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THE MIGRATION OF SALMON (*Salmo salar*, L.) FROM THE RIVER URE, YORKSHIRE

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INTRODUCTION

The River Ure is situated in the West Riding of Yorkshire where it rises on the west border of the county. It flows for a distance of 50 miles east and southeast when it unites with the River Swale to form the River Ouse. The Ouse in turn flows southeast past York and Goole to its confluence with the River Trent with which it unites to form the River Humber. The arrangement of the river systems is shown in Figure 1.

For many years the numbers of salmon caught in this river system have been very small. The lower reaches of the Ouse which receives streams from the large industrial centres has been particularly deficient in dissolved oxygen. However, it is considered that the River Ure is the main spawning area for any salmon that enter the system. In very recent years there has been an increase in the numbers of salmon taken in the Ouse/Ure watershed and a few fish have been seen and caught in the River Trent.

In an attempt to improve the run of salmon in the River Ure the Yorkshire River Authority have, since the late 1960s, introduced feeding fry into the upper reaches of the river. From 150 to 200 thousand fry have been planted out each year. The eggs from which these fry have been reared were obtained from east coast of Scotland salmon rivers.

TAGGING EXPERIMENTS

Each year migrating smolts were trapped and tagged at Mickley but instead of being released at the trapping site the tagged fish were transported below the low oxygen belt and released at Brough on the north bank of the Humber.

Table 1 gives the numbers of smolts tagged between 1969 and 1973 together with the number and percentage recaptured as adults. During this period the fish were tagged with a small green plastic plate attached by means of a double polyethylene monofilament thread. As the fry were not marked in any way when they were planted out, it was not known what proportion of the trapped smolts were from the native stock or from the planted fry. The locations at which the fish were recaptured are given in Table 2 and are also shown on the map at Figure 2. Altogether, 82 recaptures were made up to the end of the 1974 season and these show an interesting distribution.

41 fish or exactly 50% of these recaptures were reported from the West Greenland fishery. These included the one and only recapture resulting from the 1969 taggings. 3 were taken by the commercial nets on the Yorkshire coast and a further 13 by netmen off the Northumberland and Durham coasts. The netting in these areas is quite intensive and the fish were most likely intercepted on their migratory route back to the Humber. Within the Humber/Ouse system itself a further 11 fish were caught or found. Only 2 of these fish were taken in the River Ure but 3 were reported from the Humber, one from the lower reaches of the River Derwent, 2 from the River Ouse near Goole and 3 from the lower reaches of the River Trent. 2 of the fish in the Trent and one of those in the Ouse at Goole were found dead.

The only fish taken off the east coast of Scotland was one caught in the open sea by a Danish fisherman at position $58^{\circ}30'N$ $0^{\circ}30'E$. 5 of the fish were caught off the west coast of Scotland, 4 off the Isle of Mull and one by rod in the Borrodale Burn near Arisaig, Invernesshire. 3 recaptures were reported from Ireland, namely from the River Foyle and off Malin Head in the north and from the River Shannon estuary in the southwest.

Perhaps the most interesting recaptures were those taken by anglers in the non-tidal waters of the Rivers Ehen and Calder in Cumberland and the River Ribble in Lancashire. These rivers in northwest England are situated on approximately the same latitude as the River Ure. There were no recaptures reported from Wales or the southern half of England. For many years considerable numbers of salmon smolts have been tagged in rivers in Wales and southwest England but none of these fish has been recaptured in the north of the country.

Concerning the 2 recaptures from unknown locations, the tags were actually returned from an hotel in the north of England and from a catering department at London Airport. In both instances the fish were said to have been purchased as 'Scottish' salmon.

DISCUSSION

The distribution of recaptures would appear to indicate that the fish approached Britain from the north rather than from the west. Another interesting feature is that all but 4 of the fish caught in British waters were one sea-winter in age (grilse) and could not have travelled to the distant feeding grounds off West Greenland. The 4 older fish included the 2 caught in the River Ure and 2 of the salmon taken in the River Humber and lower reaches of the River Ouse. However, 41 recaptures were made off West Greenland and all but 2 of these were one sea-winter fish. Had these fish been allowed to return to Britain they would, of course, have appeared as 2 sea-winter or older fish in 'home waters'.

SUMMARY

The fact that 50% of the recaptures were reported from the West Greenland fishing is not entirely unique as similar proportions have been recorded as a result of tagging experiments in other rivers. However, the distribution of recaptures in British waters has shown a wider scatter than has been generally experienced from other tagging experiments in England and Wales. The fact that the planted fry were derived from Scottish eggs and that the tagged smolts were transported below the deoxygenated belt to be released into the River Humber could have significantly influenced the migratory behaviour pattern.

The tagging experiments on the River Ure are continuing and attempts are now being made to distinguish the smolts produced from the planted fry and any native stock.

TABLE 1 Numbers of salmon smolts tagged in the River Ure, Yorkshire and the numbers of recaptures as adults

YEAR OF TAGGING	NUMBER TAGGED	NUMBER RECAPTURED	PERCENTAGE RECAPTURED
1968	694	1	0.14
1969	1248	9	0.72
1970	3980	35	0.88
1971	971	8	0.82
1972	1320	17	1.29
1973	2139	12	0.56
TOTAL	10352	82	0.79

TABLE 2 Locations of recaptures as adults of salmon tagged as smolts in the River Ure, Yorkshire

AREA OR POSITION OF RECAPTURE	NUMBER RECAPTURED	PERCENTAGE OF TOTAL RECAPTURES
River Ure	2	2.4
River Humber	3	3.7
River Ouse	2	2.4
River Derwent	1	1.2
River Trent	3	3.7
Yorkshire coast	3	3.7
Northumberland and Durham coasts	13	15.9
Open sea off east coast of Scotland	1	1.2
West coast of Scotland (Mull)	4	4.9
Borrodale Burn, Arisaig, Invernesshire	1	1.2
River Ehen, Cumberland (Non-tidal)	1	1.2
River Calder, Cumberland (Non-tidal)	1	1.2
River Ribble, Lancashire (Non-tidal)	1	1.2
Ireland	3	3.7
Greenland	41	50.0
Unknown	2	2.4
TOTAL	82	

Fig 1. River Ure and associated river systems.

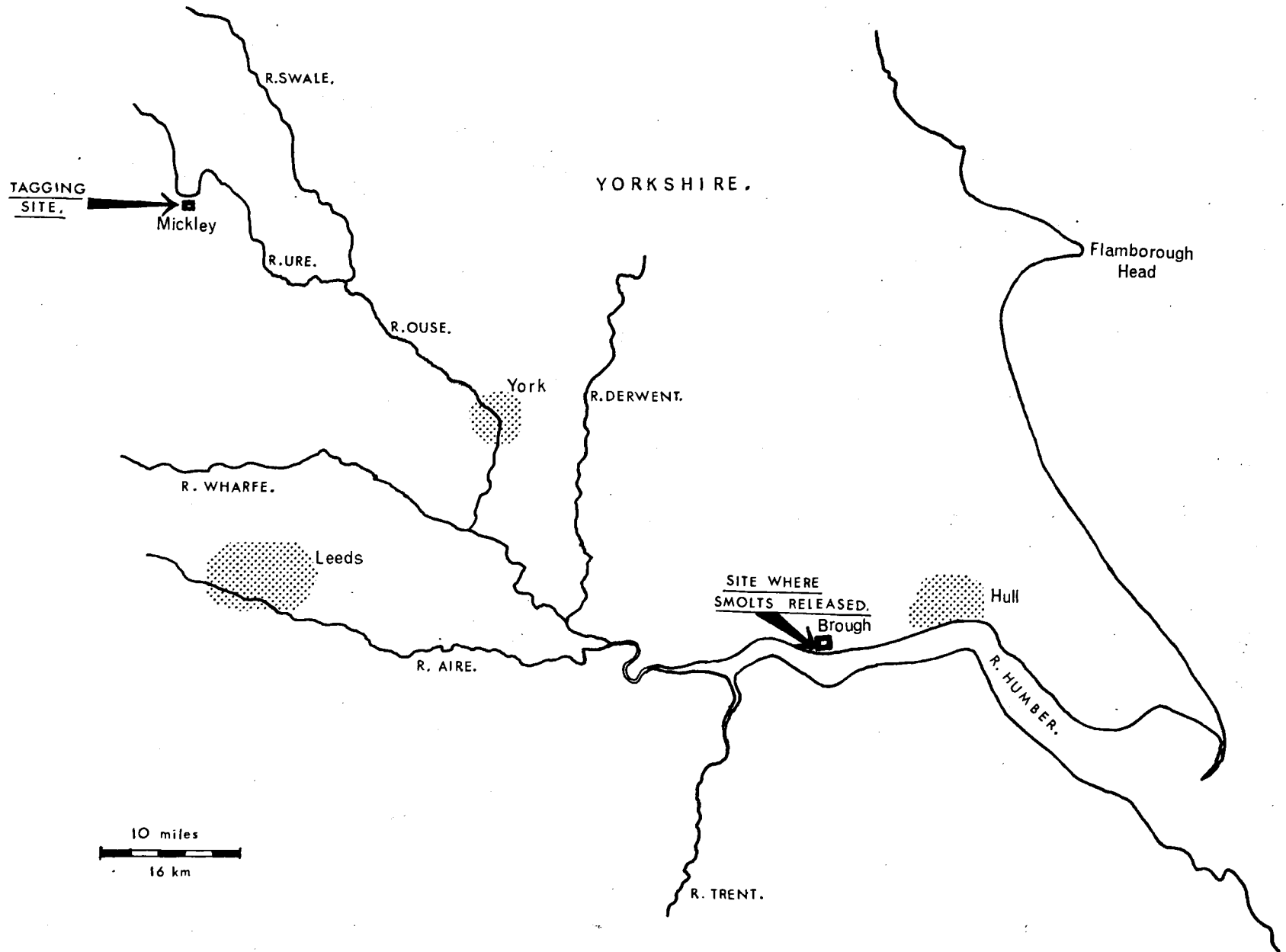


Fig 2. Positions of recaptures as adults of smolts tagged in the R. Ure.

