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# Final Report

## Part 2 - Detailed Report

## Section A - Caribbean Region

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# OVERSEAS COUNTRIES AND TERRITORIES

# ENVIRONMENTAL PROFILE

## PART 2 - Detailed Report

## Section A - Caribbean region

This study was financed by the European Commission and executed by the Joint-Venture of NIRAS PINSISI Consortium partners. The opinions expressed are those of the consultants and do not represent any official view of the European Commission nor of the governments of the territories involved.

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# LIST OF ABBREVIATIONS AND ACRONYMS USED

| | |
|---|---|
| ACAP | Agreement on Conservation of Albatrosses and Petrels |
| ACOR | Association Française pour les Récifs Coralliens |
| ACS | Association of Caribbean States |
| AEPS | Arctic Environmental Protection Strategy |
| AFL | Aruba guilders |
| AI | Ascension Island |
| AIG | Ascension Island Government |
| AIWSA | Ascension Island Works & Services Agency |
| AMAP | Arctic Monitoring and Assessment Programme |
| ANG | Anguilla |
| ANRD | Agricultural & Natural Resources Department |
| AOSIS | Alliance of Small Island States |
| APEC | Asia–Pacific Economic Cooperation |
| ARU | Aruba |
| BAS | British Antarctic Survey |
| BAT | British Antarctic Territory |
| BIOT | British Indian Ocean Territory |
| BRGM | Bureau de Recherches Géologiques et Minières |
| BVI | British Virgin Islands |
| CARICOM | Caribbean Community and Common Market |
| CAFF | Conservation of Arctic Flora and Fauna |
| CAY | Cayman Islands |
| CCAMLR | Convention on the Conservation of Antarctic Marine Living Resources |
| CCC | Cod and Climate Change Programme |
| CDB | Caribbean Development Bank |
| Caribank | Caribbean Development Bank |
| CARICOM | Caribbean Community |
| CARIFORUM | Caribbean Forum |
| CBD | Convention on Biological Diversity |
| CCAMLR | Convention on the Conservation of Antarctic Marine Living Resources |
| CDERA | Caribbean Disaster Emergency Response Agency |
| CDS | Catch Documentation Scheme |
| CEHI | Caribbean Environmental Health Institute |
| CESC | Conséil Economique, Social et Culturelle (FP) |
| CIA | (US) Central Intelligence Agency |
| CITES | Convention on International Trade in Endangered Species |
| CMS | Convention on the Conservation of Migratory Species of Wild Animals |
| CNRS | Centre National de Recherche Scientifique |
| COLTO | Coalition of Legal Toothfish Operators |
| CoP | Conference of the Parties |
| CPA | Country Poverty Assessment |
| CPACC | Caribbean Planning for Adaptation to Climate Change |
| CR | critically endangered (IUCN classification) |
| CRISP | Coral Reefs in the South Pacific |
| CROP | Council of Regional Organizations of the Pacific |
| CSD | Commission on Sustainable Development |
| CSM | Caribbean Single Market |
| DAF | Direction de l'Agriculture et de la Forêt (Mayotte) |
| DCNA | Dutch Caribbean Nature Alliance |
| DEACI | Department of Economic Affairs, Commerce and Industry |
| DEFRA | (UK) Department of Environment, Food and Rural Affairs |
| DEPD | Development & Economic Planning Department (St Helena) |

| | |
|---|---|
| DfID | (UK) Department for International Development |
| DIP | (Aruba) Directorate of Infrastructure and Planning |
| DK | Denmark |
| EC | European Community |
| ECE | Economic Commission for Europe |
| ECCB | Eastern Caribbean Central Bank |
| EDF | European Development Fund |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| EIB | European Investment Bank |
| EIS | Environmental Impact Statement |
| EN | endangered (IUCN classification) |
| ENSO | El Niño Southern Oscillation |
| EPA | Economic Partnership Agreement |
| EPD | environment, planning and development |
| EU | European Union |
| F | France |
| FAO | Food and Agriculture Organisation |
| FCO | (UK) Foreign and Commonwealth Office |
| FDA | Aruba Development Foundation |
| FEA | Fonds pour l'Environnement et l'Agriculture |
| FI | Falkland Islands |
| FIG | Falkland Islands Government |
| FP | French Polynesia |
| GCRMN | Global Coral Reef Monitoring Network |
| GDP | gross domestic product |
| GEF | Global Environment Facility |
| GGF | Good Governance Fund |
| GHG | greenhouse gas(es) |
| GIWA | Global International Water Assessment |
| GoA | Government of Anguilla |
| GR | Greenland |
| GSGSSI | Government of South Georgia and South Sandwich Islands |
| HMS | His Majesty's Ship |
| IAATO | International Association of Antarctica Tour Operators |
| IBA | Important Bird Area |
| ICCAT | International Commission for the conservation of tuna-like fish in the Atlantic |
| ICES | International Council for the Exploration of the Sea |
| ICES-CCC | ICES Cod and Climate Change Programme |
| ICRI | International Coral Reef Initiative |
| IFRECOR | Initiative Française pour les Récifs Corraliens |
| IIED | International Institute for Environment and Development (UK) |
| IMF | International Monetary Fund |
| IPCC | International Panel on Climate Change |
| IRD | Institut de Recherche pour le Développement (France) |
| IUCN | International Union for Conservation of Nature |
| IUU | illegal, unregulated and unreported (fishing) |
| JCNB | Joint Commission on Narwhal and Beluga |
| JNCC | (UK) Joint Nature Conservation Committee |
| LPO | Ligue pour la Protection des Oiseaux |
| LSB | Landbased Sources of Marine Pollution (protocol of the Cartagena Convention) |
| MAB | Man and Biosphere (Reserve) |
| MACC | Mainstreaming Adaptation to Climate Change |
| MAHLE | (Montserrat) Ministry of Agriculture, Lands, Housing and Environment |
| MAY | Mayotte |
| MDGs | Millennium development goals |

| | |
|---|---|
| MEA | Multilateral environmental agreement |
| MINA | (NL Antilles) Ministry of Public Health and Social Development |
| MON | Montserrat |
| MoU | Memorandum of Understanding |
| MRAG | Marine Resources Assessment Group |
| MVO | Montserrat Volcano Observatory |
| n.a. | not available |
| NACRI | Netherlands Antilles Coral Reefs Initiative |
| NAFO | North Atlantic Fisheries Organisation |
| NAMMCO | North Atlantic Marine Mammal Commission |
| NC | New Caledonia |
| NDP | National Development Plan (St Pierre & Miquelon) |
| NEMS | National Environmental Management Strategy |
| NGO | non-governmental organisation |
| NL | Netherlands |
| NLA | Netherlands Antilles |
| NNR | National Nature Reserve |
| NT | National Trust |
| NZ | New Zealand |
| NZ$ | New Zealand dollars |
| OECS | Organisation of Eastern Caribbean States |
| OCT | Overseas Countries and Territories |
| OCTA | Overseas Countries and Territories Association |
| OTCC | (UK) Overseas Territories Consultative Council |
| OTD | Overseas Territories Department (of UK FCO) |
| OTEF | (UK) Overseas Territories Environment Fund |
| OTEP | (UK) Overseas Territories Environment Programme |
| PADD | Plan d'Aménagement et de Développement Durable (Mayotte) |
| PAME | Protection of the Arctic Marine Environment |
| PEP | Poverty and Environment Partnership |
| PGA | Plan Général d'Aménagement |
| PGEM | Plan de gestion de l'Espace Maritime |
| PID | Pacific Islands Development Programme |
| PNG | Papua New Guinea |
| POP | persistent organic pollutant |
| PROE | Programme régional océanien de l'environnement |
| PWSD | Public Works and Services Department |
| RFMO | Regional Fisheries Management Organisation |
| RSP | Regional Seas Programme *or* Regional Strategy Paper |
| RSPB | (UK) Royal Society for the Protection of Birds |
| SAWG | South Atlantic Working Group (of the UK OTCF) |
| SCOR | Scientific Committee on Oceanic Research |
| SCP | Strategic Country Programme |
| SD | sustainable development |
| SDP | Sustainable Development Plan |
| SEA | Strategic Environmental Assessment |
| SEAFO | South-East Atlantic Fisheries Organization |
| SEF | Service de l'Environnement et de la Forêt (Mayotte) |
| SGSSI | South Georgia and South Sandwich Islands |
| SHI | St Helena Island |
| SIDS | Small Island Developing States |
| SIDSNet | Small Island Developing States Information Network |
| SITAS | Service d'Inspection du Travail et des Affaires Sociales (Wallis & Futuna) |
| SMOC | (NL Antilles) Stichting Schoon Milieu Curaçao |
| SOPAC | South Pacific Applied Geoscience Commission |
| SPA | Specially Protected Area |

| | |
|---|---|
| SPAW | Protocol concerning Specially Protected Areas and Wildlife |
| SPEM | Service de la Pêche et de l'Environnement Marin (Mayotte) |
| SPD | Single Programming Document |
| SP&M | St Pierre & Miquelon |
| SPREP | South Pacific Regional Environment Programme |
| SPT | South Pacific Tourism Organisation |
| STH | St Helena |
| TAAF | Terres Australes et Antartiques Françaises |
| TAC | total allowable catch |
| TCI | Turks & Caicos Islands |
| TDC | Tristan da Cunha |
| TEAP | Taxe pour l'environnement, l'agriculture et la pêche |
| TERV | taxe pour l'enlèvement et le recyclage des véhicules |
| UK | United Kingdom |
| UKOTCF | United Kingdom Overseas Territories Conservation Forum |
| UN | United Nations |
| UNCED | United Nations Conference on Environment and Development |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNECLAC | United Nations Economic Commission for Latin America and the Caribbean |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Social and Cultural Organisation |
| VMS | Vessel Monitoring System |
| VROM | Netherlands environment ministry |
| VU | vulnerable (IUCN classification) |
| W&F | Wallis & Futuna |
| WH | World Heritage |
| WRI | World Resources Institute |
| WTO | World Trade Organisation |
| WW2 | second world war |

# Table of Contents

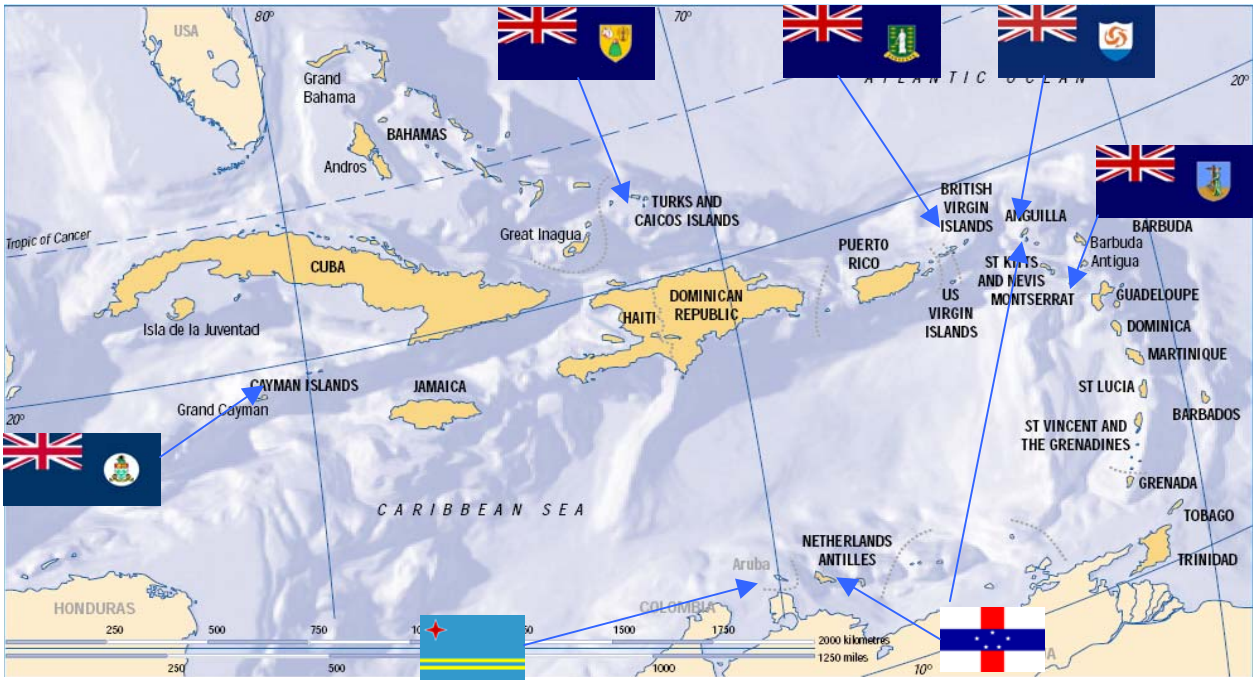
# 1 Environmental profile of Caribbean OCTs - Regional

## 1.1 Introduction

This volume is part of a 6-volume report made at the request of the European Commission. It presents environmental profiles for the seven overseas countries and territories (OCTs)[1] in the Caribbean region. There are companion volumes for the OCTs in the Pacific, North Atlantic, South Atlantic and Indian Ocean regions. The purpose of the environmental profiles is to feed discussions on the environment and possible consequences environmental trends may have on OCTs socio-economic development, and more specifically, to assist the EU in programming its EDF assistance to the OCTs.

This volume comprises an overall profile in which the territories are treated in the context of the Caribbean region as a whole (chapter 1), followed by the environmental profiles for the individual territories (Annexes A to G). The regional findings are brought together and consolidated in Part 1 - Main Report.

## 1.2 Description of the region




We here regard the Caribbean region as loosely comprising the archipelago of islands which bound or lie within the Caribbean Sea together with the islands immediately to the North of the archipelago, but not the littoral states of Central and South America.

There are 7 OCTs in the Caribbean region, namely:
- Linked to the Netherlands: Aruba, Netherlands Antilles
- Linked to the UK: Anguilla, British Virgin Islands, Cayman Islands, Montserrat, Turks and Caicos Islands

Apart from the OCTs, the Caribbean region comprises:

[1] The term overseas countries and territories refers to the 20 countries and territories which, although falling within the sovereignty of a member state of the European Union are wholly or partly autonomous

- 13 independent nations: Cuba, Haiti, the Dominican Republic, Jamaica, Barbados, the Bahamas, Trinidad and Tobago, Dominica, Grenada, St Kitts & Nevis, St Lucia, St Vincent & the Grenadines and Antigua & Barbuda, and
- a number of other territories and possessions: the French Antilles, i.e. Martinique and Guadeloupe, are part of metropolitan France, and classified as 'Outermost Regions' in relation to the EU. Puerto Rico is a commonwealth of the US, as are the US Virgin Islands.

## 1.3 Relevant regional organisations and programmes

There are a number of regional organisations important in a technical or financial sense for the purpose of these environmental profiles. These include:

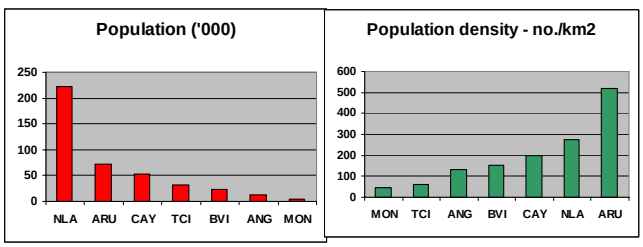
| Name | OCT members | Other members | Remarks |
|---|---|---|---|
| Association of Caribbean States (ACS) | ARU*, NLA* TCI* | 25 other countries including Latin American countries and France (for FR ANT) | Regional cooperation on natural disasters through 'Special Committee on Natural Disasters'. Institutional strengthening of regional bodies. Seeking to achieve ratification of the agreement for response to natural disasters by ACS members. Strengthens national organisations in prevention and mitigation. Interesting initiative is the Convention Establishing the Sustainable Tourism Zone of the Caribbean (STZC), involving the certification of countries adopting sustainable tourism. ARU and NLA have not signed and very few countries have ratified. The ACS has also embarked on a project aiming at "updating building codes of the Greater Caribbean for Winds and Earthquakes". It also has a project on indicators of sustainability. |
| World Bank | None | 12 Caribbean countries | Regional initiatives include the Caribbean Planning for Adaptation to Global Climate Change (CPACC) project, whose objective was to mainstream climate change adaptation strategies into development planning and sectoral investment, devise mechanisms for adapting to climate change and regional monitoring and modelling. This has been followed up by MACC (see below) |
| Caribbean Community (CARICOM) | ANG*, BVI*, CAY*, MON, TCI* | Most former British colonies in Caribbean plus, recently, Surinam and Haiti | A Caribbean Free Trade Area. In 2006 the Caribbean Single Market and Economy (CSME) was launched. No OCTs are participating at present.<br>CARICOM is the executing agency for the MACC project (Mainstreaming Adaptation to Climate Change). |
| Caribbean Disaster Emergency Response Agency (CDERA) | ANG, BVI, MON, TCI | 11 other CARICOM members | An agency of CARICOM. CDERA's main function is to make an immediate, coordinated response to any disaster affecting a member id so requested. It also provides information, technical assistance programmes, including model legislation on disasters. |
| Caribbean Environmental Health Institute (CEHI) | ANG, BVI, TCI, MON | 12 other CARICOM members | Set up on an initiative of CARICOM. Lab services, consultancy, information services.<br><br>The Cayman Islands are also interested in joining CEHI. |
| Forum of the Caribbean ACP States (Cariforum) | OCTs are observers | Fifteen independent countries in the Caribbean region | Established in 1992, bringing together the Caribbean Community and Common Market (Caricom) and Surinam, Haiti and the Dominican Republic, with a view to better coordination of EU support and improved regional integration and cooperation. Surinam and Haiti have now become members of Caricom, and the Dominican Republic has a free trade agreement with Caricom. |

| Name | OCT members | Other members | Remarks |
|---|---|---|---|
| Caribbean Natural Resources Institute (CANARI) | - | - | An independent research organisation which analyses and promotes the participatory management of natural resources in the islands of the Caribbean. |
| Caribbean Tourism Organisation | CAY | | A trade organisation seeking to develop sustainable tourism for the economic and social benefit of Caribbean people . It is made up of government and private sector reps involved with tourism across the Caribbean. CTO collects and disseminates research and data on the development of the regional industry. |
| E. Caribbean Central Bank (ECCB) | ANG, MON | 6 other E. Caribbean states | Central bank of the OECS countries which all share a common currency, the Eastern Caribbean dollar (pegged at the rate of EC$1.00 = US$0.37 since 1976). |
| Pan American Health Organisation (PAHO) | FR, UK are 'participat-ing states' | | International public health agency for the Americas, regional office of WHO. Supports country efforts in the development of affordable and sustainable water and sanitation services and solid waste disposal. |
| Organisation of Eastern Caribbean States (OECS). | ANG*, BVI*, MON | Antigua & Barbuda, Dominica, Grenada, St Kitts&Nevis, St Lucia, St Vincent & Grenadines | Dedicated to economic harmonisation and integration, protection of human and legal rights, and the encouragement of good governance. Spreads responsibility and liability in the event of natural disaster. An OECS Economic Union Treaty is to be established by July 1, 2007 (BVI uncommitted). There is an Environment & Sustainable Development Unit (OECS-ESDU). All members signed the St George's Declaration of Principles for Environmental Sustainability in April 2001. This document prescribes 21 principles which should guide governments. It also has a Tourism Development Programme |
| Wider Carib. Sea Turtle Cons. Network (WIDECAST) | | | International scientific network comprised of volunteer country coordinators (sea turtle experts and community-based conservationists), an international Board of Scientific Advisors, and partner organizations in more than 30 Caribbean States and territories. |
| Caribbean Development Bank (CDB) | ANG, BVI, CAY, MON, TCI | 13 other former British colonies | Development Bank for the Caribbean. Makes loans for development purposes to its members |

* associate member

It should be noted that organisations tend to be rather segregated along linguistic/historical/cultural lines. The only organisation which Aruba and the Netherlands Antilles are members of is the ACS, with which none of the other OCTs is associated (the UK is not a signatory). The French territories, being part of metropolitan France, are hardly involved in any of the organisations.

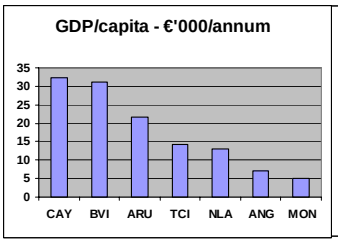
# 2 The territories: present situation and trends

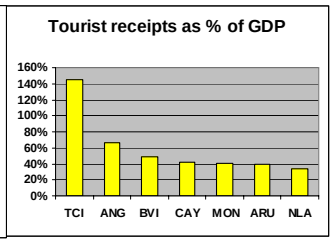



## 2.1 Population

The population of the islands ranges from 5000 (Montserrat) to 222,000 (Netherlands Antilles). The latter accounts for over half the population of the 7 territories, and the two Dutch territories for nearly three-quarters. Many of the territories are experiencing net inward migration.

## 2.2 Economic




There is a wide variation in mean incomes between the islands, as can be seen from the graph on the left. There has been a massive shift in the economies of most Caribbean economies from agriculture and fishing to tourism, and the OCTs have participated in this trend. All the islands are fairly to very dependent on tourism, and if anything, tourism is expected to play an increasing role in their economies. Offshore finance is the second main activity on some territories, particularly BVI, Cayman, TCI. There are oil refineries on Aruba and Curaçao, but this is the only heavy industry found on the OCTs.

| Importance of fishing to Caribbean OCTs | | | | | | |
|---|---|---|---|---|---|---|
| ANG | ARU | BVI | CAY | MON | NLA | TCI |
| ● | ○ | ● | ○ | ○ | ○ | ● |

| | |
|---|---|
| ○ | Unimportant |
| ○ | Mainly important for tourists and anglers |
| ○ | Moderate economic activity |
| ● | Major economic activity |

Fish are important in all the islands, as a source of food, as a direct economic product and/or as an attraction to dive tourists and anglers. Both tourism and fishing are environmentally sensitive activities. Most of the fishing takes place on the shallow shelves around the islands.

## 2.3 Nature of islands, habitats, wildlife

In their geology and biology the seven Caribbean OCTs have many common features. They are all either geologically volcanic or calcareous, and they are all fringed by mangroves, seagrass and coral reefs. These last three habitat types form an interrelated ecosystem which is important to the economic and physical well-being of the islands.

All three have an important role in the life cycle of most of the fish which inhabit the shallow waters around the islands. Seagrass and mangrove provide nurseries for many when breeding. Both coral and mangrove provide well-documented protection against rough waves and storm surges during hurricanes and tropical storms. Seagrass provides a very important settlement and sedimentation function for the particulate matter which runs off or is discharged from land, thereby protecting the coral reefs which are intolerant of and smothered by turbidity, but coral reefs also protect seagrass beds against storm damage. And of course coral reefs are a major attraction and boost for the tourist industry.

But coral reefs are vulnerable to: direct physical breakage by rough waves during hurricanes, fishing and tourist activities (anchor damage, divers), rising water temperature which causes 'bleaching[2]', 'drowning' if the sea-level rises too fast, water pollution, particularly due to nutrients in sewage or pesticides and particulate matter washed into the sea from natural sources or due to many human activities.

All the islands are subject to the Ramsar Convention, and all contain at least one designated Ramsar site of international importance (sites on Anguilla and Montserrat not yet confirmed).

The table below shows how widespread coral reefs occur on the territory and an indication of their state.

[2] A phenomenon in which coral under stress (e.g. due to high water temperature) expels its symbiotic zooxanthellae algae in large numbers, or the concentration of algal pigments decreases. As a result, the corals' white skeletons show through their tissue and they appear bleached.

| Coral reefs: | Occurrence | State of reefs | Remarks |
|---|---|---|---|
| Anguilla | ⭘ | | |
| Aruba | ⭘ | | |
| BVI | ● | | |
| Cayman | ● | | |
| Montserrat | ⭘ | | Overfishing, hurricanes, run-off |
| NLA (Saba, Saba Bank, Statia, St M) | ● | | St M exhibits bleaching and smothering |
| NLA (Curacao, Bonaire) | ● | | Curacao suffering disease |
| Turks and Caicos | ● | | Some reefs degraded |

● Extensive
⭘ Some
○ None

Relatively good for region
Declining
Degraded

An important distinguishing factor between islands is the extent to which they are low-lying or not. Most of the Caribbean OCTs are generally low-lying, i.e. either all low or mostly low (exceptions are the volcanic islands of Montserrat and the British Virgin Islands (with the exception of the island of Anegada, a very low-lying atoll)). This is important because it affects the vulnerability of the islands to natural hazards such as hurricanes and tsunamis. A hurricane can produce a storm surge of several metres. And in the longer term, climate change will lead to more sustained rises in sea-level.

## 2.4 Flora and fauna

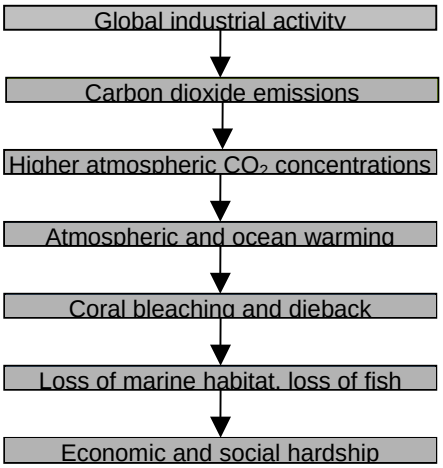
Many islands have high numbers of endemic species[3]. The isolation conferred by their insularity favours this phenomenon and the more remote an island, the higher its endemism often is. Endemism confers a special responsibility on the country or territory concerned since it is the sole steward of the fortunes of that species. The following are some statistics on endemism on the Caribbean OCTs. There are no endemic freshwater fish on these territories, and the only endemic mammals are bats.

| | Number of endemic species | | | |
|---|---|---|---|---|
| | Birds [Mammals] | Reptiles and amphibs. [fish] | Insects | Plants |
| Anguilla | | 2 | 40 | 1 |
| Aruba | 1 (bat) | 1 (snake) | | |
| BVI | | 7 | | >20 (with Puerto Rico) |
| Cayman | 16 [+1 bat] | 18 reptiles [1 marine fish, 2 freshwater fish] | >>40 | 28 |
| Montserrat | 2 (+ 1 bat species) | 7 | | 3 |
| NL Antilles | 21 birds, 2 mammals, 66 reptiles, 57 marine snails, 28 crabs | | | |
| Turks & Caicos | 14 plants and reptiles, also some endemic birds | | | |

[3] Endemism refers to the phenomenon that a species occurs in only one country (or island or group of islands). The species is then said to be endemic to that country.

# 3 Issues and threats

## 3.1 Introduction




Environmental phenomena in small tropical islands in the Caribbean, even more than elsewhere, are complex: they involve long causal chains and interrelatedness.

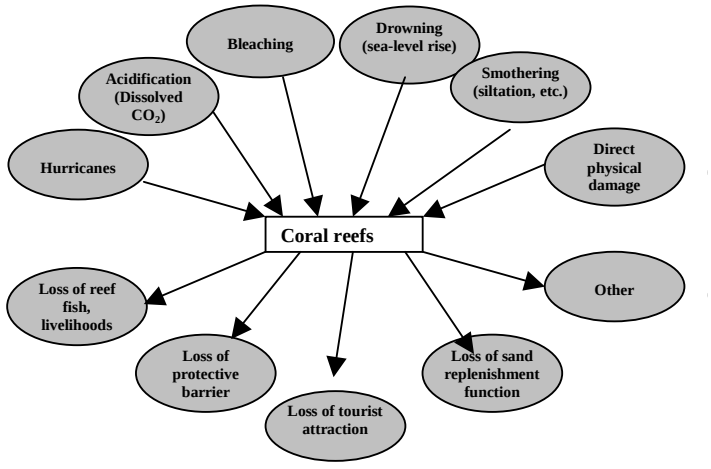
*Long causal chains*

The diagram below shows one such causal chain (strand). Industrial activity worldwide uses fossil fuels and therefore emits carbon dioxide into the atmosphere. Over time this process leads to a more elevated concentration of this 'greenhouse gas' in the earth's atmosphere. This results in a warming up of the atmosphere and the oceans. This 'global warming' has many consequences. To take just one, coral has a threshold temperature tolerance. Caribbean waters are already close to this threshold. Warming causes distress to coral reefs leading to bleaching and dieback. Coral provides a habitat for many commercial species of fish, so the ill-health or death of coral means a loss of fish, and therefore of fishermen's livelihoods.

A useful tool in dealing with these chains is the DPSIR (**D**rivers, **P**ressures, **S**tate, **I**mpacts, **R**esponse) model. Drivers (human, economic activities) lead to pressures on the environment, which in turn cause a change in the state of the environment (e.g. $CO_2$ concentration in air). This then has a whole chain of impacts on the physical world and ecosystems, and ultimately these have economic impacts. In the diagram grey indicates a driver, yellow a pressure, pink a state and blue the impacts.

*Interrelatedness between different environmental phenomena*

Although the term causal chain is used above, the term causal web would be a better one. This is because each of the boxes shown has many causal antecedents and many consequences. Carbon dioxide is not the only greenhouse gas. Industry is not the only source of carbon dioxide, etc.. Take coral, for example. Warmer seawater is not the only threat with which it must contend. It is also harmed by hurricanes (probably more intense in the future as a result of climate change), by direct damage by fishermen, ship anchors, tourists and divers, by pollution originating from the island, particularly sewage (which contains nutrients harmful to coral) and suspended particulates (which run off the land as a result of development and from natural sources) and results in smothering, by acidification of seawater (the result of increased absorption of carbon dioxide as atmospheric concentrations rise) and by 'drowning' if the sea-level rises more rapidly than the coral's ability to accrete. At the same time, the loss of marine habitat and of fish stocks is not the only impact of coral damage. Coral reefs protect their host island from wave and sea damage during storms, protect the lagoons and seagrass beds behind them which are important fish nurseries, comprise a major tourist attraction and activity (dive tourism) and have a crucial function of the sand balance on beaches. Reef loss means an impairment of all these functions.



*Interrelatedness between environment and economy*
There is a very close interdependence of economy and environment in the Caribbean OCTs. Two of the most important economic sectors - tourism and fish - are very environmentally sensitive. This is because a pristine environment, healthy reefs, abundant and varied fish stocks, unspoiled landscapes, attractive, uneroded beaches and a unique flora and fauna are the motors of tourism. If the environment is allowed to degrade this is likely to harm the reputation and tourist-attractiveness and therefore the economies of the islands. And yet growing tourism is one of the main agents in this degradation. Subsections 3.2 deal with the main environmental issues and challenges faced by the Caribbean OCTs. The foregoing notes on the complexity and interrelatedness of environmental phenomena make it clear that it is not possible to enumerate a set of independent issues and challenges. They are all interrelated and overlapping, and some of them are on a different scale or level in the DPSIR hierarchy. Nonetheless they encapsulate the most important environmental matters.

## 3.2 Climate change and energy

Climate change refers to the long-term, gradual increase in mean temperature on our planet which has been observed since at least the middle of the 20$^{th}$ century and which is expected to continue in the future. In the Caribbean the sea has warmed by 1.5°C in the last 100 years and observations have shown a decrease in rainfall. Over the last few decades there have been prolonged dry spells. At least a part of this phenomenon is considered to be caused by human activity, specifically the release of carbon dioxide and other 'greenhouse gases' (GHG) into the atmosphere, mainly through the combustion of fossil fuels and deforestation.

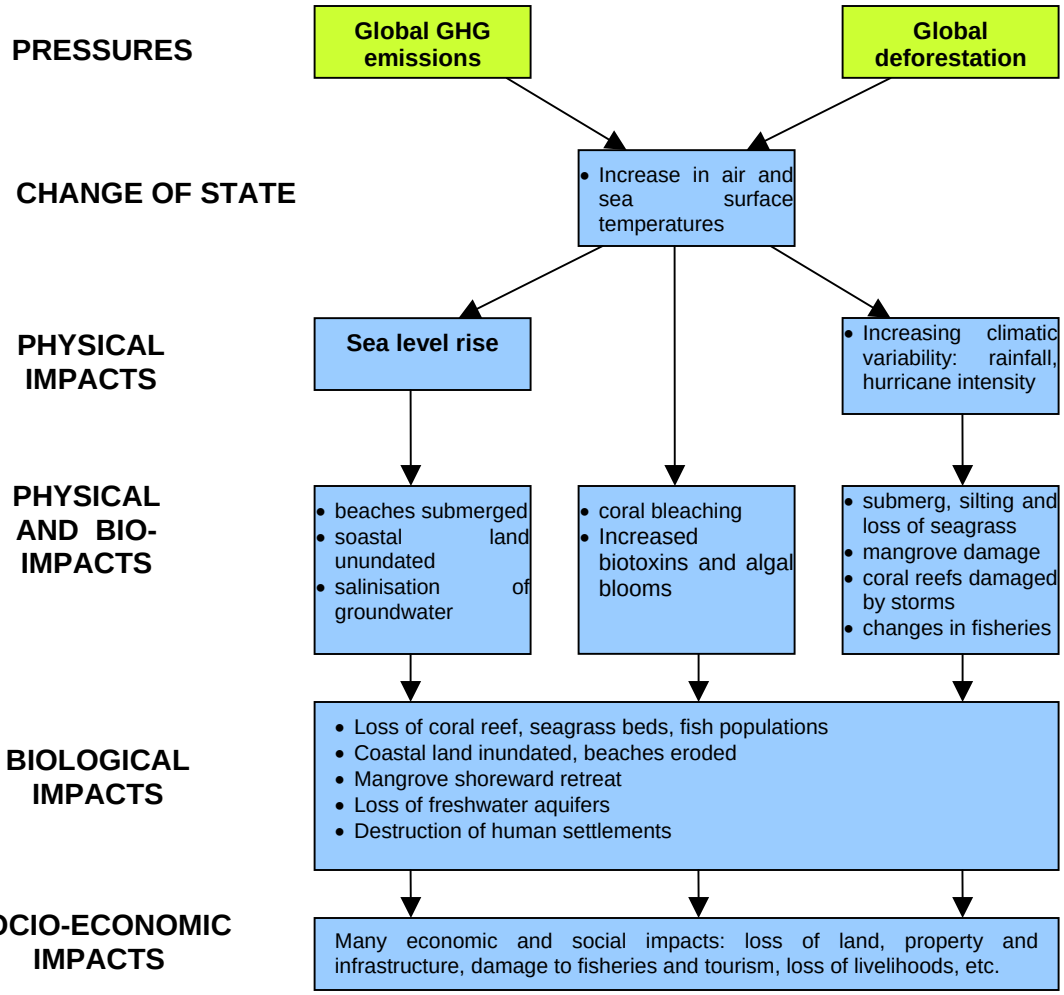
The diagram below shows the successive links in the chain pressures → state → physical and biological impacts → socio-economic impacts. Thus the pressures - GHG emissions and deforestation - result, in the first place, in changes in meteorological state parameters: an increase in temperature of the sea and air, a rise in sea-level (2 - 9 mm/year) and a rise in climate variability and the occurrence of extreme events. The pH of the oceans is also likely to fall as a result of their absorption of more carbon dioxide from the atmosphere. These in turn will have a whole range of impacts on the geosphere and the biosphere:

- coastal lands inundated, eroded and lost;
- beaches submerged or swept away;
- salt water intrusion into mangroves and estuaries;
- salinisation of groundwater, soil;
- a complex of threats to coral including bleaching and die-back (intolerance to higher temperatures, inability to keep up with increases in water surface) and increased storm damage;
- damage to or shoreward retreat of mangroves;
- loss of seagrass beds;
- increased incidence of algal blooms

Some of these impacts are mutually reinforcing. For example, since shallow coral and mangroves provide a first line of defence against large waves, their damage will further exacerbate the effect of hurricanes.

These impacts will in turn have a raft of socio-economic implications: loss of land, loss of life, damage to property, communities and infrastructure, depletion (loss of coral or mangrove habitat) or changes (many species are sensitive to temperature change) to fisheries, impact on tourism (loss of beaches, loss of diving grounds), loss of drinking water resources etc.

## TYPICAL EFFECTS OF CLIMATE CHANGE IN OCTS




. .

The likely/possible main impacts of climate change on the Caribbean OCTs are worked out in the environmental profiles for the individual Caribbean OCTs in function of their own specific circumstances (see sections ……). The results are summarised in the table below.

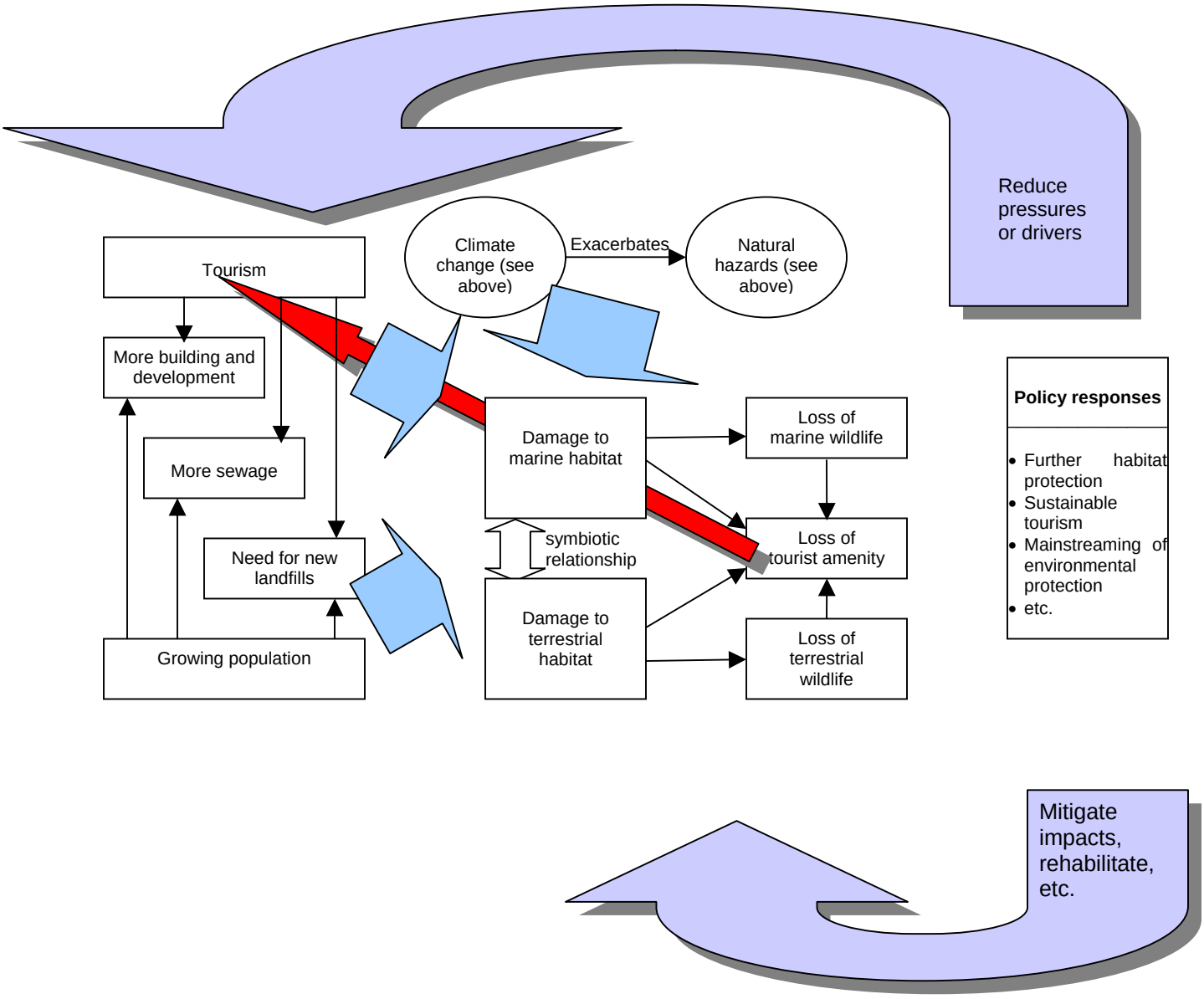
Faced with these threats, there are essentially two types of action which Caribbean islands in general and the Caribbean OCTs in particular can take:

1. actions aimed at reducing GHG emissions. Although it is important that these territories do what they can to reduce their own emissions (otherwise they will be on weak ground in asking other countries to reduce theirs), this will have little impact on global emissions and therefore the rate of climate change. They therefore need to find ways to maximise their influence and ensure their voice is heard on the world stage.
   AND
2. actions aimed at adapting their territories to reduce the negative impacts.

Adaptation activities will in any case be necessary, since even on the most optimistic scenario about GHG emissions climate change will continue to some extent.

### 3.3 General environmental degradation due to development and tourism

All the Caribbean OCTs with the exception of Montserrat are currently subject to rapid development, and in particular a fast growing tourist industry which forms the backbone of their economy. And to varying degrees they are all facing the dilemma of reconciling this rapid development with preserving the pristine beauty, natural resources and wildlife both terrestrial and marine, which are so important in attracting the tourists in the first place.
Development and tourism place multiple stresses on the fragile ecosystems found on these islands. This is illustrated in the diagram below.




Amongst the pressures placed on the environment by an expanding and increasingly affluent population and the growth in the tourist industry are:

- construction of buildings and infrastructure often involves clearance of mangroves, reclamation of wetlands, removal of beach sand (resulting in possible erosion), increased run off of silt and soil into the near-shore sea-water (damaging both coral and seagrass);
- an increased sewage load, much of which is pumped either untreated or partially treated into the sea, leading to algae formation, de-oxygenation of the seawater and distress and destruction of coral reefs;

- increasing solid waste loads, requiring new waste treatment facilities and probably, increased discharge of contaminated leachates into the sea.

As seen earlier, these place further stresses on the habitats characteristic of these islands: coral reefs, mangroves, seagrass beds, wetlands, salt ponds, etc., already under pressure from the activities of fishers, reef tourists, cruise liners, hurricanes, as well as the effects of climate change already referred to.

As shown in the diagram, policy-makers have a number of responses they can make in order to strike the necessary balance, including protecting marine and terrestrial areas of special value, environmental impact assessment, which should makes sure that the impacts of all developments are well understood beforehand by all stakeholders (not just policy-makers) and that means of minimising impacts are incorporated into the development concept.

## 3.4 Waste management

The issue of waste is not a glamorous or high-profile one, and waste is generally managed at the territorial or local level. Issues related to the Basel Convention involving illegal international movements of waste do not appear to be an issue for the OCTs. However this low profile means that it was difficult to gather comprehensive data on the state of waste management in the territories concerned.

All small island states face special problems in relation to waste management:
- lack of the critical size and therefore ability to benefit from the economies-of-scale needed to make modern waste management techniques - sanitary landfills, safe incinerators - economic;
- lack of facilities, critical size, markets to make recycling and composting feasible;
- lack of public awareness about waste, need for prevention and reduction;
- lack of facilities for dealing with hazardous waste including infectious clinical waste;
- lack of suitable space for and resistance by local residents to new landfills;
- hurricanes can generate large volumes of waste and debris, which may be toxic, e.g. timber treated with preservatives.

The situation in the territories is briefly as follows:

| Territory | Description |
|---|---|
| Anguilla | There are problems with uncontrolled disposal of waste and abandoned derelict vehicles. |
| Aruba | Present landfills are unsatisfactory. Waste disposal dump at Parkietenbos is creating water and air pollution. Problems in disposing of hazardous waste. |
| British Virgin Islands | There is an incinerator on Tortola with no monitoring of potentially hazardous air emissions. (This will be supplemented shortly by a new incinerator which will expand the processing capacity of the existing unit). Problems with abandoned car and boat wrecks. |
| Cayman Islands | The landfill site on Grand Cayman is almost full. Difficult to find acceptable new site. |
| Montserrat | The import of food in bottles, plastic and styrofoam containers presents a serious waste management problem. There are no recycling programs. The disposal of industrial waste, oils and abandoned cars is problematic. |
| Netherlands Antilles | Landfills are approaching their capacity, there are increasing risks of groundwater contamination. |
| Turks & Caicos Islands | Problems on waste dumps with fires, vermin, disposal of leachates. Feasibility study has been made for an integrated solid waste management system, but no indication of whether progressing. Litter problem are being addressed with some success |

## 3.5 Conserving biodiversity

Following UNCED in Rio de Janeiro in 1992, 188 nations ratified the Convention on the Conservation of Biological Diversity, undertaking to fight to slow the steady extinction of species of flora and fauna which the world has been witnessing for centuries. This Convention is one of a series of multilateral environmental agreements (MEAs) which are designed to protect natural habitats and threatened species. The OCTs cannot sign MEAs in their own right. But OCTs can take on the responsibilities of an

MEA if the associated sovereign state (in this case the Netherlands or the United Kingdom) has signed the MEA and asks, at the request of the OCT, that the MEA is extended to the territory of the MEA. If this happens, and if the OCT complies with the obligations of the treaties concerned and implements them fully, it can be an effective way of protecting its natural capital.

The situation with regard to some of the most relevant MEAs is as follows:

| OCT | CBD | Ram-sar | CITES | CMS | Carta-gena | Remarks |
|---|---|---|---|---|---|---|
| ANG | | ✓ | | | | No Ramsar site has yet been officially confirmed. |
| ARU | | ✓ | | | | Aruba plans to participate in Cartagena from 2007 and is also considering the Climate Change Convention and Kyoto Protocol |
| BVI | ✓ | ✓ | ✓ | ✓ | ✓* | A biodiversity action plan has not yet been developed. |
| CAY | ✓ | ✓ | ✓ | ✓ | ✓* | A biodiversity action plan has not yet been developed. Enactment by the CI of the National Conservation Law is required for full implementation of CBD, and before UK ratifies SPAW. The territory asked for UNFCCC/KYOTO to be extended to it in September 2005. |
| MON | | ✓ | ✓ | ✓ | | No Ramsar sites yet listed. |
| NLA | ✓ | ✓ | ✓ | ✓ | ✓ | Many of these MEAs are not yet fully implemented. |
| TCI | | ✓ | | ✓ | ✓* | Government intends to join CITES. Considering extending Specially Protected Areas for Wildlife (SPAW) Protocol of Cartagena, but further species legislation will be required. |

* Including Oil Spills Protocol
CBD = Convention on Biological Diversity
Ramsar = Ramsar Convention on Wetlands
CITES = Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMS = Convention on the Conservation of Migratory Species of Wild Animals
Cartagena = Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region

Although the OCTs are all participating in some MEAs, these are not always fully implemented. For example only two of the Caribbean OCTs (BVI and Cayman) has signed the CBD, and neither of these has yet implemented it fully.

## 3.6 Water pollution

Sewage systems only serve a limited proportion of households in the Caribbean, and much of the population are served by Individual septic tanks and soakaways. Packaged sewerage treatment plants service residential developments, hotels and industrial estates, but the systems are often poorly maintained and deliver raw sewage into ground and surface water. In Aruba, the pollution of groundwater by sewage effluent was one of the factors that necessitated the use of expensive desalinated water (although high salinity of groundwater was also an important reason). Hotel plants discharge untreated sewage into inshore waters throughout the region (often from inoperative treatment plants), with destructive effects on coastal wetlands, coral reefs and seagrass beds. Not all territories require holding tanks to be used on boats (e.g. BVI)

## 3.7 Air pollution

Air pollution is not a priority issue in most of the Caribbean OCTs, with the exception of Aruba and the Netherlands Antilles (Curaçao). Both of these territories have oil refineries which emit significant pollution. The emissions from road vehicles is also an issue. Funds have been reserved in Aruba to establish an air monitoring network so that the extent of the problem can be assessed. This will provide data for the formulation of an air quality policy, and will lead to restriction on emissions from the refineries.

## 3.8 Natural hazards

The Caribbean islands are subject to many kinds of natural hazard, but the four 'headline' phenomena are hurricanes, volcanic activity, earthquakes and tsunamis.

The Caribbean Sea region is active tectonically and seismically. The Soufrière *volcano* on Montserrat has been active since 1995 and has caused deaths, very extensive damage including the loss of the capital Plymouth and severe social and economic disruption. 60% of the island is considered dangerous and has been completely evacuated. *Hurricanes* are a risk for all the 7 OCTs: even Aruba and the leeward island group of Netherlands Antilles have been hit by hurricanes although they were considered to lie outside the traditional hurricane zone in the Caribbean. Hurricanes are expected to become more intense in future as a result of climate change. Although loss of life on Grand Cayman from hurricane Ivan in 2004 was limited, partly due to good preparedness and strict building regulations, material damage amounted to at least twice GDP.

Geologic events in the Caribbean can generate powerful tsunamis. During the last hundred years some 33 possible tsunamis have been reported, of which 17 are well documented and verified. Nearly all areas in the Caribbean have experienced a tsunami at some time in history. The last destructive tsunami in the Caribbean occurred in August 1946, when an earthquake and tsunami caused 75 fatalities and left 20,000 homeless (Lander *et al*, 2002).

In recent times these events have been relatively rare. Since the last major tsunami, however, the coastal regions have greatly increased in population, and the importance of tourism means that many non-residents are also at risk. These factors make the islands in this region much more vulnerable now than they were when the last major tsunami occurred.

## 3.9 Environmental governance

The governments of all 7 Caribbean OCTs recognise that their economic and physical development needs to be sustainable in environmental and social terms. This will only happen if a number of conditions are met:

- Environmental policy has to be formulated and this has to be translated into an action plan which sets priorities, contains a clear but realistic timetable of measures, allocates responsibilities clearly to named departments or persons.
- Appropriate legislation must be enacted which assigns responsibilities to named departments or persons for implementation and enforcement. This should include legislation providing for mandatory environmental impact assessment (EIA) which meets modern standards and legislation for designating and managing protected areas (marine and terrestrial) and protecting specific species of flora and fauna.

| OCT | Policy paper? | Env. action plan? | EIA? | Protected areas? | Remarks |
|---|---|---|---|---|---|
| ANG | ✗ | ✗ | ✗ | ✓ | Shortage of human and financial resources. No specific environmental department. EIA is not mandatory, specific EIA requirements have not been laid down. 5 marine protected areas (MPAs) and 1 terrestrial protected area owned by National Trust, but no modern protected area legislation. |
| ARU | ✓ | ✗ | ✗ | ✓ | No specific policy paper on the environment, but there is a chapter on the environment in the environment in the National Development Plan. EIA can be requested but is not mandatory. The Arikok National Park provides for 18% of the island's area to be reserved for nature conservation, but it is not known whether, for example, there is a management plan for the Park. |

| OCT | Policy paper? | Env. action plan? | EIA? | Protected areas? | Remarks |
|---|---|---|---|---|---|
| BVI | ? | ✗ | ✓✓ | ✓ | Work has been carried out on a National Environmental Action Plan, but the Plan has not yet been formally approved. A number of marine protected areas have been declared, but active management is limited. Resources and legal mandate lacking to control activities in the protected areas. The BVI National Parks Trust has a systems plan that includes the designation of MPAs that if fully implemented will protect 30% of each habitat type. |
| CAY | ? | ✗ | ✗ | ✓ | Legislation making EIA mandatory not yet enacted by the legislative assembly. An extensive system of marine protected areas has been established and are actively managed. No system of terrestrial protected areas, however some terrestrial habitat is preserved by the National Trust. National Conservation Legislation not yet enacted. |
| MON | | ✓ | ✓✓ | ✓ | Legislation enacted on protected areas, but this has not yet been implemented. No protected areas have yet been designated. |
| NLA | ✓ | ✗ | ✗ | ✓ | Different situation for different islands. A framework policy plan has been made at national level, but some individual islands have not yet produced plans. |
| TCI | ✗ | ✗ | ✗ | ✓ | A detailed strategy for action for implementing the Environment Charter has been formulated, but this falls somewhat short of being an environment action plan. TCI is in the process of developing a Protected Areas Policy. A number of protected areas both marine and terrestrial have been designated, and management plans have been drawn up for some of them, but there is not adequate back-up legislation at present and management plans are not fully implemented. |

None of the OCTs has yet succeeded in establishing the policy and legal framework needed to really ensure that their development is sustainable.

# 4 Recommendations for cooperation in the environment between the EC and Caribbean OCTs

The consultants were asked to make recommendations about possible areas of cooperation between the EC and the OCTs. Recommendations with regard to individual OCTs are made at the end of the individual OCT environmental profiles. Part 1 of this report looks at cooperation at the overall and interregional levels. This section considers areas which might be considered for funding at the level of the Caribbean region.

Three of the Caribbean territories, i.e. the Cayman Islands, BVI and Aruba, exceed the per capita GDP threshold for EDF funding, and therefore do not qualify for aid under the EDF territorial envelope. However they are eligible for regional EDF funding, and this makes possible regional level projects of particular interest for them.

Many of the environmental problems and challenges faced by Caribbean OCTs and indeed other island countries are essentially the same ones. In some cases the same solutions might apply. This being the case, it might appear sensible to set up multi-territory/country projects in the region to tackle these problems and find common solutions. However there are also certain diseconomies involved in regional projects:

- Geographical scatter means that there is a logistical and cost overhead involved in getting people together.
- Differences in political structures which then make access to common funding mechanisms difficult.
- Island to island differences, for example in legislation, in geology or in political choices may decrease the value of a regional approach.
- Lack of human resources and in some cases expertise.

Notwithstanding these difficulties, the following is a list of areas where a regional approach could produce synergies, assuming reasonably comparable countries/territories are involved. All of them should if appropriate build on existing regional initiatives. These suggestions are difficult to prioritise: all could be regarded as quite high priority.

1. Initiatives to establish robust protection for habitats and valuable wildlife. This means (a) ensuring that EIA based on best practice is fully in place legally and institutionally and is fully integrated into the planning process, and (b) ensuring that adequate instruments are in place for protected areas and species protection. The MEAs provide a good vehicle for this, but need to be properly implemented.

2. Work tackling common problems in waste management, including:
   - measures taken to reduce waste volumes, both from households and from the tourist industry
   - appropriate recycling instruments for reducing waste streams
   - devising standards which landfills should meet to ensure they are safe and do not pollute groundwater or coastal waters.
   - approaches for difficult waste streams: car wrecks, waste oils, other hazardous or clinical waste
   - explore waste management techniques other than traditional landfills.

3. Work on adapting to climate change.
   - Develop climate change scenarios for the Caribbean region on which to start long-term planning for adapting to climate change-related threats
   - Secure funding for OCTs to participate in the MACC project.
   - Undertake country vulnerability and capacity assessments which form the basis of adaptation strategies and prioritization and allocation of limited local resources for responses.
   - Update relevant legislation (e.g. building codes, added protection for natural buffers, etc.)
   - integrate adaptation strategy with other national developmental policies ensuring complementary planning horizons

4. Work on hurricane- and seismic-proof building regulations. Individual OCTs such as the Cayman Islands have been successful with individual approaches to this problem, but it should be possible to reach a consensus across a number of Caribbean nations facing similar problems.

5. Standards / codes of practice for sustainable tourism, possibly linked to the ACS initiative Convention Establishing the Sustainable Tourism Zone of the Caribbean (STZC), involving the certification of tourist destinations. This would of course mean joining the ACS.

6. Extension of the UN Framework Convention on Climate Change to one or more of the OCTs. The OCTs will be better placed in campaigning for cuts in global emissions of greenhouses gases if they are also taking on their own responsibilities. Aruba, the Netherlands Antilles and BVI have already expressed interest in joining. The Cayman Islands requested ratification of UNFCCC & Kyoto in September 2005.

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| **Organisation** | **Website address** | **Remarks** |
|---|---|---|
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| ADEME- French energy conservation Agency | http://www2.ademe.fr/servlet/getDoc?id=11433&m=3&cid=96 | Agence de l'Environnement et de la Maîtrise de l'Energie |
| Caribbean Development Bank | http://www.caribank.org/Publications.nsf/EReview2005_turkscaicos/$File/ECReview2005_turkscaicos.pdf?OpenElement#search=%22pier%20construction%20turks%20caicos%22 | |
| CEDRE- French documentation centre for accidental water pollution | http://oceanprevention.free.fr/cedre2.htm | Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles des eaux |
| CIA | www.cia.gov/cia/publications/factbook/index.html | Info per OCT |
| CITES or Washington Convention on trade in endangered species (1973) | www.cites.org | |
| Coalition of legal toothfish operators | http://www.colto.org | Fisheries, particularly Southern Hemisphere |
| CRED- Centre for Research on the Epidemiology of Disaters | http://www.em-dat.net/disasters/country.php | Interesting database on disasters |
| EU- Indicative programmes VIII EDF | http://ec.europa.eu/comm/development/oct/ind_prog_en.htm | |
| EU- on all OCTS | http://ec.europa.eu/comm/development/oct/index_en.htm | |
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| EU- Single programming documents IX EDF | www.ec.europa.eu/comm/development/body/csp_rsp/spd_en.cfm | |

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|---|---|---|
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| French Fund for the global environment | http://www.ffem.net/jahia/Jahia/lang/fr/pid/224 | Fonds Francais pour l'environnement mondial |
| French Ministry Ecology and SD | www.ecologie.gouv.fr general site<br>On overseas:<br>http://www.ecologie.gouv.fr/rubrique.php3?id_rubrique=970 | Ministere de l' Ecologie et Développement durable |
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| French Prime minister's office | http://www.premier-ministre.gouv.fr/information/actualites_20/transferts_fonds_europeens_collectivites_57080.html | Transfer of EU funds to French OCTS |
| Futura Sciences | http://www.futura-sciences.com/comprendre/d/index.php | Dossier on coral reefs |
| GIWA- Global assessment of international waters | www.giwa.net | A UNEP/ GEF / Kalmar university project |
| Global Ocean Ecosystem Dynamics | http://www-cger.nies.go.jp/cger-e/db/info-e/InfoDBWeb/prog/globec.htm | Global Ocean Ecosystem Dynamics |
| ICRI | http://www.icriforum.org | ICRI international coral reef initiative |
| IFEN- French institute for the environment | http://www.ifen.fr | |
| IFREMER Institut francais de recherche pour l'exploitation de la mer | http://www.ifremer.fr/francais/index.php<br>http://oceanprevention.free.fr/ifremer2.htm | |
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| Inventaire National du patrimoine naturel (INPN) | http://www.inpn.mnhn.fr | |
| IPIECA | www.ipieca.com | On oil spills |
| IRD- French research institute for development | www.ird.fr | Institut de recherche pour le developpement |
| Island Resources Foundation | http://www.irf.org/ | Foundation is dedicated to solving the environmental problems of development in small tropical islands |
| Island vulnerability | http://www.islandvulnerability.org | Good data on all territories except Greenland |
| IUCN | www.iucn.org | International Union for the Conservation of Nature |
| London Convention on prevention of marine pollution by dumping of waste and other matter | http://www.londonconvention.org/ | |
| NOAA | http://www8.nos.noaa.gov/biogeo_public/reef_photos.aspx<br>http://www.oceanservice.noaa.gov/education/kits/corals/coral09_humanthreats.html | Centre for coastal monitoring and assessment of coral reefs |
| NOAA- National Oceanic and Atmospheric Administration | http://www.noaa.gov | General site |
| OCTA | www.octassociation.org | Organisation of OCTs |
| POLMAR | http://oceanprevention.free.fr/polmar2.htm<br>www.polmar.com | French institute and rules for action in case of pollution of seas |
| Reefbase | On reefs in all countries:<br>http://www.reefbase.org/global_database/default.aspx?section=s1 | |
| Reefbase | http://www.reefbase.org/references/ref_Literature.asp?searchactive=yes&ID=13887 | Search facility reefs database |
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| UK DFID (Department for International Development) | http://www.dfid.gov.uk/countries/allcountries.asp?view=region | Country Profiles |
| UK FCO (Foreign and Commonwealth Office) | http://www.fco.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1013618138295 | On overseas territories |
| UN Millenium Developmentt Goals | http://mdgs.un.org/unsd/mdg/Data.aspx | Situation per country and territory |
| UN-ECE | http://www.unece.org/ | |
| UNEP | http://www.unep.net/profile/<br>http://www.un.org/esa/sustdev/natlinfo/natlinfo.htm | Country profiles (not on OCTS) |
| UNEP | http://www.unep.ch/ | Register international environmental conventions secretariats based in Geneva |
| UNEP on sustainable tourism | http://www.uneptie.org/pc/tourism/policy/about_principles.htm | |
| UNEP on waste management | http://www.unep.fr/pc/pc/waste/waste.htm | |
| UNEP World Conservation Monitoring Centre | www.unep-wcmc.org | for instance on coral reefs, mangroves and sea grasses, etc. |
| World Resources Institute | http://reefsatrisk.wri.org/casestudy.cfm<br>http://earthtrends.wri.org/features/view_feature.php?theme=1&fid=12 | On reefs at risk- country reports |
| World resources institute | http://www.wri.org/ | General site |
| World Resources Institute | http://earthtrends.wri.org/select_action.php?tool=3 | Statistical data per country and territory, on biodiversity, energy, coastal and marine ecosystems, economics, population, etc. |

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| Pan-American Health Organization | http://www.paho.org/english/sha/prflcay.htm | Updated for 2001. Description of solid waste and sanitation |
| UNEP | http://www.cep.unep.org/publications/Techreports/tr40en/chapter2.html | Interesting report on waste water treatment in Caribbean |
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|---|---|---|
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| CIA | https://www.cia.gov/cia/publications/factbook/print/av.html | |
| Pan-American Health Organization | http://www.paho.org/english/HIA1998/Anguilla.pdf | Interesting but rather old info about waste management, water and sanitation |
| Reefbase | http://www.reefbase.org/global_database/default.aspx?section=s1 | On ANG |
| Waste disposal in ANG | http://www.gov.ai/statistics/images/Waste%20Disposal.pdf | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3328 | Coral reefs in ANG |

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|---|---|---|
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| Aruba government | http://dutch.aruba.com/pages/faqs.htm | |
| CIA | https://www.cia.gov/cia/publications/factbook/print/aa.html | |
| Dutch Ministry of Interior and Kingdom Relations | www.minbzk.nl | |
| Multianuual development projects | http://www.nieuwsbank.nl/inp/2002/03/11/E106.htm | |
| Representation in the Netherlands | http://www.vertegenwoordiging-aruba.nl/algemene_onderdelen/persberichten/overeenstemming_over | Dutch- Aruba relations |
| UNEP | http://www.cep.unep.org/cartagena-convention/plonearticlemultipage.2005-12-01.7401488329/plonearticle.2005-12-01.9920296981 | on waste in the Caribbean protocol LBS |
| | http://www.vliz.be/vmdcdata/marbound/details.php?area=128 | On EEZ |
| IPIECA | http://www.ipieca.org/downloads/oil_spill/oilspill_reports/English/Vol3_Corals_1000.47KB.pdf#search=%22%20toxic%20waste%20aruba%22 | Impact of oil on corals |
| | www.aruba.com | |
| SIDS | www.sidsnet.org/eco-tourism/arikok.html | |
| DCNA | www.dcna.org | |
| | http://www.nciucn.nl | |
| Valero | http://www.valero.com/About+Valero/ | |
| | http://www.nieuwsbank.nl/inp/2002/03/11/E106.ht | |
| | http://netserver1.net/waterforum/template_c1_print.asp?paginanr=8 | |
| | http://www.centrogeo.org.mx/unep/documentos/Ceo/CEOurbanamb.pdf#search=%22toxic%20waste%20%22Energy%20Resources%22%20aruba%22 | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3330 | Coral reefs on ARU |

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| BVI Government | http://www.bvi.gov.vg | |
| CIA | https://www.cia.gov/cia/publications/factbook/geos/vi.html | |
| Development Planning Unit | http://www.dpu.gov.vg | Contains NIDS |
| Island Resources Foundation | http://www.irf.org | NGO operating in Virgin Islands and US |
| Pan-American Health Organization | http://www.paho.org/english/sha/prflvik.htm | Updated for 2001. Description of solid waste and sanitation |
| Virgin Islands Daily News | http://www.virginislandsdailynews.com | On-line newspaper |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3335 | Reefs on BVI |

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| Organisation | Website address | Remarks |
|---|---|---|
| Cayman Department of Environment | http://www.doe.8m.com/doewebsite/doe.html | |
| Cayman NetNews | http://www.caymannetnews.com | Online news service |
| Caymanian Compass | http://www.caycompass.com/cgi-bin/CFPnews.cgi?ID=1009275 | Interesting article on coral |
| Caymans govt site | http://www.gov.ky | |
| CIA | https://www.cia.gov/cia/publications/factbook/print/cj.html | |
| Huricanes website | http://www.hurricanecity.com/city/caymanislands.htm | Hurricanes in Cayman |
| Johngrayrecyclers | http://www.johngrayrecyclers.org | |
| Mother Jones | http://www.motherjones.com/news/special_reports/coral_reef/cayman.html | |
| National Hurricane Committee | http://www.caymanprepared.ky/portal/page?_pageid=1143,1708627&_dad=portal&_schema=PORTAL | Cannot copy |
| National Hurricane Committee | http://www.caymanprepared.ky/portal/page?_pageid=1143,1482366&_dad=portal&_schema=PORTAL | Material on tsunamis |
| Reefbase | http://www.reefbase.org/global_database/default.aspx?section=s1 | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3336 | On coral reefs in Cayman |

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| Organisation | Website address | Remarks |
|---|---|---|
| CIA | https://www.cia.gov/cia/publications/factbook/print/mh.html | |
| Montserrat Development Unit | http://www.devunit.gov.ms | Sustainable Development Plan and budget speeches available |
| Pan American Health Organisation | http://www.paho.org/English/sha/prflmon.htm | Country Health Profile |
| Proceedings of the 'Montserrat 2020: Building a Disaster Resilient Future' Conference | http://www.montserrat2020.org | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3351 | Coral reefs on MON |

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|---|---|---|
| CIA | https://www.cia.gov/cia/publications/factbook/print/nt.html | |
| NLA Ministry of Health and Environment | | |
| | http://www.mina.vomil.an/policy/plans/nepp20042007.php | National Environmental Policy Plan |

| Organisation | Website address | Remarks |
|---|---|---|
| | http://www.mina.vomil.an/policy/other/sustainable_development.php | Workshop SD |
| | http://www.mina.vomil.an/biodiversity/nature_fora/nature_forum2005_decl.php | On biodiversity |
| Reefbase | http://www.reefbase.org/global_database/default.aspx?section=s1 | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3352<br>http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3353 | Coral reefs in NLA |

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| Mother Jones | http://www.motherjones.com/news/special_reports/coral_reef/turks.html | |
| TCI Department of Economic Planning and Statistics | http://www.depstc.org/ , e.g. http://www.depstc.org/stat/economic/ecopdf/envt/National%20Parks_Sanctuaries_Natural%20Reserves.pdf | Data on national parks and protected areas |
| TCI Department of Environment and Coastal Resources | http://www.environment.tc/fisheries/index.htm | Info on Department, laws and regulations, national parks. etc. |
| TCI Government | http://www.turksandcaicosislands.gov.tc/ | |
| TCI National Trust | http://www.tcimall.tc/nationaltrust | |
| WRI | http://reefsatrisk.wri.org/casestudy_text.cfm?ContentID=3361 | Reefs on T&CI |

| Organisation | Website address | Remarks |
|---|---|---|
| Pan American Health Organisation | http://www.paho.org/english/sha/prfltuc.htm | Country Health Profile, with data on water and waste |

# ANNEX A: ENVIRONMENTAL PROFILE -

# ANGUILLA

## 0. Summary

Anguilla's tourist industry is presently undergoing rapid growth, and is the territory's dominant economic activity. The quickened pace of investment activity and heightened investor interest are prompting concerns about sustainability. Anguilla does not at present have in place solid instruments to ensure the protection of its natural beauty and richness of marine and terrestrial habitats and life, such crucial factors in making it an attractive tourist destination, will be safeguarded.

## 1. Background information


### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Anguilla |
| Region | Caribbean |
| Land area | 100 $km^2$ |
| Exclusive economic zone | 200 nm |
| Population | 13,000 |
| GNP/capita | €7000 (2002 est.) |
| Literacy rate | N.a. |
| Unemployment rate | 8% |
| % below poverty line | 18% (SPD) |

### 1.2 Constitution

Anguilla is a United Kingdom overseas territory. The constitution provides for a governor who exercises executive authority. The Governor has special responsibility for defence, external affairs, internal security (including the police) and the public service. In other areas the governor follows the advice of the Executive Council, comprising the Chief Minister and three other elected Ministers, the Attorney General and the Deputy Governor. Following legislative elections, the leader of the majority party or the leader of the majority coalition is usually appointed chief minister by the governor. The legislative body is the House of Assembly, comprising a total of 11 seats, of which 7 elected by direct popular vote, 2 *ex officio* members and 2 appointed Members serve five-year terms.

In the aftermath of the dissolution of the West Indies Federation, St. Kitts, Nevis, and Anguilla became a single 'associated state' of the UK in 1967. Anguilla attempted to dissociate itself from that entity, and

declared unilateral independence. In 1971 the British Parliament passed the Anguilla Act, which provided that if St. Kitts-Nevis-Anguilla decided to end its associated status, Anguilla could separate from the other islands. As independence for St. Kitts and Nevis approached, Anguilla formerly separated from the state. A new Constitution took effect in Anguilla in 1982.

A process of constitutional and electoral review is taking place in Anguilla, and the concept of 'free association' with the UK has received quite some attention. Essentially, it is a "half-way house" towards full independence whereby Anguilla would attain full internal self-government, with defence and external relations remaining the preserve of the UK.

## 1.3 Physical geography

Anguilla is the most northerly of the Leeward Islands in the Eastern Caribbean, comprising a main island and several offshore islands and cays. It consists of a low-lying (maximum elevation 65 m) coral platform built on top of a submerged volcanic base.

The island is 26 km long and a maximum of 5 km wide. It enjoys clear seas and some of the best beaches in the region. The island itself is predominantly flat. Anguilla's capital and administrative centre is the Valley (population 1,400).

Anguilla has one of the most important largely unbroken coral reefs in the Eastern Caribbean. The coastline consists of coral sand beaches, low rock outcrops and limestone cliffs, surrounded by coral reefs with an extensive barrier reef off the north coast. There are extensive sand dunes behind some of the beaches and several salt ponds. Several small uninhabited islets and sandy cays mostly near the main island - including Dog Island, Scrub Island, Sombrero Island, and the Prickly Pear Cays - form part of its territory.

The climate is tropical, moderated by the north-east trade winds. The wet season extends from June to November, but most of the island's rain falls within a few weeks, causing flooding in low-lying areas. Anguilla is periodically hit by hurricanes such as Luis in 1995 and Lenny in 1999.

Porous rocks capture rainfall as groundwater. Anguilla and three the other islands have brackish coastal lagoons, and a few ponds on the mainland are fed by springs from the water table. Anguilla's salt ponds are of great importance. These wetlands are a habitat for various bird species, including the endangered roseate terns, least terns and red-billed tropic birds, and act as flood control areas during hurricanes and heavy rains.

## 1.4 Flora and fauna

Vegetation on the arid territory is characterised by scrubland and sparse scrub oak with a few trees. Over 550 plant species have been recorded on the islands (320 indigenous), with *Rondeletia anguillensis* classified as an endemic.

Anguilla is rich in biological diversity. The habitats of the main island and its offshore cays range from coral reefs to coastal cliffs, degraded evergreen woodland with scattered areas of grassland and scrub to small areas of mangrove, and brackish and freshwater ponds. These habitats are home to some 130 bird species and 21 species of reptile, such as the black (or ground) lizard (endemic to Sombrero Island), the Anguillian racer snake, the Little Scrub Ground Lizard (endemic to Little Scrub Island) and the lesser Antillean iguana. The beaches are important nesting areas for Hawksbill (CR), Green (EN) and Leatherback (EN) turtles.

To date, 139 bird species have been recorded on Anguilla (38 breeding, 101 as regular visitors). At least 15 species of seabird currently breed on Anguilla. mostly on the uninhabited islands.

There are at least 40 endemic insects on Sombrero, 72 km to the north-west of the main island.

### 1.5 Demography, socio-economy

The population has been growing at an average rate of 2.8% in recent years, in part due to net inward migration. Several thousand Anguillians live and work on other Caribbean islands, in Britain and in the US.

The economy is very dependent on tourism: more than 50,000 arrivals per year. This provides about 31.5 per cent of national revenue, but accounts for 60% of GDP, 48% of employment and 50% of government revenue collections when the direct and indirect impacts are taken into account. Anguilla is an up-market tourist destination with high standard, expensive hotels. The island has experienced rapid economic development over the last decade. The tourism boom has also spawned a healthy building sector.

There is also a small but growing international financial services sector which generates some €3 million annual revenue. The British government supports this by providing the Director of Financial Services and the by developing a computerised online registration network.

Fishing is a very important economic activity in Anguilla. Fishermen produce between 300 and 500 tonnes of fish, lobster and crayfish yearly which are exported to neighbouring islands. The UK is helping to support the Longline Fisheries Development Project, aimed at improving Anguilla's fishing industry while relieving pressure on inshore fish stocks. A jetty at Island Harbour has recently been built.

Anguilla now meets its entire budgetary requirement and an increasing proportion of its capital needs from its own resources. The partnership for progress and development between the UK and Anguilla seeks economic autonomy for Anguilla. To achieve this, particular emphasis is being placed on air transport and maritime services. But government income can be severely affected by natural disasters.

Housing on the island is generally solidly built (hurricane-proof), provided with safe water, electricity and good sanitation.

## 2. Main environmental challenges

### 2.1 Overview

Rapid development and a growing tourist industry are placing multiple strains on Anguilla's environment. More than ever before, the richness of Anguilla's habitats and biodiversity is also under serious threat. A surge in development connected with housing and tourism-related activities is placing severe pressure on an already stressed environment. Furthermore, as a small and low-lying island dependent on tourism and therefore on the quality of its beaches, its coral reefs, its fish and its wildlife, Anguilla is vulnerable to the effects of climate change.

Tropical storms and hurricanes are common in this region. After Hurricane Donna in 1960 almost four decades passed without a severe hurricane until Hurricanes Luis and Marilyn struck only a week or so apart in 1995. In 1999 Hurricane Lenny passed very close to Anguilla and caused extensive erosion and sedimentation, closed most hotels and had an economic impact of some US$75 million.

### 2.2 Main challenges

#### Challenge 1 CLIMATE CHANGE SEVERE

Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of Anguilla.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ● | The islands are generally low-lying and therefore vulnerable to rising sea-level. The potential loss of beaches is a serious threat for the tourist industry. |
| Stressed fisheries | ◐ | The fishing industry is important in Anguilla. Climate change may affect these fisheries in unpredictable ways. |
| Coral reefs threatened (bleaching, decreasing pH) | ● | Islands ringed by coral reefs, presently still in reasonable condition, but already subject to multiple threats. |
| Damage to mangroves | ◐ | Only limited mangrove stands occur on Anguilla. |
| Salinisation of groundwater | ◐ | Islands have limited groundwater resources. |
| Tourist industry | ● | Tourist industry accounts for half of GDP. Reef tourism and fishing are important attractions. |
| More frequent and more intense storms | ● | This poses a severe threat; Anguilla lies within the Caribbean hurricane zone, and hurricanes already pose a threat to beaches. |
| ○ Nil ◐ Slight ◐ Moderate ● Heavy | | |

Anguilla is particularly vulnerable to the threat of global warming given its dependence on the tourist industry and its low altitude. The islands are very extensively fringed by coral reefs, which are a crucial component in the delicate ecosystem found there, are very important as a tourist attraction and therefore to livelihoods on the island, as a spawning ground for fish and as a natural buffer area protecting the islands from sea damage during storms. Climate change also poses a threat to Anguilla's beaches, which have already suffered considerable hurricane erosion, so that more intense storms are a major concern.

**Challenge 2 Halting environmental and habitat degradation due to development SEVERE**

The high rate of growth of the tourist industry, coupled with the lack of strong physical planning legislation, means that the characteristic habitats of Anguilla are coming under increasing threat. Examples of this are:

- wetlands are being dredged out for marina development;
- scrub and grassy savannahs is constantly being cleared and salt ponds filled in and reclaimed. Removing vegetation from the dunes destabilises these protective sand barriers; and clearing sites inland results in increased soil and dirt particles being washed offshore and smothering coral reef systems.;
- the Reefs at Risk analysis considers that all of Anguilla's reefs are threatened by human activities, particularly overfishing and coastal development. The many visitors have led to some anchor damage and breakage of shallow corals by snorkellers, although direct negative impacts to date have been limited. The Dog Island reefs are still almost pristine, and visitors are discouraged. But pollution from the shore, particularly the discharge of sewage and turbidity resulting from onshore development pose a major threat to these biological systems which protect the land, and provide sand to the beaches.

These developments will have adverse effects on the quality of the island's natural resources and wildlife and therefore its attractiveness as a tourist destination and ultimately, livelihoods (see section 3.3 of the regional section of this report.)

The instruments needed to protect habitats and wildlife, on the other hand are largely missing:

- The Physical Planning Bill still awaits enactment.
- Environmental impact assessment (EIA) is not mandatory, and specific EIA requirements have not been laid down.
- There is no action plan or management strategy for the environment.
- An effective national parks and protected areas system has not been established. The draft legislation to implement this system has not been enacted.

**Challenge 3 Beach erosion MODERATE**

Anguilla has many superb, pristine beaches. These beaches are essential to social, economic and environmental well-being. They:

- protect coastal lands from wave action, especially during hurricanes,
- provide an important recreational resource for tourists and local residents,
- provide habitats for coastal plants and animals, and nesting sites for sea turtles,
- are a source of fine aggregate for construction, and
- are an aesthetically pleasing - and culturally important - part of the environment.

But these beaches are being subject to various pressures which endanger them:

1. Hurricanes cause severe erosion to beaches. During the hurricanes of 1995, 1998 and 1999, many of the beaches suffered badly, and although some recovery has taken place, in most cases they have not returned to pre-1995 levels.

2. Winter storms in the North Atlantic generate high swell waves or 'groundseas' which especially affect the northern coasts of Anguilla and her cays.

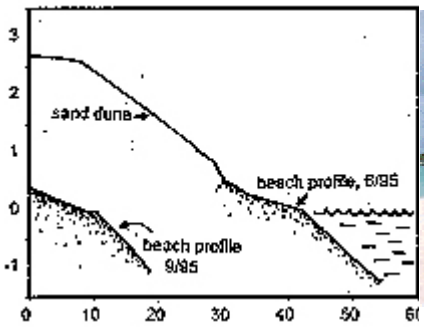
3. As mentioned above, climate change will exacerbate the erosion of beaches.

4. Badly planned sea defences may cause or exacerbate loss of the beach, or neighbouring beaches.

5. Building too close to the beach interferes with the natural sand movement may disturb fragile beach ecosystems, accelerate erosion and worsen the impact of natural disasters.

6. Coral reefs are coming under multiple threat. These recharge Anguilla's beach sand. If the reefs are damaged then (i) they will provide beaches with less sand, and (ii) there will be less protection for the beaches from high wave energy.

7. Sand extraction from beaches and dunes is a major cause of erosion. Heavily mined sites such as Sile Bay and Meads Bay were especially vulnerable to the waves of Hurricane Luis. Sand mining is now prohibited on all beaches and dunes except at Windward Point.




Source: UNECO CSI. Barnes Bay, Anguilla, September, 1994. Note the wide sand beach.

Source UNESCO CSI: Beach profile at Meads Bay Central before and after Hurricane Luis. Anguilla lost 30 m of duneland at this beach

Source: UNECO CSI. **Barnes Bay, Anguilla, October, 1995**. The beach has been stripped of sand by Hurricane Luis leaving a bare rock platform.

The diagram and pictures above illustrate some of the impacts of hurricane Luis on beaches in 1995.

Hurricanes Luis and Lenny in 1999 destroyed many beachfront properties or left them protruding onto the beach. This impacted negatively on the economy, since many tourists could not be accommodated, reducing incomes and government revenue. Studies revealed that much of this damage was due to the

close proximity of structures to the high water mark. Beaches being dynamic and fast changing natural systems, need to move freely landward and seaward. When such movement is impeded by structures, erosion occurs. Permanent structures need to be set well back from the vegetation line.

*Other environmental problems*

1. *Water and sanitation.* There is a shortage of water resources on Anguilla. The two main aquifers supplying water are located in the Valley, and contain 70% of the island's groundwater resources, But these are not enough to meet Anguilla's needs, and are supplemented by rainwater collected in cisterns (28% of consumption) and desalination plants. There are also concerns about the contamination of groundwater. All homes have access to piped water within or close to the home. The commercial sector (restaurants, bars, shops, and some hotels) is the largest consumer of public water. The distribution system was poor, but the GoA received funding from the British Government and the European Union for a water development project that includes new storage and distribution facilities and upgrading the abstraction system. There is no sewerage system in Anguilla. All wastewater is treated and disposed of on-site by means of septic tanks (80% of households), soakaways, pit latrines and package treatment plants, which are used primarily by hotels, commercial establishments and government institutions.

2. *Water pollution.* There is evidence of degradation of the coastal and marine environment due to pollution caused by the discharge of sewerage from hotels and restaurants and the discharge of sewerage and oil from visiting yachts and ships. The extent is not known because there is no monitoring of coastal water. The groundwater is at risk of contamination from direct discharges of effluents, chemicals, and pesticides in areas near the aquifer; intrusion of salt water; and uncontrolled disposal of solid waste. Poor design of septic tanks frequently results in malfunction and the release of untreated effluent into the groundwater system. The Environmental Health Department lacks the expertise and means to monitor ground water quality or the effluent from package treatment plants.

3. *Solid waste.* The Environmental Health Department retains responsibility for collection of refuse from government institutions, public roads, and beaches. Domestic solid waste is collected twice weekly, free of charge. No provision is made for the removal of construction waste, old appliances, and derelict vehicles. Hotels and other commercial establishments are required to make their own arrangements for waste collection. An estimated 12 tons of garbage are disposed of daily at the 10-acre landfill, where waste is placed in pre-excavated trenches and covered with fill.

4. *Natural disasters*. A variety of hazards, natural and human induced, large and small scale, threaten the sustainable development of Anguilla and the well-being of its population. Anguilla is prone to (irregular) hurricanes. As seen above, Hurricanes Jose and Lenny caused heavy damage to property, and although no lives were lost, many were endangered. The hurricanes resulted in 6 ½ miles of the northern coastline experiencing severe slope instability and beach erosion, and in the loss of 20% of the seagrass beds. Anguilla also lies in a seismically active area: earthquakes are typically in the range Richter 4-5. Tsunamis are also a possibility (see regional section).

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

There is no environmental department as such, although there is a Director of Environment within the Chief Minister's Office. The Environmental Health Department is responsible for managing solid and liquid waste, monitoring drinking water, sanitation, beach and road cleaning. The department is constrained by inadequate manpower, limited training, and lack of technology. The Department collects domestic and beach waste, but not bulky waste objects, auto wrecks, etc. Hotels and other commercial establishments are required to make their own arrangements for collecting waste.

The *Anguilla National Trust* (ANT) was established by law in 1988, and is charged with protecting the territory's natural resources and preserving Anguilla's historical and cultural heritage. It receives an annual subvention from the government, and collaborates with the Departments of Physical Planning, Fisheries & Marine Resources and the Director of Environment in the Chief Minister's Office. The ANT is staffed by an Executive Director, a Protected Areas Manager, and an Administrative Manager. It also has an awareness-raising role. The ANT is collaborating with regional and international partners in developing a system of parks and protected areas. It is implementing a Strategic Development Plan 2005-2008

Other local organisations, such as the Anguilla Beautification Club and the School Environment Clubs also play a part in promoting environmental awareness.

The *Anguilla Water Authority* is responsible for water supply. It treats and tests groundwater, while the Environmental Health Department inspects cisterns. Water Authority monitoring is not continuous.

The *National Disaster Office* (NDO) is responsible for disaster-preparedness and response. Staff comprises a single full-time person, the National Disaster Coordinator (NDC). The annual operating budget for the National Disaster office is about €3000 excluding the contribution to CDERA. Its activities focus on hurricane awareness, capacity building and the annual field exercise for utility services and related government departments.

## 3.2 Mechanisms for integrating environment into development

The Environment Charter (see section 3.3), signed by the UK and Anguilla governments in September 2001, includes a commitment by the latter to ensure that environmental considerations are integrated into social and economic planning processes, and that sustainable patterns of production and consumption are promoted within the Territory.

The Physical Planning Act provides that an EIA can be required for certain prescribed types of development or if Board considers that a proposal could have adverse effects. Implementing regulations have not yet been made determining the content and format of environmental impact statements. Furthermore the Physical Planning Act has not yet been implemented.

The UKG has agreed in principle to provide technical assistance to the GOA to formulate a national strategy for sustainable development, which will include detailed strategic plans and programmes for transport, tourism and other sectors to form an integrated development plan for Anguilla. Work on the national strategy for sustainable development was expected to start in early 2004.

## 3.3 Environmental strategy and policy

Because of a shortage of human and financial resources, there is an absence of a solid national strategy and policy framework for environmental protection and management in Anguilla:

- There has to date been little progress in implementing the Environmental Charter (see 3.2). For example there has been no bringing together of the major stakeholders to formulate a detailed strategy for action (Commitment 1 of the GoA).
- There is not yet a national environmental action plan.
- The land use plan has remained in draft form for over 10 years. A physical planning bill was introduced in 2005, but has not yet been enacted.
- There is no comprehensive legislation for establishing and managing protected areas, despite the fact that draft legislation was prepared five years ago..

A draft National Environmental Management Strategy and Action Plan was formulated, but an overall policy statement outlining the government's commitment to the prescribed actions was lacking, and the agencies responsible for implementing the recommended actions and the resources needed were not identified.

## 3.4 Policy instruments

The legislation most relevant to environmental protection in Anguilla is indicated in the table below.

| Item of legislation | Comments / detail |
|---|---|
| Anguilla National Trust Ordinance of 1988 | Established the Anguilla National Trust |
| Marine Parks Ordinance | Implemented by Marine Parks Regulations, 1993 |
| Plant Protection Act | |
| Protection of Animals Act | |
| The Wild Birds Protection Ordinance 1913 | protects listed wild bird species and their eggs. It needs to be repealed and replaced with appropriate legislation. |
| The Fisheries Protection Ordinance no. 4 1988 | regulates the taking and killing of certain marine species and establishes close seasons |
| Emergency Powers Ordinance | gives the Governor extraordinary powers in an emergency or disaster. |
| Fisheries Protection (Amendment) Regulations 1995 | enforces a moratorium on the harvesting of sea turtles and their eggs. |
| Beach Control Act | |
| Beach Protection Act | |
| Litter Abatement Act | |
| Physical Planning Act (not yet enacted) | It will provide for:<br>• plant preservation orders to protect specific plant (group)s;<br>• recommendations to be made on 'environmental protection areas'; Minister can require an EIA for a development within such an area;<br>• Director may prepare environmental protection area management plan;<br>• the Board on advice of the Director may require an EIA for an application for a development permit for specified developments. Regulations required to define procedures, format, etc. |

Generally the legislation is outdated and not adapted to the needs of modern environmental management and participation in the relevant multilateral environmental agreements.

A draft ordinance on National Parks and Protected areas, though drafted some time ago, has not yet been enacted. Comprehensive disaster-related legislation has not yet been enacted. Disaster management legislation based on the CDERA 1996 model has not yet been completed.

To date, most funding for conservation has been received from international agencies. Consideration has been given to securing financial sustainability by establishing an environmental trust fund or conservation fund, for example by adding 1% the present accommodation tax. No decision has yet been taken on this.

Anguilla has five marine protected areas (MPAs); Dog Island, Prickly Pear Cays, Little Bay, Shoal Bay/Island Harbour and Sandy Island. These were designated under the Marine Parks Ordinance in 1982, but were not managed until the implementing regulations came into force in 1993. Management responsibility for the MPAs lies with the Department of Fisheries and Marine Resources.

The government has transferred two sites (East End Pond Conservation Area and the Big Spring Heritage Site) to the ANT, making these the first terrestrial protected areas in the Territory.

## 3.5 Monitoring

There is no monitoring of water quality (seawater, groundwater), and no systematic monitoring of waste dumps on Anguilla. There is sporadic monitoring of cisterns by the Environmental Health Department.

Seven beaches have been monitored since 1992, and in 1994 six new beaches were added including two offshore cays. This is undertaken by the Department of Fisheries and Marine Resources

### 3.6 Enforcement

Much of the key environmental legislation has not yet been enacted, so that enforcement does not yet arise. Enforcement must be one of the issues considered in designing the structures needed to administer a viable environmental policy.

## 4. International cooperation

### 4.1 MEAs

The Ramsar Convention is the only MEA that has been extended to Anguilla.

| MEA | Remarks |
|---|---|
| Ramsar Convention | This Convention was extended to Anguilla in February 1991. No Ramsar site has yet been officially confirmed, but 5 sites have been nominated (Anguilla mainland wetlands, Dog Island & Middle Cay, Prickly Pear Cays, Scrub & Little Scrub Islands and Sombrero Island), awaiting approval. |

Although other MEAs have been examined, the Anguillian government has not yet requested that any others be extended to include Anguilla.

### 4.2 Funding by international community for environmental projects

*EU*
Total aid to Anguilla under the 4th to the 8th EDFs was €9.55 million. This was mainly for infrastructural projects - water, roads, port facilities, electricity generation, as well as aid to tourism. In addition, Anguilla benefited from a number of activities carried out by regional organisations with funding from EDF's regional resources. The 9th EDF provides €8 million in budgetary assistance to support infrastructure, and in particular air transport (extension of the Wallblake Airport to give access to larger aircraft in an effort to attract more tourists). Additional support is available from the 9th EDF's regional resources.

*UK*
The UK Department for International Development (DfID) is providing aid for Anguilla under a Strategic Country Programme (€4.5 million). These provide support for education, health, governance, social development programmes.

Environmental projects funded in recent years include:
- technical assistance to recruit the first Protected Areas Manager for the ANT;
- technical assistance for the recruitment of an advisor to guide extension and initiate implementation of the SPAW Protocol, CBD, CMS and CITES;
- establishment of a Heritage Tour of the eastern end of the island for ecotourists;
- publication of a guide to the flora of Anguilla
- a Darwin Initiative project on capacity building for biodiversity.

Anguilla's other remaining significant donor is the Caribbean Development Bank (CDB) which has financed port development, road development and electricity development projects in the past.

Other donors include the UNDP, Canadian International Development Agency (CIDA), Organisation of eastern Caribbean States-Environment & Sustainable Development Unit (OECS-ESDU), UK Royal

Society for the Protection of Birds (RSPB), and the Wider Caribbean Sea Turtle Conservation Network (WIDECAST) and the Caribbean Natural Resources Institute (CANARI).

### 4.3 Other international cooperation on the environment

Anguilla is a full member of the ECCB (Eastern Caribbean Central Bank) and of ECCB initiatives such as the Eastern Caribbean Securities Exchange (ECSE). It participates in CDB the (Caribbean Development Bank), and is a member of CDERA.

Anguilla is an associate member of CARICOM (Caribbean Community) (so not subject to the common external tariff). the OECS (Organisation of Eastern Caribbean States), the ACS (Association of Caribbean States and ECLAC (Economic Commission for Latin America and the Caribbean).

Anguilla is not a member of the Free Trade Area of the Americas; as a UK Overseas Territory it would have to seek the permission of the UK government for this.

## 5. Conclusions and Recommendations

*Sustainable tourism*
Anguilla's tourist industry is presently undergoing rapid growth, and is the territory's dominant economic activity. This is placing increasing pressures on the natural environment. The survival of island ecosystems is a precondition not only for the health of the tourism industry but the well-being of the islands as a whole. Success in finding a balance will only come if the islands ensure their tourist industry is truly sustainable. But at present the administrative structures and policy and legislative instruments needed to underpin this sustainability are lacking.

Recommended areas for cooperation between Anguilla and the EU are as follows:
- Identify what the bottlenecks are in moving forward with the establishment of environmental management policy structures and instruments (mismatch between aspirations and financial resources? lack of human resources? lack of sufficiently senior patron? lack of political will?).
- Support in preparing a realistic and feasible environmental action plan which recognises and addresses these bottlenecks, covering in particular the establishment of modern legislation (and the appropriate management structures) for environmental impact assessment, protected areas and allowing Anguilla to join the most relevant MEAs. Support in establishing the environmental trust fund, particularly if cost is a major bottleneck.
- Encourage the territory to link up with and participate in other sustainable tourism initiatives in the region.

*Increase resilience to natural disasters and climate change*
- Facilitate entry into or creation of regional and global initiatives or associations with other countries or entities which face similar threats for the purpose of drawing the attention of the world community to their special vulnerabilities.
- Identify areas where Anguilla, by virtue of its characteristics, can make a special contribution to research or monitoring of climate change, if necessary in collaboration with other international institutions.
- Align with other regional initiatives for adaptation to climate change, for example MACC.

# ANNEX B: ENVIRONMENTAL PROFILE -

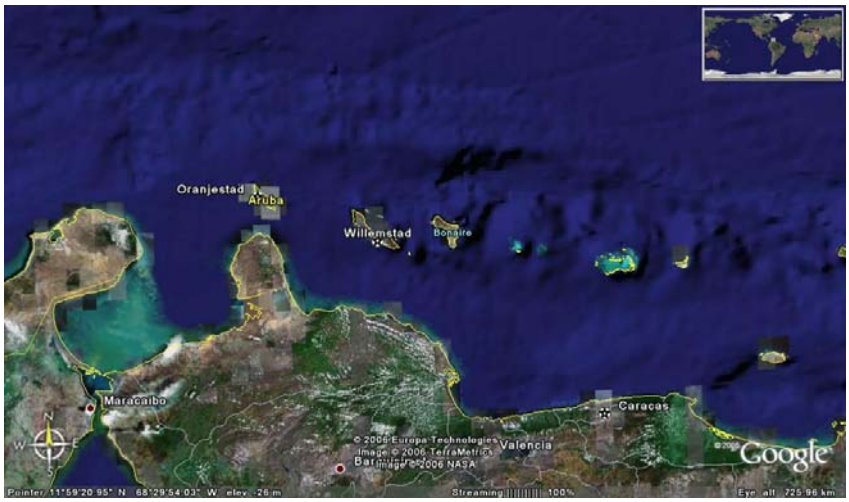
# ARUBA

## 0. Summary

Aruba, an autonomous country within the Kingdom of the Netherlands, is one of the richer territories in the Caribbean with an economy based on tourism, off-shore financial services, oil refining and shipping. The oil refinery is a source of air pollution, the management of the increasing volumes of waste still leaves room improvement, climate change risks are not being assessed.

## 1. Background information

Situated in the Caribbean region, west of the two Netherlands Antilles islands Bonaire and Curaçao, Aruba is the smallest, driest, windiest and richest of the three islands.



Source: Google Earth

### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Aruba |
| Region | Caribbean |
| Land area | 193 km$^2$ |
| Maritime claims | EEZ: 2200 km$^2$<br>Territorial sea: 2800 km$^2$ |
| Population | 100,000 (est. 2006) density 5i8/ km$^2$ |
| GDP/capita | € 21,800 (est. 2004) |
| Literacy rate | 97 % of population 14 and older |
| Unemployment rate | 7.3 % (est. 2004) |

### 1.2 Constitution

Aruba is an autonomous country within the Kingdom of the Netherlands. The Dutch government is responsible for defence, foreign affairs and the Supreme Court. Relations with the Netherlands are regulated by a Charter of the Kingdom and Aruba. It obtained *status aparte*[4] in 1986, at its request. [5]

It has an elected parliament which appoints the prime minister and head of the government. A Governor General is appointed by and represents the Dutch queen.

[4] i.e. status as a separate national entity within the Kingdom of the Netherlands.
[5] www.aruba.com

## 1.3 Physical geography

Aruba is fairly flat, although the central part of the island is more undulating. The highest point, Yamanota, reaches only 188 metres high. The temperature is around 28 degrees all year round. The climate is dry and the land generally arid. Aruba has extensive white beaches on the west side of the island. The south and west coastlines are sheltered from fierce ocean currents. The calm sea and the constant wind attracts wind surfers. The northern and eastern coasts, lacking protection, are considerably more battered by the sea and have been left largely untouched by humans. The waters around Aruba are shallow and very clear with coastal lagoons and extensive sea grass beds. Coral is found all around the coastline.

Aruba has striking geological features including wind-shaped rocks, grottos and caves. The rock originates from three major events, volcanism, plutonism and sedimentation, each with its characteristic appearance.[6]

Rock formation, from Article Archeological Museum Aruba

Although outside the hurricane belt, two hurricanes have affected Aruba in recent years: Lenny (1999) and Ivan (2004). This led to a plan (2006-09) to improve rainwater drainage.

## 1.4 Flora and fauna

Strong salt-laden east winds and a dry climate make life a challenge for plants and animals. The climate fosters dry weather plants. There are numerous varieties of cactus and other succulents such as the aloe plant, as well as the local scrubby divi-divi trees, typically bent by the wind. In the Arikok National Park the rare and endemic Aruban rattlesnake or cascabel survives.[7] Various exotic cacti and 50 different species of tree, some threatened with extinction, live on rough hills in the park.[8] The small Shoco owl is endemic[9]. The coastal lagoons and sea grass beds are home to various species, including the green turtle. Aruba has 174 bird species. Most of them use Aruba as a seasonal stop-over.

## 1.5 Demography, socio-economy

Aruba has a population density of 518 inhabitants per $km^2$.

There is emigration to the Netherlands, where 14,000 Arubans live (although this figure includes students). There is also immigration from neighbouring Latin American and Caribbean nations. More than

[6] Plutonism is a process by which new molten material solidifies within existing volcanic rock.
[7] www.sidsnet.org/eco-tourism/arikok.html
[8] Source: DCNA (Dutch Caribbean Nature Alliance) Island Profiles, www.dcna.org
[9] Source http://www.nciucn.nl . See also www.sidsnet.org/eco-tourism/arikok.html

40% of the working population are immigrants. Of these, 28 % work in the hotel and restaurant sector, 20% in commercial services, 16 % in wholesale and retail and 15% in the construction industry. [10]

The two official languages are Dutch and Papiamento, a mix of Spanish and Dutch and various other languages like Portuguese and English. Islanders can often speak four or more languages and are mostly Roman Catholic.

Aruba has a high income compared with many Caribbean countries, but according to the IMF "available data suggest that income inequality is still considerably larger than in countries with comparable income levels". The oil refinery on the island closed in 1985. Although it reopened in 1991 with a capacity of 275,000 barrels per day, the oil industry has declined in economic importance, and the focus of development has turned to the tourism sector, now very important (730,000 visitors in 2004 and still increasing, 50% of GDP). The hotel/restaurant sector employs 7700 (17% of the workforce). The wholesale and retail trade employs 16% of the workforce, and the construction industry 9%. Other important sectors are marine transhipment, offshore financial services and oil refining.

Because of its aridity and poor soil, typical (colonial) plantations did not occur. Only 10% of the land is arable.

The IMF sees the biggest challenges for the government as being to improve the quality of the labour force, raise productivity and diversify into high-value-added services. Almost 30% of the economically-active population have completed their secondary education, and only 10% have further education.

## 2. Main environmental challenges

### 2.1 Overview of state of the Aruba environment

Aruba is a home to a number of endemic species but some, like the Cascabel, are threatened by extinction. The creation of Arikok National Park in 1997 by the government reserved 18% of the island for nature conservation. Government policy seeks to ensure that tourists don't spoil the natural environment irreversibly. A moratorium has been declared on new hotels on the west and south coasts.

### 2.2 Main environmental challenges

**Challenge 1 Pollution: air, water, waste SEVERE**

The attractive natural wealth which attract tourists to Aruba is under threat on a number of fronts.

*Air*
The oil refinery and the desalination plant emit sulphur dioxide, nitrogen oxides and dust (as well as carbon dioxide). The recent significant odour problem from the waste disposal dump at Parkietenbos has was solved two years ago by a change in operations from open burning to landfill, but the increasing number of cars adds to the air pollution. Little is known about how serious the problem is because there has been very little air quality monitoring. The Aruban and the Dutch Governments have reserved funds from the Aruban Development Fund to set up an air monitoring network as a first step towards formulating an air quality policy.

*Water*
There are still some locations on the island where raw or partially treated sewage is discharged into the sea with negative effect on marine life although most of the sewage is being treated in a sewage water treatment plant (SWTP). The sewer system is limited to Oranjestad (including the Hotel area at the beach strip) and San Nicolas. On the rest of the island sewage is collected in septic tanks that treat sewage to

[10] National Development Plan 2003-2007.

some degree or simply stored in a cesspool. Excess water from septic tanks is largely being trucked to the SWTP. The storage of sewage in cesspools contaminates the environment and is not officially encouraged. To cope with growth the existing SWTP is actually being upgraded and a complete new SWTP is under construction. A third SWTP will be constructed starting 2007 These projects are also being financed by the Aruban Development Fund.

*Waste*
In the National Development Plan 2003-2007 regards waste as a top priority, as does the Dutch 2001-2005 cooperation agreement. Waste is being managed inefficiently by the state-owned Selimar and there is minimal recycling. There is no selective waste collection, there is extensive fly-tipping and the waste dump is causing water and air pollution. No special arrangements are made for toxic / hazardous waste.

The only policy framework for waste management in Aruba is a set of actions listed in the National Development Plan:
- clean up fly-tips and illegal dumps
- train employees of Selimar and buy new collection equipment;
- raise public awareness;
- a location will be identified for a new central waste processing plant at Parkietenbos or nearby, where the island's entire waste will be processed (or pre-processed for export) in an environmentally safe and economic manner;
- waste will be treated according to a well defined sequence: (i) separate household waste at source, (ii) collection by licensed companies, iii) collect toxic/ hazardous waste separately, iv) separate valuable waste streams (used oils, metals, glass, paper/cardboard;
- a depot will be built for hazardous waste (including asbestos);
- a composting installation will be created;
- legislation and fees for waste treatment will be introduced.

**Challenge 2 Climate change and natural disasters SEVERE**

Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of Aruba.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ● | Aruba is generally low-lying, with very populous coastal zones, so vulnerable to rising sea-level. Particularly vulnerable are the beaches and salt margins on the southwest side of the island. The salt margins form natural flooding areas but these are under pressure to be expended in order to develop the tourist industry. The potential loss of beaches is a serious threat for the tourist industry. |
| Stressed fisheries | O | The fishing industry is small in Aruba. |
| Coral reefs threatened (bleaching, decreasing pH) | O | Coral reefs on the North coast, still in good condition, may be subject to bleaching and destruction from more intense storms, thereby reducing protection to the island |
| Salinisation of groundwater | O | Groundwater contamination is already a problem. |
| Tourist industry | ● | Tourist industry accounts for half of GDP. Reef tourism and fishing are important attractions. |
| More frequent and more intense storms | O | Increased destruction from storms, flooding of urban areas. |
| ○ Nil | O Slight | O Moderate ● Heavy |

Aruba is particularly vulnerable to the threat of global warming given its dependence on the tourist industry and its low altitude. The island's coral reefs, very important as a tourist attraction and therefore to

livelihoods on the island, as a spawning ground for fish and as a natural buffer area protecting the islands from sea damage during storms, are at risk. Climate change also poses a threat to Aruba's beaches, important for tourism and as nesting grounds for turtles.

Aruba is considering joining the United Nations Framework Convention on Climate Change and the Kyoto Protocol. There are also plans to install some wind turbine capacity for electric generation.

**Other environmental problems** in Aruba include:
- Although Aruba has a large national park, it still lacks a modern legal instrument for designating and managing protected areas. The Nature Protection Ordinance has not yet been enacted.
- Aruba has not yet fully implemented the Ramsar Convention. Participation in and Implementation of the Cartagena Convention and its 3 protocols will also be a major challenge.

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

The Ministry of Public Health, Environment, Administrative and Foreign Affairs is responsible for the environment. The Minister formulates environmental policy, proposes new laws and is responsible for their implementation. He is supported by a staff of 10 fulltime employees.

Within this Ministry there is an Environmental Inspectorate, which implements and enforces environmental regulations, alongside the police, who are the general enforcement authority. The Inspectorate was established in November 2005 and has three divisions:
- Environmental Surveillance, 4 fulltime employees,
- Environmental Monitoring, one engineer,
- Hazardous Materials, one engineer, one assistant.

Other ministries also have departments involved in environmental tasks:
The Public Works Department in the Ministry of Education, Social Affairs and Infrastructure operates the sewage treatment plant and maintains riverbeds and salt ponds.

A Disaster Prevention Department in the Ministry of General Affairs (linked to the Prime Minister) coordinates the response to disasters and oil spills, which have to be reported to this department.

There are also other companies and associations with environmental tasks. The publicly-owned company SELIMAR collects, transports and disposes of all solid waste including bulky household waste and car wrecks. SELIMAR reports to the environmental minister. There are plans to privatise this company.

The Aruba Development Foundation was established and is funded jointly by the Aruban and Dutch governments to administer development funds. The government of Aruba drafts project proposals in different areas; the proposals are then implemented and incorporated into the appropriate government department or becomes self-supporting. The following environment-related projects are currently in execution: upgrade sewage treatment plant and construct two new plants, expand municipal landfill, implement a water and air monitoring programme, establish a coastal zone management authority and improve 3 public beaches.

**Other relevant institutions:**
- Economic planning: DEACI (Department of Economic Affairs, Commerce and Industry) of the Ministry of Finance and Economic Affairs.
- Spatial planning: Directorate of Infrastructure and Planning (DIP) of the Ministry of Education, Social Affairs and Infrastructure.
- Social affairs: Department of Social Affairs of the Ministry of Education, Social Affairs and Infrastructure

## 3.2 Mechanisms for integrating environment into development

There is a cross-governmental planning consultative committee whose task is to promote an integrated approach to spatial planning. This Committee includes representatives of all the relevant departments.

## 3.3 Environmental strategy and policy

*Policy documents/ Plans*
The main relevant policy document is the National Development Plan 2003-07[11]. This has a chapter specifically devoted to the environment. This chapter states that "Aruba has limited space, a limited supply of manpower and limited natural resources". The goal of environmental policy is to make the island "liveable" that is, "a clean island with undisturbed nature, and in particular: clean beaches and bays, streets and public parks, where people can walk about, work, relax and rest without health hazards".

The priority issues are:
1. Waste (recycling, separation of household waste),
2. Air pollution,
3. Nuisance (odours, noise and dust),
4. Wastewater.

The physical planning aspect is important: "In residential and scenic areas (quiet areas) disturbing and polluting activities should not take place. Certain areas should be protected, while others should be restored and maintained." A total of €34 million is reserved for the environmental investments required during 2003-2007.

Other policy plans that deal with the environment are:

| |
|---|
| Multiyear plan for development cooperation NL-Aruba 2006-2009 (*Fondo Desaroyo Aruba*).This plan includes environmental awareness-raising activities (see 3.4.3). |
| Spatial Development Plan, Highlights 2015, May 2006. (DIP) |
| Specific strategy for sustainable development: Sector Sustainable Economic Development |
| Department of Social Affairs - Social Policy Plan |

There are also the following policy papers and plans on the environment and nature conservation:
- Environmental Management Policy: "*Aruba: op weg naar een duurzame ontwikkeling middels een op agenda 21 gebaseerd milieubeleid* [Achieving sustainable development through an Agenda 21-based environmental policy] (June 2003).
- A nature and landscape policy is still in preparation
- National Oil Pollution Contingency Plan (1993).

Other plans in preparation are the:
- Spatial Development Plan 2015 (DIP);
- National Sustainable Tourism Policy;
- Waste reduction strategy (goal is to reduce waste to landfill by 50% by 2006 and 90% by 2009;
- Strengthening and privatisation of SELIMAR (waste management company).

Arikok National Park accounts for almost 20% of Aruba's area, and was designated an environmental sanctuary by the government in the early 1980s.[12] The Park is home to five endemic species and includes the highest hills in Aruba. It has examples of the island's three primary geological forms, which were important to the native population (Arikok). The plan to conserve this national park includes the following

[11] http://www.arubaeconomicaffairs.aw/NationalDevelopmentPlan.pdf

[12] http://www.sidsnet.org/eco-tourism/arikok.html

objectives: to maintain a unique part of Aruba's cultural and natural landscape, to keep, stabilize and restore vital populations of native flora and fauna, to preserve specific native and rare species, to develop environmental education opportunities, and to develop recreational and tourism amenities in the Park..

## 3.4 Policy Instruments

*3.4.1. Legislation, regulations and other regulatory instruments*

| Item of legislation | Comments or details |
|---|---|
| Nuisance Act | A limited list of enterprises have to have a nuisance permit |
| General Police Act | Has some articles regulating waste disposal and clean areas. |
| Public Waters and beaches Act | Regulates clean beaches and waste disposal. |
| State Ordinance Spatial Development (*Landsverordening ruimtelijke ontwikkeling*) | This state ordinance has been approved by Parliament and is in its final stages of ratification. |
| State Ordinance Letting Property On Lease (*Landsverordening uitgifte eigendommen*) | Used to request EIAs from developers. |
| Nature Protection Ordinance (*Natuurbeschermingsverordening*) | |

Other related laws:

| | |
|---|---|
| Safety Act | Regulates (among others) boilers and other facilities under high pressure. |
| EIA | In 2004 the EIA guidelines were extended to include health aspects |

Of particular interest is the moratorium on investment in hotel development on the west coast. Expansion in room capacity is only allowed under the following conditions:

1. For luxury units if realised entirely by the local labour force.
2. The contribution to the Aruban economy must be maximised. At least 25% of the construction materials should be purchased locally and only local builders should be used.
3. The hotel should be operated by local personnel recruited from the local labour pool.

*3.4.2. Economic instruments*

A solid waste management tax on collection and disposal will soon be introduced. There are no deposit /refund systems in place.

*3.4.3. Voluntary instruments*

Some companies have ISO 14000 certification. Seven hotels are Green Globe Certified, others have their own internal environmental management system in place.

*3.4.4. Information instruments*

An awareness program is in preparation for different environmental issues, to be funded by the Aruba Development Foundation. The campaign will use the media, posters and brochures. This campaign will probably start in 2007. In this awareness program, funds are reserved for providing a website with information specifically about the environment. Different environmental institutes and environmental NGOs can post information on the website. (A list of NGOs is appended). There will also be activities in schools and colleges.

## 3.5 Monitoring

Seawater is monitored to maintain a high swimming water quality. The Sanitation Department collects samples, the Laboratory analyses and the Inspection service monitors. The samples are checked for faecal coliforms, e-coli and enterococcus faecalis, pH, turbidity, and colour.

Every two months an Air Monitoring Taskforce meets with the refinery or the water and energy companies (separately) to discuss the air quality performance of the two companies. A monitoring system for air quality is to be introduced in 2007.

An early warning system for disasters is operated by the Meteorological department.

### 3.6 Enforcement

The Public Health and Environment Inspectorate is responsible for the environment and has 4 inspectors.

### 3.7 Conclusion on the administrative and policy setting

Environmental issues are clearly integrated into the national development plan and there are coordinating entities and institutions. There is legislation on pollution (not on waste) but the Spatial Development Ordinance and the Nature Protection Ordinance have not yet been approved or ratified by Parliament. The projects on waste and water have had substantial delays.

## 4. International cooperation

### 4.1 Cooperation with the Netherlands

There is a co-operation agreement with the Netherlands for the periods 2001-2005 and 2006-2009 and a special development fund (*Fondo Desaroyo Aruba*). The budgeted funds for 2006-2009 are € 200 million (equally contributed by the Dutch and Aruban governments). Its priorities are good governance, sustainable economic development, education and the social sector. [13] The first programme (2001-2005) concentrated on air, waste and water, but many of these projects are only now being implemented.

### 4.2 Cooperation with the EU

The Council Decision on the association of OCTs with the EU supports co-operation and development projects. The 8th EDF provides funding of €10 million, in accordance with the national indicative program. Projects focus on the environment (Arikok National Park ) and the cultural-historical heritage. Aruba has no territorial allocation under the 9th EDF because its GDP per capita is too high.

### 4.3 Other international cooperation and Multilateral Environmental Agreements (MEAs)

The Kingdom of the Netherlands is signatory and party to various multilateral environmental agreements. The Dutch Minister of Foreign Affairs represents the Kingdom and signs. Each country or territory can decide independently whether to join and implement such agreements. Aruba and the Dutch Antilles are autonomous when it concerns internal affairs and the environment.

Aruba participates in the following MEAs:

[13] http://www.vertegenwoordiging-aruba.nl/algemene_onderdelen/persberichten/overeenstemming_over

| MEA | Remarks |
|---|---|
| Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | Aruba plans to have the Convention plus its three protocols (Oil Spills), SPAW and Land-Based Sources Protocol extended to Aruba in 2007. Its obligations include the preparation of a national oil spill plan and the appointment of an oil spills coordinator, legislation on special protected areas and ending the discharge of untreated sewage into the sea. The costs are estimated to be about €50 million. There are no specific funds reserved for these activities. The entire environment budget for the years 2003- 2007 is only €34 million[14]. |
| Ramsar Convention | Since 1975. Aruba has one listed Ramsar site (Het Spaans Lagoen), but the precise description and mapping of its boundaries, promoting sensible/wise use of the area and scientific research and publication of the results are not yet being met. |

Aruba would also like to participate in the Kyoto Protocol to the UNFCCC, but some further legislation will be required for this.

### 4.4 Other funding by international community for environmental projects

PAHO (Pan American Health Organization) is providing technical assistance related to the new waste treatment plant at Parkietenbos. The WWF helped prepare the regulations for the Arikok National Park.

### 4.5 Other international cooperation on the environment

The public sanitation departments of Aruba and the Dutch Antilles work together in an association for effective waste management, the “Asosacion pa desaroyo di Maneho Uni di Sushi y Technologia”).

Aruba has many relations with other Caribbean countries and territories. It is a full member of the Association of Caribbean States (ACS), and has observer status within the Caribbean (trade) Community (Caricom).

Aruba is a SIDS (Small Islands Developing State, UN initiative).and a member of the Alliance of Small Island States (AOSIS).

## 5. Conclusions and Recommendations

It is a wealthy territory because of tourism earnings, the oil industry, marine transhipment activities and financial services. In the area of the environment, it has however many problems that can damage its sustainability: air pollution, a serious waste problem and climate change risks are not being assessed.

Integration of environmental protection measures into the national development plan, the plans to monitor air and water pollution and build modern waste treatment facilities, the moratorium on building new hotels on the west coast, the Arikok National Park, etc, are strong indications that Aruba is making an effort to get on the right track protecting its environment.

Recommendations:

- Aruba does not qualify anymore for EU EDF funds because of its high GDP per capita. However it does still qualify for regional projects, and should consider initiatives described in the regional section of this report where it shares problems with other Caribbean territories.

[14] National Development Plan 2003-2007, table 6.1: 81 mill AFL for health and environment, 60 million AFL for environment alone.

- There are a number of projects which have been started but need to be completed. These include enactment of the draft Nature Conservation Ordinance, developing a robust system of protected areas and species, full implementation of the Ramsar Convention, participation in the Cartagena Convention and full implementation of the protocols (when they have entered into force). Bottlenecks should be identified, and technical assistance and / or funding should be sought, if necessary in partnership with the Netherlands Antilles and other Caribbean OCTs.

Donors should also be found for the restoration of abandoned quarries (landscaping as habitat for endemic species), completing the air and water monitoring system (equipment) and expansion of the beach improvement program.

## Appendix- List of NGOs:

Accion Ambiental, approx 2 members, newspaper articles.
AHATA Environmental Comité, approx 40 members, monthly sponsor-a-mile clean up activities, newspapers advertisement and articles, TV and radio spots.
Equilibrium, approx 4 members.
FANAPA, 7 members.
Fundacion Arubano Medio Ambiente (FAMA), approx 2 members, newspaper articles.
Fundacion Salba Nos Buriconan, approx 15 members, manages donkey sanctuary.
Fundacion Aruba Limpi, approx 8 members, cleans up litter along some main routes.
ProBiMar, approx 2 members, newspaper articles.
Rainbow Warriors International, approx 2 members, newspaper articles and website.
StimAruba approximate 250 members, nature walks, vacation camps, newspaper articles.
Centro Ecologico, approx 2 members, manages herb garden.
Animal Rights Aruba, approx 20 members, newspaper articles
Marine Mammal Foundation Aruba, approx 2 members.

# ANNEX C: ENVIRONMENTAL PROFILE -

# BRITISH VIRGIN ISLANDS

## 0. Summary

The British Virgin Islands are seeking to strike a balance between using the beauty and richness of their natural resources as a tourist attraction while limiting the environmental pressures and degradation which tourism entails. The physical features and ecosystems which are so attractive to tourists are very fragile, and are coming under multiple, mutually reinforcing threats from rapid development, climate change and natural hazards, particularly hurricanes. Continued prosperity and well-being of the islands will depend amongst other factors on the careful nurture and protection of their vital ecosystems, particularly coral reefs and mangrove wetlands and the adoption of measures to enhance their resilience and adaptation to the consequences of climate change and severe meteorological events.

## 1. Background information


### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | British Virgin Islands |
| Region | Caribbean |
| Land area | 153 $km^2$ |
| Exclusive economic zone | 200 nm |
| Population | 23,000 (July 2006, est.) |
| GNP/capita | €31,000 |
| Literacy rate | 98% |
| Unemployment rate | 3% (1995) |

### 1.2 Constitution

The head of state of the British Virgin Islands (BVI) is the UK monarch, who is represented by a governor appointed by her/him. There is a unicameral Legislative Council comprising 13 seats (1 elected by direct popular vote by each of nine electoral districts, 4 elected by a territory-wide vote). The Legislative Council serves a term of four years. The Constitution provides for a ministerial system of government headed by the Governor, who presides over an Executive Council which includes the Chief Minister and three other Ministers. The leader of the majority party/coalition is usually appointed chief minister by the governor. In December 2001, inhabitants were given UK citizenship, including the right of abode.

The BVI enjoys a large measure of internal self-government. The Governor has direct responsibility for external affairs, defence and internal security (including the police), the public service and the administration of the courts, but the Executive Council is responsible for other matters. The law of the BVI is the common law of England, supplemented by locally enacted legislation.

## 1.3 Physical geography

Source: Bareboats BVI. View of Road Town, Tortola

The British Virgin Islands comprise over 40 islands, islets and cays with a total land area of only 153 sq km scattered over some 3,445 sq km of sea. This archipelago is located on the Puerto Rican Bank in the north-east Caribbean at approximately 18°N and 64°W. Sixteen of the islands are inhabited, the largest being Tortola (54 sq km, which contains the capital Road Town), Anegada, Virgin Gorda and Jost van Dyke. With the exception of the limestone island of Anegada, the islands are volcanic in origin and are mostly steep-sided with rugged topographic features and little flat land, surrounded by coral reefs. The highest point on BVI is Mount Sage, 521m. The islands once formed a continuous land mass with the US Virgin Islands and Puerto Rico, and were isolated only in relatively recent geologic time. The BVI archipelago occupies just over 150 $km^2$ of land on a shelf (to 30 m) of over 2,000 $km^2$, sitting on the Puerto Rican Bank along with Puerto Rico and the US Virgin Islands. The waters around the archipelago average depths of 10 to 30m. Anegada rests on the north-eastern edge of this bank, but its formation is not volcanic in origin. It is made of limestone, and is estimated to be less than one million years old. Sediment produced by molluscs and corals were swept into sandbanks and compressed to form limestone, a process which took thousands of years. The climate is subtropical and humid, with temperatures moderated by the NE trade winds.

## 1.4 Flora and fauna

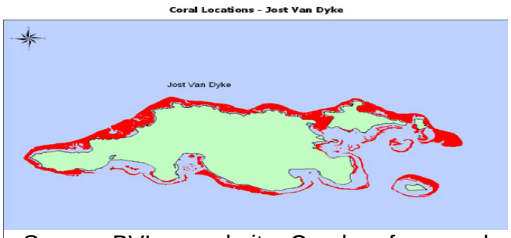
Source: CFD, Govt. of BVI. View of Anegada

Most of the shelf around the BVI consists of sand and numerous rock outcrops covered by coral reefs that vary from small isolated patches of a few square metres to the extensive Horseshoe Reef of Anegada, covering approximately 77 $km^2$. The overall reef condition remains relatively good, but with localised deterioration.

Vegetation comprises salt-tolerant plants - sea purslane, seagrape and manchineel - in the littoral zone**,** coastal scrub including thorny shrubs, cacti and frangipani in the coastal hinterland and, as the elevation increases, dry woodland including the Turpentine tree and Mampoo or Loblolly tree. Moist forest is found on higher slopes of the larger islands, for example Sage Mountain and Gorda Peak, both of which have been designated National Parks. These areas possess the best diversity of tree species in the BVI. Evergreens such as the Bulletwood and the White Cedar grow to significant heights. Most of these trees are evergreen.

Over 20 species of plant are recorded as endemic to Puerto Rico and the Virgin Islands. These include the globally threatened *Malpighia woodburyana* (CR), *Cordia rupicola* (CR) and *Maytenus cymosa* (EN). and *Acacia anegadensis* (CR). A quarter of the 24 reptiles and amphibians identified are endemic, including the Anegada Rock Iguana (CR), found only on Anegada. Other endemics include the Carrot Rock Anole (*Anolis ernestwilliamsii),the Virgin Islands Coqui frog (Eleutherodactylus schwartzi),* the Anegada Ground Snake*,* the Virgin Gorda Gecko (*Sphaerodactylus parthenopion*) and the Virgin Gorda and Anegada Worm Snakes*.* Other globally threatened reptiles within the BVI include the *Anolis roosevelti* (CR) and *Epicrates monensis granti* (EN). Eighteen roseate flamingos were reintroduced to

Anegada in 1992 where a colony of some 120 now flourishes. BVI also possesses a number of globally significant plant species, some of which occur only on Anegada , *Senna polyphylla* var *nglecta,* Poke-me-boy (*Acacia* anegadensis) and the wire wist (*Metastelma anegadense*).



Source: BVI …. website. Coral reefs around Jost van Dyke

The islands are rich in different types of habitat: mangroves, seagrass beds, coral reefs, sandy flats, trenches and sea mounts. Within these habitats live hundreds of different species of fish (283 species of reef fish have been observed), invertebrates and plants. There are also a number of marine mammals such as dolphins, pilot whales and humpback whales that migrate seasonally to the BVI. There are small nesting populations of leatherback, hawksbill and green turtles, although these are in decline. The islands are a significant foraging site for juvenile green and hawksbill turtles.

Every island in the BVI is surrounded by coral reefs of varying size, health and composition. In addition to the stony corals which build the reefs, soft corals and seafans dominate many of the reefs. The Anegada Horseshoe Reef is the third largest in the Eastern Caribbean, comprising both patch and barrier reef. In addition to over 300 shipwrecks in Anegada, there are six shipwrecks intentionally sunk by the Dive Operator's Association to create artificial reefs.


Source: BVI …. website. Distribution of seagrass around Jost van Dyke

Seagrass beds, mainly turtle grass and manatee grass, are also found around almost every island in the BVI. Some of the densest areas include Anegada's northern and south-western shore; Fat Hog's Bay, Tortola and Manchioneel Bay, Cooper Island.

There are some 580 ha of mangroves in the BVI (75% on Anegada). These serve many functions. They act as hurricane shelters for boats, for example at Paraquita Bay where over 200 boats sought shelter from Hurricane Hugo in 1989. Mangroves also protect the land and the sea from each other. The land is protected from wave action especially during high tides and storms. The marine environment is protected from soil run-off during heavy rainfall by the mangrove root structure. Mangroves serve as nurseries for many young creatures such as fish, conch, sea eggs and lobsters. These creatures then migrate to seagrass beds, and then coral reefs. Mangroves also provide a habitat for many birds like the blue gaulin. In 1990 the Conservation & Fisheries Department with technical assistance from the OECS - Natural Resources Management Unit prepared an inventory and maps of all the major mangrove systems in the BVI. Seventeen critically important mangrove sites were identified.

## 1.5 Demography, socio-economy

The population is currently about 23,000, and has grown 47% in the last 10 years, although growth has now slowed to 2% yearly. Half of the growth is due to immigration. 83% is of Afro-Caribbean ethnicity, the remainder being white, Asian and mixed. Approximately half the population are immigrants from St Kitts and Nevis, the Dominican Republic, St Vincent and other Caribbean islands. Several thousand native BVIslanders live outside the territory, mostly in the US Virgin Islands and the US.

The economy is closely tied to the larger and more populous US Virgin Islands to the west; the US dollar is the legal currency. The economy, one of the most prosperous in the Caribbean, is highly dependent on tourism, which generates an estimated 45% of national income. The islands receive some 400,000 tourists each year, mainly from the US. Yacht charter and recreational boating services, cruise ships, and diving tourism are particular attractions.

In the mid-1980s the government began offering offshore registration to companies wishing to incorporate in the islands, and incorporation fees now generate half of total government revenue. Roughly 400,000

700,000 companies were on the offshore register by the end of 2005 , this includes all International Business Companies (IBCs) and BVI Business Companies. The number of active companies varies every year, with some being struck-off the register or liquidated; approximately 50% of the companies on the offshore registry are active.. The adoption of a comprehensive insurance law in late 1994, which provides a blanket of confidentiality with regulated statutory gateways for investigation of criminal offences, made the BVI even more attractive to international business. Since 1997, the Proceeds of Criminal Conduct Act has criminalised all acts of money laundering. The Anti-Money Laundering Code of Practice, covering all licensed financial service activities, was adopted in 1999. There was concern that an EU savings directive (entered into force in 2005) destined to combat cross-border tax evasion through the collection and exchange of information, might impact adversely on the economy. Livestock rearing is the most important agricultural activity; poor soils limit the islands' ability to meet domestic food requirements. Overall, service industries account for about 92% of GDP.

## 2. Main environmental challenges

### 2.1 Overview

The BVI is particularly rich in marine habitats: coral reefs, mangrove forests, seagrass beds and salt ponds. However these habitats are coming under multiple threats and have undergone major losses as a result of development associated with an increasing population and the expansion of tourism. This degradation does not yet appear to have been reversed or halted, despite measures taken.


Source: CFD, Govt. of BVI: Mangrove restoration project on BVI

The islands have limited natural fresh water resources. The BVI's water supply comes from a number of sources, including cisterns, wells, reservoirs and desalinated water. The entire water supply on Tortola and Jost Van Dyke, and approximately 95% of Virgin Gorda's public water supply is desalinated water. All households have access to potable water, which is mainly supplied through rainwater collected in household cisterns. Piped water is supplied by the Water and Sewerage Department, and is obtained from several groundwater sources and from a desalination plant. Land and sea pollution continues to be a problem. . The common methods of sewage disposal in the BVI include the use of septic tanks, ocean outfalls and soak away beds. The leading pollution sources are used motor oil, effluent from septic tanks, garbage, surface run-off, old batteries, and household and commercial chemicals. Untreated sewage is discharged into the sea by some yachts, marinas, seafront hotels, businesses, and residences. The increase in the number of cruise ships poses an additional threat of water contamination and added demand for solid waste services. Only about 7% of households are connected to the sewerage system, and most households rely on septic tanks; some 4% have no approved toilet facilities. Malfunctioning soakaways resulting from poor soil permeability continue to pose serious problems, particularly in communities where large apartment buildings have been constructed. There is an incinerator on Tortola (shortly to be supplemented by another incinerator) and waste dumps on other islands.

The BVI are subject to hurricanes and tropical storms, the most devastating of which were Hugo (1989) and Luis and Marilyn (1995). Tortola lies near an earthquake fault, and minor earthquakes are common. An earthquake of Richter 5.2 was experienced as recently as August 2006. In addition the BVI have experienced tsunamis (there were 2 major tsunamis in 1867 following an earthquake, with waves up to 12m high).

## 2.2 Main challenges

The main environmental challenges faced by the BVI are the following (some interrelated):
- halting environmental and habitat degradation due to development pressures;
- climate change;
- Conserving BVI's endangered wildlife.

**Challenge 1 Halting environmental and habitat degradation due to development SEVERE**
The natural beauty, diversity and richness of the islands which make them one of 'Nature's Little Secrets' is under threat from the rapid rate of development and the expansion of the tourist industry in the territory. This not only puts pressure on the rich wildlife of the islands (already threatened by other factors), but also risks having negative feedback effects on the tourists, attracted in large part by the very qualities which are being jeopardised.

Although efforts are being made to reconcile development with environmental protection through the concept of integrated planning, the prescription of EIA and through a programme of designating protected areas, this has not been sufficient to halt or reverse the environmental degradation.

The three most characteristic marine habitats around the BVI, i.e. coral reefs, seagrass beds and mangrove wetlands, are all coming under multiple pressures. This leads to a whole chain of effects as shown in section 3.3 of the regional part of this report, and ultimately affects livelihoods and the physical and economic well-being of the islands. In particular:
- damage resulting directly by tourism: this includes mechanical breakage by scuba divers and snorkellers, damage caused by ships' anchors,
- overfishing, damage caused by fishing tackle;
- damage caused by pollution, particularly the pumping of sewage to sea; even treated sewage contains nutrients which result in increased algal growth harmful to coral. Water quality frequently fails to meet the standards used as a benchmark by the authorities;
- damage caused by sediments and turbidity, coral does not like sediment-rich waters, which can smother it. This sedimentation is caused by human activities, including dredging, clearance of mangrove forest, sand removal from beaches, shoreline building, etc;
- storm damage (likely to become more intense and frequent in the future).

Coral reefs protect the seagrass beds lying on their shoreward side, so their degradation can adversely affect the seagrass. The seagrass has also suffered physical removal, siltation and turbidity. Over 90 percent of the BVI's 380 sq km of reefs are considered threatened by human activities (Burke *et al, 2004*).

Many mangrove areas are already severely stressed and are facing increased development pressures. The public often regard these areas as useless swamp land with little useful function. The Conservation & Fisheries Department is trying to change this perception through a public education programme in the schools and community. Reclamation is the major threat facing mangroves in the BVI. Mangroves are also used as garbage dumps and they suffer from land based pollution. Mangroves are very vulnerable to hurricanes, as was seen during Hurricane Hugo in 1989 when considerable areas of mangroves were damaged. However, this hurricane also showed how in places mangroves protected low lying land from more severe damage.

Commercial and recreational fishing have had a substantial impact. All commercially important species appear to be overfished - particularly conch, spiny lobster, and most species of groupers and snappers.

A number of marine protected areas have been declared, but active management is limited. Neither the National Parks Trust nor the Conservation and Fisheries Department have the resources or the legal mandate to control activities in the protected areas. However, the NPT is in the process of creating a

proposed network of MPAs that would protect 30% of each habitat type in the BVI, in addition to expanding the number of marine managed areas within the territory.

**Challenge 2 Climate change SEVERE**
Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of the BVI.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ◐ | Anegada is the most immediate island at risk as it is entirely low-lying land, but there is also a lot of reclaimed land along the southern coast of Tortola which is at sea level and is important economically as it contains the main business district. The potential loss of beaches is a serious threat for the tourist industry, however. There are also many hotels, marinas and other tourism developments along the coast which would be impacted by inundation. |
| Stressed fisheries | ◐ | Fishing is predominantly artisanal with some pelagic long-line fisheries and recreational fisheries for tourism (including sport fishing). |
| Coral reefs threatened (bleaching, decreasing pH) | ● | Islands ringed by coral reefs, presently still in reasonable condition, but already subject to multiple threats. Coral bleaching events are becoming more frequent and much more severe. In 2005 a major bleaching event began in September and October with sea surface temperatures of 30°C throughout the depth range of reefs. This is the warmest temperature ever recorded for the northeast Caribbean region and resulted in almost 90% of the BVI reefs being bleached with a total loss of 35% of corals in the BVI. |
| Damage to mangroves | ● | Extensive mangroves occur particularly on Anegada, but there are also large continuous mangrove stands in Tortola, Virgin Gorda and Jost Van Dyke. |
| Salinisation of groundwater | ◐ | There is some use of brackish water from shoreline wells and alluvial well fields |
| Tourist industry | ● | Tourist industry accounts for 45% of GDP. Reef tourism and fishing are important attractions. |
| More frequent and more intense storms | ● | This poses a severe threat; the BVI lie within the Caribbean hurricane zone. |
| ○ Nil ◔ Slight ◐ Moderate ● Heavy | | |

The BVI are particularly vulnerable to the threat of global warming given their dependence on the tourist industry. The islands are very extensively fringed by coral reefs, which are a crucial component in the delicate ecosystem found there, are very important as a tourist attraction and therefore to livelihoods on the island, as a spawning ground for fish and as a natural buffer area protecting the islands from sea damage during storms. Damage to seagrass and mangroves means further destruction of fish spawning grounds and a further loss of protection from the sea. Climate change also poses a threat to BVI beaches. An increased frequency and intensity of hurricanes is also a major concern.

**Challenge 3 Conserving BVI's endangered wildlife MODERATE**
In the context of its obligations to preserve its biodiversity, there is particular concern for a number of species. The Anegada Rock Iguana, for example, is only found on Anegada and is 'critically endangered'. Two of the major threats to the species survival are habitat loss and predation of juveniles by feral cats. The National Parks Trust has constructed a headstart facility that houses between 60 to 90 juvenile iguanas until they are large enough to defend themselves against predators. The facility gives the young

iguanas an opportunity to grow to a size where they can have a better possibility of surviving in the wild. However the threats continue and the National Parks Trust is continuing to develop a proposed protected area in collaboration with the Anegada community.

Roseate flamingos which were once numerous on Anegada were hunted to extinction from the island over 50 years ago. During the 1990s the National Parks Trust reintroduced these birds onto the island, and these have been breeding successfully.

The main threats facing the birds and wildlife of Anegada are habitat loss and fragmentation through development, and introduced predators. Historically, hunting was a serious issue and was responsible for the elimination of the Greater Flamingo, the West Indian Whistling-duck and the Whitecrowned Pigeon. In addition, cats, rats, mongooses, dogs and pigs can disrupt the breeding of ground-nesting birds.

*Other environmental problems*
1. Erosion and sedimentation. The steep slopes on most of the islands, coupled with inappropriate building, road cutting and development which extends up the steep hillsides and does not mitigate against erosion, are causing sedimentation of nearshore waters. During significant rainfall events large quantities of silt are washed into the coastal waters, causing high turbidity and smothering seagrass beds and coral reefs.
2. Oil spills. During the time that spill data has been collected, the BVI averaged a total of 9 spills per year with the greatest number taking place in 1999.

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

The Conservation & Fisheries Department (CFD) soon to be renamed the *Department of Environment & Fisheries (DEF)*, is part of the Ministry of Natural Resources and Labour (MNR&L), and has overall responsibility for environmental protection, nature conservation and fisheries. The Department includes a Fisheries Unit, an Environment Unit an Environment Education Unit and a GIS Unit. These Units carry out a range of functions including:

- routine and *ad hoc* environmental assessment and monitoring programmes;
- water quality measurement and monitoring;
- public awareness raising;
- advice on environmental policy and legislation;
- maintenance of a database as a tool for environmental decision-makers;
- development, in consultation with fishermen, of sustainable fishery management strategies;

Source: Bareboats BVI. Jost Van Dyke with hurricane passing to the North

The DEF has a total staff of 56 full-time employees and an annual budget of about €1.2 million (2006).

The BVI National Parks Trust (NPT) is a non-profit, statutory body, established in 1961 by the BVI government to preserve the natural beauty and historic features of the territory. It currently manages 20 national parks (including offshore islands such as Great Tobago and The Dogs) and designated marine and terrestrial protected areas. The work includes preservation of all flora and fauna within the parks, maintenance, upgrading of trails and picnic sites and scientific research. Each park will have a Management Plan outlining how it is to be developed, as required by the National Parks Act 2006. The NPT receives an annual subvention from the government, has a staff of 32, and currently manages a total area (land and sea) of 765 ha (1,889.6 acres). It also operates programmes for biodiversity conservation (plant assessment, iguana rehabilitation, flamingo reintroduction), marine conservation (mooring buoy

programme, coral monitoring, environmental education), historical preservation (historical sites assessment and stabilisation) and terrestrial parks management (provision of trails, visitor facilities, interpretation).

There is a *Department of Disaster Management* (DDM) within the Deputy Governor's Office which is responsible for and administers the territory's disaster management programme. This includes community preparedness, mitigation measures and recovery coordination. The BVI Government created a National Disaster Plan in 1997 and established an emergency response team that includes medical staff, the police, fire and rescue officers, Virgin Islands Search and Rescue (VISAR) and the Department of Disaster Management (DDM). Emergency shelters were created throughout the BVI to provide a safe alternative for residents living in disaster prone areas. The Department has a staff of 11 persons.

*Development and economic planning* is the task of the Development Planning Unit (DPU) within the Ministry of Finance and Economic Development. Development applications are also reviewed and discussed by the Planning Authority, a committee of 11 persons from the private and public sectors and, where they relate to the seabed, the Technical Review Committee. Tourism is the responsibility of the Chief Minister's Office. Physical planning functions are carried out by the Town & Country Planning Department

Only one significant *NGO* operates in the BVI, the US-based Island Resources Foundation, active in a number of conservation projects.

## 3.2 Mechanisms for integrating environment into development

The Environment Charter (see section 3.3), signed by the UK government and the BVI government in September 2001, includes a commitment of the latter to ensure that environmental considerations are integrated within social and economic planning processes, and that sustainable patterns of production and consumption are promoted within the Territory.

The National Integrated Development Strategy (NIDS) provides for environmental concerns to be included into social and economic planning, but this is not yet fully implemented. The law now requires EIA for major development projects/applications, and includes full public consultation.

## 3.3 Environmental strategy and policy

The territory has for many years had a policy to establish a network of protected nature conservation areas, particularly in the marine environment. The first system plan for parks and protected areas in the BVI was prepared in 1981, with the assistance of the Eastern Caribbean Natural Areas Management Programme (ECNAMP). ECNAMP also assisted with the preparation of the second report in 1986. More recently, the system plan has been updated with assistance from the Island Resources Foundation in 2006 to ensure a comprehensive network of national parks, marine parks, fisheries protected areas, water conservation areas, bird sanctuaries and forestry reserves. Once completed, this updated plan must be approved by the BVI Government.

Subsequent work on the revision of the policy framework for protected areas management led to the development of the National Parks Act 2006, which replaced the National Parks Ordinance (1961).

Instruments which are important in driving environmental policy forwards are the various multilateral environmental agreements (MEAs) with which the BVI are associated (see 4.1) and the Environmental Charter, signed jointly with the UK in 2001. The Environment Charter contains a statement by both the government of the CI and the UK government of their commitments in relation to the environment. Progress is being made by the CI on many of its Charter commitments, but this has not yet been formalised in terms of an implementation plan.

The development of BVI during 2002-2006 is guided by the National Integrated Development Strategy (NIDS). All Govt departments, the private sector and the community were involved in the development and review of this strategic plan

Work has been carried out on a National Environmental Action Plan, but it has not yet been formally approved.

There is no formally approved development plan for the BVI, although development proposals require approval. In general any site may be developed for almost any purpose, provided certain rules are observed with respect to building height, density setbacks, car parking provisions, water supply, sewage and waste disposal, etc. There is no land-use zoning, so government has little influence over the distribution or type of development occurring. The capital of Road Town is the major centre of economic activity in the territory and has received the most attention in land use planning, with the Road Town Master Plan of 1970 and the 1972 Wickhams Cay Master Plan.

## 3.4 Policy instruments

The legislation most relevant to environmental protection in the BVI is indicated in the table below.

| Item of legislation | Comments / detail |
|---|---|
| Virgin Islands National Parks and Protected Areas Act, 2005 | Provides for the designation of protected areas (terrestrial or marine) and species. These include fishing priority areas (where regulated fishing is permitted), fisheries protected areas (no fishing or harvesting of marine life, limited recreational activities), forest parks and bird sanctuaries. The Act also addresses a number of usage issues, including rules for use, permits and permit fees. |
| Virgin Islands Physical Planning Act, 2004 | Regulates planning and construction permits, EIA and SEA (strategic environmental assessment) |
| Virgin Islands Fisheries Act, 1997 | Regulates fisheries activities throughout the islands. Implemented through the Fisheries Management Plan for BVI, 1998 |
| Virgin Islands Fisheries Regulations, 2003 | Provision for protection of marine habitat. For example makes provision for persons to pay penalty for contaminating the marine environment with oil. |
| Merchant Shipping (Oil Pollution) (Virgin Islands) Order 1997 | |
| The Taking of Marine Products Order of 1991 | Prohibits the taking of any marine product using scuba gear and also prohibits spear-fishing on the Horseshoe Reef. |
| Derelict Motor Vehicle Act, 2000 | Makes provision for automobile owners to pay a fee for the eventual disposal of their vehicles at end-of-life. |

The Department of Environment & Fisheries has developed a Coastal Resource Information System (CRIS) based on GIS, as a decision-making tool. CRIS includes data on the status of coral reefs, mangrove and seagrass stands, sedimentation, marine water quality, beach profiles, biodiversity (sightings of whales, turtles, or sea birds nesting), solid and liquid waste, fish stocks, oil spills. Data layers pertaining to the environment have been created by the Department of Environment and Fisheries, in addition to the BVI National Parks Trust and are shared throughout the Government through the National GIS network.

Environmental Sensitivity Index (ESI) maps are an integral component of hazardous event and hazardous material response planning. One of the primary uses of these maps are to help in the assessment of an oil spill and its possible impact on the coastal environment. The maps can help identify the critical areas for shoreline cleanup activities.

## 3.5 Monitoring

*Water quality* is regularly monitored at a number of locations around the BVI coasts. The parameters measured include: coliforms, dissolved oxygen, nitrate, nitrite, nutrients (phosphorous) and algae,

particulate matter, pH, temperature. These are compared with standards set by the US EPA. A number of *turtle monitoring* projects have been carried out by CFD, many in association with international agencies, involving monitoring at nesting sites, tagging and tracking and sightings data. The CFD monitors *seagrass* twice a year at seven sites around the BVI. At each site, densities of each type of grass are recorded along with algal densities and overall health. Deterioration has been recorded at several sites since monitoring commenced, due to run-off and sewage. Beach wardens who collect litter at 20 accessible beaches in BVI monitor the conditions of *beaches*, amount of litter collected, numbers of users and illegal activities observed. The state of the territory's *forests* are monitored by the CFD and the NPT.

### 3.6 Enforcement

Although legislation provides in some cases for sanctions when regulations are violated, these are rarely invoked. Full enforcement of legislation is hindered by the lack of adequate facilities and manpower.

## 4. International cooperation

### 4.1 MEAs

The BVI participates in the following MEAs:

| MEA | Remarks |
|---|---|
| Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | Extended to BVI in October 1987, including the Oil Spills Protocol. The Specially Protected Areas and Wildlife (SPAW) Protocol entered into force in 2000, but has not yet been ratified by the UK. |
| Convention on Biological Diversity (CBD) | Extended to BVI in June 1994 A biodiversity action plan has not yet been developed. Such a plan was developed for Anegada as part of a Darwin Initiative Project but has not been formally approved. |
| Ramsar Convention | Extended to BVI in 1991. One site (Western Salt Ponds of Anegada) formally approved to date, but Ramsar Information Sheets have been submitted for two other sites (Anegada Eastern Ponds and The Horseshoe Reef, Fat Hogs and Bar Bays). |
| CITES | Became effective in October 1976. |
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) | There is some confusion as to whether or not the UK is satisfying its obligations under this Convention with respect to the legal harvests of marine turtles in British Virgin Islands, Cayman Islands, Montserrat and the Turks and Caicos Islands. These legal harvests involve commercial trade of marine turtles that may or may not qualify as accommodating 'the needs of traditional subsistence users' (undefined in the Convention). |
| London Convention | Became effective in December 1975. |
| United Nations Convention on the Law of the Sea (UNCLOS111) | |
| FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas | |

The BVI has adopted the FAO Code of Conduct for Responsible Fisheries.

### 4.2 Access to funding by the international community for environmental and environment-related projects

*European Union*
The total aid provided for the BVI under the 6th to 8th EDFs was €5 million (of which €1 million unspent), through the Territorial Indicative Programmes. These were not generally environmental projects, however.

The BVI were not eligible for the 9th EDF as they exceeded the GDP per capita threshold. However, €1 million carried over from previous EDFs remains to be spent.

*UK*
Recent environmental projects funded include:
- biodiversity research on Anegada, gathering data on birds, marine turtles and plants, and
- funding of BVI CD atlas: environmental data are being compiled for use with the BVI GIS system by schools to support the geography curriculum.

*Others*
The OECS is working with the CFD on the digital mapping of BVI's coastal resources: seagrass, mangroves and coral.

### 4.3 Other international cooperation, membership of networks, etc. related to the environment (or environmentally sensitive sectors)

The BVI are a regional member of the Caribbean Development Bank and an associate member of UNEP, of the Caribbean Community and Common Market (CARICOM) and the Organisation of Eastern Caribbean States (OECS), where they participate only in the areas of functional cooperation and not in the common markets or foreign affairs committees. The BVI has signed the OECS St George's Declaration of Principles for Environmental Sustainability. The BVI are also associated with ECLAC (Economic Commission for Latin American and Caribbean States ) and affiliated with ILPES (Latin American and Caribbean Planning Institute) and CFTC (Commonwealth Fund for technical co-operation). In the area of health, the BVI are a member of PAHO (Pan American Health Organization)

Following an oil spill near Tortola in March 2004 affecting over 1.6 km of coastline, the BVI signed a memorandum of understanding with the US in August 2004 to respond efficiently in the event of a major discharge of oil or other hazardous substance near the islands. The agreement applies in the waters of the BVI and the US Virgin Islands.

In the field of fisheries, the BVI are a member of the International Commission for the Conservation of Atlantic Tuna (since 2001) and the Caribbean Regional Fishery Mechanism (full membership pending).

## 5. Conclusions and Recommendations

The British Virgin Islands are seeking to strike a balance between using the beauty and richness of their natural resources as a tourist attraction while limiting the environmental pressures and degradation which tourism entails. The survival of the island ecosystems is a precondition not only for the health of the tourism industry but the well-being of the islands as a whole. Tourism is such a major part of the BVI economy that sustainable development means sustainable tourism. Success in finding the balance will only come if the islands ensure their tourist industry is truly sustainable.

Recommended areas for cooperation between the BVI and the EU are as follows:
1. Support in ensuring habitat protection legislation is fully implemented and enforced so as to give adequate protection to the key wildlife and habitats, including EIA and the protection of national parks.

2. Encourage the territory to link up with and participate in other sustainable tourism initiatives in the region.

3. Support in fully implementing the MEAs which have been extended to the BVI. Most of the legislative instruments needed for this are already in place, but management plans need to be drawn up which comply with the relevant MEAs.

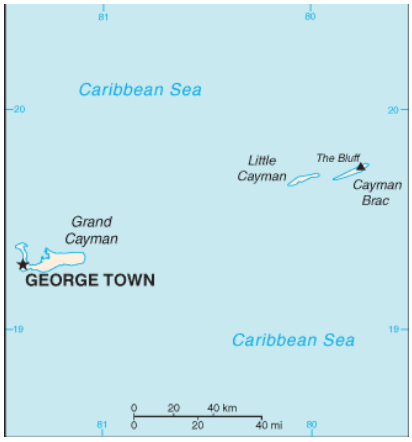
# ANNEX D: ENVIRONMENTAL PROFILE -

# CAIMAN ISLANDS

## 0. Summary

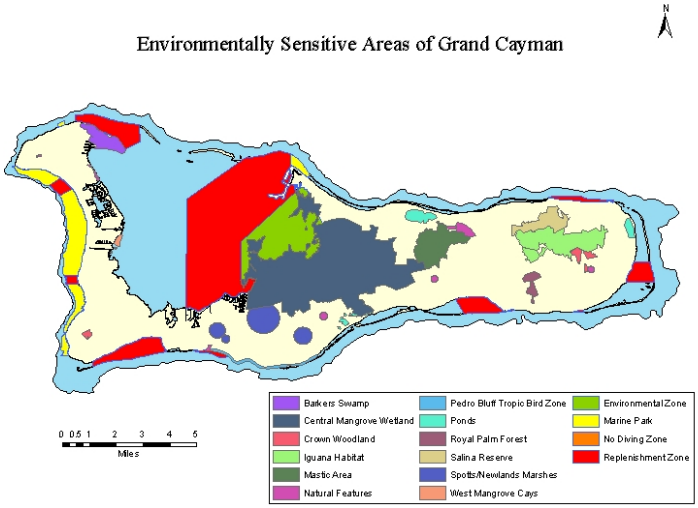
The natural environment of the Cayman Islands is under considerable pressure from rapid and poorly planned physical development and accompanying population growth. These pressures are exacerbated by the unprecedented growth in cruise ship tourism. The features of outstanding natural beauty not only contribute to the quality of life of these islands' residents but are also vital for tourism. Continued prosperity and well-being of the islands will depend amongst other factors on the careful nurture and protection of their vital ecosystems, particularly coral reefs and mangrove wetlands and the adoption of measures to enhance their resilience and adaptation to the consequences of climate change and severe meteorological events.

## 1. Background information





Source: UK Govt, 1999
The Cayman Islands in the Caribbean




Source: DOE, Cayman Islands Government

### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Cayman Islands |
| Region | Caribbean |
| Land area | 262 $km^2$ |
| Exclusive economic zone | territorial sea: 12 nm<br>exclusive fishing zone: 200 nm |
| Population | 52,000 (growing at 2.6%/year). Inward migration 18/1000/yr (2006, est.) |
| GDP/capita | $32,300 (2004 est.) |
| Literacy rate | (defined here as >15 years old, ever been to school) 98% |
| Unemployment rate | 4.1% (1997) |
| % below poverty line | Not available |

## 1.2 Constitution

Cayman Islands is an overseas territory of the UK. The head of state is the queen, who is represented by a governor appointed by the monarch. The head of government is the Leader of Government Business. The executive body is the Cabinet, of which 3 members are appointed by the governor and five by the legislative assembly. Following legislative elections, the leader of the majority party or coalition is appointed Leader of Government Business by the governor. There is a unicameral Legislative Assembly comprising 18 seats (3 appointed by the Governor and 15 elected by popular vote).

The Cayman Islands were administered from Jamaica after 1863. In 1959, the islands became a territory within the Federation of the West Indies, but on its dissolution in 1962, the Cayman Islands chose to remain a British dependency. The law is based on English common law and locally enacted statutes.

## 1.3 Physical geography

The three Cayman Islands are emergent along a submarine ridge south of Cuba, west of Jamaica. The population is centred in Grand Cayman. The Cayman Trench is more than 6 km deep and is located 6 km to the south. Each island is formed by a central core of older bluff limestone from the Oligocene-Miocene period and a surrounding coastal limestone terrace formed of consolidated coral, mollusc shells and unconsolidated (marl) from the Pleistocene period. Their narrow insular shelves support prolific coral reef communities. Grand Cayman is the largest of the three Islands, with an area of 197 $km^2$. The terrain is generally low-lying, with the exception of a massive limestone bluff on Cayman Brac, rising 43 m above sea-level. The highest point on Grand Cayman is the municipal 'landfill' which now rises to a height of 30 m. Many developed areas lie at little more than 1 m above sea-level. Grand Cayman and Little Cayman are almost completely surrounded by living coral reefs.

Grand Cayman has a unique geomorphology, with a large central swamp, measuring 50 $km^2$ (see map). The North Sound is an 85 $km^2$, semi-enclosed, shallow lagoon, fringed by coastal development on the west, mangroves to the south and east, and an exposed fringing coral reef to the north. Approximately 60% of the sound is covered by well developed beds of turtle grass.

The porosity of the rock means that there are few natural fresh water resources. The climate is tropical marine, with warm, rainy summers and cool, relatively dry winters.

## 1.4 Flora and fauna

Dominant vegetation types comprise subtropical dry forests and mangrove wetlands,. More than 180 species of birds have been identified in Cayman which is an important stop-over for migrating species. Common species include the Antillean Grackle, the Smooth-billed Ani, many species of heron and the Snowy Egret, Ground Doves, Bananaquits and Cayman Parrots, Cayman's national birds. The bird population was decimated by hurricane Ivan.

Bats are the only surviving native mammals on Cayman. However, mice, rats, cats, dogs, and agoutis are naturalized/invasive on the islands.

Large mahogany trees were once common in the dry forests, however exploitation has removed all the large trees. Native forests are threatened by land clearance and invasive species including logwood, casuarinas, wild tamarind and scaevola. Only 4% of the land is arable. Common fruit trees include breadfruit, papaya, bananas, citrus, mango and naseberry .

Remnants of the once large green turtle population (for which the Islands were once named Las Tortugas) are still found in the surrounding seas. Traditional licensed turtle fishermen are allowed, under the Marine Conservation Law, to take 6 per year in season, for local consumption only. The government-owned Cayman Turtle Farm breeds the green turtle and markets turtle meat locally.

Endemic species and subspecies include 16 birds, 18 reptiles, 28 plants, 1 bat, 1 marine fish, 2 freshwater fish, at least 40 insects (probably many more),

### 1.5 Demography, socio-economy

The population, has grown very rapidly in recent decades, from 17,000 in 1979 to over 52,000 today. High net immigration has contributed to this. As a consequence the proportion of Caymanians in the population is 61% today.

The Cayman Islands enjoy a high standard of living. After a period of economic buoyancy in the 1990s, growth has been slower. The islands are renowned worldwide as a diving and snorkelling destination. The tourist industry attracts about 1.8 million cruise arrivals (2005). The number of stay-over visitors has declined from a maximum of 354,000 in 2000 to 260,000 pre-hurricane Ivan. The islands are also a thriving offshore financial centre. Nearly 75,000 companies and 7000 mutual funds were registered in the Cayman Islands as of 2005, including almost 432 banks. About 90% of the islands' food and consumer goods must be imported. The Cayman Islands Government has never depended on the British Government for its recurrent budget, and all aid for capital projects ceased over 18 years ago.

The principal sources of government revenue are import duties, company, bank and trust licence fees and stamp duties. There is no direct taxation, estate or excise duty. Although imports outstrip exports by about 100:1, the visible trade gap is more than offset by earnings from tourism and financial services.

## 2. Main environmental challenges

### 2.1 Overview of the state of the Cayman Islands environment

The characteristic marine and wetland systems of Cayman - fringing coral reefs, sea grass beds and mangroves provide many ecological and economic services to the islands: they all provide a habitat and breeding grounds for many types of marine life. Coral reefs and mangroves protect the islands from storms and erosion. Reefs also have a role in the sand budget and beach maintenance. Sea-grass encourages settlement of sediment thereby protecting the reefs and provides a nursery for many fish species.

High economic and population growth and the rapidly expanding tourist industry have taken some toll on these systems. Ongoing deforestation threatens mangrove wetlands and ancient dry forests on all three islands. There has been large-scale clearance of mangroves and other wetlands for tourist development, especially along the western peninsula of Grand Cayman . Beach erosion in association with coastal development is a matter of ongoing and growing significance.

Despite an exemplary policy of designating and regulating marine protected areas, there has been some degradation of the islands' coral reefs resulting from over-use of the resource by divers, fishing pressure, anchor damage and bleaching events. There is currently no established system for designating and regulating terrestrial protected areas.

Drinkable groundwater is scarce on Cayman. The traditional methods of water supply in the Cayman Islands were by wells and roof catchment cisterns. These are still prevalent, but water is now being desalinated on a large scale and distributed by pipeline and road. A central sewerage treatment plant serves the main tourist hotel area of Seven Mile Beach and the majority of communities on Grand Cayman. Sewage treatment and disposal is carried out on a site-by-site basis, utilising septic tanks with deep well injection or soakaway fields in areas where piped sewerage does not yet exist. Developments of a certain size are required to operate on-site treatment plants. Given the porosity of the bedrock, the efficiency of some of these systems is questionable, and may be causing high levels of nutrients to be discharged to sea. Adequate toilet facilities are available to 99.5% of the population.

The islands generate 50,000 tonnes of solid waste per year, this relatively high (per capita) figure being partly due to the size of the tourist industry. The government-managed landfills on each of the three islands, constitute the only legal disposal sites however the territory has inadequate waste facilities, and the landfill site on Grand Cayman is almost full. On Grand Cayman solid waste is collected at least three days per week. The Department of Environmental Health has been working with businesses and civic groups to initiate recycling programmes, and has succeeded in reducing the total waste stream by 10%. Cost is a critical factor and all materials must be shipped elsewhere. . For higher-value materials like aluminium and some plastics, recycling is cost-effective. However, the cost of processing and shipping materials like glass which does not have a high scrap value makes recycling unfeasible. Since Hurricane Ivan no recycling initiatives have resumed.

## 2.2 Main challenges

The main environmental challenges faced by the Cayman Islands are the following (some interrelated):

- Pressures on the Cayman Islands' habitats and biodiversity
- Invasive species
- Climate Change / Sea Level Rise
- Natural and Environmental Disasters
- Waste management

**Challenge 1 Pressures on the Cayman Islands' habitats and biodiversity SEVERE**

The three most typical marine habitats around Cayman, the coral reefs, sea-grass beds and mangrove wetlands, are all coming under pressures quite apart from those mentioned under challenge 1 - climate change. This leads to a whole chain of effects as shown in section 3.3 of the regional part of this report, ultimately affecting livelihoods and the physical and economic well-being of the islands. In particular:

Coral reefs are subjected to:

- damage resulting directly by tourism: this includes mechanical breakage by scuba divers and snorkellers;
- damage caused by ships' anchors;
- damage caused by fishing tackle;
- damage caused by pollution; even treated sewage contains nutrients which result in increased algal growth harmful to coral;
- damage caused by bleaching events and disease;
- turbidity caused by human activities, including dredging, clearance of mangrove forest, sand removal from beaches, shoreline building, etc; coral is severely stressed by sediment-rich waters; and
- storm damage (likely to become more intense and frequent in the future).

Coral reefs protect the sea-grass beds lying on their shoreward side, so their degradation can adversely affect the sea-grass. The sea-grass beds have suffered as a result of physical removal, siltation and turbidity.

Mangroves continue to be cleared and drained for construction and development due to inadequate planning and conservation legislation..

Terrestrial habitats are also undergoing loss and fragmentation as a result of expansion of residential / commercial areas and infrastructure. Non-native species are establishing rapidly and impeding the recovery of native species in disturbed areas, especially in beach areas. Lack of comprehensive national conservation legislation and effective planning regime precludes the use of tools such as establishment of a system of terrestrial protected areas, EIA and other mechanisms which could be used to mitigate the challenge of habitat and biodiversity loss.

There is a proposed plan to construct a road corridor through the southern Central Mangrove Wetland and Southern Portion of the Salina wilderness /Mastic walking trail.

There are linkages between the threats to ecosystems from anthropogenic sources and natural disasters. These threats can be synergetic. The typical pattern of environmental breakdown in the Caribbean is not a steady, even progression: it is the gradual accumulation of small injuries and changes which increasingly compromise the ability of natural systems to respond, but which result in no immediate deterioration in system functioning until the area is hammered by a major disaster. Then, the host systems are unable to recover, and the previous condition is rapidly succeeded by a new regime or ecosystem that is less resilient, less diverse, and less able to provide environmental services such as water purification or sediment trapping.

The authorities are developing policies to counteract the threats. The Department of Environment and the National Trust of the Cayman Islands are working to establish a network of protected areas rich in biodiversity. The National Trust owns approximately 800 hectares of land which is protected in perpetuity for the people of the Cayman Islands under the Trust Law. Environmental protection is increasingly being mainstreamed into policy-making. The question is whether the policy response will be sufficient to halt gradual but steady environmental degradation.

**Challenge 2 Invasive Species SEVERE**

JNCC Report No. 372 by Karen Varnham lists over 110 invasive / naturalised flora and fauna known in the Cayman Islands. Since completion of this report, Pink Hibiscus Mealy bug has been recognised in Grand Cayman.

DoE is currently assisting in several research initiatives geared to addressing key conservation concerns associated with Invasive species:

1. Proposed research projects to investigate origin / hybridization of local freshwater turtles Hickatees *Trachemys decussate* with Red-eared Sliders *Trachemys scripta.*
2. Proposed research projects investigating the ecology and impact of *Iguana iguana* on local flora and fauna
3. Proposed research projects investigating the ecology and impact of Monk Parakeet *Myiopsitta monachus.*
4. Establishing a native plant nursery, to offer native trees and local *Scaevola plumieri* to the public, to encourage local landscaping
5. Supporting the National Trust's Blue Iguana Recovery Programme, which includes numerous aspects related to control of invasive species, including feral cats, dogs and Green iguana.

The most significant conservation issues associated with invasive species in the Cayman Islands are:

1. Shifting baselines and public attachment to invasive species, specifically feral chickens / cats / dogs, Whistling Pine *Casuarina equisetifolia*, *Scaevola sericea* (popular coastal landscaping plant), Green iguana *Iguana iguana*.
2. *Casuarina equisetifolia*, *Scaevola sericea*, Pink Hibiscus Mealy bug *Maconellicoccus hirsutus*, Mahogany shoot-borer *Hypsipyla grandella* and *Iguana iguana* are probably our highest priority invasive species requiring management action.
3. Loss of coastal vegetation and coastal habitat to invasive *Casuarina equisetifolia*, *Scaevola sericea*.
4. Damage to flora (native and non-native) from *Maconellicoccus hirsutus* (control efforts under the remit of Dept. Agriculture).
5. Failure of recruitment of Cedar *Cedrela odorata* due to infestation by Mahogany shoot-borer *Hypsipyla grandella*.
6. Impact of predation of feral cats and dogs on the critically endangered Grand Cayman Blue Iguana *Cyclura lewisi,* and public confusion with *Iguana iguana*.
7. Importation of invasive species into Cayman in imported aggregate.

Public awareness raising is an established key component of effective management response:

1. The DoE is currently raising awareness of the issues of specific invasive species through the Darwin Initiative.
2. The National Trust for the Cayman Islands is currently promoting general appreciation of native species through its media campaign “Know Your Islands”.
3. There are no organisations on-island which feed / encourage feral cats/dogs – however there are some individuals which do so.
4. Public attachment to *Casuarina equisetifolia* probably represents the single largest conflict between public awareness and ecological damage.
5. Release of unwanted pets “into the wild” remains an issue.

Current infrastructure available to address issues associated with invasive species includes:

1. DoE incorporates a multi-disciplinary staff, with an operational / research capacity to provide functional base support to the implementation of priority conservation management and research projects.
2. DoE has established links with other stakeholders in invasive species control through the Darwin Initiative, including National Trust, DoA and the Humane Society.
3. The Cayman Islands Humane Society and Dept. Agriculture currently collect and neuter / control feral cats and dogs, and work to re-home suitable candidates.

Immediate associated conservation needs include:

1. Rat / cat eradication on Little Cayman, towards preserving the Little Cayman Rock Iguana *Cyclura nubila caymanensis*. This would require effective public relations work, site assessment, and awareness-building towards local stakeholder alignment, backed up be effective practical application. Cayman has the capacity for long-term monitoring / management following a successful control, towards ensuring long-term sustainability of such a project.
2. Assessment and implementation of methods for cat / dog control on Grand Cayman, towards preservation of the Grand Cayman Blue Iguana *Cyclura lewisi*, and establishment of a protected area dedicated to supporting a self-sustaining population.
3. General awareness raising of the ecological impact of key invasive species, coupled with awareness raising of the unique and endangered nature of many of Cayman’s native flora and fauna.
4. Accessible information on projects implemented in the past, to control the specific invasive species mentioned above in the Caribbean region, and the reasons for their success / failure.
5. Expansion of capacity of spay and neuter program for cats and dogs
6. Conservation Control research and management of Green Iguana *Iguana iguana* population.

Coastal conservation programme targeting removal of *Casuarina equisetifolia* and *Scaevola sericea*, combined with habitat restoration through planting of head-started native plants and trees.

**Challenge 3 Climate change SEVERE**

Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of the Cayman Islands.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ● | The Cayman Islands are very low-lying, so correspondingly high risk. The potential loss of beaches is a serious threat for the tourism and construction industries, and turtle nesting populations. |
| Stressed fisheries | O | Commercial fishing not very important to Cayman’s economy. Sport fishing is important to tourist industry, however |
| Coral reefs threatened (bleaching, decreasing pH) | ● | Islands ringed by coral reefs, presently in reasonable condition. Past bleaching events has resulted in up to 10% mortality around Grand Cayman. |

| Impact | Sev-erity | Comments |
|---|---|---|
| Damage to mangroves | ● | Extensive mangroves occur on the islands, however rapid clearance and reclamation due to development pressures. |
| Submergence, silting of sea-grass beds | ● | Extensive beds of turtle grass in shallow lagoons around the islands |
| Salinisation of groundwater | ◐ | Island has limited groundwater resources |
| Tourist industry | ● | Tourist industry accounts for 70% of GDP. Reef tourism and angling are important attractions. |
| More frequent and more intense storms | ● | Cayman lies within the Caribbean hurricane zone, with a lot of development on the low shoreline. Very disruptive to tourist industry |
| ○ Nil ◔ Slight ◐ Moderate ● Heavy | | |

The Cayman Islands are particularly vulnerable to the challenge of global warming. The fact that they are low-lying makes them particularly at risk from a rise in sea-level.

The islands are very extensively fringed by coral reefs, which are a crucial component in the delicate ecosystem found there, are very important as a tourist attraction and therefore to livelihoods on the island, as a spawning ground for fish and as a natural buffer area protecting the islands from sea damage during storms. Damage to seagrass and mangroves means further destruction of fish spawning grounds and a further loss of protection from the sea.

Hurricanes already constitute a major threat to the island (see below). In 2004 Hurricane Ivan passed close to the islands, caused damage estimated at twice annual GDP and disrupted the tourist industry (temporary closure of hotels, etc.). An increased frequency of hurricanes would be a major concern.

**Challenge 4 Natural disasters SEVERE**

The Cayman Islands are subject to natural disasters. The highest visibility threat is from hurricanes. But the islands are also exposed to threats from earthquakes and tsunamis.

*Hurricanes*
The territory is brushed or hit by a hurricane or tropical storm on average every 2.2 years, and suffers a direct hurricane hit every 9.6 years (http://www.hurricanecity.com). In 2004 the islands were hit by Hurricane Ivan with 250 kph winds and a storm surge of 2-3 metres reported, causing damage estimated at € 3000 million. Some interesting findings emerged from research carried out after the event (Young, 2005, Young and Gibbs, 2005):

- It was because of the generally high standard of built infrastructure, especially shelter accommodation and other critical infrastructure, and a well developed disaster planning (provision of refuges, disaster response plan) that loss of life and injuries were kept so low (only 2 deaths). Effective disaster management was not so successful at reducing economic damage.
- A new building code (based on the US SBCCI) was introduced some years before the event. Buildings constructed according to the code withstood the hurricane fairly well. Older buildings suffered more damage.
- The greatest damage was caused not by wind but by water (storm surge leading to flooding, wave action). Some of this was related to siting issues.
- The role of coral reefs in protecting the coastline from breaking waves was clearly demonstrated; the small breaks in reef protection along the south coast of Grand Cayman exactly coincided with the areas of wave destruction.
- Although Ivan was a severe category 4 hurricane, this was by no means a worst case scenario. If the storm had passed across the eastern side of the island the strongest winds would have blown onshore on the heavily developed west coast; without shallow reef protection, surge and especially wave damage would have been far more destructive.

*Earthquakes*
The islands are located on a boundary between the North American and Caribbean tectonic plates. In 2004 a short earthquake occurred measuring 6.8 Richter. Mass casualty drills are regularly held.

*Tsunamis*
The Caribbean Sea region is geologically and tectonically active. Earthquakes and volcanoes are common occurrences. These geologic events can generate powerful tsunamis some of which are more devastating than the earthquake or volcanic eruption itself. During the last hundred years some 33 possible tsunamis have been reported, of which 17 are well documented and verified. Nearly all areas in the Caribbean have experienced a tsunami at some time in history. The last destructive tsunami in the Caribbean occurred in August 1946, when an earthquake and tsunami caused 75 fatalities and left 20,000 homeless (Lander *et al*, 2002).

In recent times these events have been relatively rare. Since the last major tsunami the coastal regions have greatly increased in population and development. Today tourism is a major industry that exposes thousands of non-residents to the possible catastrophic effects of a tsunami. These factors make the islands in this region much more vulnerable now than they were when the last major tsunami occurred, particularly in view of the low altitude of Cayman.

Although some Caribbean tsunamis come from across the Atlantic, most have their genesis within the region. Responding to locally generated tsunamis will be difficult because of the relatively short travel time of waves generated in trench or volcanic areas to nearby inhabited land: generally less than 30 minutes to an hour. This may be too short to allow effective early warning, and in this case preparedness might consist of making the local population aware that in the event of a strong earthquake, a sudden recession of the sea or strange sounds coming from the sea, the appropriate action to avoid possible danger is to move to high ground.

There is a National Oil Spill Contingency Plan.


**Source: Cayman NetNews. The George Town Landfill is 30m high in places**

**Challenge 5 Solid waste management MODERATE**

Although waste management in the Cayman Islands has been reasonably effective, the 22-hectare site in George Town, Grand Cayman, is now nearly full after 25 years in use,. Waste at the site now reaches a height of 30 metres in places, thereby making it the highest point on Grand Cayman. US consultants were commissioned in 2005 to prepare a study on waste management options for the territory. Their main finding was that it is "critical" that a new landfill be sited, permitted and constructed on Grand Cayman "as soon as possible". The difficulty encountered in many countries of finding a suitable site and gaining acceptance from nearby residents is also apparent here, and indeed exacerbated on this highly developed, ecologically sensitive island. Volumes are too low to make mass burn incineration viable at present. Market volatility and high shipping costs pose a challenge to the expansion of recycling in the territory, but, in-vessel and windrow composting could reduce volumes for landfill. Waste cannot be shipped to the US (quarantine law) or to other countries (Basel Convention). There is a significant volume of scrap metals and derelict vehicles stored at the landfill. There are plans to sell these metals soon thus freeing up space. The landfill site will also be re-organised to facilitate better operational capabilities. Hazardous wastes other than contaminated use oils are stored at the landfill sites in a controlled area; bio-medical and infectious waste is incinerated, but it is not known whether the technology used is properly controlled. There are occasional landfill fires on each of the three islands, yearly. The Department of Environmental Health has been monitoring the leachate from the landfill for many years, testing to EPA standards and all results have been within their acceptable limits.

The Grand Cayman  installation contains a large facility for dealing with the toxic ash remaining from the burning of debris left by hurricane Ivan. Presently an EIA is being conducted for a new installation on Cayman Brac.

Lead acid batteries, used oils and aluminium products are sent off island for recycling. The contaminated used (hazardous) oils are shipped off island for further processing or disposal.

Litter control continues to be an issue for the islands, especially on Grand Cayman due in part to the various customs of the mixed and growing population. There are also Litter laws, fines and public education as part of the control programmes. There are also several thousand derelict vehicles scattered throughout the islands from many years ago, along with a few remaining from Hurricane flood damage. It is expected that all of these old vehicles will be removed over the next year or two as part of a planned strategy.

During this fiscal year, a Solid Waste Management Strategic Committee is to be set up to examine the best suitable waste management and disposal strategies for the Cayman Islands. Additionally, the committee will discuss technologies other than traditional landfill methods.

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

The environment function falls within the portfolio of the Ministry of Tourism, Environment, Investment and Commerce. This Ministry includes amongst others the Department of Environment (DoE). The DoE is divided into three sections: Research & Assessment, Operations and Enforcement.

The Research and Assessment section has 11 people, and plans and implements research and monitoring programs on the environment and natural resources, assessing the environmental impacts of activities around the islands and recommending the appropriate action. It is also active in educational outreach and public information. The Operations staff (7 strong) are responsible for the maintenance of Marine Parks markers, signs, regulatory buoys and moorings for recreational vessels. The Enforcement section (9 people) is responsible for compliance with the Marine Conservation Law around the islands. It also provides information to the public on the regulations on Marine Parks and other natural resources.

The National Trust for the Cayman Islands (NT) is a non-profit, statutory body whose mission is to preserve natural environments and places of cultural and historical significance. It is also active in education, awareness-building and school campaigns. The NT carried out a biodiversity survey based on satellite images and fieldwork, which is now being updated through a Darwin Initiative grant awarded to the DoE and the University of Exeter. The National Trust also maintains a herbarium.

Trust nature reserves include the Booby Pond Nature Reserve on Little Cayman, a “Ramsar” site of international importance, home to 20,000 red-footed boobies, the Brac Parrot Reserve , the Salina Reserve, and some parcels in the targeted Mastic and Central Mangrove Wetland reserves on Grand Cayman. The Trust works also to preserve species like the endangered blue iguana, through a programme of captive breeding and restocking of protected habitat.

The DoE is responsible for protecting and managing the natural resources and environment of the Cayman Islands, which includes managing an extensive system of Marine Parks and work on sustainable harvest policies...The DoE also provides environmental management recommendations and sustainable development policy advice, and conducts environmental research, monitoring and assessment.

Both the DoE and the NTCI provide talks and educational materials on the importance of biodiversity. The Society for the Conservation and Study of Caribbean Birds and the Department of Education have produced the “*Wondrous West Indian Wetlands*” and Blue Iguana Recovery Programme educational programmes for schools. The DoE and other partners produced the “*Coral Gardens Teachers’ Guide,*” a

manual containing information and work plans to educate students on the coral reef, seagrass beds and mangrove ecosystems.

## 3.2 Mechanisms for integrating environment into development

The Environment Charter (see section 3.3), signed by the UK government and the government of the Cayman Islands in September 2001, includes a commitment of the CI government to ensure that environmental considerations are integrated within social and economic planning processes, and promote sustainable patterns of production and consumption within the Territory.

Vision 2008, the current national strategic development plan for the Cayman Islands, was completed in 1999 after extensive stakeholder consultation. Two strategies are intended to ensure nature conservation is integrated into development projects. Strategy 10 states "We will develop and implement a growth management plan to achieve and maintain a balance between the natural and built environment" and Strategy 11 states "We will protect our natural environment, particularly the Central Mangrove and other wetlands, the North Sound and coral reefs, from further development". The 1997 Development Plan for Grand Cayman is a planning statement document that outlines physical development within zones and includes reference to environmental and ecological considerations. Policy is translated into statute via the Development and Planning Law and Regulations, which include limited provisions for mangrove protection within the Mangrove Buffer Zone, but do not contain EIA provisions. The draft 2003 Development Plan for Grand Cayman has not been implemented and omitted the majority of recommendations made by the Environment and Coastal Zone Management Special Issue Committee[15], e.g. a workable EIA framework, open Central Planning Authority meetings, standard conditions for approval in areas of primary vegetation. Currently no physical development plans exist for the Sister Islands.

The draft National Conservation Legislation will introduce mandatory EIA for large projects, but has not yet been enacted by the legislative assembly. However despite the absence of a legislated EIA framework, an environmental report confined to the marine impacts associated with the construction of a proposed cruise ship facility in George Town Harbour is currently being prepared.

## 3.3 Environmental strategy and policy

The territory has for many years had a policy to establish a network of protected nature conservation areas, however only a system of marine parks has come to fruition leaving terrestrial environmental resources unprotected. Instruments which are important in driving environmental policy forwards are the various multilateral environmental agreements (MEAs) with which the Cayman Islands are associated (see 4.1) and the Environment Charter, signed jointly with the UK in 2001. The Environment Charter contains a statement by both the government of the CI and the UK government of their commitments in relation to the environment. Charter commitments have not yet been formalised in terms of an implementation plan.

On 27 August 2002 the Cabinet approved a National Environment Policy Framework developed to address commitments made in the Charter and MEAs in which the Cayman Islands participates. This outlines five broad goals and eight key strategies, with two of the agreed priorities being:

- the enactment of the National Conservation Legislation; and
- The establishment of a National System of Protected Areas, starting with the creation of Barkers National Park.

Both of these priority actions are still outstanding, and in fact the latter depends heavily on the former.

[15] The Environment and Coastal Zone Management SIC is a sub-committee of the Development Plan Review Committee established to administer the consultative review of the Development Plan, which is required by Law to be reviewed every 5 years.

The territory also has an Aggregates Policy Paper, approved by Cabinet on 26 July 2004, the purpose of which is to reduce natural resource loss from quarry operations whilst ensuring the continuing availability of building materials.

National Tourism Management Policy (NTMP) formulated in 2002 has as its overall goal for tourism to be a thriving and sustainable sector of the economy. It aims to accomplish this through nine key policy objectives, three of which are environment-focussed:

- adopt a sustainable approach to tourism development;
- protect and enhance the marine resources of the islands; and
- develop eco-tourism on the Sister Islands.

The establishment of terrestrial protected areas incorporated in the Development Plan and the need for impact assessments in the planning process are echoed in the NTMP. Sustainable tourism practices are encouraged through the endorsement of a proposed local initiative, Cayman Islands Environmental Project for the Tourism Sector (CEPTS), which is mirrored after the US AID-funded Environmental Audits for Sustainable Tourism (EAST) project in Jamaica that establishes environmental management systems in tourist accommodations leading to eventual Green Globe 21 certification. However, many of the mechanisms needed in order to meet the policy objectives have not been implemented.

## 3.4 Policy instruments

Relevant laws enacted include:

- **Animals Law** which protects wild birds including CI parrots, traditionally kept as pets;
- **Marine Conservation (Turtle Protection) Regulations** limit take of marine turtles by local fishermen;
- **Marine Conservation** legislation covering various culturally significant species: whelks, lobster, conch, etc.

Draft National Conservation Legislation has been in existence for a number of years, but is still awaiting enactment. It will serve to (i) establish the National Conservation Council, set out its roles and responsibilities and those of the Department of Environment, (ii) outline mechanisms for the designation and management of protected areas, (iii) set out procedures for the nomination, designation and conservation of protected species, (iv) regulate the introduction of non-indigenous or genetically altered species of flora and fauna, (v) establish statutory requirements for environmental impact assessments, (vi) establish a conservation fund, and (vii) set out detailed enforcement procedures and penalties for contravention of the provisions of the law..

In 1997 an Environmental Protection Fund was established by law in the Cayman Islands. The revenue of The fund's revenue is raised by means of a tax on departing tourists. It was originally intended that the Fund should assist with the acquisition land in environmentally sensitive areas, but it has been quite ineffective in this regard. It is envisaged that the National Conservation Law when enacted will provide for the proper creation and management of a fund for land purchase and environmental projects.

## 3.5 Monitoring

A variety of monitoring programmes is currently undertaken by the DoE, including:

- monitoring of water quality in George Town Harbour and North Sound in conjunction with the Water Authority-Cayman;
- the monitoring of mangrove, seagrass and coral reef systems as part of a regional programme for the Wider Caribbean in collaboration with the Caribbean Coastal Marine Productivity Centre (CARICOMP);
- long-term monitoring of coral reef resources on the three islands;
- incidence of coral diseases;
- studies of reproductive migrations and spatial ecology of Nassau grouper on the Little Cayman spawning aggregation;

- beach profile monitoring;
- the status of shallow water populations of queen conch in and out of the marine protected areas;
- sponge disease monitoring;
- marine turtle beach monitoring and marine turtle in-water monitoring programmes.
- status of population of Cayman parrot.

### 3.6 Enforcement

The Cayman Islands has been successful not only in protecting its marine environment on paper but also in implementation and enforcement. There is an active enforcement section within the DoE that patrols the islands daily, monitoring coastal and inland projects and fisheries conservation activities. In 1995 the Marine Conservation Law was amended to increase fines for marine offences from US$6,000 to US$600,000.

## 4. International cooperation

### 4.1 MEAs

The Cayman Islands participate in the following MEAs:

| MEA | Remarks |
|---|---|
| Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | Extended to Cayman Islands in February 1986, including the Oil Spills Protocol. The Specially Protected Areas and Wildlife (SPAW) Protocol entered into force in 2000. UK ratification is awaiting the enactment by the CI of the National Conservation Law. |
| Convention on Biological Diversity (CBD) | Extended to Cayman Islands in June 1994. In 2005 the territory submitted its Third National Report to the CBD. Awaiting enactment of National Conservation Law for full implementation. Cayman Islands has not yet developed a biodiversity action plan, although this is the subject of an ongoing for Darwin Initiative project. |
| Ramsar Convention | One site (Booby Pond & Rookery) formally approved to date, but Ramsar Information Sheets have been submitted for another four sites (Barker's Wetland, Central Mangrove Wetland, Little Sound, Ponds and associated Marine Zones, Little Cayman Crown Wetlands and Marine Parks, Salina Reserve). |
| CITES | Became effective in May 1979 and extended to Cayman Islands in February 1986. The Convention is implemented in the Endangered Species Trade and Transport Law. There has been some controversy about the small quantities of turtle products or live turtles bred in captivity and exported by the Cayman Turtle Farm and whether this is a breach of the Convention by the Cayman Islands or the importing country. |
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) | There is some confusion as to whether or not the UK is satisfying its obligations under this Convention with respect to the legal harvests of marine turtles in British Virgin Islands, Cayman Islands, Montserrat and the Turks and Caicos Islands. These legal harvests involve commercial trade of marine turtles that may or may not qualify as accommodating 'the needs of traditional subsistence users' (undefined in the Convention). |
| London Convention | Became effective in December 1975. |
| UNFCCC and Kyoto Protocol | Request for these commitments to be extended to the Cayman Islands was made in September 2005. |

### 4.2 Access to funding by the international community for environmental projects

The territory has recently (March 2006) embarked on an exercise, with the help of a grant of €250,000 from the Darwin Project, to create habitat maps for the marine and terrestrial environments using a combination of remote sensing and biological survey techniques.

### 4.3 Other international cooperation, membership of networks, etc. related to the environment (or environmentally sensitive sectors).

Cayman Islands is an Associate member of CARICOM, and like the other UK Overseas Territories, is currently awaiting UK DFID funding for participation in the Mainstreaming Adaptation to Climate Change (MACC) project. It is not part of the Caribbean Renewable Energy Development Programme.

The DoE, is a participating institution in CARICOMP (Caribbean Coastal Marine Productivity Centre), sponsored by UNESCO

## 5. Conclusions and Recommendations

*Sustainable development to ensure habitat and biodiversity protection (Challenge 1)*

- Ensuring the necessary legislation is enacted to give adequate protection to the key wildlife and habitats, including EIA and the protection and management of national parks.
- Support in preparing development plans for the smaller islands with relevant development guidelines and identified protected areas.

*Sustainable tourism*

The Cayman Islands need to strike a balance between using their natural resources as tourist attractions while limiting the environmental pressures and degradation attributed by tourism and other development activities. The survival of the island ecosystems is a precondition not only for the health of the tourism industry but the well-being of the islands as a whole. Tourism is a major part of the Cayman Islands' economy, and for the islands to achieve sustainable development tourism must be sustainable as well.

Recommended areas for cooperation between the Cayman Islands and the EU are as follows:

- Sustainable tourism:
    - Encourage the territory to link up with and participate in other sustainable tourism initiatives in the region such as the ACS Sustainable Tourism Zone of the Caribbean (Cayman Islands not at present a member of ACS), involving certification of countries adopting sustainable tourism.
    - Investigate the opportunities and implications for either or both of the smaller islands achieving international recognition as sustainable, 'green' tourism destination.
    - Campaign to encourage hotels to introduce environmental management or environmental certification systems.

*Invasive species (Challenge 2)*

- Prioritise problems of invasive species.
- Fund eradication programmes for priority pests

*Increase resilience to natural disasters and climate change (Challenges 3 and 4)*

- Enter into regional and global initiatives or associations with other countries or entities which face similar threats for the purpose of drawing the attention of the world community to their special vulnerabilities, e.g. UN Small Islands Developing States Network (SIDSnet).

- Identify areas where the Cayman Islands, by virtue of their special characteristics, can make a special contribution to research or monitoring of climate change, if necessary in collaboration with other international institutions.
- Align with other regional initiatives for adaptation to climate change (such as CARICOM MACC).

*Solid waste (Challenge 5)*

- Support for initiatives in waste prevention and reducing the waste destined for landfill through recycling and composting schemes.
- Support to ensure that sound and acceptable waste management schemes are adopted on the island, which do not pollute groundwater or coastal waters.

# ANNEX E: ENVIRONMENTAL PROFILE -

# MONTSERRAT

## 0. Summary

Although enormous progress has been made in recovering from past volcanic activity on the island and in learning to live with its ongoing activity, the volcano continues to be a dominant factor in relation to Montserrat's environment. The volcano caused extensive damage to many areas of special conservation value (including the island's first proposed Ramsar site, coral reefs, some species of flora and fauna), and had a major impact on the tourist and fishing industries. The population exodus has created capacity problems in the environmental administration as elsewhere. Introduced species are placing pressures on wildlife, including rats and feral animals such as pigs formerly reared on farms.

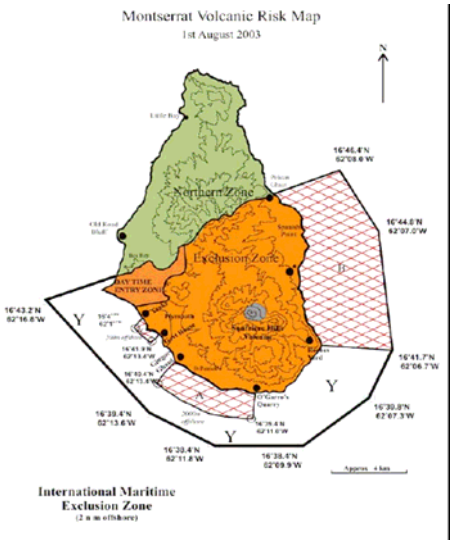
## 1. Background information


Source: HMG White Paper 1999


Source: CIA World Factbook

### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Montserrat |
| Region | Caribbean |
| Land area | 102 $km^2$, habitable 44 $km^2$ |
| Exclusive economic zone | 200 nm |
| Population | 4800 (2006 est.); some 8,000 refugees left the island following the resumption of volcanic activity in July 1995; some have returned; population density 47/$km^2$ |
| GNP/capita | €5000, 2002 est. |
| Literacy rate | 97% (defined as >15, ever attended school) |
| Unemployment rate | 6% (Feb 1998) |
| % below poverty line | Poverty and hardship leading to increased insecurity and vulnerability has been a direct result of the evacuation from the South and with it people's loss of homes, social networks and livelihoods. |




Source: Government of Montserrat, 1999

## 1.2 Constitution

The head of state of Montserrat is the UK monarch, represented by a Governor. The Governor is responsible for internal security (including the police), external affairs, defence, the public service and offshore finance. The island has an Executive Council and a unicameral Legislative Council (11 seats, 9 popularly elected plus the attorney general and financial secretary sitting as *ex officio* members). The Chief Minister is usually the head of the party with the most votes. Elections are held every five years on the basis of universal adult suffrage. There are ongoing discussions about constitutional change.

The law of Montserrat is based on English common law supplemented by locally enacted legislation.

## 1.3 Physical geography

Montserrat is a volcanic island 17 km long and 11 km wide, lying 43 km south-west of Antigua and 64 km north-west of Guadeloupe. The island is mountainous, with two main areas of highland reaching altitudes greater than 740m, with streams and waterfalls amongst dense tropical vegetation. The coastline is rugged, and offers no all-weather harbour, although there are several anchorages sheltered from the prevailing trade winds.


Source: MVO website 1999

In July 1995, the Soufrière Hills volcano in the south of the island became active for the first time in 350 years. By April 1996, increased pyroclastic activity had forced the evacuation of the capital Plymouth and most of the south of the island. The island was zoned, with an exclusion zone in the South covering over half the island including the capital Plymouth, and extending two kilometres off-shore, and a safety zone in the North. The exclusion zone has been evacuated. A provisional capital was set up in Brades.

Eruptions increased in vigour until a large explosion on 17 September 1996 destroyed a village to the east of the volcano: the village had been evacuated. The situation changed dramatically for the worse in June 1997 when a large pyroclastic flow led to the deaths of 19 people in an area already designated as unsafe. The following month the centre of Plymouth was destroyed by pyroclastic flows. Volcanic activity has continued since, with the last eruption occurring in May 2006.

## 1.4 Flora and fauna

Nearly all Montserrat's original forest cover was cleared by European colonists for agriculture or timber exploitation. Before the recent disasters, secondary forest and scrub re-growth covered approximately 7300 ha (71% of total land area). About 3000 ha of this comprised rain, cloud or moist forest. On mountains with high rainfall, lower montane and montane rain forest, palm break and elfin woodland predominate. At lower altitudes the vegetation consists of a mosaic of cactus and dry scrub woodland, littoral vegetation, semi-evergreen forest and small areas of mangrove.

There are scattered coral reefs around the island, ranging in depth from 2 to 40 m, being most abundant off the west and north coasts, although there are also reefs on the northeast and southeast. Runoff and steep topography limit the distribution of reefs around the island, particularly near ravine outflows that carry sediment. All of Montserrat's reefs are threatened by human activities (Bryant *et al*. 1998). The greatest threat is overfishing, but sedimentation from land-based sources resulting from the steep topography is also a threat. Coastal development was estimated to threaten over 90 percent, and marine pollution threatens three-quarters, of reefs. The reefs were badly damaged by several hurricanes in the 1990s.

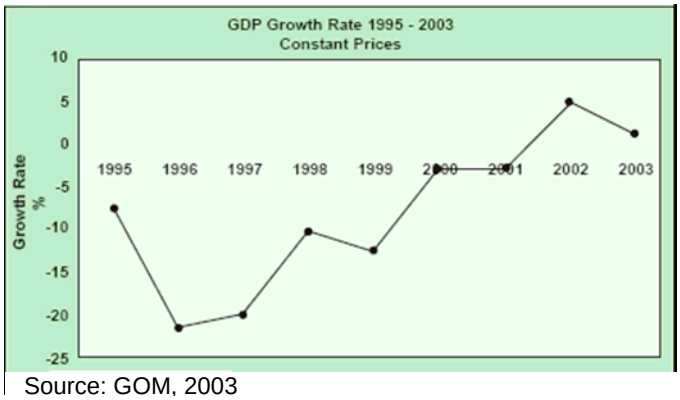
In common with other Lesser Antillean islands, Montserrat has a rich biota, and high endemism. It supports at least 132 tree species, 59 species of bird and 13 mammals. Two amphibian, 11 terrestrial reptile and 10 native bat species have been recorded on Montserrat in modern times. The Montserrat oriole (the island's national bird) is unique to Montserrat. The endangered and edible 'mountain chicken' (a frog, the second largest frog species in the world) is found only on Montserrat and Dominica. Several other species are restricted to Montserrat and some nearby islands. There are two endemic reptile species – the Montserrat galliwasp and the Montserrat anole – and four endemic subspecies – the Montserrat ameiva, Southern Leeward dwarf gecko, Montserrat black snake and the Montserrat blind worm snake. There is a subspecies of bat now confined to Dominica and Montserrat. The island is a nesting site for the green, hawksbill and leatherback turtles. The current plant list contains 875 species including the red cedar (VU), lignum vitae (EN), Brazilian mahogany (VU) and American mahogany (EN). Since the volcanic eruption, two of the three endemic species previously recorded have been found, The third island endemic species has not yet been found.

The volcanic eruption had a massive impact on native wildlife, exacerbated by the human habitat degradation that preceded it. Most of the island's hill forests, including all of the high-altitude habitats, have been lost. Ash fall is known to have had pronounced effects on the arthropod fauna, with knock-on effects up the food chain. Bats are known to have been severely impacted.

## 1.5 Demography, socio-economy

The majority of the population is of African descent, the remainder being British, American, African, Indian and German. In 1985 the population of Montserrat was nearly 12,000. Two-thirds of the 12,000 inhabitants fled the island as a result of the volcanic activity. Some began to return in 1998, but lack of housing limited the number. Montserrat now has a population of about 4800, all of whom live in the Northern part of the island, and more than 50% of whom are senior citizens and children. Some 3500 relocated to the UK. Of the rest, the majority have resettled in the Caribbean region, principally Antigua. The Montserrat crisis created severe socio-economic problems, with the relocation of nine-tenths of the pre-eruption residents and three quarters of those still on island.

The consequences of the volcanic eruption severely affected economic activity**.** Airports and seaports were destroyed/closed and the road system underwent extensive damage, causing major economic and social dislocation. There was massive disruption of agriculture and tourism. The impact on GDP (a fall of 21% in 1997) can be seen in the graph below.



Source: GOM, 2003

External aid for the development of the security zone has had a positive impact on the economy, especially the construction sector. A new airport became operational in July 2005, replacing the one destroyed in 1997, funded jointly by DFID and the European Union.

By 1981, Montserrat no longer needed budgetary support from the UK. However, following Hurricane Hugo in 1989, which damaged around 90 per cent of all property on the island, around £16 million in UK aid was required to rebuild the infrastructure. By 1995 Montserrat was on the road to recovery from Hugo and was in budgetary surplus. The volcanic crisis not only increased government spending requirements for relief and reconstruction, but also dramatically reduced the tax base. Montserrat's opportunities for borrowing are constrained by the size of its budget deficit (currently 39%), although limited loan resources through the Caribbean Development Bank (CDB) are available. Since 1995 the Government has relied on UK budgetary aid to meet its recurrent costs and finance reconstruction. The UK provided £206 million from the start of the crisis to the end of 2003/04 to restore basic infrastructure, and to maintain essential public services for the remaining population. UK budgetary support in 2006 amounted to about 55%. A new

airport, replacing the one destroyed by the volcanic eruption in 1997, became operational in July 2005. This was funded jointly by DfID and the European Union.

Montserrat had a thriving *tourism* industry prior to 1995, accounting for a third of the island's GDP. The volcanic activity decimated the industry. In 1993, 32,000 tourists visited Montserrat, 21,000 were stay-overs, and visitor expenditure was estimated at €54m. Between 1996-98 however, arrivals decreased to less than 10,000. But the sector began to show signs of recovery from 2000 when tourist arrivals increased to over 14,000, now representing 15% of the economy. The Montserrat Tourist Board is seeking to diversify in order to appeal to a wider market. The rebuilding of the tourist industry in Montserrat is a major government priority. The development of nature tourism is seen as an important component of the island's redevelopment; this potentially provides opportunities to combine biodiversity conservation with economic growth. There is also potential for 'victory tourism'.

*Agricultural* production was greatly affected by the onset of volcanic activity in 1995. Between 1995 and 1997 all the major agricultural producing areas were either destroyed or deemed unsafe. The majority of the fertile agricultural lands, pasture and fishing areas are in the Exclusion Zone with restricted or no access. As a result, the contribution of agriculture and fishing to GDP fell from 5.4% in 1994 to approximately 1.1% in 1998 (0.7% agriculture, 0.4% fishing). The government has recently sought to encourage the rearing of small ruminants and pigs and to facilitate poultry production. Emphasis has also been placed on encouraging agro-processing ventures utilising local raw materials.

Shallow-shelf and reef fish and coastal pelagics have been moderately to heavily exploited and are unlikely to support increased exploitation. The concentration of people in the safe area toward the north part of the island has led to particularly intensive fishing there, and decreased catches. But there is thought to be potential for increased exploitation of deep slope and bank fish.

A number of initiatives are afoot to use the large volume of volcanic ash, sand and pumice in the construction industry for export or processing into materials for export. Consideration is also being given to the commercial development of Montserrat's geothermal resources for electricity generation.

The social situation in Montserrat changed significantly as a result of the volcanic activity which disrupted families and communities and weakened the social fabric of the island. There are severe human resource constraints, coupled with increased unemployment, increased vulnerability and dependency, and higher levels of poverty.

## 2. Main environmental challenges

### 2.1 Overview

Apart from its enormous human and economic impact, the volcanic activity during 1995 - 1997 wreaked substantial damage to the environment of Montserrat. Huge plumes of sediment entered the sea at several locations, and the effects on the reefs on the south and east of the island were severe. Direct deposits of ash and waterborne sediment led to coral bleaching and an increase in coral diseases. The largest mangrove swamp - the Foxes Bay Bird Sanctuary - was destroyed by ash deposits and siltation.

The relocation of a large part of the population to the Northern part of the island has created pressures on natural habitats. The reconstruction involved the clearing of forest areas and is threatening important species such as the endemic Montserrat oriole and galliwasp.

Refuse is collected by private contractors on Montserrat. Prior to the crisis, a 22 ha plot had been procured for development as a sanitary landfill site, but the site had to be abandoned because it was located in the exclusion zone. A temporary dump-site was established at Little Bay in the North, but a new site has now been established. Garbage is now compacted and regularly covered.

All households receive piped water and have sewage disposal through septic tanks.

The effects of the eruptions on the island's plants and animals are being studied where circumstances allow. Extensive monitoring of the Montserrat oriole - the National Bird - the mountain chicken and other important key indicator species is ongoing. The Montserrat galliwasp has been sighted for the first time in over 30 years and more scientific research into its habitat is necessary.

## 2.2 Main challenges

**Challenge 1 Exposure to multiple natural hazards SEVERE**

Montserrat is a volcanic island lying along a geological fault line characterised by significant vulcanism and seismicity. Volcanic activity has been continuing intermittently since 1995. Vulcanologists classify the Soufrière Hills volcano as 'persistently active' and anticipate that the activity may continue for another decade. The volcano has had massive effects on the island. Amongst these effects are:

Source: DfID, 2006

- very extensive damage to property and infrastructure such as roads, airport, port facilities;
- over half the island placed out-of-bounds because of the volcano hazard;
- a large exodus of the population from the island, leaving major problems in terms of lack of human resources, major disruption, displacement and vulnerability for those remaining;
- hardship and poverty for those dispossessed by events;
- decimation of the economically important tourist industry, undermining of investor confidence, economic stigmatisation of island;
- major damage to habitats such as forests, coral reefs and mangrove swamps, leading to reduction in wildlife populations, notably that of the Montserrat oriole;
- even the 'safe' northern part of the island sometimes receives heavy ash fall.

The Montserrat Volcano Observatory (MVO) provides the Government with an organisation for managing this environmental hazard, and ensuring the continuing safety of the island's inhabitants. A Scientific Advisory Committee (see section 3) advises on longer term risks.

A vulnerability analysis and assessment, completed soon after the onset of volcanic activity, will be used to inform and develop a National Disaster Plan. The National Disaster Plan will include disaster prevention and mitigation measures that would reduce the impact of any potential hazard on the population. Additionally, steps will be taken to ensure that all the appropriate management mechanisms are in place for monitoring all disaster related activity on Montserrat.

Montserrat's volcanic eruptions in 1995 were not the first natural disaster that the country had faced recently. Montserrat has been hit by several hurricanes including Hurricane Hugo in 1989, which totally destroyed 20% of homes and severely damaged 50% and made nearly a quarter of the population homeless, and Georges, José and Lenny during 1998/99, and earthquakes during 1992-4. Montserrat is also subject to seismic activity, and is in principle exposed to a tsunami risk, although this is mitigated somewhat by its rugged steep coastline and relative absence of low settlements.

**Challenge 2 Conserving Montserrat's unique natural environment MODERATE**

Adapting to life on a volcanically active island is by far the most pressing of Montserrat's environmental problems. In the context of its obligations to preserve its biodiversity, there is particular concern for two species. The Montserrat oriole is critically endangered. Formerly found throughout the island's hill forests (at altitudes greater than about 150 m), the majority of the population was wiped out with the destruction of the southern hill forests during the volcanic eruptions. It persists in the Centre Hills, and in a small area

of the South Soufrière Hills. The loss of the southern hill forests was followed by a substantial decline in the Centre Hills population. It is estimated that there are only 200–400 pairs remaining in the wild. Jersey Zoo has a captive breeding programme to safeguard the species from the risk of extinction in the wild and to provide birds for reintroduction in the future. A joint project of the UK RSPB and the Montserrat National Trust showed that the birds have low fertility and suffer predation by rats. A workshop in May 2004 developed an Action Plan for the oriole. This prescribes the management needed to avert short-term extinction, but also highlights the need to understand the ecological problems that make the Centre Hills an apparently unsuitable final refuge for the species. However the project is now complete, and follow-up work is ensure its survival.

The Forest Thrush (VU) is a forest interior species. It is endemic to a small group of islands in the northern Lesser Antilles: Montserrat, Dominica, Guadeloupe and St Lucia. It is globally vulnerable because of declines in recent years; it is now rare on Guadeloupe and St Lucia, and Montserrat may be the species' global stronghold. The Centre Hills population appears to have recovered from the most severe period of volcanic ash fall (1996–97) and now to number a few thousand.

The volcano is not the only threat to these and other species of wildlife on the island. Rats introduced inadvertently are abundant in the Centre Hills, at least in some years, and appear to have increased during the period of volcanic activity. These rats prey on the nests of Montserrat orioles and on mountain chicken; they may have a profound effect on many other species and on the ecology of the forest. Feral pigs originating from abandoned farms in the volcanic exclusion zone are spreading rapidly through the forest from the south-east. They have already destroyed large clumps of *Heliconia caribaea* (the preferred nest plant of the Montserrat oriole) along streams in the Centre Hills. They are thought to be significant predators of mountain chicken, and perhaps also the critically threatened Montserrat galliwasp, which is extremely rare and has a small range. Feral cats are present in the forest and are known to predate forest thrushes.


Photo RSPB. Adult female and male Montserrat oriole

*Other environmental problems*

1. Various waste management problems. The import of food in bottles, plastic and styrofoam containers presents a serious waste management problem. There are no recycling programs. There is a need for environmental education and awareness. The disposal of industrial waste, oils and abandoned cars is also problematic.
2. Climate change. While its absence of low-lying settlements make Montserrat less vulnerable to climate change than some other Caribbean and Pacific islands. Nonetheless the further erosion of beaches and more frequent and intense tropical storms will hardly be good for Montserrat's recovering but fragile tourist industry. Damage to coral reefs and seagrass beds will lead to lost habitat for fish, turtles and conch. This will in turn lead to smaller fish catches and threaten fishery-based livelihoods.

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

**Ministry of Agriculture, Lands, Housing and Environment** (MALHE) is the lead Ministry for development of policy on environment and natural resources management. It is headed by a minister and a permanent secretary. The overall Ministry budget is about €500,000, of which one-third for the environment. The staff comprises 1 Director, 5 Forestry Officers and 2 Fisheries Officers. Apart from the portfolios implied by its name, MALHE also looks after spatial planning, forestry, mining, fishing and energy. A new Department of Environment is being formed which will incorporate the Forestry and Fisheries Departments. The Department of Environment will also handle climate change.

The **Development Unit** is responsible for overall economic and development planning, industry and tourism management for Montserrat. Information on planning for other sectors is fed in from the relevant sectors to the Development Unit, which develops the Macro Plan.

There is also a **Department of Environmental Health** within the **Ministry of Health and Community Services** which inspects establishments for prevention of diseases and pests and is responsible for the management of solid and liquid waste, with a staff of six. Social affairs is part of the function of the **Community Services Department** in the same Ministry.

The **Disaster Management and Coordinating Agency** is responsible for planning for and responding to disasters and emergencies, either natural or man-made. This Agency reports to the Governor's Office.

The **Montserrat National Trust**, founded by ordinance in 1970, has a mandate to manage and preserve natural resources and the cultural heritage of Montserrat. It is also involved in education and awareness campaigns and trail development. The National Trust works with partners in the public and private sectors and NGOs. Its annual operating budget is about €50,000, and it has a 5-strong staff.

The **Montserrat Volcano Observatory** (MVO) monitors the activity of the volcano, and raises alerts when necessary. There is also a Scientific Advisory Committee that advises on longer term risks.

Approximately 1% of the national budget of €25 million is spent on conservation, but funding is also available through projects such as the ongoing Darwin Initiative Project for the Centre Hills and the Oriole Conservation Project, funded by several overseas NGOs.

## 3.2 Mechanisms for integrating environment into development

The Montserrat Sustainable Development Plan (SDP) 2003 -2007 addresses the overall development and strategic goals of the country. It formulates economic, social and environmental goals in six 'strategic objectives' for Montserrat. This plan was developed with wide community and interdepartmental consultation. Understandably there is particular emphasis on the social and economic pillars of sustainable development. But strategic objective 6 deals with the environment:

| **Strategic Objective 6 of Montserrat Sustainable Development Plan 2003 - 2007** |
|---|
| To ensure that Montserrat's development is environmentally sustainable and includes appropriate strategies for disaster mitigation. Sub-strategic objectives:<br>• ensure the sustainable management and use of natural resources and the environment;<br>• prevent and manage the causes and impacts of disasters;<br>• protect Montserrat's cultural and natural heritage;<br>• protect and conserve biodiversity, energy and natural resources;<br>• inform on environmental issues through training and awareness campaigns to ensure effective participation in environmental decision-making and promote best practice by individuals and business;<br>• understand, promote across sectors and optimise the relationship between development and the environment;<br>• prevent and control pollution, manage waste and implement environmental health strategies. |

In addition the SDP 2003 - 2007 calls for Montserrat to "accede to (international) treaties and other agreements that ….. ensure environmental protection of natural resources …..".

The Physical Planning Act provides that an environmental impact assessment must be carried out for developments in excess of 50 lots, land reclamation, airports, marinas, ports, power plants, petroleum installations and operations generating emissions or hazardous substances.

All departments in and outside of government develop and discuss annually disaster management and mitigation plans. Volcanic disaster plans are discussed at least once a month at Senior Management meetings with the Governor.

## 3.3 Environmental strategy and policy

The key documents on the future development and environment of Montserrat are the Sustainable Development Plan 2003 - 2007 and the National Environment Action Plan. There is also a Disaster Management Plan which dates back to 1995, in the process of being updated, a disaster information policy and a disaster education strategy.

## 3.4 Policy instruments

The main elements of environmental legislation are as follows:

| Item of legislation | Comments or details |
|---|---|
| Physical Planning Act | Also provides for mandatory EIA |
| Endangered Animals and Plants Ordinance 1976 | Enabling legislation for CITES |
| Montserrat National Trust Act | Established the Montserrat National Trust |
| Forestry, Wildlife and National Parks and Protected Areas Ordinance, 1996 | Makes provision for an Environmental Board to manage forests, wildlife, national parks and protected areas, for a national forestry plan and for an environmental fund to finance protected areas and wildlife protection. However these have not yet been implemented. A number of potential marine protection areas have been identified, but none has been designated. A new proposal to declare the Centre Hills a National Park and develop a site management plan is in the early stages of preparation. |
| Beach Protection Act | |
| Convention on Migratory Species of Wild Animals Ordinance, 1985 | |
| Turtles Ordinance Cap. 112 1951 | Covers all marine turtle species. It provides for a closed season from 1 June to 30 September and specifies the minimum capture size as 9 kg. |
| Wild Birds Protection (Amendment) Ordinance (1987) | Provides for conservation of specific species. An action plan for the conservation of the Montserrat Oriole is in preparation. |

## 3.5 Monitoring

The Environmental Health Department monitors discharges to surface waters. The Montserrat Water Authority monitors quality and quantity of surface waters and quality and hydraulic characteristics of groundwater. Forests are monitored by the Forestry Department, while MALHE monitors habitats.

A 3-year Darwin Initiative project which started in 2005 is monitoring biodiversity on Centre Hills in close collaboration with the Montserrat National Trust and the Ministry of Agriculture and Environment

The Montserrat Volcano Observatory is continuously monitoring volcanic activity on the island. It also measures atmospheric concentrations of respirable dust, and reports the results to the public. The air quality in the safe zone in the north of the island has been consistently within acceptable limits.

Substantial beach monitoring has been carried out in the past, particularly after the hurricanes of the late 1980s, which caused extensive erosion.

### 3.6 Enforcement

No information available, but it is assumed given recent priorities in the island that enforcement is weak.

## 4. International cooperation

### 4.1 MEAs

Montserrat participates in the following MEAs:

| MEA | Remarks |
|---|---|
| Ramsar Convention on Wetlands | Ramsar was extended to Montserrat in 1976. One site, Fox's Bay Bird Sanctuary, was proposed for Ramsar listing in 1986 but was largely destroyed by pyroclastic flows. A very small, partly degraded saline lagoon and mangrove area at Carrs Bay remains. Currently 2 Ramsar sites have been proposed: Centre Hills and forested ghauts and the north-west coasts and marine shallows. |
| Convention on Biological Diversity | |
| Bonn Convention on Migratory Species | Since 1985. The enabling legislation for this treaty is the Convention of Migratory Species of Wild Animals Ordinance 1985. |
| CITES | Since 1976. The enabling legislation for CITES is the Endangered Animals and Plants Ordinance, 1976 |

### 4.2 Access to funding by the international community for environmental and environment-related projects

In recent years most of the aid received by Montserrat has been from the UK (DfID and FCO) and the European Union. In addition Montserrat has received some finance from CARICOM, Caribbean Development Bank, UNDP, the Irish Government as well as other private sources. The Sustainable Development Plan 1998-2002 was largely funded by DFID through support of both the budgetary and capital investment programme. This assistance amounted to £75 million for the period 1997/8 - 2000/1 .

Most of this funding has concentrated on crucial works necessary to allow the island to adapt to its new circumstances, equip it with the new infrastructure needed, etc. Environmental and environment-related projects have not been a high priority. But 4 environmental projects were funded, as follows:

| Project | Funding (€ approx.) | Source(s)/Partners |
|---|---|---|
| Development of a botanical garden to support ecotourism | 100,000 | UK Overseas Territories Environment Fund |
| Centre Hills Conservation Project: conducting a socioeconomic assessment, providing outreach and education, carrying out ecological fieldwork, developing a management plan for the Centre Hills through public consultation, upgrading the legal capacity to manage protected areas, and building local capacity to sustainably manage the Centre Hills | 500,000 | UK government's Darwin Initiative |
| Oriole Conservation Project (completed): monitoring the status of the oriole and developing conservation measures which address the causes of the decline in population between 1997 and 2003. | | |
| Trail Development | | UK FCO, from Jersey Wildlife, RSPB |

Montserrat also applied unsuccessfully for funding for a wetland rehabilitation project which it regards as high priority.

Under the 9th EDF, Montserrat stands to benefit from an allocation of €11 million. Montserrat has chosen Trade in Services as the focal sector for these funds. In April 2003 Montserrat opted for the 9th EDF to be in the form of budgetary support and the Commission agreed, subject to a public finance assessment.

A number of academic researchers have also been active in recent years, notably entomologists from Montana State University, bat experts from South Dakota State University and marine turtle experts from the University of Exeter.

### 4.3 Other international cooperation, membership of networks, etc. related to the environment (or environmentally sensitive sectors)

Montserrat:

- is a member of the Organisation of Eastern Caribbean States (OECS) and a signatory of the St Georges Declaration of Eastern Caribbean countries;
- participates in regional programmes for disaster preparedness and mitigation. It cooperates in this area closely with the Caribbean Disaster Emergency Response Agency (CDERA), the organisation responsible for disaster mitigation and relief in the Caribbean (agency of CARICOM).
- is a member of CARICOM (Caribbean Community), but it has not yet signed up to the CARICOM Single Market (CSM));
- is a member of the Eastern Caribbean Central Bank (ECCB).
- is an observer at CARIFORUM (Caribbean Forum).

## 5. Conclusions and Recommendations

Priority areas for environmental assistance by the EU appear to be:

1. Support in relation to disaster preparedness. This includes:
    - completion of National Disaster Plan, which will include disaster prevention and mitigation measures;
    - implement, monitor and adjust measures required in advance;
    - dissemination of all disaster information;
    - disaster simulations on regular basis
    - improved links with CDERA/International institutions;
    - adequate emergency personnel;
    - mandatory insurance;
    - strengthening and enforcement of building codes;
    - strong disaster legislation.

2. Support in fully implementing the MEAs which have been extended to Montserrat. Most of the legislative instruments needed for this are already in place. Such measures include:
    - complete and implement action plan for the conservation of the Montserrat oriole;
    - designate protected areas and draw up management plans complying with the relevant MEAs;

3. Support in making evaluation of waste management bottlenecks and proposing solutions: medical waste, waste oils, packaging waste, car wrecks, monitoring of landfill gas and leachate, possibilities for recycling, etc.

# ANNEX F: ENVIRONMENTAL PROFILE -

# NETHERLANDS ANTILLES

## 0. Summary

The Dutch Antilles have many valuable natural assets such as old cloud forests, sandy beaches, magnificent coral reefs, mangroves teeming with life, salt ponds and flamingos, colourful birds and fish. It is a wealthy territory, and its main economic activities are tourism, oil industry and financial services, but it also has a large and increasing poor population and areas with no drinking water or sewage system. The territory faces many threats due to waste, sewage, lack of physical planning, oil refinery emissions and overfishing. Environmental protection has not been a priority and the natural capital is in danger of being destroyed irreversibly. The right balance between economic development and longer term conservation has yet to be found.

Source: Department of Environment and Nature website

## 1. Background information

Situated in the Caribbean Sea, the Dutch Antilles comprise 5 islands. The 3 northern or Leeward Islands (Saba, St Eustatius (or Statia) and St Maarten) are nearly 1000 km from the 2 southern or Windward Islands (Bonaire and Curaçao). The two groups of islands have different climate, geomorphology and biodiversity. The Saba Bank (see map) is a large submerged mountain with its top a few feet (70 cm) from the surface. Willemstad, the capital of the Netherlands Antilles on Curaçao, has been declared a World Heritage site.

### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Dutch Antilles |
| Region | Caribbean |
| Land area | 802 $km^2$ |
| Maritime claims | Territorial sea: 12 nm Excl. fishing zone: 12 nm |
| Population | 222,000 (est. 2006); density 277 / $km^2$ |
| GDP/capita | € 13,300 (est. 2004 CIA) |
| Literacy rate | 98 % of population 14 and older |
| Unemployment rate | 17% (est. 2002) |
| % below poverty line | 22% |

### 1.2 Constitution

The Netherlands Antilles form part of the Kingdom of the Netherlands but have been autonomous since 1954. They have full autonomy for internal affairs, the Dutch government being responsible for defence, foreign affairs and some maritime surveillance tasks. The relations with the Netherlands and Aruba are regulated by a Charter of the Kingdom which is in debate and will probably be revised. Some islands are seeking more independence (Curaçao and Saint Maarten) and others a closer tie to the Netherlands, possibly becoming Outermost Regions of the European Union.

The territory has an elected parliament, the leader of the party winning the elections usually becomes Prime Minister and head of government. A Governor General is appointed by and represents the Dutch Queen. The Council of Ministers includes a representative in the Netherlands (Minister Plenipotentiary). The territorial Parliament has legislative powers.

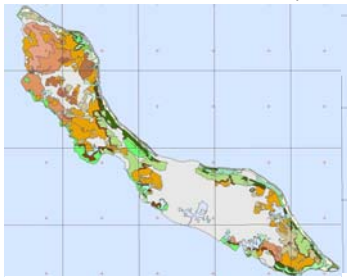
Internally the territory is actually a federation, and each island also has its own government, and a Lieutenant General appointed by the Queen on a proposal by the territorial government and after consultation with the islanders. Each island has an Executive Council and an Island Council with legislative power, elected every 4 years by the islanders, and makes its own socio-economic and

environmental plans, but legal and judicial affairs, police, taxation, public health, education, labour legislation, banking are territorial matters.

The national government is situated in Curaçao. Aruba used to be part of this set-up, but split off in 1986. Both Curaçao and St. Maarten would like to adopt *status aparte*[16], like Aruba, while Bonaire, St. Eustatius and Saba will be integrating more closely with the Netherlands.

## 1.3 Physical geography

The three northern (Windward[17]) islands of Saba, Statia and St Maarten are of volcanic origin. Statia has a dormant volcano (600 m) and for the rest savannah-like vegetation, like the Dutch (southern) part of St Maarten. The Saba Bank is 2200 km$^2$, the second largest atoll of the world. It is a mountain rising some 1800m from the sea bed, with its top slightly submerged, where reefs grow.



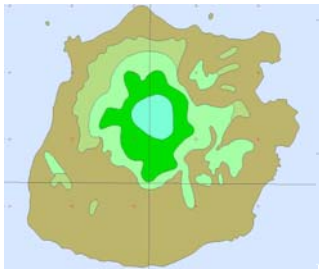
Curaçao. The white parts on the map are sand dunes

Bonaire with salt ponds (light blue) and mangroves(brown)

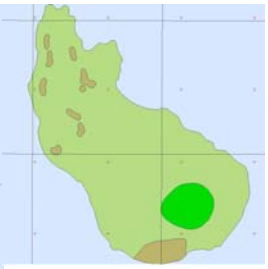
The southern (Leeward[18]) islands of Bonaire and Curaçao are very different. They are flat and arid. Sand dunes, mangroves, salinas (salt ponds) and fringing coral reefs[19] can be found. The islands were formed by a gradual build-up of coral and are about 75 km. off the Venezuelan coast. Curaçao, the largest island, has extensive sand dunes and shrubland but also fjord-like bays that cut deep into the land.

Bonaire is again different, with many salt ponds and mangroves, but a larger area with mixed cultivation.

There is lack of water on all islands. On Saba and Statia rainwater is collected in cisterns and deep wells and distributed to households by truck. On the other islands drinking water comes from desalinated sea water.



Saba with cloud forests (light blue), mountain rain forests (dark green) and lowland forests (light green)



St Eustatius with sub-montane rain forests (dark green) and savannah-like vegetation (light green)

## 1.4 Flora and fauna

The 3 Windward Islands are mountainous with lush vegetation ranging from seagrapes and aloe in the coastal areas to ferns and mahogany at altitude. Saba has high cloud forests and rain forests. St Maarten has numerous salt ponds and mangroves The vegetation of the Leeward Islands, on the other hand, consists of cactus, acacia and thorny plants characteristic of arid terrain.

The Dutch Antilles have 250 km$^2$ of coral reefs, scattered round all five islands (Reefbase). Curaçao and Bonaire, not battered by hurricanes, have better preserved reefs than those of the Windward islands: Bonaire's reefs are considered to be some of the best and healthiest in the Caribbean. Starting in very shallow water, they slope down to around 10m before dropping further seaward to depths of 60m and more. Saba's reefs are found on the top of underwater seamounts or pinnacles which make for spectacular diving. St Maarten has patch reefs[20] and barrier reefs[21]. Curaçao also has well preserved

[16] i.e. status as a separate national entity within the Kingdom of the Netherlands.
[17] In Dutch: *Bovenwindse eilanden*. In English these islands are considered to be part of Caribbean Leeward islands.
[18] In Dutch: *Benedewindse eilanden*.
[19] Reefs which form close to land, following the contours of the coastline.
[20] Patch reef: an isolated, often circular reef, usually within a lagoon or embayment.
[21] Barrier reef: reefs that are separated from land by a lagoon or open water.

fringing reefs that are home to barracudas, manta (giant) rays, sea turtles and sharks. Hypersaline lakes on the south-western coast are feeding habitats for the West Indian flamingo and migratory shore birds. The islands also have an estimated 13 $km^2$ of mangroves.

Curaçao and Bonaire are particularly rich in wildlife, having over two hundred endemic species and subspecies of beetle, spider, snake, snail, bat, lizard, crustacean (crab) and sea snail. More than 340 fish species live in the coral reefs of Bonaire. A large semi-enclosed bay (Lac) is a habitat for flamingos, frigate birds, herons, and pelicans. Its seagrasses spawn fish, green turtles and the endangered queen conch. Various salinas are breeding and foraging ground for the endangered greater Caribbean flamingo.

The 2% of the territory covered by forest, mostly on the Windward Islands, are home to a great number of unique birds and ancient mahogany trees and rare epiphytic plants and mosses, in particular on Saba's Mount Scenery (870 m).

A recent scientific expedition to the Saba Bank found a new wealth of biodiversity: 200 fish species (instead of the 45 previously known), 12 new algae species, 40 species of coral and 50 species of sponge.[22] This richness is due to the remoteness of the bank from cities and tourist resorts. The nature conservation organisation DCNA[23] notes however that the Bank is situated near the maritime lanes where supertankers manoeuvre to reach oil terminals on Statia.

### 1.5 Demography, socio-economy

A population density of over 200/$km^2$ is quite high compared with other OCTs, but there are large inter-island differences. St Maarten, for example has almost 1000/$km^2$, whereas Bonaire has <35/$km^2$. There is high migration to the Netherlands, where 130 thousand Antilleans live[24]. However 20% of the workforce on the islands come from abroad. While there is a well-educated elite, most are unskilled. Unemployment is around 15%. Besides Dutch, the main language spoken on the Leeward Islands is Papiamento, a mix of Dutch, Portuguese, Spanish. English is widely spoken.

The country has a high mean income compared with many other Caribbean countries), but a large percentage of the population (40%) can be described as poor (SPD). Growing slum areas with no sanitation, clean water supply or other social structures contribute to low levels of community and labour participation. The closing of the Shell oil refinery in Curaçao and the post-September 11 slump in tourism affected the islands badly.

The most important sectors are tourism (more than 1 million visitors per year), shipping activities, oil refining, and off-shore financial services. According to the IMF there was a strong recovery between 2000 and 2005. St. Maarten is expected to stay on a healthy growth path, and is significantly expanding its hotel capacity. Curaçao's growth has been anaemic, though recent developments in tourism, and the prospect of major new investments, including in the refinery, are encouraging.

## 2. Main environmental challenges

### 2.1 Overview of state of the Dutch Antilles environment

Although the Dutch Antilles are home to many endemic species, some are threatened or have become practically extinct, for example the Queen conch due to over fishing, some species of sea turtle, some flamingos, lizards and the Bonaire Lora. Many of these species have been given living and breeding space in (small) national parks and populations to allow them to survive and/or recuperate.

[22] January 2006: Scuba divers and a submersible vehicle were used. The research was backed by DCNA , the Department of Environment and Nature of the Dutch Antilles (MINA), Conservation International (CI) and the Smithsonian National Museum of Natural History.
[23] Dutch Caribbean Nature Alliance
[24] CBS, 2003.

In a recent report, GCMRN (2004) considers the territories in relative good health compared with other Caribbean coral reefs, due to the establishment of protected marine areas around the islands and diving fees in certain places. Reefbase, on the other hand, takes a more prospective view, and judges that 100% of the coral reefs in the Dutch Antilles are at risk, due to degradation by hurricanes (on the Windward Islands), bleaching, pollution (waste water and seepage from cesspits), tourism (diving, trampling of seagrasses, breakage by anchors) and oil spills.[25] Mangroves, crucial as spawning grounds for coral reef fish, have also been reduced near populated areas as a result of development.

Overgrazing by goats, donkeys and sheep on Bonaire and Curaçao has reduced vegetation cover, diminished recovery potential and caused a dominance of weed species (also in national parks). Large scale deforestation on Bonaire in the 1950s for charcoal production, and later for the plantation of aloe, has taken place.

## 2.2 Main environmental challenges

**Challenge 1 Pollution from Isla oil refinery in Curaçao SEVERE**

Curacao has a long history of air and soil pollution related to the oil refinery on the island. Shell built the refinery shortly after 1915, when oil was found in the Maracaibo lake in Venezuela. By 1952, the plant employed 22,000 and oil refining represented 50% of Curacao's GDP. There is documentation showing that the refinery was causing very severe air pollution at that time. Shell left in 1985, as refining became less profitable. It 'sold' the refinery for 1 dollar to the government on the condition that no environmental claims would be made in the future, in particular relating to the oil spills/ tar lake on the refinery's property. The government then leased the refinery to the Venezuelan company Petroleros de Venezuela SA. The refinery is located near the capital of Curacao, in the Schottegat bay. According to SMOC[26], a local NGO, soot and ill smelling particulates pollute the air of 20,000 inhabitants. Schools in the area close down on some days because of the bad smell.

The refinery processes a sour, heavy Venezuelan crude oil. It is antiquated and little has been done to control pollution. The main problems are very high emissions of sulphur dioxide and particulates, and a 'tar lake', a legacy from the past when proper provision was not made for the environmentally sound disposal of refining residues. There may also be a problem related to oil discharges and spills into the sea and tank-cleaning activities. The emissions to the atmosphere are discharged from relatively low stacks, and are causing unacceptably high levels of air pollution with impacts on the surrounding population, including lung complaints and eye irritation, green sulphur deposition, odour nuisance, noise from the flare, etc. (DCMR, 2004). Increasing the height of one of the main stacks seems only to have displaced the problem.

SMOC started legal procedures asking the government to enforce environmental standards. The government replied that the company would then have to close which would mean a loss of jobs. SMOC appealed to a higher court, which decided in July 2006 that the government had not proven its case. It has been estimated that €880 million would need to be invested in order to be able to comply with environmental standards.

Very little is known about the pollution emitted by the refinery or the impacts of these emissions. The severity of soil contamination is not known, but is certainly serious. Only ad hoc monitoring is carried out.

[25] http://www.reefbase.org/
[26] Stichting Schoon Milieu Curacao - SMOC

**Challenge 2 Climate change and natural disasters SEVERE**

Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of the Netherlands Antilles.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ● | Bonaire and Curaçao are low-lying and therefore particularly vulnerable to rising sea-level. The oldest part of the World Heritage site of Willemstad is built on low-lying land. The city is one of the most important assets for tourism on the island, besides its value as commercial and government centre. A limited sea level rise will greatly increase chances that during a storm the whole inner city will be inundated or even destroyed. But also on the Windward Islands there are many settlements in low-lying areas (e.g. Philipsburg and Simpson Bay on St Maarten). The potential loss of beaches is a serious threat for the tourist industry. |
| Stressed fisheries | O | The fishing industry is not of great economic importance in the territory |
| Coral reefs threatened (bleaching, decreasing pH) | ● | Islands ringed by coral reefs, presently still in reasonable condition, but already subject to multiple threats. |
| Damage to mangroves | O | Mangrove stands are being cleared for development on some islands. |
| Salinisation of groundwater | O | Even less freshwater. On three of the islands the groundwater is no longer used for drinking water, however, partly because of contamination. |
| Tourist industry | ● | Tourist industry accounts for half of GDP. Reef tourism and fishing are important attractions. |
| More frequent and more intense storms | O | This poses a severe threat for the Windward Islands particularly, which are already affected frequently by hurricanes. |
| ○ Nil | O Slight | O Moderate ● Heavy |

The Netherlands Antilles is particularly vulnerable to the threat of global warming given its dependence on the tourist industry and the low altitude of much of the territory. The islands are extensively fringed by coral reefs, which are a crucial component in the delicate ecosystem found there, are very important as a tourist attraction and therefore to livelihoods on the island, as a spawning ground for fish and as a natural buffer area protecting the islands from sea damage during storms. Climate change also poses a threat to beaches a major concern given the reliance on tourism.

**Challenge 3 Loss of natural habitats and biodiversity SEVERE**

As has been seen, the Antilles are very rich in characteristic habitats - coral reefs, mangroves, wetlands, etc. - and in wildlife. The islands are home to many endemic species as well as globally threatened species: its beaches are used by marine turtles for nesting, for example. These habitats are exposed to multiple threats: overfishing (e.g. queen conch), overgrazing, hunting, physical damage (coral reefs, beaches) and pollution (coral reefs intolerant of pollution, particularly sewage and other nutrient-rich pollution and turbidity), climate change (mangrove retreat, coral bleaching, etc.). Section 3.3 of the regional section of this report describes some of these pressures.

NACRI (Netherlands Antilles Coral Reefs Initiative) reports a continuing and rapid deterioration of coral reefs in the Netherlands Antilles, for example, while the islands' economies are heavily dependent on these fragile marine resources. There is weak public support and funding for coral reef conservation, increasing activities in the coastal zones that harm coral reefs, and inadequate legislative protection and enforcement.

Most of these threats are the result of ongoing development and building activity, leading to habitat destruction. In particular tourism, which results in demand for development land for hotels and other facilities, increased production of sewage and solid waste, increased disturbance and physical damage is

responsible for many pressures. Tourism is an important source of income. While infrastructure and a qualified workforce are necessary, this natural richness is the main reason why tourists come to the Dutch Antilles. The Sustainable Tourism policy paper, result of a national workshop on this subject, says that Saba and Bonaire have probably reached a quantitative limit in terms of the number of tourist facilities, and further growth must rely on lengthening the season and broadening the range of tourist activities.[27]

Nature conservation in the face of ongoing development of this kind requires strong planning law, and in particular mandatory environmental impact which conforms with best international practice, a strong system of designating, managing and enforcing protected areas and protected species. These elements are largely missing in the Netherlands Antilles, as will be seen later in this document.

**Other environmental problems** in the Netherlands Antilles include:

- environmental degradation due to increased population density in low-income areas and mass tourism, especially on St. Maarten;
- lack of sewage and waste water treatment in many areas is polluting the groundwater and the sea,
- poor waste management; landfills are reaching capacity, increasing risks of groundwater contamination;
- some appropriate national and island environmental regulations exist, but enforcement is limited by institutional capacity;
- Lack of funding could jeopardise implementation of the National Nature and Environment Plan 2004-2007.[28] The estimated costs are € 5.2 million, whereas central government has committed €700,000 only, leaving € 4,5 million to come from donor funds.
- Saba, St. Eustatius and St. Maarten are located within the hurricane belt. Almost every year at least one tropical cyclone occurs within a range of 100 miles and on average once every 4-5 years hurricane conditions are experienced. Aruba, Bonaire and Curaçao are on the southern fringes of the hurricane belt. History shows that roughly once every 100 years considerable damage is experienced by tropical cyclones passing over or close to the islands.[29]

## 3. Environmental policies and institutions

### 3.1 Institutional structure, manpower and budgets

The Dutch Antilles have a federal structure, with a territorial (or central) government and decentralised regional governments on each of the five islands of Bonaire, Curaçao, Saba, St Maarten and Statia. Responsibility for environment and nature conservation lies partly at territorial but mostly at the island level.

*3.1.1. Territorial level:*

At the national level there is a department in the Ministry of Public Health and Social Development responsible for Environment and Nature: MINA.[30] This department has a staff of 5 and is responsible for "the management of the environment and the management and conservation of nature, **as they derive from international treaties**."[31] Day-to-day nature conservation management and other environmental issues like water quality are matters for the islands.[32]

The Meteorological Service is responsible for the hurricane warning service. However, it is the

[27] http://www.mina.vomil.an/policy/other/notaduurzaam.php
[28] http://www.mina.vomil.an/policy/plans/nepp20042007.php
[29] MDNA&A, meteorological service N Antilles and Aruba.
[30] www.mina.vomil.na
[31] Article 2, paragraph e, section 10 of the Island Regulation of the Netherlands Antilles (ERNA. 1998)
[32] The National Nature Conservation Ordinance (*Landsverordening Grondslagen Natuurbeheer en Bescherming)* of 1999, amended in 2001, lays down the obligations of the central and island governments.

responsibility of the local island governments to maintain and activate a disaster preparedness organization.

The draft National Environment Ordinance (*Landsverordening Grondslagen Milieubeheer)* foresees the creation of an Environmental directorate.

*3.1.2. Island level:*

The island governments are responsible for the implementation of two ordinances: The National Nature Conservation Ordinance (*Landsverordening Grondslagen Natuurbeheer en Bescherming)* of 1999 and amended in 2001 and the future National Environment Ordinance *(Landsverordening Grondslagen Milieubeheer)* in draft form since 2000.

## 3.2 Mechanisms for integrating environment into development

There is no clear mechanism by which environmental and nature preservation issues are integrated in the laws and plans for social and economic development of the territory as a whole and of each of the islands.

Two public consultations have given some indications on how such an integration could and should take place:
1. A national workshop on sustainable development was held in 1999 where the linkages between different sectors and policies such as physical planning, tourism, energy, agriculture and livestock were discussed in an integrated manner.[33] The workshop participants asked the government to organise a national platform for sustainability on a regular basis.
2. National workshops were held with stakeholders on sustainable tourism[34]. In the Sustainable Tourism paper that ensued from these workshops, guidelines are given for environmental management of hotels, public access to beaches, etc.

There is no EIA legislation.

## 3.3 Environmental strategy and policy

Environmental policies and laws are elaborated at two levels. The territorial (central) level is responsible for guidance and frameworks on environment and nature conservation, waste, tourism, oil spills, etc. Each island is required to make its own policies, plans and legislation to implement the territorial and international obligations. The different laws that each island has elaborated are shown in section 3.4.2.

## 3.4 Policy instruments

*3.4.1. Policy documents/ Plans*

The most important policy paper at national level on nature and environment related issues is the (second) National Nature and Environment Plan for the period of 2004-2007. [35] The plan's objectives are:

- to make a National Environmental Review. The plan says a more precise and complete picture of the present environmental situation is needed: inventories, indicators, base line values, targets, measuring, monitoring, etc;
- to tackle waste and waste water;
- to tackle the oil industry, and the environment (including setting of quality standards);
- to promote sustainable tourism development;
- nature conservation;

[33] http://www.mina.vomil.an/policy/other/sustainable_development.php
[34] http://www.mina.vomil.an/policy/other/notaduurzaam.php
[35] http://www.mina.vomil.an/policy/plans/nepp20042007.php

- Increasing public support for environmental care and nature conservation;
- sustainable energy.

This national plan needs to be reflected in plans for each island. But only Bonaire has both a Nature Plan and an Environment Plan. At the national level there are other policy papers or guidelines such as: a national policy framework for waste and a policy paper on sustainable tourism.

### *3.4.2. Legislation, regulations and other regulatory instruments*

There are national ordinances on nature and environment, one in force, the other still a draft.

The National Nature Conservation Ordinance:[36]

| **Regulates:** | **Implements:** |
|---|---|
| Protection of flora and fauna | - Inter-American Convention for the Protection and conservation of Sea-Turtles<br>- Bonn Convention on Migratory Species |
| Conservation of biodiversity | Convention on Biological Diversity |
| Management and conservation of habitats and ecosystems | - Ramsar Convention on Wetlands of International Importance<br>- Specially Protected Areas and Wildlife (SPAW) Protocol of the Cartagena Convention |
| Trade in endangered species | CITES or Washington Convention |

At the national level there is also legislation concerning fisheries, export of CFCs, avoiding pollution from ships, civil liability of oil tankers, etc.

The draft National Environment Ordinance[37] is still awaiting enactment (since 2000), but will then:

| **Regulates:** | **Implement :** |
|---|---|
| Trade in waste and asbestos | - Basel Convention on transboundary movement and disposal of hazardous waste<br>- Rotterdam Convention on international trade of (and exchange of information on) hazardous substances |
| Trade in CFCs | Convention to protect the Ozone Layer and its Montreal Protocol which regulates use and trade in CFCs |
| Pollution/ set environmental standards for air, noise, waste water, water quality, waste | - The Cartagena convention[38] for the Protection and Development of the Marine Environment of the Wider Caribbean Region<br>- Framework Convention on Climate Change to reduce climate change |
| Sea pollution and Oil Spills | - The 3rd Protocol to the Cartagena Convention on Land-Based Sources of Marine Pollution<br>- Oil Spill Protocol to the Cartagena Convention |

At the island level many legislative acts have been adopted:

| **Island** | **Adopted** |
|---|---|
| Bonaire | - A Nature Policy Plan, implementing legislation of the Nature Ordinance<br>- A Marine Environment Ordinance<br>- A regulation for waste, emissions<br>- A regulation on physical planning |

[36] *Landsverordening Grondslagen Natuurbeheer en Bescherming,* 1998*.*
[37] *Landsverordening Grondslagen Milieubeheer,* 2000*.*
[38] Convention for the Protection and Development of the Marine Environment of the Wider Caribbean region

| Island | Adopted |
|---|---|
| Curaçao | - A regulations on building and planning<br>- Legislation on allowed emissions.<br>- Legislation on coral reefs, forbids removing orals, protects the species living in the reefs |
| Saba | - Legislation protecting the marine environment<br>- Established the protected Saba National Marine Park around the island.<br>- Legislation protecting coral reefs: forbids anchoring in reefs and otherwise killing, breaking, catching or collecting corals<br>- Legislation that forbids fishing with certain devices, regulates catches of conch and turtles, etc.<br>- A separate Fisheries regulation<br>- Legislation protecting certain species and regulating other aspects of nature conservation.<br>- An ordinance on the identification and registration of livestock and domestic animals. |
| Statia | - A Regulation for the marine areas around the island<br>- A Regulation protecting fauna and flora, for crabs in particular |
| St Maarten | - Legislation on waste, on physical planning and on nature parks and the protection of flora and fauna |

All these laws can be consulted on www.mina.vomil.na.

*3.4.3. Economic instruments*

There is a special tax facility "Netherlands Antilles and Aruba Green Projects Regulations" which is an extension of the Dutch Green Projects Regulation. It makes it possible to invest savings in 'green projects' and receive a tax deduction under this special facility. In this way the usually lower interest rates on investments in innovative and ecologically sound projects are compensated. On Curaçao there is a tax on vehicles that is used to pay for the export of old cars.

*3.4.4. Voluntary instruments*

Some hotels and companies have ISO 14000 certification.

*3.4.5. Information instruments*

- Extensive information about environmental issues, policy and legislation is available on the website of the Department of Environment and Nature (www.mina.vomil.na),
- The important coalition of nature organisations DCN A (Dutch Caribbean Nature Alliance) has a site with much information on nature parks and nature initiatives (www.dcnanature.org).
- Other NGOs who provide information are:
  - On Curaçao: Amigu de Tera (Friends of the Earth), SMOC (Action group on environmental pollution refinery), Human Care Foundation (environmental pollution refinery);
  - On Bonaire: Alianza (mainly conservation) and on St Maarten; St Maarten Pride foundation; Heritage Foundation.
- The Dutch IUCN gives a complete overview of nature on the islands (www.iucn.nl).
- On Bonaire and Curaçao (and less on St Maarten) there are environmental programmes in schools.

## 3.5 Monitoring

The Meteorological Service in Curacao provides a hurricane warning service.

There is very little environmental monitoring at present, and the development of monitoring activities is addressed in the National Nature Plan 2004-2007. Some NGOs (e.g. NACRI) monitor the state of nature parks and coral reefs on a voluntary basis.

### 3.6 Enforcement

There is a general lack of enforcement of existing environmental legislation.

### 3.7 Conclusion on the administrative and political setting

The government of the Dutch Antilles has a federal structure with governments at territorial (central) level and at island's level. Policy-making and legislation are required at both territorial and insular levels This fragmentation makes environmental policy making complex, time consuming and cumbersome. In practice it means that policy is often not implemented. Environmental policies require an integrated approach, physical planning (not available in most islands) and a good insight in the carrying capacity of each island (not available).

The territorial level is responsible for the environment and conservation of nature, as obligations **"derive from international treaties**."[39] The implementation is left to the islands. All islands have some basic legislation for fisheries, marine resources conservation, waste. Only one island (Bonaire) has complied fully with the National Nature Conservation Ordinance which requires each island not only to formulate an island nature policy plan, but also an island nature ordinance implementing legislation that is required by the various international treaties.

## 4. International cooperation

The Dutch Antilles have international co-operation agreements at several levels: with the Netherlands, in the Caribbean, at the UN level (SIDS Small Island Developing States and UNDP Poverty assessment), EU (9th EDF) and World Bank. the National Environment and Nature Plan 2004-2007 will need € 5.2 million for the coming years and central government assumes that € 4.5 million of this will come from abroad.

### 4.1 Cooperation with the Netherlands

Several Dutch ministries provide technical assistance and funding:

- KNAP fund (jointly financed by the central government and the Dutch Ministry of Agriculture, Nature and Food Safety and the Dutch ministry for Administrative Reform and Overseas Relations) was created in 1995 to support small nature conservation and education projects from civil society. It has a total budget of €50,000. Project proposals can be in the area of public awareness or education, conservation management, research/ monitoring, or for publications. Demonstration projects which can be replicated elsewhere in the islands, or projects that pave the way for larger projects financed by other sources are particularly sought.
- The MINA fund was set up in 1996, financed by the central government and the Dutch Ministries of Housing, Planning and Environment; and Administrative Reform and Overseas Relations. Its €70,000 supports projects on environmental care and sustainability.

The Netherlands funds nature conservation by NGOs in the Antilles in an innovative manner. The Dutch government recently committed €10 million to a Trust Fund for DCNA (Dutch Caribbean Nature Alliance). Other charities are now also putting money into this fund (national Lottery, IUCN, WWF). Such a construction avoids complicated project selection and disbursement procedures by civil servants. The trust fund is managed by an independent board and disburses only the interest earned by the fund.

[39] Article 2, paragraph e, section 10 of the Island Regulation of the Netherlands Antilles (ERNA. 1998)

## 4.2 Cooperation with the EU

The Council Decision on the association of OCTs with the EU, which governs EU-OCT relations, supports co-operation and development projects. In the framework of the 9th EDF, the Dutch Antilles is focusing on fostering sustained economic growth and accelerating social recovery over the long term. Incentives to small companies, more attention to education, health, crime and in particular building new infrastructures in deprived areas are sought.

EU funding is not addressing the main environmental threats head-on. But improvement of the urban infrastructure for socially deprived areas will include improvements in water supply, drainage, roads, electricity and promotion of innovative house-building technologies. Some of these measures will have a positive effect on the environment.

## 4.3 Other international cooperation and Multilateral Environmental Agreements (MEAs)

The Kingdom of the Netherlands is signatory and party to various multilateral environmental agreements. The Dutch Minister of Foreign Affairs represents the Kingdom and signs. Each country or territory can decide independently whether to join and implement such agreements. Aruba and the Dutch Antilles are autonomous when it concerns internal affairs and the environment.

The Netherlands Antilles participates in the following MEAs:

| MEA | Remarks |
|---|---|
| Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | Convention, together with the Oil Spills and SPAW Protocols will be implemented in national law when the National Nature Protection Ordinance is passed. However full implementation will have to await legislation at the island level. |
| Convention on Biological Diversity (CBD) | Enabling law is included in the National Nature Conservation Ordinance, but for full implementation island legislation is required. |
| Ramsar Convention | The NL Antilles has five listed Ramsar sites, all on Bonaire (De Slagbaai, Het Gotomeer, Het Lac, Het Pekelmeer, Klein Bonaire Island & adjacent sea) |
| CITES | Requirements implemented through the National Nature Conservation Ordinance by directly referring to the relevant texts in the convention text. |
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) | Enabling law is included in the National Nature Conservation Ordinance, but for full implementation island legislation is required. |

The territory is also considering participating in several other MEAs, including the Basel Convention, the Montreal Protocol and the UNFCCC/Kyoto Protocol, and has included a number of implementing provisions in the Nature Protection Ordinance.

Although a number of MEAs have been extended to the Netherlands Antilles, full implementation is being handicapped by the decentralised nature of the environmental/conservation portfolio in the country.

## 4.4 Other funding by international community for environmental projects

No information found.

## 4.5 Other international cooperation on the environment

The NACRI network (Netherlands Antilles Coral Reefs Initiative) that is linked to the international ICRI (International Coral Reef Initiative) network and the French IFRECOR (*Initiative Française pour les Récifs Corraliens*) have been useful settings for protecting the marine environment.

## 5. Conclusions and Recommendations

At territorial level there are legislation and action plans for nature conservation, but these are only framework instruments, and are often not being implemented at island level. Shortages of human resources, funds, public support and political will may all have a role in this. The problem is probably being compounded by likely future changes in the political status of the territory.

Recommendations:

1. Legislation:
- Introduction of legislation on land-use and physical planning, essential for sustainable development.
- Introduction of mandatory EIAs in accordance with modern standards of good practice.
- Legislation is needed at territorial and island levels which implements the designation and management of protected areas so that the Netherlands Antilles can more effectively conserve habitats and wildlife, meet its obligations under the MEAs and boost tourism.
- Support to full implementation of MEAs either by assisting the islands to make and implement their own adequate laws, or by increasing responsibilities at territorial level.

2. Administrative reform:
- Clarity on the future of Curacao and St Maarten (who want *status aparte*) and the other islands who want to move closer to the Netherlands. Ensuring greater policy effectiveness in any future constitutional arrangements.
- Less fragmentation of environmental policy-making between territory and individual islands.

3. The oil refinery on Curaçao represents a possible major threat to the health and well-being of nearby residents and to the environment. Of particular concern is air pollution and the ‘asphalt lake’, a legacy from the past and possible environmental time-bomb. The impacts are at present poorly understood. An air quality monitoring system needs to be established to see what the air quality actually is. Air quality standards are needed and means identified of meeting them. The impacts (present and future) of the asphalt lake need to be assessed and remediation options identified and costed.

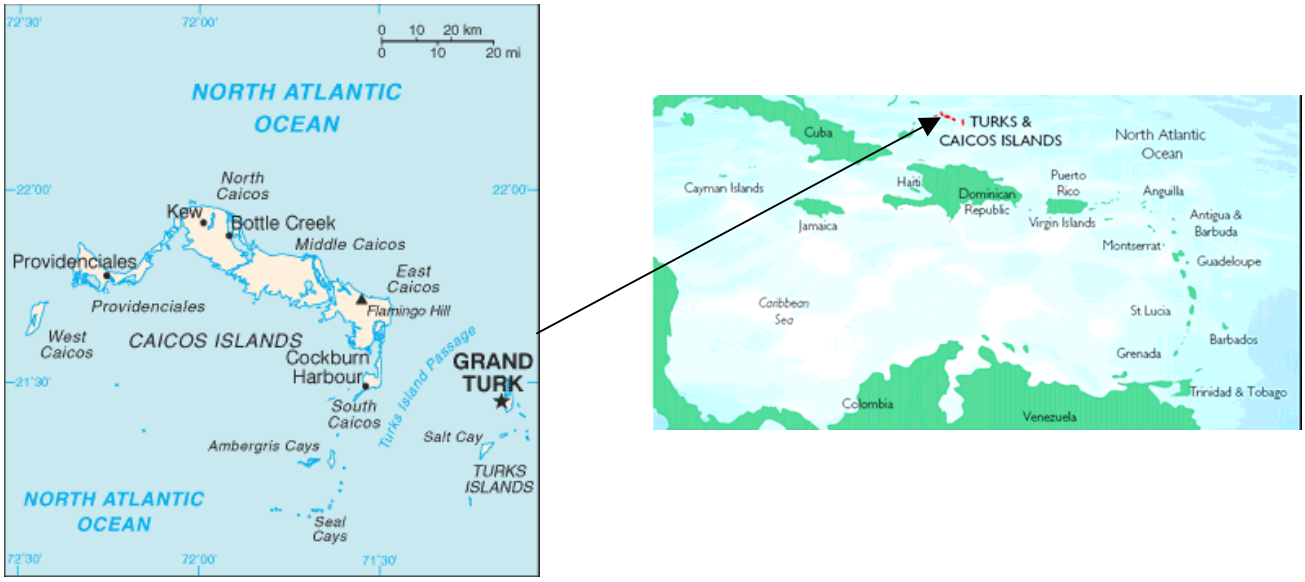
# ANNEX G: ENVIRONMENTAL PROFILE -

# TURKS & CAICOS ISLANDS

## 0. Summary

Like many other Antillean islands, the Turks and Caicos Islands are highly dependent on tourism, and are concentrating particularly on the higher end of the tourist market. Development, particularly of the tourist industry, is taking place very rapidly. There are some mechanisms in place to ensure that this development takes place sustainably, such as a comprehensive protected areas system, various pieces of environmental legislation and guidelines for Environmental Impact Assessment . However, there is a need for further improvement and strengthening of existing laws and policies. Currently authorities are in the process of preparing a Ten Year Economic Development Plan, which is aimed at addressing critical development issues in a consistent and sustainable manner.

## 1. Background information




### 1.1 Key facts and statistics

| | |
|---|---|
| Name of Territory | Turks & Caicos Islands |
| Region | Caribbean |
| Land area | 500 $km^2$ |
| Exclusive economic zone | 200 nm |
| Population | 33,000 (estimate 2003) |
| GNP/capita | €14,173 |
| Literacy rate | 95% |
| Unemployment rate | 5% |

### 1.2 Constitution

The Turks and Caicos Islands are an internally self-governing British Overseas Territory with a ministerial system of government. The 1988 Constitution provides for a Governor appointed by HM the Queen, an Executive Council (ExCo) and an elected Legislative Council (Legco). The Governor is responsible for external affairs, defence, internal security, offshore finance and certain other matters but is otherwise normally required to act on the advice of ExCo.

There is a ministerial system including the Chief Minister and five Ministers with the responsibility for the business of government exercised in accordance with policies decided by ExCo.

The Governor is President of ExCo, which comprises of nine members:

Six of which are appointed by the Governor from the elected members of LegCo.
The other three, The Governor, Chief Secretary and the Attorney General, are ex-officio members.

LegCo is comprised of 19 members, 13 elected members, 3 nominated members, 2 ex-officio (Chief Secretary and Attorney General) plus the Speaker.

In August 2006, with wide support from the TCI population, a new constitution came into effect. A number of areas where addressed to modernise the TCI Constitution including replacing the position of Chief Minister by that of Premier and the creation of a Deputy Governor. The Chief Secretary position was abolished. ExCo was renamed the Cabinet and LegCo became the House of Assembly which, after the next election, will have 21 members: 15 elected members, 4 nominated members, 1 ex-offico (the Attorney General) plus the Speaker.

The legal system is based on laws of England and Wales, with a few adopted from Jamaica and the Bahamas, and locally enacted ordinances.

## 1.3 Physical geography

The TCI consist of two Caribbean archipelagos southeast of the Bahamas, north of Haiti. Each archipelago lies on a shallow bank with deep ocean between them. The Caicos Bank is the larger of the two, covering some 8,000 km2. Water depth ranges from a few centimetres along the inland coasts of the Caicos Islands to 20–30 m at the edge of the trench. TCI is made up of over 40 islands, cays and sandbanks of which eight are inhabited. They are low, flat limestone formations with extensive marshes and mangrove swamps. Over half the land area comprises wetlands. More than half the land area is either below sea level or just above sea level, and more than 70% of the settlements are located on coastal lowland. Blue Mountain, Providenciales, is the highest point rising to 49m.

Most of the population of TCI is on Providenciales, with significant numbers also on Grand Turk, South Caicos and North Caicos, and smaller communities on Middle Caicos and Salt Cay. Providenciales is now the commercial centre of the country, with the government remaining largely at Grand Turk. Several other islands have small full time occupants: West Caicos, and Ambergris, Pine and Parrot Cays.

The islands have a tropical, marine climate moderated by trade winds; sunny and relatively dry. Hurricanes can occur from June to November, but the islands are more often visited by ‘tropical waves’ with their strong winds and drenching rains. TCI has limited fresh water resources: private cisterns are extensively used to collect rainwater. Reverse osmosis facilities also provide a substantial amount of water on Providenciales and Grand Turk.

The East Caicos, Middle Caicos and North Caicos wetland complex forms probably the best example of its type in the Caribbean.

## 1.4 Flora and fauna

The TCI form a complex of natural coral reefs, tidal flats, mangroves and marshlands which provide a haven for wildlife, as well as crucial life support systems for the fisheries and tourism industries. The islands provide a home for at least 20 endemic plants reptiles and insects.

Reef areas are extensive, totalling almost 1,200 sq km. The four largest islands (Providenciales, North Caicos, Middle Caicos, and East Caicos) have offshore fringing reefs along their entire northern coasts. The three larger islands in the eastern part of the chain have fringing reefs along their eastern coasts, and reefs are also found along the western coast of West Caicos. Shallow-water patch reefs are common around all of the islands and cays. TCI possesses some of the least adversely affected coral reefs in the

Caribbean region. The majority of the reefs are still healthy, but are showing signs of declining health due to natural and anthropogenic causes. Generally the decline in reef health can be attributed to the naturally high nutrient background, and to a lesser extent diving and coastal development.

Vast areas of the Caicos Bank are covered by bare sand, fleshy and calcareous algae, and seagrass. These habitats are crucially important as nursery grounds for conch and lobster but, because of the size of the areas in question (thousands of $km^2$) and their remoteness from population centres, they are not under much threat.

Mangrove stands grow along the inland margin of the islands fringing the Caicos Bank.

The East Caicos, Middle Caicos and North Caicos wetland complex is considered the best example of its type in the Caribbean, and is a Ramsar site. The natural wetlands formerly extended to the neighbouring islands of Providenciales and South Caicos. On Providenciales, some of the wetlands have suffered severe environmental degradation as a result of rapid development for real estate and tourism, although areas of value remain through the protected area and national parks system. A further threat to the natural environment is posed by proposals for large-scale developments on the uninhabited islands, currently prime habitats for endemic species such as rock iguana and the remaining breeding sites for turtles. Fortunately, environmental guidelines have been established based on comprehensive EIAs carried out for these developments. For example, in Ambergris Cay, which is an ecologically sensitive area, motor vehicles and feral animals are prohibited to ensure protection of the Rock Iguana. In addition, the DECR has developed national environmental standards for development.

The islands support a range of vegetation types. The Caicos Islands are relatively fertile, and support an understorey of scrub bush and cacti below a canopy of low trees, while the Turk Islands have an unproductive, fine, sandy dune topsoil which supports a sparse vegetation of sedge and cacti. This 'scrub-like' forest is actually one of the most threatened tropical forest types, dwarf dry tropical forest. This forest type covers some 90% of the total land area. Pine forests are particularly noteworthy on North Caicos, Middle Caicos and Pine Cay but matured forest stands are rare in many places because of past high demand for fuel wood and charcoal. The Pine Forest is also suffering from an apparently introduced fungal infection.

Source: DECR website: Brown pelican, National bird of TCI

204 species of bird have been recorded on TCI, of which 58 breeding and further 110 regularly occurring non-breeding species The small cays of both the Caicos and the Turks Banks, as well as some cliffs and stacks of the main islands, are important breeding sites for substantial numbers of seabirds. For some species, these are the largest recorded colonies in the Caribbean. Two threatened species of wetland bird are found on the islands: the non-breeding Kirtland's warbler (VU) and the breeding West Indian whistling duck (VU). But the dry woodlands also support important breeding populations of characteristic local birds, some widespread but others endemic to the islands (sometimes including the Bahamas, Cuba or Hispaniola).

Three species of gecko, Turk island boa, Ambergris Cay dwarf boa, the iguana *Leiocephalus psammodromus* and the Turks and Caicos ground iguana (CR) are endemic to TCI. The iguanas are preyed upon by domestic animals (cats, dogs, livestock) however, and iguanas are generally not found where these domestic animals occur, or occurred in the past. Big Ambergris Cay is the largest island refuge for the endemic iguanas, supporting more than 50% of the total estimated population. Marine turtles are common, nesting on many of the cays. Hawksbill, loggerhead and green turtles are considered to be moderately abundant but declining.

During November to March migrating humpback whales (VU) move through the deep Turks Island Passage on their way south to their breeding grounds. Sperm whales (VU), sei whales (EN) and manatees may occasionally also occur in TCI waters.

## 1.5 Demography, socio-economy

The population, currently estimated to be around 33,000, is growing at 5% per year due mainly to significant immigration from neighbouring countries Haiti, Dominican Republic and Jamaica and from South-East Asia to meet demand for construction and hotel service works in the construction and tourism sectors. More than half the population is foreign, especially from Haiti and the Dominican Republic. Most of the people are of African descent, the rest being of mixed or European origin.

Tourism is the main economic activity in the Turks and Caicos Tourist arrivals now exceed 200,000 annually, more than half of which are Americans. When taking into consideration cruise arrivals of about 200,000 the total number of visitors to TCI during 2006 will surpass 400,000.

Offshore finance is TCI's second largest source of external revenue after tourism, and is a major source of government revenue. Recently, the sector has been challenged by a number of international investigations and in response the authorities have strengthen regulations of the sector. The government is in the process of considering legislation for new products and increasing marketing and promotion sector jointly with the private sector to increase the competitiveness of the sector and its contribution to gross domestic product. Constitutional responsibility for TCI's offshore finance sector rests with the Governor. The mainstays of the industry are trusts and insurance companies: seven banks are licensed to operate in TCI.

Fishing is an important industry to TCI both economically and socially. Most of the product is exported to the USA. The commercial fisheries occur mainly on the Caicos Bank. Catches are dominated by lobster and queen conch. Other finfish species such as grouper, snapper and large pelagics are caught, but in smaller amounts, for local consumption or by sports anglers. Current catch levels are considerable below historic peaks. This is presumed to be due to overfishing. The situation was exacerbated by destructive practices. In 1999 the DECR estimated that over 40 % of the annual catch in lobster by fishers was below the minimum size and noxious substance such as bleach and gasoline were and probably still are widely used to drive lobsters out of the reefs. However with the increase in enforcement and the introduction of a bleaching test kit, these practices have declined significantly. In addition, in 2004 TCIG enacted legislation to prohibit the sale of lobster during the closed season, together with a zero tolerance enforcement policy. Lobster catch has gone up by 5.3 % since these mechanisms have been implemented. Other initiatives taken by TCIG to sustainably manage the fisheries resources include the adoption of the National Fisheries Policies. The Policy endorses a diversification strategy for the fisheries that aims at expanding into the EU market, promote aquaculture and producing value added products. There is little overexploitation of reef fishes, although there are concerns about poaching. As part of the diversification strategy TCIG have been promoting the expansion into the scale fish industry and have been endorsing Licences for Turks and Caicos Fishers to engage in commercial fishing on the Mouchoir Bank. This is also hoped to reduce poaching in this area.

The Government is also promoting aquaculture as part of its Fisheries Diversification Strategy. To date there is a Conch Farm established on Providenciales and another is proposed for Grand Turk. Further there is a proposal to establish an aquaculture farm on North Caicos to farm various marine products. The diversification of the fisheries sector is also captured in the Ten Year National Socio-economic Development Plan, which is currently being prepared. Here it is seen as way of deepening the sector to increase its local value added and employment generation prospects.

Limited rainfall, coupled with poor soils and a limestone base, restrict the possibilities for agricultural development, which is most at the subsistence level. This notwithstanding, with technical assistance from the United Nations Development Program, the government is promoting agriculture development in the lesser developed Caicos Islands (Middle Caicos and North Caicos) and a pilot agriculture 'demonstration farm' and extension service has been established on North Caicos to promotion commercial farming.

Most capital goods and food for domestic consumption are imported. Foreign investors, mainly from Canada, the UK and the USA, play a significant role in the Islands' economic life. The main areas of private investment are tourism, property development, real estate, international finance and fishing.

## 2. Main environmental challenges

### 2.1 Overview

The importance of the tourist industry and the very low altitude of the land mean that climate change poses a critical threat to TCI. The rapid development of the islands as a tourist centre is leading to a loss of characteristic features of the islands such as ground cover, mangrove stands and seagrass which maintain their physical integrity and comprise habitats for the rich characteristic wildlife. But this extensive development is centred, to a large degree, on Providenciales  Habitat loss in the rest of the Caicos Islands is minimal so far.

Fresh water is a valued resource and effective management will be an increasing challenge as the islands develop. Potable water in TCI is mainly obtained from private and public rainwater cisterns and through reverse osmosis desalination distributed by truck. On Grand Turk, Providenciales and South Caicos there are some piped water systems. The public water supply is chlorinated and regularly checked for chemical and bacterial contamination. With regard to sanitation most households use septic tank systems or pit latrines. However large facilities such as hotels and newer coastal developments have mechanical treatment plants.

Waste is disposed in landfills. In 2004 TCI was awarded a loan by the Caribbean Development Bank for a feasibility study for an integrated solid waste management system with detailed cost estimates and designs. To improve the overall efficiency and performance of the existing waste collection and disposal system the Government has decided to involve the private sector in these services.  This includes privatising the municipal solid waste collection service as well as establishing safe and environmentally sound landfill system.

### 2.2 Main challenges

**Challenge 1 Climate change SEVERE**
Climate change is expected to have a whole raft of adverse effects in many countries, but these effects are likely to be particularly severe in small tropical islands. Section 3.2 in the main section of this report summarises the main impacts and implications of climate change for small Caribbean islands. The table below applies this general analysis to the specific circumstances of the TCI.

| Impact | Sev-erity | Comments |
|---|---|---|
| Inundation of coastal land | ● | The islands are generally very low-lying and therefore vulnerable to rising sea-level. More than half the land area is either below sea level or just above sea level, and more than 70% of the settlements are located on coastal lowland. The potential loss of beaches is a serious threat for the tourist industry. |
| Stressed fisheries | ⭘ | The islands' fishery industry is dependent on the conch and lobster fisheries on the Caicos Bank. Climate change may affect these fisheries in unpredictable ways. |
| Coral reefs threatened (bleaching, decreasing pH) | ● | Islands ringed by coral reefs, presently still in reasonable condition, but already subject to multiple threats. Coral bleaching events are already becoming more frequent and much more severe. |
| Damage to mangroves | ⭘ | Extensive mangrove occurs on the islands, which may be threatened by a rise in sea-level. |
| Salinisation of groundwater | ⭘ | Islands already have limited groundwater resources. |

| Impact | Sev-erity | Comments |
|---|---|---|
| Tourist industry | ● | Tourist industry accounts for 50% of GDP. Reef tourism and fishing are important attractions. |
| More frequent and more intense storms | ● | This poses a severe threat given the geography of the islands and their presence within the Caribbean hurricane zone. |
| ○ Nil | ○ Slight | ○ Moderate ● Heavy | |

TCI is particularly vulnerable to the threat of global warming given their dependence on the tourist industry. Furthermore the islands are low-lying, and are therefore particularly vulnerable to the rising sea-level due to climate change, quite apart from other threats posed by this phenomenon.

Source: UNESCO CSI. Erosion at a leeward beach on Providenciales resulted in the collapse of this swimming pool, 2001

The islands are very extensively fringed by coral reefs, which are a crucial component in the delicate ecosystem found there, are very important as a tourist attraction and therefore to livelihoods on the island, as a fish nursery and as a natural buffer area protecting the islands from sea damage during storms. Damage to seagrass and mangroves means further destruction of fish spawning grounds and a further loss of protection from the sea. Climate change also poses a threat to TCI beaches. A rise in sea level may lead to chronic erosion and inundation of beaches, while more severe storms may lead to direct damage.

**Challenge 2 Halting environmental and habitat degradation due to development SEVERE**

The economic growth and well-being of TCI is linked strongly with the tourist industry. The islands have established a market niche as an unspoilt up-market resort, and on Grand Turk cruise-ship tourism is growing particularly rapidly. Growth in the sector has contributed to high economic growth, employment, government revenue and the quality of life of residents. It is widely recognised that the tourism industry is dependent on preserving the natural beauty and diversity of wildlife of the islands and surrounding ocean.

However the rapid growth is placing strains on the natural environment. Tourist development, once largely restricted to the main centre in Providenciales, is taking place on many of the islands. Hence the urgency for a new Physical Development Plan that addresses current issues. TCIG has recently approved for preparation of a Ten Year Physical and Sustainable Development Plan to ensure that the integrity of the natural environment is not compromised as a result of the rapid growth in development. Development pressures can cause progressive degradation in the environment, leading to adverse effects on livelihoods and on the physical and economic well-being of the islands. Section 3.3 of the regional section of this report describes some of these processes. Amongst the pressures created by this rapid development are:

- sediments and turbidity in sea water caused by human activities, including dredging, clearance of mangrove forest, sand removal from beaches, shoreline building, etc. This harms coral, seagrass, etc.;
- increasing seepage of treated effluents into the coastal waters. This can lead to poor quality bathing waters, algal growth and high nutrient loadings which are not well tolerated by coral;
- damage resulting directly by tourism: this includes mechanical breakage by scuba divers and snorkellers, damage caused by ships' anchors;
- increased volumes of waste are being generated, overburdening the present inadequate waste management systems;
- disturbance of wildlife;
- tourist vessels are causing oil spills;
- tourist development on previously uninhabited islands is disturbing wildlife.

The policy instruments for ensuring that this development is sustainable are not strong enough at present:

1. Although for many large projects an environmental impact assessment (EIA) has been carried out, the procedures and standards are not yet properly defined which are necessary to ensure this important safeguard has teeth.

2. Salinas are regarded by some potential developers as wasteland rather than the unique resource that they are. The most important ones are proposed to be included in the Protected Areas for both their historic interest and as a major wildlife feature. The TCI Government Development Manual requires an Environmental Impact Assessment for any development in a salina.

3. There is an action plan to guide the implementation of the Environment Charter which constitutes the work plan for the Environment Charter Working Group

4. The protected areas system has not yet been fully implemented (see section 3.4).

5. There is no legal protection for threatened reptiles except within protected areas where all species are protected. Lack of enforcement is a major problem for species legislation.

*Other environmental problems*

Little information has been obtained on waste management on TCI, but since a loan has been obtained from the CDB for a feasibility study for an integrated solid waste management system, it is assumed that there a significant problems in this area at present.

# 3. Environmental policies and institutions

## 3.1 Institutional structure, manpower and budgets

The Department of Environment and Coastal Resources (DECR) is responsible for conservation, protection and management of the territory's natural resources. The Department is divided into two divisions: the Protected Areas Division oversees the management of national parks, nature reserves, sanctuaries and historic areas. The Fisheries Division is responsible for the management and conservation of fish populations and habitats. In particular, the Division monitors the catches of lobster and conch and regulates successful quota systems for both local use and export. The focus of activities for the Fisheries Division is the maintenance of a profitable and sustainable fishery. The two Divisions work closely together and are also involved in research and assessment, planning, public awareness, policy and legislation development and enforcement.

The DECR also assesses and monitors development activities for possible environmental impacts and fulfils a public information function. It is also responsible for maintaining the marine and terrestrial park boundary markers, signs and regulatory buoys and the many permanent moorings for recreational vessels installed around the islands.

The Turks & Caicos National Trust is a statutory, independent organisation responsible for safeguarding the environmental, cultural and historical heritage of the islands. It is governed by an elected Council which includes representatives from all the inhabited islands. The Trust works in partnership with the government, local businesses, national and international conservation organisations, schools and the community. The Trust is supported by membership fees, government grants, private sponsorship, project grants and funds self-generated through projects and initiatives. The Trust manages some of the Protected Areas. It carries out a range of activities including education and public awareness.

Statutory protected areas have existed since the early 1990s, Because of this, the UK's Department for International Development (DfID) funded for several years from 1998 a project – the Coastal Resources Management Project (CRMP) – with the TCI Government, to develop and implement management plans

for three of the Turks and Caicos Islands' marine National Parks, in the seas adjacent to Providenciales and West Caicos. In May 2006 the Executive Council approved the Management Plan for the Columbus Landfall National Park and other Protected Areas in and around Grand Turk, prepared and being implemented by DECR. Meanwhile, the National Trust has centred on terrestrial and wetland areas, developing in the mid-1990s the effective management of Little Water Cay, as well as several historic sites. Jointly with the local community, the UK Overseas Territories Conservation Forum and some of the other member bodies of that, and with support from the UK Government's Darwin Initiative and Environment Fund for Overseas Territories, it has developed a management plan (available at www.ukotcf.org) for the large Ramsar site on North, Middle and East Caicos and its surroundings. The Trust has started implementation of this plan.

The decision to gazette a protected area is the responsibility of the Cabinet, which is advised by the National Conservation Committee..

TCI benefits from having a newly established Conservation Fund. This is funded by a 1% addition to the previously existing 8% tax on visitors, charged mainly on accommodation and meals. This provides a mechanism for ongoing funding for the management of Protected Areas. The ways of implementing this in detail are still being developed.

The Department of Environmental Health is responsible for, amongst other matters, monitoring the water supplies and solid waste collection and disposal. Environmental health officers are stationed throughout the islands. The Public Environmental Laboratory, the main laboratory within the National Public Health Laboratory System, monitors environmental quality.

### 3.2 Mechanisms for integrating environment into development

On 26 Sept 2001 TCI, like other UK overseas territories, signed with the UK government Environment Charters which include statements of principles and undertakings by both parties on integrating environmental protection into all sectors of policy planning and implementation. TCI's first undertaking was to formulate a detailed strategy for action, and the UK government's first undertaking was to help build capacity to support and implement integrated environmental management. Informally the territories have made it clear that there is a need for support in developing these strategies for action. A project was carried out by which the UK OTCF facilitated the formulation of a detailed strategy for action. The idea was that this exercise should serve as an example for other UK overseas territories. The result of this exercise was an ambitious and fairly detailed blueprint of the steps needed to comply with the Charter: 'Guidelines for the development of a strategy for action to implement an environment charter' (TCIG *et al*, 2003).

During 2006, the Department of Economic Planning and Statistics and the DECR collaborated in publishing a statistical report on the environment intituled 'TCI Environment: A Closer a Look." The TCI is only one of three Caribbean countries to publish a statistical report on the environment. This publication is available online on the websites of both departments.

Adequate statutory procedures for EIA still have not been established.

### 3.3 Environmental strategy and policy

In 2003 TCI finalised its Strategy for the Implementation of the Environment Charter. Since, TCIG has established an Environment Charter Working Group which consists of relevant government agencies, including the director of the Planning Department, Department of Economic Planning and Statistics, Environmental Health, the DECR, representatives from the AG's Chamber and the Governor's Office, the National Trust and the Museum. The group have been charged with the task of ensure that the objectives as laid out in the strategy are accomplished. In addition a wide participatory planning exercise is currently underway led by the Department of Economic Planning and Statistics and Planning Department, facilitated and coordinated by consultants, to prepare a 10-Year National Development Plan for the Turks

and Caicos Islands [Social and Economic Development Plan and National Physical Development]. The Social and Economic Development plan is to be implemented in rolling three year stages and should inform the preparation of future national budgets. Development Plans for particular Islands Islands will also be produced. A new National Physical Development Plan is also being prepared and is being led by the Planning Department.

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The Environment Charter contains a statement by both the government of the TCI and the UK government of their commitments in relation to the environment. Progress is being made by the TCI on many of its Charter commitments, but this has not yet been formalised in terms of an implementation plan.

TCI is also in the process of developing a Protected Areas Policy, which will have as an annex the SPAW protocol and other key policies and conventions that develop over time rather than create new legislation.

The government has produced a policy for the management and development of the fisheries sector (DECR, 2004).

An Endangered Species Bill is in the process of being ratified which will expand the CITES convention to the TCI.

### 3.4 Policy instruments

The legislation most relevant to environmental protection in TCI is indicated in the table below.

| Item of legislation | Comments / detail |
|---|---|
| National Parks and Protected Areas Ordinance, rev. 1998 | Establishes regulations for four different categories of protected area, i.e. national park (ecosystem and biological conservation with emphasis on recreation), nature reserve (ecosystem and biological conservation with recreation as a subsidiary goal), sanctuary (protection of the natural ecology, or animal or plant, and the avoidance of disturbance by people) and area of historic interest. To date 11 national parks, 11 national reserves, 4 sanctuaries and 7 historic areas have been designated, and these occupy one-third of the total land area and a large proportion of inshore waters and reefs. But the provisions of the Ordinance allowing the Governor to make specific regulations for the areas, provide for their management, appoint wardens, etc. have generally not yet been implemented, partly as a result of resource limitations. |
| Coast Protection Ordinance, rev.1998 | Provides protection for the coastal zone. Minerals may only be removed from coast with a licence. No depositing of objects or waste on coast. |
| Fisheries Protection Ordinance, rev.1998 | The legal basis for managing fishery resources. Provides for licences, minimum size of caught fish, close seasons, restrictions on gear. Regulations can be made to protect specific marine species. legal protection for sea turtles is provided by this legislation. A minimum size for take is specified, eggs are totally protected as are turtles on beaches. |
| Fisheries Limits Ordinance rev. 1998 | Provides for the fishery limits to be set (by a Proclamation of the Governor), and the powers of fishery officers within them. |
| National Trust Ordinance, rev.1998 | Regulates the purpose and procedures of the National Trust. It gave the Trust powers to hold land inalienable and in trust for the nation, with the ability to prepare by-laws for its protection. This is an alternative means of giving protection to areas. |
| Plant Protection Ordinance, rev. 1998 | Intended to prevent introduction of disease from the import of plants. |
| Wild Birds Protection Ordinance, rev. 1998 | This protects all wild bird species from hunting, collection or egg taking, with the exception of the migrant blue-winged teal. |
| Endangered Species Bill | At the time of writing (September 2006) this legislation is currently in its final stages, and is intended to implement CITES. |

Public awareness of the protected area system also needs to be increased. Notice-boards are urgently needed, because the protected areas are not identified on the ground and consequently few people are aware of their whereabouts and purpose

A Conservation Fund was established in 1999 to provide monetary support for management, financed by a 1 percent share of all tourist and accommodations taxes.

### 3.5 Monitoring

The DECR conducts monitoring programmes on the environment and natural resources in TCI. The DECR has several monitoring programmes in place, including, reef monitoring, beaching monitoring and fish stock assessments and the monitoring of harvested marine products.

Until recently, the DECR's capacity to carry out reef monitoring in the TCI was limited. Previously, monitoring activity was confined to ad hoc studies that were conducted by visiting researchers in collaboration with the Department. Today, however, coral reef monitoring has been outlined as a priority activity for the DECR. In 2001, the DECR contracted a private consultant to conduct long-term monitoring on several near-shore patch reefs which were being impacted by snorkellers. Since then, the DECR has also increased its technical capacity and, to date, 24 reef monitoring sites have been established.

Beach monitoring began in 1996 with 6 sites along the west coast of Grand Turk and 10 sites along the north coast of Providenciales. In 1999, an additional 3 sites were added in Providenciales and 4 established in South Caicos. The beaches are surveyed each quarter to obtain information on the width and slope.

Enforcement officers with the DECR are stationed at the five processing plants (landing sites) to inspect catches as fishermen off-load their product for commercial sale. Lobster and conch are weighed and measured for legal size and the daily catch recorded.

### 3.6 Enforcement

The National Parks Ordinance is enforced by conservation officers (11 for Fisheries Division, 5 in Protected Areas Division). Although the marine police also have an enforcement function, the activities of the latter are more oriented towards narcotics trafficking and illegal immigrants. It is understood that the lack of enforcement training of conservation officers is a constraint.

Significant steps have been taken to build capacity within the government sector to increase enforcement of fisheries and National Parks legislation. Most dive operators now install moorings to prevent anchor damage, and enforcement has improved dramatically since 2000 with regular prosecutions. The DECR owns 5 patrol vessels.

## 4. International cooperation

### 4.1 MEAs

The TCI participate in the following MEAs:

| MEA | Remarks |
|---|---|
| Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) | Extended to TCI in February 1986, including the Oil Spills Protocol. The UK FCO has provided legal advice on the extension of the Specially Protected Areas for Wildlife (SPAW) Protocol to TCI. Further species legislation will be required to implement this (SPAW). |

| MEA | Remarks |
|---|---|
| Ramsar Convention | Extended to TCI in 1976. There is presently one Ramsar site, the North, Middle, and East Caicos Islands wetland. The National Trust has begun to implement a management plan for this site. A further 7 sites have been proposed but not yet accepted. |
| CITES | **Not yet extended to TCI**. But TCI government intends to join, and a scientific panel has been informed to review research proposals, draft conservation legislation, and advise Government on CITES. The UK FCO has provided legal advice on this issue. |
| Convention on the Conservation of Migratory Species of Wild Animals (CMS) | Extended to TCI in July 1985. There is some confusion as to whether or not the UK is satisfying its obligations under this Convention with respect to the legal harvests of marine turtles in British Virgin Islands, Cayman Islands, Montserrat and the Turks and Caicos Islands. These legal harvests involve commercial trade of marine turtles that may or may not qualify as accommodating 'the needs of traditional subsistence users' (undefined in the Convention). |
| London Convention | Became effective in December 1975. |

TCI is also moving towards inclusion in the UK's ratification of the Convention on Biological Diversity and the Convention on Trade in Endangered Species. These are being progressed in the context of the development of a strategy for action to implement the Environmental Charter. Such charters were signed between the UK Government and the governments of UK Overseas Territories in September 2001. In 2002–2003, TCI provided the pilot exercise in developing a strategy for implementation, facilitated by the UK Overseas Territories Conservation Forum.

### 4.2 Access to funding by the international community for environmental and environment-related projects

The DECR and the National Trust have been working with the UKOTCF, to protect internationally significant wetlands throughout the islands.

The Turks & Caicos Islands has applied for a technical assistance loan from the Caribbean Development Bank (CDB) to help finance consulting services to conduct feasibility studies for an integrated solid waste management (SWM) system and to provide detailed cost estimates and designs. Approved by CDB July 2004.

### 4.3 Other international cooperation, membership of networks, etc. related to the environment (or environmentally sensitive sectors)

The National Trust has also continued its involvement with the Turks & Caicos Rock Iguana research conducted by the San Diego Zoo.

TCI is an associate member of the Association of Caribbean States ACS

## 5. Conclusions and Recommendations

*Sustainable tourism*
The Turks and Caicos Islands are seeking to strike a balance between using their comparative advantage in terms of the beauty and richness of its natural resources as a tourist attraction while limiting the environmental pressures and degradation which tourism entails. The survival of the island ecosystems is a precondition not only for the health of the tourism industry but the well-being of the islands as a whole. Tourism is such an important part of the TCI economy that sustainable development means sustainable tourism. Success in finding the balance will only come if the islands ensure their tourist industry is truly sustainable.

Recommended areas for cooperation between the TCI and the EU are as follows:

- Drafting of an environmental action plan with a clear indication of deadlines and assignment of responsibilities, and ensuring it is approved at the highest level.
- Ensuring the legislation is enacted necessary to give adequate protection to the key wildlife and habitats, including EIA, detailed regulations which implement the National Parks and Protected Areas Ordinance, species protection legislation to implement the SPAW Protocol, legislation to implement CITES.
- Encourage the territory to link up with and participate in other sustainable tourism and ecotourism initiatives in the region.
- Support in preparing development plans for the smaller islands with relevant development guidelines and identified protected areas.

*Climate change*

- Enter into regional and global initiatives or associations with other countries or entities which face similar threats for the purpose of drawing the attention of the world community to their special vulnerabilities.
- Identify areas where the TCI, by virtue of their special characteristics, can make a special contribution to research or monitoring of climate change, if necessary in collaboration with other international institutions.
- Align with other regional initiatives for adaptation to climate change.

*Solid waste*

- Actions to sustain momentum created by feasibility study for an integrated solid waste management system to ensure TCI advances towards a waste management system consistent with the territory's aspirations and environmental protection.