



A PRELIMINARY REPORT ON STUDIES OF THE  
IMPACT OF PERMETHRIN ON TROUT STREAMS  
IN THE GASPÉ, 1977.

by

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## INTRODUCTION

In 1976, field studies on the effects of aerial applications of the synthetic pyrethroid Permethrin (NRDC - 143) on aquatic ecosystems were initiated by the Chemical Control Research Institute (CCRI).<sup>\*</sup> These studies showed that applications of 140 g/ha Permethrin (2 oz/acre) presented substantial hazards to aquatic environments, but application rates of 70 g/ha (1 oz/acre) or less did not, at first appraisal, appear to be overly hazardous to the integrity of aquatic systems (Kingsbury 1977, Kingsbury, in press). In 1977, further studies were carried out on Permethrin at application rates of 70 g/ha and 35 g/ha (1 oz and 0.5 oz/acre). Studies were carried out in small, fast-flowing forest trout streams in contrast to the 1976 studies, where the treated systems were small lakes and a moderate flowing, sand-bottomed forest stream populated by cyprinids, sticklebacks and mudminnows.

The generous support given for these studies by Chipman Chemicals Ltd. and Shell Canada Ltd., is gratefully acknowledged.

## SITE DESCRIPTIONS

Studies were carried out in three similar streams on the North coast of the Gaspé peninsula near Ste-Anne-des-Monts. All three were fast-flowing, gravel-bottomed streams flowing north from the surrounding hills into the St. Lawrence River. Ruisseau de la Grande Tourelle, located east of Ste-Anne-des-Monts, served as the untreated control stream. A short stretch of Ruisseau Landry and a small feeder stream were treated with

<sup>\*</sup> Now called the Forest Pest Management Institute (FPMI).

70 g/ha Permethrin. Ruisseau Landry flows into Petite Rivière du Cap Chat shortly before it, in turn, flows into Rivière du Cap Chat. A short stretch of Ruisseau du Petit Capucin and one of its branches were treated with 35 g/ha Permethrin. This stream is further west along the coast from Ste-Anne-des-Monts than Ruisseau Landry.

Two sample stations were studied in each of the treated streams: an upstream station on the tributary and a mainstream station further downstream past the junction of another tributary stream. In both cases, the volume of water carried by the tributary streams were half or less of the flow within the mainstream and the tributary stations were subsequently shallower (mean depths about 10 to 15 cm) than the mainstream stations (mean depths about 25 to 30 cm). The untreated control station on Ruisseau de la Grande Tourelle was somewhat intermediate in flow and depth (mean depth about 15-20 cm) to the treated stations. Bottom types at all stations were fairly similar consisting primarily of small rocks and gravel.

#### METHODS

Treatment Procedures: Ruisseau Landry and Ruisseau du Petit Capucin were treated with Permethrin on 16 June\* and 20 June\*\*, respectively. Applications were made by CCRI's Cessna 185 aircraft, fitted with a Micronair<sup>®</sup> spray emission system. The spray plane began the treatment just downstream of the mainstream station and flew up the stream valleys treating each stream right to the end of the tributary branches (at least 2km upstream from the tributary stations).

\* Permethrin 50% oil concentrate, Chipman Chemicals Ltd.

\*\* Permethrin 300 g/l solution, Shell Canada Ltd.

Invertebrate Drift: The numbers and kinds of invertebrates drifting downstream with the current were measured over about a two-week period around the treatment dates at each sampling station. Drift nets were set for 15-minute periods each morning and evening with the nets sampling a 46cm wide portion of the stream's flow from surface to bottom, including the surface film. Additional drift net sets were made on the day of spray application at each treatment station. Water level, stream velocity and water temperature measurements were made at the same time drift samples were being taken.

Bottom Fauna Populations: Bottom fauna populations at each sampling station were measured periodically by two methods: Surber sampling and collecting invertebrates from rocks. Four  $0.093\text{m}^2$  (foot square) Surber samples (Surber, 1936) were taken on each sampling occasion, and at the same time, four rocks, approximately 20cm in diameter, were collected and the aquatic organisms on them removed and preserved. Surber samples were preserved in their entirety in the field with formaldehyde, and the organisms in them were later separated from the substrate in the lab with the aid of a "bubbler" (Kingsbury and Beveridge, 1977). Benthic organisms collected by both methods were counted and identified to order or family, using the classification of Usinger ( 1974 ).

Fish: Samples of native fish populations from the study streams were collected periodically by using an electroshocker to stun the fish and then capturing them with a dip net. Fish captured were measured and weighed in the field, and their stomachs were removed and preserved with formaldehyde for subsequent analysis of the stomach contents in the laboratory. The volume of the stomach contents of each fish was recorded and their composition determined under a dissecting microscope.

Blocking seines were set across the treated streams downstream of the mainstream station for several days following the Permethrin applications to capture any dead or distressed fish carried by the current.

#### RESULTS

Invertebrate Drift: Extremely large increases in the drift of aquatic invertebrates was seen in both Permethrin-treated streams following spray application with no indication of substantial increase evident in the control stream (Appendix A, Tables A-I to A-III). The impact on both streams were similar in terms of numbers and types of organisms affected with mayfly nymphs (Ephemeroptera), stonefly nymphs (Plecoptera), caddisfly larvae (Trichoptera) and midge larvae (Diptera:Chironomidae) being the most seriously affected groups. Dramatic increases in drift occurred sooner after spray application in Ruisseau Landry (70 g/ha) but were somewhat longer lasting in Ruisseau du Petit Capucin (35 g/ha). In both streams, impact was greatest over the first few hours following treatment and lasted for about three days.

Noticeable increases in the drift of terrestrial organisms were also seen in the treated streams as opposed to the untreated control (Appendix A, Tables A-IV to A-VI), but these were much less dramatic than increases in the drift of aquatic organisms. The impact on terrestrial organisms were considerably greater at Ruisseau Landry (70 g/ha) than at Ruisseau du Petit Capucin (35 g/ha). At Ruisseau Landry, the greatest increase was among Homoptera while Diptera were noticeably affected at both streams. The greatest impact on terrestrial organisms at both streams occurred later than the greatest impact on aquatic organisms, but still only a short time after spray application.

Bottom Fauna Populations: Bottom fauna populations in all three streams were predominated by mayfly nymphs prior to treatments (Appendix B). Caddisfly larvae were more abundant and of greater significance in terms of total numbers of aquatic insects in Ruisseau Landry than in the other streams. Bottom fauna populations in Ruisseau de la Grande Tourelle (untreated control), as measured by both Surber samples (Table B-I) and collections from rocks (Table B-II), were fairly stable in numbers and composition over the summer. Large increases in midge larvae populations were evident in August, caddisfly larvae populations were elevated, over summer levels, in August and October and mayfly nymph populations fell to low levels in Surber samples in October, while remaining abundant on rocks.

The application of 70 g/ha Permethrin to Ruisseau Landry caused decreases in the abundance of all orders of aquatic insects at both tributary (Tables B-III and IV) and mainstream (Tables B-V and VI) stations. By the first week of July, aquatic invertebrates had almost disappeared from the stream. Only very small numbers of some groups of aquatic insects were found in the stream after June, this being especially true for mayfly nymphs. Midge larvae were found again in the stream in large numbers in August and October, and some sign of partial recovery among caddisfly larvae was evident at the mainstream station at this time, though not at the tributary station. A thick covering of algae was present on the stream bed at both stations in August and October.

The effects on bottom fauna populations resulting from the application of 35 g/ha Permethrin to Ruisseau du Petit Capucin were less dramatic, encompassed fewer groups of aquatic insects and were shorter-lasting than occurred with the higher dosage applied to Ruisseau Landry. The impact on mayfly nymphs at both the tributary (Tables B-VII to VIII) and mainstream (Tables B-IX and X) stations was still severe, but not all individuals were

eliminated and substantial recovery of mayfly nymph populations was evident in August and October. The impact on mayfly nymphs of the family Baetidae was distinctly greater than on members of the family Heptageniidae.

Relatively little depression of caddisfly larvae populations was evident after the treatment and this group was found in numbers far above prespray levels at both stations in August and October. Midge larvae populations showed few changes related to the treatment and increased sharply in August and October. A substantial decrease in numbers of blackfly larvae (Diptera: Simuliidae) found on rocks at the tributary station was evident following treatment.

Fish: No evidence of fish mortality was found following the treatments of Ruisseau Landry or Ruisseau du Petit Capucin. No fish were captured in the blocking seines set across the two streams, nor were any dead or distressed fish seen during extensive searches of the treated streams. Healthy populations of small brook trout, *Salvelinus fontinalis* (Mitchill), were always found in large numbers in all the study streams, while slimy sculpins, *Cottus cognatus* (Richardson), were consistently found at both stations in Ruisseau Landry, the only stream in which they occurred.

Brook trout in Ruisseau de la Grande Tourelle were feeding primarily on aquatic insects the second week of June, but terrestrial arthropods became important items in their diet for the rest of the year beyond this point (Appendix C, Tables C-I to IV). Mayfly nymphs remained important items of the diet until October, and caddisfly larvae first diminished and then increased in importance as the year progressed. Midge larvae reached their peak contribution to the diet of brook trout in August, the same time they were most abundant in bottom samples.

Brook trout in Ruisseau Landry were feeding on quite a varied diet of mayfly nymphs, stonefly nymphs, caddisfly larvae, a number of groups of aquatic diptera larvae, earthworms (Oligochaeta) and a few terrestrial arthropods prior to the Permethrin application (Tables C-V to XII). Following the treatment, they gorged themselves on affected aquatic insects, particularly stonefly nymphs and mayfly nymphs. For the rest of the year they fed almost exclusively on terrestrial organisms with some feeding on crane fly larvae (Diptera:Tipulidae) and earthworms evident in October. Despite the lack of aquatic insect food in the stream from the end of June on, the mean volumes of food found in brook trout stomachs remained close to or greater than prespray levels throughout the rest of the year. Slimy sculpins in this stream were able to find mayfly nymphs, caddisfly larvae and stonefly nymphs to feed on up to ten days after treatment, but beyond this point fed primarily on diptera larvae (Tipulidae, Simuliidae, Chironomidae and Empididae), earthworms and snails (Table C-XIII to XX). Caddisfly larvae and aquatic coleoptera larvae were found to some extent in their stomach contents during November.

In Ruisseau du Petit Capucin, brook trout again switched to a diet predominated by terrestrial arthropods in July and August, following extreme gorging on mayfly and stonefly nymphs right after the Permethrin treatment (Tables C-XXI to XXVIII). Midge larvae and caddisfly larvae were becoming more important in August and by October, caddisfly larvae were the most important items in the diets of brook trout at both stations. Although there appeared to be more aquatic insect food material present in this stream late in the year than in Ruisseau Landry, the mean volumes of food present in brook trout stomachs remained close to or below prespray levels.



#### CONCLUSIONS

The application of 70 g/ha Permethrin to Ruisseau Landry virtually eliminated populations of most groups of aquatic insects in this stream. Repopulation of the stream by midge larvae was evident in the year of treatment, but other groups of aquatic insects had not yet shown appreciable signs of substantial recovery by November. Trout in the stream were forced to feed almost exclusively on terrestrial organisms entering the stream, but appeared to still manage to find reasonable quantities of food.

The disruption to the aquatic invertebrate fauna of Ruisseau du Petit Capucin caused by an application of 35 g/ha Permethrin, appeared at first to be similar to that seen in Ruisseau Landry, but severe depression of bottom-dwelling populations was limited to the mayfly nymphs and significant recovery of this group was apparent by November. The diet of brook trout in this stream also shifted towards utilization of terrestrial food organisms, but not to the extent or for the duration found in Ruisseau Landry.

It is apparent that applications of Permethrin at 70 g/ha can cause severe disruption to the invertebrate fauna of trout streams. The effects of half this dosage on aquatic insects are substantially less but still considerable. The ultimate effects of these levels of disruption of fish food organisms on fish growth will be considered in a final report on this year's studies after calculating condition coefficients for the fish sampled from each stream.

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APPENDIX "A"

INVERTEBRATE DRIFT

TABLE A-I

Aquatic organisms caught in 15 minute drift net sets, Ruisseau de la Grande Tourelle,  
untreated control station, 7 June to 22 June, 1977. Gaspè, Quebec

Days before or after Permethrin  
application to:

	- 9 am	- 8 am	- 7 am	- 7 pm	- 6 am	- 6 pm	-4 am	-4 pm	-3 am	-3 pm	-1 am	-1 pm
Ruisseau Landry	-13 am	-12 am	-11 am	-11 pm	-10 am	-10 pm	-8 am	-8 pm	-7 am	-7 pm	-5 am	-5 pm
Water Level (cm)	32	37	35	36	33	33	30	30	30	30	32	32
Ephemeroptera:Heptageniidae	18	14	10	14	10	17	6	8	2	11	38	7
:Baetidae	64	61	8	47	28	72	15	76	12	13	31	8
Plecoptera	11	10	1	8	7	8	-	14	1	7	1	4
Megaloptera:Sialidae	-	-	-	-	1	3	-	2	1	-	-	-
Trichoptera	22	10	-	1	4	4	-	1	3	1	13	3
Coleoptera:Hydrophilidae	-	3	-	-	-	-	-	-	-	-	-	-
:Unknown	-	-	1	-	-	-	-	-	-	-	1	-
Diptera:Tipulidae	2	6	4	-	-	-	-	2	1	2	-	2
:Dixidae	2	6	-	-	-	-	-	-	-	1	2	2
:Simuliidae	19	14	3	2	4	4	3	11	2	4	5	6
:Chironomidae	39	40	7	4	30	20	6	28	8	16	21	7
:Heleidae	-	-	-	-	1	-	-	-	-	-	-	-
:Rhagionidae	-	2	1	-	-	-	-	-	-	1	-	-
:Empididae	-	-	-	-	1	2	-	1	-	-	-	-
:Unknown	-	-	-	-	3	-	-	2	-	-	-	-
Nematomorpha	-	-	-	-	-	-	-	-	-	1	1	-
Nematoda	-	-	-	-	1	-	-	-	1	-	-	-
Oligochaeta	-	5	1	2	3	1	-	-	-	-	-	-
Gastropoda	2	6	-	-	1	-	1	-	-	-	-	-
Hydracarina	1	-	-	-	1	-	-	1	-	1	1	-
Total aquatic organisms	180	177	36	89	95	131	31	146	31	58	114	39

(Continued)...

TABLE A-I (cont.)

Days before or after Permethrin  
application to:

Ruisseau Landry	+0 pm	+1 am	+1 pm	+2 am	+2 pm	+3 am	+4 am	+4 pm	+5 am	+5 pm	+6 am	+6 pm
Ruisseau de Petit Capucin	-4 pm	-3 am	-3 pm	-2 am	-2 pm	-1 am	+0 am	+0 pm	+1 am	+2 pm	+2 am	+2 pm
Water level (cm)	31	31	29	28	28	28	27.5	27	27	26	26	26
Ephemeroptera:Heptageniidae	2	4	5	28	4	2	14	-	-	5	2	1
:Baetidae	3	11	15	37	6	7	12	7	3	6	-	1
Plecoptera	2	2	3	10	4	1	2	-	-	3	1	-
Megaloptera:Sialidae	-	-	-	-	-	-	-	-	-	-	-	-
Trichoptera	10	5	5	9	4	5	5	2	7	9	-	1
Coleoptera:Hydrophilidae	-	-	-	-	-	-	-	-	-	-	-	-
:Unknown	2	-	-	-	-	-	1	1	-	-	-	-
Diptera:Tipulidae	-	-	-	1	-	-	-	-	-	1	-	-
:Dixidae	-	-	-	-	-	-	-	-	-	-	-	-
:Simuliidae	2	4	6	5	1	1	6	-	-	3	1	-
:Chironomidae	9	8	14	12	11	3	11	8	15	2	1	12
:Heleidae	-	-	-	-	-	-	-	-	-	-	-	-
:Rhagionidae	-	-	-	-	-	-	-	-	-	-	-	-
:Empididae	1	-	-	-	-	-	-	-	-	1	-	-
:Unknown	-	-	-	-	-	-	-	-	-	-	-	-
Nematomorpha	-	-	-	-	1	-	-	4	1	-	1	2
Nematoda	-	-	-	-	-	-	-	-	-	-	-	-
Oligochaeta	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	1	-	-	-	-	-	-	-	-	-
Hydracarina	1	1	1	-	1	1	-	-	-	-	-	-
Total aquatic organisms	32	35	50	103	32	20	51	22	26	30	6	17

TABLE A-II

Aquatic organisms caught in 15 minute drift net sets, Ruisseau Landry tributary station,

7 June to 30 June, 1977. Gaspé, Quebec

Days before Permethrin application	-9 am	-8 am	-7 am	-7 pm	-6 am	-6 pm	-4 am	-4 pm	-3 am	-3 pm	-1 am	-1 pm	-0 am
Water Level (cm)	18	20	18	18	18	18	16	16	15.5	15.5	16	14	14
Ephemeroptera:Heptageniidae	3	2	-	-	-	-	1	1	3	5	3	1	2
:Baetidae	-	-	1	-	1	1	3	1	-	12	1	4	2
Plecoptera	3	3	3	-	1	-	3	-	2	23	2	3	3
Megaloptera:Sialidae	-	-	-	-	-	-	-	-	-	1	-	-	-
Trichoptera	1	-	9	1	-	2	6	1	2	4	4	5	-
Coleoptera:Hydrophilidae	-	-	1	-	-	-	-	-	-	-	-	1	-
:Elmidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Unknown	-	-	-	-	-	-	-	-	-	1	-	-	-
Diptera:Tipulidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Blephariceridae	-	-	-	-	-	-	1	1	-	-	-	-	-
:Dixidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Simuliidae	-	1	1	-	-	-	-	3	1	2	-	-	-
:Chironomidae	7	11	3	3	2	4	20	8	12	33	14	4	19
:Heleidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Rhagionidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Empididae	-	-	-	-	-	-	-	-	-	2	1	-	-
:Unknown	-	-	-	-	-	-	-	-	-	-	1	-	-
Nematomorpha	-	-	-	-	-	-	-	-	-	-	-	1	-
Oligochaeta	-	-	-	-	-	-	-	-	-	1	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	1	-	-	-
Hydracarina	-	-	-	-	-	-	2	-	1	-	-	-	-
Total Aquatic Organisms	14	17	18	4	4	7	36	15	21	85	26	19	26

(Continued)...

TABLE A-II (cont.)

Days after Permethrin application	±5 min	+½ h	+1 h	+2 h	+3 h	+6 h	+12 h	+15 h	+1 am	+1 pm	+2 am	+2 pm	+3 am	+14 am
Water Level (cm)	14	14	14	14	14	14	14	14	13.5	13.5	13	13	12.5	9.5
Ephemeroptera:Heptageniidae	32*	3,136*	23,360*	18,688*	6,816*	1,344*	512*	160*	192*	51	19	15	5	1
:Baetidae	64*	13,152*	54,496*	14,880*	5,024*	2,272*	672*	640*	448*	116	58	59	12	1
Plecoptera	768*	5,152*	13,216*	10,976*	7,424*	3,680*	2,368*	1,856*	672*	212	81	72	21	-
Megaloptera:Sialidae	-	-	480*	640*	416*	256*	96*	-	-	7	2	7	1	-
Trichoptera	448*	8,352*	13,248*	8,736*	4,256*	1,056*	512*	384*	224*	112	58	70	21	3
Coleoptera:Hydrophilidae	-	-	-	-	-	-	-	-	-	-	-	1	-	-
:Elmidae	-	-	-	-	-	-	-	-	-	-	-	1	-	-
:Unknown	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diptera:Tipulidae	-	-	-	-	128*	160*	32*	-	-	5	-	-	-	-
:Blephariceridae	-	544*	544*	128*	-	-	-	-	-	-	-	-	-	-
:Dixidae	-	-	-	64*	32*	-	-	-	-	-	-	-	-	-
:Simuliidae	-	96*	320*	160*	-	96*	-	-	-	4	1	1	-	-
:Chironomidae	640*	3,904*	5,696*	5,728*	1,984*	1,216*	704*	672*	224*	127	78	85	26	2
:Heleidae	-	-	-	-	-	32*	-	-	-	-	-	-	-	-
:Rhagionidae	-	-	32*	64*	-	-	-	-	-	-	-	1	-	-
:Empididae	-	-	-	-	96*	64*	96*	-	32*	2	-	1	-	1
:Unknown	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nematomorpha	1	-	-	-	-	-	1	1	-	-	1	-	2	-
Oligochaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Hydracarina	-	-	288*	320*	224*	160*	128*	32*	-	1	2	2	-	-
Total Aquatic Organisms	1,953	34,336	111,680	60,384	26,400	10,336	5,121	3,745	1,792	637	300	315	88	9

\* numbers extrapolated from subsamples.

TABLE A-III

Aquatic organisms caught in 15 minute drift net sets, Ruisseau du Petit Capucin tributary station,

9 June to 23 June, 1977. Gaspé, Quebec.

Days before Permethrin application	-11 am	-11 pm	-10 am	-10 pm	-8 am	-8 pm	-3 am	-3 pm	-2 am	-2 pm	-1 am	-1 pm	-0 am
Water level (cm)	24	28	21	20	20	20	16	15	15	15	15	14	14
Ephemeroptera:Heptageniidae	2	4	3	1	-	-	-	8	3	1	3	3	3
:Baetidae	3	14	5	3	2	2	8	14	17	4	6	15	12
Plecoptera	1	2	4	-	1	1	2	3	-	-	3	-	3
Megaloptera:Sialidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichoptera	-	3	4	1	-	2	1	8	6	6	4	4	12
Coleoptera:Elmidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Dytiscidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Diptera:Tipulidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Blephariceridae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Dixidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Simuliidae	3	3	2	2	1	-	4	4	4	2	5	6	4
:Chironomidae	1	2	3	1	2	1	1	8	2	1	-	1	2
:Rhagionidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Empididae	-	1	-	-	-	-	-	-	-	-	-	-	-
Nematomorpha	-	-	-	-	-	-	-	-	-	4	2	1	-
Nematoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Oligochaeta	-	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydracarina	-	-	-	-	1	-	-	-	-	3	-	-	-
Total aquatic organisms	10	29	21	8	7	6	16	45	32	21	23	30	36

(Continued) .....



TABLE A-III (cont.)

Days after Permethrin application	+5 min	+½ h	+1 h	+2 h	+3 h	+5 h	+12½ h	+16 h	+1 am	+1 pm	+2 am	+2 pm	+3 am
Water level (cm)	14	14	14	14	14	14	14	14	14	14	14	12.5	13
Ephemeroptera:Heptageniidae	6	256*	7,296*	29,893*	11,392*	2,400*	1,376*	608*	24	608*	20	9	4
:Baetidae	4	5,664*	97,920*	55,226*	23,008*	5,280*	4,272*	2,176*	300	2,112*	57	29	24
Plecoptera	5	352*	768*	11,653*	7,008*	2,912*	1,184*	160*	72	608*	9	6	1
Megaloptera:Sialidae	-	-	-	-	-	-	32*	-	-	-	-	-	-
Trichoptera	13	768*	26,112*	40,786*	20,288*	3,616*	3,776*	1,312*	294	2,016*	48	51	26
Coleoptera:Elmidae	-	-	-	-	-	-	-	-	-	-	-	-	-
:Dytiscidae	-	-	12	-	-	32*	-	-	-	-	-	-	-
Diptera:Tipulidae	-	-	-	-	64*	-	-	-	-	-	-	1	-
:Blephariceridae	-	-	-	-	-	-	-	-	-	-	1	1	-
:Dixidae	-	-	-	253*	64*	-	-	-	-	-	-	-	-
:Simuliidae	6	96*	192*	-	992*	416*	80*	160*	16	64*	1	8	2
:Chironomidae	3	256*	384*	2,786*	1,728*	352*	208*	64*	12	-	6	11	3
:Rhagionidae	-	-	-	-	-	-	-	-	-	32*	-	-	-
:Empididae	-	-	-	-	-	-	-	-	-	-	-	-	-
Nematomorpha	4	1	-	-	-	-	-	-	-	-	1	5	-
Nematoda	-	-	-	-	-	-	-	-	-	1	-	-	-
Oligochaeta	-	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydracarina	-	32*	-	253*	160*	-	-	-	-	-	-	1	-
Total aquatic organisms	41	7,425	132,684	140,850	64,704	15,008	10,928	4,480	718	5,441	143	122	60

\* numbers extrapolated from subsamples.

TABLE A-IV

Terrestrial organisms caught in 15 minute drift net sets, Ruisseau de la Grande Tourelle,  
untreated control station, 7 June to 22 June, 1977. Gaspé, Quebec.

Days before or after Permethrin  
application to:

	- 9 am	- 8 am	- 7 am	- 7 pm	- 6 am	- 6 pm	-4 am	-4 pm	-3 am	-3 pm	-1 am	-1 pm
Ruisseau Landry	- 9 am	- 8 am	- 7 am	- 7 pm	- 6 am	- 6 pm	-4 am	-4 pm	-3 am	-3 pm	-1 am	-1 pm
Ruisseau du Petit Capucin	-13 am	-12 am	-11 am	-11 pm	-10 am	-10 pm	-8 am	-8 pm	-7 am	-7 pm	-5 am	-5 pm
Water level (cm)	32	37	35	36	33	33	30	30	30	30	32	32
Collembola	-	-	1	-	-	1	-	-	-	2	-	1
Ephemeroptera	-	-	-	-	-	-	4	-	-	-	-	-
Plecoptera	-	-	-	-	2	-	-	-	-	-	-	-
Hemiptera	-	-	-	-	-	-	-	-	-	-	-	-
Homoptera	7	8	3	2	1	-	-	3	-	-	3	2
Trichoptera	-	-	-	-	-	-	1	-	-	-	-	-
Lepidoptera	1	1	4	-	2	2	-	-	-	-	-	1
Hymenoptera	-	-	-	-	3	-	1	-	-	-	1	1
Coleoptera	1	-	-	-	-	-	-	-	-	1	2	-
Diptera	39	10	18	6	8	7	-	4	-	12	13	34
Arachnida	2	4	-	-	2	2	-	1	-	-	1	3
Total terrestrial organisms	60	23	26	8	18	12	6	8	0	15	20	42

(Continued)....

TABLE A-IV (cont.)

Days before or after Permethrin  
application to:

	+0 pm	+1 am	+1 pm	+2 am	+2 pm	+3 am	+4 am	+4 pm	+5 am	+5 pm	+6 am	+6 pm
Ruisseau Landry	+0 pm	+1 am	+1 pm	+2 am	+2 pm	+3 am	+4 am	+4 pm	+5 am	+5 pm	+6 am	+6 pm
Ruisseau du Petit Capucin	-4 pm	-3 am	-3 pm	-2 am	-2 pm	-1 am	+0 am	+0 pm	+1 am	+1 pm	+2 am	+2 pm
Water level (cm)	31	31	29	28	28	28	27.5	27	27	26	26	26
Collembola	-	-	1	-	1	-	2	-	-	-	-	-
Ephemeroptera	-	-	-	-	-	-	-	-	-	-	-	-
Plecoptera	-	-	-	-	-	-	-	-	-	-	-	-
Hemiptera	-	1	-	-	2	-	1	2	-	-	-	-
Homoptera	-	2	2	2	1	3	2	-	-	1	2	5
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-
Lepidoptera	-	1	2	1	2	-	-	-	-	-	-	-
Hymenoptera	-	1	2	-	1	-	6	3	-	-	2	12
Coleoptera	1	-	2	1	1	-	-	2	-	-	-	-
Diptera	-	43	-	22	37	26	30	48	22	10	22	65
Arachnida	1	3	1	3	3	-	1	2	-	-	1	4
Total Terrestrial Organisms	2	51	8	29	48	29	42	57	22	11	27	86

TABLE A-V

Terrestrial organisms caught in 15 minute drift net sets, Ruisseau Landry tributary station,  
7 June to 30 June, 1977. Gaspé, Quebec.

Days before Permethrin application	-9 am	-8 am	-7 am	-7 pm	-6 am	-6 pm	-4 am	-4 pm	-3 am	-3 pm	-1 am	-1 pm	-0 am
Water Level (cm)	18	20	18	18	18	18	16	16	15.5	15.5	16	14	14
Collembola	-	-	-	1	1	-	-	-	-	-	1	-	2
Ephemeroptera	-	-	-	-	-	-	-	-	-	-	-	3	-
Plecoptera	-	-	-	-	-	-	-	-	-	1	-	1	-
Hemiptera	-	-	-	-	-	-	-	-	-	-	-	-	-
Homoptera	3	-	-	1	1	-	-	-	-	-	2	10	3
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidoptera	1	-	-	-	-	-	-	-	-	-	-	-	-
Hymenoptera	3	-	2	4	3	-	-	1	1	1	2	4	2
Coleoptera	-	-	-	1	-	1	-	-	-	3	-	5	-
Diptera	18	3	9	12	4	7	15	31	11	4	12	102	-
Arachnida	3	1	-	1	-	-	-	-	-	-	1	1	-
Total Terrestrial Organisms	28	4	11	20	9	8	15	32	12	9	18	126	7

(Continued)...

TABLE A-V (cont.)

Days after Permethrin application	+5 min	+½ h	+1 h	+2 h	+3 h	+6 h	+12 h	+15 h	+1 am	+1 pm	+2 am	+2 pm	+3 am	+14 am
Water level (cm)	14	14	14	14	14	14	14	14	13.5	13.5	13	13	12.5	9.5
Collembola	384*	-	96*	96*	-	-	-	-	-	2	1	3	-	1
Ephemeroptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plecoptera	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Hemiptera	32*	-	-	-	-	-	-	-	-	1	-	-	1	1
Homoptera	32*	352*	448*	1,888*	2,432*	2,976*	1,120*	640*	1,856*	70	84	44	12	1
Trichoptera	32*	-	-	32*	-	-	-	-	-	2	3	3	2	-
Lepidoptera	-	32*	32*	-	32*	-	32*	-	64*	7	3	1	1	10
Hymenoptera	32*	32*	32*	192*	128*	160*	96*	-	-	12	10	22	7	11
Coleoptera	96*	64*	32*	-	32*	-	-	-	-	7	2	-	1	5
Diptera	480*	160*	480*	572*	320*	288*	416*	160*	256*	301	169	436	107	31
Arachnida	32*	32*	64*	96*	64*	64*	32*	-	32*	3	-	1	1	1
Total Terrestrial Organisms	1,088	704	1,184	2,880	3,008	3,488	1,696	800	2,208	405	272	512	132	61

\* numbers extrapolated from subsamples.

TABLE A-VI

Terrestrial organisms caught in 15 minute drift net sets, Ruisseau du Petit Capucin tributary station,  
9 June to 23 June, 1977. Gaspé, Quebec.

Days before Permethrin application	-11 am	-11 pm	-10 am	-10 pm	-8 am	-8 pm	-3 am	-3 pm	-2 am	-2 pm	-1 am	-1 pm	-0 a
Water level (cm)	24	28	21	20	20	20	16	15	15	15	15	14	14
Collembola	-	-	-	-	-	-	-	-	-	-	1	-	-
Ephemeroptera	-	-	-	-	-	-	-	-	-	-	-	-	-
Plecoptera	1	-	-	-	-	-	-	-	-	-	-	-	-
Hemiptera	-	-	-	-	-	-	1	1	-	-	-	1	-
Homoptera	-	-	4	-	-	-	2	-	1	1	-	-	-
Trichoptera	16	-	-	-	9	-	-	-	-	-	-	-	-
Lepidoptera	-	1	1	-	-	-	-	-	-	-	-	-	-
Hymenoptera	2	-	1	-	-	-	5	2	7	10	4	2	-
Coleoptera	-	1	3	-	1	-	1	-	1	5	4	2	-
Diptera	13	7	9	5	10	3	50	36	47	88	33	37	10
Unknown Insecta	-	-	-	-	-	-	-	-	-	-	-	-	-
Arachnida	-	-	-	-	-	-	-	-	5	-	1	-	-
Total terrestrial organisms	32	9	18	5	20	3	59	39	61	104	43	42	10

(Continued) ....

TABLE A-VI (cont.)

Days after Permethrin application	+5 min	+½ h	+1 h	+2 h	+3 h	+5 h	+12½ h	+16 h	+1 am	+1 pm	+2 am	+2 pm	+3 am
Water level (cm)	14	14	14	14	14	14	14	14	14	14	14	12.5	13
Collembola	1	32*	-	-	96*	-	-	32*	1	-	8	4	5
Ephemeroptera	-	-	-	-	-	32*	-	-	-	-	-	-	-
Plecoptera	1	-	-	-	-	-	16*	-	-	-	5	-	-
Hemiptera	-	64*	-	-	32*	-	16*	64*	-	-	-	-	2
Homoptera	-	-	-	-	160*	-	112*	32*	3	32*	-	-	-
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-	-
Lepidoptera	-	-	-	-	-	32*	-	-	-	-	-	-	-
Hymenoptera	4	-	-	-	96*	-	128*	64*	-	32*	8	8	-
Coleoptera	1	-	1	-	32*	-	16*	-	1	-	1	5	-
Diptera	46	128*	384*	253*	288*	416*	368*	-	24	96*	62	132	68
Unknown Insecta	-	-	-	-	-	-	-	-	-	-	8	8	3
Arachnida	3	-	-	253*	74*	-	16*	32*	1	-	3	3	3
Total terrestrial organisms	56	224	385	506	768	480	672	224	30	160	95	160	81

\* numbers extrapolated from subsamples

**APPENDIX "B"**

**BOTTOM FAUNA POPULATIONS**



TABLE B-I

Bottom fauna populations\*, Ruisseau de la Grande Tourelle, untreated control station,  
11 June to 4 October, 1977. Gaspé, Québec.

	11 June	16 June	19 June	23 June	27 June
Ephemeroptera:Heptageniidae	16.0 ± 4.1	11.7 ± 9.4	6.0 ± 6.2	10.2 ± 8.0	6.5 ± 2.6
:Baetidae	0.5 ± 0.6	2.0 ± 0.8	1.2 ± 0.5	2.5 ± 1.0	1.2 ± 3.3
Plecoptera	2.8 ± 4.9	1.8 ± 1.2	0.2 ± 0.5	1.0 ± 0.8	0.8 ± 0.5
Trichoptera	4.0 ± 4.5	1.0 ± 0.8	1.8 ± 1.0	3.0 ± 2.6	0.8 ± 1.0
Diptera:Tipulidae	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	0.5 ± 0.6	0.5 ± 0.6
:Psychodidae	-	-	-	-	-
:Culicidae	-	-	-	-	-
:Simuliidae	-	-	-	-	-
:Chironomidae	1.0 ± 0.8	1.0 ± 0.8	0.5 ± 0.6	1.0 ± 2.0	0.8 ± 0.5
:Heleidae	-	-	-	-	-
:Rhagionidae	-	0.2 ± 0.5	-	-	-
:Empididae	-	-	-	-	0.2 ± 0.5
:Unknown	-	-	-	-	-
Nematomorpha	-	-	-	-	-
Gastropoda	-	-	-	-	-
Pelecypoda	0.5 ± 0.6	-	-	-	-
Hydracarina	-	-	0.2 ± 0.5	-	-
Total	26.0 ± 7.6	18.8 ± 4.2	10.5 ± 5.5	18.8 ± 10.8	10.8 ± 3.2

\* Mean numbers and standard deviations of organisms collected in four 0.093m<sup>2</sup> Surber samples.

(Continued).....

TABLE B-I (cont.)

	30 June	3 July	7 July	11-12 Aug. **	4 Oct
Ephemeroptera:Heptageniidae	6.8 ± 5.0	11.2 ± 8.2	8.2 ± 4.9	4.8 ± 5.2	0.2 ± 0.5
:Baetidae	1.0 ± 1.4	2.2 ± 1.5	2.2 ± 1.5	6.2 ± 3.9	0.8 ± 1.5
Plecoptera	1.0 ± 0.8	1.5 ± 1.3	1.0 ± 2.0	3.9 ± 2.7	1.2 ± 1.5
Trichoptera	1.5 ± 1.7	1.2 ± 1.0	1.2 ± 1.5	3.5 ± 3.5	6.5 ± 9.1
Diptera:Tipulidae	1.0 ± 1.4	3.0 ± 2.7	0.8 ± 0.5	1.1 ± 1.7	-
:Psychodidae	-	-	-	0.1 ± 0.4	-
:Culicidae	-	0.2 ± 0.5	-	-	-
:Simuliidae	-	-	-	0.1 ± 0.4	-
:Chironomidae	1.8 ± 1.7	0.8 ± 1.0	0.8 ± 1.0	28.8 ± 18.6	3.0 ± 2.1
:Heleidae	-	-	-	0.1 ± 0.4	-
:Rhagionidae	-	-	-	-	0.2 ± 0.5
:Empididae	-	-	-	-	-
:Unknown	-	-	-	-	0.2 ± 0.5
Nematomorpha	-	0.2 ± 0.5	-	-	-
Gastropoda	-	-	-	0.1 ± 0.4	-
Pelecypoda	0.2 ± 0.5	-	-	-	-
Hydracarina	-	-	-	0.2 ± 0.5	-
Total	13.2 ± 5.6	20.8 ± 6.4	14.2 ± 6.2	49.0 ± 25.5	12.2 ± 12.5

\*\* Four Surber samples taken on each day.

TABLE B-II

Aquatic invertebrates\* collected from rocks taken from Ruisseau de la Grande Tourelle, untreated control stream  
11 June to 4 October, 1977. Gaspé, Quebec.

	11 June	16 June	19 June	23 June	27 June	30 June	3 July	7 July	11-12 Aug.**	4 Oct.
Ephemeroptera										
:Heptageniidae	12.0 ± 5.7	17.0 ± 17.8	6.0 ± 4.5	10.8 ± 4.5	12.5 ± 9.1	13.0 ± 8.4	15.0 ± 6.2	14.2 ± 6.8	10.9 ± 7.7	5.0 ± 3.0
:Baetidae	1.8 ± 1.0	7.2 ± 6.2	5.0 ± 3.7	4.5 ± 4.2	12.0 ± 16.8	7.2 ± 7.1	5.8 ± 5.9	21.0 ± 8.7	2.8 ± 3.5	25.8 ± 27.0
Plecoptera										
	-	-	0.5 ± 0.6	-	-	0.8 ± 1.5	-	0.2 ± 0.5	0.8 ± 1.0	1.5 ± 1.0
Trichoptera										
:larvae	1.8 ± 2.4	3.5 ± 3.7	2.2 ± 1.2	1.0 ± 0.8	1.2 ± 1.2	1.5 ± 1.3	0.2 ± 0.5	0.5 ± 0.6	7.6 ± 4.6	7.8 ± 11.0
:pupae	0.2 ± 0.5	2.0 ± 3.4	2.2 ± 3.9	-	0.2 ± 0.5	1.8 ± 2.4	0.5 ± 1.0	-	-	0.5 ± 1.0
Diptera										
:Simuliidae	1.5 ± 1.7	0.2 ± 0.5	-	-	1.5 ± 1.7	1.5 ± 2.4	-	5.8 ± 10.8	2.1 ± 3.4	12.2 ± 21.0
:Chironomidae	2.8 ± 2.2	4.5 ± 5.9	4.2 ± 3.0	8.0 ± 8.2	3.5 ± 5.1	4.0 ± 2.8	1.2 ± 1.9	4.8 ± 3.4	123.4 ± 47.7	20.5 ± 23.0
:Unknown	-	-	-	-	-	-	-	-	-	0.2 ± 0.5
Turbellaria										
	-	-	-	-	-	-	-	-	0.1 ± 0.4	-
Nematoda										
	-	-	-	-	-	-	-	-	0.1 ± 0.4	-
Total	20.0 ± 3.4	34.5 ± 16.6	20.2 ± 6.2	24.2 ± 10.7	31.0 ± 28.3	29.8 ± 14.9	22.8 ± 1.5	46.5 ± 13.9	147.8 ± 48.1	73.5 ± 75.0

\* Mean numbers and standard deviations of organisms collected from four rocks approximately 20 cm in diameter.

\*\* Four rocks sampled on each day.

TABLE B-III

Bottom fauna populations\*, Ruisseau Landry tributary station, 11 June to 5 October, 1977.  
Gaspé, Québec.

	11 June	15 June	19 June	23 June	30 June	7 July	12 Aug	5 Oct
Ephemeroptera:Heptageniidae	6.5 ± 3.0	14.8 ± 5.6	2.2 ± 3.9	2.5 ± 2.1	-	-	-	-
:Baetidae	0.8 ± 1.0	1.8 ± 2.4	0.5 ± 1.0	-	-	-	-	-
Plecoptera	0.8 ± 1.0	0.5 ± 0.6	1.0 ± 0.8	0.8 ± 1.0	0.8 ± 0.5	-	-	0.5 ± 0.6
Trichoptera	1.8 ± 2.1	7.0 ± 2.2	2.0 ± 2.2	1.8 ± 1.7	1.2 ± 2.5	0.2 ± 0.5	-	-
Coleoptera:Elmidae	-	-	-	-	0.2 ± 0.5	-	-	-
Diptera:Tipulidae	0.2 ± 0.5	-	-	-	-	-	-	0.8 ± 0.5
:Blephariceridae	-	0.2 ± 0.5	0.2 ± 0.5	-	-	-	-	-
:Simuliidae	0.2 ± 0.5	0.5 ± 0.6	-	-	-	-	-	-
:Chironomidae	5.5 ± 4.7	2.2 ± 2.2	0.2 ± 0.5	0.5 ± 0.6	0.2 ± 0.5	0.2 ± 0.5	9.0 ± 3.7	20.8 ± 4.8
:Heleidae	0.2 ± 0.5	-	-	-	-	-	0.2 ± 0.5	0.2 ± 0.5
:Rhagionidae	0.8 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	-	0.5 ± 0.6	-	-	-
:Empididae	4.2 ± 7.8	0.2 ± 0.5	0.2 ± 0.5	0.5 ± 0.6	1.5 ± 2.4	-	0.2 ± 0.5	0.5 ± 0.6
:Unknown	0.2 ± 0.5	-	-	-	-	-	-	-
Nematomorpha	-	-	-	0.2 ± 0.5	-	-	-	-
Oligochaeta	-	-	-	-	-	-	-	0.2 ± 0.5
Pelecypoda	0.2 ± 0.5	-	-	-	-	-	-	-
Hydracarina	-	-	-	-	-	-	-	0.5 ± 0.6
Total	21.5 ± 12.4	27.5 ± 6.5	7.2 ± 9.3	6.2 ± 4.5	4.5 ± 3.5	0.5 ± 0.6	12.0 ± 6.0	23.5 ± 4.4

\* Mean numbers and standard deviations of organisms collected in four 0.093m<sup>2</sup> Surber samples.

TABLE B-IV

Aquatic invertebrates\* collected from rocks taken from Ruisseau Landry tributary station,  
11 June to 5 October, 1977. Gaspé, Quebec

	11 June	15 June	19 June	23 June	30 June	7 July	12 Aug	5 Oct
Ephemeroptera:Heptageniidae	5.2 ± 2.8	8.8 ± 2.2	0.2 ± 0.5	-	0.2 ± 0.5	-	-	-
:Baetidae	1.2 ± 1.0	6.0 ± 4.2	-	-	-	-	-	-
Plecoptera	-	-	-	-	-	-	-	0.2 ± 0.5
Trichoptera:larvae	3.8 ± 6.2	1.8 ± 2.9	1.0 ± 1.4	0.5 ± 1.0	-	-	0.2 ± 0.5	0.2 ± 0.5
:pupae	3.0 ± 3.6	0.2 ± 0.5	0.8 ± 1.0	0.2 ± 0.5	0.2 ± 0.5	-	-	-
Diptera:Blephariceridae	0.8 ± 1.5	1.5 ± 2.4	-	-	-	-	-	-
:Simuliidae	1.0 ± 1.4	1.2 ± 1.5	-	-	-	-	-	-
:Chironomidae	8.8 ± 6.1	4.0 ± 4.2	-	0.2 ± 0.5	0.5 ± 0.6	0.5 ± 0.6	15.5 ± 9.5	24.0 ± 14.4
:Empididae	-	-	-	-	-	-	0.2 ± 0.5	-
Nematoda	-	-	0.2 ± 0.5	-	-	-	-	-
Hydracarina	-	-	-	0.2 ± 0.5	-	-	-	-
Total	23.8 ± 15.8	23.5 ± 8.7	2.2 ± 1.7	1.2 ± 1.0	1.0 ± 0.8	0.5 ± 0.6	16.0 ± 9.5	24.5 ± 14.9

\* Mean numbers and standard deviations of organisms collected from four rocks approximately 20cm in diameter.

TABLE B-V

Bottom fauna populations\*, Ruisseau Landry mainstream station, 11 June to 5 October, 1977.  
Gaspé, Québec.

	11 June	15 June	19 June	23 June	3 July	7 July	12 Aug	5 Oct
Ephemeroptera:Heptageniidae	24.8 ± 5.0	25.2 ± 13.2	-	0.2 ± 0.5	-	-	-	-
:Baetidae	1.0 ± 0.6	4.0 ± 4.2	0.5 ± 0.6	0.5 ± 0.6	-	-	-	0.2 ± 0.5
Plecoptera	0.2 ± 0.5	0.2 ± 0.5	1.8 ± 1.7	-	-	-	0.2 ± 0.5	0.5 ± 0.6
Megaloptera:Sialidae	-	0.2 ± 0.5	-	-	-	-	-	-
Trichoptera	7.0 ± 0.8	5.8 ± 5.0	3.5 ± 1.3	0.8 ± 0.5	0.5 ± 0.6	0.2 ± 0.5	1.0 ± 0.8	1.5 ± 1.7
Diptera:Tipulidae	0.2 ± 0.5	0.2 ± 0.5	-	0.2 ± 0.5	-	-	-	1.8 ± 1.7
:Simuliidae	1.2 ± 0.5	0.5 ± 0.6	-	0.2 ± 0.5	0.2 ± 0.5	-	-	-
:Chironomidae	1.5 ± 1.3	0.5 ± 1.0	0.2 ± 0.5	1.2 ± 1.0	3.2 ± 2.6	0.5 ± 0.6	38.0 ± 29.0	6.0 ± 6.4
:Heleidae	-	-	0.2 ± 0.5	0.2 ± 0.5	0.5 ± 1.0	-	-	-
:Rhagionidae	1.0 ± 1.2	1.2 ± 1.0	0.2 ± 0.5	0.7 ± 0.5	-	0.5 ± 0.6	-	0.2 ± 0.5
:Empididae	0.8 ± 1.5	1.0 ± 0.8	0.5 ± 0.6	0.8 ± 0.5	1.8 ± 2.4	0.8 ± 0.5	-	0.5 ± 0.6
Turbellaria	-	-	-	-	-	-	-	0.2 ± 0.5
Oligochaeta	-	0.2 ± 0.5	-	-	0.2 ± 0.5	-	0.2 ± 0.5	3.5 ± 2.6
Pelecypoda	0.2 ± 0.5	-	0.2 ± 0.5	-	-	-	-	-
Hydracarina	-	0.2 ± 0.5	-	-	-	-	0.2 ± 0.5	-
Amphipoda	-	-	-	0.2 ± 0.5	0.2 ± 0.5	-	-	-
Total	38.0 ± 7.2	39.5 ± 20.0	7.2 ± 4.6	5.2 ± 1.7	6.8 ± 2.5	2.0 ± 1.6	39.8 ± 30.2	15.0 ± 2.2

\* Mean numbers and standard deviations of organisms collected in four 0.093m<sup>2</sup> Surber samples.

TABLE B-VI

Aquatic invertebrates\* collected from rocks taken from Ruisseau Landry mainstream station,  
11 June to 5 October, 1977. Gaspé, Quebec.

	11 June	15 June	19 June	23 June	30 June	7 July	12 Aug	5 Oct
Ephemeroptera:Heptageniidae	15.2 ± 5.4	14.2 ± 8.5	-	-	-	0.2 ± 0.5	-	0.5 ± 0.6
:Baetidae	12.2 ± 13.6	8.5 ± 5.0	-	-	-	-	-	0.2 ± 0.5
Plecoptera	-	-	-	-	-	-	-	0.8 ± 0.5
Trichoptera:larvae	9.8 ± 5.4	6.2 ± 3.3	-	1.5 ± 1.7	-	0.2 ± 0.5	-	0.5 ± 1.0
:pupae	1.0 ± 1.4	-	1.8 ± 2.4	0.5 ± 1.0	0.8 ± 1.5	1.2 ± 1.3	-	-
Diptera:Blephariceridae	0.2 ± 0.5	-	-	-	-	-	-	-
:Simuliidae	-	0.5 ± 0.6	-	0.2 ± 0.5	-	-	3.8 ± 3.1	2.8 ± 1.2
:Chironomidae	2.8 ± 2.1	2.8 ± 2.4	1.8 ± 3.5	0.2 ± 0.5	-	-	60.8 ± 37.6	29.8 ± 27.5
:Heleidae	-	-	0.2 ± 0.5	-	-	-	-	-
Nematoda	-	-	-	-	-	-	0.8 ± 0.5	-
Hydracarina	-	-	-	-	1.0 ± 0.0	0.5 ± 1.0	-	-
Total	41.2 ± 19.3	32.2 ± 12.7	3.8 ± 2.8	2.5 ± 2.6	1.8 ± 1.5	2.2 ± 1.5	65.2 ± 37.4	34.5 ± 27.9

\* Mean numbers and standard deviations of organisms collected from four rocks approximately 20cm in diameter.

TABLE B-VII

Bottom fauna populations\*, Ruisseau du Petit Capucin tributary station, 11 June to 4 October, 1977  
Gaspé, Québec.

	11 June	17 June	23 June	27 June	3 July	7 July	11 Aug	4 Oct
Ephemeroptera:Heptageniidae	28.2 ± 16.4	19.0 ± 3.3	7.0 ± 5.5	4.8 ± 4.3	8.2 ± 2.9	2.0 ± 2.2	3.5 ± 4.5	1.5 ± 1.0
:Baetidae	9.8 ± 7.1	9.0 ± 3.4	4.0 ± 2.7	0.2 ± 0.5	-	-	1.0 ± 0.8	2.0 ± 2.7
Plecoptera	1.0 ± 0.0	1.8 ± 1.5	1.5 ± 1.3	1.0 ± 1.4	0.8 ± 0.5	2.0 ± 1.8	-	5.0 ± 5.0
Megaloptera:Sialidae	-	-	-	-	-	-	-	0.2 ± 0.5
Trichoptera	2.5 ± 3.0	2.5 ± 2.1	2.2 ± 1.7	5.2 ± 5.3	4.5 ± 1.7	3.8 ± 3.9	14.2 ± 8.3	14.7 ± 10.5
Coleoptera:Hydrophilidae	-	0.2 ± 0.5	-	-	-	-	-	-
Diptera:Tipulidae	-	-	0.2 ± 0.5	0.5 ± 0.6	-	-	-	0.5 ± 1.0
:Blephariceridae	-	-	0.2 ± 0.5	-	-	-	-	-
:Simuliidae	0.5 ± 0.6	0.5 ± 0.6	0.2 ± 0.5	1.0 ± 1.4	0.5 ± 1.0	1.2 ± 2.5	0.8 ± 0.5	1.2 ± 2.0
:Chironomidae	0.5 ± 1.0	0.5 ± 0.6	1.2 ± 2.5	0.2 ± 0.5	2.0 ± 2.2	0.5 ± 1.0	15.8 ± 3.0	29.0 ± 19.9
:Heleidae	-	-	-	-	-	-	0.2 ± 0.5	1.0 ± 1.4
:Rhagionidae	0.2 ± 0.5	-	-	-	1.8 ± 1.7	0.5 ± 0.6	-	1.5 ± 1.7
:Empididae	-	0.2 ± 0.5	0.5 ± 0.6	0.2 ± 0.5	-	-	-	0.5 ± 1.0
Nematoda	-	-	-	-	-	-	-	0.2 ± 0.5
Turbellaria	-	-	-	-	-	-	-	1.2 ± 1.9
Oligochaeta	-	-	0.5 ± 1.0	-	-	-	-	0.5 ± 0.6
Pelecypoda	0.2 ± 0.5	-	0.2 ± 0.5	-	0.2 ± 0.5	-	-	-
Total	43.0 ± 25.2	33.8 ± 6.4	18.0 ± 11.6	13.2 ± 8.1	18.0 ± 6.7	10.0 ± 9.3	35.5 ± 15.4	59.2 ± 35.9

\* Mean numbers and standard deviations of organisms collected in four 0.093m<sup>2</sup> Surber samples.



TABLE B-VIII

Aquatic invertebrates\* collected from rocks taken from Ruisseau du Petit Capucin mainstream station  
11 June to 4 October, 1977. Gaspé, Quebec

	11 June	17 June	23 June	27 June	3 July	7 July	11 Aug	4 Oct
Ephemeroptera:Heptageniidae	22.8 ± 5.6	13.5 ± 5.0	1.8 ± 1.7	2.2 ± 2.9	2.5 ± 2.4	5.0 ± 6.6	15.5 ± 9.3	2.2 ± 2.6
:Baetidae	39.0 ± 27.0	45.0 ± 58.8	0.2 ± 0.5	-	-	0.2 ± 0.5	14.8 ± 5.7	12.0 ± 7.4
Plecoptera	-	-	-	-	-	-	0.2 ± 0.5	0.5 ± 1.0
Trichoptera:larvae	0.8 ± 1.0	1.8 ± 2.9	0.2 ± 0.5	-	-	-	82.2 ± 56.4	9.5 ± 4.0
:pupae	0.8 ± 1.5	0.5 ± 1.0	0.2 ± 0.5	1.5 ± 1.7	1.5 ± 1.7	0.8 ± 1.5	-	0.2 ± 0.5
Diptera:Simuliidae	43.5 ± 40.6	13.8 ± 25.5	2.2 ± 2.6	8.8 ± 12.2	0.2 ± 0.5	0.2 ± 0.5	7.2 ± 12.5	0.8 ± 1.5
:Chironomidae	1.2 ± 1.5	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	0.8 ± 1.0	5.5 ± 7.3	30.5 ± 18.2	27.5 ± 23.1
Nematomorpha	-	0.2 ± 0.5	-	-	-	-	-	-
Total	108.0 ± 31.1	75.0 ± 82.4	5.0 ± 1.4	12.8 ± 11.4	5.0 ± 4.1	11.8 ± 13.0	150.5 ± 68.5	52.8 ± 26.9

\* Mean numbers and standard deviations of organisms collected from four rocks approximately 20cm in diameter.

TABLE B-IX

Bottom fauna populations\*, Ruisseau du Petit Capucin mainstream station, 11 June to 4 October, 1977  
Gaspé, Québec.

	11 June	17 June	23 June	27 June	3 July	7 July	11 Aug	4 Oct
Ephemeroptera:Heptageniidae	7.0 ± 3.7	18.0 ± 5.8	1.2 ± 1.0	2.0 ± 1.8	3.8 ± 1.2	0.5 ± 1.0	1.8 ± 2.4	0.2 ± 0.5
:Baetidae	2.5 ± 1.3	3.5 ± 3.7	1.2 ± 1.5	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	-	0.2 ± 0.5
Plecoptera	-	1.2 ± 1.0	2.0 ± 3.4	1.5 ± 1.9	-	0.2 ± 0.5	1.5 ± 2.4	0.5 ± 0.6
Trichoptera:larvae	1.5 ± 1.7	2.2 ± 1.7	1.5 ± 1.3	1.2 ± 1.5	2.8 ± 1.5	0.5 ± 0.6	16.5 ± 16.2	14.2 ± 16.4
:pupae	-	-	-	-	-	-	-	0.2 ± 0.5
Lepidoptera	-	-	-	-	-	0.2 ± 0.5	-	-
Coleoptera:Dytiscidae	-	-	-	-	-	-	0.2 ± 0.5	-
:Elmidae	-	-	-	-	0.2 ± 0.5	-	-	-
Diptera:Tipulidae	-	-	-	-	0.5 ± 1.0	0.2 ± 0.5	1.0 ± 1.2	0.8 ± 1.0
:Blephariceridae	-	0.2 ± 0.5	0.2 ± 0.5	-	-	-	-	-
:Simuliidae	0.2 ± 0.5	1.8 ± 1.5	0.5 ± 0.6	0.8 ± 1.0	-	-	0.5 ± 0.6	-
:Chironomidae	0.5 ± 0.6	0.8 ± 1.0	0.5 ± 0.6	0.2 ± 0.5	1.2 ± 1.2	0.2 ± 0.5	45.5 ± 41.8	8.0 ± 12.1
:Heleidae	-	-	-	-	-	-	0.2 ± 0.5	1.2 ± 1.5
:Rhagionidae	-	-	-	0.2 ± 0.5	0.8 ± 1.0	-	0.2 ± 0.5	2.0 ± 2.2
:Empididae	0.2 ± 0.5	0.2 ± 0.5	-	-	-	-	1.2 ± 1.5	2.0 ± 2.2
:Unknown	-	-	-	-	-	-	-	0.5 ± 0.6
Nematoda	-	-	-	-	0.2 ± 0.5	-	-	0.2 ± 0.5
Turbellaria	-	-	-	-	-	-	-	0.5 ± 1.0
Oligochaeta	0.2 ± 0.5	-	0.2 ± 0.5	-	-	-	-	7.2 ± 4.3
Total	12.2 ± 6.7	28.0 ± 6.8	7.5 ± 4.7	6.2 ± 2.2	9.8 ± 2.5	2.2 ± 1.7	68.8 ± 34.5	38.0 ± 24.4

\* Mean numbers and standard deviations of organisms collected in four 0.093m<sup>2</sup> Surber samples.

TABLE B-X

Aquatic invertebrates\* collected from rocks taken from Ruisseau de Petit Capucin tributary station,  
11 June to 4 October, 1977. Gaspé, Quebec

	11 June	17 June	23 June	27 June	3 July	7 July	11 Aug	4 Oct
Ephemeroptera:Heptageniidae	9.5 ± 5.5	13.8 ± 9.9	3.0 ± 2.8	1.8 ± 2.2	2.8 ± 1.5	0.8 ± 0.5	1.5 ± 1.3	13.0 ± 9.2
:Baetidae	22.5 ± 31.9	20.8 ± 20.5	-	-	-	0.2 ± 0.5	14.0 ± 5.8	50.8 ± 34.7
Trichoptera:larvae	1.2 ± 1.0	1.0 ± 1.4	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	49.5 ± 26.6	43.8 ± 25.5
:pupae	2.8 ± 2.8	0.5 ± 0.6	1.8 ± 2.1	0.5 ± 1.0	-	-	-	21.8 ± 11.3
Coleoptera:Noteridae	-	-	-	-	-	-	0.2 ± 0.5	-
Diptera:Tipulidae	-	-	-	-	-	-	-	0.2 ± 0.5
:Blephariceridae	-	-	-	0.2 ± 0.5	-	-	-	-
:Simuliidae	8.2 ± 9.1	0.8 ± 1.5	1.8 ± 1.7	4.2 ± 6.0	1.8 ± 3.5	1.8 ± 3.5	5.8 ± 8.8	8.5 ± 5.4
:Chironomidae	1.8 ± 2.8	0.2 ± 0.5	-	1.5 ± 1.7	2.2 ± 3.3	1.2 ± 1.0	9.0 ± 3.8	329.8 ± 324.5
Turbellaria	-	-	-	-	-	-	0.2 ± 0.5	0.2 ± 0.5
Oligochaeta	0.2 ± 0.5	-	-	-	-	-	-	-
Hydracarina	-	-	-	-	-	-	0.2 ± 0.5	0.5 ± 1.0
Total	46.2 ± 44.1	37.0 ± 28.5	6.8 ± 2.4	8.5 ± 4.6	7.0 ± 2.9	4.2 ± 4.5	80.5 ± 36.0	468.5 ± 303.4

\* Mean numbers and standard deviations of organisms collected from four rocks approximately 20cm in diameter.

APPENDIX "C"

FISH STOMACH CONTENTS

TABLE C-I

Brook trout sampled for stomach content analysis from Ruisseau de la Grande Tourelle,  
14 June to 4 October, 1977. Gaspé, Québec.

	14 June	19 June	30 June	13 Aug	4 Oct
No. of Fish Sampled	10	10	10	14	12
Mean Total Length (mm)	80.6	67.6	88.5	77.1	77.9
Range	55 - 110	52 - 95	55 - 118	33 - 131	59 - 96
Mean Fork Length (mm)	77.5	65.3	85.5	73.7	74.3
Range	54 - 105	49 - 92	54 - 115	32 - 124	56 - 92
Mean Weight (g)	5.9	4.06	7.84	5.97	4.02
Range	1.5 - 12.5	1.9 - 9.4	1.5 - 15.3	1.2 - 18.0	1.6 - 7.2
Mean Volume Stomach Contents (ml)	0.08	0.09	0.30	0.08	0.19
Range	0.0 - 0.2	0.05 - 0.2	0.05 - 1.2	0.05 - 0.3	0.05 - 0.7

TABLE C-II

Percent occurrence of various food items in brook trout stomachs, Ruisseau de la Grande  
Tourelle, 14 June to 4 October, 1977. Gaspé, Québec.

	14 June	19 June	30 June	13 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	30	60	60	50	8
:Baetidae	70	60	80	50	33
Plecoptera	30	80	20	21	50
Trichoptera:larvae	60	70	30	50	83
:pupae	10	0	10	7	0
Coleoptera	0	0	0	0	17
Diptera:Tipulidae	10	10	0	0	8
:Simuliidae:larvae	20	40	30	0	0
:pupae	0	10	0	7	0
:Chironomidae:larvae	70	70	80	86	33
:pupae	20	30	0	21	0
:Heleidae	20	0	10	0	0
:Empididae	10	30	20	0	17
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	10	0	20	0	8
Gastropoda	0	0	10	0	8
Hydracarina	10	10	10	7	17
TERRESTRIAL ARTHROPODS					
Collembola	0	10	0	0	0
Ephemeroptera	0	0	20	0	0
Plecoptera	0	0	20	0	0
Hemiptera	10	0	80	36	25
Trichoptera	0	0	10	0	0
Lepidoptera	0	0	20	0	33
Hymenoptera	0	30	40	29	17
Coleoptera	0	20	50	29	0
Diptera	0	60	80	57	58
Diplopoda	0	0	10	0	0
Arachnida	10	10	20	21	2
EMPTY STOMACHS	10	0	0	0	0

TABLE C-III

Mean percentage of the volume of brook trout stomach contents contributed by various food items, Ruisseau de la Grande Tourelle, 14 June to 4 October, 1977. Gaspé, Québec.

	14 June	19 June	30 June	13 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	4.8	7.5	5.1	11.8	1.7
:Baetidae	25.2	11.5	21.3	8.9	5.0
Plecoptera	6.1	25.0	4.0	2.5	6.2
Trichoptera:larvae	26.7	12.3	5.5	13.6	33.8
:pupae	1.1	0.0	0.5	2.8	0.0
Coleoptera	0.0	0.0	0.0	0.0	1.7
Diptera:Tipulidae	2.8	0.5	0.0	0.0	1.4
:Simuliidae:larvae	1.7	4.5	2.0	1.4	0.0
:pupae	0.0	0.2	0.0	0.0	0.0
:Chironomidae:larvae	18.3	8.5	6.0	26.4	1.4
:pupae	1.7	3.0	0.0	1.8	0.0
:Heleidae	1.7	0.0	0.3	0.0	0.0
:Empididae	1.1	2.5	1.0	0.0	0.8
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	4.4	0.0	4.0	0.0	2.1
Gastropoda	0.0	0.0	1.0	0.0	2.1
Hydracarina	0.6	3.0	0.3	0.4	0.8
TERRESTRIAL ARTHROPODS					
Collembola	0.0	0.5	0.0	0.0	0.0
Ephemeroptera	0.0	0.0	1.5	0.0	0.0
Plecoptera	0.0	0.0	1.5	0.0	0.0
Hemiptera	1.7	0.0	18.0	6.4	3.8
Trichoptera	0.0	0.0	2.5	0.0	0.0
Lepidoptera	0.0	0.0	1.6	0.0	6.7
Hymenoptera	0.0	6.0	6.5	5.0	1.2
Coleoptera	0.0	2.5	2.7	2.5	0.0
Diptera	0.0	12.0	12.9	13.2	23.6
Diplopoda	0.0	0.0	1.0	0.0	0.0
Arachnida	2.2	0.5	0.8	3.2	8.8

TABLE C-IV

Mean numbers of various food items in brook trout stomachs in which they occurred,  
Ruisseau de la Grande Tourelle, 14 June to 4 October, 1977. Gaspé, Québec.

	14 June	19 June	30 June	13 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	2	1	2	1	1
:Baetidae	2	2	5	2	2
Plecoptera	1	2	1	1	3
Trichoptera:larvae	2	2	3	2	10
:pupae	1	-	1	1	0
Coleoptera	-	-	-	-	2
Diptera:Tipulidae	1	1	-	-	2
:Simuliidae:larvae	2	2	2	-	-
:pupae	-	1	-	1	-
:Chironomidae:larvae	2	2	3	37	2
:pupae	1	3	-	1	-
:Heleidae	1	-	1	-	-
:Empididae	1	2	1	-	2
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	1	-	1	-	1
Gastropoda	-	-	1	-	1
Hydracarina	1	3	1	1	1
TERRESTRIAL ARTHROPODS					
Collembola	-	1	-	-	-
Ephemeroptera	-	-	1	-	-
Plecoptera	-	-	1	-	-
Hemiptera	1	-	4	1	2
Trichoptera	-	-	3	-	-
Lepidoptera	-	-	2	-	2
Hymenoptera	-	1	2	3	1
Coleoptera	-	1	1	2	-
Diptera	-	1	3	6	8
Diplopoda	-	-	1	-	-
Arachnida	1	1	1	1	2



TABLE C-V

Brook trout sampled for stomach content analysis from Ruisseau Landry tributary station,  
14 June to 5 October, 1977. Gaspé, Québec.

	14 June	18 June	27 June	12-13 Aug	5 Oct
No. of Fish Sampled	10	13	12	14	14
Mean Total Length (mm)	79.2	80.1	80.6	81.6	105.1
Range	49 - 109	58 - 128	46 - 134	42 - 176	51 - 179
Mean Fork Length (mm)	75.5	76.8	77.0	78.5	101.4
Range	47 - 105	56 - 123	44 - 130	41 - 171	49 - 175
Mean Weight (g)	4.99	7.25	6.41	9.44	12.31
Range	1.3 - 10.2	2.6 - 19.5	1.1 - 25.9	0.8 - 54.0	1.1 - 42.5
Mean Volume Stomach Contents (mL)	0.18	0.88	0.28	0.16	0.33
Range	0.05 - 0.6	0.2 - 2.6	0.05 - 1.5	0.05 - 0.5	0.05 - 0.75

TABLE C-VI

Percent occurrence of various food items in brook trout stomachs, Ruisseau Landry tributary station, 14 June to 5 October, 1977. Gaspé, Québec.

	14 June	18 June	27 June	12-13 Aug	5 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	10	100	8	0	0
:Baetidae	40	100	0	0	0
Plecoptera	40	100	17	0	0
Megaloptera:Sialidae	0	54	8	0	0
Trichoptera:larvae	40	100	33	0	7
:pupae	10	0	0	0	0
Coleoptera	0	0	0	0	14
Diptera:Tipulidae:larvae	20	38	17	0	36
:pupae	20	0	0	0	0
:Blephariceridae	0	38	0	0	0
:Simuliidae:larvae	10	46	0	0	0
:pupae	0	8	0	0	0
:Chironomidae:larvae	90	100	33	36	36
:pupae	20	8	0	7	0
:Empididae	50	15	58	0	0
OTHER AQUATIC INVERTEBRATES					
Nematomorpha	0	0	0	7	0
Oligochaeta	20	0	0	0	14
Gastropoda	0	0	0	0	14
Hydracarina	0	8	0	14	36
TERRESTRIAL ARTHROPODS					
Collembola	0	0	0	7	0
Ephemeroptera	10	8	0	14	0
Hemiptera	30	77	58	64	43
Trichoptera	0	0	0	7	0
Lepidoptera	0	54	25	21	50
Hymenoptera	20	15	67	64	36
Coleoptera	10	8	58	7	64
Diptera	10	100	100	100	78
Arachnida	10	8	25	14	7

TABLE C-VII

Mean percentage of the volume of brook trout stomach contents contributed by various food items, Ruisseau Landry tributary station, 14 June to 5 October, 1977. Gaspé, Québec.

	14 June	18 June	27 June	12-13 Aug	5 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	0.5	15.0	0.8	0.0	0.0
:Baetidae	6.8	19.0	0.0	0.0	0.0
Plecoptera	9.5	25.0	1.2	0.0	0.0
Megaloptera:Sialidae	0.0	1.6	0.8	0.0	0.0
Trichoptera:larvae	13.0	14.8	2.9	0.0	1.1
:pupae	2.0	0.0	0.0	0.0	0.0
Coleoptera	0.0	0.0	0.0	0.0	1.4
Diptera:Tipulidae:larvae	12.5	0.8	2.9	0.0	13.6
:pupae	7.5	0.0	0.0	0.0	0.0
:Blephariceridae	0.0	0.7	0.0	0.0	0.0
:Simuliidae:larvae	0.2	0.4	0.0	0.0	0.0
:pupae	0.0	0.1	0.0	0.0	0.0
:Chironomidae:larvae	10.6	5.6	1.9	4.3	3.2
:pupae	0.4	0.1	0.0	1.1	0.0
:Empididae	11.5	0.8	7.1	0.0	0.0
OTHER AQUATIC INVERTEBRATES					
Nematomorpha	0.0	0.0	0.0	0.1	0.0
Oligochaeta	13.5	0.0	0.0	0.0	7.8
Gastropoda	0.0	0.0	0.0	0.0	1.4
Hydracarina	0.0	0.1	0.0	1.4	2.5
TERRESTRIAL ARTHROPODS					
Collembola	0.0	0.0	0.0	0.7	0.0
Ephemeroptera	0.5	0.2	0.0	1.6	0.0
Hemiptera	3.5	3.6	5.5	20.8	9.3
Trichoptera	0.0	0.0	0.0	1.4	0.0
Lepidoptera	0.0	1.4	2.6	5.1	11.4
Hymenoptera	2.0	0.2	9.2	22.8	8.6
Coleoptera	0.5	0.3	9.2	0.4	13.6
Diptera	5.0	10.2	54.6	39.3	25.4
Arachnida	0.5	0.2	1.2	0.8	0.7

TABLE C-VIII

Mean numbers of various food items in brook trout stomachs in which they occurred,  
Ruisseau Landry tributary station, 14 June to 5 October, 1977. Gaspé, Québec.

	14 June	18 June	2/ June	12-13 Aug	5 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	1	12	2	-	-
:Baetidae	2	16	-	-	-
Plecoptera	1	22	2	-	-
Megaloptera:Sialidae	-	2	2	-	-
Trichoptera:larvae	2	10	2	-	1
:pupae	1	-	-	-	-
Coleoptera	-	-	-	-	1
Diptera:Tipulidae:larvae	2	1	1	-	1
:pupae	1	-	-	-	-
:Blephariceridae	-	2	-	-	-
:Simuliidae:larvae	1	1	-	-	-
:pupae	-	1	-	-	-
:Chironomidae:larvae	4	7	2	2	2
:pupae	1	1	-	1	-
:Empididae	2	2	3	-	-
OTHER AQUATIC INVERTEBRATES					
Nematomorpha	-	-	-	1	-
Oligochaeta	1	-	-	-	1
Gastropoda	-	-	-	-	1
Hydracarina	-	1	-	1	2
TERRESTRIAL ARTHROPODS					
Collembola	-	-	-	1	-
Ephemeroptera	1	2	-	2	-
Hemiptera	2	3	2	2	2
Trichoptera	-	-	-	1	-
Lepidoptera	-	2	2	2	1
Hymenoptera	1	1	2	2	2
Coleoptera	1	1	2	2	2
Diptera	6	7	16	3	5
Arachnida	1	1	1	1	1

TABLE C-IX

Brook trout sampled for stomach content analysis from Ruisseau Landry mainstream station,  
13 June to 5 October, 1977. Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
No. of Fish Sampled	10	10	10	11
Mean Total Length (mm)	81.0	85.1	91.7	79.6
Range	60 - 128	69 - 106	66 - 132	47 - 136
Mean Fork Length (mm)	77.3	81.6	86.7	76.5
Range	58 - 121	66 - 102	62 - 126	46 - 130
Mean Weight (g)	5.49	7.39	9.22	6.11
Range	1.9 - 17.0	3.2 - 14.0	3.0 - 22.9	0.9 - 23.0
Mean Volume Stomach Contents (ml)	0.10	1.05	0.16	0.32
Range	0.0 - 0.3	0.4 - 1.7	0.05 - 0.4	0.0 - 2.6

TABLE C-X

Percent occurrence of various food items in brook trout stomachs, Ruisseau Landry mainstream station, 13 June to 5 October, 1977. Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	20	60	0	0
:Baetidae	50	90	0	9
Odonata:Anisoptera	0	10	0	0
Plecoptera	10	100	20	0
Megaloptera:Sialidae	0	60	0	0
Trichoptera:larvae	60	100	20	9
:pupae	10	0	0	0
Coleoptera	0	20	0	9
Diptera:Tipulidae	10	0	0	9
:Simuliidae	0	30	10	0
:Chironomidae:larvae	30	70	50	0
:pupae	0	10	0	0
:Heleidae	0	0	0	0
:Rhagionidae	0	0	0	9
:Empididae	30	0	10	0
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	0	10	0	0
Oligochaeta	0	0	0	9
Hydracarina	30	10	20	27
TERRESTRIAL ARTHROPODS				
Collembola	0	0	0	9
Ephemeroptera	10	0	0	0
Orthoptera	0	0	0	9
Plecoptera	0	0	10	0
Hemiptera	0	10	0	18
Lepidoptera	0	20	60	36
Hymenoptera	0	0	20	9
Coleoptera	0	20	20	64
Diptera	30	40	60	64
Arachnida	10	0	0	18

TABLE C-XI

Mean percentage of the volume of brook trout stomach contents contributed by various food items, Ruisseau Landry mainstream station, 13 June to 5 October, 1977.  
Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	4.4	1.8	0.0	0.0
:Baetidae	17.2	8.0	0.0	3.0
Odonata:Anisoptera	0.0	0.1	0.0	0.0
Plecoptera	1.7	62.7	5.0	0.0
Megaloptera:Sialidae	0.0	2.0	0.0	0.0
Trichoptera:larvae	35.0	20.8	5.0	0.5
:pupae	5.0	0.0	0.0	0.0
Coleoptera	0.0	0.2	0.0	2.0
Diptera:Tipulidae	2.2	0.0	0.0	2.0
:Simuliidae	0.0	0.3	0.5	0.0
:Chironomidae:larvae	11.1	2.0	5.2	0.0
:pupae	0.0	0.1	0.0	0.0
:Heleidae	0.0	0.0	0.0	0.0
:Rhagionidae	0.0	0.0	0.0	2.0
:Empididae	8.9	0.0	4.0	0.0
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	0.0	0.2	0.0	0.0
Oligochaeta	0.0	0.0	0.0	5.0
Hydracarina	3.9	0.1	1.5	5.5
TERRESTRIAL ARTHROPODS				
Collembola	0.0	0.0	0.0	1.0
Ephemeroptera	2.2	0.0	0.0	0.0
Orthoptera	0.0	0.0	0.0	5.0
Plecoptera	0.0	0.0	5.0	0.0
Hemiptera	0.0	0.1	0.0	2.5
Lepidoptera	0.0	0.6	40.0	13.0
Hymenoptera	0.0	0.0	7.9	2.5
Coleoptera	0.0	0.2	4.0	23.0
Diptera	5.6	0.8	21.9	28.0
Arachnida	2.8	0.0	0.0	5.0

TABLE C-XII

Mean numbers of various food items in brook trout stomachs in which they occurred,  
Ruisseau Landry mainstream station, 13 June to 5 October, 1977. Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	2	3	-	-
:Baetidae	1	9	-	1
Odonata:Anisoptera	-	1	-	-
Plecoptera	1	105	3	-
Megaloptera:Sialidae	-	2	-	-
Trichoptera:larvae	2	13	1	1
:pupae	1	-	-	-
Coleoptera	-	2	-	3
Diptera:Tipulidae	1	-	-	1
:Simuliidae	-	1	1	-
:Chironomidae:larvae	2	6	1	-
:pupae	-	1	-	-
:Heleidae	-	-	-	-
:Rhagionidae	-	-	-	2
:Empididae	1	-	2	-
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	-	1	-	-
Oligochaeta	-	-	-	8
Hydracarina	2	1	2	1
TERRESTRIAL ARTHROPODS				
Collembola	-	-	-	1
Ephemeroptera	1	-	-	-
Orthoptera	-	-	-	1
Plecoptera	-	-	1	-
Hemiptera	-	1	-	1
Lepidoptera	-	2	3	2
Hymenoptera	-	-	3	2
Coleoptera	-	1	2	1
Diptera	1	2	2	2
Arachnida	1	-	-	1



TABLE C-XIII

Slimy sculpins sampled for stomach content analysis from Ruisseau Landry tributary station,  
14 June to 5 October, 1977. Gaspé, Québec.

	14 June	18 June	12-13 Aug	5 Oct
No. of Fish Sampled	8	10	2	10
Mean Total Length (mm)	52.8	55.5	51.0	52.3
Range	47 - 61	46 - 70	38 - 64	44 - 66
Mean Weight (g)	1.26	2.06	2.10	1.31
Range	0.9 - 2.0	0.9 - 3.8	1.1 - 3.1	0.7 - 2.5
Mean Volume Stomach Contents (ml)	0.06	0.08	0.22	0.04
Range	0.05 - 0.1	0.0 - 0.1	0.05 - 0.4	0.0 - 0.05

TABLE C-XIV

Percent occurrence of various food items in slimy sculpin stomachs,  
Ruisseau Landry tributary station, 14 June to 5 October, 1977. Gaspé, Quebec.

	14 June	18 June	12-13 Aug	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	12	60	0	0
:Baetidae	50	50	0	10
Plecoptera	25	40	0	0
Trichoptera	50	80	0	20
Coleoptera	0	0	0	20
Diptera:Tipulidae	0	0	0	10
:Simuliidae:larvae	0	0	50	0
:pupae	0	20	0	0
:Chironomidae:larvae	50	60	50	80
:pupae	0	10	0	0
:Empididae	0	0	50	0
OTHER AQUATIC INVERTEBRATES				
Oligochaeta	0	0	50	0
Gastropoda	0	0	50	10
Hydracarina	0	0	0	10
TERRESTRIAL ARTHROPODS				
Lepidoptera:larvae	0	10	0	0
EMPTY STOMACHS	0	10	0	10

TABLE C-XV

Mean percentage of the volume of slimy sculpin stomach contents contributed by various food items, Ruisseau Landry tributary station, 14 June to 5 October, 1977.  
Gaspé, Québec.

	14 June	18 June	12-13 Aug	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	3.1	22.2	0.0	0.0
:Baetidae	30.0	20.6	0.0	6.7
Plecoptera	5.6	8.3	0.0	0.0
Trichoptera	30.0	31.7	0.0	14.4
Coleoptera	0.0	0.0	0.0	6.7
Diptera:Tipulidae	0.0	0.0	0.0	8.9
:Simuliidae:larvae	0.0	0.0	10.0	0.0
:pupae	0.0	2.6	0.0	0.0
:Chironomidae:larvae	31.2	8.6	15.0	55.6
:pupae	0.0	0.6	0.0	0.0
:Empididae	0.0	0.0	25.0	0.0
OTHER AQUATIC INVERTEBRATES				
Oligochaeta	0.0	0.0	45.0	0.0
Gastropoda	0.0	0.0	5.0	5.6
Hydracarina	0.0	0.0	0.0	2.2
TERRESTRIAL ARTHROPODS				
Lepidoptera:larvae	0.0	5.6	0.0	0.0

TABLE C-XVI

Mean numbers of various food items in slimy sculpin stomachs in which they occurred, Ruisseau Landry tributary station, 14 June to 5 October, 1977.

Gaspé, Québec.

	14 June	18 June	12-13 Aug	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	1	4	-	-
:Baetidae	2	3	-	1
Plecoptera	2	5	-	-
Trichoptera	1	2	-	1
Coleoptera	-	-	-	1
Diptera:Tipulidae	-	-	-	1
:Simuliidae:larvae	-	-	2	-
:pupae	-	2	-	-
:Chironomidae:larvae	14	5	5	5
:pupae	-	2	-	-
:Empididae	-	-	2	-
OTHER AQUATIC INVERTEBRATES				
Oligochaeta	-	-	1	-
Gastropoda	-	-	1	1
Hydracarina	-	-	-	1
TERRESTRIAL ARTHROPODS				
Lepidoptera:larvae	-	1	-	-

TABLE C-XVII

Slimy sculpins sampled for stomach content analysis from Ruisseau Landry mainstream station, 13 June to 5 October, 1977. Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
No. of Fish Sampled	3	6	5	12
Mean Total Length (mm)	50.0	39.8	66.4	61.1
Range	41 - 63	24 - 54	45 - 89	48 - 82
Mean Weight (g)	1.13	0.82	3.8	2.10
Range	0.2 - 2.4	0.2 - 1.9	0.9 - 7.7	0.9 - 6.1
Mean Volume Stomach Contents (ml)	0.05	0.05	0.15	0.05
Range	0.05	0.05	0.0 - 0.3	0.0 - 0.1

TABLE C-XVIII

Percent occurrence of various food items in slimy sculpin stomachs,  
Ruisseau Landry mainstream station, 13 June to 5 October, 1977. Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Baetidae	67	33	60	0
Plecoptera	33	33	80	0
Trichoptera	33	50	80	25
Coleoptera	0	0	0	17
Diptera:Tipulidae	0	0	0	50
:Simuliidae:larvae	33	17	0	0
:pupae	0	33	0	0
:Chironomidae:larvae	67	67	20	33
:Heleidae	0	0	0	8
:Empididae	0	0	20	0
OTHER AQUATIC INVERTEBRATES				
Hydracarina	0	0	0	17
TERRESTRIAL ARTHROPODS				
Coleoptera	0	0	0	0
Diptera	0	17	0	8
EMPTY STOMACHS	0	0	20	8

TABLE C-XIX

Mean percentage of the volume of slimy sculpin stomach contents contributed by various food items, Ruisseau Landry mainstream station, 13 June to 5 October, 1977.  
Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Baetidae	58.3	15.0	42.5	0.0
Plecoptera	3.3	15.0	17.5	0.0
Trichoptera	25.0	23.3	37.5	25.4
Coleoptera	0.0	0.0	0.0	14.5
Diptera:Tipulidae	0.0	0.0	0.0	39.1
:Simuliidae:larvae	3.3	16.7	0.0	0.0
:pupae	0.0	10.8	0.0	0.0
:Chironomidae:larvae	10.0	10.8	1.2	11.8
:Heleidae	0.0	0.0	0.0	1.8
:Empididae	0.0	0.0	1.2	0.0
OTHER AQUATIC INVERTEBRATES				
Hydracarina	0.0	0.0	0.0	3.6
TERRESTRIAL ARTHROPODS				
Coleoptera	0.0	0.0	0.0	3.6
Diptera	0.0	8.3	0.0	0.0

TABLE C-XX

Mean numbers of various food items in slimy sculpin stomachs in which they occurred, Ruisseau Landry mainstream station, 13 June to 5 October, 1977.

Gaspé, Québec.

	13 June	18 June	27 June	5 Oct
AQUATIC INSECTS				
Ephemeroptera:Baetidae	4	1	5	-
Plecoptera	1	10	3	-
Trichoptera	3	3	3	3
Coleoptera	-	-	-	2
Diptera:Tipulidae	-	-	-	2
:Simuliidae:larvae	1	1	4	-
:pupae	-	1	-	-
:Chironomidae:larvae	1	2	-	1
:Heleidae	-	-	-	1
:Empididae	-	-	1	-
OTHER AQUATIC INVERTEBRATES				
Hydracarina	-	-	-	2
TERRESTRIAL ARTHROPODS				
Coleoptera	-	-	-	1
Diptera	-	1	-	-



TABLE C-XXI

Brook trout sampled for stomach content analysis from Ruisseau du Petit Capucin tributary station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	4 Oct
No. of Fish Sampled	10	10	10	12
Mean Total Length (mm)	92.6	101.0	80.0	81.0
Range	61 - 132	68 - 148	66 - 111	49 - 125
Mean Fork Length (mm)	89.1	97.3	76.7	77.8
Range	58 - 125	65 - 144	64 - 107	47 - 123
Mean Weight (g)	10.91	13.73	6.55	5.73
Range	2.9 - 27.3	2.8 - 33.9	3.3 - 14.7	1.1 - 14.0
Mean Volume Stomach Contents (ml)	0.21	2.70	0.28	0.14
Range	0.1 - 0.5	0.09 - 9.0	0.02 - 0.5	0.05 - 0.4

TABLE C-XXII

Percent occurrence of various food items in brook trout stomachs, Ruisseau du Petit Capucin tributary station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	4 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	70	90	10	0
:Baetidae	100	90	40	17
Plecoptera	80	100	10	0
Megaloptera:Sialidae	0	40	0	0
Trichoptera:larvae	80	90	50	83
:pupae	0	0	0	8
Coleoptera	0	0	0	25
Diptera:Tipulidae	0	0	0	17
:Blephariceridae	0	10	0	0
:Simuliidae:larvae	30	50	20	0
:pupae	20	0	0	0
:Chironomidae:larvae	50	30	10	58
:pupae	20	0	0	8
:Rhagionidae	0	0	0	8
:Empididae	10	0	0	17
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	0	0	0	8
Oligochaeta	0	10	0	0
Gastropoda	0	0	0	25
Hydracarina	20	0	0	8
TERRESTRIAL ARTHROPODS				
Ephemeroptera	20	0	0	0
Plecoptera	0	10	10	0
Hemiptera	20	20	20	17
Trichoptera	0	10	0	0
Lepidoptera	0	10	0	8
Hymenoptera	40	20	20	0
Coleoptera	40	40	60	8
Diptera	100	40	100	67
Arachnida	20	0	10	17
TERRESTRIAL GASTROPODS				
	0	0	0	8

TABLE C-XXIII

Mean percentage of the volume of brook trout stomach contents contributed by various food items, Ruisseau du Petit Capucin tributary station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	4 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	10.7	22.0	1.5	0.0
:Baetidae	38.5	38.3	2.2	0.7
Plecoptera	12.3	27.5	1.0	0.0
Megaloptera:Sialidae	0.0	0.5	0.0	0.0
Trichoptera:larvae	10.8	8.3	5.2	44.6
:pupae	0.0	0.0	0.0	0.8
Coleoptera	0.0	0.0	0.0	2.3
Diptera:Tipulidae	0.0	0.0	0.0	3.8
:Blephariceridae	0.0	0.03	0.0	0.0
:Simuliidae:larvae	1.3	0.6	1.5	0.0
:pupae	0.7	0.0	0.0	0.0
:Chironomidae:larvae	2.4	0.3	0.2	11.2
:pupae	1.1	0.0	0.0	1.7
:Rhagionidae	0.0	0.0	0.0	0.2
:Empididae	0.8	0.0	0.0	1.9
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	0.0	0.0	0.0	0.8
Oligochaeta	0.0	0.2	0.0	0.0
Gastropoda	0.0	0.0	0.0	6.2
Hydracarina	0.5	0.0	0.0	1.7
TERRESTRIAL ARTHROPODS				
Ephemeroptera	2.0	0.0	0.0	0.0
Plecoptera	0.0	0.03	0.5	0.0
Hemiptera	0.5	0.2	4.5	2.1
Trichoptera	0.0	0.03	0.0	0.0
Lepidoptera	0.0	0.1	0.0	1.2
Hymenoptera	1.3	0.2	3.0	0.0
Coleoptera	3.4	0.3	12.6	1.7
Diptera	12.9	1.4	67.3	14.2
Arachnida	0.8	0.0	0.5	2.3
TERRESTRIAL GASTROPODS	0.0	0.0	0.0	2.5

TABLE C-XXIV

Mean numbers of various food items in brook trout stomachs in which they occurred, Ruisseau du Petit Capucin tributary station, 19 June to 4 October, 1977.

Gaspé, Québec.

	19 June	22 June	1 July	4 Oct
AQUATIC INSECTS				
Ephemeroptera:Heptageniidae	4	35	2	-
:Baetidae	10	62	1	1
Plecoptera	3	29	1	-
Megaloptera:Sialidae	-	1	-	-
Trichoptera:larvae	5	11	1	11
:pupae	-	-	-	1
Coleoptera	-	-	-	1
Diptera:Tipulidae	-	-	-	1
:Blephariceridae	-	1	-	-
:Simuliidae:pupae	2	2	2	-
:pupae	1	-	-	-
:Chironomidae:larvae	2	1	1	3
:pupae	2	-	-	2
:Rhagionidae	-	-	-	1
:Empididae	2	-	-	2
OTHER AQUATIC INVERTEBRATES				
Nematomorpha	-	-	-	1
Oligochaeta	-	1	-	-
Gastropoda	-	-	-	1
Hydracarina	2	-	-	1
TERRESTRIAL ARTHROPODS				
Ephemeroptera	1	-	-	-
Plecoptera	-	1	1	-
Hemiptera	1	1	3	2
Trichoptera	-	1	-	-
Lepidoptera	-	2	-	1
Hymenoptera	1	3	2	-
Coleoptera	3	1	4	2
Diptera	3	6	7	2
Arachnida	1	-	1	1
TERRESTRIAL GASTROPODS				
	-	-	-	1

TABLE C-XXV

Brook trout sampled for stomach content analysis from Ruisseau du Petit Capucin mainstream station,  
19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	11-14 Aug	4 Oct
No. of Fish Sampled	10	10	9	22	12
Mean Total Length (mm)	72.7	75.9	85.7	65.5	80.9
Range	52 - 109	59 - 110	55 - 120	37 - 113	49 - 112
Mean Fork Length (mm)	69.7	72.4	81.6	63.1	77.0
Range	50 - 103	56 - 105	52 - 116	36 - 109	47 - 107
Mean Weight (g)	5.27	5.20	7.99	4.18	5.40
Range	1.7 - 13.6	2.1 - 15.5	1.6 - 18.1	0.5 - 11.0	1.2 - 9.4
Mean Volume Stomach Contents (mL)	0.18	0.52	0.23	0.12	0.10
Range	0.05 - 0.4	0.05 - 2.4	0.1 - 0.5	0.0 - 0.4	0.0 - 0.4

TABLE C-XXVI

Percent occurrence of various food items in brook trout stomachs, Ruisseau du Petit Capucin  
mainstream station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	11-14 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	0	50	0	0	0
:Baetidae	70	100	22	9	0
Plecoptera	70	90	0	23	25
Trichoptera:larvae	70	80	22	50	67
:Pupae	0	10	0	0	0
Megaloptera:Sialidae	0	20	0	4	0
Coleoptera	0	0	0	0	33
Diptera:Tipulidae	0	10	0	0	0
:Blephariceridae	0	10	0	0	0
:Simuliidae:larvae	0	30	11	0	8
:pupae	20	0	0	0	0
:Chironomidae:larvae	30	30	0	77	50
:pupae	20	10	0	9	0
:Rhagionidae	0	0	0	0	8
:Empididae	0	0	0	14	8
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	0	0	0	4	0
Hydracarina	0	0	22	14	17
TERRESTRIAL ARTHROPODS					
Ephemeroptera	30	0	0	0	0
Plecoptera	0	0	11	0	0
Hemiptera	20	20	44	23	0
Trichoptera	0	10	33	0	0
Lepidoptera	10	50	78	14	0
Hymenoptera	50	10	56	0	0
Coleoptera	60	10	78	9	8
Diptera	80	50	100	77	17
Diplopoda	0	0	11	0	0
Arachnida	30	0	22	0	8
TERRESTRIAL GASTROPODS	0	0	0	0	25
EMPTY STOMACHS	0	0	0	4	8

TABLE C-XXVII

Mean percentage of the volume of brook trout stomach contents contributed by various food items, Ruisseau du Petit Capucin mainstream station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	11-14 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	0.0	4.9	0.0	0.0	0.0
:Baetidae	13.0	35.0	5.0	0.7	0.0
Plecoptera	11.2	41.0	-	5.4	5.4
Trichoptera:larvae	15.2	6.7	1.7	6.4	30.9
:pupae	0.0	0.2	0.0	0.0	0.0
Megaloptera:Sialidae	0.0	1.5	0.0	0.5	0.0
Coleoptera	0.0	0.0	0.0	0.0	7.7
Diptera:Tipulidae	0.0	0.1	0.0	0.0	0.0
:Blephariceridae	0.0	0.03	0.0	0.0	0.0
:Simuliidae:larvae	0.0	0.5	0.2	0.0	9.1
:pupae	0.8	0.0	0.0	0.0	0.0
:Chironomidae:larvae	4.1	0.53	0.0	22.5	7.3
:pupae	1.5	0.1	0.0	0.5	0.0
:Rhagionidae	0.0	0.0	0.0	0.0	6.4
:Empididae	0.0	0.0	0.0	1.4	1.8
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	0.0	0.0	0.0	0.7	0.0
Hydracarina	0.0	0.0	1.1	2.8	2.3
TERRESTRIAL ARTHROPODS					
Ephemeroptera	2.6	0.0	0.0	0.0	0.0
Plecoptera	0.0	0.0	1.1	0.0	0.0
Hemiptera	2.0	0.9	8.7	3.8	0.0
Trichoptera	0.0	0.3	3.7	0.0	0.0
Lepidoptera	0.3	2.43	20.6	4.8	0.0
Hymenoptera	3.8	0.5	10.0	0.0	0.0
Coleoptera	6.7	0.5	22.8	1.9	1.8
Diptera	37.5	4.8	21.7	48.6	10.0
Diplopoda	0.0	0.0	2.2	0.0	0.0
Arachnida	1.3	0.0	1.3	0.0	1.8
TERRESTRIAL GASTROPODS	0.0	0.0	0.0	0.0	15.4

TABLE C-XXVIII

Mean numbers of various food items in brook trout stomachs in which they occurred,  
Ruisseau du Petit Capucin mainstream station, 19 June to 4 October, 1977. Gaspé, Québec.

	19 June	22 June	1 July	11-14 Aug	4 Oct
AQUATIC INSECTS					
Ephemeroptera:Heptageniidae	-	5	-	-	-
:Baetidae	2	6	1	1	-
Plecoptera	3	26	-	1	1
Trichoptera:larvae	1	5	1	2	5
:pupae	-	1	-	-	-
Megaloptera:Sialidae	-	2	-	1	-
Coleoptera	-	-	-	-	2
Diptera:Tipulidae	-	1	-	-	-
:Blephariceridae	-	1	-	-	-
:Simuliidae:larvae	-	2	2	-	1
:pupae	1	-	-	-	-
:Chironomidae:larvae	1	3	-	13	2
:pupae	3	1	-	2	-
:Rhagionidae	-	-	-	-	1
:Empididae	-	-	-	1	3
OTHER AQUATIC INVERTEBRATES					
Oligochaeta	-	-	-	2	-
Hydracarina	-	-	2	1	2
TERRESTRIAL ARTHROPODS					
Ephemeroptera	1	-	-	-	-
Plecoptera	-	-	2	-	-
Hemiptera	3	4	2	1	-
Trichoptera	-	1	1	-	-
Lepidoptera	1	2	2	2	-
Hymenoptera	1	1	2	-	-
Coleoptera	1	1	3	2	2
Diptera	8	2	4	20	2
Diplopoda	-	-	1	-	-
Arachnida	1	-	1	-	1
TERRESTRIAL GASTROPODS	-	-	-	-	1