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Recaptures of salmon tagged as smolts in the
Girnock Burn (River Dee), Scotland, from 1967 to 1973

by

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INTRODUCTION

Studies, by means of a continuous census, on the numerical relationship between stocks of adult Atlantic salmon and the survival of their progeny have been made since 1967 on the Girnock Burn, an upper tributary of the River Dee, Scotland. During the course of this work, which is continuing, salmon parr and salmon smolts have been tagged when leaving the stream in order to provide information on the return of adults to home waters, especially the natal stream, and also to contribute to the international programme of research into the origins of salmon caught in high seas fisheries. Some of the results of the tagging programme, up to the smolt run of 1973, are discussed in this paper.

LOCATION

The Girnock Burn (Fig 1), which is 9 km long and averages 6.6 m in width, rises in the Grampian Mountains flanking the south bank of the upper Aberdeenshire Dee and joins the main river at an altitude of 230 metres, some 80 km from the estuary on the east coast of Scotland.

METHODS

Work on the Girnock Burn is based on the total trapping of all upstream and downstream migrants. Traps to take ascending adult and descending juvenile salmon were installed near the mouth of the stream late in 1966 and have been operated continuously throughout each subsequent year. All juvenile stock measuring 9.0 cm and over moving into the descending trap have been tagged and released at the site. In addition to tagging salmon smolts in spring, substantial numbers of salmon parr migrating downstream during the autumn and early winter months have also been tagged.

During 1967 and part of 1968 small, diamond shaped, oxidised, silver plate tags, measuring 7x6 mm, individually numbered and bearing the prefix "Sc" were attached to the anterior base of the dorsal fin of juvenile migrants by means of a silver wire. Many of these tags remained undetected at the adult stage, and in subsequent years all migrants were therefore marked with numbered modified Carlin, Canadian type, green plastic tags measuring 14x5 mm, attached with polyethylene monofilament passed through the internal bones beneath the dorsal fin.

RECAPTURES (GENERAL)

Notification of 503 recaptures derived from tagging carried out up to spring 1973 have been received. These comprised 344 (68.4%) taken in home waters, including 126 in the natal stream and 19 not specifically located,

157 (31.2%) taken off Greenland and 2 (0.4%) taken of the West Coast of Ireland. In addition 2 tags were taken outwith home waters but their recapture sites are not known accurately. Altogether a total of 458 recaptures originated from tagged smolts, whilst the remaining 45 (less than 9%) were from salmon parr tagged in autumn, although autumn parr comprised 40% of all juvenile migrants tagged. Locations and rates of recapture from smolts are shown in the following table:

Year	No. Released	Home Waters ^a		Natal Stream		Greenland	Total
		Grilse	Salmon	Grilse	Salmon		
1967	2,058	5 (2)	8 (4)	2 (1)	10 (5)	10 (5)	35 (17)
1968	1,440	2 (1.3)	3 (2)	1 (0.7)	6 (4)	5 (3)	17 (11)
1969	2,734	3 (1)	12 (4)	5 (2)	8 (3)	17 (6)	45 (16)
1970	2,453	9 (4)	11 (4)	2 (1)	6 (2)	16 (6)	44 (17)
1971	2,129	9 (4)	9 (4)	0 (0)	6 (3)	19 (9)	43 (20)
1972	2,888	36 (13)	40 (14)	6 (2)	64 (22)	64 (22)	210 (73)
1973	1,815	12 (7)	37 (20)	2 (1)	0 (0) ^b	13 (7)	64 (35)
Total	15,517	76 (5)	120 (8)	18 (1)	100 (6)	144 (9)	458 (29)

a British Isles excluding natal stream b Count incomplete

Figures in brackets indicate recaptures per 1000 tagged.

Home Water Recaptures outwith the Gironck Burn

Of 199 recaptures from specified locations (Fig 1), 135 were taken in commercial nets on the East Coast, and 1 on the West Coast of Scotland. The remaining 64 were taken by rod, including 18 from river systems other than the Dee. Grilse accounted for 46% of the total and 2 sea-winter and 3 sea-winter salmon for 51% and 3% respectively. Almost all grilse were taken by commercial nets, less than 3% being accounted for by anglers. Rod catches however, accounted for 50% of the combined 2- and 3-sea-winter salmon total. As expected, a large number of commercial net recaptures (59) were recorded from the Dee estuary and adjacent coast. However the largest number of East Coast net recaptures (61) were recorded in the Montrose area, some 60 km south of the River Dee estuary. It is also of interest that 19 (31%) of the recaptures in the latter area were taken above the tidal reaches of the River North Esk.

Most rod-caught recaptures were taken in the River Dee, 47 (73.4%) being notified from this source. Recaptures from other river systems covered a wide area, ranging from the River Spey (5 fish) which enters the sea approximately 160 km north of the Dee estuary, to the River Tay (6 fish), entering the sea some 130 km south of the estuary. Other errant recaptures included 5 taken in the River Don adjacent to the River Dee, 2 in the River Deveron 115 km north of the Dee and 3 from the River South Esk, 60 km south of the Dee. Such recaptures were not confined to the lower parts of these rivers, several fish having penetrated into the upper reaches, including one each from the Don and Spey respectively recorded 64 and 52 km above tidal reaches.

A small number of recaptures originating from autumn-tagged salmon parr were received from net and rod sources. Where scale samples were available they indicated that these fish had remained in fresh water after tagging until the following spring.

Recaptures in the Natal Stream

The largest single source of home water recaptures was at the Gironck Trap where 126 marked fish were recorded. Sea age composition of these recaptures differed markedly from recaptures outwith the stream, 2-sea-winter and 3-sea-

winter salmon accounting for 90% and 1% respectively whilst grilse, mainly males, accounted for the remaining 9%. This would appear to be due to exploitation by commercial nets throughout the grilse season, whereas large numbers of 2-sea-winter salmon have usually entered the river during the netting close season and avoided exploitation. Adult salmon, bearing tags, comprised on average only 16% (ranging from 6% to 38%) of all salmon taken in the home trap. A few isolated recaptures from autumn-tagged salmon parr were recorded in the stream. All showed river-age scale patterns comparable with adult salmon derived from the smolt run of the succeeding spring.

Greenland Recaptures

Of the 157 recaptures taken in Greenland almost 93% were salmon in the autumn of their second sea year, and the remaining 7% were in their third sea year. A few of these recaptures originated from autumn tagged salmon parr. All the latter showed scale patterns similar to smolts of the succeeding spring run, and appeared to have overwintered in fresh water before entering the sea.

West Coast of Ireland Recaptures

Of the two fish recorded from Ireland the location of one only was received. This was in Dungavan Bay, Co. Waterford and was confirmed as a 2-sea-winter salmon.

DISCUSSION

Several recaptures from the Girnock tagging programme taken well above tidal limits in other rivers (Fig 1) suggest that there is an apparent failure by some fish to locate the home stream, but there is no way of knowing whether these fish would have spawned in these rivers, had they not been caught.

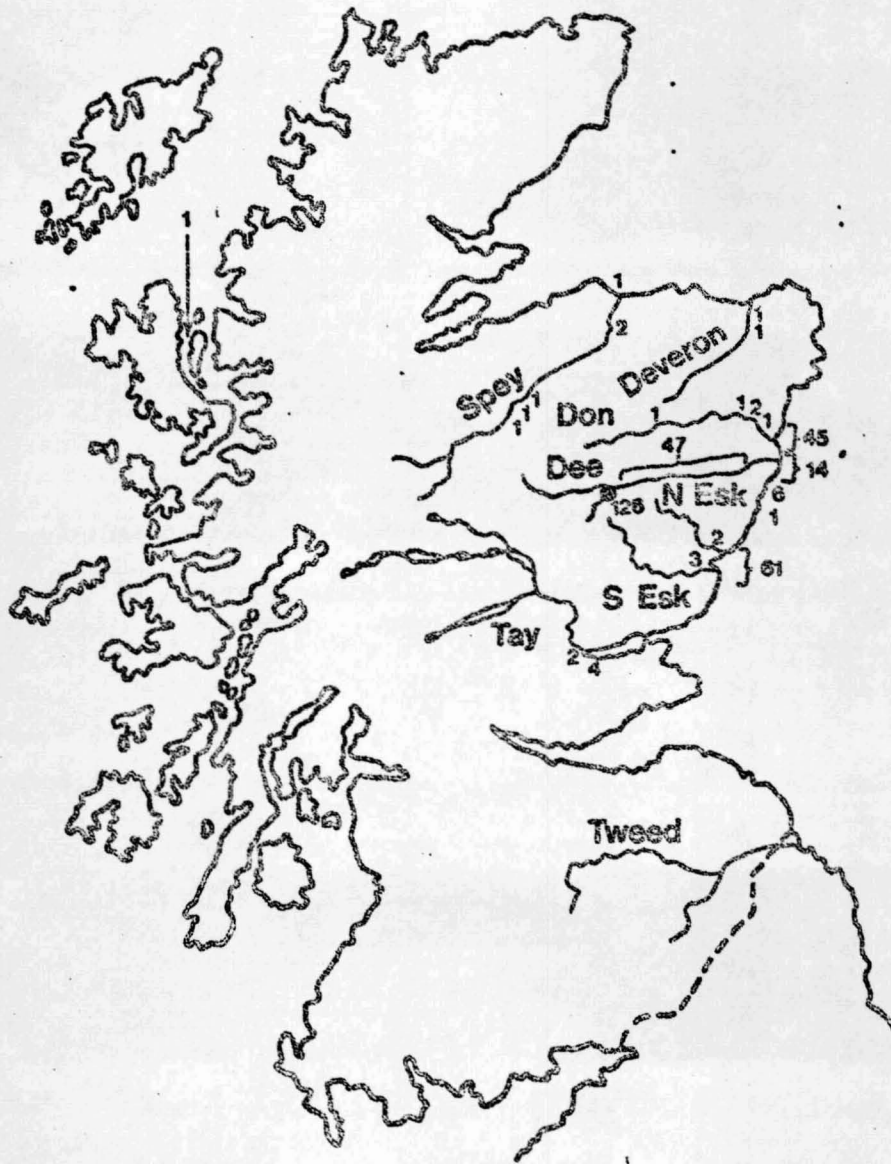
In a total trapping situation, as on the Girnock Burn, it might be expected that a high proportion, if not all, of the adults returning to the stream would bear tags. That this is not so is both disappointing and interesting, especially as no diminution in adult stocks entering the stream is apparent, untagged fish comprising the major part of the runs. The reasons for the poor return of tagged fish are largely speculative, such factors as tag rejection being unlikely in view of the almost complete absence of tagging scars in the untagged stock. Recruitment from outwith the natal stream may occur to maintain the stock, but the sea-age composition of marked and unmarked stock is similar, although the reason for this is unknown.

SUMMARY

1. Although all migrants leaving the Girnock Burn were tagged, only 25% of recaptures were made in the home stream and only 16% of the spawning stock entering the stream bore tags, with no evidence of significant tag loss.
2. Over 43% of all recaptures were made in home waters, commercial nets accounting for twice as many as rods.
3. Recapture of Grinock fish were made in several different river systems, suggesting the possibility of failure to find the natal stream.
4. Over 31% of all recaptures were made off Greenland.
5. Two recaptures were made off the West Coast of Ireland.
6. The proportion of recaptures from autumn tagged salmon parr was very low, despite large autumn migrations, and these were derived from parr which had overwintered in fresh water.

FIG 1

**RECAPTURES OF GIRNOCK BURN SALMON
IN SCOTTISH WATERS**



● = Tagging Station and Home Trap