SUSTAINABLE ECOTOURISM ON ATLANTIC ISLANDS, WITH SPECIAL REFERENCE TO WHALE WATCHING, MARINE PROTECTED AREAS AND SANCTUARIES FOR CETACEANS

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ABSTRACT

Ecotourism in the Atlantic islands region is well-established and growing. Still, in the whale watching and marine tourism sector, many so-called ecotourism enterprises fail to achieve the minimum standards required to qualify as ecotourism. In the Atlantic islands area, approximately 1.7 million people a year go whale watching, with a total expenditure of US$133 million. In this region, the 90 existing marine protected areas (MPAs) where cetaceans are present and the 59 proposed MPAs represent nearly 27 per cent of all MPAs with cetaceans worldwide. When whale watching is conducted in a sustainable manner, especially in or near a cetacean MPA, and with other regulations in place, it has the capacity to take a leading role in the development of an island-based ecotourism industry. Yet few MPAs have management plans that include strategies for sustainable ecotourism.

Sustainable ecotourism depends, firstly, on the maintenance of a pristine natural environment. Using a cost benefit analysis approach (CBA), managers can enhance the benefits or values of ecotourism and reduce the costs. CBA can be a key part of a framework for sustainable ecotourism that includes a stakeholder-agreed management plan, a legal structure, such as an MPA, together with environmental legislation and a strategy for evaluating sustainability that includes periodic review. The management plan should also set a carrying capacity for ecotourism.

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INTRODUCTION

Whales and dolphins, along with designated marine protected areas (MPAs), link the islands of the Atlantic from its northernmost reaches off Svalbard and Greenland to the far south in the Falkland Islands (Islas Malvinas) and Tristan da Cunha. With migrations stretching over 8,000km, humpback whales (*Megaptera novaeangliae*) travel from the Marine Mammal Sanctuary of the Dominican Republic in the Caribbean, sometimes stopping in the protected waters of Bermuda, swimming on to the waters of Newfoundland, Greenland and Iceland. Comparable journeys are made by humpbacks and other baleen whales in the southern Atlantic hemisphere, in the proposed South Atlantic Sanctuary (Government of Brazil 2001; Hoyt 2005).

In all, some 62 species of whales, dolphins and porpoises (cetaceans)—out of the total 84 cetacean species worldwide—are found in the Atlantic Islands region (Hoyt 2005; Reeves *et al*. 2003). Although no cetacean populations use or move throughout the entire region, three toothed whale species and three baleen whale species can be found in any part of the region. These are the orca or killer whale (*Orcinus orca*), long-finned pilot whale (*Globicephala melas*), sperm whale (*Physeter macrocephalus*), minke whale (*Balaenoptera acutorostrata*), fin whale (*Balaenoptera physalus*), as well as the humpback whale (*Megaptera novaeangliae*). Five large whale species (or key populations in the Atlantic) are considered endangered, their numbers remaining greatly reduced as a result of whaling; fin whale (*Balaenoptera physalus*), sei whale (*Balaenoptera borealis*), blue whale (*Balaenoptera musculus*), bowhead whale (*Balaena mysticetus*) and North Atlantic right whale (*Eubalaena glacialis*), (Reeves *et al*. 2003). One population, the Atlantic gray whale (*Eschrichtius robustus*), has been extinct since at least the early eighteenth century.

A growing network of MPAs—some to protect cetaceans, others to help manage whale watching and marine tourism, and still others with broader marine mandates—provides further links to large parts of the Atlantic region (Table 1). For the purposes of research and conservation through MPAs, the World Commission on Protected Areas (WCPA), a commission of the World Conservation

Table 1—Extent of whale watching, marine protected areas (MPAs) and sanctuaries on Atlantic Islands.

Island or archipelago	*Whale watchers × 1000*	*Whale watch expenditure × millions US$*	*MPAs with cetaceans*	*Proposed MPAs with cetaceans*	*Marine mammal sanctuaries*
Newfoundland (Canada)	137.6	19.93	0	1	0
Grand Manan Island (Canada)	14.0	2.643	1	1	0
Cape Sable, Sable and Digby islands, Nova Scotia (Canada)	14.0	2.643	2	0	0
Baffin Island (Canada)	0.62	0.307	1	1	0
St. Pierre et Miquelon (France)	0.61	0.094	0	0	0
Bermuda (UK)	0.18	0.020	0	0	1
Bahamas	1.80	2.97	7	0	0
Turks & Caicos Islands (UK)	1.50	0.150	1	1	0
Cuba	Low	Low	8	11	0
Jamaica	Low	Low	1	0	0
Dominican Republic	22.28	5.2	2 (1)	1	0
Puerto Rico (US)	55.00+	0.65	0	0	0
US Virgin Islands (US)	0.08	0.008	0	0	0
British Virgin Islands (UK)	0.20	0.014	0	0	0
Bonaire (Netherlands)	0.20	Low	0	0	0
St. Kitts & Nevis	0.05+	Low	0	0	0
Guadeloupe and St. Barthélemy (France)	0.40	0.023	1	0	1*
Dominica	5.00	0.97	1	0	0
St. Lucia	0.065	0.008	1	0	0
St. Vincent & the Grenadines	0.60	0.1	0	0	0
Grenada	1.80	0.27	0	0	0
Venezuela (islands)	Low, inc.	Low	0	1	0
Abrolhos archipelago (Brazil)	2.43	0.364	1	0	0
Fernando de Noronha (Brazil)	23.00	2.3	1	0	0
Anhatomirim, Santa Catarina Island (Brazil)	120.00	4.0	1	0	0
Falkland Islands (Las Malvinas) (UK)	Low	Low	0	0	1
Tristan da Cunha (UK)	None	None	2	0	1
Svalbard (Norway)	Low, inc.	Low	10	1	0
Iceland	30.33	6.47	1	1	0
Greenland (Denmark)	2.50	2.75	2	0	0
Faeroe Islands (Denmark)	Low	Low	0	0	0
United Kingdom	121.13	8.231	0	6	0
Ireland	177.60	7.119	0	8	1
Sylt (Germany)	Low, inc.	Low	2 (1)	0	0
Ouessant, Sein, Molène archipelago, Iles d'Hyères, Corsica (France)	0.50	0.341	2	2	0
Azores (Portugal)	9.50	3.37	17 (1)	0	0
Madeira (Portugal)	Low	Low	1	2	1
Tuscan, Pontino Campano, Egadi, Ventotene & Santo Stefano, Maddalena, Sardinia, Sicily, etc. (Italy)	Low, inc.	Low	8 (3)	2	0
Losinj (Croatia)	0.021	0.018	0	1	0
Crete, Kalamos (Greece)	3.68	0.261	0	2	0
Malta	Low	Low	1	2	0

Table 1 (*Continued*)

Island or archipelago	*Whale watchers × 1000*	*Whale watch expenditure × millions US$*	*MPAs with cetaceans*	*Proposed MPAs with cetaceans*	*Marine mammal sanctuaries*
Baleares, Tabarca, Alboran, Columbretes (Spain)	Low, inc.	Low, inc.	1	14	0
La Galite (Tunisia)	None	None	2	0	0
Canary Islands (Spain)	1,000.00	62.195	12	1	1★
Total for Atlantic islands	1,746.67	133.42	90 (6)	59	5 + 2★
Total worldwide	9,020.20	1,049	358 (4)	176	19 + 4★

Low, inc. = low but increasing income; ★ = proposed marine mammal sanctuaries.
Source Hoyt (2001; 2005).
Notes:
(1) Numbers in parentheses are MPAs with cetaceans that are due for expansion.
(2) MPAs do not include national or international cetacean sanctuaries, or MPAs found in overseas island territories belonging to each country.
(3) Total expenditure listed in column 3 includes ticket price, accommodation, transportation, and other tourist expenditure during whale watching.
(4) Data for 2003 from the Canary Islands shows 500,000 whale watchers due to stricter controls and permits since the reported number in Hoyt (2001).

Union (IUCN), divides the Atlantic region into six separate marine regions and parts of three others (Kelleher *et al*. 1995). Regional agreements in the Caribbean and the Mediterranean are developing MPA networks and providing models for regional conservation agreements affecting cetaceans, whale watching and marine ecotourism. In the UK, Ireland, the Canary, Azores and Madeiran archipelagos and across the European Union, Special Areas of Conservation (SACs) are currently being designated to protect habitats and species. Brazil, too, has the beginning of MPA networks, with its protected offshore reefs and islands. The most ground-breaking initiative, however, is the substantial (87,492km^2) Pelagos Sanctuary for Mediterranean Marine Mammals which surrounds Corsica and borders Sardinia and includes the national and international (high-seas) waters of France, Italy and Monaco (Notarbartolo di Sciara *et al*. 1991). This first high-seas MPA is the remarkable result of cooperation between three countries and it builds on more than a decade of cetacean studies in the area. The management plan should provide fine-detail, critical habitat protection, at the same time allowing the development of sustainable whale watching and other marine ecotourism opportunities, which already occur at a modest level.

Elsewhere in the region, there are three proposed international cetacean sanctuaries, two near the UK and Ireland and one covering the South Atlantic (Table 2). Five countries or overseas territories have national cetacean sanctuaries (Bermuda, the Falklands, Ireland, Madeira and Tristan da Cunha), which include all or most of their waters. Two other countries have proposed national sanctuaries, Guadeloupe and the Canary Islands (Table 3). There are at least 90 existing and 59 proposed MPAs in the region that have cetacean habitats, representing about 28 percent of all MPAs with cetaceans worldwide (Hoyt 2005). Few of these MPAs have management plans with strategies for sustainable marine ecotourism, though in many cases they are under consideration (Hoyt 2005).

There is no overall estimate of the value of the marine tourism industry worldwide or in the Atlantic region, but for island and coastal communities, it often forms the most important economic activity (Miller 1990; Hoyt and Hvenegaard 2002). The marine tourism industry ranges from one-person operations such as charter fishing boat operators, sea-kayak tour guides and scuba diving instructors to multinational cruise-ship companies (Orams 1999; see Table 4). The portion of the industry involved with marine wildlife varies, with a New Zealand study reporting that over 65 per cent of all marine tourism businesses focus primarily on marine mammals and sea birds (McKegg *et al*. 1996). In the Atlantic islands area, approximately 1.7 million people a year go whale watching, spending at least US$133 million in total expenditure (Hoyt 2001). This represents 19.4 per cent of the whale watchers worldwide and 12.7 percent of the total annual expenditure on whale watching worldwide (Table 1).

Whale watching has been on both the leading and the trailing edge of ecotourism. The leading edge because whale watching in the North Atlantic goes back to the 1970s when it adapted some of the best traditions of land-based nature interpretation to introduce large numbers of people to marine

wildlife and ecology (Hoyt 2002). MPAs with cetaceans have also played a small, but growing, role in terms of establishing a framework for managing ecotourism and making sure it remains sustainable.

Yet whale watching, in some areas of the Atlantic, has also been on the trailing edge of ecotourism, capitalising on the name but failing to reach minimum standards for good ecotourism practice. Whale watching off Tenerife in the Canary Islands provides a clear example. Beginning in the late 1980s, it ranged from sprawling mass tourism described as unregulated, unlicensed 'marine drinking tours' to ad hoc 'rip-off' tourism. Whales were harassed, and often misidentified, if identified at all. Some of the blame must go to several decades of all-out mass tourism development in the Canary Islands, which has put a strain on infrastructure and led to an atmosphere of complacency and opportunism. With whales and dolphins reliably close to shore year-round, good weather on 315 of 365 days a year, the Canary Islands, in terms of whale watching, could be said to have squandered and compromised its natural assets to a greater extent than probably anywhere else in the Atlantic region. However, since the late 1990s, the situation in the Canary Islands has started to improve as concerted efforts have been made to establish and enforce regulations, including initiating a boat permit system and educating tourists and, more importantly, educating certain operators and drivers (Urquiola *et al*. 1999). It is wiser to strive to make whale watching and ecotourism sustainable from the start.

SUSTAINABILITY AND ECOTOURISM

The concept of sustainability began dominating tourism debates following the UN Conference on the Environment and Development (UNCED), the Earth Summit in Rio de Janeiro in 1992. The key phrase enshrined in Agenda 21—Action Program for Sustainable Development, was that 'Only whatever can be sustained by nature and society in the long term is permissible'. Sustainability as an idea had already been planted in the 1970s by the attempt of the Organisation for Economic Cooperation and Development (OECD) to establish a framework for the study of environmental stress created by tourism and other activities. In 1980, the World Conservation Union (IUCN) and the World Wide Fund for Nature (WWF) published the World Conservation Strategy. But UNCED Agenda 21 was the first time that a comprehensive programme of environmental actions, designed to steer global activity onto a sustainable course, was adopted by 182 governments (Cooper *et al*. 1998). Still, the agreement itself was not legally binding or enforceable and has relied on the good will of individual countries to devise legislative frameworks and put them into practice in their own countries and in areas where regional initiatives exist. The idea of sustainability in the overall tourism industry has had a tremendous impact on environmental thinking, but it was perhaps a mistake to think that dramatic changes and the universal establishment of sustainability could occur overnight, even if national leaders did give tacit acceptance to the idea of sustainable development.

The idea of sustainable tourism has fuelled the growth and popularity of ecotourism (Orams 1999). Ecotourism is easier to define than sustainability, but just as misused in its application. Many businesses, from small motorboat whale watching in the Canary Islands to giant cruise ships carrying several thousand passengers to the Caribbean, have been described as ecotourism. The 'eco' label itself has cachet suggesting special quality, high-value and exclusivity, so abuse of the label is not surprising (Orams 1999). In 1991, the International Ecotourism Society defined ecotourism as 'responsible travel to natural areas that conserves the environment and sustains the well being of local people.' The World Conservation Union (IUCN) expanded this definition in 1996 as follows: 'Ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to

Table 2—International cetacean sanctuaries and high seas MPAs—existing and proposed—in the Atlantic islands region.

Name of international sanctuary or MPA	*Status*	*Location*
Celtic Shelf Break MPA	Proposed	Celtic Sea, North Atlantic
Dogger Bank SAC	Proposed	Dogger Bank, North Sea
Pelagos Sanctuary for Mediterranean Marine Mammals	Agreed 1999	Ligurian Sea (central Mediterranean—waters of Italy, France and Monaco)
South Atlantic Sanctuary	Proposed	South Atlantic Ocean

Adapted from Hoyt 2005.

enjoy and appreciate nature (and any accompanying cultural features, both past and present) that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations.' A useful description of the defining characteristics of ecotourism, arranged according to Leiper's tourism model (Leiper 1990), divides tourism into (1) generating region — ecotourism demand, i.e. the visitor, (2) destination region and (3) transit zone — transport considerations — socio-economic and environmental considerations in the host community or island, see Table 5. All three aspects need to be considered in any discussion of ecotourism.

WHALE WATCHING AS A CASE STUDY FOR SUSTAINABLE ISLAND ECOTOURISM: APPLYING COST BENEFIT ANALYSIS (CBA) TO EVALUATE WHALE WATCHING AND ENCOURAGE SUSTAINABILITY

Whale watching tours illustrate how to evaluate sustainable island ecotourism. At the most basic level, sustainable ecotourism means that the resource — the whales and dolphins and the marine habitat — must not be degraded or overexploited. Thus, it is important to enhance the numerous whale watching benefits (educational, scientific, recreational and commercial) to offset the costs, while devoting equal attention to managing and reducing the costs. Benefits are equivalent here to values and services (International Fund for Animal Welfare 1999). Environmental and social costs include hidden costs. Using cost-benefit analysis (CBA), it is possible to harness the various tools of the environmental economist to evaluate and guide the improvement of the quality of whale watching and ecotourism, and to help make it sustainable (Hoyt 2004). CBA is usually done by evaluating all the various benefits, values and services, as well as costs of a particular resource, and then comparing with other options for use and non-use, in the same or other areas. But it is also possible for operators, managers and biologists to use CBA to help enhance the value of whale watching and make it sustainable.

There are no cost benefit analyses available for whale watching, but such studies have been done for forest resources, coral reefs, protected areas, as well as the tagging of Hector's dolphins in New Zealand. Typically, these analyses compare options of various actions or uses versus non-use of resources (Hoyt 2004). In the Hector's dolphin study, a decision analysis framework was used to model the tagging of the dolphins to try to clarify the costs and benefits of such invasive work to conservation (Johnston and Read 2003). Decision trees are extremely flexible models which are often used in CBA of human medical situations. They can employ assigned values and/or real-world monetary costs, as appropriate.

A complete CBA for whale watching would list all the benefits, values and services from whale watching, expressed in a common currency, and then subtract all the costs associated with whale watching. The Socio-economic Aspects of Whale watching Workshop produced a list of all the categories of potential benefits from whale watching (International Fund for Animal Welfare 1999; see Table 6). These include educational, scientific, recreational, cultural, heritage, social, aesthetic and financial benefits, as well as benefits accruing to ecological services. Each of these benefits must be further analysed according to whether it is a use value (direct or indirect) or non-use (existence, bequest, option, quasi-option; see Table 7). When all the categories of benefits are

Table 3 — National cetacean sanctuaries — existing and proposed — in the Atlantic islands region.

Name of national sanctuary or MPA	*Status*	*Location*
Bermuda Whale Sanctuary	Designated 2000	EEZ limit
Canary Islands Cetacean Marine Sanctuary	Proposed 1990s	Undetermined (EEZ limit?)
Falkland Islands Marine Mammal Sanctuary	Designated 1992	EEZ limit
Guadeloupe Sanctuary, or Sanctuary of the South Antilles (Sanctuaire Caribéain du Sud Antilles)	Proposed 2003	Undetermined (EEZ limit?)
Irish Whale and Dolphin Sanctuary	Designated 1991	EEZ limit
Madeiran Marine Mammal Sanctuary	Designated 1986	EEZ limit
Tristan da Cunha Cetacean Sanctuary	Designated 2001	EEZ limit of Tristan da Cunha and Gough Island

EEZ = exclusive economic zone
Adapted from Hoyt (2005).

accounted for, it is possible to come up with 'total economic value'.

Potential costs from whale watching (Table 8) include pollution from boats, litter, trampling of sensitive coastal areas, exhaust emissions from transport of visitors to a site, the immediate social or long-term environmental strain on a community's infrastructure, and, more directly, the possible disturbance to individual whales or the reduced fitness of whale populations (Hoyt 2001; 2004).

Table 4 — Stakeholders in the marine tourism industry.

One-person operations:
- charter fishing boat operators,
- sea-kayak tour guides,
- scuba diving instructors and
- land-based whale watching guides.

Medium-size operations:
- whale watching fleets,
- marine nature watching boats and
- charter-yacht companies.

Large and multi-national corporations:
- cruise-ship companies.

Supporting businesses:
- coastal resorts,
- scuba tank-fill shops,
- wind-surfer rental shops,
- fishing equipment suppliers,
- island ferry services,
- souvenir shops,
- boat maintenance shops,
- artists and
- rubbish collectors.

Government agencies:
- marine park management authorities,
- fisheries control officers,
- tourism marketing and promotion boards,
- law enforcement agencies and
- marine safety organisations (coast guard, navies, etc.).

Non Governmental Organisations (NGOs):
- clubs for scuba diving,
- surf clubs (e.g. doing lifesaving),
- yachting,
- wind-surfing,
- surfing,
- fishing and
- conservation groups involved in ecosystem or wildlife protection.

Researchers:
- wildlife biologists and
- tourism researchers.

Adapted from Orams (1999).

Some of these costs are social or economic; others are common to tourism in general, while others are environmental costs specific to marine waters or to marine wildlife itself. Costs to be calculated are associated mainly with destination and transit regions.

Some of the categories of specific benefits and costs listed in Table 6 and Table 8 are difficult to evaluate. However, they may be ranked in importance by constructing an evaluation matrix, such as has been done for logging versus conservation options (OECD 1986). An evaluation matrix is a method for visualising cost-benefit analysis (CBA). A proposed evaluation matrix for whale watching (Table 9) uses hypothetical numbers to show how the matrix might work in a comparison between mass tourism and ecotourism whale watching options. Number values for 'effects', as listed in the table, can come from biological and tourism data or from surveys, and can be expressed in dollars, Euro or any local currency. Many other parameters could be listed and compared, and more options could be added. The values assigned are hypothetical for illustrative purposes only. In CBAs of whale watching, the actual numbers do not matter so much as establishing relative numbers, each with an economic value in relation to the selling price of the whale watch tour. The various benefits, values and services, and costs, should have numbers that are perceived as generally fair and logically related to each other. By assigning value to educational, scientific and other benefits associated with whale watching, it means that all the stakeholders (managers, biologists, operators, community) pay more attention to them, see them as valuable, and are able to grasp the concept of increasing benefits and reducing costs. The ideal might be described as high quality, sustainable whale watching, or 'sustainable marine ecotourism'. The key elements are: (i) good, long-term financial management, (ii) scientific input and output, (iii) attention to conservation, (iv) focus on people (local and visitors) and community relations, (v) educational input and output, (vi) enhancement of other benefits (as listed in Table 6) and (vii) reducing the costs listed in Table 8 (Hoyt 2004). Such analyses are necessary to determine a 'sustainability index'. Hoyt (1998) surveyed the state of whale watching for scientific, educational and conservation benefits, and found, among other symptoms of non-sustainable whale watching, that 48 per cent had no educational commentary. Only 35 per cent of all trips were guided by naturalists: 57 per cent had never conducted or assisted with research and only nine per cent of operators carried cetacean researchers. Overall, a little more than half of all whale watching worldwide is purely commercial.

One example of a preliminary attempt to put a value on scientific work is the estimate of the facilitation of whale researchers for the Gerry E. Studds Stellwagen Bank National Marine Sanctuary in southern New England, US. On seven of the 22 main whale watch boats, for 100–150 days a year, they provided support for research that would otherwise have cost US$875,000 (Hoyt 1994). This benefits the whale watch companies, which obtain first hand information on where the whales can be found, and it also provides benefits to research bodies including sanctuary managers who have some of their basic research needs covered through work conducted on commercial watching boats. In fact, these researchers also acted as naturalists on the boats and provided an education programme for the sanctuary and for the resource at less cost than dedicated guides. If the sanctuary, the community or whale watch operators had to fund these educational and scientific benefits separately, it would be costly.

Table 5 — The three regions characterising the ecotourism system.

Generating region: demand for ecotourism [from a visitor or visitors]
- is purposeful;
- is poorly documented;
- desires first-hand experience/contact with nature/culture;
- has the motive to study, admire and/or enjoy nature/culture;
- is tempered by the need to consume tourism responsibly;
- can be segmented in many ways including by level of commitment, physical effort, motives etc; and
- comes from tourists who are older, better-educated and with a higher income than the average tourist.

Destination region: destinations for ecotourism
- are relatively natural areas which are undisturbed and/or uncontained;
- have attractions of scenery, flora, fauna and/or indigenous culture;
- allow ecotourism to deliver economic and conservation benefits to the local people;
- develop ecotourism with a view to conserving/enhancing/maintaining the natural/cultural system;
- apply integrated planning and management techniques;
- apply environmental impact and auditing procedures to all elements of the tourism destination (such as accommodation, facilities); and
- encourage local ownership of facilities.

Transit zone: transport for ecotourism should
- be of environmentally low impact in terms of noise, emissions, congestion, fuel-consumption and waste;
- monitor emissions, environmental impact, etc.;
- promote the conservation ethic;
- be used as a management tool;
- encourage use of public transport; and
- encourage the use of locally owned transport companies.

Adapted from Cooper *et al*. (1998, p. 7), using Leiper's tourism model (Leiper 1990).

In some areas, naturalists or whale watch guides are the key to high quality whale watching (Hoyt 2001). Trained naturalists may in some cases help ensure compliance with regulations and care taken around whales (Hoyt 1994; IFAW *et al*. 1997). This ensures a high benefit-to-cost ratio and puts whale watching on the road to sustainability. Tourists generally prefer more educational whale watch tours, making these more economically successful as well (for example see, Amante-Helweg 1996; Orams 1997; Kellert 1999; Duffus and Dearden 1990).

If the idea of enhancing whale watching can be instituted in an area, periodic independent evaluations — or performance reviews — could be made of individual operators, as well as of entire whale watch communities (Table 10). Those with high benefit-to-cost ratios could be taxed at a lower level or given some other award in recognition of their effort to improve sustainability. In areas where ticket surcharges or levies are made to raise funds for research, education and protection, for example, Hervey Bay, Australia and Samaná Bay, Dominican Republic, levies could be reduced for good performance while poor performance could incur a surcharge. In effect, an operator has the choice of helping managers with research and education through provision of services on their boats and through the orientation of their whale watch tours, or they face having to pay the managers through the surcharge. Such a surcharge could be placed on the ticket price on the principle that the user helps to pay for the care and maintenance of the resource (L. Bjeder, pers. comm.).

FRAMEWORK FOR SUSTAINABLE DEVELOPMENT OF WHALE WATCHING AND ECOTOURISM

Cost-benefit analysis (CBA) may be the key starting point for the measurement and evaluation of sustainable whale watching and other ecotourism,

Table 6—Potential values (benefits and services) from whale watching.

Type of value, benefit and service provided by whale watch industry	*Explanation of value created by the existence of whale watching*
Recreation	Provides recreational value (enjoyment).
Scientific	Generates scientific value (increased knowledge about cetaceans, their habitat, etc.). Scientific value includes information about ecological services provided by cetaceans through the process of whale watching. 'Ecological services' implies the [human] life-support function provided by the continued survival of whales within the ocean ecosystem. See full definition of Ecological [services] function value below.
Education	Generates educational value.
Financial	Contributes to the financial stocks and flows of the economy.
Cultural	Contributes to cultural values (community identity, community solidarity).
Heritage	Can play an important role and contribute to heritage values (benefits to community, local cultures).
Social	Contributes to the social values (opportunities to be together with family, friends) and includes the impacts of the social experience of the local host community and impact on issues such as social equity and income distribution caused by the arrival, presence or changes in the local whale watch industry.
Aesthetic	Contributes aesthetic value—scenic beauty, whales and other wildlife scenery, serenity of the ocean experience.
Spiritual/psychological	Value provided to society through perceived sense of connection based on culture, mythology and psychological aspects such as increased self-esteem, sense of accomplishment, and health benefits.
Political	The political impact caused by the existence of the whale watch industry and from information participants obtain on whale watching trips.
Vicarious experience	The experience from listening to the stories of those who have been whale watching.
Remote viewing	Value derived from observing whales on TV, in books, magazines, DVDs, and the Internet, which would not have occurred without the existence of whale watching.
Environmental quality (amenity) value	The environment may be valued because it is of a certain level of physical quality. This quality may be closely related to the functional condition, or it may be only partially related. The physical quality of an environment is of itself a direct service which society may choose to value. This includes environmental disturbance quality, defined below.[a]
Ecological (services) function value	Ecological functioning provides many services that underpin the existence of humanity and the condition of the planet. It is of value to our society that these services are provided and hence we have referred to this service as 'ecological function' value. Many whale watch sites have instituted ecological sustainability as a minimum standard beneath which ecological functioning should not fall. The ecological system of the whale watch sites consists of many components, from water run-off to marine plant life. It is up to the scientific member of the assessment team to delineate a comprehensive list of these functions and identify the impact of each option on each function.

Table 6 (*Continued*)

Type of value, benefit and service provided by whale watch industry	*Explanation of value created by the existence of whale watching*
Environmental disturbance quality	The environment may be of greater value because it is undisturbed. An environment can be used in an ecologically sustainable manner, with good environmental quality, while being very disturbed by human activity. The level of disturbance of an environment may make a contribution to the physical services it provides.
Combination value	Humans derive a range of values from whale watching as described above. In combination, some values are worth more than the sum of their parts. For example, a beautiful view combined with a high level of other ambient values may be more valuable than the two values when separated.

Source: International Fund for Animal Welfare (1999).

a Environmental quality, environmental disturbance quality, and ecological function values are sometimes grouped together as ecological services value. In fact, ecological services value could be said to consist of these three components. The physical existence of the environment around the whale watch sites provides services to humanity labelled as 'values'. These three items are intended to describe the physical characteristics of the object called 'environment' that are valued of themselves.

but it alone will not ensure that sustainability is achieved. It is essential to create a framework for achieving sustainable development through the engagement of all stakeholders (Berrow 2000). Berrow reported that the Shannon Dolphin and Wildlife Foundation (SDWF) was created in March 2000 in Ireland to formulate and implement a plan for the development of sustainable dolphin watching. A critical part of creating this framework was designating an MPA—the Shannon Estuary Special Area of Conservation. These and other efforts are very much works in progress and it is too early to evaluate them, but there is a need for many more communities to enter into the process. The following points aimed at instituting a sustainability framework incorporate some of those used by SDWF while others are added.

1. Every community or island needs a working implementation or management plan. This plan, devised with all stakeholders as contracting parties, should require:
   - baseline research on cetaceans;
   - an initial environmental impact assessment (EIA) for the intended marine tourism operations and supporting tourism businesses and infrastructure developments;
   - the determination of carrying capacity (K) through research;
   - overall policy goals for managing whale watching and ecotourism (pre-emptive versus reactionary; not just enforcement), founded on research and education funded by levies;

Table 7—Categories of each value (benefits and services) listed in Table 6.

Use values
- Direct use values are derived on-site from personal participation in whale watching.
- Indirect use values are generated off-site as a result of the whale watch experiences.

Non-use values
- Existence value: knowing that whale watching as an experience will continue to exist, regardless of any personal use, now or in the future.
- Bequest value: knowing that whale watching will continue to exist for future generations.
- Option value: knowing that whale watching will exist for one's personal use sometime in the future.
- Quasi-option value: information which will help one make a subsequent decision about participating in whale watching.

Source: Wells (1997) and International Fund for Animal Welfare (1999).

- generous reinvestment in the business to protect the resource;
- a generous margin or allowance to cover unforeseen events that would make whale watching and other ecotourism unsustainable;
- periodic review.

2. A legal framework such as a protected area and/or specific environmental legislation is needed and should include:
   - laws to control pollution, shipping and other potential impacts;
   - regulations through permits limiting, controlling and guiding best use;
   - guidelines to encourage best whale watch and ecotourism practice;
   - MPA legislation, specifying critical habitat protection for marine species;
   - design and implementation of effective enforcement regimes;
   - a research plan to monitor and protect the resource with education of stakeholders and tourists to foster a sense of responsibility toward the resource.
3. The development and use of cost-benefit analysis can help:
   - in the recognition that all tourism has some costs and a long-term, continuing effort must be made to enhance benefits and reduce costs;
   - visualise strategies and agreements to increase benefits and reduce costs;
   - encourage joint stakeholder participation and periodic review.
4. Communities/islands require a method of and strategy for determining sustainability and evaluating success and failure that utilises:
   - some form of regular environmental auditing paired with independent performance review of operators and communities both from stakeholders and from outside evaluators.

Environmental auditing and a performance review could take the form of a sustainability report card organized along cost-benefit lines. Such a report on benefits and costs will show areas where improvement is possible and needed. However, we need to recognise that, although a high benefit-to-cost ratio is ideal and that this tends to indicate sustainability, that it does not necessarily guarantee the sustainability of an activity. Thus, a sustainability report card also needs to include assessments of overall measures of sustainability and to consider the latest research on the resource being considered, complete with local, national and international status evaluations of populations, species and habitats.

Orams (1995; 1999, pp 72–93) divided tourist management strategies into four main categories: regulatory, physical, economic and educational. The first two strategies, regulatory and physical, which control tourist behaviour through external manipulation, have been the main approach to managing marine tourism to date. Economic and educational approaches are more recent and yet to be fully utilised.

Table 8—The costs of whale watching.

Destination region	
Ecological	Use of boat fuel and water pollution, litter in water from visiting whale watchers.
	Disturbance to whales and other wildlife (short- and long-term impacts).
Social	Job losses in some sectors, and loss of, or strain on, local services due to influx of tourists.
	Conflicts with local fishing, boat and other community interests due to perceived 'invasion' of whale watchers.
Economic	Infrastructure problems from more whale watchers.
	Cost implications of managing marine sector.
	Opportunities foregone?
Transit region	
Ecological	Jet plane and car-emissions (greenhouse effect).
Social	Implications of travel choice on greener alternatives not used
Economic	Implications of travel choice on greener alternatives not used

Based on Hoyt (2004) using the tourism model in Leiper (1990).

CARRYING CAPACITY

Central to the ecotourism and sustainability debate is the definition of the term carrying capacity and the effective use of the concept. Carrying capacity (K) has been defined as 'the maximum number of people who can use a site without an unacceptable alteration in the physical environment and without an unacceptable decline in the quality of experience gained by visitors' (Mathieson and Wall 1982, as discussed in Cooper *et al*. 1998). The value of this definition hinges on the interpretation of the word unacceptable. What is unacceptable? While the definition might represent a consensus of stakeholders, it might be argued that unacceptable should be replaced with 'any'; in the context of ecotourism there should be no negligible alteration in the physical environment and no decline in the visitors' quality of experience. There also needs to be a determination of 'number of people'. 'Tourist presence' is a more useful term that encompasses many factors such as average length of stay, tourist and host characteristics (including tourist behaviour), geographical concentration of tourists, seasonality, type of activities, accessibility of sites, infrastructure use and spare capacity (Cooper *et al*. 1998).

In ecotourism policy recommendations for Hawaii (Cooper *et al*. 1998, p. 187), carrying capacity was divided into ecological or biophysical (the maximum tourist presence beyond which ecological impact will occur in the natural environment), socio-cultural (the maximum use without causing negative effects on the host community and culture) and aesthetic or facility carrying capacity (the level beyond which the visitor satisfaction drops from overcrowding). All three of these aspects of carrying capacity must be considered, not just the ecological meaning of the phrase.

Carrying capacity (K) must be defined at the outset and made part of the original management plan subject to future discussion. Thus the stakeholders will need to analyse existing research on the resource and the ecology, determine gaps, and commission new research. There must be biological and ecological research, as well as human geography tourism research. There will also be a need to conduct multi-disciplinary research, for monitoring purposes, on a continuous or periodic basis. Stakeholders working on the management plan must allow a margin to cover unforeseen events that could make tourism unsustainable, as well as

Table 9—Possible evaluation matrix for whale watching adapted from OECD model.

Effects	*Definition of effect*	*Without whale watching*	*Option A: commercial whale watching mass tourism*	*Option B: High quality, healthy whale watching ecotourism*
I	Establishment cost ($K)	0	$1200	$1500
II	Operating cost ($K yr^{-1})	0	$200	$300
III	Whale watchers ($\times 10^3$ yr^{-1}) × unit expenditure ($K)	0	30 × $10 = $300	20 × $30 = $600
IV	Profit/rate of return	0/0	100K/8%	300K/20%
V	Number of visits ($\times 10^3$ yr^{-1})	10	100	100
VI	Quality of environment	4	3	3.5
VII	Protection of cetaceans	10	5	8–15
VIII	Community education benefits	$0–10	$0–10	$100
IX	Scientific benefits	$0–10	$0–10	$100
X	Cost of management ($K yr^{-1})	$100	$150	$50
XI	Number of whale watching accidents yr^{-1}	0–1	5	1
XII	Short term FX on cetaceans	0–1	5	1
XIII	Long term FX on cetaceans	0–1	0–5	0–1
XIV	Other parameters could be listed and compared	—	—	—

encourage a generous reinvestment in the business to protect the resource (Casagrandi and Rinaldi 2002).

A basic calculation for determining K, according to 1992 guidelines from UNEP (United Nations Environment Programme) and WTO (World Tourism Organisation) guidelines, is:

$$K = \frac{\text{Area used by tourists}}{\text{Average individual standard}}$$

The average individual standard is the space a tourist requires for an acceptable experience in the protected area (MPA News 2004). It is site dependent. A wilderness environment, for example, has a much higher average individual standard than a high-traffic urban park. But K can be difficult to determine. The carrying capacity of a site can increase or decrease with the tourists' level of experience and education (MPA News 2004). If managers can educate visitors to have less impact, for example, then the carrying capacity effectively increases.

When reviewing K and deciding whether to increase it and risk the resource, the option of adding value to existing tours should be considered. Sometimes it will be judged prudent to increase K; more often, given human nature's propensity to exploit K, it may be necessary to decrease K, or to find more efficient ways to use the existing K by growing the quality instead of the quantity.

Other approaches, besides setting K, are being tried, such as the limits of acceptable change approach, but these are considered much more management-intensive (MPA News 2004).

DISCUSSION AND CONCLUSION

Whale watching is frequently promoted loosely and unjustifiably as ecotourism, but when it is conducted on a sustainable basis — especially in or near a cetacean MPA and with other guidelines and regulations in place — it has the capacity to take a strong leading role in the development of an island-based ecotourism industry.

Cost-benefit analysis can help improve whale watching and other marine ecotourism activities and help make it sustainable, but a comprehensive, systematic framework is needed to put whale watching on a sustainable basis. To evaluate ecotourism, it is necessary to include all the aspects that characterise the demand for ecotourism, its destinations and the kinds of transport used, as shown in Table 5.

One of the most valuable ways to promote and manage successful wildlife ecotourism is through the establishment of a marine protected area. MPAs

Table 10 — Topics for a sustainability report card which could be developed for each community, island or operator.

Sustainability report card
Is the wildlife resource degraded or in the process of degrading?
– Population growth (number of births minus number of deaths) must be positive.
– Is population growth-rate/birth-rate/mortality-rate same, higher or lower?
– Are animals leaving the area?
– Are animals being approached or watched closely causing them to change their behaviour, even in subtle ways?
Is the overall environment degraded?
– What is the quality of the water system?
– What about effluent?
– A pollution assessment of local waters and coastline is needed.
Tourist profile
– Are the visitors local, domestic or international?
– Did the visitors travel by air? How far?
– Did the visitors arrive by private or public transportation?
Operators' and naturalists' profile
– Are they knowledgeable about marine mammals, the environment and local culture?
– Are they personable and good teachers?
– Do they have a sense of responsibility toward the activities of visitors in their 'care'?
– Are business practices compatible with sustainable tourism?
– Does wildlife watching contribute to the community?

with cetaceans attract more tourists and provide a framework for management that can involve all stakeholders. Of course, whale or dolphin-watching is successful in waters in many areas of the world which are not part of MPAs. But MPAs that feature or include cetaceans have the added attraction of protected area designation (International Fund for Animal Welfare 1999). The MPA designation becomes a statement of the importance of the area and the whales that live there, as well as a way to sell whale watching and marine tourism. For those who believe that sustainable tourism is an important part of conserving marine ecosystems, MPAs provide a powerful, convincing method for marketing the marine environment.

Of course, not every part of every MPA should necessarily be open to tourism. Using the biosphere reserve model, or multi-zone approach, protected areas are commonly divided into zones which include highly protected core areas, mixed zones allowing tourism and light use, and transition zones with more extensive use and development (Hoyt 2005). Yet managing such areas can be complex. As with any MPA, managers cannot simply erect a fence around it. MPA managers must remain open to new management approaches and procedures, as well as scientific findings, as they arise. For example, Lusseau and Higham (2004) show how dolphin-watching ecotourism can be structured spatially along with highly protected core (no-go) zones for the most intensively used areas.

The Mediterranean is not often included in considerations of North Atlantic islands. Yet it offers a model for a high level of regional cooperation and has made significant progress in terms of cetacean conservation issues, including whale watching, marine ecotourism and MPAs, which could offer valuable insights for the Atlantic islands region. All of this has been built on a solid foundation of research. The ACCOBAMS treaty (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area) has managed to pull together a diverse array of countries and cultures in a landmark agreement for cetaceans that could be a model for other regions and areas of the world (Notarbartolo di Sciara 2002). In addition, Mediterranean countries recognise the Pelagos Sanctuary for Mediterranean Marine Mammals as a Special Protected Area of Mediterranean Interest (SPAMI), which confers high-seas protection under the Barcelona Convention. Whale watching is already being conducted to a high standard in the sanctuary, complete with research and education as part of all trips. Whale watching ecotourism is seen as an integral element of a strategy for meeting economic, educational and research goals, as well as overall sustainability (Notarbartolo di Sciara 2000; 2001). Similar regional conservation agreements pertaining to cetaceans and MPAs with an impact on ecotourism have recently come into force in the Caribbean, with the SPAW Protocol of the Cartagena Convention (Hoyt 2005).

In a world with nine million whale watchers, a figure which is increasing (Hoyt 2001), marine ecotourists must learn how to watch, learn and enjoy without disturbing, to tread softly so as to leave little or no trace of their presence among the whales, to move quietly through the marine world, with eyes, ears, minds and sensitivities open (Hoyt 2003). In this way, marine ecotourists might even sharpen their sense of wonder toward these extraordinary animals.

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