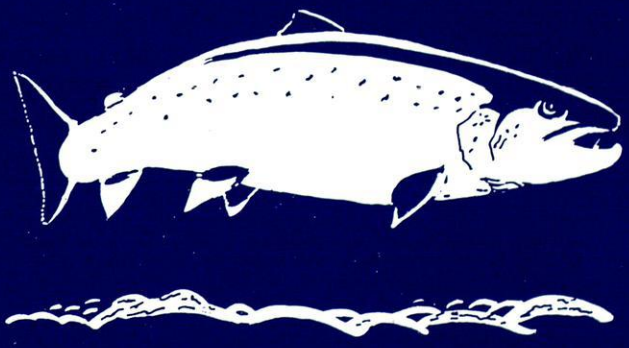
ATLANTIC SALMON TRUST

PROGRESS REPORT

June 1997



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A representative of the Scottish Office Agriculture, Environment & Fisheries Department
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Belgium:	Belgian Anglers Club
Spain:	Asturian Fishing Association of Oviedo
Germany:	Lachs-und Meerforellen-Sozietat
U.S.A:	Restoration of Atlantic Salmon in America Inc.
Canada and U.S.A:	Atlantic Salmon Federation
Ireland:	Federation of Irish Salmon & Sea Trout Anglers

Registered Charity No. 252742

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CHAIRMAN'S INTRODUCTION

The most significant event to occur since the turn of the year has been the publication of the Report by the Scottish Salmon Strategy Task Force. This is the most comprehensive and far-sighted Report on salmon management to be published since the Hunter Report of the 1960s. When launching it in February, the former Secretary of State for Scotland, Michael Forsyth, emphasised that "it would provide a blue-print for the management, conservation and sustainable exploitation of salmon and sea trout fisheries in Scotland's rivers for the Millenium and the twenty first century." The Trust has given the Report its whole-hearted endorsement and is resolved to do everything in its power to assist in taking forward the clear and well-considered strategy that it sets out. While a brief synopsis is contained elsewhere in these pages, I believe the Report is mandatory reading for everyone interested in the future of the Atlantic salmon. Copies can be obtained on request from the Scottish Office, Pentland House, Robb's Loan, Edinburgh.

Shortly after its publication, the Trust in conjunction with the Association of Scottish District Salmon Fishery Boards, held a meeting with other organisations with a direct interest in salmon. This was aimed at ascertaining what common ground existed between them in regard to the Report's strategy and recommendations. It was gratifying, but not unexpected, to learn that there was a major degree of accord among all the organisations represented. In the result a letter signed by the Chairmen of all the organisations was sent to the Scottish Office indicating their support for the Task Force Report. It was disappointing that the Salmon Net Fishing Association of Scotland, while supporting many aspects of the Report, felt unable to sign the joint letter.

During the spring, further meetings were held with the Environment Agency on the vexed question of the NE drift net fishery. Although there was a clearer understanding on both sides of the complex issues involved, it is disappointing to report that no substantial progress has been made either towards the earlier phasing out of this highly damaging fishery or, in the interim, the need to delay the opening of the net fishing season. We shall continue to give the issue high priority, and the recent announcement by the new Minister of Agriculture, Dr. Jack Cunningham, to establish "an independent group to review all aspects of existing policies and legislation on salmon and freshwater fisheries in England and Wales" will provide the Trust with yet another opportunity to seek a solution that will reflect its strongly held views on the NE drift nets.

As some will already know, our Director, John Mackenzie, has expressed a wish to retire at the end of September this year. John has been at the apex of the Trust's affairs for more than 13 years and has done an outstanding job in taking forward all the many aspects of its work, so much so that his name has become synonymous with everything connected with salmon and sea trout conservation and enhancement. John will be succeeded as Director by the present Deputy, Jeremy Read, to whom we wish every success in the appointment. The Trust has recently appointed Tim Hoggarth to be the new Deputy and he will take up his responsibilities in the early autumn.

Since the last Progress Report, there has been a change of Government and there is also the prospect of devolution in Scotland and Wales. We do not yet know the precise nature of the new Government's fishery policies but the changing and perhaps uncertain times that lie ahead will assuredly present the Trust with many challenges and, above all, with many new opportunities to pursue its objectives. All of us who are directly concerned with salmon need to be ready to identify and act upon those opportunitites.

H.F.O. BEWSHER
Chairman

DIRECTOR'S REMARKS

This is the last Report that I will write as the Director of the Atlantic Salmon Trust. In late 1984 I was asked if I would take over the Trust from Gerry Hadoke and move it to Scotland. We were lucky in that a generous benefactor gave us a large sum to purchase an office. The Trust moved into a rented cottage at Killiecrankie in December 1984, and into its present office in early 1986. Time has passed very quickly and my only regret is that, in spite of our efforts, the number of fish returning to our rivers is continuing to decline.

The move to Pitlochry has worked out very well. Being in close proximity to the Freshwater Fisheries Laboratory is of great value and I have enjoyed the close relationship that has built up between the Laboratory and the Trust. Jeremy Read has a strong liaison with the EA Headquarters and all its Regions in England and Wales and I am delighted that he is to take over from me in October. I am pleased to say that Tim Hoggarth has been selected to become the next Deputy Director and I wish him well in the future.

I have very much enjoyed working with the Honorary Scientific Advisory Panel and I have valued their advice and would like to pay tribute to their work under the chairmanship of Derek Mills.

There has been discussion in some quarters about the role of scientists and, in this Report, I reprint an article from "Salmon, Trout & Sea Trout" written by Jeremy Read which describes the AST's role in efforts to improve, develop and extend salmon and sea trout fisheries.

The potential growth of the salmon farming industry remains of concern - and it is vital that the possible effect on the environment of fish farms is taken into account before any further expansion is allowed. SEPA have produced a Report on their views entitled "Marine Cage Fish Farming in Scotland". At present SEPA is suffering from something of a financial crisis which it is hoped will be resolved before long.

I must pay tribute here to Mr. David Dickson, who has moved on from being Assistant Secretary of Division K Fisheries Group in SOAEFD. For five years David has headed this Group and his unfailing courtesy, good humour and sound judgement has been of the greatest help to all those concerned with the wild salmon. I wish him well in his new post dealing with BSE!

I am not giving up all interest in salmon and I will continue to chair the Association of West Coast Fishery Trusts. I also remain on the Tay District Fishery Board, a trustee of the Tay Foundation, and as the Vice Chairman of the Association of District Salmon Fishery Boards.

I have made so many friends during my time that it is impossible to single them out, but I would like to thank you all for making my task so enjoyable. For those who support the Auction, either by donating fishings or buying Lots, a very special thanks on behalf of the Trust.

Finally I would like to make two last pleas; one to fishermen and one to fishery owners. Fishermen, please do not be greedy! Owners, do try and open up your fisheries to the locals if at all possible - how about one day a week or after 6pm!

Do read this Report, I think you will find it of interest.

D.J. Mackenzie

SCOTTISH SALMON STRATEGY TASK FORCE

The Report of The Scottish Salmon Strategy Task Force was published on 14th February. The Report is a very comprehensive document setting out three key elements:

> The first element of the Strategy is to protect the Scottish freshwater habitat for the benefit of salmon. The salmon fisheries, wherever they may be, depend on the quality of our rivers and streams, and their ability to support vigorous salmon populations. The impact of factors which are detrimental to the salmon, whether the fish are young or returning to spawn, must be minimised.
>
> The second element is a progressive reduction in exploitation of salmon in the sea. Salmon Fisheries should be confined, so far as practicable, to rivers and estuaries, where management policies which fully recognise the biological characteristics of different salmon populations can more easily be developed. The transition to such management will not be easy, but we are convinced that it will have benefits for the long-term sustainability of the resource.
>
> The third element of the Strategy involves a radical change to the arrangements for the management and administration of the fisheries. The new structure should be capable of addressing the need to protect and improve freshwater habitats. It must also be capable of regulating the fisheries which exploit salmon in Scotland. The challenge is to provide a properly funded professional administration, backed by sound, scientific advice, in all areas where salmon are found. A new system of Area Fishery Boards is proposed. This is based on the tried and tested existing system of District Salmon Fishery Boards, but combines Districts were necessary to achieve units of viable size. Membership of the new Boards should include other organisations with interests and expertise which are relevant to the management of fresh waters, but should be founded on the involvement and commitment of the proprietors of salmon fisheries.

There are 64 recommendations which to a large extent have had broad approval. There are naturally those who do not agree with the basic administration of salmon fisheries by district fishery boards. However, the facts are that the salmon fisheries in Scotland are in a better shape than those elsewhere in the UK and their administration costs the Government very little compared to south of the Border. It is to be hoped that as many of the recommendations as possible will be acted upon voluntarily.

The AST's Council has welcomed the Report and hopes that it will not be allowed to gather dust on some shelf!

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KEEPING *GYRODACTYLUS salaris* OUT OF SCOTTISH RIVERS

Gyrodactylus salaris is a parasite which infects the skin and fins of salmon, trout and some other types of fish in fresh water. It is less than half a millimetre in size, so small that it is barely visible to the naked eye. Despite this, it can cause serious damage in some strains of Atlantic salmon.

The effects of the disease are so serious that salmon stocks have now been lost completely from more than 20 Norwegian rivers, with the particular races of salmon in the affected rivers being lost for ever. *Gyrodactylus salaris* does not occur in UK rivers and experiments carried out in Norway have shown that Scottish salmon, like those of Norway, are killed by the parasite. It is therefore essential that the parasite is not introduced into Scottish rivers.

To eliminate *Gyrodactylus salaris* from affected rivers, all types of fish capable of harbouring the parasite must be removed, so restoration of salmon stocks in affected rivers has involved poisoning whole catchments. Such remedial work is therefore destructive, difficult, very expensive, likely to take many years and may not be successful.

Gyrodactylus salaris occurs naturally in the Baltic rivers of Finland and Russia (possibly also eastern Sweden). The native fish of these rivers, including Baltic salmon, are tolerant of the parasite and normally the infection causes them no harm. However, Atlantic salmon in areas where the parasite does not naturally occur have little or no tolerance of it. Some years ago, *Gyrodactylus salaris* was accidentally transferred for the first time to some rivers of the west coast of Sweden, to Norway and more recently to some of the rivers in northern Finland and northern Russia.

Gyrodactylus salaris is a listed notifiable disease and legislation is in place preventing the transfer of live fish capable of carrying the parasite to British waters. This has now been supplemented by EU legislation which recognises the special status of GB and Ireland as being proven free of the parasite.

The parasite is very hardy and may be inadvertently introduced by fishermen. It is capable of surviving for several days in damp conditions such as plastic bags, wet angling equipment (eg bags, waders, landing nets, lines) and the wet surface of dead fish (eg bait fish). As the parasite has a direct life cycle and reproduces very rapidly, it is possible that even a single specimen imported by accident to a previously unaffected river would be capable of starting an epidemic in a very short time.

How Can Anglers Help?

Anglers must take special steps to ensure that their equipment is not contaminated.

Anglers travelling from areas which are not designated as free of *Gyrodactylus salaris*, and in particular from those areas known to be infected, such as in Scandinavia, should therefore take the following precautions:

- All fishing equipment should be thoroughly cleaned and then treated to kill any parasites by either:
- Drying at a minimum temperature of 20°C for at least two days, or
- Heating for at least one hour at a temperature above 60°C, or
- Deep freezing for at least one day, or

- Immersion in a solution suitable for killing Gyrodactylus salaris for a minimum of ten minutes. Chemical solutions which have been used successfully include Virkon* (1%), Wescodyne* (1%), sodium chloride (3%), sodium hydroxide (0.2%). It is recommended that all equipment so treated should be accompanied by a valid certificate from the relevant fish health regulatory authority in the country of origin or at the point of entry into GB. [*these chemicals are available from agricultural chemical suppliers. The use of trade names is for illustrative purposes only and does not signify endorsement of any particular product.]

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FISHMONGERS' LIVERY DINNER
Wednesday 5th March 1997

PRIME WARDEN'S SPEECH TO INTRODUCE ORRI VIGFUSSON

Wardens, My Lords, Ladies and Gentlemen

Some years ago, a Norwegian friend asked me to join him and his wife to fish the Olden River, which is at the head of Nordfjord, about 62° north. The idea was that I would meet him at sea, at a determined point west of the Veststeinen Rock, at noon precisely. We would then sail in together, anchoring off Olden, secured bow and stern if the weather allowed, to fish the river, I may say night and day for a week!

Before you begin to get the idea that I am a dab hand with a 16 foot rod, I had better explain. We could fish literally all night, for around mid-summer it is brighter than at mid-day in winter on London Bridge. My crew and neighbour, Robin Pleydell-Bouverie, a fine fisherman, used to crawl into his bunk at all hours, while I made a rule, giving some nautical excuse, to be in mine by 11. I said to him one night, "You know Robin, even if I knew that I was going to catch a 100 pound salmon at the stroke of 1, I would still prefer to be tucked up by midnight." "You're no fisherman," he said and he was right!

I am, however, in love with the salmon and all the Salmonidae, so to have you "all night fishermen", - proper fishermen that is - here tonight, is a pleasure. To have Orri here to address us is more than that, it is a delight, for he is an inspiration to all those who respect the "King" and "Queen" of fish. Nobody does that more than the Fishmongers' Company.

The Fishmongers' Company is, after all, responsible for the quality of London's fish. Our charter declares that the fish should be "wholesome for man's body and fit to be sold". This has been our responsibility over the ages. We have been ready to assist any part of the fish trade that has needed our help, whether the fish concerned were, again to quote the charter, "salt-fish, or any other fish whatsoever". In order to achieve this, the National Sea Fisheries Protection Association was founded at the Hall in 1881, the Oyster Merchants and Planters Association - now the Shellfish Association - in 1902, the Salmon and Trout Association a year later and the Central Council for Rivers Protection in 1930.

During the last 392 years, the Fishmongers' Company has been responsible for all markets in the City of London where fish is offered for sale, including, of course, supervision of Billingsgate Market. It has gained a unique insight and knowledge of the quality of salmon sold. We have played a strong part, by charter and statute, to enforce the law against the traffic in unseasonable and illegally caught salmon and trout.

The Company's writ has also long extended to Scotland. For the thirty years between the passing of the Salmon Fisheries Act of 1868 and the Royal Commission on Salmon Fisheries Act of 1900 to 1902, the Company played a considerable part in putting down the widespread trading in "unclean and unseasonable fish". Our Inspector and our Solicitor in Scotland acted to ensure that netmen obeyed the law and that poachers were brought to book. We took particular trouble to persuade Lord Hunter's Committeee of 1962 to take robust action to protect Scotland's rivers.

We urged that the Hunter Committee take aboard the recommendations of the *Bledisloe Report on English and Welsh Salmon and Freshwater Fisheries* that all salmon be sold through licensed dealers. In 1962, the record shows that from the 1st of January to the 31st March that year, 2,512 boxes of salmon arrived at Billingsgate Market. Fifty-seven percent of these fish came from drift net sources.

In our evidence to Lord Hunter's Committee we said that "it is too early to say whether these drift net catches are seriously harming the stocks of salmon which should be in the rivers in the year 1962, but it is clear to the Fishmongers' Company that if they are not controlled, the drift netters will increase and there will be a danger".

We argued for a total prohibition of drift netting for salmon as soon as possible, so that the Hunter Committee might assess the whole position and the pressure on salmon stocks.

A lot of water has gone down the rivers of Scotland in the last 35 years. Endless pages have been written and new plans drawn.

Just a few days ago, on the 19th February, *The Report of the Scottish Salmon Strategy Task Force* was published. The opening pages spell out the story. I am sure that no one patiently dressing his rod and musing on the prospects for salmon in the longer term, in 1962, would have ever believed that by 1995 the total output of salmon farms in Scotland would have reached 70,000 tonnes and that that figure would be more than 100 times larger than the Scottish catch of wild salmon - 586 tonnes, in the same year.

Lord Nickson's Task Force outline three key elements in their strategy:

- The first is to protect the Scottish freshwater habitat for the benefit of salmon, addressing particularly the impact of factors that are detrimental to young fish, or to those returning to spawn.

- The second is a progressive reduction in the exploitation of salmon in the sea, confining fisheries to rivers and estuaries, where appropriate management policies can be developed.

- The third key element involves a radical change to the management and administration of fisheries, suggesting a new system of Fishery Boards to provide good local administration, backed by sound scientific advice.

These three key elements are reinforced by 64 recommendations. The Report, the Conclusions and the Recommendations are well targeted, clear and robust. Lord Nickson and his Committee are to be congratulated.

Paper words need more than a warm welcome to be effective. Action should start as soon as the consultation period is over and the final report published. Government, the agencies and river owners should provide the stimulus and action on the ground. For example, the Government could designate the twenty or so Fishery Areas to replace the Salmon Fishery Districts as part of their final welcome. A Co-ordinator should be appointed at the same time to ensure the effective bringing together of local and national salmon monitoring and research programmes. It may be that the Fishmongers' Company, with its well developed interested in Scotland, could help in this. We are determined to continue to play our part.

Orri has made a virtue out of positive action. He does not seem entirely at home among corridors of paper. It may be the Viking in him, for such paraphernalia is not easily stowed under the thwarts of a "Longship".

He has also realised that if you are to change an old industry to save a species, you have to see to the well-being of those who need to accept change. Their energies should be harnessed in other ways, if they too are required to greet the new dawn. His ideas have persuaded me. It is my pleasure to let him loose on you.

But before I do I would like to propose the toast to The Guests.

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LIVERY DINNER FISHMONGERS' HALL, LONDON BRIDGE
5th March 1997

ADDRESS OF NASF CHAIRMAN TO THE PRIME WARDEN'S INVITATION

CONFESSIONS OF A FISHMONGER

Prime Warden, Wardens, My Lords, Ladies and Gentlemen ..
that salmon science is vitally important to the future of the species is, I think, beyond dispute. Salmon science in all its varieties has resulted in a quantum leap in our knowledge of the fish's lifecycle, particularly in rivers. Science has dramatically enlarged our understanding of spawning and nursery areas, of survival rates, of run timing etc. Research has shed light on the previously murky waters of the salmon's life, and will no doubt continue to expand our knowledge of this magnificent fish.

But is knowledge the same as wisdom? This basic question is nowhere more appropriate than in the world of salmon conservation and management. Science has indeed given us knowledge - we KNOW the salmon is under threat. What science has not given us, and perhaps never will, is the WISDOM to stop the decline of a resource we all cherish. Science has stated in clear unambiguous terms what every angler, what every nature lover, what everybody already knows. What we now need is firm, practical action to rebuild the stocks. The last thing we need is more data telling us what we already know.

Why is it that we have failed to act on what science has been telling us for years? Year in, year out we hear the same dire warnings, but fail to act. It is precisely this head in the sand attitude which led ICES last year to issue a blunt scientific warning which said: slash salmon mortality and increase escapement. We have reached a sorry state of affairs when even scientists shout their frustration and disappointment at the resource managers for failing to act on data which science has long ago made available.

Let me stress that I am not denigrating science, what I am driving at is that scientific data, or supposed scientific date, has become the holy cow which lends credibility to mind boggling decisions. A case in point: last November I wrote to Minister of State Tony Baldry pointing out that 1996 had been a disastrous year. Initial figures suggested an all-time low total catch in England and Wales of 42,000 salmon and grilse. I also pointed out that the gross landed value of the entire catch was a pittance, a mere £504,000. A pittance, that is, when compared to the £9-10 million cost to the taxpayer of administration and scientific research surrounding this catch. (This is £200 a fish). Wasn't it time, I asked the minister in my letter, to end once and for all the UK's interceptory fisheries, and to implement the North Atlantic Salmon Fund's proven cost effective compensation and early retirement plan for salmon net licence-holders? The minister replied that although catches of salmon were low in many areas in 1996, his advice was :

"That is probably due, in a large part at least, to a shortage of water during the summer."

The minister then played his trump scientific card and referred to, and I quote, "good numbers of fish", unquote, reported by certain fish counters. In all, the scientific data brought the minister to the conclusion that:

"While there is no scope for complacency, I have yet to be convinced that the situation is as serious as you suggest."

And this is precisely the problem. The minister neglects to examine the overall picture of the salmon crisis. The result is that he is not convinced of the seriousness of the situation. But the minister is not alone. Ladies and gentlemen, please do not be lulled into a false sense of security by local or regional glimmers of hope shed by dubious data. We have to see the situation in its global context and co-ordinate our efforts accordingly. The following facts show what is really happening to the wild Atlantic salmon.

In 1975 some 4 million Atlantic salmon, the vast majority wild fish, were caught. By 1980 the catch had dipped to 3.4 million fish. By 1985 the number had slipped to 2.6 million fish. Surely, people thought, things couldn't get much worse. But the decline was only really beginning. In 1990 the catch was down to 1.6 million fish. Another five years whittled the catch down to 1 million fish. And where are we now? The provisional catch figure for Atlantic salmon in 1996 is a mere 800,000 fish. So, in just over twenty years we have seen catches crash from 4 million to around 800,000 fish; yet responsible, well informed professionals can still quote scientific data in defence of present policies. But things are even more serious than this all-time low figure suggests, for a huge proportion of this tiny catch consists of farmed escapees and hatchery raised grilse. What we are in fact witnessing is nothing less than the fast disappearance of the wild Atlantic salmon.

Present structures based on data dressed up as science simply do not work, and have not worked in decades. Lord Hunter was absolutely correct in his 1963 report and now we have another great contribution, and I would like to recognise Lord Nickson's Report, that common sense is what is most urgently needed. More research programmes will not avert the disaster that is already hanging over our heads. Spawning escapement programmes are a good example. Such escapement targets may tell us what

is necessary to prevent the final decline and disappearance of the king of fish, but they tell us nothing of the abundance of fish which used to be present in our rivers and which alone is meaningful to the sporting angler. These programmes are also extremely localised in their effectiveness, and subject to climatic fluctuations, will only repay us, if at all, in the distant future, and are prohibitively expensive.

Fortunately, the Greenlanders now seem to be taking a broader approach. I was with the Royal Greenland Company last week, the biggest individual trader in North Atlantic seafood, and they committed themselves to our principle of ecological sustainability, integrity and the responsible management of fisheries, treating wild Atlantic salmon in the same way as coldwater shrimps which account for more than half of Greenland's income.

I hope I will be excused for reminding everyone present of an international auction in aid of the wild Atlantic salmon to be held at Christie's on April 23rd.

Ladies and gentlemen, I realise that your venerable Company is seeking a new direction and a new role. But let your new role be one which encourages structural change, let it be a direction which will take us away from the status quo which so tragically fails the salmon. My humble advice is for your Company to question conventional scientific research. Instead the Company should use its experience in taking an overview of the scientific effort in the context of the salmon resource as a whole. It could then decide which part of the effort to encourage and which part is irrelevant or repetitive. An example: millions of pounds are spent annually by the salmon countries in trying to apportion the resource between nets, rods and spawning beds. But a fraction of this sum could probably buy out every interceptory net and compensate every netsman for good. How marvellous it would be if this Company in conjunction with the NASF could finally bring this message home.

This Company has a proud history of involvement with the salmon, and I have a strong personal involvement with fishmongering. My family was involved in the herring industry, and I have maintained and am proud of my fishmongering links, links which I intend to foster on both a personal and professional level. I thus speak from the heart when I say that I sincerely hope to see your Company grasp this opportunity to introduce new ideas into the crusade to save the salmon. I would dearly love to see the Company enlarge its mission and strike out on ambitious plans to not only rescue but to regenerate the stocks to the abundance of former years. Your expertise and experience as inspectors are priceless assets which should be retained and redeployed towards boosting the salmon, not by tens or hundreds of hatchery grilse, but by literally millions of wild multi-sea-winter salmon. Few are as ideally placed as the Fishmongers' Company to show us the way forward.

Now, as I thank you for your time and attention, I ask you to rise and drink a toast to the Fishmongers' Company and The Prime Warden.

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Secretariat, 5th International Atlantic Salmon Symposium, Central Fisheries Board, Balnagown, Mobhi Boreen, Glasnevin, Dublin 9, Ireland. Telephone: 00 353 1 8379206 Fax: 00 353 1 8360060

5th International Atlantic Salmon Symposium

Have you registered yet for the 5th Atlantic Salmon Symposium? If not please contact the Symposium Secretariat as soon as possible.

Symposium topics include:

* *Marine Habitat Influences*
* *Predation*
* *Reared / wild interactions*
* *Habitat Management*
* *Politics and Salmon Management*

Ms. Sandra Doyle,
Secretariat,
5th International Atlantic Salmon Symposium,
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Glasnevin,
Dublin 9,
Ireland.

Tel: 00 353 1 8379206 **Fax:** 00 353 1 8360060

LOOKING AT THE BIG PICTURE..

(Lisa Coward, *SLF Rural Policy Adviser)*
Reprinted with permission of the Scottish Landowners Federation

Balance and harmony are two qualities, amongst others, that land managers are seeking to achieve in the wider countryside. Can balance and harmony be practically addressed against the discord caused by the protected status of some species?

Seals are protected under the Conservation of Seals Act 1970, as in some areas their populations are deemed vulnerable.

Although the size of the British Grey Seal population, at the start of the 1995 pupping season, was estimated to be 105,800; of which 96,800 seals were associated with breeding sites in Scotland.

Numbers have increased annually since 1984 at a rate of about 6% and there has been a total population increase since 1990 of 30-50%.

If the current trends continue, the number of grey seals breeding sites in Scotland will double in less than 12 years as a result of the protection that they receive. Concern is expressed by some people that they constitute a strong threat to salmon fisheries.

At present, seals may be killed without a licence outside the "closed season" or at any time if they are directly damaging fisheries. The culling of large numbers of seals is only practical in the breeding season when cows and pups are on shore.

At this time, a closed season is imposed and a licence is required to kill seals at their breeding sites.

In the late 1970's proposals to reduce the number of seals were much debated and the subject drew public and media attention such that focus is now being diverted, to the use of non-lethal methods for controlling seal populations through the administration of contraceptives.

This would appear to be an unequivocal recognition that Grey Seal numbers are in need of control.

The European Wild Bird Directive and the Wildlife & Countryside Act 1981, make provision for the control of certain protected birds and other animals through the issue of a licence for the purpose of preventing serious damage to fisheries.

Currently, local licences are issued for the shooting of some predatory birds; the licences are granted for the purposes of deterrence not for culling.

There has been criticism on the one hand that the issue of licences is protracted and subject to undue delay and on the other hand, that the shooting is unnecessary and ineffective.

The damage caused by fish eating birds to stocks of salmon and other fish is nothing new; the number of cormorants in particular is growing dramatically and birds have moved far in land from their normal estuary habitat.

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Fortunately, this is not just a British problem; there is major pressure in France, Italy and Germany for action to counter large scale damage to fish stocks by cormorants.

The Federation of Associations for Country Sports in Europe (FACE) is requesting that as an immediate measure a number of fish eating birds should be transferred to the "huntable annexe" of the Directive.

This is not aimed at allowing a complete open season to shoot the birds but rather at freeing Governments from the current severe constraints on their ability to allow any control.

Different individuals and groups are at liberty to care about different types of wildlife, for a whole range of reasons.

So if a cause is to be advanced, it would be advantageous to understand the significance of different wildlife to different people, as much as working out which parts of the natural world are "irreplaceable" from a scientific stand point. This could perhaps be expressed in terms of their bio-significance.

If we are seeking to perpetuate biodiversity, then surely a more holistic approach to countryside management is required, one which does not jeopardise local economies, does not cause social disharmony and does not divert resources away from habitat management for species diversity.

Biodiversity, is certainly here to stay for a generation of conservation activity at least, but in my opinion there is a strong case for the rational assessment of the bio-significance of protected species to ensure that this approach is sustainable in the long term.

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SPRING SALMON AND MANAGEMENT DECISIONS

(Colin Carnie)

This year has provided yet another spring with returns of low or very low catches of early running salmon from far too many rivers which leaves one again wondering if the situation will ever recover. But for how many springs has that thought been in our minds, how little action has there been as the overall figure for the catch of spring fish has declined, and how long will it be until we see recovery? The very fact that we have to ask these questions is a criticism of ourselves which we must not allow to continue.

Now is the time for action - the conservation of the resource calls for this - action which is based on good management decisions with the emphasis on the role of management. Managers invariably have to take decisions on the information available to them at the time the decision has to be taken. That is as true whether one is running ICI or a local store, a battalion or a railway, and a salmon river is not much different. Managers rarely, if ever, have all the information they would like to have at the time decisions have to be taken, but in order to progress they have to react to what is available, weigh up the options, consider the downsides and the risks, and take a decision.

The management of spring fish must be looked at in these terms. We certainly do not know as much about them as we would like but we know enough for managers to take decisions now. What is known may be generalities but these are the generalities on which reasonable decisions can be taken. The value of carefully organised stocking was recognised by the Salmon Advisory Committee, the value of using the right genetic material and the importance of ensuring that the juveniles grow in the correct environment are all now recognised and with that information managers can properly take decisions. The enhancement of spring runs is possible and work in that direction should be carried out before stocks decline any further.

With this information managers can take decisions without waiting for more years of research, without the need to know precisely some of the details which biologists would like to know. The input of scientific research has made the present position possible and it is essential that biologists continue their work to increase our knowledge of salmon but this is not the time to hide behind the scientists and do nothing while they do more research. Scientists must properly provide the information on which management decisions are made but it is not right to expect them to take the decisions which managers must take.

There is much that can be done and three themes merit attention. Firstly, exploitation on many rivers is too high and thankfully managers on some of these rivers have set bag limits to protect the stock in anticipation that there will be more of these valuable fish spawning. Secondly, the Kyle of Sutherland rivers have shown that it is possible to catch spring fish and hold them until they are ready for stripping in the autumn so that the correct genetic characteristics are carried through to the next generation. And thirdly, research on the North Esk and elsewhere has shown that early running salmon tend to have spent their juvenile life in the headwaters where there is limited feeding and they were thus the slow growing parr.

So if we want to see a reversal of the decline of spring stocks, steps must be taken now without waiting for more research. Managers must decide now to act, with the knowledge that the necessary steps are both possible and practical, and that the potential for reversing the downward trend is realistic.

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RESTORING HABITAT FOR WILD TROUT AND SALMON IN AN ENGLISH CHALKSTREAM

(David Summers, *The Game Conservancy Trust*)

The English chalkstreams, long synonymous with some of the best trout fishing in the world, not to forget some specimen salmon, have greatly faded from their former glories. The trout fishing may still be very good, but this is now largely for stocked fish, with truly wild trout and salmon becoming increasingly scarce. However, in an attempt to produce practical guidelines which may help turn the tide of decline for wild fish, in 1993 the Game Conservancy Trust commenced a study on fishery management techniques on the River Piddle in Dorset. This is a small chalkstream which has not been commercialised and still maintains good populations of wild brown trout, sea trout and a modest salmon run.

The initial research was based at Tolpuddle, where the fishery owner, Mr. Richard Slocock, had maintained a successful wild trout catch-and-release fishery for many years. It soon became apparent, however, that this fishery was relatively unique. The stream banks were completely fenced, there was

abundant bankside cover and good growths of water weed, especially *Ranunculus*, which provides habitat for fly life as well as important cover for fish. On many other stretches of the river, especially in the upper reaches, there were no fences at all and cattle had free access to the water. Consequently, there was little bankside cover and the banks tended to get "poached" in such that the stream widened, became shallower and more silty. In many instances even the *Ranunculus* was eaten.

Electrofishing surveys showed that numbers of trout of all ages were significantly reduced where there was no fencing. Salmon parr were not found at enough sites to make a robust statistical analysis, but the same pattern held for them too.

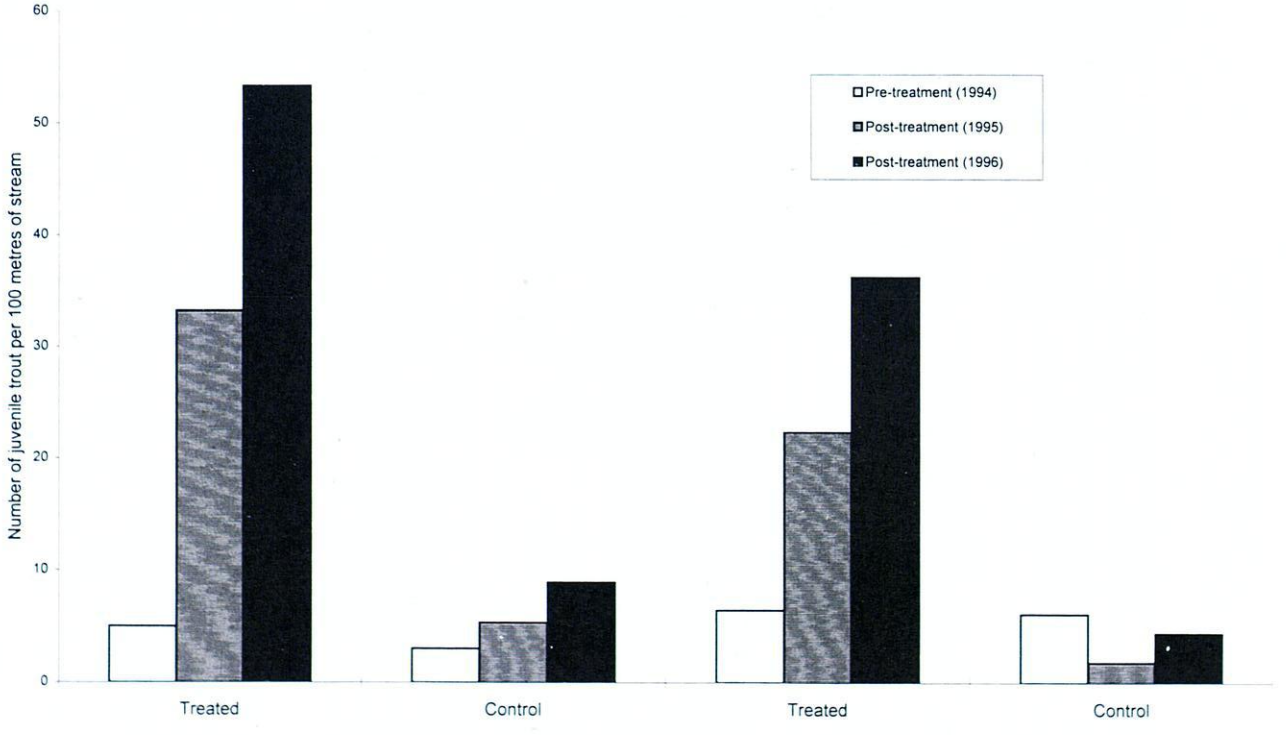
Having identified what is a major factor inhibiting salmonid production, not only in this river, but many other chalkstreams less than about 10 metres wide, an experiment was set up to see how effectively the effects of grazing could be restored. The site chosen was on the Devil's Brook, a 4m wide tributary which was almost entirely grazed. Two replicate sections of stream, each about 100m long, were selected for restoration whilst similar intervening sections were left as controls. In each section, estimates of the numbers of trout were made in September 1994 before work was carried out, and again at the same time each year thereafter.

As the stream had gradually widened over time and was uniformly shallow (10-20cm deep in summer), habitat restoration commenced by firstly excavating a series of pools at a spacing of six channel widths apart during November 1994 with a digger. To prevent pools infilling with fine sediment, the current was concentrated centrally within the channel at the upstream end of each pool by means of paired current deflectors. In May 1995, a barbed wire stock fence was erected along both restored sites. Since then no other management has been carried out.

Following the erection of the fencing there was a marked recovery in riparian vegetation. Emergent plants like fool's water cress, water cress and floating sweet-grass and, on the bank, reed canary-grass grew profusely, in stark contrast to the control sections where they were grazed down nearly to the ground. These plants caused a narrowing of the effective channel and also a slight raising of water level.

From the accompanying graph it can be seen that numbers of trout present responded rapidly. Within a year numbers of 0+ had increased about six-fold, and ten-fold by 1996. Numbers of adult brown trout also increased about six-fold within the first year and have remained about this level. Clearly, the habitat improvements have had an astounding impact, but it must be cautioned that such a rapid increase may not be seen everywhere. The increase must largely have been occasioned by fish moving into these sections from elsewhere. If longer sections had been fenced then a more gradual increase would be expected as the true population increased. Nevertheless, the experiment as it stands, shows that the carrying capacity has greatly increased.

Following on from this experiment, Wessex Water Services Ltd, who have sponsored this work, have partially grant-aided a number of riparian owners in the Piddle catchment to conduct similar habitat improvements. Accordingly, some 1.5km of the Lower Devil's Brook were fenced in 1996. Through future monitoring of this site the real impact on trout production will become apparent over time. Also, at a new improved site on the main river, it will be possible to gauge the impact of habitat improvement on salmon parr numbers. If these studies ultimately show increases similar to the first experiment, it will be concluded that tremendous potential exists for improving fish numbers in smaller chalkstreams. Then, one of the big problems facing chalkstreams will have been overcome..



Numbers of juvenile trout before and after habitat restoration in the Devil's Brook

NORTH ATLANTIC SALMON FUND (UK)

(Report by the Deputy Director)

In 1996 there was an impasse at NASCO, and a quota of 174 tons (about 65,000 fish) was eventually set unilaterally by the Greenland Government. Although Orri Vigfusson was unable to obtain any formal agreement with the Fishermen's Association (KNAPK), his influence with the fishermen themselves, a number of whom were keen to reach a deal, meant that many did not fish. Only some 80 tons were taken. This justified the money spent during the year on the development of other fisheries as a long term alternative to salmon fishing.

The lack of an agreement led the Committee of NASF(UK) to delay the launch of the 1997 appeal until the future was clearer. The February KNAPK assembly, at which discussion of NASF proposals had been anticipated, was postponed. However, Greenland delegations visited Iceland at their own request, and by 1st May NASF(UK) decided that the prospects for negotiation were sufficiently good to warrant the re-opening of the appeal. The target set for UK contributions, on the basis of forecast compensation payments and alternative development costs, is now £150,000 per year, of which the Scottish share is £120,000.

In the NASCO meeting this June, a 1997 Greenland quota was agreed, at the low figure of 57 tons. This is increasing the incentive to turn to alternative fisheries, and at the time of writing discussions on a possible renewed deal between NASF and KNAPK are in progress. The Faroes quota was reduced to 385 tons, but it is still unreasonably high - it is not yet based, like the Greenland quota, on a scientific estimate of the numbers of multi-sea-winter fish required in their home rivers to maintain spawning levels. The NASF agreement requires the Faroese to offer their quota for sale to NASF, and negotiations on the compensation level for this continued closure will be taking place. In the meantime, early response to the 1997 appeal has been encouraging, and NASF(UK) has already sent £70,000 to Iceland for the international fund.

Dr. David Solomon, scientific adviser to NASF(UK), has calculated that over 99,000 extra fish returned to UK waters between 1991 and 1995 as a result of the buyouts. 80,000 of these would have been MSW fish, more than half of which would have been added to the spawning stock. The cost to NASF(UK) of each extra fish in home waters has been about £4.50 - more tellingly, each rod-caught fish on the river bank can be costed at £22.50. This reinforces the original assessment that the buyouts represent a highly cost-effective stock enhancement measure that is vastly cheaper than other strategies.

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WORKSHOP ON THE ROLE OF ASSOCIATIONS AND TRUSTS IN RIVER MANAGEMENT

(Report by the Deputy Director)

A small informal workshop under the Chairmanship of John Hopkinson was held at Fishmongers' hall on 16 April. It was prompted by the growth in England and Wales of voluntary associations such as the Wye Foundation, the Westcountry Rivers Trust and the Eden Rivers Trust, as well as the development of the West Highland Trusts in Scotland. The aim was to explore and refine the possibilities for co-operation between such associations and statutory bodies, to develop guidelines and advice for setting up and running new associations, and to formulate guidance on seeking and exploiting grants from national and European sources.

Twenty seven participants represented English and Welsh Associations, the Scottish Trusts, the Association of Scottish District Salmon Fishery Boards, MAFF, the Environment Agency, the Scottish Office, the Country Landowners' Association, the Salmon & Trout Association, the Game Conservancy and the British Field Sports Society.

Although discussion centred on the funding and management of fisheries work south of the Border, it was useful to be able to compare the different arrangements obtaining in Scotland. Although very few rivers in England and Wales would have the assets to support the independent management enjoyed by Scottish Boards, the experience of the West Highland Trusts in combining the resources of smaller rivers was particularly relevant. The workshop discussed the problems of funding salmonid fishery work, and the need to augment a decreasing level of Grant-in-Aid. It was clear that willingness to generate funding locally would depend on the ability of local associations to be involved in the planning and implementation of work programmes.

There were useful presentations, based on experience, on the principles and procedures for setting up associations, and for obtaining charitable status. There was also a valuable account of a successful application for an EU grant. It was clear that there had been differences in the ease of early relationships between associations and regional managements in the Environment Agency - work is in progress to develop a simple common protocol to strengthen these relationships for existing and new associations. This will be published by AST, together with a compendium of the practical guidance which was aired during the workshop.

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NEWS FROM THE WILD WEST

(Andrew Wallace)

The five new West Coast Trusts have just started their first full season of survey work and will be working flat out through the summer to establish a first layer of base-line data on juvenile stocks. These electro-fishing surveys, taking place in as many of the catchments as possible in each Trust area, will give the biologists their first quantitative assessment of where juvenile stocks are either abundant, in trouble or non-existent. This work will quickly lead to some early conclusions about where the problems might lie and where effort can best be concentrated on remedying the situation.

At a basic level the problem may be as simple as an impassable road culvert or stock fence, increasing in complexity through issues such as loss of habitat and predation, ending with the more escoteric influences of acidification which will require complex continuous monitoring experiments.

Reports from fish farm hatcheries and from existing monitoring work suggest that acidification, long considered by many to be a problem largely confined to the South West, may well be more widespread and causing more damage than previously appreciated.

With this in mind the Trusts intend, after the first survey season has been completed, to set up a West Coast continuous pH monitoring project to try and establish the extent of the problem. The intention is to conduct this project in partnership with SEPA, SNH and SOAEFD and to attempt to establish where and to what extent acidification might be causing problems. Much of this work will be based on the pioneering work carried out by the West Galloway Fisheries Trust.

Complimentary to this project is the current development of a national fisheries 'Geographic Information System' (GIS) involving the 6 West Coast Trusts, Tay Foundation, Tweed Foundation, Spey Research Trust and Conon District Fishery Board. These organisations, in collaboration with SOAEFD and two commercial sponsors, have agreed to standardise techniques of data collection and storage and will, from now on, be regularly submitting this data to a central GIS system. This system which will also store data-sets on the geography, geology, hydrology, rainfall, land-use etc. of the Trust areas, will then be able to help the biologists link their survey data to other physical, chemical and biological attributes of their systems. It is hoped that this GUS system will greatly enhance our understanding of the effects of changes in land-use on fish productivity as well as saving the Trust biologists considerable amounts of time by allowing them to concentrate and prioritise their efforts.

It is hoped, with time, that this Fisheries GIS system will prove to be an invaluable fisheries research tool and that other District Fisheries Boards and Fisheries Research Trusts in other parts of the country will participate in the project.

On the marine side, early season indications are that this will be another problem year for sea-lice. Already, large numbers of post smolts have been seen returning early to West Coast rivers with very high lice numbers. Adult salmon and sea-trout too seem to be suffering.

The Trusts are collectively involved in a sea-trout/smolt mark/recapture experiment to try and understand more thoroughly the effects that these lice infestations might be having on behaviour and survival. Some Trusts are also helping to collect samples for the genetics work on sea-lice being conducted at St. Andrew's University. This work is directed at establishing the origin of the sea-lice problem.

Plans are underway to develop the concept of SOAEFD's Shieldaig Project in Wester Ross (a trap that allows accurate counts of returning adult fish as well as of smolt productivity) in other parts of the West Coast. Scottish Hydro Electric already have such a facility at Morar which is being modified for research next year and other Trusts are considering establishing variations on the theme of these projects in their own areas. The intention is to establish a network of traps (such as at Burrishoole in Ireland) to develop our understanding of stock dynamics and marine survival.

Whilst there is still a long way to go, relationships with the salmon farmers are slowly improving and certain companies in certain areas have been keen to co-operate in the Trust's research into sea-lice and other fish farm related issues. The Trusts await the outcome of negotiations which are currently underway over the role of regulation and planning of the industry which the Crown Estate wish to delegate. The decision about where these powers should lie has yet to be made but is likely to have a significant impact on the development of the industry.

The Association of West Coast Fisheries Trusts continues to support its member Trusts in whatever way it can, with a particular emphasis on ensuring good communications not only between the Trusts but also with the outside world. A further role of the AWCFT is in the development of other Trust areas and work is underway in Southern Argyll and with the existing River Clyde Fisheries Management Trust and Loch Lomond Angling Improvement Association.

The AWCFT has a significant and ongoing role to play in addressing issues that are particular to West Coast fisheries. But it will also be important for good links to be established with similar organisations on the East Coast (such as through the GIS project) to ensure consistency of thought and of approach managing the problems and potential of Scotland's fisheries.

As we now approach the first anniversary of the new West Coast Trusts, we can look back to a year of encouraging progress. The Trusts have settled down well and their profile and reputation in each area is growing. Enthusiastic and committed Trustees; a team of extremely capable biologists in post; strong links with the experience of the Galloway Trust; and further potential to establish new partners in the Argyll and Clyde area, all suggest exciting times ahead. The structure is now in place to get to grips with what are undoubtedly a daunting set of problems.

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DO SALMON NEED SCIENCE?

(Reproduced with the kind permission of the Editor of Salmon, Trout & Sea Trout)

Jeremy Read answers this question by describing the Atlantic Salmon Trust's role in efforts to improve, develop and extend salmon and sea trout fisheries.

Salmon science is nothing new. Perhaps the earliest reference to smolt tagging is Isaak Walton's description of "tying a ribbon, or some known tape or thread, in the tail of some young salmons, which have been taken in weirs as they have swimmed towards the salt water, and then by taking a part of them again with the known mark at the same place at their return from the sea". Microtags have replaced ribbons, but the principle is the same.

Since Walton's day, in this country and abroad, there has been what some see as an explosion of research concerning the Atlantic salmon. Inevitably, some doubt the need for so much study, which they see as being carried out as an academic exercise. Many argue, with some justification, that lack of incontrovertible scientific evidence is sometimes used as an excuse for delaying management decisions, particularly at Government level.

With that in mind, if scientific work is to be generally perceived as justified, it must produce information which can be applied usefully. In some cases this is easy to identify in the short term, but the work may be more fundamental and therefore of less obvious immediate benefit. It is therefore the more essential that such work should be carefully targeted.

Encourage, Assist and Influence

This conviction led to the foundation of the Atlantic Salmon Research Trust in 1967, at a time when the onset of UDN and the rapid expansion of the Greenland high seas salmon fishery coincided to threaten UK stocks. The founders of the Trust, to quote its original Memorandum of Association, wished to, "Conduct, assist in conducting, and stimulate laboratory and field research for the purpose of improving, developing and extending salmon and sea trout fisheries in the countries bordering the North Atlantic Ocean for the benefit of the people inhabiting those countries and the community at large."

Not a bad aim - and the Trust has stuck to it. Although it is now known more simply as the Atlantic Salmon Trust, and its aims include the wider task of encouraging and influencing national and international policy for the management of wild salmon and sea trout stocks, research still absorbs much of the Trust's time and of its resources.

To this end, its Council of Management enjoys the valued support of an Honorary Scientific Advisory Panel. This brings together an unrivalled array of experience in salmon biology in the UK and the Republic of Ireland. Its members, chaired by Dr. Derek Mills (a keen fisherman as well as an eminent and much-published researcher and consultant) meet annually and correspond frequently. Their task is to shape the Trust's activity in support of salmon research. How is this achieved?

Research Projects

The Trust works in a number of ways. First, there is the support of specific research projects. Some projects are funded in their entirety. Frequently, however, the Trust provides "pump-priming" finance to allow the timely launch of bigger projects, and can supplement funding of existing programmes when this is needed. In every case, the Trust has to be satisfied that the project is not just of local benefit, but that its results will have a wider application.

Many such projects are supported every year, and the Trust employs a retained biologist who is directly involved in a number of them. To give just a few examples of recent work ..

When farm cages in Loch Eriboll were wrecked by a storm in 1989, some of the many thousands of salmon which escaped were detected running the River Polla, which flows into the loch. The Trust was able to deploy its biologist, John Webb, to track and observe the fish. Using equipment and data analysing facilities provided by the Scottish Office, he showed for the first time that wild and farmed fish are perfectly capable of interbreeding and subsequent joint research on 16 Scottish rivers showed the presence of wild/farmed progeny in 14 of them. This work pointed up the potential danger of genetic weakening by the intrusion of alien stock, and helped lead to the adoption by the North Atlantic Salmon Conservation Organisation (NASCO) of international guidelines for salmon aquaculture.

Studies by Leicester University, financed by the Trust, have identified the major role played by so-called "precocious parr" in spawning, especially in upland streams. This is part of the salmon's innate strategy to compensate for the comparatively small numbers of returning multi-sea winter cock fish.

Incidentally, it is believed to be the cock which provides the genetically-inspired tendency to spend longer at sea. If releasing spring hens is good for stock enhancement, releasing cock fish may be even better.

The Trust has very recently provided funds to purchase a quantity of a new type of passive tag, which can remain in a salmon all its life. This action will speed the start of trials by the Scottish Office and the Conon District Board of a system for the remote detection of salmon passing fish-ways and dams, both downstream as smolts and on their return as adults. The technique will give information on the numbers of fish of each year class moving at the beginning and the end of their migration.

An even more comprehensive study uses "genetic finger-printing" to follow the fortunes of individual families of spring salmon from the Aberdeenshire Dee throughout their lives. Now in its third year, this is already providing valuable information on the effect of different river habitats on the survival and growth of fry and parr, and the first marked adults will be returning next year.

At the same time, the Trust aims to identify the need for new research, and to encourage its conduct by other organisations and the sharing of results. Accordingly, expert workshops on specific subjects are organised on an annual basis. To give two recent examples, one of these workshops undertook an examination of the effect of water flow and water quality on the movement of fish in rivers and estuaries, which had significant implications for the management of abstraction and hydro-generattion in order to protect fish migrating both as smolts and adults. Another workshop looked at the coverage and accuracy of catch data, and how this information can be used for the effective and responsive management of salmon fishing in order to conserve or enhance stocks.

Conferences and Symposiums

Looking to a wider public, the Trust organises periodical conferences, usually with international participation. The most recent of these took place in London in January 1996, and examined the decline in spring salmon stocks around the North Atlantic. A very clear common theme emerged - spring salmon have recently suffered an exceptionally high mortality at sea, probably because of changes in ocean temperature and salinity patterns, which affect feeding. These changes may well run in cycles, and we can do nothing directly about them. Therefore we must do all that we can to protect springers at other stages of t heir life, from improving habitat to reducing the number of spring fish killed by nets and rods.

The Atlantic Salmon Trust has a North American counterpart - the Atlantic Salmon Federation - and every few years the two organisations hold an International Salmon Symposium. These have often had far reaching results.

The second Symposium in Edinburgh in 1978 led to the setting up of NASCO and the international regulation of salmon fishing at sea. Discussion of salmon farming at the third Symposium in Biarritz in 1986 sparked international study of the problems posed by aquaculture.

The fourth Symposium, held in New Brunswick in 1992, provided a classic example of the progression of research work - its subject was "Salmon in the Sea" and as a result of the gaps that it revealed in our knowledge of the subject, the Trust organised one of its workshops in Edinburgh to examine methods of learning more about this mysterious phase of the salmon's life. Possible techniques were identified, but it became clear that the resources needed were beyond the reach of any one nation. Now Scotland, Ireland and Norway are organising a project, for which they are seeking EU funding, to carry out a joint study of migrating salmon in their first year at sea - the period in which they are thought to be most valuable.

A fifth Symposium will be held in Galway in September this year. The theme will be "Managing Wild Atlantic Salmon - New Challenges and New Techniques".

All this work requires finance, and the Atlantic Salmon Trust is supported entirely by voluntary contributions. Much of the research activity is funded from the annual Postal Auction, which offers a wide range of beats - some very hard to gain access to in any other way - at an even wider range of prices. The Director, Rear Admiral John Mackenzie, will be delighted to provide information on the Auction, and on ways of supporting the Trust.

To return to Isaak Walton - he wrote for fishers, not for academics. If he saw the value of research in the 17th Century, when salmon were abundant, can we doubt it at a time when stocks of wild fish are in such sad decline?

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AST BIOLOGIST'S REPORT

(John Webb, *Marine Laboratory, Aberdeen*)

Lifetime fitness studies on spring salmon

Monitoring the performance of young spring salmon resulting from the eggs stocked into an upper tributary of the Aberdeenshire Dee over the past two years is continuing. Parr and smolts leaving the burn are being caught in a permanent trap especially designed for intercepting juvenile fish moving downstream. Daily trap catches are being secured and each fish is being measured for fin length, scale sampled and microtagged before release downstream. At tagging, the adipose fin is routinely removed to aid identification in later life in the catches of coastal and river fisheries that exploit the population. Usually, the fin tissue or 'fin clip' is discarded. However, for the purposes of this study each fin is being retained for DNA fingerprinting.

Since early September of last year, some of the fish derived from the first years egg planting (spring 1995) have begun to leave the burn as 1+ autumn parr and 2 year old smolts. Total catch's have so far (since the start of last years autumn trapping season) have reached 3700 migrants. However, scale reading suggests that the numbers of fish derived from the first of the experimental egg groups have been quite small (<100); most of the fish caught so far being derived from natural spawning that took place in the burn during the years prior to 1994 and the start of the experiment. Nevertheless, a small number of very young migrants is to be expected as the burn is situated 1200 and 2000 feet above sea-level and has a very short growing season. Consequently, the growth of the young salmon is very much slower than would be found among juvenile salmon populations living in more lowland (and therefore warmer) tributaries.

Most of the autumn parr generated in the burn being used in the current study tend to be 2+ or 3+ years old and most of the smolts are usually 3 and 4 years old. The expectation is therefore that the planted experimental groups will begin to greatly increase their contribution to the migrant production of the burn from this autumn (1997) onwards when many will be older than the threshold of 2+ years old. Scale reading therefore allows juvenile migrants leaving the burn to be assigned to different brood or spawning years. Fish derived from each of the three consecutive stockings (1995-1997, inclusive) can therefore be identified quite easily by examination of scale growth patterns. However, further valuable information will be gained from the analysis of each fish's adipose fin sample using the latest DNA fingerprinting techniques; each sample being eventually traced back to a particular pair of adult spawners (ie. MSW salmon or grilse) and stocking location within the burn.

This spring, a further ten families of 3000 spring salmon eggs each have been planted out in the burn. Studies to monitor their survival to hatch and emergence are currently underway.

Performance of different families of salmon fry in the first summer of distribution and growth

In another experiment designed to look at the dispersal of fry from spawning redds, O-group fry obtained at the end of the summer of 1994 are in the final stages of analysis at Queen's University in Belfast to reveal the genetic 'fingerprint' of each of the samples. Each fingerprint will then be related back to the original parents used in the experiment and the positions within the experimental burn in which their eggs were placed. Having identified each sample to a spawning pair of adults and the spawning position, we

will focus on the distribution of fry of different parentage throughout a 600m length of common rearing habitat. Analysis of all the fry obtained at sampling should reveal if there are any differences in the dispersal patterns or micro-habitat preferences of fry derived from different spawnings/parents. The laboratory analysis is due to be completed in late July and a report on the preliminary results of this work will be published in the December 1997 Progress Report.

Presentations

In February, I gave a short presentation to a gathering of ghillies from the River Dee on the results of the catch and release/radiotracking studies conducted last year.

In April, I presented a paper entitled 'Escaped farmed salmon in Scotland: temporal and spatial trends in their frequency and occurrence' at the ICES/NASCO Symposium in Bath (see Conference report elsewhere in this Progress Report).

In early May, I gave a presentation to the annual meeting of the Tweed Foundation Patrons at the Tweed Foundation's headquarters near Melrose. The presentation consisted of a review of the management arguments for the introduction of a catch and release policy on a catchment-wide basis as a means of securing the fortunes of particularly valuable stocks of salmon in rivers and a brief account of the results of the radiotracking studies that were conducted on the River Dee in 1995 and 1996.

Publications

A paper entitled 'Variation in the timing of spawning of Atlantic Salmon (Salmon salar) and its relationship to temperature in the Aberdeenshire Dee, Scotland' was published in the Canadian Journal of Fisheries and Aquatic Sciences (see the Review of Scientific Literature in this report).

Posters

Two new posters have been produced for the 1997 season. One describes the results of the catch and release studies undertaken on the Aberdeenshire Dee last year and the other describes the threat that the parasite *Gyrodactylus salaris* poses to our rivers and how anglers can minimise the possibility of it being introduced to the UK.

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WESTCOUNTRY RIVERS TRUST

News Update - Summer 1997

TAMAR 2000 Progress Report

Currently around 80 farms have been visited by our FWAG Riverwise Team and our Scientific Officer. Around forty of these have had Whole Farm Plans drawn up for them, indicating how they can save money and improve the environment on their farms, focusing specifically on changes which will improve the river Tamar and its tributaries.

We are still evolving the design of the "Riverwise Plan" so that it is a succinct, practical manual identifying changes in current practise which will bring both economic and environmental benefits to the area.

A part of the Tamar 2000 Project is to increase the land and river management and the tourism skills of the farmers within the catchment, to ensure that the benefits projected in the Riverwise Plans are sustainable. To help achieve this the Trust are organising a number of diverse workshops for farmers and farm advisors within the catchment across a range of subjects including tourism marketing, fisheries management, pond design and creation.

The Tamar 2000 Project was formally launched on the 25th October 1996 at the Arundell Arms Hotel to a packed audience of farmers, riparian owners and fishermen who came to hear Arlin Rickard talk about the Trust's hopes and plans for this flagship project. The event was generously supported by Strutt & Parker and the Arundell Arms Hotel.

(The Tamar 2000 Project is supported by the AST)

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SHEEP DIP DISPOSAL

Great concern has been expressed by all concerned over the disposal of Cypermethrin sheep dip. I reproduce a press release from Grampian Pharmaceuticals Limited which is a step in the right direction and should, I suggest, receive a cautious welcome.

Care must still be taken to avoid sheep entering a watercourse after they have been dipped.

Grampian breakthrough with launch of disposal system for HCC sheep dips

Grampian Pharmaceuticals, the Lancashire-based veterinary pharmaceuticals company, have developed a disposal system for their high-cis cypermethrin (HCC) sheep dips which will improve the environmental safety of vital dipping operations.

The market leaders in sheep dips, Grampian supply HCC dips under the brand names Crovect Dip, Provinec Dip and Robust.

Launched at the Royal Show at Stoneleigh on Monday, June 30, the disposal system achieves complete degradation of HCC in under 12 hours. A standard pack, sufficient to degrade 1,000 litres of dipwash, costs £25.

HCC is the leading synthetic pyrethroid (SP) used for sheep ectoparasite control in the UK. It is licensed for the treatment and control of sheep scab, blowfly strike, lice and ticks.

Tested in a long series of laboratory studies and field dippings on UK farms, the disposal system involves the addition of sodium hydroxide (caustic soda) and a non-ionic surfactant to the spent dipwash. The insecticide disappears in under 12 hours. The treated dipwash can then be disposed of under current guidelines, mixing it with slurry or water and spreading on a suitable area of land, or through a recognised waste disposal contractor.

While the treated dipwash is still alkaline, disposal as recommended onto pasture showed no observable effect on grass. Grampian have also established the safety of treated dipwash on sensitive water crustacea. Although Grampian continue to recommend disposal of the treated dipwash according to MAFF guidelines, the disposal system provides significant protection against any environmental damage caused y accidental spillage into water courses

Grampian also launched a good dipping guide and video to promote best dipping and disposal practice. These will form the basis for a major initiative to ensure that the company's products are used for maximum effectiveness and to safeguard the environment.

John Tasker, development manager of Grampian, described the disposal system - for which the company has applied for a patent - as a significant contribution towards the protection of the environment.

"Effective dipping is vital to the continuing health and welfare of the UK's sheep flocks and to the rural economy," said Mr. Tasker. "For example, the incidence of sheep scab has escalated since compulsory dipping ended in 1992 and is currently running at around 5,000 cases.

"Our HCC dips offer a highly effective treatment for scab and other ectoparasites but, as with all chemicals, great care must be exercised in their use and disposal. Used as recommended, our disposal system will relieve concerns about the impact of dip disposal and help farmers to maintain the integrity of their local environment," said Mr. Tasker.

John Thorley, chief executive of the National Sheep Association, said: "The protection of the environment is very high on our list of priorities and we encourage our members to exercise the highest standards of care in farming practice.

"Grampian Pharmaceuticals have developed a tool which will help sheep farmers to meet these standards and preserve the environmental quality of the areas in which they work. We consider this to be a major step forward for the industry and will be working with the company to encourage farmers to use the disposal system."

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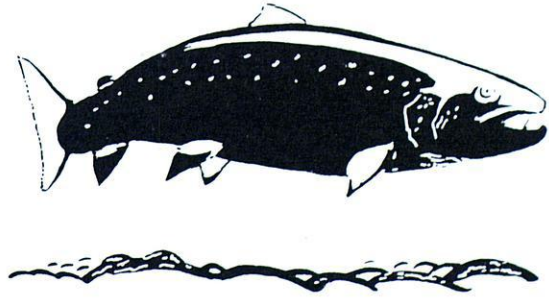

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FOURTEENTH ANNUAL MEETING OF NASCO - ILULISSAT, GREENLAND

(Derek Mills)

The BBC weather chart's revelation of a 'High' over Greenland just prior to our departure for the NASCO meeting augured well for favourable negotiations. The BBC was right for once and our arrival at Kangerlussuaq was in brilliant sunshine with temperatures in the mid-teens. A hasty departure north to Ilulissat was appreciated to escape the early seasonal emergence of trillions of bloodthirsty mosquitoes still absent 300 miles to the north in Ilulissat. There it was slightly cooler but still bathed in sunshine for the full 24 hours of each of the five days of meetings. The mosquitoes followed.

Ilulissat is a small fishing port of some 4,600 souls and 6,000 husky sled dogs. Fishing is chiefly for halibut, shrimps and capelin. Few salmon come so far north. We were warmly welcomed by officials of Greenland Home Rule and the Minister of Fisheries in the Hotel Arctic conference room, the venue for all our meetings. It was a unique experience to look out on a sea in which 20 million tons of ice floated past daily in the form of icebergs destined for the north Atlantic. There was indeed something about the aura of the place with produced a convivial atmosphere leading to co-operation and agreement on most issues. Any heat generated was soon dissipated on an evening cruise for delegates among the icebergs.

The scientific advice presented to the Commissions indicated that salmon stocks remain in poor condition in spite of the management measures taken in recent years. In the West Greenland Commission agreement was reached on a catch quota of 57 tonnes for 1997 under an amendment of an agreement made in 1993. This is a Reserve Quota and is for all catches, inclusive of subsistence, home sales and other sources. The North-East Atlantic Commission established a quota of 380 tonnes for the Faroese fishery in 1998 and additional restrictive regulatory measures, which include fishing time and effort. The North-East Atlantic Commission also adopted a Resolution on Guidelines to Protect Wild Salmon Stocks from Introductions and Transfers.

The Council adopted Guidelines for actions on transgenic salmon designed to contain the risks. It also agreed to establish a Working Group to advise on how the Precautionary Approach might be applied in relation to NASCO's work on management measures and the associated scientific research and on introductions and transfers including aquaculture impacts and possible use of transgenic salmon. Guidelines on catch and release fishing were adopted. Further steps were taken to eliminate the problem of fishing for salmon in international waters by non-Contracting Parties and to obtain information on by-catch of salmon in pelagic fisheries.

Non-Government Observers were disappointed at the decision of the United States and EU not to be party to recommendations for predator control. They suggested that more research on this subject was required. Some surprise was also occasioned by the decision of the North-East Atlantic Commission to drop the subject of Environmental Quality of Salmon Rivers from its agenda.

Everyone present at this Annual Meeting appreciated the unique Greenland experience. The 15th Annual Meeting will be held in Edinburgh during 8-12 June 1998.

The Ilulissat choir sings for delegates at the opening of the 14th Annual meeting of NASCO

NASCO delegates gaze in awe at the ice fjord at the foot of the Ilulissat glacier which produces 25 billion tonnes of ice a year and the majority of the icebergs of the Northern Hemisphere.

OPENING STATEMENT BY THE MINISTER OF FISHERIES, PAVIARAQ HEILMANN

Mr. President, Distinguished Representatives, Delegates and Observers, Ladies and Gentlemen.

On behalf of the Greenland Home Rule Government I welcome you all to Ilulissat, to Greenland and to this 14th Annual Meeting of the North Atlantic Salmon Conservation Organisation (NASCO).

It is an honour for Greenland to host this meeting. Furthermore it is inspiring to see such a large attendance. I think it is important you get the feeling of these arctic conditions, which fishermen and the fishing industry in Greenland endure. In this town of Ilulissat fishing for Greenland Halibut and shrimps is of utmost importance in daily life. As you may know the salmon fishing takes place further south on the West coast of Greenland.

Ilulissat is, in Greenland, a big town with a highly developed fish industry and with the capabilities to host a meeting of this magnitude and accommodate all of you. But that is it. As you have filled the town , we hope you will tolerate the inconvenience of not all of you being accommodated in one place.

Hunting and fishing is a natural part of the Greenlanders daily life. But if you ask a Greenlander living off the natural resources from sea and land - like seals, whales, birds, reindeer, halibut and salmon, first he will say he is a hunter - and then a fisherman. However, most commonly fishing is what makes the money, while hunting and some of the fishing makes the daily bread for him and the family.

The situation of the small scale hunters and fishermen is getting more complex every year. The technologic advances of the modern fishery together with an increasing population forces effective restrictions and quotas on most of the living resources. Restrictions that threaten the old customs and the way of living in the arctic.

Still salmon is one of the species appreciated by the Greenlandic people. Not for catch and release. But as a natural part of a varied Greenlandic diet. A diet increasingly threatened by environmental pollutants, as recently published by the Arctic Monitoring and Assessment Programme (AMAP).

Extensive research in the field of salmon life cycle and ecology has been carried out through the years in NASCO history. Present and future surveys concern the impact of farmed salmon, where loss of control has lead to the spread of diseases and irreversible mixing of genes. On the other hand exaggerated control of the genes has made it possible to make highly questionable alterations to farmed salmon. To the wild salmon stocks the risks there are at stake are just too high.

As a reaction to these problems NASCO members have agreed to implement the Oslo Resolution by 1998. Greenland also welcomes future NASCO efforts to liaise with the International Salmon Farming Industry (ISFA) and would like to see this development lead into even more firm agreement with the farming industry in a co-operative spirit.

This issue represents just one of the threats to wild salmon stocks. A more holistic approach should be developed. NASCO members must actively practice the burden sharing principle and start to take into account all activities which affect salmon and their habitats.

Still I hope that a development of Greenland fishing tourism also in future could be based on experiences in Arctic nature and possibilities for catch of salmon and Arctic Char along with other interesting species.

As you may know, we have only one single river in Greenland with the right physical and temperature conditions for salmon spawning. However trolling and other fishing is not less interesting.

Once again, welcome to Ilulissat. I wish you success in completing the work ahead of you. Finally I wish you all a very pleasant stay and hope it could be an eye-opener to the special Arctic conditions.

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REVIEW OF SCIENTIFIC LITERATURE ON SALMON

(by Derek Mills, *Institute of Ecology & Resource Management, University of Edinburgh*)

1. Smolts

What is the value of a wild salmon smolt, Salmo salar L.?
G.J.A. Kennedy & W.W. Crozier. Fisheries Management and Ecology, 1997, 4, (2), 103-110.

Information on marine and freshwater survival and exploitation of River Bush salmon was developed into a model illustrating the potential ranges of grilse production per 1000 smolts. Values were attributed to the grilse 'crop' at each of three potential production stages - commercial landings, angler catches and fertilised egg production - using both published and derived valuations. Using the model, a range of values per wild smolt was calculated for grilse production on the River Bush. The model indicates that the mean value is approximately £11,957 per 1000 smolts, ie. Just under £12 per smolt at 1995 prices.

The seaward movement of Atlantic salmon smolts in the Usk estuary, Wales, as inferred from power station catches. M.W. Aprahamian & G.O. Jones. Journal of Fish Biology, 1997, 50, 442-444.

The greatest number of Atlantic salmon smolts were caught at Uskmouth power station during the day on the flood tide and the least on an ebbing night tide. Catch rates during the day on an ebb tide and at night on a flood tide represented the immediate state. The results, together with tracking data, suggest that salmon smolts prefer to migrate seaward through the lower Usk estuary during the night on an ebbing tide.

2. Adults

Tide and diel timing of river entry by adult Atlantic salmon returning to the Aberdeenshire Dee, Scotland. I.P. Smith and G.W. Smith. Journal of Fish Biology, 1997. 50, 463-474.

The timing of salmon migration from the estuary of the Aberdeenshire Dee into the river in relation to tidal phase and time of day was studied by combined acoustic and radio tracking of individual fish and by analysing records of untagged fish from a resistivity fish counter 0.8km upstream from the tidal limit. Up-estuary movements that led to river entry were predominantly nocturnal and tended to occur during the ebb tide. Penetration into the non-tidal reaches of the river also tended to occur at night, but the timing of salmon movements was no longer significantly associated with tidal phase.

Variation in the time of spawning of Atlantic salmon (Salmon salar) and its relationship to temperature in the Aberdeenshire Dee, Scotland. John H. Webb & H. Anne McLay. Canadian Journal of Fisheries and Aquatic Sciences. 1996. 53, 2739-2744.

Time of spawning of Atlantic salmon in the River Dee was assessed from cumulative counts of redds made in five areas of the river system. Spawning occurred earliest at high altitude sites in the upper reaches of the river and progressively later at sites further downstream. The period of spawning at each location varied between 18 and 48 days and was more protracted at low altitude sites. Hatch occurred earlier in ova from redds in the lower altitude sites. Differences in the timing of spawning and hatch are considered in relation to water temperature. It is suggested that variation in the timing of spawning is of adaptive significance and that it relates to the optimal timing of fry emergence in different parts of the river system.

3. Tagging and marking

A comparison of five external marks for Atlantic salmon, Salmo salar L. I.I.J. Moffet, W.W. Crozier & G.J.A. Kennedy. Fisheries Management & Ecology, 1997. 4, (1) 49-53.

Five external marks (Panjet, visible implant tag, hot brand, anal finclip and fluorescent pigment) were compared for retention and effect on marine survival in Atlantic salmon ranching experiments aimed at complementing coded wire tagging. Only fluorescent pigment marks and Panjet marks were found to be effective, with retention rates of 76.9% and 90.0% respectively, after one year at sea. The Panjet was the only mark to significantly reduce marine survival ($P<0.001$) compared with controls.

4. Artificial propagation

Breeding success with salmon (Salmo salar L.) ova in the field using anew type of breeding box. Jorg Schneider. Osterreichs Fischerei, 1997, 50. Jahrgang. Heft 2/3, 51-57.

Throughout the reintroduction programme "Salmon 2000" between 1994 and 1996 the egg to alevin survival of eyed Atlantic salmon ova deposited in a new type of breeding box was monitored in the field. A total of 57,000 eyed ova consisting of 7 stocks were planted in 17 boxes at 3 locations in Rhineland palatinate. The boxes are made of stainless steel measuring 850 x 200 x 110mm. The interior is separated into 5 compartments and can be filled with up to 4000 eggs. The box is covered with a lid which can be opened for observation and maintenance purposes. A flow regulated shutter and rinseable filter make sure only afiltered water with a low proportion of silt reaches the eggs during high water conditions. Heavy silting is considered a major reason for high mortalities of eggs planted in Whitlock-Vibert boxes. The mortalities in 15 boxes was only 7.48% (range of 3.61 - 13.15). The possibility of direct observation of the developmental stages egg to alevin demonstrates the method's value for scientific experiments in the field, such as direct comparison of planted stocks.

5. Pollution

River Fiddich Cooling Water Discharge Project Report. C. Laburn. 1997. Spey Research Trust Report 1996. No. 3/97.

Temperature recorders showed water temperatures below distilleries to be elevated between 2-7°C above the ambient. An electro-fishing survey shoed that the growth of 0+ and 1+ salmon below the outflows was greater than those upstream. 0+ trout also showed increased growth below the distilleries.

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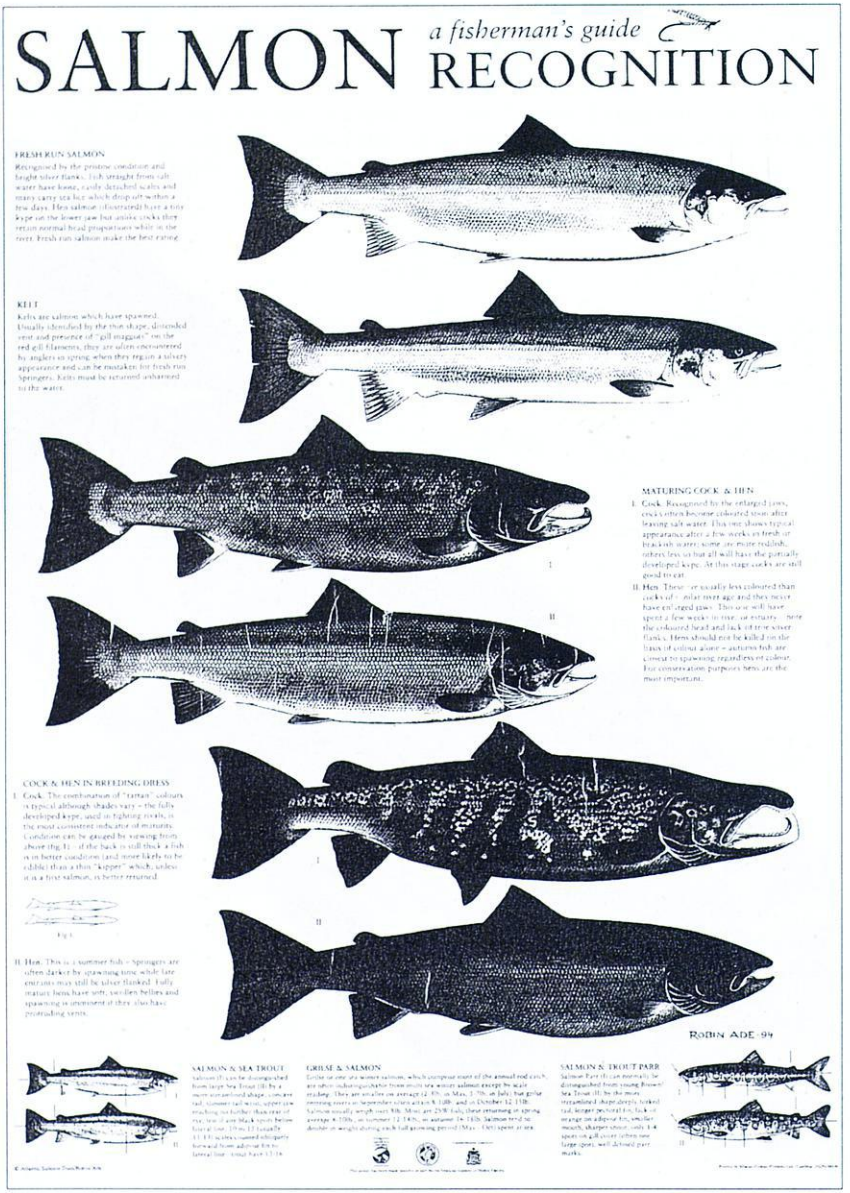

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