

The Sustainability of Whale-watching in Scotland

A.J. Woods-Ballard

*Centre for the Study of Environmental Change and Sustainability,
Edinburgh, Scotland*

E.C.M. Parsons

Hebridean Whale and Dolphin Trust, Tobermory, Isle of Mull, Scotland

A.J. Hughes, K.A. Velander and R.J. Ladle

School of Life Sciences, Napier University, Edinburgh, Scotland

C.A. Warburton

*Centre for Conservation and Sustainable Development, University of
Greenwich, England*

Scotland's tourism trade grosses £2.5 billion annually and supports 180,000 jobs; whale-watching is an important part of this activity. Whales and dolphins are the country's number one wildlife attraction and with 11,770 km of coastline the potential for the Scottish industry is huge. In rural areas it can provide as much as 12% of local income. During the tourist season of 2000, questionnaires and telephone interviews were used to investigate the sustainability of Scottish whale-watching. 48 operators cooperated providing economic and environmental information. Most operators were found to be local people (72.4%), supporting five or less full-time equivalent jobs (86.4%). Over half of those questioned (63.2%) had alternative incomes and no formal training in wildlife tourism or business management (70.8%); 89.5% of respondents stated that they follow a code of conduct. The East Coast and Western Isles show the best-perceived trends in tourist numbers. Whale-watching in Scotland is shown to have potential for growth but a need to be regulated and managed from within the industry to ensure environmental and economic sustainability into the future.

Introduction

Whale-watching became a commercial activity in 1955 along the southern California coast (Hoyt, 1992) and since the International Whaling Commission's (IWC) moratorium on whaling in 1986 has become the most economically viable and sustainable use of cetaceans.¹ It has continued to grow rapidly through the 1990s, tourist numbers and numbers of destinations increasing along with estimates of value (see Table 1).

Whale-watching is defined by the IWC as: 'any commercial enterprise which provides for the public to see cetaceans in their natural habitat' (IWC, 1994). If managed properly it can be defined as non-consumptive wildlife-orientated recreation (NCWOR); as such one person's activities do not detract from the experiences available to others, and it can be said to be a sustainable activity (Duffus

Table 1 Summary of the growing worldwide value of whale-watching (adapted from Hoyt, 1992; 1995b; 2000)

Year	No. of countries and overseas territories	Value (GB£ million)	Number of tourists worldwide (million)
1983	12		
1991	31		4
1994	65	311	5.4
1998	87	655	9

& Dearden, 1990; International Fund for Animal Welfare (IFAW) *et al.*, 1995). Duffus and Dearden (1990) define NCWOR as: 'a human recreational engagement with wildlife wherein the focal organism is not purposefully removed or permanently affected by the engagement'. In addition to this, to ensure environmental sustainability even temporary harassment or disturbance should be kept to a minimum. Good whale-watching is that which provides maximum benefit to both the tourists and the target species (Hoyt, 1999). This can be accomplished by supplying an experience for the tourist and contributions to conservation through research, education and money. Finally, if well managed, whale-watching could be classed as ecotourism, being both environmentally and economically sustainable, with benefits accruing to the local community and ecosystem.

Whale-watching in Scotland

The tourism industry in Scotland is very important to the country's economy, bringing in over £2.5 billion annually and creating over 180,000 jobs (System Three, 2000). Two of the most important assets for this industry are world famous landscapes and wildlife. Figures from the Scottish Tourist Board (STB) indicate that 40% of European visitors consider wildlife one of Scotland's most liked features (Smyth, 1998) and with no point in Scotland more than 65 km away from the 11,770 km of coastline, marine and coastal wildlife are very important. This was illustrated in a recent survey of Scotland's most popular wildlife attractions, wherein marine or coastal animals came first, second, third, seventh and can also be included in fifth (see Table 2).

There are attractive and unspoilt landscapes in most of Scotland, which, combined with the possibility of seeing many different and interesting species, can create a memorable experience even if the target species of a trip are not seen (Smyth, 1998). For example, 89% of whale-watchers not seeing dolphins in the Moray Firth still enjoyed their trip (Arnold, 1997), which is considerably higher than the 35% of tourists in Australia being satisfied when a whale is not seen on a trip (Orams, 2000). This could be attributed to a number of factors including the local scenery, the quality of the tour, other wildlife encountered and the other passengers on the boat. Whatever the explanation this figure should be encouraging to Scottish operators as it shows that despite the possibility of not getting close to or seeing cetaceans, tourists will probably be happy if other factors are emphasised.

Whale-watching in Scotland began on the Isle of Mull in 1989. However, general

Table 2 The most popular wildlife attractions in Scotland (from Smyth, 1998)

<i>Popularity rating</i>	<i>Animal</i>
1	Whales and dolphins
2	Sea birds
3	Seals
4	Wildfowl
5	Birds of prey
6	Badgers
7	Otters
8	Deer
9	Pine marten
10	Capercaillie

nature tours offering the chance of seeing whales, dolphins or porpoises have been running considerably longer. The most reliable whale-watching in Scotland is based around the resident populations of bottlenose dolphins (*Tursiops truncatus*) off the Outer Hebrides and, in particular, in the Moray Firth (Hoyt, 1995a). The Moray Firth has the only resident population of bottlenose dolphins along the U.K.'s North Sea Coast and offers some of Europe's finest shore-based whale-watching sights (Hoyt, 1992). However, most of the whale-watching in Scotland is based on transient sightings (Duffus & Dearden, 1990) with minke whales (*Balaenoptera acutorostrata*) often seen off the West coast (Hoyt, 1995a). Although there are a number of whale-watching guidelines in the UK, none of them is mandatory and the industry is thus unregulated (Parsons & Woods-Ballard, 2001).

The potential economic impact of whale-watching in Scotland is considerable, especially in remote coastal areas. For example, Warburton *et al.* (2001) state that as much as 12% of the west coast of Scotland's tourism income may come directly or indirectly from whale-related activities. Direct and indirect tourism spending due to whale-watching in the UK has been rising since 1991 along with total visitor numbers (see Table 3). However, in certain areas, for example the Isle of Mull, operators suggest that tourist numbers have been decreasing over recent years (Warburton *et al.*, 2000), so marketing is becoming increasingly important to ensure economic sustainability.

Table 3 Summary of the growing value of whale-watching in the UK (adapted from Hoyt, 1995b; 2000)

<i>Year</i>	<i>Direct spend (UK£)</i>	<i>Indirect spend (UK£)</i>	<i>No. of tourists</i>
1991	25,000	850,000	400+
1994	850,000	6,500,000	15,000+
1998	1,170,000	5,140,000	121,125+

Background to study

The study was conducted in order to ascertain the overall sustainability of whale-watching in Scotland, with inferences to be made as to management regimes and the future viability of the industry. Work on the west coast of Scotland was conducted in association with the Hebridean Whale and Dolphin Trust (HWDT) as part of a study commissioned by the Department for the Environment, Food and Rural Affairs (Defra, formerly the Department for the Environment Transport and the Regions, DETR).

Materials and Methods

This survey was initiated in June 2000, early in the UK whale-watching season (which is confined to the summer months), to ensure that operators would not feel they were too busy to help. A total of 65 questionnaires were sent out to well-advertised companies and a further 22 companies were contacted by telephone, with a summarised questionnaire due to time constraints. A pilot study of 32 questionnaires was followed by a further 33 questionnaires, refined to include only the final information reported upon in this study. They included questions on viability, tourist numbers, how long operations had been running, advertising and whether or not they followed a code of conduct. A total of 26 completed replies (40%) were received from the postal questionnaire and all 22 companies that were telephoned cooperated. Thus a total of 48 out of 87 (55%) companies contacted replied to the survey.

The data were split into regions for further determination of results relative to area; the descriptions of which and number of respondents are listed in Table 4 (see also Figure 1). The numbers of respondents in each area are incidental and are not indicative of the total number of tour operators in each of those areas. The West and Western Isles are well represented due to the locality of case studies conducted during this survey (Hughes, 2000; Woods-Ballard, 2000), which made these areas more accessible. However, results are still representative of overall trends

Results

Economic Sustainability

Operators were asked how long they had been running their particular trips. A mean of 11.2 years ($N = 39$) indicates that these businesses have been established

Table 4 The geographical distribution of the respondents to the operator survey

<i>Area</i>	<i>Description</i>	<i>No. respondents</i>
East	From Berwick-upon-Tweed to Wick	7
North	From Wick to Cape Wrath	2
North. Isles	The Islands off the North Coast	2
West	From Cape Wrath to Solway Firth	16
West. Isles	The Islands off the West Coast	21
Total		48

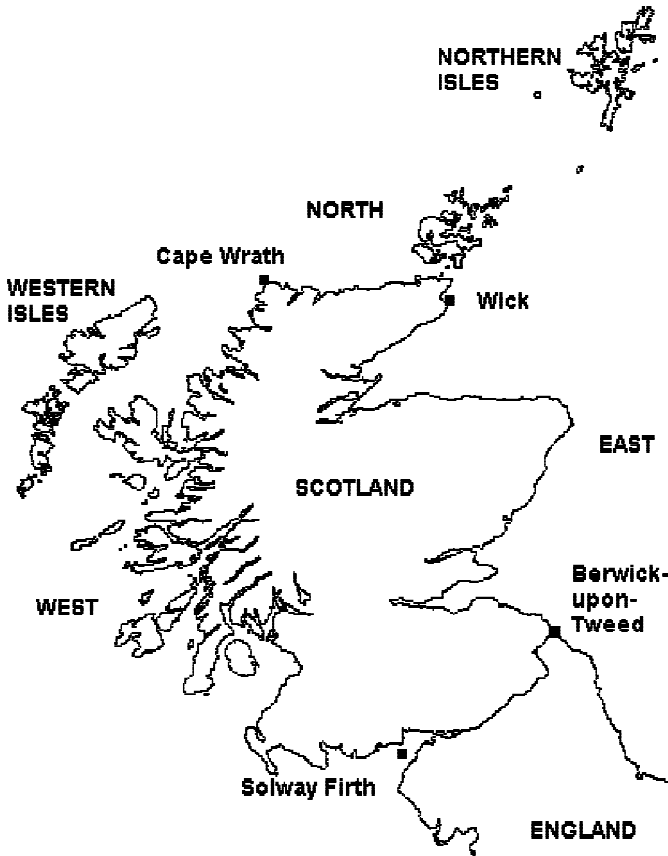


Figure 1 Map of Scotland showing the location of the five study areas: West, Western Isles, North, Northern Isles and East

for some time. Table 5 shows that a large percentage (72.4%) of the operators can be classed as local people, through either being born in the area, or living there for more than 15 years. Most of the operations (86.4%, $N = 44$) were small, supporting five or less full-time equivalent jobs (one full-time equivalent job = two part-time year-round or two full-time seasonal jobs), which were usually family members or local people. Over half (63.2%, $N = 38$) of tour operators stated that marine mammal tours were not their main source of income. A high percentage of the respondents (72%, $N = 25$) stated that they had obtained financial aid for their operation, either through grants, or from the bank and 70.8% ($N = 24$) of operators stated that they had no formal training in wildlife tourism or business management.

Table 6 shows that most operators believe that tourist numbers are falling (37.9%), remaining the same (31%) or changing very little (24.1%). However, 80.9% of operators believe their businesses to have good or moderate viability into the future. All the respondents ($N = 27$) stated that return visitors form an important part of their business.

Table 5 Length of time operators have lived in the area where they work ($N = 29$)

<i>Years in the area</i>	<i>Percentage</i>
1–5	3.5
6–10	13.8
11–15	10.3
15+ & since birth	72.4

Table 6 Perceived trends in tourist numbers over recent years ($N = 29$)

<i>Tourist numbers</i>	<i>Percentage</i>
Decreasing	37.9
Same	31.0
Up $\frac{1}{4}$	24.1
Up $\frac{1}{2}$	3.5
Up $> \frac{1}{2}$	3.5

Marketing and advertising of the business

All but one of the respondents (97.5%, $N = 40$) stated that they were members of at least one tourist board (local or national). 33 respondents were members of at least one other marketing group. Almost all of the respondents (89.5%, $N = 38$) follow a wildlife watching code of conduct, be it one of the commonly used ones (e.g. the codes recommended by the HWDT or the Scottish Marine Wildlife Operators Association (SMWOA)) or one of their own devising.

Environmental sustainability

Table 7 shows that many operators (35.7%) consider the marine mammal numbers in their area to be increasing. They also feel that species numbers are remaining the same (32.1%) or increasing (21.4%) (see Table 7). Over half the operators (60.9%, $N = 23$) stated that they keep a sightings record, many of them already being used for research purposes (for example the HWDT keep a sightings record for operators in the west of Scotland).

Table 7 Perceived trends in numbers of animals and species in the area over time ($N = 28$)

<i>Operator perception</i>	<i>Animal nos. (%)</i>	<i>Species nos. (%)</i>
Decreasing	14.3	3.6
Staying the same	10.7	32.1
Increasing	35.7	21.4
No opinion	39.3	42.9

Comparison of data from each area

Table 8 shows that trends in tourist numbers are quite different across the country with the Western Isles and the East Coast having the best perceived growth in tourist numbers. However, the Northern area needs to be further investigated, as the small number of respondents may not be representative of a larger, poorly advertised industry. Table 9 shows that most operators perceived their businesses as being viable, with only a small percentage in the West and Western Isles (42.9% and 20% respectively) describing their businesses as having bad future viability. Table 10 shows that on average there are less species (5.4) seen by operators on the East Coast of Scotland than elsewhere in the country, the most being off the North Coast (10) and the Western Isles (9.1).

Table 8 Operators' perceived trends in tourist numbers according to location

<i>Area</i>	<i>Up > ½ (%)</i>	<i>Up ½ (%)</i>	<i>Up ¼ (%)</i>	<i>Same (%)</i>	<i>Decreasing (%)</i>
East (<i>n</i> = 7)	0.0	14.3	14.3	42.9	28.6
North (<i>n</i> = 2)	0.0	0.0	0.0	0.0	100.0
Northern Isles (<i>n</i> = 2)	0.0	0.0	0.0	50.0	50.0
West (<i>n</i> = 7)	0.0	0.0	28.6	0.0	71.4
Western Isles (<i>n</i> = 11)	9.1	0.0	36.4	45.5	9.1

Table 9 Viability perceptions according to location

<i>Area</i>	<i>Good (%)</i>	<i>Medium (%)</i>	<i>Bad (%)</i>
East (<i>n</i> = 5)	40.0	60.0	0.0
North (<i>n</i> = 2)	50.0	50.0	0.0
Northern Isles (<i>n</i> = 2)	50.0	50.0	0.0
West (<i>n</i> = 7)	57.1	0.0	42.9
Western Isles (<i>n</i> = 10)	60.0	20.0	20.0

Table 10 Numbers of species relative to area

<i>Area</i>	<i>Number</i>
East	5.4
North	10
Northern Isles	6.5
West	7.4
Western Isles	9.1

Discussion

Economic sustainability

History of Scottish whale-watching

The average marine mammal tour business from this survey has been running for 11.2 years and is run by a local who has lived in the area for more than 15 years. Although most are small businesses supporting fewer than five full-time equivalent jobs, these are usually locals and almost three-quarters of the operators have additional sources of income. This is similar to the responses from a survey in Australia, where 77% of operators had sources of income other than whale- and dolphin-watching (Australian Nature Conservation Agency, 1996). The situation is indicative of areas where traditional employment such as fishing or 'crofting' (small-scale livestock farming) are proving to be unprofitable and rural people have to diversify in order to provide for themselves and bring in income from outside the community (Smyth, 1998; Wunder, 2000).

Table 11 Growth in global and UK based whale-watching

Year	Change in monetary value (%)		Change in no. of tourists (%)	
	UK	World wide	UK	World wide
1991–94	+740		+3650	+35
1994–98	-14	+111	+608	+67

The monetary value of whale-watching in the UK dropped from 1994 to 1998 compared to a 111% rise globally (Table 11). The rate of change in whale-watcher numbers in the UK is much higher than globally, but from 1994–98 this was lower than 1991–94, suggesting that the rate of growth of numbers is slowing. The higher numerical growth could be attributed to the fact that the UK industry is relatively young, and it is possible that growth will level out close to the global values in years to come. The drop in monetary value from 1994–98 occurred despite an increase in numbers of 608%. This suggests that the average whale-watcher is spending less than in previous years. It may be possible to rectify this situation by improving facilities and increasing spending opportunities in the areas around whale-watching operations.

Marketing and advertising

The marketing strategies of the operators were revealed, with at least 33 out of the 48 operators being members of marketing groups other than the national or local tourist boards. Some 67.4% of operators used the internet to advertise their trips; however, only 12.5% of whale-watchers first heard about their trips through the internet (Warburton *et al.*, 2001). This discrepancy suggests that there is need for a more consolidated approach by the operators, whereby they efficiently link their websites under a universal portal site, perhaps run by one or more of the operator associations (e.g. the SMWOA) and accessible through the Scottish Tourist Board. This would make their websites easier to find for the tourists. Only

Table 12 Some of the more important associations for marketing of marine tours in Scotland

<i>Operating Associations</i>
Scottish Marine Wildlife Operators Association (SMWOA)
Skye and Lochalsh Marine Tourism Association (SLMTA)
The Dolphin Space Programme, Moray Firth (DSP)
The Minch Project
Scottish Tourist Board (STB)
Highlands of Scotland Tourist Board (HoSTB)
Western Isles Tourist Board
Other local Tourist Boards
Shetland Isles Tourist Board
Holiday Mull
Ardnamurchan Tourist Association (ATA)

3% ($N = 1,833$) of visitors to Scotland in 1999 used the internet to book their accommodation (System Three, 2000), another indication that this resource is not being fully utilised. A marketing group could also be used to provide and publicise a recognised quality assurance certificate with operators following a compulsory code of conduct. Marketing groups could also provide a useful source of educational material for both tourists and operators and operational experience for newcomers (Arnold, 1997; Smyth, 1998). Advertising can be used to give tourists a good idea of what to expect from their tour, for example from a board with a list of recent sightings on it (Smyth, 1998). Examples of marketing groups or operators associations can be seen in Table 12. All respondents stated that return visitors form an important part of their custom, suggesting that advertising needs to be improved to bring in more first-time customers.

Environmental sustainability

Regulation of whale-watching

A large percentage of operators (89.5%) stated that they follow a code of conduct. However, the sole study of a UK whale-watching code of conduct showed the Dolphin Space Programme² in the Moray Firth to be only partially successful (Arnold, 1998). This is partly due to the lack of specific regulation of the industry in the UK. At present there are a multitude of laws that could be related to whale-watching but no definitive set of whale-watching laws (Arnold, 1998). There are also numerous codes of conduct relating to whale-watching in the UK, which becomes confusing for operators and the general public. For example, Defra only recommend that their whale-watching guidelines (1999) are followed in the absence of local codes of conduct. Along with suggested alterations to the Wildlife and Countryside Act 1981 (Royal Society for the Protection of Birds (RSPB), 1998a; Simmonds, 2000), formulation of a new set of legislation could provide the institutional controls necessary to ensure adherence to a

single, comprehensive code of conduct. To facilitate the long-term research and monitoring necessary for the conservation of cetacean stocks (IFAW *et al.*, 1995), legislation of the UK industry could also include a licensing scheme with a commitment to keeping an accurate and extensive sightings record. Legislation can be used as a tool to effectively manage aspects of whale-watching; for example in the USA the Marine Mammals Protection Act of 1972 prohibits activities that would change the natural behaviour of marine mammals, such as feeding or swimming with them.

Monitoring

Too often wildlife use begins without knowledge of the possible effects on the target species and businesses take off before the animals can be studied in detail (Mangel *et al.*, 1996). The most important data to collect are those on population size, habitat use, home range and behavioural ecology (Constantine, 1999). Management policies must be adapted to be relevant to the particular ecological systems concerned (Mangel *et al.*, 1996; Yaffee, 1999). In order to obtain a realistic picture of effects it is also necessary to have good long-term data, which can only accurately be collected through the use of standardised methods (Fairbairns, 1996). Table 13 shows a summary of Swartz's (1999) recommendations for how whale-watching can be used as a tool for assessing the status of whales and what must be measured. In addition it is necessary to make accurate health measurements of individuals; however, this is difficult without direct sampling or capture (Arnold, 1997), both highly disruptive and stressful techniques. At present the health of wild animals can only be accurately assessed through the necropsy of dead animals but carcasses are rarely found in Scotland in a good enough condition (Arnold, 1997).

Importantly, it is necessary to include continued monitoring of the species or habitats in question when proposing alterations to flexible management plans

Table 13 Summary of recommendations for long term study of cetacean populations from whale-watching vessels (adapted from Swartz, 1999)

<i>Measurement</i>	<i>Results</i>
Whale-watching effort (e.g. number and seasonality of whale-watching trips)	Assessment of numbers of cetaceans encountered per unit effort, which can be examined over time
Seasonality of presence of cetaceans in the whale-watching area	Assessment of timing of cetacean migrations and ranges to detect changes
Measurement of the specific areas and habitats used by cetaceans	Assessment of changes in habitat use patterns of cetaceans
Measurement of reproductive success of individual cetaceans that are exposed to whale-watching activities (e.g. calving rates and success of recruitment of offspring)	Production of guidelines and advice on specific activities that pose a direct threat to cetacean populations
Collection of evidence of physical injury or disease that could have resulted from exposure of whale-watching activities	Production of guidelines and advice on specific activities that pose a direct threat to cetacean populations

(Blane & Jaakson, 1994). Ideally, scientists unconnected to the operations or areas in question should complete any monitoring although the most accessible source of long term information is often from the operators themselves (Leaper *et al.*, 1997). Monitoring can be used to ensure good practice by giving funding preferentially to ecologically sound operations with minimum or zero impact, projects offering local economic growth, or those with direct benefits for species or habitats listed in the UK Biodiversity Action Plan, 1994 (Anon) (RSPB, 1998b). It is also useful for the operators and funding bodies to monitor visitor satisfaction, which could be done in a number of ways including visitor books, comments slips, watching visitor behaviour and questionnaires (Smyth, 1998). The results of monitoring could be used to help justify new legislation. Once legislation is brought in to regulate wildlife tour operators it could be used to aid conservation through licensing schemes whereby licenses are only given upon payment of a performance bond, the money from which can be used to rehabilitate an area if necessary (Greiner *et al.*, 2000). This is an example of the 'polluter pays principle'.

Codes of conduct

There are many different codes of conduct both internationally and within the UK. They are all voluntary in the UK and, as yet, there are no licensing laws requiring compliance with one code or another. The codes may be concerned with safe and considerate boating, cetacean-watching, seal-watching, marine-mammal-watching or marine-wildlife-watching in general. The codes are designed primarily to prevent disturbance of marine wildlife; however, they also form an effective marketing tool for the tour operators, as they allow tourists to choose an ecologically aware company. Often the companies are members of

Table 14 List of the codes of conduct consulted for this summary

Name of code
DETR Minimising disturbance to cetaceans from whale-watching
DETR Minimising disturbance to cetaceans from recreation at sea
Dolphin Awareness Code (with SNH) for Recreational Boats and Jet Skis
Dolphin Space Programme (with SWT, SNH & EU Life Programme)
HWDT Seal Watching Code of Conduct
HWDT Whale and Dolphin Watching Code of Conduct
IWC Recommendations on the General Principles of Whale-watching
Minch Project (see also Sea Watch Foundation)
Navigate with Nature
Scottish Marine Wildlife Operators Association Code of Conduct
Sea Life Cruises Code of Conduct for Watching Minke Whales
Sea Watch Foundation Code of Conduct
Skye and Lochalsh Marine Tourism Association Code of Conduct
Special regulations in Broadford Bay regarding Bottlenose Whales
Whale and Dolphin Conservation Society Code of Conduct

Table 15 Guidelines for production of a code of conduct

<i>Species</i>	<i>Guidelines</i>
Cetaceans	Encounters should be no longer than 15 minutes
	Approach from behind or at an oblique angle very slowly
	If possible avoid going closer than 100 m/200 m unless the animal comes to you
	Avoid having more than 1 vessel within 300 m/200 m of a group
	No more than 3 boats within 1 km at any time
	Do not drive through a group
Seals	Avoid approaching too close
	Do not approach within 100 m of pupping sites by boat, channel width permitting
	Do not approach pupping sites on foot
General	Special care should be taken around juveniles and parents
	Do not come between mother and young
	Let the animals decide the nature of the encounter
	Avoid travelling at high speed
	Maintain no wake speed during encounters
	No sudden course changes or speed changes or noises
	Shroud propellers to reduce risk of injury
	Do not feed animals
	Do not swim with animals
	Do not touch the wildlife
	Do not chase animals
	Back off if birds or animals show signs of distress
	Use binoculars for a better view
	Do not allow littering or pollution
	Respect local interests
	Use an accredited tour guide
	Do not harass animals
Monitor the effects of new and existing businesses	
Encourage education of tourists	

associations thus advertising the other members by presenting their code of conduct on an advertising flier (Masters *et al.*, 1998). Despite the variety of codes of conduct in the UK (Table 14) there are certain common themes, which are outlined in Table 15.

Comparison of data from each area

It is possible that the better trends in tourist numbers perceived in the Western Isles and the East are due to certain factors. The Western Isles may be doing better as there is a longer history of whale-watching in the area. The East may be doing well because it has relatively easy access compared to the West and North. The Western Isles and the East Coast are also the two most reliable areas for Scottish whale-watching, based around well-established operator groups (e.g. the SMWOA formed in conjunction with the Minch Project, West Coast (Morrison, 1995) and the Dolphin Space Programme, Moray Firth (Arnold, 1997)).

The North coast and Northern Isles remain under utilised as whale-watching destinations, a situation that must be remedied for businesses in those areas to remain viable. This could be accomplished through the formation of an area-specific marketing group, or perhaps including the tours as part of a package. It may also be possible to alter the price structure of the trips, to include discounts for people who have to travel a long way to get there, altering the price to ensure maximum market clearance for a mixture of tourists.

The situation on the East Coast is only superficially good. The problem there is that the dolphins in the Moray Firth are close to large population centres and easily accessible to small boats. This is why the Dolphin Space Programme was needed, to regulate a potentially unsustainable situation. The scheme was only partially successful (Arnold, 1998) and now needs updating to ensure the conservation of the resident dolphins. On the West Coast and in the Western Isles skippers need to be more qualified as cetaceans are usually reached via longer trips. Tourists to the region are also very environmentally aware (Warburton *et al.*, 2000) and police the system to an extent.

Conclusions

To conclude, the whale-watching industry in Scotland is currently at a fragile stage in its development, with the strong pound encouraging domestic tourists to travel abroad and discouraging foreigners from coming to the UK. This must be addressed by raising the profile of Scottish tourism, especially Scottish whale-watching. The Scottish industry must also continue monitoring and adapting its practices to remain as ecologically sensitive as possible, yet flexible to allow for the results of new research or legislation.

An organisation such as the SMWOA could regulate the industry from within. They could actively vet and check new operators and respond to complaints about existing operators. They could also be responsible for a licensing scheme, which could be regularly monitored and ensure a high-quality tourism product, which is both environmentally and economically sustainable.

A number of other management recommendations can be made, which could improve the situation of the Scottish whale-watching industry and ensure both economic and environmental sustainability into the future. These include:

- to improve the level and diversification of advertising;
- to raise the profile of Scottish tourism and especially whale-watching, for example through television (see Smyth, 1998);
- to create a portal site for internet use, which will link to all operators' websites;

- to initiate directed funding schemes to encourage good practice;
- to create new legislation to include an obligatory licensing scheme, with an official code of conduct;
- to increase income to operators through merchandising;
- to increase income in local areas from whale-watching, perhaps through establishment of new shops and raising the profile of each area;
- to initiate future research into the industry with this study as a pilot; and
- to continue present studies into disturbance and effects of whale-watching.

Acknowledgements

The authors wish to thank all the respondents of the questionnaires for their cooperation and Dr Simon Allen of the Centre for the Study of Environmental Change and Sustainability, University of Edinburgh, for his assistance and advice during the initial research for this project.

Correspondence

Any correspondence should be directed to Andy Woods-Ballard, 101 The Street, Capel St Mary, Ipswich, Suffolk, IP9 2EH, UK (andy_wb@email.com).

Notes

1. Cetaceans are defined as all whales, dolphins and porpoises.
2. The Dolphin Space Programme is a licensing scheme for marine-mammal-watching organisations operating in the Moray Firth, Scotland.

References

- Anon (1994) *Biodiversity: The UK Action Plan*. London: HMSO.
- Arnold, H. (1997) *The Dolphin Space Programme: The Development and Assessment of an Accreditation Scheme for Dolphin Watching Boats in the Moray Firth*. Scottish Wildlife Trust, Scottish Natural Heritage, and the EU Life Programme.
- Arnold, H. (1998) Just take two aspirin: Is the voluntary approach an effective prescription for the management of dolphin watching in Scotland? *European Research on Cetaceans* 12, 37.
- Australian Nature Conservation Agency (1996) *Whale and Dolphin Watching in Australian Waters Summary Report for 1995 Calendar Year*. Paper presented to the Scientific Committee at the 48th Meeting of the International Whaling Commission, May–June 1996, Aberdeen, UK. SC48/WW1.
- Blane, J.M. and Jaakson, R. (1994) The impact of ecotourism boats on the St Lawrence beluga whales. *Environmental Conservation* 21, 267–9.
- Constantine, R. (1999) Effects of tourism on marine mammals in New Zealand. *Science for Conservation* 106. Wellington, New Zealand: Department of Conservation.
- Department for the Environment Trade and Rural Affairs (1999) Minimising disturbance to cetaceans from whale-watching operations. On WWW at <http://www.wildlife-countryside.detr.gov.uk/whales/whale.htm>. Accessed 20.8.00.
- Duffus, D.A. and Dearden, P. (1990) Non-consumptive wildlife-orientated recreation: A conceptual framework. *Biological Conservation* 53, 213–31.
- Fairbairns, R.S. (1996) Whalewatching – ecotourism and research – a Scottish point of view. *European Research on Cetaceans* 9, 285. (Abstract).
- Greiner, R., Young, M.D., McDonald, A.D. and Brooks, M. (2000) Incentive instruments for the sustainable use of marine resources. *Ocean Coast Management* 43, 29–50.
- Hoyt, E. (1992) *Whale-watching Around the World*. Bath: Whale and Dolphin Conservation Society.
- Hoyt, E. (1995a) *Discover Whale and Dolphin Watching in Northern Europe*. Bath: Whale and Dolphin Conservation Society.

- Hoyt, E. (1995b) *The Worldwide Value and Extent of Whale-watching: 1995*. Bath: Whale and Dolphin Conservation Society.
- Hoyt, E. (1999) *The Potential of Whale-watching in the Caribbean: 1999+*. Bath: Whale and Dolphin Conservation Society.
- Hoyt, E. (2000) *Whale-watching 2000: Worldwide Tourism Numbers, Expenditures, and Expanding Socioeconomic Benefits*. Crowborough: International Fund for Animal Welfare.
- Hughes, A.J. (2000) Tourism as a sustainable industry in the rural community of Arisaig, West Scotland. Masters thesis, Napier University. 44 pp.
- International Fund for Animal Welfare, Tethys Research Institute and Europe Conservation (1995) *Report of the Workshop on the Scientific Aspects of Managing Whale-watching*. Montecastello di Vibio, Italy, 30 March–4 April 1995. Paper presented to the Scientific Committee at the 47th Meeting of the International Whaling Commission, May 1995, Dublin. SC47/018.
- International Whaling Commission (1994) Chairman's report of the forty-fifth annual meeting. Appendix 9. IWC Resolution on whale-watching. *Report International Whaling Commission 44*, 33–4.
- Leeper, R., Farburns, R., Gordon, J., Hiby, A., Lovell, P. and Papastavrou, V. (1997) Analysis of data collected from a whalewatching operation to assess relative abundance and distribution of the Minke Whale (*Balaenoptera acutorostrata*) around the Isle of Mull, Scotland. *Reports of the International Whaling Commission 47*, 505–11.
- Mangel, M., Talbot, L.M., Meffe, G.K., Agardy, T., Alverson, D.L., Barlow, J., Botkin, D.B., Budowski, G., Clark, T., Cooke, J., Crozier, R.H., Dayton, P.K., Elder, D.L., Fowler, C.W., Funtowicz, S., Giske, J., Hofman, R.J., Holt, S.J., Kellert, S.R., Kimball, L.A., Ludwig, D., Magnusson, K., Malayang III, B.S., Mann, C., Norse, E.A., Northridge, S.P., Perrin, W.F., Perrings, C., Peterman, R.M., Rabb, G.B., Regier, H.A., Reynolds III, J.E., Sherman, K., Sissenwine, M.P., Smith, T.D., Starfield, A., Taylor, R.J., Tillman, M.F., Toft, C., Twiss Jr., J.R., Wilen, J. and Young, T.P. (1996) Principles for the conservation of wild living resources. *Ecological Applications 6*(2), 338–362.
- Masters, D.E., Nautilus Consultants and Carter, J. (1998) *Marine Wildlife Tourism Developing a Quality Approach in the Highlands and Islands*. Inverness: Tourism and Environment Initiative and Scottish Natural Heritage.
- Morrison, D. (1995) *Wildlife Tourism in the Minch. Distribution, Impact and Development Opportunities*. Stornoway, Lewis: The Minch Project.
- Orams, M.B. (2000) Tourists getting close to whales, is it what whale-watching is all about? *Tourism Management 21* (6), 561–9.
- Parsons, E.C.M. and Woods-Ballard, A. (2001) *Voluntary Whale-watching Codes of Conduct: How Effective Are They in Managing Whale-watching in West Scotland?* Paper presented to the Scientific Committee at the 53rd Meeting of the International Whaling Commission, July 2001, London. SC53/WW6.
- Royal Society for the Protection of Birds (1998a) *Opportunities for Change*. Consultation paper on a revised UK strategy for sustainable development. Sandy Park, Bedfordshire: RSPB.
- Royal Society for the Protection of Birds (1998b) *Tourism – Towards Sustainability*. A consultation paper on sustainable tourism in the UK. Sandy Park, Bedfordshire: RSPB.
- Simmonds, M.P. (2000) *Chasing Dolphins! A Preliminary Report on the Failure of Existing Legislation to Protect Whales and Dolphins from Harassment and Injury in UK waters*. Bath: Whale and Dolphin Conservation Society.
- Smyth, M.A. (1998) *New Ideas in Rural Development. No. 5, Setting Up a Wildlife Tourism Initiative*. Edinburgh: Central Research Unit Papers.
- Swartz, S.L. (1999) *Whale-watching as a Means to Assess the Status of Whales*. Paper presented to the Scientific Committee at the 51st Meeting of the International Whaling Commission, May 1999, Grenada. SC51/WW1.
- System Three (2000) *Tourism Attitudes Survey, 1999*. Final Report. Report submitted to the Scottish Tourist Board and Scottish Natural Heritage. P3596. Edinburgh: System Three.
- Warburton, C.A., Parsons, E.C.M. and Goodwin, H., (2000) *Whale-watching and Marine*

Wildlife Tourism on the Isle of Mull, Scotland. Paper presented to the Scientific Committee at the 52nd Meeting of the International Whaling Commission, June 2000, Australia. SC52/WW17.

Warburton, C.A., Parsons, E.C.M., Woods-Ballard, A., Hughes, A. and Johnston, P. (2001) *Whale-watching in West Scotland*. London: Department of the Environment, Food and Rural Affairs.

Woods-Ballard A.J. (2000) Whale-watching in Scotland, with a case study on the Isle of Skye. Masters Thesis, Edinburgh University. 122pp.

Wunder, S. (2000) Ecotourism and economic incentives – an empirical approach. *Ecological Economics* 32, 465–79.

Yaffee, S.L. (1999) Three faces of ecosystem management. *Conservation Biology* 13, 713–25.