



The environmental impact of tourism in the Caribbean

Introduction

Tourism is the most important economic activity in the Caribbean. The region is four times more dependent on tourism than any other region in the world. The Caribbean receives 2.9% of the world's stay over tourists and around 50% of the world's cruise ship passengers. The industry is the major foreign exchange earner and, by 2010, Caribbean tourism is expected to produce US\$77.5 billion in economic activity and 3.7 million jobs. The tourism industry relies on its natural resources base. However, despite this dependence, the industry has the potential to impact this natural resource base in a negative way, as much of the tourism is **mass** tourism based in concentrated **enclaves**.

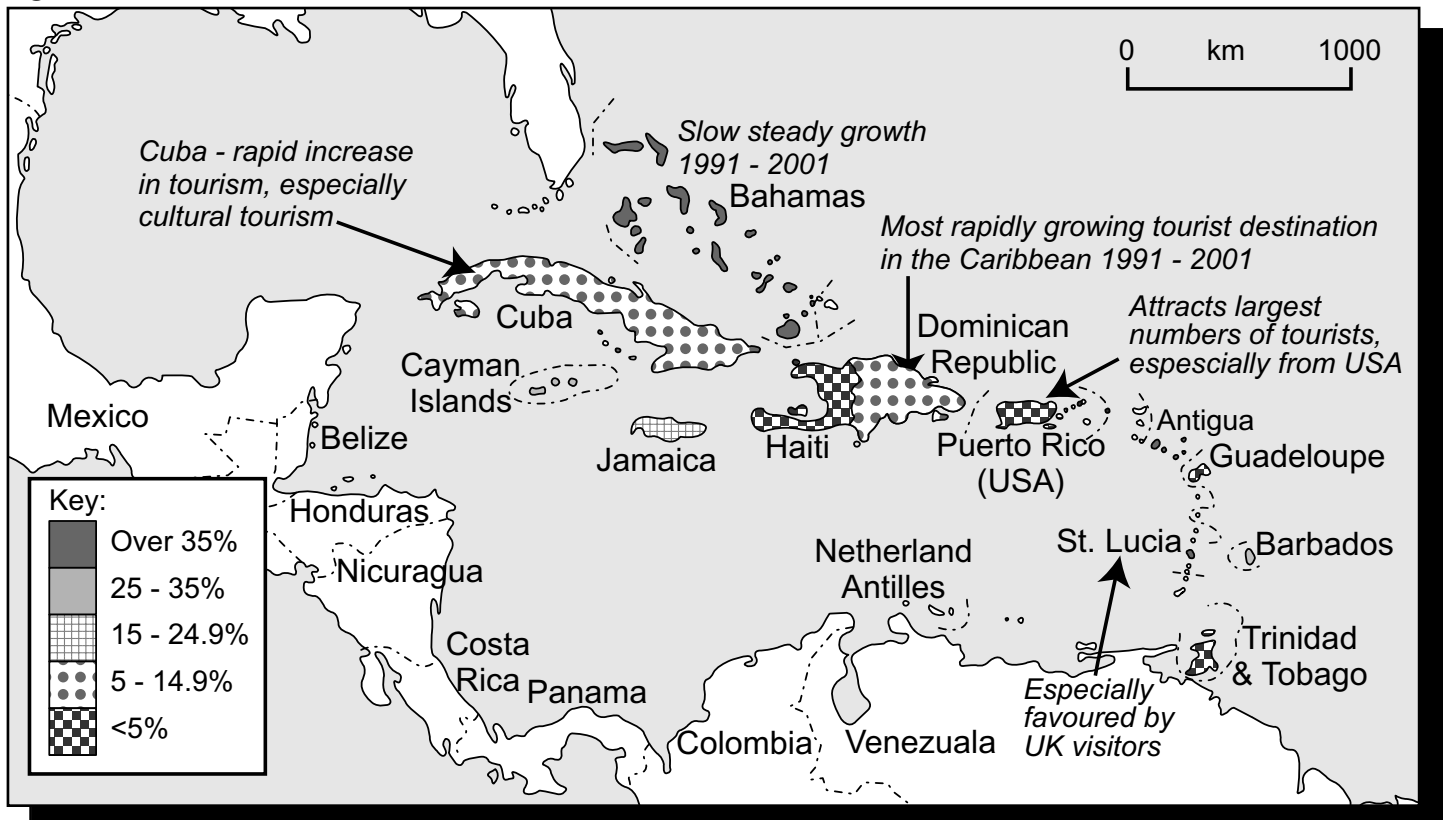
Tourism and the supporting infrastructure that it requires pose threats to the environment and to drinking (potable) water resources. The major impacts come from the improper management of **liquid waste** or wastewater. Sewage treatment and wastewater treatment plants are the major perpetrators of this type of pollution. 75% of these plants do not function efficiently enough to protect the environment. Consequently, near shore marine water quality has been significantly degraded and coral reefs impacted to the extent of reef death. Governments have attempted to reduce these impacts by establishing sewage and waste water treatment plants particularly in heavily populated tourist areas like the south and west coasts and Barbados and the Rodney Bay area in St. Lucia.

Other impacts include physical damage to corals from divers and from boat anchors and sand compaction from the heavy usage of beaches by tourists and vehicles. Building tourism facilities in ecologically sensitive areas is also a concern as is the usage of potable water. Tourists use significantly more water than residents do.

The Caribbean is the most tourism dependent region in the world with countries such as St. Lucia and Antigua being very dependent (*Fig. 1*). The continued decline of the agricultural sector over the past twenty years has seen the emergence of tourism and ex-patriot remittances become the main source of foreign exchange earnings for many countries in the region. Currently, tourism accounts for one in four jobs and most hard currency earnings come from this sector.

The economic potential of tourism makes the industry a potent weapon in the battle against poverty and a cornerstone of national development processes but the linkage between tourism development and environmental degradation is well established and a huge cause for concern.

Fig. 1 Contribution of tourism to GDP in the Caribbean.



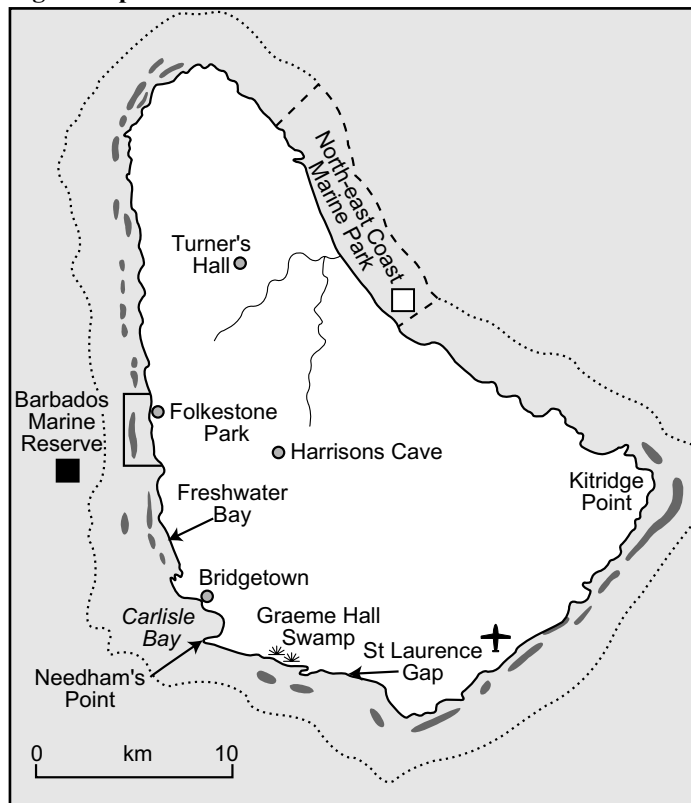
The environmental impact of tourism in St Lucia and Barbados

St Lucia and Barbados have used tourism as a means of diversifying the economic base beyond agriculture and industry. In 1999, travel and tourism accounted for 35% of jobs in Barbados and 51% of jobs in St. Lucia. Visitor expenditure as a percentage of GDP on Barbados and St. Lucia were 35 and 55% (Table 1) while the contribution of the combined industries of travel and tourism were estimated at 51 and 69% respectively.

Table 1 Visitor Expenditure as a % of GDP in the Caribbean.

	% of GDP
Anguilla	75
Cayman Islands	60
St. Lucia	55
Antigua & Barbuda	49
Aruba	41
Barbados	35
St. Kitts & Nevis	31
Grenada	28
St. Vincent & Grenadines	28
Jamaica	25

Fig. 2 Map of Barbados.



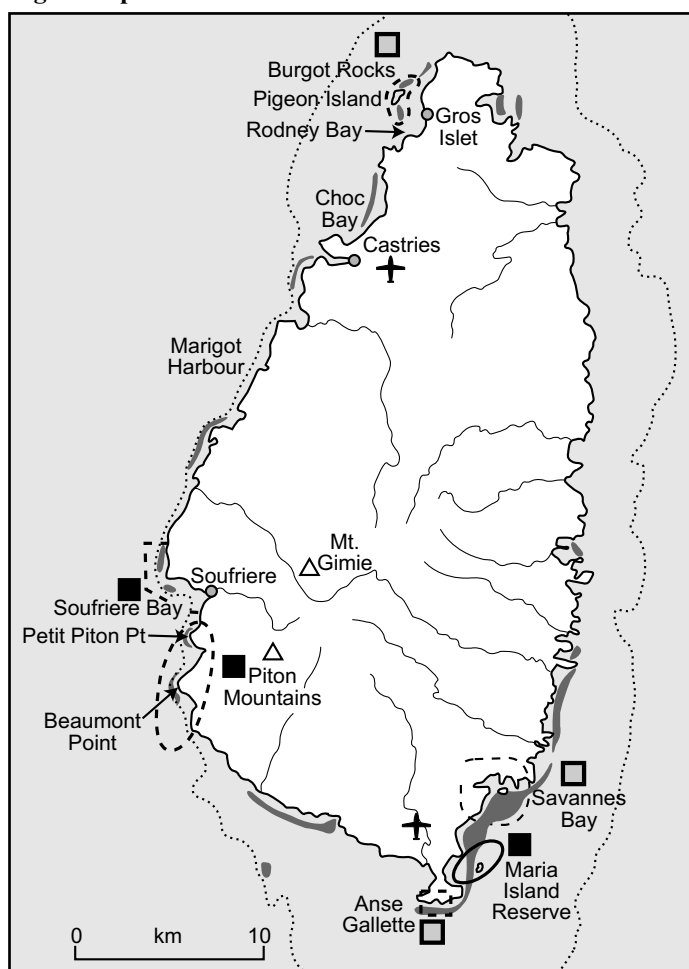
Tourism in Barbados:

- 544,696 visitors in 2000
- Average expenditure by tourists \$1261
- Total revenue received = over \$700 million
- 15% of the population directly employed in tourism
- 529 cruise ships called at Barbados in 2002

Both islands are heavily dependent on tourism. Geographically the countries are very different with St. Lucia being mountainous and of volcanic origin while Barbados is a relatively flat and is predominately composed of sedimentary rocks and coral limestone.

The industry itself in Barbados and St. Lucia is evolving from the traditional sun-sand-sea tourism to include attractions like mountains, other forms of land-based nature tourism and cultural heritage tourism. This is beginning to expose previously pristine or relatively untouched areas to environmental degradation. Harrison's Cave in Barbados and the Pitons in St. Lucia are excellent examples of such (Figs 2 and 3). Harrison's Cave had to be closed during the mid-1990s to address the high levels of environmental degradation caused by the large number of visitors. The use of lights and the increased level of carbon dioxide generated by visitors allowed algae to grow and discolour the stalactites, stalagmites and other limestone formations.

Fig. 3 Map of St. Lucia.



Tourism in St. Lucia:

- 269,850 visitors in 2000
- Average tourist expenditure per person \$956
- Total revenue received = over \$250 million
- 14% of the population directly employed in tourism
- 387 cruise ships called to Castries in 2002

Key:

- Reefs
- Approximate 100m isobath
- Proposed park or protected area
- Airport
- Park or protected area
- Proposed park or protected area boundary

Solid waste

Tourism generates substantial amounts of solid waste. This problem has special significance for both Barbados and St. Lucia since both are too small to be able to support economically viable recycling programmes. Tourists in St. Lucia generate twice as much solid waste per capita than local Caribbean residents. Cruise ship passengers produce up to four times more solid waste per day than Caribbean residents. However, the average tourist is only present on the island for eight to nine days and residents are present year round. In reality the total waste generated by tourists, 3,600 tons per year is significantly less than the 47,500 tons per year produced from domestic sources and the 30,000 tons per year produced by the commercial sector.

The solid waste generated by the tourism sector also includes ship-generated garbage. The Caribbean Sea experience a high volume of cruise and commercial ship traffic and solid waste generated from such vessels pose a potential pollution threat to sea and all of the coastal areas that it washes.

The negative impacts of solid waste on the environment are numerous. Both Barbados and St. Lucia currently use sanitary landfill technology for the disposal of solid waste. Very little recycling, composting or incineration occurs. Closed landfills and dumps threaten both groundwater quality and marine coastal water quality through generation of leachate. Leachate is toxic and is capable of impacting the near-shore marine flora and fauna. Additionally it can affect human health through ingestion if the leachate gets into potable groundwater or surface water resources. The former landfill site at Choc Bay, located in the north west of St. Lucia, may now pose a health threat to the adjacent and heavily used beaches.

Liquid waste

The tourism industry generates significant volumes of largely untreated liquid waste including:

- hotel or restaurant kitchen waste
- raw sewage
- oil and other waste from recreational vehicles (including cruise ships)
- herbicides, pesticides, and fertilisers from resort landscaping and golf course management

The increased percentage of concreted areas, roads and other impervious surfaces associated with hotel and resort development has increased rainwater runoff to coastal areas. In Barbados, the location of hotels mainly in the coastal belt has contributed significantly to the degradation of coastal water quality and ecosystems.

Studies conducted on water quality and the health of coral ecosystems in the Carlisle Bay area as well as the south coast and the west coast of the island were the impetus for the development of the Bridgetown sewage treatment plant. Similarly, studies conducted at the Rodney Bay Marina and adjacent beaches, which have a heavy clustering of tourism facilities, have culminated in the installation of a sewage treatment facility there.

St. Lucia's Biodiversity Country Study Report (1998) outlines the environmental impacts of wastewater effluent on the near shore environment. Negative effects include the introduction of pathogens into the marine aquatic environment in raw or inadequately treated sewage. This is a potential health hazard to tourists and residents but in addition introduces bacteria and viruses that can attack corals thereby inhibiting their growth. The introduction of nitrogen and phosphorus-containing effluent hastens the process of eutrophication.

Air emissions and noise

The construction of coastal tourism facilities and roads into ecologically sensitive areas can lead, albeit for short periods, to the generation of dust and particulate matter that may cause stress in the marine environment. In Barbados the emergence of adventure tourism since 2003 has led to the construction of dirt roads for the use of all-terrain vehicles in the last remaining areas of tropical rain forest on the island. This area, Turner's Hall in St. Andrew and the immediate surrounding areas remained forested because of the hilly and unstable terrain and the presence of gullies. The Turner's Hall area is an important area for biological diversity in Barbados.

Natural resources issues and land use

Tourism developments in Barbados and St. Lucia are mainly located within eight hundred metres of the coastline. The concentration of large infrastructure and resort complexes along delicate coastlines has destroyed mangroves and beaches and caused lagoon pollution from sand mining, dredging and sewage dumping. Wetland areas and mangroves remove nutrients from and restrict the rapid flow of freshwater into the marine environment. Thus, this type of ecosystem creates the conditions that are ideal for the development of coral reefs that require clear, nutrient-free water. Thus the removal of wetlands will not only disrupt the nesting and feeding habitat of birds and marine species but the coral reefs will also be affected. The St. Lawrence Gap area in Barbados is a typical example where a wetland area was sacrificed for hotel development. Similarly, the Rodney Bay Marina in St. Lucia exists because of the destruction of a mangrove area.

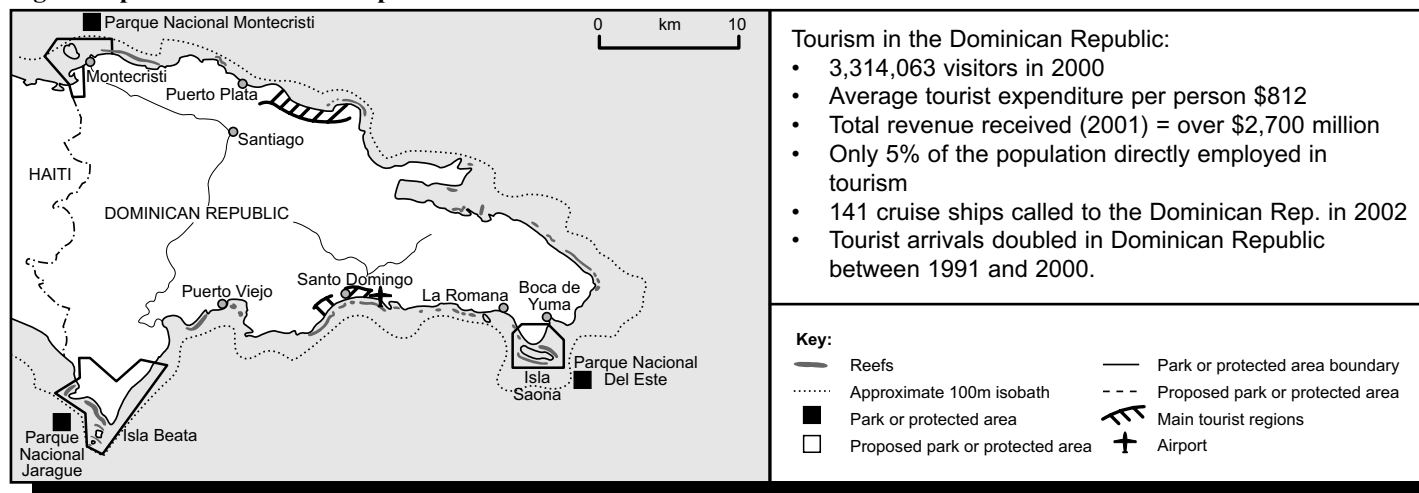
Most of the effects of tourism on coastlines have been negative due to inadequate planning. These effects include sand-mining for construction and coastal erosion from coastal engineering works. These include the construction and maintenance of jetties, groynes, piers and wharves, dredging and spoil disposal. One of the most outstanding constructions for tourism was the Pigeon Island causeway in St. Lucia. The construction of the causeway altered coastal water flows and processes so drastically that the near-shore fishing industry in the northern town of Gros Islet was virtually wiped out. Conversely, the Needhams Point development on the south western coast of Barbados is an example where coastal engineering has led to the extensive beach accretion.

The main tourism related environmental threats to the resources of the beach and the sea come from congestion, pollution and erosion. Congestion or beach overcrowding can lead to sand compaction that can have impacts on back-beach vegetation and may also impact turtle nesting sites. Significantly, lights used by tourism facilities on beaches provide a major problem to turtle hatchlings. Hatchlings tend to move towards these lights and away from the ocean.

Potable water and energy

The tourism industry consumes considerable amounts of energy and potable water. A study established that in St. Lucia the average daily consumption of water by hotel guests ranged between 80 to 150 gallons per person. Residents use around 50 gallons daily. Hotel guests use more energy per person than the national average but such usage of energy may have relatively insignificant impact on the environment. Comparatively, the average Barbadian uses between 60 and 63 gallons of water per day while hotel guests use on average 179 gallons per day. This heavy use of potable water perhaps has greater environmental consequences for Barbados than St. Lucia. Barbados depends almost entirely upon ground water for its potable water supply. Over-extraction of this resource will lead to saline intrusion of the aquifers that will render them virtually useless as a source of potable fresh water.

The Barbados Water Authority plans to recycle wastewater and to upgrade the distribution system to reduce leakage and other sources of waste. The government estimates that it can recover, through new investments in treatment and recycling, up to 5 million gallons of wastewater a day for non-potable uses.

Fig. 4 Map of the Dominican Republic.**Impacts of tourism in the Dominican Republic – a late comer**

The concept of environmental security states that a nation or region, through sound management, and sustainable use of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the welfare of its population. In contrast, environmental insecurity is a condition in which a nation or region fails to effectively govern, manage, and use its natural resources and environment, causing social, economic, or political instability that leads over time to heightened tensions, social turmoil, or conflict.

The implications of environmental security are especially important in the Dominican Republic, a poor island state vulnerable to natural hazards, with an economy moving from a traditional agricultural base toward the rapid expansion of tourism. At the same time there are increasing numbers of urban poor lacking clean water and basic sanitation. The migratory pressures from neighbouring Haiti, itself struggling with a near-collapse of its environmental resources, reinforce the links between environment and security.

The 2005 Environmental Sustainability Index of the World Economic Forum ranked the Dominican Republic 119 out of 146 nations; Haiti, at 141, was the only country in the Western Hemisphere ranked lower. The traditional economy of the Dominican Republic was based on slash and burn agriculture, hillside farming, and grazing. These farming systems were able to support the population until well into the 20th Century as there was an abundance of land relative to population. Unsustainable agricultural practices (e.g. hillside farming, deforestation, improper or excessive irrigation) have raised yields but also resulted in soil erosion and salinization. Agriculture has and will continue to decline (11.5% of GDP in 2002) but unsustainable practices continue to extract an environmental toll.

In contrast, tourism is seen as the major engine of economic growth in the Dominican Republic, but there are also environmental concerns. Tourism is contributing to salinization of surface and ground waters in the country's coastal areas; increasing stress on fragile wetlands, mangroves and reefs and aggravating vulnerability to natural hazards. The tourist industry is plagued by a lack of basic services, such as solid waste disposal; inadequate infrastructure, including water and sewer systems; shrinking underground aquifers threatened by salinization; and very limited enforcement of environmental laws.

The emphasis on high volume tourism implies significant environmental degradation that over time may destroy the industry. With no clear strategy to achieve a higher-valued added and more environmentally sound model for the long run, the Dominican Republic may benefit temporarily from an increasing volume of tourism, while undermining the long-term environmental viability of the industry.

There are five broad challenges face the Dominican Republic's tourism industry:

- Rapid growth of tourism has outpaced the development of infrastructure, policies, and services.
- The current business model for tourism, 'slash and burn' tourism, tends to destroy the aesthetic, environmental, and natural resource base upon which it depends. Scarcity of water may impose environmental and economic limits on the current tourism model.
- Changing the tourism model is difficult because foreign hotel operators whose profits depend on a high volume of inexpensive tourism dominate the industry.
- Recent experience indicates the tourism sector is woefully unprepared even for recurring natural disasters such as hurricanes.
- Tourism has brought with it increasing vulnerability to social conflicts. Tourism has become the new employer for Haitians, who are used as construction and maintenance labour but are underpaid and not sheltered or fed during natural disasters.

Conclusion

Tourism stands out as the likely engine of growth for the many Caribbean islands over the short to medium term. Yet, there are a host of concerns associated with the current nature of tourism that call into question its sustainability, including the lack of infrastructure, inadequate sanitation facilities, saltwater intrusion, weak regulatory enforcement, and lack of preparedness for natural hazards. Tourism expansion has led to deforestation, beach loss, lagoon pollution and reef damage from dredging, boat anchoring and improper waste disposal by hotels, cruise ships and yachts. If the natural environment is degraded too far, it is likely that visitors will abandon the Caribbean, and the hope for long-term (or even short-term) economic development would be limited.

Further reading

Tourism and Environment in the Caribbean: An Economic Framework. Dixon, J. 2001. World Bank. Washington.
Barbados acts to prevent water crisis. Drosdoff, D. 2005. In IDB America. Washington.

Useful websites

- Impact of tourism in the Caribbean, with reference to Jamaica: www.transafricaforum.org/reports/tourism_issuebrief0700.pdf
- www.uneptie.org/pc/tourism/sust-tourism/env-global.htm for the environmental impacts of tourism at a global level
- www.uneptie.org/pc/tourism/sust-tourism/economic.htm

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