Curatorial Report Number 11

Nova Scotia Museum
1747 Summer St.
Halifax, Nova Scotia, Canada

Leeches of the St. Mary's River Watershed and leech records of the Nova Scotia Museum

By R. Paul McClung
April 1974

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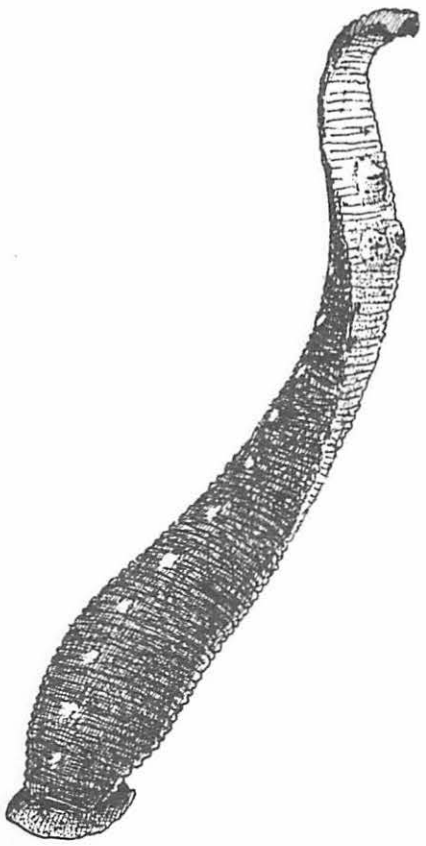

NOVA SCOTIA MUSEUM

Curatorial Reports

The *Curatorial Reports* of the Nova Scotia Museum contain information on the collections and the preliminary results of research projects carried out under the program of the museum. The reports may be cited in publications but their manuscript status should be clearly indicated.

INTRODUCTION

During the summer of 1972, the science section of the Nova Scotia Museum undertook a limited program of general field collecting in the St. Mary's River watershed in order to support an interpretive program at the Sherbrooke Village Project. Results from the 1972 study did not adequately fulfill the requirements of the interpretive program. It was decided that this might best be done by continuing the field work during the summer of 1973, but by selecting discrete research topics, each of which would be independently pursued by the various members of the science staff.

From a scientific point of view, one of the more neglected groups of animals in this province is the leeches. Previous published records were based on collections made by L. K. Pawlowski (Pawlowski, 1948) and records from other collections incorporated into reports by M. C. Meyer, J. P. Moore (Meyer and Moore, 1954; Moore, 1922) and R. W. Davies (1973). Leeches in the Nova Scotia Museum collection consisted of relatively few specimens of three or four species, many of which were in poor condition. On this basis, the choice of this topic was considered an excellent opportunity to improve the museums leech collection, compile useful information for the natural history interpretation center at Sherbrooke and contribute valuable records to leech distributions in Canada. Included in this report is a resumé of the leech records for Nova Scotia found in the literature, records of specimens in the Nova Scotia Museum prior to the St. Mary's River study, records of specimens taken during the study, and records of Nova Scotian specimens in the National Museum.

In the study of leech distribution there is merit in selecting a discrete geographical area for intensive collecting rather than spot-collecting on a province-wide basis. In any given area there are a large number of aquatic habitats varying greatly in physical and chemical characteristics. Some species of leech are highly specific in their chemical requirements; thus a diversity of habitats must be sampled in order to ensure that representatives of all species occurring in an area are recorded. Intensive collecting in one area best ensures that this is done. In addition, information regarding leech ecology becomes more significant when geological, geographic and climatic variables are eliminated.

The Atlantic Provinces are more or less isolated from each other by varying distances of salt water and salt marsh, making this region suitable for the study of the mechanisms of leech dispersal and distribution (Richardson, 1943). The results of the leech survey of the St. Mary's River watershed have provided much information on the leeches present in northeastern Nova Scotia. These results along with future work may eventually further clarify the relationships between the leech faunae of Cape Breton Island, Prince Edward Island and the Mainland of Nova Scotia.

MATERIALS AND METHODS

General methods of leech collecting include corpse baiting, sweep netting and hand collecting, both at night and during the day. Since previous experience was limited, all these methods were used.

Twelve traps were constructed using tin cans of three types including 2-gallon cans, 32-ounce coffee tins and 1-gallon unused paint cans. The cans were made into traps by cutting a circular hole in one end and inserting a nylon screen shaped as a funnel. This was then glued into place using a non-toxic silicone cement. The traps were originally designed to hold small fish such as suckers or perch. On one occasion several bullheads were caught and used for bait but eventually it was found that the time required to catch fish to be used as bait was excessive. It was later decided that liver be used since it was available locally.

Trapping produced many specimens of *Erpobdella punctata* (Leidy). This was, however, the only species taken in this manner. On may occasions a great number of flatworms, insect larvae and carnivorous adult insects were taken. At other times traps were opened and the bait taken, presumably by racoons.

Sweep netting in weedy areas also proved to be of limited success. On some occasions *Macrobdella decora* (Say), one of the larger more agressive species, would be seen swimming in the areas swept over. This was the result of their seeking the source of water disturbance.

By far the most productive method of collecting leeches was by searching shoreline debris and turning over rocks in shallow water during the day and at night. Hand collecting at night using a light proved to be an effective method of obtaining the larger species including *Macrobdella decora, Placobdella parasitica* (Say), and *Percymoorensis marmorata* (Say). Careful searching during the day by turning over rocks, however, produced by far the most specimens.

Leeches are generally most easily identified when fresh. For this reason leeches collected were kept in jars containing pond water until they could be examined closely. It was found that, by refrigeration, no mortality resulted up to a week after capture. In many cases leeches requiring close examination of minute taxonomic characters must be anaesthetised before they can be properly viewed by stereoscopic microscope. Several anaesthetising agents were used including nicotine sulfate, soda water, tobacco flakes and 70% ethyl alcohol dripped slowly into the leech container. The easiest and most practical methods, however, were by heating or freezing, depending on the size of the leech. The larger leeches (over 60 mm) were placed in a 400 ml beaker 3/4 filled with water and placed over a low flame bunsen burner. After a period of rapid activity the leeches became limp and very easy to handle. The smaller leeches were placed in plastic petri dishes about half filled with water and placed in a freezer. Both these methods usually killed the leeches but did not cause distortion or the obscuring of taxonomic detail. After the determinations were performed, the leeches were arranged in a petri dish and 70% isopropyl alcohol was added. After stiffening occurred they were photographed, transferred into vials, catalogued and incorporated into the museum's collection.

Determinations were performed using the key compiled by R. W. Davies (Davies, 1971) and in some cases dissections were performed and compared to dissection illustrations (Richardson, 1969). Nomenclature follows that of Soos (Soos, 1966, 1969a,b.).

DISCUSSION AND RESULTS

A total of 132 leeches belonging to 8 species was taken from the 17 collecting sites in the St. Mary's River watershed. The most common species encountered were *Erpobdella punctata* and *Macrobdella decora*. While the greatest number of leeches collected were *E. punctata* (41), specimens of this species were found in only 5 collecting sites. *Macrobdella decora,* while only represented by 9 specimens, was found at 8 collecting sites. Generally, *E. punctata* preferred slow moving water with a mud-silt bottom composition together with emergent vegetation. As well as being attracted to liver bait in traps, several of this species were found attached to the undersides of small rocks, at times, several to one rock.

Macrobdella decora was most often found free-swimming in larger ponds and lakes. Several were found swimming among shoreline vegetation at night. *Macrobdella decora* is a solitary leech and was not found with other members of it's species during this study. Only one specimen was taken while attached to a substrate; in this case to the underside of a waterlogged plank.

Placobdella parasitica was taken from two areas represented by 4 collecting sites. At site #14, 34 specimens were found on a large snapping turtle *Chelydra serpentina serpentina* (Linné). The turtle was heavily infested about the inner, upper, fore and hind limbs by adults and juveniles. One specimen of *Placobdella ornata* (Verrill) was also found on this turtle. It has been reported that *P. ornata* commonly feeds on the blood of turtles in the United States (Moore, 1912). This represents the first occurrence in Canada of *P. ornata* having *C. serpentina* as it's host.

Percymoorensis marmorata was found sparingly early in the spring with the exception of 13 specimens taken from a temporary roadside ditch. (Sta. #11). The roadside ditch was located on the inland side of highway 347 which runs parallel to Eden Lake. Since the ditch was dry later during the summer and since the highway separated the ditch from Eden Lake which was about 200 feet distant, the presence of leeches in this ditch remains a mystery.

Helobdella stagnalis (Linn.) was taken from 2 collecting sites and seemed to occur wherever *E. punctata* was most common. This would indicate that these leeches require similar environmental factors.

Three specimens of *Mollibdella grandis* (Verrill), the most important species of this study, were taken from the main section of the St. Mary's River (Sta. #1 and 3). These specimens represent a first record for Nova Scotia. Two were found attached to emergent vegetation, hanging limp and distended. The third specimen, taken about two miles upstream from the first two, was found beneath the bark of a tree branch several feet from the water's edge. Although several more days were spent searching in this section of the river no additional specimens were found. This species was positively identified on the basis of it's typical hirudinid 5 pairs of eyes arranged in an arch, the absence of jaws and of copulatory glands. One specimen was dissected and the arrangement of internal organs compared to illustrations by Richardson, (Richardson, 1969).

Another important specimen found during the course of this study was a leech identified by the author as *Theromyzon rude* (Rathke). Unfortunately preservation often distorts or obscures taxonomic detail particularly in the smaller leeches. In this case the number of annuli separating the gonopores was observed to be 4 in the living specimen but upon fixation and preservation the annuli lost definition and could not be counted with certainty. For this reason the identify of this specimen could not be confirmed (R. W. Davies, personal communication) beyond genus. Since this species is represented from the Atlantic provinces by only one other record from Prince Edward Island (Moore, 1922) and since recent authors now consider this species to be confined to western Canada, this specimen should not be considered as a record until further investigation can be carried out.

ACKNOWLEDGEMENTS

I would like to thank Dr. R. W. Davies for his assistance in confirming my identifications, and Dr. D. S. Davis and J. Gilhen for their help in collecting specimens.

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Table 1. Distribution of leech species collected at sample sites in the St. Mary's watershed.

Species	Site Number																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Helobdella stagnalis	3	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-
Placobdella ornata	-	-	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-
Placobdella parasitica	-	-	-	-	-	-	-	1	1	-	-	-	1	34	-	-	-
Placobdella phalera	1	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-
Theromyzon rude *	-	-	-	-	1*	-	-	-	-	-	-	-	-	-	-	-	-
Erpobdella punctata	26	-	-	-	1	-	-	-	-	-	-	10	-	-	-	2	2
Macrobdella decora	-	2	-	1	1	-	2	2	1	-	-	1	-	-	-	1	-
Mollibdella grandis	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percymoorensis marmorata	3	-	1	-	-	1	-	-	-	-	13	-	-	-	-	-	-

* See discussion regarding this specimen.

Table 2. Summary of Nova Scotia leech records.

Species	Previous Published Records				N. S. Museum Records				St. Mary's River Watershed study	
	Mainland		Cape Breton Is.		Mainland		Cape Breton Is.			
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Pisciola punctata	1	1*	-	-	-	-	-	-	-	-
Pisciola zebra	-	-	1	4	-	-	-	-	-	-
Batracobdella paludosa	-	-	1	1	-	-	-	-	-	-
Glossiphonia complanata	4	6	2	2*	1	2	-	-	-	-
Helobdella stagnalis	7	46	4	18*	3	13	-	-	2	11
Helobdella triserialis	1	1*	-	-	-	-	-	-	-	-
Placobdella ornata	1	5	-	-	6	10	1	1	2	6
Placobdella parasitica	1	2	-	-	6	56	-	-	4	37
Placobdella phalera	1	4	-	-	3	4	-	-	3	4
Theromyzon tessulatum	-	-	1	1	-	-	-	-	-	-
Theromyzon sp.	-	-	-	-	-	-	-	-	1	1
Erpobdella puntata	8	10*	3	21	15	61	-	-	5	50
Mooreobdella fervida	1	1	-	-	-	-	-	-	-	-
Macrobdella decora	2	8	1	1	14	26	1	1	7	11
Mollibdella grandis	-	-	-	-	1	3	-	-	1	3
Percymoorensis marmorata	2	6	3	3	12	39	2	5	4	18

(a) Number of collecting sites

(b) Number of specimens

(*) Where number of specimens collected at one collecting site was not known, one specimen was counted.

Records from Sable Island are not included in the table.

Table 3. Leeches in the Nova Scotia Museum collection.

Species	Accession No.	No. of Specimens	Date	Collector	Location
Glossiphonia complanata	973-Z-707-1(2)	2	24 July '73	P. McClung R. Barnes	Tributary of Stewiacke River. Hants Co., N. S.
	973-Z-760-1(1)	1	20 Oct. '71	B. Wright	Lac St. Louis, St. A. de Belleveau, Quebec
Helobdella stagnalis	973-Z-713-5(8)	8	16 Aug. '73	P. McClung	Head of Eden Lake, Pictou Co., N. S.
	973-Z-716-3(3)	3	15 Aug. '73	P. McClung	Waternish, Guysborough Co., N. S.
	973-Z-712-1(2)	2	9 Aug. '73	P. McClung	Gaspereau River, Kings Co., N. S.
		1	7 July '73	J. E. H. Martin	Sable Island, N. S.
Placobdella ornata	973-Z-700-2(1)	1	25 June '73	P. McClung J. Gilhen	Lake Road, Guysborough Co., N. S.
	973-Z-710-2(5)	5	31 July '73	P. McClung J. Gilhen	Head of Lochaber Lake, Antigonish Co., N. S.
	973-Z-706-1(1)	1	24 July '73	P. McClung R. Barnes	Water resevoir, Shubenacadie, Hants Co., N. S.
	973-Z-756-1(1)	1	3 May '50	J. S. Bleakney	Coldbrook, Kings Co., N.S.
	973-Z-757-1(1)	1	23 Aug. '72	J. Gilhen	MacLennon Brook, Cape Breton Island, N. S.
	973-Z-758-1(1)	1	26 July '49	T. Lewin D. Livingston	Upper Spectacle Lake, Digby Co., N. S.
	973-Z-761-1(1)	1	25 July '58	R. Gray J. McNeill	Bary's Run, Port Wallis, Halifax Co., N. S.
Placobdella parasitica	973-Z-729-1(1)	1	5 June '73	P. McClung	Lochaber Lake, Antigonish Co., N. S.
	973-Z-709-2(1)	1	31 July '73	P. McClung J. Gilhen	Lochaber Lake, Antigonish Co., N. S.
	973-Z-700-1(34)	34	25 June '73	P. McClung J. Gilhen	Lake Road, Guysborough Co., N. S.
	973-Z-719-1(1)	1	14 Aug. '73	P. McClung	Tributary of West Branch St. Mary's, Guysborough Co., N. S.
	973-Z-730-1(18)	18	11 Aug. '73	L. Duncanson	Ponhook Lake, Queens Co., N. S.
	973-Z-762-1(1)	1	16 May '72	J. Gilhen G. Hardy	Thompson, Cumberland Co., N.S.
Placobdella phalera	973-Z-747-1(1)	1	31 July '73	P. McClung J. Gilhen	Lochaber Lake, Antigonish Co., N. S.
	973-Z-713-5(2)	2	16 Aug. '73	P. McClung	Eden Lake, Pictou Co., N. S.
	973-Z-716-3(1)	1	15 Aug. '73	P. McClung	Waternish, Guysborough Co., N. S.
Theromyzon sp.*	973-Z-728-2(1)	1	10 Sept. '73	P. McClung	Glenelg Lake, Guysborough Co., N. S.
Erpobdella punctata	973-Z-717-1(2)	2	15 Aug. '73	P. McClung	North Caledonia, Guysborough Co., N. S.
	973-Z-728-1(1)	1	10 Sept. '73	P. McClung	Glenelg Lake, Guysborough Co., N. S.

* see discussion

Table 3 (continued)

Species	Accession No.	No. of Specimens	Date	Collector	Location
Erpobdella punctata	973-Z-713-5(10)	6	16 Aug. '73	P. McClung	Eden Lake, Pictou Co., N. S.
	973-Z-715-2(1)	1	15 Aug. '73	D. S. Davis	West Branch, Guysborough Co., N. S.
	973-Z-750-1(5)	5	31 May '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-715-2(1)	1	15 Aug. '73	P. McClung	South Caledonia, Guysborough Co., N. S.
	973-Z-755-3(4)	4	Summer '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-751-1(8)	8	31 May '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-748-1(9)	9	31 May '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-749-1(7)	7	2 May '68	J. Gilhen P. Doleman	Millers Lake, Halifax Co., N. S.
	973-Z-712-2(1)	1	9 Aug. '73	P. McClung R. Barnes	Gaspereaux River, Kings Co., N. S.
	973-Z-712-3(3)	3	9 Aug. '73	P. McClung R. Barnes	Gaspereaux River, Kings Co., N. S.
Nephelopsis obscura	973-Z-761-1(2)	2	29 Sept. '73	D. Davis	Lake Wabumun, Alberta
Macrobdella decora	973-Z-734-1(1)	1	19 June '72	J. Silver W. Johnston	Glenelg Lake, Guysborough Co., N. S.
	973-Z-704-1(2)	2	9 July '73	P. McClung	Lochaber Lake, Guysborough Co., N. S.
	973-Z-705-1(2)	2	10 July '73	P. McClung	South Lochaber Lake, Guysborough Co., N. S.
	973-Z-703-1(1)	1	10 July '73	P. McClung	North Lochaber Lake, Guysborough Co., N. S.
	973-Z-713-5(1)	1	16 Aug. '73	P. McClung	Eden Lake, Pictou Co., N. S.
	973-Z-701-1(1)	1	26 June '73	P. McClung F. Scott	Cumminger Lake, Guysborough Co., N. S.
	973-Z-718-1(1)	1	15 Aug. '73	P. McClung	South Caledonia, Guysborough Co., N. S.
	973-Z-732-1(2)	2	15 June '72	J. Silver W. Johnston	Frazer's Gully, Guysborough Co., N. S.
	973-Z-737-1(2)	2	6 June '72	J. Silver W. Johnston	Sherbrooke Lake, Guysborough Co., N. S.
	973-Z-731-1(8)	8	26 May '72	J. Gilhen G. Hardy	Wentworth Center, Cumberland Co., N. S.
	973-Z-735-1(1)	1	Summer '69	P. Doleman	Uniacke Lake, Hants Co., N. S.
	973-Z-736-1(1)	1	15 July '72	J. Cleveland	McLean Brook, Colchester Co., N. S.
	973-Z-744-1(1)	1	1 Aug. '09	L. A. Purcell	Oathill Lake, Halifax Co., N.S
	973-Z-743-1(1)	1	7 May '72	J. Gilhen	Colpton, Lunenburg Co., N. S.
	973-Z-738-1(1)	1	12 May '69	J. Gilhen	31 Miles West Winnipeg Manitoba

Table 3 (continued)

Species	Accession No.	No. of Specimens	Date	Collector	Location
Mollibdella grandis	973-Z-702-1(2)	2	11 July '73	J. Gilhen	Waternish, Guysborough Co., N. S.
	973-Z-714-1(1)	1	14 Aug. '73	D. Davis	Crow's Nest,Guysborough Co., N. S.
Percymoorensis marmorata	973-Z-755-1(1)	1	Summer '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-746-1(1)	1	30 Apr. '73	J. Gilhen	Two Mile Lake, Guysborough Co., N. S.
	973-Z-733-1(13)	13	9 June '72	J. Gilhen	Garden of Eden, Pictou Co., N. S.
	973-Z-742-1(2)	2	Summer '72	J. Silver W. Johnston	Waternish, Guysborough Co., N. S.
	973-Z-754-1(1)	1	23 June '72	J. Silver W. Johnston	Grow's Nest, Guysborough Co., N. S.
	973-Z-740-1(1)	1	5 May '72	J. Gilhen	Elmsdale, Hants Co., N. S.
	973-Z-720-1(1)	1	17 Aug. '73	L. Johnson	Riversdale, Colchester Co., N. S.
	973-Z-741-1(4)	4	7 May '73	J. Gilhen R. Merrick	MacLellan Brook, Inverness Co., N. S.
	973-Z-745-1(1)	1	29 Apr. '72	J. Gilhen G. Hardy	Delap Cove, Annapolis Co., N. S.
	973-Z-752-1(1)	1	14 July '71	J. Gilhen	Jeremy Bay, Lake Keji, Queens Co., N. S.
	973-Z-753-1(2)	2	5 May '72	J. Gilhen	Brookfield, Colchester Co., N. S.
	973-Z-739-1(2)	2	30 Apr. '73	J. Gilhen G. Hardy	Antigonish, Antigonish Co., N. S.
	973-Z-156-1(4)	4	23 Apr. '73	J. Gilhen J. Callaghan	Beaver Pond, Antigonish Co., N. S.
	973-Z-708-1(3)	3	24 July '73	P. McClung R. Barnes	Stewiacke River, Hants Co., N. S.

Fig. 1 Collecting sites

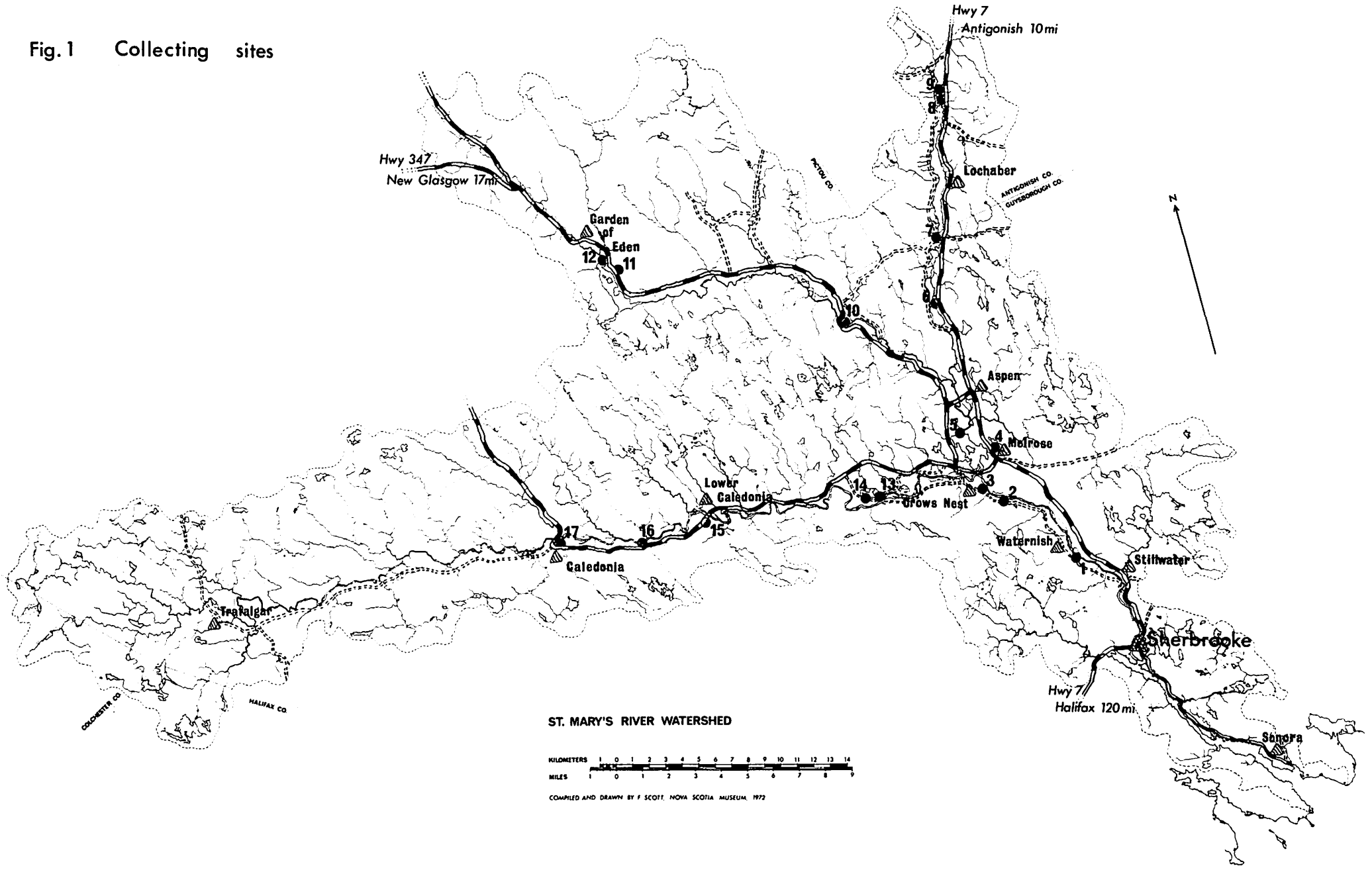


Fig. 2

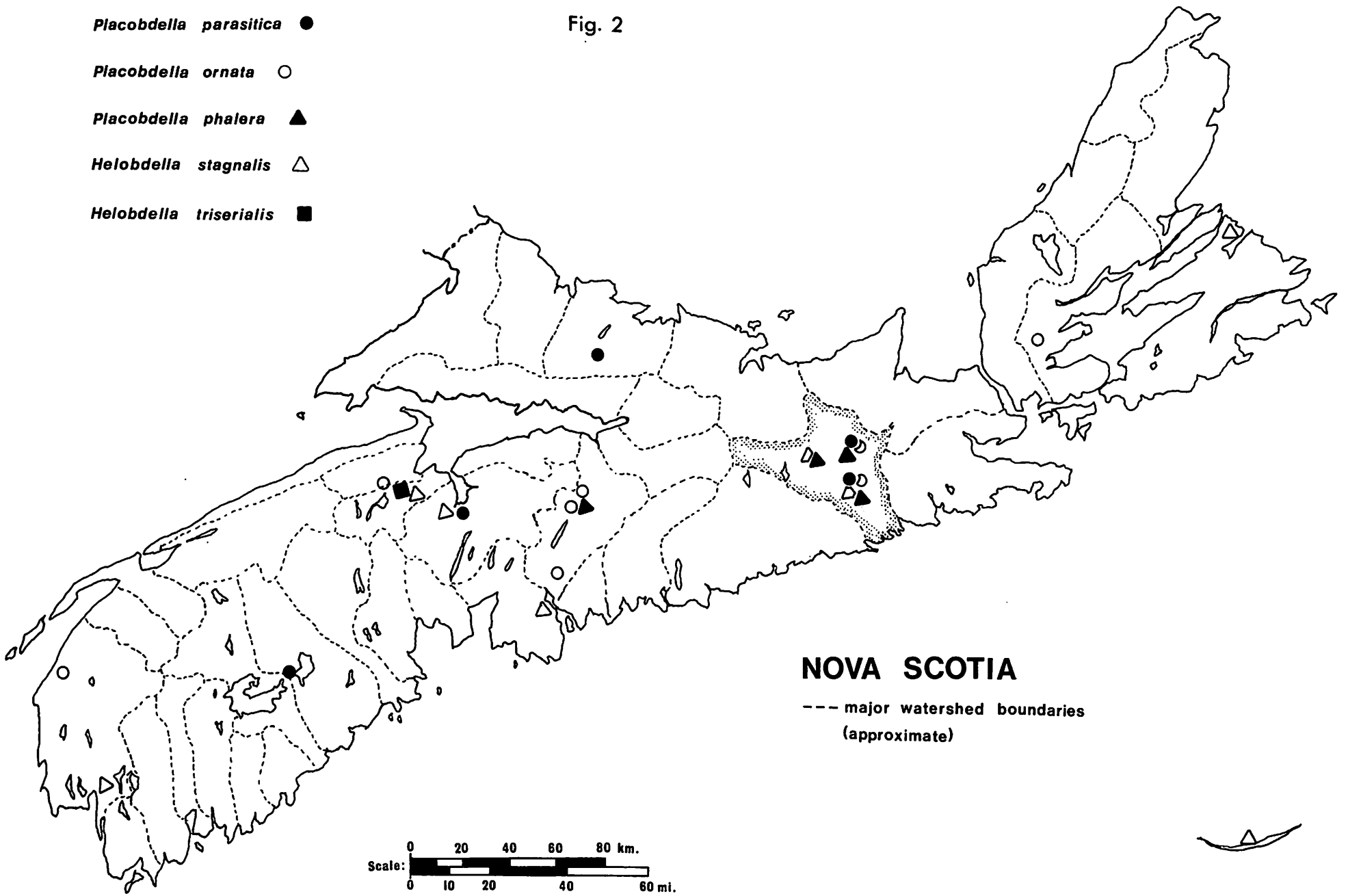

Placobdella parasitica
Placobdella ornata
Placobdella phalera
Helobdella stagnalis
Helobdella triserialis
NOVA SCOTIA
--- major watershed boundaries (approximate)
Scale:
0 20 40 60 80 km.
0 10 20 40 60 mi.

Fig. 3

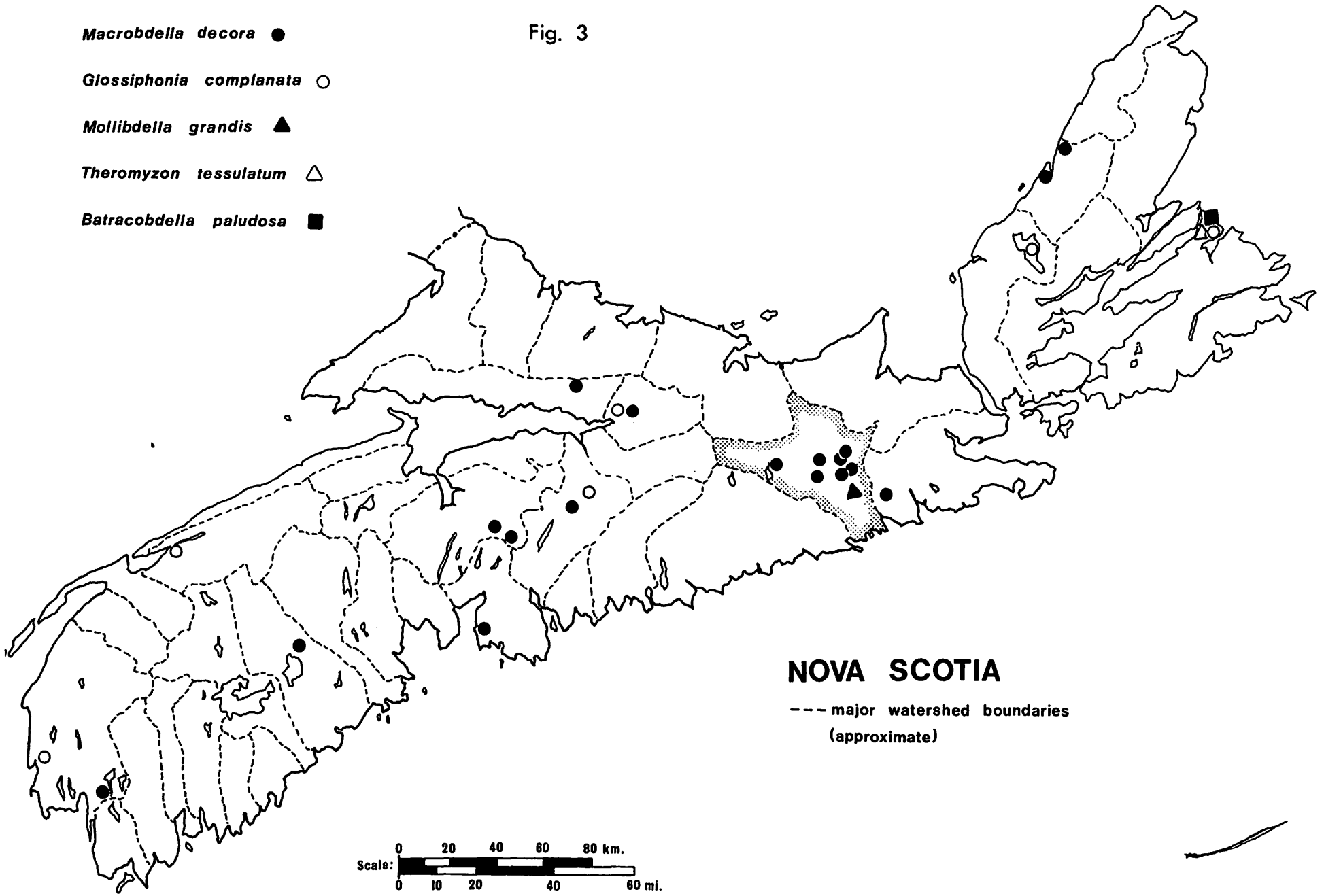
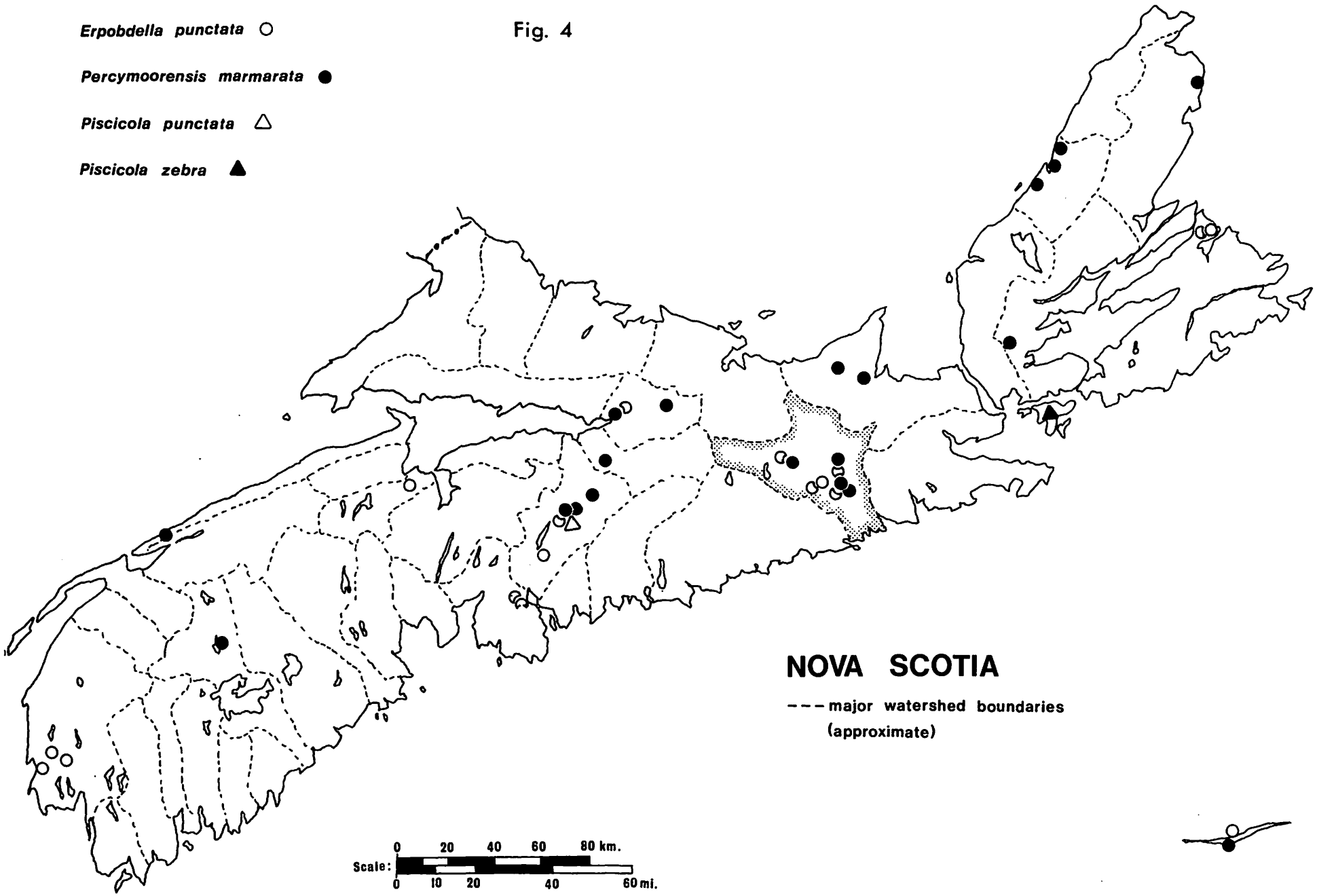

Macrobdella decora
Glossiphonia complanata
Mollibdella grandis
Theromyzon tessulatum
Batracobdella paludosa
NOVA SCOTIA
--- major watershed boundaries (approximate)
Scale:
0 20 40 60 80 km.
0 10 20 40 60 mi.

Fig. 4


Erpobdella punctata
Percymoorensis marmarata
Piscicola punctata
Piscicola zebra
NOVA SCOTIA
--- major watershed boundaries (approximate)
Scale:
0 20 40 60 80 km.
0 10 20 40 60 mi.