

International Council for
the Exploration of the Sea

CM 1975/M:10
Anadromous and
Catadromous Fish
Committee

THE MIGRATIONS OF SALMON (*Salmo salar*, L.) FROM THREE RIVERS ENTERING THE
SEVERN ESTUARY

by

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INTRODUCTION

In 1958, an experiment was started to obtain information on the origin of salmon caught in the Severn Estuary. Commercial nets and some fixed engines (putchers) operate in this area between the mouth of the River Usk near Newport and a position a few miles downstream of Gloucester. The netting is carried out within the River Authority areas of the Usk, Wye and Severn respectively. Appreciable numbers of salmon are taken during the season and the declared catches together with the anglers' returns for the years 1960 to 1967 are given in Table 1.

METHODS

With the approval and assistance of the River Authorities it was decided to trap and tag migrating salmon smolts in the 3 major salmon rivers - the Usk, Wye and Severn. The sites at which the smolt tagging took place are shown on the maps at Figures 1, 2 and 3.

On the River Usk a seine net was first of all used at Newbridge just above the tidal limit but very few fish were caught. Some difficulty was encountered in obtaining a suitable site and until 1962 most of the smolts for tagging were obtained from the screen chambers of a Power Station situated on the lower reaches of the estuary. In 1962, however, a promising site was found below Abergavenny, some 14 miles above the tidal limit and from 1962 to 1964 appreciable numbers of smolts were caught using a fixed eel net (modified fyke net).

On the River Wye a seine net was used in 1958 at Bigsweir, near the limit of tidal influence, but again catches were small, and from 1959 onwards a fixed eel net was employed at Brockhampton below Hereford.

On the River Severn an eel net was used throughout the period at Gloucester or at Tewkesbury, depending on the state of the tide.

When the experiment ended in 1964 nearly 55,000 salmon smolts had been tagged on the 3 rivers. The type of tag used consisted of a small serially numbered darkened silver plate or plastic disc with a single silver wire attachment and the tag was attached to the fish just below the anterior end of the dorsal fin.

RESULTS

The numbers of fish recaptured as adults by the commercial netsmen and anglers was disappointingly low. A total of 228 recaptures was made over the years so that the overall recapture rate for any of the rivers did not exceed 0.5%. Of the 228 recaptures, 84 or 37% resulted from the final smolt tagging experiment of 1964.

The sea age composition of the fish recaptured is given in Table 2 with the Usk and Wye producing a somewhat higher proportion of one sea-winter fish (grilse) than the Severn. 30% of the Severn fish recaptured were 3 sea-winter salmon.

Although the numbers of returns were small they did show an interesting distribution. Details of where the adult recaptures occurred are given in Tables 3 and 4 and the distributions of recaptured Usk, Wye and Severn fish are shown in Figures 1, 2 and 3 respectively.

It can be seen that salmon from all 3 rivers were taken by commercial nets operating in the Severn estuary below Gloucester. Several Usk fish were caught near the mouth of the River Wye and both Usk and Wye fish were taken by the nets operating further up the estuary towards Gloucester, the fish having apparently 'overshot' their parent rivers. It could be expected that some of the Severn fish returning to their home river from the sea would be caught by any of the nets operating in the estuary. However, although a few Severn fish were taken by the nets operating in and around the estuary of the River Wye, none was reported from the drift nets or putchers near the mouth of the River Usk.

Of the total recaptures 44% were reported from the tidal waters of the Severn estuary area and 42% were taken in the non-tidal waters of their respective parent rivers.

It is interesting to note that 15 of the recaptured fish, including salmon from each of the 3 rivers, were reported from the River Parrett estuary on the south side of the Bristol Channel. Of these 15, 11 were found dead near the shore. The River Parrett does not have a natural run of salmon and the estuary is polluted, but it was not known whether these fish were killed directly by pollution or whether they were weak or sick fish brought into the estuary by the tidal flows in that area. Apart from the fish caught in the Severn Estuary/Bristol Channel, 23 salmon were recaptured in estuaries or in the sea some considerable distance away. One fish originating from the River Severn was netted in the River Exe estuary and another was taken off the mouth of the River Axe, both on the south Devon coast. In addition, an Usk fish was caught by drift net off County Mayo on the west coast of Ireland.

During the course of the experiments 19 of the tagged fish, representing 8.3% of the total recaptures, were caught off the west coast of Greenland. Six of these were from the Usk, 6 from the Wye and 7 from the Severn. All the fish except one from the Wye were in the one sea-winter age class, the one exception being a 2 sea-winter fish. These recaptures occurred at a period when the commercial catch off Greenland was much lower than it has been in recent years and when virtually all the fishing was carried out by local fishermen using inshore gill nets. Indeed, one of the recaptured Usk fish provided the first record in 1961 of a tagged smolt from the United Kingdom being caught as an adult in Greenland waters.

Although 42% of the recaptured fish were taken in the non-tidal waters of their parent rivers it is interesting to note that 9 fish (4% of the total recaptured) were reported from the non-tidal reaches of rivers which were not their parent rivers, the locations being shown in Figures 1, 2 and 3.

The 9 salmon included 4 originating from the Severn (4.3% of the Severn fish recaptured), 3 from the Wye (3.7% of the Wye fish recaptured) and 2 from the Usk (3.8% of the Usk fish recaptured). It can be seen that none of the Usk fish was reported from the River Severn and none of the Severn fish was caught in the River Usk. All 4 Severn fish were taken on the River Wye; 2 were 3 sea-winter and one a 2 sea-winter fish, all caught in the spring, and the single one sea-winter fish (grilse) was taken in August. Both Usk fish were caught by rods on the River Wye. One was a 2 sea-winter fish caught in February and the other was a one sea-winter fish taken in July.

One of the fish originating from the River Wye, 3 sea-winters in age, was taken on a tributary of the upper reaches of the River Severn in May and a one sea-winter fish was caught near Brecon on the upper waters of the River Usk. The third Wye fish, a 2 sea-winter summer fish, was caught in the non-tidal waters of the River Exe in south Devon.

SUMMARY

A considerable number of salmon smolts were tagged in the 3 major salmon rivers, the Usk, Wye and Severn, entering the Severn estuary. Although the number of recaptures was small they did show an interesting distribution. The commercial nets operating in the upper reaches of the estuary below Gloucester caught salmon originating from all 3 rivers indicating that some of the Usk and Wye fish returning from the sea had overshot their parent rivers. Had they not been caught, of course, they could have returned to these rivers later in the season. The experiment showed that some of the fish from all 3 rivers migrate to the feeding grounds off Greenland, while one or 2 fish were intercepted on their migratory routes or had wandered into areas away from their native rivers, e.g. west coast of Ireland and south Devon. One of the most interesting features was that around 4% of the recaptured fish were taken by anglers in the non-tidal reaches of rivers which were not their parent rivers.

TABLE 1 Reported catch of salmon in the Usk, Wye and Severn areas

YEAR	USK		WYE		SEVERN	
	NET	ROD	NET	ROD	NET	ROD
1960	1081	374	1017	2677	3578	754
1961	838	327	464	2056	2792	768
1962	1403	923	994	3158	4477	743
1963	1277	895	866	4505	3261	751
1964	1599	775	867	3667	3115	417
1965	1725	1412	696	4171	3760	415
1966	1885	1953	853	6991	3195	1024
1967	1454	1185	812	7864	3708	1602

TABLE 2 Sea age composition of recaptured fish

	ONE SEA-WINTER		2 SEA-WINTERS		3 SEA-WINTERS	
	NO	% OF RECAPTURES	NO	% OF RECAPTURES	NO	% OF RECAPTURES
R Usk	17	32.1	31	58.5	5	9.4
R Wye	27	32.9	41	50.0	13	15.9
R Severn	21	22.6	44	47.3	28	30.1
Total all Rivers	65	28.5	116	50.9	46	20.2

In addition, one of the Wye fish recaptured was a 4 sea-winters fish

TABLE 3 Numbers of smolts tagged in the Rivers Usk, Wye and Severn and distribution of recaptures

PARENT RIVER	NO TAGGED	RECAPTURES					TOTAL
		NON-TIDAL PARENT RIVER	NON-TIDAL OTHER RIVERS	TIDAL WATERS SEVERN ESTUARY BRISTOL CHANNEL AREA	BRITISH ISLES ESTUARY OR SEA AWAY FROM BRISTOL CHANNEL	GREENLAND	
Severn	23,241	39	4	41	2	7	93
Wye	21,270	39	3	35	0	6	82
Usk	10,435	20	2	24	1	6	53
Total	54,946	97	9	100	3	19	228

TABLE 4 Location of recaptures of salmon tagged as smolts in the Rivers Usk, Wye and Severn

Place of recapture (as adults)	Place of tagging (as smolts)			
	R Usk	R Wye	R Severn	Total
Usk - tidal	5	4	0	9
Usk - non-tidal	20	1	0	21
Wye - tidal	5	8	2	15
Wye - non-tidal	2	38	4	44
Severn - tidal	11	19	31	61
Severn - non-tidal	0	1	39	40
Parrett - tidal	3	4	8	15
S Devon - esty or sea	0	0	2	2
S Devon - river	0	1	0	1
Sea off Co Mayo	1	0	0	1
Greenland	6	6	7	19
Total	53	82	93	228

Figure 2.

RECAPTURE POSITIONS
OF RIVER WYE FISH

□ = Tagging Sites

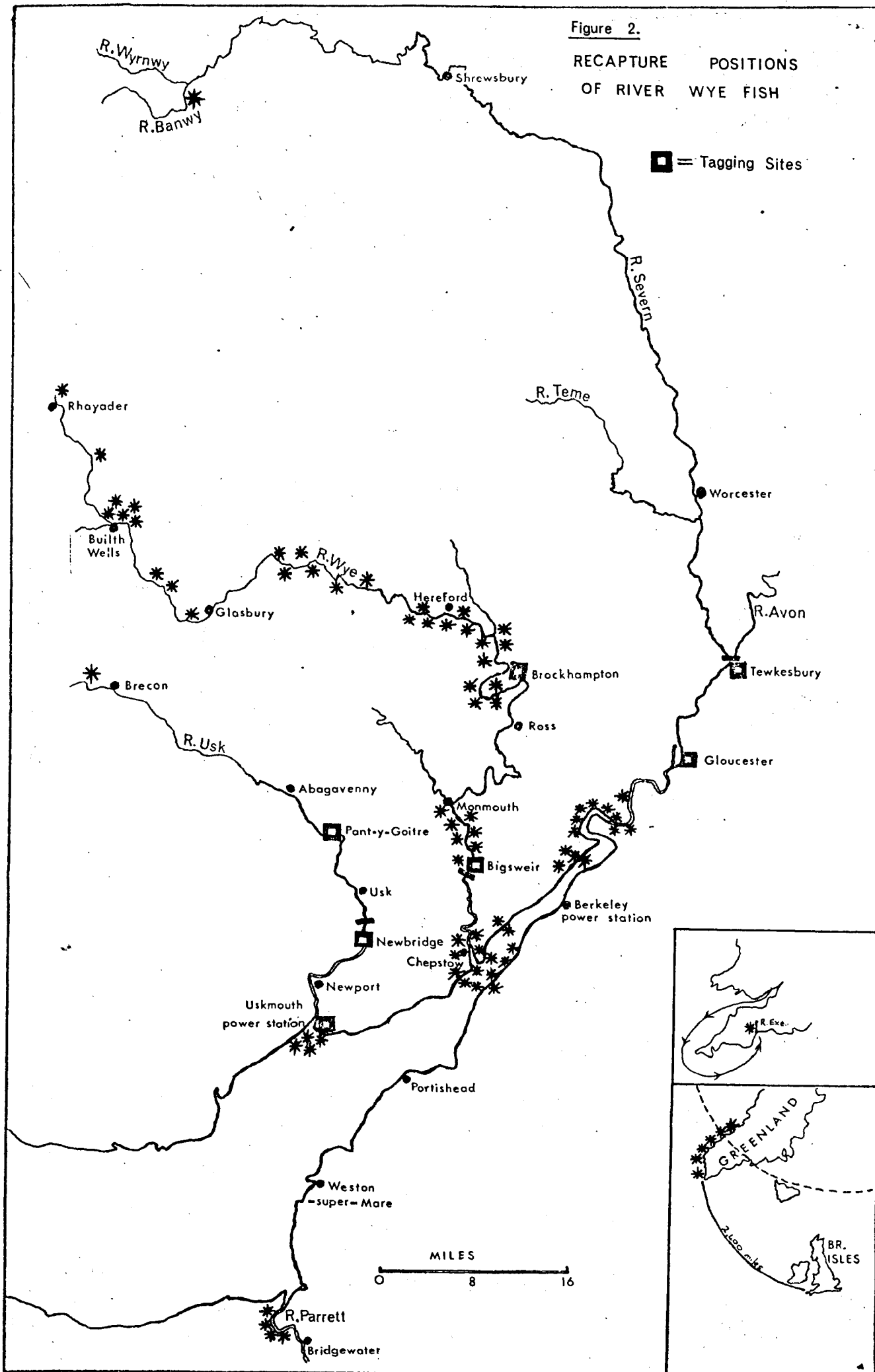


Figure 1.

RECAPTURE POSITIONS
OF RIVER USK FISH

■ = Tagging Sites

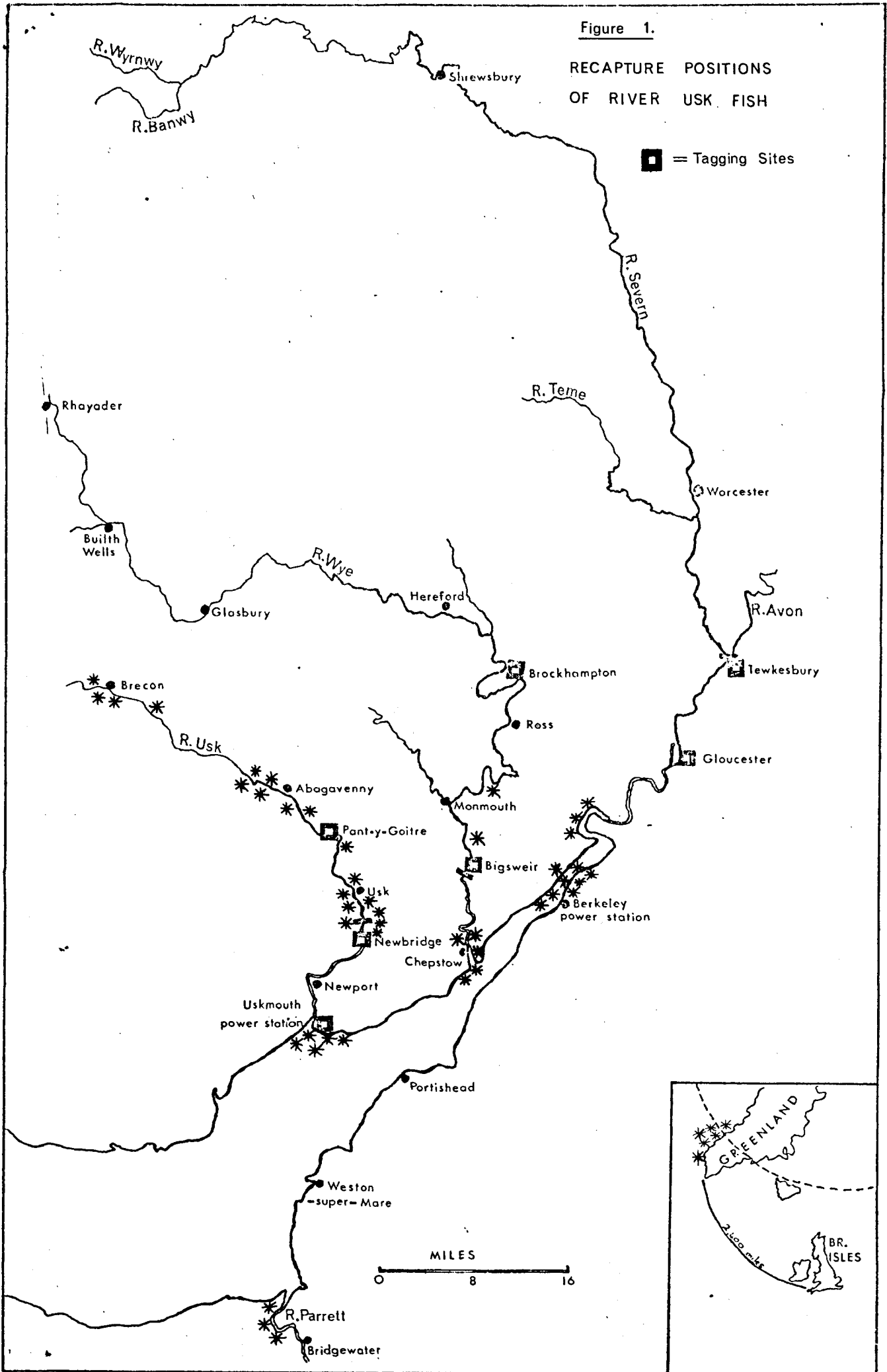


Figure 3.

RECAPTURE POSITIONS
OF RIVER SEVERN FISH.

■ = Tagging Sites.

