

FISH COLLECTIONS IN THE VICINITY OF LAKE OKONOKA, BELLE ISLE, MICHIGAN

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Introduction

This study was conducted as a pre-survey of the fish community prior to construction of a channel to connect Lake Okonoka to the Detroit River, as well as a series of breakwalls to reduce turbulence from wave action and ship wakes. The survey area was from the fishing pier west of the Coast Guard station, to the point near the Yacht Basin. Sampling was conducted on two consecutive nights, using standard gear for nearshore fish assessment. Weather was clear at the time of sampling with westerly winds from 10-20 mph. Sampling proceeded with no major difficulties. Timing of the sampling coincided with the muskellunge spawning time, as well as peak inshore migrations for many forage fishes and small game fishes. Typically, the largest inshore catches are taken in the spring.

Methods

Sampling for the pre-existing fish community in the vicinity of the construction project near Lake Okonoka was conducted in May 2015. Sampling extended over three days, with nets initially set on May 17, then retrieved on May 18 and 19 when sampling was completed. The initial plan was to set pairs of hoop nets, minnow trap gangs, and to seine and electroshock at four distinct locations between the south fishing pier and the point immediately to the west. However, this was a fairly small area, and that much sampling could not be completed due to lack of space. As a result, hoop nets and minnow traps were set singly, starting at the fishing pier and then approximately every 100 yards between there and the point, for a total of six hoop nets and six minnow gangs. Electroshocking was conducted throughout the entire area, between the shore and five-foot depth, from the fishing pier to the point.

In physical characteristics, the area is very wave-swept, with predominant winds from the west causing waves along the shoreline on a regular basis, and the passage of freighters and other vessels causing wake to scour the shoreline, as well. As a result,

nearly the entire shoreline has been armored with rip-rap, and the habitat appears to be open sand, gravel, and clay. In fact, in emptying one seine while sitting on shore at the time of a freighter passage, we witnessed the water dropping approximately one foot prior to the freighter passing, and then raising approximately two feet from that level during the passage. As a result, there was much surge in the area during that passage and most probably during any other significant freighter passage. This was also evidenced in the nets, in which their lead or pot anchors were often displaced by currents, probably causing reduced fishing effectiveness at times. However, no such surge problem occurred with minnow traps or electroshocking.

Six hoop nets were set over a period of two nights, and six minnow trap gangs with five baited minnow traps each were set over the same two-night period. We walked the entire shoreline to decide where to seine, and then seined at the two locations where the nets could be pulled to shore without dealing with significant problems from rocks and other rip-rap areas. Finally, electrofishing was conducted throughout the entire study area, from near shore to a depth of approximately five feet (Table 1).

Results

The region is fairly poor fish habitat with relatively low abundances of fish estimated by any sampling method used. Our total fish collections (Table 2) resulted in 1,010 fish taken by all methods combined, with the dominant species being emerald shiners (86% of the total composition), with rock bass, yellow perch, and spottail shiners being other common species, representing between 5-2% of the total collection. Most fish collected were either minnows or yearling game fish. Sampling in May prevented collection of young-of-year fish, which would not recruit to the gear for most species until fall. However, most of the fish collected were juveniles born the previous year.

Length information was collected on all species taken in hoop nets or minnow traps in order to evaluate the size distribution of each species (Table 2). Most species represented a narrow size range, identified as probably one-year class. A 610-mm Great Lakes musky was also collected, in addition to a 585-mm longnose gar, a 293-mm white bass, and a 308-mm northern pike. These game fish were adults, as were the largest yellow perch taken in this study (264 mm). The fish represented 14 species overall.

Previous collections have been done in the Detroit River system at different sites, mostly downstream in the Trenton Channel. Percent composition of different fish species for these collections is shown in Figure 1, as is the composition of different species in the current collection. There were significant differences between the expectation based on fish collected throughout the Detroit River and the species composition of the study area (χ^2 , $P < 0.05$). There were fewer spottail shiner, rock bass, largemouth bass, blacknose shiner, pumpkinseed, bluegill, and round goby than expected for the river in general, with far more emerald shiner and yellow perch than

expected. Of course, some of these differences are simply location or species bias differences.

Most of the fish were taken by one seine haul in the middle of the study region. That haul produced over 800 of the 1,010 fish individuals collected. The haul was dominated by emerald shiner with a few other species, as well. In comparison to that haul, all other sampling attempts had very low productivity.

Catch-per-unit effort was considerably lower than other sampling conducted in the Detroit River. A typical catch-per-unit effort for the same combination of nets in nearshore habitats for the river was approximately 60 fish/hour. Our catch-per-unit effort was approximately 2 fish/hour. This low catch rate was consistent across all gear types, as relatively few fish were taken in any sampling technique, except the one seine haul. This area appears to have a depauperate fish fauna, with relatively few species compared to other locations and relatively low abundance of individuals.

Discussion

The overall sampling of the region near the fishing pier on Belle Isle indicates very low abundance of mainly juvenile fish, and of those, predominantly minnows. The catch-per-unit effort was exceptionally lower than other sites throughout the Detroit River, and the species composition was devoid of many common species, especially juvenile game fishes. The area has limited habitat that could serve as a nursery for juvenile fishes and, as a result, has a very limited juvenile fish population. Adult fishes are also relatively uncommon, with only a few muskellunge, yellow perch, and white bass as representatives taken as adult sized game fishes. This is a marginal fish habitat that could be improved considerably by restoration.

Table 1. Sampling methods and durations for fish sampling, May 17 to 19, 2015 near Lake Okonoka, Belle Isle.

Net Type	Number	Set Time	Pull time	Number of Fish	Number of Species
Hoop	1	5/17 14:58	5/18 11:13	4	1
Hoop	2	5/17 15:05	5/18 11:20	13	3
Hoop	3	5/17 15:11	5/18 11:38	1	1
Hoop	4	5/17 15:16	5/18 11:43	3	1
Hoop	5	5/17 15:19	5/18 11:49	4	2
Hoop	6	5/17 15:27	5/18 11:55	0	0
Minnow	1	5/17 16:50	5/18 12:36	2	12
Minnow	2	5/17 16:41	5/18 12:29	0	0
Minnow	3	5/17 16:34	5/18 12:23	0	0
Minnow	4	5/17 16:28	5/18 12:15	3	1
Minnow	5	5/17 16:22	5/18 12:10	2	1
Minnow	6	5/17 16:16	5/18 12:04	0	0
Hoop	1	5/18 11:13	5/19 12:47	3	3
Hoop	2	5/18 11:20	5/19 12:42	17	3
Hoop	3	5/18 11:38	5/19 12:36	4	3
Hoop	4	5/18 11:43	5/19 12:28	0	0
Hoop	5	5/18 11:49	5/19 12:15	3	1
Hoop	6	5/18 11:55	5/19 12:10	0	0
Minnow	1	5/18 12:36	5/19 14:01	3	1
Minnow	2	5/18 12:29	5/19 13:51	1	1
Minnow	3	5/18 12:23	5/19 13:44	0	0
Minnow	4	5/18 12:15	5/19 13:37	4	1
Minnow	5	5/18 12:10	5/19 13:31	4	2
Minnow	6	5/18 12:04	5/19 13:26	0	0
Seine	1	5/18 14:50		23	3
Seine	2	5/18 15:10		882	8
Electrofishing	1	5/19 10:50	5/19 11:40	39	7

Table 2. Fish collection data from sampling, May 17-19, 2015 at Belle Isle.

Species	Common Name	Total Collected	Length Range	Mean Length
<i>Notropis atherinoides</i>	Emerald shiner	871	63-82	73.8
<i>Ambloplites rupestris</i>	Rock bass	46	63-194	91.2
<i>Perca flavescens</i>	Yellow perch	38	63-264	141.9
<i>Notropis hudsonius</i>	Spottail shiner	23		
<i>Labidesthes sicculus</i>	Brook silverside	15	68-74	73.8
<i>Neogobius melanostomus</i>	Round goby	8	67-80	71
<i>Lepomis macrochirus</i>	Bluegill	2	71-93	82
<i>Esox masquinongy</i>	Muskellunge	1	610	610
<i>Lepisosteus osseus</i>	Longnose gar	1	585	585
<i>Morone chrysops</i>	White bass	1	293	293
<i>Esox lucius</i>	Northern pike	1	308	308
<i>Cyprinella spiloptera</i>	Spotfin shiner	1		
<i>Moxostoma macrolepidotum</i>	Shorthead redhorse	1		
<i>Pimephales notatus</i>	Bluntnose minnow	1		
TOTAL	14	1010		

Figure 1. Species composition of fish collected in the Detroit River in previous studies, compared to the composition of fish sampled in this analysis.

