SECTION 2 REVIEW OF CURRENT KNOWLEDGE

2.1 Angling

The Spey catchment offers a wide range of angling opportunities ranging from internationally recognised salmon angling to more recently established put and take rainbow trout fisheries. The most important type of angling within the catchment is salmon and sea trout angling in the main river. From published angling guides[1] and other *ad hoc* information we estimate the number of salmon and sea trout rods to be 220-250 between Loch Insh and Spey Bay. Salmon and sea trout angling is also available on the major tributaries, Feshie, Fiddich and Avon. Salmon are also caught on Loch Insh.

There are very many waters within the Spey catchment where the keen brown trout fisherman can enjoy their sport. However, in terms of visitor numbers, the brown trout fishing within the catchment is very limited. As well as the Spey itself, brown trout fishing is available on the rivers Fiddich, Lossie, Feshie, Tromie Truim, and Avon. On still waters, brown trout fishing the catchment area is mainly owned by the estates, but are not that heavily fished. Brown trout fishing is available on a number of lochs, lochans and reservoirs. Section 3.2.2 provides a complete listing of these waters.

Rainbow trout fisheries are a popular type of fishery Scotland in terms of activity days. It has been widely recognised that there has been a huge increase in this kind of fishery over the last 10 or 20 years, mainly within the most densely populated areas of Scotland, such as Central Scotland and the North East. In the Spey catchment we have identified four main commercially operated rainbow trout fisheries. These are Rothiemurchus fishery (part of Rothiemurchus estate), Craggan Fishery, Inverlochy Trout Fishery and Glen of Rothes Trout Fishery. They are more accessible to tourists and locals than the brown trout waters situated throughout the catchment. Rainbow trout fishing is also available at Avielochan. They are also a cheaper, more cost effective alternative to salmon fishing on the Spey, not to mention the fact that the catch rate in a rainbow trout fishery would be in the order of 20 times higher than some of the Spey beats

Within the catchment, coarse angling is available at Loch Insh, Loch Einich, Loch Alvie, Loch Pityoulish with notable pike fishing on Loch Gynack, Loch Insh, Loch Dallas and Loch Morlich.

There have been four previous studies of the economic impact of angling in Scotland. Two of these had a direct focus on the salmon and sea trout fishing on the River Spey. The other two are of interest for comparative purpose. The four studies are:

- Tourism and Recreation Research Unit of Edinburgh University study of salmon and sea trout angling in Scotland
- Mackay Consultants study of salmon angling in Scotland

[1] Sandison B. (1997) Rivers and Lochs of Scotland: The Anglers Complete Guide, Merlin Unwin Books. Angling Times (2001) The Ultimate Guide to Freshwater Fisheries in the UK and Ireland, HCC Publishing Ltd 2002. Where to Fish 2002–2003. (2002) The Angling Directory: 88th Edition, Thomas Harmsworth Company 2002. John Ashley Cooper, Great Salmon Rivers of Scotland (1987) HFG Wotherby. Wightman A. (1996) Who Owns Scotland. Canongate Books

- Deloitte and Touché study of freshwater fishing in the Tweed catchment
- Fisheries Resource Management study of freshwater fisheries in the Western Isles

2.1.1 Tourism and Recreation Research Unit (1982)

The survey instruments were a combination of face-to-face interviews and self-completion questionnaires. These two instruments produced 147 observations across three areas (Kyle of Sutherland, the Tay and the Spey). The Department of Agriculture and Fisheries (DAFS) provided estimates of rod days obtained via a form sent out by DAFS to proprietors of fishing's along with the salmon and sea trout catch return form. Combining the mean expenditure with the rod days estimates produced the following expenditure figures for the three study areas[2].

Table 2.1.1.1 Expenditure Estimates TRRU 1982 (2003 prices)

Area	Rod Days	Local Expenditure	Non-Local Expenditure	Total
Kyle of Sutherland	7,053	1,134,128	416,618	1,550,747
Tay	42,018	8,031,480	1,874,783	9,906,263
Spey	**62,230**	**13,262,357**	**3,332,948**	**16,595,305**

The 62,230 salmon and sea trout angler days on the Spey seems high not only in relation to other rivers, but also as a proportion of all rod days in the Highlands (see table 2.1.2 below). For all three areas the implied daily spend is over £200.

The rod day estimates were also used to produce a figure for expenditure across the whole of Scotland. The regional rod days recorded and extrapolated from the returns is given below.

Table 2.1.2 Regional Rod Days TRRU (1981)

	Recorded rod days	Estimated rod days
Borders	15,504	22,291
Central	3,310	4,729
Dumfries and Galloway	34,741	49,630
Grampian	74,179	105,970
Highland	70,509	100,727
Strathclyde	17,934	25,620
Tayside	43,140	61,629
Western Isles	2,175	3107
Scotland Total	261,592	373,703

The total expenditure on salmon angling in Scotland in 1982 was estimated to be between £50m and £105m with the best estimate being £79m implying an average daily expenditure of £211.

2.1.2 Mackay Consultants (1989)

In the Scottish context, the study by Mackay Consultants (1989) has been singularly important as a benchmark measure of angler expenditure. This was a wide ranging study that not only sought to establish the pattern and impact of salmon and sea trout

[2] All monetary values are expressed at 2003 prices

angler expenditure, but also the economic importance of netting and the organisation and promotion of salmon and sea trout angling as a tourism asset. Sample data on angler expenditure were obtained through a mixture of on site surveys, a postal survey (names and addresses provided by hotels and fishery owners) and questionnaires left with tackle shops, hotels proprietors etc. A total of 2,364 responses were received and the calculated average daily expenditure was £124.34[3]. This was combined with an estimate of 435,000 total Scottish rod days for 1988. Regionally the best estimate of rod days distributed as follows[4]:

Table 2.1.2.1 Regional Rod Days (Mackay Consultants, 1989)

	Rod days		Rod days
Borders	28900	Highland	112600
Central	6400	Lothian	-
Dumfries and Galloway	56800	Strathclyde	33800
Fife	1300	Tayside	70300
Grampian	121600	Western Isles	3200

These figures are higher than those made by DAFS in 1982. On this basis, Mackay estimated the direct expenditure of all salmon anglers in Scotland to be £54 million. As far as substitution is concerned, no distinction was made between the impact of visiting anglers' expenditure and that of resident Scottish anglers' expenditure on the Scottish economy. This implies that if salmon angling did not exist, all domestic (and visitor) expenditure will be diverted out with Scotland. Mackay assumes a multiplier value of 1.5, and given this the total expenditure in Scotland derived from salmon angling (the sum of direct, indirect and induced expenditure) was estimated to be £81.12 million.

The Mackay study also generated descriptive sample statistics for the ten case study areas Lewis and Harris, Thurso, Conon, Orchy, **Spey**, Dee, Tay, Lomond, Nith and the Tweed. These are presented here for comparative purposes.

The information on rod days for the case study areas was believed to be better than the regional rod days (see above), though the Tweed figure seems relatively low.

Table 2.1.2.2 River Rod Days (Mackay Consultants, 1989)

	Rod days		**Rod days**
Lewis and Harris	2,400	**Dee**	56,800
Thurso	3,900	**Tay**	44,000
Conon	9,100	**Lomond**	11,100
Orchy	2,000	**Nith**	11,900
Spey	**62,100**	**Tweed**	19,400

The accuracy of the angler days is crucial since this is the scaling factor. The Mackay estimate for angler days on the Spey is very similar to the TRRU study; however it is unlikely that the Spey would have nearly three times the angler days of the River Tweed.

[3] £77.25 in 1988 prices is derived from the average of anglers across ten case study rivers and not the whole sample of 2,364 (see page 113)

[4] The angler day's estimates were derived from a survey of 95 proprietors covering 202 beats across the whole of Scotland.

The Tweed angler days may have been underestimated or the Spey overestimated or some combination of both. The corresponding daily and total expenditures are given below:

Table 2.1.2.3 Angler Expenditure (Mackay Consultants, 1989) (2003 prices)

Region	Average Daily Expenditure	Gross expenditure generated	Local expenditure generated	Expenditure Multiplier	Total
Lewis and Harris	£250	£601,579	82.4%	1.13	£560,142
Thurso	£180	£439,035	83.3%	1.28	£468,116
Conon	£156	£948,104	85%	1.19	£959,007
Orchy	£144	£166,011	88%	1.20	£175,307
Spey	**£141**	**£9,674,556**	**91.4%**	**1.28**	**£11,318,457**
Dee	£112	£8,222,619	92.5%	1.34	£10,191,937
Tay	£104	£6,235,783	91.4%	1.35	£7,694,332
Lomond	£83	£377,156	80.1%	1.26	£380,648
Nith	£75	£888,164	85.1%	1.22	£922,110
Tweed	£34	£3,499,452	91.7%	1.2	£3,850,798

The range of per capita daily expenditure is unexpected. The Tweed is by reputation one of the most expensive fisheries in terms of permit charges and the Western Isles fishery one of the cheaper. Generally, daily spending figures seem relatively low given the level of permit charges and accommodation costs. The daily expenditure figures are less than in the TRRU study and our own survey work generated larger estimates of daily spending. The Mackay estimates are based on quite large sample sizes.

In Table 2.1.2.3 above, the local expenditure adjustment percentage simply reflects that some recorded expenditure was not even spent in the case study area (principally transport). The multipliers are expenditure multipliers that include indirect and induced effects (i.e. type II multipliers), and are estimated from primary data from the owner survey and other information on the local economy. There is no detailed explanation of how they were derived. Using the ratio of £24,150 of final expenditure to each full time equivalent job (F.T.E.), it was estimated that 3,360 jobs in Scotland depended on the £81.12m expenditure generated through salmon and sea trout angling. This ratio is based on the relationship between fishery proprietors' revenue and their observed number of employees, with a 20% increase to reflect higher wages outside fishing. The Mackay study does not estimate local value added

2.1.3 Deloitte and Touché (1996)

Deloitte and Touché (1996) adopted a similar approach to Mackay in their assessment of the economic impact of freshwater fishing on the River Tweed main stem and tributaries. In addition to elite interviews and specially commissioned cross tabulations of the United Kingdom Tourism Survey data (UKTS), they also used a range of survey instruments:

- Interviews with local businesses (to establish multiplier effects)
- Interviews with proprietors or others to establish permit sale
- Postal survey of anglers to establish angler spending

They established the number of angler days for four groups of anglers:

- salmon visitors staying in the area
- salmon fishers on day trips,
- other non-salmon visitors
- other day trippers

Salmon visitors were initially estimated through a top down analysis of UK Tourism Statistics. Of the 300,000 domestic tourist trips to the Borders Region 3% to 3.5% had coarse/game fishing as the main purpose. After various adjustments, this group were estimated to account for 36,036 angler days. This was consistent with an analysis of the room stock in the area. Interviews with proprietors indicated that a further 5,400 salmon rod days would be taken by day fishers (4,500 of which are non-local day trips). This suggests a total of around **41,500** angler days. A bottom up analysis of beats and occupancy levels conducted in cooperation with James Leeming, the main Tweed letting agent suggested 39,500 salmon and sea trout rod days. It is reassuring that these figures are so similar and the figure of **40,000** salmon and sea trout angler days seems an appropriate estimate of the number of days at the river bank.

This differs substantially from the Mackay estimate of **19,400** angler days. With respect to daily expenditure, Deloitte and Touché estimate £187 for visitors and £81 for day trips. Both these estimates are substantially larger than the £34 estimated by the Mackay study.

When non-fishing companions are included and allowance made for non-fishing days by visitors, total expenditure is estimated to be £11.26m. Deloitte and Touché estimated that £8.4m of this (73%) is retained in the first round of expenditure. Most of this will be value added (wages to ghillies, hotel and restaurant workers), but some will be locally purchased inputs. £5.5m (65%) is retained in the next round. This is quite a high retention rate, given prevailing tax rates, and the small proportion of goods and services that will originate within the Borders area. Subsequent rounds are assumed to have a retention rate of 25%, producing further total retention of £1.4m. The sum of retained expenditure is thus £15.3m. Given the original direct expenditure of £11.36m this implies an (expenditure) multiplier of 1.35. The authors suggest that this implies an output multiplier of 0.34, but do not explain the logic of this.

The total 'economic impact' is stated as £15.3m. This is simply total expenditure on all goods (final and intermediate) and is not synonymous with local output or local income (i.e. value added). Employment is estimated by assuming full costs of employment of £29,025 and dividing the £15.3m turnover/expenditure by this figure. Thus, 520 jobs are estimated to be dependent on salmon and sea trout angling. If employment estimates are to be based on the wage costs per FTE, then arguably one should divide the wage bill, by £29,025.

2.1.4 Fisheries Resources Management (FRM) (2000)

In a study for the Western Isles Fisheries Trust, FRM estimated the economic contribution of recreational freshwater fisheries to the Western Isles. This is an extensive

and very detailed study that examines many dimensions of freshwater fisheries in the Western Isles. FRM used a variety of survey instruments:

- McPherson Research conducted a survey of 2004 face-to-face interviews with visitors between May and October 1999. This survey included a specific subset of questions related to angling.
- 2,000 self-completion questionnaires were distributed to anglers at designated points of exit; 320 were returned. In addition 35 face-to-face interviews were conducted using a scripted version of the self-completion questionnaire.
- A stratified telephone survey of 782 household on the Western Isles
- A survey of all known clubs and proprietors on the Western Isles. Of the 32 known 21 responded
- Additional survey work on three case study areas (Kildonan catchment, the River Creed and Valtos peninsula

This study is interesting because it used the number of visiting anglers as the scaling factor, since this control total was available from the McPherson study. In this report, the implied total salmon angler days (by visitors and residents) are over 40,000.

There are some problems in reconciling this 40,000 with other information. First, both the DAFS estimate of 3200 days for the Western Isles and the Mackay study's estimate of 2400 salmon and sea trout angler days for Lewis and Harris are completely different orders of magnitude. Second, the study's own survey of owners estimates that there are 22,000 salmon and sea trout rod days, but that only 22% are taken up. This implies a total of 4,620 rod days; much closer to the DAFS and MacKay estimates. Third, the official salmon and sea trout catch for the Western Isles for the year 1998 was 3,763 fish. The FRM study reports a catch of 0.56 salmon and sea trout per day. This suggests about 6,700 salmon and sea trout angler days. Fourth, the FRM study's survey of owners estimates a total catch of 3,563 salmon and sea trout and combining this with the catch per day of 0.56 would produce 6,400 days. In contrast, combining the 40,000 estimated angler days with the catch rate of 0.56, suggests anglers in the Western Isles would be catching 22,400 salmon and sea trout. This is much more than the Spey or the Tweed.

In estimating multiplier effects and employment dependency, the FRM study adopted a slightly different approach from both Mackay Consultants and Deloitte and Touch. Their expenditure multiplier was a Type I multiplier (induced effects ignored) derived by other research workers from input output analysis of the Western Isles. Their expenditure multiplier was 1.14. Employment was derived from known relationships between the value of output and the amount of labour required to produce it across various sectors in the Western Isles. These employment coefficients were applied only to the first round expenditure, and not the total expenditure.

2.1.5 Conclusion

In general there are some problems in reconciling the previous studies of the economic impact of angling in Scotland. The Mackay and TRRU estimates of angler days are very similar, although there are substantial differences between them in the average daily spend. The Deloitte and Touché study of the Tweed, generated an estimate of Tweed angler days that differed substantially from the MacKay estimate, but was more credible and their estimate of daily spending was a quite different order of magnitude from the

Mackay study. Overall, our knowledge of the economic impact of angling is patchy and a little confused.

2.2 Water Sports

Information on paddler numbers let alone economic impact of inland water-sports is noticeably poor. The STB visitor survey of 1989 found a total spend of £210m for water-sport based recreation by visitors. Later work suggests that this is likely to have been a substantial over-estimate. Possibly the best source is The UK Visitor Survey which identifies the origin, destination and activities undertaken by UK visitors. In 2001, UK residents who took part in water-sports holidays (where water-sports were the main reason for the holiday trips) spent £48m, undertook 200,000 trips and stayed 0.6 million nights. In addition a further 800,000 undertook water-sports whilst on holiday (as opposed to a water-sports based holiday).

Church et al (2001) carried out extensive research in England and Wales for DEFRA to establish base line facts on factors such as the length of potential navigable waters and their location, the number of participants and the legal background. They found that some 12% of the population (5m people) made some use of inland water and some 3% (1.2m) regularly participated in water based sport and recreation.

Included in the water-sports category in addition to sailing and paddle sports are power boats/water skiing and sub aqua. Mintel (1998) estimated the participation and growth in a range of water sports as in table 2.2.1

Table 2.2.1 Participation estimates for a range of water sports in the UK

	Club Members	Regulars	Occasional	Trend over Time
Dinghy Sailing	87,000			Up
Windsurfing		640,000		Down
Water-Skiing	9,000	80-100,000	400,000	Static
Canoeing	35,000	100,000	500-1,000,000	Up
Fishing	1,500,000	3,000,000		Static

Source: Mintel (1998)

The data was collected from a variety of sources with differing definitions and is partial. As Church et al (2001) state “one of the reasons for the lack of progress has been the disparate and partial nature of the data available. In terms of consumption and demand, there are few comprehensive data, with the principal one, the UK Domestic Visitor Survey, having significant shortcomings…” (Church et al 2001: 107). There has been no attempt was made to evaluate the economic impact of water sports activities in the UK.

In Scotland, in response to a parliamentary question April 2000 Visit Scotland suggested that Sailing contributed some £10m to the Scottish economy, “Activity Holidays” £240m, Fishing £80m and Walking some £440m. (Reported in *Participation in Outdoor Sports Activity* Research Digest 85, Sport Scotland, August 2001).

Higgins (2000) utilised estimates obtained from the STB and SNH to produce an overall estimate for “outdoor” recreation spend by visitors of between £600m and £800m of which some 7% was water based. The resulting range of £42m to £56m is compatible

with the latest information produced by VisitScotland (2003). These discuss Sailing and WaterSports without estimating expenditures. However the percentage of foreign visitors who take part in water activity is given (9%) together with the percentage of UK Holiday Makers who sail in Scotland (4%). After allowance for motor cruising the resulting estimate is of the order of £80m.

Higgins (2000) also employed multiplier analysis to identify the economic impact of outdoor education centres that invariably have a water-sport element. Centres such as Glenmore Lodge are shown to have an important role as an employer in relatively fragile rural economies.

The impact of paddle-sports on even the Spey Valley let alone the Scottish Economy is unknown. To the "tourist" (overnight) market must be added the unknown impact of the day-tripper market and the impact of capital purchases for water-sports. The proportion attributable to paddle-sports must then be identified.

At the Spey regional level the only information that could be found was from the Final Report of the 1998-99 Rothiemurchus and Glenmore Recreation Survey (Mather (2000)). In this study, of the 1762 people interviewed, the 'main activity' of 3% was stated as water-sports whilst 1.7% stated it as an 'other activity'. At Rothiemurchus the figures were 0.2% and 0.7% respectively. The report suggests the best estimates for the year for Glenmore is 270,000 and for Glenmore and Rothiemurchus 395,000. Taking 'main' and 'other' together and utilising the difference of 125,000 for Rothiemurchus we obtain a water sport number of 13,815 (4.7% * 270,000 + 0.9% * 125,000). As we shall see in section 5.2.2, this tallies with the results of the on-site survey conducted for this study.

We were unable to identify any material on economic value of gorge walking (a.k.a. canyoning) in any part of the UK or world.

2.3 Bird Watching

Whilst bird watching is excluded from the main brief some mention should be made of it. No survey work was carried out to support the following analysis; however several published reports were reviewed. There is no doubt that the bird-life of Strathspey is a major attraction for some visitors who may consider bird watching as the main or subsidiary purpose of their visit. Whilst many will be interested in a wide range of bird species in a number of habitats the presence of birds which live on and around water bodies (lochs and the river) are a major attraction to some visitors. Most notable amongst these is the osprey (*Pandion haliaetus*) and the associated RSPB visitor centre at Loch Garten. However the presence of internationally important wader populations, whooper swans (*Cygnus cygnus*), ducks (e.g. goldeneye (*Bucephala clangula*) and spotted crakes (*Porzana porzana*) on and around Insh Marshes (a Ramsar Site)[5] are an important attraction to birdwatchers. The fact that some species are winter visitors adds to the year-round economic significance of bird watching to the local community.

In 2002 Shiel *et al* (2002) updated an earlier (1996) RSPB report on the local economic impact of their **Abernethy reserve**. The author had full access to budgetary information and also used a range of standard economic techniques and published multipliers to

[5] An internationally conserved area of wetland

extrapolate from direct effects to indirect expenditure and employment in the community. The key results relevant to the present study are as follows:

Table 2.3. Abernethy Forest Reserve: Direct and Indirect Employment (1999/2000)

	Employment (fte)
Direct employment	15.5
Spending by employees	1.5
Direct reserve expenditures	4.5
Grazing lets/agricultural tenants	3.3
Products from reserve management	0.3
Employment due to visitor spend in local community (£1.4m)	40.0
Total Employment	**65.1**
Notes: 1 The figure of £1.4 excludes visitors who use the reserve but do not visit the Osprey Centre. 2 Between 1998 and 2001, the estimated number of visitors to the Osprey Centre averaged 33,600 p.a. compared with 72,400 in 1989. 3 It is estimated that the total annual number of visitors to the Abernethy Reserve (includes Forest Lodge and part of the Cairngorm Plateau) is 70,000. In 1994, there were 100,000 visitors	

Source Sheil *et al* (2002:23)

The average visitor spend was put at £41 which is similar to our estimates for spend by overnight visitors. This figure was then multiplied by all visitors to the centre, despite the fact that for RSPB reserves as a whole, 30% were local, and 26% were day trippers.

There might also be a problem of over-estimation, because of the failure to address the issue of substitution. The study is framed in the context of the impact of Scotland, in part because the multipliers and Input-Output tables are Scottish based. However within this large area substitution effects predominate. In an undergraduate project trying to evaluate the "economic value" of the Cairngorm plateau, MacAlinden (1998) surveyed RSPB members who visited this small area. It was found that a majority would have gone to the plateau even had there been no chance of seeing the rare bird species and that the RSPB members came to the area predominantly for the mountain environment and for walking. In the large area it is reasonable to assume that the vast majority of visitors to Abernethy would simply have moved their expenditure to something or somewhere else within Scotland. On the basis of the funding source and the arguments presented above, the economic impact for Scotland is little more than those directly employed at Abernethy and the associated induced effect of their expenditure. Even at a local level, substitution will be significant with local, day trippers and overnight visitors undertaking some other activity in the area.

There is no detailed study of the local economic impact of **Insh Marshes** However some indication of the significance of the reserve can be obtained from the 2000/2001 Annual Report (Prescott, 2001). This reserve has no visitor centre and is essentially open with several obvious access points leading to hides and marked trails etc. Consequently visitor numbers are difficult to estimate, but in 2000/2001 a total of around 12,700 were thought to visit the reserve. The employment situation at the reserve is

difficult to discern from the report, but in addition to a full-time Warden there is a part-time Field Teacher post and a variable number of volunteer staff. Figures for local expenditure are not provided in the report but the normal day-to-day management expenditure and that resulting from grants for fencing etc will all make a modest contribution to indirect local employment.

Whilst an estimate of local employment as a result of these RSPB reserves can be made it would be difficult to assess to what degree the attraction of bird species associated with the River Spey, Insh Marshes, Loch Garten and other lochs are central to this. Nonetheless, the national reputation of the Osprey Centre and the associated attraction of other species and aquatic habitats must play an important part in the choice of some visitors to come to Strathspey. The size of the substitution effect requires further and more detailed study as part of an overall assessment of recreation associated with the Spey and its associated water bodies.

Finally it should be noted that the Abernethy report claims that the figures used are conservative. One of the suggested impacts not counted is the expenditure on other activities in the area. It is suggested that this could be attributed to the reserve, as the "reserves play a role in encouraging people to stay in the area for several days". This is contentious and could lead to extensive double counting as each activity in an area claimed it was the reason visitors came. This could be indicative of an approach to economic impact analysis, which is designed to promote an agenda rather than inform policy makers.