A FISHERIES MANAGEMENT PLAN FOR THE RIVER TWEED IN THE SCOTTISH BORDERS

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Introduction

The River Tweed (Figs 1-4) is, in rod-catch terms, the second most important river in Britain for Atlantic salmon *Salmo salar* L., with an annual rod catch of ca. 10,000 fish, and also supports a now much reduced salmon-net fishery in its estuary (illustrated on the Front Cover of this volume) and around the immediate North Sea coastline. A drift-net fishery off the Northumbrian coast also takes a significant number of Tweed salmon (Anon. 1991). As well as its famous salmon, sea-trout *(Salmo trutta trutta)* and brown-trout *(S. trutta fario)* fisheries, some notable grayling *(Thymallus thymallus)* are caught - the present Scottish record (3 lbs 1 oz; 1.404 kg) is from the Tweed. Some coarse fish species, roach *(Rutilus rutilus)*, dace *(Leuciscus leuciscus)* and gudgeon *(Gobio gobio)*, have been introduced within the past 100 years (Mills 1989).

The river has a complex drainage system based around five major and three minor tributaries (Fig. 5) and is one of the three rivers that attain the highest stream order classification (8) in the UK (Badenoch 1989). Its catchment area of almost exactly 5000 km^2, which has been estimated to contain ca. 15% of the all spawning areas available to salmon in Scotland (Gardiner 1989), lies mainly in the eastern Scottish Borders, with one major tributary, the River Till, draining the Cheviot Hills of north Northumberland in England. Having risen at an altitude of 520 m at Tweed's Well, on the same hill that has the source of the River Clyde, its main stem flows for 156 km until it reaches the North Sea at Berwick-upon-Tweed. For a short distance between Coldstream and Berwick it forms the border between Scotland and England.

The fisheries of the Tweed have been run since 1857 by a cross-border organisation, the River Tweed Commissioners (RTC), the Council of which is now made up of 38 elected representatives of the salmon-fishery owners and 43 appointed representatives of the Scottish and English local authorities within the catchment (23 of the latter are from local angling clubs, the remaining

20 are from independent interests). The remit of the RTC is the *"general preservation and increase of the salmon, trout and other freshwater fish in the River Tweed and its tributaries"* (Anon. 1990). The statutory powers of the RTC are purely to do with fisheries; it is not concerned with water quality or flood control, which are the responsibilities of the Scottish Environmental Protection Agency in Scotland and the Environment Agency in England. Until the RTC set up the Tweed Foundation in 1983, its work in recent years was almost entirely concerned with the "preservation" part of its remit. The *"increase"* section was then devolved to the Tweed Foundation, which began active research and management in 1990 with the recruitment of the author as its first fisheries biologist and the publication of the first edition of its fisheries management plan (Jamieson 1990). That edition ran for five years and this article gives an outline of the (unpublished) second edition.

The Tweed fisheries management plan (second edition) (TFMP) is defined and shown diagrammatically in Fig. 6; contents are listed in Table 1.

The importance of the past in the TFMP

In the TFMP, study of the "past" is given the same importance as that of the "present" since, without at least some idea of what things were like in the past, it is impossible to accurately understand any present situation. Two management case-histories in which information from the past played a vital role are presented later.

Gathering data on the past is not easy. For the Tweed catchment, the longest series of data that can be found are catch records for salmon (for rods, back to the 1850s; for nets, back to 1808 [and possibly further]), and records of rainfall (back to the 1840s for Lilburn Towers, in north Northumberland). Computerising such records is a long and tedious business, but once on disc their uses are almost infinite.

Other records of past conditions that are being collected and used are personal diaries kept by anglers for brown trout. In Scotland, trout fishing does not and never did have any significant commercial value, and there are no official records of trout river fisheries as there are for salmon, so personal diaries seem to be the only sources available for data on trout fishing. The best one found so far covers the period 1900 to 1928 for the area around Peebles on the upper Tweed. Other sources are the records of local angling clubs, which generally go back to the 1880s, though in one case, the Ellem Angling Club in Berwickshire - the oldest angling club in the world - the records go back to 1829. Unfortunately, club records of competition catches only record total weights of fish, never (it seems) the numbers caught or total numbers of anglers fishing in a competition, so their uses are limited, though the records of prizes for the "best half-dozen" can give average weights.

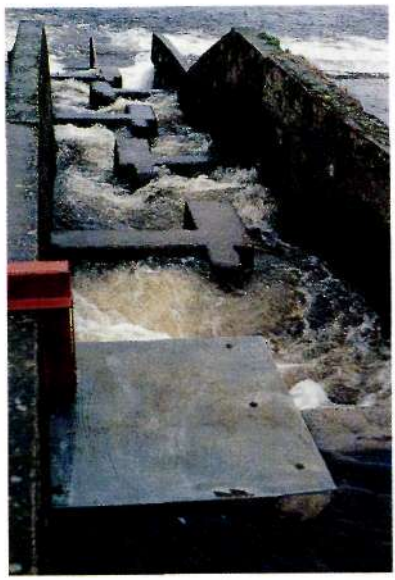


FIG. 1. A VAKI fish counter near the mouth of Ettrick Water, a tributary of the River Tweed in the Scottish Borders.

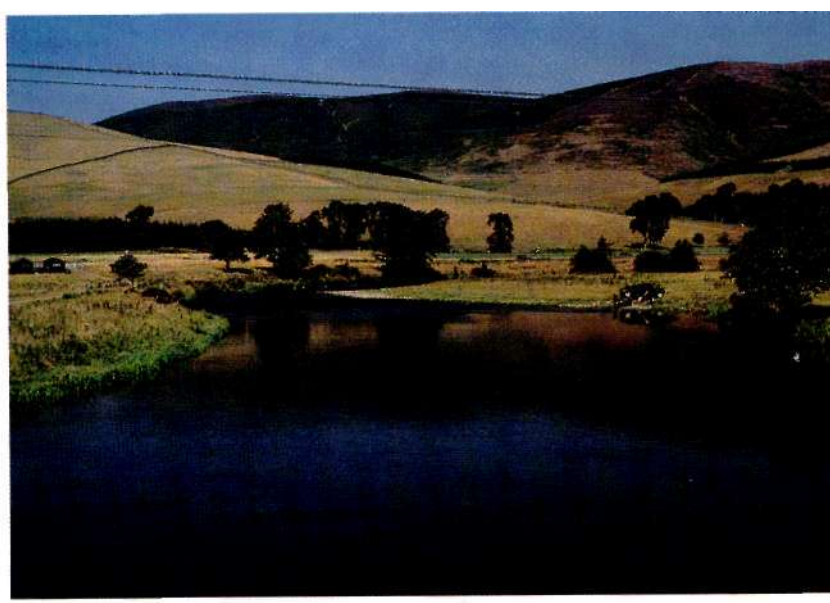
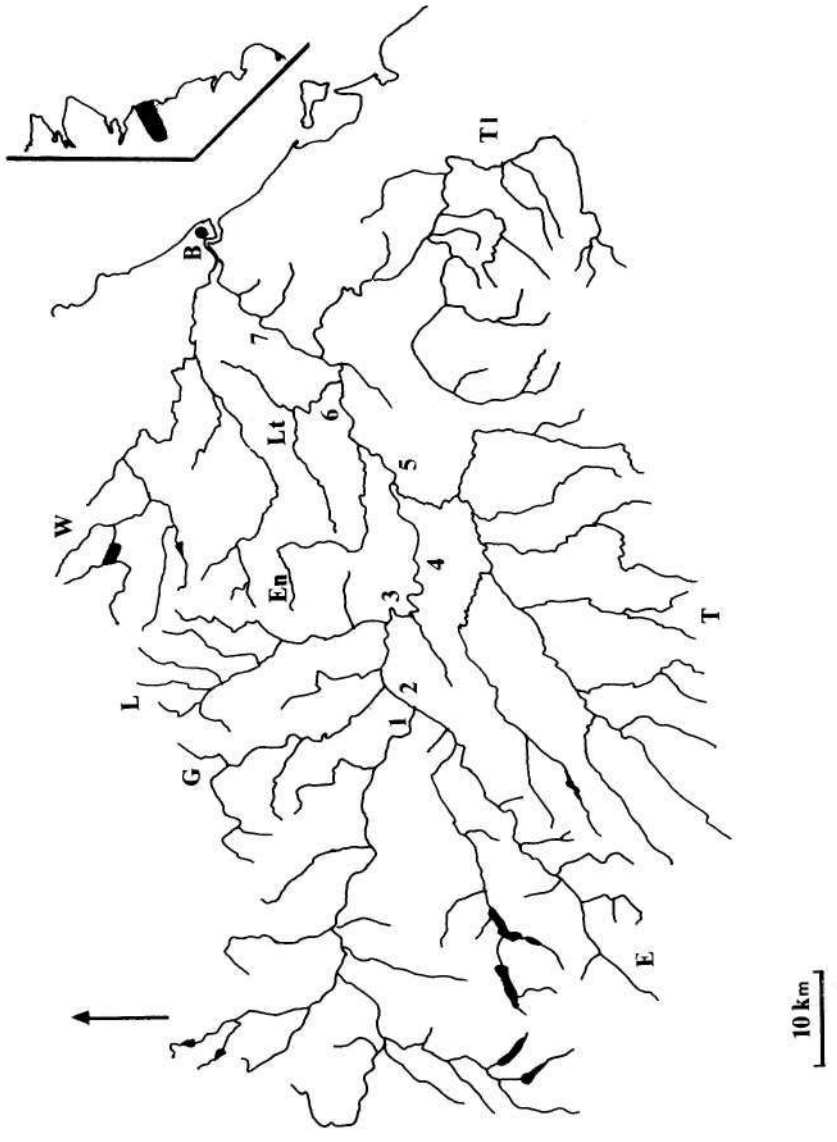


FIG. 2. The upper River Tweed at Horsburgh, near Peebles.

FIG. 3. Aerial photograph taken when radio-tracking salmon as they moved up the River Tweed in the region of Coldstream, Scottish Borders.

FIG. 4. Whiteadder Water (above) entering the River Tweed (centre foreground) ca. 3 km above the estuary at Berwick-upon-Tweed.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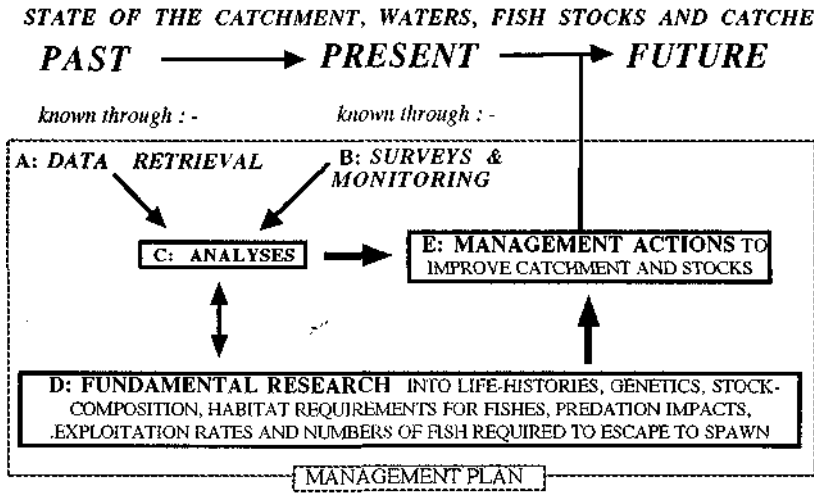


FIG. 6. The Tweed Fisheries Management Plan, summarised diagrammatically and defined as "The co-ordination of data collection and analyses with fundamental research into relevant topics to devise management actions that will beneficially affect the future state of fish stocks".

The aims of "The Present" in the TFMP

As can be seen from the items in the plan (Table 1), much of the work set down for the present is concerned with setting up recording and measuring systems for fish catches and exploitation rates, and for the operation of monitoring sites for juvenile densities and adult trout and salmon spawning runs. While surveys show the present state of affairs, the collection of records and regular monitoring of sites will mean that in the future, the past will be better known through a longer series of records. This will allow much better judgements to be made of the state of the fish stocks and catches at any particular time and of any corrective or improvement measures that are necessary.

FIG. 5 (on facing page). Outline map of the River Tweed and its major tributaries in the eastern and central Scottish Borders. B = Berwick-upon-Tweed on the north Northumbrian coast (North Sea). E = Ettrick Water; En = Eden Water; G = Gala Water; L = Leader Water; Lt = Leet Water; T = Teviot Water; Tl = River Till; W = Whiteadder Water. The Upper Tweed is defined as the river upstream of its confluence with Ettrick Water (above Melrose), the Middle Tweed lies between the confluences of Ettrick Water and Teviot Water, and the Lower Tweed is below the Teviot confluence (at Kelso). Seven fisheries are sampled (salmon and sea-trout lengths, weights and scales are taken from each fish killed) at: 1, Fairnilee; 2, Boleside; 3, Upper Mertoun; 4, Rutherford; 5, The Junction; 6, The Lees; 7, Ladykirk.

Table 1. A summary of the Tweed Fisheries Management Plan.

1. Understand, protect and enhance the environment:
   1:1. Collect historical data on the physical habitat and environmental parameters.
   1:2. Survey, protect and enhance stream environments for juvenile fish.
   1:3. Monitor techniques and areas of habitat improvement.
   1:4. Ensure further habitat problems are avoided by collecting information on best farming, forestry and road-building practices in relation to watercourses, and bringing these to the attention of appropriate local bodies.

2. Protect and improve juvenile stocks of salmon and trout throughout the Tweed fisheries district:
   2:1. Establish present distribution, abundance and population structure of juvenile populations in the smaller burns (dominated by trout) and identify poorer areas.
   2:2. Monitor the juvenile populations at key sites selected throughout the district in the larger channels (dominated by salmon) and identify poorer areas.
   2:3. Collect information on effects of predation on salmon and trout stocks and catches.
   2:4. Where appropriate, stock local salmon into newly opened-up areas.

3. Advise the RTC on composition of the salmon stock pressures on it and trends in abundance:
   3:1. Analyse the history of salmon catches in the district for as far back as possible.
   3:2. Investigate the structure(s) of the salmon stock(s) of the district, including their genetic identities.
   3:3. Monitor salmon catches and stocks, and ascertain exploitation rates, by setting up fish counters and tagging salmon entering the river fishery.
   3:4. Gather data for modelling the salmon population of the Tweed, particularly to estimate numbers required to survive to spawn.

4. Advise the RTC on composition of the sea trout stock, pressures on it and trends in abundance:
   4:1. Analyse the history of sea-trout catches in the district for as far back as possible.
   4:2. Investigate the life-histories of the sea-trout stock(s) of the district.
   4:3. Monitor the stocks (through the fish counters) and angling catches of sea-trout over the years.

5. Advise the RTC on composition of the brown trout stock, pressures on it and trends in abundance:
   5:1. Analyse the history of brown trout catches in the district for as far back as possible.
   5:2. Monitor the adult brown trout stocks in a sample of smaller burns by trapping their spawning runs and define appropriate size limits for anglers' catches.
   5:3. Monitor adult brown trout angling catches over the years through a catch diary scheme.

6. Collect information on other fish species in the district:
   6:1. Collect historical records of fish species.
   6:2. Maintain a database of fish species distribution using data obtained during electric-fishing and other surveys.
   6:3. Investigate diet and other features of the life-history of other fish species that impinge on salmon and trout.

Work for "The Future" in the TFMP

This is where all the information gathered from the past and the present is put to use, to undertake the best known methods to protect the good areas of the catchment and improve the poorer (as identified during surveys) and to suggest better regulations for the fisheries. On the Tweed, physical improvements are the responsibility of a specific employee, the "Habitat Improvement Manager". In this way the plan is not only a way of collecting information on the catchment, it is the basis for active management.

The Tweed Fisheries Management Plan for 1996-2000

The management plan is summarised in Table 1 under six section headings. For reasons of space, the detailed actions under each heading have been omitted, and it should be noted that all but the second of the six major sections of the plan are structured as Past, Present and Future. A summary of the justifications for each element in the plan is given below.

In order to interpret the present state of affairs, it is necessary to know as much as possible about past conditions in and around the river. Such background is essential if present-day features are to be seen in their proper context and importance (Policy 1:1 of the plan).

The present-day state of the catchment and channels needs to be assessed and quantified for the quality of habitat provided for fish, the quantity available, and identification of the worst areas (Policy 1:2).

The appropriate solutions to these problems, that have been devised elsewhere, need to be tested under local conditions and with the materials locally available (Policy 1:3).

Most if not all of the problems affecting the fish stocks of the catchment can be avoided if other land users are aware of the effects they could have on fish populations, so the best practices known need to be brought to their attention (Policy 1:4).

Healthy stocks of adult fish come from healthy stocks of juveniles, so it is necessary to know the state of juvenile fish stocks throughout the catchment, identifying the better and the poorer areas and finding out the reasons for such differences (Policy 2:1).

As well as defining these differences over the area of the catchment, differences in juvenile stock levels over time also need to be followed so that if adult numbers decline significantly it can be known if this is related to a decline in juveniles within the catchment or is due to some other cause (Policy 2:2).

The effect of predation on juveniles also needs to be studied and quantified as much as possible in order to assess its significance in both biological and economic terms (Policy 2:3).

Where new areas are opened up to salmon by the easing of obstacles,

stocking with fish from nearby areas may be appropriate (Policy 2:4).

Interpretation of the present state of the Tweed salmon needs to be based on a sound knowledge of past changes and cycles and how these might be related to past environmental conditions (Policy 3:1).

The stock structure of salmon needs to be known. Is there just one interbreeding stock throughout the whole catchment, or are there several stocks differentiated by their life-histories and/or genetics? (Policy 3:2).

In other rivers, the relationships between fish stocks and catches have been found to be vague, so both need to be accurately monitored in order to assess the real state of the salmon at any particular time and to identify trends over periods of years. Poor catches do not necessarily mean that stocks are poor (Policy 3:3).

The pressures on the stock(s) need to be known and, in particular, whether enough salmon to seed the next generation are escaping to spawn. If too few fish are doing so, catch regulations would need to be modified so that more survive the rod and net fisheries on the Tweed (Policy 3:4).

Very similar requirements are needed for sea-trout (Policies 4:1, 4:2, 4:3).

Catches of brown trout have not been recorded in the same way as those for salmon, but any information that is available needs to be gathered and analysed to provide background information to the present situation (Policy 5:1).

The stocks of adult brown trout need to be monitored and factual information on appropriate size limits for trout killed by anglers needs to be found (Policy 5:2).

Accurate information on the current catches of brown trout needs to be gathered continuously, and this will give trends over the years (Policy 5:3).

The history and distribution of all the fish species now found in the Tweed catchment is important background information (Policies 6:1, 6:2).

The way in which other fish species might affect the salmon and trout - through predation or competition or as prey - needs to be understood (Policy 6:3).

The two case-histories presented below show how the different elements of the plan can be used either singly or in combination to define work for the future management of the river.

Case-history 1: Setting the aims for managing the brown trout of the Tweed and defining the present state of the fishery

The Tweed is rather a "literary" river in that fishing on it features in many kinds of books. The references and occasional statistics given in this literature are being collected to give a picture of the perception of the trout fishing back into the late 18th century. Table 2 summarises information collected so far.

Although such records contain few actual statistics, the picture they give of

Table 2. Some comments by anglers about salmonids in the River Tweed in the 19th and early 20th centuries, collected from various literary sources. [Note: 1 lb = 453 g].

Date	Anglers' results and comments
1810	John Younger refers to "the millions of trout" of the Tweed: "my grandfather, in the olden time, killed 36 dozen of trout in one day".
1818	Rev. J. Russell writing about the Yarrow pre-1818 states: "a good dish of trout could then be got at almost any time in a few hours"; then he states in 1883: "the "trouting now so poor".
1840	W. C. Stewart "there are not many days from May till October in which an angler thoroughly versed in the mysteries of the craft should not kill at least 12 lbs in weight of trout".
1853	W. Scrope writes: "Before the hills were so well drained the mosses gave out the water gradually, and the river continued full for a long time . . . But now every hill is scored with little rills . . . which suddenly become rapid torrents which swell the main river . . . with tremendous violence".
1857	W. C. Stewart blames drainage: "during the last fifty years a great decrease has taken place in the quantity of trout . . . and still more in size".
1858	On the 16th June, W. C. Stewart, of Edinburgh, caught 55 lbs of trout in the Leader Water between Lauder and Earlston. [A river distance of ca. 9 km in the present day].
1858	Adam Dryden, of the Edinburgh Saturday Angling Club caught, in 49 days from April to June, 2,856 trout weighing 714 lbs on the Tweed, Leader, Gala and Ettrick. [Including one day on the Almond, outside the Tweed catchment. This gives an average weight of exactly 4 ounces or 113 g].
1861	John Robertson, covering the period 1830-1860, described the Jed as a "superior stream" and records the "excellent fishing" of the Borthwick but expectations of size not big; "the excellent trout about four ounces".
1866	T. Stoddart records "the enormous weight of 57 lbs of common trout" caught by one man on the Teviot "between 11 am and 5 pm".
1885	D. Webster, covering 1845-1885: "The anglers' take is poor compared with the baskets of 20 or 30 years ago, but even in these altered and degenerate times I should consider any days fishing a failure where I could kill less than 10 to 15 lb of trout in a day".
1912	F. Fernie: "In Yarrow and Leader the fly fisher should have no difficulty in getting three or four brace of 1/2 lb trout on a good morning in June".
1912	F. Fernie on the Teviot: "the banks are destitute of trees and cover of any kind". On the 19th century in general he wrote: "it seems that a great reduction in numbers of trout took place . . . brought about by netting . . . and by the drainage of the land . . . many of the smaller burns, which are now roaring floods in time of rain and nearly dried up in drought, used, before the hills were drained, to carry a steady volume of water all year round".

(Continued on the next page)

(Table 2 continued)

Date	Anglers` results and comments
1937	A. Wanless examined the Border competition results of the late 19th century in detail, when the biggest basket averaged around 10 lb total weight: "it will be observed that only the total weights are given". The only specifics he found were of competitions around 1900 in the Gala and Tweed area e.g., for the biggest baskets: Spring competition – 27 trout at 4 lb (the biggest fish was 3.5 oz); Summer competition – total of 202 trout caught weighing 44.5 lb giving an average weight of 3.5 oz. His conclusions on reading the authors above were that: "in the 'good old days' the Border rivers must have swarmed with tiddlers and these probably formed the bulk of the catches made by the 'great ones'".

the famous large catches made in the past is that these consisted of trout that would now be too small to be of interest to anglers, and this point is a very valuable corrective to the "golden memories" nursed by trout anglers today. Such a picture is also vital to give the correct fisheries management aim for the trout of the Tweed - which is that the river should contain numerous trout of 4 ounces in weight (113 g wet weight), and to give the proper perception to anglers that any trout over 6 oz (170 g) should be regarded as a good fish to catch. Without such a picture of the past there is a danger that unrealistic fisheries management aims may be required, and anglers may have unrealistic expectations, especially now that so many of them learn to fish on put-and-take fisheries for rainbow trout *Onchorhynchus mykiss*, where every fish is around 1 lb (450 g) in weight.

It is also possible to see from such sources when exploitation of the Tweed trout really started. The reference in Table 2 to the catch of 55 lbs (ca. 25 kg), made on the Leader Water in the 9 km stretch between Lauder and Earlston in a single day, clearly shows that the trout of that river were then quite unexploited, as such a catch would not be possible if even one fisherman a month was operating at that time. By the end of the 19th century, however, it could be written that ". . . the streams of Southern Scotland were either poached and over-fished or polluted and for good fishing it was necessary to go to the Highlands" (Anon. 1896 "The Scots Angler"). Easier travel, by train and by bicycle, must have been the main cause of this change.

Case-history 2: Investigations on the spring salmon of the Tweed

One of the monitoring tasks prescribed under Section 3:3 of the TFMP is that samples of scales are taken from all of the salmon killed at seven sample rod-fisheries along the length of the main river, to monitor the ages and sizes of fish

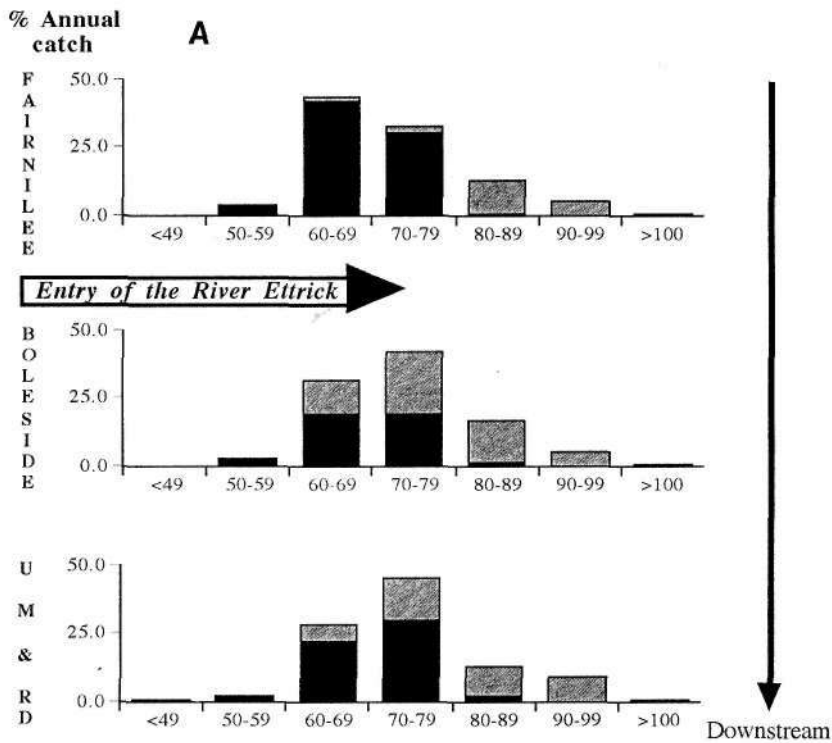


FIG. 7. The different sea-ages (grilse or salmon) and sizes (length) of fish caught at seven sample fisheries along the course of the main River Tweed, based on 6717 usable scale samples out of 7098 taken during 1991 to 1995. Dark areas represent grilse that have spent only one winter at sea before returning to spawn. Lighter grey areas represent salmon that have spent two or more winters at sea. Numbers of fish in each group and length class are expressed as percentages of the annual catches in each fishery. The names of the fisheries are shown on the left-hand side of each graph; results from two, Upper Mertoun and Rutherford (Fisheries 3 and 4), have been combined as "UM and RD". Locations are shown on Fig. 5. Results from Fisheries 1 to 4 are given above (A), and results for Fisheries 5 to 7 are shown on the following page (B).

being caught. Samples taken during 1991 to 1995 produced the results shown in Fig. 7, where fish that have returned to spawn after only one winter at sea, called "grilse", are distinguished (by scale-reading) from fish that have spent two or more winters at sea, called "salmon".

From this sampling series a clear discontinuity was found in the sizes and

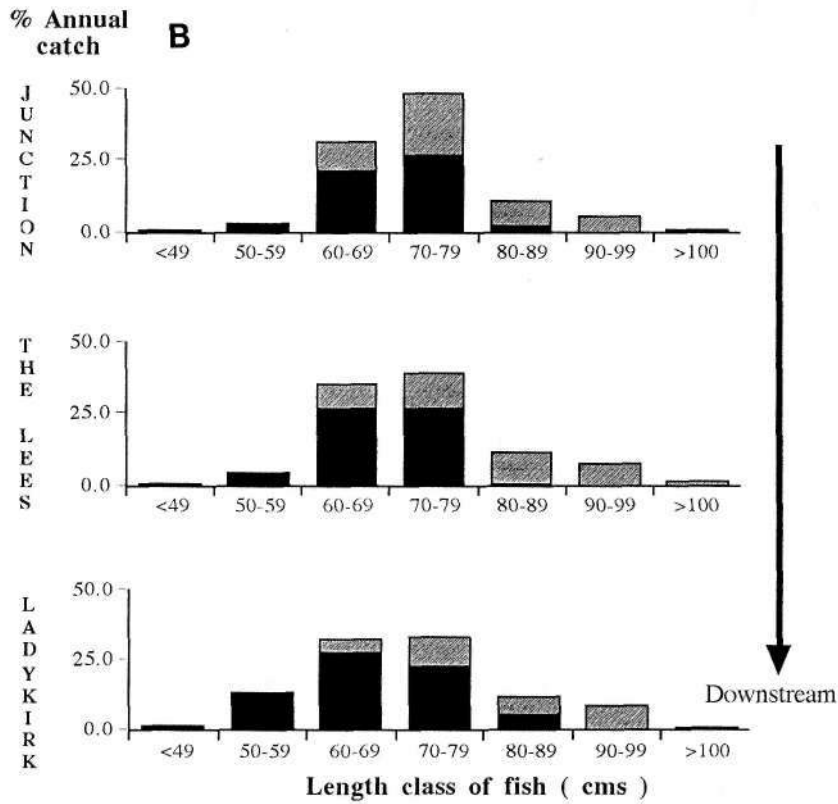


FIG. 7B. Explanation is given in the legend on the previous page.

sea-ages of fish caught above and below the entry of Ettrick Water into the main river. Below the confluence a run of relatively small salmon, between 60 and 80 cm in length, is apparent, but at Fairnilee, Fishery No. 1 on the upper Tweed just above Ettrick Water (Fig. 5), this size of salmon is virtually absent (Fig. 7A). The reason for this discontinuity is that the smaller (60-80 cm) salmon are the early-running "spring" fish which go into Ettrick Water and do not move on into the upper River Tweed. Hence these fish are caught at Boleside (Fishery No. 2) but not upstream at Fairnilee.

The monitoring work therefore identified an area of fundamental research that needed to be undertaken, i.e. which areas of the catchment produced the spring salmon. As catch records can be biased by the times and places that

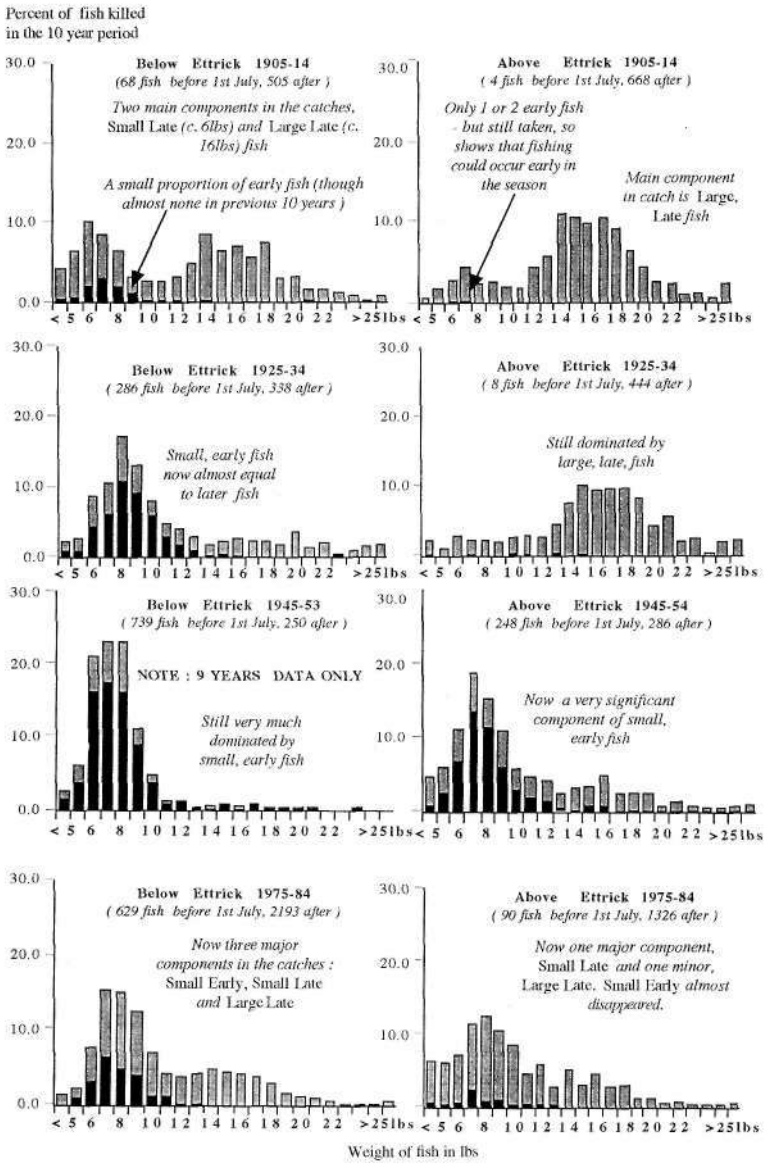
anglers choose to go fishing, an independent method of tracing the origins of these fish was needed. Therefore a joint project was set up with the Scottish Office Agriculture and Fisheries Department Marine Laboratory, Aberdeen, to radio-track fish from the time of their return to the estuary to their ultimate spawning destination within the catchment. The overall results of this exercise are shown in Table 3.

Table 3. Results of the radio-tracking of salmon and grilse in the River Tweed during 1994 to 1996. Fish were netted and radio-tagged at Berwick and then followed through to their spawning destinations. The aim was to see if there is any connection between the time of year when the fish return from the sea and where they then homed to within the catchment. The main results are shown below; tributaries and sectors of the main river are shown in Fig. 5. Numbers are percentages of the total numbers of fish tagged in each period of the year.

Spawning (home) area	Period of year when radio-tagged in the estuary: 1 Feb to 30 Jun "Spring"	1 Jul to 31 Aug "Summer"	1 Sep to 30 Nov "Autumn"
Upper Tweed	0	17	26
Ettrick	36	44	5
Gala	3	11	0
Leader	0	6	2
Middle Tweed	3	0	23
Teviot	9	0	32
Lower Tweed	0	6	5
Till	12	17	7
Whiteadder	36	0	0

The radio-tracking research backed up the results obtained from scale-reading and showed that Ettrick Water is the most important area of the catchment for spring salmon, as well as for summer salmon and grilse. It also identified the Whiteadder catchment as the other main source of spring salmon and showed that the upper Tweed is not a source of spring salmon. The main areas for autumn grilse (the upper and middle Tweed, and the Teviot Water) were also defined.

This strong structuring to the stock gave rise to the obvious question: has it always been like this - has Ettrick Water always produced spring salmon and the upper Tweed virtually none? To answer this, information was required from the past, obtained by collecting and analysing the rod-catch records from the fisheries immediately upstream and downstream of the mouth of Ettrick Water. All these fisheries are contained within a 13 km stretch of the Tweed and there are no weirs or waterfalls in the area, so the only major difference between them is whether they are above or below the Ettrick confluence. The full analysis involves the weights and dates of capture of 12,800 salmon during


Percent of fish killed in the 10 year period
Below Ettrick 1905-14
(68 fish before 1st July, 505 after)
Two main components in the catches, Small Late (c. 6lbs) and Large Late (c. 16lbs) fish
A small proportion of early fish (though almost none in previous 10 years)
Above Ettrick 1905-14
(4 fish before 1st July, 668 after)
Only 1 or 2 early fish - but still taken, so shows that fishing could occur early in the season
Main component in catch is Large, Late fish
Below Ettrick 1925-34
(286 fish before 1st July, 338 after)
Small, early fish now almost equal to later fish
Above Ettrick 1925-34
(8 fish before 1st July, 444 after)
Still dominated by large, late, fish
Below Ettrick 1945-53
(739 fish before 1st July, 250 after)
NOTE : 9 YEARS DATA ONLY
Still very much dominated by small, early fish
Above Ettrick 1945-54
(248 fish before 1st July, 286 after)
Now a very significant component of small, early fish
Below Ettrick 1975-84
(629 fish before 1st July, 2193 after)
Now three major components in the catches : Small Early, Small Late and Large Late
Above Ettrick 1975-84
(90 fish before 1st July, 1326 after)
Now one major component, Small Late and one minor, Large Late. Small Early almost disappeared.
30.0
20.0
10.0
0.0
< 5 6 8 10 12 14 16 18 20 22 >25lbs
Weight of fish in lbs

most of the 20th century. A summary of the results is shown in Fig. 8.

Inspection of Fig. 8 shows that the present stock structure is not permanent and that the results obtained from scale-reading and radio-tracking are only "snap-shots in time". At the beginning of the 20th century, Ettrick Water produced few, if any, spring salmon but the upper Tweed did for a short period of about 20 years in the 1940s and 1950s, though never to the same extent as in Ettrick Water. Without the historical analysis, completely wrong conclusions could have been drawn from the radio-tracking work regarding the significance of the present stock structure and the likelihood of changes to it in the future.

Future management of the Tweed spring salmon

The research done so far has provided a number of points for the future management of spring salmon in the Tweed, enumerated below.

1. At present, the catches for the largest part of the fishing season, February to August, are produced mainly from Ettrick Water, which forms only 10% of the whole catchment, while the catches from September to November come largely from the remaining 80% (excluding Whiteadder Water). This means that the fishery must be regarded as consisting of two parts, one much more strongly based than the other, and that fishing regulations should be set separately for the earlier and later parts of the season to take account of the relative strengths of the stocks on which the spring and autumn fisheries are based.

A policy based on this finding has now been introduced (started on the first day of the 1998 salmon fishing season) by the RTC to reduce the exploitation of the Ettrick stock of spring salmon, through a policy of "catch and release" of every second salmon (first fish released, second retained and so on) caught in the middle and lower Tweed before the 30th of June until the year 2002. This appears to be the first time in the UK that a measure has been brought in to protect one specific stock of salmon within a single river system, and the process by which the policy was arrived at through the management plan system is summarised in Fig. 9.

2. Anglers' expectations for the catches in the earlier part of the season need to be tempered by the knowledge that they are, in effect, catching salmon from only 10% or so of the catchment until September each year. Early catches cannot be expected to come anywhere near late catches and the narrowness of the production base means that considerable fluctuations must be expected.

3. The importance of Ettrick Water having been established in this way, the first fish counter (illustrated in Fig. 1) on the Tweed has been installed on the

FIG. 8 *(on facing page).* Comparison of the times of capture and individual wet weights of fish taken by rod-fisheries immediately upstream and downstream of the entry of Ettrick water into the Tweed, during four periods in the 20th century. Dark areas represent fish caught before 1 July; lighter grey areas represent fish caught after 1 July.

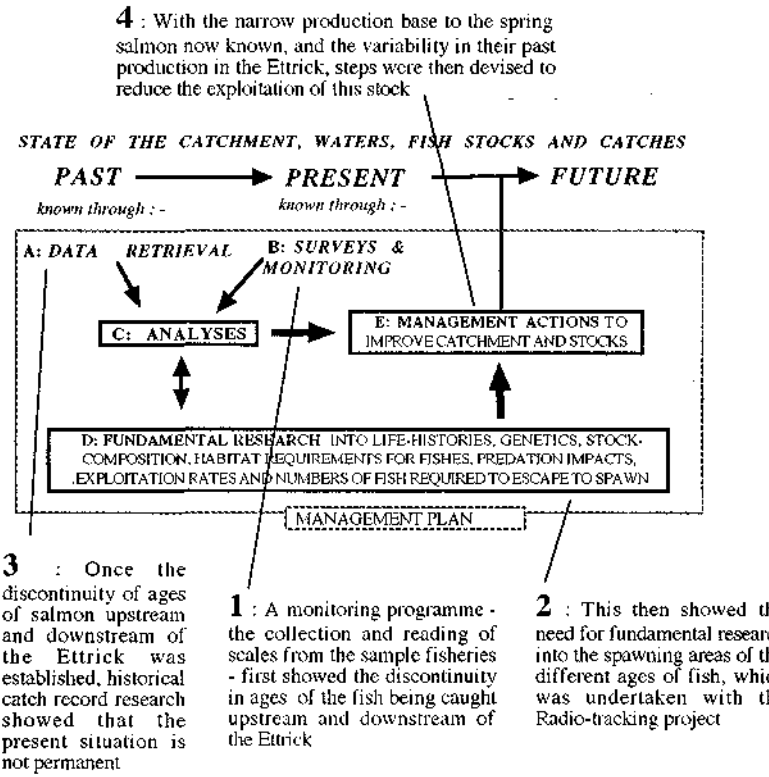


FIG. 9. The process by which various parts of the management plan system worked together to produce the "Spring Salmon Conservation Policy" introduced by the RTC in 1998.

Ettrick near its confluence with the main river, and most of the habitat improvement work being undertaken at present is directed to the catchment of Ettrick Water.

Results of the TFMP so far

The main benefits of the management plan realised so far are as follows.

1. It regulates and distributes the time available. Projects can be planned to start at certain times, in a proper order, so there is no attempt to do too much at any one time. Questions about why such-and-such a piece of work is not being done can be met by pointing out its place in the plan.

2. It gives an overview of the work that needs to be done which, in turn, gives an overview of the fish and the river and of the management and research needed. This last means that original research is undertaken - or commissioned from outside - as an integral part of management.

3. It protects long-term work which does not produce immediate results, such as monitoring and gathering catch records, from the needs of the moment.

4. The place given in the TFMP to the gathering of information on the past has proved very valuable indeed. Once catch and other records are computerised, their uses seem to be unlimited, and the perspective given on the present is invaluable.

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