



Does fish farming impact on tourism in Scotland?

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Abstract

Aquaculture is an important industry for rural Scotland, in particular for the west coast and the islands. Tourism is also important to Scotland's economy and depends heavily on the country's landscape. Targeted research was undertaken to assess whether fish farming impacts tourism in coastal areas of Scotland. This was accomplished through face-to-face interviews with tourists and telephone interviews with tourism-related businesses and aquaculture businesses at three case study locations: Outer Hebrides, Shetland and Oban and Mull. A large percentage of respondents (87% of 120 people surveyed) had seen fish farming before, although half of them had not seen fish farming at the case study location. Respondents were asked to consider how the current levels of fish farming affected their perception of the area, impact on scenery, natural environment, recreational activities and willingness to re-visit based on a scale from strongly negative, slightly negative, no affect/neutral, slightly positive, strongly positive or do not know. The majority of respondents stated that current levels of fish farming had no effect on the aforementioned parameters. When asked to consider further development or expansion of fish farming, visitors remained neutral to all, except for the impact on the scenery and the natural environment, where approximately half of the responses were negative. This research provides qualitative evidence that the current levels and future developments or expansion of aquaculture operations will not affect visitors' willingness to re-visit the case study sites or affect their key recreational activities.

Keywords: aquaculture, fish farming, tourism, Scotland

Introduction

Finfish and shellfish farming, collectively known as aquaculture or fish farming, are important industries for rural Scotland, with several communities depending on the associated employment and revenue it provides. Within Scotland, aquaculture provided 1500 full-time equivalent jobs and gross value added (GVA) of £395 million in 2007 [based on £380 million for Atlantic salmon, £10 million for other finfish species and £5 million for shellfish species (Scottish Government, 2008)] to the Scottish economy. The vast majority of fish (finfish and shellfish) produced (95% by weight) consists of Atlantic salmon (*Salmo salar* L.), followed by mussels, oysters, trout, etc. Scotland is the second-largest producer of farmed Atlantic salmon in Europe (behind Norway) and produces approximately 130 000 tonnes annually.

Tourism provides close to 5% of Scottish GVA, with over £4 billion spent by domestic and international visitors in 2007. More than 200 000 people work in tourism-related industries. The tourism sector is, therefore, more than 12 times larger than the aquaculture sector in terms of GVA and over 130 times in terms of employment. Scottish tourism depends heavily on the country's landscape, with 90% of visitors considering scenery to be important in their choice of Scotland as a holiday destination, and the natural environment being important to 65% of visitors (VisitScotland 2008a, b).

There are 454 registered active finfish sites and 332 registered active shellfish sites in Scotland (Fisheries Research Services, 2008). Aquaculture development in Scotland is guided towards appropriate sites through regulation and planning control. Decisions on siting and design have often taken into account landscape and visual impacts, along with a wide range of other planning matters. The current distri-

bution and design of individual structures therefore reflects a process that has aimed to pre-empt potential negative environmental and visual impacts that could have had an effect on visitor perception.

The impact of aquaculture on tourism in Scotland is currently unknown. Clear empirical evidence is lacking and discussion to date is based on individual concerns and anecdotal evidence. This study investigates the relationship between aquaculture and tourism in Scotland.

Methodology

Structured questionnaires were undertaken face to face with 120 tourists and by telephone with 70 tourism-dependent businesses and aquaculture businesses over the telephone to assess the potential impact of aquaculture on tourism, both qualitatively and quantitatively, in a Scottish context. Face-to-face interviews were undertaken from July to August 2008 and telephone interviews were conducted in September 2008.

This was delivered using a case study approach. A decision matrix was developed to inform the choice of locations throughout Scotland and considered the following attributes:

- Number and type of aquaculture sites, including salmon, salmon and trout smolt, trout and rope-grown mussel based on FRS Production Statistics;
- Distribution and location of aquaculture sites throughout the area;
- Case study areas that are located within a designated area or an area with recognized scenic value such as a National Scenic Area or a Special Area of Conservation;
- Viewpoint elevation – high-level viewpoints look down upon cages and lines, and so they are more readily visible against a backdrop of open water, while aquaculture operations tend to be less visible from low-level viewpoints, for example from the sea;
- Sea-going visitors including recreational activities such as yachting, angling, wildlife tours and scuba diving will be considered; and
- Tourist attractions such as Tourist Information Centres, museums, castles and viewpoints, which are a useful way to establish the importance of the area to tourism.

Three case study locations were chosen as follows: Mull and Oban, Outer Hebrides and Shetland.

Tourism questionnaire

A detailed questionnaire was developed for interviews with tourists and this was conducted face to face by the same interviewer. Forty tourists were randomly selected and interviewed at each case study location with a total of 120 respondents. Tourism-dependent businesses and aquaculture businesses were consulted via telephone using a structured interview.

The tourism questionnaire is summarized as follows:

An opening statement identified whether the interviewee was a tourist or visitor. With most of the case studies covering islands, this was simply determined by their residency, for example an individual from Barra would not be interviewed if they were approached in Lewis because they are still a resident of the overall case study location, i.e. the Outer Hebrides. For interviews in Oban, a visitor was classified as having travelled at least an hour, although in practice, the closest visitors were from Glasgow.

Section 1 of the questionnaire gathered information on the tourist's profile and behaviour, i.e. why they were visiting the area.

Section 2 gathered details of the tourist's impression of the coastline at the interview location and, more generally, their experience of human activities that occur along Scotland's coastline.

Section 3 moved into more specific impressions and focused on the respondent's impression of finfish and shellfish farming. This section included the presentation of a series of photographs.

Section 4 ended the questionnaire by gathering demographic information about the interviewee.

Control

Specific questions within the questionnaire acted as a control, allowing comparisons to be made between certain respondents. In particular the question 'Have you seen aquaculture before? And if so where?' provided a good basis to compare answers for those who have witnessed aquaculture and those who have not. Furthermore, it also allows comparison between those who have seen aquaculture at the case study location, or elsewhere in Scotland or internationally. It was assumed that those respondents who answered yes to this question and knew where they had seen it had some level of understanding about aquaculture.

Photographs

Section 3 of the questionnaire included the presentation of six photographs of the Scottish coastline, showing a range of different man-made structures interacting with the sea/coastline, including fish farming.

Images that are of parts of landscape not particularly outstanding in scenic terms were selected – they are not from designated areas, for example, and have no dramatic landscape qualities in terms of mountainous hills, receding layers of topography or particularly indented coastlines or attractive sandy beaches.

The photos illustrate similar topography of low relief, with similar spatial arrangements and proportions of land and sea and sky. The photographs also have similar water surfaces and no dramatic lighting, for example, there is no shadow on the hillsides or other distracting features.

The structures are presented in a relatively benign or neutral context, allowing the viewer to focus on their reaction to the structures, and not be too distracted by photographs of fine landscape settings or beautiful skylines, etc. Some of the photographs showed more than one structure (e.g. fish farm along with near-shore fencing and houses), and therefore, respondents were also asked to state why they had a specific reaction to a photograph. The use of photographs in this way therefore as was allows a systematic approach at assessing people's reaction to images of the structures.

Selecting interview locations

It was considered important to undertake questionnaires with individuals who had actually experienced aquaculture. This was achieved as best as possible by choosing interview locations where tourists were likely to have seen aquaculture en route to or at the actual location. The following considerations were taken when choosing potential interview locations in order to optimize response levels and ensure a representative sample:

Maximize the likelihood that respondents will have seen fish farming either at the interview location or en route.

Ensure that the location is safe and convenient for respondents to stop and answer the questionnaire.

Focus on recognized tourist destinations.

Cover a reasonable spread of interview locations throughout each case study in terms of geography and type of visitor attraction.

Typical tourist hotspots identified as potential interview sites included:

- Tourist Information centres;
- Museums;
- View points;
- Castles;
- Ferry Terminals;
- Camp sites;
- Harbours;
- Marinas;
- Bays;
- Beaches;
- Airport (on Barra only); and
- Other tourist attractions such as standing stones.

Figure 1 presents the interview locations for Mull and Oban, Outer Hebrides and Shetland.

Limitations of study

It is recognized that the geographic coverage is a limitation of this research, however, given the scope of the project, it was agreed that it would be more beneficial to carry out more surveys at fewer case study locations rather than fewer surveys at more locations. It is also recognized that not all Local Authorities are represented by these case study locations, in particular the Highland Council and Orkney Islands Council, which are also important areas for aquaculture production.

Furthermore, each case study location is (or includes) islands, with the only mainland area at Oban. Islands have specifically been chosen because not only are they important to aquaculture production but they are also places to which people are attracted because of the presence of the coast and coastal activities. Interactions between tourists and aquaculture are therefore likely to occur.

Results and discussion

Tourism questionnaire

The sample size of 120 tourists is not robust enough for detailed statistical analysis and therefore the data presented within this study is done so using descriptive statistics. The range of respondents interviewed formed a good representative sample of tourists in Scotland in relation to demographics, including gender, age, country of origin and group profile. Therefore, this allows meaningful conclusions to be

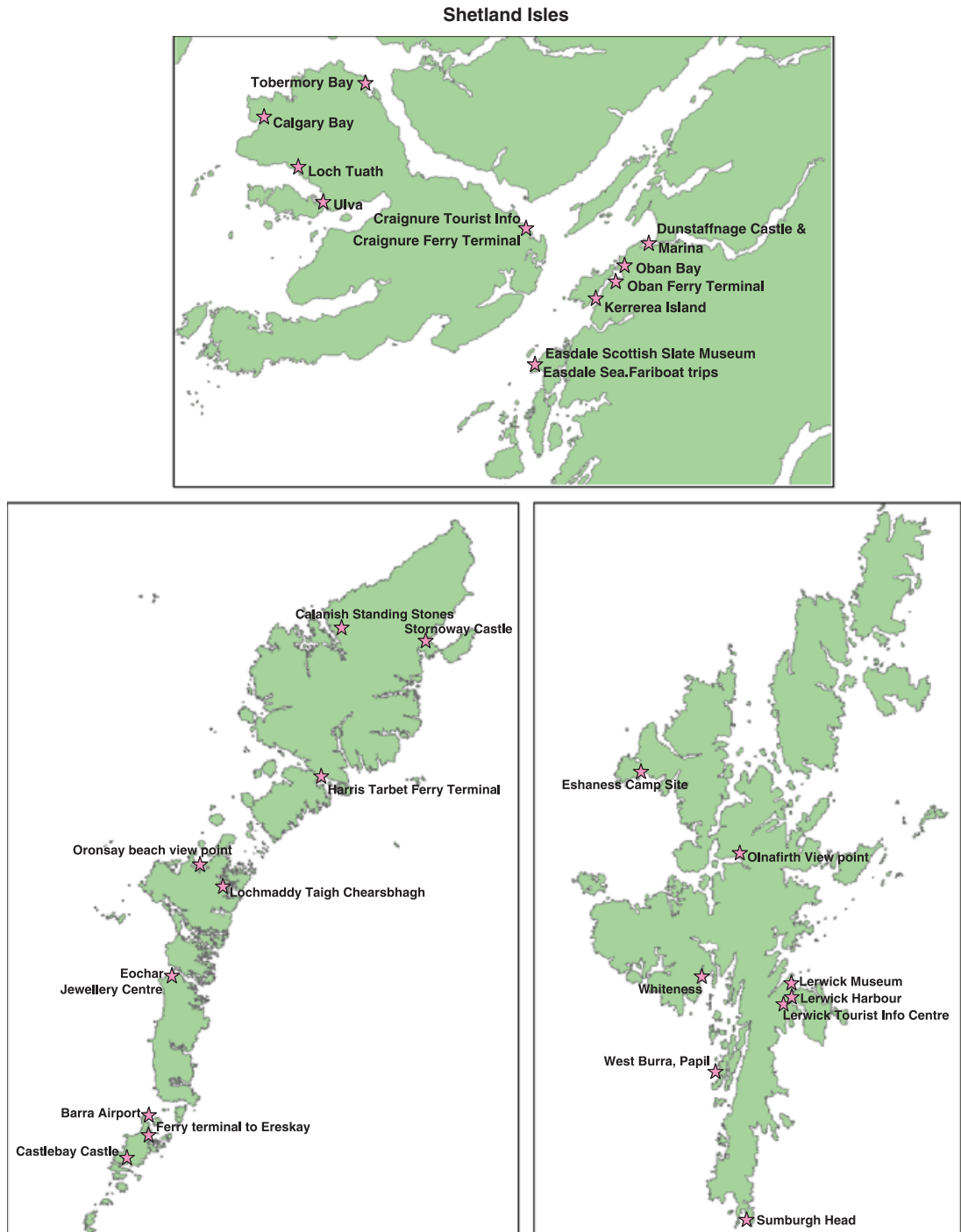


Figure 1 Interview locations for Mull and Oban, Outer Hebrides and Shetland Isles.

drawn from the survey regarding opinion of the Scottish coastline and fish farming.

This research, carried out at three case study locations (Oban and Mull, Outer Hebrides and Shetland),

found the response of tourists to current fish-farming operations to be overall neutral.

A number of visitor types were interviewed, including cyclists, hill walkers and general sightseers

(Fig. 2). However, within the total sample, only one angler was interviewed and no scuba divers were interviewed. (The interviewer visited popular angling locations and a diving centre; however, tourists carrying out these recreational activities were not found.)

Of the respondents interviewed, 98% had a positive impression of the coastline at the case study location.

The majority of respondents believed that commercial fishing, yachts, marinas, angling and fish farming have an overall positive impact on their experience of Scotland's coastline, while commercial shipping has an overall neutral impact on them (Fig. 3).

In particular, 42% of respondents had a positive opinion to fish farming and 35% were neutral. How-

ever, out of the six different human activities, fish farming ranked the most negative and the fifth least positive, although it was the second most neutral (behind commercial shipping).

A large percentage of respondents (87%) had seen fish farming before and so were speaking from a relative level of awareness (Fig. 4). Interestingly, approximately half of these respondents stated that they had not noticed fish farming at the case study location. This included some who were being interviewed behind a fish or shellfish farm, and so these respondents had either not noticed the fish farm or did not know what it was. The highest level of respondents who had seen fish farming at the case study location were from Shetland and the smallest number were from the

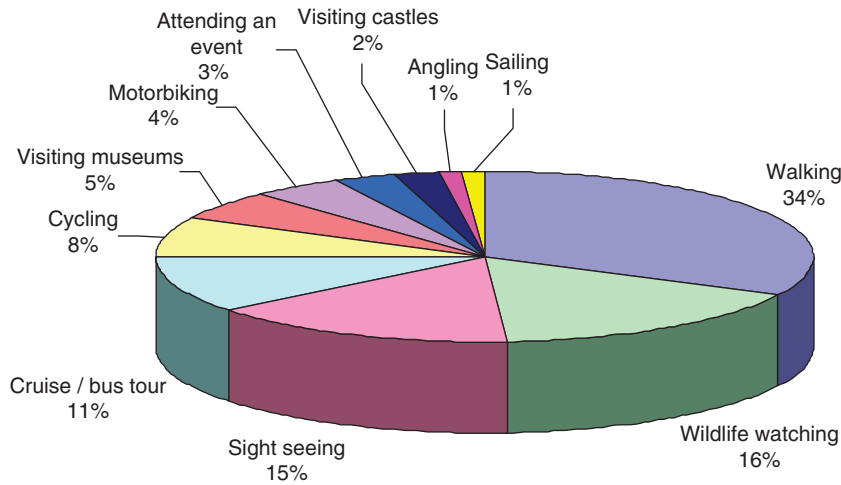


Figure 2 Main reasons for visiting location.

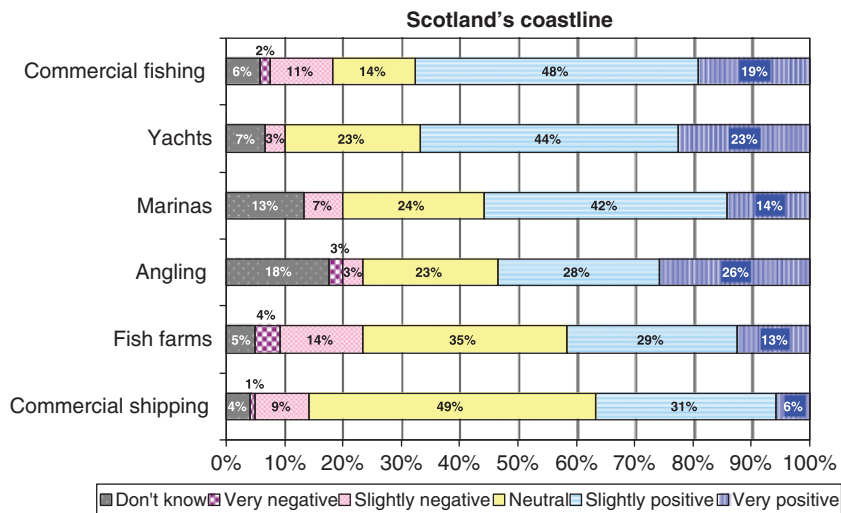


Figure 3 Impact of human activities on respondents' experience of Scotland's coastline.

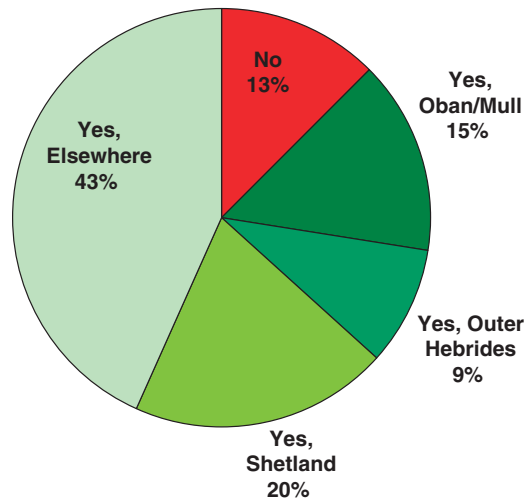


Figure 4 Proportion of respondents who have seen fish farming.

Outer Hebrides. It is evident that many of the tourist destinations in the Outer Hebrides do not coincide with fish farm sites, which are often located away from the normal tourist routes.

Throughout the survey, respondents repeatedly scored their impression of fish farming to be neutral or have no impact. Furthermore, throughout the survey, there was no evidence of significant variation between case study locations.

Because the general response was one of neutrality, the level of positive and negative scores was low and therefore difficult to analyse with regard to any trends such as age, gender, nationality, etc.

Respondents were asked whether they agreed or disagreed to a specific statement relating to aquaculture (Fig. 5).

The overwhelming majority of respondents agreed that fish farming contributes to the livelihoods in coastal communities (83%), with approximately one-third agreeing strongly (Fig. 5a). Approximately half of respondents believed that fish farms do not spoil the appearance of the coast, and an additional 7% strongly believed this (Fig. 5b).

Over three-quarters (78%) of respondents would not be less likely to visit those places in Scotland where fish farms are sited, and only 10% would be less likely to visit these locations (Fig. 5c).

Just under half (45%) of respondents believed that fish farms have no real effect on the beauty or appearance of the Scottish coastline (Fig. 5d). However, approximately one-third disagreed, believing that it does affect the Scottish coastline.

Respondents were less resolute when asked for their opinion regarding an increase in the number or the size of fish farms. For both increased number and size of fish farms, over 40% and therefore the majority of respondents neither agreed nor disagreed (Fig. 5e & f). However, approximately one-quarter of respondents did not want to see an increase in the number of fish farms along the Scottish coastline and over one-third did not want to see existing fish farms get any bigger.

Therefore, it seems that there may be a certain maximum size for a fish farm before people fear that it will begin to dominate the view and then detract from its beauty.

Figure 5e indicates that the numbers/frequency of fish farms is not particularly a problem compared with Fig. 5f, which shows that there is greater concern at the expansion in their size. This suggests that respondents would prefer to see a higher frequency of smaller fish farms rather than a lower occurrence of large fish farms.

When asked to focus on the effect of specific aspects of fish farming including perception of the area, impact on scenery, natural environment, recreational activities and willingness to re-visit, the majority of respondents remained neutral (Fig. 6). In particular, 91% stated that it would have no effect (positive or negative) on their willingness to re-visit and 88% stated that it would have no effect on their key recreational activities.

The largest negative response was given to the impact on the scenery and the natural environment, with 32% of respondents scoring these negatively.

When asked to consider further development or expansion of fish farming, respondents remained overall neutral to all categories, except for the impact on the scenery and the natural environment (Fig. 7). Forty eight per cent of respondents believed that expansion of fish farming would negatively impact the scenery and 46% believed that it would negatively impact the natural environment. However, respondents stated that further development or expansion of fish farming would not affect their willingness to re-visit or their key recreational activities.

The subjective nature of photographs is well understood. In the context of this work, the photographs were shown at the end of the questionnaire to ensure that they created no bias for earlier responses (Fig. 8). The photographs allowed those respondents who had not seen fish farming before to compare it with other human structures in the coastal area, which were presented in separate

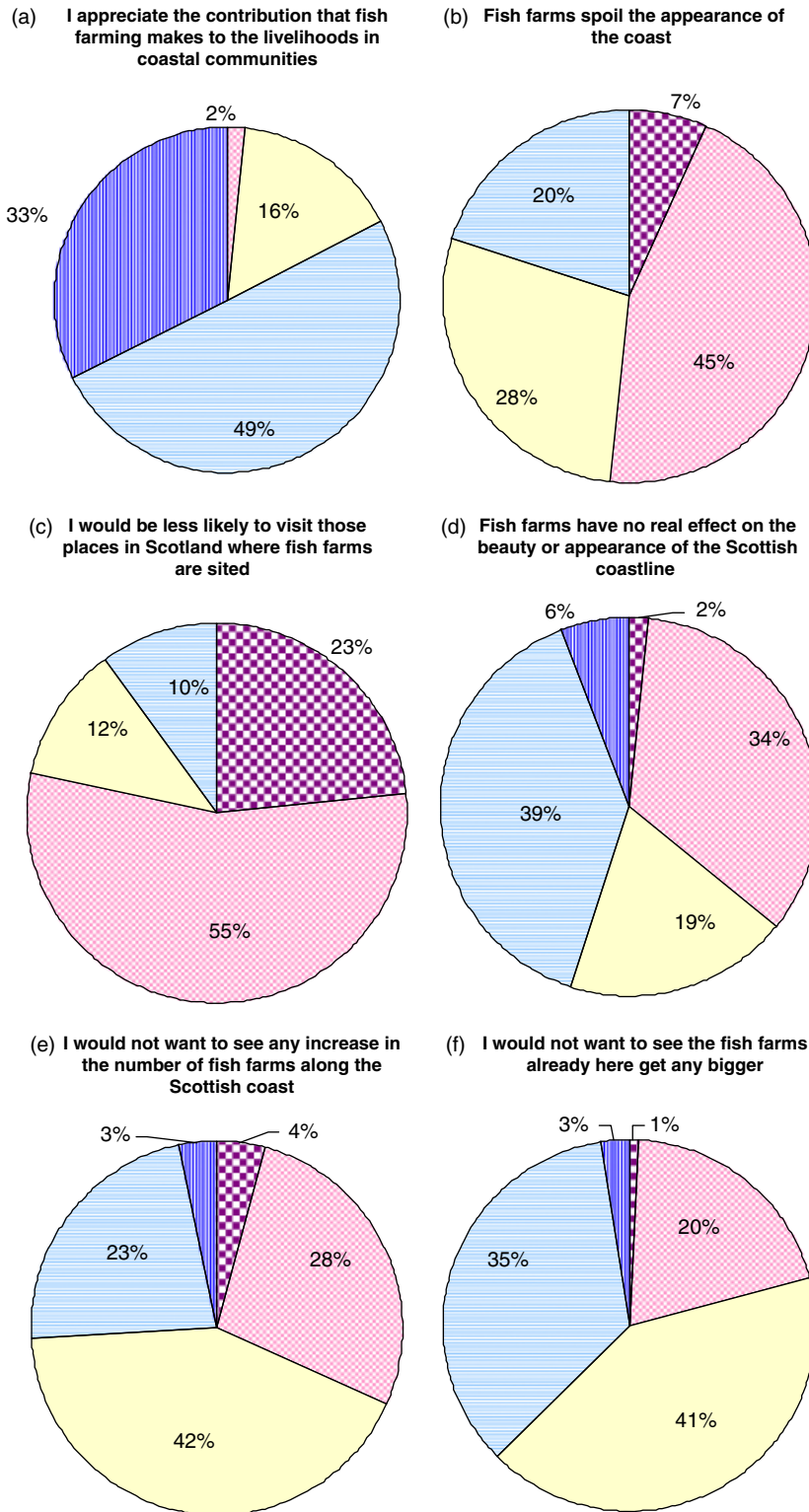


Figure 5 Statements relating to aquaculture asked during the questionnaire. (a) I appreciate the contribution that fish farming makes to the livelihoods in coastal communities; (b) Fish farms spoil the appearance of the coast; (c) I would be less likely to visit those places in Scotland where fish farms are sited; (d) Fish farms have no real effect on the beauty or appearance of the Scottish coastline; (e) I would not want to see any increase in the number of fish farms along the Scottish coast; (f) I would not want to see the fish farms already here get any bigger.

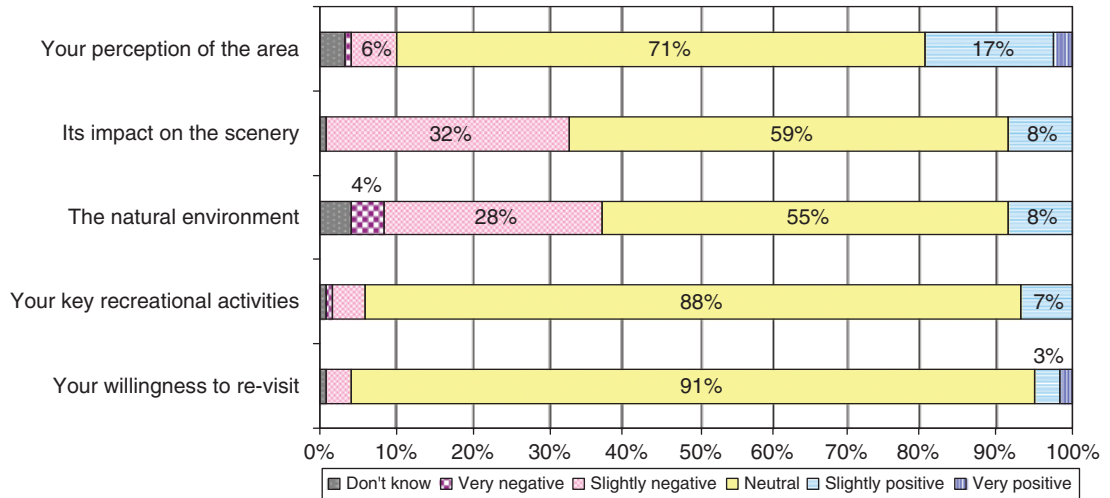


Figure 6 How do fish farming operations in this area affect you in relation to the factors mentioned?

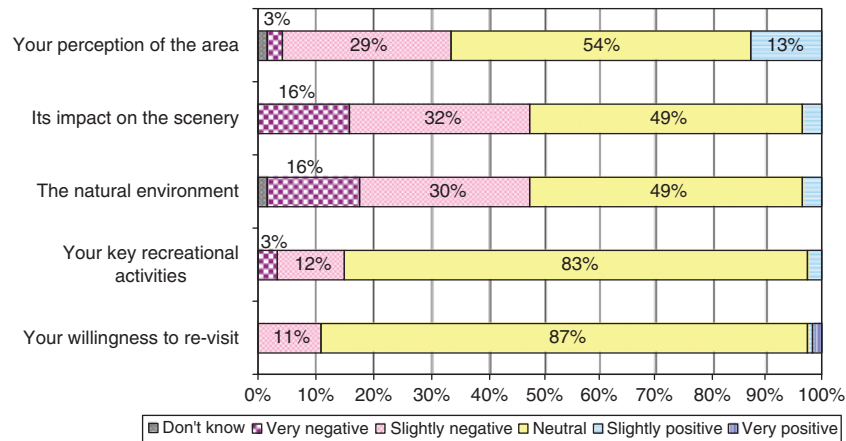


Figure 7 How would further development or expansion of fish farming in this area affect you in relation to the factors mentioned?

photographs. Overall, the photograph of caravans was viewed most negatively and the photograph of the marina was viewed most positively (Fig. 9).

Within the aquaculture photos, respondents favoured the low-level view of the finfish farm and the medium-level view of the mussel farm. Furthermore, both these photographs received an overall positive response (70% and 55% respectively).

Tourism related and aquaculture businesses

During this research, 65 tourism-related businesses (including hotels, B&Bs, restaurants, visitor centres and sightseeing boat operators) and eight aquaculture production businesses were consulted. The responses to the survey by tourism businesses in the

case study areas show a generally positive contribution made by aquaculture towards tourism as it provides a point of interest and also locally sourced food for tourists. For accommodation providers, aquaculture also provides additional business, with visitors requiring lodgings throughout the year.

There was no suggestion from any of the tourism-dependent businesses interviewed that aquaculture is having a negative impact on tourism in Scotland. Negative aspects that have emerged on occasion relate to specific wildlife issues such as the angling sector’s perception that aquaculture negatively impacts on wild fisheries. Some isolated incidents were also reported, which were attributed to bad practice by certain operators. It was not suggested that tourism revenue has been considerably affected as a result of these negative impacts, although for angling interests,



Figure 8 Photographs presented in sequence from (a) to (f) at the end of the questionnaire.

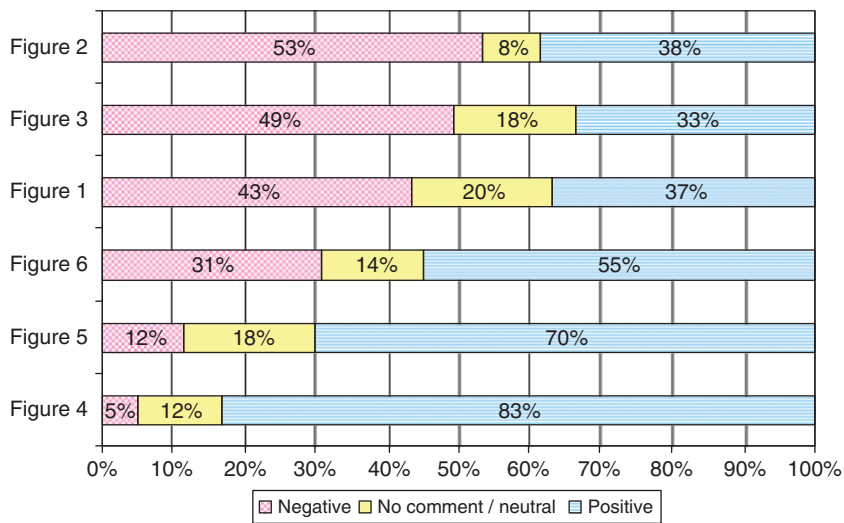


Figure 9 Responses to photographs.

this has in part been due to the restocking efforts of angling interests to improve catching opportunities.

Aquaculture is an important rural activity in all the case study areas, but there is currently limited planned interaction with tourism. It is rarely promoted as a tourism attraction in its own right, and health and safety issues are likely to mean that the larger cage farms remain off the tourist trail. There may be some potential for developing linkages between tourism and aquaculture in the areas, especially for the smaller shellfish farms that are able to sell their produce locally and in the case of land-based farms, develop tourist-related activities (produce sales, farm tours and education facilities) to diversify their incomes.

Most tourism businesses were fully aware of the type of fish farming occurring in the area. Some tourist and aquaculture businesses expressed an interest in developing more written information for tourists on aquaculture in general and on local farming operations in particular.

In contrast to an assumed conflict between wildlife watching and aquaculture, there are examples where business linkages have developed. Visits to salmon cages have proved to be a popular additional interest on wildlife watching boat tours. There is no guarantee that certain wildlife features will be seen, but the salmon cages are useful as a constant fixed feature on a boat operator's itinerary.

Conclusion and future recommendations

This research has found no evidence to suggest that current levels or future expansion of aquaculture im-

pacts tourists' willingness to visit Scotland or carry out their recreational activities at the three case study locations of Mull and Oban, Outer Hebrides and Shetland.

A number of limitations of this research are recognized including:

Statistically robust analysis was not possible with a sample size of 120.

Survey numbers of sea-based recreational users, including divers, yachters and anglers, were not sufficient for quantitative extrapolation.

The geographical coverage of the research was limited and focused on island locations.

Surveys were carried out at each location over a 3-day period and therefore may be seasonally biased.

Therefore, it is recommended that any future research should give consideration to sampling a larger area of Scotland, have a sample size that allows statistically robust analysis and have an element of focus on tourists carrying out key recreational activities.

Furthermore, any future research on the effect of expansion or further development of fish farming should be conducted according to pre-defined terms, i.e. specific surface area or number of pens or lines.

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