Ad Hoc Review Group

IP(07)19 FINAL

Implementation Plan

European Union – UK (Scotland)

EU-UK (SCOTLAND): REPORT OF IMPLEMENTATION PLAN FOR MEETING OBJECTIVES OF NORTH ATLANTIC SALMON CONSERVATION ORGANISATION (NASCO) RESOLUTIONS AND AGREEMENTS

1 Introduction

1.1 This report sets out the current fisheries management structures for Atlantic salmon in place in Scotland in 2007 and sets out a timetable for future development of fisheries management practices. The Implementation Plan has been produced by the Scottish Government and Fisheries Research Services (FRS) after discussions with the Association of Salmon Fisheries Boards (ASFB) and Rivers and Fisheries Trusts of Scotland (RAFTS). The Plan covers the period until 2012, but is subject to continuous review as new methodologies and resources become available. The principles set out in the North Atlantic Salmon Conservation Organisation (NASCO) resolutions and agreements[1] form the basis for the Plan. All actions and timetables for delivery are summarised in Table 1.

Aim

1.2. The aim of the Plan is to ensure sustainable fisheries[2] for Atlantic salmon throughout Scotland.

The Resource

1.3. Salmon enter the larger rivers throughout the year, with the earliest running multi-sea-winter (MSW) salmon entering freshwater up to 12 months before they will spawn. In many of the smaller west coast spate-rivers, entry may be more restricted to periods when discharge is sufficient to permit entry and ascent. Although a small number of west coast rivers produce early-running MSW salmon, the majority of the fish returning to these rivers are grilse.

1.4. Smolt age is generally from one to four years old, with two and three year old smolts predominating. One-year old smolts are relatively more common in the southern rivers, while northern rivers may produce a few smolts as old as five or six years.

1.5 Data presented for the NASCO Salmon Rivers Database[3] show that there are:

- 364 rivers supporting salmon populations which are designated as not being threatened with loss. Many of the larger rivers support multiple populations.
- 5 rivers where salmon populations have been restored
- 1 river where salmon exist as a result of maintenance programmes
- 11 rivers where salmon are threatened with loss
- 2 rivers where salmon populations have been lost.

1.6. A total of 17 rivers[4] have been designated as Special Areas of Conservation (SACs), 11 with salmon listed as a primary interest, under the EU Natura 2000 system.

[1] http://www.nasco.int/

[2] A sustainable salmon fishery is one where self-sustaining populations consistently provide a harvestable surplus.

[3] http://www.nasco.int/asd/summary.asp

Economic value

1.7. The report "The Economic Impact of Game and Coarse Angling in Scotland", produced for the Scottish Executive by Glasgow Caledonian University and Cogentsi Research International Ltd and published in March 2004, estimated that the average annual number of angler days associated with fishing for salmon and sea trout in Scotland was 545,048. Anglers visiting Scotland accounted for 47% of the total number of angler days. Total angler expenditure in salmon and sea trout fishing amounted to £73.5M, which translates into 2,200 full-time job equivalents, most of which are located in rural, and often remote, areas. Salmon angling is thus of great importance to the Scottish economy.

Current management

1.8. The primary legislation regulating salmon fishing and management in Scotland is the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003[5] as amended by the Aquaculture and Fisheries (Scotland) Act 2007[6]. The 2007 Act, except for section 35, came into force on 1 August 2007. Section 35 will come into force[7] on 1 August 2008.

1.9. Part 3 of the 2007 Act makes provisions in relation to salmon and freshwater fisheries, inserting new measures into the 2003 Act. In order to assist the promotion of catch and release, the 2007 Act introduced a measure prohibiting the use of gaffs, tailers and landing nets made with knotted mesh netting.

1.10. The nature and management practices of the Scottish salmon fishery are detailed below.

Fishing rights in Scotland

1.11. All salmon fishing rights in Scotland, including in the sea, are private, heritable titles, which may be held separately from any land. Salmon fishing rights in the sea extend out to 12 miles, but in practice the primary and subordinate legislation in place regulating fishing methods restricts fishing in the sea to methods operated from and attached to the coast. It is an offence for any person to fish for or take salmon unless they have the legal right or written permission from a person having such right.

Permitted methods of salmon fishing

1.12. The permitted methods of salmon fishing differ inside and outside estuary limits. Estuary limits have been fixed for most rivers either by byelaws made in 1865, or by Regulation as provided for in section 36 of the 2003 Act. Where no such estuary limits have been fixed, as may be the case where smaller streams enter the sea, the estuary limits are the natural limits which divide a river (including its estuary) from the sea.

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[4] Tweed, Tay, South Esk, Dee (Aberdeenshire), Spey, Berriedale & Langwell, Thurso, Naver, Little Gruinard, Grimersta (Langavat), Bladnoch, Endrick*, Teith*, Moriston*, Oykell*, Borgie*, North Harris*
* rivers where Atlantic salmon are included as a species of interest, but where the site was not designated primarily for salmon.

[5] http://www.opsi.gov.uk/legislation/scotland/acts2003/20030015.htm

[6] http://www.opsi.gov.uk/legislation/scotland/acts2007/20070012.htm

[7] http://www.opsi.gov.uk/legislation/scotland/ssi2007/20070333.htm

1.13. *Inside estuary limits*: the permitted methods of fishing for salmon are:

a) - rod and line, and
b) - net and coble (sweep net).

1.14. Rod and line means rod and line (used otherwise than as a set line or by foul hooking) with such bait or lure as is not prohibited by regulation made under the relevant sections of the 2003 Act. It is prohibited to use fish roe, fire or light as bait or lure. Baits and Lures Regulations prohibiting variously the use of worms, shrimps, prawns and other baits, and the use of lures bearing multiple sets of hooks and barbed hooks have been made for a number of salmon fishery districts. No person may sell in Scotland any salmon that has been caught by rod and line.

1.15. In certain locations, the use of cruives, certificated fixed engines and haaf nets may be used. Cruives are trap fisheries for which certain historical rights remain in existence. There are currently no cruive fisheries in operation, and a right of fishing may be exercised if, and only if, it was in existence before 10 May 1951. It is not anticipated that any cruive fisheries will be brought into operation.

1.16. Certificated fixed engines exist only in the Solway in south west Scotland, and the term means a fixed trap net certificated as privileged under section 5 of the Solway Salmon Fisheries Commissioners Act 1877.

1.17. The use of haaf nets is also restricted to fisheries in the Solway, and a right of fishing by this method may be used if, and only if, it was in existence before 10 May 1951.

1.18. *Outside estuary limits*: the permitted methods of fishing for salmon are:

a) - rod and line,
b) - net and coble, and
c) – bag-net, fly-net or other stake-net.

1.19. A drift net fishery for salmon 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 trolling, trawling, long lines etc, so that the permitted methods specified above remain the only lawful ways of fishing for and taking salmon.

Fishery Management Regulation

1.20. Netting is regulated by the Salmon (Definition of Methods of Net Fishing and Construction of Nets) (Scotland) Regulations 1992, as amended in 1993 and 1994. These Regulations describe how net and coble and fixed engines may be operated. In the case of fixed engines, no part of any net except mooring warps and anchors shall extend seawards beyond 1300m from the mean low water mark. The Regulations also specify that no leader of any fixed engine may be longer than 300m, and that the hanging ratio shall be at least 66%.

1.21. For all nets, no part of any net shall be designed or constructed for the purpose of catching fish by enmeshing them, and no monofilament netting shall be used in the

construction of any net used in fishing for or taking salmon. No net may have a mesh size of less than 90mm knot-to-knot (stretched mesh), and the minimum permitted twine thickness is 0.9mm.

1.22. Both net and rod fisheries are subject to weekly and annual close times. The weekly close time applies throughout Scotland and extends from 6pm on Friday until 6am on the following Monday. No fishing for salmon is permitted on a Sunday. Fishing by rod and line is permitted during the weekly close time except on Sunday.

1.23. The annual close time for fishing for salmon in Scotland (except in the Tweed district) is a continuous period of not less than 168 days and applies to all methods of fishing, except to the extent that provision is made for periods during the annual close time during which it is permitted to fish for and take salmon by rod and line. In practice, most annual close times extend from about the beginning of September until early or mid-February in the following year. Rod fishing is permitted in some salmon fishery districts until the end of November, and starts in some districts in mid-January.

1.24. In the case of the Tweed, the annual close time is a continuous period of not less than 153 days from mid September until mid-February in the following year. The periods during the annual close time when fishing by rod and line is permitted extend until 30 November, and from 1 February.

1.25. Fisheries legislation is enforced by the police and by water bailiffs employed by District Salmon Fishery Boards (DSFBs, see paragraph 1.27 below) or appointed by the Scottish Ministers. In the case of unlawful fishing at sea in Scottish waters, in addition to the police and water bailiffs, the Scottish Fisheries Protection Agency (SFPA) enforces measures relating to fishing for or landing salmon made under sea fisheries legislation.

Management areas and responsible bodies

1.26. Mainland Scotland and its islands are divided into 57 salmon fishery districts (Annex A). Each salmon fishery district is the area within coastal limits set by byelaws in 1865 or as a result of designation orders made subsequently which have amalgamated former districts and abolished them. There were originally more than 100 salmon fishery districts. Each district extends seaward for 5km from mean low water springs and landward to include the catchment area of each river which flows directly or indirectly into the sea within the coastal limits of the salmon fishery district. In each district, a line across each river is specified to divide the owners of salmon fishing rights into "Upper" and "Lower" proprietors, which correspond generally to angling and netting fisheries respectively. Most of the larger east coast salmon fishery districts are centred on a major river, such as the Tay, Dee and Spey, although smaller rivers are also included between the coastal limits. Since the mid-1980s, there has been a number of amalgamations of districts where, historically, there were districts including only very small, single river catchments. The structure effectively allows river-by-river management.

1.27. Where proprietors of salmon fishery districts form an association for the purposes of the protection or improvement of the fisheries in their district and elect, in accordance with the provisions of the 2007 Act, a committee to act for them, that committee becomes a District Salmon Fishery Board (DSFB). The DSFB may do such acts, execute such works and incur such expenses as may appear to them expedient for the protection or improvement

of the fisheries within their district, the increase of salmon, or the stocking of the waters of the district with salmon. A DSFB must appoint a person to act as Clerk to the Board, and may appoint water bailiffs to enforce the legislation and undertake management work as required. Training courses for water bailiffs have been developed by the ASFB and the Institute of Fisheries Management (IFM).

1.28. A DSFB comprises representatives of upper proprietors elected from among themselves, representatives of lower proprietors elected from among themselves, co-opted representatives of tenant netsmen operating in the district and co-opted representatives of anglers. The total number of co-optees must be less than the number of proprietors. If there are no tenant netsmen or anglers in a district, a board may comprise representatives of proprietors only. The minimum number of elected representatives of proprietors is three. As soon as possible after the elections and co-options, the members of the DSFB must elect a convener from among the representatives of proprietors. Formation of a DSFB must be undertaken at three yearly intervals.

1.29. Each DSFB must produce an annual report and a statement of accounts, which must be audited, and present it at an annual meeting of proprietors. The funding required by a DSFB to finance its work is derived principally from a fishery assessment imposed on the proprietor of each salmon fishery in the district. This levy is assessed at a uniform rate throughout the district, and each fishery is charged according to its rateable value. A DSFB may also borrow an amount not exceeding twice the amount of the total fishery assessment for the district collected in the twelve months immediately prior to the date of the decision to borrow. However, a DSFB may borrow a higher sum if this action is approved by the proprietors whose fisheries have a combined value of 80% of the total rateable value of the fisheries in the district.

1.30. Thus, river-by-river management is undertaken by DSFBs, financed locally by the owners of salmon fishing rights, working within a legal framework specified in statute law.

1.31. Sound management is dependent upon high quality information. FRS provides a national salmon and freshwater fisheries monitoring and research resource, providing advice to the Scottish Ministers, the Scottish Government (SG), DSFBs, and owners and occupiers of fisheries. In addition, under RAFTS there is network of Fisheries Trusts, and in some cases DSFBs, employing biologists throughout Scotland. These biologists are able to provide detailed monitoring, surveillance, and advice on fishery and habitat management to DSFBs and fishery owners. All Trust biologists work in accordance with standard protocols developed by the Scottish Fisheries Coordination Centre (SFCC), an organisation comprising representatives of Fisheries Trusts, DSFBs, FRS, SG and others involved in fisheries data collection and use. SFCC has developed training courses for biologists, water bailiffs and others engaged in electro-fishing and habitat surveys.

Catch returns

1.32. Proprietors and occupiers of salmon fisheries have been required to report their catches since 1952, and these figures are published annually in Statistical Bulletins published by FRS[8]. Annual catches have declined from over 600,000 salmon and grilse in the late 1960s to less than 95,000 in recent years (Annex B).

[8] http://www.frs-scotland.gov.uk/Delivery/Information_resources/information_resources_view_documents.aspx?resourceId=23692

1.33. The nominal catch of salmon for 2006 was 190.4 tonnes, of which 117.4 tonnes were taken by rod & line and 73 tonnes were taken by net. [8]

1.34. During the summer months of 2006, sample data showed that over a wide area of Scotland, grilse returning were both substantially shorter and lighter than in previous years. Back-calculations from scale samples provide strong evidence for a substantial decline in the growth of these either in the short period in freshwater before smolt emigration or, more likely, in the post-smolt phase of their life in 2005[8].

1.35. Net catches have dropped significantly since records began in 1952. Netting effort, both in the net and coble and the fixed engine fisheries is now less than 10% of the level in 1952 when records were first collected[9]. This reduction has been achieved by a combination of buy-outs, voluntary closures and reductions in the numbers of gear units used at fisheries remaining in operation. Netting effort was also reduced in 1988 by a Statutory extension to the weekly close time.

1.36. Much of the management remains in the hands of the fishery owners. In the case of the net fishery, effort is regulated by the number of locations within any fishery where a net may be set, by the labour resources available for operating the fishery, and by the fishery owners' perceptions of the availability of fish. In many cases around Scotland, net fisheries have closed as a result of private buy-out initiatives.

1.37. In the case of the rod fishery, effort is regulated by the numbers of permits issued by the owners of the fishery, and the times when fishing is permitted. Many fishery owners apply conditions to their permits such that anglers may only use certain methods. In 19 salmon fishery districts, Regulations prohibiting certain baits and lures have been made by Statutory Instrument, and failure to comply with these regulations is an offence.

1.38. Rod and line catches have remained more stable, except for the decline in catches of early-running MSW salmon. Catch and release has increased steadily since records were first kept in 1994 and currently in excess of 55% of the total number of salmon and grilse caught by rod and line are released after capture.

2 Status of Stocks

Abundance

2.1. Data available from investigations undertaken by FRS, DSFBs, and Fisheries Trusts and Foundations suggest that for the majority of the salmon rivers in Scotland (364 of the 383 identified salmon rivers), juvenile salmon production remains healthy. However, comparing the number of adult salmon returning to home waters with estimates of smolt production from two monitored sites, the North Esk and the Girnock Burn (a tributary of the River Dee in Aberdeenshire), suggests that the marine survival of salmon has declined substantially over the period since 1952, when salmon catch statistics were first collected.

[8] http://www.frs-scotland.gov.uk/Delivery/Information_resources/information_resources_view_document.aspx?resourceId=23692&documentId=2217

[9] http://www.scotland.gov.uk/Publications/2007/09/13103142/0

2.2. This decrease in marine survival has led to lower numbers of salmon returning to the Scottish coast. Estimated pre-fisheries abundance (pfa) figures for spring salmon and for summer salmon and grilse are shown at Annex C. The absolute values are dependent upon estimates of exploitation rate in the rod fishery, but irrespective of those rates, the patterns will remain broadly similar. The pfa estimates indicate the numbers of fish returning to Scottish home water have been declining over the last two decades. This is in agreement with the declines in marine survival described in paragraph 2.1. above.

2.3. Although this has undoubtedly had an impact on salmon catches in the net fisheries, particularly those located on the coast, the substantial reductions in netting effort, both in fixed engine and net and coble fisheries (around 90%), have allowed a greater proportion of returning salmon to enter rivers (see paragraphs 1.32 & 1.38). As a result, there has been a relatively stable number of fish available both for the rod fisheries and, assuming stable rod exploitation over time, as spawning escapement. However, the long-term decline in the total rod catch of early-running MSW salmon suggests that the populations associated with this stock component may be particularly vulnerable (see Annex C).

Diversity

2.4. Scottish fisheries exploit a wide range of salmon types that can be categorised according to the time of year at which they enter rivers. The range extends from early-running (or spring) MSW salmon at the beginning of the year to late running grilse which become available for exploitation just prior to the start of the spawning season near the end of the year. Based on this run-timing diversity, sustainable fisheries operate in Scotland for 11 months of the year.

2.5. Investigations by FRS continue to provide information how this diversity is maintained. To briefly summarise the current understanding of the emerging population paradigm:-

a) most stocks in the larger rivers, and in some smaller rivers, consist of a number of somewhat discrete populations
b) run-timing is heritable and varies among populations
c) there is a link between run-timing and spatial location at spawning
d) populations maintain their discreteness through precise homing
e) the abundance and dynamics of populations can vary independently
f) these differences pervade all aspects of salmon biology and management
g) on a national scale, functional independence among populations generates some of the most important issues for management.

Threatened or Endangered Stocks

2.6. Of the 383 identified salmon rivers, 11 are considered to be threatened with loss of salmon (see paragraph 1.5. above). Threats include the results of changes in land use, habitat issues and pollution. In some cases, impacts of aquaculture may have exacerbated the situation. Although fishing mortality is not thought to have been the main cause of the problem in any of the rivers under threat, where the numbers of fish killed by any means including fishing exceed the ability of populations to sustain this, fishing will clearly have contributed to decline in stocks.

3 Threats to Stocks, and Current Management Measures

Fisheries

Illegal Fisheries

3.1. As a result of enforcement of the fisheries legislation by water bailiffs, police and the SFPA, catches taken in illegal fisheries are regarded as likely to be low and unlikely to pose any significant threat to stocks at a national level. However, it is recognised that at a local level, in certain areas, illegal fisheries may have a significant impact on stocks.

Multi Sea-Winter Fisheries

3.2. Nevertheless, there is a concern about the status of populations associated with the early-running MSW salmon stock components in Scottish rivers. Measures such as the voluntary deferment of net fishing until 1 April by members of the Salmon Net Fishing Association of Scotland and the widespread voluntary practice of catch and release in the rod fishery have served to reduce levels of exploitation in the early months of the year. Salmon Conservation Regulations in the Annan and Esk Salmon Fishery Districts introduced in 2005, and extending for a period of five years, have required all anglers to return fish caught by rod and line between the start of the fishing season (February) and 31 May. The Regulations in the Esk district also capped netting effort during the month of May to the average level recorded in the past 10 years. A change to the annual close time in the Esk district prevents fishing by net until 1 May.

Mixed Stock Fisheries

3.3. NASCO has defined a mixed stock fishery (MSF) as a fishery exploiting a significant number of salmon from two or more river stocks. In their advice to NASCO, the International Council for the Exploration of the Seas (ICES) has stated that, 'due to the different status of individual stocks within the stock-complex, mixed stock fisheries present particular threats to stock status'. That threat is recognised.

3.4. All salmon fisheries in Scotland are operated under private heritable titles and all those with a legal right to fish have the ability to do so if they wish. The Scottish Government has no plans to alter those heritable rights at the present time. There remain in Scotland some 30 recreational (Haaf nets) and 50 commercial netting stations (Bag nets) in operation and the fishermen make a positive financial contribution to river management and to the local economy, frequently in the more remote rural areas. Despite great reductions in the last thirty years, mixed stock netting outwith estuarine limits (fixed engine) still accounts for 30% of exploitation (see footnote 8 and Annex B). Reduction in netting exploitation has been a factor in maintaining the relatively stable numbers of returning spawners and rod catches in the face of declining numbers of fish returning to the coast. However, the remaining MSFs, as any other form of exploitation, present a threat to conservation of stocks.

Other fisheries

3.5. Although considerable during the latter part of the 20th century, the effects of high seas fisheries at West Greenland and Faroes have been reduced to virtually negligible levels in recent years. The possible impacts of pelagic fisheries in terms of by-catch of salmon

remain unclear, but may well be much less significant than was initially feared. Closer to home, the closure of the Irish drift-net fishery will further reduce the exploitation of Scottish salmon in fisheries in the open sea. It is likely that some Scottish salmon will still be taken by the remaining drift nets operating off north east England. However, the effort reduction that has been made and the dramatic increase in salmon production in north east England rivers such as the Tyne will have increased the proportion of English salmon in the catches, making it likely that the impacts, which affected mostly the River Tweed with reducing effects further north, have been significantly reduced.

River and estuarine salmon habitats

3.6. River and estuarine conditions in Scotland are mostly good, and improving. For example, principally as a result of improved water quality, largely due to the decline in industries such as ship building and steel production, salmon are returning in increasing numbers to the River Clyde and its tributaries. There are some areas of the country where the freshwater habitat has been compromised, although in almost every case the situation is improving.

Obstructions

3.7 Legislation requiring fish–passage facilities and screening of off-takes at man-made obstructions has been in place since the mid-19th Century. The development of hydro-electricity began in Scotland in the 1930s on the River Dee in Kirkcudbrightshire in south west Scotland. During the 1940s and 1950s, there were further developments in the Highlands, notably in the Tay, Lochy, Beauly, Conon and Shin systems. In each case, the provision of a fish pass and screening arrangements were statutory requirements. The Fisheries Committee, established under the Hydro-Electric Development (Scotland) Act 1943[9], provides advice to the power companies and to the Scottish Ministers on the impacts on fish of power stations driven wholly or principally by water. Any proposed hydro-electric scheme with an installed capacity of more than 1MW must be examined by this Committee. All other dams, including mill dams and hydro-schemes of less than 1MW, are subject to the provisions of the Salmon (Fish Passes and Screens) (Scotland) Regulations 1994[10]. Under current provisions of Controlled Activity Regulations[11] (CAR), licences must be issued by the Scottish Environment Protection Agency (SEPA) for developments which may impact on the aquatic environment.

Flow Regime Change

3.8. Dams may not only cause physical obstruction to salmon movements. Flow regimes may be altered by the storage of water, and each hydro-electricity development has also required the establishment of compensation flow arrangements. In addition, the flooding of spawning and juvenile nursery areas has reduced the productive capacity of some rivers. In some cases, compensation agreements have been reached; in others this may involve the establishment of hatcheries.

[9] http://www.opsi.gov.uk/ACTS/acts1989/ukpga_19890029_en_26
[10] http://www.uk-legislation.hmso.gov.uk/si/si1994/Uksi_19942524_en_1.htm
[11] http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050348.htm

3.9. Not all impoundments are associated with the generation of power. A number of lochs in Scotland have been dammed to form reservoirs for potable water supplies. Fish passes have been required in these cases. As with hydro-electric schemes, there have been concerns about alterations in flow regimes in affected rivers. However, because of the small size of its population, the pressure on Scotland's river systems as sources of potable water is relatively low. So far as major salmon rivers are concerned, the highest levels of abstraction for human consumption are from the upper Tweed and the lower Spey, Dee (Aberdeenshire) and Tay. The effects of flow regime change are also subject to CAR and are closely monitored by both SEPA and the FRS Freshwater Laboratory.

Water Quality

3.10. The agency for monitoring and enforcing water quality Regulations is SEPA. Water quality remains high throughout most of Scotland; 36,500 km of rivers (72% of total length) have been designated under the Fresh Water for Fish Directive (78/659/EEC)[12], of which over 98% comply with mandatory water quality standards.

3.11. The EU Water Framework Directive, implemented in Scottish legislation by the Water Environment and Water Services Act 2003[13], provides an opportunity to take a step forward in the way that environmental problems affecting Scotland's rivers, lochs and coastal waters are tackled. It sets the framework for a holistic approach to planning the protection and improvement of water resources based on natural river basins. This Directive updated and replaced some of the older Community water legislation, including the Fresh Water for Fish Directive, and will provide a framework for the operation of others, such as the Nitrates and Urban Waste Water Treatment Directives. Management plans must be drawn up with co-ordinated programmes of measures designed to ensure good status of both surface and ground waters within a specified timetable. Stakeholders must be involved in the whole process, with comprehensive consultation.

3.12. The most seriously polluted Scottish river systems tend to be in the Forth/Clyde valley where most of the human population and industrial development is concentrated. Widespread improvements in effluent treatment and changes in the structure of Scottish industry have combined to increase water quality in the Forth/Clyde valley. Reduced oxygen levels at head of tide, which threatened smolt and adult survival in the Forth system and effectively excluded salmon from the Clyde and Kelvin, are no longer the problem they were. As a result, the salmon population of the Forth is now more robust than it was in 1980, and the Clyde and Kelvin have increasing salmon populations of their own.

3.13. The Don (north east Scotland), which suffered severely from industrial pollution at head of tide until some 20 years ago, is no longer affected in this way and is again an important salmon river. The Ythan system, also in north east Scotland, is currently suffering from enhanced nitrate levels from agricultural sources. However the river still supports a salmon population and nitrate inputs are being controlled as a requirement of the EEC Nitrate Directive[14].

[12] http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31978L0659&model=guichett
[13] http://www.opsi.gov.uk/legislation/scotland/acts2003/20030003.htm
[14] http://ec.europa.eu/environment/water/water-nitrates/directiv.html

3.14. Pollution in Scottish rivers is being reduced. Between 1980 and 1995, SEPA noted a 41% reduction in river length classified as polluted or seriously polluted and a 47% reduction in polluted estuaries.

3.15. The UK is a signatory to the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (The Gothenburg protocol)[15] and as an EU member state is also bound by The National Emission Ceilings Directive (NECD, 2001/81/EC)[16]. Large scale reductions in emissions have taken place since 1970[17], with further reductions required by 2010. Surface water acidification from airborne sources is a problem in areas of Scotland where the underlying geology provides low buffering capacity. The issue of river acidification is dealt with directly by the EU Water Framework Directive (see paragraph 3.11 above).

3.16 Many such areas are also favoured for the planting of conifer forests. Mature conifers are effective collectors of airborne acidifying pollutants and therefore have the potential to increase surface water acidification in sensitive catchments. Salmonids are particularly affected by increasing acidity (declining pH) and associated increases in the levels of toxic forms of aluminium. The Forest and Water Guidelines include consideration of acidification problems such that the Forestry Commission should take into account the local acid status using critical load maps. Critical load maps indicate where atmospheric deposition is likely to exceed the capacity of soils to buffer acidity. The forest and water guidelines[18] provide a decision framework for forestry activities based on critical loads maps.

3.17. The Scottish Government continues to assess recovery from acidification through support of the UK Acid Water Monitoring Network and Fisheries Research Services' long-term environmental monitoring work[19]. Monitoring of surface water acidity by the FRS Freshwater Laboratory has shown a fourfold reduction in non-marine sulphate deposition in south west Scotland (one of the principal areas affected by surface water acidification) with accompanying improvements both in surface water acidity and salmonid survival. FRS has shown recovery of fish populations in some heavily acidified catchments[20], however, "acid episodes" associated with high flow conditions continue to limit recovery. No major East Coast salmon river in Scotland is seriously compromised by surface water acidity but parts of the upper Spey and Dee (Aberdeenshire) and Forth systems are affected as are a number of rivers in Arran and south west Scotland, including the Cree, Bladnoch and Fleet, .

Land use

3.18. The productive capacity of rivers supporting salmonid and other freshwater fish may be affected by such activities as agriculture, forestry, and estate management. The types of problem that may be experienced include point pollution, diffuse pollution, erosion and siltation. Nevertheless, remarkable progress has been made in recent years, particularly as a

[15] http://www.unece.org/env/eb/welcome.html
[16] http://www.defra.gov.uk/environment/airquality/eu-int/eu-directives/ceiling/pdf/necd-nationalprog2007.pdf
[17] http://www.defra.gov.uk/news/2007/070329a.htm
[18] http://www.forestresearch.gov.uk/pdf/fcgl002.pdf/$FILE/fcgl002.pdf
[19] Data collected from sites on these networks also contributes to UNECE International Cooperative Programmes (ICP) on waters, which is responsible for Assessment and Monitoring of Acidification of Rivers and Lakes. Data from Lochnagar, Loch Coire Fionnaraich, Round Loch of Glenhead and Allt a'Mharcaidh are provided from Scotland to the working group.
[20] http://www.frs-scotland.gov.uk/Delivery/Information_resources/information_resources_view_document.aspx?resourceId=23700&documentId=1856

result of introducing practices such the use of buffer strips beside water courses; set-aside land (land taken out of agricultural use); planting of native, broad-leaved trees beside water courses; and fencing stream banks to limit access by livestock. In some upland areas, damage to fragile land in river valleys and to riverbanks may still occur as a result of the numbers of sheep and deer present.

Transport

3.19. There is a clear need for good road and rail systems throughout any country. Scotland has over 50,000km of rivers and more than 30,000 lochs and ponds. Roads and railways must cross these watercourses. Problems associated with roads and railways include pollution as a result of run-off from hard surfaces and the possible obstruction of fish passage at badly designed culverts and bridge aprons. This has been addressed in Scotland by the publication by the Scottish Executive Development Department in 2000 of 'River Crossings and Migratory Fish: Design Guidance'[21]. This guidance was produced to emphasise to engineers the need to take the requirements of fish into account when designing bridges and culverts, and to describe methods to facilitate fish passage at river crossings.

3.20. A number of other codes have been produced by local fishery management organisations for their particular areas – notably in the Tweed and Spey catchments.

Impacts of aquaculture

3.21. In many areas of Scotland, the only index of stock abundance available is that provided by catch statistics. In many rivers in the areas of Scotland where fish farming takes place, catches and stocks of both salmon and sea trout have declined in the past two decades. However, in general the overall decline started before the salmon farming industry developed. Nevertheless, it is likely that impacts of aquaculture, and most probably the effects of sea lice and escapes of farmed fish, have contributed to the decline in stocks, and may have slowed recovery of stocks in some rivers.

3.22. The importance of recreational fisheries and fish farming to the Scottish rural economy is well recognised[22] . Therefore the Scottish Government sponsors the Tripartite Working Group (TWG) see Paragraphs 4.27 & 4.28 below) to facilitate co-operation between wild salmonid fisheries and aquaculture interests to ensure they work together to develop a healthy sustainable future for both sectors of the Scottish salmon industry. The TWG helps to facilitate this nationally and locally, in order to ensure that healthy stocks of wild fish and farmed fish are maintained through reducing parasites, disease and escapes of farmed salmon. In addition, the Scottish Salmon Producers Organisation has developed a Code of Good Practice (COGP) which includes measures to control sea lice and prevent escapes. Progress has been made in reducing levels of sea lice infestation through the Area Management Process developed by the TWG. This is necessarily an ongoing process which is being addressed by increasing the coverage of the TWG and adoption of the industry's CoGP. However, levels of escapes of Atlantic salmon from fish farms in Scotland remain a significant source of concern. The Scottish Government reported the escape of a total of 154, 466[23] Atlantic salmon in 2007, of which 147,966 were reported to have escaped from SSPO

[21] http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp

[22] http://www.scotland.gov.uk/Resource/Doc/47034/0014768.pdf & http://www.scotland.gov.uk/Resource/Doc/197981/0052912.pdf

[23] http://www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18692/2007escapes

Member companies[24].The Scottish Government has developed a regulatory capability under the 2007 Act to provide a legal back-stop (see paragraphs 4.30 & 4.31 below) to address aquaculture issues, including impacts from sea lice and escapes, should the voluntary processes of the TWG and the CoGP fail.

Other Influences

Predation

3.23. In a number of salmon fishery districts, predation by birds and mammals (particularly seals) has been identified as a cause for concern. Where a case can be made that serious damage to fisheries is occurring, or evidence indicates that it will occur if no action is taken, licences to shoot birds or seals may be issued. In the case of piscivorous birds, licences are issued under the Provisions of the Wildlife and Countryside Act 1981[25], to shoot as an aid to scaring to provide point defence to salmon at particularly vulnerable times in their life cycle, and at places where they are particularly vulnerable. Licences to shoot seals are issued, under the provisions of the Conservation of Seals Act 1970[26], to allow for the removal of seals that are causing damage. No licence is issued to permit culling of predators for the purpose of population control.

3.24. When an application for a licence is received, the Scottish Government consults FRS and Scottish Natural Heritage (SNH) on the merits of the case. Where an application is for a licence to shoot seals, the Sea Mammals Research Unit (SMRU) is also consulted, and where an application for a licence to shoot birds is received, the Scottish Agricultural Science Agency (SASA) is consulted.

Non-Native Species

3.25. Invasive non-native species may also impact on fish and fisheries. Mink that escaped from fur farms during the 1960s, before the industry closed, are known to predate on juvenile and spawning adult salmon and kelts in some areas. An increasing problem is the spread of North American Signal Crayfish in Scottish rivers. These crayfish have been introduced unlawfully to a number of Scottish rivers and, in addition to predating on juvenile salmon and competing with them for food and space, cause significant damage to river banks and river beds. The keeping or release of non-native crayfish species and specified fish species is prohibited under an Order (see paragraph 4.41 below) made under the Importation of Live Fish Act 1978.

Gyrodactylus salaris (Gs)

3.26. *Gyrodactylus salaris* (Gs) is not present in the UK. The consequences for salmon stocks if Gs was to be introduced into Scotland could be considerable. Part 2 of the 2007 Act makes provisions for dealing with Gs should it ever be introduced to Scotland. Provisions include powers to designate areas for the purposes of regulating the movement of fish, eggs of fish, foodstuffs and equipment. The Act also allows Scottish Ministers to arrange for the creation of barriers to the movement of fish to aid treatment, to treat waters with appropriate chemicals,

[24] http://www.scottishsalmon.co.uk/environment/interests.asp
[25] http://www.jncc.gov.uk/page-3614
[26] http://www.pinnipeds.org/COS1970.htm

to clear fish farms and, under certain circumstances, to make compensation payments. All provisions must be exercised taking account of other relevant EU and domestic legislation. A Working Group was established in 2005 to address the threat of Gs (see paragraph 4.38 below).

Marine Survival

3.27. Monitoring in rivers around the North Atlantic over the last thirty years has confirmed that there has been a significant decline in overall marine survival, particularly for southern European and North American stocks. Major restrictions on exploitation of salmon have been introduced but, to date, the salmon stocks have not responded. Lack of understanding of the factors affecting survival of salmon at sea is the key obstacle to rational management of the Atlantic salmon and to the ability to rebuild stocks. The NASCO SALSEA programme[27] seeks to draw together intellectual and scientific resources in a concerted cooperative effort to identify the factors influencing mortality of salmon at sea and the opportunities to counteract them. The Atlantic Salmon Trust's (AST) research project 'Salmon at Sea' will also contribute to a greater understanding of marine survival as will the work being conducted by the University of St Andrews at Strathy Point where a decommissioned netting station is now being used to monitor salmon at the first point of arrival at the Scottish Coast (see paragraph 4.4 below).

4 Future Management Approach - The Implementation Plan

4.1. The Implementation Plan involves principally a continuation of the many programmes already in place, with extensions as new national and local initiatives come on line. The following provides information on how and where such programmes are in operation and developing. Rational management must be based on sound scientific principles. The necessary data collection and analyses are provided by FRS, RAFTS and DSFB biologists, as well as the numerous research projects sponsored by the AST, including their substantial contribution towards funding 'Salmon at Sea' (see paragraph 3.27 above)

Management of Fisheries

Decision Structure to aid in determining fishing controls

4.2. The **NASCO Decision Structure** approach was first used in Scotland in consideration of applications to Scottish Ministers for Salmon Conservation Regulations to restrict fishing for salmon during the early months of the year in the Esk and the Annan Salmon Fishery Districts. Scottish Statutory Instruments were made, one extending the annual close time in the Esk district so that the net fishery could not start until 1 May[28] and another capping netting effort in that district until 31 May and requiring mandatory catch and release and the use of barbless hooks in the rod fishery until 31 May[29]. In the case of the Annan District, an Instrument was made requiring mandatory catch and release in the rod fishery until 31 May[30].

[27] http://www.nasco.int/sas/salsea.htm
[28] http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050072.htm
[29] http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050024.htm.
[30] http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050037.htm

4.3. The Esk and Annan Instruments came into force in 2005 and will remain in force for a period of five years. Ongoing monitoring is being undertaken to determine whether the Instruments should be renewed, either as they are or amended, or allowed to fall at their expiry date.

Action 1 – Scottish Government to review annually to assess need for renewal at expiry date

4.4. The Decision Structure approach was used to advise the decision made to terminate the lease of the last remaining bag net fishery owned by the Scottish Government. Using an amalgam of historical tagging data, which assisted in identifying rivers likely to be supplying fish to the fishery, and recent catch data from those rivers, it was concluded that large rivers fairly close to the fishery were unlikely to be being seriously impacted upon by the fishery, but that the fishery was likely to be having an adverse impact on a number of small rivers some distance away, where indications are that the stocks are in a poorer state. The Strathy Fishery will be maintained, initially for up to 5 years, in association with salmon management and research interests as a scientific tool. This will result in exploitation rate of this mixed stock fishery being reduced by 90% and will provide specific scientific data which will contribute to the understanding of marine survival of salmon returning to Scottish waters.

Action 2 – Strathy Scientific Steering Group to review and report on scientific progress annually

4.5. The Scottish Government is supportive of the management of stocks on a catchment by catchment basis, using a proportionate precautionary approach (see Action 5 below). Scottish Ministers have Statutory Powers to close mixed stock fisheries through Salmon Conservation Regulations and to alter weekly and annual close times (see paragraph 4.9 below). Where evidence (paragraphs 4.10 & 4.11 below) indicates that conservation measures are necessary to protect stocks from any source of exploitation the Scottish Government will support this policy by:

- Scottish Ministers will take scientific advice from FRS and make Salmon Conservation Regulations as they deem appropriate (see paragraph 4.9, 4.11 and 4.36 below).
- Scottish Ministers will respond to applications from DSFBs for Salmon Conservation Regulations
- Scottish Ministers will support the policy of purchasing mixed stock, fixed engine stations, fisheries on a willing buyer/willing seller basis as a means of reducing exploitation and improving fishery management.
- In addition to their powers to make Conservation Regulations, Scottish Ministers (see paragraph 4.9 below) may also alter close times (both weekly and annual) to restrict exploitation.

Progress with setting Conservation Limits (CLs)

4.6. The process of setting CLs involves deriving a CL from an adult to adult stock recruitment relationship for a data rich site where the essential information exists and transporting this value to data poor catchments, where the required stock and recruitment information is unavailable. The size of the transported CL is adjusted, up or down, on the basis of the relative useable wetted areas of the donor and recipient catchments. Completed

FRS science project ROAME SF0270[31] (completed in March 2007) successfully derived a CL for the North Esk, and transported this CL to a number of catchments using the wetted area model. Compliance of spawning stocks with the CL in recipient rivers was examined but was hindered by uncertainties the estimation of the spawning stock size.

4.7. ROAME SF0275[32] aims to extract wetted areas for all Scottish catchments allowing CLs to be transposed across Scotland by March 2009. The usefulness of the derived catchment CLs will be assessed using independent data. In addition the use of regional specific measures of exploitation rates and close season escapements will be investigated to refine estimates of spawning stock size in recipient rivers.

Action 3 – FRS to report on development and applicability of CLs for Scottish catchments by March 2009

4.8. If meaningful CLs can be established, these will be used to set management targets which are designed to ensure sustainable fisheries and reviewed annually.

Action 4 – Scottish Government to set management targets and review annually as appropriate

4.9. Where evidence demonstrates that intervention is required for the conservation of salmon, fishery managers, including DSFBs, may seek voluntary reductions in fishing mortality and apply to the Scottish Ministers for Salmon Conservation Regulations made under the 2003 Act, such as those made in respect of the Annan and Esk Salmon Fishery Districts. Regulations may include effort limitation, mandatory catch and release and in extreme cases fisheries closure. Where they deem it necessary, Ministers may make such Regulations independently of the fisheries managers. Such regulations will only be made after consultation and will be based on evidence from statutory advisors. In addition, where application has been made by a DSFB, Scottish Ministers may alter the annual close time for the District in question, as well as the period within the close time when angling is permitted. Scottish Ministers may also, after consultation, alter the weekly close time, which applies throughout Scotland, to restrict exploitation.

Action 5 – Scottish Government to introduce Salmon Conservation Regulations or alter close times where Scottish Ministers are advised that these are necessary,

Rod catch as an abundance indicator

4.10. Until useful CLs are available management decisions have to use other measures of abundance. The outcome of detailed investigations by FRS into the use of catch data supports the view that rod catch data are a proxy for freshwater abundance.

4.11. To generalise this approach and to allow local managers to carry out assessments, the following procedures for assessing, and where necessary managing, salmon populations will be implemented. The output of this action will:

a) advise fishery managers on whether precautionary management measures should be considered such as catch and release, and

b) advise the Scottish Ministers as to whether salmon conservation regulations or other effort l imitations may be needed (see paragraph 3.2 above and 5.2 below).

[31] ROAME SF0270 'The use and development of conservation limits in a Scottish context'
[32] ROAME SF0275 'Development of conservation limits for all Scottish salmon catchments'

4.12. A Scottish Statutory Instrument[33] to permit District Salmon Fishery Boards to collect catch statistics for the salmon fisheries within their district came into force on 1 January 2007. In addition to providing quicker returns of catch data to Boards for management purposes, it will assist in assessing unreported catch levels.

4.13. The procedures are based on a fishery district level. The assessments will be carried out on an annual basis by the local management groups (DSFBs and Fisheries Trusts) with catch information supplied by the Scottish Government and FRS. The methodology is shown in Annexes D and E.

Action 6 – DSFBs and Fisheries Trusts to report to Scottish Government on annual assessments of salmon populations and management of exploitation of stocks.

Fisheries Management Plans (FMPs)

4.14. Fisheries Trusts are currently developing Fisheries Management Plans (FMPs) for each of the Trust areas in Scotland. Where there are no Fisheries Trusts in place these plans are being developed by DSFBs. FMPs will cover aspects of management that potentially impact on salmon populations such as assessment of salmon abundance and diversity, fishing mortality, habitat survey and restoration. Much of this work was ongoing, however, the process will be formalised through publication of robust management plans which can be evaluated year on year. These plans are scheduled to be completed by March 2008 and will be reviewed annually.

Action 7 - FMPs to be developed by March 2008 and reviewed annually

Protection and Restoration of Salmon Habitat

4.15. In applying the **Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat**[34], as advocated by NASCO, work continues throughout Scotland to ensure that productive salmon freshwater habitat is maintained or restored. A number of habitat protection and restoration initiatives are in place (see paragraph 4.20 below & Table 2). All of these schemes continue, and their effects are being monitored continuously by biologists of the RAFTS and SFCC.

Action 8 – RAFTS and SFCC to monitor and report on ongoing work annually

4.16. The statutory Fisheries Committee continues to provide advice to Scottish Ministers and developers on the potential impacts of existing and proposed hydro-electricity and wave and tidal energy schemes on fish stocks. The Committee works closely with the SEPA, which is responsible for the issue of Controlled Activity Regulations under the provisions of the Water Environment and Water Services (Scotland) Act 2003[35], in assessing the potential impact on the numerous proposals for renewable energy schemes coming on line. In 2006/07, the Committee examined proposals for 14 new schemes and reviewed operations at 8 existing schemes and provided appropriate advice to SEPA and the Scottish Ministers[36]

Action 9 – Fisheries Committee to review ongoing applications and produce annual reports.

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[33] http://www.opsi.gov.uk/legislation/scotland/ssi2006/20060572.htm

[34] http://www.nasco.int/pdf/nasco_res_habitatpoa.pdf

[35] http://www.opsi.gov.uk/legislation/scotland/acts2003/20030003.htm

[36] http://www.scotland.gov.uk/Resource/Doc/1063/0053748.pdf

4.17. It is important to make a distinction between a Fishery Management Plan (FMP), which is likely to be produced by a DSFB/Trust and focus on fish and fisheries issues, and a Catchment Management Plan (CMP), which will involve a wider range of stakeholders and agencies and will deal with the full complexity of catchment management planning issues.

4.18. Whilst fisheries management planning is in a relatively early stage of development, the SFCC is in the process of developing a standard protocol for the preparation of FMPs and this work is ongoing (Annex F). It is therefore expected that in coming years a much more comprehensive network of FMPs on all major systems in Scotland will be developed within a formal and agreed structure (see paragraph 4.14 above).

4.19. The following catchments are operating to Fisheries/Catchment management plans:

Tweed	
Tay	
South Esk	
Dee	
Deveron	
Spey	
Conon	
Kyle of Sutherland	
West Sutherland –	Hope
	Polla
	Rhiconich
	Inver
	Laxford
	Badna Bay
	Bhadain Daraich
	Duart
	Culag
	Kirkaig
	Garvie
	Keodale Limestone Lochs
Wester Ross -	Kanaird
	Dundonnell
	Balgy
	Ling
	Gruinard
	Ewe
	Broom
	Carron
	Ullapool
Western Isles	Hamnavay
	Creed
	22 low level management plans
Argyll	Upper Loch Fyne Rivers Strategic Plan (Aray/Fyne/Kinglass)
	Loch Awe Strategic Fishery Management Plan
	Rivers Awe and Orchy Management Plan
Solway	Bladnoch SAC Management Plan
	Cree LIFE Rivers project Management Plan

4.20. Throughout Scotland, DSFBs and fishery owners, on the basis of advice received from Fisheries Trusts and Foundations, retained biologists and SEPA, SNH and FRS, have undertaken widespread habitat surveys to establish the status of spawning, nursery and adult holding significant projects to maintain, restore or enhance in-river and bankside habitat for salmon and other fish species. Table 2 provides some examples of where these activities have been put into effect.

4.21. In 2007, FRS produced a guidance document, "Hatchery Work in Support of Salmon Fisheries"[37], to assist fishery owners and managers decide in what circumstances stocking may be appropriate, what methods are available, and what alternatives to stocking may be considered.

4.22. The Tripartite Working Group (TWG) (see paragraphs 4.27 & 4.28 below), reviewed its restoration sub-group in 2007 and published a report[38] setting out a series of recommendations for short and long-term work, to take account of NASCO guidance in accordance with currently available guidance[39]. Restoration guidance notes, including assessment protocols, and proposed restoration pilot projects are scheduled to be published in April 2008. Longer-term strategic restoration programmes will be taken forward by Fisheries Trusts and DSFBs under FMPs and the Strategic Framework for Freshwater Fisheries (paragraphs 4.33 – 4.37 below and 4.14 above, respectively). In addition, several small-scale restoration-related projects are currently underway in the River Carron, the River Ewe and the River Fynne.

Action 10 - TWG and FRS to publish restoration guidance notes by April 2008

4.23. In addition to the work being done on the ground, a number of initiatives to increase awareness of the need for habitat protection and restoration have been established. Programmes such as "Salmon in the Classroom"[40], and its many local derivatives, have been introduced in schools throughout Scotland by the Fisheries Trusts, Foundations and DSFBs. This initiative is supported by SNH.

Action 11 - Fisheries Trusts, Foundations and DSFBs to continue "Salmon in the Classroom" initiative

4.24. In many areas, DSFBs liaise closely with and provide advice to construction companies and road building contractors on the potential impacts of these activities on rivers and the fish they support.

Action 12 – DSFBs to continue to provide advice to construction companies and contractors where activities might impinge on rivers.

4.25. A number of DSFBs throughout Scotland augment natural salmon production by the use of hatcheries, using local wild salmon as broodstock.

Action 13 – DSFBs to augment natural salmon production through use of hatcheries as appropriate.

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[37] http://www.marlab.ac.uk/FRS.Web/Uploads/Documents/SFRR_65.pdf

[38] http://www.tripartiteworkinggroup.com/content.asp?ArticleCode=21

[39] CNL(04)55 – 'NASCO Guidelines on the use of stock rebuilding programmes in the context of the precautionary management of salmon stocks'

CNL(04)57 'NASCO – Guidelines for incorporating social and economic factors in decisions under the precautionary approach'

[40] http://www.snh.org.uk/Salmonintheclassroom/

Management of Aquaculture, Introductions and Transfers

4.26. A work programme continues to make progress, through voluntary initiatives such as the TWG & the aquaculture industry COGP to reduce harmful interactions between farmed and wild fisheries. The Scottish Government actively supports the above initiatives and is currently renewing the Strategic Framework for Scottish Aquaculture (see 4.33 below). However, in the event of these voluntary systems failing, provisions under the 2007 Act give Ministers legal powers to inspect, regulate and control fish farm escapes and sea-lice problems, to ensure Scotland is addressing the provisions of the NASCO **Williamsburg Resolution**[41].

4.27. The TWG[42], comprising representatives of wild salmon fishery interests, the fish farming industry and the Scottish Government has developed a system of Area Management Agreements (AMA) implemented by Area Management Groups (AMG) to address issues such as sea lice monitoring, management and control, containment of farmed fish, and minimisation of disease risks. The TWG has targeted 20 areas for the formation of AMAs. A total of 19 AMGs have been established and, to date, 16 AMAs have been signed. In areas where these Agreements have been implemented, there are signs of improvement in local wild salmon stocks. The reasons for this recovery are complex but the presence of AMAs and the better management of lice by the fish farming industry are thought likely to have contributed to this recovery.

4.28. The TWG Plenary Group consists of members of the Scottish Government, scientists from FRS, the Crown Estate, Highland Council, Highlands and Islands Enterprise, RAFTS, the Scottish Salmon Producers Organisation (SSPO) and the ASFB. The Plenary Group meets twice a year.

Action 14 – TWG Plenary Group to publish minutes of meetings twice a year.

4.29. In January 2007, the SSPO reviewed and published its Code of Good Practice for Scottish Finfish Aquaculture[43]. This Code provides detailed advice on all aspects of fish farming operations, including treatment of sea lice and containment. All members of the Scottish Salmon Producers Organisation, accounting for 95% of the salmon farming industry by production, are bound and certified as complying with the Code. A UKAS approved Lead Certification Body coordinates audits, reporting and remedial action as required. Operators must appoint UKAS approved Inspection Services to carry out audits against the provisions of the Code. The Scottish Salmon Producers Organisation has undertaken to publish annually statistics on compliance with the Code.

4.30. The Aquaculture and Fisheries (Scotland) Act 2007 makes relevant legal powers and provisions available in relation to a number of important areas, including:

- the prevention, control and eradication of parasites on fish farm sites (currently defined as sea lice – both *Caligus elongatus* and *Lepeophtheirus salmonis* species are covered)

- the containment of fish and prevention of escapes of fish from fish farm sites

[41] http://www.nasco.int/pdf/cnl_06_48.pdf
[42] http:www.tripartiteworkinggroup.com
[43] http://www.scottishsalmon.co.uk/aboutus/codes.asp

4.31. With respect to the areas detailed above, the Fish Health Inspectorate at FRS will take on the role of a non-police reporting body and act as the Inspectorate to ensure industry compliance with the 2007 Act. Section 5 of the Act gives inspectors Powers to inspect cages and records, to determine the risk of escape, whether fish have escaped and to assess the measures in place to contain, prevent escape and recover escaped fish. Under such Powers failure to have suitable measures in place to contain fish will be an offence. In such circumstances Section 6 of the Act provides for the serving of an enforcement notice. Failure to comply with an enforcement notice is an offence.

Action 15 – FRS to commence enforcement of the 2007 Act in relation to containment and sea lice control - by August 2008

4.32. The 2007 Act also makes provision for regulating the introduction of fish into inland waters for the purposes of protecting biodiversity. Species that are not native to the waters into which they may be introduced may predate on juvenile salmon or compete with them for food and space. Regulation of their introduction will, therefore, clearly be of benefit to the management of salmon and salmon fisheries. A sub-group of the Scottish Freshwater Fisheries Forum Steering Group is investigating options for dealing with licensing arrangements and monitoring the effectiveness of the system. The aim is to have a suitable system in place by August 2008 (see 4.42 below).

4.33. The Strategic Framework for Scottish Aquaculture[44] was published in 2003 and included 33 Priorities For Action (PFAs). Since then, a further three have been added. The Ministerial Working Group, established to develop the Framework, is planning to renew the document and its priorities for action and launched a three month pre-consultation discussion document in December 2007[45]. Key issues for consideration include:

- Further development of the CoGP (see paragraph 4.29 above) is essential to ensure that it reflects more faithfully problems with containment and that targets are set by the industry to drive improvements in containment which are reflected in any audit process either positively or negatively.
- Consider the development and trialling of genetic marking techniques for freshwater and marine cage fish farming stocks to ensure the origin of escapees can be identified.
- A formal assessment of the potential impact of escapes on salmon SACs to be considered.
- Assess differentials in practice and company policy within companies operating at an international level and establish information transfer mechanisms within and between companies to ensure best available information on good practice is available to the industry at an international level.
- Work to address shortfalls in scientific data/evidence gaps relating to environmental issues, particularly in relation to escapes, impacts on current protected sites/species/habitats and on any future species, habitats or features.

Action 16 – Scottish Government to hold a full public consultation on and to publish a renewed Strategic Framework for Scottish Aquaculture by end 2008

[44] http://www.scotland.gov.uk/Publications/2003/03/16842/20502
[45] http://www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18364/preconlSASet

Actions proposed in the Strategic Framework for Scottish Freshwater Fisheries

4.34. A consultation document[46], A Strategic Framework for Scottish Freshwater Fisheries was published by the Scottish Government on behalf of the Freshwater Fisheries Forum Steering Group in September 2007, with responses required by January 2008.

4.35. The high level objective of the framework is to ensure Scotland will have sustainably managed freshwater fish and fisheries resources that provide significant economic and social benefits for its people. The Framework proposes 27 Priorities for Action (PFAs) to be completed between 2008 and 2011.

4.36. If approved by Stakeholders, many of these relate directly to and will underpin the aim of the Scottish Implementation Plan, namely ***To ensure sustainable fisheries[47] for Atlantic salmon throughout Scotland.*** Whilst not specifically directed at salmon management, the Framework recognises the need to develop an integrated approach to fisheries management for the benefit of all fish species, including Atlantic salmon, using the freshwater environment. In February 2008, The Freshwater Fisheries Steering Group, recognising the threat from mixed stock fisheries, agreed to include a PFA in the Strategic Framework for Scottish Freshwater Fisheries to investigate the impact of fixed stock fisheries in Scotland. It is anticipated that the wording of the PFA will be agreed by March 2008, and a time scale for reporting prepared by April 2008. Details on progress will be given at the 25th annual meeting of NASCO.

Action 17 - Develop and Publish The Strategic Framework for Scottish Freshwater Fisheries, including a PFA on Mixed Stock Fisheries, by May 2008.

4.37. The Scottish Government will continue to chair the Steering Group which will monitor progress. It will publish, on behalf of the Freshwater Fisheries Forum, a revised version of the Priority for Action Tables every six months so that the extent of progress made is visible. The Steering Group will review the overall progress with the strategic framework within 18 months of its launch, and decide whether further indicators of progress are required.

Action 18 - Freshwater Fisheries Steering Group to review PFAs at least annually

Actions to be taken in relation to other influences

Gyrodactylus salaris (Gs)

4.38. A Working Group[48], established in 2005 to examine the threat of the introduction of the parasite *Gyrodactylus salaris* (Gs) to Scotland, published a Contingency Plan in December 2006.[49] The Plan was subjected to a desk-based "test run" in February 2007 and launched nationally and regionally in March 2007, involving local and national press, radio and television. Posters and leaflets have been distributed widely throughout Scotland to fishery managers, angling clubs and associations. The Contingency Plan will be refreshed and published by the Task Force by April 2008. It is hoped that a field trial of the Contingency

[46] http://www.scotland.gov.uk/Publications/2007/09/13103142/0

[47] A sustainable salmon fishery is one where self-sustaining populations consistently provide a harvestable surplus.

[48] http://www.scotland.gov.uk/Topics/Fisheries/Fish-Shellfish/18610/diseases/g-salaris

[49] http://www.scotland.gov.uk/Resource/Doc/1062/0042433.pdf

Plan will be undertaken in 2008/9.

Action 19 – Scottish Government to review and publish updated Gs Contingency Plan by April 2008.

Predation

4.39. Applications from fishery managers for licences to control piscivorous birds[50] and mammals[51] are dealt with on an ongoing basis. Each application is judged on its merits with advice being sought from FRS, SNH, SMRU and SASA as appropriate. The policy approach is to provide point protection to prevent serious damage to fisheries, not to kill predators at a level which will impact on their populations.

Action 20 - Scottish Government to review, and where appropriate approve, applications to protect fisheries from serious impacts due to predation.

4.40. A recent initiative to improve management of piscivorous predators has been the development of The Moray Firth Seal Management Plan. This pilot addresses interactions between seals and salmon fisheries within a regulatory framework in one local area. It involves a more co-ordinated approach to seal management within a conservation context, in close association with research and data collection on seal/salmon interactions.

Action 21 – The Moray Firth Seal Management Plan Working Group to review annually and publish findings of Pilot by end of 2008

Invasive non-native species

4.41. The Prohibition of Keeping or Release of Live Fish (Specified Species) Order 2003 made under the provisions of the Import of Live Fish (Scotland) Act 1998 prohibits the keeping or release of, amongst other species, North American Signal Crayfish except with the authority of the Scottish Ministers. No permissions have been granted except to research organisations, or to persons involved in eradication programmes to provide cover until the animals are destroyed. A number of schemes to eradicate or, where this is not possible, control crayfish are in place throughout Scotland. Each application for a licence to keep or release any of the specified species is dealt with on its merits and on the basis of advice from FRS and SNH.

Action 22 – Scottish Government to review applications to keep or release non-native species on an ongoing basis.

4.42. In addition, Section 35 of the 2007 Act provides provisions for the regulation of introductions of freshwater fish into inland Scottish waters. This provision is intended principally for the protection of biodiversity. The regulations will protect against the introduction of non-native fish species and non-native plant and crustacean passengers in consignments of fish as well as any undesirable movement of salmon genetic stock from one catchment to another. Section 35 of the 2007 comes into force on 1 August 2008.

Action 23 – Scottish Government to introduce licensing system by August 2008

[50] Wildlife and Countryside Act 1981

[51] Conservation of Seals Act 1970

5 Evaluation

5.1. The work programmes established by Fisheries Trusts, Foundations and DSFBs include monitoring and evaluation systems to assess the efficacy of the activities undertaken. Data collected by Trusts and Boards are collated by the SFCC. These data relate to specific sampling sites that are being used to build up time series of data on fish abundance, distribution and diversity, and habitat status. The development of FMPs by Fisheries Trusts and DSFBs, as described in paragraph 4.14 above, will include monitoring and evaluation procedures (see Action 7).

5.2. If the development work on CLs has progressed sufficiently to enable them to be applied with confidence, they will be used in association with catch data and other indices of abundance to assess the status of salmon populations. Data from traps operated by FRS[52] and fish counters operated by FRS and Scottish and Southern Energy[53] provide ongoing fishery-independent time series of times and abundance of adult salmon migrations. A wild smolt tagging programme has been in operation on the North Esk since 1964 and can be used as a tool to monitor broad trends in marine survival. Routine and comprehensive surveys of juvenile salmon distribution and abundance are undertaken by FRS and by Fisheries Trust biologists throughout Scotland. All of these data sources, together with catch statistics, may be used to assess salmon stock status until, and after, CLs have been established.

5.3. Salmon and sea trout catch statistics have been collected annually from all identifiable fisheries since 1952. As noted above, FRS are developing models to use these data, in conjunction with data on juvenile abundance and growth, to provide more detailed fishery management plans.

Action 24 – FRS to collate and publish catch statistics on an annual basis.

5.4. The work of the TWG continues to deliver significant benefits to Atlantic salmon stocks, by reducing the risks of disease, parasites and escapes from farmed salmon, in the rivers of the north west Highlands, Islands and the Outer Hebrides. The programme will enter its next three-year phase in April 2008. Area Management Agreements have been signed in sixteen of the identified target areas. Work continues on developing the AMA process for the remaining areas[54].

Action 25 – The TWG to develop and agree remaining Area Management Agreements by 2010

[52] Four fixed-traps are operated by the FRS at Girnock Burn (River Dee), Baddoch Burn (River Dee), River North Esk (main stem) & Shieldaig Burn. Three fixed counters are operated by the FRS at River North Esk (main stem), River North Esk (Westwater tributary) & the River Helmsdale (in association with the Helmsdale District Salmon Fishery Board.

[53] Scottish and Southern Energy operate counters on the River Tay system at Pitlochry, Clunie, Stronuich (Lyon) and Lochay (Lochay), the River Spey - Truim (about to be installed), the River Ness system - Dundreggan (R. Moriston), Garry dam (River Garry), the River Beauly system - Aigas and Kilmorack, Beannachran (River Farrar), the River Conon system - Tor Achilty, Meig and Luichart, the Rver Cassley - Duchally diversion weir , the River Shin - Shin diversion dam, the River Lochy - Mucomir cut, the River Morar - Morar Power Station - now operated by the local Fisheries Trust and the River Awe - Awe Barrage

[54] Development work continues to sign TWG AMAs in The Uists (the Outer Hebrides), Enard Bay (West Sutherland), The 2 Brooms (West Sutherland), Loch Ailort (Lochaber), Sound of Jura (Argyll) and Arran (Argyll and Bute).

5.5. In addition, there are currently two strategic studies, funded by the Scottish Government, underway to examine the wider benefits of the TWG Programme. Both will report in 2008.

CR/2007/26 'STRATEGIC SEA LICE TREATMENTS: IMPLEMENTATION AND IMPACT WITHIN SCOTTISH TRIPARTITE WORKING GROUP AREA MANAGEMENT AGREEMENTS' - Department of Computer and Information Sciences (and Comparative Epidemiology and Informatics) University of Strathclyde

Action 26 – University of Strathclyde to report by October 2008

CR/2007/22 'RESEARCH INTO THE COSTS AND BENEFITS OF TRIPARTITE WORKING GROUP (TWG) AREA MANAGEMENT AGREEMENTS (AMAs)' - Homarus Ltd, Fisheries and Aquaculture Specialists

Action 27 – Homarus Ltd to report by May 2008

Scottish Government
Marine Directorate
February 2008

Table 1. Summary of Action Points

Action	Timetable
1. In the Esk and Annan Districts, Instruments were made requiring mandatory catch and release in the rod fishery until 31 May. In addition, in the Esk District, Instruments were made to extend the annual close time until 30 April and to cap netting effort until 31 May.	**Scottish Government to review annually to assess need for renewal at expiry date**
2. The Strathy Fishery will be maintained, initially for up to 5 years, in association with salmon management and research interests as a scientific tool to monitor stocks returning to Scottish water.	**Strathy Scientific Steering Group to review and report on scientific progress annually**
3. ROAME SF0275 aims to extract wetted areas for all Scottish catchments allowing Conservation Limits (CLs) to be transported across Scotland by March 2009.	**FRS to report on development and applicability of CLs for Scottish catchments by March 2009**
4. Once meaningful CLs are established (above), these will be used to set management targets, which are designed to ensure sustainable fisheries and reviewed annually.	**Scottish Government to set management targets and review annually as appropriate**
5. Where it is recognised, relative to these management targets that intervention is required for the conservation of salmon, fishery managers may seek voluntary reductions in fishing mortality or if necessary apply to the Scottish Ministers for Salmon Conservation Regulations made under the 2003 Act. Scottish Ministers may change annual or weekly close times where necessary for conservation purposes.	**FRS, Fisheries managers and ASFB to report/request, over the 5 year duration of the plan, on the need for the Scottish Government to consider introducing Salmon Conservation Regulations. Where Scottish Ministers deem necessary, implement Conservation Regulations in the next 5 years.**
6. Until CLs are available management decisions have to use other measures of abundance. The outcome of detailed investigations by FRS into the use of catch data supports the idea that rod catch data are a proxy for freshwater abundance.	**DSFBs and Fisheries Trusts to report on annual assessments of salmon populations and review procedures for management of exploitation of stocks**
7. Rivers and Fisheries Trusts Scotland (RAFTS) are currently developing fisheries management plans for each of the Trust areas throughout Scotland.	**FMPs to be developed by March 2008 and reviewed annually**
8. A number of habitat protection and restoration initiatives are in place	**RAFTS and SFCC to monitor and report on ongoing work annually**
9. The statutory Fisheries Committee	**Fisheries Committee to review ongoing**

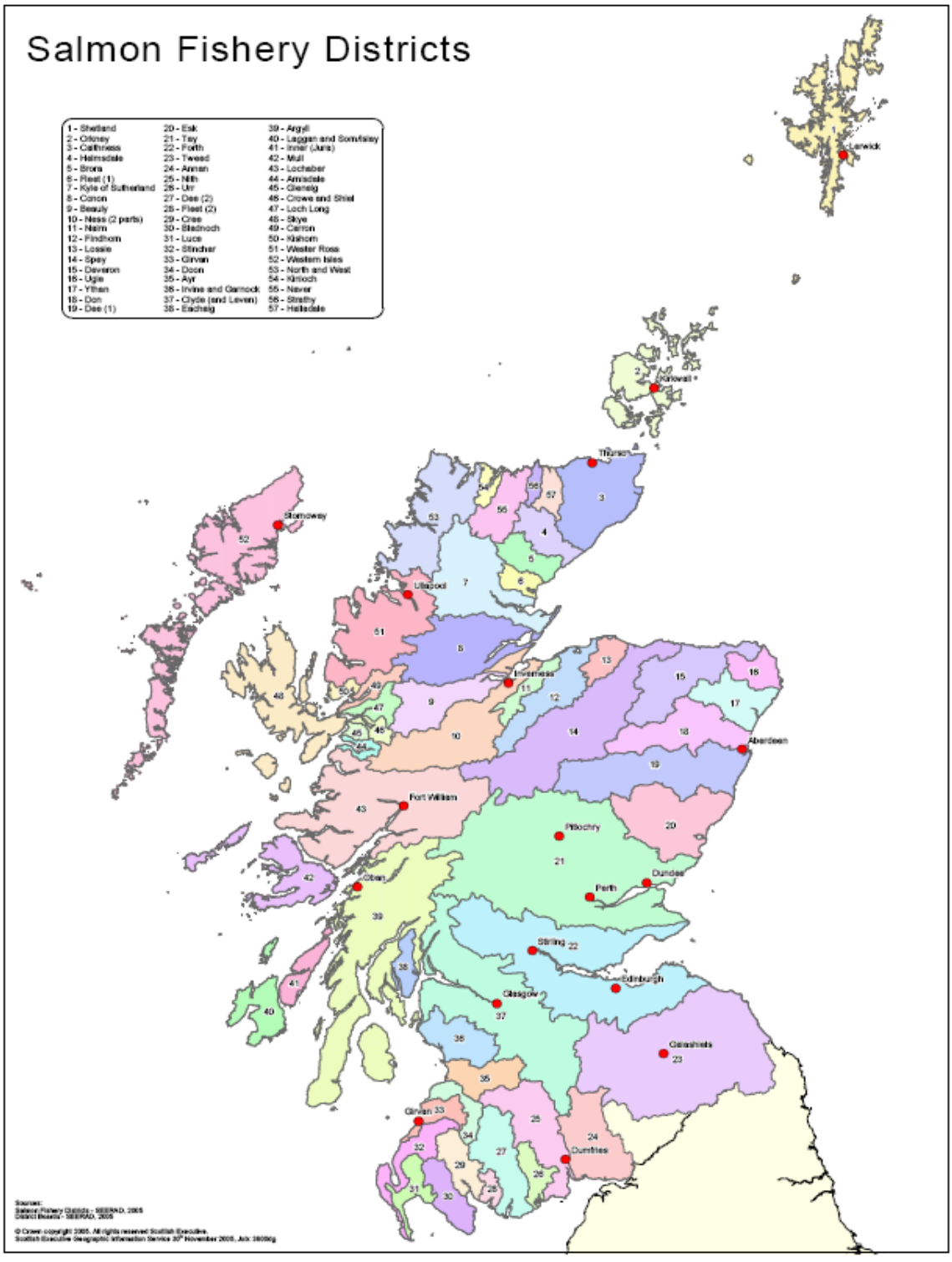
continues to provide advice to Scottish Ministers and developers on the potential impacts of existing and proposed hydro-electricity and wave and tidal energy schemes on fish stocks.	**applications and produce annual reports.**
10. TWG Restoration guidance notes, including assessment protocols, and proposed restoration pilot projects will be prepared.	**TWG and FRS to publish by April 2008**
11. "Salmon in the Classroom", and its many local derivatives, have been introduced in schools throughout Scotland by the Fishery Trusts, Foundations and DSFBs.	**Ongoing commitment**
12. DSFBs to continue to provide advice to construction companies and contractors where activities might impinge on rivers.	**Ongoing commitment**
13. DSFBs to augment natural salmon production through use of hatcheries as appropriate.	**Ongoing commitment**
14. The TWG Plenary Group meets twice a year and reviews policy direction and risk register.	**TWG Plenary Group minutes published twice a year**
15. FRS to commence enforcement of the 2007 Act in relation to containment and sea lice control.	**August 2008**
16. Scottish Government to hold a full public consultation on and to publish a renewed Strategic Framework for Scottish Aquaculture	**By end 2008**
Action 17. . Develop and Publish The Strategic Framework for Scottish Freshwater Fisheries, including a PFA on Mixed Stock Fisheries.	**May 2008**
18. The Steering Group will review the overall progress with the strategic framework within 18 months of its launch, and decide whether further indicators of progress are required.	**Freshwater Fisheries Steering Group to Review PFAs at least annually**
19. Scottish Government to review the Gs Contingency Plan annually, publish updated Plan.	**Publish updated plan by April 2008**
20. Applications from fishery managers for licences to control piscivorous birds and mammals are dealt with on an ongoing basis.	**Scottish Government to review, and where appropriate approve, applications to protect fisheries from serious impacts due to predation.**
21. A recent initiative to improve management of piscivorous predators has been the development of The Moray Firth Seal Management Plan.	**The Moray Firth Seal Management Plan Working Group to review annually and publish findings of Pilot by end of 2008**

22. A number of schemes to eradicate or, where this is not possible, control crayfish, are in place throughout Scotland.	**Scottish Government to review applications to keep or release non-native species on an ongoing basis.**
23. Section 35 of the 2007 Act provides provisions for the regulation of introductions of freshwater fish into inland Scottish waters. This provision is intended principally for the protection of biodiversity.	**Scottish Government to introduce licensing system by August 2008**
24. The development of fisheries management plans by the Fisheries Trusts will include monitoring and evaluation procedures.	**FRS to collate and publish catch statistics on an annual basis. (see Action 7)**
25. Develop and agree remaining TWG Area Management Agreements	**The TWG to develop and agree remaining Area Management Agreements by 2010**
26. CR/2007/26 'STRATEGIC SEA LICE TREATMENTS: IMPLEMENTATION AND IMPACT WITHIN SCOTTISH TRIPARTITE WORKING GROUP AREA MANAGEMENT AGREEMENTS'	**University of Strathclyde to report by October 2008**
27. CR/2007/22 'RESEARCH INTO THE COSTS AND BENEFITS OF TRIPARTITE WORKING GROUP (TWG) AREA MANAGEMENT AGREEMENTS (AMAs)'	**Homarus Ltd to report by May 2008**

Table 2. Examples of habitat management activities currently underway in Scotland.

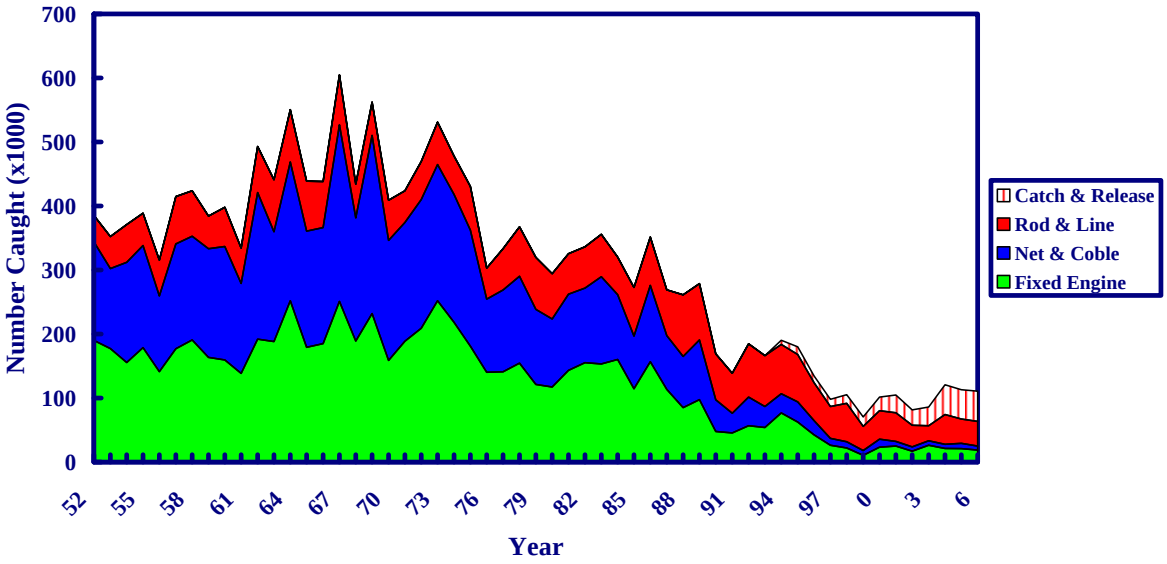
Activity	Salmon Fishery District
Reducing grazing pressure	Findhorn, Tweed, Dee (Aberdeenshire), Nith, Kanaird, Dundonnell, Little Gruinard, Beauly, Conon, Esk
Reducing bank erosion by livestock	Findhorn, Tweed, Dee (Aberdeenshire), Deveron, Nith, Kanaird, Dundonnell, Little Gruinard, Beauly, Conon
Coppicing	Deveron, Dee (Aberdeenshire), Tweed
River bank protection	Halladale, Deveron, Tweed, Nith, Kanaird, Dundonnell, Little Gruinard, Beauly, Conon, Esk
River bed stabilisation (reducing braiding)	Halladale, Tweed, Esk
Land drainage/siltation reduction programmes	Conon
Re-alignment of river to original course	Findhorn
Provision of holding pools for adult salmon	Halladale, Tweed, Esk
Improving in-stream juvenile salmon habitat	Halladale, Dee (Aberdeenshire), Findhorn, Tweed, Conon, Esk
Installation of fish passage facilities	Deveron, Tweed
Removal of dams/man-made obstructions/log jams etc	Deveron, Tweed, Nith, Beauly
River bank buffer strips	Deveron, Dee (Aberdeenshire), Nith, Kanaird, Little Gruinard, Dundonnell, Ewe, Conon
Removal of alien vegetation	Halladale, Tweed, Carron
Removal of alien animals	Tweed, Clyde, Esk, Tay
Restoration of natural riparian woodlands	Tweed, Dee (Aberdeenshire), Findhorn, Nith, Kanaird, Ewe, Beauly, Conon, Lochaber, Esk
Provision of footpaths to reduce bank erosion	Tweed, Dee (Aberdeenshire), Findhorn

ANNEX A


Salmon Fishery Districts
1 - Shetland
2 - Orkney
3 - Caithness
4 - Helmsdale
5 - Brora
6 - Fleet (1)
7 - Kyle of Sutherland
8 - Conon
9 - Beauly
10 - Ness (2 parts)
11 - Nairn
12 - Findhorn
13 - Lossie
14 - Spey
15 - Deveron
16 - Ugie
17 - Ythan
18 - Don
19 - Dee (1)
20 - Esk
21 - Tay
22 - Forth
23 - Tweed
24 - Annan
25 - Nith
26 - Urr
27 - Dee (2)
28 - Fleet (2)
29 - Cree
30 - Bladnoch
31 - Luce
32 - Stinchar
33 - Girvan
34 - Doon
35 - Ayr
36 - Irvine and Garnock
37 - Clyde (and Leven)
38 - Eachaig
39 - Argyll
40 - Laggan and Sornfsley
41 - Inner (Jura)
42 - Mull
43 - Lochaber
44 - Arnisdale
45 - Glenelg
46 - Crowe and Shiel
47 - Loch Long
48 - Skye
49 - Carron
50 - Kishorn
51 - Wester Ross
52 - Western Isles
53 - North and West
54 - Kintioch
55 - Naver
56 - Strathy
57 - Halladale
Lerwick
Kirkwall
Thurso
Stornoway
Ullapool
Inverness
Aberdeen
Fort William
Pitlochry
Oban
Dundee
Perth
Stirling
Edinburgh
Glasgow
Girvan
Dumfries

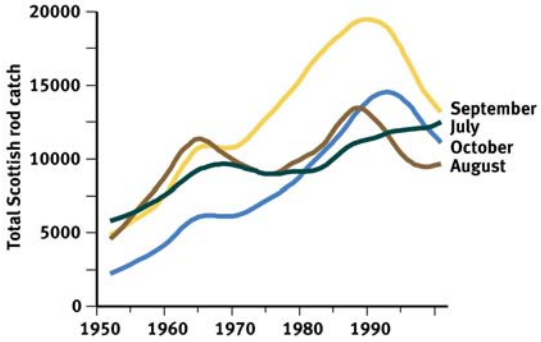
ANNEX B

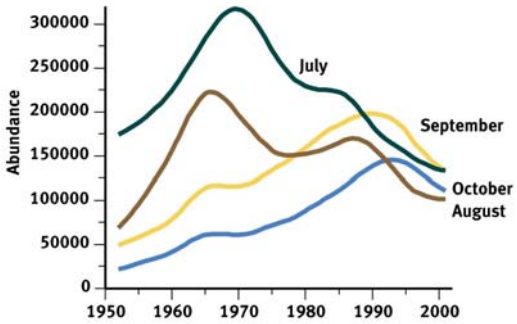
Scottish Salmon and Grilse Catches 1952-2006

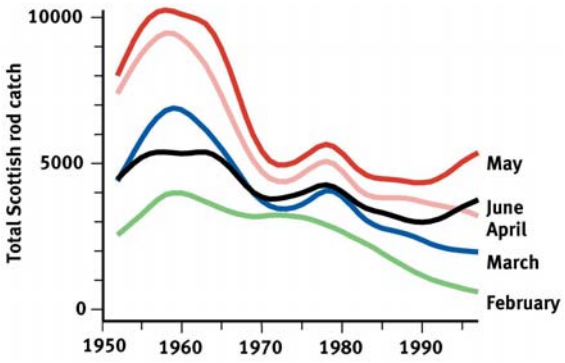


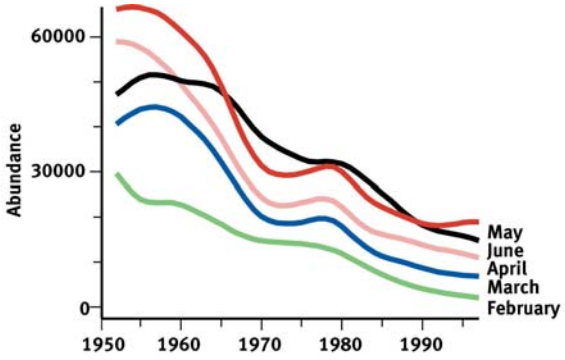
Source: The Scottish Government

ANNEX C – Reported rod catches and estimated pre-fisheries abundance (pfa) figures for spring salmon and for summer salmon and grilse (source: FRS)



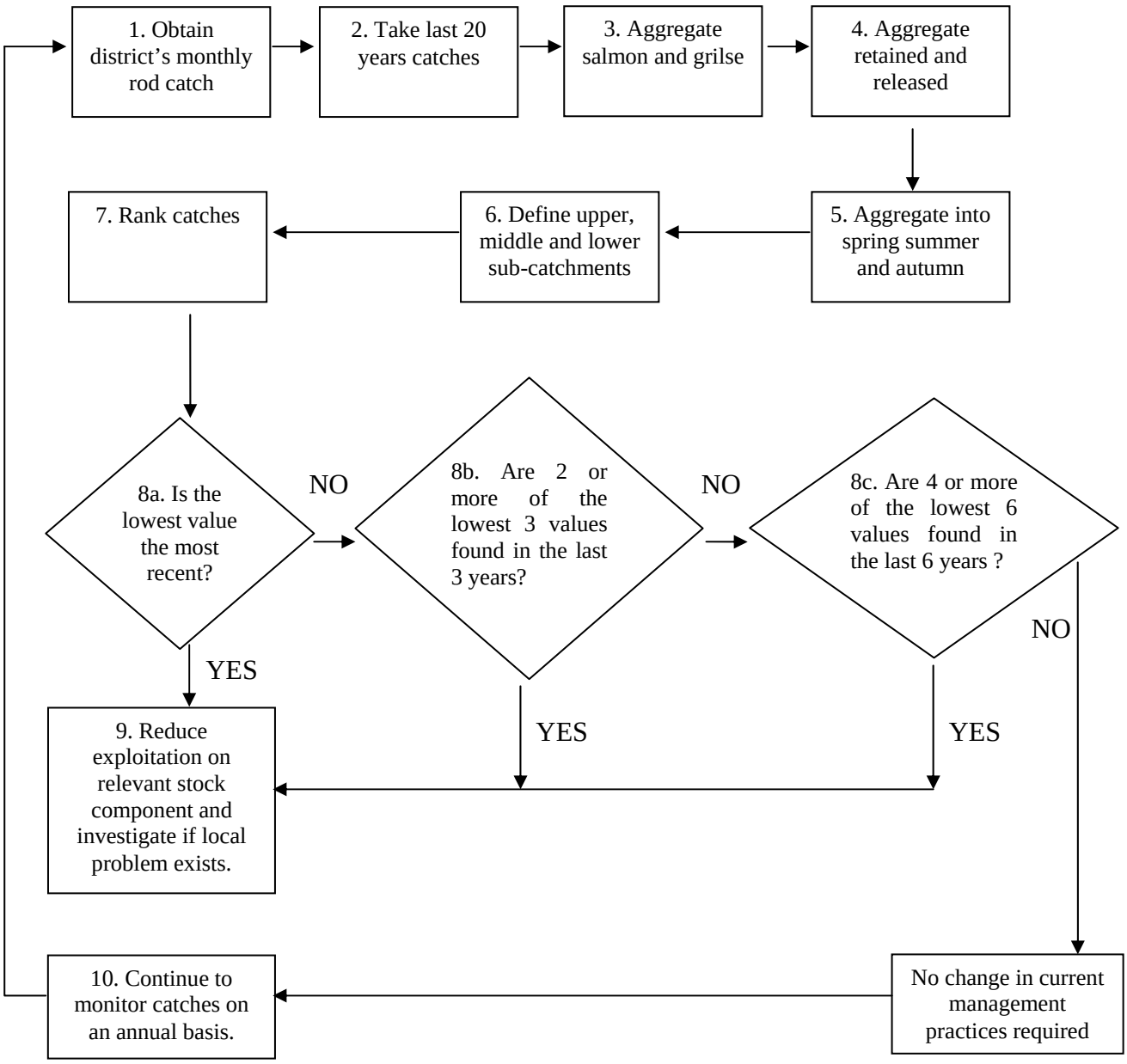






ANNEX D Rod catch as an abundance indicator – methodology

Explanatory notes for this flow diagram are provided in Annex E



ANNEX E – Guidance notes on flow diagram in Annex D

The annual survey, collation and publication of Scottish catches are currently complete in September of the year after the catches were taken. At this time local management groups who have concerns about the status of their local salmon populations may contact Scottish Government Marine Directorate or FRS to obtain district level rod catches. DSFBs and Fisheries Trusts should carry out an assessment as follows:

1. Obtain the monthly reported rod catches for the district containing the catchment of interest

- Historical and current monthly rod catches are readily available for all districts.
- District rod catches provide information about salmon abundance[1].

1. Evidence includes: trends in rod catches within districts; congruence in rod catches between districts and congruence between Girnock trap returns and Dee spring rod catch.

2. Only consider catches over the last 20 years

- Provides baseline for comparisons.
- Excludes catches that may be irrelevant to current situation.
- Allows straightforward analysis (see 8 below).

3. Aggregate salmon and grilse

- Anglers' division of rod catch into salmon and grilse is too inaccurate to use.
- A reliable method for dividing the rod catch into salmon and grilse is currently unavailable[1].

1. Work is underway to develop such a method.

4. Aggregate numbers of rod caught and retained and rod caught and released fish

- The total number of retained and released fish probably provides the most suitable figure for historical comparisons.

5. Aggregate rod catches into spring (Feb-May), summer (Jun-Aug) and autumn (Sep-Nov)[1]

- Classification of the monthly Scottish rod catch trends produces identical groupings.
- Anglers are familiar with these three seasonal groupings.
- Salmon from a single population can return over several months.

1. Aggregate into summer (Jun-Aug) and autumn (Sep-Nov) if no early-running fish.

6. Divide the catchment into upper, middle and lower subcatchments[1]

- Spring, summer and autumn caught fish tend to belong to populations in the upper, middle and lower parts of a catchment, respectively[2].

1. Or middle and lower if not spring-run.
2. Evidence includes radio-tracking studies, transfer experiments, as well as trap and net captures.

7. For each seasonal grouping, rank the catches[1]

- Does not assume a linear relationship between rod catch and abundance[2]
- Allows straightforward analysis (see 8 below).

1. If ranks are tied make the most recent value the lower rank so that analysis is conservative/precautionary.
2. A small drop in catch could indicate a large drop in abundance.

8. For each seasonal grouping, ask the following three questions: 1) Identify the lowest value. Is it also the most recent value over the twenty year period? 2) Identify the lowest three values. Are two or more of these values found in the last three years? 3) Identify the lowest six values. Are four or more of these values found in the last six years?

- Questions constitute simple analysis that can be performed on piece of paper.
- With no trend (or autocorrelation) the probability of answering yes to each of these questions is c. 5, 4.5 and 4%.
- With no trend (or autocorrelation) the probability of answering yes to one or more of these questions is c.11%.[1]

1. The conventional probability level is 5%. A level of 11% is justified by the precautionary principle, i.e., all other things being equal it is better to investigate and find that all is well than not to investigate and later discover the situation is serious.

9. If one or more yes answers take steps to reduce exploitation on the relevant stock component and investigate if there is a specific local problem impacting upon the stock component.

10. Continue to monitor the catches on an annual basis and maintain management action until all questions posed in 8. above are answered “no”.

ANNEX F - SFCC Fish and Fishery Management Plan Framework

The following framework has been developed by the SFCC to provide guidelines for the production of fish and fishery management plans. The framework is intended to be flexible to allow the production of plans for a variety of species and fisheries. The main chapter headings describe the thought process underlying the plan, whilst sub chapters can be added or deleted as necessary.

SFCC Fish and Fishery Management Plan Framework

Abstract/Summary

Introduction

Includes description of fishery management bodies involved in the development and implementation of the plan and the role of SFCC.

Should also describe the management planning process and include flow diagram to show the rationale behind the plan and how the plan will evolve into future phases of planning.

1) Aims and Objectives

¨ Set out the scope, duration and objectives of the plan.

¨ Should describe how it relates to other plans or as part of a larger Integrated Catchment Management Plan.

¨ Other plans likely to be considered are Local Structure Plans, Local Biodiversity Action Plans, NASCO guidelines and any legal designations.

¨ Should describe the area / catchments covered by the plan.

¨ Should set out aims and objectives for all fish species, both commercial and non-commercial.

¨ When developing aims and objectives, issues such as the sustainable development of fish populations and fisheries, prevention of deterioration of present stocks and the preservation of biodiversity and genetic fitness should be considered.

¨ Regard should be given to the precautionary approach.

2) Description of the Fishery and factors affecting it.

Detailed description of fishery, fish stocks, habitats, land use etc.

2.1 Description of catchment

Infrastructure
Geology and Hydrology
Topography
Climate
Water quality

2.2 Catchment use

Present land use
Historical land use

Include: Urban development, location of potential pollution sources, hydro development, forestry, agriculture, SSSI and other designations etc.

2.3 Description of fish stocks by species

Species distribution present and historical may include sub stocks.
Status of stocks: include counter data, juvenile abundance.
Description of habitat: include distribution and suitability of habitat, location of obstructions to migration, location of degraded habitat etc.

2.4 Description of fisheries

Exploitation: include rod catches, net catches and exploitation rates.
Economic value present and historical.

2.5 Fish propagation and hatchery influences present and historical

2.6 Predators and competing species

3) Analysis and evaluation

This section could include discussion of opportunities, bottlenecks and constraints.

3.1 Assessment of stock and fishery performance (may include sub-stocks).

3.2 Limiting factors

3.2.1) Limiting factors in marine phase
3.2.2) Limiting factors in freshwater.

3.3 Opportunities / constraints

3.4 Economic impact of fisheries, future potential consequences of management and or lack of management

Wide range of analytical tools may be used in stock assessment. Improved tools should be sought and applied as the plan is reviewed and updated.

Tools that may be applied include;

Development of conservation plans.
Use of trapping and counter data.
Comparison with a variety of historical data, this may be on catchment, regional or national basis.
Juvenile stock data recent and historical.
Development of models.
The use of quartile analysis over a variety of scales.

An inventory of gaps in knowledge will also help to guide research programmes both locally and nationally.

4) Prescriptions

A detailed list of prescriptions for each sub-catchment and species and stock covered by the plan. Ideally they should be prioritised, timetabled and costed.

These prescriptions are likely to be in tabular form with column headings; issue, action, costing/timetable, funding/lead agency, priority, notes.

The numbered notes can then be presented at the end of the table.

5) Monitoring and review process

This ensures that the plan achieves the objectives detailed in the first section and is also sufficiently flexible to adapt to changing circumstances and new data. This is likely to take place annually or at key milestones in the implementation of the plan.

6) Appendices

Include the survey data on which the plan is based and relevant documents such as NASCO and other guidelines. May document where this data is stored rather than include in the plan.