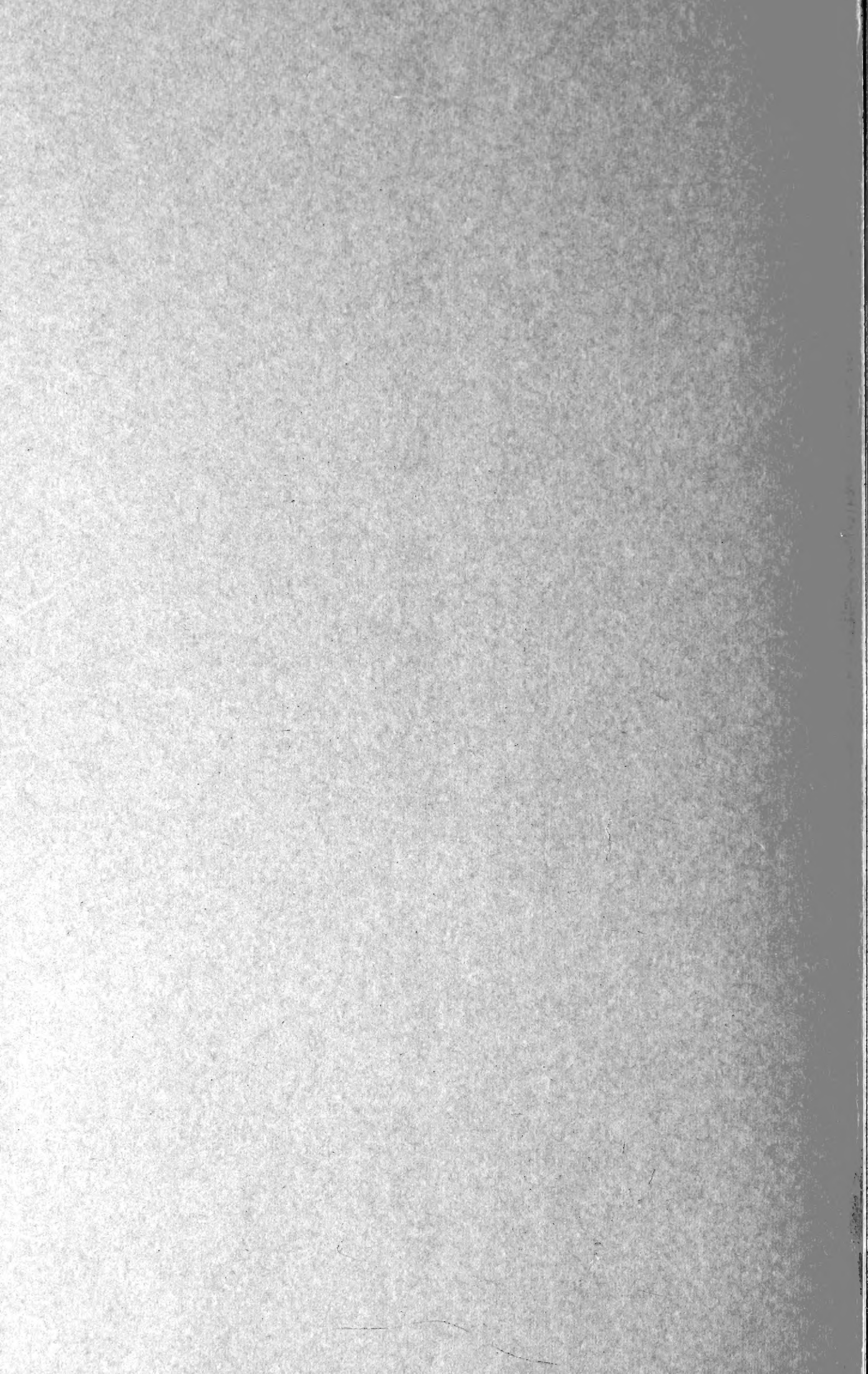


Digitized by the Internet Archive
in 2011 with funding from
University of Toronto



CONTRIBUTIONS OF THE ROYAL ONTARIO MUSEUM
DIVISION OF ZOOLOGY AND PALAEOLOGY

ROYAL ONTARIO MUSEUM LIBRARIES



3 1761 05013 7074

No. 51

LIBRARY
ROYAL ONTARIO MUSEUM
UNIVERSITY OF TORONTO
100 QUEEN'S PARK
TORONTO 5 - ONTARIO - CANADA

**THE FRESHWATER FISHES OF NEW BRUNSWICK:
A CHECKLIST WITH DISTRIBUTIONAL NOTES**

By

W. B. Scott

and

E. J. Crossman

100 Queen's Park
TORONTO, CANADA

June 20, 1959



ERRATA

Page 32: line 13

delete "fishes, would --- such material

line 13 should read

"reason for including it in a list of

New Brunswick fishes."

THE HISTORY OF

THE CITY OF BOSTON

FROM THE FIRST SETTLEMENT TO THE PRESENT

BY JOHN W. COBB

VOLUME I

BOSTON

1858

CONTRIBUTIONS OF THE ROYAL ONTARIO MUSEUM
DIVISION OF ZOOLOGY AND PALAEOLOGY

No. 51

THE FRESHWATER FISHES OF NEW BRUNSWICK:
A CHECKLIST WITH DISTRIBUTIONAL NOTES

By

W. B. Scott

and

E. J. Crossman

100 Queen's Park
TORONTO, CANADA

June 20, 1959



THE FRESHWATER FISHES OF NEW BRUNSWICK:
A CHECKLIST WITH DISTRIBUTIONAL NOTES

By W. B. SCOTT and E. J. CROSSMAN

INTRODUCTION

NOT SINCE the 1896-1900 period, when Dr. Philip Cox published his "Catalogue of the marine and freshwater Fishes of New Brunswick", and other papers, has there appeared a comprehensive work on the freshwater fish fauna of New Brunswick. During the first half of this century introductions of exotic species, fishery biology and production of game species were, and have continued to be, subjects of most of the papers on freshwater fishes. Atlantic salmon and speckled trout provide excellent sport fishing in New Brunswick and have received considerable attention. The freshwater fish fauna of the whole province, however, appears to be hardly better known than it was 50 years ago. As a matter of fact, even Dr. Cox, writing in 1896, states on page 62 ". . . the writer, in assigning localities and ranges, quotes from Moses H. Perley." Perley's catalogue was published in 1852!

The purpose of the present paper, therefore, is to draw together all data currently available in order that the need for an ichthyological survey may be emphasized, and to provide a basis for any such study.

During May and June, 1958, the present authors collected extensively, particularly in the upper Saint John River system and in the St. Croix River system of New Brunswick. The present paper includes the results, not only of these collections but also the records of New Brunswick freshwater fishes contained in the research collections of the Royal Ontario Museum, and the National Museum of Canada.

The material collected by the authors in 1958 is listed by stations in Table 2. Fishes used in this study but collected by other workers and retained in the research collections of the Royal Ontario Museum and the National Museum of Canada are listed in Tables 3 and 4. The exact locations of these stations and collections are shown in Figures 1 and 2. (See Appendix, p. 38, for Tables 2-4.)

While time has not permitted us to examine material in the research collections of the United States National Museum and the Museum of Comparative Zoology, Dr. E. A. Lachner has informed us that worthwhile material is retained in the former and possibly in the latter.

That map of New Brunswick, scale 1:500,000, published in 1955 by the New Brunswick Department of Lands and Mines, was used in the preparation of the figures and tables.



JGS

FIGURE 1. Map of New Brunswick showing where collections of fishes have been made.

- Station, Royal Ontario Museum (See Table 2).
- ⬡—Collection, Royal Ontario Museum (See Table 3).
- Collection, National Museum of Canada (See Table 4).

HISTORICAL REVIEW

In 1896 Dr. Philip Cox wrote an excellent account of the history of ichthyology of the province, entitled "History and present state of the Ichthyology of New Brunswick." In this account Cox reviewed all the important works that had been published to that time. No attempt will be made to repeat Dr. Cox's admirable treatment of the subject but a tabular summary is given in Table 1.

TABLE 1. Some major contributors to the freshwater ichthyology of New Brunswick

Year	Author	Title of publication	Remarks
1672	N. Dénys	L'Histoire Naturelle de l'Amerique Septentrionale. Paris	Enumerated about 20 species, mainly food fishes
1844	W. C. Atkinson	A Historical and Statistical account of New Brunswick, with advice to Emigrants. Edinburgh, Scotland	Provided a list of fishes, but of little or no value
1847	A. Gesner	New Brunswick. London	Provided a list of species but copied from other works
1852	M. H. Perley	Reports on the Sea and river fisheries of New Brunswick. Fredericton, N.B.	Published first comprehensive systematic list. Cox considers him the founder of this science in New Brunswick
1865	T. N. Gill	Synopsis of the fishes of the Gulf of St. Lawrence and Bay of Fundy. Canadian Naturalist, vol. 2, pp. 244-266	Includes fresh and salt water species. For freshwater relied on Perley
1873	A. L. Adams	Field and forest rambles with notes and observations on the natural history of eastern Canada. London	A very excellent account containing numerous critical comments on the taxonomic and distributional problems of the day
1893 to 1924	Philip Cox	Many titles on fishes of N.B. but particularly Catalogue of the Marine and freshwater fishes of N.B. St. John, N.B.	Cox's work during this period was of great importance. He built on the work of Perley and Adams and many other workers in the province to provide a sound basis for study
1907	B. W. Evermann and E. L. Goldsborough	A checklist of the freshwater fishes of Canada. Proc. Biol. Soc. Wash., Washington, D.C., U.S.A.	New Brunswick data obtained from Dr. Cox's 1895 papers and from Kendall's 1894 and 1903 papers.
1913	A. Halkett	Check list of the fishes of the Dominion of Canada and Newfoundland. Ottawa, Ont.	New Brunswick data was largely supplied by Dr. Cox
1925 to 1958	—	Numerous papers, particularly by staff members of the Fisheries Research Board of Canada, St. Andrew's Station, published usually in Journals, Bulletins, etc., of the Fisheries Research Board of Canada, Canadian Fish Culturist and Transactions of the American Fisheries Society	

QUEENS COUNTY

KINGS COUNTY

ST JOHN COUNTY

SUNBURY COUNTY

YORK COUNTY

JGS

BAY OF FUNDY

MAGAGUADAVIC RIVER

DIGDEQUASH RIVER

CANDORE LAKE

SAINT CROIX RIVER

POTTERS LAKE

MOHAWIG Ck

ST STEPHEN

ST PATRICK LAKE

DIGDEQUASH LAKE

GREY LAKE

KERN LAKE

BONAPARTE LAKE

LIMEBURNER LAKE

OAK BAY

CHAMCOO LAKE

GIBSON LAKE

NOBLE LAKE

ST ANDREWS

JOE'S COUNTRY

PASSAMODUDDY BAY

30

31

32

25

26

24

22

23

18

16

41

42

19

40

33

34

36

37

15

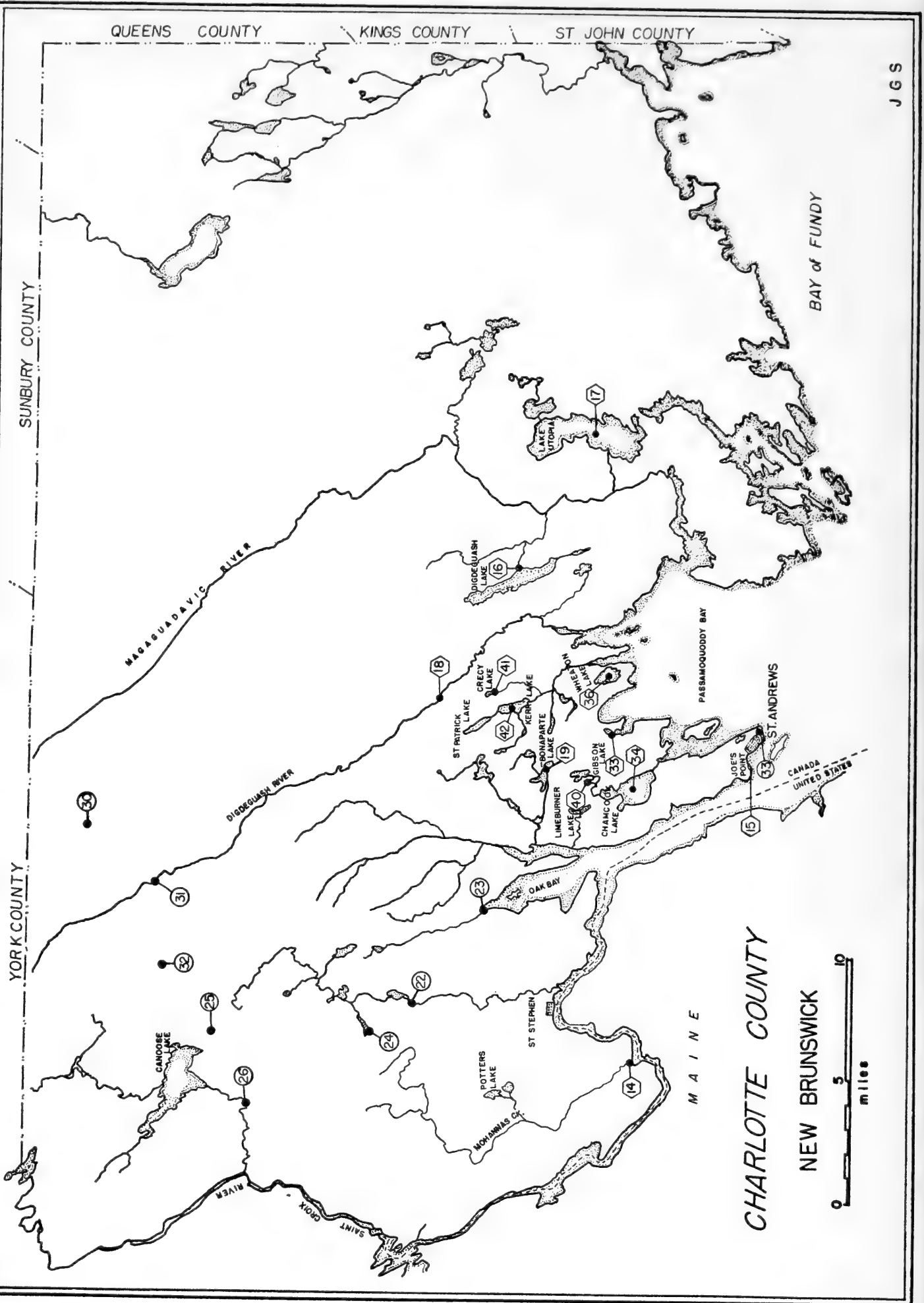
17

14

M A I N E

CHARLOTTE COUNTY

NEW BRUNSWICK



Cox wrote very highly of Perley's work and considered him to be responsible for laying the groundwork of the science of ichthyology in that province. A. Leith Adams, on the other hand, was considered by Cox to be a most able observer and a tireless traveller but one gains the impression that he did not greatly admire Adams' published work. There is, however, no doubt but that Adams' writings show a grasp of the ichthyological knowledge of the day that was most unusual, particularly in view of his recent arrival (1866) in North America. For example, during a discussion of the lake trout, three kinds of which had been described, he noted (p. 235): "it is, therefore, not unlikely, when their geographical distributions are better worked out, that this seeming partiality to certain waters may, after all, be more apparent than real. Further, it appears that their claims to be considered distinct species rest altogether on certain minor details of structure and colouring in each, which, however, have been further abridged by late researches. It will not, therefore, be surprising to such observers as may have enjoyed opportunities of studying them in their native haunts, should these so-called species turn out to be only varieties of seasonal or sexual conditions of one grey-spotted lake trout, common to the boreal regions of the continent."

In addition, Adams, unlike most workers of that time, presented in his book considerable morphometric data, comparisons with closely related forms and often concluded with statements that are as true today as when they were written. His descriptions and accounts of the salmonid fishes are well worth perusal by serious students of these fishes.

Mention must be made here of three papers credited to Charles Lanman,¹ published in the Report of the United States Fish Commission for the year 1872-1873, but published in 1874. These papers represent an extreme case of plagiarism for they are direct word for word copies of sections of Perley's (1852) account, but without appropriate credit. According to the introduction of the second article, Professor Baird (U.S. Commissioner of Fisheries), was an unwitting dupe in the affair.

Philip Cox's work on New Brunswick freshwater fishes is contained in papers published in 1893, 1896a, 1896b, 1899, 1901, 1905, 1921,

¹Chas. Lanman, 1874: The whitefish of eastern Maine and New Brunswick; The Salmonidae of eastern Maine, New Brunswick and Nova Scotia; The shad and gaspereau or alewife of New Brunswick and Nova Scotia.

FIGURE 2. Map of Charlotte County, New Brunswick, showing where collections of fishes have been made.

- Collection, National Museum of Canada (See Table 4).
- ◊—Collection, Royal Ontario Museum (See Table 3).
- Station, Royal Ontario Museum (See Table 2).

1923, 1924. His Catalogue of the Marine and Freshwater fishes of New Brunswick has not really been superseded. Both Evermann and Goldsborough (1907) and Halkett (1913) relied on Cox for data on New Brunswick fishes, although the former were aware of only two of a total of six papers that had been published by Cox up to that time. Dr. Cox's last work on freshwater fishes appears to be his 1924 paper and after this time he seems to have taken a greater interest in marine species.

In this early period certainly the three most important names in the development of knowledge of the freshwater fishes were Moses H. Perley, A. Leith Adams and Philip Cox.

Since Dr. Cox's last paper in 1924 interest in the freshwater fisheries has greatly increased, largely as a result of the establishment of a permanent federal fisheries station at St. Andrews. The staff of this station has been largely responsible for the existing wealth of literature on New Brunswick's freshwater fishes.

ANNOTATED LIST OF SPECIES

The following list includes the anadromous and catadromous fishes in addition to the strictly freshwater fishes.

The freshwater fish fauna recorded to date includes 46 species in 18 families. Five species included in three families are introduced forms. Two species not previously recorded from New Brunswick are included. Localities of known occurrence of each species are shown in two series, (*a*) Stations, numbering 1 to 30 (see Table 2 and Figures 1 and 2), and (*b*) Collections, numbering ROM² 1 to 47 and NMC³ 1 to 16 (see Tables 3 and 4 and Figures 1 and 2).

Station numbers refer to collections made by the authors in May and June of 1958. These fishes also are in the museum's collection.

Collection numbers designate material irregularly collected in the province by various workers and incorporated into the collections of the Royal Ontario Museum and the National Museum of Canada before May, 1958.

The nomenclature and systematic arrangement follows Scott (1958), except common names which, when in italics, indicate New Brunswick usage.

A complete list of synonyms for each species is not given. Rather the synonyms listed are the names used by respective authors when they referred to the species being dealt with. When, however, the name in current use was used by an author it was omitted from this list.

Prior to preparing the annotated list a provisional list was prepared and circulated. Comments received as a result of this have been incorporated.

²Royal Ontario Museum.

³National Museum of Canada.

PETROMYZONIDAE—lampreys1. *Petromyzon marinus* Linnaeus—sea lamprey

COLLECTIONS: ROM. 26 (Napan River, Northumberland County).
STATIONS: Not collected.

This species is of general distribution in coastal New Brunswick but is not known in the Saint John River above Grand Falls. While obviously common in coastal watersheds, the species is poorly represented in study collections.

Cox (1893) observed lamprey attacks on sturgeon (*Acipenser oxyrinchus*), Atlantic salmon (*Salmo salar*), cod (*Gadus morrhua*) and squirrel hake (*Urophycis* sp.). He observed many "young" sturgeon which he considered to have been killed by lampreys.

It is said to be common in the Miramichi River system (McKenzie, in press).

ACIPENSERIDAE—sturgeons2. *Acipenser oxyrinchus* Mitchill—Atlantic sturgeon

COLLECTIONS: None.

STATIONS: Not collected.

Perley (1852)—"*Accipenser oxyrinchus*"

Cox (1896b)—*Acipenser sturio* Linnaeus

This is a coastal species, which ascends larger New Brunswick rivers. Perley's (1852, pp. 220–221) account appears to have been the source for subsequent writers such as Adams, Cox, Evermann and Goldsborough and Halkett. Perley noted "This fish ascends the River Saint John in considerable numbers in May, and is then often taken in the Harbour of Saint John, . . . it basks on the Oromocto shoals, about 70 miles from the sea"; "This fish also basks on an extensive sandy shoal to the southward of Grand Point, in the Grand Lake, about 60 miles from the sea."

3. *Acipenser brevirostrum* LeSueur—shortnose sturgeon

COLLECTIONS: None.

STATIONS: Not collected.

Although previous reports of this fish in Canada were shown to be erroneous (Scott, 1958), a specimen has recently (29th May, 1957) been captured in the estuary of the Saint John River. This fish, taken by personnel of the Fisheries Research Board of Canada, has been identified and retained by Dr. V. D. Vladykov.

CLUPEIDAE—herrings

4. *Alosa pseudoharengus* (Wilson)⁴—alewife, *gaspereau*

COLLECTIONS: ROM. 29a (Miramichi River).

STATIONS: 24 (St. Croix River system).

Perley (1852)—*Alosa tyrannus*Cox (1896b)—*Clupea vernalis* MitchillHuntsman (1922)—*Pomolobus pseudoharengus* (Wilson)

Although represented by only one collection (29a) and taken at only one station it actually is rather widely distributed coastwise. Perley (1852) reported that it ascended the Saint John River almost to Fredericton. Possibly it is a permanent resident in some New Brunswick lakes.

The alewife is an anadromous species, coming into freshwater in the spring at which time it affords a commercial fishery in several large river systems.

5. *Alosa sapidissima* (Wilson)—American shad

COLLECTIONS: ROM. 28a, 37, 47.

STATIONS: Not collected.

Cox (1896b)—*Clupea sapidissima* Wilson

For detailed distribution of the shad in New Brunswick see Leim (1924, p. 168). Perley (1852) makes the following remarks about the distribution of this species—"The shad which ascend the Saint John, resort for spawning to Darling's Lake, (Kennebecasis,) Douglas Lake, (Nerepis,) the Washademoac Lake, the Ocnabog Lake, the Grand Lake, and the Oromocto River. They are caught in the Saint John near Fredericton, but not above, the water being too rapid."

The shad ascends and spawns in the Miramichi River going up both the northwest and southwest branches (Leim, p. 12). In the southwest Miramichi they ascend at least as far as Boiestown, about 60 miles from the mouth, also Tabusintac River, north of the Miramichi River. Spawning also occurs in the Petitcodiac River above Salisbury (Leim, Huntsman, 1922). Leim (p. 9) noted that the shad ascends the Saint John River as far as Grand Falls, in Victoria County, and in the lower reaches of that river it moves into Kennebecasis Bay, Washedemoak Lake, Canaan River and in Grand and French lakes. Leim also noted that the most important shad-producing regions in New Brunswick are the Saint John and Miramichi rivers and Chignecto Bay.

⁴For *A. aestivalis* see p. 29.

SALMONIDAE—salmon

6. *Oncorhynchus*⁵ *tshawytscha* (Walbaum)—chinook

COLLECTIONS: None from freshwater.

STATIONS: Not collected.

Plantings of this species were made in the Saint John River in 1881 and 1882, but these did not result in the establishment of the species.

In 1939 a specimen was taken in the Bay of Fundy, eight miles off the mouth of the Saint John River (Huntsman and Dymond, 1940). This specimen, now in the Royal Ontario Museum collections (Cat. No. 12,477), was presumed to have been a survivor of the numerous plantings made in the waters of the neighbouring states of Maine and New Hampshire.

7. *Salmo salar* Linnaeus—Atlantic salmonCOLLECTIONS: ROM. 5, 8, 18, 28*b*, 34*a*, 34*d*, 44.

STATIONS: Not collected.

Gilpin (1866)—“*Salmo gloveri*”

The Atlantic salmon is the object of special study by the Fisheries Research Board of Canada, the publications of which contain numerous references to this species in New Brunswick. The long history of its valuable fisheries and the ensuing abundance of information place summarization beyond the scope of this paper.

8. *Salmo trutta* Linnaeus—brown trout

COLLECTIONS: None.

STATIONS: Not collected.

Perley (1852) lists *Salmo trutta* as a New Brunswick species, although it was not introduced until 1921. He referred to it as the “Salmon Trout, or White Sea Trout.” It is almost certain that Perley’s “*Salmo trutta*” was in fact *Salvelinus fontinalis*. Further, Perley (p. 198) noted that Storer’s description of *salmo immaculatus* “is accurately that of *salmo trutta marina*.” The fish that Storer described was also *Salvelinus fontinalis*.

Although no specimens exist in collections, the occurrence of the brown trout in New Brunswick waters is well documented in the literature.

⁵Huntsman (1922) noted that *Oncorhynchus gorbuscha* (Walbaum), the pink salmon, was introduced into American waters and reportedly taken in weirs in Passamoquoddy Bay in 1919 and 1920. Its presence in New Brunswick waters has not been verified.

Catt (1950a) summarized the introduction of the species into the Maritime Provinces, noting that it was first brought into New Brunswick in 1921 and planted in the Loch Lomond system, Saint John County. Catt noted that further plantings "were made over the years in Nigger or Shadow Lake, Ping Pong Lake, Ashburne Lake, Blindman's Lake and the Loch Lomond and Little River watersheds, Saint John County; and in Rays Lake, King's County, New Brunswick."

9. *Salmo gairdneri* Richardson—rainbow trout

COLLECTIONS: None.

STATIONS: Not collected.

The first introduction of rainbow trout into New Brunswick waters was described by Catt and Needler (1946). Rainbow trout fingerlings were introduced in 1900 into MacFadden's Lake, Albert County, and subsequently became established, not in the lake but in Crooked Creek, which drains the lake. Dymond (1955) reported that rainbows ". . . have prevailed not only in Crooked Creek but have spread presumably through salt water to one or two neighbouring streams."

Rodd (1930) noted that ". . . rainbow trout . . . were introduced in Pisquid Lake, P.E.I., and Clear Lake, N.B., in 1925." Wilson (1958) made no mention of rainbows in Clear Lake but did list the Big Salmon River, Saint John County, where the species ". . . was established from introductions made in Dicks Lake and Crow Brook in 1944." Wilson (*ibid.*) noted that 12 specimens "were put through the Beechwood fishway in the Saint John River," in 1958.

10. *Salvelinus fontinalis* (Mitchill)—brook trout

COLLECTIONS: ROM. 1, 12, 38, 39, 43.

STATIONS: 1, 2, 3, 5, 7, 8, 9, 11, 14, 17, 19(a), 22, 23, 25(a), 29.

Perley (1850)—*Salmo fontinalis*; *Salmo trutta*

Storer (1850)—*Salmo immaculatus*

This salmonid is possibly the most widely distributed freshwater species in New Brunswick.

As in the case of the Atlantic salmon, the brook trout has been the object of many special studies and is of such wide distribution in the province that no detailed survey of the literature has been attempted.

11. *Salvelinus alpinus* (Linnaeus)—arctic char

COLLECTIONS: ROM. 13, 39, 46.

STATIONS: Not collected.

The arctic char was first taken in New Brunswick waters in Walton Lake, King's County, Kingston Parish, in August, 1949, by James Catt and D. Alderdice (Catt, 1950b). In June of the following year Dr.

G. F. M. Smith caught specimens in Upsalquitch Lake, Northumberland County, Northesk Parish. The arctic char has thus far been found only in two lakes in New Brunswick but collecting in the northern part of the province may reveal the presence of this species in other deep lakes.

Vladykov (1954) made a comparative study of eastern North American chars, including Walton Lake specimens. He considered these to be typical arctic char, quite distinct from *Salvelinus aureolus* Bean and *Salvelinus oquassa* (Girard) which occur in the neighbouring state of Maine.

12. *Salvelinus namaycush* (Walbaum)—lake trout, *togue*

COLLECTIONS: ROM. 34a (Chamcook Lake).

STATIONS: Not collected.

Perley (1852)—*Salmo ferox*

Adams (1873)—*Salmo confinis* DeKay

Cox (1893)—*Salmo namaycush* Walbaum

Perley (1852) referred to this species as *Salmo ferox* as a result of the work of Yarrell (1836). Perley stated—"On a careful examination and dissection of this fish, it was found to correspond exactly with the fish described by Mr. Yarrell as *salmo ferox*, the great grey trout of Loch Awe." The account of *Salmo ferox* Jardine and Selby given by Day (1880-1884) indicates that this is a synonym for *Salmo trutta*.

There is no doubt that the fish with which Perley was concerned was actually a lake trout. He stated, for example, that it was found "... in all the large lakes of New Brunswick" and "... it is called by the lumberers the 'togue.'" Perley also listed *Salmo ferox* from many lakes that are known to contain *Salvelinus namaycush*.

According to the literature it has been reported to occur in the following waters:

Perley (1852)—St. Francis Lakes, which includes Glasier Lake; Matapediac, Cheputnecticook and St. Croix Grand lakes.

Perley also listed Loch Lomond and Miramichi Lake but Cox (1893, 1896b) cast considerable doubt on the occurrence of this species in these waters.

Cox (1893)—Lakes of the Saint John, Restigouche and Tobique river systems, Chamcook Lakes, Long (Lepreaux River) and States lakes.

In the same paper Cox commented on the absence of this trout from the Miramichi and Nepisiguit river systems.

In summary, the lake trout occurs in the headwaters of the Saint John, St. Croix and Restigouche rivers, and in some isolated lakes in southwestern New Brunswick but not in the Miramichi River system. Whether or not the lake trout is indigenous to Chamcook Lake is questionable (Smith, 1952b, p. 416).

COREGONIDAE—whitefishes

13. *Prosopium cylindraceum* (Pallas)—round whitefish, *whitefish*

COLLECTIONS: ROM. 45 (Restigouche River, Restigouche County, Grimmer Parish).

STATIONS: 5 (Baker Brook, Madawaska County, Baker Brook Parish).

Cox (1896a)—*Coregonus quadrilaterale* Richardson

Cox (1896a) reported the first record for this species in the province. He and W. M. McLean collected it in July, 1893.

The available evidence even today indicates that the round whitefish is restricted to the watersheds of the Saint John and Restigouche rivers in Madawaska County, western Restigouche County and northern Victoria County. This extends the range only to the Restigouche since Dr. Cox (1896b) gave the distribution of this species as "Madawaska and upper St. John."

In Madawaska County and vicinity this fish, rather than *Coregonus clupeaformis*, is known as the whitefish. It is also sometimes called "pointu blanc."

14. *Coregonus clupeaformis* Mitchill—lake whitefish, *gizzard fish*

COLLECTIONS: ROM. 3, 9, 42.⁶

STATIONS: Not collected.

Perley (1852)—*Coregonus albus*

Adams (1873)—*Coregonus sapidissimus*

Cox (1893)—*Coregonus clupeiformis*

Cox (1896a)—*Coregonus labradoricus* Richardson

The lake whitefish has been said to occur in the following waters: Madawaska River, St. Francis Lakes, Grand Lake (St. Croix system), lower Saint John River, in the harbour of Saint John, Darling's Lake near Hampton Ferry (Perley, 1852); Tobique Lakes (Adams, 1873) and upper Restigouche River (Cox, 1896b). Cox (1893) commented on the absence of this species from the Miramichi and Nepisiquit river systems.

A report of this species in Glasier Lake was ascribed to Kendall (1903) by Evermann and Goldsborough (1907). In an examination of Kendall (1903) no mention of Glasier Lake could be found.

In recording this species from Kerr Lake, Charlotte County, Smith (1952a) also provides the only published biological data for lake whitefish in this province.

⁶Following completion of this paper another specimen was provided by the Fisheries Research Board of Canada, St. Andrews, having been caught in a Dutch herring trawl in Long Reach, lower Saint John River (Lat. 45° 27'N., Long. 66° 09'W.) in 60 to 90 feet of water.

OSMERIDAE—smelts

15. *Osmerus mordax* (Mitchill)—American smelt

COLLECTIONS: ROM. 25, 30, 34a; NMC. 2, 11.

STATIONS: Not collected.

Adams (1873), when writing about the smelt, noted: "I carefully compared many specimens from land-locked lakes, open rivers, and the sea, but could not discover any distinctions, all agreeing with the *O. viridescens* of Lesueur, and *O. operlanus* of Artedi . . ." In the same account Adams implied that the smelt in Utopia Lake were landlocked.

The smelt, an anadromous species which aggregates in all the major rivers and their estuaries in winter, ascends freshwater streams to spawn in the spring. It is these aggregations that are fished commercially. The smelt is supposedly landlocked in many lakes. Huntsman (1922) recorded landlocked smelt in two lakes, Chamcook and Utopia.

ESOCIDAE—pikes

16. *Esox niger* LeSueur—chain pickerel

COLLECTIONS: ROM. 10, 13.

STATIONS: 18 (c), 18(g), 24.

Adams (1873)—*Esox reticulatus*Kendall (1895)—*Lucius reticulatus*

This is an introduced species in New Brunswick waters but the exact time and place of introduction has never been fully documented. Perley (1850) noted that ". . . no Pike or Pickerel have yet been found in any of the Rivers of New Brunswick. . . ." Perley (1852), although listing the family *Esocidae* as one of the members of his order of "soft-finned fishes," does not include *E. niger* in his list of New Brunswick forms. However, Adams (1873) implied that about 1863 this species was introduced into Maine, in the Grand Lake portion of the St. Croix River system. Kendall (1895), reporting on a collection of this species from the New Brunswick side of the St. Croix River immediately upriver from St. Stephen, apparently provided the first published record of this species for New Brunswick. This record was erroneously reported by Evermann and Goldsborough (1907) as ". . . small stream near Baring, New Brunswick. . . ." The town of Baring is actually in Maine. Also, Cox (1896a) erroneously attributed the first record of the occurrence of this species to Adams (1873). Cox misinterpreted Adams' concept of the faunal connections of Maine and New Brunswick to mean that any species found in Maine could be included for New Brunswick. Adams' list of fishes is not entitled *Fishes of New Brunswick*, but more likely refers to the area of Maine and New Brunswick,

since he also includes such species as *Salmo oquassa*, known to occur only in Maine. Although reported by Cox (1896b) as "Quite common on Lower St. John and its affluents" evidence of its origin in the Saint John River was not given until 1899 when Cox wrote ". . . twenty odd years ago, the Eastern Pickerel, *Esox reticulatus*, LeS., . . . made its appearance in the St. John, but inquiry revealed the fact that a few years before it had been artificially introduced into the Meduxnakik, a branch of the St. John."

The present range of this species is apparently restricted to the lower Saint John River system and the entire St. Croix River system. Catt (1949) noted that chain pickerel were abundant in Darling's Lake and the delta of the Hammond River.

CATOSTOMIDAE—suckers

17. *Catostomus commersoni* (Lacépède)—white sucker

COLLECTIONS: ROM. 1, 18, 27, 28*b*, 34*c*, 37, 40; NMC. 5, 12*b*, 13.

STATIONS: 1, 4, 5, 6(*a*), 6(*b*), 8, 10, 12(*a*), 12(*b*), 13(*a*), 13(*b*), 14, 16, 18(*a*), 18(*c*), 18(*e*), 18(*g*), 19(*a*), 19(*b*), 19(*c*), 20, 21, 24, 27, 28, 29, 31.

Perley (1852)—*Catostomus communis*

Gill (1865)—*Catostomus Bostoniensis* LeSueur

This species was included by Perley (1852) in the family *Cyprinidae*.

The available data would suggest that the white sucker is of general distribution in the province. Indeed the situation has probably not changed since Perley (1852) wrote—"This fish abounds in all the rivers and streams of New Brunswick."

Some rate of growth data for Charlotte County lakes was given by Smith (1952b).

18. *Catostomus catostomus* (Forster)—longnose sucker

COLLECTIONS: None.

STATIONS: 5, 6(*a*), 10, 12(*b*).

Adams (1873) reported the longnose sucker as *Catostomus longirostris*, but did not include it in his list of New Brunswick fishes.

Recent collections and literature records (Cox, 1896a; 1896b—"Mada-waska and Upper St. John") would suggest that the species is restricted to the upper Saint John River system. Although Cox (1899) implied that it did not occur in the Restigouche River system, more extensive collecting in cool or deep bodies of water, particularly in the north, should extend the known distribution to other watersheds.

The record of this species by Adams (1873) from "... the Sciff Lake stream of the eastern Schoodic chain of lakes. . .," although interpreted by Cox (1896a) as being in the St. Croix River system in York County, is open to question. The Sciff Lake mentioned may well have been in Maine. Therefore, the omission from the New Brunswick list by Adams (1873) may have been intentional rather than an oversight as suggested by Cox (1896a).

Adams (1873) and Cox (1896a) came in contact with specimens of a length of about 6 inches only. Cox inferred from this that in New Brunswick this species was not as large as in other parts of its range. However, specimens collected from Baker Brook (Station 5) were 11 to 15 inches in length, and are thus comparable to fish in other parts of the range.

CYPRINIDAE—minnows

The only paper concerned solely with this group of fishes in New Brunswick waters was that written by Cox (1901), entitled "Cyprinidae of eastern Canada." This paper, an outgrowth of his 1899 publication, deals extensively with the taxonomy and distribution of eight species.

19. *Notemigonus crysoleucas* (Mitchill)—golden shiner

COLLECTIONS: ROM. 37 (Petitcodiac River); NMC. 15 (Baie-Verte Road).

STATIONS: 18(*e*), 18(*g*), 19(*a*), 20, 31.

Perley (1852)—*Leuciscus chrysoleucas*

Evermann and Goldsborough (1907)—*Abramis crysoleucas* (Mitchill)

Adams (1873) listed a species, *Leucosomus Americanus* Storer, which probably should have been *Leuciscus Americanus* Storer, a synonym for the golden shiner.

The New Brunswick distribution of this species would appear to have resulted by invasion of major river systems from coastal areas. It is known to occur in the following river systems: St. Croix (Stations 18(*e*), 18(*g*), 19(*a*), 20), Digdeguash (Station 31), lower Saint John (Perley, 1852), Petitcodiac (Collection 37, White 1957) and Miramichi (Cox, 1893, 1896b). Its occurrence in the Restigouche River is suggested by Cox's (1899) record of it in the Matepedia River, a tributary of the lower Restigouche River. The species has also been reported to occur in Gibson Lake and Kerr Lake, Charlotte County (Smith, 1952b).

20. *Semotilus atromaculatus* (Mitchill)—creek chub

COLLECTIONS: ROM. 37, 41a; NMC. 6 (Brook at Fredericton).

STATIONS: 1, 6(a), 6(b), 12(a), 13(a), 15, 16, 18(d), 19(a),
19(b), 19(c), 20, 22, 25(b), 28, 29, 30, 31, 32.Perley (1852)—*Leuciscus cephalus*Cox (1893)—*Semotilus corporalis*

The nomenclature used by early writers for this and the following species was confused to the extreme owing to the similarity of the two species.

The creek chub is a wide-ranging species in New Brunswick, occurring in all major river systems north to and including the Miramichi (Smith, 1952b; White, 1957). Cox (1899) included the Cascapedia River system of Gaspé in the range and from this we may assume that the species occurs northward in New Brunswick to the Restigouche River system. Although there appear to be no positive records, Johansen (MS) reported the species from Papineau River, a tributary of the Nepisiguit.

21. *Semotilus corporalis* (Mitchill)—fallfish

COLLECTIONS: ROM. 1, 16, 17, 19, 21, 28b, 31.

STATIONS: 2, 6(a), 12(b), 16, 19(c), 20, 21, 26, 29, 31.

Perley (1852)—*Leuciscus pulchellus*; *Leuciscus argenteus*Adams (1873)—*Leuciscus nitidus* DeKayCox (1893)—“*Semotilus bullaris* Raf.”

In 1893 Cox erroneously reduced *Leuciscus argenteus* of Perley to the synonymy of *Semotilus atromaculatus* instead of to that of this species but corrected this error in 1896 (Cox, 1896a).

Although of common occurrence in some parts of the province as far north as the Miramichi system, it is not as widely distributed as *S. atromaculatus*. There are no records of its occurrence in the Petitcodiac, Nepisiguit or Restigouche river systems.

22. *Margariscus margarita* (Cope)—pearl dace

COLLECTIONS: None.

STATIONS: 4, 6(a), 6(b), 11, 13(a), 32.

Cox (1896a)—*Couesius plumbeus* AgassizCox (1921)—*Leuciscus rubrilateralis* Cox

The first report of this species in New Brunswick was given by Cox (1896a), but he erroneously used the name *Couesius plumbeus* Agassiz. Later, the same author (1921) described as a new species a separate

population of this form under the name *Leuciscus rubrilateralis* Cox. (For a more complete account of the nomenclature see Hubbs, 1926.)

The current distribution of the pearl dace in New Brunswick is virtually unknown. Recent work showed it to be present in the upper Saint John and Digdeguash rivers and it has also been reported from the Miramichi River system (White, 1958, pers. comm.).

As a result of the confused nomenclature, a survey of the early literature adds nothing to our knowledge of its distribution.

23. *Chrosomus eos* Cope—northern redbelly dace

COLLECTIONS: ROM. 18, 37; NMC. 9, 15.

STATIONS: 11, 12(a), 13(a), 14, 15, 16, 17, 19(a), 19(b), 20, 28, 29, 30, 31, 32.

Cox (1896a)—*Chrosomus erythrogaster* Agassiz

Cox (1896a) first reported the presence of this species in New Brunswick. The specimens were taken in "Clear Lake, Lepreaux." Specimens in the collection of the National Museum of Canada (Cat. No. NMC. 58-32, Clear Lake, Lepreau, Charlotte Co., Aug. 1895. Collector P. Cox) were examined. This collection is probably the one referred to by Cox (1896a, 1896b, 1899, 1901) who, however, located Clear Lake in Saint John County.

The northern redbelly dace has a somewhat spotty distribution in New Brunswick. It occurs in the Saint John River system as far north as Grand Falls, but not above; in the Meduxnekeag, Digdeguash, Magaguadavic and Petitcodiac rivers. It has been reported from the Miramichi River by McKenzie (in press). A single specimen was taken at Station 20, the only record for the St. Croix River system.

24. *Pfrille neogaea* (Cope)—finescale dace

COLLECTIONS: ROM. 6 (Stephenson's Pond near Saint John).

STATIONS: 6(a), 14, 15, 27, 28, 30.

Cox (1893)—*Phoxinus neogaeus* Cope

Evermann and Goldsborough (1907)—*Leuciscus neogaeus* (Cope)

This dace was first published as a part of the New Brunswick fauna by Cox (1893), although Cox (1896a) claimed to have reported it in 1888. No such report apparently exists.

This species has a limited and scattered distribution in the province. It has been reported to occur in the lower Saint John River system near Maugerville, Sunbury County; Dark, Waterworks and McDonald lakes, near Saint John; Garnett's Lake, near Loch Lomond and near Anagance, King's County (Cox, 1896a, 1899). It was collected in 1958 in the

Saint John River in Madawaska and York counties, and in the Maguadavic River. White (1958, pers. comm.) reports its occurrence in the Northwest Miramichi River.

25. *Couesius plumbeus* (Agassiz)—lake chub

COLLECTIONS: ROM. 18, 20, 21, 22, 24, 28*b*, 34*b*, 34*c*, 37, 40;
NMC. 12*a*, 14.

STATIONS: 4, 6(*a*), 6(*b*), 10, 12(*b*), 13(*a*), 19(*a*), 31.

The names used to describe this species and *Margariscus* were much confused by Dr. Cox and other writers of the period. Cox (1896*a*) used the name *Couesius prosthemi* Cope and later (1899) *Ceratichthys Plumbeus* Gunther, when referring to the lake chub. When Dr. Cox used the name *Couesius plumbeus* in his papers (1896*a*, 1896*b*, 1899, 1901, 1921) he was actually referring to *Margariscus margarita*, the pearl dace.

The lake chub is one of the most wide-ranging minnows in the province, but is perhaps more abundant in the northern parts of its range, although White (1943) noted that it was one of the most abundant and widespread species in the Petitcodiac system. The present distribution includes the Saint John River system from Madawaska County southward to the Meduxnekeag River, the upper St. Croix River system, miscellaneous watersheds in southern Charlotte County, Digdeguash, Petitcodiac and Miramichi rivers.

As in the case of *M. margarita*, the nomenclature of this species is so confused that a survey of the early literature adds little to our knowledge of its distribution; for example, Evermann and Goldsborough (1907) relied on the work of Cox for their distribution of *Couesius plumbeus*. However, they combined in this distribution localities given by Cox for both *Margariscus margarita* and *Couesius plumbeus*.

26. *Rhinichthys atratulus* Hermann—blacknose dace

COLLECTIONS: ROM. 1, 18, 27, 41*b*; NMC. 4*b*, 6.

STATIONS: 1, 2, 5, 6(*a*), 6(*b*), 7, 12(*b*), 13(*a*), 14, 15, 16, 17, 19(*a*),
19(*b*), 19(*c*), 20, 22, 23, 25(*b*), 26, 28, 29, 31, 32.

Perley (1852)—*Leuciscus atronasmus*

Cox (1896*b*)—"Rhinichthys atronasmus (Mitch.) Agassiz"

The blacknose dace appears to be the most wide ranging and most abundant of all freshwater fishes in New Brunswick, since it has been recorded from every major watershed. Records of occurrence for watersheds other than those covered by Collections and Stations (above) are as follows: Petitcodiac (White, 1943), Nepisiguit and Restigouche rivers (White, 1957).

27. *Notropis cornutus* (Mitchill)—common shiner

COLLECTIONS: ROM. 1, 18, 20, 28*b*, 32, 34*c*; NMC. 5 (Saint John River, Sunbury County).

STATIONS: 1, 2, 4, 6(*a*), 6(*b*), 12(*b*), 13(*a*), 14, 16, 17, 18(*e*), 19(*a*), 19(*b*), 22, 28, 29, 31.

Perley (1852)—*Leuciscus cornutus*

Adams (1873)—*Leuciscus cornutus* DeKay; *Leuciscus vittatus* DeKay

Cox (1893)—*Minnulus cornutus* Mitchill

The common shiner is widely distributed in New Brunswick waters, including the Saint John, St. Croix, Digdeguash, Magaguadavic, Napan and Miramichi river systems. Although records of occurrence are lacking for some watersheds, such as the Petitcodiac and Restigouche, intensive collecting should reveal its presence.

28. *Notropis heterolepis* Eigenmann and Eigenmann—blacknose shiner

COLLECTIONS: ROM. 35, 37; NMC. 3 (Harvey Station, York County).

STATIONS: 13(*a*), 16, 19(*a*), 19(*b*), 20, 31.

The blacknose shiner would appear to be of limited distribution in the province. Except for the Petitcodiac River record (Collection 37), it has been reported only from the waters of southwestern New Brunswick.

29. *Pimephales promelas* Rafinesque—fathead minnow

COLLECTIONS: None.

STATIONS: 6(*a*) (creek near Edmundston).

This is the first record for this species in New Brunswick waters. It was taken in the flood plain of a small creek between the Saint John River and Highway No. 2, 8 miles south of Edmundston, Madawaska County, St. Basil Parish. Two specimens only were taken (Cat. No. 19,705). Since the species was collected on this occasion only and was not previously recorded from the province, we must assume that it is rare.

ICTALURIDAE—bullheads

30. *Ictalurus nebulosus* (LeSueur)—brown bullhead, *horned pout*

COLLECTIONS: ROM. 24, 31.

STATIONS: 18(*a*), 18(*b*), 18(*c*).

Perley (1852)—*Pimelodus catus* Gill

Cox (1896*b*)—*Amiurus catus* Gill

Evermann and Goldsborough (1907)—“*Ameiurus nebulosus* (LeSueur)”; *Ameiurus lacustris* (Walbaum)

In an account of the brown bullhead, Perley (1852) noted “. . . found in all those ponds and streams where the yellow and white perch are taken . . .” Existing collections and literature references are available for only North Lake (St. Croix), Potter’s Lake (Smith, 1941), and the Miramichi River.

Mr. R. A. McKenzie has secured specimens from brackish water in the lower Miramichi River (pers. comm.).

ANGUILLIDAE—freshwater eels

31. *Anguilla rostrata* (LeSueur)—American eel

COLLECTIONS: ROM. 34c, 36; NMC. 4a (Glenwood Wharf, King’s County).

STATIONS: 16, 18 (f)⁷, 23, 33.

Perley (1852)—*Anguilla vulgaris*

Adams (1873)—“*Anguilla Bostoniensis*. Les.”; “*Anguilla tenuirostris*. DeKay”

Evermann and Goldsborough (1907)—*Anguilla chrysypa*
Rafinesque

The American eel is a catadromous species which probably enters all New Brunswick freshwaters which have a free access to the sea. That it does not occur in the Saint John River above Grand Falls has been known at least since Cox’s (1896b) publication.

An excellent account of the eel, including the standing crop in lakes in comparison with other species, movements, age, growth and observations of general biological interest has been given by Smith and Saunders (1955).

CYPRINODONTIDAE—killifishes

32. *Fundulus diaphanus* (LeSueur)—banded killifish, *minnow*

COLLECTIONS: ROM. 18, 24, 36, 37, 40; NMC. 1, 7, 16.

STATIONS: 13(a), 16, 17, 31.

The first New Brunswick specimens reported by Cox (1896a) were taken in French Lake, Sunbury County, Sheffield Parish.

Available data suggests that the banded killifish occurs in freshwaters south of a line drawn from the Miramichi River to the Meduxnekeag River on the Maine-New Brunswick border. Smith (1952b) noted that it was very common in Charlotte County lakes.

⁷Sight record only. One specimen caught by hook and line but escaped.

33. *Fundulus heteroclitus* (Linnaeus)—mummichog

COLLECTIONS: ROM. 24, 33.

STATIONS: 33 (St. Andrews).

Perley (1852)—*Fundulus fasciatus*Adams (1873)—“*Fundulus pisculentus* Val.”Cox (1896a)—*Fundulus nigrofasciatus* LeSueur; *Fundulus heteroclitus*

The mummichog is a marine species which is frequently found in the lower reaches of streams. Although not well represented in our collections, the species is generally distributed in the coastal waters of New Brunswick.

GADIDAE—cods

34. *Lota lota* (Linnaeus)—burbot, cusk

COLLECTIONS: ROM. 7, 14.

STATIONS: Not collected.

Perley (1852)—*Lota maculosa*Adams (1873)—*Lota maculosa* DeKayCox (1893)—*Lota maculosa* LeSueur

Although Perley (1852) noted that “Some hundreds are taken annually in the River Saint John, by night-lines . . .” there is a singular lack of interest in this species at the present time. While the distribution of this species probably closely parallels that of the lake trout or togue, because of this lack of interest few records exist and little is known of the extent of the range of the burbot in the province.

Burbot or cusk are known to occur in the following waters: Glasier, Baker and First Green lakes, Madawaska County (pers. comm. Dept. Fish. offr.); Saint John River (Collection 7); St. Croix River (Collection 15) and “Restigouche waters and Lake Utopia” (Cox, 1896b).

Cox (1893) has contrasted the absence of this species in the Miramichi and Nepisiguit river systems with the occurrence in the Saint John and Restigouche river systems.

35. *Microgadus tomcod* (Walbaum)—Atlantic tomcod

COLLECTIONS: ROM. 24 (Miramichi River).

STATIONS: Not collected.

Perley (1852)—*Morrhua pruinosa*Adams (1873)—*Gadus pruinus* MitchellCox (1893)—*Gadus tomcod* Walbaum

Although a marine species, the tomcod, or frostfish, frequently enters freshwater, ascending rivers to a point many miles from the sea.

Adams (1873) noted that he had “. . . occasionally seen individuals captured through the ice at a distance of ninety miles from the sea.”

Various authors have noted that the tomcod is common in the coastal waters of the region (Vladykov and McKenzie, 1935; Bigelow and Schroeder, 1953), although published records appear to be limited to “St. John Harbour and the St. Andrews region” (Bigelow and Schroeder, 1953), and lower Kennebecasis (Squires, 1950).

The occurrence of this species in freshwater, however, is not well documented, perhaps largely because when caught in river systems it is considered a not uncommon fish and, therefore, not reported. However, Carter (1958, pers. comm.) has noted that it occurs in the following rivers: Petitcodiac, Memramcook, Tantramar, Aulac, Missaquash, Scoudouc, Shemogue and Gaspereau.

SERRANIDAE—basses

36. *Roccus americanus* (Gmelin)—white perch

COLLECTIONS: ROM. 36 (Wheaton Lake, Charlotte County); NMC. 4a (Glenwood Wharf, King's County).

STATIONS: 18(a), 18(b), 18(c), 18(g) (North Lake, York County).

Perley (1852)—“*perca labrax nucronatus* of Cuvier”; “small American basse” or “white perch” (p. 22). *Labrax pallidus*; “The little white Basse,” “. . . white perch.” (p. 182)

Adams (1873)—*Morone Americana* Gill

The distribution of the white perch in New Brunswick, if well know, is not well documented. Except for records from the Miramichi River (McKenzie, in press) it seems to be restricted to the St. Croix River system, the Saint John River system from Fredericton southward and the intervening watersheds. Outside of this area, Johansen (MS) recorded it from Richibucto, Kent County.

Although generally considered to be a euryhaline species, Huntsman (1922) noted—“In the Bay of Fundy region this species seems to be entirely land-locked, occurring only in freshwater.”

37. *Roccus saxatilis* (Walbaum)—striped bass

COLLECTIONS: 29b (Miramichi River).

STATIONS: Not collected.

Perley (1852)—“*perca labrax*” (p. 22); “*Labrax Lineatus*” (p. 181)

Adams (1873)—“*Roccus Lineatus* Gill”

Cox (1896b)—“*Roccus lineatus* (Bloch) Gill”

Evermann and Goldsborough (1907) erroneously attributed to this species the distribution given by Cox (1896b) for *Roccus americanus*.

The distribution of the striped bass in New Brunswick is well known because it is highly regarded as a game species. Although basically a euryhaline fish, in New Brunswick its range appears to be primarily restricted to freshwater. Striped bass have been reported from the following localities:

Perley (1852)—Richibucto, Miramichi, Tabusintac, Tracadie and Pokemouche rivers.

Wilson (1958)—Saint John River watershed: Aroostook River, Beechwood Dam (below), Fredericton area, Grand Lake, Long Reach (Oak Point area), Nerepis River, Hammond River, Kennebecasis River, Grand Bay and Reversing Falls.

No reports of occurrence in the Nepisiguit or Restigouche rivers could be located.

According to Huntsman (1922) Atkins (1887, p. 700) noted that striped bass were formerly abundant in the St. Croix River. A search of the article in question failed to verify this comment. On the contrary, Atkins (*ibid.*, p. 695) wrote “. . . and at no time has this species been marketed in any considerable numbers from the Penobscot or any river farther east.” The St. Croix River is east of the Penobscot.

CENTRARCHIDAE—sunfishes

38. *Micropterus dolomieu* Lacépède—smallmouth bass

COLLECTIONS: None.

STATIONS: Not collected.

The smallmouth bass gained access to the St. Croix River system of New Brunswick as a result of plantings in Maine which commenced about 1870 (Smith, 1942). The history of the introduction of this species into the various waters of the province has been given by Smith (1942) and Catt (1949).

This bass has been reported to occur in the following localities:

Smith (1942)—St. Croix River system: Potter's Lake.

Catt (1949)—Saint John River system: Kennebecasis River, King's County; Spruce, Ashburn, Sunset, Shaw and Clark's lakes, Saint John County.

Bocabec River system: Wheaton Lake, Charlotte County.

Magaguadavic River system: Magaguadavic Lake, York County; Magaguadavic River, York and Charlotte counties; Utopia Lake, Charlotte County.

Miscellaneous Bay of Fundy drainages: Lockhart Lake, Albert County; Big Meadow Pond, Deer Island; Miller's Pond, Grand Manan.

Wilson (1958)—Saint John River system: Hammond River, King's County.

Bocabec River system: Wheaton Lake, Charlotte County.

Pers. comm.—St. Croix River system: Mud Lake, Chiputneticook Lakes, York County.

39. *Lepomis auritus* (Linnaeus)—yellowbelly sunfish

COLLECTIONS: ROM. 2, 4.

STATIONS: Not collected.

Cox (1924)—“*Eupomotis auritus* Lunn.”⁸

Cox (1896a and 1896b) reported “*Lepomis auritus* (Linn.) Raf.” based on a listing by Adams (1873) of “*Pomotis appendix* Mitch.” But *Pomotis appendix* is a synonym for the pumpkinseed, the common name applied to this fish by Adams. Cox, however, erroneously applied to this same species (*Pomotis appendix*) the common name “long-eared sun-fish” and, assuming that Adams meant *Lepomis auritus*, included New Brunswick in its range since it occurred in Maine. There is no reason to believe that Cox ever saw *Lepomis auritus* (Linnaeus); indeed, this is substantiated by a statement made by Cox and published by Halkett (1913). However, in 1924 Cox reported “*Eupomotis auritus*” and “*Apomotis cyanellus*” (see p. 73) from Yoho Lake, Oromocto drainage, York County. Specimens were said to be deposited in the collection of the New Brunswick Museum but efforts to locate these have been unsuccessful.

The first valid record of the yellowbelly sunfish in New Brunswick resulted from its capture in the Canaan River, nine miles north of Havelock, Queen’s County, September 3rd, 1948, by H. C. White (Cat. No. 13,883). The species was caught again by White in the Kennebecasis River, King’s County, on August 22nd, 1949. These are the only records of its occurrence in the province, although White (1958, pers. comm.) noted that abundant resident populations exist.

40. *Lepomis gibbosus* (Linnaeus)—pumpkinseed

COLLECTIONS: ROM. 19 (Bonaparte Lake, Charlotte County);
NMC. 4a (Glenwood Wharf, King’s County).

STATIONS: 18(b), 18(f), 18(g) (North Lake, York County).

Perley (1852)—*Pomotis vulgaris*

Evermann and Goldsborough (1907)—*Eupomotis gibbosus*

The pumpkinseed is restricted to southwestern New Brunswick, according to the following records:

St. Croix River drainage—(Station 18, Kendall (1895)).

Digdeguash River drainage—Bonaparte Lake, Charlotte County (Collection 19).

Reid (1930)—Charlotte County: Utopia Lake, Chamcook Lakes (see also Kurata, 1927).

York County, McAdam Parish: Snowshoe Lake.

⁸Linn. undoubtedly intended.

Smith (1952b)—Charlotte County: Welch, Johnson, Kerr, Limeburner, St. Patrick and Gibson lakes.

Smith and Saunders (1955)—Charlotte County: Potter's and Cook lakes.

The only comprehensive study on the biology of this species in New Brunswick is that of Reid (1930).

PERCIDAE—perches

41. *Perca flavescens* (Mitchill)—yellow perch

COLLECTIONS: ROM. 19 (Bonaparte Lake, Charlotte County); NMC. 4a, 10.

STATIONS: 4, 6(a), 18(c), 18(e), 18(f), 18(g), 24

Perley (1852, p. 82)—*perca fluviatilis*

Cox (1896b)—*Perca americanus* Schranck

The yellow perch, as noted by such early writers as Perley and Cox, has a widespread range in the province but, unfortunately, the number of river systems for which there are positive records is small. Literature records for various river systems are listed below:

Saint John River system: Glasier Lake (Evermann and Goldsborough, 1907), Stephenson's Pond (Smith, 1935–1937).

St. Croix River system: Lower St. Croix and associated waters (Kendall, 1895; Smith, 1941, 1952b; Smith and Saunders, 1955).

Miramichi River system: (McKenzie, in press; White, 1957).

COTTIDAE—sculpins

42. *Cottus cognatus* Richardson—slimy sculpin

COLLECTIONS: ROM. 7, 11, 17, 23.

STATIONS: 2, 9.

Cox (1896a)—“*Uranidea boleoides* Girard”; “*Uranidea formosa* Girard”⁹; “*U. gracilis* (Heckel) Putnam”

Cox (1896a) remarked that he first reported this species for New Brunswick in 1894. The locality for this report was Green River, Madawaska County. He also noted that he had collected it in the Restigouche River and in the lower Miramichi.

White (1943) noted that in the Petitcodiac River system it occurred “. . . only in three of the colder spring streams . . .”

It is obvious that the distribution records are few. There are records from the four corners of the province but with very few intervening ones. Although early reports suggest that it was not rare (Cox 1896a), present day evidence is in contrast to this.

⁹Hubbs (1920, p. 2) stated this record by Cox “. . . was probably based on a specimen of *Cottus gracilis*.”

GASTEROSTEIDAE—sticklebacks

43. *Pungitius pungitius* (Linnaeus)—ninespine stickleback

COLLECTIONS: ROM. 18, 29a, 34b, 37.

STATIONS: 1, 2, 6(a), 6(b), 7, 13(a), 14, 16, 19(a), 21, 28, 29, 30, 31, 32.

Adams (1873)—“*Gasterosteus occidentalis*. Brevort”; “*Pygosteus DeKayii*. Brevort”

Although distribution records for the nine-spine stickleback are concentrated in western New Brunswick, it is probably more widely distributed.

Our knowledge of its distribution is based on the following literature references (in addition to the collections and stations noted above):

Lakes in extreme southwestern New Brunswick: Crecy and Gibson lakes (Smith, 1952b); Chamcook Lake (Kurata, 1927); Cook's Lake (Smith and Saunders, 1955).

Saint John watershed: Stephenson's Pond (Smith, 1935–1937).

Miramichi watershed: Miramichi River (McKenzie, in press); Sevogle River (White, 1957); Bill's Lake (Smith and Saunders, 1955).

44. *Eucalia inconstans* (Kirtland)—brook stickleback

COLLECTIONS: None.

STATIONS: 28, 29 (Magaguadavic River).

Cox (1893, 1896a, 1896b)—“*Gasterosteus inconstans* Kirtland”

Cox (1896a) stated that this species was first reported for the province “. . . a few years ago by the writer.” No reference was given, but Cox (1893) stated in reference to this stickleback—“This species has its greatest distribution in the southern parts of the province, occurring but rarely in the north.” Except for these general statements no locality records have been given by any writers previous to 1950, although Cox (1896b) noted that it was not uncommon on the lower Saint John. Johansen's diaries record it from the Papineau River, 8 miles from Bathurst, and from the head of Scoudouc River, Westmorland County.

Recent records are few indeed. Reports for the Miramichi River have been given by White (1957). In an earlier paper White (1953) listed it as rare in the province.

45. *Gasterosteus aculeatus* Linnaeus—threespine stickleback

COLLECTIONS: ROM. 15, 34b, 37.

STATIONS: 1, 6(a), 6(b), 7, 8, 12(b), 27, 28, 29, 33.

Perley (1852)—“*Gasterosteus biaculeatus*”Cox (1896b)—*Gasterosteus aculeatus* Linnaeus = *Gasterosteus biaculeatus*

It is difficult to isolate literature references to this species because of the confusion in the nomenclature of *Gasterosteus aculeatus* and a form referred to as *Gasterosteus wheatlandi* Putnam.¹⁰

Distribution records other than those noted above are as follows:

Saint John watershed: Madawaska River and upper Saint John (Cox, 1896b); Tobique River (White, 1957); Kennebecasis Bay and Saint John Harbour (Huntsman, 1922).

Lakes in the St. Andrews area: Gibson and Crecy lakes (Smith, 1952b).

Petitcodiac watershed: Lower Pollett River (White, 1957).

Miramichi watershed: Southwest Miramichi, Renous and Cains rivers (White, 1957).

Restigouche River: (Cox, 1893; 1896b).

The threespine stickleback is, according to all available data, of general distribution in the province. This is to be expected considering that all the major rivers run directly to the sea, thus providing a means of access for this euryhaline species.

46. *Apeltes quadracus* (Mitchill)—fourspine stickleback

COLLECTIONS: ROM. 29a (Miramichi River); NMC. 8 (Quaco, Saint John County).

STATIONS: 16, 23.

This stickleback was first reported from New Brunswick by Cox (1896a), who noted that it was first collected in October, 1893, at the mouth of Little River, near Saint John.

In addition to the records noted above the species has been reported from the following localities: Kennebecasis estuary, Bay du Vin estuary, Napan estuary (Cox, 1923). In addition the following localities have been noted by Johansen (MS): mouth of Eel River (near Dalhousie); outlet of Little Black River, Kouchibouguac Bay; Richibucto Harbour inlet; Black River (at Chatham); creek near Belledune River; Tracadie Lagoon, Tracadie; Buctouche River at Buctouche.

The fourspine stickleback, primarily a marine or brackish water species, is occasionally found in freshwater. That it is primarily marine is obvious, since almost all our locality records are of a coastwise nature. This stickleback is generally included in lists of freshwater fishes on rather tenuous grounds but two specimens were taken at Station 16, Saint John River. This locality is approximately 100 miles from the sea and at least 50 miles from salt water, and is the farthest inland record known to the authors.

¹⁰No freshwater records of this species have been found.

SPECIES PREVIOUSLY REPORTED TO OCCUR IN NEW BRUNSWICK

The following species have at various times been reported to occur in the province. In all cases, however, it has not been possible to verify their occurrence and, consequently, they have been omitted from the annotated list. The reasons for this action are given for each species. It should be pointed out, however, that some of these species may appear at any time and with appropriate documentation become a valid part of the New Brunswick fish fauna.

Clupea harengus Linnaeus—Atlantic herring

Although included by Evermann and Goldsborough (1907) in a list of freshwater fishes, it is here considered to be solely a marine species and is not included.

Alosa aestivalis (Mitchill)—blueback

This species, sometimes recorded as *Pomolobus aestivalis*, was reported by Cox (1896a), Huntsman (1922) and Bigelow and Schroeder (1953). No positive records for the occurrence of this species in New Brunswick are known. Investigations currently being conducted by the Fisheries Research Board of Canada (St. Andrews Station) may clarify its status.

Dorosoma cepedianum (LeSueur)—gizzard shad

The gizzard shad does not occur in New Brunswick, although it has been reported by an anonymous writer (1909), Halkett, (1913), Hubbs and Lagler (1941) and Radforth (1944). The source for all of these is the anonymous article referred to above which appeared in the *Ottawa Naturalist* (1909) signed only with the initial "C". It seems much more likely that this article was written by Philip Cox rather than E. E. Prince, as noted by Vladykov (1945, p. 36). The statement ". . . it is a native Canadian fish, and was recorded by the late Edward Jack on the St. John River, at Fredericton, N.B. . . ." is more likely to have come from Cox, a resident of New Brunswick. Vladykov (1945) and Miller (1957) have both drawn attention to this erroneous extension of range.

It should be noted that this confusion probably arose since the lake whitefish, *Coregonus clupeaformis*, is commonly referred to in New Brunswick as the "gizzard fish".

Erimyzon oblongus (Mitchill)—creek chubsucker

Adams (1873) listed a species, *Moxostomus oblongus* Ayres, presumably in reference to this form. Cox (1896a) repeated Adams listing but in (1896b) he listed "*Moxostomus oblongus* (Gunther) Adams," as a synonym for "*Erimyzon sucetta* Jordan." The species was said to occur rarely in the small tributaries of the lower Saint John River.

Halkett (1913) noted that Cox, not having seen the species for thirty years, considered it to have been eradicated by *Esox niger*. However, since no one has professed, even since that time, to have seen a specimen, it seems highly unlikely that it ever occurred in New Brunswick, although it does occur in Maine, but only in the Androscoggin river drainage and the area south of this (Everhart, pers. comm., 1958).

Rhinichthys cataractae (Valenciennes)—longnose dace

The longnose dace was reported to be of general distribution in New Brunswick by Cox (1899, 1905) and these reports were repeated by Evermann and Goldsborough (1907) and Halkett (1913). Thus, although often reported, its occurrence has not been verified by specimens. Everhart (pers. comm., 1958) stated that it occurs in Maine only in the southwestern quarter.

Roccus chrysops (Rafinesque)—white bass

This species was first reported by Adams (1873) as *Labrax albidus* DeKay and subsequently repeated by Cox (1896a, 1896b) as *L. albidus* and *Roccus chrysops*. This report was based on two specimens seen only by Adams. Halkett (1913) noted that Cox considered the record to be "open to question". Since the white bass is not indigenous to the Atlantic coastal region, the specimens described by Adams could not have been *Roccus chrysops*.

Lepomis cyanellus Rafinesque—green sunfish

The green sunfish was reported from Yoho Lake, York County, by Cox (1924) as *Apomotis cyanellus*. He specifically noted that it was rare and that he had not deposited specimens in a museum collection.

The green sunfish is not indigenous to the Atlantic coastal region and its occurrence in New Brunswick then, or now, would be most unlikely.

Stizostedion canadense (Smith)—sauger

The sauger was listed by White (1953) and Scott (1954) as a result of the statement of range by Hubbs and Lagler (1941, 1947), which included New Brunswick. No valid records that would substantiate these reports are known to the authors. Rostlund (1952) reviewed the eastern distribution and noted that it occurs nowhere in the Atlantic coastal drainage.

Stizostedion vitreum (Mitchill)—yellow walleye

New Brunswick was included in the range of the yellow walleye by Radforth (1944) and Scott (1954) as a result of an erroneous range statement by Hubbs and Lagler (1941, 1947) ". . . to Labrador; southward on the Atlantic slope to North Carolina." There are no valid records of occurrence for this walleye in New Brunswick.

Cottus bairdi Girard—mottled sculpin

This species was erroneously reported to occur in New Brunswick by Scott (1958, p. 24). The specimen on which the report was based has been re-examined and found to be a typical example of *Cottus cognatus*. Although reported to occur in the province by various authors (Cox, 1896a, 1896b, 1899; Evermann and Goldsborough, 1907; Halkett, 1913; Hubbs, 1920 and Hubbs and Lagler, 1947) and under various names, the present authors were unable to locate specimens of this sculpin from New Brunswick. All specimens examined to date have proved to be *Cottus cognatus*.

Thus, although valid records of its occurrence in the province may be found in the future, at the present time there appears to be no fishes, would welcome the opportunity to house such material.

DISCUSSION

One result of the present work is an indication that most information on freshwater fishes is available for areas in which the Fisheries Research Board has been active. These areas are either coastal or directly associated with commercial fisheries. For almost every species the distribution is apparently discontinuous as a result of localized rather than province-wide collections. For example, the fishes of Charlotte County are well known but except for the Miramichi River system and the 1958 collections, those of the whole region north of Fredericton are practically unknown. A more complete understanding of the distribution is dependent upon the study of collections from the following counties: Restigouche, Gloucester, Kent, Westmorland, Albert, Saint John and the north east portions of Victoria, Carleton and York.

While sufficient numbers of preserved specimens are on hand for preliminary systematic studies of more than half the known species, the following fishes are insufficiently represented in any collection: *Petromyzon marinus*, *Acipenser oxyrhynchus*, *A. brevirostrum*, *Alosa pseudoharengus*, *Salvelinus namaycush*, *Prosopium cylindraceum*, *Coregonus clupeaformis*, *Osmerus mordax*, *Esox niger*, *Catostomus catostomus*, *Margariscus margarita*, *Pfritille neogaea*, *Pimephales promelas*, *Anguilla rostrata*, *Lota lota*, *Roccus saxatilis*, *Lepomis auritus*, *L. gibbosus*, *Cottus cognatus*, *Eucalia inconstans*, *Apeltes quadracus*. It should be noted that of the twenty-one species listed above, eight are anadromous forms.

Of the truly native freshwater fishes some are known only by single or widely scattered records. The distribution of such forms can be adequately studied only after the results of more intensive collecting are made known. Species falling in this category can be easily determined by consulting the annotated list. It is hoped this list will

serve as a guide in acquiring the additional locality records which will make it possible to describe the complete distribution of the various species. Locality records, to be fully acceptable, must be substantiated by preserved specimens.

Collections of fishes are of value not only for such directly associated subjects as zoogeography, evolution, comparative systematics and general fisheries science, but can also aid in an understanding of post-glacial geological changes. In order to be available for study, preserved fishes should be deposited in the research collection of some recognized institution equipped to maintain them. The Royal Ontario Museum, which has taken a special interest in Canadian freshwater fishes and which has at present the largest collection of New Brunswick fishes, would welcome the opportunity to house such material.

ACKNOWLEDGEMENTS

A publication of the scope of this one, being essentially a compilation, is dependent upon the co-operation of a large number of organizations and individuals. It is with sincere pleasure that we extend our thanks to the National Museum of Canada and the Department of Fisheries, Ottawa; Fisheries Research Board of Canada Biological Station, St. Andrews, and the New Brunswick Department of Lands and Mines, whose willing co-operation made this paper possible.

We are grateful to the many persons who so kindly returned, with comments, the provisional list of New Brunswick freshwater fishes.

We owe a particular debt of gratitude to the many people who assisted immeasurably in the field and in the preparation of the paper by providing information, accommodation, specimens and various equipment, such as maps, canoes and motors. In this respect we wish to extend special thanks to the following individuals: D. Alderdice, Charles Atkinson, F. A. Beairsto, Brian Carter, James Catt, L. R. Day, W. Harry Everhart, A. G. Huntsman, E. A. Lachner, A. H. Leim, D. E. McAllister, R. A. McKenzie, Henry Paillaird, A. L. Pritchard, W. F. Saunders, George B. Smith, M. W. Smith, W. A. Squires, J. L. St. Cyr, G. A. C. Wilson, H. C. White.

Figures 1 and 2 were drawn by J. G. Sweet.

LITERATURE CITED

ANONYMOUS

1909 Review: Fishes of Ontario. *Ottawa Nat.*, vol. 22, no. 11, pp. 251-254.

ADAMS, A. L.

1873 Field and forest rambles with notes and observations on the natural history of eastern Canada. London, King & Co., 1873, pp. 1-333.

ATKINS, C. G.

1887 The river fisheries of Maine. *In* The fisheries and fishery industries of the United States. Edit. by G. B. Goode; U.S. Comm. Fish and Fish., sect. 5, vol. 1, pp. 673-728.

- ATKINSON, W. C.
1844 A historical and statistical account of New Brunswick, with advice to emigrants. Edinburgh.
- BIGELOW, H. B. AND W. C. SCHROEDER
1953 Fishes of the Gulf of Maine. U.S. Dept. Int., Fish and Wildlife Serv. Fish. Bull. 74, pp. 1-577.
- CATT, JAMES
1949 Small-mouthed black bass in the waters of New Brunswick and Nova Scotia. Can. Fish Cult., vol. 4, no. 5, pp. 15-18.
1950a Some notes on brown trout with particular reference to their status in New Brunswick and Nova Scotia. Can. Fish Cult., vol. 7, pp. 25-27.
1950b *Salvelinus alpinus* in Walton Lake, New Brunswick. Can. Field-Nat., vol. 64, no. 5, p. 189.
- CATT, J. AND A. W. H. NEEDLER
1946 Restoration of an abundant trout population by poisoning introduced yellow perch and restocking. Can. Fish Cult., vol. 1, no. 1, pp. 9-12.
- COX, PHILIP
1893 Observations on the distribution and habits of some New Brunswick fishes. Bull. Nat. Hist. Assoc., N.B., no. 11, pp. 33-42.
1896a History and present state of the Ichthyology of New Brunswick. Bull. Nat. Hist. Soc. N.B., no. 13, pp. 27-61.
1896b Catalogue of the marine and freshwater fishes of New Brunswick. Bull. Nat. Hist. Soc. N.B., no. 13, pp. 62-75.
1899 Freshwater fishes and batrachia of the Peninsula of Gaspé, P.Q. and their distribution in the Maritime Provinces of Canada. Trans. Roy. Soc. Can., ser. 2, vol. 5, no. 4, pp. 141-151.
1901 *Cyprinidae* of eastern Canada. Proc. Nat. Hist. Assoc. of Miramichi, no. 2, pp. 36-45.
1905 Extension of the list of New Brunswick fishes. Proc. Miramichi Nat. Hist. Assoc., no. 4, pp. 41-44. Chatham, New Brunswick.
1921 A cyprinid new to science. Can. Field-Nat., vol. 35, pp. 66-67.
1923 Regional variation of the four-spined stickleback, *Apeltes quadracus* Mitchill. Can. Field-Nat., vol. 37, no. 8, pp. 146-147.
1924 New and rare records of certain freshwater fishes in Canada. Can. Field-Nat., vol. 38, no. 5, pp. 85-86.
- DAY, FRANCIS
1880-1884 The fishes of Great Britain and Ireland. Vol. 2, pp. 1-338, Williams and Northgate, London.
- DENYS, NICHOLAS
1672 L'Histoire naturelle de l'Amerique Septentrionale. Paris.
- DYMOND, J. R.
1955 Introduction of foreign fishes in Canada. Proc. Int. Assoc. Theor. App. Limn., vol. 12, pp. 543-553.
- EVERHART, W. H.
1950 Fishes of Maine. Dept. of Inland Fish and Game, pp. 1-53.
- EVERMANN, B. W. AND E. L. GOLDSBOROUGH
1907 A check list of the freshwater fishes of Canada. Proc. Biol. Soc. Wash., vol. 20, pp. 89-120.
- GESNER, A.
1847 New Brunswick. London.
- GILL, T. N.
1865 Synopsis of the fishes of the Gulf of St. Lawrence and Bay of Fundy. Can. Nat., vol. 2, pp. 244-266.

GILPIN, BERNARD

1866 On the food fishes of Nova Scotia. Trans. N.S. Inst. Nat. Sci., vol. 4, pp. 76-91.

HALKETT, ANDREW

1913 Check list of the fishes of the Dominion of Canada and Newfoundland. Ottawa, pp. 1-138.

HUBBS, C. L.

1920 Further notes on the cottoid fishes of the Great Lakes. Copeia, no. 77, Jan. 1920, pp. 1-3.

1926 A check list of the fishes of the Great Lakes and tributary waters, with nomenclatorial notes and analytical keys. Univ. Mich. Mus. Zool. Misc. Pub., no. 15, pp. 1-77.

HUBBS, C. L. AND K. F. LAGLER

1941 Guide to the fishes of the Great Lakes and tributary waters. Cranbrook Inst. Sci., Bull. no. 18, pp. 1-100.

1947 Fishes of the Great Lakes region. Cranbrook Inst. Sci., Bull. no. 26, pp. 1-186.

HUNTSMAN, A. G.

1922 The fishes of the Bay of Fundy. Contrib. Can. Biol., no. 3 (1921), pp. 49-72.

HUNTSMAN, A. G. AND J. R. DYMOND

1940 Pacific salmon not established in Atlantic waters. Sci., vol. 91, no. 2367, pp. 447-449.

JOHANSEN, F.

MS Unpublished diaries and manuscripts. R.O.M. Dept. Ich. and Herp. files, circa 1920-1926.

KENDALL, W. C.

1895 Notes on the fresh-water fishes of Washington County, Maine. Bull. U.S. Fish Comm., vol. 14 (for 1894), art. 7, pp. 43-54.

1903 Notes on some fresh water fishes from Maine. Bull. U.S. Fish Comm., vol. 22 (1902-1903), pp. 353-368.

KURATA, T. B.

1927 Fishes collected in Chamcook Lake, New Brunswick. Can. Field-Nat., vol. 41, p. 202.

LAMONTHE-CADILLAC, M.

1855 Extracts from the memoirs of M. Lamonthe-Cadillac respecting Acadia, New England, New Netherland and Virginia. N.Y. Hist. Coll. 1855, vol. 9, pp. 546-550.

LEIM, A. H.

1924 The life history of the shad (*Alosa sapidissima* (Wilson)) with special reference to the factors limiting its abundance. Contrib. Can. Biol. n.s., vol. 2, no. 1, pp. 163-284.

MCKENZIE, R. A.

1959 Fishes of the Miramichi River (in press).

MILLER, R. R.

1957 Origin and dispersal of the alewife, *Alosa pseudoharengus* and the gizzard shad, *Dorosoma cepedianum* in the Great Lakes. Trans. Amer. Fish. Soc., vol. 86 (1956), pp. 97-111.

PERLEY, M. H.

1850 Report on the sea and river fisheries of New Brunswick, within the Gulf of St. Lawrence and Bay of Chaleur. Queen's Printer, Fredericton, pp. 1-137.

1852 Reports on the sea and river fisheries of New Brunswick. Queen's Printer, Fredericton, pp. 1-294.

- 1859 Report on the fisheries of the Gulf of St. Lawrence. Can. Nat. and Geol., vol. 4, art. 4 and 6.
- RADFORTH, ISOBEL
1944 Some considerations on the distribution of fishes in Ontario. Contrib. Roy. Ont. Mus. Zool., no. 25, pp. 1-116.
- REID, HELEN
1930 A study of *Eupomotis gibbosus* (L.) as occurring in Chamcook Lake, New Brunswick. Contrib. Biol. and Fish., vol. 5, no. 16, pp. 457-466.
- RODD, J. A.
1930 Unproductive waters made productive. Trans. Amer. Fish. Soc., vol. 60, pp. 116-118.
- ROSTLUND, ERHARD
1952 Freshwater fish and fishing in native North America. Univ. Calif. Pub. Geog., vol. 9, pp. 1-313.
- SCOTT, W. B.
1954 Freshwater fishes of eastern Canada. Univ. Toronto Press, pp. 1-128.
1958 A checklist of the freshwater fishes of Canada and Alaska. Roy. Ont. Mus. Div. Zool. Paleo., pp. 1-30.
- SMITH, M. W.
1935-1937 Stephenson's Pond near Loch Lomond, New Brunswick. Fish. Res. Bd. Can. MS. Repts., Biol. Sta. (Atlantic), no. 346, pp. 1-9.
1941 Treatment of Potter's Lake, New Brunswick, with rotenone. Trans. Amer. Fish. Soc., vol. 70 (1940), pp. 347-355.
1942 The smallmouth black bass in the maritime provinces. Fish. Res. Bd. Can. Prog. Repts. (Atlantic), no. 32 (note no. 86), pp. 3-4.
1947 Food of killifish and white perch in relation to supply. J. Fish. Res. Bd. Can., vol. 7, no. 1, pp. 22-34.
1952a The lake whitefish in Kerr Lake, New Brunswick. J. Fish. Res. Bd. Can., vol. 8, no. 5, pp. 340-346.
1952b Limnology and trout angling in Charlotte County Lakes, New Brunswick. J. Fish. Res. Bd. Can., vol. 8, no. 6, pp. 383-452.
- SMITH, M. W. AND J. W. SAUNDERS
1955 The American eel in certain fresh waters of the maritime provinces of Canada. J. Fish. Res. Bd. Can., vol. 12, no. 2, pp. 238-269.
- SQUIRES, W. A.
1950 New Brunswick fauna: the freshwater fishes. MS., pp. 1-10.
- STORER, H. R.
1850 Observations on the fishes of Nova Scotia and Labrador, with descriptions of new species. Boston J. Nat. Hist., vol. VI, pp. 247-270.
- VLADYKOV, V. D.
1945 Trois poissons nouveaux pour la province de Quebec. Naturaliste Canadien, vol. 73, nos. 1 & 2, pp. 27-39.
1954 Taxonomic characters of the eastern North America chars (*Salvelinus* and *Cristivomer*). J. Fish. Res. Bd. Can., vol. 11, no. 6, pp. 904-932.
1935 The marine fishes of Nova Scotia. Proc. N.S. Inst. Sci., vol. 19, pt. 1, pp. 1-113.
- WHITE, H. C.
1941 Migrating behaviour of sea-running *Salvelinus fontinalis*. J. Fish. Res. Bd. Can., vol. 5, no. 3, pp. 258-264.

- 1942 Sea life of the brook trout (*Salvelinus fontinalis*). J. Fish. Res. Bd. Can., vol. 5, no. 6, pp. 471-473.
- 1943 Fishes of the Petitcodiac River. Fish. Res. Bd. Can., Atlantic salmon and trout invest., Atlantic Biol. Sta. app. 28, pp. 1-38.
- 1953 The eastern belted kingfisher in the Maritime Provinces. Fish. Res. Bd. Can., Bull. no. 97, pp. 1-44.
- 1957 Food and natural history of mergansers on salmon waters in the maritime provinces of Canada. Fish. Res. Bd. Can., Bull. no. 116, pp. 1-63.
- WILSON, G. A. C.
1958 Maritime sport fisheries (a compilation of information revised to June, 1958). Dept. Fish., Fish Cult. Br. MS., pp. 1-10.
- YARRELL, W.
1836 A history of British fishes. Vol. 2, van Voorst, London, pp. 1-472.

APPENDIX

TABLE 2. List, by watersheds, of collections of freshwater fishes made in New Brunswick in May and June 1958 and the species recorded from each. Collectors in all cases were W. B. Scott and E. J. Crossman. Gear, except where noted in habitat column, consisted of 20 foot seine, hand seine, and dip net.

Station No.	Location	County and parish	Field No.	Date 1958	Habitat	Species
SAINT JOHN RIVER WATERSHED						
1	Small bay and inlet stream to Madawaska River, at No. 2 Hwy., 3 mi. from N.B.—Que. border	MADAWASKA St. Jacques	NB58-1	May 21	Water clear, brownish; bottom muddy; depth 4½ feet, width 50 feet	10, 17, 20, 26, 27, 43, 45
2	Saint John River at mouth of Grew Brook 4 mi. W. of Connors, N.B.	MADAWASKA St. Francois	NB58-2	May 21	Water clear, swift; bottom hard mud and boulders; depth 3 feet	10, 21, 26, 27, 42, 43
3	Baker Brook, 8 mi. above Baker Brook, N.B.	MADAWASKA Baker Brook	NB58-3	May 22	Water clear, moderately swift; bottom rocky; depth 6 feet, width 30-50 feet (Angled)	10
4	Culvert joining Baker Lake and a large overflow pond at S. end of Baker Lake at Baker Lake, N.B.	MADAWASKA Baker Lake	NB58-4	May 22	Water clear, little current; bottom mud and rocks; culvert 8 feet wide, 2 feet deep	17, 22, 25, 27, 41
5	Baker Brook, 4 mi. above Baker Brook, N.B.	MADAWASKA Baker Brook	NB58-5	May 22	Water clear, swift; bottom rocky, hard sand and mud	10, 13, 17, 18, 26
6(a)	Flood plain of creek between Saint John River and Hwy. No. 2, 8 mi. S. of Edmundston, N.B.	MADAWASKA St. Basil	NB58-6	May 23	Water deep brown, visibility 10-15 inches; bottom hard earth and sand, flooded area 50 feet wide, max. of 3 feet deep	17, 18, 20, 21, 22, 24, 25, 26, 27, 29, 41, 43, 45
6(b)	Same creek above flooded area	MADAWASKA St. Basil	NB58-7	May 23	Water deep brown, visibility 12-15 inches; bottom hard mud; creek 10 feet wide, 4 feet deep	17, 20, 22, 25, 26, 27, 43, 45
7	Green River at No. 2 Hwy.	MADAWASKA Riviere Verte	NB58-8	May 23	Water clear; bottom gravel and rubble, current rapid; stream 50-60 feet wide, taken 2 to 3 feet from shore in 0-6 feet of water	10, 26, 43, 45
8	Quisibis River, 4 mi. N. of Quisibis, N.B.	MADAWASKA Ste. Anne	NB58-9	May 23	Water clear; bottom gravel and rubble, current swift, taken 6 feet from shore in 0-5 feet of water	10, 17, 45
9	Siegas River, 6 mi. N. of Ste. Anne de Madawaska, N.B.	MADAWASKA Ste. Anne	NB58-10	May 23	Water clear, swift; bottom rubble, taken 6 feet from shore in about 2 feet of water	10, 42
10	Small stream at No. 2 Hwy. at town of L'Eglise, 2 mi. S.E. of St. Leonard, N.B.	MADAWASKA St. Leonard	NB58-11	May 24	Water clear to brownish, placid; bottom silt, taken 0-2 feet from shore in 0-2 feet of water; stream 25-30 feet wide and 6 feet deep	17, 18, 25
11	Bog pond and inlet stream at No. 2 Hwy., 2 mi. S. of Grand Falls, N.B.	VICTORIA Grand Falls	NB58-12	May 24	Water clear and brownish; fish taken 0-50 feet from shore in 0-4 feet of water	10, 22, 23

TABLE 2 (cont'd)

Station No.	Location	County and parish	Field No.	Date 1958	Habitat	Species
SAINT JOHN RIVER WATERSHED (cont'd)						
12(a)	Roadside pools and extensive flooded land — apparently not connected with Saint John River, 2 mi. S. of Perth, N.B.	VICTORIA Perth	NB58-13	May 24	Water clear, brownish; bottom silt and grass, no current. Fish taken 0-10 feet from shore in 0-15 inches; water maximum depth approx. 5 feet	17, 20, 23
12(b)	Same location, opposite side of Hwy. No. 2, extensive pools that might be permanent, open connection to Saint John River	VICTORIA Perth	NB58-14	May 24	Water clear, brownish; bottom silt and detritus; no current. Fish taken 0-10 feet from shore in 0-15 inches water. Maximum depth approx. 5 feet	17, 18, 21, 25, 26, 27, 45
13(a)	Isolated flood pools of Meduxnekeag River just E. of Maine border. Pools isolated for about 3 weeks. Had been connected to river	CARLETON Wakefield	NB58-15	May 25	Water clear brownish; polluted, no current; bottom sand, width 6-15 feet; depth to 1 foot	17, 20, 22, 23, 25, 26, 27, 28, 32, 43
13(b)	Meduxnekeag River immediately below Jackson's Falls, just E. of Maine border. Confluence of main branch and North Branch of Meduxnekeag River	CARLETON Wakefield	NB58-16	May 25	Water clear, brownish, polluted; bottom rocks and gravel; river 100-150 feet wide, swift; fish taken at shore in 2 feet of water	17
14	Dead Brook, culvert at No. 26 Hwy. 3 mi. S.W. of Canterbury Station, N.B.	YORK Canterbury	NB58-27	May 28	Water clear, brownish, polluted; moderate current, bottom silt, boulders and trash. Stream 10 feet wide, 2 feet deep	10, 17, 23, 24, 26, 27, 43
15	Small brook, 4½ mi. S.W. of Canterbury Station, culvert at Hwy. No. 26	YORK Canterbury	NB58-28	May 28	Water clear; bottom gravel and mud; stream 3 feet wide, 18 inches deep	20, 23, 24, 26
16	Mouth of Garden's Brook and Saint John River at No. 2 Hwy. 6 mi. S.E. of Prince William, P.O.	YORK Prince William	NB58-32	May 30	Water clear, brownish; bottom rubble gravel; current moderate. Fish taken at shoreline in 0-4 feet water	17, 20, 21, 23, 26, 27, 28, 31, 32, 43, 46
17	Garden's Brook at No. 3 Hwy. 8 mi. S. of junction of No. 2 and No. 3 Hwys.	YORK Manners-Sutton	NB58-33	May 30	Water clear, brownish; moderate current, bottom rubble; stream 6 feet wide, 2½ feet deep	10, 23, 26, 27, 32
ST. CROIX RIVER WATERSHED						
18(a)	North Lake, 200 yds. beyond N.B. Dept. Lands and Mines Cache	YORK North Lake	NB58-17	May 25-26	Water clear; no current; bottom muddy. Fish taken in 3-12 feet of water, 200 yards from floodline of lake; gill net	17, 30, 36
18(b)	North Lake narrows at bridge of No. 26 Hwy. E. of N.B. Dept. Lands and Mines Cache		NB58-21	May 26	As above; fish taken 0-3 feet from shore in 4 feet of water. Angled	30, 36, 40
18(c)	North Lake, 100 yds. off bridge of No. 26 Hwy.		NB58-22	May 26-27	As above; fish taken 0-50 feet from shore in 0-12 feet of water. Gill net	16, 17, 30, 36, 41

TABLE 2 (cont'd)

Station No.	Location	County and parish	Field No.	Date 1958	Habitat	Species
ST. CROIX RIVER WATERSHED (cont'd)						
18(d)	North Lake, mouth of small inlet stream $\frac{1}{2}$ mi. S.W. of N.B. Dept. Lands and Mines Cache		NB58-23	May 27	Water clear; slight current; bottom submerged grasses; 0-3 feet from shore, 0-1 foot deep	20
18(e)	North Lake, mouth of Hay Brook		NB58-24	May 27	Water clear; little current; bottom submerged grasses; flooded land, 3 feet from shore, 0-2 feet deep	17, 19, 27, 41
18(f)	North Lake, bridge at No. 26 Hwy.		NB58-25	May 27	Water clear, brownish; slight current; bottom stones and silt; 6 feet from shore, 0-5 feet deep. Angled	31*, 40, 41
18(g)	North Lake, mouth of Hay Brook		NB58-26	May 27-28	Water clear, brownish; bottom silt; 0-50 feet from shore, 0-7 feet deep. Gill net	16, 17, 19, 36, 40, 41
19(a)	Palfrey Brook, outlet of Grassy and Skiff Lakes, 11 mi. S. of Canterbury Station, N.B. in culvert and 20 ft. off	YORK Canterbury	NB58-18	May 26	Water clear, brownish; bottom gravel and silt. Fish taken in culvert and up to 20 feet away in 0-5 feet of water	10, 17, 19, 20, 23, 25, 26, 27, 28, 43
19(b)	Palfrey Brook 12 mi. S. of Canterbury Station on Stage Road		NB58-19	May 26	Water clear, slight brown tint; moderate current. Fish taken 0-3 feet from shore in 0-2 feet of water	17, 20, 23, 26, 27, 28
19(c)	Palfrey Brook, at culvert of Stage Road at North Lake and Canterbury Parish border	YORK North Lake- Canterbury	NB58-20	May 26	Water clear; moderate current; bottom gravel and rubble, 0-30 feet from shore. 0-1 foot deep	17, 20, 21, 26
20	Small creek draining Mud Lake into Skiff Lake at No. 26 Hwy.	YORK Canterbury	NB58-29	May 28	Water clear; moderate current; bottom boulders and gravel; stream 6 feet wide, 2 feet deep	17, 19, 20, 21, 23, 26, 27, 28
21	Skiff Lake at No. 26 Hwy.	YORK Canterbury	NB58-31	May 29	Water clear; no current; bottom gravel and rubble. Fish taken 0-15 feet from shore in 0-3 feet of water	17, 21, 43
22	Dennis Stream 2 mi. S. of Moores Mills, N.B.	CHARLOTTE St. Stephen	NB58-40	June 1	Water clear, brown tint; moderate current; bottom gravel and rubble. Fish taken 0-3 feet from shore in 0-2 feet of water	10, 20, 26, 27
23	Gallop Stream head of Oak Bay, culvert at No. 1 Hwy.	CHARLOTTE St. David	NB58-41	June 2	Water clear, brownish; moderate current; bottom rocky and gravel; Stream 20 feet wide, 3 feet deep	10, 26, 31, 46

*Site record only; angled and lost.

TABLE 2 (cont'd)

Station No.	Location	County and parish	Field No.	Date 1958	Habitat	Species
ST. CROIX RIVER WATERSHED (cont'd)						
24	Moore's Mills Lake, $\frac{1}{2}$ mi. S. of Moore's Mills, N.B.	CHARLOTTE St. David	NB58-42	June 1-2	Water clear, but brown; no current; rocky and silted. Fish taken 0-50 feet from shore in 0-6 feet of water. Gill net	4, 16, 17, 41
25(a)	Stream flowing into Canoose Lake from S.E. portion	CHARLOTTE St. James	NB58-44	June 3	Water clear; slight current; bottom boulders, silt, and vegetation; stream 5 feet wide, 2 feet deep	10
25(b)	Branch of stream above		NB58-45	June 3	As above; only 18 feet wide, 3 feet deep. Current sluggish	20, 26
26	Canoose River, outlet of Canoose Lake, at road crossing south of lake	CHARLOTTE St. James	NB58-46	June 3	Water clear, brownish; moderate to swift current; bottom rocky. Fish taken 0-8 feet from shore in 0-2 feet of water	21, 26
MAGAGUADAVIC RIVER WATERSHED						
27	North-east Magaguadavic River, at junction of Hwys. 3 and 4, at York Mills, N.B.	YORK Manners-Sutton	NB58-34	May 30	Water clear, brownish; swift to moderate current; bottom rocky with gravel; stream 20 feet wide, 3 feet deep	17, 24, 45
28	Brook and Beaver Pond at Hwy. No. 3, 5 mi. S. of junction of Hwys. 3 and 4	YORK Manners-Sutton	NB58-35	May 30	Water clear, brownish; slight current; bottom gravel, silt, and mud; stream 6 feet wide, 1 foot deep; pond 50 feet wide, 3 feet deep	17, 20, 23, 24, 26, 27, 43, 44, 45
29	Lower Trout Brook, branch of Magaguadavic River at No. 3 Hwy. at York-Charlotte county border	YORK-CHARLOTTE Manners-Sutton Dumbarton	NB58-36	May 30	Water clear, brown; moderate current; bottom silt and sand. Fish taken 0-10 feet from shore in 0-3 feet of water	10, 17, 20, 21, 23, 26, 27, 43, 44, 45
DIGDEGUASH RIVER WATERSHED						
30	Small stream and alder bog, 4 mi. S. of Brockway, N.B., at No. 3 Hwy.	CHARLOTTE Dumbarton	NB58-37	May 30	Water clear, very dark brown; moderate current; bottom silt and mud. Fish taken 0-6 feet from shore in 0-1 foot of water	20, 22, 23, 24, 43
31	Digdeguash River at Hwy. No. 3, at Lawrence Station, N.B.	CHARLOTTE St. James	NB58-38	May 30	Water clear, brownish; slight current; bottom sand, gravel, and some rubble. Fish taken 0-6 feet from shore in 0-2 feet of water	17, 19, 20, 21, 23, 25, 26, 27, 28, 32, 43
32	Tributary of upper Digdeguash River at junction of Hwys. No. 3 and 27	CHARLOTTE St. James	NB58-39	May 30	Water clear, brownish; bottom gravel. Fish taken in top 6 inches of total depth of 4 feet	20, 22, 23, 26, 43
DIRECT PASSAMAQUODY BAY WATERSHED						
33	Tide Pools in St. Andrews, N.B. town dump	CHARLOTTE St. Andrews	NB58-43	June 3	Water heavily polluted, murky; no current; bottom muck. In pools 200 yard from low tide line, water 1 foot deep. Connected to Passamaquody Bay at high tide, but fed by fresh water streams	31, 33, 45

TABLE 3. List of localities of collectons of freshwater fishes of New Brunswick included in the collection of the Royal Ontario Museum prior to May, 1958. The species recorded from each location are given according to the species numbers in the text

Collection No.	Location	County and parish	R.O.M. Cat. No.	Date	Collector	Species
SAINT JOHN RIVER WATERSHED						
1	Burpee Brook	SUNBURY Sheffield	Various	23-25 June 1937	M. W. Smith	10, 17, 21, 26 27 39
2	Canaan River, 9 mi. N. of Havelock, N.B.	QUEEN'S Brunswick	13883	3 Sept. 1948	H. C. White	
3	Green River, Third Lake	MADAWASKA St. Jacques	10851	20 June 1939	A. H. Leim	14
4	Kennebecasis River, near Hampton N.B.	KING'S Norton	14587	22 Aug. 1949	H. C. White	39
5	Lower Southampton, N.B.	YORK Southampton	8763	7 Nov. 1934	A. G. Huntsman	7
6	Stephenson's Pond, Saint John, N.B.	SAINT JOHN Simonds	6660	8 Nov. 1938	M. W. Smith	24
7	Saint John River (not on map)	YORK Kingsclear	Various	Various	Various	34, 42
8	Saint John River, Burgoyne Eddy at Kingsclear, N.B.	KING'S	8389	5 Nov. 1922	L. P. Schultz	7
9	Saint John River, Long Reach	Greenwich	18829	28 Aug. 1957	A. H. Leim	14
10	Saint John River, Oromocto, N.B.	SUNBURY	13180	19 Mar. 1938	R. A. McKenzie	16
11	Saint John River, Whitemarsh Creek	Burton CARLETON	15556	29 July 1951	M. W. Smith	42
12	Terreo Lake	Wicklow KING'S	15868	17 July 1949	D. Alderdice	10
13	Washademoak Lake	Hampton QUEEN'S	13179	24 June 1940	R. A. McKenzie	16
ST. CROIX RIVER WATERSHED						
14	St. Croix River, Mohannas Stream	CHARLOTTE St. Stephen	17995	13 Aug. 1950	P. Elson	34
15	St. Croix River, Joe's Point	CHARLOTTE St. Andrews	1855	9 July 1923	T. Kurata and E. B. S. Logier	45
MAGAGUADAVIC RIVER WATERSHED						
16	Linton Stream, outlet of Digdeguash Lake	CHARLOTTE St. George	17998	17 Sept. 1935	M. W. Smith	21
17	Lake Utopia	CHARLOTTE St. George	12502- 12503	30 Nov. 1939	M. W. Smith	21, 42

TABLE 3 (cont'd)

Collection No.	Location	County and parish	R.O.M. Cat. No.	Date	Collector	Species
DIGDEGUASH RIVER WATERSHED						
18	Digdeguash River near Elmsville, N.B.	CHARLOTTE St. Patrick	12482-12494	1 and 16 Aug. 1934	H. C. White	7, 17, 23, 25, 26, 27, 32, 43, 21, 40, 41
19	Bonaparte Lake	CHARLOTTE St. Patrick	18003-18006	14 July 1942	M. W. Smith	
MIRAMICHI RIVER WATERSHED						
20	Barnaby River	NORTHUMBERLAND Nelson	17976-17977	31 May 1949	R. A. McKenzie	25, 27
21	Red Bank, N.W. of Miramichi River	NORTHUMBERLAND Southesk	14171-14172	4 Feb. 1942	?	21, 25
22	Renous River at Renous, N.B.	NORTHUMBERLAND Blackville	17975	May-June, 1948	?	25
23	Chatham, N.B., town water reservoir	NORTHUMBERLAND Chatham	14487	1 June 1947	R. A. McKenzie	42
24	Miramichi River (not on map)	Location unknown	Various	Various	Various	25, 30, 32, 33, 35, 15
25	Miramichi River, Millbank	NORTHUMBERLAND Alnwick	19095	3-4 May 1951	R. A. McKenzie	
26	Miramichi River, Fraser Dam, Millstream	NORTHUMBERLAND Northesk	19090	17 April 1953	R. A. McKenzie	1
27	Miramichi River, 20 mi. above Chatham, N.B.	NORTHUMBERLAND Blackville	17988-17989	23 Sept. 1952	R. A. McKenzie	17, 26
28a	Miramichi River, 25 mi. above Chatham, N.B.	NORTHUMBERLAND Blackville	15561	Oct. 1952	R. A. McKenzie	5
28b	Miramichi River, at salmon fence	NORTHUMBERLAND NEWCASTLE Newcastle	17983-17987	22 Sept. 1952	W. B. Scott	7, 17, 21, 25, 27
29a	Miramichi River, Oak Point, Newcastle, N.B.	NORTHUMBERLAND Newcastle	Various	1942	R. A. McKenzie	4, 43, 46
29b	Miramichi River, Newcastle	NORTHUMBERLAND Newcastle	17978	16 Dec. 1950	R. A. McKenzie	37
30	Miramichi River, Big Bartibog	NORTHUMBERLAND Alnwick	19093	12 May 1948	R. A. McKenzie	15
31	Miramichi River, French Fort Cove, near Newcastle	NORTHUMBERLAND Newcastle	17980-17981	7 May 1952	R. A. McKenzie	21, 30
32	Napan River at Johnston's School	NORTHUMBERLAND Glenelg	14170	13 May 1941	?	27

TABLE 3 (cont'd)

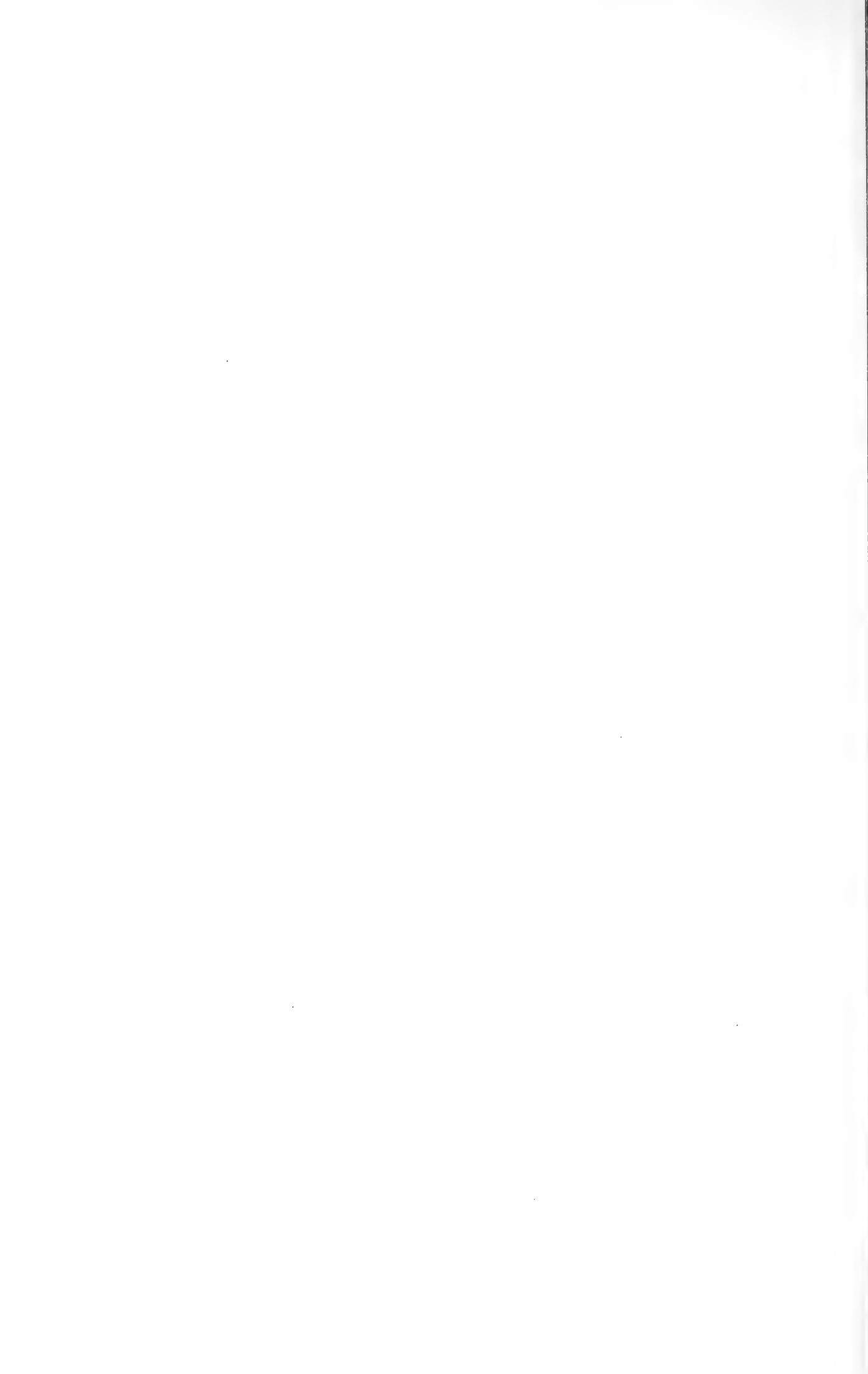
Collection No.	Location	County and parish	R.O.M. Cat. No.	Date	Collector	Species
MISCELLANEOUS BAY OF FUNDY WATERSHEDS						
33	Birch Cove	CHARLOTTE St. Patrick	4376	6 July 1925	?	33
34a	Chamcook Lake	CHARLOTTE St. Croix	Various	Various	Various	7, 12, 15
34b	First Chamcook Lake		Various	Various	Various	25, 43, 45
34c	Second Chamcook Lake		Various	Various	Various	17, 25, 27, 31
34d	Outlet of Second Chamcook Lake		1735	20 May 1925	T. Kurata and E. B. S. Logier	7
35	Cook's Lake (Musquash River)	ST. JOHN-KINGS Musquash-Westfield	17996	13 Sept. 1946	M. W. Smith	28
36	Wheaton Lake	CHARLOTTE	Various	Various	Various	31, 32, 36
37	Petitcodiac River near Salisbury, N.B.	St. Patrick WESTMORLAND Salisbury	12202- 12212	15 Aug. 1938	H. C. White	5, 17, 19, 20, 23, 25, 28, 32, 43, 45
38	Grand Manan Island	CHARLOTTE Grand Manan	17973	1952	?	10
39	Walton Lake	KING'S Waterford	15838- 15865	Aug. 1949	D. Alderdice	10, 11
MISCELLANEOUS PASSAMAQUODDY BAY WATERSHEDS						
40	Gibson Lake	CHARLOTTE St. Croix	17335- 17337	28 July 1952	W. L. Klawe	17, 25, 32
41a	Crecy Lake	CHARLOTTE St. Patrick	18053	15 June 1952	W. L. Klawe	20
41b	Tributary to Crecy Lake		17994	22 May 1952	M. W. Smith	26
42	Kerr Lake	CHARLOTTE St. Patrick	13854	3 July 1945	C. Lowery	14
MISCELLANEOUS BAY OF CHALEUR WATERSHEDS						
43	Nepisiguit River, Grand Falls	GLOUCESTER Bathurst	1951- 1953	Oct. or Nov. 1925	J. A. Rodd	10
44	Benjamin River	RESTIGOUCHE Colborne	9501	22 Sept. 1936	A. G. Huntsman	7
45	Restigouche River, near mouth of Patapedia River	RESTIGOUCHE Grimmer	8080	27 Oct. 1931	?	13
46	Upsalquitch Lake	NORTHUMBERLAND Northesk	15033- 15034	28 June 1950	G. F. M. Smith	11
GULF OF ST. LAWRENCE WATERSHED						
47	Pokemouche River, at mouth	GLOUCESTER Inkerman	17340	26 Sept. 1946	W. L. Klawe	5

TABLE 4. New Brunswick Freshwater Fishes Deposited in the National Museum of Canada. Collections 1 to 7 only have sufficient data to be mapped and are indicated on figures 1 and 2 by squares

Collection No.	Location	County and parish	N.M.C. Cat. No.	Date	Collector	Species
1	Saint John River, Belmont	SAINT JOHN Lancaster	NMC58-9			32
2	Miramichi River opposite Loggieville	NORTHUMBERLAND Chatham	NMC58-222	7 June 1918		15
3	Harvey Station	YORK Manners-Sutton	NMC58-289	30 April 1953		28
4a	Glenwood Wharf; about 2 mi. N. of Browns Flats Wharf	KING'S Greenwich	NMC58-316	18 July 1956	S. Gorham	31, 36, 40, 41
4b	Jones Creek, Browns Flats		NMC58-325	28 July 1956	S. Gorham	26
5	Saint John River, Oromocto	SUNBURY Burton	NMC58-300	5 July 1953		17, 27
6	Brook at Fredericton	YORK New Maryland	NMC58-328	9 July 1953	S. Bleakney	20, 26
7	Nashwaak	YORK St. Marys	NMC58-332			26
8	Quaco	YORK St. Martins	NMC58-336	10 July 1953	S. Bleakney	32
9	Clear Lake (Lepreaux?)	SAINT JOHN	NMC58-26	Aug. 1895	P. Cox	46
10	Healy's Falls (?)	CHARLOTTE	NMC58-32	Aug. 1895	P. Cox	23
11	Miramichi River, Middle Island	NORTHUMBERLAND	NMC58-230			41
			NMC58-235	10-19 Aug. 1918	Atlantic Biol. Sta.	15
			NMC58-236			
12a	Miramichi River, Bon Ami Point		NMC58-238	24 July 1918	Atlantic Biol. Sta.	25
12b	Below Bon Ami Point		NMC58-242			17
13	Miramichi River, Long Point		NMC58-241	22 July 1918	Atlantic Biol. Sta.	17
14	Waterworks Lake near Saint John	SAINT JOHN Simonds	NMC58-10	Aug. 1895	P. Cox	25
15	Baie-Verte Road	WESTMORLAND	NMC58-333	20 May 1953	S. Bleakney	19, 23
16	Saint John River		NMC58-11	July 1895	P. Cox	32









LIBRARY
ROYAL ONTARIO MUSEUM

