

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

CHEQUAMEGON BAY FALL ASSESSMENT REPORT 2022

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INTRODUCTION

Chequamegon Bay is a 34,000-acre, shallow (mean depth of 28 feet) embayment on Wisconsin's south shore of Lake Superior (Figure 1). It is a productive, nearshore area of the lake that supports a diverse assemblage of fishes and serves as a restricted use area from high-efficiency commercial gears. The Chequamegon Bay Fall Assessment was developed to provide an index of relative abundance for important recreational coolwater species (Walleye, Yellow Perch, Northern Pike and Smallmouth Bass) using a gear that is effective at capturing representative amounts of all nearshore target species during a season that is not biased by spawning dynamics. The use of gill nets in Chequamegon Bay also provides better spatial coverage of the study area relative to other types of sampling gears.

METHODS

From 2019 to 2022, Walleye, Smallmouth Bass, Northern Pike and Yellow Perch were targeted with graded-mesh, monofilament gill nets (400-foot gangs composed of 50-foot nets constructed with 1.5 to 5.0-inch mesh by 0.5-inch increments). Gill nets were fished for one net-night (24-hours) in six fixed locations (Figure 1) using the R/V Hack Noyes (three sites/day; two overall days) during the beginning of October.

All target species were measured (nearest 0.1 inches), weighed (when possible; nearest gram) and tagged with a uniquely numbered Floy tag on the left side of the dorsal fin. Tag data were recorded for all recaptured fish. Non-target species were also measured or counted depending on the total number and time constraints. Dorsal spines were taken from Walleye and Smallmouth Bass and anal rays were taken from Northern Pike. Saggital otoliths were taken from all deceased individuals of each target species. External marks or diseases (e.g., sea lamprey wound, lympho sarcoma, etc.) were noted.

Relative abundance (geometric mean catch-per-unit-effort [CPE]) was calculated as number of fish per km of gill net (stations as replicates).

RESULTS/DISCUSSION

Seventeen total fish species were detected during the 2022 Chequamegon Bay Fall Assessment (Table 1). Geometric mean CPE of Northern Pike and Smallmouth Bass decreased in 2022 (Table 2; Figure 2). White Perch and White Sucker relative abundance has increased since 2019. Walleye relative abundance has been stable over the four years of sampling, and Yellow Perch relative abundance has increased each year since 2019.

A majority of the Northern Pike sampled were between 22 and 28 inches in total length, and most Smallmouth Bass sampled were between 16 and 19 inches in total length (Figure 3). Walleye length distribution increased from the previous year, indicating low recruitment of young fish (missed stocking year in 2020). The 2019 year-class began recruiting to the recreational fishery as some of the cohort surpassed the 15-inch minimum length limit in 2022 (Figures 3 and 5). Yellow Perch size structure in 2022 was comprised of mostly 6-inch individuals, slightly smaller than 2021 likely due to better recruitment of age-2 fish (Figure 5). A larger year-class of White Perch was detected in 2020 at 6-7 inches total length, in 2021 at 8-10 inches in total length, and again in 2022 at 9-12 inches total length (Figure 4). Few young White Perch recruits have been observed since 2019 and 2020. White Sucker length distributions were similar each year of the survey.

Based on the first four years of sampling, it appears the Chequamegon Bay Fall Assessment will likely serve well as a method for monitoring the target species in Chequamegon Bay. This survey will be useful for monitoring large-scale changes in the relative abundance of the Chequamegon Bay fish community in addition to annual changes in Walleye and Yellow Perch size and age distribution. Future work could involve including more stations for better spatial coverage and replication or comparing results to other surveys (e.g., USGS Chequamegon Bay trawling).

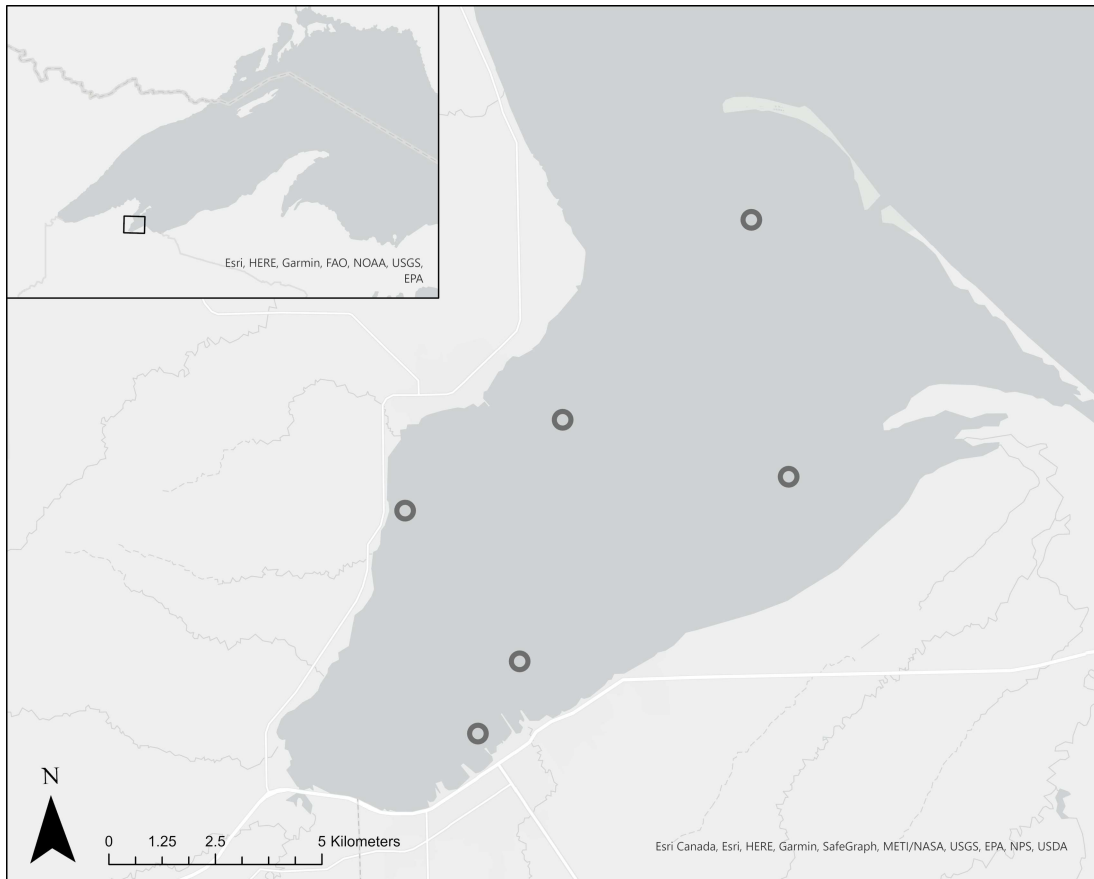


Figure 1. Gill net stations for the Chequamegon Bay Fall Assessment.

Table 1. List of all species detected in the 2022 Chequamegon Bay Fall Assessment.

Species
Black Bullhead
Brown Bullhead
Brown Trout
Cisco
Eurasian Ruffe
Lake Whitefish
Northern Pike
Pumpkinseed Sunfish
Rock Bass
Round Whitefish
Shorthead Redhorse
Silver Redhorse
Smallmouth Bass
Walleye
White Perch
White Sucker
Yellow Perch

Table 2. Geometric mean CPE (fish/km) estimates of common species in the Chequamegon Bay Fall Assessment (stations as replicates).

Species	2019	2020	2021	2022
Northern Pike	14.6	11.9	22.4	11.1
Silver Redhorse	1.1	0.9	3.7	1.1
Smallmouth Bass	3.5	2.1	4.5	0.7
Splake	3.0	3.5	0.4	0.0
Walleye	51.8	42.1	45.6	46.5
White Perch	3.6	12.9	9.8	11.7
White Sucker	119.2	89.6	110.6	177.1
Yellow Perch	20.2	28.6	68.2	94.4

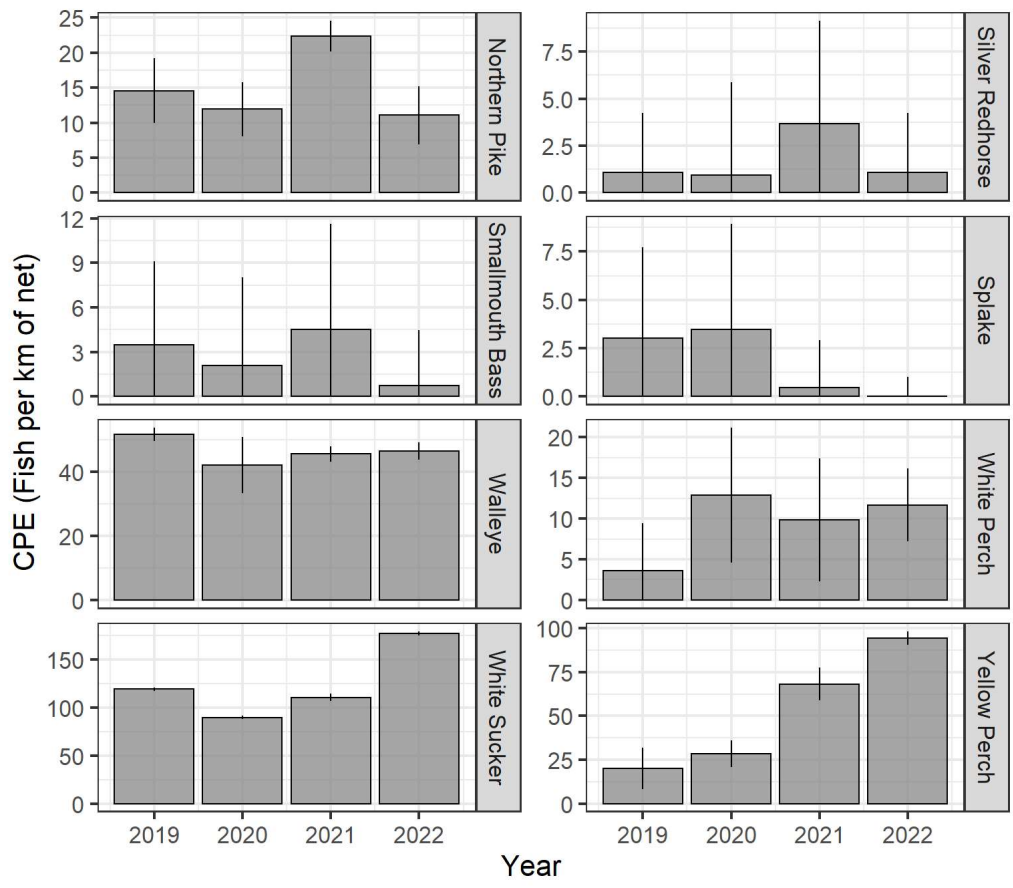


Figure 2. Geometric mean CPE of common species from the Chequamegon Bay Fall Assessment, 2019 to 2022.

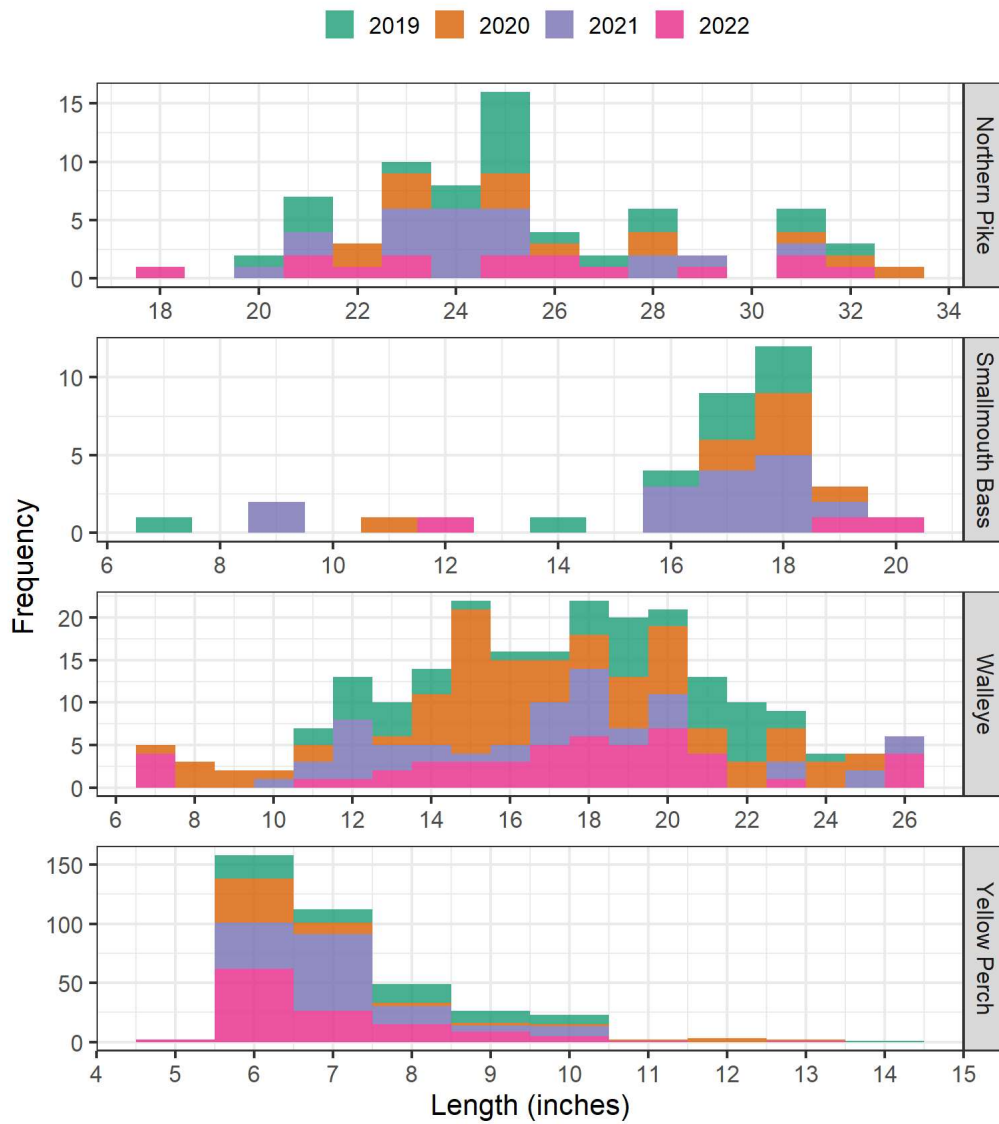


Figure 3. Length frequency of target species from the Chequamegon Bay Fall Assessment, 2019 to 2022.

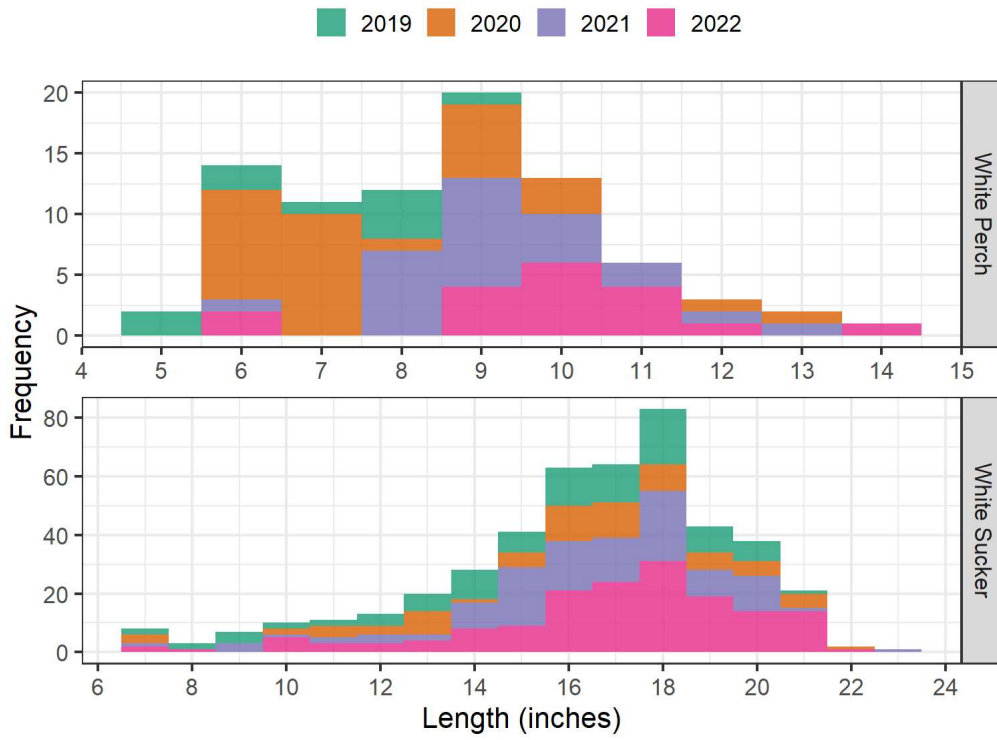


Figure 4. Length frequency of other common species from the Chequamegon Bay Fall Assessment, 2019 to 2022.

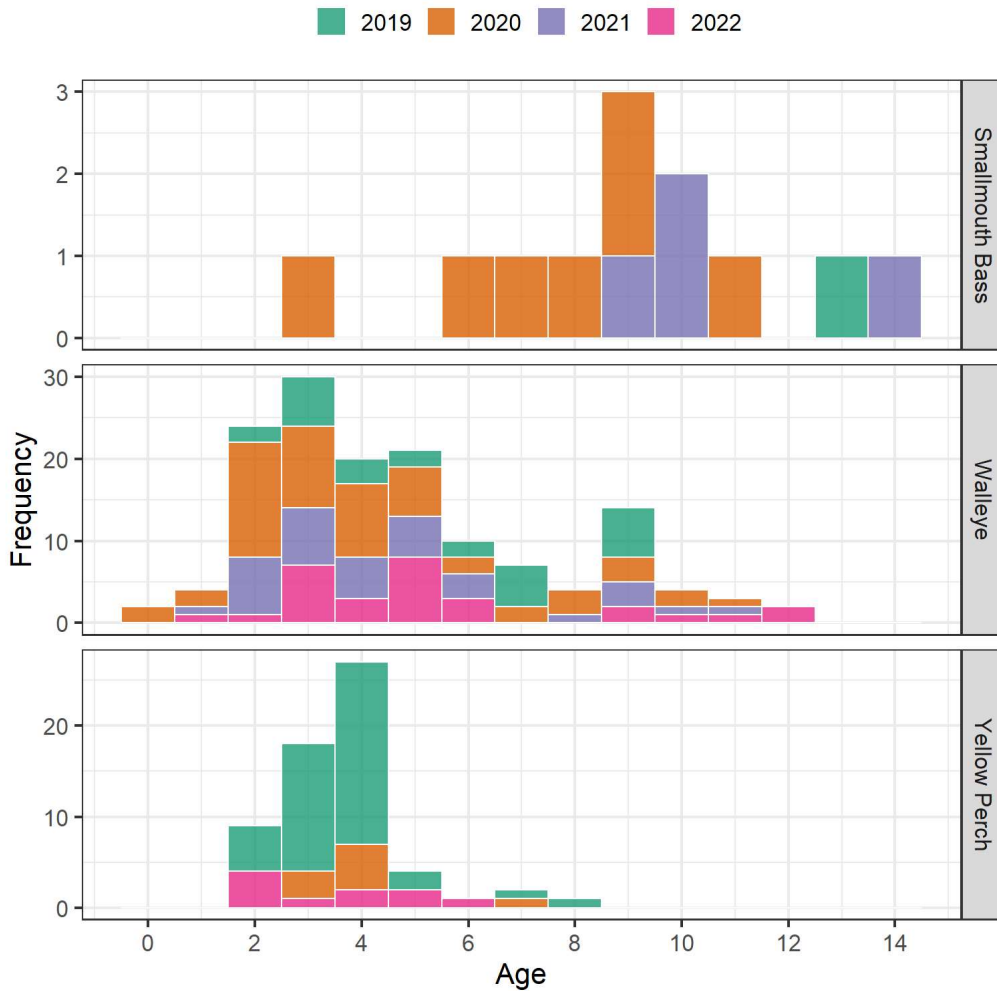


Figure 5. Age frequency of target species from the Chequamegon Bay Fall Assessment, 2019 to 2022.