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Tagging and recaptures of net marked and undamaged Atlantic salmon in two sea localities and two rivers in Norway.

by

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Abstract.

At the sea localities Kvaløya/Vikna (saltwater) and Vefsnfjord (brackish water) a total of 343 and 427 migrating Atlantic salmon were tagged and released in 1979. The same year a total of 1130 salmon moving upstream were tagged and released in the River Vefsna. From 1976 to 1979 a total of 305 ascending salmon were tagged and released in the River Imsa. At Kvaløya/Vikna, Vefsnfjord and River Vefsna there was no significant difference in the recapture rate of net marked and undamaged fish in 1979, indicating that the extra mortality of net marked salmon in this area was small. There was no significant difference in survival to kelts of net marked and undamaged ascending salmon in the River Imsa.

Introduction

During the last years the frequency of net marks on Atlantic Salmon has increased considerably in Norway. Both in 1978 and 1979 systematic registrations of net marks on salmon from different rivers and coastal areas were carried out. (Hansen 1979, 1980). In 1979 there was a decrease in the net mark frequency compared with 1978 which could be associated with regulations of the set net and drift net fishery (Hansen 1980).

There is very little information about the effects of net marks on Atlantic salmon. However, some information about Pacific salmon was summarized by Ricker (1976). His conclusions for the high sea drift net fishery was one fish killed for every one landed (immature fish), and one dead for every three landed for salmon in their final year. Coastal netting caused much less mortality. In order to get information about the mortality of net marked salmon in Norway, net marked and undamaged salmon were tagged at the coast, in a fjord and in a river in the same area, and the recaptures compared. This report also presents results of winter survival of net marked and undamaged mature salmon from a river in south-west Norway. The results are preliminary, and more recaptures can be expected.

Material and methods

Migrating salmon were tagged with Lea tags in the South Helgeland area a short distance south of the arctic circle, and in River Imsa not far from Stavanger in the south western part of Norway. A map of the Helgeland area is given in fig.1. At Kvaløya/Vikna and in Vefs fjord a total of 343 and 427 bagnet caught salmon were tagged and released. In Laksfors in the River Vefsna 1130 ascending salmon were caught in a salmon ladder, tagged and released. The fish were classified in 3 groups according to their net marks: 1) Undamaged. 2) Some damage (slight net marks on the dorsal fin and around the body).

3) Badly damaged (serious net marks, perforated skin, large loss of scales). The recaptures were reported by commercial fishermen and anglers.

In the River Imsa all fish moving upstream in 1976-79 were caught in a trap at the mouth of the river, examined for net marks, tagged and released above the trap. All descending kelts were controlled on their way to the sea some months later.

Results

In table 1. the recapture rates for the tagged salmon are divided in groups according to their net marks. At Kvaløya very few fish were seriously damaged, and these were included in the "some damage" group. Chi square tests showed no significant difference in the recapture rate for the different groups in three stations. Recaptures made at least 11 days after tagging showed no significant difference.

The survival of migrating salmon as kelts in the River Imsa is shown in table 2. There is a high survival of spawners, and a chi square test on the total material showed no significant difference in survival of salmon with and without net marks, ($X^2 = 0.01$).

Discussion

Ricker (1976) classified losses caused by salmon fishing gear into six types. Modified by Ritter et al (1979) these types are:

- (1) Predation loss - removed from the nets or so badly damaged by predators that fish are not landed;
- (2) Escapement mortality - caught temporarily, but escape and die subsequently from injuries, stress or increased predation due to greater vulnerability;
- (3) Dropout loss - caught and killed by the gear, but drop out before the gear is hauled in;

- (4) Fallout loss - caught by the gear, but fall out of the gear as it is hauled aboard the vessel;
- (5) Unreported discards - not landed because of small size or rotting in the nets;
- (6) Unreported catch - local sales, fish eaten by fishermen or sold directly to consumer, and by-catch (caught in gear not licensed to harvest salmon).

This report deals with the problems in point 2. The preliminary results of the taggings showed no significant difference in the recapture rates for net marked and undamaged salmon, even salmon with serious injuries did not show a lower recapture rate. However, there are some uncertainties. The material of tagged salmon was a mixture of fish with old and new net marks. This would tend to hide a potential mortality a few hours or days after the salmon were injured. It is also possible that salmon with net marks could be easier to catch in nets than undamaged ones, but it is difficult to believe that this is the case when angling salmon in the river. On the other hand it is probable that injured salmon easier will get caught by a predator.

The nets in the Vefsnfjord brackish water highly contribute in making net marks on the salmon, and it is possible that a lot of the salmon tagged here had newly made net marks. This suggests that the mortality of net marked salmon in this area is small. This is supported by Roald (1980) who kept net marked and undamaged salmon in a floating pen in Vefsnfjord, and found no mortality. The injuries were healed after a couple of months. Observations of net marked and undamaged salmon in a floating pen in Ørstafjord at the western coast of Norway both in 1978 and 1979 (Hansen unpublished) support Roald's (1980) observations. The small material from the River Imsa suggest no difference in winter mortality of net marked and undamaged salmon.

The data presented in this report is dealing with the conditions

in 1979 in certain areas. There is a possibility that the mortality of net marked salmon can vary from year to year for example when the conditions are favourable for certain diseases, and with fluctuations in the water salinity.

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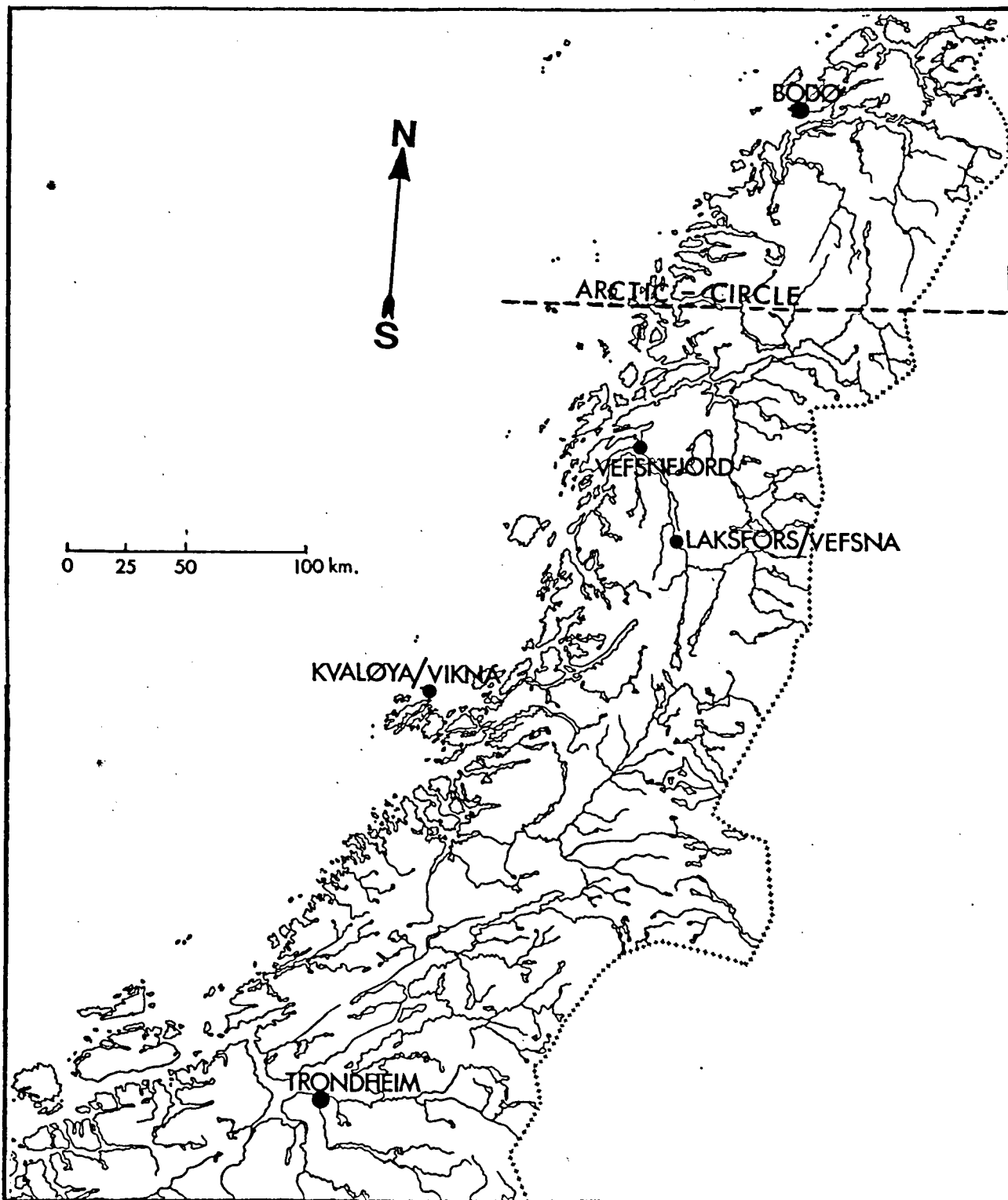


Figure 1. The research area.

Table 1. Recaptures of tagged undamaged and damaged Atlantic salmon
(preliminary figures).

KVALØYA

Group	No. tagged	Total recapture		x^2	Recaptured at least 11 days after tagging		x^2
		No.	%		No.	%	
Undamaged	272	78	28.7	0.01 n.s.	42	15.4	2.02 n.s.
Some damage	71	20	28.2		16	22.5	

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Undamaged	309	130	42.1	0.89 n.s.	68	22.0	1.16 n.s.	
<u>Damaged by nets</u>								
Some damage	99	47	47.5			27		27.3
Badly damaged	11	6	54.5			2		18.2
<u>Other damages</u>								
Damaged	8	5	62.5		4	50.0		

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Undamaged	304	64	21.1	1.86 n.s.	48	15.8	1.97 n.s.	
<u>Damaged by nets</u>								
Some damage	707	177	25.0	0.31 n.s.	138	19.5	1.03 n.s.	
Badly damaged	51	11	21.6			7		13.7
<u>Other damages</u>								
Some damaged	46	11	23.9			9		19.6
Badly damaged	22	6	27.3		4	18.2		

Table 2. No. of ascending and descending salmon with and without net marks, River Imsa.

	With net marks			Without net marks		
	No. ascents	No. descents	Descents/ ascents %	No. ascents	No. descents	Descents ascents %
1976	12	9	75.0	86	59	68.6
1977	6	5	83.3	69	52	75.4
1978	18	8	44.4	45	29	64.4
1979	15	13	86.7	54	39	72.2
Total	51	35	68.6	254	179	70.5