

H-4 Reservoir

2023 Fisheries Management Survey Report

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

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Survey and Management Summary

Fish populations in Lake Gonzales (H-4) were last surveyed in 2021 with a low-frequency electrofishing survey. These data will not be presented due to current reservoir conditions. In August 2021, the dam structure suffered a gate failure after being lowered to pass flood waters and the reservoir receded back to the historical river channel. Engineers deemed the dam not repairable and would require dam replacement. A management plan for the reservoir has been prepared and will be initiated if the dam structure is repaired (undetermined timeline) and the reservoir fills to conservation pool elevation.

Reservoir Description: H-4 Reservoir (696-acre) was located on the Guadalupe River in Gonzales County and was constructed in 1931 to provide water for hydroelectric generation and recreation. The substrate was primarily silt, sand, clay with some gravel and rock. Angler and public boat access were limited to one pay-to-use boat ramp and there were no handicap-specific facilities. Primary habitat was composed of boat docks and piers, timber, native floating-leaved and submersed vegetation, hydrilla, and water hyacinth.

Management History: Important sport fish species included Channel Catfish, Largemouth Bass, and crappie. Anglers have reported catching White Bass, Palmetto Bass, and Striped Bass from this reservoir, but these species have not been collected in any survey. Blue Catfish were stocked historically, but relative abundance remains low. The 2020 management plan focused on monitoring the expansion of hydrilla and anticipation of dewatering by Guadalupe-Blanco River Authority (GBRA) due to recent dam failures of Lake Dunlap (2019) and Lake Wood (2016).

Fish Community

- Due to reservoir conditions, fish community data are not presented. Historical fisheries data are available in the H-4 Fisheries Management Survey Report (McDonald and Binion 2020).

Management Strategies: Continue to manage sport fish populations with existing regulations. If dam infrastructure is determined feasible to repair, work with GBRA on habitat enhancement initiatives prior to reservoir refilling. If the dam infrastructure is repaired and the reservoir refills, stock with sport fish and forage species. Maintain cooperative relationship with GBRA to monitor and control nuisance aquatic vegetation.

Introduction

This document is a summary of conditions at H-4 Reservoir in 2023-2024. The purpose of this document is to provide fisheries relevant information and make management recommendations to protect and improve the sport fishery. Management strategies are included to address existing problems and/or opportunities. Fisheries population sampling was not conducted post- August 2021, due to current reservoir conditions. Historical data for H-4 Reservoir can be referenced from McDonald and Binion (2020).

Reservoir Description

H-4 Reservoir was a 696-acre mainstream reservoir on the Guadalupe River in Gonzales County and controlled by GBRA. It is part of the Guadalupe River Chain Reservoirs that also include Dunlap, McQueeney, Placid, Meadow, and formally Wood Reservoir. The reservoir was impounded in 1931 for hydropower generation and recreation. The substrate was composed primarily of silt, sand, clay, and some gravel and rock. Littoral habitat consisted of native aquatic vegetation including duckweed, spatterdock, and American lotus along with areas of timber, piers, and boat docks. Non-native vegetation (hydrilla and water hyacinth) was also present in the reservoir. The GBRA lowered reservoir water level during extended periods of freezing temperatures and hired a private contractor to conduct herbicide treatments to control water hyacinth as needed. Other descriptive characteristics for H-4 Reservoir are in Table 1.

Angler Access

H-4 Reservoir boat access was limited to a single pay-use ramp with no handicap-specific facilities available at this ramp. There were several private boat ramps around H-4 Reservoir. Due to reservoir conditions, the existing public boat access is currently out of water and unusable to watercraft. Additional boat ramp characteristics are in Table 2. Shoreline access is very limited.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (McDonald and Binion 2020) included:

1. Provide technical guidance to Aquatic Resources Relocation Plan (ARRP) and provide assistance with relocation plan to minimize loss of fish, mussels and other threatened and endangered species.

Action: Due to the premature dam gate failure an ARRP was deemed unnecessary. The Corpus Christi Fisheries Management District assisted the Kills and Spills team on a dead mussel assessment, limited fish kills were noted.
2. With increased hydrilla coverage and restriction of recreational access, increased frequency of vegetation monitoring.

Action: Due to dam gate failure additional hydrilla surveys never commenced.
3. Monitor presence, distribution, and spread of invasive aquatic vegetation and implement control measures, as needed. Monitor for presence of zebra mussels.

Action: No vegetation or zebra mussel surveys were performed due to reservoir conditions and resultant lack of boater access.

Harvest regulation history: Sport fish populations in H-4 Reservoir have always been managed with statewide regulations. Current regulations are found in Table 3.

Stocking history: Historically, Blue Catfish and Channel Catfish, Striped Bass, and Florida Largemouth Bass have been stocked in H-4 Reservoir. Radio-tagged Grass Carp were stocked in the mid-90s as part of a research project based on their movement within the reservoir. No stockings occurred during the current study period. A complete stocking history is in Table 4.

Vegetation/habitat management history: Water hyacinth, water lettuce, and hydrilla were present in H-4 Reservoir. Water hyacinth has been a problematic vegetative species for years. Prior to 1998, Texas Parks and Wildlife Department (TPWD) controlled water hyacinth on the reservoir through herbicide applications. Beginning in 2001, the GBRA began herbicide treatments through a contractor to treat specific problematic sections of the reservoir. However, herbicide applications proved ineffective as water hyacinth expanded to the entire reservoir. More recent chemical control efforts, in conjunction with selective winter drawdowns, have been effective in control of water hyacinth. During this report period, GBRA treated 101 acres of water hyacinth in 2018 and 20 acres in 2019. Water hyacinth weevils have been released in the past but provided little control. Water lettuce was also present on the reservoir but has not been as problematic and widely distributed as water hyacinth. While water lettuce weevils were introduced in 1997 and 1998, the reservoir experienced a 100-yr flood in 1998, flushing most of the water lettuce downstream. Hydrilla has historically been present around the boat ramp but had yet to create access problems. In 2014, coverage of hydrilla expanded throughout the reservoir and was controlled with herbicides. Grass Carp were also stocked in an upstream section of the Guadalupe River and may have provided additional control. East Indian hygrophylla was once well-established around the boat ramp but has since been replaced by native submersed aquatic vegetation.

Water transfer: H-4 Reservoir was primarily used for hydroelectric generation, recreation, and flood control. No interbasin transfers existed.

Methods

Due to reservoir conditions and lack of boater access, no fisheries surveys were conducted over the current survey period.

Results and Discussion

Results and species composition data from the most recent survey collections (2021) are presented in Appendix A. Results collected in historical surveys can be accessed in McDonald and Binion (2020).

Fisheries Management Plan for H-4 Reservoir, Texas

Prepared – July 2024

ISSUE 1: In August 2021, the hydroelectric dam experienced a spillway gate failure during normal operation with floodwater preparation. GBRA reported that after lowering a spillway gate, a large tree became lodged on the spillway gate, both the weight of the tree and increase in water pressure inside gate contributed to closure issues with the spillway gate. Later, evaluations by GBRA and third-party engineering consultants determined that there were no repair mechanisms available that could safely bring the gate back into operation. This ultimately resulted in a dewatering of H-4 reservoir. An initial response was conducted by a TPWD Kills and Spills response biologist and a GBRA biologist and concluded no evidence of any dead fish due to the dewatering but found numerous stranded freshwater mussels. On-site biologists relocated >2,000 live mussels to the new waterline. Later (October 2021), TPWD personnel (Kills and Spills Team and the Corpus Christi Fisheries Management District), GBRA and U.S. Fish and Wildlife Service conducted a mussel kill assessment on H-4 Reservoir resulting in an extrapolated value of 13,819 individual mussels from 11 species. In essence, the reservoir ceased to exist, as the waterbody returned to its natural stream state. Reservoir management would be reinstated when and if the dam is repaired. Public access to the reservoir was also lost, after the reservoir dewatered the single pay-to-use boat ramp was barricaded off by the landowner.

MANAGEMENT STRATEGY

1. If the dam structure is replaced and the reservoir refills to conservation level, stock the reservoir with recreationally important sport fish (Largemouth Bass, Channel Catfish, and crappies) and prey species (Bluegill).
2. If the dam structure is replaced and the reservoir refills to conservation level, apply for Habitat and Angler Access grant funding to add hard structure habitat within the reservoir (i.e. concrete reefs, stacked timber, rock, etc.).
3. If the dam structure is replaced and reservoir refills to conservation level, execute objective-based sampling to monitor success of stocking program.
4. If the dam structure is replaced and reservoir refills to conservation level, write and distribute press releases to inform the public on status of management initiatives and condition of sport fish populations.

Objective-Based Sampling Plan and Schedule (2024–2028)

Note: Dam structure replacement has not been planned. However, if H-4 Reservoir dam is replaced there will be an opportunity of a rebuilding phase with the primary objective to reestablish sport fish and prey populations. Therefore, sampling described below is hypothetical in a scenario where a dam replacement

occurs within the 2024-2028 timeframe; sampling will be exploratory in nature to document presence/absence of all fishes in the reservoir and to evaluate the success of stocking program. If or when the reservoir is repaired the proposed sampling schedule will be designed to meet the following OBS Plan, Table 5.

Sport fish, forage fish, and other important fishes

Sport fish in H-4 Reservoir include Blue, Channel, and Flathead Catfishes, Largemouth Bass, and Black and White Crappies. Important forage species include Gizzard and Threadfin Shad, and Bluegill.

Survey objectives, fisheries metrics, and sampling objectives

Catfishes: An exploratory gill net survey will be conducted to identify presence/absence of Blue Catfish, Flathead Catfish, and Channel Catfish. Additional population level data (relative abundance, size composition, relative weight) will be collected for specimens sampled. A minimum of 10 gill nets set at randomly-selected stations will be used.

Largemouth Bass: An exploratory electrofishing survey will be conducted to identify presence/absence and to aid in evaluating stocking success. Additional population level data (relative abundance, size composition, relative weight) will be collected for specimens sampled. A minimum of 12 randomly-selected electrofishing sites will be sampled to collect Largemouth Bass.

Crappies: An exploratory trap net survey will be conducted to identify presence/absence of crappies. Additional population level data (relative abundance, size composition, relative weight) will be collected for specimens sampled. A minimum of 7 subjectively-selected trap net sites will be sampled to collect crappies.

Gizzard and Threadfin Shad and Bluegill: Sampling with electrofishing per Largemouth Bass will be sufficient to identify presence/absence of forage fishes. Additional population level data (relative abundance, size composition) will be recorded on specimens collected.

Literature Cited

McDonald, D. and G. Binion. 2020. Statewide freshwater fisheries monitoring and management program survey report for H-4 Reservoir, 2019. Texas Parks and Wildlife Department, Federal Aid Report F-221-M-4, Austin.

Tables and Figures

Table 1. Characteristics of H-4 Reservoir, Texas, as of June 2021 (prior to dewatering).

Characteristic	Description
Year constructed	1931
Controlling authority	Guadalupe-Blanco River Authority
County	Gonzales
Reservoir type	Mainstem
Shoreline Development Index	2.91
Conductivity	450 μ S/cm

Table 2. Boat ramp characteristics for H-4 Reservoir, Texas, January 2024. Reservoir elevation at time of survey was 331 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Hill Shade Ramp	29.50518, -97.64340	Y	5	339	Currently out of water; unusable

Table 3. Harvest regulations for H-4 Reservoir, Texas.

Species	Bag limit	Length limit
Gar, Alligator	1 ^a	None
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (only 10 $\geq$ 20 inches)	None
Catfish, Flathead	5	18-inch minimum
Bass, White	25	10-inch minimum
Bass, Largemouth	5 ^b	14-inch minimum
Bass: Spotted and Guadalupe	5 ^b	None
Crappie: White and Black crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

^a Mandatory harvest reporting required for all harvested Alligator Gar (reporting available through the My Texas Hunt Harvest app or at <https://apps.tpwd.state.tx.us/huntharvest/home.faces>)

^b Daily bag for Largemouth Bass, Spotted Bass, and Guadalupe Bass = 5 fish in any combination.

Table 4. Stocking history of H-4 Reservoir, Texas. FGL = fingerling; ADL = adults.

Year	Number	Size
<u>Blue Catfish</u>		
1985	7,040	FGL
1986	7,000	FGL
1988	16	ADL
1994	114,199	FGL
1995	69,602	FGL
<u>1997</u>	<u>69,600</u>	FGL
Species Total	267,457	
<u>Channel Catfish</u>		
1972	53,000	FGL
<u>1991</u>	<u>77</u>	ADL
Species Total	53,077	
<u>Striped Bass</u>		
<u>1978</u>	<u>6,650</u>	FGL
Species Total	6,650	
<u>Florida Largemouth Bass</u>		
1978	27,900	FGL
1990	69,754	FGL
<u>1991</u>	<u>69,722</u>	FGL
Species Total	1,031,572	
<u>Triploid Grass Carp</u>		
1995 ^a	25	ADL
1996 ^b	5	ADL
<u>1997^b</u>	<u>6</u>	ADL
Species Total	36	

^a Radio-tagged fish

^b Replace dead radio-tagged fish

Table 5. Hypothetical proposed sampling schedule for H-4 Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall and low frequency electrofishing surveys are conducted in the summer. If the controlling authority deems the reservoir is permanently disabled, we will remove this reservoir off the sampling rotation.

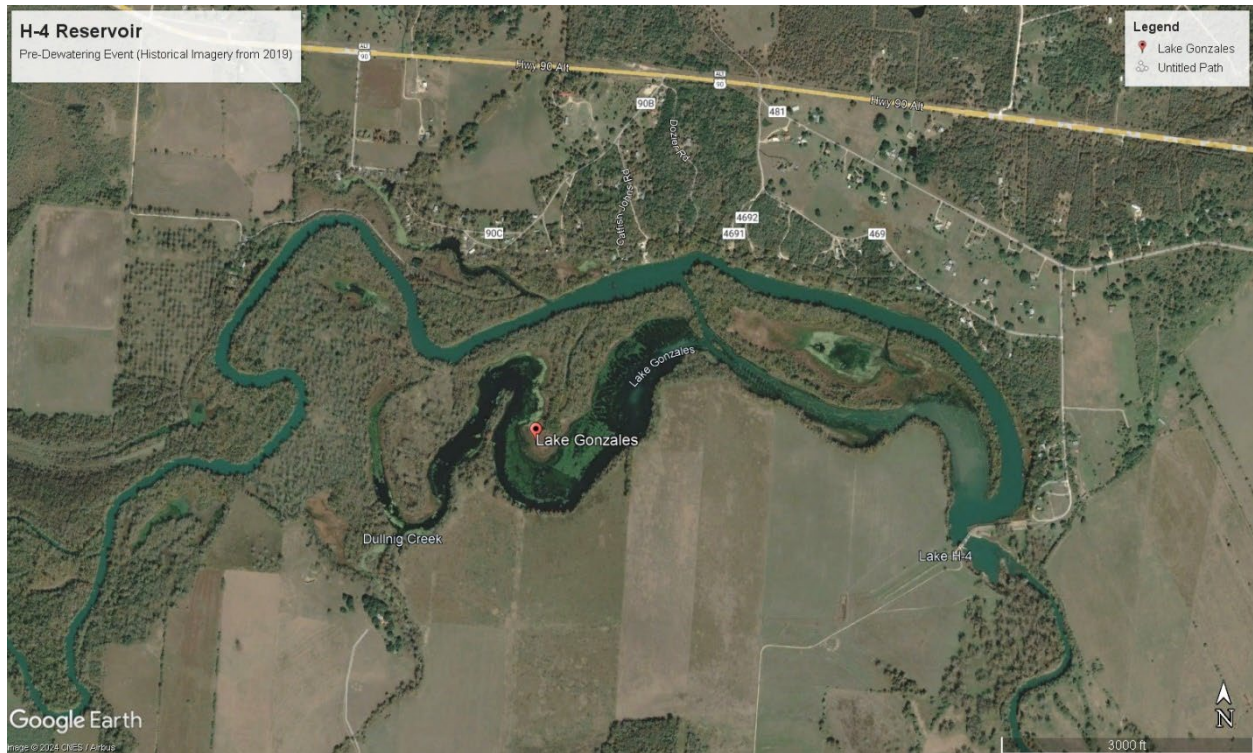
	Survey year			
	2024-2025	2025-2026	2026-2027	2027-2028
Angler Access				X
Vegetation				X
Electrofishing – Fall				X
Electrofishing – Low frequency				X
Trap netting				X
Gill netting				X
Report				X

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 H-4 Reservoir, Texas, 2021. Sampling effort was 1 hour for low-frequency electrofishing.

Species	Low-freq Electrofishing	
	N	CPUE
Blue Catfish	6	6.0 (73)
Flathead Catfish	2	2.0 (69)

APPENDIX B – Pre- and post-reservoir dewatering images





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