Victor Braunig Reservoir

2021 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Victor Braunig Reservoir were surveyed in 2019 and 2021 using electrofishing and in 2020 and 2022 using gill netting. A creel survey was conducted in 2021 to quantify the recreational fishery over a six-month period. Historical data are presented with the 2019-2022 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

Reservoir Description: 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 17% of the reservoir area. Total angling effort of boat-based anglers from April through September 2021 was 60,100 hours (h) and angler expenditures were $698,584.

Management History: Important sport fish include Red Drum and Channel Catfish. Stockings of Red Drum have occurred most years since the mid 1970's and are required to maintain their population. The controlling authority, CPSE, purchased Channel Catfish fingerlings in 2020 and sub-adult (8-12 inches) Channel Catfish in 2022. In 2021, Blue Catfish fingerlings were stocked. Hybrid Striped Bass were stocked most years since the 1970's. Stockings of Hybrid Striped Bass ceased in 2017 after multiple consecutive years of poor survival of stocked fish. Largemouth Bass were first stocked in 1976 and last stocked in 2008, and both Florida and Northern-strain fish have been stocked. Numerous other species were stocked historically, including marine fishes, to provide additional and unique angling opportunities. Red Drum have a 20-inch minimum length limit and no maximum length limit. Channel Catfish and Blue Catfish are managed in aggregate with a 14-inch minimum length limit and 15 fish daily bag limit. Various Largemouth Bass harvest regulations have been used, and the current minimum length limit of 14-inches was implemented in 2015. All other species are managed with statewide harvest regulations.

Fish Community

- **Prey species:** Gizzard Shad and Threadfin Shad relative abundance has improved but was still below the historical average. Bluegill and Blue Tilapia are also important prey species.
- **Channel Catfish:** Channel Catfish relative abundance has remained low. As such, fishing effort has continued to decline for this species and accounted for less than 1% of the total fishing effort expended at the reservoir in 2021.
- **Hybrid Striped Bass:** The fishery for this species was inconsequential in 2021 as no directed effort was documented for this species in the 2021 creel survey and no fish were caught in the 2022 gill net survey.
- **Largemouth Bass:** Relative abundance of Largemouth Bass was lower in 2019 and 2021 compared to 2017. Few legal-length fish were available to anglers. Directed fishing effort for this species continues to be low and accounted for less than 2% of the total fishing effort expended at the reservoir in 2021
- **Red Drum:** Red Drum are the most sought-after sport fish in the reservoir accounting for 80% of total fishing effort. Their relative abundance during the study period was well above the historical average. Angling success has increased over time averaging 0.5 fish/h of angling effort in 2021.

Management Strategies: Continue the moratorium on stocking Hybrid Striped Bass. It is unlikely stocking will resume as Red Drum have become the predominant sport fish in the reservoir. Stock Red Drum annually. Conduct gill nets surveys in 2024 and 2026 to monitor populations of Red Drum and Channel Catfish and electrofishing surveys in 2023 and 2025 to assess the prey fish populations. Access and vegetation surveys will be conducted in 2025. Continue to inform the public about the negative impacts of aquatic invasive species. A creel will be conducted in either 2023 or 2024 to quantify the Red Drum and Channel Catfish fisheries.

Introduction

This document is a summary of fisheries data collected from Victor Braunig Reservoir from 2019-2022. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2019-2022 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., 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, primarily bulrush and cattails, typically occupy 17% 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 on the southwest side of the reservoir in the same cove. Both ramps share a common parking area. An unimproved kayak-designated launch is also present (Table 2). Considerable shoreline access including a fishing pier exists for bank anglers.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Myers 2018) included:

1. Stock Hybrid Striped Bass in 2020 contingent on adequate abundance of shad species.

   Action: The 2019 electrofishing survey yielded improved prey fish abundance, but the decision to stock Hybrid Striped Bass was postponed until after the 2021 creel survey. No directed fishing effort for the species was documented and the 2021 electrofishing survey showed that prey fish abundance decreased compared to 2019. Given the poor performance of Hybrid Striped Bass stockings in recent years, future Hybrid Striped Bass stocking is not recommended at this time.

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

   Action: Red Drum fingerlings were stocked annually from 2019 to 2022 at stocking rates ranging from 262-280 fish/acre. Stocking success was evaluated using gill nets in 2020 and 2022 and a creel survey in 2021.

3. Stock Channel Catfish annually and evaluate stocking success using biennial gill net sampling (2020 and 2022) and a creel survey in 2020 or 2021.

   Action: Channel Catfish fingerlings were stocked in 2019 and 2020. Sub-adult Channel Catfish (N = 3,600 fish averaging 10.6 inches) were purchased and stocked by CPSE in 2022. Stocking success was evaluated using biennial gill net sampling (2020 and 2022). A creel survey was conducted in 2021.

4. 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 2021 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: Currently, harvest of all sportfish species except Blue Catfish, Channel Catfish, and Red Drum are managed with statewide regulations (Table 3). Harvest regulation for Largemouth Bass changed from a 21-inch minimum length limit (MLL) and 2-fish daily bag limit (DBL) to an 18-inch MLL, 5-fish DBL in 1995, then to the statewide 14-inch MLL and 5-fish DBL in 2015. Harvest of Red Drum has been managed with a 20-inch MLL, no maximum limit, and 3-fish DBL, which differs from the coastal Red Drum harvest regulation. The harvest regulation for Channel and Blue Catfish was changed from the statewide regulation to a 14-inch MLL and a 15-fish aggregate DBL in 2020 to protect against over-harvest.

Stocking history: Channel Catfish fingerlings were stocked in 2019 and 2020. In 2022, CPSE purchased and stocked 1,200 pounds of sub-adult size Channel Catfish (3,600 fish averaging 10.6 inches). 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, but stockings of Hybrid Striped Bass ceased after 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 Table 4.

Vegetation/habitat management history: No vegetation or habitat management activities have occurred 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

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Victor Braunig Reservoir (Myers and Nisbet 2018). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by nighttime electrofishing (1 hour at 12, 5-min stations) in 2019 and 2021. 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 (8 net nights at 8 stations) in 2020 and 2022. Gill netting CPUE was recorded as the number of fish caught per net night (fish/nn).

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

Habitat – A habitat/vegetation survey was conducted in 2021 using the random point sampling method according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Creel survey – An access-point creel survey was conducted from April through September in 2021. according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual). Although shoreline-based angling is significant at the reservoir, creel survey sampling was conducted only for boat anglers because of safety concerns. Given the high gill net and angler catch rates, collection of otoliths from angler harvested Red Drum was not conducted as stocking success was not an issue.

Results and Discussion

Habitat: A shoreline structural habitat survey was last conducted in 2009 (Dennis and Myers 2010). Shoreline structural habitat during the survey period was unchanged compared to in 2009. Native emergent aquatic vegetation (bulrush and cattail) occupied 17% of the reservoir in 2021, which was a substantial increase from previous years (Table 6). Herbicide treatments have never been conducted.

Creel: Angler utilization has increased over time (Table 7). Angling effort and expenditures in 2021 were 42% and 126% greater than in 2017, respectively. The distribution of fishing effort by species varied historically but has been consistent in recent years (Table 8). In the last ten years, fishing for Hybrid Striped Bass and Channel Catfish has decreased, while fishing for Red Drum has increased. In 2021, Red Drum accounted for 80% of the total angling effort on the reservoir.

Prey species: Electrofishing CPUE and IOV of Gizzard Shad in 2019 was 94.0/h and 15, respectively, indicating that more fish were present in the reservoir, but proportionally fewer fish were sufficiently sized as prey for predators compared to 2017 (Figure 1). Gizzard Shad CPUE declined to 74.0/h, but IOV increased substantially to 65 in 2021. In 2021, Gizzard Shad relative abundance was below the historical average, but was the highest it has been since 2011 (Figure 2). Threadfin Shad CPUE rose drastically to 555/h in 2019, up from 19.0/h in 2017, but fell to 114/h in 2021 (Figure 3). Electrofishing CPUE of Bluegill in 2017 (109.0/h) was higher than in 2019 (87.0/h) or 2021 (92.0/h; Figure 4). Bluegill population size structure was similar in 2017 (PSD = 47) and 2021 (PSD = 43), but was comprised mainly of smaller individuals in 2019 (PSD = 29). Although not enumerated because of low susceptibility to gear, Blue

Tilapia were present in the reservoir in high abundance. A commercial cast-net fishery exists for this species at the reservoir.

Channel Catfish: Gill net CPUE of Channel Catfish remained low in the reservoir in both 2020 (2.6 fish/nn) and 2022 (2.8 fish/nn; Figure 5). Proportional size distribution values have remained high, ranging from 81-100, indicating most fish reach quality size. Channel Catfish relative abundance has continued to decline since 2004 (Figure 6), resulting in the OBS size-structure sampling-objective (N $\geq$30 stock size fish) not being met. In 2021, directed angling effort (501 h), angler catch rate (0.05/h), and harvest (254 fish) were similar to estimates made in 2017, which were considerably lower than previous years (Table 9). In 2021, only 7 fish were observed harvested, with all but one fish $\geq$20 inches (Figure 7).

Hybrid Striped Bass: The discontinuation of Hybrid Striped Bass stocking has caused the population to decline quickly. Thus, the OBS size-structure sampling-objective (N $\geq$30 stock size fish) was not met. Gill net CPUE was 1.5 fish/nn in 2020 and no fish were captured in gill nets in 2022 (Figure 8 and Figure 9). In 2021, for the first time there was no angling effort specifically targeting this species (Table 10). Harvest (95 fish) was similar to estimates made in 2017 (80 fish). Some “anything” anglers who accounted for 16.6% of total fishing effort (10,197 h), made mention that Hybrid Striped Bass were one of the species they were targeting. Similar fishing techniques are used to target both Hybrid Striped Bass and Red Drum. The three observed harvested fish were $\geq$20 inches (Figure 10).

Largemouth Bass: In 2019 and 2021, Largemouth Bass CPUE-total was 49.0 fish/h and 36.0 fish/h, respectively (Figure 11). The population has declined since 2017 (83.0 fish/h) and is near the historical average (Figure 12). Size structure showed improvement with a higher proportion of fish reaching quality size in 2021 (PSD = 60) compared to the previous two surveys (PSD = 16-26). There are still few legal fish (14 inches) available to anglers in the reservoir. In 2019, mean relative weights remained very high (>120) for many size classes; some individuals were obese (W_r>150). Largemouth Bass experience very 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 (Myers 2018). However, percent occurrence of pure FLMB has remained lower than it was prior to the NLMB stockings. The Largemouth Bass fishery at the reservoir in 2021 saw a slight increase in estimated direct angling effort (1,108 h) compared to 2017 (125 h). Harvest was nil in 2017 and 2021 (Table 11).

Red Drum: Gill net CPUEs were near the historic average (6.4 fish/nn) from 2014 to 2018 (4.2-8.2 fish/nn) but increased during this study period (13.1-15.3 fish/nn; Figure 13 and Figure 14). Red Drum <10 inches were present in the 2018 gill net sample, but not in 2020 or 2022. In previous years, CPUE estimated precision was less than optimal (RSE 32-71), however precision improved in 2020 and 2022 (RSE 18-19). Red Drum attain legal-harvestable size (>20 inches) after 3 years (Dennis and Myers 2014). Red Drum CPUE-20 increased in 2022 (8.5 fish/nn) compared to 2018 and 2020 (0.6-1.0 fish/nn.

Red Drum directed angling effort has continued to increase, after more than tripling from 2010 to 2017. Directed angling effort increased by 40%, from 34,521 h in 2017 to 48,242 h in 2021 (Table 12). Likewise, Red Drum angling success (average angler catch rate) was greater in 2021 (0.5/h) than in 2017 (0.27/h), which was the previously recorded highest catch rate. Red Drum catch (33,730 fish) and harvest (10,646 fish) were also significantly greater than in previous years. Voluntary release rate of Red Drum in 2021 (21%) was lower than all previous years (30-77%). Harvested fish ranged in size from 19-37 inches, with two instances of sub-legal fish (<20 inches) being harvested (Figure 15). There were concerns in 2017 that the average size of fish had been decreasing over time (Myers and Nisbet 2018), however average size of fish harvested increased slightly in 2021 (24.5 inches) compared to 2017 (24.1 inches).

Fisheries Management Plan for Victor Braunig Reservoir, Texas

Prepared – July 2022

ISSUE 1: The Channel Catfish population and fishery have declined substantially during the last 15 years due to low recruitment. Recent stocking attempts have not yielded meaningful increases in angler success rate or gill net CPUE, however a longer evaluation period is necessary to fully inform stocking success.

MANAGEMENT STRATEGIES

1. Assess Channel Catfish population abundance in spring 2024 and 2026 using gill nets
2. Discontinue Channel Catfish stocking if relative abundance and directed angling effort remains low. Channel Catfish originally intended for Victor Braunig Reservoir could likely be stocked at Calaveras Reservoir, where directed effort for catfishes is higher.

ISSUE 2: The Red Drum fishery has continued to expand and has reached record levels in recent years. Other popular fisheries at Victor Braunig Reservoir expanded and ultimately collapsed (Hybrid Striped Bass and Channel Catfish). Extensive monitoring and continued stocking is necessary to ensure the Red Drum fishery does not meet the same fate. Red Drum condition is a concern given the ever-increasing relative abundance; however a standard relative weight equation is unavailable for this species.

MANAGEMENT STRATEGIES

1. Stock 200 Red Drum fingerlings/acre annually.
2. Evaluate stocking success using biennial gill net sampling (2024 and 2026) and a creel survey in 2024 or 2025.
3. Evaluate for a change in fish condition every two years via length-weight regression.

ISSUE 3: 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 (2022–2026)

Sport fish, forage fish, and other important fishes

Important sport fishes in Victor Braunig Reservoir are Red Drum and Channel Catfish. Known important forage species include Threadfin Shad, Gizzard Shad, Bluegill and Blue Tilapia. Sampling schedule is in Table 13.

Low-density fisheries

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 a creel survey. Any significant changes observed in those surveys will be addressed by additional sampling, as needed. Hybrid Striped Bass are no longer stocked in the reservoir, there were no anglers expending effort targeting this species, and none were captured in the recent gill net survey. If stocking plans change, additional surveys will be conducted as needed. Blue Catfish are rare in the reservoir, and none have been collected in gill nets since 2001. Their presence/absence will be documented in biennial gill net surveys.

Survey objectives, fisheries metrics, and sampling objectives

Red Drum: Red Drum is the most sought-after sport fish at the reservoir, accounting for 80% 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 (105-122 fish) and high precision (RSE = 18-19). The objectives are to monitor for population changes and determine general stocking success. Gill net surveys will be conducted in spring 2024 and 2026 (5-8 net nights of sampling effort/survey) to assess relative abundance and population size structure. The target is to biennially collect ≥30 Red Drum. If that target is not reached, additional nets will be set at randomly selected stations to achieve or approach the 30 fish target. Sampling will cease after 10 net nights. A six-month creel survey will be conducted in either 2024 or 2025 to assess angler utilization and angling success.

Channel Catfish: Channel Catfish abundance and fishing effort have both declined during the last decade. Gill net surveys will be conducted in spring 2024 and 2026 (5-8 net nights of sampling effort/survey) to assess relative abundance and population size structure. Sampling will be done in conjunction with Red Drum, no additional effort will be expended to increase the number of Channel Catfish collected or reduce RSEs. A six-month creel survey will be conducted in either 2024 or 2025 to assess angler utilization and angling success.

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 inferenced from CPUE trend data. Sampling of these species will be done through night-time random electrofishing at 12 5-minute stations. Based on historical data, this level of sampling intensity should provide adequate CPUE precision (RSE<25) of Gizzard Shad and Bluegill and 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 during fall in 2023 and 2025.

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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 µS/cm

Table 2: Boat ramp characteristics for Victor Braunig Reservoir, Texas, September 2021.

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	15*	14
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, SADL = 8-12 inches 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
	2021	65,807	FGL
Channel Catfish	1969	35,000	UNK
	1974	103,280	UNK
	2005	61,923	FGL
	2019	136,807	FGL
	2020	46,790	FGL
	2022	3,600	SADL

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

Table 4. Stocking history continued.

Species	Year	Number	Size
Red Drum (cont.)	2012	299,551	FGL
	2013	314,257	FGL
	2014	311,605	FGL
	2015	281,270	FGL
	2016	282,265	FGL
	2017	278,792	FGL
	2018	340,830	FGL
	2019	352,047	FGL
	2020	363,503	FGL
	2021	340,606	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 2019-2022.

Gear/target species	Survey objective	Metrics	Sampling objective
Gill netting			
Red Drum [a]	Relative abundance	CPUE	RSE≤25
	Size structure	PSD, length frequency	N ≥ 30
	Condition	W_r	10 fish/inch group (max)
Channel Catfish	Relative abundance	CPUE	RSE≤25
	Size structure	PSD, length frequency	N ≥30 stock size fish
	Condition	W_r	10 fish/inch group (max)
Hybrid Striped Bass	Relative abundance	CPUE	RSE≤25
	Size structure	PSD, length frequency	N ≥30 stock size fish
	Condition	W_r	10 fish/inch group (max)
Blue Catfish	Presence	N/A	Practical effort
Creel			
Red Drum	Angler Utilization and success	Fishery metrics	Practical effort
Channel Catfish	Angler Utilization and success	Fishery metrics	Practical effort
Electrofishing			
Largemouth Bass	Presence	N/A	Practical effort
Bluegill [b]	Relative abundance	CPUE	RSE≤25
	Size structure	Length frequency	none
Gizzard Shad [b]	Relative abundance	CPUE	RSE≤25
	Size structure	IOV, length frequency	none

[a] Five additional net nights of sampling effort will be used to achieve sampling objective target of ≥25 Red Drum.

[b] No additional effort will be expended to achieve an RSE ≤ 25 for CPUE of Bluegill and Gizzard Shad if not reached using 1 h of electrofishing sampling effort.

Table 6: Results of random point sampling habitat surveys conducted at Victor Braunig Reservoir in August-September of 2009, 2013, 2017, and 2021. 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	2021
Open water	93 (86-97)	89 (83-95)	96 (91-100)	83 (74-92)
Native emergent	3 (1-9)	10 (4-16)	4 (0-9)	17 (8-26)
Native submersed	4 (1-10)	2 (0-5)	0	0
Number of random points	100	100	69	65

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, from March 1 to August 31 in 2010 and 2017, and from April 1 to September 30 2021. Relative standard error is in parentheses.

Creel Statistics	2004-2005	2010	2017	2021
Total fishing effort	44,573 (12)	25,436 (18)	42,257 (15)	60,100 (18)
Total directed expenditures	190,688 (25)	151,095 (36)	308,654 (32)	698,584 (112)

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, from March 1 to August 31 in 2010 and 2017, and from April 1 to September 30 2021. Relative standard error is in parentheses.

Species	2004-2005	2010	2017	2021
Channel Catfish	23 (18)	13 (26)	2 (59)	1 (79)
Hybrid Striped Bass	7 (29)	6 (34)	1 (64)	0
Largemouth Bass	7 (29)	5 (37)	<1 (129)	2 (58)
Red Drum	23 (18)	45 (20)	82 (15)	80 (18)
Anything	39 (15)	30 (21)	15 (24)	17 (24)
Sunfishes	0	<1 (135)	0	0

Gizzard Shad

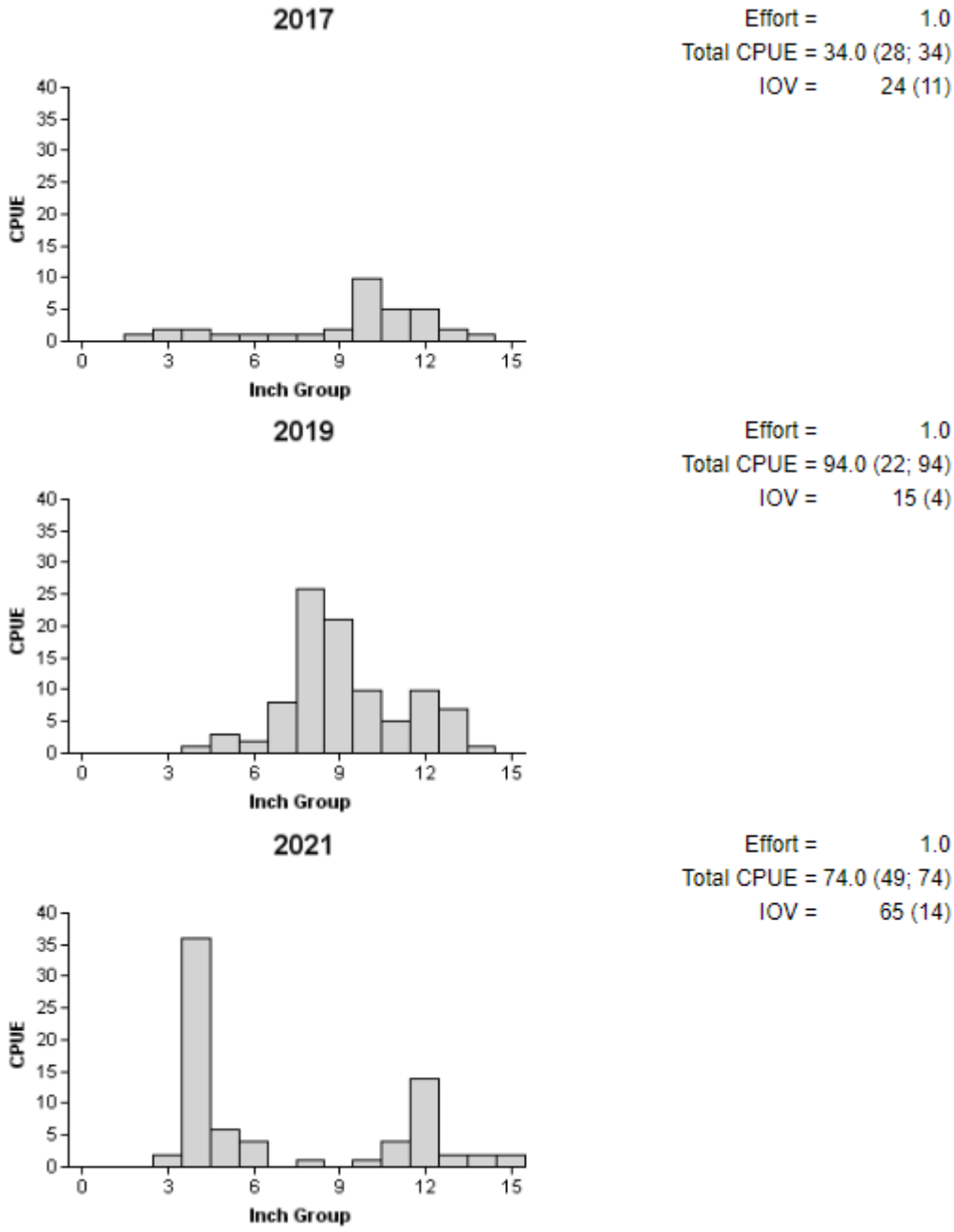


Figure 1. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2017, 2019, and 2021.

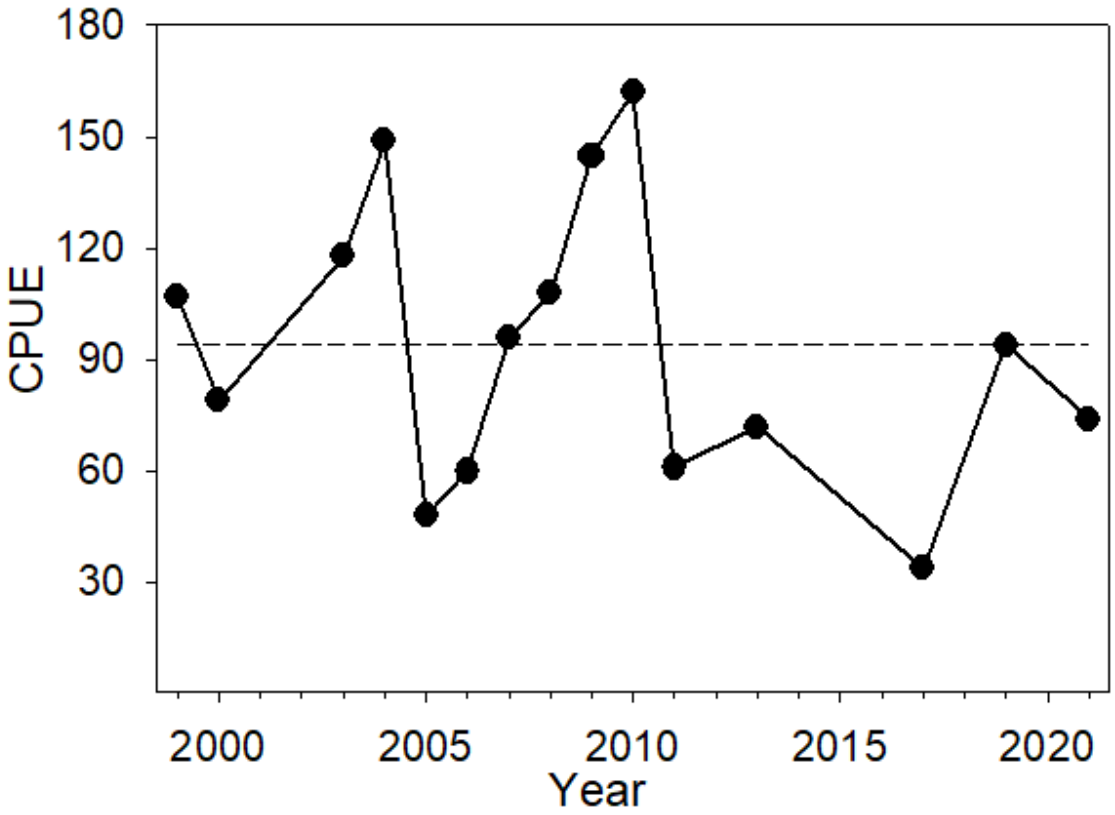


Figure 2: Number of Gizzard Shad caught per hour (CPUE) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, from 1999 to 2021. Dashed line demarks the historic average.

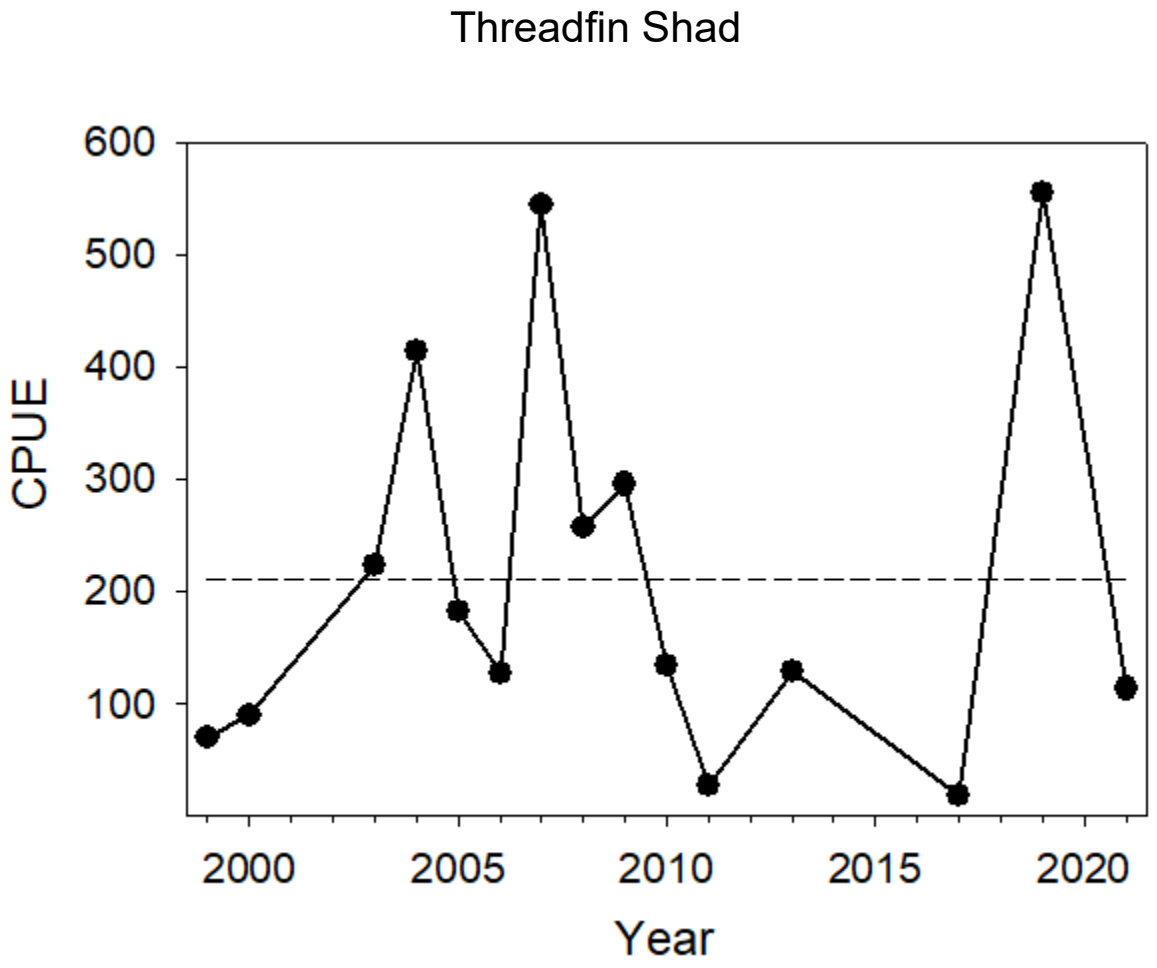


Figure 3: Number of Threadfin Shad caught per hour (CPUE) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, from 1999 to 2021. Dashed line demarks the historic average.

Bluegill

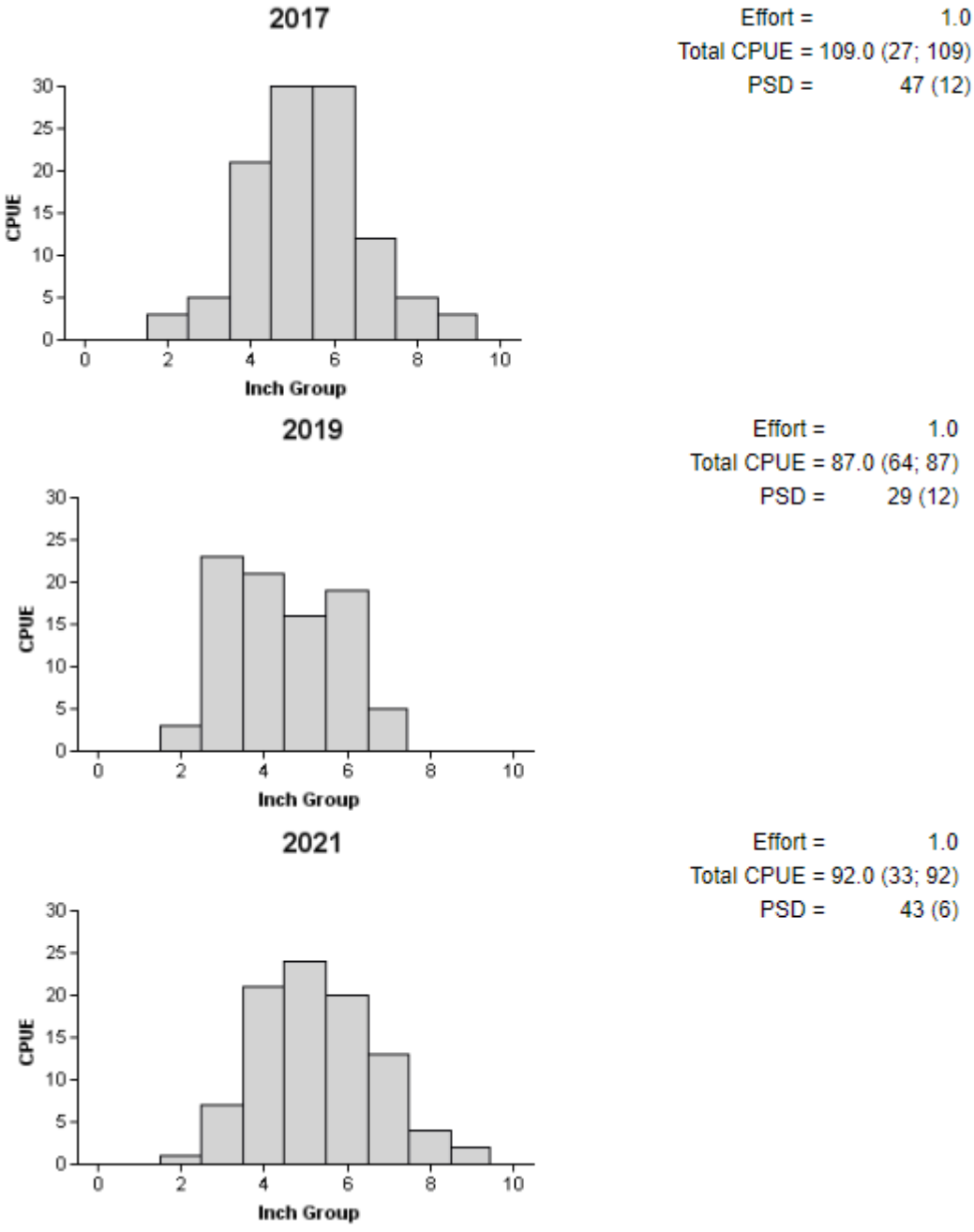


Figure 4. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2017, 2019, and 2021.

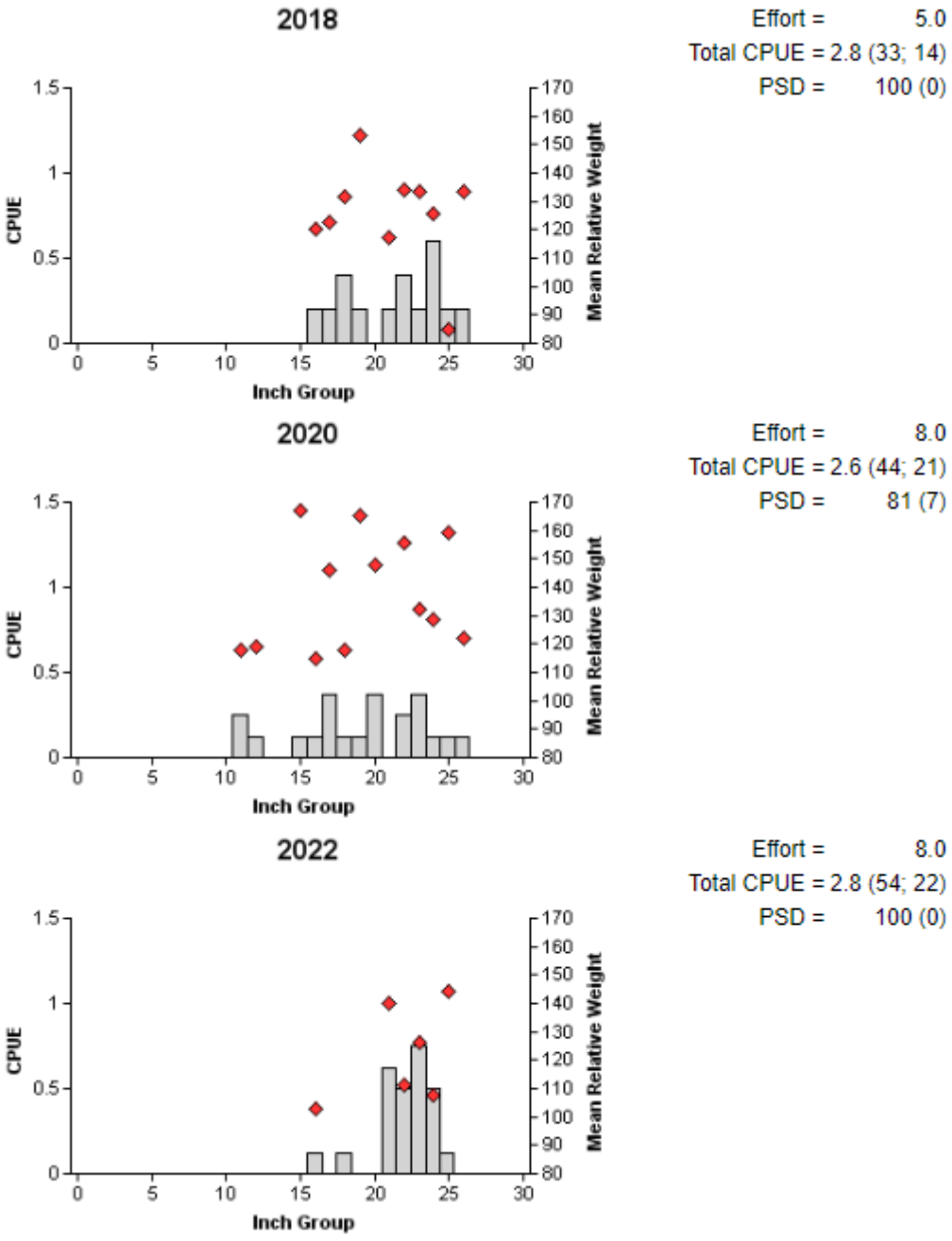


Figure 5. Number of Channel Catfish caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2018, 2020, and 2022.

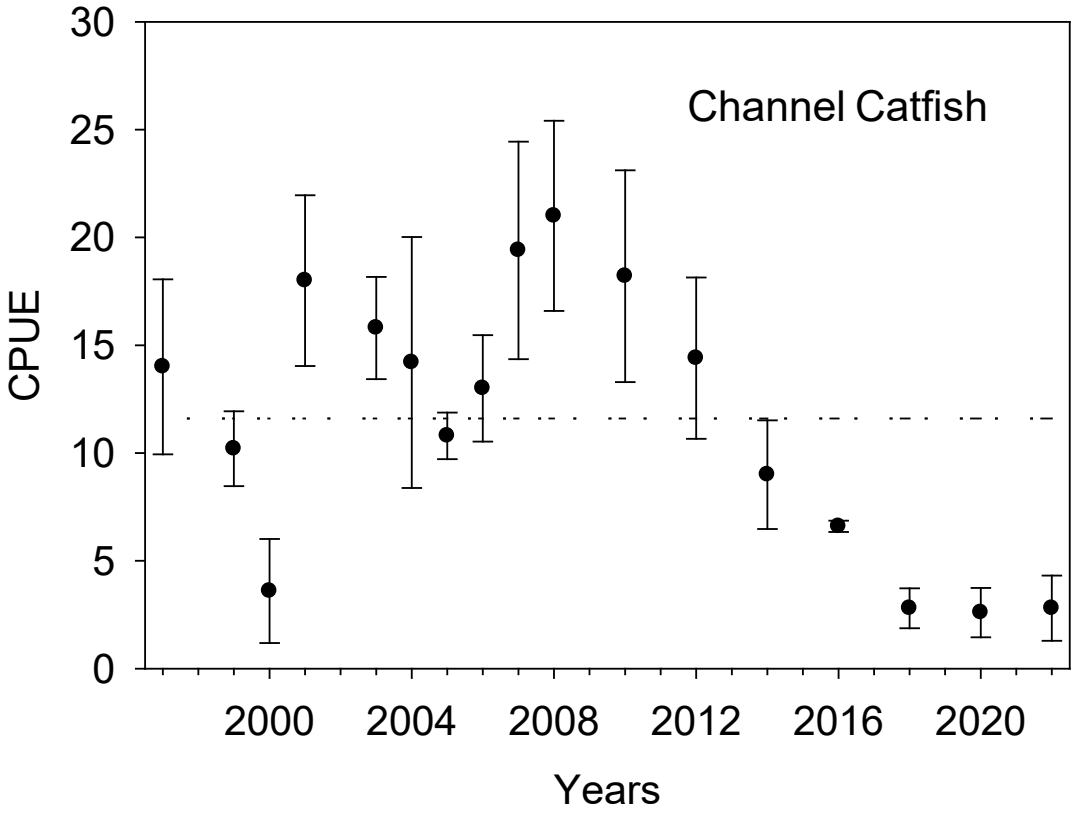


Figure 6: Average number of Channel Catfish collected per net night (CPUE) at Victor Braunig Reservoir, Texas, 1997-2021 for spring gill net surveys. Error bars represent ±1 standard error. Dashed line demarks the historic average.

Table 9: Creel survey statistics for Channel Catfish boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, 2017, and 2021. Survey periods were from December 1, 2004 to November 30, 2005, from March 1 to August 31 in 2010 and 2017, and April 1 through September 1 in 2021. 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	2021
Directed effort total (h)	10,187 (18)	3,378 (26)	773 (59)	501 (79)
Directed effort/acre (h)	7.9 (18)	2.6 (26)	0.6 (59)	0.4 (79)
Average angler catch rate (fish/h)	0.40 (62)	0.27 (43)	0.03 (90)	0.05 (>100)
Total harvest (fish)	9,035 (47)	2,089 (33)	157 (94)	254 (226)
Harvest/acre	7.0 (47)	1.6 (33)	0.1	0.2 (226)
Percent legal release	0.0	0.0	0.0	5.5

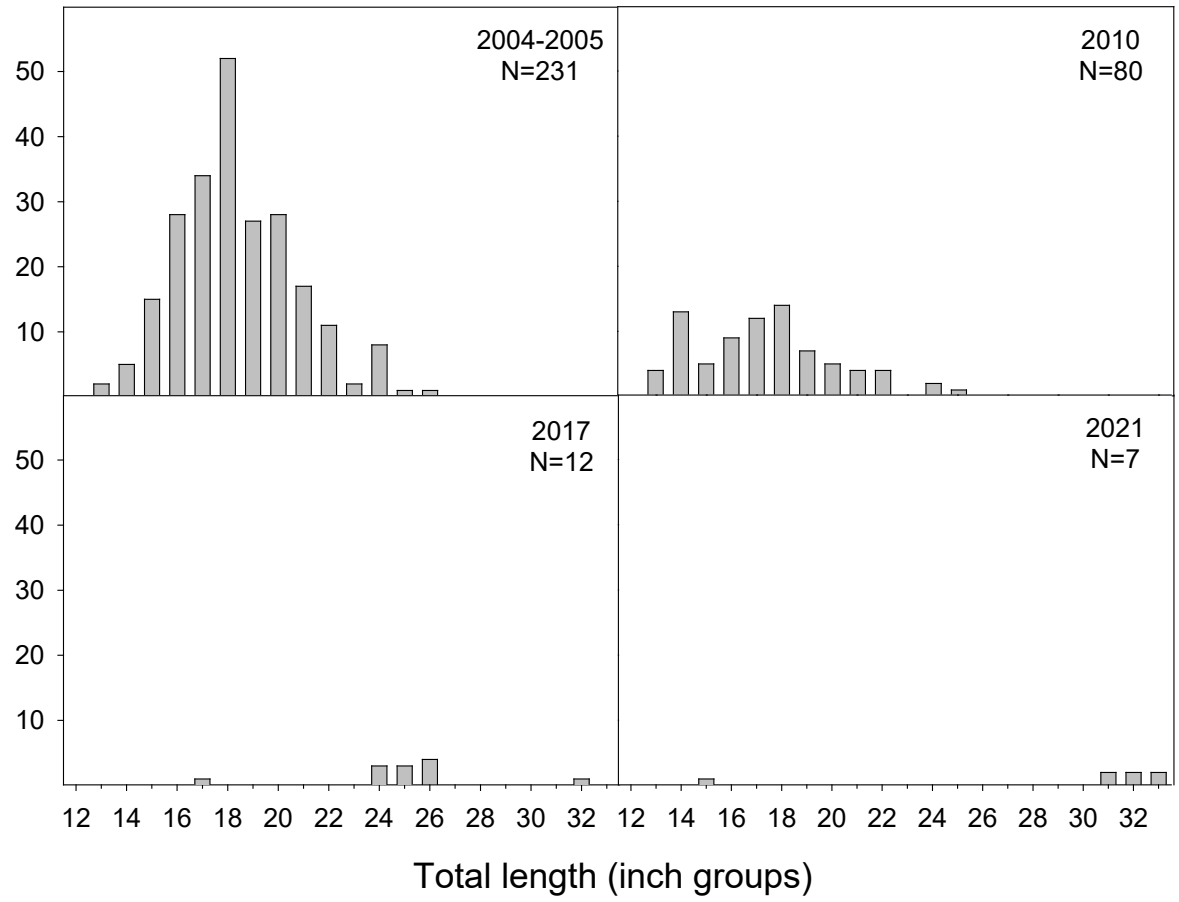
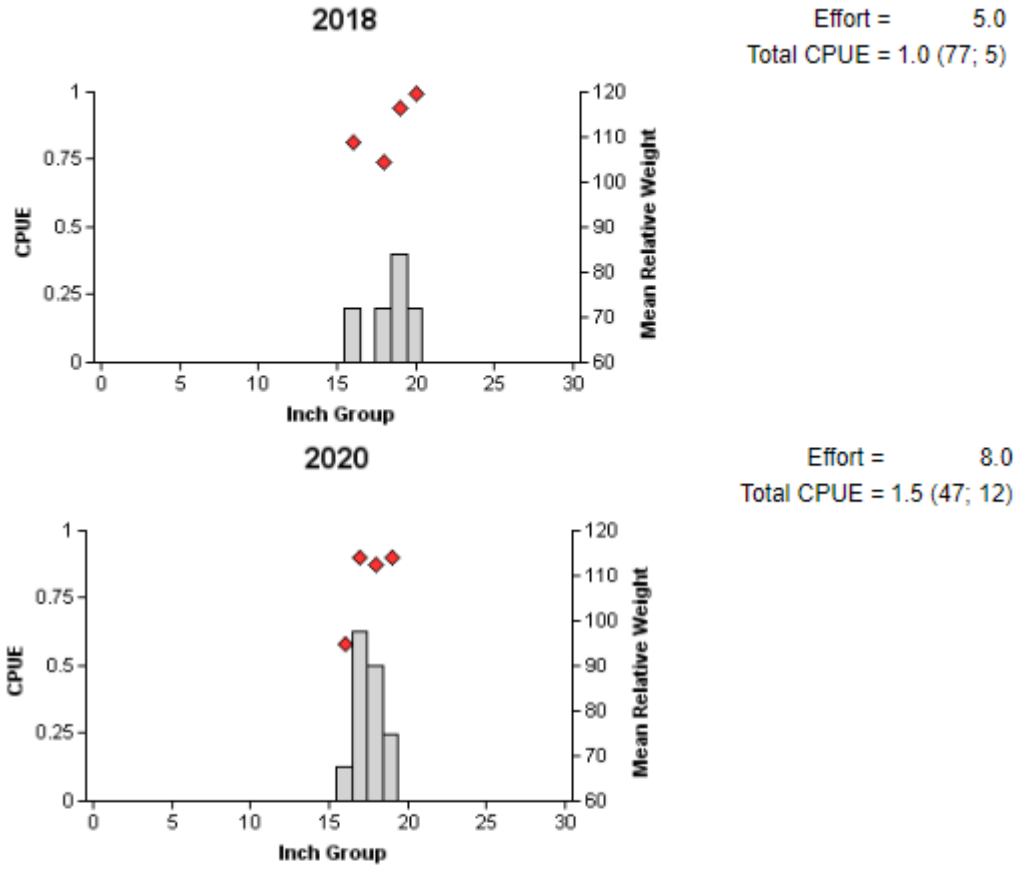


Figure 7: Length frequency distribution of angler-harvested Channel Catfish during creel survey sampling for boat-anglers at Victor Braunig Reservoir, Texas from December 1, 2004 to November 30, 2005, March 1 through August 31 in 2010 and 2017, and April 1 through September 30 in 2021. N is the number of harvested Channel Catfish observed and measured during creel surveys.

Hybrid Striped Bass



No fish collected in 2022

Figure 8. Number of Hybrid Striped Bass caught per net night (CPUE), mean relative weights (diamonds), and population indices (RSE and N for CPUE are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2018, 2020, and 2022.

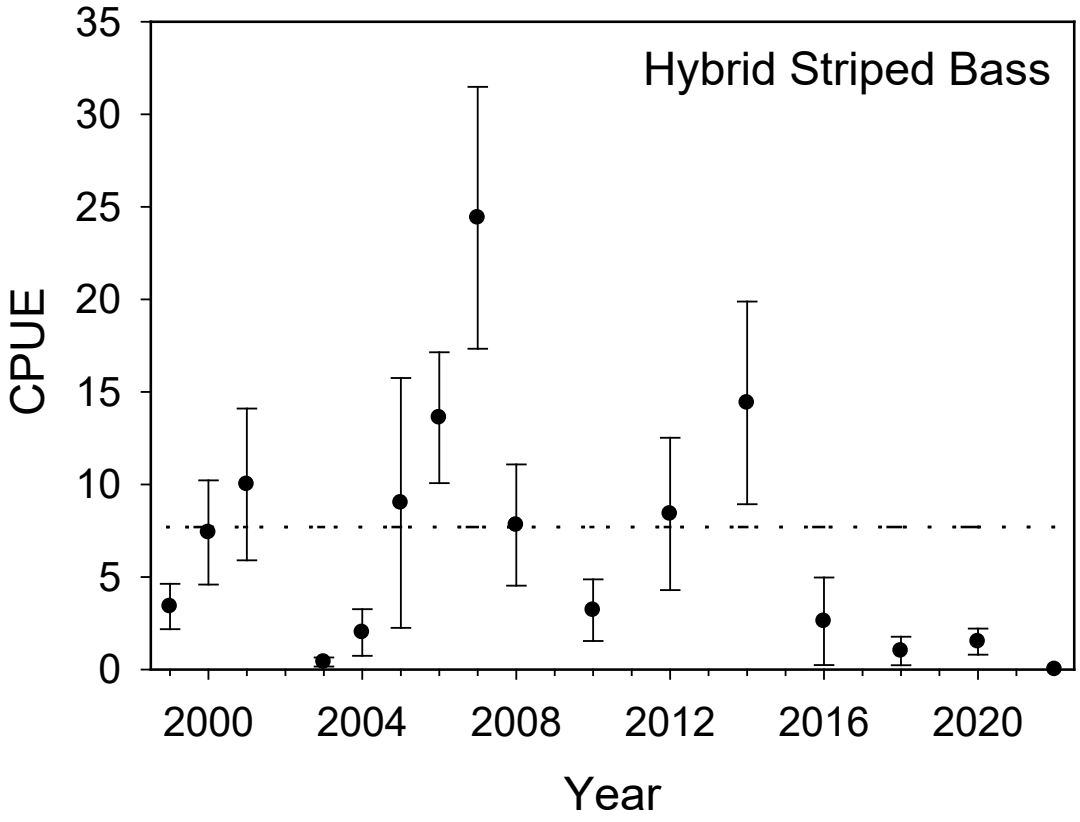


Figure 9: Average number of Hybrid Striped Bass collected per net night (CPUE) at Victor Braunig Reservoir, Texas, 1999-2022 for spring gill net surveys. Error bars represent ±1 standard error. The dashed line demarks the historic average.

Table 10: Creel survey statistics for Hybrid Striped Bass boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, 2017, and 2021. Survey periods were from December 1, 2004 to November 30, 2005, from March 1 to August 31 in 2010 and 2017, and April 1 through September 30 in 2021. Average angler catch rate is for anglers targeting Hybrid Striped Bass and total harvest is the estimated number of Hybrid Striped Bass harvested by all anglers. Relative standard error (RSE) is in parentheses.

Creel survey statistic	2004-2005	2010	2017	2021
Directed effort total (h)	3,315 (29)	1,483 (34)	559 (64)	0
Directed effort/acre (h)	2.6 (29)	1.1 (34)	0.4 (64)	0
Average angler catch rate (fish/h)	0.38 (53)	0.34 (53)	0.0 (0)	0
Total harvest (fish)	1,829 (40)	933 (37)	80 (133)	95 (>100)
Harvest/acre	1.4 (40)	0.7 (37)	<0.1 (132)	0.07 (>100)
Percent legal release	9	3	50	0

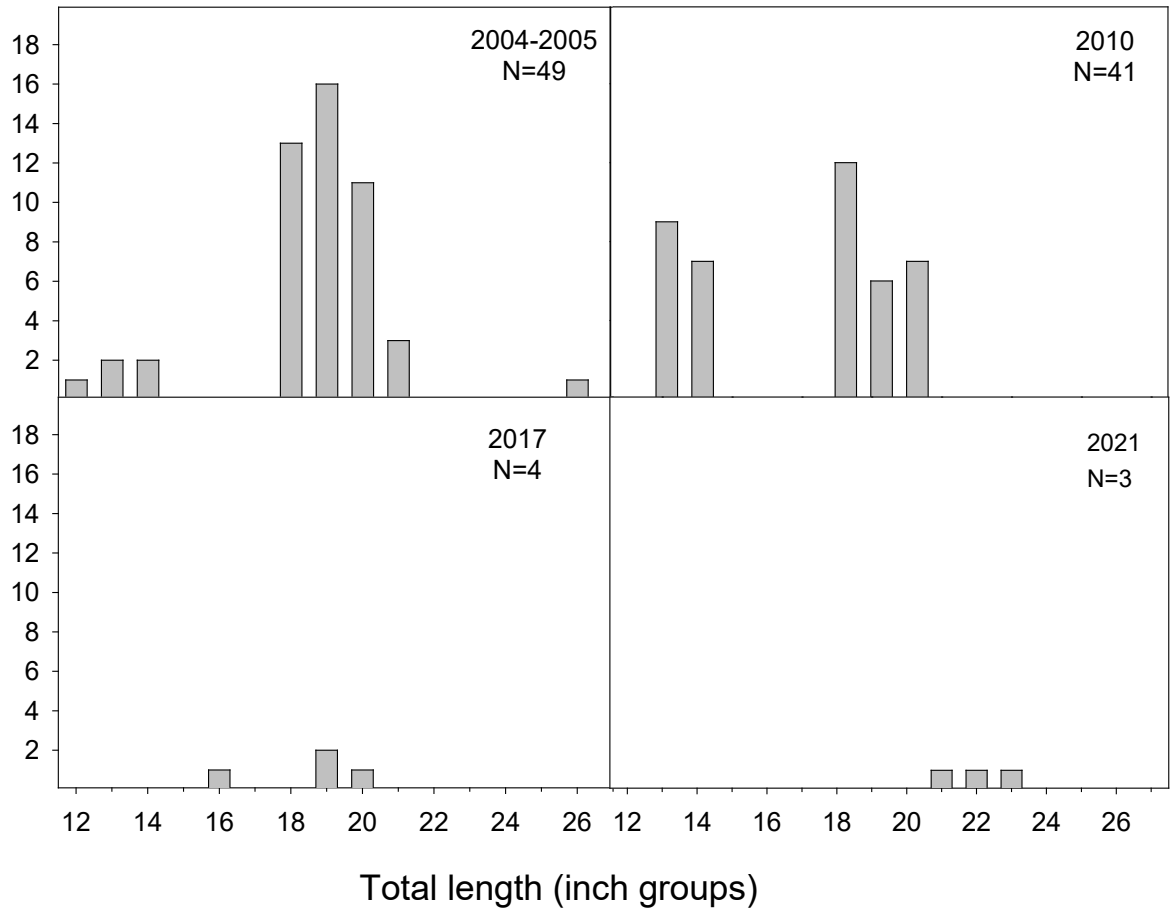


Figure 10: Length frequency distribution of angler-harvested Hybrid Striped Bass for boat anglers for Victor Braunig Reservoir, Texas, from December 2004 through November 2005, March 1 to August 31 in 2010 and 2017, and April 1 to September 30 in 2021. N is the number of harvested Hybrid Striped Bass observed and measured during creel surveys.

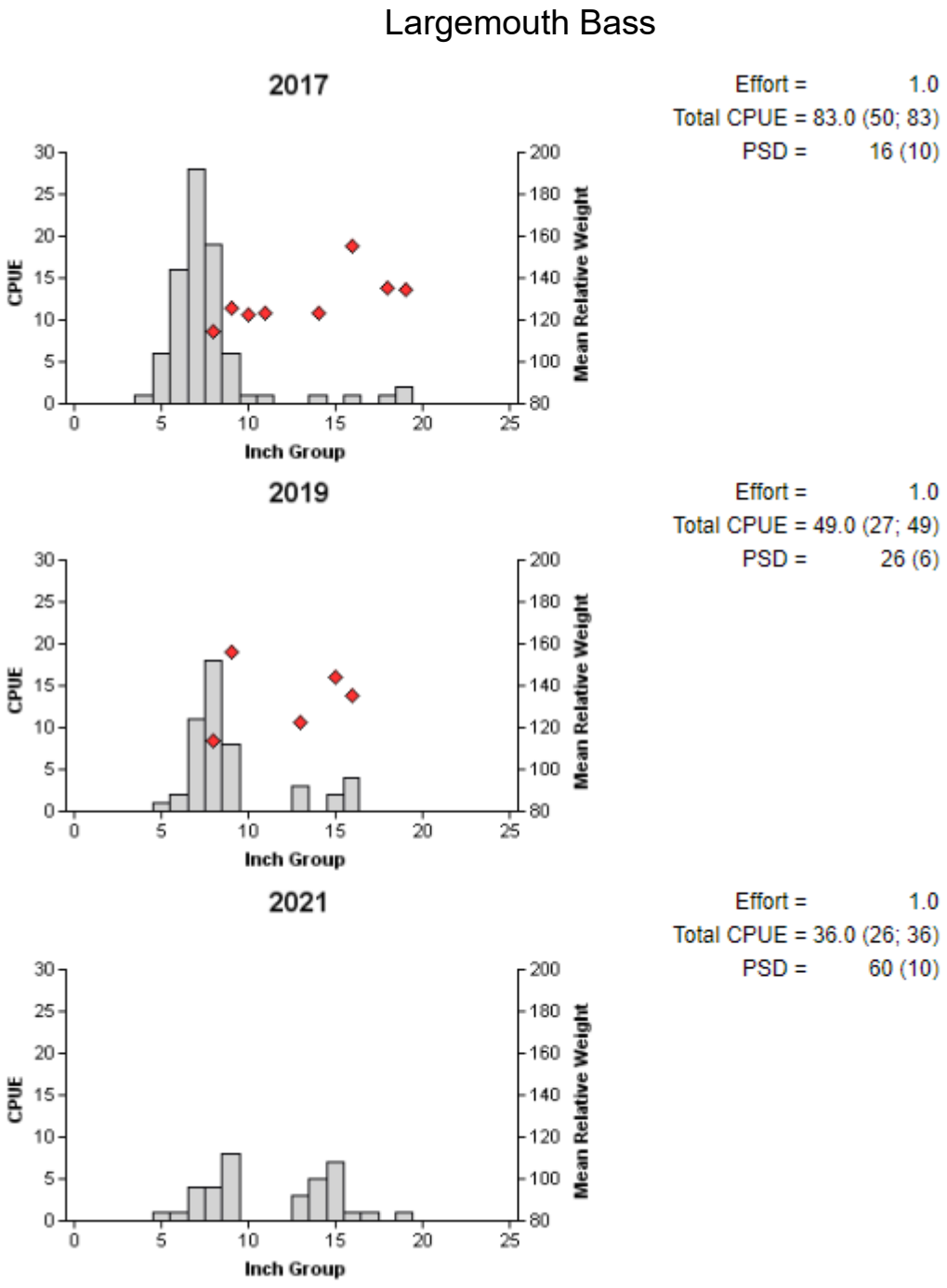


Figure 11. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Victor Braunig Reservoir, Texas, 2017, 2019, and 2021.

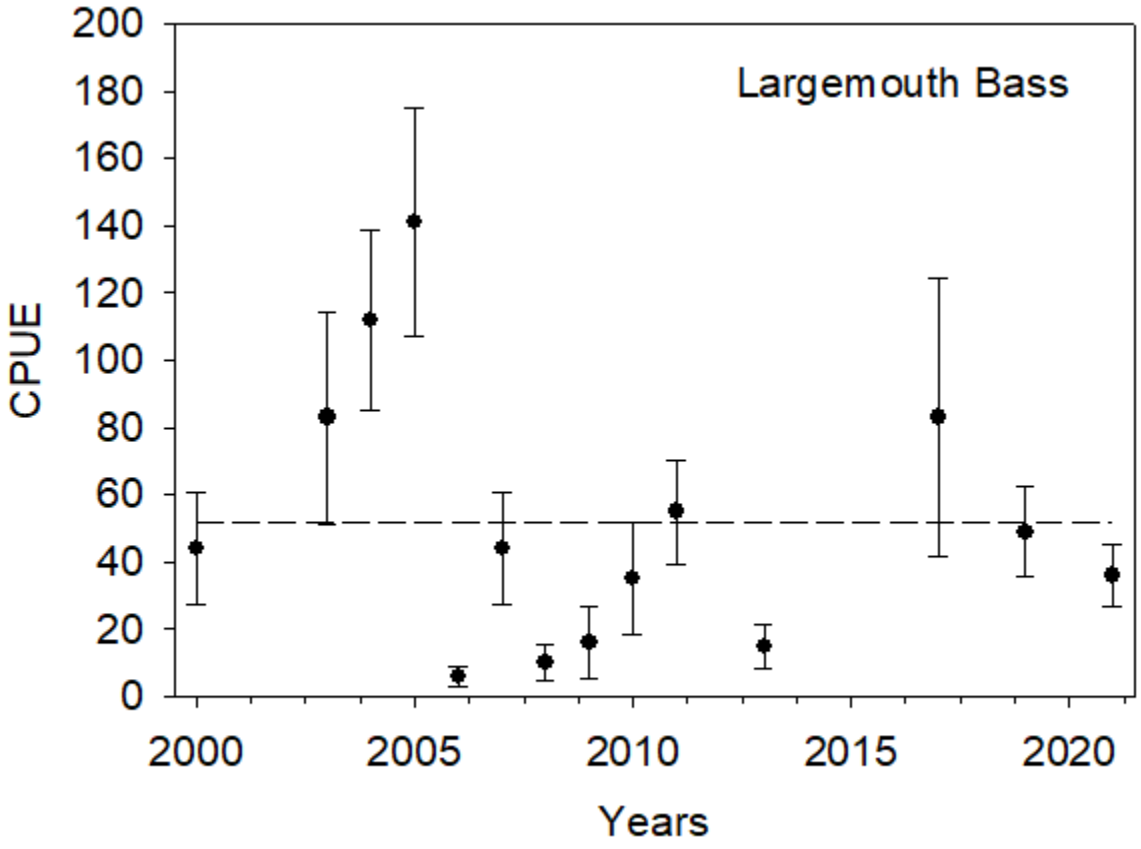


Figure 12: Average number of Largemouth Bass collected per 1 h of electrofishing (CPUE) at Victor Braunig Reservoir, 2000-2021. Error bars represent ±1 standard error and dashed line demarks the historic average.

Table 11: Creel survey statistics for Largemouth Bass boat anglers at Victor Braunig Reservoir, Texas, for 2004-2005, 2010, 2017, and 2021. Survey periods were from December 1, 2004 to November 30, 2005, from March 1 to August 31 in 2010 and 2017, and from April 1 to September 30 in 2021. 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	2021
Directed effort total (h)	2,953 (29)	1,273 (37)	125 (129)	1,108 (58)
Directed effort/acre (h)	2.3 (29)	1.0 (37)	0.1 (129)	0.9 (58)
Average angler catch rate (fish/h)	0.12 (74)	0.10 (81)	0.17 (n/a)	1.44 (33)
Total harvest (fish)	71 (360)	0 (0)	0 (0)	0 (0)
Harvest/acre	<0.1 (360)	0.0 (0)	<0.1 (132)	0 (0)
Percent legal release	77	100	100	100

Red Drum

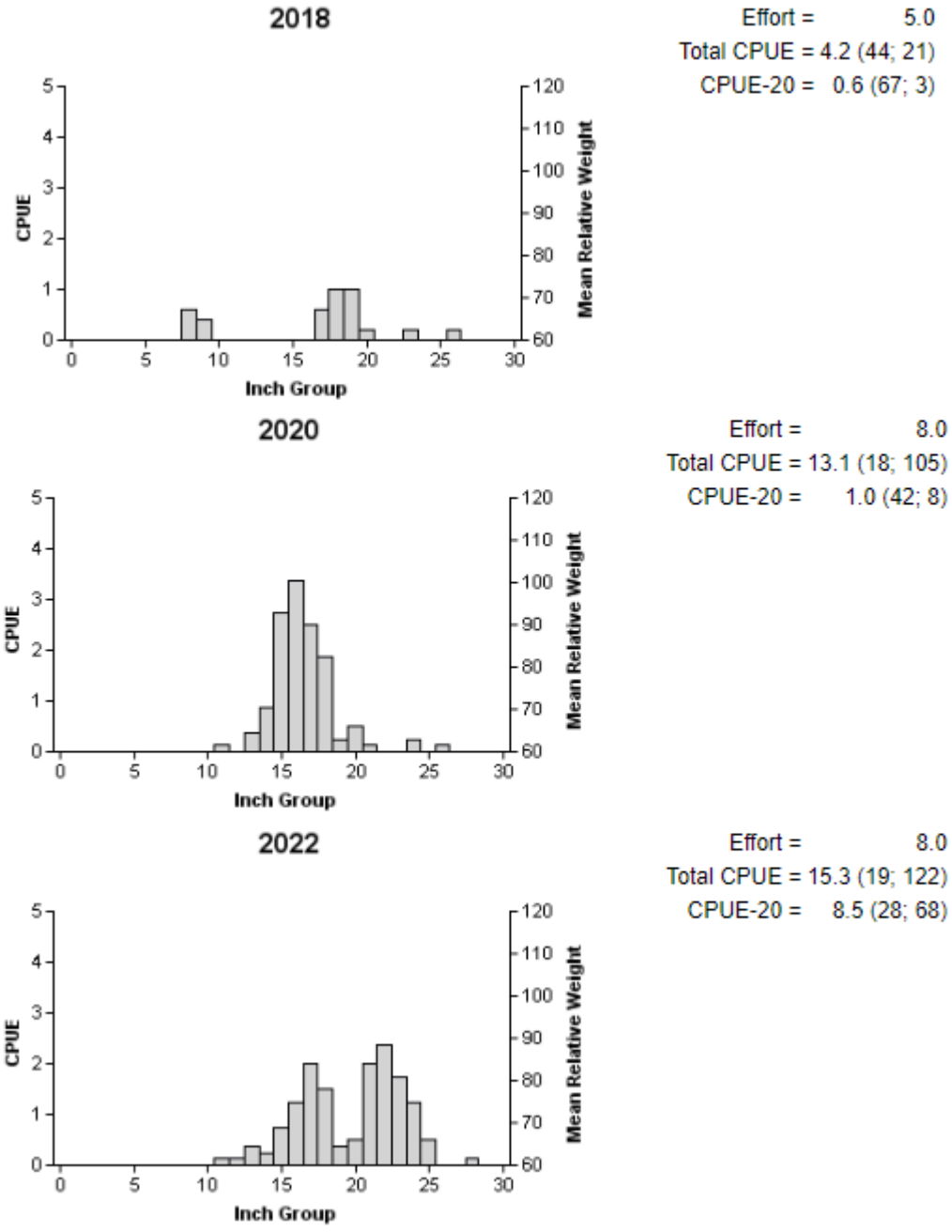


Figure 13: Number of Red Drum caught per hour (CPUE, bars) and population indices (RSE and N for CPUE are in parentheses) for spring gill net surveys, Victor Braunig Reservoir, Texas, 2018, 2020, and 2022.

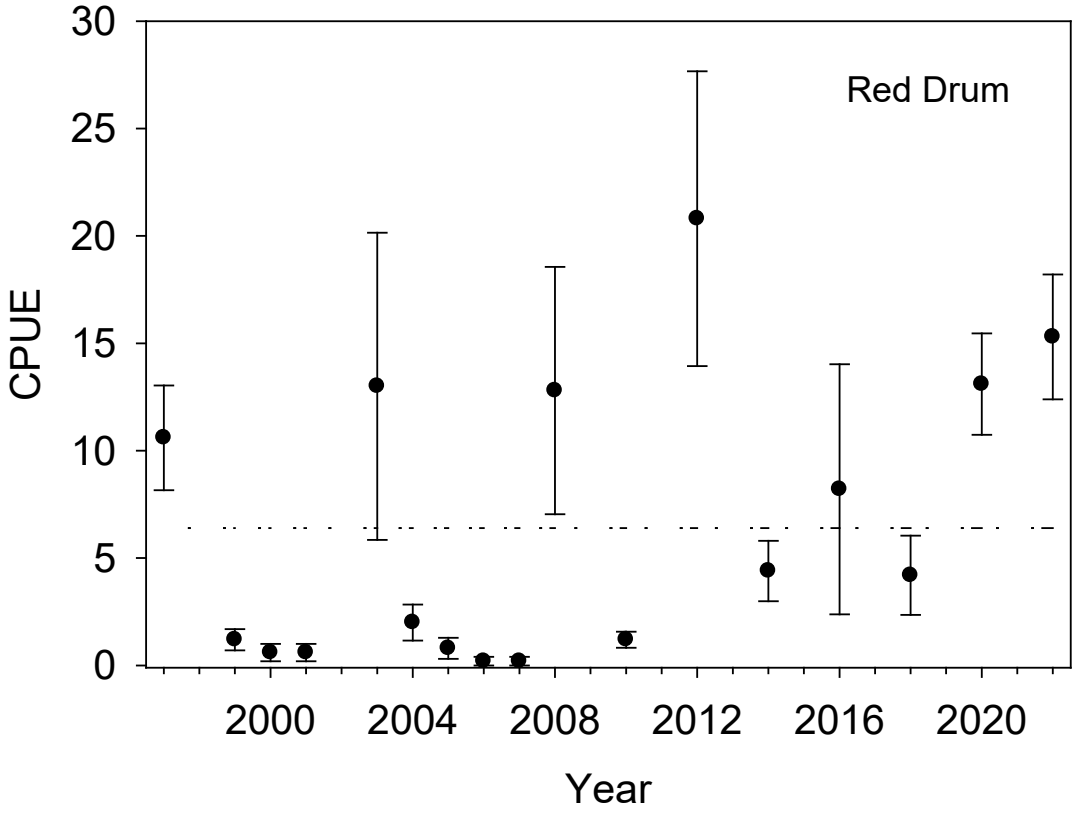


Figure 14: Average number of Red Drum collected per 1 net night (CPUE) at Victor Braunig Reservoir, 1997-2022. Error bars represent ±1 standard error and the dashed line demarks the historic average.

Table 12: 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, from March 1 to August 31 in 2010 and 2017, and from April 1 to September 30 in 2021. 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	2021
Directed effort total (h)	10,248 (18)	11,507 (20)	34,521 (15)	48,242 (19)
Directed effort/acre (h)	7.9 (18)	8.9 (20)	26.6 (15)	37.2 (19)
Average angler catch rate (fish/h)	0.09 (55)	0.18 (31)	0.27 (17)	0.53 (18)
Total harvest (fish)	1,428 (11)	2,738 (28)	2,215 (36)	10,646 (24)
Harvest/acre	1.1 (11)	2.1 (28)	1.7 (36)	8.2 (24)
Percent legal release	77	30	48	21

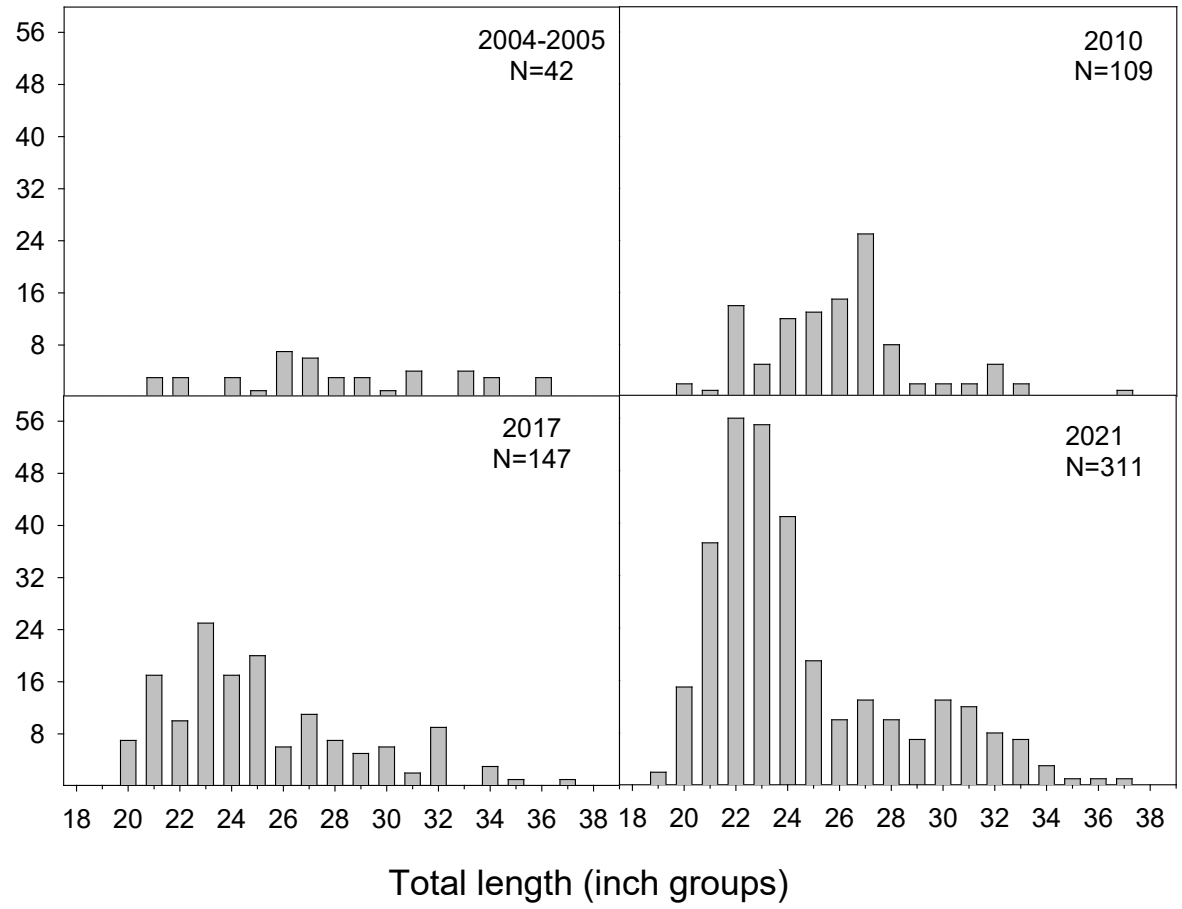


Figure 15: Length frequency distribution of angler-harvested Red Drum for boat anglers for Victor Braunig Reservoir, Texas from December 1, 2004 to November 30, 2005, March 1 to through August 31 in 2010 and 2017 and April 1 to September 30 in 2021. N is the number of harvested Red Drum observed and measured during creel surveys.

Proposed Sampling Schedule

Table 13: 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			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler Access				X
Vegetation				X
Electrofishing – Fall		X		X
Gill netting		X		X
Creel survey		X[1]	X[1]	
Report				X

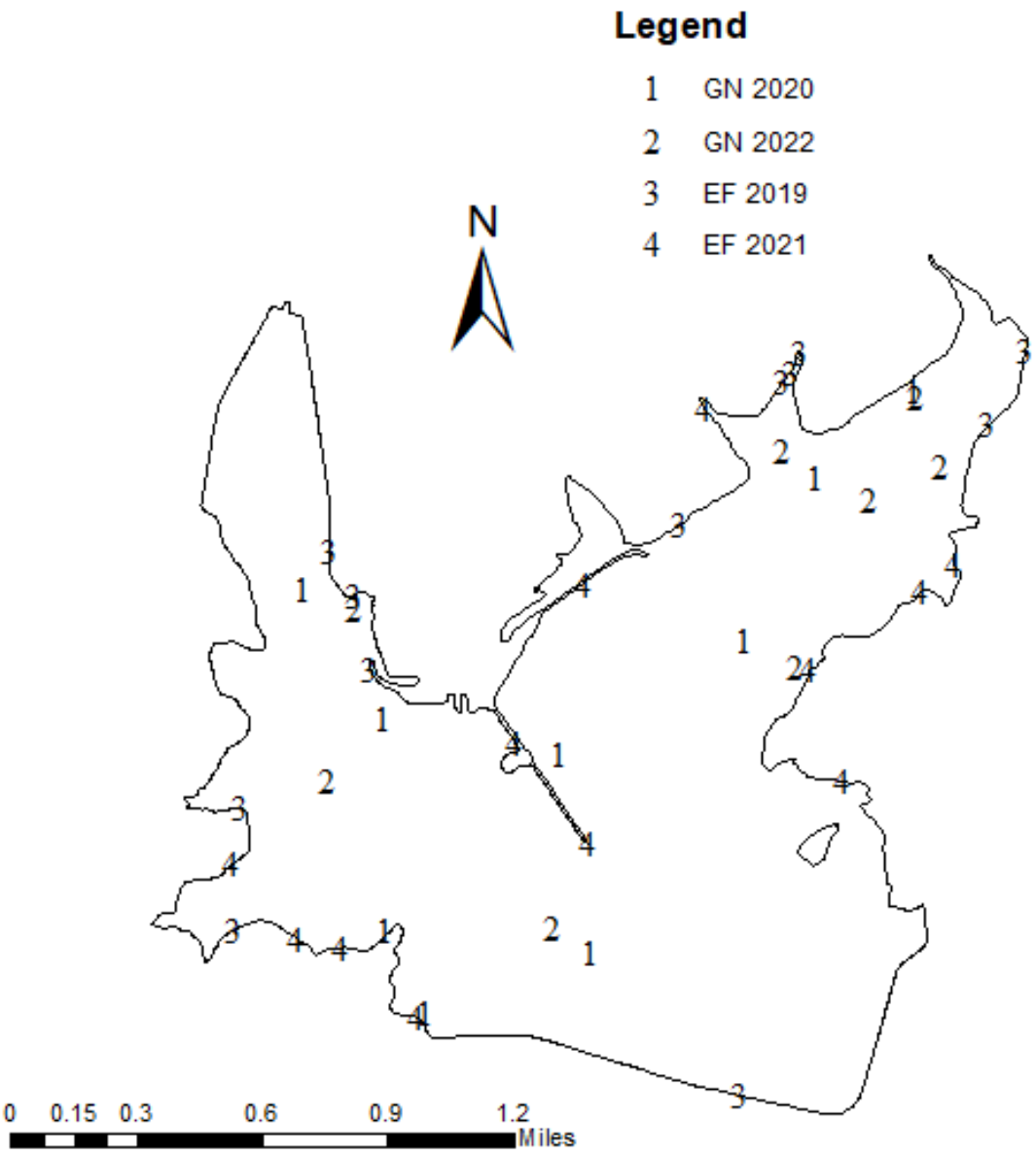
[1]Creel survey sampling will occur during only one of the indicated survey years and that has yet to be determined.

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

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from all gear types from Victor Braunig Reservoir, Texas, 2019-2022. Sampling effort was 8 net nights for gill netting in 2020 and 2022 and 1 hour for electrofishing in 2019 and 2021. Relative standard errors are shown in parentheses.

Species	Gill Netting 2020		Gill Netting 2022		Electrofishing 2019		Electrofishing 2021	
	N	CPUE	N	CPUE	N	CPUE	N	CPUE
Gizzard Shad	694	86.7 (17)	447	55.9 (26)	94	94 (22)	74	74 (49)
Threadfin Shad					555	555 (62)	114	114 (77)
Bluegill	1	0.1 (100)	3	0.4 (100)	87	87 (64)	92	92 (33)
Redear Sunfish	2	0.2 (100)			14	14 (53)	15	15 (47)
Rio Grande Cichlid					21	21 (67)	12	12 (62)
Spotted Gar	6	0.8 (70)	33	4.1 (80)				
Longnose Gar			3	0.4 (100)				
Blue Tilapia	33	4.1 (48)	62	7.8 (84)				
Red Drum	105	13.1 (18)	122	15.3 (19)			2	2 (100)
Largemouth Bass			1	0.1 (100)	49	49 (27)	36	36 (26)
Hybrid Striped Bass	12	1.5 (47)						
Channel Catfish	21	2.6 (44)	22	2.8 (54)				
Common Carp	27	3.4 (33)						

APPENDIX B – Map of sampling locations



Location of sampling sites, Victor Braunig Reservoir, Texas, 2019-2022. Gill net stations are represented by “1” and “2”, while electrofishing stations are represented by “3” and “4”.

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