Colorado City Reservoir

2020 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 Colorado City Reservoir were surveyed in 2020 using electrofishing. Historical data are presented with the 2020 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: Colorado City Reservoir is a 1,618-acre reservoir located on Morgan Creek, a tributary of the Colorado River, west of Colorado City in Mitchell County, Texas. Habitat consisted primarily of flooded terrestrial vegetation, boulders, and boat docks. Colorado City Reservoir has been severely impacted by toxic golden algae (*Prymnesium parvum*) blooms nearly every year since 2001 with fish kills occurring regularly. Shoreline access was good at the Lake Colorado City State Park.

Management History: Historically, important sport fish included Largemouth Bass, White Bass, Channel Catfish, Blue Catfish, and Red Drum. Following golden algae-induced fish kills, fish stockings were conducted to reestablish populations. Re-occurrence of golden alga-related toxic conditions rendered these stocking efforts unsuccessful at re-building populations. As a result, all fish stocking in this reservoir has been suspended pending sustained improvements in water quality.

Fish Community

- **Prey species:** Gizzard Shad were present in very low abundance. No other prey species were collected during sampling.
- **Catfishes:** No catfishes were collected during sampling.
- **White Bass:** No White Bass were collected during sampling.
- **Largemouth Bass:** No Largemouth Bass were collected during sampling.
- **White Crappie:** No White Crappie were collected during sampling.

Management Strategies: Continue to monitor for golden algae with samples in the fall (November), winter (January), and Spring (March). Remove Colorado City Reservoir from the sampling rotation until water quality improves.

Introduction

This document is a summary of fisheries data collected from Colorado City Reservoir in 2020. 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 2020 data for comparison.

Reservoir Description

Colorado City Reservoir is a 1,618-acre impoundment that was constructed in 1949 and is located on Morgan Creek, a tributary of the Colorado River, west of Colorado City in Mitchell County, Texas. The reservoir is operated and controlled by the City of Colorado City. It is a former power-plant reservoir with habitat consisting primarily of flooded terrestrial vegetation, native emergent vegetation, boulders, and boat docks. There is currently no substantial coverage of submerged aquatic vegetation. The Morgan Creek Power Plant closed in 2008 and pumping no longer occurs. Prior to the power plant closing, water levels were maintained at minimum 50% capacity (Figure 1). The Reservoir has experienced frequent and severe impacts from toxic golden algae (*Prymnesium parvum*) blooms since 2001 (Appendix A). Fish kills have occurred on a nearly annual basis. In 2010, Colorado City Reservoir was classified as hypereutrophic based on Carlson's Trophic State Index for Chlorophyll-*a* (TSI Chl-*a*) with a mean TSI chl-*a* of 66.08 (Texas Commission on Environmental Quality 2011). Other descriptive characteristics for Colorado City Reservoir are shown in Table 1.

Angler Access

There is one public boat ramp (Colorado City State Park), and a privately-owned boat ramp at Cooper's Cove Resort (Table 2). Shoreline-angler access was adequate at Lake Colorado City State Park. The state park boat ramp is not useable at low water levels.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Wright 2017) included:

1. Continue to monitor golden alga levels, stock prey and sportfish species if reservoir remains free of golden alga, and conduct electrofishing survey in fall 2020.

   Action: Golden alga levels were monitored annually, toxic golden alga levels remained high from 2017-2020 and no stockings were conducted, an electrofishing survey was conducted in fall 2020.

2. Cooperate with the Colorado City State Park to post signage, educate the public about invasive species, and track existing and future inter-basin water transfers to facilitate potential invasive species responses.

   Action: The San Angelo District continued to work with the Colorado City State Park to post signage and to educate the public on invasive species threats through media outlets.

Harvest regulation history: Sport fish in Colorado City Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Red Drum were stocked from 1981-2003. The reservoir has been impacted by fish kills since 2001 due to golden algae blooms and no stockings have occurred since 2008. The complete stocking history is shown in Table 4.

Vegetation/habitat management history: Colorado City Reservoir has no vegetation management history.

Water transfer: Colorado City Reservoir was used as a power plant cooling reservoir up until 2008 when the plant closed. Now the reservoir is primarily used for municipal water supply and recreation. Water transfers have been conducted in the past by the Colorado River Municipal Water District, moving water from Champion Creek, E. V. Spence, and Moss Creek Reservoirs into Colorado City Reservoir. However, water transfers have ceased since the closing of the power plant.

Methods

Surveys were conducted to achieve survey and sampling objectives in accordance with the objective-based sampling (OBS) plan for Colorado City Reservoir (Wright 2017). Primary components of the OBS plan are listed in Table 5. All survey sites were randomly selected. Electrofishing methods deviated from the standard procedures as we conducted daytime electrofishing and only conducted 0.5 hours of sampling. This was done due to the knowledge that the reservoir had recently suffered a golden alga fish kill and it was likely few fish remained in the reservoir. The purpose of the electrofishing survey was to confirm the presence or absent of fish species in the reservoir, thus a full hour of nighttime electrofishing was not necessary.

Electrofishing – Gizzard Shad were collected by daytime electrofishing (0.5 hour at 6, 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.

Statistics – Sampling statistics (CPUE for various length categories) were calculated for target fishes according to Anderson and Neumann (1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE.

Habitat – A structural habitat survey was conducted in 2020. Habitat was assessed with the digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2017).

Golden Algae – Cell Densities (cells/ml) and toxicity levels were determined by the TPWD analytical services laboratory in San Macros, Texas following methods outlined in Southard and Fries (2005). Toxicity levels were measured as Ichthyotoxic Units (ITU), and defined as high (ITU ≥ 25), moderate (ITU = 5), low (ITU = 1), and non-toxic (ITU = 0).

Water level – Source for water level data was the United States Geological Survey (USGS 2021).

Results and Discussion

Habitat: Littoral zone structural habitat consisted primarily of rocky shoreline and flooded terrestrial vegetation. Emergent vegetation was present, but coverage was < 1% and provided negligible value as fish habitat.

Golden Algae: Golden algae continued to be an annual problem with highly toxic blooms documented in March 2018, December 2019, and September 2020 which resulted in fish kills, primarily Bullhead spp. and Common Carp. Most recently, a moderately toxic bloom was documented in February 2021. Highly toxic conditions (conditions lethal to fish, ITU ≥ 25) have been documented in 13 of the last 19 years (Appendix A).

Prey species: Electrofishing catch rates of Gizzard Shad were 6.0/h (RSE = 67) in fall 2020. No Gizzard Shad were collected during sampling in 2017. No other prey species were observed during sampling in 2020.

Catfishes: Catfishes were not specifically targeted, but none were observed during fall electrofishing. Blue, Channel, and Flathead Catfish were last observed in Colorado City Reservoir in 2001.

White Bass: White Bass were not specifically targeted, but none were observed during fall electrofishing. White Bass were last observed in Colorado City Reservoir in 2001.

Largemouth Bass: No Largemouth Bass were collected in fall 2020. Only one Largemouth Bass was collected during the previous survey in 2017.

White Crappie: White Crappie were not specifically targeted, but none were observed during fall electrofishing. White Crappie were last observed in Colorado City Reservoir in 2008.

Fisheries Management Plan for Colorado City Reservoir, Texas

Prepared – July 2021

ISSUE 1: Colorado City Reservoir has suffered from annual golden alga blooms since 2001 that has effectively eliminated sportfish populations from the reservoir. Due to the likelihood that these blooms will continue in the future, it is no longer necessary to monitor fish populations in this reservoir.

MANAGEMENT STRATEGIES

1. Remove Colorado City Reservoir from the sampling rotation until water quality improves.
2. Continue to monitor golden algae levels in the fall (November), winter (January), and spring (March). Additional monitoring may be conducted as needed.

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 state.

MANAGEMENT STRATEGIES

1. Cooperate with the Colorado City State Park 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.

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Tables and Figures

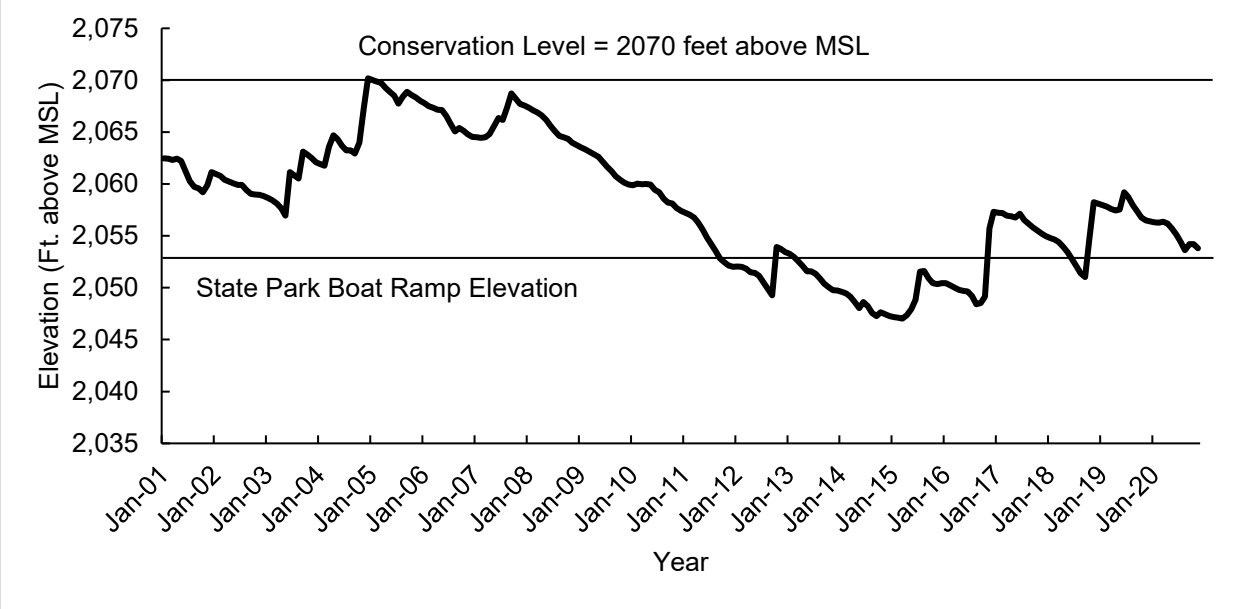


Figure 1. Monthly water level elevations in feet above mean sea level (MSL) recorded for Colorado City Reservoir, Texas.

Table 1. Characteristics of Colorado City Reservoir, Texas.

Characteristic	Description
Year constructed	1949
Controlling authority	City of Colorado City
County	Mitchell
Reservoir type	Tributary of the Colorado River
Shoreline Development Index	4.09
Conductivity	5,400 µS/cm

Table 2. Boat ramp characteristics for Colorado City Reservoir, Texas, September 2020. Reservoir elevation at time of survey was 2,054 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Lake Colorado City State Park	32.339583 -100.92872	Y	15	2053	Adequate. Extension is feasible.
Cooper's Cove	32.356565 -100.93366	N	10	2057	Out of Water. Extension is not feasible.

Table 3. Harvest regulations for Colorado City Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
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

Table 4. Stocking history of Colorado City Reservoir, Texas. FGL = fingerling; ADL = adults, UNK = unknown, FRY = fry.

Species	Year	Number	Size
Threadfin Shad	1980	2,000	UNK
Bluegill	2003	162,739	FGL
	2004	83,251	FGL
	2005	168,338	FGL
	2006	140,191	FGL
	2007	135,618	FGL
	2008	173,828	FGL
	Total	863,965	
Channel Catfish	1972	7,000	UNK
	2003	79,983	FGL
	2003	151	ADL
	2004	149,628	FGL
	2005	359,478	FRY
	2005	165,719	FGL
	2006	142,404	FGL
	2008	156,963	FGL
	Total	1,061,326	
Largemouth Bass	1966	40,000	UNK
	1968	25,000	UNK
	1970	15,000	UNK
	1972	50,000	UNK
	1997	161,800	FGL
	Total	291,800	
Florida Largemouth Bass	1986	160,351	FGL
	2000	41,113	FGL
	2004	143,915	FGL
	2005	162,134	FGL
	2007	135,384	FGL
	2008	162,250	FGL
	Total	805,147	
Palmetto Bass	1978	10,000	UNK

Table 4. Stocking history continued.

Species	Year	Number	Size
Red Drum	1981	167,400	FGL
	1982	134,000	FGL
	1986	174,850	FGL
	1987	160,000	FGL
	1991	183,800	FGL
	1992	72,803	FGL
	1993	162,780	FRY
	1994	160,859	FGL
	1995	166,000	FGL
	1996	165,228	FGL
	1997	168,178	FGL
	1999	195,948	FGL
	2000	204,400	FGL
	2001	204,016	FGL
	2003	177,093	FGL
	Total	2,497,355	
Hybrid crappie	1994	162,548	FRY
	1995	161,830	FRY
	1996	162,423	FRY
	1997	143,697	FGL
	Total	630,498	
Walleye	1978	50,000	UNK

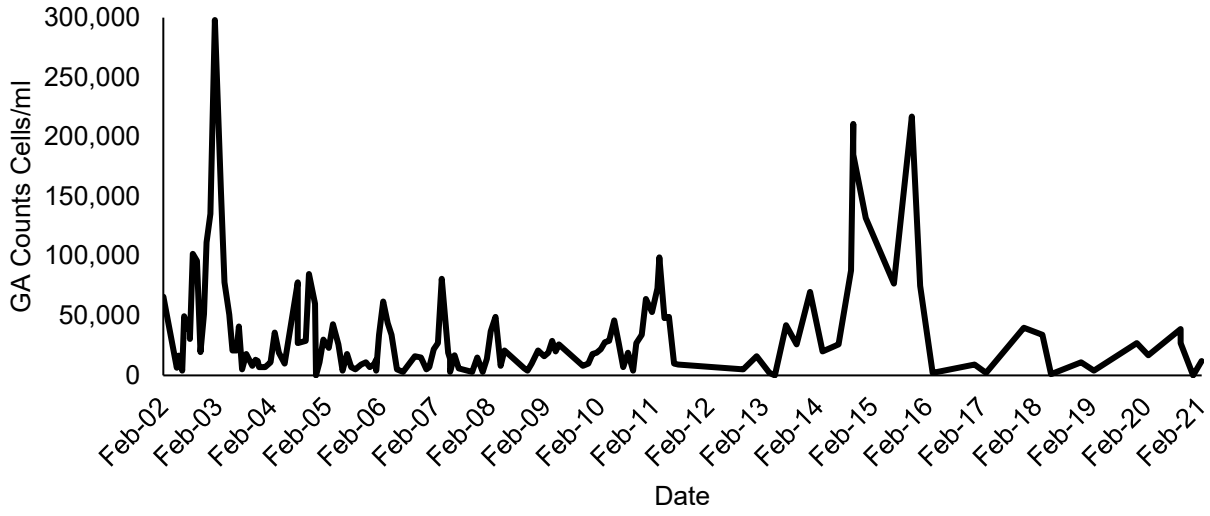
Table 5. Objective-based sampling plan components for Colorado City Reservoir, Texas 2020.

Gear/target species	Survey objective	Metrics	Sampling objective
Electrofishing			
Largemouth Bass	Abundance	CPUE–Total	Exploratory
Bluegill	Abundance	CPUE–Total	Exploratory
Gizzard Shad	Abundance	CPUE–Total	Exploratory

APPENDIX A – Golden Alga Monitoring 2002-2021

Golden algae testing results from 2002-2021. Time period was defined as August through July. Cell density are measured in cells/ml.

Time Period	# Samples	Mean Cell Density	Peak Cell Density	Peak Toxicity
2002-2003	16	78,438	298,000	High
2003-2004	14	22,714	78,000	High
2004-2005	12	28,000	85,000	High
2005-2006	14	17,929	62,000	High
2006-2007	12	19,333	81,000	High
2007-2008	8	18,750	49,000	High
2008-2009	9	16,778	29,000	High
2009-2010	10	21,400	46,000	High
2010-2011	12	40,750	99,000	High
2011-2012	-	-	-	-
2012-2013	5	13,000	42,000	Moderate
2013-2014	4	35,500	70,000	Low
2014-2015	5	138,600	211,000	High
2015-2016	3	98,000	217,000	Moderate
2016-2017	2	5,500	9,000	Non-Toxic
2017-2018	3	25,000	40,000	High
2018-2019	2	7,500	11,000	Moderate
2019-2020	2	22,000	27,000	High
2020-2021	4	19,500	39,000	High
AVERAGE	**7.6**	**34,927**	**82,944**	



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