

**Management
of Wild Fisheries in Scotland:
A Baseline Report**



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EXECUTIVE SUMMARY

1. There are at present 42 species of freshwater fish resident in Scotland, 16 of which are not native. Though only a few of these species are the object of fisheries in Scotland, almost all of them (37) are of importance commercially or for angling elsewhere in Europe.
2. Fisheries management and legislation is dominated by Atlantic Salmon and Sea Trout, but there are important fisheries for wild Brown Trout and some fisheries for coarse fish species.
3. Net fisheries, which have declined substantially in recent years, are also dominated by Atlantic Salmon and Sea Trout. Former small commercial fisheries for other species no longer exist.
4. Recent estimates of the value of Scotland's freshwater fisheries in 2003 indicate that, at 2012 prices, anglers spent a total of £140 million, with Salmon and Sea Trout accounting for over 65% (£91 million), Brown Trout (£18 million), Rainbow Trout (£24 million) and coarse fish (£6 million).
5. There is no single management body as such for freshwater fisheries in Scotland. A variety of organisations are currently involved in various aspects of management and the major driver is Atlantic Salmon, managed on a local basis by District Salmon Fishery Boards. There is no parallel management body for other freshwater fisheries.
6. The Scottish Government has a number of statutory national and international obligations in relation to freshwater fish and fisheries which are delivered through Marine Scotland, Scottish Natural Heritage and the Scottish Environment Protection Agency.
7. Seven reports published over the last 50 years came to similar recommendations regarding the changes required to improve the management structure of freshwater fisheries management in Scotland. Few of these recommendations have ever been acted on by any of the relevant governments.
8. Current deficiencies identified in the present report cover many of the same past recommendations and include:
 - No central fisheries management authority
 - No national cohesive strategy for the management of freshwater fish and fisheries
 - Existing management is almost entirely salmo-centric
 - Inadequate stock data on Atlantic Salmon and Sea Trout
 - Little stock data on Brown Trout and virtually none on other species.
 - Several issues related to District Salmon Fishery Boards of which there are too many
 - No national picture on activities such as stocking
 - Too many small Fishery Trusts, mostly inadequately funded on a short term basis
 - No financial contribution from anglers for national fisheries management and research
 - Possible demise of commercial salmon net fisheries
 - Few national plans for the monitoring and management of individual freshwater fish species
 - No national scheme for archiving fisheries data
 - Problems with international commitments because the government does not control fishery management

INTRODUCTION

The Scottish Government has a manifesto commitment to support and protect Scotland's famous and valuable salmon and freshwater fisheries and to modernise their management framework. This is a complex area which has been the subject of many reports and investigations over many decades. The Aquaculture and Fisheries (Scotland) Bill (now 2013 Act) introduced to the Scottish Parliament in October 2012 was presented by the Government as the first step in delivering the manifesto commitment and the precursor to further work to be undertaken during the lifetime of the parliament. During the passage of the Bill the Minister for Rural Affairs and the Environment gave a commitment to a full, independent review of the management of salmon and freshwater fisheries in Scotland and that the review would look to explore in greater detail some of the issues raised by the Rural Affairs, Climate Change and Environment Committee during their scrutiny of the legislation.

This report is intended to baseline the existing picture of management for salmon and freshwater fisheries, highlighting the organisations involved, reviewing relevant previous reports and discussing issues which have arisen regarding the present structure. The report will inform scoping of the Review and the Review itself.

REMIT

In order to inform advice to Ministers on options for a review of salmon and freshwater fisheries management, governance and legislation, Marine Scotland needs to baseline the existing situation, drawing on statutory regulators and advisors, and informed stakeholder input. The remit given to those preparing the report was that, in essence this might usefully take a similar form to Chapters 1 to 5 of the WWF Report (Maitland 1996) including description of:

- The current state of play re the freshwater fish stocks (in the widest sense).
- Present arrangements for management, including: roles, responsibilities and accountabilities of key parties (at local, national and international levels including the impact of, for example, the Habitats Directive).
- A summary of key reports/projects undertaken on this issue over a period of years with an assessment of why recommendations and/or progress may have stalled.
- The key deficiencies in the existing framework which require exploration - and potentially new approaches - in order to achieve balanced, evidenced based fisheries management, and the reasons for these conclusions.

What follows is a baseline report to inform scoping of a review of the management of salmon and freshwater fisheries in Scotland.

1. THE FISH AND FISHERIES

FRESHWATER FISH IN SCOTLAND

The freshwater fish fauna of Scotland is substantially impoverished compared to equivalent fish communities found further south in Europe. Nevertheless 42 of the 56 freshwater species found in the British Isles as a whole (Appendix 1) are found here and the numbers have gradually increased over the last century as alien species have been introduced from England and from abroad. Taking the starting point of the fish communities of Scotland as the close of the last Ice Age, it is clear that euryhaline fishes, many of which come into fresh water to spawn, had no difficulty in invading new pristine waters as the ice receded. Thus Sturgeon, shad, Sparling, Sea Bass, gobies and mullets must have occurred in our estuaries for thousands of years.

Apart from these estuarine species, the only fish which were able to colonise inland fresh waters as the ice receded were also those with marine affinities and capable of existing in the ice lakes and glacial rivers which prevailed at the time. At most there were then probably only about 12 species, most notable among which were lampreys (three species), Arctic Charr, Brown Trout, Atlantic Salmon, Powan, Vendace, European Eel, Three-spined and Nine-spined Sticklebacks and Flounder. By the end of the 18th Century only another five species had been added to the Scottish fauna – Pike, Minnow, Roach, Stone Loach and Perch. These probably moved north gradually from unglaciated waters further south, though there was also some transference by humans. A century later, records show that another five species had been introduced by humans and were known to be established in Scotland – Brook Charr (from North America), and Grayling, Tench, Bream and Chub (from England). By the end of the 20th Century another nine species had appeared (Rainbow Trout, Carp, Goldfish, Gudgeon, Rudd, Orfe, Dace, Bullhead and Ruffe) and all of these seem to have been introduced by humans.

Thus the present freshwater fish fauna of Scotland is a mixture of natural immigrants from the sea and from further south, along with many more recent species which have been introduced from England, continental Europe and North America. The latest arrival is the Barbel (Maitland & Miller 2002), so the situation is not yet stable, though the measures in the Aquaculture and Freshwater Fisheries (Scotland) Act 2007 controlling the movement of fish into and within Scotland, and a ban on the use of fish as livebait, should greatly help. Though some claim that additional species add to the diversity of our fish communities, they bring with them threats in the form of diseases, competition and predation on more sensitive indigenous fishes.

As well as their scientific importance (Maitland 1985), the economic, social, educational and conservation value of many of our native species is not often realised. The importance of Atlantic Salmon and Brown Trout and its migratory form, the Sea Trout, is well known. Less well known, however, for example, is the value of Arctic Charr. There are established wild fisheries and an aquaculture industry for this species elsewhere in Europe and in North America. Although there are no fisheries in Scotland for River and Sea Lampreys, both these species are highly valued as commercial fish in Finland and Portugal respectively, where they fetch high prices. Similarly, both Pike and Perch, which many game anglers and fishery managers regard as vermin, command high prices in many parts of central Europe. The total worth of Scotland's freshwater fish resource has never been evaluated and is much higher than normally appreciated.

There is a clear need to maintain a watch on what is happening to freshwater fish communities in Scotland in order to alert society to developing problems (e.g. acidification and climate change), to maintain an economically important resource and to inform management decisions. Thus scientifically robust monitoring programmes, orientated around well defined questions are required to assess the changing spatial distribution of species and the health and composition of important stocks. Only with adequate scientific data can we hope to conserve and manage Scotland's native freshwater fishes in a sustainable way.

CURRENT MANAGEMENT STRUCTURE

Atlantic Salmon

Detailed information on individual components of current fisheries management are given below, but it is important to understand that the major driver for Scotland's freshwater fisheries legislation and management is, and always has been, Atlantic Salmon. There is no proper management body as such for freshwater fisheries.

The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 of the Scottish Parliament was passed by the Parliament on 26th March 2003 and received Royal Assent on 1st May 2003. The purpose of the Act was to consolidate, with amendments recommended by the Scottish Law Commission, the enactments relating to salmon and freshwater fisheries in Scotland. The Act provides for regulation and management and enforcement of salmon and freshwater fisheries in

Scotland (excluding the River Tweed which is managed by an Order in Council under the Scotland Act 1998 and the Border River Esk which is managed under the Border Rivers Order).

Salmon fishery rights in Scotland are privately owned and operated by the owner within a legislative framework set by the Scottish Parliament. The right of salmon fishing is a separate heritable estate which can be owned separately from the local land. The fishery owners in any part of Scotland may set up a District Salmon Fishery Board (DSFB) to protect and develop their fisheries. The structure and management framework of DSFBs is outlined below.

Scotland has 17 rivers designated as Special Areas of Conservation (SACs) where the qualifying species is Atlantic Salmon (see Appendix 4). Public bodies are considered "Competent Authorities" in the context of these sites, and any physical actions considered must be considered in the light of the conservation objectives for the features contained within Natura sites. An example might be a restocking programme, habitat improvement work or in river works. Any authority must first establish: (1) whether the proposed development is directly connected with or necessary to the site management for nature conservation; and (2) whether it is likely to have a significant effect on the site either individually or in combination with other plans or projects. The authority should take account of advice from SNH. If the authority concludes that a proposal unconnected with site management is likely to affect the site significantly, it must then carry out an appropriate assessment of its implications in view of the site's conservation objectives (i.e. the reasons for which the site was classified), to judge whether or not it will adversely affect the integrity of the site. The scope and content of what constitutes an appropriate assessment will depend on the location, size and significance of the proposed project. SNH advises on a case-by-case basis.

Protection Orders were originally made under the Freshwater and Salmon Fisheries Act (1976) and by 2006 some 14 Orders were confirmed by Scottish Ministers, in accordance with paragraph 10 of Schedule 3 to the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Each Order normally refers to all the fresh waters within one catchment or group of associated catchments. The original objectives of the Protection Orders were: (a) to increase the availability of fishing in waters within the relevant catchments, and (b) to protect freshwater fishing locally within these catchments through powers to appoint wardens (Maitland 1997a). In the 1990s, following a public consultation on the operation of Protection Orders, a Task Force was set up by the Scottish Office to review the application, operation and monitoring arrangements. Though some aspects of the Task Force proposals (e.g. 'holistic approach to river management' which would 'embrace all fish') were welcomed, there was considerable criticism that this was a missed opportunity to opt for a much more ambitious national fishery management scheme (Maitland 1999).

Private Ownership

Much of Scotland's land and fresh water is owned by private individuals (including estates, hotels and syndicates) who also possess the fishing rights, which, in the case of salmon fisheries, can be extremely valuable. As with angling clubs (see below), management practices are extremely variable and can range from no action whatsoever (and sometimes even no fishing), through occasional stocking and bank clearance, to intensive management which may involve draining, removing 'pest' species (particularly Pike) by netting, and creating put-and-take fisheries for Rainbow Trout. Some private owners also run coarse fisheries as commercial ventures.

In the past, poisoning whole lochs with rotenone to remove native species such as Pike or Perch was practiced in a number of places. However, the use of piscicides is now carefully regulated and such procedures have virtually disappeared

Public Ownership

A considerable number of waters and their associated fishings are owned by the state in its various guises, notably the Scottish Government (within its agricultural holdings), the Forestry Commission, Scottish Water, Scottish Canals and local councils. The policies adopted in relation to the management

of these waters and their fisheries are varied. An important aspect of state ownership concerns the fishing rights which belong to the Crown Estate.

Several other bodies have extensive ownership of fresh waters in Scotland. These are mostly charities, for example the National Trust for Scotland, the Scottish Wildlife Trust, the John Muir Trust and the Royal Society for the Protection of Birds. Though not really 'public' organisations, they have an important role to play in the management of some fresh waters and their fisheries, and indeed can play a key role in the future development of some policies – for example, the conservation of rare species and the encouragement of the use of a rod licensing system.

SPORT FISHERIES

There are several types of fishery for freshwater fish species in Scotland and it is important to be aware of the differences as a background to any consideration of the management of freshwater fisheries as a whole. The main broad distinction is between game fisheries and coarse fisheries and there is some debate as to which species are 'game' and which are 'coarse'. This topic is considered in Appendix 2, where it is proposed that native game fish in Scotland comprise Atlantic Salmon, Brown (and Sea) Trout and Arctic Charr. The introduced Grayling, Rainbow Trout and Brook Charr are also game species as are the rare and protected Vendace and Powan which are not angled for. Coarse fish include all other species, native and non-native.

Though only a few species are currently of fisheries importance in Scotland, as noted above, 37 of the 42 freshwater species at present found in Scotland are of importance commercially and for angling elsewhere in Europe. However, in Scotland, there is no such thing as a national rod licence and anglers purchase permits to fish from relevant fishery managers or owners of the fisheries. Permit costs vary widely depending on target species, location, season, etc.

Salmon and Sea Trout

Fisheries for Atlantic Salmon and Sea Trout have traditionally dominated the angling scene in Scotland and most fisheries management, legislation and research has been concerned with these two species. It is worth noting that 'salmon' legislation refers to both Atlantic Salmon and Sea Trout – but strangely not Brown Trout – of which Sea Trout is a component. Most angling takes place in running water, though there are important fisheries in many large lochs, such as Lochs Lomond, Maree, Tay, etc. In recent years there has been large increase in the numbers of fish released after capture and 'catch and release' is now policy in many waters. Fishing for Atlantic Salmon and Sea Trout in Scotland is subject to a close season during which it is illegal to fish. These close seasons vary from river to river. The earliest salmon river to open is the Helmsdale on January 11th and the latest to close is the Tweed on 30th November. Most salmon rivers open on 1st February and close some time in October.

However, the seasons for these two species should not really be coincident. The Brown Trout (which will also include the Sea Trout component) season stops in October because these fish spawn earlier than Atlantic Salmon - but, as noted, the 'salmon' season can finish as late as November and in some rivers start again as early as January. How does this affect Sea Trout? It is apparently still legal to fish for Sea Trout up until November and start fishing for them again in January. This contradiction highlights the ambiguity that exists when it comes to managing resident and migratory forms of trout.

Several of the important fishery organisations operating in Scotland are concerned solely with one or both of these species, for example District Salmon Fishery Boards, North Atlantic Salmon Conservation Organisation, the Atlantic Salmon Trust and the Salmon and Trout Association.

Brown Trout

Brown Trout is the commonest and most widespread freshwater fish in Scotland and is the subject of many sport fisheries in both standing and running waters in all parts of the country. Some fisheries are

exclusive, closely managed, private fisheries, others are easily accessed by the public, with or without permission from the landowner. There is a range of attitudes to 'catch and release' among anglers for Brown Trout. The close season for Brown Trout in Scotland runs from the 15th March to 6th October, inclusive. Many trout anglers are members of the Salmon and Trout Association or the Wild Trout Trust.

Arctic Charr

Quite often Arctic Charr are taken by anglers fishing for Brown Trout, but there are a few dedicated anglers who fish specifically for Arctic Charr in some lochs, for example Loch Lubnaig. In Scotland, except during the spawning season, this species is almost always confined to standing waters. The majority of anglers release Arctic Charr after capture. There is no statutory close season for Arctic Charr in Scotland. However, it is worth mentioning that this species is quite plastic in terms of its temporal spawning behaviour – in lochs where different polymorphic populations exist in sympatry then fish are known to spawn in the spring and in the autumn. Also some stocks spawn in standing waters and others may spawn in streams. Close seasons for this species should, therefore, reflect local conditions.

Grayling

Grayling were first introduced to Scotland in 1855 as a sport fish and are now found in most large running waters from the River Tay southwards. The benefit of this species to anglers is that it can be fished in winter during the close season for Brown Trout and it is mainly trout anglers who take advantage of this, thus extending their fishing season. It is almost exclusively a fish of running water. Many anglers for Grayling practice 'catch and release'. There is no statutory closed season for Grayling in Scotland. Enthusiasts for this species are usually members of The Grayling Society.

Coarse fish

Apart from native Pike, Roach, Perch and Eel, most coarse fish which are angled in Scotland are introduced species, notably Carp, Crucian Carp, Goldfish, Bream, Dace, Orfe, Chub and Ruffe. The majority of coarse fisheries occur within the Central Belt or Southern Scotland and are found in a wide variety of waters, both standing and running. It is traditional among coarse anglers to practice 'catch and release' for all fish. There is no statutory close season for coarse fish in Scotland. Many individuals and clubs are associated with the Scottish Federation for Coarse Angling which is the leading organisation for the sport in Scotland. There are also specialist clubs for individual species, for example the Pike Anglers Club of Great Britain, the National Anguilla Club and the Carp Anglers Group.

Stillwater fisheries

The dominant species stocked in these mainly 'put-and-take' fisheries is farmed Rainbow Trout. However, Brown Trout, Brook Charr and even Arctic Charr are stocked in some waters. Often, sterile stocks of these species may be used. Virtually all of these stocked fish are obtained from fish farms in both Scotland and England though in some waters there is a stock of indigenous wild Brown Trout. Many of these fisheries are members of the Association of Scottish Stillwater Fisheries (ASSF). As already noted, the close season for Brown Trout in Scotland runs from the 15th March to 6th October, inclusive, but there is no statutory closed season for Rainbow Trout in Scotland. Because of this many ASSF fisheries stay open all year and the fishing is available in the winter months.

The range of interest shown in all species of freshwater fish which are angled in Scotland is indicated by the list of rod caught records, shown in Appendix 3.

NET FISHERIES

The dominant commercial net fishery for freshwater species in Scotland has always been for Atlantic Salmon and Sea Trout. However, there have been attempts at commercial fisheries for other species, notably Eels and Pike, as discussed below. From time to time, other freshwater species have been considered. In 1917, in the midst of the First World War, the Scottish Freshwater Fisheries Committee (comprising Lord Breadalbane, J. Duncan Miller and W.L. Calderwood) was appointed, “...to consider to what extent and in what manner an additional supply of freshwater fish from rivers and lochs in Scotland can under existing conditions be made available for home consumption.” The Committee issued 800 questionnaires and took evidence on the subject in Edinburgh, Glasgow, Ayr, Perth, Aberdeen and Inverness. They decided “... in view of the urgency of obtaining an immediate addition to the food supply of the country to make an interim report with recommendations applicable to the present emergency.” (Scottish Freshwater Fisheries Committee 1917). A wide range of freshwater fish was considered by the Committee, including for example, Arctic Charr. They noted that “... there are a number of lochs in Scotland which are known to contain large quantities of char, which is a food fish of excellent quality. Char can be netted during certain seasons, and the Committee have had evidence that in certain districts they have been regarded by the local farmers as a useful addition to their local food supply.” The Committee made 12 recommendations promoting the capture and use of a range of freshwater fish across Scotland, recommending “... netting for trout, char and grayling, and netting and set lining for pike, perch and eels.” It is not clear if these proposals were ever followed up (the War finished in 1918), but fishing for Powan, as the Committee noted, “... has been commenced, and ... substantial quantities of these salmonoid fish have been placed both on the local and Glasgow markets ...”

Salmon and Sea Trout

A drift net fishery for Atlantic Salmon in Scottish waters started in the early 1960s, but was prohibited in 1962, and the ban remains in force. Subsequent legislative measures were introduced to prohibit other methods of salmon fishing, including trawling and long lines, so that the permitted methods discussed below remain the only lawful ways of fishing for and taking Salmon. Two main methods using nets are currently in use to catch Salmon and Sea Trout commercially – fixed engines and net and coble. Additionally, certain specialised nets are used only in the Solway Firth.

Fixed engine is an archaic term to describe the nets used since the early 1800s to catch salmon (i.e. both Atlantic Salmon and Sea Trout) on the coast outside estuary limits. The two types still in general use are bag and stake nets; the latter include fly and jumper nets. All these nets rely on a behavioural characteristic of Salmon, whereby they will lead along a netting barrier rather than attempt to swim through it. Bag and stake nets consist of two parts, the leader which stretches seaward at right angles to the shore to the centre of the three chambered arrow shaped trap. Some of the Salmon that swim along the leader may end up in the trap. Bag nets are usually fished along rocky shores where they are held in position by floated lines and anchors. They are fished from a flat bottomed boat (coble) crewed by 3-5 persons. Stake nets which include fly and jumper nets are fished on sandy beaches or mud flats where the stakes used to support the netting are set into the soft substrate. After erection they are fished by one man.

Net and coble fishing dates back at least to the 12th Century and has changed little in the interval. It is the only method of net fishing presently permitted within estuarial limits. A curtain of netting gathered at the centre to form a pocket is paid out from the stern of the coble as it moves out from the bank and then downstream. A rope fastened to the end of the net paid out is towed downstream by a fisherman on the bank as the coble draws the net down the river. Once paid out, the coble turns towards the bank and both ends of the net are drawn ashore so that any fish encircled by the net are directed into the pocket and quickly landed to ensure the product is in pristine condition for the market. During the fishing season, outwith the weekly close time, netting is permissible 24 hours a day, but at most fisheries it is limited to a few hours either side of low water. At some stations shooting and hauling the net are repeated on a regular basis, while at others, shooting the net only occurs when fish are perceived to be present. A similar manner of fishing occurs in bays and sea lochs.

Haaf and poke nets are unique to the Solway Firth. Haaf nets are large hand-held nets which were brought to the Solway by the Vikings. Poke nets are net pockets held up on poles and arranged in lines set across the tide. There is strong community support to preserve these ancient traditional methods of fishing, not only for the sake of Scotland's cultural heritage, but also because the revenues raised by the sale of licences in the Annan Fishery District, for example, contribute to the Common Good Fund.

Eels

Within Scotland, Eels have not been heavily fished, but some limited exploitation has taken place in a few waters (e.g. Loch Lomond), mostly involving the use of fyke nets. Although long-term datasets are few, it is clear that European Eel have undergone a significant and drastic decline over the last two decades. It has been estimated that eel numbers in much of Europe have declined by over 90% during this period.

The widespread decline in European Eels has led the European Commission has develop an Eel Recovery Plan (Council Regulation No 1100/2007). This plan aims to return the European Eel stocks adults and glass eels) to sustainable levels. Each Member State is required to establish national Eel Management Plans. An Eel Management Plan for Scotland was developed by Marine Scotland Science in 2008. The Freshwater Fish Conservation (Prohibition on Fishing for Eels) (Scotland) Regulations became law on 26 January, 2009. The effect of these Regulations is to prohibit fishing by any method for Eels in Scotland, except on application and under the authority of a licence by Scottish Ministers. It seems highly unlikely that any licences will be granted except for research work.

Pike

Traditionally Pike were treated as vermin in most waters and often regularly netted and dumped or even eliminated from some lochs using rotenone. There has been much less of such practices in recent years and even some interest in netting Pike commercially for sale to restaurants, etc.

VALUE OF FRESHWATER FISHERIES

Sport fisheries

There have been several attempts at estimating the economic value of sport fishing in Scotland to the Scottish economy, most of them dealing only with the fishery for Atlantic Salmon and Sea Trout. The Tourism and Recreation Research Unit (1982) estimated the total expenditure on salmon angling in Scotland in 1982 to be between £50 million and £105 million. Mackay Consultants (1989) estimated that 3,360 jobs in Scotland depended on the £81.12million expenditure generated through salmon and sea trout angling. Deloitte & Touche (1996) estimated the total 'economic impact' of salmon and sea trout angling in the River Tweed and its tributaries to be £15.3 million with 520 jobs estimated to be dependent on the fishery for these species. A study of freshwater fisheries in the Western Isles by James (2000) showed that, in one year, 7,500 visiting game anglers spent £3.98 million and that direct expenditure by anglers accounted for 185 full time equivalent jobs. Indirect and induced impacts were worth £5.6 million and accounted for 260 full time equivalent jobs (2.7% of the working population).

In reviewing these studies, Radford et al. (2004) noted that: *“In general there are some problems in reconciling the previous studies of the economic impact of angling in Scotland. The Mackay and TRRU estimates of angler days are very similar, although there are substantial differences between them in the average daily spend. The Deloitte and Touche study of the River Tweed generated an estimate of Tweed angler days that differed substantially from the MacKay estimate, but was more credible and their estimate of daily spending was a quite different order of magnitude from the Mackay study. Finally it seems that the FRM study of the Western Isles may have over estimated the number of angler days. Overall, our knowledge of the economic impact of angling is patchy and a little confused.”*

In a new attempt to evaluate the freshwater fisheries of Scotland, the detailed study by Radford *et al.* (2004) provided the best reasonable estimates available so far. The project examined 2,830 Brown Trout, Rainbow Trout and coarse fisheries together with Atlantic Salmon and Sea Trout fisheries on a river by river basis. The overall results are shown in Table 1 (at 2012 prices) and indicate that, in total, anglers spent a total of £140.1 million on angling in Scotland, with those fishing for Atlantic Salmon and Sea Trout accounting for over 65% (£91.1 million), those for Brown Trout (£18.3 million), Rainbow Trout (£24.1 million) and coarse fish (£6.1 million).

Region	Salmon & Sea Trout	Brown Trout	Rainbow Trout	Coarse Fish	TOTALS
Dumfries & Galloway	3,672	1,471	1,495	1,732	8,370
Borders	8,270	833	753	20	9,876
Highlands	43,906	6,309	2,173	887	53,275
Northeast Scotland	30,187	1,970	6,088	1,022	39,267
Central Scotland	4,199	6,490	13,594	2,393	26,676
Western Isles	892	568	<1	<1	1,462
Orkney & Shetland	<1	634	<1	<1	637
TOTALS	91,127	18,275	24,105	6,056	139,563

Table 1. Total angler expenditure in Scotland (at 2012 prices) in £000s (Radford *et al.* 2004).

The study concluded that freshwater angling in Scotland in 2003 resulted in the Scottish economy producing over £100 million of annual output, which supported 2,800 jobs and generated nearly £50 million in wages and self-employment income to Scottish households.

In 2003 Butler *et al.* (2009) estimated the economic impact of recreational rod fisheries for Atlantic Salmon, Brown and Sea Trout, Pike, and Rainbow Trout in Strathspey. Total annual angler days were 54,746, of which 74% were from salmon and sea trout Anglers. Angler expenditure was estimated to be £11.8 million per annum, of which £10.8 million was generated by Atlantic Salmon and Sea Trout anglers. Accounting for multiplier effects, fisheries contributed £12.6 million per annum to household incomes and 420 full time equivalent (FTE) jobs in the catchment. Comparison with the national survey in 2003 by Radford *et al.* (2004) suggests that the relative impact of Atlantic Salmon and Sea Trout in the Spey catchment's economy is one of the highest in the country.

Net fisheries

There is even less information on the economic value of commercial netting for Atlantic Salmon, Sea Trout and other species. Mackay Consultants (1989) suggested a gross revenue of £3.6 million, supporting some 260-455 full time equivalent jobs. Radford *et al.* (1991) suggested a gross revenue of £5.2 million, supporting 398 full time equivalent jobs. These values have been adjusted to 2009 prices. The industry has contracted substantially since those studies (in 2008 the catch by commercial nets of all the Atlantic Salmon reported caught in Scotland was 13%) and current information is needed. (Report of the Scottish Mixed Stock Salmon Fisheries Working Group 2010).

2. PARTICIPANTS IN FISHERY MANAGEMENT

STATUTORY ORGANISATIONS

Scottish Government

Scottish Ministers have responsibility for fish and fishery management in Scotland. The area is regulated via a framework of domestic legislation and in the context of obligations to the international community through membership of the North Atlantic Salmon Conservation Organisation. The Scottish Government has obligations to Europe under the Habitats Directive and the Water Framework Directive. However, the responsibility for managing freshwater fisheries in Scotland largely rests with bodies which are not accountable to the Scottish Government and this is a major anomaly in the present structure of fisheries management in Scotland.

Scotland has a number of other international obligations which are not discussed in this review – they carry less weight than the Habitats Directive and the Water Framework Directive, but are nonetheless relevant:

- 1971 - Convention on Wetlands of International Importance especially as Waterfowl Habitat (The 'Ramsar Convention')
- 1975 - CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora (also known as the 'Washington Convention'))
- 1979 - Convention on the Conservation of European Wildlife and Natural habitats (The 'Berne Convention')
- 1979 - Convention on the Conservation of European Wildlife and Natural Habitats (The 'Bonn Convention')

Marine Scotland

Marine Scotland is the lead marine management organisation in Scotland. Its vision is for clean, healthy, safe, productive, biologically diverse marine and coastal environments, managed to meet the long-term needs of people and nature. Marine Scotland was established on 1st April 2009 as a Directorate of the Scottish Government, to integrate core marine functions involving scientific research, compliance monitoring, policy and management of Scotland's seas. Its establishment brought together the functions of the former Fisheries Research Services, the Scottish Fisheries Protection Agency and the Scottish Government's Marine Directorate.

In addition to developing and implementing Ministers' policy priorities for wild fisheries, Marine Scotland undertakes fishery management functions conferred on Scottish Ministers via the 2003 Act. These include operation of a consenting regime for fish introductions, of licensing activities which would otherwise be illegal (e.g. electrofishing), collection of statistics and consideration of applications for statutory management measures. Marine Scotland Science provides expert scientific, economic and technical advice and services on marine and freshwater fisheries, aquaculture, and the aquatic environment and its flora and fauna, in support of the policies and regulatory activities of the Scottish Government.

The Scottish Government, through membership of the European Union, is a member of the North Atlantic Salmon Conservation Organisation (NASCO) - see below.

Scottish Environment Protection Agency

The Scottish Environment Protection Agency (SEPA) is Scotland's environmental regulator and is a non-departmental public body, accountable through Scottish Ministers to the Scottish Parliament. Its main role is to protect and improve the environment. SEPA has a duty to monitor the quality of Scotland's air, land and water and report on the state of Scotland's environment and to use that

scientific understanding to inform its independent regulation of activities that may affect its quality. SEPA publishes a wide range of environmental information and advises Ministers, partner bodies, regulated industry and the public on environmental issues.

SEPA has many years' experience in monitoring the aquatic environment, historically concentrating on water quality. More recently, the EU Water Framework Directive (WFD) has introduced a holistic approach to monitoring for a range of different pressures. The Water Framework Directive is a wide-ranging and ambitious piece of legislation with the ultimate overall aim of ensuring that water bodies do not deteriorate in status and that all water bodies achieve at least good status by 2015, unless it is demonstrated that less stringent objectives should apply.

Implementation of the WFD has introduced substantial changes in the overall management and monitoring of activities which influence Scotland's aquatic environment. The Directive is transposed into Scottish law through the The Water Environment and Water Services (Scotland) Act 2003. This implements the requirements of the WFD in Scotland, subjects many previously unregulated activities (such as abstraction and in-river engineering) to regulation. New risk-based regulatory systems have been put in place, designed so that the extent and intrusiveness of this legislation is as low as possible, whilst ensuring Scotland meets the long-term quality objectives identified under the WFD.

The policy framework for implementing the WFD is drawn up by Scottish Ministers who set the policy requirements for SEPA and are responsible for approving objectives, programmes of measures and the final River Basin Management Plans for the Scotland River Basin District, required to achieve the objectives of the WFD.

Recently SEPA has had a new important role in relation to fish monitoring (using it as a classification tool) and trying to look at ways in which some types of activity (such as the production of hydro-electricity) may have on fish. It has also had a very significant role in the removal of barriers to fish migration. The WANE Act now identifies SEPA as having the lead in dealing with aquatic non-native species of plants and animals.

Scottish Natural Heritage

Scottish Natural Heritage (SNH) is the government's statutory advisor on the natural heritage. Its stated purpose is to:

- Promote care for and improvement of the natural heritage.
- Help people enjoy it responsibly.
- Enable greater understanding and awareness of it.
- Promote its sustainable use, now and for future generations.

Scottish Natural Heritage is funded through the Rural Affairs and Environment arm of Scottish Government, though its work brings it in contact with many other parts of Government. It is an advisory body and works closely with the Scottish Government in providing information and briefings for Ministers, for responses to correspondence from Members of the Scottish, UK and European Parliaments on natural heritage issues, and it provides a natural heritage input to the development of Scottish Government policies and guidance. SNH interacts too, on some issues, with the UK Government or the European Union.

The Wildlife & Countryside Act 1981 (as amended) is the primary legislative tool for the protection of habitats and species within Scotland and other parts of Great Britain. As well as providing strict protection to some freshwater fish species, such as Sturgeon, Shad, Powan and Vendace, it forms the legislative basis for a network of Sites of Special Scientific Interest. These are sites identified as being of high conservation importance for their flora, fauna, geology or physiographical features. Named freshwater fish species within Scottish SSSIs include Arctic Charr, Powan, Vendace and Sparling, although a number of water bodies which contain a range of other species, such as Atlantic Salmon, Trout, Lamprey and spine-deficient Stickleback, are also protected.

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora), together with the Birds Directive, forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The Habitats Directive is translated into Scots law through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). These Regulations are commonly referred to as the 'Habitats Regulations'. Amongst other measures, the Habitats Regulations afford protection to certain species identified in the Habitats Directive, including those requiring strict protection (European protected species).

The Habitats Directive aims to protect a European network of some 220 habitats and approximately 1,000 species listed in the Directive's Annexes. Annex I covers habitats, Annex II species requiring designation of Special Areas of Conservation (SACs), Annex IV species in need of strict protection, and Annex V species whose taking from the wild can be restricted by European law. Within Scotland SACs have been established for Atlantic Salmon (in fresh water only), Brook Lamprey, River lamprey and Sea lamprey. Many of these sites have been designated for multiple features – such as Atlantic Salmon, lamprey spp. Freshwater Pearl Mussel and European Otter. Although present in Scottish coastal waters, and listed in Annex II of the Directive, there are no SACs for either Shad or Sturgeon. Sturgeon is also listed on Annex IV, and Annex V provides additional protection to River Lamprey, Atlantic Salmon (in fresh water), Shad, *Coregonus* (including Powan and Vendace) and Grayling.

Scottish SACs for Atlantic Salmon, which are all monitored by SNH, are listed in Appendix 4 and SNH has a statutory obligation under the EC Habitats Directive and the EC Water Framework Directive to monitor and evaluate the condition of populations of Atlantic Salmon, and other designated features, in these SACs in Scotland.

NORTH ATLANTIC SALMON CONSERVATION ORGANISATION

The North Atlantic Salmon Conservation Organisation (NASCO) is an international organization, established by an inter-governmental Convention in 1984. The objective of NASCO is to conserve, restore, enhance and rationally manage Atlantic Salmon through international cooperation taking account of the best available scientific information.

The marine migrations of the Atlantic Salmon take it from its river of birth to distant-water feeding grounds in the sub-Arctic and into the fisheries zones of other countries where it may be exploited. Rational management of this resource can, therefore, only be achieved through international cooperation. Regulatory and other measures established by NASCO and its Parties have greatly reduced harvests of Atlantic Salmon all around the North Atlantic. Additionally, there are many other pressures on the resource (e.g. habitat degradation; impacts of aquaculture, introductions and transfers; illegal exploitation) where international cooperation is proving to be valuable.

Only Governments are members of NASCO, which has six Parties: Canada, Denmark (in respect of the Faroe Islands & Greenland), the European Union, Norway, the Russian Federation and the United States of America. Iceland withdrew from NASCO with effect from 31 December 2009 because of financial considerations, but has indicated that it intends to re-accede to the Convention when the economic situation improves. NASCO seeks to be a transparent and inclusive organization and includes 35 Non-Governmental Organizations (NGOs) with accredited observer status. The Council of NASCO is made up of the North American Commission; North-East Atlantic Commission; West Greenland Commission; International Atlantic Salmon Research Board (IASRB). The Secretariat is based in Edinburgh and its functions include: providing administrative services and compiling and disseminating statistics and reports concerning salmon stocks.

NON-GOVERNMENTAL ORGANISATIONS

District Salmon Fishery Boards

For the purpose of salmon fishery management, Scotland is divided into 54 statutory salmon fishery districts. The districts conform to the natural catchment areas of a specific river or group of rivers. There are currently DSFBs constituted for 41 of these districts. In recent years progressive moves have been made to amalgamate smaller districts to create larger, more coherent single districts for the purpose of creating fewer but larger DSFBs, and this process is still ongoing. Changes are made through the SSI process. There is no legal requirement for a DSFB to be in place in a district; where a Board does not exist, Scottish Ministers exercise certain fishery management functions in the area, for example considering consents to stock Atlantic Salmon or salmon fry.

The 2003 Act is the key governing legislation for Scotland's District Salmon Fishery Boards, and it sets out the provisions for the constitution, composition and financing of the boards. Elected representatives of those owners provide the core of the membership of a Board. However, since 1986, the boards are required also to include representatives of salmon anglers and salmon netmen in the district. The Government made a further revision to the constitution of the Boards in 1999 to allow for even wider representation on the boards by bodies like SEPA and SNH or others, such as local angling clubs and associations. This was recommended in the Report of the Salmon Strategy Task Force (1997) and was intended to ensure that the legislation governing membership of DSFBs was more flexible, and did not restrict the number of members. New obligations on DSFBs around good governance were introduced via the Aquaculture and Fisheries (Scotland) Act 2013.

District Salmon Fishery Boards (DSFBs) have their origin in the salmon fisheries acts introduced in the mid-1800s. Their constitution was changed in 1986 with the passing of the 1986 Salmon Act (now consolidated into the Salmon & Freshwater Fisheries (Consolidation) (Scotland) Act 2003). Salmon fishing rights in Scotland, as noted above, are private heritable titles that are registered separately from land. As such these titles can be bought and sold like any other property. DSFBs' remit does not extend beyond salmon fisheries.

The powers and duties of a DSFB can be summarised as follows:

Powers

- To act, undertake works and incur expenses for the protection and improvement of the fisheries within their districts, for the increase of Salmon and Sea Trout and the stocking of the district with these fish.
- To impose financial assessments on each salmon fishery in the district, and to charge interest on arrears.
- To borrow funds, and to incur a wide range of expenditure in furtherance of their powers and duties.
- To appoint bailiffs to enforce the salmon fisheries legislation.
- To exempt persons from certain provisions of the law for scientific or other purposes.
- To sue in the name of the clerk.

Duties

- To appoint a clerk.
- To maintain a list of proprietors within the DSFB district.
- To produce an annual report and audited accounts and to consider these at an AGM.
- To call a triennial electoral meeting.

The Association of Salmon Fishery Boards (ASFB) is the representative body for Scotland's 41 District Salmon Fishery Boards (DSFBs) including the River Tweed Commission (RTC) (Appendix

5). ASFB develops policy and promotes best practice across the sphere of salmon and sea trout fishery management in Scotland. ASFB has developed a Code of Good Practice for DSFBs.

Fishery Trusts

Starting mainly in the 1980s, several local groups (mostly registering as charities) were formed which can be grouped under the term 'fishery trusts' (Appendix 6). Individually, many of them have demonstrated how effective good local fisheries management can be when it is based on sound scientific principles. Initially at least, most trusts limited their interest to Atlantic Salmon and Brown (and Sea) Trout and have been concerned primarily with rivers, as opposed to lochs.

Funding sources for Fishery Trusts are various and variable and this is the main limiting factor in their effectiveness. For many trusts a significant proportion of staff time is spent in seeking funding.

In the beginning, Trusts were brigaded under the Association of West Coast Fishery Trusts – and then as the number and geographical coverage extended, in 2005, Rivers and Fisheries Trusts of Scotland (RAFTS) was formed. It is an independent freshwater conservation charity representing Scotland's national network of Rivers and Fisheries Trusts and Foundations. RAFTS manages a range of core policy and project-driven objectives, including representing its 25 member Trusts and Foundations (Appendix 6). RAFTS' core objective is the '*Conservation and enhancement of native freshwater fish and their environments in Scotland*'. This involves:

- Project management, fundraising and co-ordination.
- Promoting the development of new trusts and foundations.
- Promoting best practice and education in the fishery management network.
- Representing the interests of member trusts and foundations on a national groups and fora.
- Influencing relevant land, freshwater and general environmental policy.

Executive authority for RAFTS is devolved to the Board which meets four times per year.

Scottish Fisheries Co-ordination Centre

The Scottish Fisheries Co-ordination Centre (SFCC) was established in 1997 to meet a need for fisheries information and standard data collection methods in the light of a growing awareness of salmonid decline throughout Scotland. The SFCC is an association of Fishery Trusts, District Salmon Fishery Boards, Marine Scotland and others interested in the management of Atlantic Salmon and freshwater fisheries in Scotland.

The general aim of the SFCC is to support its members in collecting, collating, using and providing information on salmon and freshwater fish, their habitats and fisheries, in an effective and co-operative way. The specific aims of the SFCC are to:

- Develop general protocols for sampling related to management of all fish species.
- Co-ordinate storage of fish data.
- Facilitate sharing of GIS-related and other information.
- Co-ordinate training related to the main aims.
- Facilitate discussion and collaboration among groups of fish scientists.
- Facilitate cross-Scotland projects.

Like the Fishery Trusts, the SFCC has historically been driven by salmonid monitoring work. Little else has been considered and it still lags behind in other species monitoring. Also, it still focuses on rivers, there is no guidance available for sampling in standing waters and this is a key deficiency. Interestingly, the data do not belong to SFCC – but still belong to the individual trusts and permission must be gained from them before it is used.

Angling Associations and Clubs

There are many angling associations and clubs in Scotland, varying greatly in size and objectives. There are both game and coarse fishing groups but the majority of anglers are interested in trout – both Brown Trout and Rainbow Trout. Many anglers are also interested in fishing for Atlantic Salmon but there are few clubs specifically for that purpose. Most clubs comprise small groups of people who have a common interest in fishing but own no waters and have no fishing rights or particular management involvement. Other clubs do own waters and/or fishing rights and carry out various active management practices related to the fisheries concerned. Some of these organisations are large, for example the Loch Lomond Angling Improvement Association which has had up to one thousand members.

In general, angling clubs are as varied as their memberships. Most neither have nor seek scientific advice but carry out various management practices, invariably dominated by stocking. Others have members who are fishery biologists or seek scientific advice before any management is practised. The attitudes and management policies of such clubs may change quite rapidly as committee membership changes from year to year.

FUNDING OF FISHERY MANAGEMENT

The bulk of fishery management in Scotland is funded from private sources concerned with Atlantic Salmon. Each DSFB raises money by imposing the salmon assessment on each fishery in their district and each decides how that money will be spent. In 2010, the funding raised by DSFBs was £3,589,128; 98.7% of this was from rod fisheries and 1.3% from net fisheries (ASFB & RAFTS 2011). In addition, £490,943 was raised by DSFBs in 2010 from further projects and other funding. Lack of expertise within many boards means that there is no scientific basis to the funding of some projects. It should be noted that there is effectively public support for rod fisheries which get rates relief on the grounds that they pay a levy to their local DSFB, whereas net fisheries pay both the salmon assessment and business rates.

Fishery Trusts are funded from a variety of sources and significant staff time is often used up in seeking funding. Boards are frequently a major funder of Trusts and can have a very strong influence over the work which they carry out. However, in recent years there has been significant public funding to Trusts from the Scottish Government for fishery management plans and via SEPA (e.g. the Water Environment Fund) and SNH (e.g. studies related to the EU Habitats Directive) for specific projects. Individual Trusts have also been successful in seeking out funding from various charitable trusts and businesses and carrying out contract work.

SPECIALIST FISHERY ORGANISATIONS

Salmon Net Fishing Association

The Salmon Net Fishing Association of Scotland was established in Aberdeen in 1906 by owners and lessees of salmon fishings on the east coast of Scotland. The Association's objectives include defending, protecting and advancing the interests of salmon net fishing in Scotland, encouraging scientific research, and rendering assistance to those engaged in this work. Today's netmen are either owners or tenants of the fisheries they operate, in the same way as the operators of rod fisheries. Where they differ is in the methods they use to catch Atlantic Salmon. In 2008 the share of all the Atlantic Salmon reported caught in Scotland by netmen was 13%.

Scottish Anglers National Association

The Scottish Anglers National Association Ltd (SANA) is the national governing body for game angling in Scotland. SANA is a Company Limited by Guarantee, registered in Scotland. It plays a full part in the Angling Development Board of Scotland. Established in 1985 by the amalgamation of the

Scottish National Angling Clubs Association with the Scottish Anglers Association, SANA now represents the interests of all game anglers working with other related bodies and environmental interests in Scotland.

Scottish Federation for Coarse Angling

The Scottish Federation for Coarse Angling (SFCA) is the Scottish governing body for the sport of coarse angling. It was established in the early 1970s and is committed to the protection of coarse fish stocks in Scotland, and providing equal opportunity for all to get involved and enjoy the sport of coarse angling in a safe and responsible way. It runs programmes and courses to increase the number of anglers fishing for fun, runs competitions and provides training to increase the number of coaches required to help individuals to develop within the sport. It engages with stakeholders from across the broad spectrum of the angling sector on issues affecting coarse angling.

Institute of Fisheries Management

Created in 1969 in the UK, the Institute of Fisheries Management (IFM) is dedicated to the advancement of sustainable fisheries management. It is a non-profit organisation managed by an elected council. IFM members are fisheries managers from research bodies, fishing and angling organisations, water companies, fish farms and educational institutions.

Association of Scottish Stillwater Fisheries

The Association of Stillwater Fisheries (ASSF) aim is to promote its membership and to encourage the raising and maintaining of standards within this sector. They achieve this through the setting of minimum standards of entry, website based advice and advertising. They also promote membership through attendance at exhibitions and events. Only fully commercial fisheries are eligible to join the ASSF. The role of stocked stillwater fisheries can be a positive one and can give considerable protection to wild fish stocks. For example, it was estimated in the 1990s by the ASSF that commercially managed fisheries (mainly for Rainbow Trout) catered for the needs of some 85-90% of those fishing for trout in Scotland. If such fisheries did not exist, there would inevitably be greater pressure on wild Brown Trout and even Sea Trout and Atlantic Salmon.

Atlantic Salmon Trust

The Atlantic Salmon Trust (AST) was founded in 1967, against a backdrop of growing concerns over the excessive numbers of wild Atlantic Salmon being taken by distant water fisheries, and the impact of Ulcerative Dermal Necrosis (UDN). It was one of the first organisations devoted to the welfare of a single species, and quickly demonstrated its effectiveness in raising awareness of the plight of Atlantic Salmon. In recent years, AST's role has widened to include Sea Trout and study of this species now forms a distinct work-stream. Throughout its life, AST has depended heavily on its Honorary Scientific Advisory Panel – a group of scientists, who give their time free of charge to advise on and suggest areas of research which can support and guide AST policy.

Salmon and Trout Association

Formed in 1903, the Salmon & Trout Association (S&TA) is a company limited by guarantee which was granted charitable status in March 2008. It has a UK-wide membership of game anglers, fishery owners/managers, affiliated trades and members of the public with an interest in conserving the aquatic environment and its dependent species. It addresses all issues relevant to fisheries legislation and regulation, together with environmental and species management and conservation.

FRESHWATER FISHERIES FORUM

The Freshwater Fisheries Forum (FFF) was a Scottish Executive convened process designed to develop ideas to ensure the better management and use of Scotland's freshwater fish and fisheries. It

proved to be an effective way of achieving consensus across a wide range of organisations with both common and different interests and agendas, and for presenting cogent, credible, broadly supported ideas to policy makers. Recognising that consensus cannot be achieved on all matters, it was understood from the beginning that no member of the Forum should be prevented from making representations in the normal way to MSPs, Scottish Government, etc.

The Forum included annual public meetings, a website and e-noticeboard, written consultations, and a broadly representative steering group. The steering group, chaired by a member of, the then, Scottish Executive, consisted of all the major fish and fisheries management and angling representative bodies in Scotland, plus representatives from other important stakeholders, and also including representatives from FRS (now Marine Scotland Science), SEPA and SNH. Initially, it was hoped that the FFF would develop a Bill which would cover all the requirements of freshwater fish and fisheries in Scotland, as ‘Angling for Change’ had debated for years. However, with the realisation that there was the possibility of some elements being included in a Bill by 2007, the FFF Steering Group focussed on a smaller number of relevant measures. The Forum process, therefore, concentrated on developing and achieving consensus on the Aquaculture & Freshwater Fisheries (Scotland) Act 2007, concerning itself almost exclusively with the freshwater fisheries part of this bill.

The most relevant parts of the Act related to freshwater fish and fisheries are:

- *Gyrodactylus salaris*: containment and treatment.
- Use of gaff, tailer or landing net.
- Rod and line regulations.
- Prohibition against using pike gags and certain keepnets.
- Close times for freshwater fish.
- Exemption from certain offences.
- Freshwater fish conservation regulations.
- Unauthorised introduction of fish into inland waters.
- A ban on livebaiting with vertebrates.

The Freshwater Fisheries Forum became a credible and widely-supported vehicle for the discussion of the reform of the management of fish and fisheries management in Scotland and, whilst there is broad agreement on some of the principles required for reform of management structures, there are still a number of issues - some of them contentious - to be resolved. The major effort of the Forum after the Aquaculture and Fisheries Bill in 2007 was the production of on the strategic policy document entitled: ‘*A Strategic Framework for Scottish Freshwater Fisheries*’. This was published in 2008, shortly after which support was discontinued by the Scottish Government.

3. PAST REPORTS

The problems of inadequate national fisheries organisation and management in Scotland are not new and have been outlined from time to time by various authors. Over a century ago, Maitland (1887) noted that if his studies “...persuade District Fishery Boards that their sphere of usefulness is wider than they have hitherto held, I shall be amply rewarded”. Three decades later, Lamond (1929) was mistakenly optimistic: “By the Salmon and Freshwater Fisheries Act, 1923, which came into force on 1st January 1924, the laws of England and Wales regarding salmon, trout and coarse fish have been consolidated and amended. Similar legislation for Scotland is long overdue, and probably, although in many respects English and Scottish conditions vary in fundamentals, any fresh legislation for Scotland may be expected to follow, where appropriate, the lines of this statute. In particular, it is more than likely that any new Scottish consolidating and amending statute will deal with all species of freshwater fish ...”

For over a century there have been a number of committees and commissions which have produced reports recommending ways in which the structure of fishery management in Scotland could be improved. One of the earliest of these was the Elgin Commission in 1902, which endorsed the existing

system of Boards in Scotland but recommended the amalgamation of smaller districts and the creation of Boards where they did not exist. New legislation was drafted at the time but was not taken forward.

Six of the most recent reports in this field are considered below.

HUNTER REPORT

Scottish Salmon and Trout Fisheries

The Committee on Scottish Salmon and Trout Fisheries was appointed on 12 March, 1962 (under the chairmanship of J.O.M. Hunter) “...to review the law relating to salmon and trout fisheries in Scotland, including the Tweed, and its operation, with special reference to the constitution, powers and functions of District Boards, and the responsibilities of the Secretary of State, and to consider in the light of current scientific knowledge the extent to which fishing for salmon and trout by any method, whether in inland waters or in the sea should be regulated, and to recommend such changes in the law as might be thought desirable”.

The Committee was asked to give priority to that part of the remit which dealt with the regulation of fishing for Atlantic Salmon and Sea Trout and a first report, giving interim findings on the subject for drift-net fishing for Atlantic Salmon in the sea, was submitted on 10 June, 1963. Overall, the seven members of the Committee held 51 meetings covering 61 days, interviewed numerous people and gave very thorough consideration to their remit. The second and final report (Department of Agriculture and Fisheries for Scotland 1965) was submitted on 24 May, 1965.

This is the most thorough consideration ever given to freshwater fisheries in Scotland and, though restricted to Atlantic Salmon and Brown (and Sea) Trout, is highly relevant to the present review and thus worth considering in some detail here. The 10 chapters of the final report contained 127 conclusions and recommendations, which are summarised below. The numbers in parentheses indicate the number of recommendations.

1. The fish and their life histories (1)

The proven homing of salmonids is regarded as the key to their proper management.

2. The need for regulation and management (2-7)

Atlantic Salmon and Trout seemed likely to be exposed to great hazards in Scottish waters. If salmon and sea trout fisheries are to bring maximum benefit to Scotland, regulation must be changed so that the run is divided appropriately between netsmen, anglers and escapement for breeding. Commercial fishing should only be by methods which allow catch and escapement to be measured accurately. Management of Brown Trout could be achieved by protection and regulation allied to research and a new system of administration.

3. Objectives (8-13)

Commercial and sport fishing for Atlantic Salmon and Sea Trout should be allowed to develop to the best extent that circumstances allow, the commercial catch being regulated to allow attractive angling. The objective of fisheries for Brown Trout should be to provide ample angling for the public at a reasonable price. Fisheries for Rainbow Trout and coarse fish might be developed in appropriate waters.

4. The attainment of the objectives (14-33)

All netting in the sea should be run down and replaced by new methods. The weekly close times should gradually be replaced by direct counts of fish at the single point in each river where licensed commercial fisheries would be allowed, preferably by trap or a concentrated net fishery associated

with a counting device. Appropriate numbers of fish would be allowed to escape upstream to provide angling and spawning. Area Boards would be responsible for the catch/escapement quotas of commercial fisheries. Where the demand for salmon angling cannot be met by voluntary means, Area Boards could apply for Access Orders to certain waters. Fishing for Brown Trout without permission would be an offence and Access Orders should also apply to fisheries for Brown Trout. A Scottish Angler's Trust should be established to administer and improve those waters which it comes to control. Registers of fisheries should be compiled by Area Boards. Any fishery for Brown Trout not registered by the owner would be registered (but not owned) in the name of the Scottish Angler's Trust.

5. Administration (34-56)

Because of the shortcomings of District Boards, local administration should be in the hands of local bodies on which fishery proprietors are strongly represented and on which some independent members (including the public) serve. The local administrative authority should be able to manage all aspects of fisheries competently and have sufficient resources to do this. The new administrative areas should be based on (1) a satisfactory fisheries unit each with a fisheries officer, (2) a diversity of membership, (3) suitable communications, and (4) a suitable situation in relation to other relevant activities (e.g. River Purification Boards). A structure for the Area Boards is proposed. All anglers should be required to hold rod licences – local fees to go to the Area Boards and national fees to go to a central fund to be allocated to the Area Boards (where priority should go to the appointment of technical officers) and the Scottish Angler's Trust. There should be a central administrative function to provide advice, organise enquiries (through a Fisheries Commissioner), carry out research (through the Freshwater Fisheries Laboratory) and provide training.

6. Regulation and management (57-84)

The general law should allow angling by a single rod held in the hand (this to cover coarse fishing also). Area Boards should have powers to make appropriate bye-laws. Close seasons for commercial and sport fishing should be defined, but could be extended by Area Boards. Area Boards would have powers to control obstructions and the introduction of eggs or fish into waters in an area, to destroy predators and protect spawning grounds and young Atlantic Salmon. The introduction into inland waters of fish which are not native to Scotland should require consent of the Secretary of State.

7. Protection of fisheries for Atlantic Salmon and Trout (85-94)

Fishery wardens should be appointed by each Area Board and have the powers now available to water bailiffs together with additional powers. The law in relation to poaching activities should be extended.

8. Factors detrimental to freshwater fisheries (95-100)

Fishing for Atlantic Salmon in the open sea should be prohibited. Area Boards should have powers in relation to water abstraction, pollution and hydro-schemes.

9. Statistics and research (101-111)

Responsibility for the collection and processing of statistics for Atlantic Salmon and Sea Trout should remain with the Secretary of State. Catches of Atlantic Salmon and Trout from commercial and sport fisheries should be submitted annually and nil catches should be insisted on. Catch statistics for Brown Trout should be collected by the Scottish Angler's Trust for its waters. The details of all catch figures should be published. Better facilities for fisheries research should be provided and for communication among researchers, fishery managers and anglers.

10. Special areas (112-127)

Various special regulations are proposed in relation to the 'cross-border' fisheries of the Solway and Tweed systems.

The response

The Hunter Report caused intense interest in some quarters both during its preparation and after its publication. However, in spite of the White Paper produced in 1971 virtually no action was taken by the Government, and it was 11 years before just one of the proposals was implemented - the statutory protection of fishing for Brown Trout, which was incorporated into the Freshwater and Salmon Fisheries (Scotland) Act, 1976.

Many articles debating the report appeared in the general press, and especially in angling magazines. It received considerable criticism in some quarters, especially from riparian owners of salmon fisheries. For example, Sinclair (1967) concluded a review of the report thus: *"The strength of the report is its recommendation that the salmon fishing industry should be put under sound and well-informed management. The weakness is that it goes on to recommend the wrong sort of management policy"*.

Though there was widespread criticism from anglers at the suggestion of angling licences, many supported other aspects of the report. Shortly after a discussion of the report by the Scottish Grand Committee, Williams (1967) wrote prophetically: *"One wonders whether after its airing in debate the Hunter Report will again be swept into some administrative backwater or will ultimately attain legislative fruition. There is no doubt that if anglers could forget their prejudices, adopt a forward-looking attitude, and arrive at basic essentials to achieve management and control of Scotland's fishings a worthwhile result would be attained."*

The 1971 White Paper implied that the Government proposed to implement many of the proposals in the Hunter Report. It was apparently accepted that local fisheries administration required to be reorganised, with new Area Boards replacing the existing District Salmon Fishery Boards, with additional responsibility for trout fishing and, in some cases, coarse fishing. The functions for the new Area Boards were seen in the White Paper as: (a) representing fisheries interests generally, (b) controlling methods of fishing, (c) levying fishing rates, (d) issuing rod and net licences, (e) employing staff, including technical officers and wardens, and (f) dealing with applications for statutory protection of trout fisheries.

Although some people in Scotland felt that there were several shortcomings in the White Paper, in 1972 it was accepted by many *"... that at last something was being done about the Hunter Report."* (Jamieson 1972). In the event, over the five decades since its publication, very little was done about the Hunter Report, and the major subsequent legislation relevant to freshwater fisheries in Scotland, the Freshwater and Salmon Fisheries (Scotland) Act 1976 and the Salmon Act 1986, merely reinforced the *status quo* as far as the absence of any comprehensive fish and fishery management policies in Scotland are concerned.

In retrospect, the Hunter Report suggested much of what was required for salmonid fisheries in Scotland at the time and, if it had been implemented in its entirety, would have resulted in a much improved situation for salmonid fish and fishermen. The failure to implement the sensible policies recommended in the report must rest with both anglers (who seemed unable to reach a consensus, even among themselves) and politicians who, having set up a very powerful Committee with wide powers of consultation, failed to do anything effective in the areas which the report covered.

SALMON ADVISORY COMMITTEE REPORTS

The Salmon Advisory Committee was set up by UK Fisheries Ministers in October 1986 under the Chairmanship of Professor George Dunnet. The terms of reference of the Committee were: *'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.'* The Committee met many times over the next decade and produced a number of recommendations and relevant reports:

- Information on the status of salmon stocks
- The effects of fishing at low water levels
- Assessment of stocking as a salmon management strategy
- Factors affecting natural smolt production
- Factors affecting emigrating smolts and returning adults
- Run timing of salmon
- The effects of predation on salmon fisheries
- The anti-poaching measures contained in the Salmon Act 1986
- Fish passes and screens for salmon
- Factors affecting salmon in the sea
- The regulation of salmon angling in Great Britain

Few of the recommendations of the Committee were ever acted on, most notably those on the improvement of information available on the status of salmon stocks, which included the following topical issues:

- A need for more co-ordinated and uniform datasets
- The use of carcass tagging
- Information on fishing effort
- Installation of electronic counters wherever practicable
- Monitoring the status of each stock

WWF REPORT

Review of Policies Concerning Freshwater Fish in Scotland

This report (Maitland 1996) was commissioned by WWF Scotland in 1995 and covers all 42 freshwater fish species in Scotland. The lack of protection of native freshwater fish and threats to their habitat - including those from unscientific fisheries management - had led to increasing concerns, highlighted by the extinction of one species (Vendace), the loss of major populations of others and the spread of aggressive, non-native fish.

The WWF Report can be summarised as follows.

1. Value of the resource

The freshwater fish fauna of Scotland is a highly valuable resource of importance in economic, recreational, educational, scientific and cultural terms. It is at present under-valued and under threat.

2. Lack of integrated management

There is not at present, nor has there ever been, an overall administrative framework for the management of fish populations and fisheries in Scotland. The existing protection, conservation and management of freshwater fish populations in Scotland is fragmented, and greatly biased in favour of game species, especially Atlantic Salmon.

3. Proposed new structure

A new structure is suggested to take the best aspects of the present systems and involve minimal change to existing organisations. Its main features are:

- Scotland would be covered by about 25 catchment-based Regional Fishery Boards with statutory powers for scientific and sustainable fishery management.
- In parallel with these Boards would be independent Regional Fishery Trusts, each with a similar core structure but otherwise flexible according to local conditions,

- Both Boards and Trusts would liaise with a Central Fisheries Unit, the former on a statutory basis, the latter on a voluntary one. This unit should be based at the Freshwater Fisheries Laboratory at Pitlochry.
- The new Boards would be funded similarly to present District Salmon Fishery Boards. The new Trusts would be funded from various sources, possibly including local initiatives, angling permits from public fisheries, a national angling licence and grants from the Scottish Government, the Scottish Sports Council, Scottish Natural Heritage and other bodies.
- On both Boards and Trusts, the recognised national body representing anglers and angling clubs would be the Scottish Anglers National Association (SANA) whilst fishery managers would be represented by the Institute of Fisheries Management (IFM).

4. *Benefits to both fish and society*

In addition to the range of fish species within each catchment, there is also a range of needs from human society. These include the conservation of fish species and their habitats, the requirements of new European legislation, the demands for angling, the importance to tourism, the rights of traditional commercial fishermen and the expectation of income from fishing by riparian owners and others. The much needed restructuring of the way in which fish populations and fisheries in Scotland are managed should benefit both fish and people.

5. *Deterioration without action*

The consequences of no, or little, change in the present policies and management practices are that there will be further loss of local wild stocks and even of some species and their habitats - due to variable management over the country and continued fragmentation of interests. This is bad for fish and for anglers and it represents a lost opportunity for a strong voice and dedicated resources for this important part of our natural heritage. Lack of action will also have an impact in the wider countryside in relation to continued loss of biodiversity and unsustainable use of our lochs and rivers.

The response

The main response to the WWF Report was considerable activity and discussion on the part of angling and fishery organisations and this eventually led to the formation of a new grouping of these bodies called 'Angling for Change' (see below). It was hoped, through Angling for Change, that any future discussions on proposed new legislation would give consideration to both fish and fisheries.

NICKSON REPORT

Report of the Salmon Strategy Task Force

In 1997, the Scottish Office published the '*Report of the Scottish Salmon Advisory Task Force*', initiated by the Secretary of State in 1995 and chaired by Lord Nickson "*To consider the challenges and opportunities facing Scottish salmon fisheries with a view to recommending a Strategy for the management, conservation and sustainable exploitation of the stocks into the next century.*' It admitted that '*The management of salmon fisheries raises many issues and, when a species excites as much interest as the Atlantic salmon, it is inevitable that divergent views are sometimes held.*'"

The report reviewed the work of a number of previous Committees and Commissions and examined the legislative framework for the management of Atlantic Salmon and Sea Trout. The Report made 64 recommendations for preserving and increasing salmon stocks. Parts of the Task Force Report paralleled earlier major recommendations in both the Hunter and WWF reports:

- The formation of new fishery areas, covering all Scotland, each with a mandatory board.
- The inclusion of a range of fish-related interests on these boards.
- The need for state financial support for scientific expertise.
- Improved methods of collecting fishery statistics.

- A central body to co-ordinate monitoring and research.
- Support for fishery trusts through the Freshwater Fisheries Laboratory, Pitlochry.
- Strict control of the transport of freshwater fish into and within Scotland.

The response

There were several major criticisms of other Task Force recommendations, including (a) Only Atlantic Salmon (and to a lesser extent Sea Trout) were included, leaving all other native fish, as at present, more or less in limbo. (b) The reason for the importance attributed to Atlantic Salmon is the contribution it makes to the Scottish economy, yet no assessment was made of the valuable contributions made by other species, especially Brown Trout which was left without adequate legislation or management. (c) Proposed conservation and management of the aquatic habitat was totally dominated by salmo-centric considerations. (d) Virtually all management decisions would be controlled by salmon fishery proprietors and there was no clear commitment to following scientific fishery management principles or to the production of local science-based management plans for independent scrutiny.

There were some surprising omissions from the Task Force Report. For example, there was no consideration of several organisations which are highly relevant to freshwater fisheries in Scotland. Notable among these is the Institute of Fisheries Management (IFM) and the Scottish Anglers National Association (SANA), both of which have an important part to play in fisheries administration in Scotland.

It was clear that the Salmon Task Force Report was not a realistic blueprint for the equitable management of fish populations and fisheries in Scotland (Maitland 1997b). The salmo-centric nature of most proposals, with the expectation that salmon interests will guide virtually all other activities which might affect Atlantic Salmon, but without a corresponding gesture of commitment to science-based fishery management, was unacceptable. To base the only national structure for fisheries management in Scotland on only one species and part of another, leaving the remaining 41 species with virtually no legislation or strategic management, was an objectionable concept and it was felt by many that Scotland's diverse and valuable native fish populations deserve a better future and a more sympathetic treatment.

At the end of the 20th Century, the Scottish Executive was consolidating fisheries legislation and reviewing Protection Orders and that was the time to take account of all issues relating to the management of fish populations in Scotland, as proposed in the WWF report. In addition, following European legislation, there were strong moves at this time by government agencies (e.g. SNH and SEPA) and most NGOs towards a more integrated and holistic approach to conservation and management of the environment, which must inevitably broaden management of fish and fisheries from the narrow consideration of just two salmonids to that of all native fish and their habitats.

The Salmon Conservation (Scotland) Bill was introduced in the Scottish Parliament on 28 September 2000. This Bill was introduced in response to the drastic decline in Atlantic Salmon and Sea Trout stocks. Numbers of Atlantic Salmon caught were the lowest on record. The latest statistics showed that the numbers of Atlantic Salmon caught were 39% down on 1998 figures. Numbers of Sea Trout caught were also 24% down on 1998 figures. Due to this decline, there was an urgent need to conserve these fish in the freshwater phase of their life. It was hoped that such measures would maximise the number of spawning stocks which will eventually repopulate the rivers.

The measures this Bill introduced originated from the *Report of the Salmon Strategy Task Force* (the Nickson Report). The provisions of this Bill are in response to recommendations 12 and 13 of this report, which read:

"12. District Salmon Fishery Boards should be able to apply to Scottish Ministers to make regulations to restrict angling effort. As a minimum regulations are required to prescribe for each area, or part thereof, and to cover all or part of the fishing season: the maximum number of fish which can be taken by any method; the size of fish which may be taken; the characteristics and specifications of nets and

angling tackle which may be used; the methods of fishing which may be used and those which are prohibited; the areas on a river where fishing is not permitted; and the release of some or all of the fish.

13. The Secretary of State should have emergency powers to limit fishing when salmon populations or fisheries are severely threatened".

These recommendations were made in response to a perceived lack of ministerial power to limit exploitation of salmon stocks. Current statutory conservation measures under the 1986 Salmon Act were limited, comprising the ability to set weekly and annual close times and apply bait and lure restrictions. Scottish Ministers implemented these measures on application by District Salmon Fishery Boards. Many DSFBs also implemented a range of conservation measures on a voluntary basis. It was hoped that the proposed new statutory powers would allow the Executive to protect spawning stocks and population levels whilst allowing for their sustainable exploitation.

ANGLING FOR CHANGE REPORT

Angling for Change Proposals

Following the WWF Report, as noted above, a consensus was achieved among the main bodies concerned with fish conservation and angling in Scotland. This consensus group, called Angling for Change (AfC), was a unique initiative which brought together anglers, fishery proprietors, and fish conservation interests to consider the needs of freshwater fish and fisheries in Scotland, and develop proposals for the future. The AfC Group produced its report '*Angling for Change Proposals*' in 2000. It considered that Scotland's legislative and management structures for fisheries in fresh water should contain effective measures which operate throughout Scotland to provide:

- Appropriate conservation for all fish species.
- Science-based fishery management.
- Well-publicised and readily available access for angling of all types.
- Recognition for the full diversity of sporting species available.
- Mechanisms to gather and disseminate accurate up-to-date scientific information.
- Control and monitoring of the movement, introduction and reduction of stocks of fish, invertebrates and aquatic plants.

It was agreed by the participants in Angling for Change that any new fisheries management structure should have the following key elements:

- Ensure that, wherever possible, decisions are taken at a local level.
- Build on the strengths of the effective and well-established structures which currently exist in some areas, and promote the spread of best practice to all areas.
- Provide sufficient flexibility to accommodate the diverse interests in different areas, and give scope for relationships to develop, and local structures to evolve over time.
- Operate cost-effectively by, among other things, harnessing and maintaining the voluntary effort currently invested by individuals, clubs and other organisations.

After considerable deliberation and debate, Angling for Change devised a model for new legislation and management structures which offered comprehensive coverage, encouraged extension of access for angling, and placed appropriate weight on the need for sustainable, scientifically-informed fisheries management and fish conservation. It provided a template into which the structures which already exist in large areas of Scotland can grow over time. Angling for Change also recognised that these proposals required further refinement to translate them into a set of working structures and put them into operation.

The response

The AfC group met regularly over a number of years to develop proposals and tried, with varying degrees of success, to involve the relevant departments of the Scottish Executive. During the same period, the Scottish Executive produced a number of consultations (e.g. on Protection Orders) and reports (e.g. *Protecting and Promoting Scotland's Freshwater Fish and Fisheries: A Review*). Eventually it was accepted that the only way to move forward was for the Scottish Executive to liaise directly with angling bodies and conservation organisations and this led to the formation of the Freshwater Fisheries Forum.

Although fisheries management and new structures were not dealt with by the Aquaculture & Fisheries (Scotland) Act 2007, this issue was still considered important enough by the membership of the Freshwater Fisheries Forum to carry forward. One of the final acts of the Freshwater Fisheries Forum was the development and publication of '*A Strategic Framework for Scottish Freshwater Fisheries*'. This is described below:

APEM REPORT

Scottish Freshwater Fisheries Management: an Investigation into New Structures

The objective of this study, commissioned by the Scottish Government, was to investigate potential new structures for the management of freshwater fisheries in Scotland and to canvass opinion from organisations and representatives as to what form a new structure or structures should take. To do this, APEM undertook a questionnaire-based interview with some twenty organisations representing a variety of both public and private fish-related bodies and user groups across Scotland.

It appeared from the results of the questionnaire that there are some significant and positive aspects of the current systems that people wished to retain. An example is local participation, controlled financially by those involved. Many of the Trusts were thought to be doing good work with enthusiasm and considerable voluntary input. On the negative side of things, the report also concluded that most effort concentrates on just two species – Atlantic Salmon and Sea Trout. The report stated that there is considerable fragmentation, with about 70 different organisations involved in fisheries. The geographic coverage is patchy, particularly where there are problems. Two other issues are poor membership of Boards which is not necessarily representative and some duplication of effort.

The APEM report proposed four possible management models. *"They are all based on the co-management continuum, with different levels of public and private sector interaction. They range from a public sector-dominated scenario to a private sector-dominated scenario"*.

Model 1. A Regional Fisheries Agency

This would be a new public body that has a centralised structure. In order for this to function, the District Salmon Boards would need to be disbanded and that would require new legislation. There would be ten fisheries agencies, operating under guidance from the National Freshwater Fisheries Authority. Funding would be primarily from the private sector, grant in aid and the rod licence, possibly with fisheries assessment maintained in some form. A key feature would be, as in England and Wales, that there would be advisory committees, but without any executive power. Thus, in summary there would be ten organisations, a Regional Fisheries Agency, with Government-appointed officers, who make executive decisions with an advisory committee, but which has non-executive powers and the trusts sitting outside.

Model 2. A Regional Fisheries Board

This could be one Board or a system of Regional Fisheries Boards. Under this model, the District Salmon Fisheries Boards are retained, but their remit is extended to cover all species. So, legislation

would be as it sits, but extended to cover all freshwater fish species. Because larger management units would be needed, ten or thereabouts, regional management units feeding back up to government, the District Salmon Fishery Boards would be encouraged to merge and become multi-catchment-based organisations, where it is appropriate for the smaller bodies. There would need to be wider committee representation because of the input of public funds.

There would be ten regional offices, all autonomous, so each regional board would operate as it would wish to do so, independently, but operating under guidance from that umbrella body, using fisheries action plans for the catchments under its control, to determine how money is spent or at least make sure that the public money is spent in a way that they would wish to be spent to cover these species that have no commercial or recreational interests. So, additional funding would be required for that from the public sector, grant-in-aid, rod licence and the existing fisheries assessment maintained.

In summary, the District Salmon Fisheries Boards would become the Regional Fisheries Boards. Each would have an executive committee, with full executive powers, and the Boards that sit within that region elect the executive committee. The Trusts, as currently, sit outside of it.

Model 3. A Regional Fisheries Council

This would retain the District Salmon Fisheries Boards, but with modified powers restricted to enforcement. In order to undertake the management, a new equivalent public body would sit within the region, side by side with the District Salmon Fishery Boards, with the responsibilities for management of all freshwater fish species and the reporting of that management.

Again, there would be ten regions, each with a local committee, but wider representation (from fisheries sectors, riparian owners, local councils and so on) than at present, to represent that public funding needed. It would maintain executive power. There would be ten regional offices, again operating under guidance from the umbrella body and that guidance is given in the form of the fisheries action plans. Thus there would be rules for each catchment, specific objectives which have to be followed through and achieved and funding, from the public and private sector, grant-in-aid, rod licence, etc.

This management model combines both public and private sector involvement. In summary, there is a Regional Fisheries Council, with an executive committee, locally elected. The District Salmon Board sits within it, or possibly a group of District Salmon Boards for the smaller catchments, which is made up of publicly-appointed people, officers from the local authority departments, so the District Salmon Board system is maintained. Legislation would have to be modified, removing the management powers from the District Salmon Boards and putting those into the public side of the equation.

Model 4. A Regional Fisheries Service

Under this model, the District Salmon Fishery Boards would be dissolved again requiring new legislation. Ten regions, each with a local committee with wider representation; again with the public and private sector, riparian interests, local authority interests, local fishery interests. Crucially it maintains executive power so makes the decisions within the framework of the law. That framework is provided by a National Freshwater Fisheries Authority, through the ten regions, again, and funding from the public sector, the private sector, grant-in-aid, rod licence and again maintaining that fisheries assessment in some form.

In summary, there is an executive committee, locally elected, but instructing officers beneath it, employed by the region to undertake management and so, on their behalf, with the Trusts, again, sitting outside. The District Salmon Boards are dissolved there is new legislation and wider committee representation.

The report concludes that Models 1 and 4 are less suitable for Scotland's needs. In contrast, both Model 2 (Regional Fisheries Authority) and Model 3 (Regional Fisheries Council) are recommended for consideration as potentially effective management systems. They both involve a considerable

interaction between the private and public sector with regards to decision making. It is argued that each of these sectors should have equal representation on any executive committee. The reasoning is that although the private sector contributes a considerable amount to Scotland's economy, conservation interests are equally important and Scottish fisheries are national assets with considerable heritage and recreational value. In addition, it is recognised that these assets require substantial public sector funding to facilitate the delivery of adequate protection and management. Therefore, the public sector should provide an equal input into the decision making process and into ground level management.

The response

These proposals were put to the Freshwater Fisheries Forum at a meeting on 30 January, 2006. They were met with considerable hostility from various participants (mainly anglers) where there was strong opposition to the concept of angling licences. Little time was available to discuss the issues properly and the proposals have not been taken further or even considered seriously since then.

FRESHWATER FISHERIES FORUM REPORT

A Strategic Framework for Scottish Freshwater Fisheries

This report by the Freshwater Fisheries Forum Steering Group was published by the Scottish Government in 2008. It consists of four major parts and aims at taking account of the needs of all stakeholders in Scotland's fish and fisheries, 'having regard to the four pillars of sustainability: environmental, economic, social and stewardship'.

Part One sets out a shared vision for freshwater fish and fisheries in Scotland: "*Scotland will have sustainably managed freshwater fish and fisheries resources that provide significant economic and social benefits for its people*".

Part Two describes the context in which freshwater fisheries in Scotland is operating, and lists the recent policy developments and other initiatives which bear on its operation. It also expands further on the context of freshwater fisheries in relation to the four pillars of sustainability. It concludes, when discussing stewardship, by identifying the need to adopt an evolutionary approach in order to move towards the shared vision. Particular emphasis is placed on the following:

- Catchment based management of all freshwater fish species
- The evolution co-ordination and streamlining of existing bodies into structures that can discharge their responsibilities effectively.
- The development of sustainable funding streams and appropriate legislation to ensure this work can be done effectively.

Part Three explains in more detail how the vision set out in Part One is to be realised in an evolutionary way as set out in Part Two. It considers areas that still require further work before detailed proposals can be recommended and refines these into a series of formal 'priorities for action'. These are organised under eight broad subject headings:

- Good practice in freshwater fisheries management
- National initiatives in freshwater fisheries management
- Freshwater fisheries management resources
- Encouraging participation
- Marketing
- Reviews
- Primary legislation
- Research and development

Part Four proposes how monitoring and dissemination of progress in delivering the Framework objectives can be taken forward. It proposes that the Freshwater Fisheries Forum is continued and that regular reports are published.

The response

Many of the initial efforts of the Freshwater Fisheries Forum Steering Group were directed towards the fishery measures which eventually appeared in the Aquaculture and Freshwater Fisheries (Scotland) Act 2007. The Report outlined above was large on ideas but short on detail and efforts in the final years of the Steering Group were directed towards developing such detail in relation to the management of freshwater fisheries in Scotland.

SUMMARY OF THE REPORTS

In spite of the fact that all of the reports and reviews produced so far have included the same broad principles, none of them have ever been implemented either in part or in full. The following are major points found in almost all of the six reports described above.

- There should be a significant reduction in the number of ‘fishery boards’.
- These should be catchment based.
- The system should cover the whole of Scotland.
- There should be a ‘central authority’.

The Nickson Report and the reports of the Salmon Advisory Committee dealt with Atlantic Salmon only, The Hunter Report with Atlantic Salmon and Trout (Sea and Brown). The other Reports (WWF, AfC, FFF, APEM) all recommended an ‘all fish species’ approach to science-based management.

The following two sections (Data on Stocks and Management Issues) are, in the opinion of the author, key areas to be looked at in any future review of the management of Scotland’s freshwater fisheries.

4. DATA ON STOCKS

Assessment of the state of salmon and sea trout fisheries is reported annually by Marine Scotland Science in terms of catches to rods and nets. To an extent, these data provide a broad understanding of the state of the underlying fish stocks, but the relationship between catch and stock depends on range of factors that is often unknown, such as the degree of fishing effort and the susceptibility of fish to capture under the conditions that prevailed. A more accurate measure of stock size may be achieved using fish traps and fish counters that have been verified as being reasonably accurate. There are about 29 active fish counters in Scotland, mostly associated with hydroelectric dams (Eatherley *et al.* 2005). Counters need to be validated regularly to be of value, and located in strategic locations to provide the most useful information for fisheries management.

ATLANTIC SALMON

Total reported rod catch (retained and released) of wild salmon and grilse for 2011 was 87,915. It is the sixth highest on record and is 98% of the previous five-year average (Marine Scotland 2012a).

- The proportion of the rod catch accounted for by catch and release continues to increase. In 2011, 91% of rod caught spring salmon were released, as was 73% of the annual rod salmon and grilse catch.
- Trends in rod catch vary among individual stock components. Reported catch of spring salmon shows a general decline since records began and, although there is some indication that spring salmon catch has stabilised in recent years, it remains at a historically low level. Grilse catch, on the other hand, has generally increased over the period while the catch of summer salmon shows little overall trend.

- Catch and effort for both fixed engine and net & coble fisheries remain at historically low levels. Reported catch in each fishery was 13,802 and 6,016; 5% and 2% of the maximum reported in the respective time series. Fishing effort in these fisheries was 194.5 trap months and 80 crew months; the fourth and fifth lowest, respectively, since records began in 1952.
- Salmon and grilse of farmed origin represented 0.1% of the total catch in 2011. Their distribution was highly uneven, the North, North West and West regions accounting for 82% of reports.
- The information presented here is a summary of the data from 1,848 forms returned from 2,001 issued (92% return rate) for the 2011 season. Return rates for the previous 10 years have been between 93% and 96%.

In summary, the total rod catch (retained and released) in 2011 was very similar to the previous five-year average. Taken over the time series since 1952, annual rod catch has increased and is currently at the high end of the observed range. This may be taken as evidence of an increase in the numbers of fish entering fresh water and, given the high levels of reported catch and release, escaping to spawn.

However, the status of stocks on smaller geographic scales (e.g. among or within catchments) may differ from each other and also from the overall assessments presented above. The long-term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak although there is some indication that spring salmon catch has stabilised in recent years.

Apart from catch statistics, there is also basic information on the status of stocks of Atlantic Salmon in Scotland's river systems. The data for Scotland provided in NASCO's current rivers database show the following:

- Not threatened with loss - 341 rivers
- Threatened with loss - 15 rivers
- Lost - 9 rivers
- Restored - 4 rivers
- Maintained - 1 river
- Unknown - 20 rivers

SEA TROUT

For Scotland as a whole, total reported rod catch of sea trout (retained and released) for 2011 was 23,324. Catches have declined over much of the period since 1952, when records began (Marine Scotland 2012b). Although increasing by 4% compared to the previous five-year average, total reported rod catch in 2011 was the sixth lowest in the 60 year time series.

- The proportion of the total rod catch accounted for by catch and release has shown a general increase since records began in 1994 and accounted for 70% of the catch in 2011.
- There are clear differences among geographic regions in the relative strength of the 2011 rod catch. All mainland regions in the west of Scotland reported catches which were within the lowest five recorded over the period 1952 to 2011. The reported catch in Moray Firth and North East regions were, similarly, the second and eighth lowest respectively over the same period. Catches in the East and North regions in 2011 were, on the other hand, both among the top two catches recorded within their respective regions, while the catch recorded in the Outer Hebrides was close to the mid-point in the time series.
- Catch and effort for both fixed engine and net & coble fisheries remain at historically low levels. Reported catch in each fishery was 1,758 and 3,890; 3% and 2% of the maximum reported in the respective time series. Fishing effort in these fisheries was 194.5 trap months and 80 crew months; the fourth and fifth lowest, respectively, since records began in 1952.
- The information presented here is a summary of the data from 1,848 forms returned from 2,001 issued (92% return rate) for the 2011 season. Return rates for the previous 10 years have been between 93% and 96%.

Since 2003, rod catches of Sea Trout for Scotland as a whole have been about the lowest in the time-series. Although catches have shown a slight increase since 2008, they remain at historically low levels.

There are clear differences among geographic regions in the relative strength of the 2011 rod catch. Catches in all mainland regions in the west of Scotland together with the Moray Firth and north east regions are at historically low levels, while catches in the east and north regions are both among the highest catches recorded within their respective regions over the last 60 years. The catch recorded in the Outer Hebrides was close to the mid-point of the time series for that region.

Further the status of stocks on smaller geographic scales (e.g. among or within catchments) may differ from each other and also from the overall assessments above.

OTHER FISH SPECIES

There are no national statistics (other than those for Atlantic Salmon and Sea Trout) for any other freshwater fish species involved in fisheries, including Brown Trout. Stock assessment for resident Brown Trout and non-salmonid fish is poorly developed, particularly for still water populations, where even accurate records of species distribution are lacking. There is only a very small number of still water trout stocks where attempts have been made to assess population sizes, the most notable being Loch Leven. There are few examples of detailed catch data being used to manage Brown Trout or coarse fish on a scientific basis elsewhere.

Sites which are designated as SSSIs or SACs for fish are monitored by SNH through the Site Condition Monitoring programme mentioned above. These are not stock assessments however – they consider the condition of the feature against its historic status and use the data to identify ‘condition’ of the feature and identify management issues. For SSSIs, SNH monitors five Arctic Charr populations, Sparling in the River Cree and Powan in Lochs Lomond and Eck. For SACs there are the 17 Atlantic Salmon SACs as well as four each for Brook and Sea Lamprey and five for River Lamprey.

5. MANAGEMENT ISSUES ARISING

The issues discussed below are those aspects of current fisheries management in Scotland which, in the author’s opinion, should be fully reviewed so that improvements can be made. Many of these topics are already covered in the published reports summarised above and included in their recommendations. The topics discussed below concentrate on specific issues where there is evidence. This review is timely because the latest Bill going through the Scottish Parliament identifies some of the key issues. Legislation has changed enormously in recent years: for example: the Habitats Directive, changes to the Wildlife and Countryside Act, Eel regulations, a new INNS Directive on the way, the regulations now in place for habitat management via the Water Framework Directive (along with a range of new classification tools – including one for freshwater fish), an increased UK Biodiversity Action Plan list for fish, the impending arrival of Marine Protected Areas, etc. A modern efficient and sustainable freshwater fishery management structure is needed which is able to cope with all these important changes.

LACK OF NATIONAL STRATEGY

National issues

One of the main deficiencies of the present situation in Scotland is that there is no single national body and consequently no national co-hesive strategy for the management of freshwater fisheries. This means that there is no one organisation looking at the broad national picture of freshwater fisheries and producing plans to improve matters and make progress. This has resulted in the present structure

being somewhat disjointed and means that there are no adequate national strategies for, say, the integrated management of stocks of Atlantic Salmon (see below) – or most other fish species for that matter.

Since no single body has responsibility, there is no single plan which feeds national priorities down to local management level, ensures accountability and enables the Scottish Government to meet its obligations to the EU and NASCO. A national centre would be expected to deal with overall process issues such as staff resources, national coordination, governance and accountability, legal issues and funding.

Some of the organisations involved with freshwater fish in Scotland do have a specialised national remit and thus are able to provide important national input to areas within their remit. This is true for example of Marine Scotland Science for the gathering of statistics on catches of Atlantic Salmon and Sea Trout, for SEPA in terms of national catchment planning and for SNH in producing national action plans for rare fish such as Vendace and Powan. However, because of the proliferation of bodies at regional level there is fragmentation and competing interests and no guarantee that everyone works together - Boards focus purely on Atlantic Salmon, Trusts have funding issues, policing is in local hands.

A single national body is needed for the overall management of Scotland's freshwater fish and fisheries.

Regional problems

As described above, the main regional bodies concerned with management and research in freshwater fisheries are the District Salmon Fishery Boards and the Fishery Trusts. However, whilst there is some good work being done by both these groups, this is very patchy and there are several problems in the ways in which they operate, especially in terms of the national picture or in relation to other organisations which are dependent on them for information.

Fishery Boards and Trusts are generally too small and fragmented to provide an effective means of managing fisheries on a regional or national scale. They are in many cases unable to work together effectively and as a consequence they do not have the capacity to address effectively larger scale issues, nor do they normally have an ability to provide specialist staff or services to address key issues.

The problem concerning all the coordinating bodies (ASFB, RAFTS & SFCC) is that Boards and Trusts are vigorously independent and are often unwilling to agree national approaches. In addition, the resources available to RAFTS and SFCC are small and this constrains their ability to deliver. There appears to be little meaningful check on the level of adherence to the various standards and codes of practice, where these exist.

The main difficulties which have arisen with these regional units may be summarised as follows:

- There are too many DSFBs (41) and FTs (25) to allow most of them to carry out adequate research and management in relation to the financial and staff resources available.
- The DSFBs do not have a complete national coverage of Scotland.
- Whilst some DSFBs and FTs work well together, in some case they do not and there is conflict between the two groups working in the same area.
- There are inherent problems within DSFBs insofar as many are controlled by proprietors who have no training or scientific background in fisheries management.
- Professionalism can be an issue.
- It is not uncommon for there to be conflicts of interest for proprietors who are members of DSFBs but who may also be local fish farmers or have estate plans for forestry, wind farms, etc. Such plans may well conflict with the needs of local fisheries.

Overall, the system does not have the tools to deliver effective science-based fisheries management.

Other management issues

The bailiffing duties carried out by the DSFBs are one of their most valuable activities. However, on the management side, they are often open to criticism. For example, with stocking, the DSFBs have a duty to consider the genetic implications and also where they stock fish. Many of them choose to stock fish in areas that are currently inaccessible – SNH and other conservationists have clear views re the stocking of fish above natural obstacles (i.e. it is not supported).

Catch and release schemes are generally regarded as a success and do not affect the overall catch data significantly. They are not mandatory, though when evidence indicates that a stock is under particular stress or is in decline, mandatory catch and release could be entirely justifiable. This would be eminently preferable to draconian closures of rivers or fisheries.

ASFB, in association with the Institute of Fishery Management coordinates and helps to deliver accredited training covering fishery management and enforcement. Training schemes for bailiffs are generally regarded as a success, for fishery management, in practice, less so.

DATA AND RESEARCH

Migratory salmonids

As noted above, Marine Scotland Science has a major role in gathering statistics on catches of Atlantic Salmon and Sea Trout in Scotland as well as carrying out specific relevant research.

The catch dataset for migratory salmonids provides a relatively comprehensive and long-term national data set used to provide regional and national assessments of trends in salmon and sea trout catches. However, in many cases it is difficult to get a clear picture of current state of fish stocks in Scotland, either at national or local level and there is often insufficient evidence to inform management. There is usually insufficient evidence to provide a robust understanding of individual stock dynamics or even to accurately define the limits of each stock, or the most appropriate unit on which to take management action. The result is that Scotland has inadequate information on one of its most important natural resources, which makes it difficult to assess whether our fish stocks are being managed sustainably.

Thus there are many gaps in the data needed to manage fish stocks sustainably, for example:

- Data on rod & line fishing effort
- Data from more fish counters to calibrate catch data
- Data on marine and anadromous species in the sea
- Data on fish species other than Atlantic Salmon and Sea Trout

There is no national picture on activities such as stocking. Most DSFB stocking activities relate very much to Atlantic Salmon (odd exceptions exist) - the scenario as to how DSFBs should respond to stocking activities involving Brown Trout (which, if they contribute to the anadromous component, should also come under their management remit) remains unclear. This is an issue that Marine Scotland has to address with the Boards.

Research and monitoring

The research and monitoring carried out presently by Boards and Trusts is mostly fragmented and uncoordinated and does not adequately address the need for robust data to inform fisheries management and policy as specified in the above example for Atlantic Salmon. There is no national strategy or plan for the coordinated monitoring of freshwater fish in Scotland nor a fully standardised plan for data collection and archiving and this has led to inadequate management of this hugely valuable natural resource.

Scientific data collection

The Scottish Fisheries Coordination Centre has promoted the development of consistent methodologies but these have not been uniformly applied. There is no national plan for monitoring fish which would ensure that monitoring provides a coherent national picture which can describe the state of the most important stocks and the threats to which they are subject. Nor is there a national data archiving system (see below), which is really something the SFCC was set up to establish.

Like the Fishery Trusts, the SFCC has historically been driven by salmonid monitoring work. Little else has been considered and it still lags behind in other species monitoring. Also, since it still focuses on rivers, there is no guidance available for sampling in standing waters and this is a key deficiency.

The influence of poorly documented, current and historic, stocking practices, coupled with the lack of long term data on fish populations in general, make it difficult in some areas to determine the natural fish population structure. This in turn makes it very difficult to regulate the impact on new proposals, to determine with any certainty the impact of existing activities, or to carry out accurate classification of freshwater fish for the WFD.

Data archive

There is no national scheme for the archiving of data collected from fish monitoring and research across Scotland. Fishery Trusts, Marine Scotland Science, SEPA, SNH, universities, consultants and angling clubs all collect freshwater fish data to different degrees. Effective coordination between these groups is generally lacking and, with no adequate archiving system, much valuable, and expensively obtained, data is eventually lost. This is partly a result of inconsistencies in data collection, and poorly aligned monitoring networks, resulting in inefficient use of resources

Freshwater fisheries are one of Scotland's most important natural resources. There is, however, very limited national information published on the condition of fish populations in Scotland. The present system does not help the promotion of science-base fishery management

FUNDING

A significant proportion of fishery management in Scotland is funded from private sources. As noted above, DSFBs raise money by imposing the salmon assessment on each fishery in their district (note that rod fisheries get rates relief on the grounds that they pay a levy to the DSFB, net fisheries pay the salmon assessment and business rates). It is for each Board to determine how that money is spent. However, the portion actually spent on management is often unclear, as is the scientific basis underlying the management itself. There is need for greater transparency here.

Boards are often a major funder of the Trusts and have a very strong influence over the work which they carry out. There is frequently a short term view taken with regard to where money is spent often, on the pet projects of Board members. This short term funding of Trusts prevents such Trusts from carrying out long term monitoring and other important research.

An important part of the funding of Trusts is provided by temporary grants from external private sources or by short-term contracts with Marine Scotland, SNH and other organisations. The focus of work is frequently driven by where grant funding can be secured rather than aiming towards a long term vision or goal. This leads to an *ad hoc* approach to research and monitoring. The lack of a source of secure long term funding leads to difficulties in recruiting and retaining staff.

The lack of evidence and thus limited understanding of fish populations hinders the ability of the Water Environment Fund to direct funding to address strategic priority problems. When the Fund was first set up, it encouraged the Fishery Boards and Trusts to apply for funding to remove barriers to fish migration. The result was that some Trusts made many applications whilst others made no applications. The applications were opportunistic.

A better method of funding freshwater fisheries research and management is required. This should consider the appropriateness of angler/user contributions.

FISHERIES

Sport fisheries

Fisheries have changed in Scotland over the last fifty years – they are no longer salmonid only and there is a need to make sure that all sectors are catered for and managed appropriately. By doing this the negative impacts that one can have on the other can be reduced. Biosecurity is a key issue here. Coarse anglers have shown themselves to be particularly adept at moving new species around. This is obviously illegal but it is clear that it happens. Where there is a body of anglers who are mobile and move around the country, the biosecurity risk is higher. Such activities are not restricted to coarse anglers, game anglers are also a concern – for example in relation to the possible introduction of *Gyrodactylus*.

Most of the money paid by anglers for their fishing goes to private owners and there is virtually no input to the overall national management of and research on freshwater fish and fisheries.

Anglers must be encouraged to contribute catch statistics for wild fisheries.

Net fisheries

It is clear that there are important issues related to commercial net fisheries which need to be resolved. The current practice whereby the commercial fishermen pay dues to the DSFBs - whose main objective is to close down the commercial fisheries - is inequitable. The main objection to the latter is that most of them are based on mixed stock fisheries. However, it is now known that within large catchments there may also be several different genetic stocks and so some rod fisheries are also based on mixed stocks. There is a national obligation to manage mixed stock fisheries and more data on both angling and commercial net catches is needed to understand the impact of these fisheries on fish stocks.

If commercial net fisheries are eventually eliminated it will mean that there will never be any wild Scottish Salmon for sale on the open market. For a variety of reasons, not least that this activity has cultural and social importance, this seems an extremely undesirable end point and so a solution must be found which allows commercial netmen an equitable share of the resource. Many commercial net fisheries have been closed down since Hunter (1965) recommended that *“The system of management should be capable of dividing the run of salmon in the required proportions between the commercial catch on one hand and the angling stock and breeding escapement; of measuring the effect of changes; and of allowing the commercial fisheries to operate efficiently.”*

As well as catch statistics for Atlantic Salmon and Sea Trout, commercial net fishermen should be encouraged to collect data on threatened species which they catch, such as Allis and Twait Shad.

SUSTAINABLE WILD FISH STOCKS

Because there is no proper overall management framework for freshwater fish, there are consequently no national plans aimed at achieving sustainable wild fish stocks for sport or commercial net fishing. As well as limited data, funding is also limited. There is no holistic picture of fishery management which takes account of all species and the obligations to protect certain of these.

As an example, accepting that salmon management will inevitably be a strong focus, the main areas of fisheries management could be set out as:

- Define stocks
- Assess numbers of prospective spawners
- Assess conservation limits
- Allocate harvestable surplus among fisheries
- Reduce exploitation as required
- Maintain or increase juvenile recruitment
- Mitigate for factors impacting on stocks
- Operate national Protection Orders
- Protect against poachers

Each of these bullets subsumes any number of issues (e.g. training staff, communicating, funding, liaising with other organisations) and could be expanded. The final question is - does the current system provide the tools to achieve all these aims? The answer, on a national basis, is no.

INTERNATIONAL COMMITMENTS

Ultimately, it is the Scottish Government that has the obligations under the Water Framework Directive and the Habitats Directive, and to the international community via NASCO – but responsibility for managing the fisheries rests with bodies which are not accountable to the Scottish Government. This is an unsatisfactory state of affairs and should be rectified by restructuring the way that fisheries management is organised in Scotland.

SEPA – Water Framework Directive

The Water Framework Directive requires robust assessment of freshwater fish and the impact of relevant threats and pressures. Trusts and Boards have been a valuable source of information to assist in this, but have also proved inconsistent in their willingness to share data. The data supplied have also been patchy, particularly with respect to non-salmonid species, and it has ultimately proved impossible to develop adequate assessment methods for all fish species, or for fish in standing waters. This has created an infraction risk, and the future prospects of having a national database of detailed non-salmonid data remain unclear. Robust stocking data have also proved very difficult to obtain. These inadequacies are causing difficulties for regulatory and other environmental decision-making.

SNH – Habitats Directive

The role of SNH in freshwater fish conservation is an important one and measures implemented so far in relation to the EU Habitats Directive have been good. However, in some of their stocking activities, DSFBs are acting outwith the law. Insofar as SACs are concerned (DSFBs have to go through the same process for any SAC whether it is designated for Atlantic Salmon or not), they are placing the UK Government at risk of infraction. It is for this reason that a measure has been included in the current Bill.

NASCO - Atlantic Salmon

A strategy is being developed for the management of mixed-stock fisheries, but at present there is no clear policy. There is concern that these fisheries are still being operated despite a lack of information to characterise the exploited stocks. These issues are not consistent with the NASCO agreements and guidelines and need additional actions. In accordance with the EU Water Framework Directive comprehensive salmon habitat protection and restoration plans have been developed with timelines for implementing corrective measures and monitoring. This approach is consistent with the NASCO Plan of Action.

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Appendix 1. List of freshwater fish species in Scotland.

<i>Lampetra fluviatilis</i> (Linnaeus 1758)	River Lamprey
<i>Lampetra planeri</i> (Bloch 1784)	Brook Lamprey
<i>Petromyzon marinus</i> Linnaeus 1758	Sea Lamprey
<i>Acipenser sturio</i> Linnaeus 1758	Common Sturgeon
<i>Anguilla anguilla</i> (Linnaeus 1758)	European Eel
<i>Alosa alosa</i> (Linnaeus 1758)	Allis Shad
<i>Alosa fallax</i> (Lacepede 1803)	Twaite Shad
<i>Abramis brama</i> (Linnaeus 1758)	Common Bream
<i>Barbus barbus</i> (Linnaeus 1758)	Barbel
<i>Carassius auratus</i> (Linnaeus 1758)	Goldfish
<i>Carassius carassius</i> (Linnaeus 1758)	Crucian Carp
<i>Cyprinus carpio</i> Linnaeus 1758	Common Carp
<i>Gobio gobio</i> (Linnaeus 1758)	Gudgeon
<i>Leuciscus cephalus</i> (Linnaeus 1758)	Chub
<i>Leuciscus idus</i> (Linnaeus 1758)	Orfe
<i>Leuciscus leuciscus</i> (Linnaeus 1758)	Dace
<i>Phoxinus phoxinus</i> (Linnaeus 1758)	Minnow
<i>Rutilus rutilus</i> (Linnaeus 1758)	Roach
<i>Scardinius erythrophthalmus</i> (Linnaeus 1758)	Rudd
<i>Tinca tinca</i> (Linnaeus 1758)	Tench
<i>Barbatula barbatula</i> (Linnaeus 1758)	Stone Loach
<i>Esox lucius</i> Linnaeus 1758	Pike
<i>Osmerus eperlanus</i> (Linnaeus 1758)	Sparling
<i>Coregonus albula</i> (Linnaeus 1758)	Vendace
<i>Coregonus lavaretus</i> (Linnaeus 1758)	Powan
<i>Oncorhynchus mykiss</i> (Walbaum 1792)	Rainbow Trout
<i>Salmo salar</i> Linnaeus 1758	Atlantic Salmon
<i>Salmo trutta</i> Linnaeus 1758	Brown Trout
<i>Salvelinus alpinus</i> (Linnaeus 1758)	Arctic Charr
<i>Salvelinus fontinalis</i> (Mitchill 1814)	Brook Charr
<i>Thymallus thymallus</i> (Linnaeus 1758)	Grayling
<i>Chelon labrosus</i> Risso 1826	Thick-lipped Grey Mullet
<i>Liza aurata</i> (Risso 1810)	Golden Grey Mullet
<i>Liza ramada</i> (Risso 1826)	Thin-lipped Grey Mullet
<i>Gasterosteus aculeatus</i> Linnaeus 1758	Three-spined Stickleback
<i>Pungitius pungitius</i> (Linnaeus 1758)	Nine-spined Stickleback
<i>Cottus gobio</i> Linnaeus 1758	Bullhead
<i>Dicentrarchus labrax</i> (Linnaeus 1758)	Sea Bass
<i>Gymnocephalus cernuus</i> (Linnaeus 1758)	Ruffe
<i>Perca fluviatilis</i> Linnaeus 1758	Perch
<i>Pomatoschistus microps</i> (Kroyer 1838)	Common Goby
<i>Platichthys flesus</i> (Linnaeus 1758)	Flounder

Appendix 2. Definition of 'game' and 'coarse' fish.

It is very important that these terms are defined clearly in relation to fishery discussions. If they are to stand legal scrutiny they must have a foundation in science. The following is offered as a basis for discussion.

'Game' fish are those freshwater fish which are generally classed as 'salmonids'. Salmonid fish, in scientific terms, belong to the Order Salmoniformes. This Order is treated in two different ways by various taxonomists, as either:

one Family- Salmonidae - with three subfamilies - Salmoninae, Thymallinae and Coregonidae

or

three families - Salmonidae, Thymallidae and Coregonidae

Either way, the following species in the Order Salmoniformes are represented in Scotland:

Salmonidae (Salmoninae)

Atlantic Salmon	<i>Salmo salar</i>
Brown Trout	<i>Salmo trutta</i>
Arctic Charr	<i>Salvelinus alpinus</i>
Brook Charr	<i>Salvelinus fontinalis</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>

Thymallidae (Thymallinae)

Grayling	<i>Thymallus thymallus</i>
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Coregonidae

Vendace	<i>Coregonus albula</i>
Powan	<i>Coregonus lavaretus</i>

There appear therefore to be two options - either (1) Include all eight of these salmonid fish (i.e. Salmoniformes) within the definition of 'game' fish, or (2) Use the narrower definition of salmonid fish (i.e. Salmonidae/Salmoninae) which would include only five species.

The first of these is the more logical option, as all these fish have a great deal in common and are quite distinct from all other freshwater fish in Scotland, which would be regarded as 'coarse' fish. This is the definition used in this report.

Appendix 3. Scottish record rod-caught fish.

Game fish

Atlantic Salmon	29.029 kg	River Tay	1922
Brown Trout	11.502 kg	Loch Awe	1996
Arctic Charr	8.618 kg	Loch Arkaig	2000
Grayling	1.404 kg	River Tweed	1994
Rainbow Trout	13.920 kg	Wellsfield Fishery	2005

Coarse fish

Barbel	4.310 kg	River Clyde	2010
Bream	6.350 kg	Castle Loch	2007
Common Carp	15.760 kg	Forth & Clyde Canal	2010
Chub	2.835 kg	River Annan	1999
Dace	0.553 kg	River Tweed	1979
Eel	2.780 kg	Border quarry	2007
Goldfish	0.709 kg	Forth & Clyde Canal	1978
Orfe	3.604 kg	Culcreuch Loch	2005
Perch	2.835 kg	Loch Ard	2011
Pike	21.631 kg	Loch Lomond	1947
Roach	1.820 kg	Culcreuch Loch	2007
Tench	4.540 kg	Castle Loch	2003

Appendix 4. SACs for Atlantic Salmon in Scotland.

The Atlantic Salmon *Salmo salar* is a widespread species in the UK and is found in several hundred rivers, many of which have adult runs in excess of 1000. The UK salmon population is important in a European context, and this has influenced the selection of SACs. Site selection has focused on the identification of rivers holding large salmon populations across the geographical range of the species in the UK. Site selection has also taken into account the considerable variation in the ecological and hydrological characteristics of salmon rivers in Scotland, and in the life-cycle strategies adopted by the salmon within them. Spawning and nursery requirements are well-represented in all the selected sites, and the river systems selected include the main tributaries where significant redds occur.

It should be noted that salmon is an Annex II species only in fresh waters throughout the EU, and therefore marine and estuarine sites are excluded from selection. While the SAC series makes a contribution to securing favourable conservation status for this Annex II species, wider measures are also necessary to support its conservation in Scotland and there is extensive legislation intended to protect the species

The list of Scottish SACs for Atlantic Salmon is as follows

Berriedale and Langwell Waters

Langavat

Little Gruinard River

River Bladnoch

River Dee

River Naver

River South Esk

River Spey

River Tay

River Thurso

River Tweed

SACs where this Annex II species is a qualifying feature, but not a primary reason for site selection.

Endrick Water

North Harris

River Borgie

River Moriston

River Oykel

River Teith

Appendix 5. List of District Salmon Fishery Boards in Scotland.

Annan
Argyll
Ayr
Beaully
Bladnoch
Brora
Caithness
Cree
Cromarty
Dee (Aberdeen)
Dee (Kirkcudbright)
Deveron
Don
Doon
Eachaig
Esk
Findhorn
Fleet
Forth
Girvan
Helmsdale
Kyle of Sutherland
Laggan and Sorn
Lochaber
Lossie
Luce
Nairn
Ness
Nith
Northern
Skye
Spey
Stinchar
Tay
The North and West
Tweed
Ugie
Urr
Wester Ross
Western Isles
Ythan

Appendix 6. List of Fishery Trusts in Scotland

Argyll Fisheries Trust
Ayrshire Rivers Trust
Clyde River Foundation
Cromarty Firth Fisheries Trust
Deveron, Bogie & Isla Rivers Charitable Trust
Findhorn, Nairn & Lossie Trust
Forth Fisheries Trust
Galloway Fisheries Trust
Kyle of Sutherland Fisheries Trust
Loch Lomond Fisheries Trust
Lochaber Fisheries Trust
Ness & Beaully Fisheries Trust
Nith Catchment Fisheries Trust
Outer Hebrides Fisheries Trust
River Annan Trust
River Dee Trust
River Don Trust
Skye Fisheries Trust
Spey Research Trust
Tay Foundation
The Esks Rivers & Fisheries Trust
Tweed Foundation
West Sutherland Fisheries Trust
Wester Ross Fisheries Trust
River Ythan Trust