PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Sweetwater Reservoir

Prepared by:

Natalie Goldstrohm, Assistant District Management Supervisor
and
Michael Homer Jr., District Management Supervisor

Inland Fisheries Division
Abilene District
Abilene, Texas

Carter Smith
Executive Director

Craig Bonds
Director, Inland Fisheries

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Sweetwater Reservoir were not surveyed in fall 2014 and spring 2015 due to extreme low water level and fish kills caused by golden alga blooms.

- **Reservoir Description:** Sweetwater Reservoir is a 630-acre reservoir located 12 miles southeast of Sweetwater, Texas, in the Brazos River Basin on Bitter and Cottonwood creeks, tributaries of the Clear Fork. It is owned and operated by the City of Sweetwater and is used for municipal, industrial, and recreational purposes. Water level began dropping in 1998 and declined 38 feet over a nine year period. In July 2007, water level increased substantially and was nearly full. Since then, the water level had continuously dropped reaching 27.5 feet below conservation pool (CP) as of May 2015. Toxic golden alga blooms caused major fish kills in March 2003 and winter 2014. An additional fish kill was caused by golden alga in winter 2015. Boat access consists of one public-use ramp, and bank access was limited to the boat ramp area and park.

- **Management History:** Historically, important sport fish have included Channel Catfish, Largemouth Bass, and White Crappie. A 14- to 18-inch slot limit on Largemouth Bass was implemented in September 2001. Sport and forage fishes were reintroduced in 2007 and 2008 after the reservoir nearly filled in 2007.

- **Fish Community:**
  - **Prey Species**: No data were collected due to extreme low water level and golden alga kills.
  - **Catfishes**: No data collected were due to extreme low water level and golden alga kills.
  - **Largemouth Bass**: No data were collected due to extreme low water level and golden alga kills.
  - **White Crappie**: No data were collected due to extreme low water level and golden alga kills.

- **Management strategies:** Based on current information, the reservoir should continue to be managed with existing regulations. If waterbody conditions allow for survival of fishes, stockings of Bluegill, Channel Catfish, and Largemouth Bass will be requested as part of the drought recovery plan and to reestablish sport fish populations. Survey of fish populations will resume once stocked species become established. A meeting to discuss possible extension of the main boat ramp will be planned with the City of Sweetwater. Inform the public of the threats and impacts of golden alga and invasive species.

INTRODUCTION

This document is a summary of conditions at Sweetwater Reservoir in 2014-2015. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. No fisheries data were collected in 2014-2015 due to extreme low water level and fish kills caused by toxic golden alga blooms in 2014 and 2015.

Reservoir Description

Sweetwater Reservoir is a 630-acre impoundment constructed in 1930 on Bitter and Cottonwood creeks, located in Nolan County approximately 12 miles southeast of Sweetwater, Texas. It is owned and operated by the City of Sweetwater. Primary water use is water supply and recreation. Water level began dropping in 1998 and declined 38 feet over a period of nine years. In July 2007, water level increased substantially and by fall 2008, water level was within a foot of conservation pool (CP). Water level had steadily declined since 2008 and was 27.5 feet below CP in May 2015 (Figure 1). Fish kills caused by toxic golden alga blooms occurred in March 2003, winter 2014, and winter 2015. Species impacted during golden alga blooms in 2003 and 2014 included Gizzard Shad, sunfish, Largemouth Bass, Channel Catfish, crappie, and Common Carp. In 2015, Channel Catfish and Common Carp were observed. Other fish species (e.g., Gizzard Shad, Largemouth Bass, and crappie) were likely not present in the reservoir after the major golden alga kill in 2014. Habitat in 2010 consisted of mud shoreline and dead brush. Other descriptive characteristics for Sweetwater Reservoir are in Table 1.

Angler Access

Sweetwater Reservoir has one public boat ramp, and public bank access was limited to the boat ramp area and park. The public boat ramp was out of the water and unusable. Extension of the ramp is feasible. Other boat ramp characteristics for Sweetwater Reservoir are shown in

Table **2**.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Dumont and Neely 2011) included:

1. Determine the angler oriented statistics for the Largemouth Bass fishery under a 14- to 18-inch slot limit.
   Action: Conducted a creel survey beginning in September 2011 and ended in August 2012. Creel survey results are not included in this report due to loss of nearly all Largemouth Bass during the 2014 toxic golden alga bloom. Past angler information does not apply to current or future lake conditions. However, the 2011-2012 creel survey indicated that anglers were catching Largemouth Bass up to 20 inches in length, which suggests that the slot limit may have allowed for fish to reach larger size.
2. Long-term water loss caused by drought has impacted fish populations in Sweetwater Reservoir.
   Action: A watershed map for Sweetwater Reservoir was created and watershed characteristics were determined. Watershed-level management recommendations to improve water collections are still being considered.
3. Inform the public of the impacts and threats of invasive species.
   Action: Newspaper articles were written about the negative impacts of invasive species with emphasis on zebra mussels. Education efforts have been made to inform the public and local bass clubs about how they can prevent the spread of invasive species. After fish kills by toxic golden alga blooms, newspaper articles and television interviews have been released to educate the public about golden alga and how it impacts fishes.

Harvest regulation history: A 14- to 18-inch slot limit on Largemouth Bass was implemented in September 2001. All other sport fish in Sweetwater Reservoir are managed with statewide regulations (Table 3).

Stocking history: Due to a major fish kill caused by a toxic golden alga bloom in 2003, fish populations had to be re-introduced once water level increased and the threat of a toxic golden alga bloom lessened. The stocking recovery began in 2007 and by the end of 2008, all major forage and sport fishes had been stocked at least once. The complete stocking history is shown in Table 4. Following a major fish kill attributed to toxic golden alga blooms in winter 2014 and 2015, it was likely that there are very few if any surviving fishes from the previous stockings remaining in the reservoir.

Vegetation/habitat management history: Sweetwater Reservoir has no vegetation/habitat management history.

Water transfer: No interbasin transfers are known to exist.

METHODS

Fishes were collected in 2012 by electrofishing (1 hour at 12, 5-minute stations) and in fall 2012 by trap netting (5 net nights at 5 stations). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manuals revised 2014). No fisheries surveys were conducted in 2014 and 2015 due to extreme low water level and fish kills.

Source for water level data was the United States Geological Survey (USGS 2015).

RESULTS AND DISCUSSION

Sweetwater Reservoir has rebounded after low water level and fish kills caused by toxic golden alga blooms (Dumont and Neely 2010). In the past, a toxic golden alga bloom caused a fish kill in 2003, the water increased to conservation pool in 2007, and fish were restocked in 2007 and 2008. By 2009, the prey community was abundant and provided forage for most sport fish, Channel Catfish were up to 12 inches, and Largemouth Bass had increased to 17 inches (Dumont and Neely 2010). Additional electrofishing was conducted in 2012 and Largemouth Bass sampled were 2-19 inches long. Anglers encountered in the 2011-2012 creel survey also indicated catching Largemouth Bass that were up to 20 inches long. White Crappie had reproduced at least once since 2007 (Dumont and Neely 2010) and were up to 10 inches long in 2012.

Habitat: No data were collected due to extreme low water level and the fish kills.

Prey species: No data were collected due to extreme low water level and the fish kills.

Channel Catfish: No data were collected due to extreme low water level and the fish kills.

Largemouth Bass: No data were collected due to extreme low water level and the fish kills.

White Crappie: No data were collected due to extreme low water level and the fish kills.

Fisheries management plan for Sweetwater Reservoir, Texas

Prepared – July 2015.

ISSUE 1: Golden alga had caused three fish kills since 2000, the latest being 2014 and 2015 and all as a result of elevated conductivity as water level declined. The kills in 2014 and 2015 extirpated all important forage and sport fish.

MANAGEMENT STRATEGIES

1. Stockings are not recommended until water level has increased significantly (2,103 feet above mean sea level), when water quality is suitable, and golden alga cell levels had subsided to allow for continued survival of fishes. A recovery stocking plan will be implemented once all conditions above are met.
2. Once conditions allow, prey fish will be stocked first. Sport fish such as Largemouth Bass, Channel Catfish, and White Crappie will be added once the prey fish become established.
3. Monitor the reservoir for presence of golden alga and toxic alga blooms by collecting water samples and performing golden alga cell counts and fisheries toxicity tests. Monitoring will be conducted once the reservoir increases in water level.

ISSUE 2: Boating access at the public ramp was not possible due to low water level. The boat ramp can be extended. The lake bottom has adequate slope at the end of the ramp with access to deeper water.

MANAGEMENT STRATEGY

1. Meet with the City of Sweetwater and discuss the potential of ramp improvement projects and benefits of extending the ramp during a period of low water level.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. 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.

SAMPLING SCHEDULE JUSTIFICATION:

When water level is adequate and fish have been stocked, fisheries sampling will be conducted for sport fishes and prey. Tandem hoop netting will be conducted in summer 2018 to monitor relative abundance, size structure, and body condition for Channel Catfish. Electrofishing will be conducted for Largemouth Bass to monitor relative abundance, size structure, and body condition; prey fish will be sampled during the fall 2018 electrofishing event. Trap netting will be conducted to monitor relative abundance, size structure, and body condition for White and Black crappies in fall 2018. A vegetation, habitat, and access survey will be conducted in summer 2018. For proposed sampling schedule see Table **5**.

LITERATURE CITED

Dumont, S. and B. Neely. 2011. Statewide freshwater fisheries monitoring and management program survey report for Sweetwater Reservoir, 2010. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.

United States Geological Survey (USGS). 2015. National water information system: Web interface. Available: http://waterdata.usgs.gov/tx/nwis (July 2015).

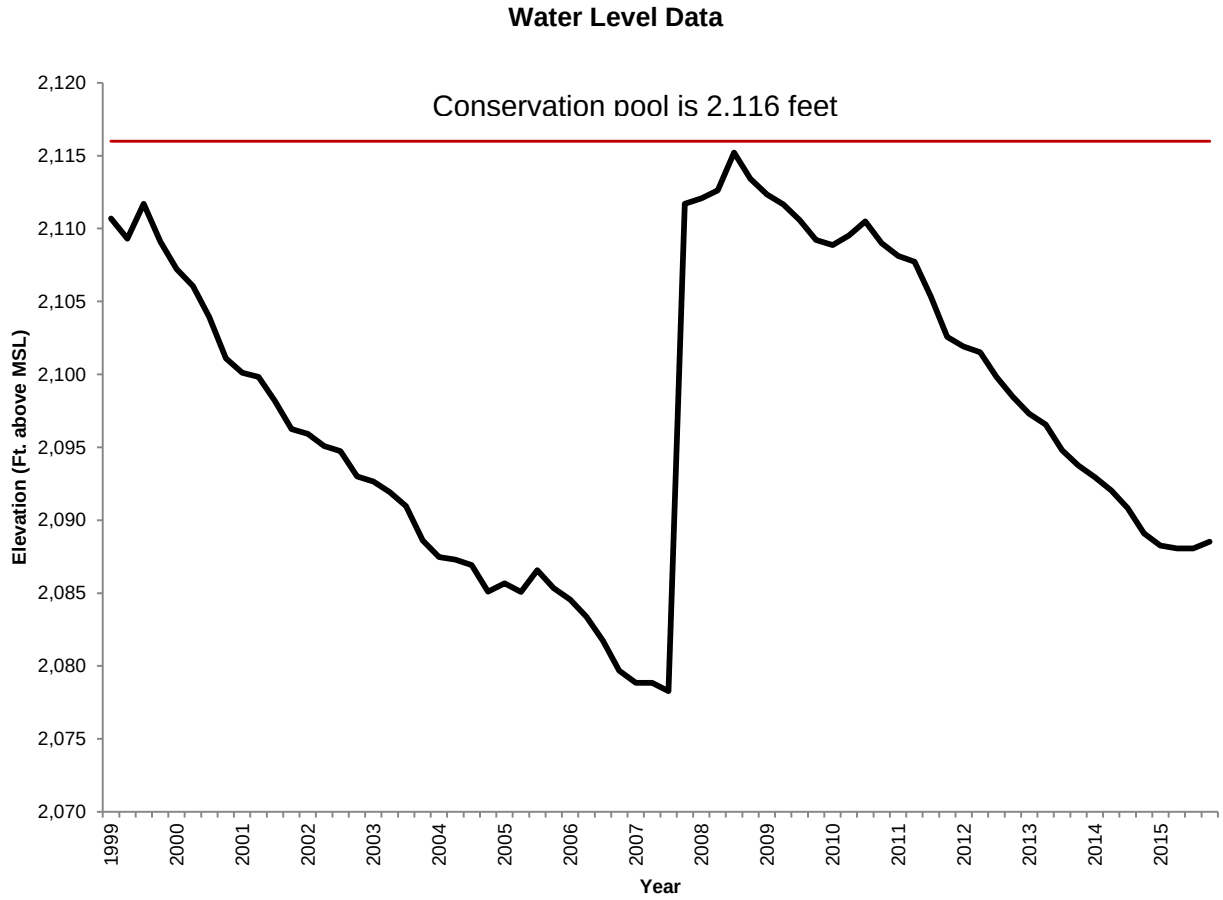

Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) for Sweetwater Reservoir, Texas. Conservation pool is 2,116 feet above mean sea level, shown in red. Dead pool is approximately at 2,070 feet above mean sea level.

Table 1. Characteristics of Sweetwater Reservoir, Texas.

Characteristic	Description
Year constructed	1930
Conservation pool (CP)	2,116 feet above mean sea level
Dead pool	2,070 feet above mean sea level
Controlling authority	City of Sweetwater
County	Nolan
Reservoir type	Tributary
River basin	Brazos River Basin
Shoreline Development Index (SDI)	4.62
USGS 8-Digit HUC Watershed	12060102 (Upper Clear Fork Brazos)
Conductivity	979-2,623 µS/cm

Table 2. Boat ramp characteristics for Sweetwater Reservoir, Texas, August, 2014. Reservoir elevation at time of survey was approximately 2,090 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Main Ramp	32.437541 -100.300439	Y	20	2,093	Out of water. Extension is feasible.

Table 3. Harvest regulations for Sweetwater Reservoir, Texas.

Species	Bag Limit	Length Limit
Catfish, Channel	25	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14- to 18-inch slot*
Crappie: White and Black, their hybrids and subspecies	25	10-inch minimum

*Largemouth Bass ≤ 14 inches and ≥ 18 inches may be harvested.

Table 4. Stocking history of Sweetwater Reservoir, Texas. Size categories: FRY = <1 inch; FGL (fingerling) = 1-3 inches; ADL = adults.

Species	Year	Number	Size
Fathead Minnow	2007	12,500	ADL
Golden Shiners	2007	1,000	ADL
Inland Silversides	2008	500	ADL
Gizzard Shad	2008	500	ADL
Bluegill	2007	64,545	FGL
	2008	64,601	FGL
	2009	86,421	FGL
	Total	215,567	
Channel Catfish	2008	62,973	FGL
	2009	63,441	FGL
	Total	126,414	
Flathead Catfish	1973	1,600	Unknown
Florida Largemouth Bass	1996	1,169	FGL
	1997	2,412	FGL
	1998	25,000	FGL
	1999	15,998	FGL
	2000	12,821	FGL
	2008	63,338	FGL
	2009	72,257	FGL
	Total	192,995	
Largemouth Bass	1966	70,000	FGL
Florida Largemouth Bass ShareLunker	2008	39,970	FGL
Walleye	1984	3,512,500	FRY
	1977	122,000	FRY
	1976	8,000	FGL
	Total	3,642,500	
White Crappie	2007	50	ADL

Table 5. Proposed sampling schedule for Sweetwater Reservoir, Texas. Survey period is June through May. Tandem hoop netting surveys are conducted in the summer, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey Year	Electrofishing Fall	Trap netting	Hoop netting	Gill Netting	Habitat/ Vegetation	Access	Creel survey	Report
2015 – 2016								
2016 – 2017								
2017 – 2018								
2018 – 2019	S	S	A		S	S		S

APPENDIX A

Google Earth satellite images of the public boat ramp on Sweetwater Reservoir, Texas, imagery dates ranged from 10/30/2008, 2,113.0 feet above mean sea level (left) to 1/25/2014, 2,092.7 feet above mean sea level (right) (accessed 11/14/2014). Conservation pool at Sweetwater Reservoir is 2,116 feet above mean sea level.