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Report on the salmon tagging cruise to West Greenland by FRS *Scotia*, 1 August-13 September 1972

by

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This cruise was undertaken as a contribution to the International Salmon Tagging Experiment, arranged by the ICES/ICNAF Joint Working Party on North Atlantic Salmon, to take place off the west coast of Greenland from the beginning of August to the end of October 1972.

OBJECTIVES

1. The main objective of this cruise was to operate a fleet of 120 drift nets in order to catch and to tag salmon in the area covered by this experiment (61°-70°N), to provide information on:

   a) The distribution and relative density of the salmon stocks present inside (and possibly outside) the area fished commercially at West Greenland,
   b) The exploitation rate and fishing mortality rate for these stocks,
   c) The rate of return of salmon tagged at Greenland to various home waters.

2. Secondary objectives were:

   a) To collect blood samples from fish unsuitable for tagging, for analysis by the Salmon and Freshwater Fisheries Laboratory of MAFF,
   b) To investigate the possibilities of a pelagic trawl as a means of catching salmon for research purposes,
   c) To carry out work on fish population estimation using the Simrad EK 38,
   d) To provide facilities for a PIROP observer to maintain observations on the distribution of sea birds and the numbers of these caught in drift nets, with particular reference to the numbers of Brunnich's guillemot (Uria lomvia) killed.

NARRATIVE

The Scotia left Aberdeen at 2220 hours on 2 August, sailing a day late to allow completion of repairs to the No. 2 power pack, which powers the plankton winch and net drum. While at West Greenland, instructions were received to return to Aberdeen on 4 September (9 days early) and the Scotia, therefore, left Godthåb at noon on 29 August and arrived in Aberdeen at midnight on 4 September.

The passage to Greenland was made in good weather but, because of a diversion to Iceland to land a sick seaman, the Scotia did not reach the southern limit (61°N) of the area covered by the experiment until 10 August. In order, therefore, to make the best use of the time available for work at Greenland and to gain experience in the techniques involved in drift netting before reaching the area (66°-68°N) allocated to the Scotia for the period 8-15 August, it was decided to begin working at once, fishing drift nets during the early part of the day and moving north as soon as 'hauling' was completed each day.

Sixty nets were accordingly shot on 10 August about 120 n.m. west of Julianhåb and on 11, 12 and 13 August fishing took place approximately 45 n.m. west of Frederikshåb (60 nets), 25 n.m. west of Godthåb (80 nets) and 15 n.m. west of Kangamuit (120 nets), respectively.

During 'hauling' on 13 August the fleet of 120 nets was retained on the foredeck and the Mk 1S pelagic trawl (with 10 m^2 doors) was rigged, shot just before midnight and towed for three hours on the south end of Lille Hellefiskebanke, in an area where drift netting earlier in the day had shown that salmon were present in worthwhile numbers. A further 3-hour trawl was made in the same area on the morning of 14 August. On 15 August, drift netting was resumed on Store Hellefiskebanke, approximately 15 n.m. west of Nordre Isortoq.

Earlier fishings by the Adolf Jensen (Denmark) on 7 and 8 August at Standard Stations 2 and 5 (approximately 15 n.m. west of Rifkol and 18 n.m. west of Disko Fjord, respectively) had suggested that fish were probably scarce in the Disko area, where the Scotia was due to work from 16 to 21 August. However, in order to check this point, these same two standard stations were fished by Scotia on 16 and 17 August, respectively. A total of only 5 salmon was caught on these two days and, on advice from the Adolf Jensen, it was decided that, following a scheduled port call at Egedesminde for water and mail, the Scotia should move south to fish off Hamborgerland, where good commercial catches had been reported recently.

The Scotia entered Egedesminde late on the evening of 17 August and left again at midday on 18 August for Hamborgerland, stopping on passage at 0200 hours on 20 August to shoot 60 nets about 30 n.m. west of Holsteinsborg, on the south end of Store Hellefiskebanke.

The suggested area off Hamborgerland was reached late on 20 August and, from 21 to 26 August, various positions were occupied in an area 30-40 n.m. west of Nappasoq on Sukkertop Banke. Fishing took place there each day, except for 23 August when storm force winds (F8-9) prevented any work. On the morning of 26 August the weather was unsuitable for fishing and the opportunity was taken to rig and operate the towed transducer (Shark) for the sonar. The weather improved later in the day and by 1230 hours it was possible to shoot 60 nets, which were patrolled until 1800 hours and 'hauled' at 1830 hours.

As part of the re-arrangement of the international program necessitated by the curtailment of this cruise, the Scotia undertook to fish Standard Stations 14 (on the south end of Tovqussaq Banke) and 15 (on Fyllas Banke) on the 27 and 28 August, respectively. After 'hauling' at Station 15 on 28 August the Scotia proceeded to Godthåb to collect mail and transfer surplus blood sampling equipment to the Adolf Jensen, entering the port during the afternoon and leaving for home at midday on 29 August.

Apart from 30 August, when head winds of up to F8 delayed progress, the weather on the return passage was excellent, with following winds, and the Scotia reached Aberdeen, as planned, late on 4 September.

RESULTS

No serious problems were experienced in handling the fleet of up to 120 drift nets, approximately 3 miles in length from Scotia. Shooting usually took about 45 minutes and hauling between three and four hours.

Shooting the nets usually began between 0200 and 0300 hours in order to ensure that they were shot before first light and 'hauling', the timing of which varied to some extent according to weather conditions and the numbers of fish entering the nets, usually began in the early afternoon and was completed by 1700 hours.

Weather permitting, patrolling by the rubber boats began as soon as it was light enough, usually 1-1 1/2 hours after the last net had been shot, and continued until 'hauling' began. Initially, the nets were patrolled during 'hauling' but this arrangement was abandoned because of the difficulty of changing the rubber boat crews while the ship was in motion.

Fortunately, any adverse effect on the tagging rate due to the absence of patrolling during 'hauling' was minimized as, contrary to expectation, significant numbers of taggable fish were recovered on deck during 'hauling' and, following the development of a method of releasing tagged fish from the ship, worthwhile numbers were tagged and released during 'hauling'. Overall, 25% of the tagged fish released were taken during hauling.

Only one complete day's work was lost because of weather although, on some other occasions, it proved necessary to reduce the number of nets shot because of wind conditions, fog, or the presence of ice or of other vessels. Details of the numbers of nets fished and the numbers of fish caught and tagged daily are given in the following table.

During 15 days drift netting the equivalent of 35 miles of nets was fished, giving an average of 2.3 miles (or 93 nets) per day. The totals of 304 salmon caught and 127 tagged during these 15 days, give averages of 20 salmon caught and 8.5 salmon tagged per day. However, 59% of the salmon caught and 68% of those tagged were taken on Sukkertop Banke during 5 days fishing (21-26 August) almost at the end of the working period when the average numbers fo fish caught and tagged per day were 36 and 17, respectively.

As previous experience suggested, the proportion of taggable fish in the catch was closely associated with weather conditions; strong winds, particularly if associated with more than a moderate swell, resulting in a marked decrease in the proportion of taggable fish.

The overall tagging rate of 42% was identical with that achieved by the Adolf Jensen over approximately the same period, but slightly lower than that recorded by the A.T. Cameron (Canada). Using the classification of 'condition' of tagged fish as defined in the 'Guide Book', 50.4%, 44.1% and 5.5% of the tagged fish were classed as in 'good', 'fair' and 'poor' condition, respectively, when released.

Date	Position	No. of Nets	Duration (Hrs) of		No. of Salmon		Percent. Tagged
			Fishing	Patrolling	Caught	Tagged	
Aug 10	60°24'N 50°12'W	60	10.7	7.0	43	8	18.6
11	62°06'N 51°15'W	60	7.7	6.0	1	1	100.0
12	64°08'N 52°41'W	80	11.9	10.0	15	10	66.7
13	65°47'N 53°42'W	120	8.2	1.5	40	4	10.0
14	Pelagic Trawling						
15	67°11'N 54°25'W	120	12.4	8.0	14	6	42.9
16	67°59'N 54°22'W	120	10.1	6.0	3	3	100.0
17	69°31'N 55°07'W	120	10.0	6.0	2	1	50.0
18	Port Call						
19	'Steaming' South						
20	66°44'N 54°46'W	60	8.8	6.0	4	2	50.0
21	65°09'N 53°30'W	120	15.2	7.3	54	21	38.9
22	65°12'N 53°52'W	120	7.9	3.0	43	17	39.5
23	Storm - No Fishing						
24	65°06'N 53°35'W	120	11.9	7.5	54	31	57.4
25	65°05'N 53°43'W	120	8.6	7.5	14	4	28.6
26	65°00'N 53°41'W	60	6.8	4.0	14	13	92.9
27	64°24'N 53°34'W	60	8.8	6.5	2	2	100.0
28	64°09'N 52°40'W	60	5.5	3.5	5	4	80.0
			Overall		308[a]	127	41.8

[a]Includes 5 fish tagged and recaptured on the same day, 2 of which were released again.

Blood samples were taken from 169 salmon unsuitable for tagging and these were centrifuged and the resulting serum samples deep frozen.

Although only 19 baskets of sandeels were taken during trawling with the Mk 1S pelagic trawl, useful experience of handling this gear was gained on this, the first occasion on which it had been used.

Due to excessive 'noise' from the Simrad echosounder, it proved impossible to use the fish-counting equipment during the cruise. Investigation failed to reveal the source of the 'noise' but, as it only appears when the ship is in motion, it may be associated with the position of the hull transducer. Use of the towed transducer greatly reduced interference, but lack of suitable opportunities for its use prevented more than a brief trial being made.

While at Greenland, excellent radio communications were maintained with the other research vessels taking part in the experiment and the regular contacts which these afforded, particularly with the Adolf Jensen, proved very valuable in day-to-day planning.