Marine Scotland

An Analysis of the Value of Wild Fisheries in Scotland

Final Report

A report prepared by

PACEC

on behalf of

Marine Scotland

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Executive Summary

X1.1 In January 2015 the Scottish Government, through Marine Scotland, commissioned PACEC to carry out an analysis of Wild Fisheries in Scotland covering salmon, trout and coarse angling and netting activities (mainly for salmon). It comprised a baseline assessment of the contribution of wild salmon and freshwater fisheries to the Scottish economy, an analysis of the scale and make up of fisheries since 2004, and, where possible, (with key drivers of change and future trends) the role and impact of public sector support.

X1.2 Within this context, the focus is on trends in the sector over the past ten years, an assessment of economic benefits including an Economic Impact Assessment (EIA), an estimate of the Net Economic Value (NEV), along with other issues such as views on the potential introduction of conservation measures (previously referred to as the Kill Licence proposals) for fish as part of the Wild Fisheries Review, and the future prospects for the sector.

X1.3 The research underpinning the analysis combined interviews with key stakeholders in government agencies and Local Authorities and representatives of salmon and trout, coarse fishing and the netting sector. It included surveys of the fisheries who provide opportunities for angling in Scotland and anglers who lived in or visited Scotland, and discussions with salmon netting organisations.

X1.4 There are over 2,300[1] salmon and sea trout fisheries in Scotland (including rod and net fisheries), which provide opportunities mainly for game fishing, and a much smaller number of sites offering coarse fishing only. It is estimated, based on salmon and sea trout returns, that around 1,000 salmon fisheries were "active" in 2013 (they recorded at least 1 salmon or sea trout caught in 2013). In 2014 there were 40 active netting operators (including individuals) in Scotland (22 coastal and 18 estuary), based on Marine Scotland information. The industry body estimates that there are twenty to twenty-five members but not all are active.

X1.5 Marine Scotland returns show that the number of salmon caught in 2014 (in netting fisheries and by rod and line) was estimated at 62,953[2], the lowest on record, with a decrease of 55% compared to the most recent peak of 138,676 in 2010. Three quarters of salmon caught were accounted for by angling and just over a quarter by netting operators. The catch for sea trout was 28,166 in 2014 and 38,727 in 2010 a reduction of 27%. Catch returns are not collected for any fish species other than salmon and sea trout.

X1.6 The main drivers that influenced the catch trends in angling and netting were considered by industry representatives to be a fall in fish stocks, which they attributed

[1] This statistic is based on information from the Scottish Assessors Association.

[2] The majority (59%) of these salmon were caught by rod and released. 28% were caught by netting fisheries, and 13% were caught by rod and retained.

to influences such as global warming, climate change, a reduction in food stuff for fish and an increase in predators.

X1.7 The perception of those surveyed was that there has been a decline in the number of anglers in the past few years that could be attributed to the recession from 2007/8 and to a continuing decline in fish stocks over past years. Regarding the latter, however, it is important to note that anglers are also attracted to Scotland to fish by the attractive environment, scenery and the overall quality of the experience. A third of fisheries reported falling angler numbers over the past five years or so. Half of the fisheries thought the numbers had stayed about the same, and just over one in ten said there had been an increase, especially in fisheries on the larger east coast rivers.

X1.8 Using the survey data from fisheries and anglers, we have estimated that 490,000 angler days were spent on salmon and sea trout fishing in Scotland in 2014. The equivalent estimate in Radford (2004) was 545,048 angler days[3]. When all species are included, we estimate that there were 1.3 million angler days in total in Scotland (the equivalent figure from Radford (2004) was 1,386,043 total days). Given that both estimates are survey-based and subject to margins of error, we do not consider this to be strong evidence of a decline in overall activity.

X1.9 The economic benefits of Scotland's wild fisheries remain significant despite the concerns identified by those surveyed. In summary, the Scotland-wide economic impact assessment of wild fisheries (including netting) indicates around £135m of angler expenditure, 4,300 full-time equivalent jobs and £79.9m Gross Value Added (GVA) in 2014 – the monetary value of the contribution to the economy made by an industry. The most comparable estimate from Radford (2004) was for £154m of angler expenditure, 4,400 jobs and £90.9m of Scottish household income (2014 prices). Generally angler expenditure in Scotland is lower in 2014 compared to 2004, which influences associated economic benefits. The activity fell during the 2007-2009 financial crisis and recession, and has since picked up to some extent on some of the larger rivers.

Table X1 Economic impacts of wild fisheries (rod & line, and netting) in Scotland

	Economic impacts in Scotland	
	FTE jobs	Gross Value Added
Direct onsite impacts (angling and netting)	1,700	£25.9m
Supply chain to the above (angling and netting)	1,500	£20.6m
Offsite impacts generated by local angler expenditure	900	£20.3m
Supply chain to the above	200	£13.2m
Total impact in Scotland	4,300	£79.9m

Note: Employment impacts rounded to nearest 100, GVA to nearest £100k

[3] See "Economic Impact of Game and Coarse Angling in Scotland" (Radford et al, 2004),

In employment terms, the netting sector contributes 30-35 FTE in direct employment and 35-45 indirect jobs (because of relatively high expenditure on supplies). This represents a significant decline in netting employment from an estimate of 400 FTE jobs in 1990 (Radford 2009) [4]

X1.10 Some four in ten of the paid jobs at the fisheries and the netting companies are permanent, the rest seasonal.

X1.11 The jobs were considered by stakeholders to be significant and important to the rural areas where the fisheries were located, as there were relatively small numbers of alternative jobs available. There were also social and cultural benefits in that the fishing helped integrate the community and protect a longstanding "way of life" in these areas.

X1.12 The analysis of additionality and potential displacement of economic activity and the views of those surveyed suggests that some nine in ten of the economic impacts (i.e., the jobs and GVA) and other benefits would not result without fishing as there are few other alternative uses for the sites that would result in additional employment opportunities.

X1.13 The net economic value (NEV)[5] for the wild fisheries was examined as a second approach to assessing the economic benefits to Scotland. NEV is estimated to be some £28m in 2014. This comprises some £17m for anglers (and what they would pay in addition to protect angling, including the consumer surplus), and £11m for the holders of fishery rights. For comparison, Radford (2009) estimated Scottish wild fishing NEV at £24.6m (at 2014 prices).

X1.14 The wild fisheries sector benefits directly and indirectly from public support, which contributes to economic benefits and NEV, for example through conservation, habitat and river management and skills development. Public sector support for the management of fisheries was estimated at some £2.6m to £2.7m in 2014/15.

X1.15 The asset values of fisheries and beats to owners and holders of fishing rights also provide an indication of the economic value of wild fisheries. It was considered by the stakeholders, including the commercial property sector that dealt with beats and fisheries, that the number of sales per annum is relatively small. The stakeholders suggest that uncertainty due to the recession, the Scottish Referendum on independence, the land reform issues, and the Wild Fisheries review may have contributed to low activity in the market for beats and fisheries. The average value of a salmon fishery/beat was estimated at £0.5m for those with higher catches. The total value for the sector could amount to several hundred million pounds for all active fisheries.

[4] Estimates made by Radford in 2009 showed there were some 400 FTE jobs supported in 1990. He considers that these would have fallen by 2009.

[5] The Net Economic Value (or NEV) of an activity (i.e., fishing) is defined as its value to participants and society (measured in monetary terms) over and above the value of the resources used to provide it (i.e., expenditure on fishing operations).

X1.16 The research also sought to assess views of organisations in the wild fisheries sector on the potential introduction of Conservation Measures (previously referred to as the Kill Licence proposals), as part of the Fisheries Reform process. This initiative is aimed at conserving salmon stocks and ensuring a harvestable surplus that was sustainable. It was widely accepted by stakeholders that the stocks, in particular, of salmon had fallen over the past ten years and it was anticipated that this was likely to continue. The main reasons given by the responding organisations for this trend were global warming and climate change, a reduction the supply of natural food for fish, predation and to some extent the activities of the netting sector. They acknowledged, however, that the scientific evidence on these factors was inconclusive and more evidence was required on the causes combined with improved methods of counting fish. Opinion of those interviewed in this study was divided on whether Marine Scotland should introduce Kill Licences

X1.17 As well as direct economic impacts, such as jobs, GVA and NEV, there were qualitative benefits for anglers[6] and those who lived near fisheries. The key ones were those associated with the attractive quality of the countryside – scenery, environment, and the fresh air – and also the ease of travel to the fisheries and other visitor attractions underpinning the "Scottish experience".

X1.18 The scale of future activity and prospects for fishing were uncertain largely because of fishing conditions (such as the level of fish stocks) and continued economic uncertainty. A little under six in ten of the owners and managers of fisheries thought the number of people fishing in Scotland would decline over the next five years, one third thought the numbers would remain the same and one in ten foresaw an increase.

X1.19 The anglers thought it was quite likely they would continue to visit Scotland, either to fish or to enjoy a holiday. Salmon and sea trout anglers were less likely to continue visiting Scotland compared to those fishing for other species.

X1.20 While the decline in anglers could potentially reduce income, jobs and GVA in the economy, the scale is difficult to forecast. However, a 10% fall in anglers and overnight visitors would probably not result in a 10% fall in jobs and GVA in the short term as labour could be retained in anticipation of a rise in activity. NEV could possibly fall as labour costs would not change in the short term while expenditure by visitors fell. The argument would be similar for the netting sector on jobs, GVA and NEV.

X1.21 In conclusion, and reflecting the aims and objectives of the study, the value of wild salmon and fresh water fisheries to Scotland is significant contributing important

[6] These benefits contribute to the Net Economic Value of fishing by contributing to the satisfaction that anglers derive from their participation – if angling did not provide these benefits, anglers would not be willing to pay as much.

numbers of jobs and income especially to rural area and helping to underpin a longstanding "way of life". These were underpinned by public sector support.

- In 2014 there were an estimated 4,300 full time equivalent jobs (covering a range of skilled occupations) and £79.9m GVA to the Scottish economy. However, some of these jobs were considered to be seasonal[7]. The jobs were particularly important in the rural areas where fisheries are located as there are relatively few alternative jobs. In these locations the fishing activity resulted in important social and cultural benefits in that fishing helped to integrate the community and support a longstanding "way of life".
- In terms of past trends stakeholders considered that the number of anglers for salmon and trout had decreased in the past few years primarily as a result of the recession. The number of angler days had also fallen to 490,000 in 2014 from 545,048 in 2004 (i.e., 10%). As a consequence the number of salmon caught (through angling and netting activities) declined from the peak of 138,676 in 2010 to 62,953 in 2014 (or 55%). A key driver was considered to be the decline in fish stocks as a result of global warming, climate change, a reduction in food stuff for fish and an increase in predators. However, anglers also visited Scotland because of the attractive countryside and environment and the "Scottish experience".
- Looking forward prospects were uncertain largely because of the level of fish stocks and continued economic uncertainty. Six in ten of the fisheries thought that the numbers fishing in Scotland would decline in the short/medium term.
- The role of public sector support for fisheries was considered to be important. It amounted to £2.6m to £2.7m in 2014/15 mainly for conservation, habitat and river management and skills development. It helped underpin activity in the sector and the economic benefits.

[7] Research for the Scottish Country Sports Tourism Group ("The Benefits and Volume and Value of Country Sports Tourism in Scotland", PACEC, 2014) showed that FTE employment in the busiest 4 months of the season was around 22% greater than in the rest of the year. However, the number of **jobs** (as opposed to their full-time equivalent) may increase by more than this if the seasonal jobs are more likely to be part-time than the annual jobs.

1 The Aims Objectives and Methodology

1.1 Introduction

1.1.1 In January 2015 the Scottish Government, through Marine Scotland, commissioned PACEC to carry out an analysis of the value of Wild Fisheries to the Scottish economy. The research, in part, provides an update of the findings of an earlier economic impact study on game and coarse angling in Scotland in 2004. This study focusses on the direct and indirect economic and social value of salmon and freshwater fisheries in Scottish rivers and inland waters and salmon netting in Scottish coastal waters.

1.1.2 The three objectives for the research were to provide:

- a baseline assessment of the value and contribution of wild salmon and freshwater fisheries in Scotland, including information on pike and carp fishing; i.e., the economic and social benefits;
- an analysis of the scale and nature of activity and changes in the rod and line fisheries since 2004, and where possible and subject to data availability, to identify the key drivers of change and assess likely future trends (i.e., where the industry is now and where it was over the past five to ten years); and
- a review of the role and impact of public support for fisheries.

1.1.3 Marine Scotland are, within this context, looking for the trends over the past five to ten years, including in public funding (the sources, who receives it, and the benefits/impacts). The research also looked at:–

- Changes to the fisheries sector over the past ten years, drivers for change and future prospects;
- An Economic Impact Assessment (EIA) focussing on economic benefits including employment and Gross Value Added (GVA) in the sector, and what would be forgone if the fishing did not take place or was significantly reduced;
- The Net Economic Value (NEV) taking into account revenue and costs (capital and operating) and profits as economic rent, and the role of producer and consumer surpluses;
- The public funding as direct/indirect support and subsidy for the activities and the implications for economic benefits;
- Views on the potential introduction of Kill Licences as a means of controlling stocks of fish and the implications for economic benefits;
- The asset values of fishing sites and beats and what may influence these, e.g., levels of catch as sites, quality of catch, the fishing environments and facilities, location and access and, in part, public sector support;
- The broad range of stakeholders and industry associations;

- Data and analysis of angling and netting activities and comparisons between them, where appropriate;

1.1.4 Case studies of a sample of rod fisheries were also undertaken to illustrate their activities and provide qualitative information reflecting the main chapters in the report. These are shown in Appendix E and cross referenced in the main chapters.

1.1.5 The research will also take account of the consultation in the Spring of 2015 on the Wild Fisheries Review[8] and in particular the potential introduction of kill licences for salmon as a method of protecting the stocks of fish.

1.2 The Methodology and the Research Tasks

1.2.1 The research gathered a range of data and information on the angling and netting sectors, in conjunction with staff at Marine Scotland. This includes data and information on trends in activity and drivers for wild fishing, types of fishing providers, their location and activities, the participation of anglers, the views of sector stakeholders and the subsequent economic and social benefits. This information was used to assess the economic benefits and net economic value (NEV) and how these may be influenced by, for example, trends in anglers and subsidies.

1.2.2 The main stages of the research were:

- **Inception Meeting:** This was held with the Steering Group to refine and agree the overall scope and direction of this study, the research methods including the sources of information and data for the desk study, stakeholders to consult with, the survey of fisheries (as providers of fishing opportunities) and anglers and the selection of case studies of fisheries and locations. The Steering Group gave a briefing on the consultation exercise for the Wild Fisheries Review and programme and provided comment on draft questionnaires and topics for surveys conducted.
- **Desk Study:** The aim of this was to provide background information on previous research that has been carried out on wild fisheries in Scotland (on salmon, trout and coarse angling), and examine data available through Marine Scotland and other agencies, on the scale and nature of the fisheries sector and activities, for example, fish caught over the 10 years from 2004. Appendix A shows the main reports used and the data sources.
- **Interviews with Stakeholders**: These focussed on the main organisations that represent and/or provide services for the wild fisheries sector including the fisheries and anglers for salmon, trout and coarse fishing (for example pike and carp) and the netting sector. They could be involved with governance and organisation of the sector (including angling and netting), providing services for members (either fisheries or anglers), the promotion of

[8] Scottish Government. Wild Fisheries Review.

fishing opportunities and booking visits, property issues and the management of fisheries. The discussions covered their views on the provision of fishing opportunities, trends in this sector (and the numbers of anglers), fish stocks, positive features and attractions for anglers, economic and social benefits, any subsidies received by the sector and views on the potential introduction of kill licences. Appendix B shows the stakeholders interviewed.

- **Survey of Fisheries**: An online survey of fisheries/providers of fishing opportunities (organised in conjunction with the main bodies that represent the sector), which was supplemented by telephone interviews. The survey covered activities and facilities at fisheries, trends in fish stocks, angler numbers, income and expenditure, employment, number of fish caught and returned, the market for beats, views on potential kill licences, future trends in angling and the competing locations with Scotland. The survey generated responses from c.150 fisheries.
- **Discussions with Netting Operators**: There were discussions with the main netting companies and operators to assess their activities, scale and trends and with the Salmon Net Fishing Association in Scotland.
- **Survey of Anglers**: This comprised an online survey (organised in conjunction with organisations who represented anglers and/or operated booking services). It covered their activities, fishing locations in Scotland, species fished, duration of fishing trips, expenditure, the attractiveness of Scotland as a location, angler visits to Scotland, and demographic characteristics (e.g., place of residence, age of anglers and employment status). The survey generated responses from 850 anglers.
- **Discussions with Local Authorities**: These covered the fishing activities (both netting and angling) and the economic and social benefits of fishing to their areas.
- **Case Studies**: These covered a selection of the rod fisheries and were carried out in different geographical areas of Scotland with a focus on the larger rivers for salmon and trout (such as the Spey and Tay), and some secondary rivers. They were selected from the survey of fisheries and included some qualitative follow-up discussions with them. The ten case studies are shown in Appendix E.

1.2.3 The topics used for the surveys are shown in Appendix C.

1.3 The Analysis

1.3.1 The analysis drew together data and information from the sources above to address the research objectives. The quantitative analysis focussed on the Economic Impact

Assessment (EIA)[9] including employment and Gross Value Added (GVA)[10], and Net Economic Value (NEV)[11]. The analysis especially for the EIA focuses on the nature and scale of activity (e.g., the number of fisheries and catch data), income (for example, from anglers), the direct employment associated with fisheries, the quality of jobs and skills, the indirect jobs (through supply chain linkages and composite multipliers with leakage effects), and tourism related expenditure and jobs (e.g., on accommodation and food and drink) and Gross Value Added (GVA).

1.3.2 The survey results were disaggregated, where possible, by the regions where angling activities took place, the size of fisheries[12] and expenditure of anglers and by species (salmon, sea trout, brown trout, rainbow trout, grayling, and coarse fishing including carp and pike) anglers fished for. The disaggregated results are shown where there are statistically significant differences between categories.

1.3.3 There was qualitative analysis to support the quantitative research which covered the perception of stakeholders, the fishery owners/managers and the anglers on issues such as the influences on fish stocks, the role of potential kill licences, the attractiveness of the fishing experience in Scotland, and future trends.

1.4 The Characteristics of Fisheries for Anglers

1.4.1 The sector describes the main features of the fisheries in Scotland based on the surveys to provide some context for the analysis that follows in the next chapters.

The Rod Fisheries for Anglers

1.4.2 The majority of respondents (around 80%) to the survey operated on a single fishery site. The respondents were located throughout Scotland, although they tended to be concentrated on the larger east coast rivers – the Spey, Dee, Tay, North and South Esk and the Tweed in the East of Scotland. By region, around half were in the Highland region, with smaller numbers in the North East, the Central belt, and Dumfries and Galloway. There were limited responses from the Western Isles. We neither received responses from Orkney nor Shetland, although data provided by Marine Scotland suggests both each had one active salmon fishery in 2014. The area definitions used, which reflect the 2004 study "Economic Impact of Game and Coarse Angling in Scotland" (Radford et al), are shown in Figure 1.1 below.

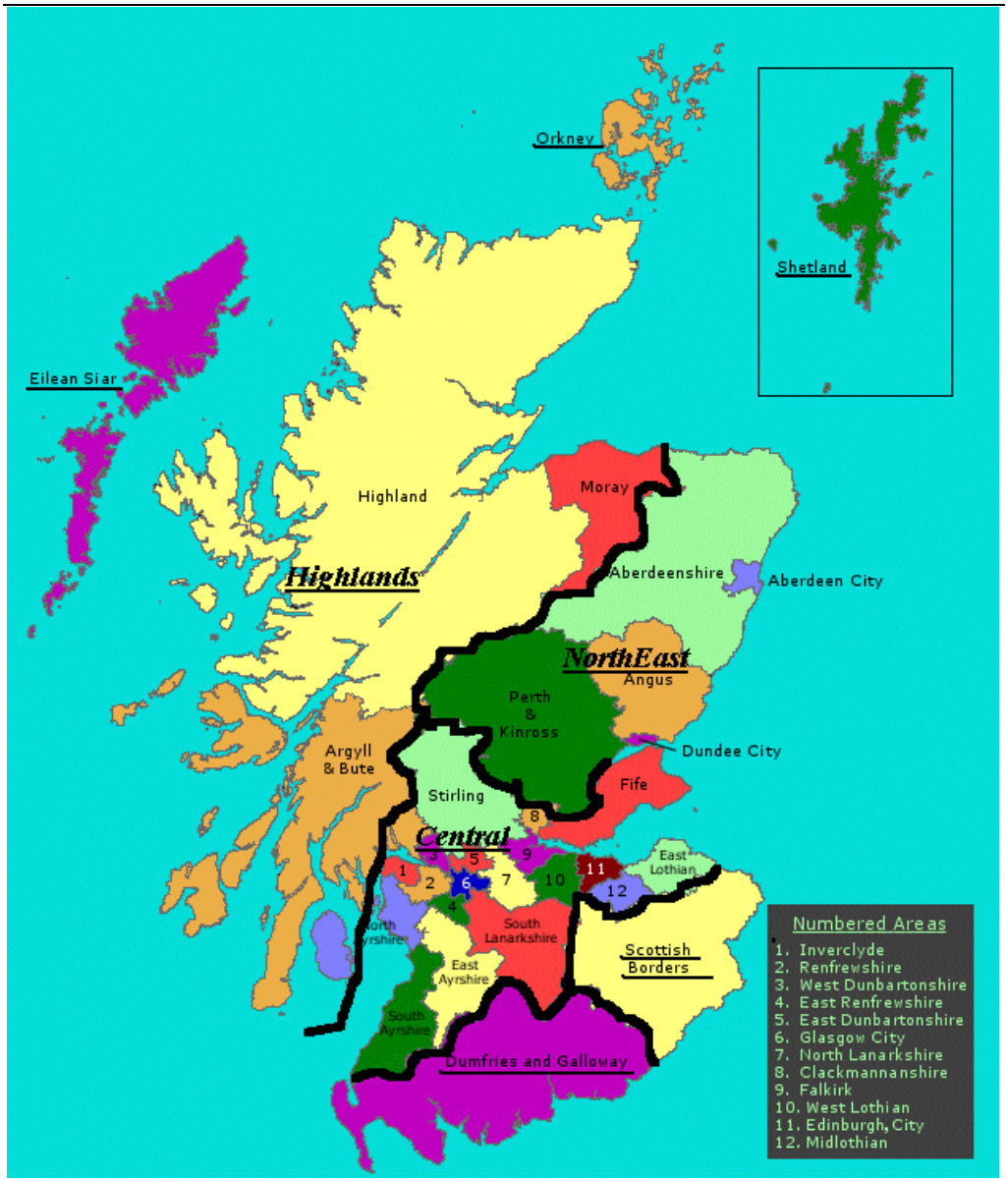
[9] EIA. This is defined as direct jobs at fisheries and indirect employment with suppliers (where purchases are made) and Gross Value Added (GVA) which is a measure of income broadly defined as the full costs of employees for employers and profits per annum.

[10] GVA. This is the monetary value of the contribution to the economy made by an industry. It can be measured as the market value of the industry's products and services, minus the cost of the inputs required to produce them; equivalently, it is the value of the wages and profits that the industry generates.

[11] NEV. This is broadly defined as the monetary difference between how much participants, and society, value an activity and the value of resources used to produce that activity, for example, the expenditure of owners of fisheries and rights.

[12] Income bands per annum for angling fisheries i.e., of £0-10k, £11-20k, £21-50k and over £55k.

Figure 1.1 Fishing Regions of Scotland



Source: Reproduced from "Economic Impact of Game and Coarse Angling in Scotland. Scottish Executive (2004)"

1.4.3 All the fisheries provided river access with a quarter offering fishing in the lochs. Almost four in ten had ghillies and guides for the anglers, with fishing huts (42%), fishing tackle (20%) and bait and boat hire (27%). Almost one in three made accommodation available at the fisheries, or close by. Very few offered clothing or camping facilities.

Table 1.1 Facilities provided at Fisheries

	Percentages of all respondents
	Total
River access	99
Loch access	24
Ghillies/guides	38
Fishing tackle/bait supplies	20
Clothing	1
Boat hire	27
Fishing huts	42
Accommodation (full/part board)	29
Camping/caravans	1
Other	10

Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q4)

1.4.4 Salmon and sea trout fishing was available at almost all (93%) fisheries responding, and brown trout at 73%. These fisheries on the salmon rivers provide few opportunities to fish for rainbow trout, pike or carp which can be fished elsewhere in stocked put-and-take fisheries. Grayling are only found on limited sites on rivers in Southern and Central Scotland.

Table 1.2 Fishing opportunities by species

	Percentages of all respondents
	Total
Salmon	98
Sea Trout	93
Pike	3
Brown Trout	70
Grayling	10
Carp	2
Rainbow Trout	3
Other game fishing	0
Other coarse fishing	0

Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q9)

1.4.5 Anglers, in the perception of fisheries managers, mainly travelled from Scotland (59%). Just over a third were from England, and less than a tenth were from overseas with the main locations being North America, Scandinavia and other locations in Western Europe.

The Anglers

1.4.6 The anglers who participated in the survey were primarily from Scotland (50%) and England (46%). The main English regions were London & South East and the North (with 14% and 13% respectively) followed by the Midlands, the South West and the Eastern Region. Just 4% responded from elsewhere[13]. See Table 1.3.

Table 1.3 Countries anglers live in (i.e., main residence)?

	Percentages of all respondents
	Total
Scotland	50
England–North	13
England— Midlands	7
England— Eastern Region	5
England— London and South East	14
England— South West	7
Elsewhere	4

Source: PACEC Survey of Participants 2015 (Q4)

1.4.7 The patterns are broadly consistent with the views of those who managed the fisheries. They considered that slightly more, six in ten anglers, were from Scotland, just over a third were from England and 7% from elsewhere.

1.4.8 The anglers participating in the survey were almost all male (98%). The largest age group was the 65+ years (38%), followed by the 55-64 age group (27%), the 45-54 year old group (17%) and the 35-44 year old group (12%). Just 6% were younger than 35 years of age. As a consequence of age four in ten were retired, a third were employed and a quarter were self-employed and ran their own businesses. Almost half were members of a fishing club in Scotland or elsewhere. Around half of anglers (with their partners or spouse) had a gross annual household income of over £50k per annum (with one in five having an income of over £100k per annum). A third had incomes of £25-50k per annum.

1.5 The Netting Fisheries

1.5.1 In Scotland netsmen are usually owners and rights holders of the fisheries they run as with most of the operators of the angling fisheries. They differ in the way salmon and trout are caught. The two main methods of fishing are fixed engine and net & coble with the former responsible for higher levels of catch. The net and coble activity takes place primarily on the east coast of Scotland, for example near Montrose and in the Borders. The fixed engine netting mainly takes place in the north

[13] The angler survey was circulated by Scottish / UK fishing organisations and Fishpal. These organisations do have overseas members but may not be representative of all overseas anglers who visit Scotland.

east, the Highland area, (for example, Banff) and in Dumfries and Galloway, for example the Solway estuary. There is also some small scale netting activity on the west coast, for example, at Loch Linnhe at Lochaber. Netting comprises about three independent companies with a few individuals who carry out netting. The membership of the trade association is around twenty to twenty-five but many of these are not active.

1.6 The Structure of the Report

1.6.1 Following this introduction the individual chapters are designed to describe the activities of the wild fisheries (in angling and netting), their scale and trends, and how these subsequently result in the economic and social benefits. The chapters cover:-

- The scale and nature of angling and netting activities in Scotland;
- The economic impact (EIA) and benefits of angling and netting;
- The net economic value (NEV);
- The public sector support for the wild fisheries;
- The market for fisheries and beats;
- Kill Licences for salmon;
- The overall qualitative experience of angling;
- The future prospects;
- The conclusions.

1.6.2 The appendices present the scope of the desk study, the list of stakeholders interviewed, topics covered by the surveys, the analysis for Net Economic Value, 10 case studies of fisheries and some comparisons with previous studies by region and species where possible.

2 The Scale and Nature of Angling and Netting in Scotland

2.1 Introduction

2.1.1 To assess the economic and social benefits that flow from fishing it is important to describe the activity which takes place. This chapter sets out the scale and nature of angling and netting activities in Scotland and the trends over recent years. It draws on the published data provided by Marine Scotland on fish caught and trends, surveys of fisheries, net operators and anglers, and the view of stakeholders and industry bodies. The main features of the chapter are:-

- The national and regional catch statistics taken from the information compiled by Marine Scotland or, for example, fish caught and released.
- The results of the fisheries survey to show the patterns of fishing by days, the number of anglers, the fish caught and those retained or released.
- The anglers survey results including where they fished by Scottish region, the number of trips and size of group.
- A profile of activities in the netting sector
- The perceptions of industry stakeholders and the Local Authorities on the activities and trends.

2.1.2 The chapter refers to previous reports on the sector where comparable information is available, and the views of those in the sector on what may have influenced the trends.

2.2 National Catch Data; Regulations on Catch, Retention, and Release

2.2.1 Marine Scotland Science are responsible for collecting statistics on salmon and sea trout caught in Scotland. The time series data for these statistics extends back to 1952. Since 1994, the statistics have distinguished between fish caught by rod and line that are retained and those that are subsequently released.

2.2.2 It is a criminal offence to fish for salmon or sea trout without the written permission of the rights holder. The river systems of Scotland, under the jurisdiction of District Salmon Fishery Boards, have an annual “close time” of at least 168 days where salmon may not be caught, with provisions to extend this season for rod and line fishing only. The extended seasons for rod and line broadly span the spring to autumn months – the most common seasonal dates are 11th February to 31st October. It is illegal to fish for salmon or sea trout on Sundays.

2.2.3 The Boards each provide their own guidelines on catch and release of salmon for the purposes of conserving stocks (provisions such as release of salmon caught before a certain date, release of gravid salmon, or restrictions on the number of fish to be

retained per day). In 2015 a new national statutory requirement was instituted that any salmon caught before April must be released back into the water.

2.2.4 It is a civil offence to fish for brown trout or other freshwater fish in Scotland without written permission from the rights holder. The national brown trout fishing season begins on the 15th March and ends on the 5th October, although individual fisheries may use shorter seasons. There is no close season for rainbow trout (which can be restocked) and availability depends upon individual fishery owners.

Marine Scotland catch statistics – salmon and sea trout

2.2.5 The total wild salmon rod catch in 2014, the most recent year available, was 45,175. This included both retained (8,036, or 18%) and released (37,139, or 82%) catches. The proportion of released catches among rod caught spring salmon[14] catches reached 93% in 2014, a record high (the equivalent figure in 1994 was under 1%).

2.2.6 The total number of sea trout caught by rod (including retained and released) was 22,058. The proportion of caught and released sea trout was the highest on record, at 80%.

2.2.7 Net catches remained low, having decreased compared to the previous years. Fixed engine catches in netting fell from 16,734 to 13,343 whilst net and coble catches fell from 7,636 to 4,435[15] or just over a quarter of the total net salmon catch.

2.2.8 No catch figures are kept for other species such as brown or rainbow trout, grayling, or pike and carp.

2.2.9 The annual rod catch of salmon showed a general slight increase over the period 1952 to 2010, with substantial year-to-year variation, according to long-term Marine Scotland time series data. Following the 2010 peak, salmon rod catches have fallen every year, and the 2014 rod catch figure is the second-lowest since 1952 when records began. It is impossible to tell from the data whether this short-term trend is set to continue or if the low size of the 2014 catch is a one-off event (see graph in Figure 2.2 below).

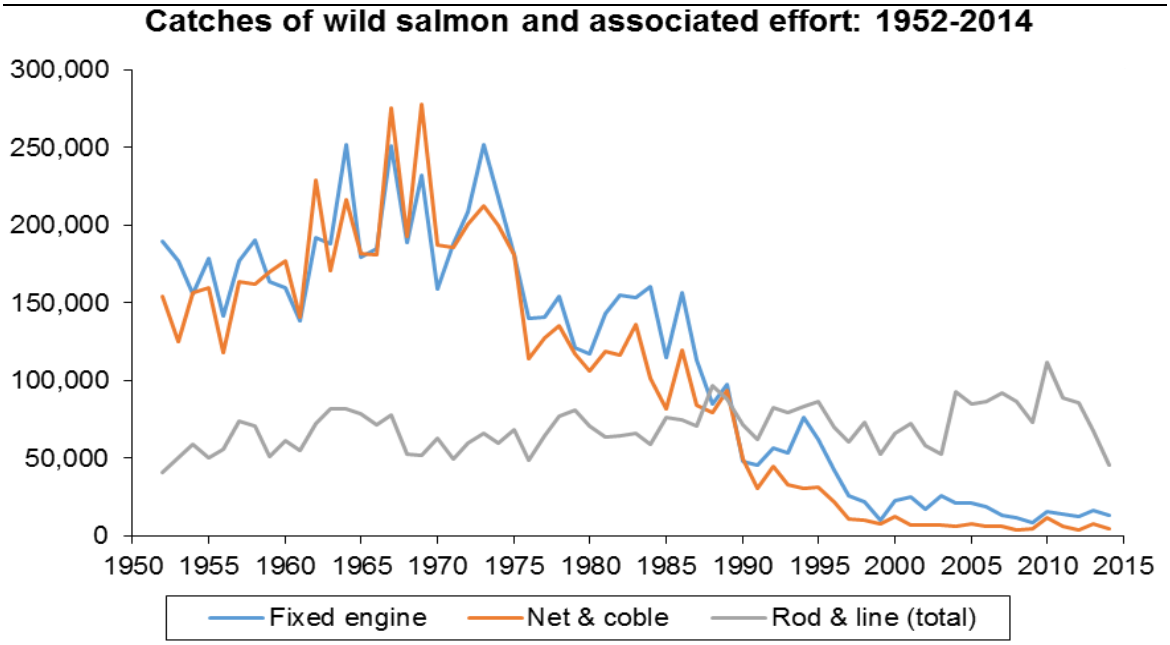
2.2.10 Although netting catches increased slightly in 2013, they remained extremely low by historical standards from the mid '60s to the mid '90s (see Figure 2.2 below), with effort expended[16] reaching record lows by 2014. .

[14] "Spring salmon" are defined as multi sea-winter fish taken before 1 May.

[15] Fixed engine netting dates from the early 1800s and comprises bag nets (with traps) and stake nets which are laid outside estuary limits. Net and coble methods, within estuarial limits, date back to the 12th Century and comprise a curtain of netting laid out from a coble (or boat) to encircle fish in a pocket of the net. The sector is subject to the overall legal framework covering, for example, salmon and trout fishing in Scotland with the seasons, locations at the river estuaries and the catch data returns.

[16] "Effort" is measured in terms of "trap-months" for fixed engine fisheries and "crew-months" for net and coble fisheries.

Figure 2.2 Rod and Net Salmon Catches : 1952-2014



Source: Marine Scotland.

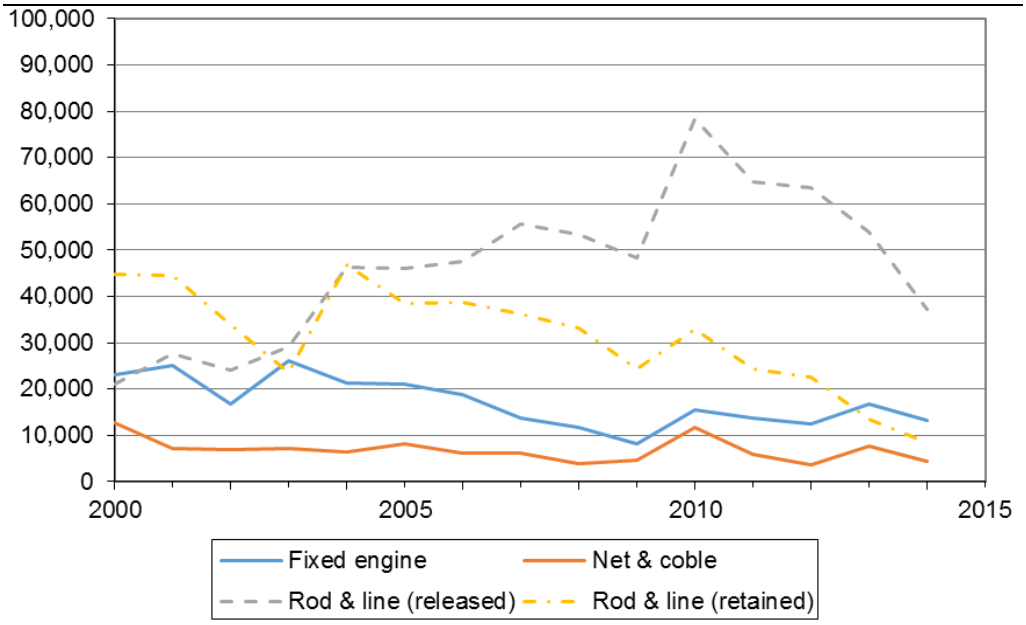
2.2.11 The high proportion of salmon and sea trout being caught and released indicates a weakening in the relationship between rod catches and estimated fish stocks, since a proportion of fish released from the rod fishery may be re-caught and hence inflate the number of fish available to catch and recorded in the catch statistics, by appearing in the reported data more than once. However, the Marine Scotland statistical bulletins report that "while catch and release may have had a small effect on reported catch, it was not sufficient to change the overall trend).

2.2.12 Figure 2.3 below shows the recent trend (2000-2014) and also disaggregates the released rod catch from the retained rod catch. It can be seen that the retained rod catch has declined as a share of the total rod catch and as a share of the total retained catch, to the point that the number of salmon caught by rod and retained is now (2013-14) lower than the number of fish caught by fixed engine fisheries[17].

2.2.13 Catch statistics are not recorded for pike and carp. The view in the sector was that the amount of fishing activity had risen in recent years, as greater numbers of people took part in coarse fishing.

[17] The same is true for sea trout: in 2014, 4,308 sea trout were reported caught and retained in the rod and line fishery, and a total of 6,108 in the net fisheries.

Figure 2.3 **Rod and net salmon catches (retained and released), 2000-2014**



Source: Marine Scotland

2.3 Regional Catch Data and Seasonal Variations

2.3.1 The regional breakdown of salmon and sea trout caught by rod and line (whether retained or released) is shown in Table 2.4 below. The most significant regions for salmon and sea trout are the Highlands (which includes Moray and a number of major salmon rivers including the River Spey) and North East Scotland (which includes the Rivers Dee, Don, Tay and Esk), which between them account for 72% of salmon catch and 60% of sea trout catch. Although about twice as many salmon as sea trout were caught in 2014, in Western Isles, Orkney and Shetland, and Dumfries and Galloway more sea trout were caught.

Table 2.4 **Rod catch of salmon and sea trout by region of Scotland, 2014**

	Rod catch by region	
	Salmon	Sea Trout
Borders	7,584	1,995
Central	2,853	1,821
Dumfries & Galloway	1,096	1,743
Highland	18,510	8,092
North East	14,063	5,119
Orkney and Shetland	0	317
Western Isles	1,069	2,971
Total	45,175	22,058

Source: Marine Scotland

2.3.2 Table 2.5 below shows the regional distribution of salmon and sea trout netting catch, by method, in 2014. Most fish landed in 2014 were salmon, using the fixed engine

method, in the Highland and North East regions (5,038 and 7,217 fish caught respectively). The net and coble catch was almost exclusively in the Borders and North East regions, and relatively evenly spread between salmon and sea trout (roughly 2,000 fish of each species in each of these 2 regions).

Table 2.5 Netting catch of salmon and sea trout by region of Scotland, 2014

	Net catch by region	
	Salmon	Sea Trout
Fixed Engine		
Borders	77	286
Dumfries & Galloway	1,011	1,159
Highland	5,038	41
North East	7,217	894
Fixed Engine Total	**13,343**	**2,380**
Net and Coble		
Borders	2,001	1,607
Central	66	90
Dumfries & Galloway	44	0
Highland	40	4
North East	2,270	2,027
Western Isles	14	0
Net and Coble Total	**4,435**	**3,728**
Netting Total	**17,778**	**6,108**

Source: Marine Scotland

2.3.3 The monthly variation in rod catch of salmon and sea trout in 2014 (which is broadly indicative of annual seasonal trends) is set out in Table 2.6 below. The number of grilse (adult salmon that have spent only a single winter at sea) showed a sharp peak in August in 2014. The number of sea trout caught is highest in June, July, and August. The catch of multi sea-winter salmon has two broad seasonal peaks: firstly, there is the spring salmon run which reaches its peak in May before falling off; followed by the three months with the highest adult salmon catch of all, which are August to October.

Table 2.6 Rod catch of salmon and sea trout by month, 2014

	Rod catch by month		
	Grilse	Multi sea-winter salmon	Sea Trout
January	0	53	3
February	0	617	73
March	1	2,026	277
April	18	2,501	556
May	160	3,361	1,724
June	484	2,725	4,119
July	1,698	1,586	4,509
August	5,857	6,264	5,906
September	3,093	4,504	2,714
October	2,653	6,508	1,984
November	191	875	193
Total	14,155	31,020	22,058

Source: Marine Scotland

2.3.4 There is also considerable regional variation in the pattern of fishing activity and catch. For example, in 2014, the Tweed and Tay recorded very strong peaks in salmon catch in October, the Spey peaked in August, and the Dee exhibited relatively even catch levels from February to October, with broad peaks in May and August-September, and a dip in July.

2.4 The Operation of Fisheries for Anglers

2.4.1 This section presents the results from the survey of fisheries. The responses are affected in many cases by the size of the fishery, which we have measured in terms of the total fishery *expenditure*[18] on providing fishing opportunities in 2014 (in five size bands: £0-10k, £11-20k, £21-50k, £51-100k, and over £100k). Where there are significant differences between responses of fisheries of different sizes, we have reported these in the text.

2.4.2 The survey of fisheries sought to assess the number of days that fishing took place at the fisheries. For 30% of fisheries there were between 1 and 50 days of fishing in 2014 and for a fifth 51-100 days and 151-200 days, respectively. One in six fisheries reported that fishing took place on over 200 days in 2014.

[18] The survey also asked for total fishery *revenue* from anglers. As many fisheries are run at a loss (their primary purpose may not be to generate income) or are subsidised by other onsite revenue streams, the expenditure figure is a better indicator of the scale of activity.

Figure 2.4 Number of days that fishing took place at fisheries 2014

	Percentages of all respondents
	Total
1–50	30
51–100	19
101–150	13
151–200	21
200+	16

PACEC Survey of Fishing Providers, 2015 (Q10)

2.4.3 For 75% of fisheries the average number of anglers per day was between 1 and 5, for 4% it was 20 to 50 and for just 1% more than 50 anglers, with the remainder between 5 and 20. This reflects the range of activities between small privately-owned waters, angling club waters, and commercial fisheries.

2.4.4 The data from the survey of fisheries, and the Marine Scotland district-level data on salmon and sea trout catch, allows us to estimate the amount of fishing effort (angler days) expended on salmon and trout fishing in Scotland by region. This was accomplished by asking each fishery about the number of salmon and trout catches which it recorded in the official statistics, and using this information to extrapolate from the survey responses to the activity reported by region in the Marine Scotland data. Out of 490,000 total angler days, most effort is expended in the North East (171,000 angler days) and Highland (140,000) regions. This is broadly in accordance with the estimates presented in Radford (2004) of 545,048 total angler days, 190,853 in the North East and 190,589 in the Highlands. For comparison, total rod and line catch in 2004 was 92,979 salmon (compared to the reported catch of 45,175 in 2014).

2.4.5 It should be noted that 2004 had very strong catch figures relative to the 5-year average of 60,276 and catches recorded in 2014. The relationship between catch and effort is likely[19] to be rather weak in the short-term; any change in angler effort driven by the availability of salmon is unlikely to be instantaneous.

[19] "Responsiveness of demand for angler days to changes in catch per day / per angler" is identified as a research priority by Radford (2009). Currently, there is poor information on the mechanisms linking changes in stocks exploitable by anglers and income and employment.

Table 2.7 Fishing effort by rod and line anglers (angler days), 2014 and 2004

	Angler days on salmon and sea trout fishing	
	2014	2004 (Radford)
Borders	82,000	43,000
Central	36,000	61,646
Dumfries & Galloway	46,000	38,245
Highland	140,000	190,589
North East	171,000	190,853
Orkney & Shetland	<1,000*	<100
Western Isles	17,000	10,715
Total	490,000	545,048

* There are no returns to the Marine Scotland salmon and sea trout statistics from Orkney. The Orkney Trout Fishing Association reports substantial brown trout fishing activity, amounting to 17-18,000 angler days annually, but minimal sea trout catch.
Note: PACEC estimates are rounded to the nearest thousand.

2.4.6 When all species are included, we estimate that there were 1.3 million angler days in total in Scotland, with the major regions being Central (360,000), North East (340,000), and Highland (240,000). The equivalent figures from Radford (2004) were 1,386,043 total days, with 473,233 in the Central region, 365,864 in the North East, and 306,782 days in the Highlands.

2.4.7 Appendix F shows comparison on angler days by region and species with results in the Radford (2004) study, where possible.

2.4.8 The fishery survey respondents were asked to state the number of fish caught during the year, and the split between those released and those retained. The most commonly caught fish were salmon and brown trout; the most commonly *retained* fish were rainbow trout, reflecting the fact that these are stocked species. In addition, as rainbow trout are non-native to Scotland, any fish caught in rivers (as opposed to stocked fisheries) are likely to be escaped fish and therefore normal practice would be to retain these fish.

Table 2.8 Average number of fish caught at each fishery in 2014

	Average (mean) amount	
	Caught and released	Caught and retained
Salmon	74.2	11.0
Sea Trout	20.2	1.8
Brown Trout	66.8	7.3
Rainbow Trout	1.6	24.8
Grayling	3.1	0.5
Other game fish	6.8	6.8

PACEC Survey of Fishing Providers, 2015 (Q21)

2.4.9 The majority of fisheries (52%) reported that the total amount of angling activity (as measured by the number of angler days) had stayed the same in the past 5 years.

Angling activity was reported to have decreased for almost one third (29%), increased for the remaining 18%. None of the largest fisheries (annual expenditure on angling in excess of £50k) said they had a fall and 44% of these fisheries said that the number had increased.

2.4.10 A fifth of all fisheries (19%) have had an increase in their number of overnight visitors[20] in the past 5 years. 26% reported a decrease in overnight visits, while 56% said they had remained the same. This represents a slightly more positive result than for total angling activity (as reported in the previous paragraph), suggesting a small transfer of activity from day visitors to overnight visitors. Only for the larger fisheries (above £50k in fisheries expenditure) did a higher proportion have an increase compared to a decrease, and none of the largest fisheries (those in the £100k+ size band) reported a decrease.

2.4.11 For the activities at fisheries see the case studies set out in Appendix E.

2.5 The Activities of Anglers

2.5.1 Salmon was the fish targeted by the greatest proportion of anglers responding to the survey (76%), while brown trout (50%) and sea trout (49%) were the main others followed by rainbow trout (20%) and those fishing for pike and other fish (coarse angling).

Table 2.9 Fish species fished for

	Percentages of all respondents
	Total
Salmon	76
Rainbow trout	20
Brown trout	50
Sea Trout	49
Grayling	10
Coarse (Pike and all other fish)	19
Other	4

Source: PACEC Survey of Participants 2015 (Q11)

2.5.2 The target fish species varied by the residences of the anglers. Anglers resident outside Scotland were much more likely to fish for salmon during the year (up to 96% of those living in London or the South East of England) than those living in Scotland (59%). Anglers from outside Scotland were less likely to fish for other species than those living in Scotland, with the exception of sea trout where the difference between Scotland and the English regions was not significant.

[20] This includes people spending the night at accommodation provided by the fishery or other local accommodation. 29% of fisheries provided their own accommodation.

Table 2.10 What fish species did you fish for?

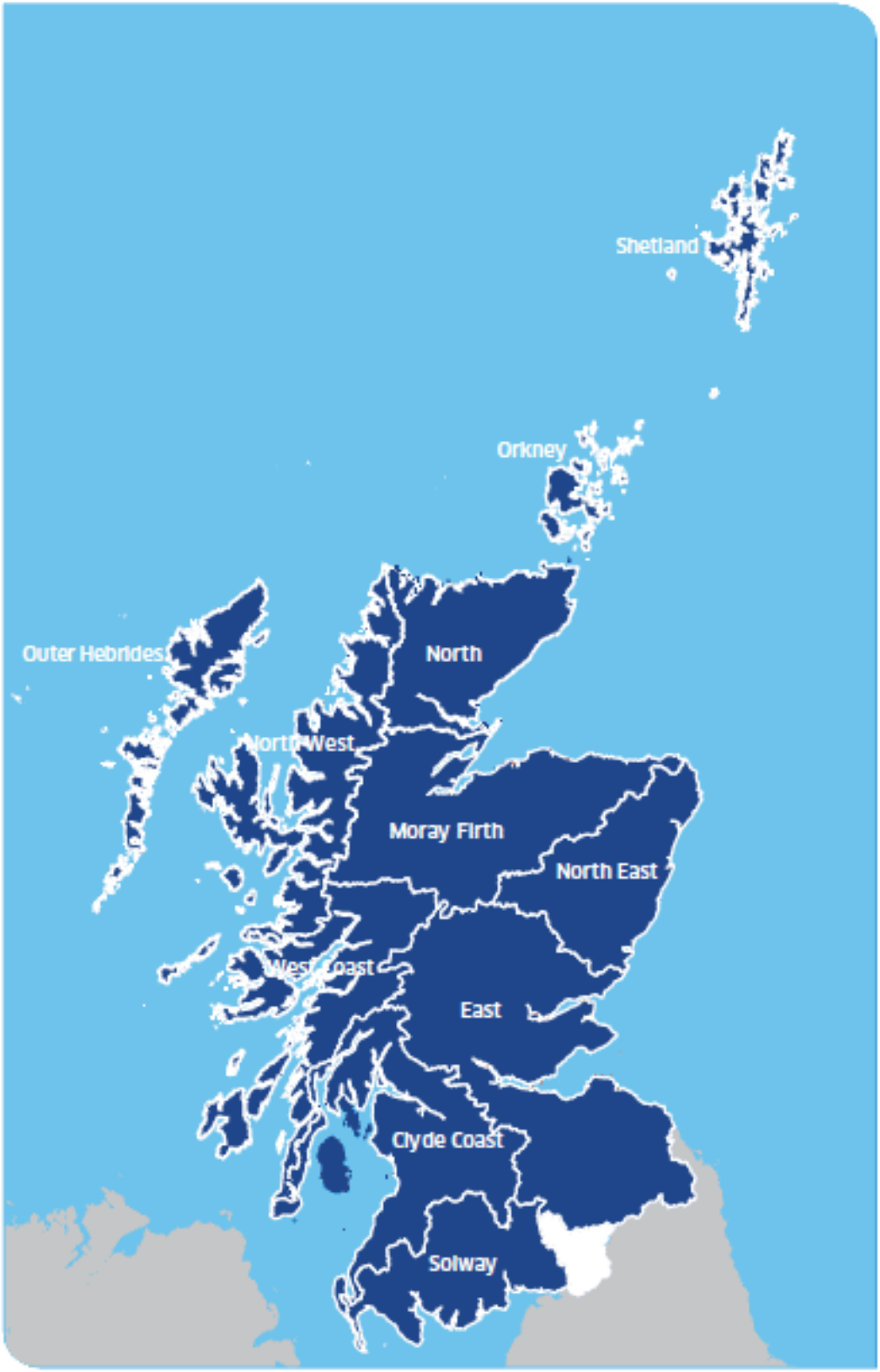
	Percentages of all respondents							
	Total	Scotland	England - North	England Midlands	England East	England Lon/SE	England SW	Other
Salmon	76	**59**	**90**	**93**	88	**96**	**95**	75
Rainbow trout	20	**36**	**1**	**5**	**6**	**8**	**2**	**4**
Brown trout	50	**67**	**38**	**28**	**29**	**35**	**32**	46
Sea Trout	49	46	48	47	41	57	61	38
Grayling	10	**16**	7	5	6	**2**	5	13
Coarse fish	19	**37**	**2**	**2**	**3**	**2**	**2**	8
Other	4	**7**	2	0	0	1	2	4

Note: Statlsitically significant differences (95% confidence) between regions and the total are highlighted in bold. A yellow highlight indicates that the difference is at least 5%, an orange highlight at least 10%.
Source: PACEC Survey of Fisheries 2015 (Q11)

2.5.3 The anglers were asked which regions of Scotland they had fished in in 2014 (using Marine Scotland statistical regions[21] for salmon and sea trout catch data) (see Table 2.9). The most popular area in Scotland for anglers in 2014 was the Eastern region (Forth, Tay and Tweed), where just over half of all respondents have fished. Moray Firth and the North East were the next most popular regions with 35% and 30% of anglers respectively. The North attracted 23% and the West Coast 17%.

[21] The regions used do not exactly correspond to the regions used in the rest of the document: broadly, "Clyde Coast" and "East" are equivalent to "Central" and "Borders" combined, "Dumfries and Galloway" and "Solway" are equivalent, "Moray Firth", "North", "North West", and "West Coast" are in combination equivalent to "Highland", but the "North East" statistical region is slightly smaller than the equivalent used in the rest of this report and in Radford (2004).

Figure 2.5 Map of Marine Scotland regions



Source: "Marine Scotland, "Collecting the Marine Scotland Salmon and Sea Trout Fishery Statistics", http://www.gov.scot/Publications/2014/09/9467/1, http://www.gov.scot/Resource/0045/00459580.gif

Table 2.11 The Regions Anglers Visited. 2014

	Percentages of all respondents
	Total
Clyde Coast	17
East (Forth, Tay, Tweed)	51
Moray Firth	35
North	23
North East	30
North West	13
Outer Hebrides	8
Solway	13
West Coast	17
Orkney	2
Shetlands	1

Respondents could select more than one option; so percentages in any column may sum to more than 100
Source: PACEC Survey of Participants 2015 (Q5)

2.5.4 The locations where anglers went to fish varied somewhat according to the residence of the angler. Anglers living in Scotland were more likely to fish in the Clyde Coast, West Coast or Solway regions than those living outside Scotland. Anglers from the North of England were more likely to visit the East region (the Forth, Tay, and Tweed) or the Solway region.

2.5.5 Just over half of the anglers made one to four "fishing trips"[22] to Scotland in 2013 and one in six made five to nine trips. Only 2% made over 100 fishing trips.

Table 2.12 Number of Trips for fishing in Scotland 2013

	Percentages of all respondents
	Total
None	0
1 to 4	54
5 to 9	16
10 to 19	11
20 to 49	13
50 to 99	5
100 to 124	1
125 to 250	1
250+	0

Source: PACEC Survey of Participants 2015 (Q6)

[22] For this question, a day's fishing without an overnight stay away from home is a single "fishing trip", and any period of consecutive days with overnight stays away from home for the purpose of fishing also constitutes a single "fishing trip".

2.5.6 Almost one in six of all anglers went fishing alone in 2013 but the proportion was 29% for grayling anglers. Most anglers (39%) fished with between two and four people. Only 6% of all anglers travelled to go fishing with 10 or more other people, with the remaining 26% typically fishing with 5-9 other people. The majority of rainbow trout, grayling and coarse anglers went fishing either alone or with one other person, but this proportion is only 3 in 10 for salmon and sea trout anglers.

2.5.7 The majority of anglers stayed overnight in Scotland at some point during the year (83%) and this proportion is highest for salmon and sea trout anglers (91%) and lowest for rainbow trout anglers (69%). For those who stayed overnight (including those resident in Scotland who nevertheless spent the night away from home for fishing purposes), 21% stayed for less than a week. Some one in five of anglers stayed for at least a month. The median stay was approximately two weeks.

2.6 The Netting Sector Operations

2.6.1 In line with Marine Scotland data, the organisations in the netting sector confirmed that over the past few years their catch levelled out with some fluctuations and was historically very low. They reported that fixed engine catch was the largest, accounting for two thirds to three quarters of their total catch compared with the net and coble methods. Their overall catch was just above a quarter of the total catch of salmon for Scotland including the rod and line methods and was declining.[23]

2.6.2 Although not directly involved in angling the views of the netting organisations were that the number of people fishing and visitors to Scotland had been in decline since the recession (as the key factor) except on the larger rivers where activity had probably held up.

2.7 Interviews with other Stakeholders

2.7.1 The interviews with other stakeholders mainly included the various industry bodies who represented the fisheries, anglers and the netting sector[24].

2.7.2 The potential influences on trends and activities were examined. The main view was that the catch had declined largely because of a perceived fall in the stocks of fish combined with a fall in the number of anglers mainly because of the financial crisis recession in the years 2007-9 (and the conditions of economic hardship and reduced household expenditure which persisted after the recession had officially ended[25]). Climate change and global warming lay behind the fall in stocks which resulted in less

[23] However as rod and line caught fish are increasingly being released, the share of *retained* fish accounted for by netting was 69% in 2014 – 52% fixed engine, 17% net and coble. The share of mortality will be slightly less than this as not all released fish survive.

[24] See Appendix B for the stakeholder organisations.

[25] The ONS Living Costs and Food Survey shows that UK expenditure on “recreation and culture” fell in 2009 and 2010.

fish food stuff combined with increased predators. Anglers found it more difficult to catch fish, which influenced the participation, although other features attracted them to Scotland such as the scenery and fresh air as well as the overall "Scottish experience".

2.7.3 In terms of the number of anglers and angler days for salmon and trout the views were split to some extent. The largest group of stakeholders thought that numbers had been in decline and influenced by the recession from 2008/09 although the good rivers had seen some growth. The peak was generally considered to be 2009 after which there had been a fall off primarily as a result of the recession and the perceived decline in fish stocks. In the future, over the next five years or so, most stakeholders foresaw stability while a smaller group either saw continuing decline or some growth in the most active rivers (Tweed, Tay, Dee, Spey), especially of foreign visitors from the USA, Australia, Germany and Scandinavia.

2.7.4 The relatively small numbers of fish being caught was a key issue (raising questions of value for money), however, for some this was offset by other Scottish visitor attractions such as the rural environment, countryside, mountains, lochs, national parks together with heritage sites and museums and other tourist/visitor attractions. These combined to form the "Scottish Experience". However, the patterns of booking were changing with a growth in short term booking which could create uncertainty, there were insufficient young people involved in fishing (in terms of future visitors) and some locations were easier to access because of improved transport infrastructure making others relatively more difficult to access.

2.7.5 It was considered that in the recent years the attractiveness of pike and carp fishing, which was not on the main rivers, had increased as access and facilities were improving and salmon stocks were declining. Hence some anglers were seeking alternatives to salmon and trout fishing.

2.8 Views of Local Authorities

2.8.1 In terms of the influences on activity the Local Authorities agreed with other industry stakeholders. The majority of staff at the Local Authorities thought that the number of fishing visitors had decreased over the past 5 years and was influenced by the recession. One person explained: "There has been a real effort to support tourism in Scotland in recent years and that includes fishing". The other officers thought that the number of fishing visitors had either decreased or had remained the same.

2.8.2 When asked about their views on the number of fishing visitors to their area for the next 5 years, half of the officers were optimistic and thought they would increase. The others were not sure.

2.9 The Overall Views on Trends

2.9.1 The overall view was that the fish caught was influenced by both a fall in fish stocks (many as a result of global warming and climate change) and the impact of the recession on anglers.

2.9.2 The general views of those interviewed (i.e., the fisheries for anglers, the netting organisations, the industry stakeholders, and the Local Authorities) were that the number of anglers for wild fish in Scotland (in particular for salmon and trout) had either stayed the same or had declined over the past five years, and had been influenced by recession amongst other things. This was the case across all regions with the exception of the larger fisheries on the large east coast rivers such as the Spey, Dee, Tay and Tweed). For these fisheries the number of anglers as overnight visitors had stayed the same (and just over eight in ten anglers surveyed said they stayed overnight) but the consultees on most other rivers considered that overnight visitors had declined.

2.9.3 Overall the recession was identified as the main factor which influenced a decrease in activity followed by uncertainty and the perceived decline in fish stocks (notably salmon). However, many visitors were still attracted by the "Scottish experience" – the environment, fresh air, the culture and heritage sites and other visitor attractions.

2.9.4 The anglers responding to the survey typically fished in the east (on the Tay, Forth or Tweed), Moray Firth, the north east and north (on the Spey and Dee). They made between one and four trips per annum, travelled with between two and four other anglers. The majority (83%) stayed overnight (between seven and fourteen nights) and predominantly fished for salmon followed by brown and sea trout.

2.9.5 The Scottish salmon and sea trout catch statistics do not record angler effort (which would be measured in "angler days", units of one angler fishing for one day). The only comparable national study to this was Radford (2004) which estimated 545,048 salmon and sea trout angler days in 2004, from a total of 1,386,043 angler days for all species. This study estimates 490,000 salmon and sea trout angler days for the year 2014, as set out above in Table 2.7 above, and a total of 1,300,000 angler days for all species.

3 The Economic Impact (EIA) and Benefits of Angling and Netting

3.1 Introduction

3.1.1 Two different analytical frameworks are used in this report to quantify the benefits and value of angling and netting: Economic Impact Assessment and Net Economic Value. The Scottish economic impact of wild fisheries is defined as its quantifiable benefits in terms of employment and income for businesses and households in Scotland. The monetary value of the household and business income can be measured as Gross Value Added (GVA). It can be expressed as the market value of the industry's products and services minus the cost of the inputs required to produce them, or equivalently the value of the wages and profits that the industry generates.

3.1.2 The Net Economic Value of an activity is defined as its value to participants and society (measured in monetary terms) over and above the value of the resources used to provide it (i.e., expenditure on fishing operations). It differs from GVA in two main ways. Firstly, the value of the activity may not solely accrue to those who provide or pay for the activity – the preferences of *all individuals in society* should be accounted for. For example, non-angling residents of Scotland may value the fact that others can enjoy angling, or angling's contribution to Scotland's international reputation. Secondly, the price that consumers pay is not always an accurate reflection of their perceived value – anglers may derive satisfaction over and above what they actually pay, providers may derive satisfaction over and above any profit they make from letting fishing opportunities, and there may be a value associated with the knowledge that future generations can enjoy fishing which is not captured in the price or profits.

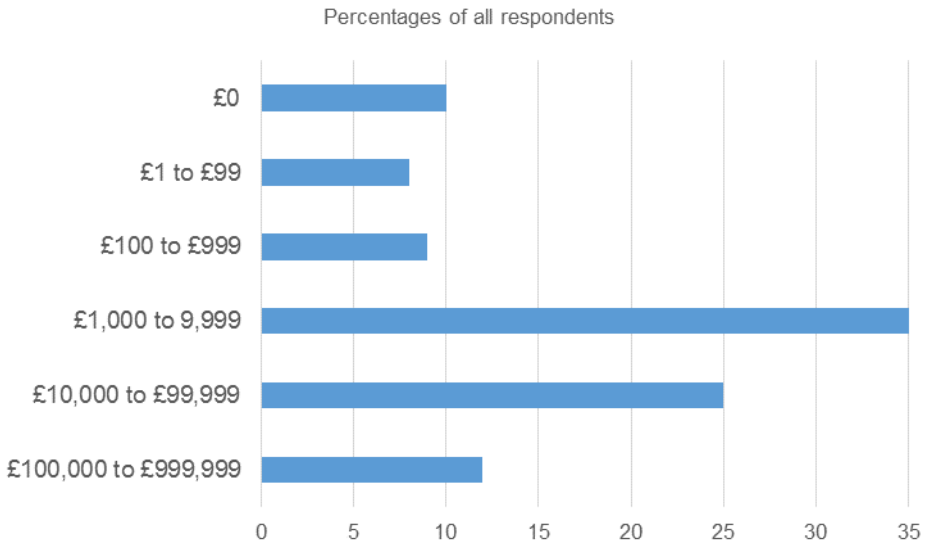
3.1.3 This chapter presents the economic and social benefits from both angling and netting. As set out above, the focus of this chapter is on employment opportunities and Gross Value Added (GVA) to the Scottish economy – the economic impact assessment (EIA). In the EIA framework, the expenditure of anglers at fisheries provides income that sustains employment in Scotland. The expenditure of fisheries on suppliers locally and elsewhere in Scotland which generates indirect employment and GVA. There are also additional jobs and GVA that arise through the expenditure of anglers away from fisheries, e.g. – on accommodation, food and drink, travel and clothing, etc. The chapter concludes with the qualitative views of the stakeholders and Local Authorities on the importance of the economic benefits from angling and netting in their areas.

3.2 Fishery Income

3.2.1 The expenditure by anglers at the fisheries (provided by the fisheries) was the key source of information for estimating fisheries income. The average fishery revenue from angling activity in 2014 was around £54,000. The distribution was highly

skewed, with the median expenditure being just £4,000 but the maximum being £800,000. Over a third of fisheries recorded angler expenditure of between £1,000 and £10,000.

Figure 3.1 Total on-site expenditure by all anglers in 2014 (including VAT)



PACEC Survey of Fishing Providers, 2015 (Q16)

3.2.2 On average, fisheries estimated that 45% of this revenue came from tourists (i.e. overnight visitors in Scotland). The distribution of tourist revenue was highly uneven, with 42% of fisheries deriving only 0-4% of expenditure from tourists[26], yet 39% of them derived about 75-100% from overnight stayers. On average, the smaller fisheries (those spending £10,000 or less on providing fishing opportunities during the year) stated that 28% of their revenue came from overnight visitors, and the larger fisheries(spending over £50,000) had on average 66% of their revenue coming from these tourists. This accords with the finding elsewhere in the survey, that of the 29% of fisheries providing on-site accommodation, 20% are among the smaller ones (expenditure by participants under £10k) and 63% among the the larger (angler expenditure over £50k). Taking all of the above into account and weighting the survey data to account for the amount of expenditure at each fishery, we estimate that 62% of angler expenditure is accounted for by tourists.

[26] This group may include angling associations with a local membership.

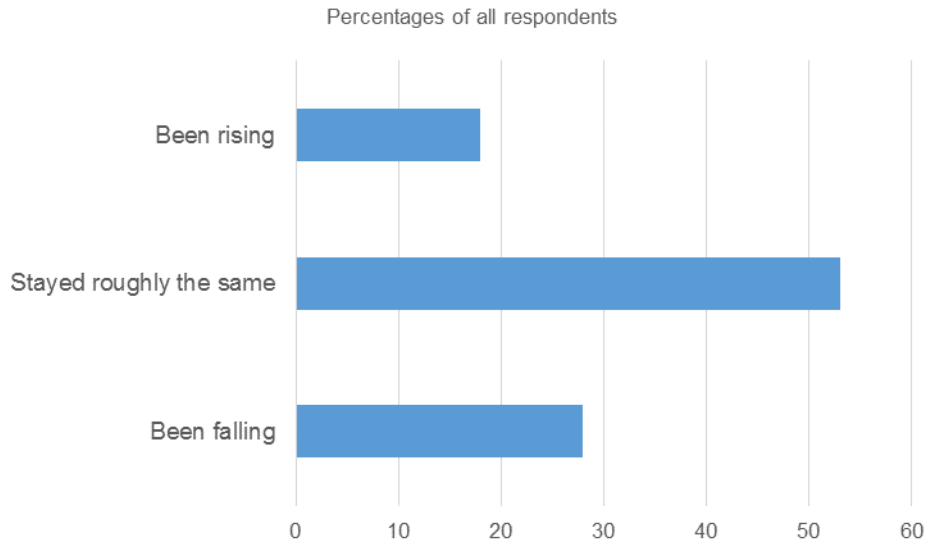
Table 3.1 Fishery revenue accounted for by tourists (i.e., overnight visitors to Scotland)

Percentage of angler expenditure accounted for by tourist	Percentages of all respondents
	Total
0	29
1 to 4	13
4 to 9	2
10 to 24	1
25 to 49	10
50 to 74	6
75 to 99	20
100	19

PACEC Survey of Fishing Providers, 2015 (Q16)

3.2.3 The fishery survey respondents were asked to consider how their fishery-related income had changed over the past 5 years. Just over half the fisheries stated that their fishery-related income had stayed roughly the same. 18% said that it had been rising, while 28% said that it had been falling. This is consistent with the reporting of angler numbers in Chapter 2, as well as the national reported catch figures for salmon and sea trout.

Figure 3.2 Change in fishery income over the past 5 years



PACEC Survey of Fishing Providers, 2015 (Q20)

3.2.4 Among those fisheries who reported a rise in income over the past 5 years, most said that the percentage rise over that period had been 10-24%, with the average being 21.6%. Among those reporting a fall in income, the average was a 19.6% drop; however, nearly half of these fisheries had recorded a fall in income of 25-49%.

3.2.5 On average, the fisheries surveyed had 1.2 paid full-time employees, 1.3 paid part-time employees, 0.3 unpaid full-time workers[27], and 0.7 unpaid part-time workers. More than half (61%) had no paid full-time employees, and 54% had no paid part-time employees. Treating each paid part-time job as the equivalent of half a full-time job in terms of the time worked, the average paid Full-Time Equivalent (FTE) employment at the fisheries was 1.9.

Table 3.2 The average number of paid and unpaid jobs at the sites in 2014

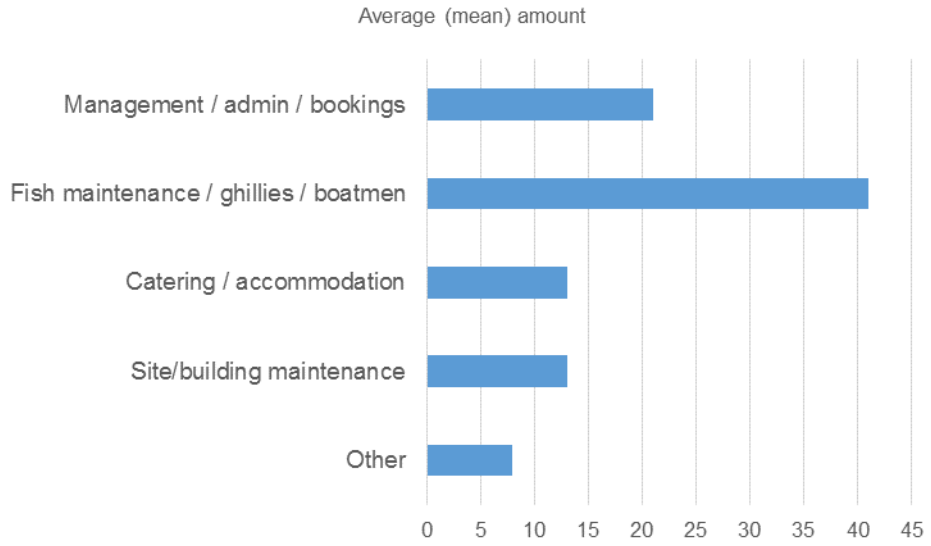
	Percentages of all respondents			
	Paid FT	Unpaid FT	Paid PT	Unpaid PT
0	61	93	54	67
1	15	3	25	19
2	11	1	8	5
3	2	0	4	1
4	3	2	1	7
5 to 9	5	0	2	2
10 thru 19	2	1	4	0
Average:	*1.2*	*0.3*	*1.3*	*0.7*

PACEC Survey of Fishing Providers, 2015 (Q23)

3.2.6 The most common paid occupation among the members of staff at the fisheries was the broad occupation of fishery maintenance, ghillies, and boatmen. On average, 41% of paid staff were in these occupations. Management, admin, and bookings made up 21% of occupations, and the categories of "catering/accommodation" and "site/building maintenance" each made up 13% of paid employment.

[27] The figure for unpaid workers includes volunteers and uncompensated landowners (and their families).

Figure 3.3 The main paid occupations



PACEC Survey of Fishing Providers, 2015 (Q24)

3.3 Fisheries-Related Expenditure on Supplies

3.3.1 The fisheries' expenditure on supplies results in indirect employment opportunities in the supply chain. Over half (56%) of the fisheries in the survey spent up to £10k to provide fishing opportunities in 2014. The average total expenditure was £58,000, reflecting the fact that a significant number of fisheries (18% of the sample) spent over £100,000 per year. As many fisheries offered fishing opportunities for multiple species, a true disaggregation of expenditure by species is not possible from our survey data – the species overlap to a great extent. However, the trend is for fisheries offering salmon and sea trout to have spent more on fishing opportunities, and fisheries offering brown and rainbow trout to have spent less. Fisheries offering pike and carp fishing exclusively fell into the lowest total expenditure bracket (£0-10k).

Table 3.3 Total expenditure in 2014 in total (all costs including VAT) in order to provide fishing opportunities

	Percentages of all respondents
	Total
£0–10K	56
£11-20K	11
£21–50K	14
£51-100K	2
Over £100k	18
Average	*£58,000*

PACEC Survey of Fishing Providers, 2015 (Q25)

3.3.2 The average breakdown of on-site expenditure in 2014 was £18,600 on staff costs, £30,300 on other operational costs, and £9,100 on capital expenditure (as capital costs vary from year to year, respondents were asked to provide a 5-year average). A banded breakdown of these costs is shown below in Table 3.4.

Table 3.4 Total on-site expenditure by category in 2014

	Percentages of all respondents		
	Staff	Operational	Capital (5-year average)
0	40	15	46
£1 to £99	10	6	8
£100 to £999	5	9	8
£1,000 to £9,999	19	36	22
£10,000 to £99.999	19	26	15
£100,000 to £999,999	8	8	1
£1,000,000+	0	1	0
Average	*£18,600*	*£30,300*	*£9,100*

PACEC Survey of Fishing Providers, 2015 (Q26, 27, 29)

3.3.3 The fisheries reported that most of their expenditure for supplies of goods and services took place locally (defined for the purposes of this survey as within 12-15 miles of the fishery), and around 95% was spent somewhere in Scotland. On average, 78.6% of operational expenditure (excluding staff costs) and 74.4% of capital expenditure by fisheries took place locally.

Table 3.5 Geographical distribution of operational and capital expenditure on supplies of goods and services

	Average (mean) amount	
	Operational (excluding staff)	Capital (5-year average)
Locally (12-15 miles) %	78.6	74.4
Elsewhere in Scotland %	16.6	20.9
Rest of UK %	4.8	5.1
Overseas %	0.0	0.0

PACEC Survey of Fishing Providers, 2015 (Q28)

3.3.4 Consultation with netting organisations suggested a similar distribution of expenditure, with around 80% of expenditure on supplies described as “local”.

3.3.5 The fisheries were asked to provide an estimate of their profit in 2014. Not all those who gave expenditure figures were able to do so; however, those that did gave a range of answers from losses of up to £40,000 to profits of up to £56,000, with the most frequent answer being a slight loss of up to £1,000 – this group comprised 38% of the respondents to the question. The average profit was £3,000 in 2014 and the

median fishery broke even. Many fisheries were run for recreational purposes so they did not seek to make profits[28] .

Table 3.6 Estimated profit and loss in 2014

	Percentages of all respondents
	Total
Loss	
>£20k	3
-£19999 to -£10000	3
-£9999 to -£1000	12
-£999 to 0	38
Profit	
£1 to £999	11
£1000 to £9,999	16
£10000 to £99,999	17
Average	*£3,000*
Median	

PACEC Survey of Fishing Providers, 2015 (Q31)

3.4 Angler Survey. Fishing and Related Activities

3.4.1 To assess the full benefits of angler expenditure in Scotland the survey also asked for expenditure away from the fishery, e.g., on accommodation and food and drink, travel and clothing etc. This expenditure generates employment in other parts of the recreation and tourism sector.

3.4.2 On average, the respondents to the angler survey stated that they spent almost £4,000 in the year 2014 on fishing trips in Scotland. The largest single categories of expenditure were fishing fees (around £1,600), and accommodation (£1,100, including meals at the accommodation site). Other significant items of expenditure included fuel (£340), bait and tackle (£300), and other food and drink (£280).

[28] Chapter 6 discusses the Market for Fisheries and Beats their value and what influences this.

Table 3.7 Amount spent in Scotland, by expenditure category, on all fishing trips in 2014 (£ Sterling)

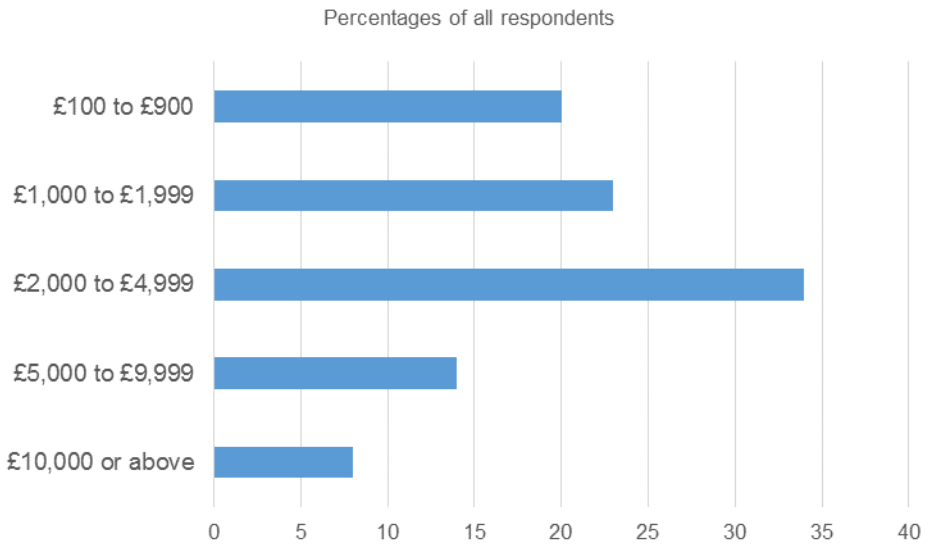
	Average (mean) amount
	Total
Fees for fishing	£1,570
Tackle, bait	£300
Clothing	£150
Accommodation (with meals included)	£1,070
Other food and drink	£280
Petrol/fuel	£340
Other travel/transport	£70
Other activities, e.g., sightseeing/visits, etc.	£60
Other	£10
Total	£3,950

Source: PACEC Survey of Fisheries 2015 (Q14)

3.4.3 By using the data from the fishery survey on total expenditure on angling and number of days spent angling, we estimate that an average of £116 per day is spent at fishery sites, including fees, on-site accommodation and refreshments, and on-site bait and tackle. An average of a further £70 per day is spent off-site but elsewhere in Scotland. This expenditure can be directly relevant to the fishing trip (off-site accommodation, food, bait and tackle, and transport costs), but also includes expenditure on other tourism sites, shopping, and expenditure by non-fishing companions.

3.4.4 There was fairly broad variation in the total amount spent by anglers on fishing trips during the year. Around a third spent between £2,000 and £5,000 pounds on their fishing in Scotland in 2014. Slightly under a quarter spent between £1,000 and £2,000, and one in five spent less than this. Among the remainder, 14% spent between £5,000 and £10,000, with 8% spending more than this.

Figure 3.4 **Amount spent in Scotland, in total, on all fishing trips in 2014 (£ Sterling)**



Source: PACEC Survey of Anglers 2015 (Q14)

3.4.5 Salmon anglers spent the most on fishing over the year, an average of £4,700. Those fishing for brown trout spent £3,100 over the year on average, those fishing for rainbow trout spent £2,700, and coarse anglers spend £2,400. Note that there is some overlap between these categories – someone who spent time in 2014 both salmon fishing and coarse fishing will contribute to the averages for both types of fishing.

3.5 The Netting Sector

3.5.1 Fishing using netting methods is a longstanding tradition in Scotland with some rights going back a thousand years or so. There are two methods – fixed engine fishing and the net and coble methods with the former accounting for two-thirds to three quarters of a typical annual catch. Interviews with netting operators (for both the net and coble and fixed engine methods) suggest that there are twenty to twenty-five operators with rights in the sector and out of these three main companies and some small operators who are active. The vast majority of the netting operators are individuals. Over the past few years a number of rights have been sold. Some sales have been to those who provide opportunities for angling, and the netting activities have not continued.

- **Location**: The net and coble activity takes place primarily on the north east coast of Scotland, for example, near Montrose and in the Borders. The fixed engine netting mainly takes place in the north east, the Highland area for example, Banff and in Dumfries and Galloway, for example, at the Solway estuary. There is also some small scale netting activity on the west coast, for example, at Loch Linnhe at Lochaber.
- **Fish Caught/Landings**: The number of salmon caught has been in steep decline since the 1960s. In 2000 some thirty five thousand fish were caught

and the figure had fallen to around eighteen thousand in 2014. The fixed engine catch is the main method (with some two thirds to three quarters of salmon caught in 2014) followed by the net and coble method. The overall catch was just over a quarter of all salmon caught in Scotland. While the focus is on salmon the activity includes some other species such as sea trout.

- **The Markets**: Discussions with the netting companies indicate that the vast majority of fish caught are exported. The main markets for fish are in Europe (especially to fish markets, retail outlets and restaurants) with some fish going to Billingsgate in London and individual buyers. Overseas countries include Scandinavia, Belgium, France, Switzerland, Ireland, Canada and the Far East (e.g., Singapore). Some fish are packed/processed/smoked and sold online by the netting operators.
- **Income and Value of Sales**: The income can range from approximately £20k to £0.5m per annum for the main companies depending on stocks of fish and the fishing conditions. The overall netting sector income can probably range from £0.6 - £0.8m per annum.
- **Profits**: These vary from year to year. In some recent years individual operators can make losses of c.£7 to £20k per annum (e.g., in 2012 and 2014) and profits of c.£20 to £60K per annum. Profits and losses for the sector also vary from year to year but the former are not high amounting to £42 to £46k per annum on average.

3.5.2 Where staff are employed, for main four netting operators, there are potentially 30-35 FTEs including direct employment opportunities in the sector, with 1 or 2 apprentices and some are seasonal jobs. The netting jobs include storing fish caught in ice houses, packing fish, maintaining the nets, the boats and vehicles, and managing the businesses/marketing.

3.5.3 The netting industry is capital-intensive, with significant expenditure on supplies (relative to staff expenditure) – estimated at around £300-350k per annum. Around 80% of that is spent is primarily in the local area for food and energy, equipment, boat repairs, engine servicing, nets, fish boxes, building repairs, rope/twine, packing cases and hauliers (transport to buyers of fish), and capital expenditure items which covers boats, lorries, vans, fork lift trucks and chill rooms.

3.5.4 The indirect jobs based on the purchase of supplies for netting activities are estimated at 35-45 FTEs. Hence the total number of jobs in netting is probably around 65 to 80 FTEs[29]. This is a decrease of almost three hundred compared to the four hundred or so (in the early 1990s) in the Radford report in 2009 which reflects the lower catch levels.

[29] Earlier estimates made by Radford in 2009 showed there were some 400 FTE jobs supported in 1990. He considers these would have fallen by 2009.

3.6 Estimates of Expenditure, Employment and Gross Value Added (GVA)

3.6.1 The employment and expenditure estimates shown in the survey of fisheries above are based on averages for the survey sample. To assess full employment and Gross Value Added (GVA)[30] from the sector the research combined the survey results with information from Marine Scotland on the numbers of active fisheries by region of Scotland, and the salmon and sea trout catch by region in Scotland. It also used the information from the angler survey to estimate the number of jobs that are supported by angler expenditure on fishing trips that takes place away from the fishery sites (e.g. on accommodation, food, and drink, travel and clothing etc., and expenditure at other local attractions). It also included information provided by the netting industry and operators on their activities, income, employment, and expenditure on local/regional supplies to assess the contribution of netting to employment and GVA.

3.6.2 The weighted results of our surveys show that there was £114m of expenditure on angling in Scotland in 2014. This arises from £71m expenditure by anglers at fisheries (of which £24m is spent by fisheries on staff, £35m on operational expenditure, and £12m capital expenditure, with just £1m reported rod and line fishery profit), as well as £43m expenditure by anglers away from fisheries (e.g. on offsite accommodation and hospitality).

3.6.3 The expenditure estimates are drawn from anglers and fisheries surveys, by weighting relevant information to match the known salmon and sea trout catch. Radford (2004) estimated that 65% of angler expenditure derived from salmon and sea trout fishing. Assuming that the distributions of expenditure and effort by species are similar to 2004, the total 2014 expenditure on angling in Scotland would be around 20% greater than our estimate of £114m (roughly £135m). The equivalent figure in Radford (2004) was £154m at 2014 prices.

3.6.4 The regional distribution of angler expenditure is also similar to 2004. We estimate that the most active regions were the Highlands and the North East, with £48m expenditure taking place in the Highlands and £29m in the North East. The equivalent figures for Radford (2004) were £43m for the Highlands (with £35m expenditure on salmon and sea trout fishing) and £32m in the North East (with £24m expenditure on salmon and sea trout fishing).

3.6.5 We estimate that the total number of direct onsite jobs supported by wild rod and line fisheries in Scotland is 2,500. With the high level of seasonal and part-time employment in the industry, we estimate that this amounts to some 1,700 full-time

[30] Gross Value Added is the monetary value of the contribution to the economy of an industry. It can be measured as the market value of the industry's products and services, minus the cost of the inputs required to produce them; equivalently, it is the value of the wages and profits that the industry generates.

equivalent jobs[31]. The regional distribution of employment is shown in Table 3.9 below. In addition, there are 900 further direct jobs supported by offsite angler expenditure on fishing trips. These too have a high part-time and seasonal component, and we estimate that the full-time equivalent employment is 600.

3.6.6 Additional employment impacts can be estimated using "multipliers", which indicate the number of additional jobs which are supported in the supply chain to an industry and by the expenditure of its staff on goods and services. A "Type I" multiplier measures the additional employment generated by purchases from businesses supplying fisheries (the "indirect" employment), but not the additional employment supported by expenditure from wages (the "induced" employment) paid to jobs created by angling. Multipliers including both indirect and induced employment are known as Type II multipliers.

3.6.7 The most recent Type I (employment) multipliers for Scotland were published in August 2014 for the year 2011[32]. They are estimated using surveys of businesses and their supply chain expenditure and are subject to survey sampling error. The average employment multiplier among 98 industrial sectors was 1.62, and the median was 1.48. In the absence of a specific multiplier for the wild fisheries industry, using the median Type I multiplier of 1.48 would suggest that an additional 900 FTE jobs are supported in the supply chain in Scotland as a result of expenditure at wild fisheries.

3.6.8 The average Type II employment multiplier for 2011 across the 98 industrial sectors was 1.98, and the median 1.85. Applying the median multiplier of 1.85 to the 1,700 direct FTE jobs would suggest total direct, indirect and induced employment of 3,100 FTE jobs supported by expenditure on Scottish wild fisheries. The offsite expenditure gives rise to 200[33] FTE supply chain jobs, giving a total of 1,100 FTE jobs in Scotland supported by offsite expenditure.

3.6.9 Direct Gross Value Added from the industry is estimated to be £25.9m. The offsite direct GVA is £20.3m. The median Type II GVA multiplier was 1.78, which if applied to the estimate of direct GVA would provide an additional £20.6m in Scotland arising from the supply chain to the industry. From industry-specific multipliers for accommodation, food service, and tourism, the research estimates the average Type II multiplier for offsite GVA to be 1.65. This gives an indirect GVA impact of £13.2m from the supply chain to the other offsite activities supported by angler expenditure.

[31] It is possible that the survey respondents have introduced a bias in their responses by underestimating the seasonal nature of their employment and reporting FTEs during the fishing season only – this would further reduce the number of FTE jobs. We have presented the findings as reported.

[32] Scottish Input-Output Tables: Scottish Supply Use and Analytical Input-Output Tables, 1998-2011, revised 13th August 2014

[33] Using industry-specific multipliers for accommodation, food service, and tourism to give an average Type II employment multiplier of 1.36

3.6.10 The netting industry provides 30-35 direct FTE jobs. There are a further 50-70 indirect jobs supported by netting, amounting to 35-45 FTEs. The total FTE employment impact of netting is therefore around 65 to 80 FTEs. Radford (2009) estimated that there were four hundred or so FTEs in the early 1990s and that this figure would have declined significantly by 2009.

3.6.11 In summary, the Scotland-wide economic impacts of wild fisheries (including netting) are set out in Table 3.8 below.[34]

Table 3.8 Economic impacts of wild fisheries (rod & line, and netting) in Scotland

	Economic impacts in Scotland	
	FTE jobs	Gross Value Added
Direct onsite impacts (angling and netting)	1,700	£25.9m
Supply chain to the above (angling and netting)	1,500	£20.6m
Offsite impacts generated by local angler expenditure	900	£20.3m
Supply chain to the above	200	£13.2m
Total impact in Scotland	4,300	£79.9m

Note: Employment impacts rounded to nearest 100, GVA to nearest £100k

3.6.12 These are conservative estimates. Analysis of supply-chain expenditure conducted for the Scottish Country Sports Tourism Group[35] suggested a Type I multiplier of 1.58 for shooting sports, which is likely to feature similar patterns of expenditure to fisheries and indeed is often co-located at shooting, stalking, and fishing lodges. The survey respondents reported high local levels of expenditure which makes it more likely that the total economic effects are retained in Scotland. It is also possible that respondents to the survey did not explicitly include the economic impacts of on-site accommodation and food in their responses.

3.6.13 The most comparable estimate from Radford (2004) was for 2,800 jobs and £90.9m of Scottish household income (2014 prices).

3.6.14 There are also important numbers of jobs related to the management of fishing and the resource. They include river managers, water bailiffs, biologists etc. In the District Salmon Fishery Boards and Fisheries Trusts there are some 147 FTE jobs in Scotland, in addition to 130 FTE volunteers.

3.6.15 Appendix F shows comparisons with the employment and GVA estimates shown in the Scottish Executive 2004 study (i.e., Radford), where possible.

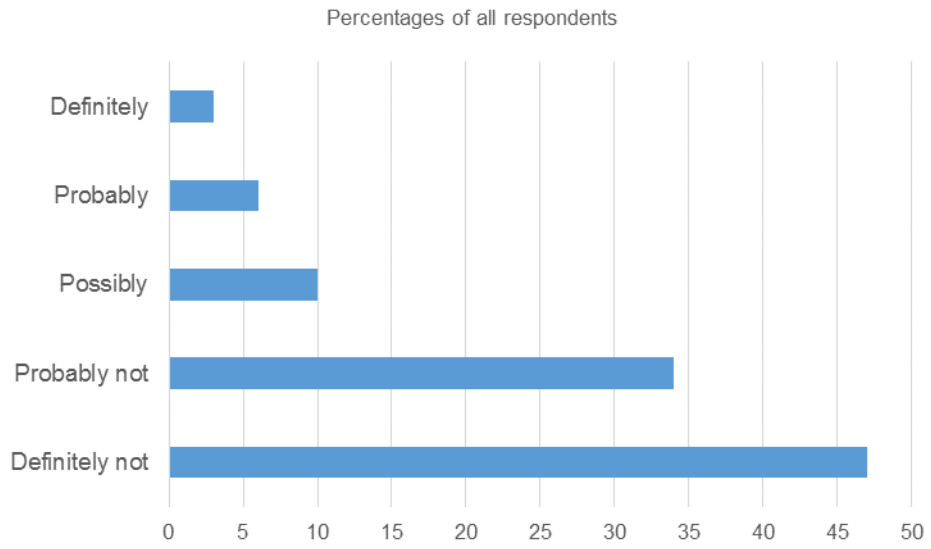
[34] This analysis cannot show region- or species- level impacts: the proportion of employment and GVA due to each species is not known, and the multiplier analysis has been carried out at a Scotland-wide level.

[35] "Volume and Value of Scottish Country Sports Tourism", PACEC 2014

Additionality

3.6.16 An important component in the process of estimating the value of the fishing industry is the question of whether the economic impacts, and wider benefits, would have arisen anyway if fishing activity were not taking place. The fishery survey respondents were asked to consider the extent to which the jobs and benefits that they had described at their fishery were likely to occur if they did not provide fishing opportunities at their site. Almost half (47%) stated that the jobs and benefits would definitely not have occurred without their fishing activities, and 34% said that they would probably not have occurred anyway.

Figure 3.5 The extent to which jobs and benefits would occur anyway if there were no fishing opportunities at the sites



PACEC Survey of Fishing Providers, 2015 (Q33)

3.6.17 Taking the above assessment of the likelihood of benefits arising without fishing at face value, a case-by-case weighted analysis suggests that 88% of the economic impacts and other benefits reported in Table 3.8 are wholly attributable to fishing.

3.6.18 The concept of **displacement** – that if anglers were not able to spend money on fishing, they would spend it on another activity, and therefore that angling is reducing activity in other sectors of the economy – was not directly addressed in this study, although respondents to the additionality question above may have considered it indirectly in giving their answer. Previous work by PACEC on Scottish country sports tourism[36] and on shooting sports in the UK[37] suggested that if shooting were not possible in the UK, 38% of UK shooting sport participants would spend additional money on fishing in the UK (on average, £720, or around 10% of their average annual £7,100 expenditure on shooting), while 36% would shoot abroad, 15% would spend money on other leisure activities abroad, and 6% would spend money on other

[36] Ibid.

[37] "The Value of Shooting", PACEC 2014

sport abroad. This overlap between fishing and shooting expenditure (from the point of view of those known to shoot) hints that expenditure on fishing might be displacing expenditure on other Scottish and UK country sports and other leisure activities, but also that in the absence of fishing opportunities, money would be spent overseas on fishing and other sport/leisure. This is particularly the case for those anglers who travel to Scotland specifically to fish.

3.6.19 Any money spent on fishing in Scotland that would otherwise be spent abroad is not displacing other expenditure in Scotland and the rest of the UK. This is consistent with the survey of fisheries which suggests Scottish fisheries face strong competition from overseas (see para 9.3.5 below). Radford (2004) estimated[38] that the displacement of output, household income, and employment by Scottish fishing was around 37% across Scotland as a whole. Overall, then, there is evidence to suggest that if fishing ceased for whatever reason then not all of the associated jobs and income would be lost to Scotland, as workers would move into other jobs and some of the expenditure would be transferred to other activities in Scotland.

3.6.20 For employment and other benefits at fisheries see the Case Studies in Appendix E.

Regional distribution of direct employment

3.6.21 Onsite direct employment in rod and line fisheries is concentrated in the Highlands. We estimate that 700 FTE jobs are supported in the Highland region and 400 in the North East, out of the total of around 1,700. The multiplier model for estimating the supply chain employment in Scotland does not trace where the additional indirect and induced employment lies, but it is likely to be concentrated towards Scotland's centres of population more than the rural and remote fishery locations.

Table 3.9 Regional distribution of full-time equivalent employment in rod and line fisheries, 2014

	FTE employment in rod and line fisheries
	2014
Borders	200
Central	100
Dumfries & Galloway	100
Highland	700
North East	400
Orkney & Shetland	0
Western Isles	200
Total	1,700

Note: All statistics are rounded to the nearest 100 FTEs to reflect the margin of error.
Source: PACEC fishery survey

[38] This "best estimate" assumed that in the absence of Scottish fishing, all expenditure from non-Scottish visiting anglers and half that from Scottish visiting anglers would be lost.

3.7 Wider Benefits of Angling and Netting

Survey of Fisheries

3.7.1 As well as employment and GVA impacts there can be additional economic benefits that result from for example, the training and skills development activity of angling and netting operators (which help improve the labour market), and links with local groups. The participants in the fishery survey were asked if they provided or carried these types of activities. 74% of the respondents stated that they did, with almost all of these (72% of the total) maintaining links with conservation groups. 49% had links with local community groups, 26% provided skills training for staff, (with some one in ten providing apprenticeship training). Some 18% had links with local education bodies, especially schools, to allow visits and provide information on salmon and trout as a species of fish and conservation and habitat management.

Table 3.10 Training and links with other organisations/groups

	Percentages of all respondents
	Total
Apprenticeships	9
Skills training	26
Links with training organisations	11
Links with educational bodies	18
Links with conservation groups	72
Links with local community groups	49
Any of the above	74
None of the above	26

Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q32)

3.8 Interviews with Stakeholders

3.8.1 The interviews with stakeholders[39] which have been outlined above provided further information on the number and types of jobs available. Overall the number and type of jobs were considered to be significant and important to the rural areas where the fisheries were located. It was considered that the individual salmon and trout fisheries could provide between one and ten direct jobs (with an average of 5). Many of the jobs were considered to be seasonal and there is a perception that the overall number had been affected by the recessionary period. The main occupations as far as stakeholders were concerned, and confirm the views of the fisheries, included bailiffs, ghillies, guides, river managers, river bank and habitat management and catering. There was considerable multiskilling and apprentices were employed to learn the spectrum of skills. The Boards and Trusts also offered employment in

[39] See Appendix B for the stakeholders interviewed.

administration, management and river patrols. Employment was largely stable but influenced by the economic cycle and number of anglers/visitors. The stakeholders interviewed were uncertain about how the Wild Fisheries Review would affect employment.

3.8.2 In the netting sector the number of jobs at individual fisheries ranged from six to fifteen. As many of these jobs were part time, the FTE employment was half the number of jobs. There were also netting rights for individuals at other locations which were used on a less regular basis. They did not usually employ people as part of their netting activities. Occupations embrace a range of skills for example, to crew and maintain boats, set and repair the nets, pack the caught fish for transporting to buyers (with some sales by mail order/the internet), process and smoke salmon, deal with health and safety issues and manage and market businesses. The companies employ people from different age groups, including young people who are provided with training, sometimes through apprenticeship schemes. These form part of the Modern Apprenticeship framework for Skills Development Scotland (SDS).

3.8.3 There is a significant number of jobs generated amongst the suppliers to angling and netting fisheries. These supply clothing, tools, equipment and boats (and their maintenance), fencing, trees and materials for riverbank conservation and habitat management. They also supply building materials for fishing huts and cottages for ghillies and visitors, and food and personal and public services for owners and staff at fisheries. The expenditure of visitors/anglers to the fisheries generated important jobs in the hotels and guest houses, the restaurants and pubs.

3.8.4 The stakeholders confirmed that the suppliers to the netting sector provide boats and engines (as well as repairs), vehicles (vans and forklift trucks), rope, twine, equipment and tackle, boxes for packing fish, maintenance of the chill rooms, ice machines and equipment, fuel, transport and road haulage services. The vast majority of suppliers are local, according to stakeholders, mainly in the Aberdeen and Montrose areas

3.8.5 The social and cultural benefits of the angling and netting fisheries were also considered to be significant. The majority of jobs, and subsequent incomes, were in rural areas where other employment opportunities were limited. The jobs had existed for many years and were part of the “fabric and way of life” in many areas. There are links with local schools, who make visits to the fisheries to learn about how they operate and about salmon and trout as species. This was aimed at attracting young people into the industry. Young people who were employed were provided with skills and training (for example, through apprenticeships). These links helped engage them in fishing as a sport, as well as outdoor recreation, forestry, habitat management and the ecological and conservation aspects of fishing. They have helped bring fishing into the classroom and education. There were also activities organised with conservation, habitat management and environmental management groups in the community. Many of these relationships were longstanding which helped develop a “sense of community”.

3.8.6 Those involved in the netting activities have similar views. The jobs they offered were long standing and local both at the fisheries and in the supply chains. Out of season employment included building maintenance, farm and gardening work and employment at the docks. They engaged with local organisations including schools (and the young people), conservation and habitat management organisations and local groups with, for example, an interest in wildlife and conservation.

3.8.7 The vast majority of the fisheries owners and managers, and the owners of the netting activities, were of the view that if their fishing did not take place it was unlikely that the economic and social benefits could be replaced by alternative activities. The areas could be used for some farming or tourist activities, for those visiting the countryside, but employment was likely to be minimal.

3.9 Views of Local Authorities

3.9.1 For the Local Authorities, angling and netting (where it took place) was widely considered to be critical to the local economy because they provided local jobs and had a positive effect on the wider tourism sector. One officer said: "People come to Scotland as a family, some of them go angling whilst their family members do other touristy things such as sightseeing or visiting museums". Other respondents explained that the angling sector supported around 400-500 jobs (FTE) in their regions as a direct result of jobs at the fisheries and through the knock-on effect in the tourism sector and expenditure by fisheries and tourists on hotel accommodation, restaurants, pubs, visits to heritage sites and other attractions. They, however, pointed out that the recession had negatively affected visitor numbers.

3.9.2 There were a number of items purchased by the fisheries locally which have an impact of the regional and local economy. Fishing tackle, bait and clothing purchases were widely considered to have a very important impact. Over half of the staff also felt that the purchase of boats and vehicles, materials for fencing and repair, tools and items related to food and drinks were very important to the regional and local economy.

3.9.3 Visitors and tourists also purchased local goods and services. The value of items purchased by visitors was considered to be very important to the local economy – albeit relatively small compared to total income but longstanding. These included the fees for fishing, fishing tackle and bait, clothing, accommodation and meals, as well as food and drink and other touristy activities. Travel, transport and petrol purchases were also very important.

3.9.4 Almost all the Local Authorities considered that the jobs provided by the fisheries in their areas, although small in number, were very important as the total number of jobs were scarce. The fisheries jobs had existed for many years.

3.9.5 The other main reasons given by those who considered the jobs critically or very important were that because the sector had already declined, it was very important to maintain employment opportunities and that it was a large sector in the local

economy. A critical reason was that the areas where fisheries were located were not densely populated and that the jobs could be widely dispersed and few in numbers compared to the towns.

3.9.6 The vast majority of staff thought that the type of occupations within the sector were important including ghillies, bailiffs, habitat management occupations and river managers. They were traditional rural skills. All the Local Authorities were aware that the fisheries engaged with conservation groups and wildlife management groups. Over half of the staff thought that they also engaged with training providers, colleges, educational bodies and outdoors recreational groups. One officer commented: "the fisheries organisations try their best to reach out by organising events and providing information".

3.9.7 The vast majority of officers said that the involvement of fisheries with local conservation and habitat groups provided social benefits (in addition to the local jobs), as well as the provision of local jobs especially where there were fewer employment opportunities. Other social benefits mentioned were continuing local traditions and the way of life. The fisheries contributed to the local social networks and interaction through their involvement with colleges, educational bodies and young people in schools and colleges.

3.9.8 Staff at the Local Authorities where netting took place for salmon and other fish thought that the economic and social benefits of netting were mostly that it brought jobs to the local area and skilled employment opportunities especially in remote rural areas. Other benefits were continuing a local tradition, involvement with young people and colleges for job / skills training and involvement with local conservation and habitat groups.

3.9.9 The main disadvantages of netting, as perceived by Local Authority staff, were the contribution to the decrease of fish stocks, the opposition to netting from some members of the local community and the fact that it affected upstream fishing.

3.9.10 As a final comment, one officer stressed that angling was a very large sector of their local economy and that: "£18 million annually is brought into the region from angling".

4 Net Economic Value (NEV)

4.1 Introduction

4.1.1 The previous chapter set out the estimates of the economic impact of angling and netting, and the benefits to the Scottish economy. This chapter takes a second approach to assessing economic benefits by examining the net economic value (NEV) of wild fisheries in Scotland. NEV provides insights into the monetary value that participants in fishing (both angling and netting) place on the activity: for example, what are the overall benefits for them and what additional financial contribution they would be prepared to make to ensure the activity is retained or can be improved.

4.1.2 The NEV approach follows cost benefit analysis principles and is the accepted basis on which policy is appraised within the UK and more broadly[40]. The NEV of an activity is the monetary difference between how much participants, and society, value an activity, and the value of the resources used to produce that activity, with the estimates discounted and summed up over time (capitalised). For the angling sector, this has been defined primarily as the net income flow (after expenditure) to owners of fishing rights (owner compensation plus profits as economic rent) plus any perceived benefits to anglers over and above what they pay[41] i.e., the consumer surplus. For the netting sector the definition is primarily "the net income flow to owners of fishing rights (profits)" [42]. This definition, and our methodology for estimating NEV, are dealt with in more detail below and in Appendix E to this report.

4.1.3 The research draws on the results of the surveys of the anglers, fisheries data on the numbers of fisheries in Scotland and the annual salmon and sea trout catch.

4.2 Net Economic Value of Angling Fisheries

Profits and Producer Surplus

4.2.1 Appendix 1 to "A Short Comparative Study of the Economics Associated With Coastal Net Fisheries (2004) and In-River Rod Fisheries for Salmon and Sea Trout in Scotland" (Radford 2009) sets out the components of net economic value of angling, which are used in this study and are applicable to all species. See Figure 4.6 below.

[40] See for example HM Treasury Green Book

[41] See "A Short Comparative Study of the Economics Associated With Coastal Net Fisheries and In-River Rod Fisheries for Salmon and Sea Trout in Scotland", Radford 2009

[42] Ibid.

Figure 4.6 Taxonomy of Net Economic Value

Net Economic Value of Angling (NEVa) comprises the sum of the following:

Anglers' Consumers' Surplus (CSa). Monetary measure of the benefit that anglers obtain from their angling, over and above their fianancial cost.

Economic Rent (ERa). Monetary measure of the net income flow fishing right owners obtain from ownership. (Probably the most important component)

Existence Value of Angling (EVa) Monetary measure of the value derived from knowing that others currently enjoy salmon angling. (Probably insignificant)

Bequest Value of Angling (BVa) Monetary measure of the benefit derived from knowing that future generations can enjoy S&ST angling. (Probably insignificant)

Anglers' Option Value (OVa). Monetary measure of the benefit from preserving the option of participating in angling. (Probably insignificant)

If, say, S&ST angling were banned or otherwise ceased the NEV loss to society would be the sum of the elements outlined above **(i.e. CSa + ERa + Eva + BVa + Ova).**

There might however also be some benefit operating through any consequential improvement in fish stocks transmitting eventually to coastal (and estuary) nets experiencing an increase catch per unit of effort. We therefore include the possibility of Stock Effects.

Stock Effects (SEa) Monetary measure of the **adverse** effect that rod exploitation has on coastal and estuary netting (Negative and probably insignificant)

In conclusion **NEVa = CSa + ERa + Eva + BVa + OVa - SEa**

Source: Alan Radford, Glasgow Caledonian University.

4.2.2 The economic rent, or producer surplus, includes any compensation of providers as owner-managers plus any retained profits. The fishery survey results suggest that net profit in the industry is low, with many survey respondents making losses. However, this is an aggregate of fisheries of different sizes with different motives – the survey reveals that there are a number of small fisheries run at a loss to the owner, where presumably the owner bears the expense because of the asset value of the fishery or rights, the value of having fishing rights for personal use and that of friends and family, or because of some perceived intrinsic value of the activity. Rather than a business expense, this a cost of the fishing hobby to the fishery owner.

4.2.3 The larger commercial fisheries which participated in the survey often succeeded in running at a profit, according to the survey results. We estimate that the total annual economic rent, or provider surplus, by this measure (owner wages plus profits) is around £11m (as at 2014).

Net Economic Value and the Anglers Survey.

4.2.4 To estimate consumer surplus, bequest value, and existence value, the anglers' survey asked if they were willing to pay more for a day of fishing in order to protect the ability to fish in Scotland. Some 78% of respondents to the survey of anglers

stated that they would be willing to pay, in principle, to maintain or protect the ability to fish in Scotland. The share was lower for rainbow trout anglers (63%) and brown trout anglers (74%) than for those seeking other species. The main stated reason for a willingness to pay was to protect angling for future generations of anglers (79%), followed by the fact that they "just enjoyed angling" (49%).

Table 4.11 If willing to pay to maintain or protect the ability to fish in Scotland: please say why

	Percentages of all respondents
	Total
I want to protect angling for future generations of anglers	79
Knowing that others can go angling is important to me	27
I just enjoy angling	49
Another reason	13

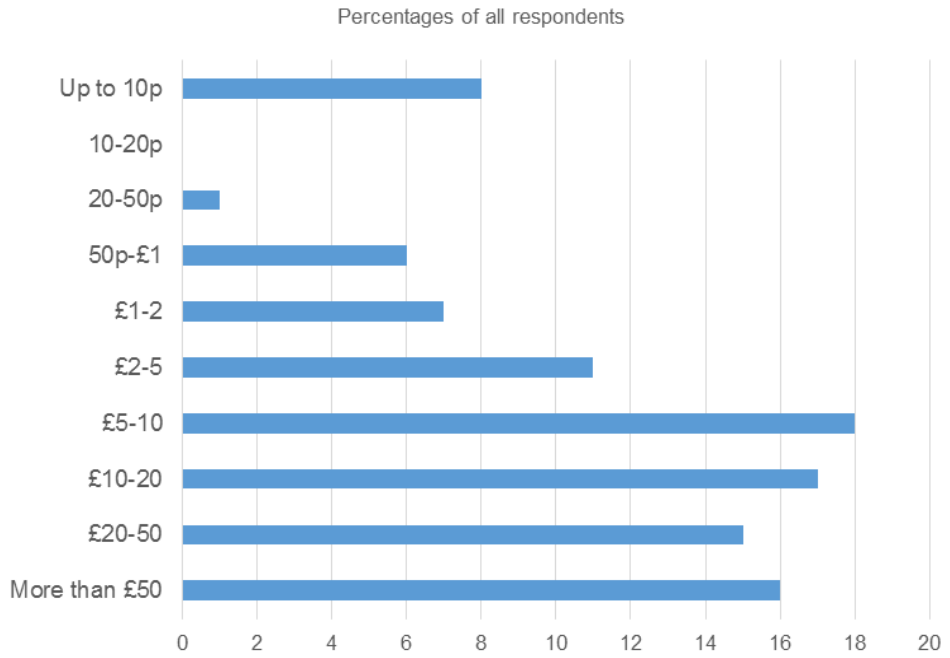
Respondents could select more than one option; so percentages in any column may sum to more than 100
Source: PACEC Survey of Fisheries 2015 (q30)

4.2.5 Among those not willing to pay, 40% said that they didn't feel that they could afford to pay extra, while 13% stated that someone else should pay. 59% gave another reason – among these, typical remarks were that money was already paid to owners, clubs, angling associations, on river memberships etc., and the amount of money and the number of organisations involved should be sufficient to protect wild fishing.

4.2.6 It is not possible to disaggregate the results from this question by species or region in Scotland, as respondents were able to (and typically did) fish in multiple locations in Scotland throughout the year and for many different species. Each respondent's answer to the question summarises their attitude to the mixture of activities they pursue which collectively form their Scottish wild fishing experience.

4.2.7 The anglers who stated they would be willing to pay extra **per fishing day** (i.e. not as a one-off payment) to protect wild fishing were asked to quantify this in terms of a maximum additional payment per fishing day, over and above existing costs such as permits, fees, ghillies, and licences. Two thirds of respondents would be willing to pay at least £5, nearly half would pay at least £10, and 16% stated that they would be willing to pay more than £50 per day to protect fishing in Scotland.

Figure 4.7 **Amount willing to pay per fishing day to maintain or protect fishing, over and above existing costs (permit fees, ghillies, licences)**



Source: PACEC Survey of Fisheries 2015 (q32)

4.2.8 In aggregate across all the respondents to the survey, the results suggest that anglers would be willing to pay 14% more than at present to safeguard Scottish wild fishing. Based on the data and responses above, an approximate estimate of the total extra amount that Scottish anglers would be willing to pay is some £17m per annum. This is considerably greater than the estimate of £3m[43] presented by Radford (2009) from a review of the literature. The technical appendix to Radford (2009) acknowledges that the attempts to measure consumer surplus via surveys had low sample sizes and that the surveying organisations were sceptical of the low values reported and re-contacted respondents to verify them. The fact that the current survey was conducted after four consecutive years of rapidly falling wild salmon catch may explain why our reported contingent values are higher than in previous years, and why Existence Value is reported as the most common justification for willingness to bear additional costs.

4.3 Net Economic Value for Angling

4.3.1 Based on the estimates of producer surplus and consumer surplus above, the central estimate of NEV is £28 million per annum. This comprises £17 million in annual surplus to the anglers and £11 million in annual surplus to the fisheries. There is potentially a margin for error in this estimate based on the response rates and

[43] The estimate of mean consumer surplus (only) per fishing day in Radford (2009) was £5.78 – this falls within the modal group (£5-10) in this study.

representativeness of the surveys and the difficulties obtaining reliable answers from survey respondents to hypothetical questions. The estimate above does not take into account the wider Existence Value among the non-fishing public, which arises from the knowledge that others can enjoy fishing in Scotland – this is assessed as "probably insignificant" in Radford's NEV taxonomy.

4.3.2 By way of comparison, Radford (2009) estimated Scottish wild salmon and sea trout fishing NEV at £20m at 2009 prices (c£23m at 2014 prices) at a point in time where salmon catch was higher than it is today. This estimate did not formally include other forms of angling in Scotland, although our survey reveals that many salmon and sea trout anglers also pursue other species. However, the distribution between consumer and producer surplus in the Radford estimates was much more heavily weighted towards the producers, which were assumed to capture most of the net economic value in rents and fees. It is possible that profits were greater at this time as the recorded catch was higher, and stocks and activity may also have been higher (although the available information on stock levels is difficult to interpret and there is no formal annual measurement of angler effort as there is with catch).

4.3.3 Appendix D sets out the various methods of estimation in more detail and investigates why these differences may have arisen. In summary, there are margins of error associated with estimates of producer economic rent, and the recent sharp decline in the rod and line salmon catch may have contributed to a higher willingness to pay to safeguard fishing for future generations, as measured by the current angler survey.

4.4 Net Economic Value for Netting

4.4.1 Appendix 1 to "A Short Comparative Study of the Economics Associated With Coastal Net Fisheries and In-River Rod Fisheries for Salmon and Sea Trout in Scotland" (Radford 2009) sets out the components of net economic value of netting. These are reproduced in Figure 4.8 below.

Figure 4.8 Taxonomy of Net Economic Value

Net Economic Value of Commercial Netting (NEVcn) comprises the sum of the following:

Consumers' Surplus (CScn). Monetary measure of the benefit obtained by consumers of net caught S&ST. (Unlikely to be highly significant).

Economic Rent (ERcn). Monetary measure of the net income flow obtained by fishing right owners and operators. (Probably the largest component).

Workers Satisfaction Bonus (WSBcn). Monetary measure of the satisfaction operators obtain from participating in coastal netting. (Could be significant)

Existence Value of Netting (EVcn). Monetary measure of the value derived from knowing that others currently engage in coastal netting. (Probably insignificant)

Bequest Value of Netting (BVcn) Monetary measure of the benefit that derived from knowing that future generations will participate in coastal netting. (Probably insignificant)

Option Value (OVcn). Monetary measure of the benefit from preserving the option of participating in coastal netting. (Probably irrelevant)

Stock Effects (SEcn) Monetary measure of the **adverse** effect that coastal netting has on angling. (Negative and probably significant)

Source: Alan Radford, Glasgow Caledonian University.

4.4.2 Our research indicates that the main positive component of the Net Economic Value of commercial netting is likely to be Economic Rent. As fish are sold at market rates and most are exported, to countries such as Scandinavia, Belgium, France, Canada, Ireland and the Far East (e.g., Singapore) Scottish consumer surplus is likely to be negligible. The total annual profit of the commercial netting industry based on filed accounts of the major operators and the interviews with them is no more than £42-46k per annum on average over the past few years. Wages in the industry are not high so the likelihood of a significant Workers Satisfaction Bonus is low. There is potentially some value to the bequest value of netting as rights to fish are longstanding and often pass through families in areas where employment is scarce.

4.4.3 Consultees were split on the potential for netting to have a negative effect on stocks available for angling. The informed view is that it is relatively small, although the fact that rod and line proprietors and anglers are willing to buy out netting rights is evidence that it is perceived to be negative by angling interests, as if there were no netting, *ceteris paribus* salmon stocks would rise and the value of angling would rise in turn.

4.5 Overall Net Economic Value

4.5.1 The overall net economic value of wild fisheries in Scotland mainly comprises the economic value ascribed to rod and line fisheries. The positive components of the

NEV of netting are very small relative to rod and line fishing - certainly smaller than the margin of error on the estimation of rod and line NEV - and we have not been able to estimate the negative components. Our best current estimate of wild fisheries NEV is £28m per annum. Capitalised on the basis of a 3% return, the NEV would be around £900m. This is comparable to the capitalised estimates made by Radford (2009) which in 2014 prices for the total NEV for wild fisheries would be £834m[44]

[44] Average annualised inflation between 2009 and 2014 was 3.6% (Bank of England CPI data).

5 Public Sector Support for the Wild Fisheries

5.1 The Role of Public Sector Support

5.1.1 Public sector support to the wild fisheries sector potentially influences its economic outcomes and impacts (both the angling sector and netting) and have implications for NEV. In Scotland, public sector support to wild fisheries is provided mainly to stakeholder organisations and umbrella groups, rather than directly to individual fisheries. It is aimed to address market failure issues such as excessive risk aversion to investment (for example on conservation measures for rivers and some skills training) and to improve information through the promotion of angling opportunities. In this chapter we examine the potential effects of the public sector support on economic benefits and NEV.

5.1.2 The first part of the chapter sets out the nature and scale of the support. The information presented is based on information provided by the public agencies in Scotland, the fisheries themselves, the sector stakeholders and the Local Authorities. The second part examines their contribution to the economic benefits and NEV through an analysis of what may occur if they are reduced or did not exist. This draws on the views of the angling fisheries, the netting organisations, the stakeholders and the Local Authorities.

5.1.3 Broadly, this section shows that public sector support contributes to maintaining employment opportunities and NEV in angling, and to some extent in the netting sector. The survey of fisheries asked if they received any grants from government or public sector schemes during 2014. The vast majority (93%) said they had not. 5% said they received funding amounting to £500-600 each in the past year and the remainder (2%) reported larger grants of between £2,000-£11,000.

5.2 The Nature of Public Sector Support

5.2.1 The research showed that public sector support ranges from support for apprenticeships and other skills training to conservation and habitat maintenance grants, and the promotion of angling to tourists. Some of the support was direct to the fisheries while other support was indirect and went to sector organisations (e.g., for conservation and habitat management works). The non-payment of business rates to Local Authorities was also seen as a potential form of subsidy although it was considered that this was replaced by the levy angling fisheries paid to the salmon fishery Boards. The summary below shows the providers of the support, the annual value and take-up, where information is available.

a Apprenticeships

These comprise core qualifications for the framework Game and Wildlife management and include the management of fishing habitats, support for angling at fisheries and the implementation of procedures to protect all types of fisheries. There are also schemes for sea fishing and maritime occupations.

Provider Skills Development Scotland as part of the Modern Apprenticeships Framework and through colleges and training providers.

Annual Value £4,600 (2013/14) and £4,600 (2014/15). Total £9,200 (2013/16).

Take-up Some 38 starts (2013/16). Estimates are that just under one in ten of those providing angling opportunities used the scheme in recent years along with possibly one in twenty of the netting organisations although one in three of the larger firms had.

b Other Skills Training

Provider Usually the Further Education Colleges in Scotland on the East Coast.

Annual Value A notional £15k per annum.

Take-up Less than one in ten of the providers of angling used the colleges and very few of the netting organisations.

However, some 26% of angling providers did train their staff in skills for ghillies, conservation and habitat management while the netting organisations upgraded skills for netting, boat and vehicle repairs and processing fish. However, much of this training did not involve colleges but could be carried out in-house and with private training providers in the sector.

c Conservation and Habitat Maintenance Grants

Providers Scottish Environmental Protection Agency (SEPA) through the Water Environment Fund (WEF), which seeks to improve the physical condition of Scottish rivers. The main use is to support the passage of fish with funds provided to the Fisheries Trusts via the umbrella body RAFTs. Some trusts also received funds from the District Salmon Fishery Boards for conservation and environmental works (for example, through riparian tree planting, coppicing, fencing and in-stream work) but this is not related to WEF. There are also some small amounts of local funding provided by Local Authorities for small works.

Annual Value The total funding between 2009/10 to 2014/15 was £7,027,359 rising from c.£134K (2009/10) to £2-5m (2014/15).

There are other funds provided by the Scottish Rural Development Programme, Scottish National Heritage (on projects with Rivers and Fisheries trusts of Scotland (RAFTS) on for example, riparian planting), Heritage Lottery Funding and the Landfill Tax Fund which may be available on a case by case basis. This could amount to approximately £200k per annum, depending on projects.

Take-up Just over a third of the providers of angling said they had benefitted from conservation grants from these sources. A very small proportion of the funding was direct to angling fisheries and almost all went via Rivers and Fisheries trusts of Scotland (RAFTS) for improvement schemes. The other source of support was through Controlled Activity Regulations (CAR) but this is not a funding mechanism but a regulatory mechanism by which works in the water environment in Scotland are controlled.

The netting sector tended not to receive conservation grants directly. Marine Scotland provided some funding via the European Fisheries Fund (EFF) for non-netting activities such as aquaculture, fishing and fish processing industries and for communities in fishery areas.

d Business Support and Advice

Providers This came through a few Local Authorities but mainly on an informal basis via the Boards and Rivers and Fisheries trusts of Scotland (RAFTS) or through the fisheries network. The netting sector exchanged views on issues through the Scottish Net Fishing Association.

Annual Value A notional value of £15k per annum.

Take-up Very few companies or organisation used public sector business support.

e Non-domestic Rates Relief

Providers The Unitary Authorities and Government.

Annual Value The providers of angling opportunities for salmon do not usually pay non- domestic rates but are eligible for rates on buildings such as sheds and huts. The vast majority receive 100% rates relief through the Small Business Bonus Scheme because of the relatively low rateable values (i.e., less than £10,000). The annual value of non-domestic rates foregone by Local Authorities and Government is uncertain as no public study has been carried out. It is likely to amount to £600-700k per year[45]. However, the angling fisheries do pay a fisheries assessment (or levy) to the District Salmon Fishery Board (DSFB) in areas where they exist. This amounts to some £4.0m-£4.25m per annum. The funding is used for the management of the fishery resource.

Take-up As the fisheries are exempt from non-domestic rates the "take up" covers all salmon fisheries. Just over two thirds of the angling fisheries surveyed recognise this. The remainder probably saw the issue as not applicable or they may not have viewed exemption as a form of public support.
The netting sector organisations are eligble for non-domestic rates for buildings, such as huts, sheds and bothies and are usually exempt where the rateable value is low enough to make them eligible for the Small Business Bonus Scheme.

f Capital Expenditure Grants for Equipment

Provider There were very few providers of grants for the angling, or netting sectors. One possible source is the Scottish Government's European Fisheries Fund (EFF) especially for local Scottish fishing communities affected by a decline in fishing activities. Local Authorities provide additional match funding and create Fisheries Local Action Groups (FLAGS) to consider applications. Projects can include skills training for local people, environmental protection, community renewable energy products and tourism services to attract more visitors.

Annual Value. Very limited in angling with grants of £100k in the netting sector in 2010/11 to 2011/12 from EFF. Other EFF and EU funds possibly amount to £50k. Overall £150k in total. The annual average was probably £30-40k per annum.

Take-up This is very small/minimal.

[45] Estimate made by Marine Scotland as part of this study. 2015.

g Promotion of Angling to the Tourist Market

Provider Mainly the Scottish Country Sports Tourism Group (SCSTG), Visit Scotland and some of the Local Authorities. The promotion usually involved staff time for website and internet content with some events stands and printed material.

Annual Value This is estimated at some £15-30k per annum.

Take-up In the survey of angling fisheries a third claimed they benefitted from the promotion of angling by and large as part of the promotion of the "Scottish experience" and salmon and trout fishing, in particular.
The netting sector did not benefit from tourism promotion.

5.3 Overview of Public Support

5.3.1 Overall, the approximate value of public sector support to fisheries in 2014 is likely to be in the range of £2.6m to £2.7m (excluding exemptions from non-domestic rates) with almost all going towards fisheries management.

Interviews with Stakeholders

5.3.2 Interviews with stakeholders asked them about the availability, take-up and the impact on activities of public sector support to the angling and netting sector. The angling sector was considered to receive a range of support primarily business rates relief, environmental and conservation grants and financial support to maintain and improve the water environment, the river banks, and the habitats. There was also considered to be support for apprenticeships (primarily for young people) as well as for formal training (for example, HNCs and qualifications for fish management, bailiffs, game keepers and ghillies). This support was important over the recessionary period and as there continued to be uncertainty in the overall economy. The development of the school curriculum to cover the environment, habitats and fish also helped to support the sectors as a whole rather than individual fisheries. There were also some heritage grants primarily for buildings. As well as the grant and financial support national and local organisations (including the Local Authorities) promoted the angling sector to stimulate visitors and tourists.

5.3.3 In the netting sector there was less availability and take up of support. There was use of apprenticeship schemes and informal training in health and safety and management. In addition there had been some capital funding for buildings and sheds through the Scottish Government using EFF where the government also provided some of the match funding. This was for £100k in 2010 to 2012.

5.3.4 In the coarse angling sector (pike and carp) there were grants for environmental management and coaching for fishing as a sports activity primarily delivered by the Angling Development Board of Scotland (ADBOS) along with coarse, game and sea angling. The coaching for pike and carp was mainly targeted on young people in schools, in areas of relative deprivation (to alleviate social exclusion) and for disabled people supported by community groups and charities. There had also been some support to promote coarse fishing.

5.3.5 The support for conservation, the water quality and the environment, apprenticeships and training, the rate relief and the promotion were seen as important and helped the sector as a whole, especially given the stakeholder view that few of the fishing activities were profitable. Without the support it was considered that it would be difficult to manage the fisheries for anglers.

5.4 Views of Local Authorities

5.4.1 Local Authorities were asked if they provided any support for the fishing sector. Some provided conservation grant funding for projects on application. Over half provided support for apprenticeships and skills training. A smaller number offered informal business support and advice. Fisheries businesses were not charged business rates unless they were netting organisations.

It was widely considered by the Local Authorities that if the fisheries did not receive support, from the range of sources in Scotland, there would be adverse impacts on them as, it was believed, that many fisheries were not profitable. This support was especially important in periods of economic uncertainty. The main impact would be an overall decline of the sector with adverse consequences for the rural economy. One respondent commented: "The fishing sector needs continuous funding to ensure it continues especially when stock are declining".

5.4.2 A reduction in support is likely to reduce the number of people fishing in Scotland as prices would be increased for participants which, in turn, could reduce demand. However, some tourists would definitely come anyway because of the other attractions – the environment, countryside and visitor attractions.

5.5 The Impact and Contribution of Support

5.5.1 Public sector support potentially influences the economic benefits that arise from fishing activities, and may go some way to addressing market failure issues, especially in a climate of economic uncertainty. Where the subsidy is addressing market failures then if it were to be reduced (wholly or in part) the costs of providing angling opportunities would rise and potentially NEV and profits would fall. Where it was not possible to pass the costs on to anglers or opportunities were reduced it is likely that employment and subsequent GVA would fall.

5.5.2 If the support is not properly addressing market failures, then reducing the level of support would have a neutral effect (subject to the above) or even produce beneficial effects for Scotland (if there are inefficiencies in the way that support is administered or directed). However, the results of the survey of anglers shows that 78% would be willing to pay more to maintain or protect the ability to fish in Scotland, i.e., they enjoyed angling and/or wished to protect angling for future generations, or know others could go angling. The total based on the survey results was some £17m more per annum. This could offset a reduction in public sector support and increases in fisheries operating costs, and hence limit the reductions in jobs and GVA to the

Scottish economy. However, careful consideration should be given to the most effective ways of raising additional resources for the sector from those expressing a high willingness to pay more to maintain and protect fisheries.

5.5.3 In conclusion, the loss of public support to the wild fishing sector poses some risk to angling activities in the short and medium terms. Reducing public sector support would also reduce taxpayers' benefits in the form of job opportunities and GVA. Reducing public sector would need to consider whether any savings would be transferred to another government activity or whether it would benefit tax payers through a reduction in taxes. Overall, the net results of reducing public sector support, in terms of overall economic impact and NEV, are uncertain.

5.5.4 In the netting sector similar arguments apply. If the higher costs cannot be passed onto consumers the revenue or activity could fall reducing jobs and GVA. Overall the alternative use of subsidy funds and the effects of a reduction in taxation would need to be considered as with the angling sector.

5.5.5 Public sector support also potentially influences Net Economic Value (i.e., primarily net income flows and profits) where financial support is an income flow and/or reduces the costs of operating for both the angling and netting sectors. If overall opportunities were the same without the support (wholly or in part) the costs could increase and profitability could be reduced. Activity and revenue could fall, for example, if anglers were charged higher prices (to offset against higher operating costs), which they did not accept, hence reducing profits. These factors could adversely impact on NEV. As stated above the anglers could be willing to pay more which could help profits, and NEV, to be retained but there is significant uncertainty.

5.5.6 In the netting sector any reduction in support could result in a reduction in profits and NEV and a fall in activity. Overall neither the angling nor the netting sectors are particularly profitable. Hence any reduction in support is likely to have adverse effects on the economic benefits and NEV.

6 The Market for Fisheries and Beats

6.1.1 The asset value of fisheries and beats can also provide a measure of the economic value of wild fisheries. This chapter assesses the potential value of fisheries, and the market for salmon and trout fisheries and beats in Scotland. It explores the factors that influence the marginal values. In principle, fisheries and beats derive market value from several sources. First, they can act as collateral security for owners seeking finance to operate and invest in fisheries or other enterprises. Second, they hold fish stocks that have a 'catch value'. Where fish stocks are declining the 'catch value' provides an incentive to protect and enhance fish stocks. Other factors that influence the value of fisheries and beats include buildings and other infrastructure, attractiveness of the physical environment (i.e. landscape) and accessibility.

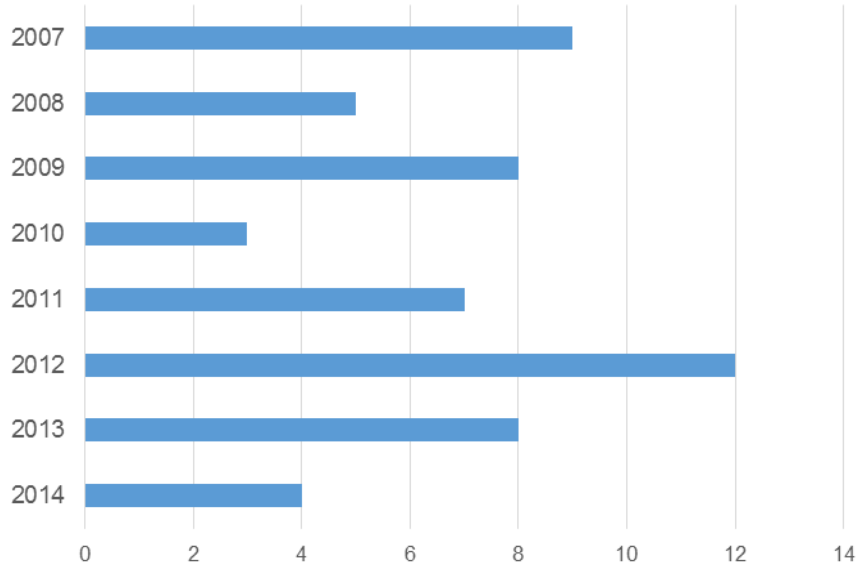
6.1.2 The analysis draws on the results of the research with the fisheries, the interviews with commercial property agents and stakeholder organisations. It deals initially with the transactions and values and then the factors which influence the market and the marginal values. The chapter concludes with an assessment of the economic benefits of fisheries and beats as an asset class.

6.2 The Transactions and Values

6.2.1 The transactions for fishing rights may cover estates with fisheries, individual fisheries and beats with timeshares/weeks at beats becoming more frequent. The interviews with organisations in the sector indicate that the purchasers of beats are usually individuals or syndicates who purchase only for leisure purposes. Other organisations who have commercial aims also purchase fisheries and beats. The purchasers are primarily based in the UK (Scotland and England) with some overseas interest from Northern Europe, North America and the Far East.

6.2.2 Estimates by the specialist commercial property agents interviewed, and information compiled by Scottish Land and Estates for this research indicate that the number of transactions for beats per annum is relatively small. Estimates indicate that there were some 54-60 transactions over the period from 2007 to 2014 throughout Scotland (i.e., 7 per annum on average). They are mainly in the East and the main rivers of the Spey, Dee, Tay, Esk and Tweed. Table 6.9 shows the number of transactions involving fisheries and beats between 2007 and 2014.

Figure 6.9 Estimate of Transactions for Fisheries and Beats



Source. Scottish Commercial Agents/Scottish Land and Estates.

6.2.3 The agents took the view that the referendum on Scottish Independence had created significant uncertainty in the market, and thus put transactions "on ice". The Land Reform issues and the Wild Fisheries Review were also cited by agents as a source of uncertainty. The uncertainty was likely to continue and be subject to cyclical effects in the economy (reflecting the recent recession), the Scottish Land Reform and the Wild Fisheries Reviews.

6.2.4 The fishery and beat owners who participated in the survey considered that the market was weak (61%), while for 35% it was neutral. Just 4% thought it was strong. They considered that there was little prospect of the values rising in the short to medium term because of uncertainty related to the economy and to some extent the Wild Fisheries Review and Land Reform. They suggested the market would continue to be for recreational/leisure activities of individuals and syndicates, rather than for commercial interest (i.e. those seeking to operate fisheries and beats as businesses).

6.2.5 The values of transactions for fisheries and beats varies widely. The estimates of the value of the fisheries as an asset puts the ranges between £50-£100k for beats sold in the lower end of the market and up to £2m or £5m for the higher end of the market on the main rivers (e.g. Tweed, Tay, Dee, Spey), dropping on the other rivers. The average is around £500,000 for those with higher levels of catch over the past few years. While recognising the range the data shows that the ownership of fisheries and beats can be a significant financial asset.

6.2.6 The market for timeshares/weeks is larger with some fifty per annum and there can be up to one hundred on the market at any one time. The duration of ownership can typically be for twenty-five to ninety-nine years. The demand is considered to be greater than the supply. The costs vary widely depending on the time of year and

location and can be around £5K per week, per rod, for in perpetuity rights in the lower part of the season to £50K per week in prime weeks.

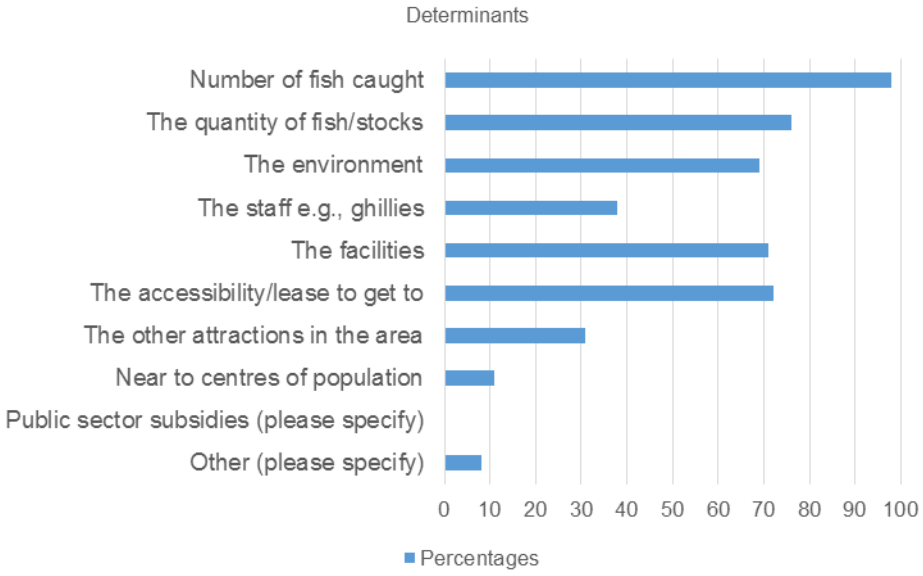
6.2.7 For further views on the market for fisheries and beats see the Case Studies in Appendix E.

6.3 Factors that Influence the Value of Fisheries and Beats

6.3.1 Having established the value of fisheries and beats a key issue for the research was what determined values. The surveys and discussions sought to provide some insights, including the features that attract the anglers who generate the income. The results show that there are many features that attract anglers to Scotland. The angler survey showed that the main attractions were the scenery, countryside, the fresh air, the water quality and the rivers and lochs, the support from ghillies at the fisheries, and the range of different fisheries to choose from.

6.3.2 The fisheries survey showed that, while these factors were recognised the main influence on the value of the fisheries and beats was the number of fish caught per annum. All fisheries identified this factor (98%) followed by the environment of sites and the area where beats were located (69%), the quality of fish (76%), the facilities (especially fishing huts for anglers) and accessibility (just over two thirds for each). See Figure 6.10 below.

Figure 6.10 Determinants of the value of fisheries and beats



Source. Survey of Fisheries.

6.3.3 The discussions with the property sector confirmed the view that the key factor that influences marginal values was the level of catch estimated by the moving annual average over a five to ten year period. However, it was difficult to say to what extent the marginal values changed. The average number of fish caught was weighted by a

value per fish, for example, £3k (on secondary rivers or beats) to £10k on the primary ones. There were ranges around these central values.

6.3.4 The other factors that came into play (as with the views of the fishery owners) were the physical environment and scenery, "the Scottish experience", the quality of fish, the on-site facilities and general accessibility. The reputation and image of an area, or river, for salmon fishing also played a role.

6.4 Economic Benefits. The Value of Fisheries and Beats in Scotland

6.4.1 The results of the research shows that for Scotland as a whole the combined value of fisheries and beats is significant given that there are considered to be over 2,300 fisheries and beats in Scotland. Fisheries and beats are a valuable asset class and the value provides collateral security for owners to finance and operate the fisheries and potentially other businesses. Given the fluctuations in markets, perceived fish stocks and the level of catch one issue, in the present context is the extent to which the value is 'sustainable'. Taking the level of catch as the key indicator the considered view of the property sector, and the fisheries owners, is that if the level of average catch rose by 10% (at the same value per fish and all other things being equal) the increase in the value would on average be similar at 10%. If the average catch fell by 10% the value would fall by some 10%.

6.4.2 Previous analysis carried out in 1991 (by Radford et al) [46] suggests that a 10% change in catch results or a 5.5% change in total market value. Hence there was not an equal ratio. The possible reason for this is that the market was potentially stronger in the early 1990s and that fish were in more plentiful supply. However, there is not a significant difference between the previous analysis and the current views of those in the angling sector.

6.4.3 Overall it is estimated taking the average value of fisheries/beats that the overall value in Scotland could be in the order of several hundred million pounds. This assumes, as well as the other factors above, that the supply of beats for sale, and the demand, remains similar to the trends over the last ten years or so.

[46] Radford, A.F., Hatcher, A. and Whitmarsh, D. (1991) *An Economic Evaluation of Salmon Fisheries in Great Britain*. A Research Report to the Ministry of Agriculture Fisheries and Food. Research Report 16, Centre for the Economics and Management of Aquatic Resources, University of Portsmouth

7 Kill Licences for Salmon

7.1.1 Part of the project sought to assess the sector's views on the Wild Salmon Fisheries Review and in particular the views on the potential introduction of Kill Licences for salmon. The question was whether the introduction of Kill Licences may have an influence on stocks and subsequent fishing activities and hence reduce economic benefits. Part of the project sought to assess the sector's views on the Wild Salmon Fisheries Review and in particular the views on the potential introduction of Kill Licences for salmon. The question was whether the introduction of Kill Licences may have an influence on stocks and subsequent fishing activities and hence reduce economic benefits. It is important to note however that proposals for the Kill Licence (now referred to as Conservation Measures) have since changed from the time interviews with various stakeholders were conducted.[47] However, the objective "to manage the level of harvesting in a sustainable manner and maintain some of the economic advantage that arises from this"[48] and help to conserve salmon stocks remains unchanged.

7.1.2 This chapter outlines the background to the Kill Licences issue and in particular views on the changes in fish stocks and views on Kill Licences based on the survey research with fisheries and interviews with representatives of the sector and other stakeholders.[49] Some twenty industry bodies have been interviewed, and responses received from almost one hundred and fifty salmon fisheries' owners and managers and eight hundred and fifty anglers. It then assesses the overall views on the possible introduction of Kill Licences, and the key reasons that were outlined. The final part of the chapter assesses what the implications of the Licences may be in terms of the economic benefits and NEV.

7.1.3 The general view of the sector was that the level of stocks and the ability to catch fish was important to the angling experience. Other locations for fishing outside Scotland were thought to have an advantage on this issue because of higher levels of fish stocks. However, the ability to catch fish was not the only attraction in Scotland where the environment and scenery were also important as part of the overall "Scottish experience"[50].

7.1.4 There is no evidence to suggest that killing fish, as such, played a part in anglers' enjoyment of fishing. They were attracted by the scenery, environment and the quality of the air in the countryside where they fished and the overall "Scottish experience". The relatively low fish stocks were not seen as ideal and the high rates of catch and release indicate that there was a willingness to conserve stocks rather than deplete them by killing fish.

[47] See http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/status .

[48] Report of the Wild Fisheries Review Panel. October 2014.

[49] The interviews were held in the Spring of 2015 at the time of government consultations on Kill Licences. The proposals as they were understood at the time may not be the same as those which could be enacted.

[50] See Chapter 8 Figures 8.18 and 8.19.

7.2 Changes in Salmon Stocks

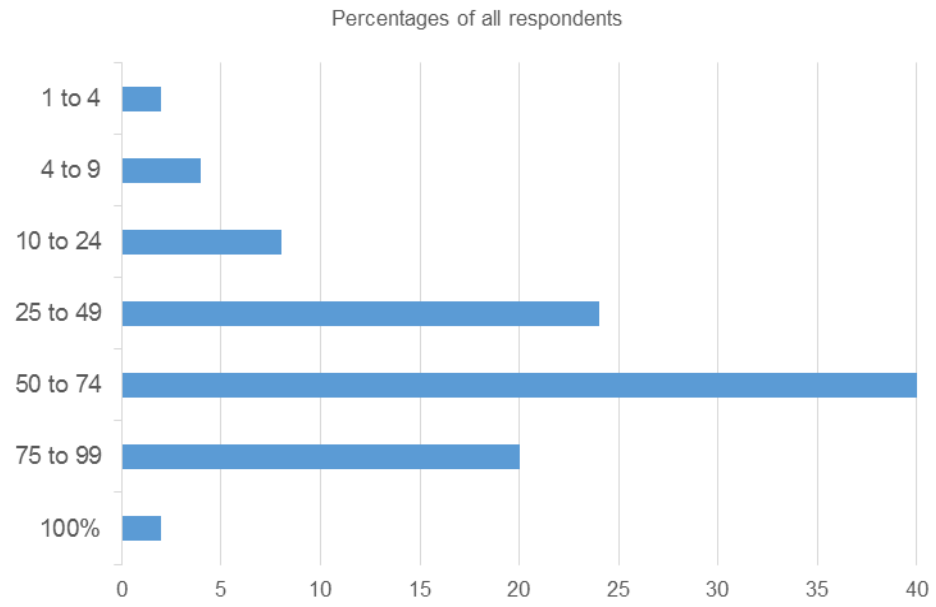
Fisheries for Anglers

7.2.1 The change in salmon stocks over the past provides the context for the consideration of Kill Licences for salmon. The respondents to the survey of fisheries were asked their opinion of any change in the level of stocks of salmon over the past 5 years. Just 2% reported stocks were rising, 14% said that salmon stocks had remained roughly the same, and the remaining 84% believed salmon stocks had fallen over the past 5 years.

7.2.2 When those that had identified a fall were asked to quantify this, the most common answer was a fall of between 50% and 74%, with 40% of respondents answering in this way. 24% considered there had been a 25-40% drop, and 20% stated that stocks had fallen by between 75% and 99%. The average estimated decline was 51%, and the median 50%. The Marine Scotland catch data, as an indication of stock levels, shows a steady decline since the early 1990's. (See Chapter 2). The most recent Marine Scotland paper on the status of Scottish salmon and sea trout stocks (2014) suggested, however, that the overall number of Atlantic salmon returning to Scottish rivers had generally increased over recent decades (although spring salmon in particular had decreased). This is despite the recent trend in rod catches suggesting a decline in stocks. Evidence on the marine mortality rates of salmon[51] suggested an upward trend in marine mortality rate over the measurement period 1964 to 2006 from around 60% to around 90%. This increased mortality would have been largely compensated in previous decades by reductions in coastal and distant water netting activity, but may now be affecting numbers of spawning salmon.

[51] "Marine Mortality in Atlantic Salmon", 2006

Figure 7.1 **Approx. % fall in salmon stocks**



PACEC Survey of Fishing Providers, 2015 (Q22)

7.2.3 The respondents to the fisheries survey attributed the decline in the salmon stock to a number of factors, including - losses to predators, climate change and global warming. Others cited to fishery practices and activities as causes for the decline. Some 78% thought that predators were responsible, for example, seals and cormorants, 54% attributed the decline to global warming, and another 54% to a decline in natural fish foods. Almost seven in ten of the fisheries providers (68%) cited netting activities and 12% identified fish caught by rod and line being killed. These factors are relevant to the potential Kill Licences. When asked to choose the single main factor, 31% responded that predators were to blame, followed by netting (16%) and a decline in fish foods (also 16%).

Table 7.1 **Factors influencing the decline in salmon stocks**

	Percentages of all respondents	
	Any factor	Main factor
Climate Change / Global warming	54	14
Decline in natural fish foods	54	16
Predators	78	31
Rod and line caught fish being killed	12	0
Fish farming	37	12
Netting activities	68	16
Other	26	10

Respondents could select more than one option; so percentages in the “any factor” column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q22)

The Netting Sector

7.2.4 The netting organisations share the views of the rod and line fisheries on the decline of stocks and the main reasons - apart from the role that netting played which they thought had been exaggerated as their catch had declined. Their view was that stocks had levelled out over the past two years or so. The other reasons they gave were predators (e.g. seals and cormorants), the fall in water levels for some rivers – which limited the number of fish moving up the rivers - and that there were relatively large numbers of fish caught by anglers that were not released (or poached) as a longstanding practice. In addition, the netting organisations believed that the fish that were released by anglers often did not survive which reduced the stocks by an estimated 18,000 per annum for salmon.

7.3 Interviews with Stakeholders

7.3.1 The interviews with stakeholders[52] in the salmon and trout fishing sectors examined views on past and future trends in fish stocks. The general view was that stocks had been in decline for many years. A minority thought they had been stable, with an even smaller minority suggesting that in some places on the "good" rivers there had been some growth. It was anticipated that the stocks of fish would continue to decline over the next few years. The influences on stocks were considered to be complex. The decline was thought to result from a combination of climate change and global warming, which affected water temperatures and ocean conditions in a way that was not conducive to fish or their food supply[53].

7.3.2 It was also considered that water levels in the rivers were also reduced which meant that the fish found it more difficult to access and go up the rivers. Although stakeholders said that the number of fish caught by the netting organisations had fallen over the past ten years or so, some considered that they still had an adverse impact on overall stocks. There was a general view that stocks changed in cycles and that, in fact, salmon were relatively robust. The general view was that the scientific evidence of what influenced stocks was incomplete.

7.3.3 The coarse fishing stocks (e.g., pike and carp) were considered to be relatively stable and would remain at current levels as stocks can be increased when required. However, there were concerns that pike in particular were being over fished and retained by some residents/visitors to Scotland who traditionally saw pike as a food source. This could have some impact on future stocks.

[52] The range of organisations representing fisheries for angling and netting, government agencies and property groups. See Appendix B.

[53] This view is supported by e.g. Todd et al, ICES Journal of Marine Science (2012): *Phenological and phenotypic changes in Atlantic salmon populations in response to a changing climate.*

7.4 Views of the Local Authorities

7.4.1 The staff at Local Authorities generally agreed that fish stocks had been in decline for many years. One officer pointed out: ”The stock of wild salmon in Scottish rivers has been in decline for many years and this is supported by research on the numbers”. However, views were split when asked about future trends. Half the staff forecasting a further decline and the other half thinking that the number will remain the same. In their view, having liaised with other organisations in the sector, the decline was attributed mainly to global warming, the impact of diseases, a decline in natural fish food, fish farming and netting activities. A small minority also thought that predators were posing a threat to fish – although officers recognised they were not experts on the subject. Their views were formed through liaison with organisations active in the sector and the fisheries themselves.

7.5 Overall Views on Kill Licences

7.5.1 It was widely considered, by some eight out of ten industry bodies/fisheries that the stocks of wild salmon in Scottish rivers had been in decline for a number of years, as demonstrated in catch figures. A number of reasons were given for the decline: climate change and global warming, predators (for example, seals), the decline in natural fish foods, netting, and fish farming. A small minority attributed the decline in stocks to rod and line caught fish being killed. There was a general view that the “science” and evidence behind the decline in stocks of fish was uncertain and incomplete. In spite of the decline in stocks, the number of anglers had stayed the same, for some six in ten fisheries. It has declined for a quarter, and increased for one in six.

7.5.2 Overall, the views of stakeholders on the introduction of kill licences were split. Some were in favour of the scheme for rod and line fishing and netting, in conjunction with tagging. A small group of stakeholder organisations did not see the need.

7.5.3 The survey of fisheries indicated that a fifth agreed with the introduction of Kill Licences but eight in ten did not.

7.5.4 The netting association and the netting companies interviewed were “not against” a scheme which in general terms helped to set quotas for fish caught that could be retained; including one with Kill Licences, that protected salmon stocks and recognised that it was possible to have a harvestable surplus. However, it needed to be fair across the whole fishery sector, including angling and netting, and recognise that there were longstanding rights associated with netting.

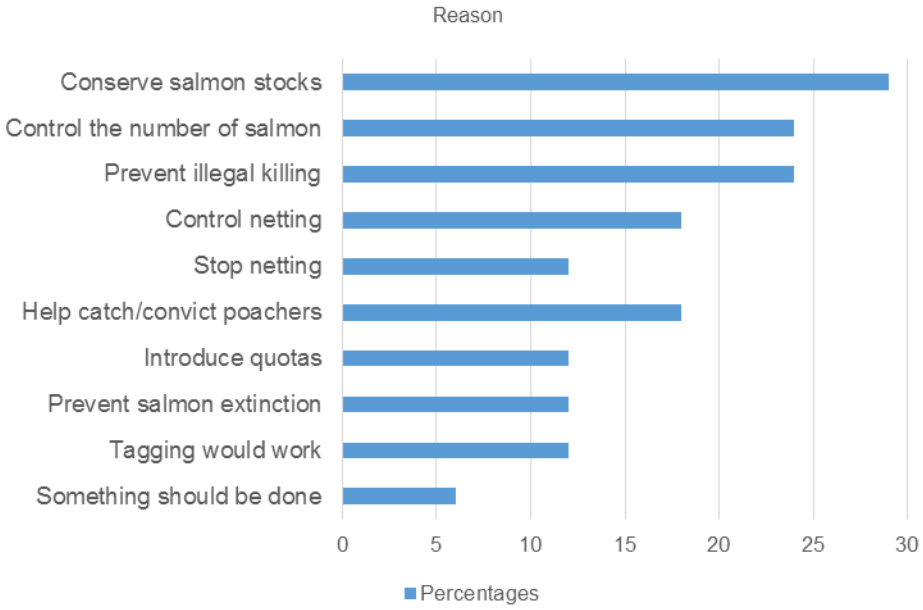
7.6 The Main Reasons for Views on Kill Licences

Rod Fisheries

7.6.1 Reasons given by the stakeholders in favour of introducing the kill licences include to help conserve fish stocks (especially early running fish) and maintain future activity and the attractiveness of fishing in Scotland. The scheme would help to identify fish that, for example, had not been tagged, and/or had been poached. It was considered that sea trout should not be excluded from the measures.

7.6.2 The main reasons given by the fisheries for introducing the licences were to conserve salmon stocks (29%), control the salmon catch not released (24%) and stop illegal killing (24%). Other reasons were to control netting (18%), stop netting (12%) and help to convict poachers (18%). Other reasons were that quotas should be introduced, and the extinction of salmon prevented, while others thought that tagging would work or something should be done. See Figure 7.2.

Figure 7.2 Anglers. Reasons for Agreeing with Kill Licences



Sources. Survey of Fisheries.

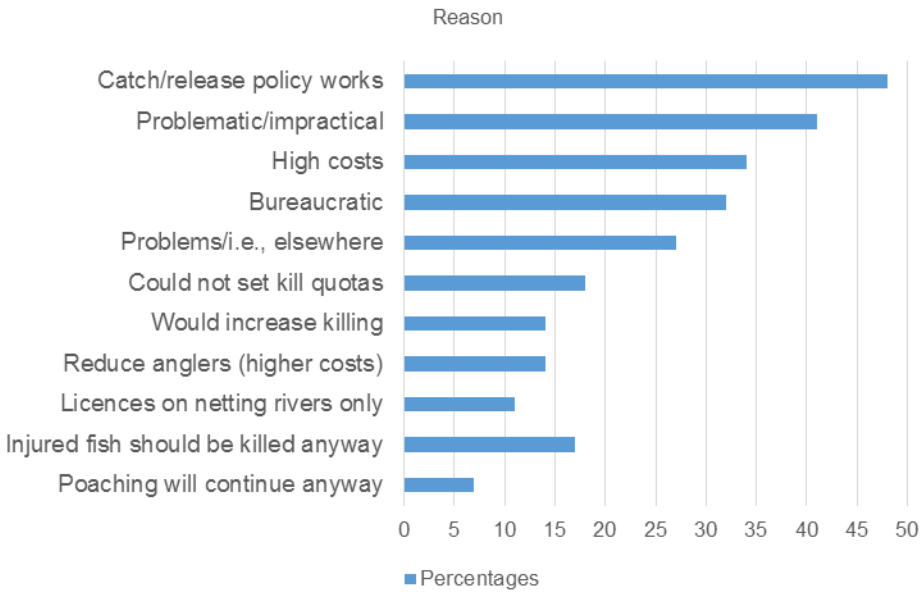
7.6.3 The netting organisations generally agreed with main reasons given by the providers of angling (apart from reasons to rigorously control netting or stop it). They placed more emphasis on controlling the activities of providers of angling, which they thought were on a large (albeit uncertain) scale relative to the impacts of their own activities.

7.6.4 The stakeholders that were not in agreement with a kill licence scheme considered that it was unnecessary bureaucracy and over-legalisation (46%), voluntary catch and release policy was adequate (42%), and that there would be high costs (both for the government agencies and the fisheries and clubs). Some fisheries considered that income could potentially be reduced if costs deterred anglers (20%), and the current

loss making position for fisheries would be made worse. It was also considered that it would be too difficult to set quotas for individual fisheries and rivers, the stocks varied from year to year, and there was uncertainty as to when there would be a surplus or a trough (12.5%).

7.6.5 The reasons given by the rod fisheries for not agreeing to the introduction of the Kill Licences were that the current catch and release policy worked, and was fully understood by anglers, and the percentages returned was very high (48% of fisheries), the system would be problematic and impractical (41%), the costs of operating fisheries would be increased (34%), the scheme introduced unnecessary bureaucracy (32%) and the problems with the lower levels of fish stocks lay elsewhere (27%). These included climate change and weather conditions that affected the oceans, predation, fish farming and to some extent netting activities. These needed to be addressed as structural drivers of fish stocks. Other reasons for not agreeing with Kill Licences included the difficulty on setting quotas for killing when the fish stocks are not known precisely and are prone to changes (18%), the likelihood that killing could increase (14%), high costs may deter anglers which could adversely affect jobs and incomes (14%), there should be licences on the netting rivers only (11%), poaching would continue (8%), and there was no reason why injured fish should not be killed as it was perfectly OK to keep some fish i.e., "one for the pot" especially cock grilse. See Figure 7.3.

Figure 7.3 Rod Fisheries. Reasons for Not Agreeing with Kill Licences



Sources. Survey of Fisheries

7.6.6 Some suggested that the practice of catching and not releasing salmon and the level of poaching was relatively small, and would continue anyway with kill licences.

7.6.7 Alternatives were put forward to retain/increase the stock. In particular, controls over netting (20%) and fish farms at the lochs and rivers (20%), and improved overall management (12.5%), along with predator control (12.5%).

7.6.8 Those in favour of kill licences considered there could be implementation difficulties due to the points above, especially the costs (for the government, fisheries, and, potentially, the anglers, as they would be passed on), it would be difficult to set quotas for rivers and fisheries in advance. They argued that although the current system of catch and release was not perfect, this posed fewer difficulties on balance. It was generally thought that the Government should be responsible for the tagging system and the administration of the scheme.

7.6.9 For views on Kill Licences at fisheries see the Case Studies in Appendix E.

The Netting Sector

7.6.10 Those who carried out netting, while generally in agreement with a kill licence scheme, subject to fair quotas being set for them and the angling sector, took the view that it would be difficult to estimate what a harvestable surplus was by location and within the different times of the fishing season that allowed quotas to be set. There were concerns about the cost of a kill licence scheme and tagging arrangements and the need to protect long standing fishing rights including those related to the ability to make a living. The netting sector had longstanding rights which any licencing scheme, or associated regulations, need to recognise. Additionally, catch from netting had fallen significantly and that the catch and release practices still accounted for, in their view, some 18,000 salmon per annum being subject to mortality.

7.7 Views of Local Authorities

7.7.1 The Local Authorities were very aware of the possibility of introducing kill licences for salmon and other fish but their views on that matter were split. When asked if they agreed or disagreed with the introduction of the scheme, just over half were not sure or declined to answer. Just under a quarter disagreed with the licences. The main reasons given were that it would be difficult or impossible to administer them and that "there was no fish conservation reasons to support licences". A small group were in favour of them but gave no specific reasons for their answers but generally thought that unauthorised fishing could be reduced.

7.8 The Economic Benefits of Kill Licences

7.8.1 The aim of Kill Licences is to manage the level of harvesting in a sustainable way and maintain some of the economic advantages and help conserve salmon stocks. The licences could help to increase stocks, ensure that they remain stable, or even (if required in future) decrease them if needed – although this is an unlikely outcome. Where stocks increase the likelihood is that the attractiveness of fishing to anglers would also increase along with the numbers. However, the rod fisheries and angler surveys suggest the current level of fish stocks was not a key factor in Scotland's attractiveness as a fishing destination, but it was an important factor for locations outside Scotland. An increase in angler numbers, and consequent income, would

potentially increase the number of jobs in the fisheries' and the tourism sector (subject to increases in productivity amongst existing staff). These would represent an increase in rural areas when jobs are relatively scarce. There would also be some associated social and community benefits. While the relationship between the increase in angler activity, income, jobs and GVA is difficult to determine, one can assume that a 10% increase in anglers and income could lead to a maximum increase of 10% in jobs and GVA but the rise is likely to be below this.

7.8.2 If stocks remained the same then the level of economic benefits would probably remain the same.

7.8.3 If fish stocks fall the number of anglers and income could well fall reducing the economic benefits. However, the fall is not likely to be similar to the fall in stocks as the survey evidence indicates that anglers are attracted to Scotland by other features of fishing such as the scenery and environment, the quality of water, the "Scottish experience" and value for money. Added to this is the research finding and the NEV analysis that some anglers could be willing to pay more to go fishing to retain and conserve fish stocks.

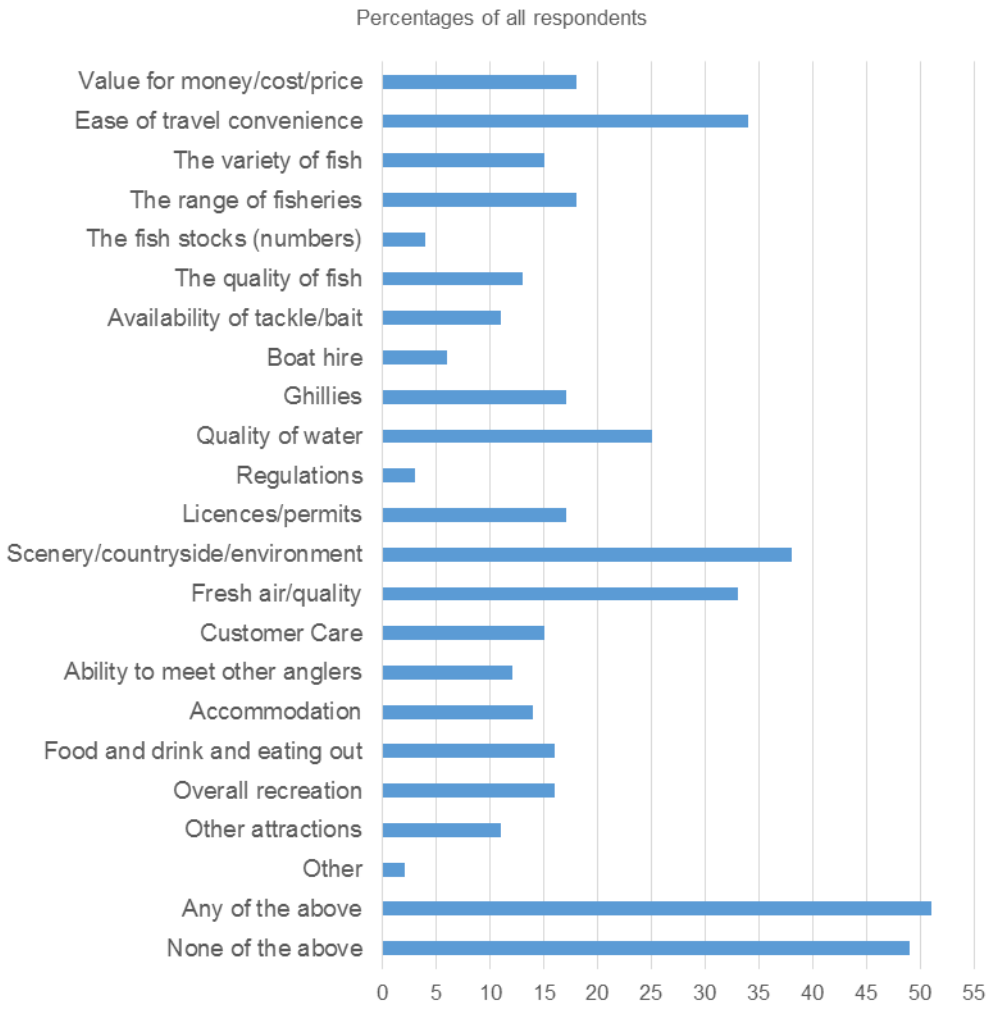
8 The Overall Recreational Experience of Angling

8.1.1 The previous chapters have shown that there are significant economic benefits for Scotland arising from the fishing activities. However, there are also important recreational benefits for those living in Scotland who go fishing and for tourists who visit Scotland from elsewhere. These benefits were examined through the discussions and surveys with the fisheries and anglers and the interviews with sector stakeholders. This chapter sets out how both the fisheries and the anglers view Scotland's attractiveness as an angling destination, and what gives it a competitive advantage over other locations. These are the features that help to create the "Scottish experience" which participants find attractive.

8.2 Fisheries Survey

8.2.1 The fisheries highlighted that Scotland's attractiveness and competitive advantages as an angling destination were linked to the quality of the countryside environment, high water & air quality, and travel convenience. The largest fisheries (by fisheries expenditure) highlighted good customer care, and variety of recreation and dining options as adding to Scotland's competitive advantage. In comparison, the smaller fisheries gave greater prominence to the variety of fish available.

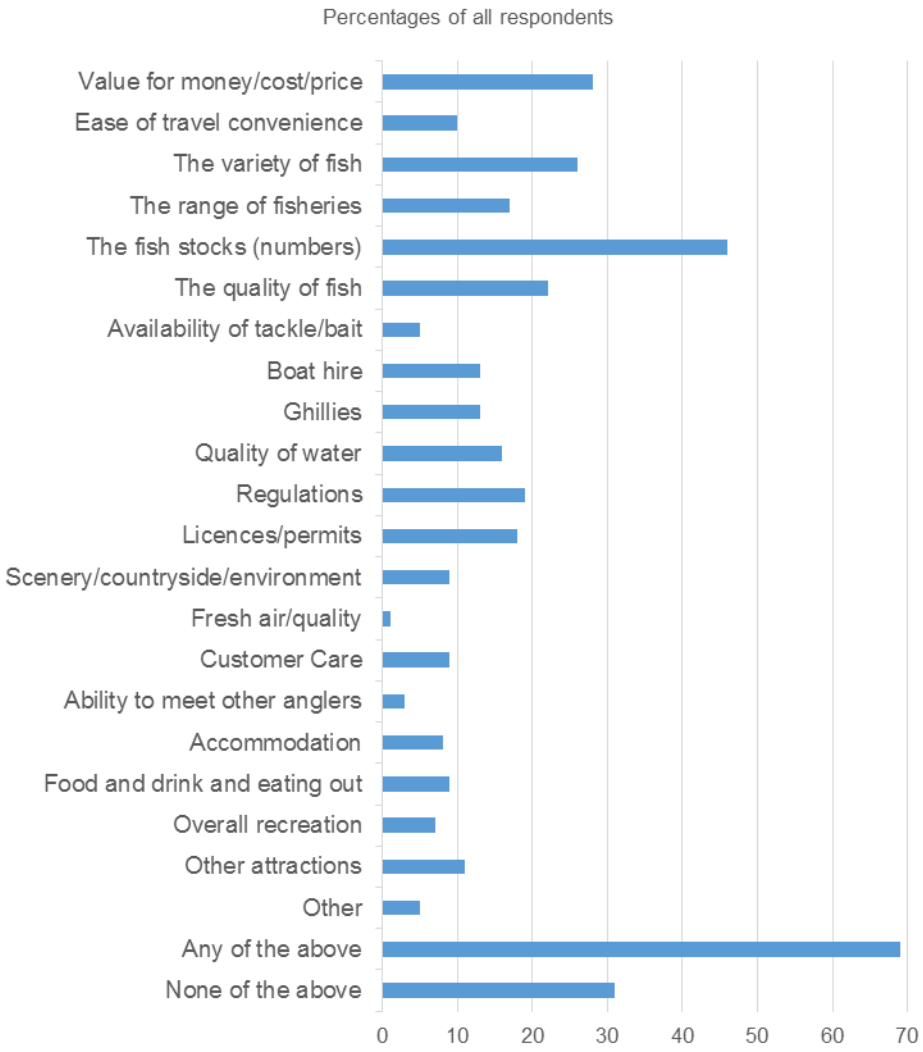
Figure 8.1 **The main features where Scotland has a competitive advantage in attracting anglers**



Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q41)

8.2.2 The fisheries highlighted higher fish stocks as the main feature that made Scotland's main competitors relatively more attractive. The larger fisheries were more likely to select higher stocks as creating an advantage for competitors outside of Scotland. Better value for money, quality of- and variety of fish were also suggested by the larger fisheries as advantages for Scotland's competitors. Smaller firms were on the other hand more likely to highlight skilled ghillies/guides, the countryside environment and other visitor attractions as advantages over Scotland's competitors.

Figure 8.2 **The main features where Scotland's competitors have a competitive advantage. Good or Very Good**

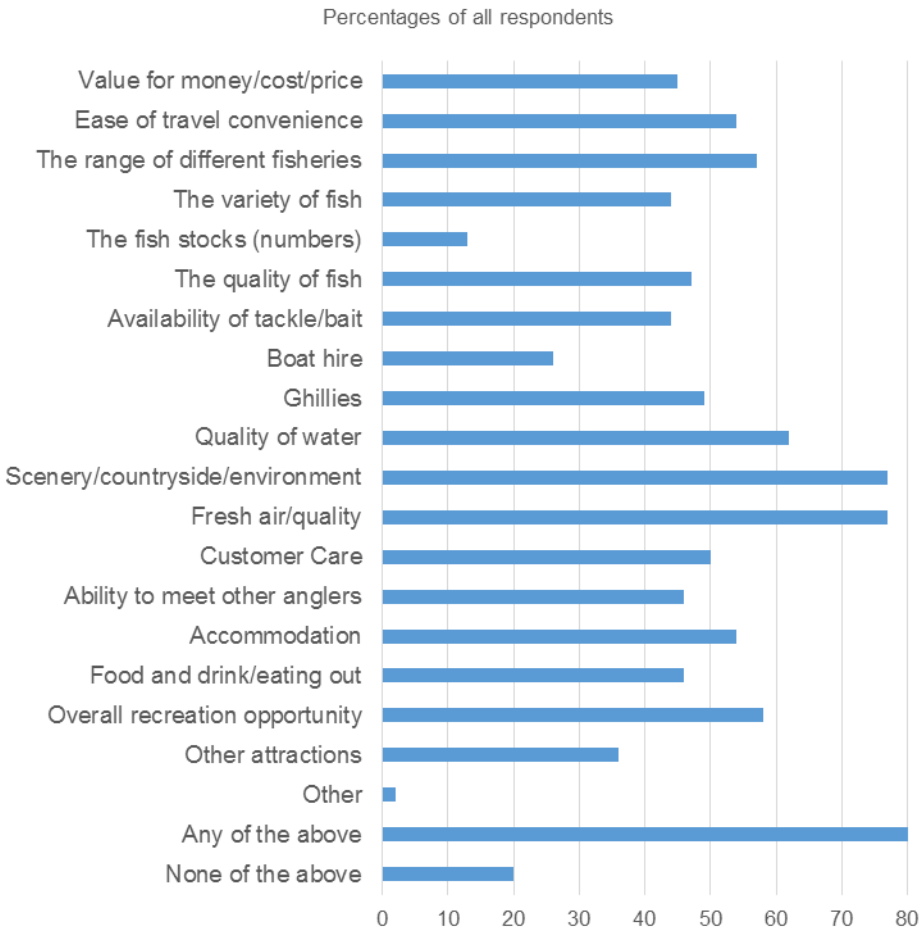


Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q41)

8.3 Anglers Survey

8.3.1 For anglers the recreational experience covered a range of factors seen as good or very good. A large majority (around three quarters) of all anglers rated good air quality and countryside environment at their Scottish fishing locations as 'very good', or 'good'. Just under two thirds identified the quality of water as 'very good' or 'good'. Over half highlighted the range of different fisheries to choose from, the accommodation to stay in while fishing and the ease of travel and convenience to get to the fisheries. Customer care, the ghillies, the quality of fish, the opportunity to meet other anglers, and the food, drink and eating out opportunities were also identified as contributing to the recreational experience of around half of the anglers responding. These factors help to demonstrate that the fishing experience was attractive to anglers "in the round".

Figure 8.3 Attractive Features of Scotland. Good or Very Good



Respondents could select more than one option; so percentages in any column may sum to more than 100
Source: PACEC Survey of Participants 2015 (Q17

8.4 Views of Stakeholders

8.4.1 The stakeholders consulted shared the views of the fisheries and the anglers. They emphasised the Scottish scenery and the physical environment – clean and good quality air and water was attractive to visitors to the fisheries. There were also a wide range of fisheries to which access had improved both in terms of transport and the ability to book fishing slots, for example the internet meant that opportunities could be easily identified and booked. Other aspects that made Scotland attractive as an angling destination include the "Scottish experience" – the ability to combine recreational fishing with the opportunity to experience Scotland's culture and other attractions such as the cities and their retailing facilities, historic sites, museums and art galleries along with the world famous festivals and events.

8.5 Views of Local Authorities

8.5.1 To Local Authorities, there were many features that attracted visitors to the fisheries in Scotland. These include the countryside and the fresh air. Access to skilled

ghillies, good quality water (in the rivers), other recreational opportunities and attractions in Scotland including castles, national parks, heritage sites, and museums contributed to Scotland's attractiveness. Over half of the organisations considered that the wide range of fisheries, the fish stocks, the quality and variety of fish and the availability of tackle and bait were also important features attracting fishing visitors to the area. Food and drink, accommodation and the ability to meet other anglers were also considered attractive features by around half of the staff. Others stated that Scotland offered good value for money, although one organisation stressed: "it is not cheap, but because of quality, it is value for money". Another officer mentioned golf courses as an angling attraction.

9 The Future Prospects

9.1.1 Chapter 2 on the scale and nature of angling and netting established the baseline position for Scotland's wild fisheries sector. The analysis in that chapter showed that since year 2000 the rod and line salmon catch rose to a peak in 2009, and has declined since – along with catch retained. The netting catch has also been falling since 2000. In this chapter future prospects for the sector are considered – drawing on views of fishery owners and managers of angling and netting businesses, the anglers, the netting sector, Local Authorities and other stakeholders.

9.1.2 The analysis is primarily from the perspective of the market and stakeholders with views on trends in the sector. As the economy has emerged from recession in recent years and incomes have risen, the anticipation is that activity in the wild fisheries sector may increase. However, there remains significant uncertainty linked to the economy and a range of factors that influence the relative attractiveness of angling, compared to other activities. This chapter concludes by examining the impact of expected future trends on the economic benefits and NEV of wild fisheries.

9.2 The Trend Data on Catch

9.2.1 The trend data provides some insights into what may occur in the future. The catch, for salmon, rose to 2010 and then declined every year since, to the second lowest catch figure in 2014 since 1952 (after 2000). If the catch continues to fall, the number of anglers could also decline. This is mainly because the fisheries and the anglers see the low level of stocks, for salmon in particular, as a negative feature for Scotland compared to other competing locations such as Scandinavia, other parts of Western Europe and North America. Set against this is the attractive environment of Scotland, the scenery, good air quality and ease of access, along with the "Scottish experience".

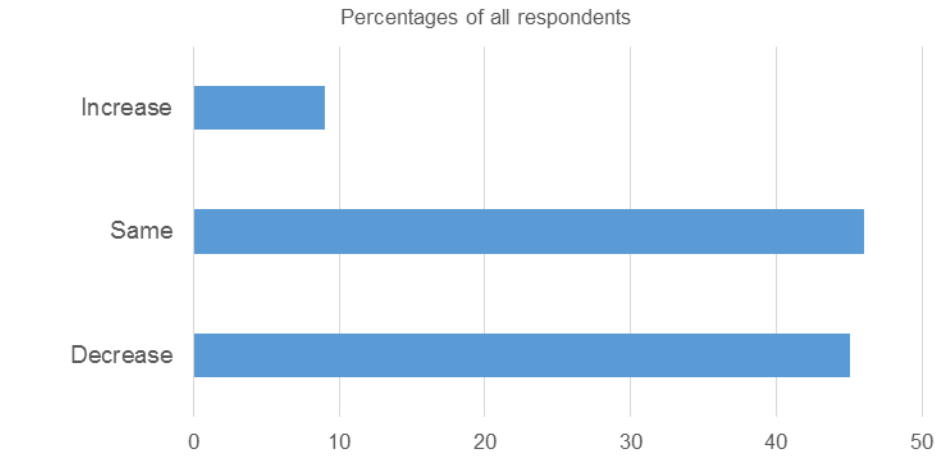
9.3 Fisheries Survey

9.3.1 The majority of fisheries (64%) believed that the number of people fishing in Scotland would decrease over the next five years. 29% thought that the level of fishing would remain the same, and only 7% believed that there will be an increase. The average predicted decrease, based on all fisheries predicting a fall, was for angling in Scotland to fall by 24%. For the few forecasting an increase, the average estimated increase in the number of anglers was 8% (the median is lower at 5%). The majority of the larger fisheries (71%) believed the number of anglers would remain the same (although none foresaw an increase). Regionally, Western Isles and Highlands fisheries were most likely to forecast that the number of people fishing in Scotland would remain the same (63% and 42% respectively), and those in the North East, and Dumfries and Galloway, were most likely to predict a decrease (79% and 83% respectively).

9.3.2 The majority of fisheries (81% overall) foresaw a decrease in the number of overnight visitors in the next 5 years – with the mean (and median) decrease at 30%. Only the small fisheries (less than £10,000 pa in expenditure) predicted any increase in overnight visitors, with 19% of these forecasting an increase (of around 9% on average).

9.3.3 The fisheries were less pessimistic about the prospects for their own visitor numbers than those for Scotland as a whole. Some 45% foresaw a decrease and 46% said their visitors would stay the same. More than 9 in 10 fisheries of less than £50,000 pa in expenditure foresaw static or falling numbers in their visitors (however, the smallest of them were less likely to predict a fall). The mean increase in overall numbers (among those predicting an increase) was +12%, while the mean decrease among those predicting a decrease was 22%.

Figure 9.4 Forecasts of visitor numbers to owners' fisheries over the next 5 years. Owners of fisheries

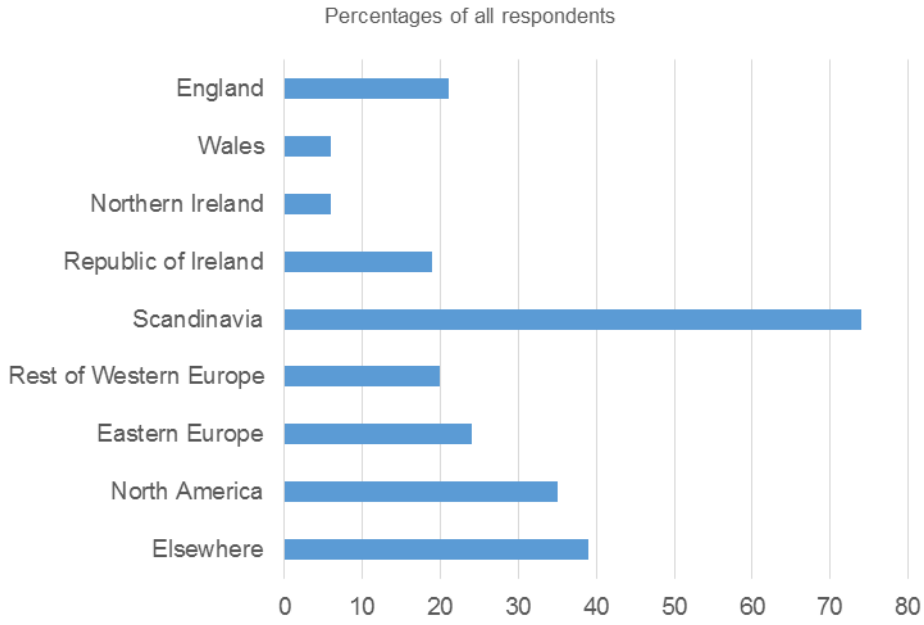


PACEC Survey of Fishing Providers, 2015 (Q38)

9.3.4 42% of fishery owners expected a fall in overnight visitor numbers over the next five years, and 57% of them thought the visitor numbers would stay the same. No fisheries with expenditure under £50,000 foresaw an increase in their numbers, although businesses of £11k–£50k are the only ones that have a clear majority (above 90%) forecasting a decrease in numbers. 5% of the largest fisheries (>£50k in expenditure) predicted an increase (amounting to a 10% increase). The mean decrease in forecast overnight visitor numbers was 23%.

9.3.5 Scandinavia is seen by the fisheries as by far the most significant fishing competitor to Scotland and is the only one mentioned by the majority of respondents (74%). The largest fisheries are more likely to suggest that other areas in Western Europe outside the British Isles are major competitors (46%). North America is the second major competitor for all the fisheries (35%) but it is even more significant for the fisheries with £21k–£50k of income pa (51%).

Figure 9.5 The main fishing competitors for Scotland



Respondents could select more than one option; so percentages in any column may sum to more than 100
PACEC Survey of Fishing Providers, 2015 (Q40)

9.3.6 For views on the future market at fisheries see the Case Studies in Appendix E.

9.4 The Anglers Survey

9.4.1 Some two thirds of anglers said they were 'very likely' to return to Scotland for fishing in the next 5 years, with a fifth 'quite likely' to do so. The salmon and sea trout anglers were least likely to return. Just over a half of anglers were more likely to return to Scotland in the next five years for a (non-fishing) holiday, while just over a quarter of salmon and trout anglers were less likely to return.

9.5 The Netting Sector

9.5.1 The netting sector considered that fish stocks, in particular salmon, had levelled out in the last two years or so. It was anticipated that this would continue to be the case in the next few years, but much depended on the climate change and global warming issues, salmon foodstuffs and protection against predators. The netting sector was usually the first to know about the changes in stocks because of its fishing locations at the mouth of rivers.

9.6 Interviews with Stakeholders

9.6.1 The interviews with stakeholders confirmed the view that over the next five years or so there was likely to be little change in the number of anglers for salmon and trout while a smaller group either saw continuing decline or some growth on the "good" and main rivers. Very much depended on the economic cycle and continued uncertainty,

and the position on salmon stocks and the quality of fish. However, the general perception of Scotland and "the Scottish Experience" would continue to be attractive to tourists.

9.7 Views of Local Authorities

9.7.1 When asked about their views on the number of fishing visitors to their area for the next 5 years, half of the Local Authority officers were optimistic and thought it would increase or stay the same. The others were not sure but thought there would be a decrease.

9.8 The Future Trends and Economic Benefits

9.8.1 Overall, those consulted as part of the research are of the view that the number of people who will fish in Scotland will decrease over the next few years or so up until 2020. However, there is uncertainty over the scale of any decline. Around two thirds of the angler fisheries held this view and a significant proportion (four in ten) thought overnight visitors and tourists would also decrease. The stakeholders and Local Authorities had similar views but were more optimistic that the decline would not be so great. The anglers were probably more optimistic with two thirds indicating they were very likely to return to Scotland to fish. However, about a fifth thought it was only quite likely and a tenth not likely.

9.8.2 To some extent the reason for this predicted decline in fishing activity was a view that some competitors had a competitive advantage over Scotland that covered a number of features. The main advantages of overseas competitors based on the views of the owners of fisheries were better stocks of fish elsewhere, the variety and quality of fish and value for money in terms of the price paid to go fishing. (Some 20% to 45% selected these factors). However, Scotland had a strong competitive advantage in terms of its scenery and the fishing environment, the air quality, the quality of water and the ease of travel and access to fisheries. (Some 30% to 40% selected these features). The fish stocks, quality and variety of fish were selected by fewer than 15% of those who owned the fisheries as advantages of Scotland's angling experience. The anglers also considered that the scenery, the environment, the air and water quality were strengths (selected by three quarters to two thirds). They also highlighted overall recreational opportunities, the range of fisheries, accommodation and ease of travel and convenience. However, very few saw fish stocks as an attractive feature, compared to competing locations.

9.8.3 The main competing locations were considered to be Scandinavia, North America, Eastern Europe and England.

9.9 The Impact on Economic Benefits and NEV

9.9.1 The implications of the catch data over the period since 2010 are that the short term trend for catch to fall could continue. The decline since 2010 is steeper than previous increases that have been observed in the data; as a result, even if the catch level begins to rise again, it is unlikely that the 2010 levels will be reached for several years, if at all. The decline has, according to views in the sector, been attributed to a fall in fish stocks which in turn could well be influenced by many factors such as global warming, and climate change, amongst other factors.

9.9.2 In the short to medium term the factors which influence activity are likely to persist i.e., the fall in fish stocks perceived to be associated with global warming and climate change and the likely recovery in angler numbers and expenditure as the national and international economies improve.

9.9.3 The implications of a decline in the catch, if influenced by lower levels of fish stocks, are that the number of people fishing and overnight visitors could fall and consequently the associated income and the number of direct and indirect employment opportunities and GVA. The scale is difficult to forecast. However, a 10% fall would in the short term not result in an equivalent fall in employment, as labour would in part be retained in anticipation of a rise in fishing activity. It may be possible to compensate for a fall in income by charging more as some anglers have indicated that they may be willing to pay more to protect angling and ensure it could continue. Set against this any rise in prices could deter other anglers, so limiting any net increase in income to support jobs and GVA.

9.9.4 The implications for NEV are similar. A fall in income could impact on profits and NEV. The same issue arises as to whether anglers would pay more reflecting their consumer surplus to support and protect fishing.

10 Conclusions

10.1.1 The research has shown that wild salmon and freshwater fisheries generate significant benefits to the Scottish economy in the form of employment opportunities, incomes and GVA (especially in the more remote parts of Scotland where there are fewer economic opportunities). The fishing activities help to support local communities and the "rural way of life" in many communities. They also contribute to Scotland's offer to tourists.

10.1.2 The total number of jobs in Scotland associated with wild fisheries is estimated at 4,300 FTE jobs (1,700 direct onsite jobs, 1,500 in the fishery supply chain, 900 supported by other offsite expenditure by anglers locally, 200 in the supply chain to these offsite activities). Within this total there are some 65-80 FTE jobs in the netting sector. The main jobs in the sector comprise ghillies, guides, boatmen, boat maintenance and repairs, conservation and habitat management roles, fish packing and processing, building repairs and the management and marketing of the fisheries.

10.1.3 The fishing activities generate some £79.9m in Gross Value Added (GVA) to the Scottish economy. Of this impact, £25.9m arises from direct onsite activity (angling and netting), £20.6m in the supply chain to these activities, £20.3 are offsite impacts generated by other local expenditure by anglers, and £13.2m in the supply chain to these external sites.

10.1.4 There are also social and cultural benefits comprising jobs for local people which helped to integrate the community and protect a "way of life". This was reinforced by the links between the fisheries and conservation and habitat management groups and schools in some areas to increase understanding of the role of the fisheries, the uniqueness and value of salmon in particular as a species, and encourage more young people to fish.

10.1.5 The Net Economic Value was estimated at some £28m per annum, comprising some £17m of value for anglers and £11m for holders of fishing rights. This Net Economic Value is around £900 million on a capitalised basis[54].

10.1.6 The fisheries are also an important financial asset to the owners of beats and fisheries in Scotland, and are potentially worth several hundred millions of pounds for those that are active.

10.1.7 There is public sector support which benefits the sector, directly and indirectly, and contributes to economic benefits and NEV. In the main, this support comprises conservation grants, support for apprenticeships and training, and promotion to tourists, and the value is estimated at some £2.7m to £2.8m per annum. The research concludes that there would be an adverse impact on the wild fisheries sector if the public sector support was not available, as this would, other things being

[54] On the basis of a 3% annual return on total net economic value.

equal, impact on NEV (as profits would probably fall) and the economic impact of the sector.

10.1.8 In terms of the scale and make-up of the fisheries there are around 1,000 active fisheries in Scotland who provide opportunities mainly for salmon, trout, and coarse fishing with a much smaller number of sites for pike and carp fishing. There were 40 active netting operators (including individuals) in Scotland in 2014 – 22 coastal and 18 estuary operators, based on Marine Scotland information, with three to four active commercial enterprises. The industry body estimates that there are twenty to twenty-five members but not all are active.

10.1.9 Marine Scotland returns show that the number of salmon caught in 2014 was estimated at 62,953, the lowest on record, some 55% lower than the most recent peak of 138,676 in 2010. The catch for sea trout was 28,166 in 2014 and 38,727 in 2010. Within the total salmon catch, netting accounts for just over one quarter, and has been declining. Returns are not made for the pike and carp sectors. The number of anglers at the fisheries has fallen over the past five years for a third of fisheries, for half it has remained the same and for one in ten there has been an increase.

10.1.10 The anglers thought it was quite likely they would continue to go to (or travel within) Scotland, either to fish or to go on holiday. The salmon and sea trout anglers were less likely to continue to visit Scotland compared to those fishing for other species.

10.1.11 On the issue of Kill Licences, while it was widely recognised that fish stocks for salmon had fallen, opinion was divided. The industry stakeholder organisations were broadly in favour of licences to conserve stocks but the owners of the fisheries were not, as they were seen as unnecessary (as the catch and release system was working), bureaucratic, and costly. The netting sector could work within a system so long as quotas for retaining catch, and any associated regulations, were fair across the whole sector and their longstanding rights were recognised. If the effect of Licences was to increase the stocks, and the number of fish caught, angling and hence economic benefits and NEV could increase, subject to any additional costs passed onto anglers being acceptable.

10.1.12 The market for fisheries and beats (i.e., the sales and purchases) was considered to be relatively weak by the fisheries and the property sector. The main factors which determined the marginal values of beats were the number of fish caught, the site environment, the quality of fish, the facilities (e.g., fishing huts for anglers), and accessibility. The recession, the Scottish Referendum on independence, land reform issues, and the Wild Fisheries review caused uncertainty. The beats with the higher catches on average could have a market value of £500k, meaning that the total value of active beats in Scotland could amount to several hundred million pounds. It was considered that the value of beats would rise or fall in proportion to the changing levels of catch.

10.1.13 The scale of future fishing activity, and the prospects for the fishing sector, were uncertain, as they were a function of economic uncertainty and fishing conditions, such as stocks. The catch data indicates a significant fall since 2010 which may take some years to recover and may well be influenced by a decline in fish stocks. Some two thirds of the owners and managers of fisheries thought the number of people fishing in Scotland would decline over the next five years, with almost one in three considering the numbers would remain the same and one in ten foreseeing an increase. Similar views were held by overnight visitors to Scotland, stakeholders, and Local Authorities. Scandinavia was seen by the fisheries as the main competitor location, followed by other parts of Western Europe and North America.

10.1.14 The future prospects in terms of economic benefits hinge on the above factors. The role of policy is important in a context where there is uncertainty about the economy and future levels of fish stocks, especially for salmon, and their impact on attracting future visitors and anglers.

Appendix A Main Reports and Data for the Study

A1.1 As part of the study there was a comprehensive desk study of sources including the Marine Scotland data. The main sources were:–

- EU Marine Strategy Framework Directive which sets out the legislative framework for the achievement of Good Environmental Status by 2020 in Scotland's marine and coastal waters
- The EU Common Fisheries Policy currently being reformed. The main instrument is the setting of Total Allowable Catches which fix the amount of each species which can be landed. This has been added to by the other conservation measures such as long term management plans and technical measures. There is a TAC set for Atlantic salmon though no long term plan is in place.
- Salmon conservation is also covered by its own international agreement. The Convention for the Conservation of Salmon in the North Atlantic Ocean. There have been efforts to develop Conservation Limits for Scottish river catchments, but data limitations mean these do not have statutory standing.
- The Aquaculture and Fisheries (Scotland) Act 2007 made amendments to the 2003 Act. It placed restrictions on the method of fishing salmon and introduced annual close times and conservation measures for species of freshwater fish other than salmon and sea trout. Regarding aquaculture, the Act introduced new provisions allowing inspections of fish farms and ensure efficient containment measures were in place.
- A Fresh Start: The renewed Strategic Framework for Scottish Aquaculture sets out the shared vision of the Ministerial Working Group on aquaculture for the sustainable growth of the aquaculture industry. It has five key themes:
    - Healthier fish and shellfish;
    - Improved systems for licensing aquaculture developments;
    - Improved containment;
    - Better marketing and improved image; and
    - Improved access to finance
    - Issues and desired outcomes are identified under each theme.
- The Economic Evaluation of Inland Fisheries. Economic Evaluation of Fishing Rights. Environment Agency.
- Comparative Study: Coastal Net Fishing and In River Rod Fisheries. Salmon and Sea Trout in Scotland. A. Radford.
- The Economic Impact of Game and Coarse Fishing in Scotland. Scottish Executive (2004)
- Inland Fisheries in Ireland. Tourism Development International (2013)
- The Report of the Wild Fisheries Review Panel. 2014
- Scottish Council Sports Tourism Group. The Benefits and Value and Value of County Sports Tourism in Scotland
- Bruce Sandison. Rivers and Lochs of Scotland
- Marine Scotland. Scottish Salmon and Sea Trout Fishery Statistics
- River Tweed Commission. Economic impact from Angling on the River Tweed system
- Information on Potential Grants and the Marine Scotland Science Support Available to the Fisheries Sector

Appendix B Stakeholder Interviews

B1 The Main Stakeholder Organisations Interviewed

- SANA. Scottish Anglers National Association
- SANACC. Scottish Anglers National Association of Competition Clubs
- SFCA. Scottish Federation of Coarse Angling. (2)
- Pike Anglers Association of Scotland / Pike Anglers Alliance
- Scottish Carp Group
- RAFTS. Rivers and Fisheries Trusts of Scotland
- Association of Salmon Fisheries Boards
- Scottish Net Fishing Association
- SATA. Salmon and Trout Association
- Fishpal
- Atlantic Salmon Trust
- Three Netting Fisheries (3)
- Strutt and Parker
- Knight Frank
- Savilles
- CKD Galbraith
- Orkney Tourism Group
- Orkney Trout Fishing Association
- Visit Scotland
- Shetland Anglers Association
- Scottish Land and Estates
- Scottish Environmental Protection Agency (SEPA)
- Scottish Natural Heritage
- Skills Development Scotland (SDS)
- Institute of Fisheries Management
- Scottish County Sports Tourism Group (SCSTG)
- Scottish Rural Development Programme Group
- The Tweed Foundation
- Crown Estate
- Unitary Authorities in Salmon Fishing areas:
    - Moray Council
    - Scottish Borders Council
    - Fife Council
    - Angus Council
    - Aberdeenshire Council
    - Highland Council
    - Orkney Islands Council
    - Shetlands Islands Council

Appendix C Survey Topics

C1 Stakeholder Interviews

1.2 The generic topics for the different types of stakeholders were as follows. They were customised for the different types of stakeholders.

- Aims of the Research Project
- Role of the Stakeholder in the Sector
- Past and Future Trends in Fishing and Influences
  - Number of fisheries
  - Fish stocks and influences
  - Visitors and anglers to Scotland
- The Economic Benefits
  - Jobs and incomes
  - Supplier linkages and benefits
  - The importance to regional/local economies
  - Jobs / benefits in the absence of fishing
  - Apprenticeships and skills training
- Social Benefits
  - Local jobs and incomes
  - Importance to rural customs / culture/ integration
  - Involvement of schools / conservation groups
- The role of Public Sector Subsidies
- The Market for Fisheries / Beats and Influences
- The Wild Fisheries Review. Potential kill licences
- Positive and Negative Features of Fishing

C2 Fisheries Survey

- Aims of the Research
- Background Information on the Fishery (e.g., location, site, facilities)
- Fishing Activity
  - Types of fish available
  - Number of days fishing and anglers
  - Trends in anglers and country of origin
  - Expenditure by anglers
  - Income and trends
  - Subsidies for fishing activities
  - Fish caught: released / retained
  - Fish stocks and influences
- Fisheries Related Jobs
  - Numbers of jobs
  - Types of occupations
- Apprenticeships and skills training

- Jobs / benefits in the absence of fishing
- Fisheries Expenditure
  - Expenditure overall and for staff, operations, capital equipment
  - Location of expenditure
  - Profits
- Other Issues
  - Links with educational, community, training and conservation groups
  - The market for fisheries / beats and what determines values
  - The Wild Fisheries Review. Potential kill licences
  - Likely fishing activities over 5 years and the market (countries and regions)
- The main features of fishing in Scotland and comparisons with competing locations

C3 Survey of Anglers

- Aims of the Research
- Place of Residence, Demographic Information
- Fishing Activities: location in Scotland, size of group, length of visit, type of fish
- Fishery Expenditure, Types of Goods etc and Value for Money
- Willingness to Pay to Protect Fishing in Scotland
- Comparison between Scotland and Elsewhere and Return Visits
- Method of Booking Trip to Scotland and Other Activities in Scotland

C4 Interviews with Netting Organisations

- Aims of the Research
- Scope of Netting Activities
- Fish Caught and the Fishing Season
- Location of Activities : estuaries and rivers
- Fish caught : past and future trends
- Fish Stock and Influences
- Number of Netting Organisations and Trends
- Economic Benefits
  - Number of jobs (paid / unpaid)
  - Types of occupations
  - Apprenticeships and skills training
  - Jobs / benefits in the absence of fishing
- Income, Expenditure, Location of Suppliers and Types
- Social Benefits : links with education, conservation, community groups
- Public Sector Subsidies and Sources
- The Wild Fisheries Review. Potential kill licences
- Income and Growth

Appendix D Net Economic Value

D1 Definitions for the Angling Fisheries

D1.1 In Chapter 4 the Net Economic Value (NEV) to participants and society of an activity is the monetary difference between how much society values an activity, and the value of the resources used to produce that activity. Appendix 1 to "A Short Comparative Study of the Economics Associated With Coastal Net Fisheries and In-River Rod Fisheries for Salmon and Sea Trout in Scotland" (Radford 2009) sets out the components of net economic value of angling. See Figure D1.1.

Figure D1.1 Angling Fisheries. Taxonomy of Net Economic Value

Net Economic Value of Angling (NEVa) comprises the sum of the following:

Anglers' Consumers' Surplus (CSa). Monetary measure of the benefit that anglers obtain from their angling, over and above their fianancial cost.

Economic Rent (ERa). Monetary measure of the net income flow fishing right owners obtain from ownership. (Probably the most important component)

Existence Value of Angling (EVa) Monetary measure of the value derived from knowing that others currently enjoy salmon angling. (Probably insignificant)

Bequest Value of Angling (BVa) Monetary measure of the benefit derived from knowing that future generations can enjoy S&ST angling. (Probably insignificant)

Anglers' Option Value (OVa). Monetary measure of the benefit from preserving the option of participating in angling. (Probably insignificant)

If, say, S&ST angling were banned or otherwise ceased the NEV loss to society would be the sum of the elements outlined above **(i.e. CSa + ERa + Eva + BVa + Ova).**

There might however also be some benefit operating through any consequential improvement in fish stocks transmitting eventually to coastal (and estuary) nets experiencing an increase catch per unit of effort. We therefore include the possibility of Stock Effects.

Stock Effects (SEa) Monetary measure of the **adverse** effect that rod exploitation has on coastal and estuary netting (Negative and probably insignificant)

In conclusion **NEVa = CSa + ERa + Eva + BVa + OVa - SEa**

Source: Alan Radford, Glasgow Caledonian University.

D1.2 We have dealt with the components of NEV through questions put to respondents in our survey research with anglers and fisheries. The information from the angler survey on the amount of money per day that anglers would be willing to pay to preserve fishing can be treated as an aggregate of Anglers' Consumer Surplus, Existence Value of Angling, Bequest Value of Angling, and Anglers' Option Value. It was considered too complicated to separate these values into separate questions: the quantitative question simply asked "Would you be willing to pay, in principle, to maintain/protect the ability to fish in Scotland?" and, in the event of a positive answer,

asked for a monetary amount per fishing day. This information can be combined with the number of days spent angling and the amount of money spent angling to arrive at an estimate of the surplus value to anglers of fishing. Some 78% said, in principle, they would be willing to pay more. In aggregate across the respondents to the survey, anglers would be willing to pay 14% extra to preserve or maintain fishing in Scotland. Assuming that this is representative of angling in Scotland as a whole, we estimate that this could amount to around £17m.

D1.3 The respondents were also asked the 14% **why** they were willing to pay the 14% and asked to select as many options as were appropriate from the following choices:

- 79% ticked "I want to protect angling for future generations of anglers" (Bequest value)
- 49% ticked "I just enjoy angling" (Anglers' Consumers' Surplus)
- 27% ticked "Knowing that others can go angling is important to me" (Existence value)

This does not necessarily imply that bequest value is more significant to anglers than their own consumer surplus – while more anglers recognise that there is a bequest value component to their net economic value than consumer surplus, the survey did not record opinions on the relative sizes of each component.

D1.4 The fishery survey results suggest that net profit in the industry is low, with many survey respondents making losses. However this is an aggregate of fisheries of different sizes different motives – the survey reveals that there are a number of small fisheries run at a loss to the owner, where presumably the owner bears the expense because of the value of having fishing rights as a financial asset and/or for personal use and that of friends and family, or because of the perceived intrinsic value of the activity – rather than a business expense, this a cost of the fishing hobby to the fishery owner. The larger commercial fisheries which participated in the survey often succeeded in running at a profit, according to the survey results.

D1.5 From the point of view of the net economic value calculation, all profit-making fisheries contribute to the provider surplus, but loss-making fisheries do not count negatively as it is assumed that the owner bears the cost of the activity and is content to do so. Compensation of providers as owner-managers is also included in provider surplus. We estimate that the total provider surplus by this measure is around £11m.

D1.6 Our central estimate of the total annual net economic value of wild fishing in Scotland is therefore £28m. There is obviously considerable margin for error in this estimate based on the response rate and representativeness of the surveys and the difficulties in defining and measuring the concepts of net economic value to the survey respondents, particularly in the case of the hypothetical contingent value assessment of what people would pay. For comparison, Radford (2009) estimated Scottish wild fishing NEV at £24.6m (at 2014 prices) at a point in time where salmon catch was higher than it is today. However, the distribution between consumer and producer surplus in the Radford estimates was much more heavily weighted towards the

producers (~£18m), which were assumed to capture most of the net economic value in rents and fees, than consumers (~£3m).

D1.7 We have estimated annual provider surplus from the reported wages and profits of owners. Previous studies have combined this method with attempts to estimate the capital value of fisheries using data on market transactions and models using a value per fish caught per annum. There are sources of error inherent in all methods. In the PACEC surveys, not all owners were willing to answer questions on income and profit, and the profit margin is volatile to annual angling conditions (in catch terms, 2014 was an unusually bad year, and the peak fishing month of August had unusually wet weather). Converting from the annual flow of net values to a capitalised value requires the selection of a rate of return (3% in Riddington et al 2006[55]) which has a large impact on the estimated values. The value model assumes the value of a fishery in any current year is the product of the average catch over the previous five years and a value per fish. According to the summary in Radford (2009):

> "All agents emphasised that this was a generalisation and values varied considerably. A small West Coast river which fished for a couple of months at the end of the season might sell for £2,150 to £3,250 per fish, whereas the best fisheries could easily command £8,650 to £10,850."

D1.8 The technical appendix to Radford (2009) acknowledges that the attempts to measure consumer surplus via surveys had low sample sizes and that the surveying organisations were sceptical of the low values reported and re-contacted respondents to verify them. The fact that the current survey was conducted after four consecutive years of rapidly falling wild salmon catch may explain why our reported contingent values are higher than in previous years, and why Existence Value is reported as the most common justification for willingness to bear additional costs.

D2 The Netting Sector

D2.1 The definitions are shown in Chapter 4 with assumptions made for the estimate of NEV.

[55] Riddington G.L., Radford A.F and Bostock J. (2006). *An Economic Evaluation of the Impact of the salmon parasite Gyrodactylus Solaris Parasite should it be introduced into Scotland* For SEERAD, Oct 2006 http://www.scotland.gov.uk/Resource/Doc/1062/0042434.pdf

Appendix E Case Studies

E1 Fishing on the River Dee

The fishery is a site on the River Dee in Aberdeenshire, managed by a tenant syndicate which also runs a second site. The site provides river access.

Fishing Activities

E1.1 The fishery provides access to salmon, sea trout, and brown trout. There were 300 angler days in 2014, averaging 1–5 anglers a day over four to five months, with ten per cent being overnight visitors. 250 angler days were fishing for salmon, and 50 for sea-trout. The number of anglers had remained constant over the previous five years, with the same proportion of overnight visitors.

E1.2 All the anglers came from Scotland.

E1.3 Income from anglers in 2014 was around £6k. Income from angling had remained constant over the previous five years. The business is not VAT registered and has no income from government grants or schemes.

E1.4 22 salmon were caught in the past year, of which one was retained. Twenty brown trout and two sea trout were caught, and none was retained. Salmon stocks at the fishery had halved over recent years. This was blamed on climate change, predators, and netting activities.

Employment Opportunities and Skills

E1.5 There were no full time jobs and one unpaid part-time job at the site in 2014.

Local Suppliers and Linkages

E1.6 The fishery spent about £6k in 2014 on suppliers to help operate the fishery, and all of this was spent in the local area (i.e., a 12-15 miles radius of the fishery). There was no capital expenditure.

Social Benefits

E1.7 There were links with conservation groups.

Employment and Other Benefits in the Absence of the Fishery

E1.8 The owner thought that the employment opportunities and social benefits would "definitely not" exist if the fishery was not operating.

The Market for Fisheries and Beats

E1.9 The market was neutral. It was mainly determined by "numbers of fish caught", which set the price. Other factors were the quantity of fish/stocks, the environment for fishing, the staff and facilities on site (e.g., ghillies and huts), and accessibility to the fishery.

The Issue of Kill Licences

E1.10 The owner did not agree with the possible introduction of kill licences for salmon. In some years no fish were killed, but sometimes a bleeding or badly injured fish had to be killed, and this was not predictable. Also, killing a few small male grilse in a large run would not affect stocks, but the runs vary so much from year to year that this is not predictable either.

The Future Market

E1.11 The owner thought that over the next five years the number of people fishing in Scotland overall would reduce by a quarter, with overnight visitors decreasing by half, but that at this particular fishery numbers would stay about the same. Angling numbers from England and Scandinavia were particularly likely to fall.

E1.12 The main competitors were countries in Scandinavia, Russia, and North America. However, Scotland had a wide range of competitive advantages, including ease of travel, quality of fish, permits and licences, and scenery.

E2 Fishing on the River Don

The fishery is a single site on the River Don in Aberdeenshire, managed by an angling association. The site provides fishing huts and river access.

Fishing Activities

E2.1 The fishery provides access to salmon, sea trout, and brown trout. There were 900 angler days in 2014, averaging 6–10 anglers a day over around six months, with five per cent being overnight visitors. 900 angler days were fishing for salmon, 350 for sea-trout, and 500 for brown trout. The number of anglers had decreased over the previous five years, by about 5%, although the number of overnight visitors has remained the same.

E2.2 Almost all the anglers came from Scotland, with a small number from England.

E2.3 Income from anglers in 2014 was around £14k, with overnight visitors accounting for about 3%. Income from angling had been falling over the previous five years. The business is not VAT registered. It has income of about £600 from conservation grants, and also has business rate discounts. Fishery income has been falling over the past five years, by about 7%.

E2.4 53 salmon were caught in the past year (with eight retained); 200 brown trout (20 retained) and 28 sea trout (2 retained) were also caught. Salmon stocks at the fishery had halved over recent years. This was blamed primarily on predators, with additional effects from indiscriminate coastal netting activities, fish farming, and the decline in natural fish foods. The annihilation of sand eels was particularly mentioned, along with the closure of salmon hatcheries on the rivers.

Employment Opportunities and Skills

E2.5 There were no full time jobs and four unpaid part-time jobs at the site in 2014.

Local Suppliers and Linkages

E2.6 The fishery spent £13k in 2014 on suppliers to help operate the fishery, and all of this was spent in Scotland, with 40% of expenditure within the local area (i.e., a 12-15 miles radius of the fishery). Capital expenditure was round £1k, spent entirely within the local area. Profit was estimated at £400.

Social Benefits

E2.7 There were links with conservation groups, local community groups, and educational bodies.

Employment and Other Benefits in the Absence of the Fishery

E2.8 The owner thought that the employment opportunities and social benefits would "definitely not" exist if the fishery was not operating.

The Market for Fisheries and Beats

E2.9 The market was weak. It was mainly determined by "numbers of fish caught". Other factors were the quantity of fish/stocks and the facilities on site. Angling restrictions and over-regulation could have a negative effect on tourist fisheries.

The Issue of Kill Licences

E2.10 The owner did not agree with the possible introduction of kill licences for salmon. The number of fish presently taken was minimal, and would not be deterred by changes in licensing rules.

The Future Market

E2.11 The owner thought that over the next five years the number of people fishing in Scotland overall would reduce by a fifth, with overnight visitors decreasing by 30%, but that at this particular fishery numbers would decrease by only about 10% and overnight visitors by 5%. Angling numbers from Scotland, England, the Republic of Ireland, and Scandinavia were particularly likely to fall, but visitor numbers from Eastern Europe would increase.

E2.12 The main competitors were countries in Scandinavia. Scotland's competitive advantages was ease of travel, but Scandinavia had the advantage of other attractions.

E3 Fishing on the River North Esk

E3.1 The fishery is a single site on the River North Esk in Angus. The facilities provided include river access, ghillies, and accommodation.

Fishing Activities

E3.2 The main focus is on salmon and sea trout. There were over 200 fishing days in 2014, of whom 80% were overnight visitors. The number of anglers had increased over the previous five years by about 40%; all of the overnight visitors were new since the accommodation had been completed. Visitors to Scotland were expected to double over the next five years, with a 10% increase forecast for this business.

E3.3 Around half the anglers came from Scotland and most of the remainder from England, with small numbers from Northern Ireland and Denmark.

E3.4 Income from angling had been rising over the previous five years. The business is not VAT registered and does not get any government grants.

E3.5 Around 300 salmon and 300 sea trout were caught in the past year.

E3.6 The fishery maintained the river banks.

E3.7 The main threat to continued salmon fishing was the protection of seal colonies at river mouths. Predation was a significant problem, and costs were incurred to control seals.

Employment Opportunities and Skills

E3.8 There was one full time job at the site in 2014. Total expenditure on staff in 2014 was around £22k.

Local Suppliers and Linkages

E3.9 The fishery spent about £23k per annum on suppliers to help operate the fishery (excluding the staff costs at the fishery) and around five per cent of this was spent in the local area (i.e., a 12-15 miles radius of the fishery) with half altogether spent in Scotland. Capital expenditure over the previous decade was about £320K, predominantly on the accommodation.

Social Benefits

E3.10 Skills training was offered.

Employment and Other Benefits in the Absence of the Fishery

E3.11 The owner thought that the employment opportunities and social benefits would "definitely not" exist if the fishery was not operating.

The Future Market

E3.12 The owner thought that over the next five years the number of people fishing would increase.

E3.13 The main competitor was Russia. However, Scotland had a wide range of competitive advantages, particularly the salmon stocks.

E4 Fishing on the River Spey

The fishery is part of a large estate on the River Spey in Moray and is one of the several fisheries at different sites that are managed by the owner. As well as access to the river their facilities include ghillies and guides, fishery huts for anglers and accommodation with full and part board.

Fishing Activities

E4.1 The main focus is on salmon and sea trout. Some forty anglers were involved over a period of six to seven months. The angler days numbered c.6000 with 80% for salmon and 20% for sea trout.

E4.2 Two thirds of the anglers were tourists/visitors primarily from Scotland and England (mainly the South-East and the Midlands) followed by the rest of the UK. Small shares came from Scandinavia, other western European countries and North America. Over the past few years the number of anglers and visitors/tourists had fallen by about a fifth. The main reasons given were the recession and continued economic uncertainty. The fishery was also probably less accessible that some of those on the other main salmon rivers in Scotland, although it benefited from regular visitors and a core group in the market-place.

E4.3 The anglers spent just under £0.5m per annum (with 70% from tourists), but expenditure had fallen compared to the spending in recent years. This was primarily because of a decline in the number of anglers. The fishery benefitted from promotion of the area through the tourist groups (Scottish Country Sports) and the Local Authorities. Relief on business rates and support for up skilling staff were the main types of public sector support.

E4.4 Almost six hundred salmon were caught in the past year and 10% retained. Sea trout caught numbered over a thousand with a fifth retained. It was considered that the catch and release policy worked well and anglers understood the need for it. This was partly reflected by the fact that salmon stocks had fallen by a half over the past five years. The main reasons were climate change and global warming with some depletion by netting activities (which was considered to be marginal).

Employment Opportunities and Skills

E4.5 There were almost ten jobs on site and over half were full time. All the jobs were paid. Almost all were for ghillies, boatmen and maintaining fish stocks. There were some for catering and accommodation for the anglers. The management and admin role accounted for one member of staff. Staff benefited from training mainly for the boatmen and maintaining the fish stocks with habitat management, but the apprenticeship scheme was not used.

Local Suppliers and Linkages

E4.6 The fishery spent about £300k per annum on suppliers to help operate the fishery (excluding the staff costs at the fishery) and some 85% of this was spent in the local area (i.e., a 12-15 miles radius of the fishery) with the remainder spent in Scotland. Some £20k was spent on capital items and equipment with half in the local area and the rest in Scotland. This expenditure supported additional local jobs and incomes.

Social Benefits

E4.7 All the jobs were taken by local people and in some cases the posts in the past had been filled by relatives. Hence there had been a longstanding relationship between this fishery and local people. There were links with local training organisations, especially the FE sector on skills and training issues. There was also interaction with conservation groups and local community groups on wildlife issues, trout and salmon and habitat management.

Employment and Other Benefits in the Absence of the Fishery

E4.8 The owner thought that the employment opportunities and social benefits would "probably not" exist if the fishery was not operating. Any other uses would not require the same number of people and tasks could probably be absorbed by other staff at the estate.

The Market for Fisheries and Beats

E4.9 The market was neither strong nor weak which had been the case for a number of years since the recession. It was mainly determined by "numbers of fish caught", which set the price. Other factors were the quality of fish/stocks, the environment for fishing, the facilities on site (e.g., ghillies and huts), accessibility to the fishery, and other visitor attractions in the area.

The Issue of Kill Licences

E4.10 The owner did not agree with the possible introduction of kill licences for salmon. It was a "totally impractical and unworkable" idea.

The Future Market

E4.11 The owner thought that over the next five years the number of people fishing in Scotland would fall by about a fifth (as in the previous five years). The number of overnight visitors/tourists would fall by the same amount. The impact would be the same for the owner's fishery. There would be fewer anglers from all the main countries, including Scotland, England and elsewhere in Europe, North America, and the rest of the world.

E4.12 The main competitors were countries in Scandinavia and Eastern Europe. However, Scotland's competitive advantage was ease of travel and convenience, the quality of fish (rather than the quantity) and the quality of the water in the rivers. The Scottish fisheries "looked after their anglers" and provided good "customer care". The Scottish scenery, countryside and the environment were competitive advantages along with the air quality. Scotland offered a range of historical and cultural attractions not available elsewhere.

E5 Fishing on the River Spey #2

This fishery on the River Spey in Moray close to the estuary, is managed by the owner. As well as access to the river their facilities, there are fishery huts for anglers and accommodation for visitors.

Fishing Activities

E5.1 The focus is on sea trout and salmon. Some twenty to fifty anglers were involved over a period of two hundred days. The angler days numbered c.1000 for both salmon and sea trout.

E5.2 Eight in ten of the anglers were tourists/visitors primarily from Scotland with a small share from England. A tenth came from Western European countries. Over the past few years the number of anglers and visitors/tourists had fallen by about 10%. The main reasons given were the recession and continued economic uncertainty. There were regular visitors and a core group in the market-place.

E5.3 The anglers spent just under £25k per annum and expenditure had risen compared to the spending in recent years by about a fifth. The fishery benefitted from promotion of the area through the tourist groups (Scottish Country Sports) and the Local Authorities and relief on business rates. There was no other public sector support.

E5.4 Almost two hundred salmon were caught in the past year and 40% retained. It was considered that the catch and release policy worked well. Salmon stocks had fallen by a half over the past few years. The main reasons were, the decline in natural fish foods (as the main reason), predators and climate change coupled with global warming.

Employment Opportunities and Skills

E5.5 There were almost twelve jobs on site and over half were full time but most were unpaid. Almost all were for management, admin and bookings, site building and maintenance and a small number for catering and accommodation. There was no training for staff.

Local Suppliers and Linkages

E5.6 The fishery spent up to £30k per annum on supplies to help operate the fishery (excluding the staff costs at the fishery) and all of this was spent in the local area (i.e., a 12-15 miles radius of the fishery). The main supplies were building repairs and maintenance, transport for fuel, food for catering and admin suppliers with energy bills. Some £5k was spent on capital items and equipment in the past year and all in the local area. This expenditure supported additional local jobs and incomes.

Social Benefits

E5.7 All the jobs were taken by local people and in some cases the posts in the past had been filled by their relatives. Hence there had been a longstanding relationship between this fishery and local people. The jobs were important to the local community where the area was not densely populated and other jobs were widely distributed. There were links with educational organisations, especially schools. There was also interaction with conservation groups and local community groups on wildlife issues, trout and salmon life cycles and habitat management.

Employment and Other Benefits in the Absence of the Fishery

E5.8 The owner thought that the employment opportunities and social benefits would definitely not exist if the fishery was not operating. Any other uses would not require the same number of people and it was difficult to consider what these uses might be.

The Market for Fisheries and Beats

E5.9 The market was weak which had been the case for a number of years since the recession. It and the value of beats was mainly determined by the quality of fish/stocks, the environment for fishing and the number of fish caught, which set the price.

The Issue of Kill Licences

E5.10 The owner did not agree with the possible introduction of kill licences for salmon. They were “not necessary” and would create admin and costs.

The Future Market

E5.11 The owner thought that over the next five years the number of people fishing in Scotland would fall but was unsure about how much. The number of overnight visitors/tourists would fall by the same amount. The impact would be the same for the owner’s fishery. There would be fewer anglers from Scotland, England and Western Europe.

E5.12 Scotland’s competitive advantage was value for money, ease of travel to and convenience, the range of fisheries for visitors/anglers to choose from, the fish stocks, the quality of the water, the permits, the scenery, countryside and the environment and the “good air” for fishing in.

E6 Fishing on the River Tay

The fishery is a single site on the River Tay in Perth and Kinross. The facilities provided include river access, fishing huts, boat hire, ghillies, fishing tackle and bait supplies, and lifejackets.

Fishing Activities

E6.1 The main focus is on salmon and sea trout. There were 1,150 angler days in 2014, averaging 1–5 anglers a day, with no overnight visitors. The number of anglers had remained constant over the previous five years.

E6.2 Around two fifths of anglers came from Scotland and three fifths from England, with small numbers from the Republic of Ireland and Western Europe.

E6.3 Income from angling had remained constant over the previous five years. The business is VAT registered and benefits from business rates reductions.

E6.4 Around 340 salmon were caught in the past year and 7% retained. Around ten sea trout were caught, and none was retained. Salmon stocks at the fishery had not changed over recent years.

Employment Opportunities and Skills

E6.5 There were two full time jobs and one part-time job at the site in 2014. All the jobs were paid. One job was in management/administration, and two in fish maintenance and as ghillies. Total expenditure on staff in 2014 was around £80k.

Local Suppliers and Linkages

E6.6 The fishery spent about £130k per annum on suppliers to help operate the fishery (excluding the staff costs at the fishery) and around two fifths of this was spent in the local area (i.e., a 12-15 miles radius of the fishery) with the remainder spent in Scotland. Some £4k was spent on capital items and equipment, entirely in the local area. This expenditure supported additional local jobs and incomes. Profit in 2014 was estimated as £35k.

Social Benefits

E6.7 There were links with local training organisations and conservation groups.

Employment and Other Benefits in the Absence of the Fishery

E6.8 The owner thought that the employment opportunities and social benefits would "definitely not" exist if the fishery was not operating.

The Market for Fisheries and Beats

E6.9 The market was weak. It was mainly determined by "numbers of fish caught", which set the price. Other factors were the quantity of fish/stocks, the environment for fishing, the staff and facilities on site (e.g., ghillies and huts), accessibility to the fishery, and other visitor attractions in the area.

The Issue of Kill Licences

E6.10 The owner did not agree with the possible introduction of kill licences for salmon. The beat was already very conscious of conservation and policed returns itself. It did not require another layer of administration and the associated costs and time.

The Future Market

E6.11 The owner thought that over the next five years the number of people fishing in Scotland, and at this particular fishery, would stay about the same.

E6.12 The main competitors were countries in Western Europe (excluding Scandinavia), Iceland, and South America. However, Scotland had a wide range of competitive advantages, including value for money, ease of travel, scenery, and the range of facilities available. The main competitive disadvantages were the limited variety of fish and the low fish stocks.

E7 Fishing on the River Tay #2

The fishery is a single site on the River Tay in Perth and Kinross. The facilities provided include river access, accommodation, a restaurant and pub, fishing huts, boat hire, and ghillies.

Fishing Activities

E7.1 The main focus is on salmon and sea trout. There were 1,010 angler days in 2014, averaging 1–5 anglers a day, with almost 70% of these being overnight visitors. The number of anglers had increased by 50% over the previous five years, with the number of overnight visitors increasing by 30% over this time. 1,000 angler days were fishing for salmon, and ten were fishing for sea trout.

E7.2 Around a third of the anglers came from Scotland and nearly half from England. Ten per cent came from North America, with small numbers from the Republic of Ireland and Western Europe.

E7.3 Anglers had spent about £330k on the site in 2014, with 85% of this coming from overnight visitors. Income from angling had risen by about 20% over the previous five years. The business is VAT registered, and had had no income from government grants or schemes.

E7.4 Around 180 salmon were caught in the past year, with 14 retained. Around ten sea trout were caught, and none was retained. Salmon stocks at the fishery had fallen over the previous five years, by about 15%. This was primarily due to predators and pelagic fishing increasing smolt mortality at sea, although the decline in natural fish foods was also a factor.

Employment Opportunities and Skills

E7.5 There were seven full time jobs at the site in 2014. All the jobs were paid. All the employees worked as ghillies, and also variously covered management, administration, catering, and site maintenance. Total expenditure on staff in 2014 was around £110k.

Local Suppliers and Linkages

E7.6 The fishery spent about £210k per annum on suppliers to help operate the fishery (excluding the staff costs at the fishery) and around 80% of this was spent in the local area (i.e., a 12-15 miles radius of the fishery) with the remainder spent mostly in Scotland, with 5% spent in the rest of the UK. Some £40k was spent on capital items and equipment, of which 10% was spent in the local area and a further 50% elsewhere in Scotland. Profit in 2014 was estimated as £20k.

Social Benefits

E7.7 The fishery provided apprenticeships and training in skills and customer care. It had links to training organisations.

E7.8 There were links with local training organisations and conservation groups.

Employment and Other Benefits in the Absence of the Fishery

E7.9 The owner thought that the employment opportunities and social benefits would "probably not" exist if the fishery was not operating.

The Market for Fisheries and Beats

E7.10 The market was weak. It was mainly determined by "numbers of fish caught", which set the price. Other factors were the facilities on site (e.g., ghillies and huts) and accessibility.

The Issue of Kill Licences

E7.11 The owner did not agree with the possible introduction of kill licences for salmon.

The Future Market

E7.12 The owner thought that over the next five years the number of people fishing in Scotland would stay about the same, but that angling at this particular fishery would increase by about 15%. Anglers would increasingly come from Scotland, the Republic of Ireland, Scandinavia, and the Far East, with decreasing interest from England and North America.

E7.13 The main competitors were England, the Republic of Ireland, Scandinavia, Russia, and Canada. Scotland benefited from ease of travel, the range of fisheries, and the quality of ghillies, but its competitors had the advantage on value for money, fish variety and stocks, and regulations and permits.

E7.14 The high end of the market was suffering, with affluent anglers now going to Russia, Canada, and Norway for the salmon stocks. The decline of salmon on Scottish rivers was driving affluent anglers away.

E7.15 The average market was still doing well, with beats becoming more competitive and customer oriented. Fishpal was promoting good value fishing.

E8 Fishery on the River Tay #3

E8.1 This fishery is a long established provider in the North of Scotland on the Tay. The landscape combines a large number of locks, rivers, and burns over a wide area within very scenic countryside. The variety of provision gives participants considerable choice, with some small boats available for hire when requested. The fish that can be caught comprise brown trout and salmon on the rivers and lochs, with some sea fishing. Virtually all caught fish were returned, as a matter of policy. The water quality related to the geology provides high quality fish. Participants can be club members or individual participants with permits from a dozen or so different vendors. The participants tended to be in the 50s and 60s age range.

Markets and Supply Chains

E8.2 There are some 2,000–2,500 visitors on average per annum that have remained constant for the past five years or so. The visitors arrive primarily from England (a third), Scotland (a third) with some local people fishing, although the fishing community is very spread out in small towns and hamlets, and from North America (Canada), Europe (France, Belgium, and Holland), and Australia (i.e., a third from overseas). Some four out of five participants made return visits and have done so over many years. The recession had little effect on the core demand, with some of the more accessible and popular lochs reaching capacity and saturation.

E8.3 Very few supplies were required for the fish as they were all wild. There was some self catering, with all food/drink purchased locally. In terms of the boats, almost all the parts, for example for the engines and chains, were bought nearby at Inverness, with some parts from the Midlands. Local labour was used to repair and paint the sheds, and repair the towpaths and banks. Participants had their own tackle but it could be supplemented if needed.

Employment and Skills

E8.4 The fishery was manned by one person who had met requirements over ten years with a dozen or so vendors who provided the permits. Other labour was voluntary, including club members, who helped with river bank maintenance, piling, managing woodland, launching and maintaining the boats, etc. A local mechanic services the boats' engines.

Conservation and the Environment

E8.5 The conservation work was important and included work with local trusts to carry out the woodland management and planting. The volunteers work on the river banks and ensure access, etc. The quality of the water is good and does not need attention. The geology and fauna and flora of the area attracts research groups and Universities from Scotland, elsewhere in Great Britain, and all over the world who are interested in

the very old rock formations and landscape, with the unique faults, limestone caves, and marble. There are a number of world heritage sites of scientific interest (SSSIs). Researchers tend to stay at the nearest hotel with good access to the geological features and SSSIs.

Social and Community Benefits

E8.6 The participation of volunteers is a longstanding practice, as is the involvement of the trusts which brings local people together. Local parties visit the area, such as the scouts, with 40/50 camping out and getting involved with fishing and some shooting. This helps young people to take part. In the recent past there was a local community acquisition of part of the area which was unique to the region.

Collaborative Activity

E8.7 This takes place with the volunteers, the research groups where collaboration and access is extensive, and the groups that visit the site. Hence there is collaboration to help manage and maintain the access to fishing, carry out research on the environment and geology, and introduce parties to the site and encourage the take up of fishing by younger people, which is important for future viability and sustainability.

Future Growth

E8.8 The participation is carefully managed. There is considerable repeat demand and too many visitors could adversely affect the uniqueness of the experience and mean more boats on the lochs. It is possible to fish on the lochs and not see anyone else over the course of the day – this was an important attraction for those who fished and visited the area.

E9 Fishing on the River Tweed

E9.1 This fishing site on the River Tweed in the Scottish Borders has been operating since around the mid-1980s on some three to four miles of river with access from both banks. The fishing is mainly for salmon (with trout towards the end of the summer), with most overall activity from June to October. The site provides a traditional "rustic" experience with beats for 7 to 8 participants. There are bankside huts and toilet facilities and support from a small group of ghillies.

Markets and Supply Chains

E9.2 Some seven in ten participants travel from England (the North and South east), a quarter from Scotland (mainly the urban areas), and one in twenty from many overseas locations – Europe (Germany, France, Norway and Sweden, Finland, Italy, and Spain), North America (especially the USA), and Japan. Some participants from England and Scotland form small syndicates. Several hundred participate per annum. Visitors stay in B&B and hotels locally, with some camping in the huts.

E9.3 All the supplies required to service the site and carry out the maintenance are local – equipment and servicing jobs, vehicles and JCBs, spraying equipment, and trees for planting.

Employment and Skills

E9.4 The main employment is with the site owner, with a couple of freelance people who act as ghillies and work on the river banks, the paths, and access. There is one trainee apprentice who moved locally and is being trained on site and through the local college on all aspects such as site and river bank maintenance, using equipment (e.g., chainsaws), and skills in customer care. There are also some local volunteers on plant, tree, and river bank maintenance, and local scouts participate in an attempt to encourage younger people into fishing and conservation.

Conservation and the Environment

E9.5 The aim is to encourage biodiversity. The vast majority of fish are returned, as a matter of policy. The planting has been important using indigenous plants and trees, with ponds for frogs and other pondlife, encouragement for deer and otters and places from where they can be viewed. The meadows offer a haven for wildlife and birds, including kingfishers and osprey. The site attracts school groups and community groups who visit to see the flora and fauna and get involved in some of the voluntary activities.

Social and Community Benefits

E9.6 The employment and volunteering activities are taken up by local people and provide them with the opportunity to meet up socially and participate in conservation, outdoor activity, and volunteering. This activity involves individuals, schools, and groups with a range of ages. Part of the social side was aimed at attracting regular visitors who would help ensure continued and sustainable involvement.

Collaborative Activity

E9.7 Apart from the involvement with local groups, there is collaboration with other owners of fishing sites on the river and the area to help foster and manage the overall wellbeing of the fish and biodiversity and the attractiveness of the opportunities. There is a relatively large and active interest group. The collaboration extends to local schools, scouts, and younger people. There was also involvement in conferences on the future of fishing, issues faced with stocks, and diversity.

Future Growth

E9.8 There are finite resources so that it is not desirable to have too much growth otherwise the product loses the attractive characteristics. Activity has not fallen over the past five years and had risen, possibly by a quarter, in the last two years. The age of participants was gradually going up but there were encouraging signs that more young people were becoming involved.

E9.9 A key issue was declining stocks, probably mainly due to climate change and global warming, which was thought to be adversely affecting the food chain for fish; however, there was significant uncertainty in the science. Netting was seen as an issue but possibly more psychological than material as the activity had reduced.

E10 Fishing on the River Urr

E10.1 This angling association manages two sites on the River Urr in Dumfries and Galloway. The river offers brown trout, sea trout, and salmon. There is also a loch with brown trout and rainbow trout. As well as access to the river and loch, there are huts for anglers and boats available for hire.

Fishing Activities

E10.2 There were about 1,500 angler days in 2014, with 5% of these being tourists from England and Scotland. The majority were fishing for rainbow trout. The number of anglers has decreased over the last five years by about ten per cent, and tourists have decreased by about 5%.

E10.3 The anglers spent around £16k per annum and expenditure had stayed about the same compared to the spending in recent years. The association is not VAT registered and does not get government grants.

E10.4 Sixteen salmon were caught in the past year, and two retained. Seven sea trout and eight brown trout were caught and released. 1.092 rainbow trout were caught and retained. Salmon stocks had been falling over the last five years, by around 70%. This was thought to be because of fish farming and netting activities; and primarily because both smolts and adults were being caught at sea.

Employment Opportunities and Skills

E10.5 There were four unpaid part-time jobs.

Local Suppliers and Linkages

E10.6 The association spent £16k per annum on supplies to help operate the fishery and all of this was spent in the local area (i.e., a 12-15 miles radius of the fishery).

The Market for Fisheries and Beats

E10.7 The market was neutral. The value of beats was mainly determined by the number of fish caught, the quantity of fish/stocks, the facilities, and accessibility.

The Issue of Kill Licences

E10.8 The owner did not agree with the possible introduction of kill licences for salmon. The local fishermen were best placed to understand the stocks in their own river, and if expensive tags were brought in this would increase the kill rate.

The Future Market

E10.9 The owner thought that over the next five years the number of people fishing in Scotland and the number of tourists would fall. The association's fisheries would also have fewer visitors.

E10.10 The main competitors were England and Wales.

E11 Fishing in South West Scotland

E11.1 Coarse angling takes place all year round primarily on a Loch where there are camping and holiday homes, also a range of outdoor activities: boating, mountain biking, walking and visits to wild life locations. The organisation on the Loch provides fishing rights. There are several other fishing "centres" on the Loch.

Fishing Activities

E11.2 Fishing for pike is the main angling activity along with some other coarse angling species, including perch, bream and roach and a few trout. The Loch has been a coarse angling centre for many years and is probably in the top six locations for pike fishing in Scotland.

E11.3 Some 2,500-3,000 people fish over the course of the year at the centre along a stretch of the bank or by boat on the Loch, with possibly some 10,000 anglers per annum on the Loch as a whole with other organisations that provide fishing rights. The main months are May to August with some 60-80 people at any one time at the centre (33% fishing by boat and 67% on the bank).

E11.4 Some 90% of those who fish are tourists from within 100-150 mile radius (mainly from the Glasgow, Edinburgh, Manchester and Newcastle areas with a very small number from overseas locations including Belgium, France and America). Most stay for a few days on site or in the area and sometimes for up to a week.

E11.5 The costs for fishing are £8-10 per day. Other "centres" on the Loch are cheaper.

Employment Opportunities and Skills

E11.6 There are five (full-time equivalent) and 3/4 part-time jobs at the centre who all have some role in the fishing activities as well as booking visits, receiving visitors (reception), maintaining the camping and garden areas and acting as wardens. The Loch owner maintains the Loch, the banks and the flow and quality of the water as well as protecting the environment in liaison with the Scottish Environment Protection Agency (SEPA).

E11.7 The centre does not usually formally train staff for qualifications although skills are developed "on the job".

E11.8 The jobs at the centre are very important as there are very few other employment opportunities in the local area i.e., mainly for farming, forestry, tourism and some other services.

E11.9 Apart from the jobs at the centre the visitors support other angling related jobs in the hotels, restaurants and pubs in the villages nearby.

Local Suppliers and Linkages

E11.10 The majority of supplies required to run and maintain the centre come from the sub-region and a 50-60 mile radius, although the boats are purchased from further afield.

The Market for Coarse Fishing Centres

E11.11 There is very little buying or selling of centres for coarse fishing as such although the related leisure activities may attract some interest if they were on the market.

The Issue of Kill Licences

E11.12 This is not relevant to coarse and pike fishing. The centre policy on pike is catch and release.

The Future Market

E11.13 Fishing activity at the centre and on the Loch has dropped significantly over the past few years. There had been 120-150 fishing competition matches over the year some years back but that activity had contracted significantly. The main reason was that stocks had fallen primarily because of the growth in the number of crayfish who eat the eggs laid by pike and the young pike. Stocks had fallen by 35% to 50% over the past ten years. Attempts to deal with the issue by the owners and SEPA had, as yet, not been successful. A further issue was that the Loch waters may have become more acidic because of the forestry activities and the number of trees felled.

E11.14 Future activity at best would be steady or may fall depending on the crayfish issue.

Appendix F Comparisons 2004 to 2014

F1.1 These tables show the comparable economic statistics from the present (2014) study and Radford study 2004 where possible. Comparisons of expenditure by species have not been possible – in the 2014 surveys anglers did not allocate their fishery expenditure between species (recording only the total). This is mainly because it was not practical over a year or for specific trips where they fished for more than one species. The 2014 multiplier analysis has been used to create a Scotland-wide estimate rather than at a sub-national level, but multipliers have been used from Radford (2004) to produce a comparable regional breakdown. All figures in the studies are survey-based estimates and therefore may be subject, to some extent to, bias and sampling error based on the mixture of fisheries and anglers who participated in the surveys.

F1.2 The 2004 study did not include comparable disaggregated data for the netting activity and hence is not shown below.

F1.3 The tables below show

- Salmon and Trout Angler Days by Region. Salmon and trout and by other species. 2014 and 2004.
- The regional contribution to Scottish GVA from rod and line angling 2014.
- Regional impact of rod and line angling on household income. 2004.
- Comparison of employment, angler expenditure and GVA for Scotland. 2014 and 2004.

F1.4 Financial information has been converted to 2014 constant prices where appropriate.

Table F1.1 Salmon and sea trout angler days by region: fishing effort by rod and line anglers.

	2014 (PACEC)	2004 (Radford)
Borders	82,000	43,000
Central	36,000	61,646
Dumfries & Galloway	46,000	38,245
Highland	140,000	190,589
North East	171,000	190,853
Orkney and Shetland	<1,000	<1000
Western Isles	17,000	17,000
Total	490,000	545,048

Table F1.2 All angler days by region, 2014: fishing effort by rod and line anglers.

	Salmon and Sea Trout	Brown Trout	Rainbow Trout	Coarse Fish	Regional Average
Borders	82,000	26,000	16,000	<1,000	125,000
Central	36,000	106,000	183,000	36,000	361,000
Dumfries & Galloway	46,000	31,000	19,000	26,000	123,000
Highland	140,000	68,000	23,000	9,000	241,000
North East	171,000	52,000	103,000	11,000	337,000
Orkney and Shetland	<1,000	27,000	<1,000	<1,000	27,000
Western Isles	17,000	16,000	<1,000	<1,000	34,000
Total	493,000	327,000	345,000	83,000	1,248,000

Table F1.3 All angler days by region, 2004: fishing effort by rod and line anglers.

	Salmon and Sea Trout	Brown Trout	Rainbow Trout	Coarse Fish	Regional Average
Borders	43,000	17,884	10,942	315	72,141
Central	61,646	134,391	231,615	45,581	473,233
Dumfries & Galloway	48,245	28,195	17,337	23,926	117,703
Highland	190,589	78,576	26,702	10,915	306,782
North East	190,853	54,715	108,894	11,402	365,864
Orkney and Shetland	<1000	27,000	<1000	<1000	27,000
Western Isles	10,715	12,606	<1000	<1000	23,321
Total	545,048	353,367	395,490	92,139	1,386,043

Table F1.4 Regional contribution to Scottish GVA from rod and line angling, 2014.

	GVA
Borders	£9.7m
Central	£10.2m
Dumfries & Galloway	£2.4m
Highland	£32.1m
North East	£21.2m
Orkney and Shetland	£0.1m
Western Isles	£2.4m
Total	£78.1m

Note: Netting contributes a further £1.8m in Scotland as a whole bringing the total to £79.9m.

Table F1.5 Regional impact of rod and line angling on household income, 2004 (2014 prices).

	Salmon and Sea Trout	Brown Trout	Rainbow Trout	Coarse Fish
Borders	£4,975,201	£368,077	£409,127	£9,578
Central	£2,824,207	£3,866,865	£8,632,713	£1,217,802
Dumfries & Galloway	£1,949,852	£656,792	£807,307	£797,729
Highland	£29,265,569	£3,776,556	£1,306,743	£503,541
North East	£20,208,677	£1,028,975	£3,453,633	£623,953
Orkney and Shetland	<£10,000	£262,717	<£10,000	<£10,000
Western Isles	£591,113	£324,291	<£10,000	<£10,000

Note: This table estimates the local impact of angling in each region – it does not include the supply chain impacts from one region to another in Scotland, and so does not sum to the Scottish total.

Table F1.6 All Wild Fishing species: comparison of employment, angler expenditure and GVA for Scotland (2014 prices).

	2014 (PACEC)[56]	2004 (Radford)[57]
Gross FTE employment	4,300	4,400
Net FTE employment (accounting for displacement[58])	2,700	2,800

[56] These are conservative estimates. PACEC analysis of supply-chain expenditure conducted for the Scottish Country Sports Tourism Group suggested higher-than-average inclusive multiplier effects for shooting sports, which feature similar patterns of expenditure to fisheries and are often co-located at shooting, stalking, and fishing lodges. The survey respondents reported high local levels of expenditure which makes it more likely that the total economic effects are retained in Scotland.

[57] Radford (2004) made the assumptions that anglers visiting Scotland to fish would take 50% of the expenditure elsewhere outside Scotland if they were unable to fish at their preferred combination of region and fishery, whereas resident Scottish anglers would fish elsewhere (or for a different species) in Scotland.

[58] Radford (2004) made the assumptions that anglers visiting Scotland to fish would take 50% of the expenditure elsewhere outside Scotland if they were unable to fish at their preferred

Angler expenditure in Scottish economy	£135m	£154m
Gross Value Added to Scottish economy	£79.9m	£90.9m
Gross Value Added to Scottish economy (accounting for displacement)	£50.1m	£66.4m

combination of region and fishery, whereas resident Scottish anglers would fish elsewhere (or for a different species) in Scotland.

PACEC June 2015