

# Victor Braunig Reservoir

## 2017 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

*Prepared by:*

Randall Myers, District Management Supervisor  
and  
Mitchell Nisbet, Assistant District Management Supervisor

Inland Fisheries Division  
San Antonio District, San Antonio, Texas

Carter Smith  
Executive Director

Craig Bonds  
Director, Inland Fisheries

July 31, 2018



## Contents

Contents .....	i
Survey and Management Summary .....	1
Introduction.....	2
Reservoir Description.....	2
Angler Access .....	2
Management History .....	2
Methods.....	3
Results and Discussion.....	4
Fisheries Management Plan for Victor Braunig, Texas .....	6
Objective-Based Sampling Plan and Schedule (2018-2022).....	7
Literature Cited.....	9
Tables and Figures .....	10
Reservoir Characteristics (Table 1) .....	10
Boat Ramp Characteristics (Table 2).....	10
Harvest Regulations (Table 3) .....	10
Stocking History (Table 4).....	11
Objective Based Sampling Plan for 2018-2020 (Table 5).....	15
Aquatic Vegetation Survey (Table 6) .....	16
Total Fishing Effort (Table 7).....	16
Percent Directed Angler Effort (Table 8).....	16
Gizzard Shad .....	17
CPUE (Figure 1).....	17
Long Term CPUE (Figure 2) .....	18
Threadfin Shad.....	19
Long Term CPUE (Figure 3) .....	19
Bluegill.....	20
CPUE (Figure 4).....	20
Channel Catfish.....	21
CPUE (Figure 5).....	21
Long Term CPUE (Figure 6) .....	22
Creel (Table 9) .....	23
Length Frequency Distribution (Figure 7) .....	24
Hybrid Striped Bass .....	25
CPUE (Figure 8).....	25
Long Term CPUE (Figure 9) .....	26
Length at Age (Table 10) .....	27

Creel (Table 11) .....	27
Length Frequency Distribution (Figure 10) .....	28
Largemouth Bass .....	29
CPUE (Figure 11).....	29
Long Term CPUE (Figure 12) .....	30
Genetics (Table 12).....	31
Creel (Table 13) .....	32
Red Drum .....	33
CPUE (Figure 13).....	33
Historic CPUE (Figure 14).....	34
Creel (Table 14) .....	35
LF Distribution (Figure 15) .....	36
Proposed Sampling Schedule.....	37
Sampling Schedule 2018-2020 (Table 15) .....	37
Appendix A – Hybrid Striped Bass Signage.....	38
Appendix B – Map of Sampling Locations .....	39
Appendix C – Catch Rates for All Species and Gear Types.....	40

## Survey and Management Summary

Fish populations in Victor Braunig Reservoir were surveyed in 2017 using electrofishing and in 2016 and 2018 using gill netting. Historical data are presented for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

**Reservoir Description:** Victor Braunig is a 1,298-acre reservoir located on the southeast side of San Antonio in Bexar County, Texas. It was built in 1964 by City Public Service Energy (CPSE) for power plant cooling, and later opened for recreation. Recreation access is controlled by Thousand Trails Management Services, Inc., and paid entry is required. Water level is maintained at or near conservation pool by pumping from the San Antonio River. In some years, aquatic plants such as bulrush, cattails, and brittle naiad occupy up to 10% of the reservoir area. Total angling effort of boat-based anglers from March through August 2017 was 42,257 hours and angler expenditures were \$308,654.

**Management History:** Important sport fishes include Red Drum, Hybrid Striped Bass, and Channel Catfish. Stockings of Red Drum and Hybrid Striped Bass have occurred most years since the mid-1970s and are required to maintain their populations. Advanced-size Sunshine Bass (4-6 inches), purchased by CPSE, were stocked annually from 2014 to 2017. Prior to 2014, the reciprocal cross Hybrid Striped Bass, Palmetto Bass (fingerling size), were mostly stocked. Largemouth Bass were first stocked in 1976 and last stocked in 2008, and both Florida and Northern-strain fish have been stocked. Sub-adult Northern Largemouth Bass, purchased by CPSE, were stocked in 2004, 2006, 2007, and 2008 to support a TPWD research project evaluating the effectiveness of this stocking strategy for changing population genetics and increasing population abundance. Numerous other species were stocked historically including marine fishes, to provide additional and unique angling opportunities. All sport fish are currently managed with statewide regulations, except Red Drum which have a 20-inch minimum length limit and no maximum length limit. Various Largemouth Bass harvest regulations have been used, and the current minimum length limit of 14-inches was implemented in 2015.

### Fish Community

- **Prey species:** Gizzard and Threadfin Shad relative abundance has decreased considerably in recent years. The low Shad spp. abundance is likely cause for the low relative abundance of Hybrid Striped Bass (see below). Bluegill and Blue Tilapia are also important prey species.
- **Channel Catfishes:** Relative abundance declined during the study period. Likewise, fishing effort declined for this species and accounted for only 2% of the total fishing effort expended at the reservoir in 2017.
- **Hybrid Striped Bass:** Relative abundance during the study period was well below the historic average. The fishery for this species has declined over the years. In 2017, an estimated 80 fish were harvested and 559 hours of angling effort was expended.
- **Largemouth Bass:** Relative abundance was much greater in 2017 than in previous years, however, very few legally-harvestable size fish were present. The fishery for this species was inconsequential in 2017.
- **Red Drum:** Red Drum have become the most sought-after sport fish in the reservoir accounting for 82% of total fishing effort. Their relative abundance during the study period was near the historic average. Angling success has increased over time averaging 0.27 fish/h of angling effort in 2017.

**Management Strategies:** Cease stocking Hybrid Striped Bass on an annual basis until Shad spp. abundance increases to historic average level. Conduct biennial electrofishing surveys (2019 and 2021) to assess prey species populations. Stock Channel Catfish fingerlings annually from 2019 to 2021. Conduct biennial gill net surveys (2020 and 2022) to monitor populations of Red Drum, Channel Catfish and Hybrid Striped Bass and creel survey sampling in either 2020 or 2021 to quantify these species' respective fisheries. Inform the public about the negative impacts of aquatic invasive species and conduct a vegetation survey in 2021.

## Introduction

This document is a summary of fisheries data collected from Victor Braunig Reservoir in 2014-2018. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2014-2018 data for comparison.

## Reservoir Description

Victor Braunig is a 1,298-acre reservoir constructed in 1964 for power plant cooling and recreation. It is located in Bexar County on the southeast side of San Antonio, Texas. The reservoir is owned and operated by City Public Service Energy (CPSE). Recreation access is managed by Thousand Trails Management Services, Inc. (TTMS), and paid entry is required. Water level is maintained at or near conservation pool by pumping from the San Antonio River. About half of the shoreline was categorized as rocky and the remainder natural (Dennis and Myers 2010). Aquatic plants such as bulrush and cattails typically occupy 10% or less of the reservoir area. Improvements were made to the boat launches in 2008. Other descriptive characteristics for Victor Braunig Reservoir are in Table 1.

## Angler Access

Victor Braunig Reservoir has two public concrete boat ramps with two lanes each located in the cove near the park entrance as well as an unimproved kayak-designated launching area (Table 2). The two public ramps are located on the southwest side of the reservoir, and the kayak launching area is located at the farthest east end of the park. Considerable shoreline access including a fishing pier exists for bank angling.

## Management History

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Dennis and Myers 2014) included:

1. Stock 30 Hybrid Striped Bass (Palmetto Bass) fingerlings/acre annually.  
**Action:** In lieu of 30 Palmetto Bass fingerlings/acre, 5.4 Sunshine Bass/acre measuring 4-6 inches were stocked annually from 2014-2017. These fish were purchased by CPSE.
2. Stock 200 Red Drum fingerlings/acre annually.  
**Action:** Red Drum fingerlings were stocked annually from 2014 to 2017 at stocking rates ranging from 215 to 240/acre.
3. Conduct creel survey in 2015 to quantify the Hybrid Striped Bass and Red Drum fisheries.  
**Action:** The creel survey was rescheduled due to conflict with other activities and was completed in 2017.
4. Devise protocol to limit the use of the "anything" category for denoting anglers simultaneously targeting Hybrid Striped Bass and Red Drum and other combinations of species.  
**Action:** During the 2017 creel survey, interviewed anglers were asked to identify the primary species sought.

5. Better inform anglers about which *Morone* spp. are present in the reservoir to reduce the illegal harvest of Hybrid Striped Bass.

**Action:** Informative signs were constructed and placed prominently at boat ramp and park entrance locations (Appendix A).

6. Explore alternative sampling protocols to effectively collect Red Drum.

**Action:** Standard experimental-mesh gill nets set in spring at random locations were reasonably effective at capturing Red Drum. Five net-nights of effort yielded 21-41 Red Drum.

7. Propose changing the Largemouth Bass length limit.

**Action:** The 18-inch minimum length limit (MLL) was replaced with the standard statewide 14-inch MLL beginning September 2015.

8. Monitor for the presence of aquatic invasive species and cooperate with the controlling authority to inform users about such and measures to take to reduce risk of introductions.

**Action:** A habitat/vegetation survey was conducted in 2017 and no invasive aquatic plants were found. "Clean, Drain, and Dry" signs were offered to the controlling authority for placement at boat ramps and the park entry. The controlling authority constructed their own similar signs and placed at appropriate locations.

**Harvest regulation history:** All sport fishes, except Red Drum, have been managed with statewide regulations (Table 3). From 1985 to 1994, Largemouth Bass were managed with a 21-inch MLL and 2-fish daily bag limit (DBL). These harvest regulations were changed to an 18-inch MLL, 5-fish DBL in 1995. In 2015 the MLL was changed to 14 inches. Red Drum have been managed with a 20-inch MLL, no maximum limit, and 3-fish DBL.

**Stocking history:** Palmetto Bass or Sunshine Bass and Red Drum were stocked in most years since 1976. Advanced-size Sunshine Bass (4-6 inches), purchased by CPSE, were stocked annually from 2014 to 2017. Prior to 2014, the reciprocal cross Hybrid Striped Bass, Palmetto Bass (mostly fingerling size), were stocked. Largemouth Bass were first stocked in 1976 and last stocked in 2008, and both Florida and Northern-strain fish have been stocked. Largemouth Bass stockings occurring from 1967 to 1987 were done to supplement recruitment and/or change the genetic composition of the population. Sub-adult Northern Largemouth Bass (6-8 inches), purchased by CPSE, were stocked in 2004, 2006, 2007, and 2008 to support a TPWD research project evaluating the effectiveness of this stocking strategy for changing population genetics and increasing population abundance. Experimental stockings of Nile Perch, Orangemouth Corvina, Tarpon, and Black X White Hybrid Crappie were conducted historically to evaluate alternative angling opportunities. The complete stocking history is summarized in **Error! eference source not found.**

**Vegetation/habitat management history:** No habitat or vegetation management activities have been conducted on this reservoir.

**Water transfer:** Water from the San Antonio River is pumped into the reservoir, and no inter-basin transfers are known to exist.

## Methods

An objective-based sampling plan (OBS) was implemented for Victor Braunig Reservoir in 2016. Sampling activities were conducted to achieve survey and sampling objectives specified in the plan. Primary components of the updated OBS plan are listed in Table 5. Sampling activities conducted prior

to OBS implementation were conducted according to Dennis and Myers (2014) and TPWD Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual, revised 2015), except when otherwise indicated. All survey sites were randomly selected, except when otherwise indicated (Appendix B).

**Electrofishing** – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected during night-time electrofishing (12, 5-min stations) during fall 2017. Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

**Gill netting** – Channel Catfish, Hybrid Striped Bass, and Red Drum were collected by gill netting (5 total net-nights across 5 stations) in spring 2016 and 2018. CPUE for gill-netting was recorded as the number of fish caught per net night (fish/nn). Hybrid Striped Bass were aged by using otoliths (N = 9 in 2016 and N = 5 in 2018). The additional 5 nn of gill net sampling effort as prescribed in the OBS plan to collect 50 for Hybrid Striped Bass was not done because of very low population abundance and/or sampling efficiency. Based on initial survey CPUE, completing this level of extra sampling effort would have resulted in a total catch of 10 fish, which is substantially short of the 50 fish target.

**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). Proportional size distribution (PSD) for Hybrid Striped Bass 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 ( $RSE = 100 \times SE$  of the estimate/estimate) was calculated for all CPUE and creel statistics. An analysis of variance test (ANOVA) was conducted to evaluate for differences in average length of harvested Red Drum among years.

**Habitat** – The random point method was used to survey vegetation in August 2017 in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2015). A shoreline structural survey was not conducted as no significant shoreline modifications took place since the last survey done in 2009.

**Creel survey** – Access creel surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual, revision in use at time of survey). Although shoreline-based angling is significant at the reservoir, creel survey sampling was conducted only for boat anglers because of concerns for staff safety. Survey periods were from December 1, 2004 to November 30, 2005, and March through August in 2010 and 2017.

## Results and Discussion

**Habitat:** A shoreline structural habitat survey was last conducted in 2009 (Dennis and Myers 2010). Shoreline structural habitat has remained rocky or natural since reservoir impoundment. Native emergent aquatic vegetation (bulrush and cattail) occupied 4% of the reservoir in 2017, which is similar to in previous years (Table 6). Herbicide treatments have never been conducted.

**Creel:** Angler utilization has increased over time (Table 7). Angling effort and expenditures in 2017 were 40% and 51% greater than in 2010. The distribution of fishing effort by species at Victor Braunig Reservoir has changed over time (Table 8). Fishing for Hybrid Striped Bass and Channel Catfish has decreased, while fishing for Red Drum has increased. In 2017, Red Drum accounted for 82% of the total angling effort on the reservoir.

**Prey species:** Gizzard Shad relative abundance continued to decline and was 34.0/h in 2017 (Figures 1-2). Gizzard Shad population size structure in 2017 differed from previous years. Modal peak of the 2017 distribution was at 10 inches in 2017, whereas modal peak was at 4 inches in 2011 and 2013. A smaller fraction of the population was suitably-sized as prey in 2017 (IOV = 24) than in previous years (IOV = 68-80). Similar to Gizzard Shad, Threadfin Shad relative abundance continued to decline and was 19.0/h in 2017 (Figure 3 and Appendix C). Electrofishing CPUE of Bluegill in 2017 (109.0/h) was lower than in 2013 and higher than in 2011 (Figure 44). Bluegill population size structure in 2017 (PSD = 47) differed from 2013 (PSD=24) and was similar to 2011 (PSD=55). Although not enumerated because of low susceptibility to gear, Blue Tilapia were present in the reservoir in high abundance. A commercial cast-netting fishery exists for this species at the reservoir.

**Channel Catfish:** Relative abundance continued to decline. Gill net CPUE in 2018 was 2.8/nn compared to 6.6/nn in 2016 and 9.0/nn in 2014 (Figure 55). In all years from 1997 to 2012, except 2000, gill net CPUE exceeded 10.0/nn (Figure 66). The population has recently been dominated by quality-size fish (PSD  $\geq$ 93 since 2014). No sub-stock fish were collected in recent years. Mean relative weight values remain high exceeding 100 for most size classes. The Channel Catfish fishery has diminished since 2004. In 2017, directed angling effort (773 h), angler catch rate (0.03/h), and harvest (157 fish) were considerably lower than in previous years (Table 9). In 2017, the majority of Channel Catfish observed harvested by anglers were  $\geq$ 24 inches (Figure 77).

**Hybrid Striped Bass:** Despite annual stockings, relative abundance was well below the historic average since 2016. Gill net CPUE was 1.0/h in 2018 (Figures 8-9). Low abundance of prey species, Gizzard and Threadfin shad, is likely the cause for the concomitant decrease in Hybrid Striped Bass abundance. Mean relative weight values remain high, exceeding 100 for most length classes from 2014 to 2018. Hybrid Striped Bass growth has remained similar across years with fish attaining the MLL of 18-inches at age 2-3 (Table 10). In 2017, estimated directed angling effort (559 h) and harvest (80 fish) was considerably lower than in previous years (Table 11). Only four fish were observed harvested in 2017, one of which was shorter than the MLL.

**Largemouth Bass:** Relative abundance was considerably greater in 2017 (CPUE=83.0/h) than in all years since 2005 (Figures 9-10). The majority of the fish collected in 2017 (61%) were sub-stock size, which indicated production of a strong year class. Very few of the collected fish exceeded the 14-inch MLL. Mean relative weight values remained excessive ( $>120$ ) for most size classes; some individuals were obese ( $W_r > 150$ ). Largemouth Bass experience rapid growth; length at age-1 ranged from 12.8 to 14.4 inches (Dennis and Myers 2014). Florida Largemouth Bass (FLMB) introgression has remained high (% FLMB alleles  $>70$ ), except in 2008 (55% FLMB alleles), despite Northern-strain Largemouth Bass (NLMB) stockings occurring in 2004 and from 2006 to 2008 (Table 12). However, percent occurrence of pure FLMB has remained lower than it was prior to the NLMB stockings. The Largemouth Bass fishery at the reservoir has become inconsequential. In 2017, only an estimated 125 h were expended by anglers targeting the species and harvest was nil (Table 13).

**Red Drum:** Gill net CPUEs were similar in 2014, 2016, and 2018, ranging from 4.2 to 8.2/h, which was similar to the historic average of 5.2/h (Figure 13 and Figure 14). Red Drum population size structure in 2018 differed compared to previous years due to the presence of fish  $<10$  inches. Although sufficient numbers of fish were collected to discern cohorts, precision of estimates were less than optimal (RSE 32-71). Red Drum attain legal-harvestable size ( $>20$  inches) after 3 years (Dennis and Myers 2014).. Red Drum directed angling effort in 2017 was more than triple that occurring in 2010 (Table 14). Likewise, Red Drum angling success (average angler catch rate) was greater in 2017 (0.27/h) than in previous years. Estimated Red Drum harvest in 2017 (2,215) was similar to in 2010. However, voluntary release increased by 18%. Harvested fish ranged in size from 20 to 37 inches (Figure 15). Although fishery metrics have improved for Red Drum, average size of fish harvested has significantly decreased over time (ANOVA;  $F = 19.6$ ;  $P < .0001$ ), 27.7 inches in 2014, 26.0 inches in 2016, and 24.1 inches in 2018.



# Fisheries Management Plan for Victor Braunig, Texas

Prepared - July 2018

**ISSUE 1:** Hybrid Striped Bass have been regularly stocked to provide an additional fishery at the reservoir. Survey data show low stocking success in recent years and correlation to low abundance of Gizzard and Threadfin Shad.

## MANAGEMENT STRATEGIES

1. Temporarily discontinue annual stockings of Hybrid Striped Bass.
2. Assess shad spp. population abundance in fall 2019 using electrofishing and stock Hybrid Striped Bass fingerlings in 2020 contingent on adequate abundance of shad spp.

**ISSUE 2:** Red Drum have become the most popular sport fish at the reservoir and accounted for 82% of the total angling effort in 2017. Data show that the average size of harvested fish has decreased.

## MANAGEMENT STRATEGIES

1. Stock 200 Red Drum fingerlings/acre annually.
2. Evaluate stocking success using biennial gill net sampling (2020 and 2022) and a creel survey in 2020 or 2021.

**ISSUE 3:** The Channel catfish population and fishery have declined substantially during the last decade due to low recruitment. Channel Catfish fingerlings were last stocked in 2005.

## MANAGEMENT STRATEGIES

1. Stock Channel Catfish fingerlings annually from 2019 to 2021.
2. Evaluate stocking success using biennial gill net sampling (2020 and 2022) and a creel survey in 2020 or 2021.

**ISSUE 4:** Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

## MANAGEMENT STRATEGIES

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

## Objective-Based Sampling Plan and Schedule (2018-2022)

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

Sport fishes in Victor Braunig Reservoir include Red Drum, Hybrid Striped Bass, and Channel Catfish. Known important forage species include Threadfin Shad, Bluegill, Gizzard Shad, and Blue Tilapia.

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

**Gizzard Shad and Bluegill:** Gizzard Shad and Bluegill are the primary forage fishes at Victor Braunig Reservoir. While CPUE of both species is variable, major changes in their relative abundances can be inferred from CPUE trend data. Sampling of these species will be done through night-time random electrofishing at 12 5-minute stations. This should provide adequate CPUE precision ( $RSE < 25$ ) of Gizzard Shad and Bluegill to detect major changes in relative abundance. No additional effort will be expended to increase the number of Bluegill or Gizzard Shad collected or reduce RSEs. Sampling will occur once every other year and the next sample will be fall of 2019.

**Channel Catfishes:** Channel Catfish abundance and fishing effort have both declined during the last decade. As such, Channel Catfish fingerlings will be stocked annually from 2019 to 2021. Our objective is to assess stocking effectiveness and for large-scale population and fishery changes. Gill net surveys will be conducted in spring 2020 and 2022 (5 net-nights of sampling effort/survey) to assess relative abundance and population size structure. Our target is collect  $\geq 30$  stock-size Channel Catfish. Data from previous years predicted that 5 net-nights of sampling effort would achieve a  $RSE < 25$  (95% confidence) for CPUE-Stock. A six-month creel survey will be conducted in either 2020 or 2021 to assess angler utilization and angling success.

**Hybrid Striped Bass:** Both Palmetto Bass and Sunshine Bass have been stocked in this reservoir. At least one of these species has been stocked on a near annual basis. Angling effort for this fish has varied throughout the years, likely based on population size as a result of stocking success. Our objectives are to monitor for population changes and determine general stocking success. Gill net surveys will be conducted in spring 2020 and 2022 (5 net-nights of sampling effort/survey) to assess relative abundance and population size structure. Our target is to biennially collect  $\geq 30$  8-inch and larger Hybrid Striped Bass. If that target is not reached, an additional five nets will be set at randomly selected stations to achieve or get closer to achieving the 30 fish target. Sampling will cease after 10 net-nights. Relative stocking success and growth will be assessed by ageing all collected fish. A six-month creel survey will be conducted in either 2020 or 2021 to assess angler utilization and angling success.

**Red Drum:** Red Drum is the most sought-after game fish at the reservoir, accounting for 82% of total angling effort. Historically, gill net sampling has been ineffective for sampling this species. However, in recent years this gear yielded more consistent catches (21-41 fish) and reasonable estimate precision ( $RSE = 32-71$ ). Our objectives are to monitor for population changes and determine general stocking success. Gill net surveys will be conducted in spring 2020 and 2022 (5 net-nights of sampling effort/survey) to assess relative abundance and population size structure. Our target is to biennially collect  $\geq 30$  Red Drum. If that target is not reached, an additional five nets will be set at randomly selected stations to achieve or get closer to achieving the 30 fish target. Sampling will cease after 10 net-nights. A six-month creel survey will be conducted in either 2020 or 2021 to assess angler utilization and angling success. Relative stocking success and growth will be assessed by ageing angler-harvested fish in conjunction with the creel survey.

## Low-density fisheries

**Largemouth Bass:** Based on historic electrofishing and angler surveys, Largemouth Bass are not abundant in the reservoir, and very little effort is expended by anglers targeting this species. Their presence/absence will be documented during electrofishing surveys for Gizzard Shad and Bluegill and their importance as a sportfish at the reservoir will be monitored through our creel survey. Any significant changes observed in those surveys will be addressed by additional sampling, as needed.

**Blue Catfish:** Blue Catfish are rare in the reservoir. None have been collected in gill nets since 2001. Their presence/absence will be documented in biennial gill net surveys.

## Literature Cited

- Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Dennis, J. A. and R. A. Myers. 2010. Statewide freshwater fisheries monitoring and management program survey report for Victor Braunig Reservoir, 2009. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Dennis, J. A. and R. A. Myers. 2014. Statewide freshwater fisheries monitoring and management program survey report for Victor Braunig Reservoir, 2013. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- DiCenzo, V. J., M. J. Maceina, and M. R. Stimpert. 1996. Relations between reservoir trophic state and gizzard shad population characteristics in Alabama reservoirs. North American Journal of Fisheries Management 16:888-895.
- Dumont, S. C. and B. C. Neely. 2011. A proposed change to Palmetto Bass proportional size distribution length categories. North American Journal of Fisheries Management 31: 722-725.
- Guy, C. S., R. M. Neumann, D. W. Willis, and R. O. Anderson. 2007. Proportional size distribution (PSD): a further refinement of population size structure index terminology. Fisheries 32(7): 348.

## Tables and Figures

Table 1: Characteristics of Victor Braunig Reservoir, Texas.

Characteristic	Description
Year constructed	1964
Controlling authority	City Public Service Energy
Counties	Bexar
Reservoir type	Tributary
Shoreline Development Index (SDI)	2.24
Conductivity	1,649 umhos/cm

Table 2: Boat ramp characteristics for Victor Braunig Reservoir, Texas, September 2017.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Improved ramps	29.248122 -98.39382	Y	53	unknown	Excellent
Kayak launch	29.246121 -98.38489	Y	10	unknown	Adequate

Table 3: Harvest regulations for Victor Braunig Reservoir, Texas.

Species	Bag Limit	Minimum length limit (inches)
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25*	12
Catfish, Flathead	5	18
Bass, Hybrid Striped	5	18
Bass, Largemouth	5	14
Drum, Red	3	20

\*in any combination

Table 4. Stocking history of Falcon Reservoir, Texas. Size categories are: FRY =<1 inch, FGL = 1-3 inches, AFGL = 4-6 inches, ADL = adults, and UNK = unknown.

Species	Year	Number	Size
Largemouth Bass	1967	28,000	UNK
	1968	60,000	UNK
	1969	40,000	UNK
	1970	67,000	UNK
	1972	56,200	UNK
	1974	69,630	UNK
	2004	6,999	ADL
	2006	11,997	ADL
	2007	12,000	ADL
	2008	11,000	ADL
Kemp's Largemouth Bass	1985	273,368	FGL
	1986	5,555	FGL
	1986	92,100	FRY
	1987	112,584	FGL
Florida Largemouth Bass	1976	27,000	FGL
	1977	67,300	FGL
	1978	49,968	FGL
	1981	68,000	FGL
	1982	68,500	FGL
	1983	67,900	FGL
	1984	268,580	FRY
Palmetto Bass	1977	9,900	UNK
	1981	16,425	UNK
	1983	13,500	UNK
	1984	61,140	FGL
	1985	101,885	FGL
	1986	67,000	FGL
	1987	135,310	FGL
	1988	180,000	FRY
	1989	179,200	FRY
	1991	139,894	FGL
	1992	277,085	FGL
	1994	135,000	FGL
	1995	25,150	FGL

Table 4. Stocking history continued.

Species	Year	Number	Size
Palmetto Bass (cont.)	1996	22,500	FGL
	1999	20,650	FGL
	2000	20,100	FGL
	2002	10,108	FGL
	2003	19,370	FGL
	2004	19,650	FGL
	2005	19,517	FGL
	2006	21,572	FGL
	2007	19,538	FGL
	2008	19,638	FGL
	2009	20,692	FGL
	2010	310,858	FRY
	2010	22,175	FGL
	2011	9,902	FGL
	2013	41,309	FGL
Sunshine Bass	2014	7,000	AFGL
	2015	7,000	AFGL
	2016	7,000	AFGL
	2017	7,000	AFGL
Black Crappie x White Crappie	1987	545,095	FGL
	1994	135,000	FRY
	1995	198,933	FRY
Black Crappie	1972	5,600	UNK
White Crappie	1974	10,000	UNK
Blue Catfish	1986	134,975	FGL
	1987	136,720	FGL
Channel Catfish	1969	35,000	UNK
	1974	103,280	UNK
	2005	61,923	FGL

Table 4. Stocking history continued.

Species	Year	Number	Size
Orangemouth Corvinia	1985	3,150	UNK
Black Drum x Red Drum	1983	3,316	UNK
	1984	47,035	UNK
	1984	5,995	ADL
Red Drum	1976	2,065	UNK
	1980	3,051	UNK
	1981	135,000	UNK
	1982	135,000	UNK
	1983	126,000	UNK
	1984	162,000	FGL
	1985	447,000	FGL
	1986	293,223	FGL
	1987	180,000	FGL
	1988	19,700	FGL
	1989	2,800	FRY
	1990	1,910	FGL
	1990	213,100	FRY
	1991	294,715	FRY
	1992	270,305	FGL
	1992	4	ADL
	1993	182,540	FRY
	1994	160,229	FGL
	1995	146,108	FRY
	1996	159,026	FGL
	1997	136,046	FGL
	1999	198,621	FGL
	2000	183,619	FGL
	2001	190,806	FGL
	2002	159,321	FGL
	2003	246,505	FGL
	2004	153,276	FGL
2006	51,835	FRY	
2006	260,136	FGL	
2007	251,543	FGL	
2008	270,330	FGL	
2010	284,555	FGL	
2011	330,622	FGL	
2012	299,551	FGL	



Table 4. Stocking history continued.

Species	Year	Number	Size
Red Drum (cont.)	2013	314,257	FGL
	2014	311,605	FGL
	2015	281,270	FGL
	2016	282,265	FGL
	2017	278,792	FGL
Nile Perch	1978	88	UNK
	1979	14	UNK
	1984	26	UNK
Spotted Sea Trout	1984	72,000	FGL
Tarpon	1984	17	UNK
	1985	17	UNK

Table 5: Objective-based sampling plan components for Victor Braunig Reservoir, Texas, 2016-2018.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Gizzard Shad <sup>a</sup>	Abundance	CPUE-total	RSE $\leq 25$
	Prey availability	IOV	Practical effort
Bluegill <sup>a</sup>	Abundance	CPUE-total	RSE $\leq 25$
	Size structure	Length frequency	Practical effort
Largemouth Bass	Abundance	CPUE-total	Practical effort
	Size structure	PSD, length frequency	Practical effort
<i>Creel</i>			
Red Drum	Angler utilization and success	Fishery metrics	Practical effort
	Age and growth	Length at age	Practical effort
<i>Gill nets</i>			
Channel Catfish <sup>b</sup>	Abundance	CPUE-stock	RSE $\leq 25$
	Size structure	Length frequency	Practical effort
Hybrid Striped Bass <sup>b</sup>	Abundance	CPUE-total	$\geq 50$ fish (>8-inches)
	Size structure	PSD, length frequency	$\geq 50$ fish (>8-inches)
	Age and growth	Length at age	$\geq 50$ fish (>8-inches)

<sup>a</sup> No additional effort will be expended to achieve an RSE  $\leq 25$  for CPUE of Bluegill and Gizzard Shad if not reached using 1 h of electrofishing sampling effort.

<sup>b</sup> Five additional net-nights of sampling effort will be used to achieve sampling objective target of  $\geq 50$  Hybrid Striped Bass.

Table 6: Results of random point sampling habitat surveys conducted at Victor Braunig Reservoir in August-September of 2009, 2013, and 2017. Percent occurrence is shown for predominate habitat types along with lower and upper 95% confidence interval (in parentheses).

Habitat type/survey metric	2009	2013	2017
Open water	93 (86-97)	89 (83-95)	96 (91-100)
Native emergent	3 (1-9)	10 (4-16)	4 (0-9)
Native submersed	4 (1-10)	2 (0-5)	0
Number of random points	100	100	69

Table 7: Total fishing effort (h) for all species and total directed expenditures (\$) for Victor Braunig Reservoir, Texas, from 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2005, and from March 1 to August 31 in 2010 and 2017. Relative standard error is in parentheses.

Creel Statistics	2004-2005	2010	2017
Total fishing effort	44,573 (12)	25,436 (18)	42,257 (15)
Total directed expenditures	190,688 (25)	151,095 (36)	308,654 (32)

Table 8: Percent directed angler effort for boat anglers by species for Victor Braunig Reservoir, Texas, 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2005, and from March 1 to August 31 in 2010 and 2017. Relative standard error is in parentheses.

Species	2004-2005	2010	2017
Channel Catfish	23 (18)	13 (26)	2 (59)
Hybrid Striped Bass	7 (29)	6 (34)	1 (64)
Largemouth Bass	7 (29)	5 (37)	<1 (129)
Red Drum	23 (18)	45 (20)	82 (15)
Anything	39 (15)	30 (21)	15 (24)
Sunfishes		<1 (135)	

## Gizzard Shad

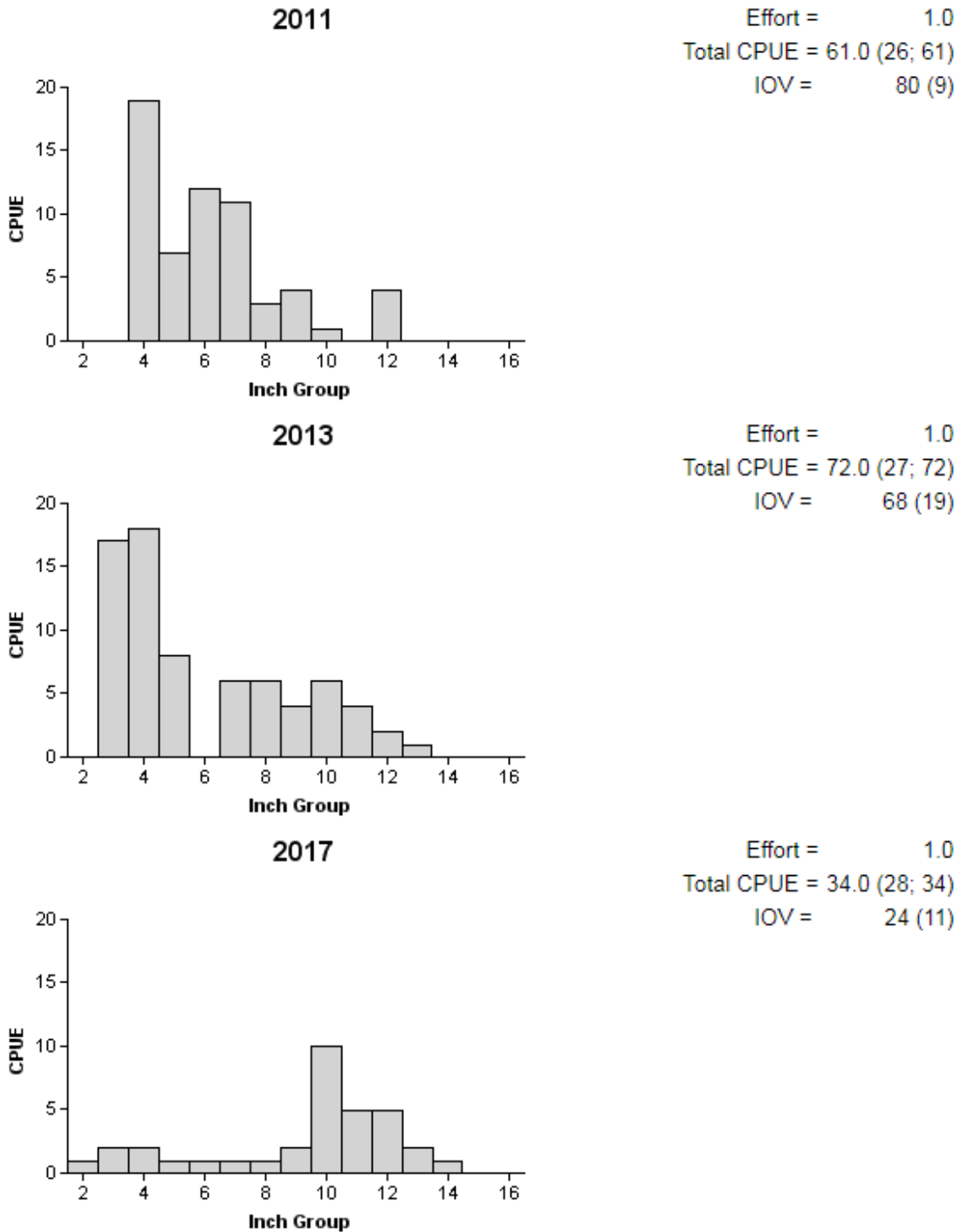


Figure 1: Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2011, 2013, and 2017.

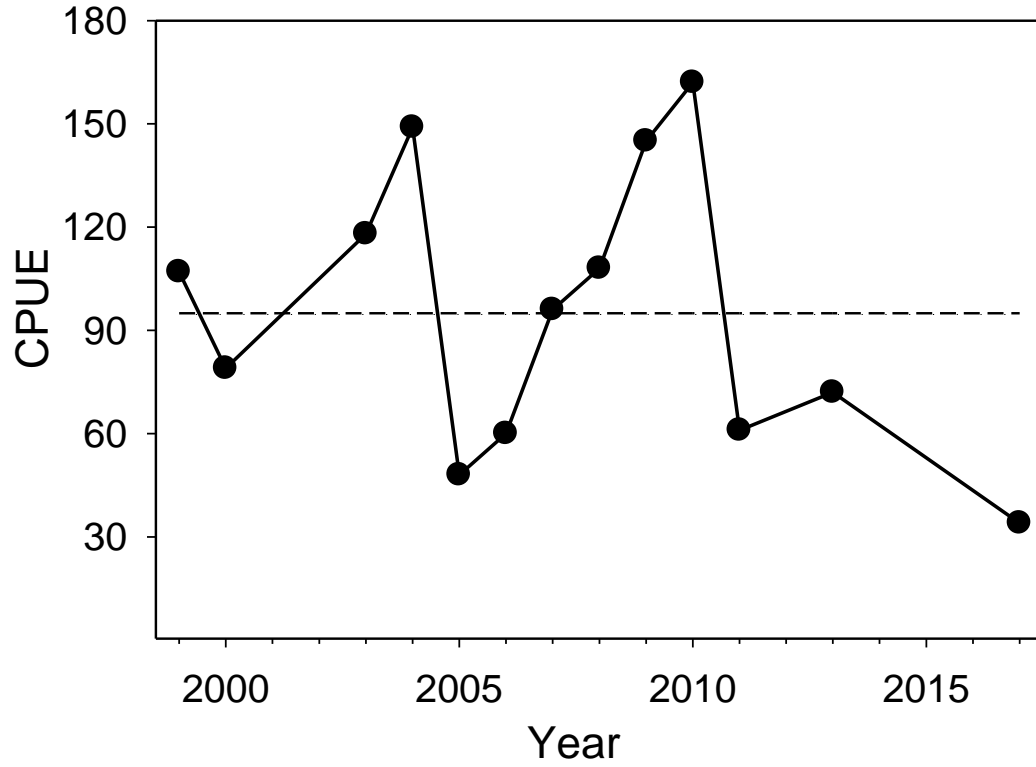


Figure 2: Number of Gizzard Shad caught per hour (CPUE) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, from 1999 to 2017. Dashed line demarks the historic average.

## Threadfin Shad

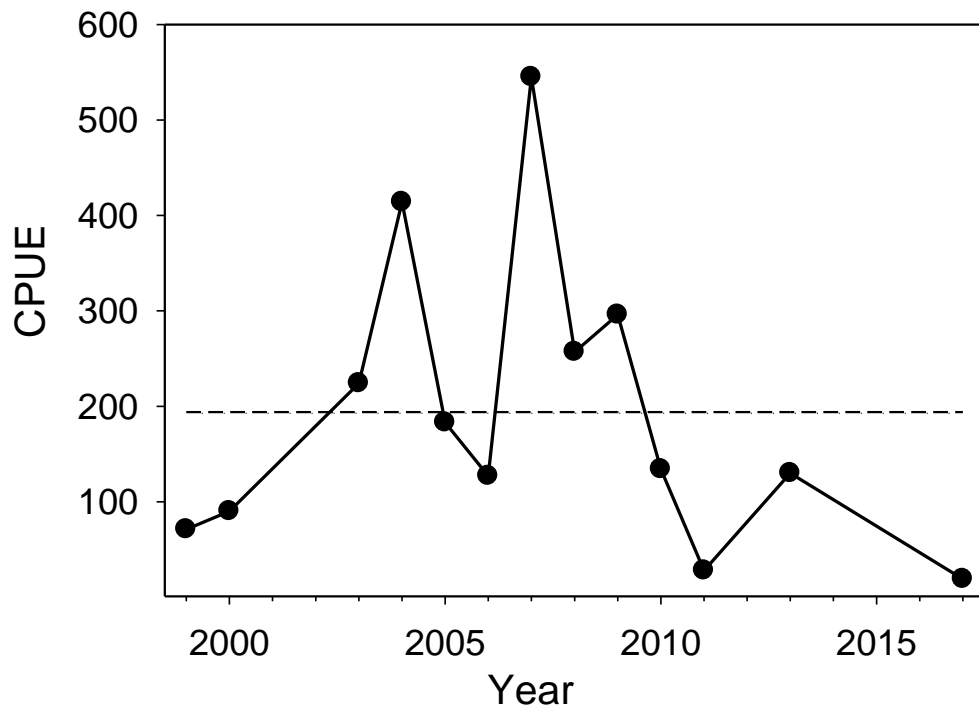
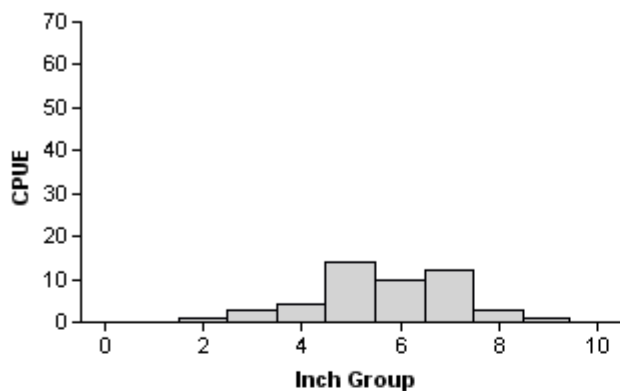


Figure 3: Number of Threadfin Shad caught per hour (CPUE) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, from 1999 to 2017. Dashed line demarks the historic average.

## Bluegill

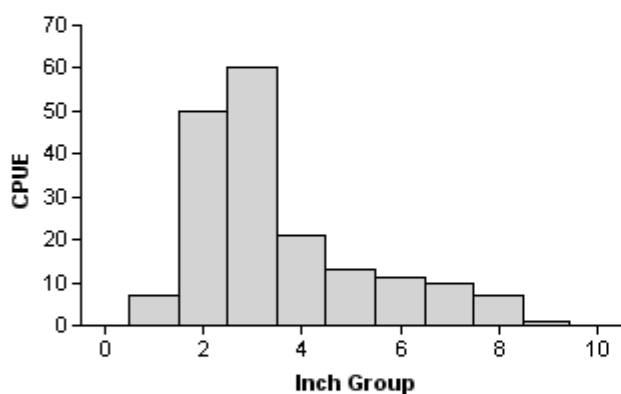
2011

Effort = 1.0  
 Total CPUE = 48.0 (35; 48)  
 PSD = 55 (12)



2013

Effort = 1.0  
 Total CPUE = 180.0 (51; 180)  
 PSD = 24 (5)



2017

Effort = 1.0  
 Total CPUE = 109.0 (27; 109)  
 PSD = 47 (12)

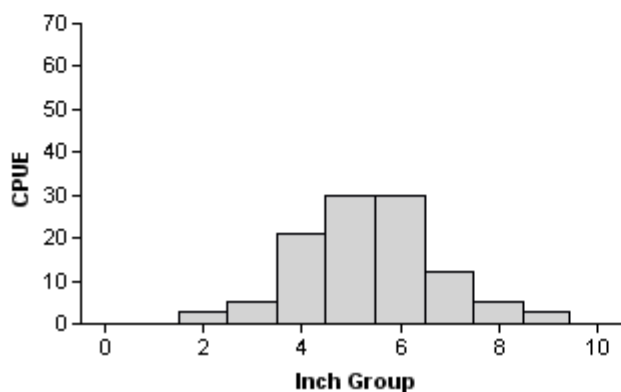


Figure 4: Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for all fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2011, 2013, and 2017.

## Channel Catfish

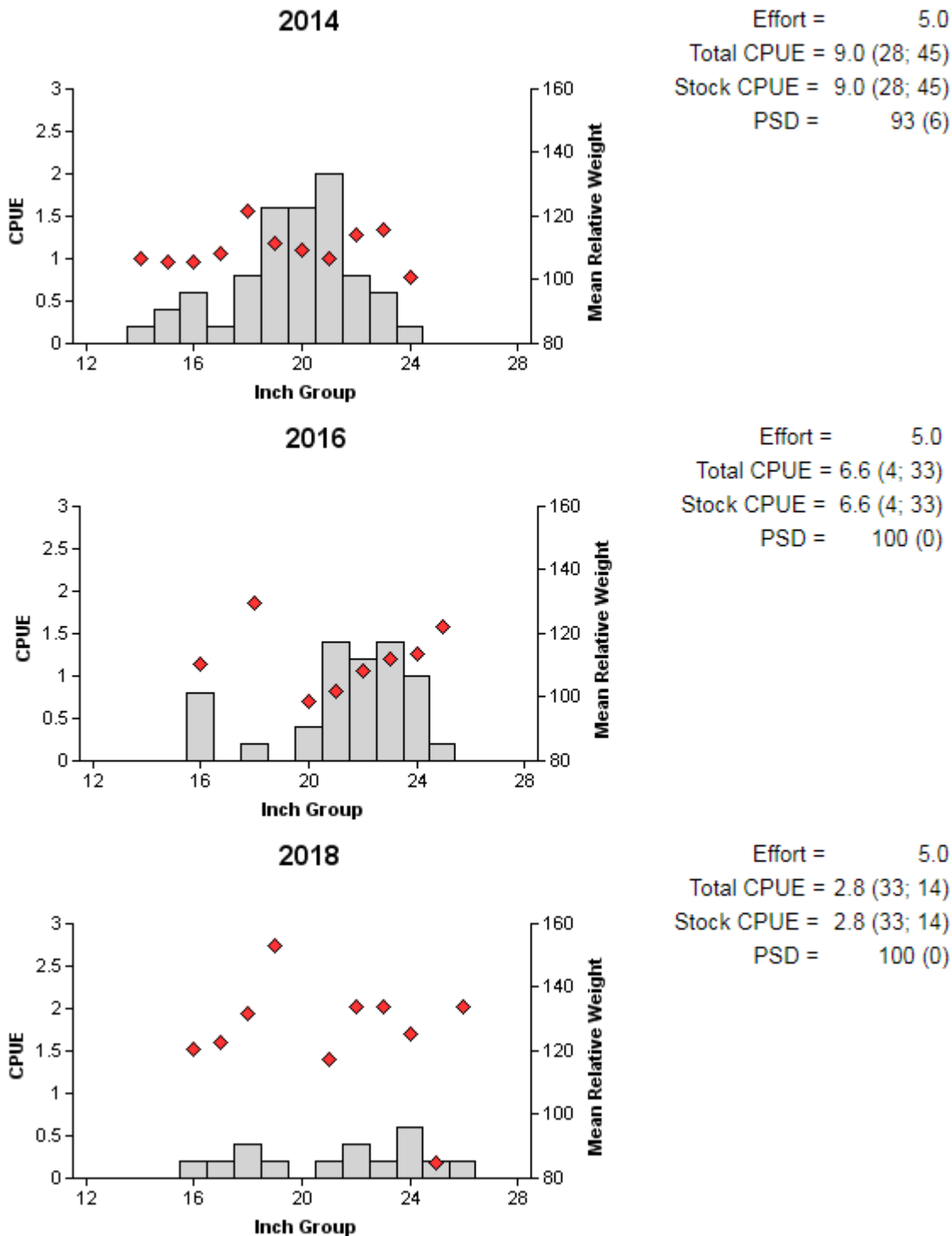


Figure 5: Number of Channel Catfish caught per net-night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2014, 2016, and 2018.



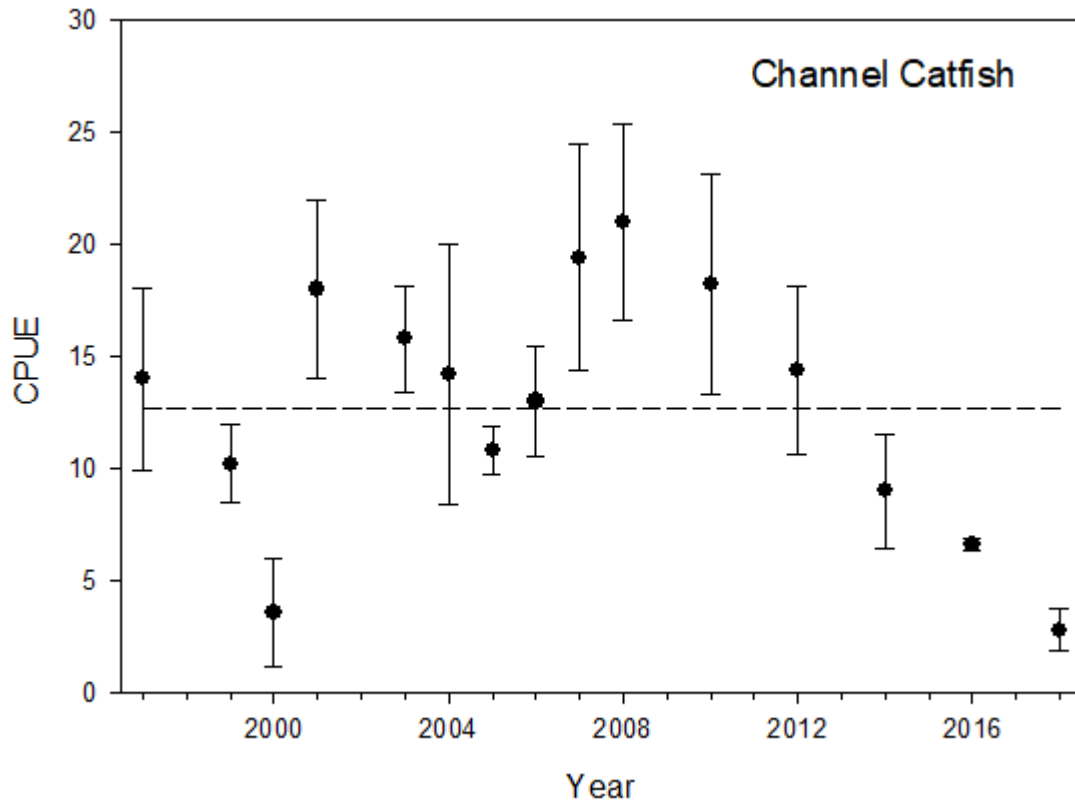


Figure 6: Average number of Channel Catfish collected per net-night (CPUE) at Victor Braunig Reservoir, Texas, 1997-2018 for spring gill net surveys. Error bars represent  $\pm 1$  standard error. Dashed line demarks the historic average.

Table 9: Creel survey statistics for Channel Catfish boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2005, and from March 1 to August 31 in 2010 and 2017. Average angler catch rate is for anglers targeting Channel Catfish and total harvest is the estimated number of Channel Catfish harvested by all anglers. Relative standard error (RSE) is in parentheses.

Creel Survey Statistic	2004-2005	2010	2017
Directed effort total (h)	10,187 (18)	3,378 (26)	773 (59)
Directed effort/acre (h)	7.9 (18)	2.6 (26)	0.6 (59)
Average angler catch rate (fish/h)	0.40 (62)	0.27 (43)	0.03 (90)
Total harvest (fish)	9,035 (47)	2,089 (33)	157 (94)
Harvest/acre	7.0 (47)	1.6 (33)	0.1
Voluntary release rate (%)	0.0	0.0	0.0

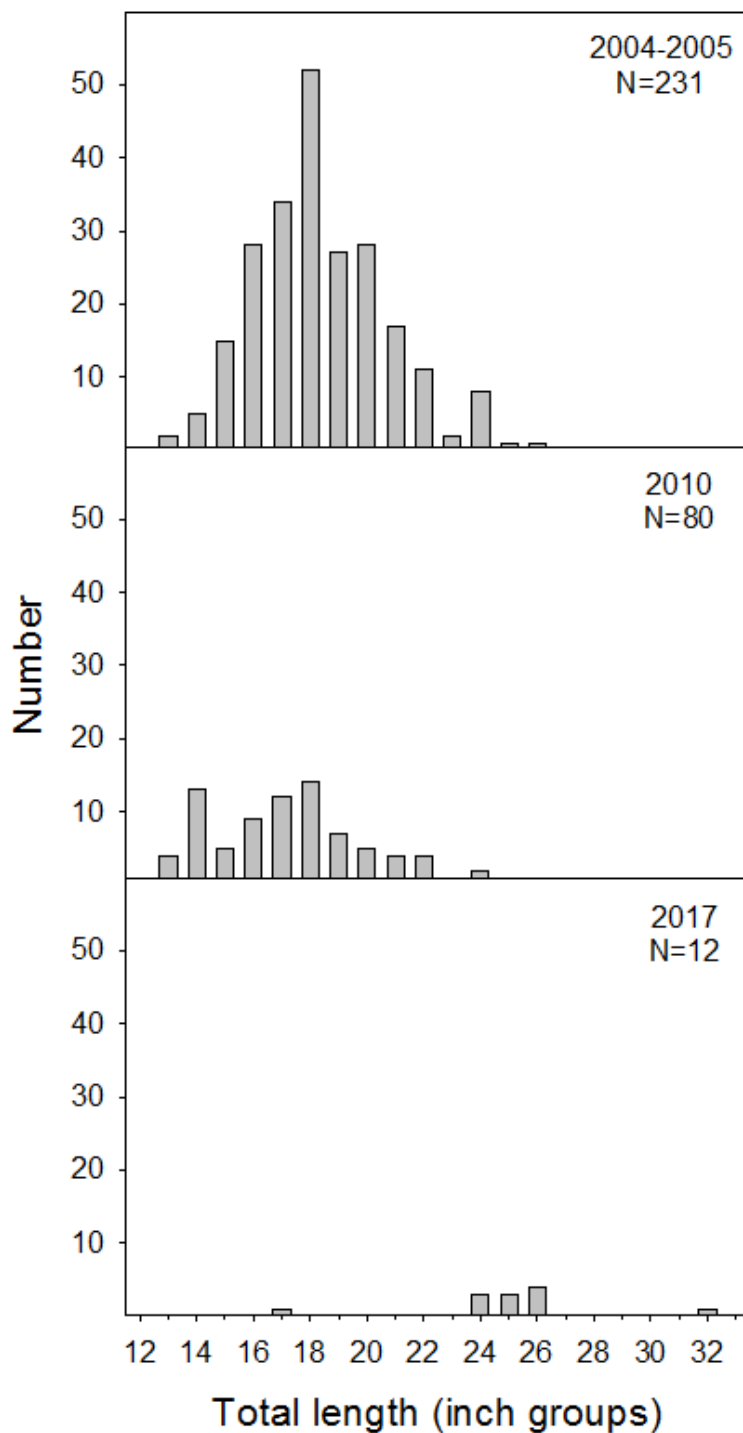


Figure 7: Length frequency distribution of angler-harvested Channel Catfish during creel survey sampling for boat-anglers at Victor Braunig Reservoir, Texas from December 1, 2004 to November 30, 2005, and March through August in 2010 and 2017. N is the number of harvested Channel Catfish observed and measured during creel surveys.

## Hybrid Striped Bass

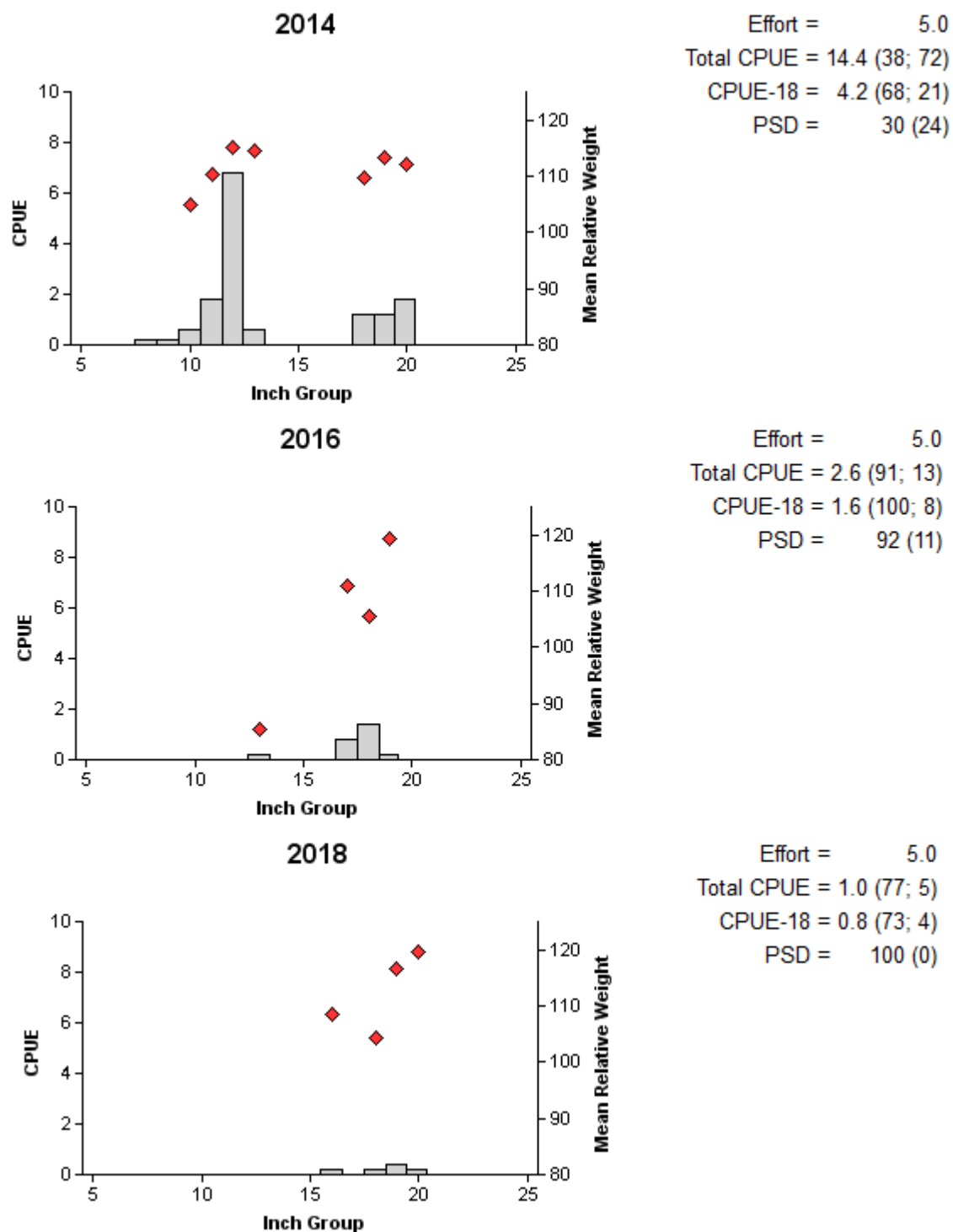


Figure 8: Number of Hybrid Striped Bass caught per net-night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2014, 2016, and 2018.

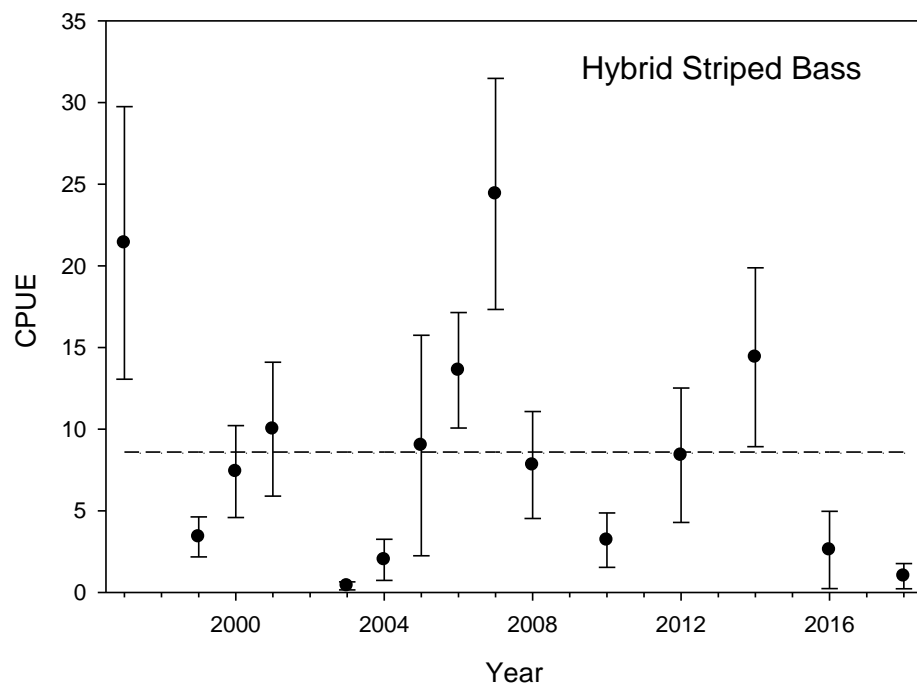


Figure 9: Average number of Hybrid Striped Bass collected per net-night (CPUE) and preferred stock-density (PSD) at Victor Braunig Reservoir, Texas, 1997-2018 for spring gill net surveys. Error bars represent  $\pm 1$  standard error. The dashed line demarks the historic average.

Table 10: Average length at age for Hybrid Striped Bass (sexes combined) collected in gill net surveys, Victor Braunig Reservoir, Texas, 2006, 2012, 2014, 2016, and 2018. Sample size is in parenthesis.

Year	1	2	3	4	5
2006		18.2 (32)	18.7 (2)		
2012	17.8 (5)	18.5 (9)	18.7 (1)	18.1 (1)	18.0 (1)
2014	12.1 (51)		19.3 (15)	20.3 (4)	20.7 (1)
2016		13.4 (1)	18.2 (8)		
2018		18.3 (4)		20.7 (1)	

Table 11: Creel survey statistics for Hybrid Striped Bass boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2005, and from March 1 to August 31 in 2010 and 2017. Average angler catch rate is for anglers targeting Hybrid Striped and total harvest is the estimated number of Hybrid Striped harvested by all anglers. Relative standard error (RSE) is in parentheses.

Creel survey statistic	2004-2005	2010	2017
Directed effort total (h)	3,315 (29)	1,483 (34)	559 (64)
Directed effort/acre (h)	2.6 (29)	1.1 (34)	0.4 (64)
Average angler catch rate (fish/h)	0.38 (53)	0.34 (53)	0.0 (0)
Total harvest (fish)	1,829 (40)	933 (37)	80 (133)
Harvest/acre	1.4 (40)	0.7 (37)	<0.1 (132)
Voluntary release rate (%)	9	3	50

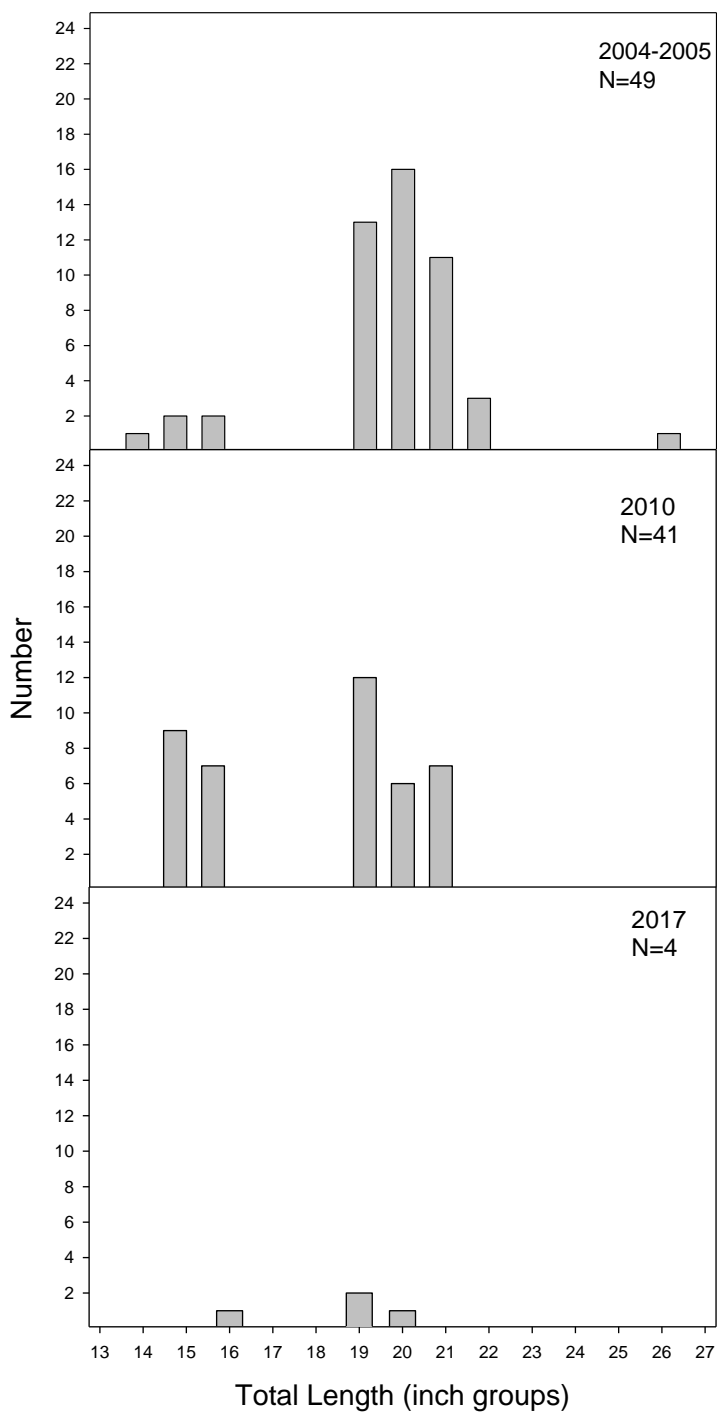


Figure 10: Length frequency distribution of angler-harvested Hybrid Striped Bass for boat anglers for Victor Braunig Reservoir, Texas, from December 2004 through November 2005, March 1 to August 31 in 2010 and 2017. N is the number of harvested Hybrid Striped Bass observed and measured during creel surveys.

## Largemouth Bass

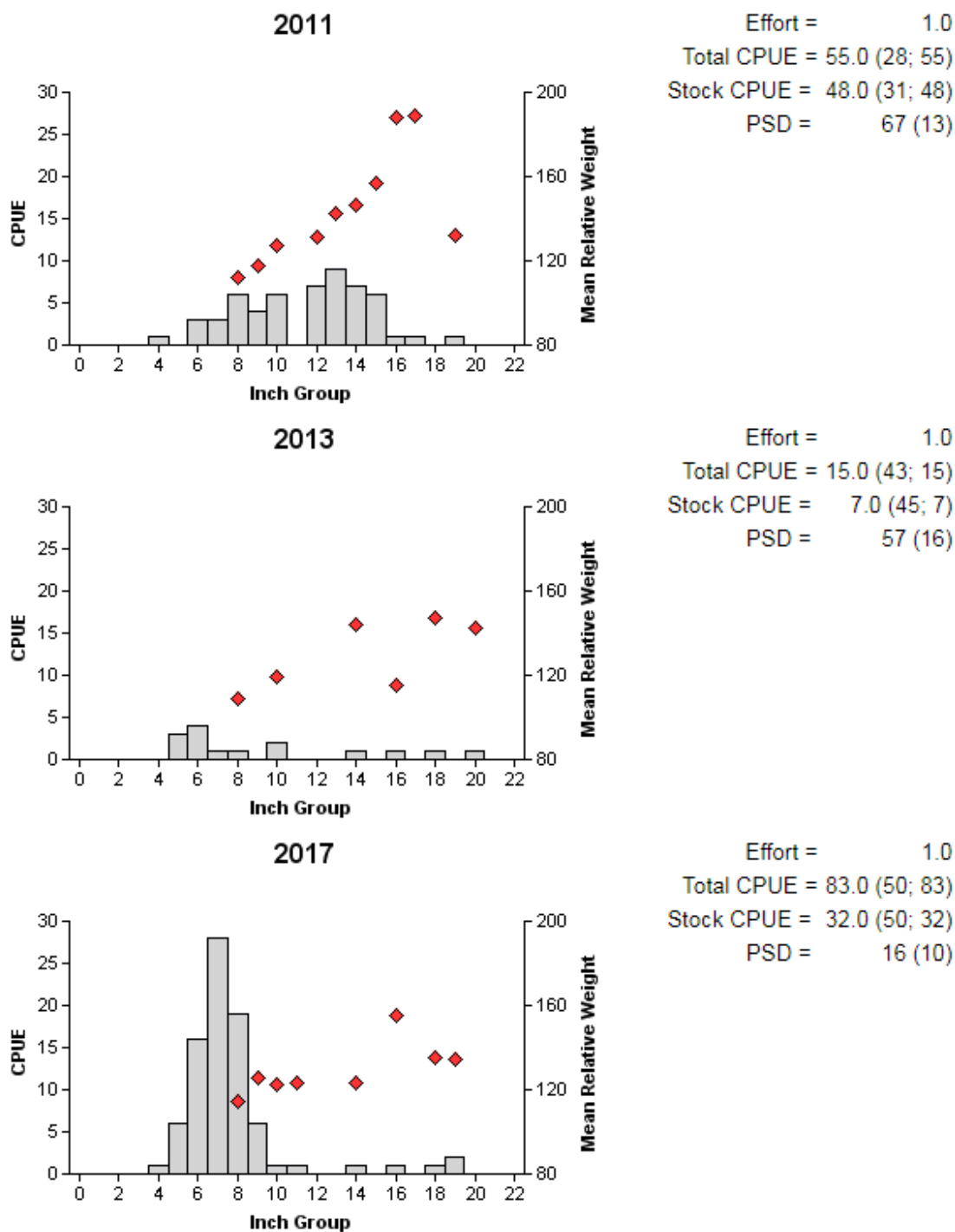


Figure 11: Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2011, 2013, and 2017.



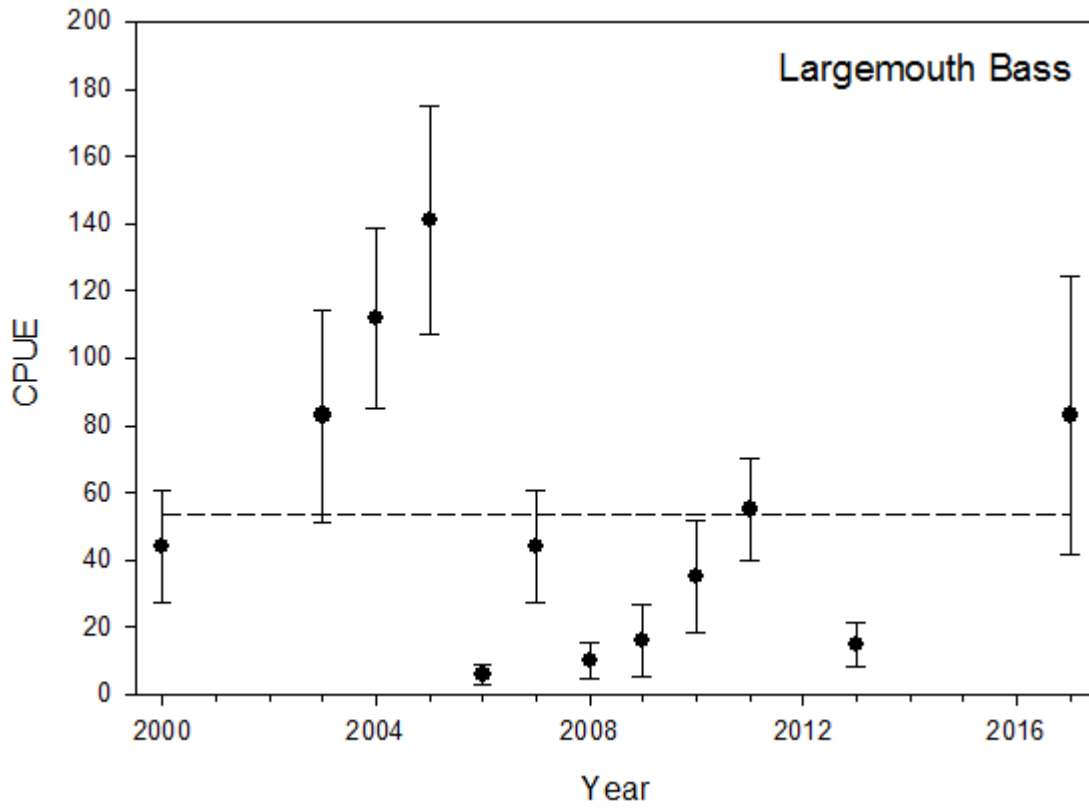


Figure 12: Average number of Largemouth Bass collected per 1 h of electrofishing (CPUE) at Victor Braunig Reservoir, 2000-2017. Error bars represent  $\pm 1$  standard error and dashed line demarks the historic average.

Table 12: History of genetic analysis of Largemouth Bass collected by fall electrofishing, Victor Braunig Reservoir, Texas, 2000-2017. 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. Shaded rows indicate years when Northern Largemouth Bass were stocked.

Year	Sample size	FLMB	Intergrade	NLMB	% FLMB alleles	% FLMB	% Intergrade
2000	31	28	3	0	94	90	10
2003	50	43	7	0	97	86	14
2004	30	25	5	0	97	83	17
2005	195	173	22	0	98	89	11
2006	200	115	58	27	79	58	29
2007	218	127	77	14	83	58	35
2008	202	50	106	46	55	25	52
2009	200	70	103	27	72	35	52
2010	259	143	108	8	80	55	42
2011	196	99	95	2	84	51	48
2013	30	13	16	1	84	43	53
2014	30	12	18	0	86	40	60
2017	48	24	24	0	92	50	50

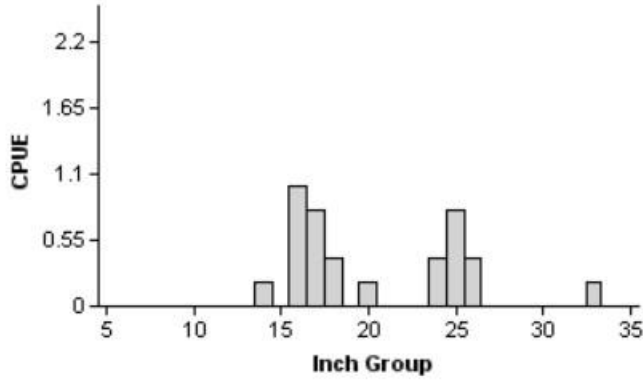
Table 13: Creel survey statistics for Largemouth Bass boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2005, and from March 1 to August 31 in 2010 and 2017. Average angler catch rate is for anglers targeting Largemouth Bass and total harvest is the estimated number of Largemouth Bass harvested by all anglers. Relative standard error (RSE) is in parentheses.

Creel survey statistic	2004-2005	2010	2017
Directed effort total (h)	2,953 (29)	1,273 (37)	125 (129)
Directed effort/acre (h)	2.3 (29)	1.0 (37)	0.1 (129)
Average angler catch rate (fish/h)	0.12 (74)	0.10 (81)	0.17 (n/a)
Total harvest (fish)	71 (360)	0 (0)	0 (0)
Harvest/acre	<0.1 (360)	0.0 (0)	<0.1 (132)
Voluntary release rate (%)	77	100	100

# Red Drum

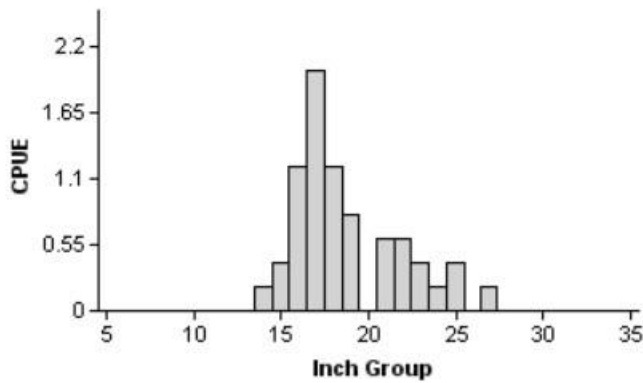
**2014**

Effort = 5.0  
Total CPUE = 4.4 (32; 22)



**2016**

Effort = 5.0  
Total CPUE = 8.2 (71; 41)



**2018**

Effort = 5.0  
Total CPUE = 4.2 (44; 21)

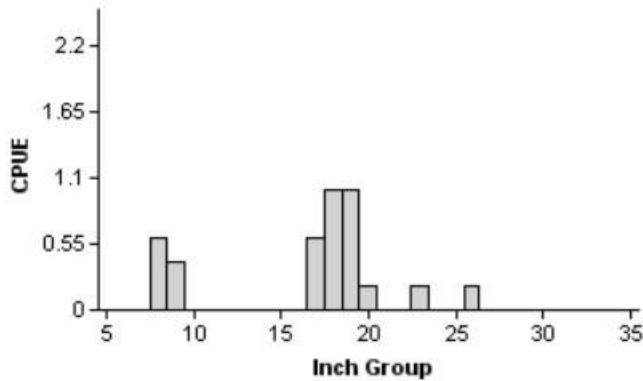


Figure 13: Number of Red Drum caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2014-2018.

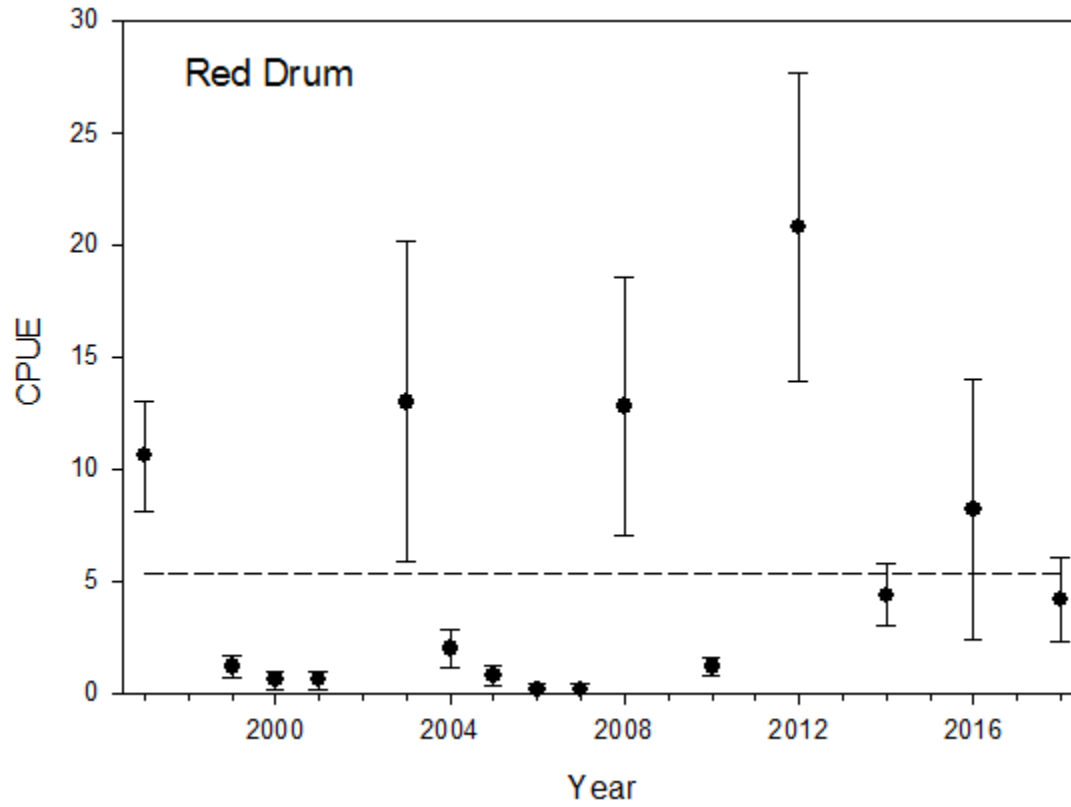


Figure 14: Average number of Red Drum collected per 1 net night (CPUE) at Victor Braunig Reservoir, 2000-2018. Error bars represent  $\pm 1$  standard error and the dashed line demarks the historic average. Dashed line demarks the historic average.

Table 14: Creel survey statistics for Red Drum boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, and 2017. Survey periods were from December 1, 2004 to November 30, 2015, and from March 1 to August 31 in 2010 and 2017. Average angler catch rate is for anglers targeting Red Drum and total harvest is the estimated number of Red Drum harvested by all anglers. Relative standard error (RSE) is in parentheses.

Creel survey statistic	2004-2005	2010	2017
Directed effort total (h)	10,248 (18)	11,507 (20)	34,521 (15)
Directed effort/acre (h)	7.9 (18)	8.9 (20)	26.6 (15)
Average angler catch rate (fish/h)	0.09 (55)	0.18 (31)	0.27 (17)
Total harvest (fish)	1,428 (11)	2,738 (28)	2,215 (36)
Harvest/acre	1.1 (11)	2.1 (28)	1.7 (36)
Voluntary release rate (%)	77	30	48

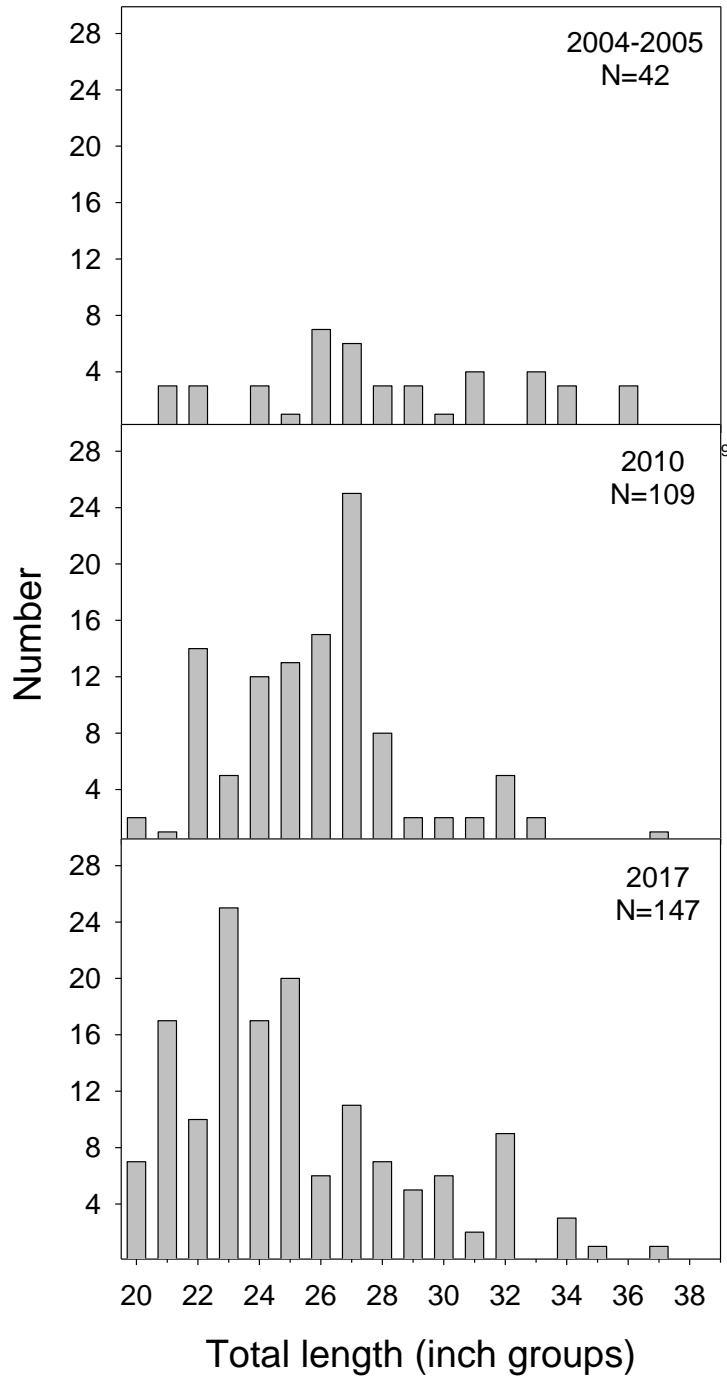


Figure 15: Length frequency distribution of angler-harvested Red Drum for boat anglers for Victor Braunig Reservoir, Texas from December 1, 2004 to November 30, 2005, and March 1 to through August 31 in 2010 and 2017. N is the number of harvested Red Drum observed and measured during creel surveys.

## Proposed Sampling Schedule

Table 15: Proposed sampling schedule for Victor Braunig Reservoir, Texas. Survey period is June through May. Only one of the below denoted creel survey sampling events will occur and selection of such is yet to be determined. Standard survey denoted by S and additional survey denoted by A.

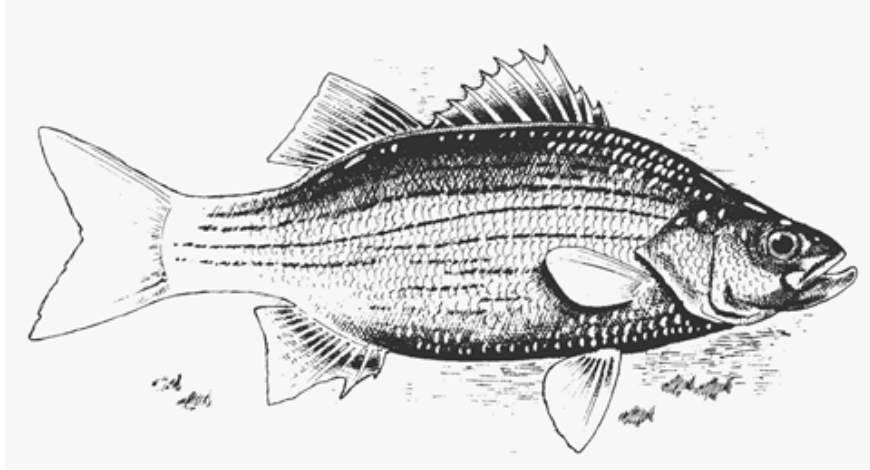
	Survey year			
	2018-2019	2019-2020	2020-2021	2021-2022
Angler Access				S
Structural Habitat				
Vegetation				S
Electrofishing – Fall		A		S
Electrofishing – Spring				S
Electrofishing – Low frequency				
Trap netting				
Gill netting		A		S
Baited tandem hoop netting				
Creel survey		A <sup>1</sup>	A <sup>1</sup>	
Report				S

<sup>1</sup>Creel survey sampling will occur during only one of the indicated survey years and that has yet to be determined.



## Appendix A – Hybrid Stripe Bass Signage

# Hybrid Striped Bass



These are stocked regularly by Texas Parks and Wildlife Department and City Public Service Energy

They are produced in hatcheries by crossing Striped Bass with White Bass. They do not reproduce on their own and require stocking to maintain populations.

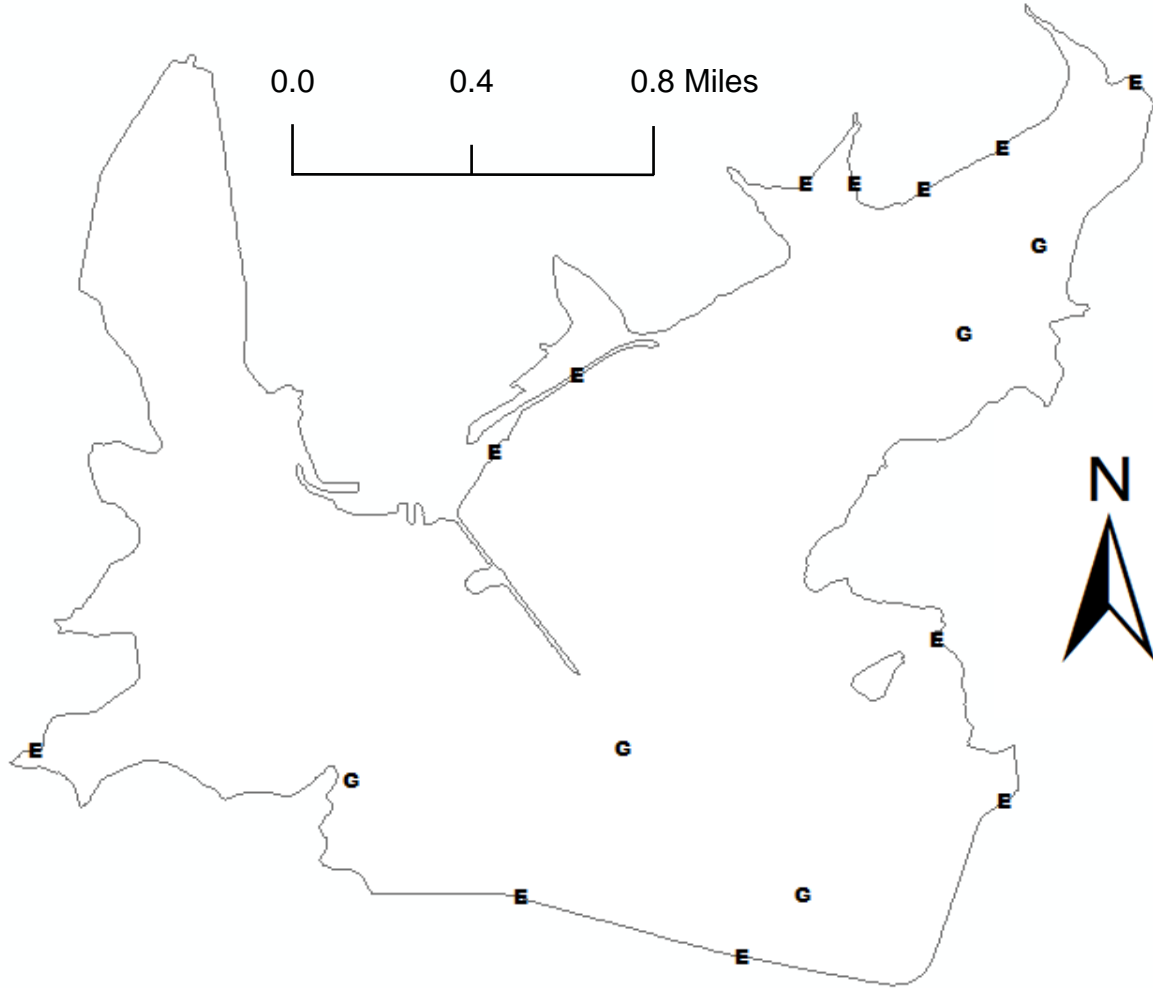
**The Minimum Length Limit is 18 inches  
and the Daily Bag Limit is 5/day**

**White Bass and Striped Bass do NOT exist  
in Calaveras or Victor Braunig Reservoirs**



Signage placed at Victor Braunig Reservoir to inform anglers about *Morone* spp. present in the reservoir and Hybrid Striped Bass harvest regulations.

## Appendix B – Map of Sampling Locations



Location of gill netting and electrofishing sample sites, Victor Braunig Reservoir, Texas 2017-2018. Gill netting and electrofishing sample sites are indicated by "G" and "E," respectively.

## Appendix C – Catch Rates for All Species and Gear Types

Number (N) and catch rate (CPUE) for all species collected from all gear types from Victor Braunig Reservoir, Texas, 2017-2018. Sampling effort was 1 h for electrofishing and 5 net-nights for gill netting.

Species	Gill Netting		Fall Electrofishing	
	N	CPUE	N	CPUE
Spotted Gar	42	8.4		
Longnose Gar	16	3.2		
Gizzard Shad	247	49.4	34	34.0
Threadfin Shad			19	19.0
Common Carp	12	2.4		
Inland Silversides			1	1.0
Channel Catfish	14	2.8		
Hybrid Striped Bass	5	1.0		
Bluegill			109	109.0
Redear Sunfish			35	35.0
Largemouth Bass			83	83.0
Blue Tilapia	1	0.2		
Red Drum	21	4.2		



**Life's better outside.®**

In accordance with Texas State Depository Law, this publication is available at the Texas State Publications Clearinghouse and/or Texas Depository Libraries.

© Texas Parks and Wildlife, PWD RP T3200-1254 (08/18)

TPWD receives funds from the USFWS. TPWD prohibits discrimination on the basis of race, color, religion, national origin, disability, age, and gender, pursuant to state and federal law. To request an accommodation or obtain information in an