



Incorporating visitor experiences into ecologically sustainable dwarf minke whale tourism in the northern Great Barrier Reef

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FOREWORD

The development and extent of the swim-with-dwarf minke whale industry on the Great Barrier Reef was described in 1999 by Dr Peter Arnold and Dr Alastair Birtles in CRC Reef Research Centre Technical Report No. 27. In that report they outlined an incipient industry that is one of the most exciting and pleasurable experiences available to tourists on the Reef.

By collaborating with industry participants and marine park managers, Dr Birtles, Dr Arnold and their co-workers have developed and refined a Code of Practice to govern minke whale - human interactions. They have also assisted in management of these interactions by coordinating an annual workshop to both explain the Code and present recent research findings to industry operators. In addition, they have developed an impressive array of educational material for operators and tourists which have been placed on vessels involved with the industry and on the CRC Reef Research Centre website (www.reef.crc.org.au)

In February 2000, the Great Barrier Reef Marine Park Authority (GBRMPA) adopted a Whale and Dolphin Conservation Policy for the Marine Park (available at website www.gbrmpa.gov.au). In an addendum, the Policy foreshadowed a proposal to limit to a maximum of 10, for precautionary reasons, the number of permissions granted for the conduct of commercial swimming-with-dwarf minke whale operations in the vicinity of the Ribbon Reefs of the northern Great Barrier Reef.

To implement this aspect of the Policy, GBRMPA plans to amend the *Cairns Area Plan of Management*. This will allow the limit on permissions to be implemented through legislation. Through mechanisms such as the proposed limit, pre-season workshops, the Code of Practice, and education materials developed by Dr Birtles, Dr Arnold and their co-workers, the industry should continue to develop in an ecologically sustainable manner.

This report presents the detailed results of the responses of 527 tourists who in 1999 and 2000 encountered, and often swam with, dwarf minke whales in the northern Great Barrier Reef. The responses are most informative for the research scientists, industry and marine park managers.

I commend all those involved with the research program. The work of the research team in presenting this wealth of information and the other facets of their research program is admirable.

Tony Stokes
Manager, Species Conservation
Conservation, Biodiversity and World Heritage Group
Great Barrier Reef Marine Park Authority

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The Minke Whale Project is a combined initiative of James Cook University, the Museum of Tropical Queensland and *Undersea Explorer*. The Project was partially funded by NHT under the Marine Species Protection Program (Coast and Clean Seas) of the Commonwealth Department of the Environment (Environment Australia) and is managed by the CRC Reef Research Centre. It would not be possible without the support of the participating Cairns section live-aboard dive industry operators.

We thank our friends and colleagues on *Undersea Explorer*, without whom this research project would not have been possible. We are especially grateful to the general manager John Rumney, whose passion, vision and commitment has helped to sustain this project over the last six years. Particular heartfelt thanks go to our most valued field assistant Monique Matthews (who is also the world's best underwater minke whale videographer), and to the staff of *Undersea Explorer*, including Tracy Priday, Debbie Maynard, Kyle Hunt, Dean Miller and all of the crew for supporting the Project in every possible way each year. Logistical and financial support of the Minke Whale Project has been provided by *Undersea Explorer* each season since 1996.

We are extremely grateful for the financial support from the Natural Heritage Trust from May 1999 to June 2001 through the Marine Species Protection Program of Coastal and Clean Seas (Environment Australia), with particular thanks to Milena Rafic, Robyn McCulloch and Jenny Dolan.

The project has been managed by the CRC Reef Research Centre and we thank all who have supported our work, especially Dave Williams, and Bryony Barnett and Louise Goggin who also assisted in the field and with the 2001 workshop. Particular thanks to Dave Windsor for his considerable support as our first Industry Task Associate.

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We are particularly grateful to crew and office staff of other live-aboard dive operations in the Cairns section, especially the CHARROA members, who have assisted the Project by allowing researchers aboard their vessels, and by collecting passenger questionnaires, sighting sheets and other valuable information from their minke whale encounters:

From Nimrod Explorer

Thanks to Lisa and Carol Wiffler for their support of the Project and for allowing Liam on board to collect data over the 2000 season, and for having Louise and Matt on board during the 2001 season. Thanks also to the *Nimrod Explorer* crew for their help in collecting questionnaires and sightings sheets over the years. Special thanks to skipper Ian Stapleton for recording and reporting so many minke sightings since the early 1990s, and for kindly providing us with his underwater video footage.

From Taka Dive

Thanks to Chris Taylor, J.J. Cantor, Pam Fischer and Sharon Davon for their support of the Project and for allowing Matt on board to collect data over the 2000 and 2001 seasons. Thanks also to the *Taka II* crew for their help in collecting questionnaires and sightings sheets over the years. In particular, special thanks to skipper Jack Brosnan for recording and reporting so many minke sightings over the past few seasons.

From Mike Ball Dive Expeditions

Thanks to Mike Ball, the incomparable Stan Kielbaska (our new Industry Task Associate) and all the office staff at *MBDE*. Thanks also to the crew of *Super Sport* for continuing to collect whale sighting sheets and passenger questionnaires over the years. Thanks also to those crew and passengers who supplied video footage and slides.

Thanks to all the GBRMPA staff who have supported the Project over the last few years, especially Tony Stokes (our first GBRMPA Task Associate), Dave Wachenfeld, Kirstin Dobbs, Hilary Skeat and Cheri Recchia.

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We thank our two kind friends who have reviewed this report, Dr Alice Crabtree and Dr David Wachenfeld and also Dr Louise Goggin, who as CRC Reef Communication Coordinator was responsible for assisting with the publication of this report. Any remaining errors are entirely our responsibility.

We are extremely grateful to the passengers on the whale watching trips for their help and co-operation during minke interactions and for filling in our questionnaires.

Finally we thank the GBR minke whales for filling our waking hours (and occasionally our sleep) with shining images of extraordinarily beautiful and inquisitive little whales.

EXECUTIVE SUMMARY

There is a commercial swim program based on dwarf minke whales, *Balaenoptera acutorostrata*, in the northern Great Barrier Reef Marine Park. During the winter months, dive tourists on the live-aboard dive vessels operating along the outer shelf Ribbon Reefs north of Port Douglas, experience close and often prolonged encounters with these inquisitive little whales while snorkelling and SCUBA diving.

Only recently recognised as different to their northern and southern hemisphere minke relatives, these whales are currently regarded as an undescribed sub-species of the northern hemisphere minke.

They were first documented in the waters of the Great Barrier Reef (GBR) in the 1980s and, despite several years of intensive study, we still know very little about their biology and ecology.

This lack of knowledge about some of the most basic information needed for ecologically sustainable management of interactions has been the driving force behind our research and this study addresses some of these information gaps.

These encounters are two-way interactions with both the whales and the humans being influenced by the behaviour of each other. It is therefore vital that we understand as much as possible about all aspects of these interactions. We have thus used research methodologies derived from both the natural sciences and the social sciences. Previous studies of other marine wildlife have shown the importance of understanding the experiences of people to effectively design and test appropriate management guidelines (Birtles, Cuthill, Valentine and Davis 1996; Davis, Banks, Birtles, Valentine and Cuthill 1997).

Observations of whale-swimmer interactions indicated that initiation of encounters both at reefs and in open water were largely controlled by the whales. Management of snorkeller/diver behaviour is necessary, however, to minimize potential harassment of the whales and to ensure that the interactions are as much as possible under the control of the whales, this being one of the key requirements of the ANZECC Guidelines (2000). We have been working with the live-aboard dive tourism industry to develop and test management guidelines for swimming with these whales, as well as providing passengers with high quality interpretation material.

A proposed Code of Practice for Dwarf Minke Whale-Human Interactions was developed and introduced to the industry at a pre-season minke workshop in June 1999. In addition, operators were provided with a detailed interpretive manual for assisting with developing their own individual interpretive materials and talks. These Minke Whale Information Packages were first supplied to the live-aboards prior to the 1999 season and have been updated each year since at the pre-season industry workshops. Much of their content can be seen at the Minke Whale Project website: www.reef.crc.org.au/about_reef/wildlife/minkewhale.html.

During the 1999 and 2000 minke whale seasons on the GBR, passengers on five live-aboard dive vessels experiencing regular in-water interactions with dwarf minke whales were surveyed using a self-administered questionnaire. The questionnaire collected information on four core components of the research task: (1) the nature of the experience, (2) details about the visitors, (3) visitor assessment of the management of

their minke whale encounters (including the Code of Practice), and (4) visitor assessment of education and interpretation provided by operators (including the Minke Whale Information Package).

This two-year survey of whale-swim participants addressed people's knowledge and expectations of the swim encounters, positive and negative aspects of the encounters, concern for possible negative impacts, assessment of present management practices, support and opposition to the Code of Practice, and assessment of interpretive material.

This study has applied these experiential data from 527 passengers to assess the proposed Code and interpretive material available on the vessels. Passenger satisfaction with encounters and their management was very high. Generally, the Code was strongly supported although certain recommended procedures received only weak support.

These results are directly applicable to the management of encounters by the participating live-aboard dive operators, providing feedback on passengers' expectations and experiences with minke whales as well as their perceptions of management of their encounters. We discuss how to incorporate such feedback into improving the management of these unique human-whale interactions.

Results from this study have already been used to improve the interpretive material in 2000 and 2001, with updates to operators' Minke Whale Information Packages and the development of a draft Information Brochure for passengers. The draft Information Brochure for passengers was formally evaluated by a JCU Master of Tourism student, Liam Smith, who interviewed passengers about their opinions of the interpretive tool (Smith, 2000). Some of this feedback has been incorporated into a new brochure for the 2002 season. This six-page colour brochure (Dwarf minke whales in the Great Barrier Reef: Current State of Knowledge May 2002) has been published by the CRC Reef Research Centre and is being distributed free to passengers on the live-aboard vessels. It can be downloaded as a pdf file from the CRC Reef website at www.reef.crc.org.au.

1. INTRODUCTION

Tourism based on viewing and interacting with coastal and marine wildlife is one of the fastest growing industries in Australia. Hoyt (2000) reported an 81% increase in the number of whale watchers between 1994 and 1998, and Birtles, Valentine and Curnock (2001) documented an almost three-fold increase in whale watching permits issued in some states during the past six years.

Dwarf minke whales, *Balaenoptera acutorostrata*, were only discovered in the Great Barrier Reef (GBR) Marine Park during the 1980s. Their behaviour, biology and ecology remain poorly understood. Increasing attention from dive tour operators and researchers has been drawn to them during the past decade, due to their unusual habit of approaching vessels and divers in the northern GBR over the winter months (see Figure 1.1 for survey area), frequently interacting with them in close proximity for extended periods (Arnold 1997; Arnold and Birtles 1999).

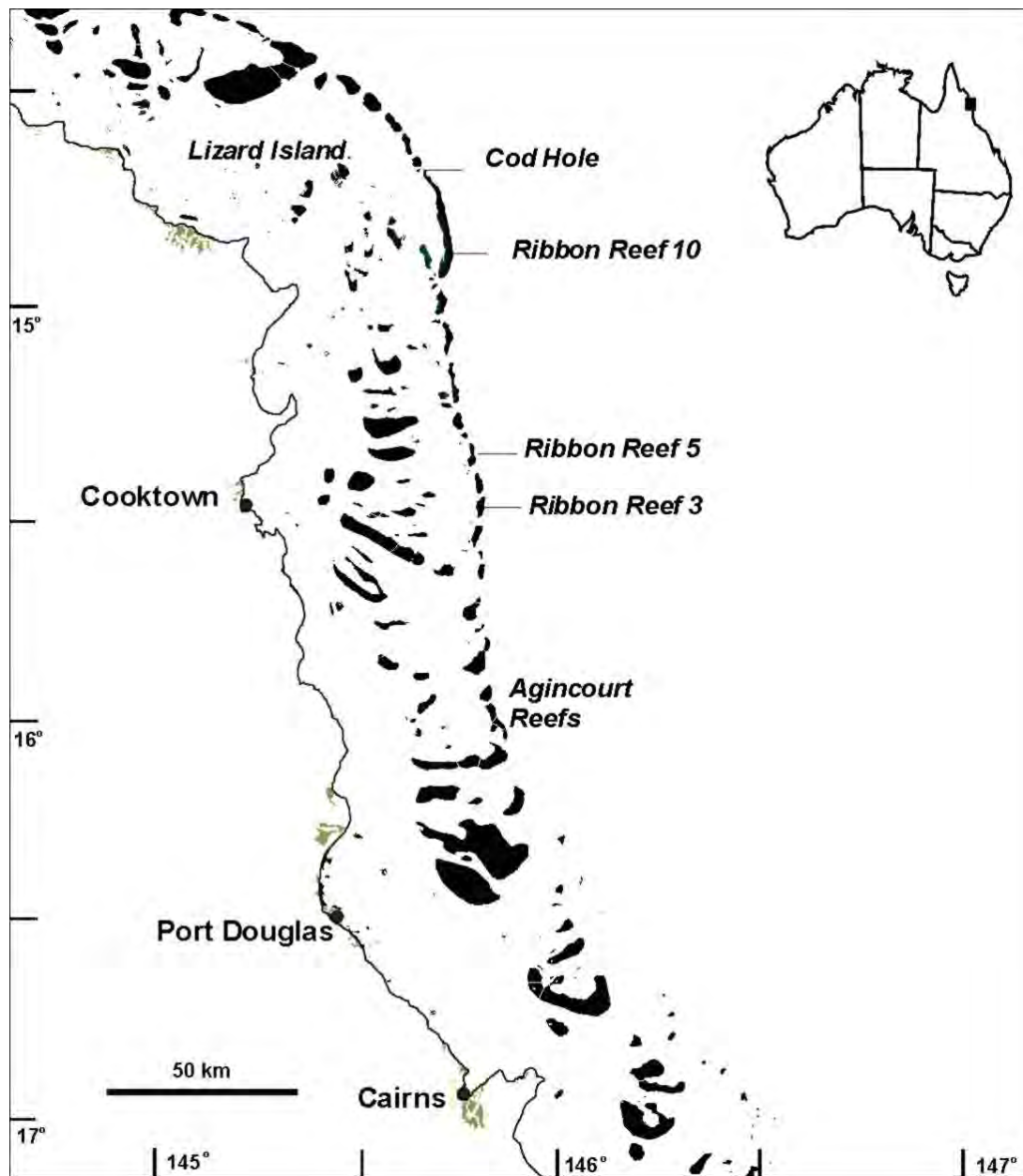
In 1996, Alastair Birtles and Peter Arnold began detailed studies on the biology and ecology of dwarf minke whales and on the dynamics of the interactions between the whales and divers and how best they could be managed (Arnold and Birtles 1999). Findings from this pilot study led to the development of a draft Code of Practice for swimmer interactions with dwarf minke whales, directed at managing people's behaviour to minimise potential for negative impacts of the continuing commercial swim programs on the whales.

Biological and behavioural data are essential to determine the significance of impacts of human interactions with these whales. Previous studies of other marine wildlife have also shown the importance of understanding the experiences of people to effectively design and test appropriate management guidelines (Birtles Cuthill Valentine and Davis 1996; Davis Banks Birtles Valentine and Cuthill 1997).

The present study forms part of a series of experiential studies (Curnock 1998, Matsukura 1998, O'Neill 2000, Smith 2000) looking at the specific case of swim-with-whale programs based on dwarf minke whales. This study uses survey data collected by the authors to gain a clearer understanding of the dwarf minke whale tourism experience. The two-year survey of whale-swim participants addressed people's knowledge and expectations of the swim encounters, positive and negative aspects of the encounters, concern for possible negative impacts, assessment of present management practices, support and opposition to the Code, and assessment of interpretative material.

This report provides a summary of this detailed two-year study of participants in the new dwarf minke whale tourism industry in the northern GBR. The purpose of this report is to set out the broad patterns of visitor experiences including analyses of perceived positive and negative elements within which more detailed analyses have been conducted. This report presents preliminary analyses of data from 1999 and 2000 with limited interpretation. A number of more specific publications are in preparation (or have been submitted) which draw on this material (e.g. Birtles Arnold and Dunstan *in press*).

Figure 1.1. Map of the Ribbon Reefs*



*Map courtesy of Adella Edwards

1.1 Brief description of the industry

The amount of time available to each operator to search for minke whales varies greatly. It is influenced by the itinerary of the vessel (Table 1.1) which may ultimately be driven by the operator's target market. Some of these operators are on tight time schedules. For example, one operator has two three-hour passenger changeover periods in Cairns each week during which beds are made, vessel maintenance is carried out and food re-supplied. Therefore time to search for whales for these operators is minimal, and dedicated encounters with minke whales usually occur opportunistically while the vessel is moored at reef sites during their regular diving program.

Data collected during the past five years suggests that some dive sites used by these operators provide more consistent sightings of dwarf minke whales during the season than others (Birtles *et al.* 2001) for example, Lighthouse Bommie (near southern end of Ribbon Reef #10) (Figure 1.1). For several operators this site is the only planned deviation from their regular diving itinerary that provides an opportunity to see whales.

During the past six years there has been an increased effort to search for whales by these vessels as well as by other vessels which have begun operating since 2000 along the Ribbon Reefs specifically during the minke season. In 1996, *Undersea Explorer* began (and advertised) dedicated minke whale research trips which allowed paying dive tourists to swim with the whales alongside researchers (operating under scientific research permit from Environment Australia) for a four week season. In the same year, four other vessels began including swimming with minke whales as part of their live-aboard diving tours (Arnold and Birtles 1999). Only two of these five vessels had whale watching permits and there were no specific guidelines or management structure for control of such activities in place. These five vessels were involved to varying degrees with this study.

During the 2001 season, a further two vessels were operating commercial dive charters in the Ribbon Reefs area and were involved in in-water interactions with dwarf minke whales. There was also a significant increase in 'dedicated' search and interaction efforts by several of the existing operators, including an extra three weeks of 'minke trips' compared with the 2000 season by one of the operators, and an additional two weeks by another.

Table 1.1: Description of vessels surveyed during 1999-2000 minke seasons

Vessel*	Vessel length	Cruising speed	Passenge capacity	No. of crew	Trip Duration (nights)	Itinerary
<i>Nimrod Explorer</i>	21m catamaran	9kn	18	6	3	Departs Cairns Tuesday 5:45pm, steam north, diving along Ribbon Reefs; Saturday morning passenger changeover on Lizard Island – new passengers fly in from Cairns, completing guests fly back to Cairns; vessel steams south, diving along Ribbon Reefs; Returns to Cairns early Tuesday morning.
<i>Reef Explorer</i>	20m	7kn	12	4	3	Departs Saturday 6pm, steam northeast to Bougainville Reef (in Coral Sea) overnight (weather permitting); Sunday begin diving at Bougainville Reef; overnight steam to the Cod Hole, dive and steam south diving along Ribbon Reefs; Tuesday 3pm return to Cairns, passenger changeover; Departs Cairns Tuesday 6pm, steam northeast to Bougainville Reef (in Coral Sea) overnight (weather permitting); Wednesday begin diving at Bougainville Reef; overnight steam to the Cod Hole, dive and steam south diving along Ribbon Reefs; Friday 3pm return to Cairns.
<i>Super Sport</i>	27m catamaran	14kn	26	6	3	Departs Cairns Friday 7am, steam north, diving along Ribbon Reefs; Monday morning passenger change over on Lizard Island – new passengers fly in from Cairns, completing guests fly back to Cairns; vessel steams south, diving along Ribbon Reefs; Returns to Cairns early Thursday morning.
<i>Taka II</i>	22m	9kn	26	6	3/4	Departs Cairns Tuesday 5pm, steam north to the Cod Hole overnight; Wednesday begin diving at Cod Hole and steaming south, diving along Ribbon Reefs; Friday 3:30pm return to Cairns, passenger changeover; Departs Friday 5pm, steam north to Cod Hole overnight, Saturday begin diving at Cod Hole; overnight steam to Osprey Reef (in Coral Sea; weather permitting); Sunday diving at Osprey Reef; overnight steam to Ribbon Reefs; Monday steaming south, diving along Ribbon Reefs; Tuesday 3:30pm return to Cairns.
<i>Undersea Explorer</i>	25m	8kn	21	6	6	Departs Port Douglas Saturday 8pm, steam north, diving along Ribbon Reefs to Cod Hole and Lizard Island area; returns to Port Douglas Friday around 3:30pm.

*Vessels presented in alphabetical order. Order not associated with vessels A to E in following results.

2. METHODS

2.1 Overview

During the 1999 and 2000 minke whale seasons on the Great Barrier Reef (GBR), passengers on five live-aboard dive vessels (Table 1.1) experiencing in-water interactions with dwarf minke whales were surveyed using a self-administered questionnaire. The aims of this survey were to gain a better understanding of divers' experiences with the whales in order to assist development of a best-practice management framework for this fledgling swim-with-whales industry.

A draft Code of Practice (Arnold and Birtles 1999) was introduced to the industry at a workshop in June 1999, prior to the core minke whale sighting season. An information package (MWIP1999), developed by Birtles and Arnold, was distributed to each operator to provide interpretation to passengers. The Minke Whale Questionnaire (MWQ1999) was issued to operators to gather passenger feedback on the Code of Practice and ensure industry understanding. Feedback to improve the current interpretive material, including the MWIP1999, was also sought. Following the 1999 season and introduction of the Code of Practice, industry members were interviewed to provide their view on the guidelines and MWIP1999.

Analysis of results from MWQ1999 led to improvements of the Information Package (MWIP2000) and the passenger questionnaire for the 2000 minke season (MWQ2000). A Japanese version of the questionnaire was also used in this season. The questionnaire was also used to obtain further passenger feedback on the revised Code of Practice and Information Package. A draft passenger information brochure was developed for testing during the 2000 season by Master of Tourism student Liam Smith, which was distributed to operators for their evaluation (Smith 2000).

Self-administered questionnaires in English were distributed to five live-aboard dive vessels operating in the Cairns section in mid-June 1999, prior to the core minke season, until end August.

2.2 Questionnaire design

Design of the six-page self administered questionnaire (Appendix 1) was based on four of the core components of the research: understanding the nature of the experiences people were having; details about the visitors (including both demographic information and their diving experience); visitor assessment of the management of their minke whale encounters (including the Code of Practice) and; visitor assessment of education and interpretation provided by operators (including the MWIP). The design employed scaled items (previously tested in other charismatic wildlife encounter programs, e.g. Birtles *et al.* 1997), several factual elements relating to individual details and a number of open-ended questions to elicit affective components of the experience.

2.2.1 Japanese translation

After feedback from several operators at the end of the 1999 season indicating a recent increase in numbers of Japanese patrons during the season, a Japanese version of the survey was developed for the 2000 season. Translation of the questionnaire was conducted using the 'back-translation' technique (as suggested by Baldauf and Jernudd 1986, Brislin Lonner and Thorndike 1973) involving the assistance of two fluent bilingual Japanese and English speakers. The technique involved the text being

originally translated by one bi-lingual assistant (into Japanese) and then back-translated (into English) ‘blindly’ by the second assistant.

All discrepancies were amended until the Japanese questionnaire was deemed satisfactory, however a single translation error was noticed when the questionnaires were returned completed after the season. Therefore Question 27 was omitted from further analysis

2.3 Defining an ‘encounter’

For the purpose of consistency and to provide a clearer understanding to respondents of our understanding of a ‘minke whale encounter’, the definition: “...each interaction session with minke whale(s), from the first sighting by a passenger/crew member to the end of the vessel’s contact with the whale(s),” was provided within the questionnaire.

2.4 Survey sample

The survey was conducted over an 11-week period each year, from mid-June (when minke whale sightings were starting to become regular) until the end of August, by which time sightings had become infrequent. Questionnaires were distributed by researchers (when present on the vessel) or crew members towards the end of trips on which minke whales were encountered. Completed questionnaires were handed to crew at the end of the trip but pre-paid envelopes were also provided for passengers who did not have time to complete the questionnaires. The crew were asked to distribute questionnaires to all passengers.

2.5 Sample size, response rate and approximate population size of passengers on board five live-aboard dive vessels in the Cairns section

A total of 527 questionnaires were collected during the two seasons (Table 2.1) from 52 vessel trips. However more than 150 trips were conducted by these vessels during the two 11-week sampling periods (Tables 2.2 and 2.3). The response rate for questionnaires collected over these 52 trips was 54%, while the estimated size of the sample compared with the total number of passengers over both 11-week periods is 16% (Table 2.1). The total sample sizes from each vessel are: vessel A, $n = 197$; vessel B, $n = 172$; vessel C, $n = 82$; vessel D, $n = 54$; vessel E, $n = 22$ (Table 2.1). Exact numbers of trips and passengers for each vessel were kindly supplied by the operators, however these figures for vessel E were unavailable.

2.6 Analyses of data

For all questionnaires, each open-ended response was coded for each element in each statement, often resulting in several coded elements for each response. For example, if a response for ‘best experiences’ reads: “Swimming with a minke whale at Steve’s Bommie”, then three elements of that statement were coded. These would be the activity: ‘swimming with’, the animal: ‘a minke whale’, and the location: ‘at Steve’s Bommie’, as they were all elements of that respondent’s best experience.

The open-ended responses from the completed Japanese questionnaires were translated with the assistance of one of the bilinguals (who had previously assisted with the questionnaire translation) prior to entry and coding.

Responses from all closed-ended and scaled questions were analysed using the statistics program, SPSS version 10.0.7. To minimise error and ensure consistency in the data, four steps were followed during data entry (as proposed by Ryan 1995):

1. Each response was checked to ensure that the questionnaire had been completed satisfactorily,
2. The questionnaires were numbered in the order in which they were received,
3. A standardised method for coding data was determined, and
4. Responses were consistently checked during the data entry process.

Statistical procedures included Pearson's Correlation Coefficients, T-tests, One-way Analyses of Variance and non-parametric Chi-Square and Kruskal-Wallis means tests. Normality of the data were confirmed prior to parametric mean-comparisons, using histograms, P-P plots and homogeneity of variance.

Table 2.1. Total MWQ response rate and sample size, 1999-2000 sample periods.

Vessel	n (number of questionnaires collected)	Total number of trips on which MWQ collected	N ₁ (total number of passengers on sampled trips)	ⁿ /N ₁ (% response rate)	Total number of trips during sample periods	N ₂ (total no. of passengers during sample periods)	ⁿ /N ₂ (% of total population sampled)
A	197	13	226	87%	20	355	55%
B	172	12	296	58%	44	978	18%
C	82	16	236	35%	41	582	14%
D	54	7	189	29%	44	1171	5%
E	22	3	33	67%	Data unavailable	Data unavailable	Data unavailable
Totals	527	52	971	54%	(excluding vessel E) 149	(excluding vessel E) 3086	(excluding vessel E) 16%

Table 2.2. MWQ response rate and sample size, 1999.

Vessel	n (number of questionnaires collected)	Number of trips on which MWQ99 collected *	N ₁ (total number of passengers on sampled trips)	ⁿ /N ₁ (% response rate)	Total number of trips during sample period*	N ₂ (total number of passengers during sample period*)	ⁿ /N ₂ (% of total population sampled)*
A	85	5	85	100%	10	178	48%
B	27	2	52	52%	22	514	5%
C	42	8	137	31%	20	331	13%
D	27	5	135	20%	22	577	5%
E	20	2	24	83%	Data unavailable	Data unavailable	Data unavailable
Totals	201	22	433	46%	(excluding vessel E) 74	(excluding vessel E) 1600	(excluding vessel E) 11%

*Questionnaire sample period began 18 June 1999, ended 31 August 1999.

Table 2.3. MWQ response rate and sample size, 2000.

Vessel	n (number of questionnaires collected)	Number of trips on which MWQ2000 collected *	N ₁ (total number of passengers on sampled trips)	ⁿ /N ₁ (% response rate)	Total number of trips during sample period*	N ₂ (total number of passengers during sample period*)	ⁿ /N ₂ (% of total population sampled)*
A	112	8	141	79%	10	177	63%
B	145	10	244	59%	22	464	31%
C	40	8	99	40%	21	251	16%
D	27	2	54	50%	22	594	5%
E	2	1	9	22%	Data unavailable	Data unavailable	Data unavailable
Totals	326	30	538	61%	(excluding vessel E) 75	(excluding vessel E) 1486	(excluding vessel E) 22%

*Questionnaire sample period began 15 June 2000, ended 1 September 2000.

3. Results

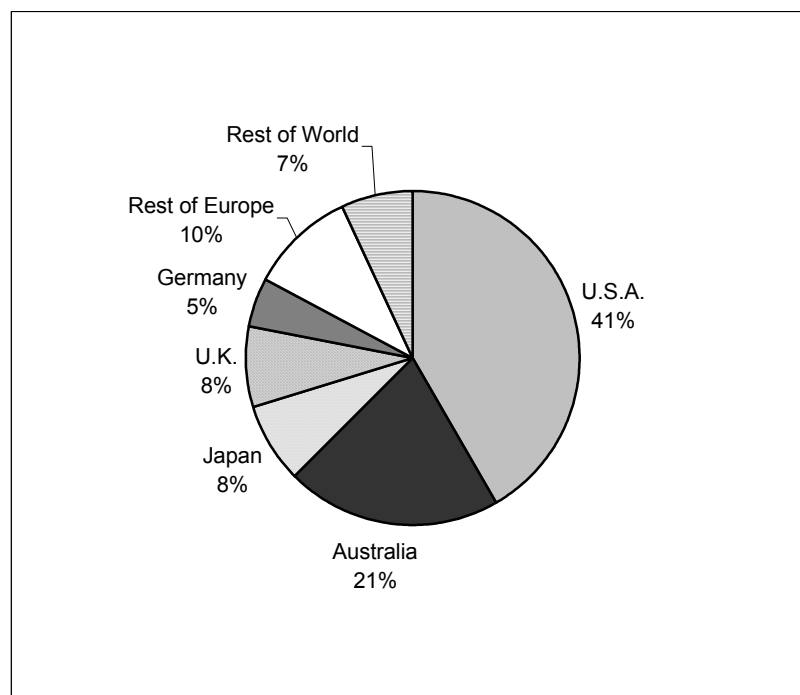
3.1 Dwarf minke whale tourism participants

Of the total sample, 53.6% were male (Table 3.1). The mean age of respondents was 33.7 years (median 32 years), ranging from 10 to 74 years. Respondents originated from 27 countries including Australia. Overseas visitors accounted for 79.2% of the total sample. Most visitors came from the USA, with 219 respondents (41.6% of the total sample). This was followed by Australia with 109 respondents (20.8% of the total sample), Japan with 42 (8.0%), the United Kingdom with 40 (7.6%) and Germany with 25 respondents (4.8%). Most Australian respondents were from Queensland with 62 (11.8% of the total sample) and New South Wales with 25 (4.8% of the total sample). The percentage representations of other countries have been grouped for comparison with the total sample in Figure 3.1. Almost two-thirds (63.2%) of the total sample were first-time visitors to the GBR.

Table 3.1. Demographics of MWQ sample (n = 527)

<u>Gender of respondents</u>		
Male	53.6%	(281)
Female	46.4%	(243)
<u>Age of respondents</u>		
Mean	33.7 years	
Median	32	
Range	10 – 74	
<u>Visits to the Great Barrier Reef</u>		
First time visitors	63.2%	(333)
Repeat visitors	36.8%	(194)

Figure 3.1. Country of origin of respondents (n=527)



3.2 Prior diving experience of participants

The total number of dives by respondents ranged from three to ten thousand (median=60), with very few respondents in the upper range. The highly skewed distribution inflated the mean, so the median better represented centrality with greater accuracy. The median total dive experience of respondents was 60 dives. Percentages of respondents' dive certification level are listed in Table 3.2.

Table 3.2: Dive experience of total sample (n = 527)

<u>Dive Qualifications</u>	
None	4.6%
Open Water	35.6%
Advanced	27.4%
Rescue	10.0%
Dive Master	6.9%
Instructor	10.3%
Other	5.2%
 <u>Years dive experience</u>	
Median	5 years (range 0 to 46 yrs)
 <u>Dives in past 12 months</u>	
Median	19 (range 0-700)
 <u>Total dives in life</u>	
Median	60 (range 3-10,000)

3.3 Dwarf minke whales as a primary attraction

Respondents were asked: "Was your visit to far north Queensland primarily to see minke whales?" The proportion of respondents who answered yes to this question increased from 21.5% in 1999 to 27.8% in 2000 (mean = 25.4%). The most frequent response in the 'no' category was, as expected, to dive on the GBR (51.9%), while 22.7% indicated various other reasons or gave no reason. The overall proportions from the total sample (1999-2000, n=527) are shown below:

To dive on the GBR	51.9%
To see minke whales	25.4%
Other	22.7%

3.4 Information sources for minke whales

Respondents were asked: 'Where did you first hear about dwarf minke whales on the Great Barrier Reef?' Many people (43%) had not heard of minke whales before they boarded the vessel (Table 3.3). An increase in this percentage over the two seasons was evident (from 35.8% in 1999 to 47.4% in 2000). The increase may have been because different proportions of passengers sampled on different vessels each year (particularly vessel B); as promotion of minke whale sightings and encounters varied greatly between the vessels.

Table 3.3. How/where respondents first heard about minke whales (n = 527)

Initial Information Source	Percentage of Respondents
On the Boat	43.0%
Word of Mouth	13.1%
Internet	12.1%
Dive Magazines	6.9%
Dive Company Office	6.1%
Travel Agent	5.7%
Other Advertising	3.8%
Other Literature	1.0%
Previous Trip	1.0%
Other	7.3%

3.5. Participants' encounters with dwarf minke whales

Respondents were asked to fill in details of their encounter(s) (Question 18, Appendix 1), indicating number of encounters; number of whales per encounter; maximum numbers of people in the water during these encounters; duration of encounters; how close they were approached by a whale during each encounter; what the boat was doing (moored/anchored or drifting); and what they were doing during the encounter (i.e. in the water holding onto a rope (either a mooring/anchor rope, safety stop chain/bar underneath the vessel, or a drifting safety/current line attached to the stern/beam of the vessel), free-swimming, using SCUBA or snorkel or watching from the boat).

Ninety-eight percent of respondents (of 523 passengers; 4 did not answer the question) indicated that they had seen minke whales on their trip (10 passengers answered 'no' to this question, however minke whales were seen by other passengers on the trips they had taken). Of these, 453 indicated that they had entered the water with the whales (88.1% of respondents).

Number and length of encounters

The mean number of minke whale encounters experienced by passengers was 2.33 (median = 2, range = 1-12). (Four of the five vessels surveyed conducted three or four-day trips, while one vessel conducted six-day trips.) The mean total time spent interacting with whales by respondents on their trip was 162.9 minutes (median 70 minutes, range = few seconds-1113 minutes) (approx. 18 ½ hours) of interactions on one trip.

Number of minke whales and closest approach

The mean total number of minke whales seen by respondents was 10.87 (median = 7, range = 1-77) over the duration of the trip. The median closest distance to which respondents indicated they were approached by a minke whale was 3 metres (mean = 21.9m, range = 0.5-1000 metres). (Note that the mean has been inflated by a small number of cases in this extreme upper range. Therefore the median is a better measure of central tendency in this case). The longer distances were passengers who had only seen minke at a distance from the deck of the vessel. The proportion of respondents based on how close they indicated they were approached by a minke whale are shown below (Table 3.4).

Table 3.4. Respondents grouped by closest distance approached by a minke whale (distance estimated by respondent)

Closest distance approached by a whale (estimated by respondent)	Number of respondents	Valid Percentage	Cumulative Percentage
Less than 2 metres	66	14.4	14.4
2 to 4 metres	207	45.3	59.7
>4 to 8 metres	91	19.9	79.6
>8 to 20 metres	66	14.4	94.0
>20 metres	27	5.9	100.0
Total	457	100.0	
Left blank	70		

Using results from the table in Question 18 (see Appendix 1) it was also possible to determine the mean closest approach distance by a whale to respondents observing in different manners, i.e. snorkelling, on SCUBA or on-board the boat, and whether they were free-swimming in the water or holding onto a rope (Table 3.5).

Table 3.5. Circumstances of closest approach by dwarf minke whales

What respondents were doing when closest approach occurred	Number of respondents	Valid Percentage
In-water holding rope (attached to vessel)	308	72.6
Observing while free swimming (no rope)	70	16.5
Observing from on-board the boat	46	10.8
Total	424	100.0
Left blank	103	

Of the 70 respondents who indicated that they were free-swimming at the time of a whale's closest approach, 52 were using SCUBA. The mean closest approach distance by a minke whale to free-swimming SCUBA divers ($n = 52$) was 6.6 metres (median = 5m, range = 0.5-20 metres). The mean closest approach distance by a minke whale to free-swimming snorkellers ($n = 16$) was 13.0 metres (median = 8.5m, range = 2.0-45 metres).

Of the 308 respondents holding onto a rope in the water when approached closest, 34 were using SCUBA. The mean closest approach distance by a minke whale to SCUBA divers holding onto a rope ($n = 34$) was 5.5 metres (median 3m), ranging from 0.5 to 50 metres. The mean closest approach distance by a minke whale to snorkellers holding onto a rope ($n = 257$) was 3.7 metres (median = 2.5m), ranging from 0.5 to 60 metres. The mean closest approach distance by a minke whale to respondents whose closest approach was on-board the vessel ($n = 43$) was 187.1 metres (median = 20m), ranging from 1.0 to 1000 metres.

(Due to uneven group sizes, none of the means given above can be compared for significant differences.)

3.5.2 Participants' satisfaction with minke whale encounters

Respondents were asked to rate their overall satisfaction with their minke experience(s) on a scale of one to ten, ranging from 1 = very poor, to 10 = excellent. The mean satisfaction score for the total sample was very high, at 9.00.

A Pearson's Correlation revealed a significant correlation between closest approach distance by a whale and respondent satisfaction rating ($r = -.458^{**}$). Significant correlations were also found between respondents' satisfaction rating and total time spent interacting with whales on their trip ($r = .207^{**}$) and the total number of whales

encountered on their trip ($r = .271^{**}$). (**Indicates significance at the 0.01 level, two-tailed.)

3.5.3 Best experiences

Respondents were asked, ‘What were the three best experiences you had during this trip to the Great Barrier Reef?’ This question received the highest response rate of all open-ended questions ($n = 504$; 95.6%) with respondents frequently providing more than three best experiences. Responses were content analysed to determine every element in each statement. This process resulted in more than 2400 coded elements (Table 3.7). The most frequently mentioned themes contributing to respondents’ best experiences with minke whales were animals, elements relating to their whale interactions, diving elements and locations (Table 3.6).

Table 3.6. Passengers’ best experiences: main themes

Theme	Number of Respondents	Valid Percentage of Respondents*
Animals	482	95.6
Minke whales	448	88.9
Other animals	241	47.8
Whale interaction elements	345	68.5
Diving elements	262	52.0
Locations	169	33.5
Boat/operation elements	72	14.3
Whale behaviour elements	22	4.4
Other elements	231	45.8
TOTAL RESPONDENTS	504	
Left blank	23	

*Respondents frequently gave more than one response to this question.

Example responses:

Animals

- “Seeing and swimming with such great diversity, e.g. Schools of pelagic fish, sharks, coral fish, whales, etc.”
- “Close encounter with white tip reef shark, potato cod and whale.”

Whale interaction elements

- “Swimming with the whales the first day was something I will remember for the rest of my life!”
- “Snorkel with a minke, 3m away – eye contact!”
- “Snorkelling with 8 whales at one time.”
- “Sighting whales, getting in the water with the whales, then floating on the rope only two to three metres above the whales.”
- “Looking eye to eye with a minke swimming just feet away and knowing she was looking at me.”

Diving elements

- “Diving into clear water, with beautiful coral gardens and exotic fish life.”
- “Having the minke whale swim around us while on a dive.”

Locations

- “Photographing dense shoal of blue striped snapper at ‘The Lighthouse.’”
- “First minke whale encounter while returning from a dive at Pixie’s Wall – at safety stop.”

Boat/operation elements

- “Great crew, great food, excellent time spent aboard ship.”

Whale behaviour elements

- “Seeing the whales jump just off the bow.”
- “Watching a minke whale circling us curiously as we hung on a line from the boat.”
- “Observing behaviour from the deck – spyhops, b-blows and breaches.”

Table 3.7. Elements of respondents best experiences

Description	Total elements	Valid %*
Animals		
Minke whale(s)	448	18.4
Potato Cod	62	2.5
Sharks	59	2.4
Fish (non-specific)	59	2.4
Coral	47	1.9
Turtles	28	1.1
Sea snake(s)	21	0.9
Dolphin(s)	16	0.7
Lion fish / fire fish	8	0.3
Moray eel(s)	6	0.2
Cuttlefish	6	0.2
Humpback whale(s)	6	0.2
Clown fish	5	0.2
Giant clam(s)	4	0.2
Nudibranch(s)	4	0.2
Soft coral	3	0.1
Manta ray(s)	3	0.1
Other specific animals	57	2.3
Animals/marine life in general	32	1.3
TOTAL ANIMALS	874	35.9
Whale interaction elements		
Being in the water with whale(s)	222	9.1
Seeing/observing whale(s)	134	5.5
Contact/encounter/ with whale(s)	43	1.8
Being “close to” whale(s)	30	1.2
Education/ /interpretation about whales	18	0.7
Many/multiple whales/encounters	12	0.5
Seeing/observing whale(s) from boat	12	0.5
“Whale watching”	11	0.5
First time whale interaction/sighting	9	0.4
Learning about research	9	0.4
Whale(s)’ movements / swimming	8	0.3
Photographing/videoing whale(s)	6	0.2
Other whale(s) behaviours	6	0.2
Holding rope during interaction	6	0.2
Sounds/vocalisations	4	0.2
Breaching	4	0.2
Feeding/gulping	4	0.2
Spy-hop	2	0.1
Other elements of whale interaction	14	0.6
TOTAL WHALE INTERACTION	549	22.5
Diving elements		
Diving in general	190	7.8
Night dive	43	1.8
Fish feeding	20	0.8
Snorkelling	17	0.7
Good dive locations / sites	16	0.7
Good diving	16	0.7
Learning to dive / lessons / improving	14	0.6
Good visibility	9	0.4
TOTAL DIVING	325	13.3

Description	Total elements	Valid %*
Locations		
Cod Hole	66	2.7
Steve’s Bommie	35	1.4
Pixie Pinnacle	31	1.3
Lighthouse Bommie	18	0.7
Challenger Bay	11	0.4
Temple of Doom	8	0.3
Lizard Island	6	0.2
Osprey Reef	4	0.2
Ribbon Reefs	4	0.2
No Name Reef	4	0.2
Clam Gardens	3	0.1
Pixie Wall	3	0.1
Wonderland	3	0.1
Other specific locations	17	0.7
The Reef / GBR	28	1.1
TOTAL LOCATIONS	241	9.9
Boat/Operation elements		
The crew	32	1.3
Food/eating on the boat	22	0.9
The live-aboard experience	9	0.4
Games on the boat	5	0.2
Being on a/the boat (in general)	19	0.8
TOTAL BOAT	87	3.6
Other elements		
Seeing/observing ... (not whales)	49	2.0
Social/meeting people	49	2.0
Many/multiple...	37	1.5
Variety/diversity of life on the Reef	31	1.3
First time / new experience	19	0.8
Education/interpretation about the Reef	19	0.8
Size of fish / animal(s) (small / large)	16	0.7
Colours of Reef/fish	12	0.5
Animal behaviour (in general)	11	0.5
Close encounter with animal(s)	10	0.4
Good weather	7	0.3
Sunset/sunrise	7	0.3
Escaping / relaxing / peace and quiet...	7	0.3
Beauty of the Reef	7	0.3
Uniqueness/exoticness of Reef/animals	6	0.2
Experience with family/friends	6	0.2
Flight to / from Lizard Island	5	0.2
Photography/videography	4	0.2
Encounter with animal(s)	3	0.1
Other (non-specific/general)	54	2.2
TOTAL OTHER	359	14.7
TOTAL ELEMENTS	2435	100
Left blank	23	

*Represents total coded elements (not numbers of respondents)

3.5.4 Best experiences with minke whales

Divers' best experiences with minke whales were further explored in order to determine precisely what it was about their minke whale experience they most enjoyed. Respondents were asked, 'What were the best things about your minke whale experience?' The response rate for this question was 92.8%. Responses typically consisted of two or three statements, and these were content analysed to determine every element in each statement. This process resulted in more than 1600 coded elements (Table 3.9). The most frequently mentioned elements contributing to respondents' best experiences with minke whales are summarised below (Table 3.8).

Table 3.8. Five most frequently mentioned elements of divers' best experiences with minke whales

Response Element	Number of Respondents	Valid Percentage of Respondents*
Seeing / observing the whale(s)	255	52%
Being close to the whale(s)	244	50%
Being in the water with them	101	21%
Observing the whales' 'inquisitive' behaviour	64	13%
Watching the whale(s) swim / move	58	12%
Total Respondents	489	
Left blank	38	

*Respondents frequently gave more than one response to this question.

Example responses:

Seeing/observing the whale(s)

- "Observing whales close up in their environment."
- "See them so close-up and watching them come closer."
- "Watching them do belly rolls, head raises and breaching."
- "Just watching them come by and watch me."
- "I saw up to 7 at a time."

Being close to the whale(s)

- "Being so close to a creature which virtually no-one knows anything about."
- "To be so close to a magnificent creature - once in a lifetime!"
- "And the fact that they would swim so close to you and just study you with these wandering eyes."
- "I couldn't believe how close they came and how much they did right in front of us."
- "The minke came so close and was probably the biggest living animal I've ever seen."
- "They came so close and looked so amazingly beautiful, it astounded me how something so massive could appear so majestic."

Being in the water with them

- "They are beautiful animals and the feeling of just being in the same water so close to them is sensational."
- "Being in the water and hearing and *feeling* the 'star wars' sound from a very close minke."
- "First in water sight – seeing the beautiful metallic sheen of their skin."

Observing the whales' inquisitive behaviour

- "Encountering a beautiful mammal in the sea, and it being as naturally curious about us as we were about it."
- "The experience of being in the water with such large creatures, a totally new experience. Most dives consist of us watching the wildlife but the whales were definitely watching us."

Watching the whale(s) swim/move

- "When a minke whale suddenly speeded up, opened its mouth and the throat grooves bulged out, and you could see baleen."
- "The sheer size and hydrodynamics of the animals and how they just stopped beside me and looked me in the face with their huge glassy eyes."

Table 3.9. Elements of respondents' best minke whale experiences

Description	Total elements	Valid %*
Whale interaction elements		
Seeing / observing / looking at whale(s)	255	15.6
Closeness / proximity to whale(s)	244	14.9
Being in the water with whale(s)	101	6.2
Size of whale(s)	42	2.6
Many/multiple whales	39	2.4
Personal feeling / 'lifetime' experience	34	2.1
Encounter / interaction with whale(s)	34	2.1
Seeing whale(s) "in the wild"	29	1.8
Length of encounter (time)	27	1.7
"Eye contact" with whale(s)	25	1.5
Education / interpretation about whales	23	1.4
First whale interaction	20	1.2
The format of interactions/use of rope	17	1.0
Meeting researchers studying whales	16	1.0
Photographing / videoing whale(s)	14	0.9
Feeling of fun/excitement from interaction	14	0.9
(Observing) whale(s) from boat	14	0.9
Recognising body markings on whales	11	0.7
Experience with / enthusiasm of others	10	0.6
Whales choice to interact / whales' terms	9	0.6
The unexpectedness of the encounter	8	0.5
The 'uniqueness' of the encounter(s)	5	0.3
Alone with whale(s)/few/no other people	4	0.2
Participating in research	4	0.2
(Seeing) whale calf (with mother..)	3	0.2
Other specific elements	16	1.0
TOTAL INTERACTION	1018	62.3
Whale behaviour elements		
'Inquisitiveness' / curiosity	64	3.9
Movements in water / swimming	58	3.6
Approaching closer with time / repeatedly	54	3.3
Looking at people	39	2.4
Whale(s) behaviour (non-specific)	28	1.7
Sounds / vocalisations	20	1.2
Circling behaviour around people / boat	15	0.9
Breaching	13	0.8
Spy-hop / head rise	12	0.7
Surfacing / surface rolls	9	0.6
Feeding / gulping	7	0.4
Belly-roll	7	0.4
'surfing' the waves	6	0.4
Bubble blasts	4	0.2
Whales interacting with each other	3	0.2
Whales interacting / playing with people	3	0.2
Hovering	3	0.2
Boat following behaviour	3	0.2
Other specific behaviours	5	0.3
TOTAL BEHAVIOUR	353	21.6

Description	Total elements	Valid %*
Descriptives for whales		
Beautiful	34	2.1
Gracious / graceful	28	1.7
Amazing	6	0.4
Powerful	3	0.2
Magnificent	3	0.2
Majestic	3	0.2
Other specific whale descriptives	24	1.5
TOTAL WHALE DESCRIPTIVES	101	6.2
Perceptions / feelings about whales		
Whales are friendly	12	0.7
Whales are gentle	10	0.6
Whales are playful	8	0.5
Whales are unafraid	7	0.4
Whales are intelligent	6	0.4
Whales are quiet	3	0.2
Whales enjoy interacting	3	0.2
Other specific feelings	23	1.4
TOTAL PERCEPTIONS	72	4.4
Whales' anatomy		
Eye(s)	13	0.8
The whale(s)' body	5	0.3
Underbelly	4	0.2
Colouring / patterns	3	0.2
Other specific anatomical features	15	0.9
TOTAL ANATOMY	40	2.4
Descriptives for encounter		
Amazing	6	0.4
Incredible	5	0.3
Wonderful	3	0.2
Other specific encounter descriptives	8	0.5
Descriptives of behaviour/anatomy	9	0.6
TOTAL OTHER DESCRIPTIVES	31	1.9
Other elements		
Good visibility	4	0.2
Social elements	2	0.1
Good weather	1	0.1
Humpback whale	1	0.1
Other specific elements	10	0.6
TOTAL OTHER	18	1.1
TOTAL ELEMENTS	1633	100
Left blank	38	

*Represents total coded elements (not numbers of respondents).

3.5.5 Elements detracting from participants' experiences with minke whales

Respondents were asked, 'were there things that stand out as detracting from your enjoyment of your minke whale experience(s)?' This question received a lower response rate (68.5%) than those for best experiences, as well as generally shorter answers with fewer distinct elements. A summary of the most frequently mentioned detracting elements is provided below (Table 3.10; Table 3.11).

Table 3.10. Most frequently mentioned elements of divers' detracting experiences with minke whales

Response element	Number of respondents	Valid Percentage of respondents*
Bad weather	31	8.6
Cold water temperature	26	7.2
Other divers chasing / following whale(s)	21	5.8
Too many divers in the water	18	5.0
Wanted to get closer to the whale(s)	14	3.9
No detracting experiences	195	54.0
Total respondents	361	
Left this question blank	166	

*Some respondents gave more than one response to this question.

Example responses:

Bad weather

- "The strong surf, swallowed heaps of salt water."
- "Better visibility at times would have been nice – can't you control for that? And while at it, calm the sea – make it a little warmer!"

Cold water temperature

- "The water was quite cold so I wasn't able to stay in as long as I liked."
- "Only that it was really rough and cold."

Other divers chasing/following whale(s)

- "Some divers went after the whales so anxious to get a picture or see them up close. Many ignored the constant requests to not chase them or leave the line from the crew. Thus, the minke whales were scared off."
- "People swimming towards or using flash photography – caused the whales to move away."
- "The snorkellers/divers swam to the whale and scared it away when before they were chasing it, the whale was getting closer and closer."

Too many divers in the water

- "There were so many people that the whales were easily scared by movement."
- "Too many people in the water, scaring the whale off."
- "People swimming after them scaring them away. Not having a line to hold onto while watching. Too many people in water."

Wanted to get closer to the whale(s)

- "Didn't get as close to them as we would have liked. It seemed other snorkellers would move closer when they saw them and the whales would stay away."
- "I wanted them to come much closer."

Table 3.11. Detracting elements of respondents experiences with minke whales

Description	TOTAL	Valid Percentage*
Weather related		
Bad / rough weather / seas	31	13.7
Cold water	26	11.5
Poor visibility	8	3.5
Current too strong	3	1.3
TOTAL	68	30.0
Wanted to, but didn't...		
Wanted to get closer to the whale(s)	14	6.2
Wanted more time / encounter not long enough	13	5.7
Wanted to see more whales / more encounters	8	3.5
Wanted to use SCUBA during the encounter	4	1.8
Wanted to swim 'freely' with the whale(s)	3	1.3
Wanted to (but didn't) swim with whale(s)	2	0.9
Wanted to touch the whale(s)	1	0.4
Wanted to photograph	1	0.4
TOTAL	46	20.3
Potential impacts on whales		
Divers / snorkellers chased whale(s)	21	9.3
Whale(s) scared away / left dive site	10	4.4
Bubbles from SCUBA divers	2	0.9
General concern for impacts	2	0.9
Divers taking flash photos	1	0.4
Effluent in water during encounter	1	0.4
Continuation of whaling	1	0.4
A scar on the whale's back	1	0.4
TOTAL	39	17.2
Management elements		
Too many divers / snorkellers in the water	18	7.9
Problems with divers in water (kicking etc.)	6	2.6
Other boats detracting from experience	3	1.3
Rope pulled too hard / much (while boat drifting)	3	1.3
Divers / snorkellers ignored rules / guidelines	2	0.9
Divers / snorkellers left the line / rope	2	0.9
Rope was too crowded	1	0.4
No rope provided	1	0.4
Encounter too long	1	0.4
TOTAL	37	16.3
Personal Elements		
Self or equipment problems	9	4.0
Lack of enthusiasm in other passengers	4	1.8
Seasickness	3	1.3
Problems with other passengers on board	3	1.3
Feeling cold	2	0.9
Swallowed water	1	0.4
Not ready / prepared for encounter	1	0.4
Rope burns	1	0.4
'Scary' feeling during encounter	1	0.4
TOTAL	25	11.0
Other (non-specific)	12	5.3
TOTAL DETRACTING ELEMENTS	227	100
No detracting experiences	195	
Left blank	166	

*Represents total coded elements (not numbers of respondents).

3.5.6 Respondents' expectations of their minke whale experience(s)

Respondents were asked, 'Overall, how well did your minke whale experience(s) meet your expectations?' A five point scale was provided (ranging from (1) "well below my expectations" to (3) "met my expectations", to (5) "well above my expectations"), and a space was provided for respondents to provide a brief explanation of why they felt that way. The mean rating for this question was quite high, at 4.33, indicating that respondents' expectations were somewhat exceeded overall by their minke whale experiences.

The response rate for the open-ended part was 47.1%. A summary of the most frequently mentioned elements is provided below (Table 3.12).

Example responses:

Positive elements:

Didn't expect to get as close to whales

- "I only expected to see the whales from afar aboard the boat."
- "I didn't expect to see any, especially at close range."

Didn't expect to see whales

- "I did not expect to see a minke whale."
- "I did not know the whales existed."
- "Didn't expect to see them, let alone end up in the water with them!"
- "Sighting a minke whale on this trip was a massive bonus as it wasn't a whale watching trip, just a general SCUBA trip."

Didn't expect encounter to last as long

- "Whales came closer than anticipated and stayed longer than expected."

Didn't expect as many whales

- "Didn't expect as many encounters as we had, nor for the length of time experienced. Didn't expect "friendliness" of whales."
- "I knew it would be a great experience, but I did not expect to see so many whales, nor did I expect the passes to be as close as they were."

Didn't expect elements of whale(s)' behaviour

- "I didn't think they would be so inquisitive."
- "I had heard how close the whales approached, but was not prepared for the curiosity of the animal."

Didn't expect to swim with whales

- "I heard from previous trips that minke whale sightings were common, so I was just hoping to see them and I did. Didn't really expect to swim with them or anything."
- "I didn't know that we were going to be in the water with them."

Negative elements:

Expected to swim with the whale(s) but didn't

- "Would have liked to have been in the water, but that's my fault, not the whales."

Expected more whales

- "I expected to see more of them but was well satisfied to have seen the 4-5 that I personally witnessed."

Table 3.12. Elements of respondents' expectations

Description	Total elements	Valid percentage*
Positive elements		
Didn't expect to get as close to whale(s)	67	21.2
Didn't expect to see whale(s)	37	11.7
Didn't expect encounter to last as long	19	6.0
Didn't expect as many whales	13	4.1
Didn't expect elements of whale(s)' behaviour	11	3.5
Didn't expect to swim with whale(s)	9	2.8
Better than previous minke experience	7	2.2
Didn't expect curiosity/friendliness of whales	6	1.9
Better than previous whale experience	2	0.6
Better than previous whale shark experience	2	0.6
Didn't expect personal feeling of experience	2	0.6
Didn't expect such interactivity of encounter	2	0.6
Impressed with good behaviour of passengers	2	0.6
Good visibility	2	0.6
Whales initiating encounter	2	0.6
Impressed with staff's knowledge of whales	1	0.3
Impressed with high quality interpretation	1	0.3
Didn't expect as many encounters	1	0.3
Good weather	1	0.3
Pleased with other divers / passengers	1	0.3
Better than TV documentaries etc.	1	0.3
General/non-specific positive	32	10.1
TOTAL POSITIVE	221	69.9
Neutral elements		
Had no expectations / didn't know what to expect	32	10.1
Expectations met	6	1.9
First time / experience	5	1.6
Expected only diving on trip	3	0.9
Knew what to expect	3	0.9
Expectations were high	1	0.3
Other/non-specific	5	1.6
TOTAL NEUTRAL	55	17.4
Negative elements		
Expected to swim with the whale(s) but didn't	11	3.5
Expected more whales	7	2.2
Wanted to touch the whale(s)	4	1.3
Expected whales to come closer	3	0.9
Bad weather	2	0.6
Not as good as previous minke experience	1	0.3
Expected the encounter to be better	1	0.3
Wanted to get closer	1	0.3
Poor visibility	1	0.3
TOTAL NEGATIVE	31	9.8
Descriptive words related to whales/encounter		
Amazing	3	0.9
Unbelievable	2	0.6
Huge	1	0.3
Graceful	1	0.3
Peaceful	1	0.3
Wonderful	1	0.3
TOTAL DESCRIPTIVES	9	2.8
TOTAL ELEMENTS	316	100
Left blank	279	

*Represents total coded elements (not numbers of respondents).

3.5.7 Improvements to respondents' minke whale experience

Respondents were asked, "Is there anything you feel would have improved your minke whale experience(s)?" The response rate for this question was 63%. A summary of the most frequently mentioned elements is provided below (Table 3.13; Table 3.14).

Table 3.13. Most frequently mentioned elements to improve respondents' minke whale experience(s)

	Number of respondents	Valid % of respondents*
To have seen more whales / had more encounters	30	9.0
To have been closer to the whale(s)	20	6.0
For there to have been better weather (in general)	19	5.7
To have used SCUBA during encounter – be under the water	17	5.1
To have had a longer encounter	16	4.8
To have had better visibility	16	4.8
For there to have been fewer divers / swimmers	16	4.8
To have received more information on the whales	13	3.9
Don't know	3	0.9
Couldn't have been better / nothing to improve	101	30.4
Total respondents	332	
Left blank	195	

*Some respondents gave more than one response to this question.

Example responses:

To have seen more whales

- "More whales! More air – both experiences were at the end of a SCUBA dive when my tank was almost empty."
- "More whales and even closer, but then who can tell what can happen."

To have been closer to the whale(s)

- "Only if the minke had come in closer."
- "If they would have swam close enough to touch."
- "Just having the whales come closer and exhibit more behaviour really close."

Better weather/visibility

- "Clear water, less choppy, warmer, few more inner tubes."
- "It's beyond our control, but if the sun were out and the water clearer, it would have been perfect (maybe too much to hope)."

To have used SCUBA

- "Pretty good as it was. Maybe we could have been able to SCUBA with them too (@ close range)."
- "To see them while diving would be interesting."

To have had a longer encounter

- "Just more time. I could have stayed out there for another hour or two."
- "A longer experience but you can't really influence that as it is up to the whales."

Fewer divers/swimmers

- "Yes! Limit the number of people in the water at any one time (especially SCUBA). Better pre-dive briefings on successful whale encounter behaviours (diver and whale)."
- "Stunning viewing – when few people in water and not chasing them."
- "Fewer people in water at once. People have a tendency to not pay attention and kick each other (this expectation is not possible, everyone on the boat needs to get in with the whales)."

To have received more information on the whales

- "If we had been better prepared: see a documentary video of 15-30 minutes about the minke, their life, what they are up to when and where we see them."
- "More background information on the whales or info on the research being conducted."
- "Access to more information about minke life history and ecology. A photographic gallery of individual whales and their markings."

Table 3.14. Elements suggested by respondents to improve their minke whale experience(s)

Description	n	Valid percentage*
Whale related		
To have seen more whales / had more encounters	30	10.6
To have been closer to the whale(s)	20	7.1
To have had a longer encounter	16	5.7
To have touched the whale(s)	12	4.2
To see whale(s) from in water	11	3.9
To have seen (more / closer) breaching	6	2.1
To have communicated with / understood the whale(s)	4	1.4
To have taken a ride on the whale's tail / dorsal fin	2	0.7
To have gotten a better look	2	0.7
To have seen more / different behavioural displays	2	0.7
For the whales to have surfaced more	1	0.4
To have seen baby whales	1	0.4
To have heard the whales' vocalisations	1	0.4
TOTAL WHALE RELATED	108	38.2
Operator / Management related		
To have used SCUBA during encounter – be under the water	17	6.0
To have received more info on the whales	13	4.6
Better ropes / more ropes / more hand-holds	8	2.8
To have been better briefed before encounter	6	2.1
To have been better informed prior to trip (about minkes)	3	1.1
More time to see whale(s)	3	1.1
To have more / better protection (legislation) for species	2	0.7
To have had a bigger tank / more air	2	0.7
To have received more info on minke research	2	0.7
More opportunities to see whales	2	0.7
For boat to have used ropes	2	0.7
For there to have been a real-time video display on board	1	0.4
To have had real time audio of encounter	1	0.4
To have been given / offered a research task	1	0.4
To have seen a photo ID gallery of individual whales	1	0.4
To have had a glass-bottom boat or u/w windows	1	0.4
TOTAL OPERATOR/MANAGEMENT RELATED	66	23.3
Weather related		
For there to have been better weather (in general)	19	6.7
To have had better visibility	16	5.7
Warmer water temperature	13	4.6
TOTAL WEATHER RELATED	48	17.0
Passenger / diver related		
For there to have been less divers / swimmers	16	5.7
For divers not to have scared away / chased whales	8	2.8
Elements of other divers' / passengers' behaviour	3	1.1
For divers to have followed guidelines / stayed on rope	2	0.7
No other divers / to be alone with whales	1	0.4
For divers not to have used flash photos	1	0.4
For other passengers not to have used SCUBA (snorkel only)	1	0.4
For other passengers not to have used snorkel (SCUBA only)	1	0.4
Better / nicer passengers on board	1	0.4
TOTAL PASSENGER / DIVER RELATED	34	12.0
Other		
Self / equipment problems	6	2.1
To have been away from the boat during the encounter	2	0.7
To have taken a dedicated minke whale watching trip	2	0.7
To have come at a better time in the season	1	0.4
To have taken more time out / more trips to Reef	1	0.4
Other / non-specific	15	5.3
TOTAL OTHER	27	9.5
TOTAL ELEMENTS	283	100
Couldn't have been better / nothing to improve	101	
Don't know	3	
Left blank	195	

*Represents total coded elements (not numbers of respondents).

3.6 Perceptions of impacts on dwarf minke whales

3.6.1 Respondents' concern for impacts

Respondents were asked (Q.22): "Do you feel any concern that this kind of whale-watching (swimming with minke) might result in some negative impacts on the whales?" Boxes were provided for respondents to tick, indicating either a yes or no answer to the question, and a space left below for their comments. The majority of respondents indicated that they were not concerned about negative impacts on the whales (77.2%; n=496; 31 did not respond), however many of these went on to qualify their lack of concern with various provisos (e.g. "not concerned as long as..."). The response rate for the open-ended part of this question was 67.4%. A summary of the responses is provided below (Table 3.15).

Example responses:

Not concerned

- "Whales don't seem perturbed by human presence – they are much bigger and can swim way better than us! As long as properly controlled and supervised (i.e. Not allowed to chase whales in boats or attack them) I feel would only have a positive impact, raising awareness of minke whales."
- "No, because the interactions were entirely controlled by them and they could leave or enter the snorkelling areas as they wish."
- "The whales are not being intruded upon at all. They begin the encounter. The only time we possibly intrude is when we end the encounter."

Not concerned as because...

- "As long as we remain as observers and let the whale control the interaction there should be no negative impact."
- "No, as long as people are informed and careful."
- "The whales were curious/friendly and interested (seemingly) in us. As long as we only observe them and do not destroy the environment, I think the negative impacts will be very low."
- "I think if people adhere to the guidelines then it will be as non intrusive as possible. We have to accept that some interaction is bound to take place."
- "In these situations where the whales come to us, there should be no negative impacts if everyone follows the rules."
- "Providing people are thoroughly briefed so as not to invade/touch /intimidate the animals and providing the encounters are on the whales' terms can see no negative impact but must be controlled."

Yes, concerned

- "Any time people attempt to interact in an animal's environment there is a chance of negative effects. People need to be educated on how to interact with these animals."
- "People don't know how to enjoy presence of wildlife without annoying, harassing or chasing it. Whales may choose to stay further offshore to avoid human contact. How does this affect whale feeding, breeding and lifestyle?"
- "I just wonder what the whales would be doing if they weren't circling the boat. Why do they hang out with us?"
- "We do not know yet the effects of our behaviour upon them."

Yes, concerned if...

- "Possible harassment if divers/swimmers aren't informed enough about rules and behaviours."
- "Only if too many boats get in on the act and it becomes a circus out there."
- "If such expeditions can be run by anyone with a commercial interest, it will be difficult to control the behaviour of other boats which may detract from research in future."
- "Habitualise them to boats – which might increase their chances of being hunted – if they approach whaling boats."
- "My only concern is the number of boats who *could* be doing this."

Table 3.15. Elements of respondents' concerns about impacts of swimming with minke

Description	n	Valid %*
Not concerned because:		
Whale(s) approached us / initiated encounter	50	8.9
Interaction was on whales' terms	30	5.3
Whales are free to leave at any time during encounter	27	4.8
Whales are / were curious	26	4.6
We didn't scare / chase / harass them	15	2.7
Whales like the attention / enjoy interactions	13	2.3
Current regulations work well / are sufficient	11	2.0
We didn't touch them	10	1.8
We used ropes	10	1.8
No negative effects seen / whales seemed okay	5	0.9
Whales seemed to enjoy encounter / were happy	5	0.9
Whales were watching us / checking us out	5	0.9
We acted responsibly / calmly / cautiously	4	0.7
Didn't feed the whales	4	0.7
The boat was moored	4	0.7
We were supervised / controlled	3	0.5
Swimmers were stationary in water	2	0.4
Observing only	2	0.4
Encounter was well managed	2	0.4
Whales not disturbed by human presence	2	0.4
People can't get too close (if they try)	1	0.2
Crew gave instructions / briefing	1	0.2
Encounter was incidental	1	0.2
Whales are bigger than us	1	0.2
No SCUBA diving during encounter	1	0.2
Whales swim faster than us	1	0.2
Weren't whale watching	1	0.2
There are only a few boats doing this	1	0.2
The whales know what's good for them	1	0.2
Other / non-specific	10	1.8
TOTAL	249	44.2
Not concerned as long as:		
Whales not chased / scared away	21	3.7
Interactions are on whales' terms	14	2.5
People follow guidelines	11	2.0
No touching	11	2.0
People properly briefed / educated	9	1.6
Use rope / stay on rope	6	1.1
People observe only	5	0.9
Whales not harassed	5	0.9
Limit number of people in water	5	0.9
No feeding	5	0.9
Interactions are properly controlled & supervised	5	0.9
Whales not hurt / harmed	4	0.7
Limit to number of boats & encounters	3	0.5
Boats not driven close to whales	3	0.5
People keep their distance	2	0.4
People don't ride them	2	0.4
Guidelines enforced	2	0.4
Swimmers keep still / calm in water	2	0.4
Other operators follow guidelines	2	0.4
Nothing done to attract whales	1	0.2
Protective measures are taken	1	0.2
Environment not destroyed	1	0.2
Whales' behaviour not changed	1	0.2
Situation remains same – no changes	1	0.2
People behave sensibly	1	0.2
Whales not attacked	1	0.2
People respect whales / have right attitude	1	0.2
Not too many tourists	1	0.2
TOTAL	126	22.4
Not concerned, but (other comments):		
Maybe an impact, if number of boats increases	4	0.7
General / non specific comments	9	1.6
TOTAL	13	2.3
Not concerned, but positive impacts:		
Raise awareness of minke whales	4	0.7
Positive impacts in general	3	0.5
TOTAL	7	1.2
TOTAL NO	395	70.2

Description	n	Valid %*
Yes, concerned if:		
Other operators / people don't follow guidelines	16	2.8
Whales become habituated to boats (whaling reasons)	14	2.5
Too many people	9	1.6
Whales become too familiar with humans	9	1.6
Swimmers / divers chase / follow whale(s) in water	7	1.2
Becomes too commercial / exploited	6	1.1
Too many boats	5	0.9
Boats chase / follow whale(s)	4	0.7
Guidelines not implemented / in place	3	0.5
Touching allowed / people try to touch	3	0.5
Divers not fully informed	2	0.4
Whales are forced to interact	2	0.4
Whales become habituated and hurt people	2	0.4
Changes whales' behaviour	2	0.4
Whales are encountered too frequently	1	0.2
People get too close	1	0.2
TOTAL	86	15.3
Yes, concerned because:		
Not all people are responsible	7	1.2
Unknown impacts / effects of interactions	5	0.9
Effects of human interaction in general	4	0.7
Whales may avoid important areas to avoid humans	4	0.7
People are swimming towards whale(s) – may impact	4	0.7
Pollution	4	0.7
People may chase / scare whales	3	0.5
Whales may become too familiar with humans	3	0.5
Camera flash may scare	2	0.4
Weight belt was dropped on a whale	2	0.4
Whales may become afraid of humans	2	0.4
Observed the boat breaching guidelines	2	0.4
People shouldn't swim with whales	1	0.2
People will try to touch them	1	0.2
Boat attracts whales	1	0.2
SCUBA bubbles may scare	1	0.2
Whales will leave sooner or later	1	0.2
Increased demand = more boats	1	0.2
Increasing human contact	1	0.2
Boat noise may impact	1	0.2
Whales swim away when approached in the water	1	0.2
Other / non-specific	4	0.7
TOTAL	55	9.8
Yes, recommendations to minimise impacts:		
Let whales approach	4	0.7
Educate people	3	0.5
Hold onto rope in water	3	0.5
Don't chase / follow whales	2	0.4
Limit number of swimmers allowed	2	0.4
Ban SCUBA	1	0.2
Ensure guidelines established and adhered to	1	0.2
Observe only	1	0.2
Don't abuse whales	1	0.2
Limit minimum approach distance	1	0.2
TOTAL	19	3.4
Yes, concerned but (other comments):		
Whales will leave if unhappy / distressed	1	0.2
Would not participate if swimming caused –ve effects	1	0.2
Yes, positive impacts	1	0.2
TOTAL	3	0.5
TOTAL YES	163	29.0
Other:		
Don't know	4	0.7
Regulation not necessary	1	0.2
TOTAL OTHER	5	0.9
TOTAL ELEMENTS	563	100
Left blank	172	

*Represents total coded elements (not numbers of respondents).

3.6.2 Perceived impacts on dwarf minke whales by respondents

Respondents were asked (Q.23): “Was there any point when you felt your interaction(s) resulted in a negative impact on the whale(s)?” Boxes were provided for respondents to tick, indicating either a yes or no answer to the question, and a space left below for their comments. The vast majority of the sample (96.8%; n=500; 27 did not respond) indicated they felt their interaction did not result in a negative impact on the whale(s).

The response rate for the open-ended part of this question was 38.3%. A summary of the responses is provided below (Table 3.16).

Example responses:

No, felt there was no impact

- “I did not touch the whale or destroy its environment. By simply looking at them, I feel that I didn’t hurt their well-being.”
- “I stayed on the line the entire time and let them come to me when they were comfortable.”
- “I was very careful and non-threatening towards the whale. They continually came in close. On snorkel I would dive down and swim parallel to them.”
- “I followed the guidelines and observed no avoidance/harassment behaviours.”
- “The whales were quite close to me. I made no moves when there was a whale nearby, I simply watched and floated on the rope.”
- “Or at least I hope they didn’t have a negative impact.”
- “After the whales made several passes, I let go of the rope and swam alongside one keeping about 2 metres distance. He/she (?) seemed to be inviting me to do this. I don’t believe there was a negative impact because I did not touch it and it kept coming back”
- “We never touch whales or interfered with their normal behaviour.”

Yes, felt there was an impact

- “Seemed like my, and others’, SCUBA and bubbles kept whales away.”
- “I didn’t really chase it, but I wanted to see them closer and approached to about 8m from the whale, then he swam away, regrettably.”
- “If you moved around a lot or there were more than 8-10 people in the water.”

Table 3.16. Elements of respondents' minke interaction which they felt may have resulted in negative impacts on the whale(s)

Description	Total elements	Valid Percentage*
No negative impacts, because...		
Whale(s) initiated contact / approached on own	48	16.5
Interaction(s) under whale(s) terms	29	10.0
Watched / observed only / passive interaction	20	6.9
Followed guidelines / stayed on rope	20	6.9
Didn't touch whale(s)	17	5.8
Because the whales seemed curious	16	5.5
Didn't chase / disturb / threaten the whale(s)	13	4.5
Whales seem comfortable/unconcerned about divers	13	4.5
Didn't move during encounter / motionless	12	4.1
Whales could leave when they wanted to	10	3.4
Not close enough to whale(s)	6	2.1
Observed from boat only	6	2.1
Observed no negative reactions / behaviour	6	2.1
Because it was interesting for the whale(s)	5	1.7
Didn't approach/swim towards whale(s)	4	1.4
Observed from distance only/not close enough	4	1.4
Whales didn't leave/stayed for some time	4	1.4
Whales move away when approached	3	1.0
Received briefing from staff on how to interact	3	1.0
Whales liked it/enjoyed encounter	3	1.0
Whales enjoy interaction / like humans...	3	1.0
Didn't destroy their environment	2	0.7
No feeding	2	0.7
Encountered for a short time only	1	0.3
Research being conducted	1	0.3
Used flash, but whales didn't react to it	1	0.3
Crew enforced guidelines	1	0.3
Had a good feeling about encounter	1	0.3
Boat didn't move during encounter	1	0.3
Didn't use flash photography	1	0.3
Didn't attempt to communicate with whale(s)	1	0.3
No shouting	1	0.3
Slow movements	1	0.3
No generally / don't think so	3	1.0
TOTAL NO	262	90.0
Yes, felt there were negative impacts because...		
Movements towards whale(s) / swim towards	3	1.0
Whales seemed scared by SCUBA / bubbles	3	1.0
Being in their environment / invading their space	2	0.7
Human presence / just being there	2	0.7
Noises made underwater	2	0.7
People moving around too much in water	2	0.7
Lots / too many people	1	0.3
Touched whale	1	0.3
TOTAL YES	16	5.5
Maybe		
Weight belt dropped (accidentally) on whale	2	0.7
Sudden movements scare whales	2	0.7
Whales scared by naked swimmers	1	0.3
Unknown effects of interaction(s)	1	0.3
Whale(s) scared by (duck) diving down	1	0.3
TOTAL MAYBE	7	2.4
Other		
Hope not	1	0.3
Didn't interact with whales	1	0.3
Don't know	1	0.3
Concerned: need for regulations, conservation	1	0.3
Other	2	0.7
TOTAL OTHER	6	2.1
TOTAL ELEMENTS	291	100
Left blank	325	

*Represents total coded elements (not numbers of respondents).

3.6.3 Respondents' observed negative effects from actions of other passengers or crew on minke whales

Respondents were asked (Q.24): "Did you observe any actions of other passengers or crew which you feel may have had negative effects on the whale(s)?" Boxes were provided for respondents to tick, indicating either a yes or no answer to the question, and a space left below for their comments. The majority of the sample (88.3%) indicated that they had observed no actions which resulted in negative effects (n=503; 24 did not respond).

The response rate for the open-ended part of this question was 26.2%. A summary of the responses is provided below (Table 3.17).

Example responses:

No, observed no negative effects

- "Everyone obeyed the guidelines."
- "Everyone was completely calm and still, no-one chased the whales at all."
- "Everyone conducted themselves well and the crew (and researchers) gave the passengers an extensive brief on the guidelines of swimming with the whales."
- "Nobody tried to touch the whales, if anybody had done anything negative, the whales could have and I believe they would have swam away."
- "The minke came and went as it pleased, no one swam towards the whale or made sudden movements. The minke made no sudden movements or change of speed."
- "People did swim toward it and dive down, but no-one got close. The whales were quite distant."
- "Everyone behaved appropriate (simply lying on the surface watching them)."
- "The whales controlled the encounter."
- "None what-so-ever, they stayed hours around the boat and seemed to enjoy it."
- "All crew and researchers are very concerned for well being of the whales and it showed."

Yes, observed negative effect(s)

- "One passenger chased them every time they swam by – it could have agitated the whales to have someone swimming after them."
- "When other passengers started jumping in to get up close and chasing them for a better close-up."
- "Two guests on SCUBA swam towards the whales which veered – not a big thing but an effect."
- "Another boat (name removed) came in on our encounter – within 100m – may have had negative effects on the whales."
- "Snorkellers and divers in the water chased the animal away."
- "Divers and snorkellers chasing to get a better or closer look."
- "Use of strobe caused a change in whale direction/speed of swimming. Swimming towards whale also caused them to change direction."
- "One goof-ball started splashing across the water chasing the whales. The crew swiftly called him back."
- "Maybe it was unintentional, but I saw someone chasing a minke. Camera flash may have frightened the minkes. Maybe because of those, the whale mightn't come back"
- "Chasing for photograph after being explicitly told not to (by passenger)."
- "When the tender started to turn around, the whale went away for a while."

Table 3.17. Actions of other passengers or crew observed by respondents which they felt may have had negative effects on the whale(s)

Description	Total elements	Valid percentage*
No negative effects observed because:		
People well informed / briefed prior to encounter	11	5.3
People were sensitive / concerned / respectful	11	5.3
People followed guidelines	7	3.3
People acted responsibly / safely	7	3.3
Encounter was on whale(s) terms	6	2.9
People didn't chase / pursue whale(s)	6	2.9
People were calm / still / moved slowly	5	2.4
Saw none	5	2.4
People not close enough to whale(s)	5	2.4
People observed / looked only	4	1.9
Whale(s) initiated encounter	3	1.4
Not watching other people	2	1.0
Whales can leave/swim away	2	1.0
Whale(s) not touched	2	1.0
Whale(s) appeared relaxed / calm	2	1.0
Rope used	1	0.5
Not enough people (in the water)	1	0.5
Whales not threatened	1	0.5
Interactions well managed	1	0.5
Whale(s) not disturbed	1	0.5
Because of length of encounter	1	0.5
No children on board	1	0.5
Other reasons / non-specific	8	3.8
TOTAL NO	93	44.7
Yes: potential causes / effects observed		
Chasing / swimming after whale(s)	35	16.8
Camera flash	6	2.9
Weight belt dropped on whale	5	2.4
Whales swam away / faster / veered etc.	5	2.4
Splashing by swimmers / too much movement	4	1.9
Swimmers leaving / letting go of the rope	3	1.4
Duck diving / diving down	3	1.4
Bubbles (from SCUBA)	3	1.4
Human presence / being there (in the water)	2	1.0
Too close to whale(s)	2	1.0
Too many divers in water	1	0.5
People attempting to touch whale	1	0.5
Sunscreens in water	1	0.5
Pollutants in water	1	0.5
Tender boat driven around, whales went away	1	0.5
Jumping in the water	1	0.5
Other passenger behaviour	1	0.5
Other	3	1.4
TOTAL YES	78	37.5
Who did it? (answered yes)		
Other passenger(s) / diver(s) / swimmer(s)	22	10.6
Crew member(s)	2	1.0
This boat	2	1.0
Other Boat	1	0.5
Researcher(s)	1	0.5
TOTAL WHOM	28	13.5
Maybe, because		
Swimmer(s) / diver(s) too close to whale(s)	2	1.0
Following / chasing / pursuing whale(s)	1	0.5
Singing / noises underwater	1	0.5
Duck diving / diving down	1	0.5
SCUBA diver(s)' effects / bubbles	1	0.5
People may abuse whale(s)	1	0.5
TOTAL MAYBE	7	3.3
Other/non-specific	2	1.0
TOTAL ELEMENTS	208	100
Left blank	389	

*Represents total coded elements (not numbers of respondents).

3.7 Respondents' satisfaction with their boat trip

Respondents were asked: "How would you rate your satisfaction with this boat trip?" and were provided a rating scale on which to circle one number (ranging from 1 = very poor to 10 = excellent). The mean rating for this question was very high, at 9.06 (out of 10).

3.8 Management of minke encounters

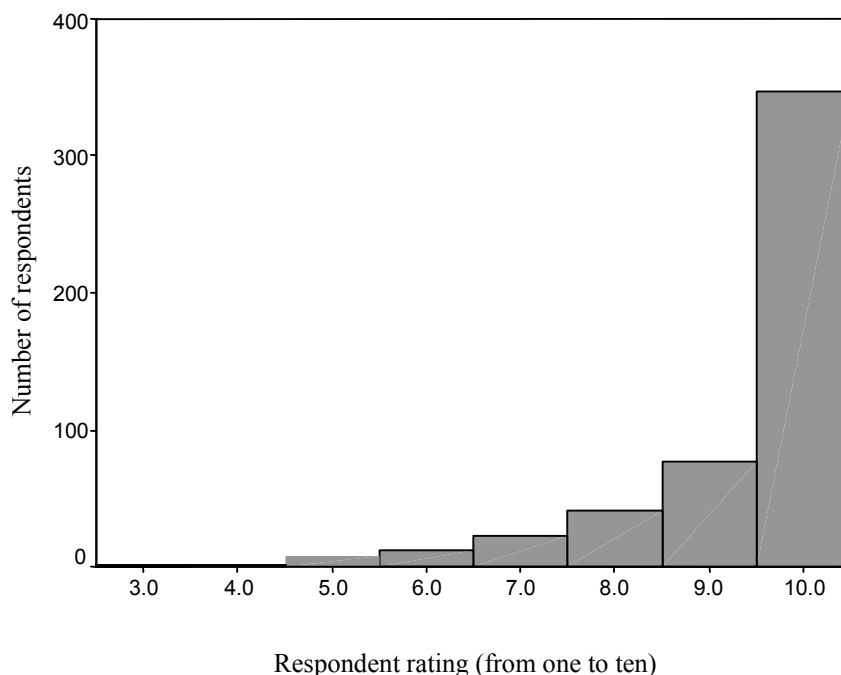
3.8.1 Respondents' perceptions of their minke encounter management

Respondents were asked (Q.27): "Overall, how well do you feel your minke whale encounter(s) were managed by your boat crew?" A ten-point rating scale was provided (ranging from 1 = very poorly to 10 = very well), followed by a space for an explanation of reasons for their selection.

The mean rating for this question was also very high, at 9.36 (out of 10; $n = 487$). The distribution of responses to this question is shown below (Figure 3.2). The open-ended part of this question received a response rate of 52.2% ($n = 487$). A summary of responses is detailed below (Table 3.18).

It was discovered upon return of the completed questionnaires that a translation error had not been picked up during the back-translation of the Japanese version. This error had the effect of changing the meaning of the sentence on the Japanese version of the questionnaire to (approximately) "How well do you feel your boat crew were able to locate the whales." Due to this error, all Japanese responses to this question were discounted. The resulting sample size for this question was reduced to $n = 487$.

Figure 3.2. Histogram of respondents' rating of how well they felt their minke whale encounter(s) were managed by their boat crew (rating scores from one to ten; $n=487$)



Example responses:

Positive statements

- “Passengers well briefed before boat left. Explained about ‘do’s and don’ts’ reinforced briefings throughout the trip. Also, very good info provided by researchers in evening talks.”
- “The crew demonstrated respect and decent common sense while the minke whales were around the boat, it was great.”
- “Good supervision of snorkellers in water – number of snorkellers monitored.”
- “The encounters were managed cautiously and carefully by the crew, very well done, very professional, the whales were only studied, not threatened at all.”
- “There was a lot of excitement which usually results in some type of chaos. But the crew was well organised and had great communication allowing things to run smoothly.”
- “They actively pursued the whales when travelling and kept us in the vicinity for a long time when swimming with whales.”

Negative statements

- “They didn’t have enough precautionary measures. It was more of a free for all when the whales arrived.”
- “Even though we were told not to swim to the whale, people still did.”
- “They did no managing except to inform us not to pursue or touch the whale.”
- “It’s hard to just get divers under control, let alone “manage” underwater.”
- “Crew gave briefing how to encounter whales, but too many people in the water.”
- “Boat crew talked a little about them and pleaded snorkellers/divers to not swim toward them, but snorkellers couldn’t resist.”
- “I would have liked more detailed info on the minkes before we encountered them.”

Table 3.18. Respondents' assessment of how well their minke whale encounters were managed (n = 487; excluding Japanese questionnaires)

Description	n	Valid percentage*
Ratings 8-10 (well managed); comments		
Good briefing(s) about rules / regulations of encounters	66	19.0
Good organisation / experience of crew	36	10.4
Told not to approach / follow / pursue whale(s)	34	9.8
Good explanations / interpretation	21	6.1
Whale(s) shown respect	14	4.0
Ropes deployed / used	14	4.0
Scientists / researchers on board	13	3.7
Let passengers swim with whales	10	2.9
Enthusiastic crew	9	2.6
Many opportunities / lots of time to swim with whale(s)	7	2.0
Knowledgeable crew	6	1.7
Good supervision of passengers / swimmers	6	1.7
Limit to number of passengers in water	4	1.2
Crew set good example by following guidelines themselves	4	1.2
Whale(s)' safety important to crew	4	1.2
Good atmosphere on boat (not stressful, exciting, etc)	4	1.2
Quick to react to whale sighting(s)	3	0.9
Boat stopped when whale(s) seen	3	0.9
Knew where to find whales	3	0.9
Had spotters/people looking for whales	3	0.9
Whales not scared / interfered with / threatened	3	0.9
Stayed at site longer (for encounter)	2	0.6
Briefing before departure	2	0.6
Lots of whales found	2	0.6
Divers put into small groups	2	0.6
Encouragement to help with research	2	0.6
Less diving than expected	2	0.6
Boat pursued whales	1	0.3
Crew broke rules	1	0.3
Rules/guidelines not clear	1	0.3
Too many people in water	1	0.3
People swam towards whales	1	0.3
Told not to look the whales in the eye	1	0.3
Encounter ended by the boat	1	0.3
Divers put in on snorkel only	1	0.3
Reading materials made available	1	0.3
Limited number of passengers in water	1	0.3
Whale(s) waited for (not chased / followed) by boat	1	0.3
Crew 'environmentally friendly' / aware	1	0.3
Consulted pax about trip itinerary / dive plan	1	0.3
Took safety precautions	1	0.3
Other / non-specific	28	8.1
TOTAL	321	92.5
Ratings 5-7 (fair/average management); comments		
Other people not following guidelines / recommendations	3	0.9
Too many swimmers in water	2	0.6
Needed better briefing	2	0.6
Crew uninterested in minke whales	1	0.3
Crew excited about whales	1	0.3
Had no encounters – felt misled by crew	1	0.3
Rope not used	1	0.3
Passengers briefed on what to do	1	0.3
Not enough precautionary measures	1	0.3
Not enough time / opportunities for encounters	1	0.3
Pax not briefed before first interaction	1	0.3
'Overbearing' crew members	1	0.3
Other / non-specific	5	1.4
TOTAL	21	6.1
Ratings 1-4 (poorly managed); comments		
Little interpretation / poor explanation(s)	1	0.3
Little help to see minke whale(s)	1	0.3
Went to location where minke(s) were expected	1	0.3
TOTAL	3	0.9
Other / non-specific	2	0.6
TOTAL ELEMENTS	347	100
Japanese responses	14	
Japanese left blank	26	
Left blank	233	

*Represents total coded elements (not numbers of respondents)

3.8.2 Respondent reactions to proposed controls on minke interactions (from Code of Practice developed by Arnold and Birtles 1999)

Respondents were asked (Q.28): “How do you feel about the following controls being used to manage people’s encounters with minke whales?” Nine controls were proposed with a five-point scale (ranging from 1 = strongly opposed, to 3 = neutral, to 5 = strongly supportive) provided for each. The mean scores from these scales are ranked below (Table 3.19). Immediately following this question, respondents were asked: “If you strongly support or strongly oppose any of these controls, please explain why.” The response rate for the open-ended part of this question was 60.9%. A summary of these responses is shown in Table 3.20.

Table 3.19. Mean ratings (from 1 = strongly oppose, to 5 = strongly support) of nine proposed minke whale interaction controls

High level of support:	Mean Score (out of 5)
No physical contact with whales	4.44
No swimming towards whales	4.40
Use of ropes	4.07
Limited number of people in water	4.06
Medium level of support:	
Ban on use of flash when photographing	3.69
Boats approach no closer than 100m	3.47
Low level of support:	
Time limits on encounters	3.01
Divers enter water no closer than 30m from a whale	2.92
Ban on use of SCUBA	2.74

Example responses:

No physical contact with whales

- “Physical contact might disturb the whales. Also, several tons of whale twitching when poked could cause injury to the pocker!”
- “The most important would be the “no physical contact” ban. This helps significantly in maintaining the health of the whale population.”
- “There is no advantage to the whales from physical human contact and it could cause harm to the whale and the swimmer!”

No swimming towards whales

- “I think swimming toward the whales could threaten the encounter for everyone involved.”
- “I think that a negative impact on the whales can happen if you swim to or touch them.”
- “Coming off a safety line in open sea is not a good idea, and whales can swim much faster than people so there is no point.”

Use of ropes

- “Let whales approach when they feel comfortable. Holding rope – doesn’t ‘crowd’ the whales, less chance of drifting off.”
- “Think snorkelling without the rope could be disastrous with the weather conditions we had.”
- “I feel that limiting #’s of people, having them hold the rope, and not moving towards or touching the whales provides the best experience for both people and whales.”

Limited number of people in water

- “Lots of people in the water likely to detract from individual experience and might (no idea?) keep whales further away (??).”

- “Too many people in the water is bad because you get hit by others’ fins, etc.”
- “I feel that limiting #’s of people, having them hold the rope, and not moving towards or touching the whales provides the best experience for both people and whales.”

Ban on use of flash when photographing

- “Flash seemed to startle whales.”
- “Since we don’t know how minke whales feel about/react to human contact and sudden bright flashes, I feel we shouldn’t subject them to it!”
- “Banning flash photography because it did scare/startle the whale we were watching.”
- “Diving and photography are reason I’m here.”

Boats approach no closer than 100m

- “Boats should be kept well away to reduce any disturbance.”
- “Boats should not use their props near whales, but the animals will come near by themselves – restrictions perhaps for boats near cows with calves”
- “Whales approach boat whether in motion or at anchor they come and go at their leisure/they are much more like dolphins than other whale species, have observed bow wave riding and breaching.”
- “For points 7 and 8, whales approach boats naturally – can’t tell a whale to stay at 100 metres!”

Time limits on encounters

- “Time limits will also limit the quality of the interaction which just keeps getting better with time generally + more whales.”
- “I can appreciate the restrictions on flash, swimming etc. Time limits are hard to control as the whale can break off the encounter.”
- “Whales decide limits on encounters both time/distance.”
- “Time limits: Why? If the minke are still curious, why leave them?”

Divers enter water no closer than 30m from a whale

- “Swimmers <30m from whales – basic safety considerations – could startle whales, could lead to accidents.”
- “Oppose 30m rule as the whale came within 5m of stationary swimmers (it was free to swim away).”
- “Couldn’t see a whale clearly at all at 30m. It was difficult to see one at 10m!”
- “Oppose – swimmers within 30m: as long as you are still, the whale will come to you if it wants. Get into water gently should be ok.”

Ban on use of SCUBA

- “The whales seemed curious and at ease with SCUBA divers in the water. If they weren’t happy they are after all free to leave.”
- “No SCUBA would definitely reduce the pleasure of the experience, as would time limits.”
- “Banning the use of SCUBA does not do much in my opinion – the whale doesn’t notice the difference between that and snorkelling and can always swim away – you may be able to learn more about them with SCUBA.”
- “Being on SCUBA will not introduce any dangers towards the whales any more than snorkelling would.”

Table 3.20. Respondents comments about proposed controls

Description	n
NO PHYSICAL CONTACT WITH WHALES	
Support because:	
Whales may be disturbed / harmed	9
Prevent disease transmission	4
Potential for injury (to swimmer) / safety reasons	3
Effects are unknown	3
Whales may be scared away if touched	3
Whales don't want to be touched	2
Touching may damage whale(s) skin	1
May threaten quality of encounter (for others)	1
No specific reason	23
TOTAL	59
Oppose because:	
Whales can initiate physical contact if they choose to	5
A BAN ON THE USE OF SCUBA	
Support because:	
Whales scared away / do not approach as close	3
SCUBA produces bubbles	1
Lets people get too close	1
Allows people to spend too much time interacting	1
No specific reason	3
TOTAL	9
Oppose because:	
No different effects than from using snorkel	8
Whales aren't threatened by SCUBA divers	6
Whales will still approach SCUBA divers	6
SCUBA has no adverse effects on whales	5
Can be done sensibly / safely (if whales control encounter)	5
Whales can swim away / escape if they want	3
Good experience to be had on SCUBA	3
Decision to approach is up to whales	2
SCUBA divers would miss out on great experience	1
Whales are more agile than divers	1
Whales are bigger than divers	1
Can get closer on SCUBA	1
No specific reason	15
TOTAL	57
Neutral: Effects of SCUBA on whales unknown	3
NO SWIMMING TOWARDS THE WHALES	
Support because:	
Makes whales swim away / scares whales away	17
Whales will come closer if you don't	6
May threaten quality of encounter / ruin it for others	5
Safety reasons (during drift encounters)	2
Whales can swim faster than people	2
Need to make whales feel safe / comfortable	1
No specific reason	22
TOTAL	55
HOLD ROPE AT THE SURFACE	
Support because:	
Safety reasons (during drift encounters)	12
Controls divers / prevents them swimming at whales	10
For the comfort / confidence of the whales	6
Rope improves experience	1
No specific reason	8
	37
Oppose because:	
Whales like to play with divers	1
Whale came back (when free swimming)	1
Whales come closer when free-swimming	1
TOTAL	3
LIMIT NUMBER OF PEOPLE IN WATER	
Support because:	
Less disturbing for the whales / will make them more comfortable	6
Too many people detract from experience	4
Makes managing people easier / ease of enforcement	4
Too many people keep whales further away	3
Too many people frighten whales	3
No specific reason	10
TOTAL	31
Oppose because:	
No problem if people 'doing the right thing'	1
Depends on the size of group / number of people	1
Didn't seem to make a difference	1
Tourists pose no threat to whales	1
	4

Description	n
TIME LIMITS ON ENCOUNTERS	
Support because:	
For safety of swimmers (exhaustion and cold)	1
Oppose because:	
Decision is up to whales / whales' choice when they leave	20
No problems – no need to restrict time	2
Interaction gets better with time	2
No specific reason	5
	29
BAN FLASH PHOTOGRAPHY	
Support because:	
Flash startles whales / scares whales away	12
Flash may harm / hurt whales' (eyes)	2
Flash disturbs animals / marine environment	2
Unknown effects of flashes on whales	2
May confuse whales	1
Doesn't help take better photos	1
No specific reason	5
TOTAL	25
Oppose because:	
Unknown effects of flashes on whales	6
Whales didn't leave (took flash photo)	1
Photos can be used to educate people	1
As long as taken from a distance, flash is okay	1
No specific reason	3
TOTAL	12
Neutral: Unknown effects of flashes on whales	1
NO WATER ENTRY < 30M TO WHALES	
Support because:	
No specific reason	1
Safety reasons	1
Whales may be startled / scared away	1
To prevent accidents	1
So whales don't feel threatened / harassed	1
TOTAL	5
Oppose because:	
Decision is up to whales / whales' choice to approach	11
No problem if people enter water gently / carefully	4
It would be difficult to get close otherwise	2
Difficult to see a whale at 30m (that's a lot of visibility)	2
No harm can be done / whales not hurt	1
Whales sometimes wait near duckboard	1
No problem if only one person	1
Whales come closer by themselves	1
No specific reason	2
	25
BOATS MIN. APPROACH 100 METRES	
Support because:	
Prevent whales being harassed / threatened	3
Need to enforce – have observed boats chasing whales	2
Propeller danger	1
Allows whales choice to interact	1
No specific reason	9
TOTAL	16
Oppose because:	
Decision is up to whales / whales' choice to approach	9
Boat poses no threat / danger to whales	1
Whales will approach closer on their own anyway	1
TOTAL	11
GENERAL COMMENTS / OTHER	
Support protection of whales / minimisation of impacts	48
Support all suggested controls	28
Encounters are / have been / will be up to the whales	26
Support interactions under whales' terms only	22
Support current guidelines	11
Impacts of interactions are unknown / research needed	6
Support continuance of experience for others	4
Support precautionary / sustainable management approach	3
Support researchers recommendations	3
Interactions increase people's understanding / appreciation	3
Whales are unaffected by current interactions / activities	3
Other / non-specific comments	28
TOTAL	58
TOTAL ELEMENTS	
Left blank	206

3.9 Interpretation

Respondents were asked: “Overall, how would you rate the quality of the information you received about minke whales?” and were provided with a ten-point rating scale (ranging from 1 = very poor, to 10 = excellent). The mean rating for the total sample for this question was again quite high, at 8.08 (out of 10).

3.9.1 Access to information

Respondents were asked: “what information about minke whales did you have access to?” and were provided boxes to tick relating to seven identified interpretive media in 1999, with the addition of an eighth (the draft brochure) in 2000. The percentage of respondents who indicated they had had access to the listed sources of information are as follows: Informal discussions (with staff or other passengers) = 68.0%; a formal on-site briefing by staff = 60.8%; a pre-trip briefing by staff = 57.4%; the Draft Minke Whale Brochure (2000 only) = 46.2%; reference books provided on the boat = 44.6%; the Minke Whale Information Package (MWIP) = 39.8%; pre-trip information (such as magazines, internet or books) = 36.6%; and tourism industry advertising material = 8.4%. These are compared below between the vessels in Figure 3.2.

The best sources of information on dwarf minke whales indicated by respondents are ranked below (Table 3.21).

Figure 3.3. Percentage comparison of availability of different interpretive media on minke whales accessible to respondents on each vessel (Note: Vessel E not represented due to insufficient sample size; “staff” may include researchers in some cases)

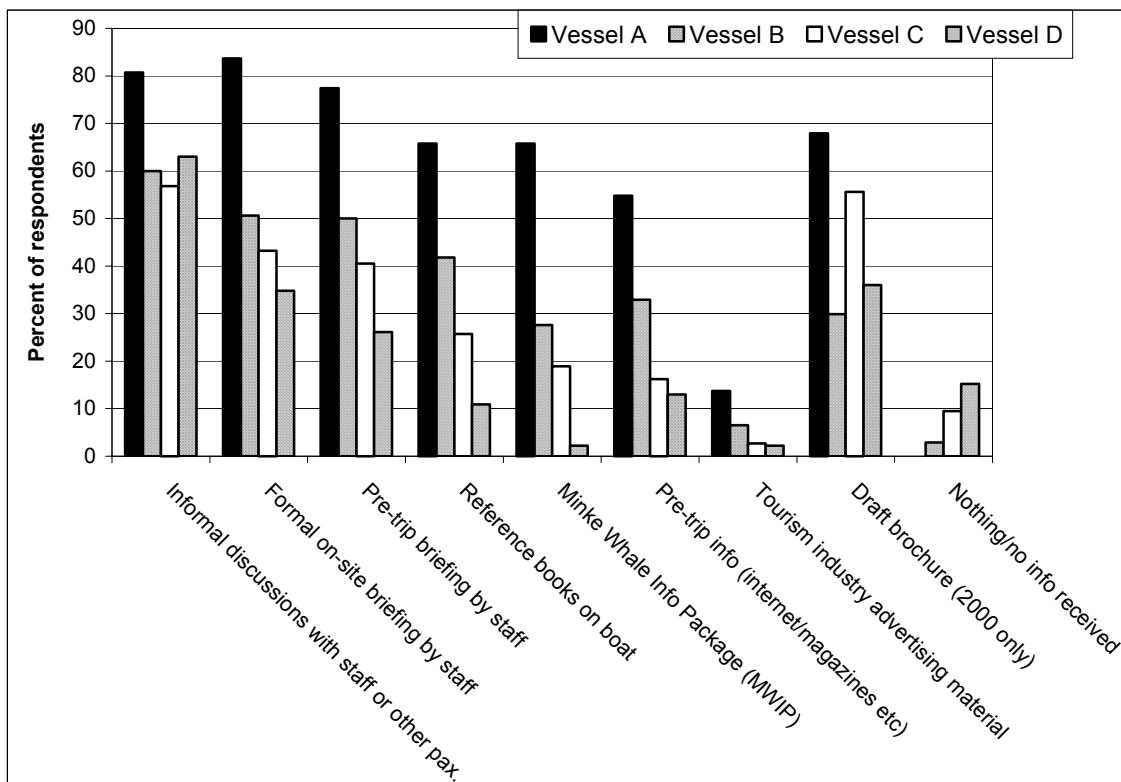


Table 3.21. Best source of information indicated by respondents

	Valid percentage of respondents
Staff – briefings and discussions	52.0
Researchers	18.0
Brochure	10.7
MWIP	9.4
Internet	2.5
Other books	2.5
Other passengers	1.6
Previous experience	1.2
Dive magazines	0.4
Other sources	1.6

3.9.2 Passenger preparation for minke whale encounters

Respondents were asked: “Do you feel you were adequately prepared for your encounter(s) with minke whales?” and answered by ticking yes or no, followed by an explanation for their response. Interestingly, 17.3% of respondents indicated that they did not feel adequately prepared for their encounter(s). Only 52.0% of respondents went on to explain the reasons for their answer in the open-ended part of this question (responses summarised in Table 3.22 below).

Example responses:

Yes, felt adequately prepared

- “We were briefed well before our encounter so we would know exactly what to do.”
- “Good briefing, supported by evening talks and opportunity for discussion with researchers. Guidelines issued to all passengers.”
- “Full briefing given on the possibility of seeing minkes and how to behave.”
- “The talk on what you can and cannot do was very clear cut and very understandable, making the person feel prepared.”
- “Very good briefing, before we saw any whales. Also excellent information on whale bio and sounds.”
- “Adequately is key word. I knew enough to stay away from contact, but I didn’t have an idea about their behaviors.”

No, felt inadequately prepared

- “Nothing could have prepared me for the grace and beauty of the whales.”
- “Pre-information, maybe by email/internet, could have informed me in advance and I would have known more from the beginning on and known how to react or what to do and what to look for.”
- “Learned nothing about its biology/ecology, or how to improve the encounter.”
- “The purpose of our trip was to dive. I don’t think seeing minke whales was a primary reason why we were out here. So, there was no info provided on them.”
- “Were not really informed but rather encouraged to jump into the water.”
- “Well, we got in and looked at them – yes, the guidelines might’ve been more effective if they’d been told to us BEFORE we got in the water.”
- “I have no idea what they are and no one has explained anything about them.”
- “Not prepared – unexpected encounter.”

Table 3.22. Respondents' reasons they felt adequately/inadequately prepared for their minke whale encounter

Description	Total elements	Valid percentage*
Yes, because:		
Told how to behave during encounter(s)	56	17.4
Briefed prior to encounter(s)	32	9.9
Good briefing(s) on whales	31	9.6
Discussions with / presentations by researchers	21	6.5
Information (printed) provided	16	5.0
Previous experience	13	4.0
Wanted more information	6	1.9
Crew were knowledgeable / informative	6	1.9
Given guidelines	5	1.6
Had prepared prior to trip	5	1.6
Info given before departure	4	1.2
Formal presentations given	3	0.9
Info brochure available to read	3	0.9
Told about whales' behaviour	3	0.9
Saw web site	2	0.6
Knew what to expect	2	0.6
Preparation not necessary before encounter(s)	2	0.6
Told about whales' sounds	2	0.6
Info package available to read	2	0.6
Whale(s) behaved as expected	1	0.3
Reading material on boat	1	0.3
Knew to stay away from whale(s)	1	0.3
Told about whales' patterns	1	0.3
Told about whales' biology	1	0.3
Info from travel agent	1	0.3
Shown a video	1	0.3
Felt prepared, but wanted a hand-out / leaflet	1	0.3
Told when whales were spotted	1	0.3
Told we might see them	1	0.3
Other / no specific reason	20	6.2
TOTAL YES	244	75.8
No, because:		
Didn't expect whales (on dive trip) / no expectations	24	7.5
No / not enough information before encounter		2.5
No / not enough info available / provided on whales	8	2.5
Unable to prepare for the personal feeling / experience	7	2.1
Not enough preparation / information	5	1.6
Not enough info prior to trip	5	1.6
Lack of info on biology / ecology / behaviour	4	1.2
Own fault	3	0.9
Lack of info on whales	2	0.6
No info on how to improve encounter	2	0.6
Self/equipment problems	2	0.6
Didn't understand briefing(s)	1	0.3
Briefing too short / not enough	1	0.3
Wanted to see a video	1	0.3
Other/non-specific	3	0.9
TOTAL NO	76	23.6
Other:		
Didn't expect encounter	1	0.3
No encounter	1	0.3
TOTAL ELEMENTS	322	100
Left blank	253	

*Represents total coded elements, not numbers of respondents.

3.9.3 Most interesting facts about minke whales

Respondents were asked: “What was the most interesting thing you have learnt about minke whales from this trip?” The response rate for this question was 76.9%. Responses are summarised below (Table 3.23; Table 3.24).

Table 3.23. Summary of main themes of most interesting facts about minke whales perceived by respondents

Description	Number of respondents	Valid percentage of respondents*
Behavioural elements Inquisitiveness / curiosity / human interest / ‘friendliness’	264 143	65.2 35.3
Research elements Unknown species / newly discovered / as yet unclassified	110 66	27.2 16.3
Biological elements	89	22.0
Other	98	24.2
TOTAL RESPONDENTS	405	
Left blank	122	

*Some respondents gave more than one response to this question.

Example responses:

Behavioural elements

- “The sounds they make and how inquisitive they are.”
- “That they seem to be very interested in humans.”
- “Varying behaviours seemed to depend on confidence of the whales.”
- “Their playful behaviour with people on lines; headrise, spyhop, baleen flash.”
- “How friendly they are towards boats and swimmers.”
- “The sounds they make and how close they are prepared to come. Obviously very curious.”
- “I don’t believe I even knew they existed before this trip. The most interesting thing is their curiosity of us and willingness to move closer to us if we don’t move toward them.”
- “They are sociable and inquisitive, smaller than I realised and not threatening, therefore very vulnerable. I always believed in conservation, now ‘save the whale’ means so much more to me.”

Research elements

- “How to identify them and how very little is known about them and their sense of curiosity.”
- “That there is so little known about them.”
- “Their as yet unexplained presence and behaviour in the GBR.”
- “Recognising the individual whales by markings and scarring.”
- “Lack of knowledge about this species and the “star wars” sound.”
- “Strangely, it was that so little is known about them. I was also pretty impressed by how interested they are in us.”
- “That no-one knows where they go.”
- “That they have not been fully classified.”
- “They can be identified individually by their patterns.”

Biological elements

- “The way the scars on them are formed and the way they feed.”
- “Their coloration and the fact that they are the smallest baleen whales.”
- “Everything including how a baleen whale eats – to how majestic and absolutely awesome they are in their own environment.”
- “Appreciation for size, physical make-up, migratory habits, sounds!”
- “Basic anatomy and behaviour.” “General info about the dwarf and the differences between the dwarf and the “full-size” minke.”

Table 3.24. Most interesting facts about minke

Description	Total elements	Valid %*
Behavioural elements		
Inquisitiveness / curiosity / human interest / 'friendliness' / 'playfulness'	143	25.5
Close approaches to boat / swimmers	34	6.1
Vocalisations and 'Star Wars' sound	40	7.1
Social behaviour (between whales)	5	0.9
Not known to feed in GBR	4	0.7
Behavioural change over time – increasing confidence	3	0.5
Bubble blasting	3	0.5
Different behaviour by individual whales	2	0.4
Gulping / baleen flash	2	0.4
'Surfing' in the swells	2	0.4
Spy-hop / head rise	2	0.4
No tail slapping	2	0.4
Apparent 'quietness' / not very vocal	2	0.4
Sensitivity to movement / sound	2	0.4
Breaching	2	0.4
Presence in GBR each winter	2	0.4
'Dolphin-like' behaviour	1	0.2
Mating season	1	0.2
Eye appears closed	1	0.2
Breathing pattern	1	0.2
Behaviour in general (non-specific)	10	1.8
TOTAL BEHAVIOUR	264	47.1
Research elements		
Unknown species / newly discovered / as yet unclassified	66	11.8
Identification technique	13	2.3
Vocal / sound studies	6	1.1
Guidelines for interactions	5	0.9
Sex determination	4	0.7
Migration / habitat / where they come from and why?	2	0.4
Research aims	2	0.4
Species name	1	0.2
World sightings	1	0.2
Re-sightings	1	0.2
Research in general (non-specific)	9	1.6
TOTAL RESEARCH	110	19.6
Biological / ecological elements		
Migration patterns / distance	22	3.9
Size, shape, weight	19	3.4
Intelligence	10	1.8
Body patterns / markings	9	1.6
Swim movements	6	1.1
Feeding	5	0.9
Differences from other minke	3	0.5
Scarring / cookie-cutter shark bites	2	0.4
Feeding/raising calves	2	0.4
Swim speed	2	0.4
Distribution	1	0.2
Population size / numbers	1	0.2
Birth	1	0.2
Smooth skin	1	0.2
Eyes	1	0.2
Biology in general (non-specific)	4	0.7
TOTAL BIOLOGY	89	15.9
General / other elements		
That they exist / are here	17	3.0
History of the whales (discovery etc..)	10	1.8
The whales' beauty / grace	9	1.6
Learned little / nothing (no information received)	7	1.2
Seeing them / what they look like	6	1.1
Whaling continues	3	0.5
Vulnerability as a species	2	0.4
Not endangered	1	0.2
Difficulty to photograph	1	0.2
The whales' life underwater	1	0.2
General other / non-specific	41	7.3
TOTAL OTHER	98	17.5
TOTAL ELEMENTS	561	100
Nothing	1	
Left blank	122	

*Represents total coded elements, not numbers of respondents.

3.9.4 Suggested Improvements to Minke Whale Information Package (MWIP)

Respondents were asked: “What would you suggest to improve the Minke Whale Information Package?” The response rate for this question was quite low, at only 24.1% (responses summarised below in Table 3.25).

Example responses:

Suggestions to improve MWIP

- “More of them.”
- “It is very thorough, perhaps just more annotated photos so we know what we are looking for.”
- “More pictures.”
- “Larger print.”
- “Easier format and info about interacting with them.”
- “More photos of individuals that have been identified.”
- “Basic facts about them; rules to watch them.”
- “More pics and info about comparing minke to other whales.”
- “More colours and pictures. The text is a bit bland and gets boring to read.”
- “Tell more about their life, their travels, what they eat, how they live, reproduce, how long they live.”

Other suggestions to improve interpretation

- “Put it on the net and provide a link via email to potential passengers.”
- “A 3 monthly season report.”
- “More colour photos, personalised brochures for passengers.”
- “Small package of info (maybe 2 pages) with some really good photos of minkes underwater as a souvenir of the trip.”
- “Access on the web.”
- “Show a videotape of them with information would be good.”

Table 3.25. Suggested Improvements to MWIP

Description	Total elements	Valid %*
MWIP seen, suggestions to improve...		
More info on minke's life history / ecology	5	3.8
More copies made available	3	2.3
Personalised brochures / leaflets	3	2.3
More photos	3	2.3
More info on research	2	1.5
Make easier to read	2	1.5
Guidelines / how to interact	2	1.5
Pictures of individual whales	2	1.5
Inclusion of future research findings	2	1.5
More colour photos	2	1.5
Less words	1	0.8
More annotated photos	1	0.8
Comparison to other whale watching (as a swim program)	1	0.8
Comparison to other whales	1	0.8
Less info – condense	1	0.8
Annual updates	1	0.8
TOTAL	32	24.6
MWIP seen, other suggestions...		
It's good, no improvements needed	11	8.5
A web site	5	3.8
More video footage	1	0.8
A summary sheet	1	0.8
TOTAL	18	13.8
MWIP not seen, but other suggestions...		
More information in general	3	2.3
A briefing by crew / staff	3	2.3
On-board video	3	2.3
Better promotion (of MWIP)	3	2.3
A 3 monthly season report	1	0.8
Books on board	1	0.8
Pamphlets available	1	0.8
Larger print run	1	0.8
Post on web	1	0.8
Info on how to interact / guidelines	1	0.8
TOTAL	18	13.8
Other comments		
(MWIP seen)		
MWIP seen but not read	1	0.8
Other comments / not related to question	1	0.8
Don't know	1	0.8
Other / non-specific	3	2.3
(MWIP not seen)		
Not seen	30	23.1
No information seen / available	8	6.2
Don't know	4	3.1
Wanted to see it	3	2.3
No minkes in advertising brochures	1	0.8
Other / not related to question	1	0.8
Other/non-specific	9	6.9
TOTAL	62	47.7
TOTAL ELEMENTS	130	100
Left blank	400	

*Represents total coded elements, not numbers of respondents.

3.9.5 Additional information on minke whales

Respondents were asked: “Was there anything specific about which you would have liked more information?”. The response rate for this question was 45.2%. A summary of the main themes is shown below (Table 3.26). Responses are summarised in Table 3.27.

Table 3.26. Summary of further information on minke whales requested by respondents: main themes

Description	Total elements	Valid %*
More info on biology/ecology	146	53.9
More info about minke whale behaviour	39	14.4
General information	86	31.7
TOTAL OVERALL	271	100
Don't know	4	
No (further) information wanted	67	
Left blank	289	

*Represents total coded elements, not numbers of respondents.

Example responses:

More info on biology/ecology

- “Behaviour patterns, breeding, why it was their season etc.”
- “Lots of questions that cannot be answered yet: birth, reproduction, migration, genetics etc.”
- “Anything – biology/numbers etc.”
- “Where were they travelling to/from? When and why? And maybe a few words on minke whale biology.”
- “Nobody seemed to know a lot about their migration, biology etc. There seems to be very little known in general.”
- “I would have liked to learn more about the whales’ biology. I also would have enjoyed learning about the minkes in comparison to other “well-known” whales.”

More info about minke whale behaviour

- “Behaviour, the effects of human interaction to protect them from negative interactions.”
- “What are they doing in the Barrier Reef.”

General information

- “I would like to have the opportunity to follow the increasing knowledge about the whales, e.g. by a good internet site.”
- “Lots, but since so little is known about them... Wouldn't it be great to know their life histories, cognitive abilities, even their emotional lives?”

Table 3.27. Further information requested by respondents

Description	Total elements	Valid %*
Biology/ecology		
Migration	16	5.9
Life history / life cycle / age	12	4.4
Vocalisations / communication	12	4.4
Feeding	11	4.1
Reproduction / breeding	9	3.3
Differs / similarities between minke and other whales	9	3.3
Birth	5	1.8
Habitat / distribution and geographic range	5	1.8
Population / census / numbers	4	1.5
Body markings / individual identification	3	1.1
Predators	2	0.7
Intelligence / cognitive abilities / emotions	2	0.7
Gestation period	2	0.7
How do they sleep	2	0.7
Size	1	0.4
Shape	1	0.4
Genetics	1	0.4
Determining males from females	1	0.4
Raising young	1	0.4
Minke genome sequence		0.4
Time between reproductive events	1	0.4
Breeding grounds / location	1	0.4
Weight	1	0.4
Fecundity	1	0.4
Diving ability	1	0.4
Differences between different minke species	1	0.4
Biology / ecology in general / non-specific	40	14.8
TOTAL BIOLOGY / ECOLOGY	146	53.9
Behaviour		
What they are doing here / in the GBR?	8	3.0
Social behaviour / groupings	6	2.2
Where they go / come from?	5	1.8
Why so friendly towards humans?	1	0.4
Why they flinch?	1	0.4
Where they go / what they do at night	1	0.4
Behaviour in general / non-specific	17	6.3
TOTAL BEHAVIOUR	39	14.4
General information		
Aware that little information exists / is available	12	4.4
Anything / everything	12	4.4
More research info / results	6	2.2
Already well informed	5	1.8
Fact sheets / handouts	4	1.5
Web site	3	1.1
Whaling industry status	3	1.1
Effects of human interaction	3	1.1
History of the minke whale	3	1.1
Learned nothing on trip / no info	2	0.7
A briefing / lecture	2	0.7
Video on the whales	2	0.7
General whale info	1	0.4
Photos	1	0.4
On-board marine biologist	1	0.4
Crown of thorns info	1	0.4
Why guidelines are used / how they work	1	0.4
Impacts on whales	1	0.4
Whale watching legislation	1	0.4
Conservation efforts	1	0.4
Best place to see them	1	0.4
Other / non-specific	20	7.4
TOTAL GENERAL / OTHER	86	31.7
TOTAL OVERALL	271	100
Don't know	4	
No (further) information wanted	67	
Left blank	289	

*Represents total coded elements, not numbers of respondents.

3.10 Changes in people

Respondents were asked: “Do you feel that this experience has changed you in any way?” The response rate for this question was 79.3%. Of these, 62.9% answered yes. Responses are summarised below (Table 3.28; Table 3.29)

Table 3.28. Summary of main elements stated by respondents in regard to whether they felt they were changed by their experiences on the trip

Description	Total elements	Valid percent*
Yes – influenced environmental / conservation attitudes	129	27.7
Yes – educational experience		14.6
Yes – personal experience	47	10.1
Yes - other	67	14.4
TOTAL COMMENTS - YES	311	66.7
TOTAL COMMENTS - NO	155	33.3
TOTAL OVERALL	466	100
Left blank	109	

*Represents total coded elements, not numbers of respondents.

Example responses:

Yes, felt changed – influenced environmental / conservation attitudes

- “Made me more convinced the conservation is very important and you don’t have to touch or feed to enjoy nature.”
- “I feel privileged to have been on this trip, to have learned something of the minke and to have been involved (in a small way) with the research, renewed my intentions to be more active in conservation issues.”
- “Yes – gave me a better appreciation for how fragile our environment is and how/why it should be conserved.”
- “Yes – this entire trip was so informative on all aspects of marine conservation that I will take much greater care in recycling and continued education.”
- “Made me more concerned about wildlife and natural environment.”
- “Yes, I’m more conscious of how certain behaviour can interfere with the animals in any way.”
- “Confirmed and widened appreciation of the special nature of dwarf minke whales – become a little more concerned about other whale watching.”

Yes, felt changed – educational experience

- “Yes – I’ve learned a lot about reef ecology.”
- “I definitely have a higher appreciation and knowledge of whales and marine life – it was just amazing to be in the water with the whales.”
- “I had no idea there were still animals that we knew so little about yet are so visible. I didn’t know there were so many mysteries about a whale. It has changed my view of science and marine biology in general... I had no idea it was so exciting!”

Yes, felt changed – personal experience

- “Yes. It would be impossible to come face to face with a minke – make eye contact and not feel different!”
- “I’m deeply humbled!!”
- “Yes – for years, I have wanted to be in the water with dolphins or whales. The experience was far beyond my expectations.”
- “Minke whales are now very special to me.”
- “I’ll always remember seeing a whale from under water, if that counts.”

No, did not feel changed in any way

- “No, it has only reinforced the opinions that I had about the importance of conservation for all species.”
- “No but it was fantastic“

Table 3.29. Changes in respondents

Description	Total elements	Valid percentage*
Yes – influenced environmental / conservation attitudes		
Greater awareness/concern/appreciation of (marine)life / nature	48	10.3
Increased / reinforced conservation awareness	28	6.0
Greater awareness / concern / appreciation of whales	27	5.8
Greater awareness of whaling issues	9	1.9
Increased awareness of human impacts on marine life / nature	6	1.3
Greater awareness of need for whale watching guidelines	3	0.6
Greater awareness of need for sustainable ecotourism		0.4
Greater awareness / appreciation of impacts of humans on whales	2	0.4
Aware that wildlife needn't be touched / fed to be enjoyed	2	0.4
Increased awareness of effects of human coastal development	1	0.2
Greater awareness of natural resource exploitation	1	0.2
TOTAL YES – CONSERVATION ATTITUDES	129	27.7
Yes – educational experience		
More informed about minke whales	21	4.5
More informed about Reef (GBR) and marine life	15	3.2
Increased interest in info on (minke) whales – want to learn more	9	1.9
More informed about / by research	8	1.7
Increased interest in info on marine life – want to learn more	4	0.9
Interested in recent discovery of species	1	0.2
Learned / understood whale watching guidelines	1	0.2
A learning / educational experience (non-specific)	9	1.9
TOTAL YES – EDUCATIONAL	68	14.6
Yes – personal experience		
Pleased / happy / satisfied by experience	6	1.3
Feel closer to / relate to whales	6	1.3
“Awed” by experience	4	0.9
Will never forget / always remember experience	4	0.9
Feel privileged / lucky / fortunate	4	0.9
“Eye opening”/“Horizon broadening”/“See bigger picture”	4	0.9
“Humbled” by experience	4	0.9
“Enlightened” by experience	2	0.4
“Dream come true” / always wanted to swim with whales	2	0.4
Feel closer to nature	2	0.4
Religious / spiritual experience	1	0.2
Life changed by experience	1	0.2
General personal experience (non-specific)	7	1.5
TOTAL YES – PERSONAL	47	10.1
Yes - other		
Want to do again / more ...	7	1.5
First experience with whales	3	0.6
Relaxed from trip	2	0.4
Want others to have same experience	1	0.2
Social experience	1	0.2
Other / non-specific	53	11.4
TOTAL YES – OTHER	67	14.4
TOTAL YES		66.7
No		
No, already aware of environmental / conservation issues	17	3.6
No, but reinforced awareness / importance of conservation	5	1.1
No, but a fun / enjoyable experience	5	1.1
No, but increased interest in (minke) whales	3	0.6
No, have had previous experience / info on minkes	2	0.4
No, but minke whales were beautiful	1	0.2
No, but learned from experience	1	0.2
No (non-specific)	121	26.0
TOTAL NO	155	33.3
TOTAL OVERALL	466	100
Left blank	109	

*Represents total coded elements, not numbers of respondents.

3.11 Participants' views on wildlife conservation

Respondents were asked to indicate their response to the statement “I feel that conservation of wildlife and the natural environment is:”, and were offered a choice of five boxes to tick (ranging from 1 = not at all important, to 5 = very important). The mean rating for this question was 4.89.

Nearly a third of respondents (30.9%) were members of organisations primarily concerned with the conservation of wildlife or the natural environment. The number of organisations of which these respondents were members ranged from one to seven different conservation organisations.

Respondents were further asked: “How informed do you consider yourself to be about current conservation issues concerning wildlife and the natural environment?” Another five point scale was provided, ranging from one (not at all informed) to five (very informed). The mean rating score for this question was 3.74.

4. Discussion

4.1 About the sample

The overall response rate of 54% of passengers that were sampled is high and reached 61% in the second year of the study (Table 2.1). Vessel A achieved an 87% overall response rate. However, the number of questionnaires completed on each vessel varies greatly, from a total of 197 respondents from Vessel A, to only 22 from Vessel E. This vessel ceased to operate during the 2000 minke season and so data returns were low in number and/or incomplete. Response rates varied considerably between vessels and between years. This is likely to have reflected a number of factors including the varying numbers of passengers for whom an English language questionnaire was inappropriate (a Japanese version was added in 2000); the varying interest levels of the crews in distributing and collecting questionnaires and the time available for both passengers and crews to participate in the study (three night trips have very rapid turn arounds) and in some weeks the questionnaires were not available. Finally there were some three-day trips at the beginning and end of the season when minke whales were not seen and questionnaires were therefore not distributed. The authors recognize that these factors may have biased the results of this survey. Clearly this sample represents only a segment of the complete spectrum of live-aboard dive tourists visiting the Cairns section of the GBR, however we consider that the sample size is sufficiently robust to produce relevant and useful conclusions about this so far relatively small population of individuals who have encountered dwarf minke whales along the Ribbon Reefs.

The largest single nationality group of respondents originated from the United States (Figure 3.1). As highlighted in Methods, the proportion of Japanese involved in minke whale encounters is likely to be under-represented in this figure as a Japanese version of the questionnaire was only included in 2000.

4.1.1 Minke whales as a primary attraction

Due to the recent recognition of the occurrence of dwarf minke whales in the northern GBR and of the factors affecting the development of this still small swim-with industry, it is of no great surprise that 43% of respondents were unaware of the presence of the whales prior to boarding their vessel (Table 3.3). It is likely that this percentage has greatly decreased since 1996 and will continue to decrease in years to come. It can be expected that increased media coverage (including regular features in diving magazines) and specific promotion by operators will lead to an increase in the proportion of divers travelling specifically to see minke whales. This is supported by the observed increase of more than 6% of respondents indicating minke whale watching as the primary reason for their trip to far north Queensland from 1999 to 2000 (Section 3.3). The amount of promotion by the boats during the course of this study varied considerably. This was at least in part due to delays in implementing specific swim-with minkes permits which left the vessels without whale watching permits in a questionable position over the legalities of such specific advertising.

4.2 Description of respondents' minke whale encounters

Questionnaires were completed only on trips that had seen minke whales, and the sampling period was conducted over the 'peak period' of each season (80% of sightings occur within June and July; Arnold 1997). The mean number of whales seen by respondents on the different vessels varied greatly, however the overall mean of

10.87 whales was still quite high (Section 3.5.1). It is important to note that although this result would seem to indicate that encounters with minke whales are frequent and consistent during this time, we are aware of several reported cases of no sightings on trips, even during the peak of the season. Even on the primary research vessel, *Undersea Explorer*, on which a full-time daylight watch is conducted, we noted no sightings for up to several days at a time during each season.

4.3 Closeness to whales

The median distance to which respondents indicated they were approached closest by a minke whale (3 metres) is consistent with observational data, and quite obviously, very close! For passengers holding onto a rope (or decompression bar), the median for the estimated closest approach by a dwarf minke whale was 3m for SCUBA ($n = 34$; range = 0.5-20m) and 2.5m for snorkel ($n = 257$, range = 0.5 – 60m). For passengers who were free-swimming, the median for the estimated closest approach by a dwarf minke whale was 5m for SCUBA ($n = 52$; range = 0.5-20m) and 8.5m for snorkel ($n = 16$; range = 2 – 45m) (Section 3.5.1). These data need to be treated with caution. They are respondents' estimates and have not been tested for accuracy. The figures of 50-60m at the upper end of the range are particularly suspect and are consistent with published tests showing that for distances beyond one metre, that distance underwater is consistently overestimated (Luria and Kinney 1970). The overestimation increases with greater distances and is particularly expressed where there are few clearly visible and accurately distanced cues (i.e. the open water conditions under which many of the present estimates were made).

An additional caution concerns the data for free-swimming passengers, in which estimated distances to whales made by individuals on SCUBA were less than those who were snorkelling (Section 3.5.1). There is no information on the behaviour of these individuals (with few exceptions, SCUBA was not used during the interactions we observed on *Undersea Explorer*). It is therefore impossible to separate effects of SCUBA (e.g. bubbles) from behaviour of swimmers (e.g. whether they were quiet or were trying to chase whales). The higher values for approach distances to both SCUBA divers and snorkellers free-swimming in open water, as opposed to holding onto a rope, suggest that the activity of swimmers does have an effect.

For comparisons of SCUBA and snorkel while holding onto a rope or 'deco bar' (safety bar/chain suspended underneath dive platform of vessel for divers to hold during their safety stop at 5m), the greater number of observations for snorkellers can not be taken as an indication that whales approach swimmers on SCUBA less frequently. This may be the case, but the preponderance of observations on snorkel may be more a reflection of the tendency not to use SCUBA for committed whale observations (especially on *Undersea Explorer*, where we were trying to keep conditions as standardised as possible during repetitive observations).

On the data presented it would be difficult to make a case that use of SCUBA is less effective or causes greater disturbance to the whales. This is particularly the case where passengers hold onto ropes and thus cannot chase the whale. The difference in median perceived minimum approach distances (2.5m vs. 3m) can not be considered significantly different given the known inability of most people to estimate distances accurately, especially underwater.

4.4 Passenger satisfaction with the minke whale experience

The mean of 9.00 (out of 10) for respondents' rating of their satisfaction with their minke experience is the highest mean rating we have seen of any tourist satisfaction study.

4.4.1 Approach distance and passenger satisfaction

The distance of closest approach by a whale was found to be correlated significantly with passenger satisfaction ($r = -.458^{**}$; Section 3.5.2). That is, the closer respondents indicated they were approached by a minke whale, the higher their satisfaction rating with their minke whale experience. This result differs from the finding by Orams' (2000) research on humpback whale watching, which indicated that proximity to whales had no significant effect on participant satisfaction with the overall experience. These differing results highlight the varied nature of tourist experiences with different species, and those of different viewing platforms (i.e. boat-based and swim-with programs). This demonstrates the importance of species-specific and even location-specific guidelines, as recommended by Birtles *et al.* (2001), for better management of whale watching activities.

Also worthy of note are the significant correlations found between respondents' satisfaction rating (with their minke experience) and how many whales they saw on their trip ($r = .271$) and the total time spent interacting with the whales ($r = .207$). It is important to recognise that respondents' satisfaction is a difficult variable to measure and respondents' rating scores are also likely to have been affected by many more variables than those explored within this survey.

4.5 Passengers' best experiences (on their trip to the GBR)

The results shown in Tables 3.6 and 3.7 indicate very strongly the powerful nature of passengers' experiences with dwarf minke whales, with nearly 90% of respondents indicating minke whales as part of their best experiences on their trip to the GBR. This question produced rich and descriptive responses from many respondents. Table 3.7, in particular, shows the very wide diversity of elements that contributed to passengers' best overall experiences. A total of 74 different species of animal (including minke whales) were mentioned as elements of the sample's best experiences.

4.5.1 Best experiences with minke whales

A wide range of elements contributing to passengers best experiences with minke whales were highlighted by respondents. A particularly strong response was shown for elements indicating the close-up and 'in-water' nature of the experience (Table 3.9).

4.6 Detracting experiences with minke whales

While this question received a low response rate these results are very important to note and demonstrate that infringements on the Code of Practice are occurring and are having negative effects on passengers' experiences, and possibly on the whales as well.

A number of passengers also indicated that they had not spent enough time interacting or had not been approached close (enough) by a whale, resulting in a detracting experience. It may be possible in this case that the respondents had been on a previous trip and had a better minke encounter, or that their expectations had been raised to an unrealistic level. In either case, this result highlights the importance of appropriate

information being delivered to passengers to prepare them prior to the experience. Passengers need to be made aware of the potential for encounters to occur and of the correct behaviour should an interaction eventuate. At the same time, their level of expectation should not be raised too high through ‘guarantees’ of sightings, anticipated numbers of whales, lengths of encounters or of expectations of particular behaviour by the whales.

The most frequently mentioned detracting element, the weather (which is typically windy and rough during the winter season), is uncontrollable. However, passengers could be better informed of the weather conditions and thus more adequately prepared prior to taking their trip.

4.7 Concern for impacts

Nearly a quarter of respondents indicated a concern for the impacts of the swim-with interactions on the whales, while many more indicated they were not concerned as long as certain conditions were met (Table 3.15).

The most common reasoning from those respondents not concerned was based on the whales’ voluntary approach to the vessel.

The following two questions (23 and 24) exploring this issue revealed a very small percentage of passengers who actually felt that their interaction had resulted in a negative impact on the whales (Section 3.5.7). It appears that few people saw anything wrong with their own behaviour, perhaps believing they ‘did the right thing’. However, nearly 12% of respondents indicated they had observed actions of other passengers or crew which they felt may have had negative effects on the whales. Of the descriptions by respondents of these observed ‘effects’ (Table 3.17), most would appear easily prevented with better preparation of passengers prior to encountering minke whales. Indeed, 11 respondents went on to identify good preparation as the primary reason no negative effects were observed (Table 3.17).

4.8 Management of minke encounters

The mean rating of how well respondents felt their encounters were managed was surprisingly high (9.36 out of ten), considering the extent of perceived negative impacts observed by respondents and the strong indication of their overall concern of impacts. While it is not possible to determine a significant difference between vessels due to the large differences in sample size, it is expected that there is potential for such variation. A larger sample of passengers from vessels C, D and E may have confirmed this result. It may also be likely, however, that vessels with lower levels of interpretation still yield a high rating of minke whale encounter management, as passengers may not be aware of the potential for impacts through their encounters due to a lack of information provided.

Nevertheless, Table 3.18 effectively highlights the perceived attributes of good, fair and poor management of minke whale encounters. This provides very useful information to help operators in improving the management of their encounters. Oddly, a number of negative remarks were made by respondents who rated the management of their experience quite highly. The strongest result in this table, indicating passengers’ perception of the most important factor in ‘good management’ of their minke encounters, is ‘good briefings’.

4.9 The proposed Code of Practice

4.9.1 No physical contact with whales

This control received the highest level of support from respondents, with a mean rating of 4.44 out of five (Table 3.19), with many supportive statements of explanation. Only five respondents offered reasons for opposing this rule, stating that the whales may themselves initiate physical contact. Only one respondent in the sample admitted to touching a whale, but we have received a few other reports of physical contact. In one case, documented on video, a surfacing whale making a very close pass caused its upper jaw to come into contact with the lens of a video camera. Such cases are however, rare.

4.9.2 No swimming towards whales

This control also received a high level of support (mean = 4.40), with no reasons provided in opposition to the control. The most frequently mentioned supporting explanations provided by respondents indicate that passengers are aware that swimming towards the whales does cause them to keep further away (Table 3.20).

4.9.3 Use of ropes

A strong indication of support was also shown for this control (mean = 4.07) with very few opposing remarks made. The most frequent response in support of this control, especially in relation to drifting encounters, was for safety reasons (of passengers). Drifting encounters with whales often result in longer interactions with more animals (which are ‘picked up’ as the vessel drifts; Arnold and Birtles 1999, Birtles and Arnold 2000), however there can be increased safety risks. Winds during the season are often greater than 20 knots, and seas inside the Reef can reach 1-1.5m (beyond the immediate shelter of the reefs), while the vessel may drift at speeds of up to 1.5 knots. There is a potential for personal injury at the entry/exit point (duckboard) at the rear of the vessel, under which swells can rise and fall rapidly when the vessel is drifting side-on (beam-on). There is also a risk of a swimmer being ‘left behind’ and unable to catch up if they let go of the rope while the vessel is drifting. This would necessitate the use of a tender in potentially close proximity to whales to recover the swimmer.

Providing a rope attached to the vessel for passengers to hold onto has also shown to be a very effective method of preventing them from swimming towards the whales. Direct observations over the past five years of fieldwork have shown that swimmers remaining relatively still in a fixed position results in a seemingly increased level of confidence/curiosity shown by the whales and increasingly close and more frequent passes (Arnold and Birtles, 1999; Birtles and Arnold, 2000).

4.9.4 Limiting the number of swimmers

There was a strong indication of support for this control (mean = 4.06), despite no indication of a specific proposed limit. Many reasons were suggested by respondents in support of this control, for example, increased potential for disturbance to the whales with larger numbers of people, easier management of smaller groups and the possibility of larger groups detracting from the experiences of others.

While no data are available yet to determine the ‘carrying capacity’ of this population of dwarf minke whales for commercial swim tours, some passengers experiencing these encounters are supportive of controls limiting numbers of people. Responses to this question relate closely to some of those given by respondents in relation to their

concern for impacts of swim encounters on the whales (Table 3.15), for example the response: “My only concern is the number of boats who *could* be doing this.”

Clearly responses from ‘detracting experiences’ such as ‘too many divers in the water’ (one of the top five detracting experiences for passengers; Table 3.10), would suggest that significant increases in even the number of passengers on vessels already conducting such operations may result in increasing detracting experiences and lower tourist satisfaction.

4.9.5 Banning flash photography

There are presently insufficient data to suggest whether camera strobes/flashes have significant long or short-term negative effects on whales’ eyes, and this reason was used in both supportive and opposing comments from respondents. The mean score, however, is marginally in favor of the use of this control (mean = 3.69; Table 3.19). Passengers on some vessels have used and continue to use strobes, despite researchers’ recommendations that operators discourage their use, and some strobe users have indicated their observations in response to this question. Several respondents stated that they had observed a reaction in the whale (e.g. “flash seemed to startle whales”) while one respondent indicated no observed reaction (Table 3.20). Application of the Precautionary Principle is recommended by the authors until more data are available, and perhaps with improved explanation of ‘why’, this control may be better embraced by future participants.

4.9.6 Minimum vessel approach distance

The minimum approach distance of 100m by a boat to a whale was also generally supported by respondents (mean = 3.47). While this guideline is supposed to be mandatory under the Australian National Guidelines for Cetacean Observation (ANZECC 2000), observational data have shown that dwarf minke whales are often not seen initially until within 100 metres of the vessel.

4.9.7 Time limits on encounters

The passenger response to this question was mixed, with the mean result being ‘neutral’ at 3.01 out of five (Table 3.19). More reasons in opposition to this control were provided than those in support of it, with the most frequent response indicating that ‘the decision is up to the whales’ and that ‘the whales choose when to leave’. Longer encounters may also contribute to higher participant satisfaction, as our observational data indicate that whales often do approach closer with time and that longer encounters result in closer passes and more frequent exuberant behaviour on the part of the seemingly ‘more confident’ whales (Birtles and Arnold 2000).

However, as we still know nothing of the short or long-term effects of human interaction on these whales, and the possibility of ‘cumulative effects’ from repeat extended interactions over each season, the development and implementation of such a control must be seriously considered. Clearly, long-term behavioural research and monitoring must be conducted to understand the cumulative effects of these interactions.

4.9.8 Entering the water no closer than 30m

While in-water approaches to cetaceans within 30m are firmly discouraged under the Australian National Guidelines for Cetacean Observation (ANZECC 2000), this control received little support from our sample of dwarf minke whale-swim participants (mean = 2.92). The way in which the question was worded may have confused some

respondents, especially those who replied that the ‘decision (to approach) is up to the whales’, as they may not have been aware that this control did not exclude the whale approaching on its own volition.

In many cases, dwarf minke whales are not visible within this 30m exclusion zone. These whales are fast swimming, highly maneuverable animals and due to their small size and dark colouring (from above), they can be hard to see in the frequently rough conditions. Furthermore, water visibility in this region rarely exceeds 30m, and is often less than 20m. The authors note that the nature of entry into the water is important (i.e. with minimal splashing/disturbance) when whales may be nearby, but are not visible.

4.9.9 Banning SCUBA

Under the Australian National Guidelines for Cetacean Observation (ANZECC 2000) the ‘use of SCUBA or hookah gear for dedicated cetacean observations is not sanctioned’. Our data show that this ban is not supported by either passengers or the industry and received the lowest level of support among the nine proposed to respondents (mean = 2.74).

Examples of responses opposing this control were statements such as: “effects of SCUBA divers were no different than those of snorkellers”, “whales did not appear threatened/distressed by the presence of SCUBA divers”, and “that the whales still made approaches to SCUBA divers”.

There was a significant desire among passengers to use SCUBA. The most frequent suggestion to improve the minke whale experience was “to have used SCUBA during encounter/be underwater (Table 3.14). Two further respondents expressed the desire ‘to have a bigger tank/more air’. These comments clearly indicate a passenger pressure on dive operators to allow use of SCUBA when observing minke whales.

Probably the major issue here is that for the majority of vessels, encounters usually occur while moored at reef sites when divers are in the water on standard reef dives at the time when whales arrive. Observations on SCUBA are therefore common and unavoidable.

4.10 Interpretation

The mean rating by respondents of the quality of information they had received about minke whales was high (8.08 out of 10). There was some noticeable variation between vessels, however, it was not possible to determine the significance of this variation due to differences in sample sizes. A visual comparison between vessels of the availability of different interpretative media (Figure 3.3) highlights the importance of a ‘knowledgeable’ crew in disseminating relevant information to passengers, and 52% of respondents went on to indicate that staff members had been their best source of information (Table 3.21). Some interpretative media appeared scarce or absent on some vessels, particularly the Minke Whale Information Package (MWIP) on vessel D. Only a single copy of this was given to each live-aboard company (because of cost) and because they were primarily intended as resource information folders from which the boats could develop their own interpretation. The fact that less than 40% of passengers indicated that they had access to MWIP indicates that they were almost certainly not available on all vessels at all times. This served to emphasise the need for more

accessible forms of interpretation to be available such as passenger information brochures to be given to all passengers.

The alarmingly high percentage of respondents who indicated they did not feel adequately prepared for their minke whale encounter(s) (17.3%; Section 3.9.2) suggests that there is much room for additional interpretative media and improvement of present resources (see below).

While many responses to Question 32 (“Do you feel you were adequately prepared for your encounter(s) with minke whale(s)”) were very positive on some vessels, indicating that the respondent had been well informed about the guidelines and had received information on the whales’ biology, some responses (from other vessels) to this question were somewhat disturbing. A significant number of respondents indicated they had received no preparation or information prior to encountering minkes (Table 3.22), and were encouraged to ‘jump in the water’ with them. Examples of such statements include: “Were not really informed but rather encouraged to jump in the water,” and “Learned nothing about its biology/ecology, or how to improve the encounter.”

While it is important that an operator does not raise passengers’ expectations unduly with guarantees or suggestions of minke whale sightings, particularly when time schedules and/or operating permits do not allow dedicated searching and encounters are entirely incidental, passengers do need to be prepared for an encounter. This extends beyond the vessels surveyed for this study to all commercial operators and recreational users within the vicinity of the Ribbon Reefs during the season. Expectations of passengers must be realistic from both perspectives, i.e. that minke whale encounters should not be unrealistically ‘hyped’ by operators, nor should passengers be left unaware of the potential for such encounters on tours with a diving focus (and only incidental minke encounters), and be unaware of the appropriate behaviour when a whale appears.

4.10.1 Improvements to MWIP

After reviewing a preliminary analysis of data collected in 1999, several improvements were made to the Minke Whale Information Package prior to the 2000 season. The addition of the Draft Minke Whale Brochure during the 2000 season also showed a significant increase in passengers’ rating of the quality of information (Smith 2000). Suggestions by respondents were further incorporated into improvements of the MWIP prior to the 2001 season, and the show of demand for a passenger brochure has led to the new brochure for distribution in 2002 (see below).

4.10.2 Requests for further information

Much of the information requested by respondents is unavailable, due to the general paucity of knowledge of dwarf minke whales. Of the five most frequently mentioned elements in Table 3.27, there are presently no answers available to address these knowledge gaps. Clearly the responses to this question indicate that passengers are genuinely interested in the biology and ecology of the whales. Results from this question also show that it is in the best interests of operators to make available interpretative media to enhance passengers’ overall experience. This has been at least in part addressed for the 2002 minke season by the provision of several thousand passenger information brochures to the industry. Published by the CRC Reef Research Centre, these are six page colour brochures (Dwarf minke whales in the Great Barrier

Reef: Current State of Knowledge May 2002) and can be downloaded from the CRC Reef website at <http://www.reef.crc.org.au>

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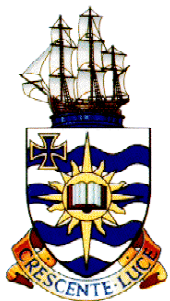
Appendix 1.

MINKE WHALE

QUESTIONNAIRE 2000



Dwarf minke whale
Balaenoptera acutorostrata



JAMES COOK
UNIVERSITY



MINKE WHALE PROJECT

Introduction

The little known dwarf minke whale was only discovered in Great Barrier Reef waters during the 1980s. We have been studying various aspects of its biology and ecology over the last few years including establishing a catalogue of identified individuals. Growing numbers of people are swimming with these whales in the Cairns Section of the Great Barrier Reef. We want to ensure that visitors have high quality experiences while minimising the impact on the whales and ensuring the long term ecological sustainability of these interactions. **In this questionnaire, we seek to understand people's experiences, and to assess management implications for this industry.** The information we gather will assist with the planning and management of sustainable swim-with-whales tourism both locally and in other areas.

Information regarding individual participants and operators is strictly confidential. Participation is entirely voluntary. This questionnaire will take approximately 15 to 20 minutes to complete. If you can help by completing this questionnaire it would be greatly appreciated. Please answer all questions as best you can. We look forward to your comments.

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This research project is being undertaken with the support of local tourism operators, the Cod Hole And Ribbon Reefs Operators' Association (CHARROA), the Great Barrier Reef Marine Park Authority (GBRMPA), the Queensland Parks and Wildlife Service (Environmental Protection Agency), and is partially funded by the Marine Species Protection Program (Coast and Clean Seas) of the Commonwealth Department of the Environment (Environment Australia). We gratefully acknowledge the participation in this project of Undersea Explorer and Digital Dimensions. The sampling period of this study is over the main minke whale season (June to August, 2000).

NOTE TO OPERATORS

You are welcome to request a summary of the results for your boat. Information concerning specific named boats is **STRICTLY CONFIDENTIAL**. It will neither be published, nor released to managers or other operators. Your support in conducting this survey is greatly appreciated and we hope that the information collected will be of use to you in your operation and lead to the long-term sustainability of the industry.

When you have completed this questionnaire, please return it to the crew of your boat, or post in our prepaid envelopes. You are welcome to tear off and keep this cover page.

Thank you for your participation.

SECTION 1:

ABOUT YOU

Date:

1. ☐ Male ☐ Female 2. Year of Birth _____

3. Name of your usual country of residence ? _____
(If Australia, please include postcode: _____)

4. Is this your first trip to the Great Barrier Reef ? ☐ Yes ☐ No ... Number of previous visits? _____
(If no, which areas did you visit ?)

- 5. What were the **three best experiences** you had during this trip to the Great Barrier Reef?**

6. Do you scuba dive ? ☐ Yes ☐ No (If no, please go on to question 11)

7. What scuba diving qualifications do you hold ? (Please tick one)

- None Open Water Advanced Rescue Dive Master Instructor

- ☐ Other: _____

8. What year did you begin scuba diving ? 19

- [illegible]

10. Did you scuba dive on this trip ? ☐ Yes ☐ No

11. Did you snorkel on this trip ? ☐ Yes ☐ No

- 12. Was your visit to Far North Queensland primarily to see minke whales ?**

- ☐ Yes ☐ No ... If no, what were your other reasons?

- 13. Have you ever participated in any other whale watching trips before?**

- ☐ No ☐ Yes ... If yes, please give details.

SECTION 2:

ABOUT YOUR EXPERIENCES

In this section, we'd like you to tell us about your experience(s) with minke whale(s).

14. Did you see any minke whales during your trip to the Great Barrier Reef ?

☐ Yes ☐ No ... If no, please go on to Question 26 in Section 3

15. Did you swim with minke whale(s) (on either snorkel or scuba)? ☐ Yes ☐ No

16. What were the **best things** about your minke whale experience(s) ?

17. Were there things that stand out as **detracting** from your enjoyment of your minke whale experience(s) ? (If so, could you provide a brief description below)

18. Please tell us about your minke whale encounter(s) by filling in the details below:

(By "encounter", we mean each interaction session with minke whale(s), from the first sighting by a passenger/crew member to end of the vessel's contact with the whale(s).)

<u>Encounter</u>	<u>Number of whales</u>	<u>Max. number of people in the water</u>	<u>Duration of encounter</u> (minutes)	<u>How close you got to a whale</u> (metres)	<u>Status of boat</u> (please tick one)		<u>What you were doing during the encounter</u> (please tick as many as apply)				
					<u>Moored</u>	<u>Drifting</u>	<u>In-water holding rope</u>	<u>In-water free swimming</u>	<u>Using scuba</u>	<u>Using snorkel</u>	<u>On- board boat</u>
<u>First</u>											
<u>Second</u>											
<u>Third</u>											
More...											

19. How would you rate your overall satisfaction with your minke whale experience(s) ?
(Please circle one number)

1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10
Very poor Excellent

20. Overall, how well did your minke whale experience(s) meet your expectations?
(Please tick one box and give a brief explanation of why you feel this way)

☐	☐	☐	☐	☐
well below my expectations	somewhat below my expectations	met my expectations	somewhat above my expectations	well above my expectations

21. Is there anything you feel would have improved your minke whale experience(s) ?
(If so, please provide a brief description below)

22. Do you feel any concern that this kind of whale-watching (swimming with minkes) might result in some negative impacts on the whales ? ☐ Yes ☐ No

- Please comment.

23. Was there any point when you felt your interaction(s) resulted in a negative impact on the whale(s)? ☐ Yes ☐ No

- Please describe why you feel this way.

24. Did you observe any actions of other passengers or crew which you feel may have had negative effects on the whale(s) ? ☐ Yes ☐ No

- Please explain.

SECTION 3:

ABOUT YOUR TRIP

In this section, we'd like you to tell us about your overall trip and aspects of its management (if you did not see any minke whales, please skip questions that do not apply).

25. Name of boat you travelled on during this trip: _____

- How many nights did you spend on the boat ? _____ nights
- How many other passengers were on board ? _____ passengers

26. How would you rate your satisfaction with this boat trip ? (Please circle one number)

1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10
Very poor Excellent

27. Overall, how well do you feel your minke whale encounter(s) were managed by your boat crew ?

1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 10
Very poorly Very well

- Please explain.

28. How do you feel about the following controls being used to manage people's encounters with minke whales ?
(Please tick one box for each statement)

	Strongly opposed	Opposed	Neutral	Supportive	Strongly supportive
• Having to hold onto a rope at the surface	☐	☐	☐	☐	☐
• A limit to the number of people in the water	☐	☐	☐	☐	☐
• No swimming towards the whales	☐	☐	☐	☐	☐
• No physical contact with whales	☐	☐	☐	☐	☐
• Time limits on encounters	☐	☐	☐	☐	☐
• A ban on the use of SCUBA	☐	☐	☐	☐	☐
• Boats not to approach within 100 metres of whales	☐	☐	☐	☐	☐
• Swimmers not to enter the water when less than 30m from whales	☐	☐	☐	☐	☐
• A ban on the use of flash photography	☐	☐	☐	☐	☐

29. If you strongly support or strongly oppose any of these controls, please explain why.

SECTION 4: EDUCATION AND INTERPRETATION ABOUT MINKE WHALES

It has been suggested that knowledge about minke whales may help people to have a better experience during their encounters, and that an understanding of the reasons for guidelines could result in their greater acceptance. In this section, we are interested in your opinion about the information available to you on minke whales.

30. Where did you first hear about dwarf minke whales on the Great Barrier Reef ?
(eg. dive magazines, from friends, on-board the boat, travel agent, on the internet - if internet, which site(s)?...)

31. Overall, how would you rate the quality of the information you received about minke whales ?

1 ---- 2 ---- 3 ---- 4 ---- 5 ---- 6 ---- 7 ---- 8 ---- 9 ---- 10
Very poor Excellent

32. Do you feel you were adequately prepared for your encounter(s) with minke whales ? ☐ Yes ☐ No
- Please explain.

33. What was the most interesting thing you have learnt about minke whales from this trip ?

34. What information about minke whales did you have access to ?
(Please tick as many as apply)

- | | |
|--|--|
| ☐ pre-trip information (eg. magazines, internet or books) | ☐ reference books provided on boat |
| ☐ informal discussions (with staff or other passengers) | ☐ tourism industry advertising material |
| ☐ pre-trip briefing by staff | ☐ formal on-site briefing by staff |
| ☐ Minke Whale Information Package 2000 | ☐ Draft Minke Whale Brochure (laminated):
("A curious little whale") |

- What was the best source of information for you about minke whales? _____
- What would you suggest to improve the Minke Whale Information Package 2000?

- What would you suggest to improve the Draft Minke Whale Brochure?

35. Was there anything specific about which you would have liked more information?

(For example, minke whale biology)

SECTION 5:

***ABOUT YOUR VIEWS ON
WILDLIFE CONSERVATION***

36. Please indicate your response to the following statement.

I feel that conservation of wildlife and the natural environment is;

☐	☐	☐	☐	☐
Not at all important	Not very important	Neutral	Somewhat important	Very important

37. Do you belong to any organisations that are primarily concerned with the conservation of wildlife or the natural environment ? ☐ No ☐ Yes If yes, could you please list those organisations.

38. How informed do you consider yourself to be about current conservation issues concerning wildlife and the natural environment ?

☐	☐	☐	☐	☐
Not at all informed	Not very informed	Neutral	Somewhat informed	Very informed

39. Do you feel that this experience has changed you in any way ?

40. Are there any other comments you would like to make about the issues covered by this survey ?

If you would like further information about our dwarf minke whale research and are willing to participate in a follow-up study in three to six months time, please leave your name and address or email below for correspondence.

THANK YOU FOR YOUR HELP WITH THIS RESEARCH