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Exploitation of Miramichi Atlantic Salmon
Based on Smolts Tagged in
1968, 1969 & 1970.

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1.0 INTRODUCTION

The Miramichi River system, New Brunswick, (Figure 1) draining over 5,500 square miles and emptying into the Gulf of St. Lawrence is a major contributor to Canadian Atlantic coast sport and commercial fisheries for salmon. In 1968 a tagging program on wild smolts was initiated to provide data for comparison with hatchery smolt releases in this river. The program on wild smolt tagging has continued through 1969, and 1970 and returns to date have provided information on migration routes, timing of migration and areas of exploitation of this Miramichi wild stock.

Wild smolt, on their seaward migration, were trapped for tagging in the Miramichi estuary at Millbank (Figure 1), and are considered to be representative of the total Miramichi stock. Smolt, anaesthetized with M.S. 222, were tagged with a modified Carlin tag attached with black, monofilament nylon in the dorsal fin region. Smolt were then released back to the estuary after a short recovery period. Between 1968 and 1970, inclusive, a total of 18,940 wild smolt were tagged and released. Yearly totals are shown in Table 1.

2.0 RESULTS

Returns as percentage of yearly smolt releases from the three years of tagging are shown by major areas of recapture in Figure . These include recaptures reported up to December 31,

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1971. Past tagging studies have shown that one and two sea-year fish represent the majority of the returns so the 1968 figures can be considered final; minor additions can be expected to the 1969 group, and the 1970 group will have major changes when 1972 returns are reported. For the two years of comparable data, the 1968 tagged group shows the higher rate of returns.

Percentage return by area over the three year period show an interesting pattern. In the three years that one sea year recaptures have been made, the returns to Greenland and Newfoundland show slight upward trends while the returns to the Miramichi system show a steady decline in the same period. A similar pattern is noted in the two years of data available on two sea year recaptures. Newfoundland percentage returns from the 1969 tagged smolt are higher than the 1968 recaptures while the Miramichi returns show a sharp drop.

Table 2 shows the total reported adult recaptures in percent by major areas of exploitation from the 1968 and 1969 tagged smolts. A considerable shift in proportion of returns to the various areas is noted between the two years. The 1968 releases show a very high return (almost 75%) to the Miramichi system, whereas the 1969 group change substantially, with Miramichi recaptures dropping to 40 percent and Newfoundland recaptures increasing to the same percentage level. When the 1968 and 1969 data were averaged the distant fisheries (Greenland and Newfoundland) accounted for 42 percent of the total adult recaptures while 56 percent were taken in home waters (Miramichi).

A further analysis of the returns was made by considering only two sea year or older fish and the Greenland recaptures which, if not caught would return to homewaters as 2 sea year or older fish. This tabulation is presented

in Table 3. Once again, a great difference is found in homewater utilization between the wild stocks tagged in 1968 and 1969. When data for the two years were averaged, the distant water fisheries returned 53.5 percent and the homewater fisheries 45.4%.

Recaptures in the Miramichi System were taken mainly by commercial fishermen and anglers, with the commercial fishermen harvesting the largest proportion of these fish (Table 4). Returns to commercial fishermen on the Miramichi from 1968 and 1969 tagging accounted for 73.0 and 61.5 percent of total homewater recaptures, respectively.

Timing of recapture of one and two sea year salmon from 1968, 1969 and 1970 tagging for West Greenland, the east and south coast of Newfoundland and the Miramichi areas is shown in Figure 2. One sea year recaptures from Greenland were taken in August, September, October and November, with September and October yielding the highest returns. One sea year returns from Newfoundland were from June, July to a lesser extent August, while on the Miramichi one sea year (grilse) returns to the trap net fishery (first water fishery to harvest them) were from June to early September, inclusive. June and July yielded the highest returns to the Miramichi; however, it should be noted that the trap net fishery normally closes before the portion of the late-run enters the river.

Two sea-year or older recaptures from Greenland are almost negligible from wild Miramichi salmon stocks tagged in 1968-1969. Two sea-year returns from Newfoundland were taken in May, June and July, with June returns the most numerous. It is probable that the majority of Miramichi two sea-year salmon migrating towards home waters pass through

the Newfoundland fisheries by the end of June. Miramichi drift net recaptures were taken from June to August 15 which covers the period this type of fishing is permitted in this area.

3.0 RELATIVE EXPLOITATION

The above data considers only the reported tag returns in presenting the relative exploitation of Miramichi stock in the various salmon fishing areas of the western Atlantic. In order to arrive at a more realistic figure of large salmon of Miramichi origin, some other information must be considered. Elson (1971) estimates that only 50 percent of tags recovered in the Greenland fishery are reported. Recapture data on time and location of one sea-year fish in waters off the northeast coast of Newfoundland would indicate that not all one-sea year fish could return as grilse to homewaters, and if not captured in Newfoundland could be available as two sea-year fish.

Two assumptions are made then to cover these two points to adjust the figures on two sea-year recaptures. First, Greenland reports only 50 percent of all recaptured tags, so the reported figure must be doubled to include all recaptures in Greenland. Second, one-third of the one sea-year recaptures are considered to be potential two sea-year fish if not captured as one sea-year, so this amount must be added to the Newfoundland two sea-year recaptures. These corrections were applied to the data and relative exploitation rates by area were calculated for large salmon and presented in Table 5.

Thus, if these assumptions are valid the relative exploitation of large salmon of Miramichi origin in Greenland was 33.3 percent for 1968 tagged salmon and 46.5 percent for

1969 tagged salmon while Miramichi exploitation was 51.4 and 17.8 percent for the same tagging years. Greenland and Newfoundland combined account for 64.6 percent and the percent returns from Greenland (39.9) is higher than for the Miramichi System (34.6).

The data presented in the last column of Tables 2, 3 and 5 are shown in three pie graphs in Figure 3. These illustrate the changes in the utilization of Miramichi stock during two years by various major fishing areas when different sea-year ages are considered.

REFERENCES

Elson, P.F. 1971. Some aspects of Canadian Atlantic salmon fisheries in relation to the new Greenland and high seas fisheries. Res. Doc. Int. Comm. Northwest Atlantic Fish., 71/73.

Table 1. Miramichi wild smolt tagging recaptures from 1968, 1969 and 1970 tagging. Percentages based on total smolt tagged and released. () - number of recaptures.

* - number of tagged smolt released

Recapture Site	Sea Year of Recapture	Year Tagged		
		1968 * 3,421 % return	1969 * 8,684 % return	1970 * 6,835 % return
Greenland	1	0.35 (12)	0.32 (28)	0.42 (29)
	2	- (0)	0.02 (2)	-
Newfoundland	1	0.24 (8)	0.25 (30)	0.35 (24)
	2	0.24 (8)	0.45 (34)	-
Miramichi System (Home waters)	1	0.99 (34)	0.50 (43)	0.26 (18)
	2	1.34 (46)	0.28 (24)	-
	3	0.03 (1)	-	-
Miscellaneous (undetermined areas)	1	0.06 (2)	0.01 (1)	- (0)
	2	- (0)	0.02 (2)	-
Total of return		3.25 (111)	1.95 (169)	1.03 (71)

Table 2. Percent returns from Miramichi Atlantic salmon tagged as wild smolt in 1968 and 1969 on the Miramichi Estuary. () - number of recaptures.

Recapture Site	Percent recaptures		
	1968 tagging	1969 tagging	Average 1968 & 1969
Greenland	10.8 (12)	18.3 (30)	14.5
Newfoundland	14.4 (16)	39.0 (64)	26.7
Miramichi System	73.0 (81)	40.9 (67)	57.0
Miscellaneous	1.8 (2)	1.8 (3)	1.8

Table 3. Percent returns of large salmon from 1968 and 1969 wild smolt tagging on Miramichi River Estuary. () - number of recaptures.

Recapture Site	Percent recaptures		
	1968 tagging	1969 tagging	Average 1968 & 1969
Greenland	21.0 (12)	33.7 (30)	27.4
Newfoundland	14.0 (8)	38.2 (34)	26.1
Miramichi - commercial angling	65.0 (37)	25.8 (23)	45.4
Miscellaneous	0 (0)	2.3 (2)	1.1
	100.0 (57)	100.0 (89)	100.0

Table 4. Miramichi System commercial and angling recaptures from wild smolt tagging on the Miramichi Estuary, 1968 to 1970, inclusive. Percentages based on recaptures in System. () - number of recaptures.

Tagging Year	One sea-year returns (%)		Two sea-year & older (%)	
	commercial	angling	commercial	angling
1968	21.4 (15)	24.2 (17)	51.6 (36)	2.8 (2)
1969	26.2 (17)	38.4 (25)	35.4 (23)	0 (0)
1970	36.8 (7)	60. (12)	-	-

Table 5. Relative exploitation of large salmon from 1968 and 1969 wild smolt tagging on the Miramichi Estuary. () - number of recaptures, "corrected"

Recapture Site	Correct percent recaptures		
	1968 tagging	1969 tagging	Average (2 yrs)
Greenland	33.3 (24)	49.5 (60)	39.9
Newfoundland	15.3 (11)	31.2 (44)	24.7
Miramichi	51.4 (37)	17.8 (23)	34.6
Miscellaneous	0 (0)	1.6 (2)	0.8
	100.0 (72)	100.0 (129)	100.0

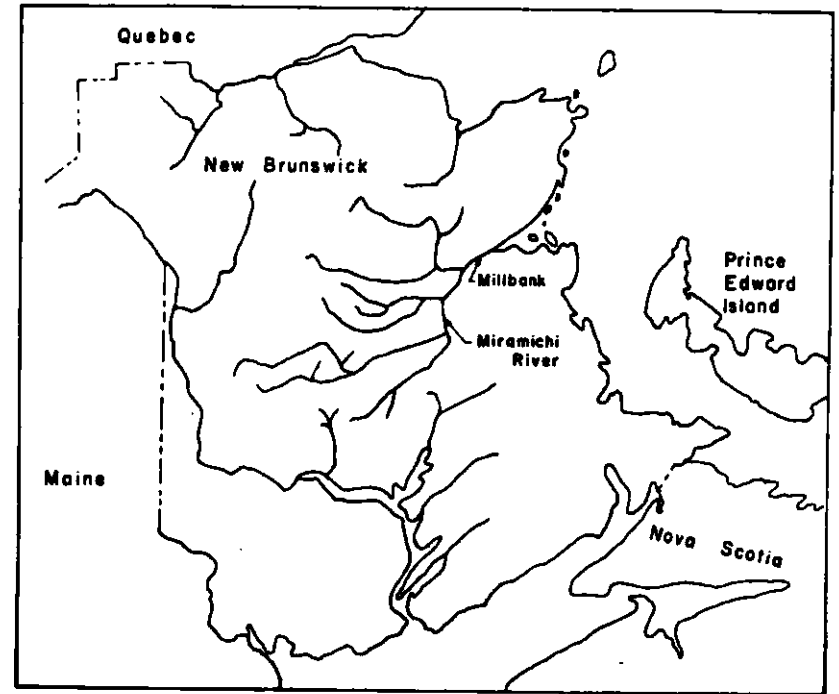


Figure 1. New Brunswick showing location of Miramichi River System and Millbank smolt trapping and tagging site.

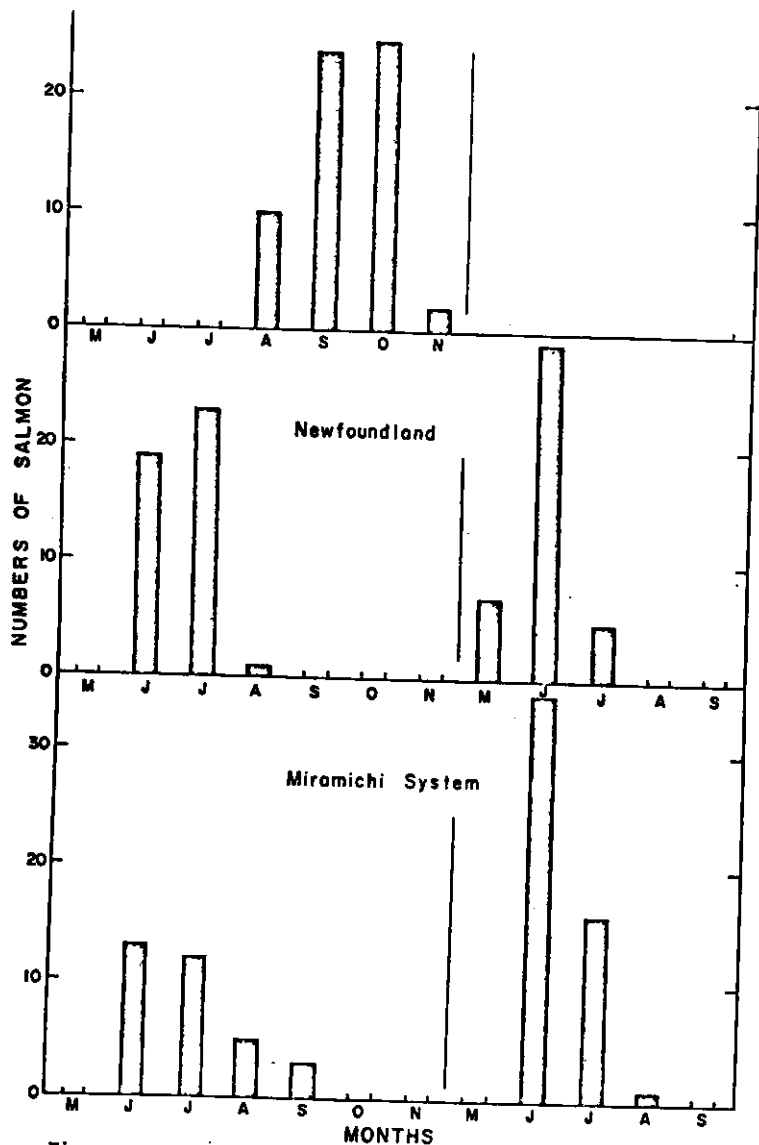


Figure 2. Recapture by month in western Atlantic fishing area of Atlantic salmon tagged as wild smolt in the Miramichi estuary in 1968 and 1969.
 A. one sea-year recaptures, B. two sea-year recaptures

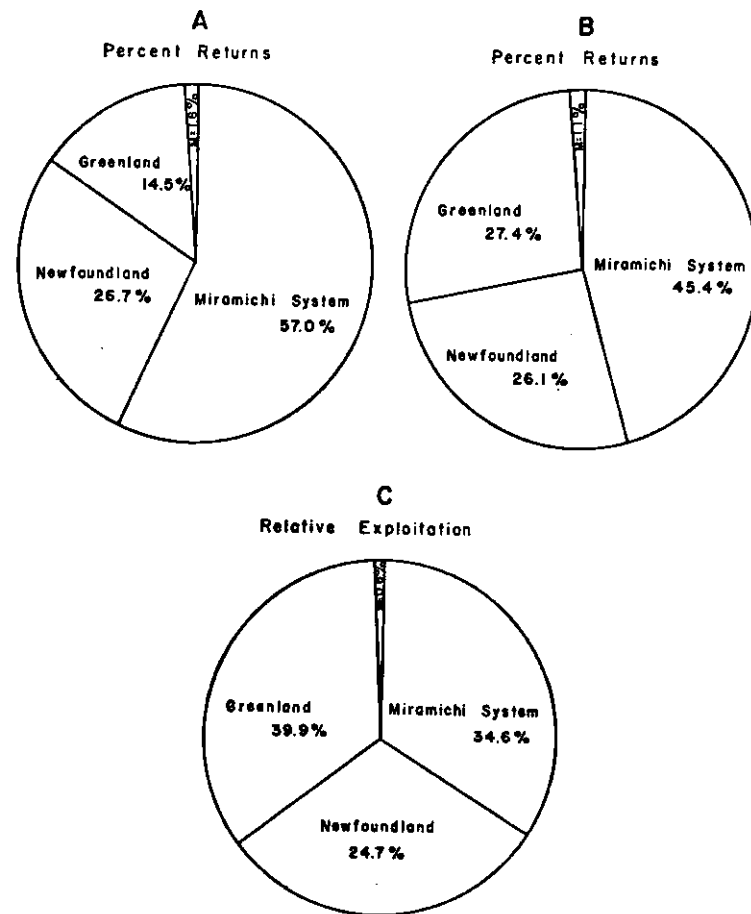


Figure 3. Average percent returns to Greenland, Newfoundland and Miramichi fisheries from wild smolt tagged in the Miramichi estuary in 1968 and 1969.
 A. one, two and three sea-year salmon combined
 B. two sea-year salmon only
 C. adjusted data on two sea-year salmon