

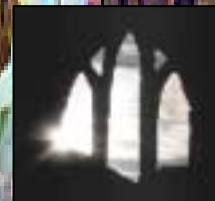
MARINE ENVIRONMENTAL AWARENESS IN ARGYLL, WEST SCOTLAND

**N.J. SCOTT
& E.C.M. PARSONS**



Hebridean Whale
and Dolphin Trust

Research - Education - Conservation



NÀDAIR

MARINE ENVIRONMENTAL AWARENESS IN ARGYLL, WEST SCOTLAND

SUMMARY

252 participants were interviewed in Argyll, West Scotland, in order to investigate the level of marine environmental awareness of the region. The majority underestimated the number of cetacean species occurring in Argyll waters. Awareness of the occurrence of cetacean species was low, with no more than 56.7% of participants answering correctly for any one species. No more than 19% of participants were able to identify any one species by sight. The top 3 threats to the Argyll marine environment were found to be over-fishing, sewage and marine litter. 96.4% of participants were against a country such as Norway hunting whales which inhabit Scottish waters and strong support is demonstrated for the establishment of legislation for the protection of cetaceans in Scotland's waters. Awareness of the presence and threatened status of cod and haddock is found to be high but lacking for other species such as the orange roughy. The majority are against seal culling and perceive Marine National Parks positively. Higher awareness was found amongst younger participants, residents of Argyll, those taking part in more marine-related activities, members of charitable environmental organisations and those who consider marine conservation issues to be of importance. Tobermory participants showed a higher awareness regarding cetaceans.

THIS REPORTS SHOULD BE CITED AS:

Scott, N.J. and Parsons, E.C.M. (2001). *Marine Environmental Awareness in Argyll, West Scotland*. Hebridean Whale and Dolphin Trust, Mull. 97pp.

Table of Contents

SUMMARY	2
Table of Contents	3
Acknowledgements	5
1 INTRODUCTION	6
1.1 Marine Environmental Awareness in Argyll	6
1.2 Aim of Study	6
1.3 Why the Argyll Region?	6
1.4 The Region of Study	7
1.5 Questions to be Addressed in the Study	8
1.5.1 The Level of Awareness of Cetaceans in Argyll	8
1.5.2 Awareness of Threats to Argyll Cetaceans	8
1.5.3 Awareness in Regard to the Protection of Argyll Cetaceans	11
1.5.4 Level of Awareness of Other Marine Species Considered to be a National Conservation Priority	12
1.5.5 Opinions about Major Marine Conservation Issues Highly Relevant in Argyll	15
i) Seal Management	15
ii) Marine National Parks Legislation	15
2 METHODOLOGY	16
2.1 Location of Sample Sites	16
2.2 Questionnaire Methods	17
2.3 Methods of Data Analysis	17
2.4 Limitations	19
3 RESULTS	20
3.1 Demographic Results	20
3.2 Participants' Answers	21
3.2.1 Knowledge of the Number of Cetacean Species Occurring in the Waters of Western Scotland	21
3.2.2 Photo-Identification of Cetacean Species	24

3.2.3	Participants' Knowledge of the Occurrence of Cetacean Species in the Argyll Region	28
3.2.4	Threats to the Argyll Marine Environment as Named by Participants	35
3.2.5	Participants' Perceptions of the Threats to Cetaceans in the Waters of Western Scotland	37
3.2.6	Participants' Views and Knowledge of Whale Hunting	42
3.2.7	Participants' Perceptions as to How Well Cetaceans Are Protected in Scotland's Waters	46
3.2.8	Participants' Knowledge of Threatened Species Occurring in Scotland's Waters	48
3.2.9	Opinions About Major Marine Conservation Issues Highly Relevant in Argyll	58
	i) Seal Management	58
	ii) Marine National Parks	61
3.2.10	Participants' Perceptions of the Effectiveness of Organisations in Conserving the Scottish Marine Environment	62
3.2.11	Participants' Perceptions of the Economy of Argyll	65
4	DISCUSSION	67
4.1	The Level of Awareness of Cetaceans in Argyll	67
4.2	Awareness of Threats to the Argyll Marine Environment and Cetaceans	67
4.3	Awareness in Regard to the Protection of Argyll Cetaceans	69
4.4	Level of Awareness of Other Marine Species Considered to be a National Conservation Priority	69
4.5	Opinions About Major Marine Conservation Issues Highly Relevant in Argyll	70
	i) Seal Management	70
	ii) Marine National Parks	73
5	CONCLUSIONS	75
	REFERENCES	77
Appendix 1:	List of Cetacean Species Occurring in the Argyll Region	80
Appendix 2:	Questionnaire Layout and Content	81
Appendix 3:	Detailed Account of Demographic Results	84

ACKNOWLEDGEMENTS

We are extremely grateful to the Heritage Lottery Fund, the Hebridean Whale and Dolphin Trust, Scottish Natural Heritage and Argyll and the Islands Enterprise for funding data collection for this survey.

We are grateful to Penny Hawdon for collecting data on the Isle of Mull.

Our thanks also go to Anna Colbert for kindly proof-reading this report.

Naomi Scott would also like to express her thanks to Dr. Andrew Tyler for the help and advice given to her and Kate A. Howie for her patient help.

Her thanks also go to Dr. David Gilvear, for his helpful advice and encouragement during the initial stages of this project.

Finally she expresses, many, many thanks to her family for their support.

This project is part of the NÀDAIR programme
(Nature And Development in the Argyll Islands Region).



1. INTRODUCTION

1.1 Marine Environmental Awareness in Scotland

A study commissioned by Scottish Natural Heritage which was carried out throughout Scotland, assessed attitudes and aspirations held in regard to the marine environment (Cobham Resource Consultants, 1996). Two groups were studied, firstly, 1020 members of the general public and secondly, approximately 500 participants with direct involvement in the marine environment. Over-fishing, sewage pollution, marine litter and oil pollution were seen to be issues of concern. The majority of participants believed marine wildlife to be under threat or under-protected and support was voiced for the establishment of areas of special protection for marine wildlife.

The following dissertation represents a more in-depth study of the Argyll region, which has not to date been targeted specifically by surveys on marine environmental awareness.

1.2 Aim of the Study

The aim of this study is to focus specifically on the level of marine environmental awareness in the region of Argyll. Emphasis is placed upon cetaceans (whales, dolphins and porpoises) and conservation priority species.

1.3 Why the Argyll Region?

The area of Argyll was chosen since the communities of Argyll are invariably located in close proximity to the sea and are largely either directly or indirectly dependent upon the surrounding marine environment economically. This may either be through fishing and aquaculture industries or through tourism, the sea and its associated wildlife providing major

attractions to holidaymakers.

The marine environment of the Argyll region is one of substantial species richness, not least in terms of the 19 species of cetacean which have been recorded in the area (Shrimpton and Parsons, 2000) and it has been established that whale watching represents an increasingly valuable component of the local economy (Warburton, 1999; Warburton et al., 2001).

Seals also occur in the area and these are an added attraction, as substantiated by many of the comments made by participants in this survey. Argyll also harbours other marine species and marine and coastal habitats of high national and international conservation priority, such as maerl (coralline algae) beds.

The NADAIR (Nature And Development in the Argyll Islands Region) Project will begin a large marine education and interpretation programme in the Argyll area in September of this year (2001). The marine aspects of the NADAIR project are being conducted by the Hebridean Whale and Dolphin Trust and are being funded by the Heritage Lottery Fund, Scottish Natural Heritage and Argyll and the Islands Enterprise. This survey will provide baseline information on the levels of marine environmental awareness in the Argyll region before the project is launched. A second study will later be conducted for comparative purposes.

1.4 The Region of Study

Argyll is located in the south-west of Scotland and encompasses the Mull of Kintyre and a number of islands, the largest being Mull, Islay and Jura. The population of Argyll is approximately 69,500 (Highlands and Islands Enterprise, 2001), the area of the region being 693,720 ha (Highlands and Islands Enterprise, 2000).

Fishing, fish-farming and agriculture (with 69.4% of land in Argyll and Bute being

under agricultural use in 1994 (Scottish Executive, 1994)) are all major components of the economy in the area. In 1999, 6% of the working population in Argyll and Bute were employed in agriculture, forestry and fishing (Scottish Executive, 2001).

Tourism is also vitally important; for example, Islay receives many visitors to its whisky distilleries and ecotourism provides a large amount of income throughout Argyll. Whale watching alone is thought to bring around 241,952 tourists to western Scotland per year, creating an estimated direct annual income of around £1,767,971 (Warburton et al., 2001).

1.5 Questions to be Addressed in the Study

1.5.1 The Level of Awareness of Cetaceans in Argyll

Examples of cetacean species found in the waters of Argyll are: harbour porpoise, *Phocoena phocoena*, Risso's dolphin, *Grampus griseus*, common dolphin, *Delphinus delphi*, bottlenose dolphin, *Tursiops truncatus*, killer whale, *Orcinus orca*, sperm whale, *Physeter macrocephalus* and minke whale, *Balaenoptera acutorostrata*. A full list of all 19 species occurring in the Argyll area is given in Appendix 1.

Given the increase in importance of whale watching to the economy of Argyll (Warburton 1999; Warburton et al. 2001), the level of awareness of these animals is of vital importance. Not only then do the cetaceans stand to benefit from awareness of their presence in the area in terms of conservation but the inhabitants of Argyll will also profit.

1.5.2 Awareness of Threats to Argyll Cetaceans

Questions were included in the survey to assess the level of knowledge and awareness regarding threats to cetaceans in Scottish waters. Cetaceans such as common dolphins are known to be caught as by-catch, becoming entangled in nets during fishery operations (Morizur et al., 1999). Cetaceans may be involved in collisions with shipping (George et al.,

1994; Laist et al., 2001). Collisions often prove fatal, especially those involving larger vessels or those travelling at high speed. In some areas, one-third of all stranded fin and right whales seem to have been involved in such collisions (Laist et al., 2001).

Scottish waters are by no means free from pollution. Entanglement in marine litter is also a problem for cetaceans. There is, for example, photographic evidence as shown in displays by the Hebridean Whale and Dolphin Trust, of minke whales entangled in plastic strapping bands with associated injuries. Ingestion of marine litter can lead to digestive system problems. Although the full extent of this problem remains unknown, it is considered to be a cause for concern (Shrimpton and Parsons, 2000).

Measurements of the concentrations of the radionuclide Technetium-99, found in seawater and the seaweed *Fucus vesiculosus* from the Irish Sea were found to correspond to discharges from the Sellafield nuclear fuel reprocessing plant (Smith et al., 2001). Higher levels of the radionuclide were detected along the southern Scottish coastline and although concentrations were found to decrease rapidly further away from shore regions (Leonard et al., 1997), the fact that Technetium-99 remains suspended in the water column may be of concern in regard to cetaceans, since this would increase the chances of the radionuclide being taken up by cetacean prey species (Shrimpton and Parsons, 2000). However, no study of the levels of radionuclides within cetaceans has been undertaken.

Land-based pollution sources may include industrial outputs, run-off containing hydrocarbons from urban areas and fertilisers from agricultural sources. It is very difficult to estimate the extent to which this poses a threat to cetaceans.

Pollution from sewage discharges into coastal waters is a matter of concern since many pathogens occurring in sewage have been found in cetaceans, although no connection has been established between the occurrence of these pathogens and symptoms in cetaceans (Parsons, 1997).

A large amount of oil-related marine traffic frequents waters west of Scotland, posing the threat of a potentially disastrous pollution incident. Oil or diesel pollution may also arise from discharges of fuel from recreational, fishing and passenger vessels.

Fish farming is a concern in regard to its possible effects on cetaceans given the rapid expansion of the industry in the west of Scotland in recent times. There are numerous facets of fish farming giving rise to this concern, one of which is the use of antibiotics. Antibacterial resistant bacteria were found to occur in higher numbers below fish farms using greater amounts of antibiotic substances such as oxytetracycline (Herwig et al., 1997). Further concerns are: chemicals used as anti-foulants and to control parasites, organic waste from farms (faecal material and uneaten food) and the use of acoustic deterrents for seals which produce underwater noise pollution (reported by Shrimpton and Parsons, 2000).

Acoustic disturbances also occur as a result of military activity (Croll et al., 2001), for example from sonar-testing, which may cause serious disturbances to cetaceans, possibly causing mass strandings (Frantzis, 1998).

Coastal quarrying operations cause acoustic disturbances during blasting procedures and shock waves from explosives underwater are known to cause hearing damage, severe injury or death of marine mammals (Richardson et al., 1995). Oil exploration and associated seismic surveys are of concern in terms of noise pollution (Croll et al., 2001), as has been publicised by Greenpeace and other environmental groups.

The reduction in availability of prey is likely to affect the distributions of cetacean populations and if prey is reduced over a long period of time, this may affect population numbers. Trawling and dredging operations have been compared to forest clearcutting operations in that they decimate the seabed, reducing structural and species diversity, recovery taking decades or more (Watling and Norse, 1998). Climate change may also cause changes in distribution, especially in the event of ocean current changes but is unlikely to

pose a serious threat.

It is unlikely that whale-watching is a significant threat to the cetaceans of the waters of western Scotland, since there is a probably a high degree of interest in and awareness of cetaceans amongst tour operators. The Hebridean Whale and Dolphin Trust distributes information to marine tour operators in order to help ensure that any disturbances from whale-watching are minimised (HWDT, 2000).

Although the commercial hunting of cetaceans is illegal within the UK, whaling is carried out in Norwegian waters. Norwegian whalers may even enter Scottish waters (Parsons et al., 2000).

1.5.3 Awareness in Regard to the Protection of Argyll Cetaceans

Commercial trade of cetacean species is illegal within the UK by way of the Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES). The Bonn Convention, also of relevance to the UK, has allowed the implementation of the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS). The intention of this agreement is to promote the following: habitat conservation and management; surveys and research; the reporting and analysis of cetaceans caught as by-catch and stranded specimens; enforcement of legislation in protection of cetaceans; and the distribution of information to the public and fishermen to encourage reporting of dead cetaceans. However, although the Baltic and North Sea are covered by this agreement, waters to the west of Scotland are not as yet specifically provided for (Convention on the Conservation of Migratory Species of Wild Animals, 1991).

The Wildlife and Countryside Act of 1981 means that the intentional or avoidable harm or disturbance of cetaceans is illegal, although there can be difficulties in proving that harm or disturbance to cetaceans is carried out with intent. A similar problem exists with the

Habitats Directive implemented in 1992, since only “deliberate” harm is accounted for. Efforts within the Wildlife and Countryside Act and the Habitats Directive to protect cetacean breeding and resting areas are furthermore crippled by the fact that such areas are difficult to identify (Shrimpton and Parsons, 2000).

Under the United Nations Convention on Biological Diversity, cetaceans are regarded as conservation priority species and as a result of this cetaceans are included in some UK National Biodiversity Action Plans. The Local Biodiversity Action Plans for Argyll and Bute include the harbour porpoise, minke whale and bottlenose dolphin specifically as well as all other cetaceans. It is, for example, stipulated within the plan for Argyll and Bute that, in liaison with leading agencies, discharges into coastal waters should be reduced and disturbances, such as acoustic disturbances, should be minimised (Joint Nature Conservation Committee, 2001).

Although the legislation already in place affords some degree of protection to cetaceans occurring in Scottish waters, the UK does not at present have specific legislation focused towards the protection of cetaceans, as is the case with the USA, New Zealand and Australia. The legislation currently implemented in the UK is very general in nature and difficult to enforce and it has been suggested that a cetacean protection Act for Scotland would be of benefit (Shrimpton and Parsons, 2000). This survey will determine whether the population of Argyll agrees.

1.5.4 Level of Awareness of Other Marine Species Considered to be a National Conservation Priority

Other threatened marine species which occur in Scottish waters include cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), basking shark (*Cetorhinus maximus*), leatherback turtle (*Dermochelys coriacea*), common skate (*Raja batis*), orange roughy

(*Hoplostethus atlanticus*) and oyster (*Ostrea edulis*). These species were used in this survey as examples to gauge peoples' knowledge of local marine conservation issues.

Cod is of great importance economically, landings from the Scottish fleet being valued at about 5 million pounds annually. However, the stock levels are today considered to be outside safe biological limits as defined by the International Council for the Exploration of the Seas (ICES) and many fish are harvested before reaching maturity (Fisheries Research Services, 2001a). Concern also surrounds the state of haddock stocks, with mortality due to fishing being greater than the precautionary level. As with cod, pressures on haddock stocks are great and it is one of the main species being caught by fishermen on the west coast of Scotland, catches bringing in approximately 6 million pounds annually (Fisheries Research Services, 2001b).

The profile of the basking shark has been raised in recent times, especially by the Marine Conservation Society which began the Basking Shark Watch Project in 1987 (Marine Conservation Society, n.d.). The species is also listed in the Local Biodiversity Action Plan for Argyll and Bute (Argyll and Bute Local Biodiversity Partnership, 2000). It is a migratory species occurring in temperate areas, usually being observed in UK waters from April to September. This species shows a slow growth rate and a low rate of reproduction, reaching maturity late in life. These characteristics mean that this species is potentially extremely vulnerable to exploitation (Marine Conservation Society, n.d.). In the UK, deliberate killing of basking sharks is an offence under the Wildlife and Countryside Act of 1981 (Joint Nature Conservation Committee, 2001).

The leatherback turtle, *Dermochelys coriacea*, is occasionally recorded in UK waters, most sightings occurring to the west of Scotland. Their arrival is associated with migratory movements, although those which stray so far north as the UK are most likely to be accidental arrivals. Their profile has been increased in recent times and reports of sightings

have increased. Guidelines have been produced in recent years by such organisations as Scottish Natural Heritage in order to advise fishermen and the general public on how to deal with stranded turtles or turtles entangled in fishing gear (Joint Nature Conservation Committee, 2001).

Common skate is, like the basking shark, very vulnerable to over-exploitation due to slow growth and late sexual maturation; individuals can live approximately 50 years and males only become mature at an age of 10 years. Common skate is listed by the International Union for the Conservation of Nature and Natural Resources (IUCN) as endangered; it is now scarce in many areas and has most likely become extinct due to over-fishing in some areas such as the Irish Sea. Even in areas where it is not directly targeted, it is often caught as by-catch. The critical situation of the species has been brought to the attention of anglers, who are encouraged to return caught specimens to the sea and Glasgow Museum has carried out a tagging programme in the Sound of Mull (Joint Nature Conservation Committee, 2001).

The orange roughy is a deep water fish occurring in the Northeast Atlantic. Again, this is a species which is very vulnerable to exploitation, since it matures only slowly and fecundity is also low. Fishing pressure on this species has increased in recent times with greater restrictions being placed on more traditional fisheries but, even in the short time for which this species has been targeted, stocks have become decimated in the west of Scotland. The Marine Conservation Society has attempted to raise the profile of the orange roughy, advising people not to eat this species and to report its occurrence in supermarkets, fishmongers or restaurants (Marine Conservation Society, n.d.).

The native oyster has suffered greatly from over-exploitation, the west of Scotland being one of the species' last refuges. Populations are greatly reduced in the UK and the species is extinct in many areas. The species is listed in the Local Biodiversity Action Plan for Argyll

and Bute (Argyll and Bute Local Biodiversity Partnership, 2000).

1.5.5 Opinions About Major Marine Conservation Issues Highly Relevant in Argyll

i) Seal Management

It is asserted by many fishermen that a cull of seals is necessary since seals cause damage to fish stocks (although any benefits of a seal cull in this regard are unsubstantiated by scientific evidence) and salmon farm nets. However, the welfare and ethical aspect of this issue also has a great amount of support. Furthermore, seals are, like cetaceans, an attraction for tourists and the issue is hence highly controversial. A paradoxical situation exists in that while some MSPs and fishing groups are calling for seal culls to take place, the government is also in the process of designating Special Areas of Conservation for seals, for example, at the Treshnish Isles and Islay. This study aims to assess public opinion in regard to this issue.

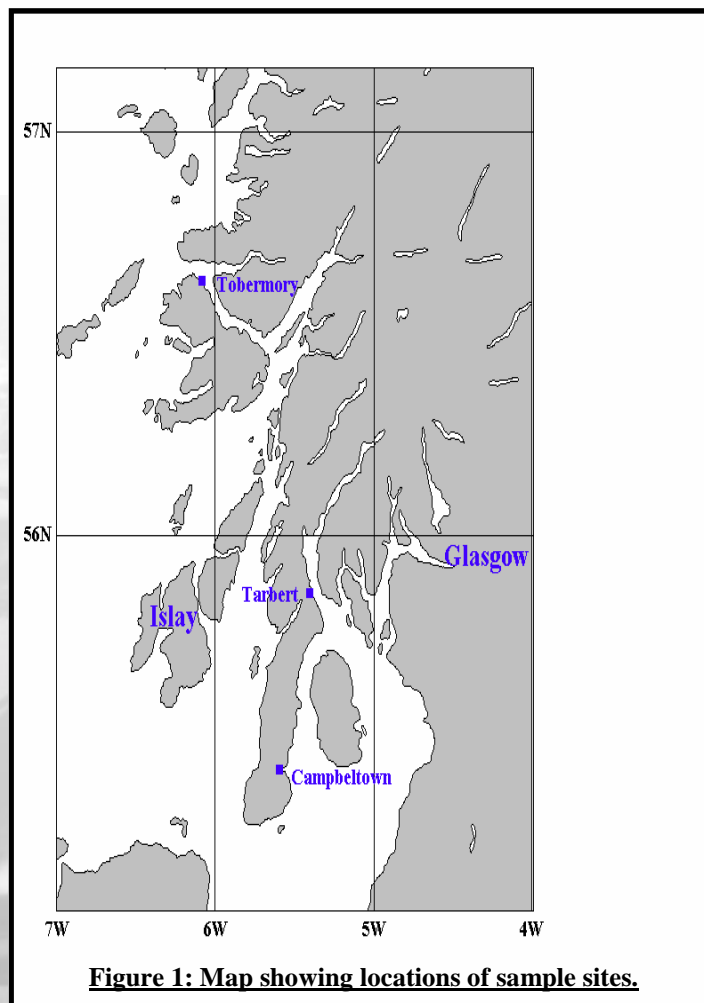
ii) Marine National Parks Legislation

Marine National Parks have been proposed as extensions to existing terrestrial schemes for areas of marine interest in Scotland (Scottish Natural Heritage, n.d.). Marine Park legislation has recently been introduced and there is provision for their introduction although no formal designations have been made as yet. Marine National Parks have generally been found to create some resistance whenever the issue is raised since it creates fears that they may add further hindrance to the already waning fishing industry. However, there is a belief that confusion surrounds the concept of Marine National Parks and what they actually are. This study aims to discover whether there is indeed confusion in regard to this issue and to assess public opinions of Marine National Parks.

2. METHODOLOGY

2.1 Location of Sample Sites

Questionnaires were carried out at 4 sample sites within Argyll, with exactly 50 questionnaires being completed at each. The sample sites were: the island of Islay, (questionnaires being carried out in the villages of Port Charlotte, Bowmore and Port Ellen), Campbeltown, the village of Tarbert and finally Tobermory, on the island of Mull. Questionnaires were also undertaken in the city of Glasgow, in order to provide perspectives from an urban area; 52 questionnaires were completed in Glasgow. The sample locations are shown in Figure 1.



2.2 Questionnaire Methods

The following false examples were included in questions 12 and 17 to enhance the assessment of participants' knowledge: Bryde's whale, gray whale, bull shark and sealion. These species do not occur in Scottish waters.

All questionnaires on Islay and in Campbeltown, Tarbert and Glasgow were carried out by the same person. Questionnaires were carried out by another person in Tobermory but care was taken to ensure that questions were posed in the same way. The layout and content of the questionnaire is shown in Appendix 2. In order to allow the questionnaire to be conducted more quickly and with greater ease, cards were presented to participants, listing the various elements and options of questions 6, 10, 12, 13, 16, 17 and 21. For question 11, a card showing 2 good quality photographs of each of the 4 species was produced, together with labels showing the lengths of the animals to inform the participant of scale. For question 17, a definition of "threatened" was given to avoid confusion and inconsistencies.

Care was taken not to prompt answers from participants, or to influence answers. Information was not provided where this may have resulted in participants' answers being influenced. In question 9, participants were asked to name the top 3 threats to the marine environment of Argyll. Where participants gave "pollution" as a threat, they were asked if they could be more specific and state which type or types of pollution they saw as being a threat.

2.3 Methods of Data Analysis

All answers were given corresponding codes. Data was then analysed where appropriate using the Chi-square statistical test within SPSS. Demographic data was analysed using the Chi-square test within Minitab. Problems in obtaining valid Chi-square tests were sometimes encountered due to low numbers within different groups. Whether tests were valid or not is

stated clearly in the results section.

Factors used in Chi-square tests were as follows: gender; year of birth; whether the participants were residents of Argyll or not; occupation category; the number of marine-related activities in which the participants were involved; the number of charitable environmental organisations of which participants were members; the importance of marine conservation issues to participants; sample location. These factors were compared with participants' answers as follows: number of correct answers regarding the number of cetacean species occurring in the waters of western Scotland; number of correct answers regarding the photo-identification of cetaceans; number of correct answers regarding the occurrence of cetacean species in the Argyll region; whether or not participants were aware of Japan / Norway's whaling activities; number of correct answers regarding the presence of threatened species in Scotland's waters; and participants' opinions in regard to seal culling.

In each case, the null hypothesis is that there is no similarity between the factor and participants' answers to the question. The alternative hypothesis is that there is similarity between the factor and participants' answers to the question. The significance level was 0.05.

Where necessary categories were united, ensuring that groups remained sensible / meaningful. Where the groupings are not self-evident, they are detailed below:

- For purposes of analysis, year of birth was divided into the following groups:
 - 1911-1930
 - 1931-1950
 - 1951-1970
 - 1971-1990
- Occupational groups were formed as follows:
 - Not employed (including: retired, housewife and student);
 - Educational professional / employed in tourist industry / fisherman / salmon farmer / other user of the marine environment;
 - Other
- Number of activities was divided as follows:

- No activities
 - 1 activity
 - 2 activities
 - 3 or more activities
- Number of charitable environmental organisations was divided as follows:
 - No organisations
 - 1 or more organisations
 - Importance of marine conservation issues was divided as follows:
 - Important (including the categories “very important” and “important”)
 - Unimportant (including the categories “unimportant” and “very unimportant”)
 - Opinions regarding seal culling were divided as follows:
 - Agree (including “strongly agree” and “agree”)
 - Disagree (including “strongly disagree” and “disagree”)
 - In the case of questions regarding the presence of cetacean species in Argyll, the presence of threatened species in Scotland’s waters and the photo-identification of cetacean species, “don’t know” was categorised as “incorrect”.

2.4 Limitations

Probably the greatest limiting factor in conducting the questionnaire was the variability in the time that participants took in its completion. While some participants took only 10 minutes, others took up to half an hour to complete the questionnaire, especially those who had many or strong opinions to express. Time and funding were of course necessary limitations to the number of sample sites and questionnaires which could be completed.

3. RESULTS

This section presents the results of the questionnaire. The data is derived from a total of 252 questionnaires, each containing 25 questions. Therefore report represents the study of a total of 6,300 questions, many of which contained multiple elements. The first section summarises the demographic data, results of Chi-square tests are given where tests were found to be valid (tests were carried out using groupings as described in section 2.3 where appropriate). Further information can be found in Appendix 3. The second section details the answers obtained from the participants.

3.1 Demographic Results

At each site male participants outnumbered female participants, in Glasgow, where 75% of participants were male. A Chi-square test confirmed that significant differences were present in the gender ratios at different sample sites. Most participants were found to have been born in the 1950-1961 period, although there were rather more younger participants in the Tobermory sample.

The resident / non-resident ratio was roughly equal at most sample sites except in Tobermory, where there were fewer residents and Campbeltown, where residents formed the majority. A Chi-square test proved that similarity existed between sample sites in terms of ratios of residents / non-residents. The general pattern was for most participants to be locals and with numbers generally becoming progressively smaller, some were resident elsewhere in Scotland, elsewhere in the UK, elsewhere in Europe, in the USA, or in other regions of the world. The most popular reason which tourists gave for being in Argyll / Glasgow was “holiday / leisure”. Other reasons were: “working in the area”, “social visit” and “shopping”, although not all reasons were represented at all sample sites.

A Chi-square test showed that significant differences existed between sites regarding the number of participants of different occupational groups. Not all occupation categories were represented at all sites.

No participants thought that issues of marine conservation were “very unimportant”. The highest percentage of participants choosing “unimportant” was found in Tobermory. Although figures for this category were also high in Campbeltown, this site also showed the highest percentage choosing the “very important” category. The lowest percentage of participants choosing this category was found in Tarbert.

The highest percentage of participants who were not members of any charitable environmental organisations occurred in Campbeltown, the lowest in Tobermory. A Chi-square test showed that there was similarity between sample sites.

Most participants took part in 1 marine-related activity. Campbeltown was found to be slightly different in that no participants took part in more than 4 activities. A Chi-square test found that similarity existed between sample sites regarding the numbers of participants taking part in different numbers of activities.

3.2 Participants' Answers

3.2.1 Knowledge of the Number of Cetacean Species Occurring in the Waters of Western Scotland

Figure 2 shows the percentages of participants of the entire sample choosing each of the different categories regarding numbers of cetacean species occurring in waters west of Scotland. Figures 3 to 7 show this information for each sample site separately. “Don’t know” was the most popular answer with 27% (see Table 1) of all participants. A high percentage, 25.8%, chose the category “6-10”. Whilst none thought that there were no cetacean species, there was a strong tendency for participants to be of the opinion that there are fewer species

than there actually are. This was especially the case in Campbeltown, where the highest percentage of participants answered “1-5”.

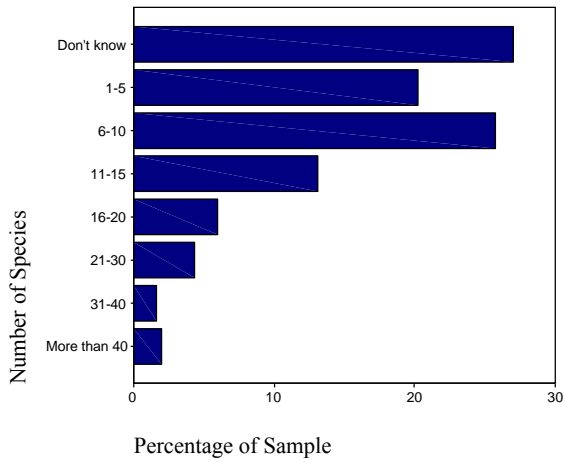


Figure 2: Answers regarding the number of cetacean species (entire sample)

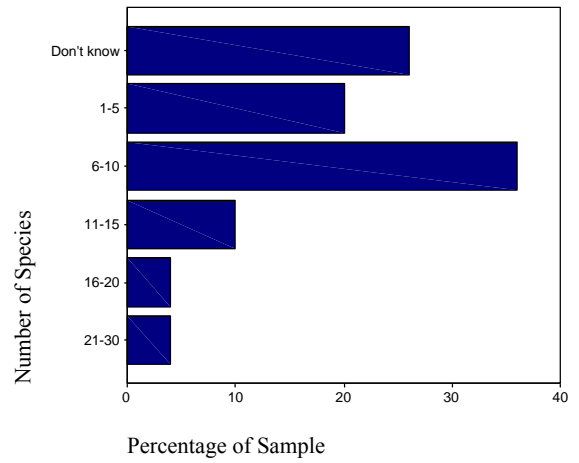


Figure 3: Answers regarding the number of cetacean species (Islay sample)

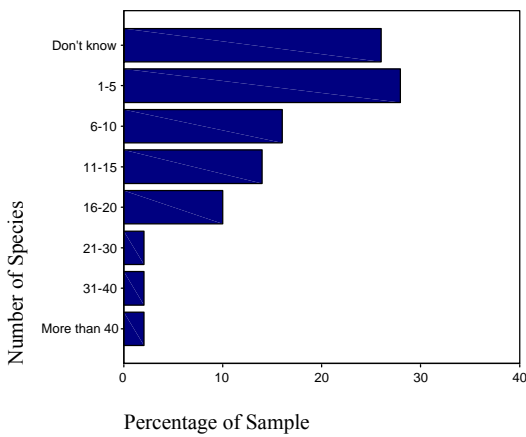


Figure 4: Answers regarding the number of cetacean species (Campbeltown sample).

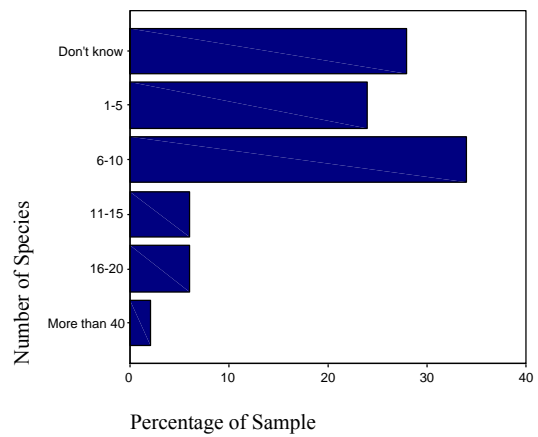


Figure 5: Answers regarding the number of cetacean species (Tarbert sample).

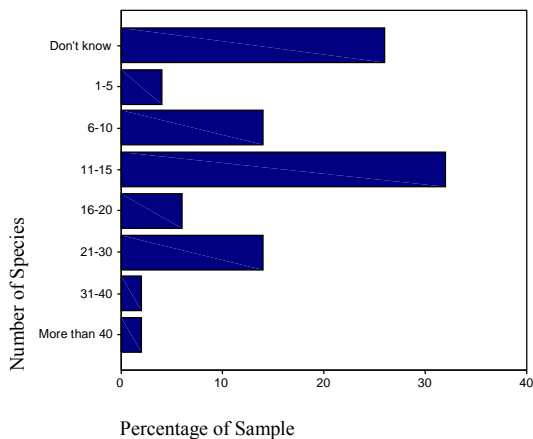


Figure 6: Answers regarding the number of cetacean species (Tobermory sample).

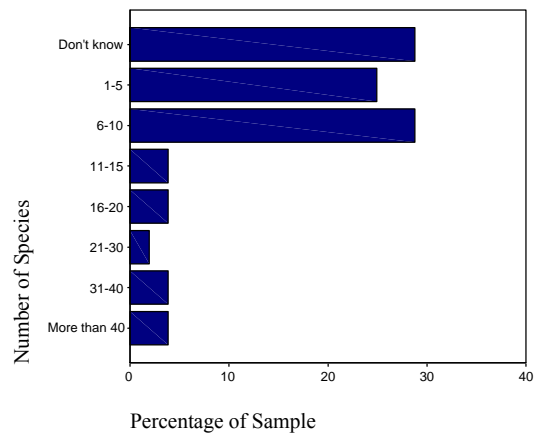


Figure 7: Answers regarding the number of cetacean species (Glasgow sample).

Table 1: Answers regarding the number of cetacean species in the waters of western Scotland (figures show percentages of participants within each sample).

Sample Site	None	1-5	6-10	11-15	16-20	21-30	31-40	More than 40	Don't Know
All	0	20.2	25.8	13.1	6.0	4.4	1.6	2.0	27.0
Islay	0	20.0	36.0	10.0	4.0	4.0	0	0	26.0
Campbeltown	0	28.0	16.0	14.0	10.0	2.0	2.0	2.0	26.0
Tarbert	0	24.0	34.0	6.0	6.0	0	0	2.0	28.0
Tobermory	0	4.0	14.0	32.0	6.0	14.0	2.0	2.0	26.0
Glasgow	0	25.0	28.8	3.8	3.8	1.9	3.8	3.8	28.8

The Chi-square test was carried out to analyse the number of correct answers (answers within the category 21-30). The results are summarised in Table 2.

Table 2: Chi-square results for the number of correct answers regarding the number of cetacean species in the waters of western Scotland.

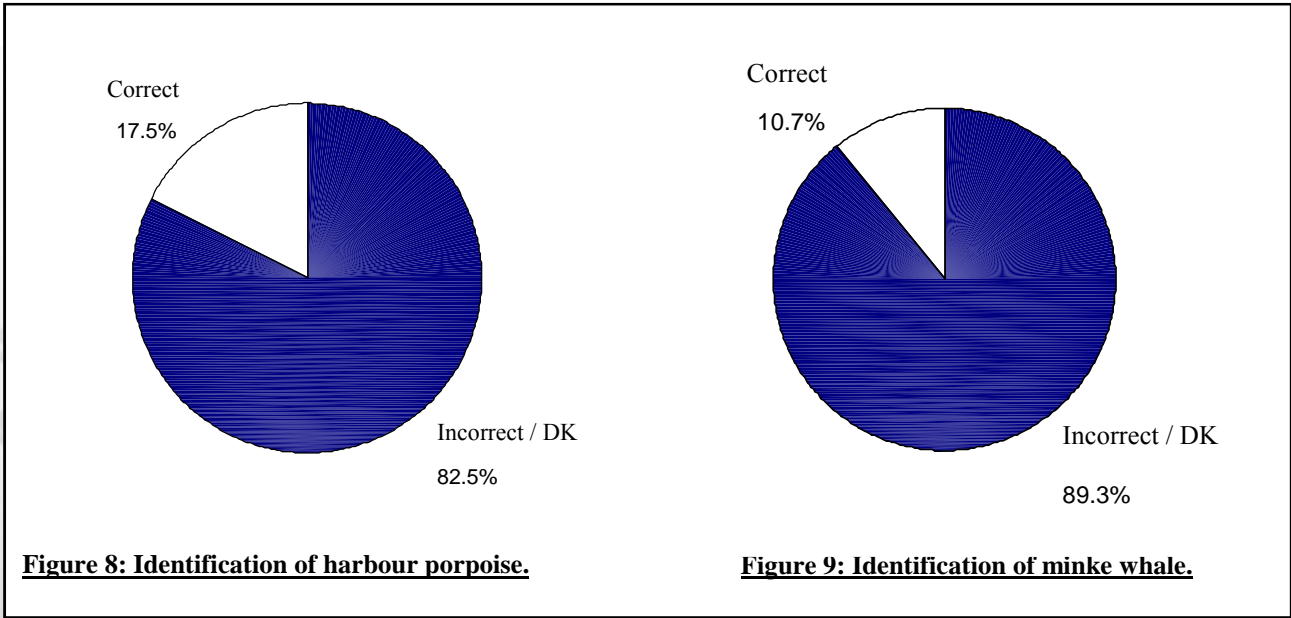
Factor	Chi-square Valid / Invalid	Significance Level
Gender	Valid	0.689
Year of Birth	Invalid	-
Resident of Argyll?	Valid	0.880
Occupation Category	Invalid	-
Number of Activities	Invalid	-
Number of Organisations	Valid	0.073
Importance of Marine Conservation Issues	Invalid	-
Location	Invalid	-

For all tests which were valid the significance level was found to be above 0.05, hence the null hypothesis that there is no similarity between the various factors and the number of correct answers cannot be rejected.

3.2.2 Photo-Identification of Cetacean Species

Figures 8 to 11 show percentages of participants within the entire sample who identified the different species correctly. The bottlenose dolphin was most commonly correctly identified, being correctly named by 19% of participants, followed closely by the harbour porpoise at 17.5%. The minke whale and common dolphin were less often correctly identified, especially the common dolphin, correctly named by only 7.1%.

Figure 12 and Table 3 show the percentages of participants at each sample site who were able to give one or more correct answers. It can be seen that Tobermory has the best result with over half of the participants being able to identify one or more species correctly. Campbeltown showed the lowest percentage with 18%, closely followed by Glasgow with 19.2% and Tarbert with 22%.



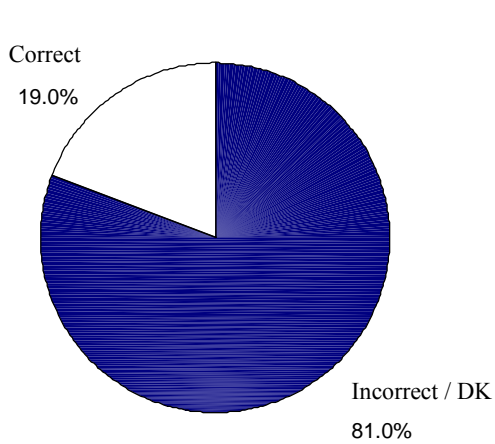


Figure 10: Identification of bottlenose dolphin.

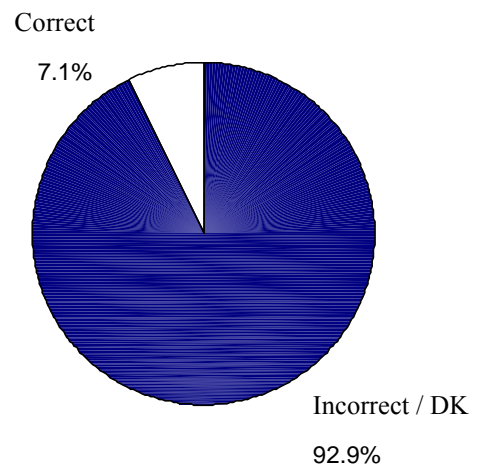


Figure 11: Identification of common dolphin.

Table 3: Participants' answers to photo-identification (figures show percentages of participants within each sample).

Sample Site	1 or More Correct Answers	Incorrect / Don't Know
All	30.2	69.8
Islay	40.0	60.0
Campbeltown	18.0	82.0
Tarbert	22.0	78.0
Tobermory	52.0	48.0
Glasgow	19.2	80.8

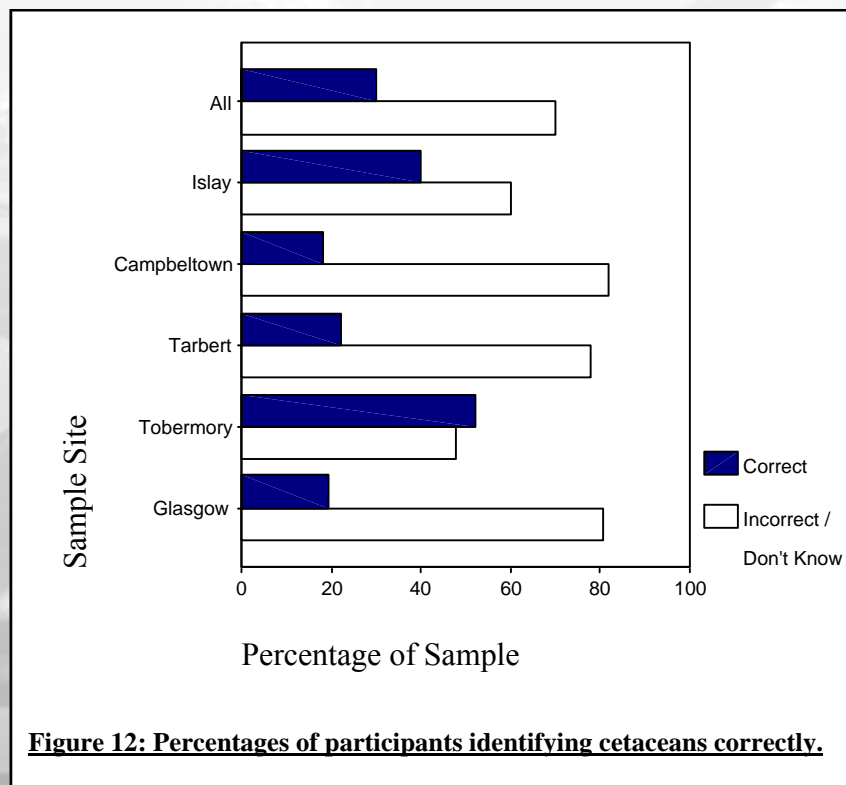


Figure 12: Percentages of participants identifying cetaceans correctly.

The Chi-square test was carried out to analyse the number of correct answers. The results are summarised in Table 4.

Table 4: Chi-square results for the number of correct answers regarding the photo-identification of cetacean species.

Factor	Chi-square Valid / Invalid	Significance Level
Gender	Valid	0.243
Year of Birth	Valid	0.003
Resident of Argyll?	Valid	0.880
Occupation Category	Valid	0.018
Number of Activities	Valid	0.039
Number of Organisations	Valid	0.049
Importance of Marine Conservation Issues	Valid	0.068
Location	Valid	0.00

As seen in Table 4 significant results were obtained for year of birth; occupation category, number of activities, number of organisations and location. Hence the null hypothesis that no similarity exists between these factors and the number of correct answers given by participants within the groups is rejected.

As shown in Table 5 there was a tendency for younger participants to perform better in identifying 1 or more species correctly.

Table 5: Answers to photo-identification (figures show percentages of participants within each year of birth category).

Year of Birth Category	Percentage of Participants Correctly Identifying One or More Species Correctly
1911-1930	7.1
1931-1950	17.6
1951-1970	37.1
1971-1990	39.7

20% of the group “not employed” identified one or more of the species correctly but the percentage was higher at 32.3% for the group containing educational professionals, those working in the tourist industry and in marine-related work. However, the highest percentage was achieved by those within the “other” category, at 37.8%. Percentages are detailed in Table 6.

Table 6: Answers to photo-identification (figures show percentages of participants within each occupational category).

Occupational Category	Percentage of Participants Correctly Identifying One or More Species Correctly
Not employed	20.0
Education Professional / Working in Tourist Industry / Fisherman / Salmon Farmer / Other User of the Marine Environment	32.3
Other	37.6

On the whole it is found that groups taking part in higher numbers of marine-related activities gave higher percentages of correct identifications, with the exception of those taking part in 1 activity. Percentages are summarised in Table 7.

Table 7: Answers to photo-identification (figures show percentages of participants within each category of numbers of marine-related activities).

Number of Activities	Percentage of Participants Identifying One or More Species Correctly
0	27.0
1	23.2
2	28.8
3 or More	45.5

42.9% of those participants who were members of 1 or more charitable environmental organisations correctly identified 1 or more cetacean species, as opposed to only 27.6% of those who were members of no organisations. These results are summarised in Table 8.

Table 8: Answers to photo-identification (figures show percentages of participants within each category of organisation number).

Number of Organisations	Percentage of Participants Correctly Identifying One or More Cetacean Species
0	27.6
1 or More	42.9

An analysis of the variations in numbers of correct answers in terms of location is summarised in Table 9. The location which achieved the highest percentage of correct answers was Tobermory, with 52% of participants identifying 1 or more species correctly. The lowest percentages are shown by Campbeltown and Glasgow, with 18% and 19.2% respectively.

Table 9: Answers to photo-identification (figures show percentages of participants within each sample).

Location	Percentage of Participants Correctly Identifying One or More Species
Islay	40.0
Campbeltown	18.0
Tarbert	22.0
Tobermory	52.0
Glasgow	19.2

The results gave no indication of any similarity between gender, whether participants are residents of Argyll or the importance of issues of marine conservation to participants and their ability to identify cetaceans during the photo-identification.

3.2.3 Participants Knowledge of the Occurrence of Cetacean Species in the Argyll Region

Figure 13 illustrates the answers given by all participants regarding the occurrence of cetacean species in Argyll. All species actually occur in the waters of Argyll with the exception of the gray whale and Bryde's whale. Table 10 allows examination of the exact percentages of participants.

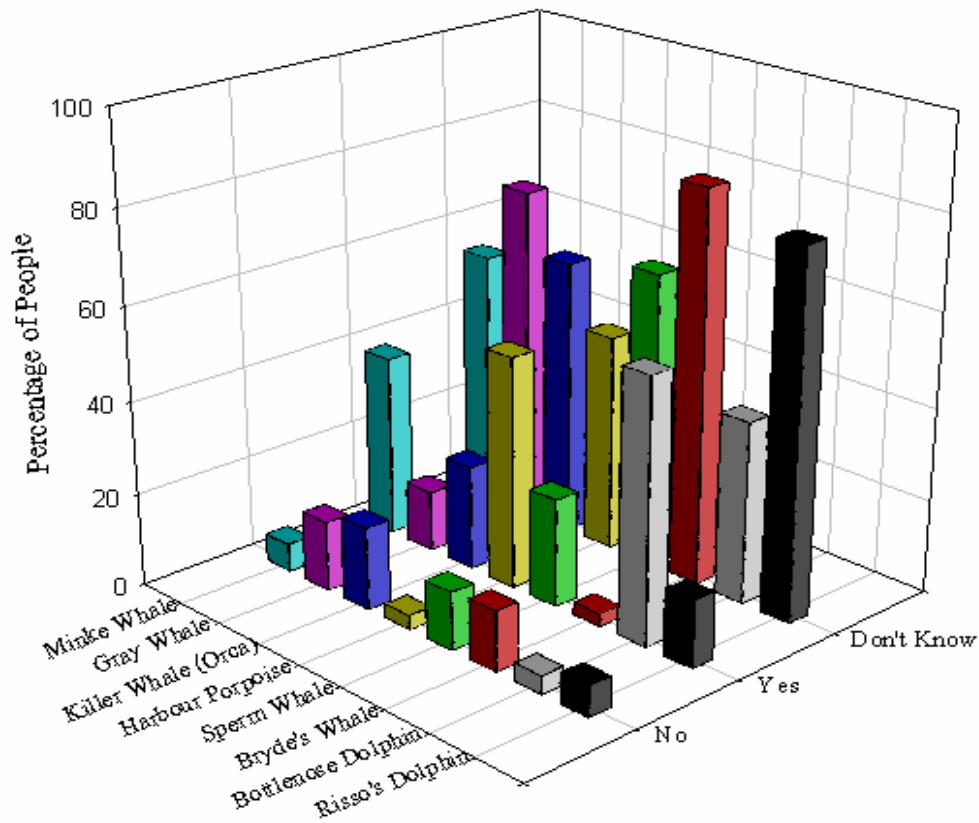
The answer “don’t know” was more common than “yes” or “no” for all species apart from the bottlenose dolphin and harbour porpoise, which appear to be the better known species. The regularity of the answer “don’t know” was very high concerning Bryde’s whale. The answer “no” was also more common than “yes” for this species; the only other species for which this is the case is for the gray whale, which also does not occur in Scottish waters. Risso’s dolphin appears to be a little-known species and whilst there was a high disparity between “yes” and “no” answers for the bottlenose dolphin, harbour porpoise and minke whale, answers were more evenly split for the killer whale and sperm whale, suggesting that these are not so well known.

Table 10: Participants’ perceptions of the occurrence of cetacean species in the waters of Argyll (figures show percentages of participants within each species).

Species	Occurrence (Percentage of Participants)		
	Yes	No	Don’t Know
Minke whale	39.3	6.0	54.8
Gray whale	13.1	15.1	71.8
Killer whale (orca)	22.6	17.9	59.5
Harbour porpoise	50.0	3.2	46.8
Sperm whale	23.5	12.7	63.7
Bryde’s whale	2.8	13.1	84.1
Bottlenose dolphin	56.7	4.0	39.3
Risso’s dolphin	14.7	6.7	78.6

The Chi-square test was carried out to analyse the number of correct answers to the questions regarding the presence of the various species of cetacean in Argyll waters. All tests were found to be valid, however, results were not significant for all species / factors. The significant results are summarised in Table 11.

Figure 13: Participants' awareness of the presence / absence of cetacean species in the waters of Argyll (entire sample).



It was found that there was no gender difference in participants' awareness of the occurrence of cetacean species in Argyll waters. In terms of year of birth, results showed that more younger participants were aware of the presence of the bottlenose dolphin in the waters of Argyll. These results are summarised in Table 12. However no indication was given in terms of differences in participants' awareness of the occurrence of any of the other species and age.

For certain species it was found that a higher percentage of residents of Argyll than other participants showed awareness of the presence or absence of the species in local waters. Table 13 summarises the results. However no such findings were established for Risso's dolphin, Bryde's whale or the sperm whale.

Table 11: Significant Chi-square results for the number of correct answers regarding the presence of cetaceans in Argyll waters.

Factor	Species for which Test Significant (Significance Level)
Gender	None
Year of Birth	Bottlenose Dolphin (0.041)
Resident of Argyll?	Bottlenose Dolphin (0.037) Harbour Porpoise (0.031) Killer Whale (0.026) Gray Whale (0.020) Minke Whale (0.033)
Occupation Category	None
Number of Activities	Risso's Dolphin (0.036) Bottlenose Dolphin (0.002) Sperm Whale (0.004) Harbour Porpoise (0.000) Killer Whale (0.018) Minke Whale (0.004)
Number of Organisations	Risso's Dolphin (0.000) Bottlenose Dolphin (0.014) Bryde's Whale (0.024) Harbour Porpoise (0.018) Killer Whale (0.002) Minke Whale (0.003)
Importance of Marine Conservation Issues	Bottlenose Dolphin (0.000) Sperm Whale (0.015) Harbour Porpoise (0.000)
Location	Risso's Dolphin (0.000) Bottlenose Dolphin (0.002) Bryde's Whale (0.012) Harbour Porpoise (0.012) Killer Whale (0.000) Minke Whale (0.000)

Table 12: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each year of birth category).

Year of Birth Category	Percentage of Participants Aware of the Occurrence of the Bottlenose Dolphin in Argyll Waters
1911-1930	28.6
1931-1950	51.4
1951-1970	59.0
1971-1990	67.2

Table 13: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each category according to whether they are resident in Argyll or elsewhere).

Percentage of Participants Aware of the Occurrence / Absence of Each Species					
	Bottlenose Dolphin	Harbour Porpoise	Killer Whale	Gray Whale	Minke Whale
Resident	64.2	57.8	29.4	21.1	46.8
Non-Resident	51.0	44.1	17.5	10.5	33.6

On the whole it was demonstrated that participants of groups taking part in higher numbers of activities were more aware of the presence of different cetacean species in Argyll waters. The results are shown in Table 14. No such findings were established, however, for correct answers given in regard to Bryde’s whale or the gray whale.

Table 14: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each category according to the numbers of marine-related activities in which they are involved).

Number of Activities	Percentage of Participants Aware of the Occurrence / Absence of Each Species					
	Risso’s Dolphin	Bottlenose Dolphin	Sperm Whale	Harbour Porpoise	Killer Whale	Minke Whale
0	7.9	44.4	12.7	30.2	15.9	23.8
1	11.0	53.7	24.7	43.9	19.5	40.2
2	17.3	53.8	17.3	61.5	19.2	38.5
3 or More	25.5	78.2	40.0	70.9	38.2	56.4

Those participants who were members of 1 or more environmental charities were more aware of the presence or absence of different cetacean species. The results are summarised in Table 15. No such findings were established, however, in the cases of the sperm whale or the gray whale.

Table 15: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each category according to number of organisations).

Number of Organisations	Percentage of Participants Aware of the Occurrence / Absence of Each Species					
	Risso's Dolphin	Bottlenose Dolphin	Bryde's Whale	Harbour Porpoise	Killer Whale	Minke Whale
0	10.5	53.3	11.0	46.7	19.0	35.2
1 or More	35.7	73.8	23.8	66.7	40.5	59.5

Those participants who considered issues of marine conservation to be very important or important to them showed a greater awareness of the presence of certain cetacean species in the waters of Argyll than those who felt such issues were unimportant. The results are summarised in Table 16. Significant results were obtained only for the harbour porpoise, sperm whale and the bottlenose dolphin.

Table 16: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each category according to importance of marine conservation issues).

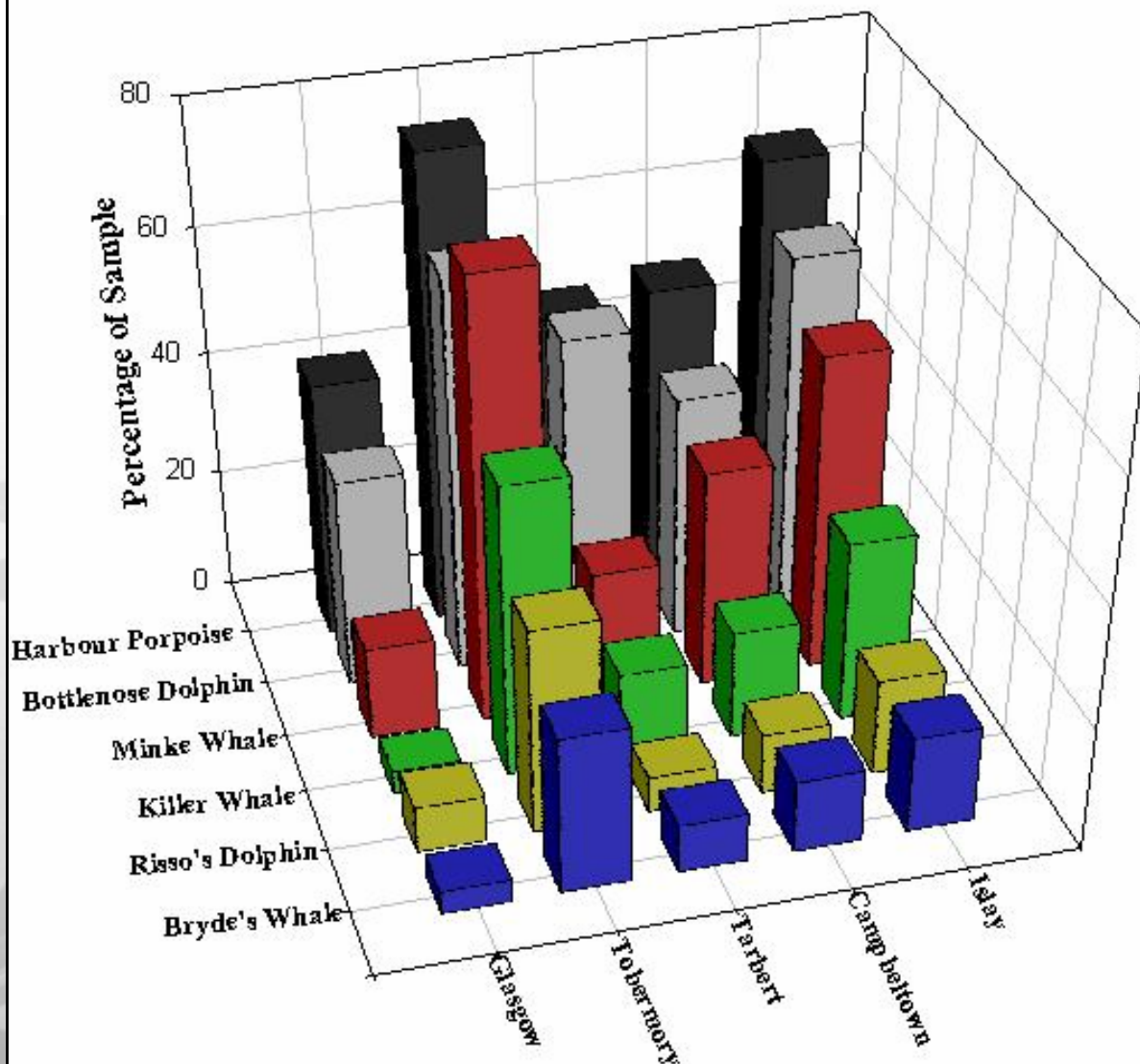
Importance of Marine Conservation Issues	Percentage of Participants Aware of the Occurrence / Absence of Each Species		
	Harbour Porpoise	Sperm Whale	Bottlenose Dolphin
Important / Very Important	53.4	25.3	59.8
Unimportant / Very Unimportant	5.6	0	16.7

Participants from the Tobermory sample were found to be more aware of the presence / absence of cetacean species than participants from other areas. A large percentage of participants in Islay also gave correct answers, whilst the lowest percentages of correct answers were given by Glasgow and Tarbert participants. These results are summarised in Table 17 and Figure 14. No significant results were found for the sperm whale or the gray whale.

Table 17: Answers regarding occurrence of cetacean species in Argyll (figures show percentages of participants within each sample).

Location	Percentage of Participants Aware of the Occurrence / Absence of Each Species					
	Bottlenose Dolphin	Bryde's Whale	Risso's Dolphin	Harbour Porpoise	Killer Whale	Minke Whale
Islay	68.0	16.0	16.0	60.0	30.0	52.0
Campbeltown	50.0	12.0	10.0	40.0	18.0	36.0
Tarbert	48.0	8.0	6.0	52.0	14.0	22.0
Tobermory	76.0	26.0	34.0	64.0	48.0	72.0
Glasgow	42.3	3.8	7.7	34.6	3.8	15.4

Figure 14: Participants awareness of the presence / absence of cetacean species in the waters of Argyll (separate samples).



3.2.4 Threats to the Argyll Marine Environment as Named by Participants

Participants were asked to name the top 3 threats to the Argyll marine environment. Figure 15 shows the frequencies with which different groups of threats were stated, whilst Table 18 shows a more detailed summary of the threats mentioned and their corresponding frequencies. It should be noted that each participant had 3 options and, since there were 252 participants in all, this gave a total count of 756. Over-fishing and fish farming (aquaculture) form the largest group, with over-fishing having the largest score of all factors at 75. Collectively pollution was very popular as a choice, especially oil pollution and pollution originating from shipping. Sewage and marine litter were also popularly seen as threats, the total counts being 70 and 67 respectively.

Participants were often unable to give any more than 1 or 2 threats, this gave a count of 144 for the “don’t know” category. It should be noted that it may sometimes have been the case that these participants were of the opinion that there were no more threats to the Argyll environment than that / those which they had mentioned. 40 participants were either of the opinion that there were no threats to the Argyll marine environment at all or were unable to name any at all. This gave a total count of 120 (40 participants multiplied by 3 options), the largest category of all.

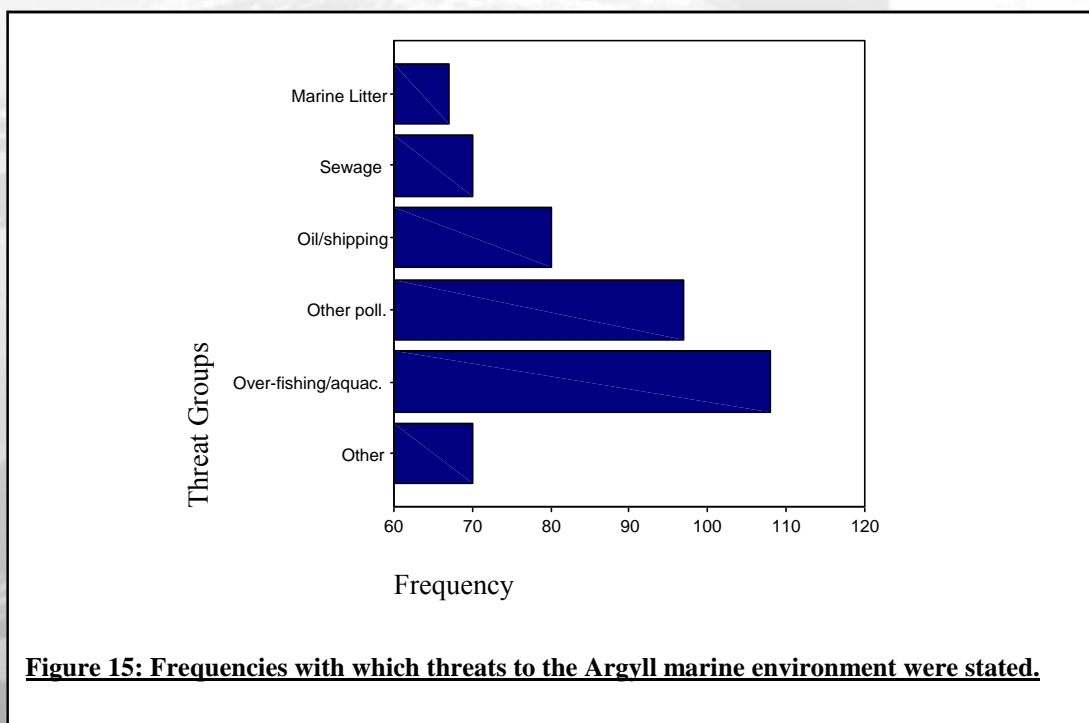
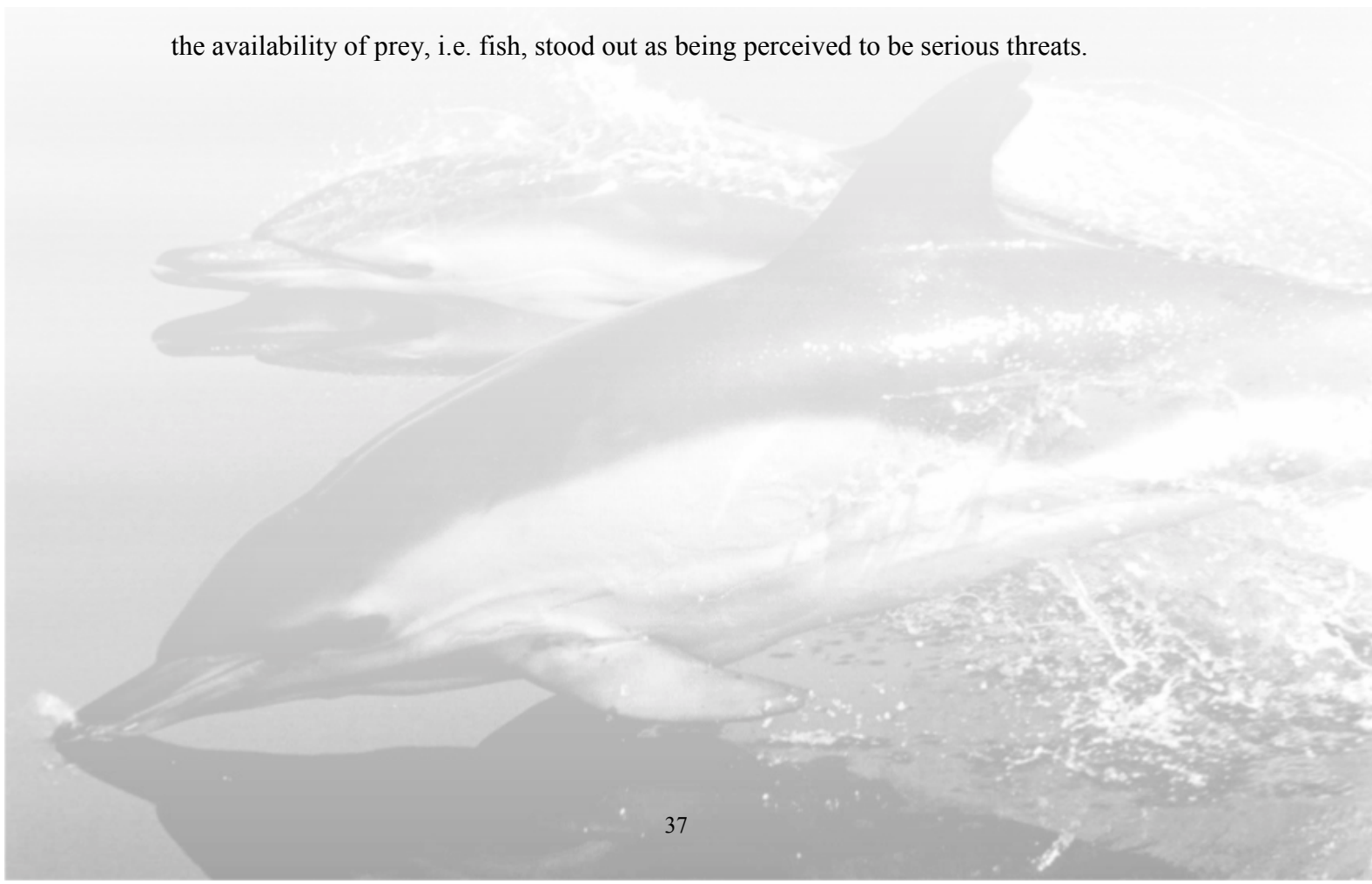


Table 18: Counts of threats to the Argyll marine environment

Threat	Group	Count
Litter	Litter	67
Sewage	Sewage	70
Oil tankers	Oil / Shipping	4
Oil pollution from the oil industry; oil / diesel pollution generally	Oil / Shipping	43
Pollution from any type of shipping, including fishing vessels and pleasure crafts	Oil / Shipping	33
Shipwrecks	Other Types of Pollution	1
Pollution – unable to specify	Other Types of Pollution	36
River pollution	Other Types of Pollution	1
Pollution from cities	Other Types of Pollution	1
Pollution from agricultural sources	Other Types of Pollution	12
Pollution from land in general	Other Types of Pollution	5
Industrial pollution	Other Types of Pollution	15
Air pollution; acid rain	Other Types of Pollution	7
Algal blooms	Other Types of Pollution	1
Nuclear power stations; dumping of nuclear waste; radioactivity; nuclear hazards; Sellafield	Other Types of Pollution	12
Nuclear submarine base / Faslane	Other Types of Pollution	4
Unauthorised / illegal dumping	Other Types of Pollution	1
Fishing gear waste	Other Types of Pollution	1
Commercial fishing methods; over-fishing	Commercial Fishing Methods / Over-Fishing / Fish Farming	75
Fish farming (escaping fish / diseases / pollution)	Commercial Fishing Methods / Over-Fishing / Fish Farming	28
Trawling / dredging	Commercial Fishing Methods / Over-Fishing / Fish Farming	5
Oil rig development; oil exploration	Other	2
Marine traffic / motorised transport generally; marine traffic endangering wildlife	Other	5
Dumping by military into the sea; ammunition on shore; the military in general	Other	9
Disturbing watersports	Other	1
Human developments in the marine environment; developments in coastal areas	Other	6
Coastal erosion; sand dune erosion	Other	2
Human attitudes / greed; man in general; unsustainable exploitation	Other	3
Vandalism; stealing of birds eggs; poachers killing marine mammals; cruelty to animals	Other	4
Foreign fishing boats	Other	2
Inadequate fisheries preservation measures; lack of effective EC policies; lack of investment from Government into conservation / research; lack of conservation; the Government in general	Other	6
Low fish stocks; effects of low fish numbers on other species (e.g. birds)	Other	3
Seals	Other	3
Global warming / if Gulf Stream moves	Other	12
Invasive species (e.g. zebra mussels, <i>Dreissena polymorpha</i>)	Other	1
Whaling	Other	1
Tourism	Other	10

3.2.5 Participants' Perceptions of the Threats to Cetaceans in the Waters of Western Scotland

Figures 16 to 32 show participants' perceptions of the threats to cetaceans in the waters of western Scotland whilst Table 19 allows examination of the percentages of participants choosing each category for the different threats. Hunting / commercial whaling was seen by most participants to be of no threat, as was whale watching. A relatively even spread of answers was received for radioactive waste, although most participants saw it as a minor threat. Military activities, dredging activities and quarrying operations were also generally seen as being minor threats. However, a relatively high percentage of participants answered "don't know" for military and dredging activities and quarrying operations. Oil exploration, pollution from shipping, pollution from fish farms and pollution from land-based sources were all mostly perceived as moderate threats, whilst accidental entrapment during fisheries operations and entanglement in / digestion of marine litter and bacteria from sewage were seen as moderate to serious. Climate change was also perceived as being a moderate / serious threat, although answers were relatively quite evenly spread. Oil spills and the reduction in the availability of prey, i.e. fish, stood out as being perceived to be serious threats.



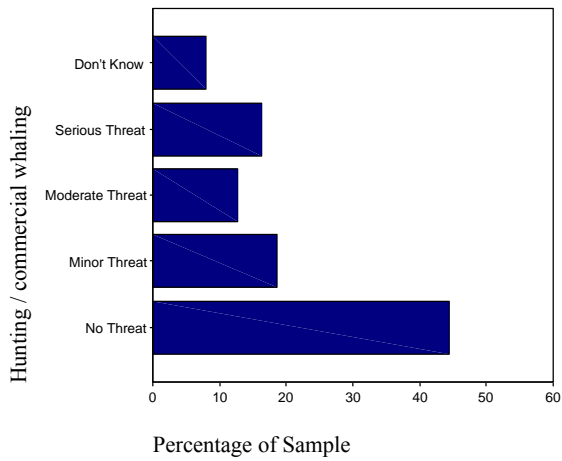


Figure 16: Participants' perceptions of hunting / commercial whaling.

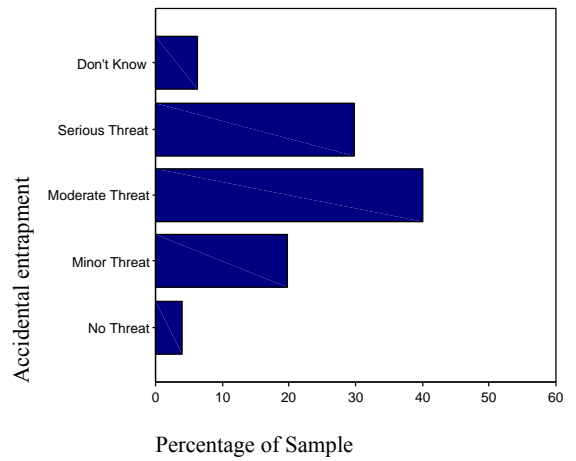


Figure 17: Participants' perceptions of accidental entrapment during fishing operations.

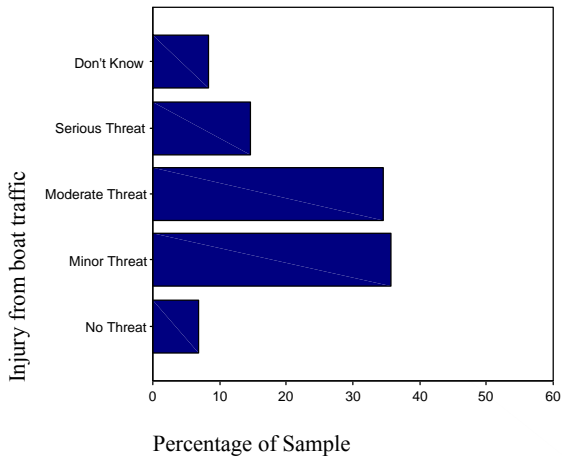


Figure 18: Participants' perceptions of injury from boat traffic.

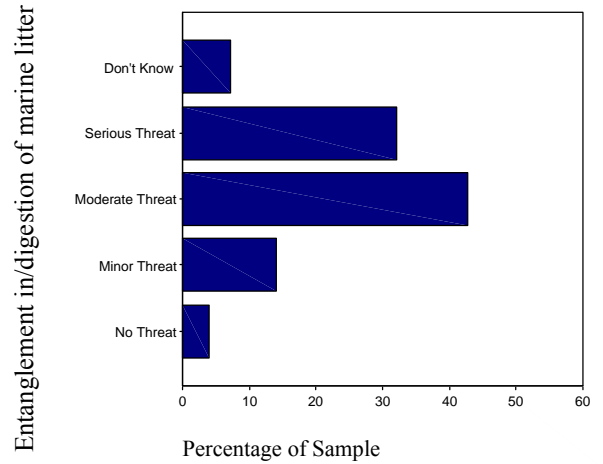


Figure 19: Participants' perceptions of entanglement in / digestion of marine litter.

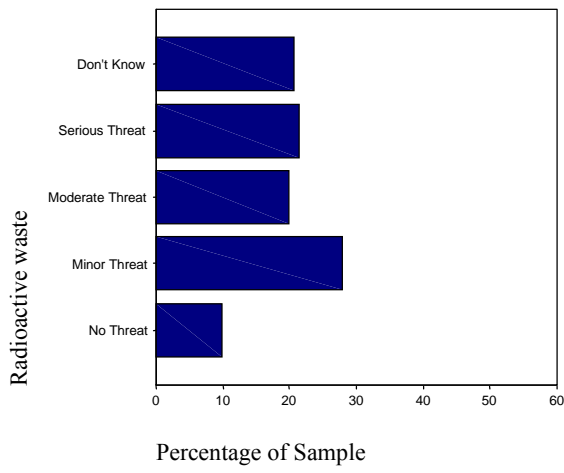


Figure 20: Participants' perceptions of radioactive waste.

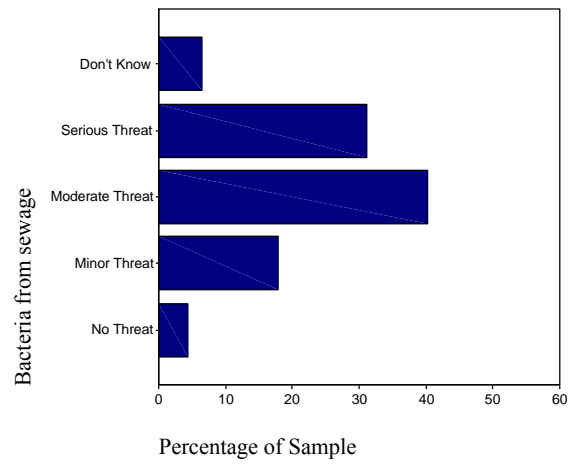


Figure 21: Participants' perceptions of bacteria from sewage.

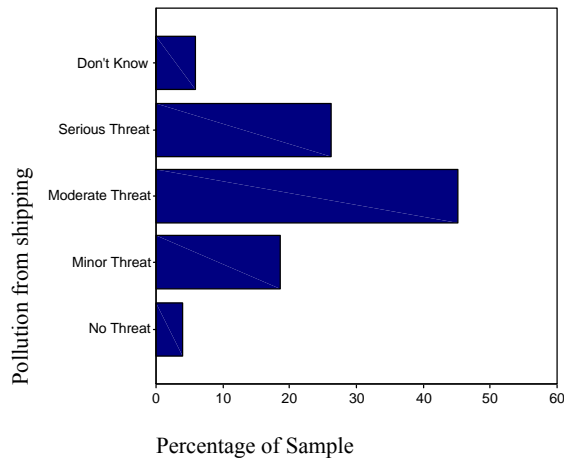


Figure 22: Participants' perceptions of pollution from shipping.

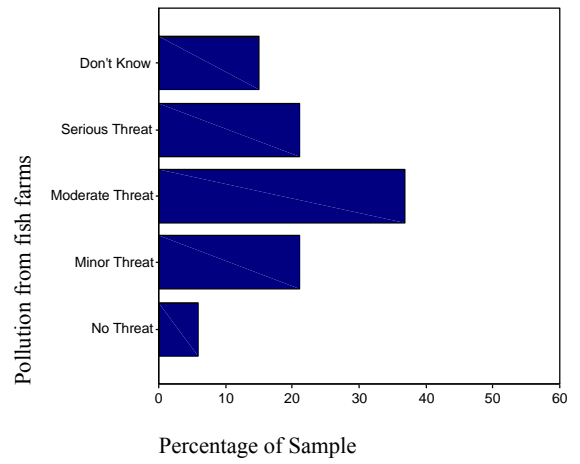


Figure 23: Participants' perceptions of pollution from fish farms.

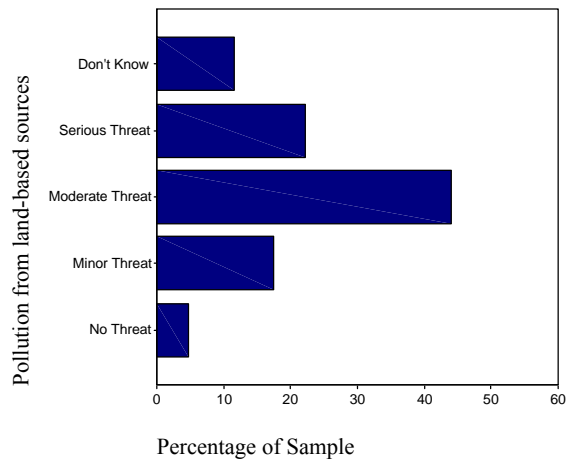


Figure 24: Participants' perceptions of pollution from land-based sources

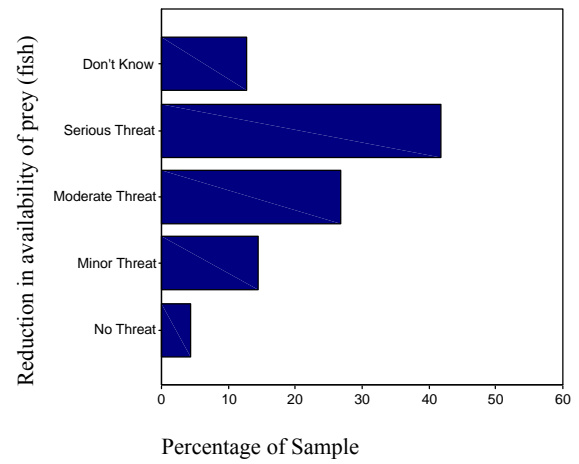


Figure 25: Participants' perceptions of reduction in availability of prey (fish)

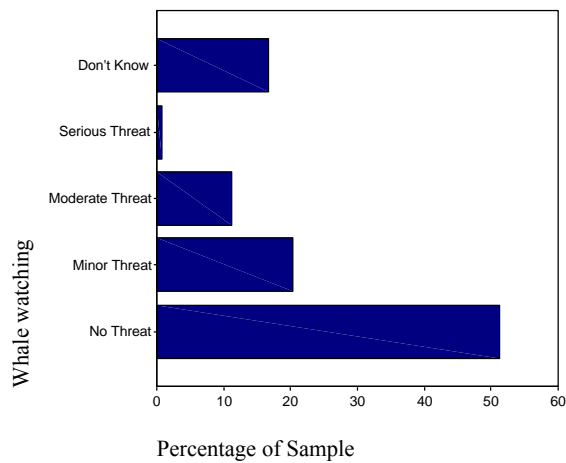


Figure 26: Participants' perceptions of whale watching

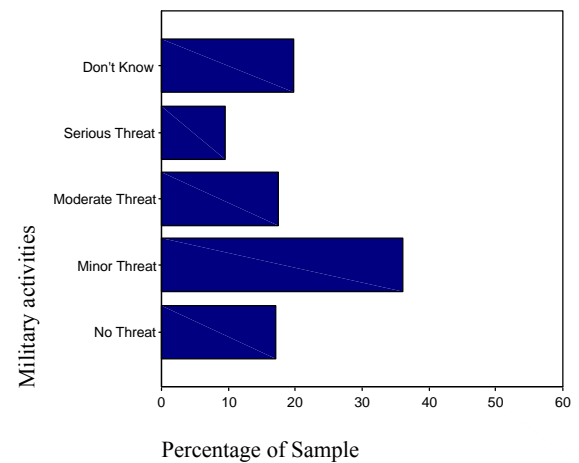


Figure 27: Participants' perceptions of military activities

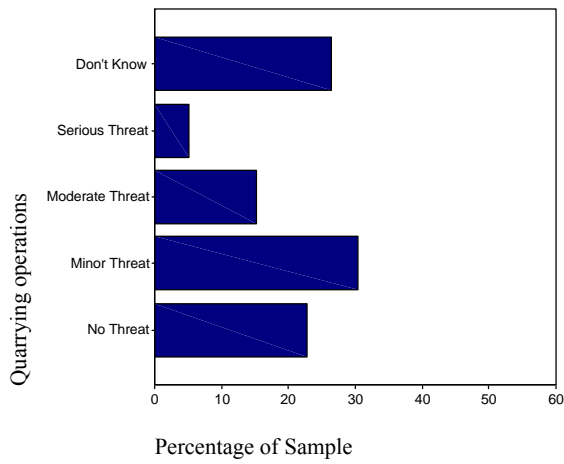


Figure 28: Participants' perceptions of quarrying operations.

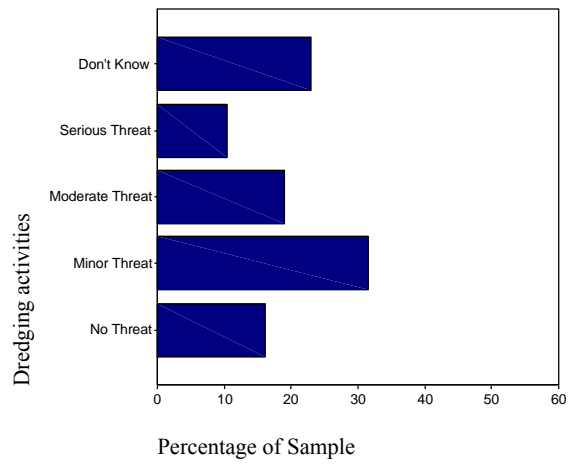


Figure 29: Participants' perceptions of dredging activities.

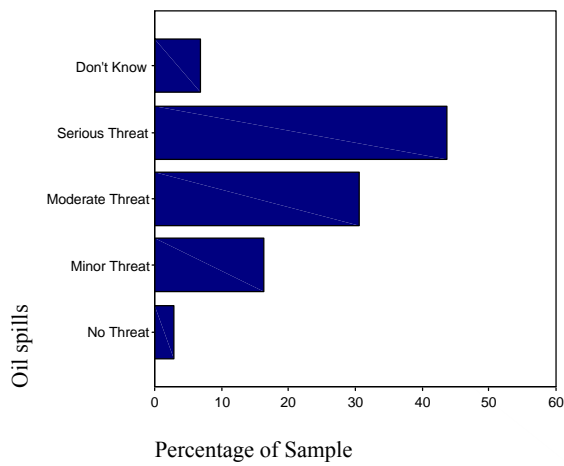


Figure 30: Participants' perceptions of oil spills.

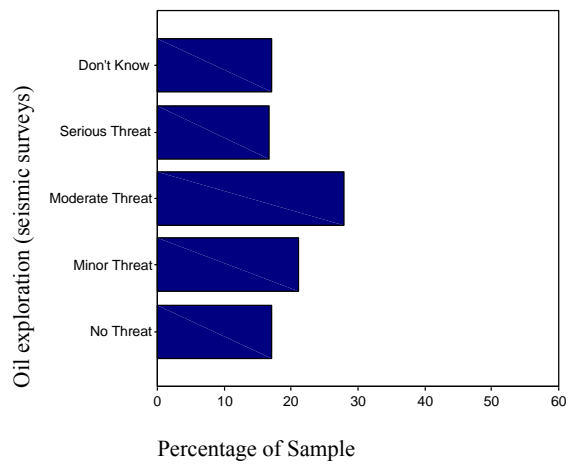


Figure 31: Participants' perceptions of oil exploration (seismic surveys).

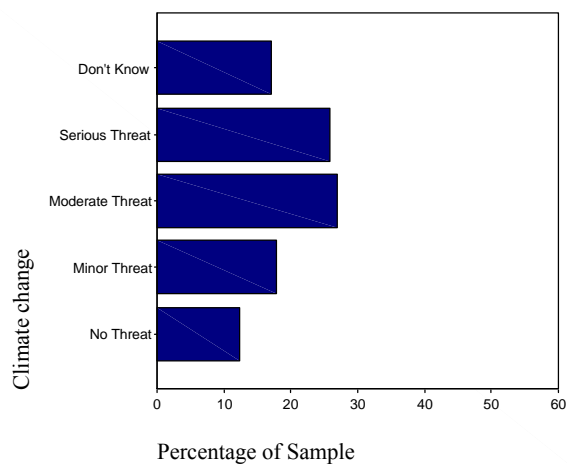


Figure 32: Participants' perceptions of climate change.

Table 19: Participants’ perceptions of threats to cetaceans in the waters of western Scotland (figures show percentages of all participants within each threat).

Threat	Don't Know	Serious	Moderate	Minor	No Threat
Hunting / commercial whaling	7.9	16.3	12.7	18.7	44.4
Accidental entrapment during fishing operations	6.3	29.8	40.1	19.8	4.0
Injury from boat traffic	8.3	14.7	34.5	35.7	6.7
Entanglement in / digestion of marine litter	7.2	32.0	42.8	14.0	4.0
Radioactive waste	20.7	21.5	19.9	27.9	10.0
Bacteria from sewage	6.4	31.1	40.2	17.9	4.4
Pollution from shipping	6.0	26.2	45.2	18.7	4.0
Pollution from fish farms	15.1	21.0	36.9	21.0	6.0
Pollution from land-based sources	11.5	22.2	44.0	17.5	4.8
Reduction in availability of prey (fish)	12.7	41.8	26.7	14.3	4.4
Whale watching	16.7	0.8	11.1	20.2	51.2
Military activities	19.8	9.5	17.5	36.1	17.1
Quarrying operations	26.4	5.2	15.2	30.4	22.8
Dredging activities	23.0	10.5	19.0	31.5	16.1
Oil spills	6.7	43.7	30.6	16.3	2.8
Oil exploration (seismic surveys)	17.1	16.7	27.9	21.1	17.1
Climate change	17.1	25.8	27.0	17.9	12.3

3.2.6 Participants’ Views and Knowledge of Whale Hunting

Figure 33 illustrates participants’ knowledge of the fact that whale hunting is being carried out by Japan and Norway. Participants who did not know of both countries’ whaling activities were placed in the “no” category. It is evident that the majority of participants were aware of the hunting activities of both countries, with 69.4% answering “yes”. Figure 34 and Table 20 show participants’ views regarding the prospect of a country such as Norway hunting whales which occur in Scottish waters. The great majority, 75%, were strongly against this and a further 21.4% chose the “against” category. Only 0.8% of participants (representing 2 people out of 252) were for such activities and no participants at all were strongly for whaling.

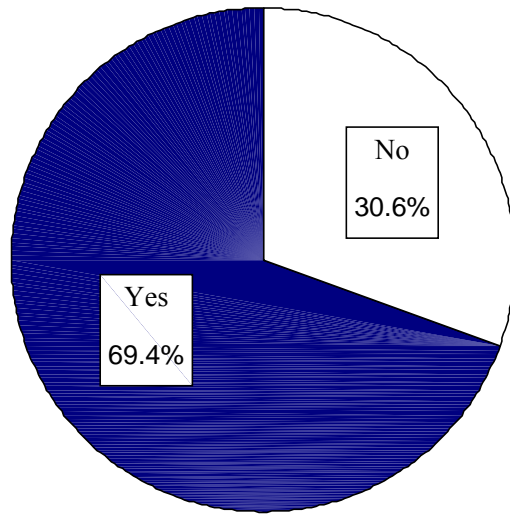


Figure 33: Answers to the question: “Did you know that Japan and Norway are currently hunting whales?”

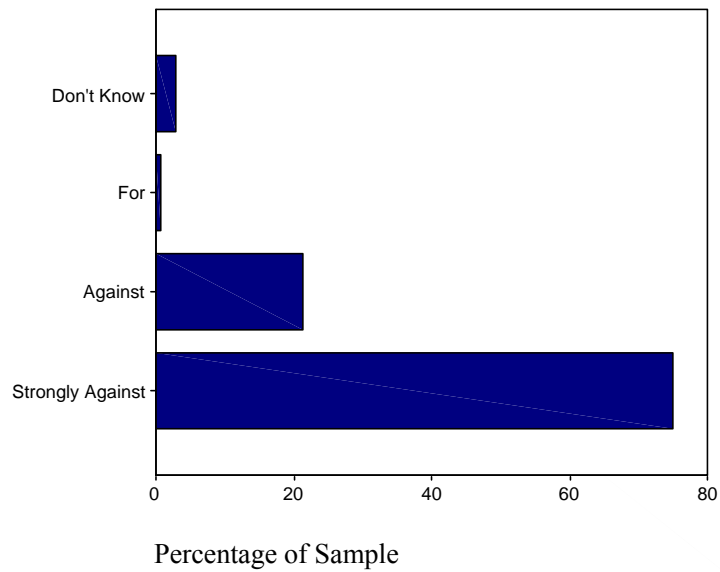


Figure 34: Participants’ views regarding a country such as Norway hunting whales / dolphins from the same populations that inhabit Scottish waters.

Table 20: Participants' views regarding the prospect of a country such as Norway hunting whales which inhabit Scottish waters.

View	Percentage of Participants
Don't Know	2.8
Strongly Against	75.0
Against	21.4
For	0.8
Strongly For	0

Statistical analysis was of awareness of the fact that both Norway and Japan are currently hunting whales. The results are summarised in Table 21.

Table 21: Chi-square results of participants' knowledge of Norway and Japan's whaling activities.

Factor	Statistically Significant?	Significance Level
Gender	No	0.072
Year of Birth	Yes	0.001
Resident of Argyll?	No	0.848
Occupation Category	Yes	0.012
Number of Activities	Yes	0.047
Number of Organisations	Yes	0.004
Importance of Marine Conservation Issues	No	0.791
Location	Yes	0.009

In terms of year of birth, participants born between the years 1951 and 1970 were found to be most aware of Japan and Norway's whaling with 77.1% replying that they had heard of these activities. Older participants were also found to be relatively aware of this issue, whilst the youngest group, 1971-1990, were least aware with a relatively low 48.3% . These results are summarised in Table 22.

Table 22: Awareness of Japan and Norway's whaling activities (figures show percentages of participants within each year of birth category).

Year of Birth	Awareness of Japan and Norway's Whaling Activities
1911-1930	71.4
1931-1950	75.7
1951-1970	77.1
1971-1990	48.3

Participants classified as “not employed” were found to have the lowest degree of awareness of Japan and Norway’s whaling. Those working as educational professionals, within the tourist industry or in work related to the marine environment were found to be more aware but a higher percentage still was achieved by those whose occupation fell into the “other” category. These results are shown in Table 23.

Table 23: Awareness of Japan and Norway’s whaling activities (figures show percentages of participants within each occupation category).

Occupation Category	Awareness of Japan / Norway’s Whaling Activities
Not Employed	58.9
Education Professional / Working in the Tourist Industry / Salmon Farmer / Fisherman / Other User of the Marine Environment	67.7
Other	77.6

It was found that those participants taking part in no marine-related activities were less aware of Japan and Norway’s whaling than those taking part in 1 or more activities. Table 24 gives a summary of results.

Table 24: Awareness of Japan and Norway’s whaling activities (figures show percentages of participants within each category of number of marine-related activities).

Number of Activities	Percentage of Participants Aware of Japan and Norway’s Whaling
0	55.6
1	75.6
2	71.2
3 or More	74.5

Results show that participants who were members of 1 or more environmental organisations were more aware of Japan and Norway’s whaling, with 81.1% of these participants having knowledge of these activities, as opposed to 65.7% of those who were not members of any such organisations.

In terms of location, participants in Tobermory and on Islay were found to be most aware of Norway and Japan’s whaling activities, whilst those participants in Glasgow were least aware. Results in terms of location are summarised in Table 25.

Table 25: Awareness of Japan and Norway’s whaling activities (figures show percentages of participants within each sample).

Location	Percentage of Participants Aware of Japan and Norway’s Whaling Activities
Islay	74.0
Campbeltown	66.0
Tarbert	62.0
Tobermory	88.0
Glasgow	57.7

3.2.7 Participants’ Perceptions as to How Well Cetaceans are Protected in Scotland’s Waters

Figure 35 illustrates the opinions of participants as to how well cetaceans are protected in Scotland’s waters. Very few participants thought that they are over-protected (0.4%) and most participants were of the opinion that they are not sufficiently protected (45.6%). Figure 36 illustrates the fact that the vast majority of participants who were of the opinion that cetaceans are not sufficiently protected were in favour of specific legislation being created for their protection. Tables 26 and 27 show the exact percentages.

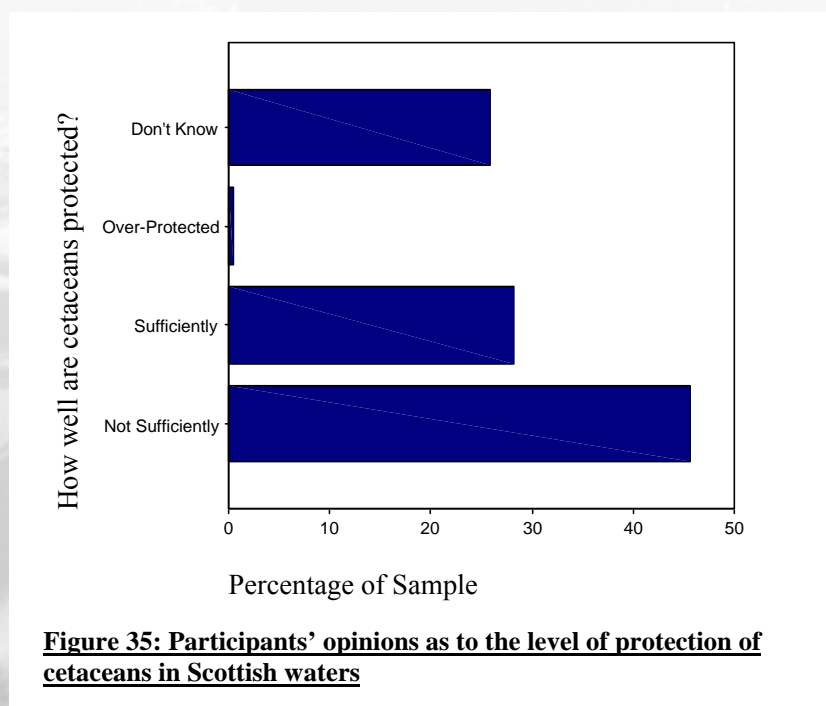


Figure 35: Participants’ opinions as to the level of protection of cetaceans in Scottish waters

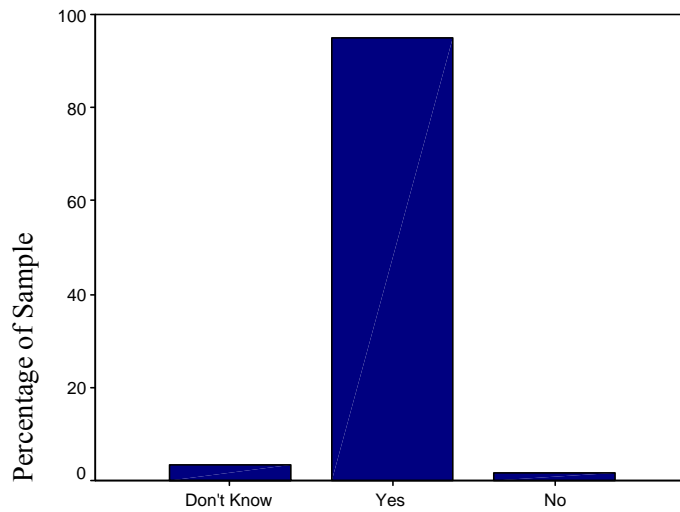


Figure 36: Participants’ opinion on whether specific legislation needs to be created to protect cetaceans in Scotland

Table 26: Answers regarding participants’ perceptions of how well cetaceans are protected.

How Well are Cetaceans Protected?	Percentage of Participants (Entire Sample)
Don’t Know	25.8
Over-Protected	0.4
Sufficiently Protected	28.2
Not Sufficiently Protected	45.6

Table 27: Percentage of participants of the opinion that specific legislation to protect cetaceans should be created.

Should Specific Legislation to Protect Cetaceans be Created?	Percentage of Those Participants who were of the Opinion that Cetaceans are not Sufficiently Protected
Don’t Know	3.5
Yes	94.8
No	1.7

3.2.8 Participants' Knowledge of Threatened Species Occurring in Scotland's Waters

Figures 37 to 45 illustrate the results in regard to participants' knowledge of the occurrence of threatened species within Scottish waters. The bull shark and sealion were included as false examples since these species do not occur in Scotland's waters. Figures 46 to 54 illustrate for each species how many of the participants who stated that the species is present in Scotland's waters were of the opinion that it is threatened in Scotland's waters. Table 28 allows more precise examination of the percentages.

Only 7.5% of participants thought that the bull shark is present in Scotland's waters, most people answering "don't know". Less than a quarter, 23.4%, of participants answered correctly that it is not present. Regarding the other false species, sealion, a very even spread of results was received with a relatively high number, over a third at 34.1%, of participants being of the opinion that this species is present in Scotland's waters.

The great majority of participants, 88.9%, answered "don't know" for the orange roughy and only 2.0% answered that it is present. Likewise most participants answered "don't know" for the leatherback turtle. A higher percentage answered that it is not present than correctly answered that it is present, 10.7% as opposed to 27.8%.

High percentages of correct answers were obtained for the basking shark, common skate and oyster. Haddock and cod proved to be very well known to be in Scottish waters with 89.3 and 89.7% respectively answering correctly that it is present.

Those people who replied that a species was present were asked if it was threatened in Scotland's waters. Most people replied "yes" for all species apart from the orange roughy, where answers were split evenly between "yes" and "don't know". Percentages were especially high for the "yes" category in the cases of both cod and haddock with 85.4% and 80.4% respectively. Almost three-quarters, 74.1%, of participants answered that the leatherback turtle is threatened in Scottish waters.

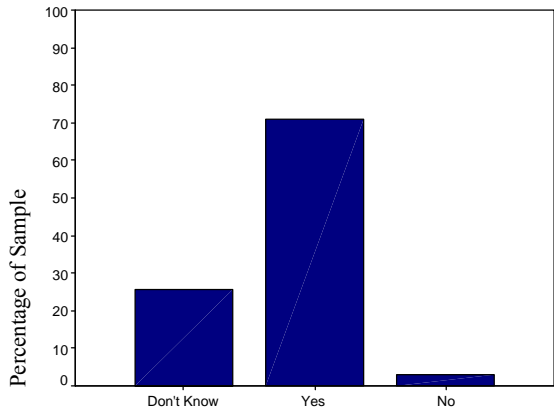


Figure 37: Participants' answers regarding the presence of the basking shark in Scottish waters.

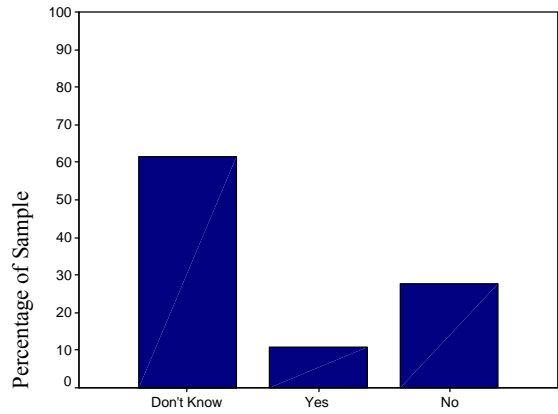


Figure 38: Participants' answers regarding the presence of the leatherback turtle in Scottish waters.

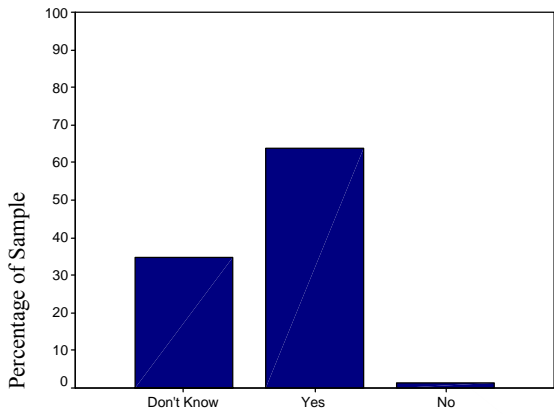


Figure 39: Participants' answers regarding the presence of common skate in Scottish waters.

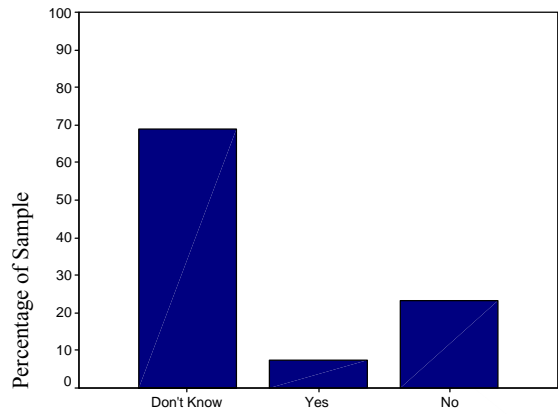


Figure 40: Participants' answers regarding the presence of the bull shark in Scottish waters.

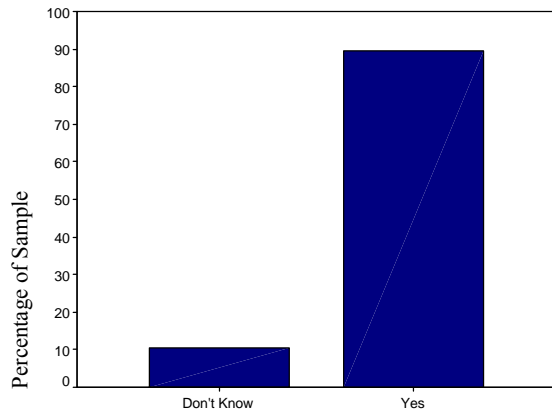


Figure 41: Participants' answers regarding the presence of cod in Scottish waters.

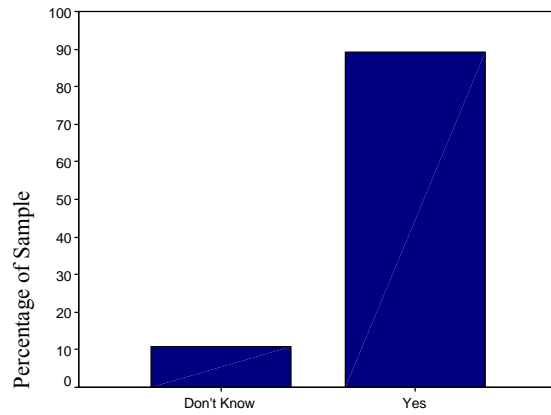


Figure 42: Participants' answers regarding the presence of haddock in Scottish waters.

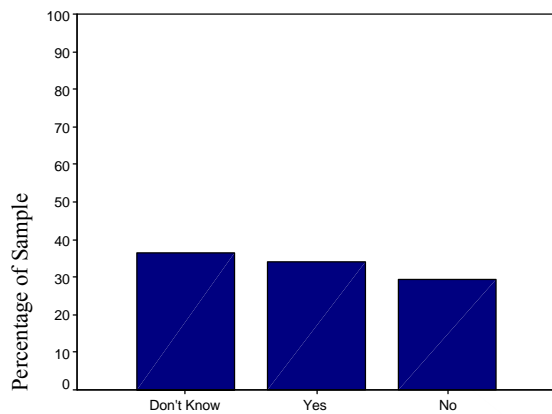


Figure 43: Participants' answers regarding the presence of sealions in Scottish waters.

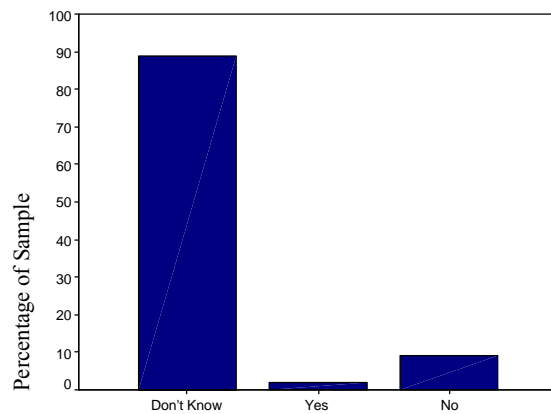


Figure 44: Participants' answers regarding the presence of the orange roughy in Scottish waters.

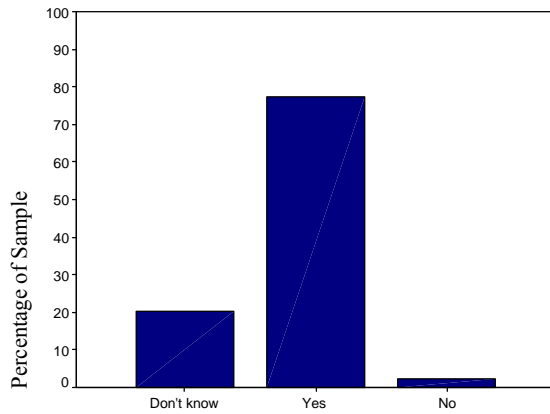


Figure 45: Participants' answers regarding the presence of oysters in Scottish waters.

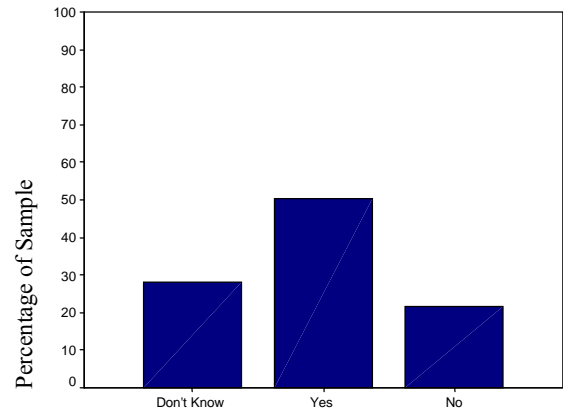


Figure 46: Participants' perceptions as to whether the basking shark is threatened.

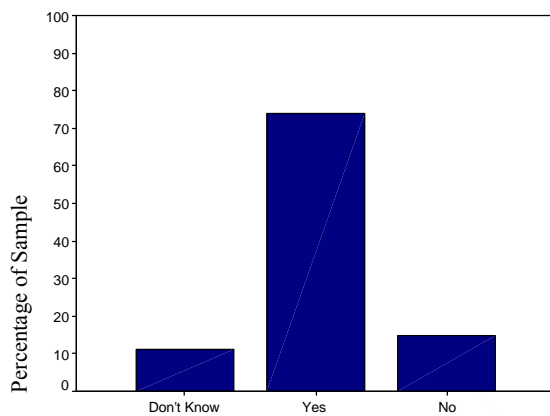


Figure 47: Participants' perceptions as to whether the leatherback turtle is threatened.

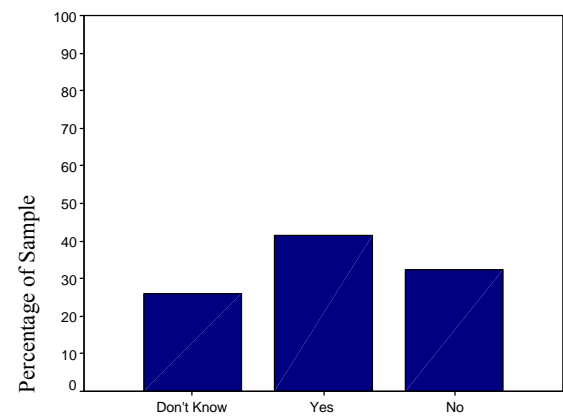


Figure 48: Participants' perceptions as to whether the common skate is threatened.

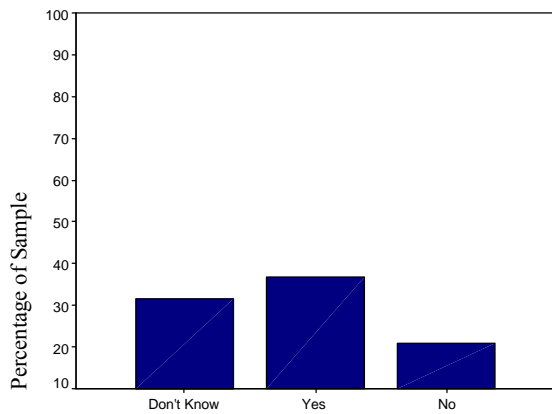


Figure 49: Participants' perceptions as to whether the bull shark is threatened.

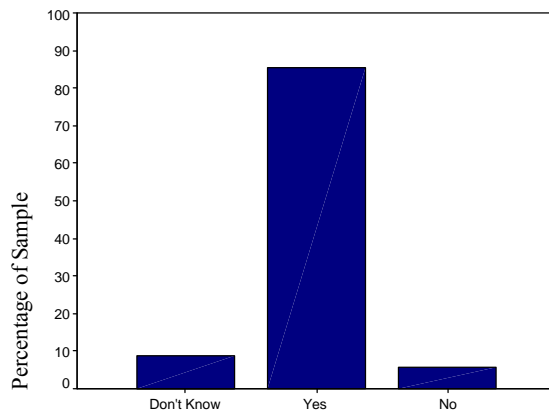


Figure 50: Participants' perceptions as to whether cod is threatened.

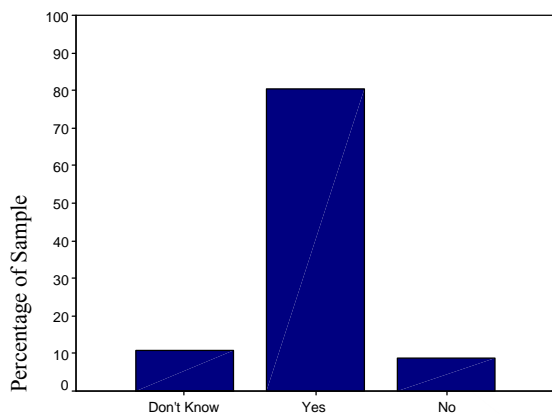


Figure 51: Participants' perceptions as to whether haddock is threatened.

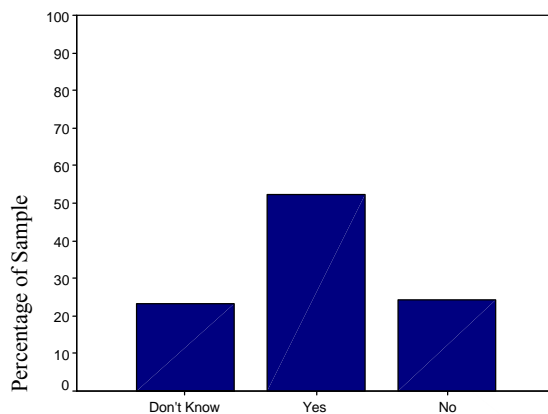
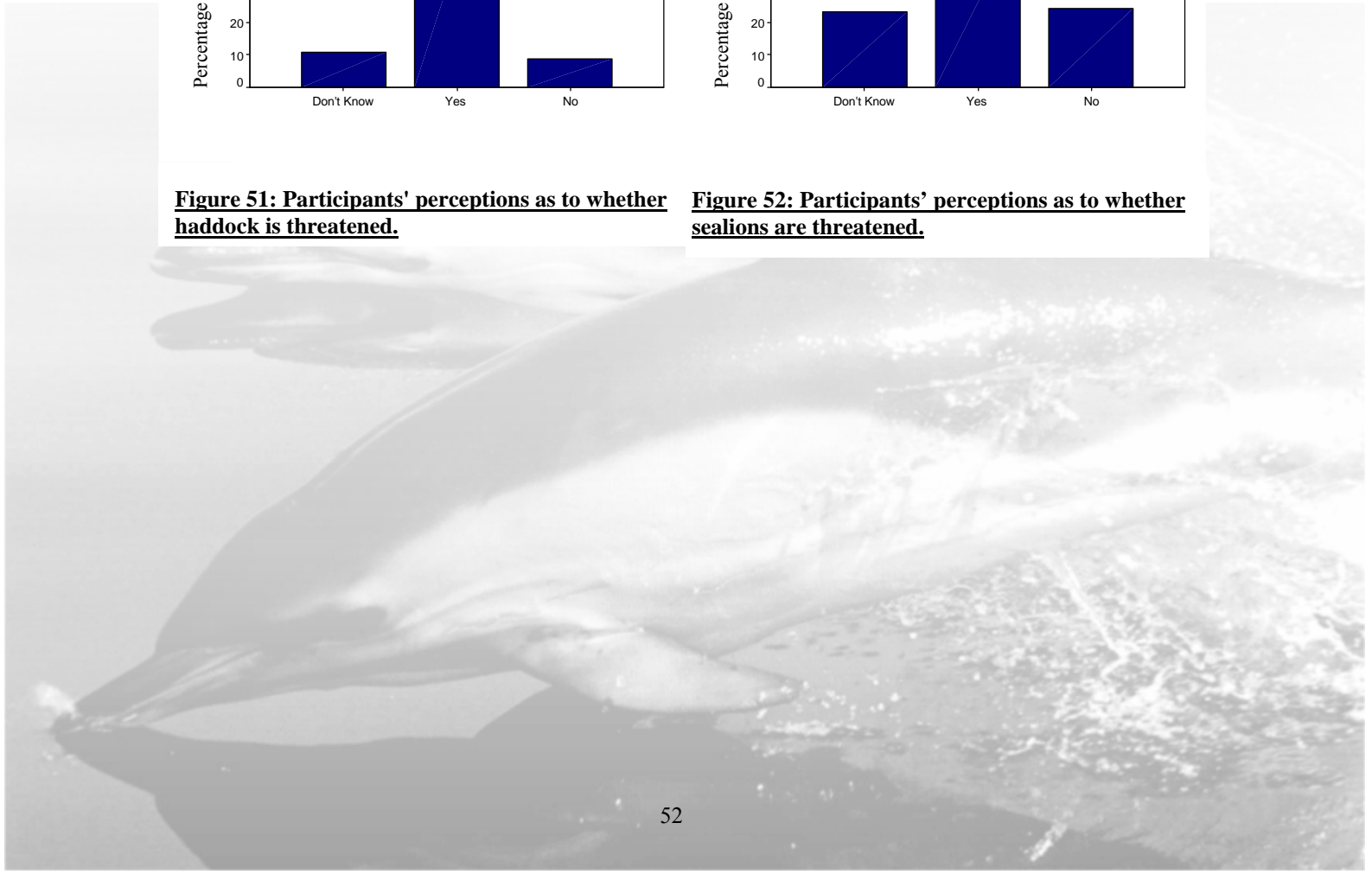


Figure 52: Participants' perceptions as to whether sealions are threatened.



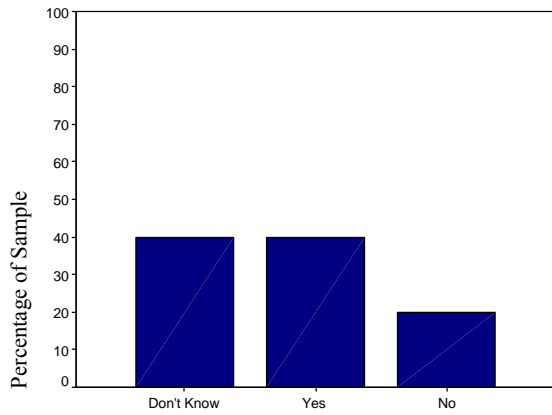


Figure 53: Participants' perceptions as to whether the orange roughy is threatened.

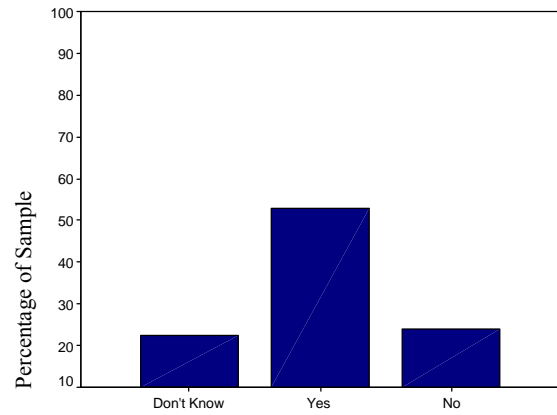


Figure 54: Participants' perceptions as to whether oysters are threatened.

Table 28: Answers regarding the presence of species and whether they are threatened (figures show percentages of participants for each species).

Species	Presence			Threatened?		
	Don't Know	Yes	No	Don't Know	Yes	No
Basking shark	25.8	71.0	3.2	27.9	50.3	21.8
Leatherback turtle	61.5	10.7	27.8	11.1	74.1	14.8
Common skate	34.9	63.9	1.2	26.1	41.6	32.3
Bull shark	69.0	7.5	23.4	31.6	36.8	21.1
Cod	10.3	89.7	0	8.8	85.4	5.8
Haddock	10.7	89.3	0	10.7	80.4	8.9
Sealion	36.5	34.1	29.4	23.3	52.3	24.4
Orange roughy	88.9	2.0	9.1	40.0	40.0	20.0
Oyster	20.2	77.4	2.4	22.6	52.8	24.1

The Chi-square test was carried out to analyse the number of correct answers received for whether species are present in Scotland's waters. The results are summarised in Table 29. All tests were valid apart from the orange roughy in the following cases: year of birth; occupation; number of activities; number of organisations; importance of marine conservation issues; and location.

Table 29: Chi-square results for number of correct answers received for species presence.

Factor	Species for which Test Significant plus Significance Level
Gender	None
Year of Birth	Basking shark (0.012) Bull shark (0.011) Cod (0.013) Haddock (0.017) Oyster (0.009)
Resident of Argyll?	Basking shark (0.000) Common skate (0.001) Cod (0.028) Haddock (0.054) Sealion (0.012) Oyster (0.000)
Occupation Category	None
Number of Activities	Basking shark (0.000) Cod (0.029) Sealion (0.013) Oyster (0.001)
Number of Organisations	Leatherback turtle (0.003)
Importance of Marine Conservation Issues	Basking shark (0.000) Common skate (0.022) Cod (0.001) Haddock (0.001) Oyster (0.004)
Location	Basking shark (0.000) Sealion (0.009) Oyster (0.012)

Gender was not found to bear any similarity to participants' awareness of the occurrence of the various species. In terms of year of birth, it was generally the case that younger participants were more aware of the presence of threatened species in Scotland's waters, although this trend was not quite so clear for the basking shark or correct answers pertaining to the bull shark (which is not present in Scotland's waters). These results are summarised in Table 30. No significant results were found for the leatherback turtle, common skate or the sealion.

Table 30: Answers regarding the presence / absence of marine species in Scotland's waters (figures show percentages of participants within each year of birth category).

Year of Birth Category	Percentage of Participants Answering Correctly Whether the Species is Present / Absent				
	Basking Shark	Cod	Haddock	Bull Shark	Oyster
1911-1930	35.7	64.3	64.3	28.6	42.9
1931-1950	73.0	89.2	89.2	13.5	75.7
1951-1970	77.1	92.4	90.5	21.9	79.0
1970-1990	67.2	91.4	93.1	37.9	84.5

Results of the Chi-square test consistently showed that residents of Argyll were more aware of the presence / absence of various species than other participants. These results are summarised in Table 31. No significant results were found for the leatherback turtle, basking shark or orange roughy.

Table 31: Answers regarding the presence / absence of marine species (figures show percentages of participants within each category according to whether they are resident in Argyll or elsewhere).

	Percentage of Participants Answering Correctly Whether the Species is Present / Absent					
	Basking Shark	Common Skate	Cod	Haddock	Sealion	Oyster
Resident	83.5	75.2	86.0	93.6	37.6	88.1
Non-Resident	61.5	55.2	94.5	86.0	23.1	69.2

No significant results were found for occupation category and awareness of the presence / absence of any of the species.

Results showed that participants taking part in more marine-related activities achieved a higher percentage of correct answers in terms of the presence or absence of certain species. These results are summarised in Table 32. No significant results were found for the leatherback turtle, common skate, basking shark or haddock.

Table 32: Answers regarding the presence / absence of marine species (figures show percentages of participants within categories according to number of marine-related activities).

Number of Activities	Percentage of Participants Answering Correctly Whether the Species is Present / Absent			
	Basking Shark	Cod	Sealion	Oyster
0	54.0	81.0	19.0	73.0
1	61.0	89.0	25.6	65.9
2	84.6	94.2	30.8	84.6
3 or More	92.7	96.4	45.5	92.7

In terms of the number of organisations of which participants were members, results showed that participants who were members of 1 or more charitable environmental organisations were more aware of the presence of the leatherback turtle in Scottish waters. Of those who were members of 1 or more organisations 23.8% were aware of the presence of this species, as opposed to 8.1% of those who were not members of any such organisations. No significant results were determined for any of the other species.

Results showed that participants who considered issues of marine conservation to be important to them achieved a higher percentage of correct answers in terms of species presence / absence. These results are shown in Table 33. No such significant results were determined for the leatherback turtle, bull shark or sealion.

Table 33: Answers regarding the presence / absence of marine species (figures show percentages of participants within each category according to importance of marine conservation issues).

Importance of Marine Conservation Issues	Percentage of Participants Answering Correctly Whether the Species is Present / Absent				
	Basking Shark	Common Skate	Cod	Haddock	Oyster
Important	74.4	65.8	91.5	91.0	79.5
Unimportant	27.8	38.9	66.7	66.7	50.0

In regard to location, significant results were obtained for the basking shark, sealion and oyster. For both the basking shark and oyster, Islay, Campbeltown and Tarbert participants obtained high percentages of correct answers in terms of the presence / absence of the species. For the sealion, however, Tobermory and Islay were shown to have the highest percentages of correct answers whilst those of Campbeltown and Tarbert were considerably lower and Glasgow lowest of all with only 13.5%. These results are summarised in Table 34.

Table 34: Answers regarding presence / absence of marine species (figures show percentages of participants within each sample).

Location	Percentage of Participants Answering Correctly Whether Species is Present / Absent		
	Basking Shark	Sealion	Oyster
Islay	80.0	42.0	84.0
Campbeltown	84.0	26.0	84.0
Tarbert	80.0	26.0	86.0
Glasgow	46.2	13.5	61.5
Tobermory	66.0	40.0	72.0

3.2.9 Opinions About Major Marine Conservation Issues Highly Relevant in Argyll

i) Seal Management

Figure 55 and Table 35 show participants' views on how well seals are protected in Scotland's waters. Whilst the majority of participants (41%) thought that they are sufficiently protected, only 9.2% were of the opinion that they are over-protected. Almost a third of participants (29.5%) thought that seals are not sufficiently protected.

Figure 56 and Table 36 show participants' opinions regarding seal culling. The majority of participants (69.1%) were not in agreement with seal culling with 42% strongly disagreeing. Only 4.4% strongly agreed with seal culling and just 16.3% agreed.

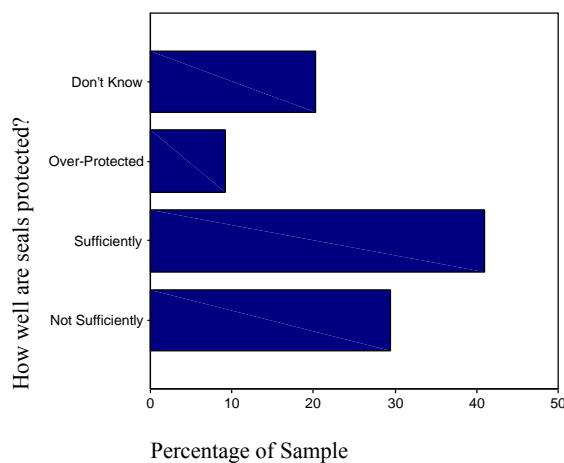


Figure 55: Participants' views on how well seals are protected.

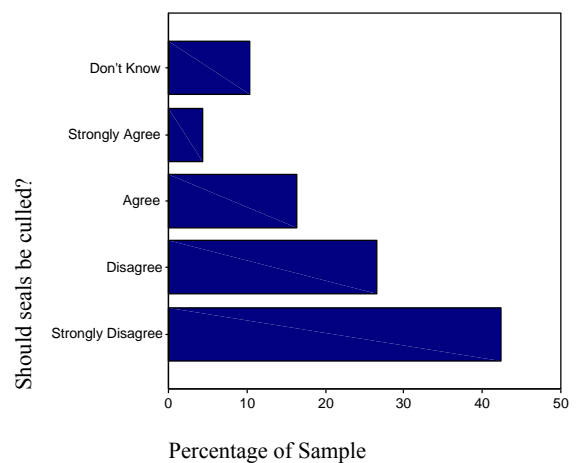


Figure 56: Participants' views on whether seals should be culled.

Table 35: Participants' views on how well seals are protected (figures show percentages of all participants).

How Well are Seals Protected?	Percentage of Participants
Don't Know	20.3
Over-Protected	9.2
Sufficiently Protected	41.0
Not Sufficiently Protected	29.5

Table 36: Participants' views on whether seals should be culled (figures show percentages of all participants).

Should Seals be Culled?	Percentage of Participants
Don't Know	10.3
Strongly Agree	4.4
Agree	16.3
Disagree	26.6
Strongly Disagree	42.5

Chi-square analysis of participants' opinions regarding seal was carried out, the results are summarised in Table 37.

Table 37: Chi-square results for participants' opinions regarding seal culling.

Factor	Statistically Significant?	Significance Level
Gender	Yes	0.003
Year of Birth	Yes	0.002
Resident of Argyll?	No	0.408
Occupation Category	No	0.823
Number of Activities	No	0.055
Number of Organisations	No	0.765
Importance of Marine Conservation Issues	Test Invalid	-
Location	No	0.222

The Chi-square test was found to be significant for gender and year of birth. No similarity was found in terms of whether the participants were residents of Argyll, their occupation category, the number of activities in which they are involved, the number of environmental charities of which they are members or the location and opinions in regard to seal culling.

It was found that females and younger participants were more likely to disagree with seal culling. These results are summarised in Tables 38 and 39 (N.B. the categories of opinions regarding seal culling were grouped as described in section 2.3, when carrying out the Chi-square test, with all factors except gender).

Table 38: Participants' opinions in regard to seal culling (figures show percentages of participants within each gender category).

Gender	Percentage of Participants in Agreement / Disagreement with Seal Culling				
	Don't Know	Strongly Agree	Agree	Disagree	Strongly Disagree
Female	15.0	1.0	10.0	28.0	46.0
Male	7.2	6.6	20.4	25.7	40.1

Table 39: Participants' opinions in regard to seal culling (figures show percentages of participants within each category according to year of birth).

Year of Birth Category	Percentage of Participants in Agreement / Disagreement with Seal Culling		
	Don't Know	Agree	Disagree
1911-1930	7.1	42.9	50.0
1931-1950	14.9	29.7	55.4
1951-1970	6.7	20.0	73.3
1971-1990	12.1	5.2	82.8



ii) Marine National Parks

Participants were asked whether they would be attracted to a Marine National Park as a tourist. Figure 57 illustrates the answers received with percentages being shown in Table 40. The majority of participants by far, 75.4%, said that they would be attracted to a Marine National Park as a tourist, with a comparatively low 20.2 % saying that they would not.

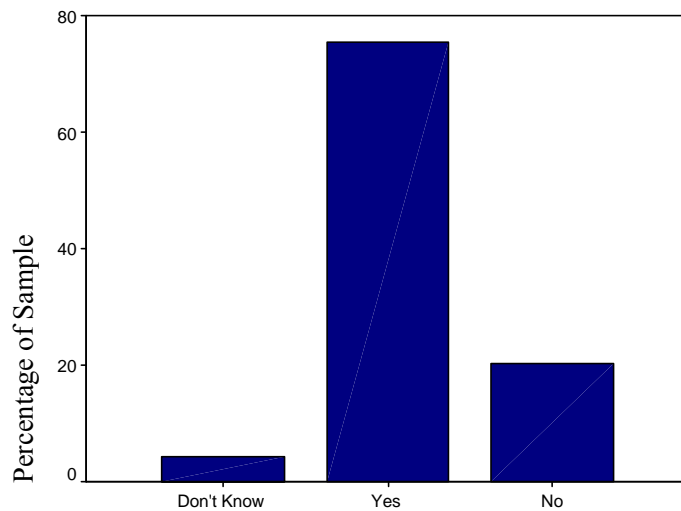


Figure 57: Participants' replies as to whether a Marine National Park would attract them to an area as a tourist.

Table 40: Whether participants would be attracted to a Marine National Park as a tourist.

Whether a Marine National Park Would Attract the Participant as a Tourist	Percentage of Participants
Don't Know	4.4
Yes	75.4
No	20.2

3.2.10 Participants' Perceptions of the Effectiveness of Organisations in Conserving the Scottish Marine Environment

Figure 58 represents percentages of participants who considered the various organisations to be “very effective”, “fairly effective” or “not effective”, or who answered “don’t know”. Table 41 allows examination of the percentages of participants. Many participants answered “don’t know”, especially in the case of the International Fund for Animal Welfare, the Hebridean Whale and Dolphin Society and the Whale and Dolphin Conservation Society. All organisations were considered by most participants to be “fairly effective” as opposed to “very effective” or “not effective”. The most positive result is displayed by Greenpeace with 42.7% of participants considering this organisation to be fairly effective and 19.4% considering it to be very effective; both of these results are the highest within these categories. The highest percentage within the “not effective” category is shown by the National Trust for Scotland with a percentage of 22.6.



Figure 58: Opinions regarding how effective various organisations are in conserving the Scottish marine environment.

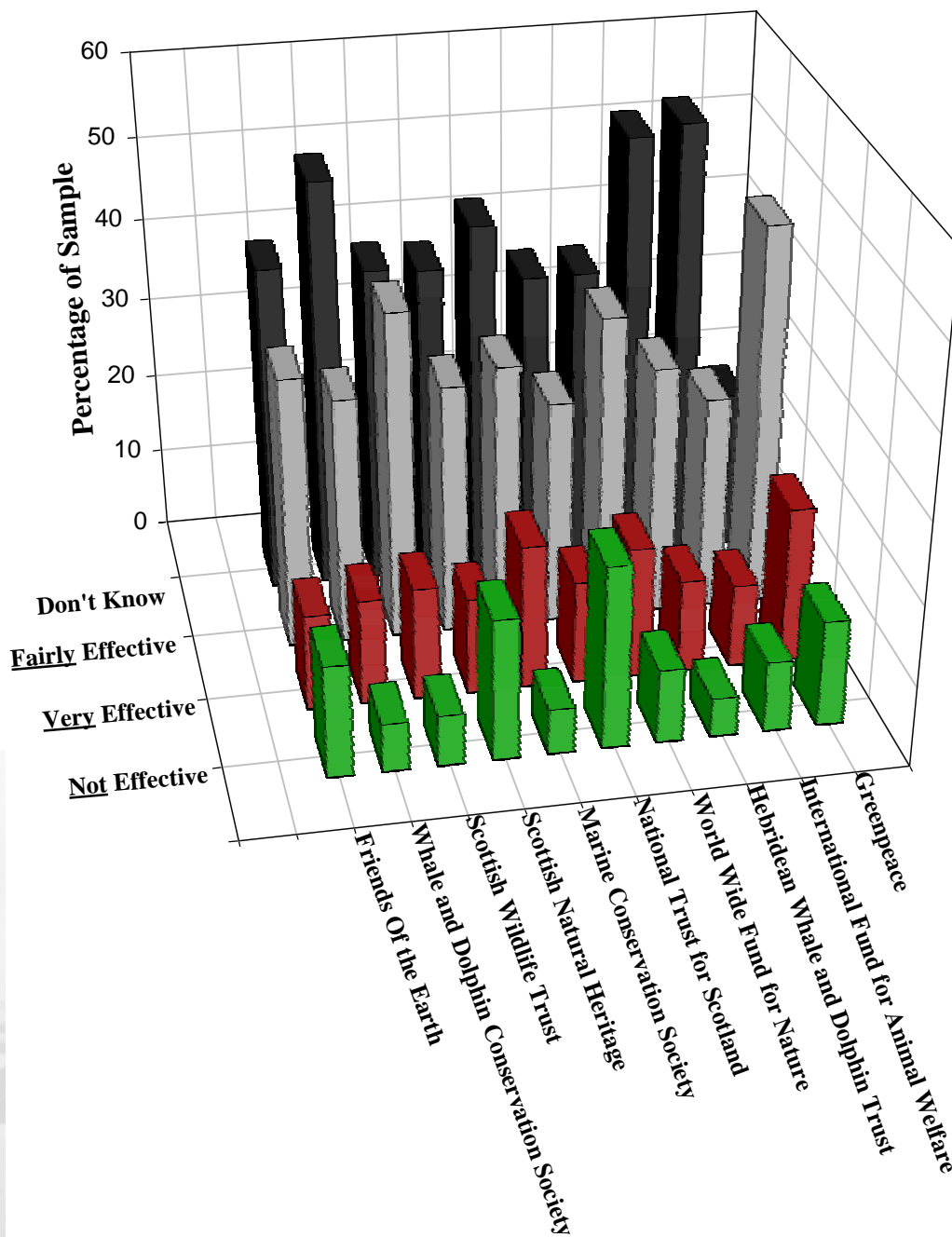


Table 41: Participants' opinions regarding how effective various organisations are in conserving the Scottish marine environment (figures show percentages within each organisation).

Organisation	Don't Know	Very Effective	Fairly Effective	Not Effective
Greenpeace	19.9	19.5	47.4	13.1
International Fund for Animal Welfare	54.2	10.4	26.7	8.8
Hebridean Whale and Dolphin Trust	52.8	11.5	31.0	4.8
World Wide Fund for Nature	36.9	16.3	37.7	9.1
National Trust for Scotland	36.9	12.7	27.8	22.6
Marine Conservation Society	43.7	17.9	32.9	5.6
Scottish Natural Heritage	39.0	12.0	31.1	17.5
Scottish Wildlife Trust	39.3	13.9	40.5	6.3
Whale and Dolphin Conservation Society	50.4	13.1	30.6	6.0
Friends Of the Earth	40.5	11.9	33.7	13.9



3.2.11 Participants' Perceptions of the Economy of Argyll

Figures 59 to 64 show perceptions in regard to the importance of fishing, aquaculture and tourism in Argyll. Table 42 shows percentages in tabular form. Fishing of both fish and shellfish was considered by the majority of participants to be very important to the Argyll area. The highest percentages for both types of aquaculture were more evenly divided between “very important” and “important”. Tourism was distinguished from the fishing and aquaculture industries in that there were representations for the category “very unimportant” but these industries were still considered by the majority of participants to be either important or very important. However, marine wildlife tourism was not seen by such a high percentage of participants to be very important by comparison with other types of tourism.

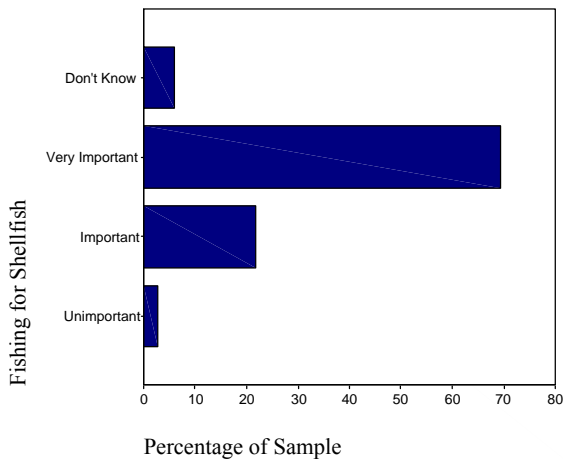


Figure 59: Participants' perceptions of the importance of fishing (shellfish).

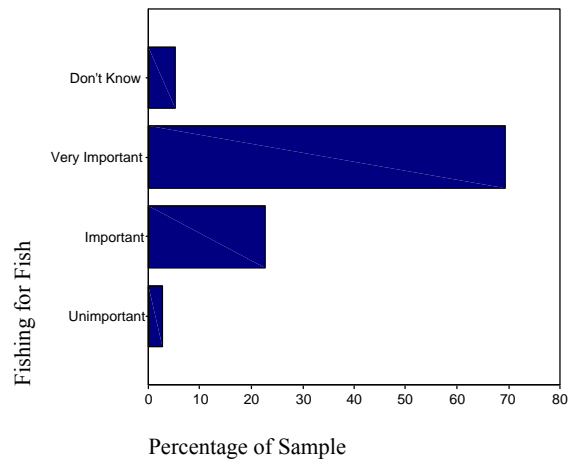


Figure 60: Participants' perceptions of the importance of fishing (fish).

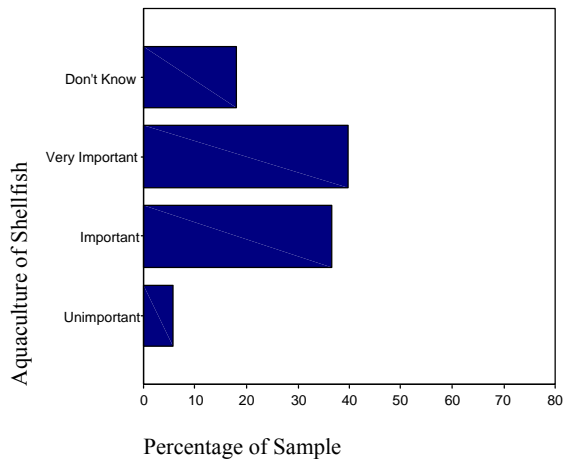


Figure 61: Participants' perceptions of the importance of aquaculture (shellfish).

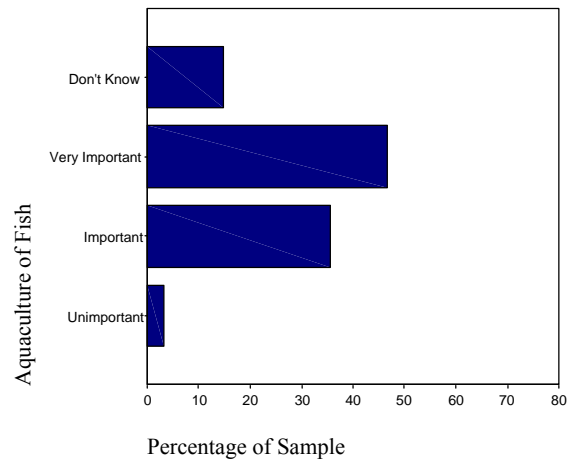


Figure 62: Participants' perceptions of the importance of aquaculture (fish).

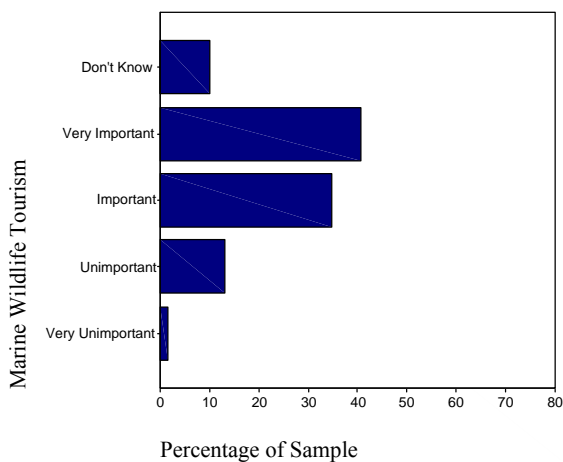


Figure 63: Participants' perceptions of the importance of marine wildlife tourism.

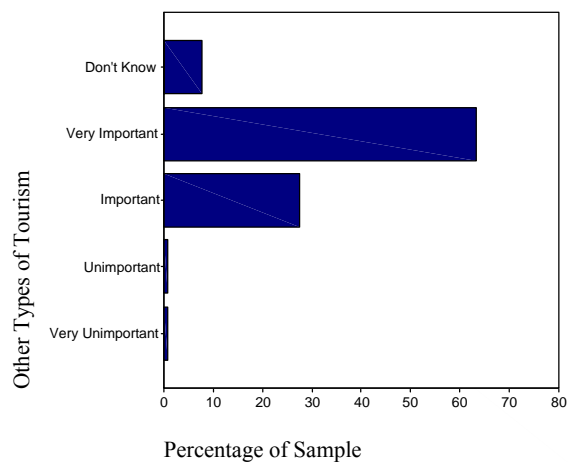


Figure 64: Participants' perceptions of the importance of other types of tourism.

Table 42: Importance of industries to the economy of Argyll (figures show percentages of participants within each industry).

Industry	Don't Know	Very Important	Important	Unimportant	Very Unimportant
Fishing (shellfish)	6.0	69.4	21.8	2.8	0
Fishing (fish)	5.2	69.4	22.6	2.8	0
Aquaculture (shellfish)	17.9	39.8	36.7	5.6	0
Aquaculture (fish)	14.7	46.6	35.5	3.2	0
Marine Wildlife Tourism and Whale Watching	10.0	40.6	34.7	13.1	1.6
Other Types of Tourism	7.6	63.2	27.6	0.8	0.8

4. DISCUSSION

4.1 The Level of Awareness of Cetaceans in Argyll

Awareness of cetaceans in Argyll was shown to be low. The majority of participants underestimated the number of cetacean species present in the waters of western Scotland, most answering that there are about half of the actual number. Furthermore, “don’t know” was the most common response to this question, given by over a quarter of all participants. Although the overall results concerning numbers of “yes” and “no” responses to the question regarding the presence of cetacean species in Argyll waters do reflect the correct answers, the number of participants answering “don’t know” was higher than those giving a definite answer in all cases except those of the harbour porpoise and bottlenose dolphin. These also proved to be the best known species in the photo-identification, although the great majority of participants were unable to identify the species.

Younger people, participants at Tobermory, participants who took part in more marine-related activities, members of charitable environmental organisations and those falling into the occupation category of “other” (as described in section 2.3) were found to perform better during the photo-identification.

Younger people, residents of Argyll, participants at Tobermory, participants who took part in more marine-related activities, members of charitable environmental organisations and participants who felt issues of marine conservation to be of importance showed better awareness of the presence / absence of cetacean species in Argyll waters.

4.2 Awareness of Threats to the Argyll Marine Environment and Cetaceans

Although the majority of participants identified fishing as being a major source of income for Argyll, it was clear that many participants were also aware of the environmental

impacts of commercial fishing methods, with over-fishing being the most common threat to the Argyll marine environment stated during the survey. Concerns regarding the scarcity of fish are reflected in the fact that “availability of prey (fish)” was seen as a serious threat to the cetaceans of western Scotland.

Sewage pollution was the second most often quoted threat to the Argyll marine environment. Participants in the survey also saw sewage pollution as being a moderate to significant threat to cetaceans in western Scotland. Sewage pollution would therefore seem to be a major source of concern in the region of Argyll.

Litter was the third most commonly stated threat, seemingly being a cause for much annoyance and frustration amongst participants in the survey because of its visual impact, obvious both to those who are much involved with the marine environment and those with a casual interest. Entanglement in or digestion of marine litter was furthermore seen as being a moderate to serious threat to the cetaceans of western Scotland.

Considering the responses as a whole, there was a wide variety of threats to the Argyll marine environment given, which in itself would suggest that participants were largely well-informed in regard to the problems facing the marine environment. However, 40 people, representing 16% of the total sample of 252, were either of the opinion that there were no threats at all to the marine environment of Argyll or did not know of any. Added to this is the fact that many participants gave only 1 or 2 threats as opposed to the requested 3, either because they knew of no more threats or because they were of the opinion that no more threats existed. The top three threats quoted, over-fishing, sewage and marine litter, are in accord with the findings of the Scottish Natural Heritage survey (Cobham Resource Consultants, 1996).

Most participants were aware that Japan and Norway hunt whales. Although younger participants were found to show greater awareness in other questions, the youngest age

group were found to be least aware of Japan and Norway's hunting activities. Tobermory participants, participants who took part in more marine-related activities, members of charitable environmental organisations and those falling into the occupation category of "other" were more aware of these activities. When asked for their opinions regarding a country such as Norway hunting whales in Scottish waters, the vast majority of participants replied that they would be strongly against this.

4.3 Awareness in Regard to the Protection of Argyll Cetaceans

Most participants were of the opinion that cetaceans are insufficiently protected in Scotland's waters and of these the vast majority (94.8%) would support the creation of specific legislation for their protection. The present situation is that specific legislation for the protection of cetaceans is lacking in the UK.

4.4 Level of Awareness of Other Marine Species Considered to be a National Conservation Priority

Awareness of the presence of cod and haddock was high (89.3 to 89.7% of participants), as was awareness of their threatened status. Awareness of the occurrence of oysters, common skate and the basking shark was fairly high (77.4, 63.9 and 71% respectively) although participants appeared to be less aware of their threatened status. There appeared to be a lot of confusion in regard to sealions; many seemingly had the impression that sealions and seals are one and the same. Awareness of the occurrence of the leatherback turtle in Scottish waters was low at 10.7%, although a high percentage (74.1%) of those that were aware of its presence were also aware that it is threatened. The orange roughy was recognised by only 2% of participants.

In general, younger people, residents of Argyll, participants taking part in more

marine-related activities and participants who felt that issues of marine conservation were important to them were found to be more aware of the presence / absence of threatened marine species in Scottish waters. Campbeltown participants were found to be most aware of the presence of the basking shark, whilst Islay participants were most aware of the absence of the sealion and Tarbert participants were most aware of the presence of the oyster. Participants who were members of one or more charitable environmental organisations were more aware of the presence of the leatherback turtle.

4.5 Opinions About Major Marine Conservation Issues Highly Relevant in Argyll

i) Seal Management

That the great majority of participants (69.1%) were against or strongly against seal culling (with 10.3% giving the answer “don’t know”) has been demonstrated. Those who agreed (20.7%) were largely of the opinion that seal numbers are too high and that they are doing damage to fish stocks and hence the fishing industry, or salmon nets. Three participants saw seal culling as probably being the easiest solution to tackle the problem.

For example:

“[culling would be the] easiest way to boost fish stocks for our benefit.”

Another participant saw seals as being “*vermin*” and the view that seal populations require control was widespread amongst those who agreed with culling. One participant thought that seal populations should be managed in the same way that wild deer populations are. Three participants thought that culling would be necessary for the sake of the seals themselves. For example:

“culling would be for their own sake – they wouldn’t survive anyway”; and

“monitoring is required – there are too many seals in places and there won’t be food for them all.”

Twelve participants who stated that they agreed with seal culling seemed not to be entirely sure of its necessity. For example:

“if they’re eating too many fish then they should be culled”;

“if they are proven to reduce fish stocks, they should be culled in certain areas”; and

“they probably predate on fish.”

A common reason quoted by participants against seal culling was that it could endanger seal populations. For example:

“although seals are plentiful now, disease and lack of food may naturally regulate them”;

and *“seals face enough threats already, disease could reduce their numbers.”*

Many participants were of the opinion that we should not interfere. For example:

“culling could cause further imbalance, it’s better to let nature sort itself out”;

“nature should be left alone, we interfere too much”;

“[culling] would interfere with the natural equilibrium”; and

“culling in my view upsets the balance, as does over-fishing.”

Other participants had the opinion that we simply had no right to cull seals. For example:

“who is to say that we decide how many of a species there should be?”; and

“what was here first – fish farms or seals?”

Other participants were of the opinion that seal populations are not so high:

“there are not so many seals in the Argyll area”;

“I don’t see enough seals”; and

“the seal population is not that large, I don’t see them so often.”

A participant in Tarbert stated:

“a cull of seals took place off Tarbert, tourists like to see them, now they are very scarce.”

The fact that seals are attractive animals was a fairly common reason stated:

“seals bring tourism and are a lovely part of the environment”; and

“seals are a part of Scotland.”

Many participants felt that seal culling is “*cruel*”, “*barbaric*” or “*inhumane*” and objected to it on ethical grounds. Some found that seals would only be culled for economic reasons, which they found unethical. For example:

*“seals would be culled for the wrong reasons – for interests of fish farms
and commercial interests”*; and

“seals would only be culled for money.”

The point was raised that there are other food sources than fish available to us. One participant specified that:

“if there was a danger to another species I would be prepared to listen to the argument.

Otherwise I am appalled, any living creature has a right to life.”

Participants commonly stated that they did not like culling methods and suggested alternatives, such as contraceptives. Some participants simply did not believe that seals do the harm that they are alleged to do and that culling was not necessary. For example:

“the seals are not a threat to fish stocks, if seals are breeding so are the fish.”

It was often thought that seals should not be blamed for low fish stocks and culling was often not seen to be the answer to the problem. For example:

“[culling is] not really tackling the source of the problem”;

*“it is man who is over-fishing, not the seals. I would suggest tackling the problem in a
different way – reduce fishing quotas or manage them better”*;

“fishermen bring low fish populations on themselves”;

*“there’s a lot of seals but over-fishing makes people too aggressive towards them – there
isn’t enough fish to catch”*;

“it’s man that has caused the problem, we shouldn’t kill other species to try to solve the problem”;

“there’s too much over-fishing and fish that are too small are taken”;

“modern fishery techniques are responsible for the problems, culling is not the answer”; and

“it’s just man’s greed that we want the fish to ourselves.”

It should be noted that fishermen and salmon farmers were not found to be unanimously in agreement with seal culling. During the survey two fishermen and one salmon farmer disagreed with seal culls, with one fisherman strongly disagreeing.

A significant difference was found in that more women were found to disagree with seal culling than men. Seal culling also showed a significant difference in terms of the age of participants with more younger people being in disagreement.

ii) Marine National Parks

Most participants (75.4%) answered that a Marine National Park would attract them as a tourist. The majority thought that it would be positive in terms of providing education, a source of interest, increased tourism and economic benefits whilst helping to conserve species and habitats. One participant stated:

“all bodies working for the environment would get together as they should do.

[They] would in theory have stricter control of marine life.”

Another participant said that Marine National Parks would *“provide pockets of sustainable marine ecosystems”*, whilst one stated that they *“would shape the relationship between society and the environment and mould the way people think and perceive the marine environment”*.

Reasons given as to why it may be negative included the concern that too much focus

would be given to one area, to the detriment of other regions. Some participants said that they found a Marine National Park hard to visualise since species would not be stationary and would move around. Some participants expressed concerns that the increased tourism could be detrimental to the environment and one participant specified that tourism should be “*encouraged in a sensible, i.e. eco-friendly way.*” Some participants feared that the resultant Government control would be over-restrictive / ineffectual. For example:

“*[A Marine National Park] would be over-management. Management should be left to organisations and land-owners, not the government.*”

Another feared:

“*[a Marine National Park] would get out of hand. It would be unfair that people would have to pay to see these things.*”

Another stated:

“*it wouldn't get enough support from the Government.*”

One participant stated:

“*[a Marine National Park] wouldn't make any difference. I'm not clear on the purpose, it might be too restrictive.*”

Another participant said:

“*[there] can be over-regulation – [there is] never enough local input.*”

Finally, one participant deemed Marine National Parks to be “*unnecessary*” whilst another feared that a Marine National Park would “*stop the development of fishing activities.*”

Importantly, it was clear that some participants did not understand what was meant by the term “Marine National Park”, with assumptions that captivity of animals would be involved being expressed.

5. CONCLUSIONS

❶ In terms of a management strategy, there is clearly a need for increased awareness of the cetaceans which inhabit the waters of Argyll and in particular, to inform people of the variety of species, which is at present greatly underestimated, placing emphasis on the less well known species such as Risso's dolphin. Education in regard to the identification of cetaceans is also necessary.

❷ The fact that participants in Tobermory were more aware of the cetaceans present in Argyll waters and showed better results in identification is most likely to be due at least in part to the activities of the Hebridean Whale and Dolphin Trust (HWDT) which has a visitor centre in this village. The establishment of informative visitor centres, such as that of the HWDT, in other locations would not only provide added interest in these locations but would seem to be an option which would ensure success in raising awareness amongst the public and is certainly merited in an area such as Argyll where the marine environment is so important to the region's economy. Whale watching has been shown to be a lucrative business in western Scotland (Warburton et al., 2001) and can only stand to benefit from raised awareness of the variety of cetaceans which may be observed. Awareness of the occurrence of cetaceans is also vital to conservation efforts.

❸ Awareness of the threats faced by the Argyll marine environment may be considered poor given the number of participants who were of the opinion that no threats existed or were unable to name any threats. There is a need to focus on this issue; however, the Scottish Natural Heritage report (Cobham Resource Consultants, 1996) recommended that people need to be encouraged to feel that they are able to take action in a positive manner. Raising

awareness of local issues and species and what people may do to contribute to conservation on their own doorstep is of therefore vital importance. In light of this it is important that greater efforts be made to raise the profile of poorly known yet threatened species in Scottish waters such as the orange roughy. There is also a requirement to improve awareness of the threatened status of better known species such as the common skate.

④ Although results indicating greater awareness amongst younger people are positive, there is a requirement for education schemes targeted towards older people. It was not found, as expected, that the group containing the categories “education professional”, “worker in the tourist industry”, “fisherman”, “salmon farmer” and “other user of the marine environment” achieved better results. Unfortunately participant numbers within each of these categories were too small to allow further valid comparisons to be made.

⑤ Strong support was shown for legislation in protection of cetaceans in Scotland’s waters. Such a result merits a larger poll being conducted with a view to the establishment of such legislation.

⑥ This study found that the majority of the Argyll population would be against a seal management (culling) programme.

⑦ The overall reaction of the people of Argyll to Marine National Parks was found to be highly positive, although there is a need to clarify what they would involve in practice.

6. REFERENCES

Anon. (2001a). *Information Leaflet Number 8 – Fish Stocks: West of Scotland Cod Stocks*. Fisheries Research Services.

Anon. (2001b). *Information Leaflet Number 4 – Fish Stocks: West of Scotland Haddock Stocks*. Fisheries Research Services.

Argyll and Bute Local Biodiversity Partnership (2000). *Biodiversity Newsletter No.1*. Argyll and Bute Council.

Cobham Resource Consultants (1996). *Review of Attitudes and Aspirations of People Towards the Marine Environment of Scotland with Respect to its Uses, Controls and Conservation Importance*. Scottish Natural Heritage Review No.67, 48pp.

Convention on the Conservation of Migratory Species of Wild Animals (1991). *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, 1991 (UNEP / ASCOBANS): Agreement Text*. http://www.wcmc.org.uk/cms/asc_bkrd.htm

Croll, D.A.; Clark, C.W.; Calambokidis, J.; Ellison, W.T.; Tershy, B.R. (2001). Effect of Anthropogenic Low-Frequency Noise on the Foraging Ecology of Balaenoptera Whales. *Animal Conservation* 4, 13-27

Frantzis, A. (1998). Does Acoustic Testing Strand Whales? *Nature* 392 (6671), 29-29

George, J.C.; Philo, L.M.; Hazard, K.; Withrow, D.; Carroll, G.M.; Suydam, R. (1994). Frequency of Killer Whale (*Orcinus orca*) Attacks and Ship Collisions Based on Scarring on Bowhead Whales (*Balaena mysticetus*) of the Bering-Chukchi-Beaufort Seas Stock. *Artic* 47, is247-255

Hebridean Whale and Dolphin Trust (2000). *Education and Research Report 1999/2000*. Hebridean Whale and Dolphin Trust.

- Herwig, R.P.; Gray, J.P.; Weston, D.P. (1997). Antibacterial Resistant Bacteria in Surficial Sediments Near Salmon Net-Cage Farms in Puget Sound, Washington. *Aquaculture*, vol.149, iss.3-4, 263-283
- Highlands and Islands Enterprise (2000). *Highlands and Islands Enterprise 8th Report 1998-1999*. Highlands and Islands Enterprise, Inverness. 96pp.
- Highlands and Islands Enterprise (2001). <http://www.aie.co.uk/>
- Joint Nature Conservation Committee (2001). *UK Biodiversity Website*. <http://www.ukbap.org.uk/default.htm>
- Laist, D.W.; Knowlton, A.R.; Mead, J.G.; Collet, A.S.; Podesta, M. (2001). Collisions Between Ships and Whales. *Marine Mammal Science* 17, 35-75
- Leonard, K.S.; McCubbin, D.; Brown, J.; Bonfield, R.; Brooks, T. (1997). Distribution of Technetium-99 in UK Coastal Waters. *Marine Pollution Bulletin* 34, 628-636
- Marine Conservation Society (n.d.). <http://www.mcsuk.org/>
- Morizur, Y., Berrow, S.D., Tregenza, N.J.C, Couperus, A.S., Pouvreau, S. (1999). Incidental Catches of Marine Mammals in Pelagic Trawl Fisheries of the Northeast Atlantic. *Fisheries Research* 41, 297-307
- Parsons, E.C.M. (1997). *Sewage Pollution in Hong Kong: Implications for the Health and Conservation of Local Cetaceans*. Friends of the Earth, Hong Kong, 42pp.
- Parsons, E.C.M.; Shrimpton, J.; Evans, P.G.H. (2000). Cetacean Conservation in Northwest Scotland: Perceived Threats to Cetaceans. *European Research on Cetaceans* 13, 128-133.
- Richardson, W.J.; Greene Jr., C.R.; Malme, C.I.; Thomson, D.H. (1995). *Marine Mammals and Noise*. Academic Press, 576pp.
- Scottish Executive (1994). <http://www.scotland.gov.uk/library3/localgov/fs12-06.asp>

Scottish Executive (2001).

http://www.scotland.gov.uk/who/elld/_LA_Data/Argyll%20&%20Bute.xls

Scottish Natural Heritage (n.d.). *Operational Plan 2000/2001: Programme 6 - Encouraging Sustainable Use of Maritime Areas*. www.snh.org.uk

Shrimpton, J.H.; Parsons, E.C.M. (2000). *Cetacean Conservation in West Scotland*. Hebridean Whale and Dolphin Trust. 85pp.

Smith, V.; Fegan, M.; Pollard, D; Long, S.; Hayden, E.; Ryan, T.P. (2001). Technetium-99 in the Irish Marine Environment. *Journal of Environmental Radioactivity* 56, 269-284

Warburton, C. (1999). *Marine Wildlife Tourism and Whale-Watching on the Island of Mull, West Scotland*. MSc. Thesis, University of Kent, UK. 100pp.

Warburton, C.A.; Parsons, E.C.M.; Woods-Ballard, A.; Hughes, A; Johnson, P. (2001). *Whale-Watching in West Scotland: Report for the Department for Environment, Food and Rural Affairs*. Hebridean Whale and Dolphin Trust. 81pp.

Watling, L.; Norse, E.A. (1998). Disturbance of the Seabed by Mobile Fishing Gear: A Comparison to Forest Clearcutting. *Conservation Biology* 12, 1180-1197



Appendix 1

List of cetacean species occurring in the Argyll region

- ◆ Atlantic white-sided dolphin, *Lagenorhynchus acutus*.
- ◆ Beluga whale, *Delphinapterus leucas*.
- ◆ Blue whale, *Balaenoptera musculus*.
- ◆ Bottlenose dolphin, *Tursiops truncatus*.
- ◆ Common dolphin, *Delphinus delphis*.
- ◆ Cuvier's beaked whale, *Ziphius cavirostris*.
- ◆ Fin whale, *Balaenoptera physalus*.
- ◆ Harbour porpoise, *Phocoena phocoena*.
- ◆ Humpback whale, *Megaptera novaeangliae*.
- ◆ Killer whale, *Orcinus orca*.
- ◆ Long-finned pilot whale, *Globicephala melaena*.
- ◆ Minke whale, *Balaenoptera acutorostrata*.
- ◆ Northern bottlenose whale, *Hyperoodon ampullatus*.
- ◆ Risso's dolphin, *Grampus griseus*.
- ◆ Sei whale, *Balaenoptera borealis*.
- ◆ Sowerby's beaked whale, *Mesoplodon bidens*.
- ◆ Sperm whale, *Physeter macrocephalus*.
- ◆ Striped dolphin, *Stenella coeruleoalba*.
- ◆ White-beaked dolphin, *Lagenorhynchus albirostris*.

(Shrimpton and Parsons, 2000)

Appendix 2

Questionnaire

1. Are you: Male Female

2. Year of birth: _____

3. Do you live in Argyll? Yes No

4. If you answered “no” to question 3, where do you come from? Please specify country and if you come from elsewhere in Scotland, please state region:

Please also state your reasons for being in Argyll at this time (e.g. tourism):

5. What is your present occupation?

Employed - please specify job title: _____

Self-employed - please specify job title: _____

Unemployed

Retired

Student

6. Do you partake in any of the following activities regularly? (Tick all that apply.)

Swimming in the sea

Visiting beaches / coast

Sailing (in marine waters)

Use of any type of motorboat / motorised fishing vessel (in marine waters)

Surfing / windsurfing

Diving / snorkelling

Canoeing

Sea angling

7. Are you a member of any charitable environmental organisations? Please list below:

8. How important are issues of marine conservation to you personally?

Very Important Important Unimportant Very Unimportant

9. In your opinion, what are the top 3 threats to the Argyll marine environment?

1. _____

2. _____

3. _____

10. How many species of cetacean (whales, dolphins and porpoises) occur in the waters of western Scotland?

None 1-5 6-10 11-15 16-20 21-30 31-40 More Than 40 Don't Know

11. Can you identify these cetaceans? [Pictures.]

	<u>Correct</u>	<u>Incorrect</u>	<u>Don't Know</u>
A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Do the following species of cetacean occur in the Argyll region?

Risso's dolphin	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Bottlenose dolphin	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Bryde's whale	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Sperm whale	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Harbour porpoise	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Gray whale	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
Minke whale	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know

13. Which of the following do you perceive to be a threat to the cetaceans which occur in the waters of western Scotland?

	Serious Threat	Moderate Threat	Minor Threat	No Threat	Don't Know
Hunting / commercial whaling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accidental entrapment during fishing operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Injury from boat traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entanglement in / digestion of marine litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radioactive waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bacteria from sewage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pollution from shipping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pollution from fish farms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pollution from land-based sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduction in availability of prey (fish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whale watching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Military activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quarrying operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dredging activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil spills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil exploration (seismic surveys)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How well do you think cetaceans are protected in Scotland's waters?

Over-Protected Sufficiently Protected Not Sufficiently Protected Don't Know

15. If you answered in question 15 that cetaceans are "not sufficiently protected" in Scotland's waters, do you think there should be legislation created by the Scottish Parliament specifically to protect cetaceans in Scotland's waters?

Yes No Don't Know

16. How effective do you consider the following organisations to be in conserving the Scottish Marine Environment?

	Very Effective	Fairly Effective	Not Effective	Don't Know
Greenpeace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
International Fund for Animal Welfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hebridean Whale and Dolphin Trust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worldwide Fund for Nature (WWF)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National Trust for Scotland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marine Conservation Society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Scottish Natural Heritage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scottish Wildlife Trust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whale and Dolphin Conservation Society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends Of the Earth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Do the following species occur in Scotland's waters? If so, are they a threatened species in Scotland's waters? (Circle appropriate answers.)

Basking shark	Present: Y / N / DK	Threatened: Y / N / DK
Leatherback turtle	Present: Y / N / DK	Threatened: Y / N / DK
Common skate	Present: Y / N / DK	Threatened: Y / N / DK
Bull shark	Present: Y / N / DK	Threatened: Y / N / DK
Cod	Present: Y / N / DK	Threatened: Y / N / DK
Haddock	Present: Y / N / DK	Threatened: Y / N / DK
Sealion	Present: Y / N / DK	Threatened: Y / N / DK
Orange roughy	Present: Y / N / DK	Threatened: Y / N / DK
Oyster	Present: Y / N / DK	Threatened: Y / N / DK

18. How well do you think seals are protected in Scotland's waters?

- Over-Protected Sufficiently Protected Not Sufficiently Protected Don't Know

19. Fishery groups have called for a cull of seals in Scotland. Do you agree that seals should be culled?

- Strongly Agree Agree Disagree Strongly Disagree Don't Know

20. What are your reasons for your answer to question 19? Please state below:

21. How important are the following to the economy of Argyll?

	Very Important	Important	Unimportant	Very Unimportant	Don't Know
Fishing (shellfish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing (fish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquaculture (shellfish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquaculture (fish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marine wildlife tourism and whale watching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other types of tourism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. If there was a Marine National Park in an area of Scotland, would it attract you to that area as a tourist?

- Yes No Don't Know

23. Do you think that Marine National Parks would be a good or a bad idea in Scotland? Please state your reasons:

24. Did you know that Japan and Norway are currently hunting whales?

- Yes No

25. How would you feel about a country such as Norway hunting whales or dolphins from the same populations as those which inhabit Scottish waters?

- Strongly For For Against Strongly Against Don't Know

Appendix 3

Detailed Account of Demographic Results

Gender Ratios

Figure 1 shows the gender ratio for the entire sample, whilst Figures 2 to 6 show gender ratios for all sample sites. It can be seen that male participants exceeded female participants at all sites, particularly Glasgow, where males formed 75% of the sample.

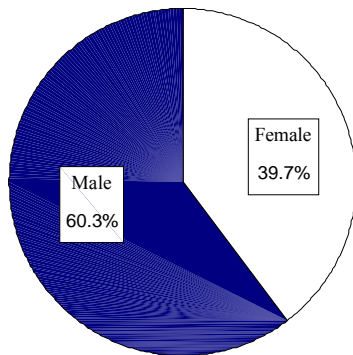


Figure 1: Gender ratio of entire sample.

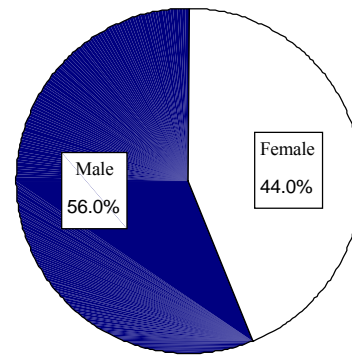


Figure 2: Gender ratio of Islay sample.

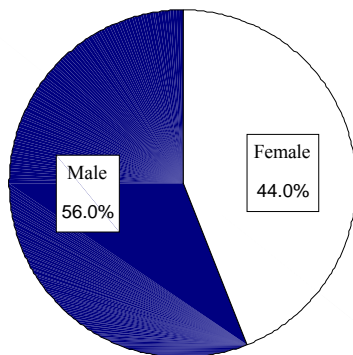


Figure 3: Gender ratio of Campbeltown sample.

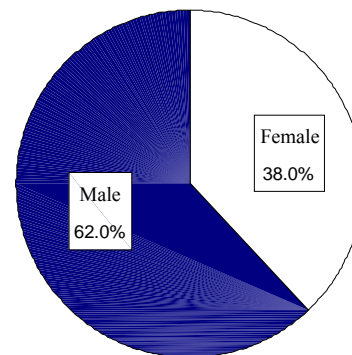


Figure 4: Gender ratio of Tarbert sample.

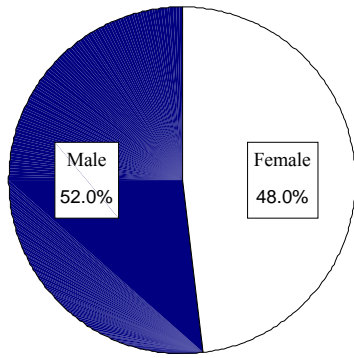


Figure 5: Gender ratio of Tobermory sample.

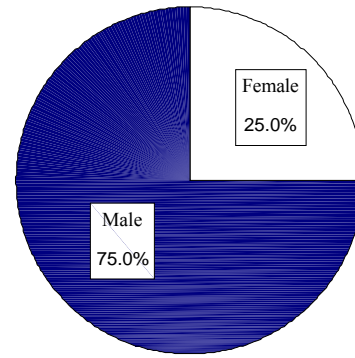


Figure 6: Gender ratio of Glasgow sample.

Figure 7 shows the age distribution for the entire sample and Figures 8 to 12 show the age distributions for each individual sample site. Most people were born during the 1951-1960 period, although Tobermory is seen to have a relatively high proportion of younger participants with most people falling into the 1971-1980 category.

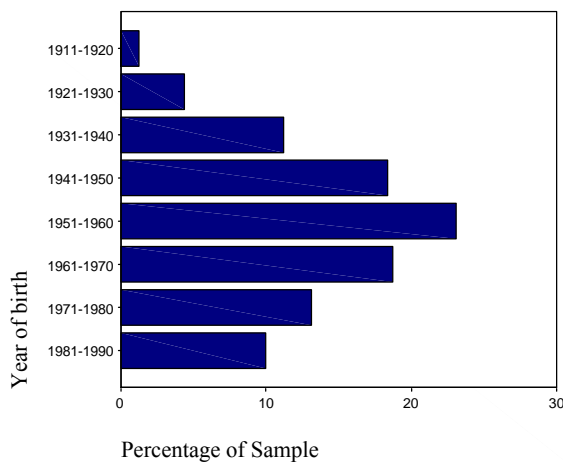


Figure 7: Age distribution of entire sample.

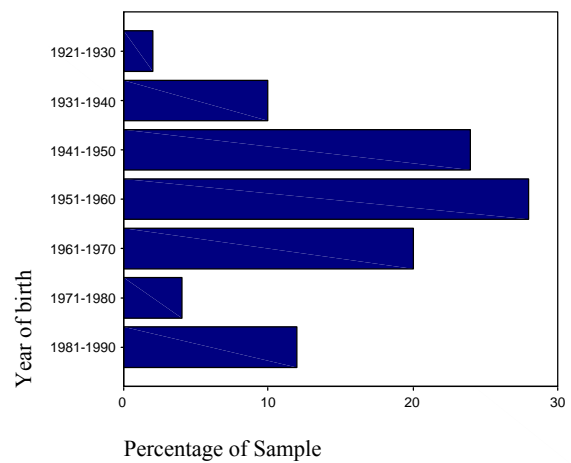


Figure 8: Age distribution of Islay sample.

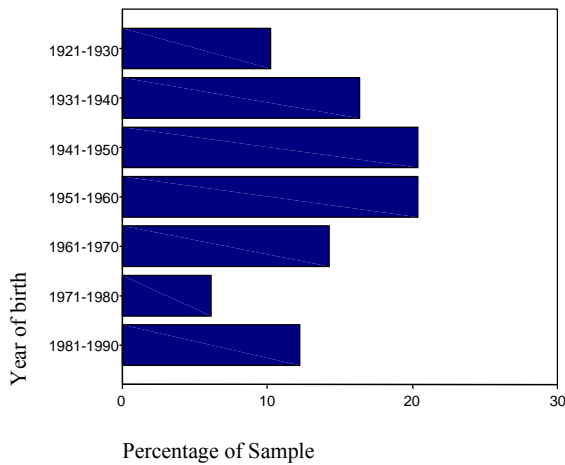


Figure 9: Age distribution of Campbeltown sample.

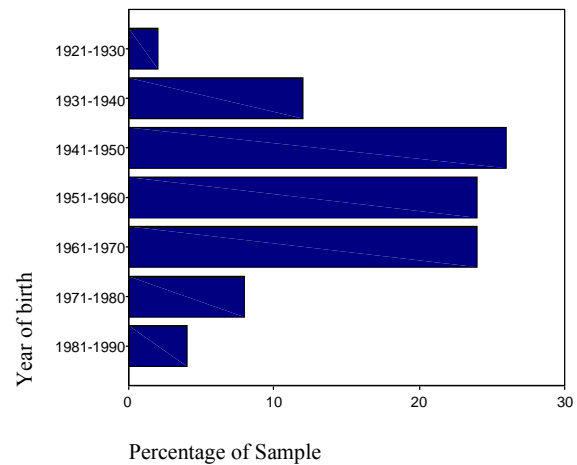


Figure 10: Age distribution of Tarbert sample.

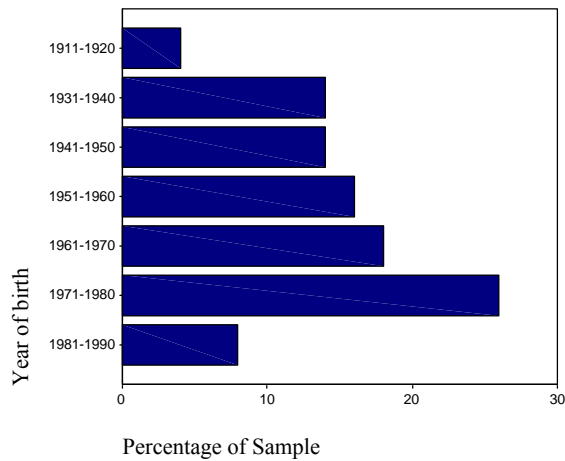


Figure 11: Age distribution of Tobermory sample.

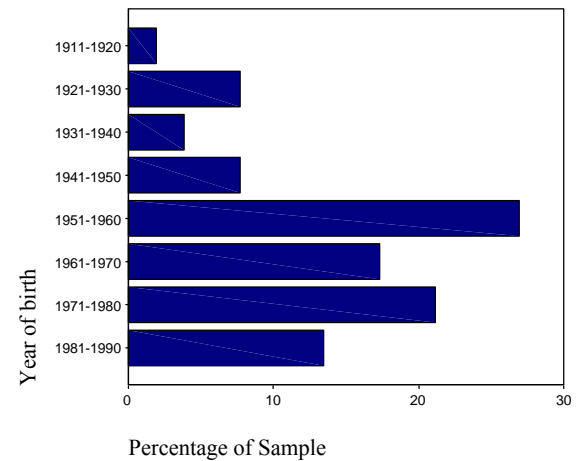


Figure 12: Age distribution of Glasgow sample.

Percentages of Participants Local to Survey Area

Figure 13 illustrates what percentage of participants within the entire sample were locals of the area in which the questionnaires were conducted, either Argyll or Glasgow. (People from Glasgow interviewed in Argyll are categorised as non-resident.) Figures 14 to 17 show what percentage of participants at the various sites in Argyll were residents of Argyll, whilst Figure 18 shows the percentage of people who took part in the survey in Glasgow who were residents of Glasgow. Resident percentages vary from 42% to 52% at most sites with the notable exception of Campbeltown where 76% of participants were residents.

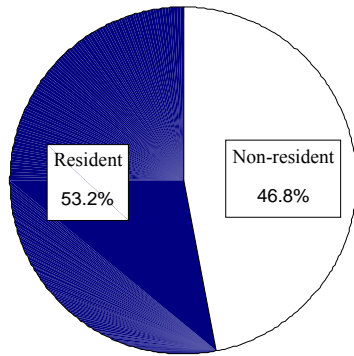


Figure 13: Proportion of residents / non-residents (entire sample).

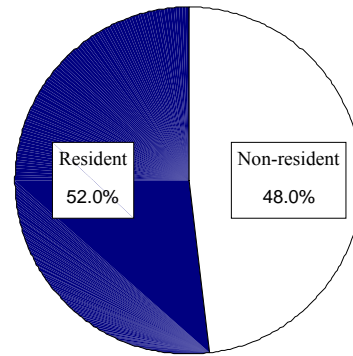


Figure 14: Proportion of residents / non-residents (Islay sample).

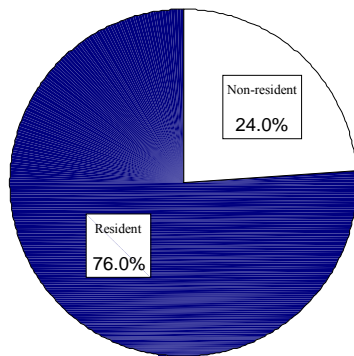


Figure 15: Proportion of residents / non-residents (Campbeltown sample).

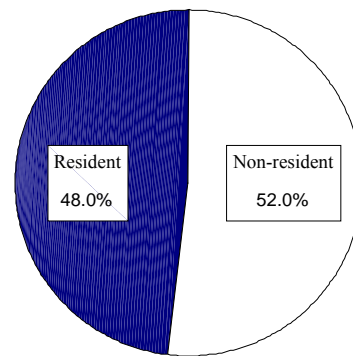


Figure 16: Proportion of residents / non-residents (Tarbert sample).

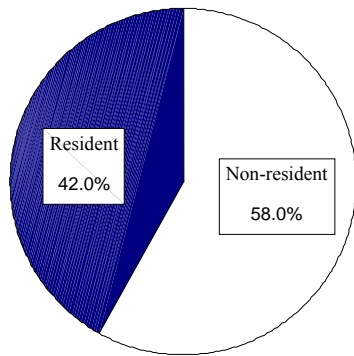


Figure 17: Proportion of residents / non-residents (Tobermory sample).

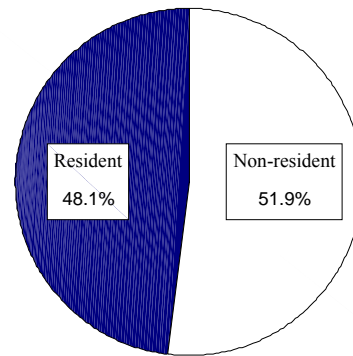


Figure 18: Proportion of residents / non-residents (Glasgow sample).

Places of Residence of Participants

Figure 19 illustrates the places of residence of all participants. (Those participants interviewed in Argyll who were resident in Glasgow are classified as coming from elsewhere in Scotland.) Figures 20 to 23 show the places of residence of participants in Argyll, whilst Figure 24 shows the places of residence of participants interviewed in Glasgow. Much the same pattern is exhibited in all samples apart from Campbeltown, where there are proportionately more locals / fewer visitors.

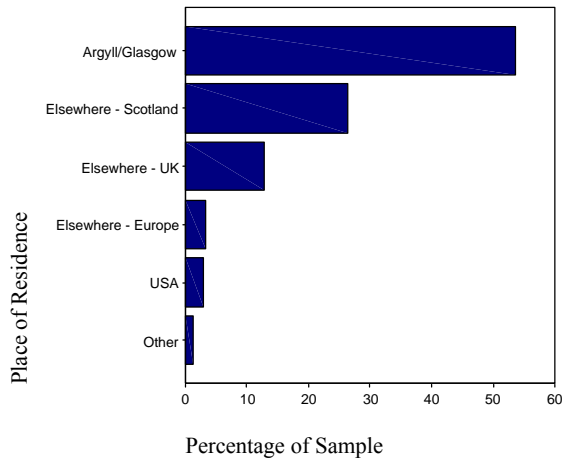


Figure 19: Place of residence of participants (entire sample).

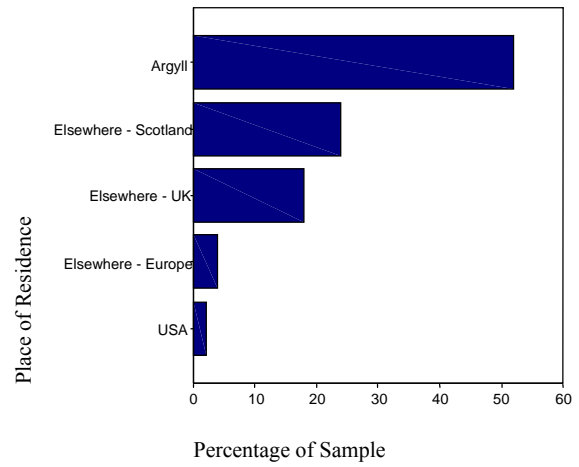


Figure 20: Places of residence of participants (Islay sample).

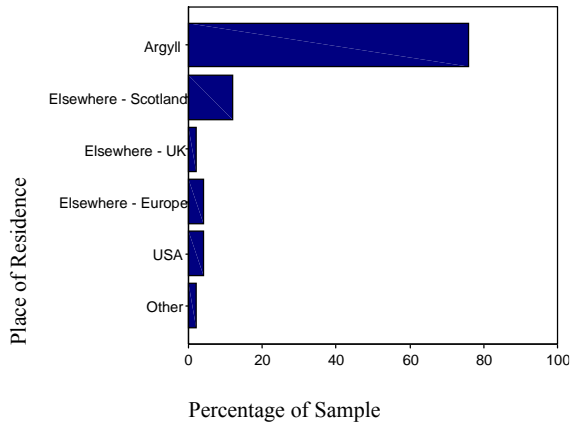


Figure 21: Places of residence of participants (Campbeltown sample).

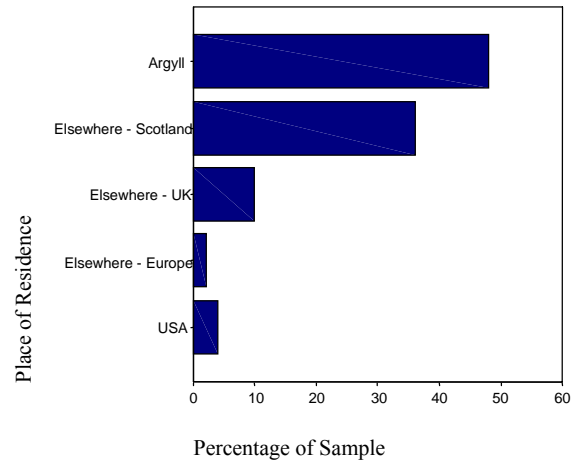


Figure 22: Places of residence of participants (Tarbert sample).

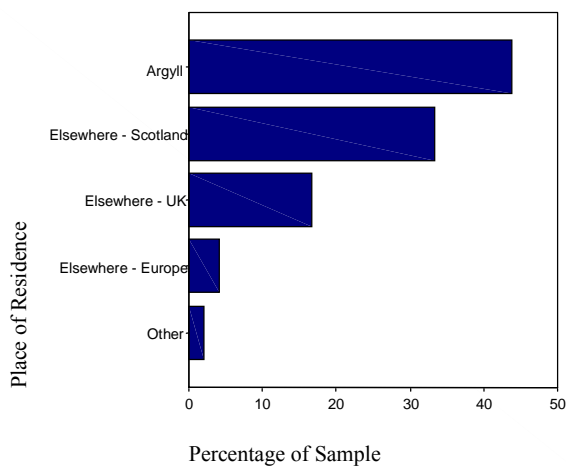


Figure 23: Places of residence of participants (Tobermory sample).

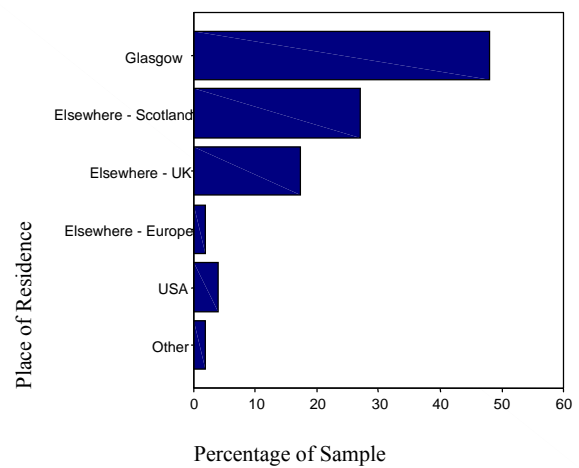


Figure 24: Places of residence of participants (Glasgow sample).

Non-residents Reasons for Being in Argyll / Glasgow

Figure 25 illustrates the reasons given by all non-residents for being in the Argyll or Glasgow area. Figures 26 to 29 show reasons given by Argyll participants of each sample site for being in the area whilst Figure 30 shows participants' reasons for being in Glasgow. The survey having been conducted during the summer season, it is not surprising that most non-residents were found to be holiday-makers.

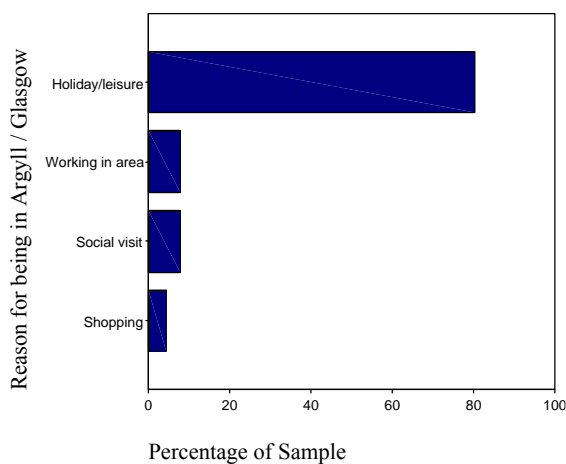


Figure 25: Non-residents' reasons for being in Argyll / Glasgow.

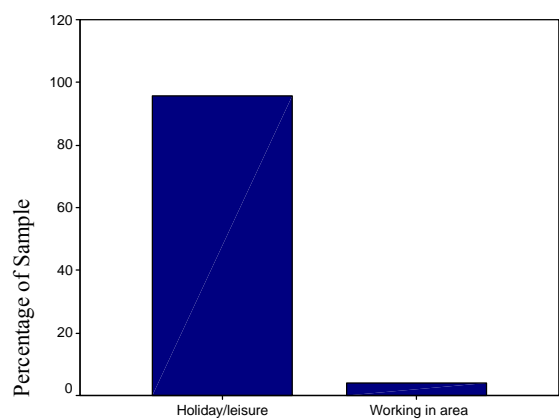


Figure 26: Non-residents' reasons for being in Argyll (Islay sample).

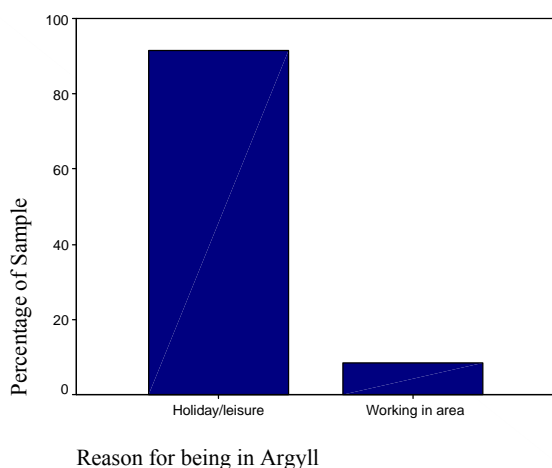


Figure 27: Non-residents' reasons for being in Argyll (Campbeltown sample).

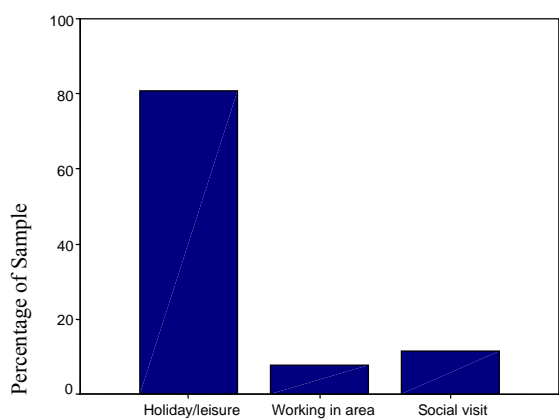


Figure 28: Non-residents reasons for being in Argyll (Tarbert sample).

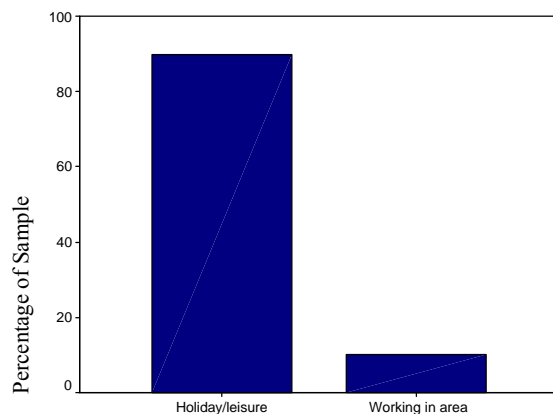


Figure 29: Non-residents' reasons for being in Argyll (Tobermory sample).

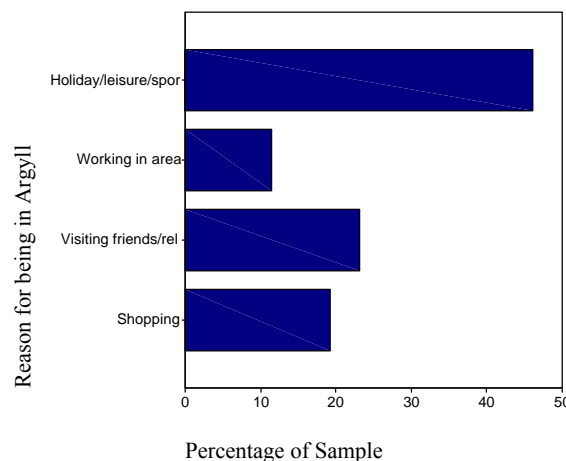


Figure 30: Non-residents' reasons for being in Glasgow

Occupations

Figure 31 shows the occupations of all participants, whilst figures 32 to 36 illustrate the occupations of participants at the various sample sites.

The category “tourist industry” includes members of the Tourist Board as well as hotel and guesthouse owners. “Working on the land” includes farmers, horticulturists and, for example, gamekeepers. As well as “fisherman / salmon farmer”, the category “other users of the marine environment” is included into which, for example, marine surveyors are placed. “Other – non-professional” also includes craftsmen (such as painters and decorators) and labourers (such as coal miners). Not all categories were represented at all sample sites.

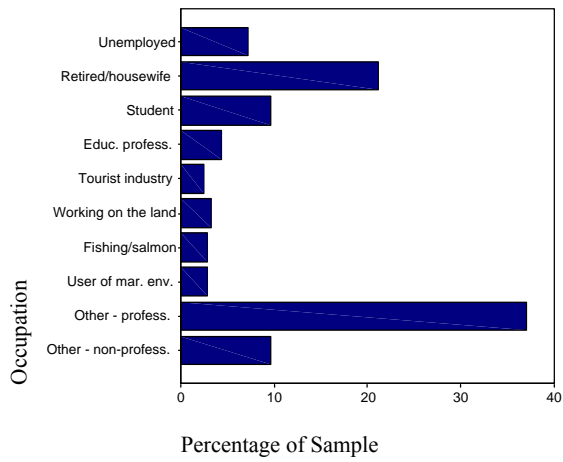


Figure 31: Occupations of entire sample.

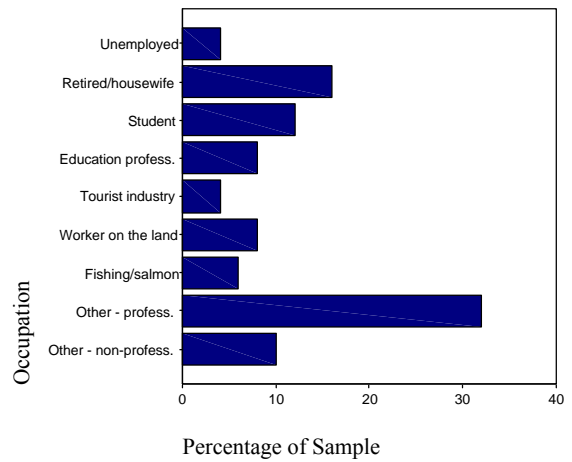


Figure 32: Occupations of Islay participants.

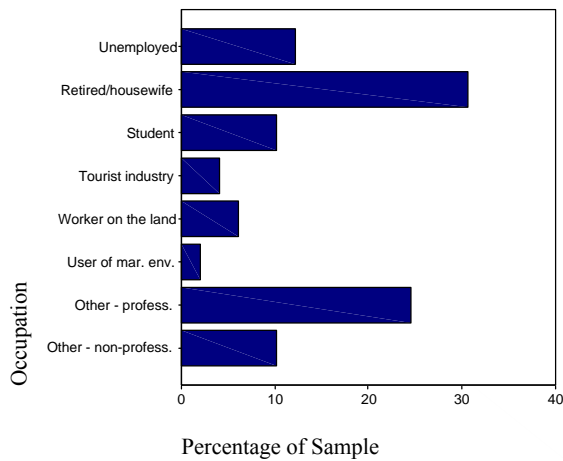


Figure 33: Occupations of Campbeltown participants.

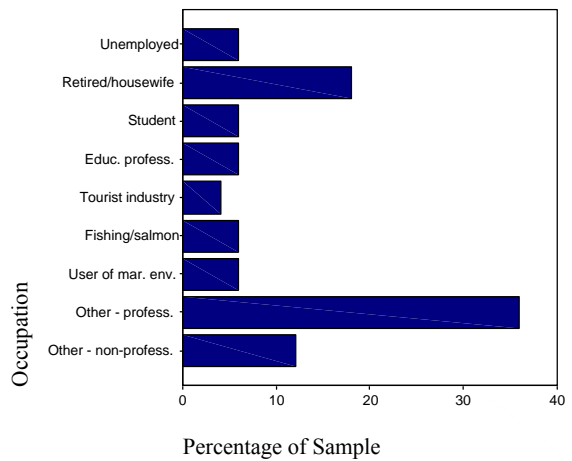


Figure 34: Occupations of Tarbert participants.

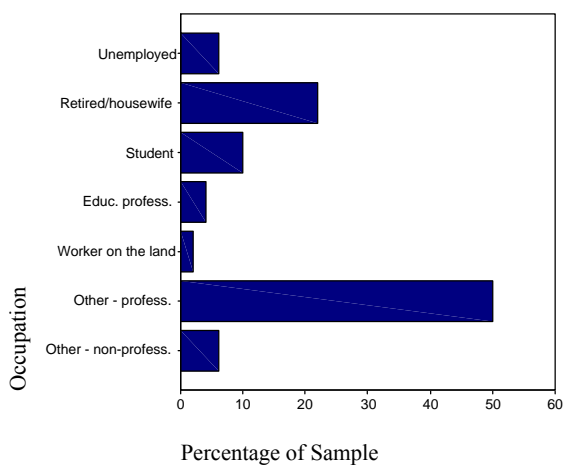


Figure 35: Occupations of Tobermory sample.

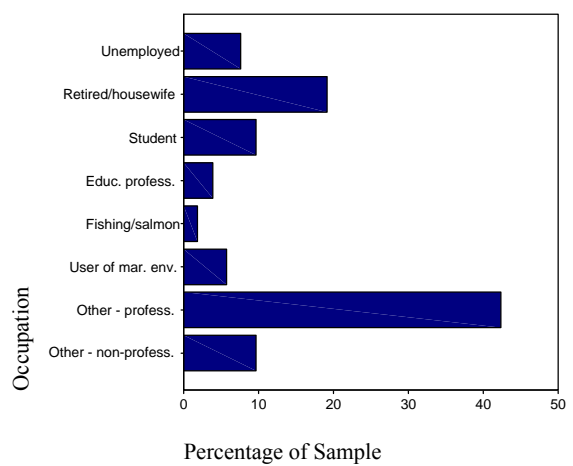


Figure 36: Occupations of Glasgow sample.

How Important Issues of Marine Conservation are to Participants

Figure 37 shows percentages of all participants who regard issues of marine conservation as “very important”, “important” or “unimportant”, whilst figures 38 to 42 illustrate this information for the separate sample sites. Although the category “very unimportant” was provided in the survey, no participants chose this option. Regarding the figures for all samples together, it can be seen from Table 1 that participants were divided between “very important” and “important” equally. Only 7.1% saw marine conservation issues as being unimportant to them. The highest figures for the “unimportant” category occurred in Tobermory with 12%, followed closely by Campbeltown with 10%. However, Campbeltown also had the highest percentage in the “very important” category, at 52%. The lowest percentage of people who found marine conservation issues unimportant occurred in Tarbert, where only 2% chose this option.

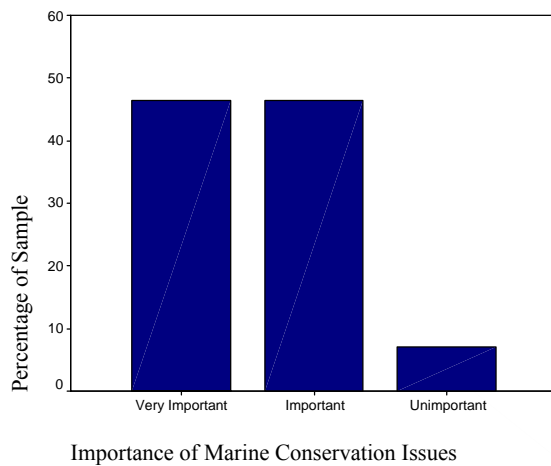


Figure 37: Importance of marine conservation issues (entire sample).

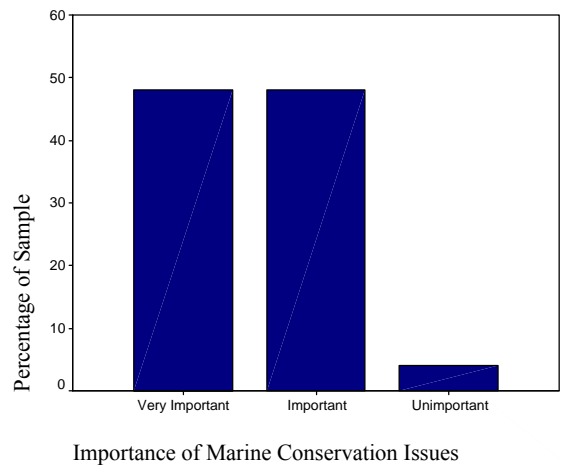
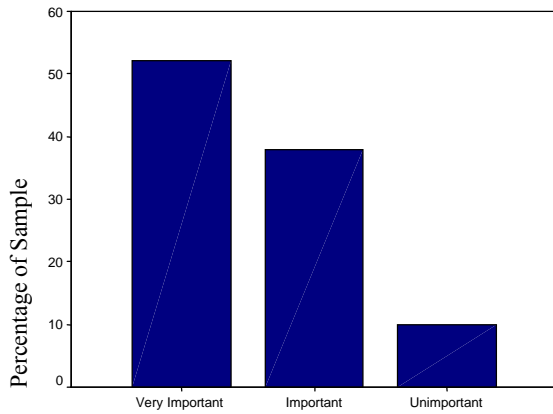
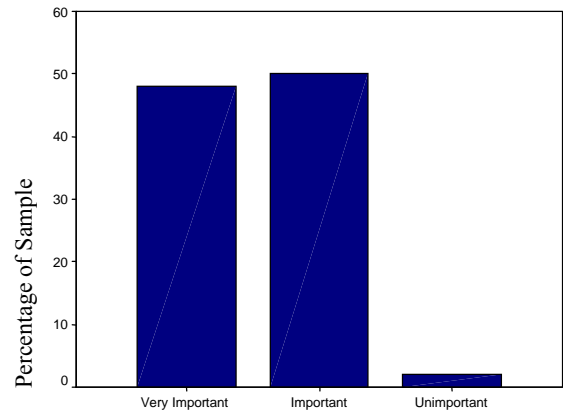


Figure 38: Importance of marine conservation issues (Islay sample).



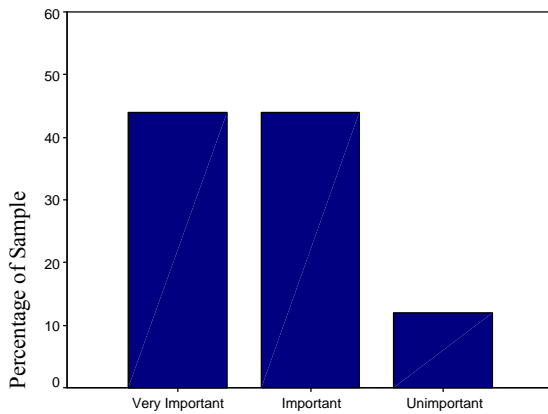
Importance of Marine Conservation Issues

Figure 39: Importance of marine conservation issues (Campbeltown sample).



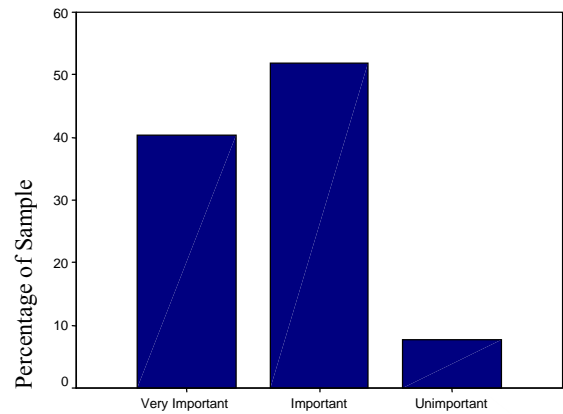
Importance of Marine Conservation Issues

Figure 40: Importance of marine conservation issues (Tarbert sample).



Importance of Marine Conservation Issues

Figure 41: Importance of marine conservation issues (Tobermory sample).



Importance of Marine Conservation Issues

Figure 42: Importance of marine conservation issues (Glasgow sample).

Table 1: Summary table of importance of marine conservation issues at each sample site (figures show percentages of participants for each sample site).

Importance of Marine Conservation Issues	Sample Site					
	All Sites	Islay	Campbeltown	Tarbert	Tobermory	Glasgow
Very Important	46.4	48.0	52.0	48.0	44.0	40.4
Important	46.4	48.0	38.0	50.0	44.0	51.9
Unimportant	7.1	4.0	10.0	2.0	12.0	7.7
Very Unimportant	0	0	0	0	0	0

Number of Charitable Environmental Organisations of which Participants were Members

Figure 43 shows the percentages of participants of all sample sites which were members of 0, 1, 2, 3 or 4 or more charitable environmental organisations. Figures 44 to 48 show the same information for all sample sites individually. It can clearly be seen that by far the majority of participants were not members of any organisations at all. Campbeltown shows the highest number of participants who were not members of any organisations at 94% (see Table 2). The Tobermory sample shows the lowest number of participants who were not members of any organisations with 64%.

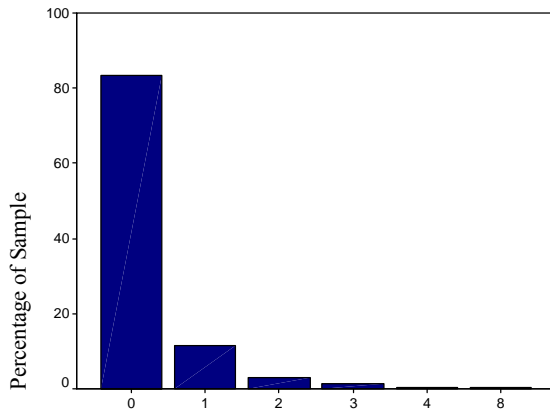


Figure 43: Number of environmental organisations (entire sample).

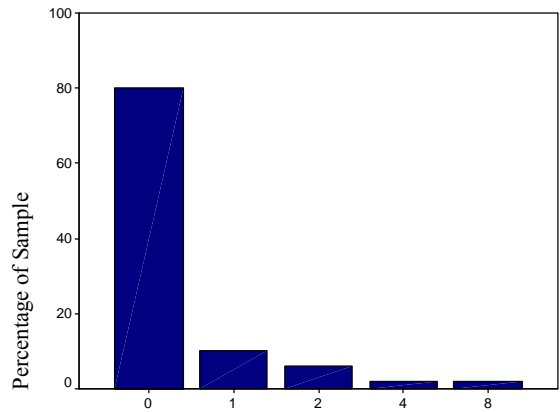


Figure 44: Number of environmental organisations (Islay sample).

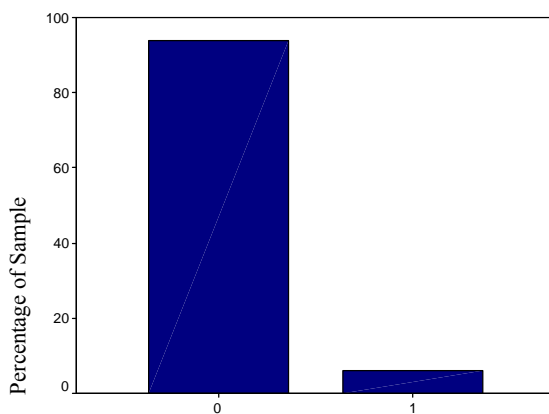


Figure 45: Number of environmental organisations (Campbeltown sample).

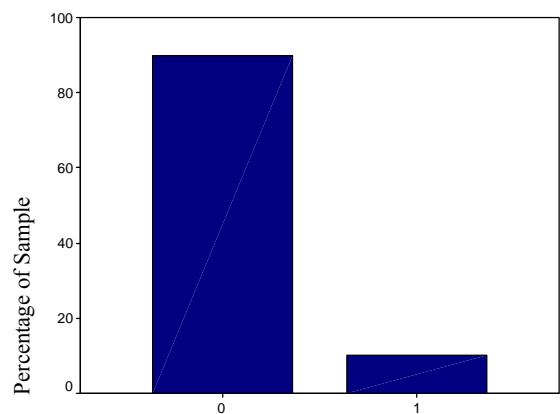


Figure 46: Number of environmental organisations (Tarbert sample).

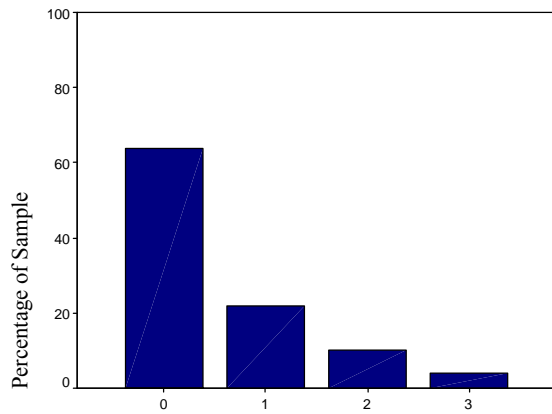


Figure 47: Number of environmental organisations (Tobermory sample).

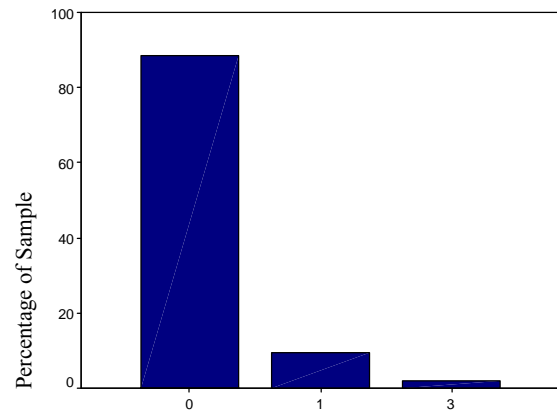


Figure 48: Number of environmental organisations (Glasgow sample).

Table 2: Participants who are members of charitable environmental organisations (figures show percentages of participants for each sample site).

No. of Organisations	Sample Site					
	All Sites	Islay	Campbeltown	Tarbert	Tobermory	Glasgow
0	83.3	80.0	94.0	90.0	64.0	88.5
1	11.5	10.0	6.0	10.0	22.0	9.6
2	3.2	6.0	0	0	10.0	0
3	1.2	0	0	0	4.0	1.9
4 or More	0.8	4.0	0	0	0	0

Number of Marine-Related Activities in which Participants are Involved

Figure 49 shows the percentages of all participants taking part in different numbers of marine-related activities, whilst Figures 50 to 55 show this information for each of the separate sample sites separately, the information is also summarised in Table 3. Most participants are found to engage in 1 activity. Campbeltown is notable in that no participants took part in more than 4 activities. Table 4 shows the percentages of participants from the entire sample taking part in each of the activities - visiting beaches or the coast is predictably the most common at 67%.

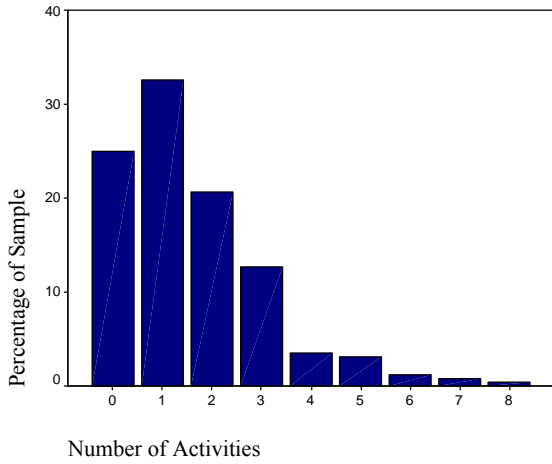


Figure 49: Number of activities (entire sample).

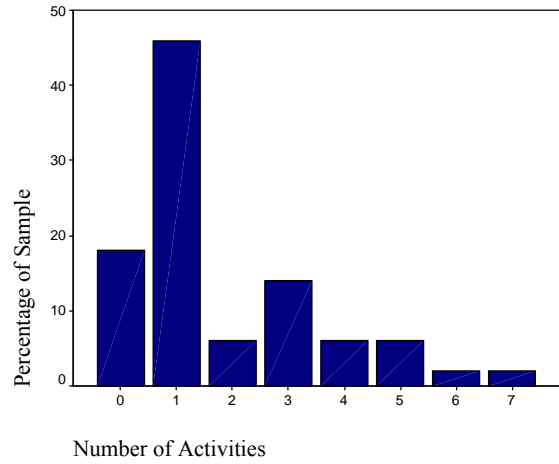


Figure 50: Number of activities (Islay sample).

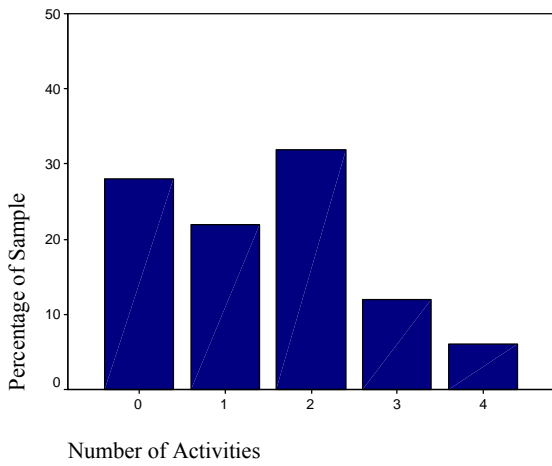


Figure 51: Number of activities (Campbeltown sample).

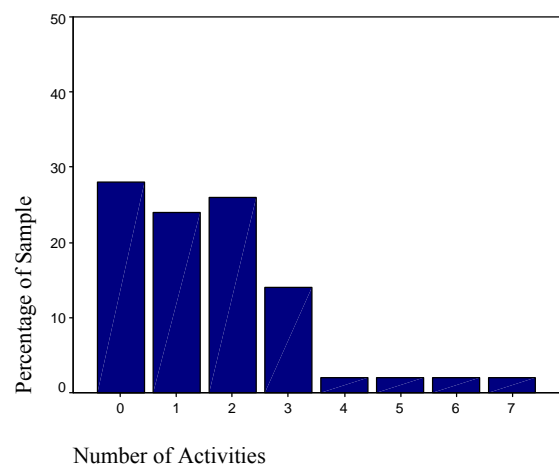


Figure 52: Number of activities (Tarbert sample).

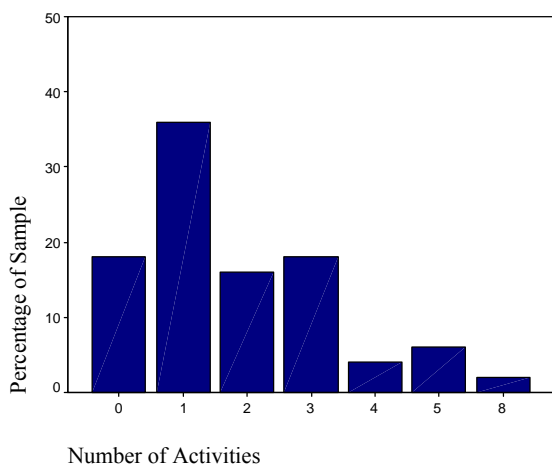


Figure 53: Number of activities (Tobermory sample).

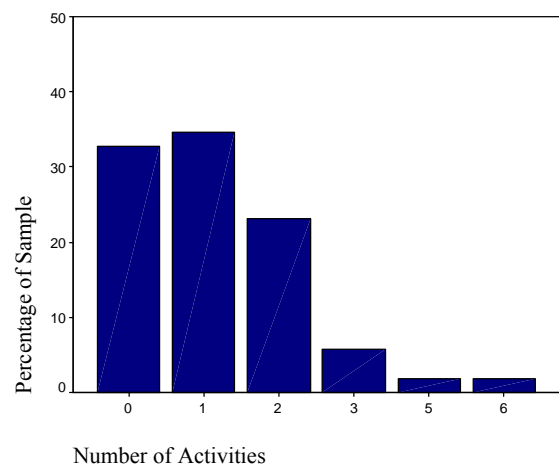


Figure 54: Number of activities (Glasgow sample).

Table 3: Participants taking part in different numbers of activities (figures show percentages of participants for each sample site).

Number of Activities	Sample Site					
	All Sites	Islay	Campbeltown	Tarbert	Tobermory	Glasgow
0	25.0	18.0	28.0	28.0	18.0	32.7
1	32.5	46.0	22.0	24.0	36.0	34.6
2	20.6	6.0	32.0	26.0	16.0	23.1
3	12.7	14.0	12.0	14.0	18.0	5.8
4	3.6	6.0	6.0	2.0	4.0	0
5	3.2	6.0	0	2.0	6.0	1.9
6	1.2	2.0	0	2.0	0	1.9
7	0.8	2.0	0	2.0	0	0
8	0.4	0	0	0	2.0	0

Table 4: Percentages of participants taking part in each activity (entire sample).

Activity	Percentage of Participants (Entire Sample)
Swimming in the Sea	31.3
Visiting Beaches / Coast	67.1
Sailing (in Marine Waters)	15.9
Use of Any Type of Motorboat / Motorised Fishing Vessel (in Marine Waters)	13.1
Surfing / Windsurfing	4.0
Diving / Snorkelling	6.7
Canoeing	7.5
Sea Angling	12.3