

PERFORMANCE REPORT

As Required by

FEDERAL AID IN SPORT FISH RESTORATION ACT

TEXAS

FEDERAL AID PROJECT F-221-M-3

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2012 Fisheries Management Survey Report

Red Bluff Reservoir

Prepared by:

Mandy K. Scott, District Management Supervisor

Inland Fisheries Division
District 1-C, San Angelo, Texas



Carter P. Smith
Executive Director

Gary Saul
Director, Inland Fisheries

July 31, 2013

TABLE OF CONTENTS

Survey and Management Summary	2
Introduction.....	3
Reservoir Description.....	3
Angler Access	3
Management History	3
Methods.....	4
Results and Discussion	4
Fisheries Management Plan	5
Literature Cited.....	5
Figures and Tables	6-8
Water Level (Figure 1)	6
Reservoir Characteristics (Table 1)	6
Stocking History (Table 2).....	7
Golden Alga and Water Quality Data (Table 3)	8

SURVEY AND MANAGEMENT SUMMARY

Fish populations in Red Bluff Reservoir were not surveyed in 2010-2013 due to ongoing poor water quality and golden alga blooms. This report recommends removing the reservoir from normal sampling rotation until conditions improve.

- **Reservoir Description:** Red Bluff Reservoir is an 11,700-acre (when full) reservoir located on the Pecos River 45 miles north of Pecos on the Loving and Reeves County line; the upper end of the reservoir reaches into New Mexico. It was constructed in 1936 for hydroelectric and irrigation water supply. It has a history of severe water level fluctuations and had approximately 2,260 surface acres of water in 2013. The reservoir has also suffered from toxic golden alga (*P. parvum*) blooms since the mid-1980s. Since 2001 the algal blooms have suppressed fish populations significantly and prevented the recovery of the fisheries. The reservoir's conductivity has long been in excess of 4,000 $\mu\text{mhos/cm}$, making electrofishing ineffective. Habitat consists mainly of rock or gravel shoreline. Shoreline access is good near the dam, and boats can be launched from the gravel shore in the same area.
- **Management History:** Catfishes and Largemouth Bass were stocked until the 1980s and Palmetto Bass were present in Red Bluff Reservoir up until 2002; however, golden alga blooms have prevented any stocking success since then. Water quality testing has been conducted to check for golden alga and conditions that promote its growth.
- **Fish Community**
 - **All species:** No fish were collected in gill net surveys in either 2007 or 2009. No fish surveys have been conducted by TPWD since then.
- **Water Quality**
 - Recent water quality tests have shown a sharp increase in salinity and conductivity, although golden alga cell counts were relatively low.
- **Management Strategies:** Keep monitoring for water quality, golden alga presence and toxicity; remove the reservoir from the sampling rotation until water quality improves.

INTRODUCTION

The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. Since the reservoir has suffered from poor water quality and golden alga blooms that have suppressed fish populations for more than a decade, this report recommends removing Red Bluff Reservoir from the normal sampling rotation until conditions improve.

Reservoir Description

Red Bluff Reservoir is an 11,700-acre (when full) reservoir located on the Pecos River 45 miles north of Pecos on the Loving and Reeves County line; the upper end of the reservoir reaches into New Mexico. It was constructed in 1936 for hydroelectric and irrigation water supply. It has a history of severe water level fluctuations (Figure 1) and had approximately 2,260 surface acres in 2013. The reservoir has also suffered from toxic golden alga (*P. parvum*) blooms since the mid-1980s. Since 2001 algal blooms have suppressed fish populations significantly and prevented the recovery of the fisheries. Red Bluff Reservoir is hypereutrophic with a mean TSI chl -a of 61.6 (Texas Commission on Environmental Quality 2011). The reservoir's conductivity has consistently been in excess of 4,000 $\mu\text{mhos/cm}$, making electrofishing ineffective. In the past year, conductivity was over 10,000 $\mu\text{mhos/cm}$ in each sample. Habitat consists mainly of rock or gravel shoreline. Boat and shoreline access are adequate. Other descriptive characteristics for Red Bluff Reservoir are presented in Table 1.

Angler Access

There is one public access point for boaters and anglers; however, there is no paved boat ramp available at current water levels. This access area is near the dam and the residential village on the south end of the reservoir (N 31° 53'53.61", W 103° 54'59.93"). No fishing or boating piers are available, but there is ample shoreline access.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Scott and Farooqi 2009) included:

1. Monitor for golden alga.
Action: We participated in collecting water samples for a Texas Tech University study in which Red Bluff and other water bodies were tested for golden alga cell count and other water quality parameters.
2. Stock fish when the golden alga problem has cleared.
Action: Golden alga blooms are still occurring at the reservoir, so no stockings have been made.

Harvest regulation history: Sport fishes in Red Bluff Reservoir have been managed with statewide regulations.

Stocking history: Species stocked have included Red Drum (1960s), Blue Catfish, Channel Catfish, Largemouth Bass, Black and White Crappie, and Striped Bass (until late 1980s and early 1990s) and Palmetto Bass (until 2002). The complete stocking history is in Table 2.

Vegetation/habitat history: The reservoir has no significant habitat management history.

Water transfer: No interbasin transfers are known to occur.

METHODS

Water level data were provided by U.S. Geological Survey website. Water samples were collected in 0.5-liter containers and transported on ice to the lab where cell counts were made under a compound microscope. Ichthyotoxin level was assessed using live fish bioassays in the San Marcos fish health lab. Water quality measurements were made with YSI meters and digital field pH meter. No fisheries surveys were conducted for this report due to the long-term problem with golden alga.

RESULTS AND DISCUSSION

Water sampling has shown the presence of golden alga blooms since 2002, with the latest confirmed bloom in February 2013 (Table 3). Cell counts were lower in 2012 compared to previous years; however, salinity and conductivity basically doubled in the most recent samples. In six of the eight bioassay tests conducted from 2002 to 2008, toxicity level was high. Toxicity level was unknown for the most recent samples.

Fisheries management plan for Red Bluff Reservoir, Texas

Prepared – July 2013.

ISSUE 1: Red Bluff Reservoir has been particularly hard-hit by golden alga and increasing salinity level. Fish stockings have been unsuccessful since 2001, and no fish were collected in the most recent gill net surveys (2007 and 2009). The reservoir lies in a remote part of West Texas approximately four hours from San Angelo Headquarters, so to conduct a fisheries sampling trip requires substantial man-hours and fuel costs for unproductive surveys.

MANAGEMENT STRATEGIES

1. Monitor Red Bluff for changes in water quality, golden alga cell counts, and toxicity at least twice a year between November and March.
2. Remove Red Bluff from the normal district sampling rotation until conditions improve. Conductivity should be below 5,000 μ mhos and toxicity should be zero for two consecutive winter seasons before the reservoir is added back to the rotation.

LITERATURE CITED

- Scott, M., and Farooqi. 2009. Statewide freshwater fisheries monitoring and management program survey report for Red Bluff Reservoir, 2008. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin.
- Texas Commission on Environmental Quality. 2011. Trophic classification of Texas reservoirs. 2010 Texas Water Quality Inventory and 303 (d) List, Austin. 18 pp.

Quarterly Water Level

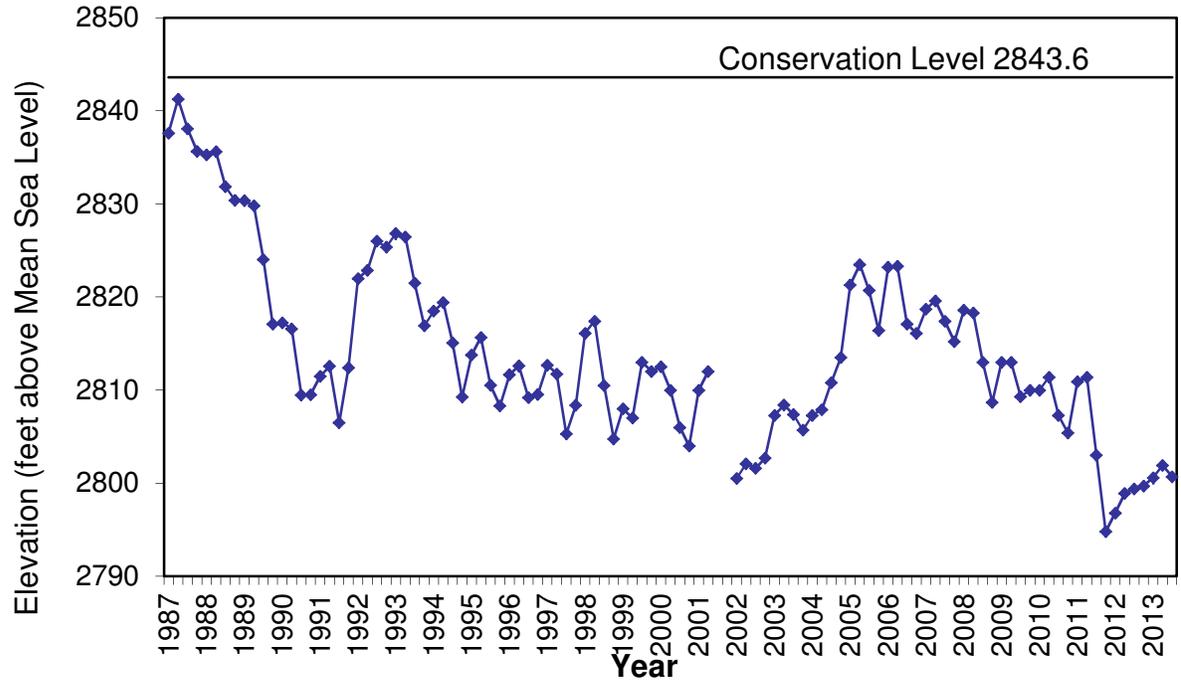


Figure 1. Quarterly water level elevations recorded for Red Bluff Reservoir, Texas.

Table 1. Characteristics of Red Bluff Reservoir, Texas.

Characteristic	Description
Year constructed	1936
Controlling authority	Red Bluff Water Power Control District
Counties	Reeves, Loving
Reservoir type	Mainstream
Shoreline Development Index	5.9
Conductivity	>10,000 μ mhos/cm

Table 2. Stocking history of Red Bluff Reservoir, Texas. Size categories are FRY = <1 inch; FGL = 1-3 inches; ADL = adult; and UNK = unknown.

Year	Number	Size	Year	Number	Size
<u>Blue Catfish</u>			<u>Red Drum</u>		
1979	263,579	UNK	1960	50	UNK
1980	86,681	UNK	1961	183	UNK
1981	50,000	UNK	1963	171	UNK
1982	49,981	UNK	1964	746	UNK
1988	15	ADL	1965	186	UNK
Total	450,256		1966	36	UNK
			Total	1,372	
<u>Channel Catfish</u>			<u>White Crappie</u>		
1966	55,680	UNK	1974	3,000	UNK
1969	10,000	UNK	1988	26,402	FGL
1970	39,300	UNK	Total	29,402	
1971	31,500	UNK			
1972	30,000	UNK	<u>Black Crappie</u>		
1973	24,750	UNK	1988	30,976	FGL
1974	19,900	UNK	1989	179,688	FRY
1975	20,000	UNK	Total	210,664	
1985	9,684	FGL			
1992	20,000	FGL	<u>Palmetto Bass</u>		
1993	300	ADL	1979	50,390	UNK
1993	292,954	FGL	1980	60,806	UNK
Total	554,068		1983	27,800	UNK
			1984	56,057	FGL
<u>Flathead Catfish</u>			1985	99,420	FGL
1976	10,600	UNK	1988	325,140	FGL
			1992	1,900,000	FRY
<u>Largemouth Bass</u>			1993	1,447,875	FRY
1966	133,280	UNK	1994	1,465,000	FRY
1967	186,300	UNK	1995	130,225	FGL
1969	94,000	UNK	1998	117,114	FGL
1970	97,000	UNK	1999	58,143	FGL
1971	64,000	UNK	2000	59,153	FGL
1974	10,000	UNK	2002	88,145	FGL
1988	75,662	FGL	Total	5,885,268	
Total	660,242				
			<u>Striped Bass</u>		
<u>Florida Largemouth Bass.</u>			1988	119,812	FGL
1988	28,400	FGL	1989	117,367	FGL
			Total	237,179	

Table 3. Golden alga (*P. parvum*) cell counts and toxicity data with corresponding salinity and conductivity measurements from Red Bluff Reservoir, Texas.

Sampling Date	Cell count (cells/mL)	Toxicity	Salinity (ppt)	Conductivity (μ mhos/cm)
1/21/2002	44,000	High		
5/8/2003	0			
2/5/2004	36,000	High		
5/24/2004	18,000	Moderate	4.2	7,590
1/5/2005	11,000	High	3.0	4,012
2/8/2005	24,000	High	3.1	3,945
3/28/2005	14,000	Slight		
1/27/2006	18,000			
3/13/2007	68,000	High		
5/7/2008	15,500	High		
2/15/2012	0			
4/17/2012	0			
6/11/2012	0		8.6	15,640
8/14/2012	0		6.9	13,010
10/15/2012	0		9.5	16,000
12/10/2012	2,000		9.3	10,510
2/12/2013	5,000		8.3	10,490
4/17/13	0		8.9	13,940