

Lake Roland (Baltimore County)

Introduction

Lake Roland is a 40.5-hectare (100 acre) impoundment located in Baltimore County and within the bounds of Lake Roland Park. The lake was created as a reservoir by the damming of Jones Falls, a tributary of the Northwest Branch of the Patapsco River and fed by Roland and Towson runs. The lake is maintained and managed by Baltimore County Department of Recreation and Parks. Fishes like black crappie (*Pomoxis nigromaculatus*), sunfishes (*Lepomis spp.*), and largemouth bass (*Micropterus salmoides*) comprise the warm water fishery in the lake. Other fishes include common carp (*Cyprinus carpio*), yellow bullhead (*Ameiurus natalis*), and white suckers (*Catostomus commersonii*). The lake is managed under state-wide fishery regulations.

Methods

The primary goals of this survey were to describe the fish resources present in Lake Roland and to determine if fishes reproduce with regularity. A qualitative fishery survey of Lake Roland was completed during daylight hours on May 15, 2023 by Freshwater Fisheries staff in collaboration with Baltimore County Department of Environmental Protection and Sustainability (EPS) and the Coastal Conservation Association - Maryland (CCA-MD). A Yellow Springs Institute (YSI) multimeter was used to measure water quality parameters. A 4.3-meter (14 foot) jon boat equipped with a Smith-Root 5.0 generator powered pulsator and a single anode was used with a single netter. Six hundred-second samples were completed at a subset of four sites in the lake. All fishes observed were collected and held in a water-filled livewell. After each sample, fish were transferred to a land-based crew, measured to the nearest mm total length (TL), and weighed to the nearest gram (g). All fishes were returned to the water after processing.

Select population metrics (i.e., proportional stock density, PSD; catch per unit effort, CPUE) were determined for black crappie, bluegill sunfish, and largemouth bass because data were robust and these are species of recreational importance. It should be noted that results and inferences made from these parameters are not comparable to those generated for other Maryland impoundments because of differences in sampling gear and methodology.

Results

Dissolved oxygen (DO) and water temperatures were suitable for fishes and typical of Maryland impoundments during late-spring (DO= 10.4 mg/L; water temperature= 18.3 °C). Salinity was elevated (salinity= 0.28 psu) but not unusual for an urban lake. Sampled sites included diverse habitats with bulkheads, open water, rip rap/rock, and submerged vegetation. Complex large and small woody debris, that included downed trees and logs, was common and provided ample

habitat for fishes. During the survey, seven fishes comprising four families were observed or collected (Table 1). Electrofishing duration for each of four sites averaged 605 seconds (SD= 4.08).

Largemouth bass are the primary gamefish in the lake and numerous individuals representing multiple size-classes were collected (Figure 1); fish ranged from 114 to 478 mm TL (4.5 - 18.8 inches) and appeared healthy. While few fish smaller than stock-size (TL \leq 200 mm) were collected, catches for stock- and quality-sized fish (stock: TL \geq 200 mm; quality: TL \geq 300 mm) were good (Table 2). PSD for largemouth bass was 34.09.

Black crappie, bluegill, and green sunfish (collectively panfish) were numerous but green sunfish were not collected for analysis. Stock- and quality-sized (stock: TL \geq 130 mm; quality: TL \geq 200 mm) black crappie were collected but no small fish were observed. Bluegill sunfish representing multiple size-classes were collected during the survey (Figure 2). Catches were high and dominated by stock- and quality-sized fish (stock: TL \geq 80mm; quality: TL \geq 150 mm), and no preferred-sized fish were collected (preferred: TL \geq 180 mm; Table 2).

Discussion

Overall, Lake Roland appears to have fisheries resources of many small impoundments in Maryland. Black crappie, bluegill sunfish, and largemouth bass are the most prominent gamefishes. Multiple year-classes of each species were observed but not all exhibited evidence of consistent annual recruitment.

While not as popular as bluegill sunfish and largemouth bass, black crappie are a frequent target for recreational anglers. Black crappie catch was composed solely of stock- and quality-size individuals (stock: TL \geq 130 mm; quality: TL \geq 200 mm); no individuals smaller than 130 mm were observed during the survey. Black crappie recruitment is known to be variable in many ponds and the lack of small fish is not an immediate concern.

Largemouth bass CPUE was moderately-high and numerous stock-sized fish were collected. Although quality-sized fish were observed, PSD was 34.09 and near the lower threshold of the desirable 40 – 60 PSD range for largemouth bass (Reynolds and Babb, 1978). Few age-1 fish were observed and suggested poor recruitment during 2022.

The population of bluegill sunfish in Lake Roland is healthy, with evidence to suggest consistently high recruitment. Multiple cohorts of fish were collected and CPUE estimates were generally high and estimated with good precision (i.e., low standard errors). Catches were dominated by stock-sized fish (TL \geq 80 mm) and the PSD was within the range common for a desirable fishery. The relationship between bluegill and largemouth bass PSDs suggests good fishery resources in a balanced predator-prey fishery. Poor natural recruitment for largemouth bass (as evidenced by few fish below stock-size) could be augmented by hatchery contributions in the future.

Water quality and habitat diversity at Lake Roland were good and similar to other urban lakes in Maryland. Unfortunately, access for shore-based anglers is limited. The addition of habitat

structures (artificial or natural) in close proximity to frequently used fishing locations would likely improve fishing for recreational anglers.

Recommendations

Future actions at Lake Roland may include:

- stocking a small number of fingerling largemouth bass to augment recent poor recruitment, and
- adding habitat structures to aggregate fishes near popular angler access points.

Table 1. Fishes collected or observed during the spring 2023 electrofishing survey of Lake Roland, Baltimore County, Maryland. Family, common, and scientific names are included.

Family	Common Name	Scientific Name
Catostomidae	White sucker	<i>Catostomus commersonii</i>
Centrarchidae	Black crappie*	<i>Pomoxis nigromaculatus</i>
	Bluegill*	<i>Lepomis macrochirus</i>
	Green sunfish	<i>Lepomis cyanellus</i>
	Largemouth bass*	<i>Micropterus salmoides</i>
Cyprinidae	Common carp	<i>Cyprinus carpio</i>
Ictaluridae	Yellow bullhead	<i>Ameiurus natalis</i>

* Denotes species with additional analyses

Table 2. Catch per unit effort and proportional stock density of selected species collected during the spring 2023 electrofishing survey of Lake Roland, Baltimore County, Maryland. Mean CPUE for sub-stock, stock, quality, and preferred fishes for each species are provided. Standard errors are provided in parentheses.

Species	CPUE _{ss}	CPUE _s	CPUE _q	CPUE _p	PSD
Black crappie	0.00 (NA)	71.58 (44.50)	22.39 (16.54)	0.00 (NA)	31.25
Bluegill sunfish	17.91 (17.58)	201.08 (74.97)	60.98 (10.54)	0.00 (NA)	30.38
Largemouth bass	4.46 (02.98)	65.48 (16.99)	22.30 (05.64)	5.96 (04.90)	34.09

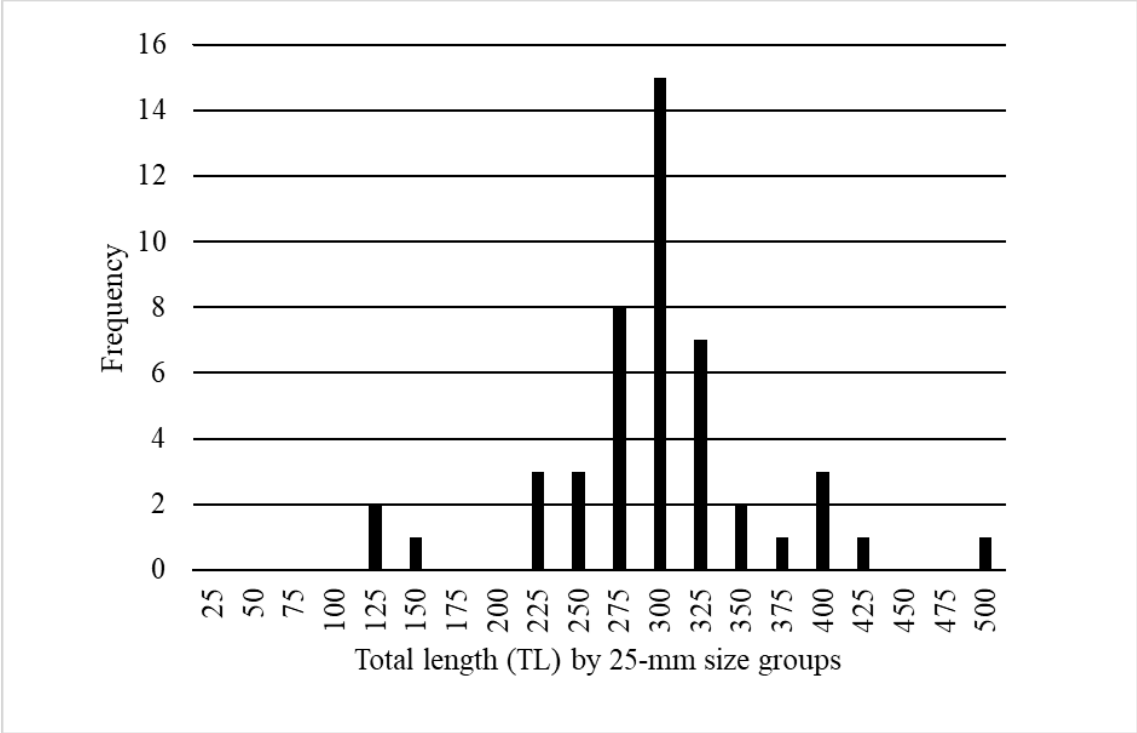


Figure 1. Length-frequency distribution of largemouth bass collected during the spring 2023 survey at Lake Roland, Baltimore County, Maryland.

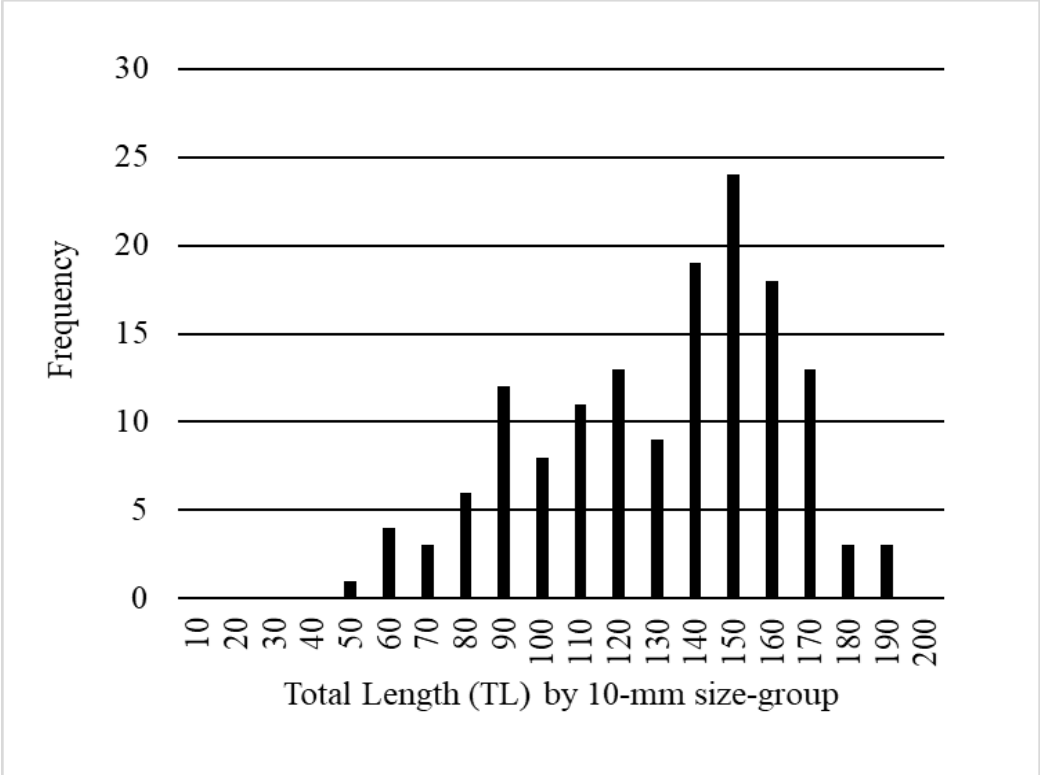


Figure 2. Length-frequency distribution of bluegill sunfish collected during the spring 2023 survey at Lake Roland, Baltimore County, Maryland.