

## Chapter 27. Tourism and Recreation

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### 1. Introduction

Seaside holidays have a long history. They were popular for several hundred years (100 BCE – 400) among the ruling classes of the Roman Empire: these visited the coast of Campania, the Bay of Naples, Capri and Sicily for swimming, boating, recreational fishing and generally lounging about (Balsdon, 1969). But thereafter seaside holidaying largely fell out of fashion. In the mid-18<sup>th</sup> century, the leisured classes again began frequenting seaside resorts, largely as a result of the health benefits proclaimed by Dr. Richard Russell of Brighton, England, in 1755 (Russell, 1755). Seaside resorts such as Brighton and Weymouth developed in England, substantially helped by the royal patronage of Kings George III and George IV of Great Britain (Brandon, 1974). After the end of the Napoleonic wars, similar developments took place across Europe, for example at Putbus, on the island of Rügen in Germany (Lichtnau, 1996). The development of railway and steamship networks led both to the development of long-distance tourism for the wealthy, with the rich of northern Europe going to the French Riviera, and to more local mass tourism, with new seaside resorts growing up to serve the working classes of industrialised towns in all countries where industrialisation took place. In England, whole towns would close down for a “wakes week”, and a large part of the population would move to seaside resorts to take a holiday: for example, in 1860 in north-west England, 23,000 travelled from the one town of Oldham alone for a week in the seaside resort of Blackpool (Walton, 1983). Between 1840 and 1969, the population of Blackpool (based almost entirely on the tourist industry) grew from 500 to 150,000 (Pevsner, 1969).

This relatively local mass tourism industry gave way to the modern mass tourist industry from the 1960s onwards. This was facilitated mainly by the introduction of, first, large passenger jet aircraft in the 1960s and, then, large-bodied jet aircraft in the 1970s, which (like the railways a century earlier) enabled relatively cheap mass transit over long distances that were not previously feasible (Sezgin et al., 2012).

### 2. Present nature and magnitude of tourism

International tourism has grown immensely over the last half century. In 1965, the number of international tourist arrivals worldwide was estimated at 112.9 million. Thirty-five years later, in 2000, this figure had grown to 687.3 million – an increase of 509 per cent, equivalent to an average annual compound growth rate of 5.3 per cent (WTO, 2014). A significant feature of these statistics is the increase in both absolute numbers and as a proportion of world tourist traffic of Asia and the Pacific: in absolute terms, the numbers of international tourist arrivals in that region has more

than doubled, and the share of world traffic has increased by 6 percentage points, from 17 per cent to 23 per cent of the global total. Likewise, tourist numbers in Africa have also risen both in absolute terms and as a proportion, although from a much lower base. Tourist arrivals in Sub-Saharan Africa rose by over a quarter between 2007 and 2012, from 3.5 per cent to 5 per cent of the global total. Nevertheless, Europe continues to dominate international tourism, with 51 per cent of all international tourist arrivals in 2012. Fuller details are in the Appendix to this chapter.

When the origins of the tourists represented by these arrivals are considered, the pattern shown in Figure 1 is not markedly different: European tourists dominate the departures as much as the arrivals; Asian and Pacific tourism is growing strongly, and African tourism is also growing significantly, although from a low base. This is not surprising since most tourists tend to visit countries in their own region (Orams, 2003). It is for small States that the growth in long-distance tourism is most important: taking, for example, the 25 States and territories that cooperate in the Caribbean Tourist Organization, 35 per cent of their 24 million arrivals<sup>1</sup> in 2012 were from the United States of America, 14 per cent from Europe and 12 per cent from Canada, meaning that at least 61 per cent of arrivals were from outside their immediate area (CTO, 2013).



Figure 1. Origins of tourists by WTO region. Source: WTO, 2014.

Although the figures for international tourist arrivals are the standard measure for looking at the tourism industry, they are somewhat misleading. They relate to

<sup>1</sup> This figure differs from that given for the Caribbean in Table 1 because the Caribbean Tourist Organization includes Belize and Cancun, Mexico in Central America and Guyana in South America.

international tourism. In global regions where there are many States (as, for example, in Europe), journeys will count as international when, in other parts of the world, they would be classed as domestic. This means that, for example, that a 1,400 km journey from the Ruhr, Germany to the Costa Brava, Spain in Europe will count towards international tourist statistics, while a 3,000 km journey from Beijing to Hainan Island in China will not. As a measure of global tourism, the statistics for international tourism will therefore exaggerate the proportion of world tourist activity in those global regions where there are relatively numerous States.

Statistics on total tourism (both international and domestic) are difficult to produce, because there is not the opportunity to capture information that arises when tourists cross national boundaries. What is clear, however, is that the numbers of domestic tourists are substantially more in large States than those of international tourists. In Brazil, it has been estimated that, in 2011, 49 million of the inhabitants made one or more visits within the country for the purpose of tourism (FIPE, 2012). This compares with 5.4 million tourists arriving from outside the country (AET, 2012). In China, in 2013, domestic tourism in mainland China was estimated to involve 3,260 million domestic tourists, compared with 129 million from Hong Kong, China, Macau, China and Taiwan Province of China, and 29 million from the rest of the world (NBSC, 2014). In the United States, domestic tourism accounted for 1,600 million person-trips for leisure purposes in 2013, compared with international arrivals of 70 million (US Travel, 2014). On the other hand, in smaller States (particularly Small Island Developing States), international tourist arrivals will be more closely aligned with total levels of tourism.

Even when allowances can be made for domestic tourism, the available statistics tend to be too broad-brush to allow a clear analysis of the impact of tourism on the ocean, since they include tourism of all kinds. The statistics quoted above give the total number of tourists, irrespective of whether they are visiting a country for a beach holiday, to view ancient monuments or to climb mountains. Again, in smaller coastal States (particularly Small Island Developing States), the total number of tourists will be close to the number of tourists who will have an impact on the ocean, since there is only the coastal zone to accommodate them. But the available global figures are not sufficiently differentiated to allow conclusions focused precisely on coastal tourism.

In Europe, efforts have been made to determine the proportion of tourists that are staying in the coastal zone. For 27 countries of the European Union, there were in total in 2009 about 28.1 million “bed-places” (hotels, hostels, camp sites, etc.). Of these, about 60 per cent were in coastal regions (coastal regions being defined as the 447 third-level statistical units (34 per cent out of a total of 1,294) that have either a coastline or more than half their population within 50 km of the sea) (Eurostat, 2014a). Looking at use, rather than supply, surveys showed that, in 2012, for the 28 European Environment Agency countries for which data are available, 599 million tourist person/nights were spent in coastal regions out of the total of 1,416 million tourist person/nights spent in those countries – that is, 42 per cent of all tourism in those countries was in coastal regions, which (as said above) represent only 34 per cent of the total number of regions (Eurostat, 2014b – extracted in

Appendix)<sup>2</sup>. Surveys of the European population have also confirmed a strong wish for seaside holidays: 46 per cent of people in the European Union give a beach holiday as their reason for holiday travel; to this must be added the proportion of the 14 per cent giving a sporting holiday, since this covers scuba diving among other activities (EU, 2014). This factor is made more important by the high proportion of international holiday travel originating in Europe. In Brazil, it was estimated that, in 2011, 78 per cent of domestic tourism destinations were in the coastal Federal Units (although, of course, several of these stretch far inland) (FIPE, 2012). In the United States, surveys of the reasons for domestic travel in 2013 showed that visiting beaches was one of the five main reasons for travel, after visiting relatives, shopping, visiting friends and fine dining (US Travel, 2014). Also in the United States, in 2008, it was noted that Miami Beach attracted more than twice as many visitors than the Grand Canyon, Yellowstone National Park and Yosemite National Park combined, and that California beaches attract more visitors than all 388 National Park Service properties combined (Houston, 2008). Coastal tourism therefore appears to represent a dominant form of tourism generally.

The statistics quoted above do not include Antarctica. Since 1966, a trade has developed both by cruise ships and (to a lesser extent) for airborne tourists. This has grown steadily (with a dip in the 2010/11 season) over the last decade from a total of 27,537 in the 2003/04 season to 37,405 in the 2013/14 season. In 2013/04, 74 per cent of the tourists landed on Antarctica. Four-fifths of the tourists come from the USA (30.1 per cent), Australia (12.6 per cent), China (11.3 per cent), Germany (8.4 per cent), the United Kingdom (7.3 per cent), Canada (4.4 per cent), France (3.4 per cent) and Switzerland (2.4 per cent) (IAATO, 2014). There are obvious concerns about the potential impact (from, among other things, waste, accidents, accidental introduction of organisms and exhausts and oil spills), although the authorities and tour operators attempt to minimise these.

Land-based tourism in the Arctic is included in the statistics for the different continents above. In addition, there is also a very significant component of cruise ships which do not land their passengers, who therefore are not counted in the statistics. The limited statistics available on Arctic land-based tourism suggest that it is growing quite quickly, but is still only counted in the 100,000s. Cruising is probably growing more quickly, with Arctic seas becoming ice-free in parts during the summer (Lück et al., 2010). The challenges posed for the marine environment are similar to those for the Antarctic.

In spite of the limitations of the available statistics, it is clear that the total amount of tourism has generally been increasing fairly steadily for the last 40 years (with occasional set-backs or slowing down in times of global recession), that the domestic component of tourism is very important in large countries, that international tourism is important in small States, and that coastal tourism is a major component of tourism, if not everywhere the predominant one. Particularly noteworthy is the way in which international tourism is increasing in Asia and the Pacific, both in absolute

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<sup>2</sup> The difference between the 60 per cent for bed-spaces and the 42 per cent for overnight stays in coastal regions is probably due to the fact that much coastal tourism in Europe is highly seasonal, with many bed-spaces being unoccupied during the winter months.

terms and as a proportion of world tourism, with the implication that pressures from tourism are becoming of significantly more concern in those regions.

### **3. Socioeconomic aspects of the human activities**

Movements of people on the scale of the tourism described above require substantial inputs in transportation, accommodation, feeding and recreation. As a study of foreign direct investment in tourism by the United Nations Conference on Trade and Development (UNCTAD) puts it: “A significant part of tourism’s development potential stems from the fact that it links together a series of cross-cutting activities involving the provision of goods and services such as accommodation, transport, entertainment, construction, and agricultural and fisheries production” (UNCTAD, 2007). Tourism has therefore become a major economic activity. (Since it is often difficult to distinguish travel for business purposes from travel for recreational purposes, it is often necessary to describe this economic activity as “tourism and travel”; in the rest of this section, tourism must be understood in this wider sense.)

Even though international tourism is only a part of the picture, it is worthwhile examining the statistics on expenditure from international tourism to see the situation in the different regions of the world. The World Bank World Development Indicator 6.14 (Inbound tourism expenditure) gives details of inbound international tourism expenditure for 2006 and 2012 for 114 coastal States and territories. Table 1 shows an analysis of this data by global regions, showing also the proportion that the inbound tourism expenditure forms of total exports. Fuller details are in the appendix to this chapter.

Table 1. Inbound international tourism expenditure by global region, ranked by regional average percentage of total exports

Region (and number of States and territories covered)	Inbound tourism expenditure (million USD\$)	Regional average % of total exports	Inbound tourism expenditure (million USD\$)	Regional average % of total exports	State or territory with highest % of total exports in region in 2012	State or territory with lowest % of total exports in region in 2012
	2006	2006	2012	2012		
Caribbean Islands (11)	10,467	40.3	12,008	44.2	Aruba (Netherlands) (65.7%)	Haiti (16.3%)
Oceania (7)	26,453	13.7	41,108	11.3	Fiji (61.1%)	Solomon Islands (10.5%)
Sub- Saharan Africa (16)	14,981	7.8	20,740	5.9	Cabo Verde (60.6%)	Democratic Republic of the Congo (0.1%)
Western and Central Europe* (18)	378,794	6.9	440,661	6.1	Cyprus (27.8%)	Germany (3.0%)
Central and South America (17)	22,245	4.9	36,606	4.5	Belize (28.9%)	Brazil (2.4%)
North America (3)	163,599	7.4	234,108	7.4	USA (9.0%)	Mexico (3.4%)
Middle East & North Africa (12)	38,092	6.7	53,889	5.3	Jordan (33.0%)	Algeria (0.4%)
East Asia (12)	132,024	4.0	273,708	4.7	Macau, China (94.2%)	Japan (1.8%)
South Asia (5)	11,882	5.0	23,093	4.4	Maldives (79.9%)	Bangladesh (0.4%)
Eastern Europe (13)	17,488	4.0	28,624	3.7	Albania (45.9%)	Russian Federation (3.0%)

\* including Cyprus and Turkey

Source: Compiled from World Bank, 2014.

This shows that, on the basis of this sample of 114 States and territories, tourism and travel accounts for about 6 per cent of total exports globally. However, some regions of the world (particularly the Caribbean) are economically very dependent on international tourism in terms of foreign-currency earnings. It also shows that most small coastal States and territories are more dependent on such earnings than larger countries with more diversified and larger industries or resources of raw materials – although it is not unimportant in countries such as Australia or the United States.

Expenditure by international tourists, however, is not the only important aspect of coastal tourism. As shown above, domestic tourism is also very important, particularly in larger States. Although there are no global estimates of the total expenditure in coastal regions by domestic and foreign tourists combined, it is helpful to look at estimates of this total expenditure for countries as a whole, given the evidence (see above) that coastal tourism can be nearly as much as a half or more of total tourism.

In assessing the importance of an economic activity such as tourism for a country, it is important to consider not only the direct expenditure on that activity, but also the “indirect” expenditure on that activity and the resulting “induced” economic activity. The indirect expenditure is that which those active in the economic activity have to spend to buy assets and supplies that they need to carry it out. In the case of tourism, this includes the construction of hotels and other necessary buildings and the purchase of food, power and services, etc. The induced economic activity (sometimes called the multiplier effect) is that which is generated by those supported by the economic activity in question. In the case of tourism, this includes the spending of those who are directly or indirectly employed in tourism. The World Travel and Tourism Council (an industry body) has commissioned research to estimate the scale of the contribution of the tourism sector (in the wider sense explained above) to national economies. Table 2 summarizes the conclusions of this research (unlike Table 1, information on land-locked States cannot be separated out from that for coastal States). The Table also shows estimates of the proportion of employment in the different regions supported directly and in total.

Table 2. Estimated contribution of tourism to GDP and employment 2013, ranked by total contribution to GDP. Source: Compiled from WTTC, 2014.

Region	Direct contribution to GDP US\$ million	% share of total GDP	Total contribution to GDP US\$ million, including the multiplier effect	% share of total GDP	% share of direct employment	% share of total employment, including multiplier effect
<b>World</b>	<b>2,155,500</b>	<b>2.9</b>	<b>6,990,540</b>	<b>9.5</b>	<b>3.3</b>	<b>8.9</b>
Caribbean	15,299	4.3	48,994	13.9	3.6	11.3
South East Asia	121,166	5.0	294,376	12.3	3.7	9.7
North Africa	34,951	5.6	74,998	12.1	5.2	11.6
Oceania	49,606	2.8	188,018	10.8	4.4	12.4
European Union (27)	552,148	3.2	1,512,360	9.0	4.0	9.9
Central and South America	142,476	3.2	387,609	8.8	2.8	7.9
North East Asia	431,742	2.6	1,389,330	8.5	2.9	8.2
North America	544,342	2.7	1,665,850	8.3	4.2	10.4
Remainder of Europe and Central Asia	111,596	2.3	362,120	7.2	NA	NA
Sub-Saharan Africa	36,623	2.6	95,713	6.9	2.3	5.8
Middle East	63,988	2.4	167,598	6.4	2.5	6.4
South Asia	NA	NA	NA	NA	NA	NA

These statistics show that tourism is a significant component of many economies. As a result, many international organizations promote tourism development as a valuable way forward in improving national economies. However, three important factors need to be borne in mind in evaluating its importance:

First, the direct employment provided by tourism in many countries has a very large proportion of female workers. Studies by the World Travel and Tourism Council showed that in four (Australia, France, Germany and South Africa) of the five countries studied, the proportion of women employed in tourism is over 60 per cent of the work force. The exception was Turkey, where the proportion was 27 per cent, no doubt as a result of cultural differences (WTTC, 2014). It has been noted that this predominance of female workers makes tourism significant in giving economic status to women (Wilson, 2008).

Secondly, there will be a “leakage” from the earnings generated by a country’s tourism activity to the rest of the world economy. This leakage will have four main components:

- (a) Goods and services (such as wine or entertainers) must be purchased from abroad to meet demands from tourists (especially international tourists) that cannot be met from indigenous sources;
- (b) Expatriate staff (especially managers) will remit at least part of their earnings to their home countries);
- (c) International hotel companies will remit earnings to their non-resident owners. The terms on which they are able to do so, and the taxation regime to which any such earnings are subject will, in many cases, be the subject of negotiations between the local authorities and the hotel companies, especially where a large investment is concerned. Small States may be at a disadvantage when negotiating such terms with large international companies, especially where there is a credible threat of choosing a site in another country as an alternative; and
- (d) Commissions will be payable to tourism organizers for directing tourists to tourist establishments.

This “leakage” is usually a higher proportion of earnings in developing countries than in developed countries, although it is not easy to quantify (Yu, 2012).

Thirdly, there is a risk that the employment in tourism will be relatively low-grade and/or seasonal. The risk of the employment being low-grade comes largely from the fact that tourists frequently expect routine tasks (such as cooking, cleaning and making beds) to be done for them, although they would commonly perform these tasks themselves in their own homes. In some areas, when managerial staff are expatriates, the grade of work for the local population can be even lower. The extent to which this is the case varies according to the quality of local trained staff that is available. An important factor is therefore the extent to which related training and education are provided: for example, the University of the West Indies

has undertaken specific programmes for this purpose, including a specialist training centre in the Bahamas (UWI, 2002; UWI, 2014).

Tourism has a further socioeconomic significance, going beyond its macroeconomic importance and the effects on those involved in providing services. Where tourist resorts are created, the circumstances of those already living in the area are affected – sometimes adversely. For example, the literature notes cases where (a) the local residents lost access to beaches that they have previously enjoyed, even where the beaches are public property, because hotels or other tourist developments block access to those beaches; (b) local residents lost access to other areas that they have enjoyed for recreation because they are taken for resort building; (c) local residents had their property expropriated without compensation for the erection of hotels; (d) large increases in land values as a result of the erection of tourist establishments effectively prevented local residents from acquiring land; (e) local residents have seen land to which they attach religious or cultural significance diverted to tourism use (Bartolo et al., 2008; Cater, 1995; Wilson, 2008). On the other hand, cases (mentioned in the same literature) are also found where careful planning and collaboration with the local people produced “win-win” situations, in which successful tourist resorts have been created and the local people have benefited substantially. Information is lacking, and would almost certainly be impossible to collect, to make an assessment of the balance of adverse and beneficial effects, even in one country or region, let alone globally.

#### **4. Major impacts on the marine environment**

##### *4.1 Coastal built environment*

Coastal tourism needs coastal infrastructure. In the first place, transport is needed to get the tourists to the coast. This requires airports, roads, car-parks and (in some cases) railways. All this tends to change the coastal landscape. In addition, tourism demands accommodation. Hotels and restaurants are therefore built in large numbers, with many completely new resorts being developed. These commonly include marine promenades, bathing places and other hard landscape features, which completely change the shoreline (Davenport et al., 2006).

Globally, there are few statistics on the extent to which coastal areas have been built up to meet tourism needs. Many studies of specific areas are available, most using satellite-based photographs or sensing, but a comprehensive overview is lacking. Particular efforts, however, have been made in Europe, making a more general overview possible. Studies by the European Environment Agency have shown that, for the coastal zone up to 1 km from the shoreline, more than 10 per cent was built up in Bulgaria, Germany, Latvia, Lithuania, the Netherlands, Poland, Portugal and Romania, more than 20 per cent in France, Italy, Spain, more than 30 per cent in Slovenia and nearly 50 per cent in Belgium (the last two countries having very short coastlines). Information was not available for the United Kingdom of Great Britain and Northern Ireland. The proportion of the area close to the shoreline covered with urban development has also been growing rapidly: between 1990 and 2000,

nearly 8 per cent of the area within 10 km of the shoreline in the States mentioned (together with Denmark, Estonia, Finland, Greece and Ireland) was changed from agricultural or natural uses to artificial land cover (EEA, 2006). Some regional studies in the United States have shown a similar picture: more than 10 per cent of the estuarine coastlines of Delaware, Maryland, Virginia, and North Carolina now have artificial shorelines (Currin, 2013).

One significant factor is the extent to which built development for tourism is linked to more general urban development. In many parts of the world (for example, Cyprus, Rousillon in France, southern Spain, Costa Rica, the Algarve in Portugal, and California and Florida in the United States), tourist development is linked with the development of residential property. This has often been targeted at the retirement market from colder industrialised areas. The tourist market and the retirement market overlap, and support a variety of land-use demands – in particular golf courses, which create specific pressures from high levels of fertilizer, pesticide and water use and the consequent run-off (see chapter 20) (Honey et al., 2007).

This change from agricultural or natural uses to hard, artificial land cover has been happening wherever coastal tourism has been developed. The fundamental (and normally irreversible) changes that it brings about have significant implications for coastal ecosystems. These changes are most obvious for species that use both land and sea, such as seabirds, marine reptiles and some marine mammals, and for habitats such as mangroves and salt marshes which combine both land and sea (see Chapters 48 and 49). The changes usually introduce a barrier of artificial land cover between the sea and the natural or agricultural land cover in the hinterland, thus preventing animals moving between one and the other, and affecting the plant cover in the marginal zone. The changes also usually introduce night-time illumination, which also affects the way in which animals (particularly nocturnal animals such as bats) can use the terrain.

The impact of these changes is most obvious for sea turtles, which need to come ashore onto sandy beaches to lay their eggs, which are usually deposited near the vegetation fringe at the top of the beach. Such areas are obviously most affected by coastal development. In the Mediterranean, at the beginning of the 19<sup>th</sup> century, there were significant breeding populations of green turtles (*Chelonia mydas*), loggerhead turtles (*Caretta caretta*) and leather-back turtles (*Dermochelys coriacea*). Because of the transformation of so many Mediterranean sandy beaches into tourist resorts, these breeding areas are now reduced to Cyprus (for the green turtle) and small areas of Greece and Turkey (for loggerhead turtles); breeding by leather-back turtles is now virtually unknown, except for occasional reports from Israel and Syria (Davenport, 1998, and see chapter 39). Night-time lighting of tourist developments is also a significant problem at turtle-hatching time: turtle hatchlings, which emerge at night, are programmed to make for the lightest part of the horizon, which in natural conditions will be the sea; they are confused by street lighting and fail to reach the sea (Tuxbury et al., 2005; Arianoutsou, 1988).

However, the change from natural to artificial shorelines also affects purely marine species. The difference between a naturally sloping beach and a more vertical seawall produces a significantly different environment. There is growing evidence that the biota living on breakwaters, seawall, groynes and similar structures, and the

fish assemblages associated with them, differ from those on natural shorelines. Even where the natural shoreline is rocky, the replacement artificial shoreline will have different effects; for example, replacing natural rock with concrete may provide a different acid/alkali balance as a result of leaching (Bulleri et al., 2010).

The introduction of artificial hard coastal constructions can also affect the longshore movement of sediments, changing the patterns of sand transport and sedimentation. This can result in changes to beaches. The exact pattern will depend on local circumstances: for example, at Nouakchott, Mauritania, the construction of port facilities is resulting in erosion of dune systems, with increased risks of sea flooding of coastal settlements, reduction of beach area and threats of siltation of the harbour (Elmoustaphat, 2007). Even though sophisticated computer modelling of the possible effects of coastal constructions can be used to reduce the risks, a study of the Herzliya marina in Israel has shown that the effects in practice diverged extensively from those predicted by a meticulous prior environmental planning exercise (Klein et al., 2001).

#### *4.2 Waste and sewage*

The influx of tourists to coastal resorts inevitably results in problems in the treatment and disposal of the large amounts of solid waste and urban waste water (sewage) that result. Inadequate handling of solid waste often results in marine debris. Indeed, litter dropped on beaches by tourists is itself a significant source of marine debris (see chapter 24 for both these problems). As described in chapter 20, achieving adequate disposal of sewage is a problem in many areas. Not only do the nutrients contained in this sewage add to the enhanced levels of nutrients in the seawater, leading to eutrophication problems in many areas, but inadequate management can also easily result in health risks to tourists bathing or boating in the sea, a problem that is more directly linked to the success of tourist resorts. Such health hazards for tourists can be self-defeating in attracting business in a highly competitive market.

A special case of these problems of waste and sewage is presented by cruise ships, particularly in the Caribbean (as described in chapter 17, one of the major cruising markets), where large cruise ships put into relatively small ports which have limited facilities for handling waste and sewage. Islands with populations in the range of 20,000 to 100,000 are faced with handling the waste and/or sewage from ships with combined passengers and crew of up to 7,000 people. The resulting difficulties were the main reason why it took so long for the Caribbean to be declared a Special Area for garbage under the International Convention for the Prevention of Marine Pollution from Ships (MARPOL), because adequate reception facilities were a precondition of such a designation. A World Bank project in the member States of the Organization of Eastern Caribbean States (OECS), costing about 50 million United States dollars, enabled much progress to be made in tackling both problems. However, problems remain. During the implementation of this project, cruise lines are reported by the World Bank to have warned the individual OECS governments that any island that imposed waste disposal charges would lose cruise tourism because the cruise lines would merely make a substitute call at ports in less

demanding States. The OECS managed to agree a common levy on cruise passengers entering ports, but the World Bank has reported problems in ensuring that these resources are devoted to the waste and sewage management tasks (World Bank, 2003; ECLAC, 2005).

### *4.3 Beach and shore usage*

For many people, the main point of a seaside holiday is the use of a sandy beach for a mixture of sun-bathing, lounging, swimming and surfing. In general, such usage does not require any change to the natural state of the beach. In many places, however, steps have been taken to try to improve the beach. Often this has taken the form of erecting groynes (wood or stone structures perpendicular to the shore) to try to prevent longshore movement of sand and thus maintain a more sandy beach. "Beach feeding" has also frequently taken place, involving the dredging of sand from further out to sea and its deposition on the beach. These efforts are one form of human intervention in the land/sea interaction, which is considered more generally in Chapter 26. In addition, more recently, attempts have been made to use the creation of artificial reefs to improve the size of surf breakers, and thus the attractiveness of beaches to surfers. The first attempt of this kind was the Cables Reef at Mossman, West Australia. This involved dumping large amounts of natural rock to build up the existing reef. The local municipality reports that it has universally been judged a success in improving the surfing (Mossman, 2003). Later attempts, mainly using a technology based on large sand-filled containers, have been less successful. At El Segundo, California, USA, an artificial reef was created in 2000 but did not achieve its purpose, and its removal began in 2008 (CCT, 2008). At Bournemouth, in the United Kingdom, an artificial surfing reef was created in 2009, but the structure has failed and hoped-for economic benefits have not materialized. (Rendle et al., 2012; Rendle, 2014; Bailey, 2012). Other examples at the Bay of Plenty in New Zealand and at Tuvalom, in India, have also not produced the hoped-for improvements in surfing (Mull, 2014).

Protection of bathers from attacks by sharks has been seen as necessary in some parts of the world, notably Australia and the United States. This has had some adverse effects on local populations of rays, dolphins and turtles, because they have become entangled in this netting (Davenport, 2006).

The need to keep beaches attractive to tourists often leads to the local beach managers (either the communal authority or a hotel which has a concession on the beach) to clean up the debris left by the beach users. However, such clean-up operations usually also include the removal of the natural deposits along the high-tide line of seaweed and other marine material (including dead seabirds and other biota). Such removal of natural material has been shown to reduce substantially the biodiversity of sandy shore shorelines, especially seabirds (Llewellyn et al., 1996; Mann, 2000). Mediterranean and Baltic beaches used substantially by tourists have been shown to have lower densities and diversity of marine invertebrates than neighbouring beaches with less use of this kind. This has been attributed to the combination of cleaning and trampling pressure from the tourists (Gheskiere et al., 2005). Nevertheless, such beach cleaning may often be necessary to maintain

tourism, especially where large amounts of seaweed are brought up onto beaches by the sea. A special problem of this kind has recently emerged in the Eastern Caribbean: since 2011, high numbers of large mats of *Sargassum* species have been washed up on beaches. The same problem, which appears to be emerging from north equatorial recirculation region, has been encountered on the island of Fernando de Noronha, Brazil, and in Sierra Leone (Johnson et al., 2012).

Similar usage impacts can be found on rocky shores. Here even a relatively low number of humans walking over rocks where seaweed and barnacles are found can reduce the coverage of these biota significantly, and heavy (more than 200 visitors a day during the tourist season) usage can take more than a year to recover. Such effects have been shown for New Zealand (Schiel et al., 1999), Italy (Milazzo et al., 2002) and the United Kingdom (Pinn et al., 2005).

Dunes are also vulnerable to heavy usage by tourists, since the footfall can disturb the vegetation cover on which the dunes' stability relies. Because of the importance of dunes in coastal protection, this has been studied extensively in Europe, where it has been shown that 200 passages a day over a dune was enough to reduce vegetation cover by 50 per cent (Hylgaard et al., 1981). Fixed dunes also have a relatively low resilience to damage from vegetation removal (Lemauiel et al., 2003).

Use of the near shore for anchoring ships can also result in damage to the seabed. This is particularly important for shores where the immediate underwater habitat is coral reefs or seagrass beds. Damage has been noted from small pleasure vessels, which often anchor over coral areas so that those on board can dive to see the corals. But more serious damage is caused by cruise ships anchoring in such areas. Destruction of corals of up to 300 square metres has been observed from one anchoring of one cruise ship. Recovery from such damage can take a long time (Allen, 1992).

#### *4.4 Enjoyment of wildlife*

Over the past few decades, coastal tourism has come to include creating opportunities for the public to enjoy the local wildlife. This has generated a large number of businesses serving tourists. Six major categories of business are involved, though others do occur. Five are non-consumptive (general marine diving, viewing corals, watching seabirds, watching whales and other marine mammals and watching sharks), and one (recreational fishing and hunting) has a direct impact on the marine biota.

#### *4.5 General marine diving*

All around the world, tourists (both domestic and international) engage in diving (usually using self-contained underwater breathing apparatus (SCUBA)). The attractions of this activity are both the sense of freedom conveyed by being in the water and the interesting rock and coral formations and biota that can be seen. The scale of this tourist activity can be judged from the activities of the Professional Association of Diving Instructors, a global organization of experts training people in

scuba diving: between 2000 and 2013, the number of firms in its membership grew by 24 per cent to 6,197, and the number of individual trainers by 26 per cent to 135,615. The annual number of people trained in this period has been around 900,000 (PADI, 2014). At low levels of usage, diving sites do not appear to be adversely affected by recreational diving. There are, however, thresholds above which both the divers' experience is affected by over-crowding and the marine environment is adversely affected (by physical damage and disturbance of fish and other biota). The problem lies in establishing where those thresholds lie, particularly in the absence of long-term monitoring (Davis, 1996).

To enhance the experience of recreational divers, artificial reefs have been created in several locations, including, Australia, Canada, Japan, New Zealand, the Cayman Islands (United Kingdom) and the United States. Many of these used former naval ships as the basis of the new reef. These ships were cleaned of potentially polluting material and then sunk at the desired location. Studies have shown that these have brought substantial economic benefits to the areas from increased visits by tourists for the experience of diving around them (SWEC, 2003; Morgan et al., 2009).

#### 4.6 *Coral viewing*

The sheer splendour and variety of tropical and sub-tropical coral reefs has made them a very popular tourist attraction: people are prepared to travel great distances and pay substantial costs to see coral reefs in their native state. This has therefore generated a large component of the tourist trade. The scale of this component can be judged from what is said on tourism and recreation in Chapter 43.

The specific pressures on corals generated by such viewing can be seen from an assessment of the tourism pressures on the Great Barrier Reef of Australia. These cover (in addition to what is said about anchor damage above):

- (a) Damage (particularly to branching corals) by untrained scuba divers – damage by qualified scuba divers is not seen as a problem;
- (b) Damage by trampling at landing points where large concentrations of tourists were landed from boats to walk on the reef – more generally, even in heavily trafficked areas, damage by tourists walking on the reef was not seen as a problem;
- (c) Some reduction in growth caused by shading from pontoons moored to provide facilities (lecture theatres, restaurants, etc.) for tourists – this could be avoided by careful choice of mooring sites, so that the pontoons were moored over sand rather than corals. Likewise, problems from the anchor points could be avoided by correct design and choice of site;
- (d) Fish feeding by tourists: inappropriate types of food can adversely affect the health of fish, and frequent feeding of large volumes of food could promote unduly large and aggressive fish aggregations. Again, such problems can be avoided by proper management;
- (e) Shell collecting: this was not seen as a major problem, provided that operators gave guidance to tourists;

- (f) Glass-bottomed boats and semi-submersible vessels were seen as potentially capable of causing damage through collisions with corals. However, a survey of one heavily used site could find no overt damage caused by operations of semi-submersible vessels over a five-year period.

The conclusion therefore was that coral viewing, even on a major and locally intensive scale, was compatible with sustaining the reef in a good condition, provided that appropriate management steps were taken (Dinesen et al., 1995). Other studies, however, suggest that: (1) diving can, through abrasion, make large massive coral communities more susceptible to other pressures (Hawkins et al., 1999); (2) damage is virtually impossible to avoid (based on studies in St Lucia and the Cayman Islands); (3) substantial damage can still occur even when restrictive and highly-policed management is in place and (4) camera-users do more damage than divers not undertaking photography (Rouphael et al., 2001; Tratalos et al., 2001; Barker et al., 2004). In some places (for example, Eilat in Israel), artificial reefs have been created to reduce pressure on natural coral reefs (Wilhelmson, 1998).

#### 4.7 *Bird-watching*

There are no global statistics to show the extent of coastal tourism based on bird-watching (Balmforth, 2009). This is largely due to two facts. First, it is not easy to identify bird-watching tourism as a distinct activity: many people may spend a day or two bird-watching out of a longer holiday, although many others will go to destinations where they intend to spend much of their time bird-watching. The latter is particularly the case for destinations where the main attraction is the presence of birds, particularly during migration seasons. Secondly, the resources demanded for bird-watching are not elaborate. Although some sites may provide hides to enable closer observation, much bird-watching is done in the open with no more equipment than binoculars. The resource demand is therefore not easy to capture. Nevertheless, bird-watching is a substantial and growing part of the tourism market. As a major source of tourists of this type, the United States' market is worth noting. In the 2012 National Survey on Recreation and the Environment (NSRE, 2012), it is estimated that 19.9 million people in the United States took trips away from home to watch birds, although not all of these will have visited coastal areas. This group is reported to have both higher educational qualifications and higher incomes than the national average. However, the previous rapid increase in the numbers watching birds (a 332 per cent increase between 1983 and 2002) has slowed down or stopped. Some coastal resorts in the United States can rely very substantially on bird-watching: in 1991, Cape May on the Atlantic Coast of New Jersey was estimated to be attracting 100,000 bird-watching visitors a year, who were spending about 10 million dollars a year (Kerlinger et al., 1991). The Caribbean Tourist Organization has accepted an estimate that, worldwide, three million tourist arrivals a year may be primarily for the purpose of bird-watching (CTO, 2014).

The adverse impact of bird-watching arises from the interaction of the tourist and bird populations. On land, tourists entering nesting areas during the breeding

season can disturb breeding birds, potentially leading to the abandonment of nests. On water, boats carrying bird-watchers can disrupt seabird feeding. This is particularly significant at staging-post sites where migrant birds congregate, since the energy balance of migrating birds is often delicate. Such sites are particularly attractive to bird-watchers because of the numbers of birds (often of many different species) passing through them. On both land and water, bird-watchers can cause birds to flush into the air, making them use energy which (particularly during migration) can be in a tight balance. Careful management of bird-watching sites can minimize this kind of problem (Green et al., 2010; Parsons et al., 2006). One survey of the literature has, however, commented on the lack of research in this field (Steven et al., 2014).

#### *4.8 Whale, seal and dolphin watching*

As a tourist activity, whale watching dates back to about 1950, when part of Point Loma in San Diego, California, United States, was declared a public venue for observing grey whales and the spectacle attracted 10,000 visitors in its first year. Within a few years, boat trips to see whales from the sea were added to the land-based opportunities for watching whales (Hoyt, 2009). The attraction spread to other areas and countries. A survey in 2008 showed that the activity was by then taking place in 119 countries, all around the world, involved about 13 million people a year taking part in whale-watching, supported about 13,000 jobs and generated expenditure by tourists of about 2.1 billion dollars (IFAW, 2009 – see Table 3). Whale watching involves not just whales in the strict sense, but also dolphins and other marine mammals: in total around 40 species.

Table 3. Whale-watching numbers and expenditure

Region	Whale-watchers 1998	Whale-watchers 2008	Average annual growth rate 1998 - 2008	Number of countries 1998	Number of countries 2008	Jobs supported	Direct expenditure* USD millions	Total expenditure* USD millions
Africa and Middle East	1,552,250	1,361,330	-1.3%	13	22	1,065	31.7	163.5
Europe	418,332	828,115	7.1%	18	22	794	32.3	97.6
Asia	215,465	1,055,781	17.2%	13	20	2,191	21.6	65.9
Oceania, Pacific Islands and Antarctica	976,063	2,477,200	9.8%	12	17	1,868	117.2	327.9
North America	5,500,654	6,256,277	1.3%	4	4	6,278	566.2	1,192.6
Central America and Caribbean	90,720	301,616	12.8%	19	23	393	19.5	53.8
South America	266,712	696,900	10.1%	8	11	615	84.2	211.8
GLOBAL TOTAL:	9,020,196	12,977,218	3.7%	87	119	13,205	872.7	2,113.1

\* In this table, "direct expenditure" is the expenditure on whale-watching trips, and "indirect expenditure" covers the other costs of the tourist trip (travel, hotels, food, etc).

Source: Compiled from IFAW, 2009.

Other marine mammals also support tourism based on watching them. Dolphin-watching has developed as a tourism activity since the 1980s, and is now practised around the world (Constantin et al., 1996). Seal-watching has also developed within the ranges of the various species of seals and other pinnipeds. Since seals and other pinnipeds regularly haul themselves out of the water onto rocks and beaches, seal-watching can offer more reliable viewing of the animals to both operators and tourists, and therefore has enhanced popularity where it is feasible (Newsom, 1996; Bosetti et al., 2002).

Whale-watching involves risks to both humans and the animals. For humans, the risks come from their presence, often in relatively small boats, in the vicinity of large marine animals. The risks are enhanced where the activity involves being in the water – "swimming with dolphins". The threats to the animals are various. The most obvious are those of collisions between whale-watching boats and cetaceans. With quite large boats, often travelling at high speeds (in order to minimize the "blank" time to get from the shore to where the cetaceans are), such collisions can often be fatal to whales (IWC, 2007).

In addition, the literature documents many responses by cetaceans to less extreme pressures from whale-watching traffic (whether on the surface or underwater): surfacing or diving (sometimes to considerable depths), slapping the tail on the water, breaching (that is, leaping out of the water), making noises, changing the size

of the group or the way in which the members of a group interact, changing their swimming patterns, changing their patterns of feeding and/or resting (Senigaglia, 2012; Parsons, 2012). The difficult issue to resolve is whether such behavioural changes are having long-term harmful effects. The result of increased demands for energy and/or increases in stress levels and/or changes in patterns of feeding and resting may affect overall health. One study of bottle-nose dolphins (*Tursiops*) suggests that, in the long term, such pressures may lead to reduced reproductive rates (Bejder, 2006). Pressuring cetaceans to move from their chosen feeding grounds may result in them settling in areas providing less (or less appropriate) food, with obvious deleterious effects. Noise from whale-watching boats may disrupt communication between individuals (which may be important for promoting mating or avoiding harm). The cumulative effect of these various pressures may worsen the situation. These were the kinds of considerations that led the whale-watching subcommittee of the International Whaling Commission to state in 2006 that "... there is new compelling evidence that the fitness of individual odontocetes [that is, the toothed whales (such as the sperm whale (*Physeter macrocephalus*), the killer whale (*Orcinus orca*), beaked whales (*Ziphiidae*) and dolphins (*Delphinidae*)] repeatedly exposed to whale-watching vessel traffic can be compromised and that this can lead to population-level effects" (IWC, 2006). The effect of whale-watching on the life-patterns of the majority of species of baleen (plankton-feeding) whales, with feeding and breeding grounds separated by long migrations, is still under study. Nevertheless, action has been taken in some areas, such as South Africa, to prevent whale-watching in nursery areas (Workshop, 2004; IWCSC, 2013)

As a result, the International Whaling Commission has instituted a five-year strategic plan (2011 – 2016) on whale-watching (IWC, 2014). This aims to provide a framework for research, monitoring, capacity-building, development and management by national authorities. The work includes analysis of the methods adopted by various national administrations to control or regulate whale-watching and coordination of scientific research (IWCSC, 2013).

The impact of watching on seals and other pinnipeds is rather different because of their habit of hauling themselves out of the water. This means that they can be observed both on foot and from boats without any interaction in the water. Furthermore a distinction exists between pinniped species which are inherently "tame" and readily allow very close human approach often to less than 20m with little overt response (most fur seals, sea lions and southern phocid seals) and those which are generally wary of human approach and flush to the water when boats may be at a distance of 200m or more (grey and harbour seals). Some seal species can also become habituated to human presence without any adverse reaction (Wilson, 2015).

#### 4.9 Shark watching

Chapter 40 describes the growth of the tourist activity in shark watching and shark diving, resulting in an industry that, on one estimate, exceeds 300 million dollars a year. The activity in many cases involves placing tourists wearing scuba gear in metal cages and lowering them into the water, and then attracting sharks by throwing

“chum” (fish waste and offal) into the water. It therefore has considerable potential both for injury to the tourists and for disturbing the local ecology. On the other hand, strong arguments are made that the potential economic gains for developing economies are large and the environmental risks are low and can be kept within acceptable bounds by suitable management and monitoring (Martin, 2006).

#### 4.10 Recreational fishing

In most countries, marine recreational fishing is less significant than inland recreational fishing. Nevertheless, estimates suggest that recreational fishing is important in 76 per cent of the world’s exclusive economic zones (Mora, 2009). Some coastal marine stocks in more industrialized nations are exclusively exploited for recreation, or intensive co-exploitation for commercial and recreational purposes occurs. Overall, there is a growing recognition of the immense economic, socio-cultural and ecological importance of recreational fishing as a significant component of global capture fisheries (FAO, 2012). One estimate puts the global level of expenditure in 2003 on recreational fishing at 40 billion dollars a year, supporting 954,000 jobs (Cisneros-Montemayor et al., 2009). This includes fishing by people in the localities around their homes, and the proportion that is attributable to tourists (whether international or domestic) is uncertain. Recreational fisheries are most developed in economically developed countries, but they are emerging as a social and economic factor in many other economies (for example, Argentina, Brazil, China, India) and some other developing countries. Where statistics are available, some 4 per cent to 16 per cent of the populations engage in recreational fishing (FAO, 2012). For example, in Brazil in 2007, about 200,000 fishers have amateur angling permits and it was estimated that there were an additional one million unregistered recreational fishers. In addition, sport fishing in Brazil has grown at a rate of up to 30 per cent a year, with a corresponding growth in tourist numbers. This is reflected, among other things, in the growing success of the sport fishing trade that draws thousands of visitors (FAO, 2010). In more detail for one developed economy where recreational fishing is popular, in Great Britain (that is, the United Kingdom less Northern Ireland) in 2012, about 2.2 per cent of the adult population (1.08 million people) went fishing in the sea at least once. Total resident sea-angler spending in that year was estimated at 1,230 million pounds (1,685 million dollars). This directly supported 10,400 jobs (Armstrong et al., 2013).

The environmental impact of this recreational fishing activity is twofold. First, it is a driver increasing the demand for small boats in coastal waters: most marine recreational fishing is carried out from boats, rather than from the shore. This demand is one of the factors underlying the development of coastal marinas (see below). Secondly, the catch from recreational fishing is a component of the total fishing mortality caused by capture fisheries. Traditionally, it has been regarded as of marginal importance in this regard. However, figures are beginning to emerge that show that it can be a significant component and needs to be taken into account in the general management of fish stocks. For example, in the United States, recreational landings in 2002 accounted for 4 per cent of total marine fish landed in the country. When large industrial fisheries (such as menhaden (*Brevoortia spp*) and pollock (*Theragra chalcogramma*)) are excluded, the recreational component was 10

per cent; when only the fish populations are considered where there are concerns about sustainability, recreational landings in that year accounted for 23 per cent of the total nationwide, rising to 38 per cent in the waters of the States on the southern Atlantic coast of the United States and to 64 per cent in the Gulf of Mexico (Coleman, 2004).

The extent to which the effects of recreational fisheries are taken into account in managing fish stocks varies around the world. Of the authorities responsible for managing the world's exclusive economic zones (EEZs), for recreational fishing, 29 per cent impose regulations on the size of fish caught, 15 per cent regulate the number of fish caught, 13 per cent collect data on what is happening and 3 per cent impose a limit on the number of recreational fishers (Mora et al., 2009).

It is therefore likely that the impacts of recreational fisheries are not being taken into account in managing fish stocks in much of the world. The acquisition of information on local impacts of recreational fishing and the skills to incorporate this information into fisheries management (especially since those undertaking the fishing will in most cases be very different from the usual populations of fisherfolk) will therefore represent significant gaps in much of the world.

Large sport fish (marlin (*Makaira nigricans*, *Istiompax indica* and *Tetrapturus spp*), sailfish (*Istiophorus platypterus*), swordfish (*Xiphias gladius*) and similar species) are a special case. Fishing by rod for these large fish requires relatively large and powerful boats. The tourist market for these species is therefore focused on the more wealthy tourists, especially from the USA. It is particularly significant in the American tropics and sub-tropics, but it is also found, for example, off Mozambique. The economic value of the total of the various recreational fisheries of this kind has been estimated at about 143 million dollars (2003 prices) (Ditton et al., 2003; IOTC, 2013). Although some data on recreational fishing around Mexico have been collected, no reliable data are available for catches of sailfish for the other recreational fisheries of Central and South America, one of the main areas for recreational fishing for large sport fish (for which we know of no reliable data on catches of sailfish (Hinton et al., 2013). Similarly, the data for the Indian Ocean are only partial (IOTC, 2013).

Waste discarded from recreational fishing boats can cause problems. For example, discarded monofilament fishing lines have been found on 65 per cent of coral colonies at Oahu, Hawaii, United States, apparently causing substantial mortality by abrading polyps when moved by wave surge (Yoshikawa et al., 2004).

Recreational hunting for seabirds and some marine mammals and reptiles also takes place. In many countries, such hunting is prohibited or strictly controlled, especially for species regarded as threatened or endangered. Nevertheless, such recreational hunting can be of some economic significance for local communities. For example, Canada is the only one of the five jurisdictions in which polar bears are found that allows recreational (trophy) hunting for them; in the two other jurisdictions where such hunting is permitted it is restricted to indigenous peoples (Lunn et al., 2002). An average of about 100 bears per year is taken by recreational hunters, representing about 20 per cent of the total number taken in Canada. This has been

estimated to bring an income of about 1.3 million dollars per year (2010 prices) to the 30 or so communities where such hunting is permitted (Écoressources, 2010).

#### *4.11 Boating and personal leisure transport*

In North America and Europe a massive growth has occurred over the last fifty years in the numbers of small vessels used for pleasure boating. For example, in the United States (including the Great Lakes and internal waterways), in 2013 just under 12 million such craft were notified to the authorities (USCG, 2014), a slight reduction on the previous year, suggesting that the market may be becoming saturated. A high proportion (82 per cent) is motorized, with consequent pollution problems from oil and noise. This activity is economically significant, with the turnover in the United States estimated at 121,500 million dollars a year. It is estimated that 36 per cent of the adult population take part in recreational boating at least once a year (NMMA, 2013). Such widespread activities are not without their risks; global figures are not available but, for example, in the United States in 2013 4,062 boating accidents occurred, involving 560 deaths. This shows that safety measures and instruction can be effective, because these represent reductions of 50 per cent (accidents) and 31 per cent (deaths) over the last 15 years (USCG, 2014). Although the current level of participation in the rest of the world is much lower, it is expected to grow rapidly over the next few years in the fast-growing economies: in Brazil, sales of leisure boats have been growing at a rate of over 10 per cent per year since 2005 (except in 2009) (FT, 2011); in China, it is forecast that the number of pleasure yachts will increase to over 100,000 by 2020 (CCYIA, 2013).

All these boats require moorings when they are not being used for recreational sailing. There has therefore been a parallel growth in marinas and specialized harbours for small boats. These installations form a significant part of the hard coastal constructions discussed above, and therefore present the problems analyzed there.

The other main environmental problems from yachts and small boats are parallel to those from larger ships (see chapter 17). Apart from the inevitable impact of oil from motor engines, the most significant are the residual problems from anti-fouling paints (especially tributyltin (TBT)), the role of small boats as vectors of non-indigenous species, waste disposal and anchoring and movement impacts.

The use of TBT has been banned since the 1980s for small vessels (under 25 metres) in many parts of the world and, more generally, under the International Convention on Control of Harmful Anti-Fouling Systems on Ships since 2003 for new applications and from 2008 for vessels already treated with TBT (see further in chapter 17). However, some States have still not accepted this prohibition: 16 per cent of the tonnage of the world's shipping is registered in States that have not become parties to this Convention (IMO, 2014). Even where States are parties to the Convention, areas still remain where TBT is being found in small-boat harbours and associated areas – for example, in Brazil, the Ilha Grande Bay, Rio de Janeiro (described as one of the most heavily protected tourist areas in the country) was shown in 2009 to be still heavily affected by TBT (Pessoa, 2009).

As concern has grown over the transport of non-indigenous organisms by ships, the role of small boats as vectors of such biota has been shown to be significant – not so much in long-distance transport, as in the more local distribution of species once they have been introduced into a region. Problems with the transport of non-indigenous organisms by recreational boats are being found in locations as far apart as British Columbia on the Pacific coast of Canada and Cornwall on the Atlantic coast of England. The problem species include shellfish, seaweeds and bryozoa (Davenport, 2006; Murray, 2011; ERCCIS, 2014). In 2012, the International Maritime Organization issued guidance for minimizing the transfer of invasive aquatic species by recreational craft (IMO, 2012).

As with cruise ships, although on a smaller scale, recreational boat anchors can cause damage to coral reefs. Their anchors can likewise cause problems to seagrass beds (Backhurst et al., 2000). Recreational motor boats can cause further damage to seagrass beds from the action of their propellers in shallow water; re-growth after such damage can take up to four years (Sargent et al., 1994; Dawes et al., 1997). Powerboats (high-speed motor-boats) cause disturbance through noise and wake to seabirds, marine mammals and sea turtles, particularly to slower-swimming species that are unable to get away, and by disturbing foraging. They can also affect the enjoyment of beaches and inshore waters by other human users. Other devices can cause similar disturbances. Such devices include Jet-Skis® and Wave-Runners®, sand-yachts and kites and paragliders towed by all-terrain vehicles and motor-boats (Davenport, 2006). In effect, these newer forms of recreation on shore and in inshore waters are competing for marine space with non-motorized uses and the natural ecology.

## **5. Integration of environmental and socioeconomic trends**

Successful management of sustainable tourism requires a complex balancing exercise. Many factors have to be taken into account: the means of access, the urban development of hotels, other accommodation, restaurants, and other support facilities, sewage and waste disposal, the many kinds of recreational activity, the interests of the local inhabitants, the profitability of resorts and, last but by no means least, the maintenance of the local natural ecology. The levels at which such varied interests can be managed will vary, hence a successful balancing exercise will usually require the involvement of a wide range of authorities, residents and commercial interests. Examples show, however, that it is possible for such successful balances to be achieved and – even more difficult – maintained over long periods.

A further factor in this balancing exercise is the cross-effects between different recreational activities and different environmental compartments and species. The impact of bird-watching on nesting and feeding areas for seabirds is explained above. But similar impacts on birds are also caused by other recreational activities: boats used in birds' feeding areas for sea-fishing, whale-watching, shark-watching or simply for sailing will cause the same type of disruption as boats used for bird-watching; coastal walking through nesting areas for simple enjoyment will cause the

same kind of disruption as access for bird-watching. Likewise, all kinds of uses of boats in areas frequented by cetaceans will have similar impacts to the use of boats for whale-watching. For wildlife which is disturbed, it does not matter what the purpose of the recreational use is: it is the cumulative impact which gives rise to a threat. Secondly, the balancing exercise is further complicated where marine protected areas are created, since these add a further set of factors which have to be taken into account.

Tourism generally, however, suffers from the problem that success risks undermining itself. For many tourists, the attraction of a tourist location relies on a combination of a relatively high level of service provision and a feeling of a relatively low level of pressure from other tourists. As a tourist location becomes recognised as providing this desirable combination, the pressure to intensify the provision of tourist services increases, thus undermining the balance. If the balance is maintained, prices are likely to rise as the service providers take advantage of the demand in the market, and the location will become less available to the less well-off. If the balance is not maintained, those who can afford to will look elsewhere, creating pressures for the development of new resorts. The world's supply of good sandy beaches is fixed. As disposable wealth in an increasing number of economies increases, the pressure to open up more and more areas for tourism will also increase.

At the same time, within any specific resort, there will be conflicting demands for marine space: among others, sun-bathing *versus* beach volley-ball, swimming *versus* Jet-Skis® and similar devices, wildlife watchers *versus* water-skiers. All this will require management – alongside the many other demands on coastal marine space from fishing (both commercial and recreational), shipping, ports, sand and gravel dredging and all the other human activities that affect the coastal zone. The management of ecotourism is particularly important, because it is essential to ensure that the pressures on the wildlife from it are not more than can be accepted: once a natural ecology is damaged, it is often impossible to restore. Since maintaining a good quality of local environment will be essential for the success of a tourist location, tourism management will be one of the first areas to feel these combined pressures.

## **6. Capacity-building gaps**

Any successful management process will rely on a combination of good information about what is happening and the skills needed to integrate and apply that information. Successful management of sustainable tourism has therefore to be based on a wide-ranging collection of all the relevant information and the development of the necessary skills. The information and skills should include: (a) knowledge about the main features of the local marine environment and their vulnerability to the tourist and recreational activities that affect the marine environment; (b) information about the location, scale and economic significance of those tourist and recreational activities; (c) the relationships between those tourist and recreational activities and the other uses of the marine environment in the

locality; and (d) skills to evaluate what would be the most appropriate balance between the various interests involved (including the conservation of the local marine environment and any formally protected coastal or marine areas) and to broker or settle an acceptable agreement between all those interests.

In many parts of the world, much progress has been made in developing the skills necessary to monitor local ecosystems, and in training local residents in managing hotels and the many other trades necessary for the proper functioning of tourist services, although there is scope for improvement. Less progress has been made in integrating these two sides of a successful sustainable tourist operation. Since so many branches of administration are relevant, a focus on ensuring that general administrators understand the importance of an integrated approach to tourism and are willing to implement it is necessary.

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