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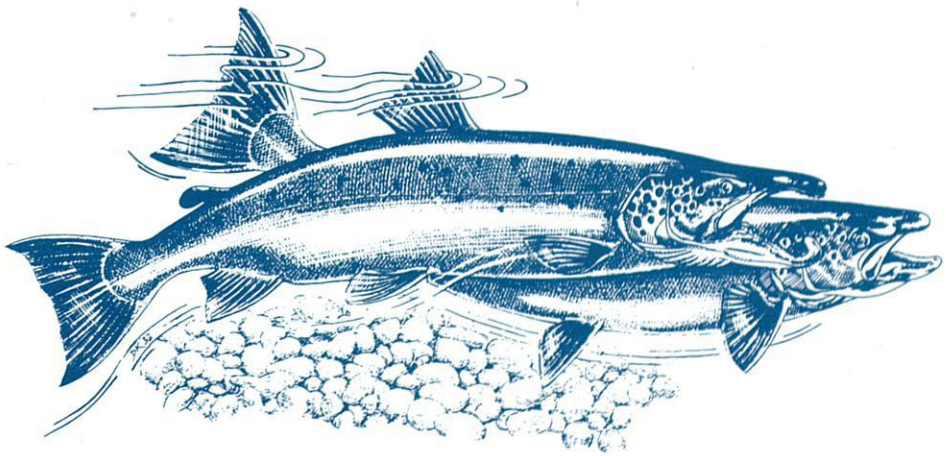
INFORMATION ON THE STATUS OF SALMON STOCKS

Report of the Salmon Advisory Committee



Ministry of Agriculture, Fisheries and Food
Scottish Office Agriculture and Fisheries Department
Welsh Office Agriculture Department

SALMON ADVISORY COMMITTEE

INFORMATION ON THE STATUS OF SALMON STOCKS

INTRODUCTION

1. The Salmon Advisory Committee was set up by Fisheries Ministers in October 1986 under the Chairmanship of Professor George M Dunnet, Regius Professor of Natural History at the University of Aberdeen. The full membership of the Committee is shown at Appendix I.

2. The terms of reference of the Committee are:

> "To examine and report on those matters relating to the conservation and development of salmon fisheries in Great Britain which are referred to it by Fisheries Ministers".

This first report relates to the Committee's examination of particular aspects of the availability of information on the status of stocks of wild salmon, one of the first issues to be referred to it by Fisheries Ministers. It contains the Committee's consideration of the kinds of information that exist, the quality of that information and its availability. We make recommendations regarding the need for comparable and reliable data sets and comment on the basic information which is required so as to monitor the country's salmon stocks more effectively. The Committee agrees that it is important to deal first with this fundamental aspect of salmon affairs before turning its attention (as it has since done) to the other matters referred to it by Ministers, for example the effects of environmental and other factors on salmon stocks.

3. A brief summary of the life cycle of the Atlantic Salmon and an explanation of terminology are contained in Appendices 2 and 3.

SALMON STOCKS

4. Atlantic salmon breed in the rivers of western Europe and eastern North America, but make their principal growth in the boreal and subarctic seas of the North Atlantic. From their tendency to return to their natal streams salmon form discrete breeding populations which may be genetically distinct. Wherever they may be, the fish of each distinct homing unit constitute a stock.

5. When considering the state of the stock or stocks in a particular river, discussion usually focuses on the major economic feature, ie the number of returning adult salmon available to be caught. The maintenance and improvement of the stock relies on an adequate number of these adults being able to spawn and on the survival of the resulting progeny. Since there is a positive relationship between the number of smolts going to sea and the number of returning adults, the main natural constraints on the size of the stock are the number of eggs laid and their survival in the river before migrating to the sea as smolts. Information on stocks during this phase in the life cycle is therefore essential to provide a suitable scientific basis for the management of salmon fisheries.

SALMON FISHERIES MANAGEMENT

6. Broadly speaking, the aim of management of wild salmon is to maintain levels of the components of populations that will ensure the perpetuation of the species in all its diversity and permit an optimum sustainable yield to fisheries. If optimum numbers of adults are to survive to spawn a minimum

level of smolt production has to be achieved. However, in order that fisheries are sustained at economically viable levels there needs to be an additional number of fish over and above this minimum. Management must be based on the discrete salmon stock or stock component in order to afford appropriate protection.

7. In this context, management can be taken to embrace a wide variety of activities. These include control of fishing effort (by, for example, restricting the times and places where fishing is permitted and specifying the gear which may be used), combating illegal fishing, improving fish passage, safeguarding water quality and quantity, controlling predators, and so on. It is important to be able to monitor the effectiveness of management and this can be achieved only by the collection and careful interpretation of adequate data. Local managers will not however have a direct influence on all factors which affect stocks; for example the effects of interceptory fisheries and environmental factors.

THE PRESENT APPROACH TO DATA COLLECTION

8. **Scotland.** Under the Salmon and Freshwater Fisheries (Protection) (Scotland) Act 1951 the Secretary of State has a power to collect salmon catch statistics and for that purpose can require proprietors and occupiers of salmon fisheries to supply him with the statistics in such form as he orders: a copy of the form in current use is shown in Appendix 4. The Department of Agriculture and Fisheries for Scotland (DAFS) has, since 1952, collected and published catch statistics of the numbers and weight of salmon, grilse and sea trout by region and by statistical district, and also by method, on a regional basis. District Salmon Fishery Boards (DSFBs), set up as voluntary associations of salmon fishery proprietors, have, if established in a

particular way, certain statutory powers in relation to the protection and improvement of salmon fisheries in their district; Boards have not been set up for all the Districts in Scotland. The Boards are not involved in the collection of the statutory salmon catch statistics but some of them collect information on catches by agreement with the proprietors in their district. Some DSFBs also accumulate various other data such as redd counts, subjective assessments of spawning success and the number of dead kelts seen. The DAFS fisheries laboratories, Scottish universities and others collect various data in the course of a variety of research and survey programmes; these are of limited or particular use though some are more comprehensive. Many individual fishery proprietors and companies keep records of their own catches and some of these extend over many years. The North of Scotland Hydro-Electric Board makes continuous counts of salmon passing upstream through fish passes at some of their dams.

9. **England and Wales.** In England and Wales, the relevant Government Departments (The Ministry of Agriculture, Fisheries and Food (MAFF) and the Welsh Office Agriculture Department (WOAD)) play a less direct role in salmon fisheries management than does DAFS in Scotland. This is because such management is devolved to the ten English and Welsh water authorities which, under the Salmon and Freshwater Fisheries Act 1975, have a statutory duty to maintain, improve and develop the salmon, trout, eel and fresh-water fisheries in their areas. To enable the water authorities to fulfil this responsibility for salmon they each attempt to assess the status of stocks by two principal means. First, they have made byelaws which require licensed anglers and netsmen to submit catch returns to the authority (see Appendix 5). Secondly, they conduct surveys of rivers and fish populations. These include counting fish at particular stages in their development and observing spawning success

by means of redd counts. Central government is responsible for providing the statutory framework within which the water authorities operate and has increasingly taken on a co-ordinating and collating role. In this respect, MAFF has published, since 1983, the collated catch data for England and Wales and the publication of validated historical data from 1951 to 1982 is also proposed. Also, the Fisheries Technical Liaison Committee (FTLC), which brings together Ministry scientists and fisheries staff in the water authorities, and which has encouraged recent improvements in the collection of catch data, has tried to improve and standardise the methodology for stock monitoring.

10. Thus, current knowledge of British stocks of Atlantic salmon is derived from two main sources: extensive data on catches (see Appendices 4 and 5) and on the distribution and abundance of juveniles in rivers, and more intensive site-specific information on the stocks of particular rivers or their tributaries. However, many of the extensive data are fragmentary, difficult to interpret and fall short of what is required for management purposes. For example, catch statistics are often inaccurate or incomplete and, in the absence of data on fishing effort, provide little reliable information on stocks. The Committee also recognises two limitations on assembling accurate catch returns: firstly an unquantifiable element of deliberate false declaration of catches and, secondly, an absence of any catch returns from illegal fishing (although the numbers of fish taken by unauthorised persons is recognised as significant). Further, some data on the distribution and abundance of juveniles may provide only a poor indication of the state of the stock because the surveys have not been carried out in a systematic manner (or critically enough) to provide an accurate account of the relative strength of year classes and other population parameters.

11. Large volumes of historical data exist for many individual fisheries, some of which are insufficiently detailed or comprehensive for critical analysis. Much of this information has never been fully studied.

12. The Committee sees a need for further refinement of the methodology for collecting and analysing routine monitoring data, and for collecting comparable long term series of data. We are also aware of the limitations to the understanding of the relationship between spawning stocks and smolt production and the fate of salmon at sea.

THE FUTURE - AN IDEAL APPROACH

13. Ideally the levels of environmental and biological monitoring on every salmon river would be such that any significant change in the size or composition of the adult stock would be quickly registered, and the cause identified, to permit rapid evaluation and the implementation of any necessary remedial measures. In effect, this would mean that every system would have to be the subject of a comprehensive programme providing estimates of the size and composition of the population.

14. In order to achieve this level of monitoring the following elements would need to be assessed.

(i) **The numbers of adult salmon returning** Significant improvements have occurred in electronic counter technology over the years and in theory a counter could be expected to provide accurate records of the numbers of fish ascending and descending a river, the timing of their movements and an estimate of their size, and thus possibly the number of years spent at sea by individual fish (sea

age). Such counters would be sited in the lower reaches of each river although additional facilities might also be installed on tributaries. Regular validation of such counters would be carried out.

(ii) **Spawning activity** Spawning would be evaluated every year by redd counts on the spawning grounds; redd maps would also be prepared.

(iii) **Juveniles** The numbers and distribution of juvenile fish would be estimated each summer by electro-fishing surveys. Parr density and age composition would be established at many sites. The density, distribution, growth rate and sex ratio of each age group would be examined.

(iv) **Catch records** Accurate catch records would be collected from all fisheries with details of the number and weight of fish caught, the date, location and method of capture and a measure of fishing effort. Reliable estimates of non-reported catches by unlicensed or unauthorised means and of non-catch mortality would also be required.

(v) **Environmental factors** Relevant environmental factors such as water flow and quality would be regularly (and where possible continuously) measured.

Such data would permit comparisons from year to year and place to place and would thereby detect trends enabling managers to be better informed about

stocks and to know if their management practices were having the desired effect.

15. The Committee recognises however that monitoring on such a scale would be so expensive, both in terms of manpower and other resources, that it would be unattainable in practice. There would be other difficulties too, some of which are outlined below, which militate against such comprehensive monitoring.

(i) There may be physical and logistical problems in operating some of the techniques, such as access to sites and surveying very wide or fast-flowing rivers.

(ii) Legal and political considerations such as the private ownership of land and riparian rights might limit the work that can be undertaken at particular locations.

(iii) Electronic counters are proving to be invaluable in the assessment of salmon stocks but have not yet been widely deployed. Particular attention needs to be given to the provision of cheaper civil engineering solutions to the problems of siting and installation.

(iv) Redd counts may be inaccurate due to varying water depth and colouration during floods. In addition, in order to estimate egg deposition it is necessary to know the numbers and sizes of spawning females.

(v) The sampling of the juvenile salmon population by electro-fishing is probably the most labour intensive and therefore expensive of the routine monitoring techniques. Comparability between different survey teams and different equipment is difficult to achieve. Wide or deep stretches of rivers are particularly difficult to survey.

(vi) Existing records of catches, collected in a non-uniform manner and with no information about fishing effort, are neither complete nor accurate.

In acknowledging these difficulties the Committee also recognises that the appropriate authorities will often have competing priorities and only limited resources. It may therefore be useful in this context to remember that careful monitoring of a river's salmon stock provides valuable information on water quality. There may thus on occasion be opportunities to improve the utilisation of resources by combining local management objectives.

THE FUTURE - A REALISTIC APPROACH

16. The Committee believes that the following are the minimum requirements for monitoring salmon stocks at the present time and the resulting data should be comparable so as to permit proper interpretation. In future we hope it will be possible to expand and develop these as resources and technical developments permit.

(i) **Comprehensive catch records** must be collected during each year. Catch data are important as indices of the performance of the salmon fisheries both individually and on a regional

and national basis. They also permit comparisons between various sectors of the fishery both spatially and temporally and, in due course, may provide a general indication of changes in the size and composition of the adult component of the stocks. Incentives should be developed and sanctions should be enforced so as to improve the number of returns and the accuracy of reporting. We believe that incentives would provide the way forward for the greater involvement of fishermen in the problems of managing the resource which supports their livelihood and/or recreation. Improvement in the quality and availability of information would lead to increased understanding and mutual confidence.

The Committee is aware of the government's decision, taken in a wider context, not to introduce carcass tagging but it recommends reconsideration of such a system in relation to improving the reliability of catch statistics.

(ii) **Information on fishing effort** is essential. The Committee recognises that there are currently statutory difficulties in this regard but believes that the collection of data on fishing effort (by sampling, if necessary) would greatly enhance the usefulness of the catch statistics obtained each year and would represent a significant advance in the interpretation of this information. We therefore recommend that the statutory powers necessary to obtain these data should be sought.

(iii) **Electro-fishing surveys** to assess the density, age structure and distribution of juvenile populations must be carried out at a number of sample sites in each river system at regular intervals (if possible at least once every three years). Initiatives taken to standardise sampling times and to develop nationwide juvenile monitoring programmes should be encouraged.

(iv) **Redd surveys** should be carried out as conditions permit at regular intervals (if possible at least once every three years). Such surveys provide a useful guide to the level of spawning activity in particular parts of the river and to major changes in the area used for spawning. Thus they may be useful indicators of problems in localised areas resulting, for example, from changing land use. They may be particularly informative when combined with juvenile surveys.

(v) **Electronic counters** should be installed wherever it is practicable to do so although the Committee recognises the inherent resource implications.

17. The Committee also believes that there is merit in looking back, more carefully than hitherto, to see what can be gleaned from the information which already exists. We therefore advocate analyses of selected catch statistics and monitoring data held by a wide range of organisations. Such analyses must relate to specific problems and concentrate on data collected over, say, the previous 35 years, rather than more historic records which may not now be

referable to contemporary conditions in the rivers. The results of such assessments should help to identify those data which will be of most value, and the level of monitoring required to detect long term trends in individual stocks. There are two approaches to the selection of the data for analysis. One is to consider groups of stocks which show particular changes (eg in catch rates or age composition) and to identify the factors in the fisheries or environment common to those stocks. The alternative is to consider well documented stocks in as much detail as possible to build up a picture of their historical performance. We believe that both have a contribution to make.

BASIC RESEARCH REQUIREMENTS

18. Such monitoring would still have to be backed up by research on the mechanisms controlling the dynamics of salmon populations until these are reliably understood. This would require intensive studies on a representative range of rivers to include:

(i) studies of distribution and abundance of juveniles;

(ii) trapping and marking of smolts in order to estimate numbers going to sea and, from subsequent recaptures, to obtain information on the exploitation of the stock;

(iii) collection of additional biological information such as the sex ratios and age composition of the adult stock from catches or sampling;

(iv) tagging and tracking of adults to investigate patterns of behaviour of the returning fish (tagging studies may also,

for example, permit estimation of levels of exploitation in various fisheries and modelling of the interactions between fisheries).

19. The Committee also believes that there is a place for experimental studies on, for example, stock enhancement to obtain a better understanding of what controls salmon population dynamics and to answer questions about the significance of genetic variability.

20. The Committee notes that the concept of indicator rivers remains largely untested. Such rivers might be chosen as representative of a group of river systems of the same type, possibly in the same area, or of a group of river systems which appear to have performed similarly. Should research reveal that this is a viable and cost effective means of contributing to the monitoring of salmonid stocks, we believe that this could well have a bearing upon the monitoring programme proposed in paragraph 16 and appropriate modifications would then be required.

CONCLUSIONS

21. The Committee believes that proper monitoring of wild salmon stocks is essential if we are to ensure the satisfactory management of this valuable natural resource. There is a need to co-ordinate the approach adopted throughout Great Britain (see paragraph 16). We recognise however that standardisation cannot be justified for its own sake; the first requirement for information is that it relates to local circumstances and the requirements of local management. Further, we believe that the most productive initial approach is to build on existing information and develop better monitoring programmes and data sets. The Committee has considered the range of

techniques available for monitoring salmon stocks and has sought to identify those which can be most readily applied on a widespread basis, having regard to resources and practical constraints, and which in our view represent the best practical option. We believe that the appropriate agencies should monitor the status of all the stocks for which they are responsible, along the lines proposed in paragraph 16 above, and to report regularly to the Fisheries Departments.

22. In sum, the Committee:

(i) concludes that there is a need for more comparable and useful data sets and recommends that, wherever possible, these should be obtained on a co-ordinated and more uniform basis throughout Great Britain (paragraphs 12 and 16);

(ii) recommends that for the assessment of the status of any salmon stock, at least the basic set of data described in paragraph 16 should be obtained;

(iii) recommends that the concept of carcass tagging should be re-examined in the context of improving the value of catch statistics (paragraph 16(i));

(iv) recommends that the necessary statutory powers should be sought to ensure the collection of information on fishing effort (paragraph 16(ii));

(v) recommends that electronic counters be installed wherever practicable (paragraph 16(v));

(vi) recommends that there should be analyses of selected existing data sets (paragraph 17);

(vii) recommends further biological research on a representative range of rivers (paragraph 18);

(viii) recommends that the status of each stock be monitored by the appropriate agency on the lines recommended in this report and made available as appropriate (paragraph 21).

MEMBERSHIP OF THE SALMON ADVISORY COMMITTEE

Chairman: Professor G M Dunnet

Members: Mr G H Bielby

Mr C G Carnie

Mr R M Clerk

The Hon Edward Davies

Mr S J Day

Mr E P Ecroyd

Mr J H Ferguson

Sir William Gordon-Cumming

Mr N W Graesser

Dr M M Halliday

Mr D Heselton

Mr A V Holden

Dr W R Howells

Dr P S Maitland

Mr I Mitchell

Mr M J Morgan

Mr D R Paton

Dr J D Pirie

Dr D J Solomon

Mr W A C Thomson

THE LIFE CYCLE OF THE ATLANTIC SALMON (Salmo salar L)

The Atlantic Salmon is a migratory species and spends part of its life in fresh water and part in the sea. It is also described as an anadromous species which means that it breeds in fresh water where the juvenile stages develop prior to migration to the sea when growth to the adult stage occurs. Adult salmon possess a very well developed homing ability enabling the great majority of surviving adults to return to their rivers of origin to spawn.

The juvenile phase

In late autumn and winter the eggs, which are large and yolky, are deposited in a redd excavated by the female in clean, well-aerated gravel, fertilised by the male, and subsequently covered over when spawning is complete. They overwinter in the interstices between the gravel, the young alevins with their attached yolk sacs hatching in the spring and subsequently emerging from the gravel as fry. The timing of development and emergence depends on the temperature. Subsequently, in Britain, the juveniles spend the first one to four and exceptionally five years of their lives in fresh water, the fish being known as parr. Later, they develop a silvery appearance and migrate downstream as smolts, eventually reaching the estuary and entering the sea. Some juveniles may commence their downstream migration still as parr, in the autumn. However, the main migration of smolts takes place in the spring. The parr are territorial, largely riffle-dwelling animals before their downstream migration. The young spawned in a particular year (or "year class") may initially be very numerous, but the death rate is high and numbers are quickly

reduced. In streams where spawning has been successful and many eggs are deposited the loss rate of young, especially in the first year, is believed to be "density dependent". That is, the more young that are present, the greater the proportion that die. In such areas, the acquisition of an adequate feeding territory is believed to be the key to survival, the "carrying capacity" of the stream determining the numbers surviving from a particular year class. However, in other nursery streams, where egg deposition is low, it is less likely that the numbers surviving are regulated in this way. Here, there may be more marked fluctuations in numbers, and the distribution of juveniles may be patchy.

The carrying capacity of a stream, and hence the density and production of juveniles, depend partly on water temperature and the food supply, but also on competition from other fish, stream bed stability, water velocity and depth. Bird predation, pollution, and detrimental land use patterns may also reduce the numbers of fish a stream can support (Mills, 1986).

Growth rates may vary greatly within a year class, and there may be overlap between the sizes of individuals spawned in different years. Indeed, the growth of fish in any one year class, and the numbers surviving from that year class, may be influenced by the numbers present locally from previous year classes. One consequence of the spread of ages within the juvenile population is that a poor spawning in one year will not eliminate juveniles from the stream; failure over several consecutive years would be necessary to reduce total numbers to very low levels.

A proportion of the male parr population become sexually mature in fresh water, and may take part in spawning with adult females. The process of

maturing impairs their growth, renders them more susceptible to disease, and may decrease their chances of survival. It may also delay smolting of these individuals.

Smolts moving downstream from a particular tributary or part of the river may, in Britain, contain up to five year classes. The total number of emigrants each year tends to vary a little, but the numbers within each individual year class may vary much more. One or more exceptionally small year classes with the emigrating population may be offset by one or more exceptionally large ones.

Only the larger parr develop into smolts. At low parr densities in a favourable environment (and at high temperatures), parr may smolt at younger ages (aged one or two, rather than three, four or five). Because of the influence of climatic and other factors upon growth, smolting occurs at later ages at higher altitudes and latitudes. There are often greater proportions of older fish in the smolts issuing from the upper reaches and tributaries of a river system.

Predation on the downstream migrating smolts may be high from both predatory fish and fish-eating birds. The numbers dying from predation and other causes are believed to be especially high during the initial period in sea water. There is evidence that both birds and predatory fish congregate in and around estuaries at the time of the smolt runs.

The marine phase and subsequent return to freshwater

Little is known about the activities of the salmon between entry to the sea as smolts and subsequent return as maturing adults. The fish show very rapid growth and are believed to spend their time feeding on small fish and crustaceans in the productive mixing zones which characterise parts of the boreal and subarctic seas. Fish which spend the longer periods at sea appear to move further into the subarctic; the younger fish do not appear to travel so far.

The West Greenland fishery, which takes place in the late summer, exploits fish which, had they not been caught there, would return to home waters after two or more winters in the sea. Such fish are known as multi-sea-winter (MSW) fish. The earliest of the MSW fish to return may reach home waters just before the completion of their second winter in the sea, but they do not spawn until the autumn or winter of the following year.

The fishery which extends north from Faroe into the Norwegian Sea also exploits MSW salmon, most being caught during their second sea winter. However, this fishery, unlike that at West Greenland, catches some younger fish, which could have returned to home waters after spending only one winter in the sea. Such one-sea-winter (1SW) fish are known as grilse on entering home waters. At the start of the Faroese high seas fishery, in November, these small fish may be discarded as being undersized.

There is circumstantial evidence that changes in the subarctic climate may influence the length of time fish spend in the sea before they return (and hence their "sea age"). The analysis of catch data from the Aberdeen Harbour

Board nets has shown that an increase in the average annual temperature to the north of Iceland is associated with larger numbers of fish returning as MSW salmon and fewer as grilse. It has been suggested by Martin and Mitchell (1985) that fish are more likely to travel north into the Arctic/subarctic during warmer years.

Fish from different kinds of river systems show differences in their behaviour during their stay in the sea. Those from short spate rivers, only a few kilometres in length, tend to return predominantly as grilse. Those from longer rivers, several tens of kilometres in length, return in greater proportions as MSW fish. For the latter rivers, females outnumber males among the MSW fish, and males outnumber the females among the grilse.

Fish return to the British coast throughout the year, and specific terms, such as "spring salmon", are applied to the fish appearing at particular times. On entering the river the early running fish spend many months without food before they spawn at the start of winter. For rivers where fish return at a variety of sea ages, the oldest sea age fish tend to return earliest and the grilse last (Shearer, 1984). Within a sea age group the fish which enter the river earliest tend to be those derived from the uppermost parts of the system (Struthers, 1984). These are often the fish which developed slowest as juveniles, with higher freshwater ages (Shearer, 1984).

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Appendix 3

Terminology applied to the Atlantic salmon Salmo salar L.

TERM	DEFINITION
REDD	The site of egg deposition in river gravel. Spawning hen fish may on occasions cut more than one redd.
ALEVIN	Stage from hatching to end of dependence on yolk sac as primary source of nutrition.
FRY	Stage from independence of yolk sac as primary source of nutrition until dispersal from the redd.
PARR	Stage from dispersal from redd to migration as a smolt.
PRECOCIOUS PARR	Male parr fully ripened or matured in fresh water.
SMOLT	Fully-silvered juvenile salmon migrating downstream to the sea.
POST-SMOLT	Stage from departure from river until end of the first winter in the sea.
SALMON	All fish after the end of the first winter in the sea.

TERM	DEFINITION
1-SEA-WINTER (1SW) SALMON	Salmon which has spent one winter at sea.
GRILSE	A 1-sea-winter salmon which has returned to home waters as a sexually maturing fish.
MULTI-SEA-WINTER (MSW) SALMON	Salmon which have spent two winters or more at sea
PREVIOUS SPAWNER	Salmon which has spawned on previous occasion(s)
KELT	Spent or spawned-out salmon before it re-enters salt water.

DEPARTMENT OF AGRICULTURE AND FISHERIES FOR SCOTLAND

SALMON AND FRESHWATER FISHERIES (PROTECTION) (SCOTLAND) ACT 1951

RETURN OF CATCHES OF SALMON FOR THE YEAR 1987

1. The Secretary of State is authorised by section 15(1)(b) of the Salmon and Freshwater Fisheries (Protection) (Scotland) Act 1951, to collect statistics of the salmon fisheries. This will provide information which will assist in protecting and developing the fisheries.

You are required to complete this form and forward it to the Secretary, Department of Agriculture and Fisheries for Scotland, Room 433, Chesser House, Gorgie Road, Edinburgh EH11 3AW, as soon as possible **and in any event not later than 31 December 1987**.

2. If you are operating more than one fishery **in the same fishery district** you may combine the returns on one form.

3. If the information given in this return covers more than one fishery, but you have received a separate form for each, give here the names and code numbers of the other fisheries included:

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4. Please state as accurately as possible the exact location of each fishery covered in this return, including limits of the fishery, and, in the case of river and estuary fisheries, whether on right or left bank. Please also give grid reference(s).

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5. IF YOU ARE NO LONGER THE PROPRIETOR OR OCCUPIER please give -

i. The date your ownership/tenancy ended: .....

ii. The name and address of new proprietor/occupier

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Form SR1

FOR OFFICIAL USE		3-5	6-8
	SALMON FISHERY DISTRICT	DISTRICT CODE NUMBER	FISHERY CODE NUMBER

PART 1 - Return of fish caught by ROD and LINE

- To be completed by the proprietor of the fishery.
- Please enter details of all fish caught by rod and line by yourself and any tenants **during each month** of 1987.

		SALMON		GRILSE		SEA-TROUT	
		Number	Total Wt lbs	Number	Total Wt lbs	Number	Total Wt lbs
101	January						
102	February						
103	March						
104	April						
105	May						
106	June						
107	July						
108	August						
109	September						
110	October						
111	November						
9-11		22-26	27-32	33-37	38-43	44-48	49-54

PART 2 - Return of fish caught by SWEEP NET (Net and coble or beach seine)

- To be completed by the occupier of the fishery.
- Please also give the number of crews and persons engaged in netting operations (including yourself if involved in operating the fishery) in each month of 1987.
- Please enter details of all fish caught by sweep net (net and coble or beach seine) in each month of 1987.
- If the number of crews or persons engaged varied during any month please give the minimum and maximum numbers of each for every month.

		Number of crews engaged each month		Number of persons engaged each month		SALMON		GRILSE		SEA-TROUT	
		Max	Min	Max	Min	Number	Total Wt lbs	Number	Total Wt lbs	Number	Total Wt lbs
202	February										
203	March										
204	April										
205	May										
206	June										
207	July										
208	August										
209	September										
9-11		12-13	14-15	16-18	19-21	22-26	27-32	33-37	38-43	44-48	49-54

PART 3 - Return of fish caught by FIXED NETS (bag nets, fly nets, stake nets, etc and any other fixed gear).

- To be completed by the occupier of the fishery.
- Please enter for each month of 1987 details of all fishcaught using the above gear and the number of traps in operation.
- Please also give the number of persons engaged in netting operations (including yourself if involved in operating the fishery) in each month of 1987.
- If the number of traps or persons engaged varied during any month please give the minimum and maximum numbers of each for every month.

		Number of traps operated each month		persons engaged each month		SALMON		GRILSE		SEA-TROUT	
		Max	Min	Max	Min	Number	Total Wt lbs	Number	Total Wt lbs	Number	Total Wt lbs
302	February										
303	March										
304	April										
305	May										
306	June										
307	July										
308	August										
309	September										
9-11		12-13	14-15	16-18	19-21	22-26	27-32	33-37	38-43	44-48	49-54

- If you have completed the table above please also give details of the gear used below.

Maximum number of bags or pockets fished in any month				Poke nets (maximum number of pokes)	Yairs	Haaf nets (Total number of permits)	Cruives (Number of traps fished)	Others (Please Specify)
Bag nets	Fly nets	Jumper nets	Stake nets					
55-56	57-58	59-60	61-62	63-64	65-66	67-68	69-70	71-72

DECLARATION

I declare the information given in this form is correct to the best of my knowledge and belief.

Signature of Proprietor/Occupier ..... Date .....

Address .....

.....

..... Telephone No. .....

In terms of section 15 (2) of the 1951 Act failure to comply with the requirement contained in paragraph 1 of page 1 or the making of a false statement is an offence.

Table 1 Water Authority annual statistics collection procedures - commercial data (1986)

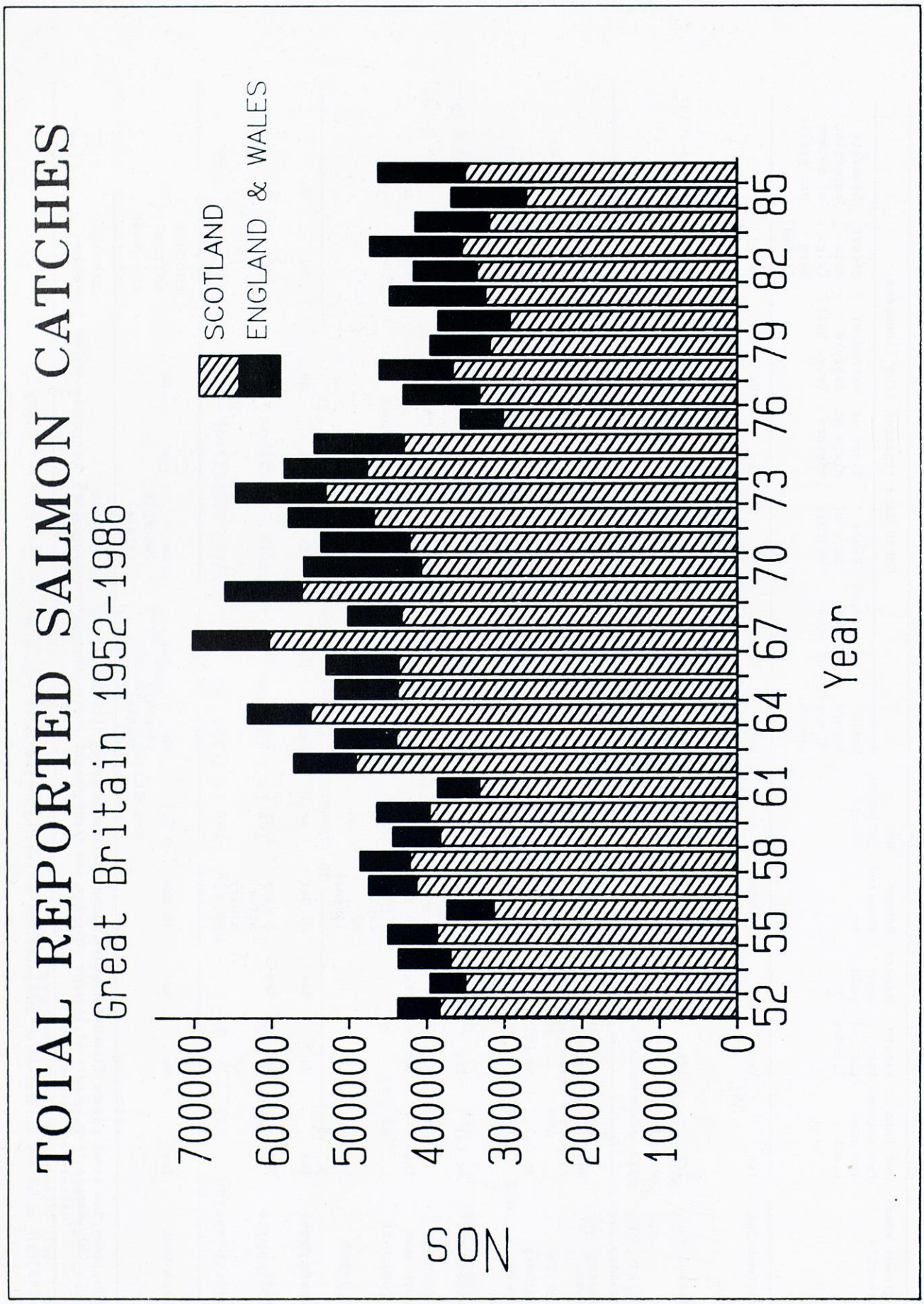
Regional Water Authority	Return form supplied	Return prepaid	Return required by	Separate reporting of salmon and grilse	Separate reporting by weight groups (not S/G)	Catch data required from licensees	Catch reported separately for each method of capture	Effort data collected
Northumbrian	Yes	Yes	Monthly	Yes (± 7 lb)	No	Daily aggregates	No	No
Yorkshire	Yes	No	15 Nov	Yes (± 7 lb)	No	Daily aggregates	Yes	No
Anglian) Thames)	No commercial fisheries for salmon							
Southern	No (a)	No	30 Nov	No	No	Monthly aggregates	Yes	No
Wessex	Yes	No	15 Nov	Yes (± 8 lb)	No	Weekly aggregates	Yes	No
South West	Yes	Yes	Monthly	No	No	Records of individual fish	Yes	No
Severn-Trent	Yes	No	31 Oct	No	Yes (b)	Daily aggregates	Yes	No
Welsh	Yes	Yes	Monthly	No	Yes (c)	Daily aggregates	Yes	Yes
North West	Yes	Yes	Monthly	Yes (± 7 lb)	No	Records of individual fish	Yes	No

KEY: (a) Only 4 commercial licensees. Data collected by letter
(b) Numbers of fish recorded for 3 broad weight categories, < 7, 7-15, > 15 lbs
(c) Numbers of fish recorded in 1 lb weight groups up to 20 lb. Large fish entered individually

Table 2 Water Authority annual statistics collection procedures - rod data (1986)

Regional Water Authority	One form for salmon and sea trout	Return form part of licence	Return pre-paid	Return required by	No. reminders issued	Catch data required from licensees						
						Daily record of nos. caught	Individual weights of fish	Exact date of capture	River or place of capture	Method of capture (e.g. bait)	Effort data (e.g. days fished)	Separate reporting of salmon and grilse
Northumbrian	Yes	Yes	No	30 Nov	0	No (monthly totals)	Yes	No (monthly totals)	Yes	No	No	No
Yorkshire	Yes	Yes	No	15 Nov	2	No (monthly totals)	Yes	No (monthly totals)	Yes	No	No	Yes (± 7 lb)
Anglian	No rod fisheries for salmon or migratory trout											
Thames	Negligible catches - no return forms used			30 Nov	0	Yes	Yes	Yes	Yes	No	No	No
Southern	No (a)	No (b)	No	30 Nov	0	No	No	No	Yes	No	No	No
						——— Monthly totals ——— (But full details for sea trout)						
Wessex	No (a)	Yes	No	15 Nov	2	No	No	No	Yes	No	No	Yes (± 8 lb)
						——— Monthly totals ———						
South West	Yes	Yes (c)	Yes	14 days after expiry of licence	0	Yes	Yes	Yes	Yes	No	No	No
Severn Trent	Yes	No	Yes	31 Oct	1 or 2	Yes	Yes	Yes	Yes	No	No	No
Welsh	Yes	Yes	Yes	7 days after expiry of licence	1 or 2	Yes	Yes	Yes	Yes	Yes	Yes	No
North West	Yes	No	No	30 Nov	0 (d)	No (monthly totals)	Yes	No (monthly totals)	Yes	No	No	No

KEY: (a) Sea trout can be fished for under either salmon or trout licences
(b) Return form is part of licence only for sea trout caught under trout licences. Salmon data collected by individual letters not return forms
(c) Licence stuck on to return card
(d) No record maintained of licensees and so issuing of reminders impossible


TOTAL REPORTED SALMON CATCHES
Great Britain 1952-1986
SCOTLAND
ENGLAND & WALES
NOS
700000
600000
500000
400000
300000
200000
100000
0
52 55 58 61 64 67 70 73 76 79 82 85
Year

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