

PERFORMANCE REPORT

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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2015 Fisheries Management Survey Report

**Abilene Reservoir**

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## SURVEY AND MANAGEMENT SUMMARY

Fish populations in Abilene Reservoir were not surveyed from 2015-2016 because of extreme prolonged drought conditions. This report contains a management plan for the reservoir.

- **Reservoir Description:** Abilene Reservoir is a 640-acre impoundment constructed on Elm Creek in the Brazos River Basin, and it is approximately 18 miles southwest of Abilene, Texas. The reservoir's primary function was recreation, but it has also historically provided some municipal water supply to the City of Abilene. In 2005, operation and control of the reservoir was transferred from the City of Abilene to Texas Parks and Wildlife Department (TPWD) – Abilene State Park. The reservoir has been subject to extreme fluctuations in water level elevation and prolonged droughts. The reservoir went completely dry in spring 2014. Between 2015 and the beginning of 2016, the reservoir had caught nearly eight feet of water. Substantial rainfall in late spring 2016 filled the reservoir to over conservation pool elevation. Both boat ramps were useable as of May 2016.
- **Management History:** Blue Catfish, Channel Catfish, and Northern Largemouth Bass were stocked after the prolonged drought in 1998-2001. Florida Largemouth Bass were stocked in 2009. After Abilene State Park took control of the reservoir, harvest regulations for Blue Catfish and Channel Catfish were changed to no minimum length limit and a five-fish daily bag limit in any combination. Fishing was restricted to pole-and-line only. Management stockings of Gizzard Shad and sunfishes were conducted in spring 2016 to repopulate the prey community after the reservoir had gone completely dry and refilled after heavy rains. Following the prey species stockings, Florida Largemouth Bass and Channel Catfish fingerlings were stocked.
- **Fish Community:**
  - In spring 2016, an exploratory electrofishing survey was conducted to see if fishes had washed into the reservoir from other areas within the watershed. Only Green Sunfish and Common Carp were detected during the electrofishing survey. Gizzard Shad, Bluegill, Longear Sunfish, Orangespotted Sunfish, and Florida Largemouth Bass were all stocked in spring 2016.

**Management Strategies:** Prior to 2005, sport fish species were managed with statewide harvest regulations. In 2005, TPWD Abilene State Park assumed control of the reservoir. Blue Catfish and Channel Catfish are managed with no minimum length limit and five-fish daily bag limit (in combination), and fishing is limited to pole-and-line only. As of May 2016, the reservoir was completely full, and a fisheries recovery plan was implemented through stockings. Stocking success will be evaluated by exploratory sampling. Priority will be to first restore prey species and Largemouth Bass, then White Crappie. Gizzard Shad, Bluegill, and Largemouth Bass fingerlings were stocked in spring 2016, and Fathead Minnows and Channel Catfish fingerlings were stocked in summer 2016. White Crappie will be stocked at least one year following the reestablishment of prey species and Largemouth Bass. Additional monitoring efforts will be conducted at least two years following the reestablishment of forage and sport fish species. Abilene State Park staff will be approached to improve access locations to the reservoir. The public will be educated about the threat of invasive species, including salt cedar.

## INTRODUCTION

This document is a summary of the conditions of fisheries at Abilene Reservoir from 2015-2016. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fisheries. No fisheries data were collected since the last report (Dumont 2012) because of prolonged drought conditions.

### *Reservoir Description*

Abilene Reservoir is a 640-acre impoundment that was built in 1921 on Elm Creek in the Brazos River Basin, and it is approximately 18 miles southwest of Abilene, Texas. The reservoir's primary function was recreation, but it has also historically provided some municipal water supply to the City of Abilene. In 2005, operation and control of the reservoir was transferred from City of Abilene to Texas Parks and Wildlife Department (TPWD) – Abilene State Park. The reservoir has been subject to extreme fluctuations in water level and prolonged droughts. The reservoir could not be sampled during the sampling period because the reservoir went dry. Prior to this sampling period, Abilene Reservoir experienced two severe low-water periods; one in the mid-1980's, and the second period occurred from the late 1990's-early 2000's. Heavy rain events in 2002, 2005, 2007, and 2010 either filled or nearly filled the reservoir, and steady declines in water level followed. The reservoir went completely dry by summer 2014, and caught about eight feet of water between fall 2015 and spring 2016 (Figure 1). Substantial rainfall in spring 2016 increased the water level to over conservation pool elevation. Other descriptive characteristics for Abilene Reservoir are in Table 1.

### *Angler Access*

Abilene Reservoir has two public boat ramps accessible through a gate requiring a passcode that can be obtained from the Abilene State Park front office. A fee is required for state park entry. However, during the majority of the survey period, both ramps were out of water because of low water level. A fishing pier existed at the south corner of the dam, but was not usable by anglers during the survey period. After spring 2016 rainfall increased water level to full pool, both boat ramps have since been reopened. Additional boat ramp characteristics are located in Table 2.

### *Management History*

**Previous management strategies and actions:** Management strategies and actions from the previous survey report (Dumont 2012) included:

1. Approach Abilene State Park about extending the boat ramp and constructing a paved parking area at the West Boat Ramp area.  
**Action:** Multiple meetings have been held with Abilene State Park staff to discuss improvements for boat ramps and water bodies within the park. Bank access has been increased by adding the fishing pier near the dam. A paved parking lot has not been created. However, in spring 2016, a paved parking lot was approved to be constructed near the West Boat Ramp.
2. Educate public about threats of invasive species.  
**Action:** Press releases were distributed to local and statewide media. Educational literature was provided to the state park to notify users of potential invasive species introductions and their threats.

**Harvest regulation history:** Prior to 2005, fish populations were managed with statewide harvest regulations. Once Abilene State Park assumed control of the reservoir in 2005, sport fish except Blue Catfish and Channel Catfish have been managed with statewide harvest regulations. Blue Catfish and Channel Catfish have been managed with no minimum length limit and five-fish daily bag limit (in combination), which reflects a regulation also enforced at community fishing lakes and water bodies entirely enclosed within state park boundaries. Fishing was also limited to pole-and-line only. Harvest

regulations for sport fish are listed in Table 3.

**Stocking history:** Abilene Reservoir's fish populations have been maintained by stockings of multiple species following re-filling events at the reservoir. In 2016, the reservoir was stocked with species including Gizzard Shad, Bluegill, Fathead Minnows, Orangespotted Sunfish, Longear Sunfish, Channel Catfish, and Florida Largemouth Bass. A complete stocking history is presented in Table 4.

**Vegetation/habitat management history:** Plantings of cypress trees and American lotus were attempted in the 1990's, but the establishment of these species was unsuccessful.

**Water Transfer:** No interbasin transfers are known to exist.

## METHODS

General monitoring was not feasible as a result of the reservoir going completely dry. However, exploratory sampling was conducted during spring 2016.

*Electrofishing* – Daytime, exploratory electrofishing was conducted in spring 2016 for a total of one hour at biologist-selected stations for any fish species encountered during the survey. Catch per unit effort (CPUE) was recorded as the number of fish caught per hour (fish/h) of actual electrofishing.

*Statistics* – Sampling statistics (CPUE) were calculated for all fish species collected. Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics.

*Water level* – Source for water level data was the United States Geological Survey (USGS 2016).

*Invasive species survey* - In July 2015, a roving survey was conducted to determine salt cedar coverage at the reservoir. The water body perimeter was circumnavigated, and salt cedar coverage at the reservoir was spatially recorded by using Global Positioning Systems (GPS) equipment. GPS waypoints were converted to shapefiles. Shapefiles were then overlaid on digital maps by using Global Information Systems (GIS) software and satellite imagery (USDA 2014). Salt cedar coverage in acres was calculated by using GIS software.

## RESULTS AND DISCUSSION

Prior to the recent period of prolonged drought, Abilene Reservoir provided excellent sport fisheries for Largemouth Bass and White Crappie. Blue Catfish also provided a fishery for anglers. Prey species like Gizzard Shad were also productive, and the most recent electrofishing catch rate in 2011 was 732.0 fish/hour (Dumont 2012). Catch of Largemouth Bass in the fall 2011 electrofishing survey was 94.4 fish/hour, and the catch rate of legal-fish was 17.6 fish/hour. White Crappie were once relatively abundant in the reservoir, but legal sized crappie detected in monitoring surveys were limited (Dumont 2012).

**Habitat:** A habitat survey was last conducted in 2011 (Dumont 2012). As the reservoir went dry, terrestrial vegetation colonized the lakebed, and many acres had been established. The inundated vegetation will serve as primary fisheries habitat within the reservoir.

**Invasive Species Survey:** In summer 2015, invasive salt cedar was discovered along the southern lakebed in patches of varying density. Salt cedar was also observed in one large patch in the northwest corner of the lakebed. No salt cedar was observed outside of the lake bed. Approximately 9.2 acres of salt cedar coverage was recorded at the reservoir, and multiple areas in the reservoir are still expected to have salt cedar present. However, access points to the rear northern half of the reservoir were closed off, and the entire survey could not be completed.

**Prey and other species:** Hybrid sunfish (1.0 fish/hour; RSE=100) and Green Sunfish (8.0 fish/hour; RSE=50) were present in low relative abundance during the spring 2016 exploratory electrofishing survey. Green Sunfish ranged from 4-6 inches in total length (TL). Common Carp were also captured at a

rate of 28.0 fish/hour (RSE=64). Common Carp ranged from 13-16 inches in TL.

**Catfishes:** Catfishes were not detected during the spring 2016 exploratory sampling.

**Largemouth Bass:** Largemouth Bass were not observed during the spring 2016 exploratory sampling.

**White Crappie:** White Crappie were not seen during the spring 2016 exploratory sampling.

## Fisheries management plan for Abilene Reservoir, Texas

Prepared – July 2016

**ISSUE 1:** Abilene Reservoir has been subjected to periods of long-term drought and extreme fluctuations in water level. The reservoir went completely dry by summer 2014, and important fisheries were lost. In 2016, various prey species, Channel Catfish, and Florida Largemouth Bass were stocked to reestablish fisheries. However, additional stockings will be necessary to restore the fisheries that once existed such as White Crappie.

### MANAGEMENT STRATEGIES

1. Continue to stock important prey and sport fish to reestablish and maintain the fisheries.
2. Sample fish to determine stocking success by electrofishing in 2017 and 2019 as well as trap netting in fall 2019.

**ISSUE 2:** The dam boat ramp is nearly inaccessible to motorized boats because of grade and shallow water depth.

### MANAGEMENT STRATEGY

1. Work with TPWD Abilene State Park to develop a boat ramp improvement plan to be implemented during future low water levels. The plan should include application for a boater access grant, dredging excess sediment, and improving the slope of the ramp.

**ISSUE 3:** Salt cedar (*Tamarix* spp.) has been documented at Abilene Reservoir, and appears to be increasing in coverage.

### MANAGEMENT STRATEGY

1. Meet with City of Abilene and TPWD invasive species experts to discuss salt cedar establishment, potential problems, possible monitoring efforts, as well as prospective measures for control.

**ISSUE 4:** 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. Contact and educate Abilene State Park staff about invasive species, and provide them with posters, literature, etc... so that they can educate their customers.
3. Educate the public about invasive species by use of media and the internet.
4. Discuss 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.

### **Objective-Based Sampling Plan and Schedule**

**Sport fish, prey fish, and other important fishes:** Historically important sport fisheries included Blue Catfish, Channel Catfish, Largemouth Bass, and White Crappie. Important prey species in the reservoir included Gizzard Shad, Threadfin Shad, and Bluegill. As of late spring 2014, the reservoir went completely dry. In 2016, the reservoir filled and was stocked with species including Gizzard Shad, Bluegill, Fathead Minnows, Orangespotted Sunfish, Longear Sunfish, Channel Catfish, and Florida Largemouth Bass.

**Management Strategies:** Gizzard Shad and sunfishes (i.e., Bluegill, Longear Sunfish, and Orangespotted Sunfish) were stocked in May 2016. Florida Largemouth Bass fingerlings were reintroduced at a rate of about 85 fingerlings/acre. A supplemental stocking of Fathead Minnows was conducted to boost prey availability. Channel Catfish fingerlings were requested for stocking at a rate of 100/acre.

Stocking success of prey species and Largemouth Bass will be assessed by exploratory electrofishing at 12 randomly-selected, 5-minute stations during fall 2017 (Table 5). Electrofishing will be conducted again in fall 2019 to monitor IOV for Gizzard Shad, relative abundance of prey species and Largemouth Bass (CPUE-Total and Stock CPUE) at target precision of RSE  $\leq 25$ . In 2019, a sample of at least 50 fish  $\geq$  stock size will be attempted to estimate size structure of prey species and Largemouth Bass. In 2019, weights from  $\geq 5$  fish from represented inch groups  $\geq$  stock-size will be collected to assess mean body conditions. During the 2019 sampling events, fin clips will be collected from a sample of 30 Largemouth Bass for genetic analysis for determining prevalence of Florida and Northern Largemouth Bass alleles. If objectives for precision of relative abundance data and body conditions are not met, up to one hour of additional sampling may be conducted if warranted.

Adult White Crappie will be stocked in 2017, at least one year after Largemouth Bass and prey species have been re-established. In fall 2019, trap netting will be conducted to obtain estimates of baseline relative abundance (CPUE-Total and Stock CPUE), size structure and body conditions. Trap netting will be conducted at 10 randomly selected stations. No additional sampling will be conducted to improve data precision for body conditions.

### LITERATURE CITED

- Dumont, S. 2012. Statewide freshwater fisheries monitoring and management program survey report for Abilene Reservoir, 2011. Texas Parks and Wildlife Department, Federal Aid Report F-30-R, Austin, Texas.
- United States Department of Agriculture (USDA). 2014. Aerial Photograph of Taylor County, Texas. USDA National Agriculture Imagery Program: Web interface. Available: <http://datagateway.nrcs.usda.gov/> (February 2016).
- United States Geological Survey (USGS). 2016. National water information system: Web interface. Available: <http://waterdata.usgs.gov/tx/nwis> (May 2016).



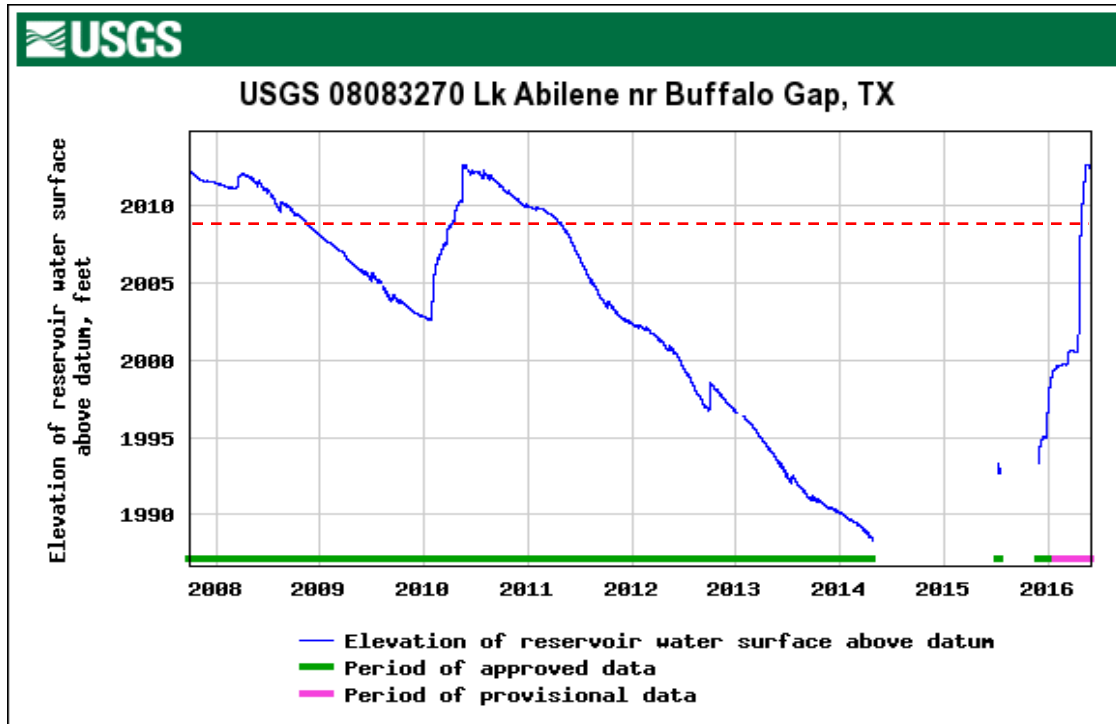


Figure 1. Mean daily water level data for Abilene Reservoir (October 2007 – June 2016), Taylor County, Texas (USGS 2016). Water level data is missing from 2014-2016 because the reservoir's water level was too low to be detected by the gauge. Dashed line represents approximate conservation pool level.

Table 1. Characteristics of Abilene Reservoir, Texas.

Characteristic	Description
Year Constructed	1921
Controlling Authority	City of Abilene
County	Taylor
Reservoir Type	Tributary; Brazos River Basin
Shoreline Development Index	2.27
USGS 8-Digit Hydrologic Unit Watershed	12060102 (Upper Clear Fork Brazos)
Conservation Pool Level (ft. above mean sea level)	2,012
Dead Pool Level (ft. above mean sea level)	1,987

Table 2. Boat ramp characteristics for Abilene Reservoir, Texas, June, 2016.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
Dam Ramp	32.232234° -99.890853°	Y	10	2,005	Accessible; modifications needed
West Boat Ramp	32.233609° -99.903101°	Y	10	2,004	Accessible

Table 3. Harvest regulations for Abilene Reservoir, Texas. Fishing is by pole and line only.

Species	Bag Limit	Length limit
Catfish: Channel and Blue, their hybrids and subspecies	5 (in any combination)	No minimum
Bass, Largemouth	5	14-in. minimum
Crappie: White and Black, their hybrids and subspecies	25 (in any combination)	10-in. minimum

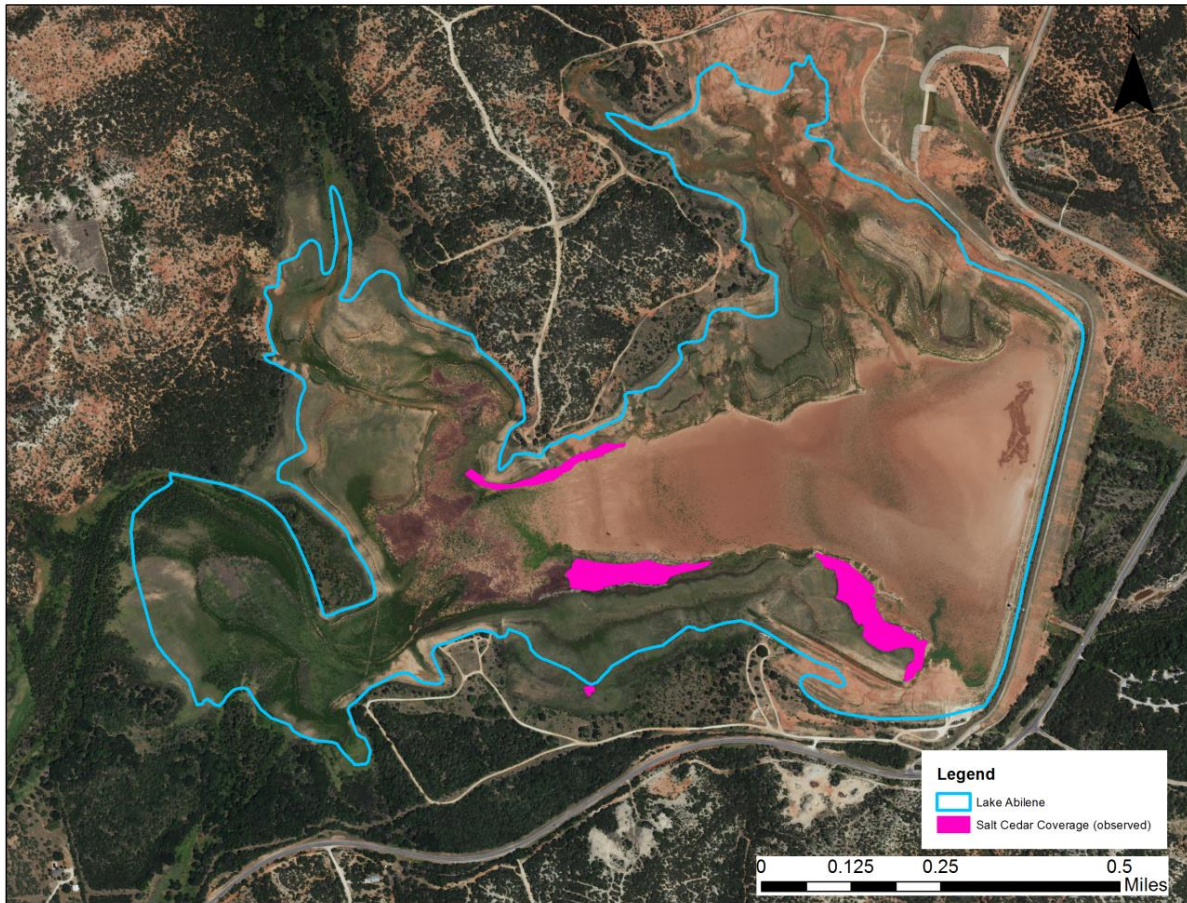
Table 4. Stocking history of Abilene Reservoir, Texas. FGL = fingerlings; ADL = Adult.

Species	Year	Number	Size
Shad, Gizzard	2016	486	ADL
Bluegill	2001	81,238	FGL
	2016	27	ADL
	Total	81,265	
Sunfish, Longear	2016	6	ADL
Sunfish, Orangespotted	2016	9	ADL
Minnow, Fathead	2016	6,944	ADL
Catfish, Blue	1995	36,883	FGL
	1996	64,429	FGL
	2004	59,893	FGL
	Total	161,205	
Catfish, Channel	1970	550	FGL
	1973	200,000	FGL
	1974	10,000	FGL
	1998	19,362	FGL
	2004	53,981	FGL
	2005	401	FGL
Total	284,294		
Bass, Florida Largemouth	1988	64,000	FGL
	1991	30,030	FGL
	1994	64,026	FGL
	2009	59,516	FGL
	2016	55,367	FGL
Total	272,939		
Bass, Largemouth	2005	63,695	FGL
Bass, Palmetto	1977	6,500	FGL
	1979	7,400	FGL
	Total	13,900	

Table 5. Proposed sampling schedule for Abilene Reservoir, Texas. The survey period is June through May. Gill netting surveys are conducted in the spring, while low-frequency electrofishing is conducted in the summer, and electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey year	Electrofishing	Trap net	Gill net	Low-frequency electrofishing	Habitat/Vegetation	Access	Creel survey	Report
2016-2017								
2017-2018	A							
2018-2019								
2019-2020	S	S		S	S	S		S

## APPENDIX A



Aerial Map (Scale 1:10,000; USDA National Agricultural Imagery Program 2014) and observed salt cedar coverage at Abilene Reservoir, Texas, July 2015. Approximately 9.2 acres of salt cedar was surveyed. The reservoir was less than 5% full and nearly dry at the time of the survey.