Population Densities of Juvenile Atlantic Salmon in Several Nova Scotia Streams

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ABSTRACT

Gray, R.W., J.D. Cameron and E.M. Jefferson. 1978. Population densities of juvenile Atlantic salmon in several Nova Scotia streams. Fish. Mar. Serv. Data Rep. No. 105, 65 p.

This report summarizes the electrofishing data collected on the St. Mary's, West, LaHave, Stewiacke, Shubenacadie, Economy and Maccan rivers from 1966-77, and estimates the density of juvenile Atlantic salmon and other freshwater species by the catch per unit effort method described by DeLury (1951). Data on age and length relationships, the location of the sites examined and the total area sampled on each river are presented.

Key words: stock assessment, Atlantic salmon, other freshwater species, Nova Scotia, electrofishing, juvenile salmon densities, age/length relationships, miscellaneous data.

RESUME

Gray, R.W., J.D. Cameron and E.M. Jefferson. 1978. Population densities of juvenile Atlantic salmon in several Nova Scotia streams. Fish. Mar. Serv. Data Rep. No. 105, 65 p.

Ce rapport résume les données de pêche électrique provenant des rivières St. Mary's, West, LaHave, Stewiacke, Shubenacadie, Economy et Maccan pour les années de 1966 a 1977. Il contient un estimé de la densité des saumons Atlantique juvéniles et autres espèces d'eaux douces d'après la méthode décrite par DeLury (1951) et basee sur la prise par unité d'effort. Des données sur la relation age - longueur, la location des lieux d'échantillonnage et la superficie échantillonnée totale y sont presentées.

Mots cles: évaluation du peuplement, saumon Atlantique, autres espèces d'eaux douces, Nouvelle Ecosse, pêche électric, densité des saumons juvéniles, le rapport age/longueur, informations diverses.

INTRODUCTION

In mainland Nova Scotia, Atlantic salmon (*Salmo salar* L.) inhabit roughly 75 different rivers, each having its own distinct genetic stock. Consequently, the diversity and complexity of these stocks, coupled with the exploitation pressures from "home" recreational and commercial fisheries and the high seas fisheries presents a significant management challenge. The data base from which biological advice is provided to regulate these stocks originates from three sources: (1) catch statistics from recreational and commercial fisheries supplied by the Conservation and Protection Division, (2) tagging studies, and (3) juvenile-salmon investigations. Although tagging and recapture methods have been used in some New Brunswick rivers to estimate population size, stock assessment investigations in Nova Scotia have not been funded to a level which would allow this approach. Consequently, biological advice for regulating the various stocks has been based to a large extent on catch statistics and juvenile salmon assessment studies in fresh water. Although this approach has been used for some years, the inadequacies of the catch data and paucity of the juvenile data on which this advice is provided are evident.

At least four distinct salmon management zones exist for mainland Nova Scotia stocks: (1) Eastern Shore, (2) South Shore, (3) Inner Fundy, and (4) Northumberland Strait. The purpose of this report is to summarize the juvenile salmon and other freshwater species data collected by electrofishing in recent years from streams in these areas (Fig. 1). If the intense demand for the salmon resource in these areas continues, an expanded stock assessment and enhancement program aimed at rebuilding these salmon populations will be required.

MATERIALS AND METHODS

Many of the streams surveyed during these investigations were inaccessible for much of their length; consequently, sites were selected on the basis of their accessibility by 4-wheel drive vehicles and being representative of juvenile salmon habitat under normal water conditions. In every case, riffle areas comprised more than 50% of the site. In areas where predominantly fry were observed, the substrate was mainly gravel; whereas parr were found in areas with faster water velocity and larger substrate, usually greater than 25 cm. Most sites averaged 18 cm in depth and 300-400 m^2 in area. As much as possible, the same sites were repeated each year to provide continuity in the data; however, changes in the river bed sometimes necessitated eliminating a site because it was no longer representative. Other species taken in these studies were incidental to the juvenile salmon, and indicate the co-existence of these species with young salmon in these areas.

Two different types of electrofishing equipment were used during these investigations. One unit consisted of a DC generator designed by the Department of Fisheries and Environment, Freshwater and Anadromous Division (Engineering Drawing M-B-470) and constructed by the Nova Scotia Armature Works, Halifax, Nova Scotia. The second unit was a model VVP-2C variable-voltage pulsator, supplied by Coffelt Electronics Co. Inc., Englewood, California. Depending on water conductivity, voltages of 250-550 were required to provide a current of 0.2-0.8 ampres to narcotize juvenile Atlantic salmon.

Each site selected for study was enclosed by barrier nets made of Dupont knotless nylon, with a mesh size of 4 mm by 8 mm, to prevent both recruitment and escapement of fish from the areas being examined. A burlap or jute strip was sewn along the bottom of each barrier net on which rocks were placed to prevent fish from getting past the barrier. The top of each barrier net was raised above the water surface by specially cut notched poles. A copper ground screen, the cathode, was immersed in the water outside the enclosed area, and was connected by a rubber-coated lead wire to the generator. An electrical current was introduced into the water when the probe operator carrying the anode attached to a non-conductive handle pushed the deadman switch completing the circuit. As fishwere narcotized around the anode, they were collected in a special non-conductive dip net as described by Ducharme (1969). From 1966 to 1968, the Pollet apron seine, described by Elson (1962), was used downstream from the probe operator and dipper to collect fish narcotized and swept downstream past the dipper, and to prevent the escape of fish affected only by the periphery of the electrical field. In areas where fish densities were low, it was found that this apron seine could be eliminated without adversely affecting results. However, in sites with high water velocities or high fish densities, use of the apron seine is recommended. In these studies, in order to conserve manpower, the apron seine was not used after 1968. Electrofishing was usually carried out starting upstream and working downstream to the lower barrier, making sweeps across the stream perpendicular to the water flow. After each sweep of the site was completed, a ten-minute pause was taken to allow fish to normalize; sweeps of the site continued until no juvenile salmon were taken or until completion of six equal-time sweeps of the site. Estimates of the density of each species were calculated by the catch per unit effort method described by DeLury (1951).

RESULTS

The results of these electrofishing surveys – including fish densities, age distribution, age-length distribution and various other sampling-site parameters – are summarized in tabular form (Tables 1-33, and Appendices A-H). Maps of the various watersheds concerned are presented (Figs. 1, 2 and 4-11) and length-frequency distributions of parr in the St. Mary's River (1976) and Maccan River (1977) are illustrated (Figs. 3 and 12, respectively).

TABLE 1. A summary of juvenile Atlantic salmon densities per 100 m^2 in the St. Mary's River, as determined from electrofishing operations in 1969[1], 1975 and 1976.

Location/Site number	Salmon fry			Salmon parr		
	1969	1975	1976	1969	1975	1976
Archibald Brook						
1	3.0		19.4	6.2		3.3
East Branch						
2	13.6		21.5	6.6		2.2
3		12.1	37.6		0.0	0.0
4		51.4	60.2		1.7	5.0
5			48.3			2.6
6		13.7	14.5		6.9	0.3
7	10.1	55.0	5.5	21.3	7.2	10.2
9		8.9	4.7		8.1	1.9
11		46.2			1.9	
12	0.7	29.9	0.3	17.2	12.0	10.3
16		15.8	0.5		6.8	6.6
18			31.5			0.9
19	160.3		16.7	18.3		7.9
Mean	46.2	29.1	21.9	15.9	5.6	4.4
SD	76.28	19.17	20.18	6.41	4.02	3.86
West Branch						
21	15.2	17.6	0.3	4.4	0.0	0.0
22		2.6			22.7	
23		8.9			3.2	
24	9.1	13.9		2.5	6.8	
25	1.3		0.8	3.7		2.2
26			0.4			3.3
27	14.8		8.1	2.2		3.8
Mean	10.1	10.8	2.4	3.2	8.2	2.3
SD	6.49	6.50	3.81	1.03	10.07	1.69
St. Mary's River						
Mean	25.3	23.0	16.9	9.2	6.4	3.8
SD	50.92	18.09	18.70	7.55	6.29	3.36
Total area sampled (m^2)	3,429.5	2,125.6	5,363.5	3,429.5	2,125.6	5,363.5
Mean area (m^2)	381.1	177.1	335.2	381.1	177.1	335.2
Total number collected (actual)	627	443	744	237	139	150

[1]Raw data was obtained from studies carried out by Semple (1969). Unpublished Report, 8 p., Freshwater and Anadromous Division, Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 2. A summary of the densities per 100 m^2 of other species captured in the St. Mary's River during electrofishing operations for Atlantic salmon in 1969[1].

Location/Site number	American eel	Cyprinidae	White sucker	Lamprey	Stickleback	Brook trout
Arichbald Brook						
1	31.6	2.2	0.9	0.0	0.0	0.0
East Branch						
2	23.6	0.0	0.0	1.9	0.0	0.0
7	24.2	0.3	0.0	0.0	0.0	0.0
12	3.7	0.8	0.0	0.0	0.0	7.3
19	8.1	0.0	0.0	6.6	0.0	9.3
Mean	14.9	0.3	0.0	2.1	0.0	4.2
SD	10.55	0.38	0.00	3.11	0.00	4.86
West Branch						
21	21.0	2.6	0.0	0.6	0.0	0.0
24	21.6	50.5	14.9	10.2	0.0	0.0
25	25.2	13.5	5.0	0.0	0.0	0.0
27	32.2	69.1	33.4	0.0	3.5	0.3
Mean	25.0	33.9	13.3	2.7	0.9	0.1
SD	5.15	31.15	14.75	5.00	1.75	0.15
St. Mary's River						
Mean	21.2	15.4	6.0	2.1	0.4	1.9
SD	9.60	25.92	11.39	3.71	1.17	3.68

[1]Raw data were obtained from studies carried out by Semple (1969). Unpublished Report, 8 p., Freshwater and Anadromous Division, Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 3. A summary of the densities per 100 m^2 of other species captured in the St. Mary's River during electrofishing operations for Atlantic salmon in 1975 and 1976.

Location/Site number	American eel	Cyprinidae	White sucker	Lamprey	Stickleback	Brook trout
1 9 7 5						
East Branch						
3	27.4	1.3	2.6	0.3	0.0	0.0
4	19.3	30.1	25.5	3.4	0.0	0.0
6	45.4	69.7	9.6	0.0	0.0	0.0
7	25.3	4.7	0.0	0.0	0.0	0.0
9	0.0	15.7	28.2	2.2	1.0	0.0
11	0.0	77.3	132.3	7.7	0.0	0.0
12	3.1	0.5	1.9	2.3	0.9	0.0
16	40.9	4.1	18.4	0.7	0.0	0.0
Mean	20.2	25.4	27.3	2.1	0.2	0.0
SD	17.93	31.29	43.79	2.59	0.44	0.00
West Branch						
21	42.0	18.2	16.0	3.0	0.0	0.0
22	21.7	4.4	11.5	0.0	0.0	0.0
23	24.2	7.8	4.6	0.0	0.0	3.0
24	20.1	24.1	22.1	1.1	0.0	1.1
Mean	27.0	13.6	13.6	1.0	0.0	1.0
SD	10.14	9.12	7.38	1.42	0.00	1.42
St. Mary's River						
Mean	22.5	21.5	22.7	1.7	0.2	0.3
SD	15.62	26.07	35.79	2.26	0.37	0.89
1 9 7 6						
Archibald Brook						
1	39.0	0.5	12.8	0.0	0.0	0.0
East Branch						
2	40.6	6.1	1.4	0.3	0.0	0.0
3	59.3	7.9	0.0	1.0	0.0	0.0
4	17.9	9.7	8.1	0.4	0.0	0.0
5	30.3	16.1	4.1	1.2	0.0	0.0
6	15.8	8.8	1.0	0.0	0.0	0.0
7	10.2	17.5	9.6	1.7	0.8	0.0
9	21.6	54.8	11.8	0.9	0.0	0.0
12	6.5	1.8	7.9	0.0	0.0	2.6
16	42.9	4.3	3.9	0.0	0.0	0.0
18	10.4	16.5	2.7	0.5	0.0	0.0
19	3.5	36.0	25.1	6.1	0.6	0.0
Mean	23.6	16.3	6.9	1.1	0.1	0.2
SD	17.69	15.81	7.16	1.75	0.29	0.78
West Branch						
21	10.0	2.8	8.8	0.3	0.0	0.0
25	10.5	10.9	2.6	0.0	0.0	0.0
26	23.8	19.8	16.2	0.0	0.3	0.0
27	21.0	4.4	1.0	0.0	0.0	0.0
Mean	16.3	9.5	7.2	0.1	0.1	0.0
SD	7.11	7.72	6.91	0.15	0.15	0.00
St. Mary's River						
Mean	22.7	13.6	7.3	0.8	0.1	0.2
SD	15.74	14.14	6.77	1.51	0.25	0.65

TABLE 4. A summary of miscellaneous data collected on the sites electrofished on the St. Mary's River in 1969[1], 1975 and 1976.

Year/Site number	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH
1969					
1	Sep 18	346.9	11.4	16.1	6.5
2	Aug 1	780.0	13.5		
7	Jul 31	356.0	20.3		
11	Sep 19	156.1	16.3	18.0	
19	Jul 30	270.8	14.2	22.0	
21	Jul 24	415.4	12.6	20.0	
24	Sep 17	393.7	13.1	18.0	
25	Jul 23	341.3	17.5	20.0	
27	Jul 21	369.3	13.6	16.1	6.5
Mean		381.1	14.7	18.6	6.5
SD		168.36	2.80	2.19	0.00
1975					
3	Jul 7	297.7	11.4	24.5	7.6
4	Aug 12	235.7	8.9	26.7	7.5
6	Aug 12	189.4	23.8	24.1	7.5
7	Aug 15	152.2	5.1	21.1	7.0
9	Aug 12	213.1	17.1	26.1	7.0
11	Aug 13	51.9	3.5	25.6	7.5
12	Aug 14	213.2	4.2	25.0	7.5
16	Aug 14	147.5	13.0	20.0	7.5
21	Aug 28	134.9	10.1	22.8	7.0
22	Aug 28	114.0	8.6	25.5	7.3
23	Aug 29	198.8	9.6	18.4	7.0
24	Aug 30	177.2	7.9	20.6	7.3
Mean		177.1	10.3	23.4	7.3
SD		63.34	5.71	2.73	0.24
1976					
1	Sep 14	217.8	16.3	14.5	6.5
2	Sep 13	698.5	10.2	16.0	7.0
3	Sep 8	195.1	24.4	14.0	7.0
4	Sep 16	260.7	17.8	17.0	7.0
5	Sep 2	252.0		18.5	7.0
6	Sep 2	309.6	14.7	17.0	7.3
7	Sep 2	360.9	10.4	17.0	7.0
9	Sep 1	215.9	16.8	17.0	7.0
12	Aug 31	343.7	7.9	13.5	7.3
16	Aug 31	188.1	19.1	17.0	7.5
18	Sep 1	564.2	11.7	20.0	7.0
19	Sep 13	314.1	20.8	14.0	7.0
21	Sep 17	362.0	20.1	18.0	6.5
25	Aug 26	504.4	12.7	23.0	7.0
26	Aug 24	284.2	31.8	21.0	7.5
27	Sep 15	292.3	14.7	16.5	6.5
Mean		335.2	16.6	17.1	7.0
SD		141.85	6.16	2.60	0.31

[1] Raw data were obtained from studies carried out by [illegible] (1969). Unpublished Report, 8 p., Freshwater and Anadromous Division, Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 5. Age frequency distribution of Atlantic salmon parr sampled in the St. Mary's River in 1969[1] and 1976.

Location	Age in years	Age frequency distribution 1969 1+	1969 2+	1969 3+	1976 1+	1976 2+	1976 3+
Archibald Brook							
Number in each age class					32	6	
Percent in each age class					84.2	15.8	
East Branch							
Number in each age class		30	10		48	7	
Percent in each age class		75.0	25.0		87.3	12.7	
West Branch							
Number in each age class		27	9	1	17	2	
Percent in each age class		73.0	24.3	2.7	89.5	10.5	
St. Mary's River							
Number in each age class		57	19	1	97	15	
Percent in each age class		74.0	24.7	1.3	86.6	13.4	

[1] Raw data were obtained from studies carried out by Semple (1969). Unpublished Report, 8 p., Freshwater and Anadromous Division, Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 6. Length frequency distribution in relation to age of Atlantic salmon parr sampled in early September in the St. Mary's River in 1976.

Fork length (cm)	Age (year) 1+	Age (year) 2+
Archibald Brook		
9.0-9.9	8	
10.0-10.9	10	
11.0-11.9	10	1
12.0-12.9	4	
13.0-13.9		3
14.0-14.9		1
15.0-15.9		
16.0-16.9		1
East Branch		
7.0-7.9	1	
8.0-8.9	14	
9.0-9.9	18	
10.0-10.9	10	
11.0-11.9	5	3
12.0-12.9		
13.0-13.9		4
West Branch		
9.0-9.9	6	
10.0-10.9	1	
11.0-11.9	3	

TABLE 7. Analysis of length in relation to age of Atlantic salmon parr sampled in early September in the St. Mary's River in 1976.

Location	Age (year) 1+	2+
Archibald Brook		
Number of specimens (n)	32	6
Range in length (cm)	9.0-12.5	11.0-16.0
Mean length (cm)	10.6	13.6
SD	1.00	1.59
East Branch		
Number of specimens (n)	48	7
Range in length (cm)	7.3-11.5	11.0-13.2
Mean length (cm)	9.4	12.3
SD	0.95	0.92
West Branch		
Number of specimens (n)	10	
Range in length (cm)	9.0-11.5	
Mean length (cm)	10.1	
SD	0.84	
St. Mary's River		
Number of specimens (n)	90	13
Range in length (cm)	7.3-12.5	11.0-16.0
Mean length (cm)	9.9	12.9
SD	1.09	1.38

TABLE 8. A summary of juvenile Atlantic salmon densities per 100 m² in the West River, Sheet Harbour, as determined from electrofishing operations, 1966-68 and 1973-77.

	Salmon fry								Salmon parr							
Site no.	1966	1967	1968	1973	1974	1975	1976	1977	1966	1967	1968	1973	1974	1975	1976	1977
1	46.6	20.2	17.5	1.6	3.5	9.7	10.5	5.7	2.4	8.1	0.8	0.4	0.5	0.3	0.6	0.2
2	30.9	10.5	11.6	8.6	7.1	10.1	14.9	13.1	7.2	4.1	2.8	1.1	2.3	0.7	0.0	1.0
3	88.4	9.7	9.6				10.2	14.9	4.4	2.3	4.2				0.5	0.0
4					1.4		0.0	0.0					0.9		0.0	0.0
5	57.0						16.2	17.7	10.3						0.7	2.8
6							0.0	0.6							0.0	0.0
7								14.6								1.5
8	23.2		5.3						5.5		2.0					
Mean	49.2	13.5	11.0	5.1	4.0	9.9	8.6	9.5	5.9	4.8	2.5	0.8	1.23	0.5	0.3	0.8
SD	25.57	5.84	5.07	4.95	2.88	0.28	7.09	7.29	2.99	2.97	1.43	0.50	0.95	0.28	0.33	1.07
Total area sampled (m²)	1,441.7	833.3	1,027.7	N/A	968.0	606.0	2,662.5	3,223.8	1,441.7	833.3	1,027.7	N/A	968.0	606.0	2,662.5	3,223.8
Mean area (m²)	240.3	277.8	256.9		484.0	303.0	443.7	460.5	240.3	277.8	256.9		484.0	303.0	443.7	460.5
Total no. collected (actual)	598	65	110		51	49	237	307	67	34	25		14	3	9	33

TABLE 9. A summary of the densities per 100 m^2 of other species captured in the West River, Sheet Harbour, during electrofishing operations for Atlantic salmon, 1966-68 and 1974-77.

Year/Site no.	American eel	Cyprinidae	White sucker	Sticklebacks	Brook trout
1966					
1	2.4	0.0	0.0	0.0	0.0
2	0.5	8.2	18.7	0.0	0.0
3	0.4	1.2	5.2	0.0	0.0
5	4.2	0.6	0.0	0.0	0.0
8	0.0	2.0	2.0	0.0	0.0
Mean	1.5	2.4	5.2	0.0	0.0
SD	1.77	3.33	7.85	0.00	0.00
1967					
1	0.3	0.3	0.0	0.3	0.3
2	0.0	0.8	1.2	0.0	0.0
3	0.0	0.4	0.7	0.0	0.0
Mean	0.1	0.5	0.6	0.1	0.1
SD	0.17	0.26	0.60	0.17	0.17
1968					
1	0.4	1.1	7.3	0.0	0.0
2	0.0	1.4	2.4	0.0	1.4
3	0.0	2.2	4.1	0.0	2.9
8	0.0	0.0	14.3	0.0	0.0
Mean	0.1	1.2	7.0	0.0	1.1
SD	0.20	0.91	5.26	0.00	1.38
1974					
1	0.5	2.0	0.8	0.0	0.5
2	0.0	1.5	2.8	0.0	0.0
Mean	0.3	1.8	1.8	0.0	0.3
SD	0.35	0.35	1.41	0.00	0.35
1975					
1	1.0	1.4	0.0	0.0	0.0
2	0.0	0.7	4.9	0.0	1.3
Mean	0.5	1.1	2.5	0.0	0.7
SD	0.71	0.50	3.46	0.00	0.92
1976					
1	5.3	2.1	0.4	0.0	0.0
2	1.0	27.0	16.5	0.0	0.3
3	0.3	10.6	14.1	0.0	0.7
4	1.4	16.4	20.2	0.0	0.5
5	3.1	0.2	2.1	0.0	0.0
6	3.5	2.3	0.8	0.0	0.0
Mean	2.4	9.8	9.0	0.0	0.3
SD	1.87	10.47	8.91	0.00	0.30
1977					
1	1.7	2.2	0.7	0.0	0.0
2	1.0	3.6	1.9	0.0	0.0
3	1.0	4.2	0.0	0.0	0.0
5	5.4	0.1	0.0	0.0	0.0
6	3.7	0.3	0.0	0.0	0.0
7	1.7	3.4	0.0	0.0	0.6
Mean	2.4	2.3	0.4	0.0	0.1
SD	1.77	1.75	0.77	0.00	0.24

TABLE 10. A summary of miscellaneous data collected on the sites electrofished on the West River, Sheet Harbour, in 1966-68 and 1974-77.

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH
1966					
1	Aug 26	251.4			
2	Aug 19	250.1			
3	Aug 22	197.0			
5	Aug 23	329.0			
7	Aug 29	213.6			
8	Sep 12	200.6			
Mean		240.3			
SD		49.5			
1967					
1	Sep 29	293.4			
2	Sep 2	280.9			
3	Aug 17	259.0			
Mean		277.8			
SD		17.41			
1968					
1	Oct 4	265.0	9.9	10.6	6.7
2	Nov 6	295.1	27.8	2.2	
3	Nov 6	270.2	20.2	2.2	
8	Oct 9	197.4	19.9	13.4	6.7
Mean		256.9	19.5	7.1	6.7
SD		41.80	7.34	5.77	0.00
1974					
1	Aug 13	568.5	10.0	20.5	
2	Aug 13	399.5	9.8	20.5	
Mean		484.0	9.9	20.5	
SD		119.50	0.14	0.00	
1975					
1	Sep 22	297.2	10.4	11.1	
2	Oct 2	308.8	15.0	8.9	6.4
Mean		303.0	12.7	10.0	6.4
SD		8.20	3.25	1.56	0.00
1976					
1	Aug 18	719.2	13.2	23.5	6.5
2	Aug 6	393.6	13.5	22.0	6.2
3	Aug 5	292.6	16.3	19.0	6.5
4	Aug 4	371.5	18.6	23.5	6.0
5	Aug 5	544.8	14.4	25.0	6.5
6	Aug 4	340.8	7.0	21.0	6.0
Mean		443.8	13.8	22.3	6.3
SD		159.54	3.91	2.14	0.25
1977					
1	Jul 11	606.0	16.3	23.0	
2	Jul 8	263.8	13.5	19.0	
3	Jul 8	406.0	17.5	22.0	
4	Jul 6	379.0	18.5	20.0	
5	Sep 15	701.6	17.0	17.5	
6	Jul 2	352.8	18.8	21.0	
7	Sep 4	514.6	19.6	16.0	
Mean		460.5	17.3	19.8	
SD		153.91	2.02	2.48	

TABLE 11. A summary of juvenile Atlantic salmon densities per 100 m^2 in the LaHave River, as determined from electrofishing operations in 1976 and 1977.

Location/Site number	Wild fry		Wild parr		Hatchery parr	
	1976	1977	1976	1977	1976	1977
Above Morgan Falls						
Main River						
8	14.6	14.6	0.3	0.5	0.0	3.1
10	7.7	44.2	0.4	1.0	0.0	0.3
11		6.2		1.1		0.0
12		1.5		1.7		8.1
Ohio River						
6	7.8	3.6	1.4	0.8	0.0	0.0
North River						
14	11.4	14.5	0.5	2.5	0.0	0.5
15	16.0	20.8	0.5	4.0	0.0	0.7
21		21.8		0.0		0.0
Mean	11.5	15.9	0.6	1.5	0.0	1.6
SD	3.81	13.70	0.44	1.28	0.00	2.83
North Branch						
North Branch						
18		15.5		2.3		0.0
19		14.0		0.7		0.0
Sherbrooke River						
20		2.1		1.9		0.0
Mean		10.5		1.6		0.0
SD		7.34		0.83		0.00
LaHave River						
Mean	11.5	14.4	0.6	1.5	0.0	1.15
SD	3.81	12.19	0.44	1.13	0.00	2.48
Total area sampled (m^2)	2,572.8	6,612.1	2,572.8	6,612.1	2,572.8	6,612.1
Mean area (m^2)	514.6	601.1	514.6	601.1	514.6	601.1
Total number collected (actual)	229	909	13	113	0	40

TABLE 12. A summary of the densities per 100 m^2 of other species captured in the LaHave River during electrofishing operations for Atlantic salmon in 1976 and 1977.

Species	Site no.	Fish densities 1976							Fish densities 1977											
		6	8	10	14	15	Mean	SD	6	8	10	11	12	14	15	18	19	20	21	Mean	SD
American eel		1.1	0.2	1.7	0.1	1.6	0.9	0.76	3.7	3.5	0.5	0.5	2.1	0.3	1.3	9.5	2.7	1.5	0.7	2.6	2.65
Cyprinidae		0.9	0.2	15.8	0.7	8.7	5.3	6.86	3.7	0.6	4.6	2.5	7.2	0.5	7.9	72.6	8.9	4.7	99.1	13.9	22.27
White sucker		1.3	0.9	3.7	0.2	1.1	1.4	1.11	0.0	0.0	0.8	0.1	9.6	0.6	1.9	14.7	1.7	1.9	11.1	3.9	5.28
Stickleback		0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.17
Brook trout		0.4	0.0	0.0	0.1	0.0	0.1	0.17	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03
Banded killifish		0.0	1.1	0.6	0.3	0.0	0.4	0.48	0.0	5.0	0.0	0.3	0.0	0.0	0.0	1.4	0.9	0.0	5.5	1.2	2.06
Lamprey		0.0	0.5	0.0	3.2	0.0	0.7	1.39	0.8	1.5	0.3	0.7	0.0	1.2	0.0	0.0	0.0	0.1	0.0	0.4	0.55
Brown bullhead		0.0	0.0	0.2	0.0	0.0	0.0	0.09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.03

TABLE 13. A summary of miscellaneous data collected on the sites electrofished on the Wallace River in 1976 and 1977.

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH
1976					
6	Jul 26	316.6	18.8	20.0	6.0
8	Jul 28	580.0	31.4	24.0	6.8
10	Jul 29	522.5	24.6	23.5	7.0
14	Jul 25	965.6	19.7	23.5	7.0
15	Jul 26	188.1	26.3	21.5	6.5
Mean		514.6	24.2	22.5	6.7
SD		297.30	5.14	1.70	0.42
1977					
6	Jul 25	453.1	24.9	22.0	
8	Sep 7	829.3	35.6	22.0	
10	Sep 2	835.1	30.5	28.0	
11	Aug 29	1,140.0	34.7	24.0	
12	Sep 9	475.7	33.7	18.0	
14	Aug 26	749.9	24.8	22.0	
15	Sep 12	397.1	29.2	18.0	
18	Sep 1	219.8	31.3	22.0	
19	Aug 31	376.1	30.5	23.0	
20	Aug 30	396.2	23.1	25.0	
21	Sep 8	739.8	30.5	21.0	
Mean		601.1	29.9	22.3	
SD		274.93	4.13	2.87	

TABLE 14. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Stewiacke River, as determined from electrofishing operations in 1968, 1969[1], 1976 and 1977.

Location/Site number	Salmon fry				Salmon parr			
	1968	1969	1976	1977	1968	1969	1976	1977
Main Stewiacke River								
1	39.9	6.8			20.3	5.6		
9		125.2				5.0		
10	102.0	41.7			0.0	9.0		
19	201.9	271.3			0.0	7.6		
22				16.1				3.0
23	18.2			38.2	12.8			2.6
24				23.1				12.5
25	71.9			0.0	1.0			1.8
Mean	86.8	111.3		19.4	6.8	6.8		5.0
SD	71.78	117.70		15.86	9.28	1.84		5.04
Stewiacke Tributaries								
2	174.2	21.8		12.4	10.9	29.4		12.6
3	42.1	13.6		3.3	29.5	35.2		12.4
4	5.8			53.4	4.3			18.6
5				31.4				12.1
6	202.8	55.9		120.4	69.9	31.7		21.9
7				37.0				23.0
8	197.0	63.6		54.9	92.0	45.5		41.7
12	110.3	48.9		40.9	21.2	33.1		18.5
13			24.0	25.3			31.3	5.6
14			5.0	51.2			14.0	11.6
15			11.0	23.9			18.5	9.9
11			15.4	32.5			33.2	8.3
16				29.5				7.7
17				20.6				9.1
18				16.9				7.7
20				98.1				25.3
21				53.0				10.2
Mean	122.0	40.8	13.9	41.5	38.0	35.0	24.3	15.1
SD	83.55	21.88	8.00	29.84	35.09	6.25	9.45	9.06
Stewiacke River								
Mean	106.0	72.1	13.9	37.3	23.8	22.5	24.3	13.2
SD	76.74	82.55	8.00	28.79	30.25	15.54	9.45	9.27
Total area sampled (m^2)	1,802.6	2,537.6	577.7	3,647.3	1,802.6	2,537.6	577.7	3,647.3
Mean area (m^2)	163.9	282.0	144.4	173.7	163.9	282.0	144.4	173.7
Total number collected (actual)	1,515	2,032	67	1,098	344	434	129	403

[1] Raw data were obtained from studies carried out by Semple (1970).

TABLE 15. A summary of the densities per 100 m^2 of other species captured in the Stewiacke River during electrofishing operations for Atlantic salmon in 1968[1] and 1969[2].

Location/ Site number	American eel	Cyprinidae	White sucker	Sticklebacks	Brook trout	Brown trout	Lamprey	Killi-fish
1 9 6 8								
Main Stewiacke River								
1	40.6	17.6	0.0	2.4	0.0	0.0	48.1	0.0
10	5.8	0.0	0.0	1.4	0.0	0.0	0.0	0.5
19	7.4	0.0	0.0	0.5	0.0	0.0	0.5	0.0
23	15.2	4.0	0.0	0.0	0.0	0.0	0.0	0.0
25	25.4	29.2	2.2	0.0	0.0	0.0	13.6	0.0
Mean	18.9	10.2	0.4	0.9	0.0	0.0	12.4	0.1
SD	14.41	12.87	0.98	1.03	0.00	0.00	20.77	0.22
Stewiacke Tributaries								
2	79.4	365.7	0.0	0.0	0.0	0.0	4.8	0.0
3	49.0	1.3	0.0	0.0	0.0	0.0	0.3	0.0
4	51.1	13.8	4.8	0.0	0.0	0.0	20.3	0.0
6	18.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	19.3	0.0	0.0	10.5	55.2	1.6	0.0	0.0
12	15.2	4.3	2.0	1.9	0.0	0.0	1.9	0.0
Mean	38.7	64.2	1.1	2.1	9.2	0.3	4.6	0.0
SD	25.52	147.80	1.97	4.20	22.54	0.65	7.93	0.00
Stewiacke River								
Mean	29.7	39.6	0.8	1.5	5.0	0.1	8.1	0.1
SD	22.72	108.56	1.57	3.11	16.64	0.48	14.86	0.15
1 9 6 9								
Main Stewiacke River								
1	35.1	1.5	13.3	1.0	0.0	0.0	4.7	0.0
9	56.2	1.0	1.0	0.0	1.1	0.0	0.2	0.0
10	37.3	0.2	0.0	0.0	0.0	0.0	0.3	0.0
19	20.8	0.0	0.0	0.0	0.4	2.2	0.0	0.0
Mean	37.4	0.7	3.6	0.3	0.4	0.6	1.3	0.0
SD	14.54	0.70	6.50	0.50	0.52	1.10	2.27	0.00
Stewiacke Tributaries								
2	135.4	217.4	54.9	1.5	0.0	0.0	1.6	0.0
3	54.6	1.1	0.4	0.0	0.0	0.0	0.4	0.0
6	24.1	6.0	0.0	31.8	5.4	21.9	0.0	0.0
8	31.6	0.0	0.0	1.0	12.2	21.3	0.0	0.0
12	33.6	2.3	9.1	0.4	0.0	0.0	0.0	0.0
Mean	55.9	45.4	12.9	6.9	3.5	8.6	0.4	0.0
SD	45.88	96.20	23.81	13.91	5.39	11.83	0.69	0.00
Stewiacke River								
Mean	47.6	25.5	8.7	4.0	2.1	5.0	0.8	0.0
SD	35.03	71.99	17.98	10.45	4.17	9.41	1.55	0.00

[1] Raw data were obtained from studies carried out by Carey (1968).

[2] Raw data were obtained from studies carried out by Semple (1970).

TABLE 16. A summary of the densities per 100 m² of other species captured in the Stewiacke River during electrofishing operations for Atlantic salmon in 1976 and 1977.

Location/ Site number	American eel	Cyprinidae	White sucker	Sticklebacks	Brook trout	Brown trout	Lamprey	Killi-fish
1976								
Stewiacke Tributaries								
13	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	17.5	17.9	15.7	0.0	5.9	0.0	0.0	0.0
15	31.9	0.0	0.0	0.0	5.2	0.0	0.0	0.0
11	30.2	2.6	1.8	0.0	0.0	0.0	0.0	0.0
Mean	23.6	5.1	4.4	0.0	2.8	0.0	0.0	0.0
SD	8.67	8.60	7.60	0.00	3.22	0.00	0.00	0.00
1977								
Main Stewiacke River								
22	6.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0
23	7.7	2.1	0.0	0.0	0.0	0.0	0.0	0.0
24	22.4	16.3	0.0	0.0	0.0	0.0	0.0	0.0
25	21.5	57.6	5.6	0.0	0.0	0.0	13.1	0.0
Mean	14.5	19.5	1.4	0.0	0.0	0.0	3.3	0.0
SD	8.69	26.32	2.80	0.00	0.00	0.00	6.55	0.00
Stewiacke Tributaries								
2	65.3	5.9	1.8	0.0	0.0	0.0	0.0	0.0
3	62.7	0.0	0.4	0.0	1.9	0.0	0.0	0.0
4	69.9	1.8	0.0	0.0	5.8	0.0	0.0	0.0
5	32.7	0.0	0.0	0.0	0.0	0.6	0.0	0.0
6	2.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0
7	15.0	0.0	0.0	0.8	0.0	21.3	0.0	0.0
8	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	15.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0
13	8.0	0.9	0.0	0.9	0.0	0.0	0.0	0.0
14	22.2	3.0	0.6	0.0	0.0	0.0	0.0	1.7
15	12.7	0.0	0.0	0.0	0.5	0.0	0.0	0.0
11	13.6	0.0	0.0	0.6	0.0	0.0	0.0	0.0
16	20.4	1.0	0.5	0.0	0.0	0.0	0.0	0.0
17	22.1	3.9	1.2	0.0	0.0	0.0	0.0	0.0
18	21.5	8.4	6.9	0.8	0.0	0.0	0.8	0.0
20	22.9	0.0	0.0	0.0	0.6	12.0	0.0	0.0
21	23.9	0.4	0.0	0.0	0.0	0.4	0.0	0.0
Mean	26.0	1.7	0.7	0.2	0.7	2.0	0.0	0.1
SD	20.32	2.46	1.68	0.34	1.51	5.75	0.19	0.41
Stewiacke River								
Mean	23.8	5.1	0.8	0.2	0.5	1.6	0.7	0.1
SD	19.06	12.65	1.88	0.32	1.37	5.21	2.86	0.37

TABLE 17. A summary of miscellaneous data collected on the sites electrofished on the Stewiacke River in 1968[1] and 1969[2].

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)
1968				
1	Jul 11	168.8	21.1	25.0
2	Jul 16	72.4	16.8	24.0
3	Jun 28	302.3	18.5	15.0
4	Jul 8	167.7	23.4	20.0
6	Jul 2	100.6	14.7	18.0
8	Jul 12	125.5	10.9	18.0
10	Jul 9	217.1	22.8	23.0
12	Jul 15	144.1	11.4	22.0
19	Jul 10	183.1	12.9	21.0
23	Jul 5	224.5	20.3	14.0
25	Jul 3	96.5	20.3	18.0
Mean		163.9	17.6	19.8
SD		66.97	4.50	3.57
1969				
1	Aug 14	196.2	21.1	22.8
2	Aug 15	171.6	15.2	20.5
3	Aug 8	270.9	13.5	22.2
6	Aug 29	135.8	22.9	15.5
8	Aug 19	133.8	11.8	21.1
9	Jul 1	671.2	16.3	20.0
10	Aug 28	423.8	21.0	14.0
12	Aug 13	260.3	25.4	23.9
19	Jul 2	274.0	11.9	21.6
Mean		282.0	17.7	20.2
SD		171.44	5.04	3.31

[1] Raw data were obtained from studies carried out by Carey (1968).

[2] Raw data were obtained from studies carried out by Semple (1970).

TABLE 18. A summary of miscellaneous data collected on the sites electrofished on the Stewiacke River in 1976 and 1977.

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH
1976					
13	Jul 19	136.6	11.6	17.2	7.0
14	Jul 20	218.7	18.9	15.5	6.5
15	Jul 22	108.3	11.3	18.9	6.8
11	Jul 23	114.1	11.3	16.1	7.3
Mean		144.4	13.3	16.9	6.9
SD		51.00	3.75	1.49	0.34
1977					
2	Jul 25	215.2	12.1	15.0	7.3
3	Jul 8	289.9	19.6	18.3	7.5
4	Jul 21	119.6	15.3	18.0	7.5
5	Aug 12	171.4	11.2	15.5	7.5
6	Jul 20	42.2	14.8	18.3	6.8
7	Aug 10	128.8	8.6	15.5	7.0
8	Jul 20	130.4	14.8	18.3	7.0
12	Jul 12	265.1	-	-	-
13	Jul 19	118.1	22.6	-	7.3
14	Jul 20	176.1	22.0	-	7.3
15	Jul 21	191.7	15.2	-	7.0
11	Jul 25	174.1	14.0	18.9	7.3
16	Aug 30	194.2	16.5	21.1	7.3
17	Aug 31	164.4	22.3	18.4	7.1
18	Sep 1	130.3	27.1	16.7	7.3
20	Jul 29	174.6	12.5	14.4	7.3
21	Jul 28	225.9	16.4	13.3	6.5
22	Jul 19	213.8	16.3	20.0	7.5
23	Jul 25	305.6	15.6	21.0	7.0
24	Aug 9	159.7	15.8	17.2	7.0
25	Jul 4	56.2	-	17.8	7.0
Mean		173.7	16.5	17.5	7.2
SD		66.8	4.51	2.22	0.26

TABLE 19. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Shubenacadie River, as determined from electrofishing operations in 1969[1] and 1977.

Location/ Site number	Salmon fry		Salmon parr	
	1969	1977	1969	1977
St. Andrews River				
31	5.4	0.5	0.0	2.3
32	7.5	19.6	13.0	8.3
Gays River				
33	3.1		9.1	
Nine Mile River				
34		1.2		1.2
35	13.3	7.4	9.1	1.7
36		2.5		3.3
37	162.3	0.9	80.1	10.5
Main Shubenacadie River				
38	51.9		8.0	
Shubenacadie River				
Mean	40.6	5.4	19.9	4.6
SD	62.33	7.43	29.81	3.88
Total area sampled (m^2)	1,511.4	2,002.7	1,511.4	2,002.7
Mean area (m^2)	251.9	333.8	251.9	333.8
Total number collected (actual)	351	94	214	58

[1] Raw data were obtained from studies carried out by Semple (1970).

TABLE 20. A summary of the densities per 100 m^2 of other species captured in the Shubenacadie River during electrofishing operations for Atlantic salmon in 1969[1] and 1977.

Year/ Site no.	American eel	Cyprinidae	White sucker	Sticklebacks	Brook trout	Lamprey	Killi-fish
1969							
31	55.7	10.3	9.8	0.0	0.0	0.0	4.4
32	89.1	3.2	18.3	0.7	0.0	0.0	0.0
33	102.0	8.1	17.6	0.0	0.0	0.0	9.1
35	49.2	181.7	24.3	0.0	0.0	0.0	1.0
37	8.4	1.2	0.0	0.0	163.0	0.0	0.0
38	90.8	23.6	0.4	0.0	0.0	0.0	1.3
Mean	65.9	38.0	11.7	0.1	27.2	0.0	2.6
SD	35.07	70.83	10.05	0.29	66.54	0.00	3.56
1977							
31	20.5	14.0	8.6	0.2	0.0	2.5	0.0
32	39.7	0.8	0.0	0.0	0.0	0.0	0.0
34	44.0	5.1	2.0	0.2	0.0	6.2	1.0
35	38.3	8.3	2.4	0.0	0.0	0.0	0.8
36	27.6	0.5	2.8	1.9	15.5	0.2	0.0
37	24.9	20.9	0.0	1.0	83.0	5.8	0.0
Mean	32.5	8.3	2.6	0.6	16.4	2.5	0.3
SD	9.42	7.98	3.16	0.76	33.20	2.91	0.47

[1]Raw data were obtained from studies carried out by Semple (1970).

TABLE 21. A summary of miscellaneous data collected on the sites electrofished on the Shubenacadie River in 1969[1] and 1977.

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH
1969					
31	Aug 26	354.1	7.6	18.0	
32	Aug 18	281.7	12.5	26.2	
33	Aug 20	255.7	14.2	24.4	
35	Aug 21	210.2	17.8	20.0	
37	Aug 22	167.3	10.2	13.9	
38	Aug 27	242.4	21.2	18.5	
Mean		251.9	13.9	20.2	
SD		63.77	4.98	4.50	
1977					
31	Aug 15	426.6	18.2	20.5	7.5
32	Aug 5	248.9	16.6	17.2	7.5
34	Jul 29	436.4	10.1	23.2	7.5
35	Aug 19	387.9	8.8	13.3	7.5
36	Aug 19	346.6	11.1	15.5	7.7
37	Aug 4	156.3	14.4	13.9	7.6
Mean		333.8	13.2	17.3	7.6
SD		110.40	3.78	3.89	0.08

[1]Raw data were obtained from studies carried out by Semple (1970).

TABLE 22. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Salmon River, as determined from electrofishing operations in 1972[1] and 1973[1].

Site number	Salmon fry		Salmon parr	
	1972	1973	1972	1973
1	0.7	4.3	0.4	0.0
2	0.0	1.7	0.0	0.0
3	0.0	1.0	0.0	0.0
4	0.1	2.0	0.3	0.0
5	2.0	5.0	1.3	2.2
6	8.9	4.8	5.3	3.1
7	52.6	22.4	8.6	13.2
8	1.0	13.9	16.9	15.0
9	6.6	8.7	5.9	5.5
10	12.1	11.2	6.0	3.4
11	10.6	30.1	2.1	4.7
12	29.7	53.7	2.0	3.2
13	16.1	8.5	1.9	21.9
14	2.3	47.3	1.9	4.4
15	32.7	81.9	13.1	9.7
16	2.5	85.9	0.0	0.0
17	0.0	7.8	0.6	0.8
18	0.0	6.2	1.7	0.8
19		26.8		2.8
20		2.3		1.7
21		0.9		0.8
Mean	9.9	20.3	3.8	4.4
SD	14.59	25.81	4.81	5.83

[1]Data were obtained from studies carried out by Sweeney (1974). Unpublished Report, 52 p., Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 23. A summary of juvenile Atlantic salmon densities per 100 m^2 in the North River, as determined from electrofishing operations in 1972[1] and 1973[1].

Site number	Salmon fry		Salmon parr	
	1972	1973	1972	1973
1	0.2	26.9	5.5	12.2
2	0.0	0.0	0.0	0.0
3	22.4	25.6	20.4	0.7
4	0.6	0.0	0.7	0.0
5	0.7	9.7	2.3	0.8
6	1.9	25.5	7.6	4.0
7	0.0	0.0	0.0	0.0
8	2.7	60.9	8.7	19.7
9	1.3	25.9	5.3	2.8
10	0.0	83.7	12.1	6.0
11	0.7	30.8	10.7	14.0
12	9.2	71.4	12.1	17.8
13	8.3	73.6	11.8	4.3
Mean	3.7	33.4	7.5	6.3
SD	6.40	29.56	6.01	7.12

[1]Data were obtained from studies carried out by Sweeney (1974). Unpublished report, 52 p., Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 24. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Chiganois River, as determined from electrofishing operations in 1972[1] and 1973[1].

Site number	Salmon fry		Salmon parr	
	1972	1973	1972	1973
1	0.7	8.6	9.5	2.1
2	3.3	9.9	1.1	0.7
3	0.4	13.7	5.2	3.7
4	1.8	12.9	5.3	3.1
5	0.0	19.3	8.4	6.7
6		65.7		10.7
Mean	1.2	21.7	5.9	4.5
SD	1.33	21.88	3.28	3.64

[1]Data were obtained from studies carried out by Sweeney (1974). Unpublished report, 52 p., Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

TABLE 25. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Economy River, as determined from electrofishing operations in 1977.

Location/ Site number	Salmon fry	Salmon parr
Economy River		
1	11.6	2.7
2	4.2	0.2
3	4.1	2.9
Mean	6.6	1.9
SD	4.30	1.50
Total area sampled (m^2)	1,708.1	1,708.1
Mean area (m^2)	569.4	569.4
Total number collected (actual)	90	30

TABLE 26. A summary of the densities per 100 m^2 of other species captured in the Economy River during electrofishing operations for Atlantic salmon in 1977.

Site number	American eel	Cyprinidae	Sticklebacks	Brook trout	Banded killifish
1	39.9	14.0	3.0	0.0	0.0
2	17.6	0.2	0.0	0.0	0.0
3	16.5	3.0	0.0	0.2	0.2
Mean	24.7	5.7	1.0	0.1	0.1
SD	13.20	7.29	1.73	0.12	0.12

TABLE 27. A summary of miscellaneous data collected on the sites electrofished on the Economy River in 1977.

Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH	Dissolved oxygen (mg/l)
1	Aug 3	372.6	27.2	19.0	7.0	10.0
2	Aug 3	550.1	24.6	19.0	7.5	12.0
3	Aug 2	785.4	34.3	19.0	7.0	11.0
Mean		569.4	28.7	19.0	7.2	11.0
SD		207.07	5.02	0.00	0.29	1.00

TABLE 28. A summary of juvenile Atlantic salmon densities per 100 m^2 in the Maccan River, as determined from electrofishing operations in 1966 and 1977.

Location/ Site no.	Salmon fry		Salmon parr	
	1966	1977	1966	1977
Main Maccan River				
9	84.6		7.2	
10		10.3		18.4
11		41.3		33.8
12		51.4		16.1
East Brook				
4		0.0		1.0
West Brook				
5	41.3		31.9	
6	25.7	4.8	12.2	0.8
7	1.9		2.3	
8	147.6		44.4	
Maccan River				
Mean	60.2	21.6	19.6	14.0
SD	57.40	23.20	17.85	13.78
Total area sampled (m^2)	1,245.4	2,132.7	1,245.4	2,132.7
Mean area (m^2)	249.1	426.5	249.1	426.5
Total number collected (actual)	792	583	265	332

TABLE 29. A summary of the densities per 100 m^2 of other species captured in the Maccan River during electrofishing operations for Atlantic salmon in 1966 and 1977.

Year/ Site no.	American eel	Cyprinidae	White sucker	Sticklebacks	Brook trout	Brown trout	Lamprey	Banded killifish
1966								
9	13.6	8.8	0.0	0.0	0.0	0.0	0.0	0.0
5	46.9	12.6	0.5	3.3	0.0	0.0	257.6	0.0
6	21.2	0.0	0.4	0.7	1.1	0.0	18.6	0.0
7	77.1	27.7	0.0	10.2	0.0	0.0	373.0	0.0
8	62.5	10.8	1.0	1.3	0.0	0.0	28.1	0.0
Mean	44.3	12.0	0.4	3.1	0.2	0.0	135.5	0.0
SD	26.88	10.03	0.41	4.16	0.49	0.00	169.47	0.00
1977								
10	16.7	0.9	0.0	0.0	0.3	0.0	0.0	0.0
11	27.3	0.8	0.2	0.0	0.9	3.4	0.5	0.0
12	21.7	0.2	0.3	0.2	1.7	8.8	0.6	0.0
4	57.2	21.7	2.3	0.0	0.0	0.0	10.2	0.4
6	11.3	14.5	0.3	0.0	0.0	0.0	1.8	0.0
Mean	26.8	7.6	0.6	0.0	0.6	2.4	2.6	0.1
SD	17.98	9.90	0.95	0.09	0.73	3.85	4.29	0.18

TABLE 30. A summary of miscellaneous data collected on the sites electrofished on the Maccan River in 1966 and 1977.

Year/ Site no.	Sampling date	Area (m^2)	Average depth (cm)	Water temperature (°C)	pH	Dissolved oxygen (mg/l)
1966						
9	Sep 14	269.9	14.9			
5	Sep 19	310.9	22.9			
6	Sep 20	187.1	17.9			
7	Sep 21	185.8	29.2			
8	Sep 26	264.7	13.3			
Mean		249.1	19.6			
SD		59.58	6.48			
1977						
10	Aug 4	337.4	24.6	17.5	7.0	11.0
11	Aug 10	482.0	19.2	16.5	7.0	11.0
12	Aug 9	645.0	14.7	14.5	7.0	11.0
4	Aug 4	280.0	14.2	19.5	7.0	10.0
6	Aug 5	388.3	25.8	16.0	7.0	9.0
Mean		426.5	19.7	16.8	7.0	10.4
SD		142.90	5.40	1.86	0.00	0.89

TABLE 31. Length frequency distribution in relation to age of Atlantic salmon parr sampled in August in the Maccan River in 1977.

Fork length (cm)	Age (yr) 1+	2+
7.0-7.9	1	
8.0-8.9	9	
9.0-9.9	12	
10.0-10.9	28	2
11.0-11.9	8	1
12.0-12.9		6
13.0-13.9		1
14.0-14.9		
15.0-15.9		
16.0-16.9		1

TABLE 32. Analysis of length in relation to age of Atlantic salmon parr sampled in early August in the Maccan River in 1977.

Fork length (cm)	Age (yr) 1+	2+
Number of specimens (n)	58	11
Range in length (cm)	7.5-11.8	10.5-16.4
Mean length (cm)	10.0	12.3
SD	0.97	1.58
Percent in each age class	84.1	15.9

TABLE 33. A summary of the total areas sampled in various Nova Scotia rivers, 1966-1977.

Location	Total area sampled by year (m^2) 1966	1967	1968	1969	1974	1975	1976	1977
St. Mary's River				3,429.5		2,125.6	5,363.5	
West River	1,441.7	833.3	1,027.7		968.0	606.0	2,662.5	3,223.8
LaHave River							2,572.8	6,612.1
Stewiacke River			1,802.6	2,537.6			577.7	3,647.3
Shubenacadie River				1,511.4				2,002.7
Economy River								1,708.1
Maccan River	1,245.4							2,132.7
Grand total	2,687.1	833.3	2,830.3	7,478.5	968.0	2,731.6	11,176.5	19,326.7

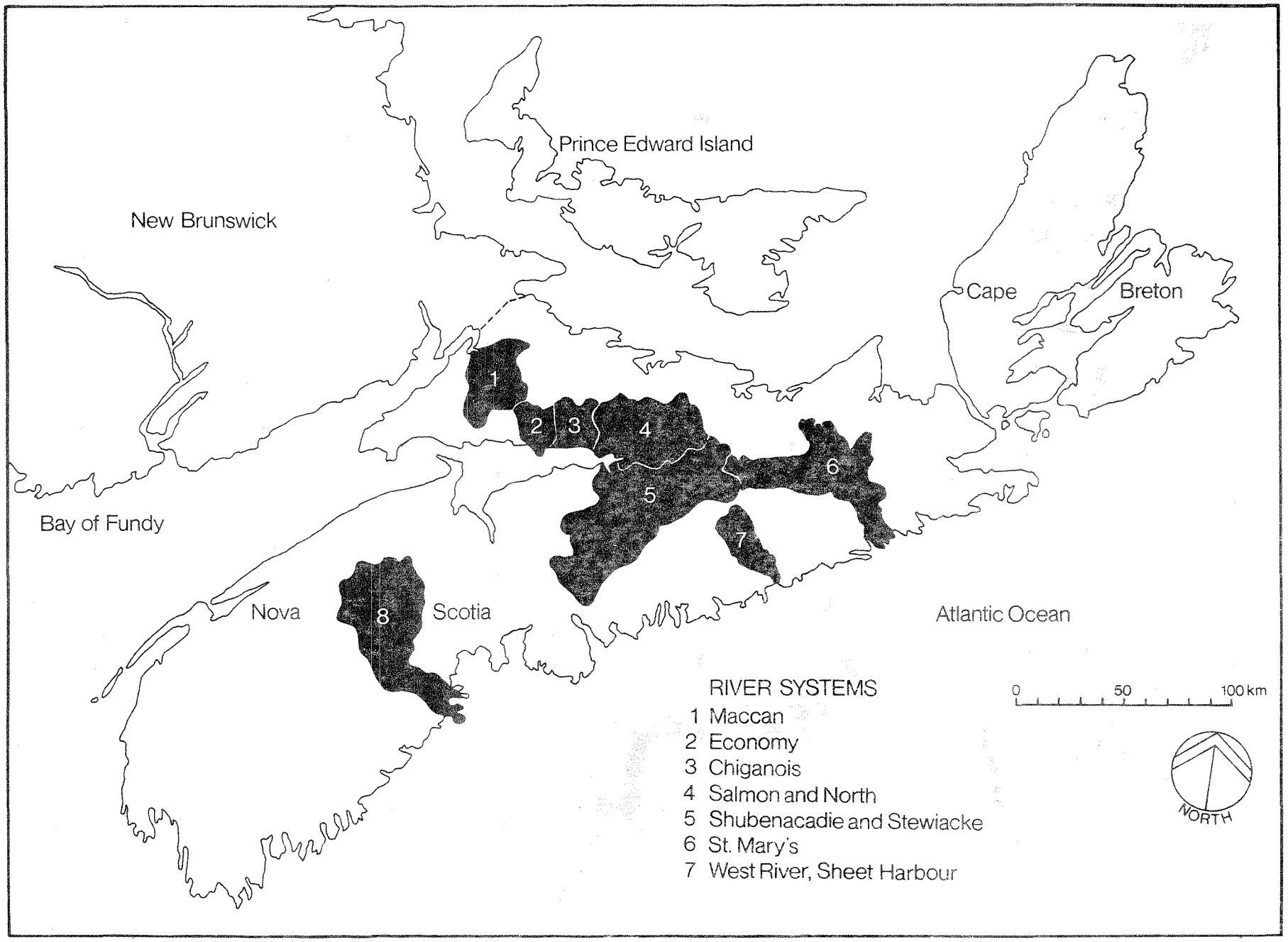

FIG. 1. Location map of the watersheds surveyed in juvenile salmon investigations in mainland Nova Scotia.

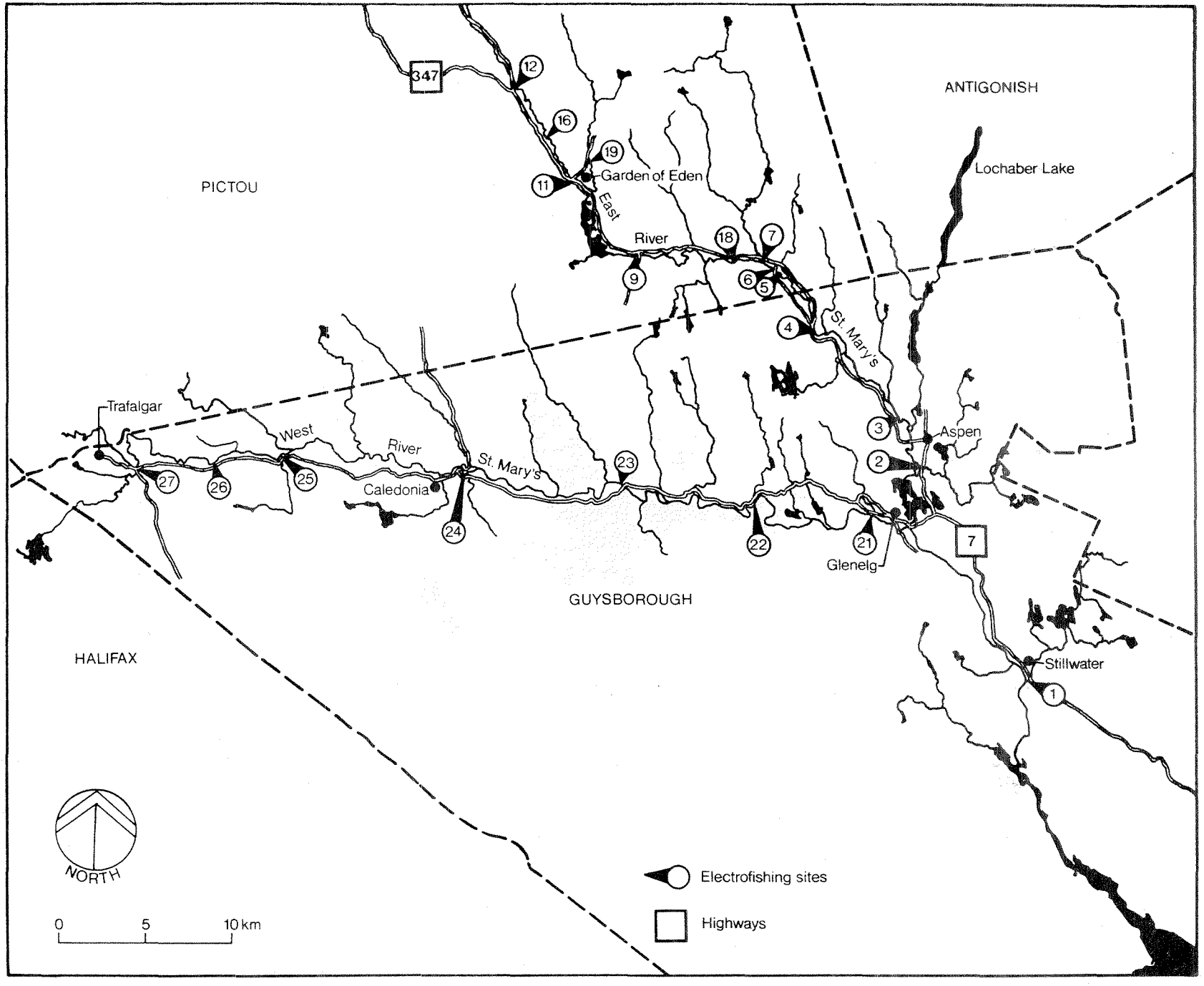

FIG. 2. Map of the St. Mary's River drainage, showing the location of electrofishing sites surveyed in 1969, 1975 and 1976.

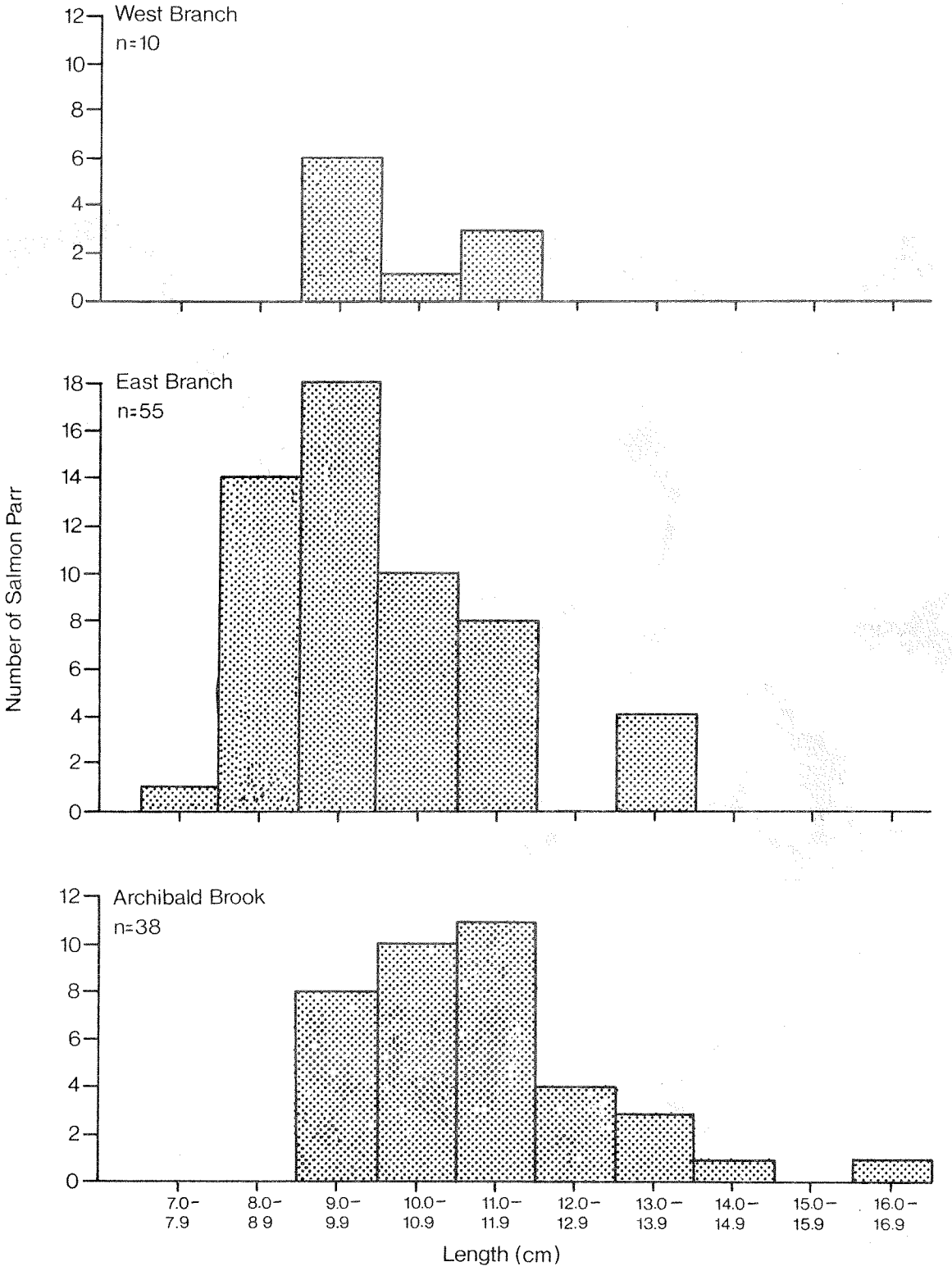

FIG. 3. Length frequency distribution of Atlantic salmon parr sampled in early September in the St. Mary's River in 1976.

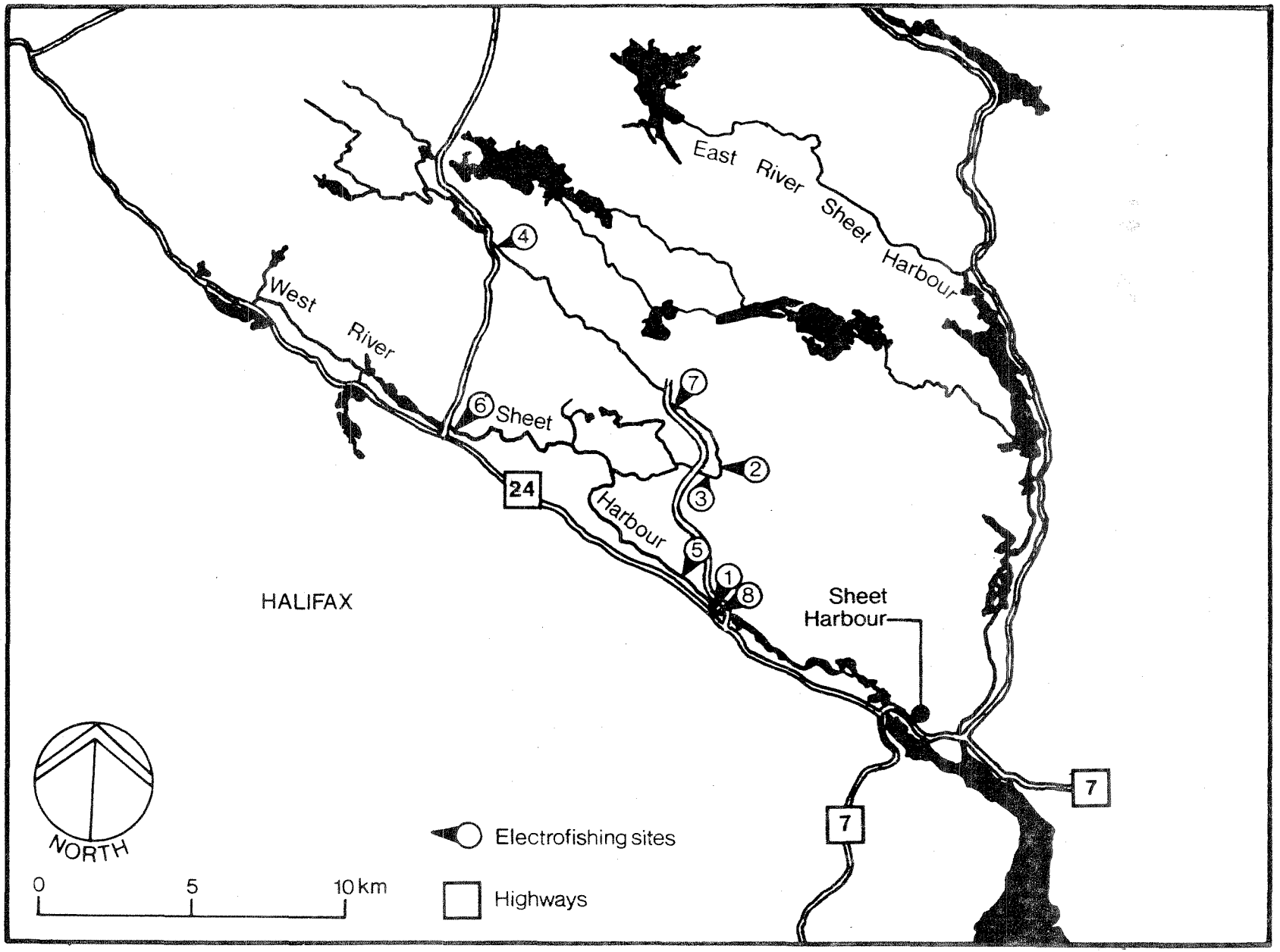

FIG. 4. Map of the West River, Sheet Harbour drainage, showing the location of electrofishing sites surveyed in 1966-68 and 1973-77.

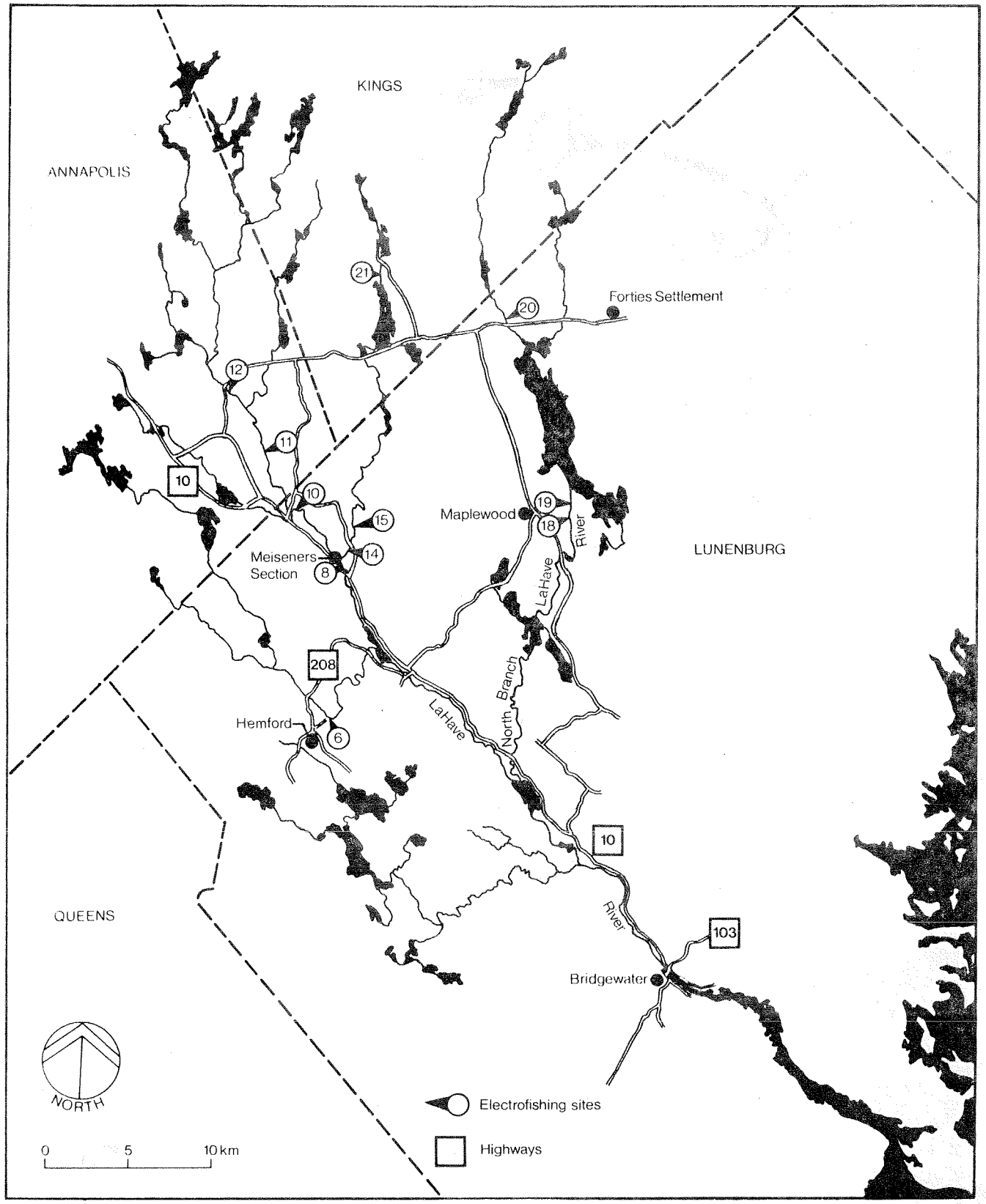

FIG. 5. Map of the LaHave River drainage, showing the location of electrofishing sites surveyed in 1966-68 and 1973-77.

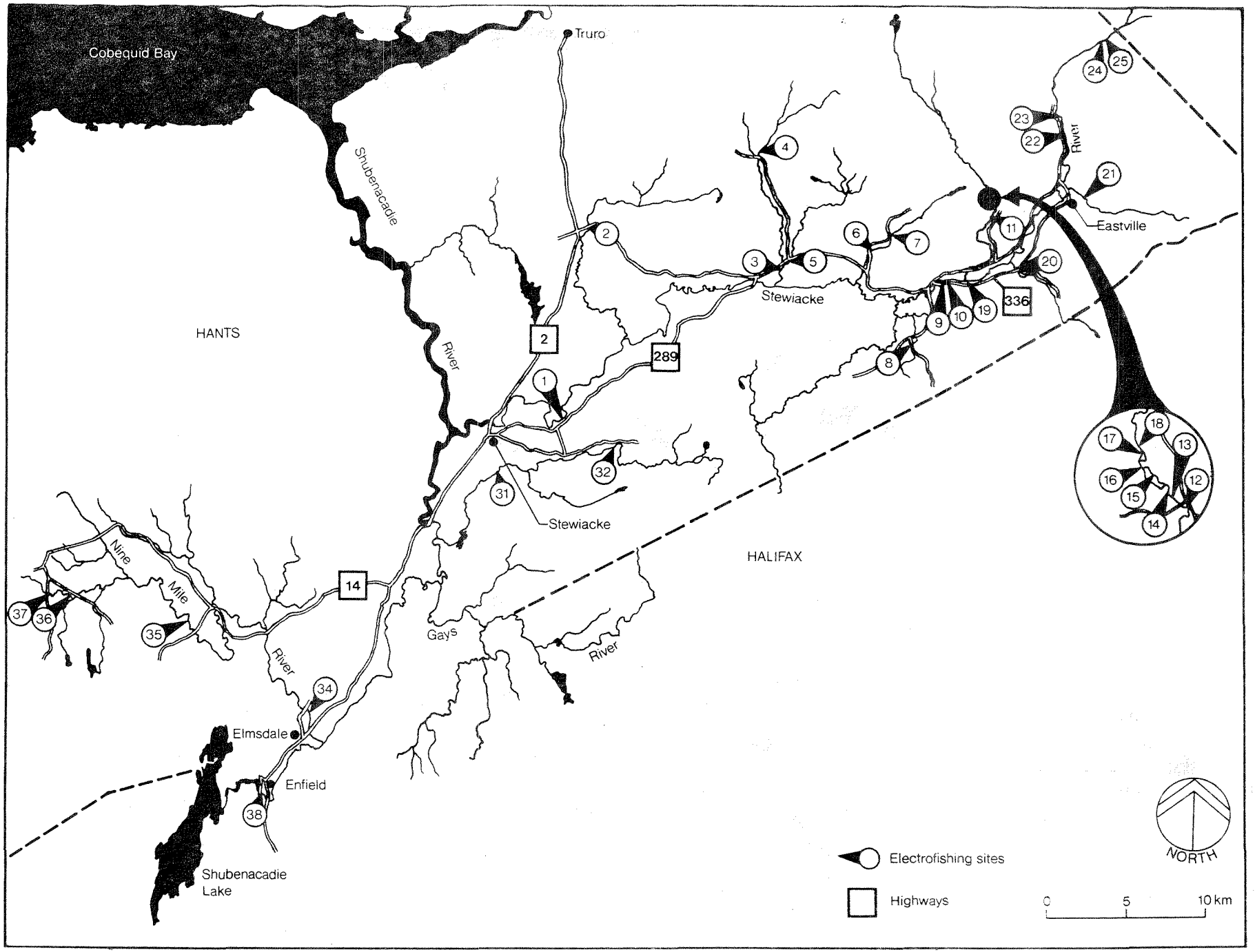

FIG. 6. Map of the Shubenacadie-Stewiacke River drainage, showing the location of electrofishing sites surveyed in 1968, 1969, 1976 and 1977.

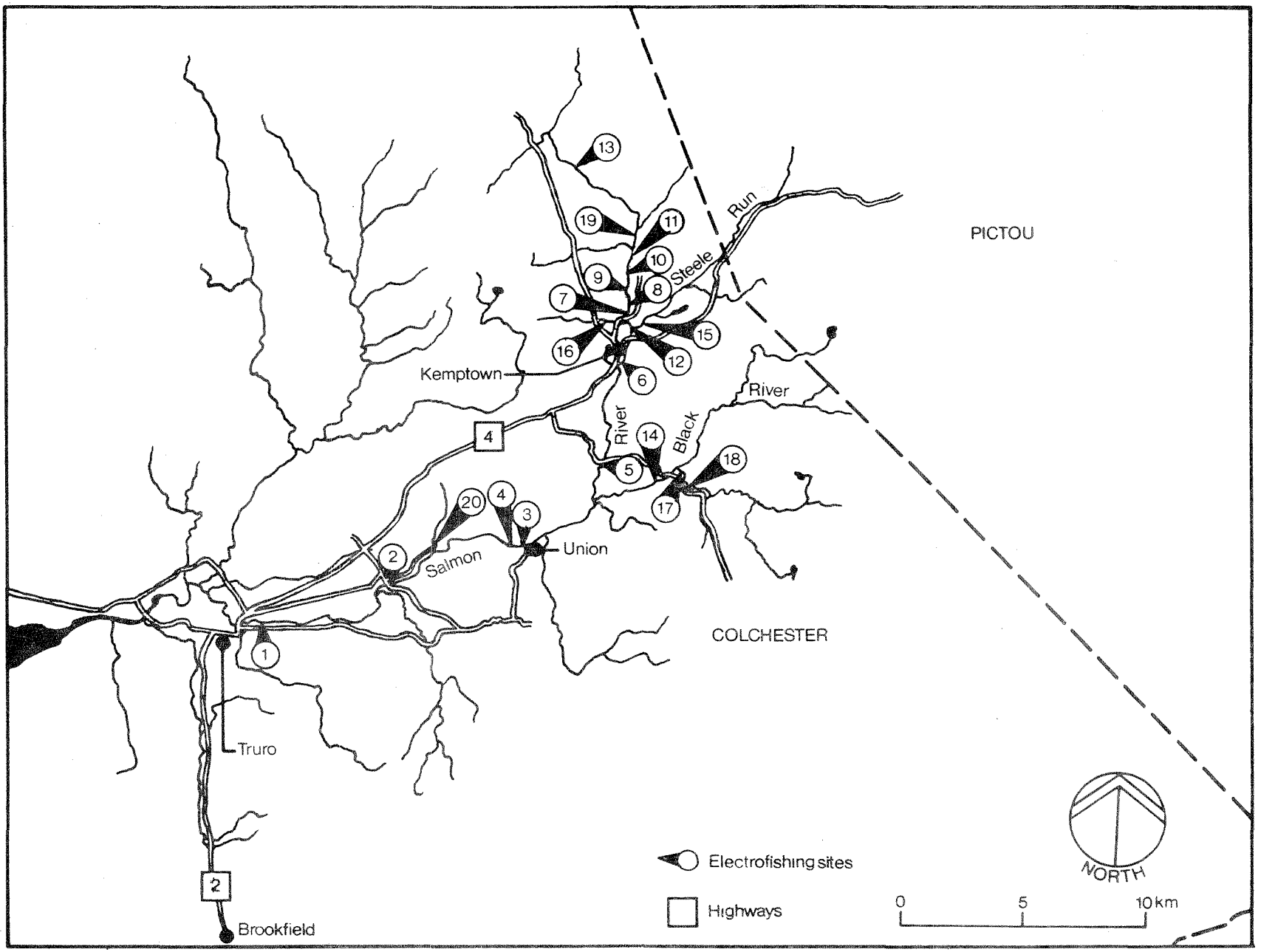

FIG. 7. Map of the Salmon River drainage, showing the location of electrofishing sites surveyed in 1972-73.

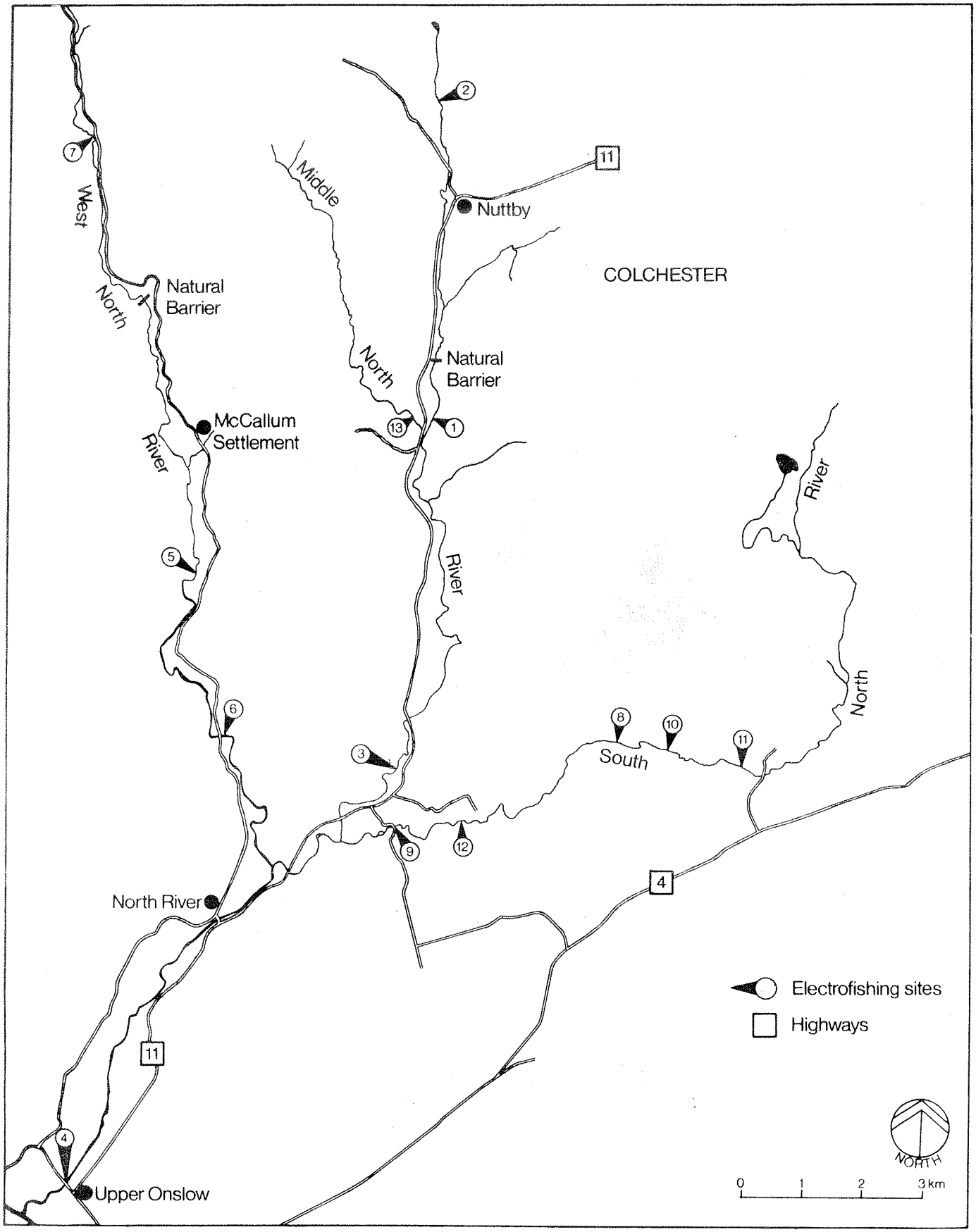

FIG. 8. Map of the North River, showing the location of electrofishing sites surveyed in 1972-73.

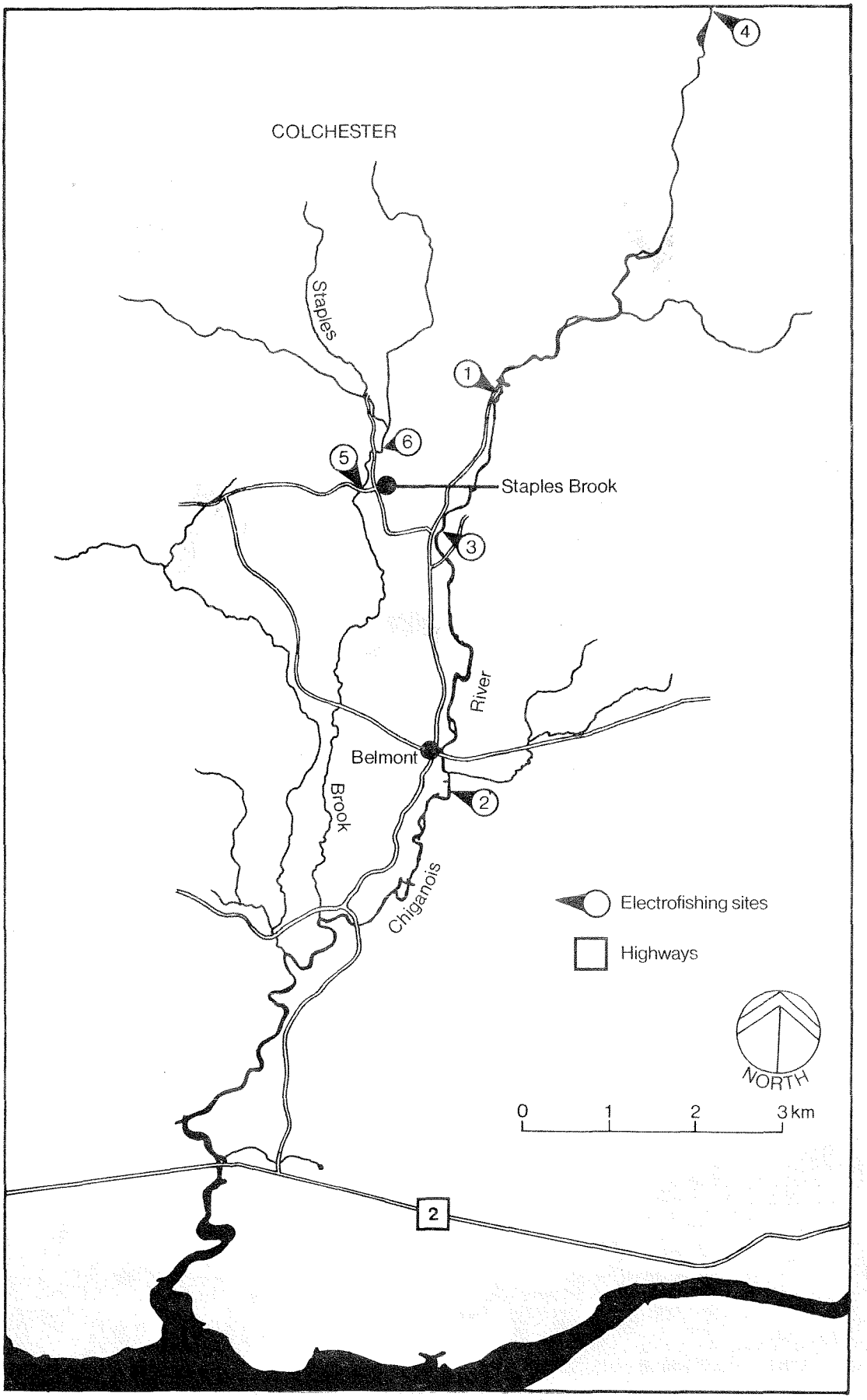

FIG. 9. Map of the Chiganois River, showing the location of electrofishing sites surveyed in 1972 and 1973.

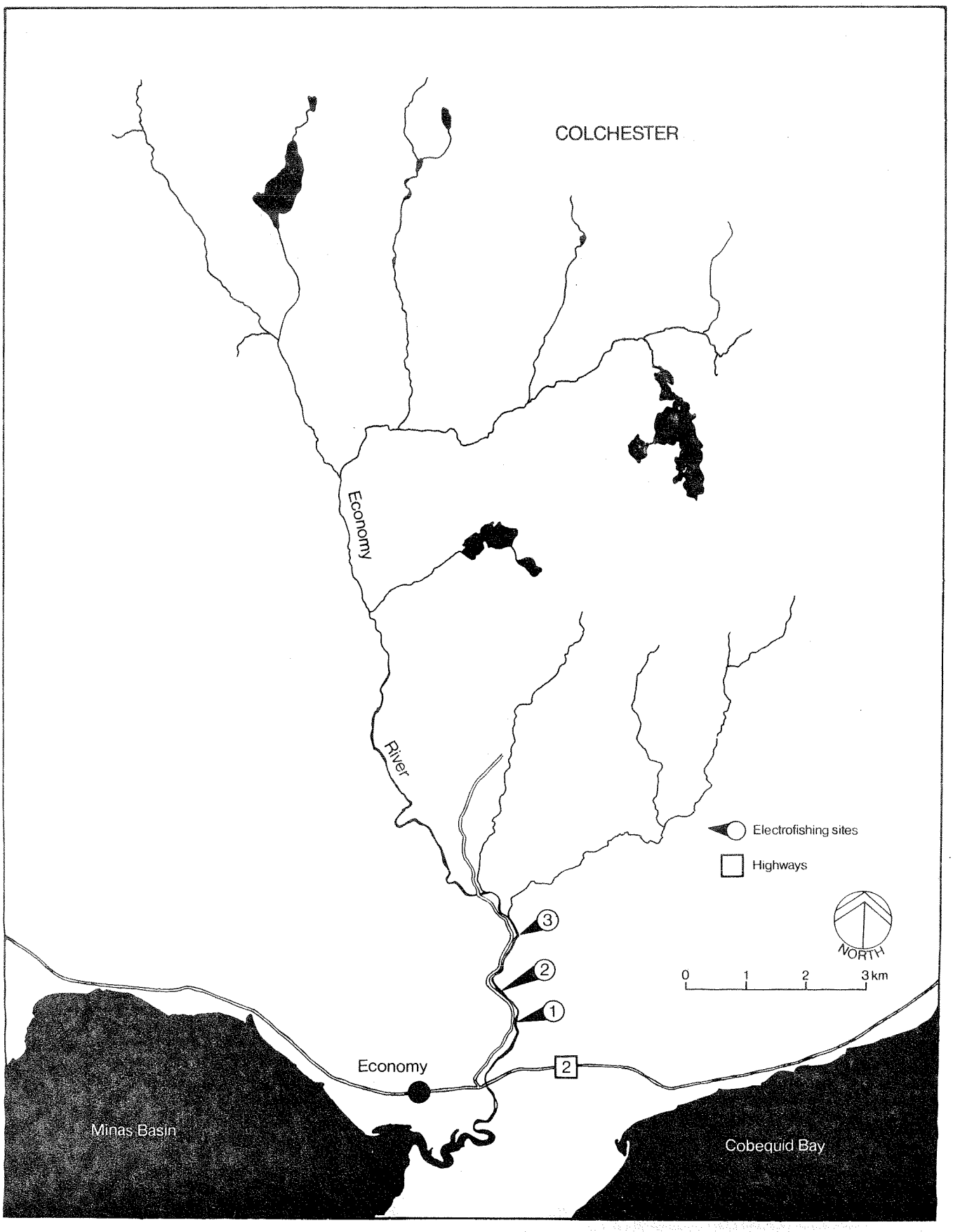

FIG. 10. Map of the Economy River drainage, showing the location of electrofishing sites surveyed in 1977.

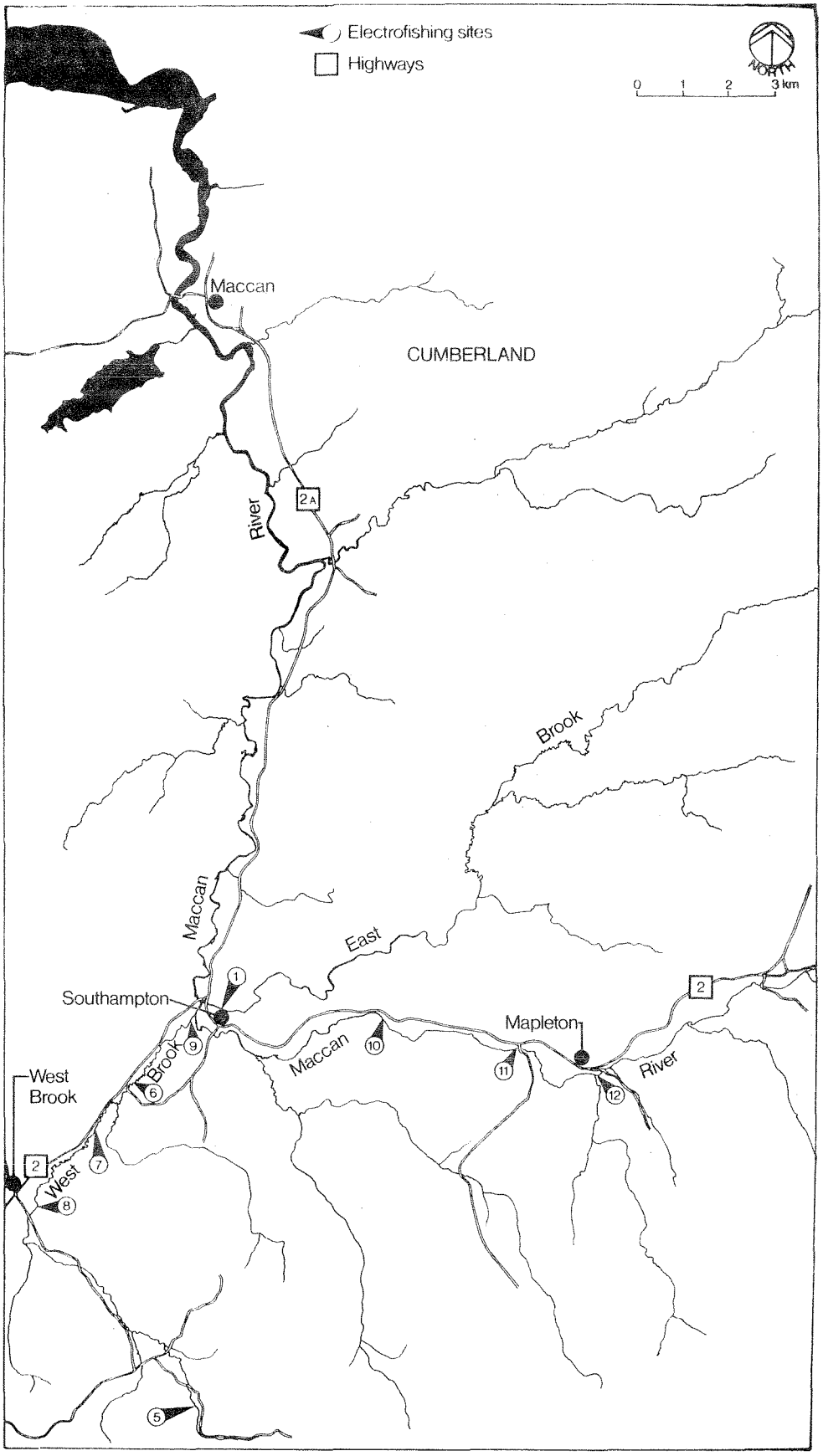

FIG. 11. Map of the Maccan River drainage, showing the location of electrofishing sites surveyed in 1966 and 1977.

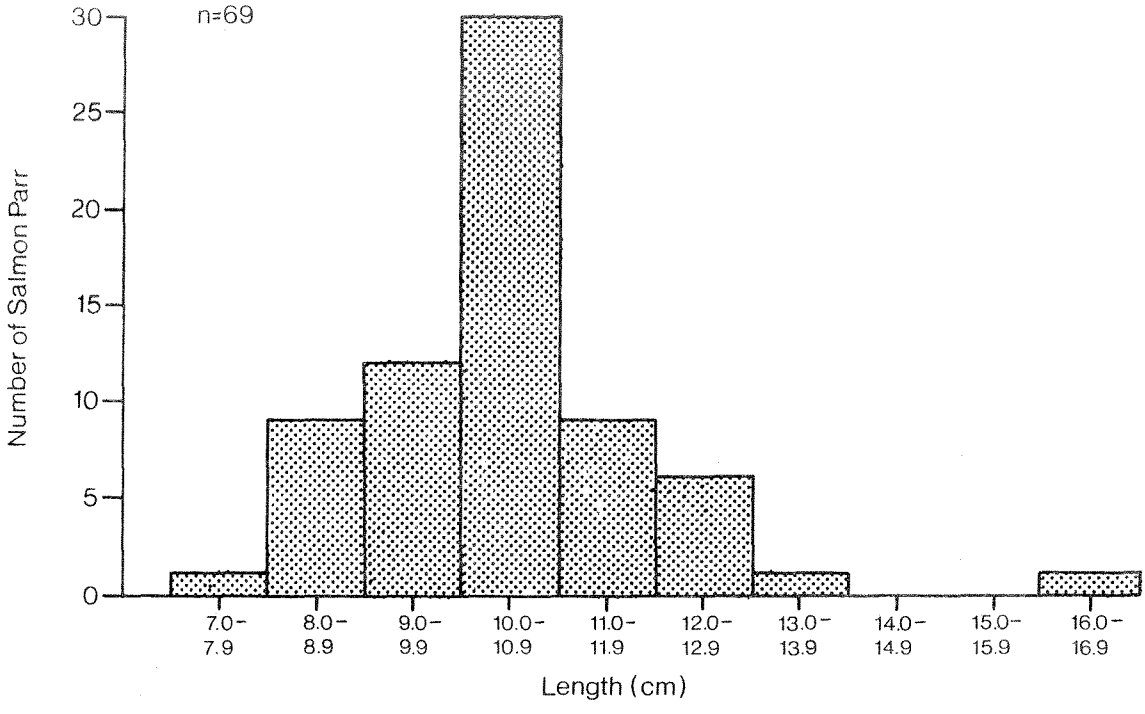

FIG. 12. Length frequency distribution of Atlantic salmon parr sampled in August in the Maccan River in 1977.

APPENDIX A

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED
ON THE EAST BRANCH OF THE ST. MARY'S RIVER
IN 1969, 1975 AND 1976

Site number	Grid reference/ map sheet	Location and access
1	803026 11 F/4	Archibald Brook - Stillwater - access via Highway #7 - located 10 metres downstream from the Highway #7 bridge crossing Archibald Brook.
2	741148 11 E/8	McKeen Brook - access via Highway #7 above Melrose and the road to the right, adjacent the bridge crossing McKeen Brook when proceeding to Aspen - located 100 metres upstream from the Highway #7 bridge.
3	727177 11 E/8	East Branch - Aspen - access via Highway #7, Highway #347 at Aspen and the road through the hayfield opposite Little Lake - located immediately upstream of the point where the road enters the East Branch.
4	676232 11 E/8	East Branch - Newton - access via Highway #347 and the old road to the river opposite the Westside Newtown sign -located 275 metres downstream from the Highway #347 bridge.
5	654260 11 E/8	East Branch - Willowdale - access via Highway #347, Westside Newtown Road and through one end of a field down a steep bank to the river - located 0.5 km downstream of the bridge crossing the East Branch on the Westside Newtown Road.
6	650262 11 E/8	East Branch - Willowdale - access via Highway #347 and Westside Newtown Road to the bridge crossing the East Branch on this road - located 40 metres upstream from this bridge.
7	645267 11 E/8	Black Brook - East River St. Mary's - access via Highway #347 to East River St. Mary's - located immediately downstream of the Highway #347 bridge crossing Black Brook.
9	577267 11 E/8	East Branch - Rocky Mountain - access via Highway #347 past Rocky Mountain, then to the road to the Garden of Eden barrens - located 20 metres upstream from the bridge crossing the East Branch on this road.
11	535310 11 E/8	Moose River - Garden of Eden - access via Highway #347 - located 30 metres downstream from the Highway #347 bridge crossing Moose River.
12	502365 11 E/8	Moose River - access via Highway #347 to French River Road - located 5 metres downstream of the first bridge crossing Moose River on the French River Road.
16	522333 11 E/8	Moose River - Garden of Eden - access via Highway #347 and an old road to the river 2.6 km upstream from site #11 - located adjacent to the west edge of an abandoned hayfield.
18	625266 11 E/8	East Branch - Willowdale - access via Highway #347 past East River St. Mary's - access via road 30 metres past the Green Brook Road and opposite the Edward Munroe farm - located 5 metres upstream from the bridge crossing the East Branch at this point.

19	545323 11 E/8	Garden River - Garden of Eden - access via Highway #347 and first road on the right past the Garden of Eden Church when proceeding towards Moose River - located immediately downstream of the culvert crossing the Garden River on this road.

APPENDIX B

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED
ON THE WEST BRANCH OF THE ST. MARY'S RIVER
IN 1969, 1975 AND 1976

Site number	Grid reference/ map sheet	Location and access
21	711121 11 E/8	West Branch - Glenelg - access via Highway #7 to Melrose and road to Glenelg - access via dirt road along the river upstream to the first farm - located 75 metres upstream from the confluence of Archibald's Brook and the West Branch.
22	644124 11 E/8	West Branch - Upper Smithfield - access via the road from Glenelg to Caledonia and a road opposite the farm near Glencross Brook - located 250 metres upstream from the confluence of Glencross Brook and the West Branch.
23	567136 11 E/8	West Branch - Lower Caledonia - access via the road from Glenelg to Caledonia - located 50 metres upstream from the bridge crossing the West Branch at Lower Caledonia.
24	477140 11 E/8	West Branch - Caledonia - access via the road from Glenelg to Caledonia - located 400 metres downstream from the bridge crossing the West Branch at Caledonia.
25	368148 11 E/7	West Branch - Cameron Settlement - access via the road from Caledonia to Trafalgar and the road to the river near the bridge over Black Brook - located immediately below the confluence of Black Brook and the West Branch.
26	330147 11 E/7	West Branch - Trafalgar - access via the road from Caledonia to Trafalgar, 4.1 km upstream from the bridge crossing Black Brook and a woods road through a burnt area to the river.
27	287140 11 E/7	South Lake Brook - Trafalgar - access via the road from Caledonia to Trafalgar up to the Liscomb Sanctuary Gate - located immediately downstream of the bridge crossing South Lake Brook.

APPENDIX C

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED ON WEST RIVER, SHEET HARBOUR IN 1966-68 AND 1973-77

Site number	Grid reference/ map sheet	Location and access
1	300783 11 D/15	Main West River - 50 metres upstream from steel bridge crossing West River on the Killag Mines Road.
2	305824 11 D/15	Killag River - 400 metres above first bridge over Killag River. Access via Killag Mines Road and road along south edge of field.
3	304824 11 D/15	Killag River - 6 metres above first bridge on Killag River. Access via Killag Mines Road.
4	233897 11 E/2	Killag River - 20 metres downstream from wooden bridge crossing the Killag River on the Beaver Dam Road.
5	291791 11 D/15	Main West River - 1.5 km upstream of the steel bridge crossing West River on the Killag Mines Road - access via Highway #24 and first woods road on the right when proceeding towards Marinette.
6	220836 11 E/2	Main West River - 25 metres below first Beaver Dam Road bridge. Access by woods road north side of river.
7	294844 11 E/2	Killag River - 10 metres above second bridge crossing the Killag River - access via the Killag Mines Road.
8	301783 11 D/15	Main West River - immediately upstream from the steel bridge crossing West River on the Killag Mines Road.

APPENDIX D

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED ON THE LAHAVE RIVER IN 1976 AND 1977

Site number	Grid reference/ map sheet	Location and access
6	588305 21 A/10	Ohio River - Hemford - access via gravel road past Mailman's store, parallel to the CNR tracks. Located 75 metres downstream from wooden bridge crossing the Ohio River on this road.
8	596394 21 A/10	Main LaHave River - Meisners - 200 metres downstream from Highway #10 bridge. Access via field on west side of the river.
10	568431 21 A/10	Main LaHave River - Cherryfield - access via Dalhousie East Road and foot path to the "Sink Spout". Located 50 metres downstream of the "Sink Spout" salmon pool.
11	549467 21 A/10	Main LaHave River - Falkland Ridge - access via the Ridge Road and the woods road through Laurence Starret's farm to the river. Located 300 metres upstream from the small cabin on the river.
12	527504 21 A/10	Main LaHave River - Falkland Ridge - access via Ridge Road and road to Dalhousie East. Located 200 metres downstream of the bridge crossing the LaHave River on this road - access down east bank of river.
14	597404 21 A/10	North River - Meisners - access via North River Road and private cabin road proceeding downstream of the bridge crossing North River. Located 400 metres downstream of the first cabin on this private road.
15	603418 21 A/10	North River - access via North River Road, 1.7 km upstream of the bridge crossing North River and woods road through the William Robar farm to the river. Located immediately below the old bridge.
18	733424 21 A/10	North Branch, LaHave River - Maplewood - access via Parkdale-Maplewood Road and private cabin road to the river at Maplewood, through the Gilbert Falkenham's property. Located 2 km downstream from Sherbrooke Lake.
19	734434 21 A/10	North Branch, LaHave River - Maplewood - access as per Site #18. Located 0.8 kilometres downstream from Sherbrooke Lake.
20	696541 21 A/10	Sherbrooke River - access via Forties Settlement Road and woods road proceeding upstream immediately past the bridge crossing the Sherbrooke River. Located just above Kelly Brook.
21	620573 21 A/10	North River - access via Forties Settlement Road, Lakeview Road and road to Lakeview cottages. Located 0.7 km upstream from Lake Torment.

APPENDIX E

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED ON THE STEWIACKE RIVER IN 1968, 1969, 1976 AND 1977 (Site numbers used by Semple [1970] and Sweeney [1976][1] are shown in parentheses)

Site number	Grid reference/ map sheet	Location and access
1(2)	770993 11 E/3	Main Stewiacke River - Stewiacke East - access via Stewiacke East to Cloverdale Road, 1 km upstream of the Stewiacke East School and through the field owned by Eugene Goodwin, adjacent to the first house on the left when proceeding towards Cloverdale.
2(4)	788111 11 E/6W	Little River - Brookfield - access via Brookfield to Middle Stewiacke Highway - located 3 metres below the bridge crossing Little River on this road.
3(11)	911088 11 E/3	Rutherford Brook - Middle Stewiacke - access via Highway #289 - located 30 metres below the bridge crossing Rutherford Brook on this road.
4(12)	895155 11 E/6E	Rutherford Brook - Middle Stewiacke - access via Highway #289 above Middle Stewiacke and road to Camden - located 25 metres upstream of the bridge crossing Rutherford Brook on this road.
5	916091 11 E/3	Chapman Brook - Middle Stewiacke - access via Highway #289 above Middle Stewiacke - located 5 metres downstream of the bridge crossing Chapman Brook on this road.
6(13)	965095 11 E/3	Otter Brook - access via Highway #289 above Middle Stewiacke and via the Otter Brook Road - located 10 metres upstream of the bridge crossing Otter Brook on this road.
7	979105 11 E/3	Otter Brook - access via Highway #289 above Middle Stewiacke, the Otter Brook Road and first dirt road on the left proceeding upstream - located 10 metres downstream of the small house on the opposite side of the road.
8(14)	991036 11 E/3	Goshen Brook - Southvale - access via Highway #289 to Middle Stewiacke, road to South Branch, Meadowvale and Southvale - located 10 metres upstream of the bridge crossing Goshen Brook on the Southvale road.
9(20)	011076 11 E/2	Main Stewiacke River - Upper Stewiacke - access via Highway #336 and first clearing to the river on the left above the Upper Stewiacke bridge.
10(21)	013077 11 E/2	Main Stewiacke River - Upper Stewiacke - access via Highway #336 and second clearing to the river on the left above the Upper Stewiacke bridge, 0.8 km upstream of Site #9.
11(4)	039111 11 E/7	Pembroke River - Glenbervie - access via Highway #289 and road from Stewiacke Crossroads to Glenbervie - first road on the left proceeding upstream - located 99 metres upstream of the bridge crossing the Pembroke River on this road.
12(23)	047121 11 E/7	Pembroke River - Glenbervie - access via Highway #289 above Upper Stewiacke, and road to Glenbervie and Burnside - access from second road on the left when proceeding towards Burnside - located 30

		metres below the bridge crossing the Pembroke River on this road.
13(1)	046122 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 - located 32 metres upstream from the bridge crossing the Pembroke River on this road.
14(2)	045123 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 - located 185 metres upstream from the bridge crossing the Pembroke River on this road.
15(3)	043125 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 - located 351 metres upstream from the bridge crossing the Pembroke River on this road.
16(5)	042126 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 - located 848 metres upstream of the bridge crossing the Pembroke River on this road - can also be reached through the field owned by Edward Nelson at the Pembroke Cemetery.
17(6)	042127 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 but through the field owned by Edward Nelson at the Pembroke Cemetery - located 916 metres upstream of the bridge crossing the Pembroke River on this road.
18(7)	042128 11 E/7	Pembroke River - Glenbervie - access same as for Site #12 but through the field owned by Edward Nelson at the Pembroke Cemetery - located 1,001 metres upstream of the bridge crossing the Pembroke River on this road.
19(24)	029075 11 E/2	Main Stewiacke River - Upper Stewiacke - access via Highway #336 and through a field owned by David Kennedy on the south side of the river - located 100 metres upstream from the confluence between the Pembroke River and the Stewiacke River.
20	058084 11 E/2	Newton Brook - Newton Mills - access via Highway #336 - located 3 metres upstream from the bridge crossing Newton Brook on Highway #336.
21	101129 11 E/7	Cox Brook - Eastville - access via Highway #336 to Eastville and Harrison Road. Road above Eastville - located 10 metres upstream of the second bridge crossing Cox Brook on this road.
22	089174 11 E/7	Main Stewiacke River - above Eastville - access via Highway #289 - 3.86 km upstream from Eastville - located 0.75 km downstream of the bridge crossing the Stewiacke River on this road.
23(30)	086181 11 E/7	Main Stewiacke River - above Eastville - access via Highway #289 - 3.86 km upstream from Eastville - located 50 metres upstream from the bridge crossing the river on this road.
24	113229 11 E/7	Main Stewiacke River - above Eastville - access via Highway #289 - located 1 km upstream from confluence of Sutherland's Brook and the Stewiacke River on Scott Paper land.
25(31)	115229 11 E/7	Main Stewiacke River - above Eastville - access as for Site #24 - located 0.3 km upstream from Site #24 on the Stewiacke River on Scott Paper land.

[1]Sweeney, R.K. 1976. Unpublished data. Freshwater and Anadromous Division, Resource Branch, Fisheries and Marine Service, Department of Fisheries and the Environment, Halifax, Nova Scotia.

APPENDIX F

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED
ON THE SHUBENACADIE RIVER IN 1969 AND 1977
(Site numbers used by Semple [1970] are shown in parentheses)

Site number	Grid reference/ map sheet	Location and access
31(2)	727958 11 E/3	St. Andrews River - Stewiacke - access via the Stewiacke to South Branch Road and the first road to the right leaving the village of Stewiacke, St. Andrews Street, when proceeding towards South Branch - access via the private farm road of Bruce Jardin to the river 2.5 km from Stewiacke.
32(5)	804976 11 E/3	St. Andrews River - Lanesville - access via the Stewiacke to South Branch Road 6.6 km from Stewiacke - located adjacent to the road at this point on the property of L.C.H. Vissers.
34(1)	604810 11 D/13	Nine Mile River - Elmsdale - access via Highway #102 to the bridge crossing the Nine Mile River at Elmsdale - located 100 metres downstream from the bridge.
35	529868 11 E/4E	Nine Mile River - access via Highway #14 to Nine Mile River, the Renfrew Road to the campground and the first road upstream at the campground through the property of Ralph Faulkner - located 1.1 km upstream from the bridge crossing Nine Mile River.
36(9)	455881 11 E/4E	Carrigan Brook - Upper Rawdon - access via the Beaverbank Road from Upper Rawdon to Sackville and the Renfrew Road - access through the property of A. Keebal to the brook 0.5 km upstream from the bridge crossing Carrigan Brook on this road.
37	442884 11 E/4E	Carrigan Brook - Upper Rawdon - access via the Beaverbank Road from Upper Rawdon to Sackville - located 30 metres downstream of the bridge crossing Carrigan Brook on this road.
38(1)	574758 11 D/13	Shubenacadie River - Enfield - access via Highway #102 to Enfield and the road to Enfield opposite the Texaco garage - located 50 metres downstream from the bridge crossing the Shubenacadie River on this road.

APPENDIX G

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED ON THE ECONOMY RIVER IN 1977

Site number	Grid reference/ map sheet	Location and access
1	301270 11 E/5W	Economy River - Economy - access via Highway #2 to the bridge crossing the Economy River, turn right on the dirt road and proceed upstream for 1.4 km - located adjacent to an old road to the river at this point.
2	298275 11 E/5W	Economy River - Economy - access the same as for Site #1 - located 1.9 km upstream from Highway #2 bridge and 91 metres below an island in the river.
3	300283 11 E/5W	Economy River - Economy - access the same as for Site #1 - located 2.7 km upstream from Highway #2 bridge.

APPENDIX H

LOCATION AND ACCESS TO ELECTROFISHING SITES SURVEYED ON THE MACCAN RIVER IN 1966 AND 1977

Site number	Grid reference/ map sheet	Location and access
4	028494 21 H/9E	East Brook - Southampton - access via Highway #2 to the bridge crossing the Maccan River and East Brook below Southampton - located 50 metres upstream from the Highway #2 bridge crossing East Brook.
5	022409 21 H/9W	West Brook - Southampton - access via Highway #2 to the bridge crossing the Maccan River below Southampton - access through the field across from the Southampton School - located 50 metres upstream from the confluence of the West Brook and Maccan River on West Brook.
6	010477 21 H/9W	West Brook - Southampton - access via Highway #2 from Southampton to Parrsboro, 2.2 km from the bridge crossing the Maccan River - turn left on the dirt road to the bridge crossing West Brook - located 20 metres downstream from this bridge.
7	002467 21 H/9W	West Brook - below West Brook - access via Highway #2 from Southampton to Parrsboro - located in West Brook 1.3 km upstream from Site #6 and across from the Melborn farmhouse.
8	990451 21 H/9W	West Brook - access via Highway #2 from Southampton to West Brook and the road from West Brook to New Canaan - located 30 metres downstream from the bridge crossing West Brook on the New Canaan Road.
9	024490 21 H/9W	Maccan River - Southampton - located 30 metres upstream from the confluence of West Brook and the Maccan River - access via the field across from the Southampton School.
10	062490 21 H/9E	Maccan River - East Southampton - access via Highway #2 to East Southampton and the road to the saw mill - located 20 metres upstream from the bridge crossing the Maccan River at the saw mill.
11	090484 21 H/9E	Maccan River - Mapleton - access via Highway #2 upstream from Southampton and the road to South Brook - located 100 metres downstream from the bridge crossing the Maccan River on the South Brook Road.
12	108479 21 H/9E	Maccan River - Mapleton - access via Highway #2 to Mapleton and the road to Lynn Mountain - located 20 metres downstream of the bridge crossing the Maccan River on the Lynn Mountain Road.

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