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Fisheries Management Focus Area Report

European Union -UK (Scotland)

EU-UK (SCOTLAND): FOCUS AREA REPORT ON MANAGEMENT OF SALMON FISHERIES

Introduction

1.1 The Guidelines for the Preparation of NASCO ‘Implementation Plans’ and for Reporting on Progress, NSTF(06)10, adopted by the Council, indicate that reports to Special Sessions will provide an in-depth assessment of actions taken under the focus areas identified. The Council has agreed that the first focus area reports should be on the management of salmon fisheries. A number of technical terms, which may relate specifically to the Scottish salmon fishery, are used throughout the Report. These are defined in the glossary at the end of the report.

Aim

1.2. The most recent version of the EU-UK (Scotland) Implementation Plan was prepared in February 2008. This Report provides an update to that part of the Implementation Plan relating to salmon fisheries management and provides an assessment of:

- the measures in place that address the NASCO agreements relating to fisheries management;
- further actions proposed within the EU-UK (Scotland) Implementation Plan to meet these agreements; and
- progress with implementing these actions.

Scottish Salmon Fisheries

1.3. In Scotland, there is an annual close time of a continuous period of not less than 168 days (153 in the Tweed district). Start and end dates vary slightly between salmon fishery districts, but fishing seasons usually start in early to mid February and end in late August or in the first week of September. In addition to the normal fishing season, there are periods during the annual close time when it is permitted to fish by rod and line. Angling seasons also vary among districts with the earliest starts being in mid-January and the latest finishes being at the end of November. There are also weekly close times. For net fishing this extends from 6pm on Friday until 6 am on the following Monday. No fishing for salmon by rod and line is permitted on Sunday

1.4. Data presented for the NASCO Salmon Rivers Database¹ show that there are 382 rivers across 54 Salmon Fishery Districts (Annex A) supporting salmon populations. Many rivers support multiple populations. Some 30 recreational (Haaf and Poke nets), 32 net and coble stations and 50 coastal netting stations (fixed engine) remain in operation and reported catches in 2006.

1.5. Proprietors and occupiers of salmon fisheries have been required to report their catches since 1952, and these figures are published annually in Statistical

¹ <http://www.nasco.int/asd/summary.asp>

Bulletins published by the Fisheries Research Services (FRS)². Net fisheries also report the amount of effort expended to take their catch and the relevant data are also included in the statistical bulletin.

- The wild 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.
- A total of 18,800, 6,161 and 38,430 wild salmon and grilse were reported caught and retained in the fixed engine, net and coble and rod and line fisheries respectively in 2006.
- A further 47,471 wild salmon and grilse were reported caught and released by the rod fishery.
- The national index of fishing effort for the fixed engine fishery was 338 trap months and for the net and coble fishery was 82 crew months. There is no record of the fishing effort associated with the rod and line fishery nationally. However, the best estimate of salmon angling effort is 467, 106 annual angler days³
- The reported number of spring salmon caught and retained by all methods in 2006 was 3,111, 96% of which were taken by rod and line.
- In 2006, catch and release accounted for 55% of the total rod catch and 66% of the spring rod catch. It is possible that some of these fish may be caught again and so may be included in the catch records more than once. However, very few studies have been completed and their methods may not be directly comparable.
- Fishing effort in both net fisheries declined in 2006 compared to the previous 5-year average, both being the lowest since records began in 1952. Catches in both net fisheries also declined compared to the previous 5-year average.

1.6. River-by-river management is undertaken by District Salmon Fishery Boards (DSFB) where they are in place. There are currently 44 DSFBs established. Net construction and methods of use are regulated by the Salmon (Definition of Methods of Net Fishing and Construction of Nets) (Scotland) Regulations 1992, as amended in 1993 and 1994. Both net and rod fisheries are subject to weekly and annual close times. 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 netsmen's perceptions of the availability of fish. Most net and coble fisheries are limited by the tide to a few hours on either side of low water. In the Solway Firth the number of stake nets is fixed by Statute. In many cases around Scotland, net fisheries have closed as a result of private buy-out initiatives.

1.7. 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 or be required to release a certain proportion of the catch. In

² http://www.frs-scotland.gov.uk/Delivery/Information_resources/information_resources_view_documents.aspx?resourceId=23692

³ <http://www.scotland.gov.uk/Resource/Doc/1062/0042434.pdf>

addition, in 21 salmon fishery districts⁴, Regulations prohibiting certain baits and lures have been made by Statutory Instrument, and failure to comply with these regulations is an offence.

1.8. Where deemed necessary, Salmon Conservation Regulations may be made by the Scottish Ministers to reduce exploitation, such as those introduced in respect of the Annan and Esk salmon fishery districts (see paragraph 4.4. & 4.5. below). Such Regulations may apply to net and/or rod fisheries for salmon.

1.9. 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. The NASCO Decision Structure approach, based on scientific evidence, was used to advise the decision by Scottish Ministers to terminate the lease of the last remaining bag net fishery owned by the Scottish Government (Strathy). A limited and non-commercial research fishery had been proposed for this site to further research into the factors impacting upon marine survival. However, unfortunately this has had to be shelved as a result of unforeseen and unfortunate circumstances. In the interim, data are now being collected from a neighbouring station.

Exploited Stocks and their Relative Abundance Status

2.1. The numbers and weight of wild Salmon exploited by rod & line, net & coble and fixed engine are detailed in Table 1. Netting effort is expressed in trap months for fixed engine and crew months for net and coble.

2.2. A programme is currently being developed to use genetic markers to detail the spatial structuring of salmon within rivers into breeding populations, and to put in place a reference data set to allow salmon caught at fisheries throughout Scotland to be allocated to their rivers of origin. The project is scheduled to provide usable results on more than 50% of the overall Scottish salmon stock by 2011.

2.3. The EU-UK (Scotland) Implementation Plan 2008 aims to provide a structure that will ensure sustainable fisheries for Atlantic salmon throughout Scotland, principally through a continuation of the many programmes already in place, with extensions as new national and local initiatives come on line. One such initiative is the process of setting Conservation Limits (CL). This 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 usable wetted areas of the donor and recipient catchments.

2.4. Completed FRS science project ROAME SF0270⁵ (completed in March 2007) successfully derived a CL for the North Esk, and transported this CL to a number of

⁴ Cree, Dee (Aberdeen), Dee (Kirkcudbright), Deveron, Don, Esk, Findhorn, Forth, Girvan, Kyle of Sutherland, Nairn, Ness, Nith, Spey, Stinchar, Tay, Tweed, Ugie, Ythan. In addition, the Regulations in the former Awe and Ewe districts were revoked and renewed when these districts were abolished and the new Argyll and Wester Ross districts respectively were designated.

⁵ ROAME SF0270 'The use and development of conservation limits in a Scottish context'

catchments using the wetted area model. Compliance of spawning stocks with the CL in recipient rivers was examined but was hindered by uncertainties with the estimation of the spawning stock size.

2.5. ROAME SF0275⁶ 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 against our current best understanding of local stock status across Scotland and against the current national CL used for assessments of the distant water fisheries at the Faroe Isles and West Greenland. CLs for all 109 catchments will be available by March 2009. Compliance assessments will remain preliminary until estimates of spawning stock can be refined. Until then, qualitative validation of such assessments will be made using catch and other data as comparators. Information from local managers will be factored into such assessments.

2.6. If useful CLs can be established, these will be used to set management targets which are designed to ensure sustainable fisheries, and will be reviewed annually. 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 is a reasonable proxy for freshwater abundance (see Annexe B & C).

2.7. The proposed method requires the consideration of catches over several years, which should accommodate inter-annual variation in non-fisheries effort related factors e.g. changes in river conditions. Analysis has shown that whilst the catch returns used are those reported by anglers, the data collected since 1952 show remarkable coherence between districts over the years. It is likely therefore that they provide an accurate record. It is an offence to falsify catch returns. In addition, the situation should become clearer as DSFBs begin to use their legal power⁷ to collect their own catch statistics. This will provide the means for greater scrutiny and strengthening of devolved fisheries management.

2.8. Fish counters can also give a very good count of fish passing a particular point on a particular river. However, the data generated requires careful validation because many of the counters were originally sited to demonstrate that fish could move through fish passes in hydroelectric generating dams, not as means of collecting data on fish numbers per se.

Stock Diversity Criteria

3.1. Investigations by FRS continue to provide information on how stock diversity can be maintained. To 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

⁶ ROAME SF0275 'Development of conservation limits for all Scottish salmon catchments'

⁷ <http://www.opsi.gov.uk/legislation/scotland/ssi2006/20060572.htm>

- 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 on a national scale, functional independence among populations generates some of the most important issues for management.

3.2. Fisheries Trusts are currently developing Fisheries Management Plans⁸ (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 the management of Atlantic salmon stocks, including population diversity identified by genetic testing, and other fish species. Much of this work is ongoing and the process will be formalised through publication of management plans with measurable targets. It is expected that a comprehensive network of FMPs will be developed for all major catchments in Scotland. The Scottish Government is providing £1.2M in funding to Fisheries Trusts over the next 3 years to enable development and implementation of these FMPs

Mixed Stock Fisheries

4.1. NASCO has defined a mixed stock fishery (MSF) as a fishery exploiting a significant number of salmon from two or more river stocks. Given that definition, in the context of conservation of salmon stocks, a MSF could be defined as one operating outwith estuary limits or one operating within a large estuary where exploitation of stocks from two or more rivers entering the estuary would be possible. Thus, a MSF might be a fixed engine, net and coble or a rod and line fishery depending upon its location. Nevertheless, it is clear that whereas fisheries inside estuary limits may be MSFs, those located outside estuaries are almost certainly MSFs.

4.2. The NASCO definition of MSF does not address issues associated with the impacts of unequal exploitation rates by angling fisheries of different genetic populations within rivers which have different run-timings and associated economic values, with populations with early running subject to much higher fishing pressures. A methodology for assessing unequal within river exploitation of different genetic populations using molecular genetic markers is currently being developed by FRS and an evaluation of its potential will be completed by 2011. This encompasses extending general understanding of within river population structuring and will enhance the ability to more finely regulate exploitation of within river fisheries, altering regulation of angling effort, to meet conservation requirements for individual river stock components.

4.3. Despite great reductions in the last thirty years, mixed stock netting by fixed engine fisheries still accounts for 30% of exploitation (Table 1). 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

⁸ The following catchments are operating to Fisheries/Catchment management plans:

Tweed, Tay, South Esk, Dee, Deveron, Spey, Conon, Hope, Polla, Rhiconich, Inver, Laxford, Badna Bay, Bhadaid Daraich, Duart, Culag, Kirkaig, Garvie, Keodale Limestone Lochs, Kanaird, Dundonnell, Balgy, Ling, Gruinard, Ewe, Broom, Carron, Hamnavay, Creed, Aray, Fyne, Kinglass, Awe, Orchy, Bladnoch & Cree

coast. However, the remaining MSFs, as any other form of exploitation, present a threat to conservation of stocks.

4.4. The **NASCO Decision Structure** approach was first used in Scotland in consideration of applications to Scottish Ministers to restrict fishing for salmon during the early months of the year in the Esk and the Annan Salmon Fishery Districts. This demonstrates the value of management of salmon fisheries being devolved to salmon fishery district level, whereby local managers may apply to the Scottish Ministers when a potential salmon conservation issue is perceived (see paragraph 5.1 below).

4.5. Two Scottish Statutory Instruments were made in relation to the Esk salmon fishery district one extending the annual close time in the Esk district so that the net fishery could not start until 1 May⁹ 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 May¹⁰. For the Annan district, a Scottish Statutory Instrument was made requiring mandatory catch and release until 31 May¹¹. 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.

4.6. 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 (see paragraph 1.9 above).

4.7. The Scottish Government are fully engaged with ongoing work on MSFs being undertaken in England and Wales by the Environment Agency and CEFAS. In addition, a strategy for MSFs, is being developed under the Strategic Framework for Scottish Freshwater Fisheries¹² (see paragraph 7.3 below). This will permit Scottish Ministers to take a pragmatic and proportionate view, in line with the precautionary approach, on the need to make Salmon Conservation Regulations where deemed necessary (see paragraph 5.1. below).

Management Actions to Control Harvest

5.1. The Scottish Government is supportive of the management of stocks on a catchment by catchment basis, using a proportionate precautionary approach. Where evidence 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 either upon application to them or, if necessary under their own hand

⁹ <http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050072.htm>

¹⁰ <http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050024.htm>.

¹¹ <http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050037.htm>

¹² www.scotland.gov.uk/Publications/2008/06/26110733

- Scottish Ministers will support the policy of purchasing mixed stock fisheries on a willing buyer/willing seller basis as a means of reducing exploitation and improving fishery management.

Scottish Ministers have no Statutory Powers to close mixed stock fisheries other than through Salmon Conservation Regulations.

5.2. To generalise this approach and to allow local managers to carry out assessments, the procedures described in Annexes B and C 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 limitations may be needed (see paragraph 2.6 above and 5.3 below).

5.3. These 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.

5.4. A Scottish Statutory Instrument¹³ 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.

5.5. Although not directly addressed at management activities to control harvest, restoration work programmes are in place throughout Scotland involving both stock enhancement and habitat improvement. Most recently, in collaboration with the Scottish Environment Protection Agency (SEPA), the Scottish Government is working on an initiative to help deliver restoration measures to support achievement of Water Framework Directive objectives. This work activity will be reported on in the focus area report on habitat.

5.6. The size of the unreported catch in Scotland, as elsewhere, is difficult, by definition, to ascertain. In the late 1980s, local management groups were approached and asked for their views on the subject. The results of this survey, modified by our best understanding of the situation over the last 15 years, are used to provide a range of likely unreported catch rates which are used in the modelling exercises conducted by the ICES NASWG.

Uncertainties in Assessments

6.1. The management, conservation and exploitation of Scottish salmon stocks are undertaken in accordance with the agreed precautionary approach¹⁴. Where information is uncertain, unreliable or inadequate more caution may be necessary (see below). The absence of adequate scientific information should not be used as a reason

¹³ <http://www.opsi.gov.uk/legislation/scotland/ssi2006/20060572.htm>

¹⁴ http://www.nasco.int/pdf/nasco_res_adoptprec.pdf

for postponing or failing to take conservation and management measures. The Scottish Government is fully supportive of such an approach but is also mindful that any precautionary measures must also be proportionate and justifiable, taking socio-economic factors associated with the operation of fisheries into account.

- a. Uncertainty is incorporated in all assessments, and methods to reduce uncertainty will be pursued. Nevertheless, the most useful data available generally are catch statistics
- b. The diversity of any stock is taken into account in all management considerations, e.g. the protection of early-running salmon afforded by the Annan and Esk Salmon Conservation Regulations .
- c. Selectivity of fisheries on different stock components is addressed through the different run timing characteristics of different stock components, e.g. voluntary deferment of net fishing until 1 April and enhanced rates of catch and release in the spring months to protect early-running MSW salmon.
- d. Non-fishery factors affecting Scottish salmon stocks are addressed in the implementation plan and will be kept under continued review.
- e. The possible impacts of pelagic fisheries (such as the herring and mackerel fisheries in the Norwegian Sea) in terms of by-catch of salmon remain unclear, but may well be much less significant than was initially feared. 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.

Expected Extent and Timescales of Effects

7.1. The EU UK (Scotland) Implementation Plan sets out the current fisheries management structures for Atlantic salmon in place in Scotland in 2008 and sets out a timetable for future development of fisheries management practices. The Plan covers the period until 2012, but is subject to continuous review as new methodologies and resources become available.

7.2. The Esk and Annan Instruments (see paragraph 4.4. & 4.5. above) 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. These measures were implemented specifically to protect early-running Multi Sea-Wintered salmon in these districts.

7.3. A strategy for MSFs, is being developed under the Strategic Framework for Scottish Freshwater Fisheries¹⁵. All aspects of mixed stock fishing, including its impact on management and conservation, will be reviewed, taking advice from FRS and other scientists. This will consider international trends, guide lines and obligations as well as the financial issues concerning Mixed Stock Fishing. The project, which will commence in the summer of 2008 will culminate in a strategy report with associated timescales to be published by the end of 2009.

¹⁵ www.scotland.gov.uk/Publications/2008/06/26110733

7.4. Work by the FRS continues to extract wetted areas for all Scottish catchments allowing Conservation Limits to be transposed across Scotland by March 2009 (see paragraphs 2.3. to 2.6.). The usefulness of the derived catchment CLs will be assessed using independent data. If meaningful CLs can be established, these will be used to set management targets which are designed to ensure sustainable fisheries and reviewed annually.

Socio-economic Factors

8.1. The guidelines¹⁶ for incorporating social and economic factors in decisions under the precautionary approach are used to inform decision making in the management, conservation and exploitation of Scottish salmon stocks.

8.2 The importance, particularly, of salmon angling to Scotland, and especially in rural areas, is highlighted by the economic evaluations made in assessing the possible impact were *Gyrodactylus salaris* to be introduced to Scotland¹⁷. This study estimated that the capital value of salmon rod fisheries in Scotland was some £550M, there is an annual angler spend of some £61.7M and that were salmon angling to be lost in Scotland, some 1966 full-time job equivalents may be lost.

8.3. The Scottish Government is supportive of the management of harvest of stocks on a catchment by catchment basis, using a proportionate precautionary approach (see paragraphs 5.1. to 5.6. above). However, all salmon fishing rights in Scotland, including in the sea, are private, heritable titles, which may be held separately from any land. The Scottish Government view is that, where there is a sustainable harvestable surplus, all those with a heritable title to fish for salmon should be allowed to do so. However, Scottish Ministers will support buy-out of fisheries, including MSFs, on a willing buyer/willing seller basis, and implement the other measures to protect stocks, described above, where necessary.

Monitoring programmes

9.1. 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, Rivers and Fisheries Trusts Scotland and DSFB biologists are able to provide detailed monitoring, surveillance, and advice on fishery and habitat management at a local level.

9.2. The EU-UK (Scotland) Implementation Plan and the actions for delivery will be kept under continual review to take full account of any emerging scientific or management developments that may have an impact on the Plan.

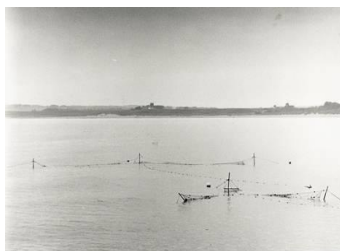
**Scottish Government
Marine Directorate
July 2008**

¹⁶ http://www.nasco.int/pdf/nasco_cn1_04_57.pdf

¹⁷ <http://www.scotland.gov.uk/Resource/Doc/1062/0042434.pdf>

Glossary of terms

Bag net - A bag net consists of two principal parts, the trap and the leader. The trap tapers from the land end through three compartments, cleek, doubling and the fish court where the fish are trapped. Three poles, the head pole and two cleek poles, hold the trap upright and provide some rigidity. The leader is a curtain of netting extending from the entrance of the trap towards the shore and is usually about 60 m in length, 2.5 m deep at the landward end and 3.5 m deep at the seaward end, where it joins the bag. Occasionally, double-headed bag nets are used. In this design, two traps are employed, fixed at right angles to the direction of the leader. The photograph below shows a single bag net in the foreground with a double-headed bag net behind. The minimum mesh size is 90mm knot-to-knot, the minimum twine thickness is 0.9mm, and no monofilament twine may be used.



Bag nets, single bag net in foreground, double-headed net behind

Crew months – A measure of fishing effort derived from the product of the mean number of net and coble crews employed and the number of months fished.

Fixed engines - stationary fishing gears including Bag nets and Stake nets.

Haaf net - The gear consists of a rectangular net hung from a horizontal wooden beam up to 5.5m wide. A central pole is rested on the fisherman's shoulder, and this permits the netsman to stand in the tideway holding the net facing the current with the netting streaming behind him. The net is lifted when a fish strikes the net. It is usual for several netsmen to work together line-abreast. The minimum mesh size is 90mm knot-to-knot, the minimum twine thickness is 0.9mm, and no monofilament twine may be used.



Haaf net

Poke net - Poke nets consist of a series of pockets of net in which the fish are trapped as the tide recedes. They are mounted in lines across the tide on rows of metal pins driven into the mud. The minimum mesh size is 90mm knot-to-knot, the minimum twine thickness is 0.9mm, and no monofilament twine may be used.



Poke nets

Net and coble – A length of netting is paid out from the stern of a small boat (coble) as it is manoeuvred across and down a length of river in a semi-circle. One end of the net is retained on the shore, and gradually pulled downstream under the effective control of the netsmen to meet the coble as it comes ashore on the same bank. The fish are enclosed within the encircling net which is then drawn onto the bank. The net is of variable length and depth and the head rope carries floats, while the ground rope normally carries lead weights. The minimum mesh size is 90mm knot-to-knot, the minimum twine thickness is 0.9mm, and no monofilament twine may be used.

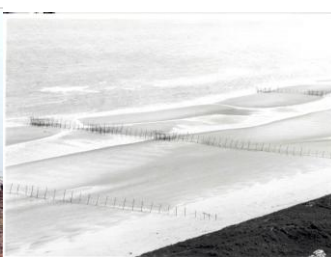


Net and coble

Stake net - Stake nets include fly nets and jumper nets. They are similar in design and operation to bag nets (see below), but, whereas bag nets are fished along rocky coasts, stake nets are fished inter-tidally on beaches, supported by wooden stakes. The traps are usually smaller than those on bag nets. The leader (tiering) of a fly net is held upright by stakes, whilst the leader of a jumper net is held only at the ends to allow it to rise and fall with the tide. The minimum mesh size is 90mm knot-to-knot, the minimum twine thickness is 0.9mm, and no monofilament twine may be used.



Solway stake net



Fly net



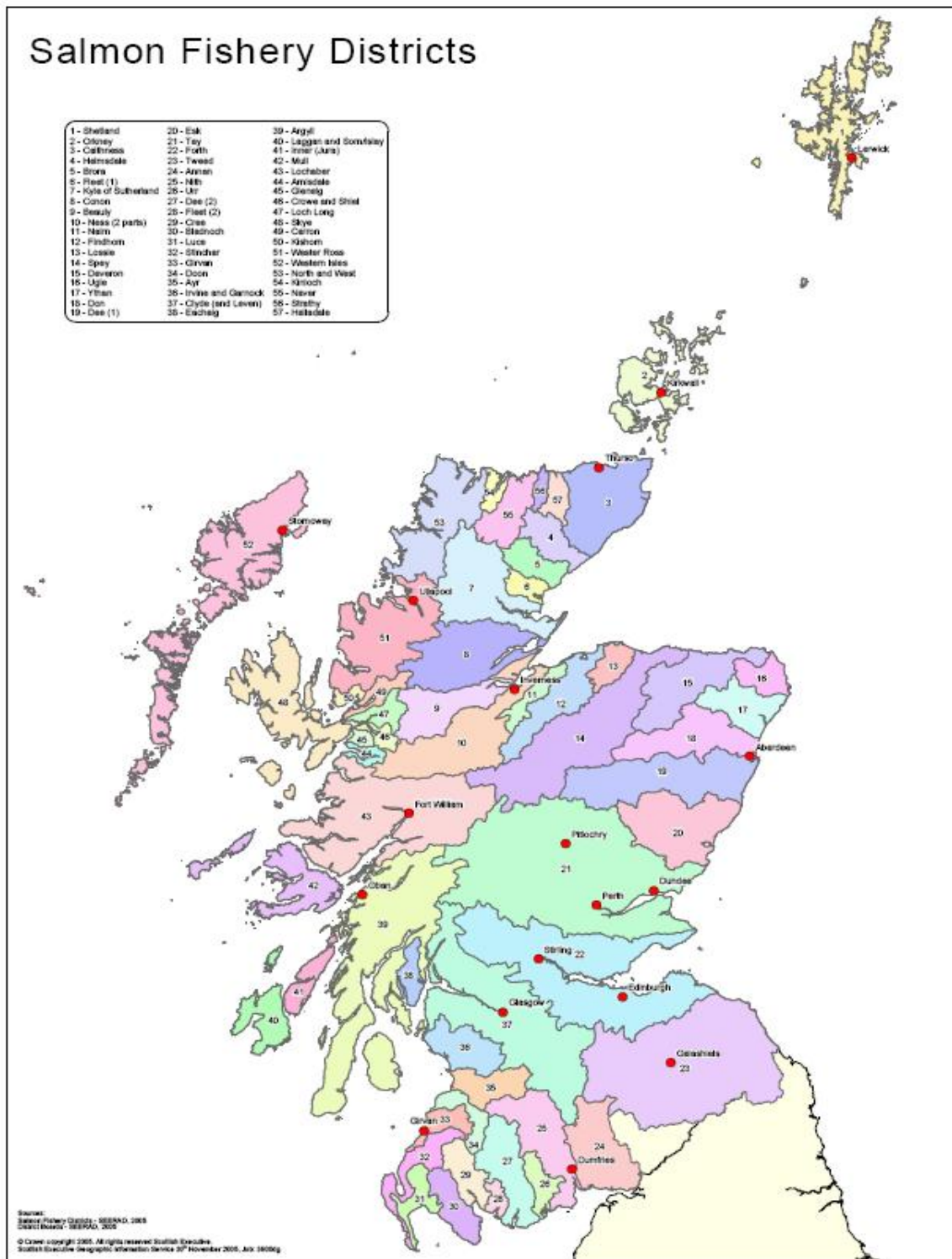
Jumper net

Statutory Instrument - Statutory Instruments (SIs) are a form of legislation which allow the provisions of an Act of Parliament to be subsequently brought into force or altered without Parliament having to pass a new Act. They are also referred to as secondary, delegated or subordinate legislation.

Trap months – A measure of fishing effort derived from the product of the mean number of fixed engine traps deployed and the number of months fished.

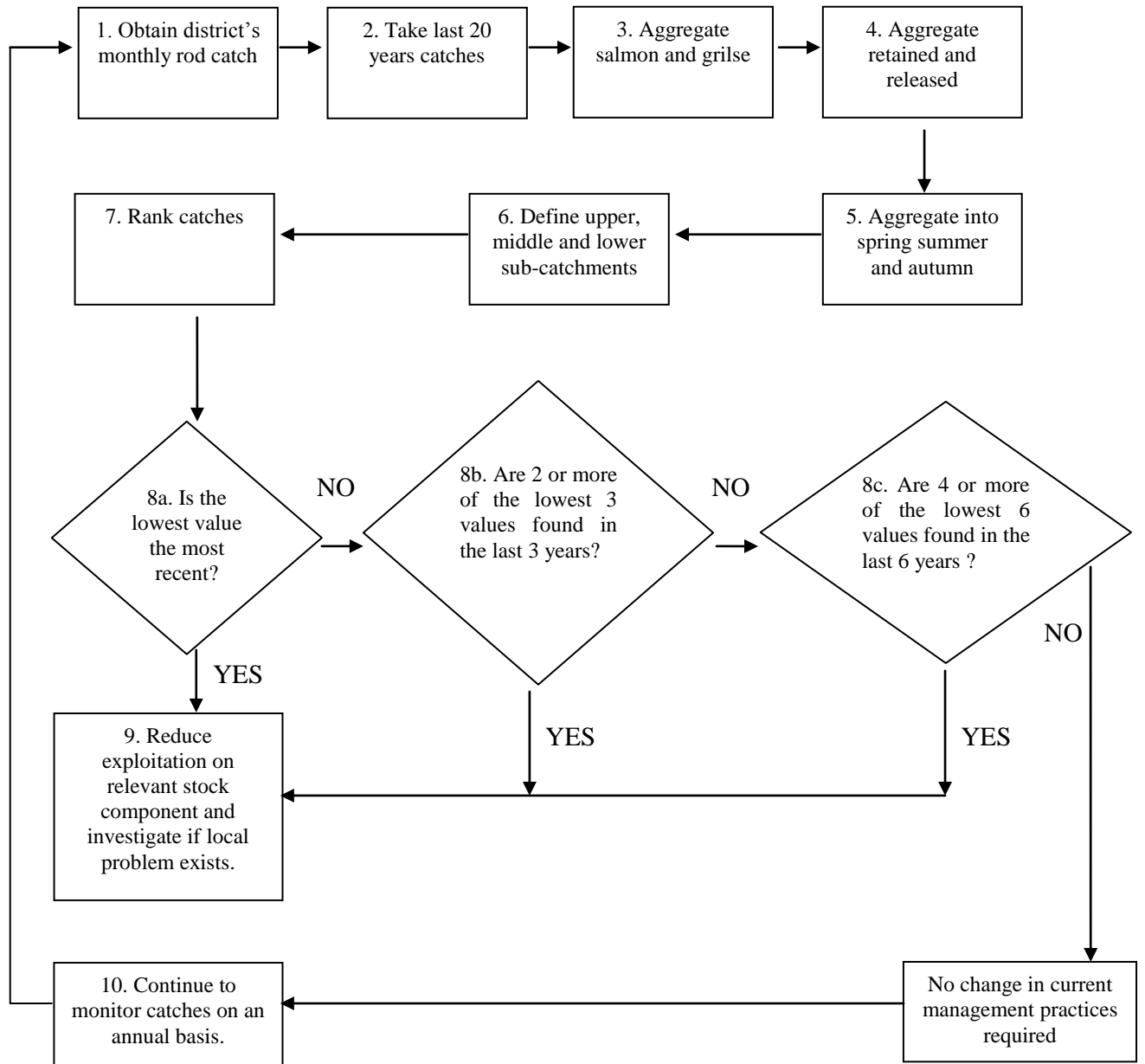
Wetted area – The area of running water utilised by salmon in a catchment.

ANNEX A Scottish salmon fishery districts



ANNEX B Rod catch as an abundance indicator – methodology

Explanatory notes for this flow diagram are provided in Annex D



ANNEX C – Guidance notes on flow diagram in Annex B

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 abundance¹.

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 unavailable¹.

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 subcatchments¹

- Spring, summer and autumn caught fish tend to belong to populations in the upper, middle and lower parts of a catchment, respectively².

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 catches¹

- Does not assume a linear relationship between rod catch and abundance²
- 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”.

Year	Rod & Line (Retained)				Rod & Line (Released)				Fixed Engine				Net and Coble				Index of effort for the fixed engine fishery	Index of effort for the net and coble fishery
	Salmon		Grilse		Salmon		Grilse		Salmon		Grilse		Salmon		Grilse		Trap months (minus Solway)	Crew months
	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)	Number	Weight (Kg)		
1952	34964	165312	6133	13729					106557	519762	83203	180075	93333	494790	61025	135209	5245	987
1953	43720	188608	6383	14751					94093	443126	83140	200190	73399	363823	51498	127714	4958	1026
1954	54289	242004	4872	11955					89723	429303	65775	160080	110923	527561	45567	115259	4868	966
1955	46492	210297	4147	9551					99264	462721	79465	179648	107861	536055	51528	116488	4414	790
1956	48463	219576	7686	18043					79192	369630	62165	138081	71995	349474	45959	106265	4993	1004
1957	64461	268011	9645	22595					69385	311018	107500	248386	85779	383745	78089	182865	4942	917
1958	61487	265279	9462	21482					75524	369226	115206	265562	87011	410541	74857	175277	3498	950
1959	47435	207841	3605	7810					101763	472693	61763	142124	120003	560843	49690	122027	4359	1065
1960	54886	236273	6458	14880					62519	300673	96863	233641	87065	433482	90198	223702	4594	997
1961	48223	205252	6720	15340					59901	271533	78712	188700	70439	334490	70141	169694	4019	906
1962	61527	275988	10602	26256					63103	301404	128773	326664	87944	436763	140985	370750	3756	946
1963	72167	322536	9239	22010					90954	437632	97467	236195	108602	548072	62554	158443	3671	936
1964	68952	284436	13005	30939					99678	450503	152425	368877	99213	475327	117252	296618	3922	876

1965	68536	295628	9693	23599					72901	344202	106144	270615	84118	403102	97324	255397	3584	962
1966	63145	278744	8719	20151					74704	350010	110118	278089	85887	420457	95430	247311	3513	861
1967	62977	277389	14819	36667					78726	378368	172455	436133	119824	576913	155889	411224	2982	836
1968	45778	191621	6838	16395					71315	340476	117633	294362	97708	489102	94810	246029	3495	970
1969	43628	186425	8441	21527					59766	276988	172255	464757	108611	533582	169557	471554	3239	849
1970	49077	201327	13752	33583					42048	199034	116679	292861	77316	374186	110164	290576	2861	775
1971	41447	167451	8078	20159					52242	236639	136243	363410	67912	314435	117839	318816	3069	802
1972	52895	226027	6751	16644					65215	304709	143711	409402	99913	481764	101003	288084	3437	810
1973	58534	268861	7772	20403					76137	368019	175880	513447	103249	520692	109438	314317	3241	884
1974	50344	220641	9576	24367					59169	294267	158907	438776	78844	396859	120933	333189	3182	777
1975	61021	281114	7231	18959					60398	288611	120670	328649	86559	436840	94463	266416	2978	768
1976	40855	173931	7819	19544					31133	144476	109272	287919	42594	203397	71401	189744	2854	756
1977	55783	236822	8784	21960					37849	182367	103107	279293	45355	219511	82373	220039	2742	677
1978	66126	297549	11270	28441					43197	210440	111346	295238	53631	272699	81854	218629	2572	691
1979	65921	277528	15244	37676					30114	140435	91046	233586	36474	179530	80946	207118	2698	747
1980	59337	269076	11167	25337					54133	274015	63117	147748	59118	308055	47157	110000	2892	670
1981	51006	230298	12287	30467					63308	312585	79902	208556	60407	300933	58549	150135	2704	647
1982	47915	208565	16839	39053					39757	190838	115199	274334	40570	196222	76023	182933	2415	647
1983	51961	228227	14109	34855					39725	191172	113479	300727	54275	252164	82029	213804	2530	670

1984	43130	185892	15543	35931					31077	151006	129124	307049	33006	167056	68412	165560	2443	653
1985	58441	245622	17649	41868					29522	135912	85015	217566	26685	132760	55348	139460	2196	551
1986	59442	271162	15736	38885					37801	193022	118835	309579	51154	281192	68284	177024	1996	618
1987	53066	228554	18060	44209					23792	121569	89845	229882	27136	152690	56880	144513	1762	577
1988	68679	287414	27809	69466					15914	77014	69090	176619	27569	136102	52199	135086	1577	402
1989	58338	244112	29669	70163					16139	80004	81415	199857	29409	139922	63857	161247	1235	356
1990	52280	226108	19366	46719					14102	72696	33715	84614	21542	124292	28013	69971	1280	340
1991	45136	187217	17314	40897					10529	51238	35086	85788	9528	46523	21208	50718	1136	289
1992	55026	227526	27871	66392					11810	57908	44863	107283	16005	75971	28942	64424	850	293
1993	51301	215555	28176	67607					10627	52542	43140	102806	9798	51662	23201	56297	900	264
1994	53133	229709	23727	57018	5062	22528	1533	3837	18404	101904	58063	146206	13395	66627	16873	43076	752	244
1995	51240	226758	22853	55316	8848	38946	3303	8356	16171	84701	46216	115544	10777	51438	20735	52907	729	222
1996	39478	171648	19783	46568	8131	36985	2282	5643	9730	49781	32765	78998	8620	45203	13621	33601	644	201
1997	32047	140239	17771	43391	8156	35183	2809	6975	5613	28651	20472	49931	2706	12973	8271	19785	688	190
1998	32641	131117	27322	60884	8531	34937	4933	10968	3997	18849	17888	41053	1743	8937	8111	18474	545	144
1999	25020	112287	12669	28410	10992	48480	3854	8939	3529	18903	6881	15939	2049	10875	5504	11783	385	129
2000	27027	114303	17733	42925	13696	58273	7376	17932	5352	27622	17636	48194	4202	18152	8476	22571	385	119
2001	26063	109200	18573	43421	18338	77692	9386	22637	6577	30588	18464	44791	2021	9136	5212	12291	387	95
2002	19873	84879	14064	31392	15810	70463	8248	18775	4654	23888	12210	30294	1761	8530	5035	11255	427	101

2003	15016	63094	8408	19552	19950	85598	9210	22255	8674	43054	17329	41907	3615	14466	3629	8519	363	109
2004	28569	118135	18117	41661	31072	133085	15207	34869	6443	31720	14810	34875	1771	8918	4576	10853	409	96
2005	21152	88967	16777	37545	29125	123774	16944	38586	4752	22293	16264	39360	2574	13987	5533	12626	382	101
2006	19805	80879	18625	36544	28629	119977	18842	36157	5709	27574	13091	28847	1700	7687	4461	8833	338	82

Table 1. Scottish wild salmon exploited by rod & line, net & coble and fixed engine, 1952 to 2006.