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Division of Fisheries

Nearshore Fish Community of Lake Michigan: 2025 Summer Harbor Assessment

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Executive Summary

Pulsed DC electrofishing was used to assess the nearshore fish community in three Illinois harbors and the shoreline inside Calumet Harbor from May through July 2025. Species richness was highest in North Point Marina and Waukegan South Harbor with a total of 21 fish species detected at each site. We detected 13 species in Jackson Harbor and 11 species along the shoreline in Calumet Harbor. Largemouth Bass, Smallmouth Bass, Pumpkinseed, Rock Bass, and Black Bullhead were the most abundant targeted, sportfish encountered. In 2025, a total of 180 Smallmouth Bass ranging from 75 to 500 mm (2.9-19.7 in) were collected with 91% of fish Stock size or larger (≥ 180 mm, 7 in). The length distribution of Stock size fish was excellent with 32% Quality size (280-345 mm), 45% Preferred size (350-425 mm), and 10% Memorable size (430-505 mm). The largest Smallmouth Bass collected in 2025 was 19.7 inches and 4.8 pounds. One hundred and ninety-eight Largemouth Bass ranging from 60 to 475 mm (2.4-18.7 in) were sampled in 2025 and 64% of fish were at least Stock size (≥ 200 mm, 8 in). Twenty-four percent of Largemouth Bass were Quality size (300-375 mm) and 39% were Preferred size (380-505 mm). The biggest Largemouth Bass collected was 18.7 inches and 4.3 pounds. Overall, relative weight of most Stock size Smallmouth Bass and Largemouth Bass continued to be equivalent to or higher than the species-specific standard weight. A total of 181 Rock Bass were collected in 2025 with 97% of fish Stock size or larger (≥ 100 mm, 4 in). A total of 40% of these were Quality size (180-225 mm) and 13% were Preferred size (230-275 mm). Similar to previous years, the relative weight of Stock size Rock Bass tended to be at or above standard weight.

Introduction

Several sport and non-sport fish species inhabit Illinois harbors and nearshore areas of Lake Michigan during summer. Common sport fish found in these areas include Smallmouth Bass (*Micropterus dolomieu*), Largemouth Bass (*Micropterus salmoides*), Yellow Perch (*Perca flavescens*), Northern Pike (*Esox lucius*), Black Bullhead (*Ameiurus melas*), Rock Bass (*Ambloplites rupestris*), Bluegill (*Lepomis macrochirus*) and several other Centrarchids (sunfish family). There has been an increasing demand for sport fishing opportunities in nearshore areas and an increased interest in the nearshore sport fishery since 1998, especially for Largemouth and Smallmouth Bass. Increases in the abundances of these warm- and cool-water fish species and angler effort for non-perch and non-salmonid fish species in the Illinois waters of Lake Michigan are evident from sport angler creel data. Prior to 1996 no estimate of Smallmouth Bass harvest could be calculated from creel data because few were found in the possession of anglers, but by 2000 anglers reported catching an estimated 4,892 Smallmouth Bass (Brofka and Dettmers 2006). Since 2015, the number of Smallmouth Bass caught and released has ranged from approximately 3,840 to a peak of 17,938 in 2024 and an estimated 232 Largemouth Bass were caught and released in Illinois waters of Lake Michigan during 2024 (Roswell and Czesny 2025).

Historical stocking of juvenile Smallmouth Bass in Illinois harbors may or may not have contributed to the establishment of sustainable populations. For example, no stocking records exist for Largemouth Bass and yet they are also observed in the nearshore fish community. Regardless, stocking events for Smallmouth Bass were small scale, sporadic and last occurred in 1985. Since that time, young-of-year (YOY) Smallmouth Bass have been captured at multiple sites that were never stocked and have been collected in areas where no Smallmouth Bass were collected in the past (e.g., Farwell Avenue Pier since 2000). Both these observations suggest that natural reproduction and immigration have allowed Smallmouth Bass to expand its range along the Illinois shoreline. Regarding Largemouth Bass, there are several potential sources for brood fish to have entered Lake Michigan in the past, such as the Lake Calumet complex, Wolf Lake, the Japanese Gardens ponds at 59th Street Harbor, Chicago River through the Chicago Lock, Lincoln Park Zoo ponds, the diversion structure at the North Branch of the Chicago River (Wilmette), and Prairie Cove Harbor on the Illinois/Wisconsin state line. Remnant populations of brood fish may have existed in these locations until recent changes in the lake favored their dispersal. Over the past five years, monitoring data suggests increasing abundance of Smallmouth Bass particularly along the shoreline in Calumet Harbor. Whereas mixed trends were observed for Largemouth Bass with fluctuating abundance at Jackson Inner Harbor and significant increases at North Point Marina since 2022. Quality sizes and good body condition have also been observed for both species within Illinois waters of Lake Michigan.

Although management of fish species inhabiting nearshore areas has been incorporated into the Illinois Strategic Plan for Lake Michigan fisheries since the early 1980s, personnel and funding deficiencies did not allow their investigation until 1995. This assessment program was developed to monitor the relative abundance distribution of nearshore sport fish species and to determine whether those species were susceptible to

overexploitation by tracking changes in relative abundances over time. Species composition, abundance, and length distribution data were previously obtained through incidental catches of non-salmonid fish species during fall electrofishing for returning salmonids and through a sport angler creel survey. During creel surveys sport anglers were interviewed, fish in their possession were measured and weighed, and estimated sport harvest was used as an index of the relative abundance of these fish species. Abundance and species composition data obtained through a creel survey, however, may be biased because anglers target specific species, effort is not equivalent at all locations, and harvest (rather than total catch) is usually reported. In addition to biological information (e.g., length and weight), an understanding of seasonal dispersal patterns of the sport fish associated with the nearshore fish community is required to effectively manage these species. If sport fish dispersal patterns for Lake Michigan are like the patterns observed in Lake Ontario, then some of these fish species will inhabit protected areas early in the year and later move into open lake areas once water temperatures reach 15° C (Danehy 1984).

The objectives of this ongoing study are to: 1) determine the fish species composition of select Illinois harbors and nearshore areas of Lake Michigan; 2) monitor changes in the relative abundances of Smallmouth and Largemouth Bass and other sport fish through time; 3) evaluate intra- and inter-annual fidelity of Smallmouth and Largemouth Bass to harbors; 4) monitor size structure and growth indices for sport fish inhabiting these harbors; and 5) collect age-composition data during select years which may eventually be used to determine recruitment rates of the most abundant fish species.

Methods

Fish were sampled using a boat electrofishing pulsed-DC control box (Smith-Root Inc.) capable of delivering 5kw from the GPP 5.0 generator to the electrodes. Pulse frequency was set to 60 Hz and duty-cycle was internally controlled. Total sampling time was based on harbor size, weather conditions, and the amount and type of fish collected. Selection of sampling sites (Figure 1) was based on harbor configurations that were conducive to electrofishing (i.e., availability of shallow water areas <3 m in depth), availability of a launch ramp, and sport-angler creel survey data. Three Illinois harbors and the shoreline inside Calumet Harbor were sampled on 4-5 occasions from May through July 2025 (Table 1). Sampling at North Point Marina was limited to the inner entrance of the north harbor, the channel connecting the north and south harbors, and the south harbor. At Waukegan, the south harbor was sampled and the inner harbor was sampled at Jackson Harbor. The Calumet Harbor site consisted of the rip-rap shoreline between the Calumet River and the north slip within Calumet Harbor. In addition, the north face of the confined disposal facility and the south face of the Calumet break wall were sampled when weather and waves permitted.

Sport fish species were the target of electrofishing effort. We attempted to capture all Largemouth and Smallmouth Bass that were encountered except for bass fry whose presence was only noted. Other targeted

species (e.g., Rock Bass, Bluegill, Yellow Perch) were subsampled to obtain a representative distribution of sizes. The presence of non-target, incidental species (e.g., Alewife, Gizzard Shad, White Sucker, and Common Carp) was usually only noted, but when possible established aquatic nuisance species (e.g., Goldfish, Koi) were captured and removed from the water. All other sampled fish were dip-netted and held onboard in a 100-gallon tank filled with a 0.5% solution of NaCl and lake water. An oxygen cylinder with an air stone was used to increase retention time and keep the fish alive while biological data were obtained. Fish were measured to the nearest 5 mm (maximum total length) and weighed to the nearest 10 grams.

Catch-per-unit-effort (CPUE) for targeted species was calculated as the number of fish per hour of electrofishing effort. Relative Stock Density (RSD) for Quality, Preferred, and Memorable length fish were calculated for Smallmouth Bass, Largemouth Bass, and Rock Bass (Table 2; Gabelhouse 1984 as reported in Anderson and Neumann 1996). Relative Weight (W_r ; a measure of a fish's body condition or plumpness) of Smallmouth Bass, Largemouth Bass, and Rock Bass was compared to species-specific Standard Weight (W_s) equations taken from Anderson and Neumann (1996). Only Smallmouth and Largemouth Bass collected after 15 June and Rock Bass collected after 31 May were included in this analysis because pre-spawn fish tend to have inflated W_r values.

Results and Discussion

Species Composition

Overall, we collected 11 target, sportfish species and encountered 19 non-target (incidental) species during the 2025 electrofishing survey. The highest number of species was detected in Waukegan South Harbor and North Point Marina (21 at each site) followed by Jackson Inner (13), and Calumet harbors (11). Largemouth Bass, Smallmouth Bass, Pumpkinseed, Rock Bass, and Black Bullhead were the most abundant targeted, sportfish encountered. Similar to that observed in past years, the presence and abundance of sportfish differed among harbors. For example, Pumpkinseed, Rock Bass, and Largemouth Bass abundance was much higher in North Point Marina than any other harbor sampled, while the majority of Black Bullhead (90%) were collected in Jackson Harbor (Table 3). Similar to previous years, CPUE (No. fish/hr) of Smallmouth Bass was highest along the shoreline in Calumet Harbor and far fewer other Centrarchid species were collected at this location. The Calumet site is an open-lake area more exposed to wave action, historically slower warm up during the spring, and the potential for rapid changes in water temperatures during the summer, which has limited the presence of these warmer water species.

The types of sport fish species encountered in the three protected harbors (North Point Marina, Waukegan Harbor, and Jackson Inner) were similar to those typically found in warm-water inland lakes with similar habitats. It is likely that increased aquatic vegetation in the protected areas of these harbors have produced favorable conditions for a number of these cool- and warm-water fish species (Jude et al. 2002). One

major difference between these harbors and inland lakes is the abbreviated growing season caused by influxes of cool water from the main lake, which typically suppresses water temperatures in the spring and can intermittently decrease temperatures during summer upwellings. A second difference particularly for Waukegan Harbor and North Point Marina is the relatively restricted fishing access; much of the area within these harbors is dedicated to moored vessels with limited fishing opportunities. Thus, Illinois harbors likely continue to provide warm water species with refuge from high fishing mortality.

Smallmouth Bass

A total of 180 Smallmouth Bass ranging from 75 to 500 mm (2.9-19.7 in) were sampled in 2025 (Figure 2). Ninety-one percent of these fish were Stock size or larger (≥ 180 mm, 7 in), the majority of which were collected along the shoreline in Calumet Harbor (N=114). The length distribution of Stock size fish continues to be excellent with 32% Quality size fish (280-345 mm), 45% Preferred (350-425 mm), and 10% Memorable (430-505 mm). The largest Smallmouth Bass collected in 2025 was 19.7 inches and 4.8 pounds. The presence of smaller, juvenile fish (<175 mm) at multiple sites indicates natural reproduction continues to occur throughout Illinois waters of Lake Michigan.

Annual catch-per-unit-effort (CPUE) of Stock size Smallmouth Bass declined from the record level in 2024 along the shoreline in Calumet Harbor but was still the second highest CPUE observed since 2000 (Table 4). Annual CPUE at Waukegan South Harbor was similar to that in 2024 and increased at Jackson Inner Harbor and North Point Marina.

The average relative weight (Wr) of Smallmouth Bass sampled in 2025 was 110 which indicates these fish were at a healthy weight for their length. As in the recent past, the relative weight of most Stock size Smallmouth Bass was equivalent to or higher than the species-specific standard weight (Ws) suggesting no food limitation for these fish (Figure 3).

Largemouth Bass

In 2025, a total of 198 Largemouth Bass were sampled and 64% of these fish were Stock size or larger (≥ 200 mm, 8 in). Most Largemouth Bass were collected at North Point Marina and Jackson Inner Harbor (N=139 and 42, respectively). Annual CPUE of Stock size Largemouth Bass has been increasing at North Point Marina since 2022 and was the highest observed in 15 years. CPUE of Stock size Largemouth Bass also increased significantly in Jackson Inner Harbor (Table 4). Three Stock size Largemouth Bass were sampled in Calumet Harbor and Waukegan South Harbor.

Largemouth Bass collected in 2025 ranged from 60 to 475 mm (2.4-18.7 in) in total length (Figure 4). Twenty-four percent of Largemouth Bass were Quality size (300-375 mm) and 39% were Preferred (380-505 mm). The biggest Largemouth Bass collected in 2025 was 18.7 inches and 4.3 pounds. The average relative weight (Wr)

of Stock size Largemouth Bass was 109 in 2025 which indicates good body condition. Measured weights were generally equivalent to standard weight for fish ≤ 260 mm and at or above standard weight for longer fish (W_s ; Figure 5). The presence of smaller, juvenile fish (< 195 mm) at multiple sites indicates that natural reproduction continues to occur throughout Illinois waters of Lake Michigan.

Rock Bass

A total of 181 Rock Bass were sampled in 2025 of which 97% were at least Stock size (≥ 100 mm, 4 in). Several Rock Bass were Quality size (40%, 180-225 mm) and 13% were Preferred size (230-275 mm). Rock Bass ranged in length from 70-270 mm (2.8-10.6 in) with approximately 70% of fish longer than 150 mm (>6 in, Figure 6). The average relative weight (W_r) of Rock Bass was 115 in 2025; the weight of fish measured in the field tended to be at or above standard weights for this species across all lengths observed (W_s ; Figure 7).

Recommendations

1. Monitor angler effort directed at Smallmouth and Largemouth Bass and potential population expansions using shoreline creel surveys.
2. Collect a representative sample of abundant sport fish species during select years to determine ages.

Acknowledgements

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Table 1. Amount of electrofishing effort (hrs:min) and water temperature at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.

<i>Sampling Date</i>	<i>Location</i>			
	<i>North Point Marina</i>	<i>Waukegan South Harbor</i>	<i>Jackson Harbor</i>	<i>Calumet Harbor</i>
<i>7 May</i>	-	-	<i>0:30 / 64F</i>	<i>0:40 / 58F</i>
<i>12, 16 May</i>	<i>0:51 / 61F</i>	<i>0:31 / 58.2F</i>	-	-
<i>22 May</i>	-	-	<i>0:40 / 61F</i>	-
<i>2, 5 June</i>	<i>0:53 / 62F</i>	<i>0:30 / 61F</i>	<i>0:33 / 68F</i>	<i>0:45 / 59F</i>
<i>16, 17 June</i>	<i>0:50 / 67F</i>	<i>0:32 / 63F</i>	<i>0:36 / 75F</i>	<i>0:49 / 68F</i>
<i>1, 2 July</i>	<i>0:38 / 78F</i>	<i>0:33 / 68F</i>	<i>0:38 / 80F</i>	<i>0:41 / 74F</i>
<i>14 July</i>	<i>0:27 / 76F</i>	<i>0:29 / 74F</i>	-	-

Table 2. Proposed minimum lengths in millimeters (inches) for Smallmouth Bass, Largemouth Bass and Rock Bass of various length categories (taken from Gabelhouse 1984).

<i>Species</i>	<i>Size Designation</i>				
	<i>Stock</i>	<i>Quality</i>	<i>Preferred</i>	<i>Memorable</i>	<i>Trophy</i>
<i>Smallmouth Bass</i>	<i>180 (7)</i>	<i>280 (11)</i>	<i>350 (14)</i>	<i>430 (17)</i>	<i>510 (20)</i>
<i>Largemouth Bass</i>	<i>200 (8)</i>	<i>300 (12)</i>	<i>380 (15)</i>	<i>510 (20)</i>	<i>630 (25)</i>
<i>Rock Bass</i>	<i>100 (4)</i>	<i>180 (7)</i>	<i>230 (9)</i>	<i>280 (11)</i>	<i>330 (13)</i>

Table 3. Fish species sampled by electrofishing in three Illinois harbors and along the shoreline in Calumet Harbor during May - July 2025. Catch-per-unit-effort (No. fish / hr. electrofishing) is shown for targeted species (no minimum length), and the presence of incidental species is denoted with the letter P.

<i>Target Species</i>	Location			
	North Point Marina	Waukegan South Harbor	Jackson Harbor	Calumet Harbor
Black Bullhead	0.3	3.9	37.3	0.3
Bluegill	5.8	4.3	7.5	
Green Sunfish	3.0	3.5		
Largemouth Bass	38.1	5.4	14.2	1.0
Northern Pike	0.3			
Pumpkinseed	44.9	12.4	5.1	0.7
Rock Bass	29.0	24.4	1.4	2.7
Smallmouth Bass	3.8	11.6	7.5	39.1
Warmouth	0.3	0.4		
Yellow Bullhead	1.4	0.4		
Yellow Perch	2.2			
<i>Incidental Species</i>				
Alewife	P	P	P	P
Banded Killifish		P		
Black Buffalo			P	
Blackstripe Topminnow		P		
Bowfin	P			
Brown Trout	P	P		
Chinook Salmon		P		
Coho Salmon	P			P
Common Carp	P	P	P	P
Freshwater Drum	P		P	
Gizzard Shad	P	P	P	
Golden Shiner	P			
Goldfish			P	
Rainbow Trout		P		
Round Goby	P	P	P	P
Shorthead Redhorse				P
Sand Shiner		P		
Spottail Shiner		P		
White Sucker	P	P		P

Table 4. Annual catch-per-unit-effort (CPUE; No. fish / hr electrofishing) of **Stock size** Smallmouth Bass (≥ 180 mm) and Largemouth Bass (≥ 200 mm) in three Illinois harbors and along the shoreline in Calumet Harbor, 2016-2025.

Year	North Point Marina		Waukegan South Harbor		Jackson Harbor		Calumet Harbor	
	SMB	LMB	SMB	LMB	SMB	LMB	SMB	LMB
2016	1.2	3.5	3.9	1.5	0	13.7	16.0	0.4
2017	5.2	7.7	3.9	3.0	1.9	19.7	16.2	0
2018	3.8	5.3	2.1	4.5	4.1	16.3	16.3	0
2019	1.7	2.7	1.4	1.4	4.6	8.5	15.7	0
2020*	1.4	4.8	7.1	0.5	1.3	1.9	6.2	0
2021	1.8	1.5	2.2	0	4.3	19.6	19.1	0.2
2022	1.1	3.3	6.6	1.1	NS	NS	28.0	0
2023	4.0	5.7	10.2	0	4.5	14.9	23.2	1.2
2024	1.0	6.8	11.0	0	4.4	9.0	48.8	1.2
2025	3.6	21.7	10.5	1.2	7.5	14.2	34.6	1.0

*Caution should be used comparing 2020 CPUE among years due to reduced sampling effort during Covid-19 restriction.



Figure 1. Location of Lake Michigan harbors sampled.

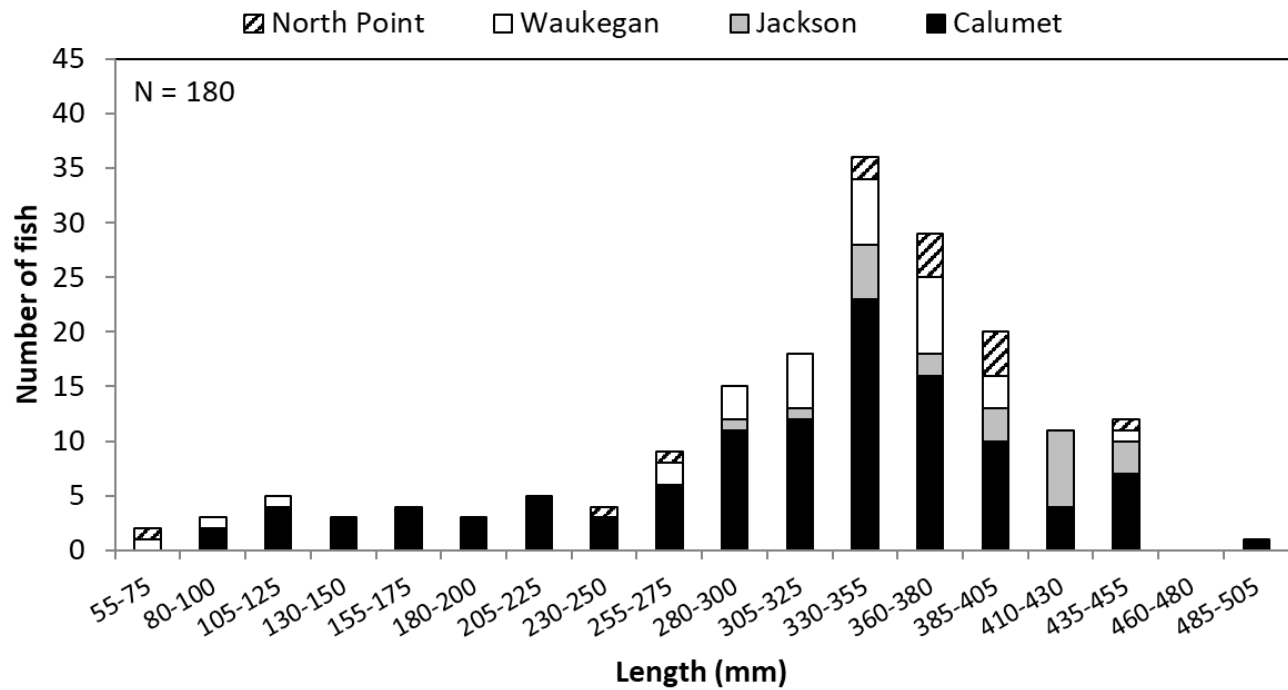


Figure 2. Length distribution of Smallmouth Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.

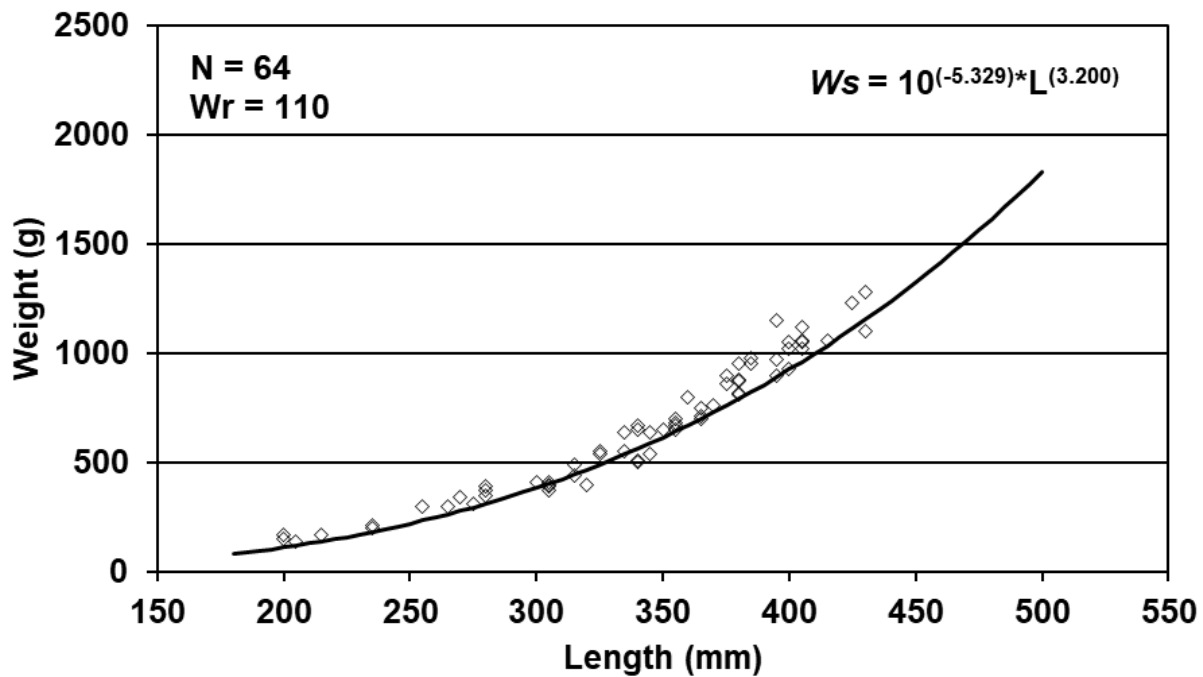


Figure 3. Observed weight-length relationship (white diamonds) and standard weight equation (W_s ; black line) of Stock size (≥ 180 mm) Smallmouth Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.

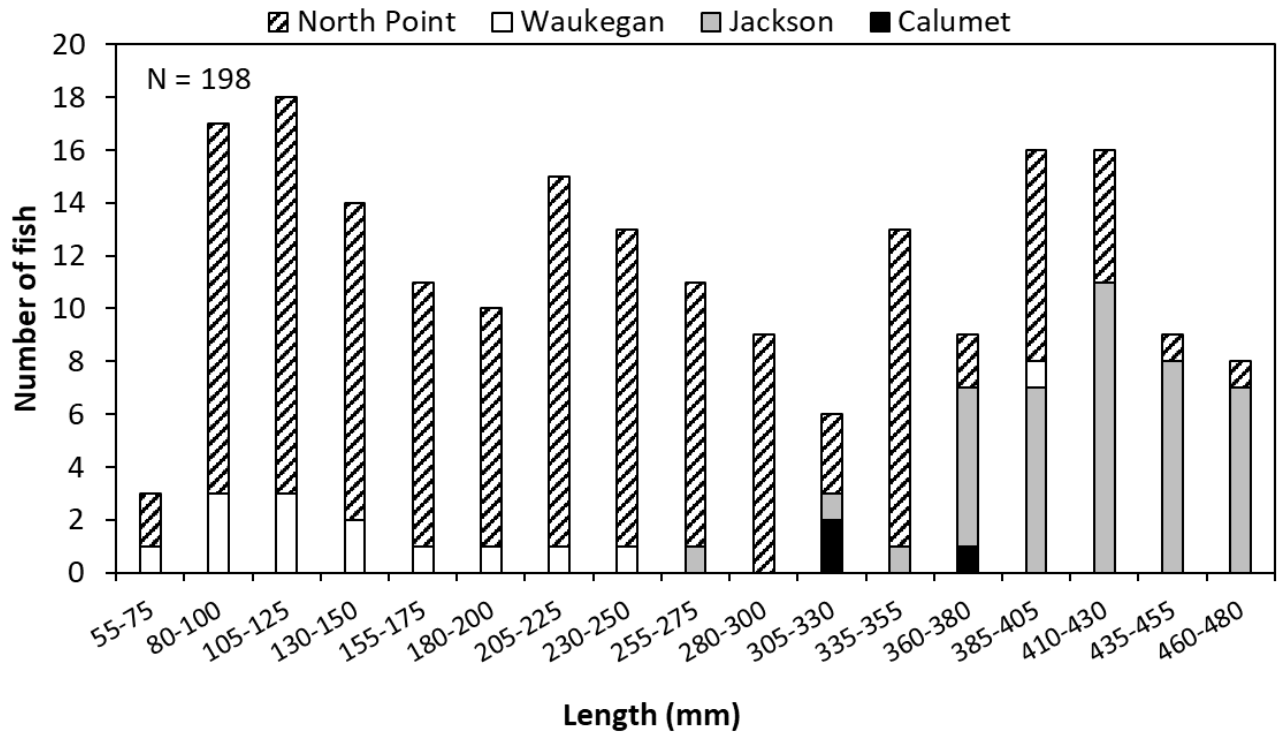


Figure 4. Length distribution of Largemouth Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.

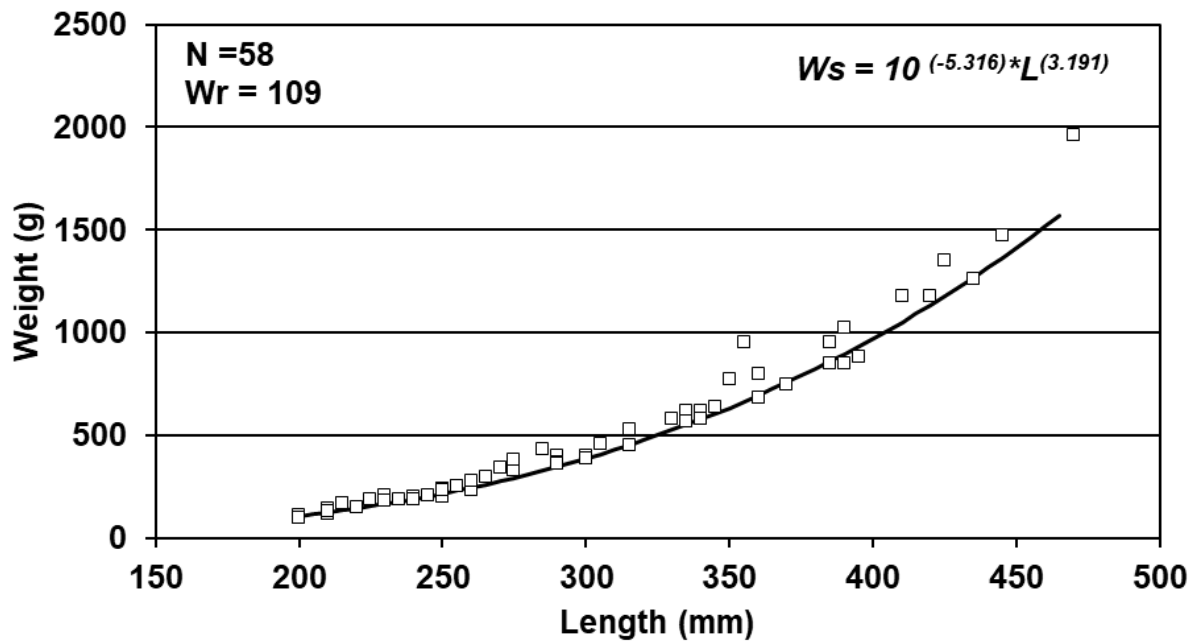


Figure 5. Observed weight-length relationship (white squares) and standard weight equation (Ws; black line) of Stock size (≥ 200 mm) Largemouth Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.

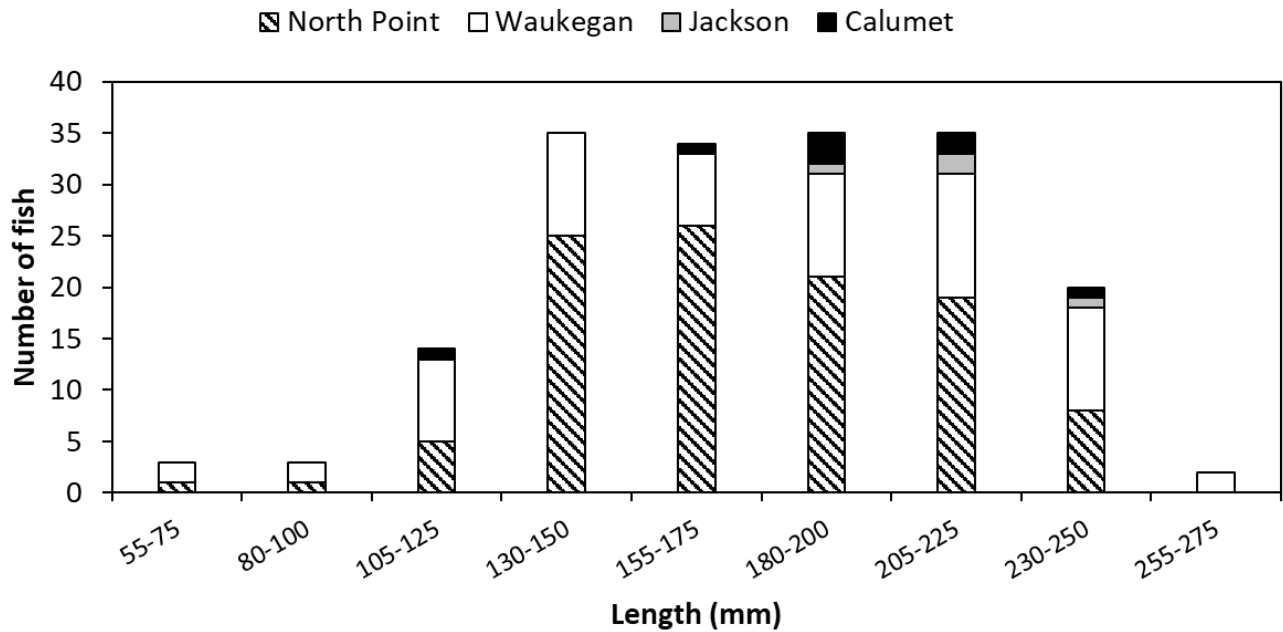


Figure 6. Length distribution of Rock Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025. N = 181.

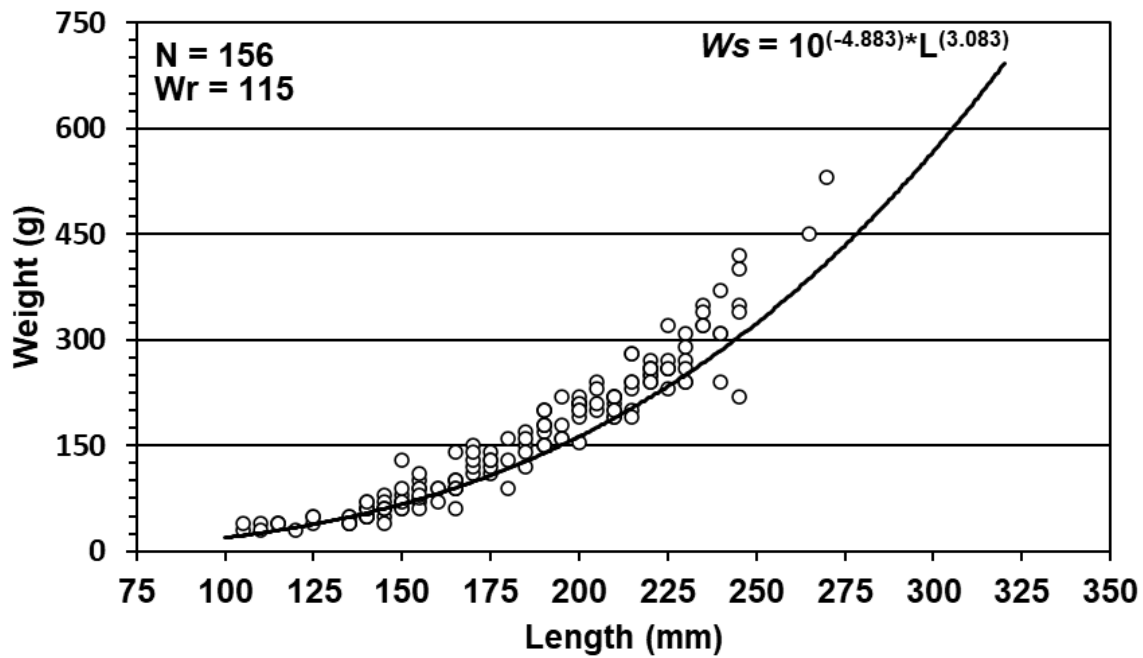


Figure 7. Observed weight-length relationship (white circles) and standard weight equation (W_s ; black line) of Stock size (≥ 100 mm) Rock Bass sampled at three Illinois harbors and along the shoreline in Calumet Harbor during 2025.