Estimated Densities of Juvenile Atlantic Salmon and Other Freshwater Fishes in Selected Nova Scotia Streams, 1978

J. D. Cameron and R. W. Gray

Freshwater and Anadromous Division
Resource Branch
Department of Fisheries and Oceans
Halifax, Nova Scotia

October, 1979

Canadian Data Report of Fisheries and Aquatic Sciences No. 163

Government of Canada
Fisheries and Oceans

Gouvernement du Canada
Pêches et Océans

Canadian Data Report of Fisheries and Aquatic Sciences

These reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of Data Reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Numbers 1-25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26-160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was changed with report number 161.

Data Reports are not intended for general distribution and the contents must not be referred to in other publications without prior written clearance from the issuing establishment. The correct citation appears above the abstract of each report.

Rapport statistique canadien des sciences halieutiques et aquatiques

Ces rapports servent de base à la compilation des données de classement et d'archives pour lesquelles il y a peu ou point d'analyse. Cette compilation aura d'ordinaire été préparée pour appuyer d'autres publications ou rapports. Les sujets des Rapports statistiques reflètent la vaste gamme des intérêts et politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

Les Rapports statistiques ne sont pas préparés pour une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au haut du résumé de chaque rapport.

Canadian Data Report of
Fisheries and Aquatic Sciences No. 163

October, 1979

ESTIMATED DENSITIES OF JUVENILE ATLANTIC SALMON AND OTHER FRESHWATER FISHES IN SELECTED NOVA SCOTIA STREAMS, 1978

J.D. Cameron and R.W. Gray

Freshwater and Anadromous Division
Resource Branch
Department of Fisheries and Oceans
Halifax, Nova Scotia
B3J 2S7

Cat. No. Fs 52-2/1979-0163 ISSN 0706-6465

CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

ABSTRACT

Cameron, J.D. and R.W. Gray, 1979. Estimated densities of juvenile Atlantic salmon and other freshwater fishes in selected Nova Scotia streams, 1978. Can. Data Rep. Fish. Aquat. Sci. No. 163. 54 p.

This report summarizes juvenile salmon and other freshwater fish population data collected during electrofishing surveys on the West St. Mary's, LaHave, Salmon (Digby), Kennetcook, Portapique, Wallace, East (Pictou), French, and West (Antigonish) rivers in 1978. These data from the ongoing juvenile salmon assessment program in mainland Nova Scotia, in conjunction with other biological data, will be useful in determining the present status of salmon stocks in the province.

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

RÉSUMÉ

Cameron, J.D. and R.W. Gray. 1979. Estimated densities of juvenile Atlantic salmon and other freshwater fishes in selected Nova Scotia streams, 1978. Can. Data Rep. Fish. Aquat. Sci. No. 163. 54 p.

Ce rapport résume sommairement les données recueillies (1978) à la pêche electrique sur les populations de poissons juveniles de saumons et autres poissons d'eau douce dans les rivières West St. Mary's, LaHave, Salmon (Digby), Kennetcook, Portapique, Wallace, East (Pictou), French, et West (Antigonish). Ces données font parties d'un program en cours, visant à l'évaluation des population salmonifères juveniles en Nouvelle Écosse. De concert avec d'autres données biologiques ces données seront utiles pour determiner le statut du saumon dans la province.

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

INTRODUCTION

In mainland Nova Scotia, Atlantic salmon *(Salmo salar* L.*)* inhabit approximately 75 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, present a significant management challenge. The data base from which biological advice is provided to regulate these stocks originates from three sources: recreational-and commercial-fisheries catch statistics, supplied by the Conservation and Protection Division; tagging studies and juvenile-salmon investigations.

This report summarizes the biological data collected in 1978 from electrofishing surveys of juvenile salmon and other freshwater fish densities conducted in nine Nova Scotia salmon streams.

MATERIALS AND METHODS

Nine rivers in mainland Nova Scotia were electrofished in 1978. Some of the sampling sites on the LaHave River and on the West Branch of the St. Mary's River were surveyed in previous years. In 1978, additional sites on these rivers were selected to improve coverage of the systems, especially in the area below Morgan Falls on the LaHave and in the upper tributaries of the West Branch, St. Mary's River. Salmon River (Digby), Kennetcook, Portapique, Wallace, East River (Pictou), French River (Pictou) and the West River (Antigonish) had not been surveyed previously.

Site selection in the new areas was initially done from topographic maps, to secure an even distribution of sites throughout the system. Follow-up surveys pinpointed actual site locations, according to their accessability and location within representative salmon fry or parr habitat.

Electrofishing began the first week in July on the LaHave River. The LaHave, Salmon River (Digby), Kennetcook and Portapique were completed by a crew stationed in New Germany. A model VVP-2C, variable-voltage pulsator, supplied by Coffelt Electronics Co., Inc., Englewood, California, was used. A second crew, stationed in New Glasgow, started the second week of July on the West Branch of the St. Mary's River. The Wallace River, East River (Pictou), French River (Pictou), West River (Antigonish) and the West Branch of the St. Mary's River were completed by this crew, using a Dirigo, Series 600B, variable-voltage and frequency pulsator, supplied by Dirigo Electronic Engineering, Corvallis, Oregon.

The methods used to electrofish each site were similar to those described by Gray et al. (1978), except for the following changes. After the barrier nets were secured, a ten-minute pause was taken to allow fish reaction to normalize before both barrier nets were raised simultaneously to seal off the area. A "Pollet" apron-seine, described by Elson (1962), was used at all sites, except when very low water conditions made the use of the seine impossible.

Juvenile salmon, collected for disease analysis in conjunction with electrofishing, were scale sampled; weighed using a Mettler Model P1200, electric balance; and fork lengths to the nearest millimeter were determined by using a standard measuring trough.

Density estimates of each species were calculated by the catch-per-unit-effort method described by DeLury (1951).

RESULTS

The results of the electrofishing surveys, including fish densities, age distribution, age-length frequency, and various other biological data, are summarized (Tables 1-37).

Descriptive information is given on location and access to electrofishing sites (Appendices A-I). Watershed areas surveyed in 1978 in mainland Nova Scotia (Fig. 1) are ranked according to under-yearling salmon densities.

Also included are maps of the various watersheds and sampling site locations (Figs. 2-10), and an illustration of the length-frequency distribution of Atlantic salmon parr in six of these streams (Fig. 11).

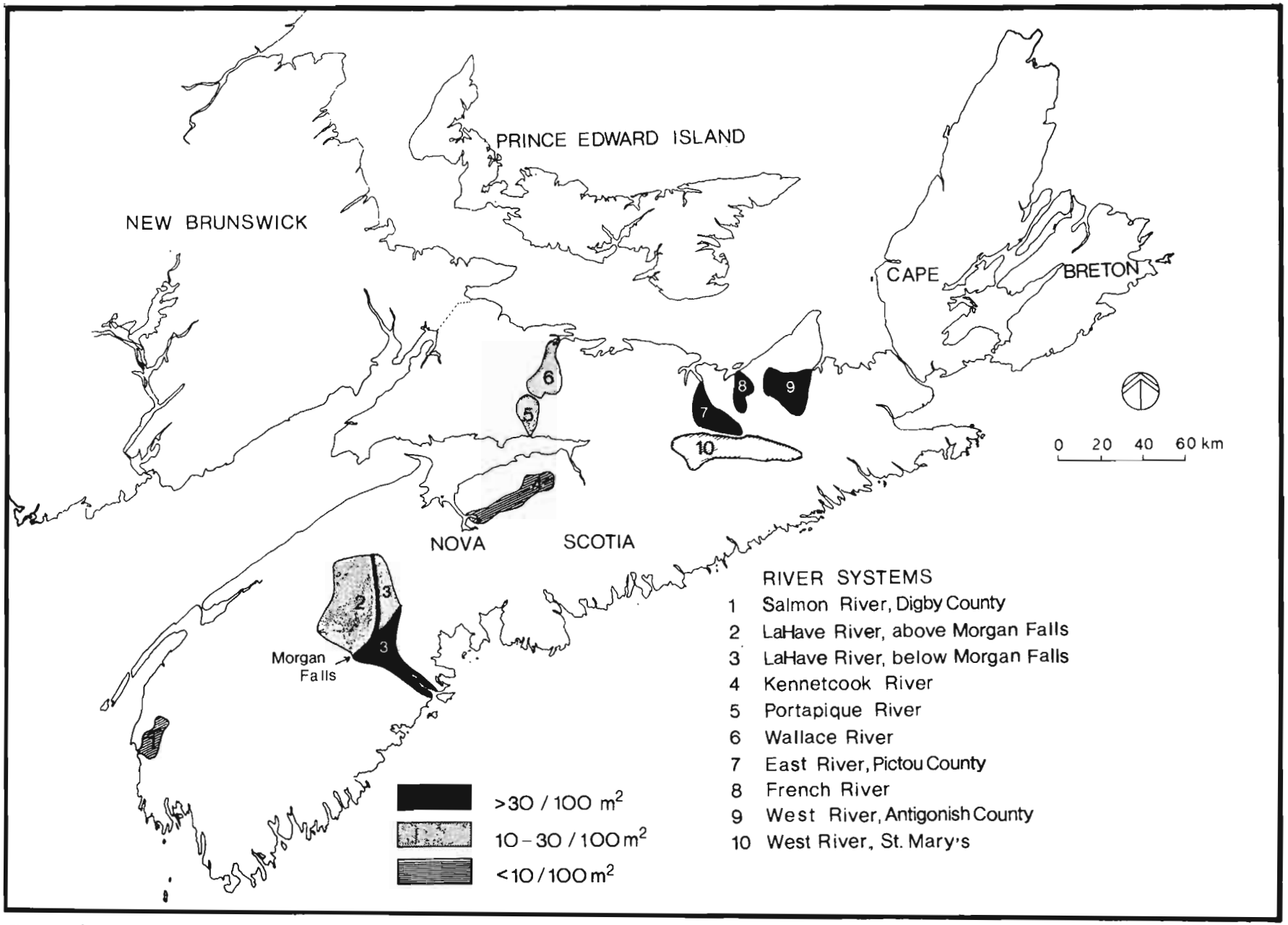

FIG. 1. Location map and a comparison of underyearling Atlantic salmon densities in watersheds surveyed in mainland Nova Scotia in 1978.

TABLE 1. A summary of the densities of fish captured during July, 1978, electrofishing investigations on the Salmon River, Digby County.

Location/ site number	Number of fish/100m²								
	Salmon		Brook trout	American eel	White sucker	Northern lake chub	Banded killifish	Yellow perch	White perch
	Fry	Parr							
Indian River									
3	1.4	20.2	2.5	48.5	0.5	0.0	0.5	0.0	0.0
Main Salmon River									
5	17.1	1.4	0.7	88.1	0.0	0.7	0.0	0.0	0.0
7	0.0	0.0	0.0	32.1	0.0	0.0	26.0	6.4	1.2
Mean density	6.2	7.2	1.1	56.2	0.2	0.2	8.8	2.1	0.4
Standard deviation	9.49	11.28	1.29	28.79	0.29	0.40	14.87	3.70	0.69

TABLE 2. A summary of miscellaneous data collected during July, 1978, electrofishing investigations on the Salmon River, Digby County.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (^{0}C)	pH	Velocity (m/sec)
Indian River						
3	July 20	223.0	17.4	22.5	6.3	0.8
Main Salmon River						
5	July 20	148.0	9.7	21.5	5.9	0.6
7	July 20	87.0	5.1	22.5	6.2	-
Mean		152.7	10.7	22.2	6.1	0.7
Standard deviation		68.12	6.21	0.58	0.21	0.14

TABLE 3. Analysis of length in relation to age of Atlantic salmon parr sampled July 20, 1978, on the Salmon River, Digby County.

	Age (yr)	
	1+	2+
Number of specimens	5	0
Range in length (cm)	13.0-15.5	-
Mean length (cm)	14.3	-
Standard deviation	0.92	-

TABLE 4. Length-frequency distribution in relation to age of Atlantic salmon parr sampled July 20, 1978 on the Salmon River, Digby County.

Length (cm)	Age (yr)	
	1+	2+
13.0-13.9	1	0
14.0-14.9	3	0
15.0-15.9	1	0

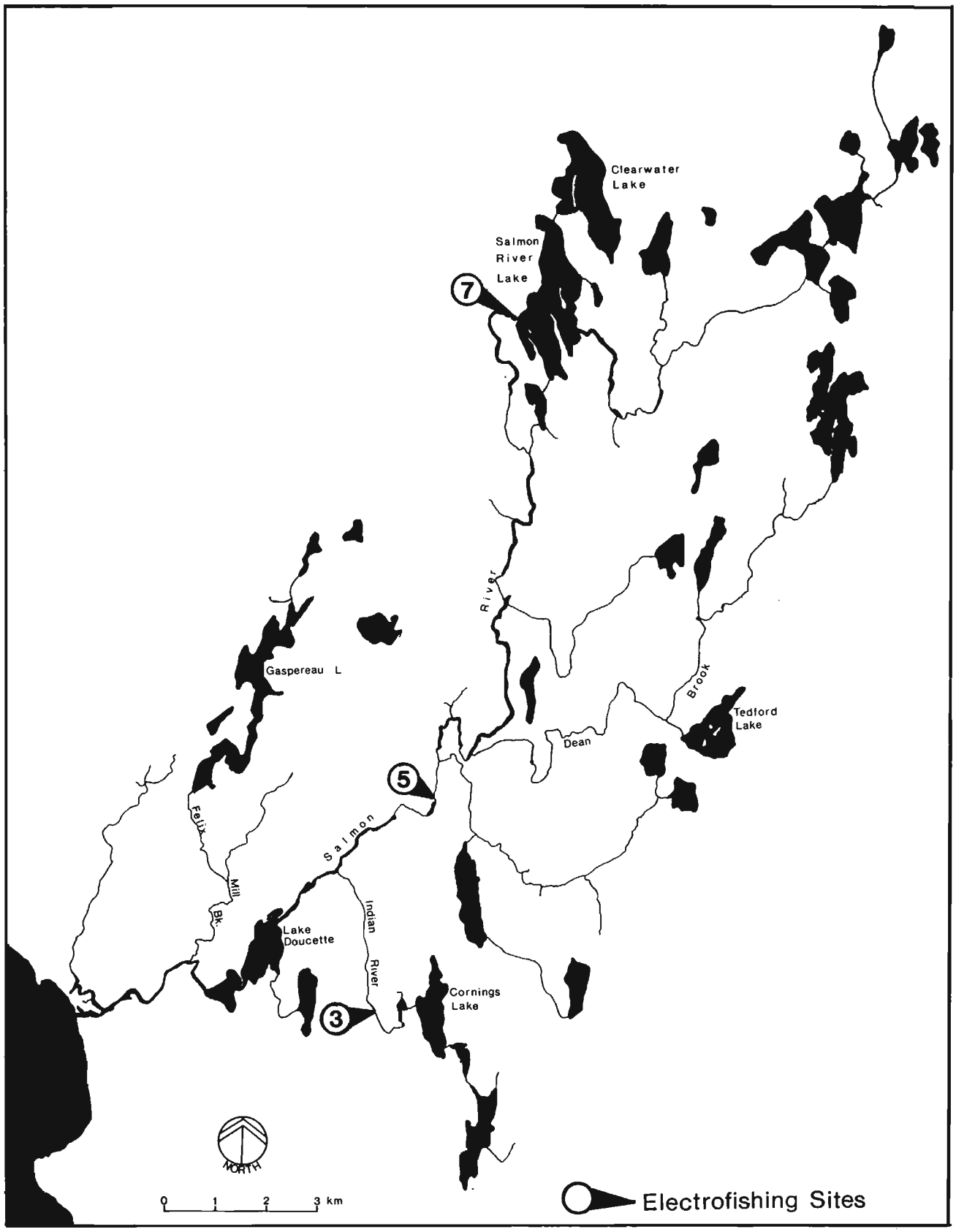

FIG. 2. Location of electrofishing sites surveyed on the Salmon River, Digby County, 1978.

TABLE 5. A summary of the densities of fish captured during early July, 1978, electrofishing investigations on the LaHave River.

Location/ site number	Number of fish/100m^2											
	Salmon		Hatchery	Brook	American		White	Northern	Banded	Common	Stickleback	
	Fry	Parr	salmon parr	trout	eel	Lamprey	sucker	lake chub	killifish	shiner	Threespine	Ninespine
Below Morgan Falls												
West LaHave River												
1	77.5	5.0	0.0	0.0	1.4	8.4	5.7	45.9	0.0	0.0	0.0	0.0
Main LaHave River												
3	36.0	1.1	0.0	0.0	6.2	9.2	0.0	0.2	1.7	0.0	0.0	0.0
North Branch LaHave River												
16	55.0	3.2	0.0	0.0	13.6	2.0	0.0	31.3	0.3	0.0	0.0	0.0
19	11.1	1.1	0.0	2.4	1.2	0.0	2.9	1.8	4.8	0.0	0.0	0.0
20	0.0	6.6	0.0	0.0	3.2	0.0	0.0	5.1	0.0	0.0	0.0	0.0
Mean density	35.9	3.4	-	0.5	5.1	3.9	1.7	16.9	1.4	-	-	-
Standard deviation	31.62	2.42	-	1.07	5.15	4.54	2.55	20.58	2.05	-	-	-
Above Morgan Falls												
Ohio River												
6	26.0	5.7	0.4	0.0	2.4	0.7	0.0	1.8	0.0	1.1	0.0	0.0
7	0.0	0.0	0.0	0.5	0.9	1.7	0.0	0.1	4.3	0.0	0.0	0.5
Main LaHave River												
8	19.6	3.8	0.0	0.0	1.8	0.8	0.0	0.0	1.4	0.0	0.0	0.0
10	46.9	2.4	0.0	0.0	0.9	0.9	0.2	5.6	0.5	0.0	0.0	0.0
11	19.0	5.6	0.0	0.0	0.4	0.0	2.2	9.0	0.4	0.0	0.0	0.0
12	2.4	8.6	0.0	0.2	0.3	0.0	5.9	5.9	0.0	0.0	0.0	0.0
13	4.3	0.4	0.8	0.1	1.6	0.1	0.0	2.6	0.1	0.1	0.0	0.0
North River												
14	21.1	7.0	0.0	0.0	0.5	1.6	0.0	2.6	0.4	0.0	0.0	0.0
15	10.2	17.5	0.0	0.0	2.3	0.0	0.4	3.1	0.0	0.0	0.0	0.0
21	0.2	6.2	0.0	1.6	5.0	0.0	12.7	33.7	1.2	0.0	0.0	0.0
Mean density	15.0	5.7	0.1	0.2	1.6	0.6	2.1	6.4	0.8	0.1	-	< 0.1
Standard deviation	14.73	5.00	0.27	0.50	1.42	0.67	4.15	9.97	1.32	0.35	-	0.16
LaHave River System												
Mean density	22.0	4.9	0.1	0.3	2.8	1.7	2.0	9.9	1.0	< 0.1	-	< 0.1
Standard deviation	23.01	4.36	0.22	0.71	3.43	2.97	3.61	14.52	1.54	0.28	-	0.13

TABLE 6. A summary of miscellaneous data collected during early July, 1978, electrofishing investigations on the LaHave River.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (^{o}C)	pH	Velocity (m/sec)
Below Morgan Falls						
West LaHave River						
1	July 27	337	7.0	24.0	6.5	-
Main LaHave River						
3	July 21	678	22.6	30.0	7.0	-
North Branch LaHave River						
16	July 19	352	66.0	25.0	6.5	-
19	July 11	699	27.1	22.0	6.2	0.5
20	July 18	487	10.8	24.0	6.5	-
Mean		510.6	26.7	25.0	6.5	-
Standard deviation		172.75	23.46	3.00	0.29	-
Above Morgan Falls						
Ohio River						
6	July 05	283	7.8	20.0	-	0.3
7	July 12	785	24.8	22.0	6.2	0.3
Main LaHave River						
8	July 10	916	45.6	25.0	7.0	0.1
10	July 07	618	37.6	24.0	7.0	0.4
11	July 13	747	62.7			
12	July 08	513	64.1	25.5	7.0	0.1
13	July 12	876	73.7	25.0	6.5	0.4
North River						
14	July 06	601	11.4	21.0	6.5	0.4
15	July 06	232		23.0	6.5	0.6
21	July 14	369	45.5	25.0	6.5	0.5
Mean		594.0	41.5	23.4	6.7	0.4
Standard deviation		242.37	23.36	2.00	0.31	0.16
LaHave River System						
Mean		566.2	36.2	24.0	6.6	0.4
Standard deviation		218.96	23.65	2.42	0.29	0.16

TABLE 7. Analysis of length in relation to age of Atlantic salmon fry and parr sampled June 28-July 14, 1978, on the LaHave River.

	Age (yr)		
	0+	1+	2+
Number of specimens	40	63	3
Range in length (cm)	4.1-5.5	8.5-14.8	13.2-15.5
Mean length (cm)	4.8	10.9	14.5
Standard deviation	0.40	1.29	1.17

TABLE 8. Age-frequency distribution of Atlantic salmon parr sampled June 28-July 14, 1978, on the LaHave River.

	Age (yr)	
	1+	2+
Number in each age class	63	3
% in each age class	95.5	4.5

TABLE 9. Length-frequency distribution in relation to age of Atlantic salmon fry and parr sampled June 28-July 14, 1978, on the LaHave River.

Length (cm)	Age (yr)		
	0+	1+	2+
4.0- 4.9	26	0	0
5.0- 5.9	14	0	0
6.0- 6.9	0	0	0
7.0- 7.9	0	0	0
8.0- 8.9	0	1	0
9.0- 9.9	0	12	0
10.0-10.9	0	18	0
11.0-11.9	0	23	0
12.0-12.9	0	5	0
13.0-13.9	0	2	1
14.0-14.9	0	2	1
15.0-15.9	0	0	1

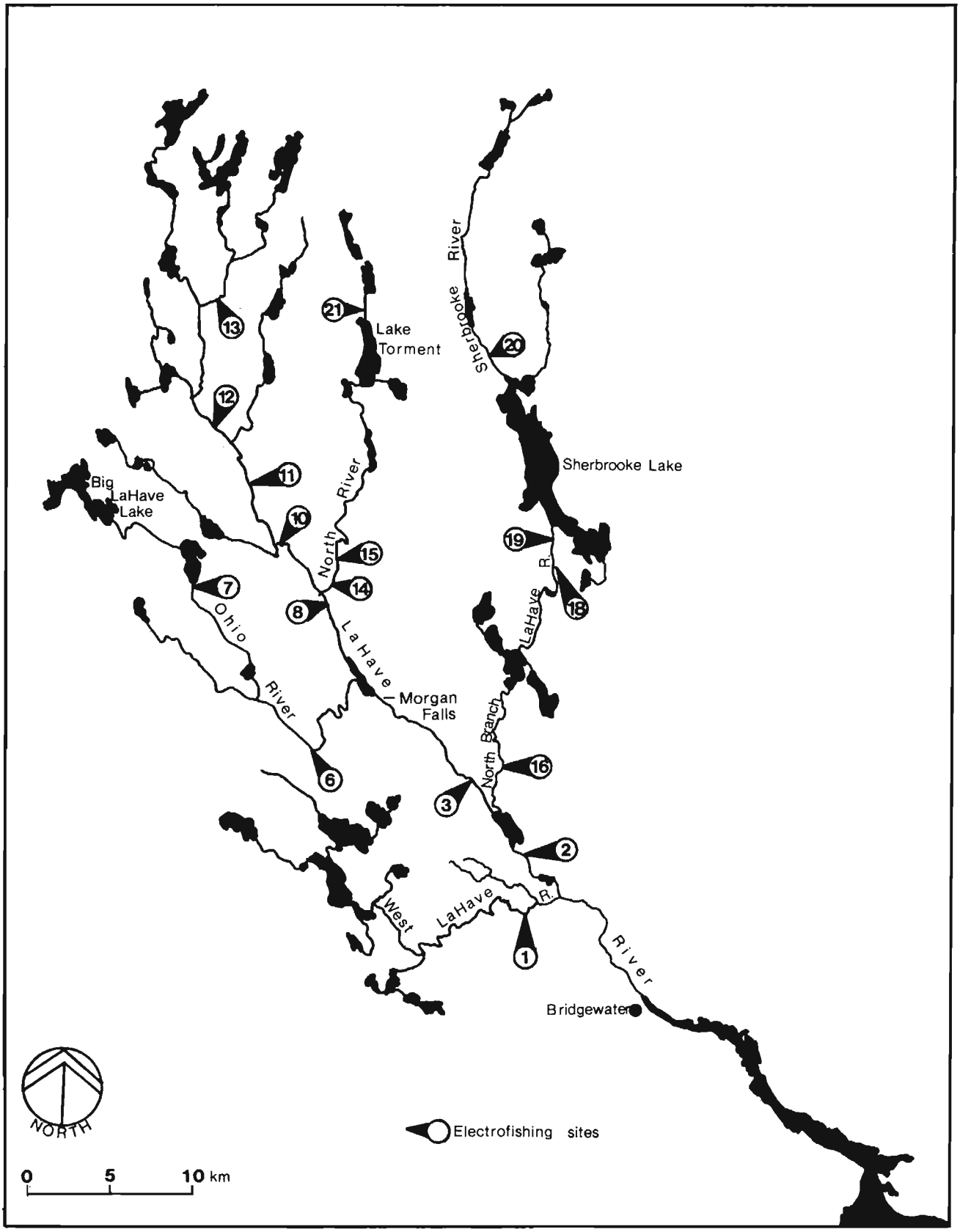

FIG. 3. Location of electrofishing sites surveyed on the LaHave River, 1978.

TABLE 10. A summary of the densities of fish captured during late July and early August, 1978, electrofishing investigations on the Kennetcook River.

Location/ site number	Salmon		American eel	White sucker	Northern lake chub	Banded killifish	Common shiner	Threespine stickleback
	fry	parr						
Kennetcook River								
1	4.6	5.7	22.0	1.0	15.4	0.0	0.0	0.0
2	1.1	8.1	29.4	8.1	19.1	0.1	0.0	0.0
3	4.7	3.5	42.7	7.6	89.6	0.0	0.0	0.4
4	12.7	13.0	51.2	3.5	16.1	0.0	0.0	0.0
5	11.6	5.8	38.1	10.3	87.7	0.0	0.0	0.0
6	3.2	4.5	39.4	6.7	20.4	0.0	0.7	0.0
Mean density	6.3	6.8	37.1	6.2	41.4	< 0.1	0.1	0.1
Standard deviation	4.71	3.42	10.23	3.38	36.66	0.04	0.29	0.16

TABLE 11: A summary of miscellaneous data collected during late July and early August, 1978, electrofishing investigations on the Kennetcook River.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature ($^{\circ}C$)	pH
Kennetcook River					
1	July 27	229	9.9	23.5	8.0
2	July 28	239	9.7	24.5	8.0
3	July 31	279	9.5	21.0	8.5
4	July 31	198	11.9	21.0	8.5
5	August 1	200	15.3	18.0	7.5
6	August 1	307	11.1	22.0	8.5
Mean		242.0	11.2	21.7	8.2
Standard deviation		43.52	2.20	2.27	0.41

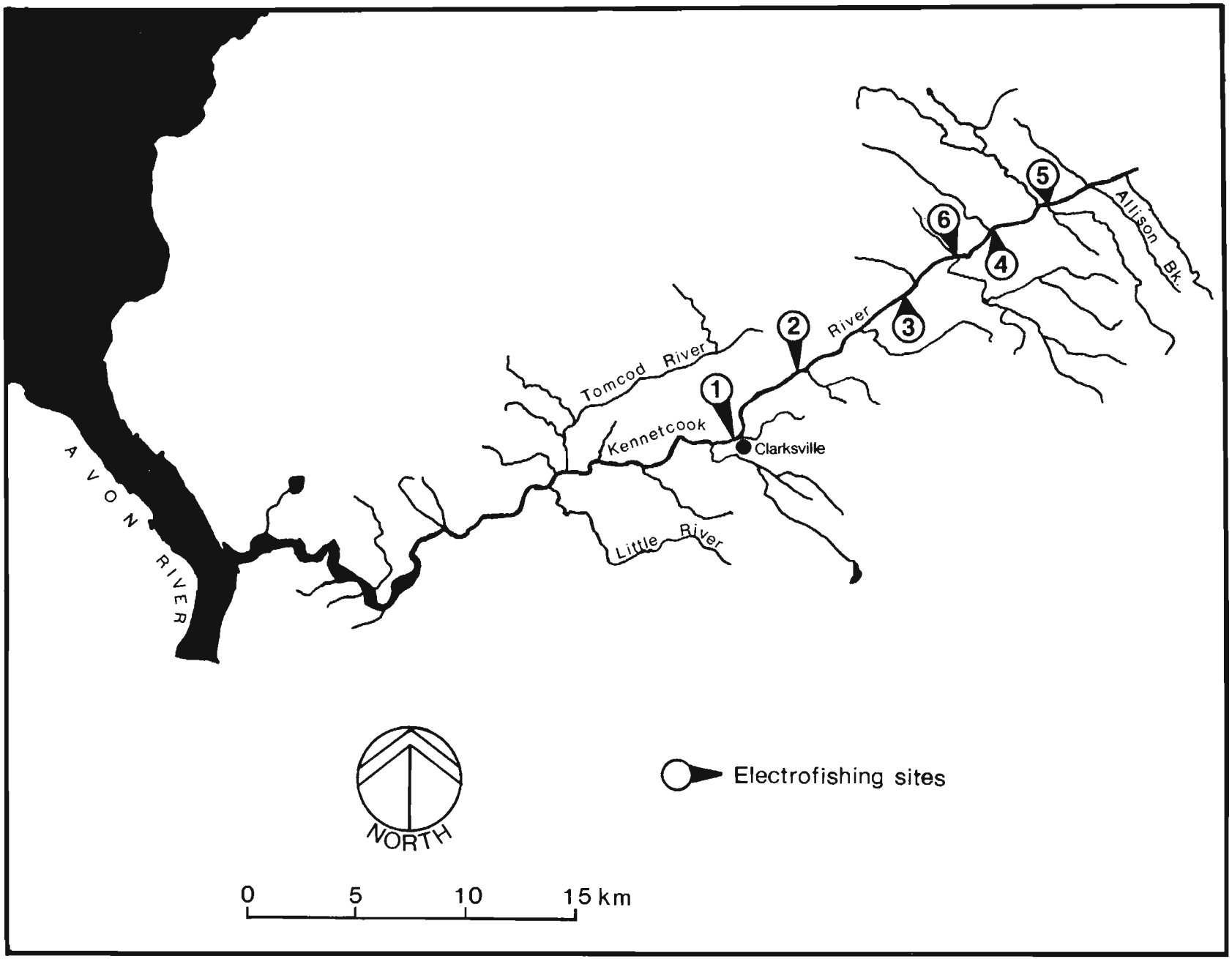

FIG. 4. Location of electrofishing sites surveyed on the Kennetcook River, 1978.

TABLE 12. A summary of the densities of fish captured during early August, 1978, electrofishing investigations on the Portapique River.

Location/ site number	Number of fish/100m²					
	Salmon		Brook trout	American eel	Northern lake chub	Threespine stickleback
	Fry	Parr				
Portapique River						
1	8.7	7.9	3.0	10.4	0.3	0.9
3	58.1	16.5	0.0	8.4	0.0	0.0
4	18.1	17.2	4.5	9.4	1.3	0.0
5	55.1	17.2	1.5	6.2	0.0	3.2
Cook Brook						
2	0.0	2.6	84.6	0.5	0.0	0.0
Mean density	28.0	12.3	18.7	7.0	0.3	0.8
Standard deviation	26.90	6.69	36.87	3.94	0.56	1.39

TABLE 13. A summary of miscellaneous data collected during early August, 1978, electrofishing investigations on the Portapique River.

Location / site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (^0C)	pH
Portapique River					
1	August 3	395	18.4	18.0	7.5
3	August 3	264	10.2	18.0	7.5
4	August 3	450	10.8	18.0	7.5
5	August 4	286	13.8	20.0	7.0
Cook Brook					
2	August 3	206	9.9	-	-
Mean		320.2	12.6	18.5	7.4
Standard deviation		99.77	3.58	1.00	0.25

TABLE 14. Analysis of length in relation to age of Atlantic salmon parr sampled August 3, 1978, in the Portapique River.

	Age (yr)	
	1+	2+
Number of specimens	43	2
Range in length (cm)	7.3-11.0	10.5-12.0
Mean length (cm)	8.7	11.3
Standard deviation	0.85	1.06

TABLE 15. Age-frequency distribution of Atlantic salmon parr sampled August 3, 1978, in the Portapique River.

	Age (yr)	
	1+	2+
Number in each age class	43	2
% in each age class	95.6	4.4

TABLE 16. Length-frequency distribution in relation to age of Atlantic salmon parr sampled August 3, 1978, in the Portapique River.

Length (cm)	Age (yr)	
	1+	2+
7.0- 7.9	7	0
8.0- 8.9	22	0
9.0- 9.9	9	0
10.0-10.9	4	1
11.0-11.9	1	0
12.0-12.9	0	1

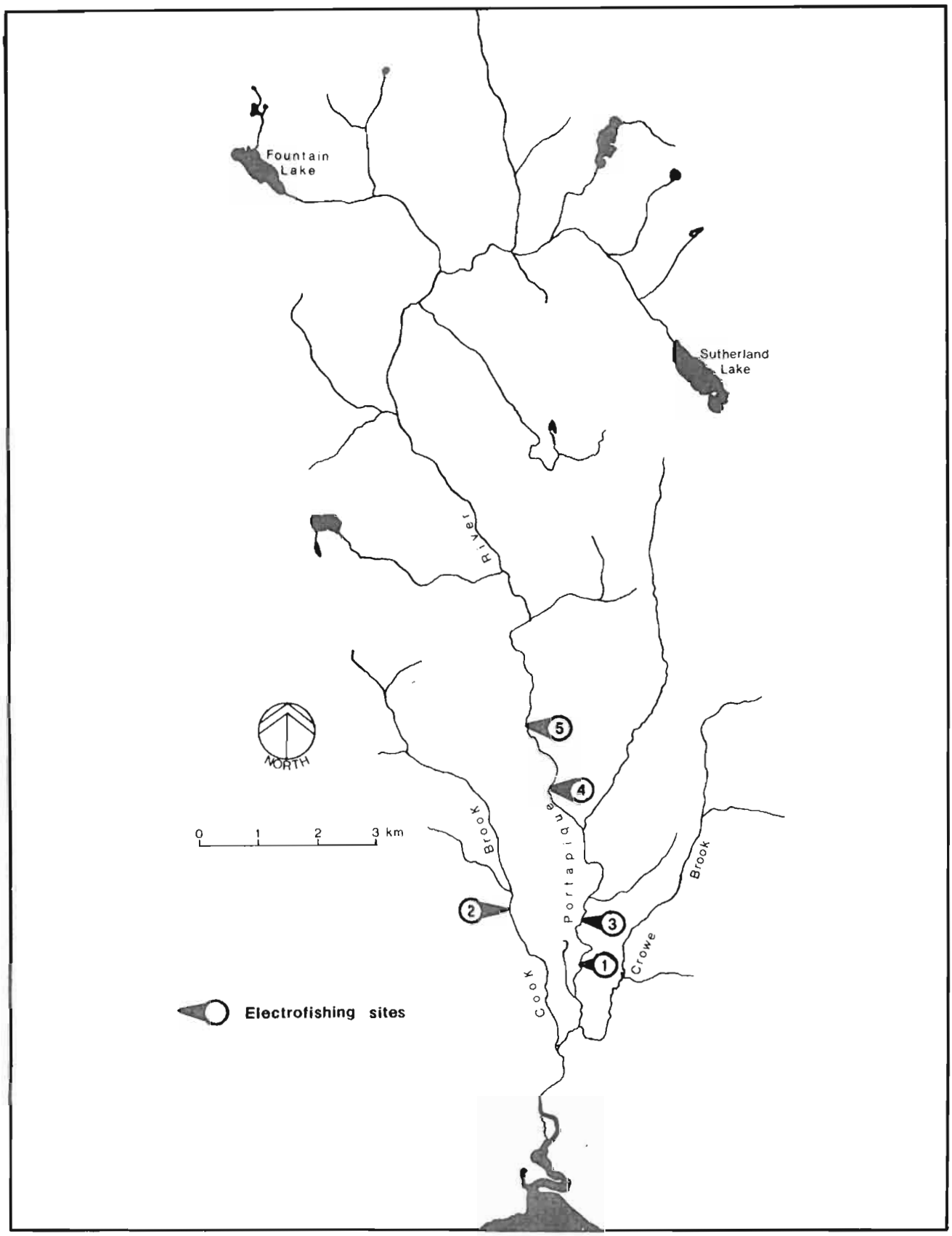

FIG. 5. Location of electrofishing sites surveyed on the Portapique River, 1978.

TABLE 17. A summary of the densities of fish captured during August, 1978, electrofishing investigations on the Wallace River.

Location/ site number	Number of fish/100m²									
	Salmon		Brook trout	Brown trout	American eel	Lamprey	White sucker	Northern lake chub	Blacknose dace	Threespine stickleback
	Fry	Parr								
Main Wallace River										
1	3.9	1.5	0.0	0.0	0.7	1.1	15.8	12.7	0.5	0.0
2	24.3	4.8	0.0	0.2	0.0	0.0	4.4	1.1	19.0	0.2
3	9.8	13.5	0.0	0.0	0.0	0.0	14.8	7.9	38.4	0.0
4	65.3	20.4	11.3	5.2	0.0	0.0	0.0	18.8	0.0	0.0
7	19.7	24.5	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mean density	24.6	12.9	3.5	1.1	0.1	0.2	7.0	8.1	11.6	<0.1
Standard deviation	24.13	9.83	5.12	2.30	0.31	0.49	7.79	7.91	17.07	0.09
West Wallace River										
6	56.9	7.9	3.5	0.0	1.2	146.2	26.4	13.3	32.8	4.7
Wallace River System										
Mean density	30.0	12.1	3.5	0.9	0.3	24.6	10.2	9.0	15.1	0.8
Standard deviation	25.29	9.03	4.58	2.11	0.52	59.60	10.55	7.39	17.55	1.90

TABLE 18. A summary of miscellaneous data collected during August, 1978, electrofishing investigations on the Wallace River.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (°C)	pH
Main Wallace River					
1	August 11	280	17.3	24.5	7.5
2	August 09	408	17.9	21.2	9.0
3	August 10	212	18.0	24.5	8.5
4	August 09	96	19.2	19.5	7.5
7	August 09	130	16.4	17.8	7.5
Mean		225.0	17.8	21.5	8.0
Standard deviation		124.85	1.03	2.99	0.71
West Wallace River					
6	August 10	86	13.4	24.5	7.5
Wallace River System					
Mean		202.0	17.0	22.0	7.9
Standard deviation		125.30	2.00	2.94	0.66

TABLE 19. Analysis of length in relation to age of Atlantic salmon parr sampled August 9, 1978, on the Wallace River.

	Age (yr)	
	1+	2+
Number of specimens	32	1
Range in length (cm)	7.3-12.0	13.5
Mean length (cm)	8.6	-
Standard deviation	0.9	-

TABLE 20. Age-frequency distribution of Atlantic salmon parr sampled August 9, 1978, on the Wallace River.

	Age (yr)	
	1+	2+
Number in each age class	32	1
% in each age class	97.0	3.0

TABLE 21. Length-frequency distribution in relation to age of Atlantic salmon parr sampled August 9, 1978, in the Wallace River.

Length (cm)	Age (yr)	
	1+	2+
7.0- 7.9	7	0
8.0- 8.9	14	0
9.0- 9.9	9	0
10.0-10.9	1	0
11.0-11.9	0	0
12.0-12.9	1	0
13.0-13.9	0	1

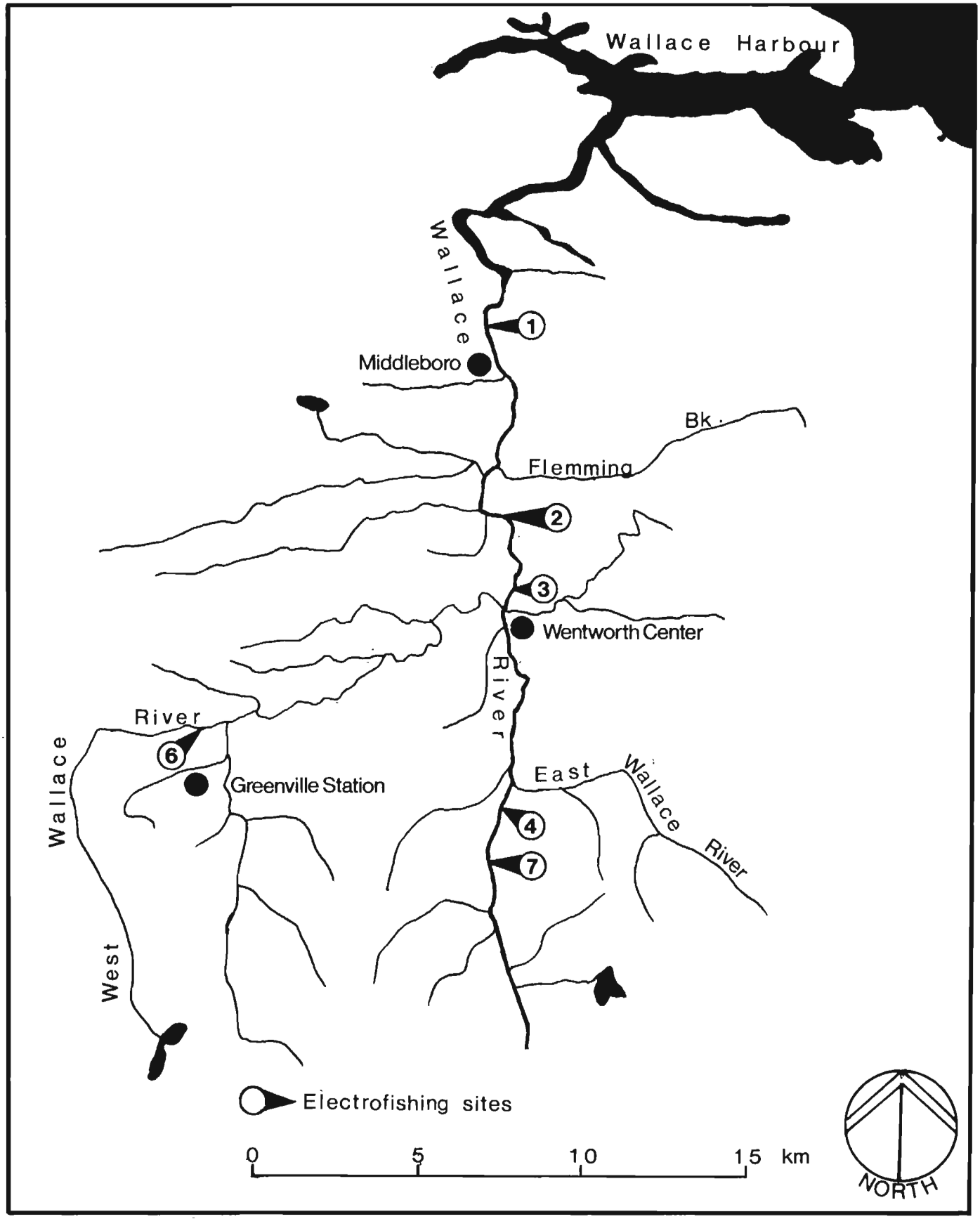

FIG. 6. Location of electrofishing sites surveyed on the Wallace River, 1978.

TABLE 22. A summary of the densities of fish captured during August, 1978, electrofishing investigations on the East River, Pictou County.

Location/ site number	Number of fish/100m²								
	Salmon		Brook trout	American eel	White sucker	Northern lake chub	Creek chub	Stickleback	
	Fry	Parr						Ninespine	Threespine
Main East River									
1	41.7	39.6	0.3	1.3	1.3	4.1	0.6	0.0	0.0
3	58.1	37.6	0.3	0.0	11.1	27.7	0.0	9.2	0.0
Mean density	49.9	38.6	0.3	0.7	6.2	15.9	0.3	4.6	-
Standard deviation	11.60	1.41	0.00	0.92	6.93	16.69	0.42	6.51	-
McLellan Brook									
2	18.7	52.1	0.0	0.0	1.2	4.4	0.4	0.0	0.4
West Branch									
4	130.3	26.9	0.0	0.0	0.0	0.0	0.0	0.0	0.7
East River System									
Mean density	62.2	39.1	0.2	0.3	3.4	9.1	0.3	2.3	0.3
Standard deivation	48.19	10.33	0.17	0.65	5.17	12.59	0.30	4.60	0.34

TABLE 23. A summary of miscellaneous data collected during August, 1978, electrofishing investigations on the East River, Pictou County.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (°C)	pH	Velocity (m/sec)
Main East River						
1	August 4	354	17.8	19.2	7.7	0.4
3	August 4	290	15.0	18.5	7.7	0.3
Mean		322.0	16.4	18.9	7.7	0.4
Standard deviation		45.25	1.98	0.49	0.00	0.07
McLellan Brook						
2	August 4	249	4.7	19.8	7.6	0.5
West Branch						
4	August 4	150	-	19.5	7.0	0.3
East River System						
Mean		260.8	12.5	19.3	7.5	0.4
Standard deviation		85.55	6.90	0.56	0.34	0.10

TABLE 24. Analysis of length in relation to age of Atlantic salmon parr sampled August 4, 1978, on the East River, Pictou County.

	Age (yr)	
	1+	2+
Number of specimens	48	2
Range in length (cm)	6.4-10.8	11.7-12.0
Mean length (cm)	7.9	11.9
Standard deviation	1.0	0.21

TABLE 25. Age-frequency distribution of Atlantic salmon parr sampled August 4, 1978, on the East River, Pictou County.

	Age (yr)	
	1+	2+
Number in each age class	48	2
% in each age class	96.0	4.0

TABLE 26. Length-frequency distribution in relation to age of Atlnatic salmon parr sampled August 4, 1978, on the East River, Pictou County.

Length (cm)	Age (yr)	
	1+	2+
6.0- 6.9	5	0
7.0- 7.9	22	0
8.0- 8.9	15	0
9.0- 9.9	2	0
10.0-10.9	4	0
11.0-11.9	0	0
12.0-12.9	0	1
13.0-13.9	0	1

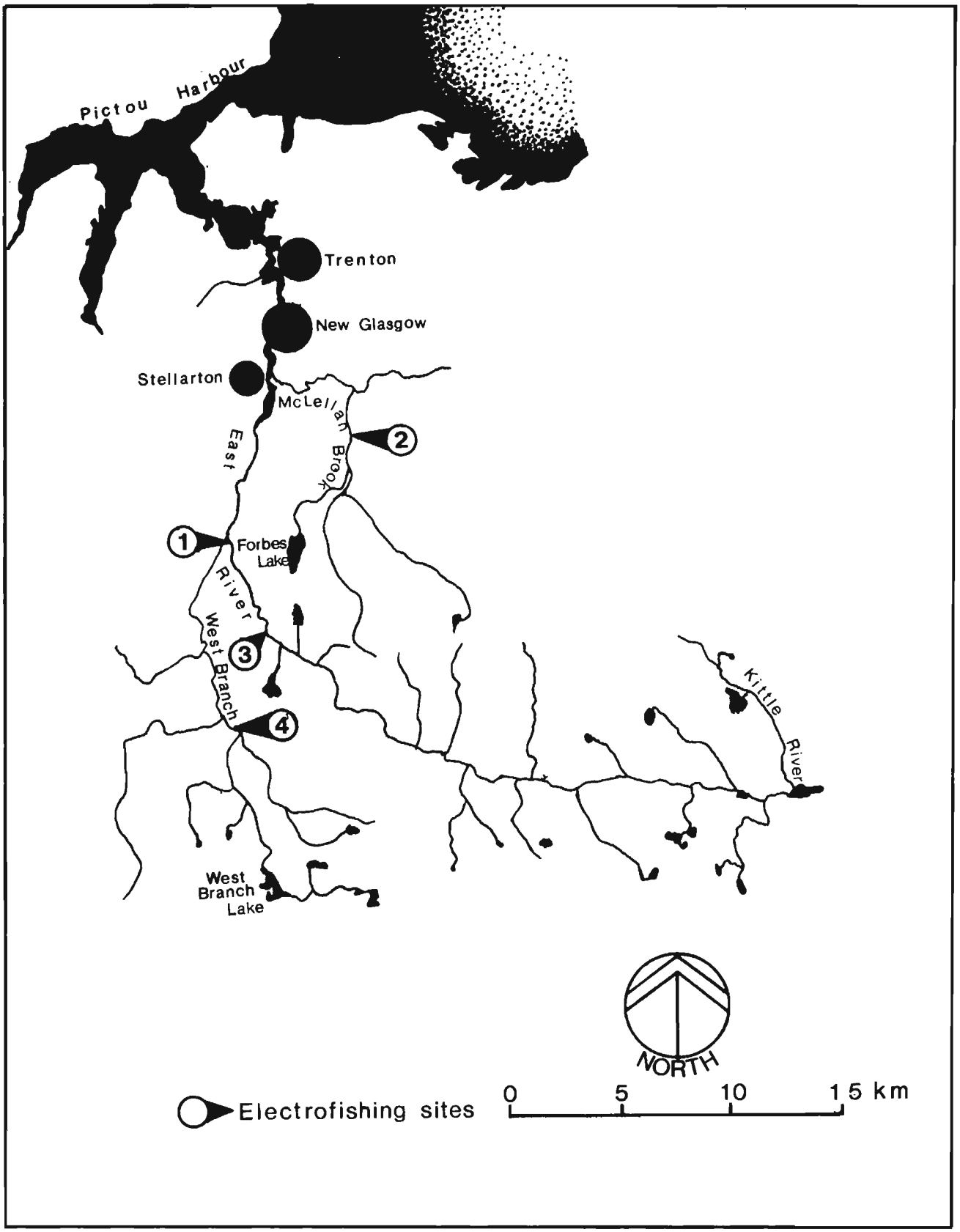

FIG. 7. Location of electrofishing sites surveyed on the East River, Pictou County, 1978.

TABLE 27. A summary of the densities of fish captured during August, 1978, electrofishing investigations on the French River, Pictou County.

Location/ site number	Number of fish/100m²					
	Salmon		Brook trout	Brown trout	American eel	Threespine stickleback
	Fry	Parr				
East French River						
1	34.9	7.6	0.0	0.6	2.5	13.0
2	3.5	11.6	2.7	0.0	0.0	2.3
Mean density	19.2	9.6	1.4	0.3	1.3	7.7
Standard deviation	22.20	2.83	1.91	0.42	1.77	7.57
Main French River						
3	41.7	8.4	0.0	1.3	0.0	3.7
4	59.4	8.6	22.0	0.0	1.3	36.2
Mean density	50.6	8.5	11.0	0.7	0.7	20.0
Standard deviation	12.52	0.14	15.56	0.92	0.92	22.98
French River System						
Mean density	34.9	9.1	6.2	0.5	1.0	13.8
Standard deviation	23.33	1.75	10.63	0.62	1.20	15.67

TABLE 28. A summary of miscellaneous data collected during August, 1978, electrofishing investigations on the French River, Pictou County.

Location/ site number	Date	Sampling area (m²)	Average depth (cm)	Water temperature (°C)	pH	Velocity (m/sec)
East French River						
1	August 15	172	11.9	-	7.5	-
2	August 08	220	14.8	19.5	-	0.7
Mean		196.0	13.4	-	-	-
Standard deviation		33.94	2.05	-	-	-
Main French River						
3	August 08	158	13.8	16.8	7.5	0.3
4	August 07	160	14.6	20.5	7.4	0.3
Mean		159.0	14.2	18.9	7.5	0.3
Standard deviation		1.41	0.57	1.91	0.07	0.03
French River System						
Mean		177.5	13.8	18.9	7.5	0.4
Standard deviation		29.00	1.32	1.91	0.06	0.23

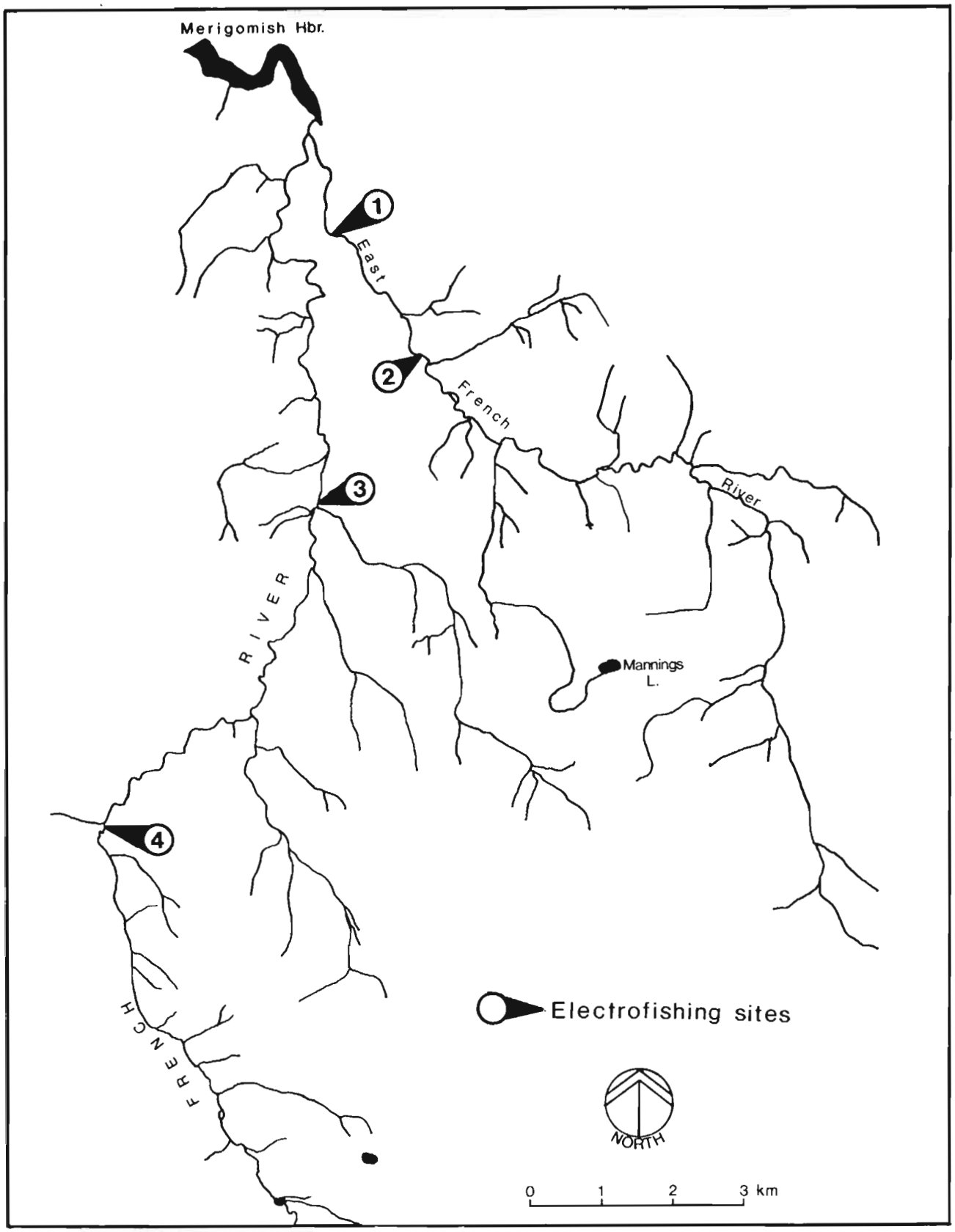

FIG. 8. Location of electrofishing sites surveyed on the French River, Pictou County, 1978.

TABLE 29. A summary of the densities of fish captured during August, 1978, electrofishing investigations on the West River, Antigonish County.

Location/ site number	Number of fish/100m²					
	Salmon		Brook trout	American eel	White sucker	Threespine stickleback
	Fry	Parr				
Main West River						
1	64.2	5.1	0.0	1.0	3.8	0.0
James River						
2	24.6	24.6	4.2	1.4	6.7	5.0
Ohio River						
3	29.1	0.5	1.1	0.0	18.9	0.5
Beaver River						
4	71.8	52.5	1.4	11.7	0.0	0.0
West River System						
Mean density	47.4	20.7	1.7	3.5	7.4	1.4
Standard deviation	24.03	23.65	1.79	5.48	8.17	2.43

TABLE 30. A summary of miscellaneous data collected during August, 1978, electrofishing investigations on the West River, Antigonish County.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (°C)	pH
Main West River					
1	August 17	314	-	24.0	7.7
James River					
2	August 16	214	16.9	21.8	7.5
Ohio River					
3	August 17	189	-	-	7.6
Beaver River					
4	August 18	141	-	23.5	7.7
West River System					
Mean		214.5	-	23.1	7.6
Standard deviation		72.92	-	1.15	0.10

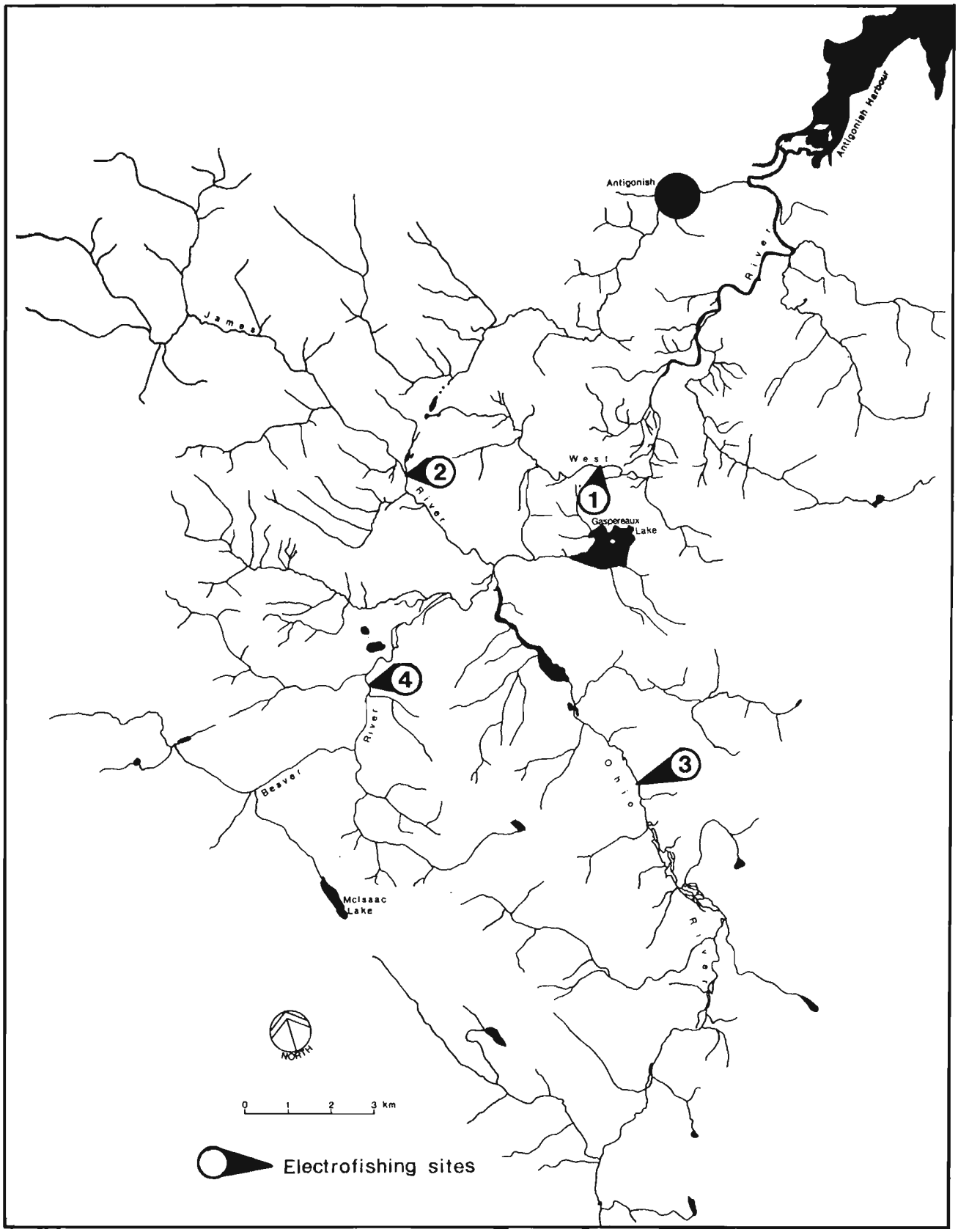

FIG. 9. Location of electrofishing sites surveyed on the West River, Antigonish County, 1978.

TABLE 31. A summary of the densities of fish captured during July, 1978, electrofishing investigations on the West River, St. Mary's.

Location/ site number	Number of fish/100m²								
	Salmon		Brook trout	American eel	Lamprey	White sucker	Northern lake chub	Common shiner	Threespine stickleback
	Fry	Parr							
Main West River, St. Mary's									
21	3.1	1.4	0.0	17.5	0.3	0.0	0.2	0.0	0.0
22	14.8	3.5	0.0	20.3	0.0	0.6	1.1	1.3	0.0
23	8.4	3.1	0.0	14.7	0.0	1.8	3.2	0.0	0.4
24	1.6	3.7	0.0	7.0	0.1	7.2	2.6	0.6	0.0
25	4.1	4.8	0.0	16.9	0.8	1.2	6.5	0.0	0.0
26	0.5	4.7	0.0	15.3	0.0	0.0	0.0	2.8	0.0
31	0.8	1.1	0.0	64.3	0.0	4.7	1.1	0.0	0.0
34	1.1	2.8	0.0	32.8	0.0	2.1	0.2	0.0	0.0
35	6.2	2.8	0.0	11.0	0.0	0.0	4.3	0.0	0.0
Mean density	4.5	3.1	-	22.2	0.1	2.0	2.1	0.5	<0.1
Standard deviation	4.69	1.28	-	17.32	0.27	2.47	2.22	0.96	0.13
South Brook									
27	2.4	12.9	0.0	36.9	0.0	9.2	2.9	0.1	0.0
28	6.8	4.2	0.0	20.3	0.0	0.3	40.7	0.3	0.0
29	25.2	15.9	0.0	14.5	0.0	0.0	12.6	0.0	0.0
Mean density	11.5	11.0	-	23.9	-	3.2	18.7	0.1	-
Standard deviation	12.10	6.08	-	11.63	-	5.23	19.63	0.15	-
Nelson River									
30	3.6	2.5	0.0	16.0	0.0	0.5	1.8	0.5	0.0
36	0.0	5.9	4.9	28.2	54.8	4.6	4.6	1.0	0.0
Mean density	1.8	4.2	2.5	22.1	27.4	2.6	3.2	0.8	-
Standard deviation	2.55	2.40	3.46	8.63	38.75	2.90	1.98	0.35	-
West River, St. Mary's									
Mean density	5.6	5.0	0.4	22.6	4.0	2.3	5.8	0.5	<0.1
Standard deviation	6.89	4.25	1.31	14.55	14.62	2.98	10.60	0.79	0.11

TABLE 32. A summary of miscellaneous data collected during July, 1978, electrofishing investigations on the West River, St. Mary's.

Location/ site number	Date	Sampling area (m^2)	Average depth (cm)	Water temperature (°C)	pH	Velocity (m/sec)
Main West River, St. Mary's						
21	July 12	658	16.5	19.0	7.0	0.5
22	July 29	315	18.6	27.0	7.0	0.7
23	July 26	273	19.1	20.5	7.0	1.0
24	July 25	715	23.2	23.0	6.5	0.7
25	July 25	500	18.6	19.0	7.0	0.4
26	July 15	560	13.2	20.5	6.5	0.4
31	July 31	276	14.2	21.0	6.8	0.5
34	July 29	280	24.0	24.5	6.5	0.2
35	July 29	223	13.6	25.0	7.5	0.3
Mean		422.2	17.9	22.2	6.9	0.5
Standard deviation		187.55	3.94	2.84	0.33	0.24
South Brook						
27	July 14	196	13.9	24.0	6.5	0.5
28	July 13	323	18.8	18.0	6.0	0.2
29	July 14	169	17.7	16.0	6.5	0.3
Mean		229.3	16.8	19.3	6.3	0.3
Standard deviation		82.23	2.57	4.16	0.29	0.15
Nelson River						
30	July 19	199	26.9	23.5	6.5	0.7
36	July 31	102	11.4	21.0	7.0	-
Mean		150.0	19.2	22.3	6.8	-
Standard deviation		68.59	10.96	1.77	0.35	-
West River, St. Mary's						
Mean		342.1	17.8	21.6	6.7	0.5
Standard deviation		189.93	4.51	3.06	0.37	0.23

TABLE 33. Analysis of length in relation to age of Atlantic salmon parr sampled July 12, 1978, on the West River, St. Mary's.

	Age (yr)	
	1+	2+
Number of specimens	40	3
Range in length (cm)	8.5-11.9	12.6-14.9
Mean length (cm)	10.2	13.7
Standard deviation	0.84	1.15

TABLE 34. Age-frequency distribution of Atlantic salmon parr sampled July 12, 1978, on the West River, St. Mary's.

	Age (yr)	
	1+	2+
Number in each age class	40	3
% in each age class	93.0	7.0

TABLE 35. Length-frequency distribution in relation to age of Atlantic salmon parr sampled July 12, 1978, on the West River, St. Mary's.

	Age (yr)	
Length (cm)	1+	2+
8.0- 8.9	2	0
9.0- 9.9	18	0
10.0-10.9	10	0
11.0-11.9	10	0
12.0-12.9	0	0
13.0-13.9	0	1
14.0-14.9	0	1
15.0-15.9	0	1

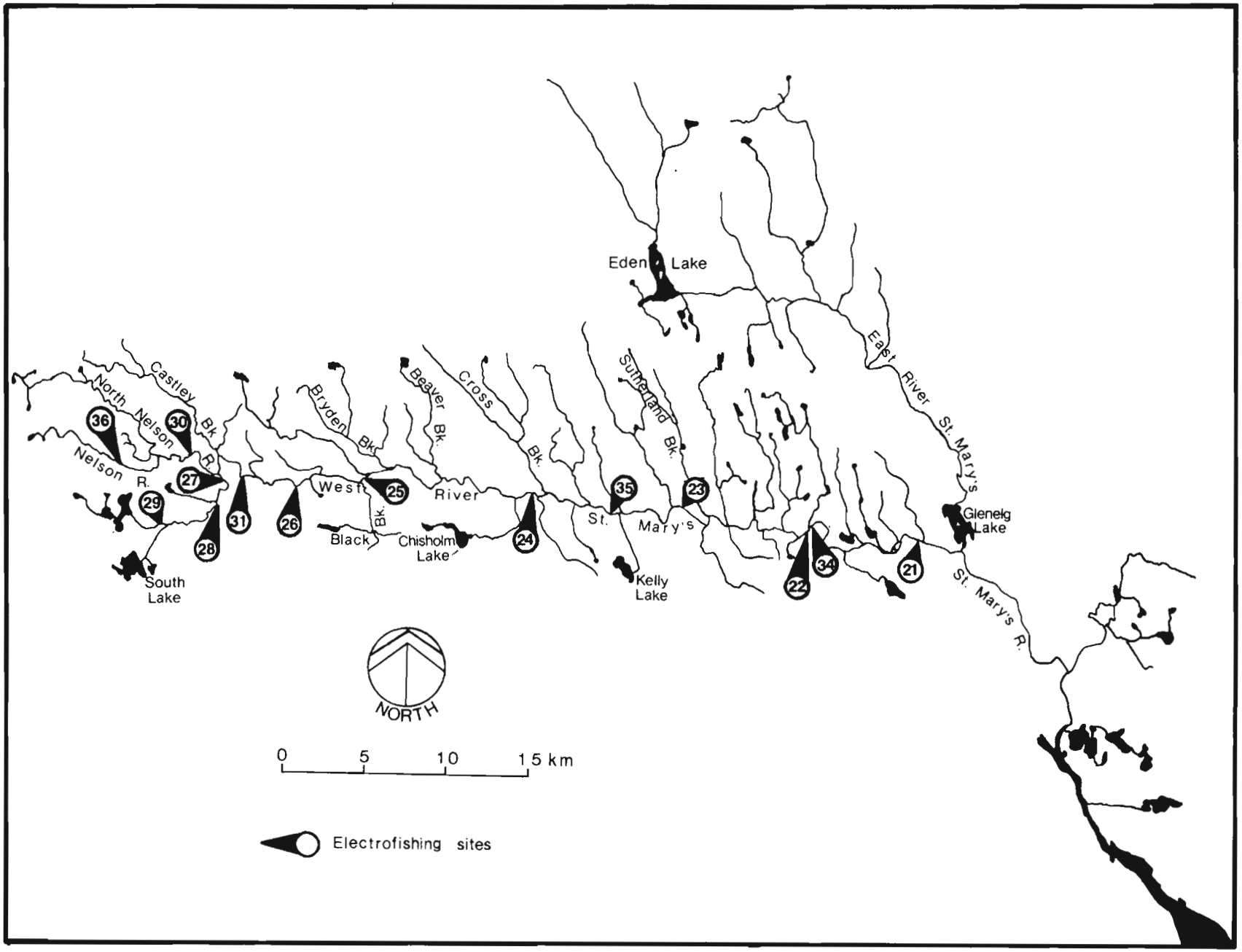

FIG. 10. Location of electrofishing sites surveyed on the West River, St. Mary's, 1978.

TABLE 36. Summary of total areas sampled and total counts of juvenile salmon collected during electrofishing investigations on nine Nova Scotia rivers in 1978. (Percentage of small and large parr in parentheses.)

River	Number of sites	Total area sampled (m^2)	Mean area per site (m^2)	Total number of juvenile salmon collected		
				Fry	Small parr	Large Parr
Salmon River, Digby County	3	458	153	26	0 (0.0)	41 (100.0)[1]
LaHave River	15	8,493	566	1443	253 (94.4)	15 (5.6)
Kennetcook River	6	1,452	242	77	89 (100.0)	0 (0.0)
Portapique River	5	1,601	320	411	199 (97.5)	5 (2.5)
Wallace River	6	1,212	202	237	100 (94.3)	6 (5.7)
East River, Pictou County	4	1,043	261	484	394 (94.9)	21 (5.1)
French River, Pictou County	4	710	178	221	58 (90.6)	6 (9.4)
West River, Antigonish County	4	858	214	406	139 (96.5)	5 (3.5)
West River, St. Mary's	14	4,789	342	177	178 (94.7)	10 (5.3)
Totals	61	20,616	338	3,482	1,410 (92.8)	109 (7.2)

[1]Only river where large parr were age 1+ (yr).

TABLE 37. Comparison of mean lengths and weights in relation to age of salmon parr collected in six Nova Scotia rivers in 1978.

River	Number of specimens	Age (yr)				Age composition (%)	
		1+		2+			
		Mean length (cm)	Mean weight (gm)	Mean length (cm)	Mean weight (gm)	1+	2+
Salmon River, Digby County	5	14.3	38.0	-	-	100.0	0.0
LaHave River	66	10.9	17.0	14.5	42.3	95.0	5.0
Portapique River	45	8.7	9.2	11.3	19.5	95.6	4.4
Wallace River	33	8.6	8.8	13.5	34.9	97.0	3.0
East River, Pictou County	50	7.9	6.5	11.9	21.5	96.0	4.0
West River, St. Mary's	43	10.2	14.0	13.7	34.7	93.0	7.0

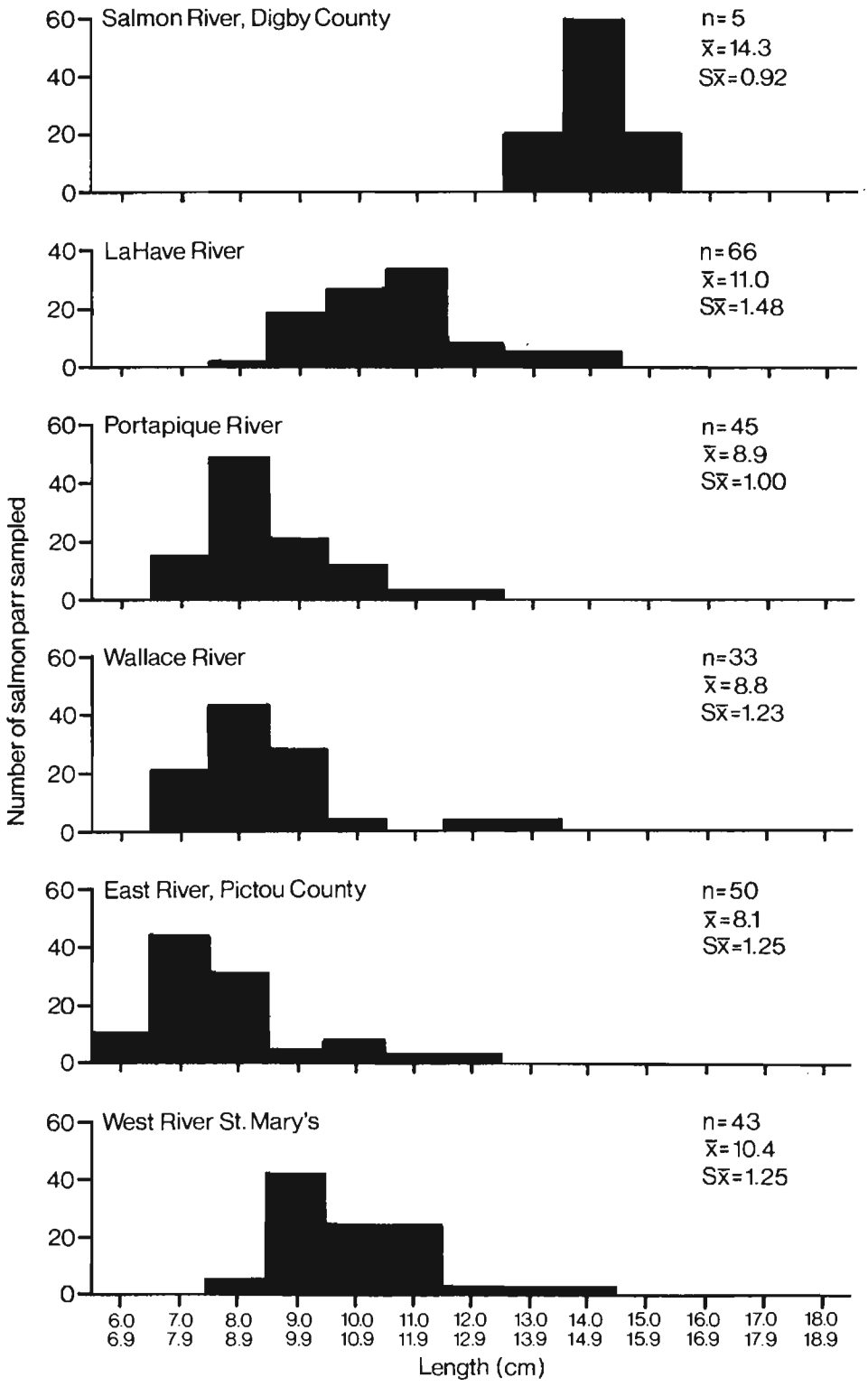

FIG. 11. Length-frequency distribution of Atlantic salmon parr sampled during electrofishing surveys of six Nova Scotia rivers, 1978.

APPENDIX A

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED ON THE SALMON RIVER, DIGBY COUNTY

Site number	Grid reference/ map sheet[1]	Access and location
3	326815 21 B/1	Indian River - Access by proceeding 5.6 km east on the Springdale Road and turning left - 0.2 km down gravel road. Location 10 m below bridge.
5	335859 21 B/1	Main Salmon River - Access from bridge at Lake Doucette, by proceeding north towards Harrington 5.6 km; turn left on dirt road to wooden bridge and cabin. Location immediately above bridge.
7	350954 21 B/1	Main Salmon River-Maxwellton - Access from Maxwellton by turning right 0.2 km past bridge below Salmon River Lake; turn right at gate on new gravel road and proceed 0.8 km. Located immediately below Salmon River Lake.

[1]National Topographic Series. (Scale 1:50,000)

APPENDIX B

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED ON THE LAHAVE RIVER, LUNENBURG COUNTY

Site number	Grid reference/ map sheet	Access and location
1	714205 21 A/7	West LaHave River-Midville - Access 1 km west of intersection of Midville Highway and Branch LaHave. Located immediately upstream of Little Wiles Lake Brook.
3	679289 21 A/10	Main LaHave River-Minkhole - Located 0.8 km upriver from intersection of road from New Canada on Highway 10.
6	588305 21 A/10	Ohio River-Hemford - Access via gravel road past Mailman's store, parallel to the CNR tracks. Located 40 m downstream from wooden bridge crossing the Ohio River on this road.
7	515405 21 A/10	Ohio River-Lake Pleasant - Access from bridge on gravel road crossing West River below Lake Pleasant, 3.6 km from Springfield. Located 49 m below bridge.
13	534582 21 A/15	Main LaHave River-below Donnelon Stillwaters - Access by proceeding east 0.7 km on East Dalhousie road, from intersection of North River Road, and continuing left for 1.1 km to Crossburn Brook; continue 4.5 km on fire road to site. Located at bridge on Shell Camp Stream.
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 40 m 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.
16	700303 21 A/10	North Branch, LaHave River-Pinehurst - Access 2.3 km from intersection of Highway 10 at Pinehurst, on west side of river. Located by road.
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 2.0 km downstream from Sherbrooke Lake.
19	734434 21 A/10	North Branch, LaHave River-Maplewood - Access as per Site No. 18. Located 0.8 km 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 C

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED
ON THE KENNETCOOK RIVER, HANTS COUNTY

Site number	Grid reference/ map sheet	Access and location
1	344945 11 E/4	Main Kennetcook-Clarksville - Access upriver 0.2 km from the intersection at Clarksville, by turning left between two houses and barn. Located 100 m below farm building.
2	374977 11 E/4	Main Kennetcook-Riverside Corner - Access upriver 4.8 km from the intersection at Clarksville; access from highway. Located 20 m below McLean Brook.
3	423015 11 E/4	Main Kennetcook-Kennetcook - Access upriver 11.4 km from the intersection at Clarksville; access down left side of cultivated field. Located immediately below field.
4	465044 11 E/4	Main Kennetcook-Upper Kennetcook - Access upriver 15.2 km from the intersection at Clarksville. Turn right down Pines Road. Turn left at 0.6 km before crossing railroad track. Follow road parallel to railroad track and turn left into field immediately before road crosses the railroad track. Located 35 m below railroad crossing.
5	486052 11 E/4	Main Kennetcook-Upper Kennetcook - Access upriver 19.3 km from the intersection at Clarksville; turn right down a dirt road for 0.4 km; access from bridge. Located immediately below bridge.
6	444029 11 E/4	Main Kennetcook-Kennetcook - Access upriver 13.3 km from the intersection at Clarksville, by turning right down private road with locked gate. Follow trail to right of house down to river. Located immediately opposite trail crossing river.

APPENDIX D

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED
ON THE PORTAPIQUE RIVER, COLCHESTER COUNTY

Site number	Grid reference/ map sheet	Access and location
1	448306 11 E/5	Main Portapique-Montrose - Access from Portapique by proceeding upriver 2.7 km and turning left; access to site by turning right through a pasture before crossing the Portapique River. Located 100 m upriver from bridge.
2	449314 11 E/5	Cook Brook - Access west 0.6 km from bridge at Site No. 1; turn north for 0.7 km; keep left 0.3 km to Cook Brook. Located downstream from culvert immediately below fence.
3	449313 11 E/5	Main Portapique - Access north 3.5 km from Highway 2 at Portapique; access by turning left through gate on right side of field. Located immediately opposite upper end of field.
4	445335 11 E/5	Main Portapique - Access west 0.6 km from bridge at Site No. 1; turn north for 0.7 km from intersection keeping right; turn right again at 0.2 km and go down a small woods road; keep left on this road for 2.1 km; access to site by walking east through the woods to river. Located upriver 50 m from bend in river and intersection of a small brook.
5	440345 11 E/5	Main Portapique - Access 1.1 km past Site No. 4 on the same road; access at end of the trail. Located immediately opposite the end of the trail.

APPENDIX E

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED ON THE WALLACE RIVER, CUMBERLAND COUNTY

Site number	Grid reference/ map sheet	Access and location
1	559667 11 E/13E	Main Wallace-Middleboro - Access by dirt road on east side of river, 0.7 km from intersection of paved roads. Located parallel to dirt road, 0.5 km from bridge.
2	568608 11 E/12	Main Wallace-Lower Wentworth - Access south from Site No. 1 on paved highway 5.9 km; turn right through small field and down to river. Located 10 m downstream from access road.
3	565587 11 E/12	Main Wallace-Wentworth Center - Access south from Site No. 2 on paved highway 0.5 km; turn right 0.5 km to old bridge site; access road to right of clearing. Located 10 m downstream from clearing.
4	564522 11 E/12	Main Wallace-Wentworth - Access by road to Westchester Station, immediately south of Provincial Picnic Park; turn left 0.2 km down road; follow road parallel to river for 0.2 km and turn left to river. Located immediately downstream from access point to river.
6	477548 11 E/12	West Wallace River-Greenville Station - Access from Westchester Station by taking road to Greenville Station for 3.6 km; turn left immediately past bridge. Located 10 m above bridge.
7	561497 11 E/12	Main Wallace - Access from Highway 104, 2.6 km south of Provincial Picnic Park. Located parallel to Highway 104, 0.4 km upstream from bridge.

APPENDIX F

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED
ON THE EAST RIVER, PICTOU COUNTY

Site number	Grid reference/ map sheet	Access and location
1	253386 11 E/10	Main East River - Access 0.6 km from Eureka, on east side of river, by turning left before crossing bridge; access under bridge. Located upriver 70 m from bridge on east side of small island.
2	307434 11 E/10	McLellan Brook - Access 3.8 km from Blue Acres Rotary; access by turning left before crossing McLellan Brook Bridge. Located 35 m below bridge.
3	269346 11 E/10	Main East River - Access 4.4 km from Eureka on Sunnybrae Road; access by turning left through small field. Located below small island, downstream 35 m from access.
4	256298 11 E/10	West Branch-East River, Pictou County - Access 7.3 km on Hopewell to Elgin highway; turn right; access by turning right before crossing bridge. Located 25 m below bridge.

APPENDIX G

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED ON THE FRENCH RIVER, PICTOU COUNTY

Site number	Grid reference/ map sheet	Access and location
1	437505 11 E/9	East French River-Merigomish - Access 2.5 km towards Merigomish from the intersection of French River Road and Avondale Road; access from main road. Located 110 m above iron bridge.
2	460487 11 E/9	East French River-Piedmont - Access at iron bridge, 250 m below the intersection of French River and Avondale Raod. Located 24 m downstream from bridge.
3	445466 11 E/9	Main French River-French River - Access at iron bridge, 0.5 km from the intersection of the French River Road and Highway 4; access by short road by bridge. Located 14 m below bridge.
4	415423 11 E/9	Main French River-North Meiklefield - Access from Meiklefield Road, 250 m from the intersection of Highway 347 and Meiklefield Road. Located immediately upriver from bridge.

APPENDIX H

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED
ON THE WEST RIVER, ANTIGONISH COUNTY

Site number	Grid reference/ map sheet	Access and location
1	743468 11 E/9	Main West River - Access by proceeding from Antigonish on Highway 7 and turning right before crossing the West River bridge. Located 5.2 km from Highway 7 at end of dirt road.
2	696476 11 E/9	James River - Access from Antigonish by turning right at the intersection of Highway 104 and Addington Forks Road; turn left at Highway 4; access immediately on right through gravel pit. Located 25 m above bridge.
3	730395 11 E/9	Ohio River-Ohio - Access upriver 3.8 km from the intersection at St. Josephs; access by turning right into meadow. Located immediately downriver from cleared area.
4	676434 11 E/9	Beaver River-Keppoch - Access from Antigonish by turning left at the intersection of Highway 104 and the Keppoch Mountain Road in James River; keep right on Keppoch Mountain Road and turn left immediately past Hortshorn Brook; proceed 2.9 km on the Keppoch Lakes Road. Located immediately upriver from the bridge on Beaver River.

APPENDIX I

ACCESS AND LOCATION OF ELECTROFISHING SITES SURVEYED ON THE WEST RIVER, ST. MARY'S, GUYSBOROUGH COUNTY

Site number	Grid reference/ map sheet	Access and location
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 m upstream from the confluence of Archibald's Brook and West Branch.
22	640124 11 E/8	West Branch-Upper Smithfield - Access 0.6 km west of bridge on Glencross Brook; access by turning left down path to sugar camp. Located opposite first cottage.
23	567136 11 E/8	West Branch-Lower Caledonia - Access at highway bridge in Lower Caledonia; access by trail on west bank of river. Located 100 m above bridge.
24	477140 11 E/8	West Branch-Caledonia - Access via the road from Glenelg to Caledonia. Located 400 m downstream from the bridge crossing the West Branch at Caledonia.
25	368148 11 E/7	West Branch-Cameron Settlement - Access via road from Caledonia to Trafalgar and 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. Located immediately upstream of access road.
27	287140 11 E/7	South 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.
28	277126 11 E/7	South Brook-Trafalgar - Access 0.9 km south of Liscomb Sanctuary gate; at Trafalgar, turn right through logging road; keep right 1.7 km to small brook; access through cut area parallel to brook. Located 145 m below confluence of brook.
29	263117 11 E/7	South Brook Trafalgar - Access by turning right 200 m south of the junction of Eastville Road; proceed in road 3.6 km to bridge on East Loon Lake Brook. Located immediately below the bridge.
30	263160 11 E/7	Nelson River-Trafalgar - Access 4 km north of Liscomb Sanctuary gate; on Trafalgar to Lorne road. Located 23 m below bridge on Nelson River.
31	295147 11 E/7	West Branch-Trafalgar - Access 1.25 km east of Liscomb Sanctuary gate; turn left down woods road to river. Located immediately opposite access road.
34	645129 11 E/8	West Branch-Upper Smithfield - Access by path west of bridge on Glencross Brook. Located 25 m below confluence of Glencross Brook and Main West River.
35	526126 11 E/8	West Branch-Caledonia - Access 4.8 km west of highway bridge at Caledonia; turn right before crossing small bridge. Located 25 m downstream from access trail.
36	227152 11 E/7	Nelson River - Access 2.5 km north of Liscomb Sanctuary gate; turn left into Eastville Road; proceed 4.6 km on Eastville Road; turn right and proceed 1.5 km to bridge on Nelson River. Located 10 m below bridge.

ACKNOWLEDGEMENTS

The authors wish to express their appreciation to Bill Ritchie and Elmer Jefferson who supervised the electrofishing crews. The assistance of Dave Morantz and Norwood Whynot in preparing the site location maps is acknowledged with appreciation.

REFERENCES

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 Rept. No. 105, 65 p.

Delury, D.B. 1951. On the planning of experiments for the estimation of fish populations. J. Fish. Res. Bd. Canada, 8:281-307.

Elson, P.F. 1962. The Pollet apron seine. J. Fish. Res. Bd. Canada, 19 (1): 93-100.