Food Habits of Irondequoit Bay Fish

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by

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Introduction

This report presents an evaluation of the potential impact of dredging a navigation channel connecting Irondequoit Bay and Lake Ontario on the fish populations of the area, based on a study of the food habits of the fish. Most fish are largely opportunistic feeders, subsisting largely on the most readily available and abundant food organisms. Yet there may be great differences in the food habits of species of fish inhabiting any given region. These differences result from differences in physical adaptations of a species, the size of the fish, and the particular habitat occupied. Species of fish of differing food habits may respond quite differently to the proposed dredging operations as the result of differing effects on the food organisms. The information in this report supplements that of our previous report concerning the potential environmental impact of the Irondequoit Bay dredging project (Ellis, Haines and Makarewicz, 1976).

Impact of Dredging

In our previous report we maintained that dredging a small boat access channel and mooring area at the northern end of Irondequoit Bay would not have any long-term impact on the bay or lake ecosystem. The data from the present study support that conclusion.

The objectives of this study may simply be stated as: 1) what are the diets of fish common to Irondequoit Bay, and 2) what is the potential impact of dredging on feeding behavior of fish. In general the most common zooplankton and benthic invertebrates in Irondequoit Bay and Lake Ontario were also the most common food items in the diets of fish. Thus the impact of dredging on fish and their food preferences is closely related to the fate of their food supply (e.g. benthic invertebrates, zooplankton).

With dredging two possible impacts may occur on zooplankton populations: 1) the population may be temporarily depressed due to anaerobic conditions and/or the release of toxic substances, and 2) an increase in zooplankton populations may occur near the site of the dredging operations as a result of increases in phytoplankton populations stimulated by the release of primary nutrients (Ellis, Haines and Makarewicz, 1976). If impact #2 occured conceivably there could be a beneficial effect on planktivores (alewives, gizzard shad, young white perch) with enhanced growth. If impact #1 occured,

the planktivores would lose their primary food source. However, this effect would be restricted to a small area (the site of dredging and possibly the plume into Lake Ontario) over a short span of time on fish not considered to be important as a commercial or sport fish, although alewives may be an important forage fish for salmonids. Furthermore, there is no reason not to believe that fish will simply avoid dredging areas as small as the one proposed.

A number of species of fish (e.g. white perch, pumpkinseed sunfish, brown bullhead) are dependent on benthic invertebrates as a food source. The most common benthic invertebrate found in fish stomachs was Chironomidae larvae. These are pollution-tolerant organisms with short generation times and high fecundities. The obvious effect of a dredging operation on the Irondequoit Bay outlet, will be an elimination of this food source from the immediate area (Ellis, Haines and Makarewicz, 1976). It is likely that the fish will simply avoid the dredging area until operations cease. Since recolonization by benthic invertebrates (except Mollusca at station 10, if that channel is dredged) should take place immediately after dredging ceases, it is unlikely that a food shortage should occur.

Switching off, or opportunistic feeding, is common in many fishes. If a specific food source is eliminated through dredging, it is probable that benthic feeding fish will switch to another area or food source. An example of this is provided

by the brown bullhead (Ictalurus nebulosus) in Lake Ontario and Irondequoit Bay. In Lake Ontario the primary foods of the bullhead were fish eggs and the amphipod Gammarus sp.. At the outlet of the Bay, the primary food was the fingernail clam (Sphaeriidae). At other stations in the Bay the bullhead fed primarily on Tubificidae, algae, fish eggs and Chironomidae larvae.

At the various sites the bullhead was feeding on what was available in greatest quantity in the benthos. Dredging operations may damage Gammarus sp. populations in adjacent areas of Lake Ontario and will eliminate the Sphaeridae population at the bay outlet if the present channel is dredged. In both instances the impact should be local and the fish can shift to other food sources, as evidenced by the bullhead food habits at other locations within the Bay.

Impact of dredging on fish through effects on their food supply could be minimized by conducting the operations during the summer months, when invertebrate populations are high and alternate food sources are available. Fish are not likely to be food limited during the summer months.

Methods

Field Collections:

Adult and juvenile fish were collected during the spring, summer and fall of 1976 at 14 sampling stations in Irondequoit Bay and adjacent Lake Ontario (Figure 1). Detailed information concerning collection times and methods are presented in Ellis, Haines and Makarewicz, 1976. For each fish collection made at each sampling station and at each date, three representative individuals (where possible) of each species collected were preserved for future analysis of stomach contents.

The fish were allowed to die of asphyxiation immediately after collection. The body cavity was opened to expose the stomach, and the fish were preserved in 10% formalin. After two days the fish were transferred to 5% formalin and stored in the laboratory.

Laboratory Procedures:

Each fish, was removed from the preservation, washed in tap water, weighed and measured (total length). The stomach was then removed from the fish intact, cut open, and the contents washed into a petri dish. The stomach lining was carefully scraped, washed and examined under a dissecting microscope to ensure that all food items were dislodged. All food items except zooplankton were identified and enumerated under a dissecting microscope. If a stomach contained

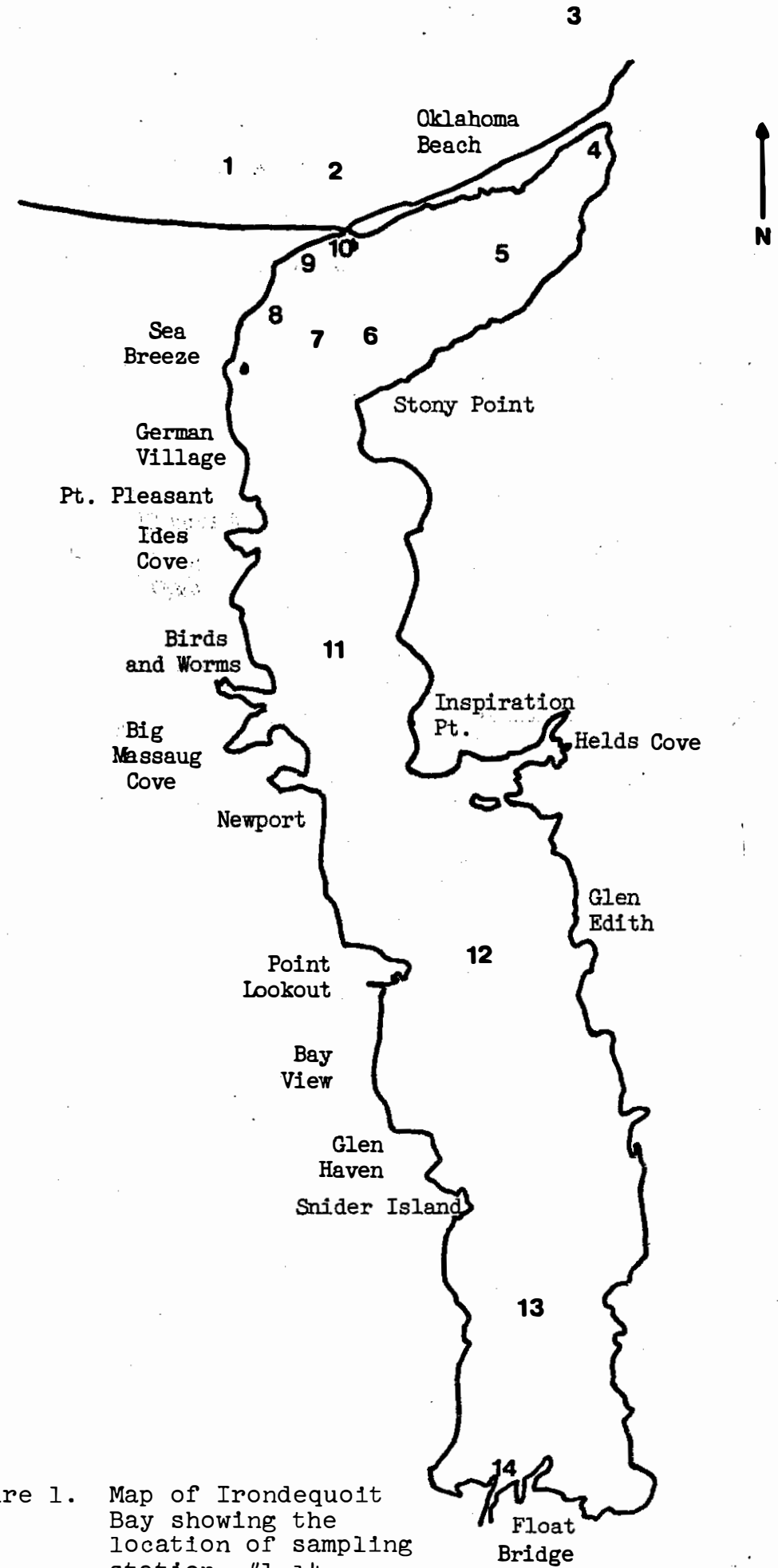

Figure 1. Map of Irondequoit Bay showing the location of sampling stations #1-14.

a significant quantity of zooplankton, the contents were transferred to a graduated cylinder and the volume of the suspension was determined. One 1 ml. subsample was removed with a Hensen-Stempel pipet and transferred to a Sedgewick-Rafter counting cell. Zooplankton were identified and enumerated with a compound microscope. Appropriate calculations were made to estimate the number of each group present per fish stomach. The identification of animal material was as follows:

1. Zooplankton
   - rotifers - Phylum Aschelminthes, genus when possible
   - copepods - Calanoida, Cyclopoida and Harpacticoida
   - cladocerans - to Genus level when possible
2. Benthos - to Family level
3. Terrestrial Insects - to Order level
4. Fish - to Family level when possible

If any stomach contained a large quantity of plant material, the volume of the material was estimated visually. The plant material was identified as precisely as possibly.

The data were tabulated following the numerical and frequency of occurrence methods of Lagler (1956). In addition the numerical percent composition of each food category in the total of all food items was determined. These methods indicate the frequency with which the different food categories were ingested by individual fish and the species group as a whole. However it is important to note that these methods are biased towards small food items and must be interpreted with this in mind.

For convenience and ease of interpretation the stomach content data for the various sampling stations have been

grouped. The groups are based upon similarity of stomach content within species of fish, and similarity of aquatic habitat among stations. For this analysis the following groups were established:

Groups	Station Numbers
Lake Ontario	1 - 3
North Bay	4 - 9
Outlet	10
South Bay	12 - 14

Station 11 was excluded as no adult fish were ever captured there. These groupings correspond very closely to those used in previous reports. The exceptions are the separation of station 10 as the outlet station from the other north bay stations, and the inclusion of station 12 in the south bay group.

Results

The food habit data for each species of fish collected are interpreted with respect to the published information for that species, and with the kind and amount of food organisms available in the place and time the fish were collected. We used the food habit summaries of Scott and Crossman (1973) for literature comparisons, as this is a recent, comprehensive work. Seasonal zooplankton and macrobenthos data collected for this project were used as the index of available food for the fish.

Alewife, Alosa pseudoharengus (Table 1)

The alewife is a zooplankton feeder, both as juvenile and adults. The fish in this study feed primarily on Cladocera and Copepoda; occasionally Ostracoda, Rotifers or Chironomidae larvae were present in the stomachs, but were generally less than 0.5% of the total by number. Of the Cladocera and Copepoda, the group which was most abundant in the stomachs was generally the group which was most abundant in the water at that time (See Table 19). This is expected in a fish that is a filter feeder; the most abundant organism of the proper particle size in the water will be the dominant food organism. The exceptions to this which occur in the spring are undoubtedly the result of the different times at which the samples were collected. Zooplankton were collected in mid-May and fish in late June. For all

other samples, the collections were made at closely corresponding times.

Gizzard Shad, Dorosoma cepedianum (Table 2)

Fully developed gizzard shad are thought to be herbivorous, feeding on the bottom on microscopic plants and phytoplankton. The young, up to 22 mm in length, feed almost entirely on zooplankton. At about 28 mm in length, their feeding behavior begins to change from carnivory to herbivory.

Only two stomachs of gizzard shad were available for analysis. Both fish were large (102 and 198 mm) and would be expected to have stomach contents containing material of plant origin. Our data indicate a diet of zooplankton with the Cladocera being the dominant group ingested. The dominant group in the stomachs of this species agrees quite well with that for alewives taken at the same time.

Goldfish, Carassius auratus (Table 3)

Goldfish are described as omnivorous feeders, consuming a wide variety of animal and plant material. The two goldfish in our sample had quite different food habits. One had eaten primarily fish eggs and Chironomidae larvae; the other had fed exclusively on zooplankton. Both had a quantity of unidentifiable material in their stomachs, a result of the strong pharyngeal teeth in this group of fish. Chironomidae larvae are one of the major groups of macrobenthos

in Irondequoit Bay and adjacent Lake Ontario (Table 20). Together with Oligochaeta they make up more than 95% of the macrobenthos by number. Of these two groups, the Oligochaeta are seldom used as a major food source by any of the fish in Irondequoit Bay, even at times or locations where they are far more abundant than the Chironomidae.

Carp, Cyprinus carpio (Table 4)

The fish collection for food habit analysis also contained but two carp, and these also had quite different stomach contents. One had fed predominately on Chironomidae larvae, the other on plant material. Both stomachs contained a large quantity of unidentifiable fragments. Carp are likewise identified as omnivores in the literature.

Golden Shiner, Notemigonus chrysoleucas (Table 5)

The Golden shiners were collected at every sampling period, but only one fish per sampling. The food habits of the three fish were quite different. The first had fed on Gammarus, Chironomidae larvae and fish. The second fed on zooplankton and Chironomidae larvae while the third fed exclusively on filamentous algae. This species is reported to be a surface and mid-water feeder, feeding on zooplankton and insects. Filamentous algae is reported to be an important item in the diet in late summer, which agrees with our data. We can find no reference to fish as a food item

for this species. One individual had eaten Ectoprocta. Although we know of no reference which reports Ectoprocta to be a common food item in fish, many species from Irondequoit Bay were found to have this item in their stomachs.

Emerald Shiner, Notropis atherinoides (Table 6)

The predominant food item of this species was fish eggs. The species is reported to be an open water pelagic species which feeds primarily on zooplankton.

Spottail Shiner, Notropis hudsonius (Table 7)

The spottail shiner ate a wide variety of food items. Among the most common were Chironomidae larvae and pupae, and zooplankton. A few fish had E toprocta remains in their stomachs. Other studies have found the food of this species to be zooplankton and other crustaceans, insects, algae and fish eggs, which agrees well with our results.

White Sucker, Catostomus commersoni (Table 8)

The two white suckers had little recognizable food items in their stomachs, as did carp and goldfish. One had a few Cladocera, the other a few Chironomidae larvae. This corresponds precisely with the food habit reported in the literature.

Brown Bullhead, Ictalurus nebulosus (Table 9)

Plant material was a common constituent of the diet of brown bullhead, and recent evidence indicates that plant material has considerable food value for this species (Gunn, Quadri and Mortimer, 1977). Bullheads from stations 1-3 fed largely on fish eggs in July, and Gammarus sp. in September. Our macrobenthos samples contained very few Gammarus, however, this organism probably has a highly clumped distribution, and concentrations were missed during our sampling. Cladophora beds in the near-shore areas of Lake Ontario would probably be excellent Gammarus habitat. Fish from stations 4-9 used Tubificidae, Chironomidae larvae and fish eggs as food. At station 10 Mollusca, especially Sphaeriidae were a common food item, along with Chironomidae larvae. Our macrobenthos samples at this station did not include Mollusca. The fish stomachs also included large quantities of sand, indicating that they were obtaining the organisms in the vicinity of this station, which is located on a shallow sandbar. At stations 12-14 the predominant food items are fish eggs and Chironomidae larvae. In addition, a large variety of different organisms were found in the stomachs, including Ectoprocta, supporting the view of this species as truly omnivorous.

Channel Catfish, Ictalurus punctatus (Table 10)

Only one fish collection contained Channel catfish and the predominant food was Chironomidae larvae and pupae. This species is also reported (as is brown bullhead) to be strongly omnivorous.

Threespine Stickleback, Gasterosteus aculeatus (Table 11)

This species was collected only in the June samples. The most common food items were Cyclopoida, Chironomidae larvae, fish eggs and Bosmina. According to the literature this species will take virtually any animal food of the proper size, and the organisms eaten generally reflect the abundant animal groups in the bay.

White Perch, Morone americana (Table 12, 13)

White perch, smaller than 14.0 cm generally had a large proportion of zooplankton in their diet, especially in July and September. In July the type of zooplankton found in the stomachs is similar to that found in alewives. In September, however, the white perch fed primarily on Cladocera at stations 4-9, and Cyclopoida at stations 12-14, whereas alewives fed on Cyclopoida at stations 4-9 and Chydoridae at stations 12-14. The literature also indicates a dependence on zooplankton for food by white perch of this size. White perch larger than 14.1 cm fed predominately on Chironomidae larvae. Chironomidae larvae were the predominant macrobenthos organisms at stations 1-12, while Tubificidae were most abundant at stations 13-14. The literature also supports this result.

In addition to the above, fish eggs were a common food item in both small and large white perch. There is one study which indicates that marine populations of this species feed on fish eggs, but no mention is made for freshwater populations.

Although fish are reported to be a common food item of large white perch, they were almost totally absent in our data. A few fish had fed on Ectoprocta, a fact of which we find no mention in the literature. A large quantity of duckweed (Lemna minor) was found in a few fish from stations 12-14, but was probably ingested incidentally when the fish were feeding on Chironomidae in the marsh areas at the south end of the bay.

White Bass, Morone chrysops (Table 14)

Only three white bass were collected in our project, all in June, and all were small fish. The food items were fish eggs, Chironomidae larvae, zooplankton and fish. According to the literature, microcrustaceans, insect larvae and fish are successively important food items as the fish grow from small to large body size. Our data agree with this.

Pumpkinseed Sunfish, Lepomis gibbosus (Table 15)

This species fed primarily on Chironomidae larvae and, to a lesser extent, pupae. There were a variety of other items taken, the most common being Gammarus, fish eggs, zooplankton, and Ectoprocta. Our results agree with the literature, and the invertebrate populations of the bay.

Bluegill Sunfish, Lepomis macrochirus (Table 16)

The lone specimen in our collections had fed primarily on adult insects. The foods of this species are reported

to be insects, crustaceans and plant material.

Smallmouth Bass, Micropterus dolomieui (Table 17)

The single bass in our sample had only a few Chironomidae larvae in its stomach. The literature indicates that this species feeds on insects, crayfish and fish.

Johnny Darter, Etheostoma nigrum (Table 18)

The Johnny darter we collected had fed on Chironomidae larvae, zooplankton, Tubificidae and Gammarus. The literature reports a diet composed of zooplankton, midge larvae and mayfly larvae for this species.

Literature Cited

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Table 1. Stomach content of alewife (Alosa psuedoharengus), Irondequoit Bay, New York.

A-1. Station 1-3, JUNE 1976

No. Analyzed: 8 — No. with empty stomachs: 3
Mean Length (cm): 14.1 (13.0-16.6) — Mean Wt. (g): 18 (14-30)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	771	79.6	100
Daphnia sp.	43	4.4	40
TOTAL	(814)	(84.0)	-
Copepoda			
Cyclopoida	152	15.7	80
Diptera			
Chironomidae larvae	2	0.3	20

A-2. Station 1-3, JULY 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (13.4-13.8) — Mean Wt. (g): 21 (17-28)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Aschelminthes			
Keratella sp.	38	0.4	66
Cladocera			
Bosmina sp.	1240	13.2	100
Daphnia sp.	308	3.3	33
Eggs	607	6.5	66
Chydoridae	2604	27.8	100
Unknown Cladocera	38	0.4	66
TOTAL	(4797)	(51.2)	-
Copepoda			
Cyclopoida	4493	48.0	100
Calanoida	38	0.4	66

Table 1. (Alewife continued)

A-3. Station 1-3, SEPTEMBER 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 15.5 (15.0-16.0) — Mean Wt. (g): 28 (25-30)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	297	2.9	100
Daphnia sp.	540	5.3	100
Diaphanosoma sp.	292	2.9	50
Chydoridae	5108	50.6	100
Eggs	263	2.6	100
TOTAL	(6500)	(64.3)	-
Copepoda			
Cyclopoida	3274	32.4	100
Calanoida	321	3.2	50

B-1. Station 4-9, JUNE 1976

No. Analyzed: 15 — No. with empty stomachs: 0
Mean Length (cm): 15.0 (13.2-16.4) — Mean Wt. (g): 19 (12-24)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Aschelminthes			
Filinia sp.	25	<0.1	13
Keratella sp.	21	<0.1	7
Brachionus sp.	39	<0.1	13
TOTAL	(85)	(0.2)	-
Cladocera			
Bosmina sp.	39,899	75.3	100
Daphnia sp.	91	0.2	13
Chydoridae	565	1.0	60
Eggs	421	.8	33
TOTAL	(90,976)	(77.3)	-
Copepoda			
Calanoida	305	0.6	13
Cyclopoida	11,597	21.9	93
Ostracoda	23	<0.1	7

Table 1. (Alewife continued)

B-2. Station 4-9, JULY 1976

No. Analyzed: 11 — No. with empty stomachs: 0
Mean Length (cm): 14.6 (13.4-16.3) — Mean Wt. (g): 25 (20-35)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Aschelminthes			
Keratella sp.	255	0.3	18
Synchaeta sp.	29	<0.1	9
Cladocera			
Bosmina sp.	8,476	9.1	100
Daphnia sp.	1,350	1.4	91
Chydoridae	11,343	12.1	100
Eggs	874	0.9	45
Unknown Cladocera	166	0.2	18
TOTAL	(22,209)	(23.7)	-
Copepoda			
Cyclopoida	71,009	75.9	100
Calanoida	98	0.1	18

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 15.8 — Mean Wt. (g): 25

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	80	100	100

Table 1. (Alewife continued)

C-1. Station 10, JUNE 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (13.4-13.8) — Mean Wt. (g): 15 (14-16)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Aschelminthes			
Keratella sp.	35	11.8	100
Cladocera			
Bosmina sp.	124	41.8	100
Copepoda			
Cyclopoida	138	46.5	50

C-2. Station 10, JULY 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 15.4 (13.8-16.8) — Mean Wt. (g): 23 (20-27)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Aschelminthes			
Keratella sp.	233	1.4	66
Cladocera			
Bosmina sp.	4,500	26.7	66
Daphnia sp.	962	5.7	66
Chydoridae	5,118	30.3	100
Unknown Cladocera	100	0.6	33
Eggs	725	4.3	66
TOTAL	(11,405)	(67.6)	-
Copepoda			
Cyclopoida	5,175	30.7	100
Calanoida	67	0.4	66

Table 1. (Alewife continued)

C-3. Station 10, SEPTEMBER 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (13.5-13.6) — Mean Wt. (g): 30 (21-38)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	1,446	6.5	100
Daphnia sp.	2,109	9.5	100
Diaphanosoma sp.	34	0.2	50
Chydoridae	11,737	52.8	100
Eggs	743	3.3	100
TOTAL	(16,069)	(72.3)	-
Copepoda			
Calanoida	397	1.8	100
Cyclopoida	5,783	26.0	100

D-1. Station 12-14, JUNE 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (13.0-14.0) — Mean Wt. (g): 15 (12-18)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	20,279	96.5	100
Daphnia sp.	37	0.2	33
Unknown Cladocera	37	0.2	33
Eggs	191	0.9	66
TOTAL	(20,544)	(97.8)	-
Copepoda			
Cyclopoida	465	2.2	100

Table 1. (Alewife continued)

D-2. Station 12-14, JULY 1976

No. Analyzed: 6 — No. with empty stomachs: 1
Mean Length (cm): 14.3 (13.5-16.5) — Mean Wt. (g): 23 (17-33)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	3,684	13.2	100
Daphnia sp.	1,806	6.5	80
Chydoridae	3,171	11.3	100
Eggs	3,121	11.2	100
Unknown Cladocera	22	<0.1	20
TOTAL	(11,804)	(42.2)	-
Copepoda			
Calanoida	540	1.9	80
Cyclopoida	15,635	55.9	100

D-3. Station 12-14, SEPTEMBER 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 16.3 (16.2-16.5) — Mean Wt. (g): 37 (23-46)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	473	1.9	75
Daphnia sp.	4,183	16.6	75
Leptodora sp.	22	<0.1	25
Chydoridae	13,693	54.2	100
Eggs	2,491	9.9	75
Unknown Cladocera	21	<0.1	25
TOTAL	(20,883)	(82.6)	-
Copepoda			
Cyclopoida	3,813	15.1	100
Calanoida	503	2.0	75
Diptera			
Chironomidae larvae	71	0.3	25

Table 2. Stomach content of gizzard shad (*Dorosoma cepedianum*), Irondequoit Bay, New York.

A-1. Station 12-14, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 19.8 — Mean Wt. (g): 102

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	72	9.6	100
Cladocera			
Bosmina sp.	662	88.5	100
Diptera			
Chironomidae larvae	14	1.9	100

A-2. Station 12-14, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 10.2 — Mean Wt. (g): 10

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Daphnia sp.	28	33.7	100
Chydoridae	55	66.3	100

Table 3. Stomach content of goldfish (*Carassius auratus*), Irondequoit Bay, New York.

A-1. Station 10, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 28.2 — Mean Wt. (g): 511

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	1	7.1	100
Copepoda			
Cyclopoida	1	7.1	100
Amphipoda			
Gammarus sp.	1	7.1	100
Diptera			
Chironomidae larvae	5	35.3	100
Eggs (unknown origin)	6	42.6	100

B-1. Station 12-14, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 25.3 — Mean Wt. (g): 333

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	168	29.4	100
Cladocera			
Bosmina sp.	403	70.6	100

Table 4. Stomach content of carp (Cyprinus carpio), Irondequoit Bay, New York.

A-1. Station 4-9, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 19.6 — Mean Wt. (g): 130

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera	1	14	100
Diptera			
Chironomidae larvae	6	86	100

B-1. Station 12-14, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 37.0 — Mean Wt. (g): 1021

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Plant debris	-	-	100
Lemna	-	-	100

Table 5. Stomach content of golden shiner (Notemigonus chrysoleucos), Irondequoit Bay, New York.

A-1. Station 4-9, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 25.0 — Mean Wt. (g): 95

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	22	85	100
Diptera			
Chironomidae larvae	2	8	100
Fish			
Stickleback	1	4	100
Unidentified	1	4	100
Ectoprocta*			100

*One fish stomach contained 70% Ectoprocta by volume.

A-2. Station 4-9, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 12.7 — Mean Wt. (g): 19

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	2	6	100
Ostracoda	16	46	100
Copepoda			
Cyclopoida	7	20	100
Diptera			
Chironomidae larvae	9	26	100
Culicidae	1	3	100

Table 5. (Golden shiner continued)

B-1. Station 12-14, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 15.2 — Mean Wt. (g): 26

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Spirogyra	-	-	100

Table 6. Stomach content of emerald shiner (Notropis atherinoides), Irondequoit Bay, New York.

A-1. Station 1-3, JULY 1976

No. Analyzed: 8 — No. with empty stomachs: 4
Mean Length (cm): 8.9 (7.5-10.3) — Mean Wt. (g): 6 (3-10)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	1	0.4	25
Chironomidae pupae	5	1.9	75
Amphipoda			
Gammarus sp.	1	0.4	25
Egg (fish?)	253	97.3	75

Table 7. Stomach content of spottail shiner (Notropis hudsonius), Irondequoit Bay, New York.

A-1. Station 1-3, SEPTEMBER 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 9.7 (9.5-10.7) — Mean Wt. (g): 7 (6-8)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	16	40	25
Chironomidae pupae	22	55	75
Hydracarina	2	5	25

B-1. Station 4-9, JUNE 1976

No. Analyzed: 7 — No. with empty stomachs: 2
Mean Length (cm): 7.2 (6.6-8.2) — Mean Wt. (g): 3 (1-5)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	15	56	40
Trichoptera			
Hydropsychidae	1	4	20
Diptera			
Chironomidae larvae	11	41	20
Ectoprocta*			14

*one fish stomach contained 65% Ectoprocta by volume.

B-2. Station 4-9, JULY 1976

No. Analyzed: 16 — No. with empty stomachs: 2
Mean Length (cm): 8.6 (7.7-9.3) — Mean Wt. (g): 6 (3-7)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tufibicidae	1	<1	7

Table 7. (Spottail shiner continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Naididae	2	<1	14
Cladocera			
Bosmina sp.	10	2	21
Cladocera eggs	83	17	21
Unidentified	53	11	21
Copepoda			
Cyclopoida	190	39	43
Unidentified	77	16	21
Diptera			
Chironomidae larvae	70	14	36
Chironomidae pupae	3	1	14
Hydracarina	1	<1	7
Ectoprocta			
Statoblasts	1	<1	7

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 9 No. with empty stomachs: 1
Mean Length (cm): 10.2 (9.2-11.3) Mean Wt. (g): 9 (6-13)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	25	32	25
Amphipoda			
Gammarus sp.	1	1	13
Diptera			
Chironomidae larvae	2	3	13
Chironomidae pupae	48	61	75
Hydracarina	3	4	25

Table 7. (Spottail shiner continued)

C-1. Station 10, JULY 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 8.9 (8.3-9.4) — Mean Wt. (g): 6 (3-7)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	1	<1	25
Naididae	1	<1	25
Cladocera			
Daphnia sp.	4	3.3	50
Ostracoda	1	<1	25
Copepoda			
Cyclopoida	80	65.0	50
Diptera			
Chironomidae larvae	16	13.0	75
Chironomidae pupae	18	14.6	50
Eggs (unknown origin)	2	1.6	25

C-2. Station 10, SEPTEMBER 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 9.7 (9.5-9.8) — Mean Wt. (g): 9 (8-9)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Naididae	2	3.0	50
Copepoda			
Cyclopoida	8	12.3	50
Diptera			
Chironomidae larvae	51	78.5	100
Chironomidae pupae	2	3.0	50
Fish Scale (ctenoid)	2	3.0	50

Table 7. (Spottail shiner continued)

D-1. Station 12-14, SEPTEMBER 1976

No. Analyzed: 2 No. with empty stomachs: 1
Mean Length (cm): 10.4 (10.1-10.6) Mean Wt. (g): 9 (8-9)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	6	35.3	100
Diptera			
Chironomidae larvae	8	47.1	100
Chironomidae pupae	3	17.6	100

Table 8. Stomach content of white sucker (Catostomus commersoni), Irondequoit Bay, New York.

A-1. Station 4-9, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 22.3 — Mean Wt. (g): 120

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera	4	100	100

B-1. Station 10, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 23.7 — Mean Wt. (g): 152

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	4	100	100

Table 9. Stomach content of brown bullhead (Ictalurus nebulosus), Irondequoit Bay, New York.

A-1. Station 1-3, JULY 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 55.9 (25-77) — Mean Wt. (g): 296 (257-315)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrency (%)
Algae			
Cladophora sp.*			50
Copepoda			
Cyclopoida	1	<0.1	25
Diptera			
Chironomidae larvae	37	1.1	100
Coleoptera			
Hydrophilidae	1	<0.1	25
Trichoptera			
Hydropsychidae	1	<0.1	25
Mollusca			
Pelecypoda Sphaeriidae	1	<0.1	25
Amphipoda			
Gammarus sp.	3	0.1	75
Fish eggs	3357	98.7	100

*The stomachs of two fish contained 98% and 60% Cladophora sp. by volume.

A-2. Station 1-3, SEPTEMBER 1976

No. Analyzed: 6 — No. with empty stomachs: 0
Mean Length (cm): 26.2 (22.2-30.0) — Mean Wt. (g): 306 (134-456)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Cladophora sp.*			33

Table 9. (Brown bullhead continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Alewife	1	0.1	17
Unknown fish	2	0.3	33
Nematoda	1	0.1	17
Diptera			
Chironomidae larvae	52	7.5	83
Trichoptera			
Hydropsychidae	2	0.3	17
Leptoceridae	3	0.4	33
Amphipoda			
Gammarus sp.	577	83.5	83
Mollusca			
Pelecypoda			
Sphaeriidae	3	0.4	17
Gastropoda			
Planorbidae	5	0.7	17
Physidae	20	2.9	50
Isopoda			
Asellus sp.	6	0.9	33
Annelida			
Hirudinea	23	3.3	50
Oligochaeta			
Tubificidae	1	0.1	17
Eggs (unknown eggs)	5	0.7	17

*The stomachs of two fish contained 85% and 10% *Cladophora sp.* by volume.

Table 9. (Brown bullhead continued)

B-1. Station 4-9, JUNE 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 24.9 (24.0-25.9) — Mean Wt. (g): 186 (179-192)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	412	68	75
Naididae	25	4	25
Trichoptera	1	<1	25
Diptera			
Chironomidae larvae	142	23	75
Chironomidae pupae	4	1	75
Heliidae	4	1	25
Fish eggs	20	3	25
Ectoprocta colony*			

*70% by volume in one fish.

B-2. Station 4-9, JULY 1976

No. Analyzed: 19 — No. with empty stomachs: 3
Mean Length (cm): 23.6 (18.0-39.4) — Mean Wt. (g): 216 (72-509)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Cladophora[1] filamentous algae-unidentified[2]			
Oligochaeta			
Tubificidae	54	6	31
Naididae	49	8	6
Cladocera	9	1	13
Ostracoda	15	2	6
Copepoda			
Cyclopoida	2	<1	13

Table 9. (Brown bullhead continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	39	4	25
Odonata	1	<1	6
Trichoptera			
Hydropsychidae	1	<1	6
Diptera			
Chironomidae larvae	427	44	88
Chironomidae pupae	102	11	56
Coleoptera	1	<1	56
Hymenoptera	1	<1	6
Terrestrial invertebrate unidentified	2	<1	13
Mollusca			
Gastropoda	3	<1	13
Pelecypoda			
Sphaeriidae	3	<1	13
Fish eggs	260	27	19
Ectoprocta			
Statoblasts	1	<1	6
Colony[3]			12

[1]found in 3 fish stomachs: 80%, 85%, and 95% by volume.

[2]found in one fish stomach: 95% by volume.

[3]found in two fish stomachs: 10% by volume in one, 2 fragments in the other.

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 10 No. with empty stomachs: 3
Mean Length (cm): 22.7 (18.7-30.0) Mean Wt. (g): 186 (83-428)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Cladophora*			20

Table 9. (Brown bullhead continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	203	42	14
Cladocera	28	6	14
Copepoda	1	<1	14
Amphipoda			
Gammarus sp.	41	9	86
Odonata			
Coenagrionidae	1	<1	14
Trichoptera			
Hydropsychidae	2	<1	14
Diptera			
Chironomidae larvae	90	19	86
Chironomidae pupae	49	10	43
Heliidae	2	<1	14
Hydracarina	39	8	29
Mullusca			
Gastropoda	20	4	14
Unidentified egg	2	<1	14

*in 2 stomachs, one 90+%, one 90% by volume.

C-1. Station 10, JULY 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 23.3 (21.5-25.0) — Mean Wt. (g): 143 (110-275)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	2	1.3	50

Table 9. (Brown bullhead continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Daphnia	4	2.6	50
Copepoda			
Cyclopoida	1	<1	50
Amphipoda			
Gammarus sp.	8	5.3	100
Diptera			
Chironomidae larvae	55	36.4	100
Chironomidae pupae	13	8.6	50
Mollusca			
Gastropoda	5	3.3	50
Pelecypoda			
Sphaeriidae	63	41.7	50
Ectoprocta fragment	2		50
Fish Scale	1		50

C-2. Station 10, SEPTEMBER 1976

No. Analyzed: 1 No. with empty stomachs: 0
Mean Length (cm): 28.0 Mean Wt. (g): 238

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Cladophora*			100
Oligochaeta			
Tubificidae	1	12.5	100
Cladocera			
Daphnia sp.	1	12.5	100
Copepoda			
Cyclopoida	2	25.0	100

Table 9. (Brown bullhead continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	2	25.0	100
Diptera			
Chironomidae pupae	2	25.0	100

*approximately 85% of total content.

D-1. Station 12-14, JULY 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 23.7 (23.4-23.9) — Mean Wt. (g): 159 (137-181)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	110	31.2	100
Chironomidae pupae	29	8.2	100
Hymenoptera (adult)	1	<1	50
Ectoprocta fragment	3		50
Fish	3	<1	50
Fish eggs (unidentified)	210	59.5	100

D-2. Station 12-14, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 25.1 (22.4-26.5) — Mean Wt. (g): 193 (154-217)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Algae			
Spirogyra	-	-	100
Plant Debris	-	-	100

Table 10. Stomach content of channel catfish (*Ictalurus punctatus*), Irondequoit Bay, New York.

A-1. Station 12-14, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 17.8 (14.3-23.0) — Mean Wt. (g): 53 (22-106)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Leptodora	2	1.6	33
Diptera			
Chironomidae larvae	77	59.7	100
Chironomidae pupae	45	34.9	100
Eggs (unknown origin)	5	3.9	33

Table 11. Stomach content of three-spine stickleback (Gasterosteus aculeotus), Irondequoit Bay, New York.

A-1. Station 4-9, JUNE 1976

No. Analyzed: 5 — No. with empty stomachs: 1
Mean Length (cm): 5.7 (5.3-6.6) — Mean Wt. (g): 1 (<1-2)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	4	4	25
Copepoda			
Cyclopoida	96	85	50
Diptera			
Chironomidae larvae	10	9	75
Chironomidae pupae	2	2	25
Fish egg	1	1	25

B-1. Station 12-14, JUNE 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 6.0 (5.5-6.3) — Mean Wt. (g): 1 (1-1.5)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	7	13.5	33
Ostracoda	1	1.9	33
Diptera			
Chironomidae larvae	33	63.5	100
Chironomidae pupae	3	5.8	67
Fish eggs (unidentified)	8	15.4	33

Table 12. Stomach content of white perch <14.0 cm (*Morone americana*), Irondequoit Bay, New York.

A-1. Station 1-3, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 13.6 — Mean Wt. (g): 41

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	14	0.2	100
Diptera			
Chironomidae larvae	20	0.3	100
Fish eggs	6000	99.3	100

B-1. Station 4-9, JUNE 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 11.7 (11.5-11.8) — Mean Wt. (g): 19 (18-20)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	67	99	100
Chironomidae pupae	1	1	50

B-2. Station 4-9, JULY 1976

No. Analyzed: 4 — No. with empty stomachs: 0
Mean Length (cm): 13.2 (12.7-14.0) — Mean Wt. (g): 35 (29-42)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	14	6	50
Copepoda			
Cyclopoida	140	62	50

Table 12. (White perch continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	4	2	25
Diptera			
Chironomidae larvae	62	28	100
Chironomidae pupae	1	<1	25
Fish eggs	4	2	25

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 13.6 — Mean Wt. (g): 34

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp. & *Daphnia sp.*	231	93	100
Copepoda			
Cyclopoida	11	4	100
Diptera			
Chironomidae pupae	5	2	100
Ectoprocta			
Statoblast	1	<1	100

C-1. Station 10, JULY 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 12.1 (11.3-12.8) — Mean Wt. (g): 27 (24-30)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Chydoridae	88	3.5	50

Table 12. (White perch continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	2,440	96.0	50
Diptera			
Chironomidae larvae	2	<1	50
Chironomidae pupae	11	<1	50

D-1. Station 12-14, SEPTEMBER 1976

No. Analyzed: 1 No. with empty stomachs: 0
Mean Length (cm): 12.6 Mean Wt. (g): 30

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Daphnia sp.	38	10.6	100
Copepoda			
Cyclopoida	282	78.8	100
Diptera			
Chironomidae larvae	38	10.6	100

Table 13. Stomach content of white perch >14.1 cm (Morone americana), Irondequoit Bay, New York.

A-1. Station 1-3, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 18.7 — Mean Wt. (g): 83

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	1	<0.1	100
Fish eggs	2844	100	100

A-2. Station 1-3, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 14.7 (9.8-18.4) — Mean Wt. (g): 92 (55-127)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae	181	98.4	100
Cladocera			
Daphnia sp.	2	1.1	33
Copepoda			
Cyclopoida	1	0.5	33

B-1. Station 4-9, JUNE 1976

No. Analyzed: 9 — No. with empty stomachs: 1
Mean Length (cm): 18.8 (16.1-21.6) — Mean Wt. (g): 91 (57-145)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	7	1	25
Naididae	3	1	25
Ostracoda	4	1	13

Table 13. (White perch continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	1	<1	13
Amphipoda			
Gammarus sp.	1	<1	13
Diptera			
Chironomidae larvae	164	35	100
Chironomidae pupae	4	1	38
Heliidae	2	<1	13
Ectoprocta			
Statoblasts	8	2	25
Fish eggs	275	62	63
Ectoprocta colony*			13

*one fish stomach contained 80% by volume Ectoprocta fragments.

B-2. Station 4-9, JULY 1976

No. Analyzed: 14 No. with empty stomachs: 0
Mean Length (cm): 18.5 (16.6-20.2) Mean Wt. (g): 89 (67-152)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	897	95	100
Chironomidae pupae	33	3	71
Ectoprocta			
Statoblast	1	<1	7
Fish eggs	15	2	21
Fish (badly digested)	1	<1	7

Table 13. (White perch continued)

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 11 — No. with empty stomachs: 0
Mean Length (cm): 16.9 (14.5-18.4) — Mean Wt. (g): 76 (41-107)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Daphnia sp.	49	3	9
Diaphanosoma sp.	705	50	9
Copepoda			
Cyclopoida	49	3	9
Amphipoda			
Gammarus sp.	7	<1	45
Diptera			
Chironomidae larvae	535	38	91
Chironomidae pupae	61	4	82
Ectoprocta colony*			9

*10% by volume in one fish stomach.

C-1. Station 10, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 16.3 — Mean Wt. (g): 57

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	2	40	100
Diptera			
Chironomidae larvae	44	89.8	100
Fish eggs	3	6.1	100

Table 13. (White perch continued)

C-2. Station 10, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 19.5 — Mean Wt. (g): 110

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	1	1	100
Diptera			
Chironomidae larvae	97	97	100
Chironomidae pupae	1	1	100

D-1. Station 12-14, JULY 1976

No. Analyzed: 6 — No. with empty stomachs: 0
Mean Length (cm): 18.1 (14.8-20.8) — Mean Wt. (g): 91 (45-145)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Plant Material			
*Lemna minor**			50
Cladocera			
Bosmina sp.	8	1.2	33
Leptodora sp.	21	3.0	17
Eggs	8	1.2	17
Copepoda			
Cyclopoida	35	5.0	17
Nauplii	10	1.4	33
Diptera			
Chironomidae larvae	260	37.4	83
Chironomidae pupae	14	2.0	67
Ectoprocta			
Statoblasts	8	1.2	17
Fish	1	<1	17

Table 13. (White perch continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Fish eggs (unidentified)	150	21.6	67
Eggs (unknown origin)	180	25.9	17

*Lemna minor made up about 50% of the stomach contents of three fish.

D-2. Station 12-14, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 16.7 (15.6-17.5) — Mean Wt. (g): 70 (54-82)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	95	62.5	100
Chironomidae pupae	57	37.5	100

Table 14. Stomach content of white bass (*Morone chrysops*), Irondequoit Bay, New York.

A-1. Station 4-9, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 11.6 — Mean Wt. (g): 19

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Bosmina sp.	4	17	100
Ostracoda	8	35	100
Copepoda			
Cyclopoida	3	13	100
Diptera			
Chironomidae larvae	8	35	100

B-1. Station 10, JUNE 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (12.5-14.6) — Mean Wt. (g): 27 (21-32)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Unidentifiable adult	1	2.9	100
Fish			
Unidentified Fish	4	11.8	50
Fish eggs	29	85.3	100

Table 15. Stomach content of pumpkinseed sunfish (Lepomis gibbosus), Irondequoit Bay, New York.

A-1. Station 1-3, SEPTEMBER 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (13.4-13.8) — Mean Wt. (g): 55 (50-61)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrency (%)
Diptera			
Chironomidae larvae	4	80	100
Amphipoda			
Gammarus sp.	1	20	50

B-1. Station 4-9, JUNE 1976

No. Analyzed: 5 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (11.4-14.6) — Mean Wt. (g): 57 (36-65)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrency (%)
Cladocera			
Bosmina sp.	1	<1	20
Amphipoda			
Gammarus sp.	6	2	60
Terrestrial Coleoptera	1	<1	20
Diptera			
Chironomidae larvae	263	88	100
Chironomidae paupae	20	7	80
Heliidae	1	<1	20
Ectroprocta			
Statoblasts	6	2	20
Colony*			20
Fish eggs	1	<1	20

*one fish stomach contained 65% Ectoprocta by volume.

Table 15. (Pumpkinseed sunfish continued)

B-2. Station 4-9, JULY 1976

No. Analyzed: 17 — No. with empty stomachs: 0
Mean Length (cm): 13.6 (8.0-15.9) — Mean Wt. (g): 61 (12-101)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda	9	1	12
Diptera			
Chironomidae larvae	555	61	100
Chironomidae pupae	53	6	76
Ectoprocta			
Statoblasts	284	31	12
Fish egg	4	<1	12

B-3. Station 4-9, SEPTEMBER 1976

No. Analyzed: 14 — No. with empty stomachs: 1
Mean Length (cm): 14.3 (8.9-17.0) — Mean Wt. (g): 76 (15-127)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	5	7	15
Trichoptera			
Hydropsychidae	1	1	8
Diptera			
Chironomidae larvae	56	78	85
Chironomidae pupae	10	14	46

C-1. Station 10, JUNE 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 12.6 — Mean Wt. (g): 43 (41-45)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrency (%)
Copepoda			
Cyclopoida	2	1.6	50

Table 15. (Pumpkinseed sunfish continued)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	106	83.5	100
Chironomidae pupae	19	15.0	100

C-2. Station 10, JULY 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 14.4 — Mean Wt. (g): 68

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Amphipoda			
Gammarus sp.	2	9.0	100
Diptera			
Chironomidae larvae	16	72.7	100
Chironomidae pupae	3	13.6	100
Fish scale	1	4.5	100

C-3. Station 10, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 0
Mean Length (cm): 13.9 (13.6-14.3) — Mean Wt. (g): 66 (58-78)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Copepoda			
Cyclopoida	1	<1	33
Amphipoda			
Gammarus sp.	43	27.2	100
Diptera			
Chironomidae larvae	44	27.0	100
Chironomidae pupae	10	6.3	100
Eggs (unknown origin)	60	38.0	33

Table 15. (Pumpkinseed sunfish continued)

D-1. Station 12-14, JULY 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 12.7 (12.2-13.2) — Mean Wt. (g): 47 (43-50)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Leptodora	1	3.1	50
Diptera			
Chironomidae larvae	28	87.5	100
Chironomidae pupae	2	6.2	100
Fish eggs (unidentified)	1	3.1	50
Ectoprocta fragment	-	-	50

D-2. Station 12-14, SEPTEMBER 1976

No. Analyzed: 3 — No. with empty stomachs: 1
Mean Length (cm): 10.1 (9.2-11.0) — Mean Wt. (g): 19 (15-25)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera			
Leptodora	10	22.7	50
Diptera			
Chironomidae larvae	33	75.0	100
Hymenoptera (adult)	1	2.3	50

Table 16. Stomach content of bluegill sunfish (*Lepomis macrochirus*), Irondequoit Bay, New York.

A-1. Station 10, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 19.6 — Mean Wt. (g): 185

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	1	20	100
Odonata (adult)	1	20	100
Terrestrial Insects Unidentifiable	3	60	100

Table 17. Stomach content of smallmouth bass (Micropterus dolomieui), Irondequoit Bay, New York.

A-1. Station 10, JUNE 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 12.2 — Mean Wt. (g): 21

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Diptera			
Chironomidae larvae	2	100	100

Table 18. Stomach content of Johnny darter (*Etheostoma nigrum*), Irondequoit Bay, New York.

A-1. Station 4-9, SEPTEMBER, 1976

No. Analyzed: 2 — No. with empty stomachs: 0
Mean Length (cm): 7.8 (6.2-9.3) — Mean Wt. (g): 4 (2-5)

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Cladocera	6	33	50
Copepoda	2	11	50
Diptera			
Chironomidae larvae	10	56	100

B-1. Station 10, SEPTEMBER 1976

No. Analyzed: 1 — No. with empty stomachs: 0
Mean Length (cm): 6.5 — Mean Wt. (g): 3

Stomach Content	Total No.	Percent of Total No.	Frequency of Occurrence (%)
Oligochaeta			
Tubificidae	3	10.0	100
Amphipoda			
Gammarus sp.	2	6.7	100
Diptera			
Chironomidae larvae	25	83.3	100

Table 19. Relative importance of various zooplankton groups (based on biomass).

	Lake Ontario	Irondequoit Bay
MAY		
Rotatoria	51.9%	56.6%
Copepoda	48.1%	38.1%
Cladocera	0.0%	5.3%
JULY		
Rotatoria	54.9%	21.5%
Copepoda	20.6%	21.8%
Cladocera	24.4%	56.7%
SEPTEMBER		
Rotatoria	30.4%	8.0%
Copepoda	34.2%	48.9%
Cladocera	35.4%	43.1%

Table 20. Composition of benthic invertebrate communities in Irondequoit Bay, 1976. Data expressed as percent by number.

		Stations		
		1-3	4-10	11-14
MAY	Chironomidae	44%	29%	14%
	Oligochaeta	56%	71%	85%
	Other	0	0	1%
JULY	Chironomidae	95%	53%	6%
	Oligochaeta	5%	46%	94%
	Other	0	1%	0
AUGUST	Chironomidae	66%	38%	10%
	Oligochaeta	31%	61%	90%
	Other	3%	1%	0