

Kickapoo 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

Prepared by:

Wes Dutter, Assistant District Management Supervisor
and
Robert Mauk, District Management Supervisor

Inland Fisheries Division
Wichita Falls District, Wichita Falls, Texas

Carter Smith
Executive Director

Craig Bonds
Director, Inland Fisheries

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Survey and Management Summary

Fish populations in Kickapoo Reservoir were surveyed in 2021 using electrofishing and trap netting. Historical data are presented with the 2021 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: Kickapoo Reservoir is a 6,028-acre impoundment located on the Little Wichita River in the Red River Basin approximately 30 miles west of Wichita Falls. It has a primarily natural and rocky shoreline. The reservoir has fluctuated five-feet from conservation pool (1,045 msl) since 2018. Kickapoo water quality is considered good for municipal use, but is turbid from surrounding clay soils.

Management History: Important sport fish include catfishes, Largemouth Bass, and White Crappie. Past management plans recommended maintaining the genetic integrity of the existing pure northern strain Largemouth Bass population as a defined source for Texas Parks and Wildlife Department (TPWD) hatchery brood stock program. The reservoir is popular for its White Crappie fishery. Kickapoo has always been managed with statewide regulations. Starting September 1, 2021 the Blue and Channel Catfish state-wide regulation changed to a 25 fish bag limit with no minimum length but only 10 fish can be 20 inches or greater in length.

Fish Community

- **Prey species:** Electrofishing catch rate of Gizzard Shad was below average, and few Gizzard Shad were available as prey to most predators. Electrofishing catch rate of Bluegill was well below the previous survey. No Threadfin Shad were sampled.
- **Catfishes:** Blue, Channel and Flathead Catfish are present in the reservoir. Channel Catfish water body record was broken in 2021. No sampling took place for catfish.
- **White Bass:** White Bass are present in the reservoir. A single White Bass was captured in the trap net survey. No sampling took place for White Bass.
- **Largemouth Bass:** Largemouth Bass catch per unit effort (CPUE) was higher than previous two surveys. Few legal-length fish were available to anglers. A pending water body record was caught in 2022. Body condition was considered good.
- **White Crappie:** White Crappie were moderately abundant with legal-length fish available to anglers. Body condition was considered good.

Management Strategies: Continue conducting genetic testing when Largemouth Bass are collected during routine monitoring every four years and during brood stock collections. Monitor the White Crappie population every four years using trap nets. Monitor the Blue Catfish population using low-frequency electrofishing in 2023.

Introduction

This document is a summary of fisheries data collected from Kickapoo Reservoir from 2021. 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 2021 data for comparison.

Reservoir Description

Kickapoo Reservoir is a 6,028-acre impoundment constructed in 1945 on the Little Wichita River. It is located in Archer County approximately 30 miles west of Wichita Falls and is operated and controlled by the City of Wichita Falls. Primary uses include municipal water supply and recreation. Mean depth was 14.2 feet with a maximum depth of 43.4 feet (Solis et. al 2014). Solis et. al (2014) reported that Kickapoo reservoir has a drainage of approximately 275 mi², a shoreline length of 62 miles (not counting islands), shoreline development index of 5.5, and the reservoir impounds 85,825 ac/ft of water at full pool. Conductivity was 433 μ S/cm in October 2021. Habitat at time of sampling consisted of natural and rocky shoreline. Water level has fluctuated five-feet from conservation pool since 2018 (1,045 mean sea level; Figure 1). Other descriptive characteristics for Kickapoo are in Table 1.

Angler Access

Kickapoo Reservoir has one public two-lane boat ramp and no private boat ramps available to the public. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to the public boat ramp area and spillway area. A popular fee fishing barge (\$4.00/Adult, \$1.00/6yrs-15 yrs, under 6yrs free, \$3.00 Senior Citizens (55+) with an additional \$3.00 per rod over two rods) and camp also operates on the reservoir.

Management History

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

1. Request northern strain Largemouth Bass stockings to minimize the introduced Florida allele influence in the Largemouth Bass population to maintain a source for the TPWD hatchery program brood stock. Monitor the Florida strain influence with genetic testing every time Largemouth Bass are collected.

Action: Northern Largemouth Bass were stocked in 2018, 2020 and 2021 to minimize the Florida allele influence. Bass genetics were tested in 2019 and 2021. Percent of Florida alleles lowered from the 2017 testing.
2. Lake Kickapoo has traditionally been viewed by anglers as a good White Crappie reservoir with other game fish species being present. The reservoir can produce good populations of catfish species and Largemouth Bass depending on reservoir elevation and available habitat. Little fishing pressure exists on the reservoir except when good populations exist and are promoted. Increased water elevation should improve game fish populations over time.

Action: Promoted the reservoir fisheries through various media outlets and in conversations with anglers.
3. The potential spread of zebra mussels and other invasive species exists. Informing the public and reservoir authorities of what to do to prevent the spread and what to do if they suddenly appear in the reservoir are prudent actions.

Action: Monitoring the reservoir for zebra mussels with a biannual plankton tow and search for adult mussels in coordination with the City of Wichita Falls. Posted articles

and media blitzes about invasive species on social media. Maintained signage about invasive species at the boat ramp and fishing barge.

Harvest regulation history: Sport fish species in Kickapoo Reservoir have always been managed using state-wide regulations (Table 3). Starting September 1, 2021 the Blue and Channel Catfish state-wide regulation changed to a combined 25 fish bag limit with no minimum length but only 10 fish can be 20 inches or greater in length.

Stocking history: Northern Largemouth Bass were stocked into Kickapoo Reservoir in 2018, 2020 and 2021. The complete stocking history is in Table 4.

Vegetation/habitat management history: Kickapoo has no significant vegetation/habitat management history. Noxious vegetation has never been documented in the reservoir.

Water transfer: Kickapoo Reservoir, in the Red River basin, is used primarily by the City of Wichita Falls for municipal and industrial uses. Raw water is transferred to the City of Wichita Falls secondary reservoir through a large underground pipeline that is gravity fed. Since water does not have to be mechanically pumped, it tends to be the favored surface water choice when the reservoir elevation is relatively high. Small amounts of untreated water are also used by waterfront property owners for irrigation purposes. The City of Wichita Falls also sells water from Kickapoo to the cities of Olney and Archer City to supplement their municipal water sources. For Olney, Kickapoo water is pumped to city lakes that include Cooper Reservoir and Olney City Lake. These two reservoirs are in the upper Brazos River basin which results in an inter-basin transfer of raw water.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Kickapoo Reservoir (Lang and Mauk 2018). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected. The trap net survey was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). The electrofishing survey was completed during the daylight hours with random sites selected. This change to standard procedures was made to compare data obtained in 2017. The reservoir is turbid, so this deviation likely had minimal impact to our survey results.

Electrofishing – Largemouth Bass, sunfishes, and Gizzard Shad were collected by electrofishing (1.5 hour at 18, 5-min stations). CPUE for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing. Daytime electrofishing was conducted to better compare data obtained during the 2017 survey and the turbid water. No differences in catch rates have been documented between daytime and nighttime electrofishing at this reservoir.

Trap netting – Crappie were collected using trap nets (10 net nights at 10 stations). CPUE for trap netting was recorded as the number of fish caught per net night (fish/nn).

Genetics – Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2017). Micro-satellite DNA analysis was used to determine genetic composition of individual fish since 2005. Electrophoresis analysis was used prior to 2005.

Statistics – Sampling statistics (CPUE for various length categories), structural indices [Proportional 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 structural habitat survey was conducted in 2017. A vegetation survey was conducted in 2021 to monitor aquatic vegetation. 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 United States Geological Survey (USGS 2022).

Results and Discussion

Habitat: A vegetation survey was conducted in 2021 finding an increase in floating leaved and emergent vegetation compared to the 2017 survey. Native submersed vegetation had a slight decline (Table 7) due to decreased water levels (Figure 1). A structural habitat survey was last conducted in 2017 those findings are provided in table 6.

Prey species: Electrofishing catch rates of Gizzard Shad and Bluegill were 191.3/h and 4.0/h, respectively. Index of Vulnerability (IOV) for Gizzard Shad was poor, indicating that only 26% of Gizzard Shad were available to existing predators; this was considerably lower than IOV estimates in 2017 (87) and 2013 (100; Figure 2). Total CPUE of Gizzard Shad was considerably lower in 2021 compared to the 2017 (280.7/h) and 2013 (644.0/h) survey (Figure 2). After documenting Threadfin Shad for the first time in 2017, no Threadfin Shad were sampled in 2021. Total CPUE of Bluegill in 2021 was lower than the 2017 (16.7/h) survey. No Bluegill were captured during the 2013 survey (Figure 3).

Catfishes: No sampling took place in 2021-2022 for Blue Catfish. Low-frequency electrofishing in 2017 showed a CPUE of 96.0/h with a stock CPUE of 6.0/h for Blue Catfish (Lang and Mauk 2018). This was following a record drought that broke in 2015. Blue Catfish populations are known to take several years to establish. The Blue Catfish population will be sampled in 2023 with low-frequency electrofishing to allow the population to rebound.

No sampling took place for Channel Catfish. A new Channel Catfish water body record was caught in 2021 weighing 8.10 lbs.

Although no sampling took place for Flathead Catfish an individual was captured during the trap netting survey.

White Bass: A single White Bass was captured while trap netting. White Bass are present, but receive little angling effort as documented from a 2006 creel survey (Howell and Mauk 2006).

Largemouth Bass: The electrofishing catch rate of stock-length Largemouth Bass was 18.0/h in 2021, higher than the 16.0/h in 2017 and the 4.0/h in 2013 (Figure 4). The CPUE-total of 20.0/h was below the historical average but is second to CPUE of 114.7/h in 2001 (Appendix C). Size structure favored quality size or greater fish with a PSD of 63 (Figure 4). Body condition in 2021 was good (relative weight above 85) for all length classes of fish (Figure 4). In 2017 Florida alleles were found in 5 out of 80 Largemouth Bass collected for hatchery brood stock. Since this fishery is used for hatchery production, northern Largemouth Bass fingerling were stocked in 2018 and 2020 and also fry in 2020 (Table 4). Genetic sampling of 36 fish in 2021 produced 35 pure northern Largemouth Bass (Table 8). A pending water body record Largemouth Bass was caught in 2022 with a weight of 5.82 lbs.

White Crappie: The trap net catch rate of White Crappie was 24.9/nn in 2021, higher than in 2017 (17.4/nn) and 2013 (4.8/nn; Figure 5), but lower than the historical average 37.0/nn (Appendix C). Mean relative weight was below that of the 2017 fish at similar lengths (Figure 5). This is a reflection of the poor IOV of Gizzard Shad.

Fisheries Management Plan for Kickapoo Reservoir, Texas

Prepared – July 2022

ISSUE 1: Kickapoo Reservoir has been one of the prime locations to obtain northern strain Largemouth Bass for TPWD hatchery program brood stock. Locations with pure northern strains of Largemouth Bass are limited in Texas. The 2021 genetic survey documented Florida strain influence in the population but at a lower rate than in 2017 due to northern strain Largemouth Bass stockings in 2018 and 2020.

MANAGEMENT STRATEGY

1. Do not stock any Florida Largemouth Bass in Kickapoo Reservoir.
2. Request a northern strain Largemouth Bass fingerling stocking in 2022 to continue minimizing the Florida strain influence in the Largemouth Bass population.
3. Continue to monitor for Florida strain influence by conducting genetic testing every time Largemouth Bass are collected for the hatchery system or in four years if no hatchery collection has occurred before then.

ISSUE 2: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels 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 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

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to maintain appropriate signage at access points around the reservoir.
2. Educate the public about invasive species through the use of media and the internet.
3. Make a speaking point about invasive species when presenting to constituent and user groups.
4. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.
5. Monitor for absence/presence of zebra mussels by collecting water samples via plankton tows during the spring and fall for inspection by the City of Wichita Falls and TPWD.

Objective-Based Sampling Plan and Schedule (2022–2026)

Sport fish, forage fish, and other important fishes

Important species include Gizzard Shad, Bluegill, Blue Catfish, Largemouth Bass, and White Crappie. White Crappie are the most important species at this reservoir as evidenced from the results of a 2006 creel survey (Howell and Mauk 2006). Largemouth Bass are an important source for the TPWD Inland Fisheries hatcheries as a brood source of northern strain Largemouth Bass.

Low-density fisheries

Channel Catfish, Flathead Catfish, and White Bass would all be considered low-density species with little targeted angling effort (Howell and Mauk 2006). No sampling will take place for these species in the reservoir.

Survey objectives, fisheries metrics, and sampling objectives

Largemouth Bass, Bluegill, and Gizzard Shad will be monitored during the fall of 2025 using daytime electrofishing at 18 sites to be able to compare data from the 2017 and 2021 surveys. The Largemouth Bass objective is general monitoring with a target of ≥ 50 stock-length fish for size structure and a $RSE \leq 25$ for CPUE-total for relative abundance. No extra sampling past the 18 random sites will be conducted due to the low historical catch rates of Largemouth Bass. The Largemouth Bass population in the reservoir has historically been used by TPWD hatchery as northern strain brood fish; so genetic monitoring is important for this population. Anytime Largemouth Bass are collected from the reservoir, genetic analysis of the fish is performed. During the 2025 survey, if a hatchery collection had not taken place during the year, 30 bass will be fin clipped for genetic analysis. Bluegill and Gizzard Shad will be monitored for relative abundance with a target of CPUE-total $RSE \leq 25$ and size structure with a total catch rate of ≥ 50 fish during the 18 site electrofishing survey. Prey availability for Gizzard Shad will be determined with a catch rate of ≥ 50 fish.

For White Crappie, general monitoring with sampling objectives for size structure, body condition, and abundance will be attained using trap nets at 10 randomly selected stations to achieve a CPUE-stock ≥ 50 fish in 2025. Historically using 10 nets produces a RSE of ≤ 25 for CPUE-stock. A category 2 age and growth survey will be done on White Crappie to determine mean age at legal-length (10-inches) by collecting 13 White Crappie between 9.0 and less than 11.0 inches in length.

Blue Catfish were sampled by low-frequency electrofishing in 2017 and the results found a high abundance of fish less than 12-inches in length with few quality fish present. Following the sampling plan from 2017 (Lang and Mauk 2018) a low-frequency electrofishing survey for Blue Catfish will be scheduled during the early summer of 2023 which allowed for growth of the abundant small fish captured in 2017. The survey objective will be general monitoring for size structure and abundance with goals of sampling ≥ 50 stock-length fish and achieving a CPUE-stock $RSE \leq 25$ during 12 stations, but no more than 18 stations will be sampled to achieve the objectives. Each station will be 5-minutes long.

Sampling schedule is in table 9.

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, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- 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.
- 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.
- Howell, M. and R. Mauk. 2006. Statewide freshwater fisheries monitoring and management program survey report for Kickapoo Reservoir, 2006. Texas Parks and Wildlife Department, Federal Aid Report F-30-R-31, Austin.
- Lang, T., and R. Mauk. 2018. Statewide freshwater fisheries monitoring and management program survey report for Kickapoo Reservoir, 2018. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-3, Austin.
- Solis, R. S., J. J. Kemp, H. Holmquist, N. Brock, M. Vielleux, K. Iqbal, and B. Whitaker. 2014. Volumetric survey of Lake Kickapoo. Texas Water Development Board, Austin.
- United States Geological Society (USGS). 2022. National water information system: Web interface. Available: <http://waterdata.usgs.gov/tx/nwis> (July 2022).

Tables and Figures

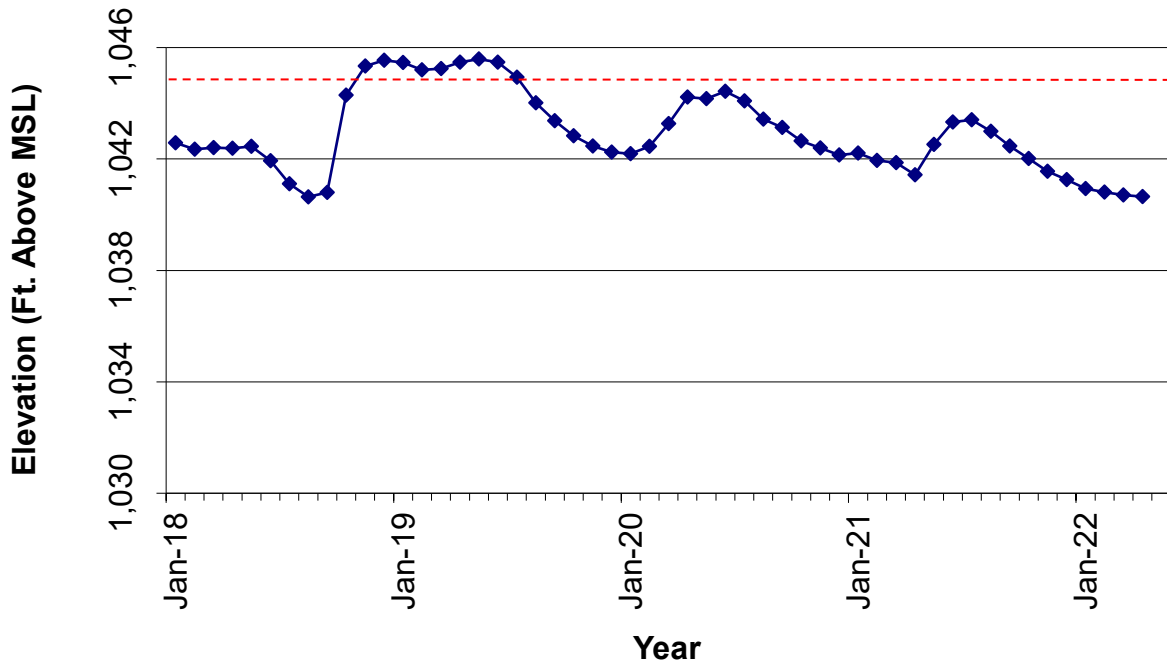


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Kickapoo Reservoir, Texas. Conservation level is 1,045 MSL shown by the red horizontal line.

Table 1. Characteristics of Kickapoo Reservoir, Texas.

Characteristic	Description
Year constructed	1945
Controlling authority	City of Wichita Falls
County	Archer
Reservoir type	Tributary
Shoreline Development Index	5.5
Conductivity	433 $\mu\text{S/cm}$

Table 2. Boat ramp characteristics for Kickapoo Reservoir, Texas, August 2021. Reservoir elevation at time of survey was 1,043 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Public Ramp	33.65027 -99.78355	Y	15	1,032	Good

Table 3. Harvest regulations for Kickapoo Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies ^a	25 (in any combination - only 10 can be 20 inches or greater in length)	No minimum length
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

^a State-wide catfish regulations changed on September 1, 2021.

Table 4. Stocking history of Kickapoo Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults.

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	1986	18,475	FGL	3.0
	1990	63,162	FGL	2.0
	1991	62,039	FGL	2.1
	Total	143,676		
Bluegill	2015	76,463	AFGL	2.7
	Total	76,463		
Channel Catfish	1969	10,000	AFGL	7.9
	1971	88,375	AFGL	7.9
	1972	50,000	AFGL	7.9
	1973	1,000	UNK	0.0
	Total	149,375		
Largemouth Bass	1970	100,000	UNK	0.0
	2013	99,088	FGL	1.8
	2015	3,668	FGL	2.3
	2016	114,218	FGL	1.7
	2018	109,716	FGL	1.5
	2020	52,819	FGL	1.7
	2020	355,736	FRY	0.3
	2021	101,370	FGL	1.5
	Total	936,615		

Table 5. Objective-based sampling plan components for Kickapoo Reservoir, Texas 2021–2022.

Gear/target species	Survey objective	Metrics	Sampling objective
<i>Electrofishing</i>			
Largemouth Bass	Exploratory	Presence/Absence	Practical Effort
Bluegill	Exploratory	Presence/Absence	Practical Effort
Gizzard Shad	Exploratory	Presence/Absence	Practical Effort
<i>Trap netting</i>			
Crappie	Exploratory	Presence/Absence	Practical Effort

Table 6. Survey of structural habitat types, Kickapoo Reservoir, Texas, 2017. Shoreline habitat type units are in miles (includes islands).

Habitat type	Estimate	% of total
Natural	38.2 miles	52.3
Natural with boat docks	2.1 miles	2.9
Rocky	30.1 miles	41.2
Rocky with boat docks	2.6 miles	3.6

Table 7. Survey of aquatic vegetation, Kickapoo Reservoir, Texas, 2001-2021. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2001	2005	2009	2013	2017	2021
Native submersed					0.1 (<0.1)	<0.1 (<0.1)
Native floating-leaved	0.1 (<0.1)		0.1 (<0.1)		2.0 (<0.1)	5.7 (0.1)
Native emergent	0.1 (<0.1)				0.1 (<0.1)	1.2 (<0.1)

Gizzard Shad

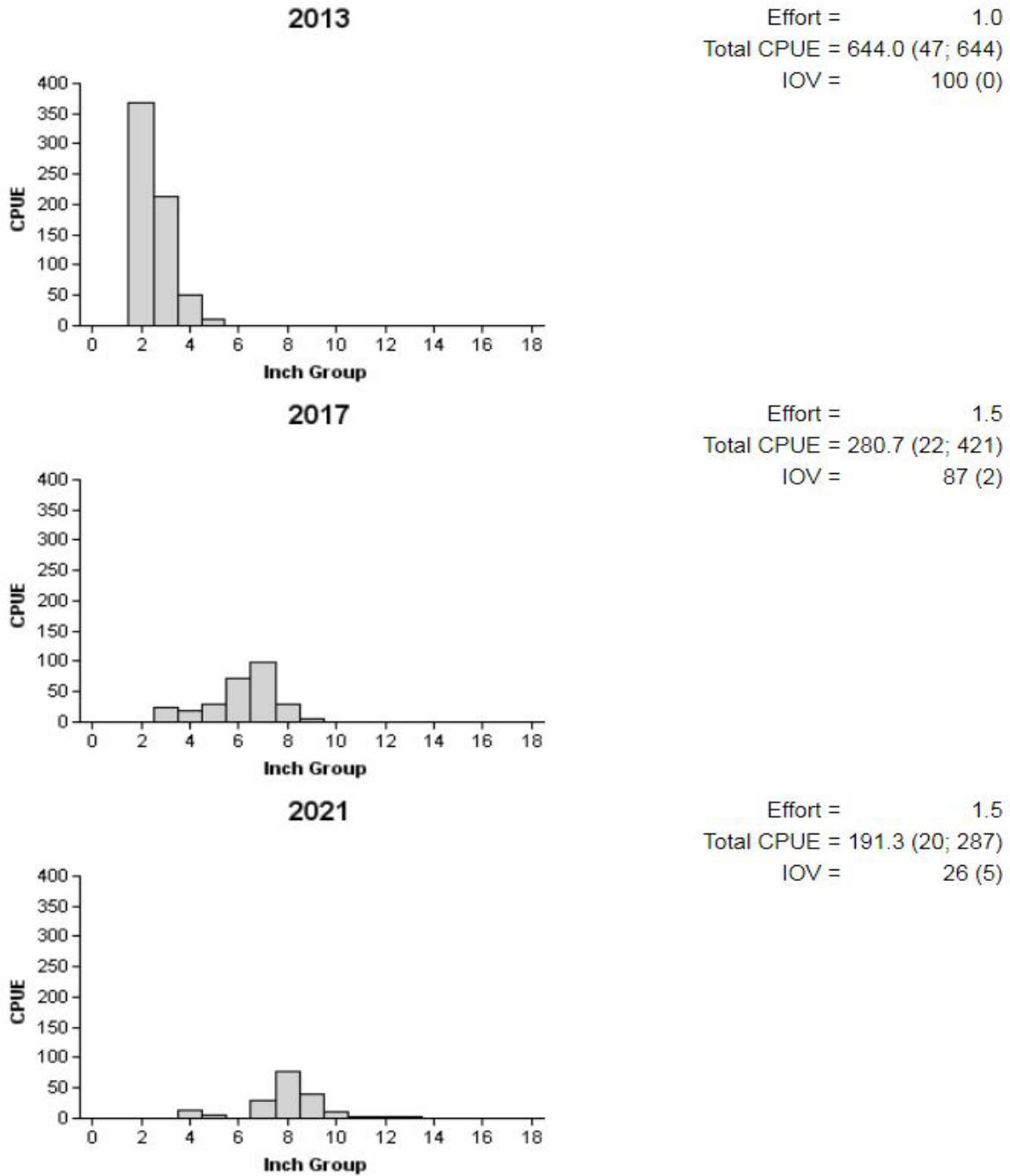


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for C and SE for IOV are in parentheses) for fall electrofishing surveys, Kickapoo Reservoir, Texas, 2013, 2017, and 2021.

Bluegill

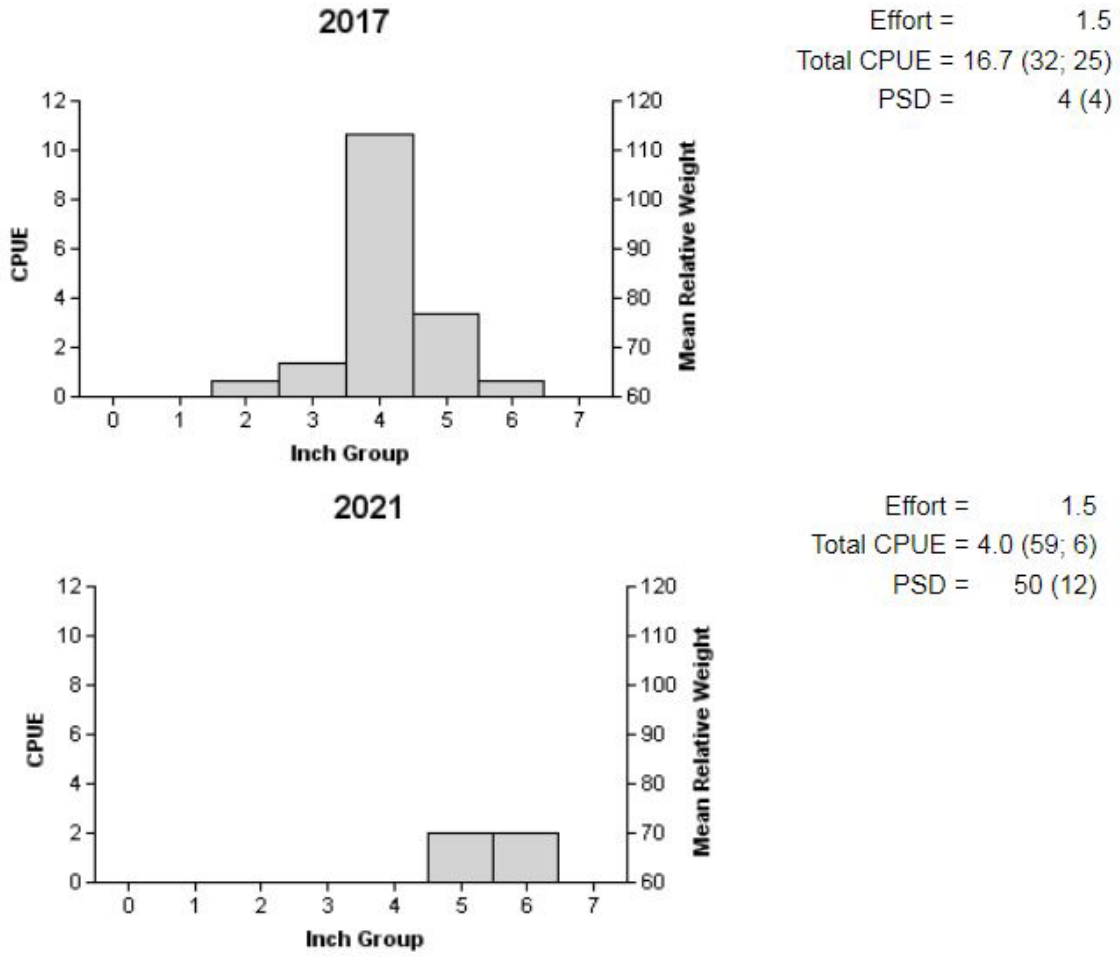


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Kickapoo Reservoir, Texas, 2017, and 2021. No Bluegill were captured during the 2013 survey.

Largemouth Bass

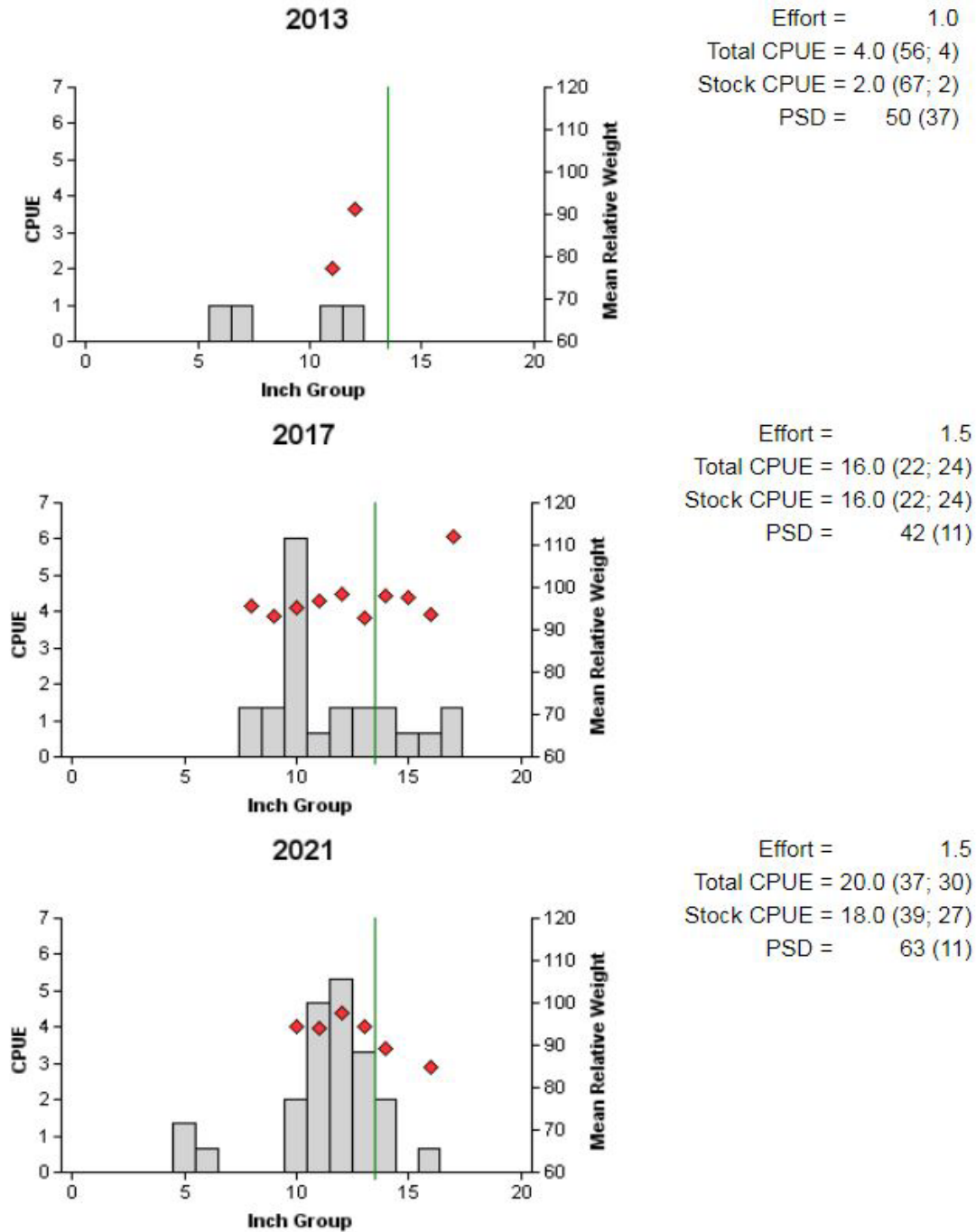


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Kickapoo Reservoir, Texas, 2013, 2017, and 2021. Vertical green line indicates minimum length limit.

Table 8. Results of genetic analysis of Kickapoo Bass collected by fall electrofishing, Kickapoo Reservoir, Texas, 1997, 2001, 2005, 2006, 2009, 2011, 2017, 2019, and 2021. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
1997	15	0	0	15	0	0
2001	30	0	0	30	0	0
2005	1	0	0	1	0	0
2006	64	0	0	64	0	0
2009	2	0	0	2	0	0
2011	19	0	0	19	0	0
2017	80	0	5	75	0.6	0
2019	61	0	2	59	0.5	0
2021	36	0	1	35	0.5	0

White Crappie

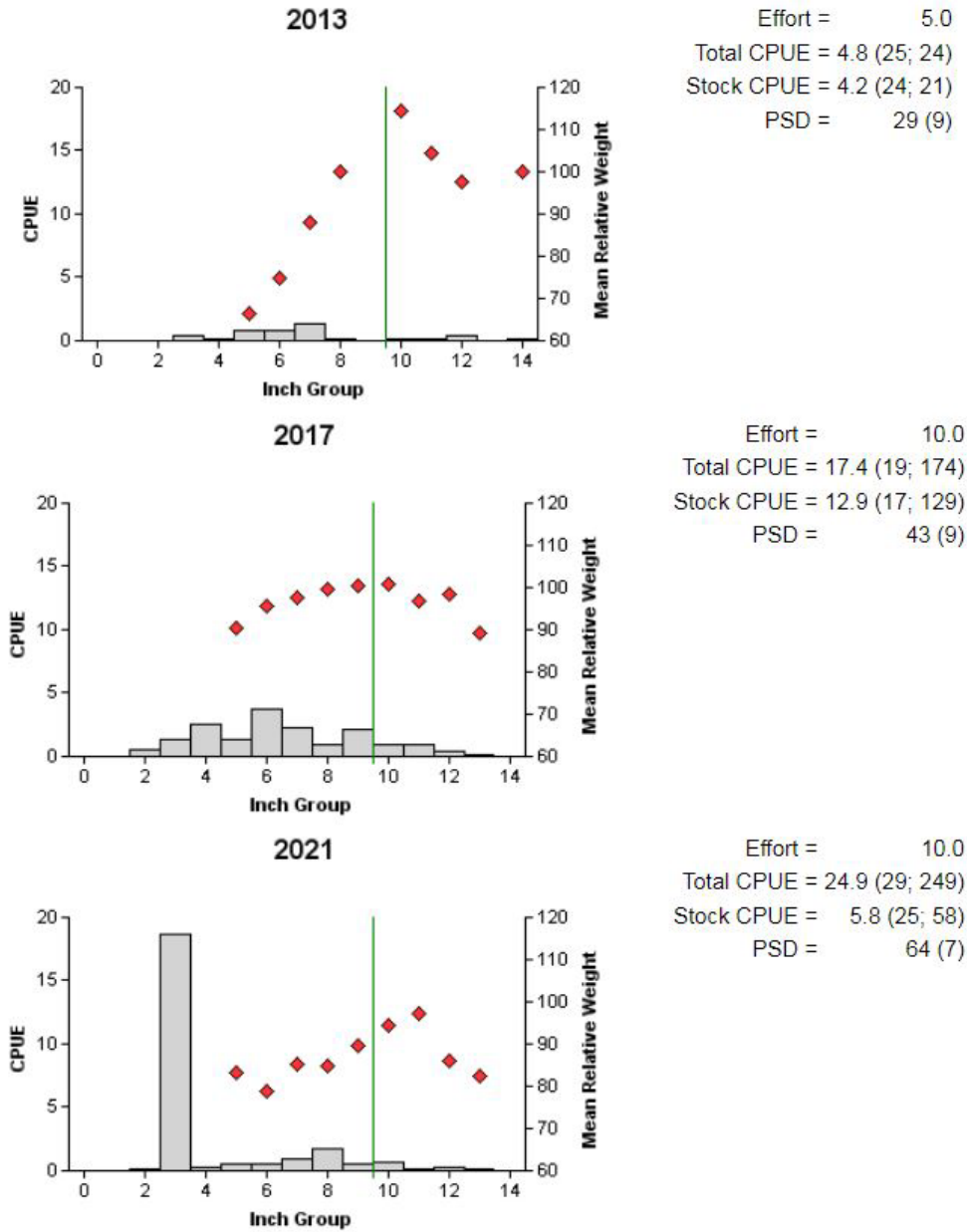


Figure 5. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Kickapoo Reservoir, Texas, 2013, 2017, and 2021. Vertical green line indicates minimum length limit.

Proposed Sampling Schedule

Table 9. Proposed sampling schedule for Kickapoo Reservoir, Texas. Survey period is June through May. Electrofishing and trap netting surveys are conducted in the fall. Low-frequency electrofishing will take place in the early summer.

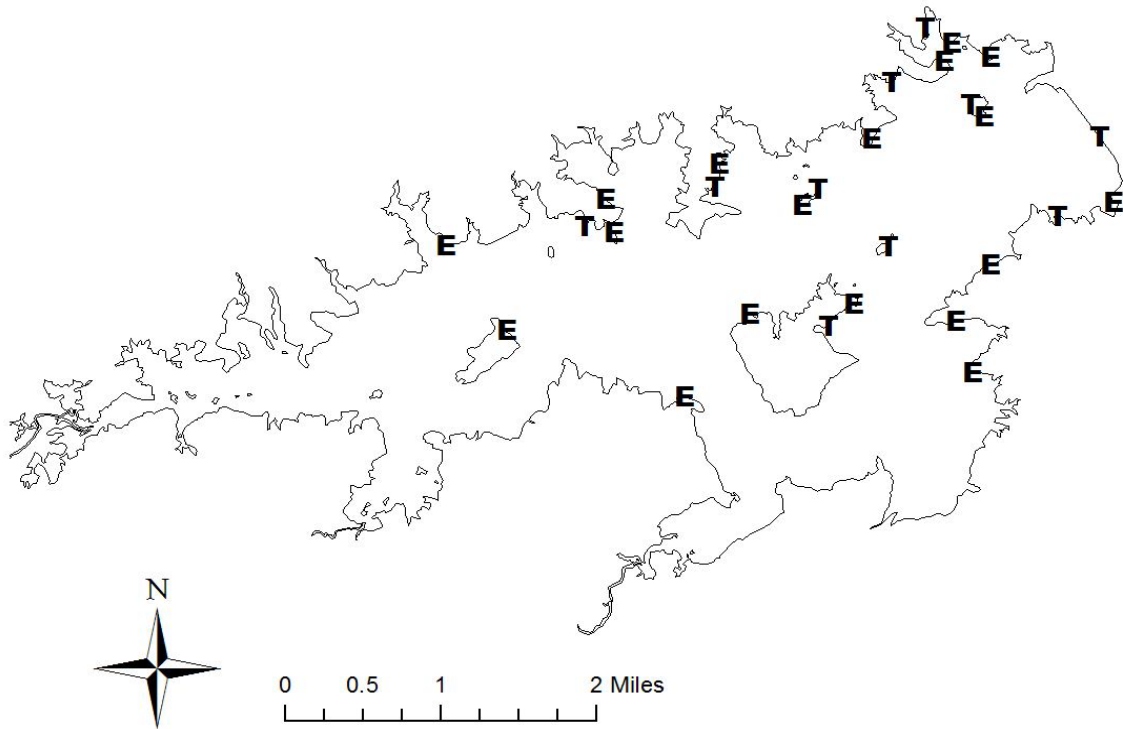
	Survey year			
	2022-2023	2023-2024	2024-2025	2025-2026
Angler Access				X
Structural habitat				X
Vegetation				X
Electrofishing – Fall				X
Electrofishing – Low-frequency		X		
Trap netting				X
Report				X

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 Kickapoo Reservoir, Texas, 2021-2022. Sampling effort was 10 net nights for trap netting and 1.5 hour for electrofishing.

Species	Trap Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			287	191.3 (20)
Smallmouth Buffalo	1	0.1 (100)		
Flathead Catfish	1	0.1 (100)		
White Bass	1	0.1 (100)		
Bluegill	14	1.4 (27)	6	4.0 (59)
Longear Sunfish	3	0.3 (51)	5	3.33 (64)
Largemouth Bass			30	20.0 (37)
White Crappie	249	24.9 (29)		

APPENDIX B – Map of sampling locations



Location of sampling sites, Kikapoo Reservoir, Texas, 2021-2022. Trap net and electrofishing stations are indicated by T and E, respectively. Water level was three foot below conservation level at time of sampling.

APPENDIX C – Historical catch rates of targeted species by gear type for Kickapoo Reservoir, Texas.

Historical catch rates for targeted species by gear type for Kickapoo Reservoir, Texas.

Gear	Species	Year						
		1997	2000	2001	2002	2005	2006	2009
Gill Netting (fish/net night)	Blue Catfish	4.9			13.2		9.0	
	Channel Catfish	1.9			1.7		0.1	
	White Bass	0.5			21.6		0.3	
Electrofishing (fish/hour)	Gizzard Shad	242.0		376.0		564.0		338.7
	Threadfin Shad							
	Green Sunfish					0.7		0.7
	Bluegill	2.0		38.0		66.7		28.7
	Longear Sunfish	5.3		42.0		19.3		26.7
	Largemouth Bass	16.0		114.7		5.3		6.0
Low-frequency Electrofishing (fish/hour)	Blue Catfish							
Trap Netting (fish/net night)	White Crappie	40.7	16.8	136.4		24.7		52.7

APPENDIX C – Continued

Gear	Species	Year					Avg
		2010	2011	2013	2017	2021	
Gill Netting (fish/net night)	Blue Catfish	6.3					8.4
	Channel Catfish	0					0.9
	White Bass	0.5					5.7
Electrofishing (fish/hour)	Gizzard Shad			644.0	280.7	191.3	376.7
	Threadfin Shad				6.0	0	3.0
	Green Sunfish			0	1.3	0	0.5
	Bluegill			0	16.7	4.0	22.3
	Longear Sunfish			0	6.7	3.3	14.8
	Largemouth Bass			4.0	16.0	20.0	26.0
Low-frequency Electrofishing (fish/hour)	Blue Catfish				96.0		96.0
Trap Netting (fish/net night)	White Crappie		14.9	4.8	17.4	24.9	37.0



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