MANAGING MARINE TOURISM RESOURCES AND EXPERIENCES: WHALE SHARKS (RHINCODON TYPOS) IN NINGALOO MARINE PARK, WESTERN AUSTRALIA

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Abstract: The whale shark (Rhincodon typus), the largest fish in the ocean, is a docile animal with which snorkellers and divers can interact at close quarters when the opportunity arises. Since 1993 Ningaloo Marine Park, on the coast of Western Australia, has become world famous as the only known, readily accessible place where whale sharks congregate in significant numbers. This congregation occurs for only about eight weeks from March to May each year. Concomitantly, a tourism industry, based on the 'whale shark experience,' has developed. The management of this industry is evolving as tourism operators and the park managers gain experience in managing tourists, the park, and the animal. The development of the industry is outlined in the paper, while aspects of the management of the industry, the whale sharks, and the experience of those who dive with the sharks, are addressed. The place of whale sharks in marine tourism in the Ningaloo Marine Park area is also briefly described. Because Ningaloo Marine Park is in an isolated location, because of the seasonality of the industry, and because the industry is confined to a marine protected area that is managed by a government agency, the opportunity exists to manage on a sustainable basis and to avoid adverse impacts on the sharks. Issues such as separation distances between divers and sharks, congestion amongst divers, and the potential of management strategies based on a combination of regulation and economic instruments are addressed in the paper. The extension of lessons learned in the management of the industry to other areas is also considered.

Keywords: marine tourism, management, economic instruments, sustainable tourism, crowding

Introduction

There is a high and increasing level of interest in marine tourism and recreation. Davis and Tisdell (1995) noted the increasing use of marine areas such as Australia's Great Barrier Reef, near-shore areas in the Caribbean and Florida and, increasingly, in locations like the Pacific island nation, the Republic of Palau. Davis and Tisdell, along with Dixon (1993) also discussed the growth in recreational SCUBA diving and the use by this recreational industry of important marine protected areas (MPAs).

In this paper a unique marine recreation experience is described—that of swimming with whale sharks in Ningaloo Marine Park, Western Australia. The history and features of Ningaloo Marine Park are outlined and placed within a geographic context. Other features of marine tourism in the area are discussed also, as well as other nearby nature-based attractions of the region in which the park is located. Various management issues are discussed, and selected results of recent surveys of users presented. These results relate to economic and experiential aspects of 'the whale shark experience.'

The underlying theme in this paper is the importance of managing the whale shark resource in Ningaloo Marine Park. Such management is important to ensure that the resource is used in a sustainable fashion, that visitor experiences are not adversely impacted by overuse or inappropriate visitor behaviour, and that negative externalities, such as impacts on the health and behaviour of the sharks, are avoided. Additionally, and as a component of sustainability, the viability of commercial charter operations must be considered in management approaches.

North West Cape

North West Cape is situated some 1,200 km north of Perth, the capital of Western Australia (Figure 1). There are only two townships in the region, Exmouth and the settlement of Coral Bay. Exmouth Shire1 is totally within the region, while a portion of Carnarvon Shire is included in the southerly parts of the Cape. The relative isolation of the area is reflected in the fact that Exmouth Shire covers 5,764 km², has a population of 3,823 (1991 census figures), less than 700 dwellings, around 470 ratepayers, and only 70 km of sealed roads (information provided by Exmouth Shire, 1993). Exmouth is 1,270 km by road from Perth. Coral Bay comprises two caravan parks, a hotel, a small shopping centre and a small number of houses. The region is serviced by Learmonth Airport, 35 km south of Exmouth. Because of the provision for military use the runway is able to cater for aircraft up to 747 size.

Reference to Figure 2 shows that much of the Cape is managed under pastoral leases, with sheep grazing in an arid or semi-arid zone being the predominant agricultural industry. Additionally, the Cape Range National Park, established in 1964, adjoins the coastline for 55 km, includes a narrow coastal plain and a large portion of the Cape Range which forms the spine of the Cape Range Peninsula (CALM, 1989). Other areas are reserved as defence land due to the presence of a Naval Defence facility in the area, while smaller areas are reserved as town site areas at Coral Bay and Mauds Landing in the south of the Cape. Two recreation reserves and various special leases also exist in the Cape region.
Ningaloo Marine Park adjoins the Cape for 260 km, and extends from the high water mark (except for an area of defence land at the head of the Cape where it extends from the low water mark) to geographical co-ordinates approximately 10 nautical miles offshore (CALM, 1989). Ningaloo Marine Park was declared in 1987 with a principal aim "to provide for conservation of the marine environment with recreational use [allowed] to the extent that it is compatible with conservation of its natural environment" (CALM, 1989, p. 1).

Tourism in the Economy of the North West Cape Region

The economy of the North West Cape region is based on pastoralism, fishing, defence and tourism. Pastoralism is, as previously noted, based mainly on the extensive grazing of sheep.

Defence activities previously related principally to the operations of the U.S. Naval Communications Station where staff numbers have since been significantly reduced (Exmouth was founded in 1967 as a support town for the naval station). Commercial fishing is based on prawn trawling from Karris Fisheries, just to the south of Exmouth in the Gulf. This industry operates exclusively in the waters of Exmouth Gulf. During the season approximately 800,000-1,500,000 kgs of prawns are harvested by Karris Fisheries.

Tourism is the growth industry of the North West Cape region. Data on tourism specifically to the Cape are not available, although an indication of visitation can be obtained by a review of certain other data. The Western Australian Tourism Commission collects data on a regional basis, with North West Cape included in the Gascoyne Region which extends from the Cape to Carnarvon, some 374 kms south of Exmouth. The region also extends around 700 kms inland. The Gascoyne Region includes the attractions of Shark Bay and Monkey Mia, the latter known for the bottlenose dolphins that enter the shallows of the bay to take fish from humans (CALM, 1993). This interaction between humans and dolphins is undoubtedly the Gascoyne Region’s best-known attraction. According to the Tourism Commission, around 222,000 visitors travelled to the Gascoyne in 1994–95, with 76% of these visitors being from Western Australia, 15% interstate, and 10% overseas (Western Australian Tourism Commission, 1995). Approximately 84% of visitors listed "pleasure/holiday" as their reason for travelling to the region.

An indication of the number of visitors to Exmouth is shown in Table 1. Two aspects of the data presented are notable. First, there was a noticeable increase in numbers in 1992 and 1993, although numbers then declined slightly in 1994 and 1995 (even taking account of the December figures for 1995 not being available). The reasons for the recent declines are not clear. Second, and more importantly, the seasonality of visitation is shown in Table 1. This seasonality occurs because of the climate of the area, with winter days typically being in the mid-20°C, while the summer period is typified by very hot days and, periodically, cyclonic conditions. Jones Lang Wooton (1993) noted that the period November to April has low visitation rates "mainly due to climatic conditions." The Exmouth office of the Department of Conservation and Land Management (CALM) estimate that more than half of all visitors to Exmouth visit the Cape Range National Park and/or Ningaloo Marine Park (Jones et al., 1993). While data are not available, it appears that many visitors to the North West Cape region are "meanderers" on long-term trips, with many of these escaping the cooler winter months to more southerly locations. The peak in visitation in July coincides with mid-winter, and with school holidays. Many visitors are caravanners and campers, as indicated by the fact that, in Exmouth Shire, there are approximately 500 hotel/motel bed spaces, but more than 600 chalets and on-site vans, along with 1,400 caravan and camping sites. Furthermore, 77% of travel to the region is by private vehicle, and the most frequently used form of accommodation is caravan parks (28%) (Jones et al., 1993).

Reference to Table 1 shows also that visitor numbers increased significantly in April and May from 1993. This was the first year of dedicated whale shark charters, and the increases may be related to the development of this tourism attraction.

Marine Tourism

Marine tourism is a focus of activities at many times through the year in the North West Cape area. Recreational fishing has long been popular in the area and that popularity continues today. The Western Australian Department of Fisheries estimated in 1992 that recreational anglers took more than 100,000 kgs of fish from Ningaloo Marine Park and its nearby waters. In survey work undertaken by the Department of Fisheries in 1989 it was found that close to 80% of all visitors to the North West Cape region participated in recreational fishing (O'Donoghue, pers. comm.). The Department has expressed some concern about the sustainability of recreational fishing and now has a range of size and bag limits in place.

The waters around North West Cape are the only place in the world where all three species of marlin—the black, blue and striped marlin—are found. Consequently, big game fishing is popular, and seven Exmouth-based charter vessels cater for both recreational angling and big game fishing.
Table 1: Exmouth Visitor numbers

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<td>January</td>
<td>3937</td>
<td>3692</td>
<td>4482</td>
<td>6397</td>
<td>5164</td>
<td>5517</td>
</tr>
<tr>
<td>February</td>
<td>2884</td>
<td>2716</td>
<td>2605</td>
<td>4264</td>
<td>3640</td>
<td>3633</td>
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<tr>
<td>March</td>
<td>3255</td>
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<td>2908</td>
<td>5686</td>
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<td>6140</td>
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<td>7567</td>
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<td>8534</td>
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<td>May</td>
<td>5512</td>
<td>7082</td>
<td>9638</td>
<td>7817</td>
<td>7526</td>
<td>8043</td>
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<td>18122</td>
<td>18513</td>
<td>19884</td>
<td>18020</td>
<td>18495</td>
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<tr>
<td>August</td>
<td>15989</td>
<td>12330</td>
<td>14689</td>
<td>15856</td>
<td>15421</td>
<td>13682</td>
</tr>
<tr>
<td>September</td>
<td>9900</td>
<td>9563</td>
<td>12633</td>
<td>10011</td>
<td>11399</td>
<td>9813</td>
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<td>October</td>
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<td>9373</td>
<td>12492</td>
<td>10358</td>
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<td>November</td>
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<td>4393</td>
<td>6232</td>
<td>5768</td>
<td>5614</td>
<td>5064</td>
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<tr>
<td>December</td>
<td>3878</td>
<td>4155</td>
<td>6843</td>
<td>5928</td>
<td>6094</td>
<td>n.a.</td>
</tr>
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Totals     | 90195| 89939| 107896| 111177| 106091| (98678)

Source: Exmouth Tourist Bureau Inc.
Notes: (a) the total for 1995 is for 11 months. (b) The figures shown are visitor numbers through the door of the Exmouth Tourist Bureau. The Bureau's manager suggested that 25 percent should be subtracted from the figures to obtain "a more accurate reflection of actual visitor numbers" (because of double counting).

Table 2: Incomes of Survey Respondents (SAUD, 1995)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min.</th>
<th>Max.</th>
<th>Sum</th>
<th>n</th>
<th>Median</th>
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<td>Personal Annual</td>
<td>51,888</td>
<td>75,252</td>
<td>3,800</td>
<td>1,000,000</td>
<td>13,906,098</td>
<td>268</td>
<td>38,000</td>
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<tr>
<td>Income (single)</td>
<td></td>
<td></td>
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<tr>
<td>Family Annual Income</td>
<td>127,088</td>
<td>137,242</td>
<td>7,000</td>
<td>1,000,000</td>
<td>15,504,745</td>
<td>122</td>
<td>90,000</td>
</tr>
<tr>
<td>Australian Mean</td>
<td>28,288</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>12,000-</td>
</tr>
<tr>
<td>Single Income ¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16,000</td>
</tr>
<tr>
<td>Australian Mean</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>25,000-</td>
</tr>
<tr>
<td>Family Income ¹</td>
<td></td>
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<td>30,000</td>
</tr>
</tbody>
</table>

Recreational fishing has become a focus of tourism activities in the Exmouth region, with three fishing competitions featured in the area's list of annual events. In April, the “Billfish Bonanza”—a tag-and-release sailfish and marlin competition—occurs, with up to 30 local and visiting deep sea fishing vessels being involved. The “Ultra Light Tackle Game Fishing Tournament” is held in August, while in late October or early November the “Gamex” fishing tournament for all classes of fish, occurs.

Humpback whales (*Megaptera novaeangliae*) are a regular sight in the waters of the region in the July to November period as they migrate north. The whales are found on both sides of the Cape, often resting in the shallower gulfs waters before commencing their migratory trip to the southern oceans. Additionally, large pods of manta rays (*Manta alfredi*) are regularly sighted nearby to Ningaloo Reef in the June to November period. While both these attractions are listed by the Exmouth Tourist Bureau as “Events in Exmouth,” there has been little development of whale watching or swimming with manta rays specifically as commercial tourism ventures. These activities tend to be on an opportunistic basis, although there is some apparent interest in developing charter operations for whale watching (Myers, pers. comm.).

Finally, Exmouth is advertised as “the diving capital of the west,” mainly because of the access to Ningaloo Marine Park which includes the largest fringing barrier coral reef (Ningaloo Reef) in the world (CALM, 1989). Bundegaq Reef and the Navy Pier, both within the Gulf, along with the Muiron Islands to the north-east of the Cape, are also attractive and popular diving locations which may be accessed from Exmouth. It is estimated that Ningaloo Marine Park contains 220 species of hard and soft corals and up to 500 species of fish (CALM, 1988). As noted above, pods of giant manta rays are common during the winter months, while species popular with divers, such as giant potato cod (*Epinephelus tukula*), are also found at various dive sites. Consequently, Ningaloo Marine Park has much to offer recreational SCUBA divers. While diver numbers are not available, the manager of the Exmouth Dive Centre noted that there are very few divers in the summer months, that numbers increase dramatically in the whale shark season (described below), and that a second peak occurs in the July school holiday period. Prior to 1996 one specialist dive centre operated in Exmouth, and one also operated in Coral Bay. In 1996 three specialist operators were advertising in Exmouth, a second operation had been opened in Coral Bay and a third is planned. Additionally, five other charter operators run periodic dive trips to the reef, while coral viewing via a semi-submersible vessel provided by an Exmouth-based operator.

Reference to the data in Table 1 does not show exactly how important marine-based tourism is to the Exmouth and North-West Cape region, but clearly it is very important. Consequently, the sustainability of tourism in the area relies to a large extent on sustaining the marine resources on which it is based.

**Whale Sharks in Ningaloo Marine Park**

It is clear that marine-based tourism is important in the North-West Cape region. However, Exmouth has become internationally famous amongst the recreational diving fraternity in recent years because of the discovery of large numbers of whale sharks in the waters of Ningaloo Marine Park.

The whale shark is a docile animal with which snorkellers and divers can interact at close quarters when the opportunity arises. Since 1993 Ningaloo Marine Park has become world famous as the only known, readily accessible place where whale sharks congregate in significant numbers. This congregation occurs for only about seven or eight weeks from March to May each year. Comcomitantly, a tourism industry, based on the whale shark experience, where divers may swim (usually on snorkel rather than SCUBA) with the sharks, has developed. The management of this industry is evolving as tourism operators and the park managers gain experience in managing tourists, the park, and the animal. An important characteristic of the industry is that it is confined to the marine park because that is where the animals are known to gather, and also where they are most accessible.

The whale shark is the largest fish in the ocean, most commonly being four to 12 m in length, and thought to grow to a length of 18 m (Kamieczewicz, unpub.). While a true shark, the whale shark is a plankton feeder which, consequently, spends lengthy periods of time close to the surface of the water. It is also a docile animal and one with which divers and snorkellers can interact at close quarters, sometimes for quite long periods of time.

Very little scientific information is available on whale sharks. For example, there is almost no information on their migratory patterns and breeding behaviour (Taylor, 1990). However, since the early 1980s whale sharks have been known to congregate in the waters of Ningaloo Marine Park (Taylor, 1990). Lent (1995) noted that Ningaloo Marine Park is the only readily accessible place known where whale sharks can be counted on to appear annually in large numbers. It is thought that between 200 and 400 whale sharks, mostly juvenile males, spend time in the park, principally from mid-March to mid-June.

Some attention has been paid to the biological aspects of the management of whale sharks in Ningaloo Marine Park. For example, shark sighting data and information on contacts with sharks have been collected by CALM and
other researchers. Following one such study, Osborne and Williams (1994) observed:

Although estimates of the proportion of fish in contact provide a guide for managers, difficulties in determining appropriate licence numbers remain until there is a clear understanding of a) the levels of harassment associated with different fish contact rates, b) the occurrence of peak and shoulder periods, and c) the relationship between vessel numbers and fish contact rates during both peak and shoulder periods.

These are valid points. However, in a recent report recommending a representative marine reserve system for Western Australia (Marine Parks and Reserves Selection Working Group, 1994), it was stated that marine protected areas are intended to contribute not only to the maintenance of biological diversity (and other conservation values) but also to a sustainable and enjoyable environment. That is, recreational values are considered as being important, although they should be compatible with the ongoing protection of natural values. Consequently, management considerations need to take account of human values as well as the biological values emphasized by Osborne and Williams. This, of course, may present a potential dilemma to management agencies such as CALM as they seek to balance alternative uses of a natural resource. But it does drive home the point that these other values need to be considered when questions such as limiting the number of licences in activities such as whale shark viewing are being considered. Interestingly, in other work Davis and Tisdell (1995) suggested that, in many cases, it will be human and recreational values which impose a greater constraint on the use of marine resources than will biological considerations.

In summary, biological data are critical to decisions about the management of the whale shark industry, but so too are data and information on the recreational aspects of the industry, particularly the expectations and experiences of users and their willingness to pay for a quality experience. Furthermore, the ability of the operators to provide that experience within the confines of the present management system, infrastructure, and financial constraints, must also be considered in decisions about management of the resource. At present, however, these types of information are not generally available to either charter boat operators or CALM.

Commercial Activity in the Industry

While occasional voyages to interact with whale sharks had been run by an Exmouth dive charter operator in the early 1990s, the whale shark tourism industry only began in earnest in 1993. During that season approximately 1,000 charter boat passengers interacted with the sharks, with up to 14 charter boats and five spotter planes catering for those visitors (Jones Lang Wooton, 1993). The number of divers increased to nearly 1,800 in 1994, and exceeded 2,000 in 1995, while the number of charter operators remained stable. While whale shark divers constitute less than two percent of total visitors to Exmouth, they extend the "tourism season" into March, thereby adding to economic activity, particularly in the accommodation and boat charter sectors. Furthermore, these tourists tend to be at the "top end" of the tourist market in Exmouth, generally staying in hotel style accommodation, and usually spending substantial amounts of money on the whale shark experience. Reference to the data collected in the 1995 survey indicates that these visitors spent, on average, close to A$3,100 on their visit to Exmouth. Around one-third of this expenditure related to food, accommodation and snorkeling/diving in the region. Close to half of the total expenditure was, however, devoted to air travel and package costs, suggesting considerable income leakages from the whale shark industry.

In addition to swimming with whale sharks, close to 99% of the visitors who responded to the survey in 1995 went diving at other sites in the North-West Cape region. Similarly, most participated in other recreational activities such as four wheel drive tours and other visits to national parks. Consequently, while the whale shark icon was the main attraction, most visitors took the opportunity to take part in other activities. The flow-on effects from the whale shark industry to general tourism in the area are, therefore, important.

The majority of commercial vessels operate through Tanjilbardi Passage at the northern end of Ningaloo Reef (Figure 2). Spotter planes are used to locate a whale shark and the mother ship is guided towards it by radio until the skipper is in visual contact. Swimmers enter the water in front of the animal (license regulations stipulate that swimmers enter the water a minimum of 30 m from the shark) either directly from the mother ship or from its inflatable tender. Most of the animals at Ningaloo are observed cruising along the reef front, at or near the surface. The interactions between whale sharks and visitors are, therefore, subject to Indian Ocean swells and although the reef slope is occasionally visible to swimmers, encounters are often in deeper water.

The season is very short, with the first charter voyages in 1995 commencing on 26 March and the last occurring on May 24 (although occasional "one-off" charters occurred outside these dates). While the peak of activity occurs during April, the season is effectively only about seven weeks in duration. Coupled with a maximum of 15 operating licences and strict controls over the number of divers allowed in the water at any one time, this means that the experience is available only to limited numbers of
divers. It is also an expensive experience because of the isolation of the area and the costs of travelling to it, and because of the high costs of servicing demand (e.g., spotter planes are used by charter operators to find sharks). This results in the daily charter cost of the experience being around A$300 for most of the season.

Management of the Industry

The management of the whale shark industry is the responsibility of the Western Australian Department of Conservation and Land Management (CALM). Whale sharks are fully protected under the Wildlife Conservation Act with additional specific regulation under the Fisheries Act. Additionally, the CALM Act addresses licensing and conditions for commercial operations.

The system for and approach to licensing has evolved since the industry began to develop in earnest in 1993. In 1993 licensing was under the Wildlife Conservation Act, requiring an "Animal Interaction License." Licensing was of vessels rather than individual operators, and no fees, other than a small application fee, were payable. These licences were for one year only and were granted to any and all applicants with the capability to run commercial charters.

In 1994 licenses were issued under the Conservation and Land Management Act, with licensing again being of vessels and, again, being for only one year's duration. In early 1994 CALM announced the imposition of a A$15 per diver per day cost, with that fee payable by tour operators in the industry. The fee was designed to allow CALM to meet the costs of bringing their own vessel, crewed by Wildlife Officers, to Ningaloo Marine Park to monitor the industry. This was an important point in the evolving relationship between CALM and the operators. The operators argued two points. First, the announcement of such a fee only two months from the beginning of the season imposed an extra and unexpected cost burden on commercial operations because their promotion had been completed and many tours pre-sold. Second, they argued that the operators themselves had a vested interest in the sustainable development of the industry and, therefore, that self-monitoring was both possible and desirable. The resulting negotiations led to the imposition of a A$7 per diver per day fee in 1994, a cost that was absorbed by the operators. This also provided the impetus for the operators to develop an industry steering committee to represent their interests when management proposals were to be discussed.

A question which also came under greater scrutiny in 1994 was that of one-year licensing, with operators arguing that this limited tenure did not allow for adequate planning of promotional and other activities, nor did it encourage investment in the industry. Subsequently, beginning in 1995 licences were issued for a three-year period to 13 operators operating through Tantabiddi Passage in the north, and for a one year period for two operators on a trial basis at Coral Bay, towards the southern end of the marine park (Figure 2). Licence holders were required to pay a deposit of A$750 each year, while a charge of A$15 per adult and A$0.50 per child (under 16) came into force in 1995. The deposit is deducted from the total user fees payable in a season, and represents the minimum annual charge payable by operators. Importantly, while the A$15 represents a charge on operators, it is made clear to consumers through the provision to them of a souvenir quality "validation pass" for swimming with whale sharks. Consequently, the charge, which operators presumably try to pass on to users, is made transparent to those users. Furthermore, it is made clear that the money collected via the charge is spent directly in the industry, being committed to management, research and consumer education.

The question of how many operators should be allowed into the industry remains to be resolved. A code of practice, developed in conjunction with the industry, was incorporated into both the Wildlife Conservation (Closed Season for Whale Sharks) Notice 1995 (which carried provision for fines up to A$10,000) and the License Conditions. These regulate the operation of vessels in the vicinity of whale sharks, specifying that when a vessel is in contact with a shark other vessels must stand off a distance of at least 250 m. A vessel may stay in contact with a shark for up to 90 minutes. Other vessels may, however, queue and take over contact with an animal beyond the 90 minute time limit. The licence conditions also limit the number of swimmers in the water with a whale shark to a maximum of 10 at any one time, and prohibit touching, or attempts to touch the animals. In 1995 swimmers were required to maintain a minimum distance of at least one metre from the head or body of a shark and four metres from its tail. They were not allowed to block a shark from its chosen direction of movement, use flash photography, or employ any form of motorised propulsion aid. Following survey work by the authors and colleagues from James Cook University in 1995 (discussed further below), it was recommended that separation distances be changed to a uniform three metres from a shark. Subsequently, in 1996 CALM rules changed the separation distances to three metres from the head and body, but retained the four metre separation—for safety reasons—from the tail.

Data Collection

A pilot survey on certain economic, demographic and managerial aspects of the whale shark industry was undertaken in 1994. At the time of undertaking this survey it was discovered that researchers from James Cook
University, North Queensland, were also planning a pilot study on experiential aspects of the industry. Consequently, it was decided to undertake joint survey work in 1995 and 1996 in order to reduce the questionnaire load on both operators and consumers.

Japanese visitors were identified in 1994 as comprising a large proportion of the visitors. The significant number of Japanese divers relates both to the growth in Japanese tourist visitation to Australia, and to the fact that a major whale shark charter operator specifically targets this market. To cater for these visitors, 400 questionnaires were distributed in Japanese and 1000 in English. Questionnaires were completed either on the boat during the return journey from the whale shark trip, on the bus journey back to Exmouth, or at the dive shop. During the 1995 season this resulted in the return of 464 visitor surveys, an overall response rate of around 23%. The sample included 188 responses from Japanese consumers. Some demographic and economic data are presented below, although the focus in this paper is on particular aspects of management and, therefore, most attention is paid to items of data of most relevance to those aspects. Additionally, the experiential data "belong" to the researchers from James Cook University and are not reported here.

**Demographic Data**

Reference to the data collected showed that, in 1995, 41% of survey respondents were from Japan, 33% from Australia, 13% from European countries and the remainder from the U.S. (2%) and other countries, mainly in Southeast Asia. More than half the survey respondents were in the age bracket between 20 and 30 years, although the mean age was 33 years. The breakdown of the sample was 243 females (53%) and 218 males (47%) (n= 461). This result is at odds with other surveys of participants in recreational diving, with males usually comprising between 65% to 75% of participants (Davis, Banks and Davey, 1996; Skin Diver Magazine, 1993).

A significant number of participants are employed in professional (25%), managerial (7%) and para-professional occupations (12%) (e.g., nurses, fire officers, ambulance personnel, etc.). These three categories account for 181 (44%) of the total of 413 people who responded to the question. More than half of the respondents were employed in occupations requiring some level of post-high school education. The level of formal education was, concomitantly, found to be high, with 262 (72.6%) of the 361 respondents to the education question having a university degree, either at Bachelors or postgraduate level. Even if the 103 non-respondents are assumed to have no formal qualifications, then 56% of the total sample have university qualifications (compared to 27.3% of all Australians between the ages of 15 and 65). A further 90 of the 361 respondents were found to have trade or technical qualifications.

The incomes of this sample of divers are reported in Table 2, where it is shown that the mean single income is almost A$52,000 per annum, while the mean of the combined incomes reported exceeds A$127,000 annually. The existence of a small number of very high or low figures can bias averages upwards or downwards. The range and standard deviations of the incomes reported are shown in Table 2 and, with individual and combined incomes of up to A$1,000,000 being stated, it is almost certain that the average income will be biased in an upward direction. Consequently, median incomes are reported and, as shown, these are also well above Australian average levels. Additionally, as previously discussed, these visitors expend considerable sums of money in a short period of time to swim with whale sharks. Consequently, it might be argued that those who participate in the whale shark experience are both willing and able to pay quite high costs to do so. They might also be generally willing to contribute to the management of the industry and the animals.

**Separation Distances and Crowding**

In 1995 CALM regulations specified that swimmers must not touch whale sharks, that they must remain a metre from the head and body and four metres from the tail, and that no more than 10 swimmers may be in the water at any one time. Responses to the experiential questions in the 1995 survey clearly indicated that the best aspects of visitor's experiences related to the ability to interact with the sharks. Of the respondents, 34 reported physical contact with a shark, despite the potential of a A$10,000 fine. Most, however, indicated that the shark moved towards them (e.g., by turning its head), or that the touch was entirely accidental.

Concomitantly, participants listed crowding as a major area of concern, suggesting that there were too many people in the water, that people in the water interfered with one another, that photography was impeded by the numbers, and that their view of the animal was impeded by other people and by bubbles from their fins.

Because of the potential for crowding problems, respondents were also asked how many people they thought should be in the water at one time. A total of 308 (71%) indicated six or less, with less than 13% considering that 10 participants was acceptable. Some operators avoided crowding by rotating groups of about four people in the water at any one time with a strictly enforced time limit for each. Other operators were reluctant to reduce their group size below 10 due to commercial considerations.
It is apparent that crowding is an issue and that the social carrying capacity was being exceeded under the rules in place in 1995. Consequently, it was recommended to CALM that separation distances be increased to three metres from the sharks' head and body in 1996, a recommendation which was adopted. Even though 10 people are still allowed in the water, keeping those people further from the animal means that the perimeter of the area from which they are excluded is considerably enlarged, and this might have the desirable affect of improving the view of all swimmers and, therefore, of reducing the perception of crowding. It is also likely to reduce the incidence of physical diver contact with sharks. These matters are being investigated again in 1996 in an effort to ascertain the outcomes of the new rules for separation distances.

Managing the Industry

There are at least three management aspects which are of importance in terms of managing the whale shark industry within the context of tourism which is socially, ecologically and economically sustainable. First, the question of the impacts on the sharks themselves is of concern to the management agency and the wider community. These impacts are unclear, but are the subject of monitoring by CALM. Only with the experience of a number of years will such impacts become evident if, indeed, they are important. Examples of possible indicators of impact might include declines in whale shark numbers over a period of a decade or more, health problems in the population, or if the behaviour of the animals begins to change—they become more aggressive or dive as soon as swimmers enter the contact zone.

Second, management needs to balance continued high quality visitor experiences against potential impacts. The analysis of crowding, of the distance between swimmers and whale sharks, and of the effects on visitor experiences in the 1995 season, led to recommendations about swimmer/shark separation distances which have since been adopted by the management agency for 1996. This is a good example of how research can be used constructively to improve regulatory guidelines and maintain the quality of visitor experiences. It is essential that the effects of these changes on both sharks and people are now monitored.

Third, there are questions which relate to the management of the operations of the industry. These include considerations of how many vessels should be allowed to operate, what the licensing arrangements should be, and who should appropriate the economic rent from the use of a natural resource which is a public good. This last issue relates closely to questions about who should pay and who should benefit from the availability of the natural resource in question and has been the subject of considerable discussion (Turner et al., 1994). Many of the generalised problems associated with managing open access goods, which might occur at some dive sites, are unlikely to be experienced in the case of Ningaloo's whale sharks. The figures reported in earlier sections of the discussion indicate that the whale shark experience constitutes a seasonal niche market, and that the isolation of Exmouth drives costs up and keeps visitor numbers down. The industry and the sharks, therefore, have a degree of 'protection,' and there is unlikely to be any pressure for mass tourism activities centred on whale sharks.

Licensing of operators has moved from one year to three year licenses, with the present three year licenses due to expire at the end of the 1997 season. The question of allocating still greater property rights to operators through, for example, selling licenses with no time restriction, might usefully be appraised at that time. Such a system would require that the licenses be transferable, but include provisions that prevent speculative buying of licenses by, for example, forfeiture of unused licenses, along with provisions preventing monopoly holdings of licenses. Such a move would be an extension of the property rights presently afforded to licensees in the whale shark industry.

It is apparent also that there exists a high level of ability and willingness to pay for the experience. Costs such as the A$15 user fee paid by the participants—a fee which is made transparent through the issuing to divers of a souvenir quality validation pass—are unlikely to affect demand at their present level. Furthermore, the fact that the industry is totally centred in a marine protected area means that regulations are relatively easy to enforce and that open access and boundary problems, typical in many natural environments, may be reduced to some degree. For example, even though private vessels are not prevented from placing divers in the water near whale sharks, they must still adhere to the rules for standing off when another vessel is in contact, and to regulations governing such matters as contact time with individual sharks. Private operators, without the support of spotter planes, will also find it difficult to locate and access sharks.

Reference to the foregoing discussion indicates a belief that reliance entirely on regulation is not the best strategy for managing this particular resource. The argument is advanced here that a judicious blend of the use of regulation, self-regulation and economic instruments is a more efficient and effective management approach. It also provides an opportunity for direct contributions by users—both charter operators and consumers—to the management and protection of the natural environment they enjoy. There is an extensive literature on the use of so-called economic instruments in the management of natural resources (e.g., James, 1993; ABARE, 1993, Turner et al., 1994), with the user-pays approach being the most
widely used. The A$15 charge on those who dive with
whale sharks constitutes such a user-pays fee. Economic
instruments such as user fees appear to have been little
used so far in the management of outdoor recreation
resources in Australia and it is difficult to find examples of
their use in marine recreation around the world. ABARE
(1993) and James (1993) identified beach parking charges at
some locations, filming permits and beach bookings, beach
site licences, and performance bonds in the Great Barrier
Reef Marine Park as management instruments relating to
marine recreation. Additionally, Australia’s Great Barrier
Reef Marine Park Authority charges a levy of A$1 per
person for all visitors on commercial vessels in the park
(i.e., private users do not pay the levy), consumers of the
whale shark experience in Ningaloo Marine Park pay a
A$15 user fee, divers in the Julian Rocks Aquatic Reserve
near Byron Bay, eastern Australia, are asked to pay a
voluntary levy of A$1 per dive, and divers in Bonaire
Marine Park in the Netherlands Antilles pay a levy of
US$10 per dive (Dixon, Scra and van’t Hof, 1993).

James (1993) noted that such fees, where they are used, are
not imposed to reduce demand, facilitate rationing of
resource use, reduce congestion, or to minimise resource
degradation—reasons for which fees might be imposed.
Furthermore, user fees have typically not been based on
the recovery of resource rents from the marine sites being
accessed for recreation (Geen and Lal, 1991). In Australia
such fees generally represent an administrative charge
designed to help cover management costs and, in the case
of the Great Barrier Reef, to partially fund research related
to the management and protection of the reef.

Conclusions

Whale sharks are a rare and unique tourism attraction of
some economic significance to Exmouth and the North-
West Cape area. Careful management of this attraction, to
ensure its sustainable use, is paramount. The addition of
whale sharks to North-West Cape’s attractions has
extended the tourism season and brought to the region
additional visitors willing to spend considerable amounts
of money to interact with the animals. These visitors also
take the opportunity to visit other attractions in the region.

Socio-economic research, such as that being undertaken on
the whale shark industry of Ningaloo Marine Park, has a
clear role to play in both defining and refining management
approaches that ensure the sustainable use of attractive
natural resources. The process of research has been
enhanced by such work, whereas reliance on scientific
research is likely to provide a slower (although still
important) route to improved management guidelines and
structures.

Experience in the whale shark industry shows that the aims
of management need to be clearly formulated and
transparent to all stakeholders. The provision of high
quality validation passes, including an explanation of the
costs involved and of the use of the funds collected, are
initiatives adopted by CALM that appear to be well
received by visitors to the area. The fact that the money
collected is specifically earmarked for the industry in
question is a likely strength. These are lessons that could
be applied in other marine tourism pursuits both in other
areas of Australia, including the Great Barrier Reef Marine
Park, as well as other parts of the world.

The nature of the industry in Ningaloo Marine Park opens
up the possibility of imaginative approaches to
management, approaches that might enhance the evolution
of the management of the whale shark experience. Limited
regulation will always be required because of the public
good nature of the resource, while increased self-regulation
and management by the industry—actions which are
already being pursued by industry participants—is both
desirable and necessary if the industry is to provide a model
for marine tourism management. One feature of the
operators at Ningaloo is a very strong willingness to
provide their knowledge and experience to the
development of a high quality management environment.
Continuing recognition of this by CALM will help achieve
compliance with the regulations and the development of
further innovative approaches to management. These
approaches could include incorporation of monitoring
tasks by operators, along with provision of greater property
rights to those operators.

Finally, the survey work presently underway will lead to the
availability of data on a range of matters such as the
willingness of divers to pay for the experience and to meet
the user-pays cost inherent in validation passes. Further
information will be collected on crowding and separation
distances to gauge the reaction to the new management
guidelines, while a range of factors that affect the quality of
the experience will also be analysed.

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**ENDNOTES**

1 "Shires" are the rural local government management areas in regional Australia.

2 One focus of the survey work in 1996 is to ascertain the willingness of participants to contribute to management costs.
THE EFFECTIVENESS OF AN EDUCATION PROGRAM IN MANAGING MARINE TOURISM

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Abstract: Education has long been touted as an answer to managing tourists' impacts on natural ecosystems. However, very little empirical research has tested this assumption. Research in the educational psychology field shows that the link between knowledge acquisition, attitude formulation and behavior is weak. Furthermore, changing human behavior through education is a difficult and complex task. It is therefore apparent that creating environmental education programs which effectively manage tourists' behavior and which result in longer term attitude and behavior change is particularly difficult.

A number of cognitive psychology techniques such as the use of cognitive dissonance and the affective domain are applicable in the marine tourism situation. Through incorporating these into an education program which is specifically designed to prompt environmentally responsible behavior, the ambitious objectives of such programs may be attainable. This paper reports on the testing of this model at Tangalooma, Australia. As this resort tourists regularly feed a group of wild dolphins.

The testing of the model revealed that an increase in acceptance of and compliance with management regulations resulted. Furthermore, it was shown that tourists enjoyment was enhanced, their knowledge increased and a number of longer term behavior changes prompted by the education program. This finding is important for it is one of only few studies which quantify the benefits of education programs in a marine tourism situation.

Keywords: education, marine, tourism, wildlife, dolphins, Tangalooma, management

Introduction

As the rapid growth of coastal and marine tourism has continued an increasing number of cases have shown that there are significant negative impacts on host communities (both natural and human). Many commentators are now critical of tourism development and argue for a cautious approach when managing tourism enterprises associated with the coastal zone (Espeeth, 1993; Miller and Kaee, 1993).

Questions regarding how coastal and marine tourism should best be managed abound and controversy exists in almost every situation where significant tourism development has occurred (for example, Brown, 1991, Johnston, 1990; Mellor, 1990; Ward, 1990). Amongst the many different solutions being advocated, educating tourists so that their behavior is both respectful of and appropriate to the host community remains one of the most popular (Orams, 1994; Forestell, 1993; Kerr, 1991; Beckmann, 1989). Advocates argue that negative impacts can be minimized only if the tourists have the right attitude and behave correctly. The argument continues to propose that the way to ensure these correct attitudes and behavior is through education. However, research in the educational psychology fields reveals that prompting attitude and behavior change is extremely difficult, even when an educational exercise is designed to do this (Gudjon and Thomas, 1991).

The reality is that few tourism operators or management agencies actively use education as a management technique (Beckmann, 1988). Furthermore, of those that do, virtually none have programs which are deliberately designed to prompt behavior change. Consequently, there are some who are suspicious of claims that educating tourists is "the answer." For example, Wheeler (1994, p. 9) states: "Education is seen by many as the way forward for nurturing a 'better' tourism. Dream on."

There has been very little empirical research which has set out to establish what educational techniques are effective. As a result there is little evidence to counter Wheeler's cynicism. However, the argument for education continues to be put forward. There is a need, therefore, to assess how effective education actually is. This paper reports on a study which attempts to do that.

Impacts of Coastal and Marine Tourism

Coastal and marine tourism mirrors the rapid growth of the wider tourism sector (Miller, 1990). An example which is indicative of this trend is the increasing popularity of whale watching (Coughran, 1993; Jeffrey, 1993; Forestell and Kaufman, 1990). Tourism which is based upon the coastal zone and marine envions has impacted host communities and controversy over the negative impacts has ensued. Numerous examples illustrate these concerns and these can be grouped at regional, site specific, species specific and activity specific levels.

At a regional level, locations like the coral reef ecosystems of the Florida Keys in the United States show major negative impacts as a result of increasing tourism. In a dramatic and emotional piece in National Geographic, Ward (1990: 123) is critical of marine tourists:

Their boats pollute the water and everything in it with petroleum products and sewage. Incompetent operators crash into the reefs. They litter the sea with plastic foam cups, aluminium cans, glass, plastic bags, bottles, and miles of tangled fishing line ... Thousands of swimmers
routine bump, scrape, and step on coral ... the cumulative devastation is enormous.

On the other side of the world similar concerns are being expressed about Australia's Great Barrier Reef where reports with titles like "Loving the Reef to Death" (Nelior, 1990) and "How Can Increased Tourism and the Great Barrier Reef Coexist?" (Digance, 1993) have become commonplace.

At a local level, smaller locations which have been subject to significant increases in tourism have resulted in similar responses. For example, in writing about Hawai'i's Hanaua Bay, Burgett (1990, p. 100-101) refers to "Traditional use to modern abuse" and "a reef on the rocks." In the United States Virgin Islands a significant cultural "backlash" against the negative impacts of tourism development has occurred (Johnston, 1990). Hundreds of similar examples from geographically diverse locations exist.

Specific animals which are attractive to tourists have come under pressure as well. For example, Forestell and Kaufman (1990, p. 401) detail the growth of the Humpback whale watching industry in Hawai'i and state:

> Concern has grown in every quarter that the cumulative effect of this activity may threaten the recovery and survival of this endangered species.

Shackley (1990: 316) is less subtle when discussing the plight of the West Indian Manatee which is subject to growing tourist interest. She argues:

> The final nail in the manatee's coffin has probably been provided by the large numbers of tourists now coming to visit them, increasing their levels of environmental stress and decreasing reproduction rates. Anyone who wants to ensure the survival of the species would be well advised to avoid visiting them.

Specific tourist activities are also causing concern. For example, the use of personal watercraft ("jet skis" and "wetbikes") are controversial in many coastal areas (National Oceanic and Atmospheric Administration, 1995; Cuthbert and Suman, 1995). Tourists feeding fish (Stevens, 1980), sharks (d'Oliveira, 1995; Coking, 1995; Crews, 1995), dolphins (Orams, 1995), stingrays (Anonymous, 1994) and other marine wildlife is also widely debated.

In summary, where ever there has been significant growth in coastal and marine tourism there has been a corresponding concern over the negative impacts. A volume of literature now exists which details these negative impacts and it is now widely accepted that tourism must be carefully managed to minimize these negative effects. In contrast to the many reported cases of problems associated with marine tourism, there are few cases which detail successful management responses. There is, therefore, a need to now focus upon developing and empirically testing management solutions.

Management Solutions

Solutions to the problems of tourism impacts have been advocated by a number of authors (Orams, 1994; Boon, 1990; Beckmann, 1988) These management responses can be grouped into four main categories: physical; regulatory; economic; and educational. Physical responses refer to those structures that seek to control tourists' behavior by physically separating them or restricting their movement within the natural environment. Regulatory responses refer to those rules and regulations which seek to control tourists' behavior through threat of punishment for noncompliance. Economic approaches are those which utilize variable pricing techniques to influence behavior. Educational strategies are those that seek to inform tourists and encourage them to voluntarily control their behavior so that it is appropriate to the environment.

Education has received much attention in the ecotourism field and is viewed by some as a critical component of ecotourism experiences (Kerr, 1991; Forestell, 1990). Despite the widespread advocacy for education as a "solution" to minimising tourists' impacts on the natural environment, there have been very few empirical tests of the effectiveness of education programs in controlling tourists' behavior (Beckmann, 1988).

The Potential of Education

Many authors are optimistic about the potential of education programs for tourists (for example, Field and Wagar, 1982; Forestell, 1990; Alcock, 1991; Ham, 1992; Bramwell and Lane, 1993). There is much anecdotal evidence that direct interaction with nature often results in profoundly important experiences where tourists do develop new attitudes and adopt new behavior—in other words—significant learning does occur. The issue arises therefore, in what circumstances is 'environmental learning' likely to occur and what type of educational programme is best suited to maximising learning?

A model originally proposed by Forestell (1993) and further developed by Orams (1996) incorporates a number of strategies which have been identified as powerful tools in the learning process (see Orams, 1996 for a more thorough discussion of these cognitive techniques). This model is shown in Figure 1.

The model identifies five main techniques which can be effective in prompting behavior change in an ecotourism
Figure 1. Components of an education program for tourists (Orams, 1996).

<table>
<thead>
<tr>
<th></th>
<th>Touches /100 feed events</th>
<th>Staff Cautions /100 feed events</th>
<th>Other Inappropriate Behaviour /100 feed events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>6.73 (n = 3,567)</td>
<td>2.62 (n = 3,134)</td>
<td>3.22 (n = 3,102)</td>
</tr>
<tr>
<td>Education Group</td>
<td>1.17 (n = 5,111)</td>
<td>1.23</td>
<td>1.10</td>
</tr>
</tbody>
</table>

\[ z = 13.75 \quad z = 4.65 \quad z = 6.85 \]

Figure 2. Impact of the education program on inappropriate behavior.
setting. These techniques (represented in Figure 1) can be summarized as follows:

- **Cognitive dissonance**—creating questions in peoples' minds. The education program should attempt to arouse participants' curiosity, to get them thinking by offering interesting questions. For example, in the case presented later in this paper questions such as how do dolphins sleep, or what is the biggest enemy that dolphins have are appropriate.

- **The affective domain**—using techniques and stories to involve participants' emotions. Emotional involvement in the subject matter is an effective “short cut” in the learning process. Topics such as birth, death, caring, “life's challenges” all evoke peoples' emotions. It is suggested that by invoking the “affective domain,” program messages are more effectively “internalized” and are more likely to be acted upon.

- **Creating motivation to act**—the program should outline the specific environmental problems/issues or themes that are relevant to the tourism experience. Simple solutions and actions that can be taken to reduce these problems should then be outlined. Specifically, the program should “personalize” the message; "here's what you should do to make a difference."

- **Giving opportunities to act**—finally, the program should actually provide opportunities for people to take action, then and there. Petitions to sign, environmental organizations to join, environmentally friendly products to buy and activities to undertake allow tourists to act on the motivation created by the program. This stage is extremely important; most participants in nature oriented tourism programs have good intentions. However, after they leave, those intentions may not result in changed behavior. By providing opportunities for participants to take action effective behavior change can be prompted “on the spot.”

- **Evaluation and feedback**—an important component of any program is an assessment of its effectiveness and a feedback of the results of this assessment into the planning for the program.

### Methods

An education program which was based upon the above model was developed and tested at Tangalooma Moreton Island Resort in Southeastern Queensland, Australia. This resort has developed a program where tourists are able to hand-feed a group of bottlenose dolphins which regularly visit the waters adjacent to the resort (Orams, 1995). This marine tourism attraction presented an ideal case to test the effectiveness of the education model presented above.

The effectiveness of the program was assessed by comparing the data gathered during the program's operation (the experiment group) with data gathered when the program was not in operation (the control group). Characteristics of the tourists who were not exposed to the program were compared with the tourists who were, in order to assess the validity of attributing data changes to the education. This control experiment design formed the basis of this study.

A jetty adjacent to where the dolphins were fed provided an elevated viewpoint from which the dolphin-tourist interaction could be clearly viewed. An observer was stationed up on this jetty and recorded information on a standardized log throughout feeding sessions. In addition, a video camera was mounted on a tripod on the jetty and each feeding was video taped. This allowed for subsequent review and checking of the data gathered by the observer.

The first part of this study focused upon quantifying “inappropriate tourist behavior,” defined as any tourist behavior which did not comply with the management regulations established by the resort to control the interaction between tourists and the dolphins.

Pilot studies resulted in three main indicators being selected for measurement. Patting and deliberately touching the dolphins was assessed to be the most common inappropriate behavior and this was selected as an indicator to be quantified. The number of cautions, given by a staff member to a tourist, for inappropriate behavior during a feeding session was also selected as a suitable indicator of compliance. Finally, because in the pilot studies no other single inappropriate behavior was common, a general category of “all other inappropriate behaviors” was selected to group data.

Immediately following each feeding session's completion, staff members were interviewed to gather data on perceived problems with the feeding and the "number of cautions" which they made to tourists with regard to inappropriate behavior.

Video records of each of the feedings were reviewed and data on the number of "feed events" (the number of times a person entered the water to feed dolphins), the number of pats or "deliberate touches" and the number of "other inappropriate behavior" was counted and recorded on the log sheet.

An analysis of data gathered from 53 feeding sessions without the formal education component (control) and the data gathered from 118 sessions with the education
component (experiment) was conducted to allow a comparison between compliance under these two different management regimes. The three indicators selected, “deliberate touches,” “staff cautions given” and “other inappropriate behavior” were recorded for each feeding session in both the control and experiment groups. These data were then calculated as a percentage of feed events; that is, the indicators were transformed into a number per 100 feed events. This permitted the comparison of a standardized measure between control and experiment data.

The second part of this study concentrated on assessing the impact of the education program on the degree of agreement with the management regime, and also the enjoyment, knowledge, attitudes and intentions of participants. In order to assess this a self-reply questionnaire was administered to a random sample of tourists in both the experiment (n=317) and control groups (n=308).

The third part of the study assessed the longer term impact of the education program. Respondents from the self-reply questionnaire who agreed, were contacted by telephone within two to three months of their visit to Tangalooma and a short telephone interview was conducted (n=110 for control and 104 for experiment groups).

Responses between the control and experiment groups over the six indicators; agreement with management controls, enjoyment, knowledge, attitudes, intentions and behavior were then compared, primarily using Chi-square analysis.

Results and Discussion

Increase Compliance with Management Regulations

The results of the observations for both the control and experiment groups over the three indicators which were used to test for compliance with the management strategy are presented in Figure 2.

This table shows that there was a significant reduction in the number of touches per hundred feeding events from the control to the experiment group. Similarly, there was a significant reduction in the number of cautions which staff gave for non-compliance from control to experiment groups and the same pattern of reduction occurred for “all other inappropriate behavior.”

The assumption implicit in these tests is that the subjects in both the control and experiment groups do not differ from one another in terms of their predisposition to comply with management policies. Given the large sample sizes in this study this assumption seems reasonable. The pattern of success in increasing compliance with management regulations during this study is clear. The introduction of a structured education program resulted in a significant reduction of non-compliance behavior across each of the three indicators measured.

Increase Acceptance of Management Regulations

Figure 3 shows that, in all cases, the experiment group had increased levels of agreement, and corresponding lower levels of disagreement, across all four indicators measured. However, these differences were significant in only two of the four indicators. Specifically, agreement with the no touching of the dolphins regulation ($c^2 = 7.026$, df = 1, $p = 0.008$) and the requirement to disinfect hands before handling the dolphin’s fish ($c^2 = 9.147$, df = 1, $p = 0.003$), significantly increased with the experiment group. However, even though the agreement with the regulation prohibiting swimming with the dolphins ($c^2 = 3.625$, df = 1, $p = 0.057$) and the banning of entering the feeding area without supervision ($c^2 = 2.957$, df = 1, $p = 0.086$) did increase, statistical significance, at the alpha = 0.05 level was not attained.

These results show that the education program produced increased acceptance of the management regulations at Tangalooma. Although statistical significance was achieved in only two of the four indicators, the pattern of increased acceptance is clear and consistent. In this case, an education program increased the level of acceptance of management regulations.

Increase Enjoyment

The questionnaire produced a series of responses which indicated the level of enjoyment of tourists at the dolphin feeding. Chi-square tests revealed that there were few significant differences between the control and experiment groups with regard to questions which assessed enjoyment levels. The general pattern of results showed a strong positive skew, with very few respondents selecting categories that can be classified as negative. A high percentage of respondents indicated that the experience was very enjoyable or one of their most enjoyable experiences ever (see Figure 4).

Enjoyment of the “dolphin experience” was ranked extremely highly by almost all respondents. There was no significant difference detected between control and experiment groups with regard to enjoyment levels as measured by most questions. However, the desire for more information did drop significantly between the control and experiment samples. Additionally, compliments significantly increased, and concern over negative impacts of feeding dolphins and suggestions for changes decreased significantly, between control and experiment groups.
Figure 3: Statements indicating level of enjoyment of experience

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percentage of Control who selected</th>
<th>Percentage of Experiment who selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was good but I enjoyed other parts of my stay on Moreton Island more</td>
<td>9.5</td>
<td>9.2</td>
</tr>
<tr>
<td>It was okay</td>
<td>7.0</td>
<td>5.8</td>
</tr>
<tr>
<td>I enjoyed it a lot</td>
<td>58.8</td>
<td>58.0</td>
</tr>
<tr>
<td>I was a little bit disappointed</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td>It was one of my most enjoyable experiences ever</td>
<td>29.2</td>
<td>28.7</td>
</tr>
<tr>
<td>It wasn’t as good as I thought it would be</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>It was good, but I would like to have learned more</td>
<td>32.4</td>
<td>11.6</td>
</tr>
<tr>
<td>I haven’t really decided what I think about it</td>
<td>0.7</td>
<td>2.6</td>
</tr>
</tbody>
</table>

(Note: respondents could select multiple statements)
### Figure 4: Results of knowledge test

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage of Control who answered correctly</th>
<th>Percentage of Experiment who answered correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echolocation</td>
<td>89.5</td>
<td>91.2</td>
</tr>
<tr>
<td>Aggression</td>
<td>28.2</td>
<td>49.8</td>
</tr>
<tr>
<td>Species type</td>
<td>75.5</td>
<td>87.2</td>
</tr>
<tr>
<td>Groups/solitary</td>
<td>12.4</td>
<td>42.0</td>
</tr>
<tr>
<td>Predators</td>
<td>59.8</td>
<td>66.2</td>
</tr>
<tr>
<td>Vision</td>
<td>21.9</td>
<td>47.0</td>
</tr>
<tr>
<td>Protection</td>
<td>55.9</td>
<td>66.9</td>
</tr>
</tbody>
</table>

### Figure 5: Results of attitude test

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage of Control who answered correctly</th>
<th>Percentage of Experiment who answered correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shark control</td>
<td>39.4</td>
<td>49.8</td>
</tr>
<tr>
<td>Effect on the sea</td>
<td>70.1</td>
<td>71.6</td>
</tr>
<tr>
<td>Responsibility for pollution</td>
<td>91.2</td>
<td>93.1</td>
</tr>
</tbody>
</table>
Collectively, these results are suggestive that the education program did enhance the enjoyment of tourists at the Tangalooma dolphin feeding, although high levels of enjoyment exist irrespective of the education program. With this fact in mind, it can be concluded that an education program can increase tourists’ levels of enjoyment.

It is not surprising that the research at Tangalooma identified that interacting with wildlife is viewed in extremely positive terms. The rapid growth of wildlife based ecotourism (Ratnapala, 1992; MacDonald, 1992; Miller and Kea, 1993; Neil et al., 1996a) suggests that interacting with wildlife is very enjoyable for tourists.

**Increase Knowledge**

The questionnaire asked respondents to rank their own degree of knowledge on dolphins before visiting Tangalooma. There was no significant difference in this self-assessment between control and experiment groups ($c^2 = 0.947$, df = 2, $p = 0.535$). However, a further question which actually tested the knowledge of respondents towards the end of a dolphin feeding session, showed an increase in correct responses across all seven indicators from the control group to the experiment group. Chi-square tests reveal that these increases are significant across five of the seven indicators (Figure 5).

The pattern of increased knowledge, as a result of the education program, is clear. This finding is encouraging. As a result of this research, it can be concluded that an education program, despite the limitations of a brief tourism encounter, can increase tourists’ knowledge regarding the attraction they visit. Evidence that this is the case has been lacking in the past. This finding is consistent with recent research by Neil et al. (1996b) who suggest that repeat whale watchers show greater levels of knowledge than those who are whale watching for the first time.

**Improve Attitudes**

The questionnaire tested respondents level of agreement/disagreement with three environmental statements. Results are summarised in Figure 6. For each statement, a correct response was that which strongly indicated an attitude which was “environmentally sound.”

Responses to a statement pertaining to controlling shark levels in Moreton Bay resulted in 39.4% of the control group responding correctly. This response rate increased in the experiment group to 49.8%. This increase is significant ($c^2 = 7.271$, df = 2, $p = 0.026$). However, statements regarding actions affecting the sea ($c^2 = 0.178$, df = 2, $p = 0.915$), and regarding pollution responsibility ($c^2 = 0.069$, df = 2, $p = 0.355$), did not show any significant change from control to experiment.

Measuring respondents’ attitudes toward the natural environment proved extremely difficult. Most respondents in both control and experiment groups, showed a strongly positive environmental attitude. This is not surprising because, over the past decade, environmental issues have been widely discussed and are understood by many. As a result, most respondents know the “desirable” answer to a question about environmental attitudes. Therefore, it is difficult to determine whether a response to a question on environmental attitudes actually reflects true attitudes or is simply given as the socially/politically correct answer (Ryan, 1995). This “social desirability” influence may have been significant in this study.

Despite the failure to detect changed attitudes from the questionnaire there were indications that the education program did have an influence in this area. The responses to the follow-up telephone interview showed that 8.3% of respondents in the control group gave an unsolicited comment that they had become more environmentally aware as a result of their experience with the dolphins. This response rate increased significantly to 20.4% in the experiment group. It appears, therefore, that the participants themselves felt that the education program improved their environmental attitude (at least as expressed by the “greater environmental awareness” comments). The failure of the questionnaire to detect changes in environmental attitudes may be related to the question used in the questionnaire. It is likely that improved environmental attitudes did result from the education program but the questionnaire failed to detect this.

**Create Desirable Intentions**

The questionnaire solicited responses to five statements which indicated the degree of commitment respondents had to changing their behavior as a result of their experience with the dolphins. This question showed a clear and consistent pattern from control to experiment groups (see Figure 7). Intentions to change behavior were high for both groups and no significant differences between groups were present.

The majority of respondents indicated that they intended to tell their friends about the dolphins. However, these data were not significantly different from control to experiment ($c^2 = 2.428$, df = 2, $p = 0.297$). Many thought they would try and get more information about dolphins, but again, the groups were not significantly different ($c^2 = 1.805$, df = 2, $p = 0.406$). Similarly, most respondents indicated that they would pick up beach litter which could harm dolphins, but control and experiment groups were not significantly different ($c^2 = 2.742$, df = 2, $p = 0.254$). Becoming more involved with environmental issues as a result of their experience with the dolphins received strong support from both groups, but the groups did not
**Figure 6: Intentions to change behavior as a result of experience with the dolphins**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Percentage of Control</th>
<th></th>
<th>Percentage of Experiment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
<td>Positive</td>
<td>Definite</td>
<td>Negative</td>
</tr>
<tr>
<td>Tell friends about the dolphins</td>
<td>3.4</td>
<td>22.4</td>
<td>74.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Try and get more information about dolphins</td>
<td>19.8</td>
<td>58.7</td>
<td>21.5</td>
<td>22.9</td>
</tr>
<tr>
<td>Remove beach litter that could harm dolphins</td>
<td>6.6</td>
<td>36.7</td>
<td>56.7</td>
<td>4.3</td>
</tr>
<tr>
<td>Become more involved in environmental issues</td>
<td>22.8</td>
<td>51.9</td>
<td>25.3</td>
<td>25.5</td>
</tr>
<tr>
<td>Make a donation to an environmental organisation</td>
<td>29.8</td>
<td>54.4</td>
<td>15.8</td>
<td>26.6</td>
</tr>
<tr>
<td>Action</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
<td>----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made a donation in an environmental organization</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issues environmental issues</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Became more involved</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removed from beach</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 7:** Action taken as a result of encountering the dolphins (follow up interview)
significantly differ ($c^2 = 1.624$, $df = 2$, $p = 0.444$). Finally, many tourists indicated that they intended to make a donation to an environmental organisation, but the control and experiment data were not significantly different ($c^2 = 3.740$, $df = 2$, $p = 0.154$).

The intentions to change behavior, of both the control and experiment groups, were extremely positive. Once again, this positive skew of the data contributed to the lack of statistical significance between the groups. The influence of "social desirability" when responding to this question is also likely to be high, so that respondents are likely to state they intend to do good things as a result of their experience with the dolphins. Consequently, no significant differences were detected between the groups. The education program cannot be shown to have increased tourists' intentions to conduct themselves in a more environmentally responsible manner. However, this does not mean that such a change did not occur. The results of the follow-up interview suggest that the education program did influence tourists' intentions because significant increases in actual behavior change were detected (see next section).

The marked positive skew in data resulting from a number of attitude, intentions to change behavior and enjoyment questions in the questionnaire has been noted with other tourism research.

One problem that can occur frequently in attitudinal research relating to holidays is that because people enjoy themselves, scores on a Likert-type scale or semantic differential are not normally distributed. They tend to be skewed towards the top end (Ryan, 1995: 168).

This problem was recognised before the study was undertaken and, as a result, categories and statements were selected which attempted to distribute these positive attitudes over a series of options which reflected the positive nature of the responses. Nevertheless, positive skewing did result. When such an influence occurs it is difficult to determine the significance of changes between the control and experiment groups.

**Prompt Environmentally Responsible Behavior**

The follow up interview assessed whether actual behavior change had occurred subsequent to the experience with the dolphins. Questions asked in the interview followed the same format as for the questionnaire, except respondents were asked whether they had actually carried out their stated intentions. With the exception of the question pertaining to telling friends about the dolphins, a clear and consistent difference existed between the control and experiment groups for these data (Figure 8).

In the control, 98.2% and 99.0% in the experiment had told friends about the dolphins. These results are not significantly different from one another ($c^2 = 0.284$, $df = 1$, $p = 0.594$). However, only 13.6% of respondents in the control group had attempted to get more information on dolphins, compared with 41.7% of the experiment group. This difference is significant ($c^2 = 21.213$, $df = 1$, $p < 0.001$). Of those respondents who had visited a beach since visiting Tangalooma, 44.9% of the control group had picked up rubbish that they had seen. Within the experiment group 65.2% had done so. This increase is also significant ($c^2 = 25.915$, $df = 1$, $p < 0.001$). Only 6.4% of respondents in the control group stated that they had become more involved in environmental issues as a result of their experience with the Tangalooma dolphins, however, in the experiment group, 32.0% stated they had done so. Additionally, within the control, 8.3% stated that they were more environmentally aware, whereas 20.4% said so within the experiment. These differences are significant ($c^2 = 35.206$, $df = 3$, $p < 0.001$).

Finally, the same pattern exists for the numbers of respondents who stated that they had donated to an environmental organisation as a result of their experience with the Tangalooma dolphins, 11.1% for the control and 23.3% for the experiment. Furthermore, of those who stated they had not donated, an unsolicited response that they still intended to donate, rose from 3.7% in the control to 19.4% in the experiment. These differences are, once again, significant ($c^2 = 22.26$, $df = 3$, $p < 0.001$).

The results of the follow-up interview are particularly important in the context of this study. The results of the follow-up interviews show that the education program was particularly effective in prompting tourists who visited the Tangalooma dolphin feeding to carry out their stated intentions to take action.

Predictably, both control and experiment respondents carried out their intentions to tell friends about the dolphins after their trip, and there was no significant influence of the education program on this indicator. However, the education program prompted a significantly higher level of action across all the other indicators measured. Thus, it is concluded that an education program caused tourists to change aspects of their behavior and become more environmentally responsible. These results are extremely important because the ultimate objective of the education program was to produce long term behavior change which benefited the environment upon which the tourism was based. Although the type of behavior change prompted in this study did not directly benefit the Tangalooma dolphins, indirectly, these changes benefit the marine environment and, through this, the animals that live in it.
Conclusions

This research has shown that, despite many authors’ concern (Hannum, 1984; Burgess, 1992; Wheeler, 1994), long-term behavior change can be prompted by a carefully structured education program. Empirical evidence of this fact has long been lacking (Olson et al, 1984; Beckmann, 1988, 1989; Uzzell, 1989; McArthur and Hall, 1993). The findings of this study provide evidence that the optimism expressed by many (Field and Wagar, 1982, Forestell, 1990; Alcock, 1991; Ham, 1992; Bramwell and Lane, 1993) regarding the potential of education as a management strategy in tourism situations is justified.

Given the considerable problems being experienced by host communities due to the effects of coastal and marine tourism activities it is important that solutions be sought. Educational programs are but one of many different approaches to managing this kind of tourism. For this kind of approach to be effective programs must be designed with the lessons of educational psychology in mind. The model, tested in the study reported in this paper, is a good starting point to improve the effectiveness of education in managing marine tourism.

Acknowledgements

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Forestell, P.H. and G.D. Kaufman 1990. The history of whale watching in Hawaii and its role in enhancing


CULTURAL PERSPECTIVES OF DOLPHINS BY ECOTOURISTS IN A “SWIM WITH WILD DOLPHINS” PROGRAM

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Graham Vaughan
University of Auckland (New Zealand)

Cleve Barlow
University of Auckland (New Zealand)

Abstract: The current trend towards environmental awareness is accompanied by people seeking ways to change their relationship with nature. However, most individuals will perceive and interpret their relationship with animals in light of their culture. This study explored the relationships among beliefs, knowledge, demographic characteristics and personal values of ecotourists using a questionnaire distributed on shore after boat excursions. Principal Component Analysis revealed attributions of spirituality, altruism, interspecies sociability and the presence of societal structure in dolphins. Females, residents of Asia, New Zealand and Australia, non-Christians were most likely to make positive spiritual attributions, while middle-aged people were more likely to agree with altruistic attributions than were younger or older people. Personal religiosity and adherence to cultural norms were positively correlated with attributions of dolphin spirituality. As the importance of honoring elders and loyalty to friends increased, the more likely the respondents were to believe that dolphins seek and enjoy human interaction (interspecies sociability). Most respondents ascribed human qualities to the dolphins. They also perceived dolphins as being dependent on one another and as having a tightly knit social structure. The ecotourists who formed this sample were unacquainted with scientific knowledge related to dolphins as well as the philosophical, educational, economic or ecological values of wildlife. The results indicate that social scientific analysis of wildlife recreational programs is sensible and can be used to establish more precise management of and educational programs for ecotourism.

Keywords: culture, beliefs, knowledge, questionnaire, principal component analysis

Ecotourist programs provide for personal experience as well as reinforce the knowledge and beliefs individuals have about nature and animals. The emotional fulfillment of being near the animals may serve to strengthen the participants' commitment to various environmental issues (Duffus & Dearden, 1993; Kellert, 1984; Lien & Graham, 1985; Whelan, 1988). In addition, anthropomorphosympathy influenced by observations of animal social behavior probably may have the strongest effect on future conservation and protection (Vicchio, 1986).

In general terms, people's attitudes, values and behavior are shaped by the groups to which they belong (Vaughan & Hogg, 1995). More specifically, individuals may perceive their relationship with animals, and interpret the behavior of animals, in the light of their culture.

Methods

Description of Ecotourist Excursion

Data were collected from participants in "Swim with Wild Dolphins" excursions with the cooperation of Dolphin Discoveries, an ecotourist company operating out of the town of Paiha on the Bay of Islands, New Zealand, in 1994. Dolphin Discoveries ran two boats and made two trips per day (approximately 3.5 hours per trip). The first cruise began at sunrise and the second cruise began in late morning or midday. The skippers met the ecotourists at the dock, provided them with life jackets and then assigned 12 passengers to each boat.

When all the passengers were on board the boats, the skippers went over rules and safety procedures, the Marine Mammals Act, and their obligations with respect to governmental management regulations. They also discussed the swimming gear (wet suits and goggles) and the weather and sea conditions.

After the skippers had gone over these details, they drove out into open water and began their search for dolphins.
Figure 1. Biplots of the relationships among the average principal component scores for gender groups. The top panel shows the separation of gender scores along the spiritual and sociability dimensions (PC1 and PC3). The bottom panel shows the separation of gender scores along the altruistic and society dimensions (PC2 and PC4).

Figure 2. Biplots of the relationship among the average principal component scores for ethnic groups. The top panel shows the separation of ethnic group scores along the spiritual and sociability dimensions (PC1 and PC3). The bottom panel shows the separation of ethnic group scores along the altruistic and society dimensions (PC2 and PC4).

Figure 3. Biplots of the relationship among the average principal component scores for regional groups. The top panel shows the separation of regional group scores along the spiritual and sociability dimensions (PC1 and PC3). The bottom panel shows the separation of regional group scores along the altruistic and society dimensions (PC2 and PC4).
The encounter success for bottlenose (Tursiops truncatus) and common (Delphinus delphis) dolphins was 90% and it usually took less than an hour to locate them. Bottlenose dolphins were typically found in groups of 10-20 individuals, in coastal waters less than 10 meters deep (inside the bay). Common dolphins were most likely to be found in groups of several hundred individuals, in offshore waters. In many instances, both the bottlenose and common dolphins would approach the boats and ride on the bow wave. Dolphin behavior included jumping, head slaps, tail slaps and chasing, and were often accompanied by vocalizations such as whistling. At times, however, the dolphins appeared to be resting or sleeping.

After spending some time observing the dolphins, the skippers decided whether to allow a swim. Up to 24 swimmers were put in the water with the dolphins (12 from each boat), usually lasting 10-15 minutes. At the end of each excursion, just prior to docking, the skippers informed the ecotourists of this research and invited them to participate.

Questionnaire Design

Data were collected at the end of each excursion. The questionnaire was designed (Amannte-Helweg, 1995) and distributed in accordance with the University of Auckland Human Subjects Ethics Committee guidelines. Questionnaires were distributed after the ecotourists gathered in a nearby cafe for coffee. The questionnaire was available in English, German and Japanese. A cover letter accompanied the questionnaire explaining the purpose of the study, that participation was voluntary and that responses were anonymous. Instructions on completion of the questionnaire were also provided. The respondents were allowed as much time as needed. However, it usually took them about 15 minutes to complete the survey. Following completion, the researcher answered any questions.

The questionnaire had a set of demographic items (about age, gender, place of birth, ethnicity, etc.) and a set of questions about the encounter and motivations for participating in the excursion. There was a set of questions that appealed to the beliefs and knowledge (BK variables) the respondents had about the dolphin’s behavior, abilities, social structure and cognitive state. BK variables consisted of a statement that required the respondents to express the degree to which they agreed on a 7-point Likert response scale that extended from “strongly agree” to “strongly disagree” and a “don’t know” response (Oppenheim, 1973). Finally, there were a set of questions related to personal values (PV variables) that required the respondents to self-rate their attitudes or personal traits; and, rank the importance of various matters in life (i.e., religion, cultural roles, etc.). PV variables consisted of statements that employed a 7-point Likert response scale as well as an Osgood semantic differential scales that required respondents to choose between two adjectives with opposing valences (e.g., “tame” vs “wild”) (Oppenheim, 1973).

Statistical Analysis

Principal Component Analysis was used to help reveal broad psychological factors related to the respondents’ perceptions of the dolphins in the beliefs and knowledge (BK variables). Principal Components (PCs) were determined from the correlations among the BK variables using PROC FACTOR (SAS Institute, Inc. 1989), with orthogonal VARIMAX rotation. Each component was associated with a cluster of highly correlated observed variables. The pattern of loadings (correlations of BK variables with a PC) was used to formulate or construct an interpretation of each component. If the pattern of loadings were not interpretable, the PC was discarded.

The four Principal Components were used as criterion variables in tests of the relationship between the respondents’ beliefs and knowledge about cetaceans and their Personal Values (PV) using multiple linear regression (PROC GLM; SAS Institute, Inc. 1989). Multiple Linear Regression a statistical procedure that uses more than one variable to predict the criterion variable (e.g., predicting weight using age and height).

Results

A total of 306 respondents completed the questionnaire, 57% females and 43% males. The respondents identified 29 countries of residence which were then categorized into regions (Table 1). These regions were identified as Asia, Europe, North Commonwealth, South Commonwealth, USA and Other.

When passengers were offered the opportunity to swim with the dolphins, 44% entered the water while 56% preferred to view the dolphins from the boat. Of those who did swim, 4% reported they were able to touch the animals. However, 100% of the swimmers reported enjoying the excursion regardless of the outcome of their swim. Of those who did not swim, 96% reported that they had enjoyed the excursion. Lack of enjoyment (five of 306 respondents) was closely linked to seasickness or lack of proximity to dolphins.

Level of Knowledge

The respondents’ knowledge of cetacean natural history was tested using fifteen factual questions related to taxonomy (e.g., “dolphins are a type of fish”), biological characteristics (e.g., “dolphins have very sensitive
Table 1. Country of Residence Grouped in Regional Categories.

<table>
<thead>
<tr>
<th>Region</th>
<th>Country of Residence</th>
<th>Female</th>
<th>Male</th>
<th>Total per region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>Southeast Asia</td>
<td>0</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Hong Kong</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indonesia</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Japan</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Singapore</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taiwan</td>
<td>0</td>
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<td></td>
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</tr>
<tr>
<td>Europe</td>
<td>Austria</td>
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<td>4</td>
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<td></td>
<td>Belgium</td>
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<td>1</td>
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<td></td>
<td>Denmark</td>
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<td>France</td>
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<td>Germany</td>
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<td></td>
<td>Holland</td>
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<td></td>
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<tr>
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<td>Italy</td>
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<td>1</td>
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<td></td>
<td>Norway</td>
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<td>1</td>
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<td></td>
<td>Switzerland</td>
<td>8</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>North Commonwealth</td>
<td>Canada</td>
<td>7</td>
<td>4</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>England</td>
<td>35</td>
<td>24</td>
<td></td>
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<td></td>
<td>Ireland</td>
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<td>0</td>
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<td>Scotland</td>
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<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wales</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>South Commonwealth</td>
<td>Australia</td>
<td>19</td>
<td>12</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
<td>40</td>
<td>23</td>
<td></td>
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<td>USA</td>
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<tr>
<td><strong>GRAND TOTAL</strong></td>
<td></td>
<td>175</td>
<td>131</td>
<td>306</td>
</tr>
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</table>
hearing"), and social structure (e.g., "dolphins babysit each other’s babies"). Interestingly, the respondents’ self-reported confidence in their knowledge of animals did not correlate with the knowledge they demonstrated on the factual questions. When the respondents were asked to rate their knowledge of animals, the majority of the respondents (58%) rated themselves as having great deal of knowledge about animals. The modal number of correct responses was eight out of 15, yet less than 5% made replies suggestive of expert knowledge (12 or more correct).

**Principal Components**

The Principal Component Analysis revealed four categories of attributions about dolphins. A sample of the pattern of loadings is found in Table 2. The variables that loaded on to PC1 were related to spiritual attributions. PC2 was composed of variables related to attributions of dolphins having altruistic characteristics. The variables that loaded on to PC3 were related to dolphin and human interactions. The variables that loaded on to PC4 related to perceptions of dolphin society. An interpretive description on each of these components is presented in Table 2.

**Cultural Differences in Principal Components of Beliefs and Knowledge**

Principal Components (PC) revealed four categories of attributions of dolphins. Differences according to gender were most visible along the Spirituality dimension (PC1). As can be seen in Figure 1, the average PC scores for males and females were most widely separated along the Spirituality dimension, and females tended to make more positive spiritual attributions than males.

In the relationships between ethnic groups and Spirituality, Figure 2 shows that Asians tended to agree with Spiritual attributions (PC1) more than Caucasians or Other respondents. There was no clear separation between the ethnic groups along attributions of Altruism, Interspecies Sociability and Dolphin Society.

In the relationships between regions and Spirituality (PC1), Figure 3 shows that there was a wide separation between the Asian and South Commonwealth regions; and, the European, North Commonwealth and United States regions. Respondents living in the Asian and Southern Commonwealth regions were, on average, more likely to believe in spiritual attributions than those who come from Europe, North Commonwealth and the United States. Also, residents of Asian countries tended to make more negative attributions of Altruism (PC3) than did others. However, there were no clear separations between the regions along Interspecies Sociability and Dolphin Society.

**Correlation of Principal Components of Beliefs and Knowledge and Personal Values**

There were no significant relationships between Altruistic attributions (PC2) or attributions of Dolphin Society (PC4) and Personal Value variables. However, Spiritual Attributions (PC1) was significantly related to the combination of “Religiousness,” “Accepting my role in my culture,” and “Preserving my group’s image.” The more religious the respondent, the more willing they were to accept their role in culture, and the more important the role of preserving the group’s image, the more likely he/she would agree with statements that make attributions of dolphin spirituality. Interspecies Sociability (PC3) was significantly related to two personal values, “Honoring of parents and elders” and “Loyalty to friends.” As the importance of honoring parents and elders and loyalty to friends increased, the respondents’ were more likely to agree with attributions that dolphins enjoy social contact with humans. Thus, subjects who rated honoring of parents and elder and loyalty to friends as very important would be predicted to make the most positive attributions about interspecies sociability.

**Anthropomorphism, Anthropocentrism, and Social Structure**

Eleven percent of the respondents had an anthropocentric view of animals ("Dolphins are here for my enjoyment"). However, most respondents perceived the dolphins as having human-like emotional or psychological traits (anthropomorphism; Vicoia, 1986). The majority of the respondents (99%) strongly agreed that "dolphins are intelligent." There was more than 80% consensus among respondents on questions related to dolphins’ tolerance and friendliness of humans ("dolphins like the company of people"); and eagerness to approach boats. Moreover, the fact that Interspecies Sociability emerged as a Principal Component, suggests the certainty that most participants have in human and dolphins interaction.

Interestingly, the majority of the respondents perceived the dolphins’ social structure as being collectivist ("every dolphin wants to belong to a group") and structured ("every dolphin group has a leader"). regardless of the type of society the respondents grew up in.

**Discussion**

**Conservation and Management**

Increased knowledge of the ecotourists’ beliefs, expectations, and motivation may help managers to ascertain the value of the wildlife programs being offered; the amount of management intervention required in whale watching and dolphin swim programs; the types of
Table 2. Sample of Principal Components Loadings

<table>
<thead>
<tr>
<th>BK Question</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
<th>PC4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolphins can help humans find inner peace.</td>
<td>.61</td>
<td>.10</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>Dolphins have healing powers</td>
<td>.77</td>
<td>.09</td>
<td>-.003</td>
<td>.08</td>
</tr>
<tr>
<td>Dolphins protect each other from sharks.</td>
<td>.01</td>
<td>.65</td>
<td>.05</td>
<td>-.02</td>
</tr>
<tr>
<td>Dolphins protect people from sharks.</td>
<td>.44</td>
<td>.64</td>
<td>.11</td>
<td>.01</td>
</tr>
<tr>
<td>Dolphins like to play near boats.</td>
<td>.10</td>
<td>.02</td>
<td>.65</td>
<td>.11</td>
</tr>
<tr>
<td>Dolphins like to swim with people.</td>
<td>.21</td>
<td>.08</td>
<td>.78</td>
<td>-.03</td>
</tr>
<tr>
<td>Every dolphin group has its own territory.</td>
<td>.18</td>
<td>-.04</td>
<td>-.04</td>
<td>.61</td>
</tr>
<tr>
<td>Dolphin mothers are very strict.</td>
<td>.08</td>
<td>.01</td>
<td>.10</td>
<td>.60</td>
</tr>
</tbody>
</table>

PC Labels  
Spirituality  
Altruism  
Sociability  
Society

Table 3. Interpretive Description of the Principal Components related to the Respondents Beliefs and Knowledge

<table>
<thead>
<tr>
<th>Component</th>
<th>Labels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Component 1</td>
<td>Spiritual Attributions</td>
<td>People with this view either perceive marine mammals as having extraordinary abilities (e.g., ESP) or perceive them as being at an equal or higher &quot;spiritual plane&quot; than humans.</td>
</tr>
<tr>
<td>Principal Component 2</td>
<td>Altruistic Attributions</td>
<td>People with this view believe that marine mammals have sentimental feelings and concern about each other and humans.</td>
</tr>
<tr>
<td>Principal Component 3</td>
<td>Interspecies Sociability</td>
<td>People with this view perceive dolphins as being sociable and interested in interacting with species other than dolphins (e.g., humans).</td>
</tr>
<tr>
<td>Principal Component 4</td>
<td>Attributions of Dolphin Society</td>
<td>A view in which people use the social norms of human cultures to interpret whale and dolphin social structure.</td>
</tr>
</tbody>
</table>
campaigns needed to enhance animal conservation and welfare; and to use information gathered as a guide for policy development.

Education

The general public do not easily recognize or understand most of the philosophical, educational, economic, or ecological values of wildlife. The study I have described can provide information on ecotourist knowledge that can be used to guide educational programs. On-going research will help determine the effectiveness of educational and management programs that are established.

Social Science

It is absurd to treat customers as if they were identical clones. We have to recognize that men and women view things differently, people of different ages view things differently, and people of different cultures view things differently. By carrying out similar types of studies, we may reveal patterns of behavior and thought among ecotourists from various cultures. One future direction could include human ecology factors in our understanding of ecotourists attitudes and motivations.

Ecotourist Operators

Smith (1977) noted that the types of visitors in an ecotourist program can sequentially change from wildlife specialists to wildlife generalists (general public). As an ecotourism program becomes popular, the type of participants change from mainly wildlife specialists, to a mixed group of specialists and general public, to wildlife generalists (general public). Learning what type of knowledge your customers have can help you determine what stage of development your operation is. For example, because less than 5% demonstrated expert knowledge of animals, it would appear that this Swim Program is entering the final stage of development.

By knowing your customers, you may be able improve upon the services you provide to your customers; be better able to effectively deal with the "experience" or "lack of experience" that your customers have of or with wildlife; learn about the kinds of expectations your customers bring with them to your program; and, increase the probability of achieving customer satisfaction. In conclusion, by knowing your customers, you can increase their enjoyment therefore your operation's success.

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THE WHALE-BASED TOURISM INDUSTRY IN AUSTRALIA: A NATIONAL OVERVIEW

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Abstract: The migratory path of the humpback and southern Right whales from Antarctica to their breeding grounds in the warmer Northern waters envelopes the south, east and west coastlines of the Australian island continent. Attracting over 600,000 whale/dolphin watchers per annum, issues arising from the need for conservation of the resource, for legislation/licensing, for education/interpretation and for a comprehensive code of practice are accelerated by the industry's rapid growth and commercial impact. The whale/dolphin watching industry in Australia is seen to be at a crucial point of development, when serious thought is given to constructive co-operation between all stakeholders and pro-active planning. A national perspective of the whale-based tourism industry in Australia will be given—its state of development, problems, and proposed solutions.

Keywords: whale watching, Australia, conservation, tourism

Natural and Cultural Setting

The migratory path of the humpback and southern right whales from Antarctica to their breeding grounds in the warmer northern waters envelopes this island continent, which has been isolated from major land masses for millions of years. The mythological connections between whales and the aborigines of Australia have been strong and persistent through the ages, as their rock engravings and bark paintings illustrate. Walking along the foreshores and through the national parks of Sydney, the many engravings on the flat surfaces of cliffs and headlands portraying whales, amongst totemic representations of kangaroos and emus, bear witness to the importance these marine mammals held for the Aborigines.

Many a story of cooperation between man and the smaller toothed whales, the dolphins, are told by the original owners of the land down under, the aborigines. Like the one about a pod of dolphins which used to drive mullet into a bay towards the waiting aboriginal tribe, for the benefit of all—all bellies for dolphin and man.

By contrast, the whaling industry decimated whale stocks from the early 1800s until 1978. Whaling stations mushroomed around the shorelines, concentrating especially on the Tasmanian east coast and the region around Albany in Western Australia, which is close to the prime calving grounds for southern rights along the Great Australian Bight.

The Resource

Today, Australia and her neighbour New Zealand are well on the way to develop a strong tourism industry based on observing cetaceans in the wild—primarily humpback whales, southern rights and inshore bottlenose dolphins.

Humpback Migratory Routes

Humpbacks leave their Antarctic feeding grounds at the onset of the antarctic winter on their annual trek to their breeding grounds in the warmer tropical waters of Australia. Their numbers are increasing at a healthy 8 to 10% per year, but because of the severe depletion of stocks, humpbacks are still considered vulnerable under the Endangered Species Protection Act. The latest estimate of the two humpback populations is between 1,500 and 2,500 animals on the east coast, and approximately 3,000–4,500 in the west (Anderson et al., 1995).

Southern Right Migratory Routes

Total numbers of southern right whales have still not recovered sufficiently to be taken off the endangered list under the Endangered Species Protection Act, 1992. Their populations came to be at such dangerously low levels because whales regarded southern rights the 'right' whale to kill—they do not sink and provide plenty of blubber for oil production. They were hunted nearly to extinction and their numbers have been slow to recover. Southern rights give birth to their young in the sheltered bays of Australia's southern coastline, the most famous stretch being the Great Australian Bight with its spectacular land-based whale watching spots.

Marine mammals are not only under pressure from an increase in whale watchers, they are vulnerable to pollution of waterways and inshore developments which impact upon the coastal zone. The last five years have seen an intensification of boat traffic on the water. How many collisions already occur between boats and whales or dolphins we will never know; it is usually not until these occurrences are highlighted in the news, as they did when several boats had to be pulled out of the annual 'Sydney to Hobart' yachting race because they had collided with whales.
Legislation & Management

State conservation agencies are responsible for the resource in Australian waters three nautical miles from agreed shore baselines. Marine parks come under a different jurisdiction. Seaward beyond the state and regional waters, whales are protected by the Commonwealth Whale Protection Act 1980 by the Australian Nature Conservation Agency (ANCA) within the limits of the 200 nautical miles of the EEZ (Exclusive Economic Zone). As the federal body for conservation, ANCA is seeking to promote pro-active strategies to resource management and protection. These considerations have contributed to attempts to improve relationships between the Australian tourism industry, government conservation and management agencies, non-governmental organisations, communities and the industry. What events have led to the interest of the Australian national government to take an interest in the whale/dolphin tourism industry?

In July 1995, ANCA co-sponsored with the Federal Department of Tourism the Encounters With Whales '95 conference/workshop at Hervey Bay. Papers and workshops were linked to the broader issues of conservation and management, legislation, research and education, and the sustainable development of the whale based tourism industry. One of the major recommendations of the Tourism Specialist Working Group, endorsed by the conference as a whole, was the establishment of a national representative whale watching body to be formed by industry. It was recognised that a consultative and voluntary approach is more likely to promote a long-term commitment towards effective resource management and environmental improvements. There is increasing awareness at federal and state government level that emphasis needs to be placed on the forging of partnerships between all stakeholders and on the initiation of informed dialogue.

As a result of that recommendation, I have recently completed a consultancy for ANCA investigating the feasibility of such a national whale and dolphin watching industry association.

I will now provide you with a quick overview of the geographical spread of whale based tourism centres in Australia and briefly touch on the results of the study. How large is the current industry and how rapidly is it growing?

Australian Whale-Based Tourism Centres

Queensland

The whale watching operations at Hervey Bay in Queensland are the most mature sector of this industry. The waters of the Hervey Bay Marine Park offer a reliable stop-over and resting place for humpback whales migrating from their more northern breeding grounds. From the beginning of August to late October, mothers and calves and other members of the migrating groups frequent the bay. The fleet comprises of 20 vessels of varying boat sizes and capacities; all whale watching activities are licensed under the Nature Conservation Act 1992 and managed by the Queensland Department of Environment & Heritage at Hervey Bay.

Further north, in the Whitsundays, several whale watching vessels operate mainly in the open sea by intercepting migrating whales. Conservation issues include control of opportunistic whale watching from the increasing number of pleasure craft in the Whitsunday Passage. In addition to the high-speed-large passenger vessels, radio contact can quickly bring many boats to where whales are present. Harassment of whales has been of growing concern to the conservation agencies.

New South Wales

Boat-based whale watching centres in NSW have started to develop from small charter boat and fishing vessels at Coffs Harbour, Eden and Narooma. Byron Bay in the north of the state offers a land-based vantage point and a whale information centre. Southern rights are lately found frolicking in full view of Sydney's beaches. Last year the whales created a boom in smash repairs on the Northern beaches as drivers, totally absorbed in the excitement of whale spotting, bumped into the cars in front of them, whose attention was doubtless equally diverted. In all other areas of NSW the industry focuses on bottlenose dolphins. There is Jervis Bay, a marine park 2 1/2 hours drive south of Sydney, and Port Stephens, approximately 3 hours drive north of Sydney. Only recently, Port Stephens has declared its intention to become the "Dolphin Capital of NSW."

Tasmania and Victoria

Whale watching in Tasmania started, as in so many other places, through sightseeing and fishing/diving trips. There are regular appearances of humpback and southern rights, and a semi-resident and friendly dolphin pod in southern Tasmania that actively seeks out kids on surf boards,
playing with them. As the local ranger describes it, “The 'play' included tipping the kids off their board. The locals involved kept it quiet and would not even tell me initially where the dolphins were when they rang me to seek advice on feeding. They [the locals] readily accepted a no-feeding rule.” Humpbacks tend to enter Great Oyster Bay, where they spend a day and then move on northwards. Southern rights tend to hang around for a few days, sometimes a few weeks.

**Victoria**

The heart of the whale watching industry in the state of Victoria is Warrnambool, and it is mainly land-based whale watching. There is a strong dolphin-centred industry close to Melbourne, at Port Phillip Bay, which has a small fleet of dolphin cruises, some of which specialise in swims with wild bottlenose dolphins. A voluntary code of conduct has been established by operators in collaboration with the conservation agencies. However, it proved somewhat inadequate. Competitiveness between operators has been known to overrule environmental sensitivities, and as with any other human endeavour, the grade of sensitivity varies amongst operators. As a result, an amendment to the Wildlife Act is presently tabled in parliament to provide legislative support to the voluntary code of conduct.

**South Australia**

The sheltered bays of the Great Australian Bight are the southern rights' calving and breeding grounds, and these large frolicsome whales with their curious calluses can be watched from vantage points along the spectacular cliffs of the Bight. Victor Harbour has a well-designed Whale Centre, which provides visitors to the Bight with educational material and information. Only last month the South Australian government has proclaimed the Great Australian Bight Marine Park to protect one of Australia's most important habitat areas for southern right whales and Australian sea lions.

**Western Australia**

Whale watching around Perth has grown since 1989 from existing tourist operations. The average trip to find the migrating humpback whales is only approximately one hour's boat drive out of Perth. But ocean conditions influenced by the warm southward-flowing Leeuwin current are very variable and can, at times, make outings for whale watching unpredictable. Further away from a major city and port of entry are two developing whale based tourism centres, one is around Albany on the south coast of the state and the other in the north around Port Headland.

The most famous site for interactions with bottle nose dolphins is still Monkey Mia in Western Australia, ever since interactions between dolphins and humans changed into a commercial enterprise in the late 1960s. Bunbury, a small town south of Perth, has deliberately developed a tourism industry based on dolphins. The town fathers employed a dolphin trainer to attract a pod of dolphins, which for years had been fed and befriended by an elderly female resident. Bunbury now has Dolphin Beach, where wild dolphins come and interact with people. Further north, on the same stretch of coast towards Perth, at Rockingham, a sole operator offers swims with the resident pod dolphins pulled along by an underwater scooter.

**Impact on Communities**

One of the issues that will arise from the intensity of the industry's rapid growth and commercial viability is its potential to substantially transform communities. You are aware of the impact here in Hawaii and in other whale-based centres in the U.S. There are international examples, such as Puerto Piramides in Patagonia, Argentina, Hermanus in South Africa, Dingle in Ireland, and closer to home, Kaikoura in New Zealand. Thriving marine mammal destinations such as Monkey Mia and Hervey Bay are prime examples of two communities in Australia. It is essential to integrate and plan for community consultation and continuous conflict management during the development processes of whale-based tourism. Social and economic impacts need to be understood and synthesised, or backlash reactions can be expected to occur. Port Stephens, for example, is presently facing some opposition to its development as the "Dolphin Capital of NSW" from its many elderly residents who see the expansion of tourism in their quiet retirement retreat as a reduction in their quality of life.

**World and Australian Whale Watching Figures**

In Hawaii, commercial and recreational whale and dolphin watching has continued to grow rapidly. It is one tourism sector which is largely demand driven, and in 1994 alone over five million whale watchers provided world-wide direct revenues of over US$120 million (Hoyt, 1995).

In the three years between 1991 and 1994, the number of whale watchers in Australia and the direct revenue from whale watching has more than doubled—from an estimated US$3.1 million in 1991 to US$7 million in 1994 (Anderson et al., 1995).
The whale watching industry is characteristically of a varied nature, and Australia is no exception: Management challenges are created by the highly seasonal nature of the whale watching and by the different priorities in the dolphin and whale watching segments. Different stages of industry development co-exist within states and on the eastern and western coast in Australia. The size of the operations varies from ‘mum & dad’ family businesses to “super cats” capable of carrying hundreds of whale watchers. In addition, the degree of dedication ranges from incidental engagement in opportunistic whale watching to dedicated whale/dolphin watching.

There can be no question that long term viability and profitability are directly related to maintaining the integrity of the resource base. It means that in a national context mechanisms for the protection of cetacees need to be found that transcend established jurisdictional boundaries. In preference to increasingly stringent legislative requirements, emphasis is to be placed upon adoption of voluntary management procedures like the use of environmental guidelines and codes of practice.

I believe that whale-based tourism in Australia is at that crucial stage when the largely untapped tourism potential can be directed in a synchronistic way with strong conservation measures to ensure protection of the resource.

Findings Survey of Australian Operators

This was recognised by ANCA when the government agency funded the survey of all whale and dolphin watching operators in Australia to canvass their views on the establishment of a national industry body.

We found that the majority of respondents who supported the formation of the national body belonged to the core group of the boat-based whale and dolphin watching industry. This core group is characterised by a high degree of dedication to whale watching and a high estimated direct income.

The operators determined that the functions required of the national body are:
- to serve as a forum for discussion and for coordination of cooperative strategies within the industry;
- to act as a lobbying body for representations to government conservation and tourism agencies;
- to coordinate product development, such as marketing and event organisation, and

- to provide coordination for funding for research and education.

Respondents were primarily concerned that issues of accreditation, codes of practice and standards are addressed at a national forum, as well as their concerns with management of licenses and research priorities. The national body is seen to take a role in the coordination of marketing, product development, maximising state and regional tourism opportunities and the monitoring of tourist expectations. Provided government funds are available, we will be moving into a stage of industry consultation around the country, to collectively finalise the form and structure of the national association and to choose a representative from each region as the spokesperson. A national meeting between regional representatives is scheduled to take place at the end of this year to finalise the charter and incorporation of the association.

Will the projected growth rate stabilise or continue growing? With an estimated global annual growth rate of 16.7% in direct and indirect revenue from whale and dolphin watching, there are no signs that the public demand for whale watching will abate. At present, Australia has not been marketed as a whale and dolphin watching destination in the international tourism market. The industry is relying almost exclusively on the national market, which provides only a small base of 18 million people. We will need to look in a coherent fashion in Australia at how we market the industry and define tourist expectations—and how such activities are integrated into regional development of nature based tourism. Whale and dolphin watching in Australia is still contained in early stages of growth. This also means, of course, the advantage that the industry can still be guided in its development. One other great advantage is that in some states a licensing system is already in place, which can serve as a platform for the development of codes of conduct and conservation principles. In particular, long-term monitoring programs are essential if the human impact on the environment is to be effectively identified and distinguished from natural influences and fluctuations.

The conflicting objectives of resource utilisation and resource protection are best served by a national strategy which supports strong cooperation and mutual benefit and understanding between government and industry. The development of management plans in consultation with the stakeholders is to ensure inbuilt mechanisms are put into place for ongoing evaluation and review of the system.
Australia has a very real chance of establishing a national
whale and dolphin watching industry firmly built upon a
framework of voluntary cooperation with industry taking
the initiative in the co-ordination and implementation of a
national strategy for whale-based tourism.

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