

EDUCATIONAL AND CONSERVATION VALUE OF WHALE WATCHING

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Many people support whale watching on the basis that it enhances people's appreciation and awareness of the whales they are viewing and can lead to the protection of the species and of the environment generally. Because whale watching can directly impact on whales' behavior it is important that whale watching is beneficial for people's understanding of whales and for the conservation of whales. This article examines the educational and conservation value of the whale-watching experiences currently offered in New South Wales, Australia. The current education provided lacks structure, there are no clear conservation objectives, and there is limited addition to knowledge and conservation behaviors of whale watchers in the long term. Through improvement of the education provided during whale-watching experiences, it is argued that the whale-watching industry can become a more sustainable form of wildlife tourism and provide conservation benefits for whales and other forms of biodiversity.

Key words: Whale watching; Interpretation; Ecotourism

Introduction

Whale watching is a major form of wildlife tourism in many parts of coastal Australia, generating millions of dollars per annum for regional towns and local economies (Birtles, Valentine, & Curnock, 2001; Hoyt, 2001) and is expanding rapidly. The latest figures (taken from 1998–2003) indicate that whale watching is growing by 15% annually (Hoyt,

2001; International Fund for Animal Welfare [IFAW], 2004). Fifty-eight percent of all whale watching in Australia occurs in New South Wales (NSW) (IFAW, 2004). In 2003, 319,706 people participated in boat-based whale watching and 616,924 participated in land-based whale watching in NSW (IFAW, 2004).

As the popularity of whale watching grows so too does the concern over the impact it is having on the

whales being watched and whether or not whale watching can be considered a benign nonconsumptive use of whales or just another form of harmful exploitation (Beach & Weinrich, 1989; Corkeron, 2004, 2006; Forestell & Kaufman, 1990; Orams, 1999; Tilt, 1987). Despite research indicating that close approach by tourist vessels can change the behavior of cetaceans (Baker & Herman, 1989; Baker, Herman, Bays, & Bauer, 1983; Bauer, 1986; Bauer & Herman, 1986; Bejder, Dawson, & Harraway, 1999; Blane & Jackson, 1994; Corkeron, 1995; Constantine, 2001; Constantine, Brunton, & Dennis, 2004; Lusseau, 2003; Scheidat, Castro, Gonzalez, & Williams, 2004; Williams, Lusseau, & Hammond, 2006; Williams, Trites, & Bain, 2002) and lead to long-term impacts at the population level (Bejder et al., 2006; Lusseau, 2005), many nongovernmental organizations (NGOs) involved in the conservation of whales actively support and encourage commercial whale watching (Corkeron, 2004, 2006). One of the four main arguments used by these organizations is that whale watching promotes and induces conservation (Corkeron, 2004, 2006).

The belief that nature-based tourism can lead to a greater awareness about the animals and areas being viewed, and promote conservation and environmental protection in general is widespread (Duffus & Dearden, 1993; Higginbottom, Northrope, & Green, 2001; Kimmel, 1999; Moscardo & Saltzer, 2005; Moscardo, Woods, & Greenwood, 2001; Orams, 1995; Reynolds & Braithwaite, 2001; Weiler & Davis, 1993). This sentiment is echoed by researchers concerned with cetacean-based tourism (Higginbottom, 2002; Lück, 2003; Meinhold, 2003; Orams, 1996; Reid, 1999). Interpretation that incorporates effective and cognitive learning processes is thought to be the key in facilitating this.

According to Higginbottom (2002), tourism based on viewing of free-ranging animals must meet the following criteria to be sustainable: 1) customers must be satisfied with their experiences, 2) operators must make sufficient profits, and 3) the activities must not cause the wildlife population(s) to decline, or to become less viewable over time. If the population were declining due to other causes, the activities should contribute positively to the species conservation. Effective interpretation is central to sustainable wildlife tourism because it can help these criteria be met. It can enhance support for conserva-

tion of the wildlife that is being viewed, and it can increase visitors' satisfaction and help reduce the activity's negative impacts (Ham & Weiler, 2001; Higginbottom, 2002; Kimmel, 1999).

Learning about whales is important to whale watchers with their satisfaction correlating with the amount they learn during their experience (Stamation, unpublished data). Others have also found a strong relationship between the amount visitors state they had learned about the wildlife and their overall satisfaction (Lück, 2003; Moscardo & Saltzer, 2005; O'Neill, Bernard, & Lee, 2004). The profitability of the industry relies heavily on the satisfaction of its customers. If visitors are satisfied, then they are more likely to return and recommend the experience to others. Education has also proven to be a valuable tool for management of inappropriate behaviors while watching wildlife. Orams and Hill (1998) found that a carefully structured education program minimized inappropriate behaviors around dolphins at Tangalooma, Australia. Meinhold (2003) described how an educational program is useful in managing tourist behaviors around killer whales in Johnstone Strait, Canada.

For whale watching to be justified as a sustainable form of ecotourism, ways of minimizing its negative impacts must be examined. The development of effective interpretation that promotes a conservation ethic and empathy for whales is one step in ensuring the sustainability of the whale-watching industry in NSW.

The aim of this study was to determine the quality and use of interpretation in whale-watching experiences in NSW and to assess the effectiveness of whale watching in increasing knowledge and promoting conservation to whale watchers. Both onsite and follow-up surveys of land-based and boat-based whale watchers were used to determine the immediate and long-term educational and conservation benefits of whale watching experiences.

Methods

Boat-Based Whale Watchers

Boat-based whale watchers were surveyed on six commercial whale-watching vessels operating out of Eden, Merimbula, and Narooma on the far south coast of New South Wales during the humpback whale's (*Megaptera novaeangliae*) southern migra-

tion. Surveys were conducted over a total of 90 days from late September to early November in 2002, 2003, and 2005.

The survey was undertaken in three parts. Part 1 “before seeing the whales” was completed by whale watchers before boarding the boat, Part 2 “after seeing the whales” was completed on the return journey to port, and Part 3 “follow-up” was completed 6–8 months after completing Part 1 and Part 2 of the questionnaire.

The researcher (K.S.) handed out Part 1 and Part 2 of the questionnaire to passengers waiting to board the whale-watching vessel. Participants were given a clipboard containing both parts of the questionnaire and were given both written and verbal instructions to complete Part 1 before boarding the vessel and to complete Part 2 on their return trip. The researcher stayed onboard the vessel during the whale-watching trip and collected the questionnaires upon return to port. Apart from distributing and collecting questionnaires the researcher’s role on board the vessel was passive. Generally the researcher did not provide additional information to passengers, but did answer questions if asked.

Respondents surveyed in 2002 and 2003 were invited to participate in a follow-up survey (Part 3). If they agreed to participate then they were contacted either by post or via email 6–8 months later. A return paid envelope was provided for those contacted by post. Those participating by email could complete the questionnaire online and email it back to the researcher. One reminder to each willing participant was sent out 4 weeks after the follow-up questionnaire was distributed.

All questionnaires contained both open and closed questions and some Likert scale and multiple choice type questions. A total of 1,037 Part 1 and Part 2 questionnaires were distributed and 1,018 were returned, yielding a return rate of 98%. Of the respondents, 276 people agreed to participate in the follow-up survey; 257 questionnaires were successfully distributed and 130 were returned, yielding a return rate for Part 3 of 51%. The follow-up return was 13% of the total response to Part 1 and Part 2.

Current Education on Whale-Watching Boats

Table 1 provides a description of the commercial whale-watching vessels involved in this study and

the education they currently provide during their whale-watching cruises. Boats varied in passenger capacity from 12 to 75 and included three catamarans and three mono-hulled vessels. Most provided live commentary containing information on whale biology, migration patterns, and population trends. There was very limited information given on whale conservation and very little onboard education material provided such as brochures, books, videos, posters, photos, and visual props. Two operators handed out information sheets to passengers. The information sheet handed out on board boat 1 was produced by the International Fund for Animal Welfare (IFAW) and included basic facts about humpback and southern right whales, information on whale migration patterns, and the NSW whale watching guidelines. The information sheet handed out onboard boat 5 was produced by the operators and contained information on whale behaviors to look out for.

Information given to passengers of boat 5 was more structured and consistent than the other vessels. The main form of communication was via live commentary and included a lot of well-informed facts regarding humpback whales and the history of the area. The information was clearly well planned but without a conservation objective. Very little information was given on current threats facing whales. The commentary was delivered by the same crew member each trip with little variation in content. The information given to passengers onboard the other five vessels varied from trip to trip. The content depended largely on which crew members were onboard. The information provided was not planned or structured and was mostly made up of facts, and some inaccurate statements, about whales. Most crew members employed on all six vessels had no science or education background and had received no formal training on delivering education to whale watchers. Discovery rangers, trained through the National Parks and Wildlife Service (NPWS) discovery program (Department of Environment and Conservation [DEC], 2004) were sometimes present on boat 3, but only for trips that combined whale watching with interpretive tours of Montague Island. One crew member of boat 1 had previous interpretive training through the NPWS discovery program. This crew member was employed by the operator of this vessel during 2003.

Table 1

Description of the Commercial Whale-Watching Vessels Involved in This Study and the Education They Provided During Their Whale-Watching Cruises

	Boat 1	Boat 2	Boat 3	Boat 4	Boat 5	Boat 6
Boat length (meters)	16	13	12	12	16	10
Boat type	Catamaran	Mono hull	Catamaran	Mono hull	Catamaran	Mono hull
Passenger numbers	72	23	37	27	47	12
Crew (not including skipper)	2	1	2	2	2	1
Educational material						
Trained guide	Sometimes ^a	No	Sometimes ^a	No	No	No
Live commentary	Yes	No	Sometimes	Sometimes	Yes	No
Fact sheets	Yes ^b	No	No	No	Yes ^c	No
Educational brochures	No	No	No	No	No	No
Videos	Sometimes	No	No	No	Sometimes	No
Books	No	No	No	No	Yes	No
Posters	Yes	No	No	No	Yes	No
Visual props	Sometimes ^d	No	No	No	Sometimes ^c	No
Photos	No	No	No	No	Yes	No
Education content						
Whale biology	Yes	Sometimes	Yes	Yes	Yes	Sometimes
Whale migration patterns	Yes	Sometimes	Yes	Yes	Yes	Sometimes
Whale population trends	Yes	No	Sometimes	Sometimes	Yes	Sometimes
Whale conservation	Sometimes	No	No	No	No	Sometimes
Whaling history	No	No	No	No	Yes	Sometimes
Local history	No	No	No	No	Yes	No
Other marine life	No	No	Yes ^f	Yes ^f	Sometimes	No
Marine environment	No	No	No	No	No	No
Marine conservation	No	No	Sometimes ^g	Sometimes ^g	No	No

^aGuides trained through NPWS discovery program.

^bFact sheets produced by the operators on typical behaviors to look for while whale watching.

^cFact sheet produced by IFAW including basic facts about humpback and southern right whales (*Eubalaena australis*), information on whale migration and the NSW whale watching guidelines.

^dCrew show pictures of baleen and stomach contents of stranded whale.

^eBaleen.

^fSeals.

^gCrew talk about dangers of plastics bags in relation to seals.

Educational Brochure

An educational brochure on humpback whales was designed by the researcher and given to boat-based whale watchers along with the questionnaires in the second season of the study. The brochure contained seven sections as follows:

1. Did You Know?—22 interesting facts about humpback whales.
2. Humpback Whale Migration—a description of migration patterns, including a diagram of migration routes of southern hemisphere humpback whale populations.
3. Population Numbers—pre-whaling, post-whaling, and current population estimates.
4. Humpback Feeding and the Food Chain—a

description of humpback whale feeding methods and a diagram of the Antarctic food chain.

5. Current Threats—a list of threats facing humpback whales.
6. Conservation Initiatives—current research and management initiatives as well as actions needed for the future management of humpback whales in Australia. NSW whale-watching guidelines including a diagram illustrating these guidelines.
7. How You Can Help—nine ways in which people can help with the conservation of humpback whales.

Land-Based Whale Watchers

Land-based whale watchers were surveyed at Cape Solander over 33 days in June and July of 2002,

2003, and 2004 during the peak of the humpback whale's northern migration past Sydney. Cape Solander is approximately 15 km south of Sydney and is part of the South Headland at the entrance of Botany Bay.

While the before/after watching whales survey worked quite well onboard whale-watching boats, where there is a structured setting and a captive audience, an initial 3-day trial in June 2002 found that two separate questionnaires did not work well at Cape Solander. Most people were inclined to fill in the before and after questionnaires together. To overcome this problem Part 1 and Part 2 questionnaires were combined and hence the survey was undertaken in two parts (not three as with the boat-based participants). Part 1 "whilst watching the whales" was completed at Cape Solander and Part 2 "follow-up" was completed 6–8 months after completing Part 1 of the survey.

Most of the Part 1 questionnaires were handed out at the ticket booth, at the entrance of the Botany Bay National Park where cars must stop to pay an entry fee to the park. In addition, in 2003 and 2004 the researcher handed out questionnaires onboard a shuttle bus ferrying whale watchers from the car park at Botany Bay National Park Discovery Centre to the viewing area at Cape Solander. There were three survey collection boxes for the questionnaires; they were located at Cape Solander, the Discovery Centre, and near the exit of the park. Participants were also given the option of mailing the completed questionnaires to the researcher, although most people who returned the questionnaires (99%) opted to do so via the boxes provided on the day of completion.

The distribution and collection of the follow-up questionnaires were conducted as described above for boat-based whale watchers. Only those surveyed in 2002 and 2003 were invited to participate in the follow-up survey.

The questionnaires contained both open and closed questions and some adjectival scale type questions. A total of 3,500 questionnaires were distributed and 1,569 returned, yielding a return rate of 45%. Of the respondents, 336 people agreed to participate in the follow-up survey, and 322 follow-up questionnaires were successfully distributed. A total of 178 respondents returned their completed questionnaires, yielding a return response rate of 55% or 11% of Part 1 respondents.

Nonparametric analyses were performed on the data using Statistical Package for Social Sciences (SPSS for Windows V12.01, SPSS Inc., Chicago).

Whale-Watching Education at Cape Solander During the Study

There were no formal education or interpretive panels relating to whales or whale watching at Cape Solander in 2002 (the first year of the study). A humpback whale fact sheet was occasionally handed out to visitors at the park entry. In 2002 the only information available on site was a white board providing updated information on the time of last whale sighting, number of sightings for the year to date, and the number of sightings for the day.

In 2003 (prior to the second year of the study), the National Parks and Wildlife Service (NPWS) made a number of changes to the area in order to meet the demand of the increasing numbers of whale watchers. A small wooden viewing platform was constructed above the rock platform. A large information sign was erected near the viewing platform. This information sign was designed by NPWS and IFAW and contained information on: common humpback whale behaviors and their distinguishing features; a map of their migration patterns; data from recent humpback whale counts at Cape Solander; whaling and the proposed South Pacific Whale Sanctuary; as well as some information on how people can help with the protection of whales in Australia.

NPWS introduced talks by Discovery Rangers on the viewing platform in 2003. Discovery Rangers are employed by the New South Wales DEC to implement the NPWS Discovery Program; their goal is to provide educational and recreational experiences to park visitors. The usual duration of these talks was 10–15 minutes and they were conducted roughly every half hour during the busy times of the day, typically between 1000 and 1600 hours. These talks provided general information on the biology of the humpback whales, their migration patterns, distinguishing features and general behaviors, and what to look for while whale watching at Cape Solander.

In all years of the study a team of whale-watching volunteers was located at the viewing platform at Cape Solander, conducting counts of the annual migration for the NPWS whale-monitoring program. These volunteers were accessible to the public and

some whale watchers asked them questions about whales and their migration. While most volunteers were quite knowledgeable about humpback whales and did their best to answer questions, they had not received any formal training on this matter. Also, in both years of this study some information on the local environment and local history as well as some photos of whale sightings from Cape Solander were on display in the Botany Bay National Park Discovery Centre located approximately 2 km from Cape Solander.

Results

Profiles

To check for any bias in the follow-up sample, profiles were compared between all Part 1 participants and the subset of follow-up participants. These were compared separately for boat-based and land-based whale watchers. The profile variables included gender, age, level of education, occupation, whale knowledge, environmental rating (based on the frequency with which respondents performed specific environmentally friendly behaviors), and nature/wildlife interest rating (based on the frequency with which respondents visited wildlife and/or nature areas). Pearson's chi-square analysis showed no significant differences between the profiles of follow-up participants and the profile for all Part 1 participants.

Knowledge

Boat-based whale watchers were given the same set of multiple-choice questions to answer prior to their whale-watching trip (Part 1) and again after their whale-watching experience (Part 2). Their knowledge of whales increased from Part 1 to Part 2 as a result of a boat-based whale-watching trip. Respondents were more likely to get all questions correct in Part 2 than in Part 1 [$\chi^2(4) = 320.14$, $p < 0.001$, $n = 907$ and 828 for Parts 1 and 2, respectively]. Most (55%) boat-based participants increased their knowledge from before trip to after trip, 41% stayed the same, and 4% decreased (Wilcoxon signed ranks test: $z = -17.186$, $p < 0.001$, $n = 750$). Respondents were more likely to improve their knowledge on approach distance (37%) and the reason humpback whales spend summer in Antarctica

(30%) than on the name of a baby whale (5%) and the name of a group of whales (7%). Most respondents already knew the answers to the latter two questions (93% and 88%, respectively) prior to their whale-watching trip.

Boat-based follow-up respondents scored better in Part 2 of the survey than in their follow-up survey (Part 3) [$\chi^2(4) = 16.19$, $p = 0.003$, $n = 113$]. Forty-one percent knew less 6–8 months after their whale-watching trip than they did directly after their trip. Sixty-nine percent of these people had increased their knowledge from Part 1 to Part 2 of the survey. This indicates that their acquired knowledge was only short term. Forty-five percent scored the same and only 14% had improved their knowledge since their trip.

There was no significant difference in the number of questions whale watchers answered correctly in Part 1 of their survey and 6–8 months after their whale-watching experience. The results of the Wilcoxon matched-pairs test indicated that 48% of land-based whale watchers had answered the same number of questions correctly, 29% had answered fewer questions correctly, and 23% had answered more questions correctly 6–8 months after their whale-watching experience. For boat-based whale watchers, the Wilcoxon signed-rank test showed that 43% had answered the same number of questions correctly prior to their whale-watching experience as they had 6–8 months after their whale-watching experience, 36% had increased their knowledge of whales, and 20% showed a decreased in knowledge 6–8 months later. There was no significant difference in the number of questions answered correctly by land-based whale-watching follow-up participants and by boat-based whale-watching follow-up participants 6–8 months after their whale-watching experience.

Both land-based whale watchers and boat-based whale watchers were more likely to forget the answers to why the humpback whales spend their summer in Antarctica and the minimum distance a boat can approach a whale in NSW waters. Of these, 32% and 28% of all follow-up respondents (boat and land combined, $n = 250$) forgot the reason why humpback whales spend summer in Antarctic waters and the minimum approach distance to whales in NSW waters, respectively, whereas only 2% and 3% forgot the name of a baby whale and of a group of whales, respectively.

Behavior

Ninety-one percent of boat-based whale watchers in the follow-up group had not been whale watching on a boat since completing their survey, whereas 15% of land-based whale watchers had been whale watching from a boat since completing their survey. Fifty percent of these land-based whale-watching respondents had already been whale watching on a boat before completing the first questionnaire.

Forty-five percent of land-based whale watchers had been whale watching from land since completing their survey and of these 36.5% had been one to five times and 8% had been more than six times. Forty-nine percent of these respondents had not been whale watching before filling in the questionnaire. For boat-based whale watchers, 33% had been whale watching from land since completing the survey. Most of them (74%) had been whale watching from land before they took their boat trip.

Eighty-seven percent of land-based whale watchers had recommended land-based whale watching to someone and 91% of boat-based whale watchers had recommended boat-based whale watching to someone. This is consistent with how many stated they would recommend such behavior in Part 2 of their survey; namely, 87% of land-based and 92% of boat-based whale watchers.

An “environmental rating” was given to Part 1 respondents based on how frequently they conducted six environmentally friendly activities prior to their whale-watching experience. The scale used to calculate the environmental rating was “not at all” = 0 point, “rarely” = 1 point, “sometimes” = 2 points, “frequently” = 3 points, and “always” = 4 (0 is the minimum and 24 is the maximum environmental rating a person can have). Only respondents who answered all six parts of this question with a score other than “not applicable” were rated. There was no significant difference in environmental rating between land-based whale watchers ($n = 1,057$, median = 18, IQR = 5) and boat-based whale watchers ($n = 777$, median = 17, IQR = 5) (Mann-Whitney U test: $z = -1.678$, $p = 0.093$).

For the majority of the six environmentally friendly activities the proportion of whale watchers who stated they would increase such actions ranged from 40% to 50%, but was lower for “donating to and/or be actively involved in helping an environmental group” (Table 2). Boat-based whale watchers were more likely than land-based whale watchers to state that they would donate to and/or be actively involved in helping an environmental group, choose household products that they think are better for the environment, and use alternatives to plastic bags more frequently as a result of their whale-watching experience.

Table 2

The Frequency of Land-Based and Boat-Based Onsite (i.e., Part 1 or Part 2) Respondents Who Said They Would Do Environmentally Friendly Activities More Than They Already Do Now as a Result of Their Whale-Watching Experience

Activities	Whale-Watching Platform	Percentage (%)	Chi-Square Test Statistics		
			<i>n</i>	<i>df</i>	χ^2
Donate to and/or be actively involved in helping an environmental group	Land	17	1,310	2	11.70
	Boat	23*	861		
Recycle	Land	43	1,314	2	4.44
	Boat	48	845		
Choose household products that you think are better for the environment	Land	41	1,333	2	10.32
	Boat	48*	870		
Avoid putting things like oil, fat paint, or turps down the sink or toilet	Land	47	1,333	2	3.89
	Boat	50	876		
Avoid putting things like litter or detergents into gutters or storm water drains	Land	46	1,330	2	1.61
	Boat	49	876		
Used alternatives to plastic bags when doing the grocery shopping	Land	40	1,333	2	8.40
	Boat	43*	873		

*Significantly greater at $p < 0.05$.

Comparisons of results from the on site surveys with the results from the follow-up survey showed no notable change in environmentally friendly behaviors of whale watchers from before their whale-watching experience to 6–8 months after their whale-watching experience (Table 3). Wilcoxon matched-pairs test showed that 45% decreased their environmental rating from Part 1 to follow-up, 37% increased, and 18% stayed the same.

Table 4 shows the proportion of Part 1 and Part 2 respondents who stated they would do five activities directly related to whales or other wildlife more than they already do now as a result of their whale-watching experience. The proportion of boat-based whale watchers who said they would do these activities ranged from 31% to 70% and the proportion of land-based whale watchers who said they would do these activities ranged from 28% to 54%. Boat-based whale watchers were more likely than land-based whale watchers to state that they would pick up litter that may be harmful to wildlife [$\chi^2(2) = 28.36, p < 0.001, n = 2,206$], tell people about whales generally [$\chi^2(2) = 62.85, p < 0.001, n = 2,206$], and tell people about whale conservation [$\chi^2(2) = 49.36, p < 0.001, n = 2,206$] more than they do now as a result of their experience. The number of respondents who stated they would do these activities more as a result of their whale-watching

experience was highest for “telling people about whales generally” and lowest for “finding out more information on other wildlife” for both boat-based and land-based whale watchers.

When asked 6–8 months later how often they had done these same activities, most either did these activities more than what they stated they would or were consistent with what they stated they would do as a result of their whale-watching experience (Table 4). The proportion of follow-up respondents doing these activities 6–8 months after their whale-watching experience was highest for “picking up litter that may be harmful to wildlife” and “telling people about whales generally” and was lowest for “telling people about whale conservation.”

In 2005 the onsite questionnaire for boat-based whale watchers included additional questions that asked with what frequency they did these activities in the 12 months prior to their whale-watching experience. For analysis it is assumed that this subset of boat-based whale watchers represents the entire boat-based whale watcher sample set. Although the proportion of respondents who stated that they “always” picked up litter that may be harmful to wildlife was higher in the follow-up group, there were no significant differences between the follow-up group and the 2005 onsite group in the other frequency categories for this activity (Table 5). The boat-based whale-watching experience had more of an

Table 3

The Frequency With Which Follow-Up Respondents Stated on Their Onsite Survey (Part 1 or Part 2) That They Currently Performed Six Environmentally Friendly Activities and the Frequency With Which These Same Respondents Stated They Had Performed These Activities in the 6–8 Months Since Their Onsite Survey

Activities	Survey	Land-Based Whale Watchers					Boat-Based Whale Watchers				
		N	R	S	F	A	N	R	S	F	A
Donate to and/or be actively involved in helping an environmental group	Part 1	28	17	34	15	6	39	16*	27	9	7
	Follow-up	35	13	32	13	7	57	3	27	7	6
Recycle	Part 1	0	1	1	10	89	1	1	2	11	86
	Follow-up	1	0	2	22*	74	0	0	4	25*	71
Choose household products that you think are better for the environment	Part 1	3	3	18	36	40	2	3	16	42	38
	Follow-up	2	3	29	33	31	5	3	23	42	26
Avoid putting things like oil, fat paint, or turps down the sink or toilet	Part 1	1	1	4	16	77	1	2	8	15	73
	Follow-up	1	2	3	18	75	2	0	6	17	75
Avoid putting things like litter or detergents into gutters or storm water drains	Part 1	1	0	3	11	84	1	0	7	13	79
	Follow-up	1	1	3	11	84	3	0	2	14	80
Used alternatives to plastic bags when doing the grocery shopping	Part 1	14	16	37	17	16	12	18	29	20	22
	Follow-up	9	17	42	22	10	15	8	29	27	21

N = not at all, R = rarely, S = sometimes, F = frequently, A = always. Onsite: Land $n =$ between 158 and 160, Boat $n =$ between 117 and 120. Follow-up (6–8 months later): Land $n =$ between 165 and 177, Boat $n =$ between 122 and 126. Numbers in tabulation refer to percentages. *Standardized residuals significant at $p < 0.05$.

Table 4

The Frequency With Which Part 1 and Part 2 Respondents Stated That They Would Do Five Activities Directly Related to Whales or Other Wildlife More Than They Already Do Now as a Result of Their Whale Watching Experience and the Frequency With Which Follow-Up Respondents Stated They Had Performed These Activities in the 6–8 Months Since Their Onsite Survey

Activities	Whale-Watching Platform	Yes, I Will Do This More Than I Already Do Now as a Result of my Whale-Watching Experience: Before (Part 1 or Part 2)		I Did This Activity “Sometimes,” “Frequently,” or “Always”: 6–8 Months After (Follow-Up)
Pick up litter that may be harmful to wildlife	Land	49%		94%
	Boat	59%*		95%
Tell people about whales generally	Land	54%		64%
	Boat	70%*		80%*
Tell people about whale conservation	Land	33%		38%
	Boat	48%*		46%
Find out more information on whales	Land	46%		40%
	Boat	50%		51%
Find out more information of other wildlife	Land	28%		70%
	Boat	31%		76%

Onsite (i.e., Part 1 or Part 2): Land *n* = between 1,311 and 1,331, Boat *n* = between 858 and 875. Follow-up (6–8 months later): Land *n* = between 169 and 177, Boat *n* = between 119 and 127.

*Significantly greater than land at *p* < 0.05.

effect on the frequency with which whale watchers told people about whales generally. Follow-up respondents were more likely to “sometimes” or “frequently” tell people about whales generally than the 2005 onsite group (Table 5).

Boat-based whale watchers told people about whales generally more frequently than land-based

whale watchers [$\chi^2(4) = 13.43, p = 0.009, n = 299$]. There was no difference between how often boat-based and land-based whale watchers performed the other four activities after their whale watching experience (Table 4).

The median environmental rating for follow-up participants was 17 (*n* = 288, IQR = 4). High envi-

Table 5

The Frequency With Which Boat-Based Whale Watchers, Surveyed in 2005 Only, Stated That They Currently Performed Five Activities Directly Related to Whales or Other Wildlife and the Frequency That Boat-Based Follow-Up Respondents Stated That They Had Performed These Activities Since Their Onsite Survey

Activities	Survey	Boat-Based Whale Watchers					Chi-Square Test Statistics		
		N	R	S	F	A	<i>n</i>	<i>df</i>	χ^2
Pick up litter that may be harmful to wildlife	Part 1	4	5	30	32	30*	266	4	47.72
	Follow-up	4	1	37	45	13	126		
Tell people about whales generally	Part 1	20	35*	30	9	6	266	4	55.35
	Follow-up	13	7	53*	25*	2	125		
Tell people about whale conservation	Part 1	29	40*	18	9	4	265	4	54.02
	Follow-up	46*	9	39*	6	1	125		
Find out more information on whales	Part 1	18	32*	38.5	9	3	265	4	41.84
	Follow-up	41*	8	41	10	0	123		
Find out more information of other wildlife	Part 1	11	21*	38	25.5	4.5	267	4	29.505
	Follow-Up	22*	2	44	29.5	2.5	122		

N = not at all, R = rarely, S = sometimes, F = frequently, A = always. Numbers in tabulation refer to percentages.

*Standardized residuals significant at *p* < 0.05.

ronmental raters were defined as those with a rating above this median, those with an environmental rating below the median were defined as low raters. Follow-up participants' responses from their onsite survey relating to behavioral intentions was cross-tabulated with their environmental rating. There was no significant difference in the behavioral intentions of low environmental raters and high environmental raters with the exception that high environmental raters were more likely to state they will donate to and/or be actively involved in helping an environmental organization as a result of their whale-watching experience [$\chi^2(2) = 7.84, p = 0.020, n = 246$].

Educational Brochure

Three hundred and thirty-three boat-based whale watchers were given the researcher's educational brochure with their survey. Forty-six percent read part of the brochure on the trip and stated they would read the rest later; 40% did not read any of the brochure on the boat trip but stated they would read it later. Only 12% read the entire brochure during the cruise. Most people (77%) stated they would keep the brochure for future reference. Fifty-four percent stated they would show the brochure to others.

Respondents were asked to tick the section of the brochure they thought was most helpful in improving their knowledge of whales. Because some respondents chose more than one response, the values sum to >100%. Most people found that the whale facts and information on whale migration were most helpful (69% and 66%, respectively). Fifty-two percent thought that the information on threats to whales was most helpful in improving their knowledge of whales and only 35% thought that section of the brochure on actions to assist in whale conservation most helpful. As a result of reading the entire brochure during the cruise, 69% ($n = 36$) of readers stated they understood the current threats facing whales, 31% stated they will try and do some of the things suggested on the brochure, and 25% stated they will try and do all of them.

Sixty-two follow-up participants received a brochure during their whale-watching trip. Fifty-three of the boat-based follow-up participants stated in their onsite questionnaire that they would read the brochure after the cruise. Six to 8 months later, 60%

of these respondents had read the entire brochure since their whale-watching trip, 38% had read parts of the brochure, and only 2% had not read the brochure. This means that most of the 86% of boat-based whale watchers who stated in their onsite questionnaire that they would read the brochure after the trip would have done so. Based on the follow-up results about 72% (60% + 12% who read it entirely on the cruise) of people receiving the brochure would have read it in its entirety.

In the follow-up sample ($n = 52$), 65% kept the brochure, 13.5% had misplaced it, 17% disposed of it, and 4% stated they did not receive a brochure. Forty-four percent had shown the brochure to other people, 3% stated they intended to ($n = 59$), 54% showed the brochure to their children, 69% showed the brochure to adult family members, 42% showed the brochure to friends and colleagues, and 15% showed it to other people including grandchildren, students, and overseas visitors.

In a sample of 58 respondents, 53% stated they had done some of the things the brochure suggested, 40% stated they had not done anything the brochure suggested, and 7% stated they had done all of them.

People who received the brochure did not state they learned any more about whales than those who did not receive the brochure [$\chi^2(2) = 0.02, p = 0.989$; no brochure: mean = 2.35, SE = 0.07, $n = 62$; brochure: mean = 2.35, SE = 0.08, $n = 55$]. People who received the brochure did not differ in whether they wanted more information on whales from those who had not received the brochure [$\chi^2(2) = 0.05, p = 0.819$; no brochure: mean = 1.43, SE = 0.07, $n = 60$; brochure: mean = 1.45, SE = 0.07, $n = 55$].

Discussion

Whale-watching experiences can improve visitors' knowledge about whales (Neil, Orams, & Baglioni, 2003; Orams, 1996). However, neither of these studies tested knowledge retention with a follow-up survey. This study shows that this increase in knowledge is short lived. Boat-based whale watchers were more knowledgeable about whales immediately after their whale-watching trip, but when tested 6–8 months later their knowledge level was back to where it was prior to the whale-watching experience. The information they were most likely to forget was that learned during their whale-watching experience.

Orams (1996) emphasized the value of a structured education program but the findings of this study indicates that whale-watching experiences with a simple structure containing few conservation themes can still have a positive impact on whale watchers' behavior. Most boat-based whale watchers conveyed general information about whales to others as result of their experience. Many people picked up litter that may be harmful to wildlife once they returned home. However, as there are no data on the frequency with which land-based whale watchers did these activities prior to their whale-watching experience, caution needs to be taken when interpreting the results. The much higher proportion of people picking up litter 6–8 months after watching the whales than what they stated they would as a result of their experience may mean that some of these people were going to do this activity regardless of their whale-watching experience. This seems to be the case for boat-based whale watchers.

Land-based and boat-based whale watching also seemed to play a positive role in encouraging more people to get involved in whale watching with most people recommending it to others. The experience did not generally encourage people to tell others about whale conservation and it seems to have done little to influence the rate at which whale-watching participants conducted environmentally friendly behaviors not directly related to whales or other wildlife in their daily lives.

Likewise, the educational brochure that was handed out to boat-based whale watchers during the second year of the study had no effect on the frequency with which whale watchers conducted environmentally friendly behaviors after they returned home. Even so, the brochure succeeded in raising awareness of whale conservation with most people stating that after reading the brochure they understood the current threats facing whales. Furthermore, more than half of whale watchers who read the brochure thought that the information on threats to whales was helpful in improving their knowledge of whales.

General attitudes are not always consistent with more specific attitudes and so they may or may not be consistent with specific behaviors (McCleery, Ditton, Sell, & Lopez, 2006). For example, just because a group of people have a specific interest in the conservation of whales does not mean that this

attitude extends to that of protection of the environment in general and vice versa. What is not clear yet is whether an improvement to the quality of interpretation offered to whale watchers could change the general attitudes and in turn behaviors of participants. The conservation messages of the brochure were rarely reinforced in the information given to whale watchers by the crew of the whale-watching vessels. If it had, a greater effect on the behaviors of whale watchers who received the brochure may have been detected.

Most participants who received the brochure kept it and almost all of them read parts or all of it after the cruise. Forty-two percent showed the brochure to others. Because whale watching can increase awareness and appreciation of whales by getting people to talk to others about what they have learned, a brochure can facilitate this process. The brochure is something that people can show to others and they can refer to it after the initial whale-watching experience.

The boat-based experience, which provided more structured education, was more successful at promoting environmental appreciation than the land-based experience. Out of the two whale-watching groups, boat-based whale watchers were more likely to state that their whale-watching experience would result in them becoming more environmentally friendly upon returning home. However, the results from the follow-up survey indicate that their intentions did not follow through to action. There was no change in the rate at which they carried out the six environmentally friendly behaviors canvassed 6 months after their whale-watching experience. These findings are consistent with Beaumont (2001), who demonstrated that interpretation during an ecotourism experience that is predominantly knowledge based and involves few sensory, message-based, or participatory techniques (like the interpretive styles used here) can increase environmental knowledge and will be seen by participants to influence their conservation views and behavioral intentions. However, despite their intentions, no changes in environmentally friendly behaviors or attitudes were detected once they had returned to their daily lives. [Beaumont \(2001\)](#) also found the least proenvironment group was the most likely to say that their visit had influenced their conservation views and behavioral intentions. However, in this study there was no difference in the environmental

attitudes between the two groups of whale watchers (as indicated by their environmental rating).

While the current interpretation onboard whale-watching vessels in southern NSW and at Cape Solander contains some elements of a good interpretation program, they both lack structure, there are no clear conservation objectives, and, in their current form, they result in limited improvement in knowledge and conservation behaviors of whale watchers in the long term.

This raises the question as to whether this form of wildlife tourism is ecotourism. Ecotourism is defined by the Australian National Ecotourism Strategy as nature-based tourism that involves education and interpretation of the natural environment and is managed to be ecologically sustainable (Alcock, Jones, Lane, & Grant, 1994) and by Ecotourism Australia as ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation, and conservation (Ecotourism Australia, 2006). The requirements for education and a contribution to conservation distinguish ecotourism from other forms of nature-based tourism. Ecotourism must also be sustainable. Under Higginbottom's (2002) criteria for wildlife tourism to be sustainable it must not cause the wildlife population(s) to decline and if the population may be declining due to other causes, the activities should contribute positively to its conservation.

Although there is no evidence of Australian humpback whale populations declining (in fact there is evidence to the contrary by [Paterson, Paterson, & Cato, 2004](#)), they are a recovering population listed as vulnerable under the Environment Protection and Biodiversity Conservation Act 1999. The threats facing their recovery are many, including pollution (noise, chemical and physical), deliberate hunting, harassment by commercial and recreational boats, collisions with large vessels, and prey removal. Educating whale watchers on minimizing these threats is one step in ensuring that whale watching is a sustainable form of wildlife tourism. Thus, for whale watching to be justified in an ecotourism context as being a positive activity for whales and their conservation, interpretation at these sites must be improved.

Successful interpretation in a wildlife tourism setting needs to bring about an intellectual and emo-

tional connection between humans and the wildlife they are viewing. Seeing whales in their natural environment can be a powerful emotional experience but, as Bierman (2002) noted, without a framework within which to support and expand on the experience its potential long-term benefits might be lost. Ways to create successful interpretation have been well documented (e.g., [Ham, 1992](#); [Ham & Weiler, 2001](#); [Higginbottom, 2002](#); [Oliver, 1992](#)). It is important that tour guides at whale-watching sites are appropriately trained in how to best utilize education techniques in order to deliver quality interpretation. A successful interpretation program must have a clear set of objectives and be planned in such a way that these objectives are being met ([Higginbottom, 2002](#); [Kimmel, 1999](#)).

Models for effective interpretation in marine tourism have been developed by [Forestell and Kaufman \(1990\)](#) and [Orams \(1995\)](#) and applied by [Forestell \(1993\)](#) to whale watching in Hawai'i and by [Orams \(1996\)](#) at the Tangalooma Dolphin Resort. Participants in the education program at Tangalooma were more likely to find out more information on dolphins, remove beach litter, become more involved in environmental issues, and make a donation to an environmental organization upon their return home ([Orams, 1996](#)). Thus, [Orams's \(1995\)](#) model for effective interpretation is recommended for whale-watching vessels in southern NSW and at Cape Solander.

Following implementation, the interpretive program should be evaluated to determine whether it is meeting conservation objectives in both the short and long term and contributing positively to the sustainability of the industry. If successful, this type of program should be implemented across the entire NSW coast as most whale-watching operations in NSW are utilizing very few interpretative techniques onboard their vessels (Stamation, unpublished data). This would be best achieved by incorporating training for operators, crew members, guides, and naturalists into a state, or even, national accreditation program for whale-watching operations.

An internationally recognized ecotourism accreditation program "EcoCertification" already exists in Australia (Ecotourism Australia, 2006). However, sustainable management of whale watching would be best served by developing a specific program

aimed at certifying responsible whale-watching operations. One of the benefits of such a program would be consistent and accurate information for whale watchers. As well as the provision of high-quality interpretation, certification should also require the demonstration of best practices when watching whales (e.g., operators' knowledge of and adherence to current state and national whale-watching regulations and guidelines) and may also acknowledge operators' contributions to conservation and research. Ongoing monitoring of the accreditation program would be necessary to ensure that the educational and conservation goals are being met. Promotion of the accreditation program, which highlights its merits and certification criteria, is crucial. Raising awareness among tourists and creating a demand for responsible whale-watching tours will help achieve widespread adoption of the program.

It is the responsibility of all stakeholders to ensure that whale watching in NSW can be accredited as an ecotourism experience that minimizes its negative impacts while maximizing the benefits to whales. To help achieve this, interpretation during whale-watching experiences must be improved. Commercial operators should benefit from implementing interpretation programs by giving their customers a more satisfying experience. If done well enough, then the interpretive program can become an attraction in itself, especially to school groups.

Ultimately the aim of the interpretation program is to promote conservation and protection of whales and this should be consistent with the operators' objectives to protect their wildlife attraction in order to ensure that their business is sustainable in the long term. Government agencies with the responsibility of managing the industry and the areas within which whale watching occurs will also benefit from improvement to interpretation programs. Education can be used as a tool for management by increasing conservation awareness and allied attitudes and behaviors and can be a successful way to lessen inappropriate behavior onsite (Ham & Weiler, 2001; Orams, 1994; [Orams & Hill, 1998](#); [Meinhold, 2003](#); Orams, 1999; [Reynolds & Braithwaite, 2001](#)).

Conclusion

Whale watching on the coast of NSW, Australia has the opportunity to acquire more educational and

conservation value. Currently whale watchers are not retaining the information learned while whale watching and the experience is having a limited impact on whale watchers' behavior upon returning home. Interpretation that promotes awareness of conservation values and ultimately leads to positive behavioral changes of whale watchers is one step in ensuring the whale-watching industry develops into a true form of ecotourism.

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