



Serial No. 2541  
(B.g.14)

ICES/ICNAF Salmon Doc. 71/15  
(also ICNAF Res.Doc. 71/71)

ANNUAL MEETING - JUNE 1971

A Report on Recapture from a 1968 Native  
Salmon Smolt Tagging Project on the Miramichi River

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1.0 INTRODUCTION

A program to evaluate the contribution of hatchery reared salmon smolts to sport and commercial fisheries in the Atlantic region was started in 1968. Part of this program included the tagging of wild native smolts in selected rivers for comparison of returns with hatchery releases. This report presents results on 1969 and 1970 recaptures of wild native smolts tagged and released in the Miramichi River in 1968. The Miramichi River (Figure 1) is located in New Brunswick, has a drainage area of over 5,500 square miles and empties into the Gulf of St. Lawrence.

2.0 METHODS AND MATERIALS

The native smolts used for the tagging project were captured in the estuary on their seaward migration and are representative of the whole river and not one particular tributary. Fish were selected for tagging because of their vigor and good physical appearance (lack of scaled areas, abrasions, fungal growth or decayed fins). Although size was not a determining factor in selection of smolts for tagging, those under 12 cm. were culled as a precaution against damage from tagging needles.

Tags used on all smolts were the modified Carlin type tied with black monofilament nylon twine and applied with a double needle tagging jig. After the jig was thrust through

the musculature just below the dorsal fin so that the needles passed between two or more interneural spines, the monofilament leads were threaded into the end of the hypodermic needles and the jig pulled back out of the fish. The monofilament leads were then tied in a square knot and the excess twine cut off.

Native smolts were trapped at a modified commercial trap or set net at Millbank on the Miramichi estuary. This trap is similar in design to the commercial trap, but utilizes 2 1/2-inch stretched mesh in the leader and 1-inch stretched mesh in the pound or trap section. Trapped smolts were put in scow-shaped live cages with screened sides and solid fronts which were then towed to the floating tagging shed mounted on two 18-foot styrofoam pontoons. This arrangement minimized smolt transportation and handling and also facilitated the use of the same estuarial water throughout the entire tagging process; including holding, anaesthetizing, tagging, and reviving. All smolt were anaesthetized with the methanesulphonate of meta-aminobenzoic acid ethyl ester (M.S. 222). River water temperatures and water temperatures in the anaesthetizing water are kept within 3° C. of each other throughout tagging. After anaesthetizing the fish, they were measured, tagged and put back into a live cage to revive. Tagging operations extended from May 27 to June 13.

After the smolts revived they were towed downriver of the smolt trap and released. Before release, however, a sample of tagged and untagged smolts was held for up to 48 hours to determine mortality due to tagging.

Posters and circulars were used in home waters to encourage fishermen to return tags and to include data on place, date, method of capture, total length, weight and sex. Scale samples were also requested. A reward of three dollars (\$3) was paid for turning in a tag. Special crews operated in the Miramichi area to contact both commercial fishermen and anglers for tag returns. Tag returns from distant fisheries depended upon the initiative of the individual fisherman in report-

ing tags to co-ordinating agencies in their own area or sending them to the address printed on the tag for the reward.

For purposes of this report, Miramichi Bay was considered to be that area to the east of an imaginary line drawn from Napan Bay to Bartibog River and extending out into the Gulf of St. Lawrence as far as Miramichi drift netters fish (10 - 15 miles). The area, including Napan Bay and Bartibog River, which extends upriver to the confluence of the Northwest and Southwest Miramichi Rivers was considered the main Miramichi River or Miramichi estuary.

### 3.0 RESULTS

#### 3.1 Tagging Operations

The number of smolts tagged, tag series used, dates of tagging and release, and brief history of the native stock are detailed in Table I. A total of 3,491 native smolts were tagged for release to the Miramichi River system. Mortalities resulting from tagging, etc., are summarized in Table II.

#### 3.2 Native Smolt Recaptures

Recaptures during 1969 and 1970 of native salmon tagged as smolts in 1968 were 3.20 percent (110) from all sources (Table III). Home water (Miramichi System) to distant fisheries returns were 1.7:1 and the recapture ratio for commercial fishermen to anglers (Table IV) was 5.1:1.

In Table V, a more detailed breakdown of recaptures is shown according to major offshore and home water fishing areas. In Greenland, recaptures which were reported, accounted for 10.9 percent (12) of the total returns, while Newfoundland recaptures accounted for 15.3 percent (15). Home water recaptures were highest, accounting for 62.9 percent (69) of the total returns. Straying was minimal among the native tagged stock.

Areas of recapture are plotted in Figure 2 according to year and place of recapture. Most recaptures in Greenland waters were taken in the fall and winter of 1969 on

the west coast between latitudes 69° and 63° N. The heaviest concentration of Newfoundland recaptures in both 1969 and 1970 were from the east coast of the Island from the northern tip of the Great Northern Peninsula to the tip of Cape Race in the south. South coast recaptures in Newfoundland were scattered along the whole coast in 1969, but were concentrated in the Port-aux-Basques region in 1970.

Figure 2 indicates the possible migration route followed by native salmon destined for the Miramichi System. From Greenland's west coast the fish migrated south along the east coast of Labrador, the east and south coast of Newfoundland, through Cabot Strait, west through the Gulf of St. Lawrence, finally arriving off the mouth of the Miramichi System between June and September each year.

Table VI shows recaptures to the Miramichi System by gear and by method of capture. Commercial fishermen harvested the largest portion of native tagged fish that returned to the system of origin. Of the total recapture reported to date, 49 (74%) were taken by commercial fishermen and 17 (26%) by the angler. Grilse recaptures, including those angled as "black" salmon were fairly evenly divided between the commercial and angling catch; whereas, the recapture of two sea year fish was predominantly by the commercial fishery.

Monthly recaptures from 1969 and 1970 are listed in Table VII. Greenland recaptures were from the late summer, fall and winter period of 1969 with September and October the heaviest tag return months. Tagged salmon caught in the Greenland fishery were completing or had completed their second summer at sea and were obviously not destined to return to their river of origin or planting during the 1969 season (grilse year). Newfoundland recaptures were taken during June and July each year.

TABLE I - BACKGROUND DATA ON NATIVE SMOLTS TAGGED IN 1968 ON THE MIRAMICHI RIVER ESTUARY AT MILLBANK

Stock	Number Tagged	Tag Series	Age at Tagging	Dates Tagged	Dates Released	Comments
Wild Native Miramichi	3,491	Green A.53,100 - 56,599	--	May 29 - June 3	May 30 - June 3	Captured at estuarial trap at Millbank

TABLE II - KNOWN NATIVE TAGGED SMOLT MORTALITIES FROM 1968 SMOLT STUDY

Stock	Number Tagged	Number and Percent Mortalities			
		From Tagging	From Angling	Misc.	%
Wild Native Miramichi	3,491	68	1	1	0.03 0.03 0.03

TABLE III - TOTAL RECAPTURES OF ATLANTIC SALMON TAGGED AS SMOLTS ON THE MIRAMICHI SYSTEM IN 1968 LISTED ACCORDING TO HOME WATERS OR OTHER AREAS COMBINED. PERCENTS LISTED BASED ON TOTALS TAGGED AND RELEASED. B1 - BLACK SALMON

Major Recapture Site	Year of Recapture	Mir. Native (MN)	
		No.	%
Miramichi System	1969	27	0.78
	1970 B1	6	0.17
	1970	35	1.02
Other	1969	23	0.67
	1970 B1	0	0
	1970	19	0.56
Combined Totals		110	3.20

TABLE IV - ATLANTIC SALMON RECAPTURES FROM 1968 SMOLT TAGGING BY COMMERCIAL OR ANGLING METHODS ON THE MIRAMICHI SYSTEM (1969 AND 1970 RETURNS COMBINED)

Method of Recapture	Miramichi Native (MN)
Commercial	49
Angling	17
Ratio of Commercial to Angling Recaptures	2.9:1

TABLE V - PERCENT RECAPTURES FROM 1968 SMOLT TAGGING IN THE MIRAMICHI SYSTEM ACCORDING TO MAJOR RECAPTURE AREAS, PERCENT RECAPTURES ARE BASED ON TOTAL RETURNS. ( ) - ACTUAL NO. RETURNED.

		Recapture Area					
Greenland.		Newfoundland		Northumberland		St. Miramichi System	Miscellaneous
1969	1970	1969	1970	1969	1970	1969 1970B1 1970	1969 1970
10.9(12)	0	8.2(9)	7.2(8)	0	7.2(8)	24.5 5.5 (27) (6)	32.9 (36)
							2.7(3) 0.9(1)

TABLE VI - ATLANTIC SALMON RECAPTURES IN THE MIRAMICHI RIVER SYSTEM FROM NATIVE SMOLTS TAGGED AND RELEASED IN 1968. B1 - BLACK SALMON.

Recapture Site	Year of Recap.	Method of Capture			
		Commercial	Angling	Experimental	Hatchery
Miramichi Bay	1969	5	-	-	-
	1970	33	-	-	-
Main Mir. River	1969	5	-	1	-
	1970	1	-	0	-
Northwest Mir. River	1969	1	2	1	-
	1970 B1	0	0	0	-
	1970	0	1	0	-
Southwest Mir. River	1969	3	3	-	1
	1970 B1	0	4	-	0
	1970	1	0	-	0
Little S.W. Mir. River	1969	-	4	-	-
	1970 B1	-	1	-	-
	1970	-	0	-	-
Sevogle River	1969	-	0	-	-
	1970 B1	-	0	-	-
	1970	-	0	-	-
Renous River	1969	-	1	-	-
	1970 B1	-	0	-	-
	1970	-	0	-	-
Cains River	1969	-	0	-	-
	1970 B1	-	1	-	-
	1970	-	0	-	-
<b>Totals</b>		<b>49</b>	<b>17</b>	<b>2</b>	<b>1</b>

TABLE VII - MONTHLY RECAPTURES OF ATLANTIC SALMON TAGGED AS SMOLTS ON THE MIRAMICHI SYSTEM IN 1968 ACCORDING TO MAJOR RECAPTURE AREA. NO BLACK SALMON RETURNS ARE INCLUDED AND 1969 AND 1970 RETURNS ARE COMBINED.

\* - 3 RETURNS IN MARCH AND APRIL, 1970 EXCLUDED

Recapture Site	Stock	Number caught/month 1969 and 1970 Combined							
		May	June	July	Aug	Sept	Oct	Nov	Dec
Greenland	MN				1	6	3	1	
Newfoundland	MN		10	4					
Miramichi Bay	MN		23	11	4				
Miramichi River Est.	MN		2	4	1				
Southwest Miramichi R. (includes all trib. recaps.)	MN		1	2	4				
Northwest Miramichi (includes all trib. recaps.)	MN		1	7					
Bay of Chaleur	MN			2					



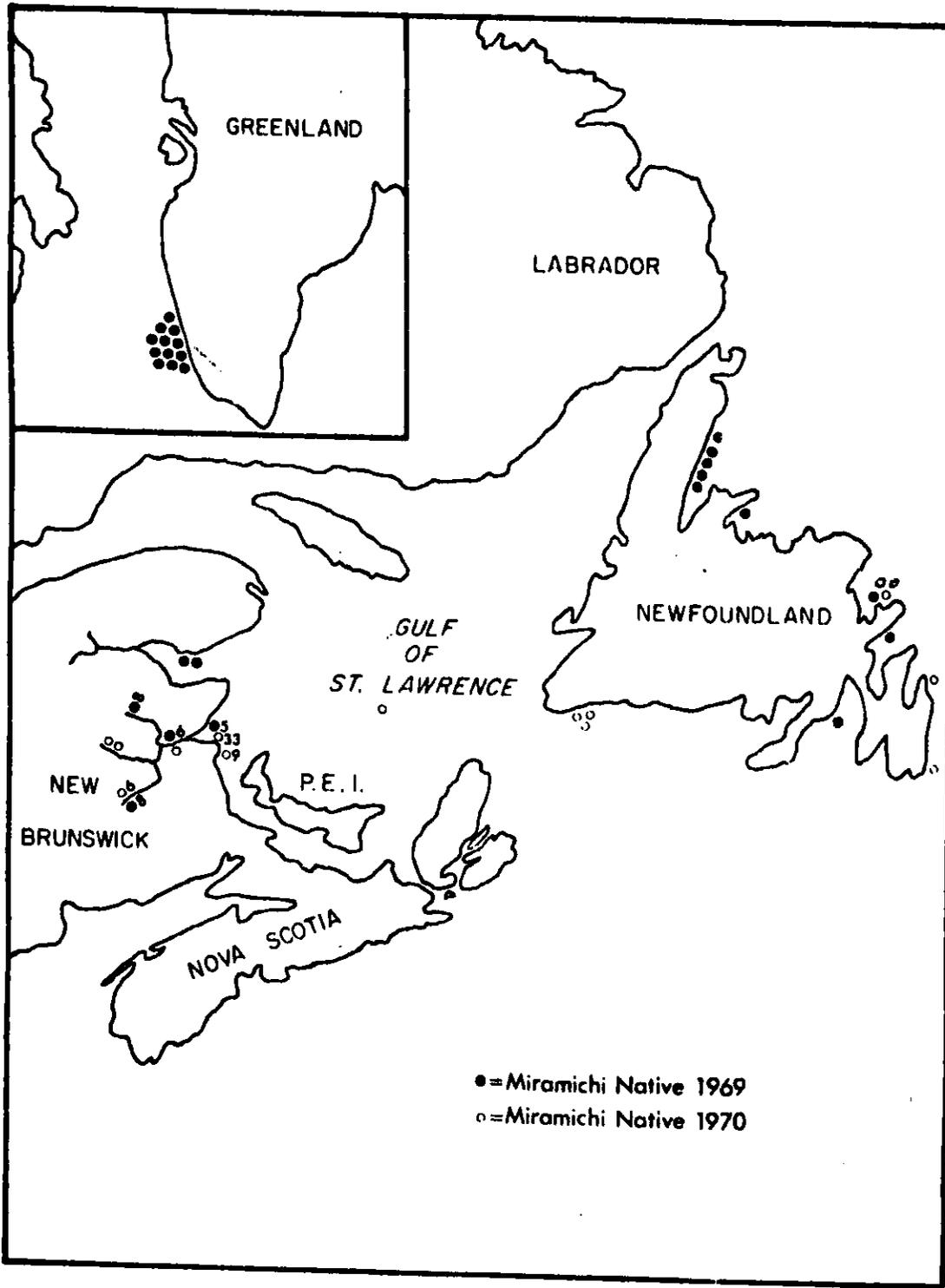


Figure 2 - 1969 and 1970 Recaptures of Salmon Tagged as Miramichi Native Smolt in 1968.