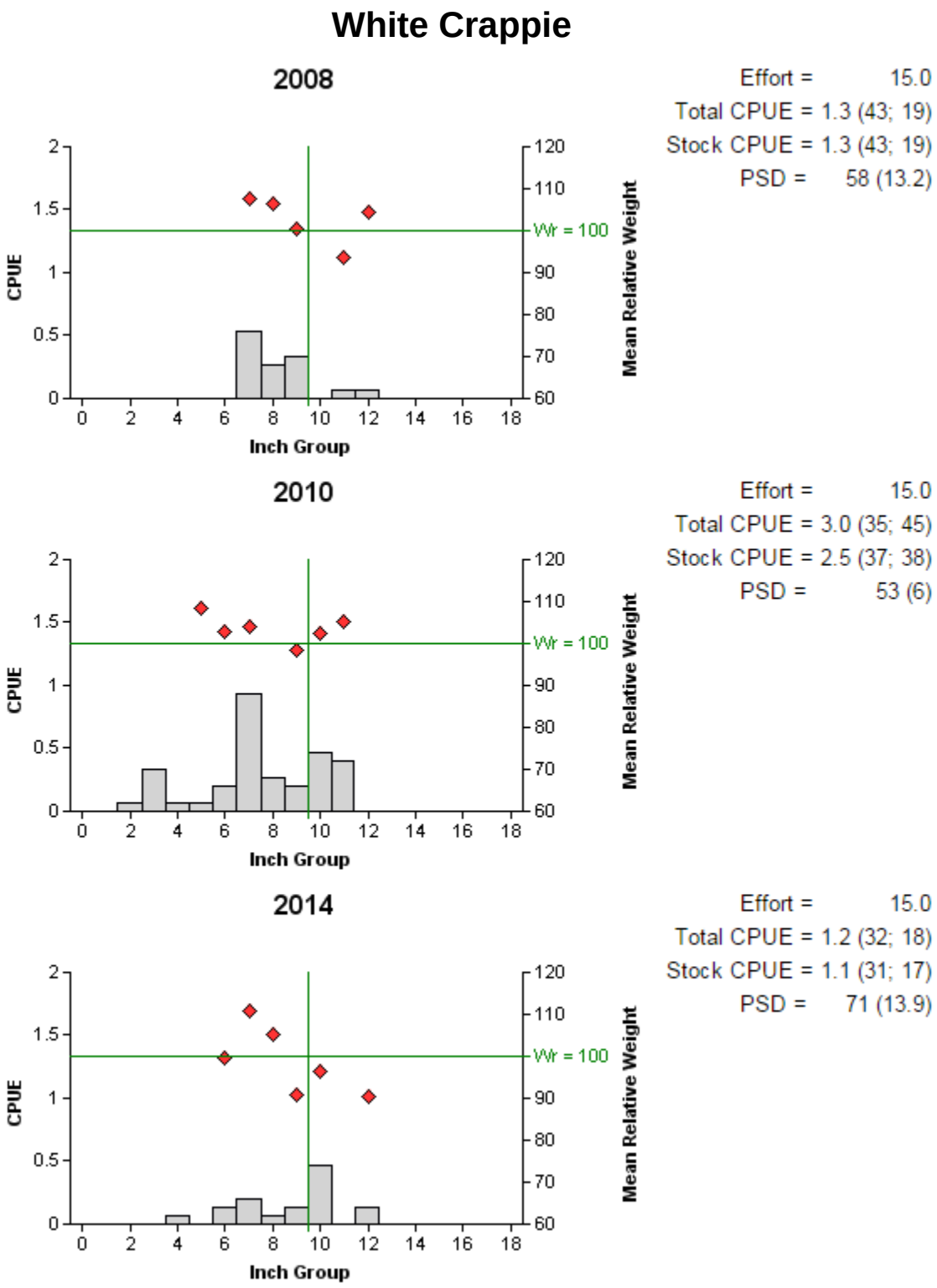


Figure 17. Number of White Crappie caught per net night (CPUE, bars), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Richland-Chambers Reservoir, Texas, 2006, 2008, and 2010. Vertical lines represent length limit at time of survey and horizontal lines represent mean relative weight of 100.

Crappies

Table 11. Creel survey statistics for crappies at Richland-Chambers Reservoir, Texas from June 2004 through May 2005, June 2006 through November 2006 and March through May 2007, June 2010 through May 2011, June through November 2014, and March through May 2015 where total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

	Year			
Creel Survey Statistic	2004-2005	2006-2007*	2010-2011	2014-2015*
Surface area (acres)	41,356	36,901	41,356	36,495
Directed effort (h)	9,138 (30)	8,403 (27)	14,345 (26)	14, 871 (26)
Directed effort/acre	0.2 (30)	0.2(27)	0.4 (26)	0.4 (26)
Total catch per hour	1.5 (46)	2.0 (31)	2.0 (51)	1.5 (35)
Total harvest	8,983 (130)	18,214 (56)	17,206 (62)	17,933 (48)
White crappie	8,834 (92)	16,367 (44)	8,272 (51)	7,537 (54)
Black crappie	149 (2,417)	1,847 (164)	8,933 (71)	10,396 (45)
Harvest/acre	0.2 (130)	0.4 (56)	0.4 (62)	0.5 (48)
White crappie	0.2 (92)	0.4 (44)	0.2 (51)	0.2 (54)
Black crappie	>0.1 (2,417)	0.04 (164)	0.2 (71)	0.3 (45)
Percent legal released	0	5	0	2

*Winter quarter was not included in the 2006-2007 or 2014-2015 creel surveys.

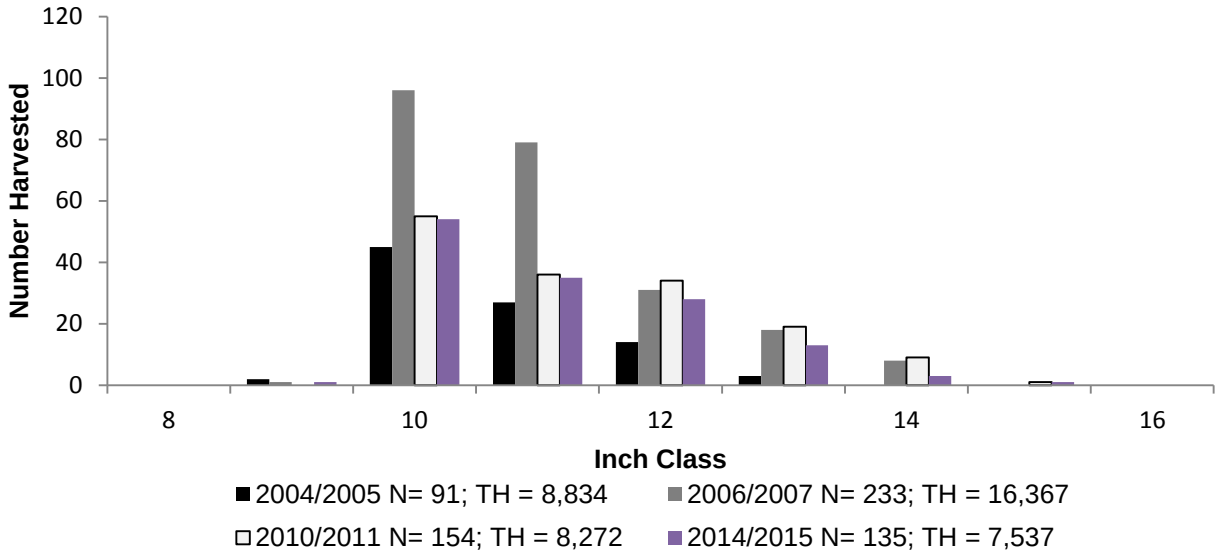


Figure 18. Length frequency of harvested White Crappie observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested White Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

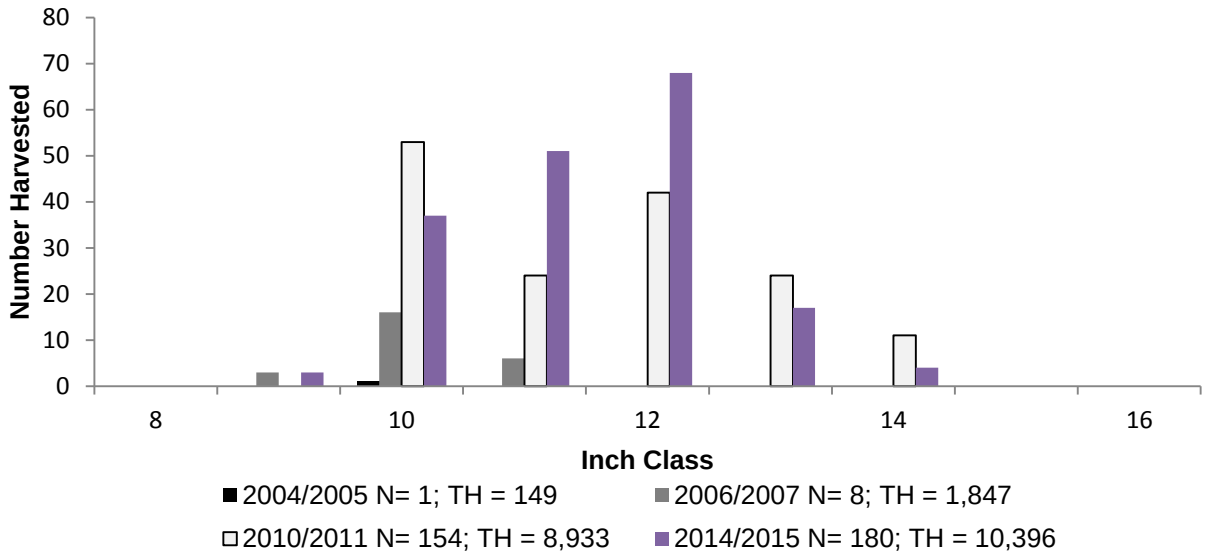


Figure 19. Length frequency of harvested Black Crappie observed during creel surveys at Richland Chambers Reservoir, Texas, June 2004 through May 2015, all anglers combined. N is the number of harvested Black Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

Table 12. Proposed sampling schedule for Richland Chambers Reservoir, Texas. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofisher	Gill Net	Trap Net	Creel Survey	Angler Access	Vegetation	Report
June 2015-May 2016							
June 2016-May 2017		A					
June 2017-May 2018							
June 2018-May 2019	S	S	A	A	S	S	S

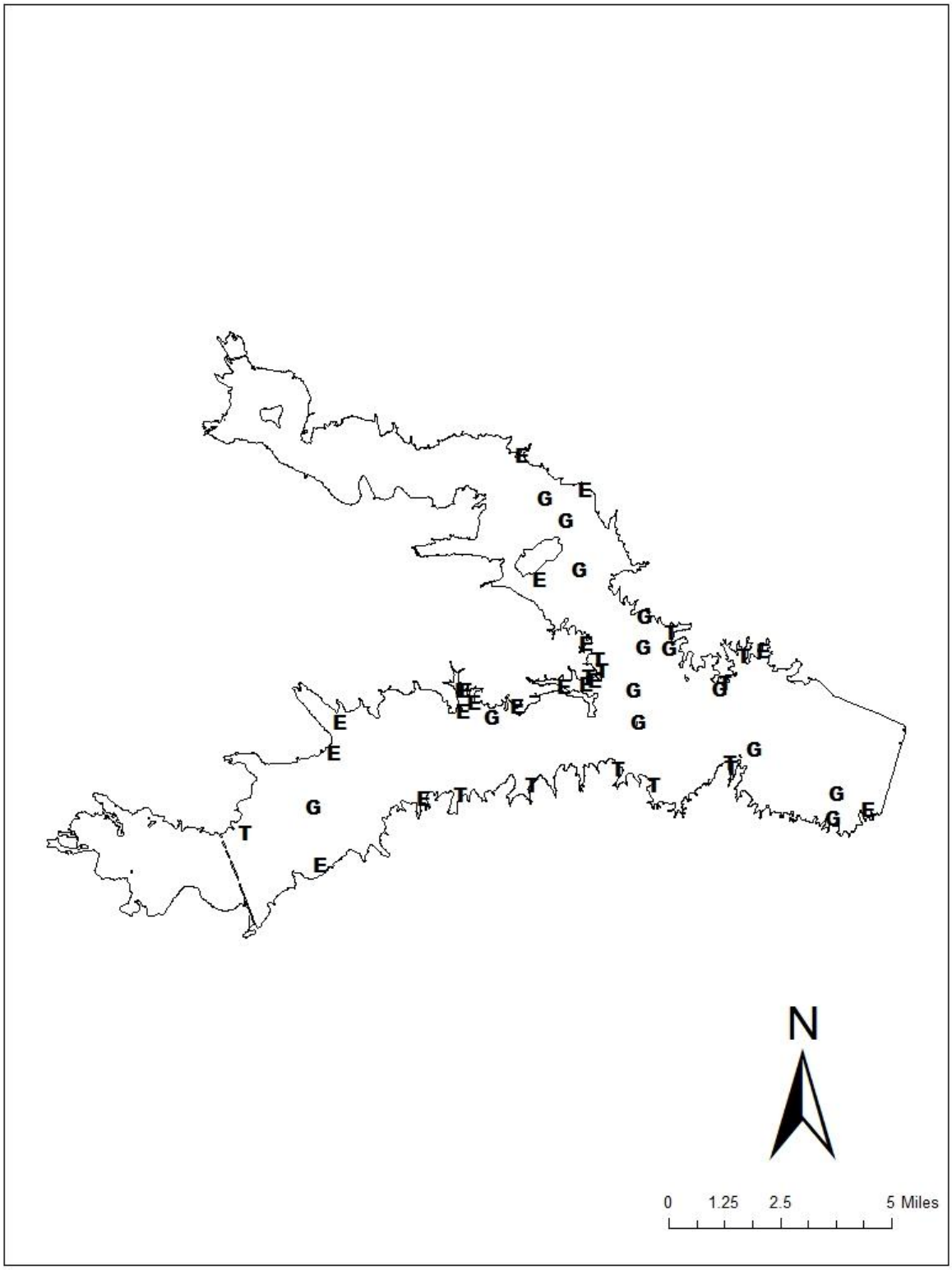
APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Richland-Chambers Reservoir, Texas, 2014 to 2015.

	Gill Netting		Electrofishing*		Trap Netting	
Species	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad			809	404.5		
Threadfin Shad			1,752	876.0		
Blue Catfish	378	25.3				
Channel Catfish	19	1.3				
White Bass	18	1.2				
Palmetto Bass (Striped X White Bass hybrid)	30	2.0				
Bluegill			30	15.0		
Longear Sunfish			11	5.5		
Largemouth Bass			15	7.5		
White Crappie					18	1.2
Black Crappie					3	0.2

* Daytime electrofishing

APPENDIX B



Location of sampling sites, Richland-Chambers Reservoir, Texas, 2014 to 2015. Gill netting, trap netting, and electrofishing stations are indicated by G, T, and E, respectively.