Travis Reservoir

2022 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 Travis Reservoir were surveyed in 2020 and 2022 using electrofishing. Historical data are presented with the 2020-2022 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: Travis Reservoir is an 18,622-acre impoundment of the Colorado River located in Travis and Burnet Counties, approximately 12 miles northwest of Austin, Texas. It was constructed in 1942 by the Lower Colorado River Authority (LCRA) for purposes of flood control, municipal and industrial water supplies, irrigation, and hydroelectric power. Travis Reservoir has a shoreline development index of 18.3. The basin is steep-sided with relatively few shallow coves and shoal areas. This reservoir experiences extreme water level fluctuations and lies within the Edwards Plateau ecological area. Land use is predominantly ranching in the upper reservoir, with residential properties common in the lower reservoir. Significant stands of aquatic vegetation have never been documented in the reservoir. In June 2017, zebra mussels *Dreissena polymorpha* were discovered in the reservoir and since have established a sustained population.

Management History: The sport fish composition includes White Bass, Largemouth Bass, crappies, and catfishes. Florida Largemouth Bass were originally stocked in the reservoir in the late 1980's to increase Florida Largemouth Bass genetic influence in the population. Blue and Channel Catfish were stocked in the 1970's to help establish a sustainable population. Striped Bass were stocked since 1973 but stockings were terminated after 2017 due to low utilization. The lake is managed under statewide regulations.

Fish Community

- **Prey species:** Threadfin Shad, Gizzard Shad, Bluegill, and Redbreast Sunfish were the predominant prey species. Overall, the forage base was adequate to support sport fish.
- **Catfishes:** Blue Catfish, Channel Catfish, and Flathead Catfish are present in the reservoir. These species were not sampled thus population statistics could not be calculated.
- **Temperate basses:** White Bass and Striped Bass were present in the reservoir. White Bass fishing becomes popular during the spring spawning run up the Pedernales and Colorado rivers. Striped Bass stockings were terminated in 2017, however, there are likely a small number of Striped Bass still persisting in the reservoir. These species were not sampled thus population statistics could not be calculated.
- **Black Basses:** Largemouth Bass abundance remains consistent with the previous two surveys (2018 and 2020). Lake Travis also contains Guadalupe bass. Some Guadalupe bass in the 12- to 15-inch range are available.
- **Crappies:** Black and White Crappie are present in the reservoir. Crappie were not sampled thus population statistics could not be calculated.

Management Strategies: Stock Lone Star Bass which are 2nd generation offspring of pure Florida strain ShareLunker Largemouth Bass that have proven to be able to grow to ≥ 13 pounds, if water levels are at or above 670 feet above mean sea level (amsl). Conduct a year-long creel survey in 2026-2027. Track Largemouth Bass fishing tournament results and Florida Bass genetics to track effectiveness of these stockings. Educate the public about the negative impacts of aquatic invasive species, monitor and record potential impacts of zebra mussels on sport fish in the reservoir. Conduct bass-only electrofishing survey in 2024 and general monitoring electrofishing survey in 2026. Access and vegetation surveys will be conducted in 2026.

Introduction

This document is a summary of fisheries data collected from Travis Reservoir in 2020-2022. 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 primary prey species. Historical data are presented with the 2020 and 2022 data for comparison.

Reservoir Description

Travis Reservoir is a 18,622-acre impoundment of the Colorado River located in Travis and Burnet Counties, approximately 12 miles northwest of Austin, Texas. It was constructed in 1942 by the Lower Colorado River Authority (LCRA) for purposes of flood control, municipal and industrial water supplies, irrigation, and hydroelectric power. Travis Reservoir has a shoreline development index of 18.3. The basin is steep-sided with relatively few shallow coves and shoal areas. This reservoir experiences extreme water level fluctuations. The reservoir experienced extreme drought conditions from 2011 to 2015, with reduced water levels of more than 50 feet. Water levels increased above or close to conservation pool after 2015 bug have begun to decline again beginning in 2020 and continuing into 2023 (Figure 1). The reservoir lies within the Edwards Plateau ecological area and is mesotrophic with a mean TSI chl-*a* of 40.8, and a 10-year change of -1.2 (Texas Commission on Environmental Quality 2022). Land use is predominantly ranching in the upper reservoir, with residential properties common in the lower reservoir. Littoral habitat at time of sampling consisted primarily of natural and rocky shorelines with piers and docks. In 2014, the non-native species hydrilla (*Hydrilla verticillate*) was documented (13.9 acres) but did not persist into the following year. In 2022, small amounts of hydrilla and other submerged aquatic vegetation began to colonize the reservoir (>1% of the reservoir surface area). In June 2017, zebra mussels *Dreissena polymorpha* were discovered in the reservoir, and since have established a sustained population. The rocky nature of the lake and hard water provide preferred conditions for this species to thrive, impacting stakeholders. Water fluctuations will likely become more prominent with the accelerated population growth around Austin, which will increase water demands from this reservoir. Other descriptive characteristics for Travis Reservoir are in Table 1.

Angler Access

Availability of boat access on Travis Reservoir is highly sensitive to water level variation (Daugherty et al. 2011). At water levels above 667 msl, angler access was excellent for boat anglers. 11 concrete public boat ramps were available when water level exceeded this level. As water level falls due to general releases, water consumption, and evaporation, the boat access availability declines. Under low-water conditions (<650 msl) boat access was poor and only two public boat ramps were available, although anglers frequently launch boats from the shoreline using four-wheel drive vehicles. Increased municipal water demand and potential effects of climate change (i.e., less rainfall) may make future recreational boating access to Travis Reservoir difficult (Daugherty et al. 2011). Bank fishing was vastly available at 18 public parks. Americans with Disabilities Act (ADA) accessibility was poor with no specifically designated fishing sites available. Additional boat ramp characteristics are in Table 2.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Farooqi and De Jesus 2019) included:

1. Reducing predator competition may help improve Largemouth Bass performance.

   Action: Striped Bass stockings into Lake Travis were terminated after 2017. Annual stocking of Striped Bass has occurred since 1973 to maintain a fishery. The creel survey in 2017-18 showed no directed effort for Striped Bass

2. Largemouth Bass growth and condition did not meet expectations following the increase in water levels in 2015. This may be attributable to high Largemouth Bass stocking rates and the infestation of zebra mussels in 2017. Further, anecdotal reports indicate that anglers were catching high numbers of Largemouth Bass, but many were undersized.

   Action: Discontinued stocking of Florida Largemouth Bass to reduce the crowding potential of young-of-year fish. Coordinated with LCRA to gather historic water quality data to determine pre- and post-trends regarding effects from zebra mussels and conducted an additional bass-only electrofishing survey in fall 2020. Conducted a Category-3 age-and-growth evaluation on Largemouth Bass during the fall 2020 survey.

3. Address suite of strategies to develop awareness and prevent the spread of invasive species, particularly, zebra mussels, present in Travis reservoir.

   Action: Worked with local authorities to install ramp stencils and signage to make boaters aware that the lake became infested with zebra mussels. Provided interviews and presentation to local stakeholders regarding invasive species. Wrote press releases and conducted news media interviews to educate the public of the newly-infested reservoir.

Harvest regulation history: The reservoir has historically been managed with statewide harvest regulations. White Bass were managed under an experimental 12-inch minimum length limit from 1995 to 2003. This was reduced to the statewide minimum length limit of 10 inches in September 2003, as analyses suggested that population densities were probably determined by environmental factors (inflow and water level) rather than angler harvest. Current regulations are found in Table 3.

Stocking history: Florida Largemouth Bass, Striped Bass, Blue Catfish, and Channel Catfish have been important species stocked in the reservoir. Striped Bass were stocked at a rate of 5/acre since 2002 to maintain a fishery. Striped Bass stockings were terminated after 2017. Florida Largemouth Bass were stocked in 1988, 2008, 2011, 2015, 2016, and 2019 to increase Florida Largemouth Bass genetic influence. Largemouth Bass Sharelunker fingerlings were stocked in 2021. Blue Catfish were stocked in 1979 and a self-sustaining population is now present. The complete stocking history is in Table 4.

Vegetation/habitat management history: Significant stands of aquatic vegetation have never been documented in Travis Reservoir in the past probably due to extended periods of low-water levels and predominance of steep sided banks. Most of the shoreline habitat was comprised of rocky shoreline/bluff with piers and docks, and natural shoreline. Water levels at Travis Reservoir fluctuated widely, but shoreline habitat in the middle and lower portions of the reservoir change very little because the shorelines were generally steep-sided.

Water transfer: Travis Reservoir is primarily used for flood control, municipal and agricultural water supply, and recreation. The reservoir forms part of the chain of “Highland Lakes” on the Colorado River, receiving water from Marble Falls Reservoir and discharging into Austin Reservoir. There are no inter-basin transfers.

Methods

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

Electrofishing – Largemouth Bass, sunfishes, Gizzard Shad, and Threadfin Shad were collected by electrofishing (2 hours at 24, 5-min stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Ages for Largemouth Bass were determined using otoliths from 200 randomly-selected fish (> 6 inches) captured during the fall 2020 bass only electrofishing survey.

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

Habitat – A structural habitat survey and aquatic vegetation survey were conducted in 2022 (Appendix A). Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Water level – Source for water level data was the Lower Colorado River Authority (LCRA 2023).

Results and Discussion

Habitat: Littoral zone structural habitat consisted primarily of natural shoreline and shorelines with rocky features, with and without piers and docks (Table 6). The rocky, steep-sided nature of the reservoir, along with water level fluctuations, makes it difficult for aquatic vegetation to establish. A small band of hydrilla was present along most of the shoreline of the reservoir. Southern Naiad and pondweed were also present with total vegetation coverage less than 2% of the reservoir (Appendix A). This vegetation will likely disappear when water levels increase, as has happened with isolated vegetation colonies in the past.

Prey species: Electrofishing catch rates of Gizzard Shad and Threadfin Shad were 42.0/h and 31.5/h, respectively (Appendix B). Index of Vulnerability (IOV) for Gizzard Shad improved from 7.0 in 2018 to 42.0 in 2022 (Figure 2). Total CPUE of Gizzard Shad was considerably lower in 2022 (42.0/h) compared to the 2018 (64.5/h) survey. Total CPUE (112.5/h) of Redbreast Sunfish in 2022 was substantially higher to 2018 (57.0) and 2014 (53.3/h). Size structure continued to be dominated by small-sized individuals between 4 and 6 inches (Figure 3). Total CPUE (442.0/h) of Bluegill in 2022 was much higher than in 2018 (98.0/h) and 2014 (74.7/h). Bluegill CPUE was the highest recorded in any survey since 1988 and may be attributable to a narrow band of hydrilla that was prevalent along the shoreline during the fall of 2022. Size structure continued to be dominated by smaller individuals (Figure 4).

Catfishes: Catfish species were not sampled with set objectives. Historically, Catfishes have shown low abundance and angler effort. No sampling effort was made for these species since the last report.

Temperate Basses: White Bass were not sampled with set objectives. Gill netting was ceased after 2019.

Striped Bass were not sampled with set objectives and Striped Bass stockings were terminated after 2017. Historically, Striped Bass collected in gill nets at low catch rates and the 2018 creel survey showed low directed fishing effort and total harvest for Striped Bass.

Black Basses: The electrofishing catch rate of stock-length Largemouth Bass was 90.0/h in 2022, similar to the 110.5/h in 2020 and 106.0/h in 2018 (Figure 5). Size structure was adequate for a quality

fishery, as PSD was 66, similar to the 71 and 75 recorded in 2020 and 2018, respectively (Figure 5). Body condition in 2018 was poor (relative weight under 90) for nearly all inch classes of fish (Figure 5). However, body condition has consistently been low for Largemouth Bass through many historical surveys. Relative weight for 14-inch Largemouth Bass have ranged from 81 – 90 in every electrofishing survey since 1988 (13 total surveys). Growth of Largemouth Bass in Lake Travis remained poor; average age at 14 inches of length was approximately 3.3 years (N = 49, 13.0 - 14.9 inches). However, growth appeared to level off at around age 4 with bass taking almost 3 years to go from 16 inches to 18 inches (N = 202; range = 0 – 7 years) (Figure 6). Growth rates evident in the 2022 survey appear consistent with growth rates documented in previous surveys. There are multiple year classes within size groups in Lake Travis (Figure 6), and large individuals are not frequently encountered during surveys.

Guadalupe Bass were present in Travis Reservoir and are an important part of the black bass fishery. Total electrofishing CPUE was 40.0/h which was the second highest electrofishing catch rate of Guadalupe Bass on Lake Travis (Figure 7).

Crappie: Both Black Crappie and White Crappie are present in Travis Reservoir. Crappie were not monitored since the last reporting cycle.

Fisheries Management Plan for Travis Reservoir, Texas

Prepared – July 2023

ISSUE 1: Largemouth Bass over 20 inches are not effectively sampled with electrofishing. Largemouth Bass tournament results from Travis Reservoir indicate Largemouth Bass over 8 pounds are commonly caught. Further, the waterbody record (15.32 pound) Largemouth Bass was caught in March of 2021 indicating the reservoir has trophy potential. Lake Travis has been lightly stocked with Florida Largemouth Bas Historically and genetic influence of Florida Largemouth Bass been low. Increased Florida Largemouth Bass influence can increase the potential for Largemouth Bass over 8 pounds.

MANAGEMENT STRATEGY

1. Stock Lone Star Bass in spring 2024 at a rate of 1000/km of shoreline if the reservoir is at or above 670 msl.
2. Use Largemouth Bass fishing tournament results and Florida Largemouth Bass genetic analysis to track the effectiveness of these stockings.
3. Conduct a creel survey in 2026-2027 to evaluate catch data.

ISSUE 2: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. Zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, plugging engine cooling systems and decreasing primary productivity. Boats from all areas of the United States are commonly transferred to Travis Reservoir, often from areas where the incidence of zebra mussels is high. The potential for introduction of this species, in conjunction with the predominantly hard substrate make the risk for establishment of this species in Travis Reservoir is high. The financial costs of controlling and/or eradicating this species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft or inter-basin transfer is a serious threat to all public waters of the state. Decreases in primary productivity due to zebra mussel introduction could significantly decrease recruitment of sport fishes in Travis Reservoir.

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 zebra mussels and other 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 (2023–2027)

Sport fish, forage fish, and other important fishes

Sport fishes in Travis Reservoir include Largemouth Bass, Guadalupe Bass, Striped Bass, White Bass, White Crappie, Black Crappie, Channel Catfish, Blue Catfish, and Flathead Catfish. Predominant forage fish species include Gizzard Shad, Threadfin Shad, Redbreast Sunfish, and Bluegill.

Underutilized or low-density fisheries

Channel Catfish: Channel Catfish are present in low density at Travis Reservoir, based on relative abundance estimates from our monitoring program. The gill netting catch rate of stock-size Channel Catfish ranged between 0.2/nn to 2.4/nn since 2003, with the lowest in 2015. However, directed effort for this species was low during the 2017-18 angler creel survey. Sampling for Channel Catfish is not a priority for the 2023-2027 sampling period. Angling effort, catch rates, and harvest will be monitored using a creel survey in 2026-2027.

Blue Catfish: Blue Catfish are present in low to moderate density at Travis Reservoir, based on relative abundance estimates from our monitoring program. The gill netting catch rate of stock-size Blue Catfish ranged between 0.8/nn to 2.6/nn since 2003, with the highest in 2019. However, directed effort for this species was low during the 2017-18 angler creel survey. Sampling for Blue Catfish is not a priority for the 2023-2027 sampling period. Angling effort, catch rates, and harvest will be monitored using a creel survey in 2026-2027.

Flathead Catfish: Flathead Catfish are present in low to moderate density at Travis Reservoir, based on relative abundance estimates from our monitoring program. The gill netting catch rate of stock-size Flathead Catfish ranged between 0.4/nn to 1.9/nn since 2003, with the lowest in 2017. However, directed effort for this species was low during the 2017-18 angler creel survey. Sampling for Blue Catfish is not a priority for the 2023-2027 sampling period. Angling effort, catch rates, and harvest will be monitored using a creel survey in 2026-2027.

Crappie: White and Black Crappie are present at Travis Reservoir. Historic trap netting surveys have failed to capture enough fish to generate a confident estimate. However, directed effort for this species was low during the 2017-18 angler creel survey. Angling effort, catch rates, and harvest will be monitored using a creel survey in 2026-2027.

Guadalupe Bass: Guadalupe Bass are present in low to moderate density in Travis Reservoir, based on historic catch rates generated by electrofishing surveys. The electrofishing catch rates of Guadalupe Bass ranged between 17.5/h to 40.5/h since 2003. However, directed effort for this species was low during the 2017-18 angler creel survey. General monitoring with no established sampling objectives during targeted electrofishing for Largemouth Bass will be sufficient for this species.

White Bass: White Bass relative abundance has remained stable, based on historic gill netting surveys. White Bass offer seasonal fishing opportunities at Travis Reservoir. Angling effort, catch rates, and harvest will be monitored using a creel survey in 2026-2027.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass: Largemouth Bass is the most targeted species by anglers at Travis Reservoir with more than 70% of all angler effort directed towards Largemouth Bass. The reservoir attracts many black bass tournaments, that reveal commonly caught quality- to trophy-size individuals. Historical sampling data indicates 24 electrofishing stations are typically sufficient to estimate stock-size CPUE for Largemouth Bass with a RSE ≤ 25 and to collect at least 50 stock-size fish for size structure estimation. A minimum of 24 randomly selected 5-min electrofishing sites will be sampled in a bass only electrofishing survey in fall 2024 and a complete electrofishing survey in fall 2026 to determine relative abundance, size

structure, condition, and growth. Exclusive of the original 24 random stations, 6 additional random stations will be pre-determined in the event some extra sampling is necessary to meet objectives. If failure to achieve either objective has occurred after 30 stations, no other efforts will be expended for this species. A Largemouth Bass genetic evaluation will be conducted in 2024. A year-long creel survey in 2026-2027 will be conducted to gather Largemouth Bass catch characteristics and angler opinions, which was last carried out in 2017/2018. A year-long creel survey in 2025-2026 will be conducted to gather Largemouth Bass catch characteristics and angler opinions, which was last carried out in 2004.

Age and growth will be determined for Largemouth Bass using otoliths from 13 individuals between 13.0 and 14.9 inches (Category 2 evaluation, TPWD, Inland Fisheries Division, unpublished manual revised 2017) in the 2024 and 2026 surveys to continue assessing the time required for Largemouth Bass to grow to the minimum length limit.

Gizzard Shad, Threadfin Shad, and sunfishes: Gizzard Shad, Threadfin Shad, Redbreast Sunfish, and Bluegill are the primary forage at Travis Reservoir. Like Largemouth Bass, trend data on CPUE and size structure of these sunfish have been collected every four years since 1998. Abundance of Threadfin Shad was also measured as a function of CPUE during those surveys and will remain the main sampling objective to measure Threadfin Shad abundance. Continuation of sampling, as per Largemouth Bass above, will allow for monitoring of large-scale changes in sunfish relative abundance and size structure. No additional effort will be expended to achieve an RSE-25 for CPUE of sunfish. Instead, Largemouth Bass body condition could indirectly gauge forage availability.

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Tables and Figures

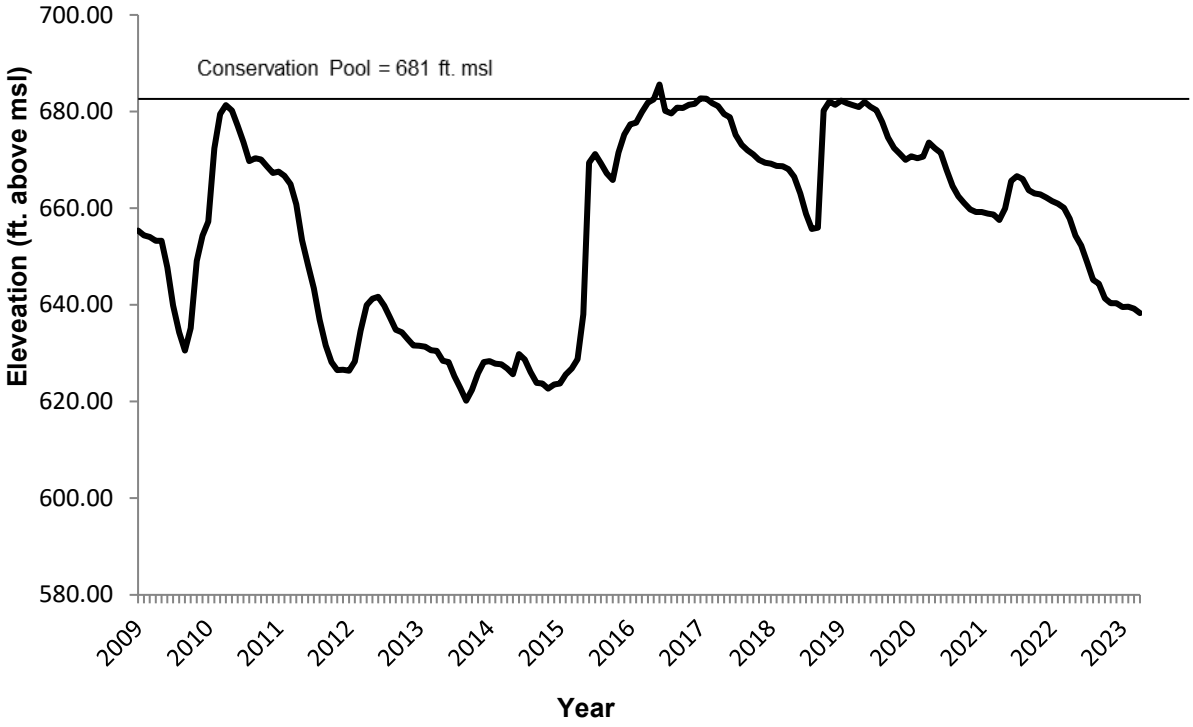


Figure 1. Mean monthly water level elevations in feet above mean sea level (MSL) recorded for Travis Reservoir, Texas.

Table 1. Characteristics of Travis Reservoir, Texas.

Characteristic	Description
Year constructed	1942
Controlling authority	Lower Colorado River Authority
County	Burnett and Travis
Reservoir type	Mainstem: Colorado River
Shoreline Development Index	18.3
Conductivity	315 µS/cm

Table 2. Boat ramp characteristics for Travis Reservoir, Texas, August 2022. Reservoir elevation at time of survey was 645 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Closure Elevation (ft.)	Condition
Arkansas Bend	30.402735 -97.952565	Y	15	661	Unimproved
Bob Wentz at Windy Point	30.413122 -97.896830	Y	30	653	Unimproved-sailboats only
Camp Creek Park	30.563203 -98.191203	Y	10	NA	Good
Camp Pedernales	30.427056 -98.089623	Y	20	NA	Good
Cypress Creek Park	30.426549 -97.872510	Y	15	667	Good
Dink Pearson Park	30.385470 -97.984830	N	12	653	Unimproved (closed as of August 2022)
Gloster Bend	30.466324 -98.076702	N	10	662	Good
Hippie Hollow	30.409322 -97.877576	Y	17	653	Good
Jones Brothers Park	30.487351 -97.925711	Y	>100	645	New 2-lane ramp; Other two ramps unimproved
Mansfield Dam Park	30.397921 -97.908991	Y	112	633	Good
Pace Bend, Collier Cove	30.461510 -98.029834	Y	30	653	Good
Pace Bend, Tatum Cove	30.452896 -98.016154	Y	15	653	Good
Pace Bend, Tournament Point	30.475220 -98.007220	Y	100	633	New low- water ramp, no paved parking or turnaround
Sandy Creek Park	30.467337 -97.907217	Y	15	648	Good
The Narrows	30.523072 -98.147638	Y	29	NA	Good

Table 3. Harvest regulations for Travis Reservoir, Texas.

Channel and Blue Catfish, their hybrids and subspecies	25[a] (in any combination)	None
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Striped	5	18-inch minimum
Bass, Largemouth	5[b]	14-inch minimum
Bass, Guadalupe	5[b]	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

[a] Daily bag for Channel Catfish, Blue Catfish, their hybrids and subspecies = 25 fish in any combination, only 10 can be 20 inches or greater in length.

[b] Daily bag for Largemouth Bass and Guadalupe Bass = 5 fish in any combination.

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

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	1979	101,313	UNK	-
	Total	101,313		
Channel Catfish	1971	13,000	AFGL	7.9
	1972	87,000	AFGL	7.9
	2005	457	ADL	15.4
	2008	400	ADL	13
	2018	617	ADL	13.5
	Total	101,474		
Florida Largemouth Bass	1988	474,535	FRY	1
	2008	464,568	FGL	1.7
	2011	232,106	FGL	1.7
	2015	424,979	FGL	1.7
	2016	347,287	FGL	1.7
	2019	358,634	FGL	1.7
	Total	2,302,109		
Largemouth Bass	1967	238,000	UNK	-
	Total	238,000		
ShareLunker Largemouth Bass [a]	2021	10,114	FGL	1.8
	Total	10,114		
Smallmouth Bass	1977	211,400	UNK	-
	1978	196,050	UNK	-
	1979	343,940	UNK	-
	Total	751,390		

Table 4, Continued

Species	Year	Number	Life Stage	Mean TL (in)
Striped Bass	1973	206,285	FGL	1.7
	1974	163,611	FGL	1.7
	1976	175,854	UNK	-
	1978	90,250	UNK	-
	1981	180,000	UNK	-
	1983	183,699	UNK	-
	1991	94,600	FGL	1.4
	2002	110,490	FGL	1.5
	2005	96,000	FGL	1.6
	2006	98,842	FGL	1.9
	2007	103,569	FGL	1.8
	2008	94,734	FGL	1.7
	2009	101,813	FGL	1.6
	2010	99,097	FGL	1.8
	2013	87,425	FGL	2.1
	2013	579,363	FRY	0.2
	2014	88,509	FGL	1.6
	2015	63,021	FGL	1.8
	2015	442,047	FRY	0.2
	2016	454,767	FRY	0.2
	2017	86,326	FGL	1.9
	Total	3,600,302		
Walleye	1976	190,000	FRY	0.2
	1977	3,666,925	FRY	0.2
	1978	4,391,640	FRY	0.2
	1979	4,503,500	FRY	0.2
	Total	12,752,065		

[a] ShareLunker Largemouth Bass are 1st generation offspring from angler-donated Largemouth Bass ≥ 13 pounds from the Toyota ShareLunker program.

Table 5. Objective-based sampling plan components for Travis Reservoir, Texas 2022.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Abundance	CPUE–Stock	RSE-Stock ≤ 25
	Size structure	PSD, length frequency	N ≥ 50 stock
	Age-and-growth	Age at 14 inches	N = 200, >150 mm
	Condition	W_r	10 fish/inch group (max)
Sunfish [a]	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
Gizzard Shad [a]	Abundance	CPUE–Total	RSE ≤ 25
	Size structure	PSD, length frequency	N ≥ 50
	Prey availability	IOV	N ≥ 50

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

Table 6. Survey of structural habitat types, Travis Reservoir, Texas, 2022. Shoreline habitat type units are in miles and standing timber is acres. The lake was 41 feet below conservation pool (681 ft msl) at the time of survey.

Habitat type	Estimate	% of total

Bulkhead	0.4 miles	0.1
Gravel shoreline	10.0 miles	3.1
Gravel with piers and docks	0.8 miles	0.3
Rocky shoreline	44.3 miles	13.8
Rocky with piers and docks	49.1 miles	15.3
Rocky bluff	50.9 miles	15.8
Rocky bluff with piers and docks	78.8 miles	24.5
Natural shoreline	80.1 miles	24.9
Natural with piers and docks	7.3 miles	2.3

Gizzard Shad

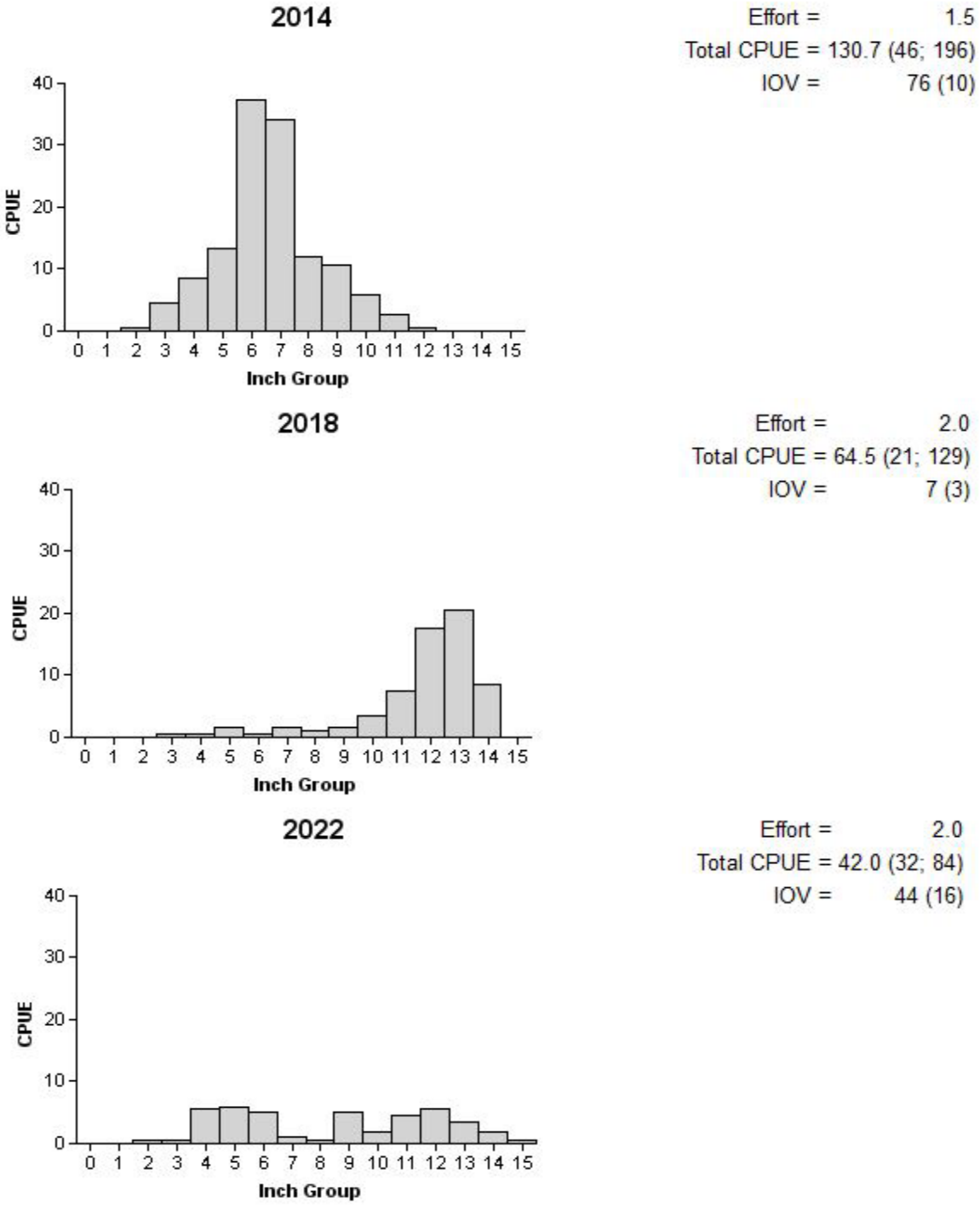


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Travis Reservoir, Texas, 2014, 2018, and 2022.

Redbreast Sunfish

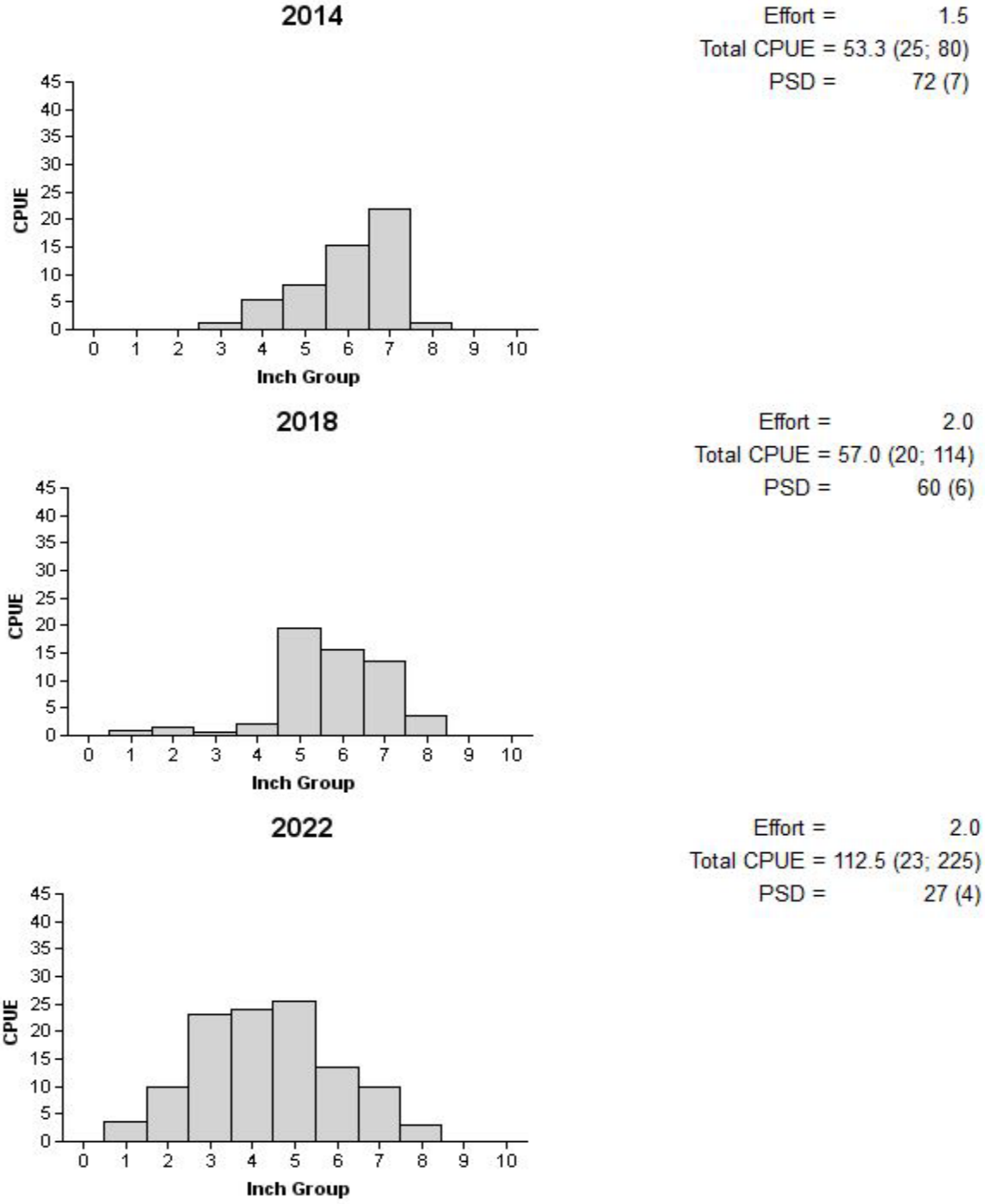


Figure 3. Number of Redbreast Sunfish caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Travis Reservoir, Texas, 2014, 2018, and 2022.

Bluegill

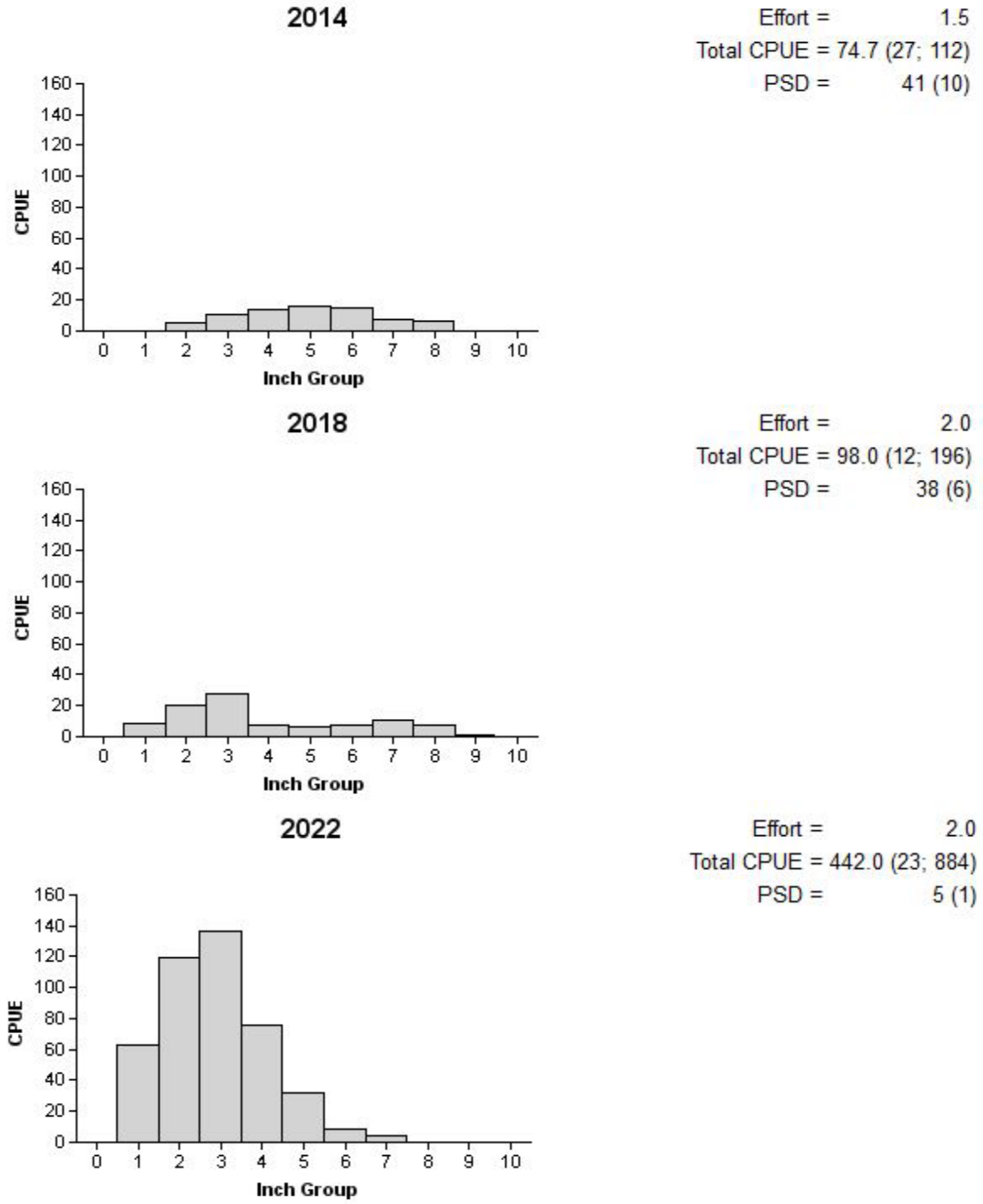


Figure 4. Number of Bluegill caught per net night (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Travis Reservoir, Texas, 2014, 2018, and 2022.

Largemouth Bass

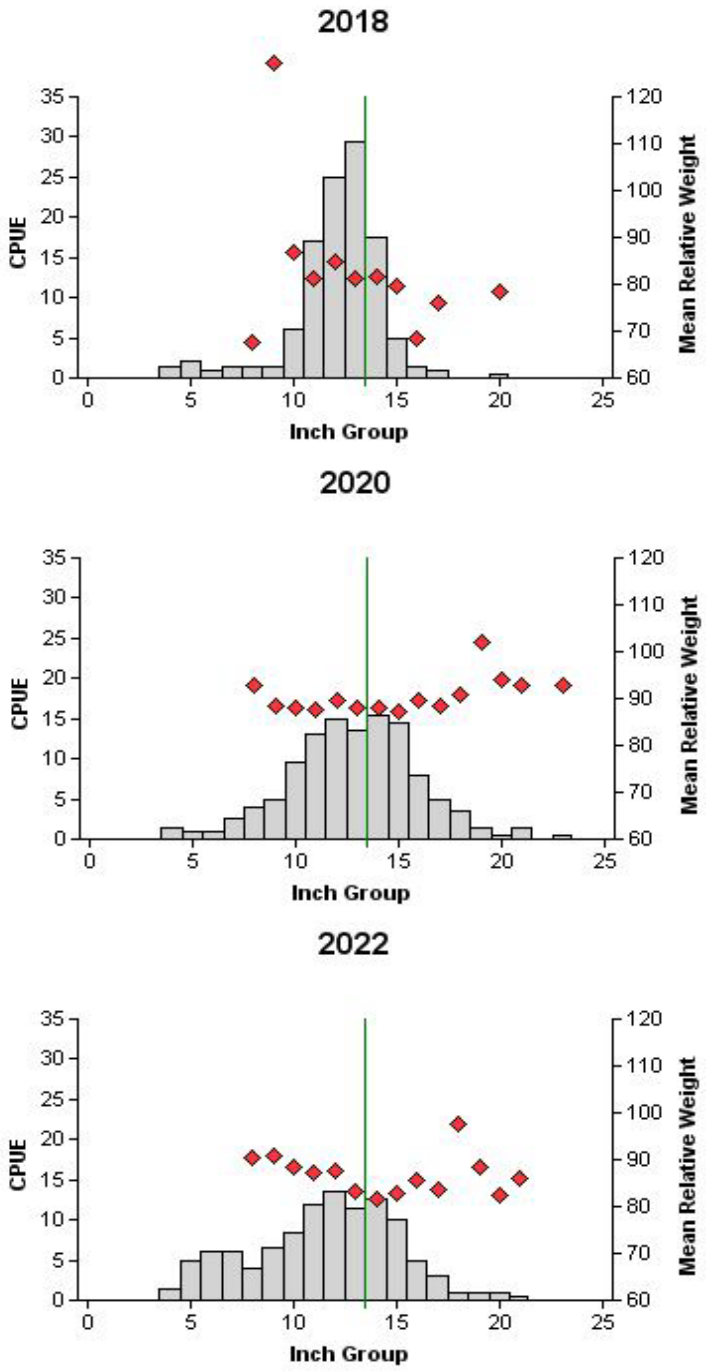


Figure 5. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Travis Reservoir, Texas, 2018, 2020, and 2022.

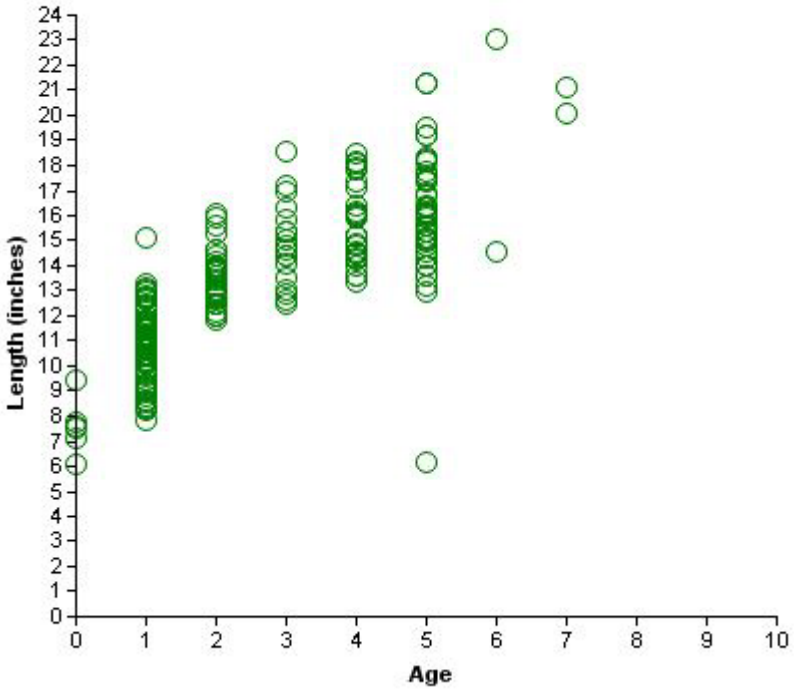


Figure 6. Length at age for Largemouth Bass (n=202) collected by electrofishing at Travis Reservoir, Texas, November 2020.

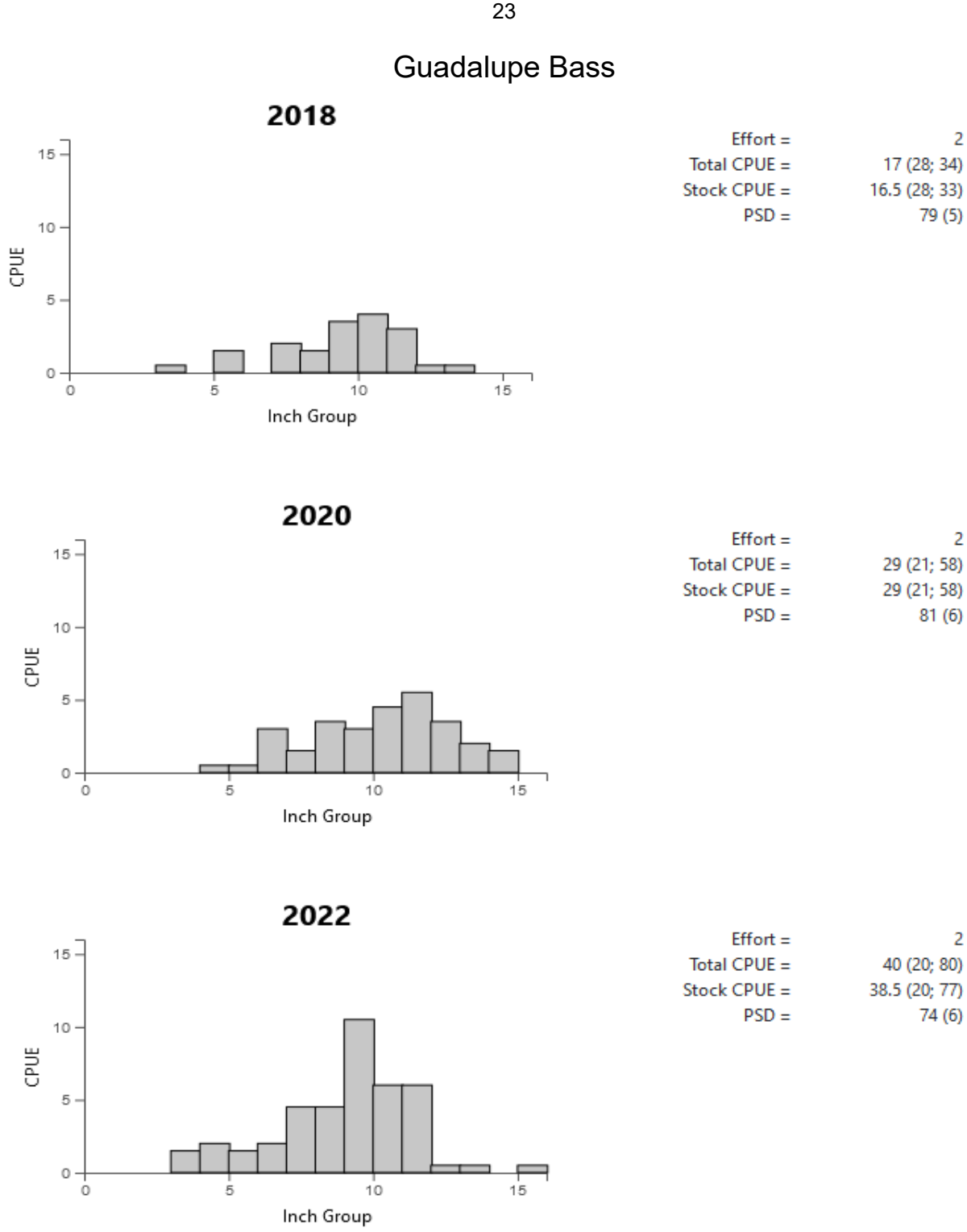


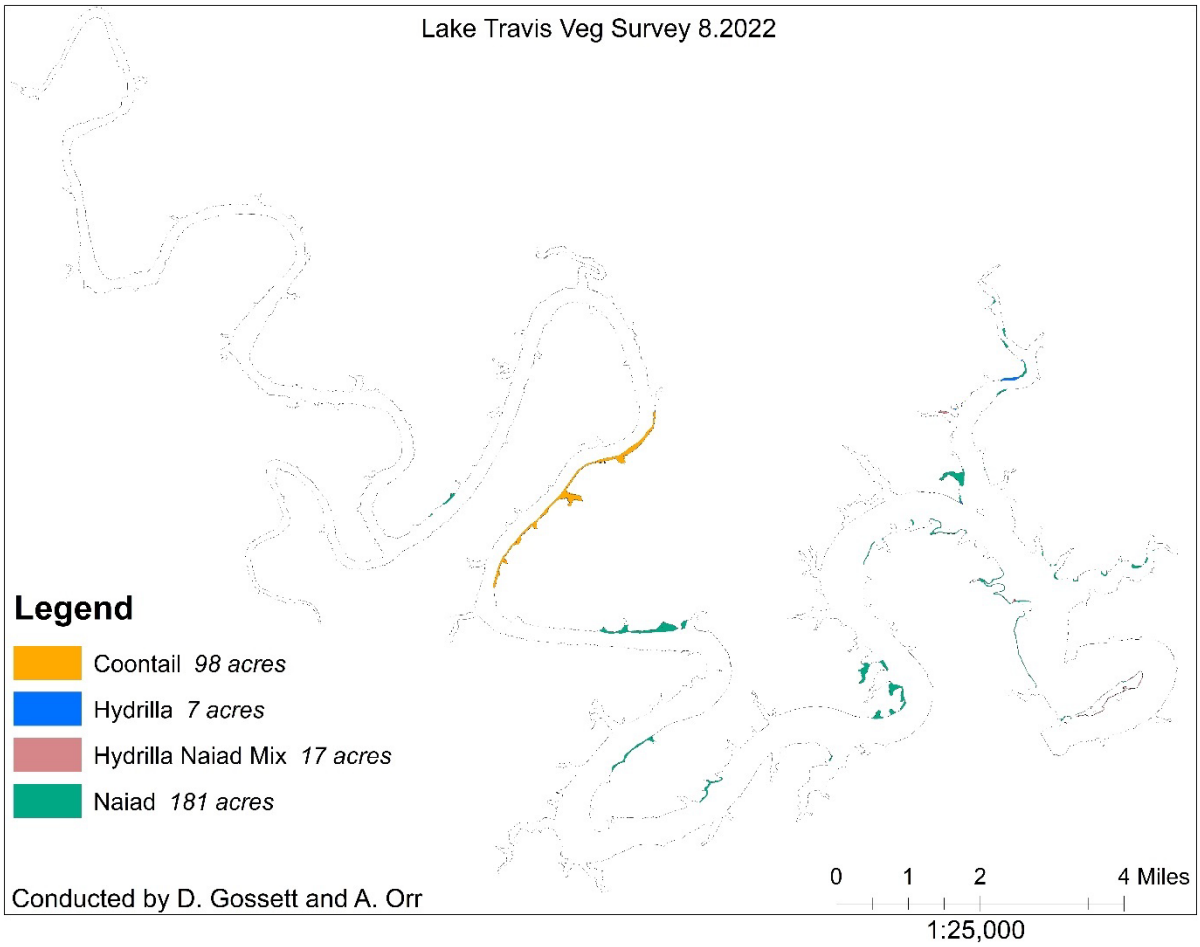
Figure 7. Number of Guadalupe Bas caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Travis Reservoir, Texas, 2018, 2020, and 2022.

Proposed Sampling Schedule

Table 7. Proposed sampling schedule for Travis Reservoir, Texas. Survey period is June through May. Electrofishing surveys are conducted in the fall.

	Survey year			
	2023-2024	2024-2025	2025-2026	2026-2027
Angler Access				X
Structural Habitat				X
Vegetation				X
Electrofishing – Fall		X		X
Creel				X
Report				X

APPENDIX A – Aquatic Vegetation Map

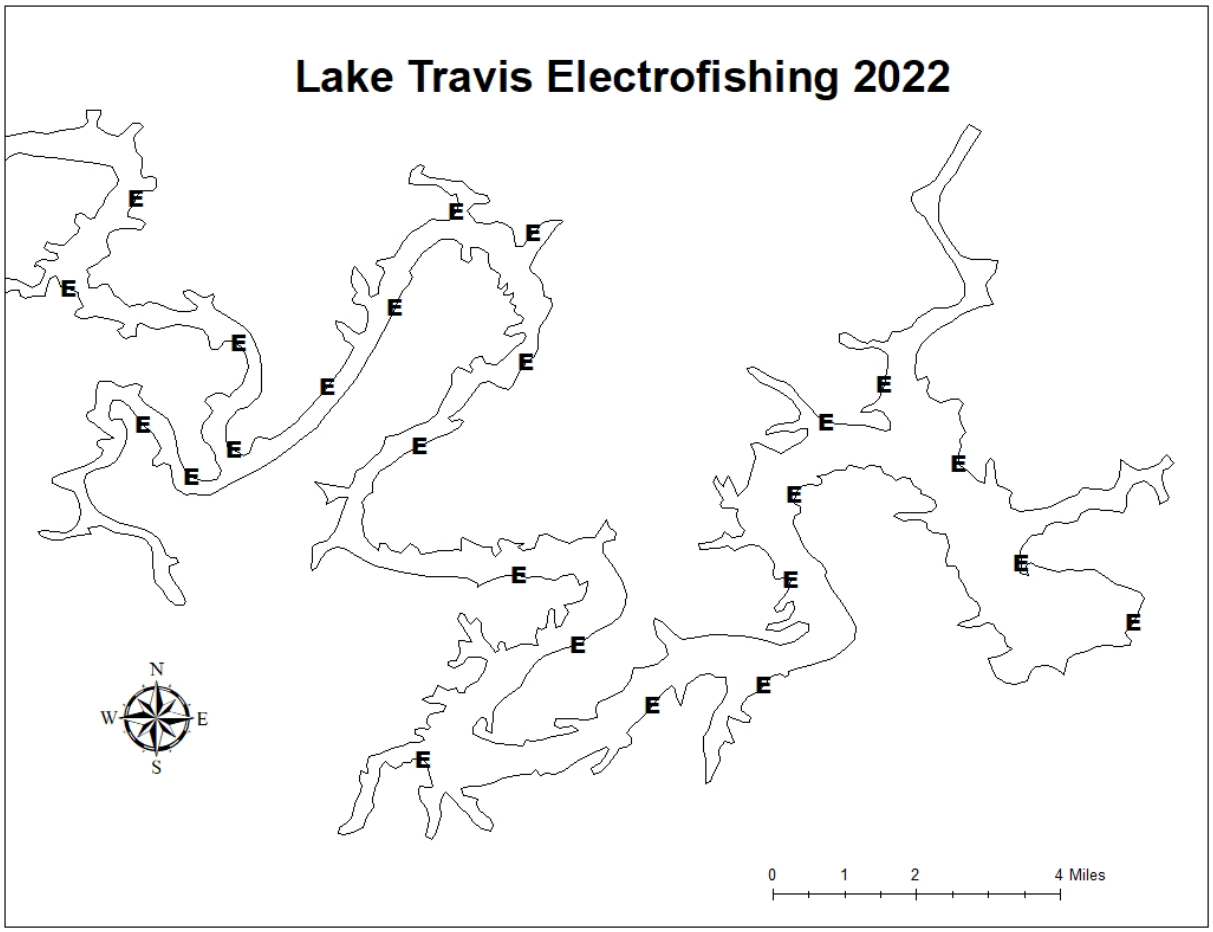


APPENDIX B – Catch rates for all species from all gear types

Number (N) and catch rate (CPUE) (RSE in parentheses) of all target species collected from fall electrofishing from Travis Reservoir, Texas, 2022. Sampling effort was 2 hours for electrofishing.

Species	Electrofishing	
	N	CPUE
Gizzard Shad	84	42.0 (32)
Threadfin Shad	63	31.5 (47)
Inland Silverside	11	5.5 (44)
Blacktail Shiner	12	6.0 (56)
Redbreast Sunfish	225	112.5 (23)
Green Sunfish	40	20.0 (44)
Warmouth	4	2.0 (59)
Bluegill	884	442 (23)
Longear Sunfish	4	2.0 (100)
Redear Sunfish	27	13.5 (32)
Largemouth Bass	217	108.5 (12)
Guadalupe Bass	80	40.0 (20)
Rio Grande Cichlid	5	2.5 (58)
Blue Tilapia	13	6.5 (33)

APPENDIX C – Map of sampling locations



Location of sampling sites, Travis Reservoir, Texas, 2022. Electrofishing stations are indicated by E. Water level was 37 feet below full pool at time of sampling.

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