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A Cursory Inspection of Salmon River
Guysborough County, N.S.

by

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FISHERIES SERVICE
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HALIFAX, N.S.

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ABSTRACT

A brief inspection survey was made of Salmon River, Guysborough County, during the autumn of 1965. Low water conditions during warm, dry periods have been a problem here for many years. The history of the river was reviewed indicating that although it has been stocked since 1929, salmon angling has probably never been exceptional. The average number of salmon caught annually on this river since 1949 is 9.4 fish. Up until ten years ago, log cutting and driving were carried out and saw mills were operated along this river. Some parts of the watershed have been denuded as a result of heavy cutting. There is no pollution.

The overall river system is relatively small and the main river has a gentle gradient with few pools or fast rapids throughout although the majority of tributaries have a rapid to torrential flow. There is a series of shoals and a falls on the main river and the conditions of each are so exacerbated by low water that they both may form barriers to Atlantic salmon. The overall system is renowned for good speckled and brown trout fishing.

In view of the fact that Salmon River has a relatively small drainage area, few suitable resting pools, limited spawning gravel and only fair nursery areas; an extensive river improvement program is not recommended.

I. INTRODUCTION

During the period October 28 to November 2, 1965, Salmon River, Guysborough Co., was examined briefly in order to ascertain whether or not conditions for salmon had changed since a 1956 survey (Edwards 1956) of the same river system. Low water conditions during warm, dry periods have been a problem here for many years. Comments are made on (a) river morphometry, (b) possible explanations for poor river conditions, (c) the potentialities of this river, and (d) suggested remedial measures.

The entire river system was inspected during the four day reconnaissance. There are roads which extend throughout most of the system thus making it reasonably accessible by automobile. No sampling of any kind was carried out. The bases for this report are visual observations and conversations with local Department of Fisheries Protection Officers. Certain representative points on the river and places where obstructions formerly existed were examined more closely.

II. HISTORY OF THE RIVER SYSTEM

1. Angling Background

The earliest recorded reference to Salmon River is a report on the distribution of young salmon throughout the system (Richardson 1938). This report states that "the past ten years have seen, from all accounts, a rapid and steady decline in the numbers of salmon taken by anglers and fishermen from the waters of Guysborough County". This rather general statement, referring to the period 1928-38 has a vague ownership and may be debated. Evidence to the contrary exists for three other rivers in this county for which angling records are available since 1928. Figure I illustrates graphically the Atlantic salmon angling results during the period 1928-38 for the St. Mary's, Ecum Secum and Gaspereau rivers. The average number of salmon angled per year from the St. Mary's River (1928-38) is 318 and of the four years that this average was exceeded, three of them are later than 1933. Likewise for the Ecum Secum River, the yearly average is 59 and three of the five years in which it was exceeded are later than 1933. The Gaspereau River yielded approximately equal numbers of salmon before and after 1933. There are no records available for Salmon River during this period.

It is evident from a brief inspection of these data that the statement quoted above may have no real basis in fact. It is quite possible that angling for Atlantic salmon on Salmon River has varied little or even increased during the past four decades. However, it must be borne in mind that the number of anglers fishing these rivers has also increased.

Table I below contains the average number of salmon angled for the periods 1928-38 and 1952-62 on the same three rivers that were considered above. It may be seen from this table that the overall number of salmon angled in this area has improved rather than declined since 1928. Again these figures are influenced by an increase in the number of rods fishing, increased accessibility to pools along the river and an increase in the number of wardens from whom the angling statistics are obtained.

TABLE I The Average Number of Atlantic Salmon Angled on Three Guysborough County (Nova Scotia) Rivers for the Periods 1928-38 and 1952-62

Name of River	1928-38	1952-62
St. Mary's	318	555
Ecum Secum	59	100
Gaspereau	18	19

Porter (1938) wrote a short paper on the rivers of eastern Guysborough County in which Salmon River is referred to as being the largest stream in the district, once celebrated for salmon fishing, but almost without a fish for the "last few years". He further states that "fish are now so few that no salmon fishing is done except at the sea entrance and even there only two or three salmon were taken in 1937, whereas ten years ago....four or more fish to a single rod were not unknown on a single tide at the sea-pool and lower river pools....". If these statements are valid, it would seem that Salmon River has been affected by circumstances which apparently did not influence the angling results of other rivers (Table I) in this county.

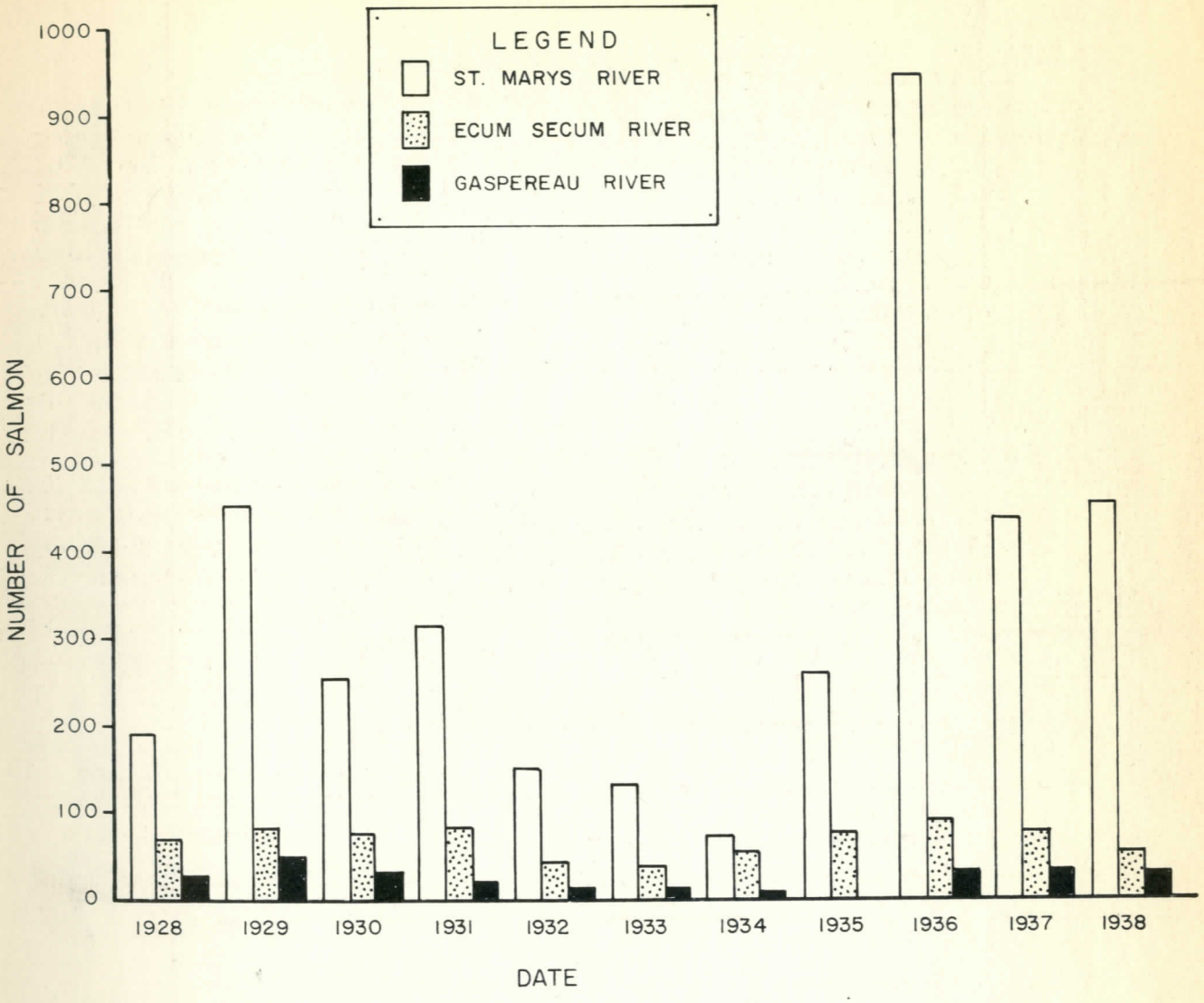

Figure I Total numbers of Atlantic salmon angled in three Guysborough County rivers during the period 1928-38.

Porter (1938) also stated that "the catch of these (salmon) nets (off shore) after normal fluctuations for a great many years, has decreased markedly quite recently in parallel with the almost complete disappearance of salmon in the rivers".

2. Pulpwood Cutting and Saw Mill Operations

Salmon River was used for driving pulpwood during several years previous to 1950. Such operations have now ceased and there are no functional driving dams remaining on any part of the system.

In former years, several saw mills were operated along the main river and one tributary. Those known to the author were located as follows: (a) one below Miller's Lake on the Miller's Lake branch and (b) two on the main river at the community of West Erinville.

3. Hydro-Power Development

There is one hydro-power development on a tributary of Salmon River (Dickie Brook), but its location on the estuary at head of tide is such that it does not affect the fish populations of the main river. The powerhouse (built 1947) receives its water supply from Tom and Donahue lakes via a pipeline.

4. Stocking

Stocking of Atlantic salmon in Salmon River began in 1929 when the Antigonish Fish Culture Station was put into operation at Fraser Mills and in 1937 speckled trout were included in the stocking program. Since 1959 many brown trout have been introduced to the system.

III. PHYSICAL DESCRIPTION

1. General Morphometry and Location

Salmon River (Guysborough County) lies on the southeastern end of mainland Nova Scotia and enters the Atlantic Ocean at the head of Chedabucto Bay near the small community of Cook's Cove, about three miles south of Guysborough Town. The mouth of the river is at latitude

45° 21'N and longitude 61° 29' W.

The main river extends approximately 25 miles from its mouth to the headwaters at Cross Lake and ranks 32nd out of 65 representative Nova Scotian rivers. There are 13 tributaries and 47 lakes on the system. The largest tributaries are Porter River (7 miles long) (Photo 2) and Miller Lake Branch (7.5 miles long), while the largest lakes are Tom Lake, Donahue Lake, Lawlor Lake, North Branch Lake, Desbarres Lake and Cross Lake. The total watershed drainage area is 120 square miles.

The main river is less than 25 feet wide at all points above Salmon River Lake (13 miles from mouth) while below the lake, the width varies considerably from less than 40 feet immediately below the lake to a maximum width greater than 150 feet near head of tide. The mean width for this lower section (below Salmon River Lake) is less than 80 feet. A large sand bar or barrichois beach (photo 1) has been formed by the action of waves and tides across the mouth of the estuary, leaving only a narrow channel 15 feet wide through which the estuarial and river water flows into Chedabucto Bay. There have never been any reports or complaints concerning the formation of a complete barricade at this point.

2. Accessibility

Public roads and some woods roads extend throughout most of the river system but there are some sections which remain inaccessible by automobile. Among the waters which cannot be easily reached are: (a) four miles of the headwaters of the main river from Island Lake downstream to the settlement of West Erinville, (b) four miles of the Miller's Lake Branch above Lion Lake, (c) three miles of Porter River below the settlement of Giant Porter River, (d) the entire North Branch Lake tributary (four miles) and (e) two and one-half miles of the main river immediately downstream from Salmon River Lake.

There are nine sparsely populated communities situated along the system.

3. Watershed and Drainage

Along the main river between the mouth and the settlement of West Erinville, a distance of 16 miles, the banks of the river on one or sometimes both sides have been cleared and used as farmland (Photos 5,7 and 8). Wood cutting is carried out in the forests of the area for use as pulpwood, saw logs, Christmas trees and firewood.

Evidence of especially heavy cutting was apparent around the settlements of Ogden (Photo 3), Rogerton (Photo 4), Salmon River Lake, and East and West Erinville. The only evidence of a forest fire is at Rogerton where one occurred two years ago.

The valley of the main river is relatively deep from the estuary upstream to the settlement of Ogden (Photo 3). However, the valley changes upstream from Ogden to Salmon River Lake in that it has a more typical, sloping watershed which has been described as a "wide, shallow bowl" (Richardson 1938). Upstream from Salmon River Lake, the river receives two major tributaries; Porter River and the Miller Lake Branch. The latter branch is simply a series of six lakes lying in relatively level watersheds. Similarly, Porter River and the main river above Salmon River Lake are small streams (less than 25 feet wide) which meander through flat, sometimes marshy land (Photos 8 and 11).

4. Gradients of Main River and Tributaries

Throughout its entire length, the main river has a comparatively gentle gradient. Along the upper section from the headwaters at Cross Lake to Salmon River Lake, the gradient is 3.7 yards per 1,000 yards and there is one rocky falls (maximum drop six feet) at the foot of Sullivan Lake near West Erinville. From Salmon River Lake to the river mouth the gradient remains slight at 3.9 yards per 1,000 yards.

Ten of the thirteen tributaries flowing into Salmon River enter below Salmon River Lake and all but two of these are fast flowing brooks with steep gradients which enter the main river rather abruptly. Table II contains gradient data for three of these brooks which have been chosen as typical examples. The remaining three tributaries which enter the main river above Salmon River Lake have gentle gradients ranging from 2.5 to 5.5 yards per 1,000 yards.

TABLE II. Gradient Data for Three Tributaries of the Lower Six Miles of Salmon River

Tributary	Length (Mi.)	Gradient(Yd.per1000)
Godfry Bk.	5.5	17
McAllister Bk.	2.0	50
Three Ponds Bk.	1.2	49

5. Pools and Riffles

Observations recorded by Edwards (1956) indicate that there is a paucity of suitable salmon pools on Salmon River. As previously mentioned, the best section of this whole system for Atlantic salmon angling is that between the estuary and Salmon River Lake (13 miles). On this section there are approximately 15 pools, only two of which are more than two feet deep and longer and wider than the average stream width.

Slow, smooth riffles are found on approximately 90% of the main river. There are no falls or fast rapids on the main river except that mentioned above (below Sullivan Lake at West Erinville).

IV. ANGLING RECORDS

1. Atlantic Salmon

Angling statistics have been recorded for Salmon River since 1949. The average annual salmon angling catch for the 16-year period 1950-65 is 9.4 fish with a maximum catch of 45 salmon in 1952 and a minimum catch of no fish in 1954. The catch was above the 16-year average during six seasons. The present open season for salmon angling on this river is June 15 to October 15.

It is anomalous that during the 1965 season, which has been one of the driest in Nova Scotia's history, Salmon River has yielded an above-average angling catch of 15 salmon. This is an indication that periods of low water during the warmer months are not the only factors involved in a poor angling season.

The fishery officer for this area has stated that to his knowledge, all Atlantic salmon angled on this river during the past eight years were taken below Horton's Shoals. In fact, he says that the majority were taken below the Dickies Brook Powerhouse which is situated on the estuary.

Table III contains salmon angling results, by months, for the period 1950-65 on Salmon River. During this period, the highest monthly percentage of salmon were angled in September.

TABLE III

Salmon Angling Success by Months on Salmon River, Guysborough County, 1950-65

Months	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	Totals
April				5							1	2					8
May						1							1				2
June							1					1		1			3
July	1	3	4			1	1	2	6			2		1	6	6	33
August			9			7	6		4	5	1	2		1	8	4	47
Sept.		1	32			6	6	2		2					2	3	54
Oct.																2	2
TOTALS	1	4	45	5		15	14	4	10	7	2	7	1	3	16	15	149

2. Speckled and Brown Trout

Angling for speckled and brown trout appears to have increased considerably during the past three years as indicated in Table IV.

TABLE IV Numbers of Speckled and Brown Trout Angled on the Salmon River System During 1963, 1964 and 1965

Species	1963	1964	1965
Speckled	4325	12,750	16,495
Brown	71	445	708

V. OBSTRUCTIONS

1. Main River

(a) From the mouth of Salmon River to a point two miles upstream, there are four gravel areas which form impassable shoals during periods of low water. The largest of these is known locally as Horton's Shoals (Photo 2). Information on file indicates that remedial work in the form of bulldozing has been carried out on this latter shoal in the years 1950, 1954 and 1956.

Conditions at the present time would appear to be similar to those existing in 1956 prior to bulldozing; although at the time of survey (Nov. 1965), water was ten inches deep in a 60 feet wide channel through Horton's Shoals. However, conversation with local fishery officers revealed that this shoal was virtually dry in late summer (1965) during a period of extremely low water.

It may be observed that bulldozing in such areas does not seem to provide a permanent solution to the problem since the work will be undone during a spring of exceptionally high water with a heavy ice flow.

(b) Approximately 17 miles upstream near the community of West Erinville at a point on the river below Sullivan Lake, there is a natural falls which has a maximum single drop of six feet. This would be a barrier to upstream migrants at times of low water.

2. Tributaries

A barrier of minor importance exists about 1.5 miles upstream from the mouth of Minister Brook. A natural falls is present which has a maximum single drop of 20 feet. Minister Brook is a narrow stream having a steep gradient and it is of little or no importance as a rearing area for Atlantic salmon.

VI. POLLUTION AND PREDATORS

There are no signs of any pollution on the Salmon River system. The present author did not see any terrestrial or aerial predators of young or adult salmon during recent brief survey.

VII. DISCUSSION AND CONCLUSIONS

There are two major factors which have precipitated recorded complaints about Salmon River since 1938. These factors are (a) extremely low water during hot, dry seasons and (b) poor angling. It is felt that the first is important in causing the second. Such low water conditions must also be considered in relation to the general topic of conservation since populations of young fish can be quickly depleted as a result of insufficient water with resultant higher water temperatures and increased suseptibility to predation.

Low water conditions on this river are caused in part by: (a) insufficient number of large, deep lakes. Many of the lakes are small and practically overgrown by aquatic vegetation. (b) In some areas the watershed has been cleared of trees so that the water table is lowered and a poor natural water control is provided.

Salmon River could probably yield more salmon to anglers than it does at present but it is possible that the increase would not be of sufficient magnitude to justify an extensive river improvement program. Based upon a recorded

maximum of 45 salmon angled in 1952, it may be estimated that with river improvement this river could average 25-30 salmon to anglers.

The majority of anglers are presently focusing their efforts on the estuary. What would be the result if some of them began to fish the river pools during improved water conditions? Following a cursory inspection of this river and a careful review of the 1956 survey report, it does not appear that there is an abundance of suitable resting pools. This point would require further investigation prior to implementation of any stream improvement work.

Another significant factor involved in angling success is the peak of the upstream migration. Salmon River appears to have a "fall run" of spawning salmon, i.e., the majority of the fish travel up the river later than mid-September. It is about this time that serious angling ceases, according to the fishery officer for this area. Therefore, it is possible that salmon angling statistics are not a valid indication of the numbers of salmon frequenting this river.

With respect to the potential of Salmon River as a rearing area for Atlantic salmon, the following is quoted from Richardson (1938): "while the penetration of the system by spawning salmon is quite good, the degree to which the system acts as a hatchery for young salmon is very limited...". He reports that he could not find any young salmon on the main river below Salmon River Lake, although limited populations were found on many of the tributary streams. Throughout the river system Richardson found a ratio of three trout to one young salmon.

Salmon River does not have a great potential as a salmon producing river. It has a relatively small drainage area, few suitable resting pools, limited spawning gravel and only fair nursery areas (Edwards 1956). An extensive river improvement program would not seem to be advisable when present indications are poor that substantial benefit will result. Possible improvement techniques include (a) construction of a low water channel through the shoals above head of tide and/or (b) construction of water storage dams at strategic locations on the river system.

Aside from other considerations, it appears that the Salmon River system has been and will continue to be an excellent trout fishing area. Conditions throughout are ideal for speckled and brown trout.

VIII. RECOMMENDATIONS

It is recommended that improvements be made to the several shoals within two miles of the river mouth by one or a combination of the following methods:

(a) Permanent wing dams or "V" dams to direct water through a definite channel, or

(b) construction of a permanent wooden or concrete channel.

Bulldozing, per se, is not recommended because of previous unsatisfactory results.

Storage dams are not recommended because this river does not have the potential to merit such an expensive undertaking.

IX. LITERATURE CITED

Edwards, H.E. 1956. Salmon River Salmon Survey. Dept. Fish. Can., Unpublished Report. 26 pp.

Porter, J.B. 1938. Notes on the Salmonidae of Eastern Guysboro County, Nova Scotia. Unpublished Report. 11 pp.

Richardson, L.R. 1938. The Distribution of Young Salmon in the Salmon River Watershed. Unpublished Report. Dept. Zool., McGill Univ. 9 pp.

APPENDIX

Note: The photographs included in the Appendix are arranged in order beginning at the mouth of Salmon River (Photo 1) and continuing upstream to Sullivan's Lake near West Erinville (Photo 10).

Photo 11 is of a tributary, Porter River.

Photo 1. Narrow Opening of Estuary into Chedabucto Bay through a Barrichois Beach.

Photo 2. Horton's Shoal Looking Upstream. This Section of the Main River is Approx. Two Miles from the Mouth.

Photo 3. River Valley at Ogden Showing Results of Heavy Wood Cutting.

Photo 4. Further Heavy Wood Cutting Evidenced at Rogerton Which is also Part of the Salmon River Drainage System.

Photo 5. Overall View of Salmon River Lake. (Approx. 13 Miles Upstream)

Photo 6. Stillwater on Main Salmon River 14 Miles Upstream, Looking Downstream, Between Salmon River Lake and Morrison Lake.

Photo 7. Overall View of Morrison Lake and Surrounding Watershed. (14½ miles upstream).

Photo 8. Main Salmon River at East Erinville Looking Downstream. Surrounding Land is Relatively Level at this Point 15¼ Miles Upstream.

Photo 9. Looking Downstream on Main River at West Brinville, 16¼ Miles Upstream. River Flows on Either Side of a Small Island. Width is 15-20 Feet Here.

Photo 10. Remains of Dam (breached) at Foot of Sullivan's Lake. About 17 Miles Upstream.

Photo 11. Porter River (a seven mile long tributary) looking Upstream at a Point Four Miles from its Confluence with the Main Salmon River. This Tributary Has an Average Width of 8-10 Feet. The River Bottom Has Good Gravel But the Water is Very Shallow.