



# **Overseas Countries and Territories: Environmental Profiles**

## **FINAL REPORT**

**PART 2 – DETAILED REPORT**

**SECTION B – INDIAN OCEAN REGION**

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## ABBREVIATIONS AND ACRONYMS

ACAP	Agreement on the Conservation of Albatrosses and Petrels
ACOR	Association Française pour les Récifs Coralliens
ACP	Africa Caribbean and the Pacific
ACS	Association of Caribbean States
AEPS	Arctic Environmental Protection Strategy
AFD	French Development Agency
AMAP	Arctic Monitoring and Assessment Programme
AMOC	Atlantic Meridional Overturning Circulation
AOSIS	Alliance of Small Island States
APEC	Asia–Pacific Economic Cooperation
BAS	British Antarctic Survey
BEST	EU Voluntary Scheme for Biodiversity and Ecosystem Services in Territories of European Overseas
BRGM	Bureau de Recherches Géologiques et Minières
CAFF	Conservation of Arctic Flora and Fauna
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CARIFORUM	Caribbean Forum
CBD	Convention on Biological Diversity
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources
CCAS	Convention on Conservation of Antarctic Seals
CCC	Cod and Climate Change Programme
CCCCC	Caribbean Community Climate Change Centre
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CDS	Catch Documentation Scheme
CEHI	Caribbean Environmental Health Institute
CIDA	Canadian International Development Agency
CITES	Convention on International Trade in Endangered Species
CMS	Bonn Convention on Migratory Species
CNRS	Centre National pour la Recherche Scientifique
COLTO	Coalition of Legal Toothfish Operators
COMESA	Common market for Eastern and Southern Africa
CoP	Conference of the Parties
CPA	Country Poverty Assessment
CPACC	Caribbean Planning for Adaptation to Climate Change
CR	Critically endangered (IUCN classification)
CRAMRA	Convention on the Regulation of Antarctic Mineral Resource Activities
CRISP	Coral Reefs in the South Pacific
CROP	Council of Regional Organizations of the Pacific
CSD	Commission on Sustainable Development
CSME	Caribbean Single Market and Economy
Darwin Plus	Fuses OTEP and Darwin (OCT component) in what concerns competitive funding to deliver long-term strategic outcomes for the natural environment in the UK's Overseas Territories
DCNA	Dutch Caribbean Nature Alliance
DEFRA	Department for Environment, Food and Rural Affairs of UK government
DFID	DEPARTMENT FOR INTERNATIONAL DEVELOPMENT of UK government
DK	Denmark

DPSIR	Driver, Pressure, State, Impact and Responses
ECCB	Eastern Caribbean Central Bank
EDF	European Development Fund
EE	Energy efficiency
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EN	Endangered (IUCN classification)
ENSO	El Niño Southern Oscillation
EPA	Economic Partnership Agreement
EPD	Environment, planning and development
EPPR	Emergency Prevention, Preparedness and Response
EU	European Union
FAO	Food and Agriculture Organisation
FCO	Foreign & Commonwealth Office UK Government
FEA	Fonds pour l'Environnement et l'Agriculture
FR	France
GCRMN	Global Coral Reef Monitoring Network
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGF	Good Governance Fund
GHG	Greenhouse Gas
GIWA	Global International Water Assessment
GLIPSA	Global Islands Partnership
HMS	His Majesty's Ship
I&M	Dutch Ministry of Infrastructure and Environment
IAATO	International Association of Antarctica Tour Operators
IAC	Inter-American Convention for the Protection and Conservation of Sea Turtles
IBA	Important Bird Area
IBRD	International Bank for Reconstruction and Development
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
IDB	Inter-American Development Bank
IFRECOR	Initiative Française pour les Récifs Coralliens
IIED	International Institute for Environment and Development (UK)
IMF	International Monetary Fund
INTEGRE	Initiative des Territoires du Pacifique pour la gestion régionale de l'environnement
IOC	Indian Ocean Commission
IPCC	International Panel on Climate Change
IRD	Institut de Recherche pour le Développement (FR)
IUCN	International Union for Conservation of Nature
IUU	Illegal unregulated and unreported fishing
JCNB	Joint Commission on Narwhal and Beluga
JNCC	Joint Nature Conservation Committee UK Government
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
MDGs	Millennium Development Goals
MEA	Multilateral Environmental Agreement
MoU	Memorandum of Understanding

MPA	Marine Protected Area
MSC	Marine Stewardship Council
MSP	Marine Spatial Planning
n.a.	not available
NAFO	North Atlantic Fisheries Organisation
NAMMCO	North Atlantic Marine Mammal Commission
NBSAP	National Biodiversity Strategy and Action Plan
NEMS	National Environmental Management Strategy
NGO	Non-governmental organization
NL	Netherlands
NNR	National Nature Reserve
NT	National Trust
NZ	New Zealand
OAD	Overseas Association Decision
OAU	Organisation of African Unity
OCTA	Overseas Countries and Territories Association
OCTs	Overseas Countries and Territories
OECD	Organisation for Economic Co-operation and Development
OECS	Organisation of Eastern Caribbean States
OT	Overseas Territories (commonly used in texts from the UK)
OTCF	UK Overseas Territories Conservation Forum
OTEP	Overseas Territories Environment Programme (replaced by Darwin Plus)
PAME	Protection of the Arctic Marine Environment
PCCFAF	Pacific Climate Change Finance Assessment Framework
PECCO	Pacific Environment and Climate Change Outlook
PEP	Poverty and Environment Partnership
PGA	Plan Général d'Aménagement
PGEM	Plan de Gestion de l'Espace Maritime
PID	Pacific Islands Development Programme
PILN	Pacific Invasives Learning Network
PIP	Pacific Invasives Partnership
PNG	Papua New Guinea
POP	Persistent Organic Pollutant
PPCR	Pilot Program for Climate Resilience
PROE	Programme régional océanien de l'environnement
PWSD	Public Works and Services Department
RE	Renewable Energy
RFMO	Regional Fisheries Management Organisation
RIP	Regional Indicative Programme
RSP	Regional Seas Programme or Regional Strategy Paper
RSPB	Royal Society for the Protection of Birds
SADC	Southern Africa Development Community
SAERI	South Atlantic Environmental Research Institute
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 Organisation
SIDS	Small Island Developing States
SIDSnet	Small Island Developing States Information Network
SME	Small and Medium Enterprises

SOPAC	South Pacific Applied Geoscience Commission
SORP	Southern Ocean Research Partnership
SPA	Specially Protected Area
SPAW	Protocol concerning Specially Protected Areas and Wildlife
SPC	Secretariat of Pacific Community
SPD	Single Programming Document
SPREP	South Pacific Regional Environment Programme
SPT	South Pacific Tourism Organisation
STZC	Sustainable Tourism Zone of the Caribbean
TAC	Total Allowable Catch
TAO	Territorial Authorising Officers
TEP	Tonne Equivalent Pétrole (TEP Vertes is a climate change mitigation programme in the Pacific)
UK	United Kingdom
UKAHT	United Kingdom Antarctic Heritage Trust
UKOTA	Association of OCT linked to the UK
UKOTCF	United Kingdom Overseas Territories Conservation Forum
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Social and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
VMS	Vessel Monitoring System
VROM	Netherlands environment ministry
VU	Vulnerable (IUCN classification)
WH	World Heritage
WIDECAST	Wider Caribbean Sea Turtle Conservation Network
WRI	World Resources Institute
WTO	World Trade Organisation
WWTP	Wastewater Treatment Plant

AI	Ascension Island
ANG	Anguilla
ARU	Aruba
BAT	British Antarctic Territory
BIOT	British Indian Ocean Territory
BLM	Saint Barthelemy
BM	Bermuda
BON	Bonaire
BVI	British Virgin Islands
CAY	Cayman Island
CUW	Curaçao
FLK	Falkland Islands
FP	French Polynesia
GL	Greenland
MSR	Montserrat
NC	New Caledonia
PIT	Pitcairn
SAB	Saba
SGSSI	South Georgia and South Sandwich islands
SH	Saint Helena
SHATdC	St Helena, Ascension and Tristan da Cunha
SPM	St Pierre and Miquelon
StEus	Sint Eustatius
SXM	Sint Maarten
TAAF	French Southern and Antarctic Territories
TCI	Turks and Caicos islands
TdC	Tristan da Cunha
W&F	Wallis and Futuna

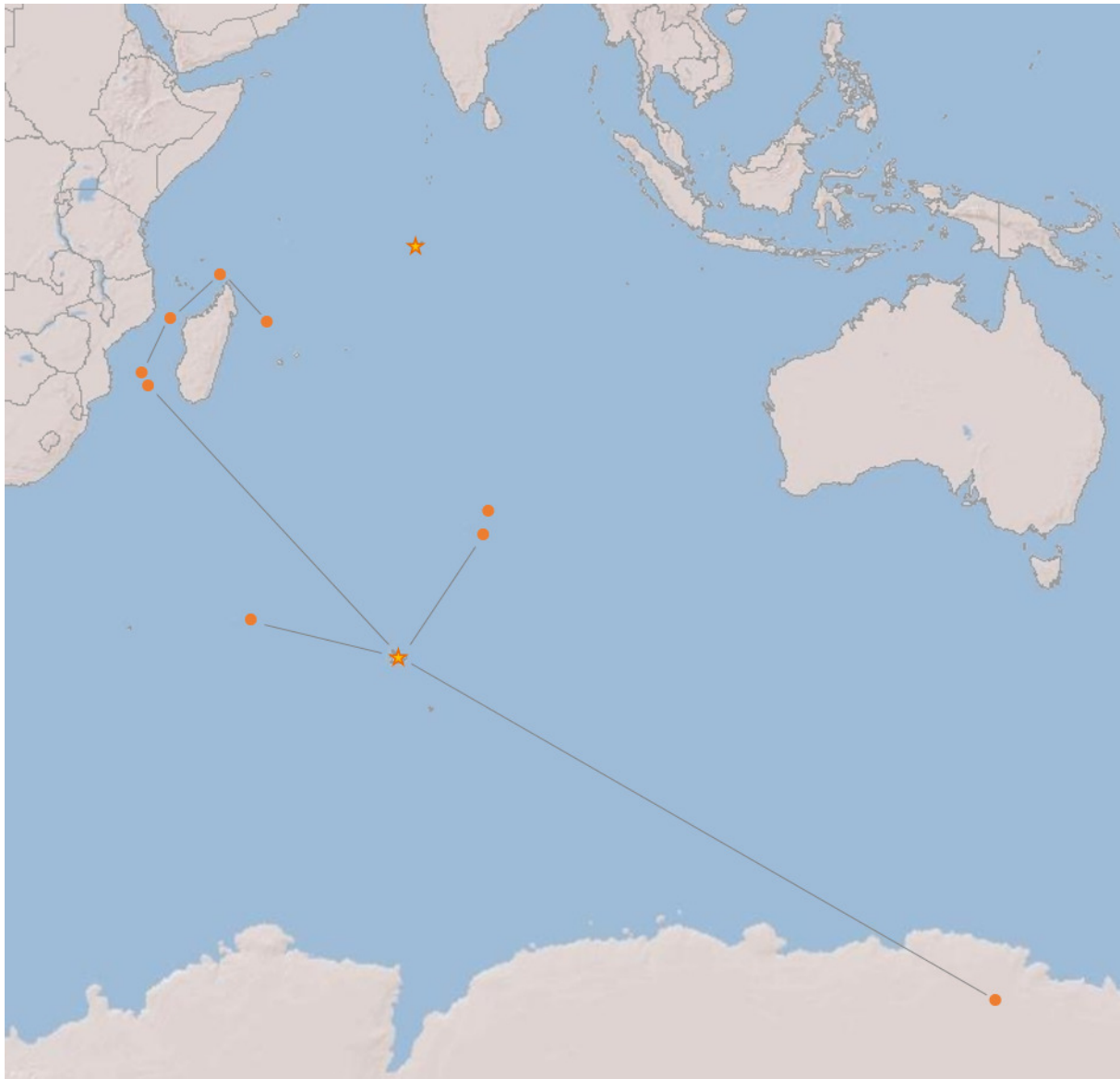
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# REGIONAL ENVIRONMENTAL PROFILE

## INDIAN OCEAN REGION



## 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 three overseas countries and territories (OCTs)<sup>1</sup> in the Indian Ocean region. There are companion volumes for the OCTs in the Caribbean, Pacific, North Atlantic and South Atlantic 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 Indian Ocean region as a whole, followed by the environmental profiles for the individual territories (Appendices A and B). The regional findings for all regions are brought together and consolidated in Part 1 - Main Report.

## 2 DESCRIPTION OF THE REGION

We here regard the Indian Ocean region as the area being bounded to the north by the Asian continent, to the west by Africa, to the east by the Malay Peninsula and Australia, but including Antarctica (Adelie Land).

There are 2 OCTs in the Indian Ocean region, namely:

- French Southern and Antarctic Territories (TAAF) associated to France;
- British Indian Ocean Territory (BIOT) associated to the UK.

Apart from the OCTs, the Indian Ocean region comprises:

- 6 independent nations: Madagascar, Mauritius, Comoros, the Maldives, Sri Lanka and the Seychelles. Many East African nations participate in regional agreements.
- Reunion Island and Mayotte, which are overseas French department, and classified as Outermost Regions (OR) in relation to the EU.

Key facts and statistics for OCTs in Indian Ocean region				
OCT	Land area (km <sup>2</sup> )	EEZ (km <sup>2</sup> )	Population	inhab/km <sup>2</sup>
BIOT	60 km <sup>2</sup> incl. Diego Garcia (44 km <sup>2</sup> )	638,568	No permanent population. There are 3,500 military personnel and contractors only on Diego Garcia	77 military and contractor personnel on Diego Garcia
TAAF	439,664 km <sup>2</sup> incl. 432,000 km <sup>2</sup> in Antarctica	2.39 million <sup>2</sup>	300 temporary researchers, military personnel on temporary assignment (50 people on the Scattered islands)	0.04

BIOT is located in the middle of the Indian Ocean, half way between Africa and Indonesia, on the Chagos-Maldives-Laccadive ridge.

The TAAF consist of Adelie Land (Antarctica), as well as Crozet archipelago, Kerguelen islands, St Paul and Amsterdam islands (in the subantarctic zone), and the Scattered islands (Europa, Glorious, Juan de Nova, Bassas da India and Tromelin) in the Indian Ocean. The northernmost islands are Glorious Islands (11.3°S). Climate is tropical to polar<sup>3</sup>.

<sup>1</sup> The term overseas countries and territories refers to the 25 countries and territories which, although falling within the sovereignty of a Member State of the European Union are wholly or partly autonomous

<sup>2</sup> <http://www.taaf.fr/The-French-Southern-and-Antarctic-Lands>

<sup>3</sup> <http://www.taaf.fr/>, <http://www.octassociation.org/presentation-of-the-french-southern-and-antarctic-lands-taaf>

Districts of TAAF						
Name	Crozet archipelago	Kerguelen islands	Saint-Paul and Amsterdam	Adelie Land	Scattered Islands	Total
Area (km <sup>2</sup> )	340	7,215	66	432,000	43	439,664
ZEE (km <sup>2</sup> )	562,000	547,000	506,000	112,000	640,400	2,367,400

Most coralline islands of BIOT are low-lying with elevations of no more than 2-3 meters. In TAAF, the islands of Saint Paul and Amsterdam have milder weather than the southern Crozet archipelago and Kerguelen Islands which are swept by bitterly cold winds.

The two OCTs have no permanent population. As BIOT has a UK/USA naval support facility (NSF) on Diego Garcia, access is restricted and permits are only given to those with connections to the military facility. The basis hosts around 3500 temporary military. In TAAF, Scattered islands host military garrisons staying there for 30 to 45 days, as well as scientists and occasionally technical staff; the three sub-Antarctic districts and Adelie Land have a population of 250 to 300 people (scientists and technical staff) who stay there for 6 months to 1 year.

There are no national accounts for the two Indian Ocean OCTs. For TAAF, it is estimated that fishing rights, limited to 6 companies, and tourism amount some € 6.6 million per year. In recent years, a small number of passengers wishing to visit the southern districts can travel on the Marion Dufresne, the boat that goes 4 times a year to the southern islands and occasionally to the Scattered islands (once every 2 or 3 years in average). Since the declaration of the BIOT Marine Protected Area on April 1, 2010 no commercial fishing licences have been issued. There is no other economic activity (except the military base and accompanying infrastructure) on BIOT.

### 3 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FRO GLOBAL BIODIVERSITY

BIOT has been called nature's stepping stone as it lies in the middle of the ocean and ocean currents can transport fish larvae from the reefs in the Indo-Pacific basin to BIOT (nursery habitat) and then further west. The Great Chagos Bank in BIOT has one of the largest lagoon in the world and well preserved coral reefs. BIOT has also managed a rapid recovery from large-scale coral reefs bleaching events, which contrasts markedly to many other locations in the region<sup>4</sup>. The islands also host large populations of congregating and nesting seabirds, many of them in internationally important numbers. Terrestrial biodiversity is not high because of the relatively young age of the islands and their remoteness.

As most TAAF islands are old (Kerguelen is 40 million years old), remote and have never been attached to a continent, they host many endemic species, among which the Amsterdam albatross, the Kerguelen cormorant and the Eaton duck. It is estimated that some 40 million seabirds breed there. Some areas of TAAF have the highest bird biomass in the world with 60 T/km<sup>2</sup>. Despite their remoteness, the biodiversity in these territories is under several pressures. Indirect impact related to climate change or direct impacts due to human presence (biological invasions, different types of pollution, fishing, etc.)

<sup>4</sup> The western Indian Ocean (and in particular low latitude islands) was one of the worst impacted regions globally by the 1998 coral bleaching event, losing approximately 45% total coral cover in that region to a depth of 40 m, and in 2004 high water temperatures caused a second beaching event. "The effects of recreational fishing at Diego Garcia on reef fish assemblages", a report for the British Indian Ocean Territory Administration", Nicholas A. J. Graham and Cindy Huchery, ARC Centre of Excellence for Coral Reef Studies (2012).

	Terrestrial Biodiversity			Marine and Coastal Biodiversity			
	Vascular plants	Insects	Birds (nesting)	Molluscs	Fish	Corals	Birds (nesting)
<b>BIOT</b>	280 (45 native)	374 (3 endemic)	6	377 (1 endemic)	859 (3 endemic)	220 (1 endemic)	17
<b>TAAF</b>	79 (24 endemic) on the southern islands; almost 200 on the Scattered islands	180 (68 endemic) on the southern islands	30 (2 endemic) on the southern islands; 12 on the Scattered islands	250 on the Scattered islands	330 (6 endemic) on the southern islands; 20 on the Scattered islands	At least 140 on the Scattered islands	34 on the southern islands; 10 on the Scattered islands

The British Indian Ocean Territory has 10 sites that qualify as Important Bird Areas.

The table below provides the relative importance of the different habitats in the Indian Ocean OCTs.

Extent of habitats in Indian Ocean region						
	Mangroves	Seagrass	Wetlands	Forests	Polar habitat	Remarks
<b>BIOT</b>	● <sup>5</sup>	● <sup>6</sup>	●	●	○	Native forests were replaced by coconut plantations on several islands. Environment on BIOT continues to be discovered.
<b>TAAF</b>	●	●	● <sup>7</sup>	●	●	Breeding ground for birds, penguins.
● Extensive      ● Some      ○ None						

In 2010 the BIOT Marine Protected Area was established. It is the largest no-take<sup>8</sup> marine reserve in the world, covering a total surface area of nearly 640,000 km<sup>2</sup>. The BIOT marine reserve contains the world's largest coral atoll (the Great Chagos Bank) and has one of the healthiest reef systems in the cleanest waters of the world, supporting nearly half the area of good quality reefs in the Indian Ocean<sup>9</sup>. Besides, the entire land territory of BIOT requires visiting permits to set foot on. Hence the whole territory of BIOT is a *de facto* protected area.

TAAF is also a restricted area: a large nature reserve was established on the southern territories in 2006 and a marine park in the Glorioso archipelago in 2012 (43,614 km<sup>2</sup>).

5 The 2010 Chagos Expedition found an extensive mangrove ecosystem on Moresby Island. Until this point the only mangrove area known in the Chagos Archipelago was the one on Eagle Island which is drying out and being swamped by a combination of over-topping vines, most seriously the parasitic *Cassytha filiformis* and *Ipomoea macrantha*, as well as being squeezed out by encroaching *Cocos nucifera* and *Hibiscus tiliaceus*. <http://herbaria.plants.ox.ac.uk/bol/biot>

6 <http://chagos-trust.org/sites/default/files/images/Chagos%20science%20and%20CCT%20plans.pdf>

7 [http://www.ramsar.org/cda/fr/ramsar-documents-list-annotated-ramsar-16400/main/ramsar/1-31-218%5E16400\\_4000\\_1\\_](http://www.ramsar.org/cda/fr/ramsar-documents-list-annotated-ramsar-16400/main/ramsar/1-31-218%5E16400_4000_1_)

8 No-take marine reserves are areas of the sea in which there is no fishing allowed and as little other disturbance as can be reasonably arranged.

9 Reefs and islands of the Chagos Archipelago, Indian Ocean: why it is the world's largest no-take marine protected area Issue, Aquatic Conservation: Marine and Freshwater Ecosystems, Volume 22, Issue 2, pages 232–261, March 2012

Implementation of protected areas in OCTs in Indian Ocean region				
	Terrestrial		Marine	Remarks
	number	area		
<b>BIOT</b>	1		Whole EEZ ~ 64 million ha	The whole territory is treated as if it were a World Heritage Site. Almost half of Diego Garcia is nature reserve. A Ramsar site has been identified. The protection of the MPA, which covers this area is funded with financial support from the Bertarelli Foundation.
<b>TAAF</b>	3	700,000 ha (nature reserve)	1.57 million ha (nature reserve of the southern islands); 43,614 km <sup>2</sup> (marine park of the Glorioso archipelago)	National Nature Reserve of French Southern Territories established in 2006. It covers all terrestrial parts of Crozet archipelago, Kerguelen, Amsterdam and Saint-Paul and much of the territorial waters. It is also the largest protected wetland linked to Europe (Ramsar convention). Adélie Land is protected since 1959 by the Antarctic Treaty, supplemented by the Madrid Protocol (1991). The Scattered islands are classified since 1975 prefectural nature reserve. Island of Europa is a Ramsar site (land and territorial waters) and the whole EEZ of the Glorioso is a marine park.

## 4 ISSUES AND THREATS

For BIOT the main concern is the effect of temperature rise on coral reefs and the effect of sea level rise. Invasive species and anthropogenic pressures are also of concern. Concerning TAAF, invasive species and conservation of populations of declining species are major issues. There is a need to study the possible regional and global effects of climate change, which is particularly impacting the Antarctic.

Main environmental challenges and problems in OCTs in Indian Ocean region			
OCT	Challenge / problem	Severity	Short description
<b>BIOT</b>	Climate change	Severe	Ocean temperature fluctuations cause damage to coral. Corals are recovering well from 1998 events contrarily to other locations. There are contested views in the scientific community that the sea level is rising in BIOT about 3 mm per year <sup>10</sup> (near the global average). Maximum elevation of islands on Chagos Bank and northern atolls is 2-3 m, but several islands are below 1 m in spring tides (which occur once a month) <sup>11</sup> hence the islands are extremely vulnerable to inundation. It is argued the consequent land erosion has caused an overall loss of land area of over 8% since the 1970s at Middle Brother and, although not as severely affected, there is some visual evidence of similar attrition in many other islands. <sup>12</sup>
	Invasive species	Moderate	Invasive rats and cats have caused decrease of nesting seabird populations on most of the islands. Besides, there are several reported invasive plants, namely in Diego Garcia <i>tangan-tangan</i> ( <i>Leucaena leucocephala</i> ), mimosa ( <i>Mimosa invisa</i> ), star of Bethlehem ( <i>Laurentia longiflora</i> ) and coral berry ( <i>Ravina humilis</i> ), and <i>Cassytha filiformis</i> are found <sup>13</sup> . It seems to be a land problem, as no evidence so far was found on invasive species at sea.

10 Shepard, C., 2014, Science underpinning management in Chagos, and what CCT plans in the year ahead. A presentation given at the 2014 AGM of Chagos Conservation Trust.

11 idem.

12 Idem.

13 Diego Garcia Environmental Management Plan <http://www.zianet.com/tedmorris/dg/2005NRMP-Appendix-botanicalsurvey.pdf>

	Anthropogenic pressures	Attention required	Poaching of sharks and sea cucumbers has recently increased and been fairly steady over the last 15 years <sup>14</sup> . The BIOT patrol vessel is engaged in surveillance and acting to challenge vessels in the EEZ, arresting where necessary. Anchor damage due to private yacht visits has been observed on the Northern Islands <sup>15</sup> . Strict anchoring regulations exist and are imposed. In Diego Garcia coral was historically used in the initial construction of the military facility, as construction aggregate <sup>16</sup> . Diego Garcia has fairly good management of ballast waters and oil spill preparedness.
<b>TAAF</b>	Climate change	Moderate	Many studies in the Antarctic lands are being elaborated, but knowledge continues to be limited. With warmer waters, resources availability will most probably affect the whole food web (particularly birds and marine mammals as top predators). On another hand, climate change (temperature) might cause a degradation of the coral reefs associated to the Scattered islands.
	Invasive species	Severe	Introduced predators (cats, rats) are responsible for the decline of most of seabird populations (in particular in tropical islands). The introduction of invasive plants and/or herbivorous mammals (e.g. impact of rabbit on Kerguelen cabbage) has considerably reduced the range of native plants.
	Anthropogenic pressures	Attention required	Increasing pressure on marine ecosystems in the EEZ of the Scattered islands with an important development of the fishing activity: legal (tuna) on the one hand, with noticeable impacts on pelagic species (incidental harvest or by-catch), among others, sharks, rays, and marine mammals; but mostly illegal on the other hand. Illegal fishing activities have grown in size in some of these islands: sport recreational fishing, spearfishing, small-scale coastal fishing aiming essentially at reef species or big pelagic species. In sub Antarctic islands, fishing is regulated and negative impacts on seabird species have been extensively reduced. Efforts still need to be made on by-catch of other species.
	Waste and marine pollution	Attention required	Accumulated waste can cause more serious pollution. The Mozambique channel (where are 4 out of the 5 Scattered islands) is considered as a highway of hydrocarbons with important risks linked to degassing of ships or grounding (rare). Regional cooperation is being built for monitoring and fight against that pollution.

On Diego Garcia, the largest island of BIOT, and host of a UK/US naval support facility, there are GHG emissions from fuel for aircraft. In TAAF, where generators and heating consume a lot of fuel, research has started into renewable energy.

### Regional Scale Challenges

There is recent information about a large amount of waste circulating in the Indian Ocean (besides the better known plastic trash swirls in the North Pacific and North Atlantic Ocean Gyres).<sup>17</sup> Water samples taken near Mauritius showed plastic waste. In the whole region, GIWA estimates that a total of 1.32 million tonnes of waste from Comoros, Madagascar, Mauritius and Seychelles is likely to end up in the Indian Ocean, as only 660,000 T of domestic waste is collected leaving a balance of 1.26 million tonnes.

High seas overfishing in the southern part of the Indian Ocean, partly illegal, is also an issue, as is longline fishing which has killed tens of thousands of albatrosses around TAAF since 2002. Means of the state (maritime affairs) have been helping to control IUU fisheries in areas of Kerguelen and Crozet

14 Shepard, C. and BIOT Administration FCO, 2011, in T. Pelembe and G. Cooper, eds. UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Peterborough, UK, Joint Nature Conservation Committee.

15 Idem

16 Diego Garcia Natural Resources Management Plan (2005), <http://www.zianet.com/tedmorris/dg/2005NRMP-Chapter03-status&currentlandmanagement.pdf>

17 <http://coastalcare.org/2010/08/new-garbage-patch-discovered-in-indian-ocean/>

archipelago, but continued attention is required. IUU fisheries vessels are regularly observed in the international waters of the CCAMLR area, sometimes in the limit of the French EEZs.

The effects of climate change on corals are well exemplified by the 1998 event, when an increase in sea surface temperatures persisted for several months causing large coral bleaching. In early 2004, the coral reefs that were recovering from 1998, suffered very extensive repeat bleaching. However, the peak water temperatures were reduced by cyclonic winds bringing heavy cloud cover and rain for a critical 10 days when bleaching was clearly evident. In the 1998 event, the Seychelles were perhaps the most severely affected, with live coral cover on the granitic islands reduced to less than 10% in some areas. A small scale expedition<sup>18</sup> of IUCN and TARA scientists on 34 sites around Mayotte in 2010, concluded: "The reefs around Mayotte have experienced the worst bleaching and mortality so far recorded in the Indian Ocean with over 50 % of corals affected by the bleaching overall and up to 30% coral mortality at the worst-affected sites," Another study of that episode, found that large areas of coral reef from Sri Lanka and the Maldives (in South Asia) to the East African coastal line stretching from Kenya and Tanzania to Madagascar were also severely affected.<sup>19</sup> A very recent study<sup>20</sup> by the Chagos Conservation Trust shows that coral reefs on Chagos were able to recover. At a regional level it will be important to establish the reason why.

BIOT is in an area with tropical storms but has been spared cyclones. BIOT has known earthquakes, the last ones in the Indian Ocean, which took place in April 2012, had a magnitude of 8.6 and 8.2, centred near Indonesia but was felt in Malaysia, the Maldives and in India. Diego Garcia is frequently subject to earthquakes caused by tectonic plate movement along the Carlsberg Ridge located just to the west of the island. In November 1983 an earthquake measuring 7.6 on the Richter scale resulted in a small tsunami which raised wave height in the lagoon to 1.5 metres; another earthquake measuring 4.6 on the Richter scale struck the island in December 2002 and the most recent occurred in November 10, 2013 with a magnitude of 4.7 on Richter scale<sup>21</sup>. The December 2004 tsunami generated near Indonesia caused minor shoreline erosion on Barton Point (the northeast point of the atoll of Diego Garcia).

On TAAF, Scattered islands are subject to periodic cyclones; Bassas da India is a maritime hazard since it is under water for a period of three hours prior to and following the high tide and surrounded by reefs<sup>22</sup>.

## 5 ENVIRONMENTAL GOVERNANCE

### 5.1 INSTITUTIONS

These are special OCTs as they are uninhabited. TAAF authorities are based in Reunion, BIOT is administered by a Commissioner based at the Foreign and Commonwealth Office in London, and is represented by a senior British naval officer stationed on Diego Garcia.

Summary of environmental management administration in Indian Ocean OCTs		
OCT	Summary of government administrative capacity	NGOs
BIOT	The BIOT Commissioner has responsibility for environmental issues and may make regulations to declare any island or part thereof a 'Strict Nature Reserve' or 'Special Reserve'. A	Chagos Conservation Trust <sup>24</sup> Chagos Environment Network Zoological society of London,

18([http://oceans.taraexpeditions.org/en/fading-fast-2010-expedition-examines-the-worrying-state-of-indian-ocean-coral-reefs.php?id\\_page=471](http://oceans.taraexpeditions.org/en/fading-fast-2010-expedition-examines-the-worrying-state-of-indian-ocean-coral-reefs.php?id_page=471))

19 [http://www.iucn.org/about/work/programmes/marine/marine\\_resources/?2967/CORDIO-1999](http://www.iucn.org/about/work/programmes/marine/marine_resources/?2967/CORDIO-1999)

20 <http://chagos-trust.org/sites/default/files/images/Chagos%20science%20and%20CCT%20plans.pdf>

21 <http://earthquake-report.com/2013/11/11/moderate-earthquake-diego-garcia-british-indian-ocean-territory-on-november-10-2013-2/>

22 [http://www.exxun.com/afd\\_hy/FrenchSouthernandAntarcticLands/mp\\_natural\\_hazards.html](http://www.exxun.com/afd_hy/FrenchSouthernandAntarcticLands/mp_natural_hazards.html)



	Science Adviser advises on matters related to environmental protection and conservation <sup>23</sup> . The UK commissioner stationed on Diego Garcia has the responsibility to implement conservation measures BIOT's waters are monitored year round by a dedicated patrol vessel, whilst sovereignty patrols are undertaken by the British Royal Navy, including the Royal Marines	Blue Marine, Pew Trust, RSPB <sup>25</sup>
<b>TAAF</b>	Staff of 50 in Reunion is engaged in a Directorate for the conservation of natural heritage, a Directorate for international affairs, sea and Antarctica and a Directorate for technical services. Environment Committee and Consultative Committee. Budget available. Informational material (e.g. website, film).	None but agreements are signed with universities and research institutes in France.

## 5.2 POLICIES, STRATEGIES, PLANS<sup>26</sup>

The following table contains an indication of the areas covered by policies, strategies and plans. It also provides a notion of enforcement and awareness activities carried out.

<b>OCT</b>	<b>Sustainable Development</b>	<b>Environment</b>	<b>Biodiversity</b>	<b>Climate Change</b>	<b>Spatial planning</b>	<b>Marine/ Fisheries</b>	<b>Disaster Risk Reduction</b>	<b>Other</b>	<b>Remarks</b>
<b>BIOT</b>		✓	✓		✓	✓		✓ (Research)	The 'no-take' BIOT Marine Protected Area was declared in 2010, established in the whole EEZ except for Diego Garcia. As the latter has a military status, BIOT enjoys similar treatment to a restricted/protected area. BIOT Conservation and Science Management Plan (2003), and a new one is expected in 2014. Environmental policy of the US Navy (OPNAVINST 5090.1) applies to Diego Garcia and there is a Natural Resources Management Plan (2005) currently being updated. Final Governing Standards also undergo periodic updating and the current version is dated December 2011. Surveillance of MPA undertaken by dedicated BIOT patrol vessel.

<sup>24</sup> An UK charity composed of a diverse group of scientists, conservationists and environmental campaigners, was established in 1992 to promote the protection and conservation of the natural environment of the Chagos Islands and to raise awareness of environmental issues affecting the Chagos archipelago. (<http://chagos-trust.org>).

<sup>23</sup> There is also the BIOT Science Advisory Group (BIOT SAG) formed in 2011 and presently consisting of 14 members (UK university professors).

<sup>25</sup> Created in 2011, is composed of 8 international conservation NGOs, and professor Charles Shepard (who organised and led the scientific input to the 2010 Chagos MPA)

<sup>26</sup> Legend: Sustainable development – environment is included in the overall territory development plan or strategy; Environment – indicate environmental management plan and/or water and sanitation and waste plans; Biodiversity – protected areas, species, strategy on invasive, etc.; Climate change – policy, strategy, or adaptation/mitigation programmes; Spatial planning – including coastal zone management; Marine / fisheries – strategy/plan on marine issues (blue growth) and fisheries master plans or management programme; Other – there is at least one of the following: forest, renewable energy and energy efficiency



<b>TAAF</b>		✓	✓			✓		✓ (Research)	Two protected areas; Island of Europa is a Ramsar site; Very detailed policy and management plans for the nature reserve of the southern territories. Action plan for invasive species; Legislation in place; Quotas for fishing via the state's policies on maritime affairs; Surveillance of waters against illegal fishing; GCRMN Biodiversity observation stations; Informational material (e.g. website, film).
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Given the special characteristics of these territories it is expected that there are not sustainable development structural documents. There is also no strategy or plan specifically addressing climate change, as these are non-inhabited territories. Disaster risk management might exist given the military status of the territories, and it is not accessible.

### 5.3 LEGAL FRAMEWORK

The OCTs cannot sign MEAs (Multilateral Environment Agreements) in their own right. But OCTs can take on the responsibilities of an MEA if the associated sovereign state (in the case of the Indian Ocean: France and UK) has signed the MEA and asks, at the request of the OCT, that the MEA is extended to the territory of the OCT.

<b>OCT</b>	<b>Party to MEAs<sup>27</sup></b>	<b>Remarks</b>
BIOT	CITES, CMS, London, Ramsar,	Designated Ramsar site, the Indian Ocean Turtle MoU <sup>28</sup> was signed in 2002.
TAAF	CBD, CITES, Antarctic, Ramsar	All French OCTs report on their biodiversity, as part of France's implementation plan under CBD. Antarctica areas are protected under the Antarctica Treaty.

On species, turtles are protected under respectively the CMS agreement for protection of the Indian Ocean Turtle (and the Sodwana resolution on a cooperative strategy for conservation of turtles). Catches of krill and other commercial fish species are limited under the rules of CCAMLR so as to conserve the food for other marine wildlife. Albatross and petrels are protected under the Agreement on the Conservation of Albatross and Petrels (ACAP).

A regional framework in which the Indian Ocean nations work together is the Nairobi Convention for the Protection, Management, and Development of the Marine and Coastal Environment in Eastern Africa. The Nairobi Convention, related protocols and the action plan were adopted in June 1985. France is a contracting Party, but the UK is not.

Nationally legislation covers the following areas (taken from territorial profiles)

<b>Topics</b>	<b>BIOT</b>	<b>TAAF</b>
Conservation of species	Wild life, green turtle, endangered species.	French Environmental code on protection of flora and fauna was adapted; agreement on protection of Albatrosses and petrels apply; quotas for fishing
Sites and habitats	✓	✓
Terrestrial & marine development control	✓	✓
Environmental Impact assessment	✓	EIA required for new buildings and infrastructures. EIA required also for activities in Antarctica.

<sup>27</sup> See acronyms in annex

<sup>28</sup> Marine Turtle Memorandum of Understanding (MoU) is a non-binding intergovernmental agreement that aims to protect, conserve, and recover marine turtles and their habitats in the Indian Ocean and South-East Asia region.

Ozone	✓	
Waste (oils, clinical, and construction demolition)	✓ not specifically, included in different legislation. Specific on Oil.	✓
Waters	✓ <sup>29</sup>	
Hunting	✓	✓
Fisheries	✓no longer allowed due to MPA, only recreational around Diego Garcia (limited control)	✓
Other relevant sectorial legislation with environment related requirements	Marine pollution (general and oil) Prohibited Imports and Exports Order 200930 Visitors and Visiting Vessels Ordinance 200631 Laws and Guidance for visitors 2010	All visitors and passing ships need a permit (national legislation) and have to agree with conditions that limit their environmental impact on the Territory. Reserves and parks of many districts have a specific and demanding legislation.

## 6 COOPERATION

### 6.1 RELEVANT REGIONAL ORGANISATIONS AND PROGRAMMES

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

Name	Members	Remarks
IOTC- Indian Ocean Tuna Commission <sup>32</sup>	31 members Including EU, UK and France, Mauritius, Maldives, Seychelles, Mozambique + 2 Cooperating Non-Contracting Parties	<b>Founded</b> in 1993 (under FAO auspices) <b>Goal:</b> To promote cooperation among the Contracting Parties (Members) and non-Contracting Cooperating Parties, to support better management of stocks <b>Tasks:</b> adopt Conservation and Management Measures (CMM), data collection, capacity building,
International Whaling Commission	15 countries signed the convention, incl. Denmark, the Netherlands, France and the UK	<b>Created</b> in 1946, at signatory of International Convention for the Regulation of Whaling. <b>Activities:</b> created SORP (Southern Ocean Research Partnership) with projects on Antarctic Blue Whale, <i>International symposium in 2012 to coordinate research, tracking etc. on Living Whales in the Southern Ocean.</i> 2 whale sanctuaries: Indian Ocean (north of 55° S) in 1979, following an initiative by the Seychelles; the Southern Ocean Whale Sanctuary was established by the IWC in 1994 with 23 countries supporting the agreement and Japan opposing it.

<sup>29</sup> prohibits the use without a licence of underwater swimming or diving equipment and any unlicensed exploration or survey of the waters or seabed

<sup>30</sup> includes the prohibition of importing into the Territory any fill material which contains plant or animal material not originating in the Territory and also prohibits the exportation without written permission of any wildlife (including seashells, corals, eggs etc.) whether alive or dead.

<sup>31</sup> An Ordinance which requires all visitors and visiting vessels to obtain a permit and to abide by conditions which limit their environmental impact on the Territory.

<sup>32</sup> <http://www.iotc.org/>

Name	Members	Remarks
IOC - Indian Ocean Commission	Comoros, Mauritius, Madagascar, Seychelles, Reunion	<b>Founded</b> in 1982, Comoros and France (for Reunion) joined in 1986. Three senior staff members (one funded by France) plus secretarial staff and technical assistants from EU and World Bank. Headquarters in Mauritius. <b>Goal:</b> Free Trade Agreement and Customs Union COMESA in smaller region. <b>Tasks</b> among others: co-operation in the field of agriculture and fishing, sustainable management of marine and coastal resources, scientific, technical fields, education, meteorology, higher education, tourism, IT development.
COMESA - Common market for Eastern and Southern Africa	19: Burundi, Congo, Comoros, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia, Zimbabwe	<b>Established</b> in 1994 to replace the Preferential Trade Area for Eastern and Southern Africa (PTA) which had been in existence since 1981 within the framework of the Organisation of African Unity's (OAU). Headquarters: Lusaka. <b>Goals:</b> formation of a large economic and trading unit and co-operation in the field of agriculture, of sea fishing and of the conservation of resources and of ecosystems. <b>Activities:</b> Clearing House, Association of Commercial Banks, Court of Justice. A Free Trade Agreement was concluded in 2000 and a Customs Union established in 2004, among others for agricultural and fisheries products, transport, energy, research.
SADC- Southern Africa Development Community	15: Angola, Botswana, P.R. Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe	<b>Created</b> in 1992. <b>Goal:</b> Deepen integration in the region with a view to accelerate poverty eradication and the attainment of other economic and non-economic development goals. <b>Activities:</b> Regional Indicative Strategic Development Plan 2005-2020 with milestones to help SADC partners measure the progress that is being made. Endeavours to put in place mechanisms for the implementation of MEAs SADC has established regional strategies for water, energy, fisheries, and is considering a strategy on blue economy.
IOR-ARC Indian Ocean Rim/Association for Regional Co-operation	20, including Comoros, Madagascar, Mauritius, Seychelles, Mozambique, Tanzania	<b>Created</b> in 1997 <b>Goal:</b> Enhancement of trade, investment, finance and energy cooperation within the region. <b>Activities:</b> Formulate and implement projects for economic co-operation for instance Tourism Feasibility Study Project or Fisheries Support Unit (FSU)

For the two OCTs in the Indian Ocean, the IOC is geographically the nearest organisation. France participates in this organisation for Reunion and Mayotte. IOC has the same free trade goals as the much larger COMESA but for a smaller area.

Legally no country can belong to more than one customs union. However, in the region there is overlap in the membership of Southern African Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA), South African Customs Union, East African Community (EAC) and the Regional Integration Facilitation Forum. SADC member states have been urged to resolve the question of multiple membership as the region was moving towards establishing a Customs Union by 2010 (goal not yet reached). As a result, the countries in the region are negotiating two separate Economic Partnership Agreements (EPAs) with the EU, permitting a freer trade regime. The ESA (Eastern and Southern Africa) has been negotiated with six countries who are members of both<sup>33</sup> SADC and COMESA. Other countries in the region are negotiating as SADC members (the SADC EPA)<sup>34</sup>. South Africa participates as an observer

33 DRC, Madagascar, Malawi, Mauritius, Zambia and Zimbabwe,  
[http://ec.europa.eu/development/icenter/repository/fact\\_sheet\\_epa\\_sadc.pdf](http://ec.europa.eu/development/icenter/repository/fact_sheet_epa_sadc.pdf)

34 Angola, Botswana, Lesotho, Mozambique, Namibia, Swaziland and the United Republic of Tanzania,  
<http://www.sardc.net/Editorial/sadctoday/view.asp?vol=413&pubno=v9n3>

after having concluded its own trade agreement with the EU in the late 1990s.

The Eastern and Southern Africa - Indian Ocean (ESA-IO) programme for the 10<sup>th</sup> EDF aims at enhancing trade and promoting the sustainable management of the region's natural resources, vital to food security. Four Regional Organisations are involved in the implementation of the cooperation with EU Delegations (EU Delegation to Zambia and COMESA; EU Delegation to Djibouti and IGAD, EU Delegation to Mauritius and IOC, and EU Delegation to Tanzania and EAC). A sum of € 619 million is earmarked for the region under the 10<sup>th</sup> EDF.

A sum of € 116 million is earmarked for the SADC region under the 10th EDF. Trade and regional integration are the main focus of this regional envelope, alongside support to regional political cooperation and capacity building for the SADC Secretariat. The programme is implemented by SADC in cooperation with the EU Delegation to Botswana and SADC.

The programming, implementation, monitoring, review and evaluation of the regional strategy and its operational programmes and projects will demand continuing coordination amongst the regional organisations, as well as with the European Commission.

## 6.2 RELEVANT REGIONAL INITIATIVES AND PROJECTS

There are issues making regional environmental cooperation difficult with Indian Ocean OCTs:

- Indian Ocean OCTs do not form a natural grouping like the Caribbean or Pacific territories. The distances involved are vast;
- TAAF includes tropical and cold temperate islands as well as a stretch of Antarctica, hence has different neighbours and regions;
- The institutional situation is special: BIOT and TAAF have no permanent residents and no resident government;
- Mauritius disputes the UK's sovereignty of BIOT.

There are some regional initiatives financed by the EU in the Indian Ocean Region implemented or partially implemented by the Indian Ocean Commission<sup>35</sup>. COMESA and IGAD<sup>36</sup> also receive EU funding for the implementation of regional projects. However, these projects do not cover TAAF or BIOT directly. Projects such as the Implementation of a Regional Fisheries Strategy (€ 21M) or the Regional Strategy and Action Plan against Piracy and for Maritime Security in the Eastern and Southern Africa-Indian Ocean region (€ 37.5M) might cover or impact the maritime territories of TAAF and BIOT. Directly, the 10<sup>th</sup> EDF financed the project Sustainable management of the natural heritage of Mayotte and Scattered Islands (€ 3M)

France/Reunion is not a beneficiary of EDF but participates in programmes via its own funds (particularly from the European Regional Development Fund - ERDF), and contributes with its expertise in several areas.

The British Indian Ocean Territory does not have independent international relations at the political level. It is not a member of Indian Ocean Commission, or other regional organisations.

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<sup>35</sup> [http://eeas.europa.eu/delegations/mauritius/regional\\_integration/indian\\_ocean\\_commission/index\\_en.htm](http://eeas.europa.eu/delegations/mauritius/regional_integration/indian_ocean_commission/index_en.htm)

<sup>36</sup> Intergovernmental Authority for Development, <http://igad.int/index.php>

## 7 RECOMMENDATIONS FOR COOPERATION IN THE ENVIRONMENT BETWEEN THE EUROPEAN UNION AND INDIAN OCEAN 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 regional level.

The two territories presented here have a high degree of natural value: coral reefs and a vast marine protected area around BIOT while TAAF also has these assets but spread over an area ranging from almost pristine sub-tropical islands (near Reunion) to the Antarctic.

The two OCTs do not seem to undertake common actions, even though they have a few similar interests:

1. BIOT and the Scattered islands could compare (and exchange information) on managing their marine reserves.
2. Research is done in both OCTs but there does not seem to be any interaction.
3. For both, man introduced invasive species are a problem.
4. Illegal fishing is a problem for both OCTs.

The Scattered islands are not far from Mayotte and Reunion and other ACPs and TAAF could possibly improve cooperation by joining forces in research and in protection of coral reefs, marine areas, act against illegal fishing and pollution. Hurricane- and seismic-proof building regulations could also be a common concern.

The following issues have been identified:

Issues	Severity
Loss of biodiversity (invasive species, overfishing)	Severe for TAAF, moderate in BIOT.
Pollution and other anthropogenic pressures	A challenge for both TAAF and BIOT, particularly regarding the monitoring and fisheries control.
Climate change/ natural catastrophes	A danger for low-lying BIOT, possibly advantageous for TAAF. TAAF are particularly interesting to follow the effects of climate change (as reference ecosystems with no population) and play the role of international observatory (networks GIEC and IPBES).
Energy dependency	Need to increase renewables energy uses in both.

The following actions can be expanded or replicated in other OCTs.

Actions	Comment
Marine protected areas	Both OCTs have large marine protected areas.
Action against invasive species	TAAF and BIOT control the entrance of invasive species into the islands. TAAF have implemented several actions to fight some invasive species.
Solid waste management	Good efforts in TAAF. Diego Garcia has just completed a new landfill facility with leachate collection and disposal system, an incinerator facility and a recycling facility, a \$ 15 million project.
Reduce energy dependency	TAAF is stimulating energy saving and looking into introducing renewables. US Personnel in Diego Garcia in BIOT have carried out some analysis of solar and wind energy potential.

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Increase knowledge on ecosystems	Research on status, historic evolution and resilience to climate change and anthropogenic pressures of the territories	Much research work has been performed both on TAAF and BIOT. On BIOT there has not been a real coordination of the initiatives, and knowledge is limited and is scattered. Regarding TAAF, there are permanent research stations operating for more than 50 years in the southern islands and research is coordinated by IPEV. In the Scattered islands research activities are being developed since 2010 aiming at achieving a model similar to the southern islands.		TAFF government BIOT government Scientific advisory bodies Environmental management bodies (including Antarctic Treaty CEP for TAAF)			
<b>Activities</b>							
<p>Increase coordination on research activities, mostly those addressing regional challenges. Examples are :</p> <ul style="list-style-type: none"> <li>-Marine: assessment of impacts of MPAs regulations on pelagic fish, in particular tuna species ; direct quantification of fishing effort and catch rates, combined with research on biology of local shark populations, to assess vulnerability of sharks to fishing pressure; endangered seabirds population trends; connectivity of the BIOT and TAAF with other areas of Indian Ocean;</li> <li>-Climate change: regional impacts of climate change, starting by understanding the changes in the Antarctic; sea level changes; habitat survival (given climate change) and reef resilience.</li> <li>-Other research topic to be carried out individually but might benefit from information sharing, e.g. on a website: general database and ecological mapping; benthic condition, island erosion and historical changes in BIOT.</li> <li>-Establish common indicators on the status of the ecosystems and establish a long term observatory.</li> <li>-The results of these studies will be also for the benefit of the ACP states of the region. They can be extended as well to promote joint work between OCTs and ACP countries, in line with OAD.</li> </ul>							

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Decrease biodiversity loss	Combat invasive species and IUU fisheries	Many endemic species and nesting birds do not have defence mechanisms against introduced predators (rats, cats, rabbits) and local vegetation is being overrun by invasive plants. Overfishing and poaching have negative effects on the marine biological resources, and besides there is by-catch of seabirds due to fisheries.					
	<b>Activities</b>						
	Issues on how to deal with invasive species on inhabited small islands are common to both territories. Both have a wealth of knowledge and experiences from implemented actions that might be of common interest. Both the British and the French navies have been successfully patrolling the EEZ territories. There is scope for concerted action, and involving the coastal and island states of the Indian Ocean. The territories can join efforts on establishing and enforcing (when they are enacted) high seas fisheries regulations in the Indian Ocean.						

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Reduce dependency on fossil fuels	Devise locally adapted solutions of renewable energies and energy efficiency for small isolated islands	Both TAAF and BIOT (solely on Diego Garcia) have carried out some research on solutions to increase penetration of renewable energy.					
	<b>Activities</b>						
	Proceed with the research, and implement pilot projects; Share the solutions with other OCTs and ACP countries.						

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Organisation	Website address	Remarks
Antarctic Treaty	<a href="http://www.ats.aq">www.ats.aq</a>	
Chagos conservation trust CCT	<a href="http://chagos-trust.org/">http://chagos-trust.org/</a>	
Coastal care	<a href="http://coastalcare.org/2010/08/new-garbage-patch-discovered-in-indian-ocean/">http://coastalcare.org/2010/08/new-garbage-patch-discovered-in-indian-ocean/</a>	
COMESA -Common market for Eastern and Southern Africa	<a href="http://www.comesa.int/">http://www.comesa.int/</a>	
CBN- Conservatoire Botanique National	<a href="http://www.cbnm.org/actualites/scientifique/236-colloque-biodiversite-2010">http://www.cbnm.org/actualites/scientifique/236-colloque-biodiversite-2010</a> <a href="http://ilesepares.cbnm.org/index.php/actions-du-cbm">http://ilesepares.cbnm.org/index.php/actions-du-cbm</a>	On biodiversity in TAAF on actions on Scattered islands
CORDIO- Coral Reef Degradation in the Indian Ocean	<a href="http://www.iucn.org/about/work/programmes/marine/marine_resources/?2967/CORDIO-1999">http://www.iucn.org/about/work/programmes/marine/marine_resources/?2967/CORDIO-1999</a>	Reefs status report 1999
EU	<a href="http://www.ebcd.org/en/Meetings_and_Workshops/New_Approaches_to_Sustainable_Fisheries_Lessons_learned_from_SmartFish_and_related_projects.htm">http://www.ebcd.org/en/Meetings_and_Workshops/New_Approaches_to_Sustainable_Fisheries_Lessons_learned_from_SmartFish_and_related_projects.htm</a>	Lessons learned from Smartfish programme
EU	<a href="https://www.youtube.com/watch?v=2-QVscGv_n4">https://www.youtube.com/watch?v=2-QVscGv_n4</a>	Vessel monitoring system
GIWA- Global International Waters	<a href="http://www.unep.org/dewa/giwa/">http://www.unep.org/dewa/giwa/</a>	



Organisation	Website address	Remarks
<b>Assessment</b>		
GCRMN- Global Coral Reef Monitoring Network	<a href="http://gcrmn.org/">http://gcrmn.org/</a> <a href="http://gcrmn.org/gcrmn-publication/status-of-coral-reefs-of-the-world-2008/">http://gcrmn.org/gcrmn-publication/status-of-coral-reefs-of-the-world-2008/</a>	status of coral reefs of the world 2 008
ICRAN-International Coral Reef Action Network	<a href="http://www.icran.org">http://www.icran.org</a>	
IWC- International Whaling Commission	<a href="http://iwc.int/home">http://iwc.int/home</a>	
Idem SORP= Southern Ocean Research Partnership	<a href="http://www.marinemammals.gov.au/__data/assets/pdf_file/0020/117704/SC_64_O14_Report-of-the-SORP-Living-Whale-Symposium_Rev1.pdf">http://www.marinemammals.gov.au/__data/assets/pdf_file/0020/117704/SC_64_O14_Report-of-the-SORP-Living-Whale-Symposium_Rev1.pdf</a>	
IOC- Indian Ocean Commission	<a href="http://www.sidsnet.org/partnerships/organizations/indian-ocean-commission">http://www.sidsnet.org/partnerships/organizations/indian-ocean-commission</a>	
IOC	<a href="http://commissionoceanindien.org/activites/smartfish/">http://commissionoceanindien.org/activites/smartfish/</a>	On Smartfish programme with EU
IOTC- Indian Ocean Tuna Commission	<a href="http://www.iotc.org/about-iotc">http://www.iotc.org/about-iotc</a>	
IOR-ARC Indian Ocean Rim/Association for Regional Co-operation	<a href="http://www.iora.net/">http://www.iora.net/</a>	
IUCN	<a href="http://www.iucnredlist.org/">http://www.iucnredlist.org/</a>	IUCN threatened coral reefs species
IUCN	<a href="http://www.statistiques.developpement-durable.gouv.fr/indicateurs-indices/f/1964/1115/especes-menacees-nombre-despeces-inscrites-listes-rouges.html">http://www.statistiques.developpement-durable.gouv.fr/indicateurs-indices/f/1964/1115/especes-menacees-nombre-despeces-inscrites-listes-rouges.html</a>	On threatened species in overseas areas
LDC Least Developed Countries	<a href="http://unctad.org/en/pages/aldc/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx">http://unctad.org/en/pages/aldc/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx</a>	
NOAA- National Oceanic and Atmospheric Administration	<a href="http://www.globalissues.org/article/173/coral-reefs">http://www.globalissues.org/article/173/coral-reefs</a>	economic services from coral reefs
RIFF- Regional Integration Facilitation Forum	<a href="http://www.comesa.int/institutions/Non-COMESA/regional_integration">http://www.comesa.int/institutions/Non-COMESA/regional_integration</a> or: <a href="http://www.insouth.org/index.php?option=com_sobi2&amp;sobi2Task=sobi2Details&amp;sobi2Id=147&amp;Itemid=68">http://www.insouth.org/index.php?option=com_sobi2&amp;sobi2Task=sobi2Details&amp;sobi2Id=147&amp;Itemid=68</a>	
SADC- Southern Africa Development Community	<a href="http://www.sadc.int/">http://www.sadc.int/</a>  Environment programme: <a href="http://www.sadc.int/issues/environment-sustainable-development/">http://www.sadc.int/issues/environment-sustainable-development/</a>	
UNEP	<a href="http://coral.unep.ch/atlaspr.htm">http://coral.unep.ch/atlaspr.htm</a>	Coral reefs atlas 2011
UNEP Coral Reef Unit	<a href="http://coral.unep.ch/">http://coral.unep.ch/</a>	
WTO- World Trade Association	<a href="http://www.wto.org/">http://www.wto.org/</a>	
The Agreement on the conservation of Albatrosses and petrels	<a href="http://www.acap.aq">www.acap.aq</a>	Accord pour la conservation des albatros et des pétrels
Unesco	<a href="http://www.tsunami.noaa.gov/iotws.html">http://www.tsunami.noaa.gov/iotws.html</a>	Indian Ocean Tsunami website

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EEZ Waters Of Chagos Archipel., Brit. Ind. Oc. Terr. (UK), The Pew Charitable Trusts, Sea Around Us Project, Fisheries Ecosystems & Biodiversity, <http://www.seaaroundus.org/eez/86.aspx>

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Robert Swan: On renewable energies project for the South Pole: <http://www.courantpositif.fr/premiere-il-va-rallier-le-pole-sud-grace-aux-energies-renouvelables/>

Organisation	Website address	Remarks
Antarctica Treaty	<a href="http://www.ats.aq">www.ats.aq</a>	
ACAP - Agreement on the conservation of Albatrosses and petrels	<a href="http://www.acap.aq/">http://www.acap.aq/</a>	Accord sur la conservation des albatros et des pétrels
CCAMLR – Convention on the conservation of Antarctic Marine Living Resources	<a href="http://www.ccamlr.org">www.ccamlr.org</a>	Commission pour la conservation de la faune et la flore marines de l'Antarctique
Conservatoire Botanique national	<a href="http://www.cbnm.org/">http://www.cbnm.org/</a>	
Conservatoire Botanique national	<a href="http://ileseparse.cbnm.org/index.php/presentation-generale?showall=&amp;start=3">http://ileseparse.cbnm.org/index.php/presentation-generale?showall=&amp;start=3</a>	On Biodiversity on Scattered Islands
Conservatoire Botanique national	<a href="http://ileseparse.cbnm.org/index.php/introduction-flore-europa">http://ileseparse.cbnm.org/index.php/introduction-flore-europa</a>	On plants on Europa Island
	<a href="http://ileseparse.cbnm.org/index.php/introduction-flore-juan-de-nova">http://ileseparse.cbnm.org/index.php/introduction-flore-juan-de-nova</a>	On plants on Juan de Nova

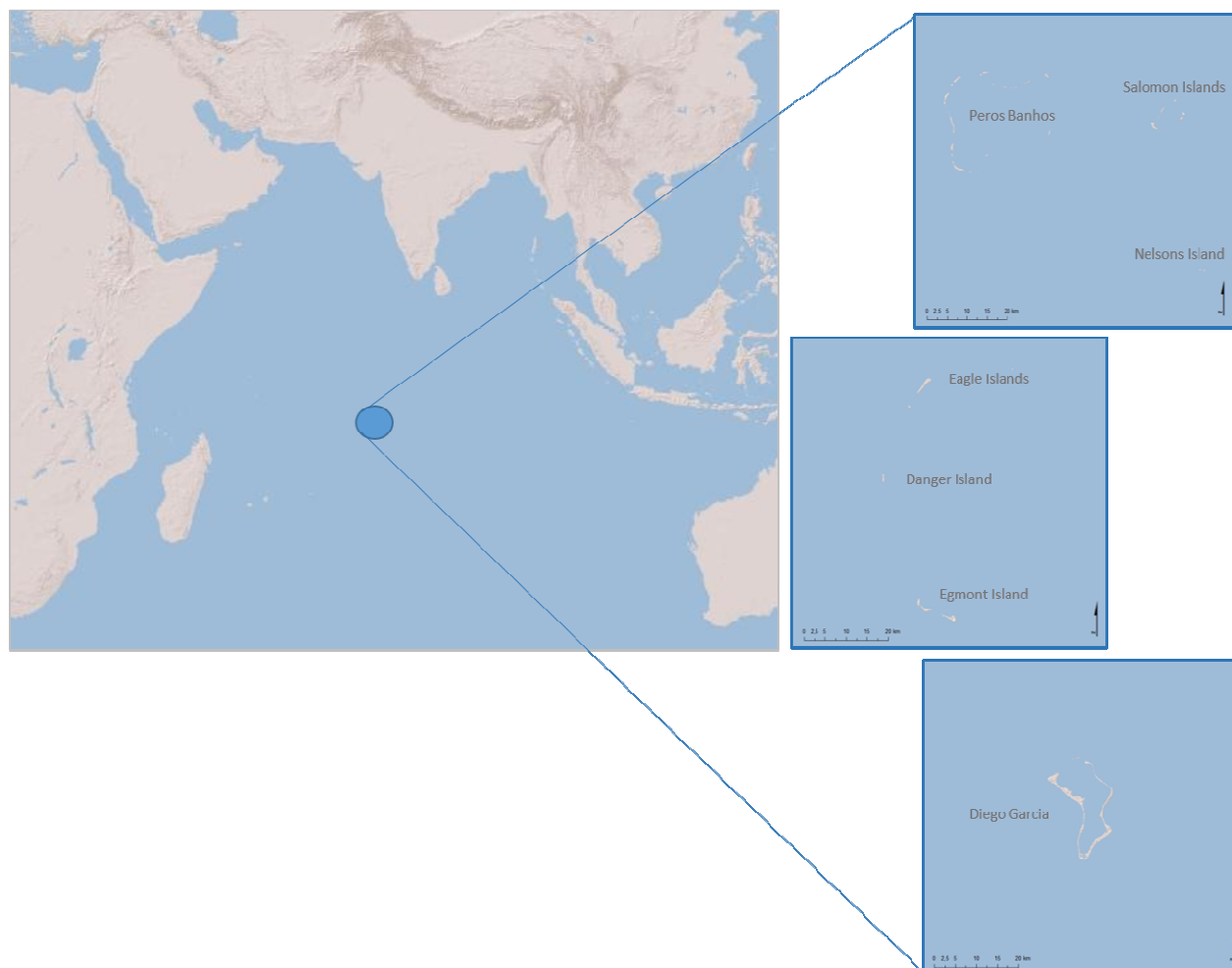
Organisation	Website address	Remarks
	<a href="http://ileseparses.cbnm.org/index.php/introduction-flore-glorieuses">http://ileseparses.cbnm.org/index.php/introduction-flore-glorieuses</a>	On plants on Glorioso
	<a href="http://ileseparses.cbnm.org/index.php/introduction-flore-tromelin">http://ileseparses.cbnm.org/index.php/introduction-flore-tromelin</a>	On plants on Tromelin
Polar Environment Committee	<a href="http://www.legifrance.gouv.fr/affichCode.do;jsessionid=3C7A9413CDFE3C419D672D7A6C709ED3.tpdjo03v_2?idSectionTA=LEGISCTA000006176692&amp;cidTexte=LEGITEXT000006074220&amp;dateTexte=20060106">http://www.legifrance.gouv.fr/affichCode.do;jsessionid=3C7A9413CDFE3C419D672D7A6C709ED3.tpdjo03v_2?idSectionTA=LEGISCTA000006176692&amp;cidTexte=LEGITEXT000006074220&amp;dateTexte=20060106</a>	Comité de l'environnement polaire
Discover France	<a href="http://www.discoverfrance.net/Colonies/Crozet.shtml">http://www.discoverfrance.net/Colonies/Crozet.shtml</a> <a href="http://www.discoverfrance.net/Colonies/Kerguelen.shtml">http://www.discoverfrance.net/Colonies/Kerguelen.shtml</a>	On Crozet and Kerguelen island groups
Emile Victor Polar Institute (IPEV)	<a href="http://www.institut-polaire.fr/ipev/l_institut">http://www.institut-polaire.fr/ipev/l_institut</a> <a href="https://www.comnap.aq/Members/IPEV/SitePages/Home.aspx">https://www.comnap.aq/Members/IPEV/SitePages/Home.aspx</a>	
French Centre for Biodiversity Convention	<a href="http://biodiv.mnhn.fr/information/oultre_mer/fol088503/10_TAAF.pdf">http://biodiv.mnhn.fr/information/oultre_mer/fol088503/10_TAAF.pdf</a>	Centre d'Echange français pour la Convention sur la diversité biologique
French Overseas Ministry	<a href="http://www.oultre-mer.gouv.fr/?la-biodiversite-des-taaf.html">http://www.oultre-mer.gouv.fr/?la-biodiversite-des-taaf.html</a>	On Biodiversity on TAAF
French Senate	<a href="http://www.senat.fr/rap/r07-132/r07-1320.html">http://www.senat.fr/rap/r07-132/r07-1320.html</a>	Broad analysis
IFREMER	<a href="http://wwwz.ifremer.fr/lareunion/Les-projets/Tortues-Marines">http://wwwz.ifremer.fr/lareunion/Les-projets/Tortues-Marines</a>	On Turtles programme
Quid France	<a href="http://www.quid.fr/departements.html?mode=detail&amp;dep=984&amp;style=fiche">http://www.quid.fr/departements.html?mode=detail&amp;dep=984&amp;style=fiche</a>	
TAAF	<a href="http://www.taaf.fr/IMG/pdf/guide_pratique_de_l_hivernant_version_2013-2_apres_modifs_services_29112013_ok.pdf">http://www.taaf.fr/IMG/pdf/guide_pratique_de_l_hivernant_version_2013-2_apres_modifs_services_29112013_ok.pdf</a>	Guide for visitors
TAAF	<a href="http://www.taaf.fr/IMG/pdf/deplianttaafvwebf.pdf">http://www.taaf.fr/IMG/pdf/deplianttaafvwebf.pdf</a>	Flyer on TAAF
TAAF	<a href="http://www.taaf.fr/-District-des-iles-Eparses-">http://www.taaf.fr/-District-des-iles-Eparses-</a>	On Scattered Islands
TAAF	<a href="http://www.taaf.fr/-La-Reserve-Naturelle-Nationale-des-Terres-autrales-francaises-">http://www.taaf.fr/-La-Reserve-Naturelle-Nationale-des-Terres-autrales-francaises-</a>  <a href="http://www.taaf.fr/IMG/pdf/telechargez_la_synthese_du_plan_de_gestion_20112015_de_la_reserve.pdf">http://www.taaf.fr/IMG/pdf/telechargez_la_synthese_du_plan_de_gestion_20112015_de_la_reserve.pdf</a>	On nature reserve Southern Territories
TAAF	<a href="http://www.taaf.fr/L-archipel-de-Crozet">http://www.taaf.fr/L-archipel-de-Crozet</a>	On Crozet district
	<a href="http://www.taaf.fr/L-archipel-de-Kerguelen">http://www.taaf.fr/L-archipel-de-Kerguelen</a>	On Kerguelen district
	<a href="http://www.taaf.fr/Les-iles-de-Saint-Paul-et-Amsterdam">http://www.taaf.fr/Les-iles-de-Saint-Paul-et-Amsterdam</a>	On St Paul and Amsterdam district
	<a href="http://www.taaf.fr/-District-de-Terre-Adelie">http://www.taaf.fr/-District-de-Terre-Adelie</a>	On Terre Adelie district
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	<a href="http://www.taaf.fr/Liste-des-especes-protegees">http://www.taaf.fr/Liste-des-especes-protegees</a>	Legislation protected species
	<a href="http://www.taaf.fr/Liste-des-zones-protegees">http://www.taaf.fr/Liste-des-zones-protegees</a>	Legislation protected spaces

ANNEX A :

BRITISH INDIAN OCEAN TERRITORY

# ENVIRONMENTAL PROFILE

## BRITISH INDIAN OCEAN TERRITORY



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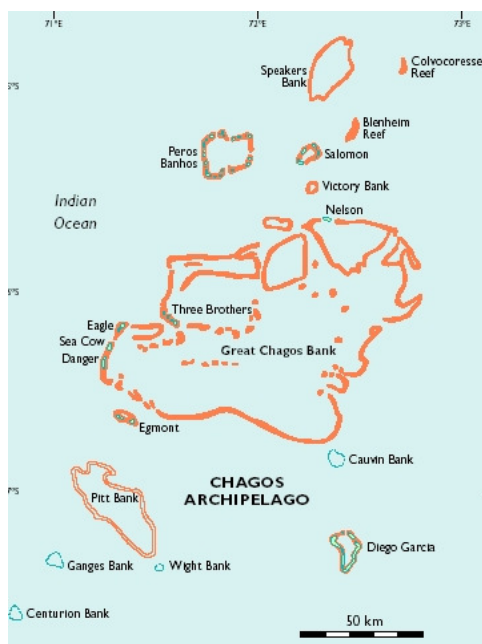
## SUMMARY

The British Indian Ocean Territory is composed of 58 uninhabited islands (except for the military base on Diego Garcia) in the middle of the Indian Ocean, between Indonesia and Africa. BIOT includes the Great Chagos Bank, the world's largest atoll. The whole territory is treated as if it were a World Heritage Site. In 2010 BIOT declared a "no take" Marine Protected area covering about 640,000 km<sup>2</sup>. In the Northern Atolls there are some islands that are strict nature reserves. There is limited knowledge on BIOT land and marine territory. Expeditions have taken place to assess the state of, in particular, the bird colonies and coral reefs. Scientific expeditions often find new ecosystems, as is the recent case of mangroves or seagrass. Being very Low lying islands BIOT are susceptible to sea level rise as a result of climate change. Besides, fauna and flora invasive species are a problem in some islands, as is poaching of sharks and sea cucumbers and anchor damage in the northern islands.

## 1 BACKGROUND INFORMATION

<b>Name of territory</b>	British Indian Ocean Territory
<b>Region</b>	Indian Ocean
<b>Land area</b>	60 km <sup>2</sup>
<b>Maritime claims<sup>1</sup></b>	EEZ: 638,568 km <sup>2</sup>
<b>Population</b>	There is no permanent population. The only people in the territory are those working at the USA-UK military facility – capacity 3500 people <sup>2</sup>
<b>GDP/capita</b>	Not applicable

The 58 individual islands of BIOT, located on the southern end of the 2500 km long Chagos-Maldives-Laccadives ridge, can be grouped into five islanded atolls: the Chagos Bank, Peros Banhos, Salomon Atoll, Egmont, and Diego Garcia Atoll with the largest island, Diego Garcia. The Great Chagos Bank is the world's largest atoll, and most of it is submerged.



The whole of BIOT covers an area of around 250 km by 400 km and is a limestone cap 1 - 2 km thick, resting on volcanic rock. The islands are located on atoll rims with elevations generally no greater than 3m. Two areas in BIOT have been tectonically uplifted to over 6 m. In the case of Diego Garcia the atoll is composed of Holocene coral rubble and sand to the depth of about 36 metres, over the limestone cap of a seamount rising approximately 1,800 metres from the floor of the Indian Ocean.

Located at low latitude, the weather in BIOT does not change much around the year. Temperatures range 23°C to 31°C with average 27°C throughout the year. There is a relatively cooler and drier season from July to September and wetter season from December to February. From June through September the influence of the Southeast trades is felt, with wind speeds of 10-15 knots. Severe storms are sometimes experienced, especially in Diego Garcia, but cyclones are very rare. BIOT lies within the influence of the South Equatorial current year-round. The surface currents of the Indian Ocean also have a monsoonal

Source: CORDIO, 1999. Map of Chagos Archipelago with islands and contour of the shallow submerged banks.

<sup>1</sup> <http://www.seaaroundus.org/eez/86.aspx>

<sup>2</sup> <http://www.globalsecurity.org/military/facility/diego-garcia.htm>

regime associated with the Asian Monsoonal wind regime. Sea surface temperatures are in the range of 26-28 °C year-round.

The Chagos islands were first discovered, uninhabited by the Portuguese, in the 16th century. The French assumed sovereignty in the late 18th century and began to exploit them for copra, originally employing slave labour. In 1814 France ceded the territory through the Treaty of Paris. By the mid-20th century there were almost 2,000 individuals, of mixed African and South Asian descent, working on plantations in the Chagos Islands. There were villages, a school, a hospital, a church, a prison, a railway, docks and a copra plantation on Diego Garcia. The former population of the Chagos Islands, from mixed African and South Asian descent, was displaced and relocated to Mauritius and the Seychelles by the British Government between 1967 and 1973, to make way for a joint US-UK military base on Diego Garcia. The Chagossians<sup>3</sup> initiated a legal battle against the UK. The UK Government conducted a feasibility study in 2001-02, the conclusion of which found that lasting resettlement would be precarious and entail expensive underwriting. New immigration regulations by an Order in Council in June 2004 prevented the right to return. After long legal dispute first in UK high courts and later at EU level, the Chagossians lost the right to return in December 2012 when the European Court of Human Rights, dismissed the Chagossians' final appeal on procedural grounds.

The military base of Diego Garcia provides services for the vessels of the US Navy, British, MSC and Allied forces transiting through Diego Garcia, and has capacity for 3500 persons. The facility features a single 3,659m-long runway paved with concrete, as well as maintenance, repair and overhaul facilities for the prepositioned ships. The air traffic control centre at Diego Garcia controls the traffic of the air mobility command aircraft operating in and around the Indian Ocean region. The Ground Electronics Maintenance Division monitors the maintenance works performed on navigation and communication equipment.

Access to BIOT is restricted and a permit is required in advance of travel. There are no commercial flights and permits are only issued to yachts in safe passage. Access to Diego Garcia is only permitted to those with connections to the military facility.

Since the declaration of the Marine Protected Area on 1 April 2010 no commercial fishing licenses have been issued. There is no other human or economic activity (except the military base and accompanying infrastructure) on the islands.

## 2 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FOR GLOBAL BIODIVERSITY

The islands are relatively young and remote so terrestrial biodiversity is low and many seabirds nest there. The most numerous breeding birds in BIOT are the red-footed booby, the brown noddy and the lesser noddy. About 90 bird species have been identified on the islands, and 16 have large breeding populations with more than 10,000 nests per site. Although BIOT has no endemic birds, ten sites qualify as Important Bird Areas (IBA).<sup>4</sup> The uninhabited islands (some of which have remained rat-free) offer an important refuge for declining seabird populations throughout the Indian Ocean.

Two endemic subspecies of the hawk moth and two endemic subspecies of butterfly have been recorded. Green and hawksbill turtles are found, with about 300 females of each species nesting annually.

As for plants and trees, there are nearly 280 species of vascular or flowering plants, including ferns, but only 45 of these are native species<sup>5</sup>. Fan flower and other shrubs like *Argusia argenta* are common, stabilising the soil and making nesting sites for seabirds. Coconut trees, planted as a crop, have replaced original forests. Small patches of hardwood forest remain on a number of the islands.

<sup>3</sup> Formerly known as islois, which is French for Islanders.

<sup>4</sup> The Important Bird Area Programme is a global initiative coordinated by BirdLife International.

<sup>5</sup> <http://chagos-trust.org/sites/default/files/images/Kew%20Winter2010pdf.pdf>

BIOT has high marine diversity, with the 220 species of hard corals being among the highest recorded in the Indian Ocean<sup>6</sup>, besides 800 species of fish and 400 species of molluscs, including 4 endemic species. Coral reefs in BIOT are considered among those with the best condition in the Indian Ocean. The atolls with islands and the submerged atolls comprise approximately 60,000 to 80,000km<sup>2</sup> of reefs in the illuminated (photosynthetic) zone. Most reefs still remain a largely unexplored area. Some areas of unknown extent support seagrass beds. Much information about the deep seafloor remains unknown<sup>7</sup>.

The western Indian Ocean was one of the worst impacted regions globally by the 1998 coral bleaching event, losing approximately 45% total coral cover in that region to a depth of 40 m. Low latitude islands as BIOT registered the greatest declines. Sheppard *et al* (2003) concluded that mortality was near-total to 15 m deep in northern atolls, and to > 35 m in central and southern atolls. Some reef surfaces had 'dropped' 1.5 m due to the loss of dense coral thickets and species dependent on corals diminished. In early 2004, the coral reefs that were recovering from 1998 event, suffered very extensive repeat bleaching. However, the peak water temperatures were reduced by cyclonic winds bringing heavy cloud cover and rain for a critical 10 days when bleaching was clearly evident. Recent information suggests that the bleached corals in the lagoons of Diego Garcia have mostly recovered<sup>8</sup>. The rapid recovery of hard coral cover in BIOT has been well documented and contrasts markedly to many other locations in the region<sup>9</sup>.

#### Summary of the 2008 IUCN red listed species for BIOT

Critically endangered	Endangered	Vulnerable	Near Threatened	Extinct (Extinct in the wild)	Lower risk/ conservation dependent	Data Deficient
1	7	75	110	0	6	36

UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot

The whole territory is treated as if it were a World Heritage Site. Several strict nature reserves were established. More or less half of Diego Garcia is nature reserve. A Ramsar site has been identified.

#### Protected areas with coral reefs

Site name	Designation	Abbreviation	IUCN cat.	Size (km <sup>2</sup> )	Year
<b>British Indian Ocean Territory</b>					
Cow Island	Strict Nature Reserve	SNR	II	na	1998
Danger Island	Strict Nature Reserve	SNR	II	na	1998
Diego Garcia	Restricted Area	RestA	V	na	1994
Eastern Peros Banhos Atoll	Strict Nature Reserve	SNR	II	na	1998
Nelson Island	Strict Nature Reserve	SNR	II	na	1998
Three Brothers and Resurgent Islands	Strict Nature Reserve	SNR	II	na	1998

Source: World Atlas of Coral Reefs

In 2010 The BIOT Marine Protected Area was established. It is the largest no-take<sup>10</sup> marine reserve in the world, covering a total surface area of 640,000 km<sup>2</sup>. The BIOT marine reserve contains the world's

<sup>6</sup> Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities – Report of the workshop held 5-6

August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI)

<sup>7</sup> Shepard, C. and BIOT Administration FCO, 2011, in T. Pelembe and G. Cooper, eds. UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Peterborough, UK, Joint Nature Conservation Committee.

<sup>8</sup> The effects of recreational fishing at Diego Garcia on reef fish assemblages, British Indian Ocean Territory Administration

<sup>9</sup> The effects of recreational fishing at Diego Garcia on reef fish assemblages, British Indian Ocean Territory Administration

<sup>10</sup> No-take marine reserves are areas of the sea in which there is no fishing allowed and as little other disturbance as can be reasonably arranged.



largest coral atoll (the Great Chagos Bank) and has one of the healthiest reef systems in the cleanest waters of the world, supporting nearly half the area of good quality reefs in the Indian Ocean<sup>11</sup>. The protection of the MPA, which covers this area is funded with financial support from the Bertarelli Foundation.

### 3 MAIN ENVIRONMENTAL CHALLENGES

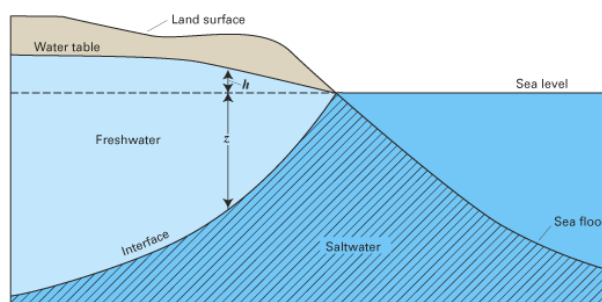
#### 3.1 OVERVIEW

BIOT has been called nature's stepping stone as it lies in the middle of the ocean and ocean currents can transport fish larvae from the reefs in the Indo-Pacific basin to BIOT (nursery habitat) and then further west. Marine biodiversity is very large and is well preserved. The islands are also a breeding ground for thousands seabird species. Terrestrial biodiversity is not high because of the relatively young age of the islands and their remoteness.

Most scientific knowledge of the area to date has come from a series of scientific visits conducted over several years. The knowledge is still limited and it is common that new ecosystems are discovered, as it was recently the case of mangroves or seagrass. As knowledge increases management has the potential to improve accordingly.

As most of the territory has strict access and surveillance of the territory is performed by British military, the major environmental pressures occur in the island that hosts humans.

Freshwater resources in Diego Garcia are very vulnerable, as they are Ghyben-Herzberg lenses<sup>12</sup>. The lenses depend of quantity (in the case of Diego Garcia in excess of 2600 mm/year) and periodicity of rain fall. There are two natural depressions in the island that capture sufficient rainfall to form areas of fresh-water wetlands of significance to island wildlife and to recharge their respective fresh-water lenses.



Source: [http://en.wikipedia.org/wiki/Saltwater\\_intrusion#cite\\_note-Verrjuit1968-11](http://en.wikipedia.org/wiki/Saltwater_intrusion#cite_note-Verrjuit1968-11) and references therein

One is centred on the northwest point of the atoll, another is found near the Point Marianne Cemetery on the southeast end of the airfield. In the plantation period, shallow wells, supplemented by rainwater collected in cisterns, provided sufficient water for the pastoral life style of the small population. Currently it is estimated that the military base uses over 100 shallow "horizontal" wells to produce over 560 m<sup>3</sup> per day from the "Cantonment" lens on the northwest arm of the island to serve a population of approximately 3,650 persons, including merchant seamen. It is estimated that this 3.7 km<sup>2</sup> lens holds 19 million m<sup>3</sup> of fresh water and has an

11 Reefs and islands of the Chagos Archipelago, Indian Ocean: why it is the world's largest no-take marine protected area Issue, Aquatic Conservation: Marine and Freshwater Ecosystems, Volume 22, Issue 2, pages 232–261, March 2012

12 The Herzberg lenses are formed when sufficient rainwater in terms of quantity and periodicity percolates through the Holocene layer to form a layer of fresh water floating atop of salt water. For this to occur, the atoll needs to be sufficiently wide to minimize tidal fluctuations in the aquifer. The size and depth of each lens is dependent on the width and shape of the island at that point, the permeability of the aquifer, and the equilibrium between recharging rainfall and losses to evaporation to the atmosphere, transpiration by plants, tidal advection, and human use. Each lens is susceptible to corruption by salt-water intrusion caused by overuse or drought, to overwash by tropical storms and tsunamis. Vertical wells can cause salt upcoming into the lens, and over-extraction will reduce fresh water pressure resulting in lateral intrusion by seawater. Lenses are easily polluted by faecal waste, burials, and chemical spills. Corruption of a lens can take years to "flush out" and reform, depending on the ratio of recharge to losses. For more information: Charles D. Hunt "Hydrogeology of Diego Garcia". In: Vacher & Quinn (1997), pp. 909–929 and Urish, Daniel (1974). "Fresh water on the coral atoll island" (PDF). The Military Engineer 429: 25–27.

average daily recharge from rainfall of over 10,000 m<sup>3</sup>, of which 40% remains in the lens and 60% is lost through evapotranspiration.

Despite the protection framework, a large area of the seaward coral reef has been dredged for use as construction material or landfill and concrete has been used for shoreline protection



Source: Sheppard, 2003. US base and dredging of coral reefs for use as construction material on Diego Garcia

A recent study<sup>13</sup> has found that recreational fishery around Diego Garcia is having an impact on the reef fish community. Boat based fishing is quite well monitored through the MWR Marina, but shore based fishing activities are not licensed or monitored. It should be noted, however, that the biomass of fish at Diego Garcia is still very high, and comparable to the highest biomass recorded elsewhere in the western Indian Ocean region.

There is also considerable GHG emissions on Diego Garcia due to large quantities of fuel for aircraft.

Besides the localized pressure referred, there is increasing evidence of Poaching of sharks and sea cucumbers in other islands as well as anchor damage due to private yacht visits on the Northern Islands. This despite the BIOT patrol vessel is engagement in surveillance and acting upon unlawful practice.

### 3.2 MAIN CHALLENGES

In 2005, the Environmental Vulnerability Index<sup>14</sup> indicated BIOT as *Vulnerable*, even with significant information gaps as only 38% of topics were covered. The most pressing issues identified were the percentage of land lower than 50m above sea level; Number of endangered and vulnerable species per 1000 km<sup>2</sup> land area (IUCN definitions); and country dispersion (composed of many small islands).

The main environmental challenges faced by BIOT were also identified in the 2006-07 Environmental Profiles and their gravity is provided in the table below. Since then, several issues have been addressed with some results that changed its gravity.

Issues	Situation in 2006-07	Current Situation
Climate Change	Greatest challenge – sea level rise and sea temperature increase	Severe
Seabirds	In recuperation in rat free islands	
Coral Reef Bleaching	Reefs recovered well from the 1998 and subsequent bleaching episodes	Healthy

<sup>13</sup> The effects of recreational fishing at Diego Garcia on reef fish assemblages, British Indian Ocean Territory Administration

<sup>14</sup> [http://www.vulnerabilityindex.net/EVI\\_Country\\_Profiles.html](http://www.vulnerabilityindex.net/EVI_Country_Profiles.html)

New Emerging issues are:

Issues	Current Situation
Invasive species	Moderate
Anthropogenic pressures	Attention required

### Challenge 1 - Climate change – Severe

Ocean temperature fluctuations cause damage to coral. Corals are recovering well from 1998 events contrarily to other locations. There is evidence that sea level is raising in BIOT about 3 mm per year<sup>15</sup> (near the global average). Maximum elevation of islands on Chagos Bank and northern atolls is 2-3 m, but several islands are below 1 m in spring tides (which occur once a month)<sup>16</sup> hence the islands are extremely vulnerable to inundation. The consequent land erosion has caused an overall loss of land area of over 8% since the 1970s at Middle Brother and, although not as severely affected, there is visual evidence of similar attrition in many other islands.<sup>17</sup>

### Challenge 2 – Invasive Species – Moderate

Invasive rats and cats have caused decrease of nesting seabird populations on most of the islands. Besides, there are several reported invasive plants, namely in Diego Garcia tanger-tanger (*Leucaena leucocephala*), mimosa (*Mimosa invisa*), Star of Bethlehem (*Laurentia longiflora*) coral berry (*Ravina humilis*), and *Cassytha filiformis* are found<sup>18</sup>. It seems to be a land problem, as no evidence so far was found on invasive species at sea.

An important potential impact to Diego Garcia which would have consequences to the rest of BIOT includes the introduction of species from ballast water or from hull fouling (both of species and of toxins). An IUCN survey in 2006 showed no introduced marine species, which is now a very unusual condition for ports.

### Challenge 3 - Anthropogenic pressures - Attention required

Poaching of sharks and sea cucumbers has increased and been fairly steady over the last 15 years<sup>19</sup>. The BIOT patrol vessel is engaged in surveillance and acting upon unlawful practice. Anchor damage due to private yacht visits has been observed on the Northern Islands<sup>20</sup>. Strict anchoring regulations exist and are imposed. In Diego Garcia coral is used as construction aggregate<sup>21</sup>. Diego Garcia has fairly good management of ballast waters and oil spill preparedness. Management of ballast waters and oil spill preparedness must be kept in high attention and well managed.

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15 Shepard, C., 2014, Science underpinning management in Chagos, and what CCT plans in the year ahead. A presentation given at the 2014 AGM of Chagos Conservation Trust.

16 idem.

17 Idem.

18 Diego Garcia Environmental Management Plan <http://www.zianet.com/tedmorris/dg/2005NRMP-Appendix-botanicalsurvey.pdf>

19 Shepard, C. and BIOT Administration FCO, 2011, in T. Pelembe and G. Cooper, eds. UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Peterborough, UK, Joint Nature Conservation Committee.

20 Idem

21 Diego Garcia Natural Resources Management Plan (2005), <http://www.zianet.com/tedmorris/dg/2005NRMP-Chapter03-status&currentlandmanagement.pdf>

## 4 ENVIRONMENTAL GOVERNANCE

### 4.1 CONSTITUTION

The Chagos archipelago has been British territory since 1814 and was administered as a dependency of Mauritius. The British Indian Ocean Territory (BIOT) was established by an Order in Council on 8 November 1965. In 1967, the British Government purchased all privately-owned coconut plantations on the islands, closed them down and started the relocation of the population to Mauritius. Between 1967 and 1973 the entire population of around 1,500 was relocated as the archipelago was developed for military use. In 1972 an Exchange Notes between the UK and US Governments allowed for the construction of a naval communication facility on Diego Garcia. The Exchange of Notes was for an initial period of 50 Years until 2016 with an option of a further 20 years.

BIOT's Commissioner, the highest administrator of the territory, is based at the Foreign and Commonwealth Office in London. The Commissioner is represented by a senior British naval officer stationed on Diego Garcia.

### 4.2 INSTITUTIONAL STRUCTURE, MANPOWER AND BUDGETS

The BIOT Commissioner, based at the Foreign and Commonwealth Office (FCO) in London, has responsibility for environmental issues and may make regulations to declare any island or part thereof a 'Strict Nature Reserve' or 'Special Reserve'. A Science Adviser advises on matters related to environmental protection and conservation.

The responsibility for implementing conservation measures lies with the UK representative stationed on Diego Garcia. The British Royal Navy, including the Royal Marines, acts as Customs officials and they and dedicated fishery protection staff polices the outer islands.

The BIOT Science Advisory Group (SAG)<sup>22</sup> was formed in early 2011. Presently it consists of 14 members from different UK universities. Its purpose is to advise the Overseas Territories Directorate (OTD) of the FCO on the development and implementation of an appropriate scientific programme for BIOT, including through: development of a scientific strategy for BIOT; and potentially facilitating the submission of grant proposals for funding scientific projects in BIOT. The SAG meets every 6 months, the first meeting was on 26 May 2011. Also attending meetings is the FCO Chief Scientific Adviser.

The Chagos Environment Network (CEN)<sup>23</sup> is a UK body of NGOs and scientific organisations that promotes the study and protection of BIOT biodiversity. In particular, the CEN led the call for Chagos to be designated as a fully no-take IUCN Category I marine reserve out to the full extent of its waters.

The Chagos Conservation Trust (CCT) is a UK charity that conducts and promotes conservation work and scientific and historical research in the Chagos Archipelago. The Board is composed of science and conservation experts. CCT also works with some of the UK's largest scientific and environmental institutions such as the Royal Society for the Protection of Birds (RSPB) and the Zoological Society of London (ZSL) as part of the Chagos Environment Network (CEN).

### 4.3 POLICY INSTRUMENTS

BIOT has signed an Environment Charter with the UK Government in which it agrees *inter alia* to integrate environmental management into the administration of the island.

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<sup>22</sup> <https://sites.google.com/site/thechagosarchipelago2/chagos-science/scientific-advisory-group>

<sup>23</sup> <http://chagos-trust.org/about/supporters>

BIOT is treated as though it were a World Heritage site. The BIOT Conservation Policy Statement (of October 1997) specifies that the Territory will be treated in accordance with the requirements of the World Heritage Convention, subject only to defence requirements. Environmental policy of the US Navy (OPNAVINST 5090.1) applies to the island of Diego Garcia. The island has an environmental management plan dated 2005 and currently under revision.

In 2003 a management plan was made for the whole archipelago. The BIOT Conservation Management Plan (Sheppard, 2003), drawn up for the territory's administration at the request of the BIOT Government, attempts a comprehensive response to the various challenges facing BIOT. It proposed a set of actions that are aimed at achieving the conservation of the archipelago as a whole by giving full-protected status to 30% of the territory, which was favoured by the lack of human interference. Some of the goals of the plan were achieved, namely with the declaration of the Marine Protected Area, the status of Strict Nature Reserves on several of the outer islands and their internal waters and with the establishment of the SAG. In July 2012, the outline a new conservation and management plan has prepared identifying the science needs and their links with management needs.

Diego Garcia is not included within the BIOT marine protected area. In Diego Garcia, the network of Nature Reserves and Strict Nature Reserves is comprehensive. Access to these areas differs and in all cases is subject to permission granted by the BIOT Administration or the Commissioner's Representative in BIOT. Diego Garcia has its own Natural Resources Management Plan prepared by the US Navy last version dates 2005 and is being updated. It encompasses the eastern uninhabited arm of the atoll as well as the military base on the western arm.

#### 4.4 LEGISLATION

BIOT has been included in the UK's ratification of 12 multilateral environmental agreements (MEAs):

MEA	Date extended	Date effective	Comments
Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)	2-8-1976	31-10-1976	There are CITES specific ordinances, the most recent from 2007
The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	23-7-1985	1-10-1985	
CMS - Indian Ocean Turtle MOU	25-03-02	-	
London Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter	17-11-1975	17-12-1975	
The Convention on Wetlands of International Importance (Ramsar)	7-09-1998	8-1-1999	The island of Diego Garcia has been designated a Ramsar site.
Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage)			The World Heritage quality of the territory is recognised in the BIOT Conservation Policy Statement (October 1997), which specifies that BIOT will be treated as a WH site, subject only to defence requirements.

BIOT has numerous pieces of legislation relevant to biodiversity conservation.

Item of legislation	Comments or details
Protection and Preservation of Wild Life Ordinance, 1970	An ordinance to provide for the protection and preservation of wild life (last amended in 2008).

Item of legislation	Comments or details
a. Green Turtles Protection Regulations, Statutory Instrument of 1968	Prohibition to harpoon, kill, destroy or take possession of turtles or to purchase or sell turtles and turtle products
b. The Restriction of Exportation of Giant Land Tortoises Regulations 1968	Prohibits the exportation of Giant Land Tortoises without a license
c. Strict Nature Reserve Regulations 1998 – Statutory Instrument No. 4 of 1998	Declaration of Strict Nature reserves in the Great Chagos Bank and in the Peros Banhos Atoll
d. The Wild Life Protection Regulations 2003 – Statutory Instrument No. 2 of 2003 (amended in 2008)	Protection of flora and fauna
The Environment Protection (Overseas Territories) Order 1988 – (amended in 1999)	Deals with deposits at sea
Ozone Layer Protection Ordinance, 1994	An Ordinance to give effect in the law of the Territory to certain international agreements for the protection of the ozone layer and, for that purpose, to control the manufacture, importation and exportation of certain substances and produce.
Diego Garcia Conservation (Restricted Area) Ordinance, 1994	An Ordinance to promote the conservation of the natural resources and historical heritage of the Territory by authorizing the restriction of access to certain areas in and adjacent to Diego Garcia and the regulation of activities within those areas
Prevention of Oil Pollution Ordinance, 1994	An ordinance to prevent the pollution of the waters of the British Indian Ocean Territory by the discharge or escape of oil
Trade in Endangered Species (Control) Ordinance, 2007 (amended in 2008)	An Ordinance to regulate the trade in endangered species
Fisheries (Conservation and Management Ordinance) 2007, amended in 2013	An Ordinance to consolidate, with amendments, existing provisions relating to the regulation, conservation and management of the fishing waters of the British Indian Ocean Territory.
The Waters (Regulation of Activities) Ordinance, 1997	An Ordinance that prohibits the use without a licence of underwater swimming or diving equipment and any unlicensed exploration or survey of the waters or seabed.
The Visitors and Visiting Vessels Ordinance 2006	An Ordinance that requires all visitors and visiting vessels to obtain a permit and to abide by conditions which limit their environmental impact on the Territory.
The Prohibited Imports and Exports Order 2009	An Order made under the Imports and Exports (Control) Ordinance 2009 which includes the prohibition of importing into the Territory any fill material which contains plant or animal material not originating in the Territory and also prohibits the exportation without written permission of any wildlife (including seashells, corals, eggs etc.) whether alive or dead.

Following the recent establishment of the BIOT Marine Protected Area (MPA), the BIOT administration is currently preparing new legislation to be enacted during 2014.

In 2010 the BIOT administration published the Laws and Guidance for visitors. Offences are liable to an on-the-spot fine of £500 to £1000, and failure to pay the fine could result, on conviction, to imprisonment for a term not exceeding 6 months and/or to a fine not exceeding £5000, and to detention and forfeiture of any boat and equipment used when committing the offence.

BIOT law applies to everyone inside its territorial waters and the FCMZ. The law establishes that any person who enters BIOT without a permit is liable to imprisonment for 3 years and/or a fine of £3000.

The following islands are strict nature reserves. It is an offence to approach within 200 meters, land on or anchor at: The Three Brothers and Resurgent Island, Danger Island, Cow Island, Nelson Island (Great



Chagos Bank); and at Peros Banhos Atoll all the islands to the east of a line drawn between the easternmost point of land on Moresby Island and the easternmost point of land on Fouquet Island.

- It is forbidden to remain ashore overnight (between sunset and sunrise), nor set up an encampment nor erect any structure of installation.
- Respect the old plantation buildings or other structure on the islands, and in particular old buildings at Ile du Coin and Ile Boddam are out of bounds until the BIOT Administration have been able to make the buildings safe.
- All fauna and flora are protected by law: The following are, for example, prohibited:
  - The collection of shells, mollusks or coral (dead or alive);
  - The killing of crabs (or the possession of crabs, alive or dead);
  - The killing of animals (or the possession of animals, alive or dead);
  - Intentionally destroying, damaging or taking a wild bird's nest, wild bird's egg or turtle's egg;
  - Intentionally disturbing dependent young of a wild bird;
  - Taking or being in possession of any specified flora
  - Taking any alive or dead wild animal out of the Territory
- All unlicensed fishing (except non-commercial fishing by rod or line for your consumption within three days) is also prohibited. In order to assist the BIOT Fisheries Officers in monitoring fish stocks, you must record numbers of fish taken, the species and size.
- The use of scuba diving equipment or underwater-swimming equipment is prohibited.
- Vegetation must not be cut; it protects the shore from erosion and provides habitat for the islands' natural inhabitants.
- Fauna and flora from outside BIOT must not be introduced into the Territory. In particular, pets are not to be landed.

All combustible garbage is to be burned or removed. All other material is to be placed in the bins provided or removed.

#### 4.5 ENFORCEMENT

Enforcement of conservation measures, such as for the existing bird sanctuaries, is the responsibility of the senior BIOT Administration representative stationed on Diego Garcia in his role as Magistrate. The BIOT fisheries patrol vessel (with 2 senior Fisheries Protection Officers on rotation) controls the Marine Protected Area and arrests vessels caught there. The United States Navy Officer in command of the Facility on Diego Garcia has responsibility for the implementation of US naval policy concerning the environment at the base.

#### 4.6 MONITORING

The environmental unit in Diego Garcia is responsible for numerous and regular measurements of air and water pollutants. Pollution monitoring is undertaken both internally and by accredited laboratories in the USA and UK, with regular audits. Details of pollution monitoring and analyses are contained in the Final Governing Standards, with further environmental details in the Natural Resources Management Plan for the island. The environmental Final Governing Standards also undergo periodic updating and the current version is dated December 2011.

Sewage discharges to water and ground water extraction are monitored. As part of the regional tsunami warning system, there is an early warning system for disasters.

Scientists who have been involved in research projects in BIOT have identified areas of further research such as:

- General database and ecological mapping of changes to underpin management;
- Reef resilience studies to aid management of climate change effects;
- Connectivity (species and genetic) of BIOT with other areas of Indian Ocean.

## 5 INTERNATIONAL COOPERATION

### 5.1 COOPERATION WITH THE UK

There have been a number of British scientific expeditions to BIOT in recent years. Besides, there are projects financed by UK Environmental department (DEFRA).

Project date	Project name	Funded by	Main Outputs
2011	Birds in the British Indian Ocean Territory, RSPB	OTEP	<ul style="list-style-type: none"> <li>• Production of a book of the birds of BIOT</li> <li>• Collation of historic records of birds in BIOT</li> <li>• Description of 50 common species</li> </ul>
2010	Prioritisation of BIOT islands for island restoration		<ul style="list-style-type: none"> <li>• Identified important bird/plant/dragonfly sites</li> </ul>
2008 - 2010	Pilot project: Barton Point Restoration Project – Diego Garcia	Self-funded	<ul style="list-style-type: none"> <li>• assess the most effective way of clearing former coconut plantations and restoration native vegetation</li> </ul>
2006 - 2010	Two research expeditions to the general archipelago	OTEP	<ul style="list-style-type: none"> <li>• £50,000 seed money for two major expeditions</li> <li>• Ecology, robustness, resilience, biomass and understanding of Chagos reefs and islands</li> <li>• Connectivity of Chagos in Indian Ocean</li> </ul>
2008	Genetic connectivity of Chagos in the Indo-Pacific	Hawaii University	<ul style="list-style-type: none"> <li>• Genetic connectivity of Chagos and Western Indian Ocean</li> </ul>
2006	Rat eradication, FFI	OTEP	<ul style="list-style-type: none"> <li>• Unsuccessful</li> </ul>

### 5.2 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. BIOT is not included in the list of recipients of the EDF, as it is an unpopulated Territory. Regional initiatives could be extended to BIOT, but none is known to date.

## 6 RECOMMENDATIONS ON FUTURE COOPERATION BETWEEN THE EUROPEAN UNION AND BIOT

The UK Foreign and Commonwealth Office, who has provided comments in the present profile, is of the opinion that given BIOT's unique circumstances there is no need to complete this section. The revised Conservation and Management in British Indian Ocean Territory (Chagos Archipelago)<sup>24</sup> contains a list of activities that can be supported.

<sup>24</sup> <http://chagos-trust.org/sites/default/files/images/Conservation%20and%20Management%20Plan.pdf>

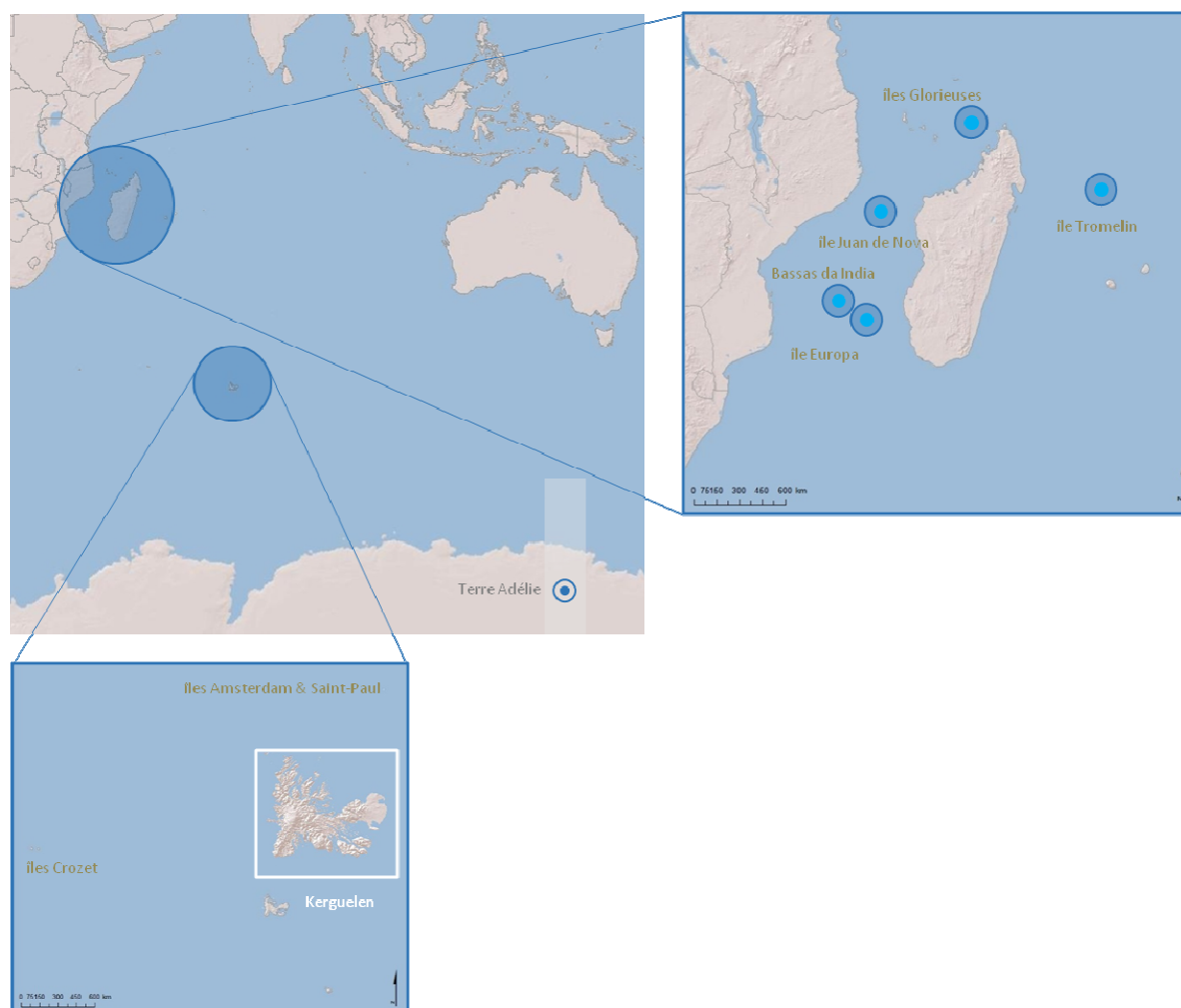


ANNEX B :

FRENCH SOUTHERN AND ANTARCTIC  
TERRITORIES

# ENVIRONMENTAL PROFILE

## FRENCH SOUTHERN AND ANTARCTIC TERRITORIES



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The French Southern and Antarctic Territories (*Terres australes et antarctiques françaises*; TAAF) are a French overseas collectivity administered from Réunion Island. Approximately 300 researchers work temporarily on this territory. The main environmental challenge is the preservation of native biodiversity, which is threatened by introduced species (rats, rabbits, cats, herbivores and vegetation). Significant avian mortality, namely albatrosses and petrels, in the early 2000s due to longline fishing has been reduced thanks to the effective combating of illegal and unreported fisheries and by the strict enforcement of fishing regulations. In order to ensure sound and reasoned management of fish resources, total allowable catches are set every year by the Prefect following the advice of scientific advisors and relevant ministries. These management procedures were at basis of Kerguelen French fishery achievement of MSC certification. In October of 2006, a nature reserve covering approximately 700 000ha of subantarctic islands was created. The Scattered Islands are also listed as nature reserves by prefectural order.

## 1 BACKGROUND INFORMATION

The TAAF are made up of the following territories:

The southern islands, in the Indian Ocean:

- Two archipelagos in the southern Indian Ocean (Crozet<sup>1</sup> and Kerguelen<sup>2</sup>);
- Two volcanic islands (Amsterdam and Saint-Paul)<sup>3</sup> in the southern Indian Ocean;

The Scattered Islands<sup>4</sup> spread throughout the Indian Ocean: the Glorioso Islands, Juan de Nova, Bassas da India and Europa in the Mozambique Channel, and the Tromelin Island, north of Réunion.

And Adélie Land<sup>5</sup>, the French claim on the Antarctic continent.

Apart from Adélie Land, all of these territories have a territorial sea and an exclusive economic zone.

These territories are occupied by researchers, the military or TAAF agents in charge of logistics who reside there during periodic missions. Access is only possible by ship, from Réunion or Tasmania (for Adélie Land). There are no ports, only offshore anchoring points. The Scattered Islands are also accessible by air.

The TAAF are administered by a senior Administrator (who is ranked as Prefect since 2004), assisted by an advisory Council, and the *Comité français de l'environnement polaire* (French Committee on the polar environment). From an administrative point of view, there are 5 Districts: Scattered Islands, Kerguelen, Saint-Paul and Amsterdam and Adélie Land. They each represent an administrative district managed by a district chief who serves among other duties those of civil registrar (registration of births and deaths) and judiciary police.

The TAAF are in Annex II of the Maastricht Treaty. In 1959, the Antarctic Treaty makes the Antarctic a zone of peace consecrated to science. This Treaty's Protocol designates it as a "natural reserve devoted to peace and science". In 2000, the territory's administration is moved from Paris to Saint-Pierre de la Réunion.

The Scattered Islands are an integral part of the TAAF since law 2007-224 of 21 February 2007.

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1 <http://www.taaf.fr/L-archipel-de-Crozet>

2 <http://www.taaf.fr/L-archipel-de-Kerguelen>

3 <http://www.taaf.fr/Les-iles-de-Saint-Paul-et-Amsterdam>

4 <http://www.taaf.fr/-District-des-iles-Eparses->

5 <http://www.taaf.fr/-District-de-Terre-Adelie->

## 1.1 KEY DATA AND STATISTICS

<b>Name of the territory</b>	French Southern and Antarctic Territories
<b>Region</b>	Southern Indian and Antarctic Oceans
<b>Area</b>	440 000 km <sup>2</sup> (8 000 km <sup>2</sup> on the islands and 432 000 km <sup>2</sup> on the Antarctic continent)
<b>Maritime claims</b>	EEZ : 2 500 000 km <sup>2</sup>
<b>Population</b>	None
<b>GDP (total revenue)</b>	15 million €

## 1.2 PHYSIOGRAPHY AND CLIMATE

The challenge in elaborating this environmental profile resides in the fact that this territory's constituent parts are very different. One region is tropical (in the Mozambique Channel and to the north of Réunion), another part is sub-Antarctic (Crozet, Kerguelen and Amsterdam and Saint-Paul islands) and a third is polar.

### Climate

The Scattered Islands in the Mozambique Channel are almost completely subjected year-round to the south-eastern Indian Ocean's trade winds. Only its northern section can be reached, in winter, by monsoons. The climate is of the seasonal tropical kind, mitigated by the oceanic influence with a warm, humid season during the austral summer (November to April) and a dry season during austral winter (May to October). Europa distinguishes itself from the other islands as it is protected from trade winds by Madagascar and is situated on the border of the monsoons' area of influence. The Glorioso Islands, Juan de Nova and Tromelin, under the influence of monsoons, are often threatened by passing tropical storms or cyclones.

The climate on the Crozet and Kerguelen archipelagos is rough and typical of the sub-Antarctic zone, windy and rainy. Winds blow at 100km/h during a third of the year on the Crozet archipelago and rainfall is 2 500mm per year. Average temperatures go from 18°C in summer to 5°C in winter.

Kerguelen's climate is oceanic, cold and extremely windy. The average annual temperature is 4.5°C with small amplitude of approx. 6°C. Strong and glacial winds (150-200km/hour) batter the islands. Precipitations are frequent, and can come in the form of rain or snow year-round. 820mm are recorded at Port-aux-Français, but it is estimated that three times more fall on the west coast. Glacial polar waters make summers cold and winters relatively mild.

Saint-Paul and Amsterdam, located further north, have a milder climate. There is no ice or snow in winter, but a western wind blows continually.

Adélie Land is subject to very low temperatures (-45 to 0°C), violent winds and hailstorms. Starting in March, the sea is covered by a sheet of ice that can be up to 2 meters thick.

### Geography

The beaches and islands of the Crozet archipelago are made of black volcanic sand. Its peak is mount Marion-Dufresne, on the East Island (1 050m).



*Saint-Paul Island, ancient volcano.*  
Source: The TAAF's official website



Morbihan Gulf, Kerguelen.



*Adélie Land's sea ice.*

In the Kerguelen archipelago, the largest island, Grande Terre, is volcanic and has a surface area of 3 400 km<sup>2</sup>. Grande Terre's coast is very erratic, with peninsulas connected to the island by narrow, low-lying isthmuses. The Cook glacier covers almost a third of its surface. Rain and melt water from the glacier supply many streams and lakes. There are also bogs, lignite and guano deposits. Its peak is mount Ross (1 850m).

Amsterdam has a surface area of 58 km<sup>2</sup>, and rugged cliffs. Saint-Paul is smaller (8 km<sup>2</sup>), with a central crater which has become a bay.

### 1.3 DEMOGRAPHY AND SOCIO-ECONOMY

The TAAF have no permanent population. About 300 civil servants, researchers, military servicepersons and technicians reside there temporarily, established in different meteorological and geophysical bases and stations.

Some regulated tourism is arranged on the *Marion Dufresne* supply ship during supply missions for the southern islands, four times per year.

Fishing is the main economic activity either for the southern EEZs or the Scattered. In the southern seas, seven French boats fish toothfish in Crozet and Kerguelen's exclusive economic zones. Only one ship is allowed to fish lobster in the Saint-Paul-and-Amsterdam waters. There is a sworn fishing inspector on each one of these boats, authorized by the TAAF's Prefect to control southern toothfish or lobster fishing. The French Navy and on occasion an Australian patrol ship continually monitor these exclusive economic zones in order to intercept any illegal fishing. The 'Osiris' southern patrol vessel for maritime affairs adds itself to this monitoring operation.



*Alfred Faure base on Crozet (source: the TAAF's official website).*

The sub-Antarctic districts hosts, depending on the bases, from 50 to 100 persons (scientists and technical staff) who spend six months to a year there: on Terre Grande (Kerguelen), there is a base in the Morbihan Gulf; on Possession Island (Crozet), there is the Alfred Faure research base; on Amsterdam Island, the Martin de Viviès research base; in Adélie Land, Dumont d'Urville base (on Petrel Island) and Concordia base<sup>6</sup>. The IPEV's (*Institut Polaire français Paul Émile Victor*; Paul Émile Victor French Polar Institute) permanent workforce, based in Brest, is made of 50 people, 2/3 of which are provided by the CNRS.<sup>7</sup> The Scattered Islands welcome military garrisons and meteorologists relieved every 30 to 45 days.

<sup>6</sup> [http://www.institut-polaire.fr/ipev/bases\\_et\\_navires/station\\_concordia\\_dome\\_c](http://www.institut-polaire.fr/ipev/bases_et_navires/station_concordia_dome_c)

<sup>7</sup> [http://www.institut-polaire.fr/ipev/l\\_institut](http://www.institut-polaire.fr/ipev/l_institut)

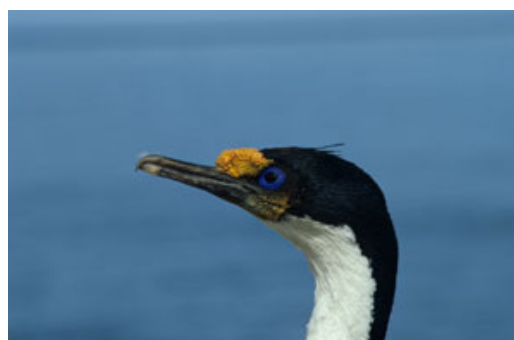
### Fauna and flora

The southern islands are characterized by their extreme isolation and specific weather conditions which contributed to the development of a high rate of endemism and unique adaptations in fauna and flora.<sup>8</sup>

<b>Crozet and Kerguelen</b>	Terrestrial fauna is not very varied, but a very large number of penguins and other birds live in the southern islands: albatross, petrel, cormorant.
<b>The Crozet Islands beaches</b>	King penguin colonies can reach more than one million individuals. Presence of elephant seals and albatross nests. Densest bird population in the world
<b>Kerguelen</b>	Thirty species of birds: penguins (rockhopper penguin, gentoo, king penguin), albatrosses (black-browed, grey-headed, light-mantled), giant petrels, skuas, sheathbills, and the Kerguelen tern. Elephant seals and Antarctic fur seals have repopulated the archipelago after having reached near-extinction in the XIX <sup>th</sup> century.
<b>Amsterdam Island</b>	The endemic Amsterdam albatross only numbers 30 couples and is considered <sup>9</sup> critically endangered by the IUCN. Many marine mammals are also present in the area: several species of dolphins, whales, as well as high concentrations of seals and elephant seals which come each year to reproduce on dry land.
<b>Adélie Land</b>	High concentration of protected bird species, marine mammals and cetaceans: petrels, penguins, seals, orcas, whales... The emperor penguin is today one of the most emblematic species of cold climate regions.
<b>Scattered Islands</b>	These islands play a crucial role in the conservation of seabirds and sea turtles (green sea turtles and hawksbill sea turtles), namely worldwide threatened and protected species by ensuring they have reproduction zones. <sup>10</sup> Juan de Nova hosts one of the largest colonies of sooty terns of the Indian Ocean (more than a million couples). Europa is one of the main reproduction and egg-laying sites in the world for green sea turtles ( <i>Cheloniemydas</i> ) and a major reproduction site for seabirds (8 species including one endemic sub-species) and several species of sharks whose preservation is of paramount importance.



*Southern giant petrel (source: G. Juin, IPEV)*



*Cormorant (source: the TAAF's official website)*

### Habitats

Each one of the Scattered Islands has its own ecological characteristics (linked to their natural history) and disparate conservation challenges (linked to the impact of their past exploitation by man). The organization of plant species in communities or habitats is quite remarkable from a heritage standpoint and these are quite original in many regards.

<sup>8</sup> Also see: <http://www.outre-mer.gouv.fr/?la-biodiversite-des-taaf.html>

<sup>9</sup> International Union for Conservation of Nature <http://www.iucn.org/>

<sup>10</sup> Given the poor conservation state and the growing threats on the Indian Ocean's western territories (Madagascar, Seychelles, Comoros, East Africa...) <http://ileseparses.cbnnm.org/index.php/presentation-generale?showall=&start=3>

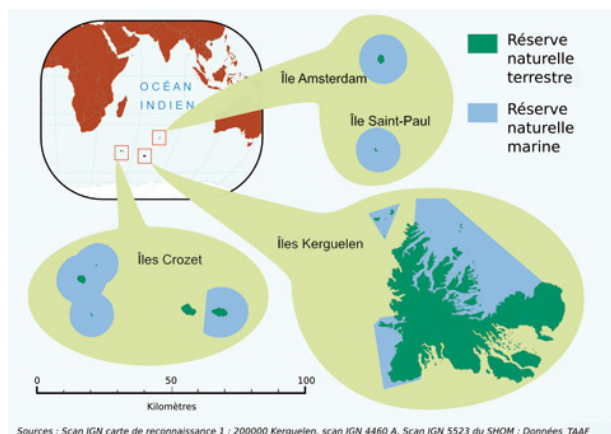
<b>Scattered Islands</b>	Many coastal habitats which have today almost completely disappeared from the shores of most islands in the south-west of the Indian Ocean are practically intact on these islands (mangroves, salt marshes and steppes). These islands have diversified and complex ecosystems such as mangroves or coral reefs.
<b>Europa</b>	Can be described as highly exceptional due to the richness of its indigenous habitats and their remarkable state of preservation. It is host to a 700ha primary mangrove which serves in particular as a nursery for sea turtles and several species of sharks.
<b>Juan de Nova and Grande Glorieuse</b>	The north of the Mozambique channel is known as a marine biodiversity hot-spot. The islands have specific biological and ecological characteristics, even if they have been impacted by intensive human activity and by the presence of several dozen people for many years. The île du Lys, in the Glorioso archipelago, however, has preserved its natural state better.
<b>Tromelin</b>	Of small size, with particularly harsh conditions (battered by marine swells, regular cyclonic activity), little impact from man, has a particularly wild character despite limited plant biodiversity.

### Invasive species

The islands were never bound to a continent and have remained isolated from any human settling. This is why they have vast virgin habitats where endemic species live. Nevertheless, plants and animals introduced by seal hunters, tourists and researchers have strongly affected the indigenous wild species.

Programs have been implemented to restore the original ecosystems by eradicating certain introduced species such as cows on the Amsterdam Island, rabbits on the 3 Kerguelen Islands, rats and rabbits on Saint-Paul, and rats and mice on several Kerguelen Islands.

### Protected Areas



The TAAF created a nature reserve in October 2006 for the Southern Territories (see chart). The terrestrial section of the reserve comprises all of the Crozet, Kerguelen, Amsterdam and St Paul archipelagos in a surface area of more than 700 000 hectares. The marine section covers 1 570 000 hectares which makes the total surface area of the reserve over 2 200 000 hectares. The Scattered Islands are also listed as a nature reserve by prefectural order.

## 3 STATE OF THE ENVIRONMENT

### 3.1 OVERVIEW

There are both problematic issues and positive developments.

#### Problems:

- Illegal, unreported and unregulated fishing (IUU): IUU fishing has been driven out of the southern islands' EEZs, but the risk remains, and IUU boats fish at the edges of the EEZs.
- In the Scattered Islands, illicit holothurian fishing is growing and strategies to combat and dissuade this are slowly being put in place.



- Endemic species disappear due to introduced predators and invasive plants. The introduction of rats, rabbits, goats, reindeer and sheep has decimated other species. The endemic Kerguelen cabbage has suffered from the introduction of rabbits by seal hunters. The rabbits deplete the vegetation, rats and cats predate on the vast majority of seabirds. New grasses have been introduced to feed the imported herbivores. Certain plant species have also been involuntarily introduced (potential seed transport on researcher and tourist's soles).

*Positive developments:*

- There are still very large colonies of penguins and other migratory birds.
- All of Adélie Land's fauna is protected (Washington Convention).
- All activity is subject to prior authorization from the Prefect, senior Administrator of the TAAF (scientific, touristic activities, construction of new buildings...).

## 3.2 MAIN ENVIRONMENTAL CHALLENGES

### **Challenge 1 - Threats to biodiversity - Severe**

Due to their long isolation, the islands have seen the development of many endemic species lacking defenses against predators or invasive plants. Certain species of petrels for example have already suffered from the introduction of exogenous species. Several initiatives are now taken to avoid the introduction of other species by the Marion Dufresne's passengers.

Toothfish and lobster overfishing reached a concerning level during a period. The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established through the Antarctic Treaty in response to concerns regarding the impacts of increased captures.<sup>11</sup> Today, TACs are determined by the TAAF's Prefect in order to insure long-term conservation and the optimal exploitation of fish resources in the TAAF's EEZs.

Albatrosses and petrels are among the most threatened birds in the world. Their populations are still diminishing. The black-browed albatross, which was once one of the most common on our planet, has known a decline of over 40% during the last thirty years. The Agreement on the Conservation of Albatrosses and Petrels (ACAP) underlines the fact that these populations suffer from the degradation and disturbance of their habitats, from pollution, the reduction of their food resources, the use and disposal of non-selective fishing trawls, and in particular from accidental deaths due to commercial fishing activities.<sup>12</sup>

Human activities outside of the bases require regulatory measures and strong awareness education for all of the people staying on the bases, so as to reduce the growing menace which exogenous species introduction and dispersion represent. Serious thought must be given to biosecurity and to a management plan.

### **Challenge 2 – Climate change – Moderate**

Climate change as a whole is the object of an in-depth study on Adélie Land, but the focus is especially drawn to its impact on the Antarctic ice mass. The effects of climate change on this territory's fauna and flora is little understood.

This phenomenon should bring about lasting - perhaps irreversible - changes to physical oceanography and ecology in the Southern Ocean. Projected reductions in sea-ice extent will alter under-ice biota and spring bloom in the sea-ice marginal zone and will cause profound impacts at all levels in the food chain, from algae to krill to the great whales. Marine mammals and seabirds, which are linked through their evolution to specific reproduction sites, will be affected by the transformation of their foraging habitats

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<sup>11</sup> <http://www.ccamlr.org/>

<sup>12</sup> <http://www.acap.aq/>



and by the migration of prey. Warming waters are likely to intensify biological activity and fish populations' growth rates, but this is not at all certain.

#### Other challenges

- **Waste:** during several decades, different types of waste have accumulated on the islands. Today, they are sorted and either processed locally or sent to processing or recycling centers on Réunion or in mainland France.
- **Energy:** develop low-polluting energy production systems, renewable energy use.

## 4 ENVIRONMENTAL GOVERNANCE

### 4.1 CONSTITUTION

The territory is administered from the TAAF head office, on Réunion, where approximately 50 people work. The Prefect is senior administrator for the 5 districts. The TAAF administration counts with an advisory Council. A Committee on the polar environment, created by the French Ministry of Ecology, Sustainable Development and Energy, issues recommendations for action plans, large-scale projects and impact studies. It also monitors human activities and is consulted regarding emergency measures and inspection reports. The IUCN also plays an advisory role for environmental questions.<sup>13</sup>

Construction and infrastructure projects must be subjected to an EIA (Environmental Impact Assessment).

A *Comité de pilotage des bonnes pratiques de pêche* (C3P; Steering Committee on good fishing practices)<sup>14</sup> brings together representatives of each fleet and<sup>15</sup> vessel licensed for toothfish fishing on Kerguelen and Crozet and, on the other side, representatives of sea and environmental management branches as well as the TAAF's fishing inspectors. Cooperation is essential to achieve their sustainable management goals.

The fishing quotas are determined after having received the opinions of the French ministries in charge of the overseas, foreign affairs and fishing, and on the basis of the MNHM's (*Museum d'Histoire Naturelle de Paris*; National Museum of Natural History) recommendations.

### 4.2 INSTITUTIONS

TAAF administration is comprised among others of a Conservation and Ecological Heritage Branch (CEHB), with 2 departments (for the nature reserve and conservation of the natural marine heritage) and a database manager. There is also an international, sea and Antarctic affairs branch with a fishing department and a legal and institutional affairs department.<sup>16</sup>

The TAAF Prefect is the French southern territories' national nature reserve's manager, assisted by the Advisory Council (AC) and the Committee on the polar environment (CPE). For specific needs, framework agreements have been signed with research organizations (CNRS, Universities, MNHN, etc.), which allow for the placement of TAAF agents in partner laboratories. These persons are in particular responsible for determining necessary protocols for gathering information in accordance with the management plan.

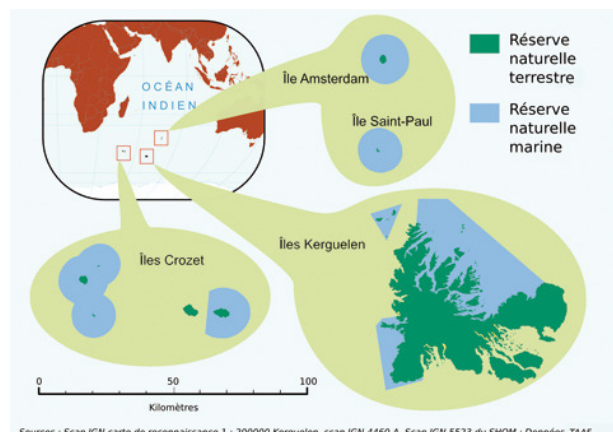
13 [http://www.taaf.fr/IMG/pdf/organigramme\\_suite\\_reorg\\_v36\\_fevrier\\_2014\\_avec\\_districts.pdf](http://www.taaf.fr/IMG/pdf/organigramme_suite_reorg_v36_fevrier_2014_avec_districts.pdf)

14 <http://www.taaf.fr/Comite-de-pilotage-des-bonnes-pratiques-de-peche>

15 SAPMER, COMATA, Armements Réunionnais, Pêche Avenir, Cap Bourbon, Armas Pêche

16 [http://taaf.fr/IMG/pdf/organigramme\\_suite\\_reorg\\_v36\\_fevrier\\_2014\\_avec\\_districts.pdf](http://taaf.fr/IMG/pdf/organigramme_suite_reorg_v36_fevrier_2014_avec_districts.pdf)

Unlike in the French southern territories' nature reserve, there are at this time no field agents on the Scattered Islands. Agents are nevertheless specifically assigned to issues related to the Scattered Islands within the TAAF's Conservation and Ecological Heritage Branch's head office team (*Direction de la Conservation du Patrimoine Naturel*).



The sub-Antarctic districts host, depending on the bases, from 50 to 100 persons (scientists and technical staff) who spend six months to one year there: the Port aux Français base on Grande Terre (Kerguelen); the Alfred Faure research base on Possession Island (Crozet); the Martin de Viviers research base on Amsterdam Island; the Dumont d'Urville base (on Petrel Island) in Adélie Land. Besides, Concordia<sup>17</sup> is a Franco-Italian base in Antarctica outside of Adélie Land. The IPEV's (*Institut Polaire français Paul Émile Victor*; Paul Émile Victor French Polar Institute) permanent workforce, based

in Brest, is made of 50 people, 2/3 of which are provided by the CNRS.<sup>18</sup> The Scattered Islands welcome military garrisons and TAAF agents relieved every 30 to 45 days.

#### 4.3 POLICIES, STRATEGIES, PLANS, PROGRAMS

Programs have been implemented to restore the original ecosystems by eradicating certain introduced species such as cows on Amsterdam Island, the Kerguelen sheep, rats and rabbits on Saint-Paul or the cabuya on Europa Island (*Furcraea foetida*).

##### Scattered Islands

In general, the TAAF administration is implementing the national environmental policy (National Biodiversity Strategy) on the Scattered Islands, and in this framework they are developing environmental monitoring programs which will inform national indicators on the health of the overseas' biodiversity. The TAAF administration shows a strong desire to put the Scattered Islands' environment in the spotlight and the community as a whole follows a strategy to enhance the ecological protection of the territories:

- Listing of Europa Island as a Ramsar site;
- Creation of the Gloriosos marine nature park;
- National Plan of Action for sea turtles: Réunion, Mayotte and Scattered islands<sup>19</sup>;
- Listing of Europa Island as a National nature reserve.

##### Southern Islands

In December 2009 a framework agreement was signed between the TAAF and the IPEV<sup>20</sup> defining the collaboration in terms of research and environmental management operations in the nature reserve. A management plan has been established for a 5 year period (2011/2015) and must be evaluated when it is completed. The plan is comprised of 9 main long-term goals, divided into 90 biodiversity conservation actions.<sup>21</sup> Among them are the national action plans implemented by the Grenelle Law, the setting up of biosecurity measures, the development of awareness programs, combating invasive species and fostering awareness of persons residing in the reserve. Setting up this plan will require heavy mainstreaming of missions led by all of the TAAF's departments.

<sup>17</sup> [http://www.institut-polaire.fr/ipev/bases\\_et\\_navires/station\\_concordia\\_dome\\_c](http://www.institut-polaire.fr/ipev/bases_et_navires/station_concordia_dome_c)

<sup>18</sup> [http://www.institut-polaire.fr/ipev/l\\_institut](http://www.institut-polaire.fr/ipev/l_institut)

<sup>19</sup> See IFREMER's work: <http://wwwz.ifremer.fr/lareunion/Les-projets/Tortues-Marines>

<sup>20</sup> [www.ipev.fr](http://www.ipev.fr)

<sup>21</sup> The plan: [http://www.taaf.fr/IMG/pdf/telechargez\\_la\\_synthese\\_du\\_plan\\_de\\_gestion\\_20112015\\_de\\_la\\_reserve.pdf](http://www.taaf.fr/IMG/pdf/telechargez_la_synthese_du_plan_de_gestion_20112015_de_la_reserve.pdf)

In order to create a context of scientific excellence for the reserve's actions, a framework agreement was signed, in December 2009, between the TAAF and the Paul Emile Victor French Polar Institute (IPEV)<sup>22</sup>. This agreement allows for the setting up of research programs dedicated to environmental management. Several research laboratories support the inventory and observation activities led by the nature reserve's agents (followed by the 'health status' of the habitats, fauna and flora). Other research programs are also put in place in order to give scientific validation to the environmental management activities to be led (preliminary studies of introduced species elimination). Several partnerships with other laboratories are currently being studied.

The national action plan for the Amsterdam albatross<sup>23</sup>, drafted with the *Ligue pour la Protection des Oiseaux* (LPO; Bird Protection League) and the Chizé CNRS (IPEV program n. 109<sup>24</sup>), aims to define, plan and coordinate relevant actions necessary to the Amsterdam albatross' restoration. Concrete actions, on land as well as at sea, are included in the plan. For the terrestrial section: implementation of an observatory which will allow to better identify the factors limiting this emblematic species' reproduction. At sea, the goal is to better understand the habitat used by this species and to define the potential interactions with industrial fisheries, in particular outside of French areas.

Programs aiming to limit the introduction of exotic species and to eradicate them constitute concrete measures for biodiversity preservation.

#### 4.4 LEGAL FRAMEWORK AND LAW ENFORCEMENT

The TAAF, as French territory, implements several MEA to which France is a party:

- CITES convention;
- CBD;
- Convention on the Conservation of Migratory Species of Wild Animals (CMS) ;
- International Whaling Convention (Washington, 1946);
- Ramsar convention;
- MARPOL convention;
- World heritage;
- London convention (marine dumping);
- International Convention on Civil Liability for Oil Pollution Damage (CLC);
- UNCLOS;
- Straddling Fish Stocks and Highly Migratory Fish Stocks;
- Antarctic Treaty;
- Agreement on the Conservation of Albatrosses and Petrels (ACAP);
- The Memorandum of Understanding on the turtles of the Indian Ocean (MoU).

Furthermore, the following MEAs are extended: Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region for the Scattered Islands; and the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) for the southern islands.

The following ordinances concern the creation of TAAF's 2 nature parks.

- Glorioso Islands marine nature park: ordinance n° 2012-245 (22 February 2012)
- Southern Lands nature reserve: ordinance n° 2006-1211 of 3 October 2006<sup>25</sup>

Ordinance n° 2009-1039 of 26 August 2009 defines the conditions governing marine fisheries in the French Southern Lands' waters and lends the senior administrator a leading role in resource

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<sup>22</sup> [www.ipev.fr](http://www.ipev.fr)

<sup>23</sup> <http://www.taaf.fr/Plan-National-d-Action-en-faveur-de-l-albatros-d-Amsterdam-423>

<sup>24</sup> [http://www.institut-polaire.fr/ipev/programmes\\_de\\_recherche/en\\_cours/](http://www.institut-polaire.fr/ipev/programmes_de_recherche/en_cours/)

<sup>109</sup> [oiseaux\\_et\\_mammiferes\\_marins\\_sentinelles\\_des\\_changements\\_globaux\\_dans\\_l\\_ocean\\_austral](http://www.taaf.fr/IMG/pdf/telechargez_le_decret_no_2006-1211.pdf)

<sup>25</sup> [http://www.taaf.fr/IMG/pdf/telechargez\\_le\\_decret\\_no\\_2006-1211.pdf](http://www.taaf.fr/IMG/pdf/telechargez_le_decret_no_2006-1211.pdf)

management.

Other (ministerial and territorial) ordinances concern:

- protected species<sup>26</sup>;
- protected areas<sup>27</sup>;
- the prohibition of any form of nature depredation and botanical and zoological sampling<sup>28</sup>;
- sea fishing operating conditions in the French Southern and Antarctic Territories<sup>29</sup>;
- prohibited fishing grounds near Crozet<sup>30</sup>;
- fishing prohibition in the Glorioso Islands' territorial waters (12 nautical miles) and around the Banc du Geyser (10 nautical mile radius)<sup>31</sup>;
- prohibition on the possession of marine animals and products in the Glorioso Islands' territorial waters (12 nautical miles) and around the Banc du Geyser (10 nautical mile radius)<sup>32</sup>;
- the list of protected vertebrate species which are threatened with extinction in France and whose natural range goes beyond the limits of a county<sup>33</sup>;
- introducing measures to ensure the conservation of fishing resources in the territorial waters and economic zone bordering the Saint-Paul and Amsterdam islands<sup>34</sup>;
- creating statistical fishing sectors around the Crozet islands and Kerguelen islands<sup>35</sup>;
- modifying the ordinance of 30 June 1998 laying down the implementation procedures of the Convention on International Trade in Endangered Species of Wild Fauna and Flora and regulations (EC) n° 338/97 of the European Council and (EC) n° 939/97 of the European Commission (CITES)<sup>36</sup>.

Regarding Law enforcement, the French Navy and TAAF agents patrol at sea: sanctions applicable to poachers can go from a simple fine to seizures of fishing equipment and illegally captured yields. The prefect is the competent national authority as regards the issuing of scientific and touristic activities authorizations in Antarctica. Activity authorization requests are accompanied by an environmental impact assessment. Sanctions are established by the Environmental Code for non-compliance.

#### 4.5 ENVIRONMENTAL AWARENESS

All persons staying on the bases go through awareness training on the conservation of the islands' natural heritage (e.g. awareness of environmental degradation risk through trampling). Research results, the Marion Dufresne's logbook, the Newsletter and the website provide information on the TAAF's species and ecosystem.

#### 4.6 FINANCE FOR THE ENVIRONMENT

Every year, the TAAF, as a managerial body, receives an endowment from the Ministry in charge of ecology in order to ensure the implementation of the management plan for the southern lands' nature reserve and associated action plans. This endowment is managed through a 'subsidiary' budget of the community's main budget and showed continuous growth from 2007 to 2010, going from 36 000 € to 1 473 000 €. In the last two years, this endowment was reduced and reached in 2012: 797 000 €.

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26 ministerial ordinance of 27 July 1995: <http://www.taaf.fr/Liste-des-especes-protegees>

27 Ordinance 15 of 30 July 1985: <http://www.taaf.fr/Liste-des-zones-protegees>

28 n°13/DG/IOI of 18 November 1975 + related note n°1157/81

29 Decree n° 2009-1039 of 26 August 2009

30 Ordinance n° 1798 of 05/05/2007

31 Ordinance n°2010-151 of 9 December 2010

32 Ordinance n°2010-151 of 9 December 2010

33 Ordinance of 09/07/1999

34 Ordinance 7 of 23/02/81

35 Ordinance 2009-41 of 20 July 2009

36 Ordinance 23/12/11

This funding covers all of the TAAF's Conservation and Ecological Branch's payroll (office and field staff) and the implementation of conservation actions scheduled in the management plan. Beyond this endowment, the TAAF, through the CEHB, answer (public and private) calls for tenders in order to compensate for the current budgetary cuts.

Budget of about 50 000 and 30 000 euro per year are allocated to waste management and infrastructure, respectively. Fishing management costs 450 000 € per year.

The funding of actions fostering biodiversity in the Scattered Islands depends on the establishment of partnerships with corporate foundations, on the use of European financial instruments (10th EDF), and on the preparation of specific projects.

## 5 INTERNATIONAL COOPERATION

### 5.1 COOPERATION WITH FRANCE

Most funding for research, staff and infrastructure comes from France. The French Ministry of Ecology, Sustainable Development and Energy (MEDDE) contributes to the protection of endangered species by funding studies and conservation programs, such as the NPA (National Plan of Action) for sea turtles in the south-western Indian Ocean led by IFREMER.<sup>37</sup> It also funds the southern lands' national nature reserve through the national plan for biodiversity.

The TAAF administration works closely with the National Research Institutes, in particular through the "Scattered Islands 2011-2013" research consortium. This was coordinated by the CNRS-INEE. Among other, it has allowed to evaluate research potential on the Scattered Islands, select the most relevant scientific programs and provided logistical and financial support in the 2011-2013 period, allowing for the execution of more than one hundred field missions on the whole territory. The Scattered Islands also benefit from special funding for the conservation of coral reefs and associated ecosystems through the *Initiative française pour les récifs coralliens* (IFRECOR; French initiative for coral reefs), the national implementation of the ICRI. The allotted funds also enabled the implementation of actions led by the TAAF through the IFRECOR local action plan for the Scattered Islands district, outlined for the 2011-2015 period. These actions are part of the global management strategy of these territories and essentially aim at developing permanent research activities as well as the implementation of management and conservation tools for the natural environment in general and coral reefs in particular.

### 5.2 EU COOPERATION

The TAAF community and the Mayotte general council, respectively in charge of the administration of these island territories and of the Indian Ocean, committed themselves, through the 10th regional European Development Fund (EDF), to jointly establish "Sustainable management of these territories' natural heritage". The implementation of the actions is slated to begin in 2014, and includes:

- a campaign to "Estimate the fish biomass of the Geyser, Zélée and Iris reefs";
- a campaign to "Inventory the biodiversity of sea mounts and of the Mayotte and Scattered Islands outer slopes";
- a campaign to "Inventory and monitor the Mayotte and Scattered Islands coral reefs";
- the training of on-board observers.

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<sup>37</sup> IFREMER: <http://www.ifremer.fr/lareunion/Les-projets/Tortues-Marines/PNA-en-cours>

The French Southern and Antarctic Territories comprise territories in the southern part of the Indian Ocean, in the southern ocean and on the Antarctic continent. Environmental protection receives attention, through specific policies and its agreements of French and international legislation. However, specific problems are linked to the dangers of illegal, unreported and unregulated fishing (IUU) and to the introduction of exogenous species.

The TAAF and the British Antarctic Territory could offer the European Commission the opportunity to participate either in highly important global research projects, in particular on the climate (the Antarctic is a major part of the world's cryosphere, hence its crucial role in the climate change equation), or to the southern ocean's conservation.

Further recommendations and suggestions given by the TAAF's experts are presented in the following tables.

Goal	Action	Current situation	Priority and timeframe	Responsible bodies	€ and HR needs	Risks and assumptions	Possible funding sources
Sustainable management, biodiversity and fish resources conservation (Southern Lands and Scattered Islands)	Protection of species and their habitats	The Southern Lands nature reserve was created in 2006. The krill, toothfish and lobster populations continue to decline. Albatrosses and petrels are among the most highly endangered birds in the world. Several endemic plant (Kerguelen cabbage) and animal species (Amsterdam albatross) are threatened by extinction. Scattered Islands tropical seabird community in decline.		TAAF and Réunion authorities CEHB (Conservation and Ecological Heritage Branch) The Advisory Council (AC) The Committee on the polar environment (CPE) Fishery service Advisory committee on good fishing practices IPEV IFREMER			
	<b>Activities</b> <ul style="list-style-type: none"><li>- Achieving / carrying out the Southern Land's nature reserve plan's 90 actions ;</li><li>- Setting up the management plans for the Scattered Islands (through the listing of the Marine Nature Park for the Gloriosos and the Ramsar listing of Europa Island)</li><li>- Expanding protective measures for the Scattered Islands (project to list Europa Island as a National Nature Reserve)</li><li>- Reinforce current measures for fishing (fishing quotas, illegal fishing control) ;</li><li>- Continue with the implementation of the action plan against invasive species and initiate new actions identified as priorities for the conservation of threatened populations ;</li><li>- Continue with the implementation of the Amsterdam albatross restoration plan among others: implementation of an observatory which will allow to better identify the limiting factors in this bird's reproduction;</li><li>- Insure the implementation of the National Plan of Action in favor of the Indian Ocean's sea turtles in the Scattered Islands during the 2015-2020 period;</li><li>- Implementation of biosecurity measures;</li><li>- Continue to educate and foster visitor awareness;</li><li>- International coordination with the ACAP (Agreement on the Conservation of Albatrosses and Petrels), and in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).</li></ul>						

Goal	Action	Current situation	Priority and timetable	Responsible bodies	€ and HR needs	Risks and hypotheses	Possible funding sources
Waste and energy management (Southern Lands)	More sustainable consumption (scientific visitors)	Waste accumulation during several decades Energy production systems causing pollution		CEHB (Conservation and Ecological Heritage Branch)			
	<b>Activities</b>						
	<ul style="list-style-type: none"> <li>- Elaborate an action plan for the elimination of accumulated waste;</li> <li>- Reduce usage of non-recyclable materials;</li> <li>- Elaborate an energy consumption reduction plan;</li> <li>- Develop low-polluting energy production systems, renewable energy usage;</li> <li>- Continue to educate and foster awareness of visitors;</li> </ul>						

Goal	Action	Current situation	Priority and timeframe	Responsible bodies	€ and HR needs	Risks and assumptions	Possible funding sources
Deepen knowledge of tropical (Scattered Islands) and Antarctic ecosystems	Research on the evolution of biodiversity and on the operation of ecosystems in different environments (from tropical to Antarctic)	The Scattered Islands are protected by prefectural ordinance and the southern lands are listed as a national nature reserve.		TAAF and Réunion authorities			
		Research in the TAAF's five districts is spread over a wide latitude range (a position unique to France in the southern hemisphere).		CEHB (Conservation and Ecological Heritage Branch)			
				The Advisory Council (AC)  The Committee on the polar environment (CPE)			
<b>Activities</b>							
<ul style="list-style-type: none"><li>- Support scientific work developed on the Scattered Islands, which have well preserved diversified and complex ecosystems (especially when compared to the region's other countries and territories).</li><li>- The implementation of a long-term monitoring program (observatories) to inform specific indicators on the state of the Scattered Islands' ecosystems.</li><li>- Make the research activities on the islands and other TAAF districts (spreading over more than 80% of the southern hemisphere) permanent year-round, as they are important to the Indian Ocean and, more globally, to the southern hemisphere.</li></ul>							