PRELIMINARY SURVEY OF FISH COMMUNITIES IN THREE TRIBUTARIES OF THE BRADDOCK BAY WATERSHED

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Introduction and Methods

As part of a cooperative effort between Monroe County and the SUNY College at Brockport to qualitatively characterize chemical and biolgical conditions in the Braddock Bay ecosystem, fish were collected in three tributaries on 10 June, 17 July and 29 September 1987. Sampling locations were chosen relative to likely impacts of development in three watersheds: Upper and Lower Northrup Creek bounded the Spencerport Sewage Treatment Plant; Larkin Creek runs through an area of extensive suburban development; and Buttonwood Creek flows predominately through agricultural lands (Figure 1).

Fish were captured using a backpack electrofishing unit in pool (5 min) and riffle (5 min) habitats at the four sampling locations on each date. Results were pooled over dates and habitats to develop species lists for each location and to calculate indices of community similarity and diversity.

Results and Discussion

Minnows (primarily creek chubs), sunfishes (mostly rock bass and pumpkinseeds), darters and white suckers predominated in samples, although Lower Northrup and Buttonwood Creeks had lower numbers of species and total organisms vs. Upper Northrup and Larkin Creeks (Table 1). These fishes are typically associated with high water quality, a finding supported by sampling few bullheads, carp or other species often associated with disturbed streams.

Species overlap among streams ranged from 30-45% and was surprisingly low given their close proximity (Table 2). Upper-Lower Northrup Creek and Larkin-Lower Northrup Creeks had the greatest community similarities (> 54%; Table 2). Buttonwood Creek consistently had low similarity to other streams; it was also the smallest stream and had the most unusual fish (pirate perch; Table 1). Except for large numbers of centrarchids captured in September, few fish were found in the stream expected to be the least impacted in the Braddock Bay watershed.

Differences in community composition can not be attributed to development activities; rather they appear to result from natural differences in stream depth, flow and substrate. All streams had cobble-gravel bottoms, except the Larkin Creek pool (mud) that also produced the greatest diversity and abundance of fish among all the sampling sites. Upper Northrup and Buttonwood Creeks were relatively shallow, but Upper Northrup had the fastest and Buttonwood had the slowest flows of the four locations.

Without knowing pre-development conditions of water quality and fish community composition in tributaries of the Braddock Bay system, it it difficult to determine the significance of impacts caused by recent development. Currently, impacts do not appear to be harmful. However, closer examination of factors contributing to low diversity in Buttonwood Creek is advisable. Also, maintenance of high community diversity in Larkin Creek is problematic given the amount of siltation that is resulting from construction-related run-off.

References

Eckblad, J. 1984. Ecological analysis programs plus. Oakleaf Systems. Decorah, IA.

Werner, R.G. 1981. Freshwater Fishes of New York. Syracuse University Press. Syracuse, NY. xxx p.

Table 1. Species and Numbers of Fish Electrofished in Three Streams of the Braddock Bay Watershed; June, July and September 1987

Family/Species	Big Ridge Rd Northrup Ck. Upper	abv Greece Rd Northrup Ck. Lower	w of James Rd Larkin Creek	Frisbee Hill Rd Buttonwood Creek
Aphredoderidae				
Aphredoderus sayanus (Pirate perch)	-	-	-	1
Catostomidae				
Catostomus commersoni (White sucker)	7	5	29	3
Centrarchidae				
Ambloplites rupestris (Rock bass)	2	3	8	4
Lepomis gibbosus (Pumpkinseed)	2	1	11	49
Lepomis macrochirus (Bluegill)	-	-	2	-
Micropterus dolomieui (Smallmouth bass)	-	2	1	-
Micropterus salmoides (Largemouth bass)	-	-	2	8
Cyprinidae				
Semotilus atromaculatus (Creek chub)	76	13	30	-
Nocomis biguttatus (Hornyhead chub)	9	3	-	-
Rhinichthyes atratulus (Blacknose dace)	1	-	-	-
Semotilus margarita (Pearl dace)	-	-	1	-
Hybognathus hankinsoni (Brassy minnow)	-	2	-	-
Hybognathus nuchalis (Silvery minnow)	-	-	1	-
Pimephales promelas (Fathead minnow)	-	-	1	-

Table 1. Continued

	Northrup upper	lower	Carbin	Buttonwood
Cyprinidae continued				
<u>Campostoma</u> <u>anomalum</u> (Stoneroller minnow)	-	-	1	-
<u>Notropis</u> <u>cornutus</u> (Common shiner)	-	7	8	2
<u>Notropis</u> <u>hudsonius</u> (Spottail shiner)	2	-	-	1
<u>Notropus</u> <u>bifrenatus</u> (Bridle shiner)	-	-	1	-
Esocidae				
<u>Esox</u> <u>americanus</u> (Grass pickerel)	-	-	2	1
Ictaluridae				
<u>Ictalurus</u> <u>nebulosus</u> (Brown bullhead)	-	-	8	-
Percidae				
<u>Percina</u> <u>caprodes</u> (Logperch)	1	-	1	-
<u>Etheostoma</u> <u>olmstedi</u> (Tesselated darter)	5	-	5	-
<u>Etheostoma</u> <u>zonale</u>? unlikely exile? blennoides? (Banded darter)	1	-	-	-
<u>Etheostoma</u> <u>flabellare</u> (Fantail darter)	-	-	1	-
Umbridae				
<u>Umbra</u> <u>limi</u> (Central mudminnow)	3	3	5	10
Total Species	11	9	19	8 — 9
Total No. Fish	109	39	118	78
Diversity Indices				
Shannon-Weaver[1]	1.764	2.782	3.260	1.835
Simpson's Diversity[2]	0.503	0.838	0.854	0.580

(1) $H' = p_i \log_2 p_i$, where p_i = no. of fish collected in taxon i/total # of fish collected in stream.

(2) $D = \sum [n_i(n_i-1)] / \sum n_i[(\sum n_i)-1]$, where n_i = # of fish collected in taxon i.

Table 2. Community Similarity Indices as Taxa in Common/Total Taxa[1] (%) and Percent Similarity[2] [%]

Streams	Upper Northrup	Lower Northrup	Larkin	Buttonwood
Upper Northrup	--			
Lower Northrup	6/14 (43) [54]	--		
Larkin	7/23 (30) [43]	7/21 (33) [60]	--	
Buttonwood	5/14 (36) [12]	5/12 (42) [22]	6/21 (29) [27]	--

(1) Jaccard coefficient = C/(A+B-C), where A and B = number of taxa in each stream and C = number of taxa common to both streams.

(2) Percent similarity = $\sum$ (#organisms in taxon i/total # organisms in stream with lowest % value for taxon i).