

Submission to the Priority for Action Statistical Bulletin Review Group, April 2009.

Scottish salmon and sea trout fishery data: the Statistical Bulletin and provision of data to support management action.

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1. Introduction

On 4th July 2008 the Cabinet Secretary for Rural Affairs and the Environment on behalf of the Scottish Freshwater Fisheries Forum launched “A Strategic Framework for Scottish Freshwater Fisheries”. The framework was developed in conjunction with organisations and individuals having an interest in fish and fisheries. In the document, a number of Priorities for Action (PFAs) were identified for detailed consideration. The remit of the Statistical Bulletin Review Group is detailed under PFA Project 6.1 and calls for a review of the Statistical Bulletin together with recommendations. In particular, the review was to include consideration of

- the possibility that the Bulletin can be made more informative in terms of reporting of salmonid data; and
- inclusion of datasets on all species of angling/management interest in Scotland.

This overview paper will outline the fishery data held by Marine Scotland in respect of salmon and sea trout fisheries and describe the process by which the data are collected and collated annually. The production of the Statistical Bulletin will be placed within the wider context of how Marine Scotland currently makes fishery information available in support of local managers and stakeholders. Finally, options for how data collection and provision may be improved to better support management action in the future will be considered.

2. Fisheries

The right to fish for salmon and sea trout in Scotland, whether in inland waters or the sea, is a heritable right which can be bought, sold or leased (Williamson, 1991). This has resulted, in the most part, in a geographically well structured system of fisheries which are well delineated and where ownership is well documented. It is worth noting in this context that “fishery” is not a particularly clearly defined term. It may best be thought of as an area or series of areas (which may not necessarily be contiguous) within a fishery district where the rights to fish share a common ownership. Marine Scotland holds information on 2,940 fisheries from which it currently collects data annually (*see* Section 3, below). Information held concerning such fisheries includes fishing method(s) used, geographic location and contact details for owners, occupiers and/or agents.

Historically, the primary function of the Marine Scotland database was to ensure that catch forms were delivered to those responsible for their completion (*see* Section 3, below) and that the resulting catch and effort data were then assigned to the correct broad geographic area. Much of the information held in the database was thus secondary to this primary function and may therefore be incomplete for any given fishery. In addition, the information held is as

reported to Marine Scotland which, for example, carries out no independent verification of the ownership of individual fisheries. These limitations notwithstanding, the database represents an extremely valuable resource and its maintenance is a core task within Marine Scotland Montrose.

1. Fishing methods

Scottish salmon and sea trout fisheries fall into one of three broad categories (Shearer, 1992). Fixed Engine fisheries operate largely in coastal areas. Within this category, bag nets, stake nets and jumper nets have operated throughout Scotland, while poke nets and haaf nets are restricted to the Solway Region. Net & Coble fisheries are beach seine operations which are generally restricted to estuaries and the lower reaches of rivers. Rod & Line fisheries comprise recreational angling activities which generally take place within rivers.

2. Geographic location

Salmon Fishery Districts were first defined for the whole of Scotland by the Salmon Fisheries (Scotland) Act, 1868. Districts correspond either to a single river catchment together with adjacent coast, or to groups of smaller neighbouring river catchments and associated coastline (Fig. 1). For the purposes of the Statistical Bulletin, data associated with these 109 Districts are combined geographically into 62 Statistical Districts and further aggregated into 11 Regions (for example Anon, 2008a).

These broad geographic areas form the basis for much of the aggregate fishery data provided by Marine Scotland. However, an increasing number of requests for information seek data which are more narrowly defined geographically, often to catchment or sub-catchment scales. In response, Marine Scotland has developed a database and a set of data querying tools more suited to dealing with such requests and is currently developing GIS applications for visualising and querying fishery information.

3. Catch Forms and Data Collection

1. Fishery data

The fishery data held by Marine Scotland are obtained from returns made annually by the proprietors, occupiers or agents in respect of salmon and sea trout fisheries under the provisions of section 64 of the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 (Appendix 2). Failure to return a completed form within the required timescale (currently 31st December of the year to which the form relates) is an offence under the act, as is making a false statement in respect of the form. Appendix 1 shows the form used to submit returns in 2008.

The returns currently include the numbers and total weight of both wild and farmed salmon and sea trout caught and retained in each month of the fishing season. In addition, rod & line fisheries provide the monthly numbers and total weights of those salmon and sea trout which were caught and may have been retained but were released back into the river (catch & release).

Net fisheries provide monthly indices of fishing effort. All report the minimum and maximum number of individuals directly employed in fishing operations. In addition, fixed engine fisheries report minimum and maximum numbers of traps deployed while net & coble

fisheries report the minimum and maximum number of crews deployed. Rod & line fisheries are not currently required to report indices of fishing effort.

The numbers and weight of wild salmon and sea trout caught and retained by both net and rod fisheries have been reported since 1952, together with data on netting effort. The net and rod catches of farmed salmon have been collected since 1994 together with information on salmon and sea trout caught and released by the rod fishery. The categories by which sea trout catch have been reported have also changed over the years. From 1952 to 1993, total sea trout catches were reported. From 1994 to 2003, sea trout catches were reported in weight categories of below 0.5kg and greater than 0.5kg. Since 2004, adult sea trout and finnock have been reported separately.

2. *Forms and Fisheries*

Data from a number of fisheries may be reported on a single form as long as each fishery is located within the same fishery district. Thus, 2,940 Scottish salmon and sea trout fisheries were associated with a total of 1975 catch forms sent out in 2008. Of these forms, 77% were associated with a single fishery while 2.4% accounted for five or more fisheries. A maximum of 37 fisheries were accounted for by a single form.

Thus, individual fisheries may comprise non-contiguous areas and further, forms may contain a number of fisheries within a given district which themselves may not be contiguous. These observations, taken with the possibility that fisheries may be included in different forms over the years if sold on to another proprietor, mean that putting together a coherent time series for analysis at sub-catchment scales can be a non-trivial task.

3. *Quality control*

“I am sorry that your form has been buried in my in tray till now. I have very little to report. We caught a few fish in single numbers and kept two or three of 1 1/2 lbs to 5 lbs and returned the others. Is this sufficient for your reporting requirements?” The preceding text was extracted from an email received in response to a reminder letter sent out this year. It serves to illustrate the point that maintaining a database of reported fishery information requires active quality control, often involving time consuming direct contact with fishery proprietors, occupiers and agents, to ensure that the data are fit for purpose.

Among the most common difficulties encountered when checking forms are incomplete information (most commonly weight and fishing effort data) and incorrectly completed forms as evidenced by fish being taken outwith the legal fishing season or weight/length ratios well outside those expected for adult salmon and sea trout. Of the 910 forms containing catch data received by 16th February 2009, 105 (11.5%) contained problems which required to be followed up.

4. *A timeline for the issue and return of forms*

In recent years, catch forms have been issued in early September with a request that they be completed and returned after the close of the fishing season and before 31st December. A reminder is issued in early December in respect of all forms not returned by that date, and a final notice issued in late January. By mid-December around 50% of forms have generally been returned, checked and queries resolved (Fig. 2). This return rate has been remained relatively static over the years and moving the date of issue for forms from late October to

early September does not result in a significant gain in the proportion of forms returned before the end of the year. Final collation of data for the season is triggered when 95% of forms are returned. This is generally achieved by mid March (Fig. 2).

4. Provision of Fishery Data

1. A timeline for issue of data

As noted above, final collation of data for a given season generally begins around mid-March of the following year. A provisional estimate for the all-Scotland catch data, based on partial returns, is presented to the ICES North Atlantic Salmon Working Group in early April. Collation and final checking of the returns takes place before the final data (effectively the summary Tables 1 to 5 from the Statistical Bulletin) are presented to the Scottish Government by the end of July. The Statistical Bulletin is then produced, given ministerial approval, printed and published by the end of September, triggering general availability of the data.

The data summarised in the Statistical Bulletin are the best available information for a given fishing season at the time of publication. Marine Scotland records are amended when further information becomes available and data subsequently obtained directly from Marine Scotland may not agree exactly with that printed in the Statistical Bulletin.

2. The statistical bulletin – a brief history

The earliest example of a Statistical Bulletin summarises the annual catch information for the 1982 fishing season. The report is limited to three text pages, two summary tables (equivalent to the current Tables 1 and 2) and figures showing times series of salmon catch by method for a limited number of Regions. The Bulletin has increased in size, complexity and scope over the years. Consideration of reported effort and sea trout returns has been included together with more detailed commentary on regional data. From 1994, data on catch and release and fish farm origin catches have been collected and summarised. Most recently, in response to suggestions from stakeholders, the overall function of the Bulletin was altered in the 2003 season publication (Anon, 2004). In addition to reporting fishery data, a final section was added to the Statistical Bulletin which provides comments on the status of Scottish salmon and sea trout stocks as derived largely from an interpretation of catch returns.

The Statistical Bulletin currently runs to 28 pages, consisting of 19 Figures, six summary Tables and approximately 5,500 words of text. The print run of 800 covers a mailing list which includes the clerks to all District Salmon Fishery Boards, individuals within Marine Scotland and Scottish Government and individual stakeholders and scientific colleagues. The Statistical Bulletin is not currently distributed to recipients of catch forms.

The Statistical Bulletin was largely developed during a period when it was the main source of catch information available to fishery managers. In recent years, the focus of the work of the Marine Scotland Salmon Assessment Group has moved away from this ‘one size fits all’ approach to one where the workload has shifted significantly towards responding to individual requests for information.

3. Responding to requests for fishery data

Over the last five years, Marine Scotland Montrose has responded to an average of just over 100 individual requests for fishery information per year, between 16% and 33% of these requests originating from District Fishery Boards and Trusts (Fig. 3). In order to deal with

such a volume of requests, Marine Scotland has developed a database and associated tools which allow the data to be queried more efficiently than was formerly possible. The previous database held data aggregated to Fishery District. Queries which sought information at finer geographic scales required scrutiny of individual paper catch form records and were extremely time consuming. The new database holds such form level data from 1986 onwards and although pre-1986 data remain aggregated at district level, many queries can be processed more efficiently and quickly than was previously possible.

Historically, the data available to stakeholders were limited by Departmental policy guidelines. Currently, however, Marine Scotland is guided by its obligations under both freedom of information and data protection legislation when responding to requests for fishery data.

The Freedom of Information (Scotland) Act 2002 and the Environmental Information (Scotland) Regulations 2004 confer on citizens a right of access to recorded information held by Scottish public authorities such as Marine Scotland. The Data Protection Act 1998 (DPA), on the other hand, gives individuals certain rights to privacy of 'personal' information relating to them and held by third parties, and places obligations on those who hold and process that information. Broadly speaking, Marine Scotland understands personal data in relation to salmon and sea trout fisheries to cover those cases where Marine Scotland can identify a living individual (either the owner or occupier of the fishery in question) to whom the data relate.

Thus,

- Marine Scotland will supply data for all fisheries where such data holdings do not fall under the provisions of the DPA.
- Marine Scotland will provide aggregate data where it is not required to identify those fisheries which contribute to the data-set. In such cases, Marine Scotland will not identify the fisheries concerned, nor indicate the number of fisheries involved. In those cases where the data include information falling under the provisions of the DPA, Marine Scotland is further required to ensure that the use to which the requested information will be put is compatible with the use for which it was collected.
- Marine Scotland will make personal data available to District Salmon Fishery Boards when this is necessary for the exercise of a legitimate function of that Board. It should be noted, however, that such personal data are released specifically for the purposes for which they were requested. They are supplied for that purpose, subject to the restrictions on their use specified in the DPA, and must not be used for any other purpose or disclosed to any third party.

These practices have been set out and communicated to those responsible for returning catch forms in leaflets accompanying the catch forms sent out for the 2007 and 2008 fishing seasons (Anon, 2007 and 2008b).

5. Issues relating to the Collection and Provision of Fishery Data

Below is a list of issues relating to the collection and provision of fishery data. At this early stage in the discussions, the list is limited to the identification of issues which the Statistical Bulletin Review Group may wish to consider and some of the factors which may constrain the final decisions.

a. *Catch forms and data collection*

- The current Marine Scotland data collection system is based solely on the return of printed forms which are manually entered into the database. No provision is made for electronic data entry by stakeholders. Such an option might result in a system where data collection was both more efficient and convenient. There are data security issues in relation to such a development which would in any case require resources and specialist database developer time. There is currently no provision within Marine Scotland programme for such a development.
- Under the Conservation of Salmon (Collection of Statistics) (Scotland) Regulations 2006, District Fishery Boards have the power to collect statistics from fisheries in their area and a number of boards currently exercise that power. The result is that not only are stakeholders in these areas required to return two sets of catch information, but that two parallel sets of fishery data are being developed. It might prove useful if discussions were to take place between Marine Scotland and ASDFB to explore whether data sharing arrangements might be set up which would benefit individual fishery proprietors/occupiers as well as meet the data requirements of all concerned.
- The future value of the fishery dataset would be greatly enhanced by the collection of rod & line fishery effort. There is, however, no consensus on the most appropriate metric for such an index which would also be practical to collect as part of the annual catch form return, particularly given that many rod & line fisheries have no history of collecting such information and may not be in a position to do so. This issue may be best dealt with as a large scale, long term sampling exercise and may be most usefully progressed by being included in ongoing discussions between Marine Scotland scientists and biologists employed by local fishery Trusts and Boards.
- The Statistical Bulletin Review Group is charged with considering inclusion [in the Statistical Bulletin] of datasets on all species of angling/management interest in Scotland. Including such statistics presupposes that such data may be available for analysis. Collection of such information is not routinely carried out at present, however, and would require significant resources, and possibly new legislation, to set up.

b. *Provision of fishery data*

- The Marine Scotland database may not currently be queried by anyone other than a restricted number of Marine Scotland scientists. Allowing direct stakeholder access to the data might provide a valuable tool for local managers and free up Marine Scotland resources. As with the electronic data entry provision, there are data security issues in relation to such a development which would in any case require resources and specialist database developer time. There is currently no provision within the Marine Scotland programme for such a development. In addition, there are Data Protection issues which would also need to be explored. Although these are not trivial problems and would need to be addressed, they are certainly not insurmountable.
- Data are not routinely provided in response to individual queries until after publication of the Statistical Bulletin. Allowing data to be provided after they have first been provided to Scottish Government would allow earliest provision to be moved forward from end of September to end of July.
- No longer printing and distributing paper copies of the Bulletin, but limiting production to a downloadable copy on the website, would bring the data of publication forward by three to four weeks. This procedure has already been

successfully employed to publish the *Scottish Fish Farms Annual Production Survey*, also produced by Marine Scotland.

- Marine Scotland is currently unable to provide fishery data from one fishing season before the start of the next fishing season. Given the extremely limited time period between the close of the latest seasons (Tweed: end of November) and start of the earliest (Tay: mid January) and current reporting rates (Fig. 2), it is extremely unlikely that summary information based on complete returns will ever be possible. Indices based on partial returns provide the only practical possibility. Even in this regard, however, given the additional resources that would be required to produce such estimates routinely, the potential management benefits of receiving such information need to be considered against the cost of making it available. In this regard, the comment which included in the Interpretation section of recent Statistical Bulletins may be relevant “... when inferring the status of stocks from catch data, it is important to consider trends over a number of years rather than simply focussing on catch levels for the most recent year” (Anon, 2008a).
- The Statistical Bulletin Review Group is charged with considering the possibility that the Bulletin can be made more informative in terms of reporting of salmonid data. The Statistical Bulletin is produced for the benefit of stakeholders. If it is no longer proving a useful tool in this regard, stakeholder input is required to allow us to decide its future content. It should be noted, however, that increasing the information content or complexity of the Bulletin may require more resources and delay its publication. Reducing information on the other hand may allow the publication date to be brought forward as well as releasing resources to respond to individual requests for data from stakeholders. Radically reducing the content of the bulletin (to leaflet size for example) may allow us to produce something which it is practical to be sent out with all catch forms.

References

Anon (2007). Catch Form 2007. FRS Leaflet, FW09|09|07.

Anon (2004). Statistical Bulletin, Scottish salmon and sea trout catches, 2003. *Scottish Executive Rural Affairs Department, no. Fis/2004/1.*

Anon (2008a). Statistical Bulletin, Scottish salmon and sea trout catches, 2007. *Scottish Executive Rural Affairs Department, no. Fis/2008/1.*

Anon (2008b). Catch Form 2008. FRS Leaflet.

Shearer, W.M. (1992). The Atlantic salmon. Natural history, exploitation and future management. Halsted Press, New York: 244 pp.

Williamson, R. (1991). Salmon Fisheries in Scotland. Atlantic Salmon Trust, Pitlochry: 42pp.

Figure 1.
Fishery Districts

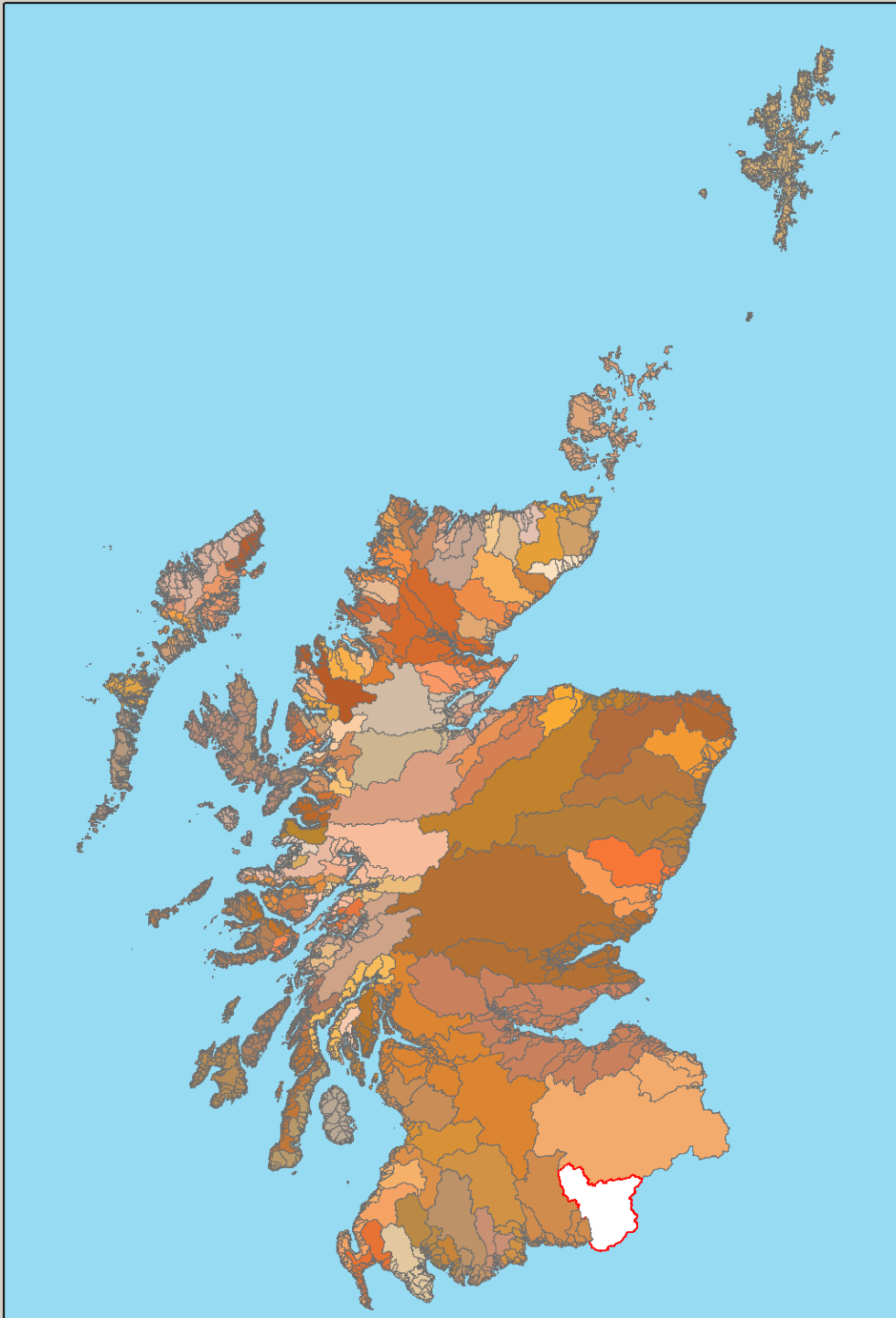


Figure 2.
The relationship between calendar date and the proportion of forms returned.

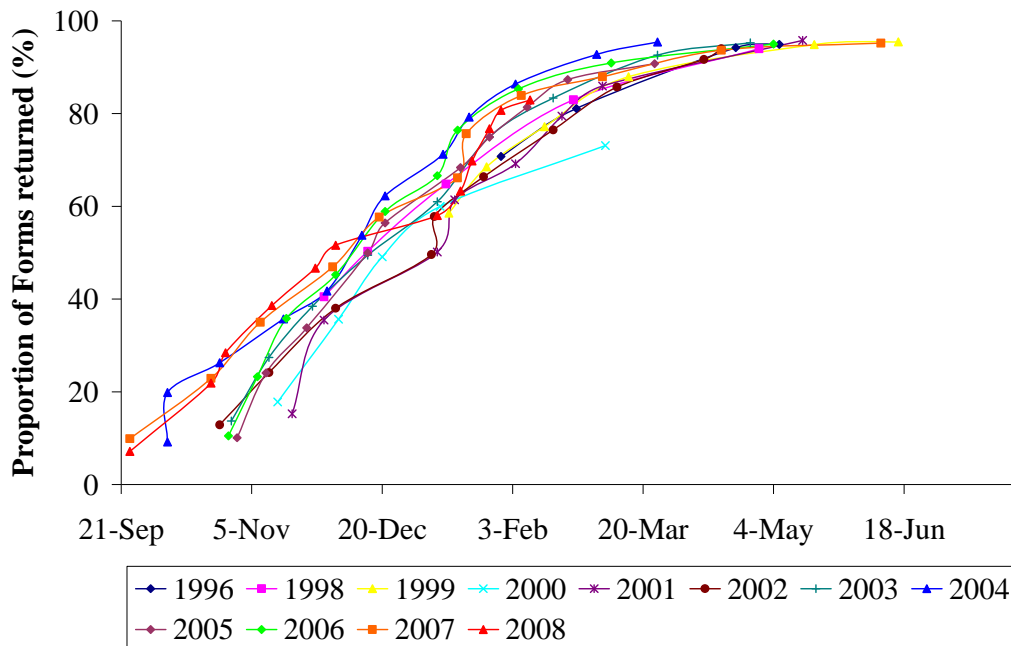
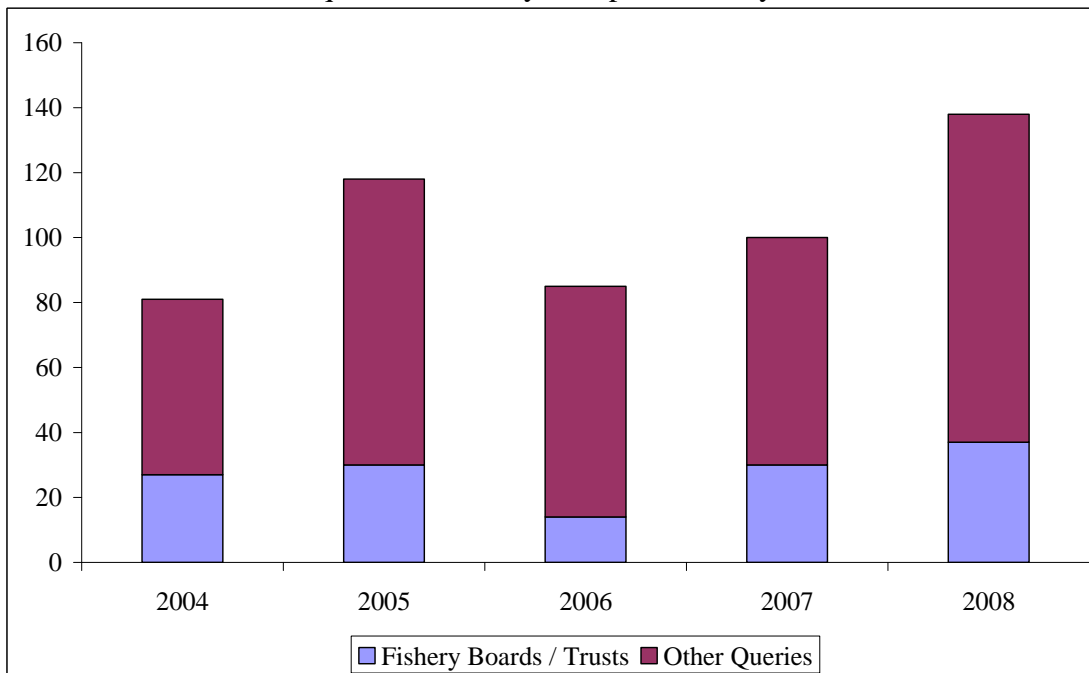




Figure 3
The annual number of requests for fishery data processed by Marine Scotland Montrose



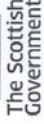
Appendix 1: Blank example of catch form used to return data for the 2008 Season. Outside cover, fishery data and general explanation



FISHERIES RESEARCH SERVICES



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The Scottish Government

Return of Scottish Salmon and Sea Trout catches for 2008

The Scottish Ministers are authorised under section 64 of the Salmon and Freshwater Fisheries (Consolidation) Act 2003 to collect statistics relating to salmon and sea trout fisheries. Your return provides valuable data which is used to protect and develop stocks. In order that the data may be published as early as possible and thus aid decision making by fishery managers, you are required to complete this form as soon as possible after the end of the fishing season and **not later than 31st December 2008**.

Please note that under Section 64 of the Salmon and Freshwater Fisheries (Consolidation) Act 2003, failure to return a completed form within the required timescale, or to make a false statement is an offence. The maximum penalty is £1,000

Contact Information
You have been sent this form because our records indicate that you either have the right to fish those areas indicated in Part 4, or that you act for someone who does. If you believe that this is not the case, or if you have any other queries regarding the form, you can contact us using the details given at the top of this page. Please quote the form number which is printed in Part 4 on the back page of this form.

Part 1. Did you exercise your right to fish this year ?

Part 4 describes those potential fisheries covered by this form. Even if no fishing took place this year we still need to hear from you. Each year we aim to carry out a census of all those areas in Scotland for which we hold a record of there being a right to fish for salmon and sea trout. *A return indicating that no fishery took place provides as with valuable information*

If you fished by rod & line during the 2008 season, please go to part 2
If you did not fish by rod & line, but operated a net fishery during the 2008 season, please go to part 3
If you did not fish during the 2008 season, please tick the box below and complete parts 4 and 5

Part 4. The Fishery
Form Number
Fishery District
Fishery Codes

If we need to update the address we use to send out the catch form, please add the new address here:

The fishery name(s) we have in our records for this form are:

Please provide a brief description of the fishery(ies) associated with the data you have provided. If the return includes fish caught in an adjacent fishery eg. on a reciprocal day arrangement, please describe

If the ownership or occupancy of the fishery has changed since you last returned a catch form, please indicate

1. Date ownership / occupancy changed
2. Please use the box provided to indicate the name and address or phone number of the new owner / occupier

If only part of the fishery has changed hands since you last returned a catch form, please indicate

1. Date when the changes took place
2. A brief description of the changes
3. Please use the box provided to indicate the name and address or phone number of the new owner / occupier or the person from whom new parts of the fishery were acquired

Part 5. Declaration
I declare that the information given in this form is correct to the best of my knowledge and belief

I have completed this form as owner / occupier (delete as necessary) or other (please specify)

Signature Date
Name (please print) Phone number

Inside pages, catch and effort data.

Part 2. Rod & Line Fisheries

Please indicate by ticking the appropriate box whether you are providing weights in lbs or kgs

i. Fish which were caught and retained.

Please include here ONLY those fish which were caught and killed. Weights should be given as the *total weight* of fish in that category for the month.

	Salmon			Grilse			Sea Trout		
	Wild fish Number	Farmed Escapes Number	Total weight	Wild fish Number	Farmed Escapes Number	Total weight	Adult Number	Finnock Number	Total weight
Jan									
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									
Oct									
Nov									

ii. Fish which were caught and released.

Please include here ONLY those fish which were caught and released. Weights should be given as the *total weight* of fish in that category for the month.

	Salmon			Grilse			Sea Trout		
	Wild fish Number	Farmed Escapes Number	Total weight	Wild fish Number	Farmed Escapes Number	Total weight	Adult Number	Finnock Number	Total weight
Jan									
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									
Oct									
Nov									

If you also operated a net fishery in 2008, please go to part 3 of the form, otherwise please complete parts 4 and 5.

Part 3. Net Fisheries

Please indicate by ticking the appropriate box whether you are providing weights in lbs or kgs

Net & Coble catch, weights should be given as the *total weight* of fish in that category for the month.

	Salmon			Grilse			Sea Trout		
	Wild fish Number	Farmed Escapes Number	Total weight	Wild fish Number	Farmed Escapes Number	Total weight	Adult Number	Finnock Number	Total weight
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									

Fixed Engine & Haaf Net catch, weights should be given as the *total weight* of fish in that category for the month.

	Salmon			Grilse			Sea Trout		
	Wild fish Number	Farmed Escapes Number	Total weight	Wild fish Number	Farmed Escapes Number	Total weight	Adult Number	Finnock Number	Total weight
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									

Fixed Engine & Haaf Net Gear, please indicate method(s) used by ticking the appropriate box(es)

Bag	Fly	Jumper	Stake	Poke	Year	Haaf	Cruive	Other (please specify)
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Netting effort, please give maximum and minimum monthly values for crew and trap numbers where appropriate and numbers of persons engaged in netting operations.

	Net & Coble		Fixed Engine & Haaf Net	
	Number of crews maximum	Number of persons maximum	Number of traps maximum	Number of persons maximum
Feb				
Mar				
Apr				
May				
Jun				
Jul				
Aug				
Sep				

Please now complete parts 4 and 5 of this form.

**Appendix 2: Section 64 of the Salmon and Freshwater Fisheries (Consolidation)
(Scotland) Act 2003**
(from:http://www.opsi.gov.uk/legislation/scotland/acts2003/asp_20030015_en_8#pt6-11g64)

PART 6 MISCELLANEOUS

64 Power of Scottish Ministers to conduct inquiries and to obtain information

- (1) For the purpose of protecting and developing stocks of salmon and trout the Scottish Ministers may—
- (a) conduct inquiries and investigations into questions of practical or scientific importance to salmon and freshwater fisheries, and for such purpose enter on and conduct such operations as may be necessary in any fishery, provided always that no damage shall be done to such fishery and that no interference shall be caused to the rights of the owner or occupier of such fishery;
 - (b) collect such statistics relating to the number of salmon caught in any salmon fishery and the species, description and weight, and method and date of capture of such salmon as they may consider necessary, and require any proprietor or occupier of a salmon fishery to furnish them with such statistics relating to such matters in such form and at such times as they may determine; and
 - (c) publish such statistics in such manner as they think fit.
- (2) Any proprietor or occupier of a fishery who wilfully refuses to comply with any requirement made in pursuance of this section, or makes any statement in relation to such a requirement which is false in a material particular, shall be guilty of an offence, and liable on summary conviction to a fine not exceeding level 3 on the standard scale.