



Environmentally sustainable cruise tourism: a reality check

David Johnson*

Maritime and Coastal Studies, Southern Institute, East Park Terrace, Southampton SO14 0YN, UK

Received 8 November 2001; received in revised form 7 February 2002; accepted 17 February 2002

Abstract

Cruise tourism continues to be a major international growth area. In terms of achieving sustainable tourism it is, therefore, a sub-sector within which socio-economic, cultural and environmental considerations need to be continually analysed, addressed and monitored. The environmental impacts of cruise tourism are categorised in this paper and potential strategies that can be employed by both cruise line operators and cruise tourism destinations are explored. Secondary evidence of action by both parties suggests that the industry is taking a number of belated positive steps. However, decision-makers in cruise tourism destinations, particularly those outside North America, need to work closely with operators to facilitate both integrated waste management and intergenerational and intra-societal equity rather than merely accept the prospect of short-term economic gain. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Cruise tourism; Environmental carrying capacity; Intergenerational equity; Intra-societal equity; Life-cycle analysis; Sustainable tourism

1. Introduction

Since the early 1970s sustainable development has become a unifying concept for environmental planning. Politically, sustainability ideals have been given prominence at the UNCED Conference in 1987, the Earth Summit in 1992 and through implementation of Agenda 21. However, the delivery of sustainable development, translating theory into practice, has proved elusive. The concept makes important links between environmental conservation and socio-economics (i.e. quality of life) but contentious issues include the balance between hard and soft sustainability; how the environment is valued; and how to address the dominance of unsustainable vested interests.

These issues extend to the debate about the future of tourism [1]. Tourism by its very nature is a resource dependent industry and some commentators argue that sustainable tourism is unachievable given the industry's ability to pollute and consume resources [2,3]. This view has been summarised as follows:

“Tourism contains the seed of its own destruction; tourism can kill tourism, destroying the very environ-

mental attractions which visitors come to a location to experience” (Glasson et al. [4], p. 27).

Alternatively, in theory, tourism can embrace sustainability principles by having regard for environmental carrying capacity, social responsibility and the integration of tourism with local peoples' wishes [5–8]. In 1992 Tourism Concern and Worldwide Fund for Nature defined sustainable tourism as tourism and associated infrastructure that both now and in the future [9]:

- operates within natural capacities for the regeneration and future productivity of resources—natural, social and cultural;
- recognises the contribution that people and communities, customs and lifestyles past and present, make to the tourism experience;
- accepts that these people must have an equitable share in the economic benefits of tourism; and
- is guided by the wishes of all stakeholders, especially local people and communities in host areas.

Much uncertainty concerning sustainable tourism has resulted from confusion with the related terms of ecotourism and responsible tourism [10,11]. As a result sustainable tourism has proved difficult to define and, as a consequence, often difficult to implement and evaluate. Within the broad framework of sustainability the

*Tel.: +44-23-8031-9000; fax: +44-23-8022-2259.

E-mail address: david.johnson@solent.ac.uk (D. Johnson).

tourism industry has, nevertheless, made efforts to establish green credentials. Green Globe 21, the World Travel and Tourism Council's environmental management programme for travel and tourism companies and destinations, has developed its own certificate, based on ISO 14001, in an attempt to highlight leading edge initiatives. The International Hotels Environment Initiative (IHEI), which seeks to reduce consumption and waste, is another example of a positive environmental change agent. However, on balance, it has been suggested that while action based on the wider use of techniques such as environmental auditing by tourist firms can bring incremental improvements in environmental performance, in terms of sustainable tourism, this is likely to be from one sub-optimal position to another [12].

To date relatively little work on sustainable marine tourism has been undertaken, although exceptional marine sites, such as the Great Barrier Reef, have developed comprehensive sustainable tourism strategies and management plans [13]. This is a sector which is growing fast and which will present significant future environmental management challenges. Orams [14], when defining marine tourism, emphasised the importance of access to the marine environment and our dependence on equipment to enjoy water-based leisure experiences. Ultimately, he argued, the supply of marine activities and destinations will be constrained by environmental quality. The aim of this paper is therefore to review the environmental sustainability of cruise tourism, which represents a major activity within the marine tourism sector.

2. Cruise tourism

Discussions of cruising in the context of its origin, change and development have been the subject of other studies, which explain that cruise tourism has developed in phases [15,16]. At its inception, in the 1920s, cruising was the preferred mode of travel for the world's social elite. Post World War 2 cruising declined, losing trade to passenger aircraft. However, the latter part of the 20th century has witnessed a tremendous revival. Cruise companies have aggressively targeted different market segments, attracted younger passengers, offered fly cruise options, raised cruise capacities and changed cruise durations, prices and itineraries. Reviews of this global phenomenon have demonstrated an 8% annual growth since 1980, and in 1997 cruise tourism catered for 8.5 million customers [17]. A year later passenger numbers increased to an estimated 9.5 million carried by a worldwide fleet of 223 ships. Currently three major companies, Carnival Corporation, Royal Caribbean International and P&O Princess Cruises, dominate the business. A recent industry analysis cited the launch of

Disney Cruise Line's first ship *Disney Magic* (indicating the influence of family cruising); industry orders for new cruise ships in excess of \$ 9 million USD; and the dominance of the Caribbean, Mediterranean and Alaska as principal destinations to be key points which reflect the state of the modern cruise tourism business [18].

Crannell [19] considered the development of more super-mega cruise ships as the main way the industry will develop into the 21st century. These new generation of ships are:

- reliant on economies of scale (i.e. the mass tourism market);
- at the cutting edge of design and technical innovation; and
- offer a multifaceted recreational shipboard experience.

Not untypical is the *Grand Princess* which at a cost of US\$ 450 million accommodates 3000 passengers and a crew of 1100. She boasts comprehensive amenities including luxury sports facilities and virtual reality simulation distractions for passengers' amusement [20]. Even larger ships, such as Royal Caribbean's *Voyager of the Seas* and P&O's *Oceana*, with increased passenger capacity, aim to generate further economies of scale and higher profits. The industry predicts a phenomenal growth to 10% of market share (13 million passengers) by 2005. This optimism is based on assumptions of latent demand and the development of new destination markets.

It has also been argued that cruise tourism destinations benefit from potentially dramatic economic benefits [19,21]. This includes passenger and crew spending together with fees charged for dockage, fresh water and any head tax. Cruise ships also have to be provisioned with fuel and consumables. As a result US\$ 10,000 average daily spend from a cruise ship visit is not unrealistic. Dwyer and Forsyth [21] provided a framework to evaluate these economic factors and substantiated the benefits using an Australian case study.

Geographically the world can be mapped into cruise regions reflecting different densities of demand [22]. One result of the boom in cruise tourism, however, is congestion at traditional destination venues. In 1998 the Caribbean received 50% of total world capacity cruise tourism placement [21]. Many established Caribbean destinations receive more cruises than stopover tourists. In response, cruise lines are considering multi-dimensional expansion to different cruise excursion destinations in future. Carnival Cruise Lines business development plans, for example, include:

- development of 'new geographical markets'—through Airtours and Costa Links;

- ‘migrating to better products’—through Holland America Line; and
- ‘attracting new lifestyles’—through Windstar cruises.

Some hitherto less popular traditional locations, such as the Asia-Pacific, are predicted to grow from a small base [23]. Other destinations are completely new. For example, from 2002 P&O are offering cruises to South America with visits to Machu Picchu, the Patagonian Fjords and the beaches of Rio de Janeiro.

Against this background of growing popularity, increasing ship size and sophistication, high profits and changing geography, Dowling and Vasudavan [24] cite ‘embracing both natural and social environmental issues’ as one of the major challenges facing the cruise industry in the new millennium. Some commentators have argued that cruise tourism, being a formally organised and spatially confined leisure activity, can be viewed as a sustainable and sociologically harmless option [22,25]. Others contest this, highlighting problems associated with waste generation and disposal, together with pressures exerted on fragile environments and host communities [26]. To date, however, no holistic sustainability assessment has been attempted.

3. Environmental considerations

A fundamental difficulty with sustainability assessments is that of quantifying and costing environmental impacts in the same way that economic benefits can be presented. Furthermore, with marine activities it is particularly difficult to allocate impacts to specific sources. For example, air pollution from seagoing shipping in general, not just cruise ships, is thought to be responsible for a large percentage of the sulphur found in the atmosphere above the oceans. European research to quantify ship emissions more precisely, including in-port emissions, is on-going [27]. The environmental impact of cruise tourism however, can at least be categorised using a life-cycle analysis (LCA) approach. This is a methodology, more typically applied to a manufactured product, but was adapted by British Airways (BA)/UK CEED to study the impacts of tourism on the Seychelles [28]. Impacts associated with each stage of the ‘life-cycle’ of a holiday product were considered as shown in Fig. 1.

Using the LCA methodology cruise tourism impacts include:

- Infrastructure impacts such as ship construction, the creation of cruise passenger terminal facilities and berthing access requirements. Modifications to the natural and built environment to enable destinations to serve as a cruise line destination involve loss of natural habitat, exploitation of local construction

materials and changes to local coastal wave and sediment patterns.

- Operational impacts involving the use of energy, water and air quality pollution, and impacts on the environment such as antifouling and accidental or deliberate physical damage to marine ecosystems (e.g. anchor damage).
- Distribution impacts associated with tourists’ travel and the logistics of supplying a cruise liner with provisions. Whilst this applies principally to air travel impacts associated with transferring people to and from departure and destination points, it also includes consideration of the environmental carrying capacity of destinations and the requirement for landside transport links.
- Use impacts which comprise the cultural impact of wealthy tourists and overcrowding created by large numbers of visitors at one destination, together with pressures on cruise destination environments including, for example, water consumption, use of chemicals and detergents, the impacts of recreational activities on wildlife such as disturbance and littering, and pressures on endangered species through exploitation for gifts and curios.
- Waste impacts including those related to relevant categories regulated by the International Maritime Organisation (IMO). The International Convention for the Prevention of Pollution from Ships (MARPOL Protocol) currently contains six annexes, four of which pertain to wastes from ships. Oils, garbage, sewage, plastics and hazardous substances require adequate waste reception facilities, waste handling and disposal.

4. Discussion

The projected increase in cruise tourism, combined with the environmental considerations described in Section 3, raises a number of key sustainability issues. These are considered below in terms of different strategies and management initiatives that both operators and destinations can employ to fulfil their sustainable development obligations. Whether these initiatives are being implemented, and thus their potential effectiveness, is then examined on the basis of evidence available from secondary sources. Clearly tourists themselves also have a duty to care for the environment but in many ways this too can be engendered or heightened by responsible operators and destinations.

4.1. Operators

A summary of environmental sustainability strategies and various management initiatives available to cruise

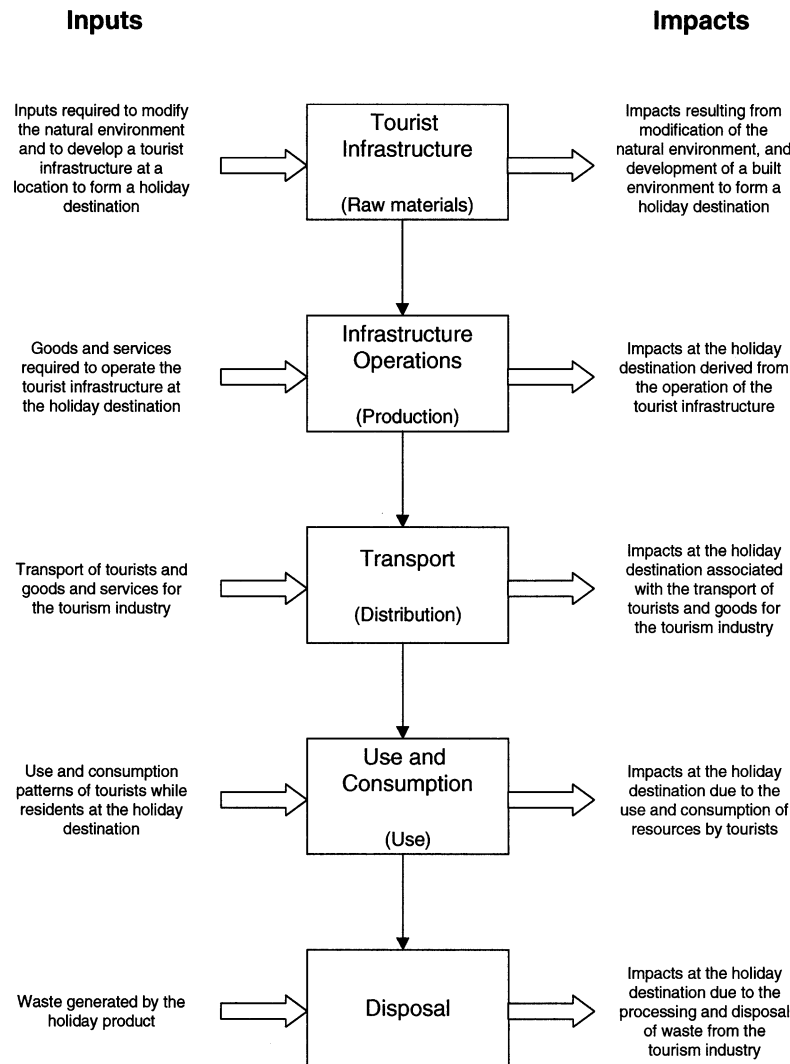


Fig. 1. LCA of a holiday product (source: BA, 1994 [28]) (reproduced with permission of British Airways/UK CEED).

tourism operators, adapted from Orams [14], is presented in Table 1.

4.1.1. Varying itineraries to avoid exceeding carrying capacity

Generalised secondary evidence suggests that cruise lines are aware of the fact that their operations can have a profound impact on destinations. Chronic environmental degradation as a direct result of cruise tourism, particularly in popular destinations such as the Caribbean, suggests that cruise itineraries are yet to be determined by operators on the basis of sustainability issues. Uebersax [29] described a complex downside to the cruise industry in the Caribbean including:

- pollution of sea floors, harbours and coastal areas;
- degradation of scarce water resources;
- destruction of coral reef habitat;
- public health concerns ashore; and

- pressures resulting from waste disposal problems for communities already unable to cope with their own domestic commercial municipal waste.

However, rather than reducing the number of visitors to the Caribbean, visitor numbers are rising rapidly elsewhere too. Princess Cruises, for example, now sail to six continents. In addition to the Caribbean, according to their website, destinations include Alaska, the Panama Canal, Europe, Mexican Riviera, South America, South Pacific, Hawaii/Tahiti, Asia, India, Africa, the Holy Land, Canada/New England, Bermuda and world voyages. In many places cruises are combined with land tours and associated infrastructure, such as riverside wilderness lodges in Alaska. In future itineraries are likely to include hitherto less popular destinations but this will be in addition to, rather than instead of, well established cruise venues.

Table 1
Environmental sustainability strategies and management initiatives for cruise Operators

Strategy	Management initiative
Physical	Vary itinerary Limit passenger numbers Destination rehabilitation/conservation projects
Regulatory	Corporate environmental policy Environmental management systems Promotion of environmental practices
Economic	Full environmental cost accounting Investment in 'clean' technologies 'Rewards' for environmental awareness Positive use of tourist revenue
Educational	Liaison with destinations re: sustainability Corporate environmental reports Codes of practice Dissemination of good practice

4.1.2. Passenger numbers

As explained previously cruise tourism is establishing different market segments. The new super-mega cruise ships are designed to take huge complements of passengers. Smaller, more traditional ships cater for niche markets. Mass cruise tourism has been likened to all-inclusive resort experiences, with the cruise ship itself providing the holiday experience rather than any destinations to be visited [30]. It could be argued that environmentally sound cruises, perhaps for which tourists also pay some form of 'green levy', should be encouraged to cater for increasing numbers as a more sustainable option than despoiling fragile terrestrial destinations. As yet, however, there is no evidence that operators are prepared to charge an 'environmental premium'; indeed competition is resulting in reduced fares and special deals, and passenger target numbers envisage substantial increases.

4.1.3. Destination rehabilitation/conservation projects

Although Royal Caribbean, for example, has set up an Ocean Fund to support marine conservation and oceanic environmental research, investment by cruise operators in destination rehabilitation projects is the exception rather than the rule. A specific example of a cruise line company, which has invested in an ecological restoration project, is the rehabilitation of Cayman coral reef ecosystem by Holland American Line. Following accidental damage to a major reef by the cruise ship *Maasdam* in 1996, Holland America Line undertook a successful restoration that involved salvaging damaged reef fragments, removing rubble, reattaching living corals and subsequent monitoring. Only some 25–30% of the restored reef has survived but there is positive evidence of coral recruitment. This example is a high

profile incident where the damage is clearly attributable to one operator but there is little evidence that cruise operators are tackling the effects of cumulative environmental impacts.

4.1.4. Environmental management

The 'flag state' in which any cruise ship is registered is responsible for certifying compliance with international pollution prevention standards. To complement regulations the adoption of a corporate environmental policy, environmental management systems, environmental auditing, screening of suppliers and corporate environmental reporting are now standard in many resource dependant industries. Whilst being very much compliance driven, much of this drive towards more environmentally sound operating standards depends on corporate commitment. The appointment of William Reilly, former US Environmental Protection Agency (EPA) Administrator, to oversee Royal Caribbean's environmental activities is an example of such commitment by a cruise operator. Published environmental policies, such as P&O's Health, Safety, Welfare and Environment Group Policy Statement, publicly affirm the importance now given to minimising any adverse environmental impacts.

Waste management planning is a key issue. Business generally is currently under pressure to adopt waste policies that move waste generation up the waste hierarchy by prioritising waste reduction and encouraging reuse and recycling rather than disposal options. Uebersax [29] suggested that the average cruise ship produces 1 kg of burnable waste, 0.5 kg food waste and 1 kg glass and tin waste per person per day. The Bluewater Network Petition, initiated by a coalition of 53 US environmental non-governmental organisations, concluded that cruise ships represent 'point sources of enormous volumes of wastes which can have significant impacts on the marine environment and public health' [31 p.7]. Evidence submitted by the Network to the US EPA in 2000 stated that a typical cruise ship can generate an estimated 1,000,000 gallons of grey water on a 1-week voyage, as well as significant amounts of hazardous chemical from on board printing, photo processing and dry cleaning operations.

More sustainable waste disposal options are being adopted by cruise operators including recycling targets; zero discharge of hazardous wastes and cleaning chemicals; installation of improved devices for separating oil from bilge water and wastewater prior to discharge; better treatment of 'grey' waste water; and the installation of on-board waste management systems and equipment. In 2001 the International Council of Cruise Lines (ICCL), an industry trade association that represents the interests of 17 passenger cruise lines in the North American cruise market and more than 60 cruise industry suppliers, adopted a new set of mandatory

waste management practices and procedures on its members' behalf [32]. Positive moves include:

- supply chain considerations—introducing more environmental-friendly and reusable products;
- materials recovery—enabling separation and recycling of packaging, glass and plastics thus reducing the production of incinerator ash;
- controlled disposal of toxic waste products such as silver from photo processing, chlorinated dry cleaning fluids and sludge contaminated filter materials;
- pulp processor maceration of organic waste (mainly food waste); and
- co-generation incinerators.

Safety Management System (SMS) Plans, which contain many of the elements of an environmental management system, have been implemented by some of the major cruise line companies. SMS Plans are certified in accordance with IMO's International Safety Management (ISM) Code.

In 1998 the P&O Group produced a second corporate environmental report (CER) containing environmental performance data at a corporate level. The latter comprised total group impact in terms of waste generated and the percentage recycled, oil consumption and carbon dioxide emissions contributing to global warming, ozone depletion, air pollution (sulphur oxides), marine pollution (oil spillage) and resource use (water) figures. This CER, which is available both in hard copy and on the web, is among the latest generation of such reports. It acknowledges impacts, sets out clear environmental policies and establishes specific annual targets for environmental improvement. Examples of these targets for 1998/1999 included:

- fuel use minimisation campaign to effect a 1% overall reduction;
- replacement of Halon fire fighting systems;
- 10% per capita reduction in water consumption and studies into the feasibility of recycling laundry water and air conditioning condensation to reduce water consumption;
- reduction of on-shore disposal of oily sludge by 10%; and
- phasing out of the most harmful volatile organic compounds (VOCs).

The impact of non-biodegradable anti-foulings, endocrine disrupting chemicals, which adversely effect the hormonal functioning of marine wildlife, is a specific problem for the shipping industry generally. Phasing out the use of tributyltin (TBT) anti-foulings on all ships by 2008 is under consideration by the IMO. Greenpeace recently undertook a direct action protest to highlight this issue, targeting the Cunard flagship Queen Elizabeth

2 (QE2). In future, possibly in response to the Greenpeace protest, the QE2 will receive TBT-free material [33].

Other examples of good practice, highlighted by Dowling and Vasudavan [24], include Royal Caribbean International's 'Save the Waves' policy; Holland America Line's 'Seagoing Environmental Awareness' on board programme; and the Cunard QE2's 'Garbage Management Plan'.

4.1.5. *Technological improvements to reduce operational impacts*

Evidence from other sectors of industry is that increasingly companies are investing in 'best available technology not exceeding excessive cost' (BATNEEC) to comply with environmental legislation or preempt such legislation. Examples of this within the cruise industry are evident, particularly for newly commissioned vessels. The introduction of new Azipod azimuthing electronic propulsion systems offers a high system redundancy, increased manoeuvrability, fuel savings and improved handling in an emergency [34]. Gas turbines, hitherto confined to the world's navies because of their inherent expense, are being fitted by Royal Caribbean in two new series of ships [35]. Gas turbines create less noise and can reduce exhaust emissions by up to 90%. Other examples of technology investment include exhaust gas cleaning devices; a new generation of oil water separators; and homogenisers to reduce nitrogen oxides (NO_x) emissions.

Newer vessels, incorporating technologies able to meet stricter pollution standards, are more likely to be able to comply with Lloyds Register's environmental class designation—Environmental Protection Rules for the Control of Operational Pollution or EP Rules—and benefit from any associated reductions in port dues [36].

4.1.6. *Rewards for environmental awareness*

Rewards for environmental awareness are unusual, but may become more common place in response to incentives to comply with legislation, as suggested by a US\$ 250,000 reward to passengers who witnessed and video taped a trail of plastic waste sacks being dumped into the sea by Princess Cruises.

4.1.7. *Educational initiatives*

There is some evidence that more conscientious and environmentally aware cruise operators, operating in specific regions, supply behavioural codes of practice to crew and customers, together with lectures and guides at landing sites. An analysis of tourism impacts in Antarctica, differentiated between smaller ships offering ecotourism and larger operations with an emphasis on sightseeing rather than education [37]. However, the overriding emphasis within the main operators'

literature is on conspicuous consumption with little or no mention of environmental stewardship.

4.2. Destinations

A summary of environmental sustainability strategies and various management initiatives available to cruise tourism destinations, also adapted from Orams [14], is presented in Table 2.

4.2.1. How can destinations manage the impacts of cruise tourism?

The ‘port state’ can conduct its own examinations to verify a visiting ship’s compliance with international standards. Nevertheless, operational waste impacts on destinations are a major concern. In 2000, for example, the Central Council of the Tlingit and Haida Indian Tribes of Alaska passed a resolution citing the threat posed by cruise line discharges to subsistence foods [38]. In tropical waters coral competes with sewage for oxygenated water. Traditionally, for subsistence economies in these areas, the ocean has been able to flush away sewage produced by relatively small populations. Mass marine tourism requires proper ship-generated waste-reception facilities. The Wider Caribbean, for example, is designated as a ‘Special Area’ under MARPOL 73/78 Annex V, and the IMO has initiated a regional programme to improve waste management systems and invest in MARPOL compliant bins and barges. A strong case can be made for restricting cruise landfalls to the urban coast, particularly for home ports and much visited destinations, with a properly certified mature waste industry with very limited stopovers at

rural destinations in order to maintain their exclusivity and environmental integrity.

Some US States (e.g. Florida) are pursuing Memoranda of Understanding and agreeing Codes of Conduct with the cruise ship industry as a way to promote better environmental behaviour. Tourism management strategies and management plans are also perceived to be crucial to the effective stewardship of cruise tourism destinations. The Cayman Islands, for example, with a host population of 33,000, received approximately 600,000 days visits from cruise ship passengers in 1998. Of these an estimated 28% participated in diving activities. The Cayman Islands rely on Marine Parks Regulations, enacted in 1986, to control recreational fishing, boat speeds, anchoring and in-water activities. Zoning plans restrict marine activities around each island and dive boats are licensed and their capacity is limited.

4.2.2. Which destinations are environmentally unsuitable?

The environmental carrying capacity of destinations is an important factor. To this end the authorities in Alaska have determined a finite number of allocated cruise ship slots to the region. The Cayman Islands Government is similarly considering the creation of permanent moorings for cruise ships. Currently, at this popular destination, all cruise liners are required to anchor in Hog Sty Bay off the Grand Cayman capital of George Town, and the number of cruise ship passengers who may visit Grand Cayman on any one day is limited to 6000 [39]. Evidence suggests, however, that in other destinations carrying capacity is being ignored. For example, plans for a major new port complex, capable of taking 660 cruise liners and 1.6 million tourists a year, on the British Caribbean islands of Turks and Caicos have been reported by the media [40]. If correct, the scale of these proposed infrastructure requirements and the need to import over 6000 workers from Haiti and Dominica imposes both threats to wildlife and attendant social problems. Schemes of this nature are clearly environmentally unsustainable.

4.2.3. Economic measures

Some destinations are beginning to secure substantial fines for environmental damage. For example, in June 1998 Holland America Line were fined US\$ 2 million for an illegal discharge of oily bilge water in Alaska’s Inside Passage that occurred in 1994. Royal Caribbean Cruises were fined an unprecedented US\$ 18 million on pleading guilty to 21 felony counts of violating federal water pollution laws in 1999. This involved deliberate dumping of waste oil and hazardous chemicals into US harbours and coastal areas. The State of Alaska has subsequently filed a civil lawsuit against Royal Caribbean Cruises who could face fines of US\$ 100,000 plus penalties of US\$ 10,000 per violation per day [41]. The

Table 2
Environmental sustainability strategies and management initiatives for cruise destinations

Strategy	Management initiative
Physical	Facility placement Facility design Sacrifice areas
Regulatory	Limit visitor numbers Close areas to activities/uses
Economic	Differential fees Damage bonds Fines Rewards Promotion of local produce
Educational	Printed material Signs Guided walks/talks Liaison with operators

fact that all these examples relate to the US is significant. In 2000 the Bluewater Network Petition, put pressure on the US EPA to take a more active role in monitoring cruise ships, prompting new proposals and regulations for environmental enforcement. These include an EPA Cruise Ship White Paper [42] and prospective Cruise Ship Discharges Assessment Report [43], the US Coast Guard's 'Operation Cruise Watch' and State governments' initiatives in Alaska, Florida and California. As yet, however, there are no indications that less developed countries are prepared to apply the same level of control. And even in North America, despite progress with respect to environmental compliance, the US General Accounting Office (GAO) has identified a continued need for improvement [44].

Concern about over-capacity has prompted some destinations to introduce passenger head taxes. These vary considerably. Bermuda currently actively limits cruise ships and imposes the highest cruise passenger head tax set at US\$ 63. The Bahamas have set tax at US\$ 15. And voters in Alaska's capital city Juneau, which receives 600,000 cruise ship passenger visits per year, are expected to be in favour of a US\$ 5-per-passenger head tax to offset environmental impacts. Whether these taxes are actually used for environmental amelioration is questionable and difficult to verify.

Another economic issue is associated with a perceived lack of cruise-ship related spending in local communities [14]. The level of economic benefit accruing to the destination is contested. Flag State Control, whereby cruise operators do not pay national taxes, mitigates against intra-societal equity on the basis that cruise lines retain all the profits of the operation, benefiting from the oceans as a common resource and 'free good'. Figures quoted by the industry are often confined to a small group of stakeholders; in other words the self-contained nature of cruise ships can exacerbate 'leakage' of tourist revenue. A vivid illustration of this being taken to extremes is Disney Cruise Lines purchase of their own destination at Castaway Cay. On the other hand, an analysis in the Caribbean, which compared leakage from stopover visitors with cruise visitors, concluded that cruise passengers are more likely to spend on low-leakage activities such as sightseeing and handicraft shopping [45]. This is an area where more detailed and destination specific research is currently limited [46], and where, for example, issues such as the risk of economic dependency on tourism should also be evaluated.

4.2.4. Can educational management tools help destination use impacts?

Low-impact messages which attempt to influence visitor behaviour are perceived as good practice [47]. Marion and Rogers [48] examined the use of different communication media as part of an integrated strategy directed at cruise visitors to the Virgin Islands National

Park. The United Nations Environment Programme (UNEP), for example, has recently launched simple new communication tools to help protect coral reefs [49]. In future interactive on-board television will provide destinations with an opportunity to incorporate subtle environmental messages aimed at educating and influencing shore excursions.

5. Conclusion

Sustainable tourism is a contentious subject, which has received considerable academic scrutiny. In practice it can be concluded that:

- Tourist operators, perhaps through fear of increased regulation, are gradually introducing more environmental considerations.
- Some destinations are adopting strategies and management plans but this is still largely confined to examples of good practice and individual projects.
- Tourists as consumers have largely failed to exert the fundamental pressure necessary to ensure real environmental improvements.

The health of the oceans is critical to the future of the planet, and the 21st century will see rapid growth of tourism based on marine resources. Cruise tourism provides the means for large numbers of tourists to make use of the oceans and the impact of cruise activities and associated infrastructure will increasingly require management solutions. Furthermore, to be regarded as sustainable tourism, cruise tourism must also deliver enduring improvements in social welfare.

Whilst cruise tourism presents a potential market opportunity for destinations, mobile mass tourism challenges sustainable tourism ideals. Evidence from this sector to date suggests:

- the need to continue to take a long-term view fostering holistic integrated management planning involving international agencies, cruise line operators and host communities;
- the need for operators to continue to invest in and promote the Best Possible Environmental Option (BPEO);
- the need for political will to safeguard destinations, given the proven adverse impacts of poorly managed cruise tourism;
- the need for greater profit sharing between cruise line shareholders and destination communities; and
- the need for both operators and destinations to raise their customers' environmental awareness.

A particular concern is the current disparity between developed and less developed countries in terms of

destinations' control of and interface with the cruise line industry. International regulatory mechanisms are in place but better universal implementation and enforcement is needed. Strict operational requirements supported by monitoring and surveillance in Alaskan waters, for example, contrast with much less visible environmental protection being demonstrated in the Caribbean. This is exacerbated by lack of infrastructure, such as the severe shortage of waste facilities in many less developed countries. Currently the major drive to achieve more comprehensive waste management practices is being led by the US. Sustainable development requires attention to environmental quality and equality. Sustainable cruise tourism requires the enforcement of an environmental protection 'level playing field' across the world's oceans and between the world's marine tourism destinations, in partnership with all the cruise line operators—big and small.

References

- [1] Hall CM, Lew A, editors. *Sustainable tourism: a geographical perspective*. London: Prentice-Hall, 1998.
- [2] Wheeler B. Tourism's troubled times: responsible tourism is not the answer. *Tourism Management* 1991;12:91–6.
- [3] Wight PA. Sustainable ecotourism: ethics or ecosell. *Journal of Travel Research* 1993;31(3):3–9.
- [4] Glasson J, Godfrey K, Goodey B. *Towards visitor impact management*. Aldershot: Ashgate Publishing, 1995.
- [5] Krippendorf J. Ecological approach to tourism marketing. *Tourism Management* 1987;8(2):174–6.
- [6] Cater E, Goodall B. Must tourism destroy its resource base. In: Mannion AM, Bowlby SR, editors. *Environmental issues in the 1990s*. Chichester: Wiley, 1992. p. 309–23.
- [7] France L, editor. *The earthscan reader in sustainable tourism*. London: Earthscan, 1997.
- [8] Swarbrooke J. *Sustainable tourism management*. Oxford: CABI Publishing, 1999.
- [9] Tourism Concern and WWF. *Beyond the Green Horizon: a discussion paper on principles for sustainable tourism*. London: WWF and Tourism Concern, 1992.
- [10] Muller H. The thorny path to sustainable tourism development. *Journal of Sustainable Tourism* 1994;2(3):131–6.
- [11] Burns P, Holden A. *Tourism: a new perspective*. London: Prentice-Hall, 1995.
- [12] Goodall B. Environmental auditing: a tool for assessing the environmental performance of tourism firms. *Geographical Journal* 1995;161(1):29–37.
- [13] Ottesen P. Tourism in the Great Barrier Reef Marine Park: how is it managed and who pays? *Proceedings of a National Conference, Heritage Management: Parks, Heritage and Tourism*. Royal Australian Institute of Parks and Recreation, Hobart, 4–9 October, 1992. p. 131–41.
- [14] Orams MB. *Marine tourism: development, impacts and management*. London: Routledge, 1999.
- [15] Cruise Lines International Association. *The cruise industry—an overview*. New York: CLIA, 1992.
- [16] Ward D Berlitz. *Complete guide to cruising and cruise ships*. New York: Berlitz, 1996.
- [17] Wood RE. Caribbean cruise tourism. *Globalization at sea*. *Annals of Tourism Research* 2000;27(2):345–70.
- [18] TTG. *World Cruising 1998*. World Travel Market Daily. London: Miller Freeman UK Ltd, 1998.
- [19] Crannell Jr P. Socioeconomic impact of port terminals for touristic cruises. In: Monso de Prat, editor. *Sustainable waterfront and coastal developments in Europe: socioeconomics, technical and environmental aspects*. *Proceedings of the Littoral '98*, Barcelona, 1998. p. 15–22.
- [20] The Times. Hi-tech comes to the high seas. *The Times* 1998, 30.
- [21] Dwyer L, Forsyth P. Economic significance of cruise tourism. *Annals of Tourism Research* 1998;25(2):393–415.
- [22] Ritter W, Schafer C. Cruise-tourism: a chance of sustainability. *Tourism Recreation Research* 1998;23(1):65–71.
- [23] Singh A. The Asia Pacific cruise line industry: current trends, opportunities and future outlook. *Tourism Recreation Research* 2000;25(2):49–61.
- [24] Dowling RK, Vasudavan T. Cruising in the new millennium. *Tourism Recreation Research* 2000;25(3):17–27.
- [25] Paige MM. Caribbean cruising towards the millennium. *World Travel and Tourism Development* 1998;3:77–80.
- [26] Marsh J, Staple S. Cruise tourism in the Canadian Arctic and its implications. In: Hall CM, Johnston ME, editors. *Polar tourism: tourism in the Arctic and Antarctic regions*. Chichester: Wiley, 1995. p. 63–71.
- [27] European Commission. Discussion paper: a community strategy on air pollution from seagoing ships. Directorate-General for Environment, Brussels, January, 2001.
- [28] British Airways. A life-cycle analysis of a holiday destination: Seychelles. *British Airways Environment Report* 1994; 41/94, UK CEED, Cambridge, 1994.
- [29] Uebersax MB. Indecent proposal: cruise ship pollution in the Caribbean. 1996. <http://www.greenbuilder.com/mader/planeta/0896/0896cruise.html>
- [30] Cooper C, Fletcher J, Wanhill, Gilbert D, Shepherd R. *Tourism principles and practice*, 2nd ed. Essex: Longman, 1998.
- [31] Bluewater Network. Petition to US Environmental Protection Agency. San Francisco, March, 2000.
- [32] Environmental News Network. Cruise lines raise the shipshape stakes. 2001. http://www.enn.com/news/enn-stories/2001/06/06192001/cruise_44027.asp
- [33] Lloyd's List. Cunard vows to end use of TBT. *Lloyd's List* 1999;57,427:16.
- [34] Lloyd's Register. Crazy for cruise, 100A1. *The Magazine of the LR Group* 1997;3(117):8–14.
- [35] Lloyd's List. Green cruises. <http://www.llplimited.com/LLArc.../output.cgi?Wed24Jun1998-033&cruise&environment>.
- [36] CQD Journal for the Maritime Environment Industry. Cruise industry responds, vol. 7, No. 3. July 2001, Miller Associates Inc. http://www.cqdjournal.com/CQD_Table.Contents/env_7_3/env_7_3.htm
- [37] Hall CM, Wouters M. Issues in Antarctic tourism. In: Hall CM, Johnston ME, editors. *Polar tourism: tourism in the Arctic and Antarctic regions*. Chichester: Wiley, 1995. p. 147–66.
- [38] Tlingit and Haida Indian Tribes of Alaska. Executive Council of the Central Council Resolution EC/00-06. Object to Cruise Ship Dumping of Pollutants in Southeast Alaska Waters. Juneau, 4 February, 2000.
- [39] Leech C. Dive tourism, marine protection working together in the Cayman Islands. Presentation by the Cayman Islands Department of Tourism to the Birmingham Dive Show, October, 1998, unpublished.
- [40] The Times. Port threatens wildlife haven. *The Times* 1998, 13.
- [41] ICE. *Royal Caribbean cruises faces state lawsuit*. Inland, coastal and estuarine waters, vol. 1. Cambridge: UK CEED, 1999.

- [42] United States Environmental Protection Agency. Cruise Ship White Paper. 2000. <http://www.epa.gov/owow/oceans/cruise-ships/white.paper.pdf>
- [43] United States Environmental Protection Agency. Cruise ships discharges assessment. <http://www.epa.gov/owow/oceans/cruise-ships/assess.html>
- [44] United States General Accounting Office. Marine pollution: progress made to reduce marine pollution by cruise ships, but important issues remain. GAO/RCED-00-48 Report to Congressional Requesters, Washington, DC, February, 2000.
- [45] Hall JA, Braithwaite R. Caribbean cruise tourism: a business of transnational partnerships. *Tourism Management* 1990;11(4): 339–47.
- [46] Henthorne TL. An analysis of expenditures by cruise ship passengers in Jamaica. *Journal of Travel Research* 2000;38: 246–50.
- [47] Orams MB. The effectiveness of environmental education: can we turn tourists into ‘greenies’? *Progress in Tourism and Hospitality Research* 1997;3:295–306.
- [48] Marion JL, Rogers CS. The applicability of terrestrial visitor impact management strategies to the protection of coral reefs. *Ocean and Coastal Management* 1994;22(2): 154–63.
- [49] Sustainable Development International. Coral or no coral? It’s my choice. 2002. <http://www.sustdev.org/industry.news/012002/15.01.shtml>