Performance Report

State: Oklahoma

Project Title: Fisheries Management Survey

Southwest Region Fisheries Management

Lake Lawtonka

Abstract

Lake Lawtonka was surveyed in 2023 via electrofishing for Largemouth and Smallmouth Bass to determine population structure and dynamics to evaluate the fishery for needs and possible improvements to the lake to enhance the system as a whole. Southwest region considers Lake Lawtonka to be the highest priority bass fishery and routine sampling occurs to monitor current trends in the population.

Lake Lawtonka has long been a quality Largemouth Bass fishery to many anglers and entities in southwest Oklahoma. Electrofishing surveys have been conducted here in 2016, 2018, 2019, 2020, 2021, and 2023 to continually assess the bass population. Lawtonka has an above average population of Largemouth Bass and a limited population of Smallmouth Bass along with a good population of Channel Catfish, Blue Catfish, and Saugeye.

Introduction

Lake Lawtonka is a medium size impoundment (2400 acres) that is main catchment of Medicine creek. Lawtonk is owned and operated by the City of Lawton Oklahoma mainly for water storage as well as for a recreational activities such as boat, camping, and fishing. This highly used fisheries regulations are set by the City of Lawton but managed jointly with ODWC who conducts surveys and compiles data for Bass, Channel Catfish, and saugeye. Lake Lawtonka is a clear lake with average depths of 10 feet with moderate water quality.

Management issues that seem to be present are water quality issues such as being a high eutrophic system, invasive species (Eurasian Milfoil and Zebra Mussels), large biomasses of common carp, and drought related issues. In recent years we have noted that invasive milfoils are starting to take over areas of the lake such as School House Slough, Robinson Landing, and north shallow flats area. While sampling we collect and remove as many common carp as possible to reduce the amount of biomass that competes with other fish. There is a moderate amount of woody habitat (cedar trees and cut willow trees) that is found in many cove areas of the lake but native vegetation is lacking in most areas. The City of Lawton routinely pumps in water from Lake Ellsworth for the use of municipal water

for the Lawton and Ft. Sill leading to fluctuating water levels throughout the year. Lake Lawtonka is a historically a clean system that houses several oddity species not normally found in SW Oklahoma.

Lawtonka has historically been a lake with high catch rates and acceptable ranges of fish health with Largemouth but Smallmouth Bass data shows a more unstable trend with more cyclic events of adult and young of year fish. This combination has led Lake Lawtonka to being a sought after bass fishing destination in southwest Oklahoma. Over the past 5 years Lake Lawtonka has been a surrogate lake for a statewide Florida Bass genetic study since we have known stockings and a large population size range to sample from and for a nationwide study looking at blotchy bass syndrome in which we collected Smallmouth bass that show signs of having this pigmentation issue. Our management objectives has been geared towards maintaining a quality bass fishery by evaluating the fishery and stocking Florida Largemouth Bass, Saugeye, and Channel Catfish to allow anglers an opportunity to catch sizeable fish and enhance the genetic variation to maximize growth potential.

The most recent stockings at Lake Lawtonka includes Saugeye, Channel Catfish, and Florida Strain Largemouth Bass.

Results

Our electrofishing samples were conducted in April of 2023 when water temperatures were 64^0F which fall within our range for spring electrofishing standard sampling protocols (SSP). Being a moderate sized lake, we were able to sample much of available shoreline and areas where known smallmouth bass populations tend to be found with that consisting of 15 sample sites with each timed site being a 10 minute units of effort that included bare bank/cobble, woody cedar trees, and deep drops near the dam area. In the duration of the 150 minute sample we collected a total of 59 largemouth and 37 Smallmouth Bass.

Largemouth bass samples are measured in catch per unit effort (CPUE) and were low based off of similar sized bodies of water with 24 fish/hr for largemouth and 15 for smallmouth bass CPUE (Figure 1). When measuring fish body condition (body mass/length) relative weight (Wr) is the metric that is used to describe how fit the population is, relative weight for largemouth was 109 and 83 for smallmouth respectively (Figure 1) which would be considered the acceptable level to population present. The length frequency of fish (Figure 2) was normally distributed but overall size structure was lacking by slightly have more smaller than larger fishes on an equally distributed range but year class strength can be seen with both species of bass. Age and growth data was not collected from this sample set but was collected in 2018 and 2021 for largemouth. In 2018 we conducted preliminary surveys for fin clips for Florida Largemouth Bass (FLMB) genetics and submitted samples to Southcentral Region for a upcoming statewide FLMB genetic project; in 2021 this statewide evaluation for FLMB was started and Lawtonka was a top tier list and sampled with fin clip (genetic tissue), length/weight, sex, and age of each fish collected.

The growth trends that we have found since 2018-2023 (Figure 3 and table 1) show largemouth in 2023 have good growth rates and could be seen by age growth keys (Figure 4 & 5) that fish are reaching recruitment levels and continuing to grow and not stockpile small fish. The fish health indices (relative weights) show Lawtonka to have a high amount of large healthy individuals (Table 1). Although catch rates (CPUE) show a large variation among sampling years, factors such as timing and weather conditions could play a role in variance. When evaluating smallmouth bass, this population has more variance than largemouth due to conditions and smaller population structure. During our sampling trips we don't see many smallmouth due to that limited population and capture techniques.

Since we have sampled consecutively from 2016-present and having comparative data it can be easier to determine the overall extent of the bass population at Lawtonka. Biologically we have noticed a rapid explosion of invasive vegetation (mainly milfoil) and water quality slightly diminish but the bass population remains strong. There is a lack of deep water habitat that Bass, Sunfish, and Crappie need on a yearly basis and a project has been established to sink more cedar trees and other woody habitat in critical areas for thermal cover. The smallmouth population is very low in abundance, the population as a whole will continue to be limited with the excessive amount of vegetation present due to restraints to spawning habitats present and cover for young of year to recruitment stage. If we continue to add habitat, monitor the population and make adjustments where we see fit Lawtonka will remain a great bass fishery. The best management plan should utilize the forage present, provide more habitats, and sample routinely for stocking recommendations in order to create a quality fishery.

Lawtonka	Electrofishing - All Species Summary Statistics			2023
	# Samples = 15			
Species	CPUE	Standard Deviation	Standard Error	Relative Weight W_r
Largemouth Bass	23.60	35.89	9.27	109
Smallmouth Bass	14.80	17.10	4.42	83

Lawtonka	Electrofishing - All Species Summary Statistics			2023
	# Samples = 15			
Species	CPUE	Standard Deviation	Standard Error	Relative Weight W_r
Largemouth Bass <8	2.80	9.31	2.40	69
Largemouth Bass >=8<13	6.00	11.11	2.87	89
Largemouth Bass >=8<14	7.60	12.72	3.28	91
Largemouth Bass >=12	17.20	28.40	7.33	117
Largemouth Bass >=14	13.20	25.17	6.50	124
Largemouth Bass >=13<16	6.80	11.08	2.86	97
Largemouth Bass >=16	8.00	17.66	4.56	141
Largemouth Bass >=21	0.40	1.55	0.40	123
Smallmouth Bass <8	1.60	3.56	0.92	90
Smallmouth Bass >=8<13	8.80	13.20	3.41	83
Smallmouth Bass >=8<14	10.80	14.02	3.62	83
Smallmouth Bass >=12	5.60	5.30	1.37	82
Smallmouth Bass >=14	2.40	3.79	0.98	79
Smallmouth Bass >=13<16	3.60	4.42	1.14	80
Smallmouth Bass >=16	0.80	2.11	0.55	83

Figure 1: Catch per unit effort and relative weights of Largemouth and Smallmouth Bass at Lake Lawtonka 2023 samples

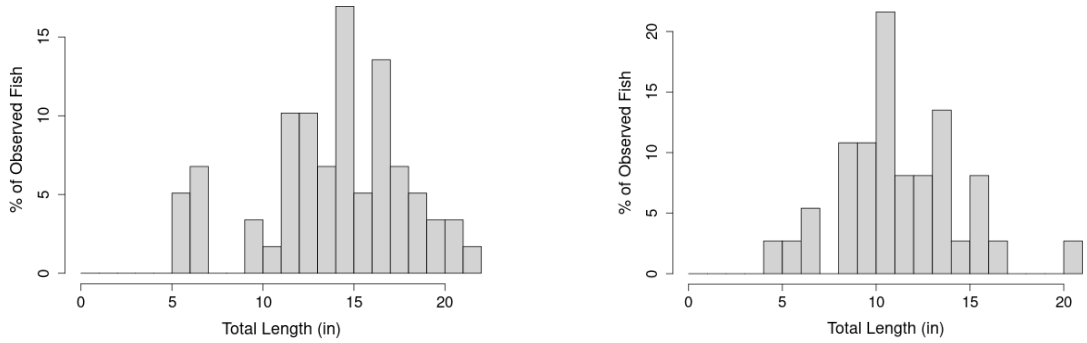

Figure 2. Length frequency and size structure of Largemouth (Left) and Smallmouth Bass (Right) in Lake Lawtonka for 2023 samples

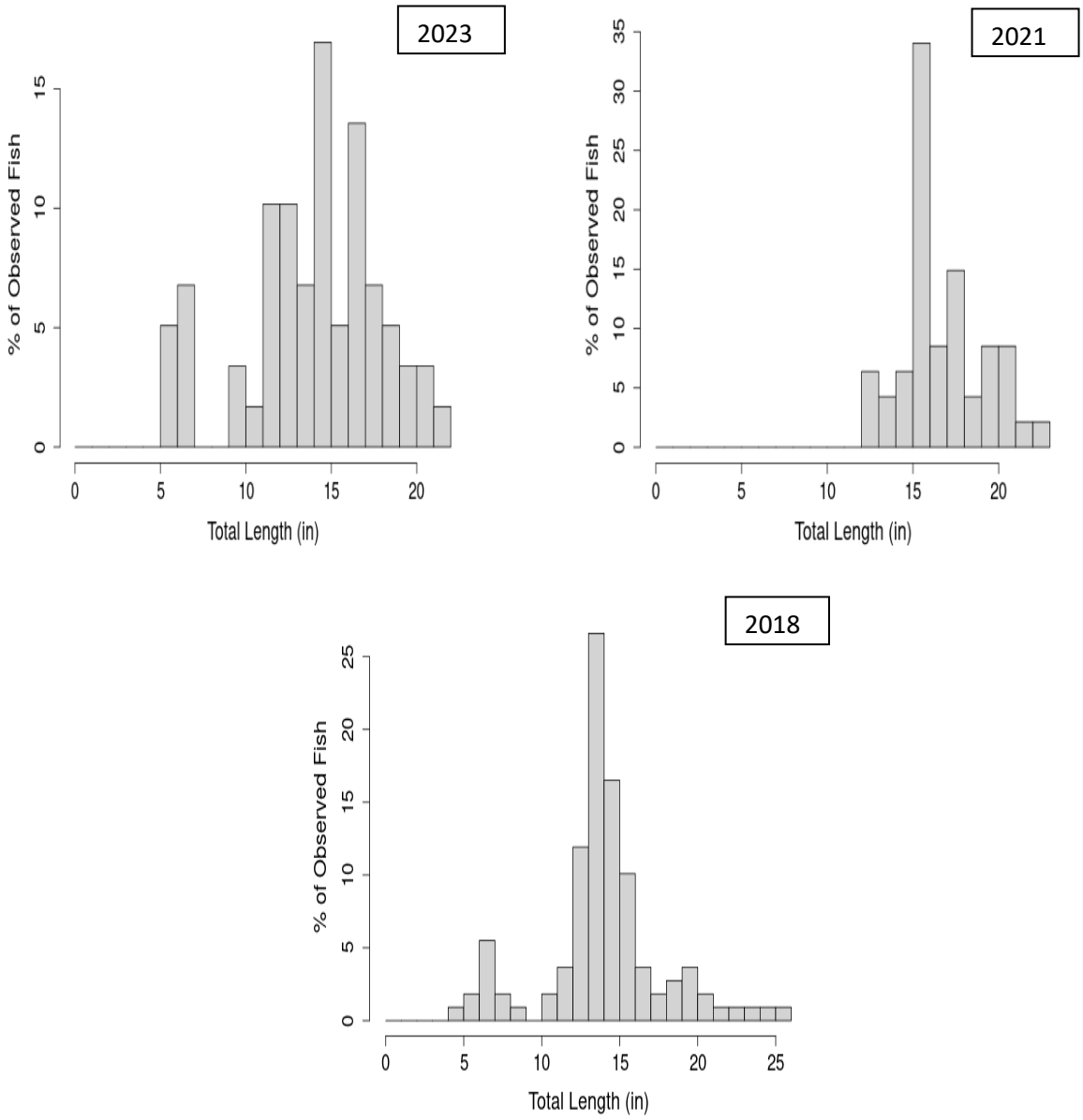

Figure 3. Length Frequency of Largemouth Bass at Lake Lawtonka 2018, 2021, 2023

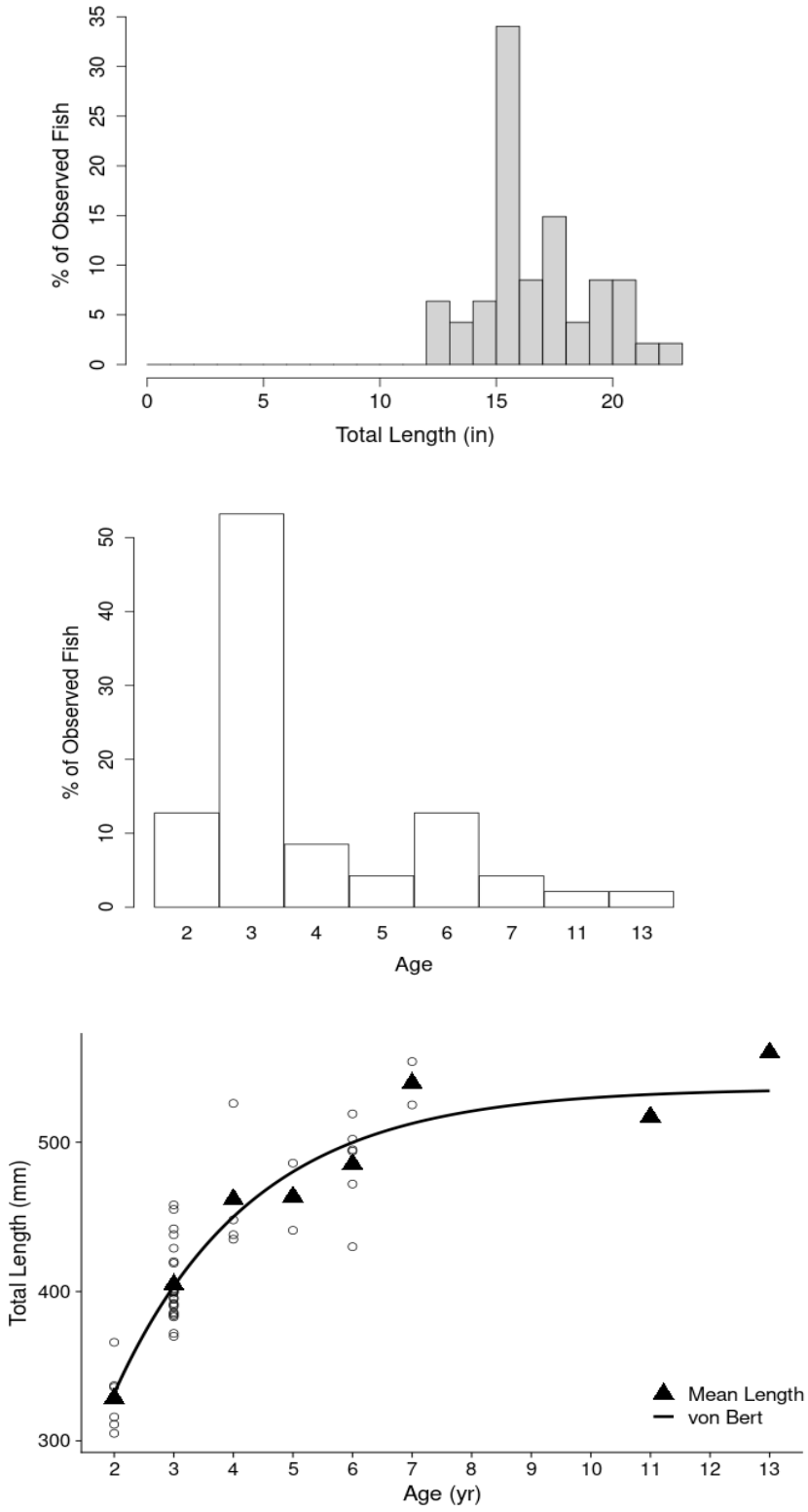

Figure 4. Age and growth metrics from Lake Lawtonka from 2021 statewide Florida Largemouth Bass genetics project.

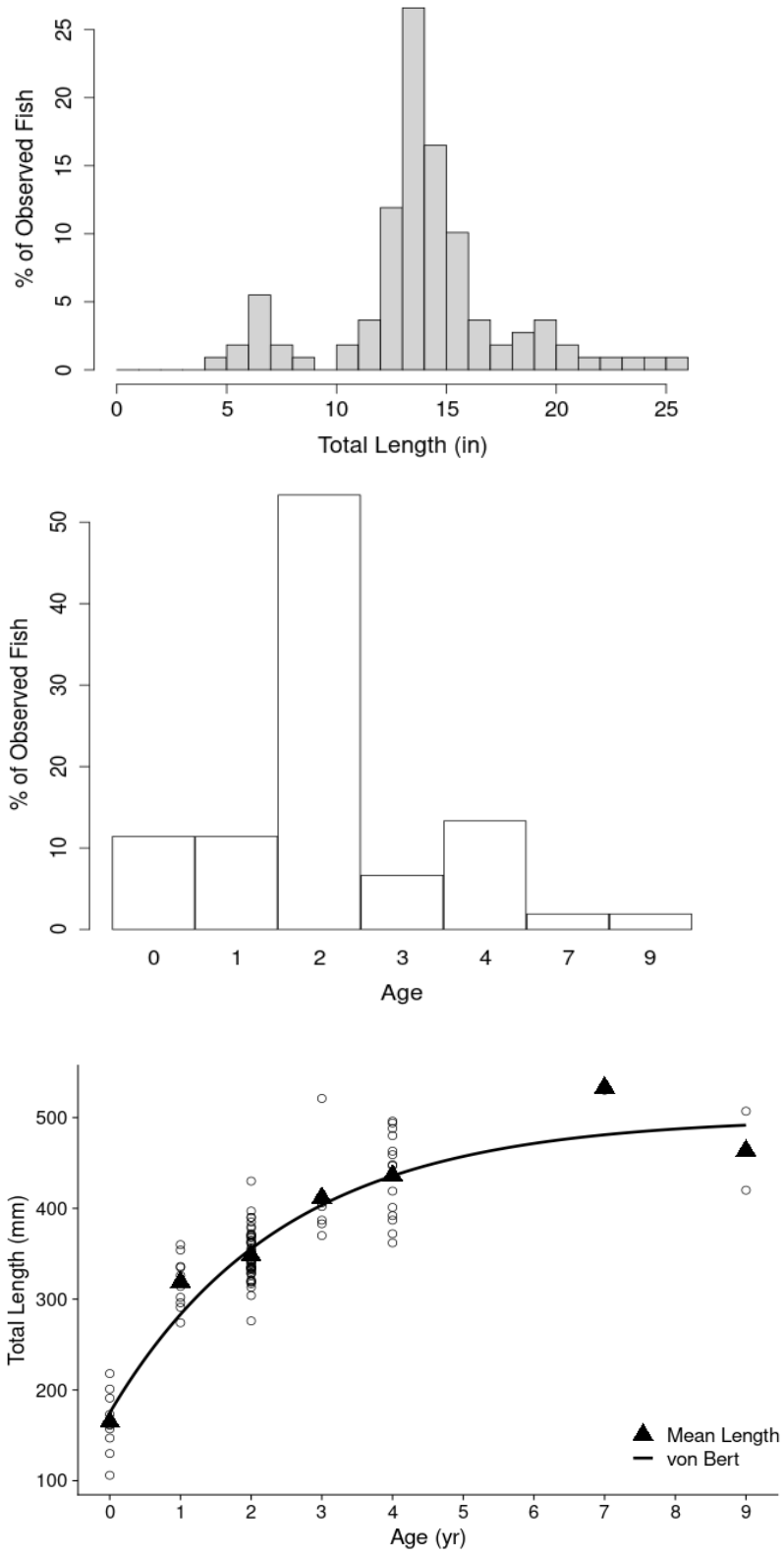

Figure 5: Age and growth metrics from Lake Lawtonka from 2018 preliminary Florida Largemouth Bass genetics project.

Year	Relative Weight (Wr)	Catch per Unit Effort (CPUE)
2018	99	38
***2019**	120	114
2021	103	12
2023	109	23

Table 1. Relative weight and catch rate tables for Largemouth Bass at Lake Lawtonka 2018, 2019, 2021, 2023. *Denotes fall electrofishing sample

Year	Relative Weight (Wr)	Catch per Unit Effort (CPUE)
2020	113	4.2
2023	83	14

Table 2. Relative weight and catch rate for Smallmouth Bass at Lake Lawtonka 2020 and 2023