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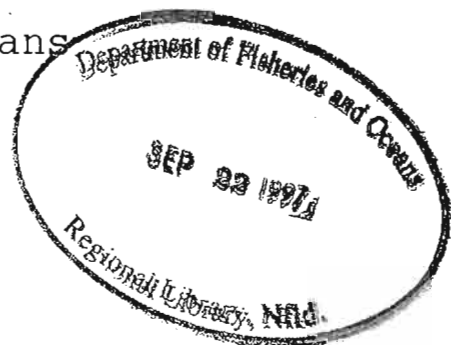


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**Electrofishing Data from a Monitoring
Program Designed to Detect the Changes
in Acid Toxicity that are Expected to
Result from a Reduction in the Long-
Range Transport of Acid Pollutants into
Nova Scotian Salmon Rivers**

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1997

**Canadian Data Report of
Fisheries and Aquatic
Sciences No. 1002**



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Canadian Data Report of Fisheries and Aquatic Sciences

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**Canadian Data Report of
Fisheries and Aquatic Sciences No. 1002**

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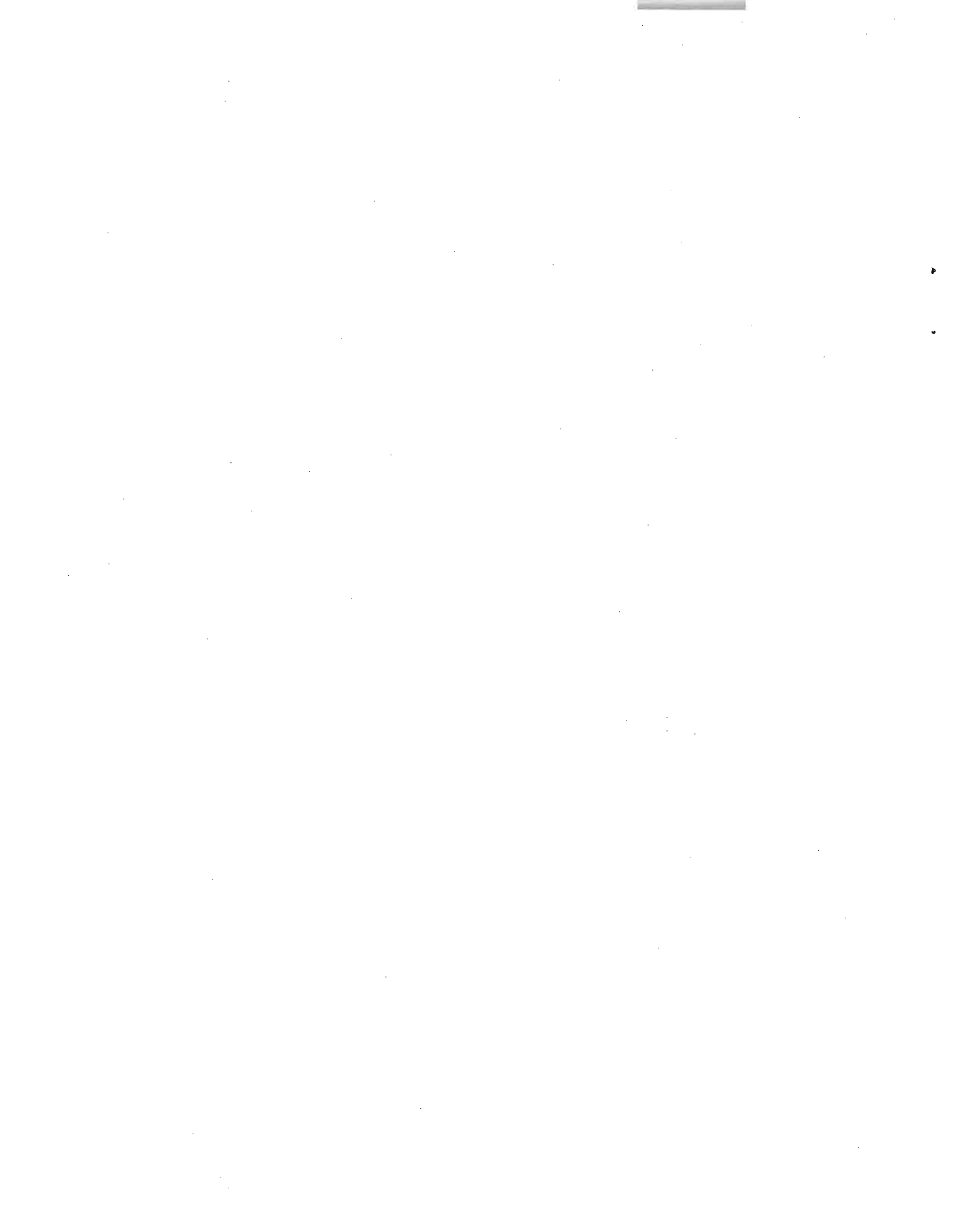
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Abstract

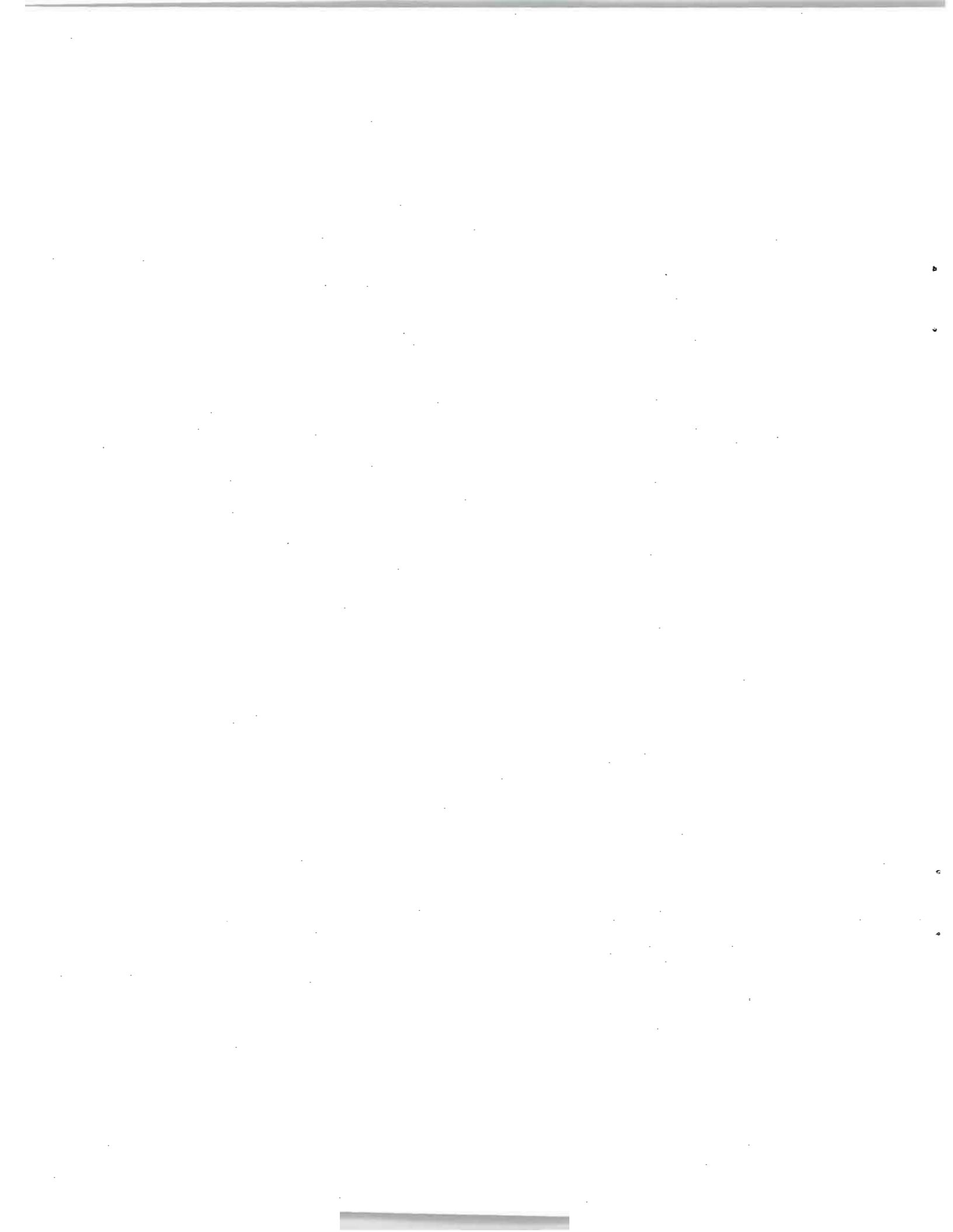
Watt, W. D., P. J. Zamora and W. J. White. 1997. Electrofishing data from a monitoring program designed to detect the changes in acid toxicity that are expected to result from a reduction in the long-range transport of acid pollutants into Nova Scotian salmon rivers. *Can. Data Rept. Fish Aquat. Sci.* **1002**, 23p.

Locations and descriptions are given for thirteen electrofishing sites on four Atlantic salmon rivers in Nova Scotia that have been acidified by long range transport of acid pollution (acid rain). Annual electrofishing data from these sites are tabulated for the period 1982 - 1995. This is part of a program to monitor the recovery from acidification that is expected to follow the Canada - USA agreement for the control of sulphate emissions. Emissions are expected to decline to target levels over the period 1995 - 2000.

Résumé

Watt, W. D., P. J. Zamora and W. J. White. 1997. Electrofishing data from a monitoring program designed to detect the changes in acid toxicity that are expected to result from a reduction in the long-range transport of acid pollutants into Nova Scotian salmon rivers. *Can. Data Rept. Fish Aquat. Sci.* **1002**, 23p.

On fournit ici l'emplacement et la description de treize sites d'électropêche dans quatre rivières à saumon de l'Atlantique acidifiées par le transport à longue distance des polluants acides (pluies acides). Les résultats annuels de l'électropêche dans les sites en question sont calculés pour la période 1982-1995. Ces expériences d'électropêche s'inscrivent dans un programme de surveillance de l'assainissement des eaux acidifiées, qui devrait faire suite à l'entente Canada-États-Unis sur la lutte contre les émissions de sulfate. On s'attend à ce que ces émissions soient ramenées aux niveaux-cibles durant la période 1995-2000.



Introduction

Acid rain has had a major destructive impact on sport fishing in many of Canada's lakes and rivers. In northern Nova Scotia most of the freshwater habitat is protected from acidification by acid neutralization capacity that is produced by natural weathering of the bedrock and soils. In southwestern Nova Scotia, however, an unfortunate combination of hard-rock geology, poor soils and prevailing weather patterns that cause much of the atmospheric pollution produced by US industry to rain out over the Maritimes has resulted in severe acidification of rivers and lakes. Consequently, Nova Scotia is the most heavily impacted province in Canada in terms of the percentage of fish habitat that has been damaged or destroyed by acid rain. It is the only region in North America where entire river systems have been acidified by atmospheric pollution.

Because acid rain is a trans-boundary problem, Canada has promoted and participated in both national and international air pollution control agreements. In the Eastern Canadian SO₂ (Sulphur dioxide) Control Program of 1985, the seven eastern provinces agreed to achieve, by 1994, a 50 percent reduction in annual SO₂ emissions from the 1980 base level of 4516 kilotons. In the United States, the Clean Air Act of 1990 requires a 9000 kilotons reduction in SO₂ emissions by the Year 2000. This reduction, representing about 40% of their 1980 level, will be achieved in two phases; phase I affecting 110 sources took effect on January 1, 1995, and phase II affecting >2000 sources is due to come into effect on January 1, 2000. The Clean Air Act paved the way for the negotiation and signing of the Canada/United States Air Quality Accord in March of 1991. The first annex to the accord sets a permanent cap on SO₂ emissions from Canada of 3200 kilotons and from the United States of 13,300 kilotons. These reductions in emissions will obviously reduce acid deposition, and a substantial degree of recovery is to be expected in Nova Scotia's acidified rivers over the next 5-10 years, especially in rivers with 'borderline' toxicity (mean annual pH 5.0-5.4).

The primary freshwater sport fishes in Nova Scotia are brook trout, sea-run and landlocked Atlantic salmon, lake trout, brown trout, rainbow trout, and striped and smallmouth basses. All eight are sensitive to acidification. However, the Atlantic salmon populations of the acidified Nova Scotia rivers are the only fish populations in North America where sufficient historic data exist to clearly identify long-range transport of acid pollutants as the cause of their decline (Watt, 1981; and Watt, Scott and White, 1983; Watt, 1986; Watt, 1987; Lacroix, 1989; ICES, 1989). The Atlantic salmon populations in Nova Scotia's acidified rivers are, therefore, considered to be a key indicator of the success or failure of the international acid emission control accords. The salmon runs to 14 Nova Scotia rivers have been lost, but small remnant populations still remain in 20 rivers where acid toxicity is marginal for survival.

Since 1981 the Canada Department of Fisheries and Oceans has been watching for signs of the pH recovery through a monitoring program of water chemistry, the fish communities and (since 1987) the macro-invertebrate communities, in salmon rivers on the South Shore of Nova Scotia (Canaan, Gold, Ingram, LaHave, Middle, Nine Mile, Sackville and Salmon). River fish communities have been monitored annually since 1982 by electrofishing at 13 sites. Initially there were more sites, but electrofishing was dropped on the Gold and Sackville rivers because of salmon stocking (as part of an acid rain mitigation program which commenced in the mid-eighties) and dropped on the West River (a tributary of the LaHave) because of reduced resources. This report presents the electrofishing data from the remaining 13 sites of this program for the 14 years from 1982 to 1995. The data are from the Canaan, Ingram, Middle and Salmon rivers, all of which have toxic acidities and small remnant native run salmon populations. Electrofishing data for the LaHave river (for use as a non-toxic high pH control) are available from the Assessment and Enhancement Section of the Diadromous Fish Division. The corresponding water chemistry data from this program are available from Watt, Scott and Mandell, 1996, and a report on the macro-invertebrate data is being prepared by N. Watson and E. A. Hamilton.

Methods

Electrofishing sweeps were started at the upstream end of the area to be sampled. A lip seine (Elson, 1962) was held facing upstream about three metres below the upper boundary of the site. The area between the upper boundary and the lip seine was swept systematically with the probe of the electrofisher (Smith-Root backpack low conductivity model XI from 1981 to 1990 and model XIA from 1991 to 1996), while the dip net operator collected as many stunned fish as possible. After the area between the upper boundary and the lip seine was thoroughly covered, the lip seine was moved laterally across the current over a distance equal to its length and the entire procedure was repeated.

The electrofishing crew moved in this way from one bank to the opposite bank of the stream, collecting all fish, and covering approximately a three-meter transect of the stream. When the opposite bank was reached, the lip seine was moved downstream about three meters and another transect was covered until the first bank is reached and the seine again moved downstream. In this way the crew progressed downstream crossing and recrossing the stream until the lower boundary was reached. During periods of low flow the lip seine was dispensed with, but the electrofishing procedure was otherwise similar.

When the anticipated number of Atlantic salmon was low (<5) only one pass (as described above) of the site was done. When larger numbers were anticipated, multiple passes (usually 3) were done, and the site was prepared by installing barrier nets at the upstream and downstream boundaries to prevent disturbed fishes from leaving the site between passes. Barrier nets were installed by laying them flat on the stream bottom, from bank to bank, with the foot upstream. As the net was unrolled, the burlap strip was covered with stones so that no gaps were left between the net and the stream bottom which might allow fish to pass under the net. When the burlap was completely weighted the headrope was raised and stakes were installed to hold it.

Electrofishing was carried out during the months of July-October, most was done in July-August but person-power availability and river water levels sometimes dictated otherwise. All fish were identified and counted, and juvenile salmonids were measured (fork length) to distinguish fry from parr (length/frequency analysis). In cases where age was not obvious, a scale sample was taken to ascertain the age. The Atlantic salmon parr were almost entirely one year old fish, with the occasional (one or two each year) two year old. No mature salmonids were captured. Captured fish were kept in 'live boxes' placed in the stream outside the range of the electrical field generated by the electrofishing apparatus. After the electrofishing (single or multiple passes) and the data collection were finished, all captured fish were returned to the river. The electronic fishing units were (1981-90) Smith-Root backpack electrofisher model XI, and (1991-95) Smith-Root backpack electrofisher model IX-A. Both models were designed for use in low conductivity waters.

Sampling Sites

The geology and geography of the river basins are described by Watt *et al.*, 1996. The electrofishing sites were chosen for their physical stability and potential quality as salmon habitat. All are predominantly riffle areas with cobble and/or gravel bottoms. The sites were marked with tree blazes and painted rocks in the stream bed. Site access maps are in Fig 1-4, and the on-site details are as follows:

Canaan River (Fig 1):

Site#1. 44° 38.87' N 64° 11.47' W. About 60 meters below a breached dam at outlet to Connaught Lake. Site begins adjacent to DOE flow gauge house and continues downstream 70m. The total area is about 400 sq. meter (the actual stream area sampled varied from year to year and with water levels).

Site#2. 44° 38.45' N 64° 11.72' W. About 1 km below Connaught Lake at invertebrate sampling site. Site begins just above small island adjacent foot path and continues downstream 30 meters. The stream averages 10 meters in width giving a total area of about 300 sq. meter.

Site#3. 44° 37.98' N 64° 10.74' W. About 2 km below Connaught Lake. Site begins just above large island adjacent foot path and includes both sides of island to the downstream end of the island. The total area is about 300 sq. meter.

Site#4. 44° 37.44' N 64° 10.23' W. About 4 km below Connaught Lake. Site begins 20m above foot path and continues downstream 40 meters to the end of island on left side of river. Total area is about 250 sq. meter.

Ingram River (Fig 2):

Site#1. 44° 41.65' N 63° 56.98' W. Above Highway 103. This site is about 110 meters upstream of the crossing. At this point, the river is split into two channels. The lower barrier extends across the downstream end of the lesser channel. The upper barrier is 56.5 meters upstream of the lower barrier. The total area is about 350 sq. meter.

Site#2. 44° 42.96' N 63° 56.96' W. Above Mersey Wood Road. This site is accessed from a Mersey wood road off Highway 103 going upstream on the right. The site covers the area beginning at the lower end of a small island on the right side of the river about 100 meters upstream of bridge and ending at the ledge riffle about 30 meters above bridge. Total area is usually about 350 sq. meter.

Middle River (Fig 3):

Site#1. 44° 37.10' N 64° 18.91' W. Middle River at Chester Grant. This site includes the riffle/run area upstream of the large pool on the upstream side of the bridge crossing on Chester Grant Road (Dirt Road from Highway 12 to Highway 14). Total area is about 350 sq. meter.

Site#2. 44° 37.11' N 64° 18.60' W. Slough River at Millett Lake outlet. This site begins at the downstream side of the bridge crossing on Chester Grant Road. The lower barrier is 50m below this giving a total area of about 350 sq. meter.

Salmon River (Fig 4):

Site#1. 44° 45.46' N 63° 23.60' W. Below Otter Lake. Access is via River Road. This site begins just below the pool at the outfall of Otter Lake. It takes in the short riffle area of about 100 sq. meter.

Site#2. 44° 44.79' N 63° 23.25' W. Above Martins Lake. Access to this site is via River Road which follows the river from Lake Echo upstream to Otter Lake on the true left bank. The site begins about 250 meters above Martins Lake. It is 40 meters in length and the total area is usually about 200 sq. meter.

Site#3. 44° 41.52' N 63° 22.59' W. Above Lawrencetown Lake - right channel. About 100 meters upstream from Minesville bridge the river is divided into two relatively equal channels. This site begins at the downstream end of the true right channel and continues upstream 50 meters, giving a total area of about 250 sq. meter.

Site#4. 44° 41.52' N 63° 22.56' W. Above Lawrencetown Lake - left channel. This site begins at the downstream end of the left channel and continues upstream 50 meters. The total area is about 250 sq. meter.

Site#5. 44° 42.73' N 63° 23.86' W. Partridge River. This site is just upstream of the Highway 107 crossing. It begins just upstream of the pool under the bridge and continues 50 meters upstream for a total area of about 300 sq. meter.

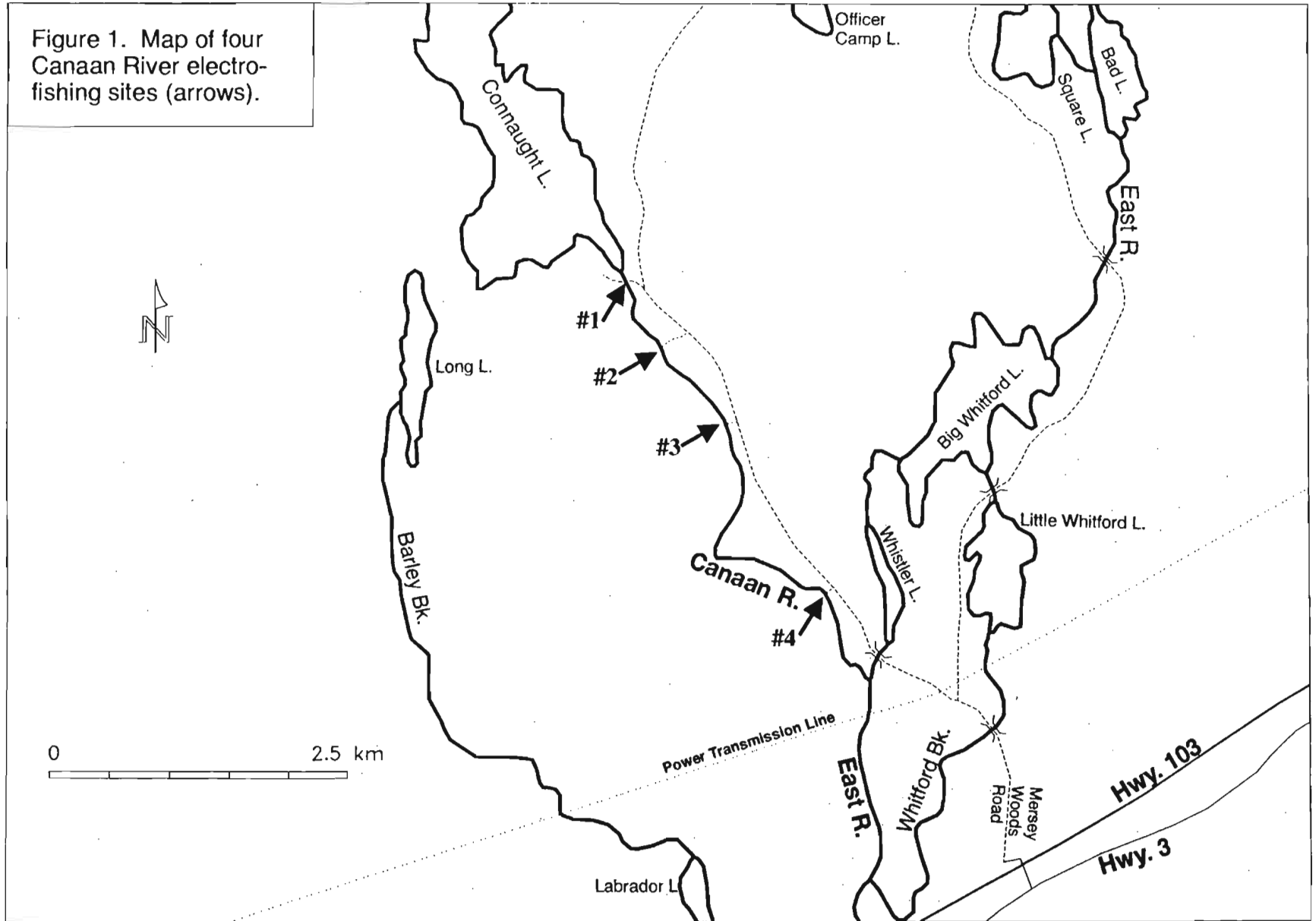
Data

The numbers of fish captured at each site are presented chronologically and by river in Tables 1- 5. Table 1 gives numbers of Atlantic salmon (*Salmo salar*) fry and parr captured. Table 2 has speckled trout (*Salvelinus fontinalis*) fry and parr. Tables 3-5 are listings of two species each. Table 3 is a listing of the numbers of American eels (*Anguilla rostrata*) and white suckers (*Catostomus commersoni*) captured. Table 4 lists lake chub (*Couesius plumbeus*) and banded killifish (*Fundulus diaphanus*). Table 5 lists captures of nine-spine stickleback (*Pungitius pungitius*) and of yellow perch (*Perca flavescens*).

References

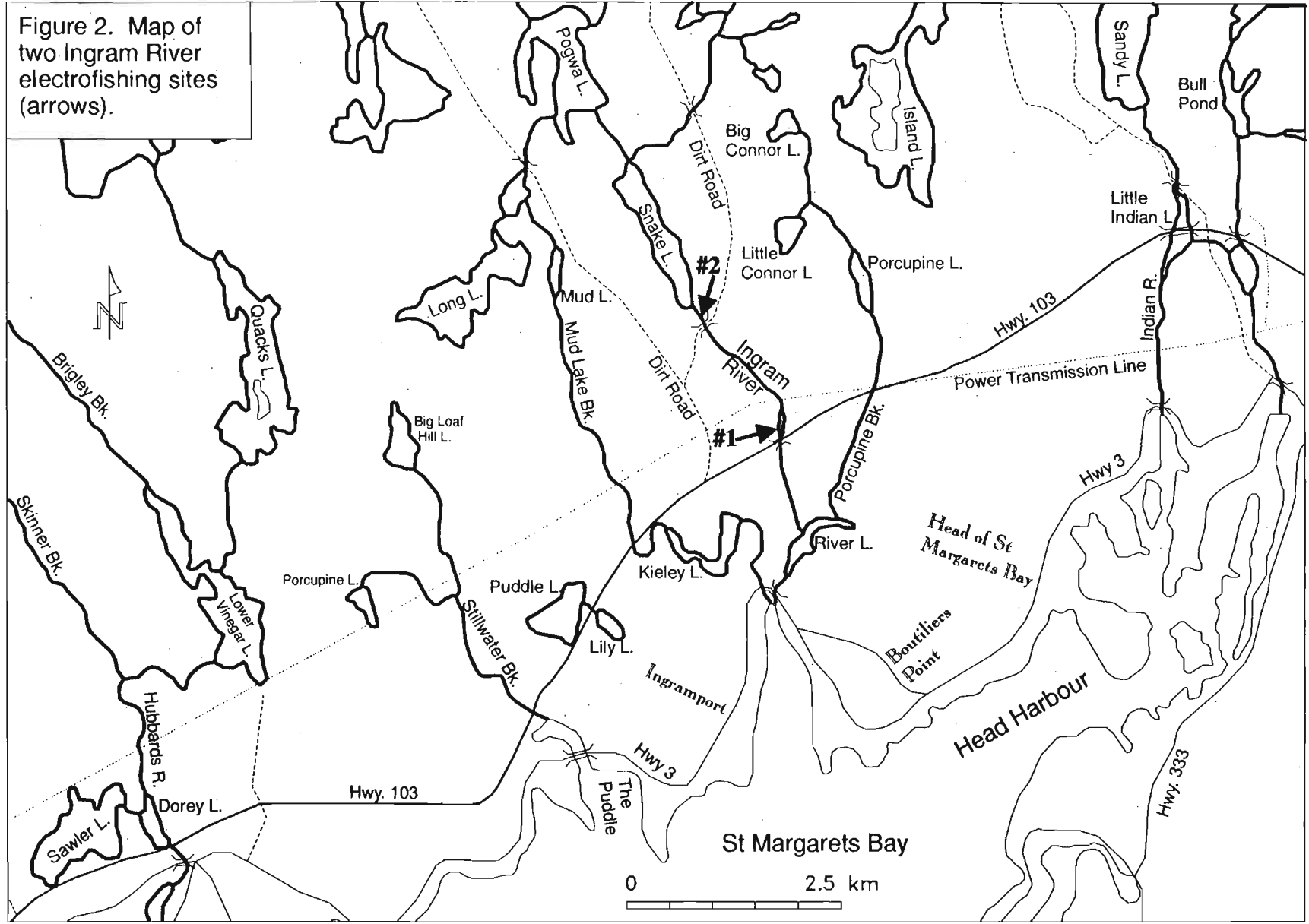
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Figure 1. Map of four Canaan River electro-fishing sites (arrows).



0 2.5 km

Figure 2. Map of two Ingram River electrofishing sites (arrows).



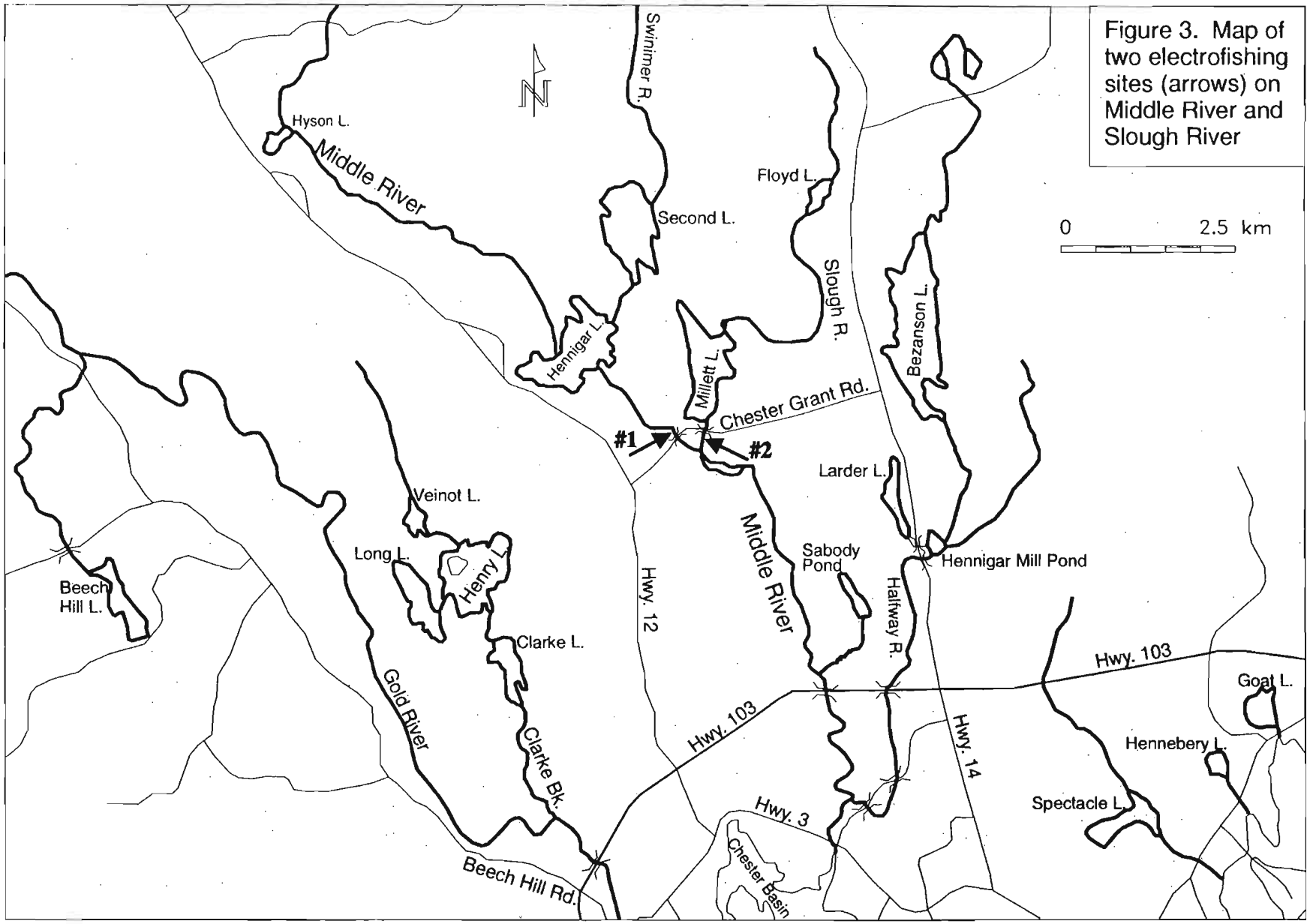


Figure 3. Map of two electrofishing sites (arrows) on Middle River and Slough River

0 2.5 km

Figure 4. Map of Salmon River (four) and Partridge River (one) electrofishing sites.

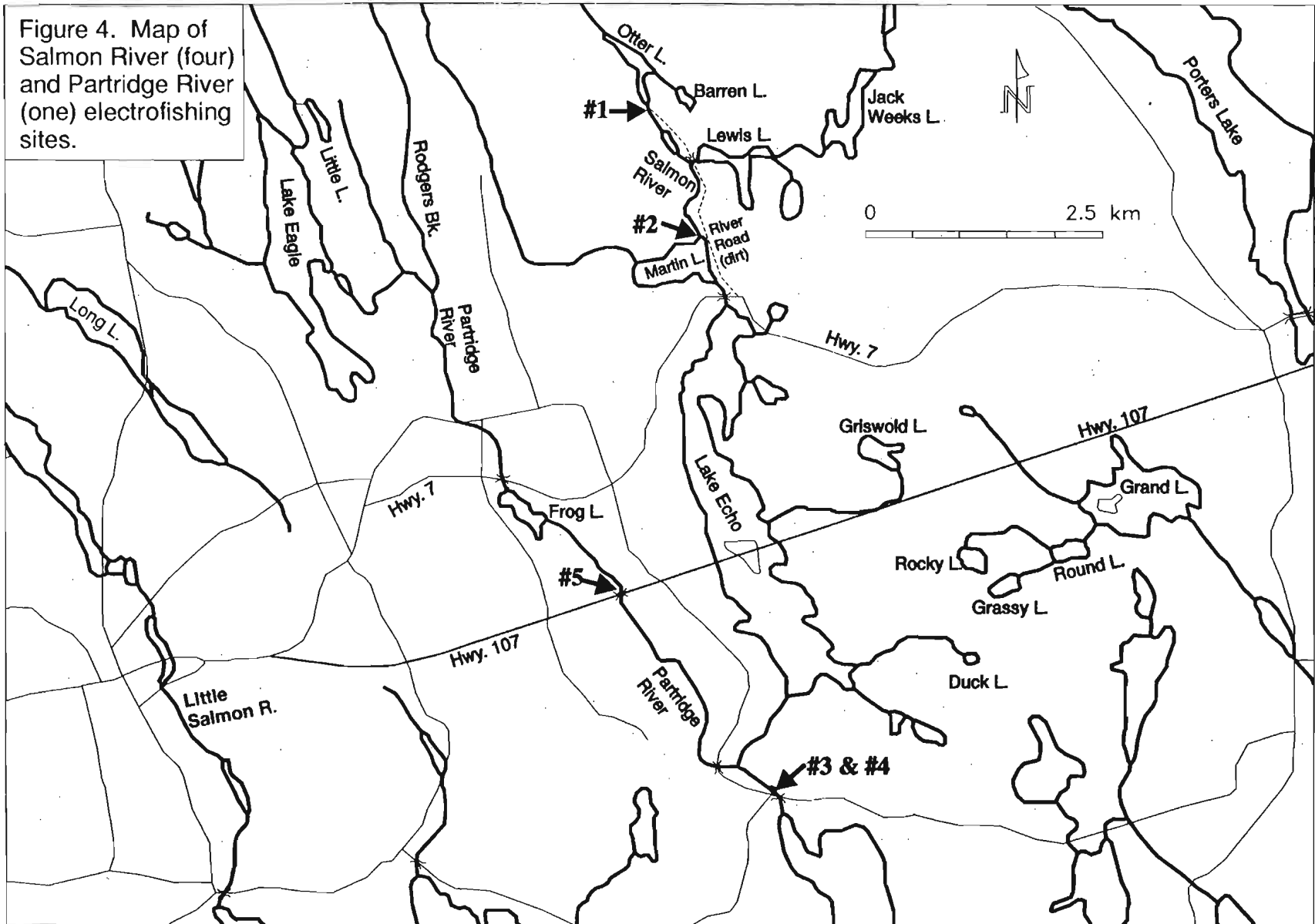


Table 1. Atlantic salmon (*Salmo salar*) fry and parr captured.

River	Site#	Date	Area (m ²)	Salmon fry	Fry 2nd pass	Fry 3rd pass	Salmon parr	Parr 2nd pass	Parr 3rd pass
Ingram	1	07-Jul-82	310	0	0	0	3	1	1
Ingram	2	05-Jul-82	338	0	0	0	0	0	0
Middle	1	16-Jul-82	315	0	0	0	1	0	0
Middle	2	15-Jul-82	301	18	17	16	2	3	0
Salmon	1	01-Sep-82	200	0			0		
Salmon	3	01-Sep-82	150	0			0		
Salmon	4	01-Sep-82	275	0			0		
Salmon	5	28-Jul-82	280	0			0		
Canaan	1	22-Sep-83	420	0			0		
Canaan	2	22-Sep-83	300	0			0		
Canaan	3	22-Sep-83	300	0			0		
Canaan	4	22-Sep-83	255	0			0		
Ingram	1	05-Aug-83	299	0	0	0	0	0	0
Ingram	2	04-Aug-83	563	0	0	0	2	0	1
Middle	2	10-Aug-83	355	0	0	0	4	0	0
Middle	1	16-Aug-83	348	0	0	0	0	0	0
Salmon	1	12-Aug-83	200	0			0		
Salmon	2	12-Aug-83	200	0			0		
Salmon	4	12-Aug-83	275	0			0		
Salmon	5	17-Aug-83	280	0			0		
Ingram	1	14-Aug-84	289	1	0	0	0	0	0
Ingram	2	14-Aug-84	450	0	0	0	0	1	0
Middle	1	09-Aug-84	324	0	0	0	0	0	0
Middle	2	09-Aug-84	329	0	0	0	0	0	0
Canaan	1	17-Oct-85	420	0			0		
Canaan	3	17-Oct-85	300	0			0		
Ingram	1	21-Aug-85	1833	1			5		
Ingram	2	21-Aug-85	5000	0			0		
Canaan	1	14-Aug-86	420	0			0		
Canaan	3	22-Aug-86	390	0			0		
Canaan	4	15-Aug-86	255	0			0		
Ingram	1	24-Jul-86	339	0	0	0	3	2	0
Ingram	2	26-Aug-86	460	0			0		
Middle	1	22-Jul-86	351	0	0	0	0	0	0
Middle	2	21-Jul-86	347	5	2	2	0	0	0
Salmon	3	17-Jul-86	150	0			0		
Salmon	5	17-Jul-86	280	0			1		
Canaan	1	11-Aug-87	420	0			0		
Canaan	3	11-Aug-87	300	0			0		
Canaan	4	11-Aug-87	255	0			0		
Ingram	1	16-Jul-87	347	7	3	3	3	1	0
Ingram	2	15-Jul-87	460	0			1		
Middle	1	02-Jul-87	351	0			0		
Middle	2	17-Jul-87	300	0	0	0	1	0	0
Salmon	2	19-Aug-87	200	0			0		
Salmon	3	19-Aug-87	150	0			0		
Salmon	4	19-Aug-87	275	0			1		
Salmon	5	19-Aug-87	280	6			12		
Canaan	1	01-Sep-88	420	0			0		
Canaan	2	01-Sep-88	300	0			0		
Canaan	3	12-Oct-88	300	0			0		
Canaan	4	12-Oct-88	255	0			0		
Ingram	1	18-Jul-88	328	18	13	3	2	2	1

Table 1. Atlantic salmon continued.

River	Site#	Date	Area (m ²)	Salmon fry	Fry 2nd pass	Fry 3rd pass	Salmon parr	Parr 2nd pass	Parr 3rd pass
Middle	2	19-Jul-88	329	5	1	7	0	1	0
Salmon	1	21-Sep-88	200	0			0		
Salmon	2	21-Sep-88	200	0			0		
Salmon	3	21-Sep-88	150	0			0		
Salmon	4	21-Sep-88	275	0			0		
Salmon	5	21-Sep-88	280	0			0		
Canaan	1	13-Jul-89	420	0			0		
Canaan	2	13-Jul-89	300	0			0		
Canaan	3	13-Jul-89	300	0			0		
Canaan	4	13-Jul-89	255	0			0		
Ingram	1	06-Jul-89	328	7	2	1	6	4	1
Middle	1	21-Jul-89	351	0			2		
Middle	2	05-Jul-89	329	0	0	1	1	0	0
Salmon	1	12-Sep-89	200	0			0		
Salmon	2	12-Sep-89	200	0			0		
Salmon	3	12-Sep-89	150	0			0		
Salmon	4	12-Sep-89	275	0			2		
Salmon	5	12-Sep-89	280	3			14		
Canaan	1	17-Jul-90	420	0			0		
Canaan	2	28-Aug-90	300	0			0		
Canaan	3	07-Sep-90	300	0			0		
Canaan	4	28-Aug-90	255	0			0		
Ingram	1	12-Jul-90	332	1	0	1	1	1	0
Ingram	2	05-Jul-90	460	0			1		
Middle	1	16-Jul-90	351	0			0		
Middle	2	16-Jul-90	347	0			0		
Salmon	1	26-Sep-90	200	0			0		
Salmon	2	26-Sep-90	200	0			0		
Salmon	3	26-Sep-90	150	0			0		
Salmon	4	26-Sep-90	275	0			0		
Salmon	5	26-Sep-90	280	2			8		
Canaan	1	30-Jul-91	420	0			0		
Canaan	2	30-Jul-91	300	0			0		
Canaan	3	30-Jul-91	300	0			0		
Canaan	4	03-Jul-91	255	0			0		
Ingram	1	03-Jul-91	327	39	23	10	2	0	0
Ingram	2	23-Jul-91	460	17			2		
Middle	1	22-Jul-91	351	0			0		
Middle	2	24-Jul-91	347	0			0		
Salmon	5	19-Sep-91	280	45			8		
Canaan	1	30-Jul-92	420	0			0		
Canaan	2	30-Jul-92	300	0			0		
Canaan	3	12-Sep-92	300	0			0		
Canaan	4	30-Jul-92	255	0			0		
Ingram	1	22-Jul-92	373	5	2	1	11	5	1
Middle	1	12-Sep-92	351	0			0		
Middle	2	15-Jul-92	339	32	13	10	0	0	0
Salmon	1	14-Oct-92	200	0			0		
Salmon	2	14-Oct-92	200	0			0		
Salmon	3	14-Oct-92	150	0			1		
Salmon	4	14-Oct-92	275	0			0		
Salmon	5	02-Sep-92	280	13			19		
Salmon	5	15-Oct-92	288	31	16	3	14	4	0
Canaan	1	01-Sep-93	420	0			0		
Canaan	2	01-Sep-93	300	0			0		

Table 1. Atlantic salmon continued.

River	Site#	Date	Area (m ²)	Salmon fry	Fry 2nd pass	Fry 3rd pass	Salmon parr	Parr 2nd pass	Parr 3rd pass
Canaan	3	01-Sep-93	300	0			0		
Canaan	4	27-Jul-93	255	0			0		
Ingram	1	13-Jul-93	327	25	9	2	3	3	1
Middle	1	27-Jul-93	351	0			1		
Middle	2	16-Jul-93	308	0	0	0	3	1	0
Salmon	5	20-Jul-93	288	36	14	9	28	9	5
Canaan	1	25-Jul-94	420	0			0		
Canaan	2	25-Jul-94	300	0			0		
Canaan	3	16-Sep-94	300	0			0		
Canaan	4	25-Jul-94	255	0			0		
Ingram	1	12-Jul-94	351	1	1	0	6	2	1
Ingram	2	27-Sep-94	460	1			4		
Middle	1	13-Jul-94	351	0			0		
Middle	2	13-Jul-94	347	0			0		
Salmon	1	15-Jul-94	200	0			0		
Salmon	2	15-Jul-94	200	0			0		
Salmon	3	26-Sep-94	150	0			4		
Salmon	4	26-Sep-94	275	0			2		
Salmon	5	26-Jul-94	269	11	3	2	17	5	0
Canaan	1	11-Sep-95	420	0			0		
Canaan	2	26-Sep-95	300	0			0		
Canaan	3	11-Sep-95	300	0			0		
Canaan	4	11-Sep-95	255	0			0		
Ingram	1	12-Jul-95	351	9	3	0	0	1	0
Ingram	2	07-Jul-95	460	1	0	0	0	0	0
Middle	1	05-Jul-95	351	0			0		
Middle	2	07-Jul-95	308	0	0	0	0	0	0
Salmon	1	15-Sep-95	200	0			0		
Salmon	2	15-Sep-95	200	0			0		
Salmon	3	15-Sep-95	150	0			0		
Salmon	4	15-Sep-95	275	0			3		
Salmon	5	01-Sep-95	269	9	4	0	4	3	0

Table 2. Speckled trout (*Salvelinus fontinalis*) fry and parr captured.

River	Site #	Date	Area (m ²)	Trout fry	T. fry 2nd pass	T. fry 3rd pass	Trout parr	T. parr 2nd pass	T. parr 3rd pass
Ingram	1	07-Jul-82	310	6	4	0	2	0	0
Ingram	2	05-Jul-82	338	0	0	0	0	0	0
Middle	1	16-Jul-82	315	0	0	0	0	0	0
Middle	2	15-Jul-82	301	0	0	0	0	0	0
Salmon	1	01-Sep-82	200	0			0		
Salmon	3	01-Sep-82	150	0			0		
Salmon	4	01-Sep-82	275	0			0		
Salmon	5	28-Jul-82	280	0			0		
Canaan	1	22-Sep-83	420	0			0		
Canaan	2	22-Sep-83	300	0			0		
Canaan	3	22-Sep-83	300	0			0		
Canaan	4	22-Sep-83	255	0			0		
Ingram	1	05-Aug-83	299	7	1	0	0	0	0
Ingram	2	04-Aug-83	563	0	1	1	0	0	0
Middle	1	16-Aug-83	348	0	0	0	0	0	0
Middle	2	10-Aug-83	355	0	0	0	0	0	0
Salmon	1	12-Aug-83	200	0			0		
Salmon	2	12-Aug-83	200	0			0		
Salmon	4	12-Aug-83	275	1			0		
Salmon	5	17-Aug-83	280	0			0		
Ingram	1	14-Aug-84	289	1	0	0	0	0	0
Ingram	2	14-Aug-84	450	0	0	0	0	0	0
Middle	1	09-Aug-84	324	0	0	0	0	0	0
Middle	2	09-Aug-84	329	0	0	0	0	0	0
Canaan	1	17-Oct-85	420	0			0		
Canaan	3	17-Oct-85	300	2			0		
Ingram	1	21-Aug-85	1833	0			0		
Ingram	2	21-Aug-85	5000	0			0		
Canaan	1	14-Aug-86	420	0			0		
Canaan	3	22-Aug-86	390	0			0		
Canaan	4	15-Aug-86	255	0			0		
Ingram	1	24-Jul-86	339	0	3	0	1	0	0
Ingram	2	26-Aug-86	460	1			1		
Middle	1	22-Jul-86	351	0	0	0	0	0	0
Middle	2	21-Jul-86	347	0	0	0	0	0	0
Salmon	3	17-Jul-86	150	0			0		
Salmon	5	17-Jul-86	280	0			0		
Canaan	1	11-Aug-87	420	0			0		
Canaan	3	11-Aug-87	300	3			0		
Canaan	4	11-Aug-87	255	2			4		
Ingram	1	16-Jul-87	347	2	0	0	0	0	0
Ingram	2	15-Jul-87	460	0			0		
Middle	1	02-Jul-87	351	0			0		
Middle	2	17-Jul-87	300	0	0	0	0	0	0
Salmon	2	19-Aug-87	200	0			0		
Salmon	3	19-Aug-87	150	0			0		
Salmon	4	19-Aug-87	275	0			0		
Salmon	5	19-Aug-87	280	0			0		
Canaan	1	01-Sep-88	420	1			0		
Canaan	2	01-Sep-88	300	0			0		

Table 2. Speckled trout continued.

River	Site #	Date	Area (m ²)	Trout fry	T. fry 2nd pass	T. fry 3rd pass	Trout parr	T. parr 2nd pass	T. parr 3rd pass
Canaan	4	12-Oct-88	255	2			0		
Ingram	1	18-Jul-88	328	3	1	0	1	0	0
Middle	1	19-Jul-88	351	0			0		
Middle	2	19-Jul-88	329	0	0	0	0	0	0
Salmon	1	21-Sep-88	200	0			0		
Salmon	2	21-Sep-88	200	0			0		
Salmon	3	21-Sep-88	150	0			0		
Salmon	4	21-Sep-88	275	0			0		
Salmon	5	21-Sep-88	280	0			0		
Canaan	1	13-Jul-89	420	0			0		
Canaan	2	13-Jul-89	300	0			0		
Canaan	3	13-Jul-89	300	0			0		
Canaan	4	13-Jul-89	255	0			0		
Ingram	1	06-Jul-89	328	0	0	0	1	0	0
Middle	1	21-Jul-89	351	0			0		
Middle	2	05-Jul-89	329	0	0	0	0	0	0
Salmon	1	12-Sep-89	200	0			0		
Salmon	2	12-Sep-89	200	0			0		
Salmon	3	12-Sep-89	150	0			0		
Salmon	4	12-Sep-89	275	0			0		
Salmon	5	12-Sep-89	280	0			0		
Canaan	1	17-Jul-90	420	0			0		
Canaan	2	28-Aug-90	300	0			0		
Canaan	3	07-Sep-90	300	3			1		
Canaan	4	28-Aug-90	255	0			0		
Ingram	1	12-Jul-90	332	3	1	0	0	0	0
Ingram	2	05-Jul-90	460	0			0		
Middle	1	16-Jul-90	351	0			0		
Middle	2	16-Jul-90	347	0			0		
Salmon	1	26-Sep-90	200	0			0		
Salmon	2	26-Sep-90	200	0			0		
Salmon	3	26-Sep-90	150	0			0		
Salmon	4	26-Sep-90	275	0			0		
Salmon	5	26-Sep-90	280	0			0		
Canaan	1	30-Jul-91	420	0			0		
Canaan	2	30-Jul-91	300	0			0		
Canaan	3	30-Jul-91	300	0			0		
Canaan	4	03-Jul-91	255	2			1		
Ingram	1	03-Jul-91	327	2	2	0	0	0	0
Ingram	2	23-Jul-91	460	0			0		
Middle	1	22-Jul-91	351	0			0		
Middle	2	24-Jul-91	347	0			0		
Salmon	5	19-Sep-91	280	1			0		
Canaan	1	30-Jul-92	420	0			0		
Canaan	2	30-Jul-92	300	0			0		
Canaan	3	12-Sep-92	300	2			3		
Canaan	4	30-Jul-92	255	6			3		
Ingram	1	22-Jul-92	373	2	0	0	1	0	0
Middle	1	12-Sep-92	351	1			0		
Middle	2	15-Jul-92	339	1	0	0	0	0	0

Table 2. Speckled trout continued.

River	Site #	Date	Area (m ²)	Trout fry	T. fry 2nd pass	T. fry 3rd pass	Trout parr	T. parr 2nd pass	T. parr 3rd pass
Salmon	1	14-Oct-92	200	0			0		
Salmon	2	14-Oct-92	200	0			1		
Salmon	3	14-Oct-92	150	1			0		
Salmon	4	14-Oct-92	275	1			0		
Salmon	5	02-Sep-92	280	0			0		
Salmon	5	15-Oct-92	288	2	3	0	0	0	0
Canaan	1	01-Sep-93	420	0			0		
Canaan	2	01-Sep-93	300	0			0		
Canaan	3	01-Sep-93	300	2			3		
Canaan	4	27-Jul-93	255	4			1		
Ingram	1	13-Jul-93	327	0	0	0	2	0	0
Middle	1	27-Jul-93	351	0			0		
Middle	2	16-Jul-93	308	0	0	0	0	0	0
Salmon	5	20-Jul-93	288	1	0	0	0	0	0
Canaan	1	25-Jul-94	420	0			0		
Canaan	2	25-Jul-94	300	0			0		
Canaan	3	16-Sep-94	300	3			3		
Canaan	4	25-Jul-94	255	0			0		
Ingram	1	12-Jul-94	351	1	0	1	1	0	0
Ingram	2	27-Sep-94	460	1			0		
Middle	1	13-Jul-94	351	0			0		
Middle	2	13-Jul-94	347	0			0		
Salmon	1	15-Jul-94	200	0			0		
Salmon	2	15-Jul-94	200	0			0		
Salmon	3	26-Sep-94	150	0			0		
Salmon	4	26-Sep-94	275	0			0		
Salmon	5	26-Jul-94	269	0	0	0	0	0	0
Canaan	1	11-Sep-95	420	0			0		
Canaan	2	26-Sep-95	300	1			1		
Canaan	3	11-Sep-95	300	1			0		
Canaan	4	11-Sep-95	255	0			0		
Ingram	1	12-Jul-95	351	2	0	0	0	0	0
Ingram	2	07-Jul-95	460	0	1	0	1	0	0
Middle	1	05-Jul-95	351	0			0		
Middle	2	07-Jul-95	308	1	1	0	0	0	0
Salmon	1	15-Sep-95	200	0			0		
Salmon	2	15-Sep-95	200	0			0		
Salmon	3	15-Sep-95	150	0			0		
Salmon	4	15-Sep-95	275	0			0		
Salmon	5	01-Sep-95	269	0	0	0	0	0	0

Table 3. American eels (*Anguilla rostrata*) and white suckers (*Catostomus commersoni*) captured.

River	Site#	Date	Area (m ²)	American eel	Eel 2nd pass	Eel 3rd pass	White sucker	W.s. 2nd pass	W.s. 3rd pass
Ingram	1	07-Jul-82	310	154	58	32	0	0	0
Ingram	2	05-Jul-82	338	60	70	48	1	0	0
Middle	1	16-Jul-82	315	93	57	38	0	0	0
Middle	2	15-Jul-82	301	67	59	52	2	3	0
Salmon	1	01-Sep-82	200	6			0		
Salmon	3	01-Sep-82	150	28			0		
Salmon	4	01-Sep-82	275	31			0		
Salmon	5	28-Jul-82	280	42			0		
Canaan	1	22-Sep-83	420	24			0		
Canaan	2	22-Sep-83	300	24			0		
Canaan	3	22-Sep-83	300	24			0		
Canaan	4	22-Sep-83	255	24			0		
Ingram	1	05-Aug-83	299	61	39	22	13	3	3
Ingram	2	04-Aug-83	563	163	118	50	1	0	0
Middle	1	16-Aug-83	348	89	37	17	0	1	0
Middle	2	10-Aug-83	355	72	47	33	1	1	2
Salmon	1	12-Aug-83	200	36			0		
Salmon	2	12-Aug-83	200	36			0		
Salmon	4	12-Aug-83	275	36			0		
Salmon	5	17-Aug-83	280	36			0		
Ingram	1	14-Aug-84	289	12	11	5	1	0	0
Ingram	2	14-Aug-84	450	57	38	14	4	3	0
Middle	1	09-Aug-84	324	42	24	9	0	0	0
Middle	2	09-Aug-84	329	46	30	17	1	5	2
Canaan	1	17-Oct-85	420	15			0		
Canaan	3	17-Oct-85	300	6			0		
Ingram	1	21-Aug-85	1833	155			0		
Ingram	2	21-Aug-85	5000	207			1		
Canaan	1	14-Aug-86	420	30			0		
Canaan	3	22-Aug-86	390	15			0		
Canaan	4	15-Aug-86	255	10			0		
Ingram	1	24-Jul-86	339	78	42	17	0	0	0
Ingram	2	26-Aug-86	460	63			0		
Middle	1	22-Jul-86	351	61	16	29	0	0	0
Middle	2	21-Jul-86	347	110	49	42	4	0	0
Salmon	3	17-Jul-86	150	36			2		
Salmon	5	17-Jul-86	280	48			0		
Canaan	1	11-Aug-87	420	36			0		
Canaan	3	11-Aug-87	300	28			0		
Canaan	4	11-Aug-87	255	12			0		
Ingram	1	16-Jul-87	347	71	22	21	7	1	0
Ingram	2	15-Jul-87	460	77			4		
Middle	1	02-Jul-87	351	62			0		
Middle	2	17-Jul-87	300	146	63	46	0	0	0
Salmon	2	19-Aug-87	200	51			0		
Salmon	3	19-Aug-87	150	40			0		
Salmon	4	19-Aug-87	275	91			0		
Salmon	5	19-Aug-87	280	21			0		
Canaan	1	01-Sep-88	420	39			0		
Canaan	2	01-Sep-88	300	19			0		

Table 3. American eels and white suckers continued.

River	Site#	Date	Area (m ²)	American eel	Eel 2nd pass	Eel 3rd pass	White sucker	W.s. 2nd pass	W.s. 3rd pass
Canaan	4	12-Oct-88	255	12			0		
Ingram	1	18-Jul-88	328	49	36	18	1	5	4
Middle	1	19-Jul-88	351	137			0		
Middle	2	19-Jul-88	329	63	38	21	3	0	0
Salmon	1	21-Sep-88	200	14			0		
Salmon	2	21-Sep-88	200	7			0		
Salmon	3	21-Sep-88	150	28			0		
Salmon	4	21-Sep-88	275	19			0		
Salmon	5	21-Sep-88	280	28			0		
Canaan	1	13-Jul-89	420	59			0		
Canaan	2	13-Jul-89	300	24			0		
Canaan	3	13-Jul-89	300	18			0		
Canaan	4	13-Jul-89	255	21			0		
Ingram	1	06-Jul-89	328	44	30	20	0	1	2
Middle	1	21-Jul-89	351	32			1		
Middle	2	05-Jul-89	329	57	26	18	0	0	0
Salmon	1	12-Sep-89	200	28			0		
Salmon	2	12-Sep-89	200	41			0		
Salmon	3	12-Sep-89	150	45			0		
Salmon	4	12-Sep-89	275	54			0		
Salmon	5	12-Sep-89	280	68			0		
Canaan	1	17-Jul-90	420	35			0		
Canaan	2	28-Aug-90	300	41			0		
Canaan	3	07-Sep-90	300	27			0		
Canaan	4	28-Aug-90	255	19			3		
Ingram	1	12-Jul-90	332	48	44	36	0	0	0
Ingram	2	05-Jul-90	460	40			0		
Middle	1	16-Jul-90	351	68			1		
Middle	2	16-Jul-90	347	74			2		
Salmon	1	26-Sep-90	200	17			0		
Salmon	2	26-Sep-90	200	29			0		
Salmon	3	26-Sep-90	150	49			0		
Salmon	4	26-Sep-90	275	27			0		
Salmon	5	26-Sep-90	280	17			0		
Canaan	1	30-Jul-91	420	36			0		
Canaan	2	30-Jul-91	300	23			0		
Canaan	3	30-Jul-91	300	53			0		
Canaan	4	03-Jul-91	255	21			1		
Ingram	1	03-Jul-91	327	9	14	12	2	0	0
Ingram	2	23-Jul-91	460	109			5		
Middle	1	22-Jul-91	351	92			0		
Middle	2	24-Jul-91	347	58			54		
Salmon	5	19-Sep-91	280	50			0		
Canaan	1	30-Jul-92	420	38			0		
Canaan	2	30-Jul-92	300	23			0		
Canaan	3	12-Sep-92	300	18			0		
Canaan	4	30-Jul-92	255	12			0		
Ingram	1	22-Jul-92	373	49	18	16	0	1	0
Middle	1	12-Sep-92	351	102			1		
Middle	2	15-Jul-92	339	99	51	22	4	5	2
Salmon	1	14-Oct-92	200	9			0		

Table 3. American eels and white suckers continued.

River	Site#	Date	Area (m ²)	American eel	Eel 2nd pass	Eel 3rd pass	White sucker	W.s. 2nd pass	W.s. 3rd pass
Salmon	2	14-Oct-92	200	47			0		
Salmon	3	14-Oct-92	150	96			0		
Salmon	4	14-Oct-92	275	66			0		
Salmon	5	02-Sep-92	280	56			0		
Salmon	5	15-Oct-92	288	25	17	10	2	0	0
Canaan	1	01-Sep-93	420	55			0		
Canaan	2	01-Sep-93	300	17			0		
Canaan	3	01-Sep-93	300	15			0		
Canaan	4	27-Jul-93	255	8			0		
Ingram	1	13-Jul-93	327	126	206	123	1	0	1
Middle	1	27-Jul-93	351	76			0		
Middle	2	16-Jul-93	308	89	38	9	0	0	0
Salmon	5	20-Jul-93	288	91	65	33	2	1	1
Canaan	1	25-Jul-94	420	50			0		
Canaan	2	25-Jul-94	300	25			0		
Canaan	3	16-Sep-94	300	10			0		
Canaan	4	25-Jul-94	255	4			0		
Ingram	1	12-Jul-94	351	27	28	25	0	0	0
Ingram	2	27-Sep-94	460	49			1		
Middle	1	13-Jul-94	351	30			0		
Middle	2	13-Jul-94	347	40			3		
Salmon	1	15-Jul-94	200	9			0		
Salmon	2	15-Jul-94	200	21			0		
Salmon	3	26-Sep-94	150	12			5		
Salmon	4	26-Sep-94	275	18			3		
Salmon	5	26-Jul-94	269	39	22	22	5	5	10
Canaan	1	11-Sep-95	420	31			0		
Canaan	2	26-Sep-95	300	14			0		
Canaan	3	11-Sep-95	300	8			0		
Canaan	4	11-Sep-95	255	11			8		
Ingram	1	12-Jul-95	351	70	53	27	1	1	1
Ingram	2	07-Jul-95	460	90	51	40	0	0	0
Middle	1	05-Jul-95	351	70			0		
Middle	2	07-Jul-95	308	81	42	26	0	0	0
Salmon	1	15-Sep-95	200	14			0		
Salmon	2	15-Sep-95	200	24			0		
Salmon	3	15-Sep-95	150	75			0		
Salmon	4	15-Sep-95	275	45			0		
Salmon	5	01-Sep-95	269	60	38	29	0	0	1

Table 4. Lake chub (*Couesius plumbeus*) and banded killifish (*Fundulus diaphanus*) captured.

River	Site#	Date	Area (m ²)	Lake chub	Chub. 2nd pass	Chub 3rd pass	Killifish	Killi. 2nd pass	Killi. 3rd pass
Ingram	1	07-Jul-82	310	0	0		0	0	0
Ingram	2	05-Jul-82	338	0	0	0	0	0	0
Middle	1	16-Jul-82	315	0	0	0	3	1	1
Middle	2	15-Jul-82	301	1	1	0	0	1	0
Salmon	1	01-Sep-82	200	0			0		
Salmon	3	01-Sep-82	150	0			0		
Salmon	4	01-Sep-82	275	0			0		
Salmon	5	28-Jul-82	280	0			0		
Canaan	1	22-Sep-83	420	0			0		
Canaan	2	22-Sep-83	300	0			0		
Canaan	3	22-Sep-83	300	0			0		
Canaan	4	22-Sep-83	255	0			0		
Ingram	1	05-Aug-83	299	0	0	0	0	0	0
Ingram	2	04-Aug-83	563	0	0	0	0	0	0
Middle	1	16-Aug-83	348	0	1	1	1	0	1
Middle	2	10-Aug-83	355	2	3	0	0	0	0
Salmon	1	12-Aug-83	200	0			0		
Salmon	2	12-Aug-83	200	0			0		
Salmon	4	12-Aug-83	275	0			0		
Salmon	5	17-Aug-83	280	0			0		
Ingram	1	14-Aug-84	290	0	0	0	0	0	0
Ingram	2	14-Aug-84	450	0	0	0	0	0	0
Middle	1	09-Aug-84	324	0	0	0	1	1	0
Middle	2	09-Aug-84	329	0	0	0	0	0	0
Canaan	1	17-Oct-85	420	0			0		
Canaan	3	17-Oct-85	300	0			0		
Ingram	1	21-Aug-85	1833	0			0		
Ingram	2	21-Aug-85	5000	0			0		
Canaan	1	14-Aug-86	420	0			0		
Canaan	3	22-Aug-86	390	0			0		
Canaan	4	15-Aug-86	255	0			0		
Ingram	1	24-Jul-86	339	0	0	0	0	0	0
Ingram	2	26-Aug-86	460	0			0		
Middle	1	22-Jul-86	351	0	1	0	1	0	0
Middle	2	21-Jul-86	347	0	3	1	0	0	0
Salmon	3	17-Jul-86	150	0			0		
Salmon	5	17-Jul-86	280	0			0		
Canaan	1	11-Aug-87	420	0			0		
Canaan	3	11-Aug-87	300	1			0		
Canaan	4	11-Aug-87	255	2			0		
Ingram	1	16-Jul-87	347	0	0	0	0	0	0
Ingram	2	15-Jul-87	460	0			0		
Middle	1	02-Jul-87	351	0			1		
Middle	2	17-Jul-87	300	22	6	5	0	0	0
Salmon	2	19-Aug-87	200	0			0		
Salmon	3	19-Aug-87	150	0			0		
Salmon	4	19-Aug-87	275	0			0		
Salmon	5	19-Aug-87	280	0			0		
Canaan	1	01-Sep-88	420	0			0		
Canaan	2	01-Sep-88	300	1			0		
Canaan	3	12-Oct-88	300	0			0		

Table 4. Lake chub and banded killifish continued.

River	Site#	Date	Area (m ²)	Lake chub	Chub. 2nd pass	Chub 3rd pass	Killifish	Killi. 2nd pass	Killi. 3rd pass
Ingram	1	18-Jul-88	328	0	0	0	0	0	0
Middle	1	19-Jul-88	351	2			4		
Middle	2	19-Jul-88	329	0	4	3	0	0	0
Salmon	1	21-Sep-88	200	0			0		
Salmon	2	21-Sep-88	200	0			0		
Salmon	3	21-Sep-88	150	0			0		
Salmon	4	21-Sep-88	275	0			0		
Salmon	5	21-Sep-88	280	0			0		
Canaan	1	13-Jul-89	420	2			0		
Canaan	2	13-Jul-89	300	0			0		
Canaan	3	13-Jul-89	300	2			0		
Canaan	4	13-Jul-89	255	6			0		
Ingram	1	06-Jul-89	328	0	0	0	0	0	0
Middle	1	21-Jul-89	351	0			0		
Middle	2	05-Jul-89	329	0	0	0	1	0	0
Salmon	1	12-Sep-89	200	0			0		
Salmon	2	12-Sep-89	200	0			0		
Salmon	3	12-Sep-89	150	0			0		
Salmon	4	12-Sep-89	275	0			0		
Salmon	5	12-Sep-89	280	0			0		
Canaan	1	17-Jul-90	420	0			0		
Canaan	2	28-Aug-90	300	1			0		
Canaan	3	07-Sep-90	300	0			0		
Canaan	4	28-Aug-90	255	6			0		
Ingram	1	12-Jul-90	332	0	0	0	0	0	0
Ingram	2	05-Jul-90	460	0			0		
Middle	1	16-Jul-90	351	1			1		
Middle	2	16-Jul-90	347	1			0		
Salmon	1	26-Sep-90	200	0			0		
Salmon	2	26-Sep-90	200	0			0		
Salmon	3	26-Sep-90	150	0			2		
Salmon	4	26-Sep-90	275	0			0		
Salmon	5	26-Sep-90	280	0			0		
Canaan	1	30-Jul-91	420	0			0		
Canaan	2	30-Jul-91	300	0			0		
Canaan	3	30-Jul-91	300	2			0		
Canaan	4	03-Jul-91	255	0			0		
Ingram	1	03-Jul-91	327	0	0	0	0	0	0
Ingram	2	23-Jul-91	460	0			0		
Middle	1	22-Jul-91	351	1			6		
Middle	2	24-Jul-91	347	36			0		
Salmon	5	19-Sep-91	280	0			0		
Canaan	1	30-Jul-92	420	0			0		
Canaan	2	30-Jul-92	300	0			0		
Canaan	3	12-Sep-92	300	1			0		
Canaan	4	30-Jul-92	255	7			0		
Ingram	1	22-Jul-92	373	0	0	0	0	0	0
Middle	1	12-Sep-92	351	2			2		
Middle	2	15-Jul-92	339	1	0	0	3	3	0
Salmon	1	14-Oct-92	200	0			0		
Salmon	2	14-Oct-92	200	0			0		

Table 4. Lake chub and banded killifish continued.

River	Site#	Date	Area (m ²)	Lake chub	Chub. 2nd pass	Chub 3rd pass	Killifish	Killi. 2nd pass	Killi. 3rd pass
Salmon	3	14-Oct-92	150	0			1		
Salmon	4	14-Oct-92	275	0			0		
Salmon	5	02-Sep-92	280	0			0		
Salmon	5	15-Oct-92	288	0	0	0	0	0	0
Canaan	1	01-Sep-93	420	0			0		
Canaan	2	01-Sep-93	300	1			0		
Canaan	3	01-Sep-93	300	2			0		
Canaan	4	27-Jul-93	255	1			0		
Ingram	1	13-Jul-93	327	0	0	0	0	0	0
Middle	1	27-Jul-93	351	4			1		
Middle	2	16-Jul-93	309	2	1	0	1	3	1
Salmon	5	20-Jul-93	288	0	0	0	2	1	0
Canaan	1	25-Jul-94	420	0			0		
Canaan	2	25-Jul-94	300	1			0		
Canaan	3	16-Sep-94	300	4			0		
Canaan	4	25-Jul-94	255	2			0		
Ingram	1	12-Jul-94	351	0	0	0	0	0	0
Ingram	2	27-Sep-94	460	0			0		
Middle	1	13-Jul-94	351	0			3		
Middle	2	13-Jul-94	347	9			0		
Salmon	1	15-Jul-94	200	0			0		
Salmon	2	15-Jul-94	200	0			0		
Salmon	3	26-Sep-94	150	0			0		
Salmon	4	26-Sep-94	275	0			1		
Salmon	5	26-Jul-94	269	0	0	0	0	0	0
Canaan	1	11-Sep-95	420	0			0		
Canaan	2	26-Sep-95	300	3			0		
Canaan	3	11-Sep-95	300	1			0		
Canaan	4	11-Sep-95	255	6			0		
Ingram	1	12-Jul-95	351	0	0	0	0	0	0
Ingram	2	07-Jul-95	460	0	0	0	0	0	0
Middle	1	05-Jul-95	351	0			1		
Middle	2	07-Jul-95	308	4	1	0	3	0	2
Salmon	1	15-Sep-95	200	0			0		
Salmon	2	15-Sep-95	200	0			0		
Salmon	3	15-Sep-95	150	0			7		
Salmon	4	15-Sep-95	275	0			3		
Salmon	5	01-Sep-95	269	0	0	0	1	0	0

Table 5. Nine-spine sticklebacks (*Pungitius pungitius*) and yellow perch (*Perca flavescens*) captured

River	Site#	Date	Area (m ²)	Stickleback	Sti.		Yellow perch	Y. p.	
					2nd pass	3rd pass		2nd pass	3rd pass
Ingram	1	07-Jul-82	310	0	0	0	0	0	0
Ingram	2	05-Jul-82	338	0	0	0	0	0	0
Middle	1	16-Jul-82	315	0	0	0	0	0	0
Middle	2	15-Jul-82	301	0	0	0	0	0	0
Salmon	1	01-Sep-82	200	0			0		
Salmon	3	01-Sep-82	150	0			0		
Salmon	4	01-Sep-82	275	0			0		
Salmon	5	28-Jul-82	280	0			0		
Canaan	1	22-Sep-83	420	0			0		
Canaan	2	22-Sep-83	300	0			0		
Canaan	3	22-Sep-83	300	0			0		
Canaan	4	22-Sep-83	255	0			0		
Ingram	1	05-Aug-83	299	0	0	0	0	0	0
Ingram	2	04-Aug-83	563	0	0	0	0	0	0
Middle	1	16-Aug-83	348	0	0	0	0	0	0
Middle	2	10-Aug-83	355	0	0	0	0	0	0
Salmon	1	12-Aug-83	200	0			0		
Salmon	2	12-Aug-83	200	0			0		
Salmon	4	12-Aug-83	275	0			0		
Salmon	5	17-Aug-83	280	0			0		
Ingram	1	14-Aug-84	289	0	0	0	0	0	0
Ingram	2	14-Aug-84	450	0	0	0	0	0	0
Middle	1	09-Aug-84	324	0	0	0	0	0	0
Middle	2	09-Aug-84	329	0	0	0	0	0	0
Canaan	1	17-Oct-85	420	0			0		
Canaan	3	17-Oct-85	300	0			0		
Ingram	1	21-Aug-85	1833	0			0		
Ingram	2	21-Aug-85	5000	0			0		
Canaan	1	14-Aug-86	420	0			0		
Canaan	3	22-Aug-86	390	0			0		
Canaan	4	15-Aug-86	255	0			0		
Ingram	1	24-Jul-86	339	0	0	0	0	0	0
Ingram	2	26-Aug-86	460	0			0		
Middle	1	22-Jul-86	351	0	0	0	0	0	0
Middle	2	21-Jul-86	347	0	0	0	0	0	0
Salmon	3	17-Jul-86	150	0			0		
Salmon	5	17-Jul-86	280	0			0		
Canaan	1	11-Aug-87	420	0			0		
Canaan	3	11-Aug-87	300	0			0		
Canaan	4	11-Aug-87	255	0			0		
Ingram	1	16-Jul-87	347	0	0	0	0	0	0
Ingram	2	15-Jul-87	460	0			0		
Middle	1	02-Jul-87	351	0			0		
Middle	2	17-Jul-87	300	0	0	0	0	0	0
Salmon	2	19-Aug-87	200	0			0		
Salmon	3	19-Aug-87	150	0			0		
Salmon	4	19-Aug-87	275	0			0		
Salmon	5	19-Aug-87	280	0			0		
Canaan	1	01-Sep-88	420	0			0		
Canaan	2	01-Sep-88	300	0			1		
Canaan	3	12-Oct-88	300	0			0		
Canaan	4	12-Oct-88	255	0			0		
Ingram	1	18-Jul-88	328	0	0	0	0	0	0
Middle	1	19-Jul-88	351	0			0		

Table 5. Nine-spine sticklebacks and yellow perch continued.

River	Site#	Date	Area (m ²)	Stickleback	Sti. 2nd pass	Sti. 3rd pass	Yellow perch	Y. p. 2nd pass	Y. p. 3rd pass
Middle	2	19-Jul-88	329	0	0	0	0	0	0
Salmon	2	21-Sep-88	200	0			0		
Salmon	3	21-Sep-88	150	0			0		
Salmon	4	21-Sep-88	275	0			0		
Salmon	5	21-Sep-88	280	0			0		
Canaan	1	13-Jul-89	420	0			0		
Canaan	2	13-Jul-89	300	0			0		
Canaan	3	13-Jul-89	300	0			0		
Canaan	4	13-Jul-89	255	0			1		
Ingram	1	06-Jul-89	328	0	0	0	0	0	0
Middle	1	21-Jul-89	351	0			0		
Middle	2	05-Jul-89	329	0	0	0	0	0	0
Salmon	1	12-Sep-89	200	0			0		
Salmon	2	12-Sep-89	200	0			0		
Salmon	3	12-Sep-89	150	0			0		
Salmon	4	12-Sep-89	275	0			0		
Salmon	5	12-Sep-89	280	0			0		
Canaan	1	17-Jul-90	420	0			0		
Canaan	2	28-Aug-90	300	0			2		
Canaan	3	07-Sep-90	300	0			1		
Canaan	4	28-Aug-90	255	0			2		
Ingram	1	12-Jul-90	332	0	0	0	0	0	0
Ingram	2	05-Jul-90	460	0			0		
Middle	1	16-Jul-90	351	0			1		
Middle	2	16-Jul-90	347	0			0		
Salmon	1	26-Sep-90	200	0			0		
Salmon	2	26-Sep-90	200	0			0		
Salmon	3	26-Sep-90	150	0			0		
Salmon	4	26-Sep-90	275	0			0		
Salmon	5	26-Sep-90	280	0			0		
Canaan	1	30-Jul-91	420	0			1		
Canaan	2	30-Jul-91	300	0			0		
Canaan	3	30-Jul-91	300	0			1		
Canaan	4	03-Jul-91	255	0			0		
Ingram	1	03-Jul-91	327	0	0	0	0	0	0
Ingram	2	23-Jul-91	460	0			0		
Middle	1	22-Jul-91	351	0			0		
Middle	2	24-Jul-91	347	0			0		
Salmon	5	19-Sep-91	280	0			0		
Canaan	1	30-Jul-92	420	0			0		
Canaan	2	30-Jul-92	300	0			0		
Canaan	3	12-Sep-92	300	0			0		
Canaan	4	30-Jul-92	255	0			1		
Ingram	1	22-Jul-92	373	0	0	0	1	0	0
Middle	1	12-Sep-92	351	0			0		
Middle	2	15-Jul-92	339	0	0	0	0	0	0
Salmon	1	14-Oct-92	200	0			0		
Salmon	2	14-Oct-92	200	0			0		
Salmon	3	14-Oct-92	150	1			0		
Salmon	4	14-Oct-92	275	5			0		
Salmon	5	02-Sep-92	280	0			0		
Salmon	5	15-Oct-92	288	0	0	0	0	0	0
Canaan	1	01-Sep-93	420	0			0		
Canaan	2	01-Sep-93	300	0			0		
Canaan	3	01-Sep-93	300	0			0		

Table 5. Nine-spine sticklebacks and yellow perch continued.

River	Site#	Date	Area (m ²)	Stickleback	Sti. 2nd pass	Sti. 3rd pass	Yellow perch	Y. p. 2nd pass	Y. p. 3rd pass
Canaan	4	27-Jul-93	255	0			0		
Ingram	1	13-Jul-93	327	0	0	0	0	0	0
Middle	1	27-Jul-93	351	0			0		
Middle	2	16-Jul-93	308	0	0	0	0	0	0
Salmon	5	20-Jul-93	288	0	0	0	0	0	0
Canaan	1	25-Jul-94	420	0			0		
Canaan	2	25-Jul-94	300	0			0		
Canaan	3	16-Sep-94	300	0			0		
Canaan	4	25-Jul-94	255	0			0		
Ingram	1	12-Jul-94	351	0	0	0	0	0	0
Ingram	2	27-Sep-94	460	0			1		
Middle	1	13-Jul-94	351	0			0		
Middle	2	13-Jul-94	347	0			0		
Salmon	1	15-Jul-94	200	0			0		
Salmon	2	15-Jul-94	200	0			0		
Salmon	3	26-Sep-94	150	0			0		
Salmon	4	26-Sep-94	275	0			0		
Salmon	5	26-Jul-94	269	0	0	0	0	0	0
Canaan	1	11-Sep-95	420	0			0		
Canaan	2	26-Sep-95	300	0			4		
Canaan	3	11-Sep-95	300	0			0		
Canaan	4	11-Sep-95	255	0			0		
Ingram	1	12-Jul-95	351	0	0	0	0	0	0
Ingram	2	07-Jul-95	460	0	0	0	0	0	0
Middle	1	05-Jul-95	351	0			1		
Middle	2	07-Jul-95	308	0	0	0	0	0	0
Salmon	1	15-Sep-95	200	0			0		
Salmon	2	15-Sep-95	200	0			0		
Salmon	3	15-Sep-95	150	0			0		
Salmon	4	15-Sep-95	275	0			0		
Salmon	5	01-Sep-95	269	0	0	0	0	0	0

