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Results of Tagging Adult Salmon in Conne River Estuary

by

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Abstract

The results of a tagging study on adult Atlantic salmon (Salmo salar L.) in Conne River estuary indicate that 79.2% of the salmon exploited by a food fishery in the estuary originated in Conne River. The angling exploitation rate was 0.27 and exploitation on Conne River stock by the food fishery was 0.049.

Résumé

L'étiquetage des saumons de l'Atlantique (Salmo salar L.) adultes dans l'estuaire de Conne River a permis de déterminer que 79,2 % du saumon pêché par les autochtones pour leur alimentation dans l'estuaire provenait de Conne River. Dans le cas de la pêche sportive, le taux d'exploitation était de 0,27 et dans le cas de la pêche pour l'alimentation, le taux d'exploitation des stocks de Conne River était de 0,049.

Introduction

In 1986, a food fishery for Atlantic salmon (*Salmo salar* L.) was conducted by the Band Council of Conne River Micmacs (Band Council) in the outer estuary of Conne River, Bay d'Espoir, Newfoundland. A tagging study was carried out to determine the proportion of salmon exploited by the food fishery that were of Conne River origin, and to estimate the exploitation rate by anglers in Conne River. This document summarizes the results of that tagging study.

Methods

General

Salmon for the study were caught in the Band Council trapnet and from DFO gillnets set shorefast in the Conne River estuary (Fig. 1). In total from 15 May to 9 July, 1986, there were 73 salmon tagged and released from the Band Council trapnet and from 6 June, 1986 to 9 July, 1986, 366 salmon were tagged and released from the DFO gillnets. The trapnet is described in Reddin and Short (1986). The gillnets were monofilament of 102 mm mesh size (length of mesh opening).

Tagging was done from a small open boat whenever weather conditions permitted. Salmon were removed from the gillnets and trapnet by cutting mesh with scissors, released into a small tank in the tagging boat, and held for a short recovery period prior to being tagged and released. Brown Floy tags were inserted into the dorsal musculature just below the anterior base of the dorsal fin so that the T-bar of the Floy tag was firmly anchored behind the internal rays.

Tagged fish were sampled for fork length (nearest cm) and scale samples were removed from the left side of the fish from three to six scale rows above the lateral line on a line extending from the posterior edge of the base of the dorsal fin to the anterior edge of the anal fin. Scales were later mounted on plastic slides and freshwater and sea ages determined.

Tagging Mortalities

To assess the mortality due to tagging, 41 salmon were held for five days prior to release. The number of mortalities and tag losses were recorded daily. The salmon were held in a small cage that was set in the Conne River estuary near the Band Council trapnet.

Tag Loss and Non-reporting of Tags

Tag loss and non-reporting of tags was assessed in three different ways. First, to assess tag loss, 307 salmon were marked by placing a red elastic band over the tail so that it loosely encircled the caudal peduncle. All salmon passing through the trap in the counting fence on Conne River were

examined visually for the red bands and if present, further examined for presence of the Floy tag and the number recorded. The bands were removed at the fence and the fish allowed to pass upstream. The red bands were applied because it was thought that brown Floy tags would not be very visible to the trap attendant, especially at night and when large numbers of fish were passing through the trap.

Second, 84 salmon were double tagged with Floy tags and released. The second tag was inserted just slightly posterior to the first tag. Third, to assess tag non-reporting in the angling fishery on the Conne River, all fish released with a Floy tag had their adipose fins removed. From 18 June, 1986 to 12 July, 1986, sampling teams examined salmon caught by anglers on the Conne River.

Results

Distribution of recapture sites of tagged salmon

The origin of salmon caught in the food fishery can be inferred from the distribution of recapture sites of tagged salmon. To do this it must be assumed that salmon do not stray, i.e., that any salmon caught by angling in freshwater is in its natal stream. Also, the salmon caught outside of the tagging site towards the entrance to Bay d'Espoir were assumed to be of non-Bay d'Espoir origin. Out of 439 salmon tagged and released there were eight caught by commercial fishermen outside of the Conne River estuary, four were angled in other rivers in Bay d'Espoir (three in Northwest Brook and one in Southeast Brook) and 183 were observed in the Conne River system (Table 1). Because returns to Conne River are complete counts while the number of tagged fish caught in other sites than Conne River are not, assumed exploitation rates were used to convert these to total numbers of tagged fish. This method assumes all salmon returning to Conne River were counted and that there is angling on other stocks in Bay d'Espoir with exploitation rates of 0.25. Therefore, total tags are: other rivers in Bay d'Espoir - 16, commercial fisheries - 32 and Conne River - 183. Thus, the food fishery is exploiting 79.2% Conne River stock, 6.9% of stocks from other rivers in Bay D'Espoir, and 13.9% from other rivers outside of Bay d'Espoir.

Tagging Mortalities

In total, 41 salmon were held in the sea cage for five full days and those remaining alive were released on the sixth day. There were six mortalities, all of which occurred during the first two days. There were seven salmon that were removed or escaped on the final day held. Therefore, tagging mortality was 6/41 or 14.6%.

There were no tag losses from salmon held in cages.

Tag Loss and Non-reporting

Of the salmon that were released with two tags attached, a total of 37 were reported, of which 3 had only 1 tag. Therefore, the tag loss rate is 8.1%.

Of the salmon that were released with an elastic band and a single tag, there were a total of 121 reported, of which 6 had the Floy tag missing. Therefore, the tag loss rate is 5.0%.

In total, there were 362 salmon examined out of an angling catch of 2060 salmon, or 17.8% of the catch. There were no salmon examined that had an adipose fin missing and did not have a Floy tag. Therefore, the non-reporting rate by anglers on the Conne River was 0.

Angling Exploitation

The angling exploitation rate in Conne River was calculated from the number of tagged fish that passed through the fence and the number reported recaptured by anglers. For these calculations non-reporting rate was 0%, tag loss 0%, and natural and tagging mortality was 0%. These rates are based on finding no dead tagged fish above the fence and no adipose fin-clipped salmon without a tag. Because tagged salmon entered the river at different times than untagged fish, their distributions over time were different, and because most angled fish were caught prior to July 5 it was decided to calculate the angling exploitation rate including only those tagged fish that entered the river on or before June 30. Recaptures of these fish after this date were included. By doing this the exploitation rate will be more comparable to that on the untagged fish which, of course, is the objective.

There were 22 tagged fish through the fence on or before June 30 and of these, 6 or 27% were recaptured.

Exploitation rate of Band Council trap net (μ_f):

The exploitation rate (μ_f) on Conne River origin salmon caught in the Band Council trapnet was estimated by the following equation:

$$\mu_f = \frac{C_F \cdot I_C}{[F_C + [(C_R + C_F) \cdot I_C]}$$

where $F_C = 7912 - 162 = 7750$ (fence count less tagged fish),

$I_C = 0.792$ (proportion of Conne River origin salmon caught in estuary),

$C_F = 525$ (catch in Band Council trap during food fishery),

$C_R = 513$ (catch used for research).

$$\therefore \mu_F = \frac{(525) \cdot (0.792)}{[7750 + ((525 + 513) \cdot 0.792)]} = 0.049.$$

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References

Reddin, D. G., and P. B. Short. 1986. Details on the Conne River Band Council food fishery in 1986. CAFSAC Res. Doc. 86/109. 10 p.

Table 1. Distribution of tag recaptures from salmon tagged and released from gear set in Conne River estuary, Newfoundland, in 1986. These are only the fish with tags. This table is complete to November 5, 1986.

	Total tagged and released	Recaptured ^a in tagging net	Caught by commercial fishermen	Angled in other rivers	Conne River Salmon Counting Fence				
					Released upstream	Dead below trap	Dead ^b in above trap	Angled ^b above fence	
1 Floy tag with band	272	11 (6)	6	0	68	18	21	2	11
2 Floy tags with band	35	0	1	0	7	2	5	1	2
1 Floy tag without band	83	1	1	3	40	1	0	0	3
2 Floy tags without band	49	1 (1)	0	1	21	0	0	0	7
Total	439	13 (7)	8	4	136	21	26	3	23

^aNumber in brackets were released alive included in total.

^bIncludes salmon released through fence.

- Tagging site
- Tagging site recaptures
- ▲ Released through fence
- △ Mortalities at fence (above and below included)
- Commercial recaptures
- Angling recaptures
- () Number tagged and recaptured

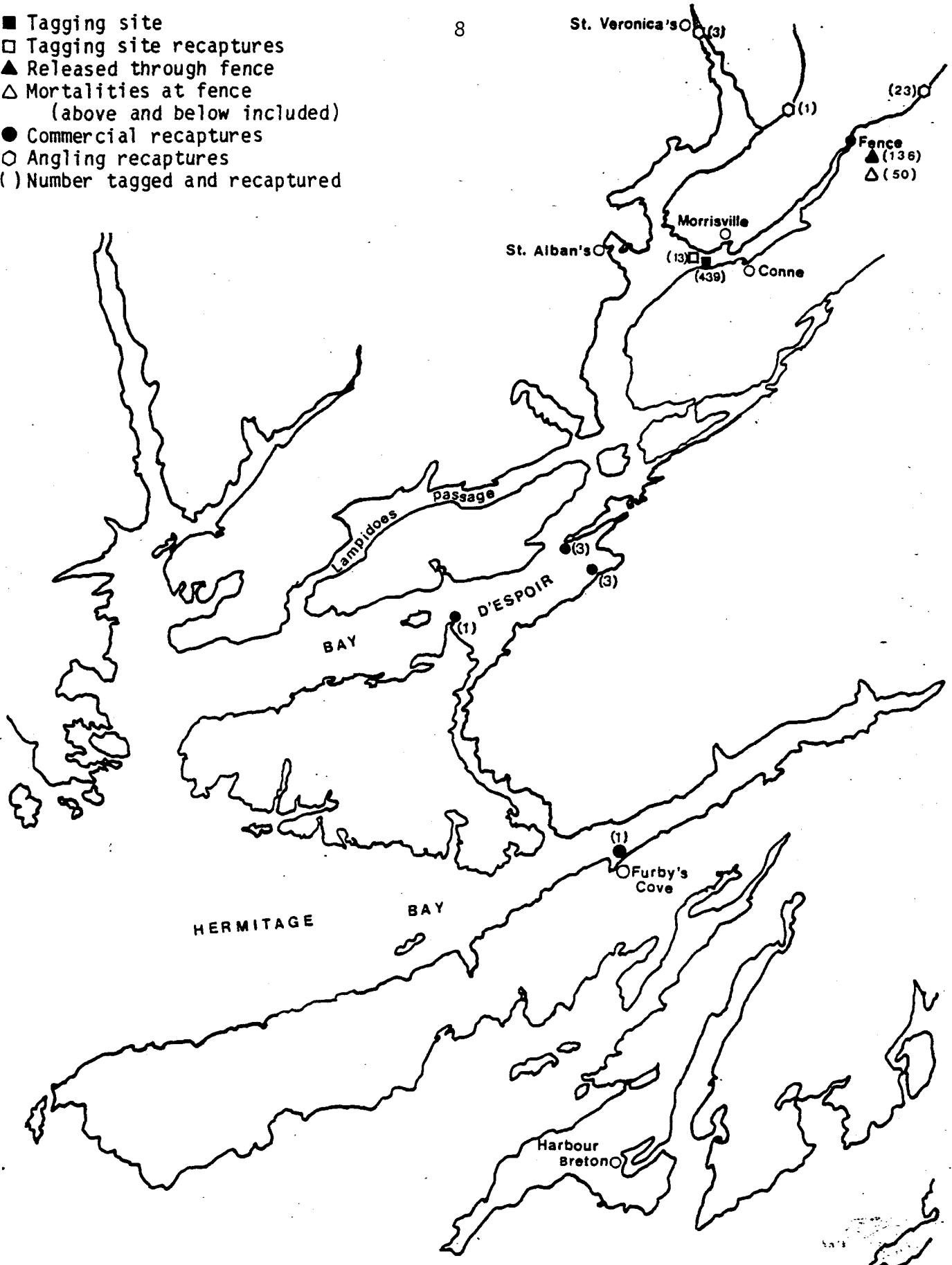


Figure 1. Map showing tagging and recapture sites Conne River, Bay D'Espoir, 1986