Socio-economic value of cetacean conservation

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Contents

Tables

Figures

Glossary

CBA	cost benefit analysis
IFAW	International Fund for Animal Welfare
MCA	multi criteria analysis
WTP	willingness to pay

1 Introduction

1.1 What the study is about

This report is about the socio-economic value of cetacean conservation and of the non-consumptive use of cetaceans, with terms defined as follows.

- Cetaceans are whales, dolphins and porpoises, of which there are at least 86 species. They comprise one of the four groups of mammals that are adapted to aquatic life.
- The concept of socio-economic value is used in analysis and discussion of how best to manage a resource for the benefit of society. Management actions generally have both benefits and costs and are said to increase the value of a resource if the benefits of the action exceeds its costs. This study is therefore concerned with the benefits and costs of management actions to protect cetaceans and promote the non-consumptive use of cetaceans.
- The non-consumptive use of cetaceans can be defined as uses that do not directly harm cetaceans. Whaling and the hunting of dolphins and porpoises are obviously excluded but any human activity that interferes excessively with the natural life and behaviour of cetaceans may be regarded as a consumptive use and is thereby excluded. For example, intensive or invasive forms of whale watching may risk collisions between boats and whales, or otherwise distress or disorient whales.
- Non-consumptive uses can also be defined positively as a combination of active and passive uses.
    - Active non-consumptive value arises from non-consumptive uses that involve some direct physical activity associated with the resource, such as non-invasive forms of whale watching. However, the concept extends to time spent in enjoyment of cetaceans through television, books and other media.
    - Passive non-consumptive value arises because people value the existence of cetaceans, and would regret their extinction or reductions in their numbers even in the absence of opportunities for active non-consumptive use.

We take for granted that members of the current generation believe that opportunities for the active and passive enjoyment of cetaceans should be available to future generations. They would regret not being able to bequeath cetaceans to their descendents. Hence, sustainable management of cetaceans is regarded as providing both active and passive value into the indefinite future.

It is possible that changes in cetacean populations have direct physical consequences for the health or abundance of other environmental resources, either positive or negative. However, such ecosystem linkages are not well understood and they are not further examined in this report.

The possibility of indirect consequences for other resources is also not examined in this report. For example, actions that support the conservation of cetaceans and the development of non-consumptive uses may require management actions that contribute to the conservation of marine ecosystems generally.

1.2 Objectives of the study and structure of the report

The report is intended for the general reader and does not assume professional expertise in either environmental or economic science. This report presents no new research: it draws entirely on published work. Source material for this report has been identified using the conventional techniques of literature and website searches, as well as by phone interviews with conservation agencies and organisations on all continents, and email contact with economists active in this area.

The report is organised in a further four chapters, dealing separately with the following research methods.

- whale watching case studies – chapter 2;
- country surveys of whale watching activity – chapter 3;
- whale watching demand studies – chapter 4;
- studies of passive use value and alternatives to monetary valuation – chapter 5

Each chapter concludes with a discussion of the issues and applications associated with each research method.

2 Whale watching case studies

This chapter provides a dot point summary of industry case studies in five regions, focusing on how whale watching is organised, its impact on the local economy, the role of private and public initiatives in the development of whale watching, and associated progress in understanding cetaceans. The chapter concludes with a discussion of how case studies and the case study method can be used to assess the value of whale watching activities and opportunities.

2.1 Hervey Bay, Australia

Sources
Scott 2004, Smith *et al* 2006, Stoeckl *et al* 2005

Location

- Hervey Bay is a town with a temperate climate and a population of 50,000 people, located about 3.5 hours north by car from the Brisbane metropolitan area, with a population of 1.7 million. It lies on the southern edge of a large body of sheltered water between the Queensland coast and Fraser Island, which is large sand island running roughly parallel with the coast.
- Humpback whales pass through this area on their way south to the Antarctic after breeding in the waters of the Great Barrier Reef off north eastern Australia. Pods may stay in Hervey Bay for up to a week from August to November, creating a sizeable transient whale population and reliable whale watching conditions.
- Whale watching is one of a large portfolio of recreational options in the area, including beaches, swimming, boating and fishing. Fraser Island is a World Heritage Area and itself a major tourist attraction.

How whale watching is organised

- There are about ten commercial operators with larger boats (70-150 seat capacity) and a couple of smaller luxury vessels.
- Tours range from 2 hours to a full day and are mostly single purpose trips that are dedicated to whale watching. The viewing area is close enough for operators to provide several short excursions per day.
- Each boat is a separate small business and relationships between operators are highly competitive.
- Many of the vessels have been custom built to optimise viewing capacity.
- Privately owned boats also engage in whale watching and congestion has been a problem at peak periods.

Mix of private and public initiative in developing whale watching

- Whale watching was initiated privately in 1987 and, after rapid growth, the market appears to have matured by the mid-1990s.
- The number of boats has fallen over time but the reduction has been more than offset by an increase in average size.
- Whale watching has been regulated from an early stage. The main elements have been the declaration of a marine park, zoning arrangements for whale watching, licensing of operators, specification of approach conditions, minimum distance requirements for boats (100 metres), requirements to provide an interpretative program of a certain minimum quality, and a code of ethics for operators. Swimmers and fixed wing aircraft must maintain 300 meters of separation and helicopters are prohibited.
- The revenue from operator licence fees (per vessel) and a passenger levy goes towards management of the marine park.
- Operators have been provided with training.

Economic impact

- The available data, to 2003, suggests that whale watching in Hervey Bay may have stabilised at 60,000 to 70,000 per year. About 30% are from overseas and another 30% are from other states of Australia.
- Visitor surveys indicate that the majority of whale watchers would not have come to Hervey Bay in the absence of whale watching, or would have spent less time there.
- In the absence of whale watching, visitor expenditure in Hervey Bay would be reduced by an estimated US$7.1-12.6 million, including visitor expenditure on food, transport and accommodation in addition to direct expenditure on whale watching trips. The uncertainty arises because 23% of whale watchers said that they would still have come to Hervey Bay but would have spent less time there, and it is difficult to know how much less time and the consequent loss of visitor spending for the local economy.

Understanding the whales

- The recovery of the humpback whale population off the east coast of Australia is well-documented.
- The behaviour of the whales seems to be well-understood and the impact of whale watching on the whales in Hervey Bay has been researched extensively. Behavioural changes have been documented but with uncertain biological significance. There is also evidence of increasing acceptance of vessels by humpbacks, including a growing tendency to seek out and investigate tour boats.
- It is a condition of operator licences that they provide interpretative services of a certain minimum quality, educating visitors about cetaceans.

2.2 Kaikoura, New Zealand

Sources
Curtin 2003, Economists@Large 2005, Hoyt 2007, Lück *et al* 2003

Location

- Kaikoura is a small town on the South Island of New Zealand with a population of about 3,600. It is located at the northern end of the Canterbury region, with a population of 520,000, including the city of Christchurch. Christchurch is about 2 hours by car from Kaikoura and has a population of 370,000.
- Kaikoura is adjacent to an area of deep undersea canyons close to the shore and nutrient rich ocean currents, attracting sperm whales that are rarely found close to shore. Sperm whales favour deep waters where their main food sources, notably squid, are to be found.
- There are sub-populations of resident whales, allowing for year-round whale watching operations. However, about 20 per cent of trips are cancelled due to bad weather.
- These waters also support a large population of dusky dolphins (October to March) and many other species of seabirds and marine animals that attract tourists.

How whale watching is organised

- One whale watch operator has been licensed for viewing sperm whales, with four boats in operation at any one time. Most are catamarans with diesel powered jet drives that generate less noise below the surface than propeller driven craft.
- Trips tend to take no more than 50 whale watchers at a time. Guides provide commentary and answer questions.
- Trips range from a 2-hour round trip to 3-10 day package.
- There is some whale watching from aircraft and two operators have been granted permits to swim with dolphins and seals.

Mix of private and public initiatives in developing whale watching

- Whale watching was jointly initiated by an American researcher and a local fisherman in 1988. They were joined shortly after by Maori entrepreneurs and the two operations combined in 1991.
- The New Zealand government has legislated specifically for the management of marine mammals and regulation of wildlife tourism by a permit system. The permits impose requirements for wildlife conservation, operator expertise and the provision of interpretative services.
- Voluntary codes of conduct are widely used by New Zealand's wildlife tourism operators.
- There are no fiscal measures that are specific to whale watching.

Economic impact

- Kaikoura's economic base (farming, fishing and government administration) was in decline prior to the commencement of whale watching in 1988. Whale watching has reversed that decline, to the point where residents have complained about the effects on the cost of living and the adequacy of roads and other infrastructure.
- Survey-based estimates of whale watching and visitor expenditure cannot be reported because it would disclose commercially confidential information for the single operator. It is likely to be some tens of millions of US$, even netting out the expenditure by visitors who would have visited Kaikoura in the absence of whale watching.
- However, there are several other indicators of the significance of whale watching for the Kaikoura economy since it commenced in 1988.
    - Between 1988 and 1991 44 new businesses were added to the community and 30 new accommodation facilities. Occupancy rates increased from 55% to 75%.
    - 68% of whale watchers in a 1993 survey said they visited Kaikoura to go whale watching.
    - In 1996, 25% of all jobs in Kaikoura were related directly to tourism.
    - By 1998 more than 100 new businesses had been started in Kaikoura.

Understanding the whales

- Whale populations are monitored and seem to be well-understood. Impacts of whale watching on whale behaviour have been documented but with uncertain biological significance.
- It is a condition of operator licences that they provide interpretative services of a certain minimum quality.
- Hoyt (2007: 20) commented that *… New Zealand is a model country in terms of careful management of whale watching including funding for research and the requirement that operators have an education program*.

2.3 Pacific coast of Mexico's Baja Peninsula

Sources
Hoyt 2007, Hoyt *et al* 2008, Schwoerer 2007

The location

- The Baja Peninsula is on the west coast of Mexico. The peninsula starts just south of the United States border and extends parallel to the coast for about 1,000 kilometres.
- The western side of the peninsula, facing the Pacific Ocean, has a series of lagoons that are breeding grounds for the North Pacific gray whale. Resident whales provide reliable whale watching opportunities for the three months from January to March.

- There are a number of small townships on the western side of the peninsula, relying mainly on fishing and tourism.
- Whale watching is one of a portfolio of marine and coastal recreational options in the area.
- Mexico is classified by the World Bank as an 'upper middle income' country.

How whale watching is organised

- Whale watching is boat-based and there are approximately 30 operators with about 130 boats seating up to six persons.
- The whale watching season is short (two to three months) and most of the boats are fishing skiffs that are temporarily converted for the season.
- Dedicated whale watching tours are from one to three hours. The viewing area is close enough for operators to provide several short excursions per day. Whale watching is also included in multi-day camping tours.
- Most whale watchers are from high income countries, particularly the United States and Canada, but there is growing participation by Mexicans, possibly 25%.

Mix of private and public initiatives in developing whale watching

- In 1970 cruise ships from the United States initiated whale watching tours into the Baja lagoons. These were high quality, self-contained tours, often with experienced and noted naturalist guides.
- In the late 1980s the cruise operators began hiring Mexican boats to take visitors into the lagoons. Around the same time other tourists began arriving overland and hiring boats on the spot.
- Whale watch operators are required to have a permit and, from 1991, the Mexican government has required the tour boats to be locally owned and staffed. The permits are free but operators must pass an examination on whale watching guidelines.
- Operators in some whale watching communities are organised as cooperatives. The cooperatives own a fixed number of permits that are variously shared between members of the cooperative. Cooperatives take a share of the revenue to fund lobbying and marketing activities and to purchase whale watching equipment.
- The resource management regime includes a marine park and zoning arrangements for several of the lagoon complexes, exclusion of whale watching from parts of other lagoon complexes, and exclusion of fishing from some areas that have been turned over to whale watching.

Economic impact

- The original side-tours from cruise ships were self-contained and provided little or no economic benefit to locals.
- Schwoerer (2007) notes that at Bahia Magdalena, *… few visitors spend much time in the local communities beyond what is needed for whale*

watching. However, attempts are being made to use tourism, and whale watching in particular, as a springboard for growth in the local economy.

- Local involvement has increased significantly over time as part of a general trend to increased local involvement in providing food, accommodation and other tourism-related services.
- The seasonal nature of whale watching, and of tourism generally, means that locals use tourism to supplement their incomes from fishing and other activities. Tourism in the Baja Peninsula also relies heavily on seasonal workers from other parts of Mexico.
- Hoyt estimates that, in 2006, whale watch operators collectively earned revenues of approximately US$2 million, and that local providers of food, accommodation and other tourism-related services earned another US$21 million that may be attributed to the additional tourist activity that whales attract to the region. Total expenditure is estimated at US$23 million, but this attributes all the associated expenditure to whale watching on the assumption that none of these visitors would have visited the Baja Peninsula in the absence of whales.

Understanding the whales

- There is considerable evidence of scientific research dealing with cetaceans in Mexican waters, including their abundance and causes of variation from year to year, patterns of distribution between and within the lagoons, residence times, the behaviour of nursing females and calves, the risks associated with shipping lanes and fishing gear, and with coastal and offshore developments.
- The North Pacific gray whales that frequent the Baja Peninsula lagoons have recovered to number in excess of 20,000. Some scientists believe that the gray whales are nearing the carrying capacity for their ecosystem.
- Whales can be severely harassed by small boats of the kind used in the lagoons, but neither the incidence nor the effect of inappropriate behaviour is reported.
- The provision of interpretative services ranges from negligible to comprehensive. There is no requirement to provide such services.

2.4 Scotland's west coast

Sources
Parsons *et al* 2003, Woods-Ballard *et al* 2003

The location

- West Scotland is a remote and sparsely populated area of great natural beauty. It comprises the west coast of the Scottish mainland plus the offshore islands of the Inner Hebrides and the Western Isles, including the Isle of Mull and the Isle of Skye.
- West Scotland is classified as a 'less-favoured area' in economic terms and a large minority of workers, possibly 40%, rely on tourism for part of their

income. People come to enjoy the scenery and the wildlife. Wildlife tourism is recording significant growth.

- Minke whales, harbour porpoises, Risso's dolphins and white-beaked dolphins are commonly sighted but several other species feature in whale watching.
- Other species promoted by tourism operators include seabird colonies, otters, seals and red deer.
- The whale watching season seems to be more constrained by the weather than the availability of whales.

How whale watching is organised

- About 60 tour boats operate off the west coast of Scotland and 32 of these operators feature whale watching in their marketing materials. There is also some land-based activity.
- Tours cover the spectrum from 2 hour excursions to 10 day cruises. Whale watching is one aspect of boat trips that are broadly aimed at viewing coastal scenery and marine wildlife, and it seems that dedicated whale watching is less prevalent than in other parts of the world.
- The boats are generally operated as individual small and medium sized businesses.
- There is some evidence that whale sightings are rare on other than dedicated whale watching tours.

Mix of private and public initiative in developing whale watching

- The commercial history of whale watching is not discussed in detail but it appears that, apart from general facilitation of tourist activity, whale watching has developed mainly as a result of private initiatives.
- Whale watching has developed slowly in the United Kingdom, and largely as an activity that is peripheral to a broader menu of tourist activities. Dolphin tours on the east coast (Moray Firth) are the main exception.
- The promotion and development of whale watching is constrained by the unpredictability of whale sightings and the weather. Operators are sensitive about 'promising too much'.
- The development of whale watching may also be impeded somewhat by gaps in operators' understanding of (a) their interrelationship with whales and (b) visitor interest in whale watching. Operators report modestly on their understanding of wildlife and are wary of developmental initiatives that may attract new entrants and increase competition.
- There are no fiscal measures that are specific to whale watching.

Economic impact

- One survey found that 44% of visitors were aware of whale watching trips, but only 13% said that the presence of these trips influenced their decision to visit. At least 20% engaged in whale watching at some level but only 23% of the whale watchers visited solely for whale watching.

- A second survey also found that 10% of visitors to the Isle of Mull (where commercial whale watching first started in the United Kingdom) would not have visited otherwise.
- There are conflicting estimates of the contribution of whale watching to total visitor expenditure, and the latest research was done in the late 1990s. The high estimate is US$15 million/year and the low estimate would be no more than US$5 million/year, after allowing for visitors who would have visited the region even in the absence of whale watching.
- Whale watching may directly provide as much as 12% of the tourism income of remote coastal areas. Parsons et al (2003) estimate direct expenditure on whale watching at their three remote survey sites in 2000 to be US$400,000 with a total contribution to the local economy of US$530,000. For West Scotland as a whole, total expenditure on whale watching and visitor centres was estimated at US$3.2 million.

Understanding the whales

- The available material does not confidently provide a definitive scientific understanding of cetaceans in these waters. For instance, it is not possible to conclude whether the incidence and predictability of whale watching opportunities is benefiting from increasing whale populations or is being harmed by intrusive whale watching practices.
- Whale watching is not licensed in the UK and there appears to be no systematic monitoring or regulation of whale watching and whale populations.
- Interpretative services are generally provided on whale watching tours, mainly brief talks and leaflets.

2.5 Tonga

Sources
Economists@Large 2007, Hoyt 2001, Orams 1999, Orams 2002

Location

- Tonga is an archipelago in the South Pacific Ocean. It has a population of 100,000 people, per capita income of about US$5,200, and is categorised by the World Bank as a country with 'lower middle income'.
- Tonga has a narrow export base of agricultural goods and tourism and is heavily dependent on external aid and remittances from the overseas Tongan community.
- 80% of visitors arrive by air and the remainder on cruise ships and private yachts.
- Humpback whales visit these islands annually and remain for the period of the breeding season from July to October, about 100 days. The combination of resident whales and mostly sheltered waters provides reliable conditions for whale watching.

How whale watching is organised

- Whale watching is entirely boat-based. There are 14 licensed operators and each is permitted to operate two boats. However, the boats are relatively small, possibly with an average capacity of only 15 persons.
- The typical tour is from 10am to 4pm and many provide for swimming with whales.
- Females with calves are popular, in part because the calves are slow and cannot stay submerged for long periods.
- The members of the Tonga Whale Watch Operators Association have about 75% of the market and seem to collaborate on price setting.

Mix of private and public initiative in developing whale watching

- Whaling was banned in 1978.
- Whale watching started in 1994 but, otherwise, its commercial history in Tonga is not reported.
- There are no fiscal measures that are specific to whale watching. All visitors pay a departure tax but that would not be specific to whale watchers and would not direct benefit whale watching.

Economic impact

- Tourism employs 5-10% of the Tongan workforce, where tourism is defined to exclude the large numbers of overseas Tongans who make return visits to friends and relatives.
- Whale watching features prominently in Tonga's marketing of tourism and it is estimated that about 16% of visitors engage in whale watching. It is common for visitors to make multiple trips and it is reasonable to infer that many visit Tonga for the purpose of watching whales.
- The average trip price is about $US100. The total revenue that would be lost in the absence of whale watching is estimated at US$1.1 million per year, including associated visitor expenditure on accommodation, food, local transport, souvenirs and the like.
- A large proportion of whale watch companies are foreign owned or managed, resulting in a significant leakage of capital and labour income.

Understanding the whales

- The available material does not confidently provide a definitive scientific understanding of cetaceans in these waters. For instance, it is not possible to conclude whether the incidence and predictability of whale watching opportunities is benefiting from increasing whale populations or is being harmed by intrusive whale watching practices.
- There is no information of the quality of interpretative material provided to visitors.

2.6 Applications and issues

A common lesson from undertaking case studies is that each case is different and this is certainly true of whale watching. The following comments are organised around the policy implications associated with the initial development and subsequent expansion of commercial whale watching activity, and the interpretation of estimates of visitor expenditure.

Getting a start

It is apparent from the case studies that private initiative is enough to initiate whale watching in at least some circumstances. But many of these circumstances are highly favourable, involving the close proximity of whales and visitor populations with high incomes. Case studies tend to focus on successes rather than failures. One consequence is that it remains an open question whether there have been instances of favourable circumstances where private initiatives on their own have failed, and whether such failure can be effectively corrected by policy action.

There seems to have been little systematic attempt to understand situations where whale watching has been tried but failed to take hold, or where whale watching has not been tried despite encouraging circumstances. One exception is a small study comparing the success of whale watching at Hervey Bay with its comparative failure at Byron Bay, both on the east coast of Australia (Scott *et al*: 2003). This study indicates that chance plays a part but also possibly that poorly planned or overly ambitious activities in the early stages may draw an adverse community response from which it is difficult to recover. There were failings in crowd control at the viewing sites, threatening public safety and damaging the environment and property.

Growth of whale watching activity

The case studies strongly indicate that a certain level of policy intervention is usually required to manage the tensions and issues that rapidly emerge as whale watching starts to accelerate. These are issues relating to:

- protection and conservation of cetaceans and of the marine environments that host whale watching, involving not only regulation but also education and information
- displacement of existing economic activities and the evolution of new arrangements for sharing marine resources
- limited carrying capacity of the viewing site and competition for access rights
- threat of reputation damage in the absence of minimum standards for whale watching operations
- equitable participation by the local community in the economic benefits
- equitable treatment of commercial and private whale watching

Communities resolve these matters in their own way and the degree of success or failure probably has less to do with the nature of the problem than with the nature of the political and economic system.

Adaptive management may be required as new challenges and opportunities emerge, particularly the emergence of new scientific information. Policy settings and arrangements need to remain flexible, for example, to deal with emerging capacity constraints and facilitate the improvements in service quality that may be needed for commercial activities to remain competitive.

Use and abuse of estimates of visitor expenditure

A large number of industry case studies provide information about the size and importance of the activity being studied, typically in terms of the number of customers, the number of suppliers and the value of the transactions between the customers and suppliers. This is useful information but easily misinterpreted and it can be difficult to reliably provide certain breakdowns that are of particular interest to policy makers.

The first problem is that expenditure estimates are often presented, implicitly if not explicitly, as measures of economic benefit. They are no such thing. This is most obvious from the consumer's perspective, since expenditures are expenses that the consumer would prefer to minimise. Consumers are better off if their expenses are reduced, provided of course they do not forego the desired good or service. Estimates of the value to consumers require a full demand study, which is the research methodology discussed in chapter 4.

Nor should expenditure be regarded as a measure of benefits that accrue to suppliers. Such an approach ignores the fact that suppliers incur costs to provide goods and services. Suppliers only benefit from a particular activity to the extent that it provides more income than could be earned if the resources were employed in their best alternative use. The incremental benefit can be negligible and, usually, is not more than a small fraction of visitor expenditure. However, it may be significant when the opportunities for alternative employment are poor, as may be the case in regions and countries that are on the periphery of the global economy. The assessment of supplier options requires detailed information and considerable care, particularly where alternative local activities may be displaced and resources are attracted from outside the region.

A second problem is that whale watching is often only one of the attractions that bring visitors to a region: many visitors, including whale watchers, would visit even in the absence of whale watching. Their expenditures would be diverted to other activities in the absence of whale watching, not lost. The analytical response has been to include questions about motivations in the visitor questionnaire, and use that to estimate the visitors and expenditures that would be lost in the absence of whale watching opportunities. For example, the evidence from several of the case studies is that 20-40% of whale watchers would not have visited the region in the absence of whale watching opportunities. Policy makers should be concerned if there is any evidence that 'optimism bias' has unduly influenced such estimates.

A third problem is that visitor expenditure is sometimes equated with the income of the regional resources that participate in the production of goods and services for visitors, either directly or indirectly. The following adjustments are required.

- From the local perspective, visitor expenditures should be adjusted to exclude 'leakages' from the local economy. These leakages would include,

for example, the cost of the vehicles and fuel that are used in whale watching but not produced locally.

- On the other hand, a proportion of increased local incomes will also be spent locally and, under certain circumstances of local unemployment or underemployment, may have beneficial multiplier effects on the local economy.

Such considerations can be addressed by a sound economic impact statement, making use of techniques such as input-output models and multiplier analysis to account for the complex interactions involved.

Overall, assessments of local economic impacts require an understanding of options on both the consumer and supplier side of the equation. The value of whale watching to both consumers and supplier depends broadly on the availability of other options. Case studies tend not to take this broader perspective.

No doubt, many policy makers and analysts are aware of these pitfalls and already apply heavy discounts to estimates of visitor expenditure. It may even be difficult for more refined estimates to avoid being painted with the same brush.

3 Country surveys of whale watching activity

It is not feasible to make a case study of every whale watching community. However a series of country and global surveys have aimed to collect key items of information from every whale watching community on the planet. The researchers have used case study reports where available but supplemented these sources with operator surveys and other informal information sources. This body of work will, over time, provide basic information about the diffusion and growth of whale watching around the world.

The most comprehensive work is the global surveys that Eric Hoyt has conducted for environmental non-government organisations (Hoyt 1992, Hoyt 1995, Hoyt 2001). His work has been expanded and updated for various countries and regions – Australia, Latin America, New Zealand, Pacific Islands and Tonga (Economists@Large 2004, 2005, 2007 & 2008; Hoyt & Iñíguez 2008; Schaffar & Garrique 2007). A further global update is scheduled for release in mid 2009. This chapter draws heavily on these sources, supplemented by unpublished data from the visitor surveys conducted by Tourism Research Australia and Statistics New Zealand, for Australia and New Zealand respectively.

3.1 Forms and characteristics of whale watching

Surveys have shown that people enjoy and experience cetaceans in many ways. Key variables are as follows:

- *Platform:* People watch from boats and aircraft or simply from a good spot on shore. The boats involved range from kayaks to cruise ships.
- *Motivation:* Whale watching may be the dominant or even sole purpose of a trip, an activity that is peripheral to the trip, or anything in between.
- *Duration of trip and frequency of sightings:* Some cetacean populations can be reached by boat in less than an hour and provide reliable opportunities for sightings. Others require day-long trips, even multi-day trips, or may not always be successful.
- *Interpretative services:* The quality if interpretive services various enormously, from virtually nothing to the use of whale experts on cruise ships. Hoyt (2007) says that whale watching can aim to provide an educational experience that motivates participants to care about whales, for example, by telling good accurate stories about whales and their behaviour and encouraging urban dwellers to develop their understanding of oceans
- *Protection of whales from biophysical interference:* There seems to be relatively poor understanding of the biophysical consequences of whale watching for whales. But there is considerable variation in the nature and extent of controls, for example, governing the number and size of vessels in a viewing area and minimum approach distances. There are situations where individual whales, or mother and calf pairs, may be the focus of repeated extended visits during a season.

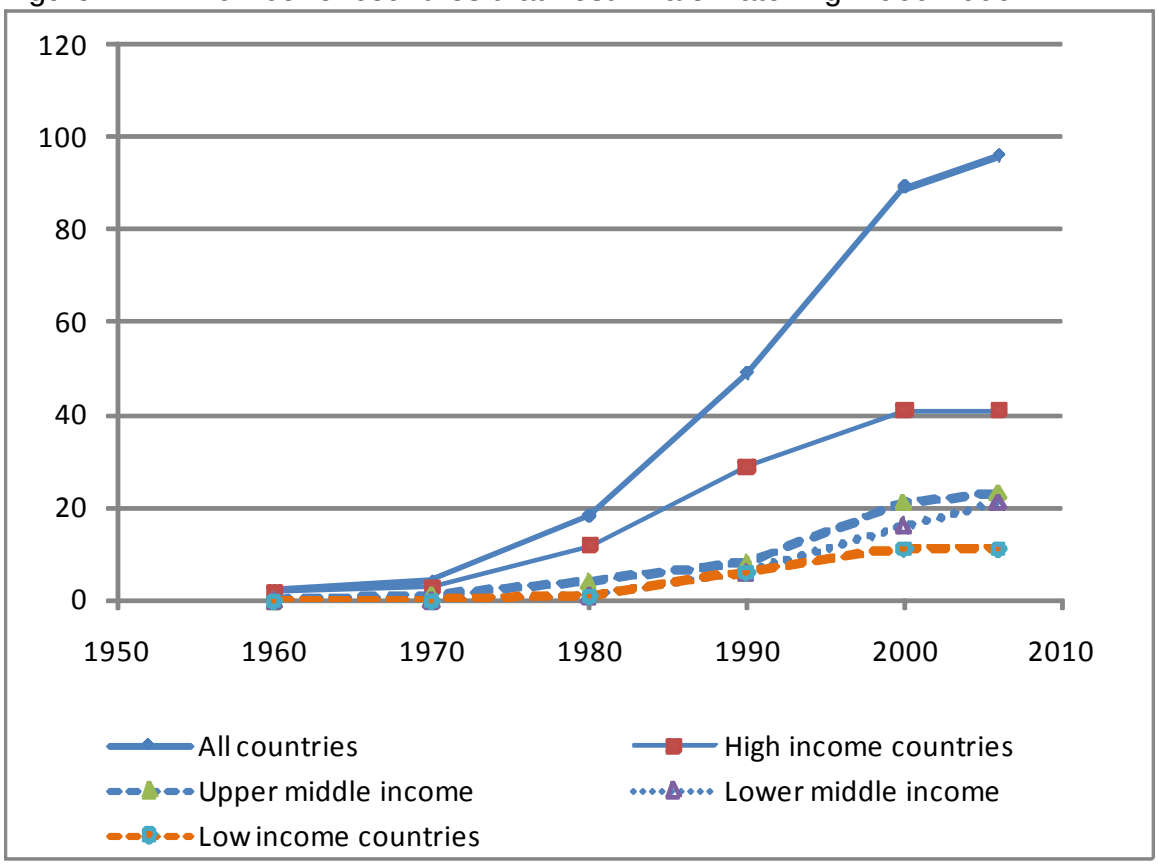
3.2 Countries participating in whale watching

The earliest recorded whale watching operation commenced in the US (California) in 1955 (Hoyt 2001: page 19) and only two countries – Australia and US – can date the commencement of whale watching to 1960 or earlier. Two more countries – Mexico and The Bahamas – had joined in by 1970. All of these are either high income countries or countries that provided whale watching opportunities to visitors from high income countries. Figure 1 shows the subsequent diffusion of whale watching to other countries. Note that:

- Figure 1 employs a four-part classification of countries by income, using the World Bank definitions of high, upper-middle, lower-middle and low income countries.
- There has been no comprehensive global update of whale watching since 2000, which means that the figures for 2006 are based on regional surveys.

Figure 1 shows a pattern of diffusion that is related to income. Whale watching started first in high income countries and progressively later in countries with lower incomes. It is now established in 54% of high income countries, 51% of upper-middle income countries, 35% of lower-middle income countries, and 21% low income countries. Whale watching is now established in 41% of the 234 countries of the world. In our count of countries we include the 209 countries listed by the World Bank plus a number of other territories, mainly island territories and unincorporated islands of former colonial powers.

Figure 1 Number of countries that host whale watching: 1960-2006



3.3 Distribution and growth of whale watching

We know which countries are involved in whale watching but rather less about recent growth in the level of whale watching activity and related expenditures. This is because the last global survey was conducted in 1998 (Hoyt 2001). The available up-to-date estimates are for countries in Oceania and South America. The following account is necessarily either dated or patchy.

Whale watching in high income countries

The US hosted 48% of the estimated 9 million whale watching trips that occurred somewhere in the world during 1998. A second tier of three high income countries – Canada, Canary Islands and Australia – accounted for another 30%. A third tier of 37 high income countries also hosted whale watching and account for another 10% of global activity, bringing the total share of high income countries to 88.5% in 1998. The more significant members of the third tier are New Zealand, Ireland, UK, Japan and Puerto Rico, each of which accounted for 1-2% of global whale watching.

On the available evidence, it is reasonable to say that the total number of people in high income countries who have experienced whale watching would now be of the order of 100 million, and growing at 10 million per year. A precise estimate requires information about the frequency of repeat visits, which is not generally available. Probably, watching whales has affected how these people feel and understand the need for conservation measures.

Table 1 presents the available information on developments in high income countries since 1998. This is a small sample, dominated by countries in the Oceania region, but all six countries returned strong growth.

Table 1 Recent growth of whale watching in 6 high income countries

Location	*Whale watchers*			*Percentage increases*	
	1998	*2005*	*2007*	*1998-2005*	*1998-2007*
Australia (ex. land based, visitor survey data)	670,000		1,323,000		100%
French Polynesia	1,000	6,000		500%	
Guam	4,000	84,000		2,000%	
Iceland	30,300		104,000		245%
New Caledonia	1,700	4,900		190%	
New Zealand (international visitors only, visitor survey data)	104,000		223,000		115%

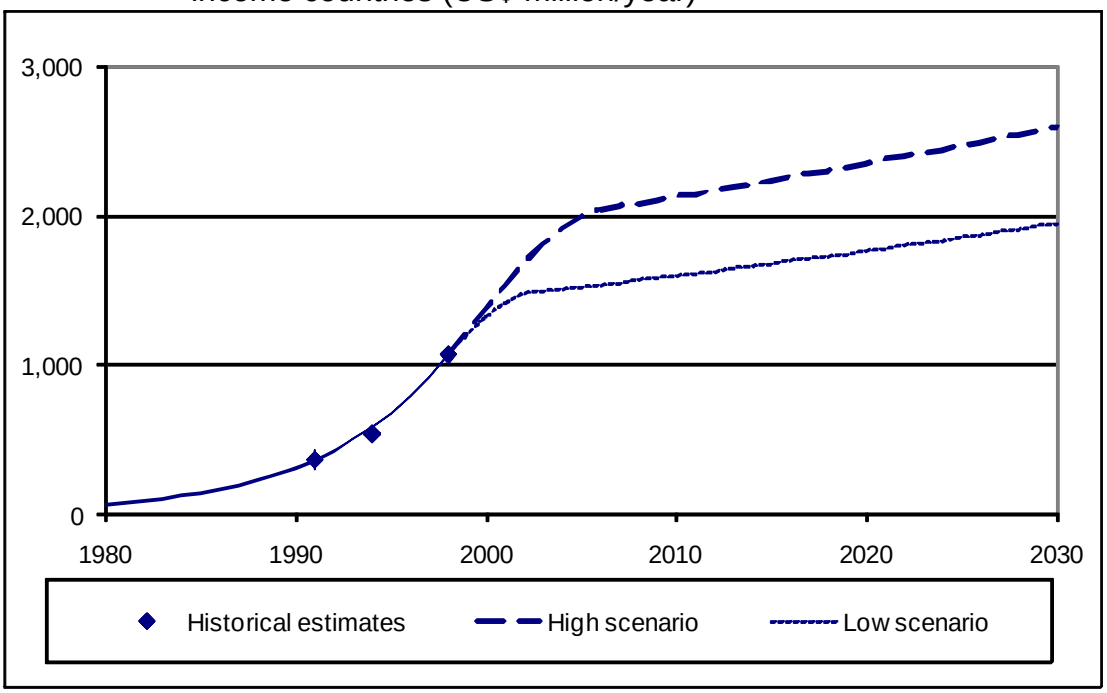
The global surveys indicate that by 1998, visitors to whale watching areas in high income countries were spending US$1.35 billion per year to watch whales (at 2008 prices). As shown in figure 2, expenditure increased rapidly through the 1990s. These high rates of growth cannot continue indefinitely and a reasonable way to think about the future is that whale watching will eventually mature as a sub-sector of the tourism industry, finding its place in the spectrum of human

activity, and settle down to steady growth in line with the broader economy. The question is how much further whale watching will expand before it matures.

Figure 2 helps pose the question. For high income countries it is assumed that the industry will expand by 50% to 100% on its level in 1998 and then continue to grow at 1% per year as a mature industry. This conforms to the classic 'S-shaped' profile of product diffusion; comprising early adoption by knowledgeable and interested individuals, an intermediate phase in which the diffusion spreads fairly quickly to most other corners of the potential market, and final mature stage of growth that is determined by underlying growth of population and average incomes (Rogers 1995).

This figuring suggests that visitor expenditure on whale watching may grow to US$2.0-2.6 billion per year over the next 20 years. The implicit assumption is that whale watching in high income countries is now in its middle stage of diffusion and has at least some way to run in that mode before reaching maturity.

Figure 2 Plausible futures for visitor expenditure on whale watching in high income countries (US$ million/year)



Whale watching in middle income countries

Middle income countries hosted one million whale watching trips in 1998, about 11% of the global total. There were 25 such countries involved, of which South Africa (5.6%), Brazil (1.8%) Mexico (1.2%) and Argentina (0.9%) were the largest. The remaining countries are geographically diverse but have a disproportionate representation from South America and the island countries of the Caribbean and Pacific.

Whale watching had a delayed start in middle income countries but their share of global activity grew rapidly during the 1990s, from 0.8% in 1991 to 11% in 1998.

Tables 2 and 3 present the available information on developments since 1998, for the South Pacific and Latin America respectively.

- There were large increases for two South Pacific countries, Niue and Tonga, where whale watching was established before 1998. The others are new-comers since 1998 and, by 2005, only the Cook Islands and Samoa recorded more than minimal levels of activity. The general impression is one of geographic diversification and the rapid growth from a small base that is associated with the early stage stages of a promising activity.

Table 2 Recent growth of whale watching in middle income countries of the South Pacific

Location	*Number of whale watchers in 2005*	*Percentage increase, 1998-2005*
Countries with whale watching established before 1998		
Niue	300	440%
Tonga	9,000	290%
New-comers to whale watching since 1998		
American Samoa	minimal	-
Cook Islands	3,700	-
Federated States of Micronesia	minimal	-
Fiji	minimal	-
Northern Mariana Islands	minimal	-
Palau	minimal	-
Samoa	700	-

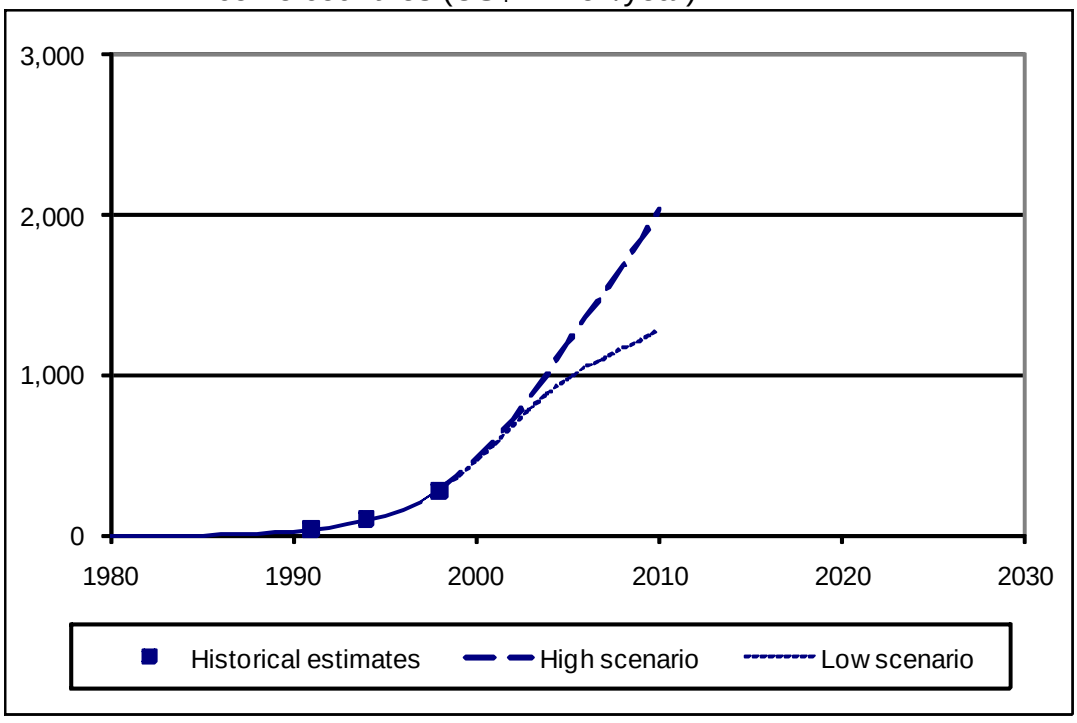
Table 3 Recent growth of whale watching in middle income countries of Latin America

Location	*Number of whale watchers in 2006*	*Percentage increase, 1998-2006*
Countries with whale watching established before 1998		
Belize	368	9%
Brazil	228,946	37%
Chile	13,720	316%
Costa Rica	105,617	8,508%
Ecuador	42,900	270%
Mexico	169,904	57%
Peru	586	10%
New-comers to whale watching since 1998		
Bolivia	400	-
Colombia	35,000	-
Guatemala	800	-
Nicaragua	8,832	-
Panama	17,711	-
Suriname	1,906	-
Uruguay	4,800	-
Venezuela, RB	9,757	-

- Whale watching is now well established in Latin America, with 8 newcomers since 1998 and strong growth in several countries where whale watching was established before 1998.Three countries – Brazil, Costa Rica and Mexico – account for 78% of the activity. Another two counties – Columbia and Ecuador – add another 12%. Overall, whale watching in Latin America increased by 112% between 1998 and 2006.

In 1998 whale watchers spent about US$285 million (2008 prices) to watch whales in middle income countries, a 5-fold increase on 1991. It is reasonable to speculate that rapid growth has generally continued beyond 1998 and will continue for some time yet, given (a) the number of countries that were hosting whale watching in 1988, (b) the relatively underdeveloped nature of the activity in 1998, (c) the indications of further growth since then, and (d) the prospects for strong income growth in many of these countries. Figure 3 provides indicative scenarios, with the 'mature' stage of this activity not yet in sight for middle income countries. It poses the question of whether the level of activity in middle income countries can reach aggregate levels that are comparable with high income countries, that is, in excess of US$2 billion per year.

Figure 3 Plausible futures for visitor expenditure on whale watching in middle income countries (US$ million/year)



Whale watching in low income countries

Low income countries hosted only 45,000 whale watching trips in 1998, about 0.5% of the global total. There were 6 such countries involved, entirely from the Indian sub-continent and Africa. India was the most significant, with 0.3% of global activity. We have no information about developments over the last decade.

3.4 Applications and issues

Country surveys are a form of industry case study, but broader geographically and less detailed in terms of information collection. The comments relating to industry studies (section 2.6) apply, particularly in relation to the use and abuse of visitor expenditure estimates.

More importantly, however, information collected in a global database promotes understanding of common interests between whale watching communities, which is a first step to effective action to protect and promote those interests.

- Cetaceans migrate annually over long distances and may attract whale watchers in multiple jurisdictions. The beneficiaries in each jurisdiction have a common interest in conservation but none can capture the full benefit of conservation actions. Nor do they pay the full cost of destructive actions. A global database can 'connect up the dots', putting whale watch communities in touch with other communities that have common interests in particular cetacean populations.
- The community of interests is widened where populations and sub-populations of cetaceans are mutually dependent for genetic diversity or share common resources such as feeding grounds.
- There may be other mutually beneficial traffic over such a network, such as:
    - sharing information and research about cetacean behaviour and the management of whale watching behaviour
    - joint funding of research to understand whether whale watching interrupts feeding, mating and calving cycles
    - comparing policy approaches to increasing local participation in whale watching, defining the carrying capacity of a viewing area and rationing access, and sharing of marine resources between competing demands
    - environmental accreditation schemes
    - joint marketing
- To illustrate, a recent IFAW report (Economists@Large 2008) found that many island nations in the Pacific satisfy the preconditions for the development of whale watching, which are an abundance of cetaceans, tourist accessibility and established marine-based tourism operators. Early growth has significantly outstripped general growth in tourist activity and the significant further challenges are to:
    - continue growing regional tourism markets and developing whale watching to complement existing tourism activity
    - better understand the seasonal cycles and behaviours of cetaceans
    - monitor the sustainability of whale watch operations, particular for evidence of excessive pressure from the number of tourism operators
    - jealously guard the environmental reputations of countries and regions
    - study the economic and financial dynamics of whale watching operations, including impacts on local communities
    - protect territorial waters from the adverse effects of human activity, such as waste disposal at sea, fisheries by-catch and whaling.

Plausibly, a global database may be organised to provide commercially valuable information, for example, about visitor profiles and market trends. New entrants need to avoid markets that have already matured and find new niches where there are growth prospects. In short, global databases may be used to do more than document the worldwide growth of whale watching. See box 1 for a brief account of what researchers have learned from developments in the South Pacific.

4 Whale watching demand studies

A visitor survey is often part of the research methodology employed to develop the industry case studies that are discussed in chapter two. In general, such studies are undertaken with a view to understanding the importance of whale watching opportunities in attracting visitors to a region and how the host community benefits from the visitor expenditure that can be attributed to whale watching. However, there is also some work that is concerned with the non-consumptive use of cetaceans solely from the perspective of visitors. The items of interest in these studies include estimates of the value that visitors place on the whale watching experience, identification of the factors that determine demand for non-consumptive uses and evaluation of the prospects for increased demand for non-consumptive uses.

The importance of this work is that it addresses the factors and preferences that drive demand for whale watching. A better understanding of why whale watchers make decisions as to whether and where to view cetaceans will assist tour operators as well as governments in making sound policy decisions.

This chapter is organised to explain the study methods that have been used in this more consumer oriented work – specifically, the travel cost method and 'stated preference' methods – and the results that have been obtained. This is the appropriate setting for discussing projections for consumer demand.

4.1 Demand studies using travel cost data

About the travel cost method[1]

The intuition behind the travel cost method is that the value placed on a resource is revealed by the amount of time and money that visitors are prepared to expend to access the resource. Increases in the value of a resource – for example, because whales become more abundant and there are more sightings per trip – would be revealed by the fact that the whales would attract new visitors from further away. Intuitively, the willingness or otherwise of people to travel long distances, and incur the associated costs, tells us something about how they value the sights that they have come to see.

But it is a mistake to equate the value to the visitor with the visitor's expenditures on travel and accommodation. Visitors try to reduce these costs and, other things given, the value to the visitor varies inversely with the cost of the visit. So what exactly is being measured if it is not the costs incurred by the visitor?

To begin, suppose you are in the habit of purchasing a product for $100 and consider that, at that price, it provides value for money. The price now rises, first to

[1] See Champ *et al* (2003) and Pearce *et al* (2006) for rigorous accounts of the travel cost method, including explanation of the various practical difficulties that need to be addressed. One of the most challenging is to deal with the problem of multiple destinations and multiple products at the destination. When applied to whale watching for example, one of the issues to be addressed is that whale watching may be only one of a number of attractions that bring visitors to a particular area.

$120, then $140 and $160, but you keep buying the product because it still provides better value than the available substitutes. You finally switch to a substitute when the price reaches $180. It may be inferred that the product provided you with $80 worth of 'net benefit' when you paid only $100, since you put its maximum value at $180 but paid only $100.

Now suppose you are in the habit of watching whales for a total cost of $100/trip, including travel costs, but the travel component increases as you move house a number of times. You stop watching whales when you move so far away that the total cost is $180/trip. It may therefore be inferred that you enjoyed a consumer surplus of $80 when you lived closer. This is the essence of the travel cost method. The travel cost researcher conducts a visitor survey that either collects detailed information about all of the costs that each visitor incurs, or makes inferences about average costs based on where the visitor lives. By, observing how demand declines and eventually ceases as distance increases, it is possible to calculate the difference between the costs that people actually incur and the maximum cost that they would be prepared to pay. The actual cost depends to a substantial extent on how far they are from the resource. The maximum cost that an individual visitor is prepared to incur is generally found to vary with person-related factors such as education and income, and with demographic and cultural factors.

Application of the travel cost method to US regions

Three published reports of applications of the travel cost method were used to calculate the non-consumptive use value of a 'cetacean resource', and one of these refers to a fourth unpublished study. All four studies are of whale watching in the US and all of the data were collected in the period from the mid-1980s to the mid-1990s. Table 4 summarises the results of these studies. There are two groups.

- The three studies by Day, Loomis *et al* and Hoagland *et al* indicate that the cetaceans provide the average whale watcher with a consumer surplus of between US$36/trip and US$46/trip. These averages hide large differences between whale watchers. The consumer surplus would be low for some, no more than a few dollars. For others it can be hundreds of dollars.
- The study by Shaikh *et al* incorporated information on the visitor's subjective assessment in the probability that whales would be sighted and used that to calculate the increase in the consumer surplus associated with higher probabilities. Their estimates indicate that whale watchers attach considerable value to more frequent sightings.

There is no reason to expect all cetacean populations to return equal or even broadly similar estimates of the average consumer surplus. Average consumer surplus will be high for favourable conjunctions of cetacean populations and human settlements, for example, where cetaceans are abundant and come close to shore in sheltered waters that are not far from large human settlements, and where the residents are environmentally aware and financially secure. Average consumer surplus is lower where the populations of either cetaceans or humans are more dispersed, since it is more difficult and costly to bring the two together.

Table 4 Estimates of the average consumer surplus accruing to whale watchers, using travel cost information

Authors	Day	Shaikh & Larson*	Loomis, Yorizane & Larson	Hoagland and Meeks
Year of publication	unpublished	2003	2000	2000
Year of survey	Mid-1980s	1991-92	1993	1996
Location	Gloucester, Massachusetts	Several shore-viewing and boat-viewing sites in California	Several shore-viewing and boat-viewing sites in California	Stellwagen Bank, New England
Estimates of consumer surplus per whale watching trip ($US, 2008 prices)	US$46/trip		US$66/trip	US$36/trip
Estimates of the increase in average consumer surplus, per trip, from an increase in the chance of seeing whales ($US, 2008 prices)				
50% better chance of seeing whales		US$133/trip		
100% better chance of seeing whales		US$158/trip		

Notes
* Shaikh & Larson use travel cost information but in variation on the traditional travel cost method. They allow the model to determine the unit value of time, subject to a constraint on the available time.

4.2 Demand studies using stated preference methods

The travel cost method is one of several revealed preference methods. The defining characteristic of such methods is that the researcher infers the value of a product from consumer behaviour: valuations are said to be revealed by actual behaviour, such as travel behaviour. An alternative approach is to ask consumers how they would respond to hypothetical choices, for example, to purchase a product at a nominated price or to make hypothetical choices between products. These studies use stated preference methods and yield estimates of the respondent's maximum willingness to pay for particular products or outcomes. Implicitly, this is the value that the respondent places on the product or outcome when the alternative is to forego it altogether. The consumer surplus can then be estimated by subtracting the actual price that is paid.

Only one study of this kind was found in the literature review. The study relates to whale watching sites on the west coast of Mexico. The estimates of (gross) willingness to pay for a whale watching trip lie between US$71 and $US100. The average consumer surplus lies in the range US$13/trip to US$60/trip at 2008 prices, and are obtained as indicated in the top row of table 5.

Mexico is an interesting example because the World Bank classifies it as an 'upper middle income' country and, while the whale watching occurs in Mexico, a large proportion of the whale watchers are from the United States and other high income countries. This raises the policy issue of how to maximise the value of whale watching activity to the host country, for example, by using rationing devices or resource taxes to transfer value from consumers to producers. Estimates of consumer's surplus provide some information about amounts that, potentially, may be transferred. This is one of the matters that are further discussed in section 4.3.

Table 5 Estimates of the average consumer surplus accruing to whale watchers in Mexico: stated preference method, $US/trip, 2008 prices

Location in Mexico	*(1) Average willingness-to-pay for a whale watching trip*	*(2) Actual cost of a whale watching trip*	*Average consumer surplus per trip = (1) – (2)*
Bahía de Banderas	US$79	US$25-65	US$14-54
Bahía Magdalena	US$78	US$65	US$13
Guerrero Negro (Laguna Ojo de Liebre)	US$71	US$45	US$26
Laguna San Ignacio	US$100	US$40	US$60

Source:
Rivera *et a*l 2007, as reported by Hoyt *et al* 2008, page 21

4.3 Applications and issues

Projected demand for whale watching

Consumer demand studies can provide an empirical basis for predicting global demand for whale watching and its distribution between regions, for example, in

terms of the number of whale watchers, the number of whale watching trips and expenditure on whale watching. To put this in context, the following provides a possible structure for a program of work to project demand for whale watching.

1. Identify the key determinants of demand for whale watching, for example, consumer income, the full price of whale watching (including travel and accommodation costs), the price of recreational substitutes and complements, and conditioning factors such as culture, education and environmental awareness.
2. Obtain empirical estimates of the demand response to each driver. Some key parameters are:
    - Income elasticity of demand, describing the proportion of future incomes that would be spent on whale watching.
    - Own-price elasticity of demand, describing how the demand for whale watching would respond to changes in the unit price of whale watching experiences, such as travel and accommodation costs, trip prices and management charges.
    - Cross-price elasticities of demand, describing how the demand for whale watching would respond to changes in the unit price of substitutes such as alternative recreation destinations, or the price of complements such as other recreation opportunities that are offered at whale watching sites.
3. Obtain credible projections for each of the drivers. It is useful to distinguish between exogenous and endogenous factors.
    - Exogenous drivers are the matters that will be determined independently of cetacean management, for example, the location and size of human settlements, long term changes in average incomes, the cost of travel and (to an extent) accommodation, and the development of generic recreational options and costs.
    - Endogenous drivers are management actions that affect the abundance of cetaceans, the management of congestion at the viewing site, and arrangements for the recovery of management costs and the sharing of benefits. These feed into the demand modelling by altering the price and quality of whale watching experiences. For example, conservation measures reduce the unit cost of a whale sighting by increasing the abundance of whales and the incidence of whale sightings during a whale watching trip.
4. Run the model and generate the projected demand expected from a mature whale watching industry. Test for sensitivity to underlying parameter estimates and assumptions.
5. Model the process of transition from the first introduction of whale watching to its maturity as a commercial activity that has found its place in the broader economy. The concept of a product life-cycle provides a useful framework and has been applied to whale watching in the report of a 1997 workshop on the development of whale watching (IFAW 1999). The first column of table 6 describes the broad commercial stages, starting with the initial discovery and exploration of the commercial opportunities, moving through a phase of rapid growth, and eventually consolidating and settling down to growth that is commensurate with the growth of the economy as a

whole. The remaining columns describe the community and operator reactions that may be associated with each stage in the development of whale watching in a particular region. Related aspects of the transition profile are (a) the diffusion of whale watching from country to country and (b) product differentiation, particularly in terms of the quality of interpretative information that is provided.

Table 6 Stages in the development of a whale watching site

Life cycle stage, or stage in commercial development of a new product	*Associated community reactions*	*Associated operator reactions*
Discovery	Euphoria	Cynicism
Exploration	Tolerance	Cynicism
Rapid growth	Annoyance Antagonism	Competition Confrontation
Consolidation	Adaptation	Co-operation
Stability	Acceptance	Stability

Source

IFAW 1999: 31-34

The existing consumer demand studies would inform steps one and two of such a program of work. Other useful information could be obtained from the empirical literature on the demand for recreational services, tourism and wildlife tourism. A stocktake of empirical requirements and information gaps would help to determine the need for updated or additional studies of demand for whale watching.

A rigorous empirical approach to the projection of demand draws attention to issues that are otherwise difficult to assess or easy to overlook. For example:

- The development of new whale watching sites may divert demand from existing sites. This could be quantitatively significant where the alternative viewing sites are geographic neighbours and visitors from the local region have a realistic choice. It can also be quantitatively significant where the sites and the potential visitors are far removed from each other. For example, a German whale watcher may regard whale viewing opportunities in the Caribbean and the South Pacific as close substitutes.
- Resource managers may be concerned that measures to recover management costs will divert visitors to competing sites, or create perceptions of such a diversion.
- It is theoretically possible for cetaceans to become so abundant that demand can be satisfied with fewer or shorter trips, reducing the amount of commercial activity that is required to meet the demand.
- A related issue is the extent to which whale watchers regard whale watching as a durable good, that is, an experience that is positively valued by the purchaser long after the actual purchase and visit. Some people would regard whale watching as a ‘once in a lifetime’ activity or at least as an experience that lasts and would not be repeated regularly. Others would go whale watching at every opportunity and would look to constantly refresh

the experience. The mix of these extreme types and of all the intermediate types is important for the future of whale watching activity. Mature viewing sites will come to rely more and more heavily on repeat business – that is, after they have worked through the stock of first time visitors – and the nature of that repeat business may not be well understood.

The scope of any comprehensive exercise in demand analysis is an issue. The discussion has been in terms of projections of global demand for whale watching and its distribution between regions, but the scope could be narrower or wider. For example, a narrower exercise may focus on a particular region or class of regions. Or the exercise could be broadened to include all forms of marine wildlife tourism and possibly all forms of marine related tourism. Broadening the scope helps to ensure that important relationships, both competitive and complementary, are not overlooked. The additional study costs need to be weighed against the benefits.

Congestion costs and rationing of access

Congested viewing areas can be a problem for both cetaceans and for visitors, creating a need to manage the number and behaviour of visitors for the sake of both. Assuming that measures have been taken to protect the cetaceans, demand studies can help to assess the need for further measures to help visitors deal with each other.

Severe congestion can create a situation where visitors enjoy the experience more if they submit to some form of rationing. Rationing may take the form of a congestion charge or quantitative restrictions such limits on the number of boats or duration at the viewing site. Detailed demand studies may help resource managers to assess the need for rationing measures, for example, aiming to assess the impact of boat size and density on the quality of the whale watching experience, and the response of whale watchers to rationing measures like peak demand pricing.

Certainly, discussions with operators have indicated that congestion has become an issue at some viewing sites, but no quantitative studies on rationing demand have been identified.

Measures to recover costs and redistribute benefits

Similarly, detailed demand studies can provide policy relevant information about the impact of measures to recover management costs, impose minimum quality standards (such as interpretative services), or to restrict entry on the basis of residence, nationality or size of business.

For example, Rivera (2007) finds that whale watchers on the Pacific coast of Mexico enjoy substantial consumer surplus and says that, at least in theory, part of the consumer surplus can be transferred to the producers, namely the tour operators. The matter was also considered in some detail by Schwoerer (2007) who concluded that there was considerable opportunity for Mexican tour operators to raise prices, and that the reasons for the current rather low levels of prices were not clear. He argues strongly against any future increase in the number of tour operators (and possibly boats), as such an increase would depress prices in a struggle for market share. More broadly when considering the worldwide picture,

there seems to be some evidence that operator licensing schemes are designed to limit competition and put a floor under prices, not just to manage visitor congestion and their impacts on cetaceans.

Whether price increases improve net returns to producers depends on the price elasticity of demand, that is, the extent to which the demand for whale watching would fall as prices rise. Schwoerer analysed the impact of price rises on demand using an estimate of price elasticity derived from Larson & Shaikh (2003) [2]. He found that returns to tour operators were maximised at a price approximately double the existing price.

[2] Price elasticity was estimated at -0.5571, which means that whale watching would fall by 5.5% in response to a 10% increase in price. The demand estimate was derived for US whale watchers, but applying it to Mexico appears reasonable given the predominance of US visitors at Mexican whale watching venues.

5 Passive use value and alternatives to monetary valuation

The non-consumptive value of a resource is the sum of its values in both active and passive non-consumptive uses. All of the discussion to this point has been in terms of the active component only, predominantly whale watching. This chapter is concerned with techniques that provide a holistic valuation of the resource, including passive use values. Passive use value can be significant. It arises because people value the simple existence of cetaceans and would regret their loss even in the absence of personal opportunities for, or interest in, active non-consumptive use.

Section 5.1 is concerned with the valuation of non-consumptive use in monetary terms. Section 5.2 briefly outlines some alternatives to monetary valuation.

5.1 Willingness-to-pay for non-consumptive use

The stated preference methods that have been used to value active non-consumptive uses (section 4.2) can also be applied to the passive component. In this case, however, survey respondents are asked about their willingness to pay (WTP) into a fund that will be used to deliver some environmental outcome, such as the protection of a species or a specified increase in the species population. It is explained to survey participants that payments in any such scheme would be mandatory, allaying fears that others could free-ride on the goodwill of a few.

Table 7 reports estimates from the available studies, with results reported separately for people who watch whales and for the general population. People who are surveyed at or near the time they watch whales are likely to express a higher WTP than the general population. Possible explanations for the observed difference in values include: (a) a component of active non-consumptive use values (that is, the consumer surplus from whale watching) are included in the stated WTP, (b) they probably have more information about the issues, and (c) their subjective values are revealed by the fact that they watch whales. The estimates are consistent with these expectations. Note that one study (Loomis et al 2004) has reported for both and provides a direct comparison.

The reported estimates are also consistent with the notion of declining WTP for successive marginal increases in the environmental outcome. For example, the WTP for a 100% increase in a whale population is less than twice the WTP for a 50% increase. A factor in the high estimate for Hervey Bay is that respondents interpreted the environmental outcome as preventing the extinction of an existing population, not an increase in the population. People may be very concerned to avoid extinction but, as the species population grows and the risk of extinction recedes, people are less willing to spend more money on conservation measures.

Table 7 Estimates of willingness to pay (WTP) for the non-consumptive use of cetaceans

Authors	*Year published*	*Location*	*Year of survey*	*Environmental goal*	*WTP US$/year, 2008 prices*
			Sub-population of whale watchers		
Loomis & Larson*	1994	California	1991/92	50% increase in gray whales	US$34
				100% increase in gray whales	US$40
Larson, Shaikh & Layton*	2004	California	1991/92	50% increase in whale population	US$26-31
				100% increase in whale population	US$32-39
Wilson & Tisdell	2003	Hervey Bay	2000	Protect humpback whales for 10 years on an annual basis	US$101-128
			General population		
Loomis & Larson*	1994	California	1991/92	50% increase in whale population	US$22
				100% increase in whale population	US$25
Rudd	2007	Atlantic coast of Canada	2006	North Atlantic right whales: increase population 25%-100%	US$22-33
Olar et al	2007	St Lawrence Estuary	2006	Beluga: recovery from 'threatened' to 'special concern'	US$92
				Beluga: recovery from 'threatened' to 'not at risk'	US$105
				Recovery: beluga & harbour seal to 'not at risk'; blue whale from 'endangered' to 'threatened'	US$208

Note
* These studies use the same dataset, a survey conducted in California in the winter of

In addition, it has been well documented in the literature on environmental valuation that estimates of willingness to accept a loss is substantially greater (at least several times) than willingness to pay for a gain of the same magnitude. Only the Hervey Bay study made estimates of willingness to accept losses.

One complication with WTP studies is that actions to promote the recovery of one species may provide benefits for other species at minimal or no additional cost. An example where this is taken into account explicitly is shown in the final row of entries for study on the St Lawrence Estuary in Canada for the case of three species jointly: beluga whales, blue whales and harbour seals.

5.2 Alternatives to monetary valuation

The valuation of environmental qualities in monetary terms, as outlined in previous sections, is an area of vigorous debate at both the theoretical and applied levels. When, to save time and resources, experimentally determined estimates of environmental valuation are applied at sites other than where they were obtained using the process of 'benefit transfer', a whole new set of issues needs to be addressed. Some commentators have investigated alternative approaches to monetary valuation, and to benefit transfer in particular, to inform decisions about resource conflicts that involve non-market impacts, since this is ultimately the purpose of environmental valuation and the social cost benefit analysis in which it tends to be imbedded.

Spash and Vatn (2006) have identified three broad approaches that go beyond economic valuation, and the discussion here is based largely on their paper.

The first approach is to deal explicitly with the motivation for people's preferences, aiming to address any disconnect between values derived from stated preference surveys and actual observed utility. (In contrast, economics takes preferences as a given and does not concern itself with how these preferences are formed.) Motivational measures have attracted substantial interest in behavioural research within the field of social psychology, and can provide quantitative scales of public opinion. This approach may provide more meaningful insights than economic values for the support of certain behaviour, such as recycling. In the case of whales, the most important dimension may be ethical considerations that transcend gains of an economic nature.

The second approach is multi criteria analysis (MCA) which, as the name suggests, is used to assess options with multiple values. MCA involves identifying a number of policy criteria and then scoring each criterion for each option. The criteria are often weighted in accordance with their perceived importance. Some of the criteria could well be monetary values (whether market based or derived from non-market situations). MCA expressly considers impacts that are difficult to incorporate in a conventional CBA framework based on the theory of welfare economics. Ultimately, the strength and weakness of the MCA approach are driven by the quality of the judgement of the stakeholders that participate: these may well have greater depth of understanding of certain matters associated with the policy issue in question, but at the same time there is no attempt to measure community wide preferences and values. MCA maybe reported in the same document as an economic assessment such as cost benefit analysis but there is little common ground between the two broad approaches.

The third approach is to make greater use of stakeholders or the general public in the deliberative process. Some of the processes that could be adopted include citizens' juries and focus groups. It should be noted that the implementation of MCA in practice often takes on the form of this third approach, where agreement is reached on the scores and the weightings for the various criteria by a process of discussion and negotiation amongst stakeholders. More broadly, explicit stakeholder involvement can be viewed as an attempt to make decisions that take into account society based views, moving away from the emphasis on individuals

found in much of economics, and which calls into question some of the underlying basis for stated preference techniques. There remain uncertainties with this third approach as to how representative the group members are, and just which views are being represented (individual, group or society).

5.3 Applications and issues

It is difficult to know what weight policy makers might give to estimates of WTP for the non-consumptive use of cetaceans. It may be difficult to justify the cost of such studies in the absence of a management structure that is prepared to take account of such estimates.

There may be value in having a more systematic understanding of the impact of information and education on WTP for conservation measures.

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