

Performance Report

State: Oklahoma

Project Title: Fisheries Management Survey

Southwest Region Fisheries Management

Duncan City Lake

Abstract

Duncan City Lake was surveyed in 2023 via spring electrofishing for Largemouth 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.

Duncan City Lake had not been evaluated for Largemouth Bass since 1994 although, fall saugeye electrofishing surveys were completed in 2009. The need to sample this lake was a priority for 2023 in order to start collecting up-to-date baseline data for future management goals. Upon sampling our recommendations were to 1) provide more usable habitat to the impoundment to enhance recruitment 2) sample the lake more routinely to evaluate all species present and lastly provide stocking recommendations for any excess Largemouth Bass (Florida or Northern strain) that may be leftover fish from the hatchery system.

Introduction

Duncan City Lake is a small impoundment (400 acres) that is owned and operated by the city of Duncan for a water source and recreation area. The City of Duncan manages this lake and sets bag and length limits for the fishery, and as of 2019 began asking advice to improve the fishery of all four of the City of Duncan owned lakes.

Management issues that seem to be present are bag/length limits for crappie, lack of usable habitat, lack of proper management, and a imbalanced stocking regime. Current limits on fish stocks are more anecdotally fitting than management based driven, current limits are Crappie bag limit 20 with minimum length 8", Black Bass bag limit 5 with minimum length 14", Channel/Blue Catfish bag limit 15 all daily. These regulations are slightly varied from ODWC regulations and the lake fish stocks could potentially benefit by adapting to current statewide regulations. Through personal communications with city of Duncan officials and local anglers the crappie populations good but all fish being caught a smaller than the length regulations, by changing this regulation the crappie population would improve to seeing larger fish by allowing harvest of smaller fish out of the population and increased growth rates on available resources. In turn, the bass population could benefit by reducing the amount of biomass of smaller crappie and allowing smaller bass to utilize available resources.

Results

Our electrofishing samples were conducted in April of 2023 when water temperatures were 66°F and consistent with our spring electrofishing standard sampling protocols (SSP). Being a smaller lake, we were able to sample all available shoreline which consisted of nine (9) sample sites with each timed site being a 10 minute units of effort that included bare bank, areas with some water willow/vegetation, rip rap dam, and channels within 2-8 foot of water. In the duration of the 90 minute sample we collected a total of 27 largemouth bass.

Largemouth bass samples are measured in catch per unit effort (CPUE) and were low based off of similar sized bodies of water with 16 fish/hr 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, the relative weight for Duncan Lake was on average a 90 (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 having a higher abundance of smaller than larger fishes on an equally distributed range. Age and growth data was collected (Figure 3) showing 1 and 2 year old fish were in the 10"-12" range (13 of 27 individuals collected) while conversely the 3-7 year old fish (14 of 27 individuals collected) ranged from 12"-20" range, which suggest stockpiling of smaller individuals competing for resources leading to slower growth rate of older individuals.

Not having recent data to compare the sample to, it is hard to determine the overall extent of the largemouth bass population at Duncan Lake. Based on this small sample set the population of largemouth bass is low but the individuals within the lake are at the acceptable range for health. While conducting this electrofishing survey it was noted the forage base of Gizzard Shad and Silversides was very abundant and plentiful giving a strong backbone for increased growth of individuals present and reaching that recruitment stage. This lake has the potential to become a balanced largemouth bass fishery if habitat is improved and potential adjustments to regulations. The best management plan should utilize the forage present, provide more habitat, and sample routinely for stocking recommendations in order to create a quality fishery.

Duncan		Electrofishing - April			2023
		# Samples = 9			
Species		CPUE	Standard Deviation	Standard Error	Relative Weight W_r
Largemouth Bass		16.67	12.65	4.22	90

Duncan		Electrofishing - April			2023
		# Samples = 9			
Species		CPUE	Standard Deviation	Standard Error	Relative Weight W_r
Largemouth Bass $\geq 8 < 13$		8.67	12.77	4.26	90
Largemouth Bass $\geq 8 < 14$		9.33	12.41	4.14	91
Largemouth Bass ≥ 12		12.67	7.00	2.33	90
Largemouth Bass ≥ 14		7.33	6.56	2.19	90
Largemouth Bass $\geq 13 < 16$		2.00	3.00	1.00	87
Largemouth Bass ≥ 16		6.00	6.00	2.00	91

Figure 1: Catch per unit effort and relative weights of Largemouth Bass at Duncan City Lake

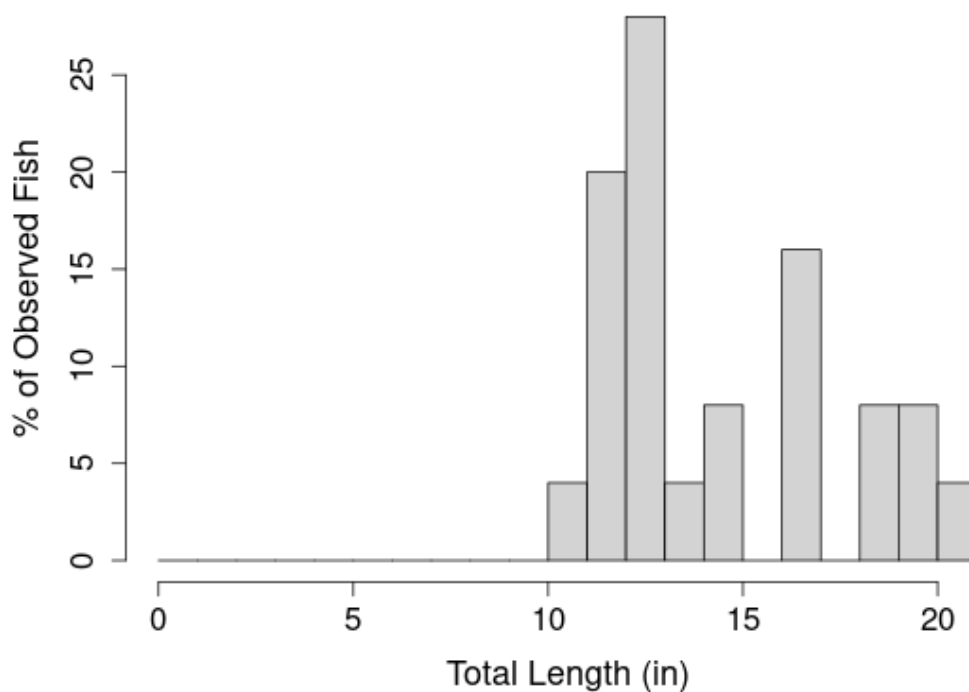


Figure 2. Length frequency and size structure of Largemouth Bass in Duncan City Lake

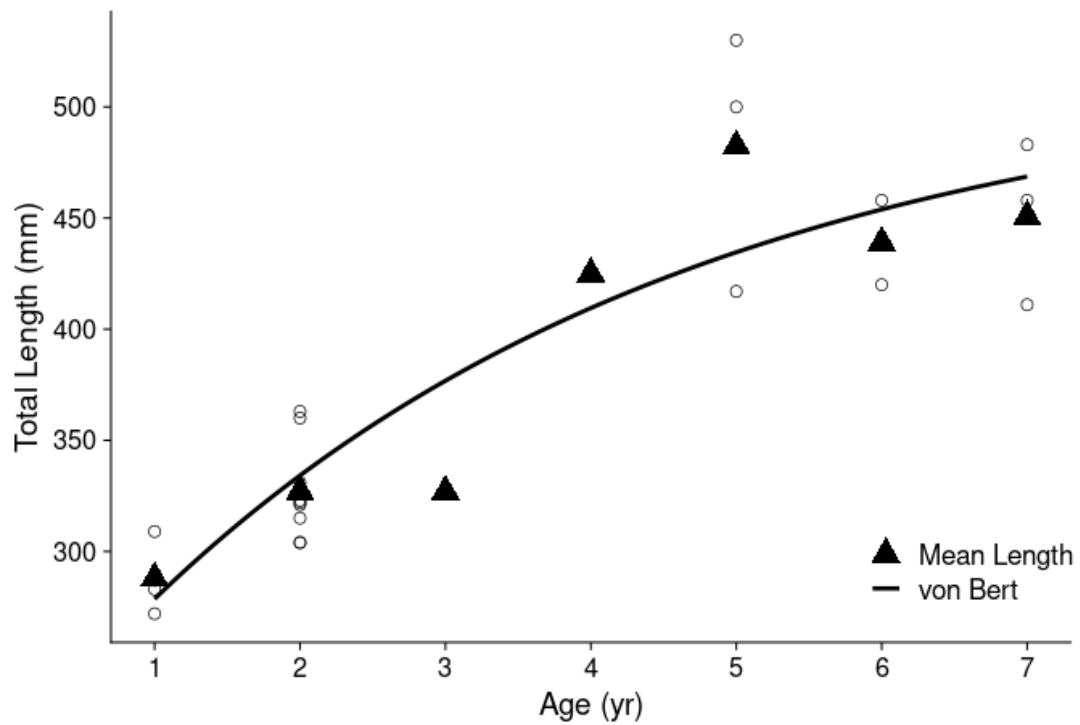
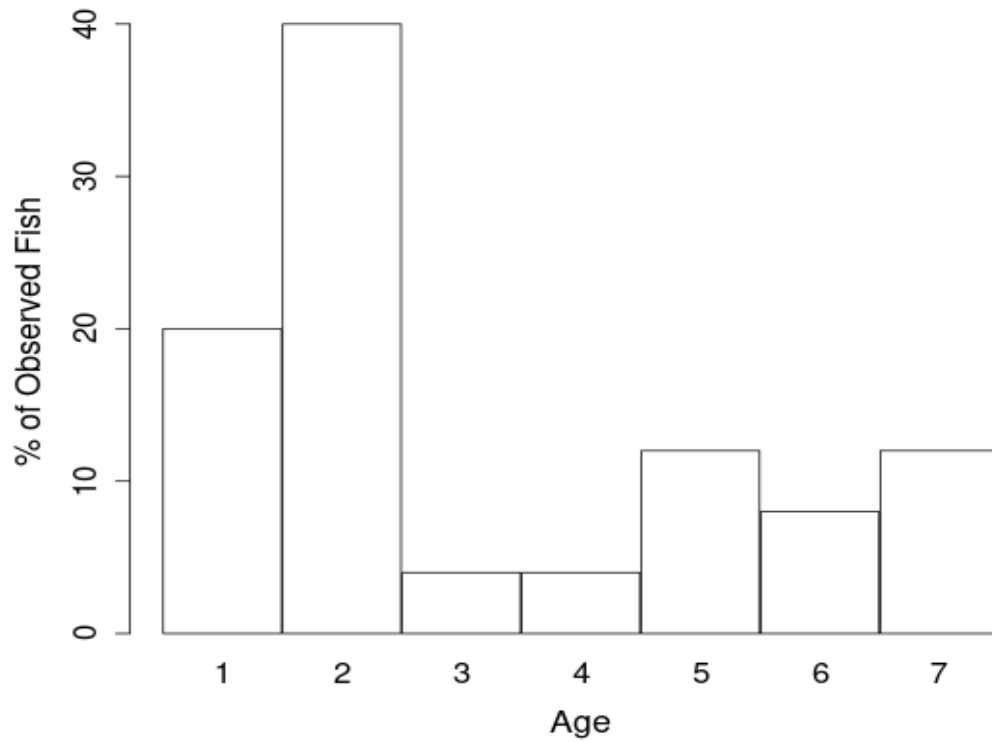


Figure 3. Age and growth of Largemouth Bass collected at Duncan City Lake